

Universidad Zaragoza



Escuela de Ingeniería y Arquitectura Universidad Zaragoza

ANEXO I –PLANOS ELECTRICOS–

PROYECTO FINAL DE CARRERA

Automatización y control de fugas de red de bombeo agrícola

AUTOR
César Alberto Alegre Melero

DIRECTOR
Ramón Piedrafita Moreno

TITULO
Ingeniería Técnica Industrial

ESPECIALIDAD
Electrónica Industrial

CONVOCATORIA
Junio 2015

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

César Alberto Alegre Melero

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50720 Zaragoza
976 093791

Universidad Zaragoza 1542

Cliente	Escuela de Ingeniería y Arquitectura - Universidad de Zaragoza
Designación de instalación	Estación de bombeo, filtrado, balsa y control de roturas
Número de diseño	PFC CAAM 2015
Comisión	Informática e Ingeniería de Sistemas
Fabricante (empresa)	César Alberto Alegre Melero
Ruta	Sistema de control de bombeo
Nombre de proyecto	CAAM
Producto	Armario de control y potencia
Tipos	Siemens
Lugar de instalación	Velilla de Cinca
Responsable del proyecto	Ramón Piedrafita Moreno
Particularidad de pieza	Proyecto de ejecución

Modificado 18/05/2015 de (abreviatura) César

Número de páginas 125

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Hoja de título			Hoja: 0 / 431.d Ubicación: CCM PFC CAAM 2015

Índice de páginas

Columna X: una página creada automáticamente se ha modificado de forma manual

Página	Descripción de página	Campo adicional de página	Fecha	Responsable	
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1.a	Indice de páginas : =+CCM/29 - =+CCM/60		18/05/2015	César	
1.b	Indice de páginas : =+CCM/61 - =+DOCUMENTACION/409		18/05/2015	César	
1.c	Indice de páginas : =+DOCUMENTACION/410 - =+DOCUMENTACION/431.d		18/05/2015	César	
2	Acometida general		18/05/2015	César	X
3	Alimentación válvulas de acequia		18/05/2015	César	X
4	Alimentación Válvulas Motorizadas		18/05/2015	César	X
5	Alimentación Caldeo de Bombas		18/05/2015	César	X
6	Alimentación Servicios Auxiliares		18/05/2015	César	X
7	Alimentación Servicios Auxiliares		18/05/2015	César	X
8	Alimentación Servicios Armario		18/05/2015	César	X
9	Potencia SAI y tensión de mando		18/05/2015	César	X
10	Alimentaciones 24VDC		18/05/2015	César	X
11	Maniobra válvula entrada acequia		18/05/2015	César	X
12	Maniobra válvula entrada acequia		18/05/2015	César	X
13	Maniobra válvula motorizada de Bomba 1		18/05/2015	César	X
14	Maniobra válvula motorizada de Bomba 2		18/05/2015	César	X
15	Maniobra válvula motorizada de Bomba 3		18/05/2015	César	X
16	Maniobra válvula motorizada de Bomba 4		18/05/2015	César	X
17	Entradas digitales PLC		18/05/2015	César	X
18	Entradas digitales PLC		18/05/2015	César	X
19	Entradas digitales PLC		18/05/2015	César	X
20	Entradas digitales PLC		18/05/2015	César	X
21	Entradas digitales PLC Bomba 1		18/05/2015	César	X
22	Entradas digitales PLC Bomba 1		18/05/2015	César	X
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	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015			
Escala	Sistema de control de bombeo Indice de páginas : =+CCM/0 - =+CCM/28			Hoja: 1 / 431.d Ubicación: CCM

Índice de páginas

Columna X: una página creada automáticamente se ha modificado de forma manual

Página	Descripción de página	Campo adicional de página	Fecha	Responsable	
29	Entradas digitales PLC Grupos		18/05/2015	César	X
30	Salidas digitales PLC		18/05/2015	César	X
31	Entradas analógicas PLC		18/05/2015	César	X
32	Entradas analógicas PLC		18/05/2015	César	X
33	Entradas analógicas PLC		18/05/2015	César	X
34	Salidas digitales PLC		18/05/2015	César	X
35	Salidas digitales PLC Bomba 1		18/05/2015	César	X
36	Salidas digitales PLC Bomba 2		18/05/2015	César	X
37	Salidas digitales PLC Bomba 3		18/05/2015	César	X
38	Salidas digitales PLC Bomba 4		18/05/2015	César	X
39	Salidas digitales PLC T5 T6 T7		18/05/2015	César	X
40	Entradas Pt100 PLC Bomba 1		18/05/2015	César	X
41	Entradas Pt100 PLC Bomba 1		18/05/2015	César	X
42	Entradas Pt100 PLC Bomba 2		18/05/2015	César	X
43	Entradas Pt100 PLC Bomba 2		18/05/2015	César	X
44	Entradas Pt100 PLC Bomba 3		18/05/2015	César	X
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46	Entradas Pt100 PLC Bomba 4		18/05/2015	César	X
47	Entradas Pt100 PLC Bomba 4		18/05/2015	César	X
48	Entradas analógicas PLC Bombas 1 y 2		18/05/2015	César	X
49	Entradas analógicas PLC Bombas 3 y 4		18/05/2015	César	X
50	Entradas analógicas PLC		18/05/2015	César	X
51	Salidas digitales PLC		18/05/2015	César	X
52	Entradas digitales PLC		18/05/2015	César	X
53	Alimentación Bomba 1		18/05/2015	César	X
54	Alimentación Bomba 2		18/05/2015	César	X
55	Alimentación Bomba 3		18/05/2015	César	X
56	Alimentación Bomba 4		18/05/2015	César	X
57	Maniobra Bomba 1		18/05/2015	César	X
58	Maniobra Bomba 2		18/05/2015	César	X
59	Maniobra Bomba 3		18/05/2015	César	X
60	Maniobra Bomba 4		18/05/2015	César	X

1.b

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015			
Escala	Sistema de control de bombeo Indice de páginas : =+CCM/29 - =+CCM/60			Hoja: 1.a / 431.d Ubicación: CCM

1

Índice de páginas

Columna X: una página creada automáticamente se ha modificado de forma manual

Página	Descripción de página	Campo adicional de página	Fecha	Responsable	
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62	Accionamiento Bomba 2		18/05/2015	César	X
63	Accionamiento Bomba 3		18/05/2015	César	X
64	Accionamiento Bomba 4		18/05/2015	César	X
101	Alimentaciones T3-T4		18/05/2015	César	X
102	Entradas digitales PLC		18/05/2015	César	X
103	Entradas analógicas ramales T3-T4		18/05/2015	César	X
104	Salidas digitales PLC T3 T4		18/05/2015	César	X
201	Alimentaciones Filtro		18/05/2015	César	X
202	Entradas digitales PLC		18/05/2015	César	X
203	Entradas digitales PLC		18/05/2015	César	X
204	Entradas analógicas ramales T1-T2		18/05/2015	César	X
205	Entradas analógicas filtro		18/05/2015	César	X
206	Salidas digitales PLC T1 T2		18/05/2015	César	X
207	Salidas digitales PLC Filtro		18/05/2015	César	X
301	Alimentaciones Balsa		18/05/2015	César	X
302	Maniobra válvula motorizada balsa		18/05/2015	César	X
303	Entradas digitales PLC		18/05/2015	César	X
304	Entradas digitales PLC		18/05/2015	César	X
305	Entradas digitales PLC		18/05/2015	César	X
306	Entradas analógicas balsa		18/05/2015	César	X
307	Salidas digitales PLC T1 T2		18/05/2015	César	X
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401.a	Plano de bornes =+CCM-X0				
402	Plano de bornes =+CCM-XARQ				
403	Plano de bornes =+CCM-XCB				
404	Plano de bornes =+CCM-XEA0				
405	Plano de bornes =+CCM-XEA1				
406	Plano de bornes =+CCM-XED0				
407	Plano de bornes =+CCM-XED1				
408	Plano de bornes =+CCM-XED2				
409	Plano de bornes =+CCM-XED3				

1.c

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015			
Escala	Sistema de control de bombeo Indice de páginas : =+CCM/61 - =+DOCUMENTACION/409			Hoja: 1.b / 431.d Ubicación: CCM

1.a

Índice de páginas

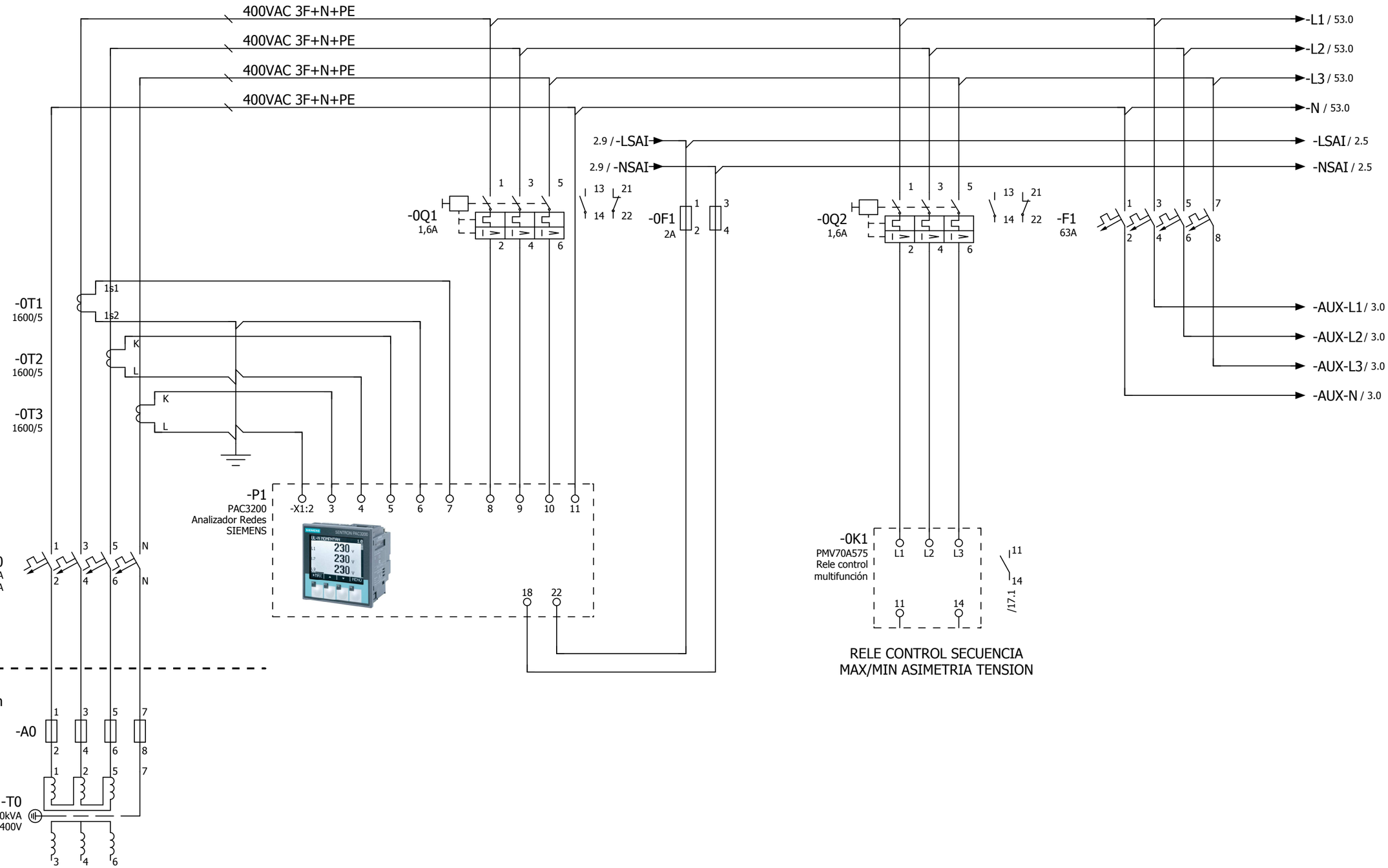
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424	Plano de bornes =+CCM-XVM3				
425	Plano de bornes =+CCM-XVM4				
426	Plano de bornes =+T3T4-T3X1				
426.a	Plano de bornes =+T3T4-T3X1				
427	Plano de bornes =+FILTRO-FIX1				
427.a	Plano de bornes =+FILTRO-FIX1				
428	Plano de bornes =+BALSA-BAX1				
428.a	Plano de bornes =+BALSA-BAX1				
429	Plano de bornes =+BALSA-BAXVM				
431	Lista de artículos : SIE.6ES7151-8AB01-0AB0 - SIE.3SB30016AA40				
431.a	Lista de artículos : SIE.3SB30016AA20 - SIE.LZX:PT5A5T30				
431.b	Lista de artículos : SIE.LZX:PT5A5T30 - SIE.3RV1011-1CA15				
431.c	Lista de artículos : SIE.3RV1011-1CA15 - SIE.5SL6210-7				
431.d	Lista de artículos : SIE.6ES7151-8AB01-0AB0 - SIE.3SB3000-1CA21				

2

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015			
Escala	Sistema de control de bombeo Indice de páginas : =+DOCUMENTACION/410 - =+DOCUMENTACION/431.d			Hoja: 1.c / 431.d Ubicación: CCM

1.b



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo Acometida general		

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Hoja: 2 / 431.d

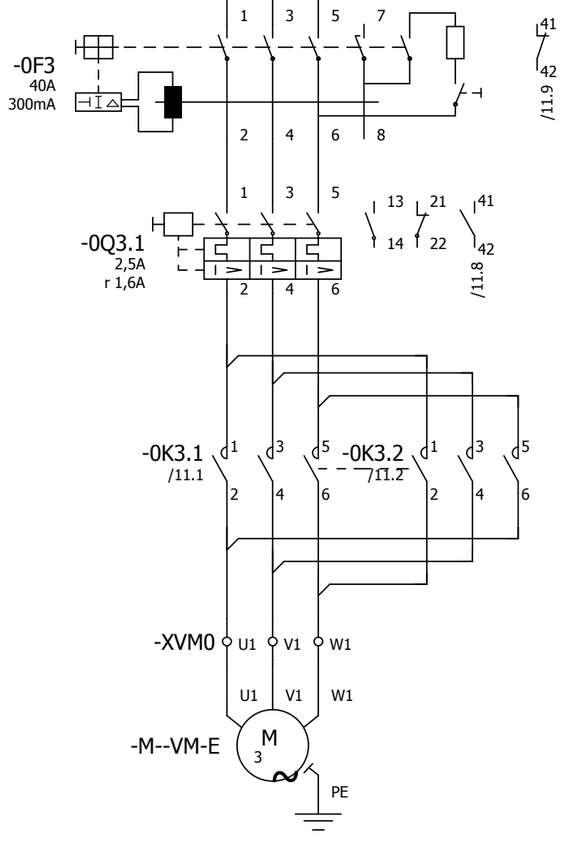
Ubicación: CCM

PFC CAAM 2015

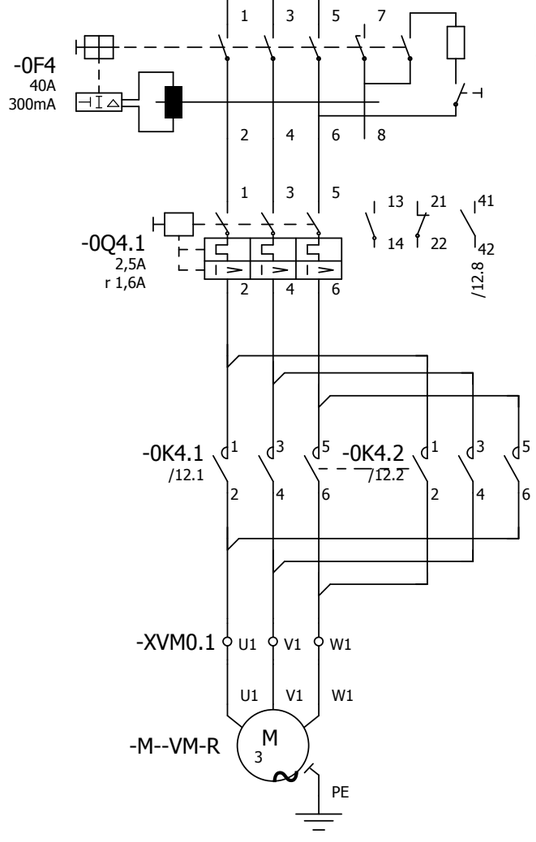
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1.c

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2.9 / -AUX-L2 → -AUX-L2 / 4.0
2.9 / -AUX-L3 → -AUX-L3 / 4.0
2.9 / -AUX-N → -AUX-N / 4.0



VALVULA MOTORIZADA
COMPUERTA ENTRADA



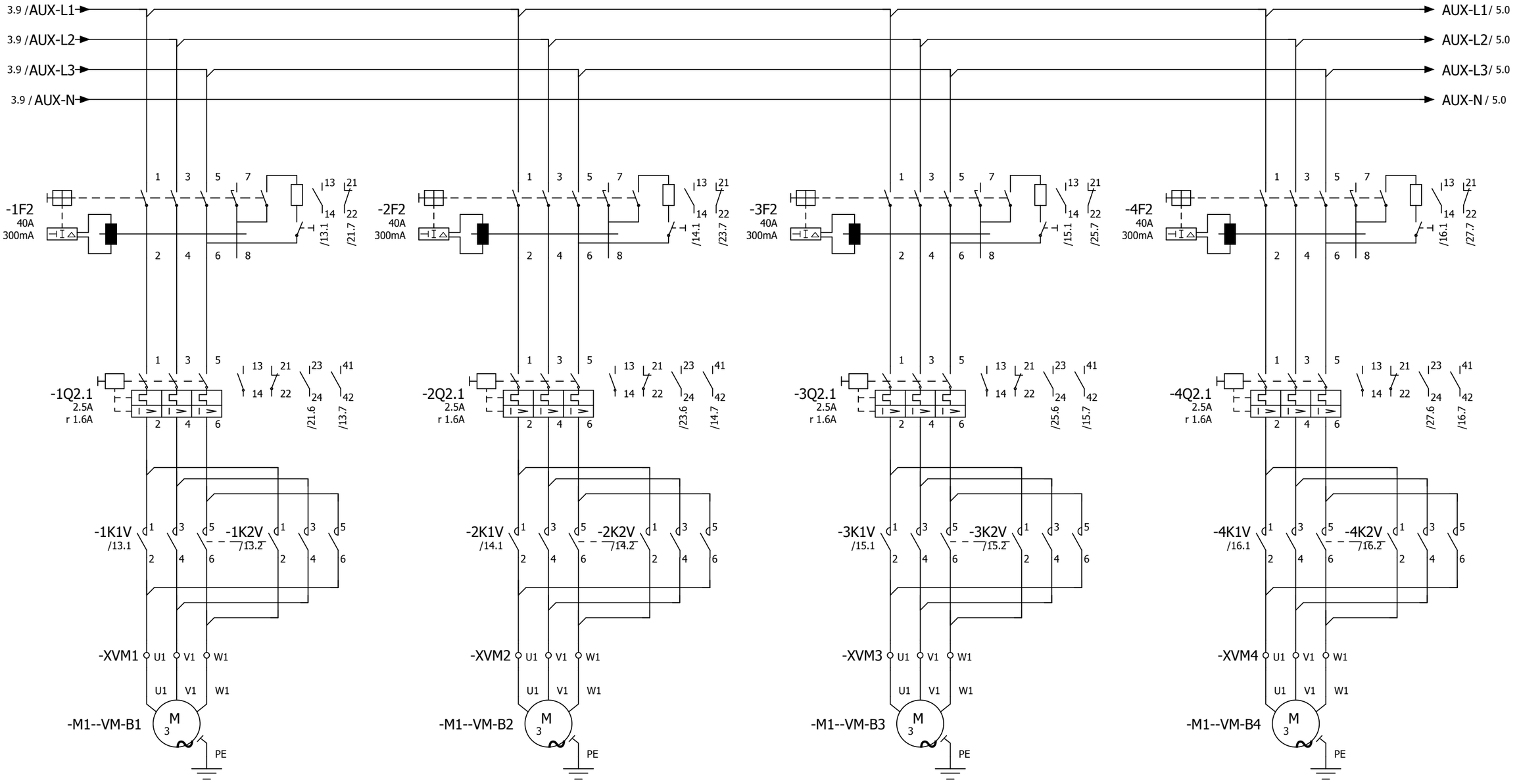
VALVULA MOTORIZADA
COMPUERTA RETENCION

4

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

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Escala	Sistema de control de bombeo
	Alimentación válvulas de acequia
Hoja:	3 / 431.d
Ubicación:	CCM
PFC CAAM 2015	



VALVULA MOTORIZADA
BOMBA 1

VALVULA MOTORIZADA
BOMBA 2

VALVULA MOTORIZADA
BOMBA 3

VALVULA MOTORIZADA
BOMBA 4

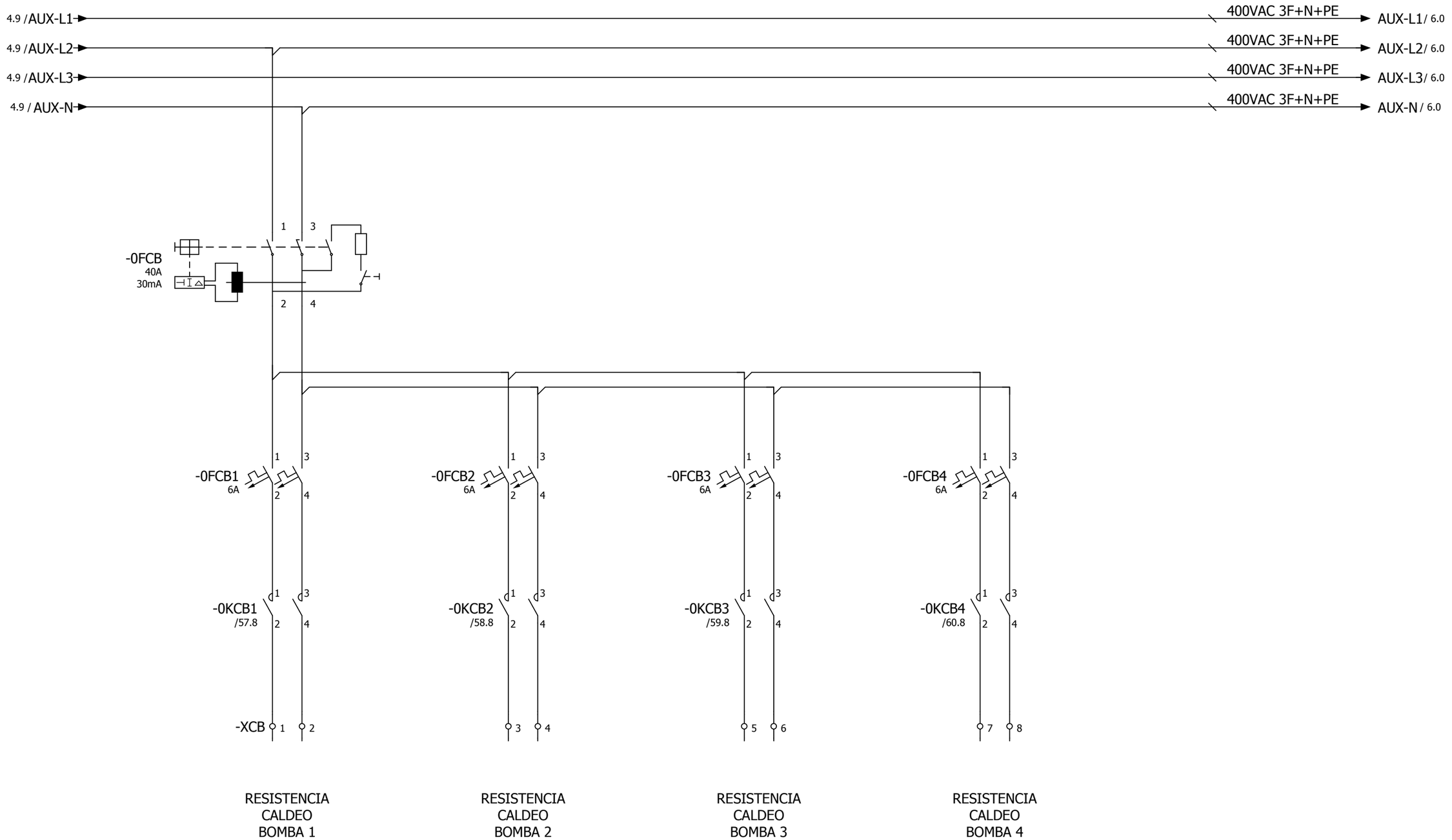
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	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

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Escala	Sistema de control de bombeo Alimentación Válvulas Motorizadas
Hoja:	4 / 431.d
Ubicación:	CCM
PFC CAAM 2015	

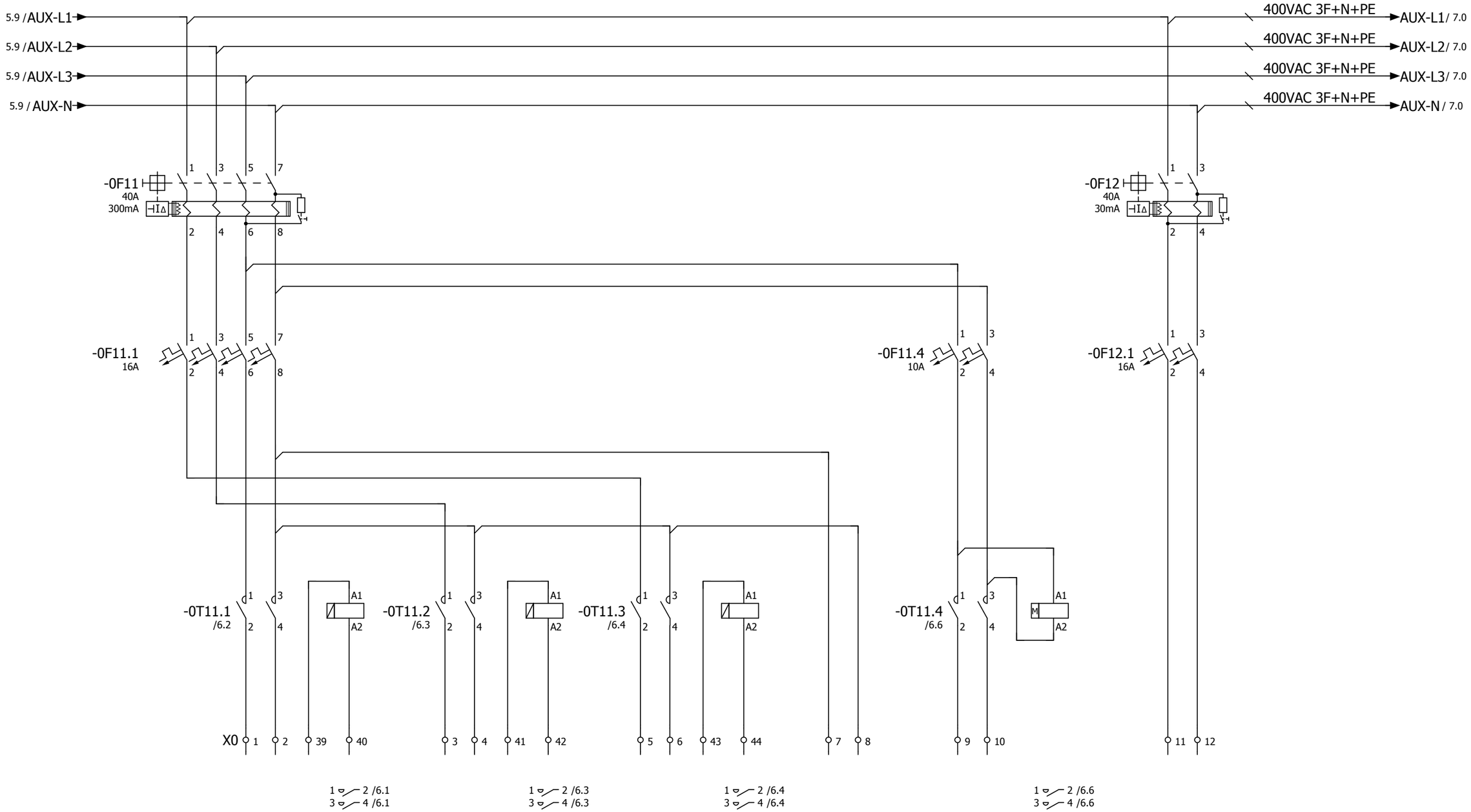
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Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo			Hoja: 5 / 431.d
	Alimentación Caldeo de Bombas			Ubicación: CCM
				PFC CAAM 2015

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	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

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Escala

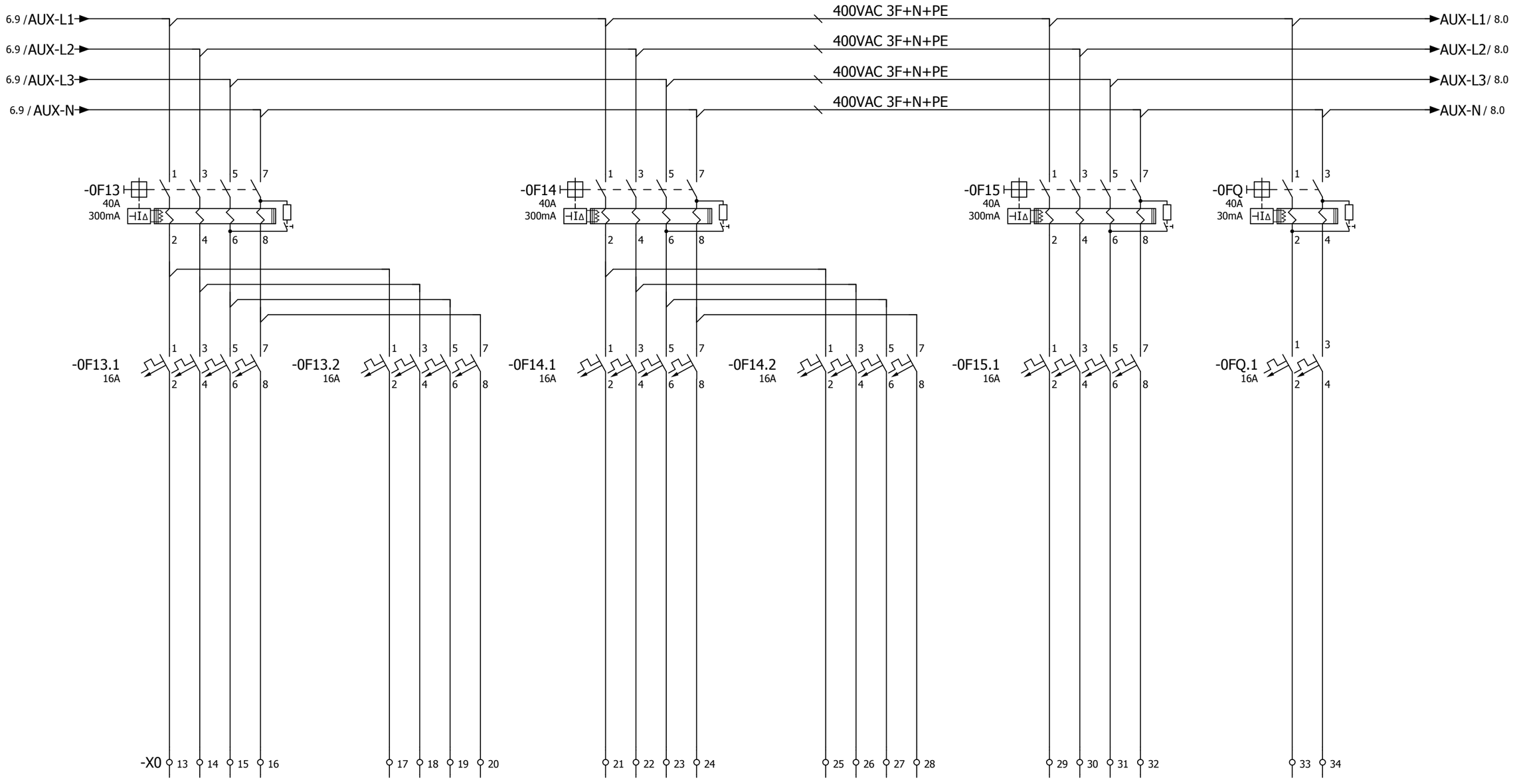
Sistema de control de bombeo

Alimentación Servicios Auxiliares

Hoja: 6 / 431.d

Ubicación: CCM

PFC CAAM 2015



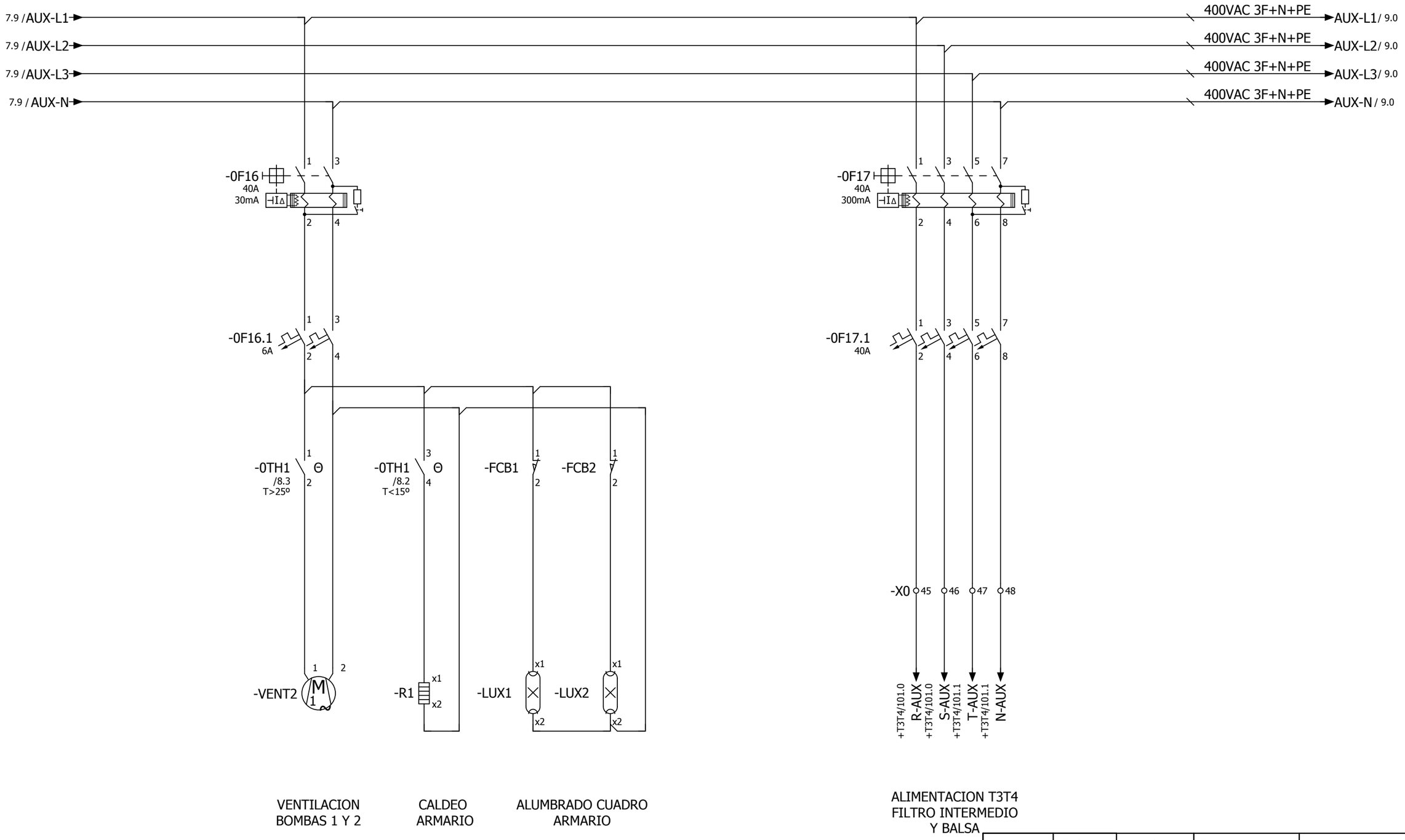
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	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

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Escala	Sistema de control de bombeo Alimentación Servicios Auxiliares
Hoja:	7 / 431.d
Ubicación:	CCM
	PFC CAAM 2015

6



VENTILACION BOMBAS 1 Y 2

CALDEO ARMARIO

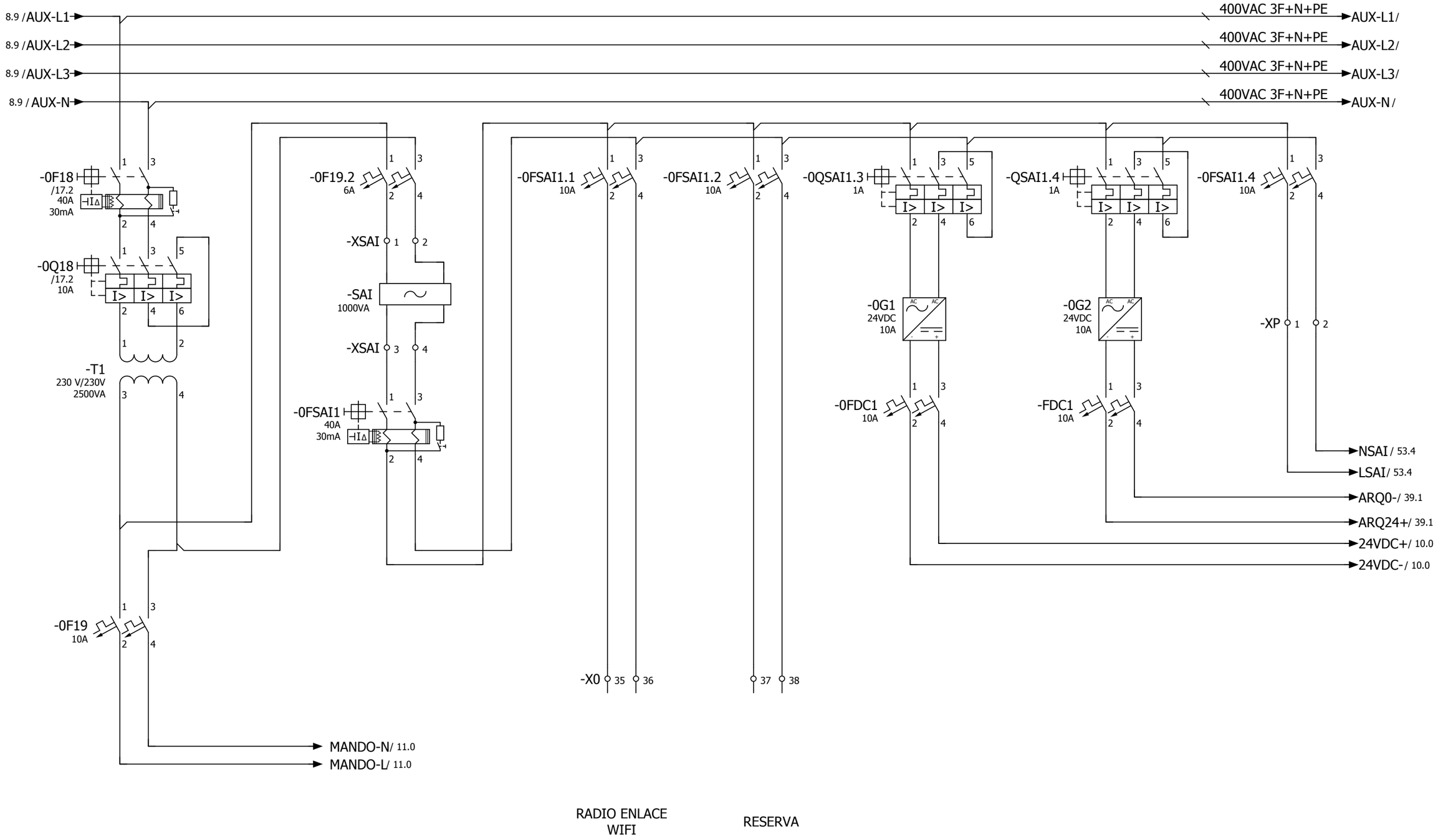
ALUMBRADO CUADRO ARMARIO

ALIMENTACION T3T4 FILTRO INTERMEDIO Y BALSA

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Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

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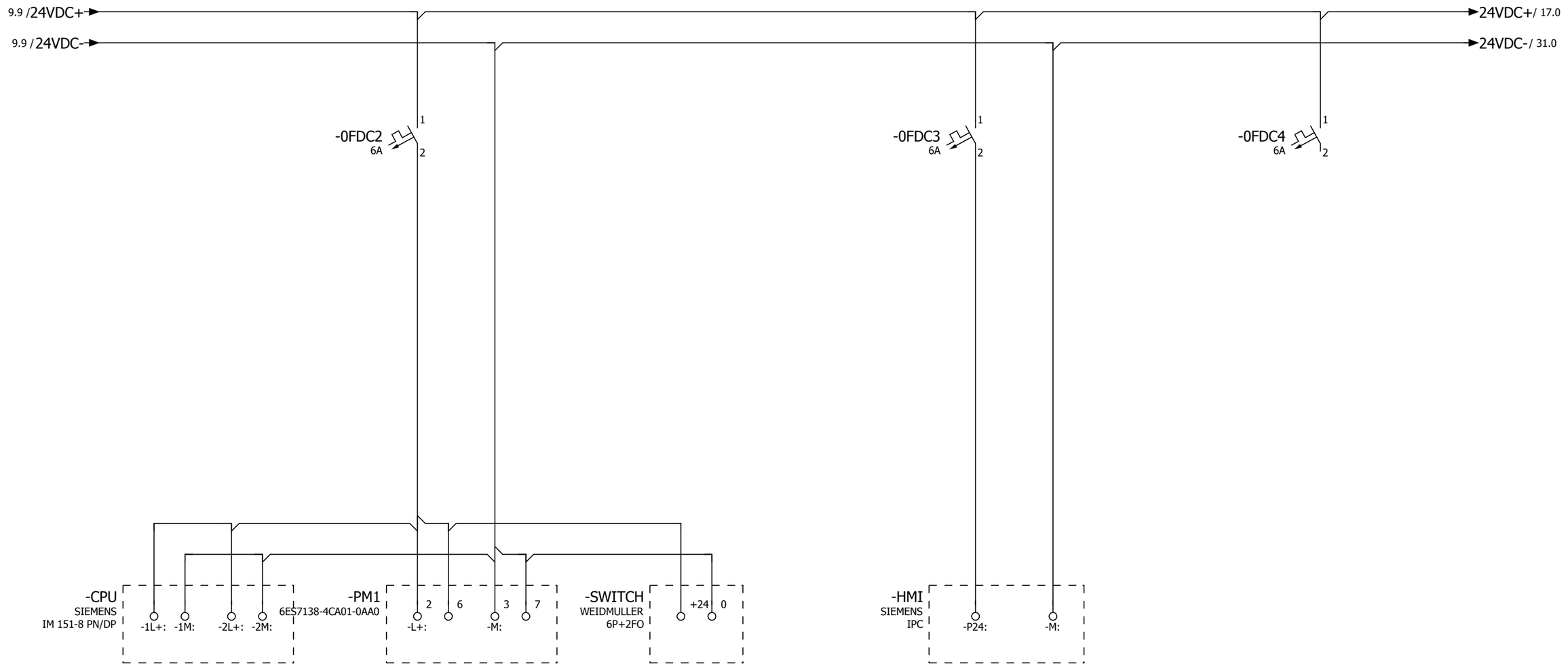
Escala	Sistema de control de bombeo
	Alimentación Servicios Armario
Hoja:	8 / 431.d
Ubicación:	CCM
PFC CAAM 2015	



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

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Escala	Sistema de control de bombeo
	Potencia SAI y tensión de mando
Hoja:	9 / 431.d
Ubicación:	CCM
PFC CAAM 2015	



CONTROLADOR PLC

MODULO POTENCIA 24VDC

SWITCH ETHERNET+ FIBRA

PANEL PC TERMINAL DE OPERADOR TACTIL

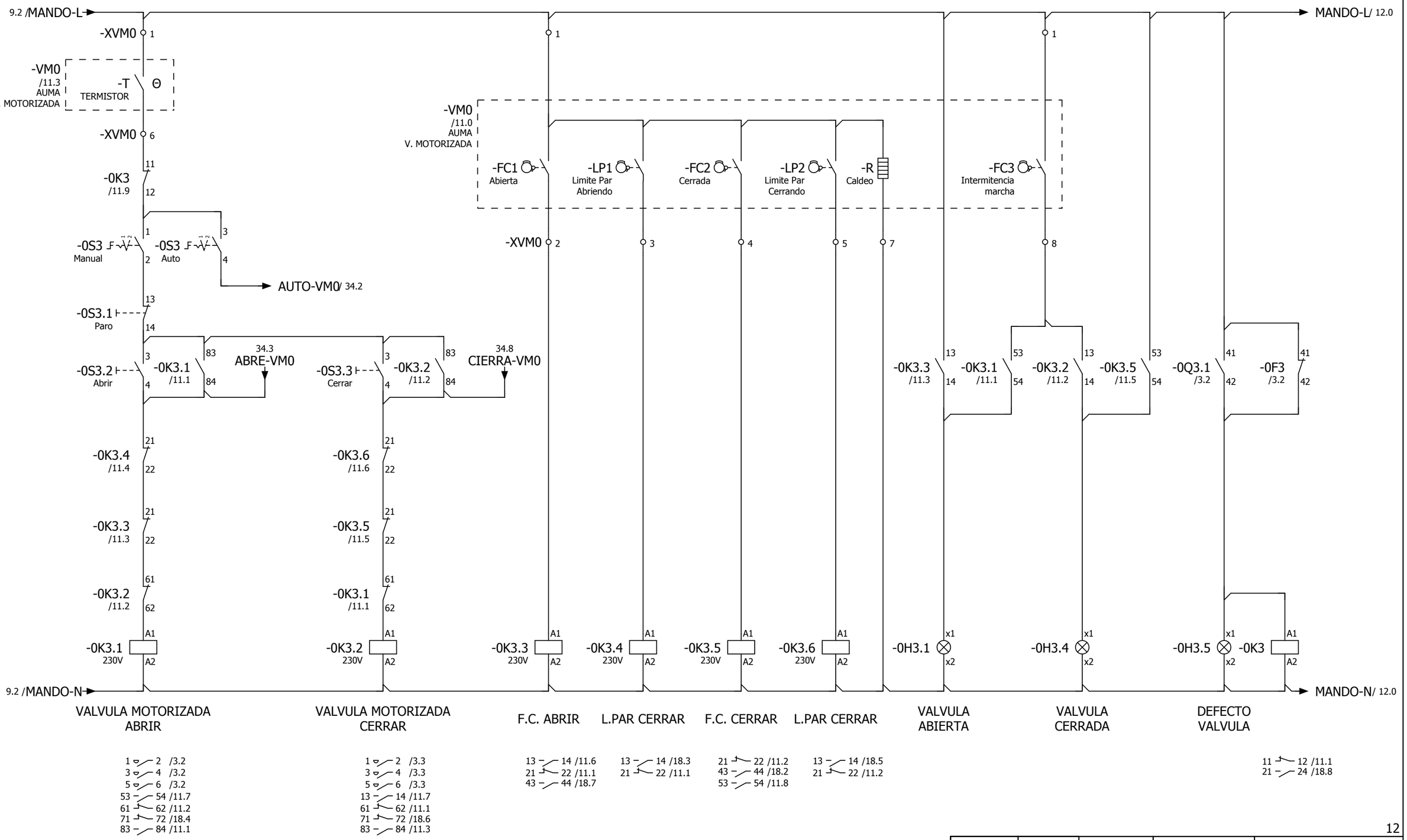
RESERVA

11

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Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Alimentaciones 24VDC
Hoja:	10 / 431.d
Ubicación:	CCM
	PFC CAAM 2015



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	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo		
	Maniobra válvula entrada acequia		

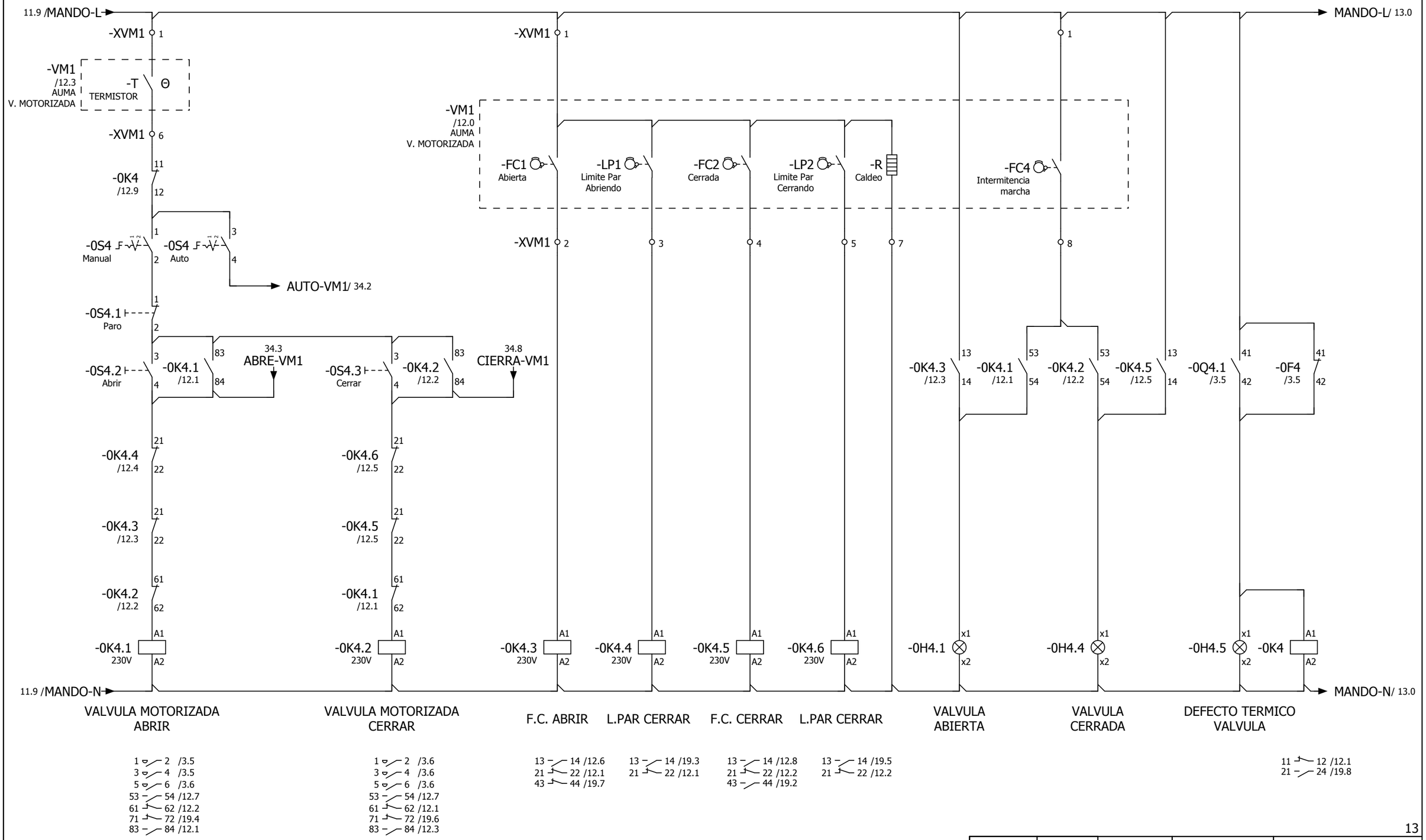
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 11 / 431.d

Ubicación: CCM

PFC CAAM 2015

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Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo		
	Maniobra válvula entrada acequia		

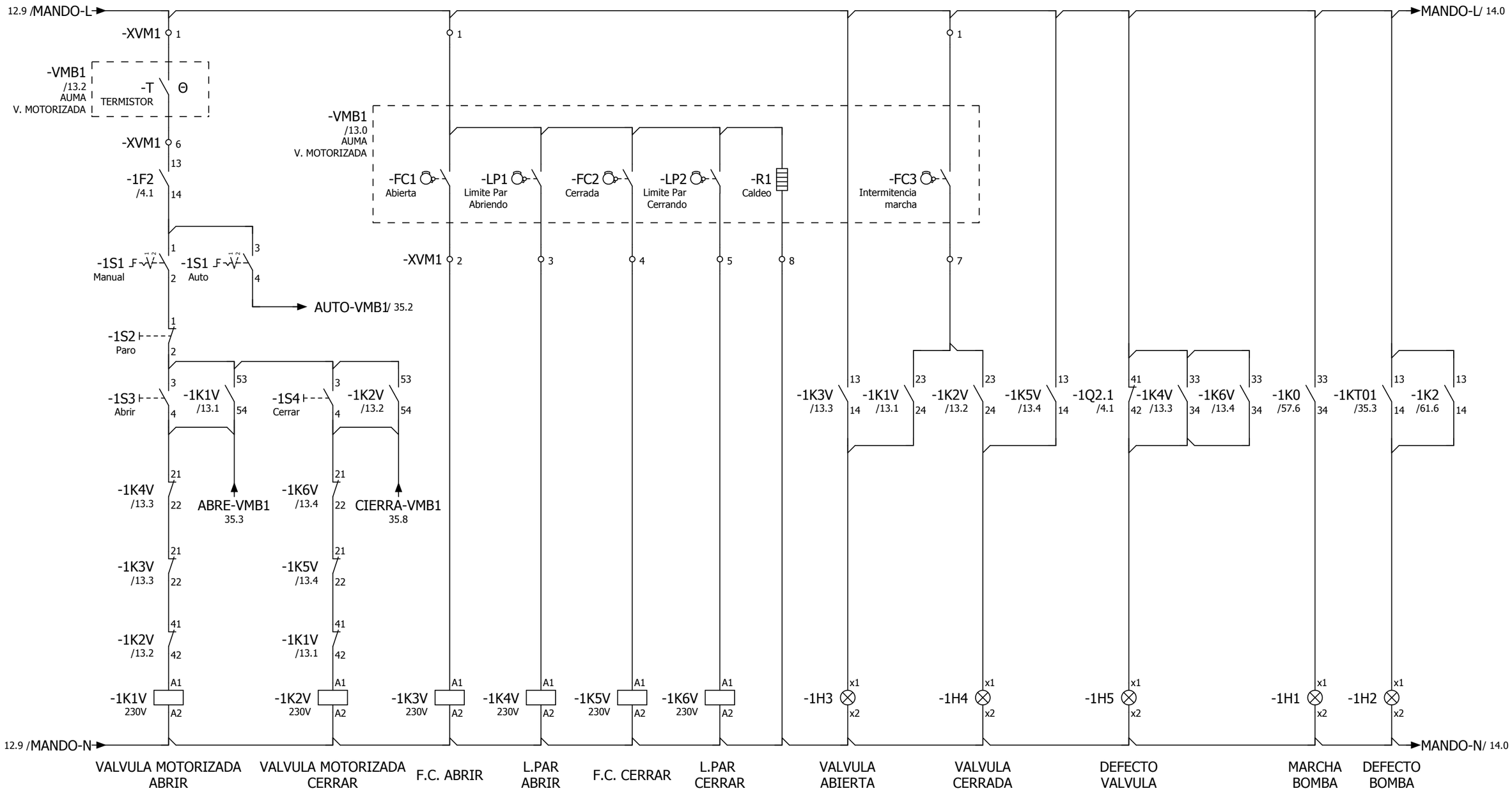
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 12 / 431.d

Ubicación: CCM

PFC CAAM 2015

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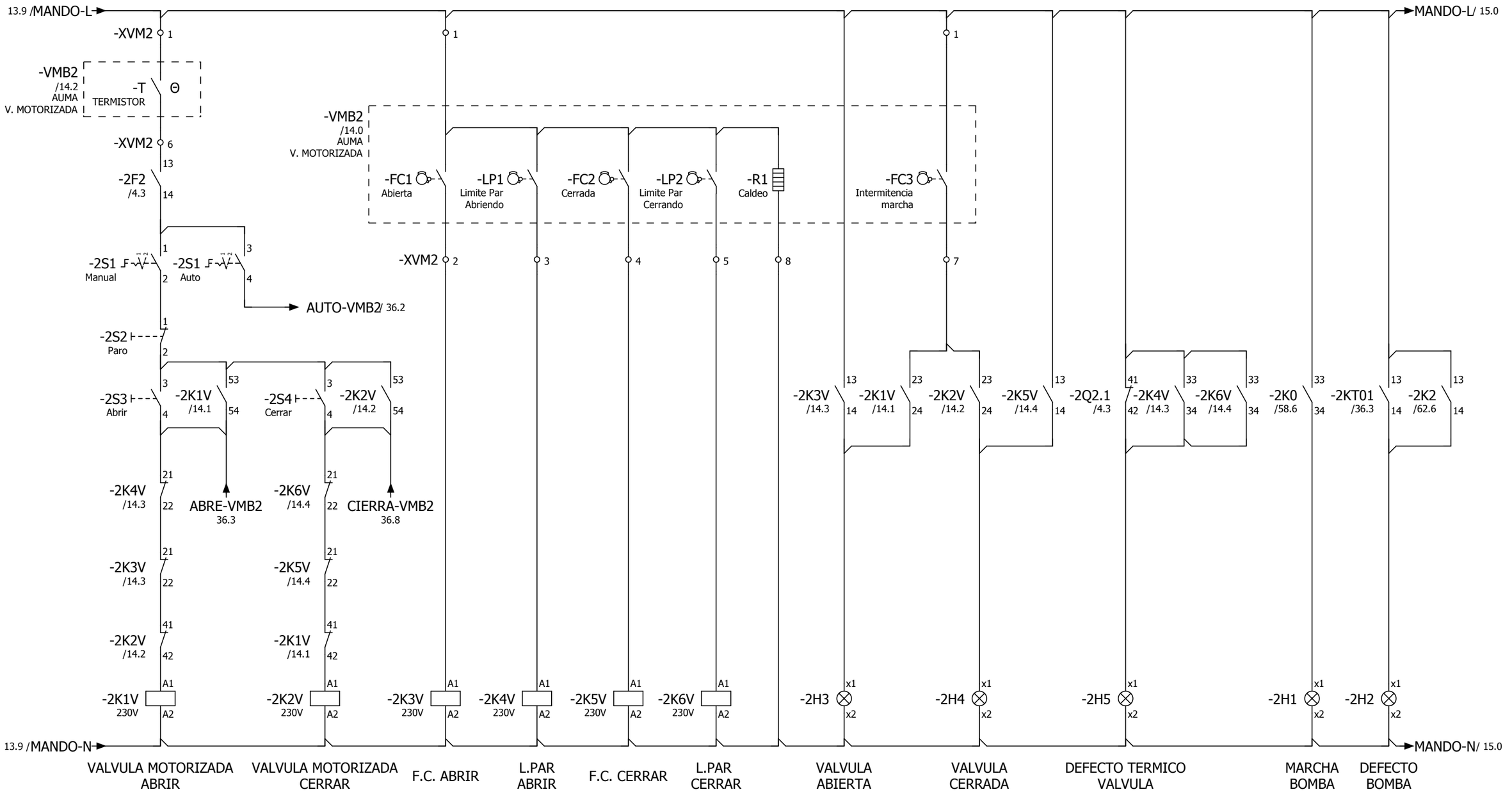
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Comprobado	20/05/2015	RPM	

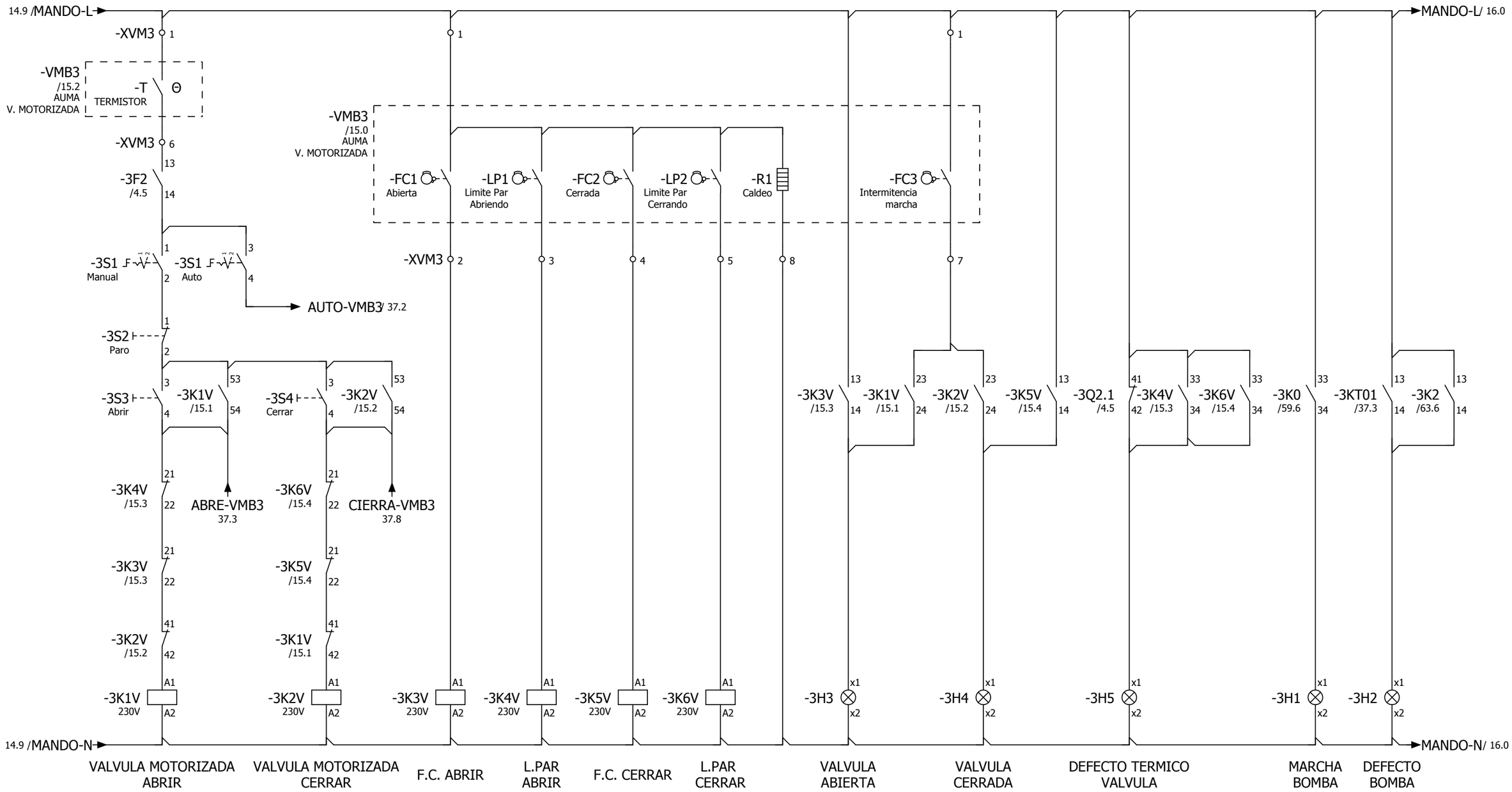
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo
	Maniobra válvula motorizada de Bomba 1
Hoja:	13 / 431.d
Ubicación:	CCM
PFC CAAM 2015	

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	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Maniobra válvula motorizada de Bomba 2			Hoja: 14 / 431.d Ubicación: CCM PFC CAAM 2015



1 — 2 /4.5
3 — 4 /4.6
5 — 6 /4.6
23 — 24 /15.6
31 — 32 /25.6
41 — 42 /15.2
53 — 54 /15.1

1 — 2 /4.6
3 — 4 /4.6
5 — 6 /4.7
23 — 24 /15.6
31 — 32 /25.8
41 — 42 /15.1
53 — 54 /15.2

13 — 14 /15.5
21 — 22 /15.1
43 — 44 /26.2

13 — 14 /26.4
21 — 22 /15.1
33 — 34 /15.7

13 — 14 /15.7
21 — 22 /15.2
43 — 44 /26.6

13 — 14 /26.8
21 — 22 /15.2
33 — 34 /15.8

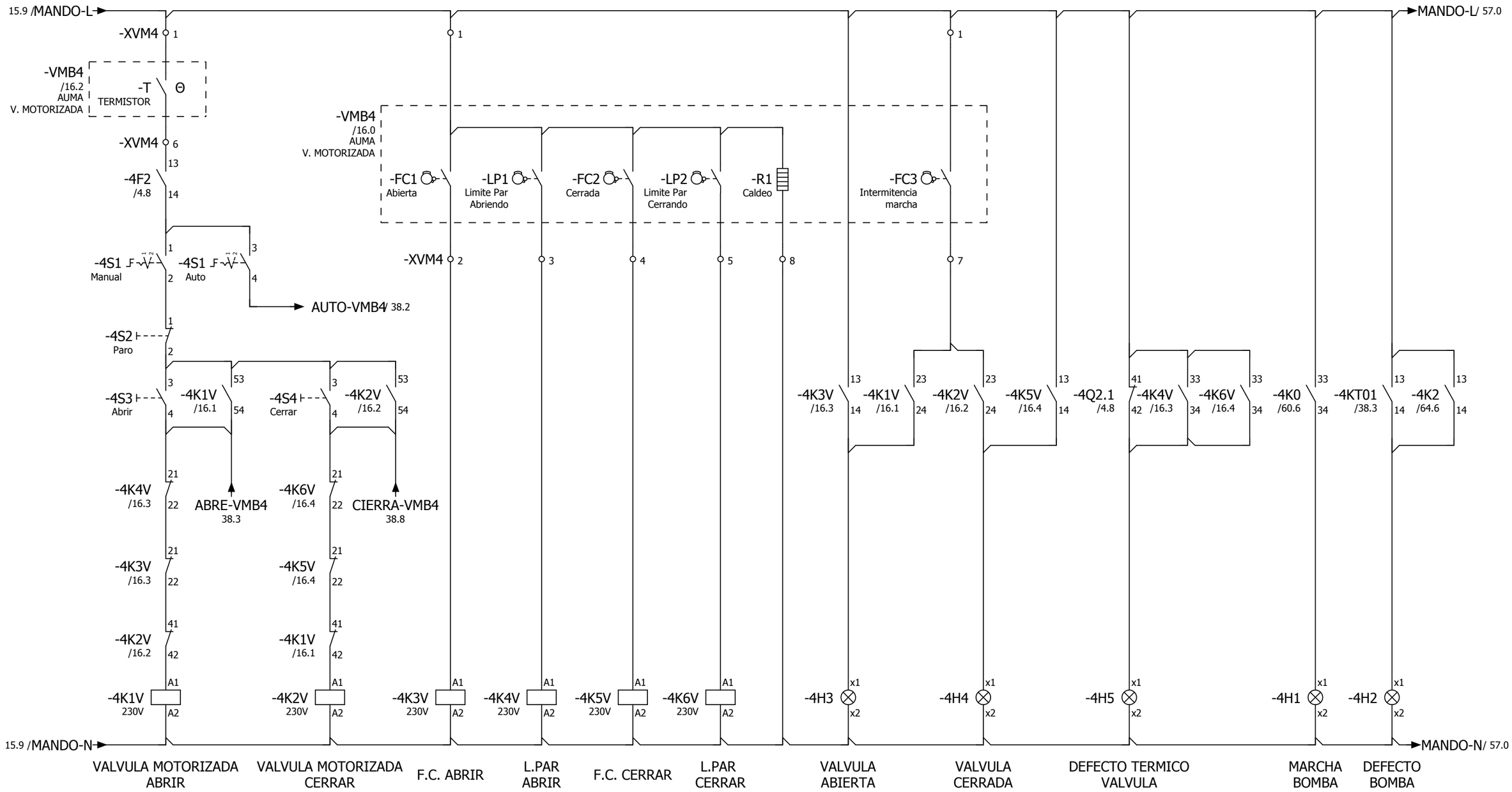
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	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Maniobra válvula motorizada de Bomba 3
Hoja:	15 / 431.d
Ubicación:	CCM
PFC CAAM 2015	

14



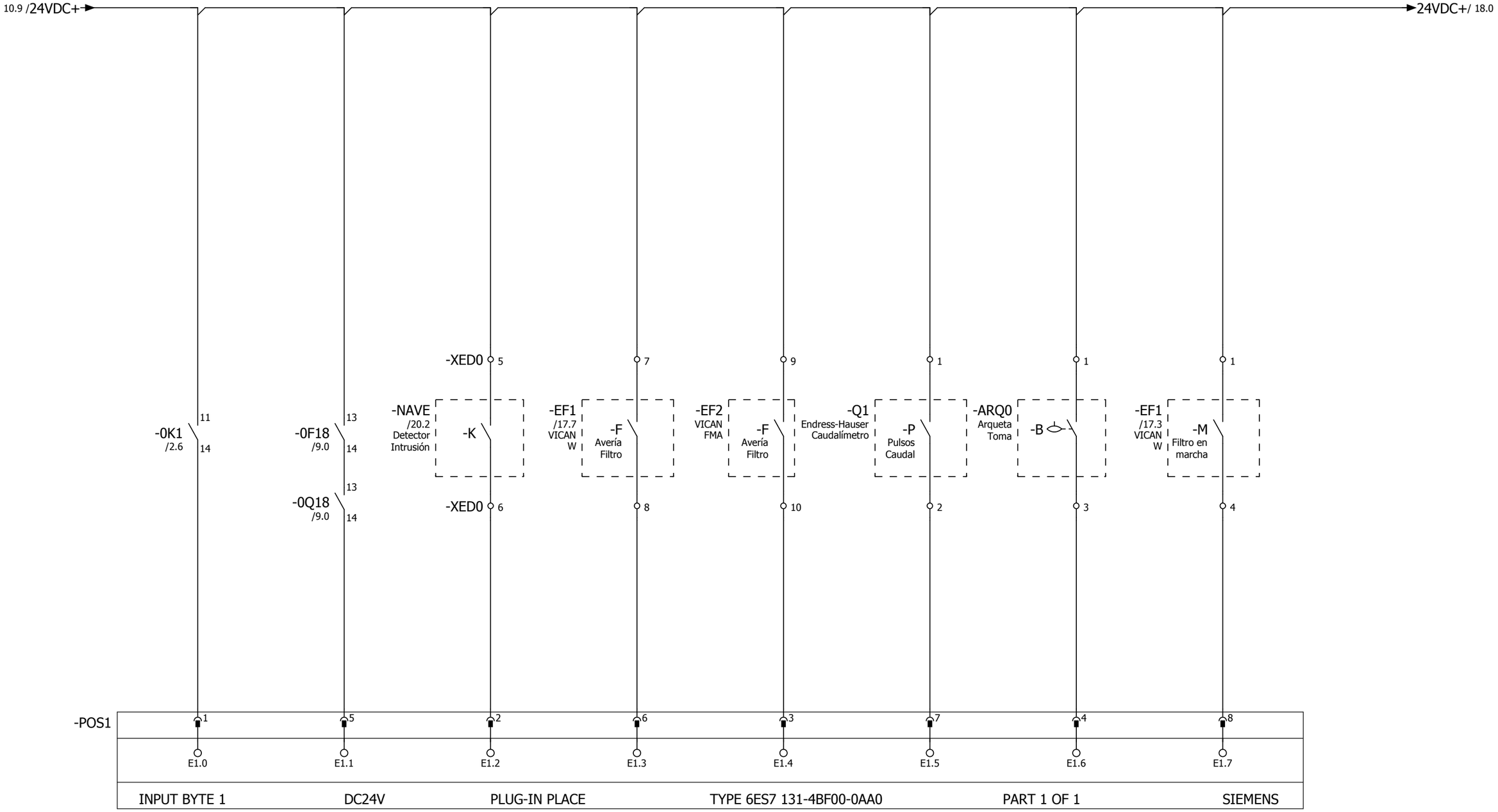
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	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo
	Maniobra válvula motorizada de Bomba 4
Hoja:	16 / 431.d
Ubicación:	CCM
PFC CAAM 2015	

15



18

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas digitales PLC
Hoja:	17 / 431.d
Ubicación:	CCM
PFC CAAM 2015	

17.9 /24VDC+ → 24VDC+/ 19.0

-0S3	-0K3.5	-0K3.4	-0K3.1	-0K3.6	-0K3.2	-0K3.3	-0K3
Auto	/11.5	/11.4	/11.1	/11.6	/11.2	/11.3	/11.9
10 / 5	43 / 44	13 / 14	71 / 72	13 / 14	71 / 72	43 / 44	21 / 24

-POS2

1	2	3	4	5	6	7	8
E2.0	E2.1	E2.2	E2.3	E2.4	E2.5	E2.6	E2.7

INPUT BYTE 2 | DC24V | PLUG-IN PLACE | TYPE 6ES7 131-4BF00-0AA0 | PART 1 OF 1 | SIEMENS

E2.0	E2.1	E2.2	E2.3	E2.4	E2.5	E2.6	E2.7
Posición Auto V.M. Entrada Acequia	Final Carrera Cerrada V.M. Entrada Acequia	Limite Par abriendo V.M. Entrada Acequia	Confirmación marcha Abrir V.M. Entrada Acequia	Limite Par cerrando V.M. Entrada Acequia	Confirmación marcha Cerrar V.M. Entrada Acequia	Final Carrera Abierta V.M. Entrada Acequia	Protección eléctrica V.M. Entrada Acequia

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escala

Sistema de control de bombeo

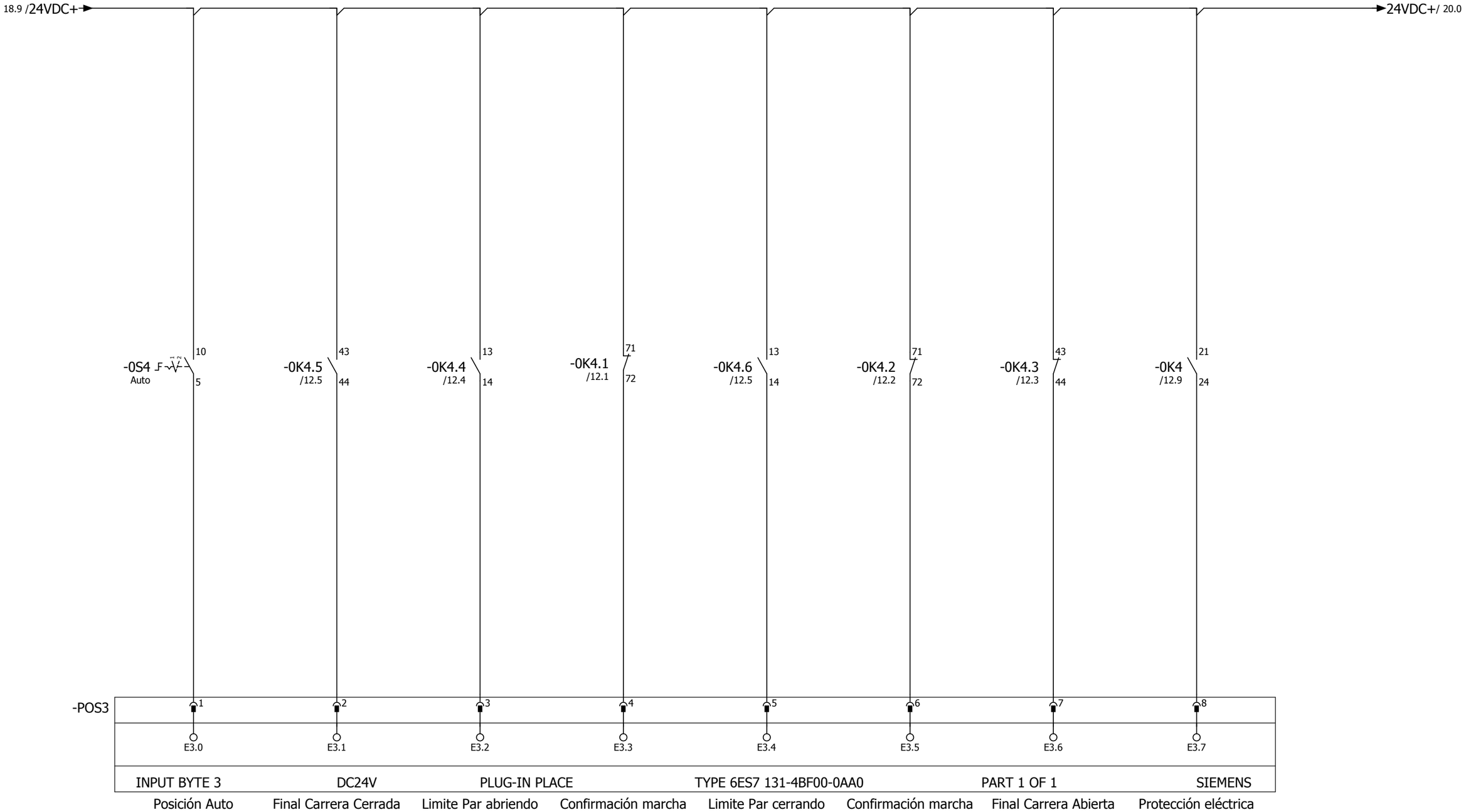
Entradas digitales PLC

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 18 / 431.d

Ubicación: CCM

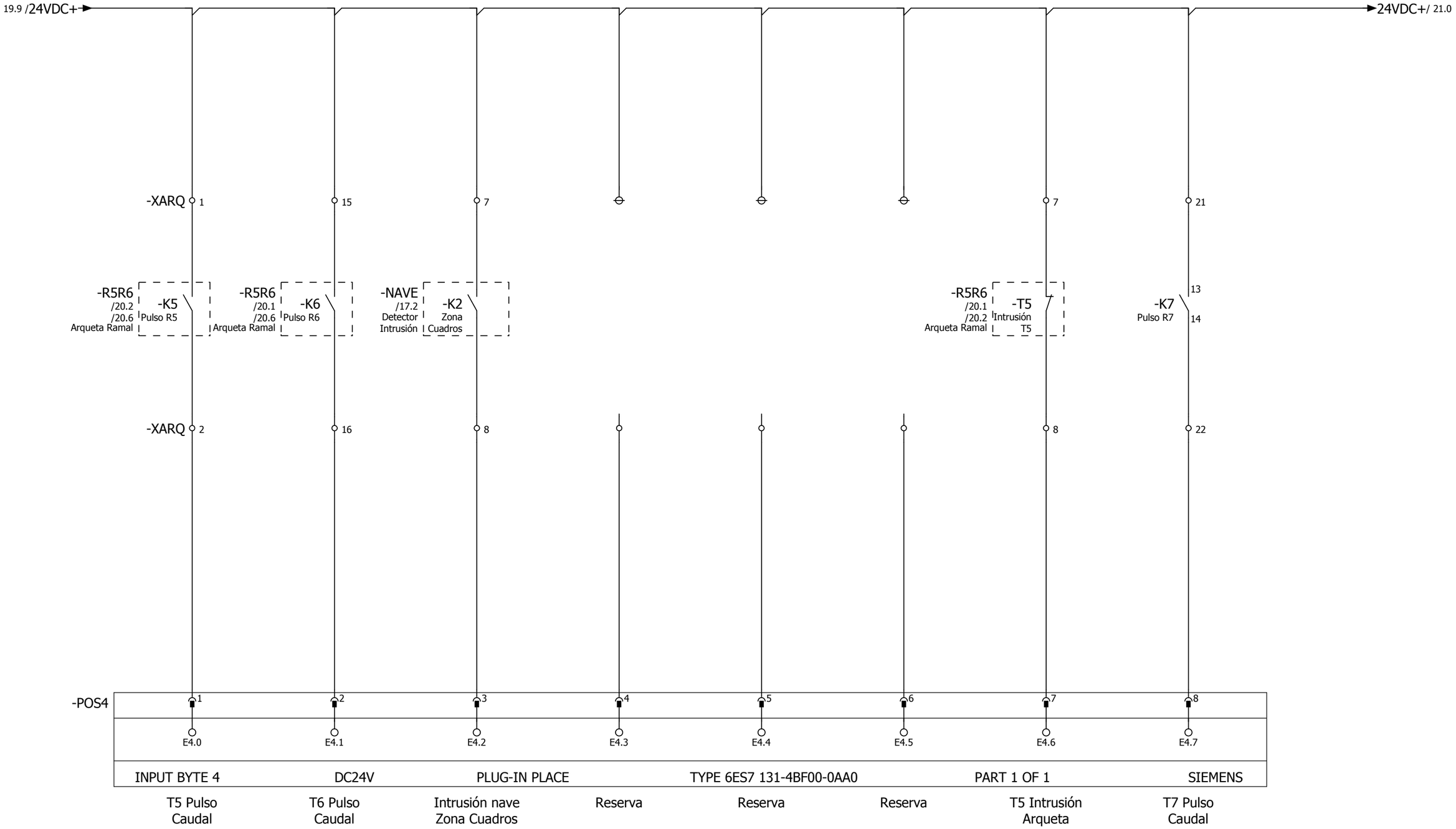
PFC CAAM 2015



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas digitales PLC
Hoja:	19 / 431.d
Ubicación:	CCM
PFC CAAM 2015	

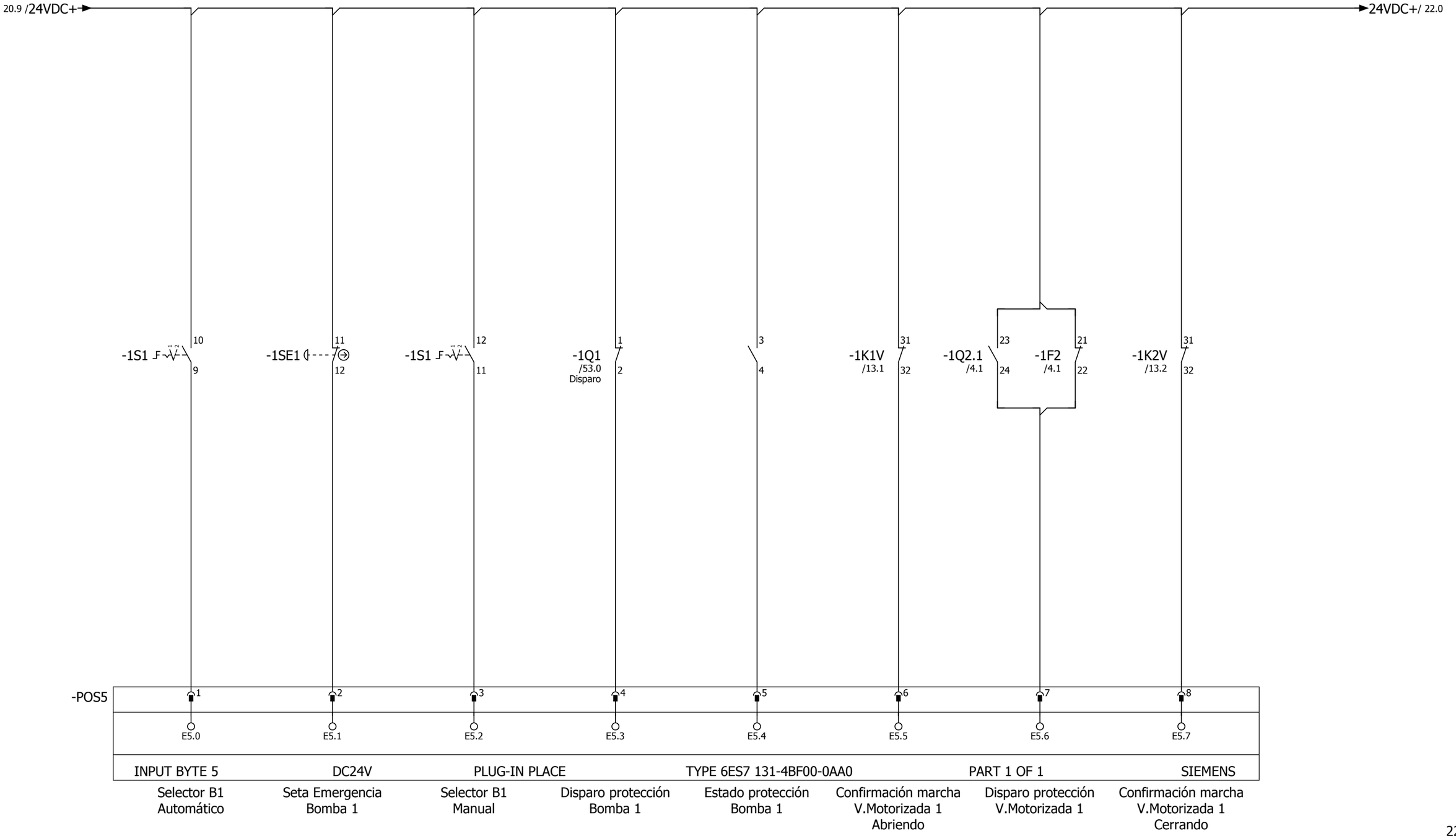


21

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

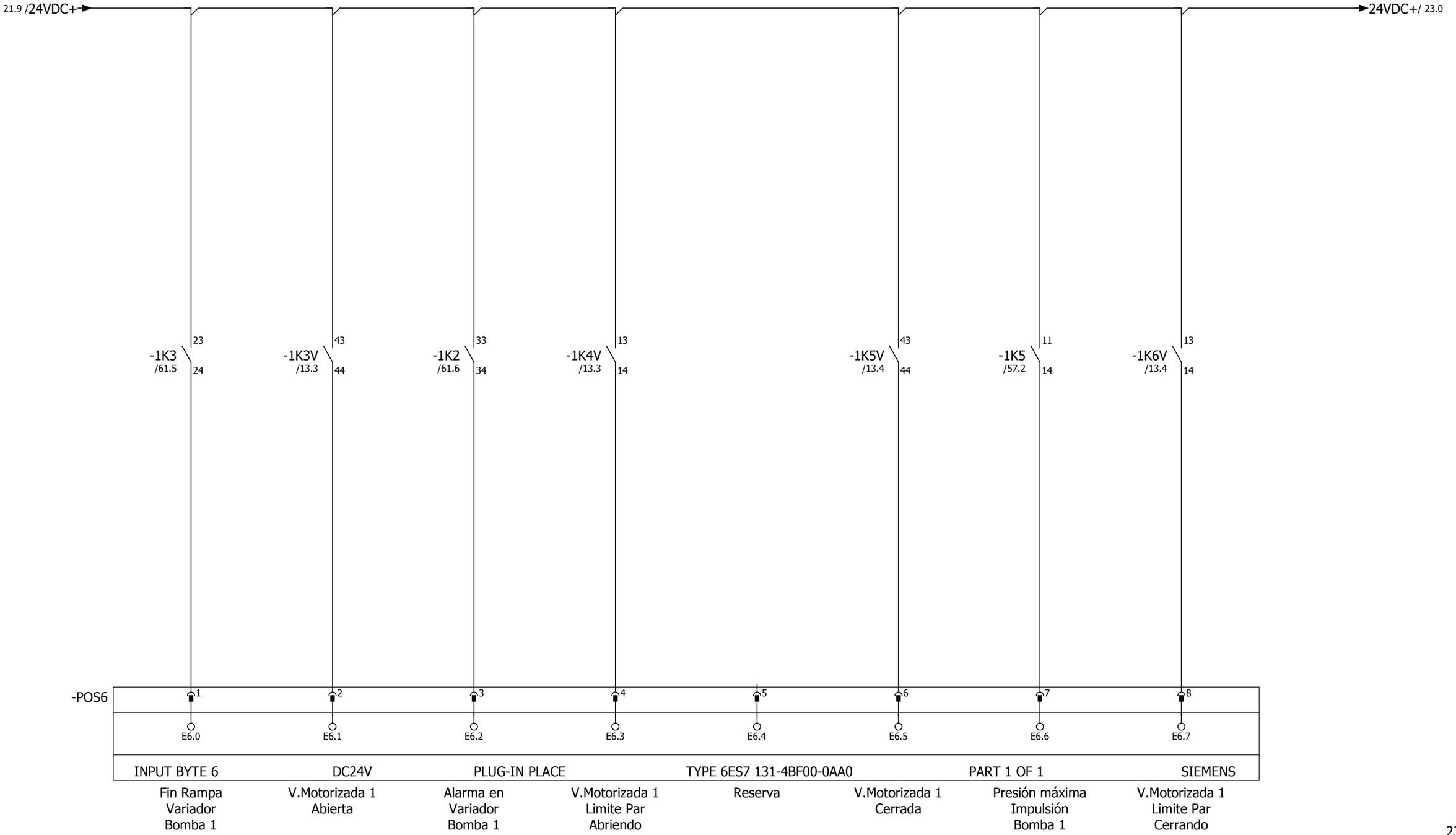
Escala	Sistema de control de bombeo
	Entradas digitales PLC
Hoja:	20 / 431.d
Ubicación:	CCM
	PFC CAAM 2015



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas digitales PLC Bomba 1
Hoja:	21 / 431.d
Ubicación:	CCM
	PFC CAAM 2015

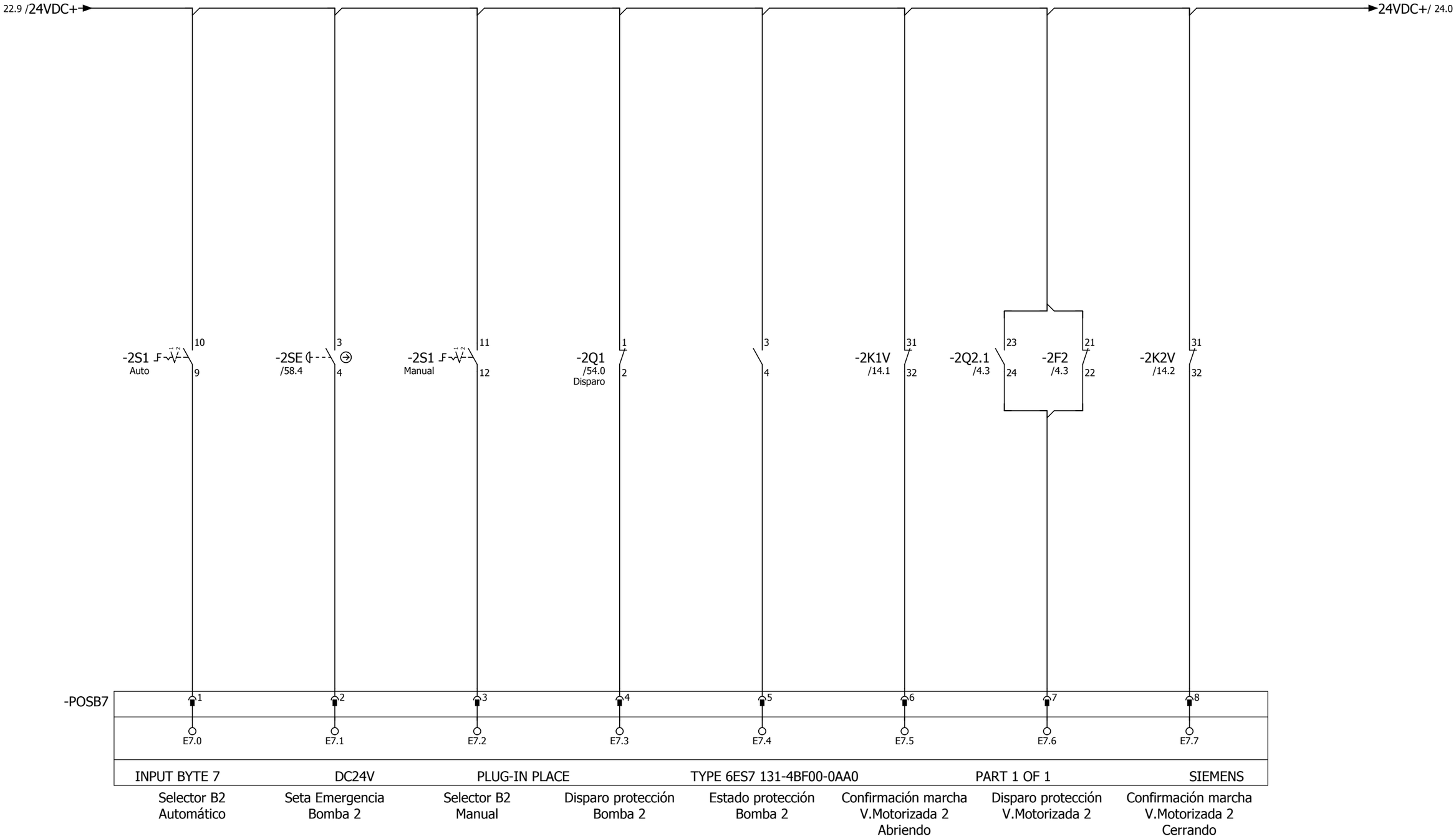


23

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas digitales PLC Bomba 1
Hoja:	22 / 431.d
Ubicación:	CCM
	PFC CAAM 2015



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala

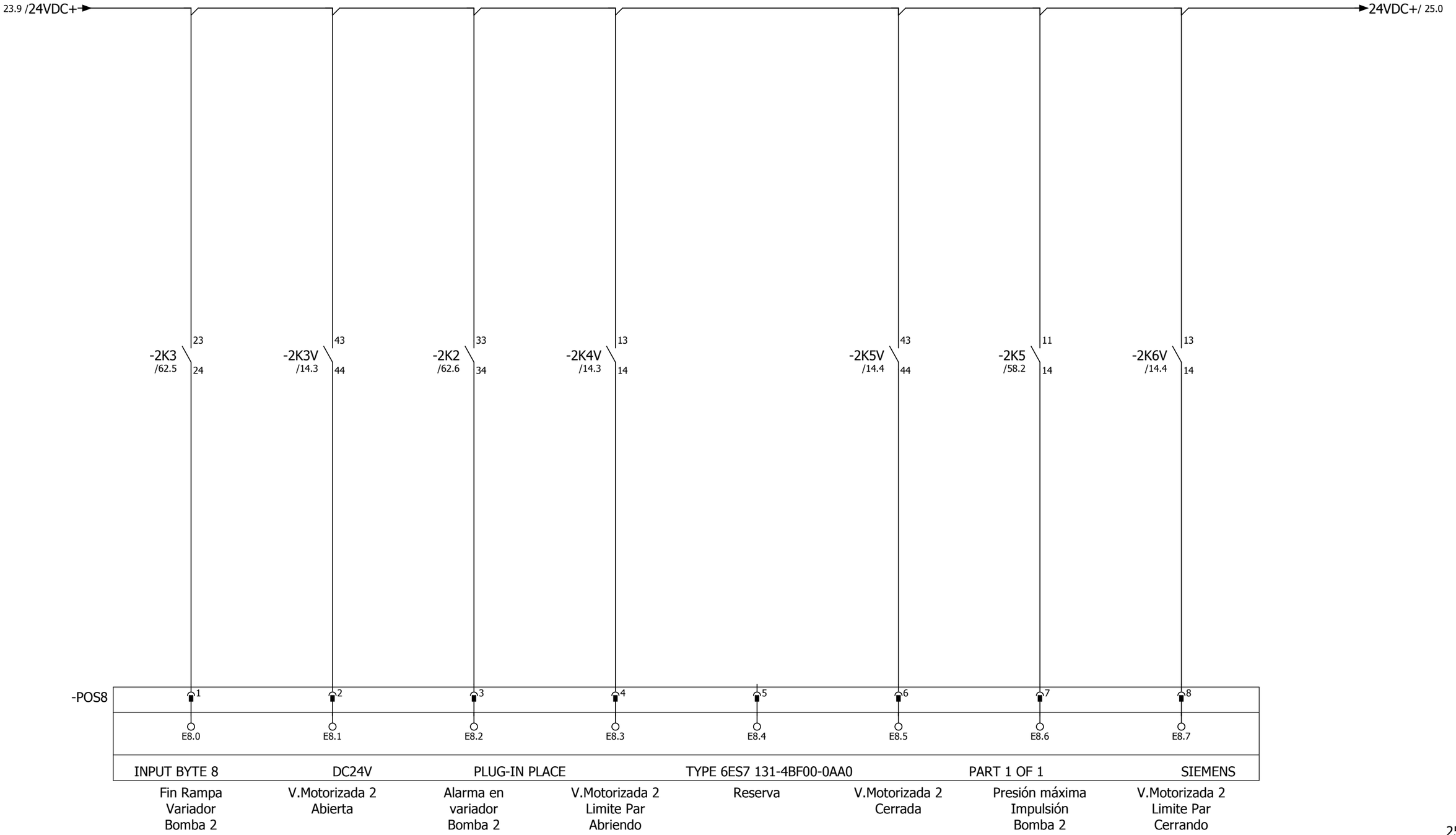
Sistema de control de bombeo

Entradas digitales PLC Bomba 2

Hoja: 23 / 431.d

Ubicación: CCM

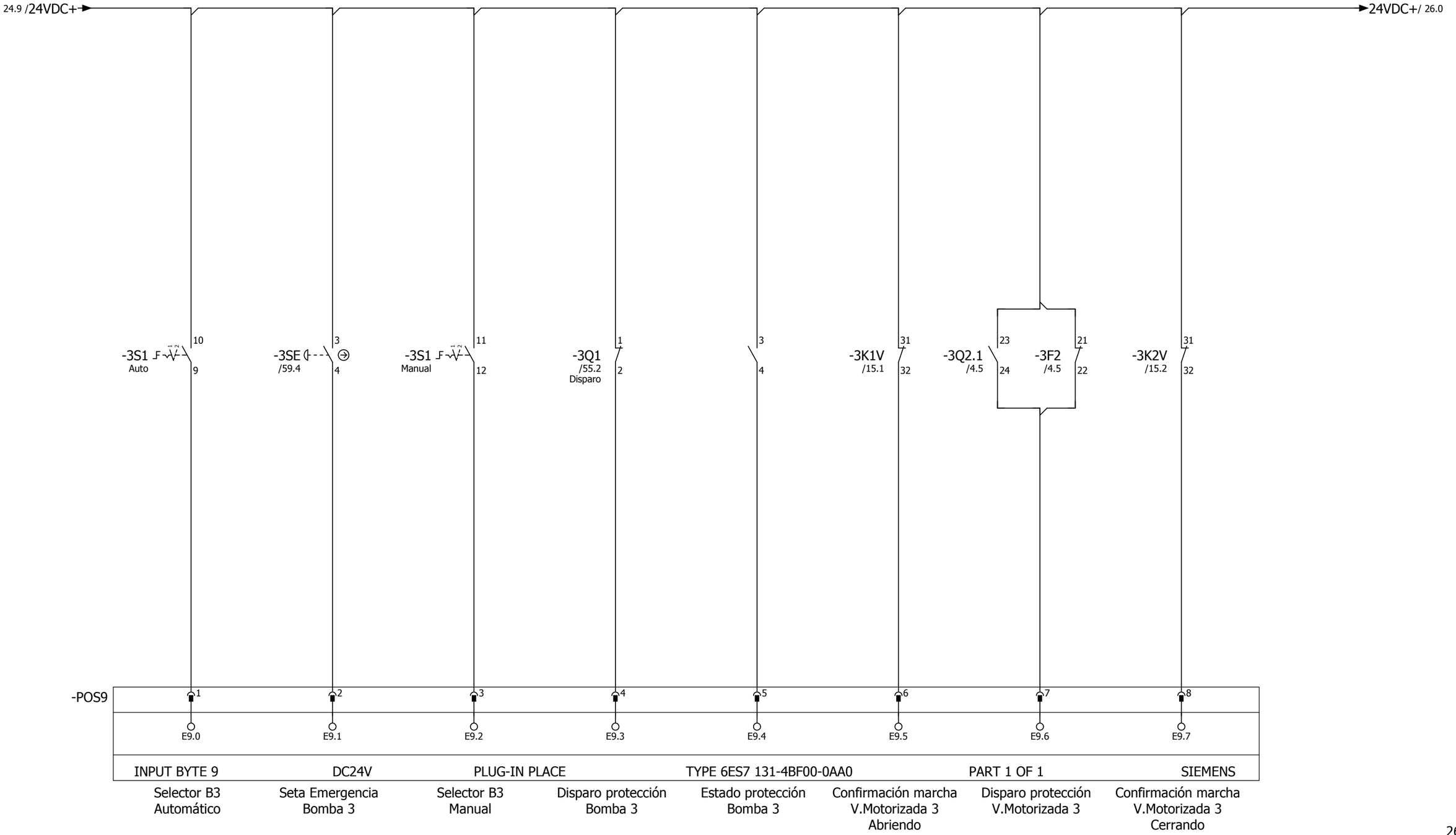
PFC CAAM 2015



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

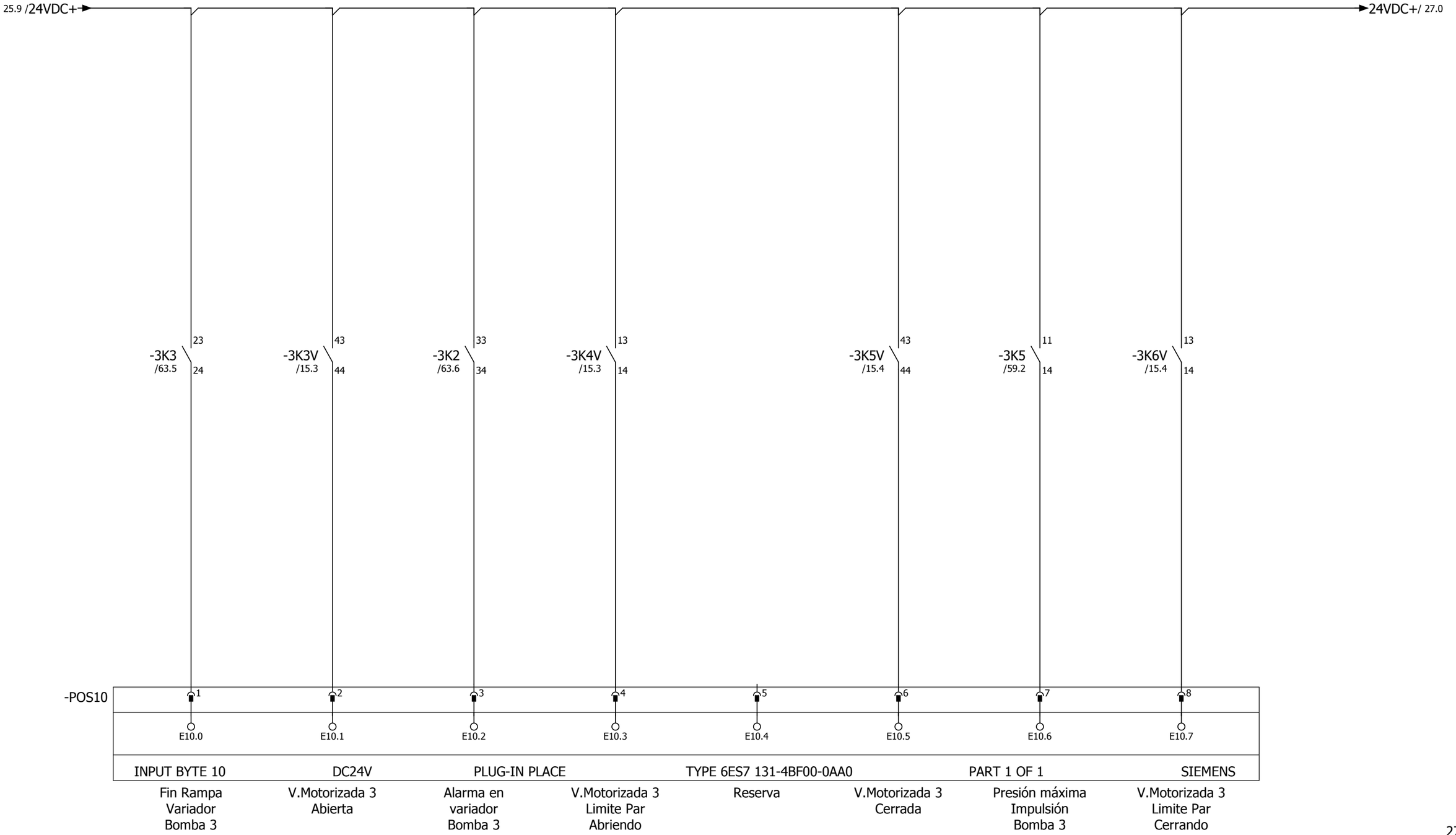
Escala	Sistema de control de bombeo Entradas digitales PLC Bomba 2
Hoja:	24 / 431.d
Ubicación:	CCM
PFC CAAM 2015	



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas digitales PLC Bomba 3
Hoja:	25 / 431.d
Ubicación:	CCM
	PFC CAAM 2015

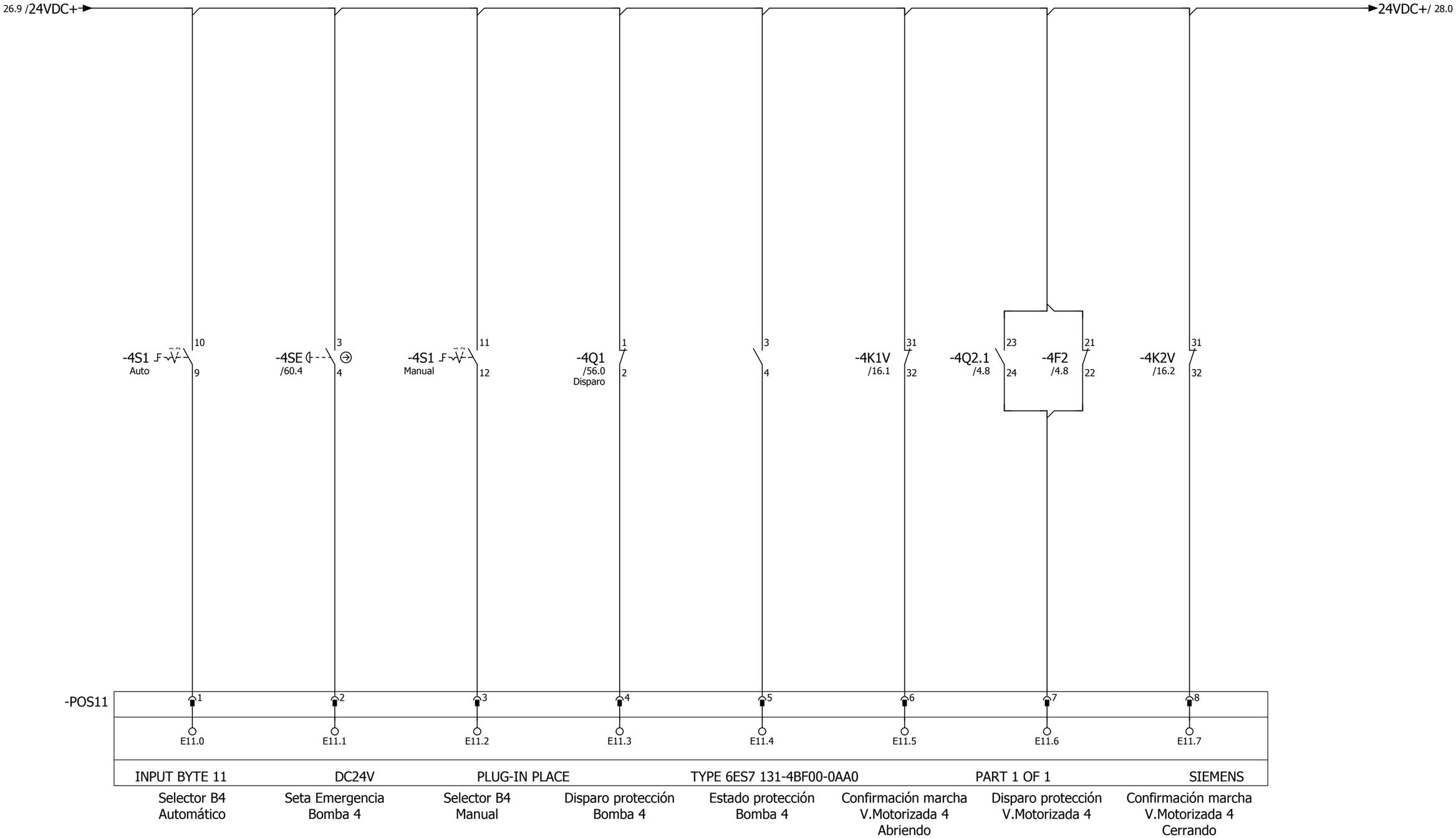


27

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

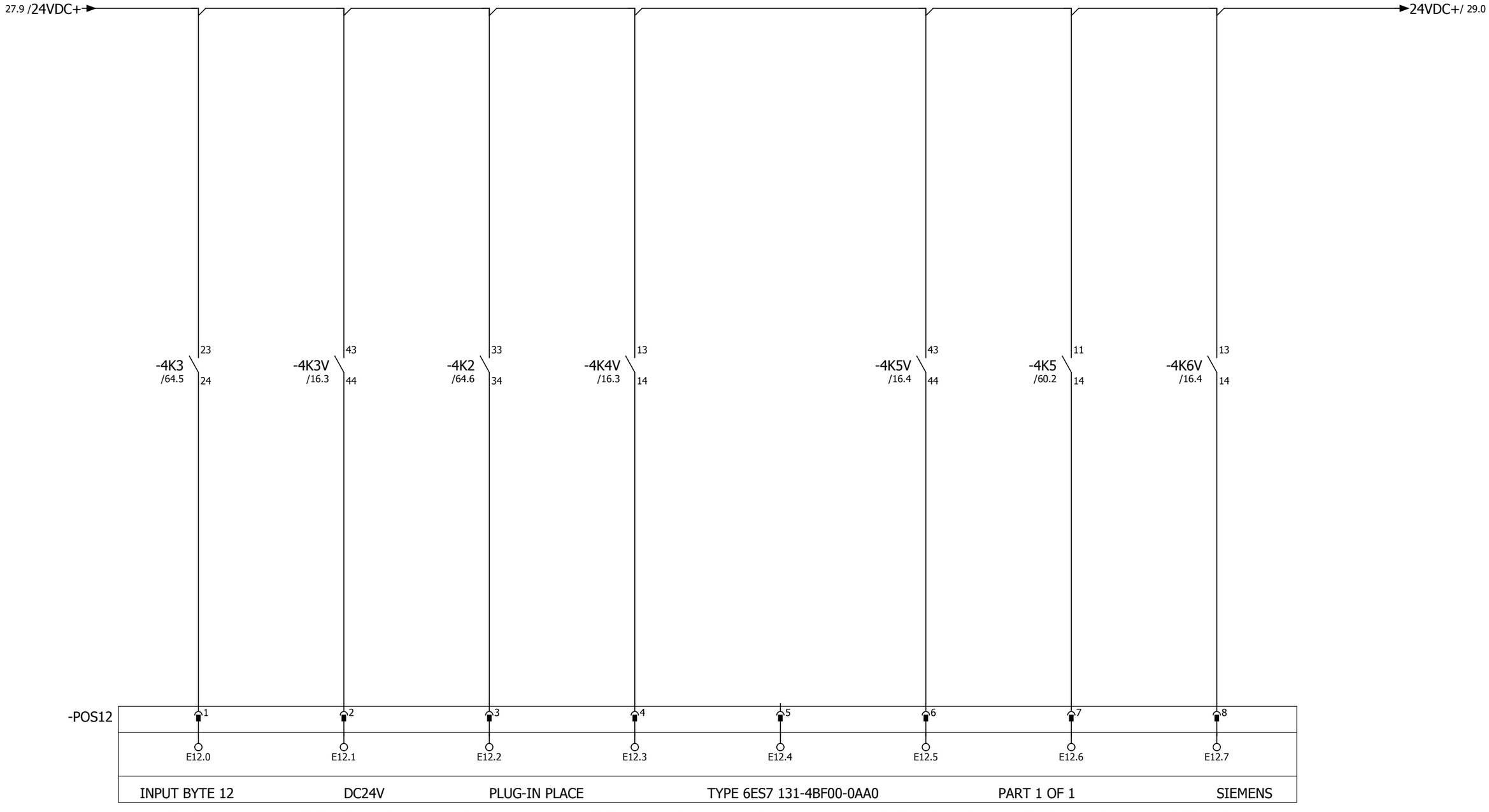
Escala	Sistema de control de bombeo Entradas digitales PLC Bomba 3
Hoja:	26 / 431.d
Ubicación:	CCM
	PFC CAAM 2015



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

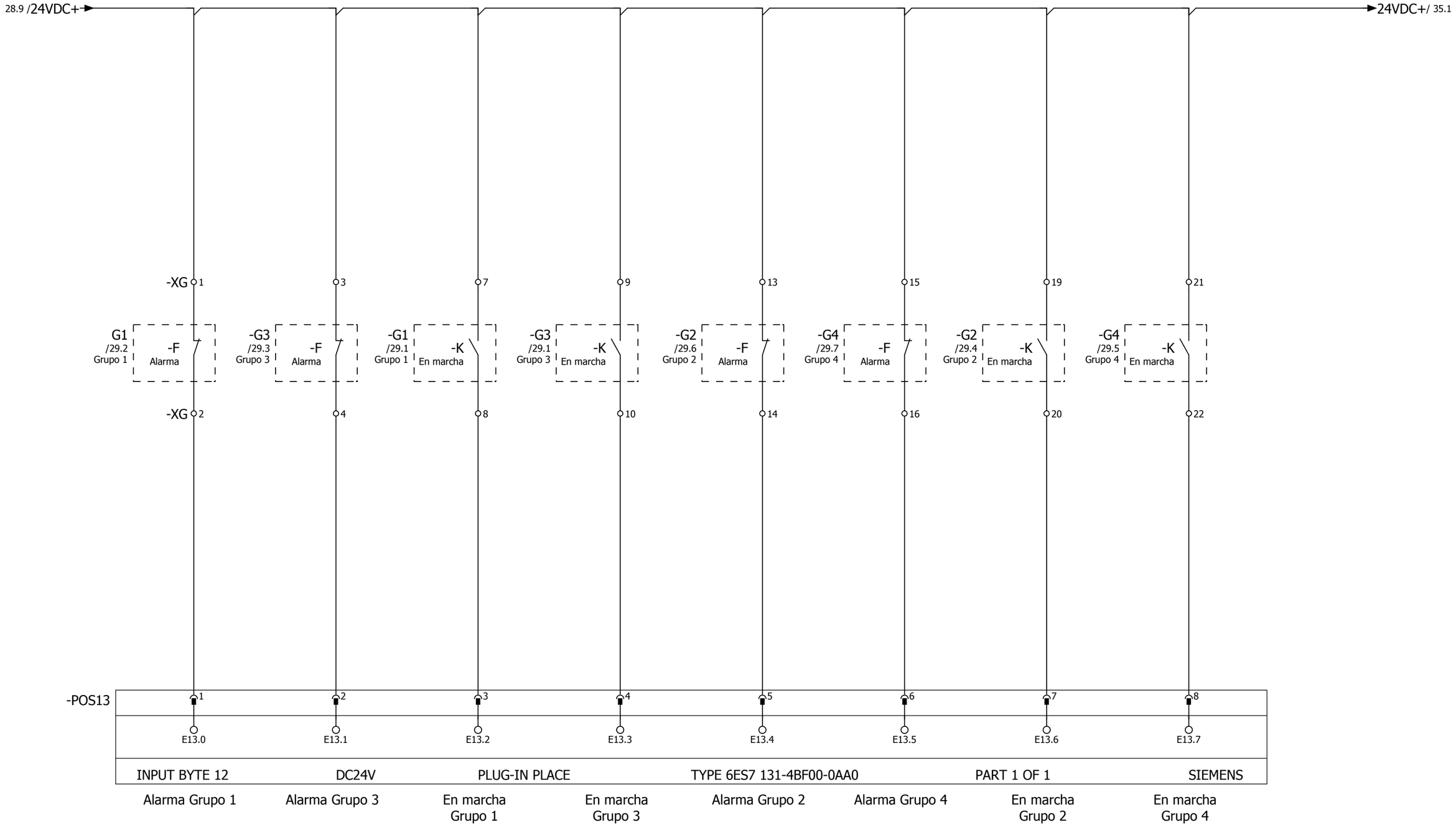
Escala	Sistema de control de bombeo Entradas digitales PLC Bomba 4
Hoja:	27 / 431.d
Ubicación:	CCM
	PFC CAAM 2015



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas digitales PLC Bomba 4
	Hoja: 28 / 431.d
	Ubicación: CCM
	PFC CAAM 2015



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	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

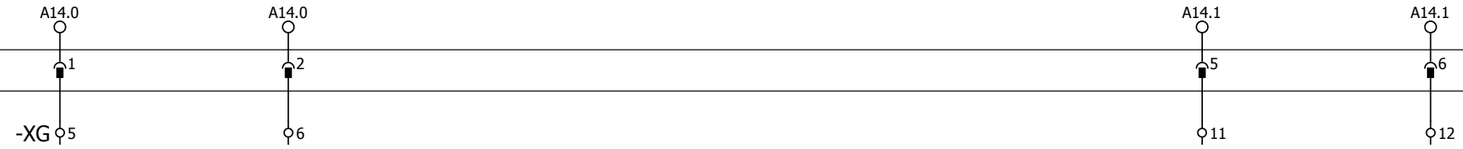
Escala	Sistema de control de bombeo
	Entradas digitales PLC Grupos
	Hoja: 29 / 431.d
	Ubicación: CCM
	PFC CAAM 2015

Orden marcha Grupo 1

Orden marcha Grupo 2

-POS14

OUTPUT BYTE 14	RELAY	PLUG-IN PLACE	TYPE 6ES7 132-4HB01-0AB0	PART 1 OF 1	SIEMENS

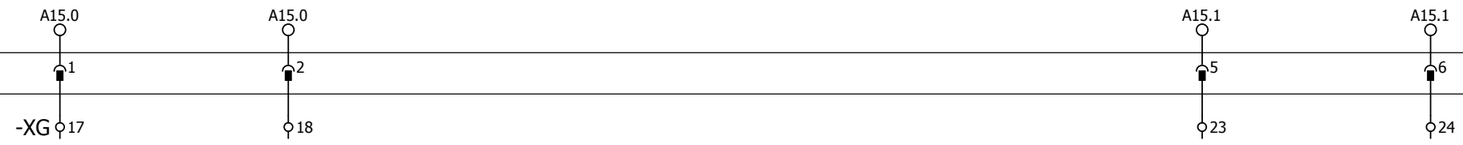


Orden marcha Grupo 3

Orden marcha Grupo 4

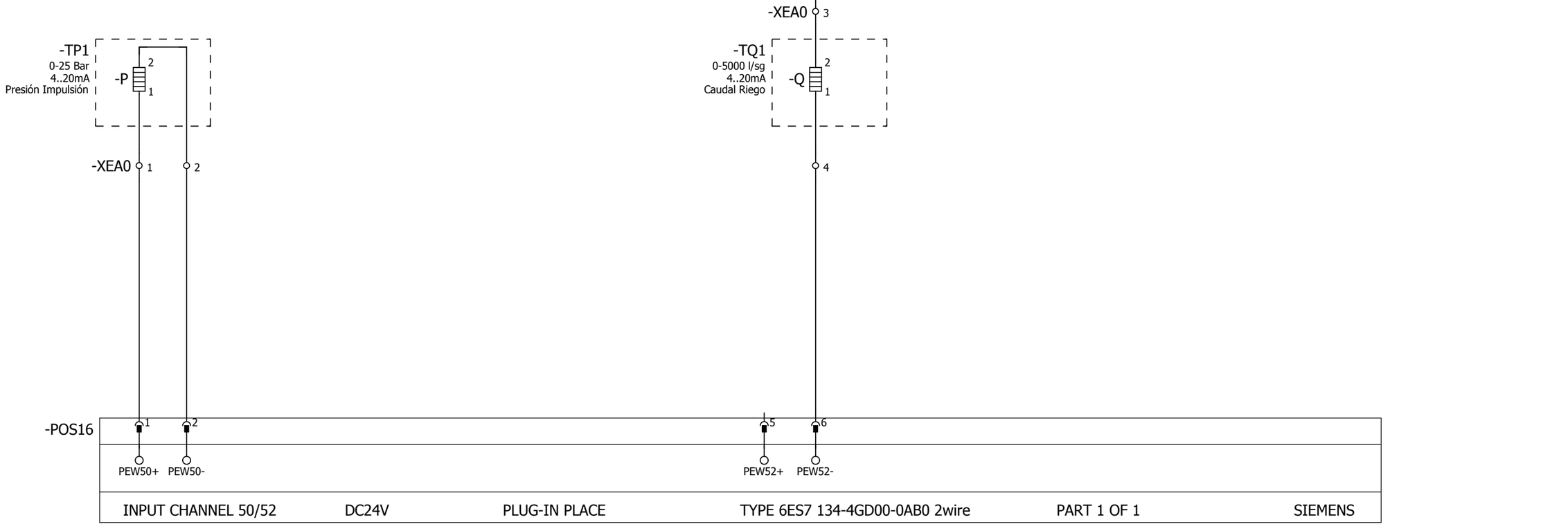
-POS15

OUTPUT BYTE 15	RELAY	PLUG-IN PLACE	TYPE 6ES7 132-4HB01-0AB0	PART 1 OF 1	SIEMENS



	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Salidas digitales PLC			Hoja: 30 / 431.d Ubicación: CCM PFC CAAM 2015

10.9 / 24VDC- → 24VDC- / 32.0



Presión Impulsión

Caudal Riego

32

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo Entradas analógicas PLC		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

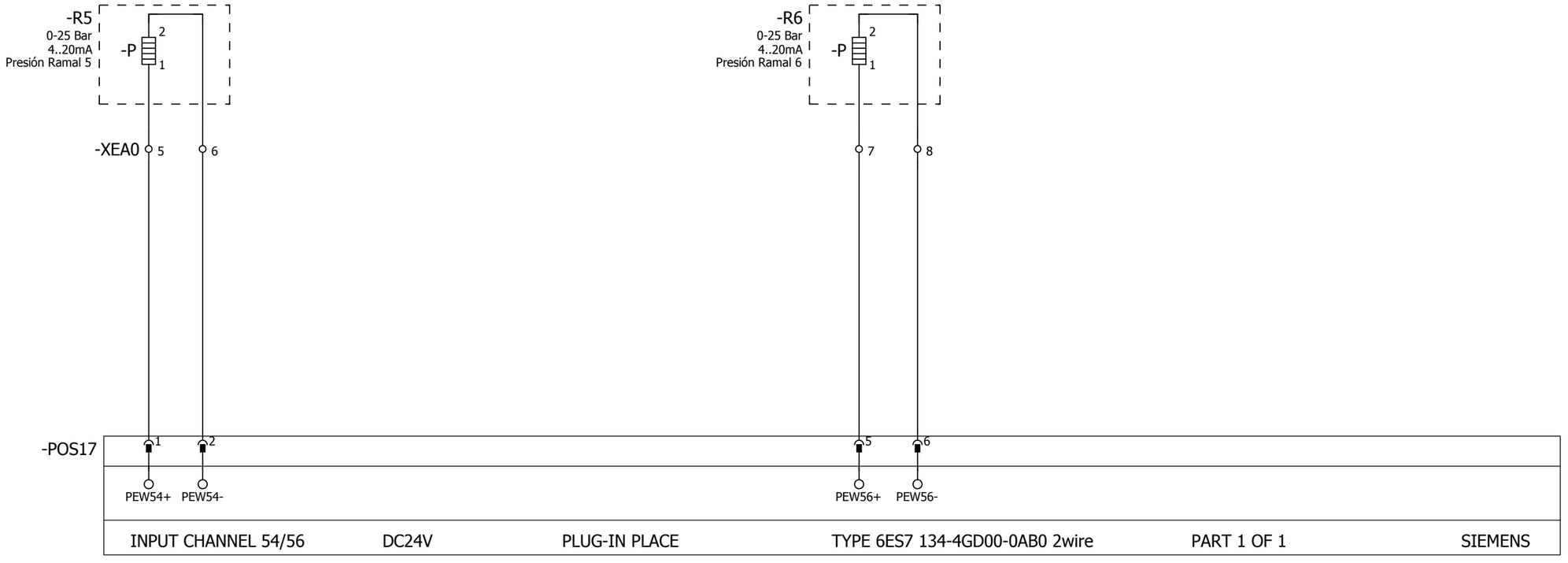
Hoja: 31 / 431.d

Ubicación: CCM

PFC CAAM 2015

30

31.9 / 24VDC- → 24VDC- / 33.0



Presión Ramal 5

Presión Ramal 6

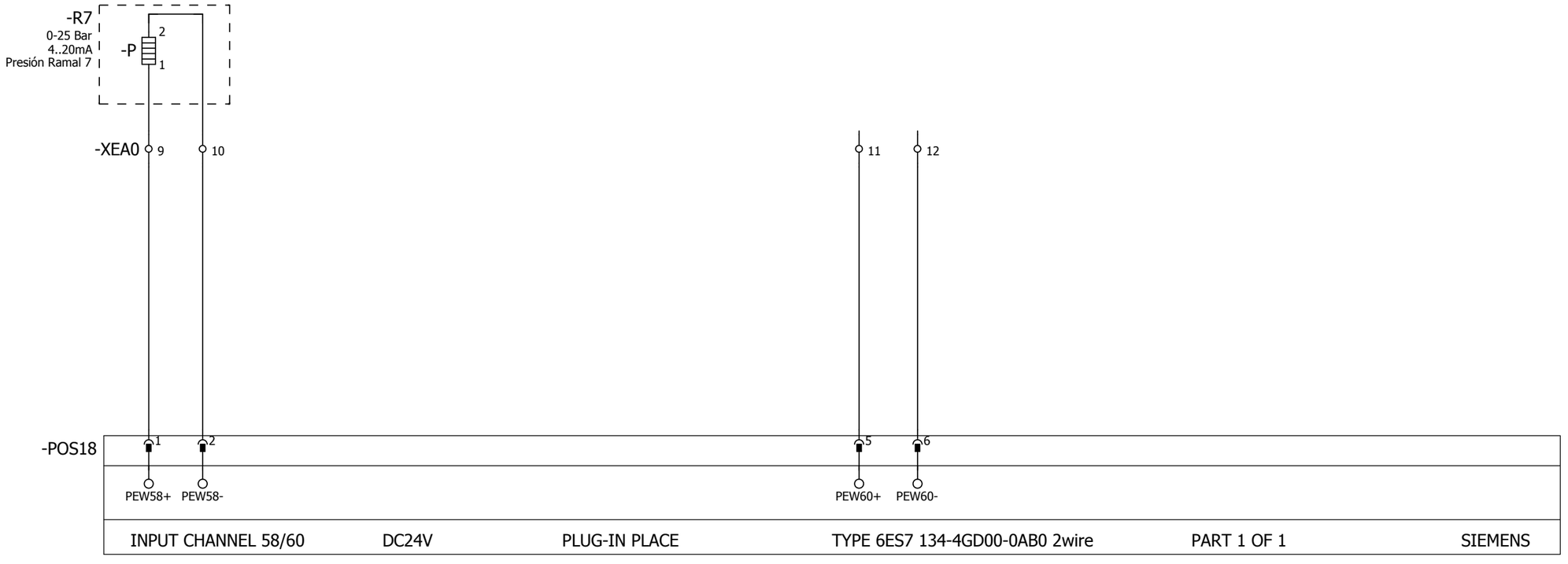
	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas analógicas PLC
Hoja:	32 / 431.d
Ubicación:	CCM
	PFC CAAM 2015

32.9 / -24VDC-

-24VDC- / 35.1



Presión Ramal 7

RESERVA

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala

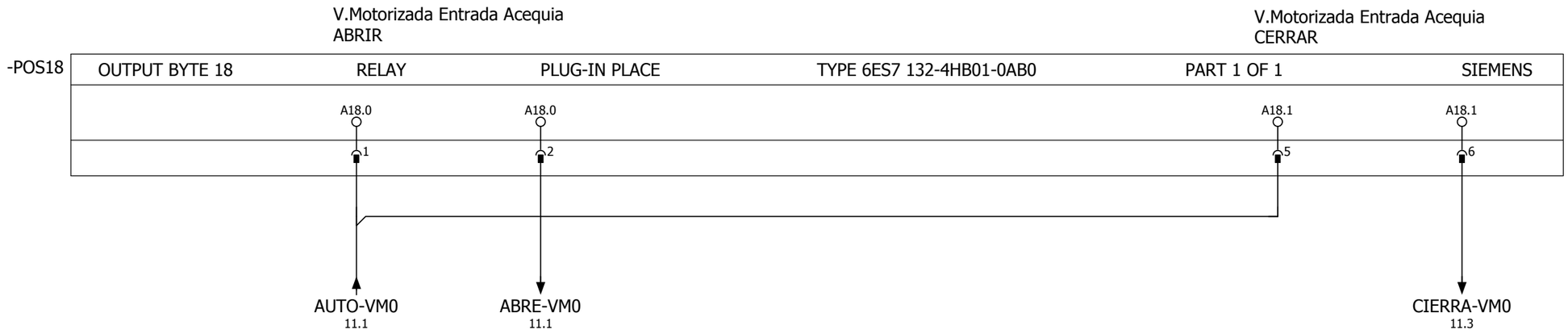
Sistema de control de bombeo

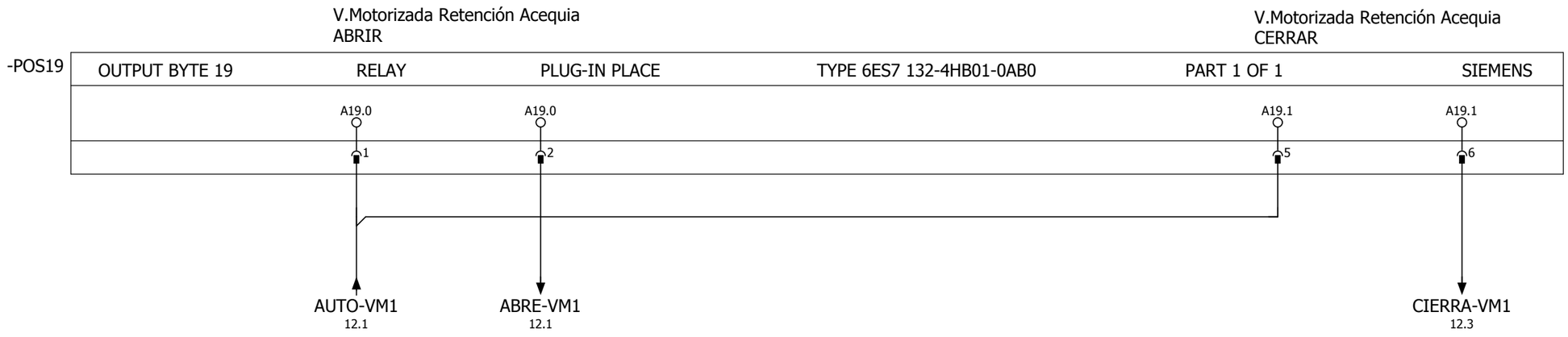
Entradas analógicas PLC

Hoja: 33 / 431.d

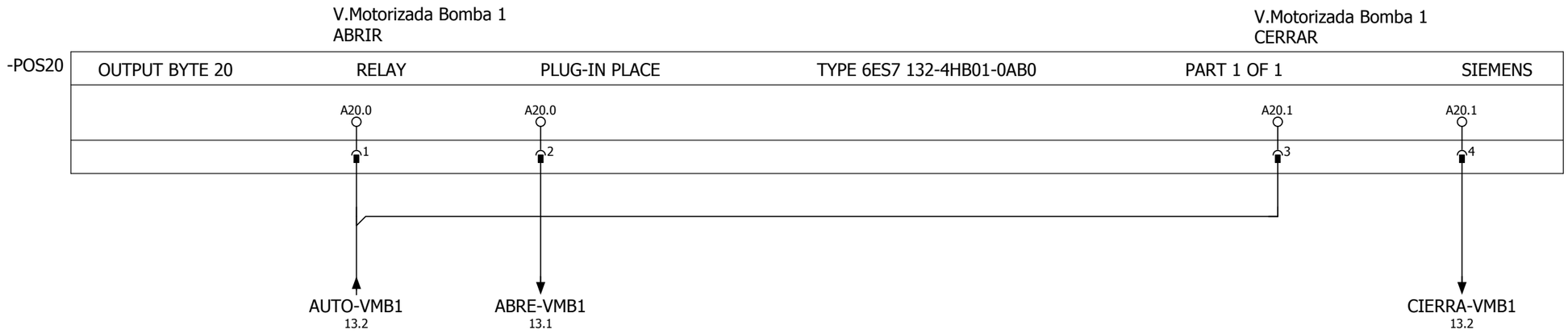
Ubicación: CCM

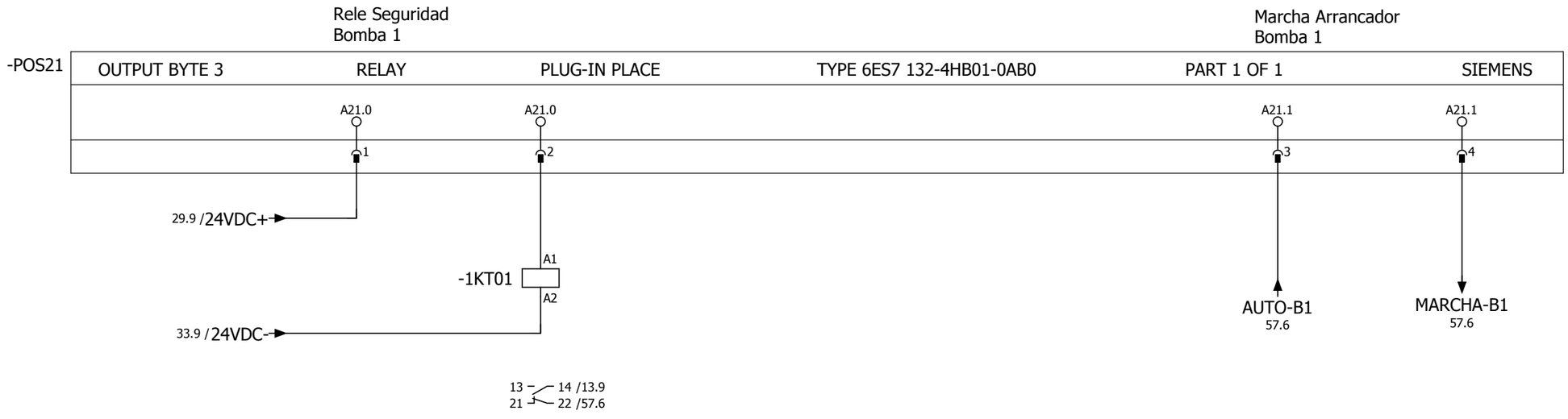
PFC CAAM 2015



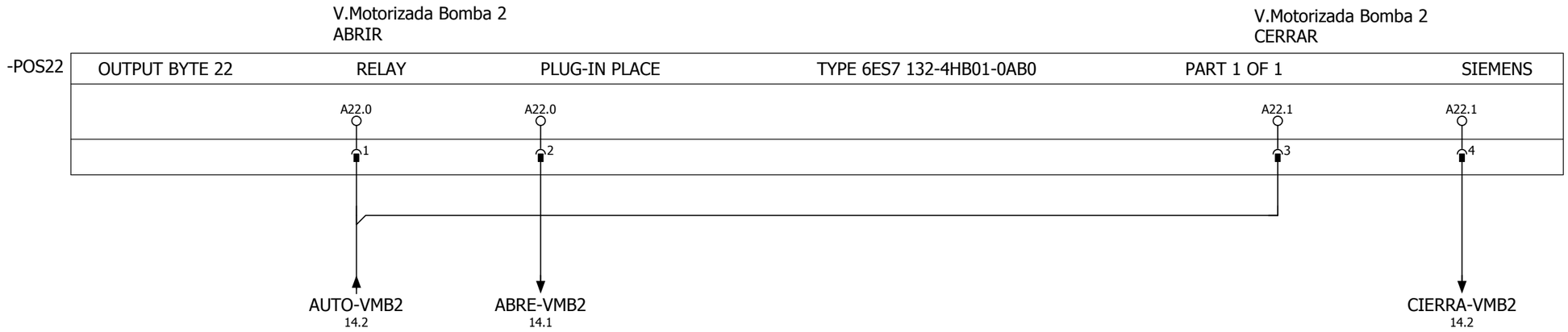


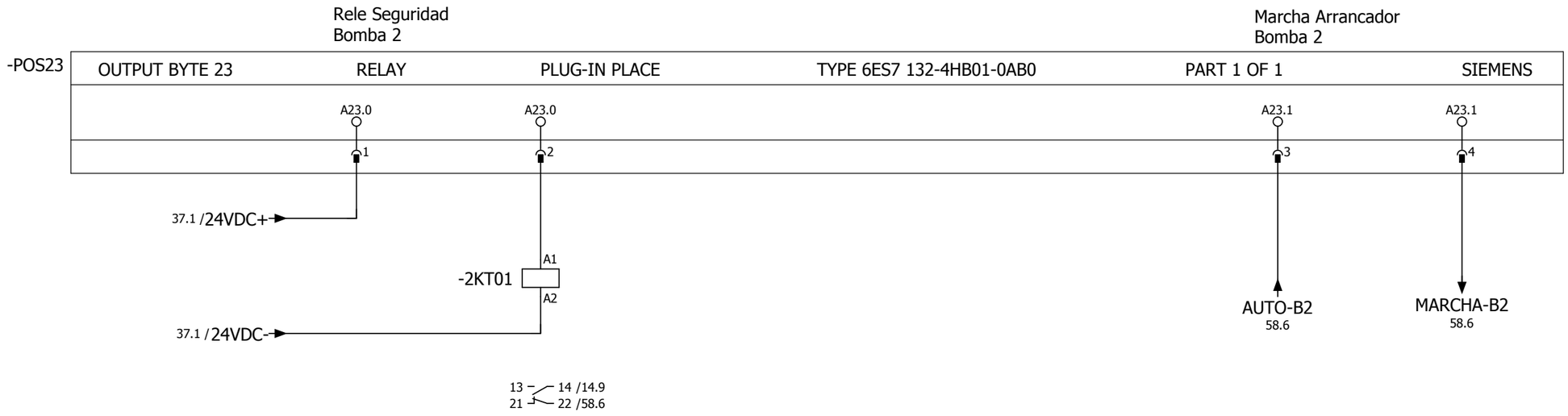
	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Salidas digitales PLC			Hoja: 34 / 431.d Ubicación: CCM PFC CAAM 2015





	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Salidas digitales PLC Bomba 1			Hoja: 35 / 431.d Ubicación: CCM PFC CAAM 2015

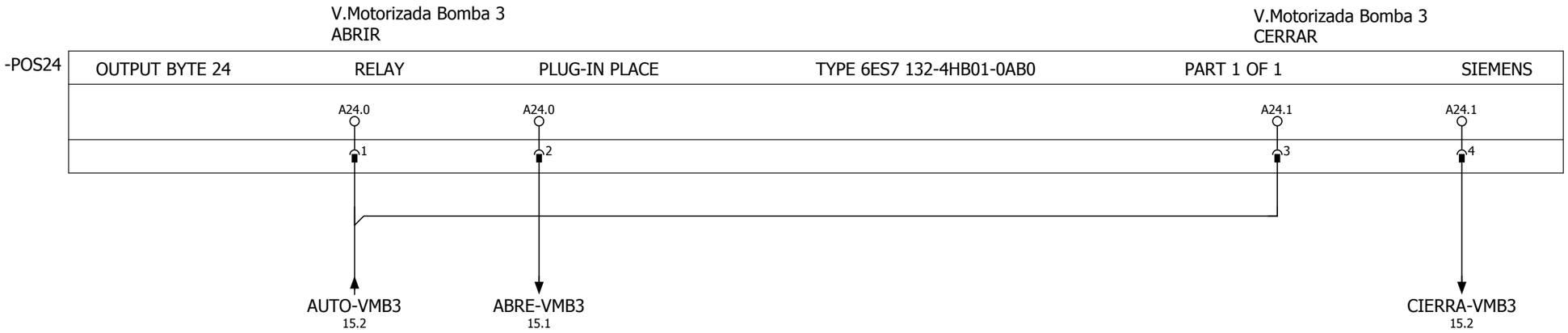


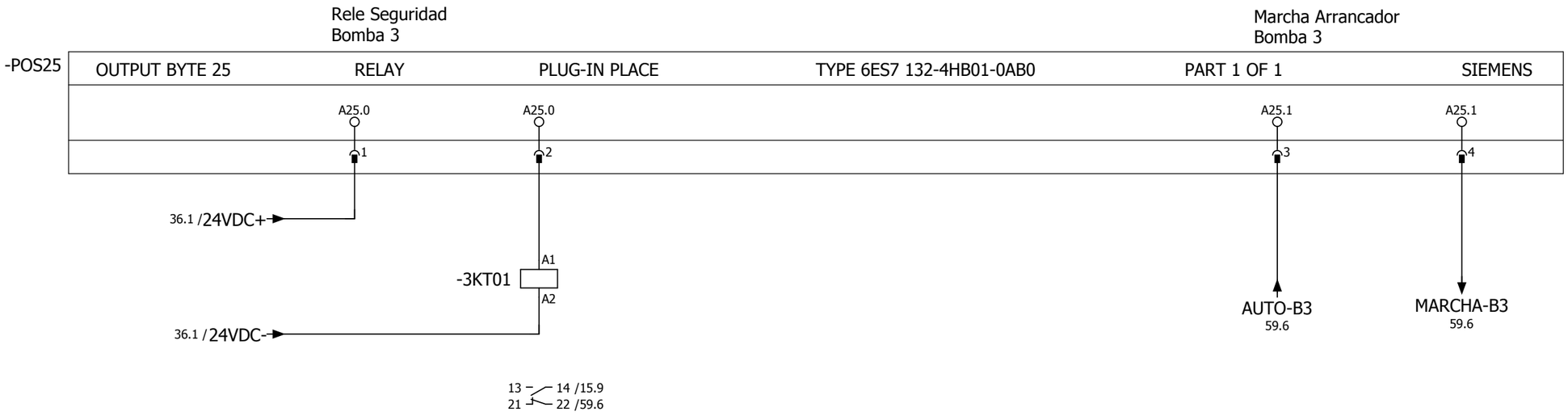


	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

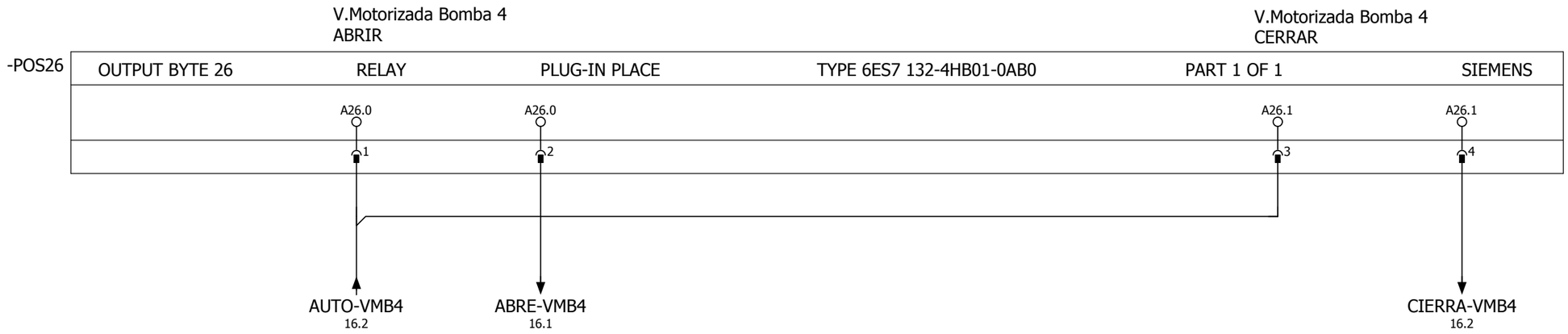
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

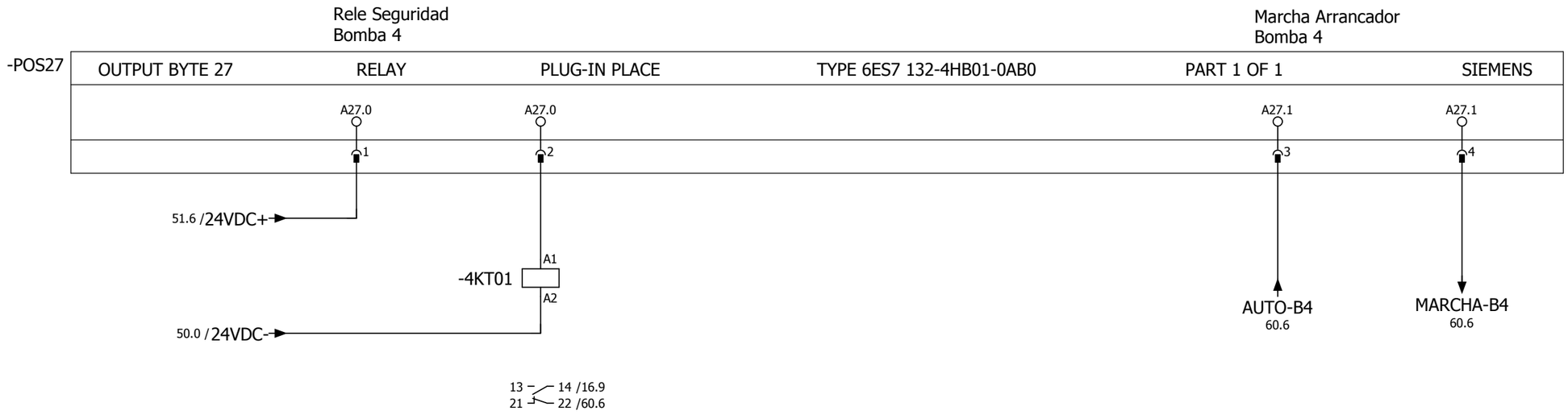
Escala	Sistema de control de bombeo
	Salidas digitales PLC Bomba 2
Hoja:	36 / 431.d
Ubicación:	CCM
PFC CAAM 2015	





	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Salidas digitales PLC Bomba 3			Hoja: 37 / 431.d Ubicación: CCM PFC CAAM 2015

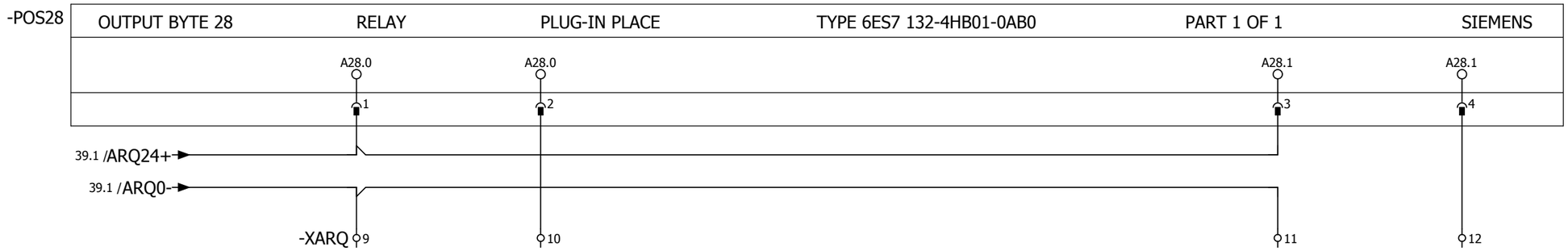




	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo			Hoja: 38 / 431.d
	Salidas digitales PLC Bomba 4			Ubicación: CCM
				PFC CAAM 2015

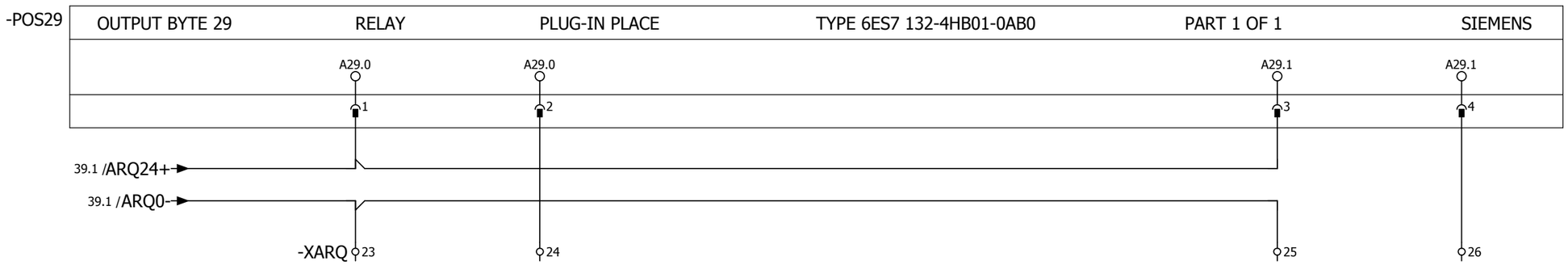
Orden Abrir T5

Orden Cerrar T5



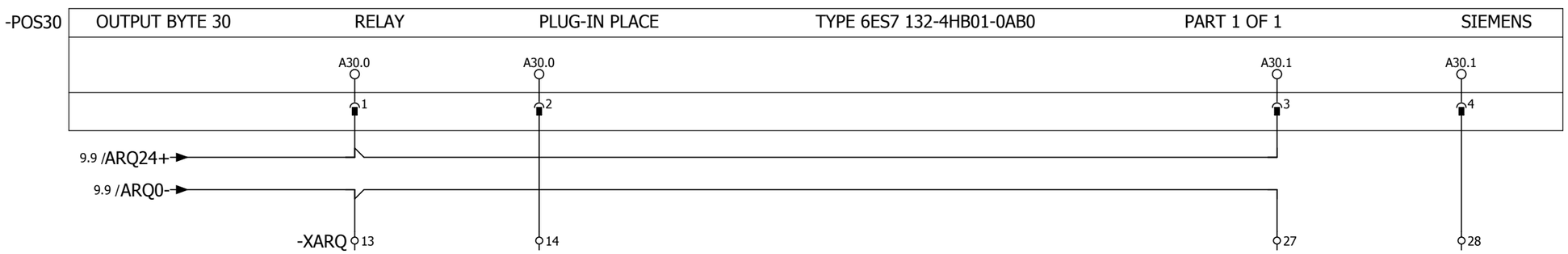
Orden Abrir T6

Orden Cerrar T6



Orden Abrir T7

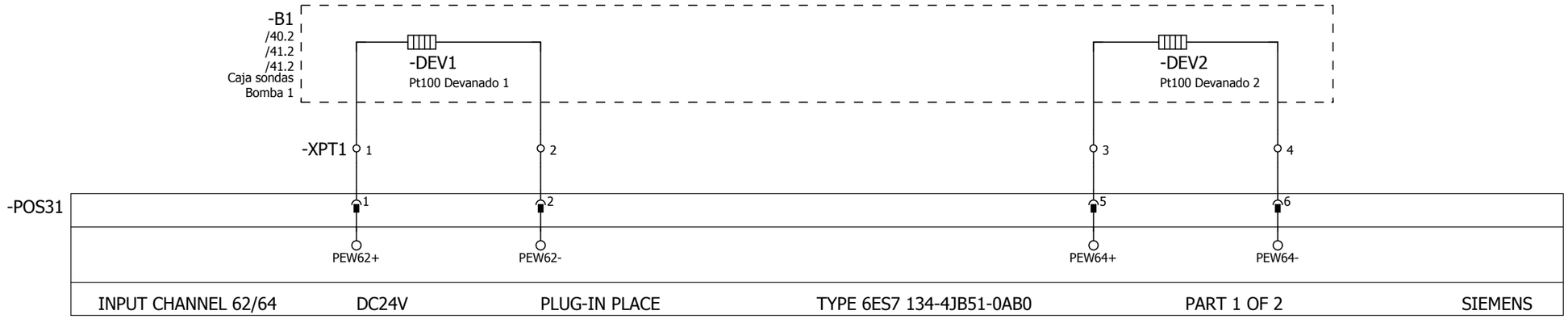
Orden Cerrar T7



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

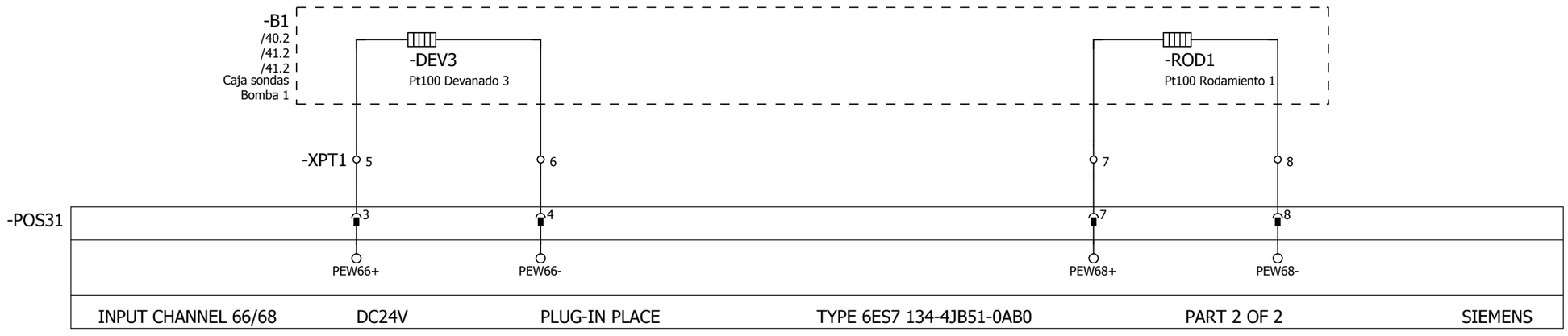
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Salidas digitales PLC T5 T6 T7
Hoja:	39 / 431.d
Ubicación:	CCM
PFC CAAM 2015	



PT100 Devanado 1
Bomba 1

PT100 Devanado 2
Bomba 1



PT100 Devanado 3
Bomba 1

PT100 Rodamiento 1
Bomba 1

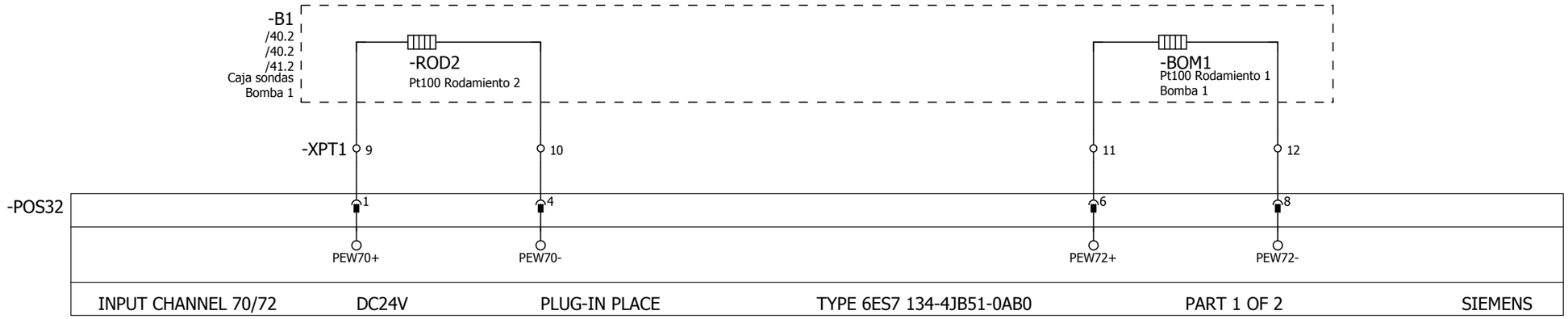
	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo Entradas Pt100 PLC Bomba 1		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 40 / 431.d

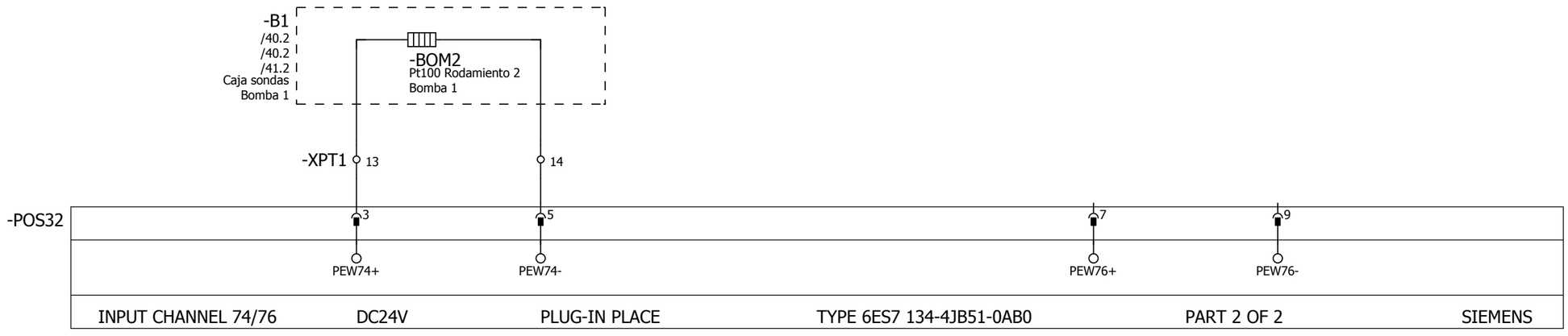
Ubicación: CCM

PFC CAAM 2015



PT100 Rodamiento 2
Bomba 1

PT100 Rodamiento bomba 1
Bomba 1



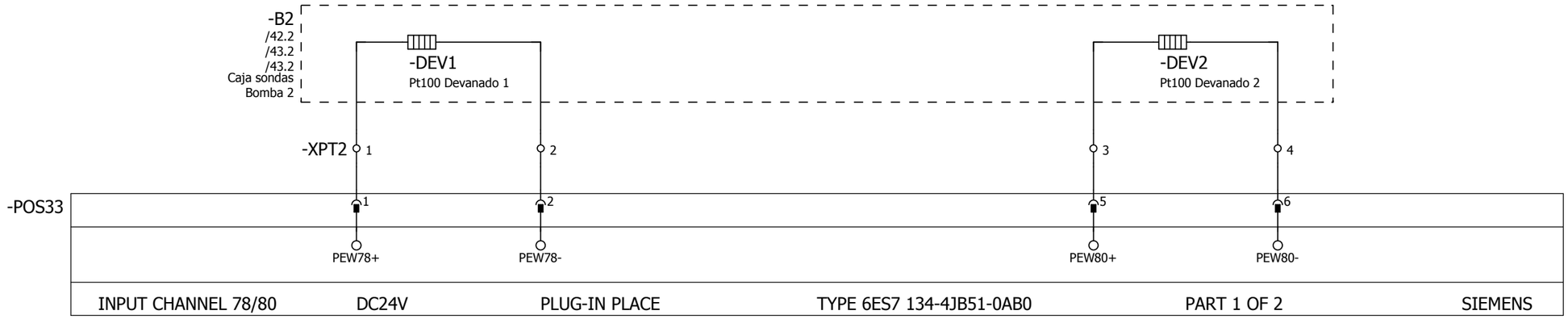
PT100 Rodamiento Bomba 2
Bomba 1

RESERVA

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

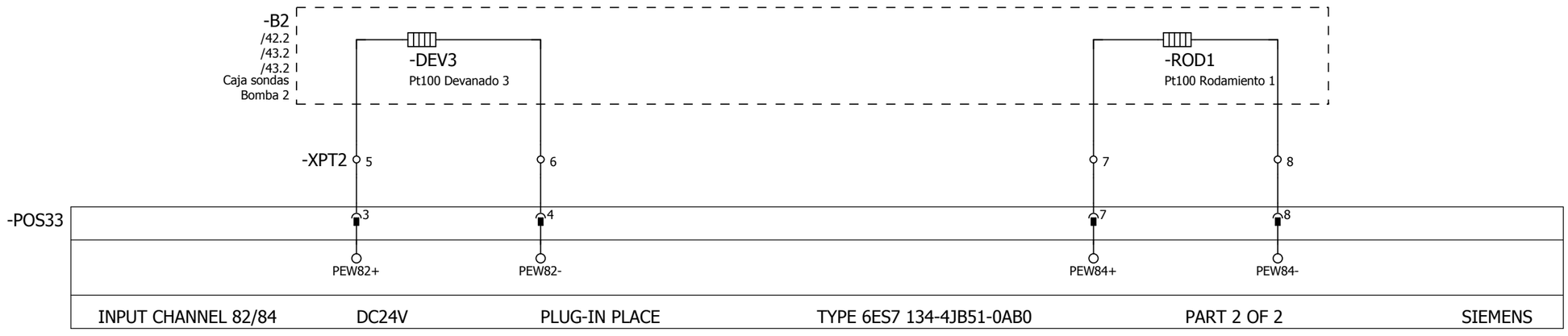
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas Pt100 PLC Bomba 1
	Hoja: 41 / 431.d
	Ubicación: CCM
	PFC CAAM 2015



PT100 Devanado 1
Bomba 2

PT100 Devanado 2
Bomba 2



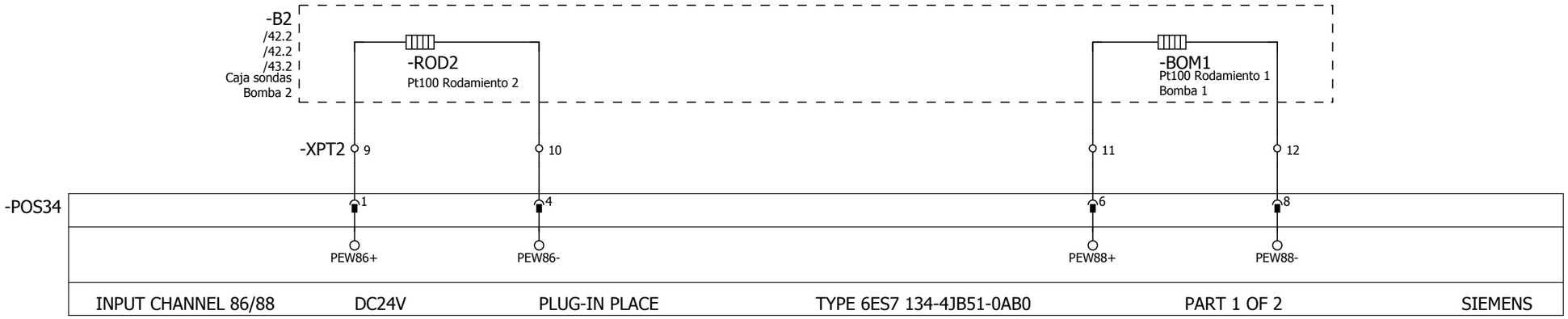
PT100 Devanado 3
Bomba 2

PT100 Rodamiento 1
Bomba 2

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

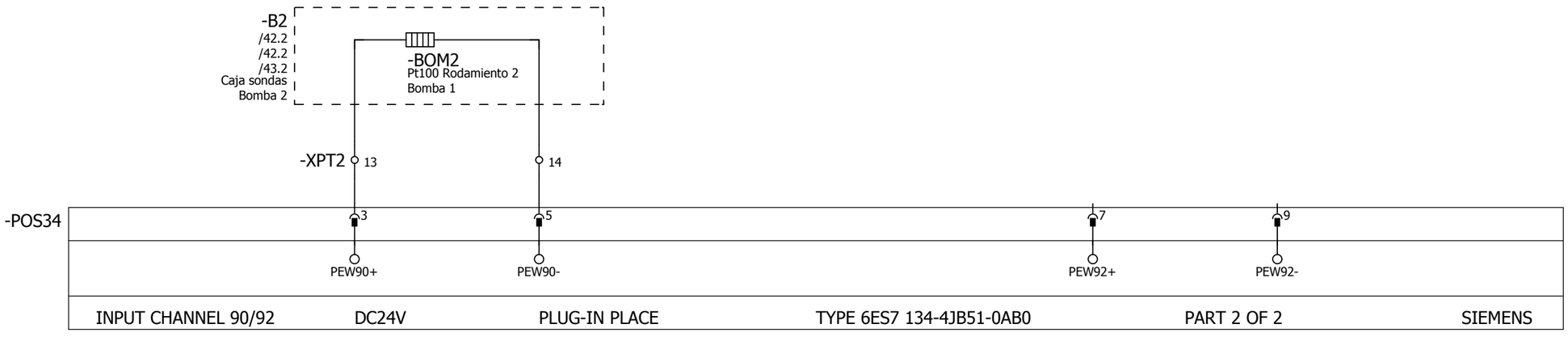
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas Pt100 PLC Bomba 2
	Hoja: 42 / 431.d
	Ubicación: CCM
	PFC CAAM 2015



PT100 Rodamiento 2
Bomba 2

PT100 Rodamiento bomba 1
Bomba 2



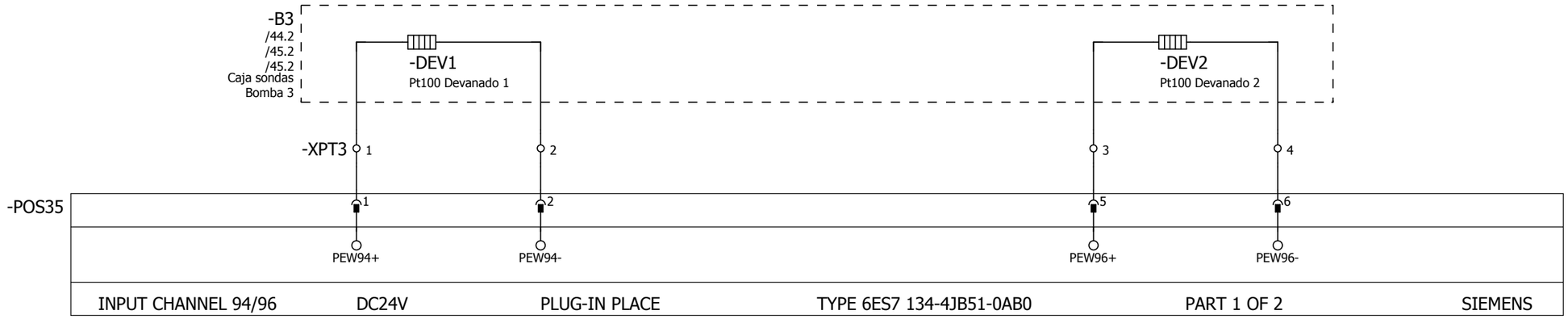
PT100 Rodamiento Bomba 2
Bomba 2

RESERVA

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

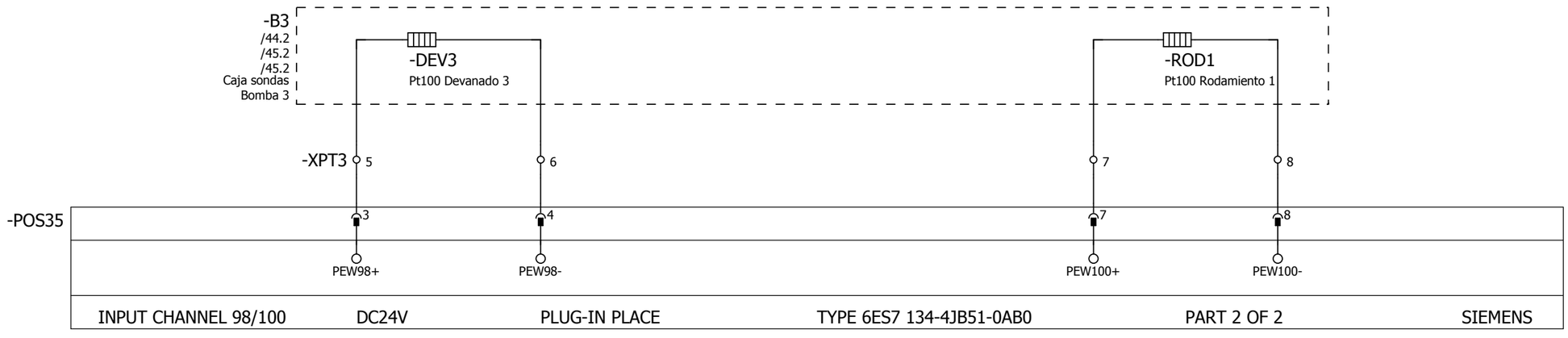
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas Pt100 PLC Bomba 2
	Hoja: 43 / 431.d
	Ubicación: CCM
	PFC CAAM 2015



PT100 Devanado 1
Bomba 3

PT100 Devanado 2
Bomba 3



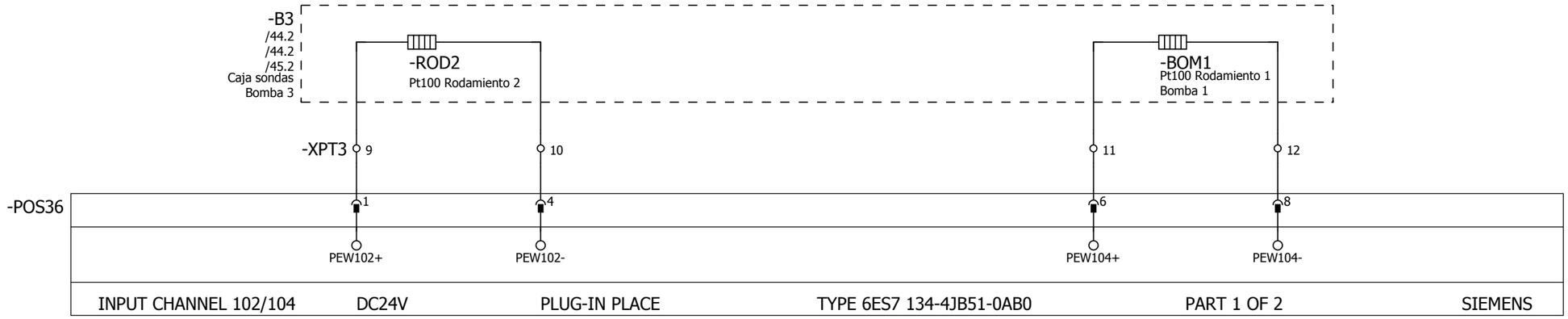
PT100 Devanado 3
Bomba 3

PT100 Rodamiento 1
Bomba 3

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo Entradas Pt100 PLC Bomba 3		

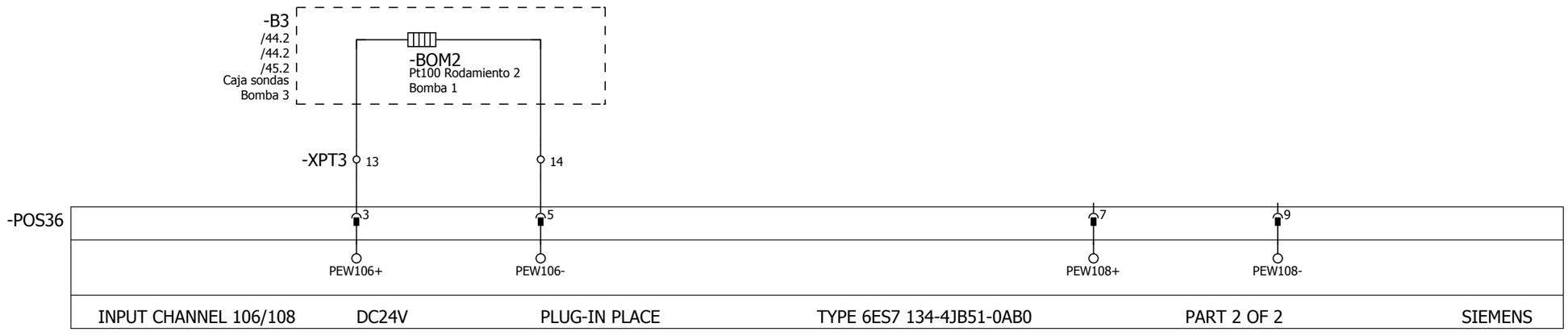
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 44 / 431.d
Ubicación: CCM
PFC CAAM 2015



PT100 Rodamiento 2
Bomba 3

PT100 Rodamiento bomba 1
Bomba 3



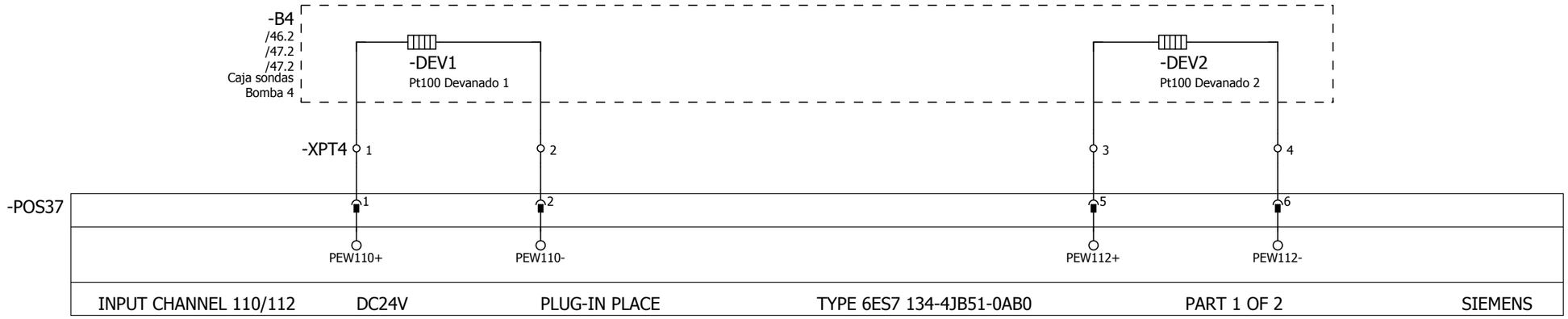
PT100 Rodamiento Bomba 2
Bomba 3

RESERVA

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

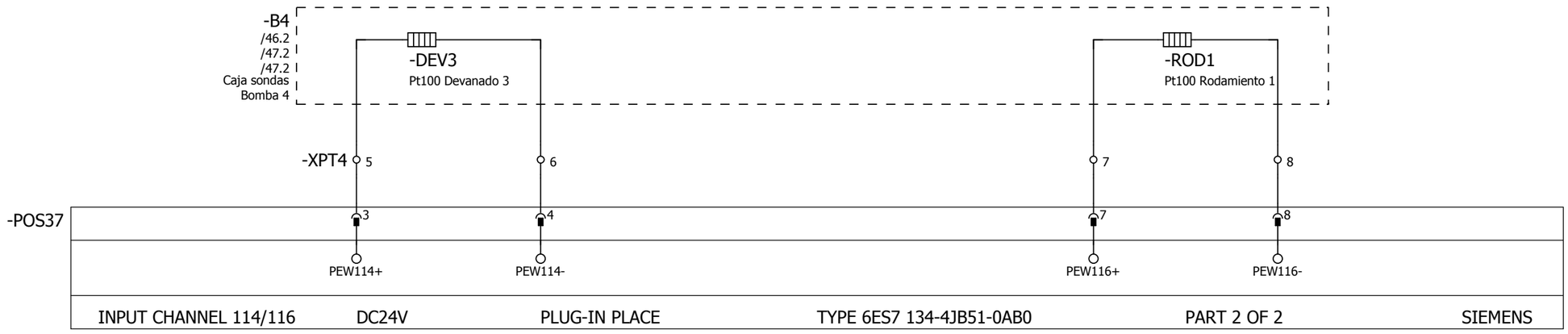
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas Pt100 PLC Bomba 3
	Hoja: 45 / 431.d
	Ubicación: CCM
	PFC CAAM 2015



PT100 Devanado 1
Bomba 4

PT100 Devanado 2
Bomba 4



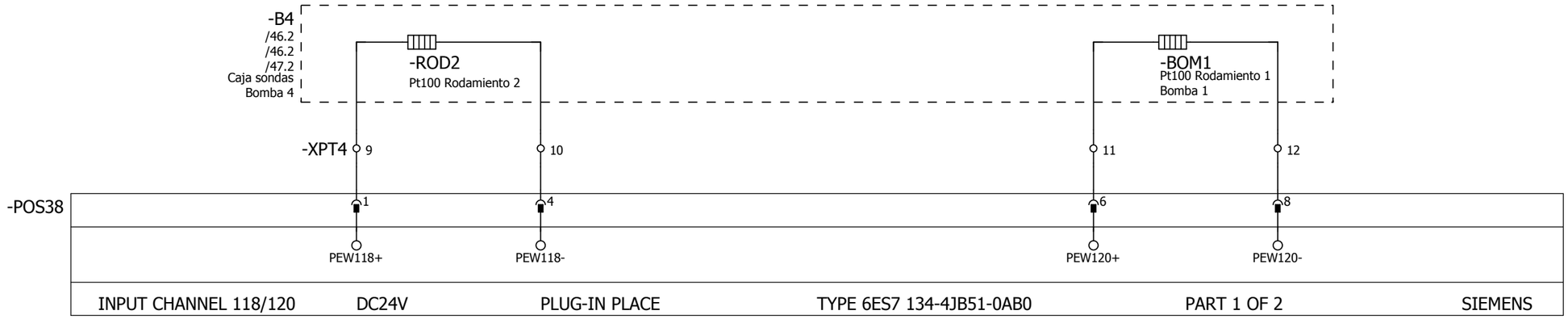
PT100 Devanado 3
Bomba 4

PT100 Rodamiento 1
Bomba 4

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

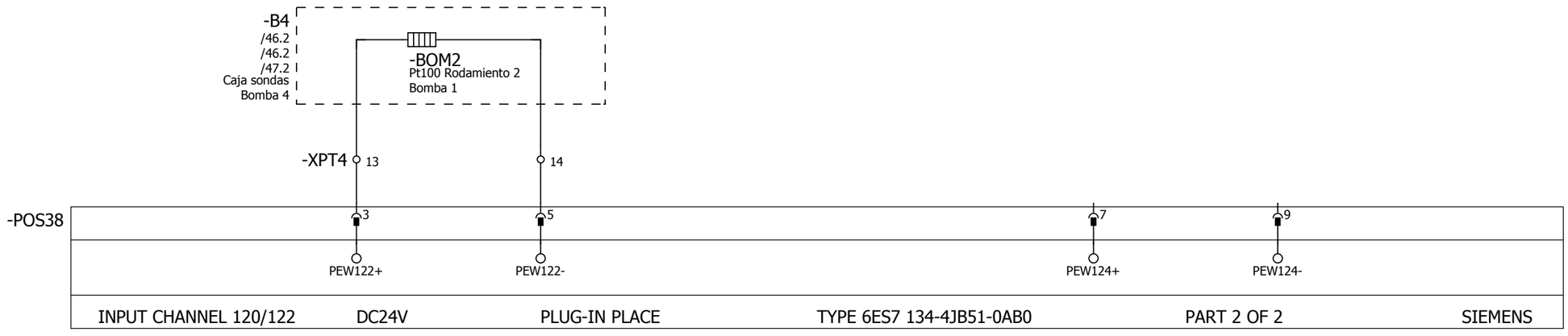
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas Pt100 PLC Bomba 4
Hoja:	46 / 431.d
Ubicación:	CCM
PFC CAAM 2015	



PT100 Rodamiento 2
Bomba 4

PT100 Rodamiento bomba 1
Bomba 4



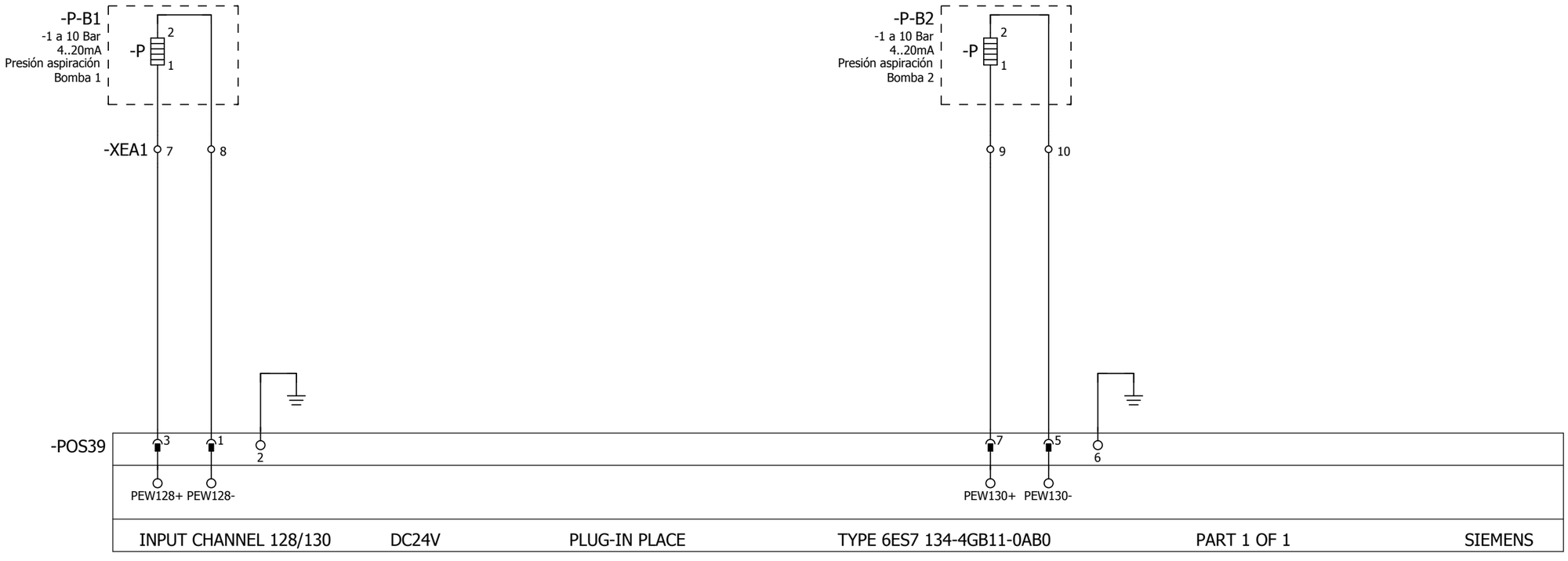
PT100 Rodamiento Bomba 2
Bomba 2

RESERVA

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas Pt100 PLC Bomba 4
	Hoja: 47 / 431.d
	Ubicación: CCM
	PFC CAAM 2015



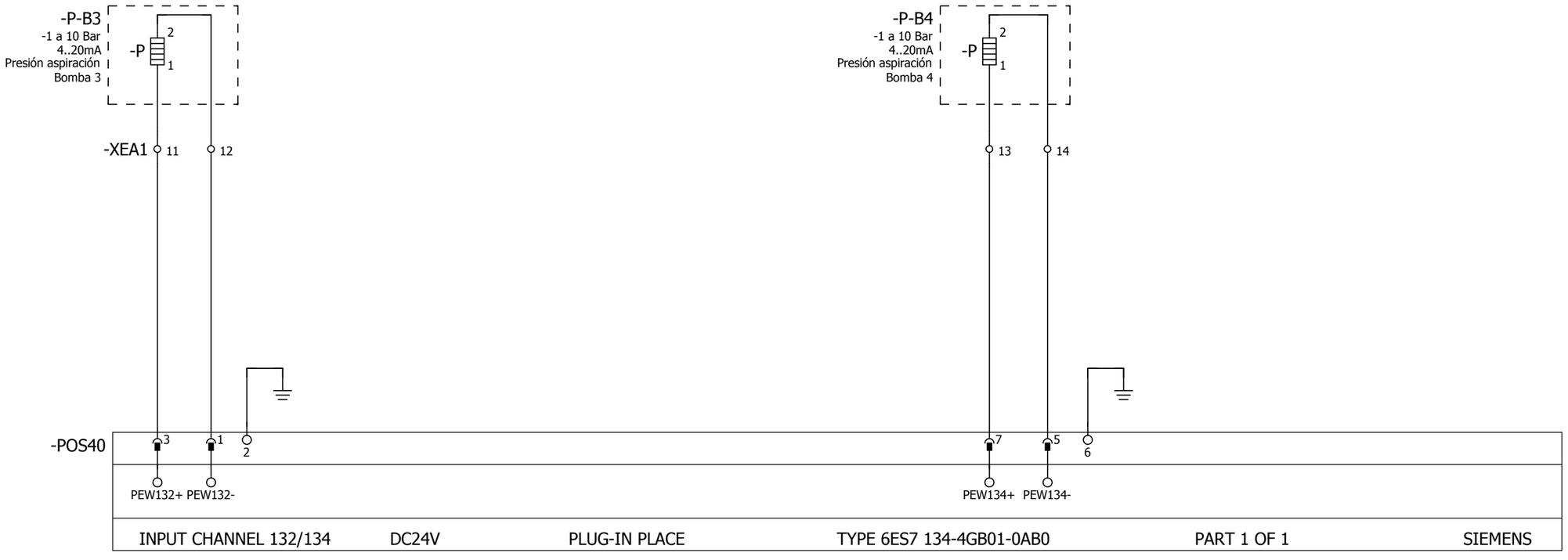
Presión aspiración
Bomba 1

Presión aspiración
Bomba 2

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas analógicas PLC Bombas 1 y 2
	Hoja: 48 / 431.d
	Ubicación: CCM
	PFC CAAM 2015



Presión aspiración
Bomba 3

Presión aspiración
Bomba 4

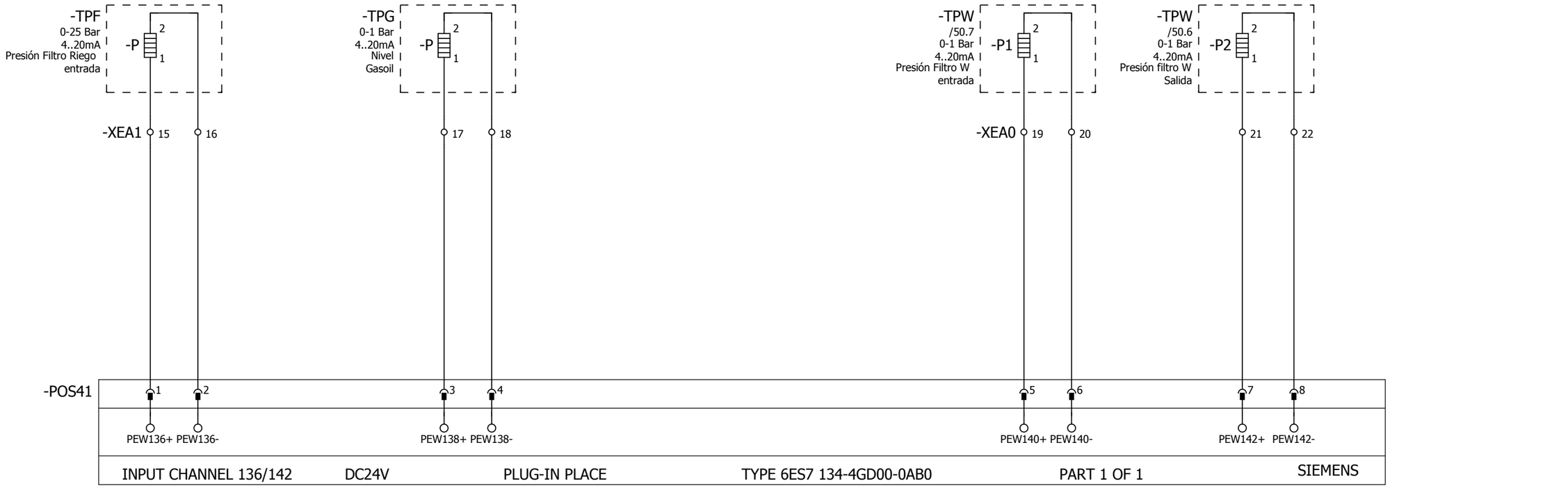
	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas analógicas PLC Bombas 3 y 4
	Hoja: 49 / 431.d
	Ubicación: CCM
	PFC CAAM 2015

0	1	2	3	4	5	6	7	8	9

38.1 / 24VDC- → 24VDC- / 51.6



Presión Filtro Riego Entrada

Presión nivel Gasoil

Presión Filtro W Entrada

Presión Filtro W Salida

51

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

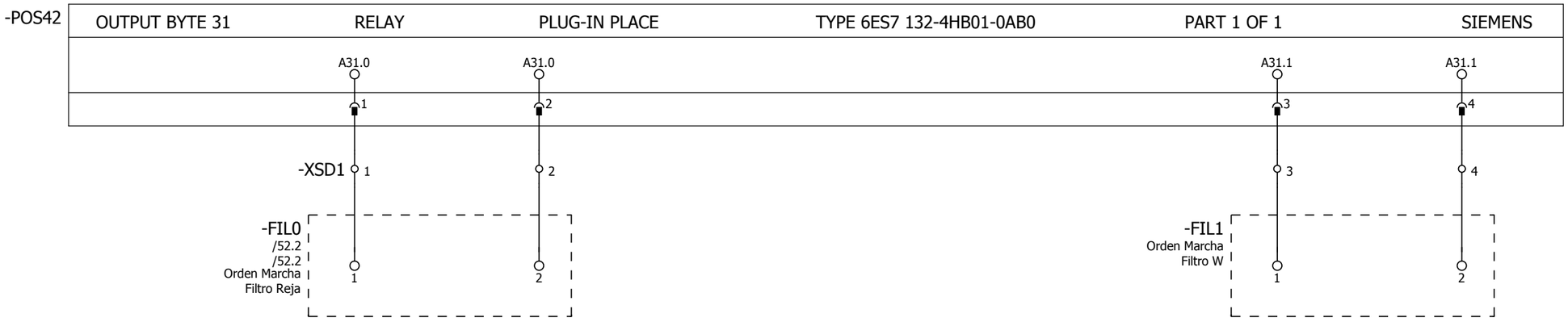
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas analógicas PLC
Hoja:	50 / 431.d
Ubicación:	CCM
	PFC CAAM 2015

49

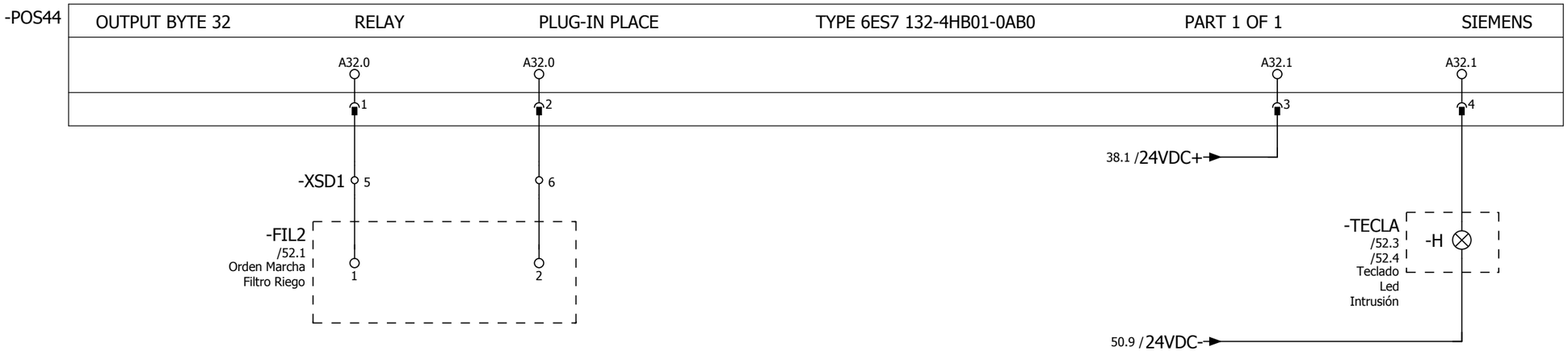
Orden Marcha reja

Orden Marcha Filtro W



Orden Marcha Filtro Riego

Display led Alarma



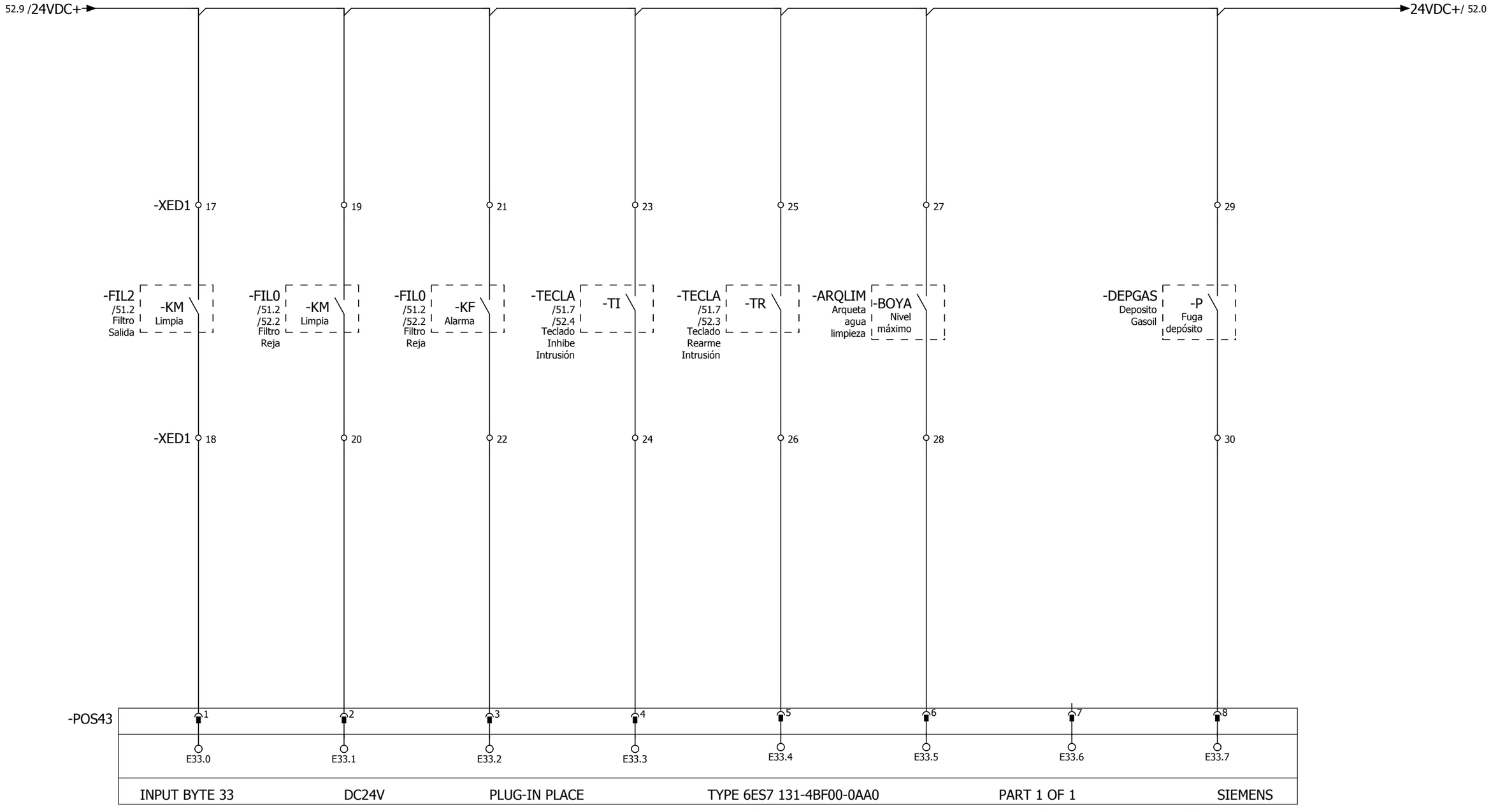
	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo Salidas digitales PLC		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 51 / 431.d

Ubicación: CCM

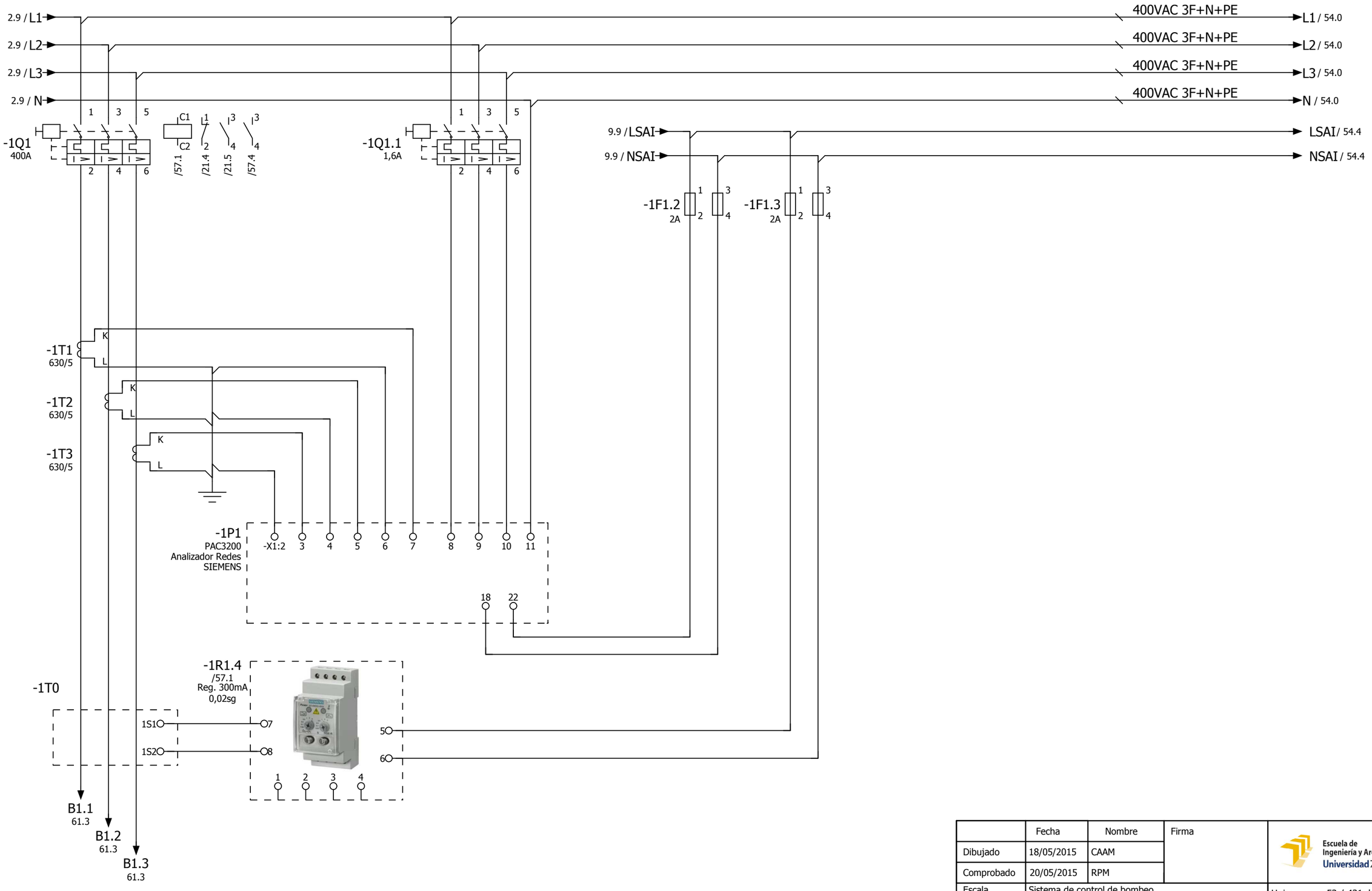
PFC CAAM 2015



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

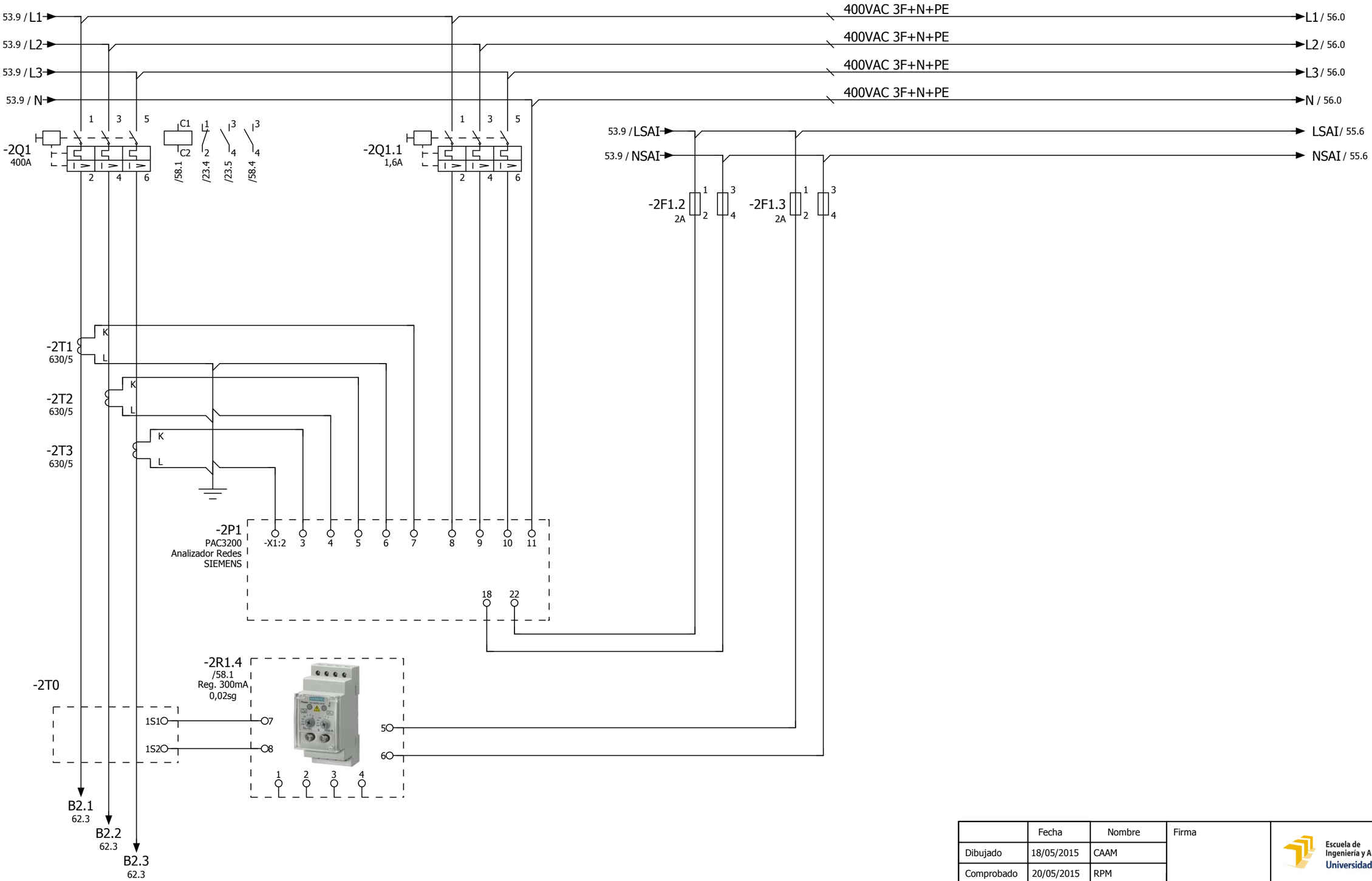
Escala	Sistema de control de bombeo Entradas digitales PLC
Hoja:	52 / 431.d
Ubicación:	CCM
PFC CAAM 2015	



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

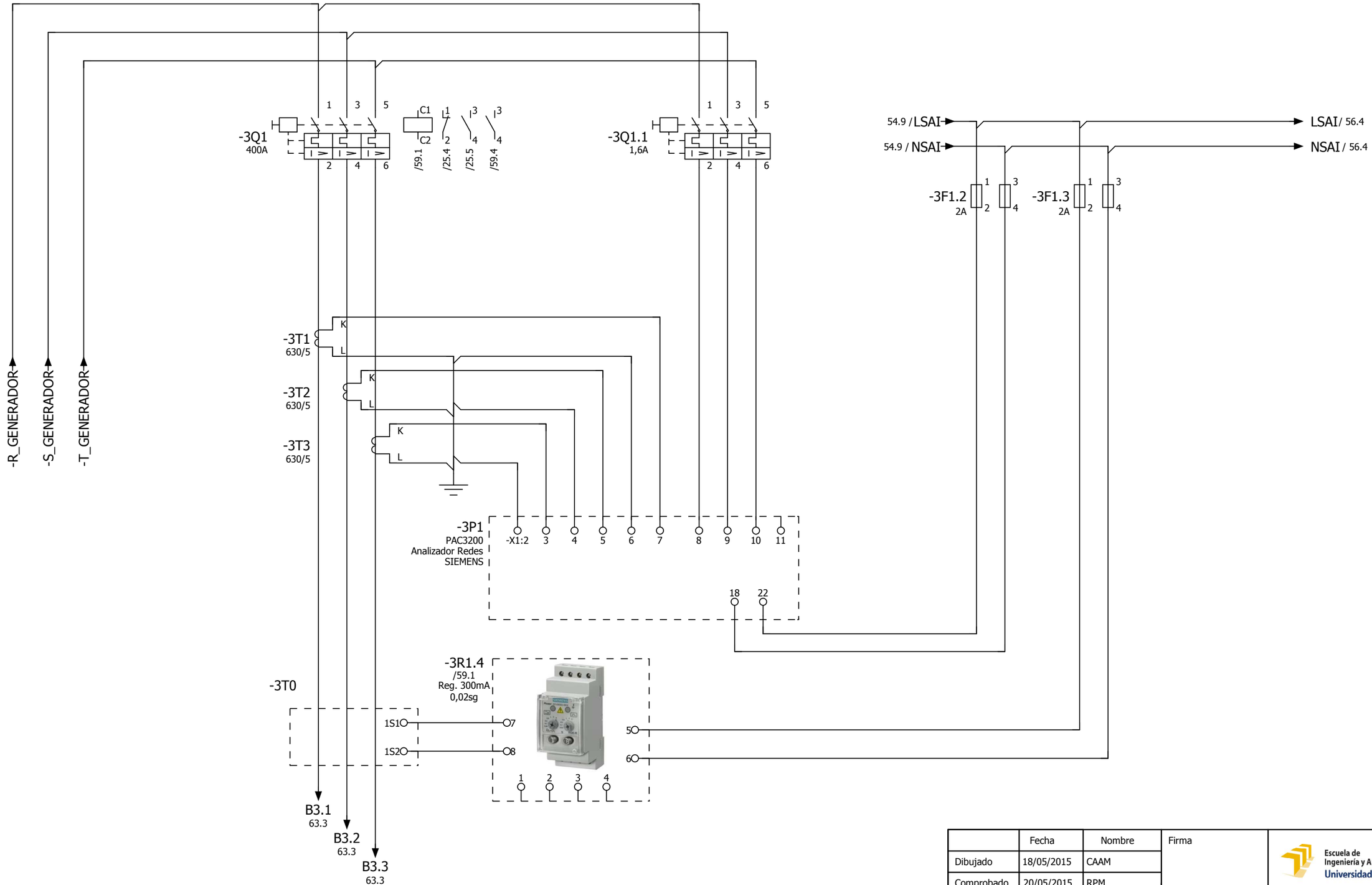
Escala	Sistema de control de bombeo Alimentación Bomba 1
Hoja:	53 / 431.d
Ubicación:	CCM
PFC CAAM 2015	



55

	Fecha	Nombre	Firma	
Dibujado	18/05/2015	CAAM		Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Alimentación Bomba 2			Hoja: 54 / 431.d Ubicación: CCM PFC CAAM 2015

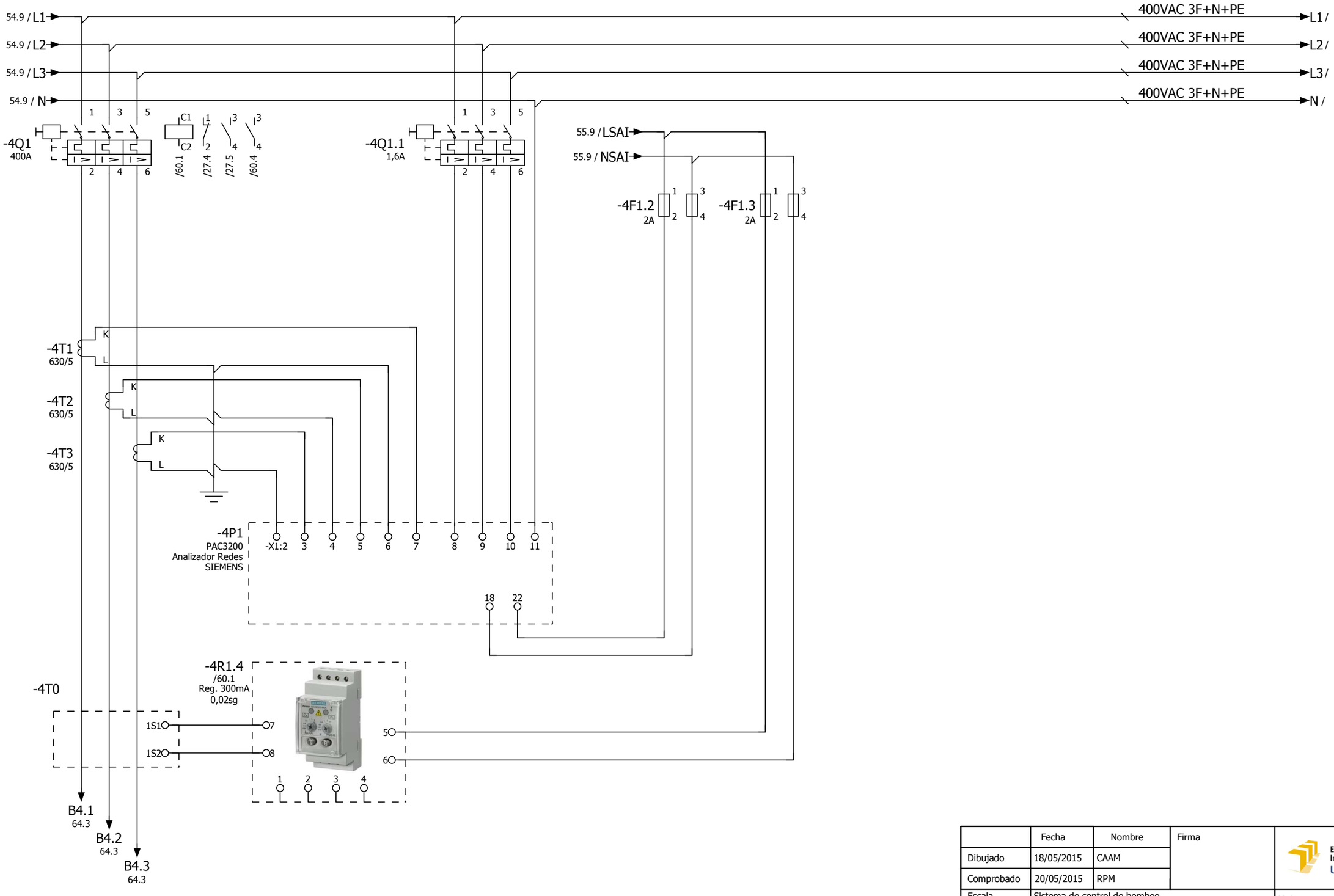
53



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

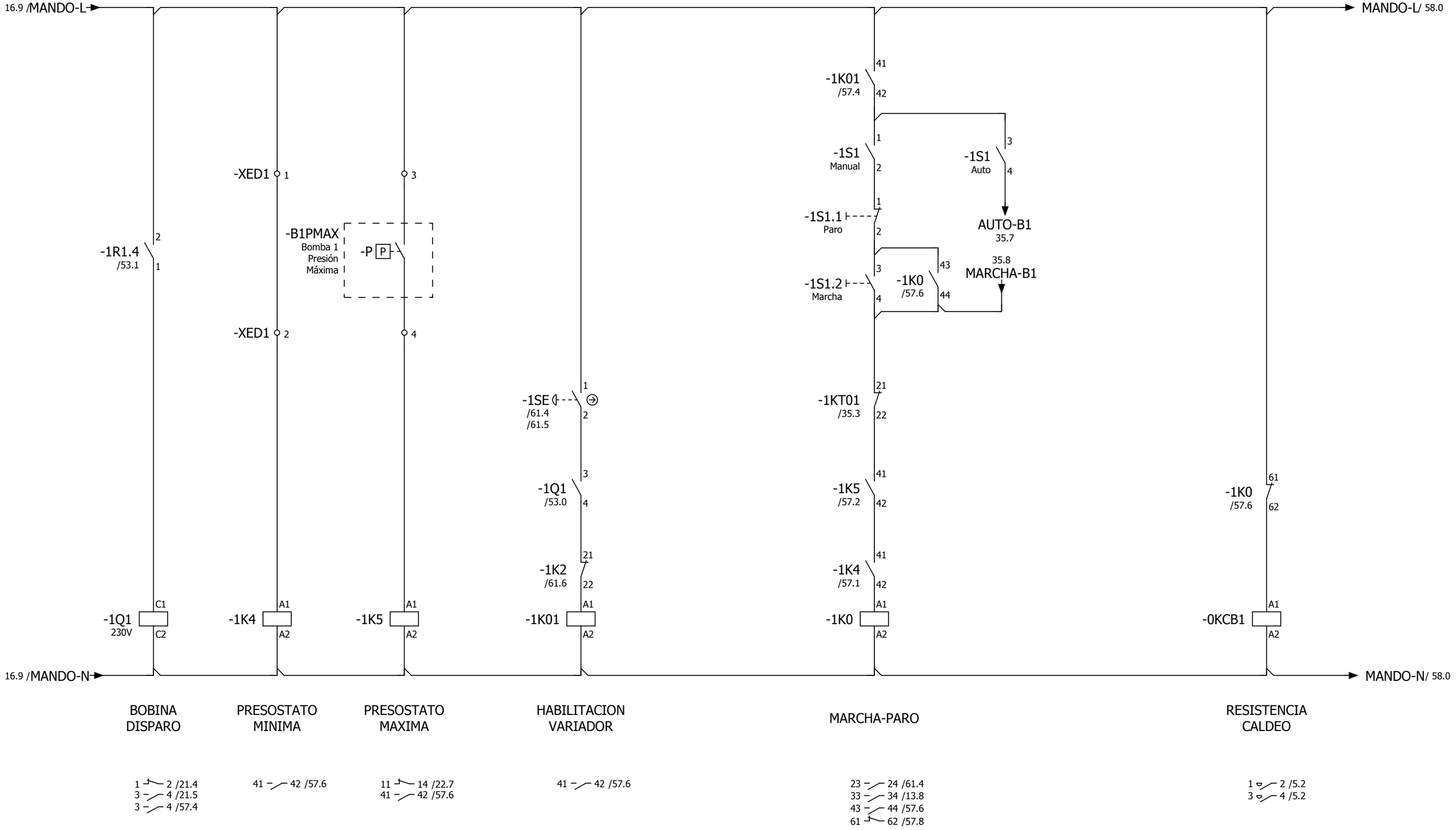
Escala	Sistema de control de bombeo
	Alimentación Bomba 3
Hoja:	55 / 431.d
Ubicación:	CCM
PFC CAAM 2015	



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

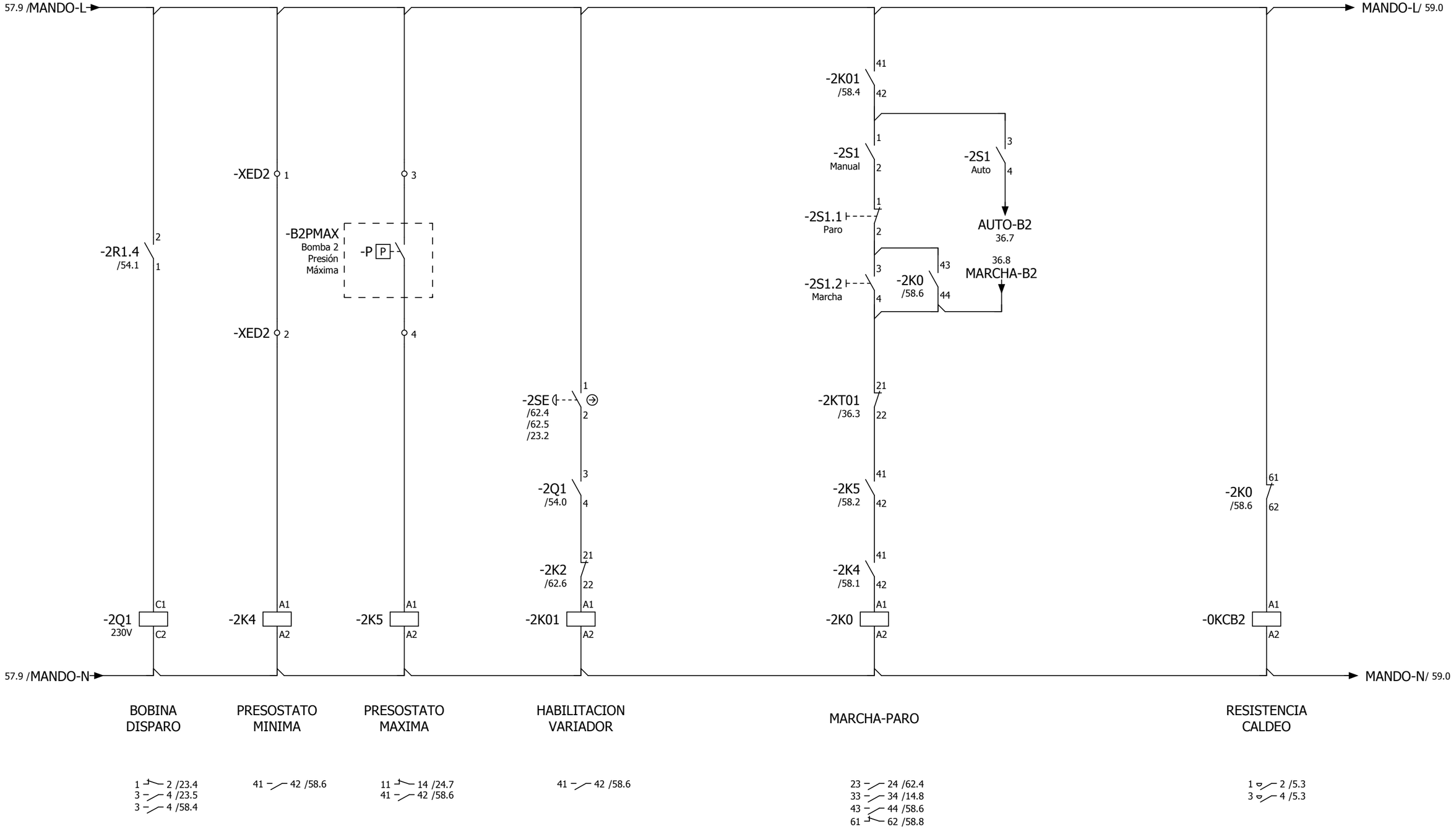
Escala	Sistema de control de bombeo
	Alimentación Bomba 4
Hoja:	56 / 431.d
Ubicación:	CCM
PFC CAAM 2015	



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	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Maniobra Bomba 1			Hoja: 57 / 431.d Ubicación: CCM PFC CAAM 2015

56



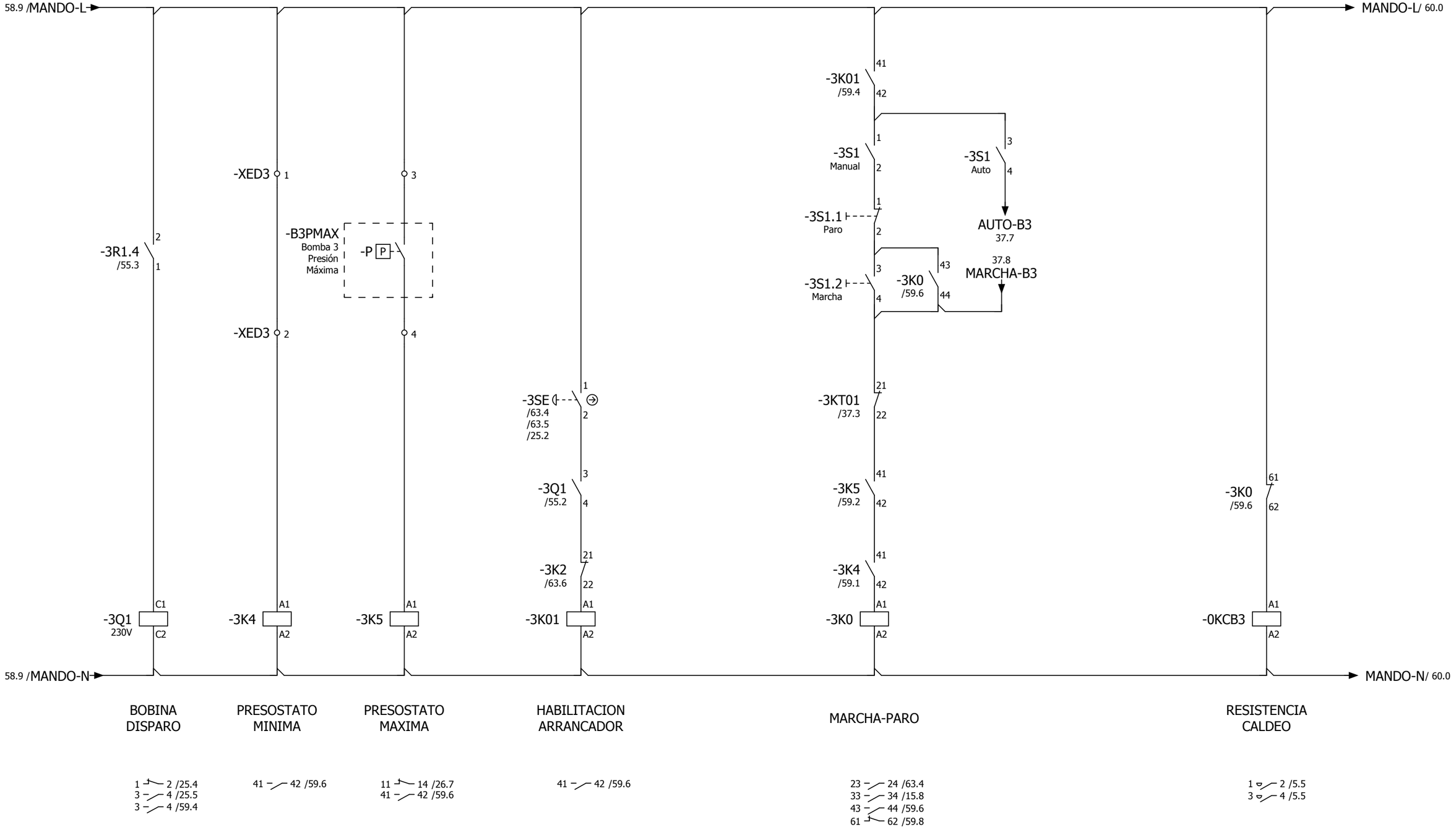
59

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Maniobra Bomba 2
	Hoja: 58 / 431.d
	Ubicación: CCM
	PFC CAAM 2015

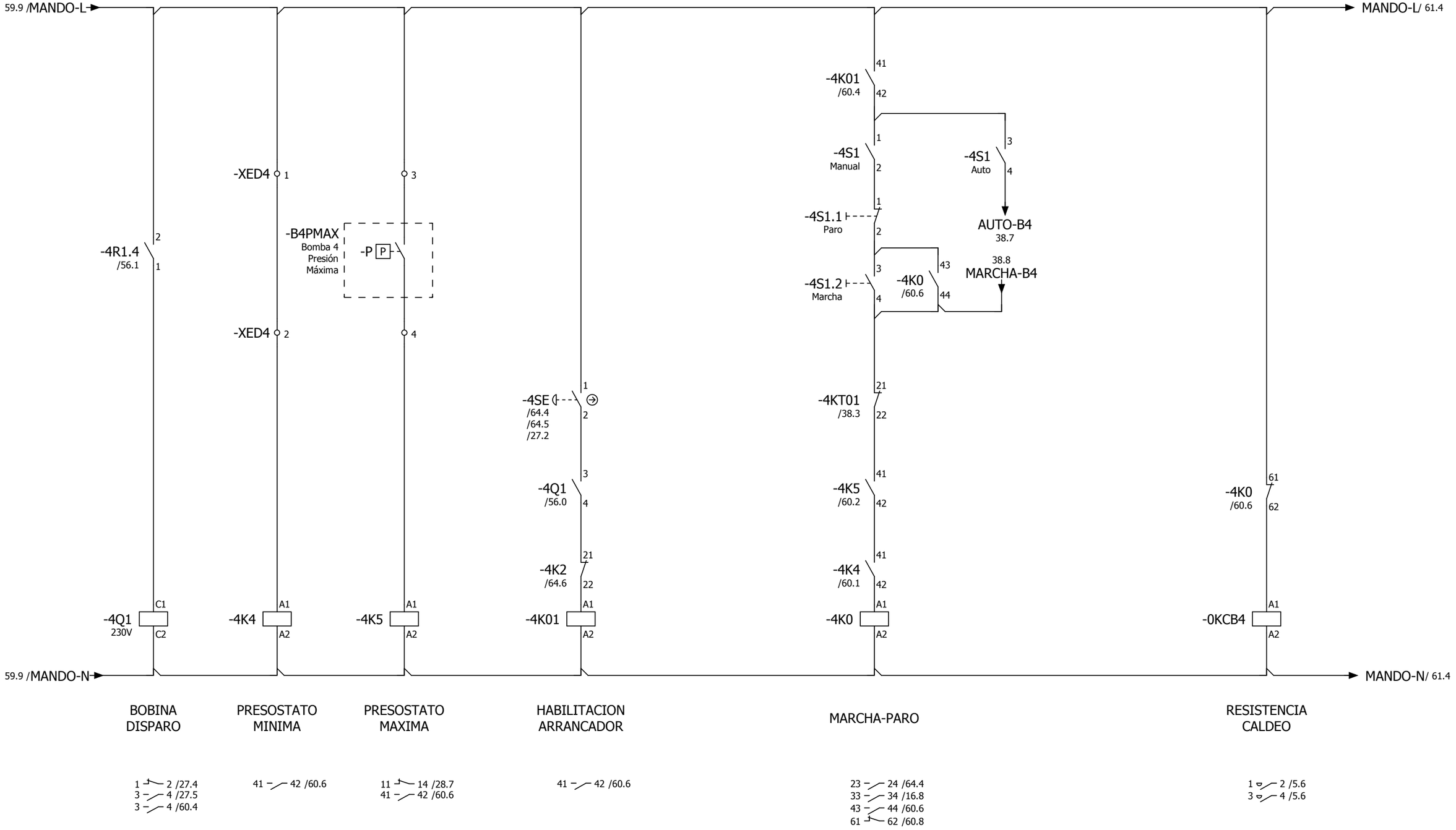
57



60

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Maniobra Bomba 3			Hoja: 59 / 431.d Ubicación: CCM PFC CAAM 2015

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61

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo		
	Maniobra Bomba 4		

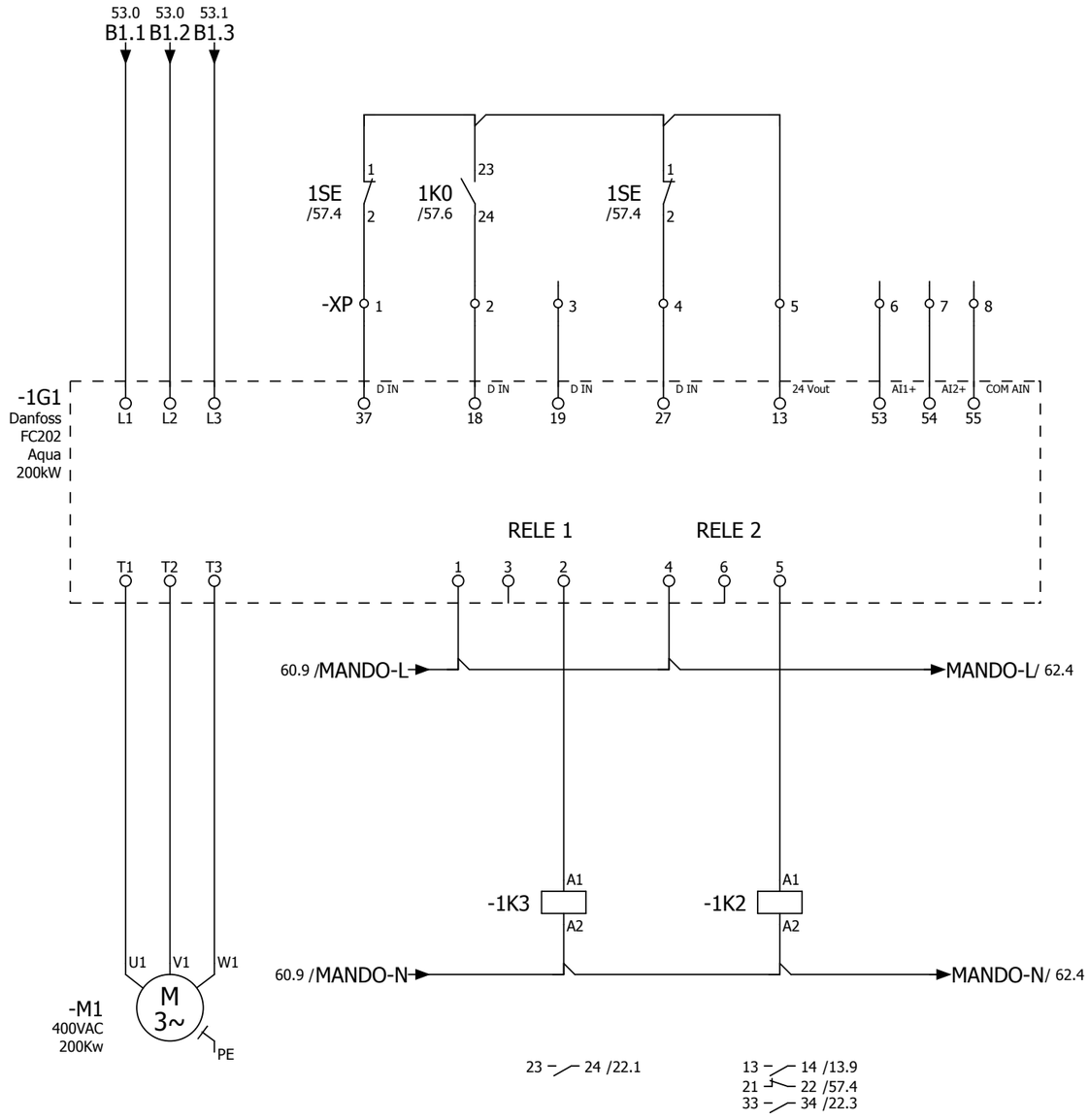
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 60 / 431.d

Ubicación: CCM

PFC CAAM 2015

59



MOTOR BOMBA 1 | FIN DE RAMPA | ALARMA

62

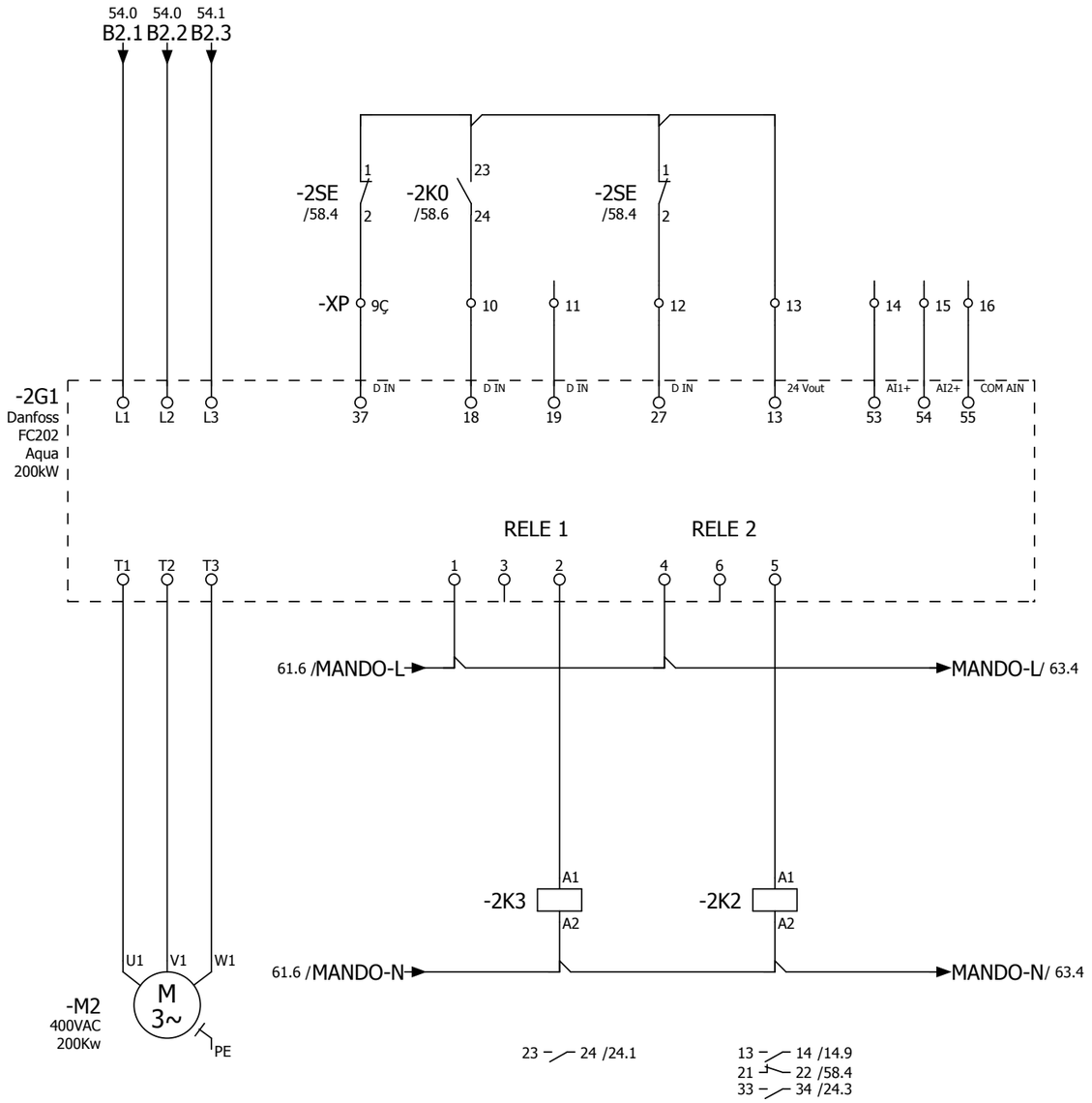
	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo Accionamiento Bomba 1		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 61 / 431.d

Ubicación: CCM

PFC CAAM 2015



MOTOR BOMBA 1 FIN DE RAMPA ALARMA

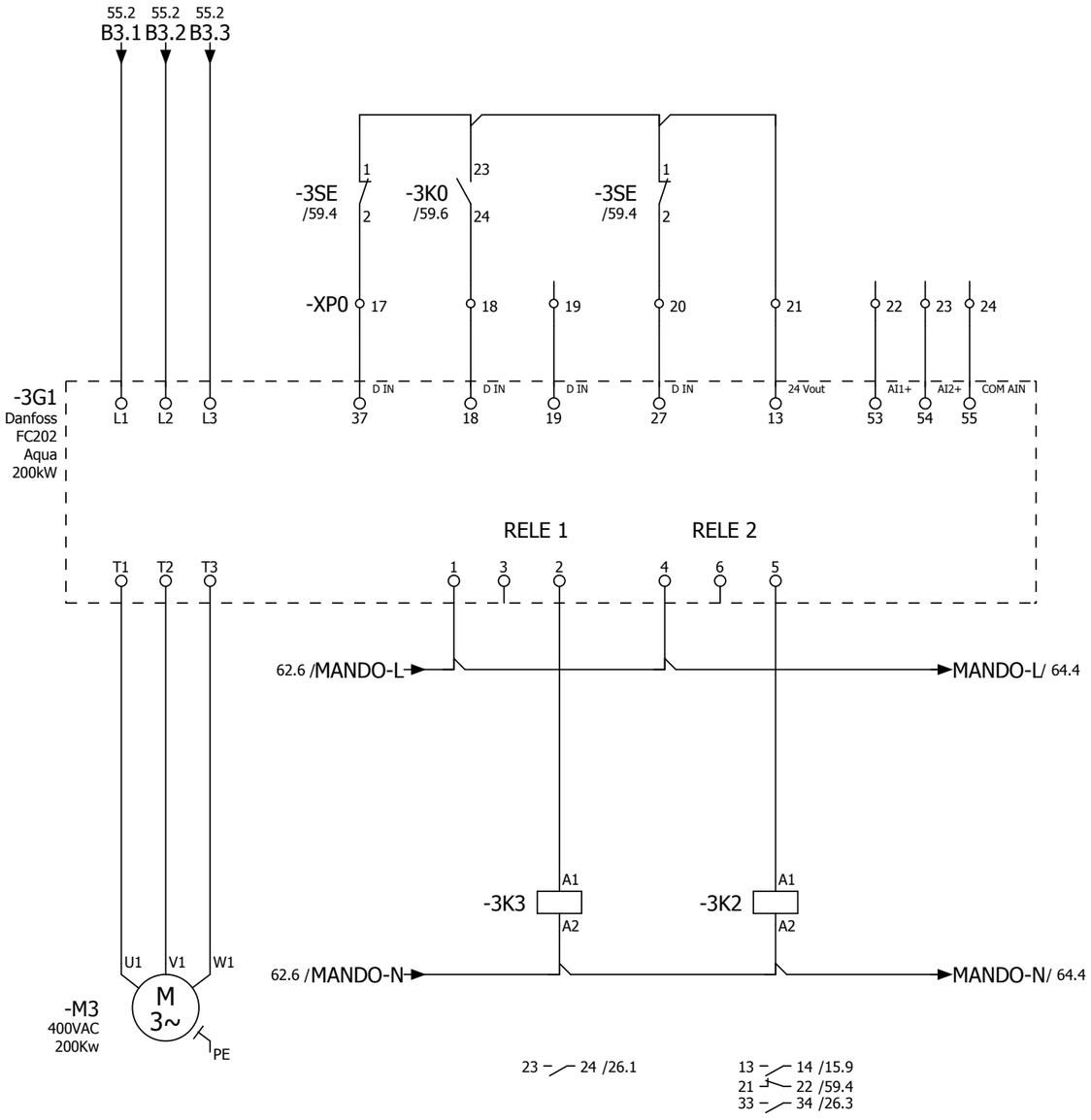
63

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Accionamiento Bomba 2
Hoja:	62 / 431.d
Ubicación:	CCM
	PFC CAAM 2015

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MOTOR BOMBA 1

FIN DE RAMPA

ALARMA

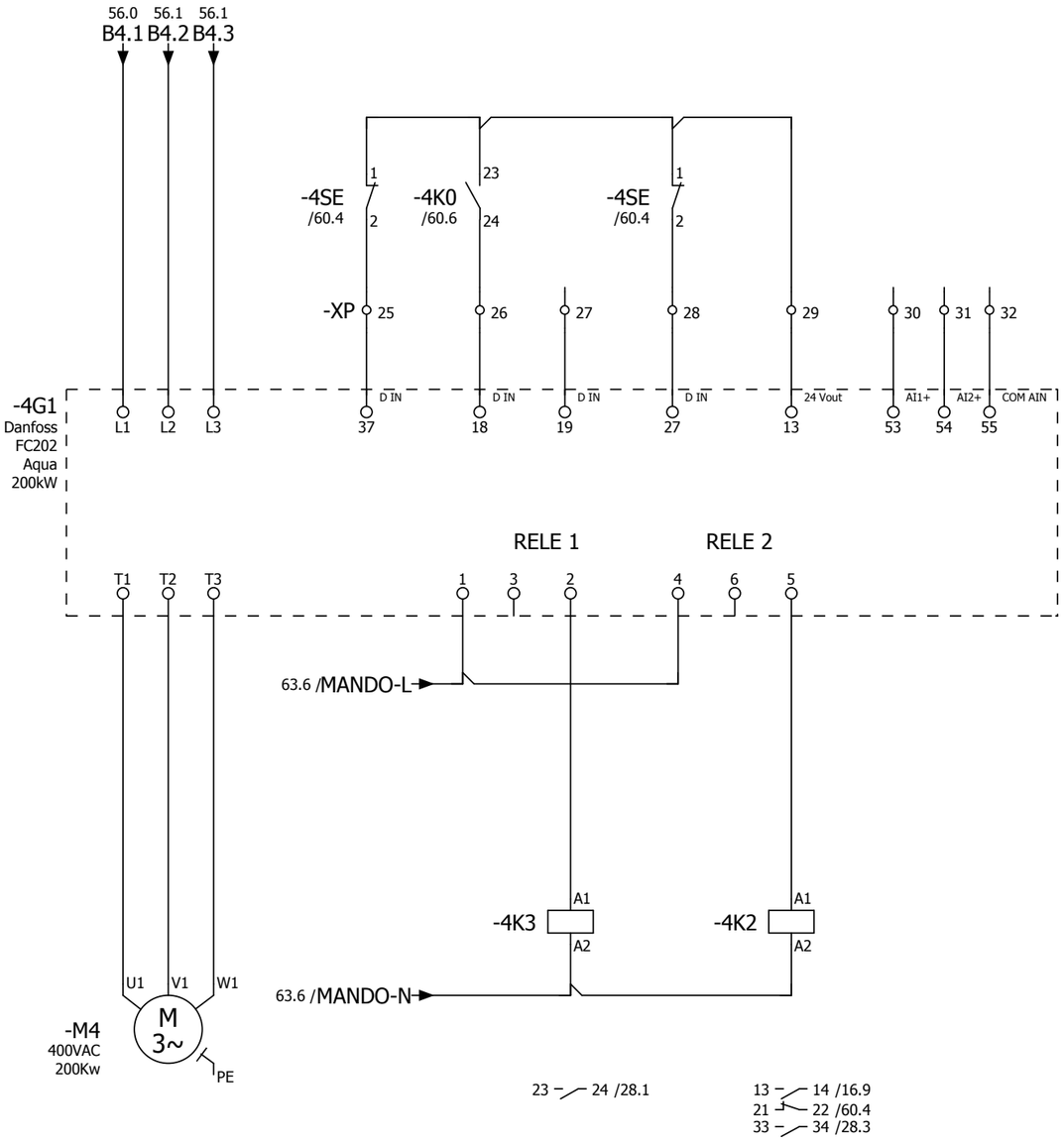
64

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Accionamiento Bomba 3
Hoja:	63 / 431.d
Ubicación:	CCM
	PFC CAAM 2015

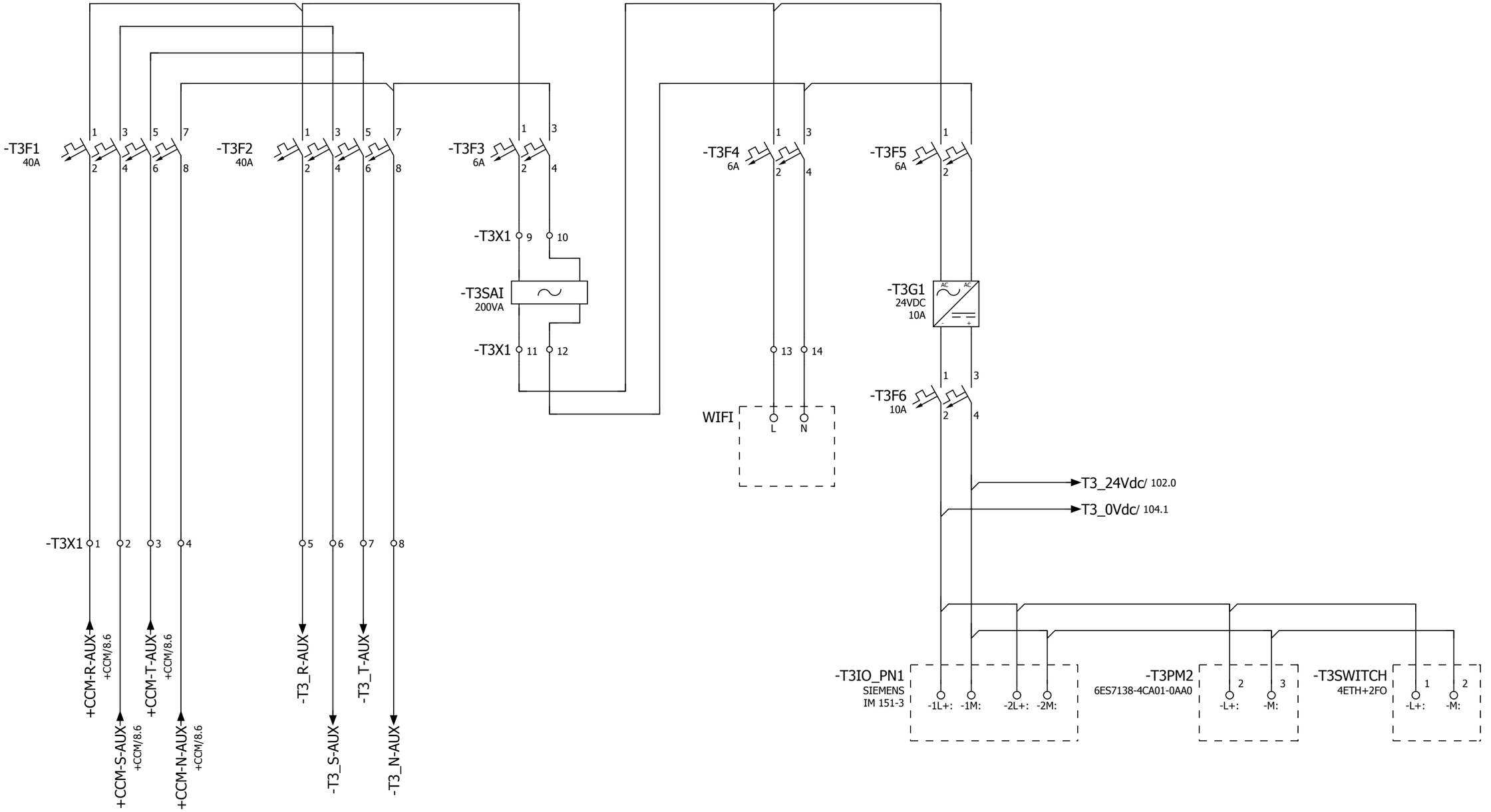
62



MOTOR BOMBA 1 FIN DE RAMPA ALARMA

+T3T4/101

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Accionamiento Bomba 4			Hoja: 64 / 431.d Ubicación: CCM PFC CAAM 2015



ACOMETIDA DESDE CCM

ACOMETIDA A FILTROS Y BALSA

WIFI UNION CON CENTRO DE CONTROL

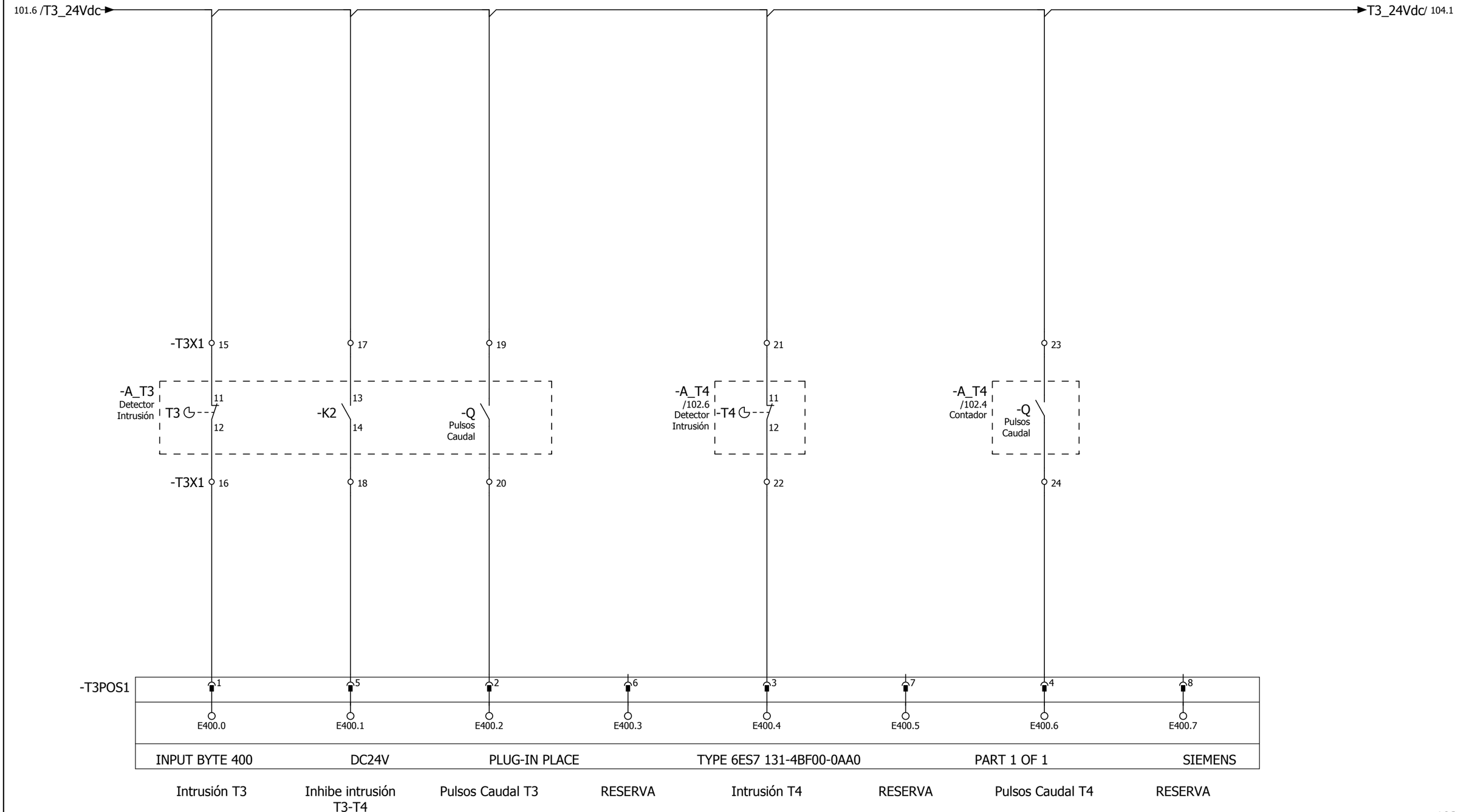
+CCM/64

102

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo
	Alimentaciones T3-T4
Hoja:	101 / 431.d
Ubicación:	T3T4
	PFC CAAM 2015



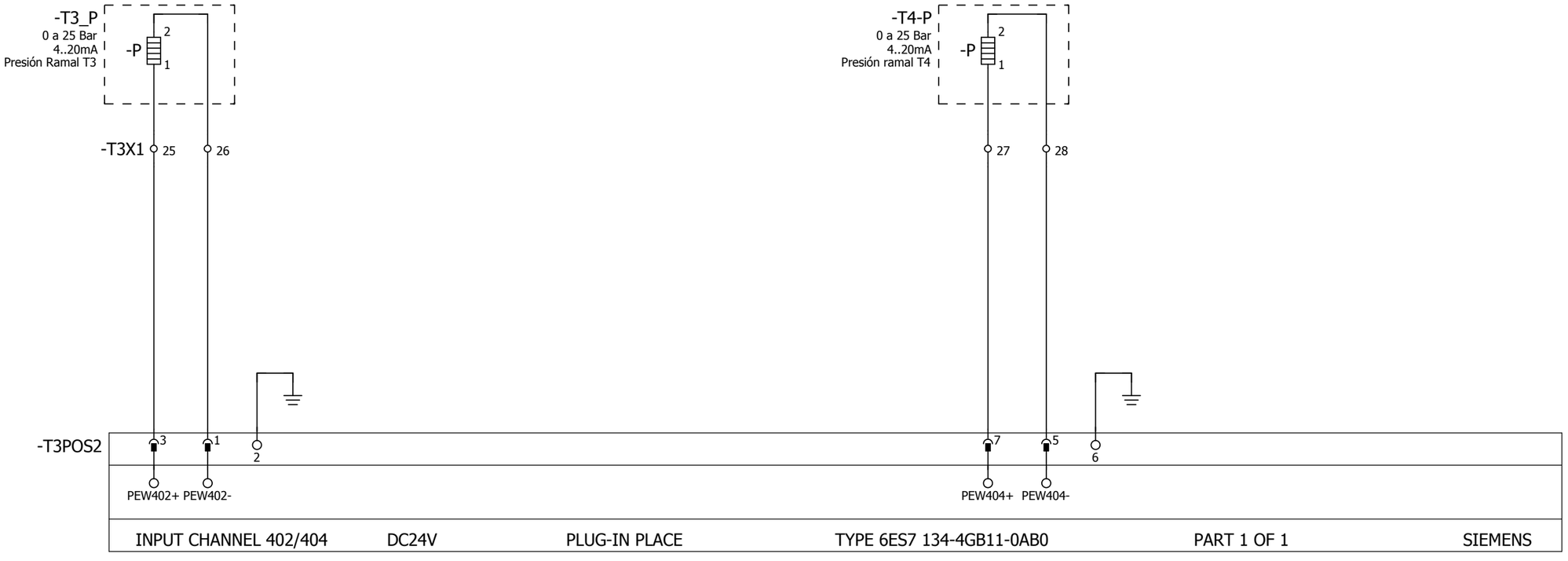
103

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas digitales PLC
Hoja:	102 / 431.d
Ubicación:	T3T4
	PFC CAAM 2015

101



Presión ramal T3

Presión ramal T4

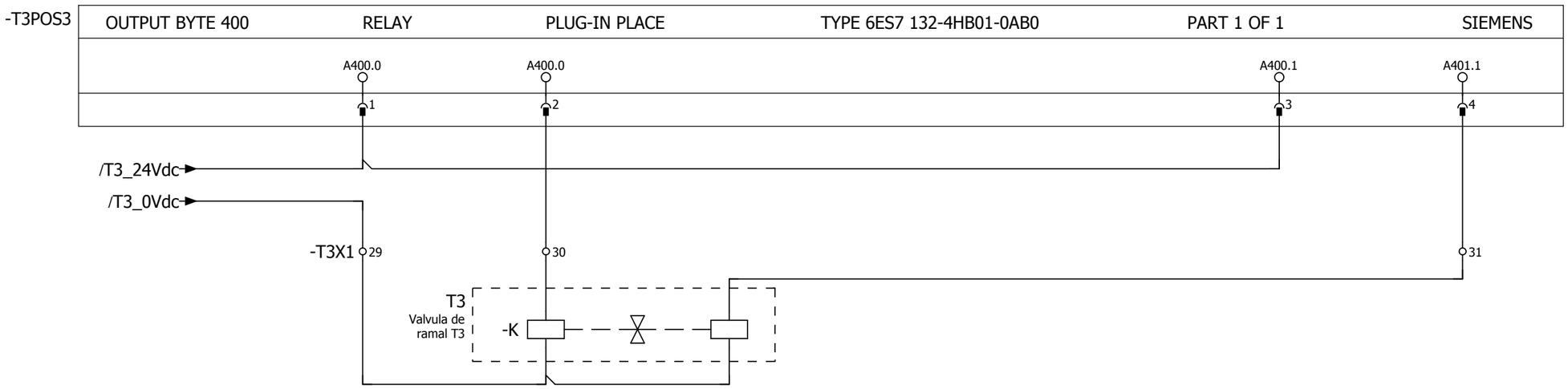
	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas analógicas ramales T3-T4
Hoja:	103 / 431.d
Ubicación:	T3T4
PFC CAAM 2015	

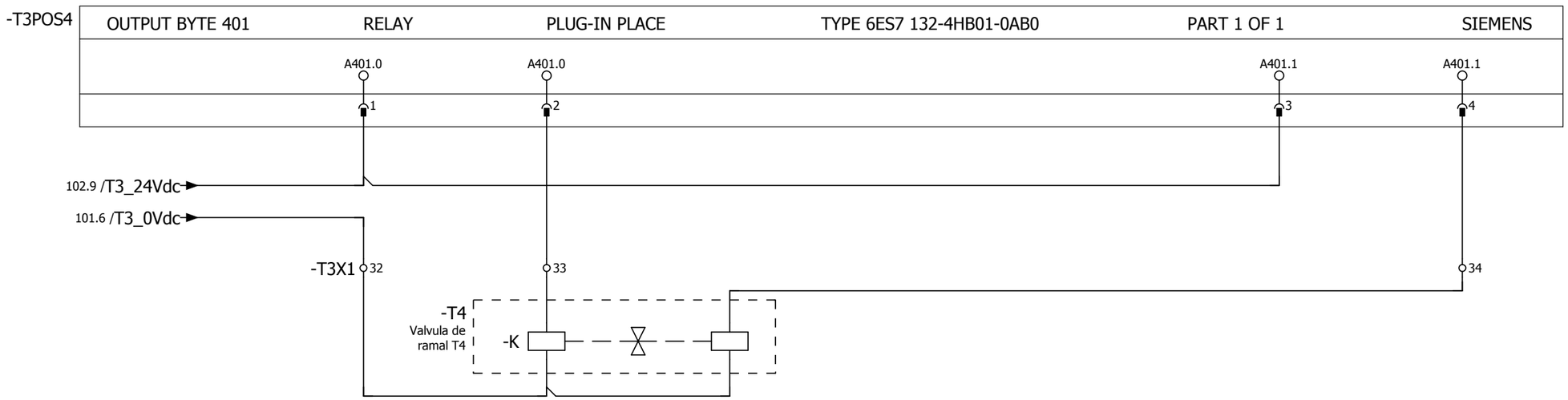
Orden Abrir T3

Orden Cerrar T3



Orden Abrir T4

Orden Cerrar T4

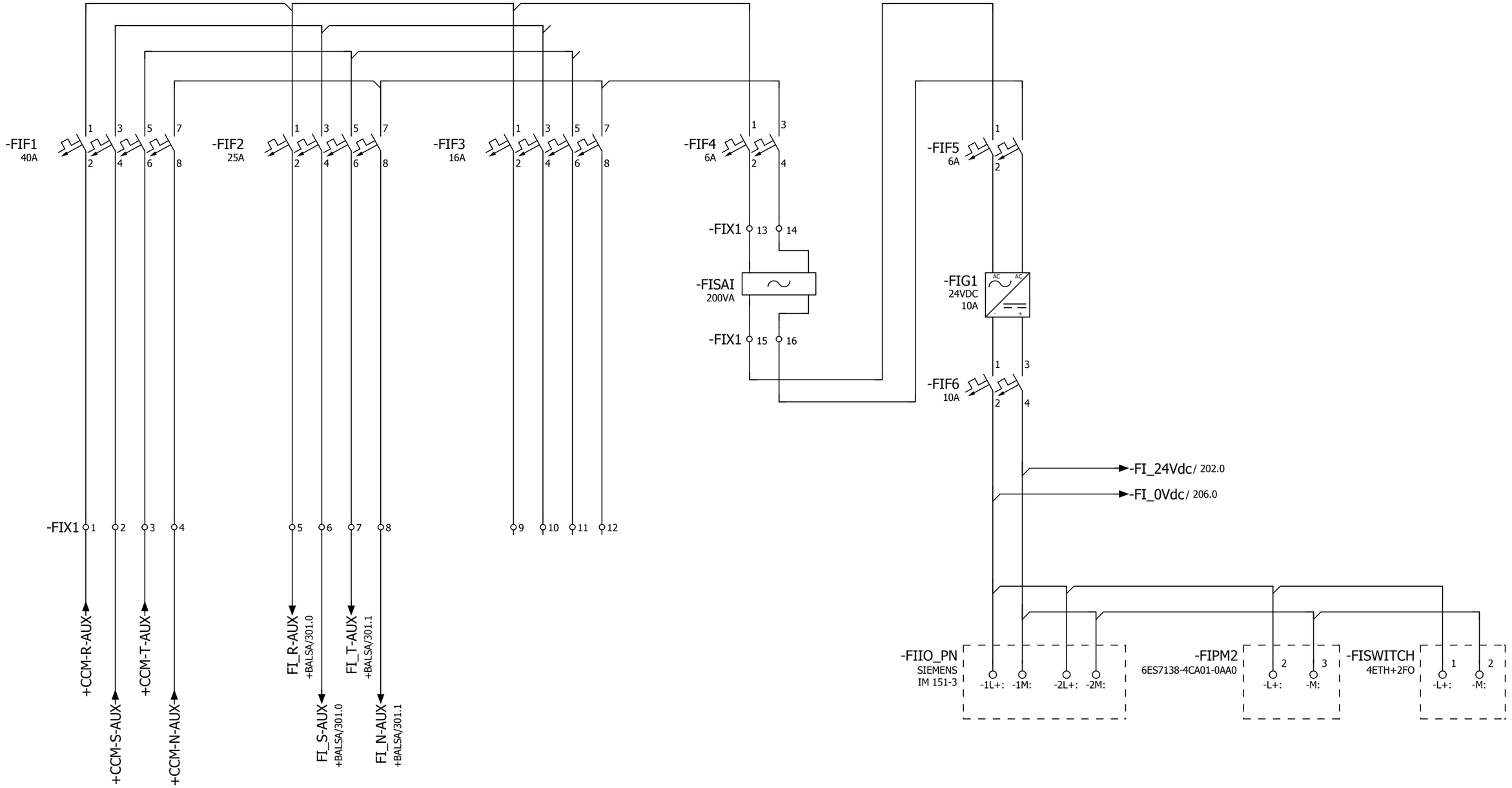


+FILTRO/201

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Salidas digitales PLC T3 T4
Hoja:	104 / 431.d
Ubicación:	T3T4
	PFC CAAM 2015



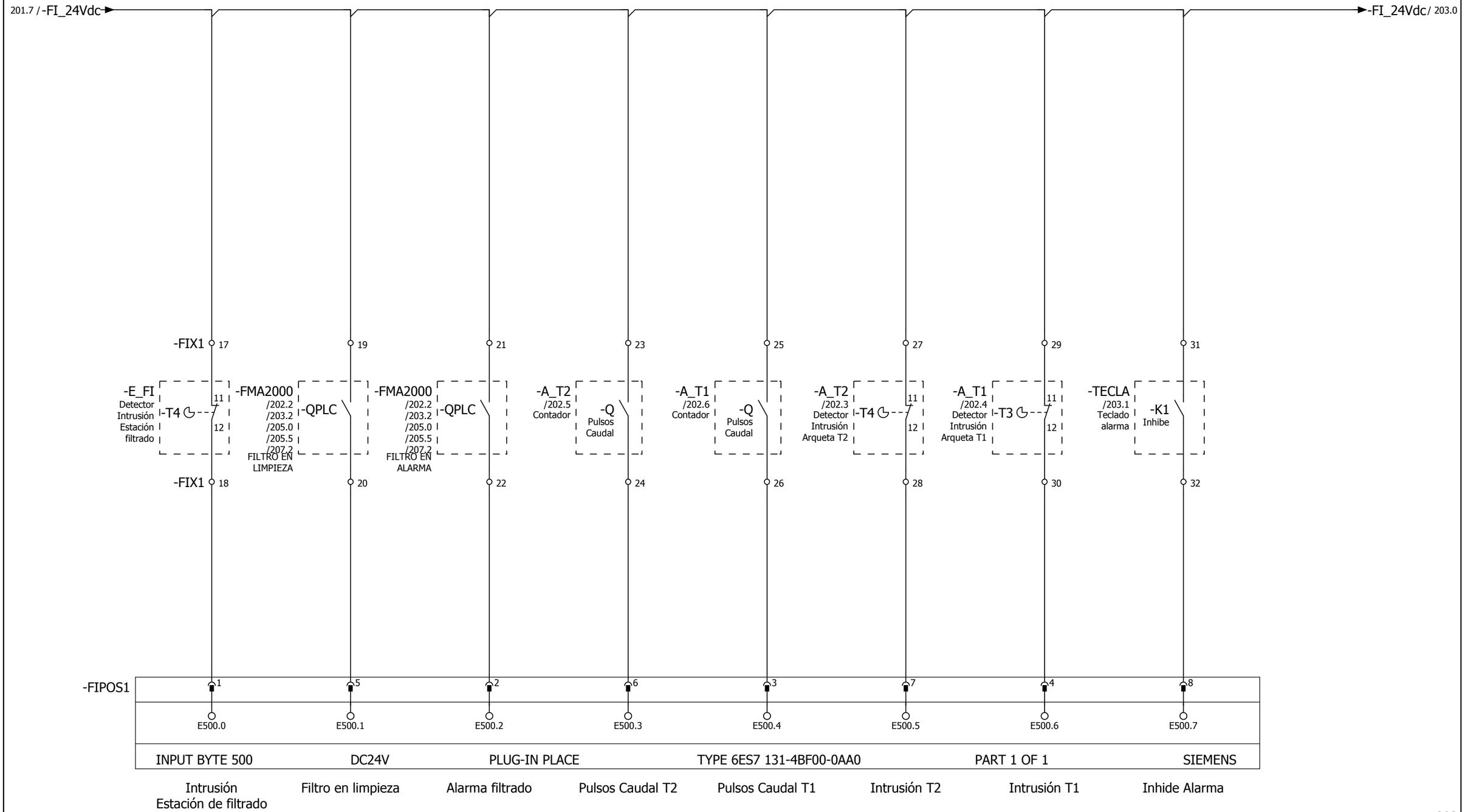
202

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo
	Alimentaciones Filtro
Hoja:	201 / 431.d
Ubicación:	FILTRO
PFC CAAM 2015	

+T3T4/104



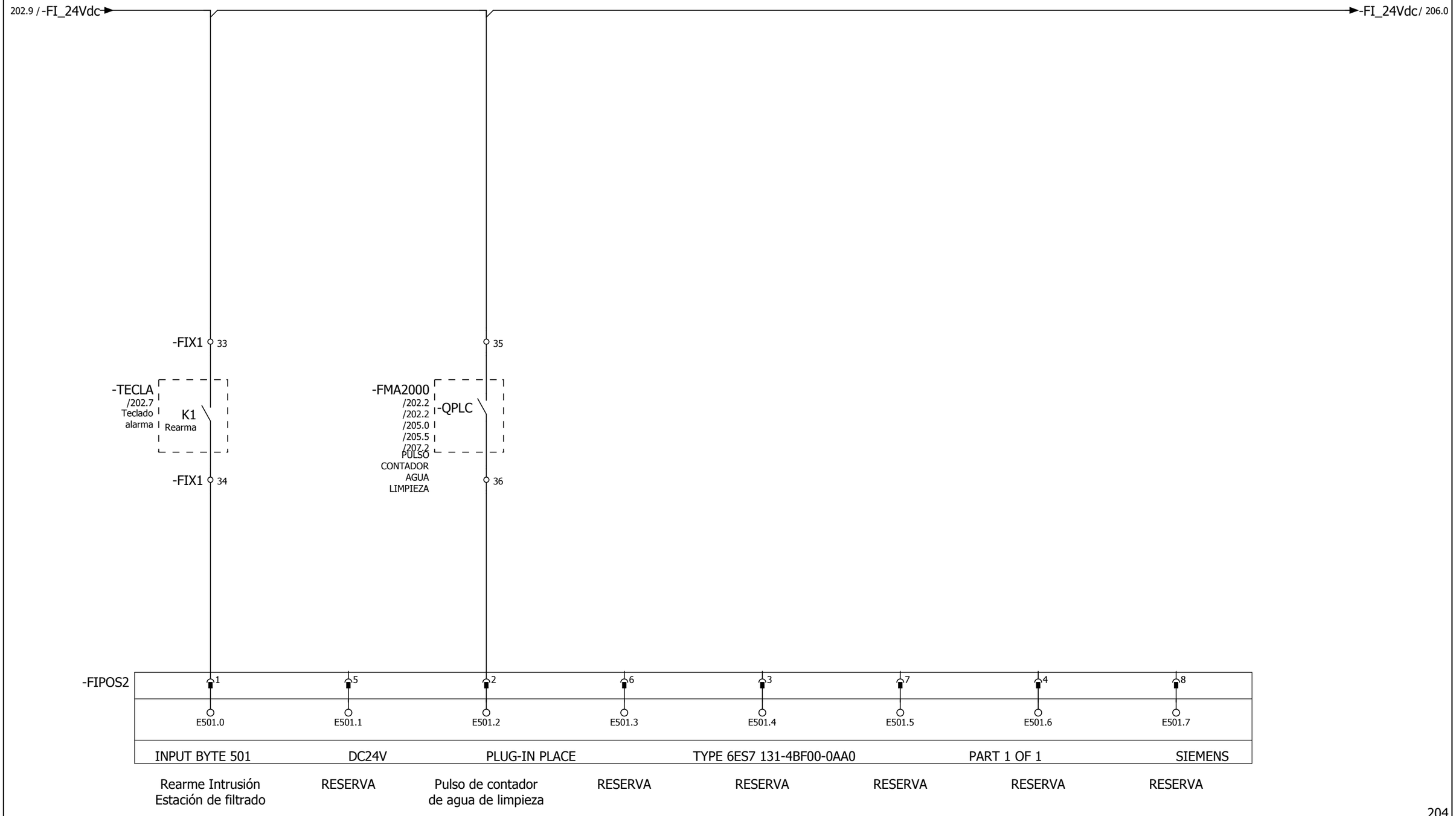
203

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas digitales PLC
Hoja:	202 / 431.d
Ubicación:	FILTRO
	PFC CAAM 2015

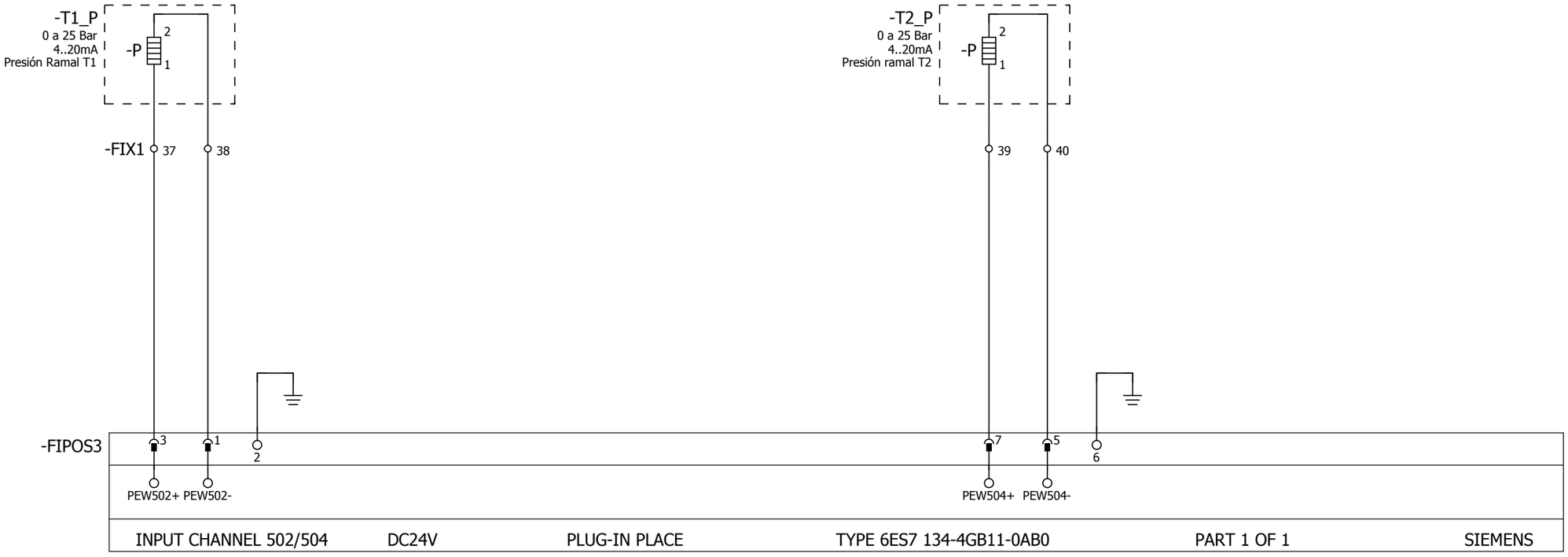
201



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas digitales PLC
Hoja:	203 / 431.d
Ubicación:	FILTRO
PFC CAAM 2015	



Presión ramal T1

Presión ramal T2

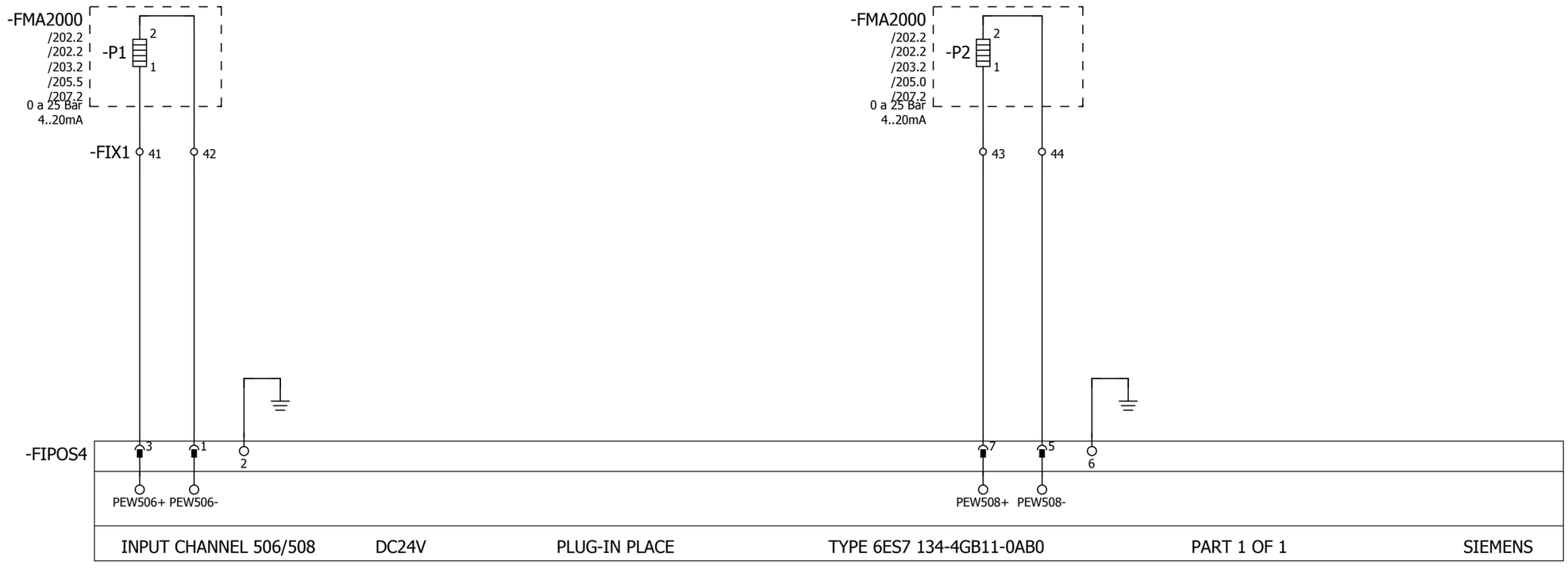
205

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas analógicas ramales T1-T2
Hoja:	204 / 431.d
Ubicación:	FILTRO
PFC CAAM 2015	

203



Presión Entrada
Filtro FMA2000

Presión Salida
Filtro FMA2000

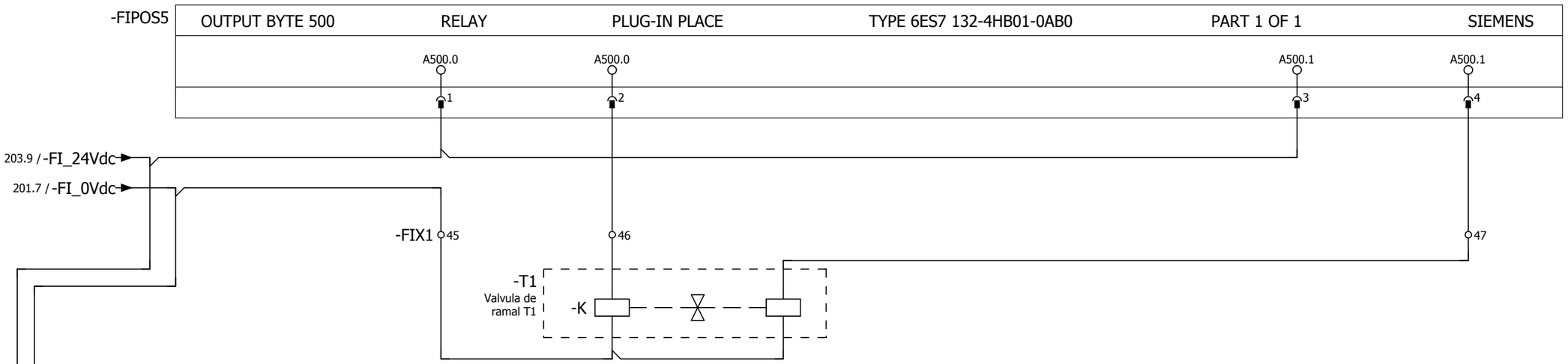
	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas analógicas filtro
Hoja:	205 / 431.d
Ubicación:	FILTRO
PFC CAAM 2015	

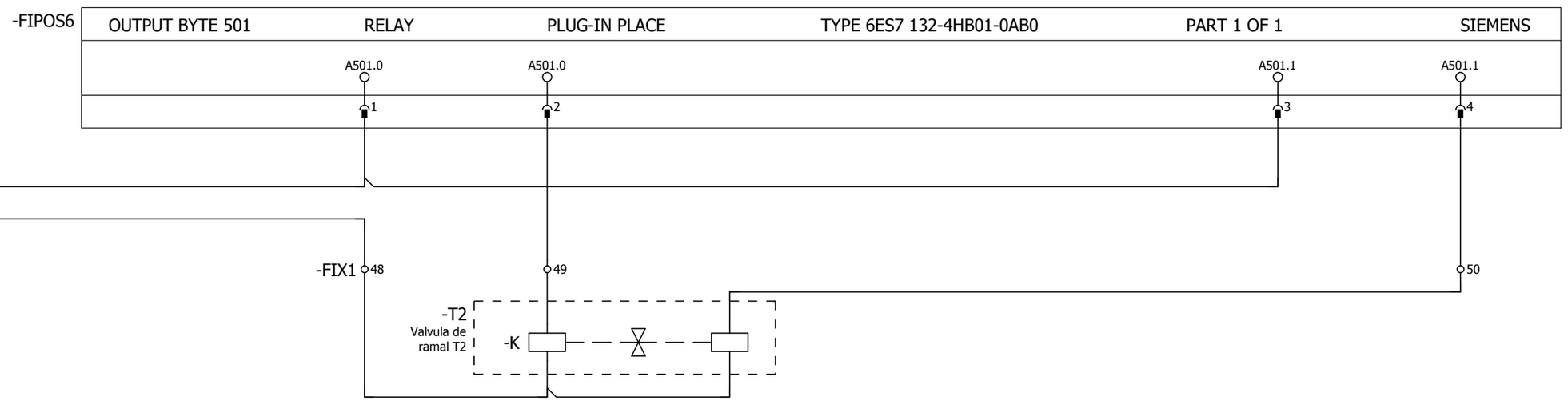
Orden Abrir T1

Orden Cerrar T1



Orden Abrir T2

Orden Cerrar T2



	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo
	Salidas digitales PLC T1 T2
Hoja:	206 / 431.d
Ubicación:	FILTRO
	PFC CAAM 2015

Orden Limpieza
FMA2000

Reserva

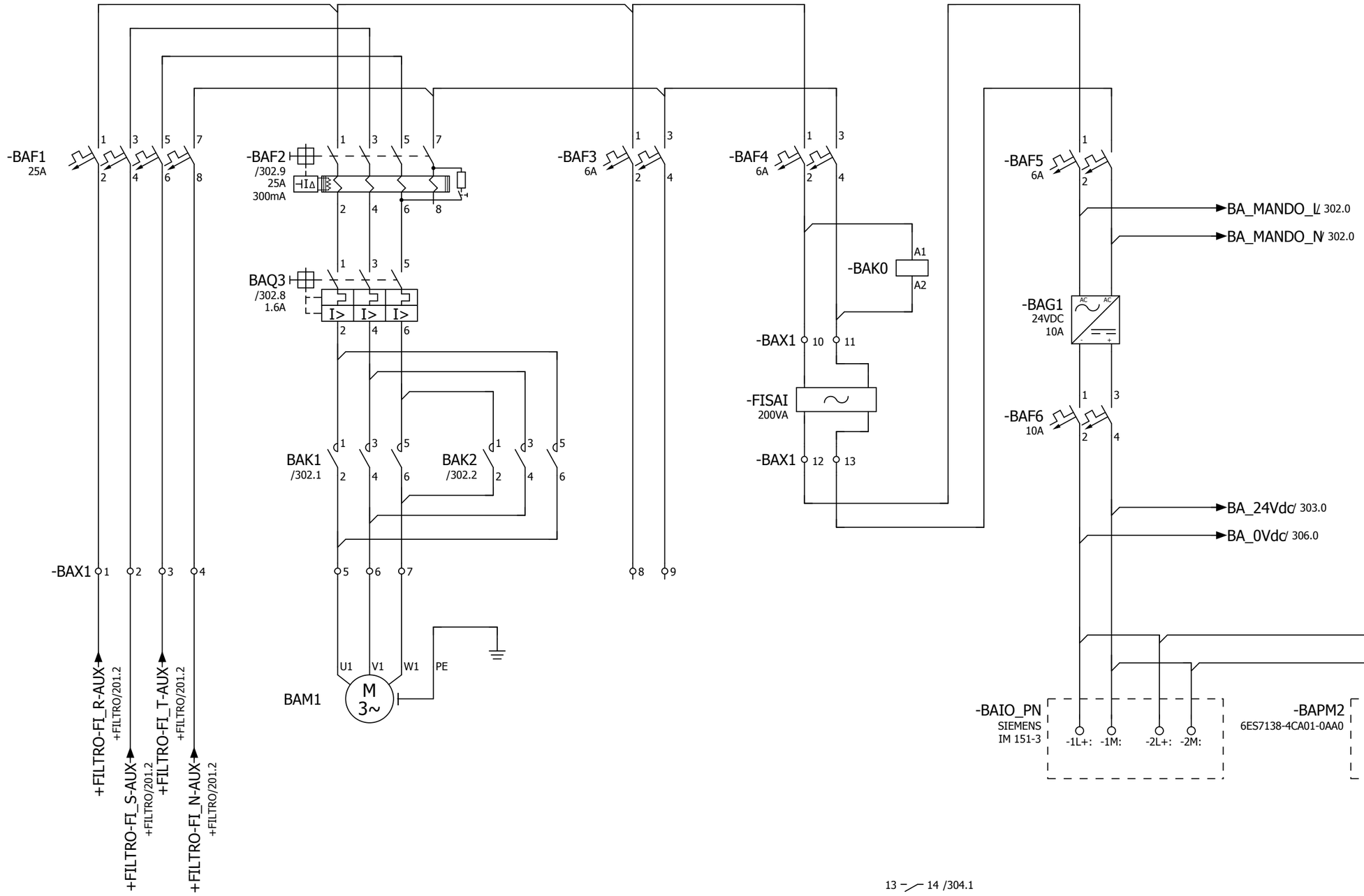
-FIPOS7

OUTPUT BYTE 502	RELAY	PLUG-IN PLACE	TYPE 6ES7 132-4HB01-0AB0	PART 1 OF 1	SIEMENS



+BALSA/301

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Salidas digitales PLC Filtro			Hoja: 207 / 431.d
				Ubicación: FILTRO
				PFC CAAM 2015



302

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo		
	Alimentaciones Balsa		

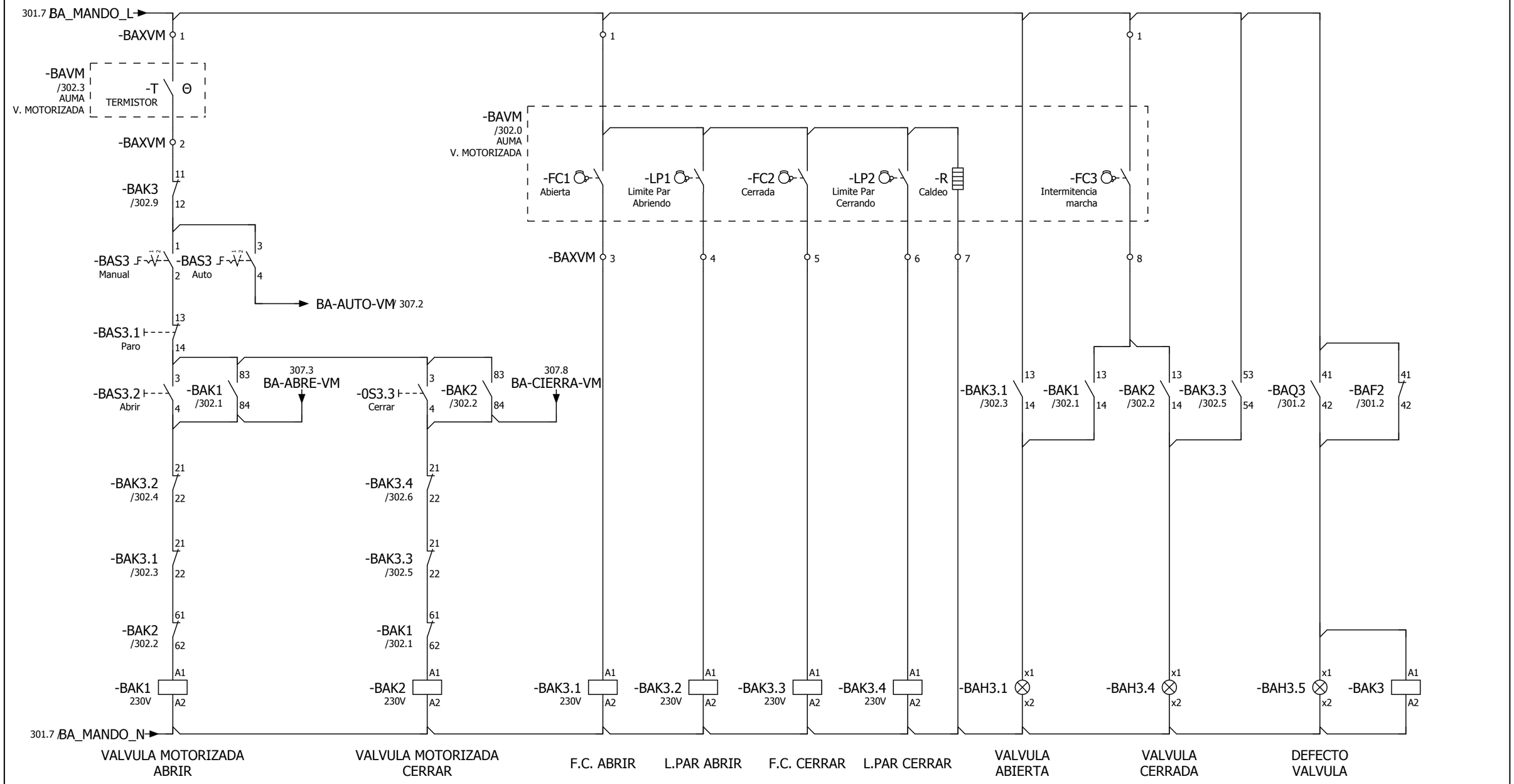
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 301 / 431.d

Ubicación: BALSA

PFC CAAM 2015

+FILTRO/207



303

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo
	Maniobra válvula motorizada balsa
	Hoja: 302 / 431.d
	Ubicación: BALSA
	PFC CAAM 2015

301

301.7 /BA_24Vdc → -FI_24Vdc/ 304.9

-BAS3	-BAK3.2	-BAK3.4	-BAK3.1	-BAK3.3	-BAK1	-BAK2	-BAK3
Auto	/302.4	/302.6	/302.3	/302.5	/302.1	/302.2	/302.9
13 / 14	13 / 14	13 / 14	13 / 14	13 / 14	53 / 54	53 / 54	13 / 14

-BAPOS1

1	5	2	6	3	7	4	8
E600.0	E600.1	E600.2	E600.3	E600.4	E600.5	E600.6	E600.7

INPUT BYTE 600	DC24V	PLUG-IN PLACE	TYPE 6ES7 131-4BF00-0AA0			PART 1 OF 1	SIEMENS
Valvula motorizada en automático	Valvula motorizada limite de par abriendo	Valvula motorizada limite de par cerrando	Valvula motorizada abierta	Valvula motorizada cerrada	Valvula motorizada confirmación marcha abriendo	Valvula motorizada confirmación marcha cerrando	Valvula motorizada protección electrica

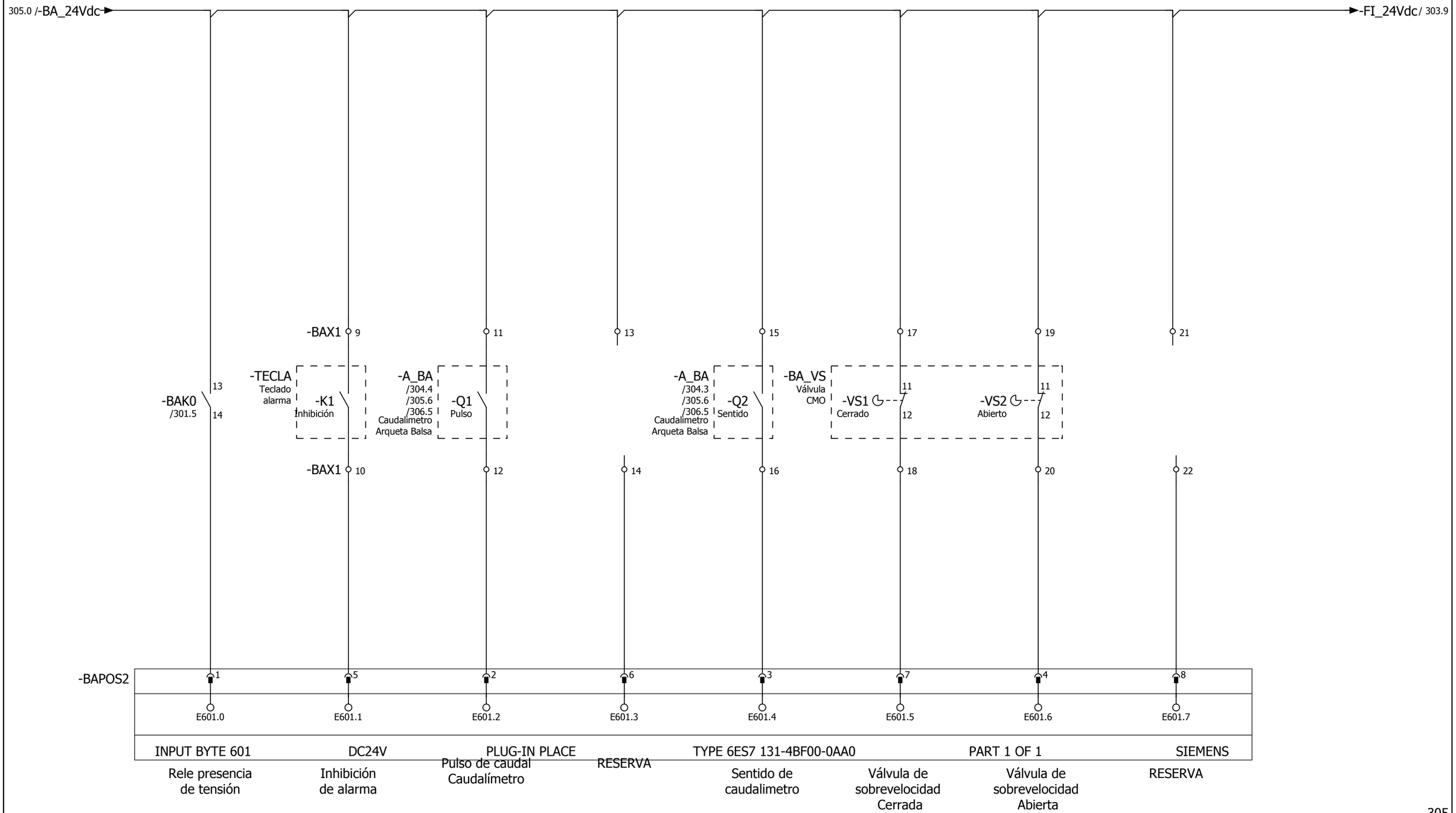
304

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo
	Entradas digitales PLC
Hoja:	303 / 431.d
Ubicación:	BALSA
	PFC CAAM 2015

302



305

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo Entradas digitales PLC		

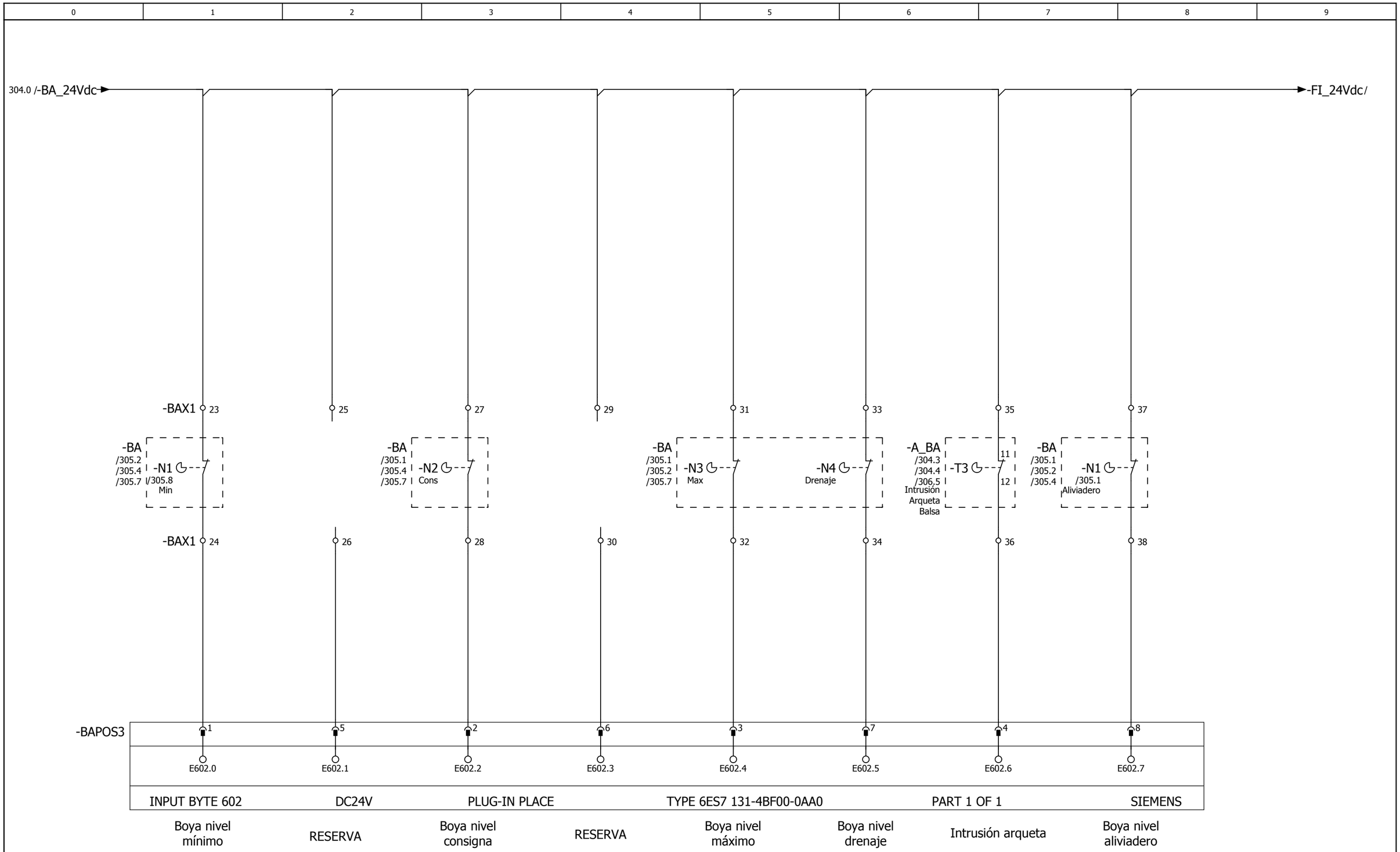
Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 304 / 431.d

Ubicación: BALSA

PFC CAAM 2015

303



306

	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Entradas digitales PLC
Hoja:	305 / 431.d
Ubicación:	BALSA
PFC CAAM 2015	

304

301.7 /-BA_0Vdc

-BA_0Vdc/

-T1_P
0 a 1 Bar
4..20mA
Presión Balsa

-P 2 1

-BAX1 39 40

-BAX1 41

-A_BA
/304.3
/304.4
/305.6
0-5000 l/sg
4..20mA
Caudal Balsa
Bidireccional
Intrusión

-Q 2 1

42

-BAPOS4

3	1	2	7	5	6
PEW610+	PEW610-		PEW612+	PEW612-	

INPUT CHANNEL 602/604 DC24V PLUG-IN PLACE TYPE 6ES7 134-4GB11-0AB0 PART 1 OF 1 SIEMENS

Presión Balsa

Caudalímetro
Entrada/Salida
Balsa

307

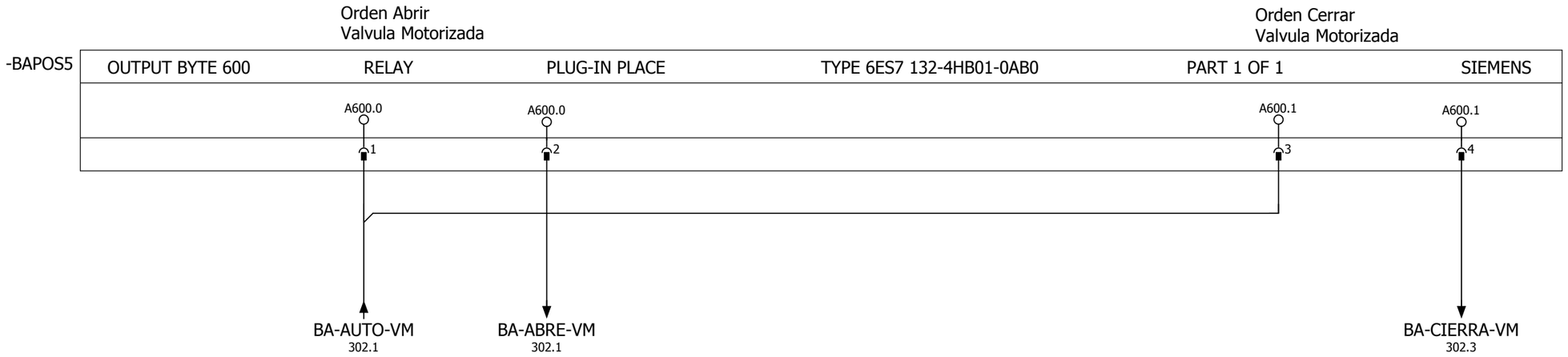
	Fecha	Nombre	Firma
Dibujado	18/05/2015	CAAM	
Comprobado	20/05/2015	RPM	
Escala	Sistema de control de bombeo Entradas analógicas balsa		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 306 / 431.d

Ubicación: BALSA

PFC CAAM 2015



+DOCUMENTACION/401

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado	18/05/2015	CAAM		
Comprobado	20/05/2015	RPM		
Escala	Sistema de control de bombeo Salidas digitales PLC T1 T2			Hoja: 307 / 431.d Ubicación: BALSA PFC CAAM 2015

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
											Regleta X0												
													1	o	-0T11.1	2							/6.1
													2	o	-0T11.1	4							/6.1
													3	o	-0T11.2	2							/6.3
													4	o	-0T11.2	4							/6.3
													5	o	-0T11.3	2							/6.4
													6	o	-0T11.3	4							/6.4
													7	o	-0T11.1	3							/6.5
													8	o	-0T11.3	3							/6.5
													9	o	-0T11.4	2							/6.6
													10	o	-0T11.4	4							/6.6
													11	o	-0F12.1	2							/6.7
													12	o	-0F12.1	4							/6.7
													13	o	-0F13.1	2							/7.1
													14	o	-0F13.1	4							/7.1
													15	o	-0F13.1	6							/7.1
													16	o	-0F13.1	8							/7.1
													17	o	-0F13.2	2							/7.2
													18	o	-0F13.2	4							/7.2
													19	o	-0F13.2	6							/7.2
													20	o	-0F13.2	8							/7.3
													21	o	-0F14.1	2							/7.3
													22	o	-0F14.1	4							/7.4
													23	o	-0F14.1	6							/7.4
													24	o	-0F14.1	8							/7.4
													25	o	-0F14.2	2							/7.5
													26	o	-0F14.2	4							/7.5
													27	o	-0F14.2	6							/7.5
													28	o	-0F14.2	8							/7.5

401.a

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-X0		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 401 / 431.d

Ubicación: DOCUMENTACION

+BALSA/307

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
											Regleta X0												
													29	o	-0F15.1	2							/7.6
													30	o	-0F15.1	4							/7.6
													31	o	-0F15.1	6							/7.7
													32	o	-0F15.1	8							/7.7
													33	o	-0FQ.1	2							/7.8
													34	o	-0FQ.1	4							/7.8
													35	o	-0FSAI1.1	2							/9.4
													36	o	-0FSAI1.1	4							/9.4
													37	o	-0FSAI1.2	2							/9.5
													38	o	-0FSAI1.2	4							/9.5
													39	o	-0T11.1	A1							/6.2
													40	o	-0T11.1	A2							/6.2
													41	o	-0T11.2	A1							/6.3
													42	o	-0T11.2	A2							/6.3
													43	o	-0T11.3	A1							/6.4
													44	o	-0T11.3	A2							/6.4
											+T3T4-T3X1	1	45	o	-0F17.1	2							/8.6
											+T3T4-T3X1	2	46	o	-0F17.1	4							/8.6
											+T3T4-T3X1	3	47	o	-0F17.1	6							/8.6
											+T3T4-T3X1	4	48	o	-0F17.1	8							/8.6

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado		CAAM		
Comprobado	20/05/2015			
Escala	Sistema de control de bombeo Plano de bornes =+CCM-X0			Hoja: 401.a / 431.d Ubicación: DOCUMENTACION

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Regleta XARQ: Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable	Página / columna
T5 Pulso Caudal			-R5R6-K5		1		-0K4	21			/20.1
=			-POS4	1	2		-R5R6-K5				/20.1
Intrusión nave Zona Cuadros			-NAVE-K2		7		-XARQ				/20.3
T5 Intrusión Arqueta			-R5R6-T5		7		-XARQ				/20.7
Intrusión nave Zona Cuadros			-POS4	3	8		-NAVE-K2				/20.3
T5 Intrusión Arqueta			-POS4	7	8		-R5R6-T5				/20.7
Orden Abrir T5					9						/39.2
=					10		-POS28	2			/39.3
Orden Cerrar T5					11						/39.7
=					12		-POS28	4			/39.8
Orden Abrir T7					13		-FDC1	4			/39.2
Orden Abrir T5					14		-POS30	2			/39.3
T6 Pulso Caudal			-R5R6-K6		15						/20.2
=			-POS4	2	16		-R5R6-K6				/20.2
T7 Pulso Caudal			-K7	13	21		-1S1	10			/20.8
=			-POS4	8	22		-K7	14			/20.8
Orden Abrir T6					23						/39.2
Orden Abrir T5					24		-POS29	2			/39.3
Orden Cerrar T6					25						/39.7
Orden Cerrar T5					26		-POS29	4			/39.8
Orden Cerrar T7					27						/39.7
Orden Cerrar T5					28		-POS30	4			/39.7
Reserva			-POS4	4							/20.4
=			-POS4	5							/20.5
=			-POS4	6							/20.6

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XARQ		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 402 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
			Regleta XCB								
					1	o	-0KCB1	2			/5.2
					2	o	-0KCB1	4			/5.2
					3	o	-0KCB2	2			/5.3
					4	o	-0KCB2	4			/5.3
					5	o	-0KCB3	2			/5.5
					6	o	-0KCB3	4			/5.5
					7	o	-0KCB4	2			/5.6
					8	o	-0KCB4	4			/5.6

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XCB		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 403 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Regleta XEA0 Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable	Página / columna
Presión Impulsión			-POS16	1	1	o	-TP1-P	1			/31.1
=			-POS16	2	2	o	-TP1-P	2			/31.1
Caudal Riego			-TQ1-Q	2	3	o	-HMI-M				/31.5
							-1KT01	A2			
Caudal Riego			-POS16	6	4	o	-TQ1-Q	1			/31.5
Presión Ramal 5			-POS17	1	5	o	-R5-P	1			/32.1
=			-POS17	2	6	o	-R5-P	2			/32.1
Presión Ramal 6			-POS17	5	7	o	-R6-P	1			/32.4
=			-POS17	6	8	o	-R6-P	2			/32.5
Presión Ramal 7			-POS18	1	9	o	-R7-P	1			/33.1
=			-POS18	2	10	o	-R7-P	2			/33.1
RESERVA			-POS18	5	11	o					/33.4
=			-POS18	6	12	o					/33.5
Presión Filtro W Entrada			-POS41	5	19	o	-TPW-P1	1			/50.6
=			-POS41	6	20	o	-TPW-P1	2			/50.6
Presión Filtro W Salida			-POS41	7	21	o	-TPW-P2	1			/50.7
=			-POS41	8	22	o	-TPW-P2	2			/50.8

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XEA0		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 404 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Regleta XEA1 Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
Presión aspiración Bomba 1											-POS39	3	7	o	-P-B1-P	1							/48.1
=											-POS39	1	8	o	-P-B1-P	2							/48.1
Presión aspiración Bomba 2											-POS39	7	9	o	-P-B2-P	1							/48.5
=											-POS39	5	10	o	-P-B2-P	2							/48.5
Presión aspiración Bomba 3											-POS40	3	11	o	-P-B3-P	1							/49.1
=											-POS40	1	12	o	-P-B3-P	2							/49.1
Presión aspiración Bomba 4											-POS40	7	13	o	-P-B4-P	1							/49.5
=											-POS40	5	14	o	-P-B4-P	2							/49.5
Presión Filtro Riego Entrada											-POS41	1	15	o	-TPF-P	1							/50.1
=											-POS41	2	16	o	-TPF-P	2							/50.1
Presión nivel Gasoil											-POS41	3	17	o	-TPG-P	1							/50.2
=											-POS41	4	18	o	-TPG-P	2							/50.3

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
							Regleta XED0				
Filtro salida en alarma			-Q1-P		1						/17.6
Pulsos caudalímetro			-ARQ0-B		1						/17.7
Boya Arqueta Entrada			-EF1-M		1		-0S3	10			/17.8
Filtro salida en alarma			-POS1	7	2		-Q1-P				/17.6
Pulsos caudalímetro			-POS1	4	3		-ARQ0-B				/17.7
Boya Arqueta Entrada			-POS1	8	4		-EF1-M				/17.8
Disparo Maniobra			-NAVE-K		5		-0F18	13			/17.3
=			-POS1	2	6		-NAVE-K				/17.3
Intrusión Nave			-EF1-F		7						/17.4
=			-POS1	6	8		-EF1-F				/17.4
Filtro W en alarma			-EF2-F		9						/17.5
=			-POS1	3	10		-EF2-F				/17.5

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
							Regleta XED1				
					1		-1R1.4	2			/57.1
			-1K4	A1	2						/57.1
			-B1PMAX-P		3		-1SE	1			/57.2
			-1K5	A1	4		-B1PMAX-P				/57.2
Filtro Salida en marcha			-FIL2-KM		17						/52.1
=			-POS43	1	18		-FIL2-KM				/52.1
Filtro Reja en marcha			-FIL0-KM		19						/52.2
=			-POS43	2	20		-FIL0-KM				/52.2
Filtro Reja alarma			-FIL0-KF		21						/52.3
=			-POS43	3	22		-FIL0-KF				/52.3
Desarme Intrusión			-TECLA-TI		23						/52.4
=			-POS43	4	24		-TECLA-TI				/52.4
Rearmar Intrusión			-TECLA-TR		25						/52.5
=			-POS43	5	26		-TECLA-TR				/52.5
Alarma arqueta agua de limpieza			-ARQLIM-BOYA		27						/52.6
=			-POS43	6	28		-ARQLIM-BOYA				/52.6
Fuga en depósito de gasoil			-DEPGAS-P		29						/52.8
=			-POS43	8	30		-DEPGAS-P				/52.8

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XED1		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 407 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
											Regleta XED2												
													1		-2R1.4	2							/58.1
											-2K4	A1	2										/58.1
											-B2PMAX-P		3		-2SE	1							/58.2
											-2K5	A1	4		-B2PMAX-P								/58.2

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XED2		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 408 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Regleta XED3 Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable	Página / columna
					1		-3R1.4	2			/59.1
			-3K4	A1	2						/59.1
			-B3PMAX-P		3		-3SE	1			/59.2
			-3K5	A1	4		-B3PMAX-P				/59.2

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado		CAAM		
Comprobado	20/05/2015			
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XED3			Hoja: 409 / 431.d Ubicación: DOCUMENTACION

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
											Regleta XED4												
													1		-4R1.4	2							/60.1
											-4K4	A1	2										/60.1
											-B4PMAX-P		3		-4SE	1							/60.2
											-4K5	A1	4		-B4PMAX-P								/60.2

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Regleta XG: Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable	Página / columna
Alarma Grupo 1			-G1-F		1		-4K6V	13			/29.1
=			-POS13	1	2		-G1-F				/29.1
Alarma Grupo 3			-G3-F		3						/29.2
=			-POS13	2	4		-G3-F				/29.2
Orden marcha Grupo 1					5		-POS14	1			/30.2
Orden marcha Grupo 3					6		-POS14	2			/30.3
En marcha Grupo 1			-G1-K		7						/29.3
=			-POS13	3	8		-G1-K				/29.3
En marcha Grupo 3			-G3-K		9						/29.4
=			-POS13	4	10		-G3-K				/29.4
Orden marcha Grupo 2					11		-POS14	5			/30.7
Orden marcha Grupo 4					12		-POS14	6			/30.8
Alarma Grupo 2			-G2-F		13						/29.5
=			-POS13	5	14		-G2-F				/29.5
Alarma Grupo 4			-G4-F		15						/29.6
=			-POS13	6	16		-G4-F				/29.6
Orden marcha Grupo 3					17		-POS15	1			/30.2
=					18		-POS15	2			/30.3
En marcha Grupo 2			-G2-K		19						/29.7
=			-POS13	7	20		-G2-K				/29.7
En marcha Grupo 4			-G4-K		21		-POS21	1			/29.8
=			-POS13	8	22		-G4-K				/29.8
Orden marcha Grupo 4					23		-POS15	5			/30.7
=					24		-POS15	6			/30.8

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	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XG		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 411 / 431.d

Ubicación: DOCUMENTACION

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Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Regleta XP: Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable	Página / columna
			-1F1.2	1	1	o	-0FSAI1.4	2			/9.8
			-1G1	37	1	o	-1SE	2			/61.4
			-1F1.2	3	2	o	-0FSAI1.4	4			/9.8
			-1G1	18	2	o	-1K0	24			/61.4
			-1G1	19	3	o					/61.5
			-1G1	27	4	o	-1SE	2			/61.5
			-1G1	13	5	o	-1SE	1			/61.6
			-1G1	53	6	o					/61.6
			-1G1	54	7	o					/61.6
			-1G1	55	8	o					/61.6
			-2G1	37	9Ç	o	-2SE	2			/62.4
			-2G1	18	10	o	-2K0	24			/62.4
			-2G1	19	11	o					/62.5
			-2G1	27	12	o	-2SE	2			/62.5
			-2G1	13	13	o	-2SE	1			/62.6
			-2G1	53	14	o					/62.6
			-2G1	54	15	o					/62.6
			-2G1	55	16	o					/62.6
			-4G1	37	25	o	-4SE	2			/64.4
			-4G1	18	26	o	-4K0	24			/64.4
			-4G1	19	27	o					/64.5
			-4G1	27	28	o	-4SE	2			/64.5
			-4G1	13	29	o	-4SE	1			/64.6
			-4G1	53	30	o					/64.6
			-4G1	54	31	o					/64.6
			-4G1	55	32	o					/64.6

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XP		

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Ubicación: DOCUMENTACION

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Regleta XP0 Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable	Página / columna
			-3G1	37	17	o	-3SE	2			/63.4
			-3G1	18	18	o	-3K0	24			/63.4
			-3G1	19	19	o					/63.5
			-3G1	27	20	o	-3SE	2			/63.5
			-3G1	13	21	o	-3SE	1			/63.6
			-3G1	53	22	o					/63.6
			-3G1	54	23	o					/63.6
			-3G1	55	24	o					/63.7

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Regleta XPT1 Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
PT100 Devanado 1 Bomba 1											-POS31	1	1	o	-B1-DEV1								/40.2
PT100 Devanado 3 Bomba 1											-POS31	2	2	o	-B1-DEV1								/40.3
PT100 Devanado 2 Bomba 1											-POS31	5	3	o	-B1-DEV2								/40.6
PT100 Rodamiento 1 Bomba 1											-POS31	6	4	o	-B1-DEV2								/40.7
PT100 Devanado 1 Bomba 1											-POS31	3	5	o	-B1-DEV3								/40.2
PT100 Devanado 3 Bomba 1											-POS31	4	6	o	-B1-DEV3								/40.3
PT100 Devanado 2 Bomba 1											-POS31	7	7	o	-B1-ROD1								/40.6
PT100 Rodamiento 1 Bomba 1											-POS31	8	8	o	-B1-ROD1								/40.7
PT100 Rodamiento 2 Bomba 1											-POS32	1	9	o	-B1-ROD2								/41.2
PT100 Rodamiento Bomba 2 Bomba 1											-POS32	4	10	o	-B1-ROD2								/41.3
PT100 Rodamiento bomba 1 Bomba 1											-POS32	6	11	o	-B1-BOM1								/41.6
RESERVA											-POS32	8	12	o	-B1-BOM1								/41.7
PT100 Rodamiento 2 Bomba 1											-POS32	3	13	o	-B1-BOM2								/41.2
PT100 Rodamiento Bomba 2 Bomba 1											-POS32	5	14	o	-B1-BOM2								/41.3

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	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XPT1		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 414 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Regleta XPT3 Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable	Página / columna
PT100 Devanado 1 Bomba 3			-POS35	1	1	o	-B3-DEV1				/44.2
PT100 Devanado 3 Bomba 3			-POS35	2	2	o	-B3-DEV1				/44.3
PT100 Devanado 2 Bomba 3			-POS35	5	3	o	-B3-DEV2				/44.6
PT100 Rodamiento 1 Bomba 3			-POS35	6	4	o	-B3-DEV2				/44.7
PT100 Devanado 1 Bomba 3			-POS35	3	5	o	-B3-DEV3				/44.2
PT100 Devanado 3 Bomba 3			-POS35	4	6	o	-B3-DEV3				/44.3
PT100 Devanado 2 Bomba 3			-POS35	7	7	o	-B3-ROD1				/44.6
PT100 Rodamiento 1 Bomba 3			-POS35	8	8	o	-B3-ROD1				/44.7
PT100 Rodamiento 2 Bomba 3			-POS36	1	9	o	-B3-ROD2				/45.2
PT100 Rodamiento Bomba 2 Bomba 3			-POS36	4	10	o	-B3-ROD2				/45.3
PT100 Rodamiento bomba 1 Bomba 3			-POS36	6	11	o	-B3-BOM1				/45.6
RESERVA			-POS36	8	12	o	-B3-BOM1				/45.7
PT100 Rodamiento 2 Bomba 3			-POS36	3	13	o	-B3-BOM2				/45.2
PT100 Rodamiento Bomba 2 Bomba 3			-POS36	5	14	o	-B3-BOM2				/45.3

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XPT3		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 416 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Regleta XPT4 Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
PT100 Devanado 1 Bomba 4											-POS37	1	1	o	-B4-DEV1								/46.2
PT100 Devanado 3 Bomba 4											-POS37	2	2	o	-B4-DEV1								/46.3
PT100 Devanado 2 Bomba 4											-POS37	5	3	o	-B4-DEV2								/46.6
PT100 Rodamiento 1 Bomba 4											-POS37	6	4	o	-B4-DEV2								/46.7
PT100 Devanado 1 Bomba 4											-POS37	3	5	o	-B4-DEV3								/46.2
PT100 Devanado 3 Bomba 4											-POS37	4	6	o	-B4-DEV3								/46.3
PT100 Devanado 2 Bomba 4											-POS37	7	7	o	-B4-ROD1								/46.6
PT100 Rodamiento 1 Bomba 4											-POS37	8	8	o	-B4-ROD1								/46.7
PT100 Rodamiento 2 Bomba 4											-POS38	1	9	o	-B4-ROD2								/47.2
PT100 Rodamiento Bomba 2 Bomba 2											-POS38	4	10	o	-B4-ROD2								/47.3
PT100 Rodamiento bomba 1 Bomba 4											-POS38	6	11	o	-B4-BOM1								/47.6
RESERVA											-POS38	8	12	o	-B4-BOM1								/47.7
PT100 Rodamiento 2 Bomba 4											-POS38	3	13	o	-B4-BOM2								/47.2
PT100 Rodamiento Bomba 2 Bomba 2											-POS38	5	14	o	-B4-BOM2								/47.3

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	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo		
	Plano de bornes =+CCM-XPT4		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 417 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Regleta XSAI: Designación de destino	Conexión	Borne	Puente	Regleta XSAI: Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
											-SAI		1	o	-0F19.2	2							/9.2
											-SAI		2	o	-0F19.2	4							/9.2
											-0FSAI1	1	3	o	-SAI								/9.2
											-0FSAI1	3	4	o	-SAI								/9.2

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
											Regleta XSD1												
Orden Marcha reja											-FIL0	1	1	o	-POS42	1							/51.2
Orden Marcha Filtro Riego											-FIL0	2	2	o	-POS42	2							/51.3
Orden Marcha Filtro W											-FIL1	1	3	o	-POS42	3							/51.7
Display led Alarma											-FIL1	2	4	o	-POS42	4							/51.8
Orden Marcha Filtro Riego											-FIL2	1	5	o	-POS44	1							/51.2
=											-FIL2	2	6	o	-POS44	2							/51.3

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
				Regleta XVM0							
			-VM0-T		1		-0F19	2			/11.1
			-VM0-FC1		1		-0K3.3	13			/11.3
			-VM0-FC3		1		-0K3.3	13			/11.7
							-0K3.5	53			
			-0K3.3	A1	2		-VM0-FC1				/11.3
			-0K3.4	A1	3		-VM0-LP1				/11.4
			-0K3.5	A1	4		-VM0-FC2				/11.5
			-0K3.6	A1	5		-VM0-LP2				/11.6
			-0K3	11	6		-VM0-T				/11.1
			-0K3.6	A2	7		-VM0-R				/11.6
			-0H3.1	x2							
			-0K3.1	53	8		-VM0-FC3				/11.7
			-0K3.2	13							
			-M-VM-E	U1	U1		-0K3.1	2			/3.2
							-0K3.2	6			
			-M-VM-E	V1	V1		-0K3.1	4			/3.2
							-0K3.2	4			
			-M-VM-E	W1	W1		-0K3.1	6			/3.2
							-0K3.2	2			

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XVM0		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 420 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
											Regleta XVM0.1												
											-M-VM-R	U1	U1	o	-0K4.1	2							/3.5
															-0K4.2	6							
											-M-VM-R	V1	V1	o	-0K4.1	4							/3.5
															-0K4.2	4							
											-M-VM-R	W1	W1	o	-0K4.1	6							/3.6
															-0K4.2	2							

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
			Regleta XVM1								
			-VM1-T		1		-0Q3.1	41			/12.1
			-VM1-FC1		1		-0K4.3	13			/12.3
			-VM1-FC4		1		-0K4.3	13			/12.7
							-0K4.5	13			
			-VMB1-T		1		-0Q4.1	41			/13.1
			-VMB1-FC1		1		-1K3V	13			/13.3
			-VMB1-FC3		1		-1K3V	13			/13.6
							-1K5V	13			
			-0K4.3	A1	2		-VM1-FC1				/12.3
			-1K3V	A1	2		-VMB1-FC1				/13.3
			-0K4.4	A1	3		-VM1-LP1				/12.4
			-1K4V	A1	3		-VMB1-LP1				/13.3
			-0K4.5	A1	4		-VM1-FC2				/12.5
			-1K5V	A1	4		-VMB1-FC2				/13.4
			-0K4.6	A1	5		-VM1-LP2				/12.5
			-1K6V	A1	5		-VMB1-LP2				/13.4
			-0K4	11	6		-VM1-T				/12.1
			-1F2	13	6		-VMB1-T				/13.1
			-0K4.6	A2	7		-VM1-R				/12.6
			-0H4.1	x2							
			-1K1V	23	7		-VMB1-FC3				/13.6
			-1K2V	23							
			-0K4.1	53	8		-VM1-FC4				/12.7
			-0K4.2	53							
			-1K6V	A2	8		-VMB1-R1				/13.5
			-1H3	x2							
			-M1-VM-B1	U1	U1		-1K1V	2			/4.1
							-1K2V	6			

422.a

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Plano de bornes =+CCM-XVM1
Hoja:	422 / 431.d
Ubicación:	DOCUMENTACION

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Regleta XVM1 Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
			-M1-VM-B1	V1	V1	o	-1K1V	4			/4.1
							-1K2V	4			
			-M1-VM-B1	W1	W1	o	-1K1V	6			/4.1
							-1K2V	2			

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
				Regleta XVM2							
			-VMB2-T		1		-1KT01	13			/14.1
			-VMB2-FC1		1		-2K3V	13			/14.3
			-VMB2-FC3		1		-2K3V	13			/14.6
							-2K5V	13			
			-2K3V	A1	2		-VMB2-FC1				/14.3
			-2K4V	A1	3		-VMB2-LP1				/14.3
			-2K5V	A1	4		-VMB2-FC2				/14.4
			-2K6V	A1	5		-VMB2-LP2				/14.4
			-2F2	13	6		-VMB2-T				/14.1
			-2K1V	23	7		-VMB2-FC3				/14.6
			-2K2V	23							
			-2K6V	A2	8		-VMB2-R1				/14.5
			-2H3	x2							
			-M1-VM-B2	U1	U1		-2K1V	2			/4.3
							-2K2V	6			
			-M1-VM-B2	V1	V1		-2K1V	4			/4.3
							-2K2V	4			
			-M1-VM-B2	W1	W1		-2K1V	6			/4.3
							-2K2V	2			

424

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo		
	Plano de bornes =+CCM-XVM2		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 423 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
											Regleta XVM3												
											-VMB3-T		1		-2KT01	13							/15.1
											-VMB3-FC1		1		-3K3V	13							/15.3
											-VMB3-FC3		1		-3K3V	13							/15.6
															-3K5V	13							
											-3K3V	A1	2		-VMB3-FC1								/15.3
											-3K4V	A1	3		-VMB3-LP1								/15.3
											-3K5V	A1	4		-VMB3-FC2								/15.4
											-3K6V	A1	5		-VMB3-LP2								/15.4
											-3F2	13	6		-VMB3-T								/15.1
											-3K1V	23	7		-VMB3-FC3								/15.6
											-3K2V	23											
											-3K6V	A2	8		-VMB3-R1								/15.5
											-3H3	x2											
											-M1-VM-B3	U1	U1		-3K1V	2							/4.5
															-3K2V	6							
											-M1-VM-B3	V1	V1		-3K1V	4							/4.6
															-3K2V	4							
											-M1-VM-B3	W1	W1		-3K1V	6							/4.6
															-3K2V	2							

425

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+CCM-XVM3		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 424 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
											Regleta XVM4												
											-VMB4-T		1		-3KT01	13							/16.1
											-VMB4-FC1		1		-4K3V	13							/16.3
											-VMB4-FC3		1		-4K3V	13							/16.6
															-4K5V	13							
											-4K3V	A1	2		-VMB4-FC1								/16.3
											-4K4V	A1	3		-VMB4-LP1								/16.3
											-4K5V	A1	4		-VMB4-FC2								/16.4
											-4K6V	A1	5		-VMB4-LP2								/16.4
											-4F2	13	6		-VMB4-T								/16.1
											-4K1V	23	7		-VMB4-FC3								/16.6
											-4K2V	23											
											-4K6V	A2	8		-VMB4-R1								/16.5
											-4H3	x2											
											-M1-VM-B4	U1	U1		-4K1V	2							/4.8
															-4K2V	6							
											-M1-VM-B4	V1	V1		-4K1V	4							/4.8
															-4K2V	4							
											-M1-VM-B4	W1	W1		-4K1V	6							/4.8
															-4K2V	2							

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Plano de bornes =+CCM-XVM4
Hoja:	425 / 431.d
Ubicación:	DOCUMENTACION

Plano de bornes

Regleta
T3X1

Texto de función	Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
			+CCM-X0	45	1	o	-T3F1	2			/101.0
			+CCM-X0	46	2	o	-T3F1	4			/101.0
			+CCM-X0	47	3	o	-T3F1	6			/101.1
			+CCM-X0	48	4	o	-T3F1	8			/101.1
					5	o	-T3F2	2			/101.2
					6	o	-T3F2	4			/101.2
					7	o	-T3F2	6			/101.2
					8	o	-T3F2	8			/101.2
			-T3SAI		9	o	-T3F3	2			/101.3
			-T3SAI		10	o	-T3F3	4			/101.3
			-T3F4	1	11	o	-T3SAI				/101.3
			-T3F4	3	12	o	-T3SAI				/101.3
			-WIFI	L	13	o	-T3F4	2			/101.5
			-WIFI	N	14	o	-T3F4	4			/101.5
Intrusión T3			-A_T3-T3	11	15	●	-T3IO_PN1-1M				/102.1
=			-T3POS1	1	16	o	-A_T3-T3	12			/102.1
Inhibe intrusión T3-T4			-A_T3-K2	13	17	●					/102.2
=			-T3POS1	5	18	o	-A_T3-K2	14			/102.2
Pulsos Caudal T3			-A_T3-Q		19	●					/102.3
=			-T3POS1	2	20	o	-A_T3-Q				/102.3
Intrusión T4			-A_T4-T4	11	21	●					/102.5
=			-T3POS1	3	22	o	-A_T4-T4	12			/102.5
Pulsos Caudal T4			-A_T4-Q		23	●	-T3POS4	1			/102.7
=			-T3POS1	4	24	o	-A_T4-Q				/102.7
Presión ramal T3			-T3POS2	3	25	o	-T3_P-P	1			/103.1
=			-T3POS2	1	26	o	-T3_P-P	2			/103.1
Presión ramal T4			-T3POS2	7	27	o	-T4-P-P	1			/103.5
=			-T3POS2	5	28	o	-T4-P-P	2			/103.5

426.a

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+T3T4-T3X1		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 426 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función									Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable					Página / columna
											Regleta T3X1												
Orden Abrir T3											-T3-K		29	o									/104.2
=											-T3-K		30	o	-T3POS3	2							/104.3
Orden Cerrar T3											-T3-K		31	o	-T3POS3	4							/104.8
Orden Abrir T4											-T4-K		32	o	-T3IO_PN1-1L+								/104.2
Orden Abrir T3											-T4-K		33	o	-T3POS4	2							/104.3
Orden Cerrar T3											-T4-K		34	o	-T3POS4	4							/104.8

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
							Regleta FIX1				
					1	o	-FIF1	2			/201.0
					2	o	-FIF1	4			/201.0
					3	o	-FIF1	6			/201.1
					4	o	-FIF1	8			/201.1
			+BALSA-BAX1	1	5	o	-FIF2	2			/201.2
			+BALSA-BAX1	2	6	o	-FIF2	4			/201.2
			+BALSA-BAX1	3	7	o	-FIF2	6			/201.2
			+BALSA-BAX1	4	8	o	-FIF2	8			/201.2
					9	o	-FIF3	2			/201.3
					10	o	-FIF3	4			/201.3
					11	o	-FIF3	6			/201.3
					12	o	-FIF3	8			/201.4
			-FISAI		13	o	-FIF4	2			/201.5
			-FISAI		14	o	-FIF4	4			/201.5
			-FIF5	1	15	o	-FISAI				/201.5
			-FIF5		16	o	-FISAI				/201.5
Intrusión Estación de filtrado			-E_FI-T4	11	17		-FIIO_PN-1M				/202.1
=			-FIPOS1	1	18	o	-E_FI-T4	12			/202.1
Filtro en limpieza			-FMA2000-QPLC		19						/202.2
=			-FIPOS1	5	20	o	-FMA2000-QPLC				/202.2
Alarma filtrado			-FMA2000-QPLC		21						/202.3
=			-FIPOS1	2	22	o	-FMA2000-QPLC				/202.3
Pulsos Caudal T2			-A_T2-Q		23						/202.4
=			-FIPOS1	6	24	o	-A_T2-Q				/202.4
Pulsos Caudal T1			-A_T1-Q		25						/202.5
=			-FIPOS1	3	26	o	-A_T1-Q				/202.5
Intrusión T2			-A_T2-T4	11	27						/202.6
=			-FIPOS1	7	28	o	-A_T2-T4	12			/202.6

427.a

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+FILTRO-FIX1		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 427 / 431.d

Ubicación: DOCUMENTACION

426.a

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
			Regleta FIX1								
Intrusión T1			-A_T1-T3	11	29						/202.7
=			-FIPOS1	4	30		-A_T1-T3	12			/202.7
Inhide Alarma			-TECLA-K1		31						/202.8
=			-FIPOS1	8	32		-TECLA-K1				/202.8
Rearme Intrusión Estación de filtrado			-TECLA-K1		33						/203.1
=			-FIPOS2	1	34		-TECLA-K1				/203.1
Pulso de contador de agua de limpieza			-FMA2000-QPLC		35		-FIPOS6	1			/203.3
=			-FIPOS2	2	36		-FMA2000-QPLC				/203.3
Presión ramal T1			-FIPOS3	3	37		-T1_P-P	1			/204.1
=			-FIPOS3	1	38		-T1_P-P	2			/204.1
Presión ramal T2			-FIPOS3	7	39		-T2_P-P	1			/204.5
=			-FIPOS3	5	40		-T2_P-P	2			/204.5
Presión Entrada Filtro FMA2000			-FIPOS4	3	41		-FMA2000-P1	1			/205.1
=			-FIPOS4	1	42		-FMA2000-P1	2			/205.1
Presión Salida Filtro FMA2000			-FIPOS4	7	43		-FMA2000-P2	1			/205.5
=			-FIPOS4	5	44		-FMA2000-P2	2			/205.5
Orden Abrir T1			-T1-K		45						/206.2
=			-T1-K		46		-FIPOS5	2			/206.3
Orden Cerrar T1			-T1-K		47		-FIPOS5	4			/206.8
Orden Abrir T2			-T2-K		48		-FIIO_PN-1L+				/206.2
Orden Abrir T1			-T2-K		49		-FIPOS6	2			/206.3
Orden Cerrar T1			-T2-K		50		-FIPOS6	4			/206.8
Orden Limpieza FMA2000			-FMA2000	A	51		-FIPOS7	1			/207.2
=			-FMA2000	B	52		-FIPOS7	2			/207.3
Reserva					53		-FIPOS7	3			/207.7
=					54		-FIPOS7	4			/207.8

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+FILTRO-FIX1		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 427.a / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Regleta BAX1 Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable	Página / columna
			+FILTRO-FIX1	5	1	o	-BAF1	2			/301.0
			+FILTRO-FIX1	6	2	o	-BAF1	4			/301.0
			+FILTRO-FIX1	7	3	o	-BAF1	6			/301.1
			+FILTRO-FIX1	8	4	o	-BAF1	8			/301.1
			-BAM1	U1	5	o	-BAK1	2			/301.2
							-BAK2	6			
			-BAM1	V1	6	o	-BAK1	4			/301.2
							-BAK2	4			
			-BAM1	W1	7	o	-BAK1	6			/301.2
							-BAK2	2			
					8	o	-BAF3	2			/301.3
					9	o	-BAF3	4			/301.4
Inhibición de alarma			-TECLA-K1		9	●	-BAK0	13			/304.2
			-FISAI		10	o	-BAF4	2			/301.4
							-BAK0	A1			
Inhibición de alarma			-BAPOS2	5	10	o	-TECLA-K1				/304.2
			-FISAI		11	o	-BAF4	4			/301.5
							-BAK0	A2			
Pulso de caudal Caudalímetro			-A_BA-Q1		11	●					/304.3
			-BAF5	1	12	o	-FISAI				/301.4
Pulso de caudal Caudalímetro			-BAPOS2	2	12	o	-A_BA-Q1				/304.3
			-BAF5		13	o	-FISAI				/301.5
Pulso de caudal Caudalímetro					13	●					/304.4
RESERVA			-BAPOS2	6	14	o					/304.4
Sentido de caudalimetro			-A_BA-Q2		15	●					/304.5
=			-BAPOS2	3	16	o	-A_BA-Q2				/304.5
Válvula de sobrevelocidad Cerrada			-BA_VS-VS1	11	17	●					/304.6
=			-BAPOS2	7	18	o	-BA_VS-VS1	12			/304.6

427.a

428.a

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+BALSA-BAX1		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 428 / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Regleta BAX1 Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Nombre de cable	Tipo de cable	Página / columna
Válvula de sobrevelocidad Abierta			-BA_VS-VS2	11	19						/304.7
=			-BAPOS2	4	20		-BA_VS-VS2	12			/304.7
=					21		-BAK3	13			/304.8
RESERVA			-BAPOS2	8	22						/304.8
Boya nivel mínimo			-BA-N1		23		-BAK0	13			/305.1
=			-BAPOS3	1	24		-BA-N1				/305.1
=					25						/305.2
RESERVA			-BAPOS3	5	26						/305.2
Boya nivel consigna			-BA-N2		27						/305.3
=			-BAPOS3	2	28		-BA-N2				/305.3
=					29						/305.4
RESERVA			-BAPOS3	6	30						/305.4
Boya nivel máximo			-BA-N3		31						/305.5
=			-BAPOS3	3	32		-BA-N3				/305.5
Boya nivel drenaje			-BA-N4		33						/305.6
=			-BAPOS3	7	34		-BA-N4				/305.6
Intrusión arqueta			-A_BA-T3	11	35						/305.7
=			-BAPOS3	4	36		-A_BA-T3	12			/305.7
Boya nivel aliviadero			-BA-N1		37						/305.8
=			-BAPOS3	8	38		-BA-N1				/305.8
			-BAPOS4	3	39		-T1_P-P	1			/306.1
Presión Balsa			-BAPOS4	1	40		-T1_P-P	2			/306.1
Caudalímetro Entrada/Salida Balsa			-A_BA-Q	2	41		-BAIO_PN-1L+				/306.5
=			-BAPOS4	5	42		-A_BA-Q	1			/306.5

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+BALSA-BAX1		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 428.a / 431.d

Ubicación: DOCUMENTACION

Plano de bornes

Texto de función	Nombre de cable	Tipo de cable	Designación de destino	Conexión	Borne	Puente	Designación de destino	Conexión	Tipo de cable	Nombre de cable	Página / columna
						Regleta BAXVM					
			-BAVM-T		1		-BAG1				/302.1
			-BAVM-FC1		1		-BAK3.1	13			/302.3
			-BAVM-FC3		1	o	-BAK3.1	13			/302.7
							-BAK3.3	53			
			-BAK3	11	2	o	-BAVM-T				/302.1
			-BAK3.1	A1	3	o	-BAVM-FC1				/302.3
			-BAK3.2	A1	4	o	-BAVM-LP1				/302.4
			-BAK3.3	A1	5	o	-BAVM-FC2				/302.5
			-BAK3.4	A1	6	o	-BAVM-LP2				/302.6
			-BAK3.4	A2	7	o	-BAVM-R				/302.6
			-BAH3.1	x2							
			-BAK1	13	8	o	-BAVM-FC3				/302.7
			-BAK2	13							

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		
Escala	Sistema de control de bombeo Plano de bornes =+BALSA-BAXVM		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Hoja: 429 / 431.d

Ubicación: DOCUMENTACION

Lista de artículos

F01_001 - unizar

Identificador de medios de explotación	Cantidad	Designación	Número de tipo	Fabricante	Comentario
+CCM-CPU	1	CPU Et200S 192kB	6ES7 151-8AB01-0AB0	SIEMENS	
+CCM-F0	1	FESTEINBAU-LEISTUNGSSCHALTER 4-POLIG,	3WL12202NB421AA2	SIE	
+CCM-F1	1		5SL6463-7	SIEMENS	
+CCM-0F1	1		3NW7053	SIEMENS	
+CCM-0F3	1		5SM3644-6	SIEMENS	
+CCM-0F4	1		5SM3644-6	SIEMENS	
+CCM-0F11	1		5SM3644-6	SIEMENS	
+CCM-0F11.1	1		5SL6416-7	SIEMENS	
+CCM-0F11.4	1		5SL6210-7	SIEMENS	
+CCM-0F12	1		5SM3312-0FB	SIEMENS	
+CCM-0F12.1	1		5SL6216-7	SIEMENS	
+CCM-0F13	1		5SM3644-6	SIEMENS	
+CCM-0F13.1	1		5SL6416-7	SIEMENS	
+CCM-0F13.2	1		5SL6416-7	SIEMENS	
+CCM-0F14	1		5SM3644-6	SIEMENS	
+CCM-0F14.1	1		5SL6416-7	SIEMENS	
+CCM-0F14.2	1		5SL6416-7	SIEMENS	
+CCM-0F15	1		5SM3644-6	SIEMENS	
+CCM-0F15.1	1		5SL6416-7	SIEMENS	
+CCM-0F16	1		5SM3312-6	SIEMENS	
+CCM-0F16.1	1		5SL6506-7	SIEMENS	
+CCM-0F17	1		5SM3644-6	SIEMENS	
+CCM-0F17.1	1		5SL6416-7	SIEMENS	
+CCM-0F18	1		5SM3312-6	SIEMENS	
+CCM-0F18	1		5SW3002	SIEMENS	
+CCM-0F19.2	1		5SL6506-7	SIEMENS	
+CCM-1F2	1		5SM3644-6	SIEMENS	
+CCM-2F2	1		5SM3644-6	SIEMENS	
+CCM-3F2	1		5SM3644-6	SIEMENS	
+CCM-4F2	1		5SM3644-6	SIEMENS	
+CCM-FCB1	1		M22-DL-R	MOE	
+CCM-FCB2	1		M22-DL-R	MOE	
+CCM-0FCB	1		5SM3312-0FB	SIEMENS	
+CCM-0FCB1	1		5SL6506-7	SIEMENS	
+CCM-0FCB2	1		5SL6506-7	SIEMENS	
+CCM-0FCB3	1		5SL6506-7	SIEMENS	
+CCM-0FCB4	1		5SL6506-7	SIEMENS	
+CCM-FDC1	1		5SL6210-7	SIEMENS	
+CCM-0FDC1	1		5SL6210-7	SIEMENS	
+CCM-0FDC2	1		5SL6106-7	SIEMENS	
+CCM-0FDC3	1		5SL6106-7	SIEMENS	
+CCM-0FDC4	1		5SL6106-7	SIEMENS	
+CCM-0FQ	1		5SM3312-0FB	SIEMENS	
+CCM-0FQ.1	1		5SL6216-7	SIEMENS	
+CCM-0FSAI1	1		5SM3312-6	SIEMENS	
+CCM-0FSAI1.1	1		5SL6210-7	SIEMENS	
+CCM-0FSAI1.2	1		5SL6210-7	SIEMENS	
+CCM-0FSAI1.4	1		5SL6210-7	SIEMENS	
+CCM-0H3.1	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-0H3.4	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-0H3.5	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+CCM-0H4.1	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-0H4.4	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	

431.a

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Lista de artículos : SIE.6ES7151-8AB01-0AB0 - SIE.3SB30016AA40
Hoja:	431 / 431.d
Ubicación:	DOCUMENTACION

Lista de artículos

F01_001 - unizar

Identificador de medios de explotación	Cantidad	Designación	Número de tipo	Fabricante	Comentario
+CCM-0H4.5	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+CCM-1H1	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-1H2	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+CCM-1H3	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-1H4	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-1H5	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+CCM-2H1	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-2H2	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+CCM-2H3	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-2H4	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-2H5	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+CCM-3H1	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-3H2	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+CCM-3H3	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-3H4	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-3H5	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+CCM-4H1	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-4H2	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+CCM-4H3	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-4H4	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+CCM-4H5	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+CCM-HMI	1	IPC477C 15" Touch PN/IE	IPC477C	SIEMENS	
+CCM-0K1	1		PMV70A575	MOE	
+CCM-0K3	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-0K3.1	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-0K3.1	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-0K3.2	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-0K3.2	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-0K3.3	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-0K3.4	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-0K3.5	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-0K3.6	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-0K4	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-0K4.1	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-0K4.1	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-0K4.2	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-0K4.2	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-0K4.3	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-0K4.4	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-0K4.5	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-0K4.6	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-1K0	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-1K1V	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-1K1V	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-1K2	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-1K2V	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-1K2V	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-1K3	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-1K3V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-1K4	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-1K4V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-1K5	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-1K5V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	

	Fecha	Nombre	Firma	Escuela de Ingeniería y Arquitectura Universidad Zaragoza
Dibujado		CAAM		
Comprobado	20/05/2015			
Escala	Sistema de control de bombeo Lista de artículos : SIE.3SB30016AA20 - SIE.LZX:PT5A5T30			Hoja: 431.a / 431.d Ubicación: DOCUMENTACION

Lista de artículos

F01_001 - unizar

Identificador de medios de explotación	Cantidad	Designación	Número de tipo	Fabricante	Comentario
+CCM-1K6V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-1K01	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2K0	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2K1V	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-2K1V	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-2K2	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2K2V	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-2K2V	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-2K3	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2K3V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2K4	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2K4V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2K5	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2K5V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2K6V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2K01	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3K0	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3K1V	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-3K1V	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-3K2	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3K2V	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-3K2V	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-3K3	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3K3V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3K4	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3K4V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3K5	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3K5V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3K6V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3K01	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4K0	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4K1V	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-4K1V	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-4K2	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4K2V	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+CCM-4K2V	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+CCM-4K3	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4K3V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4K4	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4K4V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4K5	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4K5V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4K6V	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4K01	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-0KCB1	1	SCHUETZKOMBINATION ZUM REVERS. AC-3,	3RA13158XB301AP0	SIEMENS	
+CCM-0KCB2	1	SCHUETZKOMBINATION ZUM REVERS. AC-3,	3RA13158XB301AP0	SIEMENS	
+CCM-0KCB3	1	SCHUETZKOMBINATION ZUM REVERS. AC-3,	3RA13158XB301AP0	SIEMENS	
+CCM-0KCB4	1	SCHUETZKOMBINATION ZUM REVERS. AC-3,	3RA13158XB301AP0	SIEMENS	
+CCM-P1	1		PAC3200	SIEMENS	
+CCM-PM1	1				
+CCM-0Q1	1		3RV1011-1CA15	SIEMENS	
+CCM-0Q2	1		3RV1011-1CA15	SIEMENS	
+CCM-0Q3.1	1		3RV1011-1CA15	SIEMENS	

431.c

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Lista de artículos : SIE.LZX:PT5A5T30 - SIE.3RV1011-1CA15
Hoja:	431.b / 431.d
Ubicación:	DOCUMENTACION

431.a

Lista de artículos

F01_001 - unizar

Identificador de medios de explotación	Cantidad	Designación	Número de tipo	Fabricante	Comentario
+CCM-0Q4.1	1		3RV1011-1CA15	SIEMENS	
+CCM-0Q18	1		3RV1021-1JA15	SIEMENS	
+CCM-1Q1	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-1Q2.1	1		3RV1011-1CA15	SIEMENS	
+CCM-2Q1	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-2Q2.1	1		3RV1011-1CA15	SIEMENS	
+CCM-3Q1	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-3Q2.1	1		3RV1011-1CA15	SIEMENS	
+CCM-4Q1	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+CCM-4Q2.1	1		3RV1011-1CA15	SIEMENS	
+CCM-QSAI1.4	1		3RV1011-1CA15	SIEMENS	
+CCM-0QSAI1.3	1		3RV1011-1CA15	SIEMENS	
+CCM-0S3.1	1		3SB3000-1CA21	SIEMEN	
+CCM-0S3.2	1		3SB3000-1CA21	SIEMEN	
+CCM-0S3.3	1		3SB3000-1CA21	SIEMEN	
+CCM-0S4.1	1		3SB3000-1CA21	SIEMEN	
+CCM-0S4.2	1		3SB3000-1CA21	SIEMEN	
+CCM-0S4.3	1		3SB3000-1CA21	SIEMEN	
+CCM-1S1.1	1		3SB3000-1CA21	SIEMEN	
+CCM-1S1.2	1		3SB3000-1CA21	SIEMEN	
+CCM-1S2	1		3SB3000-1CA21	SIEMEN	
+CCM-1S3	1		3SB3000-1CA21	SIEMEN	
+CCM-1S4	1		3SB3000-1CA21	SIEMEN	
+CCM-2S1.1	1		3SB3000-1CA21	SIEMEN	
+CCM-2S1.2	1		3SB3000-1CA21	SIEMEN	
+CCM-2S1.1	1		3SB3000-1CA21	SIEMEN	
+CCM-2S1.2	1		3SB3000-1CA21	SIEMEN	
+CCM-2S2	1		3SB3000-1CA21	SIEMEN	
+CCM-2S3	1		3SB3000-1CA21	SIEMEN	
+CCM-2S4	1		3SB3000-1CA21	SIEMEN	
+CCM-3S1.1	1		3SB3000-1CA21	SIEMEN	
+CCM-3S1.2	1		3SB3000-1CA21	SIEMEN	
+CCM-3S2	1		3SB3000-1CA21	SIEMEN	
+CCM-3S3	1		3SB3000-1CA21	SIEMEN	
+CCM-3S4	1		3SB3000-1CA21	SIEMEN	
+CCM-4S1.1	1		3SB3000-1CA21	SIEMEN	
+CCM-4S1.2	1		3SB3000-1CA21	SIEMEN	
+CCM-4S2	1		3SB3000-1CA21	SIEMEN	
+CCM-4S3	1		3SB3000-1CA21	SIEMEN	
+CCM-4S4	1		3SB3000-1CA21	SIEMEN	
+CCM-SWITCH	1	SWITCH no genstionado 6ETH + 2 F.O.	IE-SW-BL08-6TX-2SC	WEI	
+CCM-0T1	1		TI 1600/5	SIEMEN	
+CCM-0T2	1		TI 1600/5	SIEMEN	
+CCM-0T3	1		TI 1600/5	SIEMEN	
+CCM-0T11.1	1	TELERRUPTOR 2 POLOS 25A	5TT5800-0	SIEMENS	
+CCM-0T11.2	1	TELERRUPTOR 2 POLOS 25A	5TT5800-0	SIEMENS	
+CCM-0T11.3	1	TELERRUPTOR 2 POLOS 25A	5TT5800-0	SIEMENS	
+CCM-0T11.4	1	RELE HORARIO SEMANAL 1 CANAL	7LF4401-5	SIEMENS	
+CCM-0TH1	1		M22-DDL-WS	MOE	
+T3T4-T3F1	1		5SL6440-7	SIEMENS	
+T3T4-T3F2	1		5SL6440-7	SIEMENS	
+T3T4-T3F3	1		5SL6106-7	SIEMENS	
+T3T4-T3F4	1		5SL6106-7	SIEMENS	
+T3T4-T3F5	1		5SL6106-7	SIEMENS	
+T3T4-T3F6	1		5SL6210-7	SIEMENS	

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Lista de artículos : SIE.3RV1011-1CA15 - SIE.5SL6210-7
Hoja:	431.c / 431.d
Ubicación:	DOCUMENTACION

Lista de artículos

F01_001 - unizar

Identificador de medios de explotación	Cantidad	Designación	Número de tipo	Fabricante	Comentario
+T3T4-T3IO_PN1	1	CPU Et200S 192kB	6ES7 151-8AB01-0AB0	SIEMENS	
+T3T4-T3PM2	1				
+T3T4-T3SWITCH	1				
+FILTRO-FIF1	1		5SL6440-7	SIEMENS	
+FILTRO-FIF2	1		5SL6425-7	SIEMENS	
+FILTRO-FIF3	1		5SL6425-7	SIEMENS	
+FILTRO-FIF4	1		5SL6106-7	SIEMENS	
+FILTRO-FIF5	1		5SL6106-7	SIEMENS	
+FILTRO-FIF6	1		5SL6210-7	SIEMENS	
+FILTRO-FIIO_PN	1	CPU Et200S 192kB	6ES7 151-8AB01-0AB0	SIEMENS	
+FILTRO-FIPM2	1				
+FILTRO-FISWITCH	1				
+BALSA-BAF1	1		5SL6425-7	SIEMENS	
+BALSA-BAF3	1		5SL6106-7	SIEMENS	
+BALSA-BAF4	1		5SL6106-7	SIEMENS	
+BALSA-BAF5	1		5SL6106-7	SIEMENS	
+BALSA-BAF6	1		5SL6210-7	SIEMENS	
+BALSA-BAH3.1	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+BALSA-BAH3.4	1	LEUCHTMELD,VORSATZ,RUND,LINSE,GN	3SB30016AA40	SIE	
+BALSA-BAH3.5	1	LEUCHTMELD,VORSATZ,RUND,LINSE,RD	3SB30016AA20	SIE	
+BALSA-BAIO_PN	1	CPU Et200S 192kB	6ES7 151-8AB01-0AB0	SIEMENS	
+BALSA-BAK1	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+BALSA-BAK1	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+BALSA-BAK2	1	SCHUETZ,3KW400V,1S,AC230V50/60HZ	3RT10151AP01	SIEMENS	
+BALSA-BAK2	1	HS-BLOCK,22,2S2OE,4POL,BGR S0-S3,SCHRAUB	3RH19211HA22	SIEMENS	
+BALSA-BAK3	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+BALSA-BAK3.1	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+BALSA-BAK3.2	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+BALSA-BAK3.3	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+BALSA-BAK3.4	1	STECKRELAIS KOMPLETTGERAET AC 230V, 4	LZX:PT5A5T30	SIEMENS	
+BALSA-BAPM2	1				
+BALSA-BAS3.1	1		3SB3000-1CA21	SIEMEN	
+BALSA-BAS3.2	1		3SB3000-1CA21	SIEMEN	
+BALSA-BASWITCH	1				
+BALSA-0S3.3	1		3SB3000-1CA21	SIEMEN	

	Fecha	Nombre	Firma
Dibujado		CAAM	
Comprobado	20/05/2015		

Escuela de Ingeniería y Arquitectura Universidad Zaragoza

Escala	Sistema de control de bombeo Lista de artículos : SIE.6ES7151-8AB01-0AB0 - SIE.3SB3000-1CA21
Hoja:	431.d / 431.d
Ubicación:	DOCUMENTACION

ANEXO II –PROGRAMA DE PLC–

PROYECTO FINAL DE CARRERA

Automatización y control de fugas de red de bombeo agrícola

AUTOR
César Alberto Alegre Melero

DIRECTOR
Ramón Piedrafita Moreno

TITULO
Ingeniería Técnica Industrial

ESPECIALIDAD
Electrónica Industrial

CONVOCATORIA
Junio 2015

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PFC_CAAM

Project											
Nombre:	PFC_CAAM	**Fecha y hora de creación:**	12/05/2015 20:51:59	**Última modificación:**	13/05/2015 9:40:33	**Autor:**	César	**Autor de la última modificación:**	César	**Versión:**	
Comentario:											

Sistema operativo	
Nombre	**Descripción**
Sistema operativo	Microsoft Windows 7 Home Premium
Versión del sistema operativo	6.1.7601.65536
Service Pack del sistema operativo	Service Pack 1
Versión del Internet Explorer	9.11.9600.17633
Nombre del equipo	PORTATIL_ASUS
Nombre del usuario	PORTATIL_ASUS\César
Ruta de instalación del TIA Portal	C:\Program Files (x86)\SIEMENS\Automation\Portal V13

Componentes		
Nombre	**Versión**	**Revisión**
WinCC Runtime Advanced V13 - SIMATIC WinCC Runtime Advanced V13.0 (HMIRTM_V11)	V13.0	V13.00.00.00_15.07.00.01
WinCC Runtime Advanced V13 - HMIRTM Simulation Single SetupPackage V13.0 (HMIRTM_V11)	V13.0	V13.00.00.00_15.07.00.01
Compatibility Check Tool TIA - TIACOMPCHECK Single SetupPackage V11.0 + SP1 (TIACOMPCHECK)	V11.0 + SP1	K11.00.02.00_01.01.00.02
Totally Integrated Automation Portal V13 - TIA Portal Single SetupPackage V13.0 (TIAP13)	V13.0	V13.00.00.00_15.07.00.01
Siemens Totally Integrated Automation Portal V13 - HM All Editions Single SetupPackage V13.0 (TIAP13)	V13.0	V13.00.00.00_15.07.00.01
Siemens Totally Integrated Automation Portal V13 - HM NoBasic Single SetupPackage V13.0 (TIAP13)	V13.0	V13.00.00.00_15.07.00.01
Siemens Totally Integrated Automation Portal V13 - HM All Editions Single SetupPackage V13.0 (TIAP13)	V13.0	V13.00.00.00_15.07.00.01
Siemens Totally Integrated Automation Portal V13 - HM NoBasic Single SetupPackage V13.0 (TIAP13)	V13.0	V13.00.00.00_15.07.00.01
Siemens Totally Integrated Automation Portal V13 - Hardware Support Base Package 0 V13.0 (TIAP13)	V13.0	V13.00.00.00_10.01.00.03
Siemens Totally Integrated Automation Portal V13 - STEP 7 Safety Single SetupPackage V13.0 (TIAP13)	V13.0	V13.00.00.00_16.01.00.01
Siemens Totally Integrated Automation Portal V13 - STEP 7 Single SetupPackage V13.0 (TIAP13)	V13.0	V13.00.00.00_15.07.00.01
Siemens Totally Integrated Automation Portal V13 - Hardware Support Base Package 02 V13.0 (TIAP13)	V13.0	V13.00.00.00_10.01.00.03
Siemens Totally Integrated Automation Portal V13 - Hardware Support Base Package 03 V13.0 (TIAP13)	V13.0	V13.00.00.00_10.01.00.03
Siemens Totally Integrated Automation Portal V13 - Support Base Package TO-01 V13.0 (TIAP13)	V13.0	V13.00.00.00_10.01.00.03
Siemens Totally Integrated Automation Portal V13 - Support Base Package TO-02 V13.0 (TIAP13)	V13.0	V13.00.00.00_10.01.00.03
Siemens Totally Integrated Automation Portal V13 - Hardware Support Base Package WCF-01 V13.0 (TIAP13)	V13.0	V13.00.00.00_10.01.00.03
Siemens Totally Integrated Automation Portal V13 - TIACOMPCHECK Single SetupPackage V13.0 (TIAP13)	V13.0	V13.00.00.00_15.07.00.01
Siemens Totally Integrated Automation Portal V13 - Simatic Single SetupPackage V13.0 (TIAP13)	V13.0	V13.00.00.00_15.07.00.01
Siemens Totally Integrated Automation Portal V13 - WinCC Single SetupPackage V13.0 (TIAP13)	V13.0	V13.00.00.00_15.07.00.01
Automation Software Updater	13.0	V01.00.00.00_05.01.00.80
SIEMENS OPC	3.9	03.09.04.00_01.10.00.02
OPC-XML-Gateway	13.0.0.0	V13.0.0.0_1.1.0.8
SIMATIC HMI ProSave	13.0	V13.00.00.00_15.07.00.01
SIMATIC HMI Symbol Library	13.0	V13.00.00.00_15.07.00.01
SIMATIC HMI Touch Input	13.0	V13.00.00.00_15.07.00.01
SIMATIC Device Drivers WoW	20.2	K20.02.03.00_01.04.00.02
SIMATIC Event Database	5.5.3.0	05.05.03.00_01.11.00.01
SeCon	2.1.0.0	V02.01.00.00_01.04.00.02
SIMATIC SCS	V07.03.00.00	V07.03.00.00_01.13.00.03
WinCC Runtime Advanced Simulator	13.0	V13.00.00.00_15.07.00.01

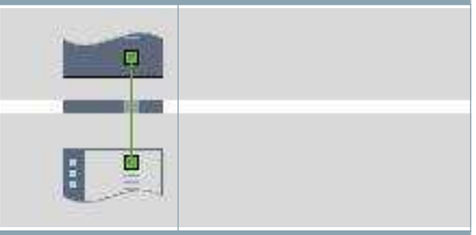
Productos		
Nombre	**Versión**	**Revisión**
SIMATIC WinCC Runtime Advanced Simulation	V13.0	V13.00.00.00_15.07.00.01
SIMATIC STEP 7 Professional	V11.0 + SP2	K11.00.02.00_02.08.00.01
SIMATIC WinCC Basic	V11.0 + SP2	K11.00.02.00_02.08.00.01
SIMATIC STEP 7 Safety	V13.0	V13.00.00.00_16.01.00.01
SIMATIC STEP 7 Professional	V13.0	V13.00.00.00_15.07.00.01
SIMATIC WinCC Comfort/Advanced	V13.0	V13.00.00.00_15.07.00.01

Nombre	Versión	Revisión
SIMATIC WinCC/Audit Viewer	2008 SP2	V07.02.00.00_01.04.00.01
Automation License Manager	V5.3 + Upd1	05.03.00.01_01.01.00.02
SIMATIC OPC-XML-Gateway	V13.0	V13.0.0.0_1.1.0.8
S7-PLCSIM	V5.4 + SP5 + Upd3	K05.04.05.03_01.02.00.01
SIMATIC ProSave	V13.0	V13.00.00.00_15.07.00.01

PFC_CAAM

CPU_VELILLA [IM151-8 CPU]

CPU_VELILLA									
General									
Nombre	CPU_VELILLA	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	2
General\Información de catálogo									
Nombre abreviado	IM 151-8 PN/DP CPU	**Descripción**	Memoria de trabajo 128KB; 0,3ms/1000 instrucciones; interfaz PROFINET; comunicación S7 (FBs/FCs cargables); controlador PROFINET IO; soporta RT/IRT; 3 puertos; PROFINET CBA; proxy de PROFINET CBA; protocolo de transporte TCP/IP, UDP e ISO on TCP; routing de registros; firmware V2.7; ampliación con un máximo de 63 módulos de la gama ET200S; también disponible como módulo SIPLUS con la referencia 6AG1 151-8AB00-4AB0.	**Referencia**	6ES7 151-8AB00-0AB0	**Versión de firmware**	V2.7		
General\Identification & Maintenance									
ID de la instalación		**ID de situación**							
Interfaz PROFINET [X1]\General									
Nombre	Interfaz PROFINET_1	**Autor**	César	**Comentario**					
Interfaz PROFINET [X1]\General\Información de catálogo									
Nombre abreviado	Interfaz PROFINET	**Descripción**		**Referencia**		**Versión de firmware**			
Interfaz PROFINET [X1]\Direcciones Ethernet\Interfaz conectada en red con									
Subred:	PN/IE_1								
Interfaz PROFINET [X1]\Direcciones Ethernet\Protocolo IP									
	Ajustar dirección IP en el proyecto	**Dirección IP:**	192.168.0.200	**Másc. subred:**	255.255.255.0	**Utilizar router**	False		
Interfaz PROFINET [X1]\Direcciones Ethernet\PROFINET									
Generar automáticamente el nombre del dispositivo PROFINET	True	**Nombre del dispositivo PROFINET**	cpu_velilla	**Nombre convertido:**	cpuxbvelilladf06	**Número de dispositivo:**	0		
Interfaz PROFINET [X1]\Sincronización horaria\Modo NTP									
Activar sincronización horaria vía servidor NTP	Falso		Direcciones IP	**Servidor 1**	0.0.0.0	**Servidor 2**	0.0.0.0	**Servidor 3**	0.0.0.0
Servidor 4	0.0.0.0	**Intervalo de actualización**	10s						
Interfaz PROFINET [X1]\Opciones avanzadas\Opciones de interfaz									
Llamar el programa de usuario en caso de errores de comunicación	False	**Permitir sustitución de dispositivo sin medio de almacenamiento extraíble**	True	**Usar modo LLDP IEC V2.2**	True				
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Comunicación IO									
Tiempo de ciclo de emisión:	1.000ms								
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Sincronización									
Dominio de sincronización:	Sync-Domain_1	**Función de sincronización:**	Sin sincronizar	**Clase RT:**	RT,IRT				

Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Opciones en tiempo real									
Ancho de banda calculado para datos IO cíclicos:	0.014ms								
Interfaz PROFINET [X1]\Opciones avanzadas\Puerto [X1 P1]\General									
Rack	1	**Nombre**	Puerto_1	**Rack**	2	**Comentario**		**Nombre**	Puerto_2
Rack	3	**Comentario**		**Nombre**	Puerto_3	**Comentario**			
Interfaz PROFINET [X1]\Opciones avanzadas\Puerto [X1 P1]\Interconexión de puertos\Puerto local:									
Puerto local:	CPU_VELILLA\Interfaz PROFINET_1 [X1]\Puerto_1 [X1 P1]	**Medio:**	Cobre	**Denominación del cable:**	---				
Interfaz PROFINET [X1]\Opciones avanzadas\Puerto [X1 P1]\Interconexión de puertos\Puerto interlocutor:									
Interlocutores alternativos	False	**Puerto interlocutor:**	Cualquier interlocutor						
Interfaz PROFINET [X1]\Opciones avanzadas\Puerto [X1 P1]\Opciones de puerto\Activar									
Activar este puerto para el uso	True								
Interfaz PROFINET [X1]\Opciones avanzadas\Puerto [X1 P1]\Opciones de puerto\Conexión									
Velocidad de transferencia/dúplex:	Automático	**Monitorizar**	False	**Activar autonegotiation**	True				
Interfaz PROFINET [X1]\Opciones avanzadas\Puerto [X1 P1]\Opciones de puerto\Boundaries									
Fin del registro de dispositivos accesibles	False	**Fin de la detección de topología**	False	**Fin del dominio Sync**	False				
Interfaz PROFINET [X1]\Opciones avanzadas\Puerto [X1 P1]\Direcciones de diagnóstico\Direcciones de diagnóstico									
Dirección inicial	2046	**Dirección inicial**	2045	**Dirección inicial**	2044				
Interfaz PROFINET [X1]\Direcciones de diagnóstico\Direcciones de diagnóstico									
Dirección inicial	2047	**Sistema PROFINET IO**	2042						
Sinóptico de direcciones									
Entradas	True	**Salidas**	True	**Huecos direcciones**	False	**Slot**	True		

Sinóptico de direcciones\Sinóptico de direcciones

Tipo	Dir. desde	Dir. hasta	Módulo	IPP	DP	PN	Rack	Slot
I*	2047	2047	Interfaz PROFINET_1	-	-	-	0	2 X1
I*	2046	2046	Puerto_1	-	-	-	0	2 X1 P1
I*	2045	2045	Puerto_2	-	-	-	0	2 X1 P2
I*	2044	2044	Puerto_3	-	-	-	0	2 X1 P3
I*	2043	2043	PM-E 24V DC_1	-	-	-	0	4
I	1	1	8DI x 24V DC_1	IP OB1	-	-	0	5
I	2	2	8DI x 24V DC_2	IP OB1	-	-	0	6
I	3	3	8DI x 24V DC_3	IP OB1	-	-	0	7
I	4	4	8DI x 24V DC_4	IP OB1	-	-	0	8
I	5	5	8DI x 24V DC_5	IP OB1	-	-	0	9
I	6	6	8DI x 24V DC_6	IP OB1	-	-	0	10
I	7	7	8DI x 24V DC_7	IP OB1	-	-	0	11
I	8	8	8DI x 24V DC_8	IP OB1	-	-	0	12
I	9	9	8DI x 24V DC_9	IP OB1	-	-	0	13
I	10	10	8DI x 24V DC_10	IP OB1	-	-	0	14
I	11	11	8DI x 24V DC_11	IP OB1	-	-	0	15
I	12	12	8DI x 24V DC_12	IP OB1	-	-	0	16
I	13	13	8DI x 24V DC_13	IP OB1	-	-	0	17
I	50	53	2AI x I 2WIRE ST_1	IP OB1	-	-	0	20
I	54	57	2AI x I 2WIRE ST_2	IP OB1	-	-	0	21
I	58	61	2AI x I 2WIRE ST_3	IP OB1	-	-	0	22
I	62	65	2/4AI x RTD ST_1	IP OB1	-	-	0	36
I	66	69	2/4AI x RTD ST_2	IP OB1	-	-	0	37
I	70	73	2/4AI x RTD ST_3	IP OB1	-	-	0	38
I	74	77	2/4AI x RTD ST_4	IP OB1	-	-	0	39
I	94	97	2/4AI x RTD ST_5	IP OB1	-	-	0	40
I	102	105	2/4AI x RTD ST_6	IP OB1	-	-	0	41
I	110	113	2/4AI x RTD ST_7	IP OB1	-	-	0	42
I	118	121	2/4AI x RTD ST_8	IP OB1	-	-	0	43
I	136	143	4AI x I 2WIRE ST_1	-	-	-	0	46
I	132	135	2AI x I 4WIRE ST_2	-	-	-	0	45
I	128	131	2AI x I 4WIRE ST_1	-	-	-	0	44
I	33	33	8DI x 24V DC_14	IP OB1	-	-	0	49
I*	2042	2042	Interfaz PROFINET_1	-	-	-	0	2 X1
I*	2041	2041	T3-T4	-	-	100(1)	0	0
I*	2040	2040	T3-T4	-	-	100(1)	0	0
I*	2039	2039	Port_1	-	-	100(1)	0	0 X1 P1
I*	2038	2038	Port_2	-	-	100(1)	0	0 X1 P2
I*	2037	2037	PM-E 24V DC_1	-	-	100(1)	0	1
I*	2036	2036	FILTRADO	-	-	100(2)	0	0
I*	2035	2035	FILTRADO	-	-	100(2)	0	0
I*	2034	2034	Port_1	-	-	100(2)	0	0 X1 P1
I*	2033	2033	Port_2	-	-	100(2)	0	0 X1 P2
I*	2032	2032	PM-E 24V DC_1	-	-	100(2)	0	1
I*	2031	2031	BALSA	-	-	100(3)	0	0
I*	2030	2030	BALSA	-	-	100(3)	0	0
I*	2029	2029	Port_1	-	-	100(3)	0	0 X1 P1
I*	2028	2028	Port_2	-	-	100(3)	0	0 X1 P2
I*	2027	2027	PM-E 24V DC_1	-	-	100(3)	0	1
I	400	400	8DI x 24V DC_1	-	-	100(1)	0	2
I	402	405	2AI x I 2WIRE ST_1	-	-	100(1)	0	3
I	500	500	8DI x 24V DC_1	-	-	100(2)	0	2
I	502	505	2AI x I 2WIRE ST_1	-	-	100(2)	0	3
I	506	509	2AI x I 2WIRE ST_2	-	-	100(2)	0	4
I	600	600	8DI x 24V DC_1	-	-	100(3)	0	2
I	601	601	8DI x 24V DC_2	-	-	100(3)	0	3

Tipo	Dir. desde	Dir. hasta	Módulo	IPP	DP	PN	Rack	Slot
I	602	605	2AI x I 2WIRE ST_1	-	-	100(3)	0	4
Q	14,0	14,1	2RO x NO 24/230V / 5A_1	IP OB1	-	-	0	18
Q	15,0	15,1	2RO x NO 24/230V / 5A_2	IP OB1	-	-	0	19
Q	18,0	18,1	2RO x NO 24/230V / 5A_3	IP OB1	-	-	0	23
Q	19,0	19,1	2RO x NO 24/230V / 5A_4	IP OB1	-	-	0	24
Q	20,0	20,1	2RO x NO 24/230V / 5A_5	IP OB1	-	-	0	25
Q	21,0	21,1	2RO x NO 24/230V / 5A_6	IP OB1	-	-	0	26
Q	22,0	22,1	2RO x NO 24/230V / 5A_7	IP OB1	-	-	0	27
Q	23,0	23,1	2RO x NO 24/230V / 5A_8	IP OB1	-	-	0	28
Q	24,0	24,1	2RO x NO 24/230V / 5A_9	IP OB1	-	-	0	29
Q	25,0	25,1	2RO x NO 24/230V / 5A_10	IP OB1	-	-	0	30
Q	26,0	26,1	2RO x NO 24/230V / 5A_11	IP OB1	-	-	0	31
Q	27,0	27,1	2RO x NO 24/230V / 5A_12	IP OB1	-	-	0	32
Q	28,0	28,1	2RO x NO 24/230V / 5A_13	IP OB1	-	-	0	33
Q	29,0	29,1	2RO x NO 24/230V / 5A_14	IP OB1	-	-	0	34
Q	30,0	30,1	2RO x NO 24/230V / 5A_15	IP OB1	-	-	0	35
Q	31,0	31,1	2RO x NO 24/230V / 5A_16	IP OB1	-	-	0	47
Q	32,0	32,1	2RO x NO 24/230V / 5A_17	IP OB1	-	-	0	48
Q	401,0	401,1	2RO x NO 24/230V / 5A_1	-	-	100(1)	0	4
Q	402,0	402,1	2RO x NO 24/230V / 5A_2	-	-	100(1)	0	5
Q	500,0	500,1	2RO x NO 24/230V / 5A_1	-	-	100(2)	0	5
Q	501,0	501,1	2RO x NO 24/230V / 5A_2	-	-	100(2)	0	6
Q	502,0	502,1	2RO x NO 24/230V / 5A_3	-	-	100(2)	0	7
Q	600,0	600,1	2RO x NO 24/230V / 5A_1	-	-	100(3)	0	5

Arranque

Arranque si la configuración real difiere de la teórica	True	**Arranque tras conexión (POWER ON)**	Rearranque completo (en caliente)

Arranque\Tiempo de vigilancia para

Señal "ready" de los módulos	100x 100 ms	**Transferencia de parámetros a módulos**	100x 100 ms

Ciclo

Tiempo de vigilancia del ciclo	150ms	**Carga del ciclo por comunicación**	20%	**Tamaño de la memoria imagen de proceso de las entradas:**	128	**Tamaño de la memoria imagen de proceso de las salidas:**	128	**Llamar al OB85 en caso de error de acceso a la periferia**	Sin llamada OB85

Marca de ciclo

Marca de ciclo	False	**Byte de marcas**	0

Remanencia

Número de bytes de marcas a partir de MB 0	16	**Número de temporizadores S7 a partir de T 0**	0	**Número de contadores S7 a partir de Z 0**	8

Alarmas\Alarmas horarias

Número de OB	Prioridad	Activo	Ejecución	Hora de arranque
OB 10:	2	False	Ninguno	1994-01-01 00:00:00.000

Alarmas\Alarmas de retardo

Número de OB	Prioridad	Memoria(s) imagen parcial de proceso
OB 20:	3	Ninguno

Alarmas\Alarmas cíclicas

Número de OB	Prioridad	Ejecución	Unidad
OB 35:	12	100	ms

Alarmas\Alarmas de proceso

Número de OB	Prioridad
OB 40:	16

Alarmas\Alarmas para DPV1\	
Número de OB	**Prioridad**
OB 55:	2
OB 56:	2
OB 57:	2

Alarmas\Alarmas de error asíncrono\	
Número de OB	**Prioridad**
OB 82:	26
OB 83:	26
OB 85:	26
OB 86:	26
OB 87:	26

Sistema de diagnóstico					
Notificar causa del STOP	True	**Número de avisos en el búfer de diagnóstico**	500		

Diagnóstico del sistema\General					
Activar el diagnóstico de sistema para este PLC	False				

Hora					
Factor de corrección	0ms				

Modo de operación					
	Modo Test	**Tiempo de ciclo máx. para funciones de test**	ms		

Protección					
Contraseña		**Confirmar contraseña**			

Protección\	
Nivel de protección	Sin protección

Protección\ \Eliminable por contraseña	
Eliminable por contraseña	False

Parámetros					
Supresión de frecuencias perturbadoras	50Hz	**Longitud de bus**	<= 1m		

Parámetros\Unión fría						
Unión fría	False	**Número de slot**	0	**Número de canal**	0	

Servidor web\General	
Activar servidor web en el módulo	False

Servidor web\Actualización automática			
Activar actualización automática	False	**Intervalo de actualización**	0s

Servidor web\Languages		
Activo	**Idioma del servidor web**	**Asignar idioma del proyecto**
False	Alemán	Ninguno
False	Inglés	Ninguno
False	Francés	Ninguno
False	Español	Ninguno
False	Italiano	Ninguno
False	Japonés	Ninguno
False	Chino (simplificado)	Ninguno

Servidor web\Display classes of messages	
Discriminador	**Activo**
0	True
1	True
2	True
3	True
4	True
5	True
6	True
7	True
8	True
9	True
10	True
11	True
12	True
13	True
14	True
15	True
16	True

Anchor (ParameterCommunicationMenu)	
The TreeNode ParameterCommunicationMenu was not filled by some ACF	

Anchor (AddressesOverviewMenu)	
The AddressesOverviewMenu was not filled by some ACF	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

Main [OB1]

Main Propiedades											
General											
Nombre	Main	**Número**	1	**Tipo**	OB	**Idioma**	KOP	**Numeración**	automática		
Información											
Título	"Main Program Sweep (Cycle)"	**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor predet.	Comentario
▼ Temp				
OB1_EV_CLASS	Byte	0.0		Bits 0-3 = 1 (Coming event), Bits 4-7 = 1 (Event class 1)
OB1_SCAN_1	Byte	1.0		1 (Cold restart scan 1 of OB 1), 3 (Scan 2-n of OB 1)
OB1_PRIORITY	Byte	2.0		Priority of OB Execution
OB1_OB_NUMBR	Byte	3.0		1 (Organization block 1, OB1)
OB1_RESERVED_1	Byte	4.0		Reserved for system
OB1_RESERVED_2	Byte	5.0		Reserved for system
OB1_PREV_CYCLE	Int	6.0		Cycle time of previous OB1 scan (milliseconds)
OB1_MIN_CYCLE	Int	8.0		Minimum cycle time of OB1 (milliseconds)
OB1_MAX_CYCLE	Int	10.0		Maximum cycle time of OB1 (milliseconds)
OB1_DATE_TIME	Date_And_Time	12.0		Date and time OB1 started
Constant				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DATOS_B1 [DB1]

DATOS_B1 Propiedades											
General											
Nombre	DATOS_B1	**Número**	1	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
READY	Bool	0.0	false	True	True	True	False	
EN_HORARIO	Bool	0.1	false	True	True	True	False	
HABILITADA	Bool	0.2	false	True	True	True	False	
FORZADA	Bool	0.3	false	True	True	True	False	
GRUPO_OK	Bool	0.4	false	True	True	True	False	
VM_OK	Bool	0.5	false	True	True	True	False	
RESET_HORAS	Bool	0.6	false	True	True	True	False	
REARME	Bool	0.7	false	True	True	True	False	
PASO0	Bool	1.0	false	True	True	True	False	
PASO1	Bool	1.1	false	True	True	True	False	
PASO2	Bool	1.2	false	True	True	True	False	
PASO3	Bool	1.3	false	True	True	True	False	
PASO4	Bool	1.4	false	True	True	True	False	
PASO5	Bool	1.5	false	True	True	True	False	
PASO6	Bool	1.6	false	True	True	True	False	
PASO7	Bool	1.7	false	True	True	True	False	
PASO8	Bool	2.0	false	True	True	True	False	
PASO9	Bool	2.1	false	True	True	True	False	
PASO10	Bool	2.2	false	True	True	True	False	
PASO11	Bool	2.3	false	True	True	True	False	
PASO12	Bool	2.4	false	True	True	True	False	
PASO13	Bool	2.5	false	True	True	True	False	
PASO14	Bool	2.6	false	True	True	True	False	
MARCHA_CONJUNTO	Bool	2.7	false	True	True	True	False	
ALARMA_VALVULA_LP_ABRE	Bool	3.0	false	True	True	True	False	
ALARMA_VALVULA_LP_CIERRA	Bool	3.1	false	True	True	True	False	
ALARMA_VALVULA_DISPARO	Bool	3.2	false	True	True	True	False	
ALARMA_PROTECCIO_DISPARO	Bool	3.3	false	True	True	True	False	
ALARMA_VARIADOR_DISPARO	Bool	3.4	false	True	True	True	False	
ALARMA_TIEMPO_VALVULA_A	Bool	3.5	false	True	True	True	False	
ALARMA_TIEMPO_VALVULA_C	Bool	3.6	false	True	True	True	False	
HORAS_USO	Real	4.0	0.0	True	True	True	False	
ARRANQUES	Real	8.0	0.0	True	True	True	False	
HORAS_PARA_MTO	Real	12.0	0.0	True	True	True	False	
HORAS_ULTIMO_MTO	Real	16.0	0.0	True	True	True	False	
RENDIMIENTO	Int	20.0	0	True	True	True	False	
ARRANQUE_GRUPO	Bool	22.0	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DATOS_B2 [DB2]

DATOS_B2 Propiedades									
General									
Nombre	DATOS_B2	**Número**	2	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
READY	Bool	0.0	false	True	True	True	False	
EN_HORARIO	Bool	0.1	false	True	True	True	False	
HABILITADA	Bool	0.2	false	True	True	True	False	
FORZADA	Bool	0.3	false	True	True	True	False	
GRUPO_OK	Bool	0.4	false	True	True	True	False	
VM_OK	Bool	0.5	false	True	True	True	False	
RESET_HORAS	Bool	0.6	false	True	True	True	False	
REARME	Bool	0.7	false	True	True	True	False	
PASO0	Bool	1.0	false	True	True	True	False	
PASO1	Bool	1.1	false	True	True	True	False	
PASO2	Bool	1.2	false	True	True	True	False	
PASO3	Bool	1.3	false	True	True	True	False	
PASO4	Bool	1.4	false	True	True	True	False	
PASO5	Bool	1.5	false	True	True	True	False	
PASO6	Bool	1.6	false	True	True	True	False	
PASO7	Bool	1.7	false	True	True	True	False	
PASO8	Bool	2.0	false	True	True	True	False	
PASO9	Bool	2.1	false	True	True	True	False	
PASO10	Bool	2.2	false	True	True	True	False	
PASO11	Bool	2.3	false	True	True	True	False	
PASO12	Bool	2.4	false	True	True	True	False	
PASO13	Bool	2.5	false	True	True	True	False	
PASO14	Bool	2.6	false	True	True	True	False	
MARCHA_CONJUNTO	Bool	2.7	false	True	True	True	False	
ALARMA_VALVULA_LP_ABRE	Bool	3.0	false	True	True	True	False	
ALARMA_VALVULA_LP_CIERRA	Bool	3.1	false	True	True	True	False	
ALARMA_VALVULA_DISPARO	Bool	3.2	false	True	True	True	False	
ALARMA_PROTECCIO_DISPARO	Bool	3.3	false	True	True	True	False	
ALARMA_VARIADOR_DISPARO	Bool	3.4	false	True	True	True	False	
ALARMA_TIEMPO_VALVULA_A	Bool	3.5	false	True	True	True	False	
ALARMA_TIEMPO_VALVULA_C	Bool	3.6	false	True	True	True	False	
HORAS_USO	Real	4.0	0.0	True	True	True	False	
ARRANQUES	Real	8.0	0.0	True	True	True	False	
HORAS_PARA_MTO	Real	12.0	0.0	True	True	True	False	
HORAS_ULTIMO_MTO	Real	16.0	0.0	True	True	True	False	
RENDIMIENTO	Int	20.0	0	True	True	True	False	
ARRANQUE_GRUPO	Bool	22.0	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DATOS_B4 [DB4]

DATOS_B4 Propiedades											
General											
Nombre	DATOS_B4	**Número**	4	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
READY	Bool	0.0	false	True	True	True	False	
EN_HORARIO	Bool	0.1	false	True	True	True	False	
HABILITADA	Bool	0.2	false	True	True	True	False	
FORZADA	Bool	0.3	false	True	True	True	False	
GRUPO_OK	Bool	0.4	false	True	True	True	False	
VM_OK	Bool	0.5	false	True	True	True	False	
RESET_HORAS	Bool	0.6	false	True	True	True	False	
REARME	Bool	0.7	false	True	True	True	False	
PASO0	Bool	1.0	false	True	True	True	False	
PASO1	Bool	1.1	false	True	True	True	False	
PASO2	Bool	1.2	false	True	True	True	False	
PASO3	Bool	1.3	false	True	True	True	False	
PASO4	Bool	1.4	false	True	True	True	False	
PASO5	Bool	1.5	false	True	True	True	False	
PASO6	Bool	1.6	false	True	True	True	False	
PASO7	Bool	1.7	false	True	True	True	False	
PASO8	Bool	2.0	false	True	True	True	False	
PASO9	Bool	2.1	false	True	True	True	False	
PASO10	Bool	2.2	false	True	True	True	False	
PASO11	Bool	2.3	false	True	True	True	False	
PASO12	Bool	2.4	false	True	True	True	False	
PASO13	Bool	2.5	false	True	True	True	False	
PASO14	Bool	2.6	false	True	True	True	False	
MARCHA_CONJUNTO	Bool	2.7	false	True	True	True	False	
ALARMA_VALVULA_LP_ABRE	Bool	3.0	false	True	True	True	False	
ALARMA_VALVULA_LP_CIERRA	Bool	3.1	false	True	True	True	False	
ALARMA_VALVULA_DISPARO	Bool	3.2	false	True	True	True	False	
ALARMA_PROTECCIO_DISPARO	Bool	3.3	false	True	True	True	False	
ALARMA_VARIADOR_DISPARO	Bool	3.4	false	True	True	True	False	
ALARMA_TIEMPO_VALVULA_A	Bool	3.5	false	True	True	True	False	
ALARMA_TIEMPO_VALVULA_C	Bool	3.6	false	True	True	True	False	
HORAS_USO	Real	4.0	0.0	True	True	True	False	
ARRANQUES	Real	8.0	0.0	True	True	True	False	
HORAS_PARA_MTO	Real	12.0	0.0	True	True	True	False	
HORAS_ULTIMO_MTO	Real	16.0	0.0	True	True	True	False	
RENDIMIENTO	Int	20.0	0	True	True	True	False	
ARRANQUE_GRUPO	Bool	22.0	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DATOS_B3 [DB3]

DATOS_B3 Propiedades											
General											
Nombre	DATOS_B3	**Número**	3	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
READY	Bool	0.0	false	True	True	True	False	
EN_HORARIO	Bool	0.1	false	True	True	True	False	
HABILITADA	Bool	0.2	false	True	True	True	False	
FORZADA	Bool	0.3	false	True	True	True	False	
GRUPO_OK	Bool	0.4	false	True	True	True	False	
VM_OK	Bool	0.5	false	True	True	True	False	
RESET_HORAS	Bool	0.6	false	True	True	True	False	
REARME	Bool	0.7	false	True	True	True	False	
PASO0	Bool	1.0	false	True	True	True	False	
PASO1	Bool	1.1	false	True	True	True	False	
PASO2	Bool	1.2	false	True	True	True	False	
PASO3	Bool	1.3	false	True	True	True	False	
PASO4	Bool	1.4	false	True	True	True	False	
PASO5	Bool	1.5	false	True	True	True	False	
PASO6	Bool	1.6	false	True	True	True	False	
PASO7	Bool	1.7	false	True	True	True	False	
PASO8	Bool	2.0	false	True	True	True	False	
PASO9	Bool	2.1	false	True	True	True	False	
PASO10	Bool	2.2	false	True	True	True	False	
PASO11	Bool	2.3	false	True	True	True	False	
PASO12	Bool	2.4	false	True	True	True	False	
PASO13	Bool	2.5	false	True	True	True	False	
PASO14	Bool	2.6	false	True	True	True	False	
MARCHA_CONJUNTO	Bool	2.7	false	True	True	True	False	
ALARMA_VALVULA_LP_ABRE	Bool	3.0	false	True	True	True	False	
ALARMA_VALVULA_LP_CIERRA	Bool	3.1	false	True	True	True	False	
ALARMA_VALVULA_DISPARO	Bool	3.2	false	True	True	True	False	
ALARMA_PROTECCIO_DISPARO	Bool	3.3	false	True	True	True	False	
ALARMA_VARIADOR_DISPARO	Bool	3.4	false	True	True	True	False	
ALARMA_TIEMPO_VALVULA_A	Bool	3.5	false	True	True	True	False	
ALARMA_TIEMPO_VALVULA_C	Bool	3.6	false	True	True	True	False	
HORAS_USO	Real	4.0	0.0	True	True	True	False	
ARRANQUES	Real	8.0	0.0	True	True	True	False	
HORAS_PARA_MTO	Real	12.0	0.0	True	True	True	False	
HORAS_ULTIMO_MTO	Real	16.0	0.0	True	True	True	False	
RENDIMIENTO	Int	20.0	0	True	True	True	False	
ARRANQUE_GRUPO	Bool	22.0	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_CAUDALES [DB5]

CALCULO_CAUDALES Propiedades											
General											
Nombre	CALCULO_CAUDALES	**Número**	5	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
CONTADOR_SEG_T1	Real	0.0	0.0	True	True	True	False	
CONTADOR_SEG_T2	Real	4.0	0.0	True	True	True	False	
CONTADOR_SEG_T3	Real	8.0	0.0	True	True	True	False	
CONTADOR_SEG_T4	Real	12.0	0.0	True	True	True	False	
CONTADOR_SEG_T5	Real	16.0	0.0	True	True	True	False	
CONTADOR_SEG_T6	Real	20.0	0.0	True	True	True	False	
CONTADOR_SEG_T7	Real	24.0	0.0	True	True	True	False	
ULT_CONT_SEG_T1	Real	28.0	0.0	True	True	True	False	
ULT_CONT_SEG_T2	Real	32.0	0.0	True	True	True	False	
ULT_CONT_SEG_T3	Real	36.0	0.0	True	True	True	False	
ULT_CONT_SEG_T4	Real	40.0	0.0	True	True	True	False	
ULT_CONT_SEG_T5	Real	44.0	0.0	True	True	True	False	
ULT_CONT_SEG_T6	Real	48.0	0.0	True	True	True	False	
ULT_CONT_SEG_T7	Real	52.0	0.0	True	True	True	False	
T1_LS	Real	56.0	0.0	True	True	True	False	
T2_LS	Real	60.0	0.0	True	True	True	False	
T3_LS	Real	64.0	0.0	True	True	True	False	
T4_LS	Real	68.0	0.0	True	True	True	False	
T5_LS	Real	72.0	0.0	True	True	True	False	
T6_LS	Real	76.0	0.0	True	True	True	False	
T7_LS	Real	80.0	0.0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

VISUAL [DB6]

VISUAL Propiedades											
General											
Nombre	VISUAL	**Número**	6	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personaliza-da**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
VOLUMEN_BALSA	Real	0.0	0.0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

NUEVOS_ACUMULADORES [DB7]

NUEVOS_ACUMULADORES Propiedades											
General											
Nombre	NUEVOS_ACUMULADORES	**Número**	7	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personaliza-da**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
CONTADOR_BALSA_IN	Real	0.0	0.0	True	True	True	False	
CONTADOR_BALSA_OUT	Real	4.0	0.0	True	True	True	False	
CONTADOR_POSIB_PERDIDAS	Real	8.0	0.0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

BLOQUE_CALCULO [DB8]

BLOQUE_CALCULO Propiedades											
General											
Nombre	BLOQUE_CALCULO	**Número**	8	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
ANTERIOR_Q_T1	Real	0.0	0.0	True	True	True	False	
ANTERIOR_Q_T2	Real	4.0	0.0	True	True	True	False	
ANTERIOR_Q_T3	Real	8.0	0.0	True	True	True	False	
ANTERIOR_Q_T4	Real	12.0	0.0	True	True	True	False	
ANTERIOR_Q_T5	Real	16.0	0.0	True	True	True	False	
ANTERIOR_Q_T6	Real	20.0	0.0	True	True	True	False	
ANTERIOR_Q_T7	Real	24.0	0.0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DATOS_RENDIMIENTO [DB9]

DATOS_RENDIMIENTO Propiedades											
General											
Nombre	DATOS_RENDIMIENTO	**Número**	9	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
VOLTS_B1	Real	0.0	0.0	True	True	True	False	
AMPS_B1	Real	4.0	0.0	True	True	True	False	
COSFI_B1	Real	8.0	0.0	True	True	True	False	
VOLTS_B2	Real	12.0	0.0	True	True	True	False	
AMPS_B2	Real	16.0	0.0	True	True	True	False	
COSFI_B2	Real	20.0	0.0	True	True	True	False	
VOLTS_B3	Real	24.0	0.0	True	True	True	False	
AMPS_B3	Real	28.0	0.0	True	True	True	False	
COSFI_B3	Real	32.0	0.0	True	True	True	False	
VOLTS_B4	Real	36.0	0.0	True	True	True	False	
AMPS_B4	Real	40.0	0.0	True	True	True	False	
COSFI_B4	Real	44.0	0.0	True	True	True	False	
RENDIMIENTO_GRAL	Real	48.0	0.0	True	True	True	False	
RENDIMIENTO_B1	Real	52.0	0.0	True	True	True	False	
RENDIMIENTO_B2	Real	56.0	0.0	True	True	True	False	
RENDIMIENTO_B3	Real	60.0	0.0	True	True	True	False	
RENDIMIENTO_B4	Real	64.0	0.0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DB_ALARMAS [DB10]

DB_ALARMAS Propiedades											
General											
Nombre	DB_ALARMAS	**Número**	10	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
PRESION_ALTA_IMP	Real	0.0	0.0	True	True	True	False	
PRESION_MAXIMA_IMP	Real	4.0	0.0	True	True	True	False	
TIEMPO_PRESION	Time	8.0	T#0ms	True	True	True	False	
PRESION_BAJA_IMP	Real	12.0	0.0	True	True	True	False	
PRESION_MINIMA_IMP	Real	16.0	0.0	True	True	True	False	
CAUDAL_MAXIMO_1B	Real	20.0	0.0	True	True	True	False	
CAUDAL_MAXIMO_2B	Real	24.0	0.0	True	True	True	False	
CAUDAL_MAXIMO_3B	Real	28.0	0.0	True	True	True	False	
CAUDAL_MAXIMO_4B	Real	32.0	0.0	True	True	True	False	
PRESION_ASP_MIN_B1	Real	36.0	0.0	True	True	True	False	
PRESION_ASP_MIN_B2	Real	40.0	0.0	True	True	True	False	
PRESION_ASP_MIN_B3	Real	44.0	0.0	True	True	True	False	
PRESION_ASP_MIN_B4	Real	48.0	0.0	True	True	True	False	
TIEMPO_CAUDAL	Time	52.0	T#0ms	True	True	True	False	
R1	Real	56.0	0.0	True	True	True	False	
R2	Real	60.0	0.0	True	True	True	False	
R3	Real	64.0	0.0	True	True	True	False	
R4	Real	68.0	0.0	True	True	True	False	
R5	Real	72.0	0.0	True	True	True	False	
R6	Real	76.0	0.0	True	True	True	False	
R7	Real	80.0	0.0	True	True	True	False	
R8	Real	84.0	0.0	True	True	True	False	
R9	Real	88.0	0.0	True	True	True	False	
R10	Real	92.0	0.0	True	True	True	False	
R11	Real	96.0	0.0	True	True	True	False	
R12	Real	100.0	0.0	True	True	True	False	
R13	Real	104.0	0.0	True	True	True	False	
R14	Real	108.0	0.0	True	True	True	False	
TIEMPO_PRESION_RAMAL	Time	112.0	T#0ms	True	True	True	False	
TIEMPO_CAUDAL_RAMAL	Time	116.0	T#0ms	True	True	True	False	
AL_TIEMPO_VM_BALSA	Bool	120.0	false	True	True	True	False	
AL_TIEMPO_VM_B1	Bool	120.1	false	True	True	True	False	
AL_TIEMPO_VM_B2	Bool	120.2	false	True	True	True	False	
AL_TIEMPO_VM_B3	Bool	120.3	false	True	True	True	False	
AL_TIEMPO_VM_B4	Bool	120.4	false	True	True	True	False	
AL_TIEMPO_VM_ENTRADA	Bool	120.5	false	True	True	True	False	
AL_TIEMPO_VM_RETENCION	Bool	120.6	false	True	True	True	False	
AL_CONF_VM_BALSA	Bool	120.7	false	True	True	True	False	
AL_CONF_VM_B1	Bool	121.0	false	True	True	True	False	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
AL_CONF_VM_B2	Bool	121.1	false	True	True	True	False	
AL_CONF_VM_B3	Bool	121.2	false	True	True	True	False	
AL_CONF_VM_B4	Bool	121.3	false	True	True	True	False	
AL_CONF_VM_ENTRADA	Bool	121.4	false	True	True	True	False	
AL_CONF_VM_RETENCION	Bool	121.5	false	True	True	True	False	
AL_VARIADOR_B1	Bool	121.6	false	True	True	True	False	
AL_VARIADOR_B2	Bool	121.7	false	True	True	True	False	
AL_VARIADOR_B3	Bool	122.0	false	True	True	True	False	
AL_VARIADOR_B4	Bool	122.1	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DIAG_ANALOGICAS [DB11]

DIAG_ANALOGICAS Propiedades											
General											
Nombre	DIAG_ANALOGICAS	**Número**	11	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
PRES_IMP1	Word	0.0	16#0	True	True	True	False	
PRES_IMP2	Word	2.0	16#0	True	True	True	False	
PRES_ASP1	Word	4.0	16#0	True	True	True	False	
PRES_ASP2	Word	6.0	16#0	True	True	True	False	
PRES_ASP3	Word	8.0	16#0	True	True	True	False	
PRES_ASP4	Word	10.0	16#0	True	True	True	False	
CAUDAL_IMP	Word	12.0	16#0	True	True	True	False	
CAUDAL_BALSA	Word	14.0	16#0	True	True	True	False	
NIVEL_BALSA	Word	16.0	16#0	True	True	True	False	
PRES_R1	Word	18.0	16#0	True	True	True	False	
PRES_R2	Word	20.0	16#0	True	True	True	False	
PRES_R3	Word	22.0	16#0	True	True	True	False	
PRES_R4	Word	24.0	16#0	True	True	True	False	
PRES_R5	Word	26.0	16#0	True	True	True	False	
PRES_R6	Word	28.0	16#0	True	True	True	False	
PRES_R7	Word	30.0	16#0	True	True	True	False	
NIVEL_GASOIL	Word	32.0	16#0	True	True	True	False	
PRES_IMP_ANTES	Word	34.0	16#0	True	True	True	False	
PRES_FILT_ANTES	Word	36.0	16#0	True	True	True	False	
PRES_FILT_DESPUES	Word	38.0	16#0	True	True	True	False	
PRES_W_ANTES	Word	40.0	16#0	True	True	True	False	
PRES_W_DESPUES	Word	42.0	16#0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

HMI_MANUAL [DB12]

HMI_MANUAL Propiedades											
General											
Nombre	HMI_MANUAL	**Número**	12	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
ABRE_T1	Bool	0.0	FALSE	True	True	True	False	
CIERRA_T1	Bool	0.1	FALSE	True	True	True	False	
ABRE_T2	Bool	0.2	FALSE	True	True	True	False	
CIERRA_T2	Bool	0.3	FALSE	True	True	True	False	
ABRE_T3	Bool	0.4	FALSE	True	True	True	False	
CIERRA_T3	Bool	0.5	FALSE	True	True	True	False	
ABRE_T4	Bool	0.6	FALSE	True	True	True	False	
CIERRA_T4	Bool	0.7	FALSE	True	True	True	False	
ABRE_T5	Bool	1.0	FALSE	True	True	True	False	
CIERRA_T5	Bool	1.1	FALSE	True	True	True	False	
ABRE_T6	Bool	1.2	FALSE	True	True	True	False	
CIERRA_T6	Bool	1.3	FALSE	True	True	True	False	
ABRE_T7	Bool	1.4	FALSE	True	True	True	False	
CIERRA_T7	Bool	1.5	FALSE	True	True	True	False	
ABRE_VM_BALSA	Bool	1.6	FALSE	True	True	True	False	
CIERRA_VM_BALSA	Bool	1.7	FALSE	True	True	True	False	
MANUAL_VM_BALSA	Bool	2.0	FALSE	True	True	True	False	
LIMPIA_FILTRO_REJA	Bool	2.1	FALSE	True	True	True	False	
LIMPIA_FILTRO_W	Bool	2.2	FALSE	True	True	True	False	
LIMPIA_FILTRO_IMPULSION	Bool	2.3	FALSE	True	True	True	False	
LIMPIA_FILTRO_RIEGO	Bool	2.4	FALSE	True	True	True	False	
CAUDAL_SUFICIENTO_TEST	Bool	2.5	FALSE	True	True	True	False	
FUGA_EN_BALSA	Bool	2.6	FALSE	True	True	True	False	
CAUDAL_REAL_SALIDA	Real	4.0	0.0e+0	True	True	True	False	
CAUD_MIN_SIN_FILTRO	Real	8.0	-3.0e+2	True	True	True	False	
CAUD_MIN_CON_FILTRO	Real	12.0	-5.0e+2	True	True	True	False	
SUMA_CAUDALES	Real	16.0	0.0e+0	True	True	True	False	
POSIBLE_FUGA	Real	20.0	0.0e+0	True	True	True	False	
PERCENTIL_FUGA	Real	24.0	0.0e+0	True	True	True	False	
PERCENTIL_ADMISIBLE	Real	28.0	2.0e-1	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

HMI_GESTION_LOGGER [DB13]

HMI_GESTION_LOGGER Propiedades											
General											
Nombre	HMI_GESTION_LOGGER	**Número**	13	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
NUMERO_BOMBAS_ON	Int	0.0	0	True	True	True	False	
B1_EN_REGIMEN	Bool	2.0	false	True	True	True	False	
B2_EN_REGIMEN	Bool	2.1	false	True	True	True	False	
B3_EN_REGIMEN	Bool	2.2	false	True	True	True	False	
B4_EN_REGIMEN	Bool	2.3	false	True	True	True	False	
INICIO_REGISTRO	Bool	2.4	false	True	True	True	False	
PRESION_DIF_FILTRO_W	Real	4.0	0.0	True	True	True	False	
MAX_PRESION_FILTRO_W	Real	8.0	0.0	True	True	True	False	
VALOR_ALTURA_GASOIL	Real	12.0	0.0	True	True	True	False	
AVISO_ALTURA_GASOIL	Real	16.0	0.0	True	True	True	False	
MINIMO_ALTURA_GASOIL	Real	20.0	0.0	True	True	True	False	
PRESION_IMP_ANTES_FILTRO	Real	24.0	0.0	True	True	True	False	
PRESION_DIF_IMPULSION	Real	28.0	0.0	True	True	True	False	
MAX_DIF_PRESION_IMPULSIO	Real	32.0	0.0	True	True	True	False	
PRESION_IN_EST_FILTRADO	Real	36.0	0.0	True	True	True	False	
PRESION_OUT_EST_FILTRADO	Real	40.0	0.0	True	True	True	False	
PRESION_DIF_EST_FILTRADO	Real	44.0	0.0	True	True	True	False	
MAX_DIF_PRESION_EST_FILT	Real	48.0	0.0	True	True	True	False	
PRESION_IN_FILTRO_W	Real	52.0	0.0	True	True	True	False	
PRESION_OUT_FILTRO_W	Real	56.0	0.0	True	True	True	False	
G1_HORAS_PARA_MTO	Real	60.0	0.0	True	True	True	False	
G2_HORAS_PARA_MTO	Real	64.0	0.0	True	True	True	False	
G3_HORAS_PARA_MTO	Real	68.0	0.0	True	True	True	False	
G4_HORAS_PARA_MTO	Real	72.0	0.0	True	True	True	False	
MAX_SEG_PRESION_FILTRO_W	Real	76.0	0.0	True	True	True	False	
MAX_SEG_PRESION_IMPULSIO	Real	80.0	0.0	True	True	True	False	
TIEMPO_AL_FILTROS_SUCIOS	Time	84.0	T#0ms	True	True	True	False	
CANTIDAD_BOMBAS_PERMISO	Int	88.0	0	True	True	True	False	
MAX_SEG_PRESION_EST_FILT	Real	90.0	0.0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DB_TEMPERATURAS [DB14]

DB_TEMPERATURAS Propiedades											
General											
Nombre	DB_TEMPERATURAS	**Número**	14	**Tipo**	DB	**Idioma**	DB	**Numeración**	automática		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
B1_DEV_R	Int	0.0	0	True	True	True	False	
B1_DEV_S	Int	2.0	0	True	True	True	False	
B1_DEV_T	Int	4.0	0	True	True	True	False	
B1_DEV_ROD1_M	Int	6.0	0	True	True	True	False	
B1_DEV_ROD2_M	Int	8.0	0	True	True	True	False	
B1_DEV_ROD1_B	Int	10.0	0	True	True	True	False	
B1_DEV_ROD2_B	Int	12.0	0	True	True	True	False	
B2_DEV_R	Int	14.0	0	True	True	True	False	
B2_DEV_S	Int	16.0	0	True	True	True	False	
B2_DEV_T	Int	18.0	0	True	True	True	False	
B2_DEV_ROD1_M	Int	20.0	0	True	True	True	False	
B2_DEV_ROD2_M	Int	22.0	0	True	True	True	False	
B2_DEV_ROD1_B	Int	24.0	0	True	True	True	False	
B2_DEV_ROD2_B	Int	26.0	0	True	True	True	False	
B3_DEV_R	Int	28.0	0	True	True	True	False	
B3_DEV_S	Int	30.0	0	True	True	True	False	
B3_DEV_T	Int	32.0	0	True	True	True	False	
B3_DEV_ROD1_M	Int	34.0	0	True	True	True	False	
B3_DEV_ROD2_M	Int	36.0	0	True	True	True	False	
B3_DEV_ROD1_B	Int	38.0	0	True	True	True	False	
B3_DEV_ROD2_B	Int	40.0	0	True	True	True	False	
B4_DEV_R	Int	42.0	0	True	True	True	False	
B4_DEV_S	Int	44.0	0	True	True	True	False	
B4_DEV_T	Int	46.0	0	True	True	True	False	
B4_DEV_ROD1_M	Int	48.0	0	True	True	True	False	
B4_DEV_ROD2_M	Int	50.0	0	True	True	True	False	
B4_DEV_ROD1_B	Int	52.0	0	True	True	True	False	
B4_DEV_ROD2_B	Int	54.0	0	True	True	True	False	
MAX_TEMP_DEVANADOS	Int	56.0	0	True	True	True	False	
MAX_TEMP_RODAMIENTOS_M	Int	58.0	0	True	True	True	False	
MAX_TEMP_RODAMIENTOS_B	Int	60.0	0	True	True	True	False	
ALARMA_TEMP_B1_DEV_R	Bool	62.0	false	True	True	True	False	
ALARMA_TEMP_B1_DEV_S	Bool	62.1	false	True	True	True	False	
ALARMA_TEMP_B1_DEV_T	Bool	62.2	false	True	True	True	False	
ALARMA_TEMP_B1_ROD1_M	Bool	62.3	false	True	True	True	False	
ALARMA_TEMP_B1_ROD2_M	Bool	62.4	false	True	True	True	False	
ALARMA_TEMP_B1_ROD1_B	Bool	62.5	false	True	True	True	False	
ALARMA_TEMP_B1_ROD2_B	Bool	62.6	false	True	True	True	False	
ALARMA_TEMP_B2_DEV_R	Bool	62.7	false	True	True	True	False	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
ALARMA_TEMP_B2_DEV_S	Bool	63.0	false	True	True	True	False	
ALARMA_TEMP_B2_DEV_T	Bool	63.1	false	True	True	True	False	
ALARMA_TEMP_B2_ROD1_M	Bool	63.2	false	True	True	True	False	
ALARMA_TEMP_B2_ROD2_M	Bool	63.3	false	True	True	True	False	
ALARMA_TEMP_B2_ROD1_B	Bool	63.4	false	True	True	True	False	
ALARMA_TEMP_B2_ROD2_B	Bool	63.5	false	True	True	True	False	
ALARMA_TEMP_B3_DEV_R	Bool	63.6	false	True	True	True	False	
ALARMA_TEMP_B3_DEV_S	Bool	63.7	false	True	True	True	False	
ALARMA_TEMP_B3_DEV_T	Bool	64.0	false	True	True	True	False	
ALARMA_TEMP_B3_ROD1_M	Bool	64.1	false	True	True	True	False	
ALARMA_TEMP_B3_ROD2_M	Bool	64.2	false	True	True	True	False	
ALARMA_TEMP_B3_ROD1_B	Bool	64.3	false	True	True	True	False	
ALARMA_TEMP_B3_ROD2_B	Bool	64.4	false	True	True	True	False	
ALARMA_TEMP_B4_DEV_R	Bool	64.5	false	True	True	True	False	
ALARMA_TEMP_B4_DEV_S	Bool	64.6	false	True	True	True	False	
ALARMA_TEMP_B4_DEV_T	Bool	64.7	false	True	True	True	False	
ALARMA_TEMP_B4_ROD1_M	Bool	65.0	false	True	True	True	False	
ALARMA_TEMP_B4_ROD2_M	Bool	65.1	false	True	True	True	False	
ALARMA_TEMP_B4_ROD1_B	Bool	65.2	false	True	True	True	False	
ALARMA_TEMP_B4_ROD2_B	Bool	65.3	false	True	True	True	False	
ALTA_TEMP_DEVANADOS	Int	66.0	0	True	True	True	False	
ALTA_TEMP_RODAMIENTOS_M	Int	68.0	0	True	True	True	False	
ALTA_TEMP_RODAMIENTOS_B	Int	70.0	0	True	True	True	False	
ALARMA_SG_TEMP_B1_DEV_R	Bool	72.0	false	True	True	True	False	
ALARMA_SG_TEMP_B1_DEV_S	Bool	72.1	false	True	True	True	False	
ALARMA_SG_TEMP_B1_DEV_T	Bool	72.2	false	True	True	True	False	
ALARMA_SG_TEMP_B1_ROD1_M	Bool	72.3	false	True	True	True	False	
ALARMA_SG_TEMP_B1_ROD2_M	Bool	72.4	false	True	True	True	False	
ALARMA_SG_TEMP_B1_ROD1_B	Bool	72.5	false	True	True	True	False	
ALARMA_SG_TEMP_B1_ROD2_B	Bool	72.6	false	True	True	True	False	
ALARMA_SG_TEMP_B2_DEV_R	Bool	72.7	false	True	True	True	False	
ALARMA_SG_TEMP_B2_DEV_S	Bool	73.0	false	True	True	True	False	
ALARMA_SG_TEMP_B2_DEV_T	Bool	73.1	false	True	True	True	False	
ALARMA_SG_TEMP_B2_ROD1_M	Bool	73.2	false	True	True	True	False	
ALARMA_SG_TEMP_B2_ROD2_M	Bool	73.3	false	True	True	True	False	
ALARMA_SG_TEMP_B2_ROD1_B	Bool	73.4	false	True	True	True	False	
ALARMA_SG_TEMP_B2_ROD2_B	Bool	73.5	false	True	True	True	False	
ALARMA_SG_TEMP_B3_DEV_R	Bool	73.6	false	True	True	True	False	
ALARMA_SG_TEMP_B3_DEV_S	Bool	73.7	false	True	True	True	False	
ALARMA_SG_TEMP_B3_DEV_T	Bool	74.0	false	True	True	True	False	
ALARMA_SG_TEMP_B3_ROD1_M	Bool	74.1	false	True	True	True	False	
ALARMA_SG_TEMP_B3_ROD2_M	Bool	74.2	false	True	True	True	False	
ALARMA_SG_TEMP_B3_ROD1_B	Bool	74.3	false	True	True	True	False	
ALARMA_SG_TEMP_B3_ROD2_B	Bool	74.4	false	True	True	True	False	
ALARMA_SG_TEMP_B4_DEV_R	Bool	74.5	false	True	True	True	False	
ALARMA_SG_TEMP_B4_DEV_S	Bool	74.6	false	True	True	True	False	
ALARMA_SG_TEMP_B4_DEV_T	Bool	74.7	false	True	True	True	False	
ALARMA_SG_TEMP_B4_ROD1_M	Bool	75.0	false	True	True	True	False	
ALARMA_SG_TEMP_B4_ROD2_M	Bool	75.1	false	True	True	True	False	
ALARMA_SG_TEMP_B4_ROD1_B	Bool	75.2	false	True	True	True	False	
ALARMA_SG_TEMP_B4_ROD2_B	Bool	75.3	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

FILTROS_TELECONTROL [DB15]

FILTROS_TELECONTROL Propiedades											
General											
Nombre	FILTROS_TELECONTROL	**Número**	15	**Tipo**	DB	**Idioma**	DB	**Numeración**	automática		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
PASO_ALARMA	Int	0.0	0	True	True	True	False	
R1_CIERRA_RAMAL	Bool	2.0	false	True	True	True	False	
R2_CIERRA_RAMAL	Bool	2.1	false	True	True	True	False	
R3_CIERRA_RAMAL	Bool	2.2	false	True	True	True	False	
R4_CIERRA_RAMAL	Bool	2.3	false	True	True	True	False	
R5_CIERRA_RAMAL	Bool	2.4	false	True	True	True	False	
R6_CIERRA_RAMAL	Bool	2.5	false	True	True	True	False	
R7_CIERRA_RAMAL	Bool	2.6	false	True	True	True	False	
RESERVA	Bool	2.7	false	True	True	True	False	
R1_ABRE_RAMAL	Bool	3.0	false	True	True	True	False	
R2_ABRE_RAMAL	Bool	3.1	false	True	True	True	False	
R3_ABRE_RAMAL	Bool	3.2	false	True	True	True	False	
R4_ABRE_RAMAL	Bool	3.3	false	True	True	True	False	
R5_ABRE_RAMAL	Bool	3.4	false	True	True	True	False	
R6_ABRE_RAMAL	Bool	3.5	false	True	True	True	False	
R7_ABRE_RAMAL	Bool	3.6	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

ANALIZADORES [DB20]

ANALIZADORES Propiedades											
General											
Nombre	ANALIZADORES	**Número**	20	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personaliza-da**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
KWH_GENERAL	Real	0.0	0.0	True	True	True	False	
KWH_BOMBA_1	Real	4.0	0.0	True	True	True	False	
KWH_BOMBA_2	Real	8.0	0.0	True	True	True	False	
KWH_BOMBA_3	Real	12.0	0.0	True	True	True	False	
KWH_BOMBA_4	Real	16.0	0.0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

GRUPO_1 [DB21]

GRUPO_1 Propiedades											
General											
Nombre	GRUPO_1	**Número**	21	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
GRUPO_READY	Bool	0.0	false	True	True	True	False	
GRUPO_EN_MARCHA	Bool	0.1	false	True	True	True	False	
GRUPO_EN_ALARMA	Bool	0.2	false	True	True	True	False	
GRUPO_EN_MANUAL	Bool	0.3	false	True	True	True	False	
GRUPO_EN_AUTO	Bool	0.4	false	True	True	True	False	
EMERGENCIA_GRUPO	Bool	0.5	false	True	True	True	False	
BAJO_NIVEL_ACEITE	Bool	0.6	false	True	True	True	False	
ALTO_NIVEL_ACEITE	Bool	0.7	false	True	True	True	False	
BAJO_NIVEL_AGUA	Bool	1.0	false	True	True	True	False	
ALTO_NIVEL_AGUA	Bool	1.1	false	True	True	True	False	
ALTA_TEMPERATURA_MOTOR	Bool	1.2	false	True	True	True	False	
ALTA_TEMPERATURA_GENER	Bool	1.3	false	True	True	True	False	
BAJAS_REVOLUCIONES	Bool	1.4	false	True	True	True	False	
FALLO_ELECTRICO	Bool	1.5	false	True	True	True	False	
FALLO_MOTOR	Bool	1.6	false	True	True	True	False	
BAJA_ASPIRACION_GASOIL	Bool	1.7	false	True	True	True	False	
X1	Bool	2.0	false	True	True	True	False	
X2	Bool	2.1	false	True	True	True	False	
X3	Bool	2.2	false	True	True	True	False	
X4	Bool	2.3	false	True	True	True	False	
X5	Bool	2.4	false	True	True	True	False	
X6	Bool	2.5	false	True	True	True	False	
X7	Bool	2.6	false	True	True	True	False	
X8	Bool	2.7	false	True	True	True	False	
X9	Bool	3.0	false	True	True	True	False	
X10	Bool	3.1	false	True	True	True	False	
X11	Bool	3.2	false	True	True	True	False	
X12	Bool	3.3	false	True	True	True	False	
X13	Bool	3.4	false	True	True	True	False	
X14	Bool	3.5	false	True	True	True	False	
X15	Bool	3.6	false	True	True	True	False	
X16	Bool	3.7	false	True	True	True	False	
X17	Bool	4.0	false	True	True	True	False	
X18	Bool	4.1	false	True	True	True	False	
X19	Bool	4.2	false	True	True	True	False	
X20	Bool	4.3	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

GRUPO_2 [DB22]

GRUPO_2 Propiedades											
General											
Nombre	GRUPO_2	**Número**	22	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
GRUPO_READY	Bool	0.0	false	True	True	True	False	
GRUPO_EN_MARCHA	Bool	0.1	false	True	True	True	False	
GRUPO_EN_ALARMA	Bool	0.2	false	True	True	True	False	
GRUPO_EN_MANUAL	Bool	0.3	false	True	True	True	False	
GRUPO_EN_AUTO	Bool	0.4	false	True	True	True	False	
EMERGENCIA_GRUPO	Bool	0.5	false	True	True	True	False	
BAJO_NIVEL_ACEITE	Bool	0.6	false	True	True	True	False	
ALTO_NIVEL_ACEITE	Bool	0.7	false	True	True	True	False	
BAJO_NIVEL_AGUA	Bool	1.0	false	True	True	True	False	
ALTO_NIVEL_AGUA	Bool	1.1	false	True	True	True	False	
ALTA_TEMPERATURA_MOTOR	Bool	1.2	false	True	True	True	False	
ALTA_TEMPERATURA_GENER	Bool	1.3	false	True	True	True	False	
BAJAS_REVOLUCIONES	Bool	1.4	false	True	True	True	False	
FALLO_ELECTRICO	Bool	1.5	false	True	True	True	False	
FALLO_MOTOR	Bool	1.6	false	True	True	True	False	
BAJA_ASPIRACION_GASOIL	Bool	1.7	false	True	True	True	False	
X1	Bool	2.0	false	True	True	True	False	
X2	Bool	2.1	false	True	True	True	False	
X3	Bool	2.2	false	True	True	True	False	
X4	Bool	2.3	false	True	True	True	False	
X5	Bool	2.4	false	True	True	True	False	
X6	Bool	2.5	false	True	True	True	False	
X7	Bool	2.6	false	True	True	True	False	
X8	Bool	2.7	false	True	True	True	False	
X9	Bool	3.0	false	True	True	True	False	
X10	Bool	3.1	false	True	True	True	False	
X11	Bool	3.2	false	True	True	True	False	
X12	Bool	3.3	false	True	True	True	False	
X13	Bool	3.4	false	True	True	True	False	
X14	Bool	3.5	false	True	True	True	False	
X15	Bool	3.6	false	True	True	True	False	
X16	Bool	3.7	false	True	True	True	False	
X17	Bool	4.0	false	True	True	True	False	
X18	Bool	4.1	false	True	True	True	False	
X19	Bool	4.2	false	True	True	True	False	
X20	Bool	4.3	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

GRUPO_3 [DB23]

GRUPO_3 Propiedades											
General											
Nombre	GRUPO_3	**Número**	23	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
GRUPO_READY	Bool	0.0	false	True	True	True	False	
GRUPO_EN_MARCHA	Bool	0.1	false	True	True	True	False	
GRUPO_EN_ALARMA	Bool	0.2	false	True	True	True	False	
GRUPO_EN_MANUAL	Bool	0.3	false	True	True	True	False	
GRUPO_EN_AUTO	Bool	0.4	false	True	True	True	False	
EMERGENCIA_GRUPO	Bool	0.5	false	True	True	True	False	
BAJO_NIVEL_ACEITE	Bool	0.6	false	True	True	True	False	
ALTO_NIVEL_ACEITE	Bool	0.7	false	True	True	True	False	
BAJO_NIVEL_AGUA	Bool	1.0	false	True	True	True	False	
ALTO_NIVEL_AGUA	Bool	1.1	false	True	True	True	False	
ALTA_TEMPERATURA_MOTOR	Bool	1.2	false	True	True	True	False	
ALTA_TEMPERATURA_GENER	Bool	1.3	false	True	True	True	False	
BAJAS_REVOLUCIONES	Bool	1.4	false	True	True	True	False	
FALLO_ELECTRICO	Bool	1.5	false	True	True	True	False	
FALLO_MOTOR	Bool	1.6	false	True	True	True	False	
BAJA_ASPIRACION_GASOIL	Bool	1.7	false	True	True	True	False	
X1	Bool	2.0	false	True	True	True	False	
X2	Bool	2.1	false	True	True	True	False	
X3	Bool	2.2	false	True	True	True	False	
X4	Bool	2.3	false	True	True	True	False	
X5	Bool	2.4	false	True	True	True	False	
X6	Bool	2.5	false	True	True	True	False	
X7	Bool	2.6	false	True	True	True	False	
X8	Bool	2.7	false	True	True	True	False	
X9	Bool	3.0	false	True	True	True	False	
X10	Bool	3.1	false	True	True	True	False	
X11	Bool	3.2	false	True	True	True	False	
X12	Bool	3.3	false	True	True	True	False	
X13	Bool	3.4	false	True	True	True	False	
X14	Bool	3.5	false	True	True	True	False	
X15	Bool	3.6	false	True	True	True	False	
X16	Bool	3.7	false	True	True	True	False	
X17	Bool	4.0	false	True	True	True	False	
X18	Bool	4.1	false	True	True	True	False	
X19	Bool	4.2	false	True	True	True	False	
X20	Bool	4.3	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

GRUPO_4 [DB24]

GRUPO_4 Propiedades											
General											
Nombre	GRUPO_4	**Número**	24	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
GRUPO_READY	Bool	0.0	false	True	True	True	False	
GRUPO_EN_MARCHA	Bool	0.1	false	True	True	True	False	
GRUPO_EN_ALARMA	Bool	0.2	false	True	True	True	False	
GRUPO_EN_MANUAL	Bool	0.3	false	True	True	True	False	
GRUPO_EN_AUTO	Bool	0.4	false	True	True	True	False	
EMERGENCIA_GRUPO	Bool	0.5	false	True	True	True	False	
BAJO_NIVEL_ACEITE	Bool	0.6	false	True	True	True	False	
ALTO_NIVEL_ACEITE	Bool	0.7	false	True	True	True	False	
BAJO_NIVEL_AGUA	Bool	1.0	false	True	True	True	False	
ALTO_NIVEL_AGUA	Bool	1.1	false	True	True	True	False	
ALTA_TEMPERATURA_MOTOR	Bool	1.2	false	True	True	True	False	
ALTA_TEMPERATURA_GENER	Bool	1.3	false	True	True	True	False	
BAJAS_REVOLUCIONES	Bool	1.4	false	True	True	True	False	
FALLO_ELECTRICO	Bool	1.5	false	True	True	True	False	
FALLO_MOTOR	Bool	1.6	false	True	True	True	False	
BAJA_ASPIRACION_GASOIL	Bool	1.7	false	True	True	True	False	
X1	Bool	2.0	false	True	True	True	False	
X2	Bool	2.1	false	True	True	True	False	
X3	Bool	2.2	false	True	True	True	False	
X4	Bool	2.3	false	True	True	True	False	
X5	Bool	2.4	false	True	True	True	False	
X6	Bool	2.5	false	True	True	True	False	
X7	Bool	2.6	false	True	True	True	False	
X8	Bool	2.7	false	True	True	True	False	
X9	Bool	3.0	false	True	True	True	False	
X10	Bool	3.1	false	True	True	True	False	
X11	Bool	3.2	false	True	True	True	False	
X12	Bool	3.3	false	True	True	True	False	
X13	Bool	3.4	false	True	True	True	False	
X14	Bool	3.5	false	True	True	True	False	
X15	Bool	3.6	false	True	True	True	False	
X16	Bool	3.7	false	True	True	True	False	
X17	Bool	4.0	false	True	True	True	False	
X18	Bool	4.1	false	True	True	True	False	
X19	Bool	4.2	false	True	True	True	False	
X20	Bool	4.3	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

AJUSTES [DB25]

AJUSTES Propiedades									
General									
Nombre	AJUSTES	**Número**	25	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
Static								
MODO_TRABAJO	Int	0.0	0	True	True	True	False	
NIVEL_BALSA_PARO	Real	2.0	9.0e+0	True	True	True	False	
NIVEL_BALSA_ARRANQUE	Real	6.0	7.0e+0	True	True	True	False	
NIVEL_MAXIMO_BALSA	Real	10.0	9.7e+0	True	True	True	False	
TIEMPO_ARRANQUE_VM_B1	Time	14.0	T#5S	True	True	True	False	
TIEMPO_ARRANQUE_VM_B2	Time	18.0	T#5S	True	True	True	False	
TIEMPO_ARRANQUE_VM_B3	Time	22.0	T#5S	True	True	True	False	
TIEMPO_ARRANQUE_VM_B4	Time	26.0	T#5S	True	True	True	False	
TIEMPO_PARO_VM_B1	Time	30.0	T#5S	True	True	True	False	
TIEMPO_PARO_VM_B2	Time	34.0	T#5S	True	True	True	False	
TIEMPO_PARO_VM_B3	Time	38.0	T#5S	True	True	True	False	
TIEMPO_PARO_VM_B4	Time	42.0	T#5S	True	True	True	False	
TIEMPO_CICLO_VM1	Time	46.0	T#1M30S	True	True	True	False	
TIEMPO_CICLO_VM2	Time	50.0	T#1M30S	True	True	True	False	
TIEMPO_CICLO_VM3	Time	54.0	T#1M30S	True	True	True	False	
TIEMPO_CICLO_VM4	Time	58.0	T#1M30S	True	True	True	False	
TIEMPO_ENTRE_ARRANQUES	Time	62.0	T#1M30S	True	True	True	False	
TIEMPO_ARRANQUE	Time	66.0	T#1M20S	True	True	True	False	
TIEMPO_PARO	Time	70.0	T#1M20S	True	True	True	False	
TIEMPO_ENTRE_PAROS	Time	74.0	T#1M30S	True	True	True	False	
PROGRAMADO_P1	Bool	78.0	FALSE	True	True	True	False	
PROGRAMADO_P2	Bool	78.1	FALSE	True	True	True	False	
PROGRAMADO_P3	Bool	78.2	FALSE	True	True	True	False	
PROGRAMADO_P4	Bool	78.3	FALSE	True	True	True	False	
PROGRAMADO_P5	Bool	78.4	FALSE	True	True	True	False	
PROGRAMADO_P6	Bool	78.5	FALSE	True	True	True	False	
TIEMPO_ANTICIPACION	Time	80.0	T#5M	True	True	True	False	
HAB_CONTROL_T1	Bool	84.0	FALSE	True	True	True	False	
HAB_CONTROL_T2	Bool	84.1	FALSE	True	True	True	False	
HAB_CONTROL_T3	Bool	84.2	FALSE	True	True	True	False	
HAB_CONTROL_T4	Bool	84.3	FALSE	True	True	True	False	
HAB_CONTROL_T5	Bool	84.4	FALSE	True	True	True	False	
HAB_CONTROL_T6	Bool	84.5	FALSE	True	True	True	False	
HAB_CONTROL_T7	Bool	84.6	FALSE	True	True	True	False	
HAB_CONTROL_BALSA	Bool	84.7	FALSE	True	True	True	False	
DECREM_PRESION_ALARMA	Real	86.0	4.0e+0	True	True	True	False	
MAX_VELOCIDAD_RAMAL	Real	90.0	2.2e+0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

REGISTROS_FILTROS [DB26]

REGISTROS_FILTROS Propiedades											
General											
Nombre	REGISTROS_FILTROS	**Número**	26	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
IN_CONSUMO	Real	0.0	0.0e+0	True	True	True	False	
OUT_CONSUMO	Real	4.0	0.0e+0	True	True	True	False	
MED_CONSUMO	Real	8.0	0.0e+0	True	True	True	False	
IN_T_ENTRE_1B	Real	12.0	0.0e+0	True	True	True	False	
IN_T_ENTRE_2B	Real	16.0	0.0e+0	True	True	True	False	
IN_T_ENTRE_3B	Real	20.0	0.0e+0	True	True	True	False	
IN_T_ENTRE_4B	Real	24.0	0.0e+0	True	True	True	False	
OUT_T_ENTRE_1B	Real	28.0	0.0e+0	True	True	True	False	
OUT_T_ENTRE_2B	Real	32.0	0.0e+0	True	True	True	False	
OUT_T_ENTRE_3B	Real	36.0	0.0e+0	True	True	True	False	
OUT_T_ENTRE_4B	Real	40.0	0.0e+0	True	True	True	False	
RESERVA1	Real	44.0	0.0e+0	True	True	True	False	
RESERVA2	Real	48.0	0.0e+0	True	True	True	False	
RESERVA3	Real	52.0	0.0e+0	True	True	True	False	
RESERVA4	Real	56.0	0.0e+0	True	True	True	False	
IN_M3_ENTRE_LIMPIEZAS	Real	60.0	0.0e+0	True	True	True	False	
OUT_M3_ENTRE_LIMPIEZAS	Real	64.0	0.0e+0	True	True	True	False	
MED_M3_ENTRE_LIMPIEZAS	Real	68.0	0.0e+0	True	True	True	False	
IN_NUMERO_LIMPIEZAS	Real	72.0	0.0e+0	True	True	True	False	
OUT_NUMERO_LIMPIEZAS	Real	76.0	0.0e+0	True	True	True	False	
MED_NUMERO_LIMPIEZAS	Real	80.0	0.0e+0	True	True	True	False	
IN_PRESION_DIFER	Real	84.0	0.0e+0	True	True	True	False	
OUT_PRESION_DIFER	Real	88.0	0.0e+0	True	True	True	False	
MED_PRESION_DIFER	Real	92.0	0.0e+0	True	True	True	False	
IN_MAX_PRESION_ALARMA	Real	96.0	0.0e+0	True	True	True	False	
OUT_MAX_PRESION_ALARMA	Real	100.0	0.0e+0	True	True	True	False	
MED_MAX_PRESION_ALARMA	Real	104.0	0.0e+0	True	True	True	False	
IN_MIN_M3_ENTRE_LIMP	Real	108.0	0.0e+0	True	True	True	False	
OUT_MIN_M3_ENTRE_LIMP	Real	112.0	0.0e+0	True	True	True	False	
MED_MIN_M3_ENTRE_LIMP	Real	116.0	0.0e+0	True	True	True	False	
TEMP_M3_IN	Real	120.0	0.0e+0	True	True	True	False	
TEMP_M3_OUT	Real	124.0	0.0e+0	True	True	True	False	
TEMP_M3_MED	Real	128.0	0.0e+0	True	True	True	False	
TEMP_SG_1B_IN	Real	132.0	0.0e+0	True	True	True	False	
TEMP_SG_2B_IN	Real	136.0	0.0e+0	True	True	True	False	
TEMP_SG_3B_IN	Real	140.0	0.0e+0	True	True	True	False	
TEMP_SG_4B_IN	Real	144.0	0.0e+0	True	True	True	False	
TEMP_SG_1B_OUT	Real	148.0	0.0e+0	True	True	True	False	
TEMP_SG_2B_OUT	Real	152.0	0.0e+0	True	True	True	False	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
TEMP_SG_3B_OUT	Real	156.0	0.0e+0	True	True	True	False	
TEMP_SG_4B_OUT	Real	160.0	0.0e+0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

REGISTROS_FILTROS_2 [DB27]

REGISTROS_FILTROS_2 Propiedades											
General											
Nombre	REGISTROS_FILTROS_2	**Número**	27	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
IN_M3_ENTRE_1B	Real	0.0	0.0	True	True	True	False	
IN_M3_ENTRE_2B	Real	4.0	0.0	True	True	True	False	
IN_M3_ENTRE_3B	Real	8.0	0.0	True	True	True	False	
IN_M3_ENTRE_4B	Real	12.0	0.0	True	True	True	False	
OUT_M3_ENTRE_1B	Real	16.0	0.0	True	True	True	False	
OUT_M3_ENTRE_2B	Real	20.0	0.0	True	True	True	False	
OUT_M3_ENTRE_3B	Real	24.0	0.0	True	True	True	False	
OUT_M3_ENTRE_4B	Real	28.0	0.0	True	True	True	False	
TEMP_IN_M3_1B	Real	32.0	0.0	True	True	True	False	
TEMP_IN_M3_2B	Real	36.0	0.0	True	True	True	False	
TEMP_IN_M3_3B	Real	40.0	0.0	True	True	True	False	
TEMP_IN_M3_4B	Real	44.0	0.0	True	True	True	False	
TEMP_OUT_M3_1B	Real	48.0	0.0	True	True	True	False	
TEMP_OUT_M3_2B	Real	52.0	0.0	True	True	True	False	
TEMP_OUT_M3_3B	Real	56.0	0.0	True	True	True	False	
TEMP_OUT_M3_4B	Real	60.0	0.0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

ESTADISTICA_FILTROS [DB28]

ESTADISTICA_FILTROS Propiedades											
General											
Nombre	ESTADISTICA_FILTROS	**Número**	28	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
IN_FLANCO_1B	Bool	0.0	false	True	True	True	False	
IN_FLANCO_2B	Bool	0.1	false	True	True	True	False	
IN_FLANCO_3B	Bool	0.2	false	True	True	True	False	
IN_FLANCO_4B	Bool	0.3	false	True	True	True	False	
IN_M3_ENTRE_1B_MEDIA3	Real	2.0	0.0	True	True	True	False	
IN_M3_ENTRE_2B_MEDIA3	Real	6.0	0.0	True	True	True	False	
IN_M3_ENTRE_3B_MEDIA3	Real	10.0	0.0	True	True	True	False	
IN_M3_ENTRE_4B_MEDIA3	Real	14.0	0.0	True	True	True	False	
IN_SG_ENTRE_1B_MEDIA3	Real	18.0	0.0	True	True	True	False	
IN_SG_ENTRE_2B_MEDIA3	Real	22.0	0.0	True	True	True	False	
IN_SG_ENTRE_3B_MEDIA3	Real	26.0	0.0	True	True	True	False	
IN_SG_ENTRE_4B_MEDIA3	Real	30.0	0.0	True	True	True	False	
OUT_FLANCO_1B	Bool	34.0	false	True	True	True	False	
OUT_FLANCO_2B	Bool	34.1	false	True	True	True	False	
OUT_FLANCO_3B	Bool	34.2	false	True	True	True	False	
OUT_FLANCO_4B	Bool	34.3	false	True	True	True	False	
OUT_M3_ENTRE_1B_MEDIA3	Real	36.0	0.0	True	True	True	False	
OUT_M3_ENTRE_2B_MEDIA3	Real	40.0	0.0	True	True	True	False	
OUT_M3_ENTRE_3B_MEDIA3	Real	44.0	0.0	True	True	True	False	
OUT_M3_ENTRE_4B_MEDIA3	Real	48.0	0.0	True	True	True	False	
OUT_SG_ENTRE_1B_MEDIA3	Real	52.0	0.0	True	True	True	False	
OUT_SG_ENTRE_2B_MEDIA3	Real	56.0	0.0	True	True	True	False	
OUT_SG_ENTRE_3B_MEDIA3	Real	60.0	0.0	True	True	True	False	
OUT_SG_ENTRE_4B_MEDIA3	Real	64.0	0.0	True	True	True	False	
MED_FLANCO	Bool	68.0	false	True	True	True	False	
MED_M3_ENTRE_LIM_MEDIA3	Real	70.0	0.0	True	True	True	False	
MED_SG_ENTRE_LIM_MEDIA3	Real	74.0	0.0	True	True	True	False	
▼ IN_M3_ENTRE_1B_ARRAY	Array[1..3] of Real	78.0		True	True	True	False	
IN_M3_ENTRE_1B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
IN_M3_ENTRE_1B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
IN_M3_ENTRE_1B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
▼ IN_M3_ENTRE_2B_ARRAY	Array[1..3] of Real	90.0		True	True	True	False	
IN_M3_ENTRE_2B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
IN_M3_ENTRE_2B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
IN_M3_ENTRE_2B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
▼ IN_M3_ENTRE_3B_ARRAY	Array[1..3] of Real	102.0		True	True	True	False	
IN_M3_ENTRE_3B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
IN_M3_ENTRE_3B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
IN_M3_ENTRE_3B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
IN_M3_ENTRE_4B_ARRAY	Array[1..3] of Real	114.0		True	True	True	False	
IN_M3_ENTRE_4B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
IN_M3_ENTRE_4B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
IN_M3_ENTRE_4B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
IN_SG_ENTRE_1B_ARRAY	Array[1..3] of Real	126.0		True	True	True	False	
IN_SG_ENTRE_1B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
IN_SG_ENTRE_1B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
IN_SG_ENTRE_1B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
IN_SG_ENTRE_2B_ARRAY	Array[1..3] of Real	138.0		True	True	True	False	
IN_SG_ENTRE_2B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
IN_SG_ENTRE_2B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
IN_SG_ENTRE_2B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
IN_SG_ENTRE_3B_ARRAY	Array[1..3] of Real	150.0		True	True	True	False	
IN_SG_ENTRE_3B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
IN_SG_ENTRE_3B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
IN_SG_ENTRE_3B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
IN_SG_ENTRE_4B_ARRAY	Array[1..3] of Real	162.0		True	True	True	False	
IN_SG_ENTRE_4B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
IN_SG_ENTRE_4B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
IN_SG_ENTRE_4B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
OUT_M3_ENTRE_1B_ARRAY	Array[1..3] of Real	174.0		True	True	True	False	
OUT_M3_ENTRE_1B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
OUT_M3_ENTRE_1B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
OUT_M3_ENTRE_1B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
OUT_M3_ENTRE_2B_ARRAY	Array[1..3] of Real	186.0		True	True	True	False	
OUT_M3_ENTRE_2B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
OUT_M3_ENTRE_2B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
OUT_M3_ENTRE_2B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
OUT_M3_ENTRE_3B_ARRAY	Array[1..3] of Real	198.0		True	True	True	False	
OUT_M3_ENTRE_3B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
OUT_M3_ENTRE_3B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
OUT_M3_ENTRE_3B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
OUT_M3_ENTRE_4B_ARRAY	Array[1..3] of Real	210.0		True	True	True	False	
OUT_M3_ENTRE_4B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
OUT_M3_ENTRE_4B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
OUT_M3_ENTRE_4B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
OUT_SG_ENTRE_1B_ARRAY	Array[1..3] of Real	222.0		True	True	True	False	
OUT_SG_ENTRE_1B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
OUT_SG_ENTRE_1B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
OUT_SG_ENTRE_1B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
OUT_SG_ENTRE_2B_ARRAY	Array[1..3] of Real	234.0		True	True	True	False	
OUT_SG_ENTRE_2B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
OUT_SG_ENTRE_2B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
OUT_SG_ENTRE_2B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
OUT_SG_ENTRE_3B_ARRAY	Array[1..3] of Real	246.0		True	True	True	False	
OUT_SG_ENTRE_3B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
OUT_SG_ENTRE_3B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
OUT_SG_ENTRE_3B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
OUT_SG_ENTRE_4B_ARRAY	Array[1..3] of Real	258.0		True	True	True	False	
OUT_SG_ENTRE_4B_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
OUT_SG_ENTRE_4B_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
OUT_SG_ENTRE_4B_ARRAY[3]	Real	8.0	0.0	True	True	True	False	
MED_M3_ENTRE_FILTR_ARRAY	Array[1..3] of Real	270.0		True	True	True	False	
MED_M3_ENTRE_FILTR_ARRAY[1]	Real	0.0	0.0	True	True	True	False	
MED_M3_ENTRE_FILTR_ARRAY[2]	Real	4.0	0.0	True	True	True	False	
MED_M3_ENTRE_FILTR_ARRAY[3]	Real	8.0	0.0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

ENERO [DB60]

ENERO Propiedades									
General									
Nombre	ENERO	**Número**	60	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	2	True	True	True	False	
DE_9_A_10	Int	18.0	2	True	True	True	False	
DE_10_A_11	Int	20.0	1	True	True	True	False	
DE_11_A_12	Int	22.0	1	True	True	True	False	
DE_12_A_13	Int	24.0	1	True	True	True	False	
DE_13_A_14	Int	26.0	2	True	True	True	False	
DE_14_A_15	Int	28.0	2	True	True	True	False	
DE_15_A_16	Int	30.0	2	True	True	True	False	
DE_16_A_17	Int	32.0	2	True	True	True	False	
DE_17_A_18	Int	34.0	2	True	True	True	False	
DE_18_A_19	Int	36.0	1	True	True	True	False	
DE_19_A_20	Int	38.0	1	True	True	True	False	
DE_20_A_21	Int	40.0	1	True	True	True	False	
DE_21_A_22	Int	42.0	2	True	True	True	False	
DE_22_A_23	Int	44.0	2	True	True	True	False	
DE_23_A_0	Int	46.0	2	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

FEBRERO [DB61]

FEBRERO Propiedades											
General											
Nombre	FEBRERO	**Número**	61	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	2	True	True	True	False	
DE_9_A_10	Int	18.0	2	True	True	True	False	
DE_10_A_11	Int	20.0	1	True	True	True	False	
DE_11_A_12	Int	22.0	1	True	True	True	False	
DE_12_A_13	Int	24.0	1	True	True	True	False	
DE_13_A_14	Int	26.0	2	True	True	True	False	
DE_14_A_15	Int	28.0	2	True	True	True	False	
DE_15_A_16	Int	30.0	2	True	True	True	False	
DE_16_A_17	Int	32.0	2	True	True	True	False	
DE_17_A_18	Int	34.0	2	True	True	True	False	
DE_18_A_19	Int	36.0	1	True	True	True	False	
DE_19_A_20	Int	38.0	1	True	True	True	False	
DE_20_A_21	Int	40.0	1	True	True	True	False	
DE_21_A_22	Int	42.0	2	True	True	True	False	
DE_22_A_23	Int	44.0	2	True	True	True	False	
DE_23_A_0	Int	46.0	2	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

MARZO [DB62]

MARZO Propiedades									
General									
Nombre	MARZO	**Número**	62	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	4	True	True	True	False	
DE_9_A_10	Int	18.0	4	True	True	True	False	
DE_10_A_11	Int	20.0	4	True	True	True	False	
DE_11_A_12	Int	22.0	4	True	True	True	False	
DE_12_A_13	Int	24.0	4	True	True	True	False	
DE_13_A_14	Int	26.0	4	True	True	True	False	
DE_14_A_15	Int	28.0	4	True	True	True	False	
DE_15_A_16	Int	30.0	4	True	True	True	False	
DE_16_A_17	Int	32.0	3	True	True	True	False	
DE_17_A_18	Int	34.0	3	True	True	True	False	
DE_18_A_19	Int	36.0	3	True	True	True	False	
DE_19_A_20	Int	38.0	3	True	True	True	False	
DE_20_A_21	Int	40.0	3	True	True	True	False	
DE_21_A_22	Int	42.0	4	True	True	True	False	
DE_22_A_23	Int	44.0	4	True	True	True	False	
DE_23_A_0	Int	46.0	4	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

ABRIL [DB63]

ABRIL Propiedades									
General									
Nombre	ABRIL	**Número**	63	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	5	True	True	True	False	
DE_9_A_10	Int	18.0	5	True	True	True	False	
DE_10_A_11	Int	20.0	5	True	True	True	False	
DE_11_A_12	Int	22.0	5	True	True	True	False	
DE_12_A_13	Int	24.0	5	True	True	True	False	
DE_13_A_14	Int	26.0	5	True	True	True	False	
DE_14_A_15	Int	28.0	5	True	True	True	False	
DE_15_A_16	Int	30.0	5	True	True	True	False	
DE_16_A_17	Int	32.0	5	True	True	True	False	
DE_17_A_18	Int	34.0	5	True	True	True	False	
DE_18_A_19	Int	36.0	5	True	True	True	False	
DE_19_A_20	Int	38.0	5	True	True	True	False	
DE_20_A_21	Int	40.0	5	True	True	True	False	
DE_21_A_22	Int	42.0	5	True	True	True	False	
DE_22_A_23	Int	44.0	5	True	True	True	False	
DE_23_A_0	Int	46.0	5	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

MAYO [DB64]

MAYO Propiedades											
General											
Nombre	MAYO	**Número**	64	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	5	True	True	True	False	
DE_9_A_10	Int	18.0	5	True	True	True	False	
DE_10_A_11	Int	20.0	5	True	True	True	False	
DE_11_A_12	Int	22.0	5	True	True	True	False	
DE_12_A_13	Int	24.0	5	True	True	True	False	
DE_13_A_14	Int	26.0	5	True	True	True	False	
DE_14_A_15	Int	28.0	5	True	True	True	False	
DE_15_A_16	Int	30.0	5	True	True	True	False	
DE_16_A_17	Int	32.0	5	True	True	True	False	
DE_17_A_18	Int	34.0	5	True	True	True	False	
DE_18_A_19	Int	36.0	5	True	True	True	False	
DE_19_A_20	Int	38.0	5	True	True	True	False	
DE_20_A_21	Int	40.0	5	True	True	True	False	
DE_21_A_22	Int	42.0	5	True	True	True	False	
DE_22_A_23	Int	44.0	5	True	True	True	False	
DE_23_A_0	Int	46.0	5	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

JUNIO_QUINCENA_1 [DB65]

JUNIO_QUINCENA_1 Propiedades											
General											
Nombre	JUNIO_QUINCENA_1	**Número**	65	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	4	True	True	True	False	
DE_9_A_10	Int	18.0	3	True	True	True	False	
DE_10_A_11	Int	20.0	3	True	True	True	False	
DE_11_A_12	Int	22.0	3	True	True	True	False	
DE_12_A_13	Int	24.0	3	True	True	True	False	
DE_13_A_14	Int	26.0	3	True	True	True	False	
DE_14_A_15	Int	28.0	3	True	True	True	False	
DE_15_A_16	Int	30.0	4	True	True	True	False	
DE_16_A_17	Int	32.0	4	True	True	True	False	
DE_17_A_18	Int	34.0	4	True	True	True	False	
DE_18_A_19	Int	36.0	4	True	True	True	False	
DE_19_A_20	Int	38.0	4	True	True	True	False	
DE_20_A_21	Int	40.0	4	True	True	True	False	
DE_21_A_22	Int	42.0	4	True	True	True	False	
DE_22_A_23	Int	44.0	4	True	True	True	False	
DE_23_A_0	Int	46.0	4	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

JUNIO_QUINCENA_2 [DB66]

JUNIO_QUINCENA_2 Propiedades											
General											
Nombre	JUNIO_QUINCENA_2	**Número**	66	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	2	True	True	True	False	
DE_9_A_10	Int	18.0	2	True	True	True	False	
DE_10_A_11	Int	20.0	2	True	True	True	False	
DE_11_A_12	Int	22.0	1	True	True	True	False	
DE_12_A_13	Int	24.0	1	True	True	True	False	
DE_13_A_14	Int	26.0	1	True	True	True	False	
DE_14_A_15	Int	28.0	1	True	True	True	False	
DE_15_A_16	Int	30.0	1	True	True	True	False	
DE_16_A_17	Int	32.0	1	True	True	True	False	
DE_17_A_18	Int	34.0	1	True	True	True	False	
DE_18_A_19	Int	36.0	1	True	True	True	False	
DE_19_A_20	Int	38.0	2	True	True	True	False	
DE_20_A_21	Int	40.0	2	True	True	True	False	
DE_21_A_22	Int	42.0	2	True	True	True	False	
DE_22_A_23	Int	44.0	2	True	True	True	False	
DE_23_A_0	Int	46.0	2	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

JULIO [DB67]

JULIO Propiedades									
General									
Nombre	JULIO	**Número**	67	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	2	True	True	True	False	
DE_9_A_10	Int	18.0	2	True	True	True	False	
DE_10_A_11	Int	20.0	2	True	True	True	False	
DE_11_A_12	Int	22.0	1	True	True	True	False	
DE_12_A_13	Int	24.0	1	True	True	True	False	
DE_13_A_14	Int	26.0	1	True	True	True	False	
DE_14_A_15	Int	28.0	1	True	True	True	False	
DE_15_A_16	Int	30.0	1	True	True	True	False	
DE_16_A_17	Int	32.0	1	True	True	True	False	
DE_17_A_18	Int	34.0	1	True	True	True	False	
DE_18_A_19	Int	36.0	1	True	True	True	False	
DE_19_A_20	Int	38.0	2	True	True	True	False	
DE_20_A_21	Int	40.0	2	True	True	True	False	
DE_21_A_22	Int	42.0	2	True	True	True	False	
DE_22_A_23	Int	44.0	2	True	True	True	False	
DE_23_A_0	Int	46.0	2	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

AGOSTO [DB68]

AGOSTO Propiedades									
General									
Nombre	AGOSTO	**Número**	68	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	6	True	True	True	False	
DE_9_A_10	Int	18.0	6	True	True	True	False	
DE_10_A_11	Int	20.0	6	True	True	True	False	
DE_11_A_12	Int	22.0	6	True	True	True	False	
DE_12_A_13	Int	24.0	6	True	True	True	False	
DE_13_A_14	Int	26.0	6	True	True	True	False	
DE_14_A_15	Int	28.0	6	True	True	True	False	
DE_15_A_16	Int	30.0	6	True	True	True	False	
DE_16_A_17	Int	32.0	6	True	True	True	False	
DE_17_A_18	Int	34.0	6	True	True	True	False	
DE_18_A_19	Int	36.0	6	True	True	True	False	
DE_19_A_20	Int	38.0	6	True	True	True	False	
DE_20_A_21	Int	40.0	6	True	True	True	False	
DE_21_A_22	Int	42.0	6	True	True	True	False	
DE_22_A_23	Int	44.0	6	True	True	True	False	
DE_23_A_0	Int	46.0	6	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

SEPTIEMBRE [DB69]

SEPTIEMBRE Propiedades											
General											
Nombre	SEPTIEMBRE	**Número**	69	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	4	True	True	True	False	
DE_9_A_10	Int	18.0	3	True	True	True	False	
DE_10_A_11	Int	20.0	3	True	True	True	False	
DE_11_A_12	Int	22.0	3	True	True	True	False	
DE_12_A_13	Int	24.0	3	True	True	True	False	
DE_13_A_14	Int	26.0	3	True	True	True	False	
DE_14_A_15	Int	28.0	3	True	True	True	False	
DE_15_A_16	Int	30.0	4	True	True	True	False	
DE_16_A_17	Int	32.0	4	True	True	True	False	
DE_17_A_18	Int	34.0	4	True	True	True	False	
DE_18_A_19	Int	36.0	4	True	True	True	False	
DE_19_A_20	Int	38.0	4	True	True	True	False	
DE_20_A_21	Int	40.0	4	True	True	True	False	
DE_21_A_22	Int	42.0	4	True	True	True	False	
DE_22_A_23	Int	44.0	4	True	True	True	False	
DE_23_A_0	Int	46.0	4	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

OCTUBRE [DB70]

OCTUBRE Propiedades									
General									
Nombre	OCTUBRE	**Número**	70	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	5	True	True	True	False	
DE_9_A_10	Int	18.0	5	True	True	True	False	
DE_10_A_11	Int	20.0	5	True	True	True	False	
DE_11_A_12	Int	22.0	5	True	True	True	False	
DE_12_A_13	Int	24.0	5	True	True	True	False	
DE_13_A_14	Int	26.0	5	True	True	True	False	
DE_14_A_15	Int	28.0	5	True	True	True	False	
DE_15_A_16	Int	30.0	5	True	True	True	False	
DE_16_A_17	Int	32.0	5	True	True	True	False	
DE_17_A_18	Int	34.0	5	True	True	True	False	
DE_18_A_19	Int	36.0	5	True	True	True	False	
DE_19_A_20	Int	38.0	5	True	True	True	False	
DE_20_A_21	Int	40.0	5	True	True	True	False	
DE_21_A_22	Int	42.0	5	True	True	True	False	
DE_22_A_23	Int	44.0	5	True	True	True	False	
DE_23_A_0	Int	46.0	5	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

NOVIEMBRE [DB71]

NOVIEMBRE Propiedades									
General									
Nombre	NOVIEMBRE	**Número**	71	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	4	True	True	True	False	
DE_9_A_10	Int	18.0	4	True	True	True	False	
DE_10_A_11	Int	20.0	4	True	True	True	False	
DE_11_A_12	Int	22.0	4	True	True	True	False	
DE_12_A_13	Int	24.0	4	True	True	True	False	
DE_13_A_14	Int	26.0	4	True	True	True	False	
DE_14_A_15	Int	28.0	4	True	True	True	False	
DE_15_A_16	Int	30.0	4	True	True	True	False	
DE_16_A_17	Int	32.0	3	True	True	True	False	
DE_17_A_18	Int	34.0	3	True	True	True	False	
DE_18_A_19	Int	36.0	5	True	True	True	False	
DE_19_A_20	Int	38.0	3	True	True	True	False	
DE_20_A_21	Int	40.0	3	True	True	True	False	
DE_21_A_22	Int	42.0	3	True	True	True	False	
DE_22_A_23	Int	44.0	4	True	True	True	False	
DE_23_A_0	Int	46.0	4	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DICIEMBRE [DB72]

DICIEMBRE Propiedades									
General									
Nombre	DICIEMBRE	**Número**	72	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	2	True	True	True	False	
DE_9_A_10	Int	18.0	2	True	True	True	False	
DE_10_A_11	Int	20.0	1	True	True	True	False	
DE_11_A_12	Int	22.0	1	True	True	True	False	
DE_12_A_13	Int	24.0	1	True	True	True	False	
DE_13_A_14	Int	26.0	2	True	True	True	False	
DE_14_A_15	Int	28.0	2	True	True	True	False	
DE_15_A_16	Int	30.0	2	True	True	True	False	
DE_16_A_17	Int	32.0	2	True	True	True	False	
DE_17_A_18	Int	34.0	2	True	True	True	False	
DE_18_A_19	Int	36.0	1	True	True	True	False	
DE_19_A_20	Int	38.0	1	True	True	True	False	
DE_20_A_21	Int	40.0	1	True	True	True	False	
DE_21_A_22	Int	42.0	2	True	True	True	False	
DE_22_A_23	Int	44.0	2	True	True	True	False	
DE_23_A_0	Int	46.0	2	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

FESTIVOS [DB73]

FESTIVOS Propiedades											
General											
Nombre	FESTIVOS	**Número**	73	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
DE_0_A_1	Int	0.0	6	True	True	True	False	
DE_1_A_2	Int	2.0	6	True	True	True	False	
DE_2_A_3	Int	4.0	6	True	True	True	False	
DE_3_A_4	Int	6.0	6	True	True	True	False	
DE_4_A_5	Int	8.0	6	True	True	True	False	
DE_5_A_6	Int	10.0	6	True	True	True	False	
DE_6_A_7	Int	12.0	6	True	True	True	False	
DE_7_A_8	Int	14.0	6	True	True	True	False	
DE_8_A_9	Int	16.0	6	True	True	True	False	
DE_9_A_10	Int	18.0	6	True	True	True	False	
DE_10_A_11	Int	20.0	6	True	True	True	False	
DE_11_A_12	Int	22.0	6	True	True	True	False	
DE_12_A_13	Int	24.0	6	True	True	True	False	
DE_13_A_14	Int	26.0	6	True	True	True	False	
DE_14_A_15	Int	28.0	6	True	True	True	False	
DE_15_A_16	Int	30.0	6	True	True	True	False	
DE_16_A_17	Int	32.0	6	True	True	True	False	
DE_17_A_18	Int	34.0	6	True	True	True	False	
DE_18_A_19	Int	36.0	6	True	True	True	False	
DE_19_A_20	Int	38.0	6	True	True	True	False	
DE_20_A_21	Int	40.0	6	True	True	True	False	
DE_21_A_22	Int	42.0	6	True	True	True	False	
DE_22_A_23	Int	44.0	6	True	True	True	False	
DE_23_A_0	Int	46.0	6	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

HORARIO [DB74]

HORARIO Propiedades											
General											
Nombre	HORARIO	**Número**	74	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
ENERO	Bool	0.0	false	True	True	True	False	
FEBRERO	Bool	0.1	false	True	True	True	False	
MARZO	Bool	0.2	false	True	True	True	False	
ABRIL	Bool	0.3	false	True	True	True	False	
MAYO	Bool	0.4	false	True	True	True	False	
JUNIO1	Bool	0.5	false	True	True	True	False	
JUNIO2	Bool	0.6	false	True	True	True	False	
JULIO	Bool	0.7	false	True	True	True	False	
AGOSTO	Bool	1.0	false	True	True	True	False	
SEPTIEMBRE	Bool	1.1	false	True	True	True	False	
OCTUBRE	Bool	1.2	false	True	True	True	False	
NOVIEMBRE	Bool	1.3	false	True	True	True	False	
DICIEMBRE	Bool	1.4	false	True	True	True	False	
FESTIVO	Bool	1.5	false	True	True	True	False	
MES_ACTUAL	Int	2.0	0	True	True	True	False	
DIA_ACTUAL	Int	4.0	0	True	True	True	False	
HORA_ACTUAL	Int	6.0	0	True	True	True	False	
DIA_DE_SEMANA	Int	8.0	0	True	True	True	False	
FECHA_HORA	Date_And_Time	10.0	DT#1990-01-01-00:00:00	True	True	True	False	
ES_P1	Bool	18.0	false	True	True	True	False	
ES_P2	Bool	18.1	false	True	True	True	False	
ES_P3	Bool	18.2	false	True	True	True	False	
ES_P4	Bool	18.3	false	True	True	True	False	
ES_P5	Bool	18.4	false	True	True	True	False	
ES_P6	Bool	18.5	false	True	True	True	False	
GRUPO_ELECTROGENO	Bool	18.6	false	True	True	True	False	
MINUTO_ACTUAL	Int	20.0	0	True	True	True	False	
HORA_INICIO	Int	22.0	0	True	True	True	False	
MINUTO_INICIO	Int	24.0	0	True	True	True	False	
HORA_FIN	Int	26.0	0	True	True	True	False	
MINUTO_FIN	Int	28.0	0	True	True	True	False	
LUNES_PROGRAMADO	Bool	30.0	false	True	True	True	False	
MARTES_PROGRAMADO	Bool	30.1	false	True	True	True	False	
MIERCOLES_PROGRAMADO	Bool	30.2	false	True	True	True	False	
JUEVES_PROGRAMADO	Bool	30.3	false	True	True	True	False	
VIERNES_PROGRAMADO	Bool	30.4	false	True	True	True	False	
SABADO_PROGRAMADO	Bool	30.5	false	True	True	True	False	
DOMINGO_PROGRAMADO	Bool	30.6	false	True	True	True	False	
HORA_INICIO2	Int	32.0	0	True	True	True	False	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
MINUTO_INICIO2	Int	34.0	0	True	True	True	False	
HORA_FIN2	Int	36.0	0	True	True	True	False	
MINUTO_FIN2	Int	38.0	0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DATOS_GRUPOS [DB96]

DATOS_GRUPOS Propiedades											
General											
Nombre	DATOS_GRUPOS	**Número**	96	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
CONSUMO_G1	Int	0.0	0	True	True	True	False	
CONSUMO_G2	Int	2.0	0	True	True	True	False	
CONSUMO_G3	Int	4.0	0	True	True	True	False	
CONSUMO_G4	Int	6.0	0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

DATOS_GENERALES [DB100]

DATOS_GENERALES Propiedades									
General									
Nombre	DATOS_GENERALES	**Número**	100	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
PRESION_IMPULSION	Real	0.0	0.0e+0	True	True	True	False	
CAUDAL_IMPULSADO	Real	4.0	0.0e+0	True	True	True	False	
PRESION_RAMAL_5	Real	8.0	0.0e+0	True	True	True	False	
PRESION_RAMAL_6	Real	12.0	0.0e+0	True	True	True	False	
CONTADOR_IMPULSION	Real	16.0	0.0e+0	True	True	True	False	
COMPUERTA_ENTRADA_OK	Bool	20.0	FALSE	True	True	True	False	
TENSION_MANIOBRA_OK	Bool	20.1	FALSE	True	True	True	False	
EMERGENCIA_GENERAL	Bool	20.2	FALSE	True	True	True	False	
BOMBAS_EN_MARCHA	Bool	20.3	FALSE	True	True	True	False	
NIVEL_BALSA	Real	22.0	0.0e+0	True	True	True	False	
CAUDAL_BALSA	Real	26.0	0.0e+0	True	True	True	False	
PRESION_RAMAL_7	Real	30.0	0.0e+0	True	True	True	False	
INICIA_CONTROL_T1	Bool	34.0	FALSE	True	True	True	False	
INICIA_CONTROL_T2	Bool	34.1	FALSE	True	True	True	False	
INICIA_CONTROL_T3	Bool	34.2	FALSE	True	True	True	False	
INICIA_CONTROL_T4	Bool	34.3	FALSE	True	True	True	False	
INICIA_CONTROL_T5	Bool	34.4	FALSE	True	True	True	False	
INICIA_CONTROL_T6	Bool	34.5	FALSE	True	True	True	False	
INICIA_CONTROL_T7	Bool	34.6	FALSE	True	True	True	False	
TIEMPO_CONTROL	S5Time	36.0	S5T#3M	True	True	True	False	
PULSOS_MAXIMOS	Int	38.0	1	True	True	True	False	
NUMERO_BOMBAS_ON	Int	40.0	0	True	True	True	False	
R2	Int	42.0	0	True	True	True	False	
R3	Int	44.0	0	True	True	True	False	
R4	Int	46.0	0	True	True	True	False	
R5	Int	48.0	0	True	True	True	False	
R6	Int	50.0	0	True	True	True	False	
R7	Int	52.0	0	True	True	True	False	
FLANCO_T1	Bool	54.0	FALSE	True	True	True	False	
FLANCO_T2	Bool	54.1	FALSE	True	True	True	False	
FLANCO_T3	Bool	54.2	FALSE	True	True	True	False	
FLANCO_T4	Bool	54.3	FALSE	True	True	True	False	
FLANCO_T5	Bool	54.4	FALSE	True	True	True	False	
FLANCO_T6	Bool	54.5	FALSE	True	True	True	False	
FLANCO_T7	Bool	54.6	FALSE	True	True	True	False	
FORZADO_GENERAL	Bool	54.7	FALSE	True	True	True	False	
NUMERO_BOMBAS	Int	56.0	0	True	True	True	False	
BOMBEO_EN_MARCHA_RED	Bool	58.0	FALSE	True	True	True	False	
PETICION_POR_BOYAS	Bool	58.1	FALSE	True	True	True	False	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
PETICION_POR_NIVEL	Bool	58.2	FALSE	True	True	True	False	
MODO_LLENADO	Bool	58.3	FALSE	True	True	True	False	
BOMBEO_EN_MARCHA_GASOIL	Bool	58.4	FALSE	True	True	True	False	
CICLO1	Int	60.0	1	True	True	True	False	
CICLO2	Int	62.0	2	True	True	True	False	
CICLO3	Int	64.0	3	True	True	True	False	
CICLO4	Int	66.0	4	True	True	True	False	
C1_ASOC1	Bool	68.0	FALSE	True	True	True	False	
C1_ASOC2	Bool	68.1	FALSE	True	True	True	False	
C1_ASOC3	Bool	68.2	FALSE	True	True	True	False	
C1_ASOC4	Bool	68.3	FALSE	True	True	True	False	
C2_ASOC1	Bool	68.4	FALSE	True	True	True	False	
C2_ASOC2	Bool	68.5	FALSE	True	True	True	False	
C2_ASOC3	Bool	68.6	FALSE	True	True	True	False	
C2_ASOC4	Bool	68.7	FALSE	True	True	True	False	
C3_ASOC1	Bool	69.0	FALSE	True	True	True	False	
C3_ASOC2	Bool	69.1	FALSE	True	True	True	False	
C3_ASOC3	Bool	69.2	FALSE	True	True	True	False	
C3_ASOC4	Bool	69.3	FALSE	True	True	True	False	
C4_ASOC1	Bool	69.4	FALSE	True	True	True	False	
C4_ASOC2	Bool	69.5	FALSE	True	True	True	False	
C4_ASOC3	Bool	69.6	FALSE	True	True	True	False	
C4_ASOC4	Bool	69.7	FALSE	True	True	True	False	
POS1_0	Bool	70.0	FALSE	True	True	True	False	
POS2_0	Bool	70.1	FALSE	True	True	True	False	
POS3_0	Bool	70.2	FALSE	True	True	True	False	
POS4_0	Bool	70.3	FALSE	True	True	True	False	
BOMBEO_AUTORIZADO	Bool	70.4	FALSE	True	True	True	False	
PRESION_ASP_B1	Real	72.0	0.0e+0	True	True	True	False	
PRESION_ASP_B2	Real	76.0	0.0e+0	True	True	True	False	
PRESION_ASP_B3	Real	80.0	0.0e+0	True	True	True	False	
PRESION_ASP_B4	Real	84.0	0.0e+0	True	True	True	False	
PRESION_RAMAL_1	Real	88.0	0.0e+0	True	True	True	False	
PRESION_RAMAL_2	Real	92.0	0.0e+0	True	True	True	False	
PRESION_RAMAL_3	Real	96.0	0.0e+0	True	True	True	False	
PRESION_RAMAL_4	Real	100.0	0.0e+0	True	True	True	False	
ACUMULADO_T1	Real	104.0	0.0e+0	True	True	True	False	
ACUMULADO_T2	Real	108.0	0.0e+0	True	True	True	False	
ACUMULADO_T3	Real	112.0	0.0e+0	True	True	True	False	
ACUMULADO_T4	Real	116.0	0.0e+0	True	True	True	False	
ACUMULADO_T5	Real	120.0	0.0e+0	True	True	True	False	
ACUMULADO_T6	Real	124.0	0.0e+0	True	True	True	False	
ACUMULADO_T7	Real	128.0	0.0e+0	True	True	True	False	
AHORA_P1	Bool	132.0	FALSE	True	True	True	False	
AHORA_P2	Bool	132.1	FALSE	True	True	True	False	
AHORA_P3	Bool	132.2	FALSE	True	True	True	False	
AHORA_P4	Bool	132.3	FALSE	True	True	True	False	
AHORA_P5	Bool	132.4	FALSE	True	True	True	False	
AHORA_P6	Bool	132.5	FALSE	True	True	True	False	
HORARIO_AUTORIZADO	Bool	132.6	FALSE	True	True	True	False	
RES1	Bool	132.7	FALSE	True	True	True	False	
ANTES_P1	Bool	133.0	FALSE	True	True	True	False	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
ANTES_P2	Bool	133.1	FALSE	True	True	True	False	
ANTES_P3	Bool	133.2	FALSE	True	True	True	False	
ANTES_P4	Bool	133.3	FALSE	True	True	True	False	
ANTES_P5	Bool	133.4	FALSE	True	True	True	False	
ANTES_P6	Bool	133.5	FALSE	True	True	True	False	
RES2	Bool	133.6	FALSE	True	True	True	False	
RES3	Bool	133.7	FALSE	True	True	True	False	
DESPUES_P1	Bool	134.0	FALSE	True	True	True	False	
DESPUES_P2	Bool	134.1	FALSE	True	True	True	False	
DESPUES_P3	Bool	134.2	FALSE	True	True	True	False	
DESPUES_P4	Bool	134.3	FALSE	True	True	True	False	
DESPUES_P5	Bool	134.4	FALSE	True	True	True	False	
DESPUES_P6	Bool	134.5	FALSE	True	True	True	False	
RES4	Bool	134.6	FALSE	True	True	True	False	
RES5	Bool	134.7	FALSE	True	True	True	False	
HORAS_TRABAJADAS_BOMBEO	Real	136.0	0.0e+0	True	True	True	False	
NUMERO_FILTRADOS_IN	Real	140.0	0.0e+0	True	True	True	False	
NUMERO_FILTRADOS_OUT	Real	144.0	0.0e+0	True	True	True	False	
M3_ENTRE_FILTRADOS_IN	Real	148.0	0.0e+0	True	True	True	False	
M3_ENTRE_FILTRADOS_OUT	Real	152.0	0.0e+0	True	True	True	False	
TEMP_M3_FILTRADOS_IN	Real	156.0	0.0e+0	True	True	True	False	
TEMP_M3_FILTRADOS_OUT	Real	160.0	0.0e+0	True	True	True	False	
NUMERO_FILTRADOS_BALSA	Real	164.0	0.0e+0	True	True	True	False	
M3_ENTRE_FILTRADOS_BALSA	Real	168.0	0.0e+0	True	True	True	False	
TEMP_M3_FILTRADOS_BALSA	Real	172.0	0.0e+0	True	True	True	False	
R1	Int	176.0	0	True	True	True	False	
temp_time_control	DInt	178.0	L#0	True	True	True	False	
CONTADOR_BALSA	Real	182.0	0.0e+0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

TELECONTROL [DB101]

TELECONTROL Propiedades											
General											
Nombre	TELECONTROL	**Número**	101	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
HAY_ROTURA_T1	Bool	0.0	FALSE	True	True	True	False	
HAY_ROTURA_T2	Bool	0.1	FALSE	True	True	True	False	
HAY_ROTURA_T3	Bool	0.2	FALSE	True	True	True	False	
HAY_ROTURA_T4	Bool	0.3	FALSE	True	True	True	False	
HAY_ROTURA_T5	Bool	0.4	FALSE	True	True	True	False	
HAY_ROTURA_T6	Bool	0.5	FALSE	True	True	True	False	
HAY_ROTURA_T7	Bool	0.6	FALSE	True	True	True	False	
HAY_ROTURA_BALSA	Bool	0.7	FALSE	True	True	True	False	
TIEMPO_ESPERA_PETICION	Time	2.0	T#30S	True	True	True	False	
COMPRUEBA_T1	Bool	6.0	FALSE	True	True	True	False	
COMPRUEBA_T2	Bool	6.1	FALSE	True	True	True	False	
COMPRUEBA_T3	Bool	6.2	FALSE	True	True	True	False	
COMPRUEBA_T4	Bool	6.3	FALSE	True	True	True	False	
COMPRUEBA_T5	Bool	6.4	FALSE	True	True	True	False	
COMPRUEBA_T6	Bool	6.5	FALSE	True	True	True	False	
COMPRUEBA_T7	Bool	6.6	FALSE	True	True	True	False	
RESERVA	Int	8.0	0	True	True	True	False	
CERRADO_T1	Bool	10.0	FALSE	True	True	True	False	
CERRADO_T2	Bool	10.1	FALSE	True	True	True	False	
CERRADO_T3	Bool	10.2	FALSE	True	True	True	False	
CERRADO_T4	Bool	10.3	FALSE	True	True	True	False	
CERRADO_T5	Bool	10.4	FALSE	True	True	True	False	
CERRADO_T6	Bool	10.5	FALSE	True	True	True	False	
CERRADO_T7	Bool	10.6	FALSE	True	True	True	False	
RESERVA_CERRADO	Bool	10.7	FALSE	True	True	True	False	
ABIERTO_T1	Bool	11.0	FALSE	True	True	True	False	
ABIERTO_T2	Bool	11.1	FALSE	True	True	True	False	
ABIERTO_T3	Bool	11.2	FALSE	True	True	True	False	
ABIERTO_T4	Bool	11.3	FALSE	True	True	True	False	
ABIERTO_T5	Bool	11.4	FALSE	True	True	True	False	
ABIERTO_T6	Bool	11.5	FALSE	True	True	True	False	
ABIERTO_T7	Bool	11.6	FALSE	True	True	True	False	
CAUDAL_MAX_T1	Real	12.0	2.2e+3	True	True	True	False	
CAUDAL_MAX_T2	Real	16.0	2.2e+3	True	True	True	False	
CAUDAL_MAX_T3	Real	20.0	2.2e+3	True	True	True	False	
CAUDAL_MAX_T4	Real	24.0	2.2e+3	True	True	True	False	
CAUDAL_MAX_T5	Real	28.0	2.2e+3	True	True	True	False	
CAUDAL_MAX_T6	Real	32.0	2.2e+3	True	True	True	False	
CAUDAL_MAX_T7	Real	36.0	2.2e+3	True	True	True	False	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
ALARMA_CAUDAL_T1	Bool	40.0	FALSE	True	True	True	False	
ALARMA_CAUDAL_T2	Bool	40.1	FALSE	True	True	True	False	
ALARMA_CAUDAL_T3	Bool	40.2	FALSE	True	True	True	False	
ALARMA_CAUDAL_T4	Bool	40.3	FALSE	True	True	True	False	
ALARMA_CAUDAL_T5	Bool	40.4	FALSE	True	True	True	False	
ALARMA_CAUDAL_T6	Bool	40.5	FALSE	True	True	True	False	
ALARMA_CAUDAL_T7	Bool	40.6	FALSE	True	True	True	False	
PRESION_MIN_T1	Real	42.0	1.0e+0	True	True	True	False	
PRESION_MIN_T2	Real	46.0	1.0e+0	True	True	True	False	
PRESION_MIN_T3	Real	50.0	1.0e+0	True	True	True	False	
PRESION_MIN_T4	Real	54.0	1.0e+0	True	True	True	False	
PRESION_MIN_T5	Real	58.0	1.0e+0	True	True	True	False	
PRESION_MIN_T6	Real	62.0	1.0e+0	True	True	True	False	
PRESION_MIN_T7	Real	66.0	1.0e+0	True	True	True	False	
ALARMA_PRESION_T1	Bool	70.0	FALSE	True	True	True	False	
ALARMA_PRESION_T2	Bool	70.1	FALSE	True	True	True	False	
ALARMA_PRESION_T3	Bool	70.2	FALSE	True	True	True	False	
ALARMA_PRESION_T4	Bool	70.3	FALSE	True	True	True	False	
ALARMA_PRESION_T5	Bool	70.4	FALSE	True	True	True	False	
ALARMA_PRESION_T6	Bool	70.5	FALSE	True	True	True	False	
ALARMA_PRESION_T7	Bool	70.6	FALSE	True	True	True	False	
TEMP_T1	Bool	70.7	FALSE	True	True	True	False	
TEMP_T2	Bool	71.0	FALSE	True	True	True	False	
TEMP_T3	Bool	71.1	FALSE	True	True	True	False	
TEMP_T4	Bool	71.2	FALSE	True	True	True	False	
TEMP_T5	Bool	71.3	FALSE	True	True	True	False	
TEMP_T6	Bool	71.4	FALSE	True	True	True	False	
TEMP_T7	Bool	71.5	FALSE	True	True	True	False	
ACUMULADO_T1	Real	72.0	0.0e+0	True	True	True	False	
ACUMULADO_T2	Real	76.0	0.0e+0	True	True	True	False	
ACUMULADO_T3	Real	80.0	0.0e+0	True	True	True	False	
ACUMULADO_T4	Real	84.0	0.0e+0	True	True	True	False	
ACUMULADO_T5	Real	88.0	0.0e+0	True	True	True	False	
ACUMULADO_T6	Real	92.0	0.0e+0	True	True	True	False	
ACUMULADO_T7	Real	96.0	0.0e+0	True	True	True	False	
CAUDAL_MAX_BALSA	Real	100.0	4.0e+3	True	True	True	False	
SECCION_T1	Real	104.0	0.0e+0	True	True	True	False	
SECCION_T2	Real	108.0	0.0e+0	True	True	True	False	
SECCION_T3	Real	112.0	0.0e+0	True	True	True	False	
SECCION_T4	Real	116.0	0.0e+0	True	True	True	False	
SECCION_T5	Real	120.0	0.0e+0	True	True	True	False	
SECCION_T6	Real	124.0	0.0e+0	True	True	True	False	
SECCION_T7	Real	128.0	0.0e+0	True	True	True	False	
PRES_NOMINAL_T1	Real	132.0	0.0e+0	True	True	True	False	
PRES_NOMINAL_T2	Real	136.0	0.0e+0	True	True	True	False	
PRES_NOMINAL_T3	Real	140.0	0.0e+0	True	True	True	False	
PRES_NOMINAL_T4	Real	144.0	0.0e+0	True	True	True	False	
PRES_NOMINAL_T5	Real	148.0	0.0e+0	True	True	True	False	
PRES_NOMINAL_T6	Real	152.0	0.0e+0	True	True	True	False	
PRES_NOMINAL_T7	Real	156.0	0.0e+0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

BALSA [DB102]

BALSA Propiedades									
General									
Nombre	BALSA	**Número**	102	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
VM_AUTO	Bool	0.0	FALSE	True	True	True	False	
VM_LIM_PAR_ABRIR	Bool	0.1	FALSE	True	True	True	False	
VM_LIM_PAR_CERRAR	Bool	0.2	FALSE	True	True	True	False	
VM_FC_ABRIR	Bool	0.3	FALSE	True	True	True	False	
VM_FC_CERRAR	Bool	0.4	FALSE	True	True	True	False	
VM_CONF_ABRIR	Bool	0.5	FALSE	True	True	True	False	
VM_CONF_CERRAR	Bool	0.6	FALSE	True	True	True	False	
VM_DISPARO	Bool	0.7	FALSE	True	True	True	False	
RELE_TENSION	Bool	1.0	FALSE	True	True	True	False	
INHIBICION	Bool	1.1	FALSE	True	True	True	False	
PULSO_CAUDAL	Bool	1.2	FALSE	True	True	True	False	
R00	Bool	1.3	FALSE	True	True	True	False	
SENTIDO_CAUDAL	Bool	1.4	FALSE	True	True	True	False	
SOBREVEL_CERRADA	Bool	1.5	FALSE	True	True	True	False	
SOBREVEL_ABIERTA	Bool	1.6	FALSE	True	True	True	False	
RESERVA_2	Bool	1.7	FALSE	True	True	True	False	
BOYA_MINIMO	Bool	2.0	FALSE	True	True	True	False	
RESERVA_3	Bool	2.1	FALSE	True	True	True	False	
BOYA_CONSIGNA	Bool	2.2	FALSE	True	True	True	False	
RESERVA_4	Bool	2.3	FALSE	True	True	True	False	
BOYA_MAXIMO	Bool	2.4	FALSE	True	True	True	False	
BOYA_DRENAJE	Bool	2.5	FALSE	True	True	True	False	
INTRUSION	Bool	2.6	FALSE	True	True	True	False	
BOYA_ALIVIADERO	Bool	2.7	FALSE	True	True	True	False	
Q_BALSA_VM_ABRE	Bool	3.0	FALSE	True	True	True	False	
Q_BALSA_VM_CIERRA	Bool	3.1	FALSE	True	True	True	False	
QR1	Bool	3.2	FALSE	True	True	True	False	
QR2	Bool	3.3	FALSE	True	True	True	False	
QR3	Bool	3.4	FALSE	True	True	True	False	
QR4	Bool	3.5	FALSE	True	True	True	False	
QR5	Bool	3.6	FALSE	True	True	True	False	
QR6	Bool	3.7	FALSE	True	True	True	False	
Q_BALSA_SOLENOIDE_SOBREV	Bool	4.0	FALSE	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

FILTRADO [DB103]

FILTRADO Propiedades											
General											
Nombre	FILTRADO	**Número**	103	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
FILTRADO_INTRUSION	Bool	0.0	false	True	True	True	False	
FILTRADO_EN_MARCHA	Bool	0.1	false	True	True	True	False	
FILTRADO_ALARMA	Bool	0.2	false	True	True	True	False	
T2_PULSO	Bool	0.3	false	True	True	True	False	
T1_PULSO	Bool	0.4	false	True	True	True	False	
T2_INTRUSION	Bool	0.5	false	True	True	True	False	
T1_INTRUSION	Bool	0.6	false	True	True	True	False	
INHABILITA_INTRUSION	Bool	0.7	false	True	True	True	False	
Q_T1_CERRAR	Bool	1.0	false	True	True	True	False	
Q_T1_ABRIR	Bool	1.1	false	True	True	True	False	
R2	Bool	1.2	false	True	True	True	False	
R3	Bool	1.3	false	True	True	True	False	
R4	Bool	1.4	false	True	True	True	False	
R5	Bool	1.5	false	True	True	True	False	
R6	Bool	1.6	false	True	True	True	False	
R7	Bool	1.7	false	True	True	True	False	
Q_T2_ABRIR	Bool	2.0	false	True	True	True	False	
Q_T2_CERRAR	Bool	2.1	false	True	True	True	False	
R8	Bool	2.2	false	True	True	True	False	
R9	Bool	2.3	false	True	True	True	False	
R10	Bool	2.4	false	True	True	True	False	
R11	Bool	2.5	false	True	True	True	False	
R12	Bool	2.6	false	True	True	True	False	
R13	Bool	2.7	false	True	True	True	False	
Q_MARCHA_FILTRO_MED	Bool	3.0	false	True	True	True	False	
Q_INTRUSION_ARMADA	Bool	3.1	false	True	True	True	False	
R14	Bool	3.2	false	True	True	True	False	
R15	Bool	3.3	false	True	True	True	False	
R16	Bool	3.4	false	True	True	True	False	
R17	Bool	3.5	false	True	True	True	False	
R18	Bool	3.6	false	True	True	True	False	
R19	Bool	3.7	false	True	True	True	False	
REARME_INTRUSION	Bool	4.0	false	True	True	True	False	
R20	Bool	4.1	false	True	True	True	False	
PULSO_CAUDAL_FILTRADO	Bool	4.2	false	True	True	True	False	
R21	Bool	4.3	false	True	True	True	False	
R22	Bool	4.4	false	True	True	True	False	
R23	Bool	4.5	false	True	True	True	False	
R24	Bool	4.6	false	True	True	True	False	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
R25	Bool	4.7	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

T3T4 [DB104]

T3T4 Propiedades											
General											
Nombre	T3T4	**Número**	104	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
T3_INTRUSION	Bool	0.0	false	True	True	True	False	
INHABILITA_INTRUSION	Bool	0.1	false	True	True	True	False	
T3_PULSO	Bool	0.2	false	True	True	True	False	
R2	Bool	0.3	false	True	True	True	False	
T4_INTRUSION	Bool	0.4	false	True	True	True	False	
R3	Bool	0.5	false	True	True	True	False	
T4_PULSO	Bool	0.6	false	True	True	True	False	
R4	Bool	0.7	false	True	True	True	False	
Q_T3_CERRAR	Bool	1.0	false	True	True	True	False	
Q_T3_ABRIR	Bool	1.1	false	True	True	True	False	
R5	Bool	1.2	false	True	True	True	False	
R6	Bool	1.3	false	True	True	True	False	
R7	Bool	1.4	false	True	True	True	False	
R8	Bool	1.5	false	True	True	True	False	
R9	Bool	1.6	false	True	True	True	False	
R10	Bool	1.7	false	True	True	True	False	
Q_T4_CERRAR	Bool	2.0	false	True	True	True	False	
Q_T4_ABRIR	Bool	2.1	false	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

HMI [DB110]

HMI Propiedades											
General											
Nombre	HMI	**Número**	110	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
ORDEN_MARCHA_GRUPO1	Bool	0.0	FALSE	True	True	True	False	
ORDEN_MARCHA_GRUPO2	Bool	0.1	FALSE	True	True	True	False	
ORDEN_MARCHA_GRUPO3	Bool	0.2	FALSE	True	True	True	False	
ORDEN_MARCHA_GRUPO4	Bool	0.3	FALSE	True	True	True	False	
TEMP_TEMPERATURA_GRUPO1	Int	2.0	0	True	True	True	False	
TEMP_TEMPERATURA_GRUPO2	Int	4.0	0	True	True	True	False	
TEMP_TEMPERATURA_GRUPO3	Int	6.0	0	True	True	True	False	
TEMP_TEMPERATURA_GRUPO4	Int	8.0	0	True	True	True	False	
TEMP_ARRANQUE_GRUPOS	Int	10.0	55	True	True	True	False	
TEMP_MAX_GRUPOS	Int	12.0	0	True	True	True	False	
AVERIA_GRUPO1	Bool	14.0	FALSE	True	True	True	False	
AVERIA_GRUPO2	Bool	14.1	FALSE	True	True	True	False	
AVERIA_GRUPO3	Bool	14.2	FALSE	True	True	True	False	
AVERIA_GRUPO4	Bool	14.3	FALSE	True	True	True	False	
TEMPERATURA_GRUPO1	Int	16.0	0	True	True	True	False	
TEMPERATURA_GRUPO2	Int	18.0	0	True	True	True	False	
TEMPERATURA_GRUPO3	Int	20.0	0	True	True	True	False	
TEMPERATURA_GRUPO4	Int	22.0	0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

TELECONTROL_SELECT [DB111]

TELECONTROL_SELECT Propiedades											
General											
Nombre	TELECONTROL_SELECT	**Número**	111	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
T_CONTROL_R1	S5Time	0.0	S5T#0ms	True	True	True	False	
T_CONTROL_R2	S5Time	2.0	S5T#0ms	True	True	True	False	
T_CONTROL_R3	S5Time	4.0	S5T#0ms	True	True	True	False	
T_CONTROL_R4	S5Time	6.0	S5T#0ms	True	True	True	False	
T_CONTROL_R5	S5Time	8.0	S5T#0ms	True	True	True	False	
T_CONTROL_R6	S5Time	10.0	S5T#0ms	True	True	True	False	
T_CONTROL_R7	S5Time	12.0	S5T#0ms	True	True	True	False	
MAX_PULSOS_R1	Int	14.0	0	True	True	True	False	
MAX_PULSOS_R2	Int	16.0	0	True	True	True	False	
MAX_PULSOS_R3	Int	18.0	0	True	True	True	False	
MAX_PULSOS_R4	Int	20.0	0	True	True	True	False	
MAX_PULSOS_R5	Int	22.0	0	True	True	True	False	
MAX_PULSOS_R6	Int	24.0	0	True	True	True	False	
MAX_PULSOS_R7	Int	26.0	0	True	True	True	False	
TEMP_R1	DInt	28.0	0	True	True	True	False	
TEMP_R2	DInt	32.0	0	True	True	True	False	
TEMP_R3	DInt	36.0	0	True	True	True	False	
TEMP_R4	DInt	40.0	0	True	True	True	False	
TEMP_R5	DInt	44.0	0	True	True	True	False	
TEMP_R6	DInt	48.0	0	True	True	True	False	
TEMP_R7	DInt	52.0	0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

ACUMULADORES_Q_FILTROS [DB112]

ACUMULADORES_Q_FILTROS Propiedades											
General											
Nombre	ACUMULADORES_Q_FIL-TROS	**Número**	112	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personaliza-da**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
CONTADOR_FILTRO_IMPULSIO	Real	0.0	4.23e+2	True	True	True	False	
CONTADOR_FILTRO_RIEGO	Real	4.0	5.62e+2	True	True	True	False	
R_ACC_F_IMPULSION	Bool	8.0	FALSE	True	True	True	False	
R_ACC_F_RIEGO	Bool	8.1	FALSE	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

COPIA_AJUSTES [DB125]

COPIA_AJUSTES Propiedades											
General											
Nombre	COPIA_AJUSTES	**Número**	125	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
A1	Int	0.0	0	True	True	True	False	
A2	Real	2.0	0.0e+0	True	True	True	False	
A3	Real	6.0	0.0e+0	True	True	True	False	
A4	Real	10.0	0.0e+0	True	True	True	False	
TIEMPO_ARRANQUE_VM_B1	DInt	14.0	L#0	True	True	True	False	
TIEMPO_ARRANQUE_VM_B2	DInt	18.0	L#0	True	True	True	False	
TIEMPO_ARRANQUE_VM_B3	DInt	22.0	L#0	True	True	True	False	
TIEMPO_ARRANQUE_VM_B4	DInt	26.0	L#0	True	True	True	False	
TIEMPO_PARO_VM_B1	DInt	30.0	L#0	True	True	True	False	
TIEMPO_PARO_VM_B2	DInt	34.0	L#0	True	True	True	False	
TIEMPO_PARO_VM_B3	DInt	38.0	L#0	True	True	True	False	
TIEMPO_PARO_VM_B4	DInt	42.0	L#0	True	True	True	False	
TIEMPO_CICLO_VM1	DInt	46.0	L#0	True	True	True	False	
TIEMPO_CICLO_VM2	DInt	50.0	L#0	True	True	True	False	
TIEMPO_CICLO_VM3	DInt	54.0	L#0	True	True	True	False	
TIEMPO_CICLO_VM4	DInt	58.0	L#0	True	True	True	False	
TIEMPO_ENTRE_ARRANQUES	DInt	62.0	L#0	True	True	True	False	
TIEMPO_ARRANQUE	DInt	66.0	L#0	True	True	True	False	
TIEMPO_PARO	DInt	70.0	L#0	True	True	True	False	
TIEMPO_ENTRE_PAROS	DInt	74.0	L#0	True	True	True	False	
X1	Bool	78.0	FALSE	True	True	True	False	
X2	Bool	78.1	FALSE	True	True	True	False	
X3	Bool	78.2	FALSE	True	True	True	False	
X4	Bool	78.3	FALSE	True	True	True	False	
X5	Bool	78.4	FALSE	True	True	True	False	
X6	Bool	78.5	FALSE	True	True	True	False	
TIEMPO_ANTICIPACION	DInt	80.0	L#0	True	True	True	False	
C1	Bool	84.0	FALSE	True	True	True	False	
C2	Bool	84.1	FALSE	True	True	True	False	
C3	Bool	84.2	FALSE	True	True	True	False	
C4	Bool	84.3	FALSE	True	True	True	False	
C5	Bool	84.4	FALSE	True	True	True	False	
C6	Bool	84.5	FALSE	True	True	True	False	
C7	Bool	84.6	FALSE	True	True	True	False	
C8	Bool	84.7	FALSE	True	True	True	False	
C9	Real	86.0	0.0e+0	True	True	True	False	
C10	Real	90.0	0.0e+0	True	True	True	False	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

EXTRA_AJUSTES [DB126]

EXTRA_AJUSTES Propiedades											
General											
Nombre	EXTRA_AJUSTES	**Número**	126	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Static								
T_ESP_CIERRE	DInt	0.0	0	True	True	True	False	
T_ARR_GRUPOS	Time	4.0	T#0ms	True	True	True	False	
L_m3	Real	8.0	0.0	True	True	True	False	
euros_M3	Real	12.0	0.0	True	True	True	False	
euros_L_gasoil	Real	16.0	0.0	True	True	True	False	

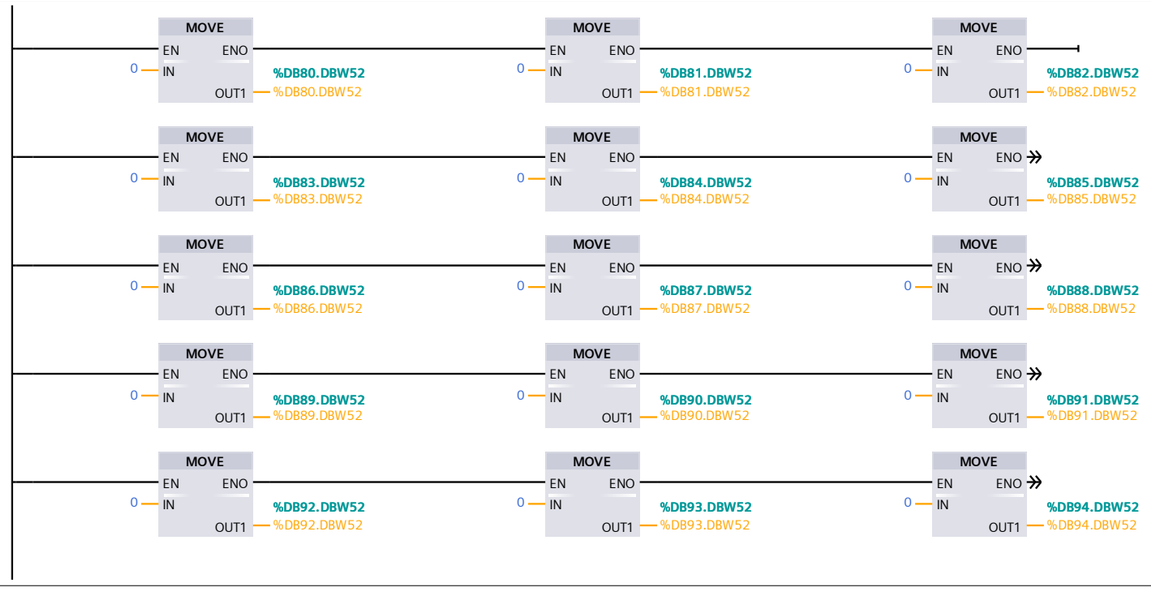
PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_HORARIOS [FC60]

CALCULO_HORARIOS Propiedades											
General											
Nombre	CALCULO_HORARIOS	**Número**	60	**Tipo**	FC	**Idioma**	KOP	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personaliza-da**	

Nombre	Tipo de datos	Offset	Valor predet.	Comentario
Input				
Output				
InOut				
Temp				
Constant				
▼ Return				
CALCULO_HORARIOS	Void			

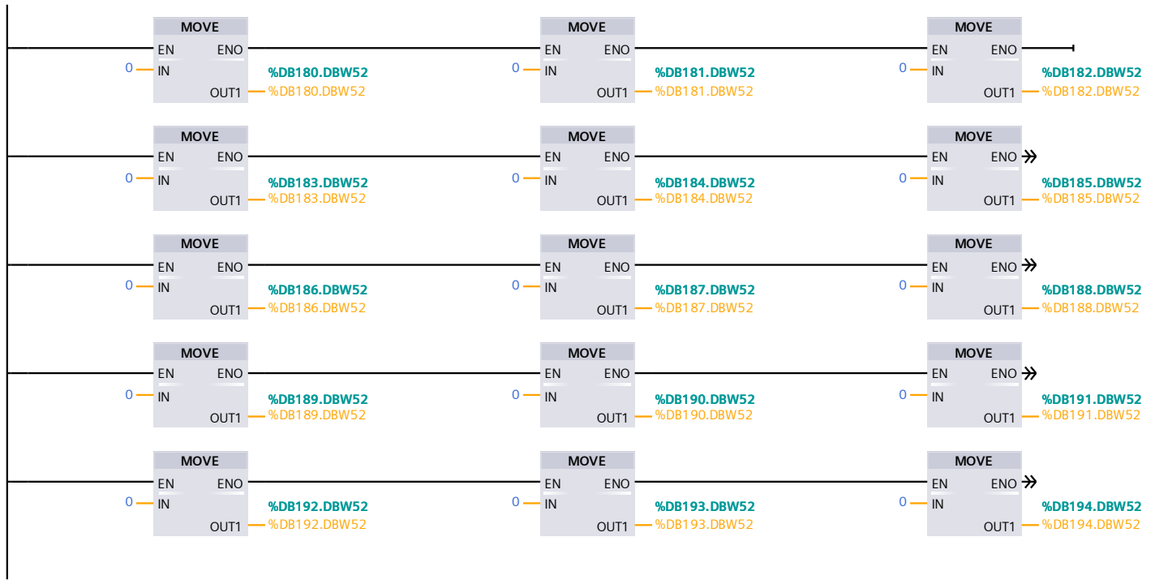
Segmento 1: INICIALIZACION DE CALCULOS



Símbolo	Dirección	Tipo	Comentario
%DB80.DBW52	%DB80.DBW52	Word	
%DB81.DBW52	%DB81.DBW52	Word	
%DB82.DBW52	%DB82.DBW52	Word	
%DB83.DBW52	%DB83.DBW52	Word	
%DB84.DBW52	%DB84.DBW52	Word	
%DB85.DBW52	%DB85.DBW52	Word	
%DB86.DBW52	%DB86.DBW52	Word	
%DB87.DBW52	%DB87.DBW52	Word	
%DB88.DBW52	%DB88.DBW52	Word	

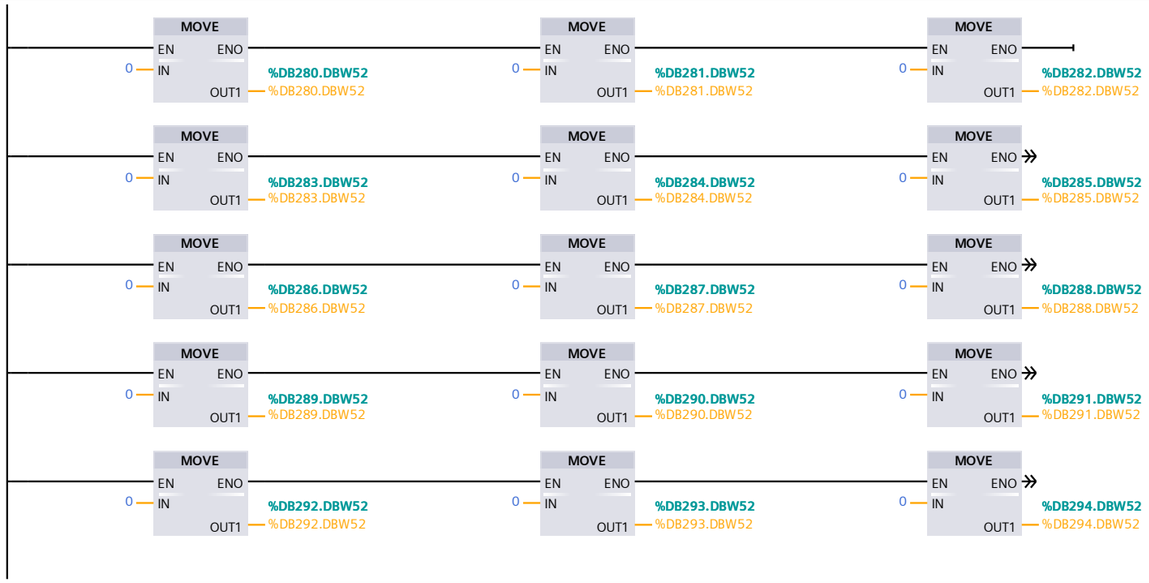
Símbolo	Dirección	Tipo	Comentario
%DB89.DBW52	%DB89.DBW52	Word	
%DB90.DBW52	%DB90.DBW52	Word	
%DB91.DBW52	%DB91.DBW52	Word	
%DB92.DBW52	%DB92.DBW52	Word	
%DB93.DBW52	%DB93.DBW52	Word	

Segmento 2: INICIALIZACION DE CALCULOS



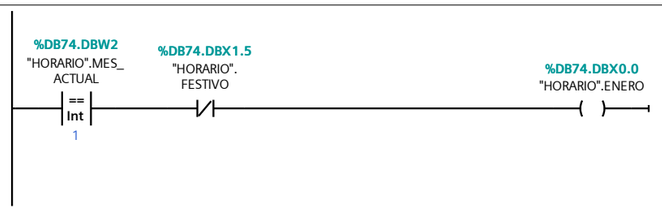
Símbolo	Dirección	Tipo	Comentario

Segmento 3: INICIALIZACION DE CALCULOS



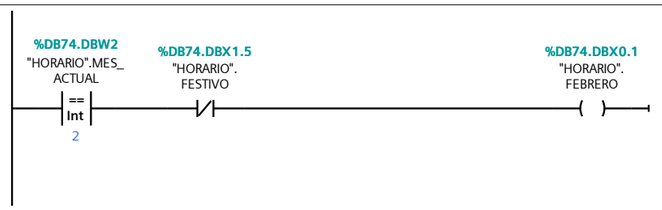
Símbolo	Dirección	Tipo	Comentario

Segmento 4:



Símbolo	Dirección	Tipo	Comentario
"HORARIO".ENERO	%DB74.DBX0.0	Bool	
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	

Segmento 5:



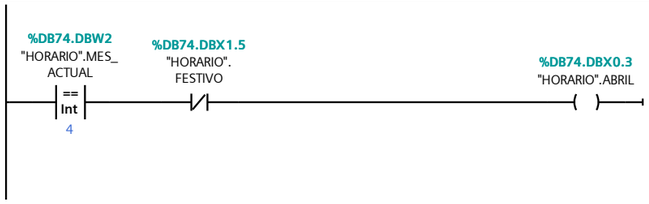
Símbolo	Dirección	Tipo	Comentario
"HORARIO".FEBRERO	%DB74.DBX0.1	Bool	
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	

Segmento 6:



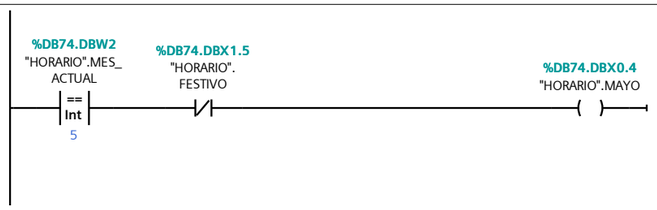
Símbolo	Dirección	Tipo	Comentario
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".MARZO	%DB74.DBX0.2	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	

Segmento 7:



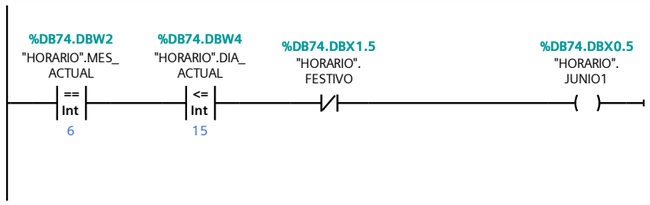
Símbolo	Dirección	Tipo	Comentario
"HORARIO".ABRIL	%DB74.DBX0.3	Bool	
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	

Segmento 8:



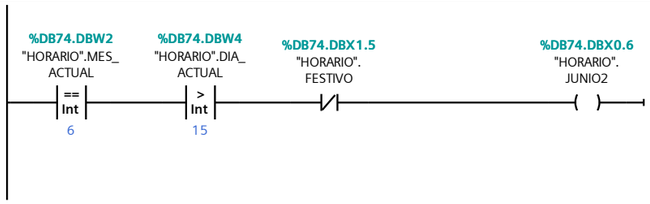
Símbolo	Dirección	Tipo	Comentario
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".MAYO	%DB74.DBX0.4	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	

Segmento 9:



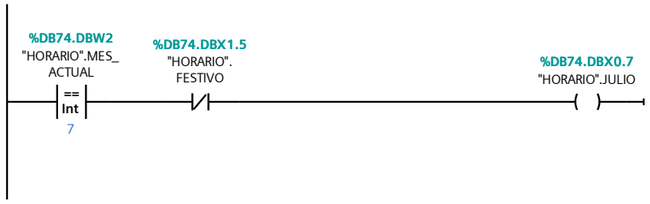
Símbolo	Dirección	Tipo	Comentario
"HORARIO".DIA_ACTUAL	%DB74.DBW4	Int	
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".JUNIO1	%DB74.DBX0.5	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	

Segmento 10:



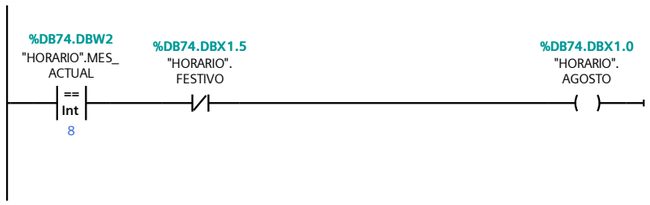
Símbolo	Dirección	Tipo	Comentario
"HORARIO".DIA_ACTUAL	%DB74.DBW4	Int	
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".JUNIO2	%DB74.DBX0.6	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	

Segmento 11:



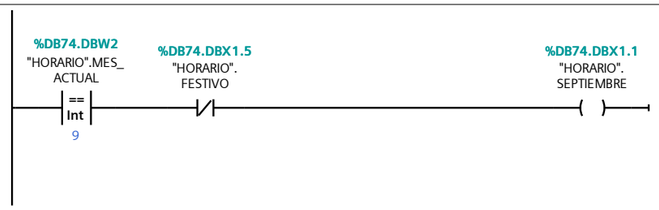
Símbolo	Dirección	Tipo	Comentario
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".JULIO	%DB74.DBX0.7	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	

Segmento 12:



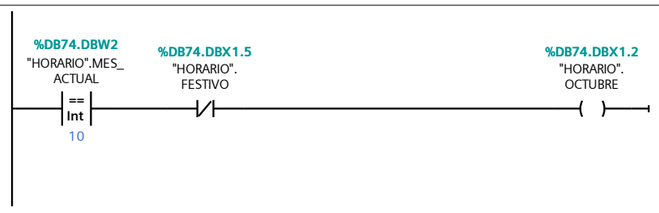
Símbolo	Dirección	Tipo	Comentario
"HORARIO".AGOSTO	%DB74.DBX1.0	Bool	
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	

Segmento 13:



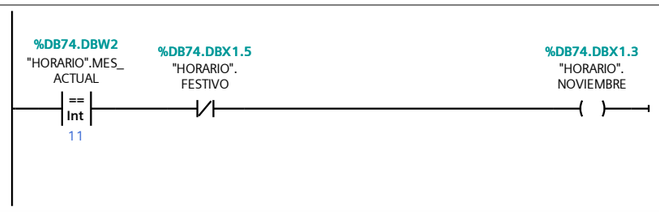
Símbolo	Dirección	Tipo	Comentario
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	
"HORARIO".SEPTIEMBRE	%DB74.DBX1.1	Bool	

Segmento 14:



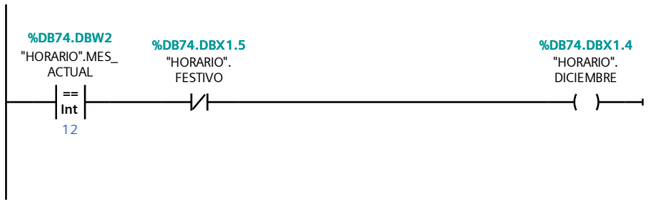
Símbolo	Dirección	Tipo	Comentario
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	
"HORARIO".OCTUBRE	%DB74.DBX1.2	Bool	

Segmento 15:



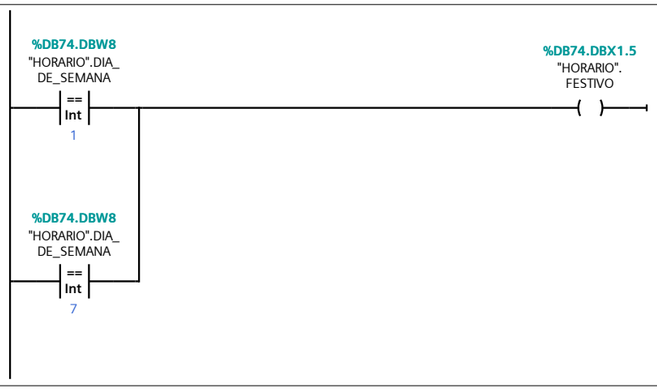
Símbolo	Dirección	Tipo	Comentario
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	
"HORARIO".NOVIEMBRE	%DB74.DBX1.3	Bool	

Segmento 16:



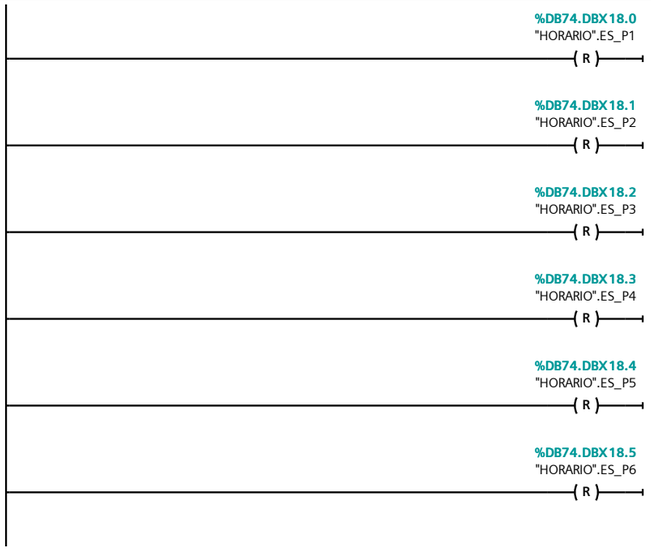
Símbolo	Dirección	Tipo	Comentario
"HORARIO".DICIEMBRE	%DB74.DBX1.4	Bool	
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".MES_ACTUAL	%DB74.DBW2	Int	

Segmento 17:



Símbolo	Dirección	Tipo	Comentario
"HORARIO".DIA_DE_SEMANA	%DB74.DBW8	Int	
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	

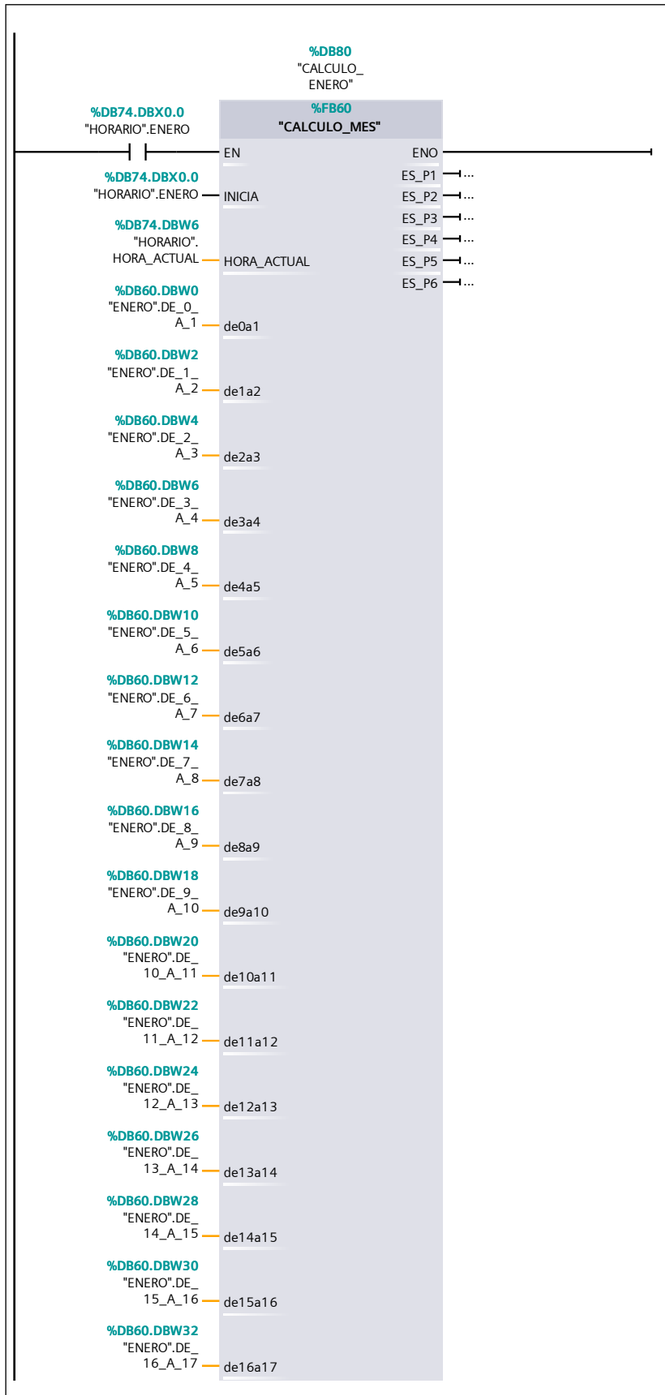
Segmento 18:



Símbolo	Dirección	Tipo	Comentario
"HORARIO".ES_P1	%DB74.DBX18.0	Bool	
"HORARIO".ES_P2	%DB74.DBX18.1	Bool	
"HORARIO".ES_P3	%DB74.DBX18.2	Bool	
"HORARIO".ES_P4	%DB74.DBX18.3	Bool	
"HORARIO".ES_P5	%DB74.DBX18.4	Bool	
"HORARIO".ES_P6	%DB74.DBX18.5	Bool	

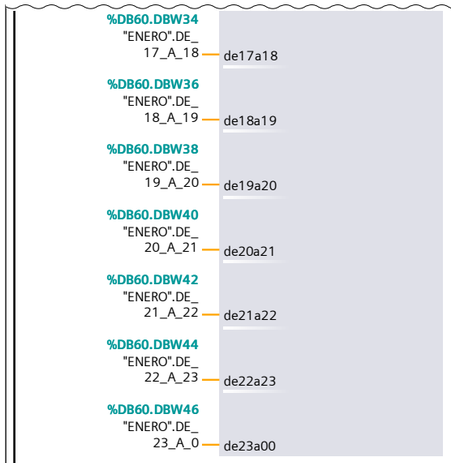
Segmento 19:

Segmento 19: (1.1 / 2.1)



Segmento 19: (2.1 / 2.1)

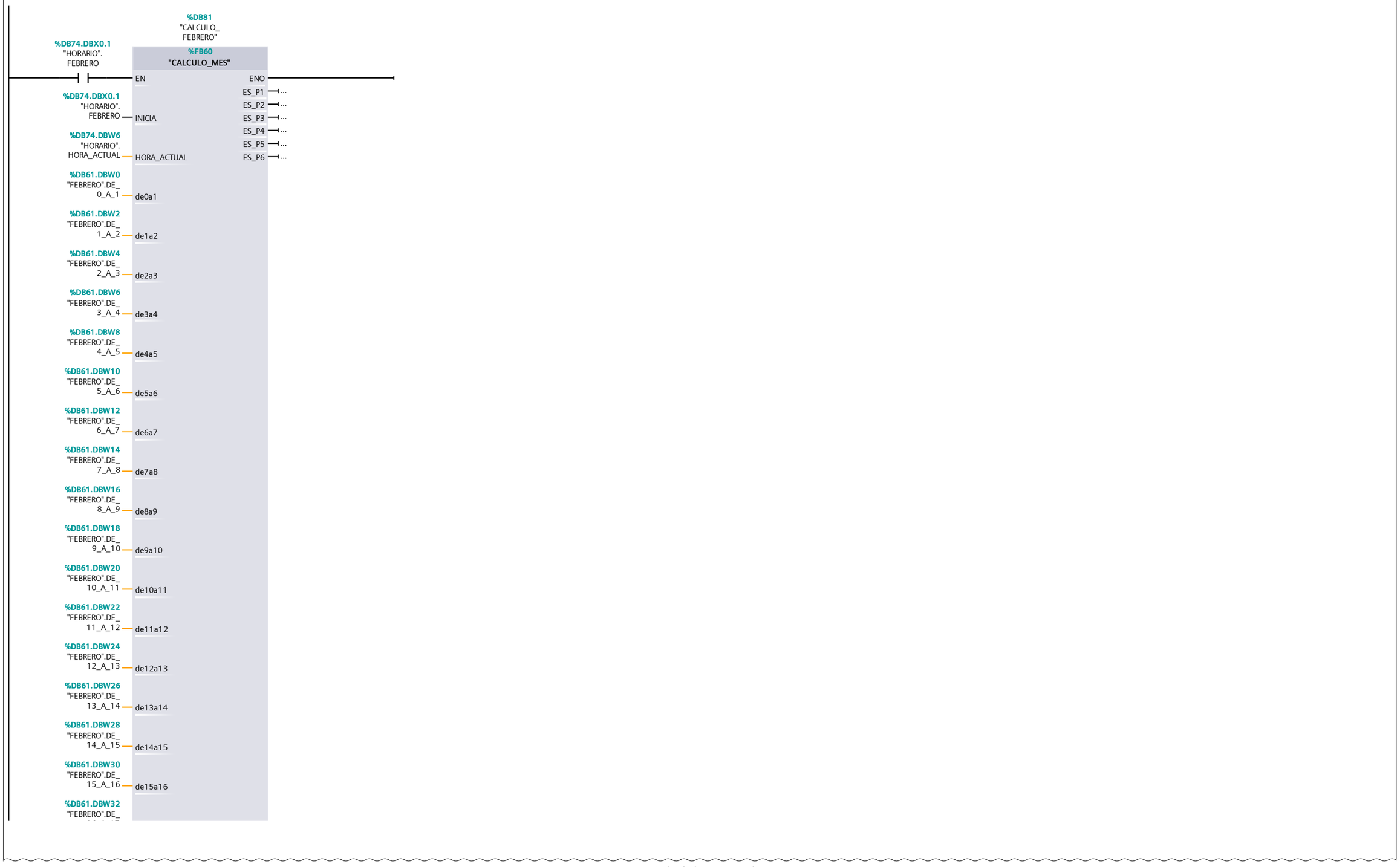
1.1 (Página56 - 9)



Símbolo	Dirección	Tipo	Comentario
"ENERO".DE_0_A_1	%DB60.DBW0	Int	
"ENERO".DE_1_A_2	%DB60.DBW2	Int	
"ENERO".DE_2_A_3	%DB60.DBW4	Int	
"ENERO".DE_3_A_4	%DB60.DBW6	Int	
"ENERO".DE_4_A_5	%DB60.DBW8	Int	
"ENERO".DE_5_A_6	%DB60.DBW10	Int	
"ENERO".DE_6_A_7	%DB60.DBW12	Int	
"ENERO".DE_7_A_8	%DB60.DBW14	Int	
"ENERO".DE_8_A_9	%DB60.DBW16	Int	
"ENERO".DE_9_A_10	%DB60.DBW18	Int	
"ENERO".DE_10_A_11	%DB60.DBW20	Int	
"ENERO".DE_11_A_12	%DB60.DBW22	Int	
"ENERO".DE_12_A_13	%DB60.DBW24	Int	
"ENERO".DE_13_A_14	%DB60.DBW26	Int	
"ENERO".DE_14_A_15	%DB60.DBW28	Int	
"ENERO".DE_15_A_16	%DB60.DBW30	Int	
"ENERO".DE_16_A_17	%DB60.DBW32	Int	
"ENERO".DE_17_A_18	%DB60.DBW34	Int	
"ENERO".DE_18_A_19	%DB60.DBW36	Int	
"ENERO".DE_19_A_20	%DB60.DBW38	Int	
"ENERO".DE_20_A_21	%DB60.DBW40	Int	
"ENERO".DE_21_A_22	%DB60.DBW42	Int	
"ENERO".DE_22_A_23	%DB60.DBW44	Int	
"ENERO".DE_23_A_0	%DB60.DBW46	Int	
"HORARIO".ENERO	%DB74.DBX0.0	Bool	
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	

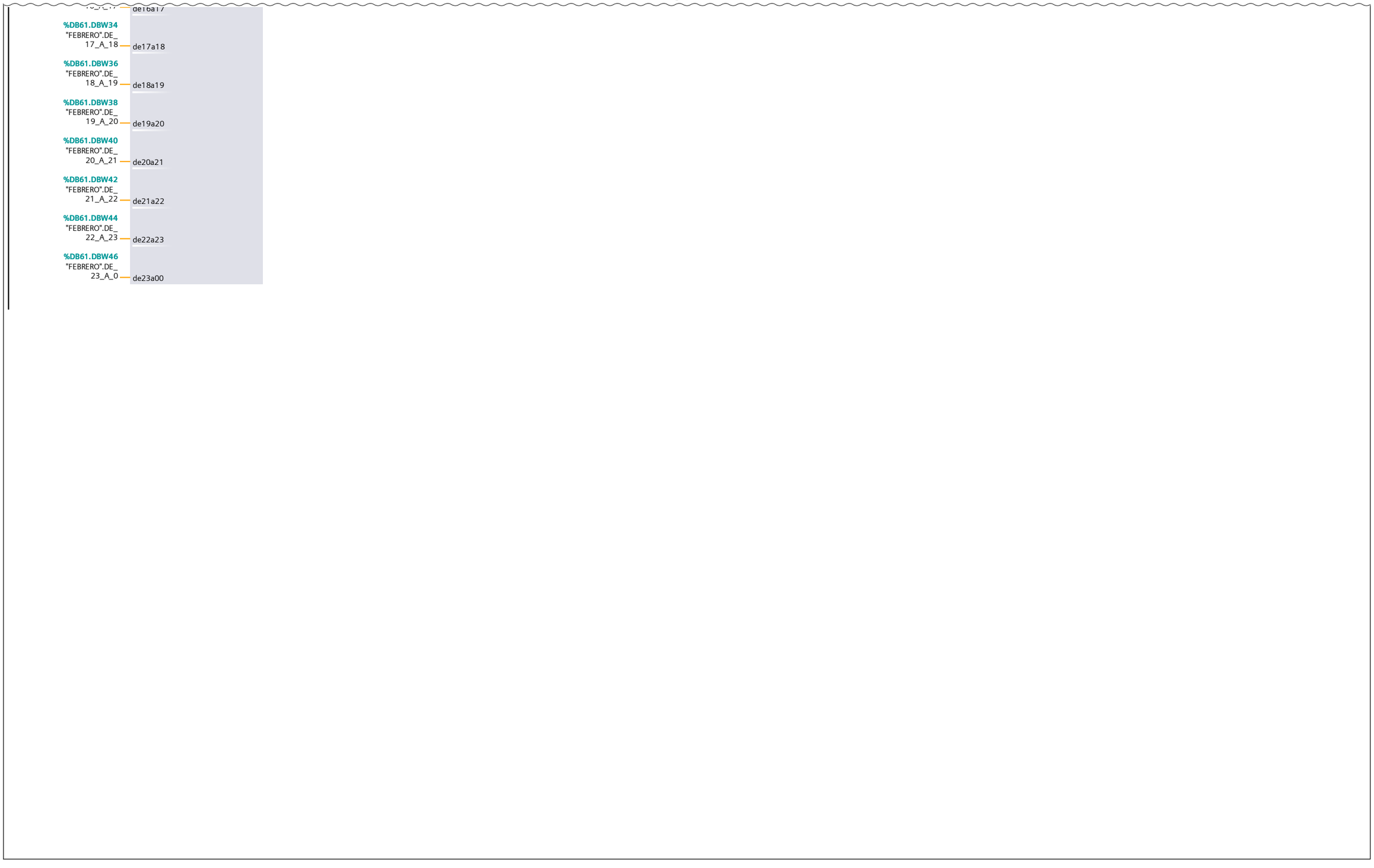
Segmento 20:

Segmento 20: (1.1 / 2.1)



Segmento 20: (2.1 / 2.1)

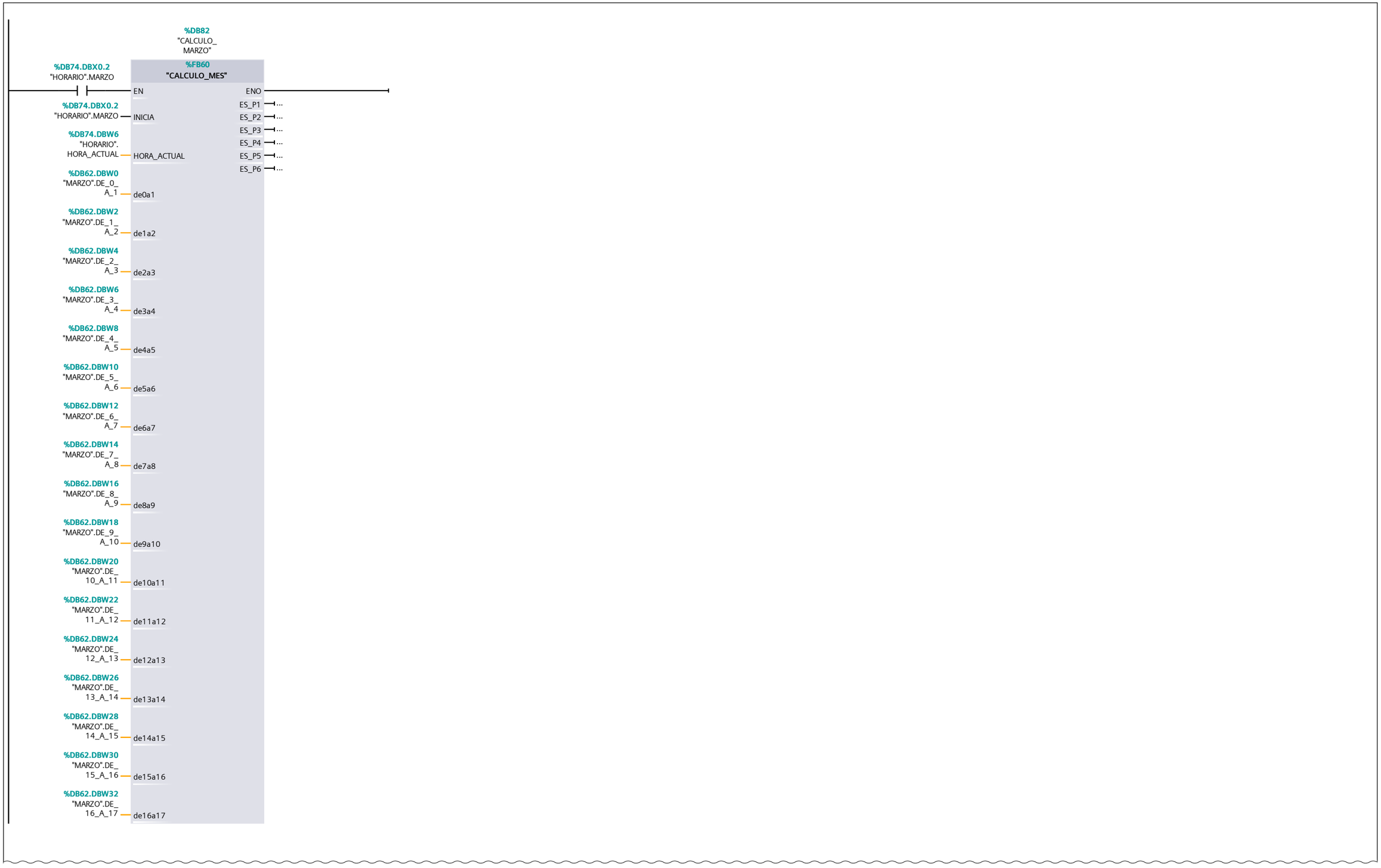
1.1 (Página56 - 12)



Símbolo	Dirección	Tipo	Comentario
"FEBRERO".DE_0_A_1	%DB61.DBW0	Int	
"FEBRERO".DE_1_A_2	%DB61.DBW2	Int	
"FEBRERO".DE_2_A_3	%DB61.DBW4	Int	
"FEBRERO".DE_3_A_4	%DB61.DBW6	Int	
"FEBRERO".DE_4_A_5	%DB61.DBW8	Int	
"FEBRERO".DE_5_A_6	%DB61.DBW10	Int	
"FEBRERO".DE_6_A_7	%DB61.DBW12	Int	
"FEBRERO".DE_7_A_8	%DB61.DBW14	Int	
"FEBRERO".DE_8_A_9	%DB61.DBW16	Int	
"FEBRERO".DE_9_A_10	%DB61.DBW18	Int	
"FEBRERO".DE_10_A_11	%DB61.DBW20	Int	
"FEBRERO".DE_11_A_12	%DB61.DBW22	Int	
"FEBRERO".DE_12_A_13	%DB61.DBW24	Int	
"FEBRERO".DE_13_A_14	%DB61.DBW26	Int	
"FEBRERO".DE_14_A_15	%DB61.DBW28	Int	
"FEBRERO".DE_15_A_16	%DB61.DBW30	Int	
"FEBRERO".DE_16_A_17	%DB61.DBW32	Int	
"FEBRERO".DE_17_A_18	%DB61.DBW34	Int	
"FEBRERO".DE_18_A_19	%DB61.DBW36	Int	
"FEBRERO".DE_19_A_20	%DB61.DBW38	Int	
"FEBRERO".DE_20_A_21	%DB61.DBW40	Int	
"FEBRERO".DE_21_A_22	%DB61.DBW42	Int	
"FEBRERO".DE_22_A_23	%DB61.DBW44	Int	
"FEBRERO".DE_23_A_0	%DB61.DBW46	Int	
"HORARIO".FEBRERO	%DB74.DBX0.1	Bool	
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	

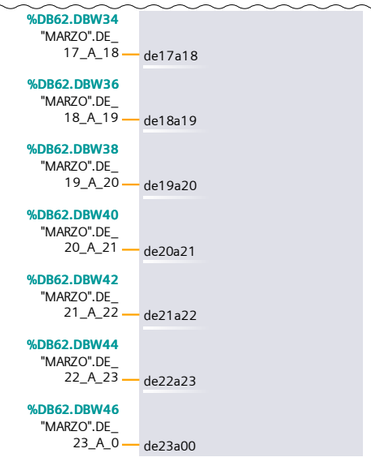
Segmento 21:

Segmento 21: (1.1 / 2.1)



Segmento 21: (2.1 / 2.1)

1.1 (Página56 - 15)



Símbolo	Dirección	Tipo	Comentario
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	
"HORARIO".MARZO	%DB74.DBX0.2	Bool	
"MARZO".DE_0_A_1	%DB62.DBW0	Int	
"MARZO".DE_1_A_2	%DB62.DBW2	Int	
"MARZO".DE_2_A_3	%DB62.DBW4	Int	
"MARZO".DE_3_A_4	%DB62.DBW6	Int	
"MARZO".DE_4_A_5	%DB62.DBW8	Int	
"MARZO".DE_5_A_6	%DB62.DBW10	Int	
"MARZO".DE_6_A_7	%DB62.DBW12	Int	
"MARZO".DE_7_A_8	%DB62.DBW14	Int	
"MARZO".DE_8_A_9	%DB62.DBW16	Int	
"MARZO".DE_9_A_10	%DB62.DBW18	Int	
"MARZO".DE_10_A_11	%DB62.DBW20	Int	
"MARZO".DE_11_A_12	%DB62.DBW22	Int	
"MARZO".DE_12_A_13	%DB62.DBW24	Int	
"MARZO".DE_13_A_14	%DB62.DBW26	Int	
"MARZO".DE_14_A_15	%DB62.DBW28	Int	
"MARZO".DE_15_A_16	%DB62.DBW30	Int	
"MARZO".DE_16_A_17	%DB62.DBW32	Int	
"MARZO".DE_17_A_18	%DB62.DBW34	Int	
"MARZO".DE_18_A_19	%DB62.DBW36	Int	
"MARZO".DE_19_A_20	%DB62.DBW38	Int	
"MARZO".DE_20_A_21	%DB62.DBW40	Int	
"MARZO".DE_21_A_22	%DB62.DBW42	Int	
"MARZO".DE_22_A_23	%DB62.DBW44	Int	
"MARZO".DE_23_A_0	%DB62.DBW46	Int	

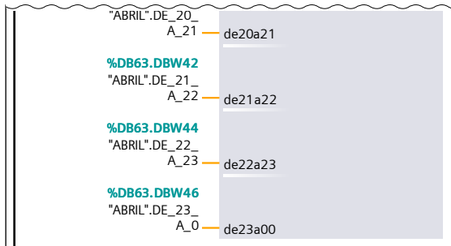
Segmento 22:

Segmento 22: (1.1 / 2.1)



Segmento 22: (2.1 / 2.1)

1.1 (Página56 - 18)



Símbolo	Dirección	Tipo	Comentario
"ABRIL".DE_0_A_1	%DB63.DBW0	Int	
"ABRIL".DE_1_A_2	%DB63.DBW2	Int	
"ABRIL".DE_2_A_3	%DB63.DBW4	Int	
"ABRIL".DE_3_A_4	%DB63.DBW6	Int	
"ABRIL".DE_4_A_5	%DB63.DBW8	Int	
"ABRIL".DE_5_A_6	%DB63.DBW10	Int	
"ABRIL".DE_6_A_7	%DB63.DBW12	Int	
"ABRIL".DE_7_A_8	%DB63.DBW14	Int	
"ABRIL".DE_8_A_9	%DB63.DBW16	Int	
"ABRIL".DE_9_A_10	%DB63.DBW18	Int	
"ABRIL".DE_10_A_11	%DB63.DBW20	Int	
"ABRIL".DE_11_A_12	%DB63.DBW22	Int	
"ABRIL".DE_12_A_13	%DB63.DBW24	Int	
"ABRIL".DE_13_A_14	%DB63.DBW26	Int	
"ABRIL".DE_14_A_15	%DB63.DBW28	Int	
"ABRIL".DE_15_A_16	%DB63.DBW30	Int	
"ABRIL".DE_16_A_17	%DB63.DBW32	Int	
"ABRIL".DE_17_A_18	%DB63.DBW34	Int	
"ABRIL".DE_18_A_19	%DB63.DBW36	Int	
"ABRIL".DE_19_A_20	%DB63.DBW38	Int	
"ABRIL".DE_20_A_21	%DB63.DBW40	Int	
"ABRIL".DE_21_A_22	%DB63.DBW42	Int	
"ABRIL".DE_22_A_23	%DB63.DBW44	Int	
"ABRIL".DE_23_A_0	%DB63.DBW46	Int	
"HORARIO".ABRIL	%DB74.DBX0.3	Bool	
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	

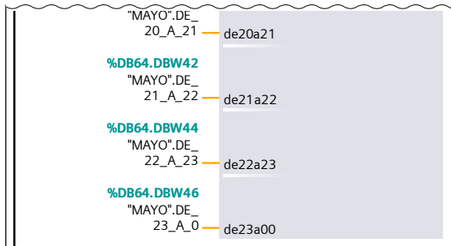
Segmento 23:

Segmento 23: (1.1 / 2.1)



Segmento 23: (2.1 / 2.1)

1.1 (Página56 - 21)



Símbolo	Dirección	Tipo	Comentario
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	
"HORARIO".MAYO	%DB74.DBX0.4	Bool	
"MAYO".DE_0_A_1	%DB64.DBW0	Int	
"MAYO".DE_1_A_2	%DB64.DBW2	Int	
"MAYO".DE_2_A_3	%DB64.DBW4	Int	
"MAYO".DE_3_A_4	%DB64.DBW6	Int	
"MAYO".DE_4_A_5	%DB64.DBW8	Int	
"MAYO".DE_5_A_6	%DB64.DBW10	Int	
"MAYO".DE_6_A_7	%DB64.DBW12	Int	
"MAYO".DE_7_A_8	%DB64.DBW14	Int	
"MAYO".DE_8_A_9	%DB64.DBW16	Int	
"MAYO".DE_9_A_10	%DB64.DBW18	Int	
"MAYO".DE_10_A_11	%DB64.DBW20	Int	
"MAYO".DE_11_A_12	%DB64.DBW22	Int	
"MAYO".DE_12_A_13	%DB64.DBW24	Int	
"MAYO".DE_13_A_14	%DB64.DBW26	Int	
"MAYO".DE_14_A_15	%DB64.DBW28	Int	
"MAYO".DE_15_A_16	%DB64.DBW30	Int	
"MAYO".DE_16_A_17	%DB64.DBW32	Int	
"MAYO".DE_17_A_18	%DB64.DBW34	Int	
"MAYO".DE_18_A_19	%DB64.DBW36	Int	
"MAYO".DE_19_A_20	%DB64.DBW38	Int	
"MAYO".DE_20_A_21	%DB64.DBW40	Int	
"MAYO".DE_21_A_22	%DB64.DBW42	Int	
"MAYO".DE_22_A_23	%DB64.DBW44	Int	
"MAYO".DE_23_A_0	%DB64.DBW46	Int	

Segmento 24:

Segmento 24: (1.1 / 2.1)



Segmento 24: (2.1 / 2.1)

QUINCENA_1".
DE_12_A_13 — de12a13

%DB65.DBW26
"JUNIO_
QUINCENA_1".
DE_13_A_14 — de13a14

%DB65.DBW28
"JUNIO_
QUINCENA_1".
DE_14_A_15 — de14a15

%DB65.DBW30
"JUNIO_
QUINCENA_1".
DE_15_A_16 — de15a16

%DB65.DBW32
"JUNIO_
QUINCENA_1".
DE_16_A_17 — de16a17

%DB65.DBW34
"JUNIO_
QUINCENA_1".
DE_17_A_18 — de17a18

%DB65.DBW36
"JUNIO_
QUINCENA_1".
DE_18_A_19 — de18a19

%DB65.DBW38
"JUNIO_
QUINCENA_1".
DE_19_A_20 — de19a20

%DB65.DBW40
"JUNIO_
QUINCENA_1".
DE_20_A_21 — de20a21

%DB65.DBW42
"JUNIO_
QUINCENA_1".
DE_21_A_22 — de21a22

%DB65.DBW44
"JUNIO_
QUINCENA_1".
DE_22_A_23 — de22a23

%DB65.DBW46
"JUNIO_
QUINCENA_1".
DE_23_A_0 — de23a00

Símbolo	Dirección	Tipo	Comentario
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	
"HORARIO".JUNIO1	%DB74.DBX0.5	Bool	
"JUNIO_QUINCENA_1".DE_0_A_1	%DB65.DBW0	Int	
"JUNIO_QUINCENA_1".DE_1_A_2	%DB65.DBW2	Int	
"JUNIO_QUINCENA_1".DE_2_A_3	%DB65.DBW4	Int	
"JUNIO_QUINCENA_1".DE_3_A_4	%DB65.DBW6	Int	
"JUNIO_QUINCENA_1".DE_4_A_5	%DB65.DBW8	Int	
"JUNIO_QUINCENA_1".DE_5_A_6	%DB65.DBW10	Int	
"JUNIO_QUINCENA_1".DE_6_A_7	%DB65.DBW12	Int	
"JUNIO_QUINCENA_1".DE_7_A_8	%DB65.DBW14	Int	
"JUNIO_QUINCENA_1".DE_8_A_9	%DB65.DBW16	Int	
"JUNIO_QUINCENA_1".DE_9_A_10	%DB65.DBW18	Int	
"JUNIO_QUINCENA_1".DE_10_A_11	%DB65.DBW20	Int	
"JUNIO_QUINCENA_1".DE_11_A_12	%DB65.DBW22	Int	
"JUNIO_QUINCENA_1".DE_12_A_13	%DB65.DBW24	Int	
"JUNIO_QUINCENA_1".DE_13_A_14	%DB65.DBW26	Int	
"JUNIO_QUINCENA_1".DE_14_A_15	%DB65.DBW28	Int	
"JUNIO_QUINCENA_1".DE_15_A_16	%DB65.DBW30	Int	
"JUNIO_QUINCENA_1".DE_16_A_17	%DB65.DBW32	Int	
"JUNIO_QUINCENA_1".DE_17_A_18	%DB65.DBW34	Int	
"JUNIO_QUINCENA_1".DE_18_A_19	%DB65.DBW36	Int	
"JUNIO_QUINCENA_1".DE_19_A_20	%DB65.DBW38	Int	
"JUNIO_QUINCENA_1".DE_20_A_21	%DB65.DBW40	Int	
"JUNIO_QUINCENA_1".DE_21_A_22	%DB65.DBW42	Int	
"JUNIO_QUINCENA_1".DE_22_A_23	%DB65.DBW44	Int	
"JUNIO_QUINCENA_1".DE_23_A_0	%DB65.DBW46	Int	

Segmento 25:

Segmento 25: (1.1 / 2.1)



Segmento 25: (2.1 / 2.1)

1.1 (Página56 - 27)

QUINCENA_2".
DE_12_A_13 — de12a13

%DB66.DBW26
"JUNIO_
QUINCENA_2".
DE_13_A_14 — de13a14

%DB66.DBW28
"JUNIO_
QUINCENA_2".
DE_14_A_15 — de14a15

%DB66.DBW30
"JUNIO_
QUINCENA_2".
DE_15_A_16 — de15a16

%DB66.DBW32
"JUNIO_
QUINCENA_2".
DE_16_A_17 — de16a17

%DB66.DBW34
"JUNIO_
QUINCENA_2".
DE_17_A_18 — de17a18

%DB66.DBW36
"JUNIO_
QUINCENA_2".
DE_18_A_19 — de18a19

%DB66.DBW38
"JUNIO_
QUINCENA_2".
DE_19_A_20 — de19a20

%DB66.DBW40
"JUNIO_
QUINCENA_2".
DE_20_A_21 — de20a21

%DB66.DBW42
"JUNIO_
QUINCENA_2".
DE_21_A_22 — de21a22

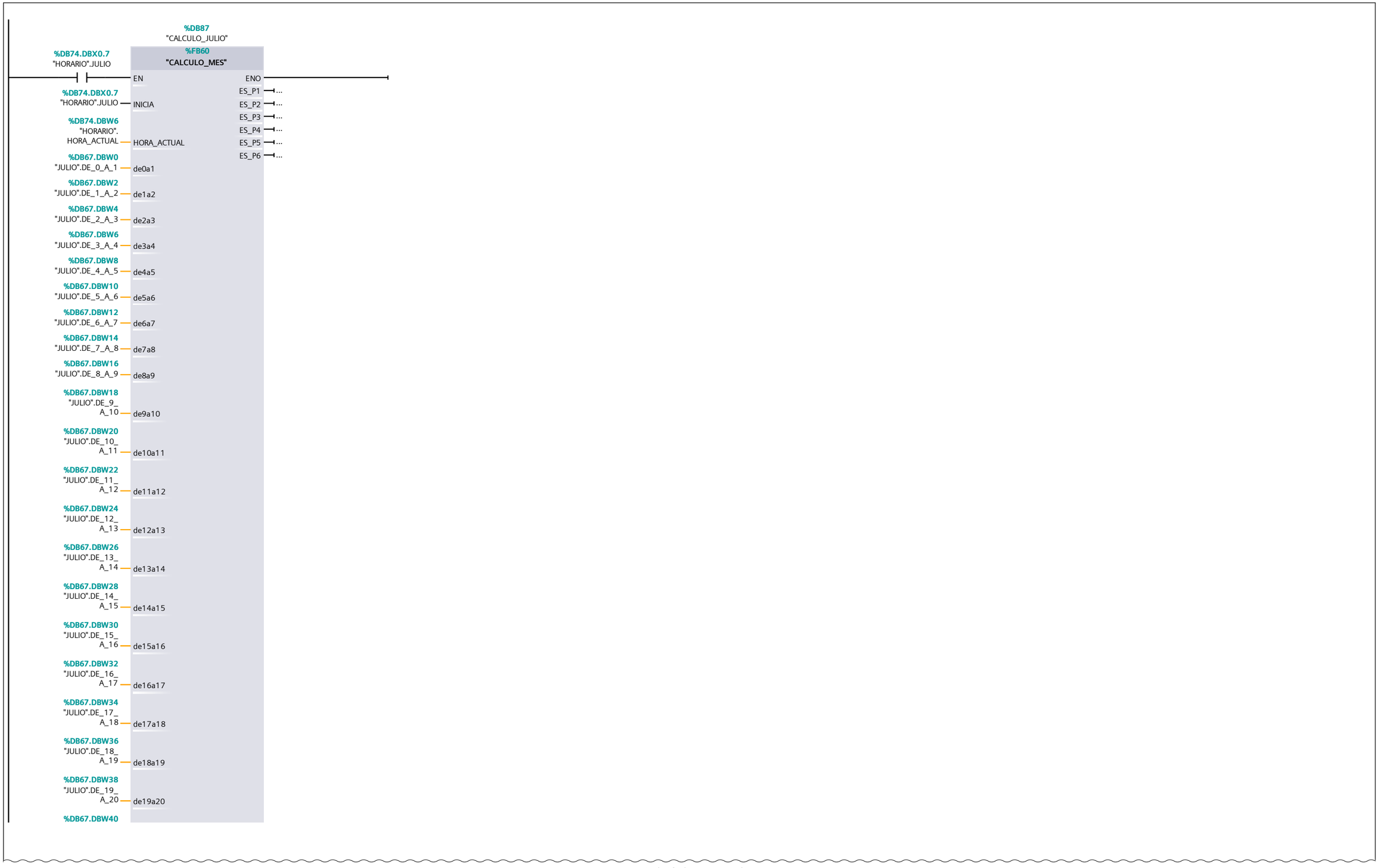
%DB66.DBW44
"JUNIO_
QUINCENA_2".
DE_22_A_23 — de22a23

%DB66.DBW46
"JUNIO_
QUINCENA_2".
DE_23_A_0 — de23a00

Símbolo	Dirección	Tipo	Comentario
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	
"HORARIO".JUNIO2	%DB74.DBX0.6	Bool	
"JUNIO_QUINCENA_2".DE_0_A_1	%DB66.DBW0	Int	
"JUNIO_QUINCENA_2".DE_1_A_2	%DB66.DBW2	Int	
"JUNIO_QUINCENA_2".DE_2_A_3	%DB66.DBW4	Int	
"JUNIO_QUINCENA_2".DE_3_A_4	%DB66.DBW6	Int	
"JUNIO_QUINCENA_2".DE_4_A_5	%DB66.DBW8	Int	
"JUNIO_QUINCENA_2".DE_5_A_6	%DB66.DBW10	Int	
"JUNIO_QUINCENA_2".DE_6_A_7	%DB66.DBW12	Int	
"JUNIO_QUINCENA_2".DE_7_A_8	%DB66.DBW14	Int	
"JUNIO_QUINCENA_2".DE_8_A_9	%DB66.DBW16	Int	
"JUNIO_QUINCENA_2".DE_9_A_10	%DB66.DBW18	Int	
"JUNIO_QUINCENA_2".DE_10_A_11	%DB66.DBW20	Int	
"JUNIO_QUINCENA_2".DE_11_A_12	%DB66.DBW22	Int	
"JUNIO_QUINCENA_2".DE_12_A_13	%DB66.DBW24	Int	
"JUNIO_QUINCENA_2".DE_13_A_14	%DB66.DBW26	Int	
"JUNIO_QUINCENA_2".DE_14_A_15	%DB66.DBW28	Int	
"JUNIO_QUINCENA_2".DE_15_A_16	%DB66.DBW30	Int	
"JUNIO_QUINCENA_2".DE_16_A_17	%DB66.DBW32	Int	
"JUNIO_QUINCENA_2".DE_17_A_18	%DB66.DBW34	Int	
"JUNIO_QUINCENA_2".DE_18_A_19	%DB66.DBW36	Int	
"JUNIO_QUINCENA_2".DE_19_A_20	%DB66.DBW38	Int	
"JUNIO_QUINCENA_2".DE_20_A_21	%DB66.DBW40	Int	
"JUNIO_QUINCENA_2".DE_21_A_22	%DB66.DBW42	Int	
"JUNIO_QUINCENA_2".DE_22_A_23	%DB66.DBW44	Int	
"JUNIO_QUINCENA_2".DE_23_A_0	%DB66.DBW46	Int	

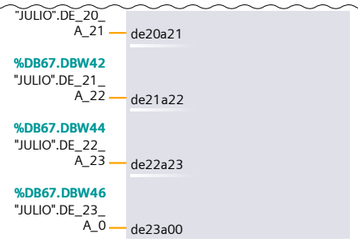
Segmento 26:

Segmento 26: (1.1 / 2.1)



Segmento 26: (2.1 / 2.1)

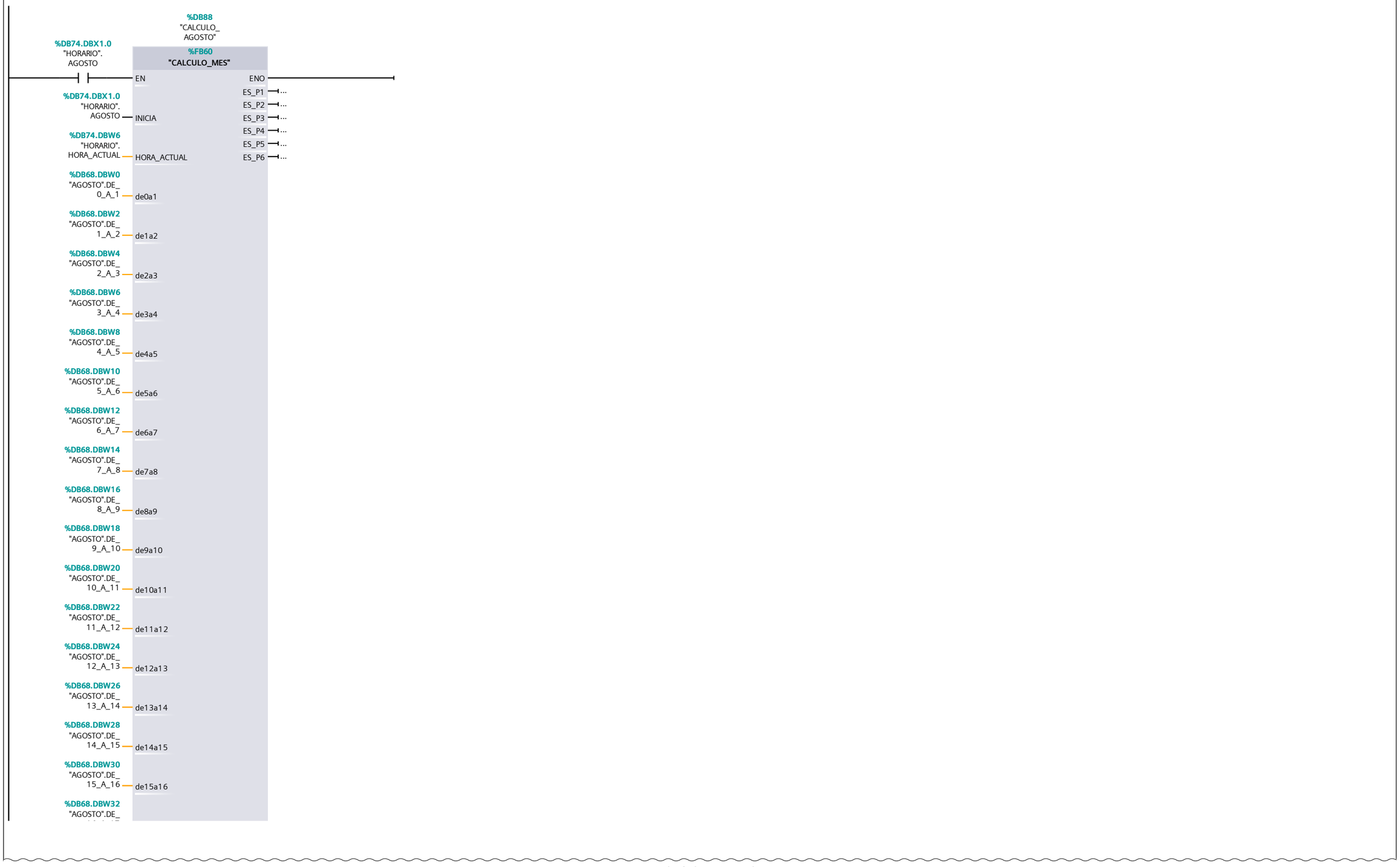
1.1 (Página56 - 30)



Símbolo	Dirección	Tipo	Comentario
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	
"HORARIO".JULIO	%DB74.DBX0.7	Bool	
"JULIO".DE_0_A_1	%DB67.DBW0	Int	
"JULIO".DE_1_A_2	%DB67.DBW2	Int	
"JULIO".DE_2_A_3	%DB67.DBW4	Int	
"JULIO".DE_3_A_4	%DB67.DBW6	Int	
"JULIO".DE_4_A_5	%DB67.DBW8	Int	
"JULIO".DE_5_A_6	%DB67.DBW10	Int	
"JULIO".DE_6_A_7	%DB67.DBW12	Int	
"JULIO".DE_7_A_8	%DB67.DBW14	Int	
"JULIO".DE_8_A_9	%DB67.DBW16	Int	
"JULIO".DE_9_A_10	%DB67.DBW18	Int	
"JULIO".DE_10_A_11	%DB67.DBW20	Int	
"JULIO".DE_11_A_12	%DB67.DBW22	Int	
"JULIO".DE_12_A_13	%DB67.DBW24	Int	
"JULIO".DE_13_A_14	%DB67.DBW26	Int	
"JULIO".DE_14_A_15	%DB67.DBW28	Int	
"JULIO".DE_15_A_16	%DB67.DBW30	Int	
"JULIO".DE_16_A_17	%DB67.DBW32	Int	
"JULIO".DE_17_A_18	%DB67.DBW34	Int	
"JULIO".DE_18_A_19	%DB67.DBW36	Int	
"JULIO".DE_19_A_20	%DB67.DBW38	Int	
"JULIO".DE_20_A_21	%DB67.DBW40	Int	
"JULIO".DE_21_A_22	%DB67.DBW42	Int	
"JULIO".DE_22_A_23	%DB67.DBW44	Int	
"JULIO".DE_23_A_0	%DB67.DBW46	Int	

Segmento 27:

Segmento 27: (1.1 / 2.1)



Segmento 27: (2.1 / 2.1)

1.1 (Página56 - 33)



Símbolo	Dirección	Tipo	Comentario
"AGOSTO".DE_0_A_1	%DB68.DBW0	Int	
"AGOSTO".DE_1_A_2	%DB68.DBW2	Int	
"AGOSTO".DE_2_A_3	%DB68.DBW4	Int	
"AGOSTO".DE_3_A_4	%DB68.DBW6	Int	
"AGOSTO".DE_4_A_5	%DB68.DBW8	Int	
"AGOSTO".DE_5_A_6	%DB68.DBW10	Int	
"AGOSTO".DE_6_A_7	%DB68.DBW12	Int	
"AGOSTO".DE_7_A_8	%DB68.DBW14	Int	
"AGOSTO".DE_8_A_9	%DB68.DBW16	Int	
"AGOSTO".DE_9_A_10	%DB68.DBW18	Int	
"AGOSTO".DE_10_A_11	%DB68.DBW20	Int	
"AGOSTO".DE_11_A_12	%DB68.DBW22	Int	
"AGOSTO".DE_12_A_13	%DB68.DBW24	Int	
"AGOSTO".DE_13_A_14	%DB68.DBW26	Int	
"AGOSTO".DE_14_A_15	%DB68.DBW28	Int	
"AGOSTO".DE_15_A_16	%DB68.DBW30	Int	
"AGOSTO".DE_16_A_17	%DB68.DBW32	Int	
"AGOSTO".DE_17_A_18	%DB68.DBW34	Int	
"AGOSTO".DE_18_A_19	%DB68.DBW36	Int	
"AGOSTO".DE_19_A_20	%DB68.DBW38	Int	
"AGOSTO".DE_20_A_21	%DB68.DBW40	Int	
"AGOSTO".DE_21_A_22	%DB68.DBW42	Int	
"AGOSTO".DE_22_A_23	%DB68.DBW44	Int	
"AGOSTO".DE_23_A_0	%DB68.DBW46	Int	
"HORARIO".AGOSTO	%DB74.DBX1.0	Bool	
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	

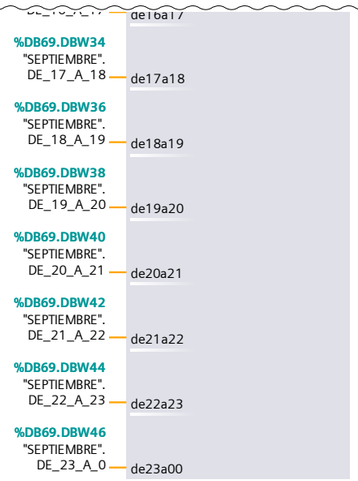
Segmento 28:

Segmento 28: (1.1 / 2.1)



Segmento 28: (2.1 / 2.1)

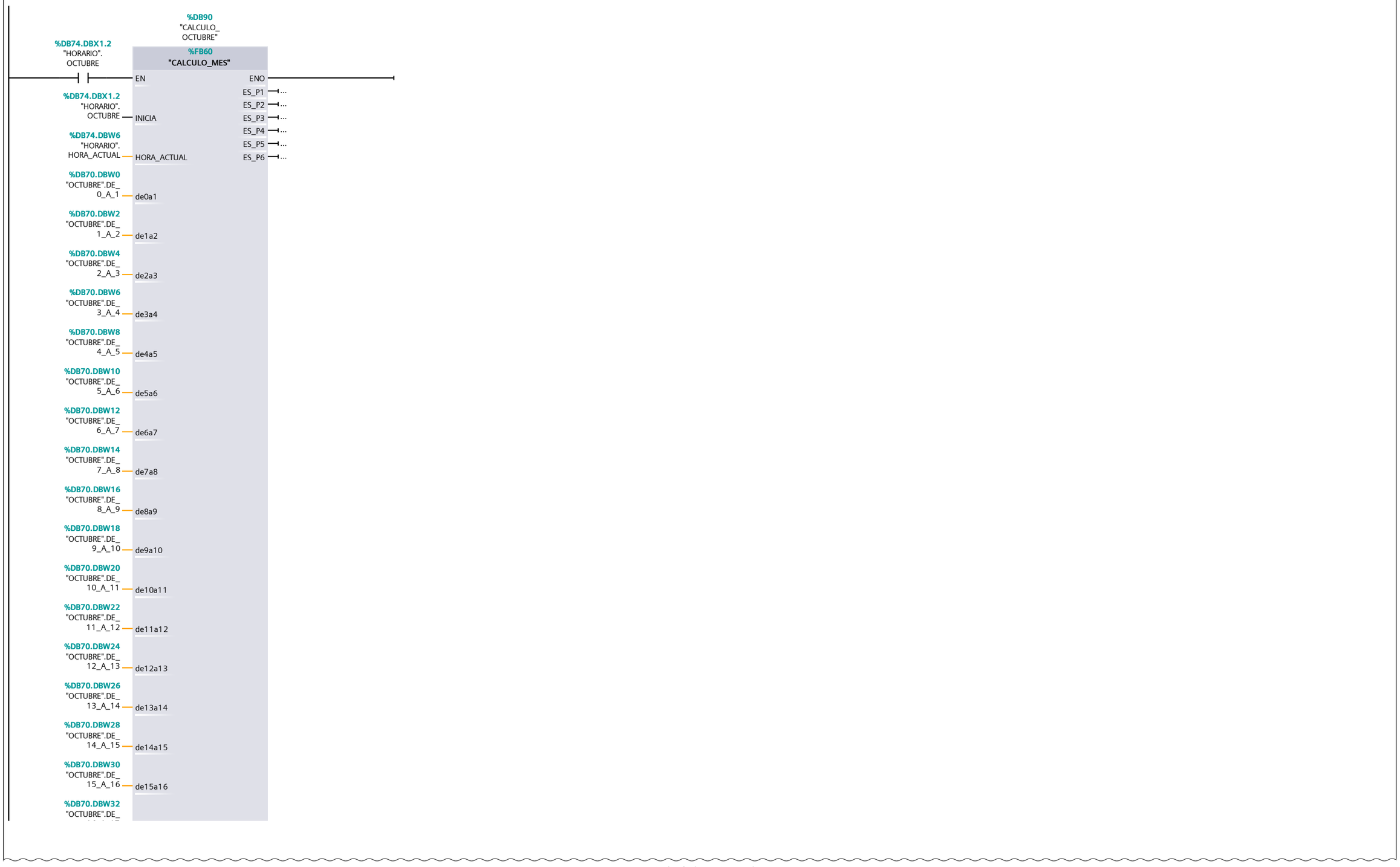
1.1 (Página56 - 36)



Símbolo	Dirección	Tipo	Comentario
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	
"HORARIO".SEPTIEMBRE	%DB74.DBX1.1	Bool	
"SEPTIEMBRE".DE_0_A_1	%DB69.DBW0	Int	
"SEPTIEMBRE".DE_1_A_2	%DB69.DBW2	Int	
"SEPTIEMBRE".DE_2_A_3	%DB69.DBW4	Int	
"SEPTIEMBRE".DE_3_A_4	%DB69.DBW6	Int	
"SEPTIEMBRE".DE_4_A_5	%DB69.DBW8	Int	
"SEPTIEMBRE".DE_5_A_6	%DB69.DBW10	Int	
"SEPTIEMBRE".DE_6_A_7	%DB69.DBW12	Int	
"SEPTIEMBRE".DE_7_A_8	%DB69.DBW14	Int	
"SEPTIEMBRE".DE_8_A_9	%DB69.DBW16	Int	
"SEPTIEMBRE".DE_9_A_10	%DB69.DBW18	Int	
"SEPTIEMBRE".DE_10_A_11	%DB69.DBW20	Int	
"SEPTIEMBRE".DE_11_A_12	%DB69.DBW22	Int	
"SEPTIEMBRE".DE_12_A_13	%DB69.DBW24	Int	
"SEPTIEMBRE".DE_13_A_14	%DB69.DBW26	Int	
"SEPTIEMBRE".DE_14_A_15	%DB69.DBW28	Int	
"SEPTIEMBRE".DE_15_A_16	%DB69.DBW30	Int	
"SEPTIEMBRE".DE_16_A_17	%DB69.DBW32	Int	
"SEPTIEMBRE".DE_17_A_18	%DB69.DBW34	Int	
"SEPTIEMBRE".DE_18_A_19	%DB69.DBW36	Int	
"SEPTIEMBRE".DE_19_A_20	%DB69.DBW38	Int	
"SEPTIEMBRE".DE_20_A_21	%DB69.DBW40	Int	
"SEPTIEMBRE".DE_21_A_22	%DB69.DBW42	Int	
"SEPTIEMBRE".DE_22_A_23	%DB69.DBW44	Int	
"SEPTIEMBRE".DE_23_A_0	%DB69.DBW46	Int	

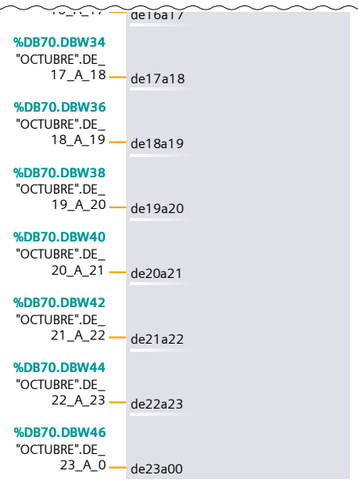
Segmento 29:

Segmento 29: (1.1 / 2.1)



Segmento 29: (2.1 / 2.1)

1.1 (Página56 - 39)



Símbolo	Dirección	Tipo	Comentario
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	
"HORARIO".OCTUBRE	%DB74.DBX1.2	Bool	
"OCTUBRE".DE_0_A_1	%DB70.DBW0	Int	
"OCTUBRE".DE_1_A_2	%DB70.DBW2	Int	
"OCTUBRE".DE_2_A_3	%DB70.DBW4	Int	
"OCTUBRE".DE_3_A_4	%DB70.DBW6	Int	
"OCTUBRE".DE_4_A_5	%DB70.DBW8	Int	
"OCTUBRE".DE_5_A_6	%DB70.DBW10	Int	
"OCTUBRE".DE_6_A_7	%DB70.DBW12	Int	
"OCTUBRE".DE_7_A_8	%DB70.DBW14	Int	
"OCTUBRE".DE_8_A_9	%DB70.DBW16	Int	
"OCTUBRE".DE_9_A_10	%DB70.DBW18	Int	
"OCTUBRE".DE_10_A_11	%DB70.DBW20	Int	
"OCTUBRE".DE_11_A_12	%DB70.DBW22	Int	
"OCTUBRE".DE_12_A_13	%DB70.DBW24	Int	
"OCTUBRE".DE_13_A_14	%DB70.DBW26	Int	
"OCTUBRE".DE_14_A_15	%DB70.DBW28	Int	
"OCTUBRE".DE_15_A_16	%DB70.DBW30	Int	
"OCTUBRE".DE_16_A_17	%DB70.DBW32	Int	
"OCTUBRE".DE_17_A_18	%DB70.DBW34	Int	
"OCTUBRE".DE_18_A_19	%DB70.DBW36	Int	
"OCTUBRE".DE_19_A_20	%DB70.DBW38	Int	
"OCTUBRE".DE_20_A_21	%DB70.DBW40	Int	
"OCTUBRE".DE_21_A_22	%DB70.DBW42	Int	
"OCTUBRE".DE_22_A_23	%DB70.DBW44	Int	
"OCTUBRE".DE_23_A_0	%DB70.DBW46	Int	

Segmento 30:

Segmento 30: (1.1 / 2.1)



Segmento 30: (2.1 / 2.1)

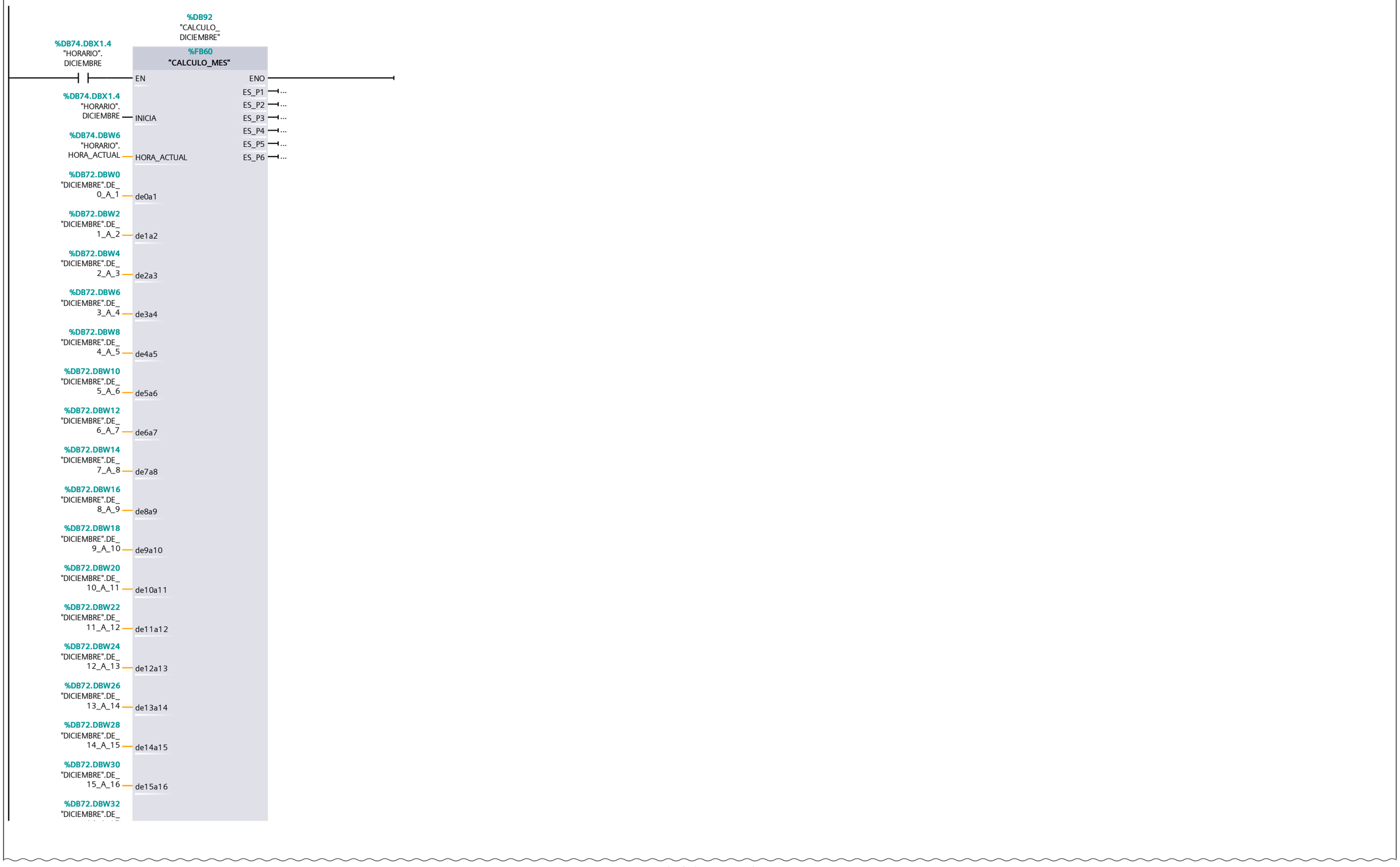
1.1 (Página56 - 42)



Símbolo	Dirección	Tipo	Comentario
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	
"HORARIO".NOVIEMBRE	%DB74.DBX1.3	Bool	
"NOVIEMBRE".DE_0_A_1	%DB71.DBW0	Int	
"NOVIEMBRE".DE_1_A_2	%DB71.DBW2	Int	
"NOVIEMBRE".DE_2_A_3	%DB71.DBW4	Int	
"NOVIEMBRE".DE_3_A_4	%DB71.DBW6	Int	
"NOVIEMBRE".DE_4_A_5	%DB71.DBW8	Int	
"NOVIEMBRE".DE_5_A_6	%DB71.DBW10	Int	
"NOVIEMBRE".DE_6_A_7	%DB71.DBW12	Int	
"NOVIEMBRE".DE_7_A_8	%DB71.DBW14	Int	
"NOVIEMBRE".DE_8_A_9	%DB71.DBW16	Int	
"NOVIEMBRE".DE_9_A_10	%DB71.DBW18	Int	
"NOVIEMBRE".DE_10_A_11	%DB71.DBW20	Int	
"NOVIEMBRE".DE_11_A_12	%DB71.DBW22	Int	
"NOVIEMBRE".DE_12_A_13	%DB71.DBW24	Int	
"NOVIEMBRE".DE_13_A_14	%DB71.DBW26	Int	
"NOVIEMBRE".DE_14_A_15	%DB71.DBW28	Int	
"NOVIEMBRE".DE_15_A_16	%DB71.DBW30	Int	
"NOVIEMBRE".DE_16_A_17	%DB71.DBW32	Int	
"NOVIEMBRE".DE_17_A_18	%DB71.DBW34	Int	
"NOVIEMBRE".DE_18_A_19	%DB71.DBW36	Int	
"NOVIEMBRE".DE_19_A_20	%DB71.DBW38	Int	
"NOVIEMBRE".DE_20_A_21	%DB71.DBW40	Int	
"NOVIEMBRE".DE_21_A_22	%DB71.DBW42	Int	
"NOVIEMBRE".DE_22_A_23	%DB71.DBW44	Int	
"NOVIEMBRE".DE_23_A_0	%DB71.DBW46	Int	

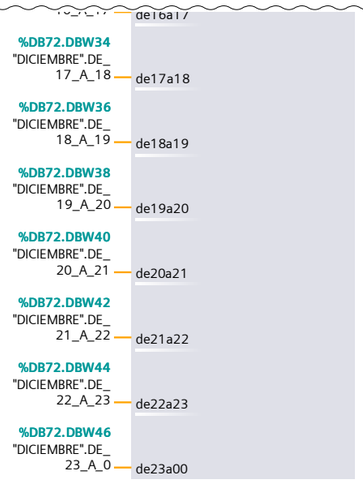
Segmento 31:

Segmento 31: (1.1 / 2.1)



Segmento 31: (2.1 / 2.1)

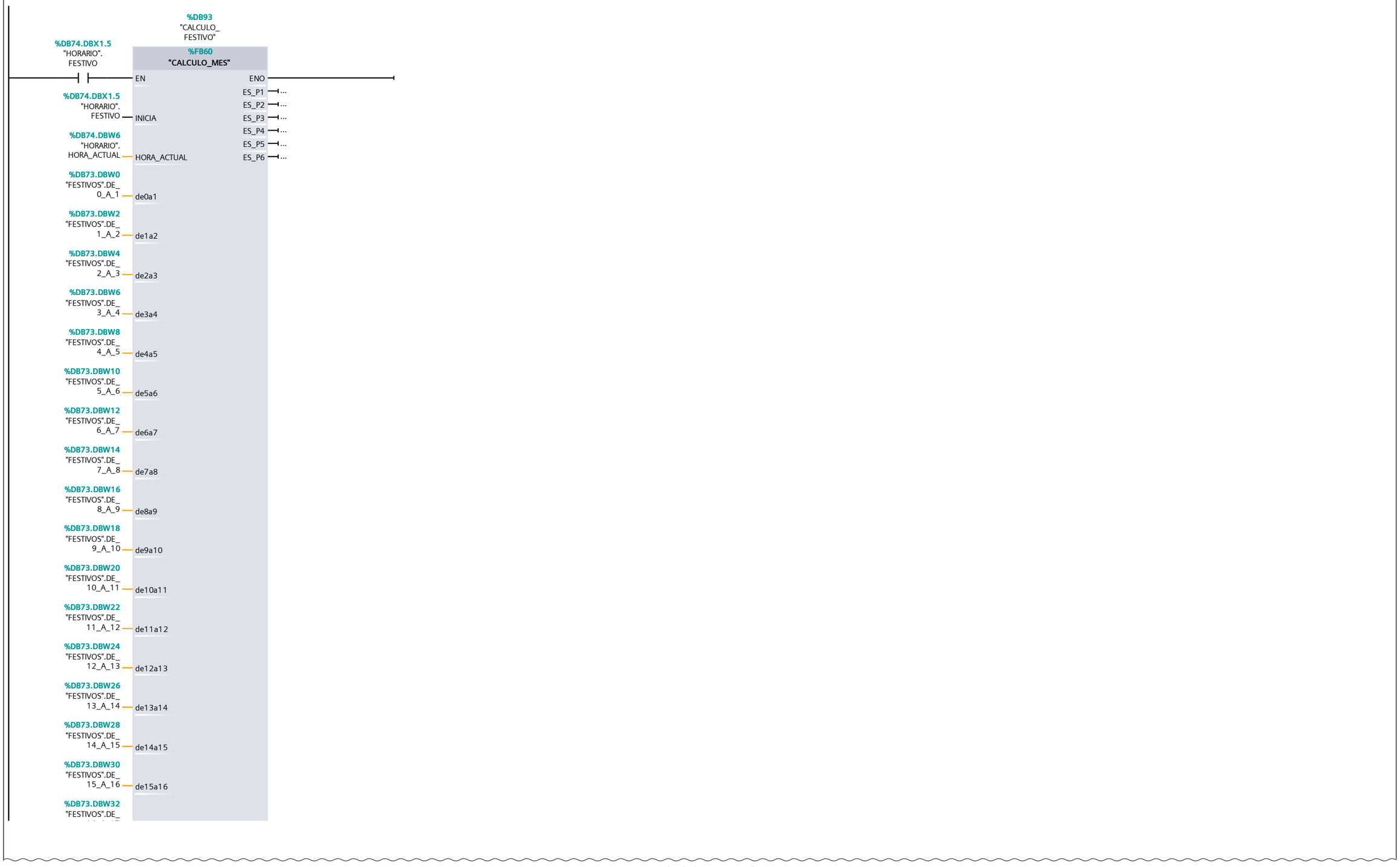
1.1 (Página56 - 45)



Símbolo	Dirección	Tipo	Comentario
"DICIEMBRE".DE_0_A_1	%DB72.DBW0	Int	
"DICIEMBRE".DE_1_A_2	%DB72.DBW2	Int	
"DICIEMBRE".DE_2_A_3	%DB72.DBW4	Int	
"DICIEMBRE".DE_3_A_4	%DB72.DBW6	Int	
"DICIEMBRE".DE_4_A_5	%DB72.DBW8	Int	
"DICIEMBRE".DE_5_A_6	%DB72.DBW10	Int	
"DICIEMBRE".DE_6_A_7	%DB72.DBW12	Int	
"DICIEMBRE".DE_7_A_8	%DB72.DBW14	Int	
"DICIEMBRE".DE_8_A_9	%DB72.DBW16	Int	
"DICIEMBRE".DE_9_A_10	%DB72.DBW18	Int	
"DICIEMBRE".DE_10_A_11	%DB72.DBW20	Int	
"DICIEMBRE".DE_11_A_12	%DB72.DBW22	Int	
"DICIEMBRE".DE_12_A_13	%DB72.DBW24	Int	
"DICIEMBRE".DE_13_A_14	%DB72.DBW26	Int	
"DICIEMBRE".DE_14_A_15	%DB72.DBW28	Int	
"DICIEMBRE".DE_15_A_16	%DB72.DBW30	Int	
"DICIEMBRE".DE_16_A_17	%DB72.DBW32	Int	
"DICIEMBRE".DE_17_A_18	%DB72.DBW34	Int	
"DICIEMBRE".DE_18_A_19	%DB72.DBW36	Int	
"DICIEMBRE".DE_19_A_20	%DB72.DBW38	Int	
"DICIEMBRE".DE_20_A_21	%DB72.DBW40	Int	
"DICIEMBRE".DE_21_A_22	%DB72.DBW42	Int	
"DICIEMBRE".DE_22_A_23	%DB72.DBW44	Int	
"DICIEMBRE".DE_23_A_0	%DB72.DBW46	Int	
"HORARIO".DICIEMBRE	%DB74.DBX1.4	Bool	
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	

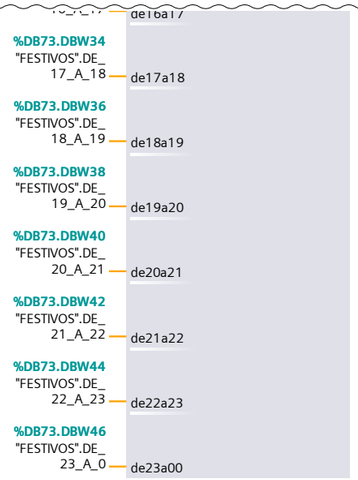
Segmento 32:

Segmento 32: (1.1 / 2.1)



Segmento 32: (2.1 / 2.1)

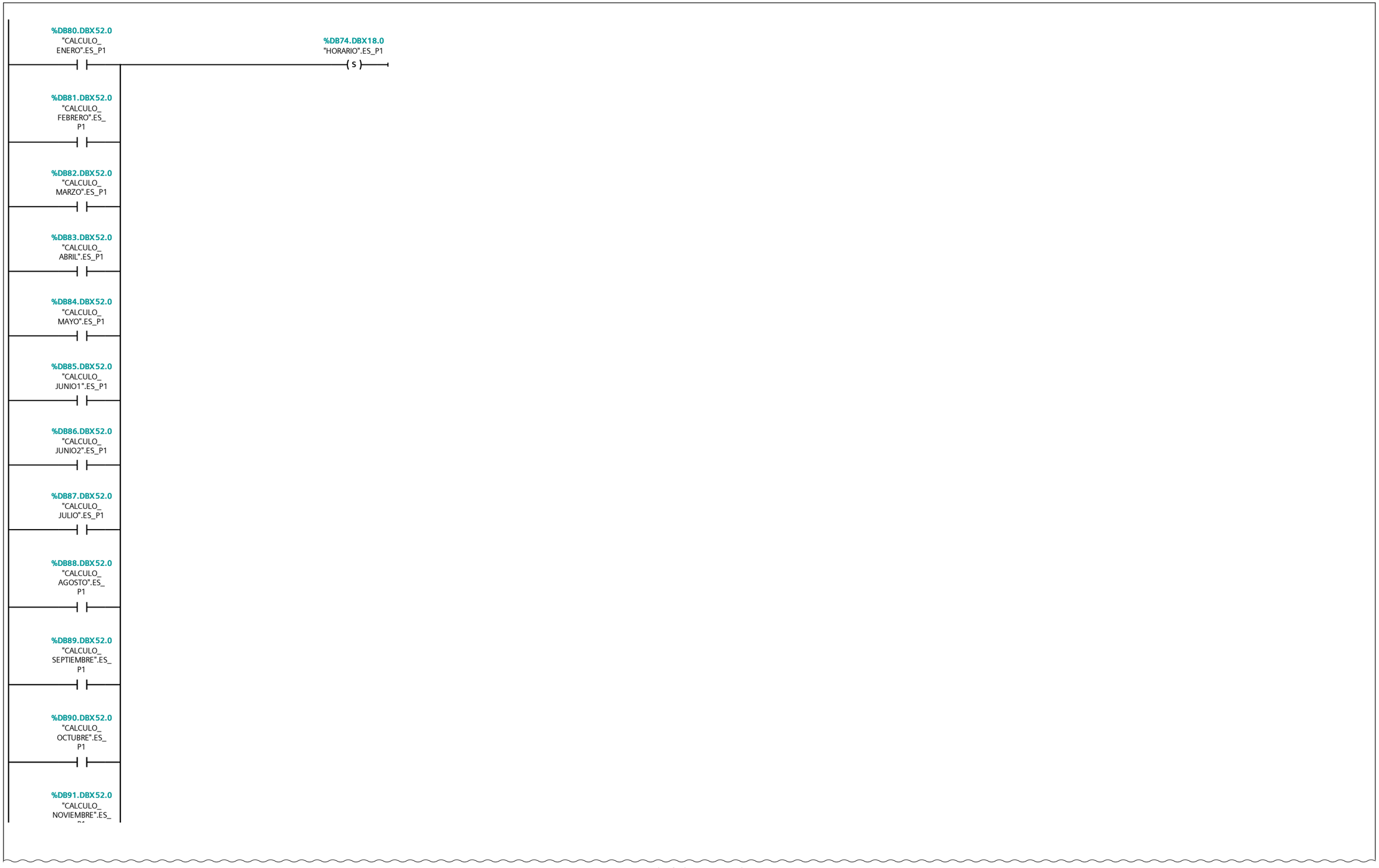
1.1 (Página56 - 48)



Símbolo	Dirección	Tipo	Comentario
"FESTIVOS".DE_0_A_1	%DB73.DBW0	Int	
"FESTIVOS".DE_1_A_2	%DB73.DBW2	Int	
"FESTIVOS".DE_2_A_3	%DB73.DBW4	Int	
"FESTIVOS".DE_3_A_4	%DB73.DBW6	Int	
"FESTIVOS".DE_4_A_5	%DB73.DBW8	Int	
"FESTIVOS".DE_5_A_6	%DB73.DBW10	Int	
"FESTIVOS".DE_6_A_7	%DB73.DBW12	Int	
"FESTIVOS".DE_7_A_8	%DB73.DBW14	Int	
"FESTIVOS".DE_8_A_9	%DB73.DBW16	Int	
"FESTIVOS".DE_9_A_10	%DB73.DBW18	Int	
"FESTIVOS".DE_10_A_11	%DB73.DBW20	Int	
"FESTIVOS".DE_11_A_12	%DB73.DBW22	Int	
"FESTIVOS".DE_12_A_13	%DB73.DBW24	Int	
"FESTIVOS".DE_13_A_14	%DB73.DBW26	Int	
"FESTIVOS".DE_14_A_15	%DB73.DBW28	Int	
"FESTIVOS".DE_15_A_16	%DB73.DBW30	Int	
"FESTIVOS".DE_16_A_17	%DB73.DBW32	Int	
"FESTIVOS".DE_17_A_18	%DB73.DBW34	Int	
"FESTIVOS".DE_18_A_19	%DB73.DBW36	Int	
"FESTIVOS".DE_19_A_20	%DB73.DBW38	Int	
"FESTIVOS".DE_20_A_21	%DB73.DBW40	Int	
"FESTIVOS".DE_21_A_22	%DB73.DBW42	Int	
"FESTIVOS".DE_22_A_23	%DB73.DBW44	Int	
"FESTIVOS".DE_23_A_0	%DB73.DBW46	Int	
"HORARIO".FESTIVO	%DB74.DBX1.5	Bool	
"HORARIO".HORA_ACTUAL	%DB74.DBW6	Int	

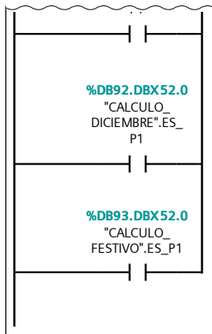
Segmento 33:

Segmento 33: (1.1 / 2.1)



Segmento 33: (2.1 / 2.1)

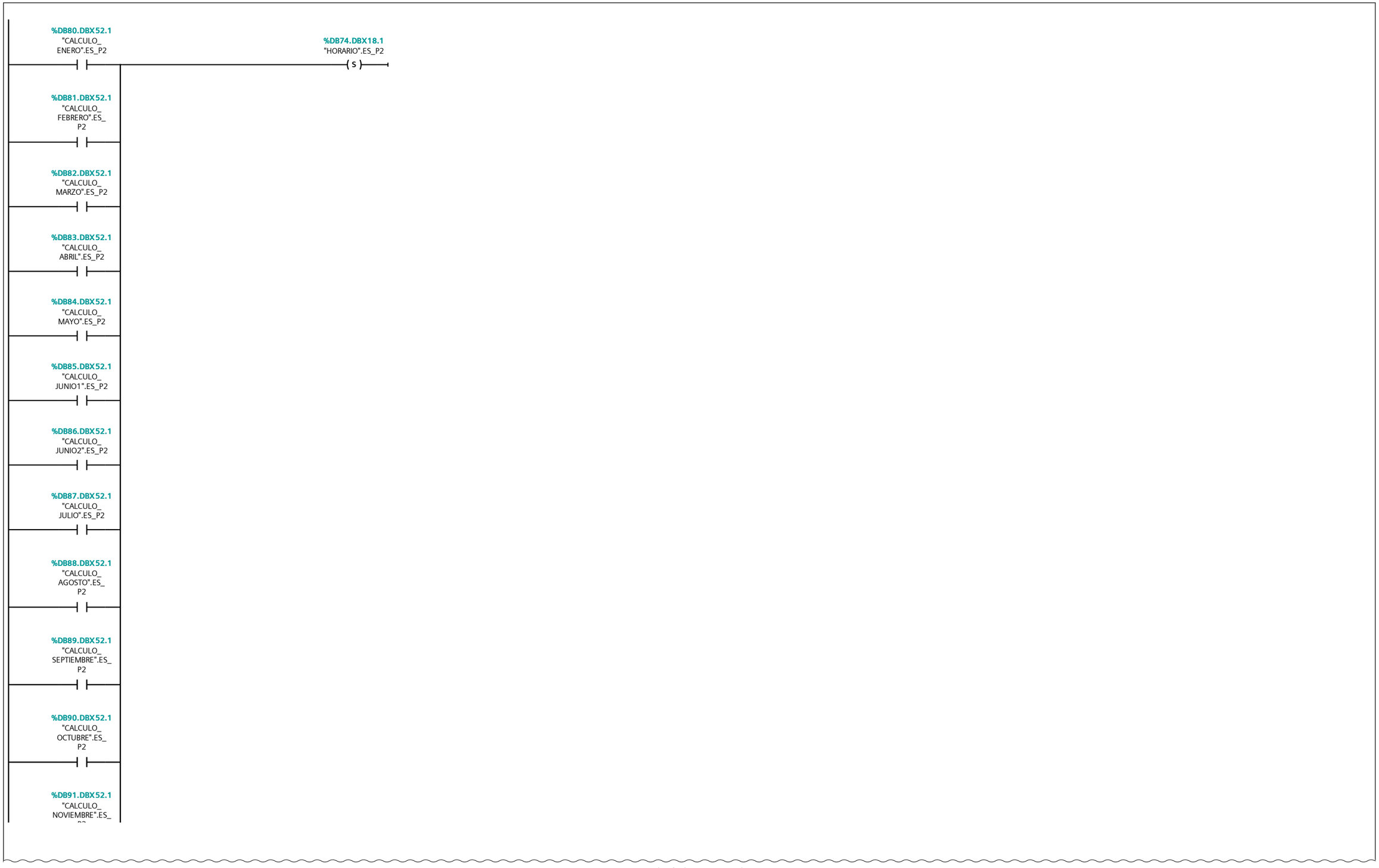
1.1 (Página56 - 51)



Símbolo	Dirección	Tipo	Comentario
"CALCULO_ABRIL".ES_P1	%DB83.DBX52.0	Bool	
"CALCULO_AGOSTO".ES_P1	%DB88.DBX52.0	Bool	
"CALCULO_DICIEMBRE".ES_P1	%DB92.DBX52.0	Bool	
"CALCULO_ENERO".ES_P1	%DB80.DBX52.0	Bool	
"CALCULO_FEBRERO".ES_P1	%DB81.DBX52.0	Bool	
"CALCULO_FESTIVO".ES_P1	%DB93.DBX52.0	Bool	
"CALCULO_JULIO".ES_P1	%DB87.DBX52.0	Bool	
"CALCULO_JUNIO1".ES_P1	%DB85.DBX52.0	Bool	
"CALCULO_JUNIO2".ES_P1	%DB86.DBX52.0	Bool	
"CALCULO_MARZO".ES_P1	%DB82.DBX52.0	Bool	
"CALCULO_MAYO".ES_P1	%DB84.DBX52.0	Bool	
"CALCULO_NOVIEMBRE".ES_P1	%DB91.DBX52.0	Bool	
"CALCULO_OCTUBRE".ES_P1	%DB90.DBX52.0	Bool	
"CALCULO_SEPTIEMBRE".ES_P1	%DB89.DBX52.0	Bool	
"HORARIO".ES_P1	%DB74.DBX18.0	Bool	

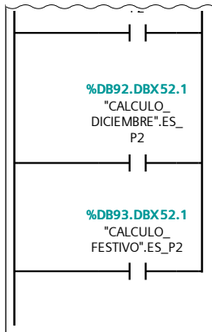
Segmento 34:

Segmento 34: (1.1 / 2.1)



Segmento 34: (2.1 / 2.1)

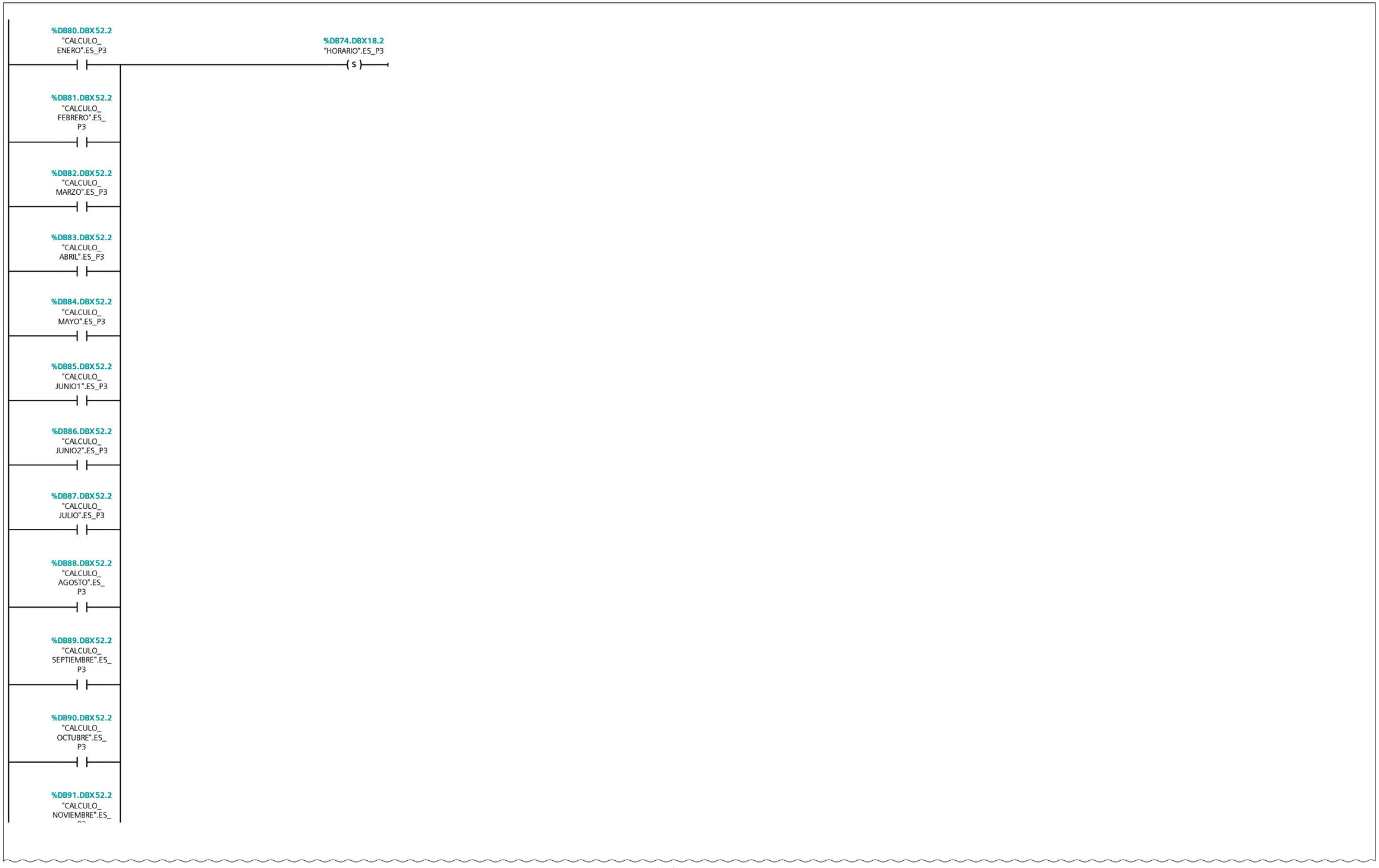
1.1 (Página56 - 54)



Símbolo	Dirección	Tipo	Comentario
"CALCULO_ABRIL".ES_P2	%DB83.DBX52.1	Bool	
"CALCULO_AGOSTO".ES_P2	%DB88.DBX52.1	Bool	
"CALCULO_DICIEMBRE".ES_P2	%DB92.DBX52.1	Bool	
"CALCULO_ENERO".ES_P2	%DB80.DBX52.1	Bool	
"CALCULO_FEBRERO".ES_P2	%DB81.DBX52.1	Bool	
"CALCULO_FESTIVO".ES_P2	%DB93.DBX52.1	Bool	
"CALCULO_JULIO".ES_P2	%DB87.DBX52.1	Bool	
"CALCULO_JUNIO1".ES_P2	%DB85.DBX52.1	Bool	
"CALCULO_JUNIO2".ES_P2	%DB86.DBX52.1	Bool	
"CALCULO_MARZO".ES_P2	%DB82.DBX52.1	Bool	
"CALCULO_MAYO".ES_P2	%DB84.DBX52.1	Bool	
"CALCULO_NOVIEMBRE".ES_P2	%DB91.DBX52.1	Bool	
"CALCULO_OCTUBRE".ES_P2	%DB90.DBX52.1	Bool	
"CALCULO_SEPTIEMBRE".ES_P2	%DB89.DBX52.1	Bool	
"HORARIO".ES_P2	%DB74.DBX18.1	Bool	

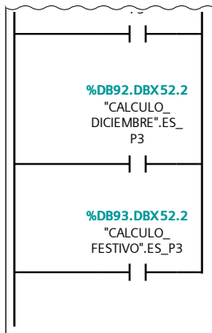
Segmento 35:

Segmento 35: (1.1 / 2.1)



Segmento 35: (2.1 / 2.1)

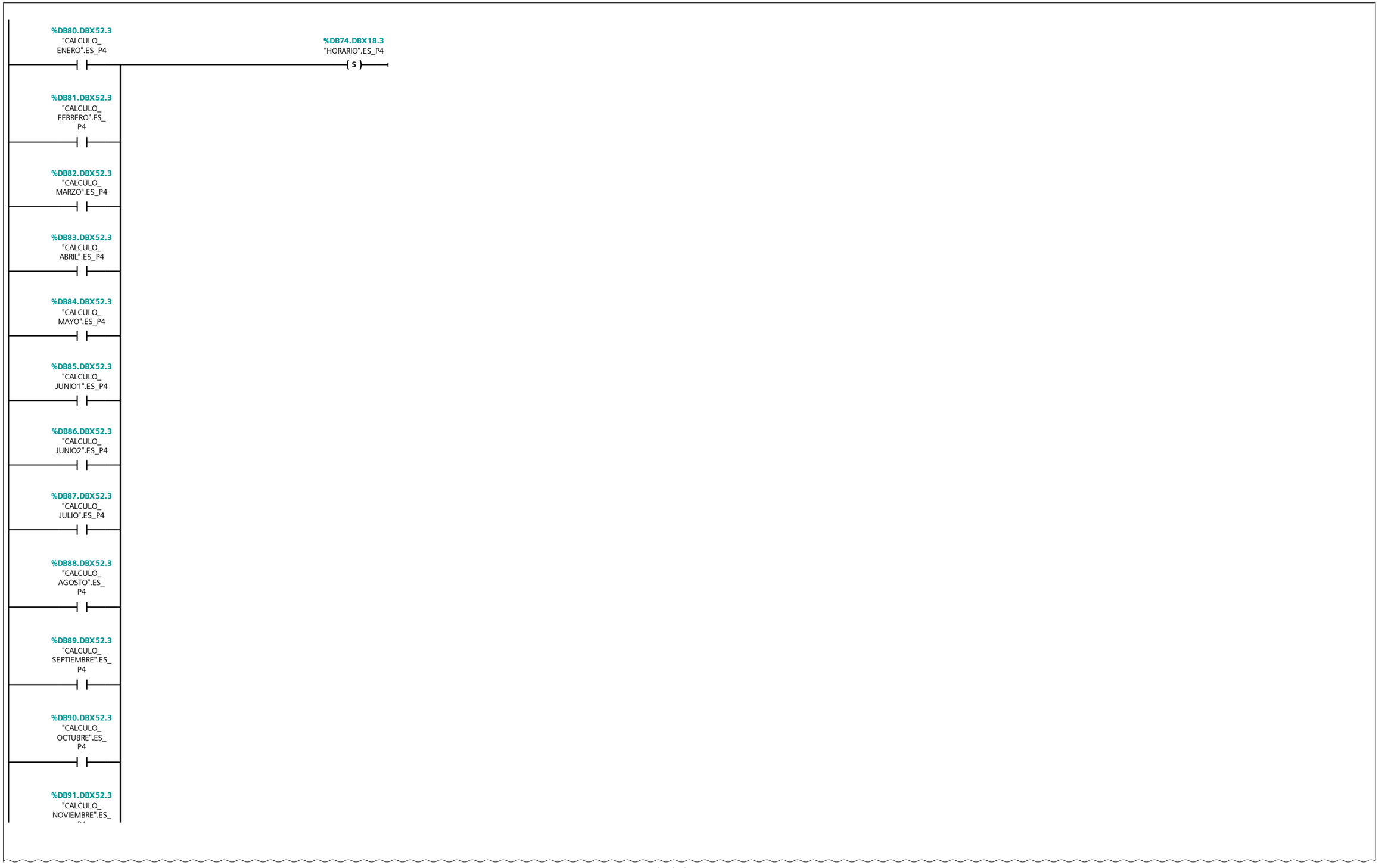
1.1 (Página56 - 57)



Símbolo	Dirección	Tipo	Comentario
"CALCULO_ABRIL".ES_P3	%DB83.DBX52.2	Bool	
"CALCULO_AGOSTO".ES_P3	%DB88.DBX52.2	Bool	
"CALCULO_DICIEMBRE".ES_P3	%DB92.DBX52.2	Bool	
"CALCULO_ENERO".ES_P3	%DB80.DBX52.2	Bool	
"CALCULO_FEBRERO".ES_P3	%DB81.DBX52.2	Bool	
"CALCULO_FESTIVO".ES_P3	%DB93.DBX52.2	Bool	
"CALCULO_JULIO".ES_P3	%DB87.DBX52.2	Bool	
"CALCULO_JUNIO1".ES_P3	%DB85.DBX52.2	Bool	
"CALCULO_JUNIO2".ES_P3	%DB86.DBX52.2	Bool	
"CALCULO_MARZO".ES_P3	%DB82.DBX52.2	Bool	
"CALCULO_MAYO".ES_P3	%DB84.DBX52.2	Bool	
"CALCULO_NOVIEMBRE".ES_P3	%DB91.DBX52.2	Bool	
"CALCULO_OCTUBRE".ES_P3	%DB90.DBX52.2	Bool	
"CALCULO_SEPTIEMBRE".ES_P3	%DB89.DBX52.2	Bool	
"HORARIO".ES_P3	%DB74.DBX18.2	Bool	

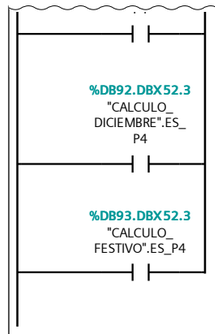
Segmento 36:

Segmento 36: (1.1 / 2.1)



Segmento 36: (2.1 / 2.1)

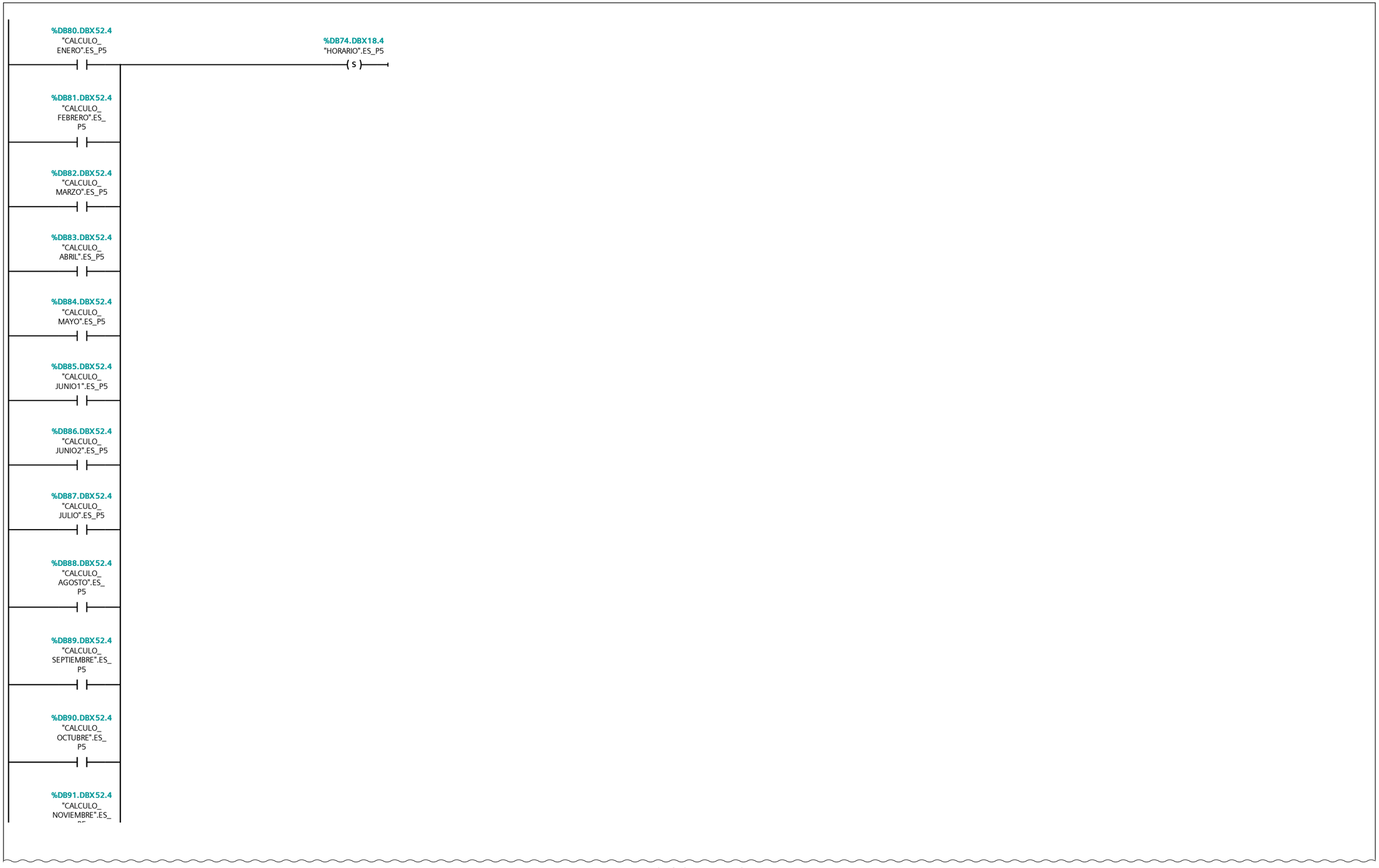
1.1 (Página56 - 60)



Símbolo	Dirección	Tipo	Comentario
"CALCULO_ABRIL".ES_P4	%DB83.DBX52.3	Bool	
"CALCULO_AGOSTO".ES_P4	%DB88.DBX52.3	Bool	
"CALCULO_DICIEMBRE".ES_P4	%DB92.DBX52.3	Bool	
"CALCULO_ENERO".ES_P4	%DB80.DBX52.3	Bool	
"CALCULO_FEBRERO".ES_P4	%DB81.DBX52.3	Bool	
"CALCULO_FESTIVO".ES_P4	%DB93.DBX52.3	Bool	
"CALCULO_JULIO".ES_P4	%DB87.DBX52.3	Bool	
"CALCULO_JUNIO1".ES_P4	%DB85.DBX52.3	Bool	
"CALCULO_JUNIO2".ES_P4	%DB86.DBX52.3	Bool	
"CALCULO_MARZO".ES_P4	%DB82.DBX52.3	Bool	
"CALCULO_MAYO".ES_P4	%DB84.DBX52.3	Bool	
"CALCULO_NOVIEMBRE".ES_P4	%DB91.DBX52.3	Bool	
"CALCULO_OCTUBRE".ES_P4	%DB90.DBX52.3	Bool	
"CALCULO_SEPTIEMBRE".ES_P4	%DB89.DBX52.3	Bool	
"HORARIO".ES_P4	%DB74.DBX18.3	Bool	

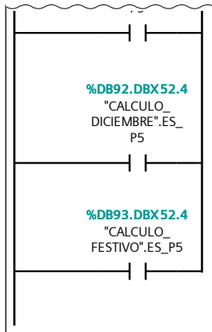
Segmento 37:

Segmento 37: (1.1 / 2.1)



Segmento 37: (2.1 / 2.1)

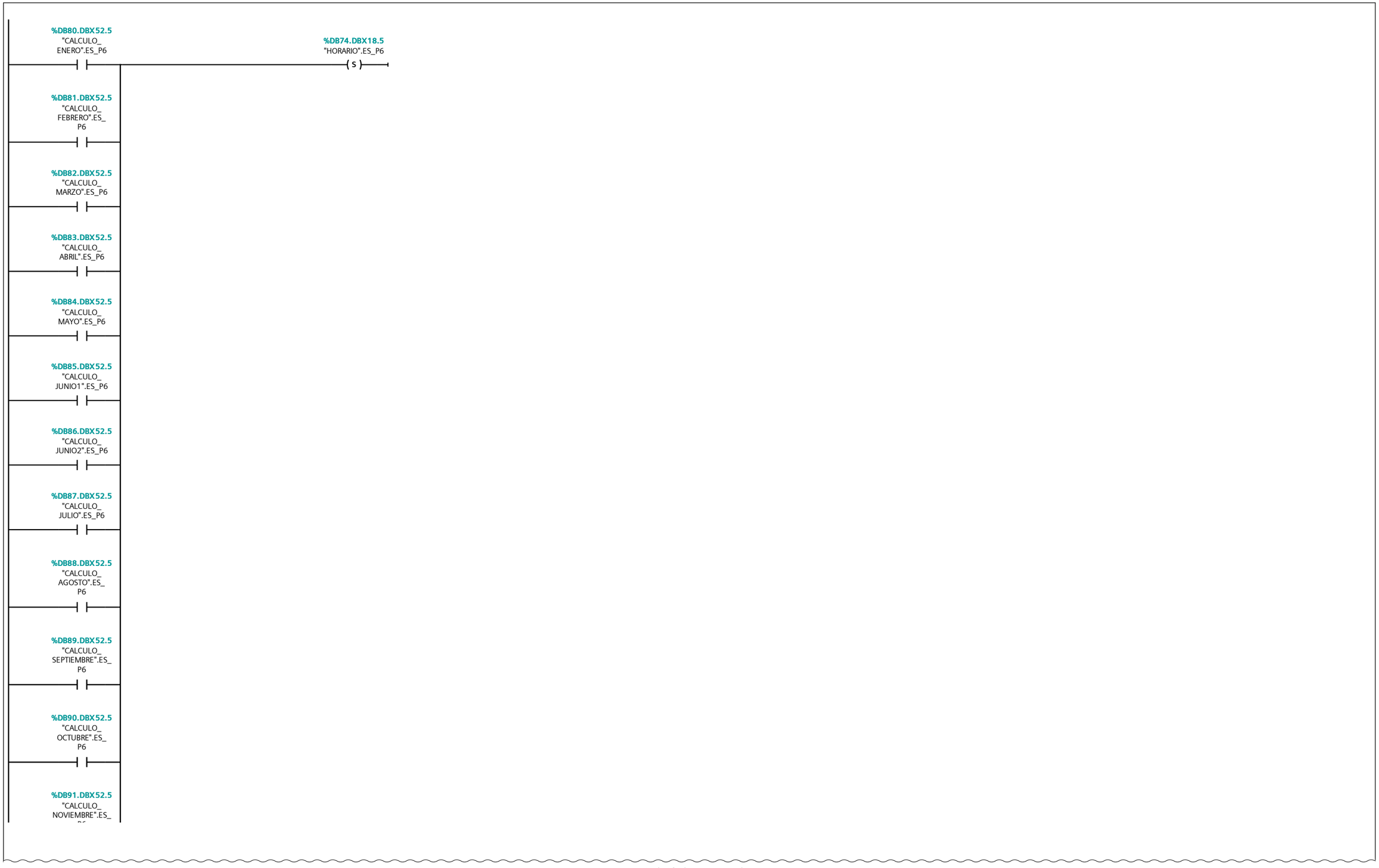
1.1 (Página56 - 63)



Símbolo	Dirección	Tipo	Comentario
"CALCULO_ABRIL".ES_P5	%DB83.DBX52.4	Bool	
"CALCULO_AGOSTO".ES_P5	%DB88.DBX52.4	Bool	
"CALCULO_DICIEMBRE".ES_P5	%DB92.DBX52.4	Bool	
"CALCULO_ENERO".ES_P5	%DB80.DBX52.4	Bool	
"CALCULO_FEBRERO".ES_P5	%DB81.DBX52.4	Bool	
"CALCULO_FESTIVO".ES_P5	%DB93.DBX52.4	Bool	
"CALCULO_JULIO".ES_P5	%DB87.DBX52.4	Bool	
"CALCULO_JUNIO1".ES_P5	%DB85.DBX52.4	Bool	
"CALCULO_JUNIO2".ES_P5	%DB86.DBX52.4	Bool	
"CALCULO_MARZO".ES_P5	%DB82.DBX52.4	Bool	
"CALCULO_MAYO".ES_P5	%DB84.DBX52.4	Bool	
"CALCULO_NOVIEMBRE".ES_P5	%DB91.DBX52.4	Bool	
"CALCULO_OCTUBRE".ES_P5	%DB90.DBX52.4	Bool	
"CALCULO_SEPTIEMBRE".ES_P5	%DB89.DBX52.4	Bool	
"HORARIO".ES_P5	%DB74.DBX18.4	Bool	

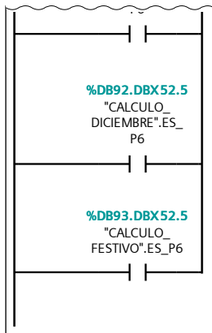
Segmento 38:

Segmento 38: (1.1 / 2.1)



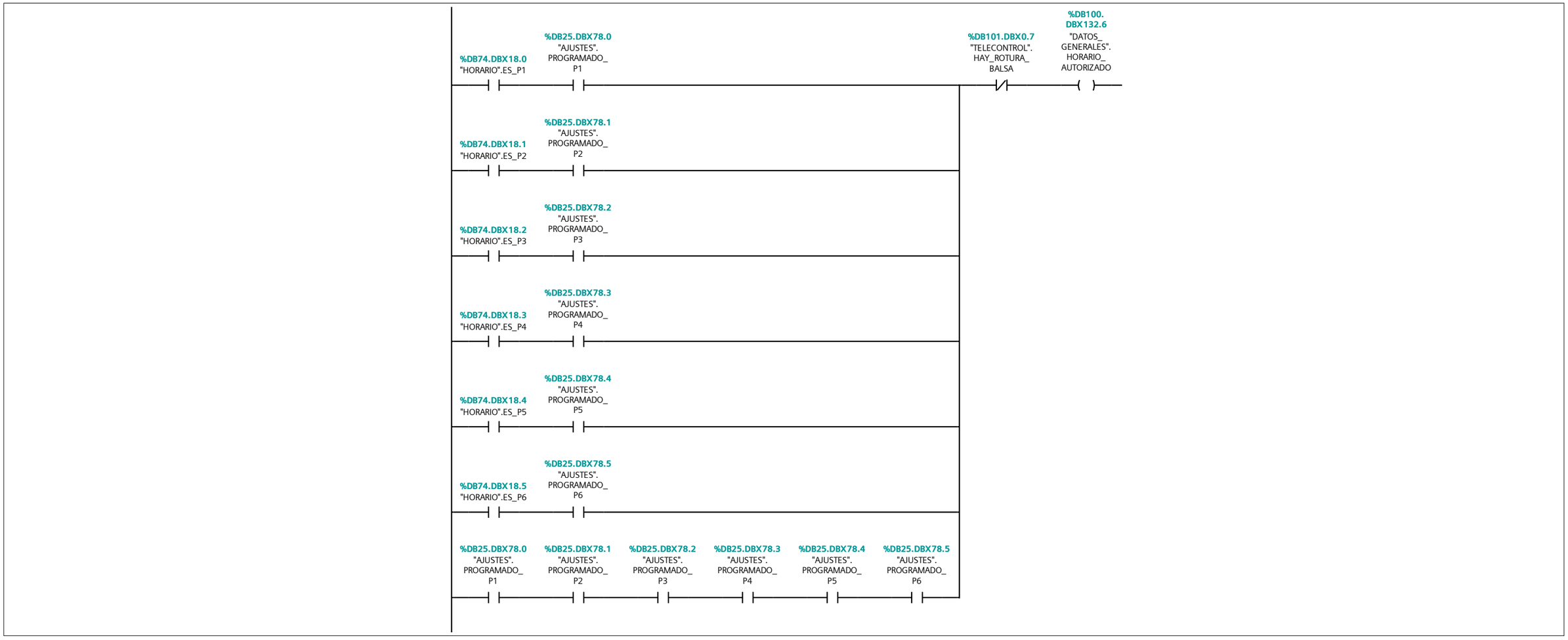
Segmento 38: (2.1 / 2.1)

1.1 (Página56 - 66)



Símbolo	Dirección	Tipo	Comentario
"CALCULO_ABRIL".ES_P6	%DB83.DBX52.5	Bool	
"CALCULO_AGOSTO".ES_P6	%DB88.DBX52.5	Bool	
"CALCULO_DICIEMBRE".ES_P6	%DB92.DBX52.5	Bool	
"CALCULO_ENERO".ES_P6	%DB80.DBX52.5	Bool	
"CALCULO_FEBRERO".ES_P6	%DB81.DBX52.5	Bool	
"CALCULO_FESTIVO".ES_P6	%DB93.DBX52.5	Bool	
"CALCULO_JULIO".ES_P6	%DB87.DBX52.5	Bool	
"CALCULO_JUNIO1".ES_P6	%DB85.DBX52.5	Bool	
"CALCULO_JUNIO2".ES_P6	%DB86.DBX52.5	Bool	
"CALCULO_MARZO".ES_P6	%DB82.DBX52.5	Bool	
"CALCULO_MAYO".ES_P6	%DB84.DBX52.5	Bool	
"CALCULO_NOVIEMBRE".ES_P6	%DB91.DBX52.5	Bool	
"CALCULO_OCTUBRE".ES_P6	%DB90.DBX52.5	Bool	
"CALCULO_SEPTIEMBRE".ES_P6	%DB89.DBX52.5	Bool	
"HORARIO".ES_P6	%DB74.DBX18.5	Bool	

Segmento 39:



Símbolo	Dirección	Tipo	Comentario
"AJUSTES".PROGRAMADO_P1	%DB25.DBX78.0	Bool	
"AJUSTES".PROGRAMADO_P2	%DB25.DBX78.1	Bool	
"AJUSTES".PROGRAMADO_P3	%DB25.DBX78.2	Bool	
"AJUSTES".PROGRAMADO_P4	%DB25.DBX78.3	Bool	
"AJUSTES".PROGRAMADO_P5	%DB25.DBX78.4	Bool	
"AJUSTES".PROGRAMADO_P6	%DB25.DBX78.5	Bool	
"DATOS_GENERALES".HORARIO_AUTORIZADO	%DB100.DBX132.6	Bool	
"HORARIO".ES_P1	%DB74.DBX18.0	Bool	
"HORARIO".ES_P2	%DB74.DBX18.1	Bool	
"HORARIO".ES_P3	%DB74.DBX18.2	Bool	
"HORARIO".ES_P4	%DB74.DBX18.3	Bool	
"HORARIO".ES_P5	%DB74.DBX18.4	Bool	
"HORARIO".ES_P6	%DB74.DBX18.5	Bool	
"TELECONTROL".HAY_ROTURA_BALSA	%DB101.DBX0.7	Bool	

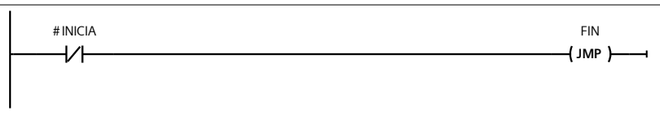
PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_MES [FB60]

CALCULO_MES Propiedades											
General											
Nombre	CALCULO_MES	**Número**	60	**Tipo**	FB	**Idioma**	KOP	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personaliza-da**	

Nombre	Tipo de datos	Offset	Valor predet.	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input							
INICIA	Bool	0.0	false	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	False	
de0a1	Int	4.0	0	True	True	False	
de1a2	Int	6.0	0	True	True	False	
de2a3	Int	8.0	0	True	True	False	
de3a4	Int	10.0	0	True	True	False	
de4a5	Int	12.0	0	True	True	False	
de5a6	Int	14.0	0	True	True	False	
de6a7	Int	16.0	0	True	True	False	
de7a8	Int	18.0	0	True	True	False	
de8a9	Int	20.0	0	True	True	False	
de9a10	Int	22.0	0	True	True	False	
de10a11	Int	24.0	0	True	True	False	
de11a12	Int	26.0	0	True	True	False	
de12a13	Int	28.0	0	True	True	False	
de13a14	Int	30.0	0	True	True	False	
de14a15	Int	32.0	0	True	True	False	
de15a16	Int	34.0	0	True	True	False	
de16a17	Int	36.0	0	True	True	False	
de17a18	Int	38.0	0	True	True	False	
de18a19	Int	40.0	0	True	True	False	
de19a20	Int	42.0	0	True	True	False	
de20a21	Int	44.0	0	True	True	False	
de21a22	Int	46.0	0	True	True	False	
de22a23	Int	48.0	0	True	True	False	
de23a00	Int	50.0	0	True	True	False	
▼ Output							
ES_P1	Bool	52.0	false	True	True	False	
ES_P2	Bool	52.1	false	True	True	False	
ES_P3	Bool	52.2	false	True	True	False	
ES_P4	Bool	52.3	false	True	True	False	
ES_P5	Bool	52.4	false	True	True	False	
ES_P6	Bool	52.5	false	True	True	False	
InOut							
Static							
Temp							
Constant							

Segmento 1:



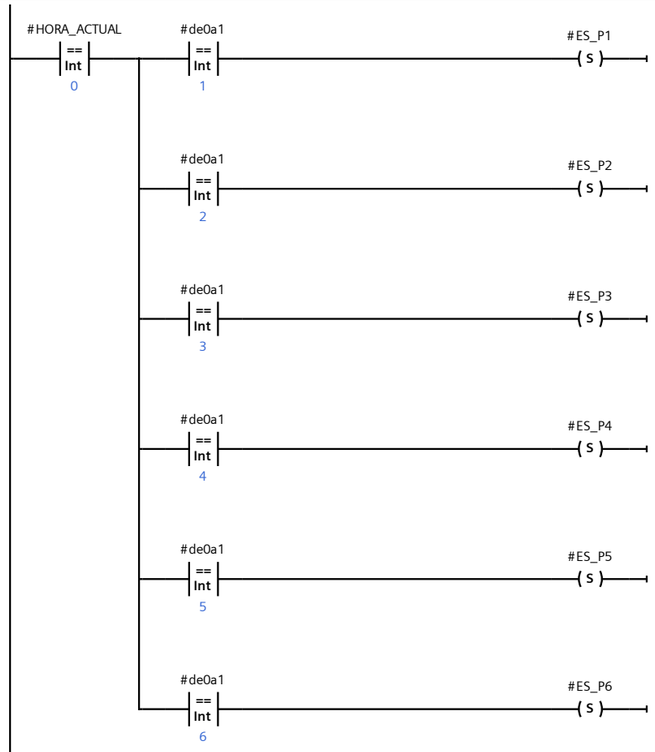
Símbolo	Dirección	Tipo	Comentario
#INICIA		Bool	

Segmento 2:



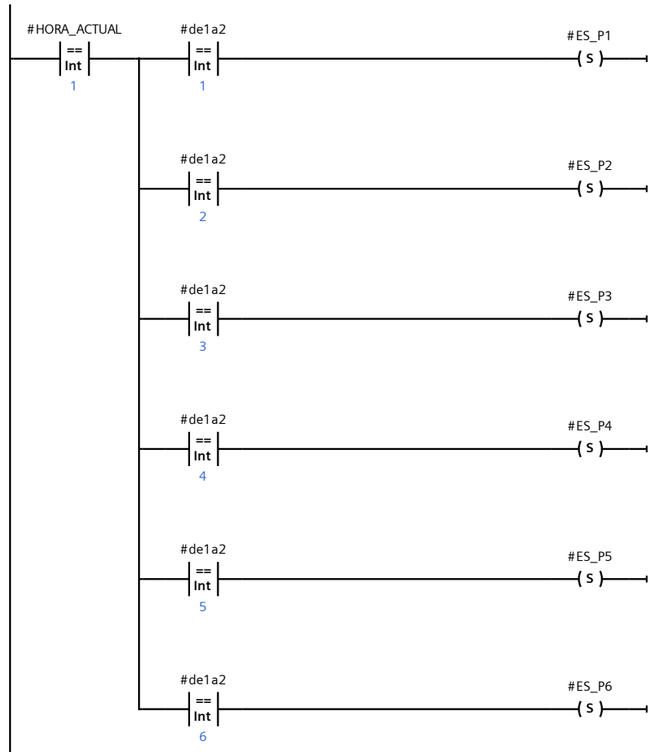
Símbolo	Dirección	Tipo	Comentario
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	

Segmento 3:



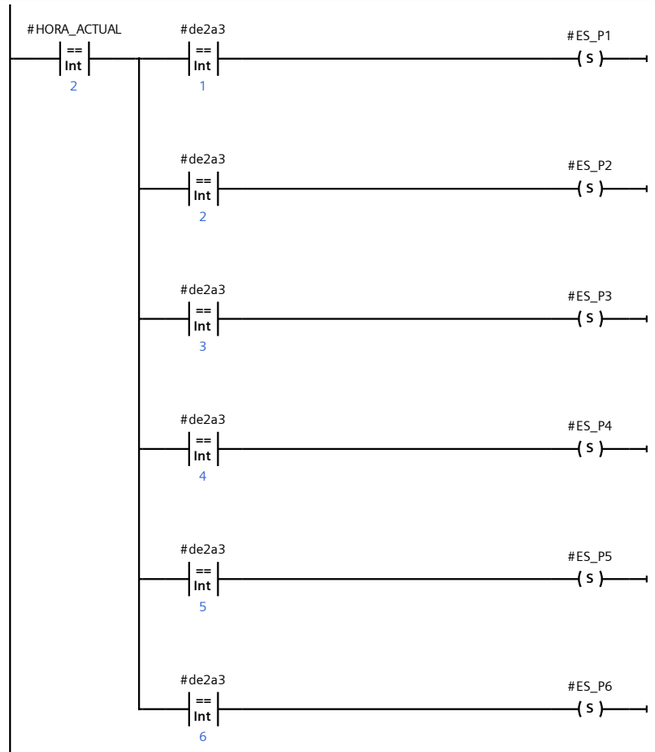
Símbolo	Dirección	Tipo	Comentario
#de0a1		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 4:



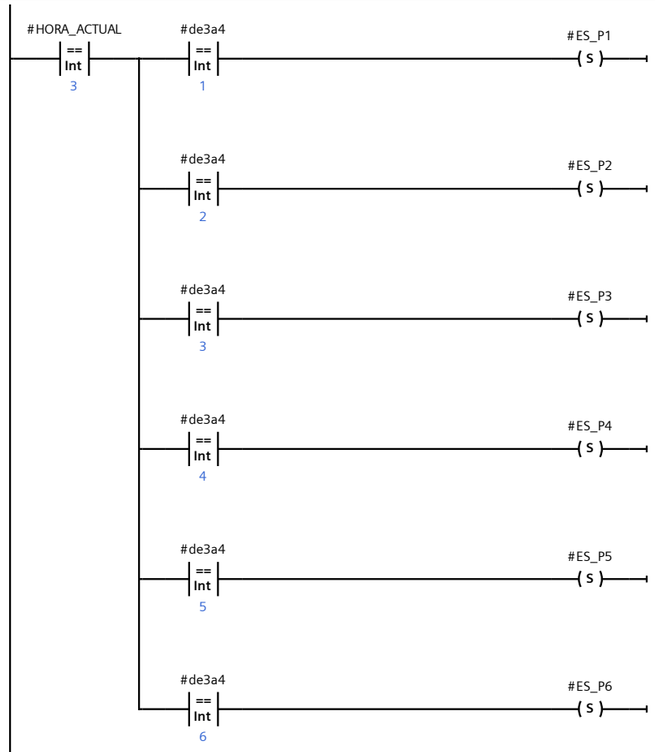
Símbolo	Dirección	Tipo	Comentario
#de1a2		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 5:



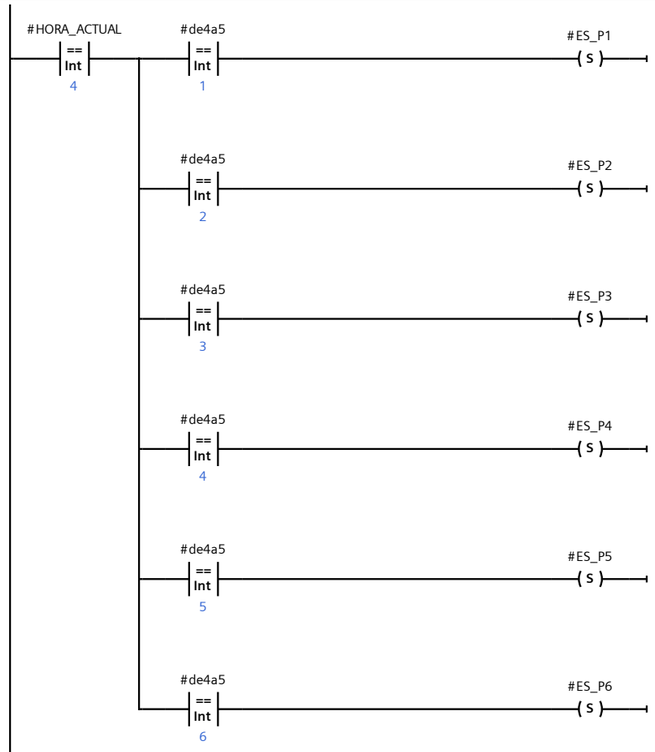
Símbolo	Dirección	Tipo	Comentario
#de2a3		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 6:



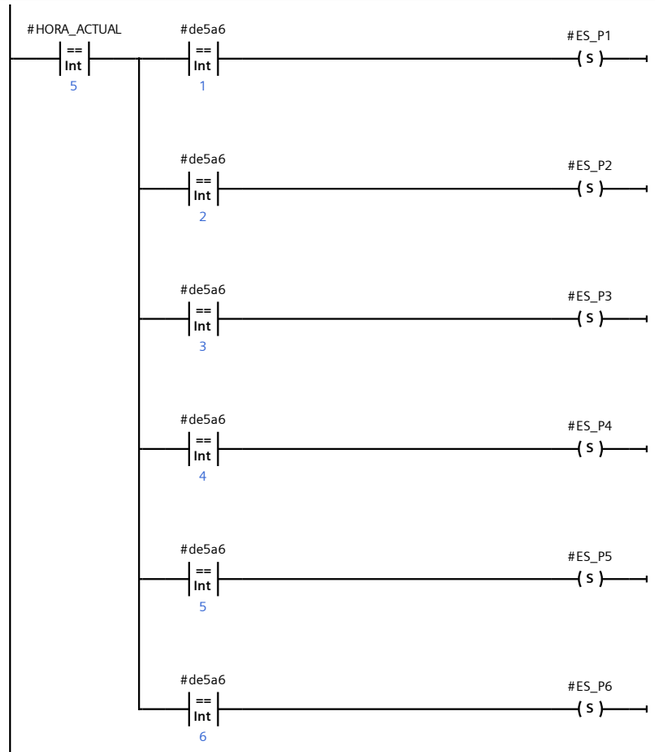
Símbolo	Dirección	Tipo	Comentario
#de3a4		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 7:



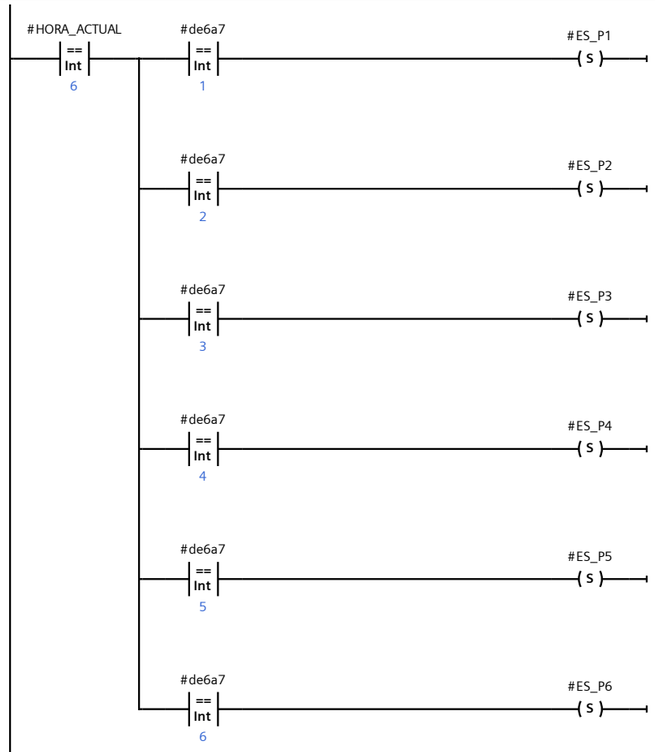
Símbolo	Dirección	Tipo	Comentario
#de4a5		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 8:



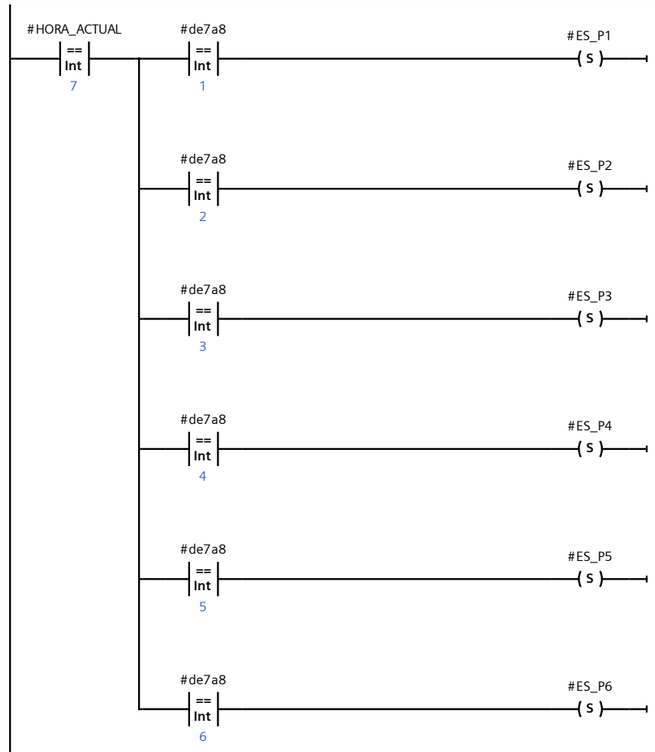
Símbolo	Dirección	Tipo	Comentario
#de5a6		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 9:



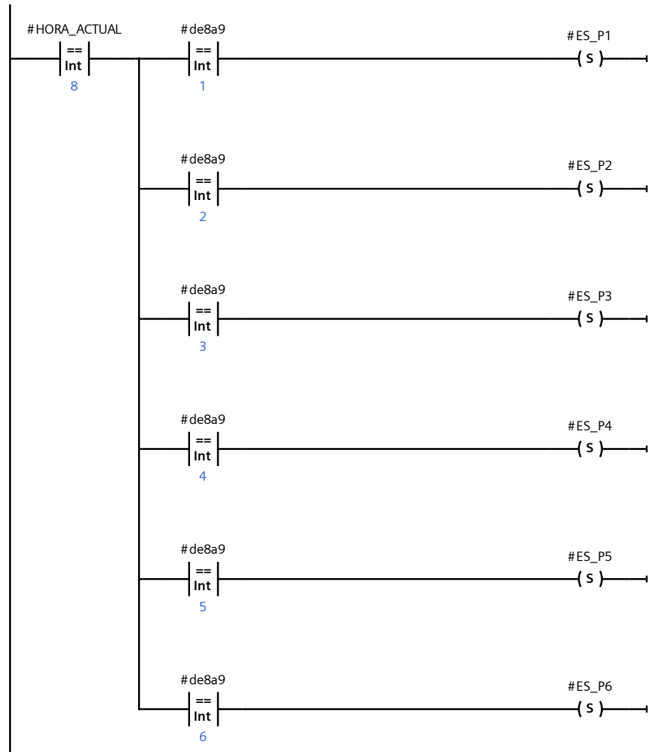
Símbolo	Dirección	Tipo	Comentario
#de6a7		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 10:



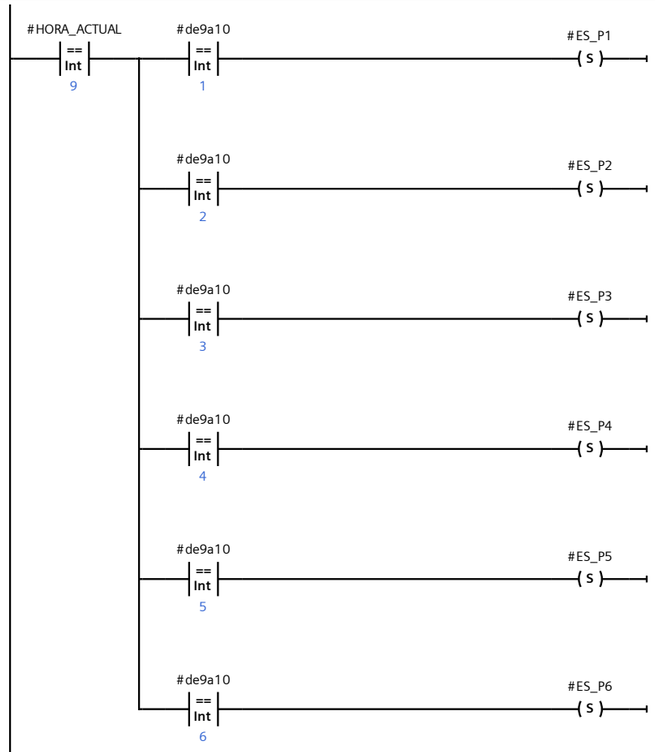
Símbolo	Dirección	Tipo	Comentario
#de7a8		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 11:



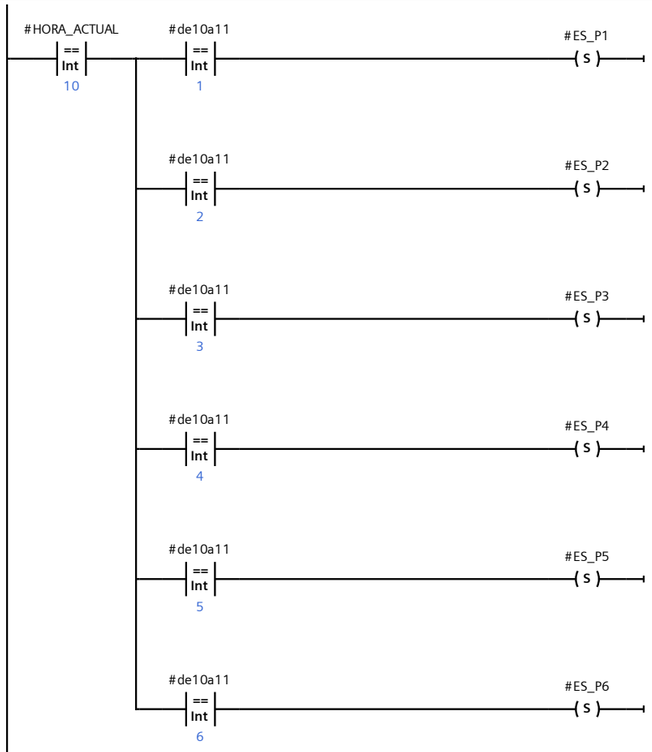
Símbolo	Dirección	Tipo	Comentario
#de8a9		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 12:



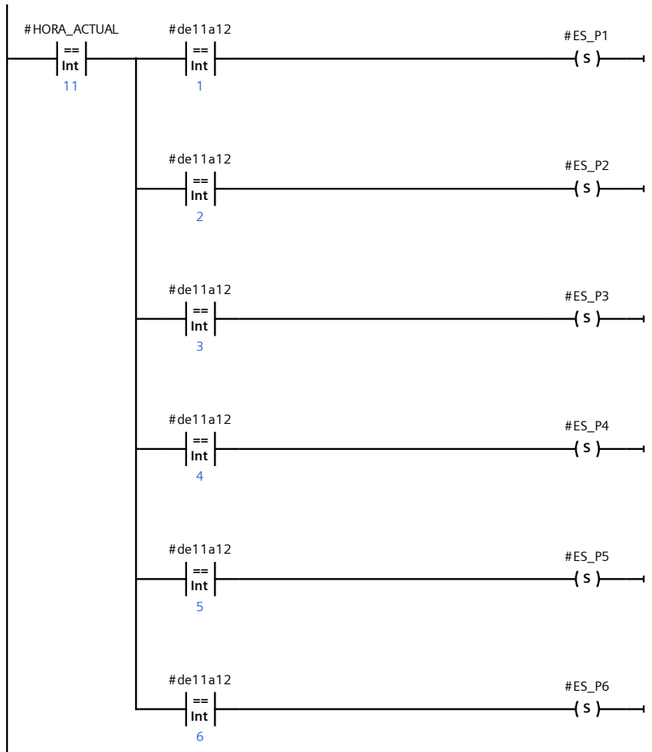
Símbolo	Dirección	Tipo	Comentario
#de9a10		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 13:



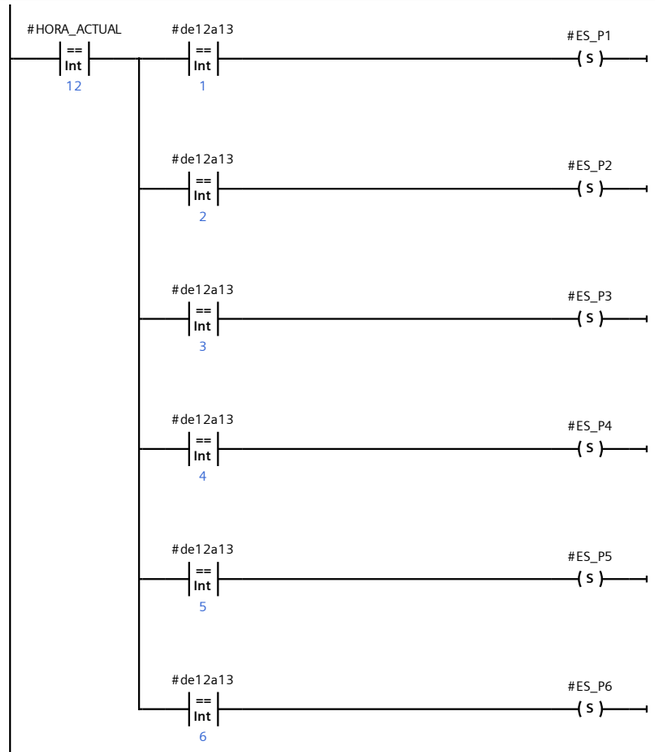
Símbolo	Dirección	Tipo	Comentario
#de10a11		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 14:



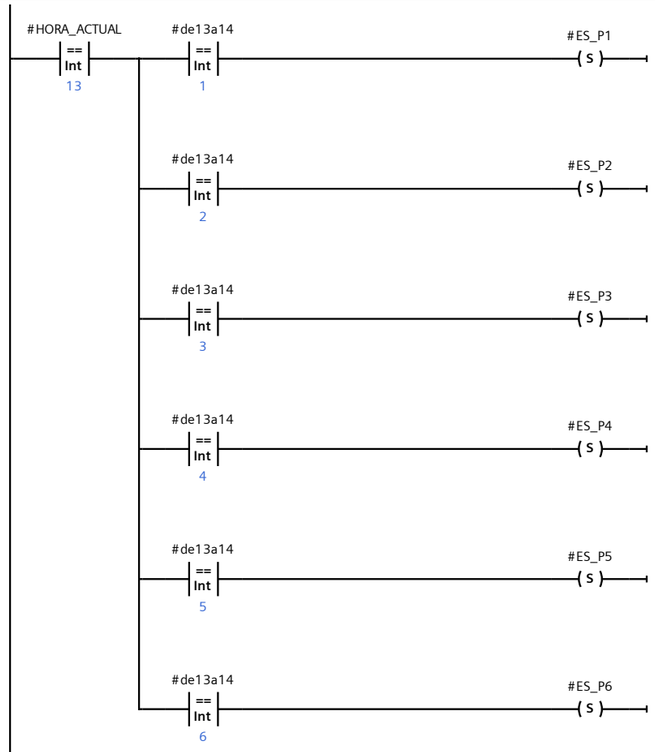
Símbolo	Dirección	Tipo	Comentario
#de11a12		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 15:



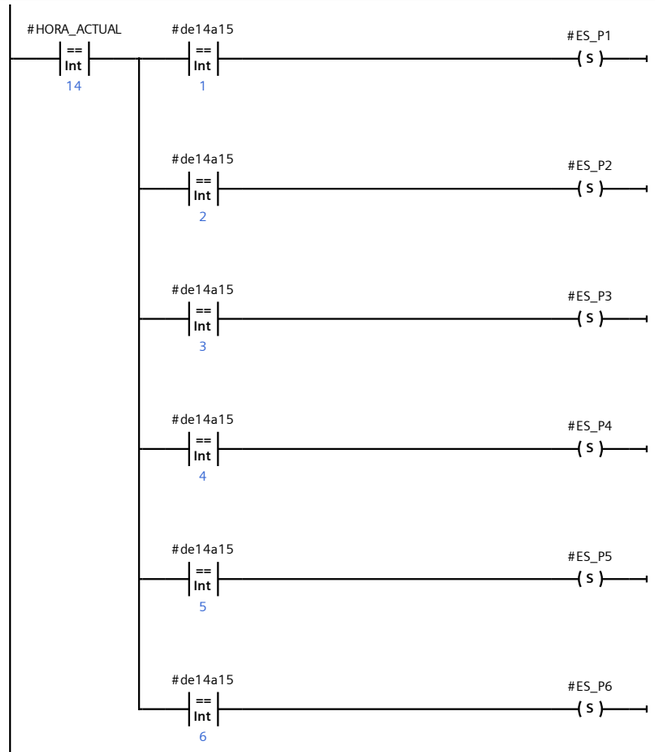
Símbolo	Dirección	Tipo	Comentario
#de12a13		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 16:



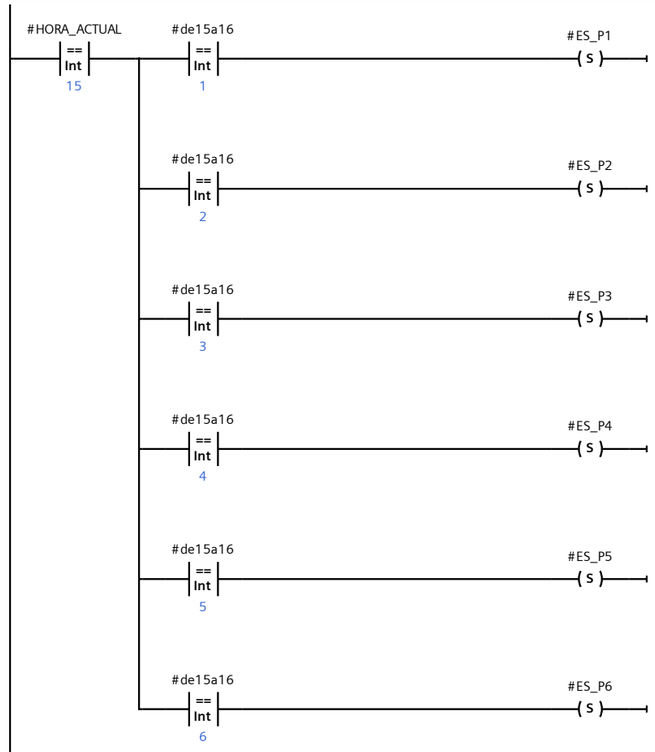
Símbolo	Dirección	Tipo	Comentario
#de13a14		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 17:



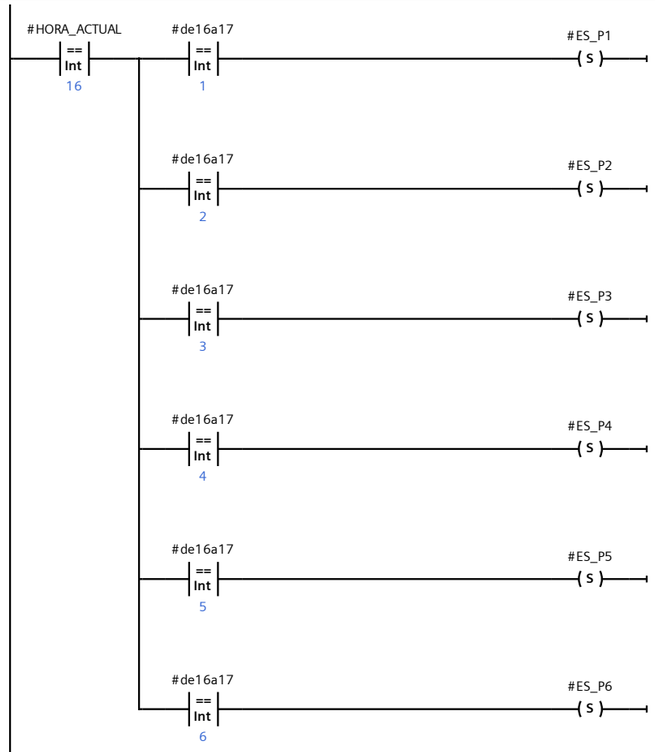
Símbolo	Dirección	Tipo	Comentario
#de14a15		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 18:



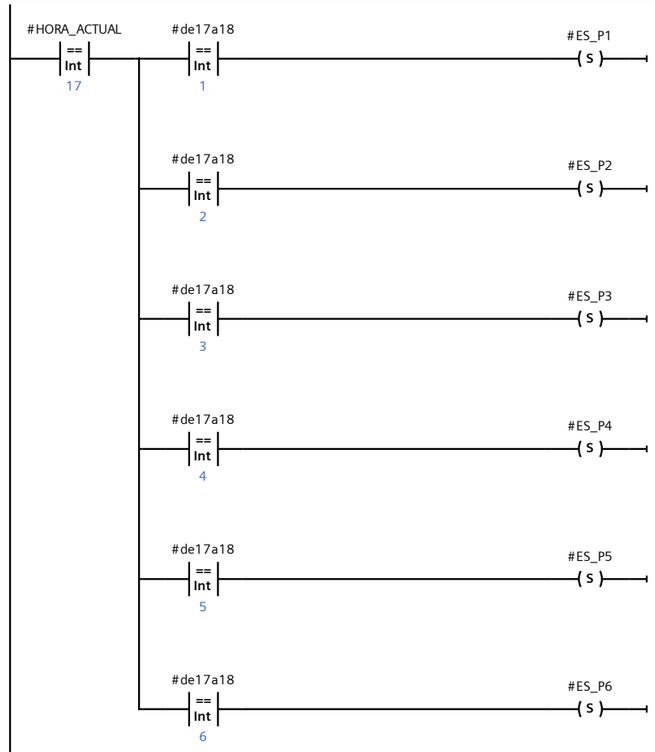
Símbolo	Dirección	Tipo	Comentario
#de15a16		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 19:



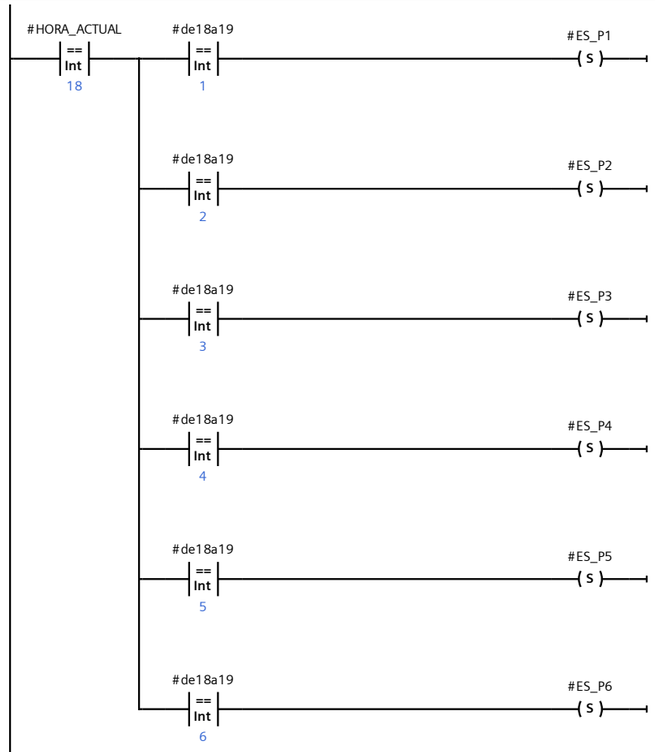
Símbolo	Dirección	Tipo	Comentario
#de16a17		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 20:



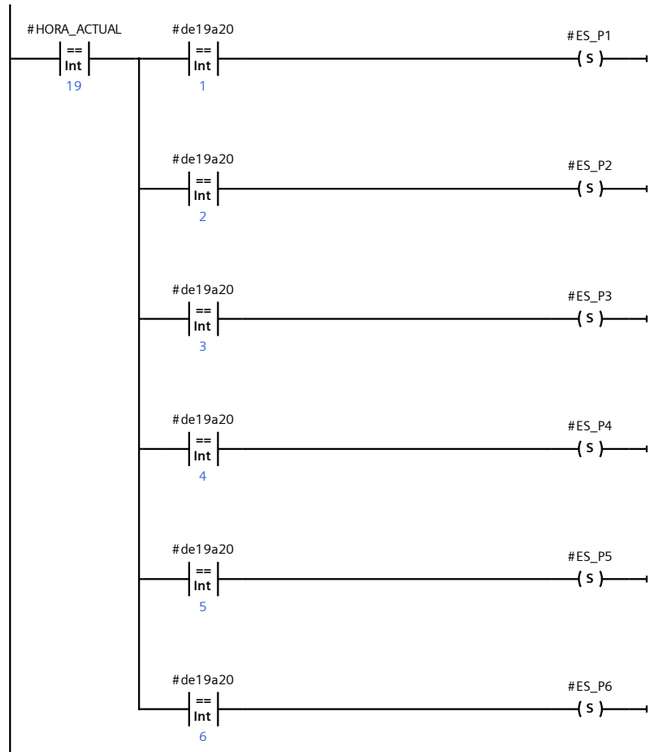
Símbolo	Dirección	Tipo	Comentario
#de17a18		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 21:



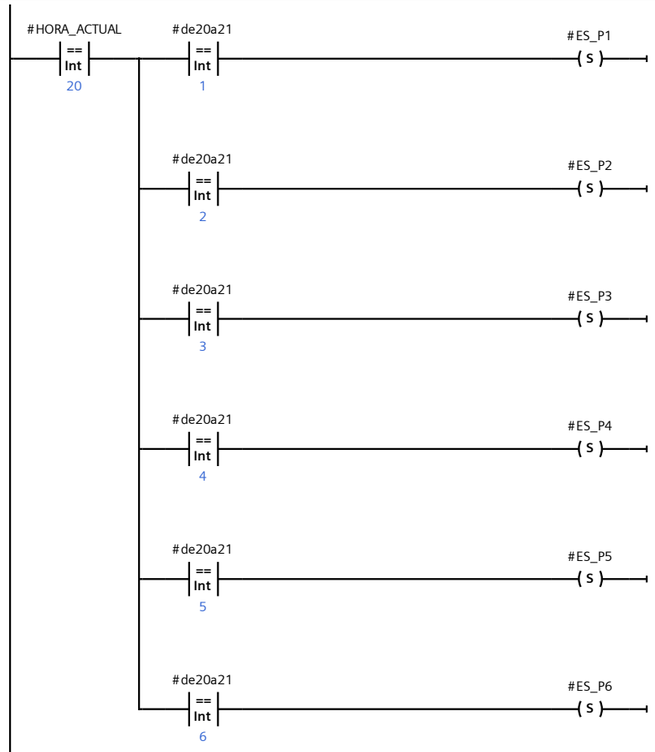
Símbolo	Dirección	Tipo	Comentario
#de18a19		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 22:



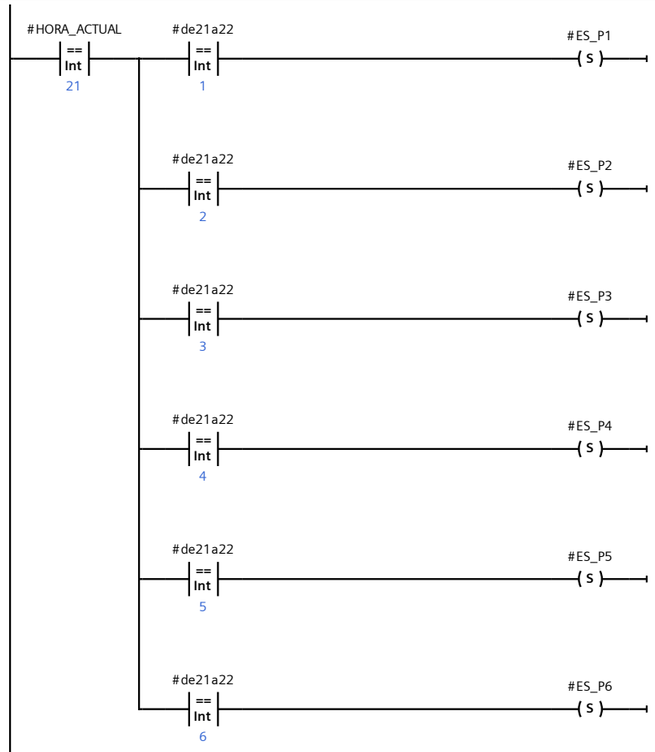
Símbolo	Dirección	Tipo	Comentario
#de19a20		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 23:



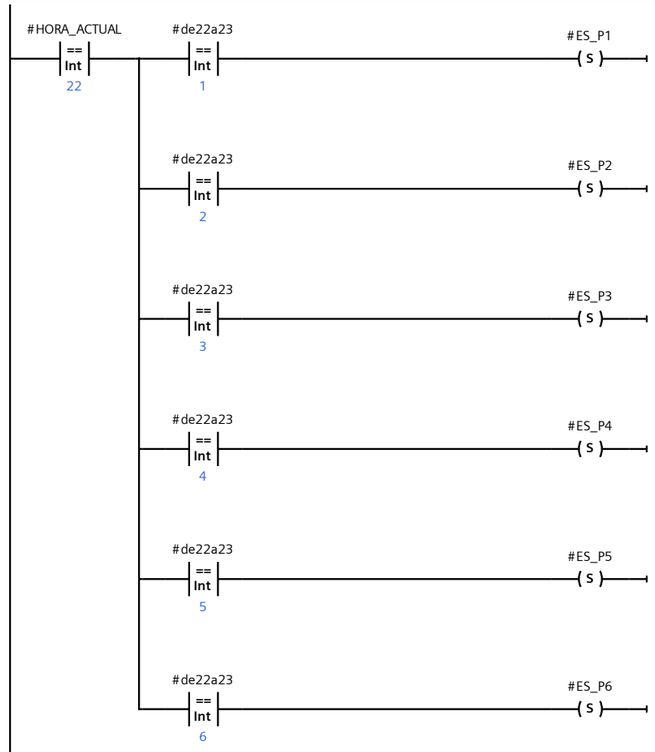
Símbolo	Dirección	Tipo	Comentario
#de20a21		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 24:



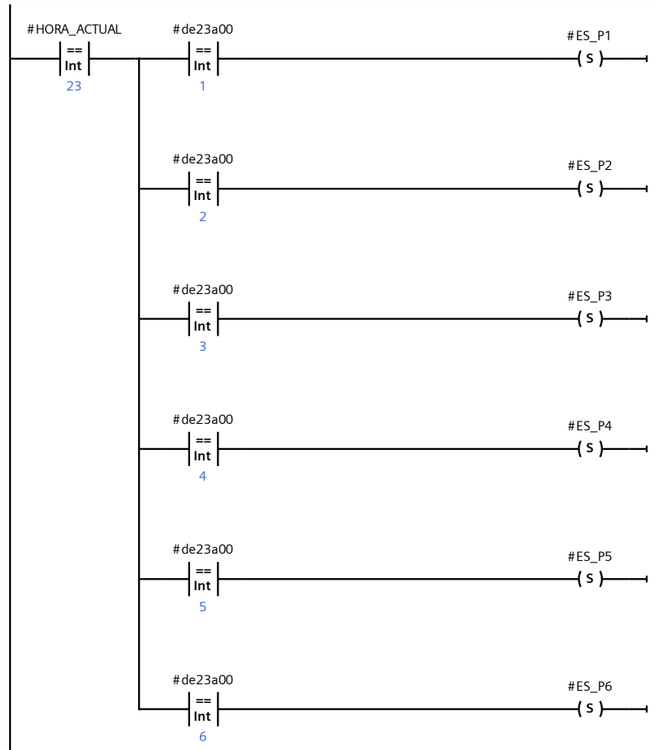
Símbolo	Dirección	Tipo	Comentario
#de21a22		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 25:



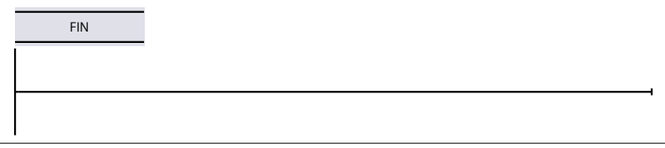
Símbolo	Dirección	Tipo	Comentario
#de22a23		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 26:



Símbolo	Dirección	Tipo	Comentario
#de23a00		Int	
#ES_P1		Bool	
#ES_P2		Bool	
#ES_P3		Bool	
#ES_P4		Bool	
#ES_P5		Bool	
#ES_P6		Bool	
#HORA_ACTUAL		Int	

Segmento 27:



Símbolo	Dirección	Tipo	Comentario

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_ENERO [DB80]

CALCULO_ENERO Propiedades											
General											
Nombre	CALCULO_ENERO	**Número**	80	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_FEBRERO [DB81]

CALCULO_FEBRERO Propiedades											
General											
Nombre	CALCULO_FEBRERO	**Número**	81	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personaliza-da**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_MARZO [DB82]

CALCULO_MARZO Propiedades									
General									
Nombre	CALCULO_MARZO	**Número**	82	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_ABRIL [DB83]

CALCULO_ABRIL Propiedades											
General											
Nombre	CALCULO_ABRIL	**Número**	83	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_MAYO [DB84]

CALCULO_MAYO Propiedades											
General											
Nombre	CALCULO_MAYO	**Número**	84	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_JUNIO1 [DB85]

CALCULO_JUNIO1 Propiedades											
General											
Nombre	CALCULO_JUNIO1	**Número**	85	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_JUNIO2 [DB86]

CALCULO_JUNIO2 Propiedades									
General									
Nombre	CALCULO_JUNIO2	**Número**	86	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_JULIO [DB87]

CALCULO_JULIO Propiedades											
General											
Nombre	CALCULO_JULIO	**Número**	87	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_AGOSTO [DB88]

CALCULO_AGOSTO Propiedades											
General											
Nombre	CALCULO_AGOSTO	**Número**	88	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_SEPTIEMBRE [DB89]

CALCULO_SEPTIEMBRE Propiedades											
General											
Nombre	CALCULO_SEPTIEMBRE	**Número**	89	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_OCTUBRE [DB90]

CALCULO_OCTUBRE Propiedades											
General											
Nombre	CALCULO_OCTUBRE	**Número**	90	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_NOVIEMBRE [DB91]

CALCULO_NOVIEMBRE Propiedades											
General											
Nombre	CALCULO_NOVIEMBRE	**Número**	91	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual		
Información											
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1	**ID personalizada**	

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_DICIEMBRE [DB92]

CALCULO_DICIEMBRE Propiedades									
General									
Nombre	CALCULO_DICIEMBRE	**Número**	92	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Bloques de programa

CALCULO_FESTIVO [DB93]

CALCULO_FESTIVO Propiedades									
General									
Nombre	CALCULO_FESTIVO	**Número**	93	**Tipo**	DB	**Idioma**	DB	**Numeración**	manual
Información									
Título		**Autor**		**Comentario**		**Familia**		**Versión**	0.1
ID personalizada									

Nombre	Tipo de datos	Offset	Valor de arranque	Remanencia	Accesible desde HMI	Visible en HMI	Valor de ajuste	Comentario
▼ Input								
INICIA	Bool	0.0	false	True	True	True	False	
HORA_ACTUAL	Int	2.0	0	True	True	True	False	
de0a1	Int	4.0	0	True	True	True	False	
de1a2	Int	6.0	0	True	True	True	False	
de2a3	Int	8.0	0	True	True	True	False	
de3a4	Int	10.0	0	True	True	True	False	
de4a5	Int	12.0	0	True	True	True	False	
de5a6	Int	14.0	0	True	True	True	False	
de6a7	Int	16.0	0	True	True	True	False	
de7a8	Int	18.0	0	True	True	True	False	
de8a9	Int	20.0	0	True	True	True	False	
de9a10	Int	22.0	0	True	True	True	False	
de10a11	Int	24.0	0	True	True	True	False	
de11a12	Int	26.0	0	True	True	True	False	
de12a13	Int	28.0	0	True	True	True	False	
de13a14	Int	30.0	0	True	True	True	False	
de14a15	Int	32.0	0	True	True	True	False	
de15a16	Int	34.0	0	True	True	True	False	
de16a17	Int	36.0	0	True	True	True	False	
de17a18	Int	38.0	0	True	True	True	False	
de18a19	Int	40.0	0	True	True	True	False	
de19a20	Int	42.0	0	True	True	True	False	
de20a21	Int	44.0	0	True	True	True	False	
de21a22	Int	46.0	0	True	True	True	False	
de22a23	Int	48.0	0	True	True	True	False	
de23a00	Int	50.0	0	True	True	True	False	
▼ Output								
ES_P1	Bool	52.0	false	True	True	True	False	
ES_P2	Bool	52.1	false	True	True	True	False	
ES_P3	Bool	52.2	false	True	True	True	False	
ES_P4	Bool	52.3	false	True	True	True	False	
ES_P5	Bool	52.4	false	True	True	True	False	
ES_P6	Bool	52.5	false	True	True	True	False	
InOut								
Static								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU]

Objetos tecnológicos

Esta carpeta está vacía.

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Variables PLC / Tabla de variables estándar [427]

Variables PLC

Variables PLC

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	ABIERTA_T1	Bool	%M32.0		True	True	
	ABIERTA_T2	Bool	%M32.1		True	True	
	ABIERTA_T3	Bool	%M32.2		True	True	
	ABIERTA_T4	Bool	%M32.3		True	True	
	ABIERTA_T5	Bool	%M32.4		True	True	
	ABIERTA_T6	Bool	%M32.5		True	True	
	ABIERTA_T7	Bool	%M32.6		True	True	
	AL_SUCIO_FILTRO_ASP	Bool	%M113.4		True	True	
	AL_SUCIO_FILTRO_EST_FILT	Bool	%M113.6		True	True	
	AL_SUCIO_FILTRO_IMP	Bool	%M113.5		True	True	
	ALARMA_ALTA_PRESION_IMP	Bool	%M100.0		True	True	
	ALARMA_AN_CAUDAL_BALSA	Bool	%M114.4		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_AN_CAUDAL_IMPULS	Bool	%M114.5		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_AN_NIVEL_BALSA	Bool	%M115.5		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_AN_PRESION_R1	Bool	%M114.6		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_AN_PRESION_R2	Bool	%M114.7		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_AN_PRESION_R3	Bool	%M115.0		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_AN_PRESION_R4	Bool	%M115.1		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_AN_PRESION_R5	Bool	%M115.2		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_AN_PRESION_R6	Bool	%M115.3		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_AN_PRESION_R7	Bool	%M115.4		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_ANALOGICA_ASP1	Bool	%M102.6		True	True	
	ALARMA_ANALOGICA_ASP2	Bool	%M102.7		True	True	
	ALARMA_ANALOGICA_ASP3	Bool	%M103.0		True	True	
	ALARMA_ANALOGICA_ASP4	Bool	%M103.1		True	True	
	ALARMA_ANALOGICA_IMP1	Bool	%M114.2		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_ANALOGICA_IMP2	Bool	%M114.3		True	True	ERROR MEDICION SEÑAL ANALOGICA
	ALARMA_ARQ_SALIDA_LLENA	Bool	%M241.1		True	True	
	ALARMA_BAJA_PRESION_IMP	Bool	%M100.2		True	True	
	ALARMA_BAJO_GASOIL	Bool	%M116.5		True	True	
	ALARMA_BALSA_AL_MINIMO	Bool	%M114.1		True	True	
	ALARMA_CAUDAL_1_BOMBA	Bool	%M110.2		True	True	
	ALARMA_CAUDAL_2_BOMBAS	Bool	%M110.3		True	True	
	ALARMA_CAUDAL_3_BOMBAS	Bool	%M110.4		True	True	
	ALARMA_CAUDAL_4_BOMBAS	Bool	%M110.5		True	True	
	ALARMA_CAUDAL_T1	Bool	%M110.7		True	True	

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	ALARMA_CAUDAL_T2	Bool	%M111.0		True	True	
	ALARMA_CAUDAL_T3	Bool	%M111.1		True	True	
	ALARMA_CAUDAL_T4	Bool	%M111.2		True	True	
	ALARMA_CAUDAL_T5	Bool	%M111.3		True	True	
	ALARMA_CAUDAL_T6	Bool	%M111.4		True	True	
	ALARMA_CAUDAL_T7	Bool	%M111.5		True	True	
	ALARMA_COMMS_BALSA	Bool	%M112.5		True	True	
	ALARMA_COMMS_FILTRADO	Bool	%M112.6		True	True	
	ALARMA_COMMS_T3T4	Bool	%M112.7		True	True	
	ALARMA_FILTRO_REJA	Bool	%M116.6		True	True	
	ALARMA_FUGA_BALSA	Bool	%M118.7		True	True	
	ALARMA_INTRUSION_1	Bool	%M101.5		True	True	
	ALARMA_INTRUSION_2	Bool	%M101.6		True	True	
	ALARMA_INTRUSION_BALSA	Bool	%M119.6		True	True	
	ALARMA_INTRUSION_FILTR	Bool	%M119.2		True	True	
	ALARMA_INTRUSION_T1	Bool	%M119.3		True	True	
	ALARMA_INTRUSION_T2	Bool	%M119.4		True	True	
	ALARMA_INTRUSION_T3	Bool	%M119.0		True	True	
	ALARMA_INTRUSION_T4	Bool	%M119.1		True	True	
	ALARMA_INTRUSION_T56	Bool	%M119.5		True	True	
	ALARMA_MAX_CAUDAL_IMP	Bool	%M100.4		True	True	
	ALARMA_MAX_PRES_MED	Bool	%M117.2		True	True	
	ALARMA_MAX_PRES_OUT	Bool	%M117.1		True	True	
	ALARMA_MAX_PRES_W	Bool	%M117.0		True	True	
	ALARMA_MAX_PRESION_IMP	Bool	%M100.1		True	True	
	ALARMA_MAX_TEMP_R_B1	Bool	%M104.1		True	True	
	ALARMA_MAX_TEMP_R_B2	Bool	%M105.7		True	True	
	ALARMA_MAX_TEMP_R_B3	Bool	%M107.5		True	True	
	ALARMA_MAX_TEMP_R_B4	Bool	%M109.3		True	True	
	ALARMA_MAX_TEMP_ROD1B_B1	Bool	%M104.4		True	True	
	ALARMA_MAX_TEMP_ROD1B_B2	Bool	%M106.2		True	True	
	ALARMA_MAX_TEMP_ROD1B_B3	Bool	%M108.0		True	True	
	ALARMA_MAX_TEMP_ROD1B_B4	Bool	%M109.6		True	True	
	ALARMA_MAX_TEMP_ROD1M_B1	Bool	%M104.6		True	True	
	ALARMA_MAX_TEMP_ROD1M_B2	Bool	%M106.4		True	True	
	ALARMA_MAX_TEMP_ROD1M_B3	Bool	%M108.2		True	True	
	ALARMA_MAX_TEMP_ROD1M_B4	Bool	%M110.0		True	True	
	ALARMA_MAX_TEMP_ROD2B_B1	Bool	%M104.5		True	True	
	ALARMA_MAX_TEMP_ROD2B_B2	Bool	%M106.3		True	True	
	ALARMA_MAX_TEMP_ROD2B_B3	Bool	%M108.1		True	True	
	ALARMA_MAX_TEMP_ROD2B_B4	Bool	%M109.7		True	True	

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	ALARMA_MAX_TEMP_ROD2M_B1	Bool	%M104.7		True	True	
	ALARMA_MAX_TEMP_ROD2M_B2	Bool	%M106.5		True	True	
	ALARMA_MAX_TEMP_ROD2M_B3	Bool	%M108.3		True	True	
	ALARMA_MAX_TEMP_ROD2M_B4	Bool	%M110.1		True	True	
	ALARMA_MAX_TEMP_S_B1	Bool	%M104.2		True	True	
	ALARMA_MAX_TEMP_S_B2	Bool	%M106.0		True	True	
	ALARMA_MAX_TEMP_S_B3	Bool	%M107.6		True	True	
	ALARMA_MAX_TEMP_S_B4	Bool	%M109.4		True	True	
	ALARMA_MAX_TEMP_T_B1	Bool	%M104.3		True	True	
	ALARMA_MAX_TEMP_T_B2	Bool	%M106.1		True	True	
	ALARMA_MAX_TEMP_T_B3	Bool	%M107.7		True	True	
	ALARMA_MAX_TEMP_T_B4	Bool	%M109.5		True	True	
	ALARMA_MINIMA_ASP_B1	Bool	%M101.1		True	True	
	ALARMA_MINIMA_ASP_B2	Bool	%M101.2		True	True	
	ALARMA_MINIMA_ASP_B3	Bool	%M101.3		True	True	
	ALARMA_MINIMA_ASP_B4	Bool	%M101.4		True	True	
	ALARMA_MINIMA_PRES_IMP	Bool	%M102.5		True	True	
	ALARMA_MINIMA_TENS_GRAL	Bool	%M102.4		True	True	
	ALARMA_MINIMO_CAUDAL	Bool	%M115.6		True	True	
	ALARMA_MINIMO_GASOIL	Bool	%M101.7		True	True	
	ALARMA_MINMA_TENSION_B1	Bool	%M102.0		True	True	
	ALARMA_MINMA_TENSION_B2	Bool	%M102.1		True	True	
	ALARMA_MINMA_TENSION_B3	Bool	%M102.2		True	True	
	ALARMA_MINMA_TENSION_B4	Bool	%M102.3		True	True	
	ALARMA_MTO_B1	Bool	%M116.0		True	True	
	ALARMA_MTO_B2	Bool	%M116.1		True	True	
	ALARMA_MTO_B3	Bool	%M116.2		True	True	
	ALARMA_MTO_B4	Bool	%M116.3		True	True	
	ALARMA_MTO_ELECTRICO	Bool	%M116.4		True	True	AVISO DE REVISION SISTEMA CONTROL
	ALARMA_MTO_G1	Bool	%M117.3		True	True	
	ALARMA_MTO_G2	Bool	%M117.4		True	True	
	ALARMA_MTO_G3	Bool	%M117.5		True	True	
	ALARMA_MTO_G4	Bool	%M117.6		True	True	
	ALARMA_NIVEL_ALIVIADERO	Bool	%M113.7		True	True	
	ALARMA_NIVEL_ARQUETA	Bool	%M110.6		True	True	
	ALARMA_NIVEL_DRENAJE	Bool	%M114.0		True	True	
	ALARMA_POCO_GASOIL	Bool	%M116.7		True	True	
	ALARMA_PRESION_T1	Bool	%M111.6		True	True	
	ALARMA_PRESION_T2	Bool	%M111.7		True	True	
	ALARMA_PRESION_T3	Bool	%M112.0		True	True	
	ALARMA_PRESION_T4	Bool	%M112.1		True	True	

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	ALARMA_PRESION_T5	Bool	%M112.2		True	True	
	ALARMA_PRESION_T6	Bool	%M112.3		True	True	
	ALARMA_PRESION_T7	Bool	%M112.4		True	True	
	ALARMA_PRESOSTATO_MAX_B1	Bool	%M100.5		True	True	
	ALARMA_PRESOSTATO_MAX_B2	Bool	%M100.6		True	True	
	ALARMA_PRESOSTATO_MAX_B3	Bool	%M100.7		True	True	
	ALARMA_PRESOSTATO_MAX_B4	Bool	%M101.0		True	True	
	ALARMA_SUCIO_OUT_1B	Bool	%M118.3		True	True	
	ALARMA_SUCIO_OUT_2B	Bool	%M118.4		True	True	
	ALARMA_SUCIO_OUT_3B	Bool	%M118.5		True	True	
	ALARMA_SUCIO_OUT_4B	Bool	%M118.6		True	True	
	ALARMA_SUCIO_W_1B	Bool	%M117.7		True	True	
	ALARMA_SUCIO_W_2B	Bool	%M118.0		True	True	
	ALARMA_SUCIO_W_3B	Bool	%M118.1		True	True	
	ALARMA_SUCIO_W_4B	Bool	%M118.2		True	True	
	ALARMA_TEMP_R_B1	Bool	%M103.2		True	True	
	ALARMA_TEMP_R_B2	Bool	%M105.0		True	True	
	ALARMA_TEMP_R_B3	Bool	%M106.6		True	True	
	ALARMA_TEMP_R_B4	Bool	%M108.4		True	True	
	ALARMA_TEMP_ROD1B_B1	Bool	%M103.5		True	True	
	ALARMA_TEMP_ROD1B_B2	Bool	%M105.3		True	True	
	ALARMA_TEMP_ROD1B_B3	Bool	%M107.1		True	True	
	ALARMA_TEMP_ROD1B_B4	Bool	%M108.7		True	True	
	ALARMA_TEMP_ROD1M_B1	Bool	%M103.7		True	True	
	ALARMA_TEMP_ROD1M_B2	Bool	%M105.5		True	True	
	ALARMA_TEMP_ROD1M_B3	Bool	%M107.3		True	True	
	ALARMA_TEMP_ROD1M_B4	Bool	%M109.1		True	True	
	ALARMA_TEMP_ROD2B_B1	Bool	%M103.6		True	True	
	ALARMA_TEMP_ROD2B_B2	Bool	%M105.4		True	True	
	ALARMA_TEMP_ROD2B_B3	Bool	%M107.2		True	True	
	ALARMA_TEMP_ROD2B_B4	Bool	%M109.0		True	True	
	ALARMA_TEMP_ROD2M_B1	Bool	%M104.0		True	True	
	ALARMA_TEMP_ROD2M_B2	Bool	%M105.6		True	True	
	ALARMA_TEMP_ROD2M_B3	Bool	%M107.4		True	True	
	ALARMA_TEMP_ROD2M_B4	Bool	%M109.2		True	True	
	ALARMA_TEMP_S_B1	Bool	%M103.3		True	True	
	ALARMA_TEMP_S_B2	Bool	%M105.1		True	True	
	ALARMA_TEMP_S_B3	Bool	%M106.7		True	True	
	ALARMA_TEMP_S_B4	Bool	%M108.5		True	True	
	ALARMA_TEMP_T_B1	Bool	%M103.4		True	True	
	ALARMA_TEMP_T_B2	Bool	%M105.2		True	True	

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	ALARMA_TEMP_T_B3	Bool	%M107.0		True	True	
	ALARMA_TEMP_T_B4	Bool	%M108.6		True	True	
	ALARMA_TIEMPO_GRUPO_1	Bool	%M113.0		True	True	
	ALARMA_TIEMPO_GRUPO_2	Bool	%M113.1		True	True	
	ALARMA_TIEMPO_GRUPO_3	Bool	%M113.2		True	True	
	ALARMA_TIEMPO_GRUPO_4	Bool	%M113.3		True	True	
	ALARMA_VARIADOR_1	Bool	%M120.0		True	True	
	ALARMA_VARIADOR_2	Bool	%M120.1		True	True	
	ALARMA_VARIADOR_3	Bool	%M120.2		True	True	
	ALARMA_VARIADOR_4	Bool	%M120.3		True	True	
	ARQUETA_DESAGUE_INUNDADA	Bool	%I34.5		True	True	
	ARRANCA_1_BOMBA	Bool	%M11.0		True	True	
	ARRANCA_2_BOMAS	Bool	%M11.1		True	True	
	ARRANCA_3_BOMBAS	Bool	%M11.2		True	True	
	ARRANCA_4_BOMBAS	Bool	%M11.3		True	True	
	B1_ALARMA_VF	Bool	%I6.2		True	True	
	B1_AUTO	Bool	%I5.0		True	True	
	B1_BOMBEANDO	Timer	%T70		True	True	
	B1_CONF_ABRIR	Bool	%I5.5		True	True	
	B1_CONF_CERRAR	Bool	%I5.7		True	True	
	B1_DISPARO_VALV	Bool	%I5.6		True	True	
	B1_DISPARO	Bool	%I5.3		True	True	
	B1_ESTADO_OK	Bool	%I5.4		True	True	
	B1_FC_ABRIR	Bool	%I6.1		True	True	
	B1_FC_CERRAR	Bool	%I6.5		True	True	
	B1_FIN_RAMPA_VF	Bool	%I6.0		True	True	
	B1_LIM_PAR_ABRE	Bool	%I6.3		True	True	
	B1_LIM_PAR_CIERRA	Bool	%I6.7		True	True	
	B1_MANUAL	Bool	%I5.2		True	True	
	B1_PRESOSTATO_MAX	Bool	%I6.6		True	True	
	B1_RESERVA	Bool	%I6.4		True	True	
	B1_SETA	Bool	%I5.1		True	True	
	B2_ALARMA_VF	Bool	%I8.2		True	True	
	B2_AUTO	Bool	%I7.0		True	True	
	B2_BOMBEANDO	Timer	%T71		True	True	
	B2_CONF_ABRIR	Bool	%I7.5		True	True	
	B2_CONF_CERRAR	Bool	%I7.7		True	True	
	B2_DISPARO_VALV	Bool	%I7.6		True	True	
	B2_DISPARO	Bool	%I7.3		True	True	
	B2_ESTADO_OK	Bool	%I7.4		True	True	
	B2_FC_ABRIR	Bool	%I8.1		True	True	

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	B2_FC_CERRAR	Bool	%I8.5		True	True	
	B2_FIN_RAMPA_VF	Bool	%I8.0		True	True	
	B2_LIM_PAR_ABRE	Bool	%I8.3		True	True	
	B2_LIM_PAR_CIERRA	Bool	%I8.7		True	True	
	B2_MANUAL	Bool	%I7.2		True	True	
	B2_PRESOSTATO_MAX	Bool	%I8.6		True	True	
	B2_RESERVA	Bool	%I8.4		True	True	
	B2_SETA	Bool	%I7.1		True	True	
	B3_ALARMA_VF	Bool	%I10.2		True	True	
	B3_AUTO	Bool	%I9.0		True	True	
	B3_BOMBEANDO	Timer	%T72		True	True	
	B3_CONF_ABRIR	Bool	%I9.5		True	True	
	B3_CONF_CERRAR	Bool	%I9.7		True	True	
	B3_DISPARO_VALV	Bool	%I9.6		True	True	
	B3_DISPARO	Bool	%I9.3		True	True	
	B3_ESTADO_OK	Bool	%I9.4		True	True	
	B3_FC_ABRIR	Bool	%I10.1		True	True	
	B3_FC_CERRAR	Bool	%I10.5		True	True	
	B3_FIN_RAMPA_VF	Bool	%I10.0		True	True	
	B3_LIM_PAR_ABRE	Bool	%I10.3		True	True	
	B3_LIM_PAR_CIERRA	Bool	%I10.7		True	True	
	B3_MANUAL	Bool	%I9.2		True	True	
	B3_PRESOSTATO_MAX	Bool	%I10.6		True	True	
	B3_RESERVA	Bool	%I10.4		True	True	
	B3_SETA	Bool	%I9.1		True	True	
	B4_ALARMA_VF	Bool	%I12.2		True	True	
	B4_AUTO	Bool	%I11.0		True	True	
	B4_BOMBEANDO	Timer	%T73		True	True	
	B4_CONF_ABRIR	Bool	%I11.5		True	True	
	B4_CONF_CERRAR	Bool	%I11.7		True	True	
	B4_DISPARO_VALV	Bool	%I11.6		True	True	
	B4_DISPARO	Bool	%I11.3		True	True	
	B4_ESTADO_OK	Bool	%I11.4		True	True	
	B4_FC_ABRIR	Bool	%I12.1		True	True	
	B4_FC_CERRAR	Bool	%I12.5		True	True	
	B4_FIN_RAMPA_VF	Bool	%I12.0		True	True	
	B4_LIM_PAR_ABRE	Bool	%I12.3		True	True	
	B4_LIM_PAR_CIERRA	Bool	%I12.7		True	True	
	B4_MANUAL	Bool	%I11.2		True	True	
	B4_PRESOSTATO_MAX	Bool	%I12.6		True	True	
	B4_RESERVA	Bool	%I12.4		True	True	

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	B4_SETA	Bool	%I11.1		True	True	
	BASE_TIEMPO_1S	Bool	%M2.5		True	True	
	BIT_DE_VIDA	Bool	%M0.2		True	True	
	BOYA_ARQUETA	Bool	%I1.6		True	True	
	C1_B1	Bool	%M12.0		True	True	
	C1_B2	Bool	%M12.4		True	True	
	C1_B3	Bool	%M13.0		True	True	
	C1_B4	Bool	%M14.0		True	True	
	C2_B1	Bool	%M12.1		True	True	
	C2_B2	Bool	%M12.5		True	True	
	C2_B3	Bool	%M13.1		True	True	
	C2_B4	Bool	%M14.1		True	True	
	C3_B1	Bool	%M12.2		True	True	
	C3_B2	Bool	%M12.6		True	True	
	C3_B3	Bool	%M13.2		True	True	
	C3_B4	Bool	%M14.2		True	True	
	C4_B1	Bool	%M12.3		True	True	
	C4_B2	Bool	%M12.7		True	True	
	C4_B3	Bool	%M13.3		True	True	
	C4_B4	Bool	%M14.3		True	True	
	CERRADA_T1	Bool	%M31.0		True	True	
	CERRADA_T2	Bool	%M31.1		True	True	
	CERRADA_T3	Bool	%M31.2		True	True	
	CERRADA_T4	Bool	%M31.3		True	True	
	CERRADA_T5	Bool	%M31.4		True	True	
	CERRADA_T6	Bool	%M31.5		True	True	
	CERRADA_T7	Bool	%M31.6		True	True	
	CODIGO_ERROR	Int	%MW152		True	True	
	CONTROL_HORA_1	Bool	%M21.4		True	True	
	CONTROL_HORA_2	Bool	%M21.5		True	True	
	CONTROL_TENSION_OK	Bool	%I1.0		True	True	
	CUATRO_BOMBAS	Bool	%M10.3		True	True	
	DESARMADA_BOMBEO	Bool	%M21.3		True	True	
	DESARMADA_T3T4	Bool	%M21.2		True	True	
	DESARMADO_BALSA	Bool	%M21.0		True	True	
	DESARMADO_FILTRADO	Bool	%M21.1		True	True	
	DIAS_DESDE_MTO	Int	%MW150		True	True	
	DOS_BOMBAS	Bool	%M10.1		True	True	
	EST_FILT_PRESION_DIFERENCIAL	Int	%IW506		True	True	
	FALSA_ALARMA_T1	Bool	%M33.0		True	True	
	FALSA_ALARMA_T2	Bool	%M33.1		True	True	

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	FALSA_ALARMA_T3	Bool	%M33.2		True	True	
	FALSA_ALARMA_T4	Bool	%M33.3		True	True	
	FALSA_ALARMA_T5	Bool	%M33.4		True	True	
	FALSA_ALARMA_T6	Bool	%M33.5		True	True	
	FALSA_ALARMA_T7	Bool	%M33.6		True	True	
	RESERVA3	Bool	%I4.5		True	True	
	FILTRO_ENTRADA_ALARMA	Bool	%I1.3		True	True	
	FILTRO_ENTRADA_MARCHA	Bool	%I1.7		True	True	
	RESERVA2	Bool	%I4.4		True	True	
	FILTRO_SALIDA_ALARMA	Bool	%I1.4		True	True	FILTRO_SALIDA_MARCHA
	FILTRO_SALIDA_EN_MARCHA	Bool	%I33.0		True	True	
	RESERVA1	Bool	%I4.3		True	True	
	FL_P_T1	Bool	%M15.0		True	True	
	FL_P_T2	Bool	%M15.1		True	True	
	FL_P_T3	Bool	%M15.2		True	True	
	FL_P_T4	Bool	%M15.3		True	True	
	FL_P_T5	Bool	%M15.4		True	True	
	FL_P_T6	Bool	%M15.5		True	True	
	FL_P_T7	Bool	%M15.6		True	True	
	FLANCO_1S	Bool	%M15.7		True	True	
	FLANCO_ARRANQUE	Bool	%M8.1		True	True	
	FUGA_GASOIL	Bool	%I33.7		True	True	TRUE ESTADO SIN FUGA
	GASOIL_NIVEL	Int	%IW138		True	True	
	GRUPO_1_EN_MARCHA	Bool	%I13.2		True	True	
	GRUPO_1_NO_FALLO_TENSION	Bool	%I13.0		True	True	
	GRUPO_2_EN_MARCHA	Bool	%I13.6		True	True	
	GRUPO_2_NO_FALLO_TENSION	Bool	%I13.4		True	True	
	GRUPO_3_EN_MARCHA	Bool	%I13.3		True	True	
	GRUPO_3_NO_FALLO_TENSION	Bool	%I13.1		True	True	
	GRUPO_4_EN_MARCHA	Bool	%I13.7		True	True	
	GRUPO_4_NO_FALLO_TENSION	Bool	%I13.5		True	True	
	HAY_ROTURA_T1	Bool	%M30.0		True	True	
	HAY_ROTURA_T2	Bool	%M30.1		True	True	
	HAY_ROTURA_T3	Bool	%M30.2		True	True	
	HAY_ROTURA_T4	Bool	%M30.3		True	True	
	HAY_ROTURA_T5	Bool	%M30.4		True	True	
	HAY_ROTURA_T6	Bool	%M30.5		True	True	
	HAY_ROTURA_T7	Bool	%M30.6		True	True	
	INHIBE_INTRUSION_BOMBEO	Bool	%I33.3		True	True	
	INHIBIR_CAUDALIMETRO	Bool	%M115.7		True	True	
	INTRUSION_1	Bool	%I1.2		True	True	

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	INTRUSION_SALA_CUADROS	Bool	%I4.2		True	True	
	MANIOBRA	Bool	%I1.1		True	True	
	MARCA_CICLO	Byte	%MB2		True	True	
	NUEVA_ALARMA_R1	Bool	%M161.0		True	True	
	NUEVA_ALARMA_R2	Bool	%M161.1		True	True	
	NUEVA_ALARMA_R3	Bool	%M161.2		True	True	
	NUEVA_ALARMA_R4	Bool	%M161.3		True	True	
	NUEVA_ALARMA_R5	Bool	%M161.4		True	True	
	NUEVA_ALARMA_R6	Bool	%M161.5		True	True	
	NUEVA_ALARMA_R7	Bool	%M161.6		True	True	
	P_T1	Bool	%M16.0		True	True	
	P10	Bool	%M7.1		True	True	
	P11	Bool	%M7.2		True	True	
	P12	Bool	%M7.3		True	True	
	P13	Bool	%M7.4		True	True	
	P14	Bool	%M7.5		True	True	
	P15	Bool	%M7.6		True	True	
	P16	Bool	%M7.7		True	True	
	P9	Bool	%M7.0		True	True	
	PARANDO_C2	Bool	%M40.0		True	True	
	PARANDO_C3	Bool	%M40.1		True	True	
	PARANDO_C4	Bool	%M40.2		True	True	
	PREALARMA_BALSA	Bool	%M240.5		True	True	
	PREALARMA_BOMBEO_IN	Bool	%M240.7		True	True	
	PREALARMA_FILTRADO	Bool	%M240.2		True	True	
	PREALARMA_SALA_CUADROS	Bool	%M241.0		True	True	
	PREALARMA_T1	Bool	%M240.3		True	True	
	PREALARMA_T2	Bool	%M240.4		True	True	
	PREALARMA_T3	Bool	%M240.1		True	True	
	PREALARMA_T4	Bool	%M240.0		True	True	
	PREALARMA_T5T6	Bool	%M240.6		True	True	
	PRES_IMP_ENTRADA_FILTRO	Int	%IW136		True	True	
	PULSO_CAUDALIMETRO	Bool	%I1.5		True	True	
	PULSO_CONTADOR	Bool	%M8.2		True	True	
	Q_ABRIR_COMP_ENTRADA	Bool	%Q19.0		True	True	
	Q_ABRIR_COMP_RETENCION	Bool	%Q18.0		True	True	
	Q_ABRIR_VM_1	Bool	%Q20.0		True	True	
	Q_ABRIR_VM_2	Bool	%Q22.0		True	True	
	Q_ABRIR_VM_3	Bool	%Q24.0		True	True	
	Q_ABRIR_VM_4	Bool	%Q26.0		True	True	
	Q_CERRAR_COMP_ENTRADA	Bool	%Q19.1		True	True	

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	Q_CERRAR_COMP_RETENCION	Bool	%Q18.1		True	True	
	Q_CERRAR_VM_1	Bool	%Q20.1		True	True	
	Q_CERRAR_VM_2	Bool	%Q22.1		True	True	
	Q_CERRAR_VM_3	Bool	%Q24.1		True	True	
	Q_CERRAR_VM_4	Bool	%Q26.1		True	True	
	Q_MARCHA_B1	Bool	%Q21.1		True	True	
	Q_MARCHA_B2	Bool	%Q23.1		True	True	
	Q_MARCHA_B3	Bool	%Q25.1		True	True	
	Q_MARCHA_B4	Bool	%Q27.1		True	True	
	Q_MARCHA_FILTRO_REJA	Bool	%Q31.0		True	True	
	Q_MARCHA_FILTRO_SALIDA	Bool	%Q31.2		True	True	
	Q_MARCHA_FILTRO_W	Bool	%Q31.1		True	True	
	Q_MARCHA_GRUPO_1	Bool	%Q14.0		True	True	
	Q_MARCHA_GRUPO_2	Bool	%Q14.1		True	True	
	Q_MARCHA_GRUPO_3	Bool	%Q15.0		True	True	
	Q_MARCHA_GRUPO_4	Bool	%Q15.1		True	True	
	Q_SEGURIDAD_B1	Bool	%Q21.0		True	True	
	Q_SEGURIDAD_B2	Bool	%Q23.0		True	True	
	Q_SEGURIDAD_B3	Bool	%Q25.0		True	True	
	Q_SEGURIDAD_B4	Bool	%Q27.0		True	True	
	Q_T5_ABRIR	Bool	%Q28.0		True	True	
	Q_T5_CERRAR	Bool	%Q28.1		True	True	
	Q_T6_ABRIR	Bool	%Q29.0		True	True	
	Q_T6_CERRAR	Bool	%Q29.1		True	True	
	Q_T7_ABRIR	Bool	%Q30.0		True	True	
	Q_T7_CERRAR	Bool	%Q30.1		True	True	
	REARME_B1	Bool	%M5.1		True	True	
	REARME_B2	Bool	%M5.2		True	True	
	REARME_B3	Bool	%M5.3		True	True	
	REARME_B4	Bool	%M5.4		True	True	
	REARME_GENERAL	Bool	%M5.0		True	True	
	REARME_ROTURAS	Bool	%M5.5		True	True	
	REJA_EN_ALARMA	Bool	%I33.2		True	True	
	REJA_EN_MARCHA	Bool	%I33.1		True	True	
	SEG_MARCHA_BOMBEO	Bool	%M8.3		True	True	
	SIEMPRE0	Bool	%M0.0		True	True	
	SIEMPRE1	Bool	%M0.1		True	True	
	T5_INTRUSION	Bool	%I4.6		True	True	
	T5_PULSO	Bool	%I4.0		True	True	
	T6_PULSO	Bool	%I4.1		True	True	
	T7_PULSO	Bool	%I4.7		True	True	

	Nombre	Tipo de datos	Dirección	Remanencia	Visible en HMI	Accesible desde HMI	Comentario
	TEMP_FUGA_BALSA_SUMAS	Timer	%T31		True	True	
	TEMPORIZADO_C2	Bool	%M60.0		True	True	
	TEMPORIZADO_C3	Bool	%M60.1		True	True	
	TEMPORIZADO_C4	Bool	%M60.2		True	True	
	TRES_BOMBAS	Bool	%M10.2		True	True	
	UNA_BOMBA	Bool	%M10.0		True	True	
	V_ENTR_AUTO	Bool	%I3.0		True	True	
	V_ENTR_CONF_ABRIR	Bool	%I3.3		True	True	
	V_ENTR_CONF_CERRAR	Bool	%I3.5		True	True	
	V_ENTR_FC_ABRIR	Bool	%I3.6		True	True	
	V_ENTR_FC_CERRAR	Bool	%I3.1		True	True	
	V_ENTR_LIM_PAR_ABRE	Bool	%I3.2		True	True	
	V_ENTR_LIM_PAR_CIERRA	Bool	%I3.4		True	True	
	V_ENTR_PROT_OK	Bool	%I3.7		True	True	
	V_RET_AUTO	Bool	%I2.0		True	True	
	V_RET_CONF_ABRIR	Bool	%I2.3		True	True	
	V_RET_CONF_CERRAR	Bool	%I2.5		True	True	
	V_RET_FC_ABRIR	Bool	%I2.6		True	True	
	V_RET_FC_CERRAR	Bool	%I2.1		True	True	
	V_RET_LIM_PAR_ABRE	Bool	%I2.2		True	True	
	V_RET_LIM_PAR_CIERRA	Bool	%I2.4		True	True	
	V_RET_PROT_OK	Bool	%I2.7		True	True	

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Variables PLC / Tabla de variables estándar [427]

Constantes de usuario

Constantes de usuario				
	Nombre	Tipo de datos	Valor	Comentario

PFC_CAAM / CPU_VELILLA [IM151-8 CPU]

Tipos de datos PLC

Esta carpeta está vacía.

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Tablas de observación y forzado permanente

Tabla de forzado permanente

Nombre	Dirección	Formato visualización	Valor de forzado permanente	Comentario

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Avisos de PLC

Avisos de PLC

Avisos de PLC																							
Nombre	Tipo	ID	Banda	Lugar	Texto de aviso	Texto informativo	Categoría	Con acuse	Prioridad	Clase de visualización	Registro	Autor	Fecha de creación	Última modificación	ID de grupo	Texto adicional 1	Texto adicional 2	Texto adicional 3	Texto adicional 4	Texto adicional 5	Texto adicional 6	Texto adicional 7	Texto adicional 8	Texto adicional 9

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Avisos de PLC

Avisos de diagnóstico de usuario

Avisos de diagnóstico de usuario												
	Nombre	Tipo	Clase de error	Número	ID	Lugar	Texto informativo	Texto entrante	Texto saliente	Autor	Fecha de creación	Última modificación

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Avisos de PLC

Avisos de sistema

Avisos de sistema																								
Nombre	Tipo	ID	Banda	Lugar	Lugar	Texto de aviso	Texto informativo	Categoría	Con acuse	Prioridad	Clase de visualización	Registro	Autor	Fecha de creación	Última modificación	ID de grupo	Texto adicional 1	Texto adicional 2	Texto adicional 3	Texto adicional 4	Texto adicional 5	Texto adicional 6	Texto adicional 7	Texto adicional 8	Texto adicional 9

PFC_CAAM / CPU_VELILLA [IM151-8 CPU]

Listas de textos

Esta carpeta está vacía.

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

PM-E 24V DC_1

PM-E 24V DC_1									
General									
Nombre	PM-E 24V DC_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	4
General\Información de catálogo									
Nombre abreviado	PM-E 24V DC	**Descripción**	Módulo de potencia PM-E para módulos electrónicos, 24V DC, con diagnóstico; también disponible como módulo SIPLUS con la referencia 6AG1 138-4CA01-2AA0.	**Referencia**	6ES7 138-4CA01-0AA0	**Versión de firmware**			
Parámetros del módulo\Diagnóstico									
Diagnóstico: Falta tensión de carga L+	False								
Direcciones de diagnóstico\Direcciones de diagnóstico									
Dirección inicial	2043								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_1

8DI x 24V DC_1									
General									
Nombre	8DI x 24V DC_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	5
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	1.0	**Dirección final**	1.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_2

8DI x 24V DC_2									
General									
Nombre	8DI x 24V DC_2	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	6
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	2.0	**Dirección final**	2.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_3

8DI x 24V DC_3									
General									
Nombre	8DI x 24V DC_3	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	7
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isó-crono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firm-ware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	3.0	**Dirección final**	3.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_4

8DI x 24V DC_4									
General									
Nombre	8DI x 24V DC_4	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	8
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	4.0	**Dirección final**	4.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_5

8DI x 24V DC_5									
General									
Nombre	8DI x 24V DC_5	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	9
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	5.0	**Dirección final**	5.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_6

8DI x 24V DC_6									
General									
Nombre	8DI x 24V DC_6	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	10
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	6.0	**Dirección final**	6.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_7

8DI x 24V DC_7									
General									
Nombre	8DI x 24V DC_7	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	11
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	7.0	**Dirección final**	7.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_8

8DI x 24V DC_8									
General									
Nombre	8DI x 24V DC_8	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	12
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	8.0	**Dirección final**	8.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_9

8DI x 24V DC_9									
General									
Nombre	8DI x 24V DC_9	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	13
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	9.0	**Dirección final**	9.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_10

8DI x 24V DC_10									
General									
Nombre	8DI x 24V DC_10	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	14
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	10.0	**Dirección final**	10.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_11

8DI x 24V DC_11									
General									
Nombre	8DI x 24V DC_11	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	15
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	11.0	**Dirección final**	11.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_12

8DI x 24V DC_12									
General									
Nombre	8DI x 24V DC_12	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	16
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	12.0	**Dirección final**	12.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_13

8DI x 24V DC_13									
General									
Nombre	8DI x 24V DC_13	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	17
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isócrono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firmware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	13.0	**Dirección final**	13.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_1

2RO x NO 24/230V / 5A_1									
General									
Nombre	2RO x NO 24/230V / 5A_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	18
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	14.0	**Dirección final**	14.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_2

2RO x NO 24/230V / 5A_2									
General									
Nombre	2RO x NO 24/230V / 5A_2	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	19
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	15.0	**Dirección final**	15.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2AI x I 2WIRE ST_1

2AI x I 2WIRE ST_1									
General									
Nombre	2AI x I 2WIRE ST_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	20
General\Información de catálogo									
Nombre abreviado	2AI x I 2WIRE ST	**Descripción**	Módulo de entradas analógicas 2AI x I, TM 2 hilos (4..20mA / 13bits), estándar; también disponible como módulo SIPLUS con referencia 6AG1 134-4GB01-2AB0.	**Referencia**	6ES7 134-4GB01-0AB0	**Versión de firmware**			
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 1									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Direcciones E/S\Direcciones de entrada									
Dirección inicial	50	**Dirección final**	53	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2AI x I 2WIRE ST_2

2AI x I 2WIRE ST_2									
General									
Nombre	2AI x I 2WIRE ST_2	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	21
General\Información de catálogo									
Nombre abreviado	2AI x I 2WIRE ST	**Descripción**	Módulo de entradas analógicas 2AI x I, TM 2 hilos (4..20mA / 13bits), estándar; también disponible como módulo SIPLUS con referencia 6AG1 134-4GB01-2AB0.	**Referencia**	6ES7 134-4GB01-0AB0	**Versión de firmware**			
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 1									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Direcciones E/S\Direcciones de entrada									
Dirección inicial	54	**Dirección final**	57	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2AI x I 2WIRE ST_3

2AI x I 2WIRE ST_3									
General									
Nombre	2AI x I 2WIRE ST_3	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	22
General\Información de catálogo									
Nombre abreviado	2AI x I 2WIRE ST	**Descripción**	Módulo de entradas analógicas 2AI x I, TM 2 hilos (4..20mA / 13bits), estándar; también disponible como módulo SIPLUS con referencia 6AG1 134-4GB01-2AB0.	**Referencia**	6ES7 134-4GB01-0AB0	**Versión de firmware**			
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 1									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Direcciones E/S\Direcciones de entrada									
Dirección inicial	58	**Dirección final**	61	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_3

2RO x NO 24/230V / 5A_3									
General									
Nombre	2RO x NO 24/230V / 5A_3	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	23
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	18.0	**Dirección final**	18.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_4

2RO x NO 24/230V / 5A_4									
General									
Nombre	2RO x NO 24/230V / 5A_4	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	24
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	19.0	**Dirección final**	19.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_5

2RO x NO 24/230V / 5A_5									
General									
Nombre	2RO x NO 24/230V / 5A_5	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	25
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	20.0	**Dirección final**	20.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_6

2RO x NO 24/230V / 5A_6									
General									
Nombre	2RO x NO 24/230V / 5A_6	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	26
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	21.0	**Dirección final**	21.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_7

2RO x NO 24/230V / 5A_7									
General									
Nombre	2RO x NO 24/230V / 5A_7	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	27
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	22.0	**Dirección final**	22.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_8

2RO x NO 24/230V / 5A_8									
General									
Nombre	2RO x NO 24/230V / 5A_8	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	28
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	23.0	**Dirección final**	23.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_9

2RO x NO 24/230V / 5A_9									
General									
Nombre	2RO x NO 24/230V / 5A_9	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	29
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	24.0	**Dirección final**	24.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_10

2RO x NO 24/230V / 5A_10									
General									
Nombre	2RO x NO 24/230V / 5A_10	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	30
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	25.0	**Dirección final**	25.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_11

2RO x NO 24/230V / 5A_11									
General									
Nombre	2RO x NO 24/230V / 5A_11	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	31
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	26.0	**Dirección final**	26.1	**Memoria imagen de proceso**	MIP OB1				

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2RO x NO 24/230V / 5A_12

2RO x NO 24/230V / 5A_12									
General									
Nombre	2RO x NO 24/230V / 5A_12	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	32
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	27.0	**Dirección final**	27.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_13

2RO x NO 24/230V / 5A_13									
General									
Nombre	2RO x NO 24/230V / 5A_13	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	33
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	28.0	**Dirección final**	28.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_14

2RO x NO 24/230V / 5A_14									
General									
Nombre	2RO x NO 24/230V / 5A_14	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	34
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	29.0	**Dirección final**	29.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_15

2RO x NO 24/230V / 5A_15									
General									
Nombre	2RO x NO 24/230V / 5A_15	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	35
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	30.0	**Dirección final**	30.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2/4AI x RTD ST_1

2/4AI x RTD ST_1									
General									
Nombre	2/4AI x RTD ST_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	36
General\Información de catálogo									
Nombre abreviado	2/4AI x RTD ST	**Descripción**	Módulo de entradas analógicas 2/4AI x RTD / 15 bits+signo, estándar, R: 150 Ohm, 300 Ohm, 600 Ohm, PTC; RTD: Pt100, Ni100; también disponible como módulo SIPLUS con la referencia 6AG1 134-4JB51-7AB0.	**Referencia**	6ES7 134-4JB51-0AB0	**Versión de firmware**			
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:15:34.429	**Información adicional**			
Modo de operación									
Modo de funcionamiento	2 canales								
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Entradas\Canal 1									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Direcciones E/S\Direcciones de entrada									
Dirección inicial	62	**Dirección final**	65	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2/4AI x RTD ST_2

2/4AI x RTD ST_2									
General									
Nombre	2/4AI x RTD ST_2	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	37
General\Información de catálogo									
Nombre abreviado	2/4AI x RTD ST	**Descripción**	Módulo de entradas analógicas 2/4AI x RTD / 15 bits+signo, estándar, R: 150 Ohm, 300 Ohm, 600 Ohm, PTC; RTD: Pt100, Ni100; también disponible como módulo SIPLUS con la referencia 6AG1 134-4JB51-7AB0.	**Referencia**	6ES7 134-4JB51-0AB0	**Versión de firmware**			
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:15:43.524	**Información adicional**			
Modo de operación									
Modo de funcionamiento	2 canales								
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Entradas\Canal 1									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Direcciones E/S\Direcciones de entrada									
Dirección inicial	66	**Dirección final**	69	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2/4AI x RTD ST_3

2/4AI x RTD ST_3									
General									
Nombre	2/4AI x RTD ST_3	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	38
General\Información de catálogo									
Nombre abreviado	2/4AI x RTD ST	**Descripción**	Módulo de entradas analógicas 2/4AI x RTD / 15 bits+signo, estándar, R: 150 Ohm, 300 Ohm, 600 Ohm, PTC; RTD: Pt100, Ni100; también disponible como módulo SIPLUS con la referencia 6AG1 134-4JB51-7AB0.	**Referencia**	6ES7 134-4JB51-0AB0	**Versión de firmware**			
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:15:47.190	**Información adicional**			
Modo de operación									
Modo de funcionamiento	2 canales								
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Entradas\Canal 1									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Direcciones E/S\Direcciones de entrada									
Dirección inicial	70	**Dirección final**	73	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2/4AI x RTD ST_4

2/4AI x RTD ST_4									
General									
Nombre	2/4AI x RTD ST_4	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	39
General\Información de catálogo									
Nombre abreviado	2/4AI x RTD ST	**Descripción**	Módulo de entradas analógicas 2/4AI x RTD / 15 bits+signo, estándar, R: 150 Ohm, 300 Ohm, 600 Ohm, PTC; RTD: Pt100, Ni100; también disponible como módulo SIPLUS con la referencia 6AG1 134-4JB51-7AB0.	**Referencia**	6ES7 134-4JB51-0AB0	**Versión de firmware**			
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:15:49.265	**Información adicional**			
Modo de operación									
Modo de funcionamiento	2 canales								
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Entradas\Canal 1									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Direcciones E/S\Direcciones de entrada									
Dirección inicial	74	**Dirección final**	77	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2/4AI x RTD ST_5

2/4AI x RTD ST_5									
General									
Nombre	2/4AI x RTD ST_5	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	40
General\Información de catálogo									
Nombre abreviado	2/4AI x RTD ST	**Descripción**	Módulo de entradas analógicas 2/4AI x RTD / 15 bits+signo, estándar, R: 150 Ohm, 300 Ohm, 600 Ohm, PTC; RTD: Pt100, Ni100; también disponible como módulo SIPLUS con la referencia 6AG1 134-4JB51-7AB0.	**Referencia**	6ES7 134-4JB51-0AB0	**Versión de firmware**			
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:15:51.605	**Información adicional**			
Modo de operación									
Modo de funcionamiento	2 canales								
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Entradas\Canal 1									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Direcciones E/S\Direcciones de entrada									
Dirección inicial	94	**Dirección final**	97	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2/4AI x RTD ST_6

2/4AI x RTD ST_6									
General									
Nombre	2/4AI x RTD ST_6	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	41
General\Información de catálogo									
Nombre abreviado	2/4AI x RTD ST	**Descripción**	Módulo de entradas analógicas 2/4AI x RTD / 15 bits+signo, estándar, R: 150 Ohm, 300 Ohm, 600 Ohm, PTC; RTD: Pt100, Ni100; también disponible como módulo SIPLUS con la referencia 6AG1 134-4JB51-7AB0.	**Referencia**	6ES7 134-4JB51-0AB0	**Versión de firmware**			
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:15:54.085	**Información adicional**			
Modo de operación									
Modo de funcionamiento	2 canales								
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Entradas\Canal 1									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Direcciones E/S\Direcciones de entrada									
Dirección inicial	102	**Dirección final**	105	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2/4AI x RTD ST_7

2/4AI x RTD ST_7									
General									
Nombre	2/4AI x RTD ST_7	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	42
General\Información de catálogo									
Nombre abreviado	2/4AI x RTD ST	**Descripción**	Módulo de entradas analógicas 2/4AI x RTD / 15 bits+signo, estándar, R: 150 Ohm, 300 Ohm, 600 Ohm, PTC; RTD: Pt100, Ni100; también disponible como módulo SIPLUS con la referencia 6AG1 134-4JB51-7AB0.	**Referencia**	6ES7 134-4JB51-0AB0	**Versión de firmware**			
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:15:56.129	**Información adicional**			
Modo de operación									
Modo de funcionamiento	2 canales								
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Entradas\Canal 1									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Direcciones E/S\Direcciones de entrada									
Dirección inicial	110	**Dirección final**	113	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2/4AI x RTD ST_8

2/4AI x RTD ST_8									
General									
Nombre	2/4AI x RTD ST_8	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	43
General\Información de catálogo									
Nombre abreviado	2/4AI x RTD ST	**Descripción**	Módulo de entradas analógicas 2/4AI x RTD / 15 bits+signo, estándar, R: 150 Ohm, 300 Ohm, 600 Ohm, PTC; RTD: Pt100, Ni100; también disponible como módulo SIPLUS con la referencia 6AG1 134-4JB51-7AB0.	**Referencia**	6ES7 134-4JB51-0AB0	**Versión de firmware**			
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:15:59.389	**Información adicional**			
Modo de operación									
Modo de funcionamiento	2 canales								
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Entradas\Canal 1									
Tipo de medición	Termorresistencia (lineal, 4 hilos)	**Rango de medición**	Rango estándar Pt 100	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno		
Direcciones E/S\Direcciones de entrada									
Dirección inicial	118	**Dirección final**	121	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2AI x I 4WIRE ST_1

2AI x I 4WIRE ST_1									
General									
Nombre	2AI x I 4WIRE ST_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	44
General\Información de catálogo									
Nombre abreviado	2AI x I 4WIRE ST	**Descripción**	Módulo de entradas analógicas 2AI x I, MU 4 hilos (+/-20mA / 13bits+signo, 4..20mA / 13bits), estándar; también disponible como módulo SIPLUS con referencia 6AG1 134-4GB11-2AB0.	**Referencia**	6ES7 134-4GB11-0AB0	**Versión de firmware**			
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo/rango de medición	Intensidad (TM4H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 1									
Tipo/rango de medición	Intensidad (TM4H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Direcciones E/S\Direcciones de entrada									
Dirección inicial	128	**Dirección final**	131	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2AI x I 4WIRE ST_2

2AI x I 4WIRE ST_2									
General									
Nombre	2AI x I 4WIRE ST_2	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	45
General\Información de catálogo									
Nombre abreviado	2AI x I 4WIRE ST	**Descripción**	Módulo de entradas analógicas 2AI x I, MU 4 hilos (+/-20mA / 13bits+signo, 4..20mA / 13bits), estándar; también disponible como módulo SIPLUS con referencia 6AG1 134-4GB11-2AB0.	**Referencia**	6ES7 134-4GB11-0AB0	**Versión de firmware**			
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo/rango de medición	Intensidad (TM4H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 1									
Tipo/rango de medición	Intensidad (TM4H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Direcciones E/S\Direcciones de entrada									
Dirección inicial	132	**Dirección final**	135	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

4AI x I 2WIRE ST_1

4AI x I 2WIRE ST_1									
General									
Nombre	4AI x I 2WIRE ST_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	46
General\Información de catálogo									
Nombre abreviado	4AI x I 2WIRE ST	**Descripción**	Módulo de entradas analógicas 4AI x I, MU 2 hilos (4..20mA / 13bits), estándar; también disponible como módulo SIPLUS con referencia 6AG1 134-4GD00-2AB0.	**Referencia**	6ES7 134-4GD00-0AB0	**Versión de firmware**			
Entradas									
Diagnóstico de grupo	desactivado	**Rebase de diagnóstico por exceso o por defecto**	desactivado						
Entradas\Canal 0									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 1									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 2									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 3									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Direcciones E/S\Direcciones de entrada									
Dirección inicial	136	**Dirección final**	143	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_16

2RO x NO 24/230V / 5A_16									
General									
Nombre	2RO x NO 24/230V / 5A_16	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	47
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	31.0	**Dirección final**	31.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

2RO x NO 24/230V / 5A_17

2RO x NO 24/230V / 5A_17									
General									
Nombre	2RO x NO 24/230V / 5A_17	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	48
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	32.0	**Dirección final**	32.1	**Memoria imagen de proceso**	MIP OB1				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Módulos locales

8DI x 24V DC_14

8DI x 24V DC_14									
General									
Nombre	8DI x 24V DC_14	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	49
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isó-crono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firm-ware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	33.0	**Dirección final**	33.7	**Memoria imagen de proceso**	MIP OB1	**Número de OB de alarma**	40		

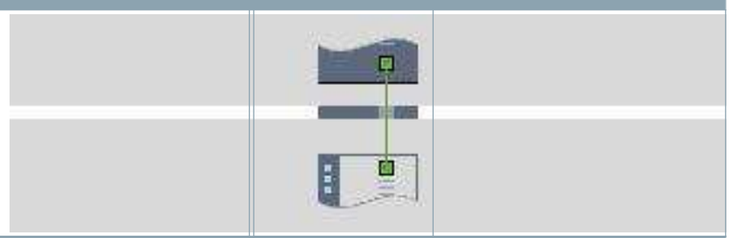
PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada

PROFINET IO-System (100): PN/IE_1

PROFINET IO-System					
General					
Nombre:	PROFINET IO-System	**Número:**	100	**Utilizar nombre como amplia-ción de nombre PROFINET.**	False

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1

BALSA

BALSA									
General									
Nombre	BALSA	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	0
General\Información de catálogo									
Nombre abreviado	IM 151-3 PN	**Descripción**	Dispositivo PROFINET IO módulo de interfaz IM 151-3 PN ST (ERTEC200) para módulos electrónicos ET200S, soporta compresión de direcciones; interfaz PROFINET y 2 puertos; actualización de FW vía bus; diagnóstico de puerto; funcionalidad I&M; IRT y arranque optimizado; firmware V7.0	**Referencia**	6ES7 151-3AA23-0AB0	**Versión de firmware**	V7.0		
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:19:41.955	**Información adicional**			
Interfaz PROFINET [X1]\General									
Nombre	Interfaz PROFINET	**Comentario**							
Interfaz PROFINET [X1]\Direcciones Ethernet\Interfaz conectada en red con									
Subred:	PN/IE_1								
Interfaz PROFINET [X1]\Direcciones Ethernet\PROFINET									
Generar automáticamente el nombre del dispositivo PROFINET	True	**Nombre del dispositivo PROFINET**	balsa	**Nombre convertido:**	balsa	**Número de dispositivo:**	3		
Interfaz PROFINET [X1]\Opciones avanzadas\Opciones de interfaz									
Arranque optimizado	False	**Usar modo LLDP IEC V2.2**	True						
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Ciclo IO\Tiempo de actualización									
Automática	True	**Tiempo de actualización**	2,000ms	**Ajustable**	False				
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Ciclo IO\Tiempo de supervisión de respuesta									
Activar supervisión de respuesta tras	3ciclos si faltan datos IO.	**Tiempo de supervisión de respuesta:**	6,000ms						
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Sincronización									
Dominio de sincronización:	Sync-Domain_1	**Clase RT:**	Rt	**Función de sincronización:**	NotSynchronized				
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\General									
Slot	1	**Nombre**	Port_1	**Slot**	2	**Comentario**		**Nombre**	Port_2
Comentario									
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Interconexión de puertos\Puerto local:									
Puerto local:	BALSA\Interfaz PROFINET [X1]\Port_1 [X1 P1 R]	**Medio:**	Cobre	**Denominación del cable:**	---				
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Interconexión de puertos\Puerto interlocutor:									
Interlocutores alternativos	False	**Puerto interlocutor:**	Cualquier interlocutor						

Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Opciones de puerto\Activar							
Activar este puerto para el uso	True						
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Opciones de puerto\Conexión							
Velocidad de transferencia/dúplex:	Automático	**Monitorizar**	False	**Activar autonegotiation**	True		
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Opciones de puerto\Boundaries							
Fin del registro de dispositivos accesibles	False	**Fin de la detección de topología**	False	**Fin del dominio Sync**	False		
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Direcciones de diagnóstico\Direcciones de diagnóstico							
Dirección inicial	2029	**Dirección inicial**	2028				
Interfaz PROFINET [X1]\Direcciones de diagnóstico\Direcciones de diagnóstico							
Dirección inicial	2030						
Parámetros del módulo							
Supresión de frecuencias perturbadoras	50 Hz	**Longitud de bus**	Menor o igual a 1 m	**Slot de unión fría**	Sin unión fría	**Entrada de unión fría**	RTD en canal 0
Parámetros del módulo\Configuración futura							
Configuración futura	False						
Direcciones de diagnóstico\Direcciones de diagnóstico							
Dirección inicial	2031						

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / BALSA

PM-E 24V DC_1

PM-E 24V DC_1									
General									
Nombre	PM-E 24V DC_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	1
General\Información de catálogo									
Nombre abreviado	PM-E 24V DC	**Descripción**	Módulo de potencia PM-E para módulos electrónicos, 24V DC, con diagnóstico; también disponible como módulo SIPLUS con la referencia 6AG1 138-4CA01-2AA0.	**Referencia**	6ES7 138-4CA01-0AA0	**Versión de firmware**			
Parámetros del módulo\Diagnóstico									
Diagnóstico: Falta tensión de carga L+	False								
Direcciones de diagnóstico\Direcciones de diagnóstico									
Dirección inicial	2027								
Direcciones E/S									
Byte de estado	False								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / BALSA

8DI x 24V DC_1

8DI x 24V DC_1									
General									
Nombre	8DI x 24V DC_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	2
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isó-crono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firm-ware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	600.0	**Dirección final**	600.7	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / BALSA

8DI x 24V DC_2

8DI x 24V DC_2									
General									
Nombre	8DI x 24V DC_2	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	3
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isó-crono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firm-ware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	601.0	**Dirección final**	601.7	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / BALSA

2AI x I 2WIRE ST_1

2AI x I 2WIRE ST_1									
General									
Nombre	2AI x I 2WIRE ST_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	4
General\Información de catálogo									
Nombre abreviado	2AI x I 2WIRE ST	**Descripción**	Módulo de entradas analógicas 2AI x I, TM 2 hilos (4..20mA / 13bits), estándar; también disponible como módulo SIPLUS con referencia 6AG1 134-4GB01-2AB0.	**Referencia**	6ES7 134-4GB01-0AB0	**Versión de firmware**			
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 1									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Direcciones E/S\Direcciones de entrada									
Dirección inicial	602	**Dirección final**	605	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

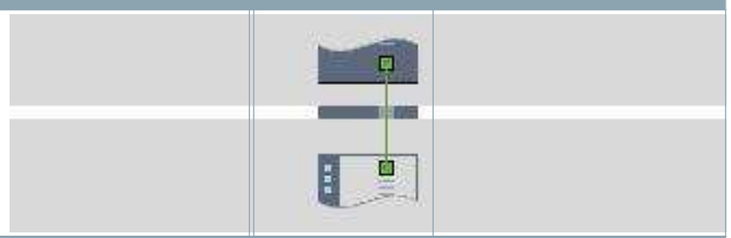
PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / BALSA

2RO x NO 24/230V / 5A_1

2RO x NO 24/230V / 5A_1									
General									
Nombre	2RO x NO 24/230V / 5A_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	5
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	600.0	**Dirección final**	600.1	**Memoria imagen de proceso**	---				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1

FILTRADO

FILTRADO									
General									
Nombre	FILTRADO	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	0
General\Información de catálogo									
Nombre abreviado	IM 151-3 PN	**Descripción**	Dispositivo PROFINET IO módulo de interfaz IM 151-3 PN ST (ERTEC200) para módulos electrónicos ET200S, soporta compresión de direcciones; interfaz PROFINET y 2 puertos; actualización de FW vía bus; diagnóstico de puerto; funcionalidad I&M; IRT y arranque optimizado; firmware V7.0	**Referencia**	6ES7 151-3AA23-0AB0	**Versión de firmware**	V7.0		
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:19:25.450	**Información adicional**			
Interfaz PROFINET [X1]\General									
Nombre	Interfaz PROFINET	**Comentario**							
Interfaz PROFINET [X1]\Direcciones Ethernet\Interfaz conectada en red con									
Subred:	PN/IE_1								
Interfaz PROFINET [X1]\Direcciones Ethernet\PROFINET									
Generar automáticamente el nombre del dispositivo PROFINET	True	**Nombre del dispositivo PROFINET**	filtrado	**Nombre convertido:**	filtrado	**Número de dispositivo:**	2		
Interfaz PROFINET [X1]\Opciones avanzadas\Opciones de interfaz									
Arranque optimizado	False	**Usar modo LLDP IEC V2.2**	True						
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Ciclo IO\Tiempo de actualización									
Automática	True	**Tiempo de actualización**	2,000ms	**Ajustable**	False				
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Ciclo IO\Tiempo de supervisión de respuesta									
Activar supervisión de respuesta tras	3ciclos si faltan datos IO.	**Tiempo de supervisión de respuesta:**	6,000ms						
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Sincronización									
Dominio de sincronización:	Sync-Domain_1	**Clase RT:**	Rt	**Función de sincronización:**	NotSynchronized				
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\General									
Slot	1	**Nombre**	Port_1	**Slot**	2	**Comentario**		**Nombre**	Port_2
Comentario									
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Interconexión de puertos\Puerto local:									
Puerto local:	FILTRADO\Interfaz PROFINET [X1]\Port_1 [X1 P1 R]	**Medio:**	Cobre	**Denominación del cable:**	---				
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Interconexión de puertos\Puerto interlocutor:									
Interlocutores alternativos	False	**Puerto interlocutor:**	Cualquier interlocutor						

Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Opciones de puerto\Activar							
Activar este puerto para el uso	True						
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Opciones de puerto\Conexión							
Velocidad de transferencia/dúplex:	Automático	**Monitorizar**	False	**Activar autonegotiation**	True		
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Opciones de puerto\Boundaries							
Fin del registro de dispositivos accesibles	False	**Fin de la detección de topología**	False	**Fin del dominio Sync**	False		
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Direcciones de diagnóstico\Direcciones de diagnóstico							
Dirección inicial	2034	**Dirección inicial**	2033				
Interfaz PROFINET [X1]\Direcciones de diagnóstico\Direcciones de diagnóstico							
Dirección inicial	2035						
Parámetros del módulo							
Supresión de frecuencias perturbadoras	50 Hz	**Longitud de bus**	Menor o igual a 1 m	**Slot de unión fría**	Sin unión fría	**Entrada de unión fría**	RTD en canal 0
Parámetros del módulo\Configuración futura							
Configuración futura	False						
Direcciones de diagnóstico\Direcciones de diagnóstico							
Dirección inicial	2036						

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / FILTRADO

PM-E 24V DC_1

PM-E 24V DC_1									
General									
Nombre	PM-E 24V DC_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	1
General\Información de catálogo									
Nombre abreviado	PM-E 24V DC	**Descripción**	Módulo de potencia PM-E para módulos electrónicos, 24V DC, con diagnóstico; también disponible como módulo SIPLUS con la referencia 6AG1 138-4CA01-2AA0.	**Referencia**	6ES7 138-4CA01-0AA0	**Versión de firmware**			
Parámetros del módulo\Diagnóstico									
Diagnóstico: Falta tensión de carga L+	False								
Direcciones de diagnóstico\Direcciones de diagnóstico									
Dirección inicial	2032								
Direcciones E/S									
Byte de estado	False								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / FILTRADO

8DI x 24V DC_1

8DI x 24V DC_1									
General									
Nombre	8DI x 24V DC_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	2
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isó-crono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firm-ware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	500.0	**Dirección final**	500.7	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / FILTRADO

2AI x I 2WIRE ST_1

2AI x I 2WIRE ST_1									
General									
Nombre	2AI x I 2WIRE ST_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	3
General\Información de catálogo									
Nombre abreviado	2AI x I 2WIRE ST	**Descripción**	Módulo de entradas analógicas 2AI x I, TM 2 hilos (4..20mA / 13bits), estándar; también disponible como módulo SIPLUS con referencia 6AG1 134-4GB01-2AB0.	**Referencia**	6ES7 134-4GB01-0AB0	**Versión de firmware**			
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 1									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Direcciones E/S\Direcciones de entrada									
Dirección inicial	502	**Dirección final**	505	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / FILTRADO

2AI x I 2WIRE ST_2

2AI x I 2WIRE ST_2									
General									
Nombre	2AI x I 2WIRE ST_2	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	4
General\Información de catálogo									
Nombre abreviado	2AI x I 2WIRE ST	**Descripción**	Módulo de entradas analógicas 2AI x I, TM 2 hilos (4..20mA / 13bits), estándar; también disponible como módulo SIPLUS con referencia 6AG1 134-4GB01-2AB0.	**Referencia**	6ES7 134-4GB01-0AB0	**Versión de firmware**			
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 1									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Direcciones E/S\Direcciones de entrada									
Dirección inicial	506	**Dirección final**	509	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / FILTRADO

2RO x NO 24/230V / 5A_1

2RO x NO 24/230V / 5A_1									
General									
Nombre	2RO x NO 24/230V / 5A_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	5
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	500.0	**Dirección final**	500.1	**Memoria imagen de proceso**	---				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / FILTRADO

2RO x NO 24/230V / 5A_2

2RO x NO 24/230V / 5A_2									
General									
Nombre	2RO x NO 24/230V / 5A_2	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	6
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	501.0	**Dirección final**	501.1	**Memoria imagen de proceso**	---				

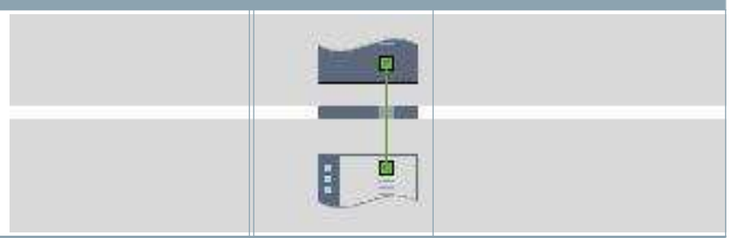
PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / FILTRADO

2RO x NO 24/230V / 5A_3

2RO x NO 24/230V / 5A_3									
General									
Nombre	2RO x NO 24/230V / 5A_3	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	7
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	502.0	**Dirección final**	502.1	**Memoria imagen de proceso**	---				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1

T3-T4

T3-T4									
General									
Nombre	T3-T4	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	0
General\Información de catálogo									
Nombre abreviado	IM 151-3 PN	**Descripción**	Dispositivo PROFINET IO módulo de interfaz IM 151-3 PN ST (ERTEC200) para módulos electrónicos ET200S, soporta compresión de direcciones; interfaz PROFINET y 2 puertos; actualización de FW vía bus; diagnóstico de puerto; funcionalidad I&M; IRT y arranque optimizado; firmware V7.0	**Referencia**	6ES7 151-3AA23-0AB0	**Versión de firmware**	V7.0		
General\Identification & Maintenance									
ID de la instalación		**ID de situación**		**Fecha de instalación**	2015-05-12 21:19:13.906	**Información adicional**			
Interfaz PROFINET [X1]\General									
Nombre	Interfaz PROFINET	**Comentario**							
Interfaz PROFINET [X1]\Direcciones Ethernet\Interfaz conectada en red con									
Subred:	PN/IE_1								
Interfaz PROFINET [X1]\Direcciones Ethernet\PROFINET									
Generar automáticamente el nombre del dispositivo PROFINET	True	**Nombre del dispositivo PROFINET**	t3-t4	**Nombre convertido:**	t3-t4	**Número de dispositivo:**	1		
Interfaz PROFINET [X1]\Opciones avanzadas\Opciones de interfaz									
Arranque optimizado	False	**Usar modo LLDP IEC V2.2**	True						
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Ciclo IO\Tiempo de actualización									
Automática	True	**Tiempo de actualización**	2,000ms	**Ajustable**	False				
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Ciclo IO\Tiempo de supervisión de respuesta									
Activar supervisión de respuesta tras	3ciclos si faltan datos IO.	**Tiempo de supervisión de respuesta:**	6,000ms						
Interfaz PROFINET [X1]\Opciones avanzadas\Configuración en tiempo real\Sincronización									
Dominio de sincronización:	Sync-Domain_1	**Clase RT:**	Rt	**Función de sincronización:**	NotSynchronized				
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\General									
Slot	1	**Nombre**	Port_1	**Slot**	2	**Comentario**		**Nombre**	Port_2
Comentario									
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Interconexión de puertos\Puerto local:									
Puerto local:	T3-T4\Interfaz PROFINET [X1]\Port_1 [X1 P1 R]	**Medio:**	Cobre	**Denominación del cable:**	---				
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Interconexión de puertos\Puerto interlocutor:									
Interlocutores alternativos	False	**Puerto interlocutor:**	Cualquier interlocutor						

Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Opciones de puerto\Activar							
Activar este puerto para el uso	True						
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Opciones de puerto\Conexión							
Velocidad de transferencia/dúplex:	Automático	**Monitorizar**	False	**Activar autonegotiation**	True		
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Opciones de puerto\Boundaries							
Fin del registro de dispositivos accesibles	False	**Fin de la detección de topología**	False	**Fin del dominio Sync**	False		
Interfaz PROFINET [X1]\Opciones avanzadas\Port [X1 P1 R]\Direcciones de diagnóstico\Direcciones de diagnóstico							
Dirección inicial	2039	**Dirección inicial**	2038				
Interfaz PROFINET [X1]\Direcciones de diagnóstico\Direcciones de diagnóstico							
Dirección inicial	2040						
Parámetros del módulo							
Supresión de frecuencias perturbadoras	50 Hz	**Longitud de bus**	Menor o igual a 1 m	**Slot de unión fría**	Sin unión fría	**Entrada de unión fría**	RTD en canal 0
Parámetros del módulo\Configuración futura							
Configuración futura	False						
Direcciones de diagnóstico\Direcciones de diagnóstico							
Dirección inicial	2041						

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / T3-T4

PM-E 24V DC_1

PM-E 24V DC_1									
General									
Nombre	PM-E 24V DC_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	1
General\Información de catálogo									
Nombre abreviado	PM-E 24V DC	**Descripción**	Módulo de potencia PM-E para módulos electrónicos, 24V DC, con diagnóstico; también disponible como módulo SIPLUS con la referencia 6AG1 138-4CA01-2AA0.	**Referencia**	6ES7 138-4CA01-0AA0	**Versión de firmware**			
Parámetros del módulo\Diagnóstico									
Diagnóstico: Falta tensión de carga L+	False								
Direcciones de diagnóstico\Direcciones de diagnóstico									
Dirección inicial	2037								
Direcciones E/S									
Byte de estado	False								

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / T3-T4

8DI x 24V DC_1

8DI x 24V DC_1									
General									
Nombre	8DI x 24V DC_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	2
General\Información de catálogo									
Nombre abreviado	8DI x 24V DC	**Descripción**	Módulo de entradas digitales 8DI x 24V DC, soporta el modo isó-crono; también disponible como módulo SIPLUS con la referencia 6AG1 131-4BF00-7AA0.	**Referencia**	6ES7 131-4BF00-0AA0	**Versión de firm-ware**			
Direcciones E/S\Direcciones de entrada									
Dirección inicial	400.0	**Dirección final**	400.7	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / T3-T4

2AI x I 2WIRE ST_1

2AI x I 2WIRE ST_1									
General									
Nombre	2AI x I 2WIRE ST_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	3
General\Información de catálogo									
Nombre abreviado	2AI x I 2WIRE ST	**Descripción**	Módulo de entradas analógicas 2AI x I, TM 2 hilos (4..20mA / 13bits), estándar; también disponible como módulo SIPLUS con referencia 6AG1 134-4GB01-2AB0.	**Referencia**	6ES7 134-4GB01-0AB0	**Versión de firmware**			
Entradas									
Diagnóstico de grupo	desactivado	**Rebase por exceso/por defecto**	desactivado						
Entradas\Canal 0									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Entradas\Canal 1									
Tipo/rango de medición	Intensidad (TM2H): 4..20 mA	**Rotura de hilo**	desactivado	**Filtrado**	Ninguno				
Direcciones E/S\Direcciones de entrada									
Dirección inicial	402	**Dirección final**	405	**Memoria imagen de proceso**	---	**Número de OB de alarma**	40		

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / T3-T4

2RO x NO 24/230V / 5A_1

2RO x NO 24/230V / 5A_1									
General									
Nombre	2RO x NO 24/230V / 5A_1	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	4
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	401.0	**Dirección final**	401.1	**Memoria imagen de proceso**	---				

PFC_CAAM / CPU_VELILLA [IM151-8 CPU] / Periferia descentralizada / PROFINET IO-System (100): PN/IE_1 / T3-T4

2RO x NO 24/230V / 5A_2

2RO x NO 24/230V / 5A_2									
General									
Nombre	2RO x NO 24/230V / 5A_2	**Autor**	César	**Comentario**		**Rack**	0	**Slot**	5
General\Información de catálogo									
Nombre abreviado	2RO x NO 24/230V / 5A	**Descripción**	Módulo de salidas digitales 2DO x relé 24..230V UC / 5A; también disponible como módulo SIPLUS con referencia 6AG1 132-4HB01-2AB0.	**Referencia**	6ES7 132-4HB01-0AB0	**Versión de firmware**			
Salidas									
Reacción a STOP de la CPU	Aplicar valor sustitutivo								
Salidas\Canal 0									
Aplicar valor sustitutivo	0								
Salidas\Canal 1									
Aplicar valor sustitutivo	0								
Direcciones E/S\Direcciones de salida									
Dirección inicial	402.0	**Dirección final**	402.1	**Memoria imagen de proceso**	---				

PFC_CAAM / Datos comunes

Categorías

Categorías		
Nombre	**Nombre de visualización**	**Con acuse**

PFC_CAAM / Datos comunes

Listas de textos

SYSTEM_AlarmServices_PriorityList			
Selección	Decimal	**Id**	0
Observación			

SYSTEM_AlarmServices_PriorityList		
Rango de	**Rango hasta**	**Entrada**
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16

SYSTEM_AlarmServices_DisplayClassList			
Selección	Decimal	**Id**	0
Observación			

SYSTEM_AlarmServices_DisplayClassList		
Rango de	**Rango hasta**	**Entrada**
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16

SYSTEM_AlarmServices_AcknowledgementGroupList			
Selección	Decimal	**Id**	0
Observación			

SYSTEM_AlarmServices_AcknowledgementGroupList		
Rango de	**Rango hasta**	**Entrada**
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16

SYSTEM_AlarmServices_ProducerList			
Selección	Decimal	**Id**	0
Observación			

SYSTEM_AlarmServices_ProducerList		
Rango de	**Rango hasta**	**Entrada**
0	0	Programa de usuario
1	1	Notificar errores de sistema
2	2	Programa de usuario
3	3	Programa de usuario
4	4	Diagnóstico de sistema
5	5	Motion Control
6	6	Seguridad
7	7	SINUMERIK

SYSTEM_AlarmServices_TextNameList			
Selección	Decimal	**Id**	0
Observación			

SYSTEM_AlarmServices_TextNameList		
Rango de	**Rango hasta**	**Entrada**
0	0	Texto informativo
1	1	Texto de aviso
2	2	Texto adicional 1
3	3	Texto adicional 2
4	4	Texto adicional 3
5	5	Texto adicional 4
6	6	Texto adicional 5
7	7	Texto adicional 6
8	8	Texto adicional 7
9	9	Texto adicional 8
10	10	Texto adicional 9

PFC_CAAM / Datos comunes

Informes

Esta carpeta está vacía.

PFC_CAAM / Idiomas y recursos

Idiomas del proyecto

Idiomas
Idioma de referencia
Español (España)

Idioma de edición
Español (España)

Otros idiomas del proyecto
Vacío

PFC_CAAM / Idiomas y recursos / Textos del proyecto

Textos del proyecto

Textos del proyecto		
Español (España)	**Categoría**	**Referencia**
	Otra categoría de texto	PFC_CAAM\Comment
"Main Program Sweep (Cycle)"	Categoría de textos multilingües	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Bloques de programa\Main [OB1]\Comment
0	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\0\Entry
0	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\0\Entry
0	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\0\Entry
1	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\1\Entry
1	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\1\Entry
1	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\1\Entry
10	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\10\Entry
10	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\10\Entry
10	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\10\Entry
11	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\11\Entry
11	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\11\Entry
11	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\11\Entry
12	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\12\Entry
12	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\12\Entry
12	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\12\Entry
13	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\13\Entry
13	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\13\Entry
13	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\13\Entry
14	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\14\Entry
14	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\14\Entry
14	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\14\Entry
15	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\15\Entry
15	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\15\Entry
15	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\15\Entry
16	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\16\Entry
16	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\16\Entry
16	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\16\Entry
2	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\2\Entry
2	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\2\Entry
2	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\2\Entry
3	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\3\Entry
3	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\3\Entry
3	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\3\Entry
4	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\4\Entry
4	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\4\Entry
4	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\4\Entry
5	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\5\Entry
5	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\5\Entry
5	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\5\Entry
6	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\6\Entry
6	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\6\Entry
6	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\6\Entry
7	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\7\Entry
7	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\7\Entry
7	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\7\Entry
8	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\8\Entry
8	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\8\Entry
8	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\8\Entry

Español (España)	Categoría	Referencia
9	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_PriorityList\9\Entry
9	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_DisplayClassList\9\Entry
9	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_AcknowledgementGroupList\9\Entry
AVISO DE REVISION SISTEMA CONTROL	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_MTO_ELECTRICO\Comment
Diagnóstico de sistema	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_ProducerList\SysDiag\Entry
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_AN_PRESION_R1\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_AN_PRESION_R2\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_AN_PRESION_R6\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_AN_CAUDAL_BALSA\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_AN_CAUDAL_IMPULS\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_AN_NIVEL_BALSA\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_AN_PRESION_R4\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_ANALOGICA_IMP1\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_ANALOGICA_IMP2\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_AN_PRESION_R3\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_AN_PRESION_R5\Comment
ERROR MEDICION SEÑAL ANALOGICA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\ALARMA_AN_PRESION_R7\Comment
FILTRO_SALIDA_MARCHA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\FILTRO_SALIDA_ALARMA\Comment
INICIALIZACION DE CALCULOS	Categoría de textos multilingües	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Bloques de programa\CALCULO_HORARIOS [FC60]\\Comment
INICIALIZACION DE CALCULOS	Categoría de textos multilingües	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Bloques de programa\CALCULO_HORARIOS [FC60]\\Comment
INICIALIZACION DE CALCULOS	Categoría de textos multilingües	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Bloques de programa\CALCULO_HORARIOS [FC60]\\Comment
Motion Control	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_ProducerList\SMC\Entry
Notificar errores de sistema	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_ProducerList\Rse\Entry
Programa de usuario	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_ProducerList\Alarming\Entry
Programa de usuario	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_ProducerList\Iecpl\Entry
Programa de usuario	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_ProducerList\Simotion\Entry
Seguridad	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_ProducerList\Security\Entry
SINUMERIK	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_ProducerList\Sinumerik\Entry
Texto adicional 1	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto adicional 1\Entry
Texto adicional 2	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto adicional 2\Entry
Texto adicional 3	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto adicional 3\Entry
Texto adicional 4	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto adicional 4\Entry
Texto adicional 5	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto adicional 5\Entry
Texto adicional 6	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto adicional 6\Entry
Texto adicional 7	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto adicional 7\Entry
Texto adicional 8	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto adicional 8\Entry
Texto adicional 9	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto adicional 9\Entry
Texto de aviso	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto de aviso\Entry
Texto informativo	Categoría de listas de textos	PFC_CAAM\SYSTEM_AlarmServices_TextNameList\Texto informativo\Entry
TRUE ESTADO SIN FUGA	Categoría de texto Comentario de variable	PFC_CAAM\CPU_VELILLA [IM151-8 CPU]\Variables PLC\Tabla de variables estándar [427]\FUGA_GASOIL\Comment

ANEXO III –PROGRAMA DE SCADA–

PROYECTO FINAL DE CARRERA

Automatización y control de fugas de red de bombeo agrícola

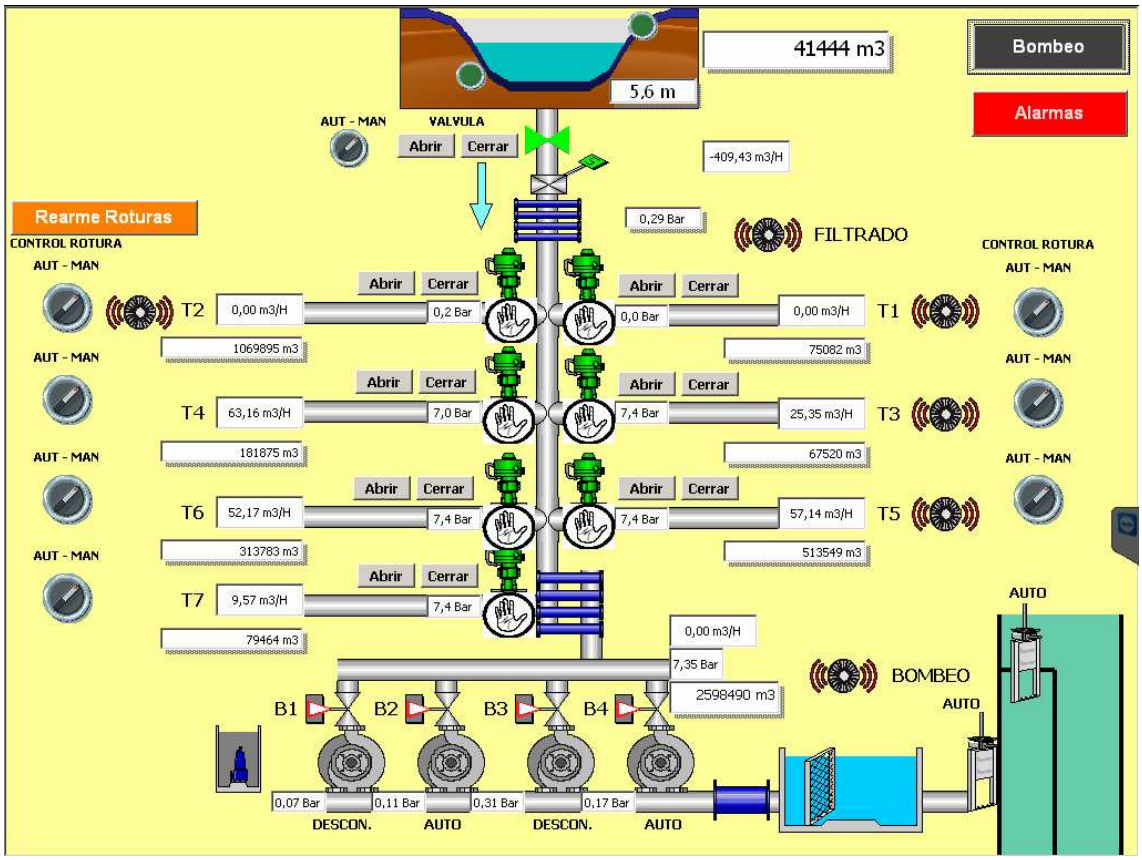
AUTOR
César Alberto Alegre Melero

DIRECTOR
Ramón Piedrafita Moreno

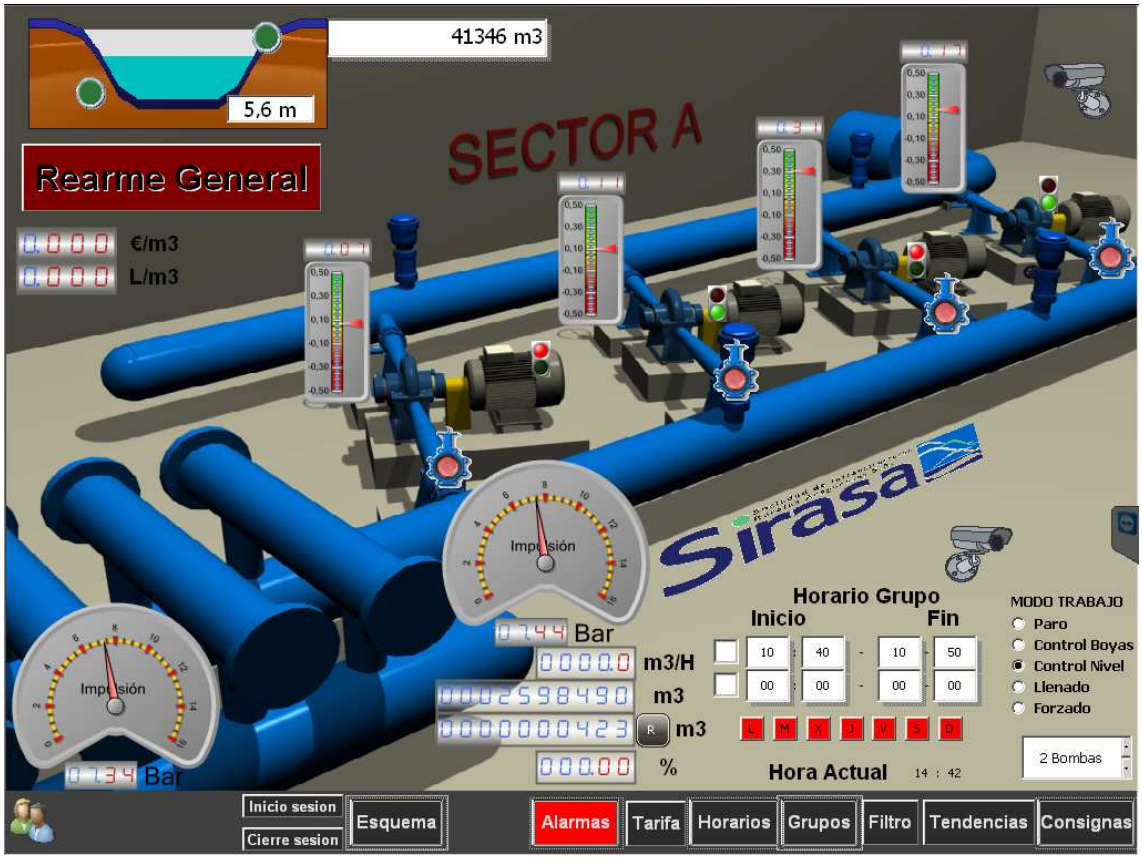
TITULO
Ingeniería Técnica Industrial

ESPECIALIDAD
Electrónica Industrial

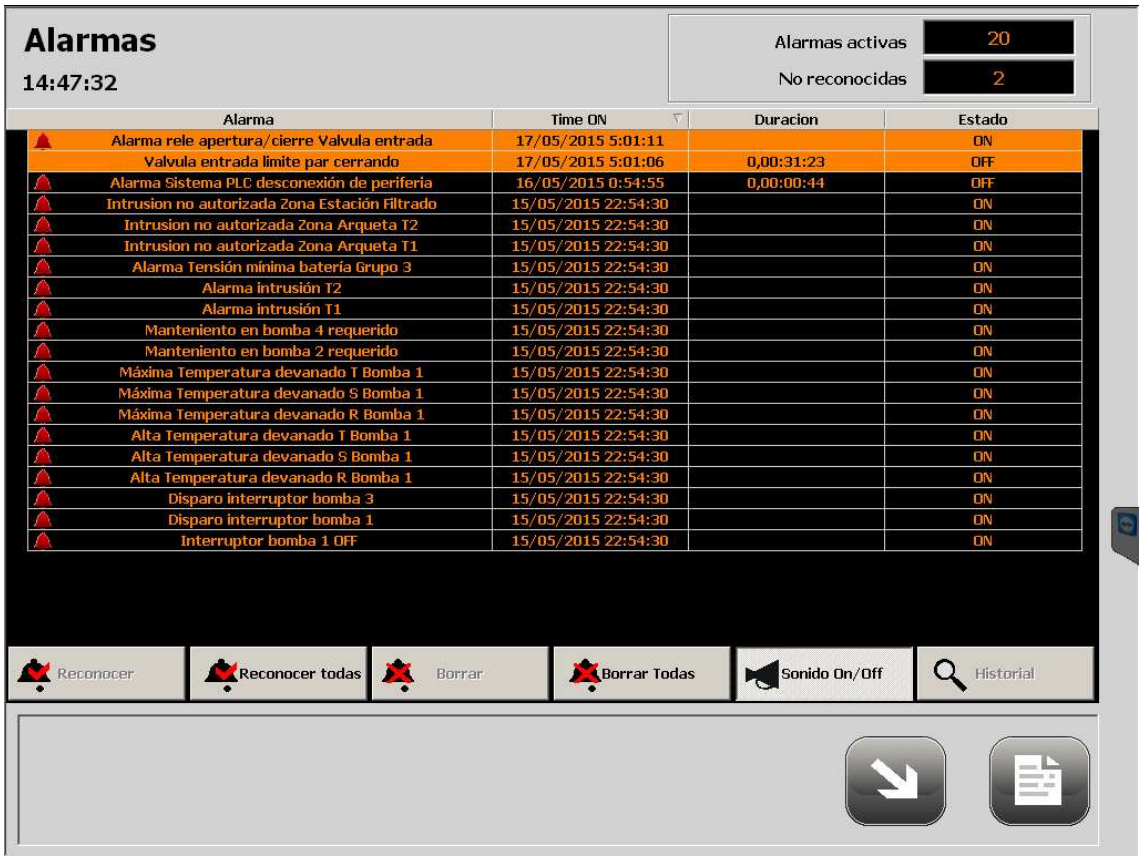
CONVOCATORIA
Junio 2015



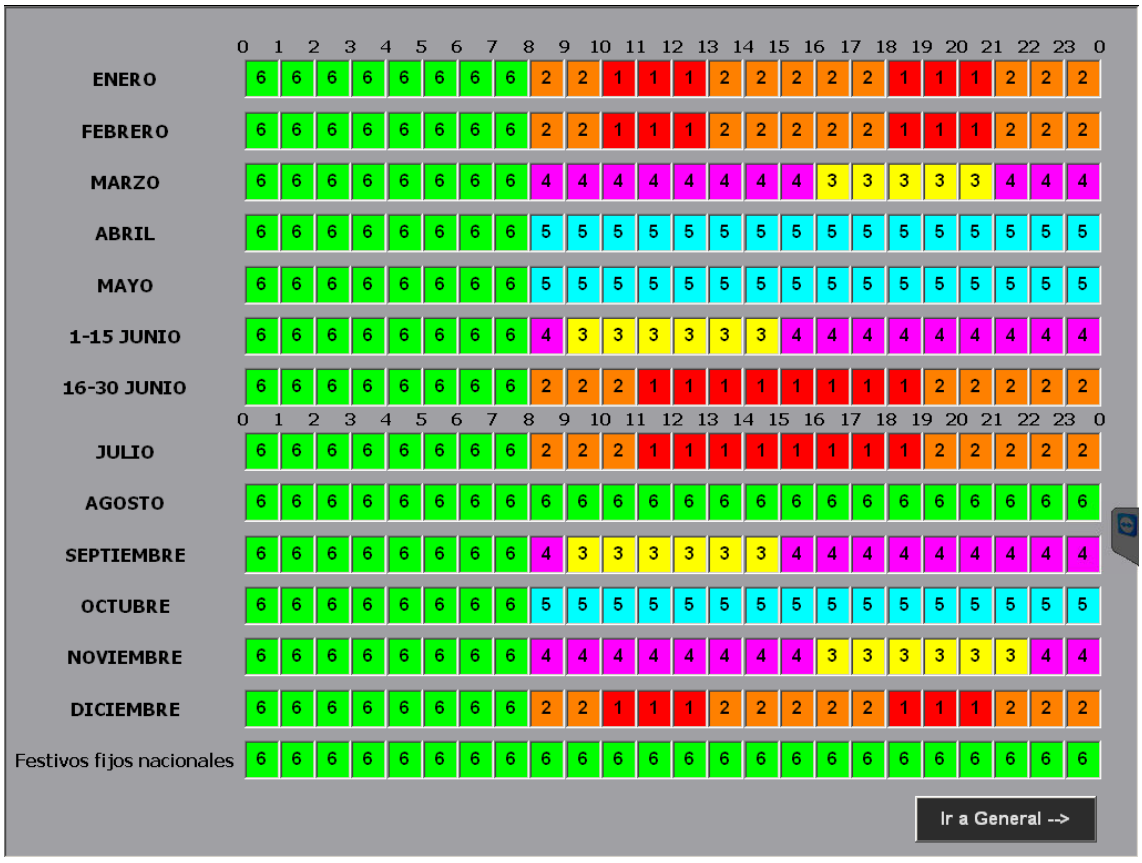
Pantalla de esquema general de la instalación. Bombeo, Arqueta T3-T4, Filtrado y Balsa



Pantalla de monitorización global de estación de bombeo



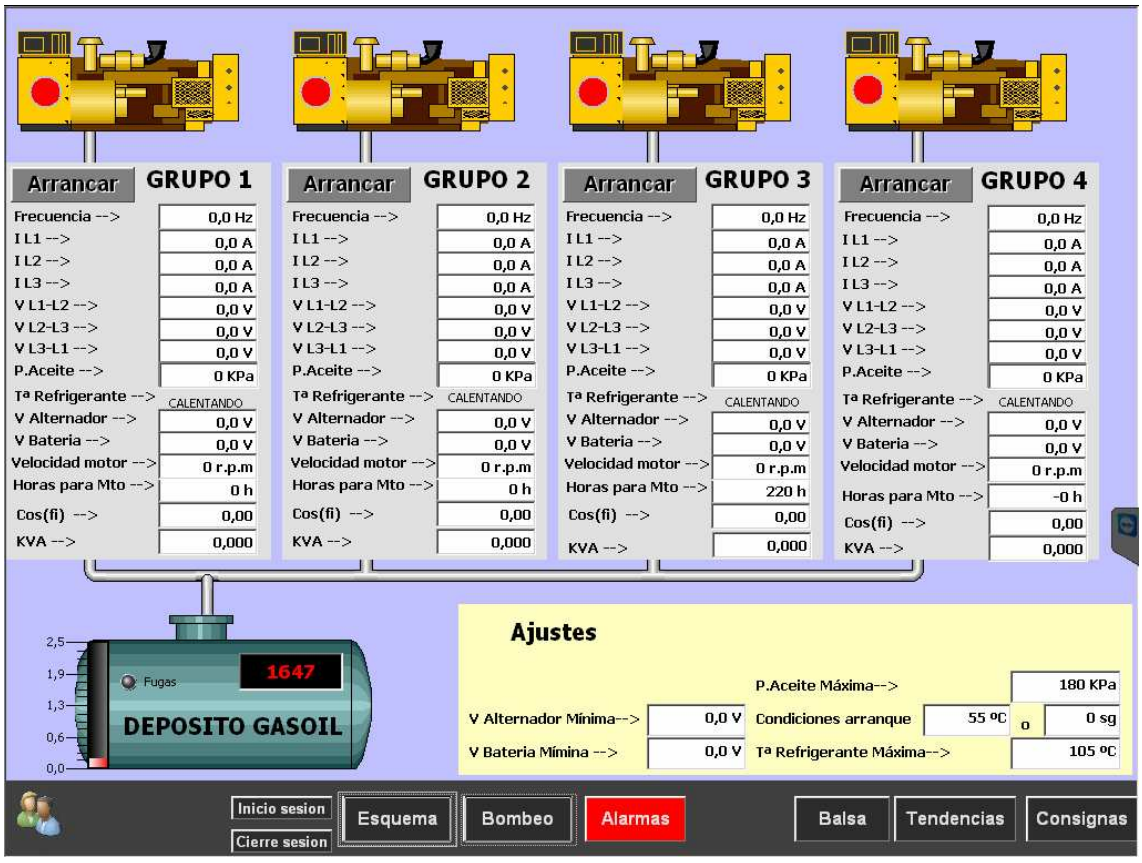
Pantalla de monitorización de alarmas de instalación



Pantalla de parametrización de horarios energéticos



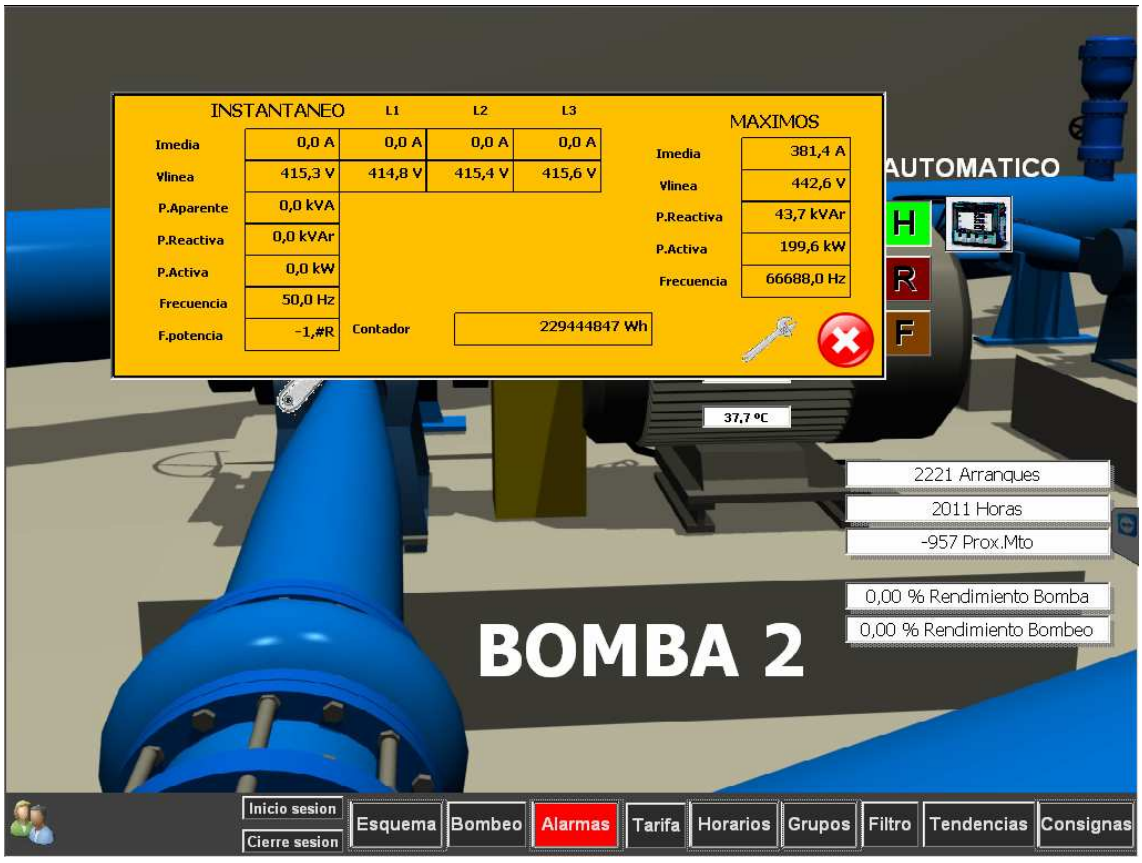
Pantalla de selección de horarios energéticos contratados



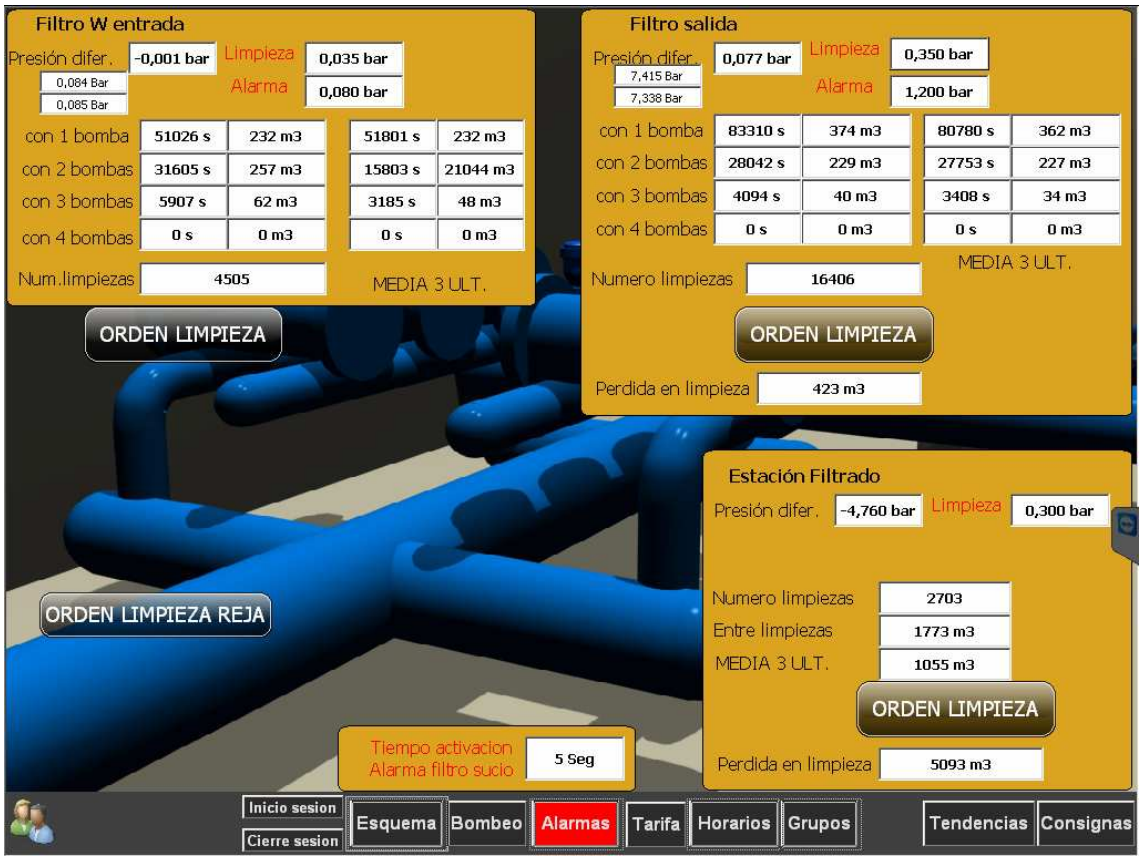
Pantalla de monitorización y maniobra de grupos electrógenos



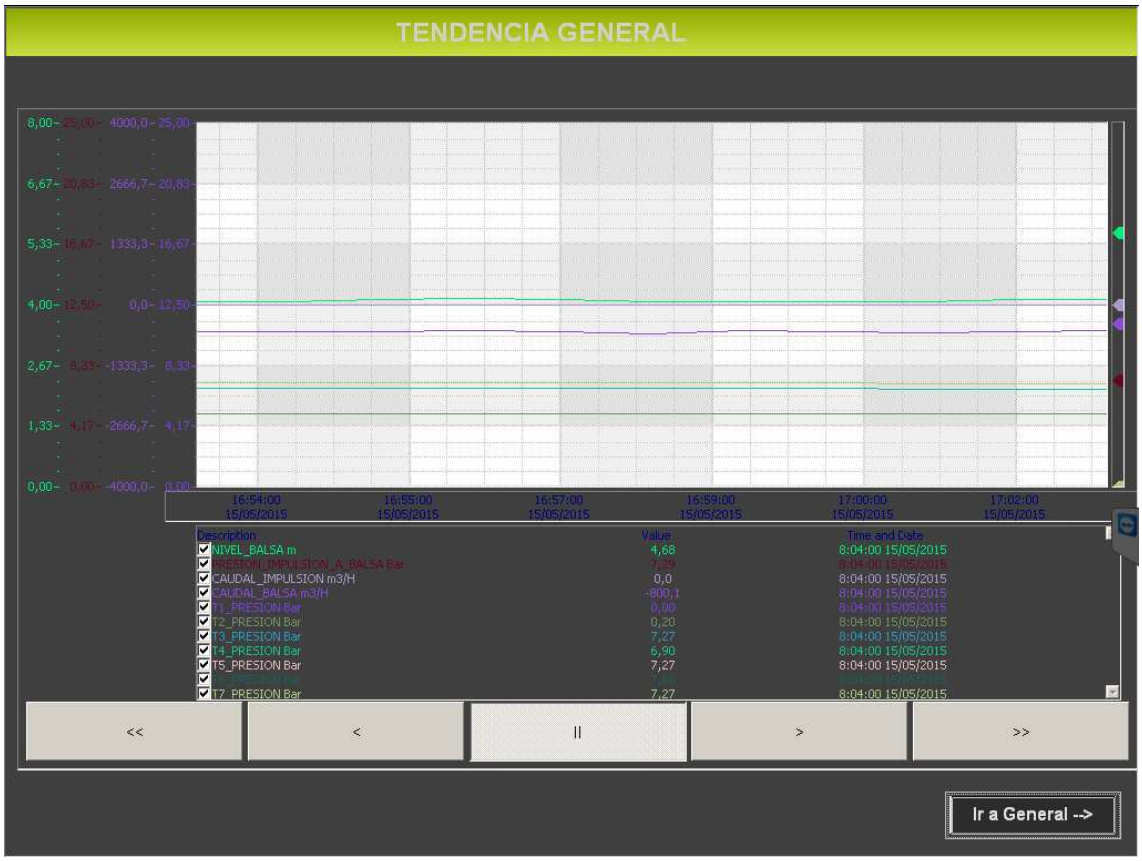
Pantalla de monitorización y maniobra de unidades motobomba



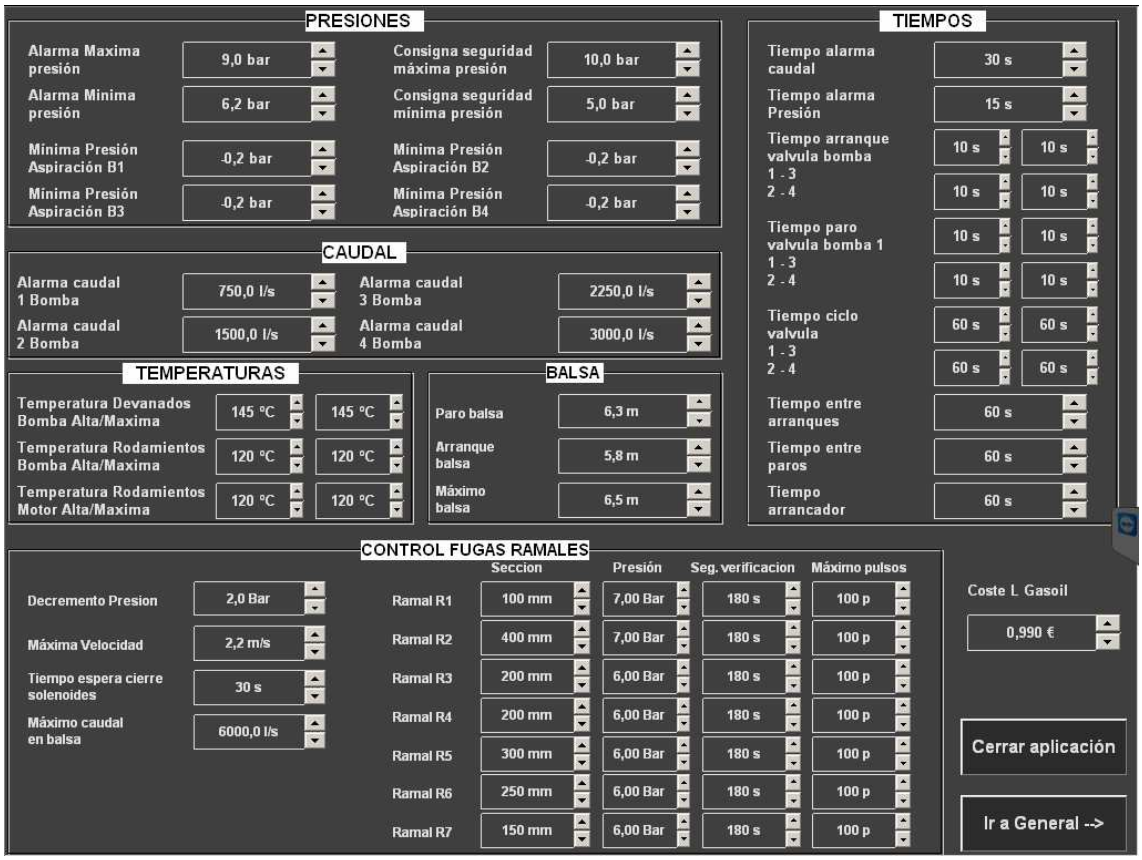
Pantalla de visualiación de parámetros eléctricos de excitación de la unidad motobomba



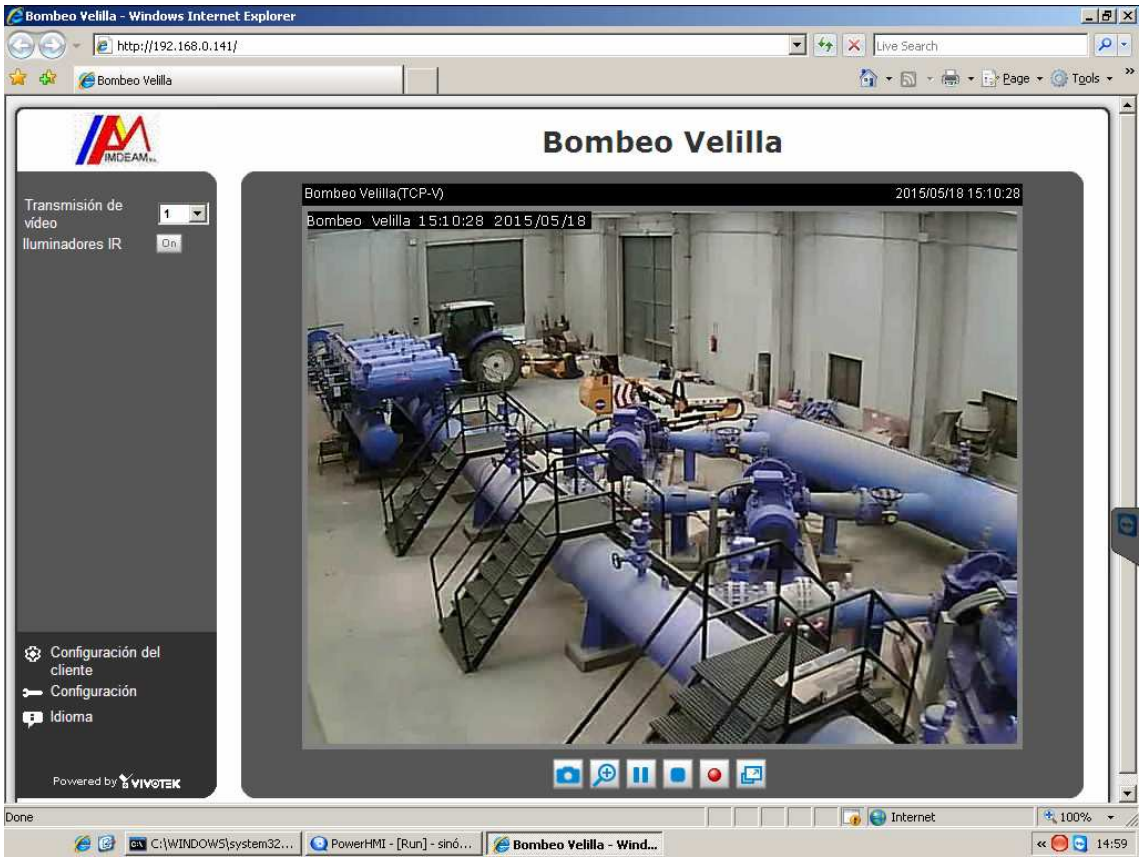
Pantalla de gestión y control de filtros automáticos de la instalación.



Pantalla de visualización de curvas de tendencia de las variables registradas



Pantalla de parametrización de valores de control del bombeo y control de roturas



Monitorización mediante camara IP de interior de estación de bombeo



Monitorización mediante camara IP de exterior de estación de bombeo en zona de grupos electrógenos

ANEXO IV –PLANOS DE CONJUNTO DE BOMBEO–

PROYECTO FINAL DE CARRERA

Automatización y control de fugas de red de bombeo agrícola

AUTOR
César Alberto Alegre Melero

DIRECTOR
Ramón Piedrafita Moreno

TITULO
Ingeniería Técnica Industrial

ESPECIALIDAD
Electrónica Industrial

CONVOCATORIA
Junio 2015

POLÍGONO 8
PARCELA 247

POLÍGONO 8
PARCELA 245

POLÍGONO 6
PARCELA 60

TUBERÍA DE TOMA

POLÍGONO 8
PARCELA 246

90,00°

DEPÓSITO DE GASOIL 20.000 L.

GRUPOS ELECTRÓGENOS 250 KVA.

FILTRO DE REJA
AUTOLIMPIABLE

Cota
explanación
116,40

OBRA DE
TOMA

ACEQUIA VIEJA

R.5

R.7

POLÍGONO 8
PARCELA 244

VALLADO
PERIMETRAL

POLÍGONO 6
PARCELA 61

R.6

CAMINO

L.A.M.T.

NUEVO TRAMO DE CAMINO

CAMINO

POLÍGONO 6
PARCELA 62

T.M. VELILLA DE CINCA

GOBIERNO DE ARAGÓN

DEPARTAMENTO DE AGRICULTURA Y ALIMENTACIÓN

DIRECCION GENERAL DE DESARROLLO RURAL

PROYECTO MODIFICADO Nº1 DE MODERNIZACION DEL REGADIO MEDIANTE TRANSFORMACIÓN A RIEGO LOCALIZADO PARA LA COMUNIDAD DE REGANTES DE LAS HUERTAS DE FRAGA, VELILLA Y TORRENTE DE CINCA (HUESCA) N/REF: 5085

PROMOTOR: Sociedad de Infraestructuras Rurales Aragonesas S.A. Sirasa

EL INGENIERO AGRONOMO,

Fdo: DOMINGO GIMENO CRESPO

ESCALA: 1/1000

FECHA: AGOSTO DE 2010

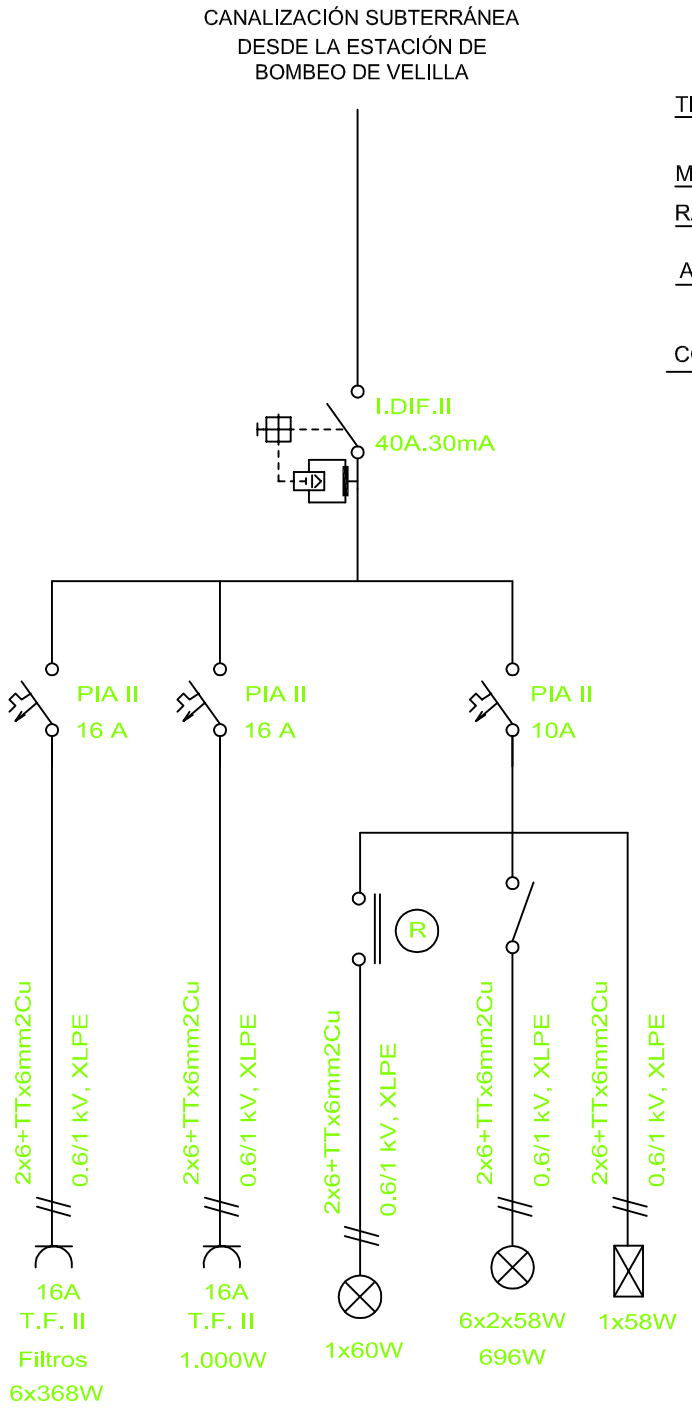
REF: 5085

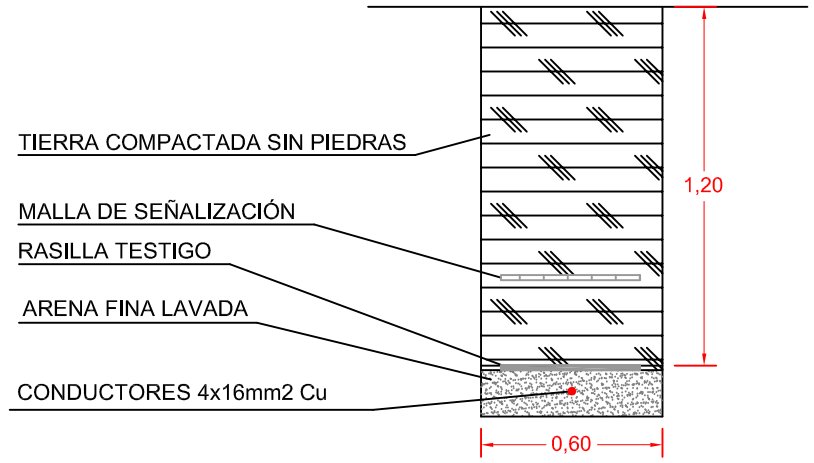
PLANO: ESTACIÓN DE BOMBEO
SECTOR A (VELILLA-MIRALSOT)
URBANIZACIÓN (ESTADO FINAL)

Nº DE PLANO: 10.1

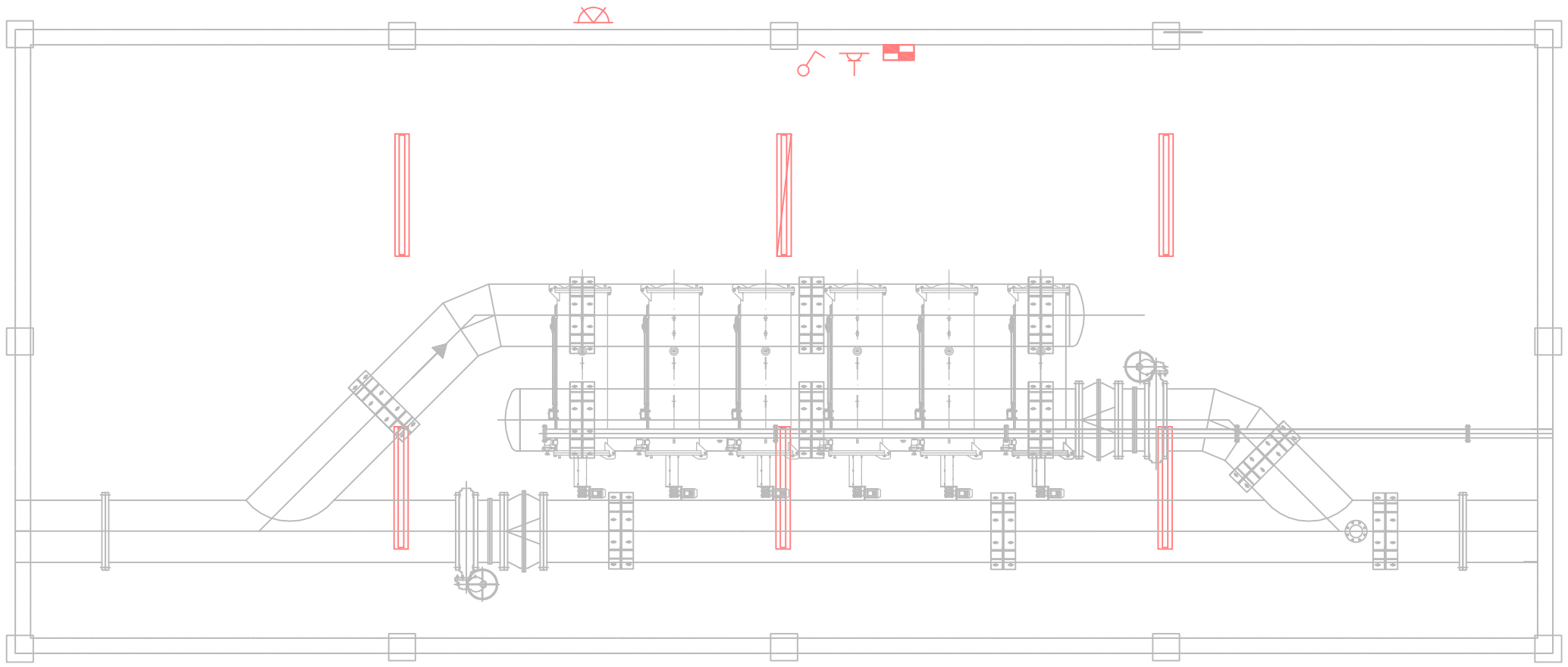
Nº DE HOJA: Hoja 1 de 1

- CANALIZACIÓN SUBTERRÁNEA DESDE LA ESTACIÓN DE BOMBEO DE VELILLA HASTA LA ESTACIÓN DE FILTRADO 2





	INTERRUPTOR UNIPOLAR ESTANCO
	TOMA DE FUERZA ESTANCA MONOFÁSICA 16A
	LUMINARIA FLUORESCENTE ESTANCA DE 2x58w
	LUMINARIA FLUORESCENTE CON EMERGENCIA DE 2x58w
	APLIQUE EXTERIOR DE 60w
	CAJA DE PROTECCIÓN Y DERIVACIÓN



GOBIERNO DE ARAGÓN

DEPARTAMENTO DE AGRICULTURA Y ALIMENTACIÓN

DIRECCION GENERAL DE DESARROLLO RURAL

PROYECTO MODIFICADO Nº1 DE MODERNIZACION DEL REGADIO MEDIANTE TRANSFORMACIÓN A RIEGO LOCALIZADO PARA LA COMUNIDAD DE REGANTES DE LAS HUERTAS DE FRAGA, VELILLA Y TORRENTE DE CINCA (HUESCA) N/REF: 5085

PROMOTOR: Sociedad de Infraestructuras Rurales Aragonesas S.A. SIRASA

EL INGENIERO AGRONOMO, Fdo: DOMINGO GIMENO CRESPO

ESCALA: 1/75

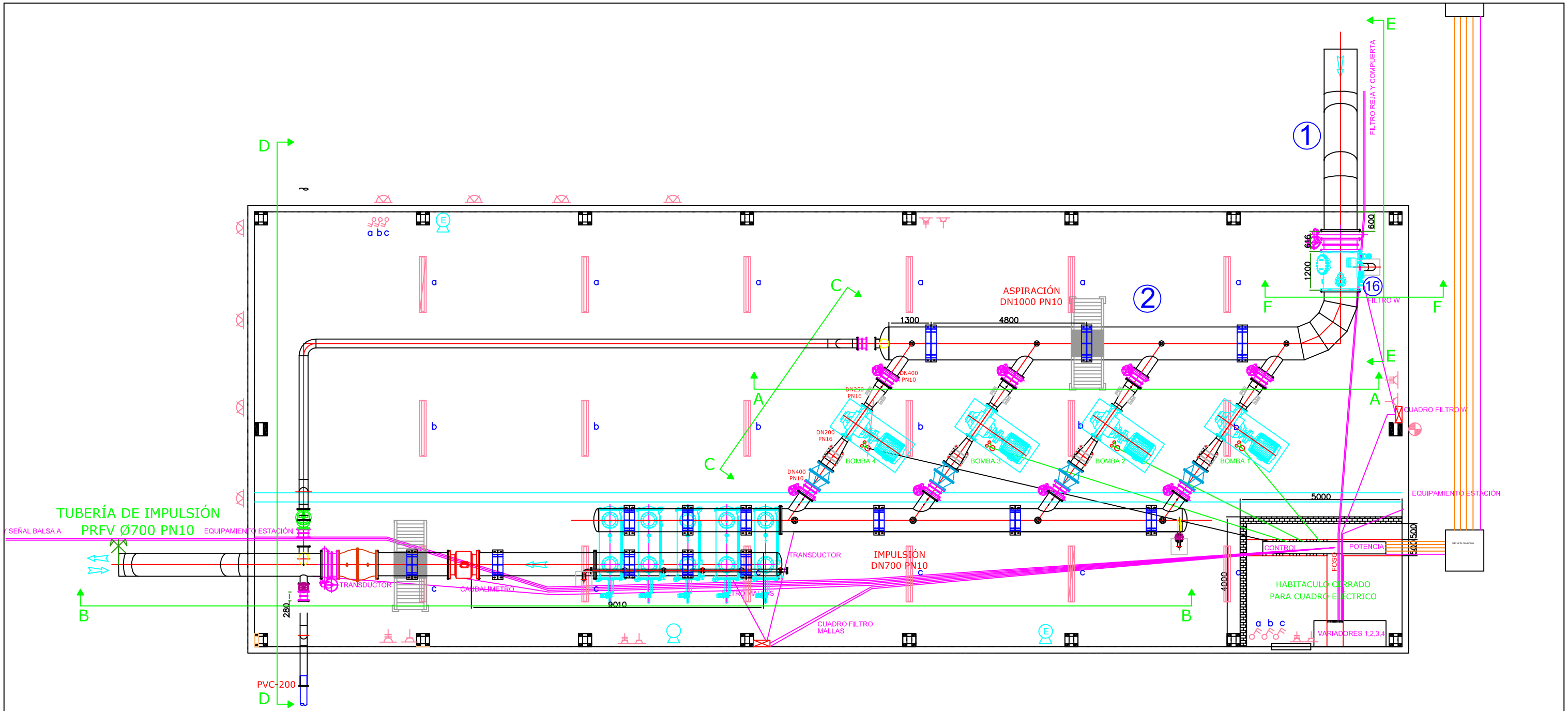
FECHA: AGOSTO DE 2010

REF: 5085

PLANO: ESTACION DE FILTRADO
SECTOR A (VELILLA-MIRALSOT)
INSTALACIONES ELECTRICAS EN B.T.

Nº DE PLANO: 15.4

Nº DE HOJA: 1 de 1

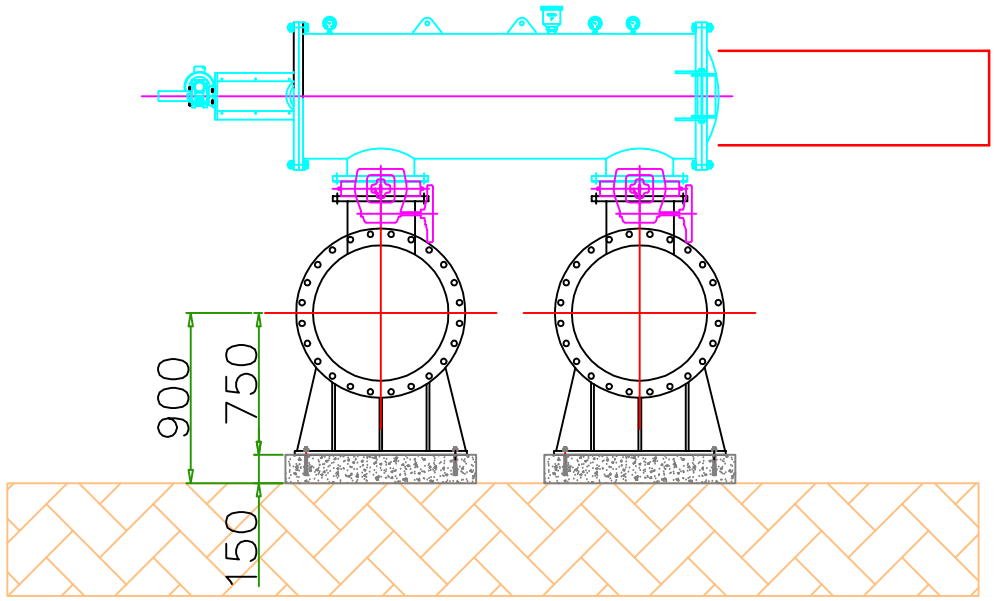


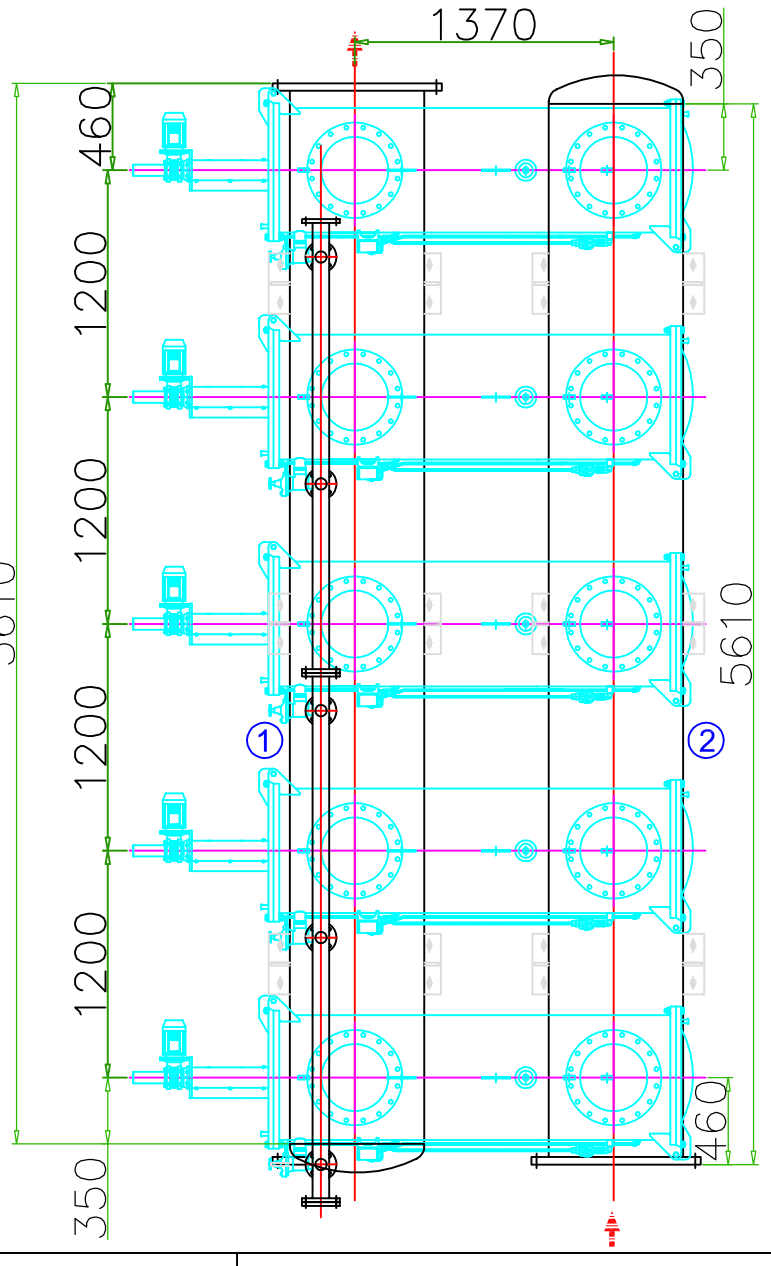
LEYENDA	
	TUBO □ 90
	1 TUBO DE □ 160 2 TUBO DE □ 90
	1 □ 160 + 2 □ 90

	CANALIZACIÓN EN TUBO DE ø160mm BAJO HORMIGÓN
	CANALIZACIÓN SUBTERRÁNEA DIRECTAMENTE EN TIERRA
	INTERRUPTOR UNIPOLAR ESTANCO
	INTERRUPTOR CONMUTADO ESTANCO
	TOMA DE FUERZA ESTANCA MONOFÁSICA 16A
	TOMA DE FUERZA ESTANCA TRIFÁSICA 16A
	LUMINARIA FLUORESCENTE ESTANCA DE 2x58w
	LUMINARIA FLUORESCENTE CON EMERGENCIA DE 2x58w
	APLIQUE EXTERIOR DE 60w
	EQUIPO AUTÓNOMO DE EMERGENCIA Y SEÑALIZACIÓN
	PARARRAYOS CON RADIO DE COBERTURA DE 87m (NIVEL DE PROTECCIÓN 4)

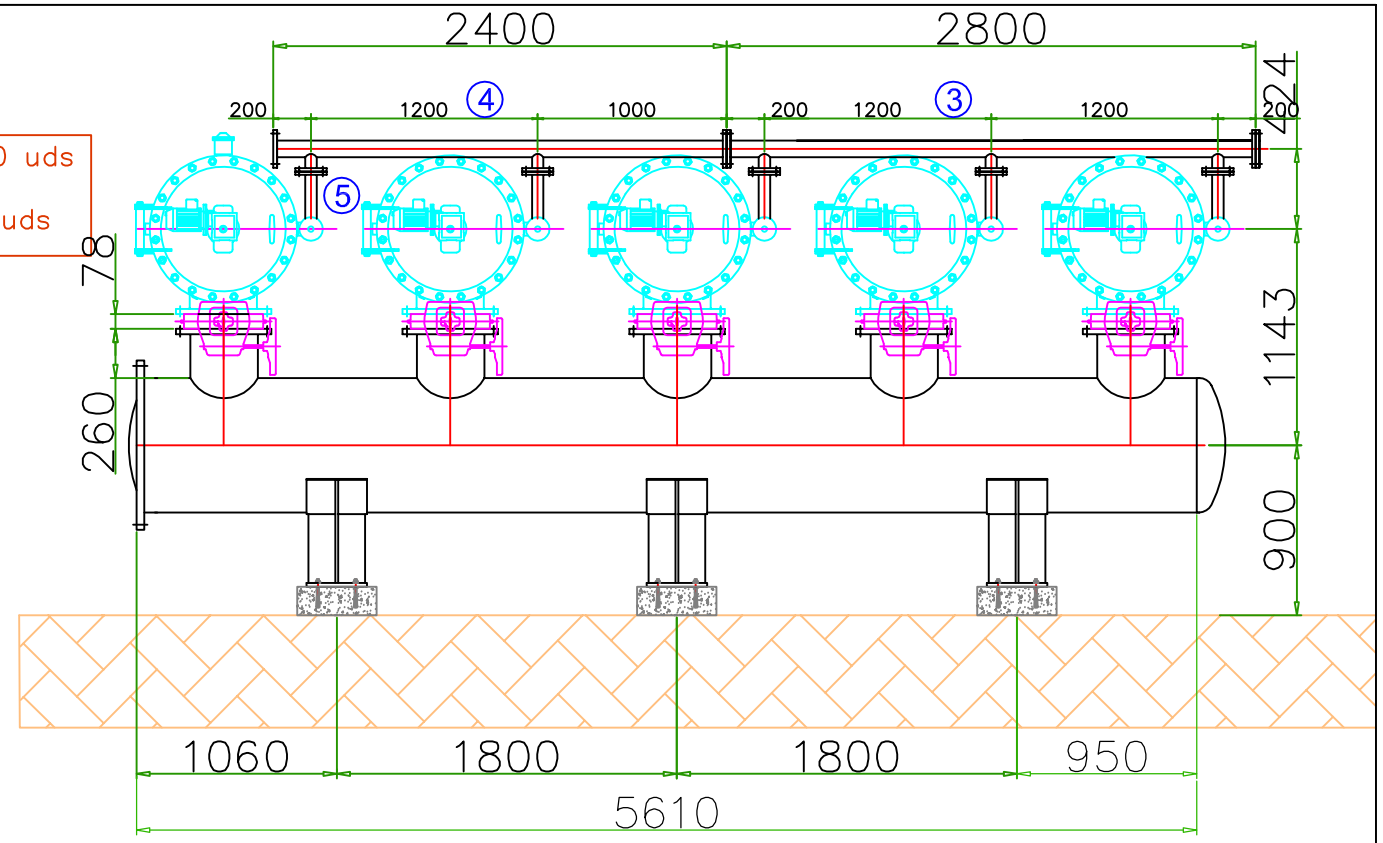
E	EXTINTOR POLVO ABC 6 Kg
	EXTINTOR DE 5 Kg DE CO2

GOBIERNO DE ARAGÓN	DEPARTAMENTO DE AGRICULTURA Y ALIMENTACIÓN DIRECCION GENERAL DE DESARROLLO RURAL	PROYECTO MODIFICADO Nº1 DE MODERNIZACION DEL REGADIO MEDIANTE TRANSFORMACIÓN A RIEGO LOCALIZADO PARA LA COMUNIDAD DE REGANTES DE LAS HUERTAS DE FRAGA, VELILLA Y TORRENTE DE CINCA (HUESCA) N/REF: 5085	PROMOTOR: Sirasa	EL INGENIERO AGRONOMO, Fdo: DOMINGO GIMENO CRESPO	ESCALA: 1/1000	FECHA: AGOSTO DE 2010 REF: 5085	PLANO: ESTACION DE BOMBEO SECTOR A (VELILLA-MIRALSOT) DISTRIBUCION INSTALACIONES INTERIORES EN B.T.	Nº DE PLANO: 15.2 Nº DE HOJA: 1 de 1



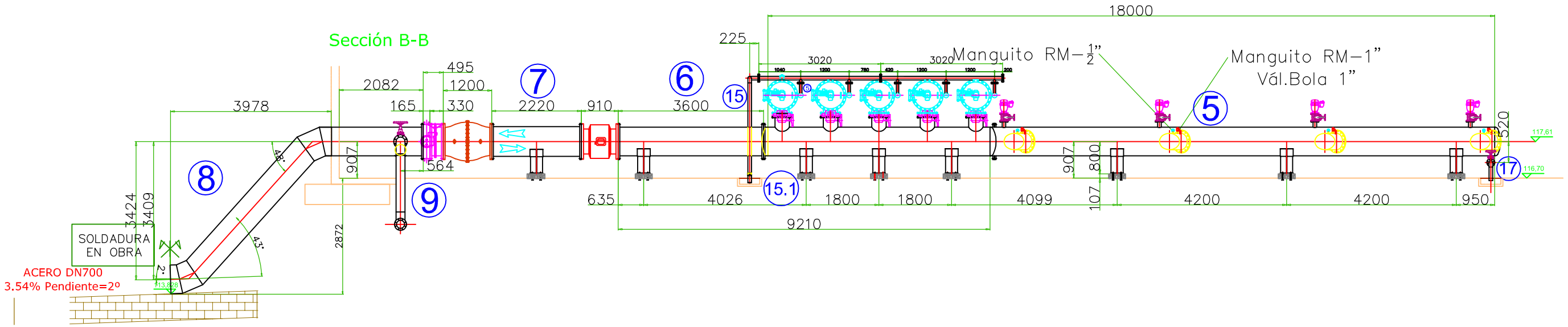


Varilla M20*190 BiCr – 160 uds
Tuerca M20 BiCr– 160 uds
Arandela M20 BiCr – 320 uds

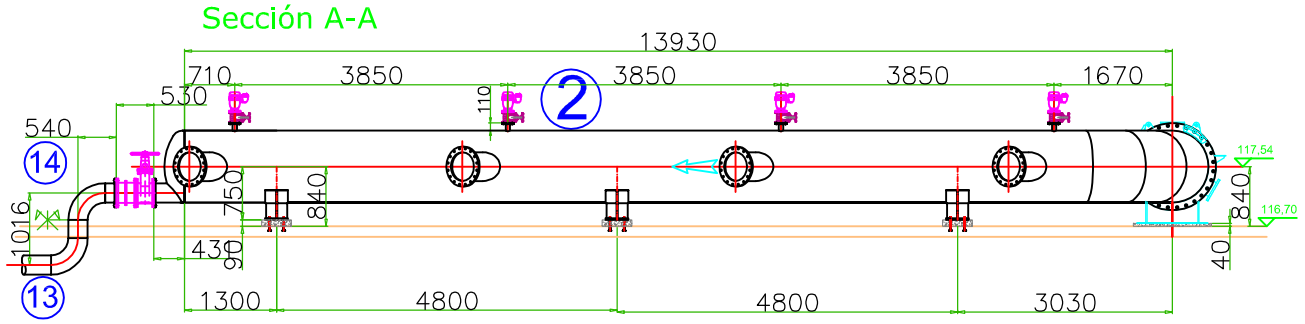


GOBIERNO DE ARAGÓN	DEPARTAMENTO DE AGRICULTURA Y ALIMENTACIÓN DIRECCION GENERAL DE DESARROLLO RURAL	PROYECTO MODIFICADO Nº1 DE MODERNIZACION DEL REGADIO MEDIANTE TRANSFORMACIÓN A RIEGO LOCALIZADO PARA LA COMUNIDAD DE REGANTES DE LAS HUERTAS DE FRAGA, VELILLA Y TORRENTE DE CINCA (HUESCA) N/REF: 5085	PROMOTOR: Sociedad de Infraestructuras Rurales Aragonesas S.A. Sirasa	EL INGENIERO AGRONOMO, Fdo: DOMINGO GIMENO CRESPO	ESCALA: 1/100	FECHA: AGOSTO DE 2010 REF: 5085	PLANO: ESTACIÓN DE BOMBEO SECTOR A (VELILLA-MIRALSOT) PLANTA GENERAL DE INSTALACIONES HIDRAULICAS	Nº DE PLANO: 10.14 Nº DE HOJA: Hoja 1 de 1

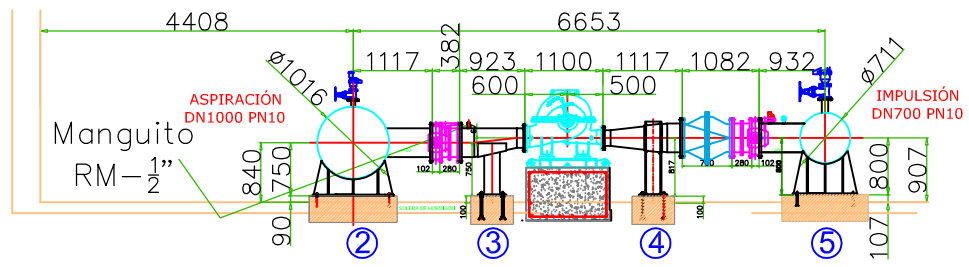
Sección B-B



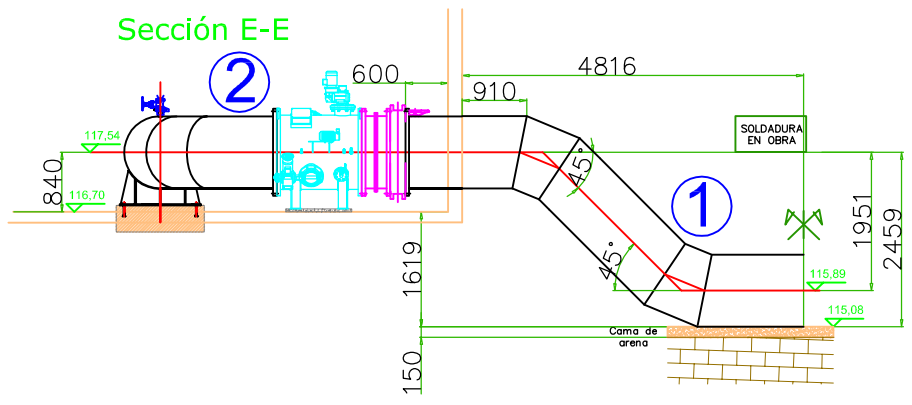
Sección A-A



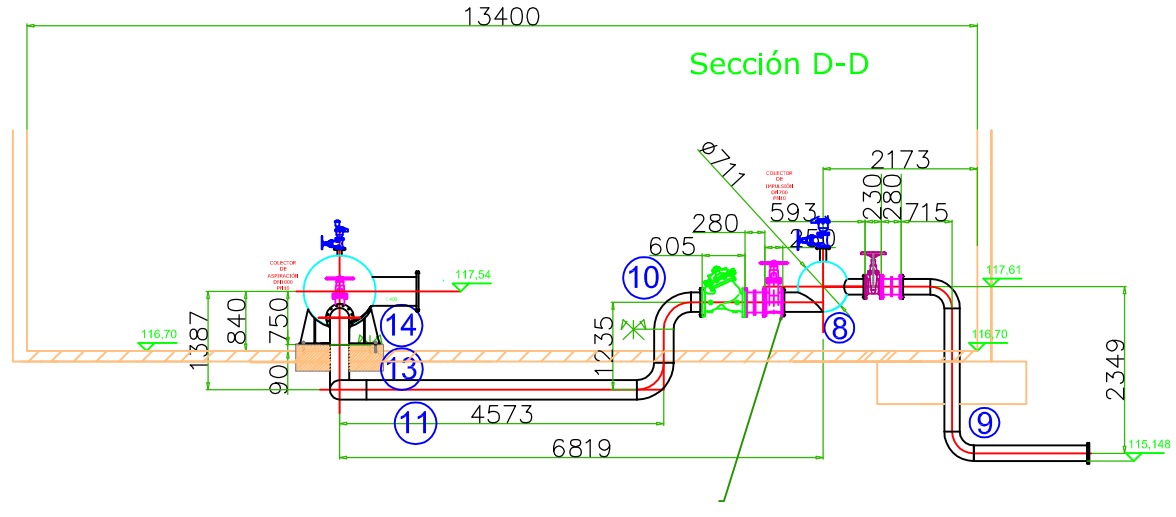
Sección C-C



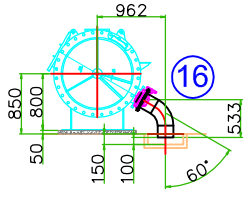
Sección E-E



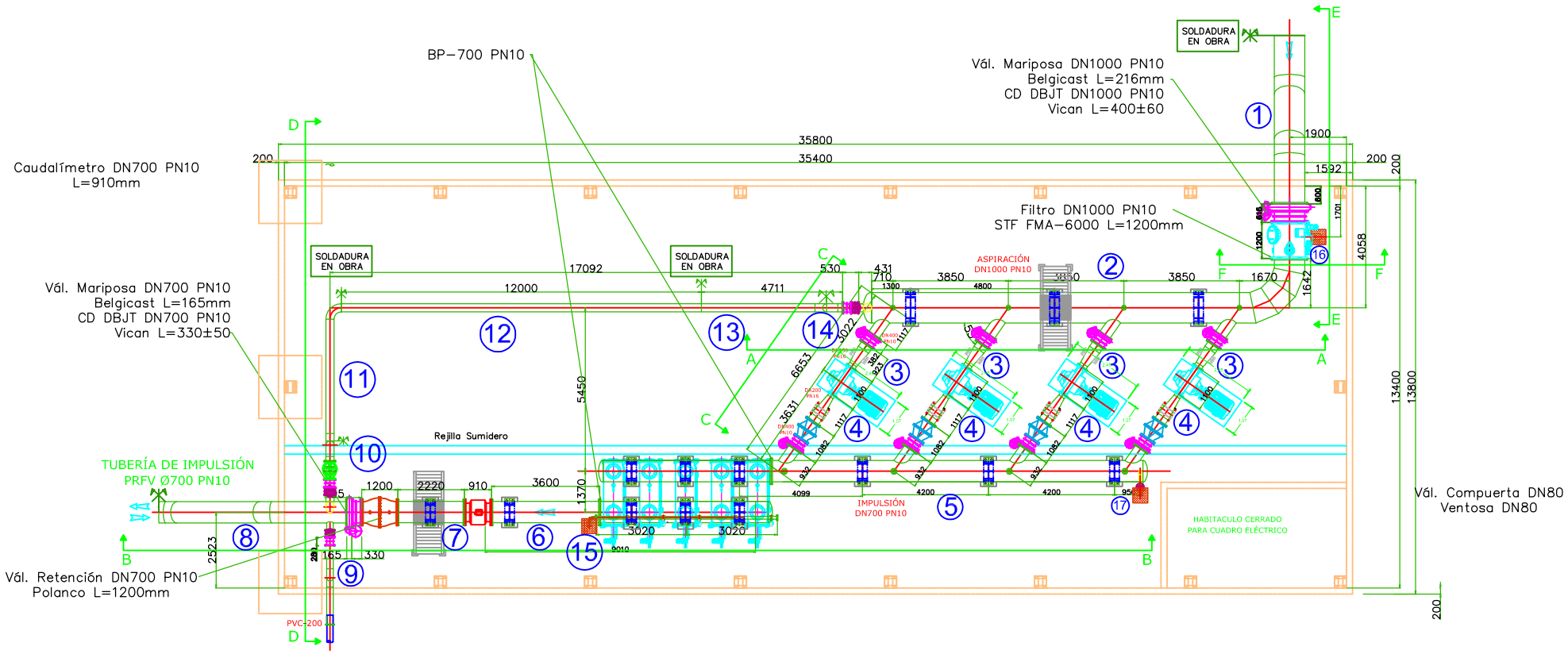
Sección D-D



Sección F-F



GOBIERNO DE ARAGÓN	DEPARTAMENTO DE AGRICULTURA Y ALIMENTACIÓN DIRECCION GENERAL DE DESARROLLO RURAL	PROYECTO MODIFICADO Nº1 DE MODERNIZACION DEL REGADIO MEDIANTE TRANSFORMACIÓN A RIEGO LOCALIZADO PARA LA COMUNIDAD DE REGANTES DE LAS HUERTAS DE FRAGA, VELILLA Y TORRENTE DE CINCA (HUESCA) N/REF: 5085	PROMOTOR: Sociedad de Infraestructuras Rurales Aragonesas S.A. Sirasa	EL INGENIERO AGRONOMO, Fdo: DOMINGO GIMENO CRESPO	ESCALA: 1/100	FECHA: AGOSTO DE 2010 REF: 5085	PLANO: ESTACIÓN DE BOMBEO SECTOR A (VELILLA-MIRALSOT) PLANTA GENERAL DE INSTALACIONES HIDRAULICAS	Nº DE PLANO: 10.13 Nº DE HOJA: Hoja 1 de 1



GOBIERNO DE ARAGÓN	DEPARTAMENTO DE AGRICULTURA Y ALIMENTACIÓN DIRECCION GENERAL DE DESARROLLO RURAL	PROYECTO MODIFICADO Nº1 DE MODERNIZACION DEL REGADIO MEDIANTE TRANSFORMACIÓN A RIEGO LOCALIZADO PARA LA COMUNIDAD DE REGANTES DE LAS HUERTAS DE FRAGA, VELILLA Y TORRENTE DE CINCA (HUESCA) N/REF: 5085	PROMOTOR: Sociedad de Infraestructuras Rurales Aragonesas S.A. Sirasa	EL INGENIERO AGRONOMO, Fdo: DOMINGO GIMENO CRESPO	ESCALA: 1/500	FECHA: AGOSTO DE 2010 REF: 5085	PLANO: ESTACIÓN DE BOMBEO SECTOR A (VELILLA-MIRALSOT) PLANTA GENERAL DE INSTALACIONES HIDRAULICAS	Nº DE PLANO: 10.12 Nº DE HOJA: Hoja 1 de 1

ANEXO V –FICHAS DE PRODUCTOS–

PROYECTO FINAL DE CARRERA

Automatización y control de fugas de red de bombeo agrícola

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TITULO
Ingeniería Técnica Industrial

ESPECIALIDAD
Electrónica Industrial

CONVOCATORIA
Junio 2015

ANEXO V –CAUDALIMETRO ENDRESS+HAUSER–

Technical Information
Proline Promag 50L
Electromagnetic flowmeter



The flowmeter with a weight-optimized sensor and a modular electronic concept

Application

- The measuring principle is virtually independent of pressure, density, temperature and viscosity
- Fully suitable for standard applications in the water and wastewater industry

Device properties

- Up to 30 % less sensor weight
- Nominal diameter: DN 25 to 2400 (1 to 90")
- Maximum reduced installation length to DVGW/ISO
- 2-line backlit display with push buttons
- Device in compact or remote version
- HART, PROFIBUS PA/DP

Your benefits

- Reduced installation costs – flexible mounting by one-of-a-kind lap-joint flange concept (DN < 350/14")
- Energy-saving flow measurement – no pressure loss due to cross-section constriction
- Maintenance-free – no moving parts
- Fast commissioning – application-specific Quick Setups
- Safe operation – display provides easy readable process information
- Fully industry compliant – IEC/EN/NAMUR

Endress+Hauser
People for Process Automation

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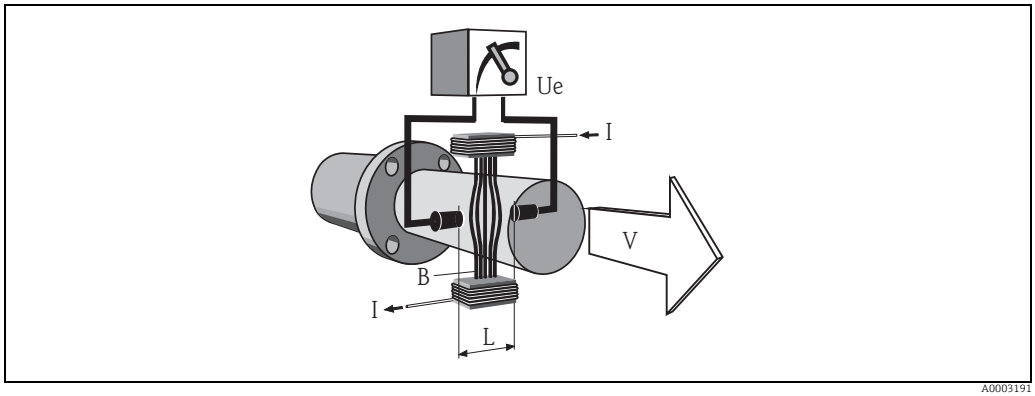
Documentation 42

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Function and system design

Measuring principle

Following *Faraday's law of magnetic induction*, a voltage is induced in a conductor moving through a magnetic field.
In the electromagnetic measuring principle, the flowing medium is the moving conductor.
The voltage induced is proportional to the flow velocity and is supplied to the amplifier by means of two measuring electrodes. The flow volume is calculated by means of the pipe cross-sectional area.
The DC magnetic field is created through a switched direct current of alternating polarity.



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$Ue = B \cdot L \cdot v$
$Q = A \cdot v$

Ue	*Induced voltage*
B	*Magnetic induction (magnetic field)*
L	*Electrode spacing*
v	*Flow velocity*
Q	*Volume flow*
A	*Pipe cross-section*
I	*Current strength*

Measuring system

The measuring system consists of a transmitter and a sensor.
Two versions are available:
- Compact version: Transmitter and sensor form a mechanical unit.
- Remote version: Sensor is mounted separate from the transmitter.

Transmitter:
- Promag 50 (key operation, two-line display)

Sensor:
- Promag L
  - DN 25 to 300 (1 to 12")
  - DN 350 to 2400 (14 to 90")

Caution!
To avoid corrosion, the sensor and process connection material must be selected considering the environmental and process conditions.

Input

Measured variable	Flow velocity (proportional to induced voltage)
Measuring ranges	Measuring ranges for liquids Typically v = 0.01 to 10 m/s (0.033 to 33 ft/s) with the specified accuracy
Operable flow range	Over 1000 : 1
Input signal	Status input (auxiliary input): U = 3 to 30 V DC, R_i = 5 kΩ, galvanically isolated. Configurable for: totalizer(s) reset, measured value suppression, error-message reset. Status input (auxiliary input) with PROFIBUS DP: U = 3 to 30 V DC, R_i = 3 kΩ, galvanically isolated. Switching level: 3 to 30 V DC, independent of polarity. Configurable for: totalizer(s) reset, measured value suppression, error-message reset, batching start/stop (optional), batch totalizer reset (optional).

Output

Output signal

Current output
active/passive selectable, galvanically isolated, time constant selectable (0.01 to 100 s), full scale value selectable, temperature coefficient: typ. 0.005% o.r./°C (o.r. = of reading), resolution: 0.5 µA

- Active: 0/4 to 20 mA, R_L < 700 Ω (HART: $R_L \geq 250$ Ω)
- Passive: 4 to 20 mA, operating voltage V_s: 18 to 30 V DC, $R_i \geq 150$ Ω

Pulse/ frequency output
passive, open collector, 30 V DC, 250 mA, galvanically isolated

- Pulse output: pulse value and pulse polarity selectable, max. pulse width configurable (0.5 to 2000 ms)
- Frequency output: full scale frequency 2 to 1000 Hz (f_{max} = 1250 Hz), on/off ratio 1:1, pulse width max. 10 s

PROFIBUS DP interface
- Transmission technology (Physical Layer): RS485 in accordance with ASME/TIA/EIA-485-A: 1998, galvanically isolated
- Profile version 3.0
- Data transmission rate: 9.6 kBaud to 12 MBaud
- Automatic data transmission rate recognition
- Function blocks: 1× analog input, 1× totalizer
- Output data: volume flow, totalizer
- Input data: positive zero return (ON/OFF), totalizer control, value for local display
- Cyclic data transmission compatible with previous model "Promag 33"
- Bus address adjustable via miniature switches or local display (optional) at the measuring device

PROFIBUS PA interface
- Transmission technology (Physical Layer): IEC 61158-2 (MBP), galvanically isolated
- Profile version 3.0
- Current consumption = 11 mA
- Permissible supply voltage: 9 to 32 V
- Bus connection with integrated reverse polarity protection
- Error current FDE (Fault Disconnection Electronic) = 0 mA
- Function blocks: 1× analog input, 2 × totalizer
- Output data: volume flow, totalizer
- Input data: positive zero return (ON/OFF), control totalizer, value for local display
- Cyclic data transmission compatible with previous model "Promag 33"
- Bus address adjustable via miniature switches or local display (optional) at the measuring device

Signal on alarm

- Current output → Failsafe mode can be selected (e.g. in accordance with NAMUR Recommendation NE 43)
- Pulse/ frequency output → Failsafe mode can be selected
- Status output → "Not conductive" in the event of fault or power supply failure

Load

Section "output signal" → 📄 5

Low flow cut off

Switch-on points for low flow are selectable.

Galvanic isolation

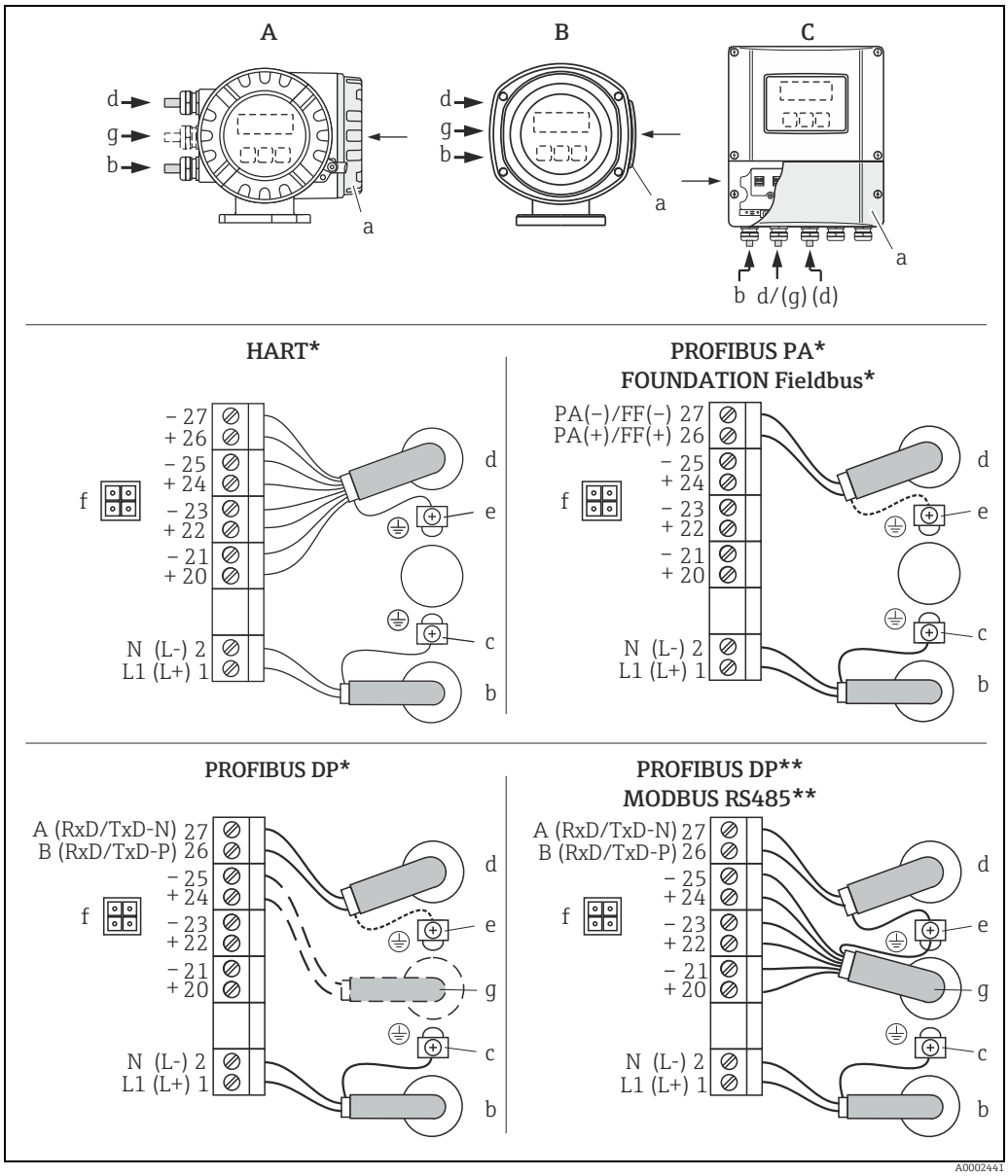
All circuits for inputs, outputs and power supply are galvanically isolated from each other.

Switching output

Status output
Open collector, max. 30 V DC / 250 mA, galvanically isolated
Configurable for: error messages, Empty Pipe Detection (EPD), flow direction, limit values

Power supply

Electrical connection, measuring unit



Connecting the transmitter, cable cross-section max. 2.5 mm2 (14 AWG)

A View A (field housing)
B View B (stainless steel field housing)
C View C (wall-mount housing)

**)* not changeable communication board
***)* changeable communication board
a Cover of the connection compartment
b Cable for power supply: 85 to 260 V AC, 20 to 55 V AC, 16 to 62 V DC
- Terminal No. 1: L1 for AC, L+ for DC
- Terminal No. 2: N for AC, L– for DC

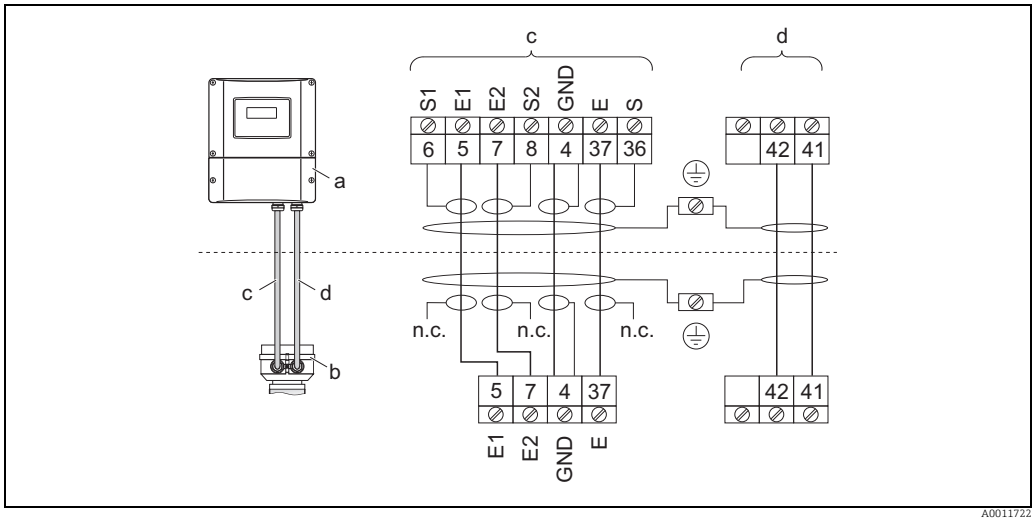
c Ground terminal for protective conductor
d Signal cable: see Terminal assignment → 🖹 7
Fieldbus cable:
- Terminal No. 26: DP (B) / PA (+) / (PA with reverse polarity protection)
- Terminal No. 27: DP (A) / PA (–) / (PA with reverse polarity protection)

e Ground terminal for signal-cable shield / Fieldbus cable / RS485 line
f Service connector for connecting service interface FXA 193 (Fieldcheck, FieldCare)
g Signal cable: see Terminal assignment → 🖹 7
Cable for external termination (only for PROFIBUS DP with fixed assignment communication board):
- Terminal No. 24: +5 V
- Terminal No. 25: DGND

Electrical connection, terminal assignment

Order version	Terminal No. (inputs/ outputs)			
	20 (+) / 21 (–)	22 (+) / 23 (–)	24 (+) / 25 (–)	26 (+) / 27 (–)
50***–**********W	–	–	–	Current output HART
50***–**********A	–	–	Frequency output	Current output HART
50***–**********D	Status input	Status output	Frequency output	Current output HART
50***–**********H	–	–	–	PROFIBUS PA
50***–**********J	–	–	+5 V (external termination)	PROFIBUS DP
Ground connection, power supply → 🖹 6				

Electrical connection, remote version



Connecting the remote version

a Wall-mount housing connection compartment
b Sensor connection housing cover
c Signal cable
d Coil current cable
n.c. Not connected, insulated cable shields

Terminal numbers and cable colors:
5/6 = brown, 7/8 = white, 4 = green, 37/36 = yellow

Supply voltage (power supply)

- 85 to 250 V AC, 45 to 65 Hz
- 20 to 55 V AC, 45 to 65 Hz
- 16 to 62 V DC
- PROFIBUS PA
- Non-Ex: 9 to 32 V DC
- Ex i: 9 to 24 V DC
- Ex d: 9 to 32 V DC

Cable entry

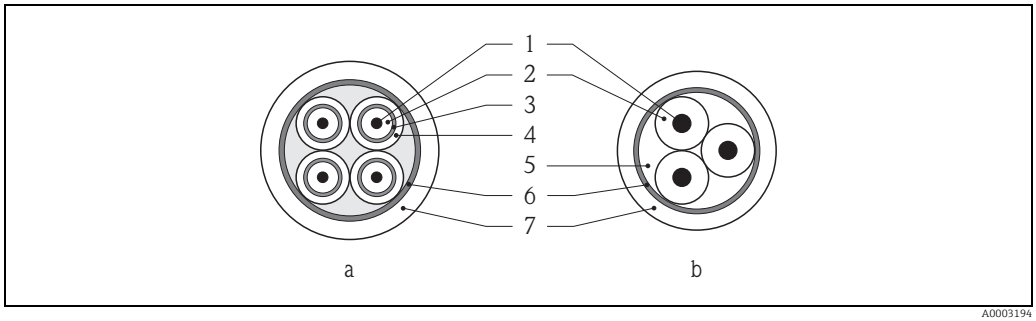
Power supply and signal cables (inputs/ outputs):
- Cable entry M20 × 1.5 (8 to 12 mm / 0.31 to 0.47")
- Thread for cable entries, ½" NPT, G ½"

Connecting cable for remote version:
- Cable entry M20 × 1.5 (8 to 12 mm / 0.31 to 0.47")
- Sensor cable entry for armoured cables M20 × 1.5 (9.5 to 16 mm / 0.37 to 0.63")
- Thread for cable entries, ½" NPT, G ½"

Remote version cable specifications

Coil cable
- 2 × 0.75 mm² (18 AWG) PVC cable with common, braided copper shield (∅ ~ 7 mm / 0.28")
- Conductor resistance: ≤ 37 Ω/km (≤ 0.011 Ω/ft)
- Capacitance core/core, shield grounded: ≤ 120 pF/m (≤ 37 pF/ft)
- Operating temperature: –20 to +80 °C (–68 to +176 °F)
- Cable cross-section: max. 2.5 mm² (14 AWG)
- Test voltage for cable insulation: ≤ 1433 AC r.m.s. 50/60 Hz or ≥ 2026 V DC

Signal cable
- 3 × 0.38 mm² (20 AWG) PVC cable with common, braided copper shield (∅ ~ 7 mm / 0.28") and individual shielded cores
- With empty pipe detection (EPD): 4 × 0.38 mm² (20 AWG) PVC cable with common, braided copper shield (∅ ~ 7 mm / 0.28") and individual shielded cores
- Conductor resistance: ≤ 50 Ω/km (≤ 0.015 Ω/ft)
- Capacitance core/shield: ≤ 420 pF/m (≤ 128 pF/ft)
- Operating temperature: –20 to +80 °C (–68 to +176 °F)
- Cable cross-section: max. 2.5 mm² (14 AWG)



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a *Signal cable*
b *Coil current cable*

1 *Core*
2 *Core insulation*
3 *Core shield*
4 *Core jacket*
5 *Core reinforcement*
6 *Cable shield*
7 *Outer jacket*

Optionally, Endress+Hauser also supplies reinforced connecting cables with an additional, metal strenghtening braid. We recommend such cables for the following cases:
- Cables laid underground
- Danger of rodent attack
- Device used with ingress protection IP 68

Operation in zones of severe electrical interference
The measuring device complies with the general safety requirements in accordance with EN 61010 and the EMC requirements of IEC/EN 61326 as well as the NAMUR Recommendation NE 21.

Caution!
Grounding is by means of the ground terminals provided for the purpose inside the connection housing.
Ensure that the stripped and twisted lengths of cable shield to the ground terminal are as short as possible.

Power consumption

- AC: < 15 VA (incl. sensor)
- DC: < 15 VA (incl. sensor)

Switch-on current:
- Max. 8.5 A (< 50 ms) for 24 V DC
- Max. 3 A (< 5 ms) for 260 V AC

Power supply failure

Lasting min. 1 power cycle:
- EEPROM retain the measuring system data in the event of a power supply failure
- S-DAT: exchangeable data storage chip which stores the data of the sensor (nominal diameter, serial number, calibration factor, zero point etc.)

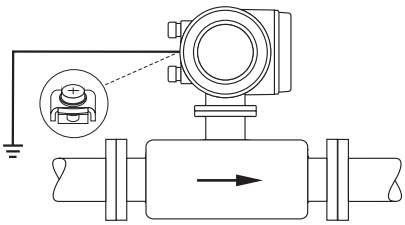
Potential equalization

Warning!
The measuring system must be included in the potential equalization.

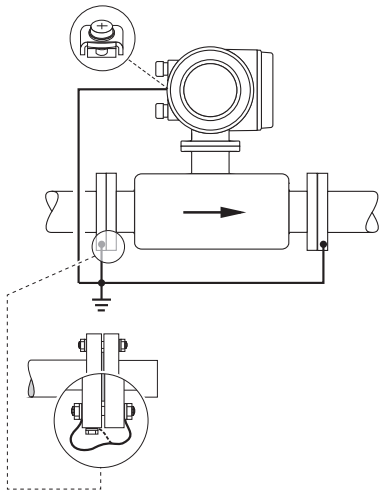
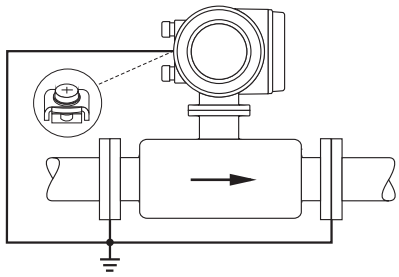
Perfect measurement is only ensured when the fluid and the sensor have the same electrical potential. This is ensured by the reference electrode integrated in the sensor as standard.

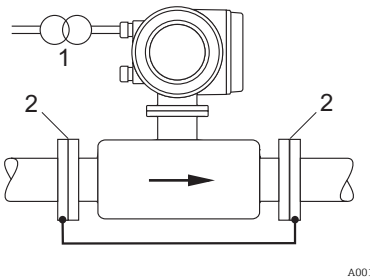
The following should also be taken into consideration for potential equalization:
- Internal grounding concepts in the company
- Operating conditions, such as the material/grounding of the pipes (see Table)

Standard situation

Operating conditions	Potential equalization
When using the measuring device in a: ▪ Metal, grounded pipe Potential equalization takes place via the ground terminal of the transmitter. Note! When installing in metal pipes, we recommend you connect the ground terminal of the transmitter housing with the piping.	 A0011892 *Via the ground terminal of the transmitter*

Special situations

Operating conditions	Potential equalization
When using the measuring device in a: ▪ Metal pipe that is not grounded This connection method also applies in situations where: ▪ Customary potential equalization cannot be ensured. ▪ Excessively high equalizing currents can be expected. Both sensor flanges are connected to the pipe flange by means of a ground cable (copper wire, 6 mm² / 0.0093 in²) and grounded. Connect the transmitter or sensor connection housing, as applicable, to ground potential by means of the ground terminal provided for the purpose. The ground cable is mounted directly on the conductive flange coating with the flange screws. Note! The ground cable for flange-to-flange connections can be ordered separately as an accessory from Endress+Hauser → 📄 42.	 A0011576 *Via the ground terminal of the transmitter and the flanges of the pipe*
When using the measuring device in a: ▪ Plastic pipe ▪ Pipe with insulating lining This connection method also applies in situations where: ▪ Customary potential equalization cannot be ensured. ▪ Excessively high equalizing currents can be expected. Potential equalization takes place using additional ground disks, which are connected to the ground terminal via a ground cable (copper wire, min. 6 mm² / 0.0093 in²). When installing the ground disks, please comply with the enclosed Installation Instructions. Ground disks can be ordered separately as an accessory from Endress+Hauser → 📄 42.	 A0011895 *Via the ground terminal of the transmitter*

Operating conditions	Potential equalization
When using the measuring device in a: ▪ Pipe with a cathodic protection unit The device is installed potential-free in the pipe. Only the two flanges of the pipe are connected with a ground cable (copper wire, min. 6 mm^2 / 0.0093 in^2). Here, the ground cable is mounted directly on the conductive flange coating with flange screws. Note the following when installing: ▪ The applicable regulations regarding potential-free installation must be observed. ▪ There should be no electrically conductive connection between the pipe and the device. ▪ The mounting material must withstand the applicable torques.	 A0011896 *Potential equalization and cathodic protection* *1 Power supply isolation transformer* *2 Electrically isolated*

Performance characteristics

Reference operating conditions

As per DIN EN 29104 and VDI/VDE 2641:
- Fluid temperature: +28 ± 2 °C (+82 ± 4 °F)
- Ambient temperature: +22 ± 2 °C (+72 ± 4 °F)
- Warm-up period: 30 minutes

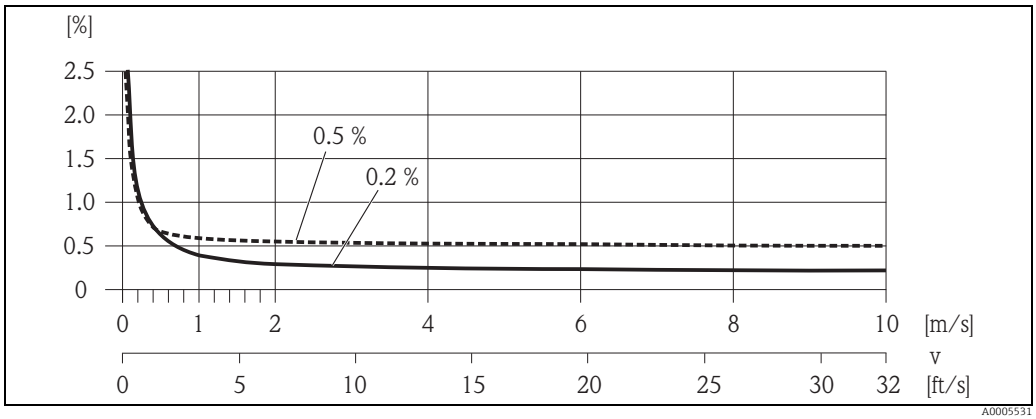
Installation conditions:
- Inlet run > 10 × DN
- Outlet run > 5 × DN
- Sensor and transmitter grounded.
- The sensor is centered in the pipe.

Maximum measured error

- Pulse output: ±0.5% o.r. ± 1 mm/s (±0.5% o.r. ± 0.04 in/s) (o.r. = of reading)
- Current output: also typically ± 5 µA

Optional:
- Pulse output: ±0.2% o.r. ± 2 mm/s (±0.2% o.r. ± 0.08 in/s) (o.r. = of reading)
- Current output: also typically ± 5 µA

Fluctuations in the supply voltage do not have any effect within the specified range.



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Max. measured error in % of reading

Repeatability

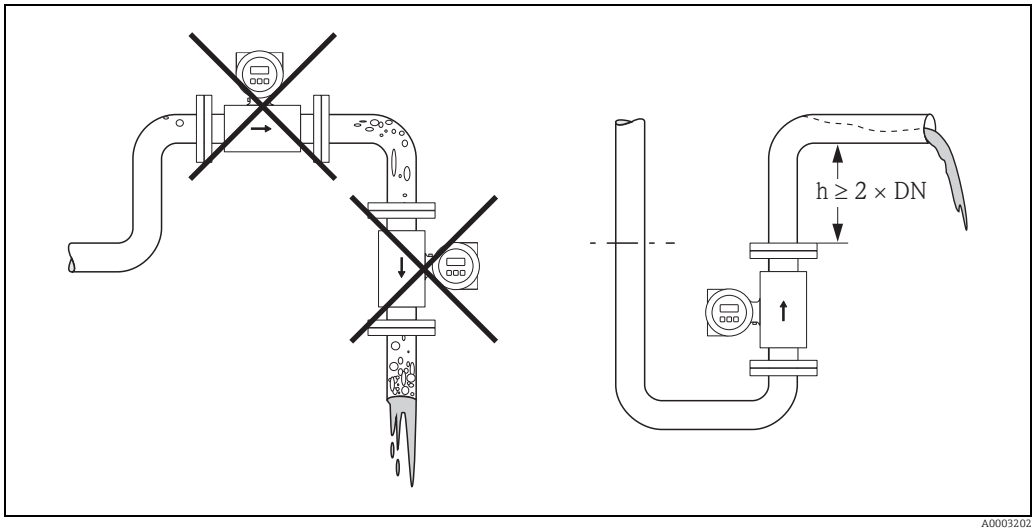
Max. ±0.1% o.r. ± 0.5 mm/s (±0.1% o.r. ± 0.02 in/s) (o.r. = of reading)

Installations

Installation instructions

Mounting location

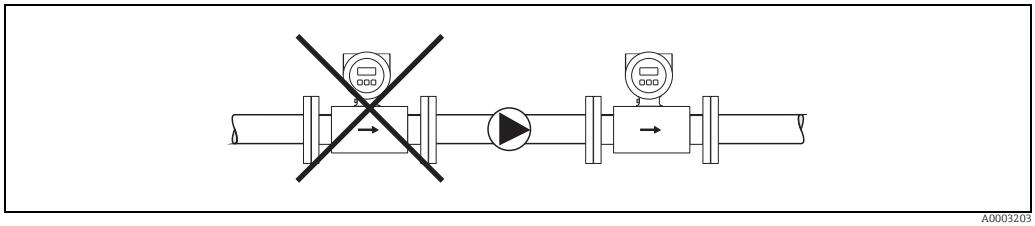
Entrained air or gas bubble formation in the measuring tube can result in an increase in measuring errors.
Avoid the following installation locations in the pipe:
- Highest point of a pipeline. Risk of air accumulating!
- Directly upstream from a free pipe outlet in a vertical pipeline.



Mounting location

Installation of pumps

Sensors may not be installed on the pump suction side. This precaution is to avoid low pressure and the consequent risk of damage to the lining of the measuring tube. Information on the pressure tightness of the measuring tube lining → 18, Section "Pressure tightness".
Pulsation dampers may be needed when using piston pumps, piston diaphragm pumps or hose pumps. Information on the shock and vibration resistance of the measuring system → 17, Section "Shock and vibration resistance".

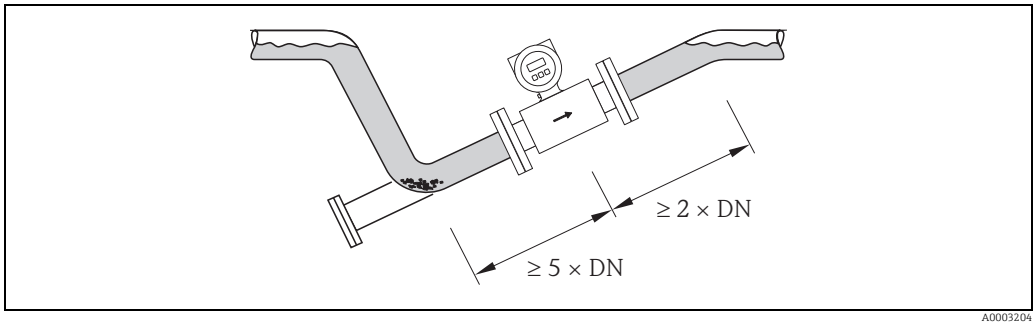


Installation of pumps

Partially filled pipes

Partially filled pipes with gradients necessitate a drain-type configuration.
The empty pipe detection function (EPD) provides additional security in detecting empty or partially filled pipes.

Caution!
Risk of solids accumulating. Do not install the sensor at the lowest point in the drain. It is advisable to install a cleaning valve.

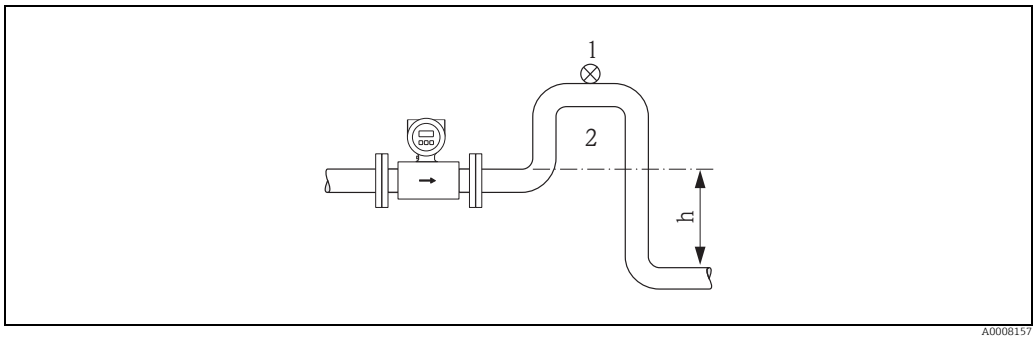


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Installation with partially filled pipes

Down pipes

Install a siphon or a vent valve downstream of the sensor in down pipes h ≥ 5 m (16.4 ft). This precaution is to avoid low pressure and the consequent risk of damage to the lining of the measuring tube. This measure also prevents the liquid current stopping in the pipe which could cause air locks. Information on the pressure tightness of the measuring tube lining → 18, Section "Pressure tightness".



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Installation measures for vertical pipes

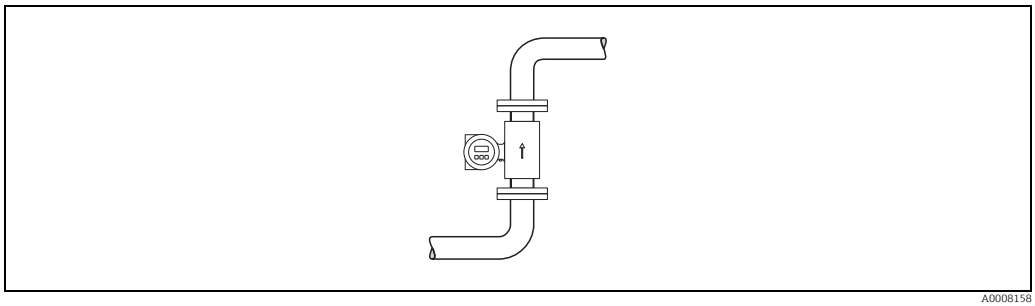
1 Vent valve
2 Pipe siphon
h Length of the down pipe

Orientation

An optimum orientation helps avoid gas and air accumulations and deposits in the measuring tube. Promag, nevertheless, supplies a range of options and accessories for correct measuring of problematic mediums:

- Empty Pipe Detection (EPD) for recognition of partially filled measuring tubes, or for degassing mediums or for applications with fluctuating process pressure.

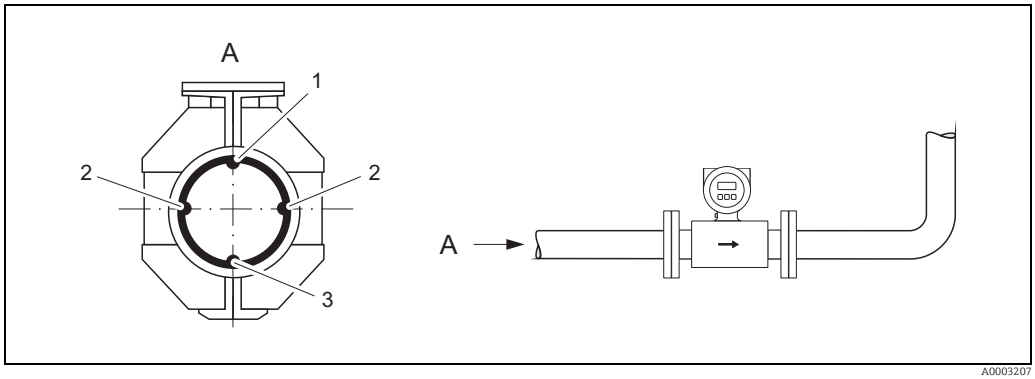
Vertical orientation
This is the ideal orientation for self-emptying piping systems and for use in conjunction with empty pipe detection.



Vertical orientation

Horizontal orientation
The measuring electrode axis should be horizontal. This prevents brief insulation of the two measuring electrodes by entrained air bubbles.

Caution!
Empty pipe detection only works correctly with horizontal orientation if the transmitter housing is facing upwards. Otherwise there is no guarantee that empty pipe detection will respond if the measuring tube is only partially filled or empty.



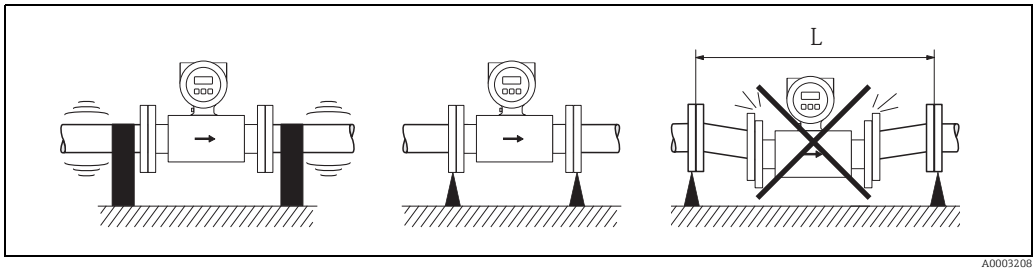
Horizontal orientation

1 EPD electrode for empty pipe detection
2 Measuring electrodes for signal detection
3 Reference electrode for potential equalization

Vibrations

Secure the piping and the sensor if vibration is severe.

Caution!
If vibrations are too severe, we recommend the sensor and transmitter be mounted separately. Information on the permitted shock and vibration resistance → 17, Section "Shock and vibration resistance".



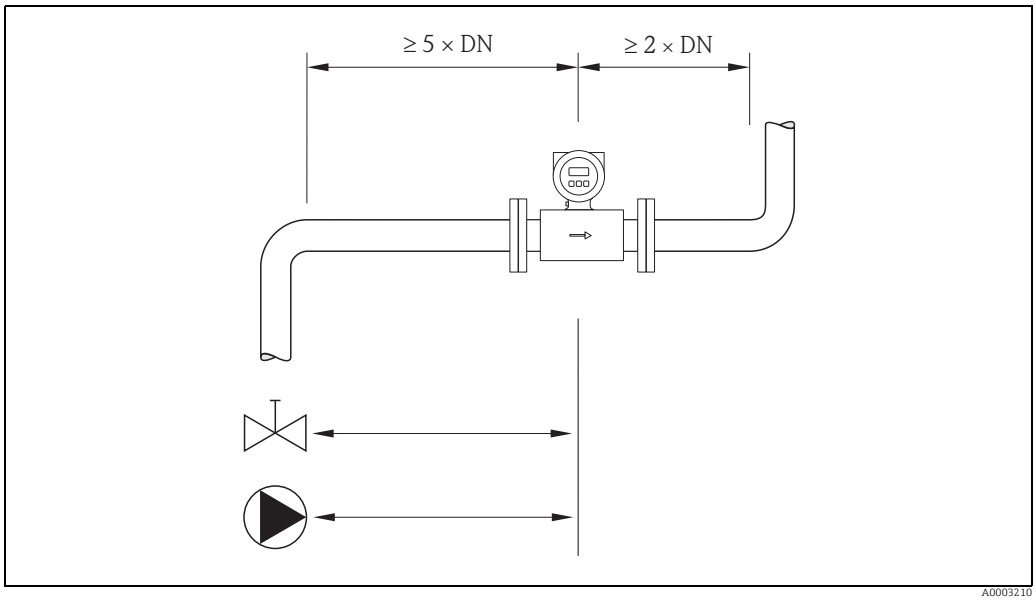
Measures to prevent vibration of the measuring device

L > 10 m (33 ft)

Inlet and outlet run

If possible, install the sensor well clear of assemblies such as valves, T-pieces, elbows etc.

Note the following inlet and outlet runs to comply with measuring accuracy specifications:
- Inlet run: ≥ 5 × DN
- Outlet run: ≥ 2 × DN



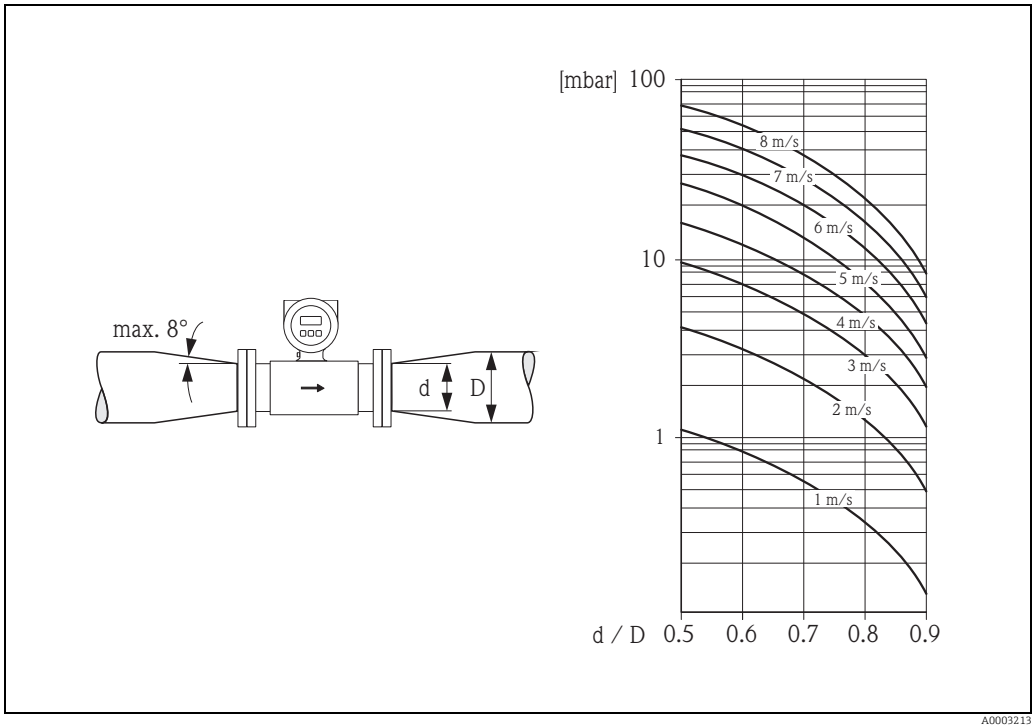
Inlet and outlet run

Adapters

Suitable adapters to DIN EN 545 (double-flange reducers) can be used to install the sensor in larger-diameter pipes. The resultant increase in the rate of flow improves measuring accuracy with very slow-moving fluids. The nomogram shown here can be used to calculate the pressure loss caused by reducers and expanders.

Note!
The nomogram only applies to liquids of viscosity similar to water.

1. Calculate the ratio of the diameters d/D.
2. From the nomogram read off the pressure loss as a function of flow velocity (downstream from the reduction) and the d/D ratio.

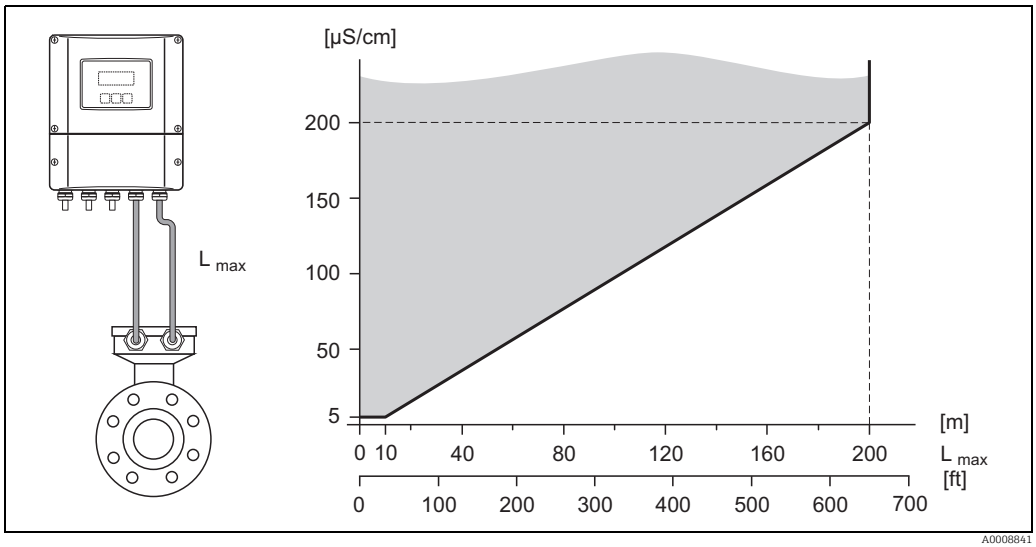


Pressure loss due to adapters

Length of connecting cable

When mounting the remote version, please note the following to achieve correct measuring results:

- Fix cable run or lay in armored conduit. Cable movements can falsify the measuring signal especially in the case of low fluid conductivities.
- Route the cable well clear of electrical machines and switching elements.
- If necessary, ensure potential equalization between sensor and transmitter.
- The permitted cable length L_{max} is determined by the fluid conductivity.
  The required minimum conductivity for measuring
  – fluids in general: 5 µS/cm
  – demineralized water: 20 µS/cm
- When the empty pipe detection function is switched on (EPD), the maximum connecting cable length is 10 m (33 ft).



Permitted length of connecting cable for remote version
Area marked in gray = permitted range; Lmax = length of connecting cable in [m] ([ft]); fluid conductivity in [µS/cm]

Environment

Ambient temperature range

Transmitter
- Standard: −20 to +60 °C (−4 to +140 °F)
- Optional: −40 to +60 °C (−40 to +140 °F)



Note!
At ambient temperatures below −20 °C (−4 °F) the readability of the display may be impaired.

Sensor
- Flange material carbon steel: −10 to +60 °C (14 to +140 °F)
- Flange material stainless steel (DN ≤ 300/12"): −40 to +60 °C (−40 to +140 °F)



Caution!
The permitted temperature range of the measuring tube lining may not be undershot or overshot (→ 18, Section "Medium temperature range").

Please note the following points:
- Install the device in a shady location. Avoid direct sunlight, particularly in warm climatic regions.
- The transmitter must be mounted separate from the sensor if both the ambient and fluid temperatures are high (→ 18, Section "Medium temperature range").

Storage temperature

The storage temperature corresponds to the operating temperature range of the measuring transmitter and the appropriate measuring sensors.



Caution!
- The measuring device must be protected against direct sunlight during storage in order to avoid unacceptably high surface temperatures.
- A storage location must be selected where moisture does not collect in the measuring device. This will help prevent fungus and bacteria infestation which can damage the liner.

Degree of protection

- Standard: IP 67 (NEMA 4X) for transmitter and sensor.
- Optional: IP 68 (NEMA 6P) for sensor for remote version (DN ≤ 300 only with stainless steel flange).
- For information regarding applications where the device is buried directly in the soil or is installed in a flooded wastewater basin please contact your local Endress+Hauser Sales Center.

Shock and vibration resistance

Acceleration up to 2 g following IEC 600 68-2-6

Electromagnetic compatibility (EMC)

- As per IEC/EN 61326 as well as NAMUR Recommendation NE 21

Process

Medium temperature range

- 0 to +80 °C (+32 to +176 °F) for hard rubber (DN 350 to 2400 / 14 to 90")
- −20 to +50 °C (−4 to +122 °F) for polyurethane (DN 25 to 1200 / 1 to 48")
- −20 to +90 °C (−4 to +194 °F) for PTFE (DN 25 to 300 / 1 to 12")

Conductivity

Minimum conductivity:
- ≥ 5 µS/cm for fluids in general
- ≥ 20 µS/cm for demineralized water

Note!
In the remote version, the necessary minimum conductivity also depends on the cable length (→ 16, Section "Length of connecting cable").

Medium pressure range (nominal pressure)

- EN 1092-1 (DIN 2501)
  - PN 6 (DN 350 to 2400 / 14 to 90")
  - PN 10 (DN 200 to 2400 / 8 to 90")
  - PN 16 (DN 25 to 300 / 1 to 12")
- EN 1092-1, lap joint flange, stampel plate
  - PN 10 (DN 25 to 300 / 1 to 12")
- ASME B16.5
  - Class 150 (1 to 24")
- AWWA
  - Class D (28 to 90")
- AS2129
  - Table E (350 to 1200 / 14 to 48")
- AS4087
  - PN 16 (350 to 1200 / 14 to 48")

Pressure tightness

Measuring tube lining: Polyurethane, hard rubber

Promag L Nominal diameter		Measuring tube lining	Resistance of measuring tube lining to partial vacuu: Limit values for abs. pressure [mbar] ([psi]) at various fluid temperatures		
			25 °C	50 °C	80° C
[mm]	[inch]		77 °F	122 °F	176° F
25 to 1200	1 to 48"	25 to 1200	1 to 48"	0	–
350 to 2400	14 to 90"	Hard rubber	0	0	0

Measuring tube lining: PTFE

Nominal diameter		Limit values for abs. pressure [mbar] ([psi]) at fluid temperatures:			
		25 °C (77 °F)		90 °C (194 °F)	
[mm]	[inch]	[mbar]	[psi]	[mbar]	[psi]
25	1"	0	0	0	0
32	–	0	0	0	0
40	1 ½"	0	0	0	0
50	2"	0	0	0	0
65	–	0	0	40	0.58
80	3"	0	0	40	0.58
100	4"	0	0	135	1.96
125	–	135	1.96	240	3.48
150	6"	135	1.96	240	3.48
200	8"	200	2.90	290	4.21
250	10"	330	4.79	400	5.80
300	12"	400	5.80	500	7.25

Limiting flow

The diameter of the pipe and the flow rate determine the nominal diameter of the sensor.
The optimum flow velocity is between 2 to 3 m/s (6.5 to 9.8 ft/s). The velocity of flow (v), moreover, has to be matched to the physical properties of the fluid:

- v < 2 m/s (6.5 ft/s): for abrasive fluids such as potter's clay, lime milk, ore slurry etc.
- v > 2 m/s (6.5 ft/s): for fluids causing build-up such as wastewater sludges etc.

Flow characteristic values (SI units)

Diameter		Recommended flow	Factory settings		
[mm]	[inch]	Min./max. full scale value (v ~ 0.3 or 10 m/s)	Full scale value Current output (v ~ 2.5 m/s)	Pulse value (~ 2 pulses/s)	Low flow cut off (v ~ 0.04 m/s)
25	1"	9 to 300 dm³/min	75 dm³/min	0.50 dm³	1 dm³/min
32	–	15 to 500 dm³/min	125 dm³/min	1.00 dm³	2 dm³/min
40	1 ½"	25 to 700 dm³/min	200 dm³/min	1.50 dm³	3 dm³/min
50	2"	35 to 1100 dm³/min	300 dm³/min	2.50 dm³	5 dm³/min
65	–	60 to 2000 dm³/min	500 dm³/min	5.00 dm³	8 dm³/min
80	3"	90 to 3000 dm³/min	750 dm³/min	5.00 dm³	12 dm³/min
100	4"	145 to 4700 dm³/min	1200 dm³/min	10.00 dm³	20 dm³/min
125	–	220 to 7500 dm³/min	1850 dm³/min	15.00 dm³	30 dm³/min
150	6"	20 to 600 m³/h	150 m³/h	0.025 m³	2.5 m³/h
200	8"	35 to 1100 m³/h	300 m³/h	0.05 m³	5.0 m³/h
250	10"	55 to 1700 m³/h	500 m³/h	0.05 m³	7.5 m³/h
300	12"	80 to 2400 m³/h	750 m³/h	0.10 m³	10 m³/h
350	14"	110 to 3300 m³/h	1000 m³/h	0.10 m³	15 m³/h
375	15"	140 to 4200 m³/h	1200 m³/h	0.15 m³	20 m³/h
400	16"	140 to 4200 m³/h	1200 m³/h	0.15 m³	20 m³/h
450	18"	180 to 5400 m³/h	1500 m³/h	0.25 m³	25 m³/h
500	20"	220 to 6600 m³/h	2000 m³/h	0.25 m³	30 m³/h
600	24"	310 to 9600 m³/h	2500 m³/h	0.30 m³	40 m³/h
700	28"	420 to 13500 m³/h	3500 m³/h	0.50 m³	50 m³/h
–	30"	480 to 15000 m³/h	4000 m³/h	0.50 m³	60 m³/h
800	32"	550 to 18000 m³/h	4500 m³/h	0.75 m³	75 m³/h
900	36"	690 to 22500 m³/h	6000 m³/h	0.75 m³	100 m³/h
1000	40"	850 to 28000 m³/h	7000 m³/h	1.00 m³	125 m³/h
–	42"	950 to 30000 m³/h	8000 m³/h	1.00 m³	125 m³/h
1200	48"	1250 to 40000 m³/h	10000 m³/h	1.50 m³	150 m³/h
–	54"	1550 to 50000 m³/h	13000 m³/h	1.50 m³	200 m³/h
1400	–	1700 to 55000 m³/h	14000 m³/h	2.00 m³	225 m³/h
–	60"	1950 to 60000 m³/h	16000 m³/h	2.00 m³	250 m³/h
1600	–	2200 to 70000 m³/h	18000 m³/h	2.50 m³	300 m³/h
–	66"	2500 to 80000 m³/h	20500 m³/h	2.50 m³	325 m³/h
1800	72"	2850 to 90000 m³/h	23000 m³/h	3.00 m³	350 m³/h
–	78"	3300 to 100000 m³/h	28500 m³/h	3.50 m³	450 m³/h
2000	–	3400 to 110000 m³/h	28500 m³/h	3.50 m³	450 m³/h
–	84"	3700 to 125000 m³/h	31000 m³/h	4.50 m³	500 m³/h
2200	–	4100 to 136000 m³/h	34000 m³/h	4.50 m³	540 m³/h
–	90"	4300 to 143000 m³/h	36000 m³/h	5.00 m³	570 m³/h
2400	–	4800 to 162000 m³/h	40000 m³/h	5.50 m³	650 m³/h

Flow characteristic values (US units)

Diameter		Recommended flow rate	Factory settings		
[inch]	[mm]	Min./max. full scale value (v ~ 0.3 or 10 m/s)	Full scale value Current output (v ~ 2.5 m/s)	Pulse value (~ 2 pulses/s)	Low flow cut off (v ~ 0.04 m/s)
1	25	2.5 to 80 gal/min	18 gal/min	0.20 gal	0.25 gal/min
1 ½"	40	7 to 190 gal/min	50 gal/min	0.50 gal	0.75 gal/min
2"	50	10 to 300 gal/min	75 gal/min	0.50 gal	1.25 gal/min
–	65	16 to 500 gal/min	130 gal/min	1 gal	2.0 gal/min
3"	80	24 to 800 gal/min	200 gal/min	2 gal	2.5 gal/min
4"	100	40 to 1250 gal/min	300 gal/min	2 gal	4.0 gal/min
–	125	60 to 1950 gal/min	450 gal/min	5 gal	7.0 gal/min
6"	150	90 to 2650 gal/min	600 gal/min	5 gal	12 gal/min
8"	200	155 to 4850 gal/min	1200 gal/min	10 gal	15 gal/min
10"	250	250 to 7500 gal/min	1500 gal/min	15 gal	30 gal/min
12"	300	350 to 10600 gal/min	2400 gal/min	25 gal	45 gal/min
14"	350	500 to 15000 gal/min	3600 gal/min	30 gal	60 gal/min
15"	375	600 to 19000 gal/min	4800 gal/min	50 gal	60 gal/min
16"	400	600 to 19000 gal/min	4800 gal/min	50 gal	60 gal/min
18"	450	800 to 24000 gal/min	6000 gal/min	50 gal	90 gal/min
20"	500	1000 to 30000 gal/min	7500 gal/min	75 gal	120 gal/min
24"	600	1400 to 44000 gal/min	10500 gal/min	100 gal	180 gal/min
28"	700	1900 to 60000 gal/min	13500 gal/min	125 gal	210 gal/min
30"	–	2150 to 67000 gal/min	16500 gal/min	150 gal	270 gal/min
32"	800	2450 to 80000 gal/min	19500 gal/min	200 gal	300 gal/min
36"	900	3100 to 100000 gal/min	24000 gal/min	225 gal	360 gal/min
40"	1000	3800 to 125000 gal/min	30000 gal/min	250 gal	480 gal/min
42"	–	4200 to 135000 gal/min	33000 gal/min	250 gal	600 gal/min
48"	1200	5500 to 175000 gal/min	42000 gal/min	400 gal	600 gal/min
54"	–	9 to 300 Mgal/day	75 Mgal/day	0.0005 Mgal	1.3 Mgal/min
–	1400	10 to 340 Mgal/day	85 Mgal/day	0.0005 Mgal	1.3 Mgal/min
60"	–	12 to 380 Mgal/day	95 Mgal/day	0.0005 Mgal	1.3 Mgal/min
–	1600	13 to 450 Mgal/day	110 Mgal/day	0.0008 Mgal	1.7 Mgal/min
66"	–	14 to 500 Mgal/day	120 Mgal/day	0.0008 Mgal	2.2 Mgal/min
72"	1800	16 to 570 Mgal/day	140 Mgal/day	0.0008 Mgal	2.6 Mgal/min
78"	–	18 to 650 Mgal/day	175 Mgal/day	0.0010 Mgal	3.0 Mgal/min
–	2000	20 to 700 Mgal/day	175 Mgal/day	0.0010 Mgal	3.0 Mgal/min
–	2000	20 to 700 Mgal/day	175 Mgal/day	0.0010 Mgal	2.9 Mgal/day
84"	–	24 to 800 Mgal/day	190 Mgal/day	0.0011 Mgal	3.2 Mgal/day
–	2200	26 to 870 Mgal/day	210 Mgal/day	0.0012 Mgal	3.4 Mgal/day
90"	–	27 to 910 Mgal/day	220 Mgal/day	0.0013 Mgal	3.6 Mgal/day
–	2400	31 to 1030 Mgal/day	245 Mgal/day	0.0014 Mgal	4.1 Mgal/day

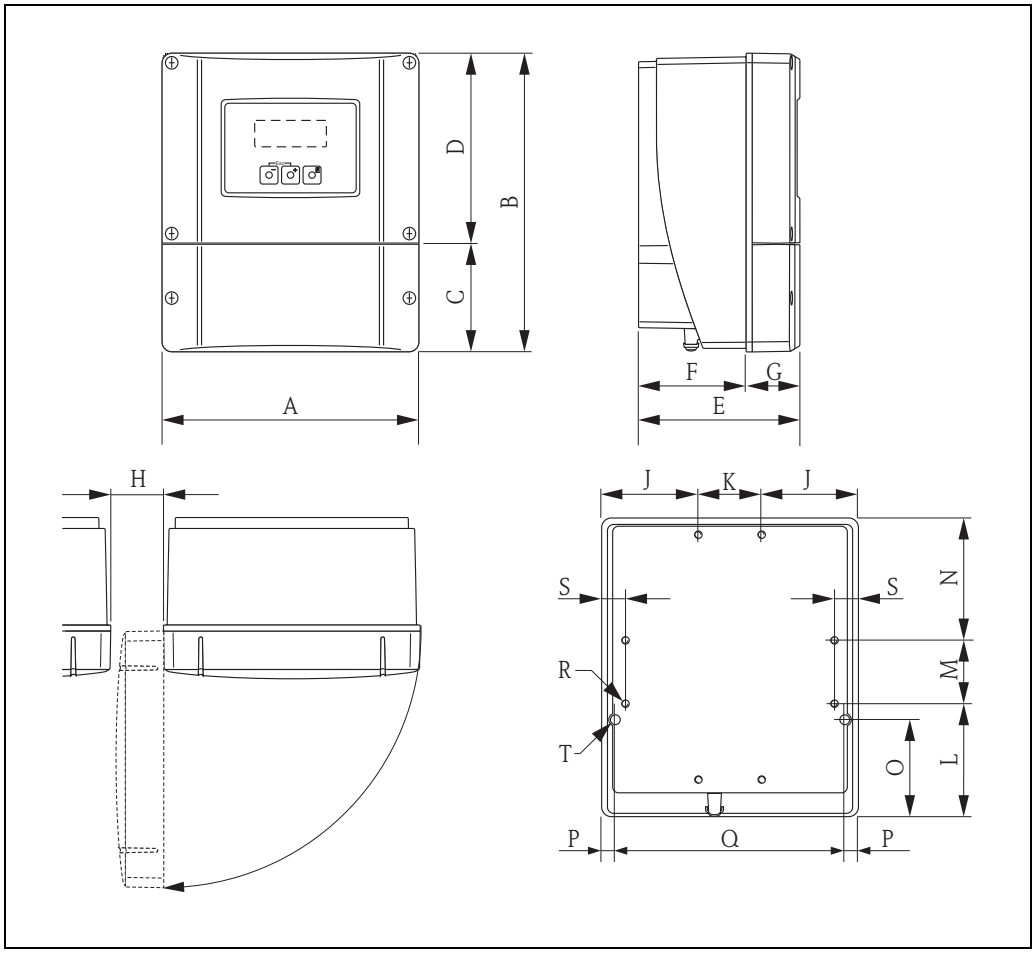
Pressure loss

- No pressure loss if the sensor is installed in a pipe with the same nominal diameter.
- Pressure losses for configurations incorporating adapters according to DIN EN 545 (→ 15, Section "Adapters").

Mechanical construction

Design. dimensions

Transmitter remote version, wall-mount housing (non Ex-zone and II3G/Zone 2)



A0001150

Dimensions in SI units

A	B	C	D	E	F	G	H	J	K
215	250	90.5	159.5	135	90	45	> 50	81	53
L	M	N	O	P	Q	R	S	T[1)]	
95	53	102	81.5	11.5	192	8 × M5	20	2 × ∅ 6.5	

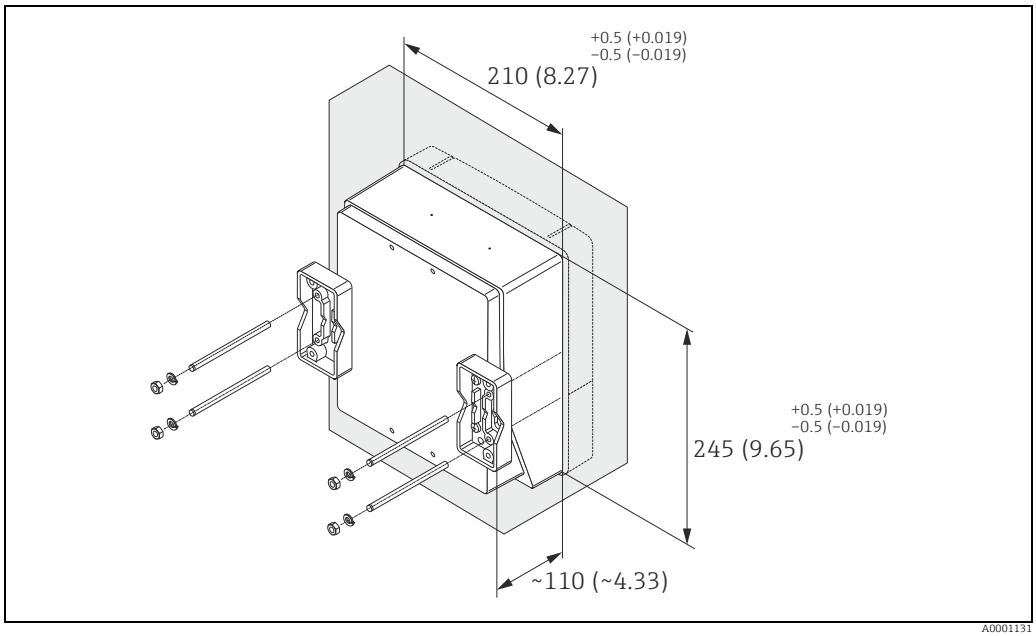
[1)] Securing screw for wall mounting: M6 (screw head max. 10.5 mm)
All dimensions in [mm]

Dimensions in US units

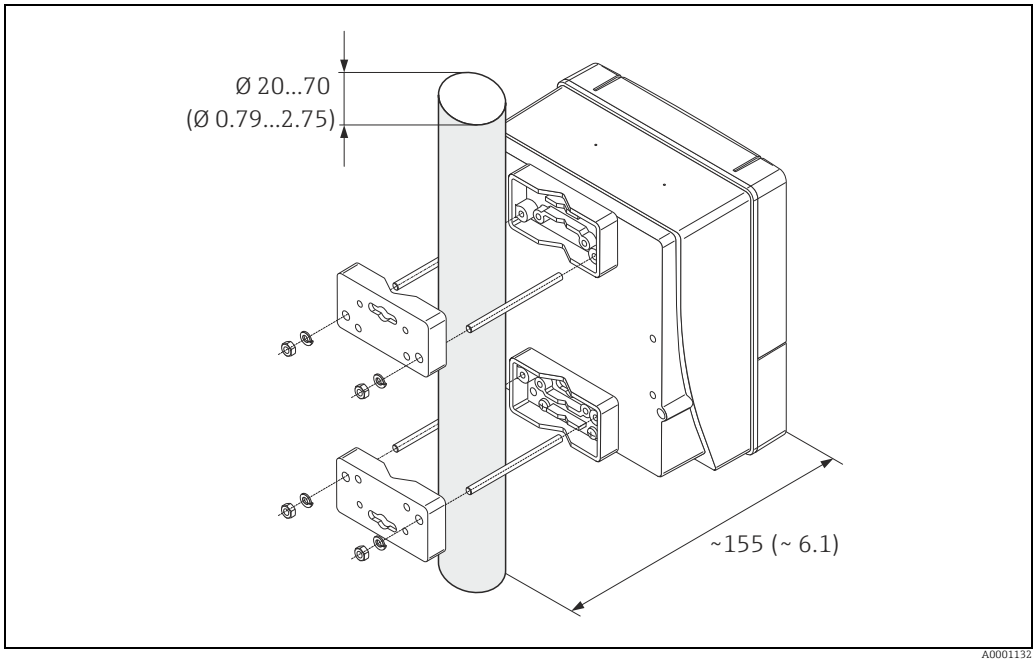
A	B	C	D	E	F	G	H	J	K
8.46	9.84	3.56	6.27	5.31	3.54	1.77	> 1.97	3.18	2.08
L	M	N	O	P	Q	R	S	T[1)]	
3.74	2.08	4.01	3.20	0.45	7.55	8 × M5	0.79	2 × ∅ 6.5	

[1)] Securing screw for wall mounting: M6 (screw head max. 0.41")
All dimensions in [inch]

There is a separate mounting kit for the wall-mounted housing. It can be ordered from Endress+Hauser as an accessory. The following installation variants are possible:
- Panel-mounted installation
- Pipe mounting

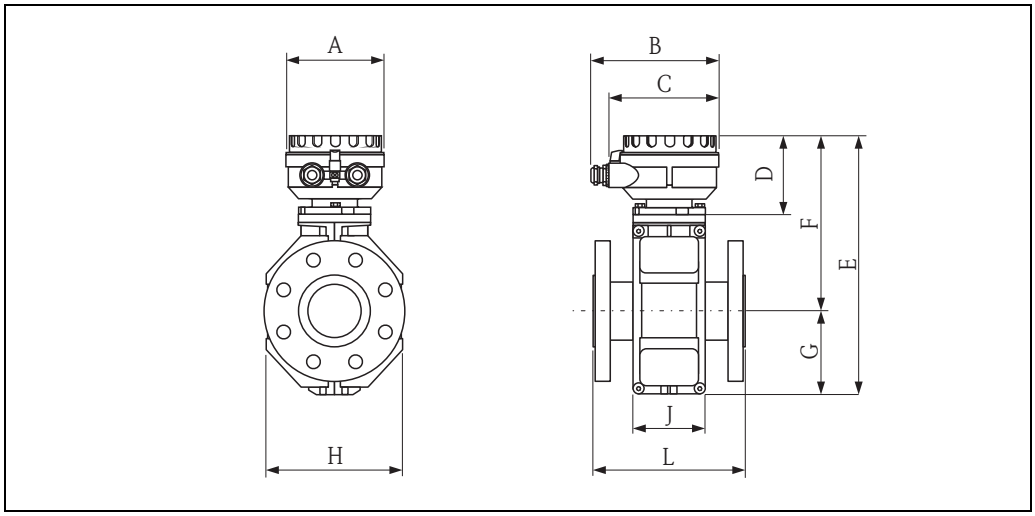


Panel-mounted installation



Pipe mounting

Sensor, remote version, DN 25 to 300 (1 to 12")



A0012462

Dimensions in SI units

DN	L[1)]	A	B	C	D	E	F	G	H	J
25	200	129	163	143	102	286	202	84	120	94
32	200					286	202	84	120	94
40	200					286	202	84	120	94
50	200					286	202	84	120	94
65	200					336	227	109	180	94
80	200					336	227	109	180	94
100	250					336	227	109	180	94
125	250					417	267	150	260	140
150	300					417	267	150	260	140
200	350					472	292	180	324	156
250	450					522	317	205	400	156
300	500					572	342	230	460	166

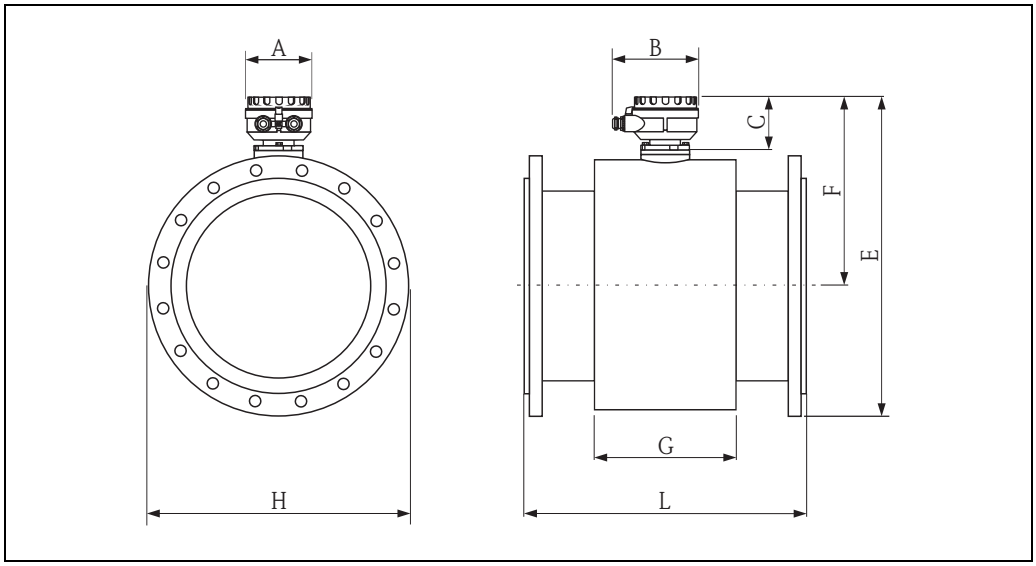
[1)] The length (L) is regardless of the pressure rating selected. Fitting length to DVGW.
All dimensions in [mm]

Dimensions in US units

DN	L[1)]	A	B	C	D	E	F	G	H	J
1"	7.87	5.08	6.42	5.63	4.02	11.3	7.95	3.32	4.72	3.70
1 ½"	7.87					11.3	7.95	3.32	4.72	3.70
2"	7.87					11.3	7.95	3.32	4.72	3.70
3"	7.87					13.2	8.94	4.30	7.10	3.70
4"	9.84					13.2	8.94	4.30	7.10	3.70
6"	11.8					16.4	10.5	5.91	10.2	5.51
8"	13.8					18.6	11.5	7.10	12.8	6.14
10"	17.7					20.6	12.5	8.08	15.8	6.14
12"	19.7					22.5	13.5	9.06	18.1	6.54

[1)] The length (L) is regardless of the pressure rating selected. Fitting length to DVGW
All dimensions in [inch]

Sensor, remote version, DN 350 to 2400 (14 to 90")



A0014987

Dimensions in SI units

DN	L	A	B	C	F	G
350	550	129	163	102	353	290
375	600				379	290
400	600				379	290
450	600				407	290
500	600				432	290
600	600				473	290
700	700				538	424
750	750				575	454
800	800				594	500
900	900				644	580
1000	1000				694	660
1050	1050				730	755
1200	1200				808	828
1350	1350				920	1008
1400	1400				920	1008
1500	1500				1020	1147
1600	1600				1020	1147
1650	1650				1071	1284
1800	1800				1128	1379
2000	2000				1239	1569
2150	2150				1339	1711
2200	2200				1339	1711
2300	2300				1444	1859
2400	2400				1444	1859

All dimensions in [mm]

DN	E with pressure rating					H with pressure rating				
	PN 6	PN 10	PN 16	ASME AWWA	AS	PN 6	PN 10	PN 16	ASME AWWA	AS
350	598	605	616	620	615	490	505	520	533	525
375	–	–	–	–	654	–	–	–	–	550
400	649	661	669	677	669	540	565	580	597	580
450	704	714	727	724	727	595	615	640	635	640
500	754	767	790	781	784	645	670	715	699	705
600	850	863	893	879	885	755	780	840	813	825
700	968	985	993	1001	993	860	895	910	927	910
750	–	–	–	1067	1073	–	–	–	984	995
800	1082	1102	1107	1124	1124	975	1015	1025	1060	1060
900	1182	1202	1207	1228	1232	1075	1115	1125	1168	1175
1000	1282	1309	1322	1339	1322	1175	1230	1255	1289	1255
1050	–	–	–	1403	–	–	–	–	1346	–
1200	1511	1536	1551	1564	1553	1405	1455	1485	1511	1490
1350	–	–	–	1762	–	–	–	–	1683	–
1400	1735	1758	1763	–	–	1630	1675	1685	–	–
1500	–	–	–	1947	–	–	–	–	1854	–
1600	1935	1978	1985	–	–	1830	1915	1930	–	–
1650	–	–	–	2087	–	–	–	–	2032	–
1800	2150	2185	2193	2226	–	2045	2115	2130	2197	–
2000	2371	2401	2412	2420	–	2265	2325	2345	2362	–
2150	–	–	–	2606	–	–	–	–	2534	–
2200	2576	2614	–	–	–	2475	2550	–	–	–
2300	–	–	–	2796	–	–	–	–	2705	–
2400	2786	2824	–	–	–	2685	2760	–	–	–

All dimensions in [mm]

Dimensions in US units

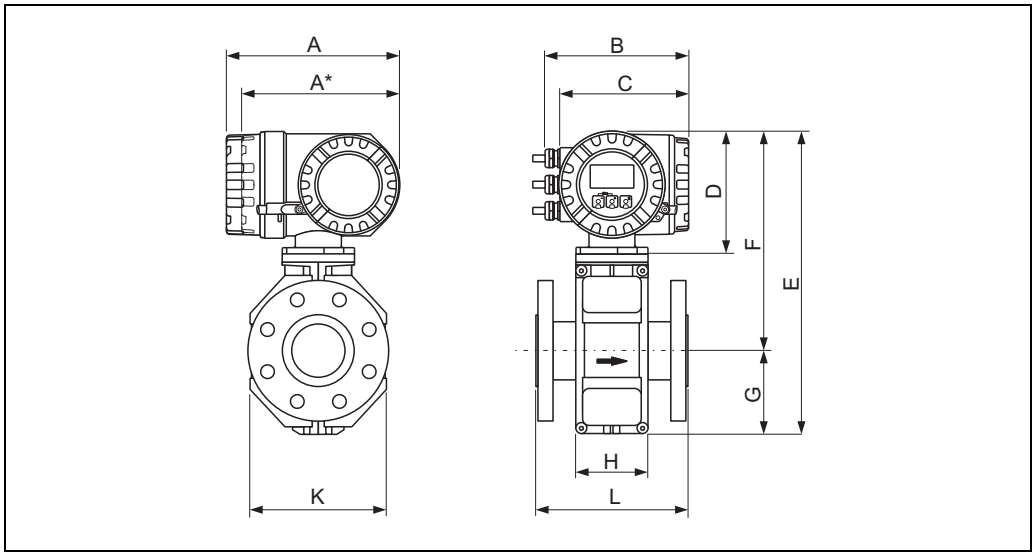
DN	L	A	B	C	F	G
14"	21.6	5.08	6.42	4.02	13.9	11.4
15"	23.6				14.9	11.4
16"	23.6				14.9	11.4
18"	23.6				16.0	11.4
20"	23.6				17.0	11.4
24"	23.6				18.6	11.4
28"	27.6				21.4	16.7
30"	29.5				22.8	17.9
32"	31.5				23.6	19.7
36"	35.4				25.6	22.8
40"	39.4				27.5	26.0
42"	41.3				28.9	29.7
48"	47.2				32.0	32.6
54"	53.1				36.0	39.6
60"	59.0				40.2	45.2
66"	64.9				42.1	50.6
72"	70.8				44.4	54.2
78"	78.7				48.8	61.8
84"	84.6				52.7	67.4
90"	90.5				56.9	73.2

All dimensions in [inch]

DN	E with pressure rating					H with pressure rating				
	PN 6	PN 10	PN 16	ASME AWWA	AS	PN 6	PN 10	PN 16	ASME AWWA	AS
14"	23.5	23.8	24.3	24.4	24.2	19.3	19.9	20.5	21.0	20.7
15"	–	–	–	–	25.7	–	–	–	–	21.7
16"	25.6	26.0	26.3	26.7	26.3	21.3	22.2	22.8	23.5	22.8
18"	27.7	28.1	28.6	28.5	28.6	23.4	24.2	25.2	25.0	25.2
20"	29.7	30.2	31.1	30.7	30.9	25.4	26.4	28.1	27.5	27.8
24"	33.5	34.0	35.2	34.6	34.8	29.7	30.7	33.1	32.0	32.5
28"	38.1	39.0	39.1	39.6	39.3	33.9	35.2	35.8	36.5	35.8
30"	–	–	–	42.2	42.4	–	–	–	38.7	39.2
32"	42.6	43.6	43.6	44.4	44.4	38.4	40.0	40.4	41.7	41.7
36"	46.5	47.5	47.5	48.5	48.7	42.3	43.9	44.3	46.0	46.3
40"	50.5	51.7	52.0	52.9	52.2	46.3	48.4	49.4	50.7	49.4
42"	–	–	–	55.4	–	–	–	–	53.0	–
48"	59.5	60.6	61.1	61.8	61.3	55.3	57.3	58.5	59.5	58.7
54"	–	–	69.4	69.4	–	–	–	66.3	66.3	–
60"	–	–	78.1	76.7	–	–	–	76.0	73.0	–
66"	–	–	–	82.2	–	–	–	–	80.0	–
72"	84.7	86.0	86.3	87.66	–	80.5	83.3	83.9	86.5	–
78"	93.4	94.5	95.0	95.3	–	89.2	91.5	92.3	93.0	–
84"	–	–	–	102.6	–	–	–	–	99.8	–
90"	–	–	–	110.1	–	–	–	–	106.5	–

All dimensions in [inch]

Compact version, DN 25 to 300 (1 to 12")



Dimensions in SI units

DN	L[1)]	A	A*	B	C	D	E	F	G	H	K
25	200	227	207	187	168	160	341	257	84	94	120
32	200						341	257	84	94	120
40	200						341	257	84	94	120
50	200						341	257	84	94	120
65	200						391	282	109	94	180
80	200						391	282	109	94	180
100	250						391	282	109	94	180
125	250						472	322	150	140	260
150	300						472	322	150	140	260
200	350						527	347	180	156	324
250	450						577	372	205	156	400
300	500						627	397	230	166	460

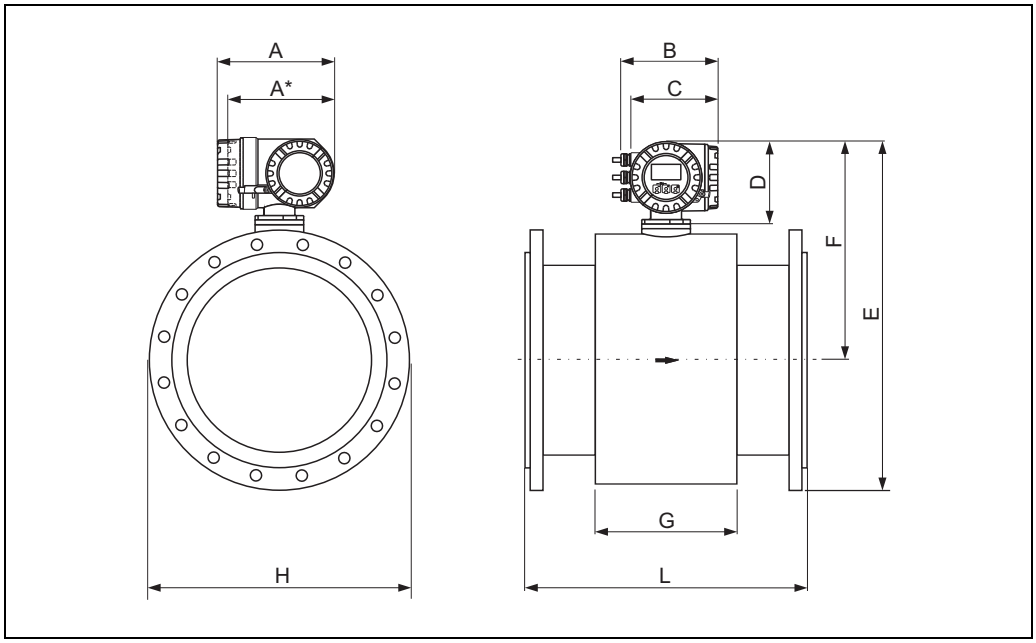
[1)] The length (L) is regardless of the pressure rating selected. Fitting length to DVGW.
All dimensions in [mm]

Dimensions in US units

DN	L[1)]	A	A*	B	C	D	E	F	G	H	K
1"	7.87	8.94	8.15	7.36	6.61	6.30	13.4	10.1	3.32	3.70	4.72
1½"	7.87						13.4	10.1	3.32	3.70	4.72
2"	7.87						13.4	10.1	3.32	3.70	4.72
3"	7.87						15.4	11.1	4.30	3.70	7.10
4"	9.84						15.4	11.1	4.30	3.70	7.10
6"	11.8						18.6	12.7	5.91	5.51	10.2
8"	13.8						20.8	13.7	7.10	6.14	12.8
10"	17.7						22.7	14.7	8.08	6.14	15.8
12"	19.7						24.7	15.6	9.06	6.54	18.1

[1)] The length (L) is regardless of the pressure rating selected. Fitting length to DVGW.
All dimensions in [inch]

Compact version, DN 350 to 2400 (14 to 90")



A0014951

Dimensions in SI units

DN	L	A	A*	B	C	D	F	G
350	550	227	207	187	168	160	411	290
375	600						437	290
400	600						437	290
450	600						465	290
500	600						490	290
600	600						531	290
700	700						596	424
750	750						633	454
800	800						652	500
900	900						702	580
1000	1000						752	660
1050	1050						788	755
1200	1200						866	828
1350	1350						978	1008
1400	1400						978	1008
1500	1500						1078	1147
1600	1600						1078	1147
1650	1650						1129	1284
1800	1800						1186	1379
2000	2000						1297	1569
2150	2150						1397	1711
2200	2200						1397	1711
2300	2300						1502	1859
2400	2400						1502	1859

All dimensions in [mm]

DN	E at pressure rating					H at pressure rating				
	PN 6	PN 10	PN 16	ASME AWWA	AS	PN 6	PN 10	PN 16	ASME AWWA	AS
350	656	663	664	678	673	490	505	568	533	525
375	–	–	–	–	712	–	–	–	–	550
400	707	719	717	735	727	540	565	628	597	580
450	762	772	775	782	785	595	615	688	635	640
500	812	825	838	839	842	645	670	763	699	705
600	908	921	941	937	943	755	780	888	813	825
700	1026	1043	1041	1059	1051	860	895	958	927	910
750	–	–	–	1125	1131	–	–	–	984	995
800	1140	1160	1155	1182	1182	975	1015	1073	1060	1060
900	1240	1260	1255	1286	1290	1075	1115	1173	1168	1175
1000	1340	1367	1370	1397	1380	1175	1230	1303	1289	1255
1050	–	–	–	1461	–	–	–	–	1346	–
1200	1569	1594	1599	1622	1611	1405	1455	1533	1511	1490
1350	–	–	–	1820	–	–	–	–	1683	–
1400	1793	1816	1811	–	–	1630	1675	1733	–	–
1500	–	–	–	2005	–	–	–	–	1854	–
1600	1993	2036	2033	–	–	1830	1915	1978	–	–
1650	–	–	–	2145	–	–	–	–	2032	–
1800	2208	2243	2241	2284	–	2045	2115	2478	2197	–
2000	2429	2459	2460	2478	–	2265	2325	2393	2362	–
2150	–	–	–	2664	–	–	–	–	2534	–
2200	2634	2672	–	–	–	2475	2550	–	2705	–
2300	–	–	–	2854	–	–	–	–	–	–
2400	2844	2882	–	–	–	2685	2760	–	–	–

All dimensions in [mm]

Dimensions in US units

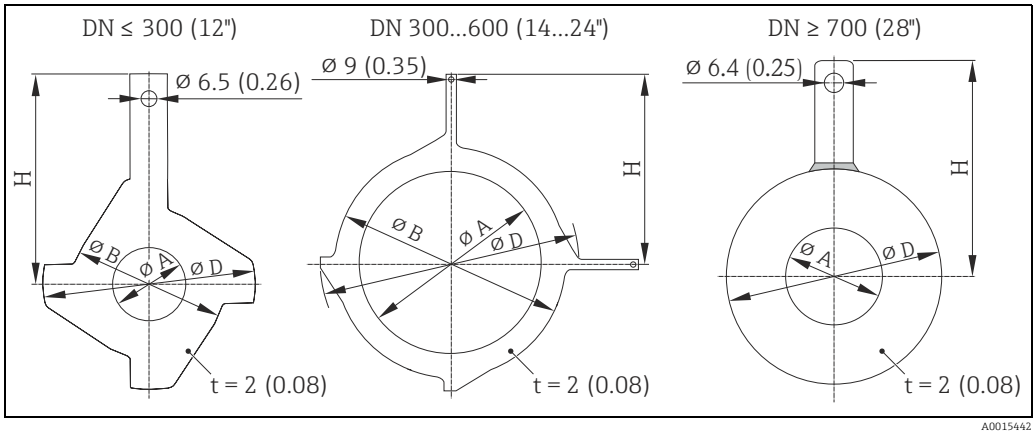
DN	L	A	A*	B	C	D	F	G
14"	21.6	8.94	8.15	7.36	6.61	6.30	16.2	11.4
15"	23.6						17.2	11.4
16"	23.6						17.2	11.4
18"	23.6						18.3	11.4
20"	23.6						19.3	11.4
24"	23.6						20.9	11.4
28"	27.6						23.6	16.7
30"	29.5						25.1	17.9
32"	31.5						25.9	19.7
36"	35.4						27.8	22.8
40"	39.4						29.8	26.0
42"	41.3						31.2	29.7
48"	47.2						34.3	32.6
54"	53.1						38.5	39.7
60"	59.0						42.4	45.27
66"	64.9						44.5	50.6
72"	70.8						46.7	54.3
78"	78.7						51.0	61.8
84"	84.6						55.0	67.4
90"	90.5						59.1	73.2

All dimensions in [inch]

DN	E at pressure rating:					H at pressure rating:				
	PN 6	PN 10	PN 16	ASME AWWA	AS	PN 6	PN 10	PN 16	ASME AWWA	AS
14"	25.8	26.1	26.1	26.7	26.5	19.3	19.9	22.4	21.0	20.7
15"	–	–	–	–	28.0	–	–	–	–	21.7
16"	27.8	28.3	28.2	28.9	28.6	21.3	22.2	24.7	23.5	22.8
18"	30.0	30.4	30.5	30.8	30.9	23.4	24.2	27.1	25.0	25.2
20"	32.0	32.5	33.0	33.0	33.1	25.4	26.4	30.0	27.5	27.8
24"	35.8	36.3	37.0	36.9	37.1	29.7	30.7	35.0	32.0	32.5
28"	40.6	41.3	41.0	41.9	41.6	33.9	35.2	37.7	36.5	35.8
30"	–	–	–	44.5	44.7	–	–	–	38.7	39.2
32"	45.1	45.8	45.5	46.7	46.7	38.4	40.0	42.2	41.7	41.7
36"	49.0	49.8	49.4	50.8	51.0	42.3	43.9	46.2	46.0	46.3
40"	52.9	54.0	53.9	55.2	54.5	46.3	48.4	51.3	50.7	49.4
42"	–	–	–	57.7	–	–	–	–	53.0	–
48"	61.9	62.9	63.0	64.0	63.6	55.3	57.3	60.4	59.5	58.7
54"	–	–	71.3	71.7	–	–	–	68.2	66.3	–
60"	–	–	80.0	78.9	–	–	–	77.9	73.0	–
66"	–	–	–	84.5	–	–	–	–	80.0	–
72"	87.0	88.3	88.2	89.9	–	80.5	83.3	97.6	86.5	–
78"	95.6	96.8	96.6	97.6	–	89.2	91.5	94.2	93.0	–
84"	–	–	–	104.9	–	–	–	–	99.8	–
90"	–	–	–	112.4	–	–	–	–	–	–

All dimensions in [inch]

Ground disk



Dimensions in SI and US units

DN		Pressure rating	A		B		D		H	
[mm]	[inch]		[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
25	1"	1)	26	1.02	62	2.44	77.5	3.05	87.5	3.44
32	–	1)	35	–	80	–	87.5	–	94.5	–
40	1 ½"	1)	41	1.61	82	3.23	101.0	3.98	103	4.06
50	2"	1)	52	2.05	101	3.98	115.5	4.55	108	4.25
65	2 ½"	1)	68	2.68	121	4.76	131.5	5.18	118	4.65
80	3"	1)	80	3.15	131	5.16	154.5	6.08	135	5.31
100	4"	1)	104	4.09	156	6.14	186.5	7.34	153	6.02
125	5"	1)	130	5.12	187	7.36	206.5	8.13	160	6.30
150	6"	1)	158	6.22	217	8.54	256	10.08	184	7.24
200	8"	1)	206	8.11	267	10.51	288	11.34	205	8.07
250	10"	1)	260	10.24	328	12.91	359	14.13	240	9.45
300	12"	1)	312	12.28	375	14.76	413	16.26	273	10.75
350	14"	DIN, PN 6	343	13.50	420	16.54	479	18.86	365	14.37
		DIN, PN 10/16								
		ASME, Cl.150								
375	15"	PN 16	393	15.5	461	18.15	523	20.6	395	15.6
400	16"	DIN, PN 6	393	15.47	470	18.50	542	21.34	395	15.55
		DIN, PN 10/16								
		ASME, Cl.150								
450	18"	DIN, PN 6	439	17.28	525	20.67	583	22.95	417	16.42
		DIN, PN 10/16								
		ASME, Cl.150								
500	20"	DIN, PN 6	493	19.41	575	22.64	650	25.59	460	18.11
		DIN, PN 10/16								
		ASME, Cl.150								
600	24"	DIN, PN 6	593	23.35	676	26.61	766	30.16	522	20.55
		DIN, PN 10/16								
		ASME, Cl.150								
700	28"	DIN, PN 6	697	27.44	–	–	786	30.94	460	18.11
		DIN, PN 10	693	27.28	–	–	813	32.01	480	18.9
		AS, PN 16	687	27.05	–	–	807	31.77	490	19.29
		AWWA, Class D	693	27.28	–	–	832	32.76	494	19.45

DN		Pressure rating	A		B		D		H	
[mm]	[inch]		[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
750	30"	AS, PN 16								
		AWWA, Class D	743	29.25	–	–	833	32.8	523	20.59
800	32"	DIN, PN 6	799	31.46	–	–	893	35.16	520	20.47
		DIN, PN 10	795	31.30	–	–	920	36.22	540	21.26
		AS, PN 16	789	31.06	–	–	914	35.98	550	21.65
		AWWA, Class D	795	31.30	–	–	940	37.01	561	22.09
900	36"	DIN, PN 6	897	35.31	–	–	993	39.09	570	22.44
		DIN, PN 10	893	35.16	–	–	1020	40.16	590	23.23
		AS, PN 16	886	34.88	–	–	1014	39.92	595	23.43
		AWWA, Class D	893	35.16	–	–	1048	41.26	615	24.21
1000	40"	DIN, PN 6	999	39.33	–	–	1093	43.03	620	24.41
		DIN, PN 10	995	39.17	–	–	1127	44.37	650	25.59
		AS, PN 16	988	38.90	–	–	1131	44.53	660	25.98
		AWWA, Class D	995	39.17	–	–	1163	45.79	675	26.57
1050	42"	AWWA, Class D	1044	41.10	–	–	1220	48.03	704	27.72
1200	48"	DIN, PN 6	1203	47.36	–	–	1310	51.57	733	28.86

1) Ground disks can be used for all flange norms/ pressure ratings.

Weight

SI units

Compact version (lap joint flanges / welded flanges DN > 300/12")

Weight data in kg													
Nominal diameter		Compact version (including transmitter)											
[mm]	[inch]	EN (DIN)						ASME/ AWWA		AS			
25	1"	PN 6	–	PN 10	–	PN 16	7.3	ASME / Class 150	7.9	PN 16	–	Tabelle E	–
32	1 ¼"		–		–		8.0		–		–		–
40	1 ½"		–		–		9.0		7.5		–		–
50	2"		–		–		9.4		7.6		–		–
65	2 ½"		–		–		10.4		–		–		–
80	3"		–		–		12.4		12.8		–		–
100	4"		–		–		14.4		16.1		–		–
125	5"		–		–		15.9		–		–		–
150	6"		–		–		23.9		24.4		–		–
200	8"		–		43.4		44.9		49.6		–		–
250	10"		–		63.4		70.7		75.1		–		–
300	12"		–		68.4		85.8		100		–		–
350	14"		77.4		88.4		103		137		99.4		99.4
375	15"		–		–		–		–		105		–
400	16"		89.4		104		124		168		120		120
450	18"		99.4		112		139		191		133		143
500	20"		114		132		174		228		182		182
600	24"		155		162		303		302		260		260
700	28"		190		240		288	AWWA / Class D	266		367		346
750	30"		–		–		–		318		445		433
800	32"		240		315		364		383		503		493
900	36"		308		393		456		470		702		690
1000	40"		359		468		579		587		759		761
1050	42"		–		–		–		670		–		–
1200	48"		529		717		866		901		–		1237
–	54"		–		–		–		1273		–		–
1400	–		784		1114		1274		–		–		–
–	60"		–		–		–		1594		–		–
1600	–		1058		1624		1872		–		–		–
1650	66"		–		–		–		2131		–		–
1800	72"		1418		2107		2409		2568		–		–
2000	78"		1877		2630		2997		3113		–		–
–	84"		–		–		–		3755		–		–
2200	–		2512		3422		–		–		–		–
–	90"		–		–		–		4797		–		–
2400	–		2996		4094		–		–		–		–

Transmitter Promag (compact version): 3.1 kg
(Weight data valid without packaging material)

Remote version (lap joint flanges / welded flanges DN > 300/12")

Weight data in kg												
Nominal diameter		Remote version (sensor plus sensor housing without cable)										
[mm]	[inch]	EN (DIN)						ASME/ AWWA		AS		
25	1"	PN 6	–	PN 10	–	PN 16	5.3	ASME / Class 150	5.9	PN 16	–	Tabelle E	–
32	1 ¼"		–		–		6.0		–		–		–
40	1 ½"		–		–		7.0		5.5		–		–
50	2"		–		–		7.4		5.6		–		–
65	2 ½"		–		–		8.4		–		–		–
80	3"		–		–		10.4		10.8		–		–
100	4"		–		–		12.4		14.1		–		–
125	5"		–		–		13.9		–		–		–
150	6"		–		–		21.9		22.4		–		–
200	8"		–		41.4		42.9		47.6		–		–
250	10"		–		61.4		68.7		73.1		–		–
300	12"		–		66.4		83.8		98		–		–
350	14"		75.4		86.4		103		135		97.4		97.4
375	15"		–		102		–		–		103		–
400	16"		87.4		102		124		166		118		118
450	18"		97.4		110		139		189		131		141
500	20"		112		130		174		226		180		180
600	24"		153		160		303		300		258		258
700	28"		188		238		288	AWWA / Class D	264		365		344
750	30"		–		–		–		316		443		431
800	32"		238		313		364		381		501		491
900	36"		306		391		456		468		700		688
1000	40"		357		466		579		585		757		759
1050	42"		–		–		–		668		–		–
1200	48"		527		715		866		899				1235
–	54"		–		–		–		1271		–		–
1400	–		782		1112		1274		–		–		–
–	60"		–		–		–		1592		–		–
1600	–		1056		1622		1872		–		–		–
1650	66"		–		–		–		2129		–		–
1800	72"		1416		2105		2409		2566		–		–
2000	78"		1875		2628		2997		3111		–		–
–	84"		–		–		–		3753		–		–
2200	–		2510		3420		–		–		–		–
–	90"		–		–		–		4795		–		–
2400	–		2994		4092		–		–		–		–
Transmitter Promag (remote version): 3.4 kg (Weight data valid without packaging material)													

Lap joint flanges, stamped plate

Weight data in kg						
Nominal diameter		Compact version		Remote version (without cable)		
[mm]	[inch]	EN (DIN)		Sensor EN (DIN)		Transmitter
25	1"	PN 10	5.8	PN 10	3.8	4.2
32	1 ¼"		5.4		3.4	4.2
40	1 ½"		6.3		4.7	4.2
50	2"		5.4		3.4	4.2
65	2 ½"		6.2		4.2	4.2
80	3"		7.2		5.2	4.2
100	4"		9.7		7.7	4.2
125	5"		13.2		11.2	4.2
150	6"		17.2		15.2	4.2
200	8"		35.7		33.7	4.2
250	10"		54.2		52.2	4.2
300	12"		55.2		53.2	4.2
Transmitter Promag (compact version): 1.8 kg (Weight data valid for standard pressure ratings and without packaging material)						

US units

ASME/AWWA (lap joint flanges / welded flanges DN > 300/12")

Weight data in lbs					
Nominal diameter		Compact version ASME/AWWA		Remote version ASME/AWWA	
[mm]	[inch]				
25	1"	ASME / Class 150	17.4	ASME / Class 150	13
32	1 ¼"		–		–
40	1 ½"		16.5		12.1
50	2"		16.8		12.3
65	2 ½"		–		–
80	3"		28.2		23.8
100	4"		35.5		31.1
125	5"		–		–
150	6"		53.8		49.4
200	8"		109		105
250	10"		166		161
300	12"		221		216
350	14"		302		298
375	15"		–		–
400	16"		370		366
450	18"		421		417
500	20"		503		498
600	24"		666		662
700	28"	AWWA / Class D	587	AWWA / Class D	582
750	30"		701		697
800	32"		845		840
900	36"		1036		1032
1000	40"		1294		1290
1050	42"		1477		1473
1200	48"		1987		1982
–	54"		2807		2803
1400	–		–		–
–	60"		3515		3510
1600	–		–		–
1650	66"		4699		4694
1800	72"		5662		5658
2000	78"		6864		6860
–	84"		8280		8275
2200	–		–		–
–	90"		10577		10573
2400	–		–		–
Transmitter Promag (compact version): 4.0 lbs Transmitter Promag (remote version): 6.8 lbs (Weight data valid without packaging material)					

Measuring tube specifications

Internal diameter for pressure rating EN (DIN), AS 2129, AS 4087, ASME and AWWA

Nominal diameter		Pressure rating			Internal diameter measuring tube					
		EN (DIN)	AS 2129 AS 4087	ASME AWWA	Hard rubber		Polyurethane		PTFE	
[mm]	[inch]				[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
25	1"	PN 10/16	–	Class 150	–	–	23.7	0.95	25.3	1.0
32	1 ¼"	PN 10/16	–	Class 150	–	–	32.4	1.28	34.0	1.3
40	1 ½"	PN 10/16	–	Class 150	–	–	38.3	1.5	39.9	1.6
50	2"	PN 10/16	–	Class 150	–	–	50.3	2.0	51.9	2.0
65*	2"	PN 10/16	–	Class 150	–	–	66.1	2.6	67.7	2.7
80	3"	PN 10/16	–	Class 150	–	–	78.9	3.1	79.9	3.1
100	4"	PN 10/16	–	Class 150	–	–	104.3	4.1	103.8	4.1
125	5"	PN 10/16	–	Class 150	–	–	129.7	5.1	129.1	5.1
150	6"	PN 10/16	–	Class 150	–	–	158.3	6.2	156.3	6.2
200	8"	PN 10	–	–	–	–	206.7	8.1	202.1	8.0
		PN 16	–	Class 150	–	–	205.1	8.1	200.5	7.9
250	10"	PN 10	–	–	–	–	260.6	10.3	256.2	10.1
		PN 16	–	Class 150	–	–	259.0	10.2	254.6	10.0
300	12"	PN 10	–	–	–	–	311.5	12.3	305.5	12.0
		PN 16	–	Class 150	–	–	309.9	12.2	303.9	12.0
350	14"	PN 6	–	–	341	13.4	344	13.5	–	–
		PN 10	–	–	341	13.4	344	13.5	–	–
		PN 16	–	–	339	13.3	342	13.4	–	–
		–	PN 16 Table E	–	339	13.3	342	13.4	–	–
		–	–	Class 150	339	13.3	342	13.4	–	–
375	15"	–	PN 16	–	389	15.3	392	15.4	–	–
400	16"	PN 6	–	–	391	15.4	394	15.5	–	–
		PN 10	–	–	391	15.4	394	15.5	–	–
		PN 16	–	–	389	15.3	392	15.4	–	–
		–	PN 16 Table E	–	389	15.3	392	15.4	–	–
		–	–	Class 150	387	15.2	390	15.3	–	–
450	18"	PN 6	–	–	442	17.4	445	17.5	–	–
		PN 10	–	–	442	17.4	445	17.5	–	–
		PN 16	–	–	440	17.3	443	17.4	–	–
		–	PN 16 Table E	–	440	17.3	443	17.4	–	–
		–	–	Class 150	438	17.2	441	17.3	–	–
500	20"	PN 6	–	–	493	19.4	496	19.5	–	–
		PN 10	–	–	491	19.3	494	19.3	–	–
		PN 16	–	–	489	19.2	492	19.3	–	–
		–	PN 16 Table E	–	489	19.2	492	19.3	–	–
		–	–	Class 150	487	19.2	490	19.2	–	–
600	24"	PN 6	–	–	595	23.4	598	23.5	–	–
		PN 10	–	–	593	23.3	596	23.5	–	–
		PN 16	–	–	591	23.3	594	23.4	–	–
		–	PN 16 Table E	–	591	23.3	594	23.4	–	–
		–	–	Class 150	589	23.2	592	23.3	–	–
700	28"	PN 6	–	–	696	27.4	699	27.5	–	–
		PN 10	–	–	694	27.3	697	27.4	–	–
		PN 16	–	–	694	27.2	693	27.3	–	–
		–	PN 16 Table E	–	690	27.2	693	27.3	–	–
		–	–	Class D	694	27.3	697	27.4	–	–
750	30"	–	PN 16 Table E	–	741	29.2	744	29.3	–	–
		–	–	Class D	743	29.3	746	29.4	–	–

Nominal diameter		Pressure rating			Internal diameter measuring tube					
		EN (DIN)	AS 2129 AS 4087	ASME AWWA	Hard rubber		Polyurethane		PTFE	
[mm]	[inch]				[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
800	32"	PN 6	–	–	798	31.4	801	31.5	–	–
		PN 10	–	–	796	31.3	799	31.5	–	–
		PN 16	–	–	788	31.0	791	31.1	–	–
		–	PN 16 Table E	–	792	31.2	795	31.3	–	–
		–	–	Class D	794	31.3	797	31.4	–	–
900	36"	PN 6	–	–	897	35.3	900	35.4	–	–
		PN 10	–	–	895	35.2	898	35.4	–	–
		PN 16	–	–	889	35.0	892	35.1	–	–
		–	PN 16 Table E	–	889	35.0	892	35.1	–	–
		–	–	Class D	895	35.2	898	35.4	–	–
1000	40"	PN 6	–	–	999	39.3	1002	39.4	–	–
		PN 10	–	–	997	39.2	1000	39.4	–	–
		PN 16	–	–	991	39.0	994	39.1	–	–
		–	PN 16 Table E	–	991	39.0	994	39.1	–	–
		–	–	Class D	995	39.2	998	39.3	–	–
1050	42"	–	–	Class D	1046	41.2	1049	41.3	–	–
1200	48"	PN 6	–	–	1203	47.4	1206	47.5	–	–
		PN 10	–	–	1199	47.2	1202	47.3	–	–
		PN 16	–	–	1191	46.9	1194	47.0	–	–
		–	PN 16 Table E	–	1191	46.9	1194	47.0	–	–
		–	–	Class D	1195	47.0	1198	47.2	–	–
–	54"	–	–	Class D	1346	53.0	–	–	–	–
1400	–	PN 6	–	–	1419	55.9	–	–	–	–
		PN 10	–	–	1395	54.9	–	–	–	–
		PN 16	–	–	1387	54.6	–	–	–	–
–	60"	–	–	Class D	1499	59.0	–	–	–	–
1600	–	PN 6			1601	63.0	–	–	–	–
		PN 10	–	–	1591	62.6	–	–	–	–
		PN 16	–	–	1581	62.2	–	–	–	–
–	66"	–	–	Class D	1647	53.0	–	–	–	–
1800	72"	PN 6	–	–	1801	70.9	–	–	–	–
		PN 10	–	–	1791	70.5	–	–	–	–
		PN 16	–	–	1781	70.1	–	–	–	–
		–	–	Class D	1791	70.5	–	–	–	–
2000	78"	PN 6	–	–	1999	78.7	–	–	–	–
		PN 10	–	–	1991	78.4	–	–	–	–
		PN 16	–	–	1979	77.9	–	–	–	–
		–	–	Class D	1987	78.2	–	–	–	–
–	84"	–	–	Class D	2100	82.7	–	–	–	–
2200	–	PN 6	–	–	2195	86.4	–	–	–	–
		PN 10	–	–	2187	86.1	–	–	–	–
		–	–	Class D	1987	78.2	–	–	–	–
–	90"	–	–	Class D	2247	88.5	–	–	–	–
2400	–	PN 6	–	–	2395	94.3	–	–	–	–
		PN 10	–	–	2387	94.0	–	–	–	–

* Auslegung gemäß EN 1092-1 (nicht nach DIN 2501)

Material

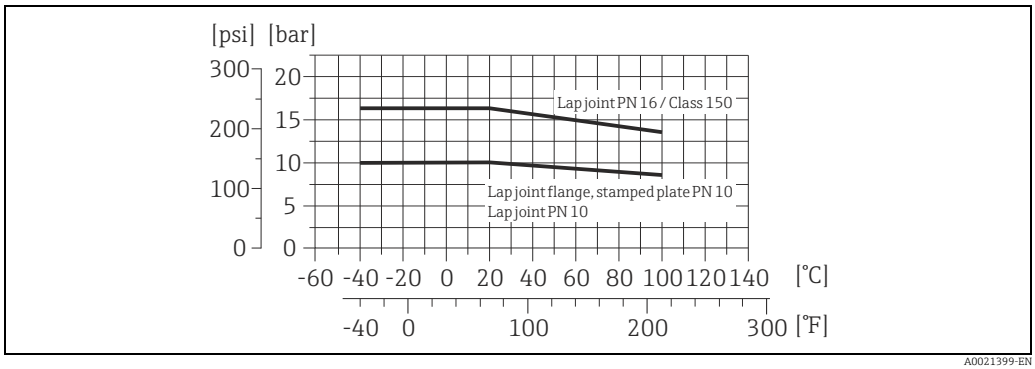
- Transmitter housing:
  - Compact housing: powder-coated die-cast aluminum
  - Wall-mounted housing: powder-coated die-cast aluminum
- Sensor housing
  - DN 25 to 300 (1 to 12"): powder-coated die-cast aluminum
  - DN 350 to 1200 (14 to 48"): with protective lacquering
- Measuring tube:
  - DN ≤ 300 (12"); stainless steel 1.4301/304 or 1.4306/304L
  - DN ≥ 350 (14"); stainless steel 202 or 304
- Electrodes: 1.4435/316L, Alloy C22
- Flanges (All lap joint flanges made from carbon steel are hot-dip galvanized):
  - EN 1092-1 (DIN 2501): DN ≤ 300: 1.4306/304L; 1.4307/304L; 1.4301/304; 1.0038 (S235JRG2)
  - EN 1092-1 (DIN 2501): DN ≥ 350: A105; 1.0038 (S235JRG2)
  - ASME: A105; 316L
  - AWWA: A181/A105; 1.0425/316L (P265GH); 1.0044 (S275JR)
  - AS 2129: A105; 1.0345 (P235GH); 1.0425/316L (P265GH); 1.0038 (S235JRG2); FE 410 WB
  - AS 4087: A105; 1.0425/316L (P265GH); 1.0044 (S275JR)
- Seals: to DIN EN 1514-1
- Ground disks: 1.4435/316L or Alloy C22

Pressure-temperature ratings

Caution!

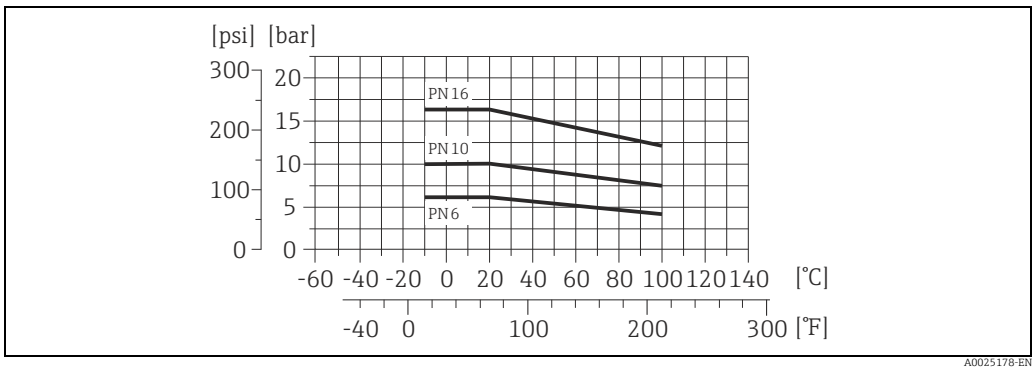
- The following diagrams contain allowable operating pressures as a function of the medium temperature. However, the maximum medium temperatures permitted always depend on the lining material of the sensor and/or the sealing material (→ 🖹 18).
- Permitted test pressure = 1.5 × nominal pressure

Process connection: lap joint flange/lap joint flange, stamped plate according to EN 1092-1 (DIN 2501) and ASME B16.5; DN 25 to 300 (1 to 12")



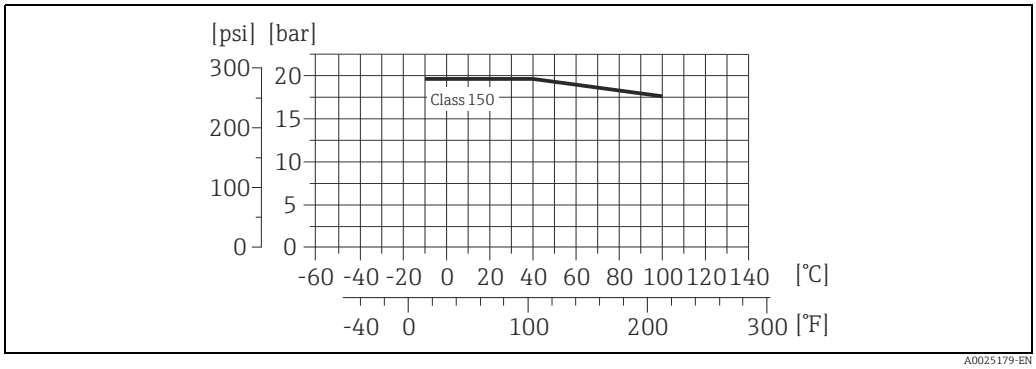
Process connection material: stainless steel (min. -40 °C (-40 °F)), carbon steel (min. -10 °C (+14 °F))

Process connection: flange according to EN 1092-1 (DIN 2501); DN 350 to 2400 (14 to 90")



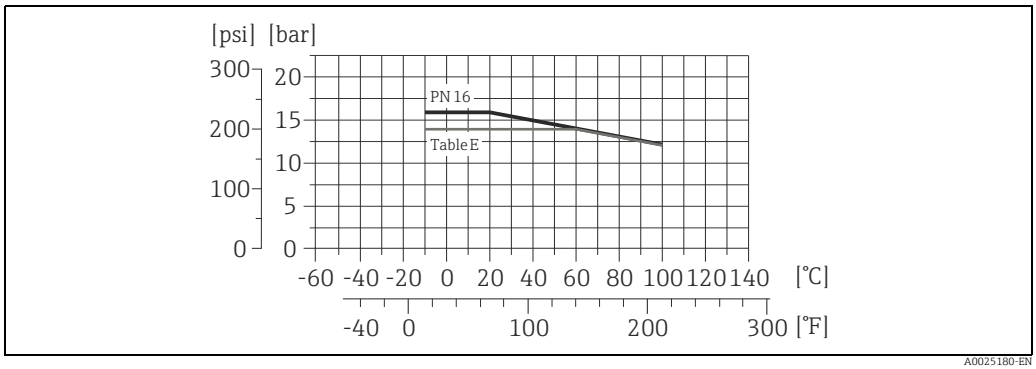
Process connection material: carbon steel

Process connection: flange according to ASME B16.5; DN 350 to 600 (14 to 24")



Process connection material: A105

Process connection: flange according to AS 2129 and AS 4087; DN 350 to 2400 (14 to 90")



Process connection material: carbon steel

Fitted electrodes

Measuring electrodes, reference electrodes and empty pipe detection electrodes available as standard with:
- 1.4435/304L
- Alloy C22

Process connections

Flange connection:
- EN 1092-1 (DIN 2501)
  - DN ≤ 300 (12") = form A
  - DN ≥ 350 (14") = form B
- ASME B16.5
- AWWA C207
- AS

Surface roughness

Electrodes with 1.4435/304L, Alloy C22: ≤ 0.3 to 0.5 µm (11.8 to 19.7 µin)
(all data refer to parts in contact with medium)

Human interface

Display elements

- Liquid crystal display: illuminated, two-line, 16 characters per line
- Custom configurations for presenting different measured-value and status variables
- 2 totalizers

Operating elements

- Onsite operation via three keys (−, +, E)
- Quick Setup menus for straightforward commissioning

Language groups

Language groups available for operation in different countries:

- Western Europe and America (WEA):
  English, German, Spanish, Italian, French, Dutch and Portuguese
- Eastern Europe and Scandinavia (EES):
  English, Russian, Polish, Norwegian, Finnish, Swedish and Czech
- South and East Asia (SEA):
  English, Japanese, Indonesian

You can change the language group via the operating program "FieldCare".

Remote operation

Operation via HART, PROFIBUS DP/PA

Certificates and approvals

CE mark

The measuring system is in conformity with the statutory requirements of the EC Directives. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

C-tick mark

The measuring system meets the EMC requirements of the "Australian Communication and Media Authority (ACMA)".

Drinking water approval

- WRAS BS 6920
- ACS
- NSF 61
- KTW/W270

PROFIBUS DP/PA certification

The flow device has successfully passed all the test procedures carried out and is certified and registered by the PNO (PROFIBUS User Organisation). The device thus meets all the requirements of the following specifications:

- Certified to PROFIBUS PA, profile version 3.0 (device certification number: on request).
- The device can also be operated with certified devices of other manufacturers (interoperability).

Other standards and guidelines

- EN 60529
  Degrees of protection by housing (IP code).
- EN 61010
  Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures.
- IEC/EN 61326
  "Emission in accordance with requirements for Class A".
  Electromagnetic compatibility (EMC requirements).
- ASME/ISA-S82.01
  Safety Standard for Electrical and Electronic Test, Measuring, Controlling and related Equipment - General Requirements. Pollution degree 2, Installation Category II.
- CAN/CSA-C22.2 No. 1010.1-92
  Safety requirements for Electrical Equipment for Measurement and Control and Laboratory Use. Pollution degree 2, Installation Category II
- NAMUR NE 21
  Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment.

- NAMUR NE 43
  Standardisation of the signal level for the breakdown information of digital transmitters with analogue output signal.
- NAMUR NE 53
  Software of field devices and signal-processing devices with digital electronics.

Ordering information

Detailed ordering information is available from the following sources:
- In the Product Configurator on the Endress+Hauser website: www.endress.com → Select country → Instruments → Select device → Product page function: Configure this product
- From your Endress+Hauser Sales Center: www.endress.com/worldwide



Note!
Product Configurator - the tool for individual product configuration
- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

Accessories

Various accessories, which can be ordered separately from Endress+Hauser, are available for the transmitter and the sensor. Your Endress+Hauser service organization can provide detailed information on the order codes in question.

Documentation

- Flow measurement (FA005D/06)
- Operating Instructions Promag 50 (BA00046D/06 und BA049D/06)
- Operating Instructions Promag 50 PROFIBUS DP/PA (BA00055D/06 und BA056D/06)

You can order the documents from your Endress+Hauser service organization or download them from the internet addresses given on the last page.

Registered trademarks

HART®
Registered trademark of the HART Communication Foundation, Austin, USA

PROFIBUS®
Registered trademark of the PROFIBUS User Organisation, Karlsruhe, D

HistoROM™, S-DAT®, T-DAT®, F-CHIP®, FieldCare®, Fieldcheck®, Field Xpert™, Applicator®
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Endress+Hauser

People for Process Automation

ANEXO V –COMPUERTA ARQUETA CMO–

COMPUERTA MURAL SERIE MC

17/02/2012

Compuerta mural UNIDIRECCIONAL o BIDIRECCIONAL

- Compuerta para líquidos limpios o cargados con sólidos.
- Diseño de la compuerta cuadrada o rectangular.
- Posibilidad de unidireccional o bidireccional.
- Múltiples materiales de cierre disponibles.
- Diseño habitual para instalar apoyada en muros mediante anclajes de expansión o químicos.

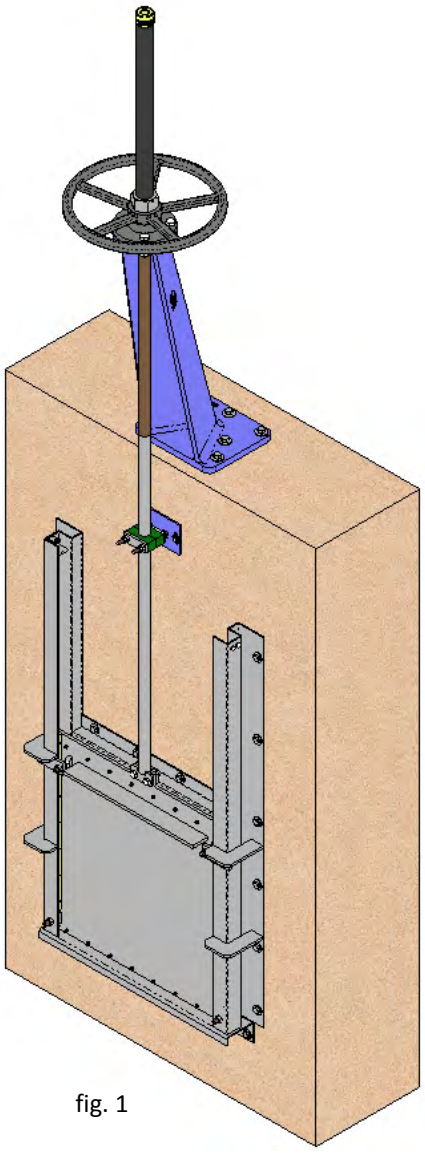


fig. 1

Aplicaciones generales:

- Esta compuerta mural está diseñada para instalarla sobre orificios en muros. El orificio puede ser rectangular, redondo o cuadrado, esta compuerta tiene cierre a 4 lados.
  Es apropiada para trabajar con líquidos limpios o cargados con sólidos. Principalmente utilizada en:
  - Plantas de tratamiento de aguas
  - Centrales hidroeléctricas
  - Regadíos
  - Conducciones

Tamaños:

- Desde 150 x 150 hasta 3000 x 3000 (mayores dimensiones bajo consulta). Para conocer las dimensiones generales de una compuerta mural en concreto, consultar con CMO.

(ΔP) de trabajo:

- La presión de trabajo máxima, se adapta a las necesidades que tiene el cliente en cada proyecto. Estas compuertas se diseñan para que cumplan con unas condiciones de servicio acordes a la obra donde vayan a ser instaladas.

Obra civil:

- Las compuertas murales **MC** estándares de CMO están diseñadas para que se amarren al muro mediante anclajes de expansión o químicos. Los taladros necesarios para amarrarla, se realizan al montaje utilizando el cuerpo de la compuerta como guía.

Estanqueidad.

- La estanqueidad de las compuertas murales **MC** cumplen con las exigencias de la normativa DIN 19569, clase 5 de fuga.

Directivas:

- Directiva de máquinas: **DIR 2006/42/CE (MAQUINAS)**
- Directiva de equipos a presión: **DIR 97/23/CE (PED) ART.3, P.3**
- Directiva de atmosferas explosivas (opcional): **DIR 94/9/CE (ATEX) CAT.3 ZONA 2 y 22 GD**, para información de categorías y zonas, contactar con el departamento técnico-comercial de C.M.O.

Dossier de calidad:

- La estanqueidad del área del asiento se mide con galgas.
- Es posible suministrar certificados de materiales y pruebas.

COMPUERTA MURAL SERIE MC

Ventajas del "Modelo MC" de CMO

Las compuertas murales **MC** están diseñadas para trabajar con líquidos. Los elementos principales de las **MC**-s son el cuerpo o bastidor, en el cual va encajado una tajadera o tablero que se mueve en sentido ascendente - descendente y lleva un sistema de sellado a 4 lados para evitar fugas de liquido. En la parte superior del cuerpo se atornillan los topes (solo en caso de que lleven accionamiento manual).

Las **MC** estándares de CMO están diseñadas para que el cuerpo quede instalado en el muro mediante anclajes de expansión o químicos. Las dimensiones interiores del paso del cuerpo suelen coincidir con las dimensiones del orificio del muro, con lo que se consigue que no haya ninguna obstrucción en el paso del fluido y de esta manera, cuando la compuerta está completamente abierta proporciona un paso total y continuo evitando acumulaciones de residuos.

La caperuza de protección del husillo es independiente de la tuerca de fijación del volante de forma que se puede desmontar la caperuza sin tener que soltar el volante completo. Esta ventaja permite realizar operaciones habituales de mantenimiento tales como engrase del husillo, etc.

El husillo de la compuerta CMO está fabricado en acero inoxidable 18/8. Esta es otra ventaja añadida, ya que algunos fabricantes lo suministran con un 13% de cromo y se oxida rápidamente.

El volante de maniobra está fabricado en fundición nodular GGG50. Algunos fabricantes lo suministran en hierro fundido normal y corriente, lo cual puede derivar en rotura en caso de un par de maniobra muy alto o un golpe.

El puente de maniobra se fabrica con un diseño compacto con la tuerca de actuación de bronce protegida en una caja cerrada y engrasada. Esto da la posibilidad de mover la compuerta con una llave, incluso sin volante (en otros fabricantes esto no es posible).

Las tapas superior e inferior del accionamiento neumático se fabrican en fundición nodular GGG40, por lo tanto la resistencia a golpes es alta. Esta característica es esencial en accionamientos neumáticos.

Las juntas del cilindro neumático son comerciales y se pueden conseguir en todo el mundo. Por lo tanto no es necesario contactar con CMO cada vez que se necesiten las juntas.

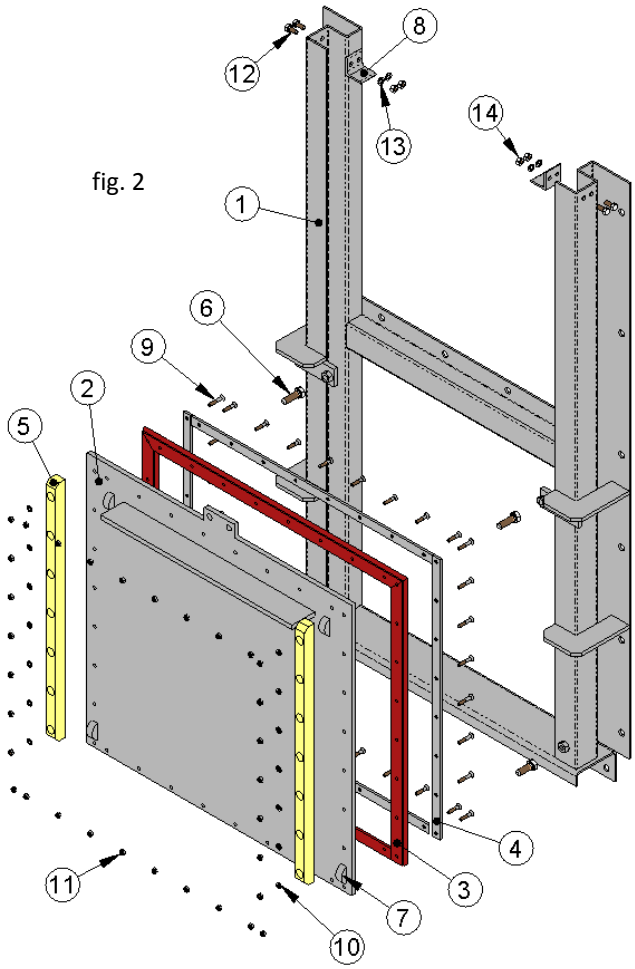


fig. 2

LISTADO DE COMPONENTES			
COMPONENTE	**VERSION S275JR**	**VERSION AISI304**	**VERSION AISI316**
1- Cuerpo	S275JR	AISI304	AISI316
2- Tajadera	S275JR	AISI304	AISI316
3- Cierre	EPDM	EPDM	EPDM
4- Brida junta	AISI304	AISI304	AISI316
5*- Deslizadera	HD-500	HD-500	HD-500
6*- Cuña	A2	A2	A4
7*- Contracuña	AISI316	AISI316	AISI316
8*- Tope final	S275JR	AISI304	AISI316
9- Tornillo avellanado	A2	A2	A4
10- Arandela	A2	A2	A4
11- Tuerca autoblocante	A2	A2	A4
12*- Tornillo	5.6 ZINC	A2	A4
13*- Arandela	5.6 ZINC	A2	A4
14*- Tuerca	5.6 ZINC	A2	A4

tabla 1

Nota: Los elementos con * son opcionales.

CARACTERISTICAS DE DISEÑO

1- CUERPO

El cuerpo o bastidor es mecano soldado, fabricado en una sola pieza. Construido con perfiles plegados para evitar posibles deformaciones y aumentar la robustez. Los perfiles laterales poseen un hueco en toda su longitud (para deslizar la tajadera), obtenido mediante varios pliegues (sin soldadura), con lo que se evita que el cuerpo pueda tener fugas.

El cuerpo tiene como mínimo una altura aproximada del doble de la tajadera, para poder alojar esta, cuando la compuerta se encuentre totalmente abierta. En la parte superior incorpora unos topes finales (en caso de tener accionamiento manual) para delimitar el movimiento longitudinal de la tajadera.

El cuerpo estándar está diseñado para montar apoyado en el muro mediante anclajes de expansión o químicos, por lo que no requiere la realización de ningún tipo de cajera en la obra civil. Como el cuerpo se diseña en función de las dimensiones del orificio del muro, se consigue que no haya ningún resalte, por lo que el paso es total y continuo. Aunque si el orificio del muro está al ras del suelo existe la posibilidad de montar la compuerta con la solera embutida en el hormigón (fig. 33) o atornillada mediante anclajes de expansión o químicos (fig. 32), hay que tener en cuenta que si se opta por la última opción, el paso del canal disminuye ligeramente.

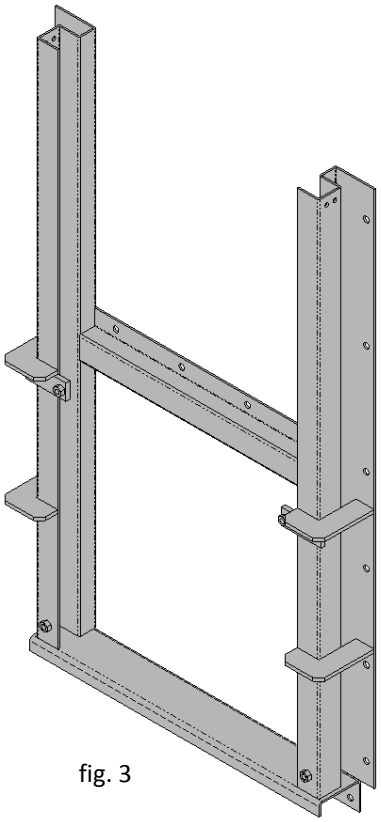


fig. 3

Existe la posibilidad de cuerpos cuadrados o rectangulares.

El material utilizado habitualmente es el acero inoxidable AISI304 o AISI316, pero también se fabrican en acero al carbono S275JR. En función de las condiciones que se va someter a la compuerta hay otros materiales especiales para elegir bajo consulta, tales como el AISI316Ti, Duplex, 254SMO, Uranus B6, Aluminio,.... Como norma habitual las compuertas de acero al carbono van pintadas con una protección anti corrosiva de 80 micras de EPOXI (color RAL 5015), aunque existen a su disposición otros tipos de protecciones anti corrosivas.

2- TAJADERA

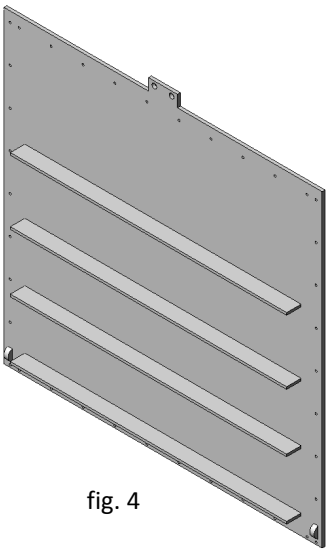


fig. 4

El material de fabricación de la tajadera habitualmente suele ser igual que el que se haya utilizado para construir el cuerpo, pero también pueden ser suministrados bajo consulta con otros materiales o combinaciones.

En función de las dimensiones de la compuerta, suele ser común que se le suelden algunos refuerzos a la tajadera (tal como se aprecia en la fig. 4) para conseguir la rigidez necesaria. En la parte superior de la tajadera se le conecta el vástago, cuyo movimiento longitudinal hace que cierre o abra la compuerta. Es en la tajadera donde llevan la junta de cierre a cuatro lados amarrado mediante bridas de acero inoxidable.

3- ASIENTO

El cierre estándar de este tipo de compuertas se realiza mediante cuatro llantas de goma que están en los cuatro lados, estas llantas de goma se amarran a la tajadera mediante bridas de acero inoxidable. La estanqueidad cumple con las exigencias de la normativa DIN 19569, clase 5 de fuga.
En función de la aplicación de trabajo, se puede elegir entre estas opciones:

- UNIDIRECCIONAL FAVORABLE: (fig. 5 y fig. 6)

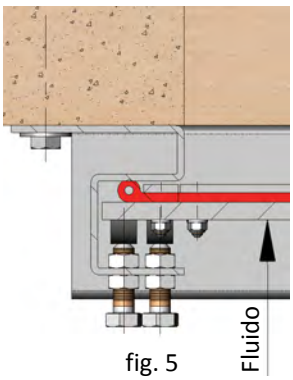


fig. 5

Este tipo de compuerta se utiliza cuando la dirección del fluido siempre presiona la compuerta contra el muro. Las juntas que se utilizan en este tipo de compuertas son de tipo nota musical.

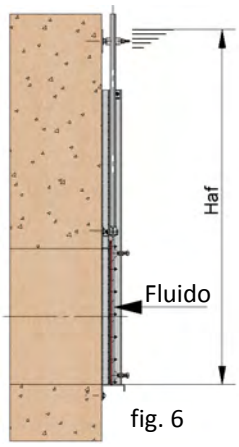


fig. 6

- UNIDIRECCIONAL DESFAVORABLE: (fig. 7 y fig. 8)

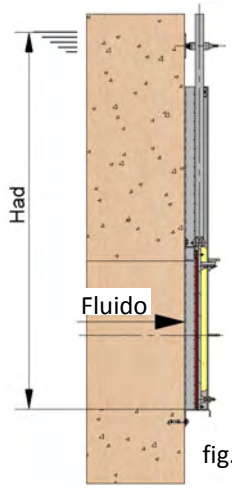


fig. 7

Este tipo de compuerta se utiliza cuando la dirección del fluido siempre tiende a separar la compuerta del muro. En este caso el diseño de la compuerta es idéntica a la bidireccional.
Las juntas que se utilizan en este tipo de compuertas son de doble pico.

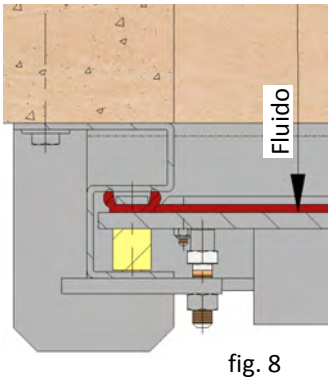


fig. 8

- BIDIRECCIONAL: (fig. 9 y fig. 10)

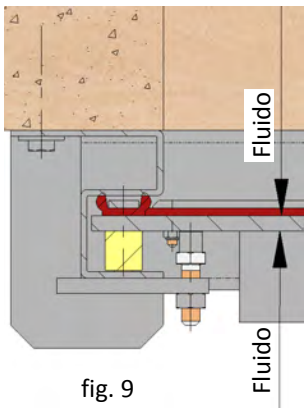


fig. 9

Este tipo de compuerta se utiliza cuando el fluido puede venir tanto en un sentido como en otro, esto es el fluido puede tender a separar la compuerta del muro, como puede presionar contra el muro. En este caso el diseño de la compuerta es idéntica a la unidireccional desfavorable.
Las juntas que se utilizan en este tipo de compuertas son de doble pico.

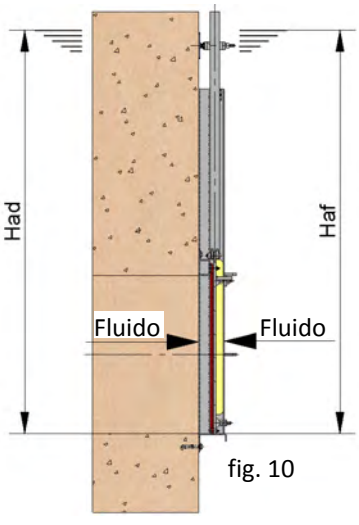


fig. 10

A pesar de que el material de la junta de estanqueidad estándar sea el EPDM, dependiendo de las aplicaciones de trabajo que se quieran dar a la compuerta (temperatura de trabajo, tipo de fluido,...), existen otros tipos de materiales donde escoger la más apropiada. A continuación describimos las características de las más habituales y más adelante las resumimos en la tabla 2:

Materiales de junta estanqueidad

EPDM

Recomendado para temperaturas no mayores de 90°C*, proporciona a la compuerta una estanqueidad del 100%. Aplicación: Agua y ácidos.

NITRILO

Se utiliza en fluidos que contienen grasas o aceites temperaturas no mayores de 90°C*. Proporciona a la compuerta una estanqueidad del 100%.

VITON

Apropiado para aplicaciones corrosivas y altas temperaturas de hasta 190°C en continuo y picos de 210°C. Proporciona a la compuerta una estanqueidad del 100%.

SILICONA

Principalmente utilizada en industria alimentaria y para productos farmacéuticos con temperaturas no mayores de 200°C. Proporciona a la compuerta una estanqueidad del 100%.

PTFE

Apropiado para aplicaciones corrosivas y PH entre 2 y 12. No proporciona a la compuerta el 100% de estanqueidad. Fuga estimada: 0.5% del caudal.

CAUCHO NATURAL

Puede ser utilizada en múltiples aplicaciones a temperaturas no mayores de 90°C, con productos abrasivos y proporciona a la compuerta una estanqueidad del 100%. Aplicación: fluidos en general.

Nota: En algunas aplicaciones se usan otros tipos de goma, como: hipalón, butilo,…. Por favor contactar con CMO en caso de que tengan tal requerimiento.

ASIENTO/JUNTAS		
Material	**Tª. Máx. (ºC)**	**Aplicaciones**
EPDM (E)	90 *	Agua, ácidos y aceites no mineral
Nitrilo (N)	90 *	Hidrocarburos, aceites y grasas
Vitón (V)	200	Hidrocarburos y disolventes
Silicona (S)	200	Productos alimentarios
PTFE (T)	250	Resistente a la corrosión
Caucho Natural	90	Productos abrasivos

tabla 2

Nota: Más detalles y otros materiales bajo consulta.

*** ➔ EPDM y Nitrilo: es posible hasta Tª Max.: 120°C bajo pedido.**

4- HUSILLO

El husillo de las compuertas CMO está fabricado en acero inoxidable 18/8. Esta característica le proporciona una resistencia alta y unas propiedades excelentes frente a la corrosión.

El diseño de la compuerta puede ser con husillo ascendente o husillo no ascendente. Cuando la compuerta es requerida con husillo ascendente, se suministra una caperuza que protege al husillo del contacto con el polvo y suciedad, además de mantenerlo lubricado.

5- ACCIONAMIENTOS

En estas compuertas murales **MC** cuando se necesite que la altura de la compuerta sea mínima, pueden llevar un puente en la parte superior del cuerpo donde se alojará el actuador (fig. 11). El mismo puente delimitará el movimiento longitudinal de la tajadera.

De lo contrario si deseamos colocar el actuador a una distancia considerable respecto a la ubicación de la compuerta, se puede acoplar un alargamiento al husillo o vástago y amarrar el accionamiento en una columna de maniobra (fig. 12) o en un soporte escuadra (fig. 13). En este caso el cuerpo dispondrá de un sistema de topes para delimitar el movimiento longitudinal de la tajadera (solo en caso de accionamientos manuales).

En ambos casos al poner en funcionamiento el actuador, este ejerce el par o el tiro necesario en el husillo o vástago, el cual a su vez lo transmite a la tajadera e inicia el movimiento de apertura o cierre.

Existen varios tipos de accionamientos con los que suministramos nuestras compuertas murales, con la ventaja de que debido al diseño de CMO, los accionamientos son intercambiables entre sí.

Este diseño permite al cliente cambiar el accionamiento por sí mismo y no necesita ningún tipo de accesorio de montaje extra.

En función del tipo de accionamiento que se escoja las dimensiones totales de la compuerta pueden variar.

Manuales:
Volante con husillo ascendente
Volante con husillo no ascendente
Volante-cadena
Reductor
Otros (cuadradillo de maniobra,...)

Automáticos:
Actuador eléctrico
Cilindro neumático
Cilindro hidráulico

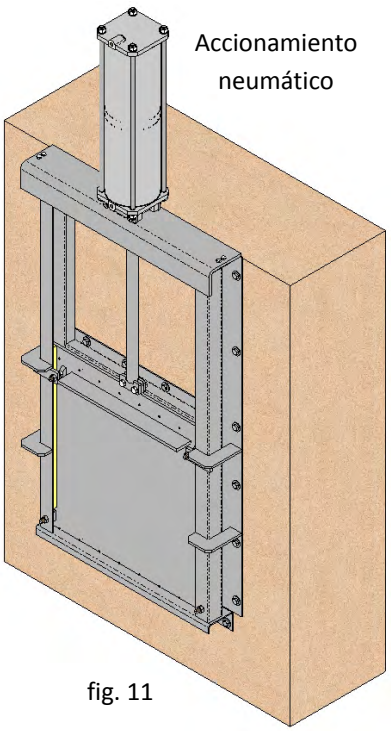


fig. 11

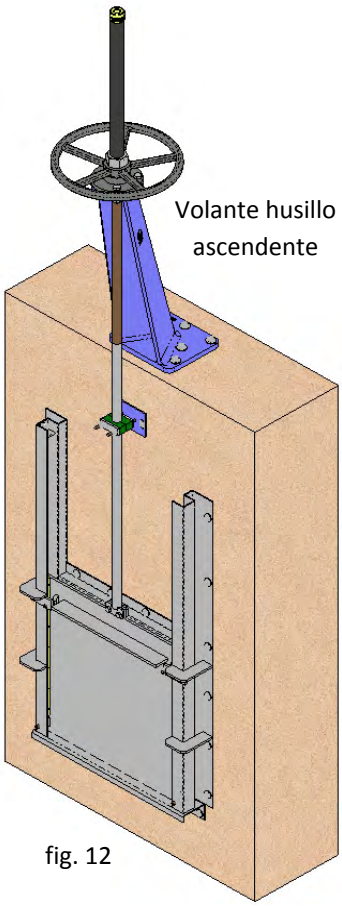


fig. 12

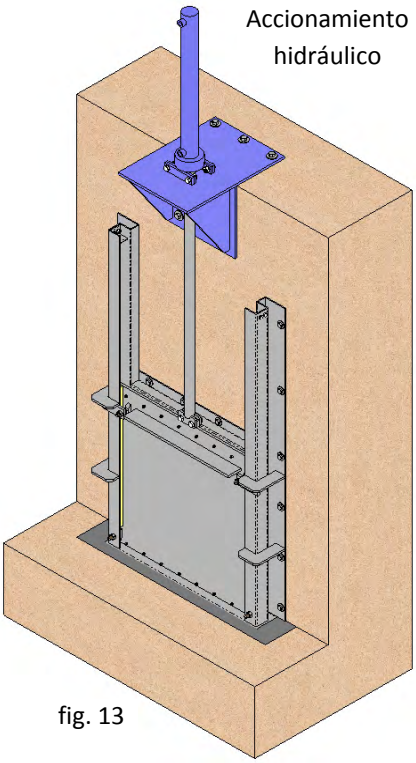


fig. 13

COMPUERTA MURAL SERIE MC

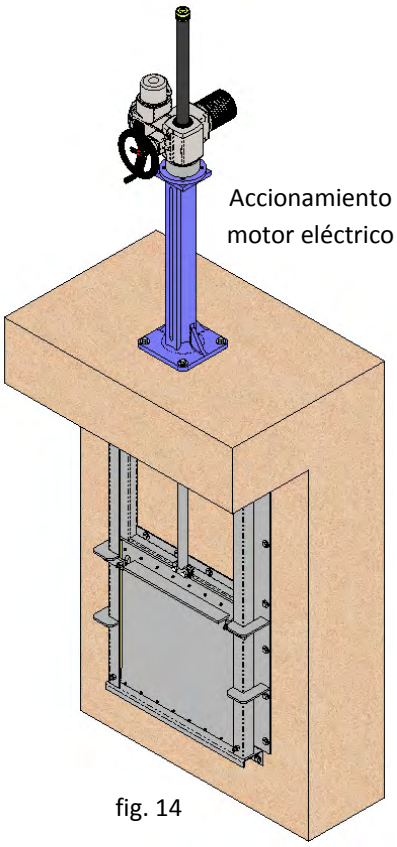


fig. 14

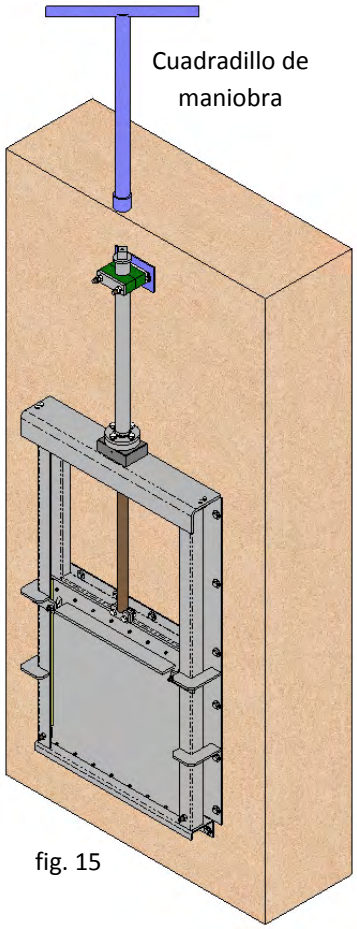


fig. 15

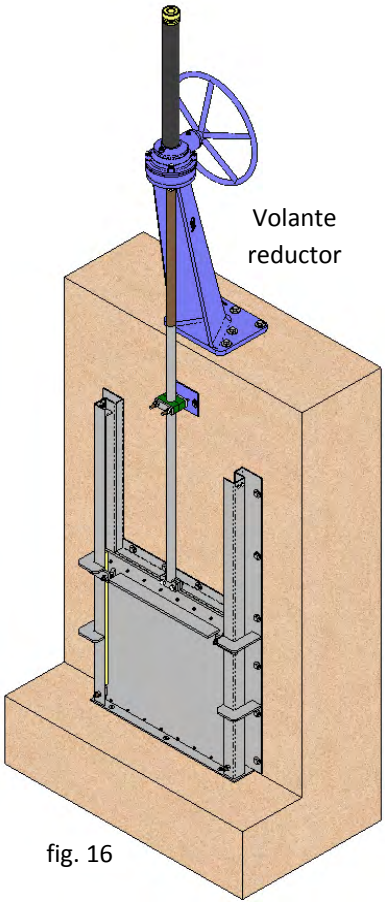


fig. 16

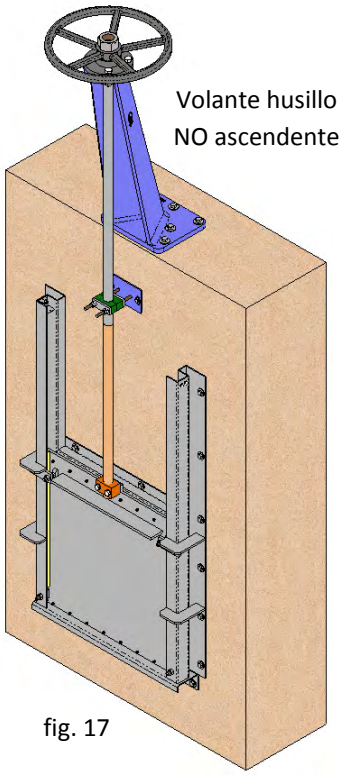


fig. 17

Los accionamientos de volante, volante-cadena, reductor y motor también están disponibles con husillo no ascendente.

También se han desarrollado los alargamientos de husillo, permitiendo la actuación desde posiciones alejadas de la ubicación de la compuerta para ajustarse a todas las necesidades. Se recomienda consulten previamente a nuestros técnicos.

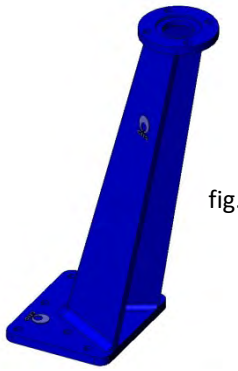
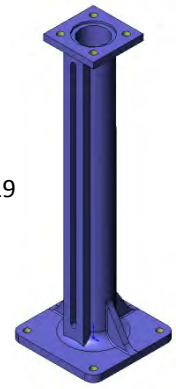


fig. 18

Gran disponibilidad de accesorios:
Topes mecánicos
Dispositivos de bloqueo
Acctos. manuales de emergencia
Electroválvulas
Posicionadores
Finales de carrera
Detectores de proximidad
Columnas de maniobra recta (fig. 19)
Columna de maniobra inclinada (fig. 18)
...

fig. 19



ACCESORIOS Y OPCIONES

Existen diferentes accesorios para adaptar la compuerta a condiciones de trabajo específicas, como:

-Finales de carrera mecánicos, detectores inductivos y posicionadores (fig.20):
Instalación de finales de carrera o detectores para indicación de posición puntual de la compuerta y posicionadores para indicación de posición continua.

-Electroválvulas (fig. 20):
Para la distribución del aire a los accionamientos neumáticos.

-Cajas de conexión, cableado y entubado neumático:
Suministro de unidades montadas con todos los accesorios necesarios.

-Limitadores de carrera mecánicos (topes mecánicos):
Permiten ajustar mecánicamente la carrera, limitando el recorrido deseado que realice la compuerta.

-Sistema de bloqueo mecánico:
Permite bloquear mecánicamente la compuerta en una posición fija durante largos periodos de tiempo.

-Accionamiento manual de emergencia (volante / reductor):
Permite actuar la compuerta manualmente en caso de fallo de energía o de aire (fig. 20).

-Accionamientos intercambiables:
Todos los accionamientos son fácilmente intercambiables entre sí.

-Recubrimiento de epoxi:
Todos los cuerpos y componentes de acero al carbono de las compuertas CMO van recubiertas de una capa de EPOXI, que da a las compuertas una gran resistencia a la corrosión, y un excelente acabado superficial. El color estándar de CMO es el azul RAL-5015.

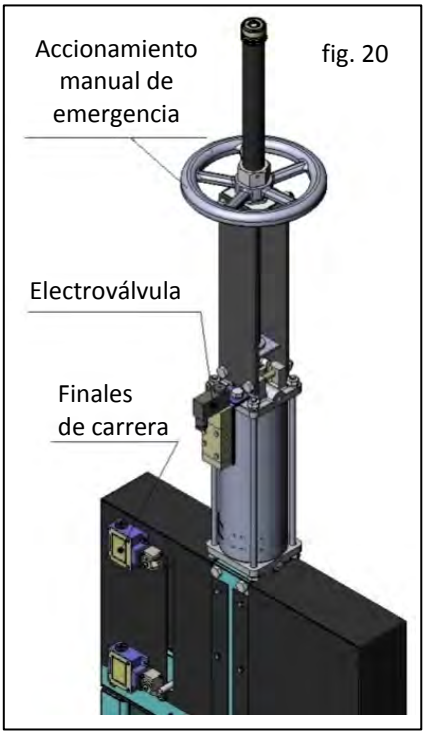


fig. 20

TIPOS DE EXTENSIONES

Si la necesidad es la de accionar la compuerta desde una posición alejada, podemos colocar accionamientos de distinto tipo:

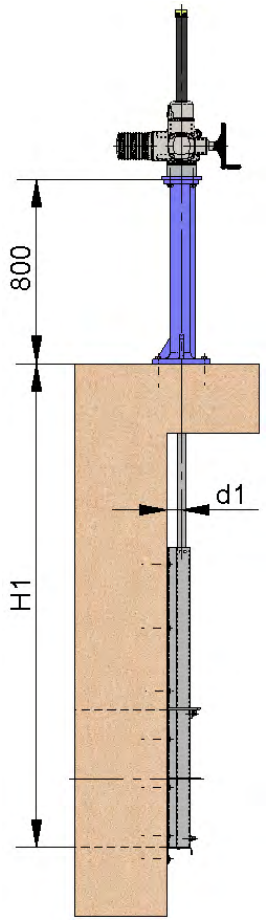


fig. 21

1- Extensión: Columna de Maniobra.
Este alargamiento se realiza acoplando un alargamiento al husillo. Definiendo la longitud del alargamiento, conseguimos la medida de extensión deseada. Normalmente se incorpora una columna de maniobra para soportar el accionamiento.

Las variables de definición son:
H1: Distancia de la solera del orificio del muro a la base de la columna.
d1: Separación desde el muro hasta el eje del alargamiento.

Características:
- Puede ser acoplado sobre cualquier tipo de accionamiento.
- Se recomienda un soporte-guía de husillo (fig. 22) cada 1,5 m.
- La columna de maniobra estándar es de 800 mm de altura (fig. 21).

Otras medidas de columna bajo consulta.
- Posibilidad de colocar una regleta de indicación para conocer el grado de apertura de la compuerta.
- Posibilidad de columna inclinada (fig. 23).

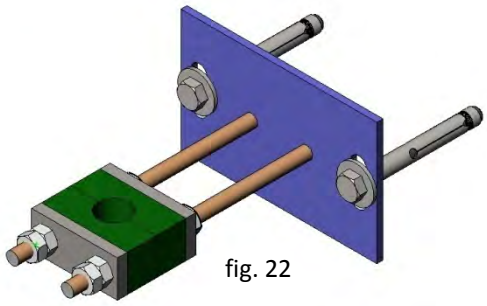


fig. 22

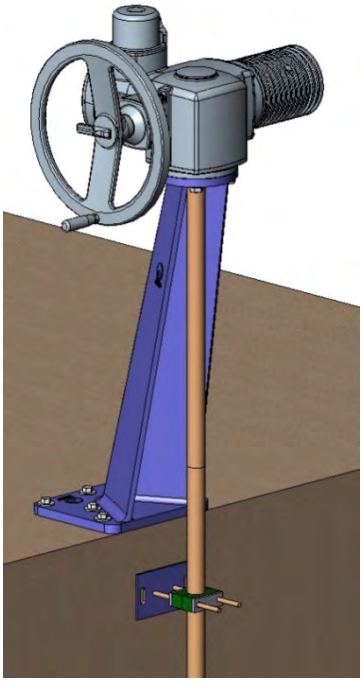


fig. 23

LISTA DE COMPONENTES	
Componente	**Versión Estándar**
Husillo	AISI 303
Vástago	AISI 304
Soporte-guía	Acero al carbono con recubrimiento EPOXI
Deslizadera	Nylon
Columna	GGG 50 con recubrimiento EPOXI

tabla 3

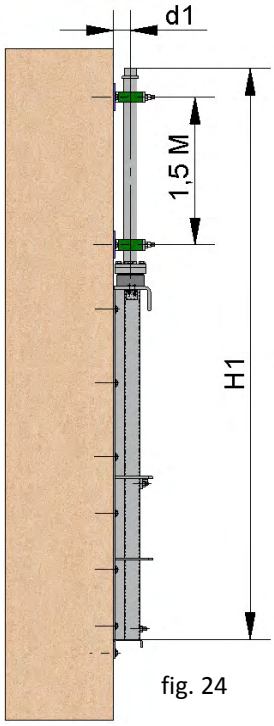


fig. 24

2 - Extensión: Tubo (fig. 24)

Consiste en elevar el accionamiento. El tubo girará solidario al volante o llave cuando la compuerta se acciona, pero ésta siempre permanecerá a la misma altura.

Las variables de definición son:
H1: Distancia de la solera del orificio del muro a la altura deseada del accionamiento.
d1: Separación desde el muro hasta el eje del tubo.

Características:
- Accionamientos estándar: Volante y "Cuadradillo".
- Se recomienda un soporte-guía del tubo cada 1,5m.
- Los materiales estándar son: Acero al carbono con recubrimiento EPOXI o acero inoxidable.

3 - Extensión: Guías del cuerpo alargadas (fig. 25)

Cuando se trata de una extensión, se puede conseguir prolongando las guías del cuerpo. Para reforzar la estructura de las guías del cuerpo, se puede colocar un puente intermedio.

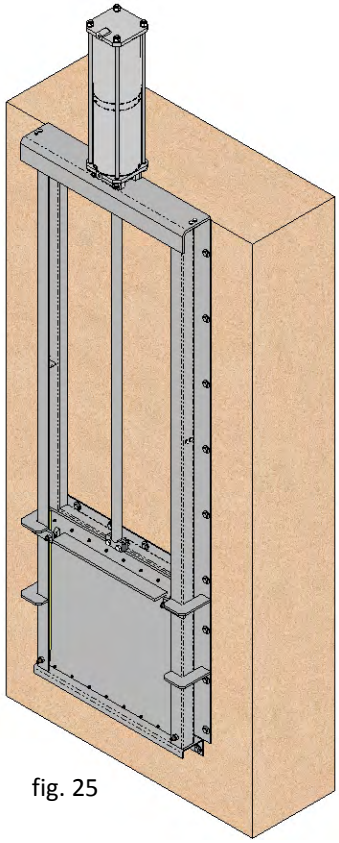


fig. 25

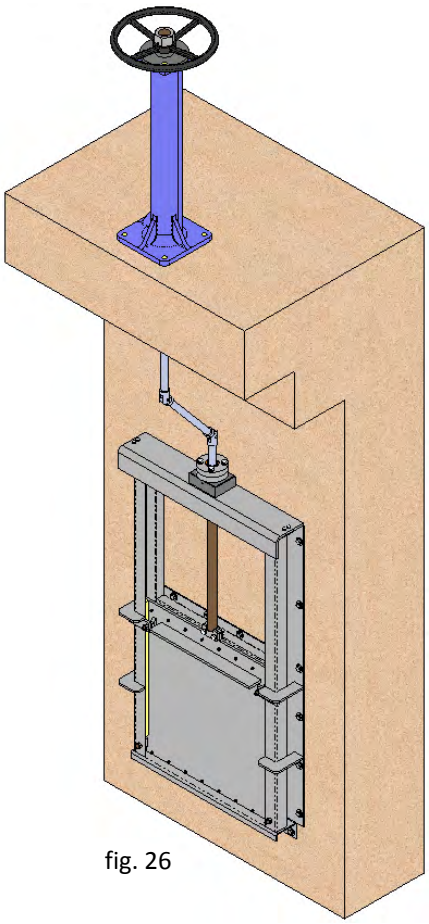


fig. 26

4 - Extensión: Cardan (fig. 26)

Si nos encontramos con una desalineación entre la compuerta y el accionamiento, podemos solucionar el problema colocando una articulación tipo cardan.

DIMENSIONES GENERALES

Para definir una compuerta mural **MC**, necesitamos saber la anchura y altura de la compuerta, el sentido de fluido y la carga de fluido que habrá a cada lado de la compuerta. También necesitamos saber la altura del suelo (Hs).
Para referirse a las variables de anchura y altura, utilizaremos las cotas A y B, y el modo de designación será A x B (Anchura x Altura). Las dimensiones van desde 150 x 150 hasta 3000 x 3000 (mayores dimensiones bajo consulta). Estas compuertas pueden ser tanto cuadradas como rectangulares, por lo que no tienen por qué ser iguales la anchura (A) y la altura (B). A continuación describiremos cada cota de la fig. 27:

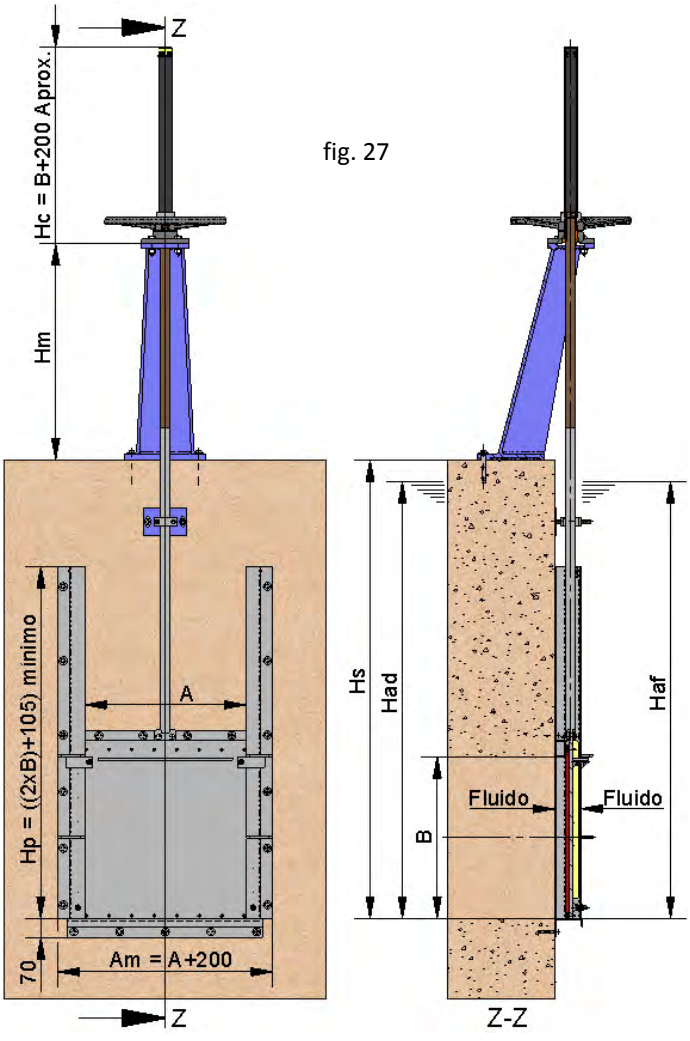


fig. 27

- Cota **A**: Es la que se utiliza para definir la anchura de la compuerta.
- Cota **B**: Es la que se utiliza para definir la altura de la compuerta.
- Cota **Hs**: Es la que se utiliza para definir la altura desde la solera del orificio hasta el suelo.
- Cota **Hm**: Es la que se utiliza para definir la distancia desde el suelo hasta donde se ubica el accionamiento. Habitualmente esta cota (Hm) suele ser de 800 mm para que una persona pueda maniobrar la compuerta cómodamente.
- Cota **Hp**: Es la que se utiliza para definir la distancia desde la solera de la compuerta hasta la parte superior del cuerpo. Esta cota deberá ser como mínimo el doble de la altura de la compuerta (B) más 105 mm (para que se pueda abrir completamente la compuerta).
- Cota **Hc**: Es la que se utiliza para definir la altura total del accionamiento. Aproximadamente esta cota (Hc) suele ser la altura de la compuerta (B) más 200 mm.

En caso de que la compuerta tenga un accionamiento de husillo no ascendente, la cota Hc se reduce, y tendrá un valor aproximado de 300 mm (dependiendo del accionamiento que se instale).

- Cota **Am**: Es la que se utiliza para definir la anchura máxima que abarca el cuerpo. Aproximadamente esta cota (Am) suele ser la anchura de la compuerta (A) más 200 mm.
- Cota **Haf**: Es la que se utiliza para definir la carga de fluido favorable (cuando la dirección del fluido presiona a la compuerta contra el muro), la cota Haf define el nivel de fluido máximo midiendo desde la solera del orificio.
- Cota **Had**: Es la que se utiliza para definir la carga de fluido desfavorable (cuando la dirección del fluido tiende a separar la compuerta del muro), la cota Had define el nivel de fluido máximo midiendo desde la solera del orificio.

Cuando el orificio del muro está al ras del suelo, no se puede montar la compuerta de la forma habitual (apoyada toda la compuerta en el muro mediante anclajes de expansión o químicos). Por eso existen dos variantes de la versión estándar, que permiten en estos casos instalar las compuertas satisfactoriamente.

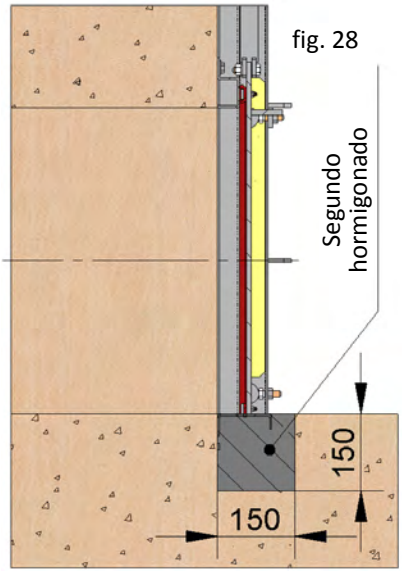


fig. 28

VISTA LATERAL

La compuerta se puede montar con la solera embutida en el hormigón. Para poder montarlo de esta manera, hay que realizar una cajera en la solera para poder introducir la compuerta y llevar a cabo su posterior hormigonado. En las fig. 28 y fig.29 detallamos las dimensiones que debería tener dicha cajera:

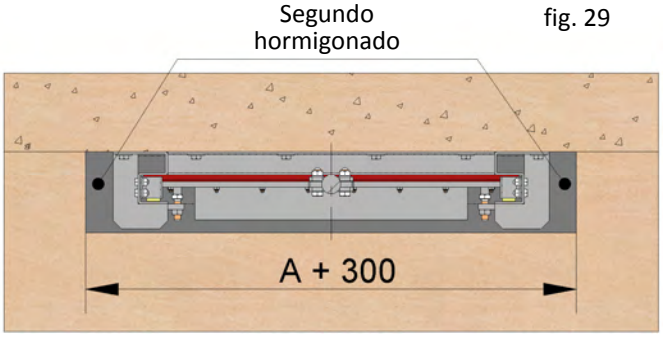


fig. 29

VISTA EN PLANTA

Aunque si la obra civil está construida y no dispone de la cajera necesaria para montar con la solera hormigonada, existe la posibilidad de construir la compuerta con solera plana y sujetarla mediante anclajes de expansión o químicos (fig. 30).

En este caso en la solera de la obra civil se amarrará una llanta lisa donde la compuerta pueda realizar el cierre inferior. Esta llanta tendrá un espesor (cota E), que varía en función de la anchura de la compuerta (A), y la definimos en la tabla 4.

LLANTA INFERIOR (SOLERA)	
Anchura compuerta (A)	Espesor llanta solera (E)
150 ~ 1000 mm	6 mm
1100 ~ 2000 mm	8 mm
2000 ~ 3000 mm	10 mm

tabla 4

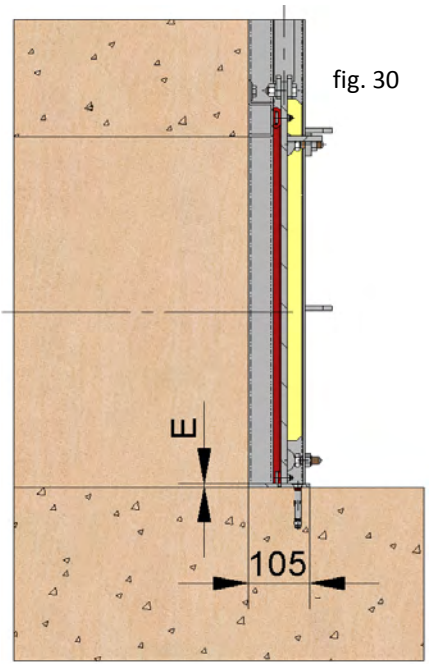


fig. 30

VISTA LATERAL

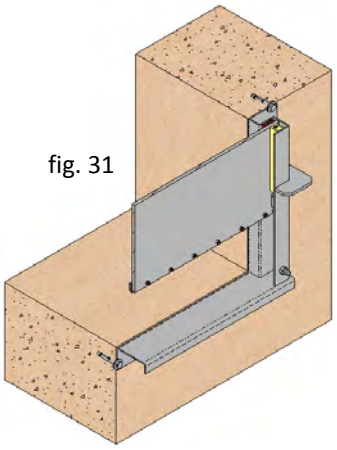
OPCIONES DE FIJACION

Tal como hemos mencionado anteriormente, el sistema más habitual de montar estas compuertas murales es apoyándolas en el muro y amarrando mediante anclajes de expansión o químicos (fig. 31), pero como podemos apreciar en la fig. 32 y fig. 33, existen más opciones de montaje.
Sea cual sea la opción de fijación, los perfiles laterales y el superior siempre se sujetan mediante anclajes de expansión o químicos. Debido a esto es muy importante que el muro esté completamente plano, de lo contrario al empezar a apretar los anclajes, el cuerpo podría deformarse y sufrir daños irreparables.
Por eso se recomienda utilizar una regla plana cuando se proceda a atornillar el cuerpo. Apoyaremos la regla sobre el cuerpo y empezaremos a apretar los tornillos de anclaje, en cuanto veamos que el cuerpo empieza a deformarse, dejaremos de apretar.

- Para montar la compuerta mediante anclajes de expansión o químicos (el modo más habitual), colocamos la compuerta completamente abierta en el muro haciendo coincidir el paso de la compuerta con el orificio del muro. Utilizando los agujeros del cuerpo de la compuerta como guía, taladraremos los agujeros para los anclajes de expansión o químicos en el muro. Retiraremos la compuerta y donde vayamos a ubicarla aplicaremos una pasta de sellado tipo SIKAFLEX-11FC o similar con el fin de evitar fugas entre el cuerpo y el muro. Volveremos a colocar la compuerta en su ubicación y procederemos a atornillar mediante los anclajes de expansión o químicos. Tendremos que tener cuidado en atornillar en modo cruzado, utilizando la regla plana y sin apretar excesivamente, de lo contrario se podrían producir deformaciones en la compuerta.
Este procedimiento sirve tanto para compuertas de solera plana (fig. 32) como para estándares (fig. 31).

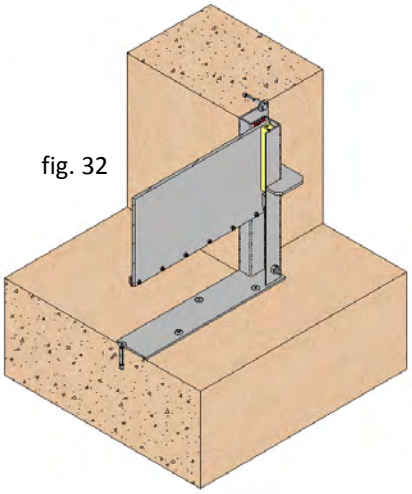
- Para montar la compuerta con la solera embutida en el hormigón (fig. 33), se necesita que en la obra civil haya una cajera en el suelo de las dimensiones que hemos definido anteriormente en las fig. 28 y fig. 29. Una vez tengamos colocada la compuerta en la cajera, la centraremos respecto al orificio del muro asegurando que la solera de la compuerta quede al ras de la obra civil, de esta manera se consigue que no haya ningún resalte en la solera logrando un paso total y continuo. Procederemos a realizar los taladros necesarios para los perfiles laterales y superior, utilizando los agujeros del cuerpo de la compuerta como guía. Retiraremos la compuerta y donde vayamos a ubicarla en el muro, aplicaremos una pasta de sellado tipo SIKAFLEX-11FC o similar con el fin de evitar fugas entre el cuerpo y el muro. Volveremos a colocar la compuerta en su ubicación y procederemos a atornillar mediante anclajes de expansión o químicos, con el procedimiento habitual, con la ayuda de una regla plana, atornillando en cruzado y sin apretar excesivamente.
A continuación se procederá a realizar el segundo hormigonado, que consistirá en rellenar la cajera de la solera asegurando que no quede ningún resalte en el paso del fluido.

fig. 31



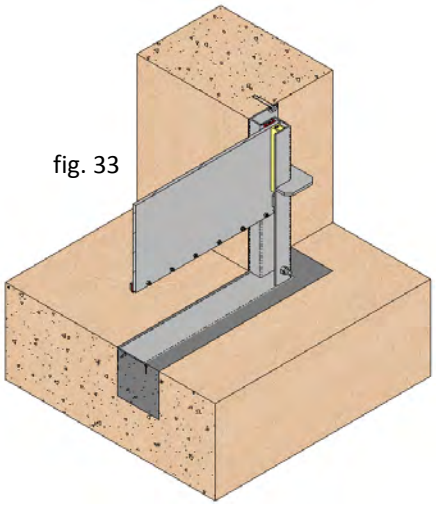
Amarrada al muro mediante anclajes de expansión o químicos (estándar)

fig. 32



Solera plana

fig. 33



Solera con cajera

ANEXO V –FILTROS MALLAS STF–

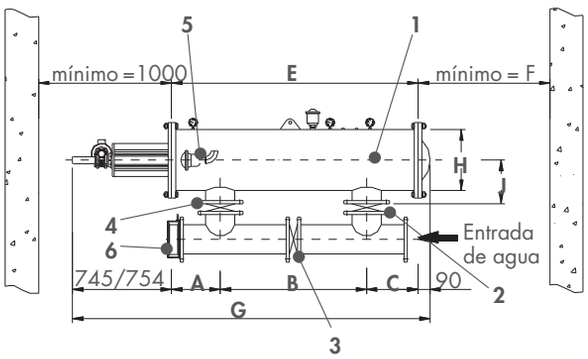
Filtro de malla autolimpiante FMA 6000



Modelo	Conexión Ent./Sal		Conexión drenaje		Caudal (m^3/s)		Potencia instalada (Kw)
	DN	Pulgadas	DN	Pulgadas	Malla (1,5x1,5)	Malla (2x2)	
FMA-6016	400	16″	80	3″	0,13	0,17	1,48
FMA-6020	500	20″	100	4″	0,19	0,36	1,48
FMA-6024	600	24″	125	5″	0,3	0,56	1,68
FMA-6028	700	28″	150	6″	0,45	0,65	1,75
FMA-6032	800	32″	150	6″	0,63	0,92	1,83
FMA-6036	900	36″	200	8″	0,89	1,25	2,1
FMA-6040	1000	40″	200	8″	1,14	1,53	2,57
FMA-6044	1100	44″	200	8″	1,42	1,75	2,8
FMA-6048	1200	48″	250	10″	1,69	2,22	3,35
FMA-6052	1300	52″	250	10″	1,9	2,5	3,5
FMA-6056	1400	56″	300	12″	2,35	3,33	3,7
FMA-6060	1500	60″	300	12″	2,85	3,89	4,1
FMA-6064	1600	64″	300	12″	3,4	4,17	4,3
FMA-6068	1700	68″	350	14″	3,75	4,72	4,7
FMA-6072	1800	72″	350	14″	4,14	5,14	5,2
FMA-6076	1900	76″	400	16″	4,75	5,56	5,5
FMA-6080	2000	80″	400	16″	5,41	6,67	6
FMA-6088	2200	88″	450	18″	6,45	7,78	6,2
FMA-6096	2400	96″	500	20″	7,5	8,89	6,38
FMA-6104	2600	104″	500	20″	8,39	11,1	6,72
FMA-6112	2800	112″	500	20″	9,55	13,06	7,1
FMA-6120	3000	120″	600	24″	10,3	14,44	7,25

Filtro de malla autolimpiante eléctrico FMA 2000





Filtro Automático Serie 2000	**1**
Válvula de mariposa de entrada	**2**
Válvula de by-pass	**3**
Válvula de mariposa de salida	**4**
Válvula de limpieza de 2"	**5**
Válvula de retención (opcional)	**6**

Modelo Soporte PVC	Conexión Ent./Sal.	Dimensiones (mm)									Superficie filtrante (cm^2)	Consumo de agua por limpieza (l)	Peso (kg.)
		A	B	C	DN	E	F	G	H	J			
FMA-2003	3"	302	360	219	80	881	400	1625	457	325	2.450	35	245
FMA-2004	4"	314	770	220	100	1305	690	2140	457	325	4.900	70	280
FMA-2006	6"	340	1000	240	150	1580	970	2415	457	325	7.350	105	340
FMA-2008	8"	367	1100	388	200	1855	1240	2690	457	325	9.800	140	390
FMA-2010	10"	419	1370	341	250	2130	1520	2965	457	325	12.250	175	430
FMA-2012	12"	430	1100	325	300	1855	1240	2690	660	450	16.100	140	595
FMA-2014	14"	433	1370	327	350	2130	1520	2965	660	450	20.100	175	668

Modelo Soporte INOX	Conexión Ent./Sal.	Dimensiones (mm)									Superficie filtrante (cm^2)	Consumo de agua por limpieza (l)	Peso (kg.)
		A	B	C	DN	E	F	G	H	J			
FMA-2003	3"	302	360	219	80	881	400	1625	457	325	2.650	35	261
FMA-2004	4"	315	770	220	100	1305	690	2140	457	325	5.380	70	304
FMA-2006	6"	340	1000	240	150	1580	970	2415	457	325	7.990	105	382
FMA-2008	8"	367	1100	388	200	1855	1240	2690	457	325	10.600	140	439
FMA-2010	10"	446	1370	314	250	2130	1520	2965	457	325	13.210	175	495
FMA-2012	12"	430	1100	325	300	1855	1240	2707	660	450	16.500	140	675
FMA-2014	14"	433	1370	327	350	2130	1520	2982	660	450	21.300	175	753

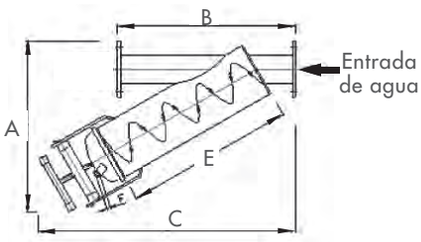
Modelo PVC	Caudales (m^3/h)			
	Caudal máx.	Calidad Alta	Calidad Media	Calidad Baja
FMA-2003	75	45	35	25
FMA-2004	150	80	65	50
FMA-2006	290	150	120	90
FMA-2008	450	250	200	150
FMA-2010	800	400	320	240
FMA-2012	920	500	400	300
FMA-2014	1250	600	480	360

Modelo INOX	Caudales (m^3/h)			
	Caudal máx.	Calidad Alta	Calidad Media	Calidad Baja
FMA-2003	120	60	48	34
FMA-2004	235	110	90	70
FMA-2006	500	215	173	129
FMA-2008	700	320	256	192
FMA-2010	1150	580	464	348
FMA-2012	1400	700	560	420
FMA-2014	1800	900	720	540

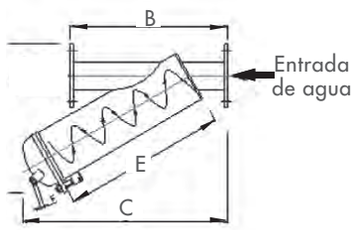
Nota: Los datos de caudales están calculados para mallas de 125 micras. Otros tamaños consultar.

Filtros metálicos en Y efecto ciclónico





Tipo A



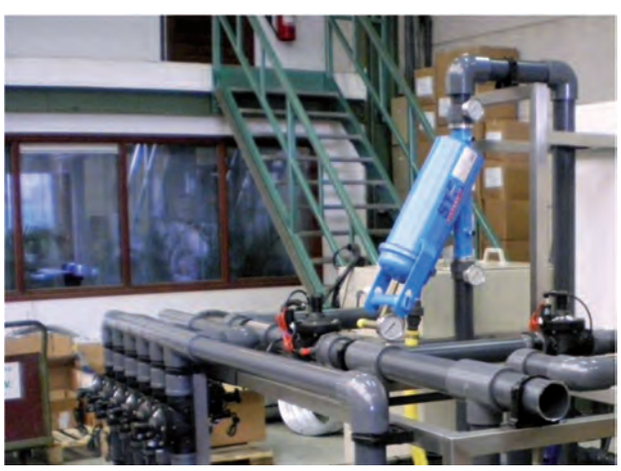
Tipo B

Modelo	Conexión	Superficie filtrante (cm^2)	Caudal (m^3/h) Cartucho 125 micras	Caudal (m^3/h) Cartucho 2 mm	Dimensiones (mm)				Tipo	Peso (kg.)
					A	B	C	D		
FY-2-CIC	Rosca 2"	1498	38	38	488	450	693	377		14
FY-3-CIC	Brida 3"	2004	55	55	583	495	837	502	A	21
FY-4-CIC	Brida 4"	3120	65	65	672	695	1.004	659		41
FY-5-CIC	Brida 5"	3120	65	65	672	695	1.004	659		42
FY-6-CIC	Brida 6"	5456	115	115	938	725	1.003	895	B	66

Características del equipo

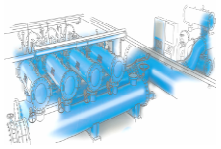
- Materiales de construcción:
  _ Cuerpo de acero al carbono
  _ Tornillería bicromatada calidad 5.6 y 5.8
  _ Cartucho de Malla: soporte PVC, Malla de acero inoxidable AISI-316. 125 micras
  _ Cartucho de Aspersión: acero Inoxidable AISI-304. 2 mm

- Tratamiento de superficies:
  _ Granallado de superficies hasta grado SA 2 1/2
  _ Recubrimiento de pintura en polvo EPOXI-POLIESTER



Principio de funcionamiento

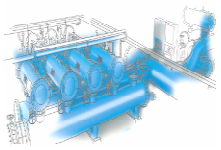
- En los filtros metálicos en Y efecto ciclónico se producen tres procesos que optimizan el rendimiento final de la filtración:
  _ Separación por efecto centrífugo de los sólidos más pesados.
  _ Filtración a través de malla de acero inoxidable.
  _ Limpieza constante de cartucho filtrante, provocada por la incidencia del agua a presión en trayectoria helicoidal a lo largo de la superficie del cartucho filtrante.



ESPECIFICACIONES TÉCNICAS – FMA 6000

MODELO	FMA-6000
	CARACTERÍSTICAS GENERALES
CUERPO DEL FILTRO	
Cuerpo del filtro y tapas	Acero al carbono S-235-JR
Tratamiento de acabado externo	Recubrimiento interior epoxy sin disolventes, exterior imprimación, intermedia y acabado.
Tratamiento de acabado interno	Recubrimiento con pintura epoxi calidad alimentaria.
Tobera succión	Acero inoxidable AISI-304
Anillos estructurales	Acero inoxidable AISI-304
CORONA FILTRANTE	
Estructura	Acero inoxidable AISI-304
Paneles de malla DOUBLE DIAMOND	Acero inoxidable AISI-316
Eje	Acero F-127 tratado
Cubo de cojinete	Acero inoxidable AISI-304
Engranajes	Acero inoxidable AISI-304
MECANISMO DE TRACCIÓN	
Bastidor	Acero inoxidable AISI-304
Eje de tracción	Acero F-127 tratado
Cojinete	Bronce
Piñón	Acero inoxidable AISI-303
VÁLVULA DE LAVADO	
Cuerpo	Fundición GGG-40
Disco	Acero inoxidable AISI-316
Revestimiento	EPDM
Eje	Acero inoxidable AISI-420

Modelo	Conexión Entrada / Salida		Conexión Drenaje		Caudal Nominal m³/s			Potencia Instalada	Volumen de Limpieza (L)
	DN	Pulgadas	DN	Pulgadas	Malla (1x1)	Malla (1,5x1,5)	Malla (2x2)		
FMA - 6016	400	16”	80	3”	0,089	0,13	0,17	1,48 Kw	600
FMA - 6020	500	20”	100	4”	0,13	0,19	0,36	1,48 Kw	1.100
FMA - 6024	600	24”	125	5”	0,2	0,3	0,56	1,68 Kw	2.070
FMA - 6028	700	28”	150	6”	0,31	0,45	0,65	1,75 Kw	2.200
FMA - 6032	800	32”	150	6”	0,43	0,63	0,92	1,83 Kw	2.445
FMA - 6036	900	36”	200	8”	0,61	0,89	1,25	2,1 Kw	3.900
FMA - 6040	1.000	40”	200	8”	0,78	1,14	1,53	2,57 Kw	4.200
FMA - 6044	1.100	44”	200	8”	0,97	1,42	1,75	2,8 Kw	4.350
FMA - 6048	1.200	48”	250	10”	1,16	1,69	2,22	3,35 Kw	6.100
FMA - 6052	1.300	52”	250	10”	1,3	1,9	2,5	3,5 Kw	7.100
FMA - 6056	1.400	56”	300	12”	1,61	2,35	3,33	3,7 Kw	8.800
FMA - 6060	1.500	60”	300	12”	1,95	2,85	3,89	4,1 Kw	9.200
FMA - 6064	1.600	64”	300	12”	2,33	3,4	4,17	4,3 Kw	9.600
FMA - 6068	1.700	68”	350	14”	2,57	3,75	4,72	4,7 Kw	10.700
FMA - 6072	1.800	72”	350	14”	2,83	4,14	5,14	5,2 Kw	11.450
FMA - 6076	1.900	76”	400	16”	3,25	4,75	5,56	5,5 Kw	13.750
FMA - 6080	2.000	80”	400	16”	3,7	5,41	6,67	6 Kw	14.500
FMA - 6088	2.200	88”	450	18”	4,42	6,45	7,78	6,2 Kw	18.300
FMA - 6096	2.400	96”	500	20”	5,14	7,5	8,89	6,38 Kw	20.600
FMA - 6104	2.600	104”	500	20”	5,75	8,39	11,1	6,72 Kw	22.100
FMA - 6112	2.800	112”	500	20”	6,54	9,55	13,06	7,1 Kw	22.900
FMA - 6120	3.000	120”	600	24”	7,1	10,3	14,44	7,25 Kw	32.000



ESPECIFICACIONES TÉCNICAS – FMA 2000

MODELO	2003	2004	2006	2008	2010	2012	2014
CARACTERÍSTICAS GENERALES							
Diámetro Entrada/Salida (1)	DN-80 (3”)	DN-100 (4”)	DN-150 (6”)	DN-200 (8”)	DN-250 (10”)	DN-300 (12”)	DN-350 (14”)
Presión de trabajo máx./mín.	2 bar / 10 bar (Otras consultar)						
Temperatura máx. del fluido	50 ºC (Hasta 95 ºC bajo pedido)						
SOPORTE MALLA PVC							
Caudal Máximo (m^3/h)	75	150	290	450	800	920	1.250
Superficie filtrante bruta (cm^2)	2.450	4.900	7.350	9.800	12.250	16.100	20.100
Superficie filtrante neta (cm^2)	1.600	3.200	4.800	6.400	8.000	10.300	12.800
Peso en vacío (kg)	245	280	340	390	430	595	668
Tamaños de filtración	1.000, 500, 300, 200, 125,100 micras						
INOXIDABLE							
Caudal Máximo (m^3/h)	120	235	500	700	1.150	1.400	1.800
Superficie filtrante bruta (cm^2)	2.650	5.380	7.990	10.600	13.210	16.500	21.300
Superficie filtrante neta (cm^2)	2.200	4.390	6.900	9.400	11.900	14.700	19.150
Peso en vacío (kg)	261	304	382	439	495	675	753
Tamaños de filtración	1.000, 500, 300, 200, 125,100, 80, 50, 25, 20 y 10 micras						
CONTRALAVADO							
Válvula de contralavado	Rosca G-2”						
Duración del ciclo de lavado	25 segundos						
Caudal de lavado (m^3/h)	5	10	15	20	25	20	25
Consumo de agua por lavado (litros)	35	70	105	140	175	140	175
DATOS ELÉCTRICOS							
Tensión de alimentación	220 V AC 50 Hz Monofásico (Opcional 400 V AC Trifásico y 12 V DC)						
Tensión de control	24 V DC (12 V DC en alimentación 12 V DC)						
Potencia del motor eléctrico	0,37 kW (0,25 kW en opción 12 V)						
Consumo del motor eléctrico	1,4 A						
MATERIALES ESTÁNDAR							
Cuerpo del filtro y tapas	Acero al carbono S-235-JR						
Tratamiento de acabado	Recubrimiento con pintura en polvo epoxy-poliester polimerizada en horno.						
Escáner aspiración	Acero inoxidable AISI-304						
Mallas filtrante	Acero inoxidable AISI-316						
Boquilla de succión	PVC con anillo en acero inoxidable AIS 316 y cerdas de nylon						
Válvulas de limpieza	Cuerpo de latón con muelle y eje en acero inox. y tapa en poliamida.						
Tornillería	Bicromatada calidad 5.6 y 5.8						
Juntas	NBR – EPDM - Viton						
(OPCIONALES)							
Cuerpo del filtro y tapas	Acero al carbono A-516 / Acero inox. AISI 304 / AISI 316 / SuperDuplex						
Tratamiento de acabado	Recubrimiento interior apto para agua de mar y exterior para ambiente marino.						
Escáner aspiración	Acero inoxidable Duplex o Superduplex						
Mallas filtrante	Acero inoxidable Avesta 254 SMO						
Boquilla de succión	Completa en acero inoxidable Duplex o Superduplex y cerdas de nylon						
Válvulas de limpieza	De accionamiento hidráulico, eléctrico o neumático “Consultar opciones de materiales”						
Tornillería	Acero inoxidable A2 o A4						
Juntas	Consultar						

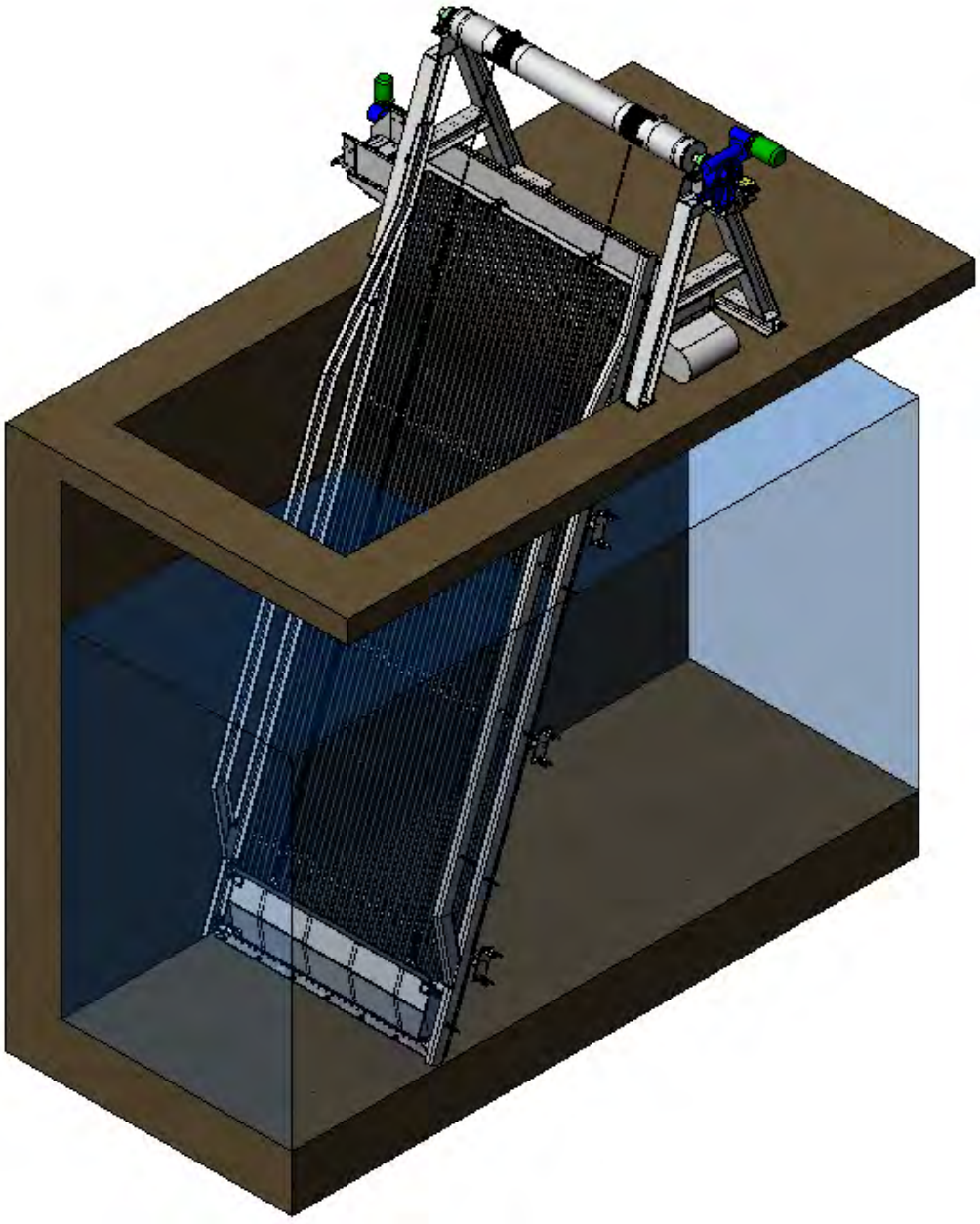
ANEXO V –FILTRO REJA CMO–

LIMPIARREJAS SERIE – RJ

PROGRAMA DE FABRICACION

RACK CLEANER RJ – SERIES

FABRICATION RANGE



- **UTILIZACION:**

Limpieza de canales de sólidos ligeros.

- *UTILIZATION:*

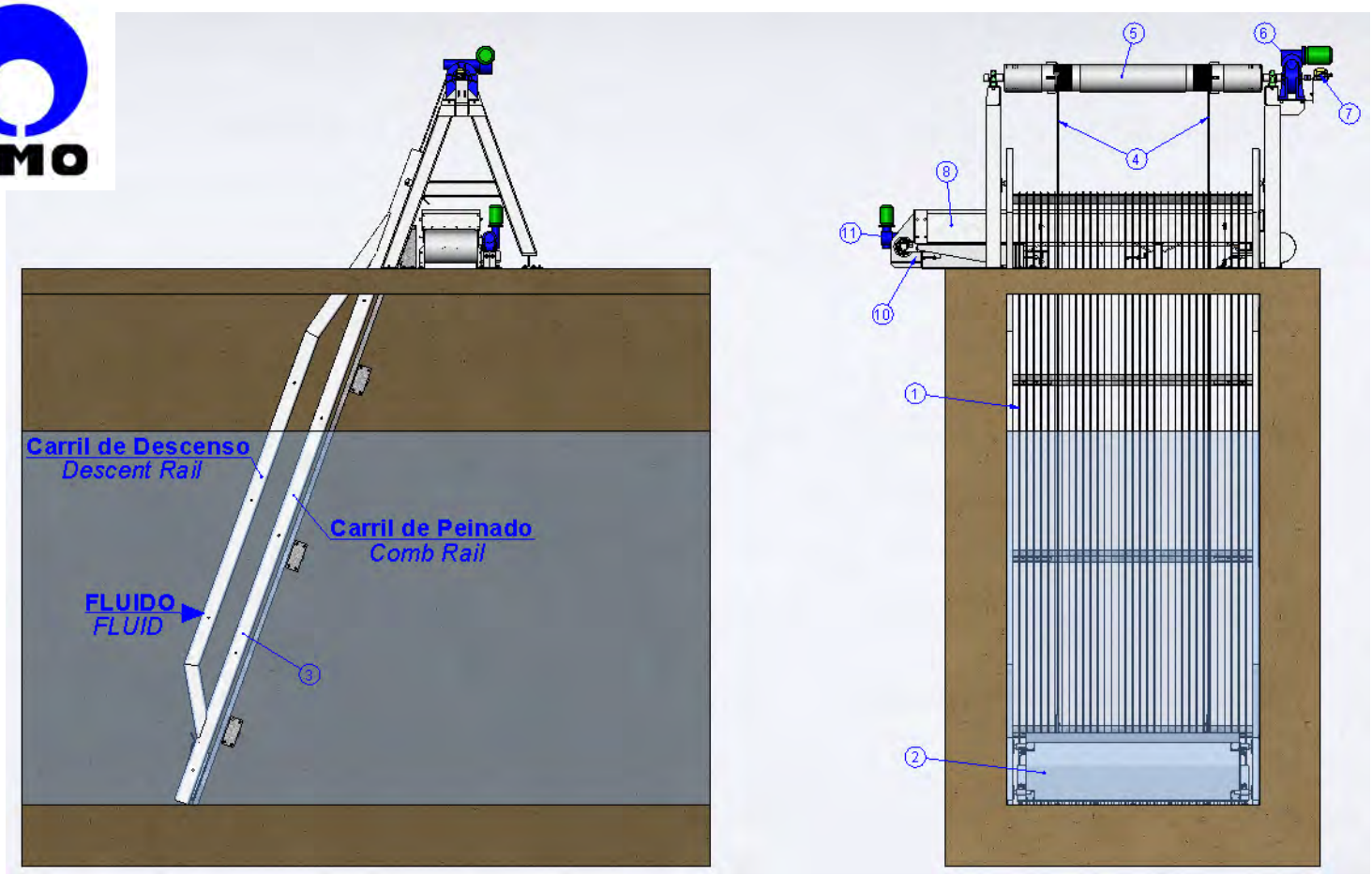
Light solids cleaner for channels.

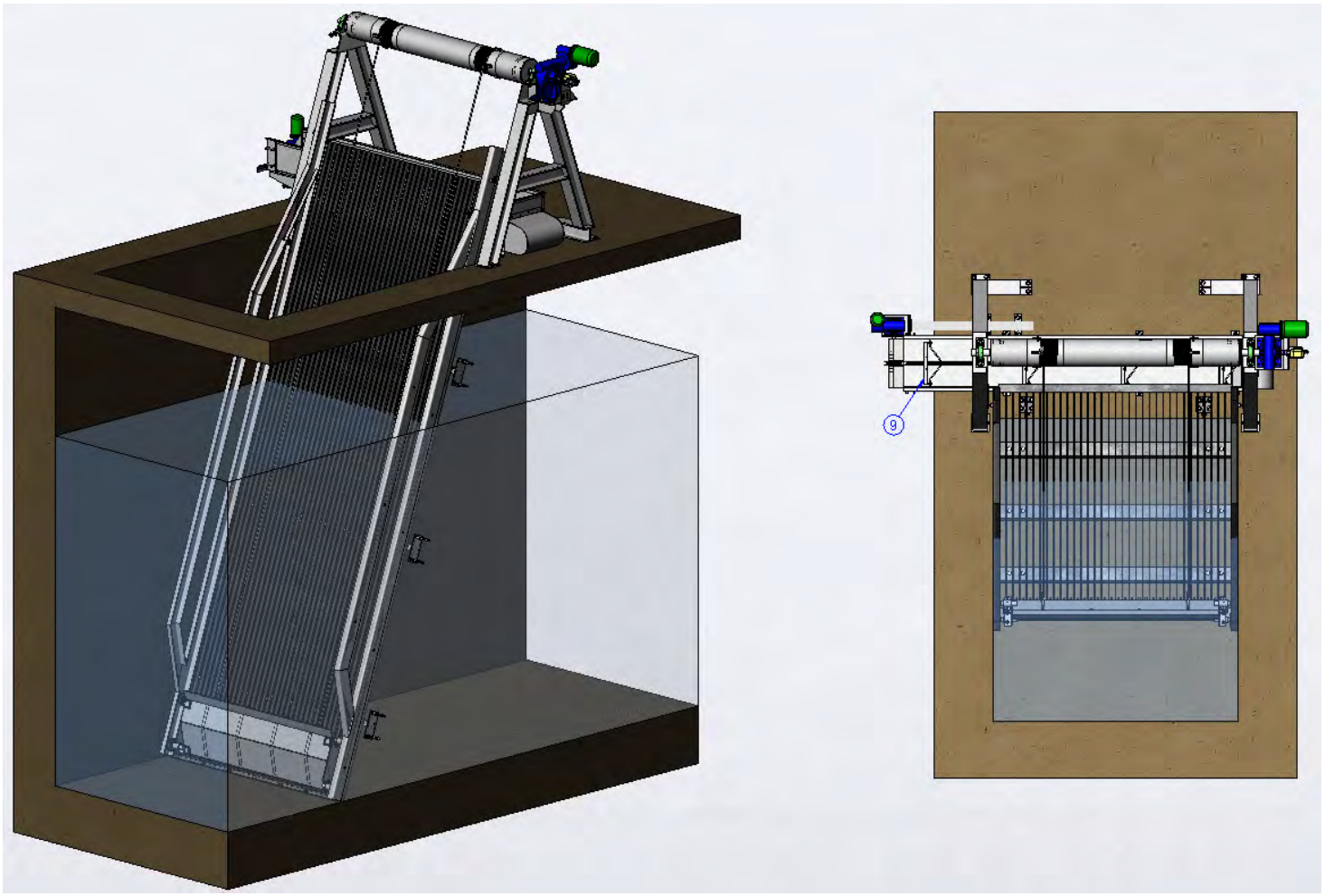
LLOYD'S REGISTER QUALITY ASSURANCE · ISO9001

GESTION DE LA CALIDAD CERTIFICADA

QUALITY MANAGEMENT CERTIFIED

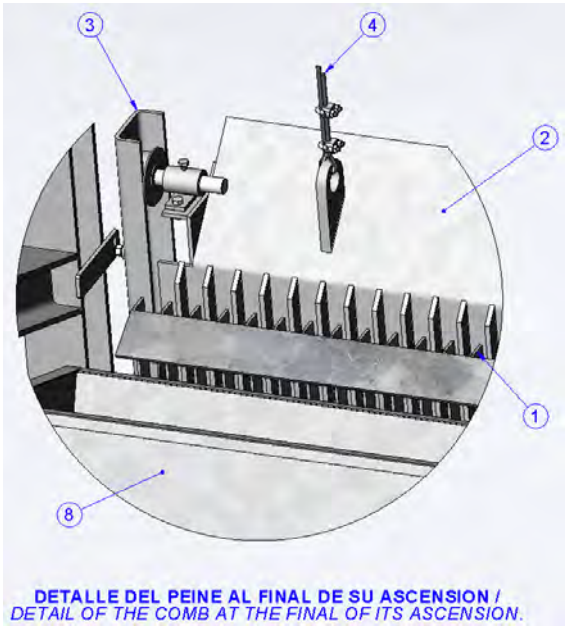
CMO





NOTA: Tambien disponemos de otros tipos de accionamientos, como por ejemplo hidráulicos o con cremallera.

NOTE: We also have other type of actuators, like hydraulic cylinders or rack type actuator.

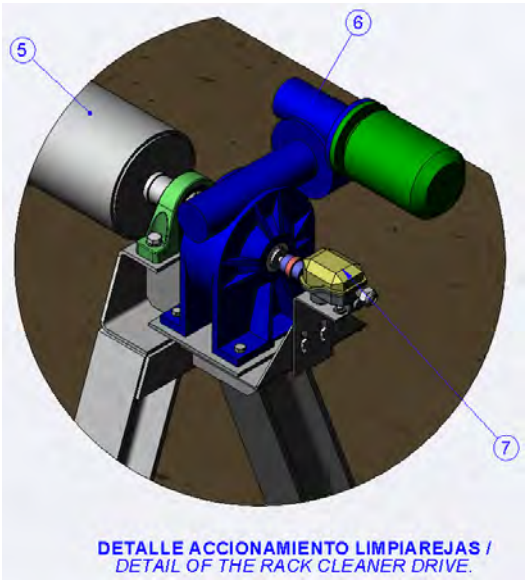


DETALLE DEL PEINE AL FINAL DE SU ASCENSION /
DETAIL OF THE COMB AT THE FINAL OF ITS ASCENSION.

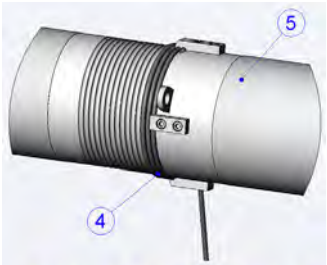


DETALLE DEL PEINE AL PRINCIPIO DE SU ASCENSION /
DETAIL OF THE COMB AT START OF ITS ASCENSION.

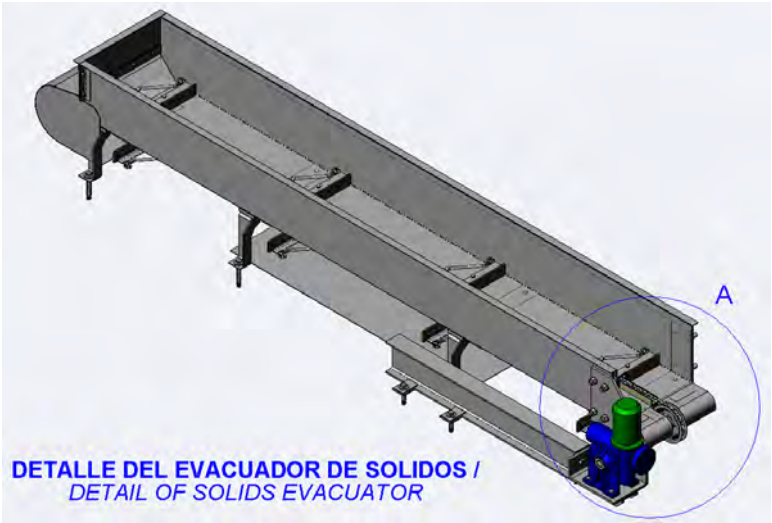
POS.	**DENOMINACION**	*DENOMINATION*
1	**REJA**	*RACK*
2	**PEINE**	*COMB*
3	**GUIAS**	*GUIDES*
4	**CABLES IZADO**	*HOISTING LINE*
5	**ARRASTRADOR**	*HAULER*
6	**ACCIONAMIENTO LIMPIAREJAS**	*RACK CLEANER DRIVE*
7	**FINES DE CARRERA**	*LIMIT SWITCHES*
8	**EVACUADOR DE SOLIDOS**	*SOLIDS EVACUATOR*
9	**PALAS TRANSPORTADOR**	*SLIPS SCRAPER*
10	**CADENA TRANSMISORA**	*DRIVING CHAIN*
11	**ACCIONAMIENTO DE EVACUADOR DE SOLIDOS**	*SOLIDS EVACUATOR DRIVE*



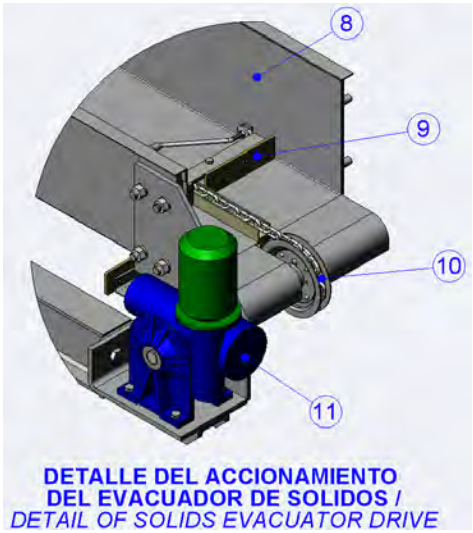
DETALLE ACCIONAMIENTO LIMPIAREJAS /
DETAIL OF THE RACK CLEANER DRIVE.



DETALLE ARRASTRADOR /
HAULER DETAIL.



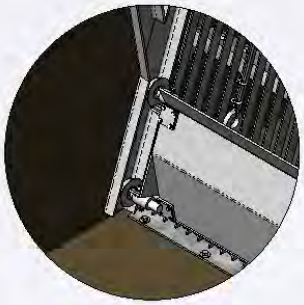
DETALLE DEL EVACUADOR DE SOLIDOS /
DETAIL OF SOLIDS EVACUATOR



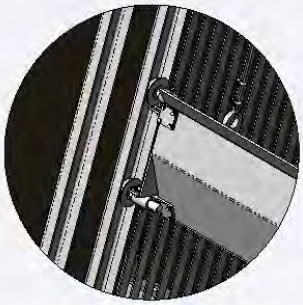
DETALLE DEL ACCIONAMIENTO DEL EVACUADOR DE SOLIDOS /
DETAIL OF SOLIDS EVACUATOR DRIVE

PROCESO DE FUNCIONAMIENTO

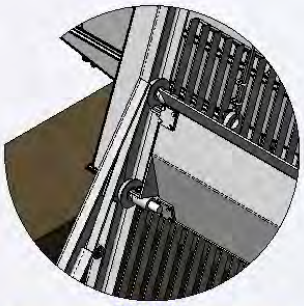
OPERATION PROCESS



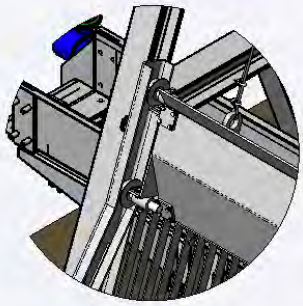
FASE -1-
POSICION DE REPOSO
-1- PHASE
SETTLING POSITION



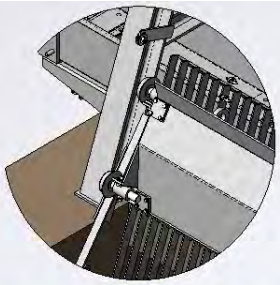
FASE -2-
ASCENSO PEINANDO LA REJA
-2- PHASE
COMBING THE RACK ASCENT



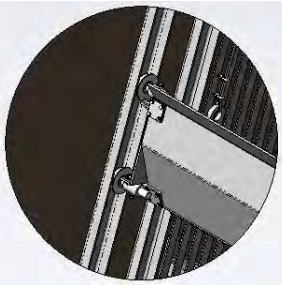
FASE -3-
ASCENSO BAJO GUIA DE DESVIO
-3- PHASE
UNDER THE DESVIATION GUIDE ASCENT



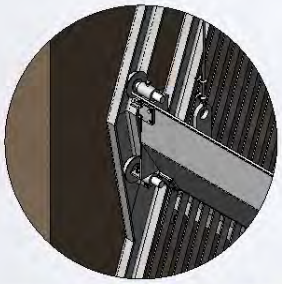
FASE -4-
FIN DEL ASCENSO
-4- PHASE
FINAL OF THE ASCENT



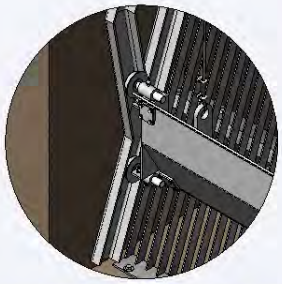
FASE -5-
DESCENSO SOBRE GUIA DE DESVIO
-5- PHASE
DESCENT OVER THE DESVIATION GUIDE



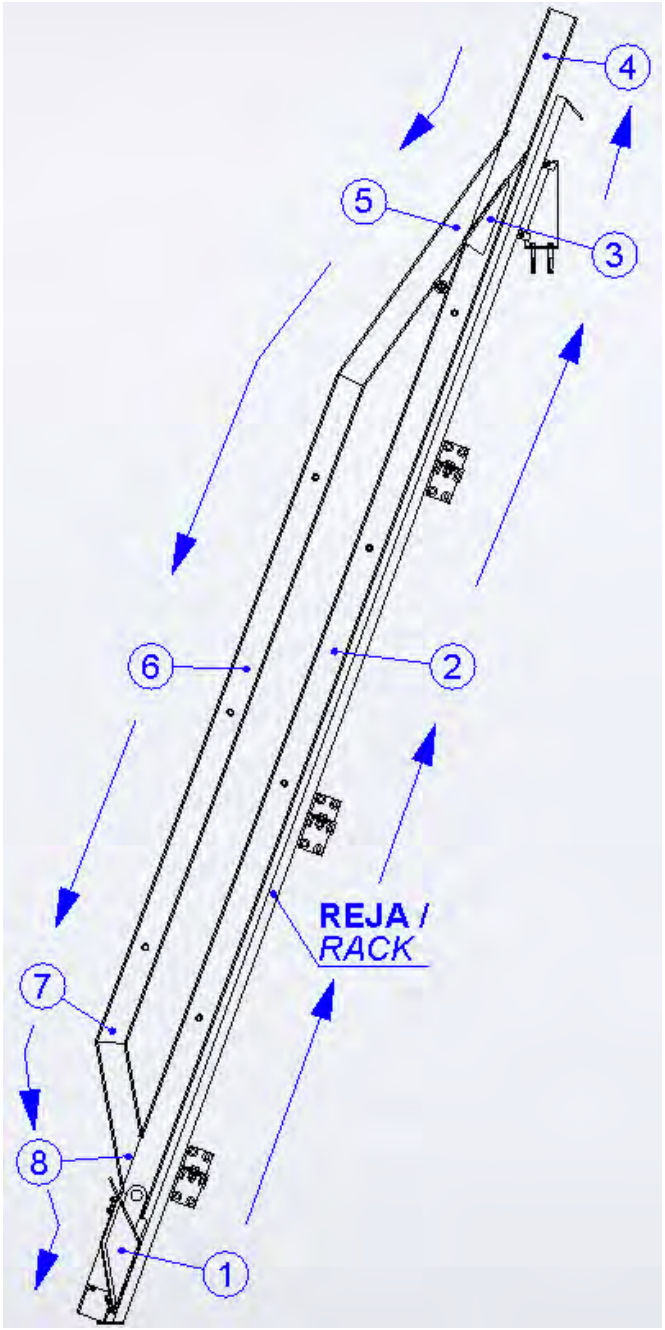
FASE -6-
DESCENSO SIN PEINAR LA REJA
-6- PHASE
DESCENT WITHOUT COMBING THE RACK



FASE -7-
DESCENSO ACCEDIENDO AL CARRIL DE PEINADO
-7- PHASE
DESCENT ACCESING TO COMBING RACK



FASE -8-
DESCENSO A LA POSICION DE REPOSO
-8- PHASE
DESCENT TO SETTLING POSITION



CONSTRUCCIONES METALICAS DE OBTURACION, S.L.

VÁLVULAS Y COMPUERTAS

Tel.: 902 40 80 50 Fax.: 902 40 80 51

MADRID - BARCELONA - TOLOSA (SPAIN)

E-mail: cmo@cmo.es Web: www.cmo.es

ANEXO V –PANTALLA HMI SIEMENS–

SIEMENS



Quality, Reliability, Performance

SIMATIC IPC: The More Industrial PC

siemens.com/ipc

Brochure

Edition
April 2014

Answers for industry.

PC innovations for industry.

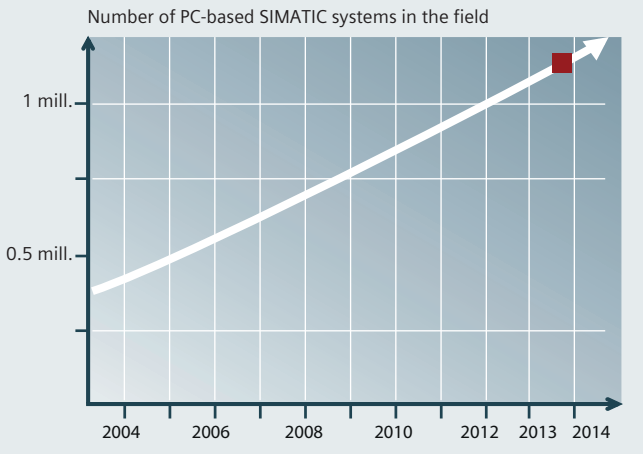
For almost three decades now, Siemens has offered industrial PCs that are both innovative and designed to remain available over the long term to enable you to implement tasks of increasing complexity with less risk and less effort.

The offering encompasses compact, maintenance-free embedded IPCs, high-end IPCs, and industrial PCs that can be flexibly adapted to any requirements. They all have particularly high reliability and durability in common. We develop and manufacture the mainboards ourselves to meet increased industrial requirements.

System availability can be individually further expanded via a range of hardware and software options, making SIMATIC IPCs the more industrial PC.

The success story made in Germany

Back in 1983, Siemens combined standard PC technology with industrial characteristics. Since then, SIMATIC IPCs have continuously set new milestones. Over the past 9 years, Siemens has more than doubled the number of PC-based systems in the field to over a million devices and is the world market leader in industrial PCs with a market share of 19 % in the industrial sector (IHS Research 2014).



New productivity standards thanks to Totally Integrated Automation

Efficient interaction between all automation components means requirements for optimized processes and enables a reduction in the total cost of ownership, shortening of the time to market, and improvement in quality. This perfect balance between quality, time and costs is the decisive success factor for industry, today more than ever.
Totally Integrated Automation, industrial automation from Siemens, is the name given to efficient interaction between all automation components, and is open to third-party systems through the consistent use of international standards.

As an integral component part of Totally Integrated Automation, SIMATIC IPCs can be configured and programmed easily and efficiently via the TIA Portal integrated engineering framework. For control, visualization, or drive solutions, you always benefit from integrated and safe engineering with a high level of data transparency.



An overview of the most important documents and links relating to PC-based automation:

siemens.com/pc-based-overview

Greatest engineering efficiency with the TIA Portal, the common engineering framework for all automation tasks:

siemens.com/tia-portal

Embedded IPCs –
rugged, compact, maintenance-free



High-end IPCs –
excel in performance and expandability



Industrial PCs –
high performance, attractive price



Device variants for special requirements



Distributed operator control and monitoring



SIMATIC IPC – The more industrial PC	
As varied as requirements in industry. Our offer.	4
Quality and farsightedness. Our claim.	6
SIMATIC Embedded IPCs	
Extremely rugged, compact and maintenance-free	8
Highlights of the SIMATIC Embedded Industrial PCs	10
Visualization and control software installed and ready to use	12
Device variants for special requirements	13
SIMATIC High-end IPCs	
Rugged and powerful with high functionality	14
Highlights of the SIMATIC High-end Industrial PCs	16
SIMATIC Industrial PCs	
High performance, attractive price	18
Distributed operator control and monitoring	20
Intuitive and fast operation with multitouch displays	21
PC-based Control and HMI software	22
Individually expandable system availability	24
More application options	25
References for PC-based automation	26

As varied as the requirements in industry.

More product diversity, more selection options

SIMATIC IPCs are available in various designs and with different functionalities. You can order more than 90 million configurations directly from the catalog, in order quantities as small as one unit. We can also supply you with individual products and systems based on the SIMATIC standard, precisely tailored to your special requirements.

The quick and simple way to a suitable system – with the TIA Selection Tool

The TIA Selection Tool supports you with selecting processors, memory configurations, drives, add-on cards, and preinstalled, already activated operating systems. A wizard also enables you to select according to technical requirements or according to the type of application. To order, you can export your configuration directly to the cart of the Industry Mall or the CA 01 catalog.

Benefits of an identical mainboard base

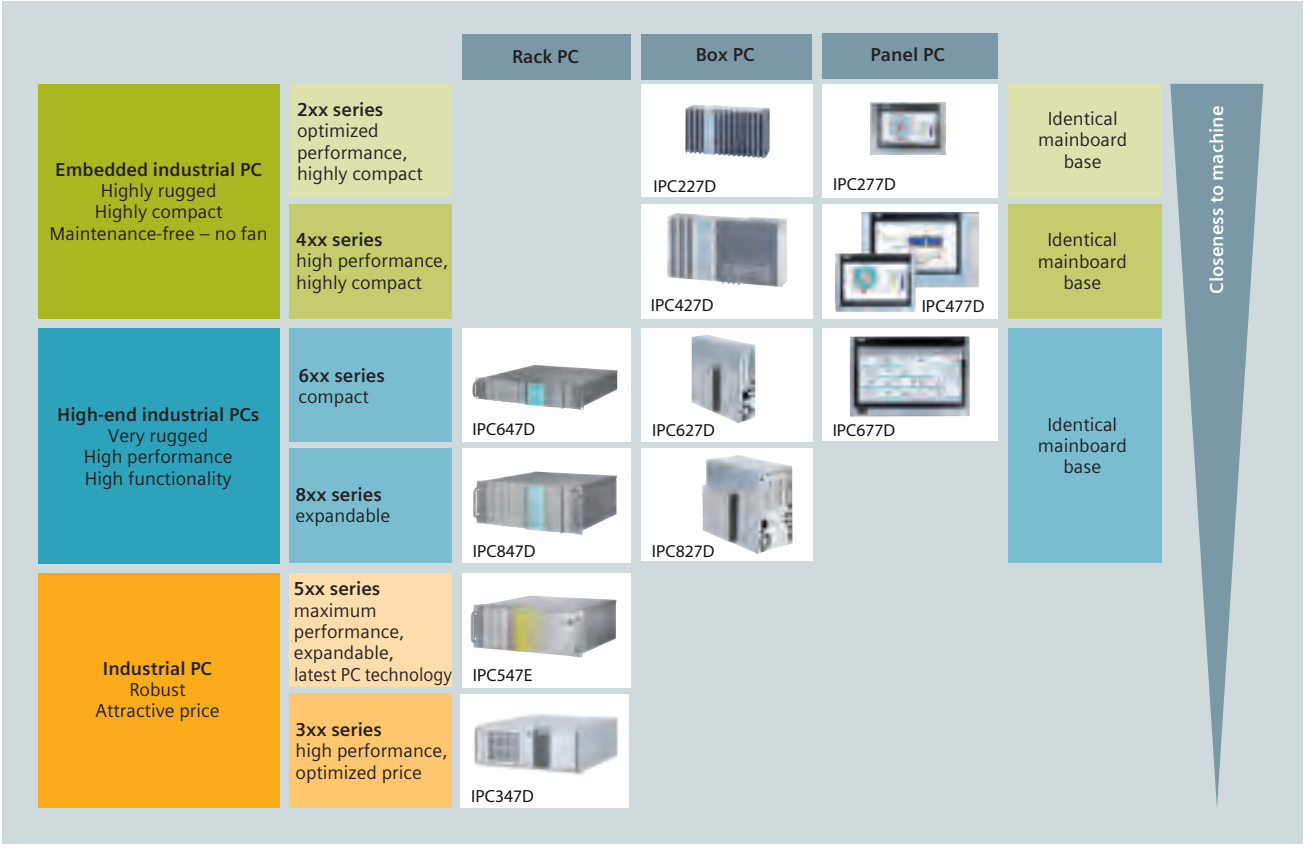
- Same system software and drivers due to identical processors and chipsets
- Reduced evaluation effort when using different SIMATIC IPCs
- Reduced spare parts inventory (e.g. memory, hard disks)

Long-term availability and defined further development

- In-house development and production in Germany
- Long-term availability of 4 to 6 years
- 5 years repair and spare parts service

This results in a total service and support period of 9 to 11 years.

siemens.com/tia-selection-tool



More networking options with PROFINET onboard



SIMATIC IPCs optionally offer PROFINET onboard. This simplifies integration into PROFINET networks – for integrated real-time-capable communication from the corporate management level down to the field level. Real-time, IT communication, and TCP/IP are thus possible on a single line. Compared with conventional solutions, PROFINET reduces costs for the installation and integration of system components by 30 to 35%.

More service and support

For SIMATIC IPCs, we provide a well-developed service and support offer that you can rely on anytime.

- Online support: comprehensive help at the click of a mouse – with FAQs, tools, downloads, newsletter, etc.
- SIMATIC hotline: experts answer you questions 24 hours a day, even in difficult cases
- PC-based competence center: competent support with planning a PC-based automation project – and support with engineering
- Local service, worldwide: 35 repair centers in 30 countries and branch offices in 190 countries provide comprehensive support – from PC repair in our repair centers to servicing your plant.

Advantages at a glance

- The PROFINET onboard interface saves one slot, which can be used for other PC cards
- The intelligent controller architecture with integrated 3-port switch (ERTEC 400) increases the PC system performance by reducing the load on the CPU
- Full support of the WinAC RTX software PLC and the fail-safe WinAC RTX F variant
- Optimized integration of SIMATIC IPCs in PROFINET configuration (STEP 7 and NCM-PC)
- Efficient self-diagnostics via status LEDs for easier commissioning and diagnostics

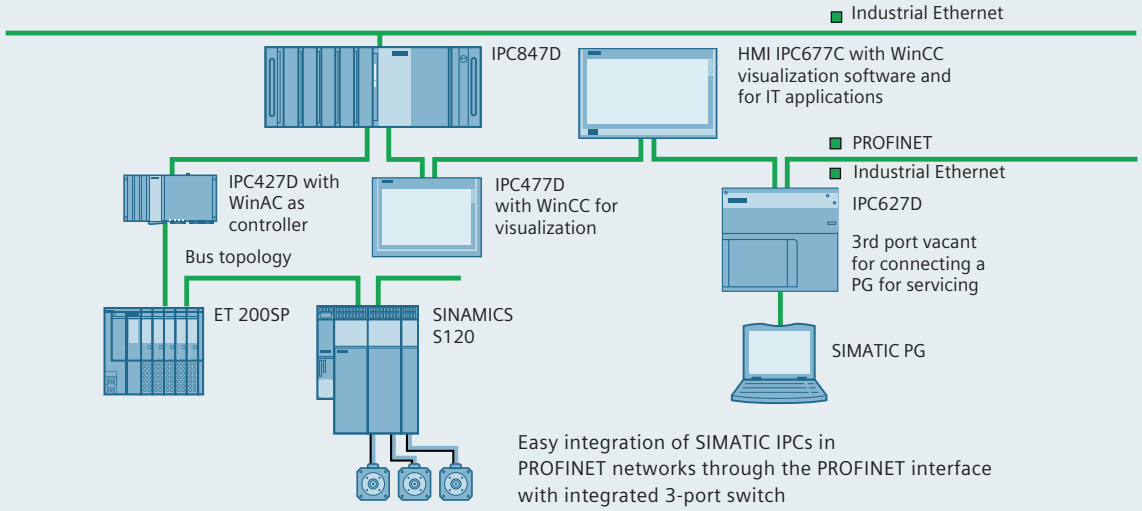
Comprehensive support – from the support service to the forum:

siemens.com/automation/support

After Sales Information System (ASIS) – news about our products:

siemens.com/asis

Integration into higher-level networks via Gigabit Ethernet interface



Easy integration of SIMATIC IPCs in PROFINET networks through the PROFINET interface with integrated 3-port switch

Quality and continuity

More quality

SIMATIC IPCs provide top quality for reliable continuous operation in an industrial environment. One reason for this is our well-developed, gapless concept for quality assurance – from in-house development and production, to the test center, to logistics, use in the field, and environmental protection. Starting with development, we do not leave anything to chance and conduct two test runs with 40 prototypes each, for example. Production in climate-controlled halls with constant temperature/air humidity and special test procedures, series-accompanying type tests and trials ensure 100% correct functioning and compliance with all technical specifications. The highest packaging and transportation quality ensures that the product reaches you in its manufactured quality. And as for quality in the field, regular inspections show that the CE and UL certifications are not only complied with but exceeded by far. Finally, Siemens standard SN 36350-1 on environmentally sound product design reduces the environmental impact, from production to disposal.

Experience:

siemens.com/simatic-ipc-video-quality

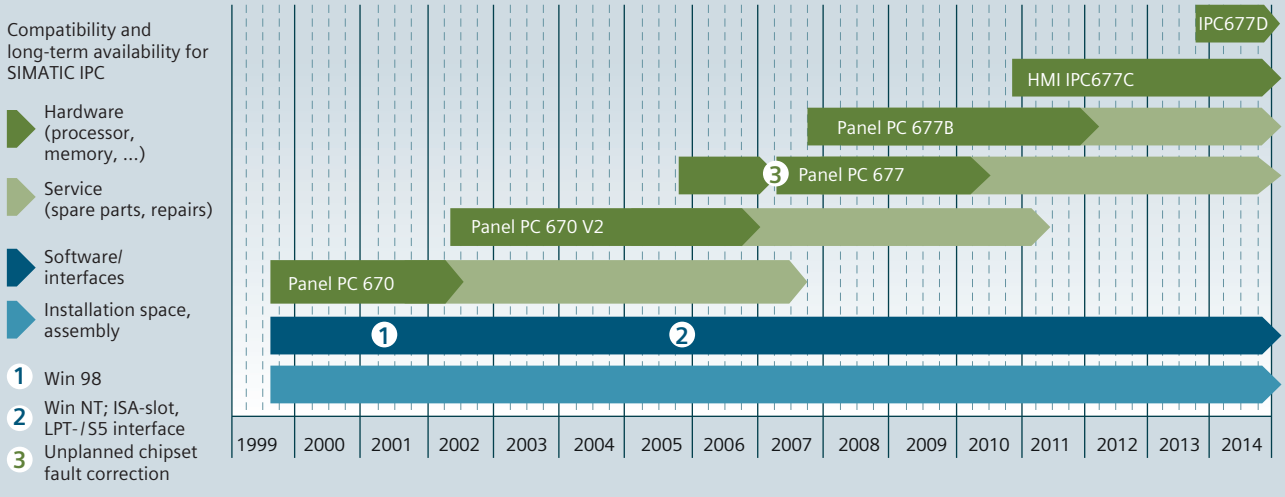
More continuity

SIMATIC IPCs stand for a very high level of compatibility and long-term availability – with at least 6 months overlap as innovations and new generations are adopted. For example, we usually guarantee availability of four to six years and a repair and spare parts service for five years. On request, you can also be provided with systems permanently tailored to a specific application, so-called design freeze systems – complete and ready for operation. Where practical, the mechanical dimensions of SIMATIC IPCs are compatible with the design of their predecessors. This enables quick and simple integration. A high level of image compatibility within each device generation also minimizes adaptation effort.

Advantages at a glance

- Top quality and reliable compliance with all specifications
- Full performance even in continuous operation and in especially harsh and demanding ambient conditions
- High continuity and long-term availability
- Easy on resources and environmentally friendly

More continuity and long-term availability



Designed for industry

Meeting the high demands of industrial compatibility starts with product design of the SIMATIC IPCs. Their special features include:

- Mainboards developed in-house
- Rugged enclosure designs with high electromagnetic compatibility (EMC) and degrees of protection up to IP65/NEMA 4
- Integrated industrial power supplies (to NAMUR) and redundant power supplies that can be swapped during normal operation
- High MTBF even in the extended temperature range
- High vibration/shock resistance thanks to special hard disk holders
- Lockable plug connectors and card retainers
- Internal USB interface, e.g. for a software dongle
- Microsoft operating systems already installed and activated for fast installation
- Service-friendly, modular device design
- Restore CD/DVD for recovery to the as-delivered condition

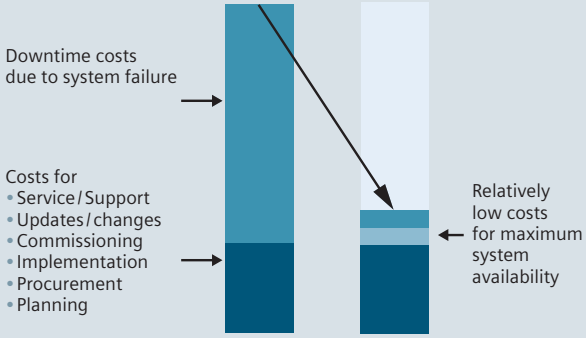
Further information on the system highlights of our SIMATIC IPCs:

siemens.com/the-more-industrial-pc

Higher system availability

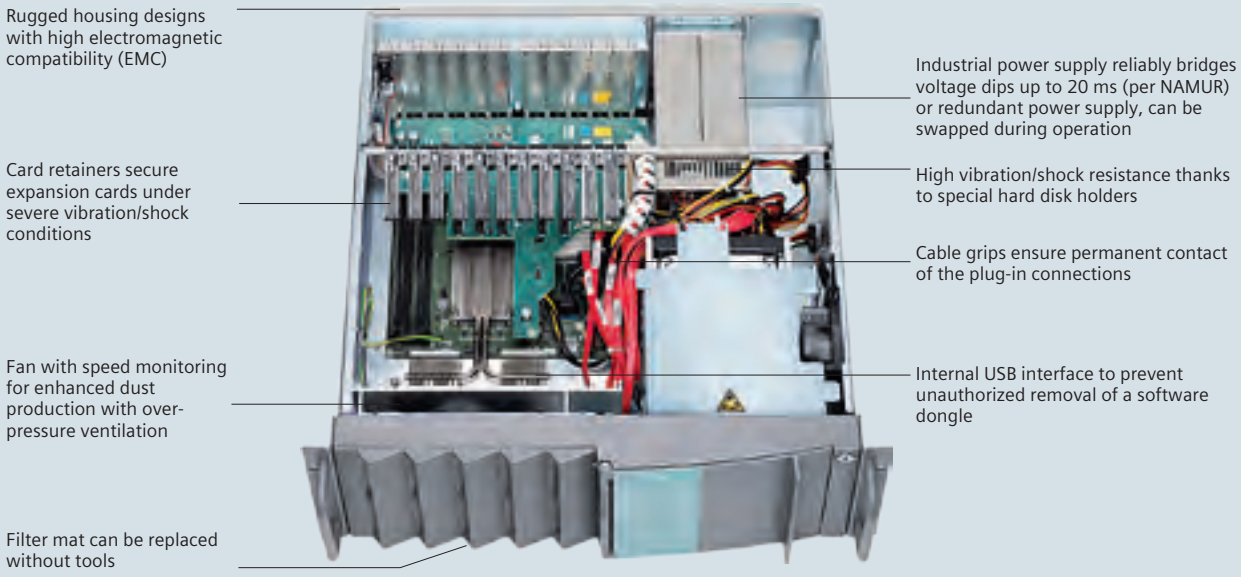
Thanks to their product features and additional components for enhancing system availability, SIMATIC IPCs ensure high plant availability in the long term, with reduced subsequent costs. This creates the conditions for maximum productivity and economic efficiency.

Reduction of total costs with SIMATIC IPCs system availability components



Total cost of ownership (TCO) analysis for plants with higher availability requirements

Measures for greater ruggedness and industrial compatibility, based on a SIMATIC Rack PC



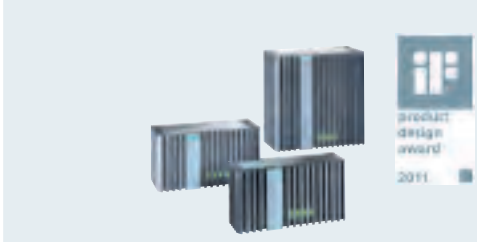
SIMATIC Embedded IPCs

Rugged, compact, and maintenance-free

For universal installation in machines, control enclosures, and control cabinets, the fan-free embedded devices from SIMATIC are available in Box PC and Panel PC formats.

The Embedded Industrial PCs SIMATIC IPC2x7D/IPC4x7D enable particularly flexible and compact handling of the most diverse tasks:

- Measuring, open-loop and closed-loop control of process and machine data
- Industrial image processing with data acquisition and processing
- Distributed visualization in conjunction with SIMATIC Industrial Flat Panels
- Used as a data concentrator or gateway





General features	IPC227D – Nanobox PC – compact, flexible mounting and dust protection	IPC277D – Nanopanel PC – compact with displays from 7"
Operating systems (preinstalled and activated)	Windows Embedded Standard 7 / Windows Embedded Standard 2009 / Windows 7 Ultimate / XP Professional	
Processor	Intel Atom E660 – 1.3 GHz; Atom E640 – 1.0 GHz; Atom E620 – 600 MHz [1]	
SATA HDD, SATA SSD, CF Drive	HDD 250 GB [1]; SSD 50 GB (high endurance); SSD 80 GB (standard); 1 x CFC up to 16 GB (can be replaced from outside)	
Networking options (onboard)	2 x Gigabit-Ethernet, 1 x PROFINET (real-time over standard Ethernet)	
Expandability with cards	1 x PCIe (optional)	–
Integrated non-volatile memory	MRAM 512 KB (optional), 128 KB of which usable for WinAC	
Long-term availability		
Availability [2]	4 to 6 years	
Repair and spare parts service	Additional 5 years	
Industrial compatibility		
Shock/vibration	15 g/1 g	
Ambient temperature during operation	0 ... 50 °C	
Options for increased system availability		
DiagMonitor diagnostics software		
Remote access (Intel AMT for Core i5/i7)	–	
Image & Partition Creator backup software		

[1] Only IPC227D [2] As of the start of delivery

The benefits of embedded devices

- Extremely high system availability and data security
- High degree of flexibility for interfaces and expansions
- Universal installation orientations and mounting options
- Fast commissioning thanks to preinstalled and activated operating system
- Ready-to-use bundles with visualization and control software

Configure your ideal system quickly and simply with the TIA Selection Tool:

siemens.com/tia-selection-tool







IPC427D – Microbox PC – flexibly configurable	IPC477D – Panel PC – flexibly configurable, displays from 12"	IPC477C PRO – Panel PC – IP65 allround with 15" and 19" displays
Windows Embedded Standard 7 / Windows 7 Ultimate MUI		Microsoft Windows Embedded Standard 7 Windows Embedded Standard 2009 Windows 7 Ultimate (32 bit)
Intel Core i7-3517UE – 1.7 GHz (2.8 GHz); Core i3-3217UE – 1.6 GHz; Celeron U827E – 1.4 GHz		Intel Core2 Duo SU9300 (2 x 1.2 GHz; 800 MHz FSB; 3 MB SLC); Intel Core2 Solo ULV SU3300 (1 x 1.2 GHz; 800 MHz FSB; 3 MB SLC); Intel Celeron M ULV 723 (1.2 GHz; 800 MHz FSB; 1 MB SLC)
HDD 250 GB; SSD 50 GB (high endurance); SSD 80/160 GB (Standard); to 16 GB (can be changed from outside), second CFast up to 16 GB internal		2 x slot for CFC to 16 GB; SSD 50 GB 1 x CFast (SATA; high endurance) or SSD 80 GB (SATA; Standard)
2 x Gigabit Ethernet, 1 x MPI/PROFIBUS (optional), 1 x PROFINET (3 ports, opt.)		
Up to 2 x PCIe (optional)	1 x PCIe (optional)	–
512 KB NVRAM, 128 KB of which usable for WinAC		Static RAM 2 MB
4 to 6 years		
Additional 5 years		
15 g/1 g	5 g/1 g	
0 ... 55 °C	0 ... 50 °C	0 ... 45 °C
■		
■ / and via SIMATIC IPC Remote Manager		–
■		

Highlights of the SIMATIC Embedded IPCs

Extremely high system availability and data security

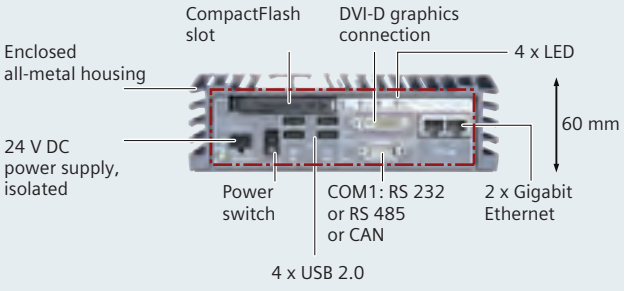
SIMATIC Embedded IPCs are extremely rugged and reliable devices, partly thanks to:

- Rugged mass storage device:
  - Solid-state drive (SSD) with 50 GB (high endurance)
  - Solid-state drive (SSD) with 80 / 160 GB (standard)
  - CompactFlash drive up to 16 GB (IPC2x7D)
  - CFast drive up to 16 GB (IPC4x7D)
- 512 KB non-volatile memory (opt.), e.g. for backing up process data during a power failure
- Front LED display for efficient self-diagnostics
- Pre-installed local diagnostics software for monitoring mass storage device, battery, temperature, and program execution

High degree of flexibility for interfaces and expansions

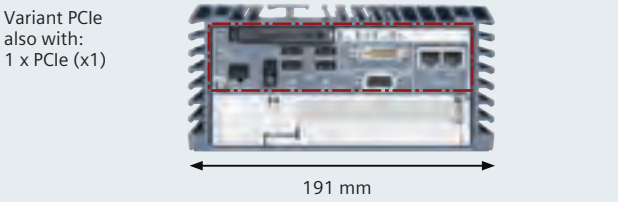
SIMATIC IPC227D / IPC277D: Connectors and expansions

IPC227D basic unit







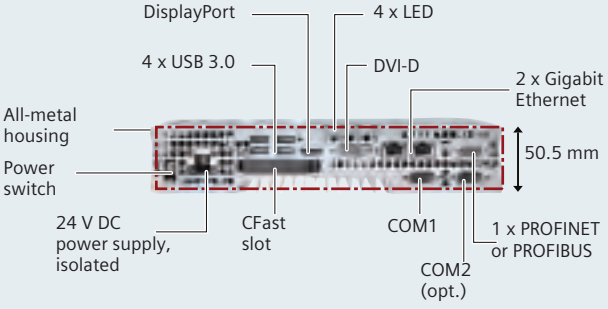


IPC277D basic unit 7"

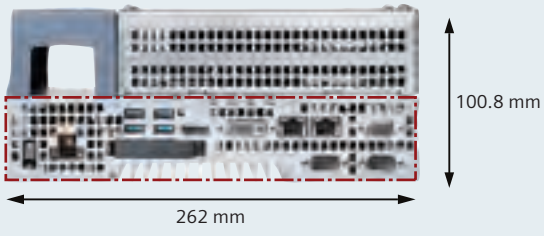


SIMATIC IPC427D / IPC477D: Connectors and expansions

IPC427D basic unit







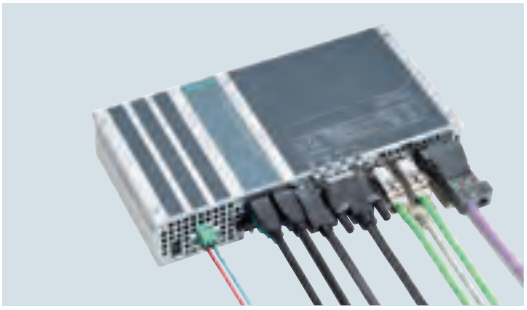
IPC477D basic unit 12"
from 12"–22", from 15" with 1 x front USB 2.0



Universal installation orientations and mounting options

The compact SIMATIC IPC227D and IPC427D Box PCs are optimized for flexible use in confined spaces in the control cabinet and directly at the machine.
They offer versatile mounting options and orientations while retaining assured properties, such as ambient temperatures up to 55 °C (IPC427D).

- More than 20% space saving. For easy installation and fast cabling, all the interfaces are conveniently accessible from one side.
- Simple, tool-free mounting on standard rail, e.g. in conjunction with a SITOP power supply.





Mounting options on the SIMATIC IPC227D



Tool-free mounting on standard rail



Flexible wall mounting with interfaces above or below



Space-saving portrait mounting with a small footprint



Side mounting with minimum space requirements

Visualization and control software installed and ready to use

Fast commissioning with Embedded Bundles

You can purchase embedded industrial PCs as ready-to-use SIMATIC Embedded Bundles complete with a Windows Embedded operating system and preinstalled and preconfigured SIMATIC software.



Advantages at a glance

- Extremely high system availability and data security
- High degree of security thanks to perfectly matched and tested hardware and software combinations
- Extremely time-saving thanks to ready-to-use system with fast, problem-free commissioning
- As-delivered condition can be restored at any time with the Restore CD/DVD
- High level of data security since retentive machine data can be saved and secured against loss resulting from power failure
- The IPC onboard interfaces can be used by the SIMATIC WinAC software controller for connecting distributed I/O over PROFIBUS/PROFINET
- Problem-free modular expansion of the S7-mEC Embedded Controller with SIMATIC I/O modules, such as a PROFIBUS card
- Efficient, cost-effective overall package as an alternative to ordering individual components

SIMATIC Embedded Bundles for fast commissioning:

siemens.com/simatic-embedded-bundles

SIMATIC Embedded Bundles operating system	IPC2x7D WES 2009 / WES 7	IPC4x7D WES 7	IPC477C PRO WES 2009	IPC477C PRO WES 7
Operator control and monitoring				
WinCC RT Professional (TIA Portal)		●		●
WinCC RT Advanced (TIA Portal)	● ●	● ●		● ●
Open-loop and closed-loop control				
WinAC RTX	●	●	●	●
WinAC RTX F	●	●	●	●

● Combination that can be ordered preinstalled and preconfigured

WES 2009 = Windows Embedded Standard 2009
WES 7 = Windows Embedded Standard 7

Device variants for special requirements

All-round protection with degree of protection IP65, flexible use

The Embedded Panel PC SIMATIC HMI IPC477C is also available with all-round protection with degree of protection IP65 – with 15-inch and 19-inch displays. The SIMATIC HMI PRO devices (PRO = Protected) with degree of protection IP65 all-round are perfect for harsh ambient conditions. They can be mounted on support bracket and stand systems from different manufacturers using an adapter. This means they can be used directly at the machine outside the control cabinet, for ergonomic operation at different points in the plant or production line. The removable rear wall cover with degree of protection IP20 makes for high servicing convenience. The PRO devices are available with different functionalities as a Flat Panel Monitor, Thin Client, and Panel PC.



The SIMATIC HMI IPC477C PRO 15" and 19" can be supplemented with expansion units such as the KP8 Key Panel.

Advantages at a glance

- Operator panels with all-round IP65 protection for mounting on support brackets or stands
- Removable rear wall cover for optimum servicing convenience, with degree of protection IP20
- Maximum compactness and low weight for easy mounting
- Easy adjustability to changing requirements thanks to modular expandability

Intrinsically safe for the hazardous area



The intrinsically-safe SIMATIC HMI Panel PC Ex and SIMATIC HMI Thin Client Ex devices can be used directly in hazardous areas of Zones 1/21 and 2/22, without special measures such as inconvenient and costly enclosures or additional certification procedures. They are highly resistant to vibration and shock and are certified for marine use.

SIMATIC HMI PRO devices with degree of protection IP65 all-round:

siemens.com/ip65-hmi-devices

Intrinsically safe SIMATIC HMI devices for hazardous areas:

siemens.com/simatic-hmi-ex

Customized solutions:

siemens.com/customized-automation

Individual SIMATIC IPCs

Wherever SIMATIC standard products (IPC, HMI, S7) do not fully meet your requirements, we offer you Customized Automation for the perfect solution in our familiar high quality.

An offer that covers all the bases:

- Changes in design (e.g. company logo, color)
- OEM products (e.g. with special expansion cards)
- Software products (e.g. with special drivers and customer images)
- Turnkey products (e.g. with ready-to-use HMI operator stations)
- Industry solutions (e.g. for oil & gas, chemicals, food & beverages)
- Individual service, support, and logistics solutions (e.g. tests, certification, approvals, just-in-time delivery)

Individual design in less than 20 days:



With Digital Express Design, the operator panel fronts can be designed in less than 20 days even for small ordered quantities. Photo-realistic images with a resolution up to 600 dpi are also possible.

SIMATIC High-end IPCs

Rugged and powerful with high functionality

The rugged high-end industrial PCs from SIMATIC offer a high degree of functionality, and are particularly powerful for high-speed processing of large volumes of data.

The following device variants are available:

- 19" rack PCs for the control cabinet, or as desktop IPCs
- Integrated box and panel PC platform for direct installation in machines

The benefits of high-end devices

- High performance and extremely fast system response
- Platform with identical performance features
- High system availability and data security
- High energy efficiency
- High service-friendliness

Configure your ideal system quickly and simply with the TIA Selection Tool:

siemens.com/tia-selection-tool







General features	IPC647D – Rack PC high performance, functionality, and compactness	IPC847D – Rack PC high performance, functionality, and expandability	IPC627D – Box PC high performance, functionality and compactness
Operating systems (preinstalled and activated)	Windows 7 Ultimate (32/64 bit); Windows Server 2008 R2 (64 bit)		
Processor	Intel Xeon E3-1268L v3 – 2.3 GHz (3.3 GHz) Core i5-4570TE – 2.7 GHz (3.3 GHz) Core i3-4330TE – 2.4 GHz		
Drives	Internal/removable drive bay: 500 GB; 1 TB; 2 x 1 TB; SSD 240 GB; RAID1: 2 x 1 TB, 2 x 1 TB (optional plus SSD 240 GB)	Internal/removable drive bay: 500 GB; 1 TB; 2 x 1 TB; SSD 240 GB; RAID1: 2 x 1 TB (optional plus 1 TB as hot spare or SSD 240 GB); RAID5: 3 x 1 TB (optional plus 1 TB as hot spare)	
Networking options (onboard)	2 x Gigabit Ethernet, 1 x PROFINET 3 ports optional, 1 x PROFIBUS/MPI optional		
Expandability with cards	3 x PCI Express x 16 (4 lanes); 1 x PCI Express x 16 (8 lanes) or 2 x PCI; 2 x PCIe x 16 (8 lanes)	7 x PCI, 1 x PCI Express x 16, 3 x PCI Express x 4 or 3 x PCI, 5x PCI Express x 16, 3 x PCI Express x 4	2 x PCI or 1 x PCI and 1 x PCIe x16
Integrated non-volatile memory	–		Battery-
Long-term availability			
Availability [1]	4 to 6 years		
Repair/spare parts service	Additional 5 years		
Industrial compatibility			
Shock/vibration	5 g/0.5 g		
Ambient temperature	in operation: 5 ... 50 °C		
Options for increased system availability			
Diagnostics software	SIMATIC IPC DiagMonitor		
Remote access	Intel AMT 9.0 (for Core i5, Core i7, and Xeon) and via SIMATIC IPC Remote Manager		Intel AMT 9.0 (for
Backup software	SIMATIC IPC Image & Partition Creator		SIMATIC IPC Ima

[1] As of start of delivery

SIMATIC High-end IPCs are the first choice for tasks with the highest demands for performance and system availability:

- Measuring, and open/closed-loop control of industrial processes
- Visualization of production sequences – centrally with the IPC677D or distributed, e.g. with the Industrial Flat Panel Monitors
- Image processing, e.g. for quality inspections
- Data acquisition and management, e.g. for recipe management
- Intelligent energy management
- Industrial server applications with maximum system performance, availability and data security





	IPC827D – Box PC high performance, functionality, and expandability	IPC677D – Panel PC high performance and functionality with single-touch and multitouch displays as of 19"
	Windows 7 Ultimate (32/64 bit)	
	Intel Xeon E3-1269L v3 – 2.3 GHz (3.3 GHz) Core i3-4330TE – 2.4 GHz Celeron G1820TE – 2.2 GHz	
	without; 250 GB; 500 GB; SSD 240 GB; RAID1: 2 x 250 GB	
	2 x Gigabit Ethernet; 1 x PROFINET (3 ports) optional; 1 x PROFIBUS / MPI optional	
	3 x PCI, 1 x PCIe x 16 and 1 x PCIe x 4	2 x PCI or 1 x PCI and 1 x PCIe x16
backed SRAM 2 MB, 128 KB of which usable for WinAC		
	4 to 6 years	
	Additional 5 years	
	5 g/1 g	
	in operation: 5 ... 55 °C	
	SIMATIC IPC DiagMonitor	
Core i5, Core i7 and Xeon) and via SIMATIC IPC Remote Manager		
ge & Partition Creator		

Universal use and easy installation

SIMATIC Box PCs are optimized for flexible implementation in confined spaces in the switching cabinet and directly at the machine:

Stainless steel fronts

The SIMATIC HMI IPC677C Panel PC with 15" touch display is also available with a stainless front, designed for use in the food and beverages industry.

It is characterized by:

- Simple cleaning and disinfecting
- High resistance
- Splinter protection of the display
- High degree of protection



The Panel PC SIMATIC HMI IPC677C can also be customized as an ergonomic operator station to a high degree of protection (up to IP66K all-round) built into a stainless-steel control box.

SIMATIC IPC677C 15" Touch INOX	
Material and surface	Stainless steel 1.4301, polyester foil/polished, grain size 240
Seal	EPDM
Special features	Optimized rack profile, angled surfaces, tested hygiene with LGA symbol 5664018
Degree of protection	Front: IP66K, rear: IP20

Protection against explosion

The SIMATIC IPC627C Box PC and the SIMATIC HMI IPC677C 19" Panel PC have UL certification Class I / Division 2 for operation in potentially explosive atmospheres, for example, in the oil and gas or petrochemical industries.

SIMATIC IPC 677 15" Touch INOX:

siemens.com/inox-hmi-devices

Highlights of the SIMATIC High-end IPCs

Maximum performance and particularly fast system response

- 4th generation Intel processors
- Powerful onboard HD graphics integrated into the CPU
- Now also with Intel Xeon processors
- PCI Express x16 and USB 3.0
- High data transfer rates thanks to two Gigabit Ethernet ports

Platform with identical performance features

- High robustness against vibrations and shocks
- Full performance even at higher temperatures
- Great expandability via PCI Express slots
- High degree of compatibility regarding installation, interfaces and software
- Optional PROFIBUS or PROFINET interface with three ports for cost-effective connection of distributed field devices or to couplings with SIMATIC S7

Special features of the SIMATIC Rack PCs

High-quality industrial design

- Vibration- and shock-absorbing hard disk holder
- Reliable dust protection and low noise due to fan-controlled overpressure ventilation
- Painted enclosure for increased corrosion protection



High service-friendliness

- Front fan can be replaced without tools
- Only one screw needs to be removed to quickly open the enclosure
- Hard disks and power supply unit can be replaced during operation



High level of security

- Lockable front door protects drives, on/off button, and reset button on the front from misuse
- USB flash drive can be operated while the front door is locked
- Additional internal USB interface for protection against unauthorized removal of a USB flash drive (e.g. for a software dongle).



Efficient self-diagnostics

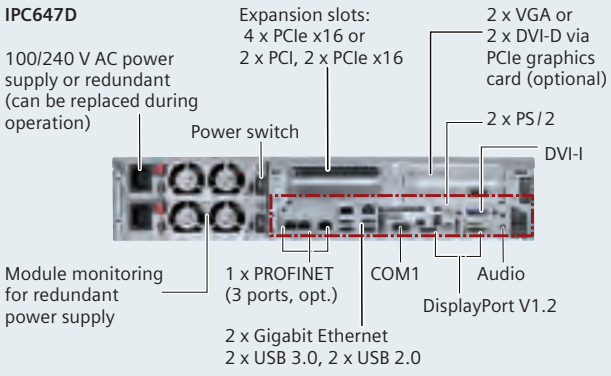
Front LED display, e.g. for simple identification of a faulty hard disk in the RAID group by HDD1, HDD2, or HDD3 ALARM (IPC847D)

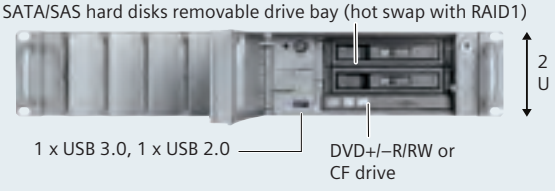
Multi-monitoring

Up to 5 monitors – via optional PCI Express x16 graphics card and onboard graphics

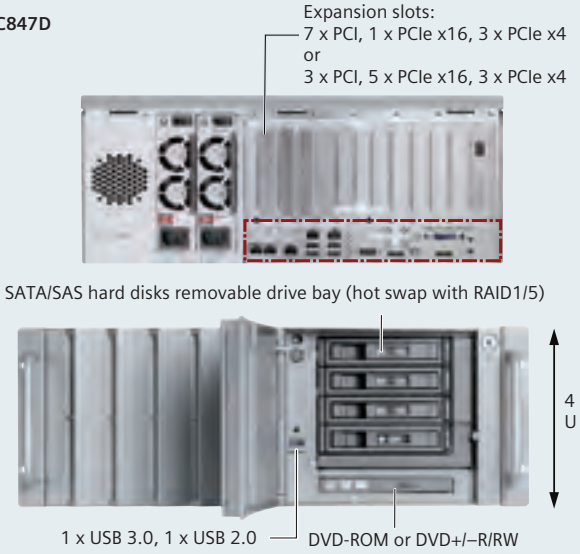
SIMATIC IPC647D/IPC847D: Connectors and expansions

IPC647D





IPC847D



Maximum system availability and data security

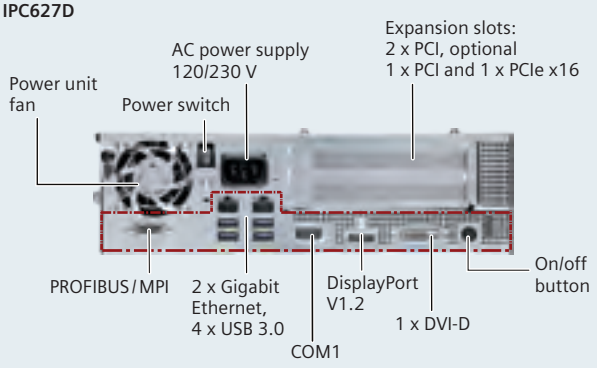
- High-quality industrial design with vibration/shock-absorbing hard-disk holders
- RAID controller onboard or hardware RAID[1] and additional hot spare hard disk
- SAS controller[1] with 1 TB SAS HDD
- Robust mass storage device, solid-state drive with 240 GB
- ECC RAM main memory with error correction
- Non-volatile data memory for storing the process data after a power failure
- Redundant power supply (hot swap) [1]
- Redundancy thanks to two teaming-capable Gigabit Ethernet connections
- Secure remote access via Intel AMT [2] and SIMATIC IPC Remote Manager

High energy efficiency

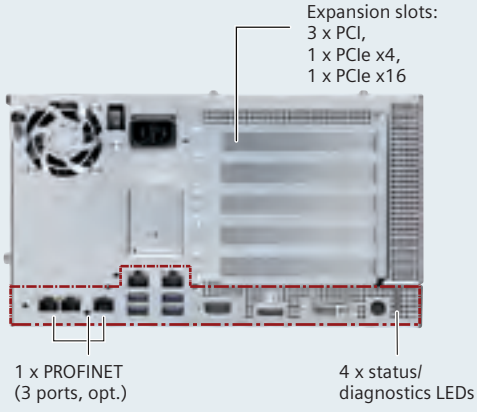
- Low power consumption thanks to mobile processors
- Wake-on-LAN functionality for timed start-up from a central point, over the network (e.g. after a shutdown weekend)

IPC627D / IPC827D / IPC677D: Connectors and expansions

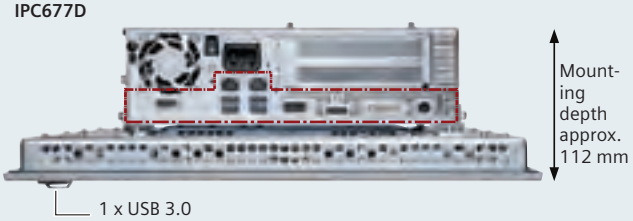
IPC627D



IPC827D



IPC677D



Special features of IPC627D / IPC827D / IPC677D



Fast replacement of the CMOS battery even when installed due to externally accessible battery compartment.



Fast diagnostics of the operating condition and display of the BIOS start procedure by four status and signaling LEDs:
1x LED: BIOS
2x LEDs: user/WinAC RTX 1 x LED: WinAC RTX.



The SIMATIC IPC677D is available as a single-touch or multitouch device.

[1] On Rack PC
[2] With Intel Core i7 / i5

SIMATIC Software Packages:
Secure price advantages for yourself with our package offers for all available SIMATIC IPCs

siemens.com/simatic-ipc-packages

High performance, attractive price

With the new SIMATIC IPC347D, we offer you the ideal entry into the world of SIMATIC IPCs. The new 19-inch rack PC in a rugged all-metal housing is especially suitable for applications in production, requiring greater ruggedness than office PCs. These include visualization tasks, data collection, management, and storage, and measurement and testing tasks, for example, in building or process automation, logistics, and mail-order business, and medical engineering.
Four fixed configurations are available that differ by their processor type, RAM, optical drives, and operating system.

SIMATIC IPC347D: Advantages at a glance

- Industrial functionality at an optimized price
- Ideal for visualization and SCADA applications
- Clearly enhanced system availability over office PCs

Highlights at a glance: IPC347D

- Powerful processors of the 3rd generation up to Intel Core i5
- No additional dust protection required thanks to filter mat and overpressure ventilation (replacement without tools)
- RAM up to 16 GB expandable
- Lockable front covers
- Front USB interface (lockable with front cover)
- Space-saving mounting in cabinets with depths starting at 500 mm
- Prepared for mounting on telescopic rails





General features	IPC347D – ideal entry-level device in a rugged metal housing	IPC547E – short rack PC – high performance at an attractive price with small mounting depth
Operating systems (preinstalled and activated)	Windows 7 Ultimate (64 bit)	Windows 7 Ultimate (32/64 bit)
Processor	Intel Pentium G2010, Intel Core i5-3340S	Intel Pentium Dual Core G3420 – 3.2 GHz Celeron G1820 – 2.7 GHz
Drive	500 GB HDD	500 GB, 1 TB, 2 x 1 TB
Networking options (onboard)	2 x Gigabit Ethernet	1 x Gigabit Ethernet
Expandability with cards	1 x PCIe x 16, 1 x PCIe x 8, 1 x PCIe x 1, 4 x PCI	4 x PCI, 2 x PCIe x 16, 1 x PCIe x 8
Integrated non-volatile memory	–	–
Long-term availability		
Availability [1]	At least 1 year	At least 1.5 years
Repair and spare parts service	Approx. 1 further year	Additional 3 years
Industrial compatibility		
Shock/vibration	Not specified	1 g/0.2 g
Ambient temperature during operation	5 ... 40 °C	5 ... 40 °C
Options for increased system availability		
Diagnostics software	–	SIMATIC IPC DiagMonitor
Remote access	–	–
Backup software	–	SIMATIC IPC Image & Partition Creator

[1] As of start of delivery

For the high-performance range, too, we offer an industrial PC at an attractive price – the SIMATIC IPC547E: The powerful and flexibly expandable rack PC in 19" format (4U) is especially suitable as an industrial workstation and server for fast parallel processing of large volumes of data in industrial image processing, process visualization, data acquisition and processing. In addition to the high performance, the IPC547E impresses with its high system and data availability. For example, failures can be avoided and continuous operation ensured. For a better overview in the control room, up to five monitors or displays can be connected.

SIMATIC IPC547E: Advantages at a glance

- Maximum performance and fast system response
- Extremely high system availability and data security
- High data transfer rates and redundancy
- Targeted start-up from a central position via network with wake-on-LAN functionality

Highlights at a glance: IPC547E

- Intel Core processors of the 4th generation (up to i7 with 4C/8T)
- Powerful onboard Intel HD graphics 4600
- DDR3 memory technology up to 32 GB
- RAID controller onboard for up to 3 hard disks in RAID5 network in removable drive bay plus optional hot-spare hard disk
- Solid-state drive (SSD) with 240 GB (SATA 2.5")
- Redundant power supply (hot swap)
- Front LED displays for efficient self-diagnostics
- Multi-monitoring with up to 5 monitors via onboard graphics
- 11 x USB ports
- Wake-on-LAN functionality for timed start-up from a central point, over the network



IPC547E – Rack PC – maximum performance at an attractive price
Windows 7 Ultimate (32/64 bit); Windows Server 2008 R2 (64 bit)
Intel Core i7-4770S – 3.1 GHz (3.9 GHz) Core i5-4570S – 2.9 GHz (3.6 GHz) Pentium Dual Core G3420 – 3.2 GHz
Internal/removable drive bay: 500 GB; 1 TB; 2 x 1 TB; SSD 240 GB; RAID1 2 x 1 TB (optional plus 1 TB as hot spare or SSD 240 GB); RAID5 3 x 1 TB (optional plus 1 TB as hot spare)
2 x Gigabit Ethernet
4 x PCI, 2 x PCIe x 16, 1 x PCIe x 8
–
At least 1.5 years
Additional 3 years
1 g/0.2 g
5 ... 40 °C
SIMATIC IPC DiagMonitor
Intel AMT 9.0 (for Core i5, Core iU)/ via SIMATIC IPC Remote Manager
SIMATIC IPC Image & Partition Creator

Special features IPC547E



Maximum data availability with hot spare HDD and RAID1 or RAID5 support



Optimum system availability thanks to redundant power supply



Space-saving installation in the cabinet is enabled by two housing variants (depths 356 mm and 446 mm)

Distributed operator control and monitoring

with industrial flat panel monitors and thin clients

For solutions with detached operator unit, SIMATIC offers two different concepts: Industrial flat panel monitors for small-scale separated solutions over a distance of up to 30 meters and Industrial thin clients, for one or more operator stations, any distance apart over Industrial Ethernet.

SIMATIC IFP Industrial Flat Panel Monitors – for fast response times

SIMATIC IFPs are available in the following variants: with widescreen fronts in 15", 19", and 22" as pure display devices, with touch operation, in a 15" touch/key variant with front USB and multitouch variant. The devices can be separated from the industrial PC up to a distance of 30 m via a DisplayPort or DVI interface, and they offer quick response times, for example, for jog mode or curve display. Devices with 4:3 displays are still available – also with degree of protection IP65 all-round.



Industrial Thin Clients SIMATIC ITC – for cost-optimized and versatile client-server architectures

SIMATIC ITCs are powerful operator terminals with high-resolution widescreen touch displays in the sizes 12", 15", 19", and 22". They are especially user-friendly in implementing distributed HMI solutions with client-server architecture, and they can be used flexibly from machine-level operator control and monitoring, right up to connection to control systems (SCADA) and numerical controls (SINUMERIK, available soon).

The devices can be almost any distance from the server system over Industrial Ethernet. A Gigabit LAN interface, integrated web browser, and diverse supported protocols offer high flexibility and high-speed communication with other systems. Intrinsically-safe devices for hazardous areas are available, as well as devices with degree of protection IP65 all-round.

Advantages at a glance

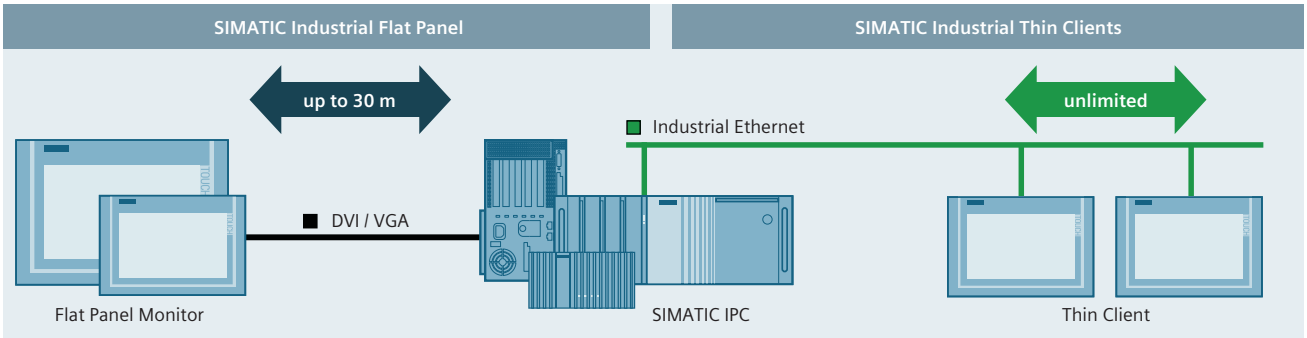
- Cast aluminum fronts for 24-hour continuous operation, also for high temperature, vibration, shock, and EMC requirements
- Energy-saving LED backlighting (100% dimmable), especially long service life
- High-resolution widescreen display for clear display and operator input, with good readability from all directions
- Integrated front design in widescreen format like Panel PCs and Comfort Panels, for uniform appearance of machines and plants
- Very long-term availability

Industrial Flat Panel Monitors SIMATIC IFP:

siemens.com/simatic-ifp

Industrial Thin Clients SIMATIC ITC:

siemens.com/simatic-itc



SIMATIC IFP Industrial Flat Panel Monitors and SIMATIC ITC Industrial Thin Clients offer maximum flexibility with distributed operator control and monitoring

Intuitive and fast operation with multitouch display

The trend toward operation with gestures and/or more than one finger at a time is all around us – and is now entering automation. The best example: the new Flat Panel Monitors and Panel PCs. They offer an attractive design, industrial standard widescreen displays and projected capacitive touch displays specially designed for industrial applications. This innovative touch technology enables fast and efficient operation of machines and plants with intuitive single-touch and multitouch gestures or two-hand operation. Approvals for hazardous areas and marine use will be available soon.



Advantages at a glance

- Completely anti-glare glass front, scratchproof, and resistant to chemicals, with metal surround for protection against damage
- Sharp and high-contrast displays, uniform brightness improves legibility
- Detection of 5 fingers simultaneously with high touch resolution for exact operation
- Intelligent operating error detection (e.g. ball of hand detection, drop detection, soiling, etc.)
- High shock and vibration resistance as well as high EMC ensure reliability and a long service life
- Degree of protection IP65 on the front
- Software support
  - Individual programming using the tablet functions of Windows 7/8
  - SIMATIC TIA Portal V13 with Windows 7
  - SIMATIC WinCC V7.2 with Windows 7
  - SIMATIC WinCC OA V3.12 with Windows 7

More information on our multitouch devices:

siemens.com/hmi-multitouch





PC-based Control and HMI software

Software for operator control and monitoring

A range of hardware and software options is available for PC-based automation. Their optimized interaction with SIMATIC IPCS is ensured by joint development and extensive system tests.

SIMATIC WinCC (TIA Portal) – innovative HMI software

SIMATIC WinCC in the Totally Integrated Automation Portal (TIA Portal) is part of a new, integrated engineering concept that offers a uniform engineering environment for programming and configuration of control, visualization, and drive solutions.

WinCC in the TIA Portal is the software for all HMI applications ranging from the simplest operation solutions with Basic Panels to SCADA applications on PC-based multi-user systems.

Maximum configuration efficiency

Compared with the predecessor product WinCC flexible, you benefit from still better engineering efficiency – especially if other Siemens components are part of the automation solution (e.g. SIMATIC S7 controller). Efficient interaction with STEP 7 in the TIA Portal avoids multiple entry and ensures consistent data management at all times. All the common functions are uniform – including in the way they appear on the screen. The list of advantages resulting from this is long. It ranges from intuitive operation, to integrated intelligence of editors, to the common database to ensure best transparency and absolute consistency.

SIMATIC WinCC V7 – scalable process visualization with plant intelligence

SIMATIC WinCC is a price- and performance-graded process visualization system for all sectors, including the pharmaceutical industry, where the applicable options meet the requirements of 21 CFR Part 11. WinCC offers SCADA functionality – from single-user to distributed multi-user systems with redundant servers and multi-site solutions with web clients. In particular, WinCC is characterized by absolute openness. Via open interfaces, system houses can develop individual applications and install system expansions on WinCC. With the integrated process database, WinCC forms the information hub for company-wide, vertical integration.

Advantages of WinCC to you at a glance

- Universally usable worldwide – in all industries
- Meets requirements according to 21 CFR Part 11
- Can be integrated in all automation and IT solutions
- Can be configured simply and efficiently
- Continuously scalable – also via the web
- Open standards for easy integration
- Integrated MS SQL server for data archiving as an information hub
- Increased production transparency through Plant Intelligence
- Expandable using options and add-ons

SIMATIC WinCC can be run with server functionality under Windows Server 2008. This is possible for the SIMATIC Rack PCs.

Software for HMI applications – SIMATIC WinCC:

siemens.com/simatic-wincc

STEP 7 in the TIA Portal:

siemens.com/tia-portal





Software for controlling

PC-based control with SIMATIC WinAC RTX

WinAC RTX enables control on the PC. The software controller is used when requirements for high performance, high data volumes, and strict real time coincide. The optimized runtime system supports the processing of extensive and demanding PC applications in parallel with the control task. It executes under the operating systems Windows Embedded Standard 2009/Standard 7 or Windows 7 and uses a real-time core for real-time and deterministic behavior.

WinAC RTX uses the latest innovations for SIMATIC Controllers when communicating over PROFINET. Particular features are the isochronous mode over PROFINET and IRT, and the web server functionality. Isochronous mode is used for extremely fast and accurate automation solutions. Input signals are acquired, processed, and output at fixed intervals. The web server automatically generates web pages that can also be used for remote diagnostics and, with the relevant authorization, permits access to a plant from any PC.

Use of SIMATIC know-how

WinAC RTX is programmed with the usual SIMATIC programming tools: with STEP 7 or, if required, also with the field-proven engineering tools, such as the IEC 61131-3-compliant languages S7-SCL or S7-GRAPH. WinAC RTX is code-compatible with SIMATIC S7. That means: program code developed for SIMATIC S7-300 and S7-400 can be used in WinAC RTX and vice versa.

Software packages – ordering with a price advantage

With our Software Packages, which we offer for all available SIMATIC IPCs, you benefit from real price advantages. You only have to select your SIMATIC IPC, configure it, and order it together with the SIMATIC software.

Fail-safe variant SIMATIC WinAC RTX F

WinAC RTX F provides a TÜV-certified (German Technical Inspectorate), fail-safe software controller for safety-related applications. The S7 Distributed Safety software (a STEP 7 option) is used for programming the fail-safe program. The PROFIsafe profile permits fail-safe communication via PROFIBUS DP and PROFINET IO.

Openness and know-how protection

WinAC RTX is open to the integration of technological applications, such as barcode readers, image processing, measured value acquisition, and numerical controls. C / C++ / C# programs can be integrated into the WinAC RTX control program for this purpose. This makes for highly flexible solutions with access to all the hardware and software components of the PC. C / C++ / C# is frequently used to program complex technology functions. These often contain valuable know-how. C / C++ / C# encapsulates these programs. The openness of WinAC RTX can therefore also be used to protect know-how in customized functions.

Integration of complex closed-loop controllers with MATLAB/Simulink

Siemens is a partner of "The MathWorks" in the MathWorks Connection Program. Its software MATLAB/Simulink enables graphical modeling and simulation of processes and PID controllers. With Embedded Coder, the Simulink subsystems can be translated into C/C++ code. This code can be integrated into a WinAC ODK project and can be called and executed from the S7 program using DLL/RTDLL. Example templates for integration are available on the Internet. These are provided as free downloads.

SIMATIC WinAC software controller:

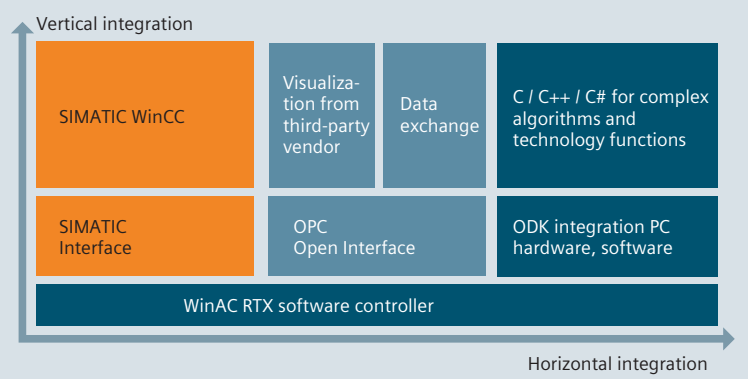
siemens.com/simatic-winac

Integrating complex controller structures with MATLAB/Simulink:

siemens.com/simulink

SIMATIC Software Packages –
complete offers at attractive prices:

siemens.com/simatic-ipc-packages





Individually expandable system availability

Prevention of potential failures

With its rugged design and high industrial suitability, SIMATIC IPCs set standards in availability – despite the heavy loads placed on both the hardware and software in industry. For applications with individual requirements for system availability, we offer a coordinate spectrum of optional expansion components with which potential failures can be detected early and actual downtimes can be effectively minimized. They include:

- Uninterruptible power supplies (UPS)
- The redundant power supply unit can be replaced during operation
- Flash disk and SSD as safe mass storage media
- RAID1/RAID5 configuration with automatic multiple data backup and restore

Uninterruptible power supplies (UPS)

The rugged SITOP DC-UPS 24 V devices ensure safe storage of data, controlled shutdown, and correct start-up on power failures lasting longer than 20 ms.



More information about uninterruptible power supplies:

siemens.cm/sitop/usv

Expansion options to increase system availability of SIMATIC IPCs:

siemens.com/ipc-expansion-components

SIMATIC IPC DiagMonitor – intelligent and comprehensive diagnostics, local or remote

With SIMATIC IPC DiagMonitor, potential failures in the field can be detected early. The software tool provides intelligent and extensive diagnostic and alarming functions that permit preventive maintenance in good time.



Minimization of downtimes

Once a fault has brought a plant to a standstill, it must be started up again as quickly as possible to minimize costs. The expansion options required to achieve this are therefore available for SIMATIC IPCs.
They include:

- SIMATIC IPC Remote Manager software for implementing low-cost maintenance, troubleshooting, and administration of SIMATIC IPCs by means of encrypted remote access
- SIMATIC IPC Image & Partition Creator software for preventive data backup and efficient partition management



More application options

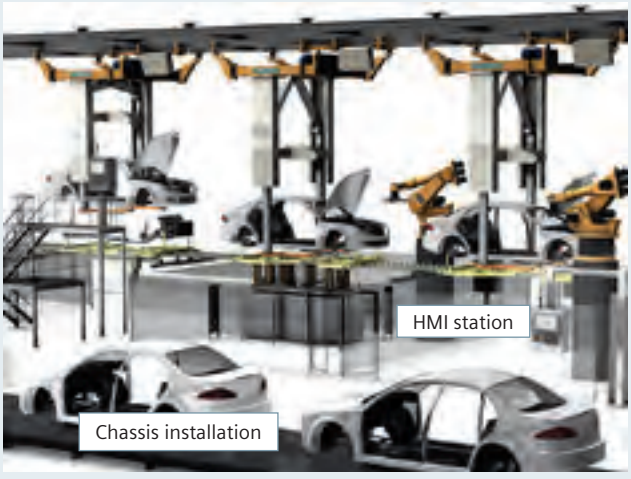
SIMATIC IPCs are perfectly equipped and suitable for open- and closed-loop control, visualization, measuring and testing, data processing and communication tasks, as well as as a gateway or network transition. They are used increasingly also for intelligent energy management or in shipbuilding.

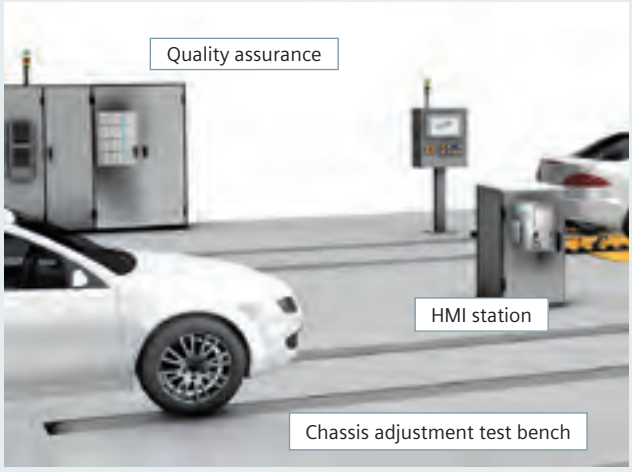
SIMATIC IPCs – at home in many industries

- Automotive industry (e.g. test bays, paint lines)
- Semiconductor and electronics industry (e.g. diffusion plants)
- Regenerative energy (solar, wind)
- Chemicals and pharmaceuticals industry (e.g. tablet presses, fermenters)
- Oil, gas and water (e.g. water treatment, water supply)
- Food and beverages industry (e.g. filling systems, fruit presses)
- Stock keeping and logistics (e.g. high-bay warehouses, conveyor technology)
- Mechanical engineering (e.g. printing machines, textile machines, CD/DVD production)

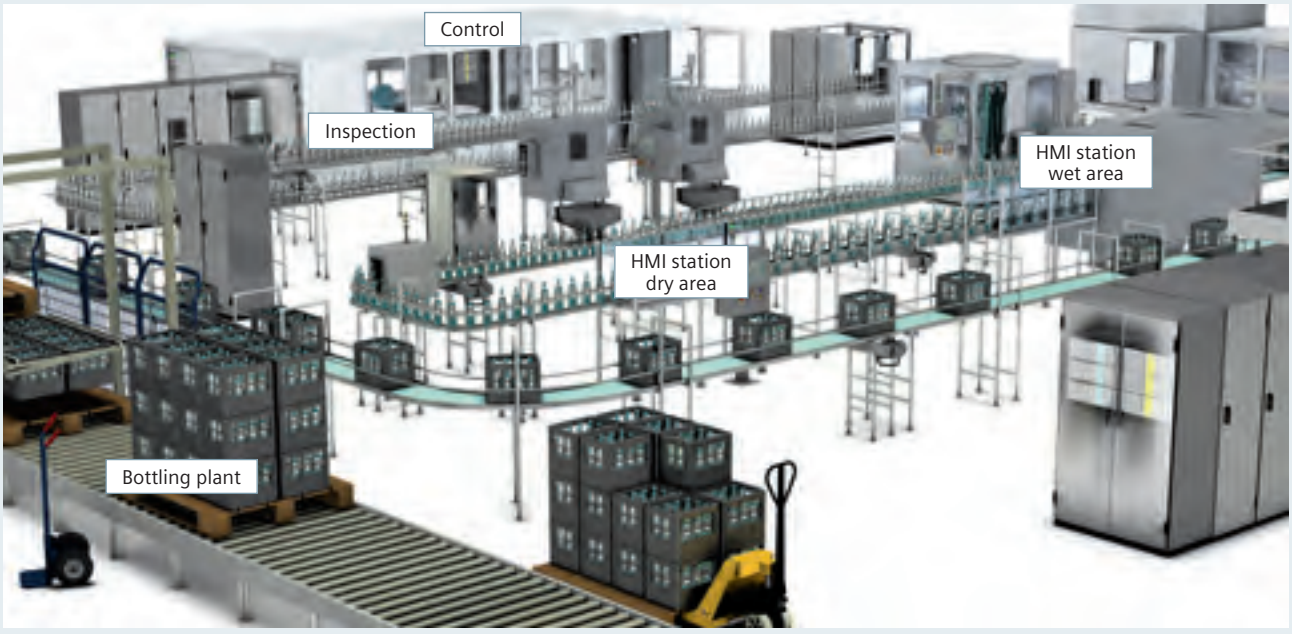
Application examples

Automotive industry





Food and beverages industry



Examples of use animated in 3D:

siemens.com/pc-based-applications

References for PC-based automation

Machine data acquisition optimizes production



AGCO GmbH, one of the largest manufacturers and suppliers of tractors and farming machinery worldwide, offers high-tech solutions for agriculture. For more economic production processes with reduced consumption of resources, centralized and integrated machine data acquisition has been introduced by means of panel PCs with all-round protection. With easy, cost-saving retrofitting of the panel PCs direct in the production plant on a stand, there was no need for additional installation of a control desk, permitting a reduction in costs.

Retrofit for high performance and precision



Heinrich Kuper GmbH & Co. KG, a global player in the woodworking and plastics processing industry, is a specialist in retrofitting older machines. New automation and safety engineering with a fail-safe software controller on a maintenance-free embedded PC multiplied the performance and precision of a customer plant, and integrated diagnostics capability. The control cabinet size was reduced by 20 percent, wiring by 50 percent, and machine downtimes were shortened, too.

Retrofit with safety:

siemens.com/reference-video-kuper

Control and monitoring of wind turbine generator systems



All Siemens turbines for offshore wind power plants feature technical characteristics that ensure long-term, low-maintenance operation. A rugged Box PC in a shock-proof and vibration-proof all-metal enclosure with high electromagnetic compatibility ensures safe 24-hour continuous operation at ambient temperatures up to 55 °C. A RAID1 mirror disk system has been selected for a high level of data security. International standards, CE and UL certification, as well as worldwide service ensure global use.

References in many industries:

siemens.com/automation/references

Find out more:

siemens.com/pc-based-automation

SIMATIC IPC
The more industrial PC

- Comprehensive range of rugged and reliable industrial PCs
- Innovative, high-quality hardware and software with long-term availability

SIMATIC IPC – all information!



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Industrial security

Siemens offers automation and drives products with industrial security functions that support safe operation of the plant or machine. They are an important component in a holistic industrial security concept. With this in mind, our products undergo continuous development. We therefore recommend that you regularly check for updates of our products and that you only use the latest versions.
You will find information on this at:
http://support.automation.siemens.com.
There you can also register for a newsletter specifically about these products.

For the secure operation of a plant/machine, it is also necessary to take suitable protective measures (e.g. cell protection concept), and to integrate the automation and drives components into a holistic, state-of-the-art industrial security concept for the entire plant/machine. Products used from other manufacturers should also be taken into account here.
You will find further information at:
www.siemens.com/industrialsecurity.

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Industrial Automation Systems
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GERMANY

SIMATIC Embedded IPC

	SIMATIC IPC227D	SIMATIC IPC277D					SIMATIC IPC427D	SIMATIC IPC477D					
													
General features	**Box PC**	**Panel PC, 7″ Touch**	**Panel PC, 9″ Touch**	**Panel PC, 12″ Touch**	**Panel PC, 15″ Touch**	**Panel PC, 19″ Touch**	**Box PC**	**Panel PC, 12″ Touch**	**Panel PC, 15″ Touch**	**Panel PC, 15″ Touch / Keys**	**Panel PC, 19″ Touch**	**Panel PC, 22″ Touch**	**General features**
Processor	Intel Atom E660 (1.3 GHz, 2 GB RAM); Intel Atom E640 (1.0 GHz, 1 GB RAM); Intel Atom E620 (600 MHz, 512 MB RAM, not on IPC277D)						Intel Core i7-3517UE 2 x 1.7 GHz (TB to 2.8 GHz); 4 MB SLC; Intel Core i3-3217UE 2 x 1.6 GHz; 3 MB SLC; Intel Celeron 827E 1.4 GHz; 1.5 MB SLC						**Processor**
Main memory	512 KB MRAM, of which 128 KB can be written to within the buffer time (optional)						From 1 GB DDR3-SDRAM SODIMM (without ECC); From 4 GB DDR3-ECC SODIMM (with ECC); 512 KB NVRAM, of which 128 KB can be written to by the WinAC RTX within the buffer time	From 1 GB DDR3-SDRAM SODIMM (without ECC); 512 KB NVRAM, of which 128 KB can be written to by the WinAC RTX within the buffer time					**Main memory**
Free expansion slots	1 x PCIe (optional); 4 digital inputs and outputs 24 V (optional)	–					Up to 2 x PCIe cards; depending on enclosure variant (1 x PCIe x4 and 1 x PCIe x1); max. 5 W / 10 W	Only for device expansions: 1 x PCIe-x4 expansion card can be used; max. 5 W					**Free expansion slots**
Operating system	Windows Embedded Standard 2009; Windows XP Professional MUI[1]; Windows Embedded Standard 7 32-bit; Windows 7 Ultimate MUI[1] 32-bit; Linux[2] and others project-specifically on request						Windows 7 Ultimate MUI[1]; Windows Embedded Standard 7; Linux, QNX and VxWorks project-specifically on request	Windows 7 Ultimate MUI[1]; Windows Embedded Standard 7; Linux, QNX and VxWorks project-specifically on request					**Operating system**
Packages / bundles	Packages with WinCC flexible, WinCC RT Advanced and WinAC RTX (F) / ready-to-use bundles with WinCC RT Advanced and/or WinAC RTX (F)						Packages with WinCC RT Advanced, other packages / bundles available soon	Packages with WinCC RT Advanced; others available soon / bundles available soon					**Packages / bundles**
Current supply	24 V DC; 20.4 to 28.8 V; isolated / max. 10 ms (in accordance with NAMUR); On/Off switch						24 V DC; 19.2 to 28.8 V, isolated / max. 15 ms (in accordance with NAMUR); On/Off switch	24 V DC; 19.2 to 28.8 V; isolated / max. 20 ms (in accordance with NAMUR); or 100–240 V AC, 50/60 Hz; On/Off switch					**Current supply**
MTBF backlighting	–	Up to 80,000 h (with 24 h continuous operation, depending on temperature), dimmable from 0 to 100%					–	Up to 80,000 h (with 24 h continuous operation, depending on temperature); dimmable from 0 to 100%					**MTBF backlighting**
Drives													**Drives**
Mass storage	Slot for CFast up to 16 GB (externally accessible); SSD 50 GB (High Endurance) or SSD 80 GB; HDD from 250 GB (IPC227D only)						Connection via USB port	Slot for CFC up to 16 GB (externally accessible); SSD 50 GB (High Endurance) or SSD 80 GB (Standard); HDD from 250 GB					**Mass storage**
Optical drives	Connection via USB port						Connection via USB port	Connection via USB port; slot for DVD-RW for device with expansion					**Optical drives**
Ports													**Ports**
Fieldbus	PROFINET with RT (Real-Time) over Ethernet						PROFIBUS DP/MPI: 1 x 12 Mbps (isolated, compatible with CP 5622); PROFINET: 1 x 10/100 Mbps (3-port switch, compatible with CP 1616) optional	PROFIBUS DP/MPI: 1 x 12 Mbps (isolated, compatible with CP 5622); PROFINET: 1 x 10/100 Mbps (3-port switch, compatible with CP 1616) optional					**Fieldbus**
Ethernet	2 x 10/100/1000 Mbps (RJ45); teaming						2 x 10/100/1000 Mbps (RJ45), teaming; 1 x 10/100/1000 Mbps on PROFINET variant	2 x 10/100/1000 Mbps (RJ45), teaming; 1 x 10/100/1000 Mbps on PROFINET variant					**Ethernet**
USB (2.0 high-current)	4 x V2.0	Rear: 3 x V2.0		Rear: 3 x V2.0; Front: 1 x V2.0			4 x USB 3.0	Rear: 4 x USB 3.0	Rear: 4 x USB 3.0; Front: 1 x USB 2.0				**USB (2.0 high-current)**
Serial / parallel	COM1: (RS 232, RS 485 or CAN); COM2–4 (RS 232, opt.)	COM1: 1 x V.24 (RS 232)					COM1: RS 232; COM2: RS 232 (optional)	COM1: RS 232; COM2: RS 232 (optional)					**Serial / parallel**
Graphics interface	1 x DVI-D	–					1 x DVI-I (VGA/DVI-D); 1 x DisplayPort	1 x DVI-I (VGA/DVI-D); 1 x DisplayPort					**Graphics interface**
Monitoring / diagnostics functions													**Monitoring / diagnostics functions**
Basic functionality	Temperature; watchdog; CFC; SSD; CMOS battery (alarm locally by means of SIMATIC IPC DiagBase software); HDD (IPC227D only)						Temperature; watchdog; HDD; CFast; SSD; CMOS battery (alarm locally by means of SIMATIC IPC DiagBase software)	Temperature; watchdog; HDD; CFast; SSD; CMOS battery (alarm locally by means of SIMATIC IPC DiagBase software)					**Basic functionality**
Advanced functions / remote access	System monitoring: Operating hours counter for preventive maintenance, maintenance mode, networking (LAN), SNMP and OPC interface (optionally via SIMATIC IPC DiagMonitor software)						System monitoring: Operating hours counter for preventive maintenance, maintenance mode, networking (LAN), SNMP and OPC interface (optionally via SIMATIC IPC DiagMonitor software) / remote access via Intel AMT with Core i7 and SIMATIC IPC Remote Manager						**Advanced functions / remote access**
Ambient conditions													**Ambient conditions**
Degree of protection / EMC	IP40 / EN 55022B; EN 61000-6-3; EN 61000-6-4; FCC A	IP65 (front) / EN 55022A; EN 61000-6-4; EN 61000-6-2; FCC A					IP20 according to IEC 60529 / EN 61000-6-3; EN 61000-6-4; CISPR220 Class B; FCC Class A	IP65 (at the front) in accordance with IEC 60529 / EN 61000-6-4; CISPR220 Class B; FCC Class A; IP20 (at the rear)					**Degree of protection / EMC**
Vibration during operation [3]	10 to 58 Hz: 0.0375 mm; 58 to 200 Hz: 9.8 m/s² (approx. 1 *g*)						5 to 9 Hz: 3.5 mm; 9 to 500 Hz: 9.8 m/s² (approx. 1 *g*) when operated with CFast / SSD	5 to 9 Hz: 3.5 mm; 9 to 500 Hz: 9.8 m/s² (approx. 1 *g*) when operated with CFast / SSD					**Vibration during operation [3]**
Shock during operation [4]	150 m/s²; 30 ms (approx. 15 *g*) when operated with CFC / SSD	50 m/s²; 30 ms (approx. 5 *g*) when operated with CFC / SSD					150 m/s²; 11 ms (approx. 15 *g*) when operated with CFast / SSD	50 m/s²; 30 ms (approx. 5 *g*) when operated with CFast / SSD					**Shock during operation [4]**
Relative humidity [9]	Up to 95% (CFC / SSD); up to 80% (HDD)	Up to 80% at 25 °C (no condensation)					Up to 80% at 25 °C (no condensation)	Up to 85% at 30 °C (no condensation)					**Relative humidity [9]**
Ambient temperature during operation [9]	0 ... 50 °C	0 °C to 50 °C; 19″ variant: 0 °C to 45 °C					0 to 55 °C	0 to 50 °C		0 to 45 °C			**Ambient temperature during operation [9]**
Certification / EU directives	CE; cULus (508); shipbuilding: WEEE / RoHS; C-Tick	CE, cULus (508), shipbuilding approvals available for 7″/9″/12″, 15″/19″: GL, LRS, BV, DNV, ABS, Class NK					CE; cULus (508); shipbuilding approval available soon; WEEE / RoHS; C-Tick	CE; cULus (508); shipbuilding approval available soon; WEEE / RoHS; C-Tick					**Certification / EU directives**
Dimensions													**Dimensions**
Operator panel (W x H)	–	214 x 158 mm	274 x 190 mm	330 x 241 mm	415 x 310 mm	483 x 337 mm	–	330 x 241 mm	415 x 310 mm	483 x 310 mm	483 x 337 mm	560 x 380 mm	**Operator panel (W x H)**
Installation dimensions (W x H x D)	Base unit: approx. 191 x 100 x 60 mm	197 x 141 x 71 mm	251 x 166 x 71 mm	310 x 221 x 66 mm	396 x 291 x 73 mm	465 x 319 x 73 mm	Base unit: approx. 262 x 134 x 50.5 mm Depth with 1 x PCIe / 2 x PCIe expansion: 80.5 mm / 100.8 mm	310 x 221 x 83 mm	395 x 290 x 83 mm	450 x 290 x 83 mm	464 x 318 x 83 mm	542 x 360 x 83 mm	**Installation dimensions (W x H x D)**
Article number	6ES7647-8A…-….	6AV7881-1A.00-…0	6AV7881-2A.00-…0	6AV7881-3A.00 …0	6AV7881-4A.00-…0	6AV7881-5A.00-…0	6AG4140-……-…A0	6AV7240-.A…-..A0	6AV7240-.B…-..A0	6AV7240-.C…-..A0	6AV7240-.D…-..A0	6AV7240-.E…-..A0	**Article number**

1) MUI (multi-language user interface); 5 languages (ENG, GER, FR, SP, IT)

	SIMATIC HMI Panel PC Ex		SIMATIC HMI Thin Client Ex		SIMATIC PRO devices				SIMATIC Industrial Thin Client				SIMATIC Industrial Flat Panel				
																	
Design	**15″ Touch[1]**	**19″ Touch**	**15″ Touch[1]**	**19″ Touch**	**SIMATIC HMI IPC477C 15″ Touch**	**SIMATIC HMI IPC477C 19″ Touch**	**Flat Panel Monitor 15″ Touch**	**Flat Panel Monitor 19″ Touch**	**12″ Touch widescreen**	**15″ Touch widescreen**	**19″ Touch widescreen**	**22″ Touch widescreen**	**15″ Touch**	**15″ Keys**	**19″ Touch**	**22″ Touch**	**Design**
Size in inches / resolution in pixels	15″ / XGA (1024 x 768)	19″ / SXGA (1280 x 1024)	15″ / XGA (1024 x 768)	19″ / SXGA (1280 x 1024)	15″ / XGA (1024 x 768)	19″ / SXGA (1280 x 1024)	15″ / XGA (1024 x 768)	19″ / SXGA (1280 x 1024)	12″ wide (1280 x 800)	15″ wide (1280 x 800)	19″ wide (1366 x 768)	22″ wide (1920 x 1080)	15″ wide (1280 x 800)	15″ wide (1280 x 800)	19″ wide (1366 x 768)	22″ wide (1920 x 1080)	**Size in inches / resolution in pixels**
Front type	Touch screen; keys		Touch screen; keys		Touch screen		Touch screen with very smooth plastic front membrane		Touch screen with extended viewing angle				Touch screen with extended viewing angle, touch devices also for vertical display				**Front type**
Max. distance to computer	–	–	unlimited via Ethernet		–		30 m		Unlimited via Ethernet				Standard: 5 m; extended: 30 m				**Max. distance to computer**
General features																	**General features**
Processor / chip set	Intel Atom N270 (1.6 GHz) / Mobile Intel 945GSE		Based on x86		Intel Core2 Duo SU9300 (2 x 1.2 GHz; 800 MHz FSB; 3 MB SLC); Intel Core2 Solo ULV SU3300 (1 x 1.2 GHz; 800 MHz FSB; 3 MB SLC); Intel Celeron M ULV 723 (1.2 GHz; 800 MHz FSB; 1 MB SLC)		–		Intel Celeron (1.2 GHz)				–				**Processor / chip set**
Main memory	1 GB DDR2 SDRAM, optionally available with 2 GB		–		From 1 GB DDR3 1066 SDRAM; SODIMM; configurable up to 4 GB; non-volatile memory: Static RAM 2 MB		–		–				–				**Main memory**
Operating system	Microsoft Windows XP Professional; Microsoft Windows Embedded Standard 2009; Windows 7 Ultimate (only on HDD)		Closed system on the basis of Windows Embedded Standard 2009		Microsoft Windows Embedded Standard 7; Windows Embedded Standard 2009; Windows 7 Ultimate (32-bit) or Windows XP Professional		–		–				–				**Operating system**
Graphics	Intel GMA 950 graphics controller integrated in chip set		–		Onboard Intel GMAX4500 graphics controller; DVM up to 512 MB		–		16 million colors				16 million colors				**Graphics**
Power supply / max. power consumption	24 V DC / approx. 60 W	24 V DC / approx. 65 W	24 V DC / approx. 45 W	24 V DC / approx. 50 W	24 V DC; 20.4 to 28.8 V, isolated / max. 15 ms (in accordance with NAMUR); On/Off switch		24 V DC; 110/230 V AC / 40 W	24 V DC; 110/230 V AC / 55 W	24 V DC / approx. 28 W	24 V DC / approx. 36 W	24 V DC / approx. 32 W	24 V DC / approx. 53 W	24 V DC; 19.2 to 28.8 V, isolated / max. 20 ms (in accordance with NAMUR) / approx. 40 W; Extended version: 100–240 V AC, 50/60 Hz;				**Power supply / max. power consumption**
Supported protocols / MTBF backlighting	– / Typically 50,000 h		RDP; VNC / Typically 50,000 h		– / Typically 50,000 h (at 24 h continuous operation; depending on temperature)				RDP; VNC; Web; Sm@rt Access; SINUMERIK (available soon) / 80,000 h (depending on temperature); dimmable from 0 to 100%				– / 80,000 h (depending on temperature); dimmable from 0 to 100%				**Supported protocols / MTBF backlighting**
Drives																	**Drives**
Mass storage	CompactFlash 4 GB or 16 GB (not swappable) or HDD 100 GB; USB 16 GB available as an accessory		–		2 x slot for CFC up to 16 GB; SSD 50 GB (SATA; High Endurance) or SSD 80 GB (SATA; Standard)		–		USB flash drive available as accessory				–				**Mass storage**
Optical drives	Optionally over USB (not for hazardous areas)		–		Optional		–		–				–				**Optical drives**
Ports																	**Ports**
Ethernet	1 x 100 Mbps Ex e; or fiber optics 100 Mbps (SC)				2 x onboard; 10/100/1000 Mbps; RJ45; teaming		–		1 x 10/100/1000 Mbps; RJ45				–				**Ethernet**
USB	2 x Ex e ("Zone 1" variant) or 2 x Ex nA ("Zone 2" variant)	2 x Ex i; 2 x Ex e ("Zone 1" variant) or 2 x Ex nA ("Zone 2" variant)			4 x at the rear		Up to 2 x for additional I/O devices (optional)		2 x at the rear (USB 2.0 high-current)				Extended: 2 x USB 2.0 (at the rear); 15″ Key variant: 1 x USB 2.0 (at the rear) and 1 x USB 2.0 (at the front)				**USB**
Serial / parallel	1 x RS 232 or 1 x RS 422/485				COM1: 1 x V.24 (RS 232)		–		–				–				**Serial / parallel**
Graphics interface	–				DVI-I can be used for additional display unit		DVI-D, VGA		–				1 x DVI-D; 1 x DisplayPort				**Graphics interface**
Ambient conditions																	**Ambient conditions**
Degree of protection	IP66 (at the front); IP65 (at the rear)				IP65 (at the front) according to EN 60529, NEMA 4 tested		IP65 all-round; enclosure type 4		IP65 (at the front; enclosure type 4); IP20 (at the rear)				IP65 (at the front; enclosure type 4); IP20 (at the rear)				**Degree of protection**
EMC	CE; FCCA; 55022A; EN 61000-6-4/61000-6-2	CE; EN 55011; EN 61000-6-4			CE; FCCA; 55022A; EN 61000-6-4/61000-6-2		CE; EN 55011; EN 61000-6-2; EN 61000-6-4		CE; EN 61000-6-4				CE; EN 61000-6-4; EN61000-6-2				**EMC**
Vibration during operation [3]	3 to 22 Hz: 1 mm; 22 to 500 Hz: 9.8 m/s² (1 *g*)				10 to 58 Hz: 0.0375 mm; 58 to 200 Hz: 9.8 m/s² (1 *g*)				10 to 58 Hz: 0.0375 mm; 58 to 200 Hz: 9.8 m/s² (1 *g*)				10 to 58 Hz: 0.0375 mm; 58 to 200 Hz: 9.8 m/s² (1 *g*)				**Vibration during operation [3]**
Shock during operation [4]	150 m/s² (approx. 15 *g*); 11 ms				50 m/s² (5 *g*); 30 ms				50 m/s² (5 *g*); 30 ms				150 m/s²; 11 ms (approx. 15 *g*)				**Shock during operation [4]**
Relative humidity [9]	90% at 40 °C (no condensation)				5 to 80% at 25 °C (no condensation)				5 to 85% at 25 °C (no condensation)				95% at 25 °C (no condensation)				**Relative humidity [9]**
Ambient temperature during operation [9]	–20 to 50 °C				0 to 45 °C		5 to 45 °C		0 to 50 °C		0 to 45 °C		0 to 50 °C		0 to 45 °C		**Ambient temperature during operation [9]**
Certification / EU directives	Variant "Zone 1": II 2 (2) G Ex d e mb ib [ib] [op is], IIC T4, II 2 D Ex tD A21 IP65 T90 °C, DNV (shipbuilding), GOST-R, UL-Inmetro[23] Variant "Zone 2": II 3 (3) G Ex d e mb nA nL [nL] [op is], IIC T4, II 3 (2) G Ex d e mb nA nL [ib] [op is], IIC T4, II 3 (2) D Ex tD A22 IP65 [ibD] T90 °C, GOST-R; UL Class 1 Div. 2				CE; cULus (508); C-Tick		CE; cULus (508); ATEX 22 (Ex)		CE; cULus; C-Tick; KCC; FM				CE; KC; cULus / cULus Hazardous Location; ATEX; C-Tick; FM; GL; ABS; BV; DNV; LRS: Class NK				**Certification / EU directives**
Dimensions																	**Dimensions**
Operator panel (W x H)	440 x 340 mm	535 x 425 mm	440 x 340 mm	535 x 425 mm	400 x 350 mm	483 x 400 mm	400 x 310 mm	483 x 400 mm	330 x 241 mm	415 x 310 mm	483 x 337 mm	560 x 380 mm	415 x 310 mm	483 x 310 mm	483 x 337 mm	560 x 380 mm	**Operator panel (W x H)**
Installation dimensions (W x H x D)	427.5 x 327.5 x 165 mm	522.5 x 412.5 x 165 mm	427.5 x 327.5 x 165 mm	522.5 x 412.5 x 165 mm	None installed	None installed	None installed	None installed	310 x 221 x 82 mm	396 x 291 x 75 mm	465 x 319 x 75 mm	542 x 362 x 75 mm	396 x 291 x 63 mm	450 x 391 x 63 mm	465 x 319 x 63 mm	542 x 362 x 63 mm	**Installation dimensions (W x H x D)**
Article number	6AV7200-1….-…A0		6AV7200-0….-…A0		6AV7883-6A….-…0	6AV7883-7A.-…0	6AV7861-5TB10-1BA0	6AV7861-6TB10-1BA0	6AV6646-1AA22-0AX0	6AV6646-1AB22-0AX0	6AV6646-1AC22-0AX0	6AV6646-1AD22-0AX0	6AV7863-2T..0-.AA0	6AV7863-2B..0-.AA0	6AV7863-3…0-.AA0	6AV7863-4…0-.AA0	**Article number**

1) Optionally with daylight display 2) Panel PC only 3) Tested according to: IEC 60068-2-6 4) Tested according to: IEC 60068-2-27 5) With full processor performance (without throttling) 6) In accordance with the specifications of the Siemens manufacturer declaration "Suitable for Linux" 7) Microbox PC with PROFINET onboard only 1 x Ethernet 8) Requires IPC with Core i7, i5 processors 9) Tested according to DIN IEC 60068-2-78, DIN IEC 60068-2-30, -60068-2-56

SIMATIC Industrial PCs				SIMATIC High-end IPC					SIMATIC HMI IPC677C			
	SIMATIC IPC347D	SIMATIC IPC547E		SIMATIC IPC647D	SIMATIC IPC847D	SIMATIC IPC627D	SIMATIC IPC827D	SIMATIC IPC677D				
												
Design / display	**Rack PC, 19", 4HE**	**Rack PC, 19", 4HE short enclosure**	**Rack PC, 19", 4HE**	**Rack PC, 19", 2HE**	**Rack PC, 19", 4HE**	**Box PC**	**Box PC**	**Panel PC, 22" Single Touch and Multitouch, from 19"**	**Panel PC, from 12" Touch or Key, 4:3 display**	**Panel PC, 15" Touch INOX**	**Panel PC, 19" Touch**	**Design / display**
Mounting	Ready for telescopic rails; for horizontal installation	Ready for telescopic rails; for horizontal installation; 19" mounting bracket detachable from the outside	Ready for telescopic rails; for horizontal and vertical installation; 19" mounting bracket can be removed externally; tower kit (optional)	Ready for telescopic rails; for horizontal installation; 19" mounting bracket can be removed from the outside	Ready for telescopic rails; for horizontal and vertical installation; 19" mounting bracket can be removed externally; tower kit (optional)	Wall mounting using any mounting bracket; portrait mounting using front/portrait mounting kits (optional)	Wall mounting using any mounting bracket; portrait mounting using front/portrait mounting kits (optional)	Built-in unit for centralized configuration	Built-in unit for centralized configuration	Built-in unit with stainless steel front for centralized configuration	Built-in unit for centralized configuration	**Mounting**
General features												**General features**
Processor	Intel Core i5-3340S (4C/4T, 2.8 (3.3) GHz, 6 MB cache, VT-x/-d); Intel Pentium Dual Core G2010 (2C/2T, 2.8 GHz, 3 MB cache, VT-x)	Intel Pentium Dual Core G3420 (2C/2T, 3.2 GHz, 3 MB cache, VT-x); Intel Celeron available soon	Intel Core i7-4770S (4C/8T, 3.1 (3.9) GHz, 8 MB cache, VT-x/-d, AMT 9.0); Intel Core i5-4570S (4C/4T, 2.9 (3.6) GHz, 6 MB cache, VT-x/-d, AMT 9.0); Intel Pentium Dual Core G3420 (2C/2T, 3.2 GHz, 3 MB cache, VT-x)	Intel Xeon E3-1268L v3 (4C/8T; 2.3 (3.3) GHz; 8 MB cache; VT-x/-d; AMT 9.0); Core i5-4570TE (2C/4T; 2.7 (3.3) GHz; 4 MB cache; VT-x/-d; AMT 9.0); Core i3-4330TE (2C/4T; 2.4 GHz; 4 MB cache; VT-x)		Intel Xeon E3-1268L v3 (4C/8T; 2.3 (3.3) GHz; 8 MB cache; VT-d; AMT 9.0); Core i3-4330TE (2C/4T; 2.4 GHz; 4 MB cache; VT-x); Celeron G1820TE (2C/2T; 2.2 GHz; 2 MB cache)	Intel Xeon E3-1268L v3 (4C/8T; 2.3 (3.3) GHz; 8 MB cache; VT-d; AMT 9.0); Core i3-4330TE (2C/4T; 2.4 GHz; 4 MB cache; VT-x); Celeron G1820TE (2C/2T; 2.2 GHz; 2 MB cache)	Intel Core i7-610E (2C/4T; 2.53 GHz; 4 MB cache; TB; VT-x/-d); Intel Core i3-330E (2C/4T; 2.13 GHz; 3 MB cache; VT-x); Intel Celeron P 4502 (2C/2T; 1.86 GHz; 2 MB cache)			**Processor**
Main memory	2 GB and 4 GB DDR3 SDRAM; 2 x DIMM	From 2 GB DDR3-1600 SDRAM (dual-channel support); 2 x DIMM; configurable up to 16 GB	From 2 GB DDR3-1600 SDRAM (dual-channel support); 4 x DIMM; configurable up to 32 GB	Intel Xeon E3-1268L v3 (4C/8T; 2.3 (3.3) GHz; 8 MB cache; VT-x/-d; AMT 9.0); Core i5-4570TE (2C/4T; 2.7 (3.3) GHz; 4 MB cache; VT-x/-d; AMT 9.0); Core i3-4330TE (2C/4T; 2.4 GHz; 4 MB cache; VT-x)		From 2 GB DDR3-1600 SDRAM; 2 x DIMM; configurable up to 16 GB; ECC optional; non-volatile memory: NVRAM 2 MB optional		From 2 GB DDR3-1600 SDRAM; 2 x DIMM; configurable up to 16 GB; ECC optional; non-volatile memory: NVRAM 2 MB optional	From 1 GB DDR3 1066 SDRAM; DIMM; configurable up to 8 GB; ECC optional; non-volatile memory: Static RAM 2 MB (optional), 128 KB of which usable for WinAC			**Main memory**
Free expansion slots	4 x PCI; 1 x PCIe x 16; 1 x PCIe x 8, 1 x PCIe x 1	4 x PCI; 2 x PCIe x 16; 1 x PCIe x 8 (all 260 mm)	4 x PCI; 2 x PCIe x 16; 1 x PCIe x 8 (all 312 mm)	3 x PCIe x16; 1 x PCIe x16 or 2 x PCI and 2 x PCIe x 16	7 x PCI; 1 x PCIe x16; 3 x PCIe x 4 or 3 x PCI; 5 x PCIe x16; 3 x PCIe x 4	2 x PCI (185 mm) or 1 x PCI and 1 x PCIe x16 (185 / 185 mm)	2 x PCI (240 mm); 1 x PCI (185 mm); 1 x PCIe x 16 (185 mm); 1 x PCIe x 4 (185 mm)	2 x PCI (185 mm) or 1 x PCI and 1 x PCIe x16 (185 / 185 mm)	1 x PCI (265 mm) and 1 x PCI (185 mm) or 1 x PCI (265 mm) and 1 x PCIe x16 (185 mm)			**Free expansion slots**
Graphics	Onboard Intel HD Graphics / Intel HD Graphics 2500 integrated in processor, Dynamic Video Memory up to 1.05 GB, max. resolution VGA / DVI-I: 1920 x 1200	Intel HD Graphics 4600/4400 integrated in the processor with Dynamic Video Memory up to 1.7 GB; max. DisplayPort resolution: 3840 x 2160 / 130 Hz / 32-bit color depth; DVI: 1920 x 1200 / 60 Hz / 24-bit; Graphics card: NVIDIA NVS 300 optional, dual-head: 2 x VGA or 2 x DVI-D; PCIe x16, 512 MB; max. resolution 2048 x 1536 / 60 Hz / 32-bit color depth		Intel HD Graphics 4600 integrated in the processor with Dynamic Video Memory up to 1.7 GB; max. DisplayPort resolution: 3840 x 2160 / 130 Hz / 32-bit color depth; DVI: 1920 x 1200 / 60 Hz / 24-bit; Graphics card: NVIDIA NVS 300 optional; Dual Head: 2 x VGA or 2 x DVI-D; PCIe x16, 512 MB; max. resolution 2048 x 1536 / 60 Hz / 32-bit color depth	Intel HD Graphics 4600 integrated in the processor with Dynamic Video Memory up to 1.7 GB; max. DisplayPort resolution: 3840 x 2160 / 130 Hz / 32-bit color depth; DVI: 1920 x 1200 / 60 Hz / 24-bit; Graphics card: NVIDIA NVS 300 optional; Dual Head: 2 x VGA or 2 x DVI-D; PCIe x16, 512 MB; max. resolution 2048 x 1536 / 60 Hz / 32-bit color	Intel HD Graphics 4600 (Xeon, Core i3) integrated in the processor with Dynamic Video Memory up to 512 MB; max. DisplayPort resolution: 3840 x 2160 / 130 Hz / 32-bit color depth; DVI: 1920 x 1200 / 60 Hz / 24-bit		Intel HD Graphics 4600 (Xeon, Core i3) integrated in the processor with Dynamic Video Memory up to 512 MB; max. DisplayPort resolution: 3840 x 2160 / 130 Hz / 32-bit color depth; DVI: 1920 x 1200 / 60 Hz / 24-bit	Intel HD graphics controller integrated in processor; Dynamic Video Memory up to 256 MB; up to 2048 x 1536 pixels / 16-bit / 75 Hz; Graphics card: NVIDIA Quadro NVS 295 (optional) (Dual-Head: 2 x VGA or 2x DVI-D via DP adapter); PCIe x16; 256 MB; max. resolution: analog (VGA): 2048 x 1536 pixels / 75 Hz; digital (DVI): 1920 x 1200 pixels / 60 Hz			**Graphics**
Power supply / temporary voltage interruption	100–240 V AC, 50–60 Hz	AC: 100–240 V; 50–60 Hz / max. 20 ms	AC: 100–240 V, 50–60 Hz / max. 20 ms; optional AC, redundant: 100–240 V, 50–60 Hz / max. 20 ms	AC: 100–240 V; 50–60 Hz / max. 20 ms (in accordance with NAMUR); optional AC, redundant: 100–240 V, 50–60 Hz / max. 20 ms		AC: 100–240 V; 50–60 Hz / max. 20 ms (in accordance with NAMUR); 24 V DC: 20.4 to 28.8 V		AC: 100–240 V; 50–60 Hz / max. 20 ms (in accordance with NAMUR); 24 V DC: 20.4 to 28.8 V	AC: 100–240 V; 50–60 Hz / max. 20 ms (in accordance with NAMUR); 24 V DC: 20.4 to 28.8 V			**Power supply / temporary voltage interruption**
Operating system												**Operating system**
Installed and activated	Windows 7 Ultimate (64-bit)	Windows 7 Ultimate (32/64-bit)	Windows 7 Ultimate (32/64-bit); Windows Server 2008 R2 (64-bit)	Windows 7 Ultimate (32/64-bit); Windows Server 2008 R2 (64-bit)		Windows 7 Ultimate (32/64-bit)		Windows 7 Ultimate (32/64-bit)	Windows 7 Ultimate (32/64-bit); Windows XP Professional (32-bit); Windows Embedded Standard 2009			**Installed and activated**
Others	–	Project-specific: Linux on request		Project-specific: Linux on request		Linux on request		–	Can be ordered separately: RMOS3 V3.50 real-time operating system; project-specific: Linux; others on request			**Others**
Packages, bundles	–	Packages with WinCC flexible; WinCC V7; WinCC RT Advanced; WinCC RT Professional and WinAC RTX (F)		Packages with WinCC flexible; WinCC V7; WinCC RT Advanced; WinCC RT Professional and WinAC RTX (F)		Packages with WinCC flexible; WinCC V7; WinCC RT Advanced; WinCC RT Professional and WinAC RTX (F)		Packages with WinCC flexible; WinCC V7; WinCC RT Advanced; WinCC RT Professional and WinAC RTX (F)	Packages with WinCC flexible; WinCC V7; WinCC RT Advanced; WinCC RT Professional and WinAC RTX (F)			**Packages, bundles**
Drives												**Drives**
Hard disks	Installed internally: 500 GB	Installed internally: 500 GB; 1 TB; 2 x 1 TB	Installed internally or front-mounted in removable frame: 500 GB; 1 TB; 2 x 1 TB; SSD 240 GB; RAID 1 2 x 1 TB (optional plus 1 TB as hot-spare or SSD 240 GB); RAID5 3 x 1 TB (optional plus 1 TB as hot-spare)	Installed internally or front-mounted in removable frame: 500 GB; 1 TB; 2 x 1 TB; SSD 240 GB; RAID1 2 x 1 TB; RAID1 2 x 1 TB and 1 x 240 GB SSD	Internal installation or in withdrawable frame at the front: 500 GB; 1 TB; 2 x 1 TB; SSD 240 GB; RAID1 2 x 1 TB; RAID1 2 x 1 TB and 1 x 1 TB HDD as hot-spare; RAID1 2 x 1 TB and 1 x 240 GB SSD; RAID5 3 x 1 TB; RAID5 3 x 1 TB and 1 x 1 TB HDD as hot-spare	250 GB 3.5" or 500 GB 3.5"; RAID1: 2 x 250 GB 2.5" or 2nd delivery stage mid-2014; RAID1 on 2 x removable HDD SSD 240 GB (optional)		S-ATA: 250 GB 3.5" or 500 GB 3.5"; RAID1: 2 x 250 GB 2.5" or 2nd delivery stage mid-2014 RAID1 on 2 x removable HDD SSD 240 GB, 2.5" SATA MLC (optional)	none; 250 GB; 500 GB; 2 x 250 GB, 2.5"; SSD 50 GB (SATA, High Endurance); RAID1; 2 x 250 GB, 2.5" (RAID controller onboard)			**Hard disks**
Optical drives	DVD±R/RW or DVD ROM	–	DVD±R/RW (slim)	DVD±R/RW (slim)		DVD ± R/RW/-DL/-RAM		DVD ± R/RW/-DL/-RAM	DVD±R±RW (not in combination with option for second CFC holder internally)			**Optical drives**
Slots	4 (internal: 1 x 3.5"; Front 3 x 5.25")	2 (internal: 2 x 3.5")	6 (internal: 2 x 3.5"; Front: 3 x 5.25"; 1 x 12.7 mm slimline) or 7 (internal: 2 x 3.5"; Front: 4 x low-profile withdrawable frames; 1 x 12.7 mm slimline)	3 (internal: 2 x 3.5"; Front: 1 x 12.7 mm slimline) or 3 (front: 2 x low-profile withdrawable frame; 1 x 12.7 mm slimline)	6 (internal: 2 x 3.5"; Front: 3 x 5.25", 1 x 12.7 mm slimline) or 7 (internal: 2 x 3.5"; Front: 4 x low-profile withdrawable frame; 1 x 12.7 mm slimline)	–		–	–			**Slots**
Ports												**Ports**
PROFIBUS/MPI	–			1 x 12 Mbps (isolated, compatible with CP 5622) optional		1 x 12 Mbps (isolated, compatible with CP 5622) optional		1 x 12 Mbps (isolated, compatible with CP 5622) optional	1 x 12 Mbps (isolated, compatible with CP 5611) optional			**PROFIBUS/MPI**
PROFINET	2 x Realtek: 10/100/1000 Mbps (RJ45);			PROFINET (IRT; 3 ports; CP 1616-compatible) optional		PROFINET (IRT, 3 ports, CP 1616-compatible), optional		PROFINET (IRT, 3 ports, CP 1616-compatible), optional	1 x 10/100 Mbps (with integrated 3-port switch; compatible with CP 1616) optional			**PROFINET**
Ethernet		1x Intel: 10/100/1000 Mbps (RJ45)	2 x Intel: 10/100/1000 Mbps (RJ45); teaming	2 x Intel: 10/100/1000 Mbps (RJ45); teaming		2 x Intel: 10/100/1000 Mbps (RJ45); teaming		2 x Intel: 10/100/1000 Mbps (RJ45); teaming	2 x 10/100/1000 Mbps (RJ45); teaming			**Ethernet**
USB (2.0 high-current)	USB 2.0: 4 x at the rear, 2 x at the front	USB 3.0: 2 x at the front; USB 2.0: 6 x at the rear	USB 3.0: 2 x at the front; 2 x at the rear; USB 2.0: 6 x at the rear; 1 x internal	USB 3.0: 1 x at the front; 2 x at the rear; 1 x internal; USB 2.0: 1 x at the front; 2 x at the rear		4 x USB 3.0		4 x USB 3.0; 1 x USB 3.0 at the front	4 x USB at the rear; 1 x USB at the front (not on 15" INOX variant)			**USB (2.0 high-current)**
Serial / parallel	1 x COM1 (V.24); 1 x COM2 (V.24)	1 x COM2 (V.24) (optional); 1 x LPT (optional)	1 x COM1 (V.24); 1 x COM2 (V.24) (optional); 1 x LPT (optional)	1 x COM1 (V.24); 1 x COM2 (V.24) (optional); 1 x LPT (optional)		1 x COM1		1 x COM1	COM1: 1 x V.24 (RS 232)			**Serial / parallel**
VGA / DVI / DisplayPort	1 x VGA / 1 x DVI-D	1 x DVI-I / 1 x DisplayPort V1.2; 2 x VGA or 2 x DVI-D via PCIe graphics card (optional)	VGA via adapter cable; 1 x DVI-I / 2 x DisplayPort V1.2; 2 x VGA or 2 x DVI-D via PCIe graphics card (optional)	VGA via adapter cable; 1 x DVI-I / 2 x DisplayPort V1.2; 2 x VGA or 2 x DVI-D via PCIe graphics card (optional)		1 x DVI-D / 1 x DisplayPort		1 x DVI-D / 1 x DisplayPort	1 x DVI-I (VGA via adapter)			**VGA / DVI / DisplayPort**
Keyboard, mouse	2 x PS/2			2 x PS/2		Connection via USB interface		Connection via USB interface	Connection via USB interface			**Keyboard, mouse**
Audio	1 x Line In; 1 x Line Out; 1 x Mic.			1 x Mic.; 1 x Line Out		–		–	–			**Audio**
Monitoring / diagnostics functions												**Monitoring / diagnostics functions**
Basic functionality	–	Temperature; fan; watchdog; HDD; CMOS battery (alarm locally by means of SIMATIC IPC DiagBase software)	Temperature; fan; watchdog; HDD; RAID; SSD; CMOS battery (alarm locally by means of SIMATIC IPC DiagBase software)	Temperature; fan; watchdog; HDD; RAID; SSD; CMOS battery; redundant power supply (alarm locally via SIMATIC IPC DiagBase software)		Temperature; fan; watchdog; HDD; RAID; SSD; CMOS battery (alarm locally by means of SIMATIC IPC DiagBase software)		Temperature; fan; watchdog; HDD; RAID; SSD; CMOS battery (alarm locally by means of SIMATIC IPC DiagBase software)	Temperature; fan; watchdog; HDD; RAID; CFC; SSD; CMOS battery (alarm locally by means of SIMATIC IPC DiagBase software)			**Basic functionality**
Advanced functions	–	Temperature; fan; watchdog; hard drives (SMART) • System/Ethernet monitoring • Operating hours counter • Communication via Ethernet; SNMP and OPC interface (optionally via SIMATIC IPC DiagMonitor software)		Temperature; fan; watchdog; hard drives (SMART) • System/Ethernet monitoring • Operating hours counter • Communication via Ethernet; SNMP and OPC interface (optionally via SIMATIC IPC DiagMonitor software)		Temperature; fan; watchdog; hard drives (SMART) • System/Ethernet monitoring • Operating hours counter • Communication via Ethernet; SNMP and OPC interface (optionally via SIMATIC IPC DiagMonitor software)		Temperature; fan; watchdog; hard drives (SMART) • System/Ethernet monitoring • Operating hours counter • Communication via Ethernet; SNMP and OPC interface (optionally via SIMATIC IPC DiagMonitor software)	System monitoring: Operating hours counter for preventive maintenance, maintenance mode, network (LAN); SNMP and OPC interface (optionally via SIMATIC IPC DiagMonitor software)			**Advanced Functions**
Remote access	–	–	Via Intel Active Management Technology (iAMT) 9.0 and SIMATIC IPC Remote Manager	Via Intel Active Management Technology (iAMT) 9.0 (with Core i5, and Xeon) and SIMATIC IPC Remote Manager		Via Intel Active Management Technology (iAMT) 9.0 (Xeon) and SIMATIC IPC Remote Manager		Via Intel Active Management Technology (iAMT) 9.0 and SIMATIC IPC Remote Manager	Via Intel Active Management Technology (iAMT) 6.0 and SIMATIC IPC Remote Manager			**Remote access**
Front LEDs	POWER; HDD	POWER; HDD; TEMP; FAN	POWER; HDD; TEMP; FAN; HDD ALARM 1/2/3/4	POWER; HDD; ETHERNET 1/2; PROFIBUS/PROFINET; WATCHDOG; TEMP; FAN; HDD 0/1 ALARM	POWER; HDD; ETHERNET 1/2; PROFIBUS/PROFINET; WATCHDOG; TEMP; FAN; HDD 0/1/2/3 ALARM	1 x power; 3 x users (WinAC)		1 x power; 3 x users (WinAC)	–			**Front LEDs**
Ambient conditions												**Ambient conditions**
Degree of protection	IP20 front; IP20 rear	IP30 front; IP20 rear		IP41 front; IP20 rear		IP20		IP65 front; IP20 elsewhere	IP65 (at the front) tested according to EN 60529, NEMA 4; 15" Touch INOX: IP66K (at the front)			**Degree of protection**
Protection class	Protection class I according to IEC 61140	Protection class I according to IEC 61140		Protection class I according to IEC 61140		Protection class I according to IEC 61140		Protection class I according to IEC 61140	Protection class I according to IEC 61140			**Protection class**
Vibration during operation	–	20 to 58 Hz: 0.015 mm; 58 to 200 Hz: 2 m/s² (approx. 0.2 *g*)		10 to 58 Hz: 0.0375 mm; 58 to 500 Hz: 5 m/s² (approx. 0.5 *g*)		10 to 58 Hz: 0.075 mm; 58 to 500 Hz; 9.8 m/s² (approx. 1 *g*)		10 to 58 Hz: 0.075 mm; 58 to 500 Hz; 9.8 m/s² (approx. 1 *g*)	10 to 58 Hz: 0.075 mm; 58 to 500 Hz: 9.8 m/s² (ca. 1 *g*)			**Vibration during operation**
Shock during operation	–	9.8 m/s²; 20 ms (approx. 1 *g*)		50 m/s²; 30 ms (approx. 5 *g*)		50 m/s²; 30 ms (approx. 5 *g*)		50 m/s²; 30 ms (approx. 5 *g*)	50 m/s²; 30 ms (approx. 5 *g*)			**Shock during operation**
Relative humidity	–	5 to 80% at 25 °C (no condensation)		5 to 85% at 30 °C (no condensation)		5 to 80% at 25 °C (no condensation)		5 to 80% at 25 °C (no condensation)	5 to 80% at 25 °C (no condensation)			**Relative humidity**
Ambient temperature during operation	5 to 40 °C	5 to 40 °C at full processor performance		5 to 50 °C at full processor performance		55 °C/ 50 °C / 5 to 45 °C (10 W on PCI / 20 W on PCI / maximum configuration)		5 to 45 °C (maximum configuration)	5 to 45 °C (maximum configuration)			**Ambient temperature during operation**
Electromagnetic Compatibility (EMC)												**Electromagnetic Compatibility (EMC)**
Emitted interference	EN 61000-6-3; EN 61000-6-4; EN 61000-3-2 Class D	EN 61000-6-3; EN 61000-6-4; CISPR 22 / EN 55022 Class B; FCC Class A; EN 61000-3-2 Class D; EN 61000-3-3		EN 61000-6-3; EN 61000-6-4; CISPR 22 / EN 55022 Class B; FCC Class A; EN 61000-3-2 Class D; EN 61000-3-3		EN 61000-6-3; EN 61000-6-4; CISPR220 Class B; FCC Class A		EN 61000-6-3; EN 61000-6-4; CISPR220 Class B; FCC Class A	EN 61000-6-4 Class A; EN 61000-3-3; FCC Class A			**Emitted interference**
Approvals / directives												**Approvals / directives**
Safety	IEC 60950-1; IEC 61131-2	IEC 60950-1; EN 60950-1; UL 60950-1; CSA C22.2 No. 60950-1-07		IEC 60950-1; EN 60950-1; UL 60950-1; CSA C22.2 No. 60950-1-07		AC: EN 60950-1; UL 60950-1; CAN/CSA C22.2 No. 60950-1-03; DC: EN 61131-2; UL 508; CSA C22.2 No. 142		IEC/EN/DIN EN 60950-1	AC: EN 60950-1; UL 60950-1; CAN/CSA C22.2 No. 60950-1-03 DC: EN 61131-2; UL 508, CSA C22.2 No. 142			**Safety**
CE Mark / EU Directives, Certifications	CE for industrial use; cULus (UL 60950)	CE for use in residential, commercial and industrial sector; cULus (UL 60950); RoHS, KC; C-Tick		CE for use in residential, commercial and industrial sector; cULus (UL 60950); RoHS, KC; C-Tick		CE for residential, commercial and industrial use; cULus (UL 60950); RoHS, KC; C-Tick		CE for industrial sector; cULus according to UL 508	Industrial use; cULus (UL 508 and UL 60950); UL Class I [2] Div. 2; RoHS; KCC; C-Tick; shipbuilding; ATEX 22 (Ex)	add. with UL Class1 Div. 2; ATEX 22; KEMA 10ATEX0182 X Issue 1; C-Tick		**CE Mark / EU Directives, Certifications**
Dimensions and weight												**Dimensions and weight**
Installation dimensions (W x H x D) in mm	430 x 177 x 463	434 x 177 x 356	434 x 177 x 446	430 x 88 x 448	430 x 170 x 448	312 x 301 x 100 (with mounting rails; with DVD)	312 x 301 x 170 (with mounting rails; with DVD)	(W x H): 541 x 362	368 x 290 x 123 Front: 400 x 310	450 x 325 x 124 Front: 483 x 355	450 x 380 x 130 Front: 483 x 400	**Installation dimensions (W x H x D) in mm**
Weight	from 13 kg	from 15 kg	from 16 kg	from 16 kg	from 16 kg	approx. 6 kg	approx. 7 kg	approx. 15 kg	approx. 12.5 kg	approx. 15 kg	approx. 16.8 kg	**Weight**
Article number	6AG4012-0....-....	6AG4104-3...0-....	6AG4104-3....-....	6AG4112-2....	6AG4114-2....	6AG4131-2....	6AG4132-2....-....	6AV7260-.....-....	6AV789-.....-....	6AV7892-2....-....	6AV7894-.....-....	**Article number**

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Intuitive and fast operation through multitouch

The trend toward operation via gestures and/or multiple fingers can be found everywhere today – and its use in automation is no exception. The best example is the new Flat Panel monitors and Panel PCs. They offer an attractive design, industrially compatible widescreen displays and capacitive touch especially designed for industrial applications. This innovative touch technology enables fast and efficient operation of machinery and plant with intuitive single-finger and multiple-finger gestures or two-handed operation.



Original accessories for SIMATIC IPCs

The original SIMATIC accessories ensure the reliability of your automation solution. They are system-tested with SIMATIC IPCs as well as SIMATIC programming devices and meet the high quality requirements specific to EMC and functional applications in an industrial environment.

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www.siemens.com/ipc-expansion-components

SIMATIC IPC USB flash drive



With the 8 GB SIMATIC IPC USB flash drive (USB 2.0) in SLC technology we offer you a fast and reliable memory facility for mobile data transport in a rugged metal housing.

Uncomplicated handling thanks to plug & play, they are flexible and ready for immediate use – also as a boot medium, or in low-maintenance applications that do not include floppy or optical drives.

SIMATIC IPC CompactFlash and CFast



CompactFlash and CFast cards (up to 16 GB) ensure safe data storage at higher temperatures, vibration levels and shock loads.

Further benefits:
- long-term availability
- diagnostics capability for monitoring with the SIMATIC IPC DiagMonitor

SIMATIC IPC Service USB flash drive



The 8 GB Service USB flash drive is an indispensable tool for setting up, maintaining and servicing SIMATIC IPCs – ready for immediate use thanks to preinstalled software products:

- SIMATIC IPC BIOS Manager
- SIMATIC IPC Image & Partition Creator

SIMATIC IPC keyboards / mouse / touch pen



SIMATIC IPC offers suitable ergonomic input devices especially for industrial use:
- 19" slide-in, full-stroke or IP65 membrane keyboard
- Touch pen, mounted in a special holder next to the Panel PC (cannot be detached)
- Optical mouse with non-slip surface coating, three buttons, including a large scroll wheel, and symmetrical housing design for right-handed and left-handed operators. Thanks to innovative BlueTrack technology, it can also be used without a mouse pad on a host of surfaces, such as granite.

ANEXO V –PLC SIEMENS–

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SIMATIC

ET 200S distributed I/O IM 151-8 PN/DP CPU interface module

Operating Instructions

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Appendix A

06/2008
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Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

⚠ WARNING

This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Industry Sector
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℗ 07/2008

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Preface

Purpose of the operating instructions

These operating instructions are intended to supplement the *ET 200S Distributed I/O System* Operating Instructions. It contains a description of all the functions performed by the IM 151-8 PN/DP CPU interface module. The operating instructions do not include functions that relate generally to ET 200S. These can be found in the *ET 200S Distributed I/O System* Operating Instructions.

The information contained in these operating instructions and the *ET 200S Distributed I/O System* Operating Instructions allows you to commission ET 200S with the IM 151-8 PN/DP CPU interface module and to run it as an IO controller on the PROFINET.
You will also find information on how the IM 151-8 PN/DP CPU interface module can be operated together with the DP master module on the PROFIBUS DP.

Basic knowledge required

To understand these operating instructions you should have general experience in the field of automation engineering.

Range of validity of these operating instructions

These Operating Instructions are valid for

- the IM 151-8 PN/DP CPU interface module (order number 6ES7151-8AB00-0AB0)
- the DP master module (order number 6ES7138-4HA00-0AB0)
- the components of the ET 200S distributed I/O system specified in the *ET 200S Distributed I/O System* Operating Instructions.

Note

The special features of the IM 151-8F PN/DP CPU interface module can be found as product information on the Internet under
http://support.automation.siemens.com/WW/view/en/11669702/133300.

These operating instructions contain a description of the components that was valid at the time of publication. We reserve the right to issue a Product Information which contains up-to-date information about new components and new versions of components.

Changes since the previous version

These operating instructions are the first version published.

Guide

The operating instructions contain the following guides which provide quick access to the specific information you need:

- At the beginning of the documentation you will find a comprehensive table of contents.
- Important terms are explained in the glossary.
- Navigate to the most important topics in our documents using the index.

Recycling and disposal

The IM 151-8 PN/DP CPU interface module is recyclable due to its non-toxic materials. For environmentally compliant recycling and disposal of your electronic waste, please contact a company certified for the disposal of electronic waste.

Further support

If you have any questions relating to the products described in these operating instructions, and do not find the answers in this document, please contact your Siemens partner at our local offices.

http://www.siemens.com/automation/partner

The portal to our technical documentation for the various SIMATIC products and systems is available at:

http://www.siemens.com/automation/simatic/portal

The online catalog and ordering system are available at:

http://www.siemens.com/automation/mall

Training center

We offer courses to help you get started with the ET 200S and the SIMATIC S7 automation system. Please contact your regional training center or the central training center in D - 90327, Nuremberg, Germany.
Phone: +49 (911) 895-3200.

http://www.siemens.com/sitrain

Technical Support

You can reach technical support for all A&D projects

- using the support request web form:
  http://www.siemens.com/automation/support-request
- Phone: + 49 180 5050 222
- Fax: + 49 180 5050 223

For additional information about our technical support, refer to the Internet at

http://www.siemens.com/automation/service

Service & Support on the Internet

In addition to our documentation services, you can also make use of our comprehensive online knowledge base on the Internet.

http://www.siemens.com/automation/service&support

There you will find:

- Our Newsletter, which constantly provides you with the latest information about your products.
- The right documentation for you using our Service & Support search engine.
- The bulletin board, a worldwide knowledge exchange for users and experts.
- Your local contact for Automation & Drives in our contact database.
- Information about on-site services, repairs, spare parts. Lots more can be found on our "Services" pages.

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Description

1

1.1 Function of the IM 151-8 PN/DP CPU interface module

The IM 151-8 PN/DP CPU interface module is a component of the ET 200S distributed I/O system with degree of protection IP20. The IM 151-8 PN/DP CPU interface module is an "intelligent preprocessor". It enables you to decentralize control tasks.

Therefore, an ET 200S with IM 151-8 PN/DP CPU can exercise full and, if necessary, independent control over a process-related functional unit. An IM 151-8 PN/DP CPU interface module can be

- either an IO controller or a PROFINET CBA device (with or without proxy functionality for PROFIBUS DP) on the PROFINET The DP master module must also be connected for the proxy functionality for PROFIBUS DP.
- a DP master on the PROFIBUS DP together with the optional DP master module.

The use of the IM 151-8 PN/DP CPU interface module leads to further modularization and standardization of process-related functional units and simple, clear machine concepts.

1.2 Properties of the IM 151-8 PN/DP CPU interface module

Properties of the IM 151-8 PN/DP CPU interface module

The IM 151-8 PN/DP CPU interface module has the following special features:

- The interface module has PLC functionality (integrated CPU component with 128 KB working memory).
- The interface module can only be used with the load memory inserted (SIMATIC Micro Memory Card).
- The interface module can be enhanced with up to 63 I/O modules from the ET 200S range.
- The maximum bus length is 2 m.
- Connection to PROFINET via a PROFINET interface with integrated switch and 3 RJ45 ports.
  - The IP address for PROFINET is saved alongside the HW Config configuration on the SIMATIC Micro Memory Card.
  - Communication takes place via PROFINET, in doing so both PROFINET IO (up to 128 IO devices can be connected) and PROFINET CBA are supported.
- As a PROFINET IO controller, the IM 151-8 PN/DP CPU interface module also supports
  - the real-time communication via RT and IRT,
  - the prioritized start-ups of PROFINET IO devices,
  - the device replacement without removable media / PD and
  - changing IO devices during operation (changing partner ports).
- Down times are minimized thanks to the integrated diagnostics.
- It is possible to update the firmware via SIMATIC Micro Memory Card or online via the network.
- An integrated web server for information, status and diagnostics provides the respective data to any location.
- The interface module has a mode selector with positions for RUN, STOP and MRES.
- There are 10 LEDs on the front of the interface module to indicate the following:
  - ET 200S faults (SF)
  - bus faults on PROFINET (BF-PN)
  - available maintenance information (MT)
  - Supply voltage for electronic components (ON)
  - Force requests (FRCE)
  - operating mode of the IM 151-8 PN/DP CPU interface module (RUN and STOP)
  - Connection status at ports 1 and 3 of the PROFINET interface (P1 - LINK, P2 - LINK, P3 - LINK)
- The IM 151-8 PN/DP CPU interface module can be expanded by **one** DP master module. This also lends it the functionality of a DP master.

Integration of the IM 151-8 PN/DP CPU interface module in ET 200S

The IM 151-8 PN/DP CPU interface module is integrated in ET 200S just like any other module; i. e. same configuration concept, installation and expansion capability. Information on this can be found in the *ET 200S distributed I/O system* Operating Instructions.

How do I configure and program the ET 200S with IM 151-8 PN/DP CPU ?

To configure an ET 200S with IM 151-8 PN/DP CPU (configuration and parameter assignment) and to program the IM 151-8 PN/DP CPU interface module you will need the *STEP 7* project design software, V5.4 + ServicePack 4 or later.
The procedure for configuring the ET 200S with IM 151-8 PN/DP CPU is described in the *Commissioning* section of these Operating Instructions. In the *S7-300 Instruction List* you will find the *STEP 7* instruction set for programming the IM 151-8 PN/DP CPU interface module.
The instruction list can be found on the Internet under http://www.siemens.com/automation/service&support, entry ID 13206730.

Constraints on using motor starters and ET 200S modules

With central use in an ET 200S with IM 151-8 PN/DP CPU the following motor starters and ET 200S modules can cause disturbing responses. The product versions specified of these motor starters and ET 200S modules should **not** be used in an ET 200S with IM 151-8 PN/DP CPU.

Table 1-1 Constraints on using motor starters and ET 200S modules

Motor starter / module	Order number	Up to and including product version
DS1e-x direct-on-line starter; HF	3RK1301-0❑B10-❑AA2	E06
RS1e-x reversing starters; HF		
F-DS1e-x fail-safe direct starters; HF	3RK1301-0❑B13-❑AA2	E06
F-RS1e-x fail-safe reversing starters; HF		
DS1e-x direct-on-line starter; HF	3RK1301-0❑B❑0-❑AA3	E03
RS1e-x reversing starters; HF		
DSS1e-x direct soft starters; HF		
DS1e-x direct-on-line starter; HF	3RK1301-0❑B❑❑-❑AA4	E02
RS1e-x reversing starters; HF		
DSS1e-x direct soft starters; HF		
F-DS1e-x fail-safe direct starters; HF		
F-RS1e-x fail-safe reversing starters; HF		
2AI I 2WIRE HS analog electronic module	6ES7134-4GB52-0AB0	E03
2 AI I 4WIRE HS analog electronic module	6ES7134-4GB62-0AB0	E01
Analog electronic module 2AI U HS	6ES7134-4FB52-0AB0	E01
2AO I HS analog electronic module	6ES7135-4GB52-0AB0	E01
2AO U HS analog electronic module	6ES7135-4FB52-0AB0	E03

1.3 Properties of the DP master module

Together with the DP master module you can operate the IM 151-8 PN/DP CPU interface module as a DP master.

Note

The IM 151-8 PN/DP CPU interface module can be expanded by no more than **one** DP master module.

Properties of the DP master module

The DP master module has the following special features:

- The PROFIBUS DP address is saved alongside the HW Config configuration on the SIMATIC Micro Memory Card in the IM 151-8 PN/DP CPU interface module.
- There is 1 LED on the front of the DP master module to indicate bus faults on the PROFIBUS DP (BF).
- Connection to PROFIBUS DP via the DP interface (RS 485) on the DP master module

Integration of the DP master module in ET 200S

The DP master module is connected to the IM 151-8 PN/DP CPU from the right and hence integrated in the ET 200S.

How do I configure and program the ET 200S with IM 151-8 PN/DP CPU and master module?

To configure an ET 200S with IM 151-8 PN/DP CPU and DP master module (configuration and parameter assignment) and to program the IM 151-8 PN/DP CPU interface module you will need the *STEP 7* project design software, V5.4 + ServicePack 4 or later.
The procedure for configuring the ET 200S with IM 151-8 PN/DP CPU and DP master module is described in the *Commissioning* section of these Operating Instructions.

1.4 Example configurations

Example configuration of an ET 200S with IM 151-8 PN/DP CPU

The figure below shows an example configuration of an ET 200S with IM 151-8 PN/DP CPU.

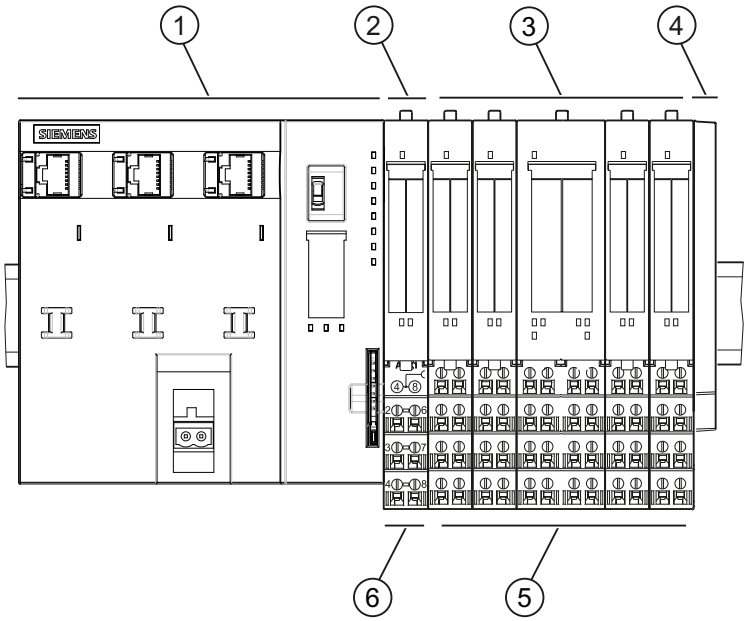


Figure 1-1 View of the ET 200S distributed I/O system with IM 151-8 PN/DP CPU

① IM 151-8 PN/DP CPU interface module
② PM-E power module for electronic modules
③ Electronic modules
④ Terminating module
⑤ TM-E terminal modules for electronic modules
⑥ TM-P terminal modules for PM-E power modules

Example configuration of an ET 200S with IM 151-8 PN/DP CPU and DP master module

The figure below shows an example configuration of an ET 200S with IM 151-8 PN/DP CPU and DP master module.

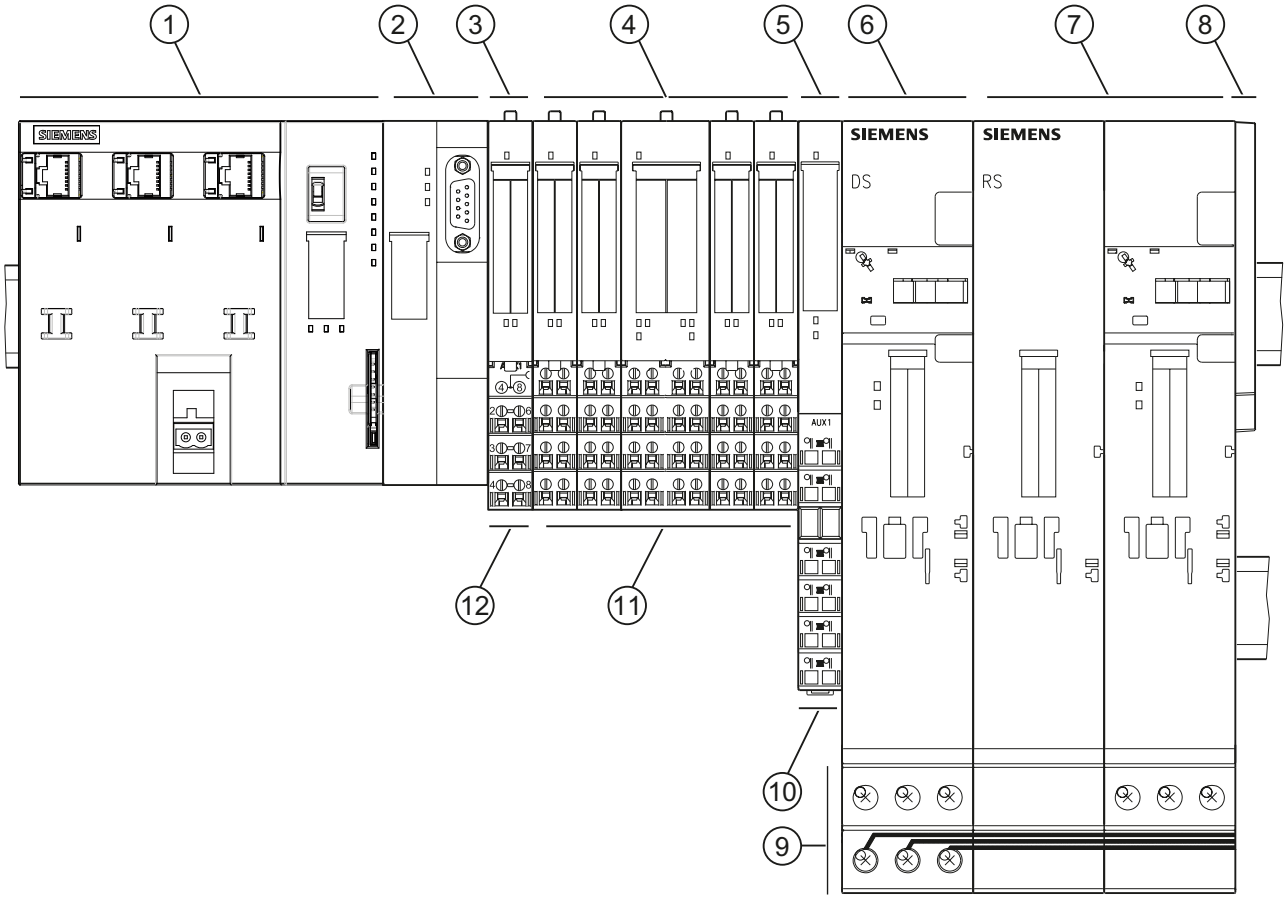


Figure 1-2 View of the ET 200S distributed I/O system with IM 151-8 PN/DP CPU and DP master module

① IM 151-8 PN/DP CPU interface module
② DP master module
③ PM-E power module for electronic modules
④ Electronic modules
⑤ PM-D power module for motor starters
⑥ Direct starters
⑦ Reversing starter
⑧ Terminating module
⑨ Power bus
⑩ TM-P terminal module for PM-D power modules
⑪ TM-E terminal modules for electronic modules
⑫ TM-P terminal modules for PM-E power modules

Operating and display elements

2

2.1 Operating and display elements of the IM 151-8 PN/DP CPU interface module

Operating and display elements

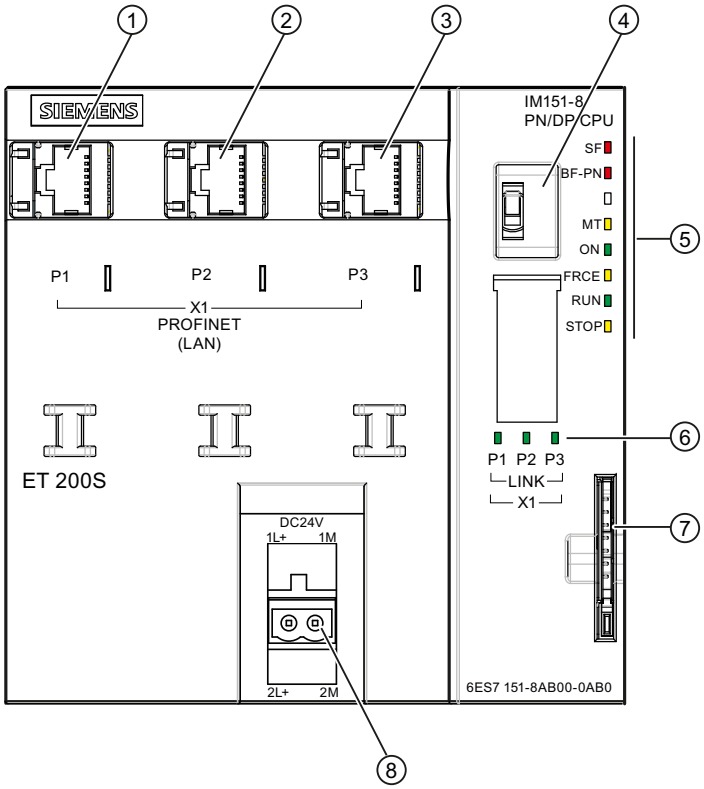


Figure 2-1 Operating and display elements of the IM 151-8 PN/DP CPU interface module

The figure shows ...	the following elements of the IM 151-8 PN/DP CPU interface module
①	RJ45 socket (port 1 of the PROFINET interface)
②	RJ45 socket (port 2 of the PROFINET interface)
③	RJ45 socket (port 3 of the PROFINET interface)
④	Mode selector switch
⑤	Status and error displays of the IM 151-8 PN/DP CPU interface module
⑥	Status displays of the PROFINET interface
⑦	Slot for the SIMATIC Micro Memory Card
⑧	Connection for supply voltage

Slot for the SIMATIC Micro Memory Card

Memory module is a SIMATIC Micro Memory Card. You can use MMCs as load memory and as portable storage media. The slot for the SIMATIC Micro Memory Card can be accessed from the front of the interface module. The *Inserting/Replacing a Micro Memory Card* section contains detailed information on inserting the SIMATIC Micro Memory Card.

Note

The IM151-8 PN/DP CPU interface module does not have an integrated load memory, so you will need to connect a SIMATIC Micro Memory Card to the IM 151-8 PN/DP interface module in order to use it.

Mode selector switch

You can use the mode selector switch to set the current operating mode of the IM 151-8 PN/DP CPU .

Table 2-1 Mode selector switch settings

Position	Meaning	Description
RUN	RUN mode	The IM 151-8 PN/DP CPU interface module processes the user program.
STOP	STOP mode	The IM 151-8 PN/DP CPU interface module does not process the user program.
MRES	Memory reset	Mode selector switch setting for • Memory reset of the IM 151-8 PN/DP CPU interface module • Backing up the firmware to the SIMATIC Micro Memory Card • Resetting to the as-supplied state A memory reset using the mode selector requires a number of steps to be carried out in a set order.

Reference

- Operating modes of the IM 151-8 PN/DP CPU interface module: *STEP 7 Online Help.*
- Information on performing a memory reset of the IM 151-8 PN/DP CPU interface module: Section *Resetting the IM 151-8 PN/DP CPU interface module using the mode selector switch)*
- Evaluation of the LEDs for errors or diagnostics: See the *Diagnostics using status and error LEDs* section.

See also

Inserting/Replacing a SIMATIC Micro Memory Card (Page 106)

2.2 Status and error displays of the IM 151-8 PN/DP CPU interface module

General status and error displays

Table 2-2 General status and error displays of the IM 151-8 PN/DP CPU interface module

LED designation	Color	Meaning
SF	Red	Group fault for hardware or software error
MT	Yellow	Maintenance information
ON	Green	Supply voltage for the IM 151-8 PN/DP CPU
FRCE	Yellow	LED is lit: Active force job LED flashes at 2 Hz: Node flash test function.
RUN	Green	IM 151-8 PN/DP CPU in RUN The LED flashes during STARTUP at a rate of 2 Hz, and in HOLD state at 0.5 Hz.
STOP	Yellow	IM 151-8 PN/DP CPU in STOP or in HOLD or STARTUP The LED flashes at 0.5 Hz when the CPU requests a memory reset, and during the reset at 2 Hz.

Status and error displays for the bus interfaces

Table 2-3 Status and error displays for the bus interfaces of the IM 151-8 PN/DP CPU interface module

LED designation	Color	Meaning
BF-PN	Red	Bus fault on the PROFINET
P1 - LINK	Green	Connection at port 1 is active
P2 - LINK	Green	Connection at port 2 is active
P3 - LINK	Green	Connection at port 3 is active

Reference

- Operating modes of the IM 151-8 PN/DP CPU interface module: *STEP 7 Online Help*
- Information on performing a memory reset of the IM 151-8 PN/DP CPU interface module: Section *Resetting the IM 151-8 PN/DP CPU interface module using the mode selector switch)*
- Evaluation of the LEDs for errors or diagnostics: See the *Diagnostics using status and error LEDs* section

2.3 Display elements of the DP master module

Display elements

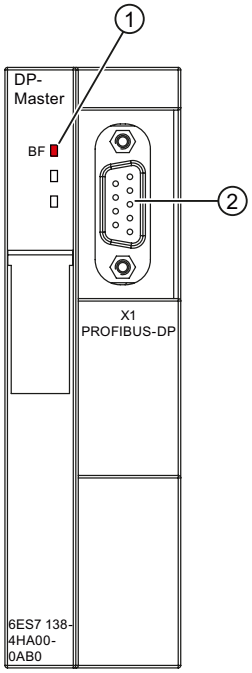


Figure 2-2 Display elements of the DP master module

The figure shows ...	the following elements of the DP master module
①	Status and error displays
②	9-pin sub D socket for PROFIBUS DP

Communication 3

3.1 Interfaces

3.1.1 PROFINET (PN)

Availability

The IM151-8 PN/DP CPU interface module has a PROFINET interface with integral switch and 3 ports (RJ45 sockets).
At these ports it is possible, for example, to configure the network with a line structure or with no additional external switch. You can also connect an additional PROFINET device (e.g. a PD for commissioning or an OP to operate and monitor).

Connecting to Industrial Ethernet

You can use the integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module to establish a connection to Industrial Ethernet.

The integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module is configured via the PROFINET interface.

Time Synchronization using PROFINET

The IM 151-8 PN/DP CPU interface module can be used as a time client at the PROFINET interface by using the NTP method. This is set in HW Config. The default setting is no time synchronization.

As the time client, the IM 151-8 PN/DP CPU receives synchronization message frames from a time NTP server (e.g. SICLOCK TS) and accepts this time as its own internal time.

In addition to time synchronization at the PROFINET interface, there is also time synchronization at the DP interface of the DP master module. The IM 151-8 PN/DP CPU interface module can be the time slave on only one of these interfaces.
At the PN interface, there is **only** the functionality as a time client (functionality is the same as that of a time slave at the DP interface).

Example: The IM 151-8 PN/DP CPU interface module is synchronized by a time server over NTP via the PN interface (corresponding to the functionality as a time slave). The IM 151-8 PN/DP CPU interface module can then only be used as a time master at the DP interface.

Devices capable of PROFINET (PN) communication

- PROFINET IO devices (for example, interface module IM 151-3 PN in an ET 200S)
- S7-300 / S7-400 with PROFINET interface (for example, CPU 317-2 PN/DP or CP 343-1)
- Active network components (a switch, for example)
- IE/PB link
- Programming device / PC with network card

Properties of the PROFINET interface

Properties	
IEEE standard	802.3
Connector design	
• Ports 1 to 3	RJ45
Transmission speed	Up to 100 Mbps
Media	Twisted pair Cat5 (100 BASE-TX)

Note

Networking PROFINET components

The use of switches, rather than hubs, for networking PROFINET components brings about a substantial improvement in decoupling bus traffic, and improves runtime performance under higher bus load. PROFINET CBA with cyclic PROFINET interconnections requires the use of switches in order to maintain compliance with performance specifications. Full duplex mode at 100 Mbps is mandatory for cyclic PROFINET interconnections.

PROFINET IO also requires the use of switches and 100 Mbps full duplex mode.

For PROFINET IO in IRT mode (Isochronous Real Time) all PROFINET devices in the sync domain must be IRT-capable, even the switches.

Configuring the port properties of the PROFINET interface in *STEP 7*

The PROFINET interfaces in our devices are preset to a default "automatic setting" (Autonegotiation). Ensure that all devices connected to the PROFINET interface of the IM 151-8 PN/DP CPU interface module are also set to the "Autonegotiation" operating mode. This is the default setting of standard PROFINET / Ethernet components.

If you connect a device to the PROFINET interface of the IM 151-8 PN/DP CPU interface module that does not support the "automatic setting" (Autonegotiation) operating mode, or if you select a setting other than the "automatic setting" (Autonegotiation), note the following:

- PROFINET IO and PROFINET CBA require operation with 100 Mbps full-duplex, i.e. when the PROFINET interface of the IM 151-8 PN/DP CPU interface module for PROFINET IO / CBA communication and Ethernet communication is used at the same time, the PROFINET interface can only be operated with 100 Mbps full-duplex.
- If the PROFINET interface of the IM 151-8 PN/DP CPU interface module is used only for Ethernet communication, alongside the "automatic setting" (Autonegotiation) 100 Mbps full-duplex or 10 Mbps full-duplex operating modes can be used. Half-duplex mode is not allowed in any situation.

Reason: If, for example, a switch permanently set to "10 Mbps half-duplex" is connected to the PROFINET interface of the IM 151-8 PN/DP CPU interface module, due to the "Autonegotiation" setting the IM 151-8 PN/DP CPU interface module forwards this setting to the partner device - i.e. the communication operates de facto with "10 Mbps half-duplex". However, since PROFINET IO and PROFINET CBA require operation with 100 Mbps full-duplex, this operating mode is not allowed.

Note

To configure the ports of IO devices which are to perform a prioritized start-up refer to the special information under *PROFINET System Description*.

Disabling a port of the PROFINET interface with IM 151-8 PN/DP CPU

In *STEP 7* HW Config you can disable a port of the PROFINET interface of an IM 151-8 PN/DP CPU interface module. This is enabled as default.

The IM 151-8 PN/DP CPU interface module cannot be reached via a disabled port in the PROFINET interface.

Note that it is not possible to perform communication functions, like for example, PD / OP functions, open IE communications or S7 communication, via a disabled port.

Note

In the case of an IM 151-8 PN/DP CPU interface module one port must always be enabled so that access to the module is always guaranteed.

Addressing the ports

To diagnose the individual ports of a PROFINET interface, these ports must each have a separate diagnostics address. The addressing is done in HW Config.
For further information, refer to the *PROFINET System Description*.

The diagnostic message (fault and maintenance information) can be enabled using OB 82 (enable in HW Config) and then analyzed using SFB 54, for example, in order to diagnose any problems identified in the user program. There are also various data records (read using SFB 52) and system status lists (read using SFC 51) provided for more detailed diagnostics.

Diagnostics is also possible in *STEP 7* (e.g. communication diagnostics, network connection, Ethernet statistics, IP parameters, etc).

Send clock and send cycle

The IM151-8 PN/DP CPU interface module operating as IO controller supports send clocks of 250 µs, 500 µs or 1 ms.

Controllers and devices with a standardized send clock can be used in a PROFINET IO subnet. For devices that do not support a faster controller send clock, the send clock is adapted to the capabilities of the device. That is, you could operate devices both at a send clock of 250 µs and 1 ms on a IM151-8 PN/DP CPU interface module (IO controller) which operates at a send clock of 250 µs.

The device send cycle can be set within a relatively large range. This, in turn, depends on the send clock. The following update times can be configured when using the IM151-8 PN/DP CPU interface module:

Send clock		Update Time
250 µs	⇒	250 µs to 128 ms
500 µs	⇒	500 µs to 256 ms
1 ms	⇒	1 ms to 512 ms

The minimum send cycle depends on the number of devices in use, the amount of configured user data and the communication portion for PROFINET IO. *STEP 7* automatically considers these dependencies during configuration.

Reference

- Details of how to configure the integral PROFINET interface of the IM 151-8 PN/DP CPU interface module are given in the *Connecting a PD/PC to the integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module* and *Commissioning PROFINET IO* sections.
- For additional information on PROFINET, refer to *PROFINET System Description*.

  There you will also find descriptions regarding the functionalities
  - Real-time communication (RT and IRT)
  - Device replacement without removable medium
  - Prioritized startup of IO devices
  - Changing IO devices during operation (changing partner ports)
- Extensive information on the subject of Ethernet networks, network configuration and network components can be found in the *SIMATIC NET, Twisted Pair and Fiber Optic Networks* Manual.
  This can be found on the Internet at
  http://www.siemens.com/automation/service&support, entry ID 8763736
- *Component Based Automation, Commissioning Systems - Tutorial,* entry ID 18403908
- Additional information about PROFINET at http://www.profinet.com

See also

Connecting a programming device / PC to the integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module (Page 115)

Configuring and commissioning the PROFINET IO system (Page 123)

3.1.2 PROFIBUS DP

Availability

Together with the optional DP master module, the IM 151-8 PN/DP CPU interface module has an RS 485 interface with DP master functionality.

Properties

The PROFIBUS DP interface on the DP master module is mainly used to connect distributed I/O. PROFIBUS DP allows you to create large subnets, for example.

You can configure the PROFIBUS DP interface as master or to be inactive. It allows a transmission rate of up to 12 Mbps.

The IM 151-8 PN/DP CPU broadcasts its bus parameters (such as the baud rate) to the PROFIBUS DP interface when it is used as the master. A programming device, for example, can thus receive the correct parameters and automatically connect to a PROFIBUS subnet. In your configuration you can specify to disable bus parameter broadcasting.

Time synchronization using PROFIBUS

Time synchronization is possible via the DP interface on the DP master module of the IM 151-8 PN/DP CPU interface module. The IM 151-8 PN/DP CPU may act as the time master (with suitably programmed synchronization interval) or time slave. This is set in HW Config. The default setting is no time synchronization.

As the time master, the IM 151-8 PN/DP CPU interface module sends synchronization message frames to the DP interface at the configured synchronization interval in order to synchronize other stations on the connected PROFIBUS DP subnet.

If the IM151-8 PN/DP CPU interface module is configured on the DP interface as time master, then there will be no time synchronization of the connection time slaves, as the clock of the IM 151-8 PN/DP CPU interface module is still set to default.
Note that the clock of the IM151-8 PN/DP CPU interface module is not yet set when it ships, after a reset to factory setting by means of the mode selector switch or after a firmware update.

As soon as the time of day is set the first time, the time synchronization starts as the time master by means of:

- PD function
- SFC call or
- a different time master (if the IM 151-8 PN/DP CPU interface module has also be configured as a time client by the PROFINET interface).

As the time slave, the IM 151-8 PN/DP CPU interface module receives synchronization message frames from a different time master and accepts this time as its own internal time.

In addition to time synchronization at the DP interface of the DP master module, there is also time synchronization at the PROFINET interface. The IM 151-8 PN/DP CPU interface module can be the time slave on only one of these interfaces. At the PN interface, it can only act as a time client (functionality is the same as that of a time slave at the DP interface).

Example: The IM 151-8 PN/DP CPU interface module is time synchronized by a time server over NTP via the PN interface. The IM 151-8 PN/DP CPU interface module can then only be used as a time master at the DP interface.

Devices capable of PROFIBUS DP communication

- Programming device / PC
- OP/TP
- DP slaves
- Actuators/Sensors
- S7-300/S7-400 with PROFIBUS DP interface

Reference

Additional information on PROFIBUS: http://www.profibus.com

3.2 Communication services

3.2.1 Overview of communication services

Selecting the communication service

You need to decide on a communication service, based on functionality requirements. Your choice of communication service will have no effect on:

- The functionality available
- Whether an S7 connection is required or not
- The time of connecting

The user interface can vary considerably (SFC, SFB, ...), and is also determined by the hardware used (IM 151-8 PN/DP CPU, PC, ...).

Overview of communication services

The table below provides an overview of the communication services provided by the IM 151-8 PN/DP CPU interface module.

Table 3-1 Communication services of the IM 151-8 PN/DP CPU interface module

Communication service	Functionality	Time at which the S7 connection is established ...	via PN	via DP (optional)
Programming device communication	Commissioning, test, diagnostics	From the programming device, starting when the service is used	X	X
OP communication	Control and monitoring	From the OP at Power ON	X	X
S7 communication	Data exchange in server and client mode: Configuration of communication required	from the active partner at power on.	X	Only in server mode
Global data communication	Cyclic data exchange (for example, bit memory)	Does not require an S7 connection	–	–
Routing programming device functions	for example testing, diagnostics on other networks also	From the programming device, starting when the service is used	X	X
Data set routing	e.g. configuration and diagnostics of field devices on PROFIBUS DP, if the PD with the associated configuration tool (e.g. PDM) is not connection to the same PROFIBUS DP subnet as that of the field device, but, for example, on the PROFINET subnet at which the PN interface of the IM 151-8 PN/DP CPU interface module is also connected.	from the PD, starting when the service is being used	X	X

Communication service	Functionality	Time at which the S7 connection is established ...	via PN	via DP (optional)
PROFIBUS DP	Data exchange between master and slave	Does not require an S7 connection	–	X only as DP master
PROFINET CBA	Data exchange by means of component based communication	Does not require an S7 connection	X	–
PROFINET IO	Data exchange between IO controllers and the IO devices	Does not require an S7 connection	X	–
Web server	Diagnostics	Does not require an S7 connection	X	–
SNMP (Simple Network Management Protocol)	Standard protocol for network diagnostics and configuration	Does not require an S7 connection	X	–
Open communication by means of TCP/IP	Data exchange via Industrial Ethernet with TCP/IP protocol (by means of loadable FBs)	Does not require an S7 connection, is handled in the user program by means of loadable FBs	X	–
Open communication by means of ISO on TCP	Data exchange via Industrial Ethernet with ISO-on-TCP protocol (by means of loadable FBs)	Does not require an S7 connection, is handled in the user program by means of loadable FBs	X	–
Open communication by means of UDP	Data exchange via Industrial Ethernet with UDP protocol (by means of loadable FBs)	Does not require an S7 connection, is handled in the user program by means of loadable FBs	X	–

See also

Distribution and availability of S7 connection resources (Page 69)

Connection resources for routing (Page 70)

3.2.2 PG communication

Properties

Programming device communication is used to exchange data between engineering stations (programming device, PC, for example) and SIMATIC modules which are capable of communication. This service is available via PROFIBUS and Industrial Ethernet subnets. Transition between subnets is also supported.

Programming device communication provides the functions needed to download / upload programs and configuration data, to run tests and to evaluate diagnostic information. These functions are integrated in the operating system of the IM 151-8 PN/DP CPU interface module.

An IM 151-8 PN/DP CPU interface module can maintain several simultaneous online connections to one or multiple programming devices.

IM 151-8 PN/DP CPU without configured PROFINET interface

If your IM 151-8 PN/DP CPU interface module still does not have a configured PROFINET interface (IP address), you can nevertheless communication from the PD with the IM 151-8 PN/DP CPU interface module.

- The IM 151-8 PN/DP CPU interface module logs on to the SIMATIC Manager with its MAC address via "Available nodes".

  If the Ethernet interface of the PD is set to "TCP/IP (Auto)", then during the first establishment of a communication connection (e.g. call of the module status or the online table of contents of the CPU), a temporary IP address is automatically assigned by the PD to the PG interface of the IM 151-8 PN/DP CPU interface module. This is then maintained until the next power off / power on or memory reset, or until a HW configuration with a differing (retentive) IP address is loaded.

- Whilst downloading the parameters of the HW Config, the correct IP address can be allocated to IM 151-8 PN/DP CPU interface module during the loading process. The procedure for this can be found in section *Connecting a PD / PC to the integrated PROFINET interface of the an IM151-8 PN/DP CPU interface module*.

3.2.3 OP communication

Properties

OP communication is used to exchange data between operator stations (OP, TP, for example) and SIMATIC modules which are capable of communication. This service is available via PROFIBUS and Industrial Ethernet subnets.

OP communication provides functions you require for monitoring and modifying. These functions are integrated in the operating system of the IM 151-8 PN/DP CPU interface module.

An IM 151-8 PN/DP CPU interface module can maintain several simultaneous online connections to one or different OPs.

It is only after the PN interface of the IM 151-8 PN/DP CPU interface module has been operated with a configured IP address that an OP be run on the interface.

3.2.4 S7 communication

Properties

The IM 151-8 PN/DP CPU interface module can act as either a server or a client in S7 communication. A distinction is made between:

- Communication with unilateral configuration (for PUT/GET only)
- Communication with bilateral configuration (for USEND, URCV, BSEND, BRCV, PUT, GET)

The available functionality is described in the following table.

Table 3-2 client and server in S7 communication, using connections with unilateral / bilateral configuration

Interface module	Use in server mode for connections with unilateral configuration	Use in server mode for connections with bilateral configuration	Use as client
IM 151-8 PN/DP CPU	Usually possible at the DP/PN interface without programming the user interface	Possible at the PN interface with loadable FBs	Possible at the PN interface with loadable FBs

The user interface is implemented using standard function blocks (FBs) under communication blocks in the standard *STEP 7* library.

Reference

For additional information on communication, refer to the *Communication with SIMATIC* manual.

3.2.5 Routing

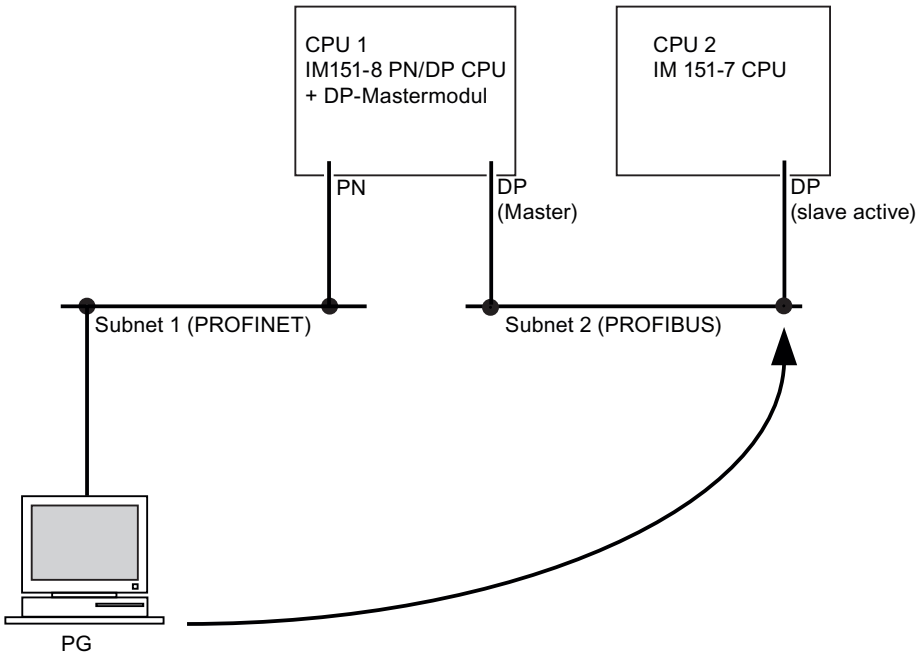
Properties

As of *STEP 7* V5.4 + SP 4 you can use the PD / PC via your IM 151-8 PN/DP CPU interface module (with DP master module) to reach a CPU in a different subnet, in order, for example, to

- Download user programs
- Download a hardware configuration, or
- Perform debugging and diagnostic functions.

Routing network nodes: PROFINET - PROFIBUS

Gateways between subnets are routed in a SIMATIC station that is equipped with interfaces to the respective subnets. The figure below shows the access from PROFINET to PROFIBUS. The CPU 1 (IM 151-8 PN/DP CPU with DP master module) is the router between subnet 1 and subnet 2.



Number of connections for routing

A maximum of 4 connections are available on the PROFINET interface of the IM 151-8 PN/DP CPU interface module for the routing function.

Requirements

- The station modules are "capable of routing" (CPUs or CPs).
- The network configuration does not exceed project limits.
- The modules have loaded the configuration data containing the latest "knowledge" of the entire network configuration of the project.

  Reason: All modules participating in the network transition must receive the routing information defining the paths to other subnets.
- In your network configuration, the programming device/PC you want to use to establish a connection via network node must be assigned to the network it is physically connected to.

Reference

Additional information

- About configuring with *STEP 7* can be found in the *Configuring Hardware and Connections in STEP 7* manual
- On communication are found in the *Communication with SIMATIC* Manual.
- On SFCs, refer to the *S7-300 Instruction List*.
  A detailed description is given in the *STEP 7 Online Help* or *System and Standard Functions for S7-300/400* Reference Manual.

3.2.6 Data set routing

Availability

The IM 151-8 PN/DP CPU interface module supports data set routing if a DP master module is connected to it.

Routing and data set routing

Routing is the transfer of data beyond network boundaries. You can send information from a transmitter to a receiver across several networks.

Data record routing is an expansion of the "standard routing" and is used, for example, by *SIMATIC PDM*. The data sent through data set routing includes the parameters for the participating field devices (slaves) as well as device-specific information (e.g. setpoint values, limit values, etc.). The structure of the target address for data record routing depends on the data contents, i.e. the slave to which the data is to be sent.

With the PD, e.g. a parameter set that already exists on the field device can be read, edited and then sent back to the field device if the PD is not connected to the same PROFIBUS DP subnet as that of the field device.

The field devices themselves do not have to support data set routing, since they do not forward the information received.

Data set routing

The following figure shows the access of the PD to a variety of field devices. In doing so, the PD is connected via PROFINET to the IM 151-8 PN/DP CPU interface module. The IM 151-8 PN/DP CPU interface module communicates via PROFIBUS with the field devices.

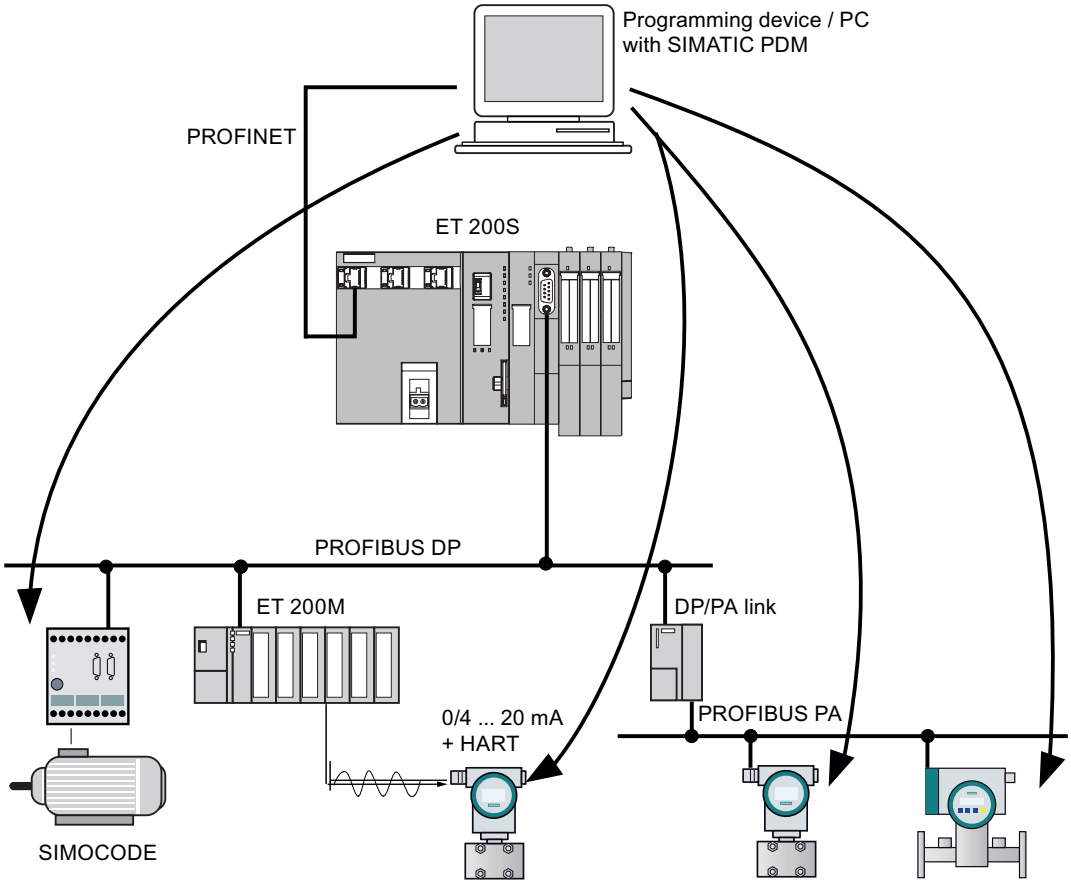


Figure 3-1 IM 151-8 PN/DP CPU data set routing

See also

You can find additional information on *SIMATIC PDM* in the *The Process Device Manager* Manual.

3.2.7 Data consistency

Properties

A data area is consistent if it can be read or written to from the operating system as a consistent block. Data exchanged collectively between the stations should belong together and originate from a single processing cycle, that is, be consistent. If the user program contains a programmed communication function, for example,
FB 12 "BSEND" / FB 13 "BRCV", which accesses shared data, access to that data area can be coordinated by means of the "BUSY" parameter itself.

With PUT/GET functions

For S7 communication functions, such as PUT / GET or write / read via OP communication, which do not require a block in the user program on the IM151-8 PN/DP CPU interface module (acting as a server), allowances must be made in the programming for the extent of the data consistency. The PUT / GET functions for S7 communication, or for read / write variables via OP communication, are executed at the IM151-8 PN/DP CPU interface module´s cycle control point. In order to ensure a defined process interrupt reaction time, communication variables are copied consistently in blocks of up to 64 bytes to/from the user memory at the operating system's cycle control point. Data consistency is not guaranteed for larger data areas.

Note

If defined data consistency is required, the length of the communication variables in the IM151-8 PN/DP CPU interface module operating system's user program must not exceed 64 bytes.

3.2.8 Communication by means of PROFINET

3.2.8.1 Introduction

What is PROFINET?

Within the framework of Totally Integrated Automation (TIA), PROFINET represents a consequent enhancement of:

- PROFIBUS DP, the established field bus, and
- Industrial Ethernet, the communication bus for the cell level

Experience gained from both systems was and is being integrated into PROFINET.

PROFINET is an Ethernet-based automation standard of PROFIBUS International (previously PROFIBUS Users Organization e.V.), and defines a multi-vendor communication, automation, and engineering model. PROFINET has been part of the standard IEC 61158 since 2003.

Objectives in PROFINET

The objectives in PROFINET are:

- Open Ethernet Standard for automation based on Industrial Ethernet.
  Although Industrial Ethernet and Standard Ethernet components can be used together, the Industrial Ethernet devices are more sturdy and therefore better suited for industrial environments (temperature, immunity to interference, etc.)
- Using TCP / IP and IT standards
- Automation with real-time Ethernet
- Total integration of field bus systems

Implementation of PROFINET in SIMATIC

We have integrated PROFINET as follows:

- We have implemented communication between field devices in SIMATIC with **PROFINET IO**.
- In SIMATIC, communication between controllers as components in distributed systems is implemented with **PROFINET CBA** (Component based Automation).
- Installation engineering and network components are available in SIMATIC NET.
- Established IT standards from the Office environment (e.g., SNMP=Simple Network Management Protocol for network parameter assignment and diagnosis) are used for remote maintenance and network diagnostics.

Documentation from PROFIBUS International on the Internet

At the website of PROFIBUS International (previously PROFIBUS User Organization, PNO), you will find numerous documents on the topic of PROFINET. http://www.profinet.com

For more information, go to: http://www.siemens.com/profinet

3.2.8.2 PROFINET IO and PROFINET CBA

What is PROFINET IO?

Within the framework of PROFINET, PROFINET IO is a communication concept for the implementation of modular, distributed applications.

PROFINET IO allows you to create automation solutions, which are familiar to you from PROFIBUS.

This means that you have the same application view in *STEP 7*, regardless of whether you are configuring PROFINET or PROFIBUS devices.

What is PROFINET CBA (Component Based Automation)?

Within the framework of PROFINET, PROFINET CBA is an automation concept for the implementation of applications with distributed intelligence.

PROFINET CBA lets you create distributed automation solutions, based on default components and partial solutions.

Component Based Automation allows you to use complete technological modules as standardized components in large systems.

The components are also created in an engineering tool which may differ from vendor to vendor. Components of SIMATIC devices are created, for example, with *STEP 7*.

Extent of PROFINET CBA and PROFINET IO

PROFINET IO and CBA represent two different views of automation devices on Industrial Ethernet.

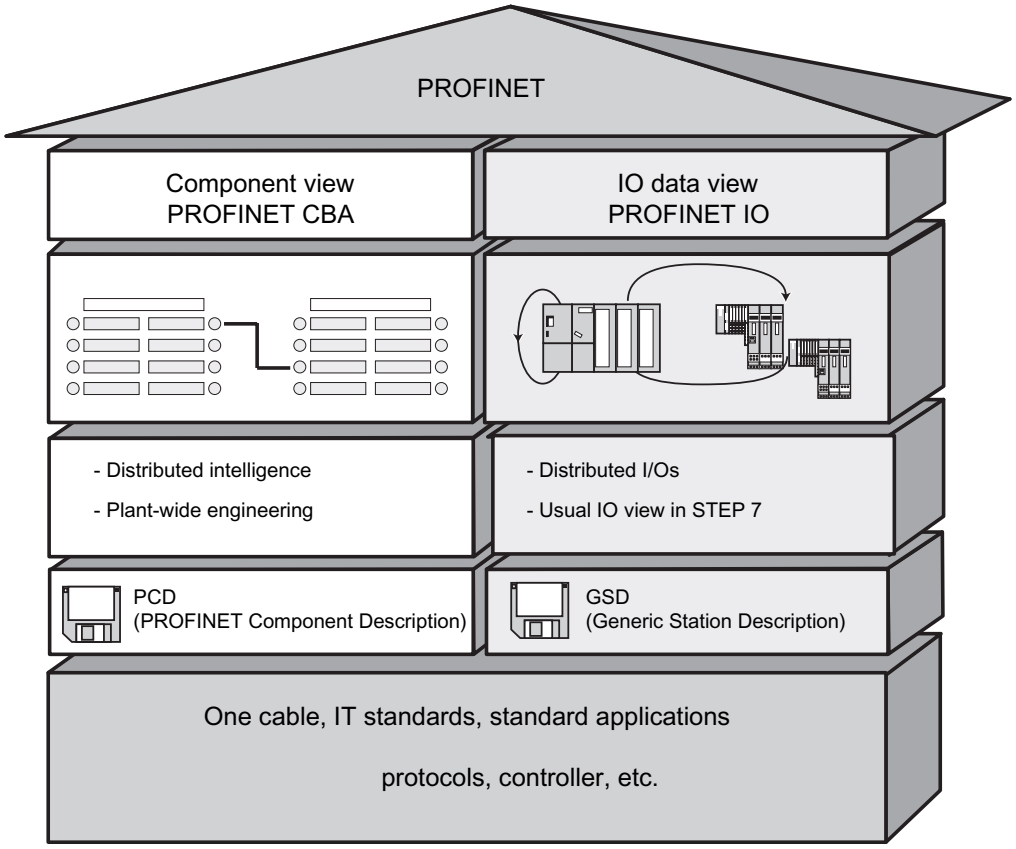


Figure 3-2 Extent of PROFINET IO and Component-Based Automation

Component Based Automation divides the entire system into various functions. These functions are configured and programmed.

PROFINET IO provides you with a view of the system that is very similar to the view obtained in PROFIBUS. You continue to configure and program the individual automation devices.

Reference

Additional information

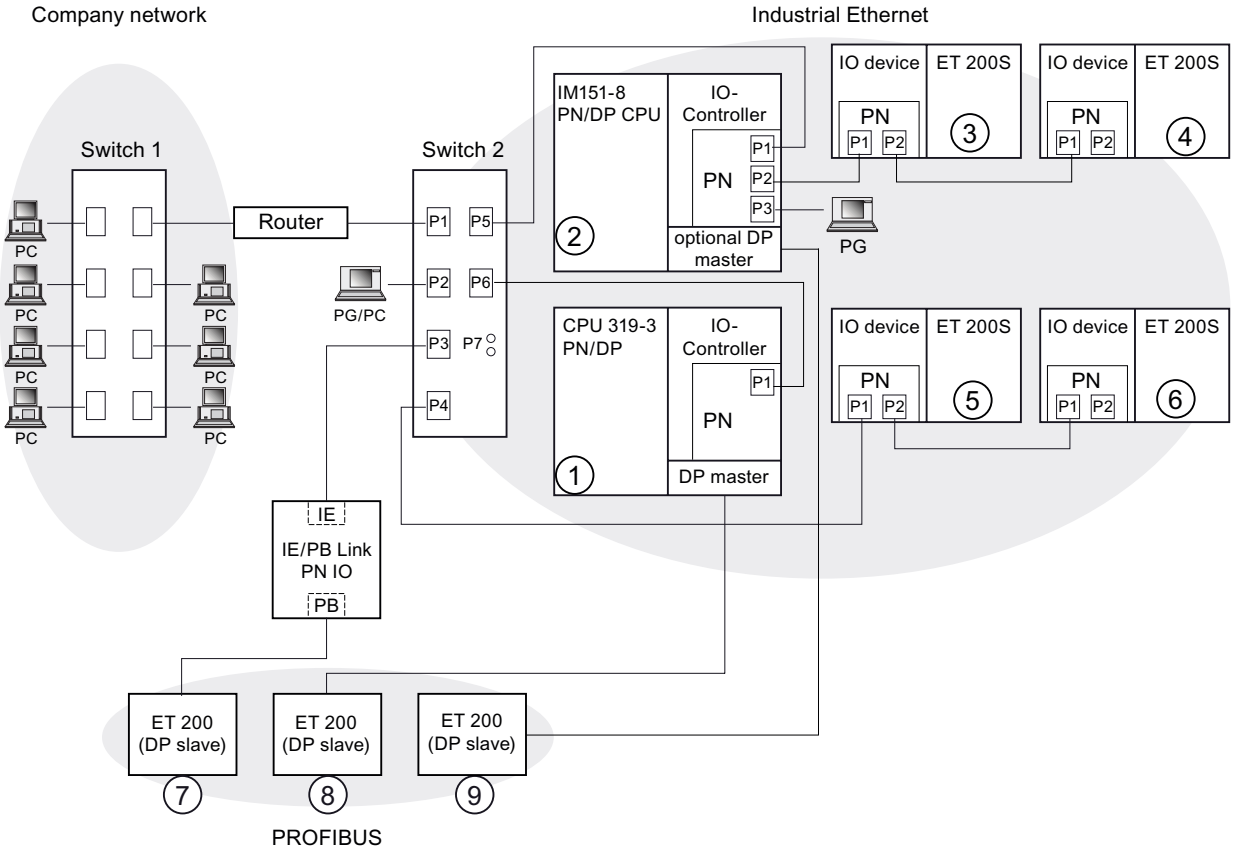
- on PROFINET IO and PROFINET CBA is available in the *PROFINET System Description.*

  There you will also find descriptions regarding the PROFINET IO functionalities
  - Real-time communication (RT and IRT)
  - Device replacement without removable medium
  - Prioritized startup of IO devices
  - Changing IO devices during operation (changing partner ports)
- Differences between and common properties of the PROFIBUS DP and PROFINET IO are described in the *From PROFIBUS DP to PROFINET IO* Programming Manual.
- For additional information on PROFINET CBA, refer to the documentation on SIMATIC iMAP and Component Based Automation.

3.2.8.3 PROFINET IO System

Functions of PROFINET IO

The following graphic shows the new functions in PROFINET IO.



The graphic shows	Examples of connection paths
The connection of company network and field level	From PCs in your company network, you can access devices at the field level. Example: • PC - Switch 1 - Router - Switch 2 - CPU 319-3 PN/DP ①
Connections between the automation system and field level	You can, of course, also access other areas on the Industrial Ethernet from a programming device at the field level. Example: • Programming device - Integrated switch IM 151-8 PN/DP CPU ② - Switch 2 - Integrated switch IO device ET 200S ⑤ - on IO device ET 200S ⑥
The IO controller of the IM151-8 PN/DP CPU interface module ② **directly** controls devices on the Industrial Ethernet and PROFIBUS.	At this point, you can see IO features between the IO controller and IO device(s) on the Industrial Ethernet: • The IM151-8 PN/DP CPU interface module ② is the IO controller for the two IO devices - ET 200S ③ and ET 200S ④ • The IM 151-8 PN/DP CPU interface module ② is also the IO controller for the ET 200 (DP slave) ⑦ via the IE/PB Link.

The graphic shows	Examples of connection paths
The IM 151-8 PN/DP CPU interface module ② and the CPU 319-3 PN/DP ① can be both the IO controller as well as the DP master	Here you can see that a CPU can be both the IO controller for an IO device and the DP master for a DP slave: • The IM151-8 PN/DP CPU interface module with DP master module ② is the DP master for a DP slave ⑨. The DP slave ⑨ is assigned locally to the IM151-8 PN/DP CPU interface module ② and is not visible on the Industrial Ethernet. • The 319-3 PN/DP CPU ① is the IO controller for the two IO devices - ET 200S ⑤ and ET 200S ⑥ • The 319-3 PN/DP CPU ① is the DP master for a DP slave ⑧. The DP slave ⑧ is assigned locally to the CPU ① and is not visible on the Industrial Ethernet.

Reference

Additional information

- About PROFINET can be found in the *From PROFIBUS DP to PROFINET IO* programming manual. This manual also provides a clear overview of the new PROFINET blocks and system status lists.

See also

PROFINET (PN) (Page 21)

3.2.8.4 Blocks for PROFINET IO

Content of this Section

This section explains the following:

- Which blocks are intended for PROFINET
- Which blocks are intended for PROFIBUS DP
- Which blocks are intended for both PROFINET IO and PROFIBUS DP

Compatibility of the New Blocks

For PROFINET IO, it was necessary to create some new blocks, among other things, because larger configurations are now possible with PROFINET. You can also use the new blocks with PROFIBUS.

Comparison of the System and Standard Functions of PROFINET IO and PROFIBUS DP

For the IM 151-8 PN/DP CPU interface module with an integrated PROFINET interface, the table below provides an overview of:

- System and standard functions for SIMATIC that you may need to replace when converting from PROFIBUS DP to PROFINET IO.
- New system and standard functions

Table 3-3 New System and Standard Functions/System and Standard Functions to be Replaced

Blocks	PROFINET IO	PROFIBUS DP
SFC 12 (deactivation and activation of DP slaves/IO devices)	Yes	Yes
SFC 13 (read diagnostic data of a DP slave)	No Substitute: • Event-related: SFB 54 • State-related: SFB 52	Yes
SFC 58/59 (write/read data record in I/O)	No Substitute: SFB 53/52	Yes You should use SFB 52 / 53 under DPV1.
SFB 52/53 (read/write data record)	Yes	Yes
SFB 54 (evaluate interrupt)	Yes	Yes
SFC 102 (read predefined parameters)	No Substitute: SFB 81	Yes
SFB 81 (read predefined parameters)	Yes	Yes
SFC 5 (determine logical start address of a module)	No (replacement: SFC70)	Yes
SFC 70 (determine start address of a module)	Yes	Yes

Blocks	PROFINET IO	PROFIBUS DP
SFC 49 (determine the slot belonging to a logical address)	No Substitute: SFC 71	Yes
SFC 71 (determine the slot belonging to a logical address)	Yes	Yes

The following table provides you with an overview of the system and standard functions for SIMATIC, whose functionality must be implemented by other functions when converting from PROFIBUS DP to PROFINET IO.

Table 3-4 System and Standard Functions in PROFIBUS DP that must be Implemented with Different Functions in PROFINET IO

Blocks	PROFINET IO	PROFIBUS DP
SFC 55 (write dynamic parameters)	No Replicate via SFB 53	Yes
SFC 56 (write predefined parameters)	No Replicate via SFB 81 and SFB 53	Yes
SFC 57 (assign module parameters)	No Replicate via SFB 81 and SFB 53	Yes

You cannot use the following SIMATIC system and standard functions with PROFINET IO:

- SFC 11 (synchronize groups of DP slaves)
- SFC 72 (read data from a communication partner within local S7 station)
- SFC 73 (write data to a communication partner within local S7 station)
- SFC 74 (cancel an existing connection to a communication partner within local S7 station)
- SFC 103 (determine the bus topology in a DP master system)

Comparison of the Organization Blocks of PROFINET IO and PROFIBUS DP

Here, there are changes in OB 83 and OB 86, as shown in the following table.

Table 3-5 OBs in PROFINET IO and PROFIBUS DP

Blocks	PROFINET IO	PROFIBUS DP
OB 83 (removal and insertion of modules during operation)	New error information	The removal and insertion of modules during operation is signaled by slaves added using a GSD file by means of a diagnostic interrupt, in other words OB 82. In the case of S7 slaves, a swapping interrupt causes a CPU stop to be reported and OB 86 to be called.
OB 86 (CPU stop)	New error information	Unchanged

Detailed Information

For detailed descriptions of the individual blocks, refer to the *System and Standard Functions for S7-300/400* manual.

3.2.8.5 Open communication via Industrial Ethernet

Requirement

- *STEP 7* V5.4 + Servicepack 4 or higher

Functionality

The IM 151-8 PN/DP CPU interface module with integrated PROFINET interface supports open communication functionality via Industrial Ethernet (abbreviated to *open IE communication*).

The following services are available for open IE communication:

- Connection oriented protocols
  - TCP to RFC 793, connection type B#16#01
  - TCP to RFC 793, connection type B#16#11
  - ISO on TCP to RFC 1006
- Connectionless protocols
  - UDP according to RFC 768

Features of the communication protocols

The following distinctions are made between protocol types in data communication:

- Connection oriented protocols:

  Prior to data transmission these establish a (logical) connection to the communication partner and close this again, if necessary, after transmission is completed. Connection oriented protocols are used when security in especially important in data transmission. A physical cable can generally accommodate several logical connections.

  For the FBs to open communication by means of Industrial Ethernet, the following connection oriented protocols are supported:

  – TCP according to RFC 793 (connection types B#16#01 and B#16#11)

  – ISO on TCP according to RFC 1006 (connection type B#16#12)

- Connectionless protocols:

  These operate without a connection. There is also no establishing or terminating a connection to remote partner. Wireless protocols transmit data to the remote partner without any acknowledgement; data transfer is, therefore, not secure.
  The FBs for open communication over Industrial Ethernet support the following wireless protocol:

  – UDP according to RFC 768 (connection type B#16#13)

How to use open IE communication

To allow data to be exchanged with other communication partners, *STEP 7* provides the following FBs and UDTs under "Communication Blocks" in the "Standard Library":

- Connection oriented protocols: TCP/ISO-on-TCP
  – FB 63 "TSEND" for sending data
  – FB 64 "TRCV" for receiving data
  – FB 65 "TCON", for connecting
  – FB 66 "TDISCON", for disconnecting
  – UDT 65 "TCON_PAR" with the data structure for the configuration of the connection
- Connectionless protocol: UDP
  – FB 67 "TUSEND" for sending data
  – FB 68 "TURCV" for receiving data
  – FB 65 "TCON" for establishing the local communication access point
  – FB 66 "TDISCON" for resolving the local communication access point
  – UDT 65 "TCON_PAR" with the data structure for configuring the local communication access point
  – UDT 66 "TCON_ADR" with the data structure of the address parameters of the remote partner

Data blocks for the configuration of the connection

- Data blocks for assigning parameters for TCP and ISO-on-TCP connections

  To assign parameters for your connection at TCP and ISO-on-TCP, you need to create a DB that contains the data structure of UDT 65 "TCON_PAR." This data structure contains all parameters you need to establish the connection. You need to create such a data structure for each connection, and you can also organize it in a global DB.

  Connection parameter CONNECT of FB 65 "TCON" reports the address of the corresponding connection description to the user program (for example, P#DB100.DBX0.0 byte 64).

- Data blocks for the configuration the local UDP communication access point

  To assign parameters for the local communication access point, create a DB containing the data structure from the UDT 65 "TCON_PAR" This data structure contains the required parameters you need to establish the connection between the user program and the communication level of the operating system

  The CONNECT parameter of the FB 65 "TCON" contains a reference to the address of the corresponding connection description (e.g. P#DB100.DBX0.0 Byte 64).

Note

Setting up the connection description (UDT 65)

You must enter the interface to be used for communication in the "local_device_id" parameter in UDT 65 "TCON_PAR" (e.g. B#16#01: Communication via the integrated PN interface of the IM 151-8 PN/DP CPU interface module).

Establishing a connection for communication

- Use with TCP and ISO-on-TCP

  Both communication partners call FB 65 "TCON" to establish the connection. In your connection configuration, you define which communication partner activates the connection, and which communication partner responds to the request with a passive connection. To determine the number of possible connections, refer to your IM 151-8 PN/DP CPU interface module´s technical specifications.

  The IM 151-8 PN/DP CPU interface module automatically monitors and maintains the established connection.

  If the connection is broken, for example by line interruption or by the remote communication partner, the active partner tries to reestablish the connection. You do not have to call FB 65 "TCON" again.

  FB 66 "TDISCON" disconnects the IM 151-8 PN/DP CPU interface module from a communication partner, as does STOP mode. To reestablish the connection to have to call FB65 "TCON" again.

- Use with UDP

  Both communication partners call FB 65 "TCON" to set up their local communication access point. This establishes a connection between the user program and operating system's communication level No connection is established to the remote partner.

  The local access point is used to send and receive UDP message frames.

Disconnecting

- Use with TCP and ISO-on-TCP

  FB 66 "TDISCON" disconnects the communication connection between the IM 151-8 PN/DP CPU interface module and a communication partner.

- Use with UDP

  FB 66 "TDISCON" disconnects the local communication access point, i.e., the connection between the user program and the communication layer of the operating system is interrupted.

Options for interrupting the communication connection

Events causing interruptions of communication:

- You program the cancellation of connections at FB 66 "TDISCON."
- The IM 151-8 PN/DP CPU interface module changes from RUN to STOP.
- With POWER OFF / POWER ON

Reference

For detailed information on the blocks described earlier, refer to the *STEP 7 Online Help.*

3.2.8.6 SNMP communication service

Availability

The SNMP communication service is available for the IM 151-8 PN/DP CPU interface module with integrated PROFINET interface.

Properties

SNMP (Simple Network Management Protocol) is a standard protocol for TCP/IP networks.

Reference

For additional information on the SNMP communication service and diagnostics with SNMP, refer to the *PROFINET System Description.*

3.3 Web server

Introduction

The web server allows you to monitor your IM 151-8 PN/DP CPU interface module over the Internet or your company's intranet. This allows analyses and diagnostics to be carried out remotely.

Messages and status information are displayed on HTML pages.

Web browser

You will need a web browser to access the HTML pages for the IM 151-8 PN/DP CPU interface module .

The following web browsers are suitable for communication with the IM 151-8 PN/DP CPU interface module:

- Internet Explorer (version 6.0 or later)
- Mozilla Firefox (version 1.5 or later)
- Opera (version 9.0 or later)
- Netscape Navigator (version 8.1 or later)

Reading information via the web server

Via the web server, you can read the following information from the IM 151-8 PN/DP CPU interface module:

- Start page with general information
- Identification data
- Contents of the diagnostics buffer
- Messages (without acknowledgment option)
- Information about the PROFINET
- Variable status
- Variable tables

The following pages describe the HTML pages and contain detailed explanatory notes.

Web access to the IM 151-8 PN/DP CPU interface module via PD / PC

Proceed as follows to access the web server:

1. Connect the client (programming device or PC) to the IM 151-8 PN/DP CPU interface module via the PROFINET interface.
2. Open the web browser (e.g. Internet Explorer).

   Enter the IP address of the IM 151-8 PN/DP CPU interface module in the "Address" field of the web browser in the format http://a.b.c.d. (for example: http://192.168.3.141).
   The start page of the IM 151-8 PN/DP CPU interface module opens. From the start page you can navigate to additional information.

Note

Up to 5 http connections are possible.

Web access to the IM 151-8 PN/DP CPU interface module via HMI devices and PDA

The web server also supports the Windows terminal service which means that thin client solutions with mobile devices (e.g. PDA or MOBIC T8) and robust local stations (e.g. SIMATIC MP370 with the ThinClient/MP option) can be implemented under Windows CE, in addition to the use of programming devices and PCs.

Proceed as follows to access the web server:

1. Connect the client (HMI device, PDA) to the IM 151-8 PN/DP CPU interface module via the PROFINET interface.
2. Open the web browser (for example, Internet Explorer).

   Enter the IP address of the IM 151-8 PN/DP CPU interface module in the "Address" field of the web browser in the format http://a.b.c.d/basic (for example: http://192.168.3.141/basic).
   The start page of the IM 151-8 PN/DP CPU interface module opens. From the start page you can navigate to additional information.

The IM 151-8 PN/DP CPU interface module information is processed in a specially-designed browser for HMI devices running under Windows CE. The information appears in a simplified format in this browser. The following illustrations show the detailed form respectively.

Note

Asian languages Chinese and Japanese are not supported on HMI devices that are running Windows CE.

Web servers without SIMATIC Micro Memory Card

Note

You can also use the web server without the SIMATIC Micro Memory Card inserted The condition for operation is that you have assigned an IP address to the IM 151-8 PN/DP CPU interface module.

- The content of the diagnostics buffer is displayed in hex code.
- Start page, identification and PROFINET information as well as variable status are displayed in plain text.
- Messages and variable tables are not displayed (content of the message buffer).

Security

The web server by itself does not provide any security. Protect your web-compliant IM 151-8 PN/DP CPU interface module against unauthorized access by means of a firewall.

See also

Language settings (Page 49)

3.3.1 Language settings

Display languages

The web server provides messages and diagnostics information in the following languages:

- German (Germany)
- English (United States)
- French (France)
- Italian (Italy)
- Spanish (traditional sorting)
- Simplified Chinese
- Japanese

Both Asian languages can be combined as follows:

- Chinese with Japanese
- Chinese with English
- Japanese with English

Conditions for the availability of Asian languages

The following conditions must be fulfilled for the Asian languages Chinese and Japanese:

- Windows XP with the respective language package has been installed on the viewing device (e.g. PC).
- STEP 7 for Asian languages (V5.4 + SP 4) is installed on the PD for the configuration of the IM 151-8 PN/DP CPU interface module.

What you need to display texts in different languages

You must make two language settings in *STEP 7* so that the web server displays the various languages correctly.

- Setting the language for display devices in SIMATIC Manager
- Set the language for the web in the IM 151-8 PN/DP CPU interface module Properties dialog. For further information, refer to section *Settings in HW Config, "Web" tab*.

Setting the language for display devices in SIMATIC Manager

Select the languages for display devices in SIMATIC Manager:
Options > Language for display devices



Figure 3-3 Example for selecting the display device language

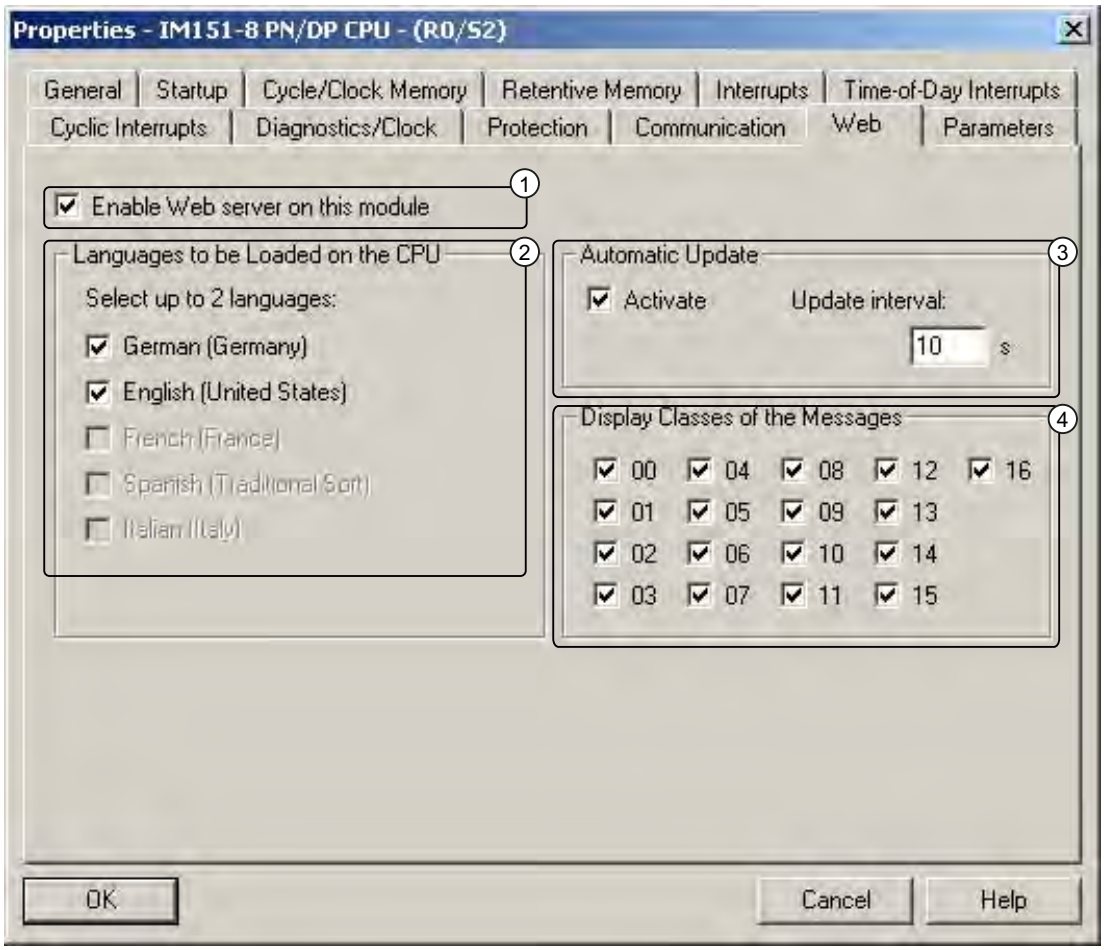
3.3.2 Settings in HW Config, "Web" tab

Requirements

You have opened in HW Config the Properties dialog for the IM 151-8 PN/DP CPU interface module.

To use the full functionality of the web server, carry out the following settings in the "Web" tab:

- Activating the web server
- Set the language for Web
- Activate automatic update
- Display classes of the messages



① Activate the web server

The web server is deactivated in HW Config by default. You activate the web server in HW Config.

1. Check the "Activate web server on this module" check box.

② Set the language for web

Select up to two languages for the Web from the languages installed for display devices.

1. Select the required languages for the web.

Note

If you activate the web server and do not select a language, messages and diagnostic information will be displayed in hexadecimal code.

③ Activate the automatic update

The following web pages can be updated automatically:

- Start page
- PROFINET
- Variable status
- Variable table

1. Activate the check box "Activate" under "Automatic update".
2. Specify the updating interval in the value range from 1 s to 999 s.

Note

Update time

The activation interval set in the HW Config represents the shortest update time. Greater quantities of data or more than one FTP connection will increase the update time.

④ Display classes of the messages

All display classes of the messages are activated in the HW Config factory setting. The selected display classes will be displayed later on the "Messages" web page.

You must first configure the message classes in the HW Config under **Options > Report system errors**. Information on configuring message texts is available in *STEP 7*.

Note

Reducing the memory requirement of web SDBs

You can reduce the memory requirement of web SDBs by selecting just the message display classes that are to be filled in the web SDB.

3.3.3 Updating

Screen content refresh status and printing

Screen content

Automatic updating is deactivated in HW Config by default.
This means that the web server screen display contains static information.

You manually update the web pages in each case via the  symbol or by pressing <F5>.

Printing

Any print-outs will always show the current information for the IM151-8 PN/DP CPU interface module. It is therefore possible that the information output to the printer may be more current than the screen contents.

You print web pages via the  symbol.

Filter settings have no effect on the print-out, The print-out always shows the entire contents of the message buffer.

Disabling automatic update for an individual web page

To temporarily disable the automatic update for a web page, select the 

symbol.

You can switch the automatic update back on again via the 

symbol or by pressing <F5>.

3.3.4 Web pages

3.3.4.1 Start page with general CPU information

Establishing a connection to the web server

Connect to the web server by entering the IP address of the configured IM151-8 PN/DP CPU interface module on the web browser's address bar (e.g. http: //192.168.1.158). The connection is established and the "Intro" page opens.

Intro

The web server calls the following page upon start-up:



Figure 3-4 Intro

Click on the ENTER link to access the web server pages.

Note

Skip website intro

Check the "Skip Intro" check box to skip the intro. You will then access the web server's start page directly in future. You can reverse the "Skip intro" setting by clicking on the "Intro" link on the start page.

Start page

The start page contains information as shown below.

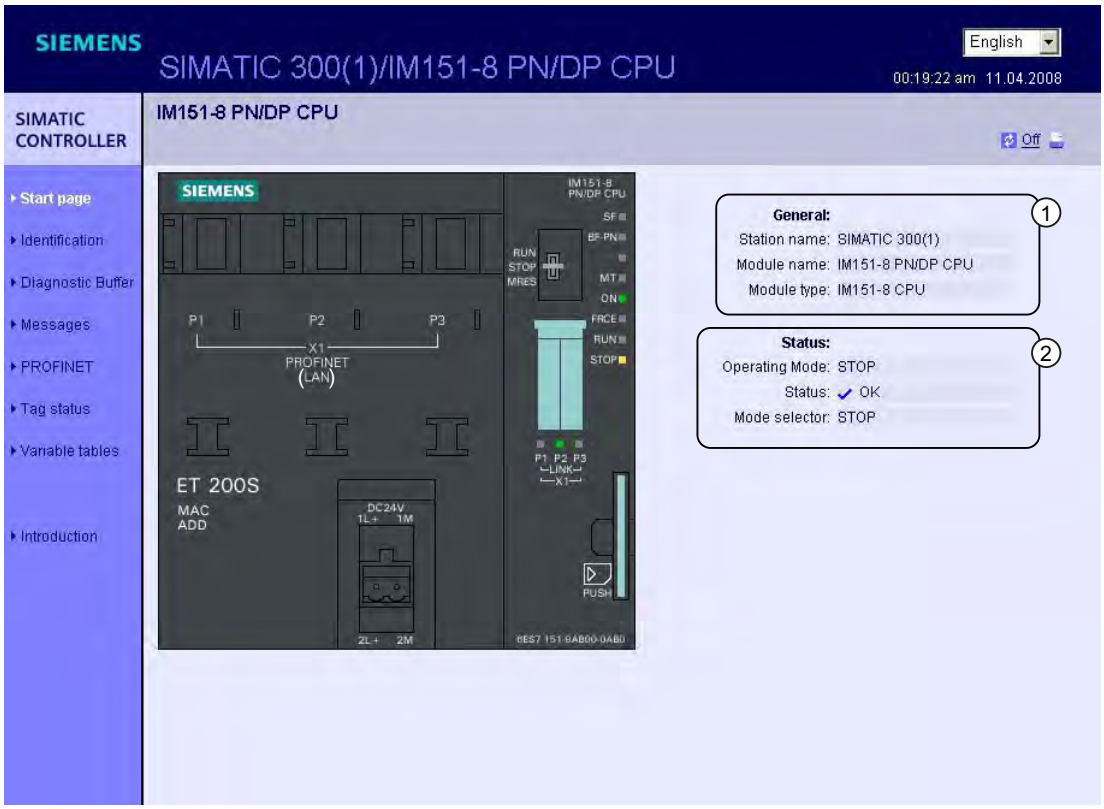


Figure 3-5 General Information

The image of the IM151-8 PN/DP CPU interface module with LEDs reflects your current status at the time of checking the data.

① "General"

Information about the IM151-8 PN/DP CPU interface module, the web server with which you are currently connected, is combined in this group.

② "Status"

Status information about the IM151-8 PN/DP CPU interface module at the time of the query is displayed in the "Status" info field.

Updating

If "Automatic update" is enabled, then this page is updated in accordance with the configured updating interval.

3.3.4.2 Identification

Characteristics

The "Identification" web page contains the characteristic data for the IM151-8 PN/DP CPU interface module.

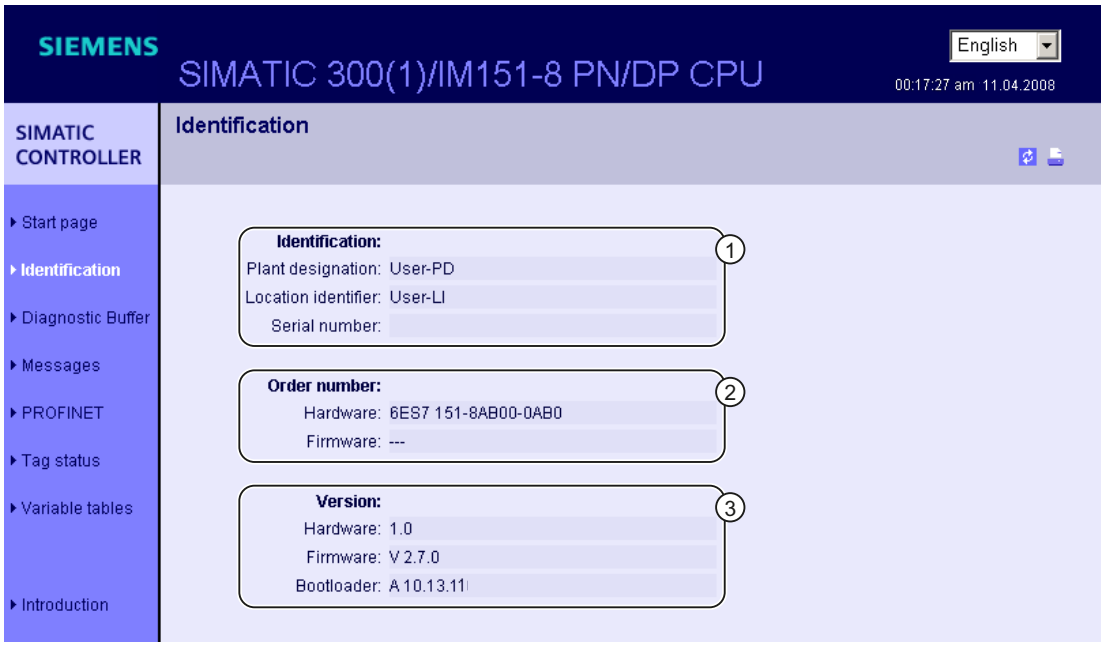


Figure 3-6 Identification

① "Identification"

The "Identification" info field contains the system and location designations as well as the serial number.

② "Order number"

The "Order number" info field contains order numbers for the hardware and software.

③ "Version"

The hardware, firmware and boot loader versions are displayed in the "Version" info field.

3.3.4.3 Diagnostic buffer

Diagnostics buffer

The browser displays the content of the diagnostics buffer on the "Diagnostics buffer" web page.

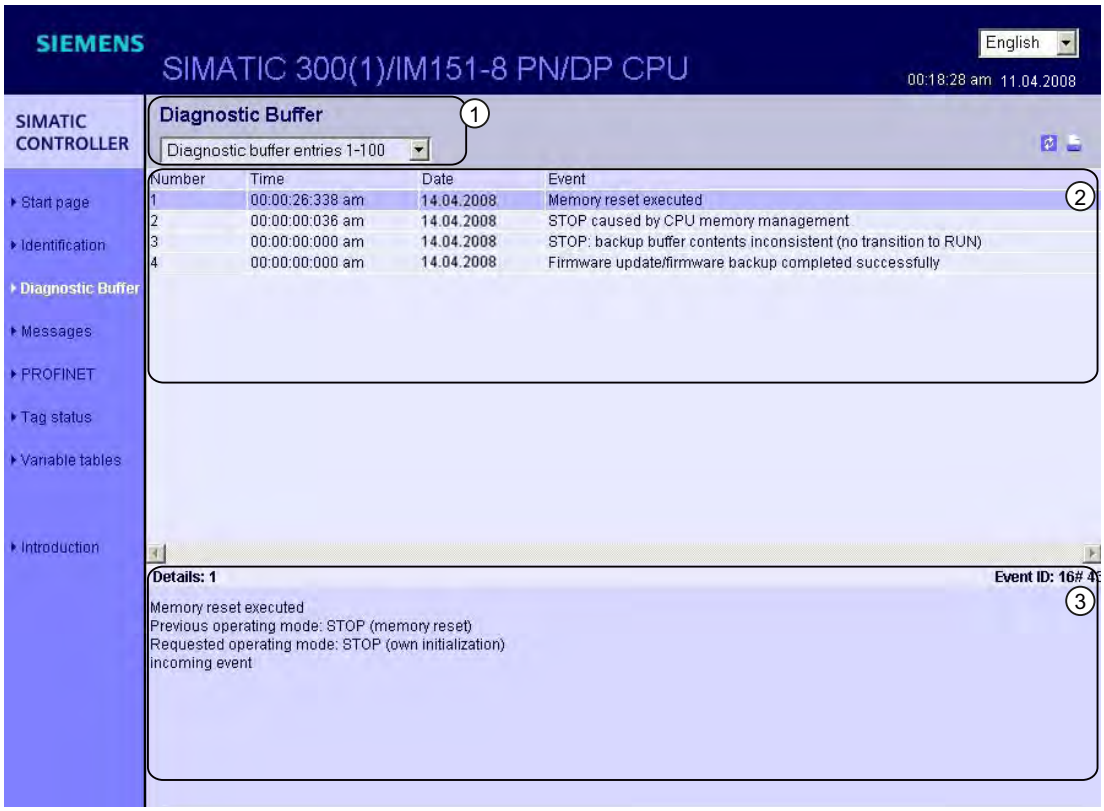


Figure 3-7 Diagnostics buffer

Requirement

You must have activated the web server, made the language setting and compiled and loaded the project in *STEP 7*.

① "Diagnostics buffer entries 1-100"

The diagnostics buffer may contain up to 500 messages. Select an interval for the buffer entries from the list box. Each interval contains 100 entries.

Note that, for performance reasons, it is always the last 10 buffer entries that are displayed in RUN mode.

② "Events"

The "Events" info field contains the diagnostic events with the date and time.

③ "Details"

This box contains detailed information about the selected event.

Select the event from the ② "Events" info field.

Configuration

Configuration involves the following steps:

1. Select the "Object properties" dialog box from the context menu of the relevant IM151-8 PN/DP CPU interface module.
2. Select the "Web" tab and check the "Activate web server on this module" check box.
3. Select up to two languages to be used to display plaintext messages.
4. Save and compile the project and download it to the IM151-8 PN/DP CPU interface module.

Point to note when changing between languages

You can change the language, e.g. from German to English, in the top right-hand corner. If you select a language that you have not configured, then the information will appear as hexadecimal code, rather than in plaintext.

3.3.4.4 Messages

Messages

The browser displays the content of the message buffer on the Messages web page. You cannot acknowledge the messages via the web server.

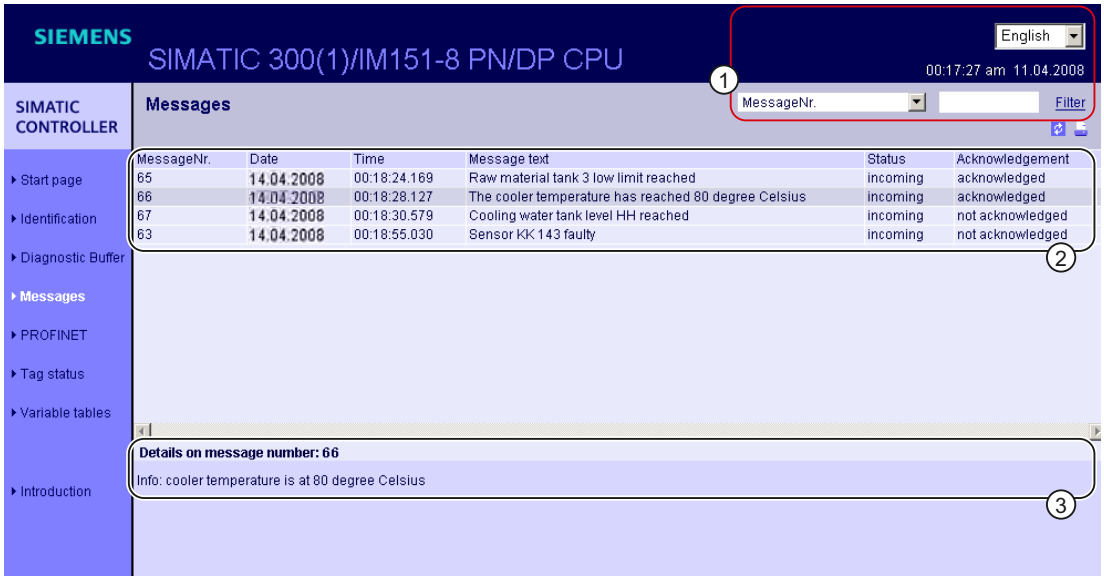


Figure 3-8 Messages

Requirement

The message texts must have been configured in the correct languages. You will find information about configuring messages texts in *STEP 7* and on the Internet at: http://support.automation.siemens.com/WW/view/en/23872245

① "Filter"

Allows you to access certain specific information on this page.

The list box ① allows you to display only entries for the selected parameter. Enter the value of the selected parameter in the input box and click on "Filter".

If you wish to display all messages with the status "arrived", for example, then:

1. Select the "Status" parameter from the list box.
2. Enter the "incoming" text in the input box.
3. Click on "Filter".

Effects

- The filter settings are also retained when you update a page.
- Filter settings have no effect on the print-out. The print-out always shows the entire contents of the message buffer.

Deactivating a filter

Having pressed the "Filter" button as described above, the value in the input box is deleted. If you now (with an empty input box) press "Filter" again, then the filter conditions are deleted, i.e. the filter is disabled.

② "Messages"

IM151-8 PN/DP CPU interface module messages are displayed in chronological order in the info field ②, together with the **date** and **time**.

The **Message text** parameter relates to the entering of message texts configured for the particular error definitions.

Sort

You also have the option of displaying the individual parameters in ascending or descending order. To do this, click on one of the parameters in the column header:

- Message number
- Date
- Time-of-day
- Message text
- State
- Acknowledgement

If you click "Date", the messages will be displayed in chronological order.

Incoming and outgoing events are output in the **Status** parameter.

③ "Details for message number"

This info field is used to display detailed information about a message. Select the message for which you are interested in the details from the info field ②.

Point to note when changing between languages

You can change the language, e.g. from German to English, in the top right-hand corner. If you select a language that you have not configured or for which no message text was configured, then the information will appear as hexadecimal code, rather than in plaintext.

3.3.4.5 PROFINET

PROFINET

On this web page, tab ① "Parameters" contains information about the integrated PROFINET interface of the IM151-8 PN/DP CPU interface module.

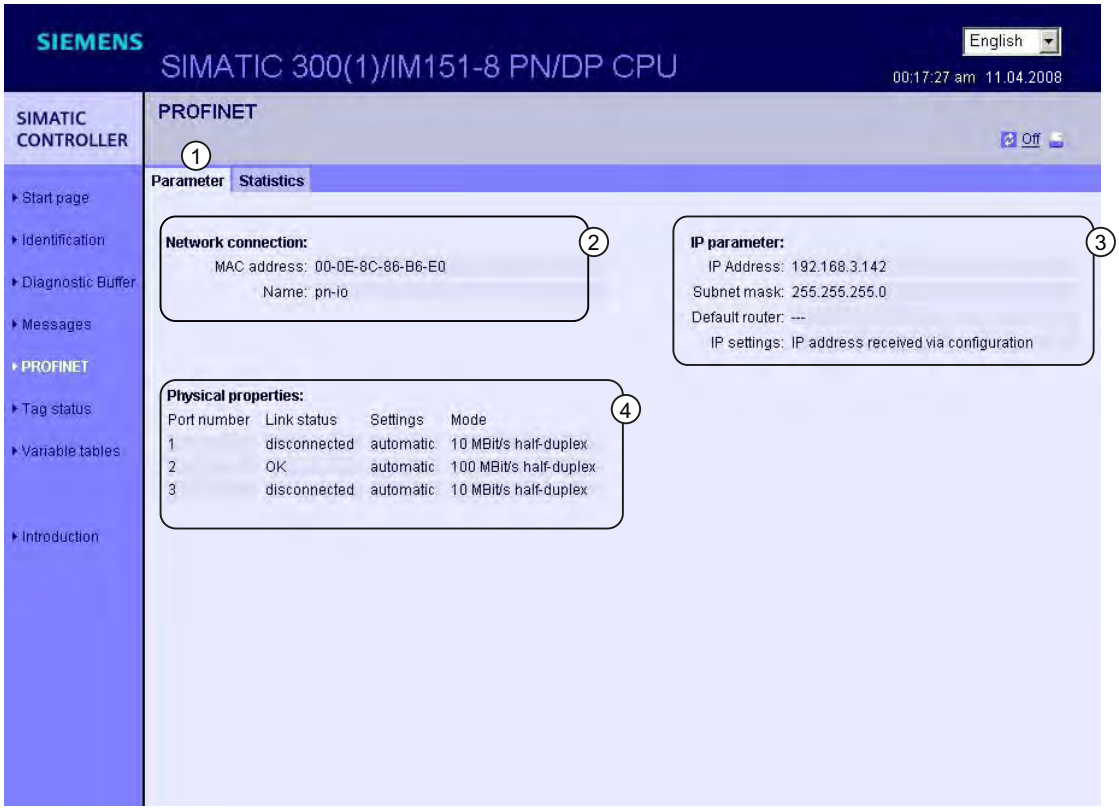


Figure 3-9 Parameters of the integrated PROFINET Interface

② "Network connection"

Here you will find information that will help you to identify the integrated PROFINET interface of the IM151-8 PN/DP CPU interface module.

③ "IP parameters"

Information about the configured IP address and number of the subnet containing the IM151-8 PN/DP CPU interface module.

④ "Physical properties"

The following information is available in the "Physical properties" info field:

- Port number
- Link status
- Settings
- Mode

The "Statistics" tab ① contains information about the quality of the data transmission.

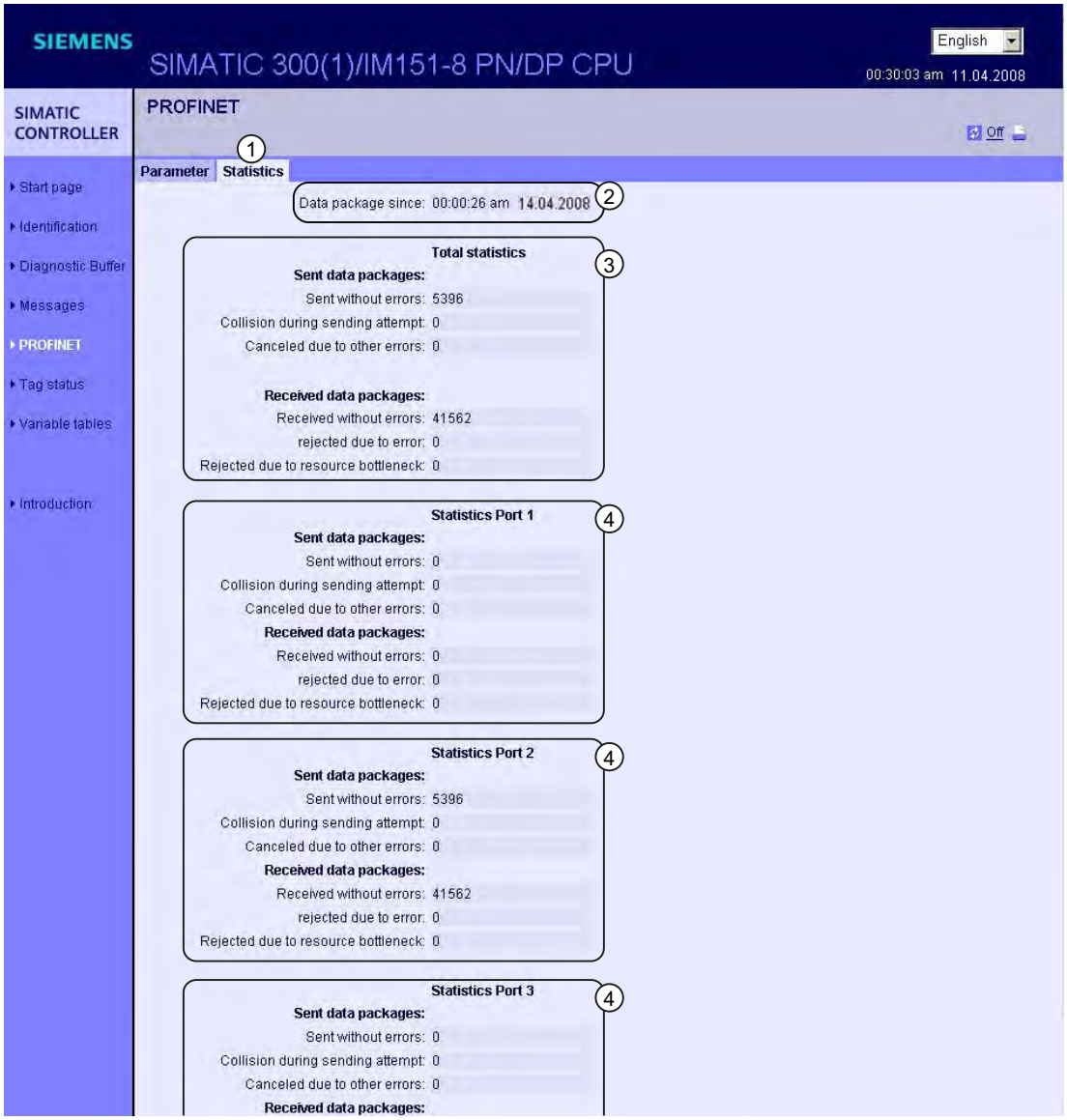


Figure 3-10 Key data transmission figures

② "Data packets since"

This shows the time at which the first data packet was sent or received.

③ "Total statistics"

Here you can find out the total of how many data packets have been sent and received and their quality.

④ "Statistics port n"

Here you can find out how many data packets on port n have been sent and received and their quality.

Updating

If "Automatic update" is enabled, then this page is updated in accordance with the configured updating interval.

3.3.4.6 Variable status

Variable status

The variable status is displayed by the browser via the web page of the same name. You can monitor the status of up to 50 variables.

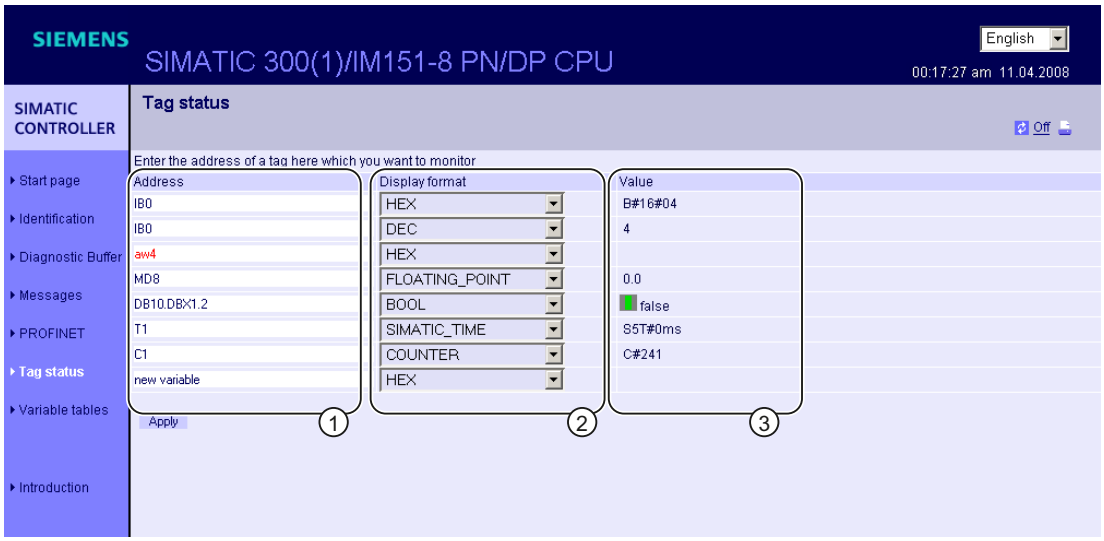


Figure 3-11 Variable status

① "Address"

In the "Address" text box, enter the address of the operand whose behavior you wish to monitor. If you enter an invalid address, it is displayed in red.

② "Display format"

Select the required display format for the variable from this drop-down list box. If the variable cannot be displayed in the required display format, it will be displayed in hexadecimal code.

③ "Value"

This displays the value of the operand in the selected format.

Updating

If "Automatic update" is enabled, then this page is updated in accordance with the configured updating interval.

Point to note when changing between languages

You can change the language, e.g. from German to English, in the top right-hand corner. Please note that the mnemonic for German differs from that for the other languages. This means that the operand that you entered may have the wrong syntax when you change between languages. For example: ABxy rather than QBxy. Incorrect syntax is displayed in red in the browser.

3.3.4.7 Variable tables

Variable tables

The browser displays the content of the variable tables on the web page of the same name. You can monitor up to 200 variables with each variable table. If the associated variable table in the *STEP 7* project receives more than 200 variables, then the web server variable table is automatically restricted to 200 variables, without a message indication.

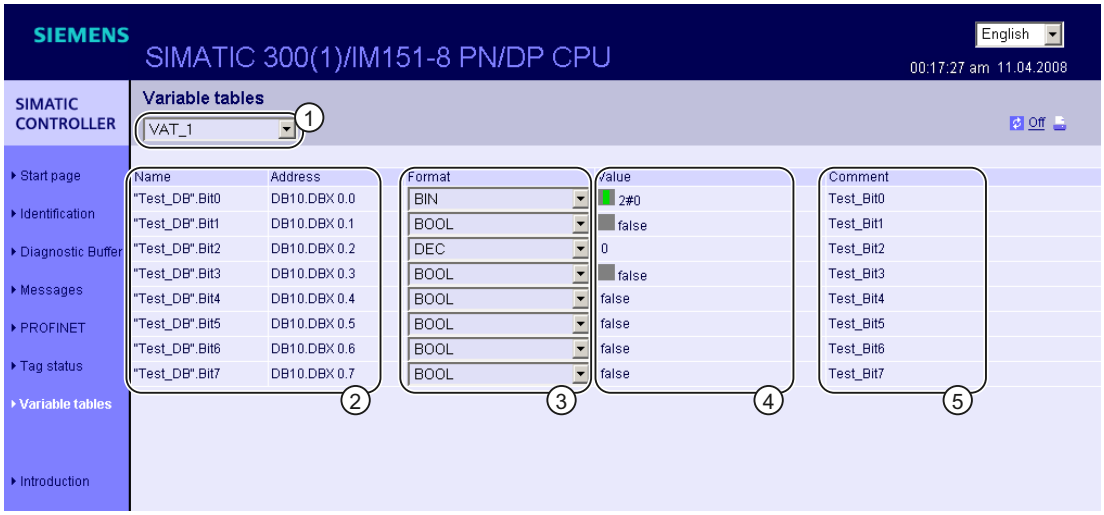


Figure 3-12 Variable tables

① Selection

Select one of the configured variable tables from the drop-down box.

② "Name" and "Address"

This info field displays the name of an operand and its address.

③ "Format"

Select the display format for the operand from this drop-down list box. The drop-down list box contains all the permitted display formats.

④ "Value"

This column shows the values in the display format.

⑤ "Comment"

The comment that you enter is displayed to make it easy to recognize the importance of an operand.

Updating

If "Automatic update" is enabled, then this page is updated in accordance with the configured updating interval.

Configuring variable tables for web servers

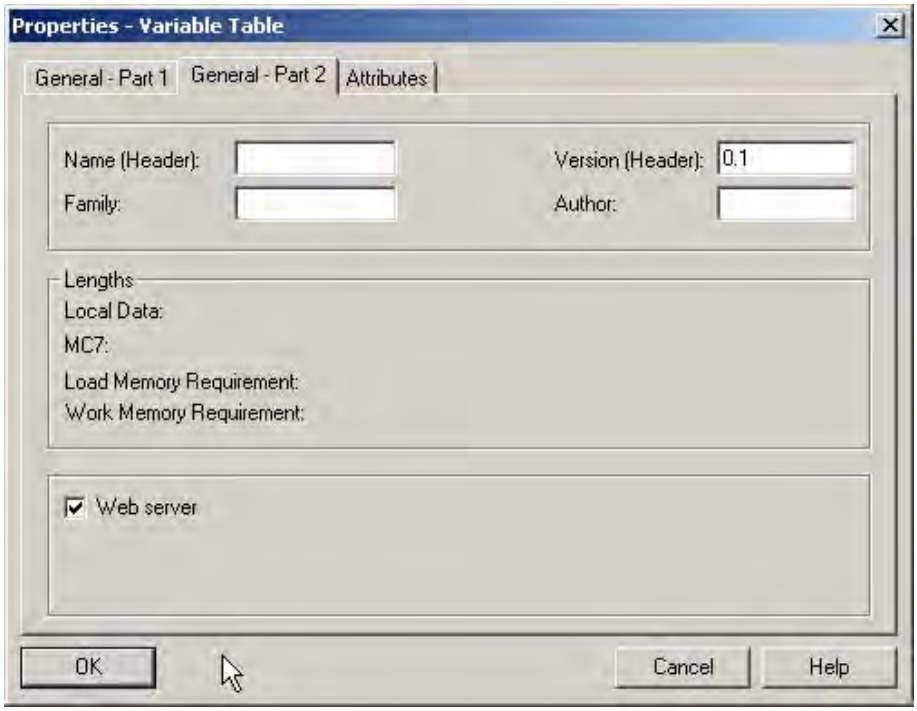
The web server allows you to monitor up to 50 variable tables with up to 200 variables. The available memory of the IM151-8 PN/DP CPU interface module is used by both messages and variables, so it is possible that the number of variable tables that can actually be used may be smaller.
Example: The available memory is sufficient for around 400 messages and 50 variable tables with 100 variables (with symbol names, but without symbol comments).

If the permitted memory is exceeded by configured messages and variables, the variable tables displayed in the web browser will be incomplete. In this case, you will have to replace the memory needed by your messages and symbol comments. If at all possible, you should only use one language for the display.

You should also configure your variable tables with as few variables as possible since these variable tables are more likely to be displayed in full by the web server and will also be updated faster than tables with lots of variables.

Creating a variable table for web servers

1. Create a variable table with *STEP 7*.
2. Open the variable table Properties dialog.
3. Activate the "Web server" check box.



4. Save and compile the project and download it to the IM151-8 PN/DP CPU interface module.

3.4 S7 connections

3.4.1 S7 connection as communication path

An S7 connection is established when S7 modules communicate with one another. This S7 connection is the communication path.

Note

No S7 connections are required for communication via PROFIBUS DP, PROFINET CBA, PROFINET IO, web server, TCP/IP, ISO on TCP, UDP and SNMP.

Each communication link requires S7 connection resources on the IM151-8 PN/DP CPU interface module for the entire duration of this connection.

Thus, each IM151-8 PN/DP CPU interface module is provided with a specific number of S7 connection resources. These are used by various communication services (PG / OP communication or S7 communication).

Connection points

An S7 connection between modules with communication capability is established between connection points. The S7 connection always has two connection points: The active and passive connection points:

- The active connection point is assigned to the module that establishes the S7 connection.
- The passive connection point is assigned to the module that accepts the S7 connection.

Any module that is capable of communication can thus act as an S7 connection point. At the connection point, the established communication link always uses one S7 connection of the module concerned.

Transition point

If you use the routing functionality, the S7 connection between two modules capable of communication is established across a number of subnets. These subnets are interconnected via a network transition. The module that implements this network transition is known as a router. The router is thus the point through which an S7 connection passes.

Each IM 151-8 PN/DP CPU interface module (with DP master module) can be a route for an S7 connection. You can establish a certain maximum number of routing connections. This does not limit the data volume of the S7 connections.

See also

Connection resources for routing (Page 70)

3.4.2 Assignment of S7 connections

There are several ways to allocate S7 connections on a communication-capable module:

- Reservation during configuration
- Assigning connections in the program
- Allocating connections during commissioning, testing and diagnostics routines
- Allocating connection resources to HMI services

Reservation during configuration

One connection resource each is automatically reserved on the IM151-8 PN/DP CPU interface module for programming device and OP communication. Whenever you need more connection resources (for example, when connecting several OPs), configure this increase in the IM151-8 PN/DP CPU interface module properties dialog box in *STEP 7*.

Connections must also be configured (using *NetPro*) for the use of S7 communication. For this purpose, connection resources have to be available, which are not allocated to programming device/OP or other connections. The required S7 connections are then permanently allocated for S7 communication when the configuration is uploaded to the IM151-8 PN/DP CPU interface module.

Assigning connections in the program

In open Industrial Ethernet communication with TCP/IP, the user program establishes the connection. In doing so, the operating system of the IM151-8 PN/DP CPU interface module initiates the connection. The open IE communication does not use any S7 connections. The maximum number of eight connections also applies to this type of communication.

Using connections for commissioning, testing and diagnostics

An active online function on the engineering station (programming device /PC with *STEP 7*) assigns S7 connections for programming device communication:

- An S7 connection resource for programming device communication which was reserved in your IM151-8 PN/DP CPU interface module hardware configuration is assigned to the engineering station, that is, it just needs to be allocated.
- If all reserved S7 connection resources for programming device communication are allocated, the operating system automatically assigns a free S7 connection resource which has not yet been reserved. If no more connection resources are available, the engineering station cannot communicate online with the IM151-8 PN/DP CPU interface module.

Allocating connection resources to HMI services

An online function on the HMI station (OP/TP/... with *WinCC*) is used for assigning S7 connection resources for the OP communication:

- An S7 connection resource for programming device communication which was reserved in your IM151-8 PN/DP CPU interface module hardware configuration is assigned to the HMI station, that is, it just needs to be allocated.
- If all reserved S7 connection resources for OP communication are allocated, the operating system automatically assigns a free S7 connection resource which has not yet been reserved. If no more connection resources are available, the HMI station cannot communicate online with the IM151-8 PN/DP CPU interface module.

Chronological order in which S7 connection resources are assigned

When you program your project in *STEP 7*, the system generates parameter assignment blocks which are read by the modules in the startup phase. This allows the module's operating system to reserve or assign the relevant S7 connection resources. This means, for example, that OPs cannot access an S7 connection resource that has been reserved for programming device communication. If the IM151-8 PN/DP CPU interface module has S7 connection resources that have not been reserved, these can be used freely. These S7 connection resources are allocated in the order they are requested.

Example

If there is only one free S7 connection left on the IM151-8 PN/DP CPU interface module, you can still connect a programming device to the bus. The programming device can then communicate with the IM151-8 PN/DP CPU interface module. However, the S7 connection will always be used if the PD is communicating with the IM151-8 PN/DP CPU interface module. If you connect an OP to the bus while the programming device is not communicating, the OP can establish a connection to the IM151-8 PN/DP CPU interface module. Since an OP maintains its communication link at all times, in contrast to the PG, you cannot subsequently establish another connection via the PG.

See also

Open communication via Industrial Ethernet (Page 42)

3.4.3 Distribution and availability of S7 connection resources

Distribution of connection resources

Table 3-6 Distribution of connections

Communication service	Distribution
Programming device communication OP communication S7 basic communication	In order to avoid allocation of connection resources being dependent only on the chronological sequence in which various communication services are requested, connection resources can be reserved for these services. For PG and OP communication, at least one connection resource is reserved by default. The following table and the technical specifications for the IM151-8 PN/DP CPU interface module contain the configurable S7 connections and the default setting. You "redistribute“ the connection resources by setting the relevant IM151-8 PN/DP CPU interface module parameters in *STEP 7*.
S7 communication	Available connection resources that are not specially reserved for a service (programming device / OP communication, S7 basic communication) are used for this.
Routing PG functions	Together with the DP master module, the IM 151-8 PN/DP CPU interface module has a number of connection resources available for routing purposes. These connections are available in addition to the connection resources. The subsection below shows the number of connection resources.
PROFIBUS DP	This communication service requires no S7 connection resources.
PROFINET CBA	This communication service requires no S7 connection resources.
PROFINET IO	This communication service requires no S7 connection resources.
Web server	This communication service requires no S7 connection resources.
Open communication via TCP/IP	This communication service requires no S7 connection resources. Independently of the S7 connections, a total of 8 own resources are available for connections or local access points (UDP) for TCP/IP, ISO on TCP, UDP.
Open communication by means of ISO on TCP	
Open communication by means of UDP	
SNMP	This communication service requires no S7 connection resources.

Availability of connection resources

Table 3-7 Availability of connection resources

Interface module	Total number connection resources	Reserved for			Free S7 connections
		Programming device communication	OP communication	S7 basic communication	
IM 151-8 PN/DP CPU	12	1 to 11 default 1	1 to 11 default 1	0 to 10 default 0	Displays all non-reserved S7 connections as free connections.

Note

If you are using the IM151-8 PN/DP CPU interface module, you can configure up to 10 connection resources for S7 communication in *NetPro*. These connections are then reserved.

3.4.4 Connection resources for routing

Number of connection resources for routing

A maximum of 4 connections are available on the PROFINET interface of the IM151-8 PN/DP CPU interface module for the routing function. Routing is only possible if the DP master module is connected and configured.

Example for the IM 151-8 PN/DP CPU

The IM 151-8 PN/DP CPU interface module makes available 12 connection resources:

- Reserve two connection resources for programming device communication.
- Reserve two connection resources for OP communication.
- In *NetPro* you configure 3 S7 connection resources for S7 communication via the integrated PROFINET interface.

This leaves 5 S7 connections available for any communication services, e.g. S7 communication, OP communication, etc.

However, no more than 10 connection resources for S7 communication at the integrated PN interface can be configured in *NetPro*.

There are also 4 routing connections available for the IM151-8 PN/DP CPU interface module that do not affect the S7 connection resources mentioned above.

3.5 DPV1

New automation and process engineering tasks require the range of functions performed by the existing DP protocol to be extended. In addition to cyclical communication functions, acyclical access to non-S7 field devices is another important requirement of our customers, and was implemented in the EN 50170 standard. In the past, acyclic access was only possible with S7 slaves. The standard concerning distributed I/Os (EN 50170) has been further developed. All the changes concerning new DPV1 functions are included in IEC 61158/ EN 50170, volume 2, PROFIBUS.

Definition DPV1

The term DPV1 is defined as a functional extension of the acyclic services (to include new interrupts, for example) provided by the DP protocol.

Availability

Together with the DP master module you can operate the IM 151-8 PN/DP CPU interface module as a DP master via the expanded DPV1 functionality.

Requirement for using the DPV1 functionality with DP slaves

For DPV1 slaves from other vendors, you will need a GSD file conforming to EN 50170, revision 3 or later.

Extended functions of DPV1

- Use of any DPV1 slaves from external vendors (in addition to the existing DPV0 and S7 slaves, of course).
- Selective handling of DPV1-specific interrupt events by new interrupt blocks.
- Reading/writing SFBs that conform to standards to the data record (although this can only be used for centralized I/O modules).
- User-friendly SFB for reading diagnostics.

Interrupt blocks with DPV1 functionality

Table 3-8 Interrupt blocks with DPV1 functionality

OB	Functionality
OB 40	Process interrupt
OB 55	Status interrupt
OB 56	Update interrupt
OB 57	Vendor-specific interrupt
OB 82	Diagnostic interrupt

Note

You can now also use organization blocks OB40 and OB82 for DPV1 interrupts.

System blocks with DPV1 functionality

Table 3-9 System function blocks with DPV1 functionality

SFB	Functionality
SFB 52	Read data record from DP slave / IO device or centralized I/O module
SFB 53	Write data record to DP slave / IO device or centralized I/O module
SFB 54	Read additional alarm information from a DP slave / IO device or a centralized I/O module in the relevant OB
SFB 75	Set any interrupts for intelligent slaves

Note

You can also use SFB 52 to SFB 54 for centralized I/O modules. SFBs 52 to 54 can also be used for PROFINET IO.

Reference

For additional information on the above blocks can be found in the *System and Standard Functions for S7-300/400* reference manual, or in the *STEP 7 Online Help*.

See also

PROFIBUS DP (Page 25)

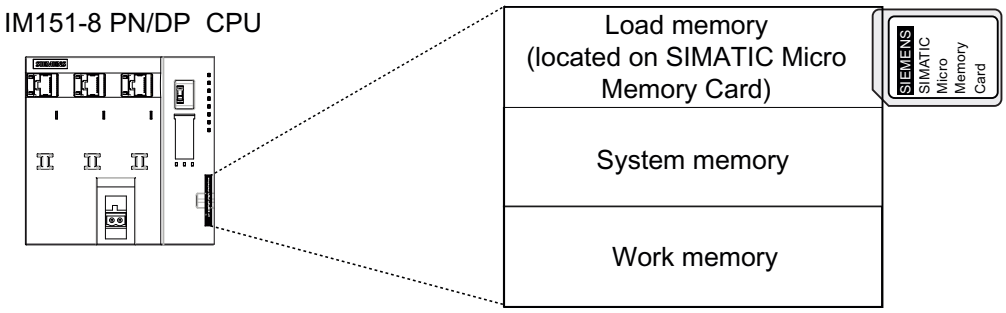
Memory concept

4

4.1 Memory areas and retentive memory

4.1.1 Memory areas of the IM 151-8 PN/DP CPU interface module

The three memory areas of your IM 151-8 PN/DP CPU interface module



Load memory

The load memory is located on the SIMATIC Micro Memory Card. The size of the load memory corresponds exactly to the size of the SIMATIC Micro Memory Card. It is used to store code blocks, data blocks and system data (configuration, connections, module parameters, etc.). Blocks that are identified as non runtime-related are stored exclusively in load memory. You can also store all the configuration data for your project on the SIMATIC Micro Memory Card.

Note

User programs can only be downloaded and thus the IM151-8 PN/DP CPU interface module can only be used if the SIMATIC Micro Memory Card is inserted in the interface module.

System memory

The system memory is integrated in the IM151-8 PN/DP CPU interface module and cannot be extended.

It contains

- The address areas for address area memory bits, timers and counters
- The process image of the I/Os
- Local data

Work memory

The working memory is integrated in the IM 151-8 PN/DP CPU interface module and cannot be extended. It is used to run the code and process user program data. Programs only run in work memory and system memory.

4.1.2 Retentivity of load memory, system memory and RAM

Your IM151-8 PN/DP CPU interface module is equipped with a maintenance-free retentive memory, i.e. its operation does not require a back-up battery. Data is kept in retentive memory across POWER OFF and restart (warm start).

Retentive data in load memory

Your program in the load memory is always retentive. It is stored on the SIMATIC Micro Memory Card, where it is protected against power failure or CPU memory restart

The configuration data for the interface of the IM151-8 PN/DP CPU interface module will be stored retentively in the load memory of an SDB.

Retentive data in system memory

In your configuration (IM151-8 PN/DP CPU interface module Properties, Retentivity tab), specify which parts of the bit memory, timers and counters should be kept retentive and which should be reinitialized to "0" on restart (warm restart).

The operating hour counter is usually stored in the retentive memory area on the IM151-8 PN/DP CPU interface module.

Only the last 100 entries in the diagnostics buffer are retentive with POWER OFF / POWER ON.

Retentive data in RAM

Therefore, the contents of retentive DBs are always retentive at restart and POWER OFF / POWER ON. Retentive data blocks can be uploaded to the work memory in accordance with the maximum limit allowed by the work memory.

The IM 151-8 PN/DP CPU interface module also supports non-retentive DBs. Non-retentive DBs are initialized from the load memory with their initial values whenever a restart is performed or with POWER OFF / POWER ON. Non-retentive data blocks and code blocks can be loaded in accordance with the maximum work memory limit.

64 KB of RAM can be used for retentive data blocks in the IM 151-8 PN/DP CPU interface module.

See also

Properties of the SIMATIC Micro Memory Card (Page 79)

4.1.3 Retentivity of memory objects

Retentive behavior of the memory objects

The table below shows the retentive behavior of memory objects during specific operating state transitions.

Table 4-1 Retentive behavior of the memory objects

Memory object	Operating state transition		
	POWER OFF / POWER ON	STOP → RUN	Memory reset
User program / data (load memory)	X	X	X
• Retentive behavior of the DBs for the IM 1518 PN/DP CPU interface module	This can be set in the DB Properties in *STEP 7* V5.4 + SP 4 or later.		–
Bit memory, timers and counters configured as retentive data	X	X	–
Diagnostics buffers, operating hour counters	X[1]	X	X
Configuration data for the interface of the IM 151-8 PN/DP CPU interface module in an SDB			
• IP data for the PN interface	– [2]	X	– [2]

X = retentive; – = not retentive

[1] Only the last 100 entries in the diagnostics buffer are retained in the event of a POWER OFF / POWER ON.

[2] The IP data for the PROFINET interface is only retentive if the interface has been configured in HW Config and this configuration is also loaded on the IM 151-8 PN/DP CPU interface module, i.e. the SDBs must be available on the SIMATIC Micro Memory Card.

Retentive behavior of a DB with the IM 1518 PN/DP CPU interface module

For the IM 151-8 PN/DP CPU interface module you can specify in *STEP 7* or via SFC 82 "CREA_DBL" (parameter ATTRIB -> NON_RETAIN bit), whether, in response to a POWER ON / OFF or RUN-STOP, a DB

- Keeps the actual values (retentive DB), or
- Accepts the initial values from load memory (non-retentive DB)

Table 4-2 Retentive behavior of the DB with the IM 1518 PN/DP CPU interface module

After a POWER OFF / POWER ON or restart of the IM 151-8 PN/DP CPU interface module, the DB should	
Receive the initial values (non-retentive DB)	**Retain the last actual values (retentive DB)**
Reason: After a POWER OFF / POWER ON and restart (STOP-RUN) of the IM 151-8 PN/DP CPU interface module, the actual values of the DB are non-retentive. The DB receives the start values from load memory.	Reason: After a POWER OFF / POWER ON and restart (STOP-RUN) of the IM 151-8 PN/DP CPU interface module, the actual values of the DB are retained.
Requirement in *STEP 7*: • The "Non-retain" check box must be activated in the block properties of the DB, or • a non-retentive DB was generated with SFC 82 "CREA_DBL" and the associated block attribute (ATTRIB -> NON_RETAIN bit).	Requirement in *STEP 7*: • The "Non-retain" check box must be activated in the block properties of the DB, or • A retentive DB was generated with SFC 82.

4.1.4 Address areas of system memory

The system memory of the IM 151-8 PN/DP CPU interface module is broken down into operand areas (refer to the table below). In a corresponding operation of your user program, you address data directly in the relevant address area.

Address areas of system memory

Table 4-3 Address areas of system memory

Address areas	**Description**
Process image of inputs	At every start of an OB 1 cycle, the IM 151-8 PN/DP CPU interface module reads the inputs from the input modules and saves the values to the process image input.
Process image of outputs	During its cycle, the program calculates the values for the outputs and writes these to the process image of outputs. At the end of the OB 1 cycle, the IM 151-8 PN/DP CPU interface module writes the calculated output values to the output modules.
Bit memory	This area provides memory for saving the intermediate results of a program calculation.
Timers	Timers are available in this area.
Counters	Counters are available in this area.
Local data	Temporary data in a code block (OB, FB, FC) is saved to this memory area while the block is being edited.
Data blocks	See *Recipes* and *Measured value logs*

Reference

The address areas of your IM 151-8 PN/DP CPU interface module are listed in the *S7-300 Instruction List*.

I/O process image

When the user program addresses the input (I) and output (Q) operand areas, it does not query the signal states of digital electronic modules. Instead, it accesses a memory area in the IM 151-8 PN/DP CPU interface module system memory. This particular memory area is the process image.

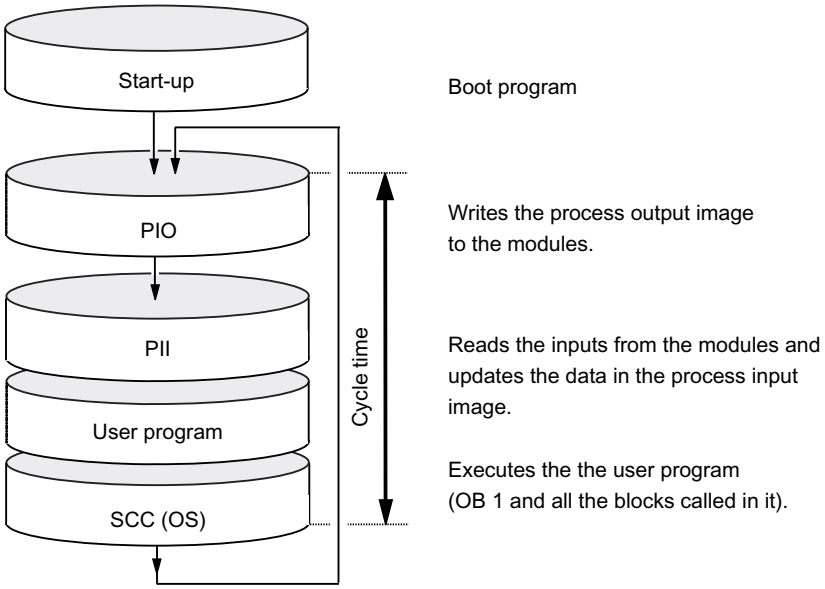
The process image is organized in two sections: The process image of inputs, and the process image of outputs.

Advantages of the process image

In contrast to direct access of the input / output modules, accessing the process image has the advantage that a consistent image of the process signals is made available to the IM 151-8 PN/DP CPU interface module during cyclic program execution. When the signal status at an input module changes during program execution, the signal status in the process image is maintained until the image is updated in the next cycle. Moreover, since the process image is stored in the IM 151-8 PN/DP CPU interface module system memory, access is significantly faster than direct access to the electronic modules.

Process image update

The operating system updates the process image periodically. The figure below shows the sequence of this operation within a cycle.



Local data

Local data store:

- The temporary variables of code blocks
- The start information of the OBs
- Transfer parameters
- Intermediate results

Temporary Variables

When you create blocks, you can declare temporary variables (TEMP) which are only available during block execution and then overwritten again. These local data have fixed length in each OB. Local data must be initialized prior to the first read access. Each OB also requires 20 bytes of local data for its start information. Local data access is faster compared to access to data in DBs.

The IM 151-8 PN/DP CPU interface module has memory for storing temporary variables (local data) of recently executed blocks. This memory is divided among the priority classes into partitions of equal size. Each priority class has its own local data area.

CAUTION

All temporary variables (TEMP) of an OB and its nested blocks are stored in local data. When using complex nesting levels for block processing, you may cause an overflow in the local data area.
The IM 151-8 PN/DP CPU interface module will change to STOP mode if the permissible length of the local data for a priority class is exceeded.
Make allowances for local data space required for synchronous error OBs. This is assigned to the respective triggering priority class.

See also

Retentivity of load memory, system memory and RAM (Page 74)

4.1.5 Properties of the SIMATIC Micro Memory Card

The SIMATIC Micro Memory Card as a memory module for the IM 151-8 PN/DP CPU interface module

The memory module used in your IM 151-8 PN/DP CPU interface module is a SIMATIC Micro Memory Card. It can be used as load memory or as a portable storage medium.

Note

The IM 151-8 PN/DP CPU interface module requires the SIMATIC Micro Memory Card for operation.

The following data are stored on the SIMATIC Micro Memory Card.

- User programs (all blocks)
- Archives and recipes
- Configuration data (*STEP 7* projects)
- Data for operating system update and backup

Note

You can either store user and configuration data or the operating system on the SIMATIC Micro Memory Card.

Properties of a SIMATIC Micro Memory Card

The SIMATIC Micro Memory Card ensures maintenance-free and retentive operation of the IM 151-8 PN/DP CPU interface module .

SIMATIC Micro Memory Card copy protection

Your SIMATIC Micro Memory Card has an internal serial number that implements an MMC copy protection. You can read this serial number from the SSL partial list $011C_H$ index 8 using SFC 51 "RDSYSST." If the reference and actual serial number of your SIMATIC Micro Memory Card are not the same, program a STOP command in a know-how-protected module, for example.

Reference

Additional information

- on the *SSL partial list* refer to the *S7-300 Instruction list* or the *System and standard functions for S7-300/400* Reference Manual.
- to memory reset the IM 151-8 PN/DP CPU interface module, refer to section *Resetting the IM 151-8 PN/DP CPU interface module using the mode selector switch*.

Useful life of a SIMATIC Micro Memory Card

The life of an SIMATIC Micro Memory Card depends mainly on the following factors:

1. The number of delete or programming cycles
2. External influences such as ambient temperature

At ambient temperatures up to 60 °C, up to 100,000 delete/write operations can be performed on a SIMATIC Micro Memory Card.

CAUTION
To prevent data losses, do not exceed this maximum of delete/write operations.

See also

Retentivity of load memory, system memory and RAM (Page 74)

Operating and display elements of the IM 151-8 PN/DP CPU interface module (Page 17)

4.2 Memory functions

4.2.1 General: Memory functions

Memory functions

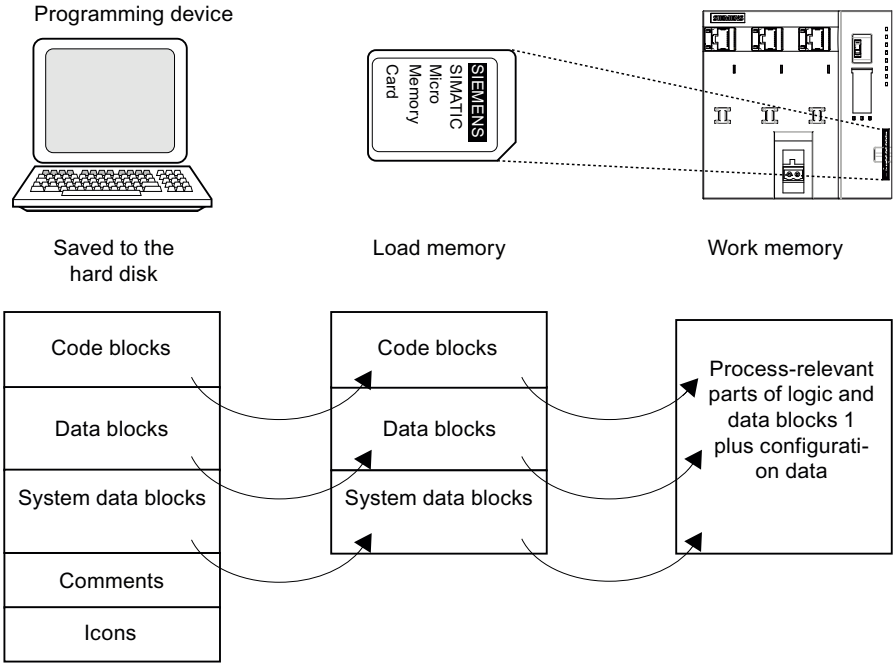
Memory functions are used to generate, modify or delete entire user programs or specific blocks. You can also ensure that your project data are retained by archiving these. If you created a new user program, use a programming device/PC to download the complete program to the SIMATIC Micro Memory Card.

4.2.2 Downloading user programs via SIMATIC Micro Memory Card to the IM 151-8 PN/DP CPU interface module

User program download

The entire user program is downloaded from your PD / PC to the IM 151-8 PN/DP CPU interface module via the SIMATIC Micro Memory Card. The previous content of the SIMATIC Micro Memory Card is deleted in the process. Blocks use the load memory area as specified under "Load memory requirements" in "General block properties".

The figure shows the load and work memory of the IM 151-8 PN/DP CPU interface module .



1: If not all of the work memory area is retentive, the retentive part is indicated in the *STEP 7* module status as retentive memory. You cannot run the program until all the blocks are downloaded.

Note

This function is only permissible if the IM 151-8 PN/DP CPU interface module is in STOP mode. Load memory is cleared if the load operation could not be completed due to power loss or illegal block data.

4.2.3 Handling blocks

4.2.3.1 Download of new blocks or delta downloads

There are two ways to download additional user blocks or download deltas:

- Download of blocks: You have already created a user program and downloaded it to the IM 151-8 PN/DP CPU interface module via the SIMATIC Micro Memory Card. You then want to add new blocks to the user program. In this case you do not need to reload the entire user program to the MCC. Instead you only need to download the new blocks to the SIMATIC Micro Memory Card (this reduces the download times for highly complex programs.)
- Delta download: In this case, you only download the deltas in the blocks of your user program. In the next step, perform a delta download of the user program, or only of the changed blocks to the SIMATIC Micro Memory Card, using the programming device/PC.

⚠ WARNING
The delta down of block / user programs overwrites all data stored under the same name on the SIMATIC Micro Memory Card.

The data of dynamic blocks are transferred to RAM and activated after the block is downloaded.

4.2.3.2 Uploading blocks

In contrast to downloading, uploading involves the transfer of individual blocks or a complete user program from the IM 151-8 PN/DP CPU interface module to the programming device / PC. In doing so, the blocks have the content of the last download in the IM 151-8 PN/DP CPU interface module. Dynamic DBs form the exception, because their actual values are transferred. Uploading blocks or the user program from the IM 151-8 PN/DP CPU interface module in *STEP 7* does not affect the memory assignment of the IM 151-8 PN/DP CPU interface module.

4.2.3.3 Deleting blocks

When you delete a block, it is deleted from load memory. In *STEP 7*, you can also delete blocks with the user program (DBs also with SFC 23 "DEL_DB"). RAM used by this block is released.

4.2.3.4 Compressing blocks

When data are compressed, gaps which have developed between memory objects in load memory/RAM as a result of load/delete operations will be eliminated. This releases free memory in a continuous block. You can compress both in STOP mode as well as in RUN mode of the IM 151-8 PN/DP CPU interface module.

4.2.3.5 Promming (RAM to ROM)

When writing the RAM content to ROM, the actual values of the DBs are transferred from RAM to load memory to form the start values for the DBs.

Note

This function is only permissible if the IM 151-8 PN/DP CPU interface module is in STOP mode. Load memory is cleared if the function could not be completed due to power loss.

4.2.4 CPU memory reset and restart

Memory reset

After inserting or removing a SIMATIC Micro Memory Card, a complete memory reset restores the IM 151-8 PN/DP CPU interface module to defined conditions in order to make a restart (warm start) possible. When resetting the IM 151-8 PN/DP CPU interface module, the memory management of the IM 151-8 PN/DP CPU interface module is reestablished. Blocks in load memory are retained. All dynamic runtime blocks are transferred once again from load memory to RAM, in particular to initialize the data blocks in RAM (restore initial values).

Restart (warm start)

- All retentive DBs retain their current values. Non-retentive DBs are reset to their initial values.
- The values of all retentive M, C, T are retained.
- All non-retentive user data are initialized:
  - M, C, T, I, O with "0"
- All run levels are initialized.
- The process images are deleted.

Reference

Read also section *Resetting the IM 151-8 PN/DP CPU interface module using the mode selector switch*.

See also

Reset the IM 151-8 PN/DP CPU interface module using the mode selector switch (Page 109)

4.2.5 Recipes

Introduction

A recipe represents a collection of user data. You can implement a simple recipe concept using static DBs. In this case, the recipes should have the same structure (length). One DB should exist per recipe.

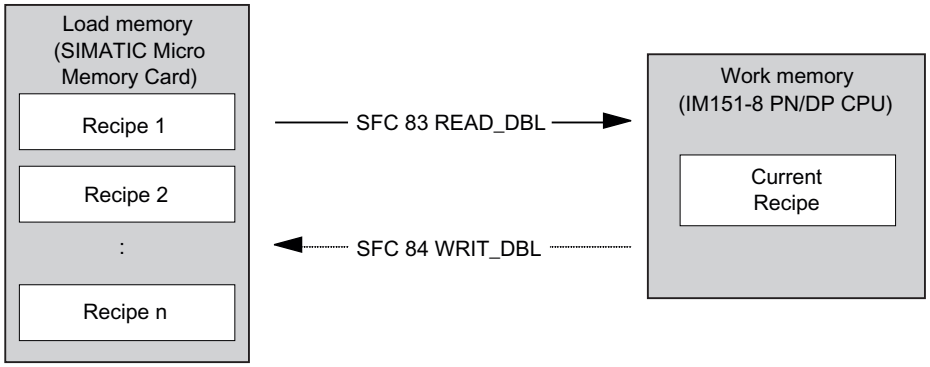
Processing sequence

Recipe is written to load memory:

- The individual data records of the recipes are created as static DBs in *STEP 7* and then downloaded to the IM 151-8 PN/DP CPU interface module. Therefore, recipes only use load memory, rather than RAM.

Working with recipe data:

- SFC83 "READ_DBL" is called in the user program to copy the data record of a current recipe from the DB in load memory to a static DB that is located in work memory. As a result, the RAM only has to accommodate the data of one record. The user program can now access data of the current recipe. The figure below shows how to handle recipe data:



Saving a modified recipe:

- The data of new or modified recipe data records generated during program execution can be written to load memory. To do this, call SFC 84 "WRIT_DBL" in the user program. The data written to load memory are portable and retentive on Memory reset. You can backup modified records (recipes) by uploading and saving these in a single block to the programming device/PC.

Note

Active system functions SFC82 to 84 (active access to the SIMATIC Micro Memory Card) have a distinct influence on programming device functions (for example, block status, variable status, download block, upload, open.) This typically reduces performance (compared to passive system functions) by a factor of 10.

Note

To prevent data losses, do not exceed this maximum of delete/write operations.

4.2.6 Measured value log files

Introduction

Measured values are generated when the IM 151-8 PN/DP CPU interface module executes the user program. These measured values are to be logged and analyzed.

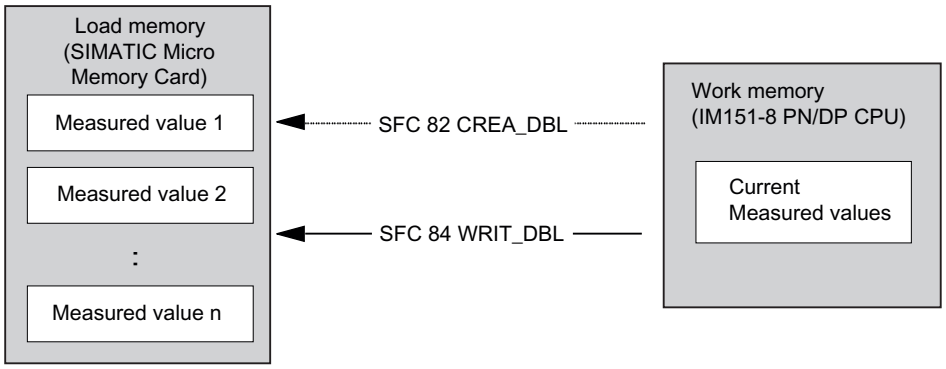
Processing sequence

Acquisition of measured values:

- The IM 151-8 PN/DP CPU interface module writes all measured values to a DB (for alternating backup mode in several DBs) which is located in the work memory.

Measured value logging:

- Before the data volume can exceed work memory capacity, you should call SFC 84 "WRIT_DBL" in the user program to swap measured values from the DB to load memory. The figure below shows how to handle measured value log files:



- You can call SFC 82 "CREA_DBL" in the user program to generate new (additional) static DBs in load memory which do not require RAM space.

Reference

For additional information on the block SFC 82 can be found in the *System and Standard Functions for S7-300/400* reference manual, or in the *STEP 7 Online Help*.

Note

SFC 82 is terminated and an error message is generated if a DB already exists under the same number in load memory and/or work memory.

The data written to load memory are portable and retentive on Memory reset.

Evaluation of measured values:

- Measured value DBs saved to load memory can be uploaded and evaluated by other communication partners (programming device, PC, for example).

  Note

  Active system functions SFC82 to 84 (active access to the SIMATIC Micro Memory Card) have a distinct influence on PG functions (for example, block status, variable status, download block, upload, open.) This typically reduces performance (compared to passive system functions) by a factor of 10.

  Note

  With the IM 151-8 PN/DP CPU interface module you can also generate non-retentive DBs using SFC 82 (parameter ATTRIB -> NON_RETAIN bit.)

  Note

  To prevent data losses, do not exceed this maximum of delete/write operations.

4.2.7 Backup of project data to SIMATIC Micro Memory Card

Function principle

Using the **Save project to Memory Card** and **Fetch project from Memory Card** functions, you can save all project data to a SIMATIC Micro Memory Card, and retrieve these at a later time. For this operation, the SIMATIC Micro Memory Card can be located in the IM 151-8 PN/DP CPU interface module or in the programming adapter of a programming device or PC.

Project data is compressed before it is saved to a SIMATIC Micro Memory Card, and uncompressed on retrieval.

Note

In addition to project data, you may also have to store your user data on the MMC. You should therefore first select a SIMATIC Micro Memory Card with sufficient free memory.

A message warns you if the memory capacity on your SIMATIC Micro Memory Card is insufficient

The volume of project data to be saved corresponds with the size of the project's archive file.

Note

For technical reasons, you can only transfer the entire contents (user program and project data) using the **Save project to memory card** action.

Mounting and connecting

5

5.1 Content

Where can I find what information?

You will find comprehensive information about fitting and connecting an ET 200S in the relevant sections of the *ET 200S Distributed I/O Device* Operating Instructions.

The following sections will show you the differences and special features associated with using an ET 200S with the IM 151-8 PN/DP CPU interface module.

5.2 Installing the IM 151-8 PN/DP CPU interface module

Introduction

The IM 151-8 PN/DP CPU interface module connects the ET 200S with PROFINET.

Requirement

The mounting rail has been fitted (see the *ET 200S Distributed I/O Device* Operating Instructions).

Procedure

1. Install the IM 151-8 PN/DP CPU interface module (see the *ET 200S Distributed I/O Device* Operating Instructions).
2. Install the appropriate terminal module (see the *ET 200S Distributed I/O Device* Operating Instructions).

   Note

   Note the installation sequence

   If you wish to extend the IM 151-8 PN/DP CPU interface module with an optional DP master module, you must first of all install the DP master module before you install the required terminal module.

3. Install the terminating module (see the *ET 200S Distributed I/O Device* Operating Instructions).

5.3 Connecting the IM 151-8 PN/DP CPU interface module

Introduction

You connect the supply voltage and PROFINET IO to the IM 151-8 PN/DP CPU interface module. The IM 151-8 PN/DP CPU interface module is equipped with an internal PROFINET switch. This allows the PROFINET to be looped through directly, or an additional IO device (e.g. ET 200S with IM 151-3 PN) to be connected directly.

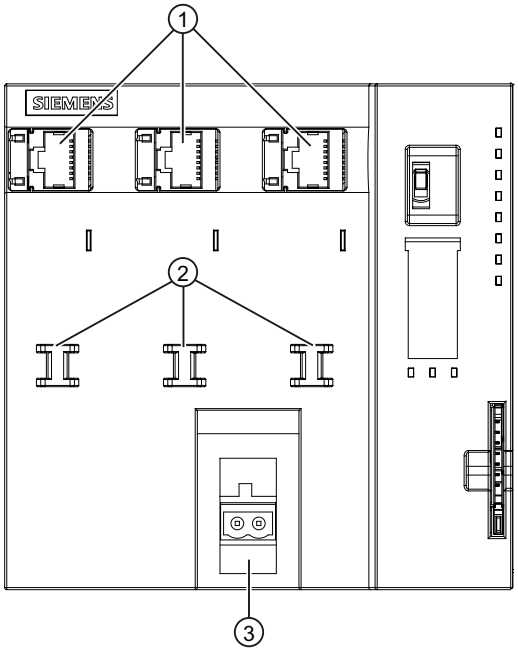


Figure 5-1 Connections of the IM 151-8 PN/DP CPU

① Connection for PROFINET IO (with 3 ports, RJ45)
② Cable holder
③ Connection for supply voltage

⚠ CAUTION

PROFINET

Modules with PROFINET interfaces may only be operated in LANs (Local Area Network) in which all nodes are equipped with SELV / PELV power supplies or protection systems of equal quality.

A data transfer terminal (modem, for example) is required to access the WAN (Wide Area Network) in order to ensure compliance with this safety standard.

Requirements

- The IM 151-8 PN/DP CPU interface module is installed on the mounting rail.
- Wire the interface module with the supply voltage switched off.

Required tools

Industrial Ethernet Fast Connect stripping tool (6GK1901-1GA00)
(stripping tool for Industrial Ethernet Fast Connect installation cables)

Power supply

You may only use PELV-type power supply units with a guaranteed electrically isolated extra-low voltage (≤ 60 VDC).

Required accessories

- Cable with maximum 2.5 mm^2 conductor cross section for the supply voltage
- PROFINET connector (according to the specifications in the *PROFINET Installation Guide*)

  The following are suitable:

PROFINET RJ45 connector with Fast Connect connection system, 90° cable outlet	6GK1901-1BB20-2AA0

- Industrial Ethernet Fast Connect installation cables

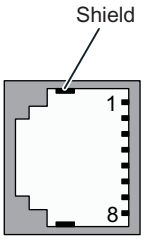
  The following are suitable:

Fast Connect standard cable	6XV1840-2AH10
Fast Connect trailing cable	6XV1840-3AH10
Fast Connect marine cable	6XV1840-4AH10

Installing the PROFINET cable connector

Install the PROFINET cable connector according to the information in the *PROFINET Installation Guide*.
The *PROFINET Cabling and Interconnection Technology, Version 1.99* Guideline can be found at http://www.profinet.com in the *Downloads* area.

Pin assignment for the RJ45 cable connector

View of the RJ45 socket	Terminal	Assignment
	1	RD (Receive Data +)
	2	RD_N (Receive Data –)
	3	TD (Transmit Data +)
	4	Ground
	5	Ground
	6	TD_N (Transmit Data –)
	7	Ground
	8	Ground

Connecting PROFINET IO

Connect the PROFINET IO as follows:

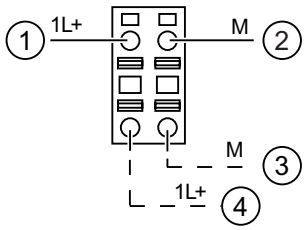
1. Insert the PROFINET cable connector onto the PROFINET terminal X1 P1.
2. Clamp the PROFINET cable securely in the cable holder.

The integrated switch enables looping through of PROFINET IO.
If necessary, you can connect the PROFINET connections X1 P2 and X1 P3 to other I/O devices.

Connecting the supply voltages

The voltage supply is over a connecting plug. When it ships, this is connected to the connection for the supply voltage on the 151-8 PN/DP CPU interface module.
The connecting plug makes it possible to loop the voltage supply uninterrupted.

Pin assignment of the interface:



① 24 VDC (red)
② Ground (blue)
③ Ground (blue)
④ 24 VDC (red)

Connect the supply voltage as follows:

1. Strip the wires for the supply voltage to 10 mm.
2. Insert the individual cables into the spring-loaded terminal (round openings) of the cable connector.
3. Inesrt the wired connector onto the 24 VDC terminal of the 151-8 PN/DP CPU interface module.
4. Please ensure that there is sufficient strain relief.

5.4 Installing and connecting the DP master module

If you wish to extend the IM 151-8 PN/DP CPU interface module with an optional DP master module, you can use the 151-8 PN/DP CPU interface module as a DP master. Connect the PROFIBUS DP to the DP master module.

Requirements

- The mounting rail has been fitted (see the *ET 200S Distributed I/O Device* Operating Instructions).
- The 151-8 PN/DP CPU interface module is installed on the mounting rail (see *Installing the 151-8 PN/DP CPU interface module*).

Note

You should install the required terminal module only having first installed the DP master module.

Installing the DP master module

1. Suspend the DP master module in the mounting rail to the right of the 151-8 PN/DP CPU interface module.
2. Rotate the DP master module to the back until it engages.
3. Slide the DP master module to the left until it audibly engages with the 151-8 PN/DP CPU interface module.

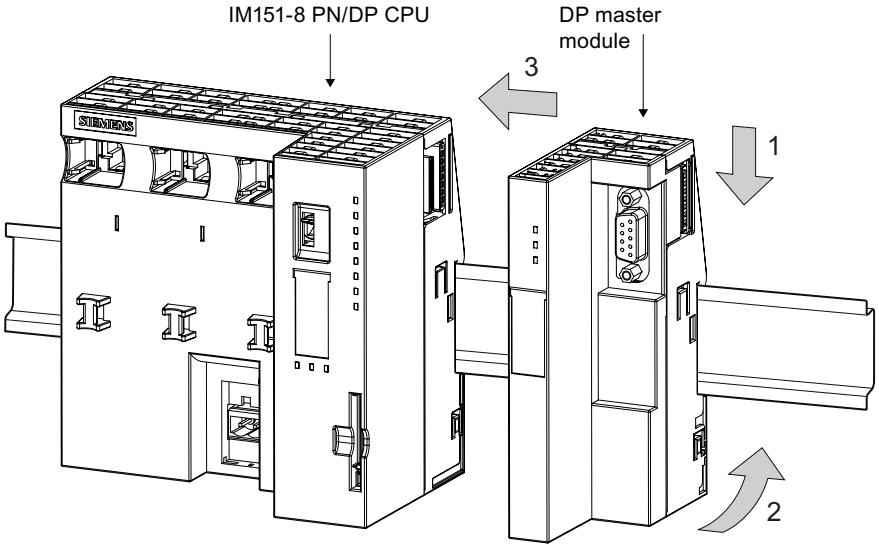


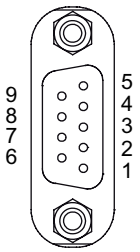
Figure 5-2 Installing the DP master module

Connecting PROFIBUS DP

Connect the PROFIBUS DP as follows:

- Use a pre-fabricated PROFIBUS cable.
- Insert the bus connector in the X1 connection socket on the DP master module.
- Screw the bus connector into the connection socket.

Pin assignment for the bus connector:

View of the connection socket	Terminal	Signal	Designation
 RS 485 interface	1	–	–
	2	–	–
	3	RxD / TxD-P	Data line B
	4	RTS	Request To Send
	5	M5V2	Data reference potential (station)
	6	P5V2	Supply plus (station)
	7	–	–
	8	RxD / TxD-N	Data line A
	9	–	–

Addressing

6

6.1 Addressing the I/O modules

6.1.1 Slot-oriented addressing of the centralized I/O modules

Slot-oriented addressing

A slot-orientated addressing is available only for the centralized I/O of the IM 151-8 PN/DP CPU interface module. If the IM 151-8 PN/DP CPU interface module is started up without a configuration loaded, then the I/O modules are addressed by slot by default.

Note

Without a loaded configuration, the IM 151-8 PN/DP CPU interface module has no retentive IP address for the PROFINET interface. You will have to reassign the IP address after each POWER OFF / POWER ON or memory reset.

This is the digital or analog address set by default according to the type of I/O module (see table below).

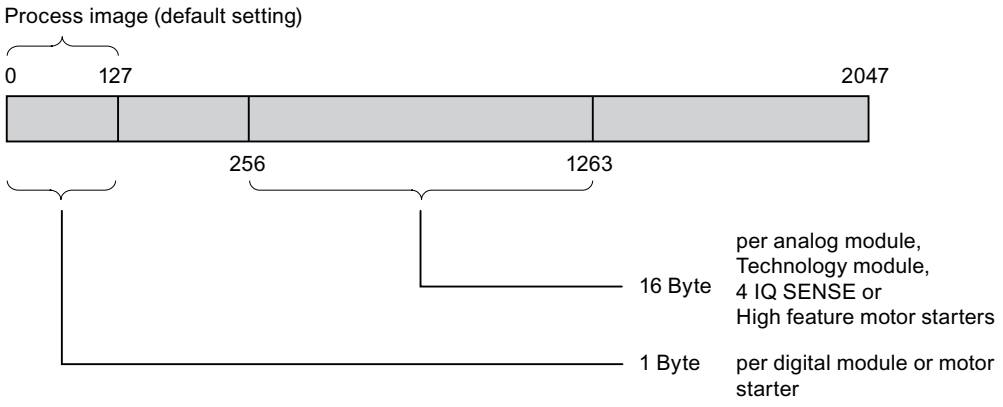


Figure 6-1 Structure of the default address area

Slot assignment

The figure below shows an ET 200S configuration with digital and analog electronic modules as well as the technology modules and slot assignment.

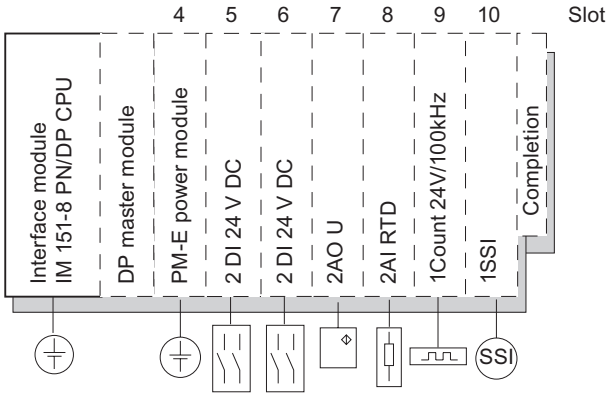


Figure 6-2 Slots for the ET 200S

Address assignment

Depending on the slot, 1 byte is reserved for digital I/Os, motor starters and 4 IQ SENSE as well as 16 bytes for analog I/Os and the technology module for each of the I/O modules (up to 63).

The table below indicates the default address assignment for analog and digital modules per slot for slot-oriented addressing.

Table 6-1 Default address assignment for centralized I/O modules in an ET 200S with IM 151-8 PN/DP CPU interface module

Reserved Address Area	Slot number									
	1	2	3	4	5	6	7	8	…	66
Digital module, motor starter	IM 151-8 PN/DP CPU [1]			-	1	2	3	4	…	62
Analog module, technology module, 4 IQ SENSE, motor starter high feature				-	272 to 287	288 to 303	304 to 319	320 to 335	…	1248 to 1263
Power modules [2]				256	272	288	304	320	…	1248

[1] with X1 P1 / P2 / P3 as PROFINET interface and X1 as DP interface

[2] Diagnostics addresses (no user data)

Example of Slot-Oriented Address Assignment for I/O Modules

The figure below illustrates a sample ET 200S configuration, showing an example of the address allocation for I/O modules. The addresses for the I/O modules are predefined in default addressing.

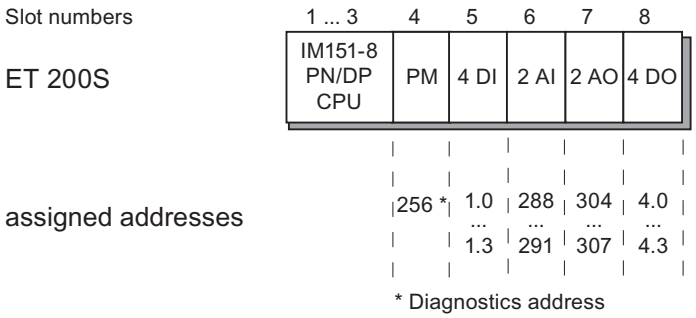


Figure 6-3 Example of address assignment for I/O modules

6.1.2 User-oriented addressing of the I/O Modules

User-oriented addressing

User-oriented module addressing is possible with both centralized and distributed I/Os.

User-oriented addressing means you can freely select

- Input addresses for modules and
- Output addresses for modules

within the range 0 to 2047 with byte-level granularity independently of one another. Assign the addresses in *STEP 7*. Specify the module start address that forms the basis for all other addresses of the module.

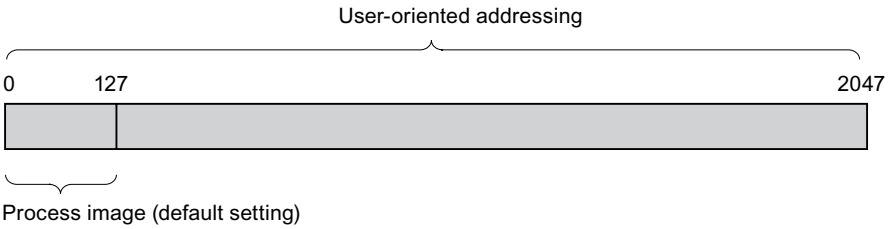


Figure 6-4 Structure of the address area for user-oriented addressing

Note

If you are using PROFIBUS DP or PROFINET IO field devices, then you must always configure the hardware in *STEP 7* HW Config. User-oriented addressing of modules is used automatically, and there is no fixed slot addressing.

Advantage

Advantages of user-oriented addressing:

- You can make the best possible use of the available address spaces because there are no "address gaps" between the modules.
- When creating standard software, you can specify addresses that are independent of the configuration of the ET 200S station.

6.2 Addressing on PROFINET IO

Overview

The relevant IO devices must first be brought into service on the PROFINET IO before the distributed I/Os can be addressed from the user program.

During this commissioning process:

- The device number and device name are defined for the IO devices.
- The device names are assigned to the IO devices so that the IM 151-8 PN/DP CPU interface module , as the IO controller, can assign an IP address to and thus address the IO devices.

  Note

  Name assignment at "Device replacement without removable medium"

  If the functionality "Device replacement without removable medium" is configured in HW Config, IO devices can also be replaced without the user having to assign a name. To do so, the IO device must be reset to the factory setting.

- Address ranges are assigned to the input / output modules or slots / subslots so that they can be addressed from the user program. Slots without user data are given a diagnostics address.

Additional information on commissioning the IM 151-8 PN/DP CPU interface module as an IO controller can be found in the *Commissioning PROFINET IO* section.

User-oriented addressing of the distributed PROFINET I/Os

You must use user-oriented addressing for the distributed PROFINET IO I/Os.

Information can be found in the *User-oriented addressing of the I/O modules* section.

Addressing consistent user data areas

The table below illustrates the points to consider with respect to communication in a PROFINET IO system if you want to transfer I/O areas with "Total length" consistency.

For 1 to 254 byte data consistency on the PROFINET IO:
The address area of consistent data in the process image is automatically updated.
To read and write consistent data, you can also use SFC 14 "DPRD_DAT" and SFC 15 "DPWR_DAT". If the address area of consistent data is not in the process image, you must use SFC 14 and SFC 15 to read and write consistent data.
The length in the SFC must tally with the length of the programmed area when accessing areas with "Total length" consistency.
Direct access to consistent areas is also possible (e.g. L PEW or T PAW).
In a PROFINET IO system you can transfer up to 254 bytes of consistent data.

See also

Configuring and commissioning the PROFINET IO system (Page 123)

User-oriented addressing of the I/O Modules (Page 97)

6.3 Addressing on PROFIBUS DP

Overview

The relevant DP slaves must first be brought into service on the PROFIBUS DP before the distributed I/Os can be addressed from the user program.

During this commissioning process:

- PROFIBUS addresses are assigned to the slaves
- Address ranges are assigned to the input / output modules or slots so that they can be addressed from the user program. Slots without user data are given a diagnostics address.

Additional information on commissioning the IM 151-8 PN/DP CPU interface module as a DP master module can be found in the *Commissioning PROFIBUS DP* section.

User-oriented addressing of the distributed PROFIBUS I/Os

You must use user-oriented addressing for the distributed PROFIBUS DP I/Os.

Information can be found in the *User-oriented addressing of the I/O modules* section.

Addressing consistent user data areas

The table below illustrates the points to consider with respect to communication in a PROFIBUS DP master system if you want to transfer I/O areas with "Total length" consistency.

For 1 to 32 byte data consistency on the PROFIBUS DP:
The address area of consistent data in the process image is automatically updated.
To read and write consistent data, you can also use SFC 14 "DPRD_DAT" and SFC 15 "DPWR_DAT". If the address area of consistent data is not in the process image, you must use SFC 14 and SFC 15 to read and write consistent data.
The length in the SFC must tally with the length of the programmed area when accessing areas with "Total length" consistency.
Direct access to consistent areas is also possible (e.g. L PEW or T PAW).
In a PROFIBUS DP system you can transfer up to 32 bytes of consistent data.

See also

Commissioning the IM 151-8 PN/DP CPU interface module with DP master module as a DP master (Page 130)

User-oriented addressing of the I/O Modules (Page 97)

Commissioning 7

7.1 Overview

This section contains important notes on commissioning which you should strictly observe in order to avoid injury or damage to machines.

Note

Your commissioning phase is determined primarily by your application, so we can only offer you general information, without claiming completeness of this topic.

Reference

Note the information about commissioning provided in the descriptions of your system components and devices.

7.2 Commissioning procedure

7.2.1 Procedure: Commissioning the hardware

Hardware requirements

- ET 200S is installed (IM 151-8 PN/DP CPU interface module and terminal module)
- ET 200S is wired up (IM 151-8 PN/DP CPU interface module and terminal module)

With a networked ET 200S, the following applies to the interfaces

- PROFINET
  - the integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module has been configured in *STEP 7* (IP address and device name set in HW Config)
  - the IM 151-8 PN/DP CPU interface module is connected to the subnet
- PROFIBUS (on optional DP master module)
  - the PROFIBUS address is set
  - the terminating resistors on the segments are enabled

Recommended procedure: Hardware

Due to its modular structure and the many different expansion options, an ET 200S can be very large and complex. It is therefore not a good idea to switch it on for the first time with all the modules installed. Rather, we recommend a step-by-step commissioning procedure.

We recommend the following initial commissioning procedure for an ET 200S:

Table 7-1 Recommended commissioning procedure: Hardware

Activity	Remarks	Information on this can be found in section
An installation and wiring check according to checklist	-	*Commissioning check list*
Disconnecting drive aggregates and control elements	This prevents negative effects on your system as a result of program errors. Tip: By redirecting data from your outputs to a data block, you can always check the status at the outputs	-
Preparing the IM 151-8 PN/DP CPU	Connect a programming device	*Connecting the programming device (PG)*
Start up the power supply and ET 200S with the IM 151-8 PN/DP CPU interface module and check the LEDs	Commission the power supply and the ET 200S with IM 151-8 PN/DP CPU interface module.	*Initial power on*
	Check the LED displays of the IM 151-8 PN/DP CPU interface module.	*Debugging functions, diagnostics and troubleshooting*
Reset the IM 151-8 PN/DP CPU interface module memory and check the LEDs	-	*Reset the IM 151-8 PN/DP CPU interface module using the mode selector switch*
Commission the rest of the modules	Gradually install the other modules in the ET 200S and start them up in succession.	*ET 200S* Operating Instructions

⚠ DANGER

Proceed step-by-step. Do not go to the next step unless you have completed the previous one without error / error message.

Reference

Important notes can also be found in the *Debugging Functions, Diagnostics and Troubleshooting* section.

See also

Procedure: Software commissioning (Page 103)

7.2.2 Procedure: Software commissioning

Requirements

You have your ET 200S with IM 151-8 PN/DP CPU

- mounted and
- wired.

Software requirements to be satisfied in order to utilize the full functionality of your IM 151-8 PN/DP CPU interface module:

For …	you require the following versions of *STEP 7*
IM 151-8 PN/DP CPU	V5.4 + Service pack 4 or higher

At the ports for

- PROFINET
  - the integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module has been configured in *STEP 7* (IP address and device name set in HW Config)
  - the IM 151-8 PN/DP CPU interface module is connected to the subnet.
- PROFIBUS (on optional DP master module)
  - the PROFIBUS address is set
  - the terminating resistors on the segments are enabled

Note

Please observe the procedure for commissioning the hardware.

Recommended procedure: Software

Table 7-2 Recommended commissioning procedure: Software

Activity	Remarks	Information can be found ...
• Switch on the programming device and run SIMATIC Manager • Transferring the configuration and program to the IM 151-8 PN/DP CPU interface module: The IM 151-8 PN/DP CPU interface module logs on to the SIMATIC Manager with its MAC address via "Available nodes". If the Ethernet interface of the PD is set to **TCP/IP (Auto)**, then during the first establishment of a communication connection (e.g. double-clicking this network node that displays only the MAC address in order to open the online block container), a temporary IP address is automatically assigned by the PD to the PN interface of the IM 151-8 PN/DP CPU interface module. Now the blocks, especially also the SDB container with the HW configuration, can be moved by drag-and-drop from the offline block container to the online block container. When loading the SDB container, the IP address assigned by *STEP 7* in the HW Config are also transferred by the IM 151-8 PN/DP CPU interface module.	-	in the *Programming with STEP 7* Manual
Debugging the I/Os	Helpful functions are here: • Monitoring and modifying variables • Testing with program status • Forcing • Controlling the outputs in STOP mode (PO enable) **Tip:** Test the signals at the inputs and outputs	• in the *Programming with STEP 7* Manual • in the *Alarm, error and system messages* section
Commissioning PROFINET IO		• in the *Commissioning PROFINET IO* section • in the *System Description PROFINET*
Commissioning PROFIBUS DP	-	in the *Commissioning PROFIBUS DP* section
Connect the outputs	Commissioning the outputs successively.	-

⚠ DANGER

Proceed step-by-step. Do not go to the next step unless you have completed the previous one without error / error message.

Reaction to errors

React to errors as follows:

- Check the system with the help of the check list in the chapter below.
- Check the LED displays on all modules. The meaning is described in the *ET 200S Distributed I/O Device* Operating Instructions.
- If required, remove individual components to trace the error.

Reference

Important notes can also be found in the *Debugging Functions, Diagnostics and Troubleshooting* section.

See also

Procedure: Commissioning the hardware (Page 101)

7.3 Commissioning check list

Introduction

Once you have installed and wired up your ET 200S, we advise you to check all the previous steps once again.

The following tables give you instructions in the form of a checklist for checking your ET 200S. They also provide cross-references to sections containing additional information on the relevant topic.

Mounting rail

The points to be checked are listed in the ET 200S Operating Instructions	*ET 200S* Operating Instructions in section
Is the rail mounted firmly to the wall, in the frame or in the cabinet?	*Installing*
Have you maintained the free space required?	*Installing*

Concept of grounding and chassis ground

The points to be checked are listed in the ET 200S Operating Instructions	*ET 200S* Operating Instructions in section
Have you established a low-impedance connection (large surface, large contact area) to ground potential?	*Wiring and assembly*
Is the profile rail properly connected to reference potential and ground potential (direct electrical connection or ungrounded operation)?	*Wiring and assembly*
Are all grounding points of electrically connected measuring instruments and of the load power supply units connected to reference potentials?	*Appendix*

Module installation and wiring

The points to be checked are listed in the ET 200S Operating Instructions	*ET 200S* Operating Instructions in section
Are all the terminal modules, including the terminating module, installed correctly?	*Installing*
Are all the terminal modules wired up correctly?	*Wiring and assembly*
Are all the power modules, electronic modules, ... correctly connected?	*Wiring and assembly*

7.4 Commissioning the modules

7.4.1 Inserting/Replacing a SIMATIC Micro Memory Card

SIMATIC Micro Memory Card (MMC) as memory module

The memory module used in your IM 151-8 PN/DP CPU interface module is a SIMATIC Micro Memory Card. You can use the SIMATIC Micro Memory Card as a load memory or a portable data medium.

Note

You must have a connected SIMATIC Micro Memory Card in order to operate the IM 151-8 PN/DP CPU interface module.
The SIMATIC Micro Memory Card is not supplied as standard with the IM 151-8 PN/DP CPU interface module.

Note

The IM 151-8 PN/DP CPU interface module goes into STOP and requests a memory reset when you remove the SIMATIC MMC while the IM 151-8 PN/DP CPU interface module is in RUN state.

CAUTION

Data on a SIMATIC Micro Memory Card can be corrupted if you remove the card while it is being accessed by a write operation. You may have to delete the SIMATIC Micro Memory Card using the PD or format it in the IM 151-8 PN/DP CPU interface module if you remove it from the live system.
DO NOT remove the SIMATIC Micro Memory Card when the system is in RUN state; always shut down power or set the IM 151-8 PN/DP CPU interface module to STOP in order to prevent any write access of a programming device. If the CPU is in STOP mode and you cannot determine whether or not a programming device function is active (e.g. load / delete block), disconnect the communication lines.

WARNING

Make sure that the SIMATIC Micro Memory Card to be inserted contains the proper user program for the IM 151-8 PN/DP CPU interface module (system). The wrong user program may have fatal processing effects.

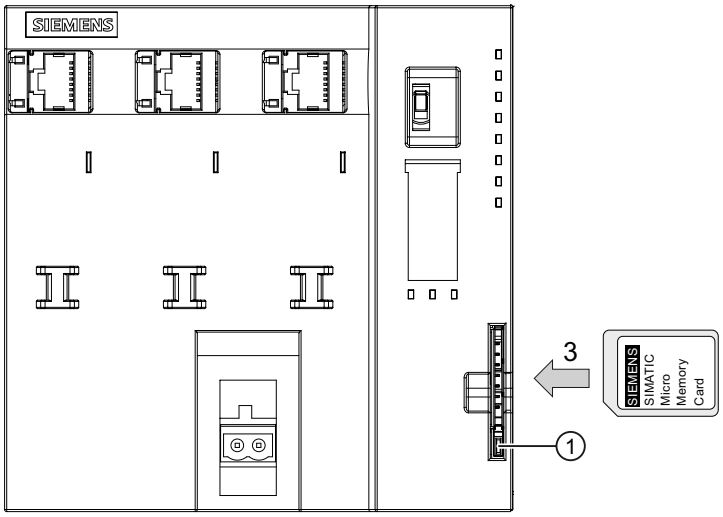
Inserting / replacing the SIMATIC Micro Memory Card

1. First of all, switch the IM 151-8 PN/DP CPU interface module to STOP.
2. Is there a SIMATIC Micro Memory Card inserted?

   If yes, first of all ensure that no writing PD functions (e.g. downloading blocks) are running. If you cannot ensure this, interrupt the communication connections of the IM 151-8 PN/DP CPU interface module.

   Press the ejector and remove the SIMATIC MMC.

   An ejector ① is located on the frame of the module receptacle to enable you to remove the SIMATIC Micro Memory Card.
   Use a small screwdriver or ball-point pen to eject.
3. Insert the ("new") SIMATIC Micro Memory Card into the receptacle so that its beveled edge points towards the ejector.
4. Gently press the SIMATIC Micro Memory Card into the IM 151-8 PN/DP CPU interface module until it engages.
5. Perform a reset (refer to section *Resetting the IM 151-8 PN/DP CPU interface module using the mode selector switch*).



Removing and inserting a SIMATIC Micro Memory Card

After you replace a SIMATIC MMC in POWER OFF state, the IM 151-8 PN/DP CPU interface module detects

- A physically identical SIMATIC Micro Memory Card with a different content
- A new SIMATIC Micro Memory Card with the same content as the old SIMATIC Micro Memory Card

It automatically performs a Memory reset after POWER ON.

Reference

Additional information about the SIMATIC Micro Memory Card can be found in the *Technical Data* section of the *S7-300, CPU 31xC and CPU 31x* manual.

See also

Reset the IM 151-8 PN/DP CPU interface module using the mode selector switch (Page 109)

7.4.2 Initial power on

Requirements

- You have installed and wired up the ET 200S.
- The SIMATIC Micro Memory Card is inserted in the IM 151-8 PN/DP CPU interface module
- The mode selector of your IM 151-8 PN/DP CPU interface module is set to STOP.

First switch-on of an ET 200S with IM 151-8 PN/DP CPU

Switch on the supply voltage for the ET 200S.

Result:

On the IM 151-8 PN/DP CPU interface module

- The ON LED lights up
- the STOP LED flashes at 2 Hz when the IM 151-8 PN/DP CPU interface module is carrying out an automatic memory reset
- The STOP LED lights up after the memory reset.

7.4.3 Reset the IM 151-8 PN/DP CPU interface module using the mode selector switch

When must I perform a memory reset of the IM 151-8 PN/DP CPU interface module?

You must perform a memory reset of the IM 151-8 PN/DP CPU interface module,

- When all retentive memory bits, timers and counters have been cleared and the initial values of retentive data blocks in the load memory are to be used as actual values in the work memory.
- if the retentive memory bits, timers and counters could cause unwanted responses after "Load user program onto memory card" with the user program just downloaded to the IM 151-8 PN/DP CPU interface module.

  Reason: "Load user program onto memory card" does not delete the retentive areas.
- if the IM 151-8 PN/DP CPU interface module requests a memory reset with its STOP LED flashing at 0.5 Hz intervals. Possible reasons for this request are listed in the table below.

Table 7-3 Possible causes for a request to memory reset by the IM 151-8 PN/DP CPU interface module

Causes for a request to memory reset by the IM 151-8 PN/DP CPU interface module	Special features
The SIMATIC Micro Memory Card has been replaced.	–
RAM error in the IM 151-8 PN/DP CPU interface module	–
Work memory is too small, i.e. not all the blocks of the user program on a SIMATIC Micro Memory Card can be loaded.	IM 151-8 PN/DP CPU interface module with SIMATIC Micro Memory Card inserted: This causes continuous requests for a memory reset. This may be prevented by formatting the SIMATIC Micro Memory Card (see *Formatting the SIMATIC Micro Memory Card*). For additional information on the way the SIMATIC Micro Memory Card responds to a memory reset, see *Memory reset and restart*.
Attempts to load faulty blocks; if a wrong instruction was programmed, for example.	

How to reset memory

There are two ways to reset the IM 151-8 PN/DP CPU interface module memory:

Memory reset using the mode selector switch	Memory reset using the programming device
... is described in this section.	... is only possible when IM 151-8 PN/DP CPU interface module is in STOP mode (see *STEP 7 Online Help*).

Resetting the memory of the IM 151-8 PN/DP CPU using the mode selector switch

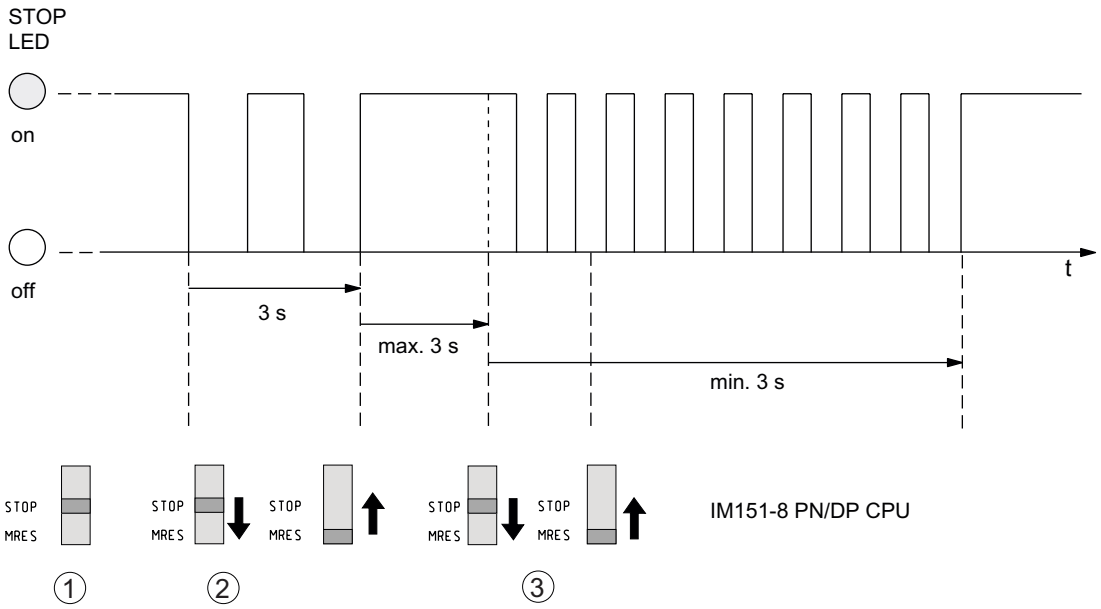
The following table contains the steps required to memory reset the IM 151-8 PN/DP CPU interface module.

Table 7-4 Steps for performing a memory reset of the IM 151-8 PN/DP CPU interface module

Step	Resetting the memory of the IM 151-8 PN/DP CPU
1.	Turn the key to STOP position ①
2.	Turn the key to MRES position Hold the key in this position until the STOP LED lights up for the second time and remains on (this takes 3 seconds). ② Now release the key.
3.	You must turn the key to MRES position again within 3 seconds and hold it there until the STOP LED flashes (at 2 Hz). ③ You can now release the switch. When the IM 151-8 PN/DP CPU interface module has completed the memory reset, the STOP LED stops flashing and lights up. The memory reset has been carried out on the IM 151-8 PN/DP CPU interface module.

The procedure described in the table above is only required if you wish to reset the IM 151-8 PN/DP CPU interface module memory without this being requested by the IM 151-8 PN/DP CPU interface module (STOP LED flashing slowly). If the IM 151-8 PN/DP CPU interface module prompts you for a memory reset, you only have to turn the mode selector briefly to the MRES position to initiate the memory reset operation.

The figure below shows how to use the mode selector switch to reset the IM 151-8 PN/DP CPU interface module memory:



If the IM 151-8 PN/DP CPU interface module prompts you for another memory reset following a successful memory reset operation, the SIMATIC Micro Memory Card may need to be reformatted see section (*Formatting the Micro Memory Card*).

STOP LED does not flash during the memory reset

What should I do if the STOP LED does not flash during the memory reset or if other LEDs are lit?

1. You must repeat steps 2 and 3.

2. If the IM 151-8 PN/DP CPU interface module does not perform a memory reset again, you must evaluate the diagnostics buffer of the IM 151-8 PN/DP CPU interface module.

What happens to the IM 151-8 PN/DP CPU interface module with a memory reset?

Table 7-5 Internal processes in the IM 151-8 PN/DP CPU during a memory reset

Event	Action in the IM 151-8 PN/DP CPU interface module	
Process in the IM 151-8 PN/DP CPU interface module	1.	The IM 151-8 PN/DP CPU interface module deletes the entire user program in the work memory.
	2.	The IM 151-8 PN/DP CPU interface module deletes the retentive data.
	3.	The IM 151-8 PN/DP CPU interface module tests its hardware.
	4.	The IM 151-8 PN/DP CPU interface module copies the sequence-related content of the SIMATIC Micro Memory Card (load memory) to the work memory. **Tip:** If the IM 151-8 PN/DP CPU interface module is unable to copy the content of the SIMATIC Micro Memory Card and requests a memory reset, then: • Remove the SIMATIC Micro Memory Card • Resetting the memory of the IM 151-8 PN/DP CPU • Provide the IM 151-8 PN/DP CPU interface module with a temporary IP address and then read out the diagnostics buffer or in the SIMATIC-Manager under "Available nodes", establish the MAC address of the IM 151-8 PN/DP CPU interface module. When the Ethernet interface of the PD is set to "TCP/IP (Auto)", you can read out the diagnostics buffer also via this available MAC address, because then *STEP 7* assigns a temporary IP address.
Memory contents after reset	The user program is transferred back from the SIMATIC Micro Memory Card to the work memory and the memory utilization is indicated accordingly.	
What's left?	Data in the diagnostics buffer.[1] You can read the diagnostics buffer with the programming device (see *STEP 7 Online Help*).	
	Content of elapsed time counter	
[1] After POWER OFF / POWER ON (see above, action 4 in the IM 151-8 PN/DP CPU interface module under *Tip*), only the last 100 entries in the diagnostics buffer are retentive.		

Special feature: Interface parameters

The interface parameters of the PN interface (IP parameters) and the DP interface (DP parameters) are not retentive if there is no configuration on the SIMATIC Micro Memory Card. Therefore, always download the configuration data from the HW Config to the IM 151-8 PN/DP CPU interface module. The configuration data is stored in the SDBs on the SIMATIC Micro Memory Card.

The table below describes which interface parameters remain valid after a Memory reset.

Memory reset ...	IP / DP parameters
with SIMATIC Micro Memory Card inserted	... stored on the SIMATIC Micro Memory Card as configuration data in an SDB are valid
without inserted SIMATIC Micro Memory Card or without loaded configuration data	... will be lost.

See also

CPU memory reset and restart (Page 83)

Formatting the SIMATIC Micro Memory Card (Page 112)

7.4.4 Formatting the SIMATIC Micro Memory Card

You must format the SIMATIC Micro Memory Card in the following cases

- The SIMATIC Micro Memory Card module type is not a user module.
- The SIMATIC Micro Memory Card has not been formatted.
- The SIMATIC Micro Memory Card is defective.
- The content of the SIMATIC Micro Memory Card is invalid.

  The content of the SIMATIC Micro Memory Card has been identified as invalid.
- The "Load user program" operation was interrupted as a result of POWER OFF.
- The "Write RAM to ROM" operation was interrupted as a result of POWER OFF.
- Error when evaluating the module content during Memory reset.
- Formatting error, or formatting failed.

If one of these errors has occurred, the IM 151-8 PN/DP CPU interface module prompts for yet another memory reset, even after the memory has already been reset. The card's content is retained until the SIMATIC Micro Memory Card is formatted, unless the "Load user program" or "Write RAM to ROM" operation was interrupted as a result of POWER OFF.

The SIMATIC Micro Memory Card is only formatted if there is a reason to do so (see above) and not, for example, when you are prompted for a memory reset after a module is changed. In this case, a switch to MRES triggers a normal memory reset for which the module content remains valid.

Use the following steps to format your SIMATIC Micro Memory Card

If the IM 151-8 PN/DP CPU interface module is requesting a memory reset (STOP LED flashing slowly), you can format the SIMATIC Micro Memory Card as follows:

1. Toggle the switch to the MRES position and hold it there until the STOP LED lights up and remains on (after approx. 9 seconds).
2. Within the next three seconds, release the switch and toggle it once again to MRES position. The STOP LED flashes to indicate that formatting is in progress.

Note

Always perform this sequence of operation within the specified time. Otherwise, the SIMATIC Micro Memory Card will not be formatted, but rather returns to memory reset status.

See also

Reset the IM 151-8 PN/DP CPU interface module using the mode selector switch (Page 109)

7.4.5 Resetting to the as-delivered state

Setting the IM 151-8 PN/DP CPU interface module back to factory settings

In the factory settings, the properties of the IM 151-8 PN/DP CPU interface module are set to the following values:

Table 7-6 Properties of the IM 151-8 PN/DP CPU interface module factory settings

Properties	Value
Retentive memory bits, timers, counters	All retentive memory bits, timers and counters are cleared
Set retentive area for memory bits, timers and counters	Default setting (16 memory bytes, no timers, 8 counters)
Contents of the diagnostics buffer	cleared
Operating hours counter	0
Time-of-day	1.1.1994 00:00:00
IP address	None

Procedure

Proceed as follows to reset a IM 151-8 PN/DP CPU interface module to the factory settings using the mode selector:

1. Switch off the power supply.
2. Remove the SIMATIC Micro Memory Card from the receptacle (see *Inserting/replacing a Micro Memory Card*)
3. Keep the mode selector switch in the MRES position and switch the power supply on again.
4. Wait until LED lamp image 1 from the subsequent overview is displayed.
5. Release the mode selector switch, set it back to MRES within 3 seconds and hold it in this position.
6. The LED lamp image 2 from the subsequent overview is displayed.
   This lamp image lights up while the reset operation is running (approximately 5 seconds). During this period you can cancel the resetting procedure by releasing the mode selector.
7. Wait until LED lamp image 3 from the following overview is displayed and release the mode selector again.

The IM 151-8 PN/DP CPU interface module is reset to the factory settings. It runs unbuffered (all the LEDs light up, apart from P1 - LINK, P2 - LINK and P3 - LINK) and changes to STOP mode.

Lamp images while resetting the IM 151-8 PN/DP CPU interface module

While you are resetting the IM 151-8 PN/DP CPU interface module to the factory settings, the LEDs light up in succession in the following lamp images:

Table 7-7 Lamp images

LED	Color	Lamp image 1	Lamp image 2	Lamp image 3
SF	Red	□	○	Δ
BF-PN	Red	□	□	□
MT	Yellow	□	□	□
ON	Green	Δ	Δ	Δ
FRCE	Yellow	○	□	□
RUN	Green	○	□	□
STOP	Yellow	○	□	□
P1 - LINK	Green	□	□	□
P2 - LINK	Green	□	□	□
P3 - LINK	Green	□	□	□
Legend: Δ = LED lit; □ = LED dark; ○ = LED flashes at 0.5 Hz				

See also

Inserting/Replacing a SIMATIC Micro Memory Card (Page 106)

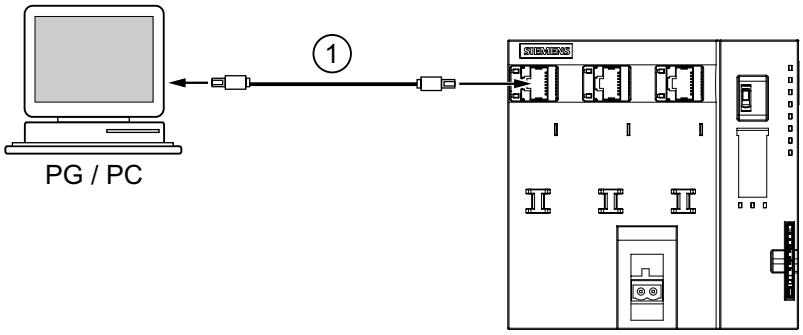
7.4.6 Connecting a programming device / PC to the integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module

Requirement

- IM 151-8 PN/DP CPU with integrated PROFINET interface
- Programming device / PC with network card

Connecting a programming device / PC to the integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module

1. Connect the programming device / PC to the X1 P1 interface of the IM 151-8 PN/DP CPU interface module using a pre-assembled, uncrossed twisted pair cable ①.



   Of course, a programming device can also be connected and used at the other two ports of the PROFINET interface.

Result

You have connected your programming device / PC to the integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module.

Configuring the PROFINET interface of the IM 151-8 PN/DP CPU interface module

If you wish to connect only a programming device and no IO devices to the IM 151-8 PN/DP CPU interface module, you must also configure the PROFINET interface accordingly.

Procedure:

Step	Activity
Configuring hardware in STEP 7 SIMATIC Manager	
1	Select **File > New...** Enter a name for your project and click on "OK" to confirm.
2	Select **Insert > Station > SIMATIC 300 Station** to add an S7-300 station.
3	Double-click "Hardware." **Result**: HW Config opens.
4	Insert your IM 151-8 PN/DP CPU interface module using drag-and-drop. **Result**: The "Properties – Ethernet Interface PN-IO" window opens. The properties of the PROFINET interface X1 are shown in the "Parameters" tab.
Assigning the IP address	
5	Enter the required IP address in the window. Note: The worldwide unique MAC address is preset by the manufacturer and cannot be changed.
6	Click "OK" to close the Properties dialog box.
Saving the configuration	
7	Save your configuration with **Station > Save and compile**.
Configuration download	
8	Download the configuration to the IM 151-8 PN/DP CPU interface module. There are two ways of doing this: • online via the PN interface To download the configuration, select the MAC address of the target IM 151-8 PN/DP CPU interface module. You can display the list of available nodes in the "Select node address" window "whilst downloading the HW configuration. Here you can select the desired target device via the associated IP or MAC address. If the device has only had a MAC address so far, then this can now be assigned the configured IP address. The programming device must be connected to the IM 151-8 PN/DP CPU interface module in order to do this. The programming device interface must be set to **TCP/IP (Auto)**. In the **IE-PG Access** tab of the interface properties you must set: **Assign Project-Specific IP Address**. • offline, by saving the data to a SIMATIC Micro Memory Card in SIMATIC Manager on your programming device, and then inserting the SIMATIC Micro Memory Card into the IM 151-8 PN/DP CPU interface module

Result

You have assigned a (retentive) IP address to the PROFINET interface of the IM 151-8 PN/DP CPU interface module.

Reference

- For information on PROFINET, refer to the *PROFINET System Description*.
- For information on passive network components such as switches, refer to the *SIMATIC NET manual: Twisted Pair and Fiber-Optic Networks.*

See also

Configuring and commissioning the PROFINET IO system (Page 123)

7.4.7 Starting SIMATIC Manager

Introduction

SIMATIC Manager is a GUI for online/offline editing of S7 objects (projects, user programs, blocks, hardware stations and tools).

The SIMATIC Manager lets you

- Manage projects and libraries,
- Call *STEP 7* tools,
- Access the PLC (AS) online,
- Editing SIMATIC Micro Memory Cards.

Starting SIMATIC Manager

After installation, the **SIMATIC Manager** icon appears on the Windows desktop, and the Start menu contains entry **SIMATIC Manager** under **SIMATIC**.

1. Run SIMATIC Manager by double-clicking the icon, or from the Start menu (same as with all other Windows applications).

User interface

A corresponding editing tool is started up when you open the relevant objects. You start the program editor by double-clicking the program block you want to edit (object-oriented start).

Online Help

The online help for the active window is always called by pressing F1.

7.4.8 Monitoring and modifying I/Os

The "Monitor and modify variables" tool

The *STEP 7* "Monitor and modify variables" tool lets you:

- Monitor program variables in any format
- Editing (modifying) the status or content of variables in the IM 151-8 PN/DP CPU interface module.

Creating a variable table

You have two options of creating a variable table (VAT):

- In the LAD / FBD / STL editor by selecting the **PLC > Monitor/Modify Variables** command

  This table is also available directly online.
- In the SIMATIC Manager with the **Blocks** container open via menu item **Insert New Object > Variable table**

  This table created offline can be saved for future retrieval. You can also test it after switching to online mode.

VAT structure:

In the VAT, every address to be monitored or modified (e.g. inputs, outputs) occupies one row.

The meaning of the VAT columns is as follows:

Column text	In this field ...
Address	contains the absolute address of the variable
Icon	contains the symbolic descriptor of the variables This is identical to the specification in the Symbol Table.
Symbol comment	shows the symbol comment of the Symbol Table
Status format	contains the default format setting, e.g. HEX. You can change the format as follows: • right-click in the format field. The Format List opens. or • left-click in the format field until the relevant format appears
Status value	shows the content of the variable at the time of update
Modify value	is used to enter the new variable value (modify value)

Monitor variable

You have two options for monitoring variables:

- Updating the status values once via menu item **Variable > Update Status Values**

  or
- Continuous update of status values via menu item **Variable > Monitor**

Modifying variables

To modify variables, proceed as follows:

1. Left-click the field **Modify value** of the relevant variable.
2. Enter the modify value according to the data type.
3. To update modify values once, select the menu item **Variable > Activate Modify Value**.

   or

   Enable modify values permanently via menu item **Variable > Modify**.
4. In the **Monitor** test function, verify the modify value entry in the variable.

Is the modify value valid?

You can disable the modify value entered in the table. An invalid value is displayed same as a comment. You can re-enable the modify value.

Only valid modify values can be enabled.

Setting the trigger points

Trigger points:

- The "Trigger point for monitoring" determines the time of update for values of variables to be monitored.
- The "Trigger point for modifying" determines the time for assigning the modify values to the variables to be modified.

Trigger condition:

- The "Trigger condition for monitoring" determines whether to update values once when the trigger point is reached or continuously every time the trigger point is reached.
- The "Trigger condition for modifying" determines whether to assign modify values once or permanently to the variable to be modified.

You can customize the trigger points using the tool "Monitoring and Modifying Variables" in the menu item **Variable > Set Trigger...** .

Special features

- If "Trigger condition for monitoring" is set to **once** , the menu items **Variable > Update Status Values** or **Variable > Monitor** have the same effect, namely a single update.
- If "Trigger condition for modifying" is set to **once** , the menu items **Variable > Update Status Values** or **Variable > Modify** have the same effect, namely a single assignment.
- If trigger conditions are set to **permanent** , the said menu items have different effects as described above.
- If monitoring and modifying is set to the same trigger point, monitoring is executed first.
- If **Process mode** is set under **Debug > Mode**, values are not cyclically updated when **permanent modifying** is set.
  To correct or avoid error: Use the **Force** test function.

Saving/opening the variable table

Saving the VAT

1. After aborting or completing a test phase, you can save the variable table to memory. The name of a variable table starts with the letters VAT, followed by a number from 0 to 65535; e.g. VAT5.

Opening VAT

1. Select the menu item **Table > Open**.
2. Select the project name in the **Open** dialog.
3. In the project window below, select the relevant program and mark the **Blocks** container.
4. In the block window, select the desired table.
5. Confirm with **OK**.

Creating a connection to the IM 151-8 PN/DP CPU interface module

The variables of a VAT represent dynamic quantities of a user program. To monitor or modify variables, you will need to establish a connection with the relevant IM 151-8 PN/DP CPU interface module. Every variable table can be linked to another IM 151-8 PN/DP CPU interface module.

Use the **PLC > Connect to ...** menu item to establish a connection to one of the following IM 151-8 PN/DP CPU interface modules:

- configured IM 151-8 PN/DP CPU interface module
- directly connected IM 151-8 PN/DP CPU interface module
- available IM 151-8 PN/DP CPU interface module

The table below lists the display of variables.

Interface modules	The variables of the IM 151-8 PN/DP CPU interface module are displayed, ...
configured IM 151-8 PN/DP CPU interface module	in S7 program (hardware station) of which the variable table is stored.
directly connected IM 151-8 PN/DP CPU interface module	that is connected directly to the programming device.
available IM 151-8 PN/DP CPU interface module	that is selected in the dialog window. Use the **PLC > Connect to ... > Available CPU ...** menu item to connect to an available IM 151-8 PN/DP CPU interface module. With this you can create a connection to any IM 151-8 PN/DP CPU interface module in the network.

Controlling outputs in STOP of the IM 151-8 PN/DP CPU interface module

The function **Enable PO** resets the output disable signal for the peripheral outputs (PO), This enables you to control the PO when the IM 151-8 PN/DP CPU interface module is in STOP mode.

In order to enable the POs, proceed as follows:

1. Select **Table > Open the variable table (VAT)** to open the variable table containing the POs you want to modify, or activate the window containing the corresponding VAT.
2. To control the POs of the active VAT, select the required IM 151-8 PN/DP CPU interface module connection using the **PLC > Connect to ...** menu item.
3. Use the **PLC > Operating Mode** menu item to open the **Operating Mode** dialog and switch the IM 151-8 PN/DP CPU interface module to STOP mode.
4. Enter your values in the "Modify value" column for the PO you want to modify.

   Examples:
   PO: POB 7 modify value: 2#0100 0011
   POW 2 W#16#0027
   POD 4 DW#16#0001
5. Select **Variable > Enable PO** to set "Enable PO" mode.
6. Modify the PO by selecting **Variable > Activate Modify Values**. "Enable PO" mode remains active until reset by selecting **Variable > Enable PO** once mode.

   "Enable PO" is also terminated when the connection to the programming device is dropped.
7. Return to step 4 if you want to set new values.

Note

If the IM 151-8 PN/DP CPU interface module changes its mode, for example, from STOP to RUN or STARTUP, a message is shown.
A message is also shown if the IM 151-8 PN/DP CPU interface module is set to "Enable PO" function while the IM 151-8 PN/DP CPU interface module is in RUN mode.

7.5 Commissioning PROFINET IO

7.5.1 Requirements for commissioning PROFINET

Requirements

Requirements to be satisfied before you can start to commission your PROFINET IO system:

ET 200S with ...	Software required	PROFINET IO system installed
IM 151-8 PN/DP CPU	*STEP 7* V5.4 + SP 4 or higher	X

PROFINET IO address areas of the IM 151-8 PN/DP CPU interface module

Table 7-8 PROFINET IO address areas of the IM 151-8 PN/DP CPU interface module

Address area	IM 151-8 PN/DP CPU
PROFINET address area, for inputs and outputs	2048 bytes
Number of those in process image for I/Os	Bytes 0 to 2047 (can be set)
	Byte 0 to 127 (preset)

In the input address area, **diagnostics addresses** each take up 1 byte for

- The IO controller
- the PROFINET interface and its ports and each IO device (header module at slot 0),
- each module / submodule without user data within the device (e.g. ET 200S power module or ports of the PROFINET interface).

You can use these addresses, for example, to read module-specific diagnostics data records by calling SFB 52. The diagnostics addresses are specified in your configuration. If you do not specify any diagnostics addresses, *STEP 7* assigns these addresses in descending order, starting from the highest byte address.

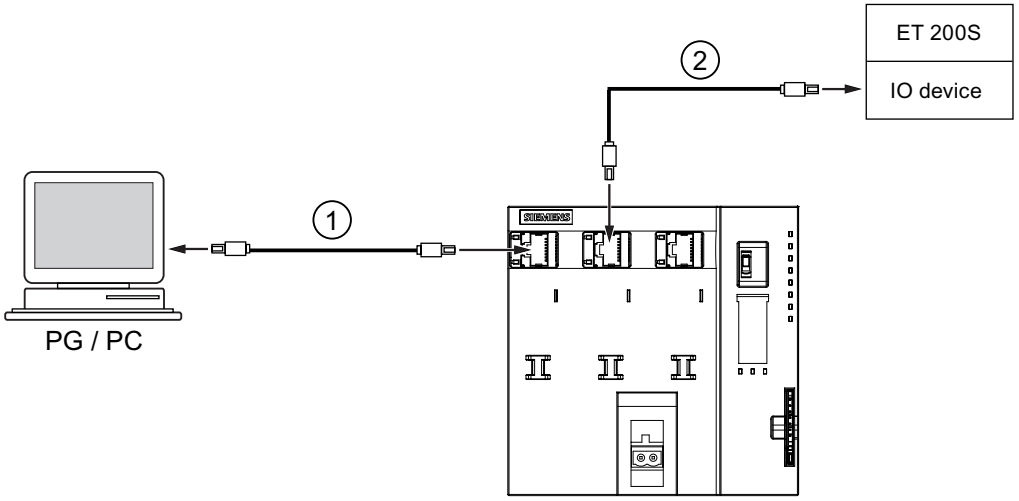
7.5.2 Configuring and commissioning the PROFINET IO system

Overview

There are several ways to start commissioning the PROFINET IO interface of the IM 151-8 PN/DP CPU interface module, and then the PROFINET IO system:

- online via the PN interface
- offline, by saving the data to a SIMATIC Micro Memory Card in SIMATIC Manager on your programming device, and then inserting the SIMATIC Micro Memory Card into the IM 151-8 PN/DP CPU interface module

Commissioning a PROFINET IO system directly via PN interface



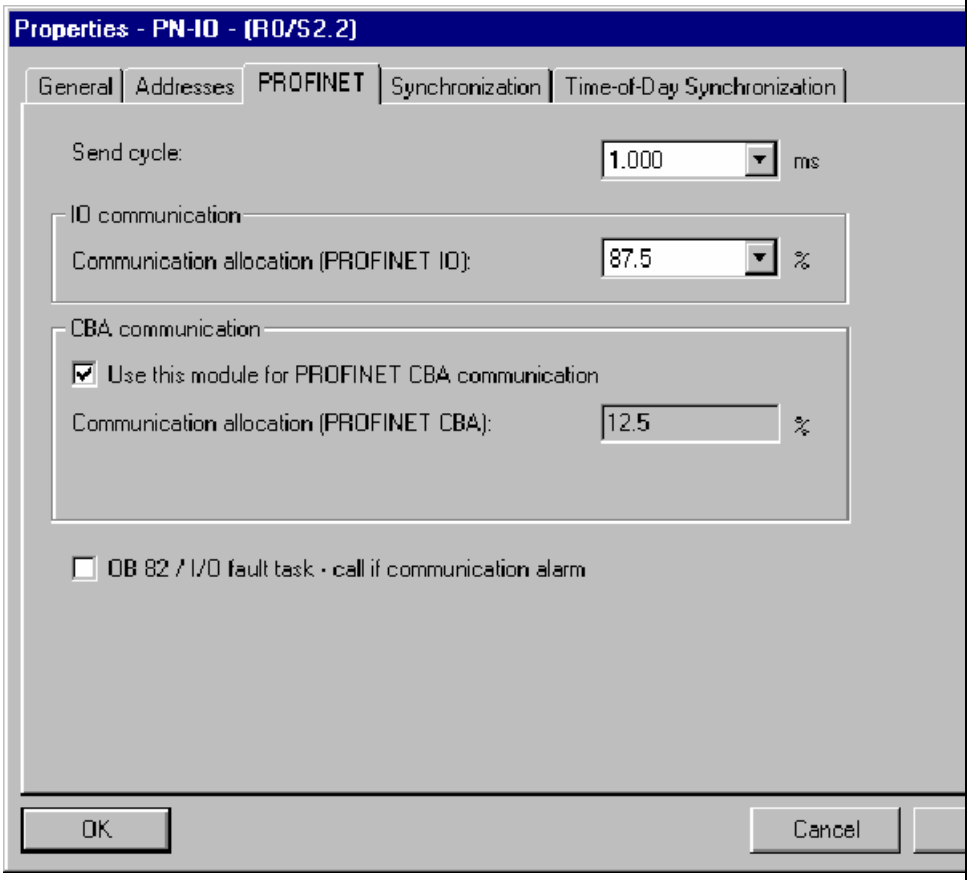
Number	Meaning
①	Connect the programming device / PC to the X1 P1 interface of the IM 151-8 PN/DP CPU interface module using a pre-assembled, uncrossed twisted pair cable.
②	Use a pre-assembled, uncrossed twisted pair cable to connect the IO device (e.g. ET 200S) to the integrated PROFINET interface X1 P2 of your IM 151-8 PN/DP CPU interface module. The IO device can also be connected to X1 P3. It is also possible to interpose a switch.

Commissioning requirements:

- The IM 151-8 PN/DP CPU interface module is in STOP mode.
- The IO devices are switched on.
- The PROFINET subnet is installed, and the communication partners (programming device, IO controller, IO devices, for example) are connected to the PROFINET subnet.

Configuring the PROFINET IO system

Step	Activity
Configuring hardware in STEP 7 SIMATIC Manager	
1	Select **File > New...** Enter a name for your project and click on OK to confirm.
2	Select **Insert > Station > SIMATIC 300 Station** to add an S7-300 station.
3	Double-click "Hardware." **Result**: HW Config opens.
4	Insert your IM 151-8 PN/DP CPU interface module using drag-and-drop. **Result**: The "Properties – Ethernet Interface PN-IO" window opens. The properties of the PROFINET interface X1 are shown in the "Parameters" tab.
Assigning the IP address	
5	Click "New" on the "Properties – Ethernet Interface PN-IO" dialog box to create a new subnet. **Result**: The "Properties – New Industrial Ethernet Subnet" dialog box opens.
6	Assign a name and confirm with "OK." **Result**: You are back to the "Properties – Ethernet Interface PN-IO" dialog box.
7	Enter the IP address and the subnet mask in the dialog box. This information is available from your network administrator. Note: The worldwide unique MAC address is preset by the manufacturer and cannot be changed.
8	If you setup a connection via router, you must also enter the address of the router. This information is also available from your network administrator.
9	Click "OK" to close the Properties dialog box.
Configuring the PROFINET IO system	
10	Insert the IO devices at the PROFINET IO system, for example, an IM 151-3 PN (ET 200S under PROFINET IO), then configure the slots and set their parameters using drag-and-drop with reference to the physical layout.
11	Select **Edit > Object properties** to assign device names and numbers to the IO devices.

Step	Activity
12	If you are running PROFINET IO and PROFINET CBA in parallel, open the Properties dialog for the PROFINET IO system, • activating the "Use this module for PROFINET CBA communication" check box • Modify the "Communication portion (PROFINET IO)" parameter (e.g. change the communication portion of PROFINET IO to 87.5 %). 
13	Save your configuration with **Station > Save and compile**.

Step	Activity
Configuration Download	
14	Download the configuration to the IM 151-8 PN/DP CPU interface module. There are two ways of doing this: • Online via the PN interface. When you download the configuration in a system containing several nodes, select the appropriate IP address for the IM 151-8 PN/DP CPU interface module. Select the MAC address of the target interface module if the IM 151-8 PN/DP CPU interface module does not yet have an IP address. You can display the list of available nodes in the "Select node address" window whilst downloading the HW configuration. Here you can select the desired target device via the associated IP or MAC address. If the device has only had a MAC address so far, then this can now be assigned the configured IP address. The programming device must be connected to the subnet. The programming device interface must be set to **TCP/IP (Auto)**. In the **IE-PG Access** tab of the interface properties you must set: **Assign Project-Specific IP Address**. • offline, by saving the data to a SIMATIC Micro Memory Card in SIMATIC Manager on your programming device, and then inserting the SIMATIC Micro Memory Card into the IM 151-8 PN/DP CPU interface module
Assigning IO Device Names	
15	**Requirement:**The programming device must be connected to the subnet. The programming device interface must be set to TCP/IP (Auto) mode. Setting in the **IE-PG Access** tab of the interface properties dialog box: **Assign Project-Specific IP Address.** **Procedure:** In online mode, select the various IO devices in HW Config, then select **PLC > Ethernet > Assign Device Name** to assign the corresponding device names. **Note**: When you have configured "Device replacement without removable medium" and specified the set topology of the PROFINET IO system with the topology editor, you don´t always have to assign the device name. For this to be the case, the actual topology must correspond with the set topology and the devices must be reset to the factory settings. **Note**: The IM 151-8 PN/DP CPU interface module can only assign the IP address automatically, and thus communicate correctly with the IO device, if you have assigned a device name to the IO device. If the configuration of the IO devices you downloaded to the IM 151-8 PN/DP CPU interface module actually corresponds to their physical configuration on the subnet, then the IO devices will be addressed by the IM 151-8 PN/DP CPU interface module, and the BF LED will stop flashing on both the IM 151-8 PN/DP CPU interface module and the IO device. You can then switch the IM 151-8 PN/DP CPU interface module to RUN, provided there are no other conditions preventing startup, and the IM 151-8 PN/DP CPU interface module and IO devices will exchange data (read inputs, write outputs, for example).

Result

You have used *STEP 7* to configure the PROFINET interface of your IM 151-8 PN/DP CPU interface module and the PROFINET IO system. The IM 151-8 PN/DP CPU interface module can now be reached by other nodes on your Industrial Ethernet subnet.

Reference

Detailed Information

- About assigning addresses to the PROFINET IO interface and
- Setting the properties of the PROFINET IO interface and the individual ports

can be found in the *STEP 7 online help* and the *PROFINET System Description*.

Starting up the IM 151-8 PN/DP CPU interface module as an IO controller

During startup, the IM 151-8 PN/DP CPU interface module checks the preset configuration against the actual configuration

- Of the local I/O,
- the PROFINET IO system and
- (the distributed I/O on the PROFIBUS DP system).

The IM IM 151-8 PN/DP CPU interface module startup depends on the configuration settings made in the **Startup** tab:

Table 7-9 Starting up the IM 151-8 PN/DP CPU interface module as an IO controller

Preset = Actual configuration	Preset ≠ Actual configuration	
	Startup permitted if Preset configuration is not the same as the Actual configuration	**Startup not permitted if Preset configuration is not the same as the Actual configuration**
IM 151-8 PN/DP CPU in RUN	IM 151-8 PN/DP CPU in RUN After POWER ON, and after the parameter monitoring time has elapsed, the IM 151-8 PN/DP CPU interface module switches to RUN. The flashing BF-PN LED indicates that at least one IO device cannot be addressed. In this case, check that all IO devices are switched on and correspond to the set configuration. For additional information, read the diagnostics buffer in *STEP 7*.	IM 151-8 PN/DP CPU does not start up.

Detecting interruptions in the data transfer to the IO device

The following table shows how the IM 151-8 PN/DP CPU interface module recognizes interruptions in the data transfer:

Table 7-10 Event recognition of the IM 151-8 PN/DP CPU interface module as an IO controller

Event	What happens in the IO controller?	
	IM 151-8 PN/DP CPU in RUN	**IM 151-8 PN/DP CPU in STOP**
Bus interruption (short circuit, connector removed)	• Call to OB 86 with the message **Station failure** (incoming event; diagnostics address of the IO device) • With I/O access: Call to OB 122 (I/O access error)	• The event is written to the diagnostics buffer

Tip:

Always program OB 86 when you commission the IM 151-8 PN/DP CPU interface module. This allows you to detect and analyze interruptions in the data transfer.

Status/control, programming via PROFINET

You can use the PROFINET interface to program the IM 151-8 PN/DP CPU interface module or execute the status and control programming device functions.

If you have not yet commissioned the PROFINET interface of the IM 151-8 PN/DP CPU interface module, you can connect to the IM 151-8 PN/DP CPU interface module using its MAC address (see also *Configuring the PROFINET IO System* in the table above).

Therefore, always download the configuration data from the HW Config to the IM 151-8 PN/DP CPU interface module. You select the IM 151-8 PN/DP CPU interface module from the MAC address. After you have downloaded the configuration, the IM 151-8 PN/DP CPU interface module is also assigned the configured IP address. With that you can then use all programming device functions, such as download program, status/control etc., on the interface.

7.6 Commissioning PROFIBUS DP

7.6.1 Commissioning the PROFIBUS DP network

Requirements

Requirements for commissioning a PROFIBUS DP network:

- The IM 151-8 PN/DP CPU interface module can be expanded by one DP master module.
- A PROFIBUS DP network is installed.
- You have configured the PROFIBUS DP network using *STEP 7* and have assigned a PROFIBUS DP address and the address space to all the nodes.
- Note that you must also set address switches for some of the DP slaves (see the description of the relevant DP slave).
- The software as shown in the following table is required for the IM 151-8 PN/DP CPU interface module:

Table 7-11 Software requirements for the IM 151-8 PN/DP CPU interface module

Interface module	Order number	Software required
IM 151-8 PN/DP CPU	6ES7151-8AB00-0AB0	*STEP 7* V5.4 + SP 4 or higher

DP address areas of the IM 151-8 PN/DP CPU interface module

Table 7-12 DP address areas of the IM 151-8 PN/DP CPU interface module

Address area	IM 151-8 PN/DP CPU
DP address area for I/Os	2048 bytes
Number of those in process image for I/Os	Bytes 0 to 2047 (can be set)
	Bytes 0 to 127 (preset)

DP diagnostics addresses occupy 1 byte for the DP master and for each DP slave in the input address area. For example, at these addresses DP standard diagnostics can be called for the relevant node (LADDR parameter of SFC 13). The DP diagnostics addresses are specified in your configuration. If you do not specify any DP diagnostic addresses, *STEP 7* assigns these DP diagnostics addresses in descending order, starting at the highest byte address.

If there is an IM 151-8 PN/DP CPU interface module with DP master module as the master, assign two different diagnostics addresses for S7 slaves:

- Diagnostics address of the slave (address for slot 0)

  At this address all slave events are reported in the DP master (node proxy), e.g. node failure.

- Diagnostics address of the module (address for slot 2)

  All module (STOP / RUN transition of an IM 151-7 CPU as an intelligent DP slave, for example) events are reported in the master (OB 82) at this address.

7.6.2 Commissioning the IM 151-8 PN/DP CPU interface module with DP master module as a DP master

Requirements for commissioning

- A DP master module is connected to the IM 151-8 PN/DP CPU interface module.
- The PROFIBUS subnet has been configured.
- The DP slaves are ready for operation (see relevant DP slave manuals).
- Before commissioning, you must configure the IM 151-8 PN/DP CPU interface module as a DP master. That means that, in *STEP 7* you must
  - configure the IM 151-8 PN/DP CPU interface module as a DP master,

    Note

    You must suspend the DP master module separately as a submodule (X2) in the station window in HW Config.

  - assign a PROFIBUS address to the DP interface on the DP master module,
  - assign a master diagnostics address to the DP interface on the DP master module,
  - Integrate the DP slaves into the DP master system

    Is the DP CPU a DP slave?

    If so, this DP slave will appear in the PROFIBUS DP catalog as an **already configured station**. In the DP master, assign a slave diagnostics address to this DP slave CPU. You must interconnect the DP master with the DP slave CPU and specify the address areas for data exchange with the DP slave CPU.

Commissioning

Commission the IM 151-8 PN/DP CPU interface module with DP master module as a DP master in the PROFIBUS subnet as follows:

1. Download the PROFIBUS subnet configuration created with *STEP 7* (preset configuration) from the programming device to the IM 151-8 PN/DP CPU interface module.
2. Switch on all the DP slaves.
3. Switch the IM 151-8 PN/DP CPU interface module from STOP to RUN.

Behavior of the IM 151-8 PN/DP CPU interface module during commissioning

- The DP master module is installed and IM 151-8 PN/DP CPU interface module is configured as a DP master
  ⇒ the IM 151-8 PN/DP CPU interface module switches to RUN with master functionality
- The DP master module is installed and the IM 151-8 PN/DP CPU interface module is not configured as a DP master
  ⇒ the IM 151-8 PN/DP CPU interface module switches to RUN without master functionality

Starting up the IM 151-8 PN/DP CPU interface module as a DP master

During startup, the IM 151-8 PN/DP CPU interface module checks the configured preset configuration of its DP master system against the actual configuration.

If the preset configuration = the actual configuration, the IM 151-8 PN/DP CPU interface module goes to RUN.

If the preset configuration ≠ the actual configuration, the configuration of parameter **Startup if preset configuration ≠ actual configuration** determines the startup behavior of the IM 151-8 PN/DP CPU interface module.

Startup when the preset configuration ≠ actual configuration = Yes (default setting)	Startup when the preset configuration ≠ actual configuration = no
IM 151-8 PN/DP CPU in RUN (BF LED flashes if any of the DP slaves cannot be addressed).	The IM 151-8 PN/DP CPU interface module remains in STOP mode, and the BF LED flashes after the set **Monitoring time for transfer of parameters to modules**. The flashing BF LED indicates that at least one DP slave cannot be addressed. In this case, check that all the DP slaves are switched on and correspond with your configuration, or read out the diagnostics buffer with *STEP 7*.

Recognizing the operating state of DP slaves (Event recognition)

The table below shows how the IM 151-8 PN/DP CPU interface module with DP master module acting as a DP master recognizes operating mode transitions of a CPU acting as a DP slave or any interruption of the data exchange.

Table 7-13 Event recognition of the IM 151-8 PN/DP CPU interface module as a DP master

Event	What happens in the DP master?
Bus interruption (short circuit, connector removed)	• Call of OB86 with the message **Station failure** (incoming event; diagnostics address of the DP slave assigned to the DP master) • With I/O access: Call of OB 122 (I/O access error)
DP slave: RUN → STOP	• Call of OB 82 with the message **Module error** (incoming event; diagnostics address of the DP slave assigned to the DP master; Variable OB82_MDL_STOP=1)
DP slave: STOP → RUN	• Call of OB82 with the message **Module OK** (outgoing event; diagnostics address of the DP slave assigned to the DP master; variable OB82_MDL_STOP=0)

Tip:

When commissioning the IM 151-8 PN/DP CPU interface module as the DP master, always program OB 82 and OB 86. This helps you to recognize and evaluate data exchange errors or interruptions.

Constant Bus Cycle Time

This is a property of PROFIBUS DP that ensures bus cycles of exactly the same length. The "Constant bus cycle time" function ensures that the DP master always starts the DP bus cycle after a constant interval. From the perspective of the slaves, this means that they receive their data from the master at constant time intervals.

In *STEP 7* V5x or later, you can configure constant bus cycle times for PROFIBUS subnets. A detailed description of the constant bus cycle time can be found in the *STEP 7 Online Help*.

Time synchronization

Information about time synchronization via PROFIBUS DP can be found under *Interfaces > PROFIBUS DP*.

SYNC/FREEZE

The **SYNC** control command is used to set the DP slaves of a group to sync mode. In other words, the DP master transfers the current output data and instructs the relevant DP slaves to freeze their outputs. The DP slaves writes the output data of the next output frames to an internal buffer; the state of the outputs remains unchanged.

After each SYNC control command, the DP slaves of the selected groups transfer the output data stored in their internal buffer to the process outputs.

The outputs are only updated cyclically again after you transfer the UNSYNC control command using SFC11 "DPSYC_FR".

The **FREEZE** control command is used to set the relevant DP slaves to Freeze mode. In other words, the DP master instructs the DP slaves to freeze the current state of the inputs. It then transfers the frozen data to the input area of the IM 151-8 PN/DP CPU interface module.

Following each FREEZE control command, the DP slaves freeze the state of their inputs again.

The DP master does not receive the current state of the inputs cyclically once more until you have sent the UNFREEZE control command with SFC11 "DPSYC_FR".

SFC 11 is described in the *STEP 7 online help* and in the *System and Standard Functions for S7-300/400* reference manual.

Powering up the DP master system

IM 151-8 PN/DP CPU as a DP master
Set the power-up monitoring time for DP slaves using the **Monitoring time for parameter transfer to modules** parameter.
This means that the DP slaves must power up within the set time and must be set by the IM 151-8 PN/DP CPU interface module (as DP master).

PROFIBUS address of the DP master

For the IM 151-8 PN/DP CPU interface module you **must not set "126"** as a PROFIBUS address.

See also

PROFIBUS DP (Page 25)

7.6.3 Direct data exchange

Requirement

In *STEP 7* V5.x or later you can configure "direct data exchange" for the PROFIBUS nodes. The IM 151-8 PN/DP CPU interface module with DP master module participate in a direct data exchange as a receiver.

Definition

"Direct data exchange" is a special communication relationship between PROFIBUS DP nodes.

Direct data exchange is characterized by the fact that the PROFIBUS DP nodes "listen" on the bus for data that a DP slave returns to its DP master. This mechanism allows the "listening node" (recipient) direct access to deltas of input data of remote DP slaves.

Address Areas

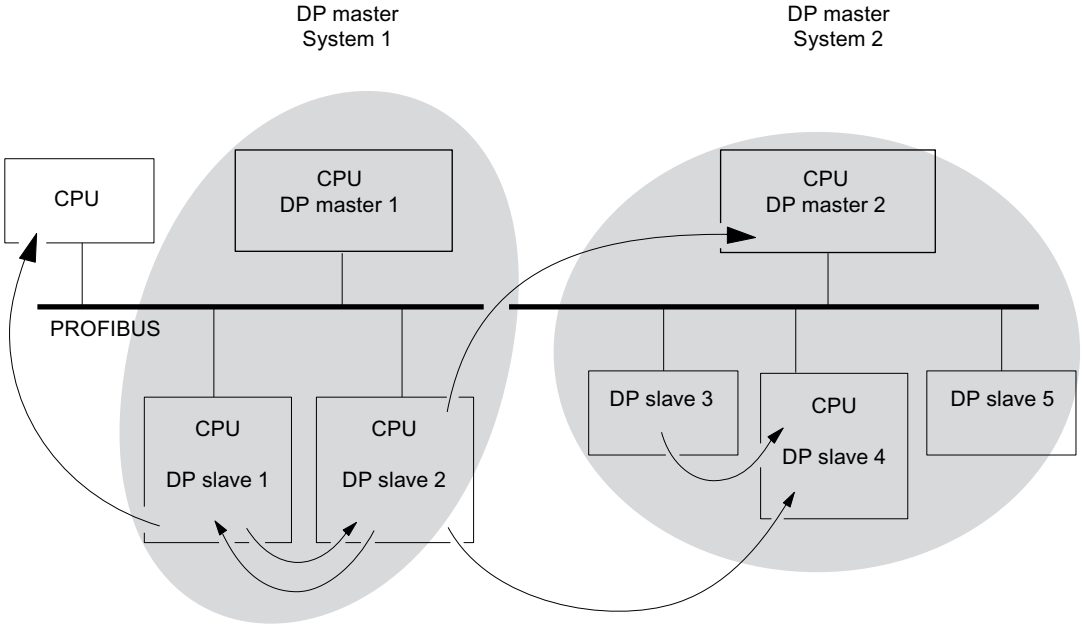
During configuration in *STEP 7*, use the I/O input addresses to specify the address area of the recipient at which the sender's data should be read.

The IM 151-8 PN/DP CPU interface module with DP master module can be a receiver:

- as a DP master
- as a CPU that is not integrated in a master system

Example: Direct data exchange via DP CPUs

The example in the figure below shows the relationships you can configure for direct data exchange. All the DP masters and DP slaves (apart from slave 3 and slave 5) are in each case a DP-CPU, whereby the IM 151-8 PN/DP CPU interface module can be just a DP master. Note that other DP slaves (ET 200M, ET 200S, ET 200pro) can only operate as transmitters.



Service and maintenance

8

8.1 Overview

For the ET 200S with IM 151-8 PN/DP CPU, service and maintenance are

- Backing up the firmware to the SIMATIC Micro Memory Card
- Updating the firmware via the SIMATIC Micro Memory Card
- Updating of the firmware online
- Backing up of project data on a SIMATIC Micro Memory Card
- Replacing an IM 151-8 PN/DP CPU interface module
- replacing a DP master module

8.2 Backing up firmware on a SIMATIC Micro Memory Card

In which situations should I back up the firmware?

In some cases, we recommend that you back up the firmware on your IM 151-8 PN/DP CPU interface module.

For example, you might want to replace the IM 151-8 PN/DP CPU interface module in your system with an IM 151-8 PN/DP CPU interface module from your inventory. In this case, you should make sure that the IM 151-8 PN/DP CPU interface module from your inventory has the same firmware that is used in the system.

We also recommend that you create a back-up copy of the firmware for emergency situations.

On which IM 151-8 PN/DP CPU can you backup the firmware?

You can backup firmware as of the following versions of the IM 151-8 PN/DP CPU interface module:

Interface module	Order number	SIMATIC Micro Memory Card required ≥ in MB
IM 151-8 PN/DP CPU	6ES7151-8AB00-0AB0 or later	4

Backing up the firmware on your IM 151-8 PN/DP CPU interface module to the SIMATIC Micro Memory Card

Table 8-1 Backing up the firmware to the SIMATIC micro memory card

Step	Action required:	This takes place in the IM 151-8 PN/DP CPU interface module:
1.	Insert the new SIMATIC Micro Memory Card in the IM 151-8 PN/DP CPU interface module.	The IM 151-8 PN/DP CPU requests a memory reset.
2.	Turn the mode selector switch to MRES position and hold it there.	-
3.	Switch supply voltage off and then on again and hold the mode selector switch in the MRES position until ...	... the STOP, RUN and FRCE LEDs start flashing.
4.	Mode selector switch to STOP.	-
5.	Mode selector switch briefly to MRES position, then let it return to STOP.	• The IM 151-8 PN/DP CPU interface module starts to back up the firmware on the SIMATIC Micro Memory Card. • All LEDs are lit during the backup operation. • The STOP LED flashes when the backup is complete, to indicate that the IM 151-8 PN/DP CPU interface module requires a memory reset.
6.	Remove the SIMATIC Micro Memory Card with the backed up firmware.	-

8.3 Updating the firmware

8.3.1 When should you update the IM 151-8 PN/DP CPU interface module?

After (compatible) functional expansions, or after an enhancement of operating system performance, the firmware of the IM 151-8 PN/DP CPU interface module should be upgraded (updated) to the latest version.

Where do I get the latest version of the firmware?

You can order the latest firmware (as *.UPD files) from your Siemens partner, or download it from the Siemens Internet homepage:

http://www.siemens.com/automation/service&support

8.3.2 Firmware update using a SIMATIC Micro Memory Card

Table 8-2 Firmware update using a SIMATIC Micro Memory Card

Step	Action required:	This takes place in the IM 151-8 PN/DP CPU interface module:
1.	**Recommendation** Before you update the IM 151-8 PN/DP CPU interface module firmware, create a backup copy of the "old" firmware on an empty SIMATIC Micro Memory Card. If problems occur during the update, you can reload your old firmware from the SIMATIC Micro Memory Card.	
2.	Transfer the update files to a blank SIMATIC Micro Memory Card using *STEP 7* and your programming device. To do this, click "Update PLC / operating system" in the SIMATIC Manager. Note: You will need a SIMATIC Micro Memory Card with at least 4 MB of memory.	-
3.	Switch off the IM 151-8 PN/DP CPU power and insert a SIMATIC Micro Memory Card containing the firmware update.	-
4.	Switch on power.	• The IM 151-8 PN/DP CPU interface module automatically detects the SIMATIC Micro Memory Card with the firmware update and runs the update. • All LEDs are lit during firmware update. • The STOP LED flashes when the backup is complete, to indicate that the IM 151-8 PN/DP CPU interface module requires a memory reset.
5.	Switch off the IM 151-8 PN/DP CPU power and insert a SIMATIC Micro Memory Card containing the firmware update.	-

Result

You have updated your IM 151-8 PN/DP CPU interface module online with a new firmware version.

8.3.3 Updating the firmware online (via networks)

To update the IM 151-8 PN/DP CPU interface module firmware, you require the (*.UPD) files containing the latest FW version.

Requirements

- The firmware can be updated online in *STEP 7* V5.4 + SP 4 or later.
- The interface module of the station pending a firmware update must be accessible online.
- The files containing the current firmware versions must be available in the file system of your programming device or PC. A folder may contain only the files of one firmware version.

Performing a firmware update

1. Run *STEP 7* and change to HW Config.
2. Open the station with the IM 151-8 PN/DP CPU interface module that is to be updated.
3. Select the IM 151-8 PN/DP CPU interface module.
4. Select **PLC > Update Firmware**.
5. In the **Update Firmware** dialog, select the path to the firmware update files (*.UPD) using the **Browse** button.
6. After you selected a file, the information in the lower fields of the **Update Firmware** dialog box shows you the firmware file and version for the corresponding modules.
7. Click on the **Run** button. *STEP 7* checks to determine whether the selected file can be interpreted by the IM 151-8 PN/DP CPU interface module and, if so, then downloads the file to the interface module. If this requires changing the operating state of the IM 151-8 PN/DP CPU interface module, you will be asked to perform these tasks in the relevant dialog boxes. The IM 151-8 PN/DP CPU interface module then performs the firmware update independently.
8. Use *STEP 7* (read out the CPU diagnostics buffer) to verify that the IM 151-8 PN/DP CPU interface module can start with the new firmware.

As an alternative you can also trigger the firmware update in SIMATIC Manager:

- Select the respective IM 151-8 PN/DP CPU interface module as the target CPU and then select "Update PLC / Firmware".
- Via "Available nodes", select the target CPU and then select "Update PLC / Firmware".

You can use both paths to read step 5 described above. Then continue with the remaining steps.

Result

You have updated your IM 151-8 PN/DP CPU interface module online with a new firmware version.

8.4 Backing up project data on a SIMATIC Micro Memory Card

Function principle

Using the **Save project to Memory Card** and **Fetch project from Memory Card** functions, you can save all project data to a SIMATIC Micro Memory Card, and retrieve these at a later time. For this operation, the SIMATIC Micro Memory Card can be located in an IM 151-8 PN/DP CPU interface module or in the SIMATIC Micro Memory Card adapter of a programming device or PC.

Project data is compressed before it is saved to a SIMATIC Micro Memory Card, and uncompressed on retrieval.

Note

In addition to project data, you may also have to store your user data on the SIMATIC Micro Memory Card. You should therefore first select a SIMATIC Micro Memory Card with sufficient free memory.

A message warns you if the memory capacity on your SIMATIC Micro Memory Card is insufficient

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The volume of project data to be saved corresponds with the size of the project's archive file.

Note

For technical reasons, you can only transfer the entire contents (user program and project data) using the **Save project to memory card** action.

Handling the functions

How you use the **Save project to memory card** / **Retrieve project from memory card** functions depends on the location of the SIMATIC micro memory card:

- When the SIMATIC MMC is inserted in the MMC slot, select a project level (for example, CPU, programs, sources or blocks) which is uniquely assigned to the IM 151-8 PN/DP CPU interface module from the project window in SIMATIC Manager. Select the **Target system > Save project to memory card** or **Target system > Retrieve project from memory card** menu command. All the complete project data is then written to / retrieved from the SIMATIC Micro Memory Card.
- If project data are not available on the currently used programming device (PG/PC), you can select the source CPU via "Available nodes" window. Select **PLC > Show available nodes** to open the "Available nodes" window. Then select the connection / IM 151-8 PN/DP CPU that contains your project data on the SIMATIC Micro Memory Card. Now select menu command **Fetch project from Memory Card**.
- If the SIMATIC MMC is located in the MMC programming unit of a PD or PC, open the "S7 memory card window" using the **File > S7 Memory Card > Open command.** Select the **Target system > Save project to memory card** or **Target system > Retrieve project from memory card** menu command. to open a dialog in which you can select the source or target project.

Note

Project data can generate high data traffic. Especially in RUN mode with read/write access to the IM 151-8 PN/DP CPU interface module, this can lead to waiting periods of several minutes.

Sample application

When you assign more than one member of your service and maintenance department to perform maintenance tasks on a SIMATIC PLC, it may prove difficult to provide quick access to current configuration data to each staff member.

However, IM 151-8 PN/DP CPU interface module configuration data available locally on any IM 151-8 PN/DP CPU that is to be serviced can be accessed by any member of the service department. They can edit this data and then release the updated version to all other personnel.

8.5 Replacing the IM 151-8 PN/DP CPU interface module

Introduction

You can replace the IM 151-8 PN/DP CPU interface module if it is faulty.

Requirements

To replace the IM 151-8 PN/DP CPU interface module you must switch off the supply voltage on the faulty IM 151-8 PN/DP CPU interface module .
Result: Failure of the ET 200S station and all components connected to it (DP slaves, IO devices)

CAUTION
PROFINET IO If you switch off the supply voltage at an ET 200S, the integrated switch will also fail. This will interrupt communication with all connected peers (e.g. IO devices or other PROFINET devices) that communicate with one another via this switch.

NOTICE
PROFIBUS DP The bus terminator function may fail if you shut down supply voltage at the first or last ET 200S of a bus segment.

Required tools

Screwdriver with 3 mm blade

Replacing the IM 151-8 PN/DP CPU interface module

The IM 151-8 PN/DP CPU interface module is wired, and the terminal modules are on the right:

1. Switch off the supply voltage for the faulty IM 151-8 PN/DP CPU interface module.
2. Remove the SIMATIC Micro Memory Card from the receptacle (see *Inserting/replacing a Micro Memory Card*)
3. Release the connector for the supply voltage and the RJ45 connector(s) on the IM 151-8 PN/DP CPU interface module.
4. Use a screwdriver to slide the slider on the IM 151-8 PN/DP CPU interface module downwards until it stops. Now move the IM 151-8 PN/DP CPU interface module to the left.

   Note: The slider is located in the centre beneath the IM 151-8 PN/DP CPU interface module.
5. Press down on the slider while swiveling the IM 151-8 PN/DP CPU interface module off the rail.
6. Suspend the new IM 151-8 PN/DP CPU interface module in the rail.
7. Press down on the slider while swiveling the IM 151-8 PN/DP CPU interface module downwards until the slider audibly engages.
8. Now move the IM 151-8 PN/DP CPU interface module to the right until the first terminal module.

   If a DP master module is connected:
   Move the IM 151-8 PN/DP CPU interface module to the right until it audibly engages on the DP master module.
9. Insert the SIMATIC Micro Memory Card removed from the defective IM 151-8 PN/DP CPU interface module into the slot on the new IM 151-8 PN/DP CPU interface module.
10. Switch on the power supply.

Behavior of the IM 151-8 PN/DP CPU interface module after replacement

As the SIMATIC Micro Memory Card has been changed, after the IM 151-8 PN/DP CPU interface module has been replaced it always automatically resets the memory and remains in STOP mode, regardless of the position of the mode selector. The IM 151-8 PN/DP CPU interface module can then be switched to RUN once more using the mode selector.

If the IM 151-8 PN/DP CPU interface module stays in STOP, you can view the cause of error in *STEP 7* (see the *STEP 7* User Manual).

8.6 Replacing the DP master module

Introduction

You may replace a defective DP master module.

Requirements

To replace the DP master module you must switch off the supply voltage on the associated IM 151-8 PN/DP CPU interface module .
Result: Failure of the ET 200S station and all components connected to it (DP slaves, IO devices)

CAUTION
PROFINET IO If you switch off the supply voltage at an ET 200S, the integrated switch will also fail. This will interrupt communication with all connected partners (e.g. IO devices or other PROFINET devices) that communicate with one another via this switch.

NOTICE
PROFIBUS DP The bus terminator function may fail if you shut down supply voltage at the first or last ET 200S of a bus segment.

Required tools

3 mm screwdriver

Replacing the DP master module

The DP master module and the IM 151-8 PN/DP CPU interface module are wired, and the terminal modules are on the right:

1. Switch off the supply voltage for the respective ET 200S station (IM 151-8 PN/DP CPU).
2. Release the connector for the supply voltage and the RJ45 connector(s) on the IM 151-8 PN/DP CPU interface module.
3. Use a screwdriver to slide the slider on the IM 151-8 PN/DP CPU interface module downwards until it stops. Now move the IM 151-8 PN/DP CPU interface module about 40 mm to the left.

   Note: The slider is located in the centre beneath the IM 151-8 PN/DP CPU interface module.
4. Use the screwdriver to slide the slider on the DP master module downwards to the stop. Slide the faulty DP master module to the left until the connector for the backplane bus is free.

   Note: The slider is located underneath the DP master module.
5. Keeping the slider pressed down, swivel the DP master module out of the mounting rail.
6. Suspend the new DP master module in the rail and swing it downwards.
7. Slide the DP master module to the right until the first terminal module.
8. Move the IM 151-8 PN/DP CPU interface module to the right until it audibly engages with the DP master module.
9. If required, connect the connector for the supply voltage and the RJ45 connector(s) with the IM 151-8 PN/DP CPU interface module.
10. Switch on the power supply.

Functions

9

9.1 Assigning parameters of the reference junction for the connection of thermocouples

Introduction

If you want to use the IM 151-8 PN/DP CPU interface module in an ET 200S system with thermocouples and a reference junction, set the parameters in the "Properties" section of the hardware configuration.

Parameter assignment of the reference junction

Table 9-1 Setting parameters for the reference junction

Parameters	Value range	Explanation
Activation of the reference junction	activated / not activated (Example, see figure below)	You can enable the reference junction with this parameter. Only then can you continue to parameterize the reference junction.
Slot	none / 5 to 66 (Example, see figure below)	You can use this parameter to assign the RTD module slot to the reference junction.
Channel number	RTD on channel 0 RTD on channel 1 (Example, see figure below)	This parameter can be used to set the channel (0 / 1) for measuring the reference temperature (calculation of the compensation value) for the assigned slot of the RTD module.

RTD module parameter	Value range	Explanation
Measurement type/measurement range	Resistance / temperature measurement, e.g. • RTD-4L Pt100 standard range	If you use a channel of the RTD module for reference junction configuration, you must configure the measurement type / measurement range for this channel as **RTD-4L Pt 100 climatic range**.

TC module parameter	Value range	Explanation
Reference junction number	1	This parameter allows you to assign the reference junction (1) that contains the reference temperature (compensation value).
Reference junction channel 0 and reference junction channel 1	None, RTD	This parameter allows you to enable the use of the reference junction.

Example of a parameterization dialog box

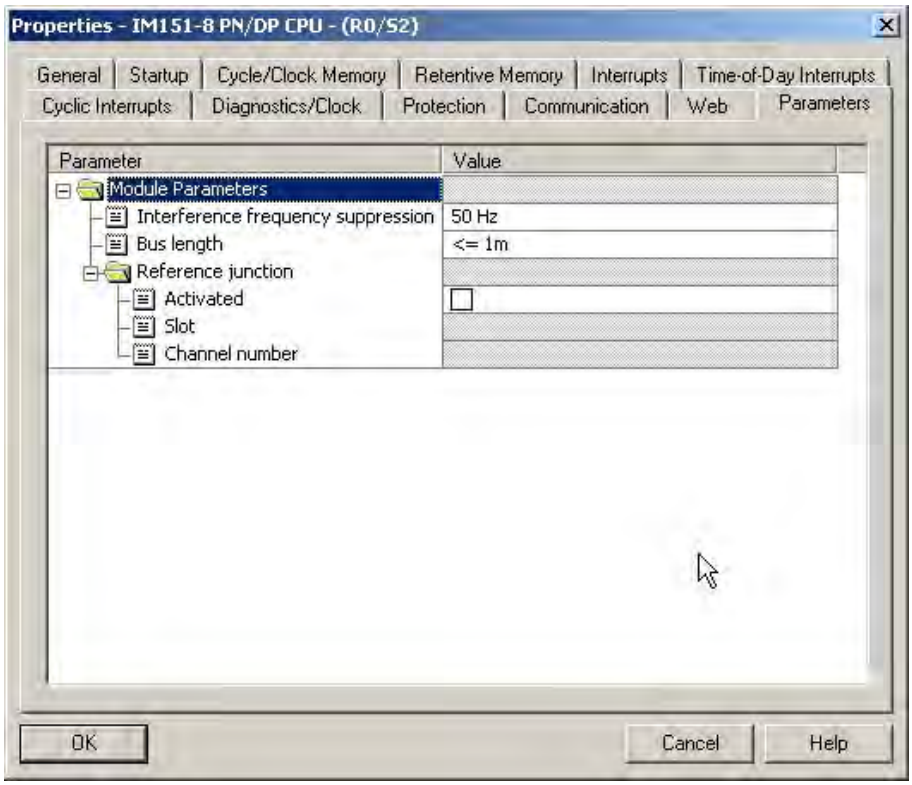


Figure 9-1 Example for a parameterization dialog box of the IM 151-8 PN/DP CPU module parameters in *STEP 7*

Reference

You can find detailed information on the procedure, the connection system and an example of configuration in the section entitled *Analog Electronic Modules* in the *ET 200S Distributed I/O System* Manual.

9.2 Removal and insertion of modules during operation

9.2.1 Overview

The ET 200S with IM 151-8 PN/DP CPU supports the removal and insertion of in each case one module of the ET 200S I/O system during operation and in an energized state.

Exceptions

The IM 151-8 PN/DP CPU interface module itself must **not** be removed during operation and in an energized state.

Removal and insertion of modules in an energized state and during operation

When removing and inserting modules in an energized state and during operation, refer both to the specifications given here and the restrictions in the *ET 200S Distributed I/O System* Operating Instructions, section *Wiring and equipping*.

⚠ WARNING

When an output module is inserted, the outputs set by the user program become active immediately. We therefore advise you to set the outputs to "0" in the user program before removing the module.

If modules are removed or inserted incorrectly (see *ET 200S Distributed I/O System* Operating Instructions, section *Wiring and equipping*), this can cause uncontrolled system states. Adjacent modules could be affected.

9.2.2 What happens when modules are removed during operation

- When you remove a module from the ET 200S I/O system during operation, OB 83 is called and a corresponding diagnostics buffer entry is generated (event ID 3961_H). This takes place regardless of whether the associated power module is switched on or off.

  If the OB 83 is available on the IM 151-8 PN/DP CPU interface module, this remains in RUN.

  The absence of the module is noted in the system status list.

- If the module that has been removed is accessed from the user program, an I/O access error occurs with a corresponding entry in the diagnostics buffer and the OB 122 is called up.

  If the OB 122 is available on the IM 151-8 PN/DP CPU interface module, this remains in RUN.

9.2.3 Procedure when modules are inserted during operation

Overview

If you insert a module in the ET 200S I/O system during operation, the IM 151-8 PN/DP CPU interface module initially carries out a set / actual comparison with regard to the inserted module. In doing so, the configured module is compared with the one that is actually inserted. The activities described below take place dependent on the result of the set / actual comparison.

Non-configurable modules

The following actions will take place regardless of whether the power module of the inserted module is switched on or off.

Table 9-2 Result of the set / actual comparison in the case of non-configurable modules

Inserted module = configured module	Inserted module ≠ configured module
OB 83 is called with the corresponding diagnostics buffer entry (event -ID 3861_H).	OB 83 is called with the corresponding diagnostics buffer entry (event -ID 3863_H).
The module remains entered in the system status list as unavailable.	The module remains entered in the system status list as unavailable.
Direct access is again possible.	Direct access is not possible.

Modules that can be parameterized

The following actions only take place when the power module of the inserted module is switched **on**.

Table 9-3 Result of the preset/actual comparison in the case of parameterizable modules with the power module switched on

Inserted module = configured module	Inserted module ≠ configured module
OB 83 is called with the corresponding diagnostics buffer entry (event -ID 3861_H).	OB 83 is called with the corresponding diagnostics buffer entry (event ID 3863_H).
The IM 151-8 PN/DP CPU interface module reconfigures the module.	The IM 151-8 PN/DP CPU interface module does not configure the module.
If parameter assignment is successful, the module is entered in the system status list as available.	The module remains entered in the system status list as unavailable. The SF LED on the module remains lit.
Direct access is again possible.	Direct access is not possible.

The following actions only take place when the power module of the inserted module is switched **off**.

Table 9-4 Result of the preset/actual comparison in the case of parameterizable modules with the power module switched off

Inserted module = configured module	**Inserted module ≠ configured module**
OB 83 is called with the corresponding diagnostics buffer entry (event -ID 3861_H).	
When the power module is switched on, the IM 151-8 PN/DP CPU interface module reconfigures the module.	When the power module is switched on, the IM 151-8 PN/DP CPU interface module does not reconfigure the module.
If parameter assignment is successful, the module is entered in the system status list as available.	The module remains entered in the system status list as unavailable. The SF LED on the module remains lit.
Direct access is again possible.	Direct access is not possible.

9.3 Switching power modules off and on during operation

What happens when power modules are switched off during operation

If the load power voltage to a power module is switched off during operation, the following activities take place:

- If you enable diagnostics when assigning parameters for the power module, the diagnostics interrupt OB 82 (diagnostics address of the power module) is called with the corresponding diagnostics buffer entry (event ID 3942_H).
- The power module is entered as present but faulty in the system status list.

Switching off the load power supply has the following effects on the modules supplied by the power module:

- The SF LED on the modules lights up.
- The modules can continue to be accessed without an I/O access error occurring.
- The outputs of the modules are deenergized and inactive for the process.
- The inputs of digital modules and FM modules return 0; the inputs of analog modules return $7FFF_{H.}$

What happens when power modules are switched on during operation

If the load power supply to a power module is switched on during operation, the following activities take place:

- If you enable diagnostics when assigning parameters for the power module, the diagnostics interrupt OB 82 (diagnostics address of the power module) is called with the corresponding diagnostics buffer entry (event ID 3842_H).
- The power module is entered as present and o.k. in the system status list.

Switching on the load power supply has the following effects on modules supplied by the power module:

- The SF LED on the modules goes out.
- The modules regain their full functionality.

Removal and insertion of power modules during operation

If, during operation, you remove or insert a power module, the activities listed in section *Removing and inserting modules during operation* take place.

Removal and insertion has the same effects as switching the load power supply off and on for the modules that are supplied by the power module.

Debugging functions, diagnostics and troubleshooting

10

10.1 Overview

This chapter helps you to get acquainted with tools you can use to carry out the following tasks:

- Hardware/software error diagnostics.
- Elimination of hardware/software errors.
- Testing the hardware/software – for example, during commissioning.

Note

It would go beyond the scope of this manual to provide detailed descriptions of all the tools you can use for diagnostics, testing and troubleshooting functions. Further notes are found in the relevant hardware/software manuals.

10.2 Identification and maintenance data of the IM 151-8 PN/DP CPU interface module

Definition and properties

Identification and maintenance data (I&M) are data that are stored in a module for assisting you in:

- Checking the system configuration
- Locating hardware changes in a system
- Correcting errors in a system

Identification data (I data) is information regarding the module, like for example, order number and serial number, which are partly also printed on the housing of the module. I data is manufacturer´s information about the module. It is fixed and can only be read.

Maintenance data (M data) is system-specific information, such as the installation location. M data is created during the configuration and written to the module.

I&M data enable modules to be uniquely identified online.

Reading and writing the I&M data of the IM 151-8 PN/DP CPU interface module with *STEP 7*

Read:

- In *STEP 7* the I&M data is displayed under "Module state – IM 151-8 PN/DP CPU" ("General" and "Identification" tabs) and via "Available nodes" (detailed view) (see *STEP 7* online help).
- In the user program, the I&M data can be read via SFC 51. Specify the required SSL sublist number and the index in the input parameters of the SFC 51 (see table below).
- You can read the I&M data on the "Start" and "Identification" pages using the web server.

Write:

You will always need *STEP 7* HW Config to write the M data for modules.

For example, you can enter the following data during configuration:

- Name of the automation system (device name)

  The device name is assigned when you create the station in SIMATIC Manager. In this case a "SIMATIC 300(1) station is created by default. This name can be changed at any time.

- You can enter the following data in *STEP 7* HW Config on the "General" tab under "IM 151-8 PN/DP CPU Properties":
  - Name of the module

    In this case, HW Config assigns a default name, e.g. IM 151-8 PN/DP CPU interface module (this can be changed).
  - Higher level designation of the module

    No default setting
  - Location designation of a module

    No default setting

Reading the I&M data from the IM 151-8 PN/DP CPU interface module with the user program

If you want to read the I&M data from the IM 151-8 PN/DP CPU interface module in the user program, you must read the associated system state list, specifying the relevant SSL ID and the index using SFC 51. The SSL IDs and the associated indexes are listed in the following table.

SSL sublists with I&M data

The I&M data can be found in the following SSL sublists under the specified indexes.

Table 10-1 SSL sublists with I&M data

SSL ID W#16#…	Index W#16#…	Meaning
Module identification		
0111		an identification data record
	0001	Identification of the module This contains the module's order number and the product version.
	0006	Identification of the basic software Provides information on the software version of the module. (The IM 151-8 PN/DP CPU interface module has no basic software so, in this case, the identification data are the same as index 0001.)
	0007	Identification of the basic firmware Provides information on the firmware version of the module.
Identification of a component		
011C		Identification of a component
	0001	Name of the automation system The name of the automation system (device name) is saved to this parameter.
	0002	Name of the module The name of the module is saved to this parameter.
	0003	Higher level designation of the module This is a system-wide unique identifier for the module.
	000B	Location designation of a module This is the module's installation location.

For detailed information on the structure and content of the system state lists, see the *System and Standard Functions for S7-300/400* reference manual.

Additional information about reading the SSL with SFC 51 can be found in Reference Manual *System and Standard Functions for S7-300/400* or in the *Online Help for STEP 7*.

I&M data for the connected I/O devices

Information about the I&M data for the I/O devices connected to the IM 151-8 PN/DP CPU interface module can be found in the relevant I/O module manuals.

10.3 Debugging functions

10.3.1 Overview: Debugging functions

Determining addressed nodes with "Node flashing test"

To identify the addressed node, select **PLC > Diagnostics/Setting > Node/Flashing Test** in *STEP 7*.

A dialog appears in which you can set the flashing time and start the flashing test. The directly connected node can be identified by a flashing FRCE LED. The flashing test cannot be performed if the FORCE function is active.

Debugging functions of the software: Monitoring and modifying variables, stepping mode

STEP 7 offers you the following testing functions that you can also use for diagnostics:

- Monitoring and modifying variables

  Can be used to monitor the current values of individual variables of a user program or an IM 151-8 PN/DP CPU interface module on the programming device / PC. You can also assign constant values to the variables.

- Testing with program status

  You can test your program by viewing the program status of each function (result of logical links, status bit) or the data of specific registers in real-time mode.

  If you have selected the LAD programming language to be represented in *STEP 7*, the color of the symbol will indicate a closed switch or an active circuit, for example.

  Note

  The *STEP 7* testing function with program status extends the IM 151-8 PN/DP CPU interface module´s cycle time! *STEP 7* allows you to set a maximum permitted increase in the cycle time. To do this you have to set process mode in the IM 151-8 PN/DP CPU interface module parameters in *STEP 7*.

- Stepping mode

  When testing in single-step mode, you can process your program instructions in sequence (= single-step) and set break points. This is only possible in testing mode and not in process mode.

Debugging functions of the software: Forcing variables

The Force function can be used to assign the variables of a user program or IM 151-8 PN/DP CPU interface module (also: inputs and outputs) constant values which can not be overwritten by the user program.

For example, you can use it to jumper sensors or switch outputs permanently, irrespective of the user program.

DANGER

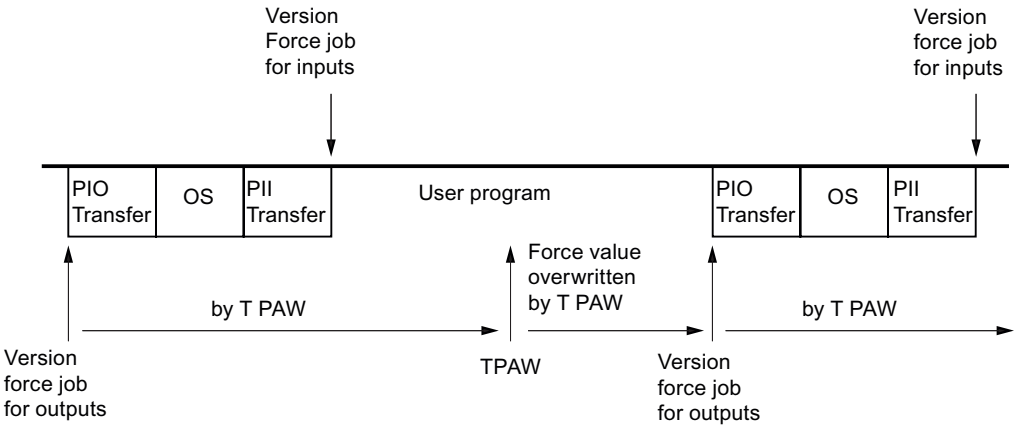
This could result in severe injury or even death, and damage to property.
Incorrect use of the Force function could result in death or severe injury, and damage to machinery or even the entire plant. Always follow the safety instructions in the *STEP 7 manuals*.

DANGER

Forcing with the IM 151-8 PN/DP CPU interface module

The force values in the process image of the **inputs** can be overwritten by write commands (such as T IB x, = I x.y, Copy with SFC, etc.) and by read I/O commands (such as L PIW x) in the user program, or by write PG/OP functions! **Outputs** initialized with forced values only return the forced value if not accessed by the user program via I/O write instructions (TPQB x, for example) or by programming device / OP write functions!
Always ensure that forced values in the I/O process image cannot be overwritten by the user program or programming device / OP functions!

In the case of the IM 151-8 PN/DP CPU interface module, forcing corresponds to a "cyclic control"



OS: Operating system processing

Figure 10-1 Forcing with the IM 151-8 PN/DP CPU interface module

The differences between forcing and modifying variables

Table 10-2 The differences between forcing and modifying variables

Characteristics/function	Forcing	Modifying Variables
Memory bit (M)	-	Yes
Timers and counters (T, C)	-	Yes
Data blocks (DB)	-	Yes
Inputs and outputs (I, O)	Yes	Yes
Peripheral inputs (PI)	-	-
Peripheral outputs (PO)	-	Yes
User program can overwrite modify/force values	Yes	Yes
Maximum number of force values	10	-

Reference

Details on debugging functions of the software are available in the *STEP 7 Online Help* and in the *Programming with STEP 7* Manual.

10.3.2 Overview: Diagnostics

Introduction

System errors can occur especially in the commissioning phase. Tracking these errors might be a time-consuming effort, since they can occur both on the hardware and software side. The many different testing functions ensure that commissioning runs smoothly.

Note

Errors during **operation** are almost always a result of faults or damage to the hardware.

Type of error

Errors that the IM 151-8 PN/DP CPU interface module can recognize and to which you can respond with organization blocks (OBs) can be split into the following categories:

- Synchronous error: Errors you can relate to a specific point in the user program (error when accessing an I/O module, for example).
- Asynchronous error: Errors you can **not** relate to a specific point in the user program (cycle time exceeded, module error, for example).

Troubleshooting

Programming with foresight and, above all, knowledge and proper handling of diagnostic tools puts you into an advantageous position in error situations:

- You can reduce the effects of errors.
- It makes it easier for you to locate errors (by programming error OBs, for example).
- You can limit downtimes.

Diagnostics with LED display

The SIMATIC hardware of the distributed I/Os offers diagnostics with LEDs.

These LEDs are implemented in three colors:

LED color	Status of the IM 151-8 PN/DP CPU interface module
Green	Regular operation. Example: Power is on.
Yellow	Non-regular operating status. Example: Forcing is active.
Red	Fault. Example: Bus error
LED flashing	Special event Example: Memory reset

The LEDs for the PROFINET interface ports are of the following colors:

LED color	State	Meaning
Green	Off	No other device is connected to the corresponding port of the integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module .
	On	Another PROFINET device (such as a switch) is connected at the corresponding port of the integrated PROFINET interface of the IM 151-8 PN/DP CPU interface module and the physical connection has been established.

Reference

Notes on diagnosing suitable I/O modules can be found in the *ET 200S* Operating Instructions.

Diagnostics buffer

If an error occurs, the IM 151-8 PN/DP CPU interface module writes the cause of error to the diagnostics buffer. In *STEP 7* you use the programming device to read the diagnostics buffer. This location holds error information in plain text.

Modules with diagnostics capability that do not have their own diagnostics buffer write their error information to the IM 151-8 PN/DP CPU interface module´s diagnostics buffer.

When an error or an interrupt event occurs, (e.g. time-of-day interrupt), the IM 151-8 PN/DP CPU interface module switches to STOP mode, or you can respond in the user program via error / interrupt OBs. This would be OB82 in the above example.

Diagnostics of field devices on PROFINET

For additional information, refer to the *PROFINET System Description* and to the *From PROFIBUS DP to PROFINET IO* Programming Manual.

Diagnostics with system functions

On the IM 151-8 PN/DP CPU interface module, we recommend that you use the more user-friendly **SFB 54** "RALRM" (called in diagnostic OB 82) to evaluate the diagnostics from I/O modules or DP slaves.

Further options for diagnostics with system functions are listed below:

- Using **SFC 51** "RDSYSST" to read an SSL sublist or an extract thereof.
- Reading the diagnostic data (slave diagnostics) of a DP slave, using **SFC 13** "DPNRM_DG"

  Every DP slave provides slave diagnostic data according to EN 50170 Volume 2, PROFIBUS. You can use SFC 13 "DPNRM_DG" to read this diagnostic data. Error information is stored in hex code. Refer to the relevant module manual for information on the meaning of the read code.

  For example, the entry of the value 50H (= dual 0101 0000) in byte 7 of the slave diagnostics for the distributed I/O module ET 200B indicates a faulty fuse or missing load voltage in channel group 2 and 3.
- Reading a data record with **SFB 52** "RDREC"

  You can use SFB 52 "RDREC" (read record) to read a specific data record from the addressed module. Data records 0 and 1 are especially suitable for reading diagnostic information from a diagnosable module.

  Data record 0 contains 4 bytes of diagnostic data that indicates the current state of a module. Data record 1 contains the 4 bytes of diagnostic data also stored in data record 0, plus module-specific diagnostic data.
- Reading the start information of the current OB using **SFC 6** "RD_SINFO"

  Information about the error can also be found in the start information of the relevant error OB.

  You can use SFC 6 "RD_SINFO" (read start information) to read the start information of the OB that was last called and not yet processed completely, and of the startup OB that was last called.
- Triggering detection of the bus topology in a DP master system with **SFC 103** "DP_TOPOL"

  The diagnostic repeater makes it easier to identify faulty modules or an interruption on the DP cable when a fault occurs during operation. The repeater acts as a slave and is able to determine the topology of a DP segment and log faults on the basis of this topology.

  You can use SFC103 "DP_TOPOL" to trigger the identification of the bus topology of a DP master system by the diagnostic repeater. SFC 103 is described in the *STEP 7 online help* and in the *System and Standard Functions for S7-300/400* reference manual. The diagnostic repeater is described in the *Diagnostic Repeater for PROFIBUS DP* Manual. The manuals can be found under http://support.automation.siemens.com/WW/view/de/ and the relevant entry ID 1214574 and 7915183.

10.3.3 Diagnostic functions available in STEP 7

Diagnosing with the "Diagnosing hardware" function"

Locate the cause of a module error by viewing the online information on the module. You can locate the cause of an error in the user program cycle with the help of the diagnostics buffer and of the stack content. In addition to this, you can check whether a user program is capable of running on the IM 151-8 PN/DP CPU interface module.

Hardware diagnostics give you an overview of the PLC status. In an overview representation, a symbol can display the error status of every module. A double-click on the faulty module opens detailed error information. The scope of this information depends on the specific module. You can view the following information:

- General information about the module (e.g. order number, version, designation) and state of the module (e.g. faulty).
- Module errors (channel errors, for example) in centralized I/O modules and PROFIBUS DP slaves or PROFINET IO devices.
- Display of messages from the diagnostics buffer.
- Diagnostic data about the PROFINET interface and its ports is also available (e.g. network connection, communication diagnostics and statistics).

For the IM 151-8 PN/DP CPU interface module, you can also view the following information about the module states:

- Cause of an error in the user program cycle.
- Indication of the cycle time (longest, shortest and last cycle).
- Performance data (number of possible inputs and outputs, memory bits, counters, timers and blocks).

For complete and current details of diagnostic functions in *STEP 7* and specific procedures, refer to the *Programming with STEP 7* manual and the *STEP 7 Online Help*.

10.3.4 Network infrastructure diagnostics (SNMP)

Availability

As an open standard, you can use any systems or software solutions for diagnostics based on SNMP in PROFINET.

Network Diagnostics

SNMP (Simple Network Management Protocol) makes use of the wireless UDP transport protocol. It consists of two network components, similar to the client/server model. The SNMP manager monitors the network nodes and the SNMP agents collect the various network-specific information in the individual network nodes and stores it in a structured form in the **MIB** (Management Information Base). This information allows a network management system to run detailed network diagnostics.

Detecting the network topology

LLDP (Link Layer Discovery Protocol) is a protocol that is used to detect the closest neighbors. It enables a device to send information about itself and to save information received from neighboring devices in the LLDP MIB. This information can be looked up via the SNMP. This information allows a network management system to determine the network topology.

Integration in *STEP 7*

Configuration of the OPC server is integrated into *STEP 7* HW Config. Stations that have already been configured in the *STEP 7* project can be transferred directly. As an alternative to *STEP 7*, the configuration can also be run with the NCM PC (included on the SIMATIC NET CD) or can be determined automatically and transferred to the project configuration.

No *STEP 7* connection is needed for network management with the SNMP protocol.

Use of SNMP in the SIMATIC NET environment

SNMP-compliant devices from the SIMATIC NET family can be monitored and operated via a conventional standard Internet browser. The management system known as web-based management offers a range of device-specific information (network statistics, status of redundant supply, for example).

Diagnostics with the SIMATIC NET SNMP OPC server

The SNMP OPC server software provides diagnostics and parameter assignments for all SNMP devices. The OPC server uses the SNMP protocol to exchange data with these devices.

All information can be integrated into OPC-compatible systems, into the WinCC HMI system, for example. This enables process and network diagnostics to be combined in the HMI system.

Uses of SNMP

SNMP can be used as follows:

- By users to integrate network diagnostics into a central HMI/SCADA system using the SNMP OPC server.
- By the IT administrators of machine and system operators to monitor their Industrial Ethernet network using standard network management systems.
- By the IT administrators to primarily monitor the office network, but often also the automation network using standard network management systems (for example, HP Openview).

Additional information

Information relating to SNMP in the network management standardization group can be found at http://www.profibus.com.

Additional details about SNMP can be found at http://www.snmp.org.

Additional information about the SNMP OPC server can be found at http://www.siemens.com/snmp-opc-server.

The *PROFINET system description* contains additional information about the SNMP communication service and diagnostics with SNMP.

10.4 Diagnostics using status and error LEDs

10.4.1 Introduction

Diagnostics with LEDs is an initial tool for error localization. Usually, you evaluate the diagnostics buffer for further error localization.

The buffer contains plain text information on the error that has occurred. For example, you will find the number of the appropriate error OB here. If you generate this error OB, you can prevent the IM 151-8 PN/DP CPU interface module switching to STOP mode.

10.4.2 Status and error displays of the IM 151-8 PN/DP CPU interface module

Table 10-3 Status and error displays of the IM 151-8 PN/DP CPU interface module

LED					Meaning
SF	ON	FRCE	RUN	STOP	
Off	Off	Off	Off	Off	the IM 151-8 PN/DP CPU interface module is without supply voltage. Remedy: Check whether the supply voltage is connected to mains and switched on.
Off	On	X	Off	On	The IM 151-8 PN/DP CPU interface module is in STOP mode. To correct or avoid error: Start the IM 151-8 PN/DP CPU interface module.
On	On	X	Off	On	The IM 151-8 PN/DP CPU interface module is in STOP mode as a result of error. To correct or avoid error: refer to the tables below, evaluation of the SF LED
X	On	X	Off	Flashes (0.5 Hz)	The IM 151-8 PN/DP CPU requests a memory reset.
X	On	X	Off	Flashes (2 Hz)	The IM 151-8 PN/DP CPU carries out a memory reset.
X	On	X	Flashes (2 Hz)	On	The IM 151-8 PN/DP CPU interface module is in startup.
X	On	X	Flashes (0.5 Hz)	On	The IM 151-8 PN/DP CPU interface module is paused by a programmed break point. For details refer to the *Programming with STEP 7* Manual.
On	On	X	X	X	Hardware or software error To correct or avoid error: refer to the tables below, evaluation of the SF LED
X	X	On	X	X	You enabled the Force function For details refer to the *Programming with STEP 7* Manual.
X	X	Flashes (2 Hz)	X	X	Node flashing test was activated.
Flashes	Flashes	Flashes	Flashes	Flashes	Your IM 151-8 PN/DP CPU interface module has an internal system error. The procedure is as follows: 1. Set the mode selector switch to STOP. 2. Switch the supply voltage 1L+ off and on again. 3. Read the diagnostics buffer with *STEP 7*. 4. Contact your local SIEMENS partner.
X = This state is irrelevant for the current IM 151-8 PN/DP CPU interface module function.					

Maintenance information MT

The LED MT lights up yellow as soon as PROFINET issues a maintenance request (e.g. failure of the sync master in a sync domain for the IRT operation of a PROFINET IO system). In addition to the LED display, an alarm message is generated if these interrupts have been enabled by the configuration of the PN interface.

Reference

A detailed description of the OBs and on SFCs required for their evaluation can be found in the *STEP 7 Online Help* and in the *S7-300/400 System and Standard Functions* Reference Manual.

For information on maintenance, refer to the *PROFINET System Description*.

10.4.3 Evaluating the SF LED in case of software errors

Table 10-4 Evaluation of the SF LED (software error)

Possible error	Response of the IM 151-8 PN/DP CPU interface module	Possible Remedies
TOD interrupt is enabled and triggered. However, a matching block is not loaded. (Software/configuration error)	Call of OB 85. The IM 151-8 PN/DP CPU interface module STOPs if OB 85 is not loaded.	Load OB 10 (OB number can be seen from the diagnostics buffer).
Start time of the enabled TOD interrupt was jumped, e.g. by advancing the internal clock.	Call of OB 80. The IM 151-8 PN/DP CPU interface module STOPs if OB 80 is not loaded.	Disable the TOD interrupt before you set the time-of-day with SFC 29.
Delay interrupt triggered by SFC 32. However, a matching block is not loaded. (Software/configuration error)	Call of OB 85. The IM 151-8 PN/DP CPU interface module STOPs if OB 85 is not loaded.	Load OB 20 (OB number can be seen from the diagnostics buffer).
Process interrupt is enabled and triggered. However, a matching block is not loaded. (Software/configuration error)	Call of OB 85. The IM 151-8 PN/DP CPU interface module STOPs if OB 85 is not loaded.	Load OB 40 (OB number can be seen from the diagnostics buffer).
Status alarm is generated, but the appropriate OB55 is not loaded.	Call of OB 85. The IM 151-8 PN/DP CPU interface module STOPs if OB 85 is not loaded.	Load OB55
Update alarm is generated, but the appropriate OB 56 is not loaded.	Call of OB 85. The IM 151-8 PN/DP CPU interface module STOPs if OB 85 is not loaded.	Load OB56
Vendor-specific alarm is generated, but the appropriate OB57 is not loaded.	Call of OB 85. The IM 151-8 PN/DP CPU interface module STOPs if OB 85 is not loaded.	Load OB57

Possible error	Response of the IM 151-8 PN/DP CPU interface module	Possible Remedies
Access to missing or defective I/O module when the process image is updated (software or hardware error)	Call OB 85 (depending on the parameter settings in HW Config). The IM 151-8 PN/DP CPU interface module STOPs if OB 85 is not loaded.	Load OB 85. The start information of the OB contains the address of the relevant I/O module. Replace the affected I/O module or eliminate the program error.
The cycle time was exceeded. Probably too many interrupt OBs called simultaneously.	Call of OB 80. The IM 151-8 PN/DP CPU interface module STOPs if OB 80 is not loaded. The IM 151-8 PN/DP CPU interface module switches to STOP even though OB 80 is loaded if twice the cycle time was exceeded without the cycle time being triggered again.	Extending the cycle time (*STEP 7* – Hardware configuration), changing the program structure. To correct or avoid error: If necessary, retrigger cycle time monitoring by calling SFC 43
Programming error • Block not loaded • Wrong block number • Wrong timer/counter number • Read/write access to wrong area • etc.	Call of OB 121. The IM 151-8 PN/DP CPU interface module STOPs if OB 121 is not loaded.	Eliminate the programming error. The *STEP 7* testing function helps you to locate the error.
I/O access errors An error has occurred when I/O module data was accessed	Call of OB 122. The IM 151-8 PN/DP CPU interface module STOPs if OB 122 is not loaded.	Check the I/O module addressing in HW Config and identify whether a I/O module / DP slave has failed.

Tip:

- You can use SFC 39 to disable all interrupts and asynchronous error events.
- You can set the times in the cyclic interrupt OB 35, starting from 1 ms.

Note

The shorter the selected cyclic interrupt period, the more likely it is that cyclic interrupt errors will occur. You must take into account the operating system times of the IM 151-8 PN/DP CPU interface module, the user program runtime and extension of the cycle time by active programming device functions, for example.

Reference

A detailed description of the OBs and on SFCs required for their evaluation can be found in the *STEP 7 Online Help* and in the *S7-300/400 System and Standard Functions* reference manual.

10.4.4 Evaluating the SF LED in case of hardware errors

Table 10-5 Evaluating the SF LED (hardware error)

Possible error	Response of the IM 151-8 PN/DP CPU interface module	Possible Remedies
A centralized I/O module was removed or inserted while the system was in RUN mode.	Call of OB 83. The IM 151-8 PN/DP CPU interface module STOPs if OB 83 is not loaded. If more than one module is removed, the IM 151-8 PN/DP CPU interface module always switches to STOP.	Load OB 83.
A distributed module was removed or inserted on PROFINET IO while the system was in RUN.	Call of OB 83. The IM 151-8 PN/DP CPU interface module STOPs if OB 83 is not loaded. OB 86 is also called when one or more modules of an ET 200S (IO device) are removed or inserted while the system is in RUN. The IM 151-8 PN/DP CPU interface module STOPs if OB 86 is not loaded.	Load OB 83 and OB 86.
A distributed module was removed from or inserted on the PROFIBUS DP while the system was in RUN mode.	Call of OB 86. The IM 151-8 PN/DP CPU interface module STOPs if OB 86 is not loaded. If the module was integrated using a GSD file: Call of OB 82. The IM 151-8 PN/DP CPU interface module STOPs if OB 82 is not loaded.	Load OB86 or OB82.
An I/O module with diagnostic capability reports a diagnostic interrupt.	Call of OB 82. The IM 151-8 PN/DP CPU interface module STOPs if OB 82 is not loaded.	Response to the diagnostic event, which depends on the parameter assignments for the I/O module.
Attempt to access a missing or faulty I/O module. Loose connector (software or hardware error).	Call of OB 85, if access was attempted during update of the process image (OB 85 call must be enabled accordingly in the parameters). Call OB 122 for direct I/O access. The IM 151-8 PN/DP CPU interface module STOPs if an OB is not loaded.	Load OB 85 or OB 122. The start information of the OB contains the address of the relevant I/O module. Replace the relevant I/O module, fix the connector or eliminate the program error.
SIMATIC Micro Memory Card is faulty.	The IM 151-8 PN/DP CPU switches to STOP and requests a memory reset.	Replace the SIMATIC Micro Memory Card, reset the IM 151-8 PN/DP CPU interface module memory, transfer the program again, then set the IM 151-8 PN/DP CPU interface module to RUN mode.

Reference

A detailed description of the OBs and on SFCs required for their evaluation can be found in the *STEP 7 Online Help* and in the *S7-300/400 System and Standard Functions* reference manual.

10.4.5 Status and error displays for the PN interface

Status and Error Indicators: PROFINET devices

Table 10-6 LED displays for PROFINET

LED	LED status	Description of the status
P1 - LINK, P2 - LINK, P3 - LINK	Lit	There is an Ethernet connection between the allocated port of the PROFINET interface of your PROFINET device and a communication peer on the Ethernet (a switch, for example).
	Flashes	The user has activated flashing from *STEP 7*.
	Does not light up	There is no Ethernet connection between the allocated port of the PROFINET interface of your PROFINET device and a communication peer on the Ethernet.
BF-PN	lit[1]	Error at the PROFINET interface, communication is no longer possible To correct or avoid error: See the table below
	Flashes	Error at the PROFINET interface (for example, due to CPU stop in one or more IO devices) To correct or avoid error: See the table below
	Does not light up	No error at the PROFINET interface
[1] The BF-PN LED only lights up if a PROFINET IO system is configured. If the BF-PN LEDs do not light up because the PROFINET IO system is not to be used, for example, then the PROFINET IO system must be separated or deleted from the configuration in HW Config.		

Remedy for errors at the PROFINET interface - BF-PN LED lights up

Table 10-7 BF-PN LED lights up

Possible error	Example response of the IM 151-8 PN/DP CPU interface module	Possible remedies
• Bus fault (no cable connection to a subnet/switch) • Wrong transmission speed • Full duplex mode not set	Call of OB 86 (if the IM 151-8 PN/DP CPU interface module is in RUN and has previously run IO devices that are now failing). The IM 151-8 PN/DP CPU interface module STOPs if OB 86 is not loaded.	• Check the bus cable for a short-circuit or break. • Check whether the IM 151-8 PN/DP CPU interface module is connected to a switch and not to a hub. • Check that data are being transmitted at 100 Mbps and in full duplex mode. • If a DP master module is connected to your IM 151-8 PN/DP CPU interface module, you can read out the diagnosis via the DP master interface. Edit the configuration.

Remedy for errors at the PROFINET interface of an IO controller - BF-PN LED flashes

Table 10-8 BF-PN LED flashes with a PROFINET IO controller

Possible error	Example response of the IM 151-8 PN/DP CPU interface module	Possible remedies
• Failure of a connected IO device • At least one of the assigned IO devices cannot be addressed • Bad engineering configuration	Call of OB 86 (if the IM 151-8 PN/DP CPU interface module is in RUN and connected IO devices have since failed). The IM 151-8 PN/DP CPU interface module STOPs if OB 86 is not loaded.	• Check whether the Ethernet cable is connected to the IM 151-8 PN/DP CPU interface module and that the bus is not interrupted. • Wait until the IM 151-8 PN/DP CPU interface module has started up. If the LED does not stop flashing, check the IO devices or evaluate their diagnostic information. • Check whether the configured device name matches its actually assigned name. • Check whether the connected IO devices have different device names and IP addresses.

Remedy for errors at the PROFINET interface of an IO controller - BF LED flashes

Table 10-9 BF LED flashes with a PROFINET IO device

Possible error	Possible remedies
• Wrong IP address • Bad engineering configuration • Wrong parameter assignment • IO controller not found / switched off, but there is an Ethernet connection. • Bad or no device name • The response monitoring time has expired.	• Check that the Ethernet cable is correctly connected. • Check whether the Ethernet cable to the controller is interrupted. • Check the configuration and parameter settings. • On the IO device: Switch on the IO controller. • Check whether the expected configuration matches the actual configuration. • Check the physical communication connection for interruption

Tip: Identification of the PROFINET device in the control cabinet

PROFINET IO devices must be assigned a device name when they are started for the first time. In *STEP 7* HW Config, you can make the LINK LED of the PROFINET IO device to be assigned a name flash using **PLC > Ethernet > Assign device name**. This allows you, for example, to clearly identify the PROFINET IO device among several identical devices in a cubicle.

10.4.6 Status and error displays of the DP master module

Explanation of the BF LED

Table 10-10 BF LED

Meaning			
IM 151-8 PN/DP CPU		**DP master module**	
SF	**ON**	**BF**	
On	On	On/flashes	PROFIBUS DP interface error. To correct or avoid error: See the tables below

Table 10-11 BF LED on the DP master module lights up

Possible error	Response of the IM 151-8 PN/DP CPU interface module	Possible remedies
• Bus fault (hardware fault). • Slave not available or switched off • Short-circuit on the bus	Call of OB 86 (if the IM 151-8 PN/DP CPU interface module is in RUN and has previously run DP slaves that are now failing). The IM 151-8 PN/DP CPU interface module STOPs if OB 86 is not loaded.	• Check to see if the connector for PROFIBUS DP is inserted properly. • Check the bus cable for a short-circuit or break. • Analyze the diagnostic data. Edit the configuration.

Table 10-12 BF LED on the DP master module flashes

Possible error	Response of the IM 151-8 PN/DP CPU interface module	Possible remedies
The IM 151-8 PN/DP CPU interface module is the DP master: • Failure of a connected station • At least one of the configured slaves cannot be accessed. • Incorrect configuration (configured address areas of the actual structure do not correspond with the set structure.)	Call of OB 86 (if the IM 151-8 PN/DP CPU interface module is in RUN and connected DP slaves have since failed). The IM 151-8 PN/DP CPU interface module STOPs if OB 86 is not loaded.	• Check whether the bus cable on the DP master module is connected to the IM 151-8 PN/DP CPU interface module and that the bus is not interrupted. • Wait until the IM 151-8 PN/DP CPU interface module has started up. If the LED does not stop flashing, check the DP slaves or evaluate the diagnostic data for the DP slaves. • Check the settings for the configured address areas for the DP master.

Reference

A detailed description of the OBs and on SFCs required for their evaluation can be found in the *STEP 7 Online Help* and in the *S7-300/400 System and Standard Functions* reference manual.

10.5 Basics of diagnostics in PROFINET IO

Totally Integrated Diagnostics Concept

PROFINET IO supports you with an integrated diagnostics concept. The diagnostics concept with PROFINET IO is similar to that of PROFIBUS DP.

Below, we will explain the basics of the concept.

Basic concept

Each individual or several errors occurring simultaneously are transferred from the IO device to the IO controller.

If you require the full status of the IO device including any pending errors, you can also read the status directly from the IO device.

Extended maintenance concept

PROFINET devices support the comprehensive diagnostics and maintenance concept described in the IEC 61158-6-10 standard.

The aim of the maintenance concept is the early detection and elimination of potential faults - before they cause a production failure.

The PROFINET devices / modules / submodules can therefore also display information for preventive maintenance, in addition to the status information "OK" and "Faulty".

Maintenance information

Maintenance information describes the urgency with which maintenance is needed. The concept distinguishes between two levels of maintenance information:

- Maintenance required (identified by a green wrench in *STEP 7*):
  - Maintenance is recommended

    This can, for example, arise if the attenuation on a fiber optic cable is too high. Although operation is still possible, the transmission link may fail completely in the near future.
- Maintenance requested (identified by a yellow wrench in *STEP 7*):
  - Maintenance alarm

    This can, for example, arise if the sync master in a sync domain for the IRT operation has failed.

The times at which maintenance information is generated are defined individually for each wear parameter (e.g. attenuation on a fiber optic cable).

Information on Diagnostics in PROFINET IO

For additional information, refer to the *STEP 7 Online Help*, the *From PROFIBUS DP to PROFINET IO* programming manual and the *PROFINET System Description.*

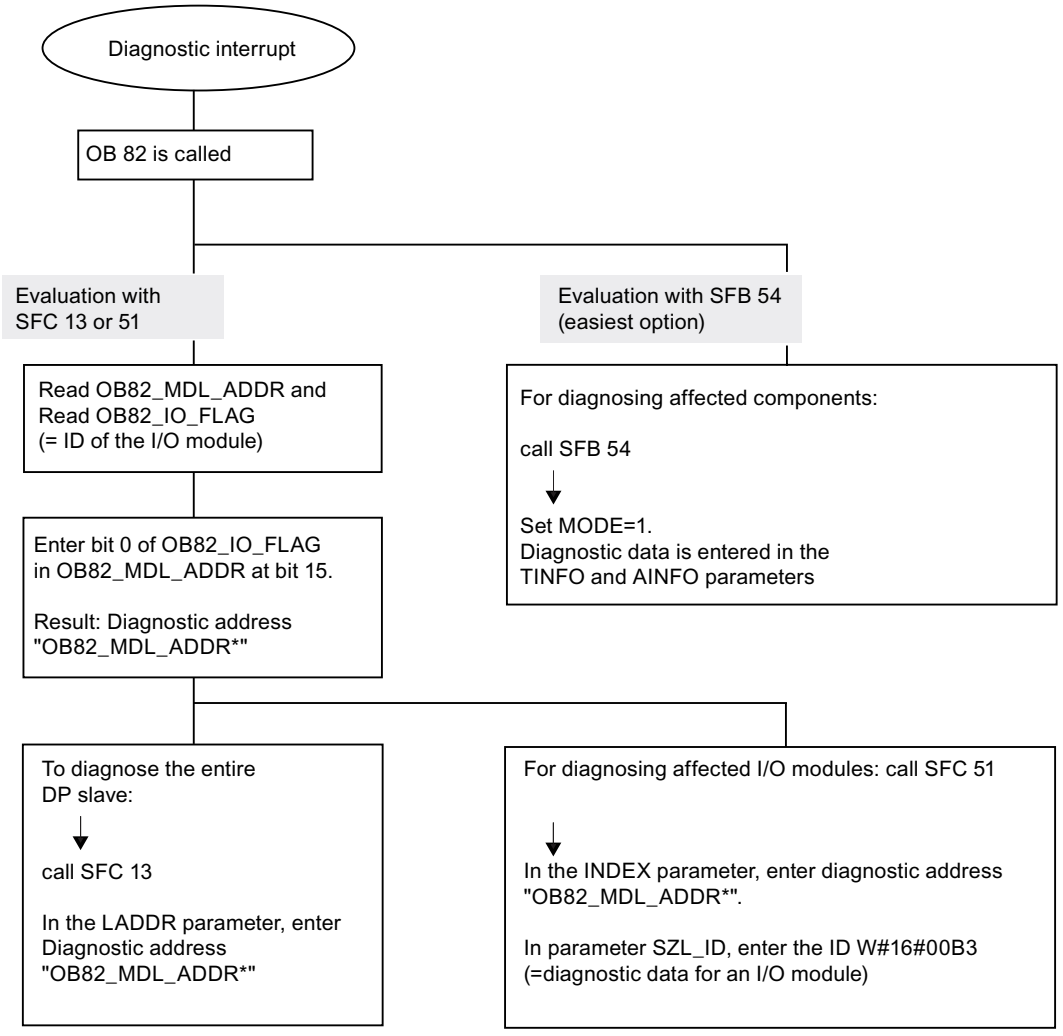
The system status lists and data records for PROFINET diagnostics are described in the programming manual.

10.6 Diagnostics on the PROFIBUS DP

10.6.1 Diagnostics of the IM 151-8 PN/DP CPU interface module as a DP master

Evaluate diagnostics in the user program

The figure below illustrates the procedure for evaluating diagnostics data in the user program.

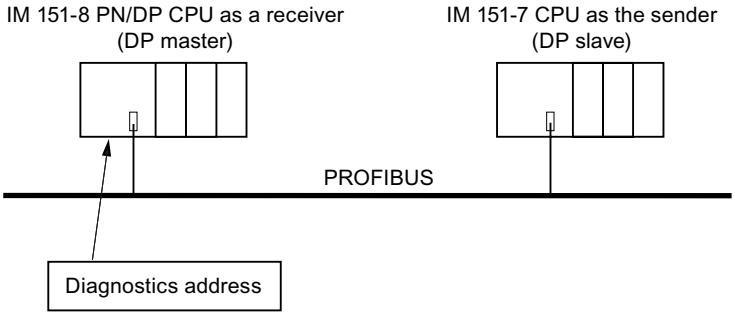


Note:
SFC 13 is asynchronous, which means that it may be called multiple times until its state has changed to BUSY=0.

Initial call in OB 82,
execution completed in the cycle

Diagnostics addresses for DP masters and DP slaves

With IM 151-8 PN/DP CPU interface module you assign diagnostics addresses for the PROFIBUS DP. Verify in your configuration that the DP diagnostics addresses are assigned once to the DP master and once to the DP slave.



Explanation of the DP master configuration	Explanation of the DP slave configuration
When you configure the DP master, assign two different diagnostics addresses for an intelligent DP slave, that is, one diagnostics address for slot 0, and one for slot 2. These two addresses perform the following functions: • The diagnostics address for slot 0 reports in the master all events relating to the entire slave (station representative), for example, node failure. • The diagnostics address for slot 2 is used to report events concerning this slot. For example, if the IM 151-7 CPU is acting as an intelligent slave, it returns the diagnostic interrupts for operating state transitions. These diagnostics addresses are referred to as *assigned to the DP master* below. These diagnostics addresses are used by the DP master to obtain information about the state of the DP slave, or about bus interruptions.	When you configure the DP slave, you also assign it a diagnostics address (in the associated DP slave project). This diagnostics address is referred to as *assigned to the DP slave* below. This diagnostics addresses is used by the DP slave to obtain information about the state of the DP master, or bus interruptions.

Event detection

The table below shows how the IM 151-8 PN/DP CPU interface module acting as a DP master recognizes operating mode transitions of a CPU acting as a DP slave or any interruption of the data exchange.

Table 10-13 Event recognition of the IM 151-8 PN/DP CPU interface module as a DP master

Event	What happens in the DP master?
Bus interruption (short circuit, connector removed)	• Call of OB 86 with the message **Station failure** (incoming event; diagnostics address of Slot 0 of the DP slave that is assigned to the DP master) • With I/O access: call of OB 122 (I/O access error)
DP slave: RUN → STOP	• Call of OB 82 with the message **Module error** (incoming event; diagnostics address of Slot 2 of the DP slave that is assigned to the DP master; Variable OB82_MDL_STOP=1)
DP slave: STOP → RUN	• Call of OB 82 with the message **Module OK.** (outgoing event; diagnostics address of Slot 2 of the DP slave that is assigned to the DP master; Variable OB82_MDL_STOP=0)

Evaluation in the user program

The table below shows how you can, for example, evaluate RUN to STOP transitions of the DP slave in the DP master.

Table 10-14 Evaluating RUN to STOP transitions of the DP slave in the DP master

In the DP master	In the DP slave (e.g. CPU 31x-2 DP)
Diagnostics addresses: (Example) Master diagnostics address =**1023** Slave diagnostics address =**1022** (Slot 0 of slave) (Diagnostic) address for "Slot 2"=**1021** (Slot 2 of slave)	Diagnostics addresses: (Example) Slave diagnostics address =**422** Master diagnostics address = irrelevant
The IM 151-8 PN/DP CPU interface module calls OB 82 with the following information: • OB82_MDL_ADDR:=**1021** • OB82_EV_CLASS:=B#16#39 (incoming event) • OB82_MDL_DEFECT:=module fault Tip: This information is also available in the diagnostics buffer of the IM 151-8 PN/DP CPU interface module. In the user program you should also include SFC 13 "DPNRM_DG" for reading DP slave diagnostic data.	CPU: RUN -> STOP The CPU generates a DP slave diagnostic message frame

11 Technical data

11.1 General technical data

Reference

The IM 151-8 PN/DP CPU interface module conforms to the standards and test values that apply to the ET 200S distributed I/O device. Detailed information on the general technical specifications can be found in the *ET 200S Distributed I/O Device* Operating Instructions.

11.2 IM 151-8 PN/DP CPU interface module

11.2.1 IM 151-8 PN/DP CPU with DP master module block diagram

The following figure shows the block diagram for the IM 151-8 PN/DP CPU interface module with the optional DP master module.

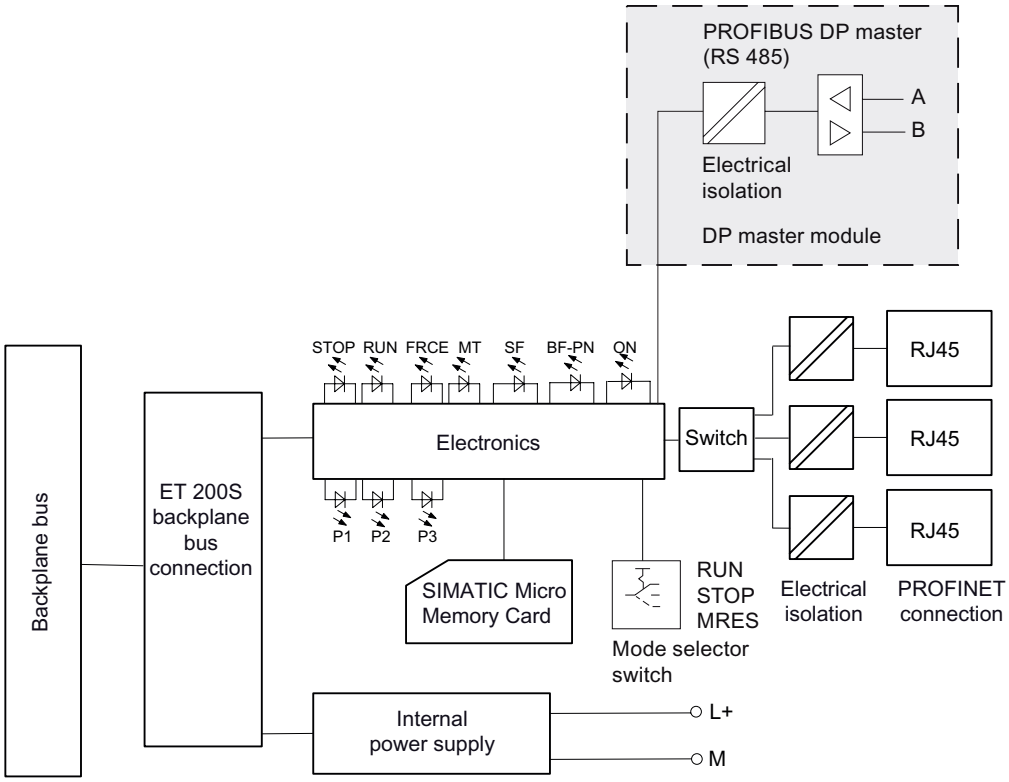


Figure 11-1 IM 151-8 PN/DP CPU interface module with DP master module block diagram

11.2.2 IM 151-8 PN/DP CPU technical specifications

Table 11-1 Technical specifications of the IM 151-8 PN/DP CPU interface module

Technical specifications	
IM 151-8 PN/DP CPU and product version	
Order number [MLFB]	6ES7151-8AB00-0AB0
• Hardware version	01
• Firmware version	V 2.7.0
• Associated programming package	*STEP 7* V5.4 + SP 4 or higher
Memory	
Work memory	
• Work memory	128 KB
• Expandable	No
• Capacity of the retentive memory for retentive data blocks	64 KB
Load memory	Pluggable via SIMATIC Micro Memory Card (max. 8 MB)
Buffering	Guaranteed by SIMATIC MMC (maintenance-free)
Data retention on the SIMATIC Micro Memory Card (after final programming)	At least 10 years
Execution times	
Processing times of	
• Bit operations	0.1 µs
• Word instructions	0.2 µs
• Fixed-point arithmetic	2 µs
• Floating-point arithmetic	3 µs
Timers / counters and their retentivity	
S7 counters	256
• Retentive memory	Configurable
• Default	From C0 to C7
• Counting range	0 to 999
IEC Counters	Yes
• Type	SFB
• Number	Unlimited (limited only by work memory)
S7 timers	256
• Retentive memory	Configurable
• Default	Not retentive
• Timer range	10 ms to 9990 s
IEC timers	Yes
• Type	SFB
• Number	Unlimited (limited only by work memory)

Technical specifications	
Data areas and their retentive address areas	
Bit memory	256 bytes
• Retentive memory	Configurable
• Preset retentive address areas	From MB0 to MB15
Clock memory	8 (1 memory byte)
Data blocks	
• Number	511 (in the number range from 1 to 511)
• Size	64 KB
• Non-retain support (configurable retentive address areas)	Yes
Local data per priority class	Max. 510 bytes per call
Blocks	
Total	1024 (DBs, FCs, FBs) The maximum number of blocks that can be loaded may be reduced if you are using another SIMATIC Micro Memory Card.
OBs	See *S7-300 Instruction List*
• Size, max.	64 KB
• Number of free cycle OBs	1 (OB 1)
• Number of time-of-day-interrupt OBs	1 (OB 10)
• Number of delay interrupt OBs	1 (OB 20)
• Number of cyclic interrupt OBs	1 (OB 35)
• Number of hardware interrupt OBs	1 (OB 40)
• Number of DPV1 interrupt OBs	3 (OB 55, 56, 57)
• Number of asynchronous error interrupts	6 (OB 80, 82, 83, 85, 86, 87) (OB 83 only for centralized I/O and PN IO)
• Number of startup OBs	1 (OB 100)
• Number of synchronous error interrupt OBs	2 (OB 121, 122)
Nesting depth	
• Per priority class	16
• Additional within an error OB	4
FBs	See *S7-300 Instruction List*
• Number, max.	1024 (in the number range from 0 to 2047)
• Size	64 KB
FCs	See *S7-300 Instruction List*
• Number, max.	1024 (in the number range from 0 to 2047)
• Size	64 KB

Technical specifications	
Address areas (I/O)	
Total I/O address area	
• Inputs, freely adressable	2048 bytes
• Outputs, freely adressable	2048 bytes
• Of which distributed – Inputs, freely adressable – Outputs, freely adressable	 2048 bytes 2048 bytes
Process I/O image	
• Inputs, adjustable	2048
• Outputs, adjustable	2048
• Inputs, preset	128
• Outputs, preset	128
Number of process image partitions	none
Digital channels	
• Inputs	16336
• Outputs	16336
• Inputs, central	496
• Outputs, central	496
Analog channels	
• Inputs	1021
• Outputs	1021
• Inputs, central	124
• Outputs, central	124
Removal	
Mounting rail	1
I/O module for each ET 200S	Max. 63
Station width	≤ 1 m or < 2 m
Current carrying capacity per load group (power module)	Max. 10 A
Time-of-day	
Clock	Yes (hardware clock)
• Factory setting	DT#1994-01-01-00:00:00
• Buffered	Yes
• Buffered period	Typically 6 weeks (at an ambient temperature of 40 °C)
• Behavior of the clock on expiration of the buffered period	The clock keeps running, continuing at the time-of-day it had when power was switched off.
• Accuracy	Deviation per day: < 10 s
Operating hours counter	1
• Number	0
• Value range	2^{31} hours (if SFC 101 is used)
• Granularity	1 hour
• Retentive	Yes; must be manually restarted after every restart

Technical specifications	
Time synchronization	Yes
• on PROFINET	Via NTP (only as time-of-day client)
• on PROFIBUS DP	Time-of-day master / time-of-day slave (with DP master module)
S7 message functions	
Number of stations that can be logged on for signaling functions	12 (depends on the number of connections configured for programming device / OP communication)
Process diagnostics messages	Yes
• Simultaneously enabled interrupt S blocks	300
Test and startup functions	
Monitor/modify variable	Yes
• Variables	Inputs, outputs, memory bits, DBs, timers, counters
• Number of variables – Of those as status variable – Of those as control variable	30 Max. 30 Max. 14
Force	Yes
• Variables	Inputs/Outputs
• Number of variables	Max. 10
Block status	Yes
Single-step	Yes
Breakpoints	2
Diagnostics buffer	Yes
• Number of entries (not configurable)	Max. 500
• Retentivity of the entries after POWER OFF / POWER ON	Only the last 100 entries are retained.
Communication functions	
Web server	Yes
• Number of http clients	5
Open IE communication	
Number of connections / access points, total	8
TCP/IP	Yes (via integrated PROFINET interface and loadable FBs)
• Maximum number of connections	8
• Data length for connection type 01_H, max.	1460 bytes
• Data length for connection type 11_H, max.	8192 bytes
ISO on TCP	Yes (via integrated PROFINET interface and loadable FBs)
• Maximum number of connections	8
• Data length, max.	8192 bytes

Technical specifications	
UDP	Yes (via integrated PROFINET interface and loadable FBs)
• Maximum number of connections	8
• Data length, max.	1472 bytes
PG/OP communication	Yes
S7 basic communication	Yes (I blocks only)
• User data per job – Consistent data	Max. 76 bytes 76 bytes
S7 communication	Yes
• As server	Yes
• As client	Yes (via integrated PN interface and loadable FBs)
• User data per job – Consistent data	See the *STEP 7 Online Help, Common parameters of SFBs/FBs and SFCs/FCs for S7 communication)*
Number of connections	12
can be used for	
• Programming device communication – Reserved (default) – Configurable	Max. 11 1 1 to 11
• OP communication – Reserved (default) – Configurable	Max. 11 1 1 to 11
• S7 basic communication – Reserved (default) – Configurable	Max. 10 0 0 to 10
S7 routing • Connections	Yes (with DP master module) Max. 4
Data set routing	Yes (with DP master module)
CBA	
Reference setting for CPU communication	50%
Number of remote interconnecting partners	32
Number of master/slave functions	30
Total of all master/slave connections	1000
Data length of all incoming master/slave connections, max.	4000 bytes
Data length of all outgoing master/slave connections, max.	4000 bytes
Number of device-internal and PROFIBUS interconnections	500
Data length of the device-internal and PROFIBUS interconnections, max.	4000 bytes
Data length per connection, max.	1400 bytes

Technical specifications	
Remote interconnections with acyclical transmission	
• Scan rate: Scan interval, min.	500 ms
• Number of incoming interconnections	100
• Number of outgoing interconnections	100
• Data length of all incoming interconnections, max.	2000 bytes
• Data length of all outgoing interconnections, max.	2000 bytes
• Data length per connection, (acyclic interconnections), max.	1400 bytes
Remote interconnections with cyclical transmission	
• Transmission frequency: Minimum transmission interval	1 ms
• Number of incoming interconnections	200
• Number of outgoing interconnections	200
• Data length of all incoming interconnections, max.	2000 bytes
• Data length of all outgoing interconnections, max.	2000 bytes
• Data length per connection, (acyclic interconnections), max.	250 bytes
HMI variables via PROFINET (acyclic)	
• Update HMI variables	500 ms
• Number of stations that can be logged on for HMI variables (PN OPC/iMAP)	2x PN OPC / 1x iMAP
• Number of HMI variables	200
• Data length of all HMI variables, max.	2000 bytes
PROFIBUS proxy functionality	
• supported	Yes
• Number of coupled PROFIBUS devices	16
• Data length per connection, max.	240 bytes (slave dependent)
Interfaces	
1st interface (X1)	
Type of interface	PROFINET
Physics	Ethernet
Isolated	Yes
Transmission rate	100 Mbps full duplex
Transmission mode	100BASE-TX
Autosensing (10/100 Mbaud)	Yes
Interface	
• Connection	3 x RJ45
• Switch function	Yes, internal
• Auto-cross-over	Yes

Technical specifications	
Functionality	
• PROFINET	Yes
• MPI	No
• PROFIBUS DP	No
• Point-to-point communication	No
Services	
• Programming device communication	Yes
• OP communication	Yes
• S7 communication – Max. configurable interconnections – Maximum number of instances	Yes (with loadable FBs) 10 32
• S7 routing	Yes (with inserted DP master module)
• Data set routing	Yes (with inserted DP master module)
• PROFINET IO	Yes
• PROFINET CBA	Yes
• Open IE communication – via TCP/IP – ISO on TCP – UDP – Local port numbers used by the system	 Yes Yes Yes 0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Web server – Number of http clients	Yes 5
PROFINET IO	
Number of integrated PROFINET IO controllers	1
Number of connectable PROFINET IO devices	128
• Of which RT – Of which in line with RT	Max. 128 Max. 128
• Of which IRT with the "high flexibility" option – Of which in line with IRT	Max. 128 Max. 61
Prioritized startup supported	Yes
• Max. number of IO devices for which a prioritized startup can be carried out	32
Changing IO devices during operation (changing partner ports) supported	Yes
• Max. number of IO devices per docking unit (recommendation on account of max. resources for simultaneous activation / deactivation of IO devices)	8
Device replacement without removable medium	Yes
IRT supported	Yes
Isochronous mode	No

Technical specifications	
Activate / deactivate PROFINET IO devices	Yes
• Max. number of simultaneously IO devices that can be activated / deactivated	8
Max. user data consistency with PROFINET IO	254 bytes
Send clock	Configurable: 250 µs, 500 µs and 1 ms
Update Time	The minimum value is determined by the set communication portion for PROFINET IO, the number of IO devices and the amount of configured user data.
• for send clock of 250 µs	250 µs to 128 ms
• for send clock of 500 µs	500 µs to 256 ms
• for send clock of 1 ms	1 ms to 512 ms
S7 routing	Yes
Data record routing (to field devices on PROFIBUS DP)	Yes
S7 protocol functions	
• PG functions	Yes
• OP functions	Yes
2nd interface (X2 on DP master module)	
Type of interface	Integrated RS 485 interface on DP master module
Physics	RS 485
Isolated	Yes
Interface power supply (15 V DC to 30 V)	No
Connection	9-pin sub D socket
Functionality	
• MPI	No
• PROFIBUS DP	Yes (DP master only)
• Point-to-point communication	No
• PROFINET	No
DP master	
Services	
• PG/OP communication	Yes
• S7 routing	Yes
• Data set routing	Yes
• Global data communication	No
• S7 communication	Yes (server only, configured one-way connection)
• Support for constant bus cycle time	Yes
• Isochronous mode	No
• Enable/disable DP slaves	Yes
• SYNC/FREEZE	Yes
• Direct data exchange	Yes
• DPV1	Yes

Technical specifications	
Transmission speed	Up to 12 Mbaud
Number of DP slaves, max.	32
Address area	
• Inputs, max.	2048 bytes
• Outputs, max.	2048 bytes
User data per DP slave	
• Inputs, max.	244 bytes
• Outputs, max.	244 bytes
Programming	
Programming language	*STEP 7* (LAD, FBD, STL)
Instruction set	See *S7-300 Instruction List*
Nesting levels	8
System functions (SFC)	See *S7-300 Instruction List*
System function blocks (SFB)	See *S7-300 Instruction List*
User program protection	Yes
Dimensions	
Mounting dimensions W x H x D (mm)	120 x 119.5 x 75
Weight	approx. 320 g
Voltages, currents, electrical potentials	
Rated supply voltage for the electronic components 1L+	24 VDC
• Permissible range	20.4 V to 28.8 V
• Reverse polarity protection	Yes; against destruction
• Short-circuit protection	Yes
• Power failure buffering	5 ms
Current consumption from rated supply voltage 1L+	
• IM 151-8 PN/DP CPU	Typically 320 mA with 24 V; 380 mA with 20 V
• IM151-8 PN/DP CPU + DP master module	Typically 385 mA with 24 V; 460 mA with 20 V
• Power supply for the ET 200S backplane bus	Max. 700 mA
Inrush current	Typically 1.8 A
I^2t	Typically 0.21 A^2s
External fusing of power supply lines (recommended)	
• Electronic / encoder supply 1L+	24 VDC / 16 A circuit-breaker with type B or C tripping characteristic **Note:** A 24 VDC/16A circuit-breaker with type B tripping characteristic trips before the equipment fuse is tripped. A 24 VDC/16A circuit-breaker with type C tripping characteristic trips after the equipment fuse is tripped.
Power loss	Typically 5.5 W

Technical specifications	
Insulation tested with	500 VDC
Galvanic isolation	
• between the backplane bus and supply voltages 1L+	No
• between PROFIBUS / PROFINET and power supplies 1L+	Yes
• between the electronics and supply voltage 1L+	No
Maximum potential difference	75 VDC, 60 VAC
Status, interrupts, diagnostics	
Interrupts	Yes
Diagnostics function	Yes
Group errors	Red "SF" LED
Bus monitoring PROFINET	Red "BF-PN" LED
Maintenance information	Yellow "MT" LED
Monitoring of the supply voltage for the electronic components 1L+	Green LED "ON"
Existing connection to PROFINET	Green LED "P1 - LINK", "P2 - LINK" and "P3 - LINK"

11.3 DP master module

11.3.1 Technical specifications - DP master module

Table 11-2 Technical specifications of the DP master module

Technical specifications	
Removal	
DP master module	
• Position	At the right alongside IM 151-8 PN/DP CPU
• Number for each IM 151-8 PN/DP CPU	1
Dimensions	
Mounting dimensions W x H x D (mm)	35 x 119.5 x 75
Weight	approx. 100 g
Status, interrupts, diagnostics	
PROFIBUS DP bus monitoring	Red "BF" LED

Appendix

A

A.1 Order numbers

A.1.1 Module order numbers

IM 151-8 PN/DP CPU interface module

Table A-1 IM 151-8 PN/DP CPU order numbers

Designation	Order number
IM 151-8 PN/DP CPU interface module with terminating module, 1 unit *	6ES7151-8AB00-0AB0
* The SIMATIC Micro Memory Card is not supplied as standard.	

DP master module

Table A-2 DP master module order numbers

Designation	Order number
DP master module, 1 unit	6ES7138-4HA00-0AB0

A.1.2 Order numbers of accessories

IM 151-8 PN/DP CPU interface module accessories

Table A-3 IM 151-8 PN/DP CPU accessories order numbers

Designation	Order number	Suitable for a FW update via SIMATIC Micro Memory Card
SIMATIC Micro Memory Card 64k	6ES7953-8LF20-0AA0	–
SIMATIC Micro Memory Card 128k	6ES7953-8LG20-0AA0	–
SIMATIC Micro Memory Card 512k	6ES7953-8LJ20-0AA0	–
SIMATIC Micro Memory Card 2M	6ES7953-8LL20-0AA0	–
SIMATIC Micro Memory Card 4M	6ES7953-8LM20-0AA0	X
SIMATIC Micro Memory Card 8M	6ES7953-8LP20-0AA0	X
Label sheets DIN A4, 10 units		
• beige	6ES7193-4BA00-0AA0	
• Yellow	6ES7193-4BB00-0AA0	
• red	6ES7193-4BD00-0AA0	
• petrol	6ES7193-4BH00-0AA0	

Connectors and cables

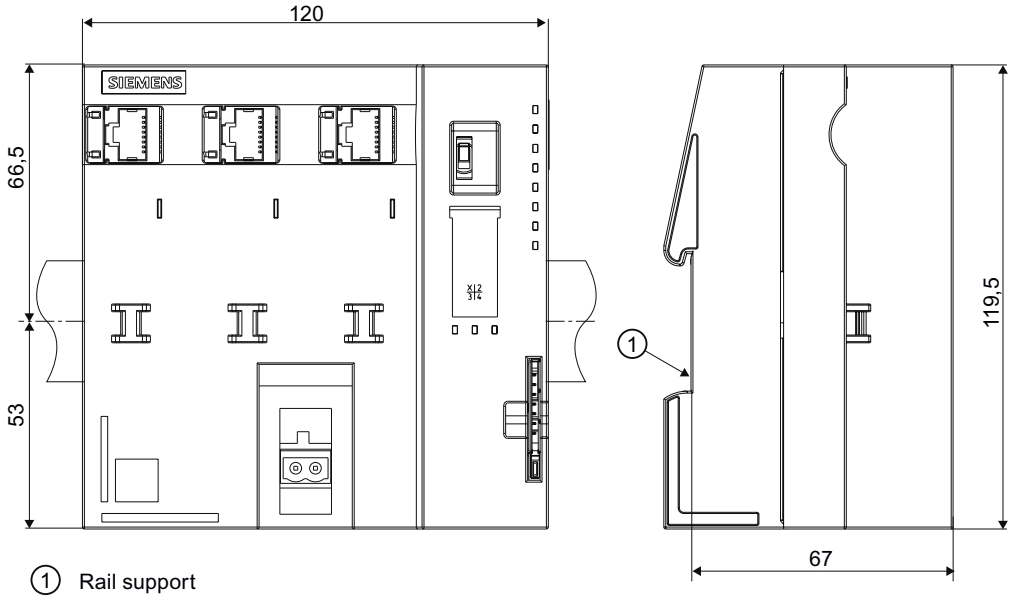
Table A-4 Connectors and cables order numbers

Designation	Order number
PROFINET	
PROFINET RJ45 connector with FastConnect connection system, 90° cable outlet	
• 1 per pack, 1 pack	6GK1901-1BB20-2AA0
• 10 per pack, 1 pack	6GK1901-1BB20-2AB0
PROFINET FC cable Sold by meter, min. ordering quantity 20 m Delivery unit max. 1000 m, 1 m	
• FC TP standard cable	6XV1840-2AH10
• FC TP trailing cable (for cable carriers)	6XV1840-3AH10
• FC TP marine cable	6XV1840-4AH10
PROFINET FastConnect stripping tool	6GK1901-1GA00
PROFIBUS	
PROFINET bus connector (12 Mbit/s) with FastConnect connection system, 90° cable outlet	
• without PD connection socket	6ES7972-0BA50-0XA0
• with PD connection socket	6ES7972-0BB50-0XA0
PROFIBUS FC cable Sold by meter, min. ordering quantity 20 m Delivery unit max. 1000 m, 1 m	
• FC Standard Cable	6XV1830-0EH10
• FC Trailing Cable (for cable carriers)	6XV1830-3EH10
• FC Food Cable (PE sheath)	6XV1830-0GH10
• FC Food Cable (PUR sheath)	6XV1830-0JH10
PROFIBUS FastConnect stripping tool	6GK1905-6AA00

A.2 Dimension drawings

A.2.1 IM 151-8 PN/DP CPU interface module

IM 151-8 PN/DP CPU interface module

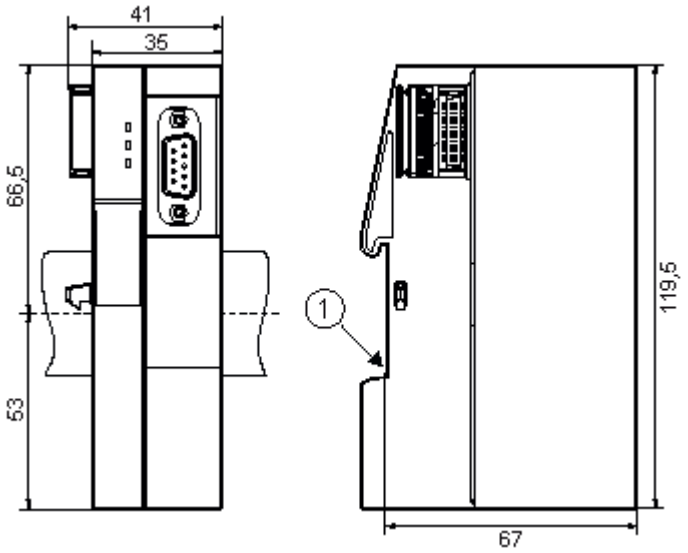


① Rail support

Figure A-1 IM 151-8 PN/DP CPU interface module dimensional diagram

A.2.2 DP master module

DP master module



① Rail support

Figure A-2 DP master module dimensional diagram

A.3 Cycle and response times

A.3.1 Overview

Overview

This section contains detailed information about the following topics:

- Cycle time
- Response time
- Interrupt response time

Reference: Cycle time

You can view the cycle time of your user program on the programming device. For additional information, refer to the *STEP 7 Online Help* or to the *Configuring Hardware and Connections in STEP 7* manual.

Reference: Execution time

Execution times can be found in the *S7-300 Instruction List*. The instruction list contains the execution times in table form for all

- *STEP 7* instructions that can be processed by the IM 151-8 PN/DP CPU interface module ,
- SFCs / SFBs integrated in the IM 151-8 PN/DP CPU interface module,
- The IEC functions that can be called in *STEP 7*.

A.3.2 Cycle time

A.3.2.1 Overview: Cycle time

Introduction

This section explains what we mean by the term "cycle time", what it consists of, and how you can calculate it.

Meaning of the term cycle time

The cycle time represents the time that an operating system needs for one program pass, i.e. one OB 1 cycle, including all program sections and system activities interrupting this cycle. This time is monitored.

Time slice model

Cyclic program processing, and therefore user program execution, is based on time shares. To clarify these processes, let us assume that every time share has a length of precisely 1 ms.

Process image

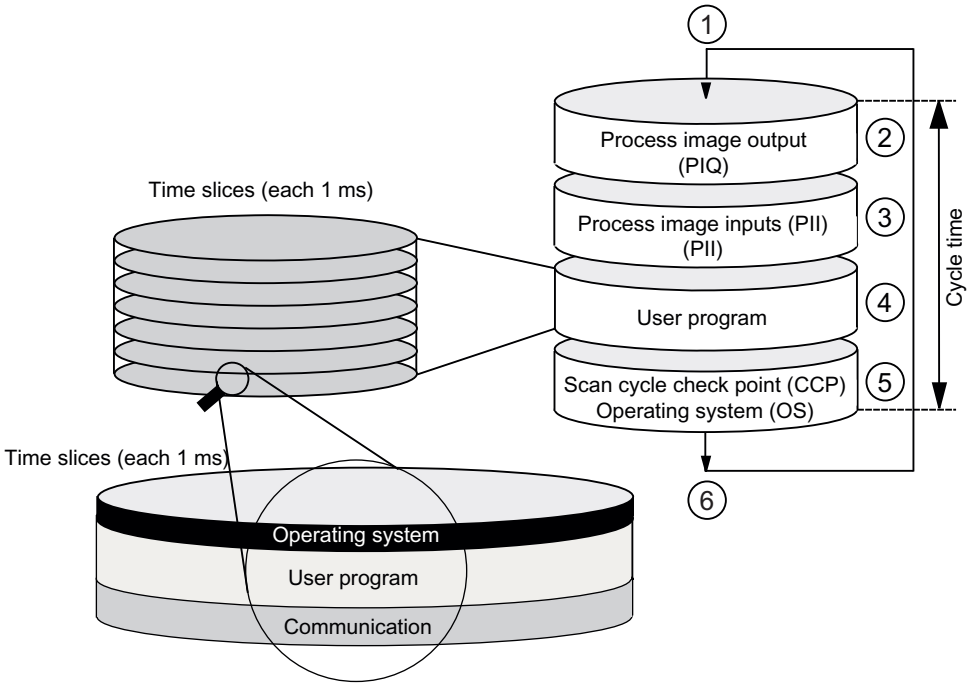
During cyclic program processing, the IM 151-8 PN/DP CPU interface module requires a consistent image of the process signal. To ensure this, the process signals are read / written prior to program execution. The IM 151-8 PN/DP CPU interface module then does not address input (I) and output (Q) operand areas directly at the I/O modules, but rather accesses the system memory area containing the I/O process image.

Sequence of cyclic program processing

The table and figure below show the phases in cyclic program processing.

Table A-5 Cyclic program processing

Step	Sequence
1	The operating system initiates cycle time monitoring.
2	The IM 151-8 PN/DP CPU interface module writes the values from the process output image to the output modules.
3	The IM 151-8 PN/DP CPU interface module reads the status at the inputs of the input modules and then updates the process input image.
4	The IM 151-8 PN/DP CPU interface module processes the user program in time slices and executes the operations specified in the program.
5	At the end of a cycle, the operating system executes queued tasks, for example, loading and deleting blocks.
6	The IM 151-8 PN/DP CPU interface module then returns to the start of the cycle, and restarts cycle time monitoring.



PIQ: Process image of outputs
PIQ: Process image of inputs
CCP: Cycle control point
OS: Operating system

In contrast to S7-400 CPUs, the IM 151-8 PN/DP CPU interface module only accesses data with an OP / TP (monitor and modify functions) at the cycle control point (for data consistency, see *Technical specifications*). Processing of the user program is not interrupted by the monitor and modify functions.

Extending the cycle time

Always make allowances for the extension of the cycle time of a user program due to:

- Time-based interrupt processing
- Process interrupt processing
- Diagnostics and error processing
- Communication with programming devices (PGs), operator panels (OPs) and via connected CPs (e.g. Ethernet or PROFIBUS DP)
- Testing and commissioning such as, e.g. status/controlling of variables or block status functions.
- Transfer and deletion of blocks, compressing user program memory
- Write/read access to the SIMATIC Micro Memory Card using SFC 82 to 84 in the user program
- S7 communication via the PROFINET interface.
- PROFINET CBA communication via the PROFINET interface (system load, SFC call, updating at the cycle control point)
- PROFINET IO communication via PROFINET interface (system load)

A.3.2.2 Calculating the cycle time

Introduction

The cycle time is derived from the sum of the following influencing factors.

Process image update

The table below shows the times that an IM 151-8 PN/DP CPU interface module needs to update the process image (process image transfer time). The specified times may be extended as a result of interrupts or IM 151-8 PN/DP CPU interface module communication. The process image transfer time is calculated as follows:

Table A-6 Formula for calculating the process image (PI) transfer time

The transfer time of the process image is calculated as follows:	
Base load K	+ Number of bytes in the PI for ET 200S I/Os (A)
	+ Number of words in the PI via PROFINET (P)
	+ Number of words in the PI via PROFIBUS DP (D)
	= Transfer time for the process image

Table A-7 Data for calculating the process image (PI) transfer time

Constant	Components	IM 151-8 PN/DP CPU
C	Base load	100 µs
A	per byte in the PO for centralized ET 200S I/Os	78 µs
P (PROFINET only)	per WORD in the PROFINET area for the integrated PROFINET interface	7 µs
D (PROFIBUS DP only)	per word in the DP area for the DP interface integrated in the DP master	5 µs

Extending the user program processing time

In addition to actually working through the user program, your IM 151-8 PN/DP CPU interface module´s operating system also runs a number of processes in parallel, such as timer management for the core operating system. These processes extend the processing time of the user program. The table below lists the multiplication factors required to calculate your user program processing time.

Table A-8 Extending the user program processing time

Interface module	Factor
IM 151-8 PN/DP CPU	1,10

Operating system processing time at the scan cycle check point

The table below shows the operating system processing time at the cycle control point of the IM 151-8 PN/DP CPU interface module. This time applies without:

- Testing and commissioning routines, e.g. status/controlling of variables or block status functions
- Transfer and deletion of blocks, compressing user program memory
- Communication
- Writing, reading of the SIMATIC Micro Memory Card with SFC 82 to 84

Table A-9 Operating system processing time at the scan cycle check point

Interface module	Cycle control at the scan cycle check point (CCP)
IM 151-8 PN/DP CPU	500 µs

Extension of the cycle time as a result of nested interrupts

Enabled interrupts also extend cycle time. Details are found in the table below.

Table A-10 Extended cycle time due to nested interrupts

Interrupt type	Process interrupt	Diagnostic interrupt	Time-of-day interrupt	Delay interrupt	Cyclic interrupt
IM 151-8 PN/DP CPU	500 µs	600 µs	400 µs	300 µs	150 µs

The program runtime at interrupt level must be added to this time extension.

Extension of the cycle time due to error

Table A-11 Cycle time extension as a result of errors

Type of error	Programming errors	I/O access errors
IM 151-8 PN/DP CPU	400 µs	400 µs

The interrupt OB processing time must be added to this extended time. The times required for multiple nested interrupt/error OBs are added accordingly.

A.3.3 Response time

A.3.3.1 Overview: Response time

Definition of response time

The response time is the time between the detection of an input signal and the change of a linked output signal.

Fluctuation width

The physical response time lies between the shortest and the longest response time. You must always reckon with the longest response time when configuring your system.

The shortest and longest response times are shown below, to give you an idea of the fluctuation width of the response time.

Factors

The response time depends on the cycle time and following factors:

- Delay in the I/O module inputs and outputs
- Additional send cycles for PROFINET IO
- Additional DP cycle times on PROFIBUS DP
- Execution in the user program

Reference

The delay times are described in the technical data for the I/O modules *ET 200S Distributed I/O Device* Operating Instructions.

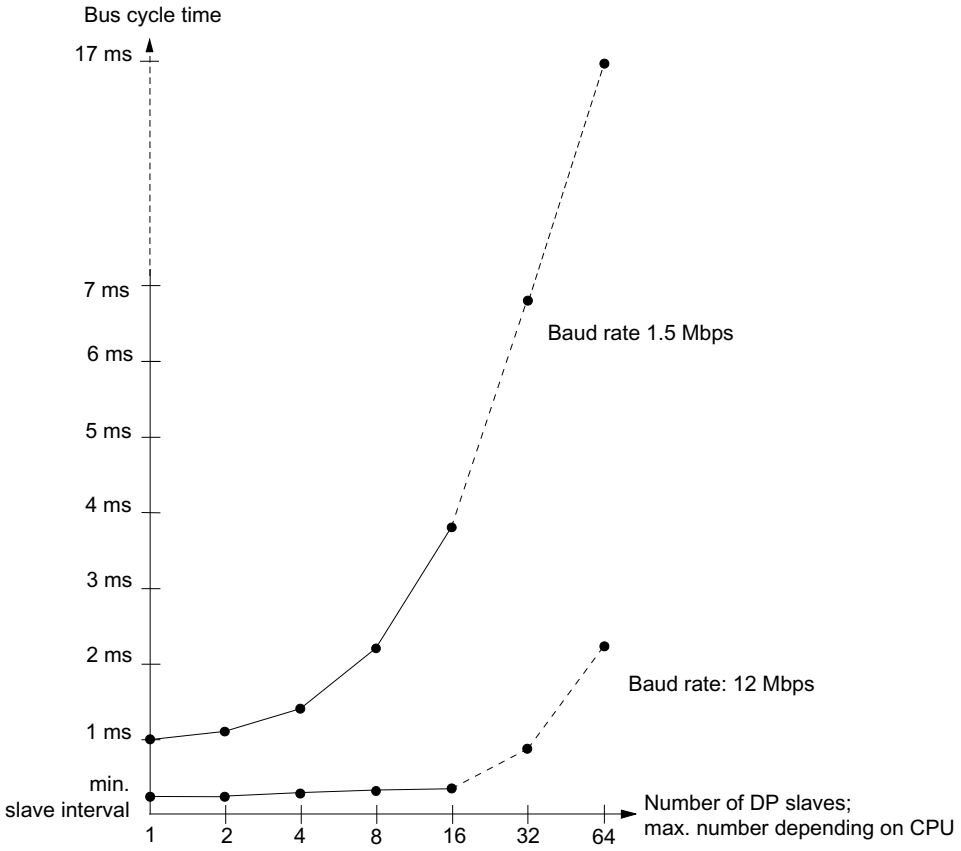
Update Time for PROFINET IO

If you configured your PROFINET IO system in *STEP 7*, *STEP 7* calculates the send cycle for PROFINET IO. You can then view the PROFINET IO send cycles on your PG.

DP cycle times in the PROFIBUS DP network

If you configured your PROFIBUS DP master system with *STEP 7*, then *STEP 7* will calculate the typical DP cycle time that must be expected. You can then view the DP cycle time of your configuration on the programming device.

The figure below gives you an overview of the DP cycle time. In this example, let us assume that the data of each DP slave has an average length of 4 bytes.

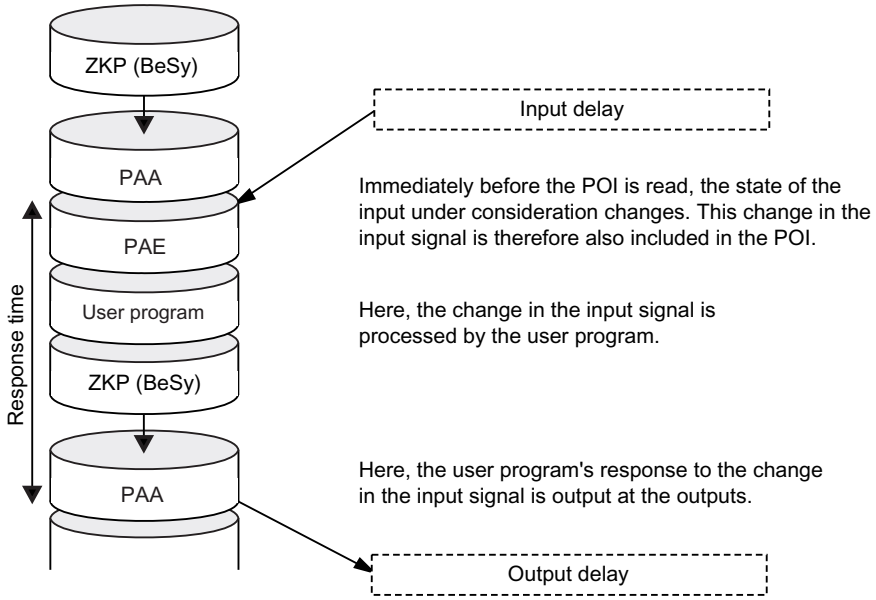


With multi-master operation on a PROFIBUS-DP network, you must make allowances for the DP cycle time at each master. That is, you will have to calculate the times for each master separately and then add up the results.

A.3.3.2 Shortest response time

Conditions for the shortest response time

The figure below shows the conditions under which the shortest response time is reached.



Calculation

The (shortest) response time is the sum of:

Table A-12 Formula: Shortest response time

	1 x process image transfer time for the inputs
+	1 x process image transfer time for the outputs
+	1 x program processing time
+	1 × operating system processing time at the SCC
+	Delay in the inputs and outputs
=	**Shortest response time**

The result is equivalent to the sum of the cycle time plus the I/O delay times.

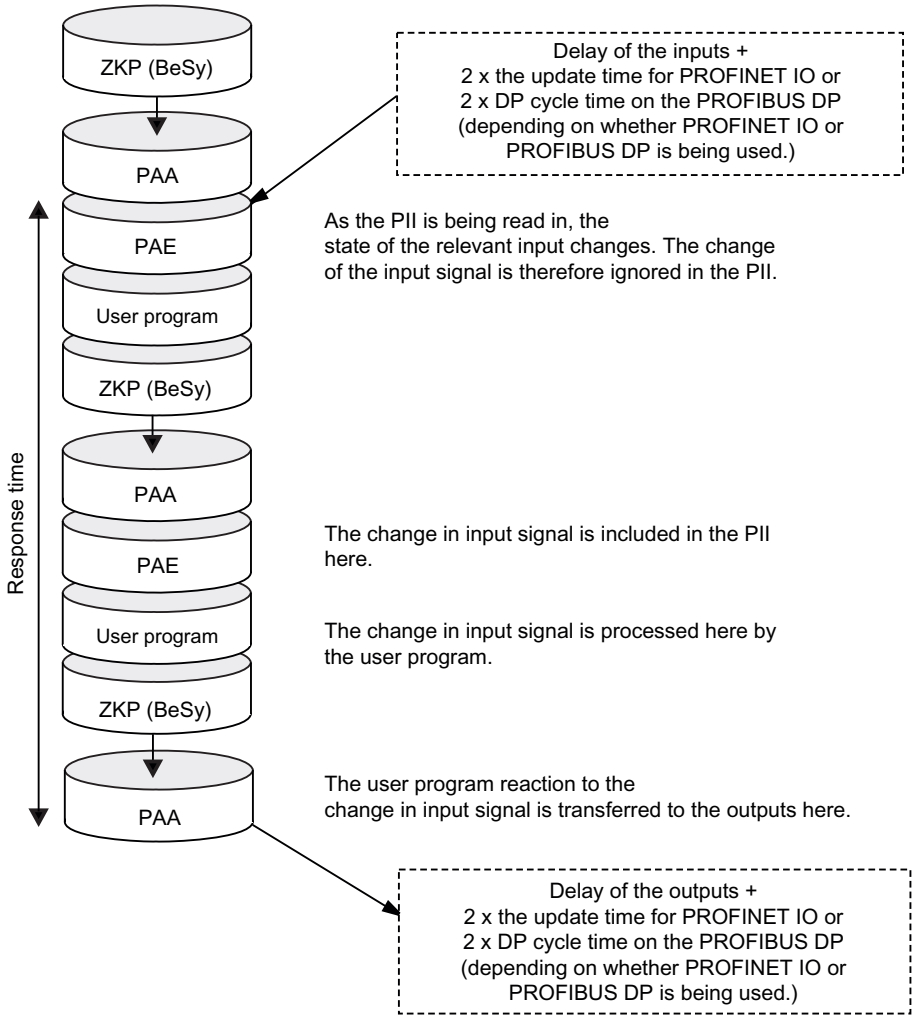
See also

Overview: Response time (Page 195)

A.3.3.3 Longest response time

Conditions for the longest response time

The figure below shows the conditions under which the longest response time is reached.



Calculation

The (longest) response time is the sum of:

Table A-13 Formula: Longest response time

	2 x process image transfer time for the inputs
+	2 x process image transfer time for the outputs
+	2 x program processing time
+	2 × operating system processing time
+	4 x PROFINET IO update time (only if PROFINET IO is used)
+	4 x DP cycle time on PROFIBUS DP (only if PROFIBUS DP is used)
+	Delay in the inputs and outputs
=	**Longest response time**

Equivalent to the sum of 2 x the cycle time + I/O delay time + 4 x the PROFINET IO scan cycle or 4 x the DP cycle time on PROFIBUS DP.

See also

Overview: Response time (Page 195)

A.3.4 Interrupt response time

A.3.4.1 Overview: Interrupt response time

Definition of interrupt response time

The interrupt response time is the time that elapses between the first occurrence of an interrupt signal and the call of the first interrupt OB instruction. Generally valid: Higher-priority interrupts take priority. This means that the interrupt response time is increased by the program processing time of the higher-priority interrupt OBs and the interrupt OBs of equal priority which have not yet been executed (queued).

Process interrupt and diagnostic interrupt response times of the IM 151-8 PN/DP CPU interface module

Table A-14 Process interrupt and diagnostic interrupt response times of the IM 151-8 PN/DP CPU interface module

Interrupt response times (without communication) for ...	Duration
Process alarm / diagnostic alarm	less than 10 ms

Process interrupt processing

Process interrupt processing begins after process interrupt OB 40 is called. Higher-priority interrupts stop process interrupt processing. Direct I/O access is executed during runtime of the instruction. After process interrupt processing has terminated, cyclic program execution continues or further interrupt OBs of equal or lower priority are called and processed.

See also

Overview (Page 189)

A.4 Additional documentation

The following documentation contains detailed information on specific topics. The appropriate areas of these operating instructions refer to this documentation.

You´ll find the documents in the Internet under the address:
http://support.automation.siemens.com/WW/view/de/ and the corresponding entry ID

Name of manual	Description
Operating Instructions ET 200S Distributed I/O System **Entry ID:** 1144348	Application planning; assembling; wiring and assembly; commissioning; functions; alarm, error, and system messages; interface modules, COMPACT modules
Manual ET 200S Distributed I/O System **Entry ID:** 22167495	Description of functions and technical specifications of the terminal modules, power modules, and digital and analog electronic modules
System Manual PROFINET system description **Entry ID:** 19292127	PROFINET overview, setups, data exchange and communication, engineering, user examples
Programming Manual From PROFIBUS DP to PROFINET IO **Entry ID:** 19289930	PROFINET IO and PROFIBUS DP, blocks, system status lists, data records for PROFINET IO, diagnostics
S7-300 Instruction List CPU 31xC, CPU 31x, IM 151-7 CPU, etc. **Entry ID:** 13206730	List of the operation set of the CPUs and their execution times. List of executable blocks
Reference Manual System Software for S7-300/400 System and Standard Functions **Entry ID:** 1214574	This manual, consisting of Volume 1 and Volume 2, provides a complete overview of the OBs, SFCs, SFBs, IEC functions, diagnostics data, system status list (SSL) as well as the events contained in the operating systems of the CPUs of the S7-300 and S7-400. This manual is part of the *STEP 7* reference information. You can also find the description in the *Online Help for STEP 7*.

Name of manual	Description
Manual Programming with STEP 7 **Entry ID:** 18652056	This manual provides a complete overview of programming with *STEP 7*. This manual is part of the *STEP 7* basic information. You can also find the description in the *Online Help for STEP 7*.
Manual Configuring Hardware and Communication Connections with STEP 7 **Entry ID:** 18652631	basics, configuration, saving, importing, exporting, networking, configuring connections, downloading
S7-300 Operating Instructions CPU 31xC and CPU 31x, Technical specifications **Entry ID:** 12996906	communication, memory concept, general technical specifications, technical specifications
Manual SIMATIC NET: Twisted Pair and Fiber-Optic Networks **Entry ID:** 8763736	Description of Industrial Ethernet networks, network configuration, components, installation guidelines for networked automation systems in buildings, etc.
Tutorial Component Based Automation, Commissioning Systems **Entry ID:** 18403908	Creating PROFINET components, commissioning systems
Manual Communication with SIMATIC **Entry ID:** 1254686	Fundamentals, services, networks, communication functions, connection of PG/OP, configuring in *STEP 7*
Manual The Process Device Manager **Entry ID:** 21407212	Starting *SIMATIC PDM*, configuring networks and devices, working with *SIMATIC PDM*, communication, diagnostics
Manual Diagnostic repeater for PROFIBUS DP **Entry ID:** 7915183	product overview, functions, configuration possibilities, installation, wiring, commissioning, diagnostics

Glossary

Accumulator

Accumulators represent CPU register and are used as buffer memory for download, transfer, comparison, calculation and conversion operations.

Address

An address is the identifier of a specific operand or operand area.
Examples: Input I 12.1; Memory Word MW 25; Data Block DB 3.

Analog modules

Analog modules convert analog process values (for example, temperature) into digital values that can be processed by the IM 151-8 PN/DP CPU interface module or convert digital values into analog manipulated variables.

Application

→ *User program*

Application

An application is a program that runs directly on the MS-DOS / Windows operating system. Applications on the programming device include, for example, the *STEP 7* basic package, S7-GRAPH and others.

ASIC

ASIC is the acronym for Application Specific Integrated Circuits.

PROFINET ASICs are components with a wide range of functions for the development of your own devices. They implement the requirements of the PROFINET standard in a circuit and allow extremely high packing densities and performance.

Because PROFINET is an open standard, SIMATIC NET offers PROFINET ASICs for the development of your old devices under the name ERTEC .

Automation system

An automation system is a programmable logic controller in the context of SIMATIC S7.

Autonegotiation

Configuration protocol in the Fast Ethernet. Before the actual data transfer the devices on the network agree a transfer mode that each participating device can master (100 Mbps or 10 Mbps, full-duplex or half-duplex)

Backplane bus

Serial data bus used by the interface module to communicate with electronic modules and to supply power to these. The individual modules are interconnected by means of terminal modules.

Backup memory

Backup memory ensures buffering of the memory areas of a CPU without backup battery. It backs up a configurable number of timers, counters, bit memory, data bytes and retentive timers, counters, bit memory and data bytes).

Baud rate

Data transfer rate (in bps)

Bit memory

Bit memory are part of the CPU's system memory. They store intermediate results of calculations. They can be accessed in bit, word or dword operations.

Bus

A bus is a communication medium connecting several nodes. Data can be transferred via serial or parallel circuits, that is, via electrical or fiber optic conductors .

Bus connector

Physical connection between the bus node and the bus cable.

Bus node

This is a device that can send, receive or amplify data via the bus. It can be a DP master, DP slave, RS 485 repeater, active star coupler etc.

Bus segment

A bus segment is a self-contained section of a serial bus system. Bus segments are linked to one another using repeaters in PROFIBUS DP, for example.

Changing IO devices during operation (changing partner ports)

Functionality of a PROFINET device.
A PROFINET device that supports this function can communicate during operation with changing communication partners at the same port.

Chassis ground

Chassis ground includes all the interconnected inactive parts of equipment that must not carry a hazardous voltage even in the event of a fault.

Clock memory

Memory bit which can be used to generate clock pulses in the user program (1 memory byte).

Note

Make sure that the clock memory byte is not overwritten in the user program.

Code block

A SIMATIC S7 logic block contains elements of the *STEP 7* user program. (in contrast to a DB: this contains only data.)

Component-based automation

→ *PROFINET CBA*

Compression

The programming device online function "Compress" is used to rearrange all valid blocks in CPU RAM in one continuous area of user memory, starting at the lowest address. This eliminates fragmentation which occurs when blocks are deleted or edited.

Configuration

Assignment of modules to slots and (for example with electronic modules) addresses.

Consistent data

Data which are related in their contents and not to be separated are referred to as consistent data.

For example, the values of analog modules must always be handled as a whole, that is, the value of an analog module must not be corrupted as a result of read access at two different points of time.

Counters

Counters are part of CPU system memory. The content of "Counter cells" can be modified by *STEP 7* instructions (for example, up/down count.)

CPU

Central processing unit = CPU of the S7 automation system with a control and arithmetic unit, memory, operating system, and interface for programming device.

Cycle time

The cycle time represents the time a CPU requires for one execution of the user program.

Cyclic interrupt

→ *Interrupt, cyclic interrupt*

Data block

Data blocks (DB) are data areas in the user program which contain user data. There are shared data blocks which can be accessed by all code blocks, and instance data blocks which are assigned to a specific FB call.

Data exchange broadcast

→ *Direct data exchange*

Data exchange traffic

→ *Direct data exchange*

Data set routing

Functionality of a module with several network connections.
Modules that support this function are able to pass on data of an engineering system (for example parameter data generated by SIMATIC PDM) from a subnetwork such as Ethernet to a field device at the PROFIBUS DP.

Data, static

Static data can only be used within a function block. These data are saved in an instance data block that belongs to a function block. Data stored in an instance data block are retained until the next function block call.

Data, temporary

Temporary data is the local data of a block. It is stored in the L-stack when the block is executed. After the block has been processed, this data is no longer available.

Default router

The default router is the router that is used when data must be forwarded to a partner located within the same subnet.

In *STEP 7*, the default router is called **Router**. *STEP 7* assigns a local IP address to the default router by default.

Determinism

→ *Real Time*

Device

Within the context of PROFINET, "device" is the generic term for:

- Automation systems
- Field devices (PLC, PC, for example)
- Active network components (for example, distributed I/O, valve terminals, drives)
- Hydraulic devices
- Pneumatic devices

The main characteristic of a device is its integration in PROFINET communication over Ethernet or PROFIBUS.

The following device types are distinguished based on their attachment to the bus:

- PROFINET devices
- PROFIBUS devices

Device

→ *PROFIBUS device*

Device

→ *PROFINET device*

Device name

Because a fixed IP address is assigned to the device name, an IO device must have a device name in order to be addressed by an IO controller. With PROFINET, this procedure is used because names are easier to handle than complex IP addresses.

The assignment of a device name for a specific IO device can be compared with the setting of the PROFIBUS address for a DP slave.

In the state of delivery a IO device has no device name. The IO device can only be addressed by a IO controller after the device has been assigned a device name, for the transfer of configuration data (IP address and other data) in the startup phase or for the exchange of user data in cyclic operation, for example.

Alternatively the device name can be written directly to the SIMATIC Micro Memory Card (e.g. for the ET 200S IO device) in the programming device.

Device replacement without removable media / PD

IO devices having this function can be replaced simply:

- A removable medium (such as Micro Memory Card) with stored device name is not required.
- The device name does not have to be assigned with the PD.
- If a replacement is necessary, an IO device already in operation has to be reset to the factory settings by using "Reset to factory setting".

The replaced IO device obtains the device name from the IO controller, not from the removable medium or from the programming device. For this purpose, the IO controller uses the configured topology and the neighbor relationships determined by the IO devices. The configured setpoint topology must agree with the actual topology.

Diagnostic interrupt

Modules capable of diagnostics operations report detected system errors to the CPU by means of diagnostic interrupts.

Diagnostics

→ *System diagnostics*

Diagnostics buffer

The diagnostics buffer represents a buffered memory area in the CPU. It stores diagnostic events in the order of their occurrence.

Direct data exchange

Direct data exchange is a special communication relationship between PROFIBUS DP nodes. The direct data exchange is characterized by PROFIBUS DP nodes which "listen" on the bus and know which data a DP slave returns to its DP master.

Distributed I/O systems

I/O systems that are not integrated into the central controller, but rather at distributed locations a long distance from the CPU, such as:

- ET 200M, ET 200L, ET 200S, ET 200pro
- DP/AS-I Link
- S5-95U with PROFIBUS DP slave interface
- Further DP slaves supplied by Siemens or other vendors.

The distributed I/O systems are connected to the DP master via PROFIBUS DP.

DP master

→ *Master*

DP master

A master that complies with the IEC 61784-1:2002 Ed1 CP 3/1 standard is known as a DP master.

DP slave

→ *Slave*

DP slave

A slave running on the PROFIBUS using the PROFIBUS DP protocol in compliance with IEC 61784-1:2002 Ed1 CP 3/1 is known as a DP slave.

DP Standard

Bus protocol of the ET 200 distributed I/O system to IEC 61784-1:2002 Ed1 CP 3/1.

DPV1

The designation DPV1 means extension of the functionality of the acyclical services (to include new interrupts, for example) provided by the DP protocol. The DPV1 functionality is an integral part of the IEC 61784-1:2002 Ed1 CP 3/1 standard.

Electrically isolated

Electrically isolated I/O modules are isolated from the reference potentials of the control and load circuits by means of an optocoupler, relay contact or transformer circuit, for example. I/O circuits may be connected to the same potential.

Electronic modules

Electronic modules form the interface between the process and the automation system. There are

- digital input and output modules
- analog input and output modules
- Technology modules

Equipotential bonding

Electrical connection (equipotential bonding conductor) that keeps electrical equipment and extraneous conductive objects to the same or almost the same potential in order to prevent disturbing or dangerous voltages between those objects.

Error display

One of the possible reactions of the operating system to a runtime error is to output an error message. Further reactions: Error reaction in the user program, CPU in STOP.

Error handling via OB

After the operating system has detected a specific error (e.g. an access error with *STEP 7*), it calls a dedicated organization block (error OB) in which the subsequent behavior of the CPU can be defined.

Error response

Reaction to a runtime error. Reactions of the operating system: It sets the automation system to STOP, indicates the error, or calls an OB in which the user can program a reaction.

ERTEC

→ *ASIC*

ET 200

The ET 200 distributed I/O system with PROFIBUS DP or PROFINET IO allows the connection of distributed I/Os to a CPU via a DP master or IO controller. ET 200 is characterized by high-speed reaction times, because of a minimum data transfer volume (bytes.)

The ET 200 is based on IEC 61784-1:2002 Ed1 CP 3/1.d standard.

The ET 200 works on the master / slave principle or controller / device principle.
The DP masters are, for example, the IM 308-C master connection or the IM 151-8 PN/DP CPU interface module with DP master module. An IO controller could be, for example, the IM 151-8 PN/DP CPU interface module.

DP slaves / IO devices could be the distributed I/Os ET 200M, ET 200L, ET 200S, ET 200pro or DP slaves / IO devices from Siemens or other vendors.

External lightning protection

External plant components at which galvanic coupling of lightning surges is excluded. Corresponds with lightning protection zone 0_A and 0_B.

Fast Ethernet

Fast Ethernet describes the standard for transferring data with 100 Mbits. Fast Ethernet uses the 100 Base-T standard.

FB

→ *Function block*

FC

→ *Function*

Flash EPROM

FEPROMs can retain data in the event of power loss, same as electrically erasable EEPROMs. However, they can be erased within a considerably shorter time (FEPROM = Flash Erasable Programmable Read Only Memory). They are used on SIMATIC Micro memory cards.

FORCE

The Force function can be used to assign the variables of a user program or CPU (also: inputs and outputs) constant values.

Note in this connection also the restrictions in section *Overview: Debugging functions* in section *Debugging functions, diagnostics and troubleshooting*.

FREEZE

Control command a DP master may broadcast to a group of DP slaves.

When it receives a FREEZE command, the slave freezes its current input status and outputs its data cyclically to the DP master.

The DP slave freezes its input status again after each new FREEZE command.

The DP slave does not resume the transfer input data to the DP master until the DP master has sent the UNFREEZE control command.

Function

According to IEC 1131-3, a function (FC) is a code block without static data. A function allows transfer of parameters in user program. Functions are therefore suitable for programming frequently occurring complex functions, e.g. calculations.

Function block

According to IEC 1131-3, a function block (FB) is a code block with static data. An FB allows the user program to pass parameters. Function blocks are therefore suitable for programming complex functions, e.g., closed-loop controls, mode selections, which are repeated frequently.

Functional ground

Grounding which has the sole purpose of safeguarding the intended function of electrical equipment. With functional grounding you short-circuit interference voltage which would otherwise have an unacceptable impact on equipment.

Ground

The conductive earth whose electrical potential can be set equal to zero at any point.

Ground potential may be different from zero in the area of grounding electrodes. The term reference ground is frequently used to describe this situation.

Ground-free

Having no direct electrical connection to ground

Grounding

Grounding means, to connect an electrically conductive component via an equipotential grounding system to a grounding electrode (one or more conductive components with highly conductive contact to earth).

GSD file

The properties of a PROFINET device are described in a GSD file (General Station Description) that contains all the information required for configuration.

As with PROFIBUS, you can link a PROFINET device in *STEP 7* by means of a GSD file.

In the case of the PROFINET IO the GSD file is in XML format. The structure of the GSD file is compliant with ISO 15734, which is the world-wide standard for device descriptions.

For PROFIBUS, the GSD file is in ASCII format (according to IEC 61784-1:2002 Ed1 CP 3/1).

Hot-swapping

The removal and insertion of modules during the operation of the ET 200S.

IM

Interface module: The interface module combines the ET 200S with the DP master or the IO controller and prepares the data for the electronic modules.
In an ET 200S with IM151-8 PN/DP CPU, the IM 151-8 PN/DP CPU interface module is itself the

- IO controller or
- DP master (together with the DP master module).

Industrial Ethernet

→ *Fast Ethernet*

Industrial Ethernet

Industrial Ethernet (formerly SINEC H1) is a technology that allows data to be transmitted free of interference in an industrial environment.

Standard Ethernet components can be used since the PROFINET is an open system. However, we recommend setting up PROFINET as Industrial Ethernet.

Industrial Wireless LAN

In addition to data communication, Industrial Wireless LAN from SIMATIC NET with the standard IEEE 802.11, offers a multitude of extensions (I-Features) that are of great benefit to industrial users. IWLAN is particularly suited for complex industrial applications with requirement for reliable radio communication, owing to:

- Automatic roaming if connection to Industrial Ethernet is interrupted (Rapid Roaming)
- Cost savings generated by using a single wireless network for secure operation of a process with both process-critical data (alarm message, for example) and non-critical communication (service and diagnostics, for example)
- Cost-effective connection to devices in remote, difficult-to-access environments

Instance data block

The *STEP 7* user program assigns an automatically-generated DB to every call of a function block. The instance data block stores the values of input, output and in/out parameters, as well as local block data.

Internal lightning protection

Shielding of buildings, rooms or devices Corresponds with lightning protection zone 1, 2 or 3.

Interrupt

The operating system of an S7 CPU can distinguish between different priority classes that control how the user program is executed. These priority classes include interrupts, e.g. process interrupts. When an interrupt is triggered, the operating system automatically calls an assigned OB. In this OB the user can program the desired response (e.g. in an FB).

Interrupt, cyclic interrupt

A cyclic interrupt is generated periodically by the CPU in a configurable time pattern. A corresponding OB will be processed.

Interrupt, delay

The delay interrupt belongs to one of the priority classes in SIMATIC S7 program processing. It is generated on expiration of a time started in the user program. A corresponding OB will be processed.

Interrupt, delay

→ *Interrupt, delay*

Interrupt, diagnostic

→ *Diagnostic interrupt*

Interrupt, process

→ *Process interrupt*

Interrupt, status

A status interrupt can be generated by a DPV1 slave or a PNIO device respectively. At the DPV1 master or the PNIO controller respectively the receipt of the interrupt causes the OB 55 to be called.

For detailed information on OB 55, refer to the Reference Manual *System Software for S7-300/400*.

Interrupt, time-of-day

The time-of-day interrupt is one of the priority classes in SIMATIC S7 program processing. It is generated at a specific date (or daily) and time-of-day (e.g. 9:50 or hourly, or every minute). A corresponding OB will be processed.

Interrupt, update

An update interrupt can be generated by a DPV1 slave or a PNIO device respectively. At the DPV1 master or the PNIO controller respectively the receipt of the interrupt causes the OB 56 to be called.

For detailed information on OB 56, refer to the Reference Manual *System Software for S7-300/400*.

Interrupt, vendor-specific

A manufacturer-specific interrupt can be generated by a DPV1 slave or a PNIO device respectively. At the DPV1 master or the PNIO controller respectively the receipt of the interrupt causes the OB 57 to be called.

For detailed information on OB 57, refer to the Reference Manual *System Software for S7-300/400*.

IO controller

→ *PROFINET IO Controller*

IO controller

→ *PROFINET IO Device*

IO controller

→ *PROFINET IO Supervisor*

IO controller

→ *PROFINET IO System*

IO device

→ *PROFINET IO Controller*

IO device

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→ *PROFINET IO Device*

IO supervisor

→ *PROFINET IO Supervisor*

IO supervisor

→ *PROFINET IO System*

IO system

→ *PROFINET IO System*

IP address

To allow a PROFINET device to be addressed as a node on Industrial Ethernet, this device also requires an IP address that is unique within the network. The IP address is made up of 4 decimal numbers with a range of values from 0 through 255. The decimal numbers are separated by periods.

The IP address is made up of:

- The address of the (subnet) network
- The address of the node (generally called the host or network node)

IRT

→ *Isochronous Real Time communication*

Isochronous Real Time communication

Synchronized transmission procedure for the cyclic exchange of IRT / IO data between PROFINET devices.
A reserved bandwidth within the send clock is available for the IRT / IO data. The reserved bandwidth ensures that the IRT IO data can be transmitted at reserved, synchronized intervals whilst remaining uninfluenced even by other greater network loads (e.g. TCP / IP communication or additional real time communication).

LAN

Local area network. Interconnects computers within an enterprise. The LAN therefore has a limited geographical span and is solely available to a company or institution.

Load memory

The load memory contains objects generated by the programming device. For the IM 151-8 PN/DP CPU interface module, it takes the form of a plug-in SIMATIC Micro Memory Card with various memory sizes. There must be a SIMATIC Micro Memory Card inserted in order to use the IM 151-8 PN/DP CPU interface module.

Load power supply

Power supply for the load voltage for the power modules

Local data

→ *Data, temporary*

MAC Address

Every PROFINET device is assigned a worldwide unique device identification before it leaves the factory. This 6-Byte long device identification is the MAC address.

The MAC address is divided into:

- 3-Byte manufacturer identification
- 3-Byte device identification (consecutive number)

The MAC address is normally printed on the front of the device.
Example: 08-00-06-6B-80-C0

Master

When a master is in possession of the token, it can send data to other nodes and request data from other nodes (= active node). The DP masters are, for example, the CPU 315-2 DP or the IM 151-8 PN/DP CPU interface module with DP master module.

Master

→ *Slave*

Micro Memory Card

→ *SIMATIC Micro Memory Card*

Module parameters

Module parameters are values which can be used to configure module behavior. There are two different types of parameter: static and dynamic.

NCM PC

→ *SIMATIC NCM PC*

Nesting depth

A block can be called from another by means of a block call. Nesting depth is referred to as the number of simultaneously called code blocks.

Network

A network is a larger communication system that allows data exchange between a large number of nodes.

All the subnets together form a network.

Network

A network consists of one or more interconnected subnets with any number of nodes. Several networks can exist alongside each other.

Non-isolated

The reference potentials of the control and load circuit of non-isolated I/O modules are electrically interconnected.

NTP

The Network Time Protocol (NTP) is a standard for synchronizing clocks in automation systems via Industrial Ethernet. NTP uses the UDP wireless network protocol.

OB

→ *Organization blocks*

OB priority

The CPU operating system distinguishes between different priority classes, for example, cyclic program execution or process interrupt-controlled program processing. Each priority class is assigned organization blocks (OBs) in which the S7 user can program a response. The OBs are assigned different default priority classes. These determine the order in which OBs are executed or interrupt each other when they appear simultaneously.

Operating state

SIMATIC S7 automation systems know the following operating states: STOP, STARTUP, RUN.

Operating system

The CPU OS organizes all functions and processes of the CPU which are not associated to a specific control task.

Operating system

→ *CPU*

Organization blocks

Organization blocks (OBs) form the interface between CPU operating system and the user program. The order in which the user program is executed is defined in the organization blocks.

Parameter

- Variable of a *STEP 7* code block
- Variable used to set the behavior of a module (one or more per module). All modules have a suitable basic factory setting which can be customized in *STEP 7*.
  There are static and dynamic parameters.

Parameter assignment

This means the passing of parameters from the DP master to the DP slave or from the IO controller to the IO device.

Parameters, dynamic

In contrast to static parameters, you can change dynamic module parameters in runtime by calling an SFC in the user program, e.g. limit values for an analog input module.

Parameters, static

In contrast to dynamic parameters, static parameters of modules cannot be changed by the user program. You can only modify these parameters by editing your configuration in *STEP 7*, for example, by modifying the input delay parameters of a digital input module.

PC station

→ *SIMATIC PC station*

PELV

Protective Extra Low Voltage = extra low voltage with safe isolation

PG

→ *Programming device*

PLC

→ *CPU*

PLC

Programmable controllers (PLCs) are electronic controllers whose function is saved as a program in the control unit. Therefore, the configuration and wiring of the unit does not depend on the PLC function. The programmable logic PLC has the structure of a computer; it consists of a CPU with memory, I/O modules and an internal bus system. The I/O and the programming language are oriented to control engineering needs.

PLC

→ *PLC*

PNO

→ *PROFIBUS International*

Prioritized startup

Prioritized startup designates the PROFINET functionality for accelerating the startup of IO devices in a PROFINET IO system with RT and IRT communication.

The function reduces the time that the correspondingly configured IO devices require in order to return to the cyclic user data exchange in the following cases:

- after the supply voltage has returned
- after a station has returned
- after IO devices have been activated

Priority class

The S7 CPU operating system provides up to 26 priority classes (or "Program execution levels"). Specific OBs are assigned to these classes. The priority classes determine which OBs interrupt other OBs. Multiple OBs of the same priority class do not interrupt each other. In this case, they are executed sequentially.

Process image

The process image is part of CPU system memory. At the start of cyclic program execution, the signal states at the input modules are written to the process image of the inputs. At the end of cyclic program execution, the signal status of the process image of the outputs is transferred to the output modules.

Process interrupt

A process interrupt is triggered by interrupt-triggering modules as a result of a specific event in the process. The process interrupt is reported to the CPU. The assigned organization block will be processed according to interrupt priority.

Process-Related Function

→ *PROFINET components*

Product version

The product version identifies differences between products which have the same order number. The product version is incremented when forward-compatible functions are enhanced, after production-related modifications (use of new parts/components) and for bug fixes.

PROFIBUS

→ *PROFIBUS International*

PROFIBUS

PROcess FIeld BUS, German process field bus standard specified in IEC 61784-1:2002 Ed1 CP 3/1. It specifies functional, electrical and mechanical properties for a bit-serial field bus system.
From the perspective of the user program, the distributed I/O is just as sophisticated as the centralized I/O.

PROFIBUS is available with the protocols DP (= Distributed Peripherals), FMS (= Fieldbus Message Specification), PA (= Process Automation), or TF (= Technological Functions.)

PROFIBUS address

A node must be assigned a unique PROFIBUS address in order to allow its identification on PROFIBUS.

The PC/Programming device is assigned PROFIBUS address "0."

The PROFIBUS addresses 1 to 125 may be used for the ET 200S distributed I/O system.

PROFIBUS device

→ *Device*

PROFIBUS device

A PROFIBUS device has at least one or more PROFIBUS ports.

A PROFIBUS device cannot take part directly in PROFINET communication but must be included over a PROFIBUS master with a PROFINET port or an Industrial Ethernet/PROFIBUS link (IE/PB Link) with proxy functionality.

PROFIBUS DP

→ *PROFIBUS International*

PROFIBUS DP

→ *PROFIBUS*

PROFIBUS International

Technical committee dedicated to the definition and development of the PROFIBUS and PROFINET standard.

Also known as the PROFIBUS User Organization membership corporation (PNO.)

Homepage: http://www.profibus.com

PROFINET

→ *PROFIBUS International*

PROFINET

Within the framework of Totally Integrated Automation (TIA), PROFINET represents a consequent enhancement of:

- PROFIBUS DP, the established field bus, and
- Industrial Ethernet, the communication bus for the cell level

Experience gained from both systems was and is being integrated into PROFINET.

PROFINET is an Ethernet-based automation standard of PROFIBUS International (previously PROFIBUS Users Organization e.V.), and defines a multi-vendor communication, automation, and engineering model. PROFINET has been part of the standard IEC 61158 since 2003.

PROFINET ASIC

→ *ASIC*

PROFINET CBA

In the context of PROFINET, PROFINET CBA (Component-based Automation) is an automation concept for:

- Implementation of modular applications with distributed intelligence
- Machine-to-machine communication

PROFINET CBA lets you create distributed automation solutions, based on default components and partial solutions. This concept satisfies demands for a higher degree of modularity in the field of mechanical and systems engineering by extensive distribution of intelligent processes.

Component-based Automation allows you to use complete technological modules as standardized components in large systems.

PROFINET CBA is implemented by:

- The PROFINET standard for programmable controllers
- The SIMATIC iMAP engineering tool

The components are created in an engineering tool that can differ from vendor to vendor. Components of SIMATIC devices are created, for example, with *STEP 7*.

PROFINET components

A PROFINET component encompasses the entire data of the hardware configuration, the parameters of the modules, and the corresponding user program. The PROFINET component is comprised of:

- Technological function

  The (optional) technological (software) function includes the interface to other PROFINET components in the form of configurable inputs and outputs.

- Device

  The device is the representation of the physical automation device or field device including the IO devices, sensors, actuators, mechanics, and device firmware.

PROFINET device

→ *Device*

PROFINET device

A PROFINET device always has at least one Industrial Ethernet port. A PROFINET device can also have a PROFIBUS port as a master with proxy functionality.

PROFINET IO

Within the framework of PROFINET, PROFINET IO is a communication concept for the implementation of modular, distributed applications.

PROFINET IO allows you to create automation solutions, which are familiar to you from PROFIBUS.

PROFINET IO is based both on the PROFINET standard for programmable controllers and on the *STEP 7* engineering tool. This means that you have the same application view in *STEP 7*, regardless of whether you are configuring PROFINET or PROFIBUS devices. Programming your user program is essentially the same for PROFINET IO and PROFIBUS DP if you use the extended blocks and system status lists for PROFINET IO.

PROFINET IO Controller

Device via which the connected IO devices are addressed. That means: the IO controller exchanges input and output signals with assigned field devices. The IO controller is often the controller on which the automation program runs.

PROFINET IO Controller

→ *PROFINET IO Device*

PROFINET IO Controller

→ *PROFINET IO Supervisor*

PROFINET IO Controller

→ *PROFINET IO System*

PROFINET IO Device

→ *PROFINET IO Controller*

PROFINET IO Device

Distributed field device assigned to one of the IO controllers
(e.g. remote IO, valve terminals, frequency converters, switches).

PROFINET IO Device

→ *PROFINET IO Supervisor*

PROFINET IO Device

→ *PROFINET IO System*

PROFINET IO Supervisor

→ *PROFINET IO Controller*

PROFINET IO Supervisor

→ *PROFINET IO Device*

PROFINET IO Supervisor

PG/PC or HMI device for commissioning and diagnostics.

PROFINET IO Supervisor

→ *PROFINET IO System*

PROFINET IO System

→ *PROFINET IO Controller*

PROFINET IO System

→ *PROFINET IO Device*

PROFINET IO System

PROFINET IO controller with assigned PROFINET IO devices.

Programming device

Basically speaking, PGs are compact and portable PCs which are suitable for industrial applications. They are identified by a special hardware and software for programmable logic controllers.

Proxy

→ *PROFINET device*

Proxy

The PROFINET device with proxy functionality is the substitute for a PROFIBUS device on Ethernet. The proxy functionality allows a PROFIBUS device to communicate not only with its master but also with all nodes on PROFINET.

You can easily integrate existing PROFIBUS systems into PROFINET communication, for example with the help of an IE/PB link or an IM 151-8 PN/DP CPU interface module. The IE/PB link / IM 151-8 PN/DP CPU handles communication via PROFINET as a substitute for the PROFIBUS components.

Publisher

→ *Direct data exchange*

Publisher

The publisher is a sender in the direct data exchange.

RAM

RAM (Random Access Memory) is a semiconductor read/write memory.

Real Time

Real time means that a system processes external events within a defined time.

Determinism means that a system reacts in a predictable (deterministic) manner.

In industrial networks, both these requirements are important. PROFINET meets these requirements. PROFINET is implemented as a deterministic real-time network as follows:

- The transfer of time-critical data between different stations over a network within a defined interval is guaranteed.

  To achieve this, PROFINET provides an optimized communication channel for real-time communication : Real Time (RT).
- An exact prediction of the time at which the data transfer takes place is possible.
- It is ensured that seamless communication can take place in the same network by means of other standard protocols, such as industrial communication for programming device / PC.

Real Time

→ *Real Time*

Reference ground

→ *Ground*

Reference potential

Reference potential for the evaluation / measuring of the voltages of participating circuits.

Restart

When the IM 151-8 PN/DP CPU interface module starts up (for example, after changing the mode selector switch from STOP to RUN or after a POWER ON), organization block OB 100 (warm restart) is executed before cyclic program processing (OB 1). On restart, the input process image is read in and the *STEP 7* user program is executed, starting at the first instruction in OB1.

Retentive memory

A memory area is considered retentive if its contents are retained even after a power loss and transitions from STOP to RUN. The non-retentive area of bit memory, timers and counters is reset following a power failure and a transition from the STOP mode to the RUN mode.

Retentive can be the:

- Bit memory
- S7 timers
- S7 counters
- Data areas

Router

→ *Default router*

Router

→ *Switch*

Router

A router connects two subnetworks with each other. A router works in a way similar to a switch. With a router, however, it is also possible to specify which communications nodes can communicate via the router and which cannot. Communication nodes on different sides of a router can only communicate with each other if you have explicitly enabled communication between the two nodes via the router. Real time data cannot be replaced beyond subnetwork limits.

RT

→ *Real Time*

Runtime error

Errors occurred in the PLC (that is, not in the process itself) during user program execution.

Scan cycle check point

The cycle control point is the section of the CPU program processing in which the process image is updated.

Segment

→ *Bus segment*

SELV

Safety Extra Low Voltage

SFB

→ *System function block*

SFC

→ *System function*

SIMATIC

The term denotes Siemens products and systems for industrial automation.

SIMATIC Micro Memory Card

SIMATIC Micro Memory Cards are storage media for the IM 151-8 PN/DP CPU interface module

SIMATIC NCM PC

SIMATIC NCM PC is a version of *STEP 7* designed specifically for configuring PCs. It provides the complete *STEP 7* functionality for PC stations.

SIMATIC NCM PC is the central tool with which you configure the communication services for your PC station. The configuration data generated with this tool must be downloaded to the PC station or exported. This makes the PC station ready for communication.

SIMATIC NET

Siemens business area for industrial communication, networks, and network components.

SIMATIC PC station

A "PC station" is a PC with communication modules and software components within a SIMATIC automation solution.

Slave

→ *Master*

Slave

A slave can only exchange data after being requested to by the master.

SNMP

SNMP (Simple Network Management Protocol) makes use of the wireless UDP transport protocol. It consists of two network components, similar to the client/server model. The SNMP manager monitors the network nodes and the SNMP agents collect the various network-specific information in the individual network nodes and stores it in a structured form in the **MIB** (Management Information Base). This information allows a network management system to run detailed network diagnostics.

STARTUP

A STARTUP routine is executed at the transition from STOP to RUN mode. Can be triggered by means of the mode selector switch, or after power on, or by an operator action on the programming device. A restart has been carried out on the IM 151-8 PN/DP CPU interface module.

STEP 7

Engineering system. Contains programming software for the creation of user programs for SIMATIC S7 controllers.

Subnet mask

The bits set in the subnet mask determine which part of the IP address contains the address of the subnet/network.

In general:

- The network address is obtained by an AND operation on the IP address and subnet mask.
- The node address is obtained by an AND NOT operation on the IP address and subnet mask.

Subnetwork

All the devices connected by switches are located in the same network, called a subnet. All the devices in a subnet can communicate directly with each other.

All devices in the same subnet have the same subnet mask.

A subnet is physically restricted by a router.

Subscriber

→ *Direct data exchange*

Subscriber

The subscriber is a recipient in the direct data exchange.

Substitute

→ *Proxy*

Substitute value

Substitute values are configurable values which output modules transfer to the process when the CPU switches to STOP mode.

In the event of an I/O access error, a substitute value can be written to the accumulator instead of the input value which could not be read (SFC 44).

Switch

PROFIBUS is based on a line topology. Communication nodes are interconnected by means of a passive cable known as the bus.

By contrast, Industrial Ethernet is made up of point-to-point connections: Each communication node is interconnected directly with one other communication node.

A node is interconnected with several other communication nodes via the port of an active network component (switch). Other communications nodes (including switches) can then be connected to the other ports of the switch. The connection between a communication node and the switch remains a point-to-point connection.

The task of a switch is thus to regenerate and distribute received signals. The switch "learns" the Ethernet address(es) of a connected PROFINET device or of other switches, and passes only the signals intended for the connected PROFINET device or switch.

A switch has a certain number of ports. Connect only one PROFINET device or a further switch to any one of the ports.

SYNC

Control command a DP master may broadcast to a group of DP slaves.

With the SYNC control command the DP master causes the DP slave to freeze the statuses of the outputs at the current value. The DP slave stores the output data contained in the next frame, but does not change the state of its outputs.

After each new SYNC control command, the DP slave sets the outputs it has saved as output data. The outputs are not updated cyclically again until the DP master has sent a UNSYNC control command.

System diagnostics

System diagnostics refers to the detection, evaluation, and signaling of errors that occur within the PLC, for example programming errors or module failures. System errors can be indicated by LEDs or in *STEP 7*.

System function

A system function (SFC) is a function integrated in the operating system of the CPU that can be called when necessary in the *STEP 7* user program.

System function block

A system function block (SFB) is a function block integrated in the operating system of the CPU that can be called when necessary in the *STEP 7* user program.

System memory

System memory is an integrated RAM memory in the CPU. System memory contains the address areas (e.g. timers, counters, bit memory) and data areas that are required internally by the operating system (for example, communication buffers).

System status list

The system status list contains data that describes the current status of an ET 200S with IM 151-8 PN/DP CPU interface module. You can always use this list to obtain an overview of:

- the configuration of the ET 200S
- The current CPU parameter assignments and configurable electronic modules
- The current statuses and processes in the CPU and the configurable electronic modules

Terminating module

The ET 200S distributed IO system is completed by the terminating module. If you have not inserted a terminating module, the ET 200S is not ready for operation.

Terminating resistor

The terminating resistor is used to avoid reflections on data links.

Time-of-day interrupt

→ *Interrupt, time-of-day*

Timer

→ *Timers*

Timers

Timers are part of CPU system memory. The content of timer cells is automatically updated by the operating system, asynchronously to the user program. *STEP 7* instructions are used to define the precise function of the timer cell (for example, switch-on delay) and to initiate their execution (for example, start).

Token

Allows access to the PROFIBUS DP for a limited time.

Topology

Structure of a network. Common structures include:

- Bus topology
- Ring topology
- Star topology
- Tree topology

Twisted Pair

Fast Ethernet via twisted-pair cables is based on the IEEE 802.3u standard (100 Base-TX). Transmission medium is a shielded 2x2 twisted-pair cable with an impedance of 100 Ohm (AWG 22). The transmission characteristics of this cable must meet the requirements of category 5.

The maximum length of the connection between end device and network component must not exceed 100 m. The ports are implemented according to the 100 Base-TX standard with the RJ-45 connector system.

Update Time

Within this time interval, an IO device / IO controller in the PROFINET IO system is supplied with new data by the IO controller / IO device. The update time can be configured separately for each IO device and determines the interval at which data is sent from the IO controller to the IO device (outputs) as well as data from the IO device to the IO controller (inputs).

User program

In SIMATIC, a distinction is made between the operating system of the CPU and user programs. The user program contains all instructions, declarations and data for signal processing required to control a plant or a process. It is assigned to a programmable module (for example CPU) and can be structured in smaller units (blocks).

User program

→ *Operating system*

User program

→ *STEP 7*

Voltage group

A group of electronic modules supplied by one power module.

WAN

Wide Area Network; extends beyond LAN limits and allows worldwide communication. Legal rights do not belong to the user, but to the provider of the WAN networks.

Work memory

The work memory is integrated in the CPU and cannot be extended. It is used to run the code and process user program data. Programs only run in work memory and system memory.

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ANEXO V –PRESOSTATOS DANFOSS–

Folleto técnico

Pressostatos
Tipo RT



Los presostatos RT incorporan un conmutador inversor unipolar controlado por presión, donde la posición del contacto depende de la presión en la conexión de entrada y del valor ajustado en escala.

La serie RT se compone de presostatos, presostatos diferenciales y presostatos para regulación de zona neutra. Estas unidades se usan para aplicaciones Industriales y Marítimas generales.

La serie incluye también presostatos de seguridad para el control de calderas de vapor de agua.

Para instalaciones donde el funcionamiento se considera crítico desde el punto de vista de seguridad y económico, se recomienda la utilización de presostatos de fallo seguro, así como el uso de contactos dorados, si se funciona con bajo número de ciclos a bajos valores de tensión e intensidad.

Características

- Diseño sencillo
- Alta precisión
- Alta repetibilidad
- Larga vida útil
- Disponible con todas las principales homologaciones para instalaciones navales

Homologaciones

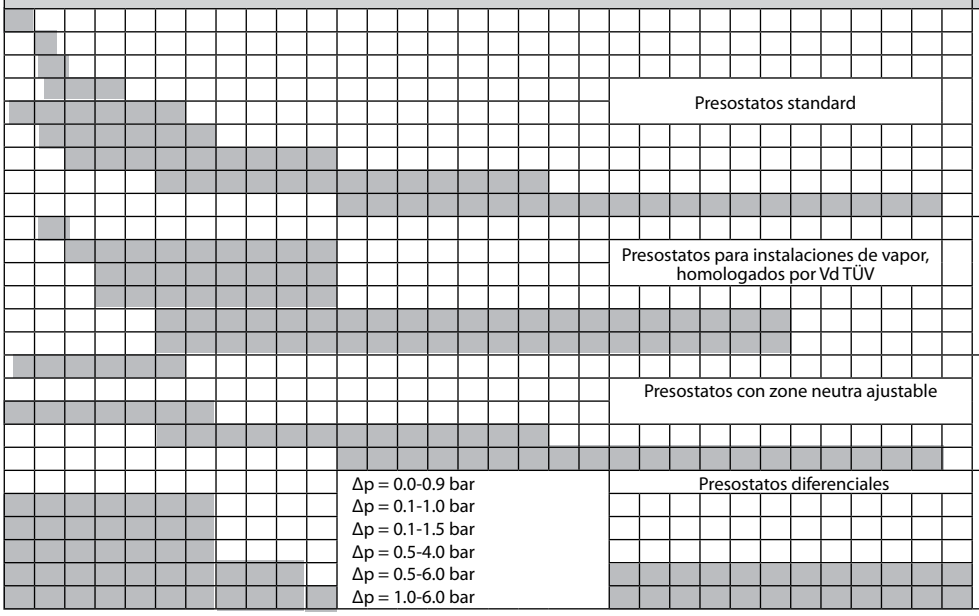
RT 1	RT 1A RT 5A RT 121	RT 1AL	RT 5	RT 30AW RT 30AB RT 30AS RT 19W RT 19B RT 19S	RT 31W RT 31B RT 31S RT 32W RT 32B	RT 33B RT 35W RT 112W	RT 110	RT 112	RT 113	RT 116 RT 117 RT 200	RT 117L RT 200L	RT 260A RT 262A RT 265A RT 260AL RT 262AL RT 263AL RT 266AL	Homologaciones
•	•	•	•	•	•	•	•	•	•	•	•	•	Marca CE de acuerdo con EN 60947-4/-5
				•	•	•							VD TÜV, Alemania
							•	•	•	•			Det Norske Veritas, DNV
			•				•	•		•			Lloyds Register of Shipping, LR
•			•	•			•	•		•			Germanischer Lloyd, GL
			•				•	•	•	•			Bureau Veritas, BV
•	•	•	•	•	•	•	•	•	•	•	•	•	Registro Italiano Navale, RINA
•	•	•	•	•	•	•	•	•	•	•	•	•	Russian Maritime Register of shipping, RMRS
•	•		•				•	•	•	•			Nippon Kaiji Kyokai, NKK
•	•	•	•	•	•	•	•	•	•	•	•	•	China Compulsory Certificate, CCC

Nota: Véanse también las copias de los certificados que están a disposición en Danfoss.

Todos los presostatos RT tienen:

- Marca CE de acuerdo con la norma EN 60947-4/-5, para ventas en Europa
- Las series RT 19, RT 30, RT 35 y RT112 W, RT33, RT31 y RT32 tienen marca CE de acuerdo a la norma PED 97/23/EC, categoría IV, equipos seguros

Presostatos tipo RT



Rango p_e bar	Tipo
−1 → 0	RT 121
0 → 0.3	RT 113
0.1 → 1.1	RT 112
0.2 → 3	RT 110
−0.8 → 5	RT 1, 1A
0.2 → 6	RT 200
1 → 10	RT 116
4 → 17	RT 5, 5A
10 → 30	RT 117
0.1 → 1.1	RT 112
0 → 2.5	RT 33B, RT 35 W
1 → 10	RT 30 AW/ AB/ AS
2 → 10	RT 31 W/ B/ S
5 → 25	RT 19 W/ B/ S
5 → 25	RT 32 W/ B
−0.8 → 5	RT 1 AL
0.2 → 3	RT 110 L
0.2 → 6	RT 200 L
4 → 17	RT 5 AL
10 → 30	RT 117 L
−1 → 6	RT 266 AL
−1 → 6	RT 263 AL
−1 → 9	RT 262 AL/ A
−1 → 18	RT 260 AL/ A
−1 → 36	RT 260 A
−1 → 36	RT 265 A

Caractéristiques techniques et numéros de code

Lors de la commande, indiquer le type et le numéro de code.

Les lettres utilisées dans les désignations ont la signification suivante:
A: L'appareil convient à l'ammoniac.
L: L'appareil est avec zone neutre réglable



RT 113
réglage manuel et façade avec fenêtres



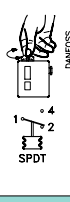
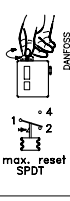
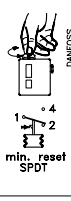
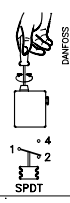
RT 116
réglage à outil, façade sans fenêtres et capuchon protecteur



RT 262 A
RT 262 A pressostat différentiel

Pressostat

Versions conseillées

Plage de réglage (p_e = pression relative) bar	Différentiel mécanique églable/ fixe bar	Pression de service max. PB bar	Pression d'essai max. p' bar	Raccord de pression ISO 228/1	Code no.  SPDT	Code no.  max. reset SPDT	Code no.  min. reset SPDT	Code no.  SPDT	Type
−1 → 0	0.09 → 0.4	7	8	G 3/8 A	**017-521566**				RT 121
0 → 0.3	0.01 → 0.05	0.4	0.5	G 3/8 A	**017-519666**				RT 113
0.1 → 1.1	0.07 → 0.16	7	8	G 3/8 A	**017-519166**			**017-519366**	RT 112
0.1 → 1.1	0.07	7	8	G 3/8 A		**017-519266**			RT 112
0.2 → 3	0.08 → 0.25	7	8	G 3/8 A	**017-529166**			**017-529266**	RT 110
0.2 → 3	0.08	7	8	G 3/8 A			**017-511066**		RT 110
−0.8 → 5	0.5 → 1.6	22	25	7/16-20 UNF	**017-524566**				RT 1
−0.8 → 5	0.5	22	25	7/16-20 UNF			**017-524666**		RT 1
−0.8 → 5	0.5 → 1.6	22	25	G 3/8 A [1]	**017-500166**				RT 1A
−0.8 → 5	0.5	22	25	G 3/8 A [1]			**017-500266**		RT 1A
−0.8 → 5	1.3 → 2.4	22	25	G 3/8 A [1]	**017-500766**				RT 1A
0.2 → 6	0.25 → 1.2	22	25	G 3/8 A	**017-523766**			**017-524066**	RT 200
0.2 → 6	0.25	22	25	G 3/8 A		**017-523866**	**017-523966**		RT 200
1 → 10	0.3 → 1.3	22	25	G 3/8 A	**017-520366**			**017-520066**	RT 116
1 → 10	0.3	22	25	G 3/8 A		**017-520466**	**017-519966**		RT 116
4 → 17	1.2 → 4	22	28	G 3/8 A	**017-525566**			**017-525366**	RT 5
4 → 17	1.2	22	28	G 3/8 A		**017-509466**[2]			RT 5
4 → 17	1.2 → 4	22	28	G 3/8 A [1]	**017-504666**[2]				RT 5A
4 → 17	1.2	22	28	G 3/8 A [1]		**017-504766**[2]			RT 5A
10 → 30	1 → 4	42	47	G 3/8 A [1]	**017-529566**			**017-529666**	RT 117

[1] Raccord à souder Ø 6/ Ø 10 mm compris.
[2] Avec capuchon protecteur

Pressostats à zone neutre réglable

Plage de réglage (p_e) bar	Différentiel mécanique bar	Zone neutre réglable bar	Pression de service max., PB bar	Pression d'essai max. p' bar	Raccord de pression	**N° de code**	Type
−0.8 → 5	0.2	0.2 → 0.9	22	25	G 3/8 A [1]	**017L003366**	RT 1AL
0.2 → 3	0.08	0.08 → 0.2	7	8	G 3/8 A	**017L001566**	RT 110L
0.2 → 6	0.25	0.25 → 0.7	22	25	G 3/8 A	**017L003266**	RT 200L
4 → 17	0.35	0.35 → 1.4	22	25	G 3/8 A [1]	**017L004066**	RT 5AL
10 → 30	1	1 → 3.0	42	47	G 3/8 A	**017L004266**	RT 117L

[1] Raccord à souder Ø6/ Ø10 mm compris

Pressostats différentiels

Plage de réglage Δp bar	Différentiel mécanique bar	Zone neutre réglable bar	Plage de travail bar	Pression de service max. PB bar	Pression d'essai max. p' bar	Raccord de pression ISO 228/1	**N° de code**	Type
0 → 0.9	0.05	0.05 → 0.23	−1 → 6	7	8	G 3/8 A [1]	**017D008166**	RT 266AL
0.1 → 1.0	0.05	0.05 → 0.23	−1 → 6	7	8	G 3/8 A [1]	**017D004566**	RT 263AL
0.1 → 1.5	0.1	0.1 → 0.33	−1 → 9	11	13	G 3/8 A [1]	**017D004366**	RT 262AL
0.1 → 1.5	0.1		−1 → 9	11	13	G 3/8 A [1]	**017D002566**	RT 262A
0 → 0.3	0.035		−1 → 10	11	13	G 3/8 A [1]	**017D002766**[2]	RT 262A
0.5 → 4	0.3	0.3 → 0.9	−1 → 18	22	25	G 3/8 A [1]	**017D004866**	RT 260AL
0.5 → 4	0.3		−1 → 18	22	25	G 3/8 A [1]	**017D002166**	RT 260A
0.5 → 6	0.5		−1 → 36	42	47	G 3/8 A [1]	**017D002366**	RT 260A
1.5 → 11	0.5		−1 → 31	42	47	G 3/8 A	**017D002466**	RT 260A
1 → 6	0.5		−1 → 36	42	47	G 3/8 A [1]	**017D007266**[3]	RT 265A

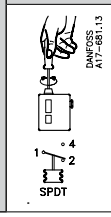
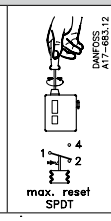
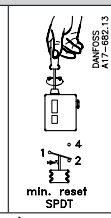
[1] Raccord à souder Ø 6/Ø 10 mm compris. [2] Avec système de contact progressif (voir sous "pièces et accessoires", contact 017-018166) [3] Avec systèmes de contact SPST et SPDT pour alarme et coupure à 0.8 et 1 bar

Características técnicas

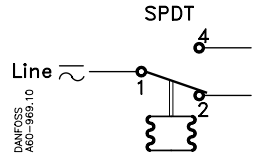
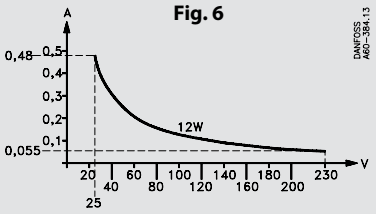
Letras de designación de tipo:
A: Unidades apropiadas para amoniaco.
W: Unidades para aplicaciones de control.
B: Unidades de seguridad con rearme externo.
S: Unidades de seguridad con rearme interno.

Presostatos para instalaciones de vapor de agua, homologados por *PED de acuerdo con la norma EN 12953-9 y EN 12922-11*

Versiones más utilizadas

Rango de regulación (p_e = presión efectiva) bar	Diferencial mecánica ajustable/ fijo bar	Presión de funcionamiento máx. PB bar	Presión de prueba máx. p' bar	Conexión de presión ISO 228/1	Code no. 	Code no. 	Code no. 	Tipo
Para presión creciente								
0.1 → 1.1	0.07	7	8	G ½A	**017-528266**			RT 112W
0 → 2.5	0.1	7	8	G ½A	**017-528066**			RT 35W
1 → 10	0.8	22	25	G ½A	**017-518766**			RT 30AW
1 → 10	0.4	22	25	G ½A		**017-518866**		RT 30AB
1 → 10	0.4	22	25	G ½A		**017-518966**		RT 30AS
5 → 25	1.2	42	47	G ½A	**017-518166**			RT 19W
5 → 25	1	42	47	G ½A		**017-518266**		RT 19B
5 → 25	1	42	47	G ½A		**017-518366**		RT 19S
Para presión decreciente								
0 → 2.5	0.1	7	8	G ½A			**017-526266**	RT 33B
2 → 10	0.3 → 1	22	25	G ½A	**017-526766**			RT 31W
2 → 10	0.3	22	25	G ½A			**017-526866**	RT 31B
2 → 10	0.3	22	25	G ½A			**017-526966**	RT 31S
5 → 25	0.8 → 3	42	47	G ½A	**017-524766**			RT 32W
5 → 25	0.4	42	47	G ½A			**017-524866**	RT 32B
Presostato para instalaciones de vapor de agua a baja presión (supervisión de la presión) ninguna aprobación PED								
0.1 → 1.1	0.07 → 0.16	7	7	G ½A	**017-518466**			RT 112

Caracteristicas técnicas

Denominación	**RT presostatos**
Temperatura ambiente	Generalemente –50 a 70°C ; Versión diafragma –10 a 70°C VD TÜV approved –40 a 70°C
Temperatura del fluido	Generalemente –40 a 100°C; Versión diafragma –10 a 90°; Para homologación VD TÜV -40 a 150°C, véase página 6 (plantas de vapor)
Sistema de contactos	 Microinterruptor con conmutador unipolar (SPDT)
Carga de los contactos Material de los contactos: AgCdO	**Corriente alterna:** AC-1: 10A, 400 V AC-3: 4A, 400 V AC-15: 3A, 400 V **Corriente continua:** DC-13: 12 W, 230 V (véase fig. 6) **Fig. 6** 
Sistema de contactos especiales	Véase al apartado de accesorios y recambios página15
Conexión de cable	2 PG 13.5 para diámetros de cable 6 - 14 mm
Protección	IP 66 ségun IEC 529 y EN 60529. Los aparatos con rearme externo. IP 54. La envoltura del presostato es de baquelita, ségun DIN 53470, mientras que la cubierta es de poliamida.

Materialds en contacto con el fluido

Material	Part	W .no.	DIN	RT 1	RT 1A	RT 5	RT 5A	RT 110	RT 112	RT 113	RT 116	RT 117	RT 121	RT 200/ 200 L	RT 260A	RT 262A/ 262 AL	RT 260AL	RT 265A	RT 263AL/ 266AL
Acero inoxidable 18/8	Fuelle	1.4301	17440	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x
Acero inoxidable 17/7	Muelle	1.4568	17224	x						x		x	x	x					
Latón	Envoltura	2.0402	17660			x		x	x		x	x	x	x					
Latón	Anillo de fuelle	2.0321	17660			x		x	x		x	x	x	x					
Acero de fácil mecanización	Conexión abocardada	1.0718	1651	x															
Acero para embutición profunda (superficie revestida de niquel)	Envoltura	1.0338	1623	x	x		x								x	x	x	x	x
Acero al carbono C 20 no aleado	Para conexión mediante soldadura	1.0402	1652		x		x								x	x	x	x	x
Aluminio	Junta	3.0255	1712		x		x			x					x	x	x	x	x
Acero cementado C 15	Conexión de fuelle mediante soldadura	1.0401	1652																
Acero inoxidable	Guía elástica + tornillo	1.4305	17440																
Caucho NBR	Diafragma									x									
Acero para embutición profunda (soldadura supervicial) conexión DIN 50961 Fe/Zn 5C)	Envoltura de diafragma con conector soldado	1.0338	1623							x									
Rosca de muelle	Muelle	1.1250	17223		x														

Materiales en contacto con el fluido. Presostatos

Material	Pieza	W. Núm.	DIN	RT 19W B,S	RT 30AW AB, AS	RT 31W B,S	RT 32W B	RT 33B 35W	RT 112 W
Acero inoxidable 18/8	Fuelle	1.4301	17440	x	x	x	x	x	x
Acero inoxidable 17/7	Orificio	1.4305	17440	x	x				
Acero C 15	Conector	1.0401	1652	x	x				
Acero para embutición + Nl	Anillo de fuelle	1.0338	1623	x	x	x	x	x	x
Acero inoxidable 17/7	Muelle de fuelle	1.4568	17224		x			x	
Acero inoxidable	Anillo	1.4305	17440		x				
Acero para embutición + Nl	Envoltura	1.0338	1623	x	x	x	x	x	x
Aceero inoxidable	Conexión de fuelle	1.4305	17440			x			
Acero de fácil mecanización inox. y soldable	Conector	1.4301	17440			x	x	x	x
Acero para embutición+ Sn	Guía de muelle	1.0338	1623					x	
Láton	Envoltura	2.0402	17660						
Láton	Anillo de fuelle	2.0321	17660						

Funcionamiento

a. RT 19, RT 30, y presostatos con rearme máx.
Cuando la presión rebasa el valor ajustado en el rango, los contactos 1-4 se cierran y los contactos 1-2 se abren. Los contactos vuelven a su posición inicial cuando la presión disminuye hasta el valor del rango menos el diferencial (véase fig. 4).

I. Alarma para presión creciente dada en el valor de rango ajustado.
II. Alarma para presión decreciente dada en el valor de rango ajustado menos el diferencial.

Las unidades con rearme máx. pueden ser puestas a cero sólo a una presión que corresponde al valor de rango ajustado menos el diferencial, o a una presión inferior.

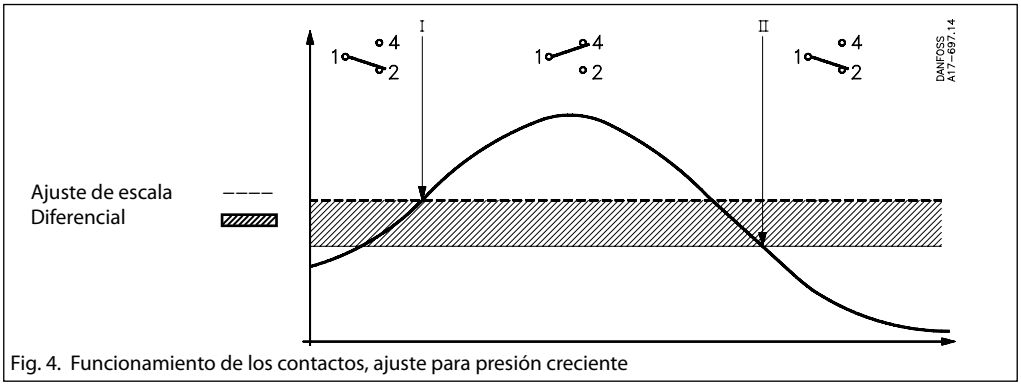


Fig. 4. Funcionamiento de los contactos, ajuste para presión creciente

Funcionamiento
(continuar)

b. Todos los demás presostatos RT
Cuando la presión cae al valor ajustado en el rango, los contactos 1-2 se cierran y los contactos 1-4 se abren. Los contactos vuelven a su posición original cuando la presión sube de nuevo hasta el valor ajustado en el rango más el diferencial. Véase fig. 5.

I. Alarma para presión decreciente dada en el valor de rango ajustado.
II. Alarma para presión creciente dada en el valor de rango ajustado más el diferencial.

Las unidades con rearme mín. pueden ser puestas a cero sólo a una presión que corresponde al valor ajustado en la escala más el diferencial.

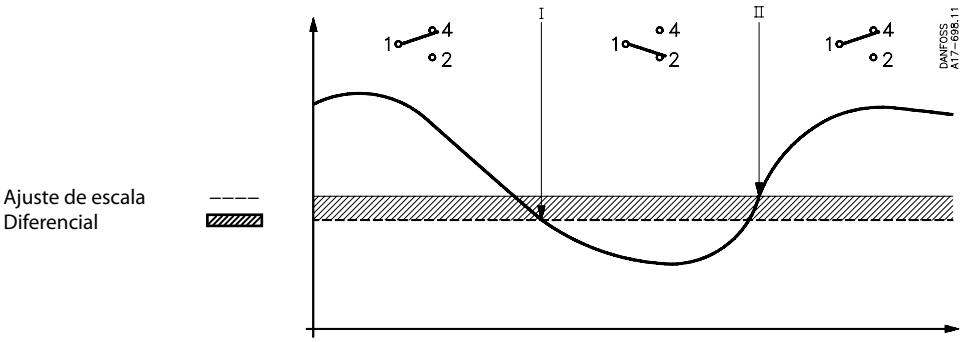


Fig. 5. Funcionamiento de los contactos, ajuste para presión decreciente

Ejemplo 1
Una bomba de agua de refrigeración suplementaria debe arrancar cuando la presión del agua de refrigeración disminuye por debajo de 6 bar, y debe pararse cuando la presión rebasa el valor de 7 bar. Elegir un RT 116 con un rango de 1-10 bar y una diferencial ajustable de 0,2-1,3 bar. La presión de arranque de 6 bar debe ser ajustada en la escala de rango. La diferencial debe ser ajustada bajo la forma de la diferencia entre la presión de parada (7 bar) y la presión de arranque (6 bar) = 1 bar. De acuerdo con la fig. 3, el disco de ajuste de diferencial debe ser ajustado en 8.

Ejemplo 2
El quemador en una caldera de vapor de agua debe ser desactivado cuando la presión rebasa el valor de 17 bar. No debe producirse su rearranque automático. Elegir un RT 19B con rearme externo. Si se necesita una seguridad suplementaria, puede utilizarse un RT 19S con rearme máx. interno.
El rango es de 5-25 bar y el diferencial se fija en 1 bar aproximadamente. La escala de rango debe ser ajustada en 17 bar. Después de la desconexión, el rearme manual puede efectuarse sólo cuando la presión ha disminuído al valor de reglaje de 17 bar menos el diferencial: en este caso, un valor igual o inferior a 16 bar.

Ejemplo 3
La presión de aceite de lubricación mínima admisible para un engranaje es de 3 bar. No debe ser posible efectuar el rearme mientras no se haya estudiado el motivo del fallo de la presión de aceite. Elegir un RT 200 con rearme mín. El valor del rango debe ser ajustado al mismo tiempo que se observa la escala de rango. El rearme manual es posible sólo cuando la presión ha alcanzado el valor de 3,2 bar (el diferencial se fija en un valor igual o superior a 0,2 bar).

Descripción del funcionamiento de las unidades RT

Función de seguridad positiva para presión decreciente
La figura 5a representa una sección transversal de un elemento de fuelle de RT 32W con función de seguridad positiva para presión decreciente. Cuando
la presión aumenta, el brazo de contactos abre la conexión entre los terminales 1 y 2.

Cuando la presión disminuye, el brazo de contactos abre la conexión entre los terminales 1 y 4. Si se produce un defecto en el fuelle, el muelle de ajuste acciona el brazo de contactos para abrir la conexión entre los terminales 1 y 4, como en el caso de una presión decreciente. Esto se producirá cualquiera que sea la presión en el fuelle.

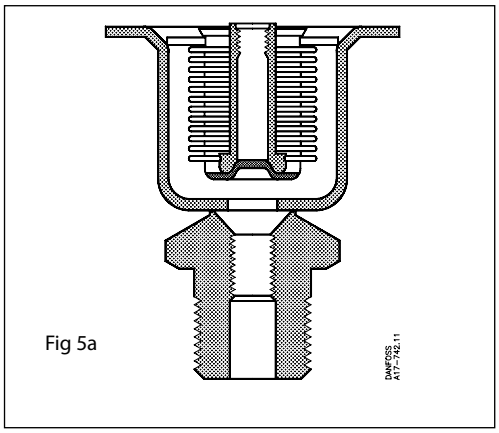


Fig 5a

Función de seguridad positiva para presión creciente
La fig. 5b representa una sección transversal a través de un elemento de fuelle para RT 30W con seguridad positiva para presión creciente. Cuando la presión aumenta, el brazo de contactos abre la conexión entre los terminales 1 y 2.

Si se produce un defecto en el fuelle interno, la presión es transmitida al fuelle externo. El fuelle externo tiene una superficie igual a 3 veces la del fuelle interno. La conexion entre los terminales 1 y 2 se abre.

Si se produce un defecto en el fuelle externo, el inter-valo entre los dos fuelles estará sometido a la presión atmosférica. Esto activa el sistema de contactos para abrir la conexión entre los terminales 1 y 2. Con el diseño de fuelle doble el factor importante es el vacío entre lo dos fuelles.

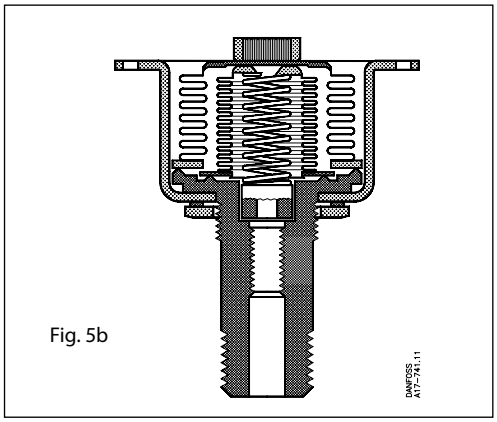


Fig. 5b

Presostatos para control de nivel de líquido RT 113

El RT 113 puede utilizarse para controlar el nivel del líquido en depósitos abiertos. La fig. 6 representa, en principio, cuatro tipos diferentes de instalación.

1. *Con campana de aire (véase «Accesorios»)*
   Para efectuar el control, la campana de aire debe instalarse a 20-40 mm por debajo del nivel más bajo del líquido. Además, el tubo entre el RT 113 y la campana de aire debe ser absolutamente hermética al aire. Si se necesita sólo una indicación, la campana puede situarse a 100 mm por debajo del nivel máx. El RT 113 debe ser ajustado en 0 cm de agua y el disco diferencial en 1.

2. *Conexión con el costado del depósito, estando el RT 113 encima del nivel del líquido*
   El tubo horizontal A debe tener una longitud determinada con relación al tubo vertical B, con el fin de garantizar un control fiable. La longitud de A puede encontrarse en la fig. 7, utilizando B y la presión C de ajuste de rango.

3. *Conexión con el costado del depósito, estando el RT 113 bajo el nivel del líquido*
   Se utilizará esta forma de conexión cada vez que sea posible. Si se trata de un líquido capaz de absorber aire como por ejemplo el aceite, esta solución es preferible a las soluciones 1 y 2. El ajuste de rango resultante es la distancia entre la superficie del líquido y el centro de la envoltura del diagragma.

4. *Conexión en el depósito con el RT 113 por encima del nivel del líquido*
   Este método está previsto para ser utilizado con líquidos que absorben aire cuando no es posible utilizar la cone xión del tipo 3. La longitud más corta del tubo horizontal se determina como se describe en 2. Se instala una válvula de cierre entre el depósito de aceite y el depósito de agua de tal manera que las impurezas puedan ser descargadas del depósito de agua por medio de un tapón de drenaje inferior. A continuacion puede verterse agua en el depósito a través de un conector de llenado situado en su parte superior.

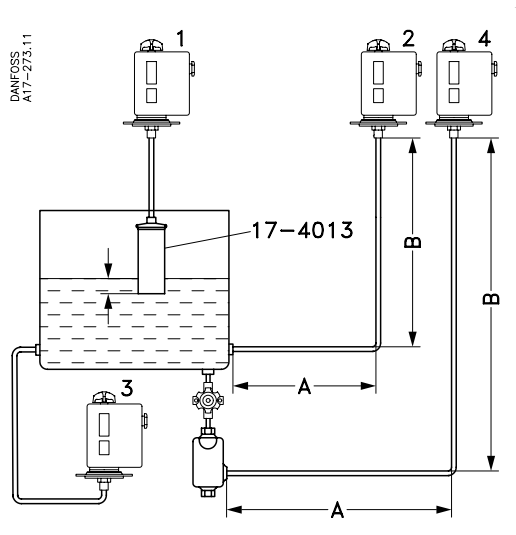
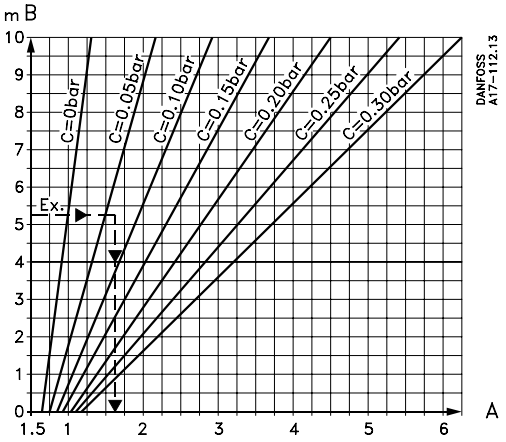


Fig. 6

Altura entre el conector del depósito y el presostato



Longitud mín. del tubo horizontal

Fig. 7

Aplicación

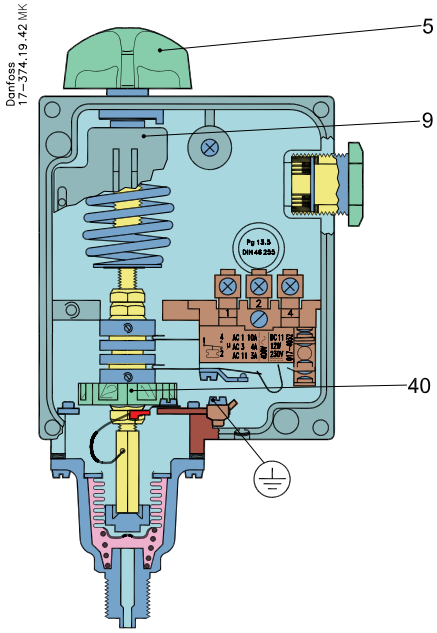


Fig. 8

5. Mando de ajuste
9. Escala principal
40. Disco de zona neutra

Los presostatos RT-L estan provistos de un conmutador con zona neutra ajustable. Esto permite utilizar las unidades para control flotante. La terminología utilizada se explica a continuación.

Control flotante
Se trata de una forma de control discontínuo en el cual el elemento de corrección (por ejemplo una válvula, un registro, o un elemento similar) se mueve hacia una posición extrema a una velocidad independiente de la magnitud del error cuando este último rebasa un valor positivo definido, y hacia la posición extrema opuesta cuando el error rebasa un valor negativo definido.

Oscilaciones periódicas
Se trata de variaciones periódicas de la variable controlada con relación a la referencia fija.

Zona neutra
Es el intervalo en la variable controlada donde no se produce repuesta del elemento de corrección. Véase fig. 13.

El sistema de contactos en aparatos con zona neutra no se puede cambiar, debido a que el ajuste del sistema de contactos está adaptado al resto de los componentes del aparato.

Ajuste de la zona neutra

El rango se ajusta utilizando el mando de ajuste (5) fig. 8, al mismo tiempo que se observa la escala principal (9). La presión ajustada es la presión de apertura de los contactos 1-4 (véase fig. 13).

La zona neutra requerida puede encontrarse en el diagrama de la unidad. La posición en la cual el disco de zona neutra (40) debe ser ajustado puede ser leída en la escala inferior del diagrama. El funcionamiento puede verse en la fig. 13.

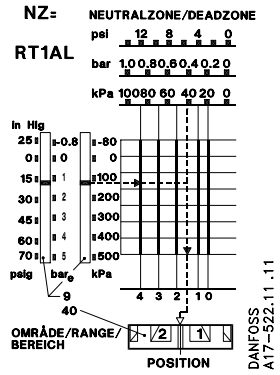


Fig. 9

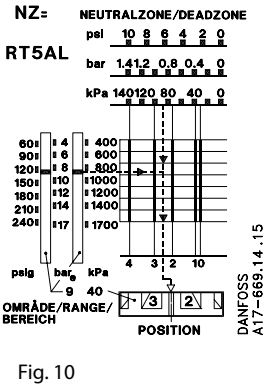


Fig. 10

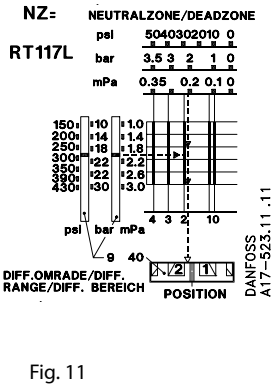


Fig. 11

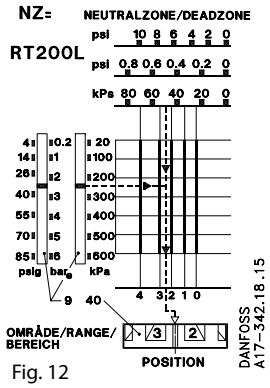
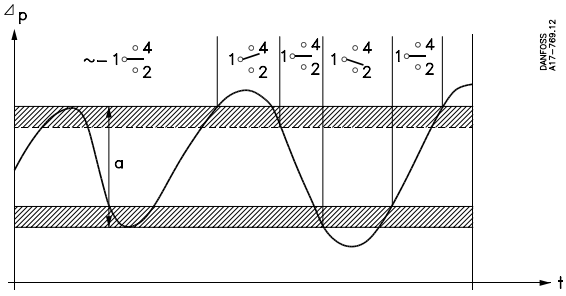


Fig. 12



Ajuste de rango -----
Presión de entrada ∿∿

Diferencial (diferencial natural), que corresponde al ajuste de zona neutra más pequeño a

a: La zona neutra y la persión de entrada pueden variar en este intervalo, sin dar lugar al cierre de los contactos 1-2 o 1-4.

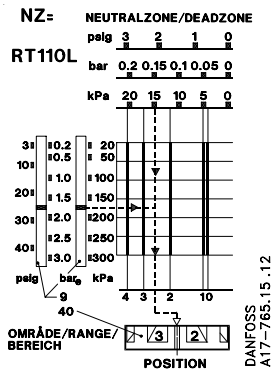


Fig. 13

Ejemplo

Conjuntamente con un convertidor estático de frecuencia VLT®, los presostatos de zona neutra tipo RT 200L pueden ser utilizados para el control infinitesimal de una bomba instalada, por ejemplo, en una instalación de elevación de presión. En este caso, la bomba debe ser regulada para va-lores superiores e inferiores de 32 y 35 m de agua.

El RT 200L debe ser ajustado mediante la utilización del mando ajuste (5) fig. 8, en 3,5 bar (35 m de agua) menos el diferencial fijo de 0,2 bar.

El ajuste de rango es 3,5-0,2 = 3,3 bar.

La zona neutra, 35-32 = 3 m de agua, que corresponde a 0,3 bar, debe ser ajustada en el disco de zona neutra (40) fig. 8, pág. 9. De acuerdo con el diagrama de la figura 10, el disco se ajusta en 1 o un poco más. Un ajuste más preciso puede obtenerse utilizando el equipo de prueba ilustrado en la fig. 14.

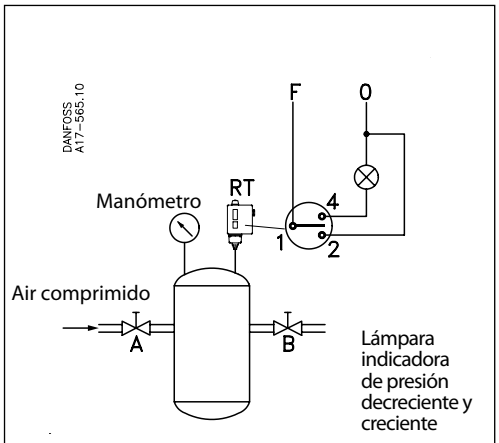
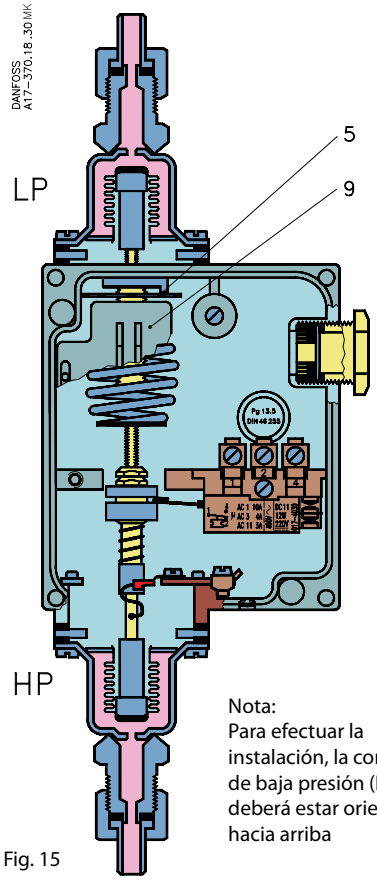


Fig. 14
Equipo de prueba para ajustar el presostato

Aplicación

Control y visualización de diferenciales de presión
Un presostato diferencial es un conmutador controlado por presión que conecta y desconecta la corriente en función del diferencial de presión entre los elementos de fuelle antagónicos y el valor ajustado en la escala. Esta unidad puede obtenerse también con zona neutra ajustable (como el RT-L que se describe en la página 9.

Ajuste



Nota:
Para efectuar la instalación, la conexión de baja presión (LP) deberá estar orientada hacia arriba

Fig. 15

5. Disco de ajuste
9. Escala de rango

El disco de ajuste (5) es accesible al ser retirada la cubierta frontal. La presión diferencial se ajusta haciendo girar el disco con un destornillador al mismo tiempo que se observa la escala (9).

En los presostatos diferenciales provistos de un interruptor, el diferencial de contacto es fijo porque las unidades tienen un diferencial de presión fijo. En las unidades con zona neutra ajustable, el disco de zona neutra debe también ser ajustado. Véanse diagramas en la fig. 16.

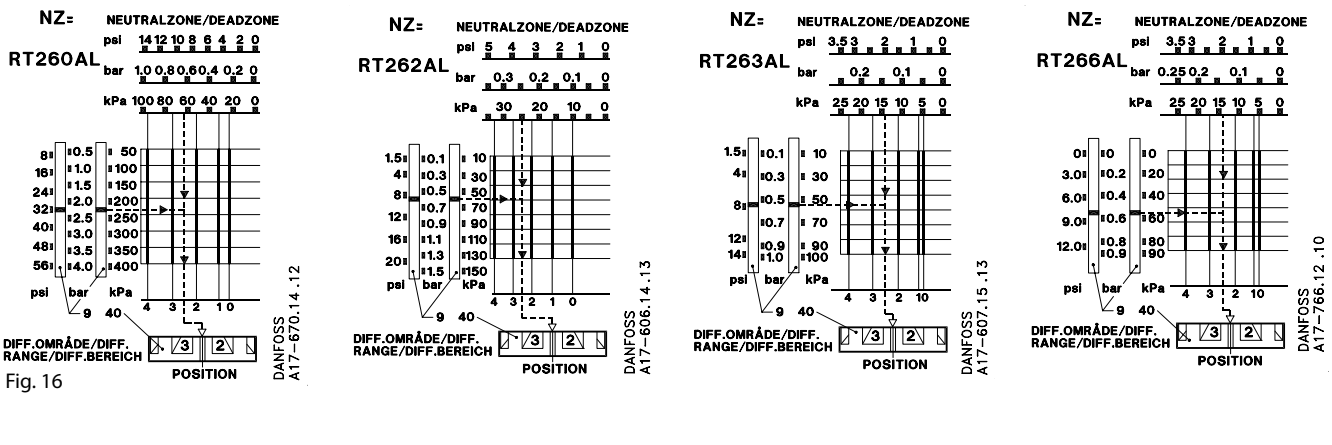


Fig. 16

Funcionamiento

a. Unidades con conmutador (SPDT)

Si la presión diferencial disminuye por debajo del valor ajustado, los contactos 2-1 se cierran y los contactos 1-4 se abren. Los contactos 2-1 se abren de nuevo y los contactos 1-4 se cierran cuando la presión diferencial ha subido hasta el valor de rango ajustado más el diferencial de contacto fijo.

I. Los contactos se cierran cuando la presión diferencial disminuye por debajo del valor de rango ajustado.

II. Los contactos se cierran cuando la presión sube por encima del valor de rango ajustado más la diferencial mecánica fijo.

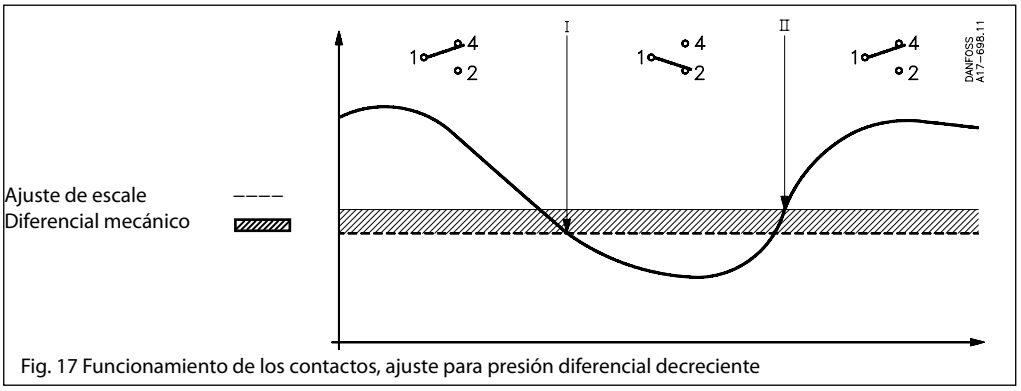


Fig. 17 Funcionamiento de los contactos, ajuste para presión diferencial decreciente

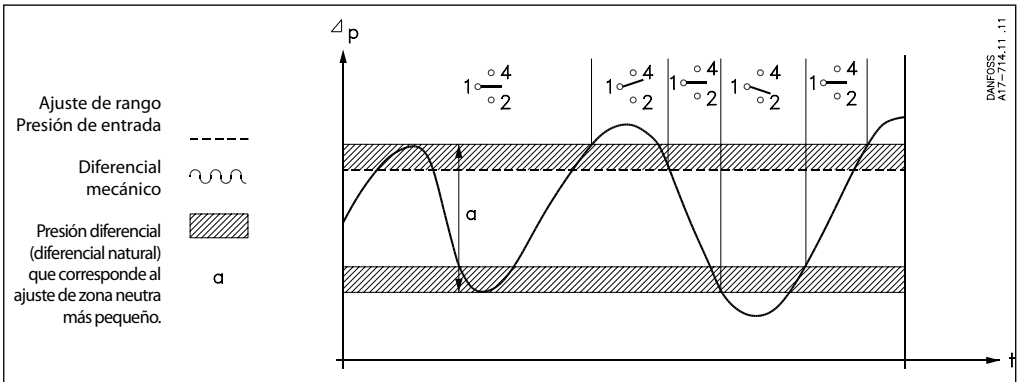
b. Unidades con zona neutra ajustable (SPDTNP)

Si la presión diferencial sube por encima del valor ajustado más el diferencial, los contactos 1-4 se cierran. Cuando la presión disminuye en un valor igual al de la diferencial (que es fija en esta unidad), los contactos 1-4 se abren. Si la presión disminuye hasta la zona neutra menos la diferencial, los contactos 2-1 se cierran. Cuando la presión diferencial sube de nuevo en un grado que corresponde a la diferencial, los contactos 2-1 se abren nuevamente.

El funcionamiento de los contactos puede ser resumido come sigue:

I. Reglaje del disco de ajuste para presión diferencial decreciente.

II. Disco de zona neutra ajustado para presión diferencial creciente.



a: La zona neutra y la presión de entrada pueden variar en este intervalo sin dar lugar al cierre de los contactos 1-2 o 1-4.

Fig. 18. Funcionamiento de los contactos, ajuste de zona neutra

Ejemplo 1

Cuando la presión diferencial rebasa el valor de 1,3 bar, el filtro ha de ser limpiado. La presión estática encima del filtro es de 10 bar.

De acuerdo con la tabla de pedidos de la página 4, se elige un RT 260A (El RT 262A tiene una presión de funcionamiento máx. en el lado de baja presión (LP) de 6 bar y por tanto no es conveniente para esta aplicación).

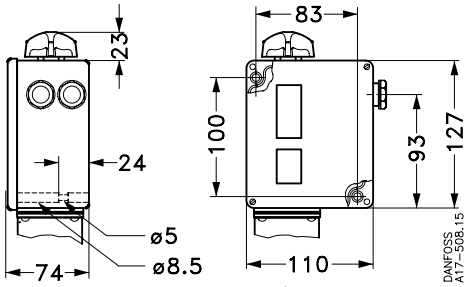
Ajuste: puesto que se necesita una señal para presión diferencial creciente el valor de ajuste pasa a ser de 1,3 - 0,3 bar = 1,0 bar.

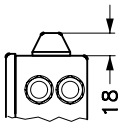
Ejemplo 2

La velocidad de una bomba de circulación debe ser controlada para dar una presión diferencial constante de 10 m de agua en una instalación de calefacción. La presión estática de la instalación es de 4 bar. Se elige un RT 262AL.

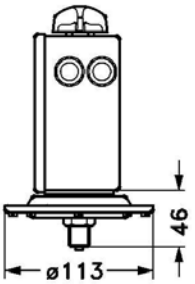
El disco de diferencial (5),fig. 15 pág. 13 debe ser ajustado en 1 bar (10 m de agua) menos el diferencial fijo de 0,1 bar, es decir en 0,9 bar. El disco de zona neutra se ajusta en fábrica (marcado en rojo).

Dimensiones y peso

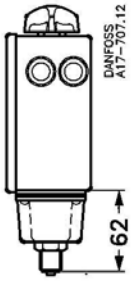




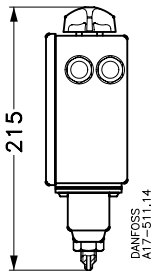
RT 5, 110, 112, 116, 117, 200
Versión inaccesible con tapa a prueba de intervenciones no autorizadas y cubierta ciega



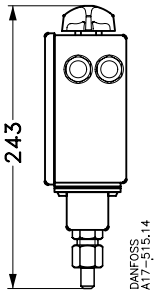
RT 13



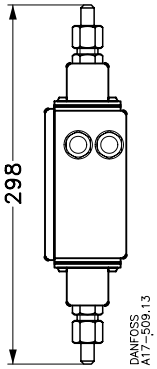
RT 5, 110, 112, 116, 117, 117L, 121, 200, 200L



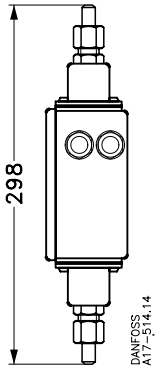
RT 5



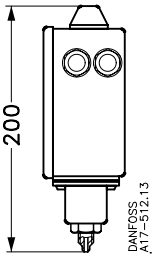
RT 1A, 1AL



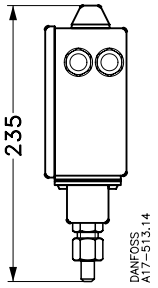
RT 260A, 260AL



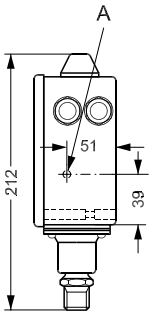
RT 262A, 262AL, 263AL



RT 5

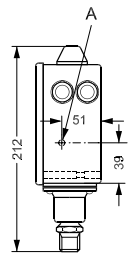


RT 5A, 5AL

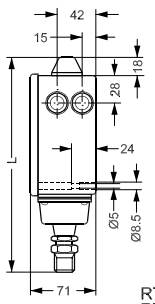


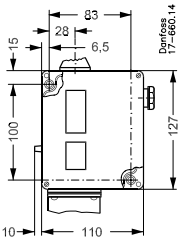
: Pulsador de rearme externo, sólo para RT...B

RT 30 AW, -B, -S	L = 225
RT 19 W, -B, -S	L = 228
RT 33 B, 35W	L = 221
RT 112 W	L = 210
RT 31 W-B, -S	L = 212
RT 32 W-B	L = 212



RT 31W,-B,-S
RT 32W,-B,-S

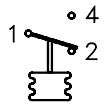
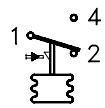
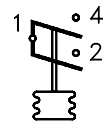




RT 30AW,-B,-S, L=225
RT 19W,-B,-S, L=228
RT 33B, 35W L=221
RT 112W L=210

Peso: approx. 1 kg

Recambios y accesorios

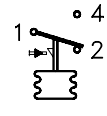
Versión	Simbolo	Descripción	Carga de contacto	Nº de código
Standard		Conmutador unipolar (SPDT) con placa de terminales a prueba de fugas de corriente **Montado en todas las versiones standard del tipo RT**[1]. Contactos inversores de acción brusca	*Corriente alterna:* AC-1 (carga óhmica): 10 A, 400 V AC-3 (carga inductiva): 4 A, 400 V AC-14/15 (bobina/transformador): 3 A, 400 V Rotor bloqueado: 28 A, 400 V *Corriente continua:* DC 13/14: 12 W, 230 V	**017-403066**
Con rearme máx.		Para rearme manual de la unidad después de la conmutación de los contactos al subir la presión. **Para unidades con dispositivo de rearme máx.**		**017-404266**
Con rearme mín.		Para rearme manual de la unidad después de la conmutación de los contactos al disminuir la presión. **Para unidades con dispositivo de rearme mín.**		**017-404166**
Standard		Conmutador unipolar (SPDT) con contactos dorados (sin óxido) aumenta la fiabilidad de la conexión en sistemas de alarma y de control, etc. Contactos inversores de acción brusca. Placa de terminales a prueba de fugas de corriente.	*Corriente alterna* AC-1 (carga óhmica): 10 A, 400 V AC-3 (carga inductiva): 2 A, 400 V AC-14/15 1 A, 400 V Rotor bloqueado: 14 A, 400 V *Corriente continua:* DC-13/14: 12 W, 230 V	**017-424066**
Cierra simultáneamente dos circuitos		Conmutador unipolar que cierra simultáneamente dos circuitos al subir la presión. Contactos inversores de acción brusca. Placa de terminales a prueba de fugas de corriente.	*Corriente alterna:* AC-1(carga óhmica): 10 A, 400 V AC-3 (carga inductiva): 3 A, 400 V AC-14/15 2 A, 400 V Rotor bloqueado: 20 A, 400 V *Corriente continua:* DC-13/14: 12 W, 230 V * Si la corriente pasa por los contactos 2 y 4, es decir si los terminales 2 y 4 están conectados pero no el contacto 1, la carga máx. autorizada aumenta hasta 90 W, 220 V - - -.	**017-403466**
Con contactos inversores de acción no brusca		Conmutador unipolar con contactos inversores de acción no brusca. Contactos dorados (sin óxido)	*Corrienta alterna o continua:* 25 VA, 24 V	**017-018166**

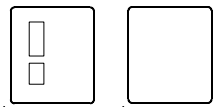
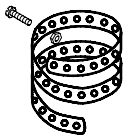
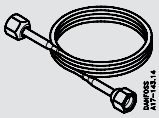
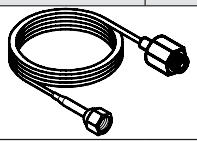
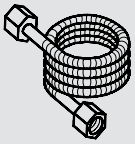
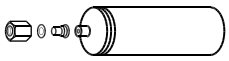
[1]) Tratándose de cargas que conllevan corrientes/tensiones pequeñas, pueden apare cer fallos en los contactos de plata debido a oxidación. En instalaciones donde tales fallos de contactos sean de importancia para el funcionamiento del sistema (alarmas o similarses), se deberían utilizar contactos dorados.

Los sistemas de contactos para aparatos con zona neutra no se suministran como recambio. El ajuste del sistema de contactos está adaptado al resto de los componentes del aparato, por lo tanto no pueden ser recambiados.

Los contactos del conmutador se representan en la posición que ocupan cuando disminuye la presión/temperatura, es decir después del desplazamiento hacia abajo del eje principal del aparato RT.
El indicador de ajuste del termostato muestra el valor de escala para el cual se produce la conmutación de los contactos cuando la presión/temperatura disminuye.
Una excepción es la del conmutador núm. **017-403066** con rearme máximo, en el que el indicador de ajuste muestra el valor de escala para el cual se produce la conmutación de los contactos, cuando la presión sube.

Conmutadores

Versión	Simbolo	Descripción	Carga de contacto	Nº de código
Con rearme mín.		Para rearme manual de la unidad depués de la conmutación de los contactos al disminur la presión. Contactos dorados (sin óxido)	*Para aplicaciones de alarma* *Corriente alterna:* AC-1 (carga óhmica): 10 A, 400 V AC-3 (carga inductiva): 2 A, 400 V Corriente a plena carga: 2 A, 400 V AC-14/15: 1 A, 400 V Rotor bloqueado: 14A, 400 V *Corriente continua:* DC-13/14: 12W, 230 V *Para aplicaciones de control* máx. 100 mA / 30 V c.a./ c.c. mín. 1 mA / 5 V c.a. / c.c.	**017-404766**
Con rearme máx.		Para rearme manual de la unidad espués de la conmutación de los contactos al subir la presión. Contactos dorados (sin óxido)		**017-404866**

Pieza		Descripción	Núm.	Nº de código
Cubiertas		Cubiertas: Poliamida Con ventanas Color: Gris claro RAL 7035 Sin ventanas	5 5	**017-436166** **017-436266**
Mando de ajuste		Mando de ajuste: Gris claro Ral 7035	30	**017-436366**
Tapa de estanqueidad		La tapa de estanqueidad está destinada a sustituir al mando de ajuste Negro de tal manera que el ajuste puede ser modificado sólo con herramientas	20	**017-436066**
Tornillo de precinto para cubiertas & cápsula protectora			1+1	**017-425166**
Cinta de fijación		Para todos presostatos RT con serpentin de amortiguación u otras conexiones más largas L= 392 mm	10	**017-420466**
Conector con casquillo		Paso de rosca ISO 228/1, conector G⅜, casquillo y arandela/ diámetro externo 10 mm/ interno 6.5 mm, para ser unido a tubo de acero o de cobre mediante soldadura eléctrica o soldadura fuérte.	5	**017-436866**
Conector		Tuerca abocardada de 7/16 - 20 UNF para ¼ CU, latón llave de 16	10	**011L1101**
Reductor		Paso de rosca ISO 228/1, G½A × G⅜, acero, llave de 22	1	**017-421966**
Adaptador		Paso de rosca ISO 228/1, G⅜ × ⅜ - 27 NPT con arandela de cobre, láton llave de 22	1	**060-333466**
Adaptador		Paso de rosca ISO 228/1, G⅜ A × ¼ - 18 NPT con arandela de cobre, láton llave de 22	1	**060-333566**
Adaptador		Paso de rosca ISO 228/1, G⅜ × ¼ - 18 NPT con arandela de cobre, láton llave de 22	1	**060-333666**
Adaptador		Paso de rosca ISO 228/1, G⅜ A - G ¼ A, láton, llave de 17	1	**060-324066**
Adaptador		Paso de rosca ISO 228/1, G⅜ A × R ⅜ (ISO 7/1) láton, llave de 17	1	**060-324166**
Serpentin de amortiguación	 0.50 m 1.00 m 1.50 m 2.00 m	Serpentin de amortiguación con conector de 7/16 - 20 UNF. Si se desea utilizar un serpentin de amortiguación con aparatos RT con conexion de paso de rosca ISO 228/1, G⅜, habrá que utilizar un reductor, núm. 017-420566. El serpentin de amortiguación está disponible con varias longitudes de tubo capilar, consulte Danfoss.	1	**060-019066** **060-019166** **060-019266** **060-019366**
Serpentin de amortiguación		Paso de rosca ISO 228/1, serpentin de amortiguación con conectores de G⅜ y tubo capilar de cobre de 1.5 m. Se suministran arandelas estándar.	1	**060-104766**
Serpentin de amortiguación blindado		Paso de rosca ISO 228/1, serpentin de amortiguación con conectores de G⅜ y 1 m tubo capilar de cobre blindado. Se suministran arandelas estándar.	1	**060-333366**
Campana de aire para control de nivel de líquido RT 113		Campana de aire, diámetro ext de 62 mm × longitud de 204 mm. Paso de rosca ISO 228/1, conector de G⅜ , tuerca y casquillo (10 mm de diám. ext. / 6.5 mm de diám. int.) para unir a tubo de acero o cobre mediante soldadura eléctrica o soldadura fuerte. La campana de aire es de latón CuZn 37, W.no. 2.0321.	1	**017-401366**

Instalación

Las unidades RT tienen dos orificios de montaje que son accesibles al ser retirada la cubierta frontal. Las unidades provistas del conmutador 017-018166*) deben instalarse con el mando de ajuste orientado hacia arriba. Cuando se instalan presostatos diferenciales, el lado de baja presión (marcado LP) debe estar orientado hacia arriba. Los demás presostatos de la serie RT pueden instalarse en cualquier dirección. En instalaciones sometidas a fuertes vibraciones en dirección vertical, es ventajoso instalar el aparato con la entrada roscada para cables orientada hacia abajo.

*) Sistema de contactos de acción no brusca. Véase el apartado de recambios y accesorios, pág. 13.

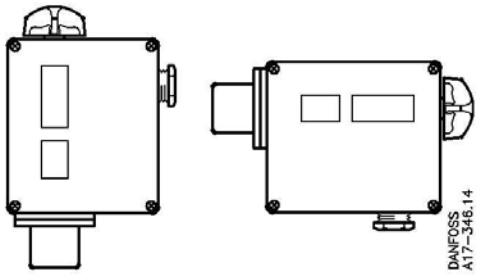


Fig. 1 Posicionamiento de la unidad

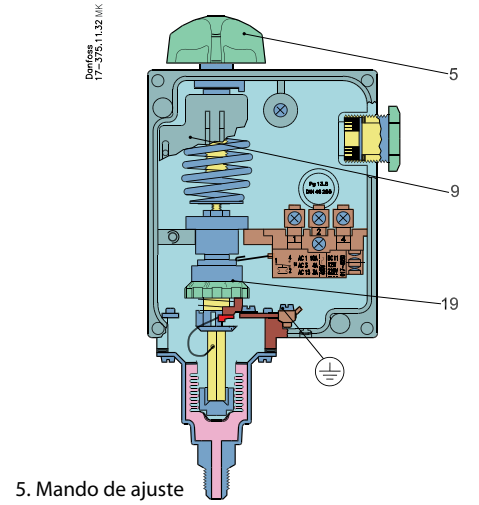
Conexión de presión
Cuando se efectúa el montaje o el desmontaje de las tuberías de presión las superficies planas previstas para una llave en la conexión de presión deberán ser utilizadas para aplicar un par antagónico.

Instalaciones de vapor
Para proteger el elemento de presión contra una temperatura superior a la temperatura máxima del fluido 150°C (RT 113 90°C), se recomienda intercalar un bucle lleno de agua.

Sistemas de agua
El agua contenida en el elemento de presión no es dañina, pero si existe la posibilidad de congelación, el elemento de presión lleno de agua puede reventar. Para evitar esto se hará que el presostato funcione sobre un colchón de aire.

Resistencia al fluido
Véase tabla de materiales en contacto con el fluido. Si se trata de agua de mar, se recomiendan los presotatos de diafragma de los tipos KPS 43, 45 y 47.

Pulsaciones
El presostato debe ser conectado de tal manera que el elemento de presión sea afectado lo menos posible por las pulsaciones. Es posible intercalar un serpentín de amortiguación (véase "Accesorios"). En el caso de fluidos sometidos a fuertes pulsaciones, puede ser conveniente utilizar los presostatos de diafragma de los tipos KPS 43, 45 y 47.



5. Mando de ajuste
9. Escala de rango
19. Disco de ajuste de diferencial

Fig. 2

Ajuste
El rango se ajusta utilizando el mando de ajuste (5) al mismo tiempo que se observa la escala (9). Es preciso utilizar herramientas para ajustar los presostatos provistos de una tapa de cierre hermético. En las unidades que tienen un diferencial fijo, se determina naturalmente la diferencia entre las presiones de conexión y de desconexión. En unidades que tienen un diferencial ajustable, es preciso retirar en primer lugar la cubierta frontal. El disco de diferencial (19) debe ajustarse de acuerdo con el diagrama.

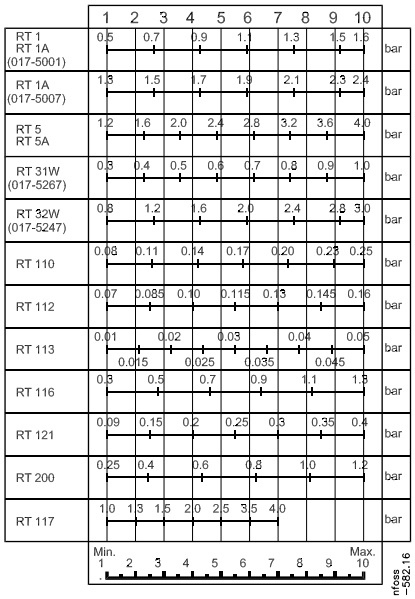


Fig. 3
Escala que puede obenerse en el disco de diferencial

Selección de la diferencial
Para asegurar el funcionamiento correcto de la instalación, es necesario que la presión diferencial sea la adecuada. Un diferencial demasiado pequeño dará lugar a períodos de funciona-
miento cortos y al riesgo de oscilaciones periódicas. Un diferencial demasiado grande producirá grandes oscillaciones de presión.

La escala de valores diferenciales es orientativa.

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Data sheet

Pressure switch and thermostat Types KP and KPI



The KP and KPI pressure switches and thermostats are used for control, monitoring and alarm systems in a wide variety of industry applications.

KP pressure switches are mainly used for gaseous fluid whereas KPI pressure switches are more for liquid and gaseous fluid.

The KP pressure range include special designed pressure switches and limiters for steam boilers and other heating applications.

For water pump control and protection (dry run) the dual pressure switch KP44 is suitable and secure improved life time of the water pump.

Features

- Wide setting range,
- Shock and impact resistant,
- Snap action electrical contacts minimize chatter, bounce, and wear, and ensure long term electrical and mechanical reliability,
- Small dimensions. Space saving – easy to install in panels,
- Electrical connection from front of the unit makes rack mounting easier and also saves space,
- Suitable for alternating current and direct current,
- Single pressure switches and thermostats are fitted with a single pole double throw contact system (SPDT),
- Can be used for both liquids and gases (KPI),
- Manual trip function enables electrical connections verification without any tools or pressure changes in the application,
- Versions with automatic and manual reset available.

Approvals

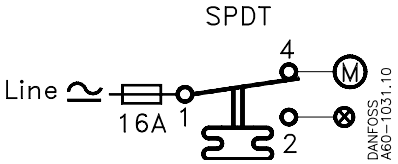
CE-marked in accordance with LVD 2006/95/EC:
EN 60947-1, EN 60947-4-1, EN 60947-5-1
Underwriters Laboratories Inc., UL

China Compulsory Certificate, CCC
(excluding boiler versions)
GOST (excluding KPI)

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SINGLE PRESSURE SWITCH

Technical data

Description		KP 35, KP 36	KPI 35, KPI 36	KPI 38	KP 34, KP 35, KP 36, KP 37 boiler version
Ambient temperature [°C]		-40 – 65 °C (for max. 2 hours up to 80 °C)			
Media temperature [°C]		-40 – 100 °C			
Fluid		Gaseous media	Gaseous media and liquids		Steam, air, gaseous media & liquids
Parts in contact with fluid	**Bellows**	Phosphor bronze or Stainless steel	Phosphor bronze		Stainless steel
	Pressure connector	Free-cutting steel (nickel plated) or Stainless steel	Brass	Free-cutting steel (nickel plated)	
Contact system		 Single-pole double throw (SPDT)			
Contact load, Silver		*Alternting current:* AC-1: 16 A, 400 V AC-3: 16 A, 400 V AC-15: 10 A, 400 V *Direct current:* DC-13: 12 W, 220 V	*Alternting current:* AC-1: 10 A, 440 V AC-3: 6 A, 440 V AC-15: 4 A, 440 V *Direct current:* DC-13: 12 W, 220 V		*Alternting current:* AC-1 : 16 A, 440 V AC-3 : 16 A, 440 V AC-15 : 10 A, 440 V *Direct current:* DC-13: 12 W, 220 V
Contact load, Gold plated contact set		See information page 15.			
Enclosure, IP30 grade		Unit must be mounted on a flat surface/ a flat fitting and all unused holes covered.			
Enclosure, IP44 grade		Mounted as IP30 plus fitting of top cover, code no. **060-109766.**			
Enclosure, IP55 grade		Unit mounted in a special IP55 enclosure, code no. **060-033066** or **060-062866.**			
Cable entry		Rubber cable gland entry for 6 – 14 mm diameter cables.			
Mounted on back plate/wall bracket		Vibration proof in the range 0 – 1000 Hz, 4 g (1 g = 9.81 m/s^2).			
Mounted on angle bracket		Not recommended in areas where vibrations occur.			

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Ordering

Pressure switch, types KP 35 and KP 36

Type	Setting range p_e [bar]	Differential [bar]	Permissible operating pressure p_e [bar]	Max. test pressure [bar]	Pressure connection	Contact material	Code no.
KP 35	-0.2 – 7.5	0.7 – 4.0	17	22	G 1/4 A	silver	**060-113366** **060-113391**[1]
	-0.2 – 7.5	0.7 – 4.0	17	22	G 1/4 A	gold-plated	**060-504766**
	-0.2 – 7.5	0.7 – 4.0	17	22	G 1/4 A	silver	**060-538666**[2]
	-0.2 – 7.5	0.7 – 4.0	17	22	G 1/4 A	silver	**060-450366**[3]
KP 36	2.0– 14.0	0.7 – 4.0	17	22	G 1/4 A	gold-plated	**060-110866** **060-110891**[1]
	2.0– 14.0	0.7 – 4.0	17	22	G 1/4 A	silver	**060-113766**
	2.0– 14.0	0.7 – 4.0	17	22	G 1/4 A	silver	**060-538766**[2]
	4.0 – 12.0	0.5 – 1.6	17	22	G 1/4 A	gold-plated	**060-122166**
	4.0 – 12.0	0.5 – 1.6	17	22	G 1/4 A	silver	**060-114466**
	4.0 – 12.0	0.5 – 1.6	17	22	G 1/4 A	silver	**060-450166**[3]

[1] Available only in Asia market
[2] IP55 transparent enclosure
[3] Stainless steel version, IP55 non-transparent enclosure

Pressure switch, types KPI 35 – KPI 38

Type	Setting range p_e [bar]	Differential [bar]	Permissible operating pressure p_e [bar]	Max. test pressure [bar]	Pressure connection	Contact material	Code no.
KPI 35	-0.2 – 8.0	0.4 – 1.5	18	18	G 1/4 A	silver	**060-121766**
	-0.2 – 8.0	0.4 – 1.5	18	18	G 1/4 A	gold-plated	**060-316466**
	-0.2 – 8.0	0.5 – 2.0	18	18	G 1/4 A	silver	**060-121966**
	-0.2 – 8.0	0.4 – 1.5	18	18	G 1/4 A	silver	**060-315766**[1]
KPI 36	4 .0– 12.0	0.5 – 1.6	18	18	G 1/4 A	silver	**060-118966**
	4.0 – 12.0	0.5 – 1.6	18	18	G 1/4 A	gold-plated	**060-113866**
	2.0 – 12.0	0.5 – 1.6	18	18	G 1/4 A	silver	**060-316966**
	2.0 – 12.0	0.5 – 1.6	18	18	G 1/4 A	silver	**060-319366**[2]
KPI 38	8.0 – 28.0	1.8 – 6.0	30	30	G 1/4 A	silver	**060-508166**
	8.0 – 28.0	1.8 – 6.0	30	30	G 1/4 A	silver	**060-541866**[2]

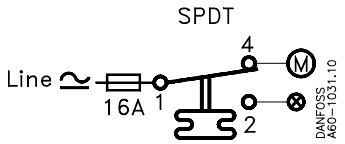
[1] IP55 transparent enclosure
[2] IP55 non-transparent enclosure

Ordering
(continued)

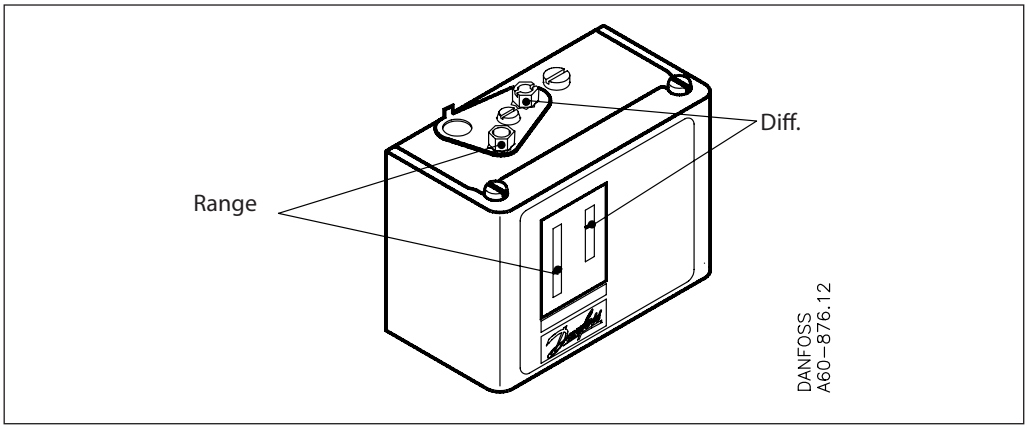
Pressure switch, types KP 34 – KP 37, boiler version

Type	Setting range p_e [bar]	Differential [bar]	Reset	Pressure connection [bar]	Max. test pressure [bar]	Contact material	Code no.
KP 34	0.1 – 1.0	0.1 – 0.4	Automatic	G $^1/_2$ A	4.0	silver	**060-216466**
	0.1 – 1.0	0.2	Manual	G $^1/_2$ A	4.0	silver	**060-216366**
KP 35	0.4 – 3.4	0.4 – 2.2	Automatic	G $^1/_2$ A	10	silver	**060-216666**
	0.4 – 3.4	0.5	Manual	G $^1/_2$ A	10	silver	**060-216566**
KP 36	1.0 – 10.0	0.7 – 4.0	Automatic	G $^1/_2$ A	17	silver	**060-215966**
	1.0 – 10.0	0.7	Manual	G $^1/_2$ A	17	silver	**060-216066**
KP 37	4.0 – 20.0	1.8 – 3.1	Automatic	G $^1/_2$ A	28	silver	**060-216166**
	4.0 – 20.0	3.0	Manual	G $^1/_2$ A	28	silver	**060-216266**

Contact system and application

Switch type – single pole double throw	Switch action	Application
 SPDT	1. Terminal 1 – 4 close high and open low Terminal 1 – 2 can be used as low pressure alarm	1. Low pressure cut-out
	2. Terminal 1 – 2 open high and close low Terminal 1 – 4 can be used as high pressure alarm	2. High pressure cut-out

Setting



Cut-in and cut-out pressures of the system should always be checked with an accurate pressure gauge.

Pressure setting for switches with automatic reset.
1. Set the cut-in pressure on the "CUT-IN" scale (range scale),
2. Set the differential on the "DIFF" scale.

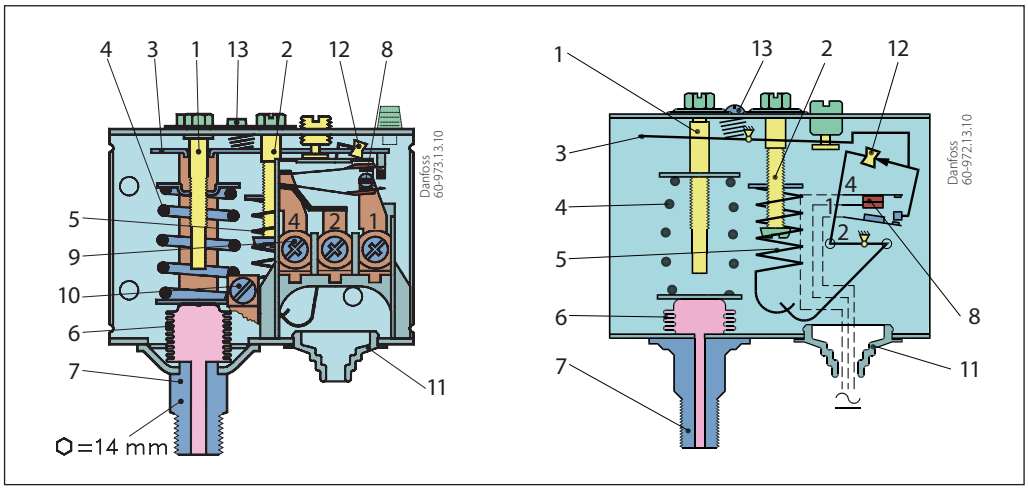
The cut-out pressure must be above absolute vacuum (pe = -1 bar.).
For high pressure switches the restart pressure is equal to cut-out pressure minus differential.

Pressure switches with manual reset
Set the cut-out presure on the "CUT-OUT" scale (range scale).
Low pressure limiters can be manually reset when the pressure is equal to the cut-out pressure plus the differential. High pressure limiters can be manually reset when the pressure is equal to the stop pressure minus the differential.

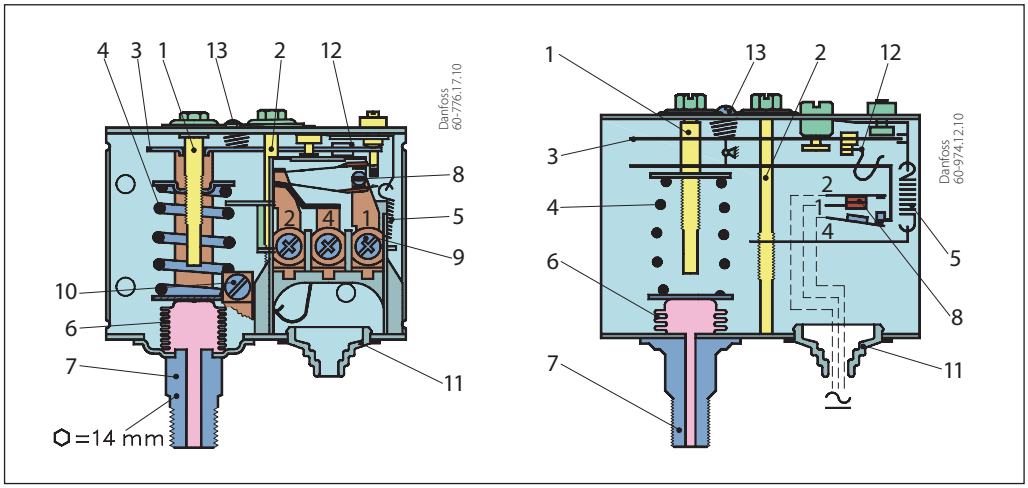
Note:
For low pressure switches the restart pressure is equal to cut-out pressure plus differential value.

Design / Function

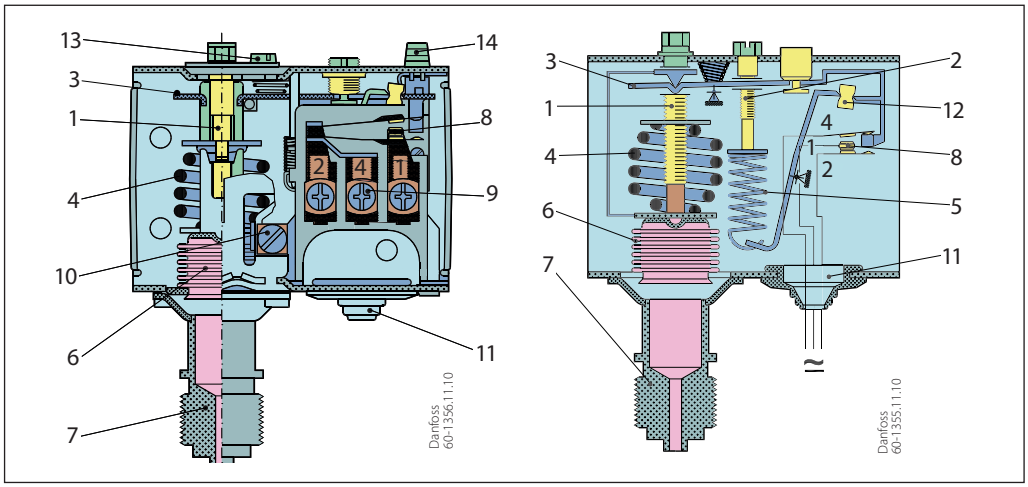
Key sketch of KP pressure switch



Key sketch of KPI pressure switch



Key sketch of KP pressure switch, boiler version



1. Setting spindle
2. Differential setting spindle
3. Main arm
4. Main spring
5. Differential spring
6. Bellows
7. Pressure connector
8. Contact system
9. Connection terminals
10. Earth terminal
11. Cable entry
12. Omega spring (KPI)
12. Tumbler (KP)
13. Locking screw
14. Manual reset

The contact system in KP pressure switches has a snap function. This means that the bellows is active only when the cut-in or cut out value is reached.
The bellows is connected to the pressure of the controlled plant via the connector (7)

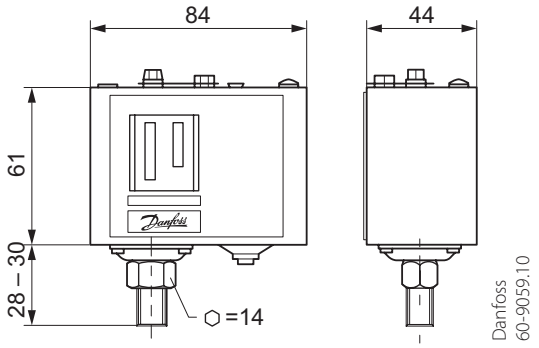
Danfoss KPI pressure switches are designed so that the bellows moves in the same proportion as the pressure switches change. To ensure a snap function on contact change over, an omega spring is located between bellows and contact system.

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Dimensions [mm] and weights [kg]

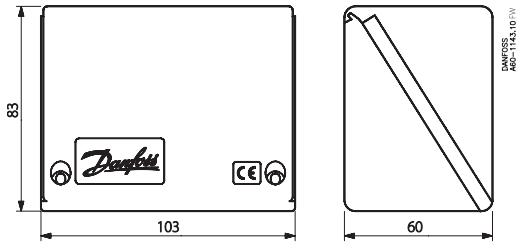
Pressure switch, types KP 35, KP 36, KPI 35, KPI 36 and KPI 38:

Standard IP30 housing

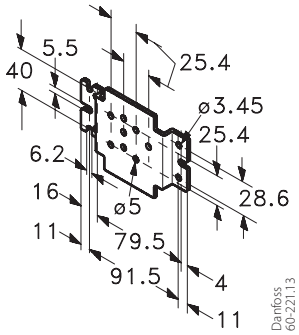


Net weight approx. 0.3 kg

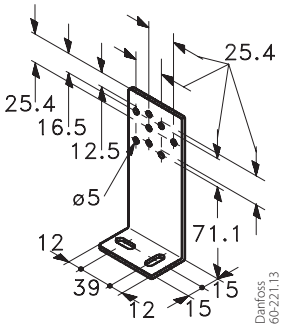
IP 55 enclosure



Wall bracket

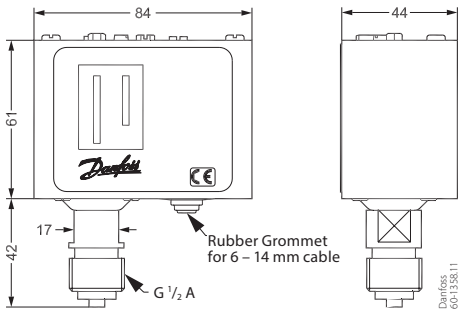


Angle bracket



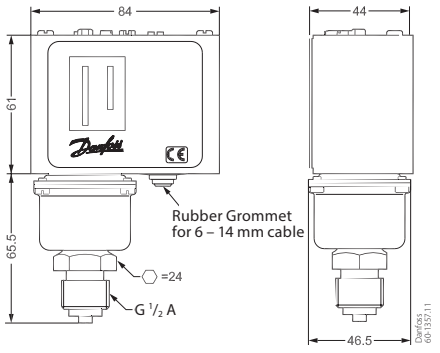
Dimensions [mm] and weights [kg]
(Boiler version)

Pressure switch, types KP 35 and KP 36



Net weight approx. 0.34 kg

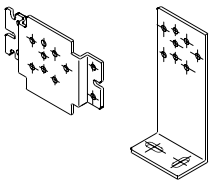
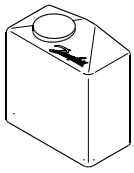
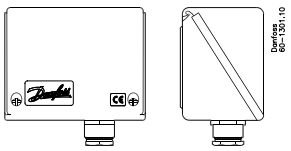
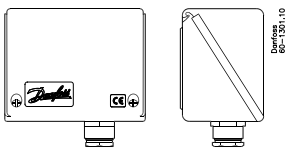
Pressure switch, type KP 34



Net weight approx. 0.43 kg

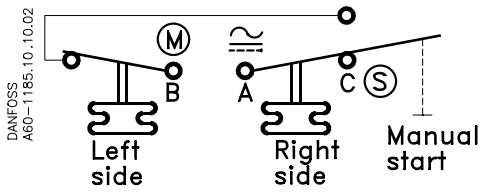
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Accessories for KP pressure switches

Part	Symbol	Description	Total	Code no.
Brackets with mounting screws and washers		Wall bracket for KP	1	**060-105566**
		Angle bracket for KP	1	**060-105666**
Screwed cable entry		PG 13.5 with special nut For 6 –14 mm diameter cables	1	**060-105966**
Sealing screw		For sealing the setting on KP	2	**060-105766**
Top cover		If a bracket is mounted on the backplate of the housing, the KP thermostats will have an IP44 grade of enclosure. The cover protects the setting spindles.	1	**060-109766**
Protective cap		Protective cap for KP thermostats. To protect the unit against rain and humidity. Grade of enclosure: IP44 Material: Polyethylene Max. ambient temperature: 65 °C Min. ambient temperature: -40 °C	1	**060-003166**
IP55 enclosure		If the unit risk being exposed to heavy water influence a better grade of enclosure can be achieved when mounting product in a special IP55 enclosure.	1	**060-033066**
IP55 transparent enclosure		If the unit risk being exposed to heavy water influence a better grade of enclosure can be achieved when mounting product in a special IP55 enclosure.	1	**060-062866**

DUAL PRESSURE SWITCH

Technical data

Ambient temperature [°C]	-40 – 65 °C (for max. 2 hours up to 80 °C)	
Media temperature [°C]	Max. 100 °C	
Fluid	Fresh water	
Parts in contact with fluid	Bellows	Phosphor bronze, CuSn6
	Pressure connector	Free-cutting steel (nickel plated)
Contact system		
Contact load, Silver	*Alternting current:* AC-1: 16 A, 400 V AC-3: 16 A, 400 V AC-15: 10 A, 400 V *Direct current:* DC-13: 12 W, 220 V	
IP level	IP22	
Cable entry	Rubber cable gland entry for 6 – 14 mm diameter cables	
Mounted on backplate or wall bracket	Vibration-proof in the range 0 – 1000 Hz, 4g (1g = 9.81m/s²)	
Mounting on angle bracket	Not recommended for areas where vibration occurs	

Ordering

Pressure switch, type KP 44

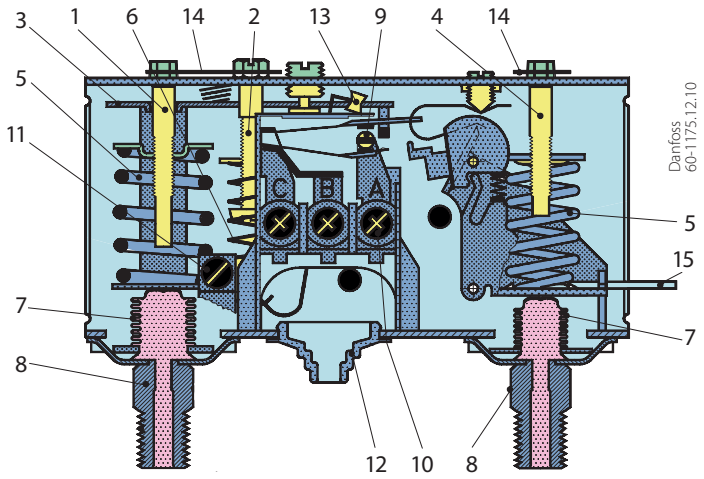
Pressure range		Differential		Permissible operating pressure p_e	Max. test pressure	Pressure connection	Contact material	Code no.
Control [bar]	Safety [bar]	Control [bar]	Safety [bar]	[bar]	[bar]			
2.0 – 12.0	0.5 – 6.0	0.7 – 4.0	1.0	Left side: 17 Right side: 17	Left side: 25 Right side: 19	2 × G ¼ A	silver	**060-001366**

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Design / Function

1. Lefthand pressure setting spindle
2. Differential setting spindle
3. Main arm
4. Righthand pressure setting spindle
5. Main spring
6. Differential spring
7. Bellows
8. Pressure connections
9. Contact system
10. Terminal
11. Earth terminal
12. Cable entry
13. Tumbler
14. Locking plate
15. Impulse lever

Key contact system of KP 44 pressure switch

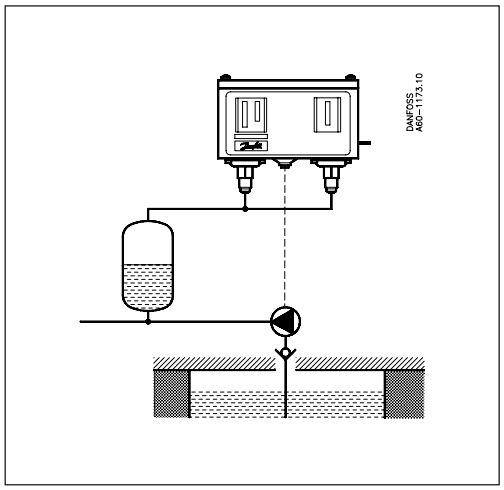


Water supply from reservoir or well

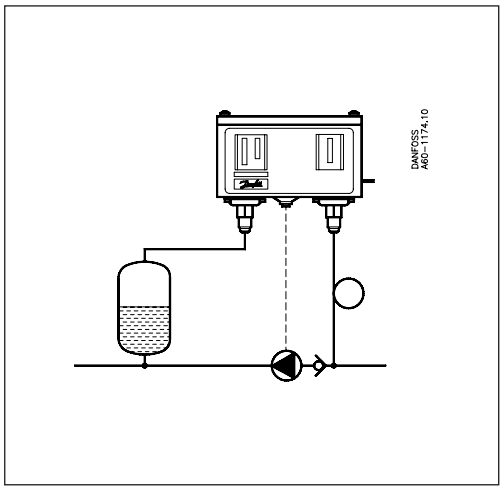
The contact system in the KP 44 has a snap-action function and allows the bellows moves only when the cut-in or cut-out value is reached. If water is running short in the well or reservoir, the pump will no longer be able to increase the pressure to the cut-out value. Consequently the pump will keep running - perhaps without water. However, the KP 44 pressure switch will stop the pump as soon as the righthand bellows pressure drops below the safety cut-out setting.
The pump can be started again by lifting the impulse lever. The pump will continue to operate when the impulse lever is released, provided that the righthand bellows pressure is higher than the safety cut-out setting plus a fixed differential of 1 bar. If this is not the case, the pump will cut-out again indicating insufficient water supply.

Pressurized water supply direct to pump

When water supply fails on the inlet side, the pump will no longer be able to boost the pressure to the cut-out value. Consequently the pump will keep running - perhaps without water. However, the KP 44 pressure switch will stop the pump as soon as the pressure in the pump suction line drops below the safety cut-out setting. The pump will automatically start again when the pump suction pressure has reached the level of 1 bar above the safety cut-out setting.
Automatic start-up will only take place if the righthand bellows is connected to the pump suction line. Air pockets should be avoided to prevent the pump from starting up on air pressure rise, without the presence of water.



In a hydrophore system where water is pumped from a well or an open tank, both bellows are connected to a pressure outlet on the air side in the pump pressure line, if possible.



In a booster system receiving pressurized water the righthand bellows is connected
- to the low pressure side of the pump forautomatic start-up.
- to the high pressure side of the pump for manual start-up.

The lefthand bellows is always connected to the high pressure side of the pump.

Setting

Safety cut-out setting
The righthand bellows will automatically cut-out the pump at the safety cut-out setpoint. Automatic start-up, if any, will take place when the pressure has reached the level of 1 bar above the setpoint. Manual cut-in is made by lifting the impulse lever and releasing it again when the pressure has increased by min. 1 bar.

The safety cut-out setpoint is normally determined by the static pressure (the water column). However, in order to avoid disturbing signal interaction, care should be taken to ensure that the safety cut-out setting is at least 1.5 bar lower than the control pressure cut-in setting. See table with pressure setting examples below.

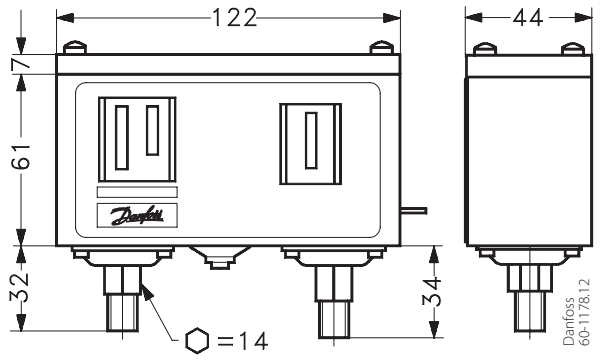
Required tap water pressure	≥2.3 bar	≥4.0 bar	≥5.0 bar	≥8.0 bar
Control pressure cut-out setting	3.0 bar	5.0 bar	8.0 bar	12 bar
Differential	0.7 bar	1.0 bar	3.0 bar	4.0 bar
Control pressure cut-in setting	2.3 bar	4.0 bar	5.0 bar	8.0 bar
Max. safety cut-out setting	0.8 bar	2.5 bar	3.5 bar	6.0[1] bar

[1] 6.0 bar is the normal max. setpoint

Control pressure settings
Control pressure cut-out setpoint is set on the lefthand pressure setting scale.

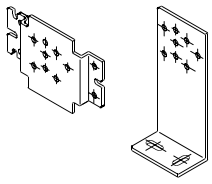
The differential is set between 0.7 and 4 bar. The control pressure cut-in setting will be the cut-out control pressure less the differential.

Dimensions[mm] and weights [kg]



Net weight approx. 0.5 kg

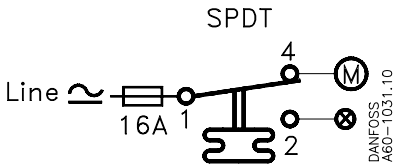
Accessories for KP 44 pressure switches

Part	Symbol	Description	Total	Code no.
Brackets with mounting screws and washers		Wall bracket	1	**060-105566**
		Angle bracket	1	**060-105666**
Screwed cable entry		Screwed cable entry Pg 13.5 with special nutfor 6 – 14 mm cables	1	**060-105966**
Sealing screw		For sealing the setting on KP	2	**060-105766**

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SINGLE THERMOSTAT

Technical data

Ambient temperature [°C]	-40 – 65 °C (for max. 2 hours up to 80 °C)
Sensor material	Tinned copper Cu/Sn5
Contact system	 Single-pole double throw (SPDT)
Contact load, Silver	*Alternting current:* AC-1: 16 A, 400 V AC-3: 16 A, 400 V AC-15: 10 A, 400 V *Direct current:* DC-13: 12 W, 220 V
Contact load, Gold plated contact set	See Information page 15.
Enclosure, IP30 grade	Unit must be mounted on a flat surface / a flat fitting and all unused holes covered.
Enclosure, IP44 grade	Mounted as IP30 plus fitting of top cover, code no. **060-109766.**
Enclosure, IP55 grade	Unit mounted in a special IP55 enclosure, code no. **060-033066** or **060-062866**. Exception: KP 75.
Cable entry	Entry for 6 – 14 mm diameter cable.
Mounted on backplate or wall bracket	Vibration-proof in the range 0 – 1000 Hz, 4 g (1 g = 9.81 m/s^2).
Mounted on angle bracket	Not recommended for areas where vibration occurs.

Ordering

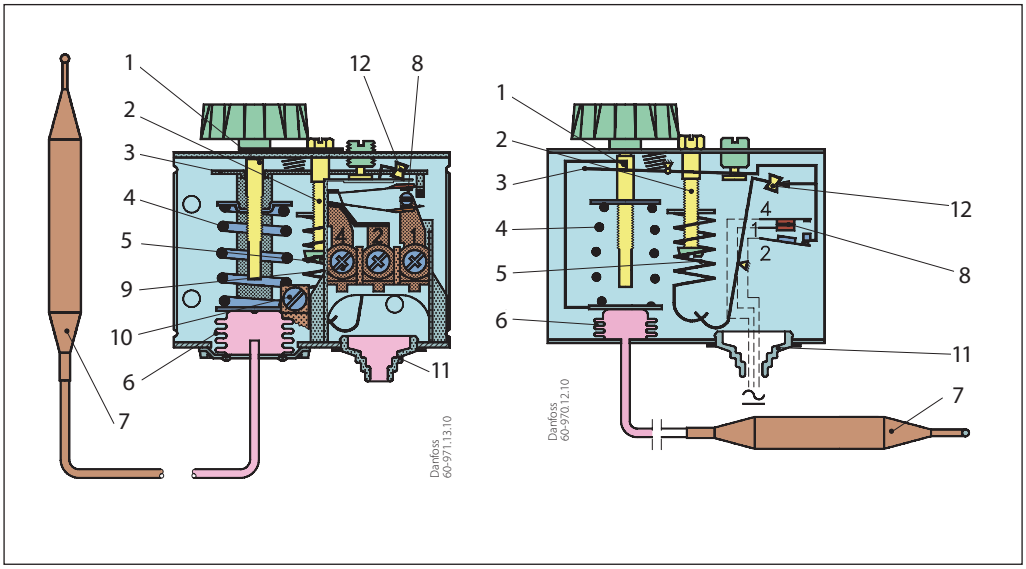
Thermostat, types KP 75 – KP 81

Type	Setting range [°C]	Differential [°C]	Max. sensor temperature [°C]	Capillary tube length [m]	Contact material	Code no.
KP 75	0 – 40	3 – 10	80	Room sensor	silver	**060L121266**
	0 – 40	3 – 10	80	Room sensor	gold-plated	**060L117166**
KP 78	30 – 90	5 – 15	150	2	silver	**060L118466**
KP 79	50 – 100	5 – 15	150	2	silver	**060L112666**
KP 81	80 – 150	7 – 20	200	2	silver	**060L112566**
KP 81	80 – 150	7 – 20	200	3	silver	**060L118366**
KP 81	80 – 150	7 – 20	200	5	silver	**060L117066**
KP 81 (max. reset)	80 – 150	8 (max. reset)	200	2	silver	**060L115566**

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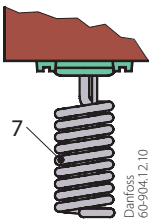
Design / Function

Key sketch of KP thermostat, types KP 78, KP 79, KP 81



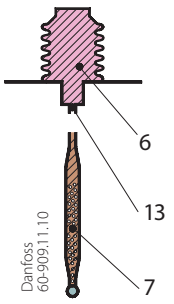
1. Temperature setting spindle
2. Differential setting spindle
3. Main arm
4. Main spring
5. Differential spring
6. Bellows
7. Sensor
8. Contact system
9. Connection terminals
10. Earth terminal
11. Cable entry
12. Tumbler

KP 75 room sensor



The contact system in KP thermostats has a snap function. This means that the bellows is active only when the cut-in or cut-out value is reached.

Charges



6. Bellows
7. Sensor
13. Capillary tube

Absorption charge
The charge consists partly of a superheated gas and partly of a solid substance with a large absorption surface.
The solid substance is concentrated in the sensor (7), and consequently it is always the sensor that comprises the temperature-regulating part of the thermostatic element.
The sensor can be placed both warmer or colder than the thermostat housing and capillary tube. However, placing it in an ambient temperature higher or lower than 20 °C can affect the accuracy of the scale.

Setting

Thermostats with automatic reset
Set the upper limit temperature on the range scale. Then set the differential on the DIFF scale.
The temperature set on the range scale is also the temperature at which contact changeover re-occurs on rising temperature.
The contacts changeover when the temperature has fallen to a value lower than that set on the DIFF scale.
If at lower settings the plant will not start/stop, the reason might be that the differential has been set too high.

Thermostats with minimum reset
Set the temperature on the range scale.
The differential setting is fixed.
Min. reset units will restart after the temperature at the thermostat sensor has risen by a value greater than that of the fixed differential.

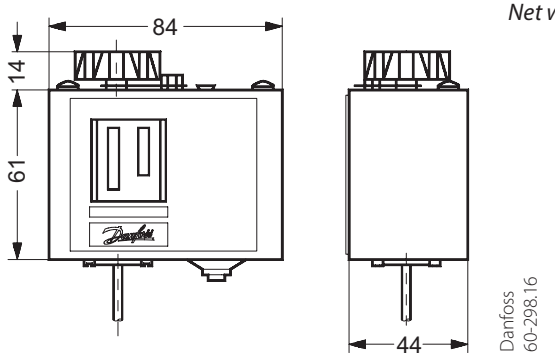
Thermostats with maximum reset
Set the stop temperature on the range scale.
The differential setting is fixed.
Max. reset units will restart after the temperature at the thermostat sensor has fallen by a value greater than that of the fixed differential

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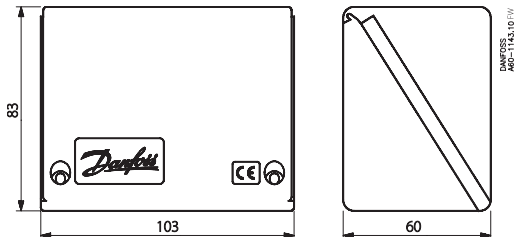
Dimensions [mm] and weights [kg]

Thermostat, types KP 75, KP 78, KP 79, KP 81

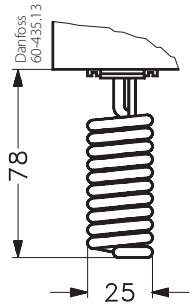
Net weight approx. 0.4 kg



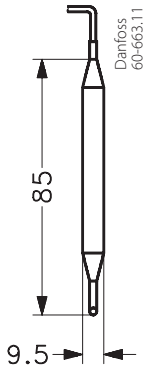
IP 55 enclosure



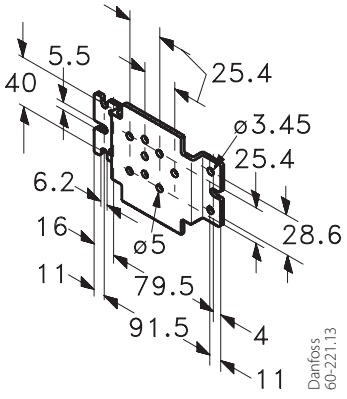
KP 75 Sensor: Tinned copper Cu/Sn 5



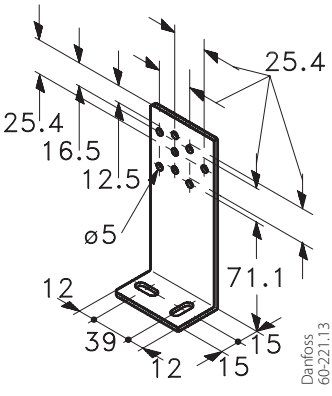
KP 78, 79, 81 Sensor: Tinned copper Cu/Sn 5



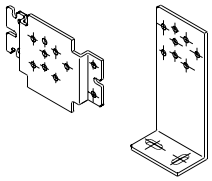
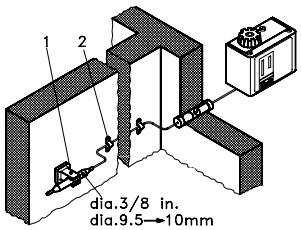
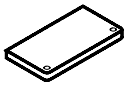
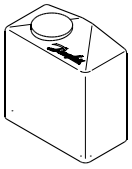
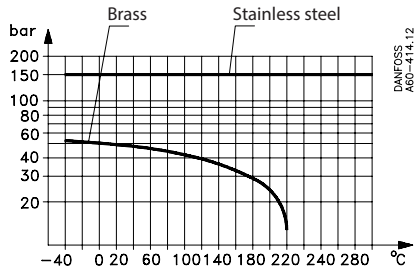
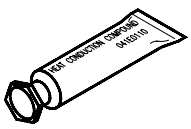
Wall bracket



Angle bracket

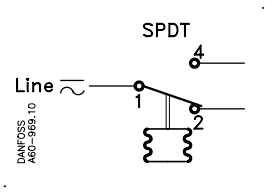


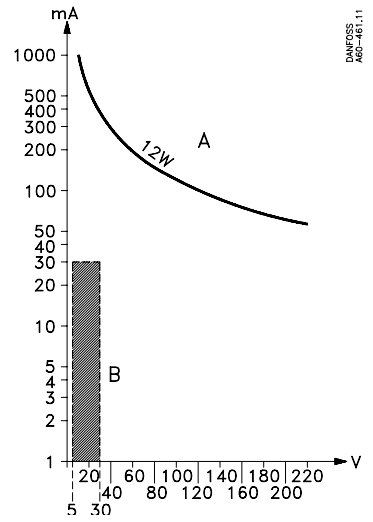
Accessories for KP thermostats

Part	Symbol	Description	Total	Code no.
Brackets with mounting screws and washers		Wall bracket for KP	1	**060-105566**
		Angle bracket for KP	1	**060-105666**
Sensor holder		Sensor holder for wall mounting with four capillary tube clips and 9-off 12 mm pins	1	**017-420166**
Screwed cable entry		PG 13.5 with special nut For 6 – 14 mm diameter cables A standard Pg 16 cable entry can be used for 8 –16 mm diameter cables	1	**060-105966**
Sealing screw		For sealing the setting on KP	2	**060-105766**
Top cover		If a bracket is mounted on the backplate of the housing, the KP thermostats will have an IP44 grade of enclosure. The cover protects the setting spindles.	1	**060-109766**
Protective cap		Protective cap for KP thermostats. To protect the unit against rain and humidity. Grade of enclosure: IP44 Material: Polyethylene Max. ambient temperature: 65 °C Min. ambient temperature: -40 °C	1	**060-003166**
Sensor pocket		For all KP thermostats with cylindrical remote sensor. Sensor pocket, gasket and union for screwing into G½ connectors welded onto tubes, containers, etc.		
		Int. diameter 9.6 mm, insert depth 112 mm (brass). Ext. diameter 11 mm	1	**017-437066**
		Int. diameter 9.6 mm, insert depth 112 mm (st 18/8). Ext. diameter 11 mm	1	**017-436966**
		Int. diameter 9.6 mm, insert depth 465 mm (brass). Ext. diameter 11 mm	1	**017-421666**
	 Permissible pressure of sensor pipe medium	Media temperature for sensor: 250 °C This temperature can be increased by applying a different gasket material		
Heat-conductive aluminium paste	Tube 	For KP and RT thermostats with sensor mounted in a sensor pocket. Temperature range: -20 – 150 °C (short-lived 220 °C) Tube with 5 g aluminium paste	1	**041E0114**

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General information
Gold contacts

Contact material	**Gold-plated silver**
Contact system	 Single-pole double throw (SPDT)
Contact load (when Au surface is burnt away)	*Alternating current:* Ohmic load: AC-1: 10 A, 440 V Inductive load: AC-3: 6 A, 440 V AC-15: 4 A, 440 V *Direct current:* DC-13: 12 W, 220 V



Curve A gives the maximum load.
Hatched area B: Acceptable load
for the gold plating of the contact. DC 13

Terminology

Range setting/ Set point
The pressure range within which the unit will give a signal (contact changeover).

Differential
The difference between contact changeover on rising and falling pressure.
The differential is a condition for stable automatic plant operation.

Manual reset
A unit with manual reset can only be restored to operational mode by activation of the external reset button.
Min. reset units will restart after the pressure has risen by a value greater than that of the fixed differential.
Max. reset units will restart after the pressure has fallen by a value greater than that of the fixed differential.

Automatic reset
Units with automatic reset restart automatically after stop.

Permissible operating pressure
The highest permissible constant pressure or pressure variation the unit can be exposed to.

Maximum working pressure
The maximum permissible pressure for safe functioning of a heating system or any of its parts.

Maximum test pressure
The maximum pressure applied in strength or leakage tests on heating system or components thereof.

Snap function
A specific contact force is maintained until snap is initiated. The time over which contact force reaches zero is a few milliseconds; therefore, contact bounce cannot occur as a result, for example, of slight vibrations before cut-out.
The snap-action contact system will continue to function even when micro-welds are created between the contacts during cut-in.
The force created to separate the contacts is strong, and instantly shears off all contact surface welds that have been created as the result of cut-in action.
These design features ensure that the cut-out point of the KP control remains very accurate and completely independent of the magnitude of the current load.

Current ratings:

AC – 1
The alternating current rating, in amperes, of the non-inductive, slightly inductive loads or resistive furnaces

AC – 3
The alternating current rating, in amperes, of the squirrel-cage motors: starting, plugging, inching

AC – 15
The alternating current rating, in amperes, of electromagnetic loads (>72VA)

DC – 13
The direct current rating, in amperes, of electromagnets

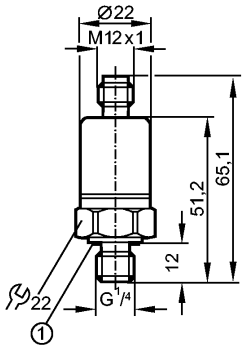
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ANEXO V –TRANSDUCTORES DE PRESIÓN IFM–

PT3553

PT-025-SBG14-A-ZVG/US/ /W

Sensores de presión



1: Junta FKM / DIN 3869-14
par de apriete 25 Nm

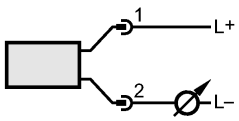
Made in Germany

Características del producto		
Sensor electrónico de presión		
para aplicaciones móviles		
en conformidad con e1		
Conexión de proceso: G ¼ A		
Salida analógica		
Rango de medición: 0...25 bar		
Aplicación		
Aplicación		Tipo de presión: presión relativa Fluidos líquidos y gaseosos
Resistencia a la presión	[bar]	60
Presión de rotura mín.	[bar]	600
Temperatura del fluido	[°C]	-25...90 ****)
Datos eléctricos		
Alimentación		DC
Tensión de alimentación	[V]	8,5...36 DC
Resistencia de aislamiento	[MΩ]	> 100 (80 V DC)
Clase de protección		III
Protección contra inversiones de polaridad		sí
Salidas		
Salida		Salida analógica
Función de salida		4...20 mA analógica
Salida analógica		4...20 mA
Carga máx.	[Ω]	(Ub - 8,5 V) x 50; 775 con Ub = 24 V
Rango de configuración / medición		
Rango de medición	[bar]	0...25
Precisión / diferencias		
Precisión / diferencias (en % del margen)		
Exactitud señal analógica *)		< ± 1,8
Linealidad		< ± 0,25 (BFSL) / < ± 0,5 (LS)
Histéresis		< ± 0,2
Repetibilidad **)		< ± 0,1

Estabilidad a largo plazo ***)		< ± 0,1	
Coeficientes de temperatura (CT) en el rango de temperatura -25...90° C (en % del margen por cada 10 K)			
CT más alto del punto cero		< ± 0,1	
CT más alto del margen		< ± 0,1	
Tiempos de reacción			
Tiempo de respuesta de la salida analógica frente a una variación brusca	[ms]	8	
Condiciones ambientales			
Temperatura ambiente	[°C]	-25...90 ****)	
Temperatura de almacenamiento	[°C]	-40...100	
Grado de protección		IP 67 / IP 69K	
Homologaciones / pruebas			
CEM		EN 61000-4-2 ESD: inmunidad a perturbaciones ISO 11452-2 ISO 11452-4 ISO 7637-2 emisión de perturbaciones EN 61000-6-1 EN 61000-6-4	4 kV CD / 8 kV AD según Directiva 95/54/CE 04/104CE / 05/83CE sobre vehículos a motor 100 V/m 100 mA / Grado de severidad 4 Grado de severidad 4 según CISPR 25
Resistencia a choques		DIN IEC 68-2-27:	50 g (11 ms)
Resistencia a las vibraciones		DIN IEC 68-2-6:	20 g (10...2000 Hz)
MTTF	[años]	1494	
Datos mecánicos			
Conexión de proceso		G ¼ A	
Materiales en contacto con el fluido		inox (1.4404 / 316L); junta de estanqueidad: FPM (Viton)	
Materiales de la carcasa		inox (1.4404 / 316L); TROGAMID	
Ciclos de presión mín.		50 millones	
Peso	[kg]	0,08	
Conexión eléctrica			
Conexionado		Conector M12	

Conexionado





Notas

Notas

*) incl. deriva debida al par de apriete, error del punto cero y del margen
**) con variaciones de temperatura < 10 K
***) en % del margen cada 6 meses
****) -40...100°C previa petición
BFSL = Best Fit Straight Line (configuración del valor mínimo) / LS = configuración del valor límite

efectorsoo

PT3553

PT-025-SBG14-A-ZVG/US/ /W

Sensores de presión

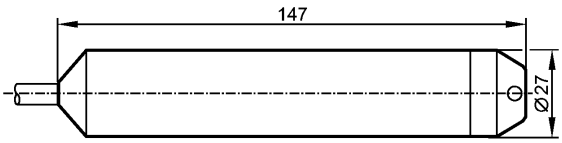
Cantidad por pack	[Pieza]	1

efectorsoo

PS307A

SUBMERSIBLE 0,6BAR 10M FEP CABLE 1G/1D

Sensores de presión



Made in Germany

Características del producto

- Sonda de nivel
- Conexión por cable
- Homologación ATEX
- Grupo II, categoría 1D/1G
- Salida analógica
- Rango de medición: 0...0,6 bar

Aplicación

Aplicación		Tipo de presión: presión relativa Fluidos líquidos
Resistencia a la presión	[bar]	4
Presión de rotura mín.	[bar]	4,8
Temperatura del fluido	[°C]	T6: -10...60 / T5: -10...80 / T4: -10...85; 1 D, 1/2 D, 2 D: -10...40 (750 mW) / -10...70 (650 mW) / -10...85 (550 mW)

Datos eléctricos

Alimentación		Conexión a separadores galvánicos con seguridad intrínseca (Ex ia)
Tensión de alimentación	[V]	10...30 DC
Clase de protección		III
Protección contra inversiones de polaridad		sí

Salidas

Salida		Salida analógica
Función de salida		4...20 mA analógica
Protección contra cortocircuitos		sí
Salida analógica		4...20 mA
Carga máx.	[Ω]	máx. (Ub - 10 V) x 50; 700 (Ub = 24 V)

Rango de configuración / medición

Rango de medición	[bar]	0...0,6

Precisión / diferencias

Precisión / diferencias (en % del margen)	
Exactitud señal analógica *)	< 0,25 (BFSL) / 0,5 ****)
Linealidad	< 0,2 (BFSL)
Repetibilidad **)	< 0,1
Estabilidad a largo plazo ***)	< 0,2
Coeficientes de temperatura (CT) en el rango de temperatura 0...50° C (en % del margen por cada 10 K)	
CT más alto del punto cero	< ± 0,2
CT más alto del margen	< ± 0,2

Condiciones ambientales

Temperatura ambiente	[°C]	T6: -10...60 / T5: -10...80 / T4: -10...85;, 1 D, 1/2 D, 2 D: -10...40 (750 mW) / -10...70 (650 mW) / -10...85 (550 mW)

PS307A

SUBMERSIBLE 0,6BAR 10M FEP CABLE 1G/1D

Sensores de presión

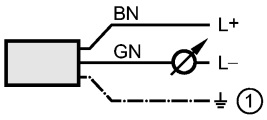
Temperatura de almacenamiento[°C]		-10...60
Grado de protección		IP 68
Homologaciones / pruebas		
Homologaciones		BVS 10 ATEX E 132 X IECEx BVS 10.0085 X
Marcado del aparato		I M1 Ex ia I Ma II 1 G Ex ia IIA T4/T5/T6 Ga II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb II 2 G Ex ia IIC T4/T5/T6 Gb II 1D Ex ia IIIC T120°C Da
MTTF	[años]	969
Datos mecánicos		
Materiales de la carcasa		inox (1.4571 / 316Ti)
Ciclos de presión mín.		
Peso	[kg]	1,051
Conexión eléctrica		
Conexionado		cable FEP / 10 m; diámetro del cable 7,5 mm

Conexionado

Colores de los hilos

BN marrón

GN verde



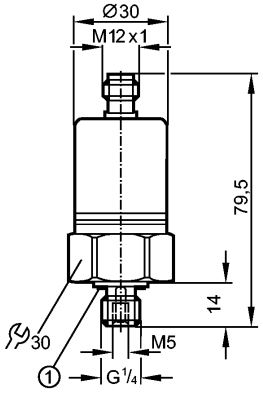
1: apantallado (conectado a la carcasa)

Notas		
Notas		*) BFSL = Best Fit Straight Line (configuración del valor mínimo) **) con variaciones de temperatura < 10 K ***) en % del margen por año ****) incluido errores de linealidad, del punto cero y del margen (configuración del valor límite)
Cantidad por pack	[Pieza]	1

PA3509

PA-1-1-RBG14-A-ZVG/US/ /V

Sensores de presión



1: Junta FPM / DIN 3869-14

Made in Germany

Características del producto		
Sensor electrónico de presión		
Conexión por conector		
en conformidad con e1		
Conexión de proceso: G¼ A / M5 I		
Salida analógica		
Rango de medición: -1...1 bar		
Aplicación		
Aplicación		Tipo de presión: presión relativa Fluidos líquidos y gaseosos
Resistencia a la presión	[bar]	10
Presión de rotura mín.	[bar]	30
Temperatura del fluido	[°C]	-25...90 ****)
Datos eléctricos		
Alimentación		DC
Tensión de alimentación	[V]	9,6...32 DC
Resistencia de aislamiento	[MΩ]	> 100 (500 V DC)
Clase de protección		III
Protección contra inversiones de polaridad		sí
Salidas		
Salida		Salida analógica
Función de salida		4...20 mA
Resistente a sobrecargas		sí
Carga máx.	[Ω]	(Ub - 9,6 V) x 50; 720 con Ub = 24 V
Rango de configuración / medición		
Rango de medición	[bar]	-1...1
Precisión / diferencias		
Precisión / diferencias (en % del margen)		
Exactitud señal analógica *)		< ± 0,25 (BFSL) / < ± 0,5 (LS)
Repetibilidad **)		< 0,1
Estabilidad a largo plazo ***)		< ± 0,05

Coeficientes de temperatura (CT) en el rango de temperatura 0...80° C (en % del margen por cada 10 K)

CT más alto del punto cero	< ± 0,2
CT más alto del margen	< ± 0,2

Tiempos de reacción

Tiempo de respuesta de la salida analógica frente a una variación brusca [ms]	3

Condiciones ambientales

Temperatura ambiente [°C]	-25...80
Temperatura de almacenamiento [°C]	-40...100
Grado de protección	IP 65

Homologaciones / pruebas

CEM	EN 61000-4-2 ESD:	4 kV CD / 8 kV AD
	EN 61000-4-3 HF radiado:	30 V/m
	EN 61000-4-4 Burst:	2 kV
	EN 61000-4-6 HF guiado:	10 V
	emisión de perturbaciones CISPR25	según Directiva 2004/104/CE sobre vehículos a motor
	inmunidad a perturbaciones	según Directiva 2004/104/CE sobre vehículos a motor
	ISO 11452-2 HF radiado:	100 V/m
	ISO 7637-2 pulse:	Grado de severidad 4
Bahnanwendungen	DIN EN 50155 / IEC 60571	clase T3, C1, S1
Resistencia a choques	DIN EN 60068-2-27:	50 g (11 ms)
	DIN EN 61373:	Categoría 3
Resistencia a las vibraciones	DIN EN 60068-2-6:	20 g (10...2000 Hz)
	DIN EN 61373:	Categoría 2
MTTF [años]	506	

Datos mecánicos

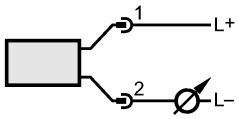
Conexión de proceso	G¼ A / M5 I
Materiales en contacto con el fluido	inox (1.4305 / 303); céramica; junta de estanqueidad: FPM (Viton); según DIN 3869-14
Materiales de la carcasa	inox (1.4404 / 316L); FPM (Viton); PA; EPDM/X (Santoprene)
Ciclos de presión mín.	100 millones
Peso [kg]	0,219

Conexión eléctrica

Conexionado	Conector M12; contactos dorados

Conexionado





Notas

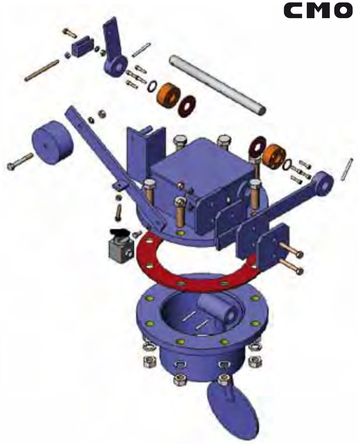
Notas	*) BFSL = Best Fit Straight Line (configuración del valor mínimo) / LS = configuración del valor límite **) con variaciones de temperatura < 10 K

	) En % del valor terminal de rango de medición cada 6 meses *) -40...90 °C previa petición
Cantidad por pack [Pieza]	1

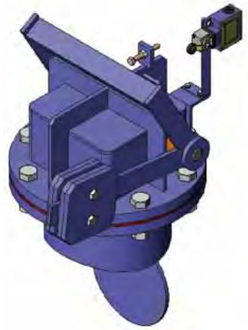
ANEXO V –VALVULA SOBREVELOCIDAD CMO–

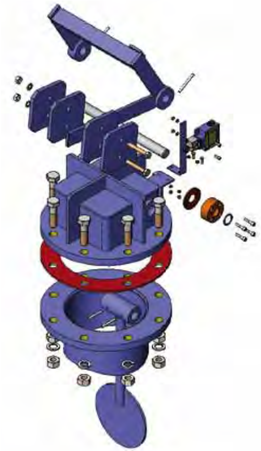
DETALLES DETECTORES DE SOBREVELOCIDAD /
SPEED DETECTOR DETAILS



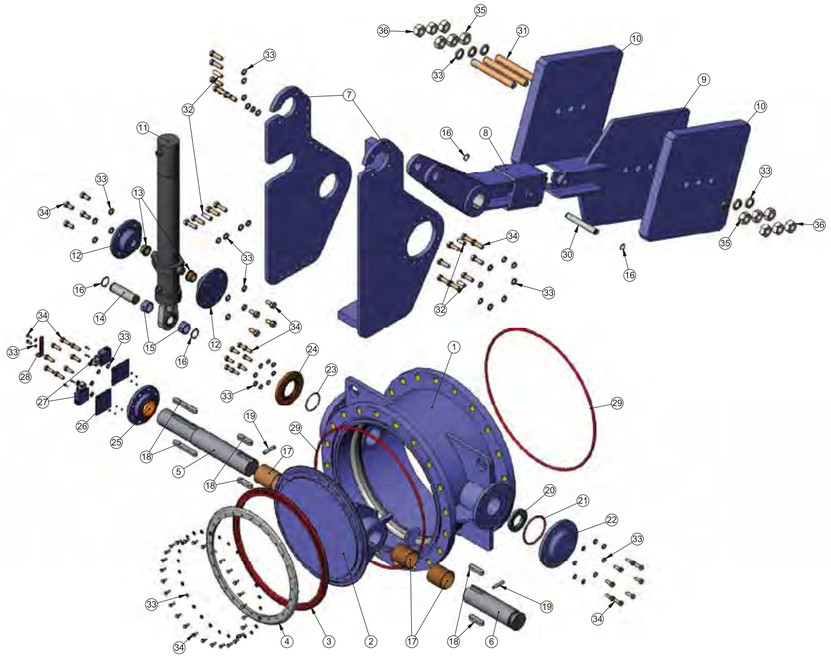


DETECTOR SOBREVELOCIDAD MECANICO / *MECHANICAL SPEED DETECTOR*





DETECTOR SOBREVELOCIDAD ELECTRICO / *ELECTRICAL SPEED DETECTOR*



POS.	DESCRIPCION / *DESCRIPTION*	POS.	DESCRIPCION / *DESCRIPTION*
1	**CUERPO** / *BODY*	19	**PASADOR** / *PIN*
2	**CLAPETA** / *DISC*	20	**ARANDELA DE FRICCION** / *FRICTION WASHER*
3	**JUNT** / *JOINT*	21	**HILO TORICO** / *O-RING*
4	**BRIDA JUNTA** / *JOINT FLANGE*	22	**TAPA CIEGA** / *BLANK COVER*
5	**EJE ACCTO.** / *ACTUATOR SHAFT*	23	**HILO TORICO** / *O-RING*
6	**EJE** / *SHAFT*	24	**TAPA GUIA** / *GUIDE COVER*
7	**SOPORTE ACCTO.** / *ACTUATOR SUPPORT*	25	**TAPA SOPORTE** / *SUPPORT COVER*
8	**BRAZO CONTRAPESO** / *COUNTERWEIGHT ARM*	26	**SOP. FINAL CARRERA** / *LIMIT SWITCH SUPPORT*
9	**SOPORTE CONTRAPESO** / *COUNTERWEIGHT SUPPORT*	27	**FINAL DE CARRERA** / *LIMIT SWITCH*
10	**CONTRAPESO** / *COUNTERWEIGHT*	28	**INDICADOR DE POSICION** / *POSITION INDICATOR*
11	**ACTUADOR** / *ACTUATOR*	29	**JUNTA TORICA** / *O-RING*
12	**TAPA SOPORTE** / *SUPPORT COVER*	30	**BULON** / *BOLT*
13	**COJINETE** / *BEARING*	31	**VARILLA ROSCADA** / *THREAD STEM*
14	**BULON** / *BOLT*	32	**PASADOR** / *PIN*
15	**CASQUILLO DISTANCIADOR** / *DISTANCER SOCKET*	33	**ARANDELA** / *WASHER*
16	**CIR-CLIP** / *CIR-CLIP*	34	**TORNILLO** / *SCREW*
17	**COJINETE** / *BEARING*	35	**TUERCA** / *NUT*
18	**CHAVETA** / *KEY*	36	**CONTRATUERCA** / *CHECK NUT*

CONSTRUCCIONES METALICAS DE OBTURACION, S.L.

VÁLVULAS Y COMPUERTAS

Tel.: 902 40 80 50 Fax: 902 40 80 51

MADRID - BARCELONA - TOLOSA (SPAIN)

E-mail: cmo@cmo.es Web: www.cmo.es

VALVULAS DE MARIPOSA Serie-ME

PROGRAMA DE FABRICACION (VALVULA DE SOBREVELOCIDAD)

BUTTERFLY VALVES ME-Series

FABRICATION RANGE (OVER SPEED VALVE)

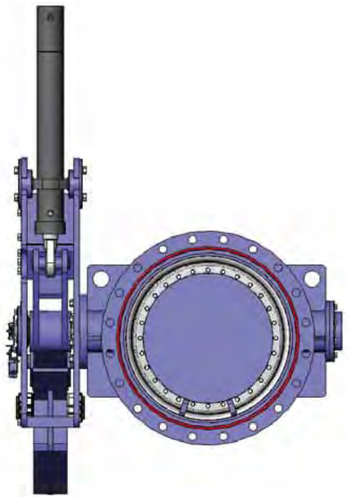


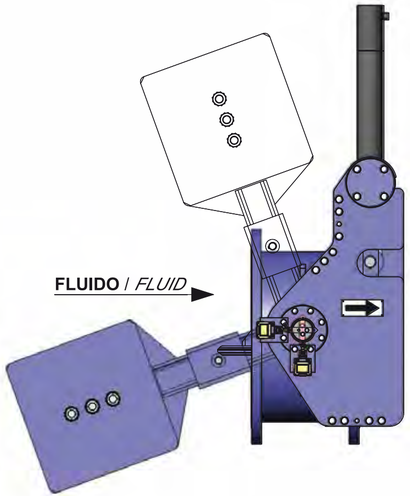
- UTILIZACIÓN:
Válvula de mariposa biexcentrica.
No necesita juntas entre las bridas por tenerla incorporada en el cuerpo.
Aplicación principal: tuberia en línea con peligro de rotura, entre bridas.

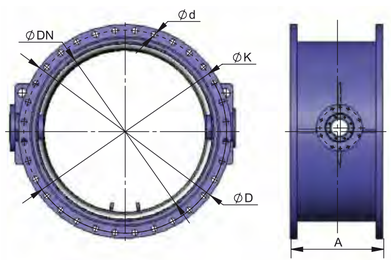
- UTILIZATION:
Double eccentic butterfly valve.
It is not necessary any joint between the flanges as it is incorporated in the body.
Main application: in line pipes with danger of breakage, between flanges.

GESTION DE LA CALIDAD CERTIFICADA

QUALITY MANAGEMENT CERTIFIED



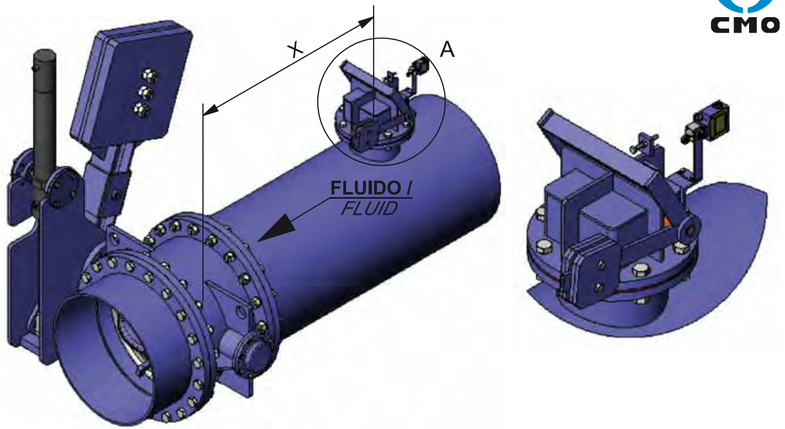


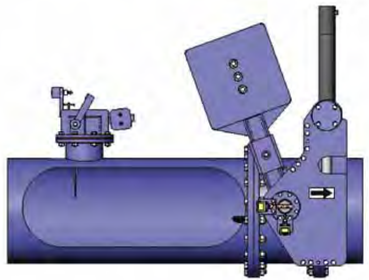


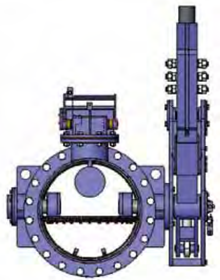
DN	TALADRADO DE BRIDAS / *BORING JOINT*					PARES DE APRIETE / *TORQUE SETTING*
	DIN PN-10					
	A	Cant.	Ød	ØD	ØK	(Nm)
200	230	8	22	340	295	126
250	250	12	22	395	350	126
300	270	12	22	445	400	126
350	290	16	22	505	460	126
400	310	16	26	565	515	309
500	350	20	26	670	620	309
600	390	20	30	780	725	455
700	430	24	30	895	840	455
800	470	24	33	1015	950	615
900	510	28	33	1115	1050	615
1000	550	28	36	1230	1160	821
1200	630	32	39	1455	1380	1089
1400	710	36	42	1675	1590	1320
1600	790	40	48	1915	1820	1978
1800	870	44	48	2115	2020	1978
2000	950	48	48	2325	2230	1978
2200	1030	52	56	2550	2440	2976
2400	1110	56	56	2760	2650	2976
2600	1190	60	56	2960	2850	2976
2800	1270	64	56	3180	3070	2976
3000	1350	68	62	3405	3290	3776

OBSERVACIONES: Tamaños mayores y otras normas bajo consulta. / *NOTE: Bigger sizes and other standards under request.*

DETECTOR DE SOBREVELOCIDAD ELECTRICO /
ELECTRICAL SPEED DETECTOR

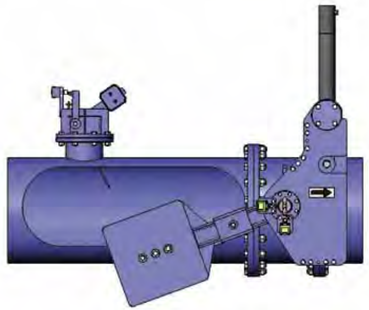


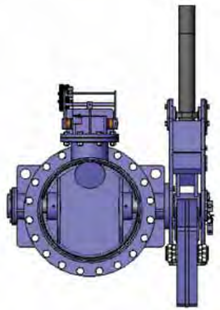




Detector de sobrevelocidad en reposo = Válvula de mariposa se mantiene abierta.

Speed detector in settling = Butterfly valve keeps open

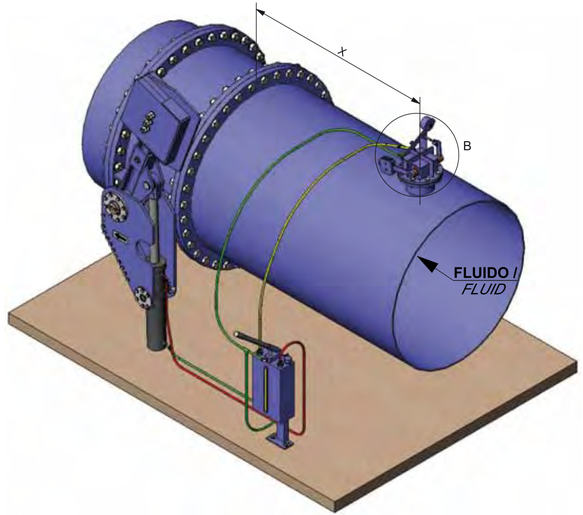




Detector de sobrevelocidad activado por el fluido = Válvula de mariposa se cierra.

Speed detector is activate due to the over speed of the fluid = Butterfly valve closes.

DETECTOR DE SOBREVELOCIDAD MECANICO /
MECHANICAL SPEED DETECTOR

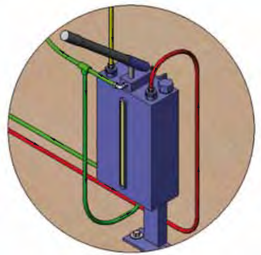


INSTRUCCIONES DE INSTALACION:

LA COTA "X" DEBERA SER DE 1,5 VECES EL DN DE LA VALVULA DE MARIPOSA, CON UNA DISTANCIA MINIMA DE 500 mm.

INSTALLATION INSTRUCTIONS:

"X" SHOULD BE 1,5 TIMES THE DN OF THE BUTTERFLY VALVE, ALWAYS WITH A MINIMUM DISTANCE OF 500 mm.



DETALLE A /
A DETAIL

Tubería verde: Salida del grupo hidráulico.
Green pipe: Exit from the hydraulic group.

Tubería roja: Retorno del cilindro hidráulico.
Red pipe: Return from the hydraulic cylinder.

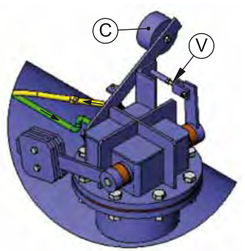
Tubería amarilla: Retorno del detector de sobrevelocidad.
Yelow pipe: Return from the speed detector.

INSTRUCCIONES DE USO:

Después de que la válvula de mariposa se cierre por causa de la sobrevelocidad de fluido, para volver a abrir la válvula:
1- Elevar el contrapeso "C" del detector de sobrevelocidad, dejando apoyado sobre la varilla "V".
2- Mediante el grupo hidráulico manual volver a introducir presión en el cilindro hidráulico para poder abrir la válvula de mariposa.

USE INSTRUCTIONS:

After valve closes due to the over speed of the fluid, to re-open the valve:
1- Lift the "C" counterweight of the speed detector, leaving on the rod "V".
2- With the manual hydraulic group put pressure inside the hydraulic cylinder to be able to open the butterfly valve again.



DETALLE B /
B DETAIL

Tubería verde: Entrada a la válvula del detector de sobrevelocidad.
Green pipe: Entry to the valve of the speed detector.

Tubería amarilla: Salida de la válvula del detector de sobrevelocidad.
Yelow pipe: Exit from the valve of the speed detector.

VALVULA DE MARIPOSA SERIE ME

27/04/2012

Válvula de mariposa BI-EXCENTRICA

- Válvula de mariposa unidireccional con doble excentricidad.
- Múltiples materiales de construcción disponibles.
- Dos opciones de distancia entre caras:
  - Serie corta: según la norma EN 558 SERIE 13.
  - Serie larga: según la norma EN 558 SERIE 14.
- Dispone de una flecha en el cuerpo indicando la dirección del flujo.

Aplicaciones generales:

- Esta válvula de mariposa es apropiada para trabajar en línea y como válvula de seguridad para casos de emergencia. Es muy utilizada en conducciones forzadas en las centrales hidroeléctricas.

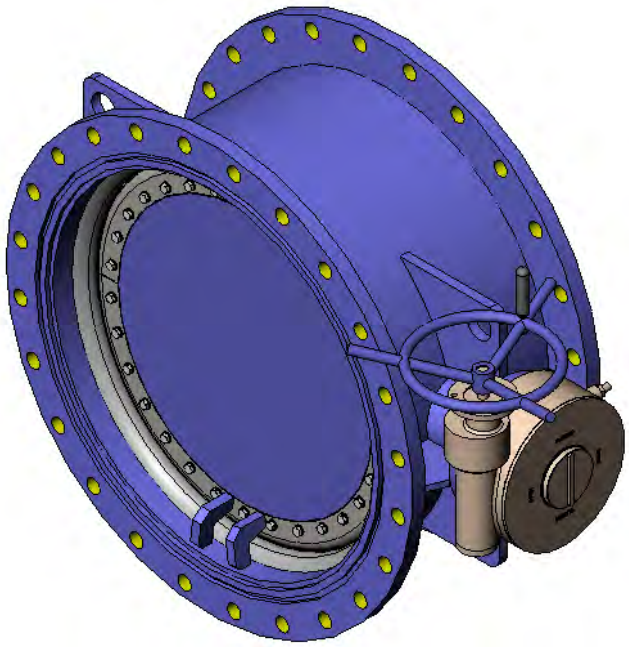


fig. 1

Tamaños:

DN200 a DN3000 (mayores dimensiones bajo consulta).

(ΔP) de trabajo:

La presión diferencial (ΔP) a la que pueden trabajar estas válvulas es muy variable, se diseñan para las necesidades de cada proyecto en concreto, pero pueden ser diseñadas para soportar presiones de hasta 100 kg/cm².

Velocidad de fluido:

La velocidad de fluido máxima con la que pueden trabajar estas válvulas es de 4,9 m/s (según norma AWWA C 504).

Taladrado bridas:

DIN PN10 y ANSI B16.5 (150 LB)

Otras usuales:

DIN PN 16	JIS standard	Australian standard
DIN PN 6	DIN PN25	British standard

Directivas:

- Directiva de máquinas: **DIR 2006/42/CE (MAQUINAS)**
- Directiva de equipos a presión: **DIR 97/23/CE (PED) ART.3, P.3**

Dossier de calidad:

- Todas las válvulas se prueban hidrostáticamente con agua en CMO y se suministran certificados de materiales (según norma EN 10204 3.1.) y pruebas (según normas ISO 5208 y EN 12266).
- Prueba del cuerpo = presión de trabajo x 1,5.
- Prueba de cierre = presión de trabajo x 1,1.

Ventajas del "Modelo ME" de CMO

La principal característica de la válvula de mariposa **ME** de CMO es su diseño con doble excentricidad.

El eje de giro se encuentra desplazado respecto al plano central de la clapeta (Exc.1), y a su vez también se encuentra desplazado respecto al plano central del cuerpo de la válvula (Exc.2), con lo que se obtiene la doble excentricidad (fig. 2).

Gracias a esta doble excentricidad, se obtiene un sistema de cierre muy eficaz. En cuanto se empiece a abrir la válvula, la junta de elastómero deja de estar presionada y no roza contra el cuerpo. Es por ello que no se presiona la junta hasta el momento del cierre, por lo que se evitan gran parte de rozamientos y aplastamientos de la junta y esto ayuda a prolongar su vida útil.

Por otro lado, debido a que el eje de giro esta desplazado respecto al plano central del cuerpo (Exc.2), el flujo siempre tiende a cerrar la válvula, esto es una gran ventaja cuando esta válvula trabaja como válvula de seguridad en situaciones de emergencia.

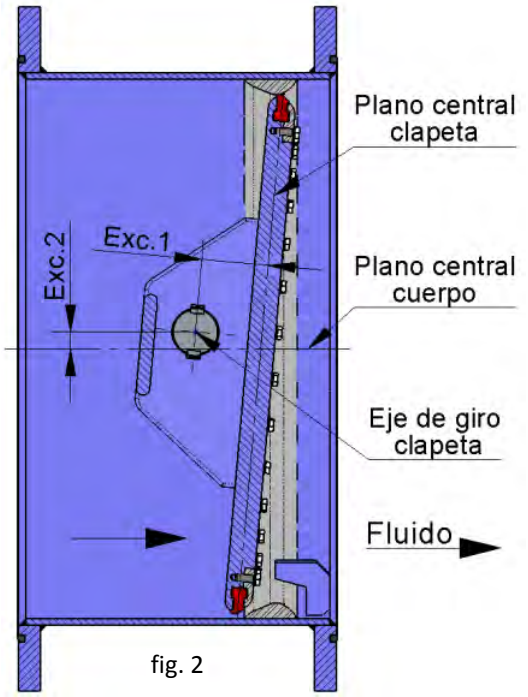


fig. 2

El cuerpo de la válvula **ME** básicamente consta de una virola del mismo diámetro interior que la conducción donde va instalada, con una brida a cada lado. Estas bridas tienen mecanizado un rebaje para ubicar la junta tórica, gracias a estas juntas tóricas no se necesita ninguna junta adicional para poder montar la válvula entre bridas.

Para realizar el cierre, lleva un anillo de inoxidable mecanizado en el interior de la virola, para que realice el cierre con la junta de manera eficaz y a su vez produzca las mínimas perturbaciones posibles en el flujo.

Por las características que acabamos de mencionar y por su simplicidad resulta una válvula robusta y económica, es un tipo de válvula muy apropiado para trabajar en tomas y descargas.

Por el contrario, no son válvulas apropiadas para la regulación de caudal. Cuando la válvula se encuentra completamente abierta, la clapeta está horizontal, con lo que el disco queda paralelo a la dirección del flujo y las perturbaciones que genera la válvula en el flujo son mínimas. Pero cuanto el grado de apertura sea menor, mayores son las perturbaciones que se generan en el flujo, debido a que la clapeta se encuentra cada vez más vertical y se generan mayores vibraciones y turbulencias.

No se aconseja el uso de este tipo de válvulas con aperturas intermedias, por ello no son adecuadas para la regulación de caudal.

Estás válvulas son muy apropiadas para utilizarlas en situaciones de emergencia, suelen estar completamente abiertas, generando perturbaciones mínimas en el flujo, y si se halla alguna situación de emergencia se cierran en un tiempo mínimo, por lo que se evitan grados de apertura medios de forma permanente.

VALVULA DE MARIPOSA SERIE ME

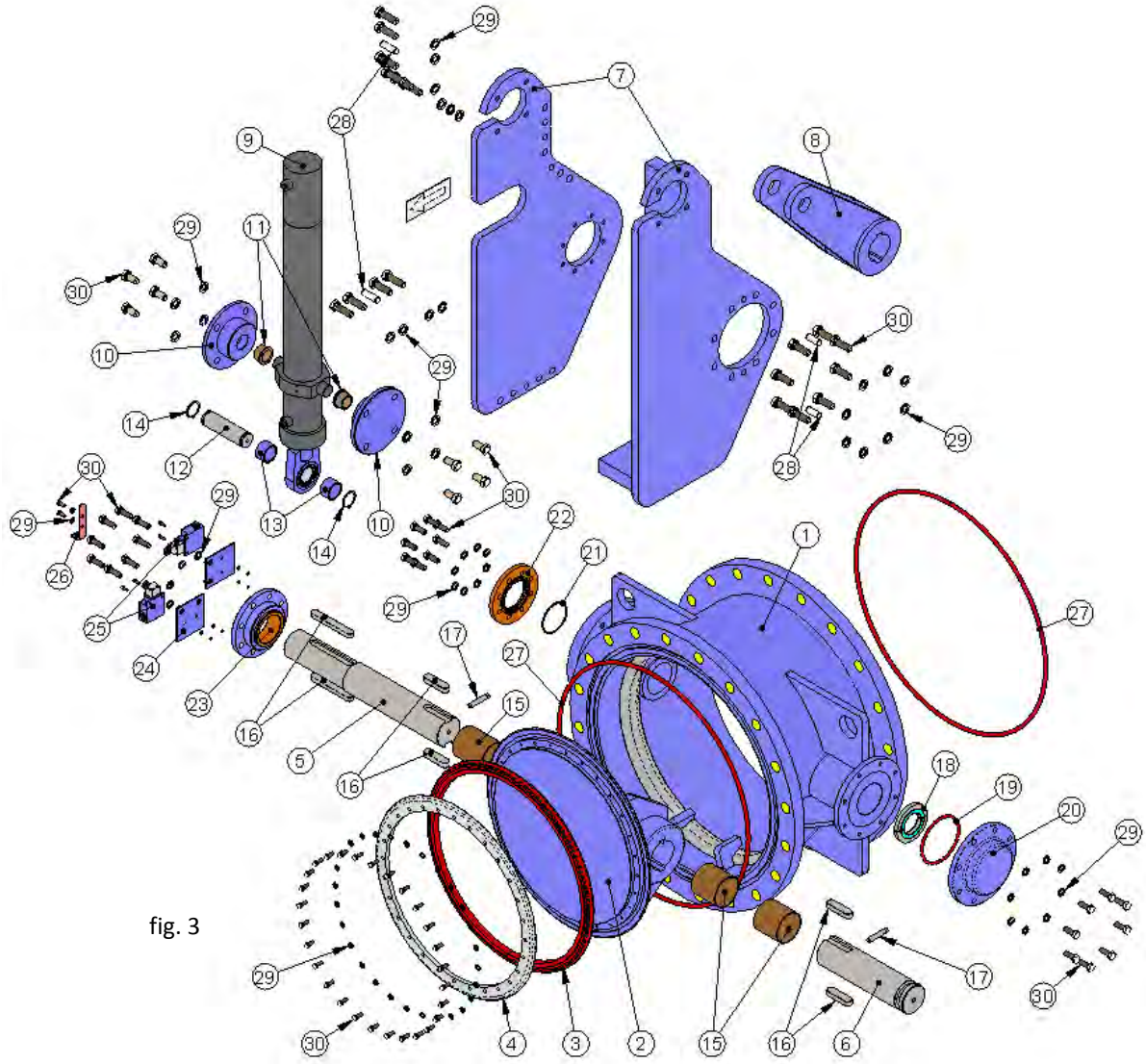


fig. 3

LISTA DE COMPONENTES ESTANDAR			
POS.	**COMPONENTE**	**POS.**	**COMPONENTE**
1	CUERPO	16	CHAVETA
2	CLAPETA	17	PASADOR
3	JUNTA	18	ARANDELA DE FRICCION
4	BRIDA JUNTA	19	HILO TORICO
5	EJE ACCIONAMIENTO	20	TAPA CIEGA
6	EJE	21	HILO TORICO
7	SOPORTE ACCIONAMIENTO	22	TAPA GUIA
8	BRAZO ACCIONAMIENTO	23	TAPA SOPORTE
9	ACTUADOR	24	SOP. FINAL CARRERA
10	TAPA SOPORTE	25	FINAL DE CARRERA
11	COJINETE	26	INDICADOR DE POSICION
12	BULON	27	JUNTA TORICA
13	CASQUILLO DISTANCIADOR	28	PASADOR
14	CIR-CLIP	29	ARANDELA
15	COJINETE	30	TORNILLO

tabla 1

CARACTERISTICAS DE DISEÑO

1- CUERPO

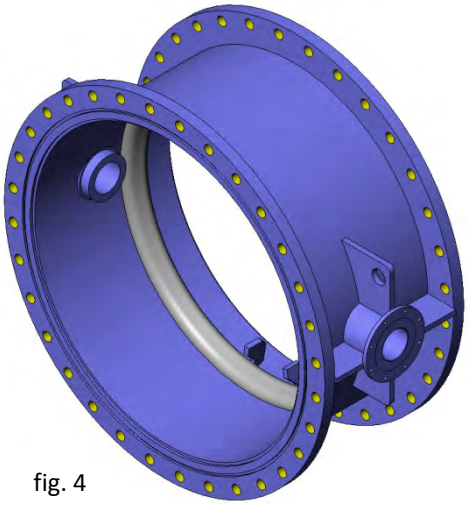


fig. 4

El cuerpo de la válvula **ME** básicamente consta de una virola del mismo diámetro interior que la conducción donde va instalada, con una brida a cada lado. Estas bridas llevan mecanizado un rebaje en todo el diámetro para ubicar la junta tórica.

Para realizar el cierre lleva un anillo en el interior de la virola, que siempre es de inoxidable independientemente del material que sea el cuerpo. Este anillo posteriormente se mecaniza para que realice el cierre con la junta de manera eficaz y a su vez produzca las mínimas perturbaciones posibles en el flujo.

Para los alojamientos de los ejes, se les colocan unos moyus a la virola del cuerpo, unos refuerzos y nervios en el exterior para unir los alojamientos de ejes, virola y bridas. De esta manera se obtiene un cuerpo que consiste en una pieza muy robusta para que soporte sin problemas todas las tensiones.

Los materiales de fabricación estándar son el acero al carbono S275JR, GGG50 y el acero inoxidable AISI304 o AISI316. Pero otros materiales y aleaciones de acero inoxidable (AISI316Ti, Duplex, 254SMO, Uranus B6….) están disponibles bajo consulta.

Como norma habitual los cuerpos de acero al carbono son pintadas con una protección anti corrosiva de EPOXY (color RAL 5015). Existen a su disposición otros tipos de protecciones anti corrosivas.

2- CLAPETA

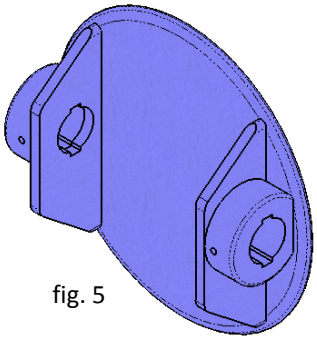


fig. 5

La clapeta básicamente consta de un disco circular liso de considerable espesor. Este disco lleva dos orejas, en las que se acoplan los ejes que transmiten el movimiento del accionamiento (fig. 5). La clapeta va dimensionada en función de la presión de trabajo. Las clapetas de CMO siempre son movidas por chavetas y no por pasadores.

Los materiales de fabricación estándar son el acero al carbono S275JR en válvulas con cuerpo de acero al carbono S275JR, la fundición nodular GGG50 en válvulas con cuerpo de GGG50 y el acero inoxidable AISI304 o AISI316 en válvulas con cuerpo de AISI304 o AISI316 respectivamente. Otros materiales o combinaciones pueden ser suministrados bajo consulta.

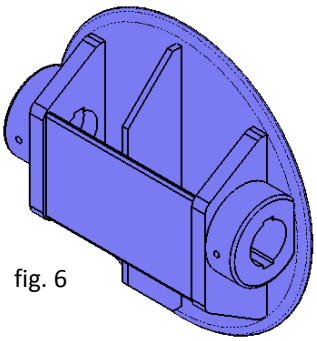


fig. 6

La clapeta tiene mecanizado un rebaje en todo el perímetro del disco principal, donde se aloja la junta de estanqueidad que es fijada mediante la brida junta.

Como norma habitual las clapetas de acero al carbono son pintadas con una protección anti corrosiva de EPOXY (color RAL 5015). Existen a su disposición otros tipos de protecciones anti corrosivas.

3- ASIENTO/JUNTA:

Las válvulas de mariposa **ME** de CMO, realizan el cierre presionando un perfil especial de elastómero (3) contra un anillo de inoxidable (5).
El perfil especial de elastómero (3) se ubica en el rebaje exterior del perímetro de la clapeta (2) y es sujetada mediante una brida junta (4) con tornillería de acero inoxidable (6).
El anillo de inoxidable (5) se encuentra en el interior de la virola del cuerpo (1), esta mecanizada para asegurar un cierre correcto y minimizar las perturbaciones que produce en el flujo.

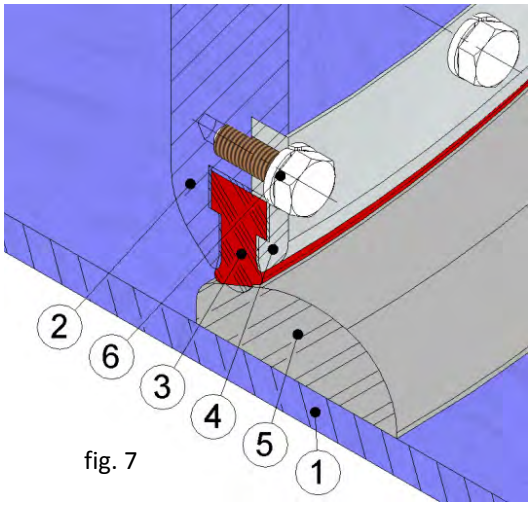


fig. 7

Habitualmente la junta de estanqueidad suele ser de EPDM, pero también existen otros tipos de elastómeros a disposición del cliente.
La junta se puede cambiar sin desmontar la válvula de la tubería.

Materiales de junta de estanqueidad

EPDM
Es la junta de estanqueidad estándar en las válvulas CMO. Puede ser utilizada en múltiples aplicaciones pero generalmente se utiliza para agua y productos diluidos en agua a temperaturas no mayores de 90°C*. También puede ser utilizada con productos abrasivos y proporciona a la válvula una estanqueidad del 100%.

NITRILO
Se utiliza en fluidos que contienen grasas o aceites a temperaturas no mayores de 90°C*. Proporciona a la válvula una estanqueidad del 100%.

VITON
Apropiado para aplicaciones corrosivas y altas temperaturas de hasta 190°C en continuo y picos de 210°C. Proporciona a la válvula una estanqueidad del 100%.

SILICONA
Principalmente utilizada en industria alimentaria y para productos farmacéuticos con temperaturas no mayores de 200°C. Proporciona a la válvula una estanqueidad del 100%.

Nota: En algunas aplicaciones se usan otros tipos de goma, como: hipalón, butilo o caucho natural. Por favor contactar con CMO en caso de que tengan tal requerimiento.

ASIENTO/JUNTAS		
Material	**Tª. Máx. (°C)**	**Aplicaciones**
EPDM (E)	90 *	Agua, ácidos y aceites no minerales
Nitrilo (N)	90 *	Hidrocarburos, aceites y grasas
Vitón (V)	200	Hidrocarburos y disolventes
Silicona (S)	200	Productos Alimentarios

NOTA: Más detalles y otros materiales bajo consulta. * ➜ EPDM y Nitrilo: es posible hasta Tª Max.: 120°C bajo pedido.

tabla 2

4- EJES

Los ejes (3) de las válvulas de mariposa **ME** de CMO se fabrican en acero inoxidable AISI316, AISI420, etc., esta característica le proporciona una resistencia alta y unas propiedades excelentes frente a la corrosión.

Para transmitir el movimiento del accionamiento a la clapeta, se utilizan chavetas paralelas (4), con lo que tanto la clapeta (2) como los ejes (3) tienen mecanizados varios chaveteros.

Para que los ejes (3) puedan girar con facilidad se colocan casquillos de bronce auto-lubricados (5) en los moyus del cuerpo (1).

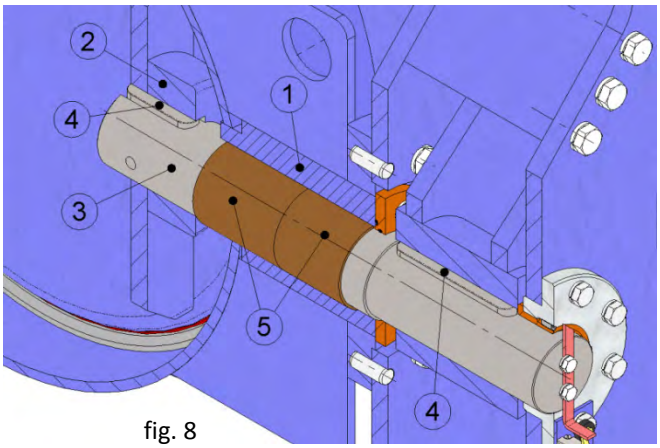


fig. 8

5- JUNTAS TORICAS

Para garantizar la estanqueidad entre la conducción y el exterior, se utilizan juntas tóricas (4). Los únicos puntos en los que puede haber fugas del cuerpo son entre los ejes (2) y los moyus (1), por lo que para lograr la estanqueidad se colocan juntas tóricas (4) en una brida de bronce (3). Habitualmente las juntas tóricas (4) que se utilizan en las válvulas **ME** suelen ser de nitrilo, pero también existen otros tipos de elastómeros a disposición del cliente.

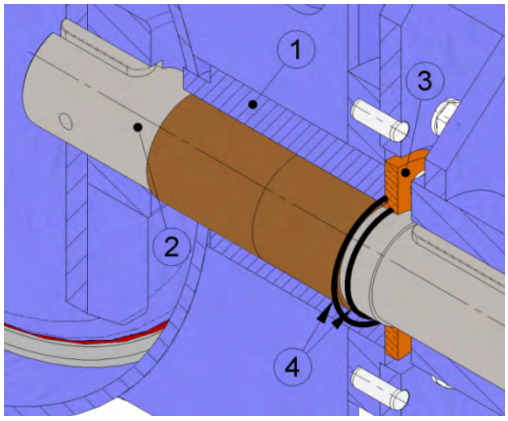


fig. 9

7- ACCIONAMIENTOS

Es posible suministrar todo tipo de accionamientos, tanto manuales como automáticos. Según las condiciones de trabajo y las características de las instalaciones donde se vaya utilizar, se elige el tipo de accionamiento mas idóneo para cada caso. En otras ocasiones es el mismo cliente el que especifica qué tipo de accionamiento necesita para su proyecto.

Manuales:
Reductor

Automáticos:
Actuador eléctrico
Cilindro hidráulico

Gran disponibilidad de accesorios:
Topes mecánicos
Dispositivos de bloqueo
Accionamientos de contrapeso de emergencia
Posicionadores
Finales de carrera
Detectores de proximidad
...

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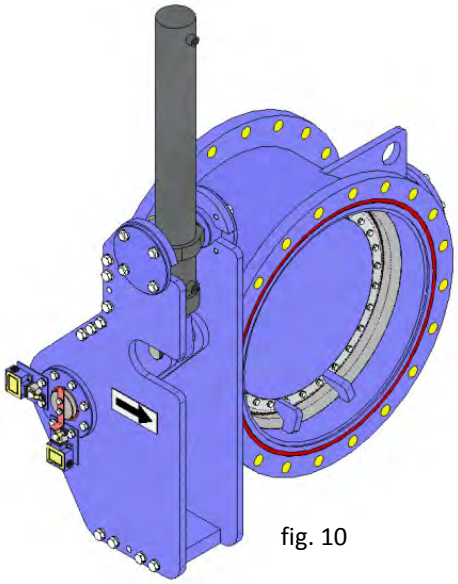


fig. 10

Accionamiento
Hidráulico
Doble Efecto

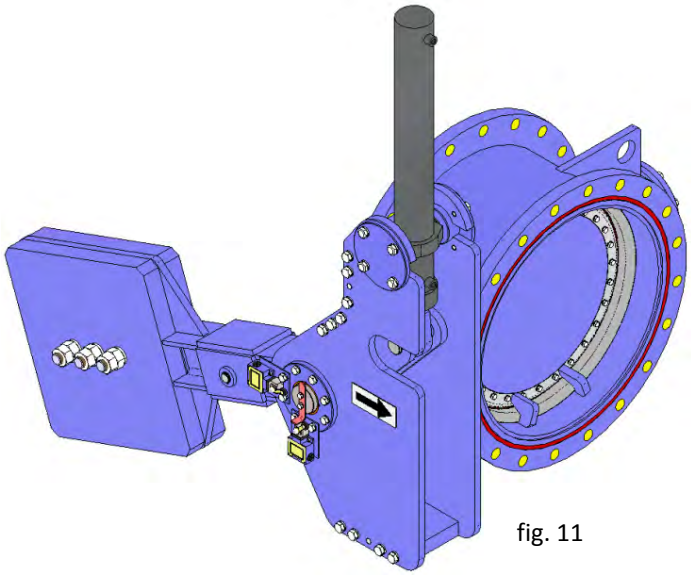


fig. 11

Accionamiento
Hidráulico +
Contrapeso

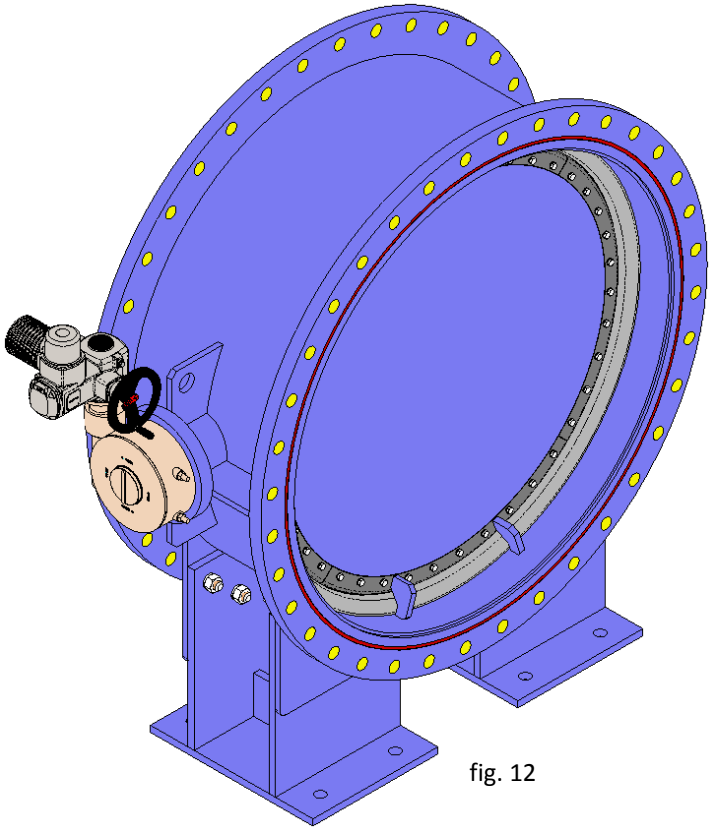


fig. 12

Accionamiento
Reductor
Motorizado

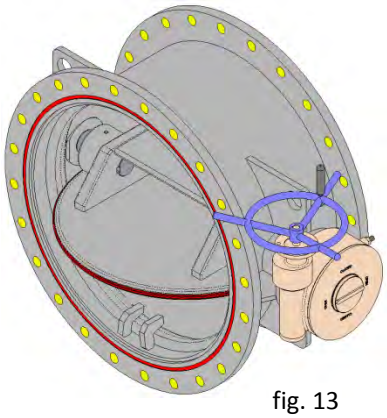


fig. 13

Accionamiento
Reductor
Manual

ACCESORIOS Y OPCIONES

Existen diferentes accesorios para adaptar la válvula a condiciones de trabajo específicas, como:

Cajas de conexión, cableado y entubado hidráulico:

Suministro de unidades montadas con todos los accesorios necesarios.

Finales de carrera mecánicos o detectores inductivos (fig. 14):

En el extremo de uno de los ejes se le acopla una flecha que indica la posición de apertura de la válvula, esta misma flecha de indicación, acciona los finales de carrera mecánicos, los cuales nos indican la posición puntual de la válvula.

Si el cliente así lo precisa, en vez de con finales de carrera mecánicos, también se puede suministrar con detectores inductivos.

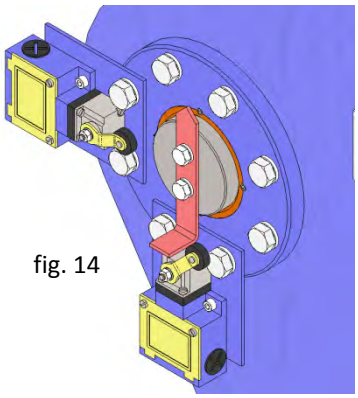
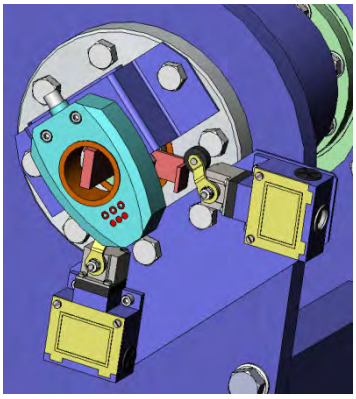


fig. 14



Posicionadores (fig. 15):

Cuando se requiere conocer la posición de la válvula en remoto, se instala un posicionador que sirve para la indicación de la posición de la válvula continuamente.

fig. 15

Sistema de bloqueo mecánico (fig. 16):

Permite bloquear mecánicamente la válvula en una posición fija durante largos periodos de tiempo.

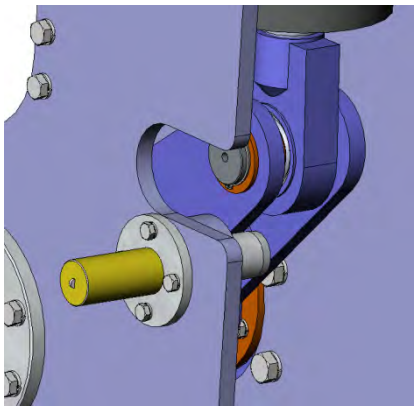


fig. 16

Limitadores de carrera mecánicos (topes mecánicos):

Permiten ajustar mecánicamente el grado de apertura de la válvula, limitando el recorrido del giro deseado que realice la clapeta.

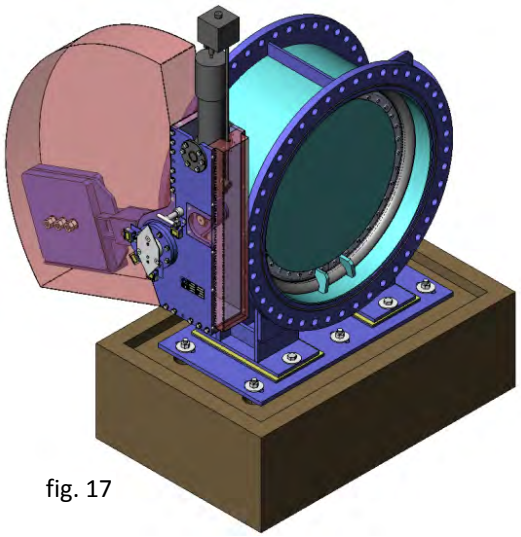
Accionamiento de emergencia (volante / contrapeso):

Cuando la válvula vaya provista de un accionamiento automático (motorizado o hidráulico), el accionamiento de emergencia permite accionar la válvula de mariposa en caso de fallo de energía.

- Accionamiento hidráulico (fig. 11): Cuando la válvula vaya provista con un cilindro hidráulico como actuador, existe la posibilidad añadirle un contrapeso. En caso de avería en el circuito hidráulico, este contrapeso tendería a cerrar la válvula, mientras el cilindro hidráulico operaria como amortiguador, pudiendo controlar desde la válvula estranguladora la velocidad de cierre. Por lo que se podría regular para que el cierre se realizara de una forma suave y de esta manera evitar el golpe de ariete.
- Accionamiento motorizado (fig. 12): Todos los accionamientos motorizados que suministra CMO, llevan un volante de emergencia desembragable, con el fin de poder accionar la válvula manualmente en caso de fallo de energía.

Recubrimiento de epoxi:
Todos los cuerpos y componentes de acero al carbono de las válvulas CMO van recubiertas de una capa de EPOXI, que da a las válvulas una gran resistencia a la corrosión y un excelente acabado superficial. El color estándar de CMO es el azul RAL-5015.

Protecciones de seguridad (fig. 17):
Siguiendo la normativa europea de seguridad (marcado "CE"), a las válvulas automáticas de CMO se les incorporan unas protecciones metálicas en el recorrido de la biela y el contrapeso (si lo llevan), evitando así que ningún cuerpo u objeto pueda ser accidentalmente atrapado o arrastrado.


fig. 17

VARIANTES DE VALVULAS DE MARIPOSA

Existen dos principales variantes que se realizan partiendo de estas válvulas de mariposa **ME**.

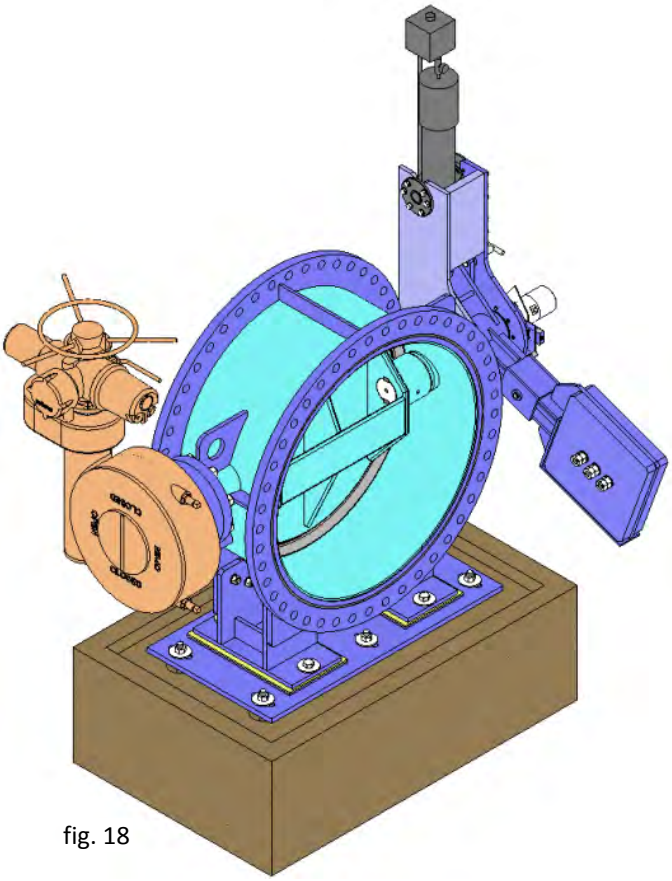
A. COMBINACION DE MARIPOSA Y RETENCION (fig. 18):

Este tipo de válvula es una mariposa que funciona como una válvula de retención, con la peculiaridad que permite delimitar el grado de apertura de la válvula.

Esta válvula siempre permanece cerrada, únicamente se abre por la fuerza del flujo y solo hasta el nivel de apertura que se le delimite en cada momento.

La excentricidad entre el eje de giro y el plano central del cuerpo (Exc. 2 en fig. 2) es mayor de lo habitual en una mariposa, es similar a la de una retención, con lo que el flujo puede abrir la clapeta con más facilidad.

Uno de los ejes de la válvula lleva un mecanizado especial, en el cual se acopla un reductor motorizado. Este realiza la función de delimitar el grado de apertura de la válvula, incluso si así se precisa mantiene la válvula completamente cerrada.


fig. 18

En el otro eje de la válvula, se acopla un cilindro hidráulico con contrapeso. El contrapeso está compuesto por unas placas atornilladas y sirve para controlar a partir de que flujo se quiere que se abra la clapeta, dependiendo del número de placas que se coloquen en el contrapeso, la clapeta se abrirá con un flujo mayor o menor.
Junto con el contrapeso se instala un cilindro hidráulico que actúa de amortiguador. Este cilindro hidráulico amortigua los movimientos que pueda tener la clapeta en función de las variaciones de flujo. Se puede regular la resistencia del amortiguador desde la válvula estranguladora del cilindro hidráulico. Incluso en el caso de que la conducción se quedara sin flujo, evitaría que la clapeta se cerrará de golpe, pudiendo regular la velocidad de cierre de la clapeta desde la válvula estranguladora.

B. VALVULA DE SOBREVELOCIDAD:

Este tipo de válvula es una mariposa que funciona como una válvula de emergencia, es un conjunto de una válvula de mariposa **ME** y un detector de sobre-velocidad.
Estas válvulas de sobre-velocidad, se instalan en conducciones que exista peligro de rotura de tubería. Su finalidad es que si se produce una rotura de la tubería o por otra causa, el detector de sobre-velocidad haga cerrar la válvula de mariposa **ME**.
El detector de sobre velocidad se coloca aguas arriba de la mariposa, a una distancia de 1,5 veces del diámetro de la válvula con una distancia mínima de 500 mm (cota "X" en fig. 21 y fig. 24).
Puede ser eléctrico (fig. 19) o mecánico (fig. 20) pero su funcionamiento básicamente es el mismo. Consta de una pala en forma de disco que es introducida en la conducción perpendicular al sentido del flujo. Esta pala está conectada a un eje, el cual lleva una palanca con un contrapeso en uno de los extremos. La palanca del contrapeso suele estar en reposo, y cuando la incidencia del flujo sobre la pala supera el peso del contrapeso, el brazo del contrapeso sube y actúa sobre el final de carrera (en caso de detector eléctrico, fig. 19) o sobre la válvula hidráulica (en caso de detector mecánico, fig. 20).
Este contrapeso está formado por varias placas atornilladas, con lo que se puede regular la velocidad mínima del flujo para accionar el detector de sobre-velocidad. Cuantas más placas coloquemos en la palanca del contrapeso, más velocidad necesitará el flujo para superar el peso del contrapeso. Otra forma para conseguir el mismo efecto, es alejando estas placas sobre la palanca, respecto al eje de giro.

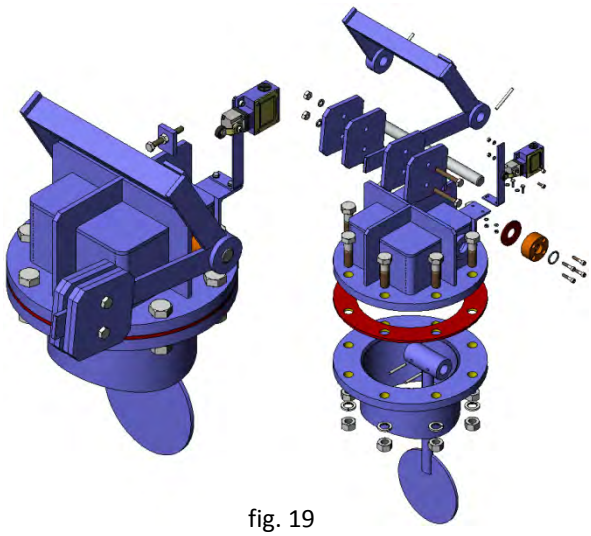


fig. 19

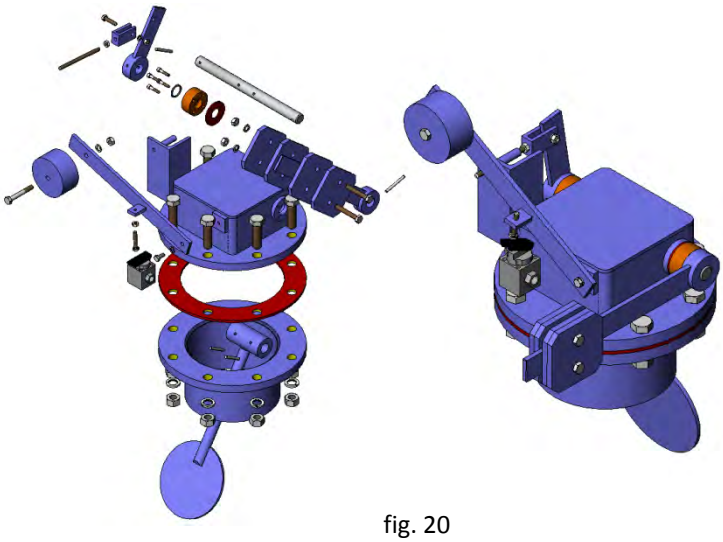


fig. 20

CONJUNTO ELECTRICO

Consta de un detector de sobre-velocidad eléctrico con una válvula de mariposa **ME** con cilindro hidráulico y contrapeso. Este conjunto se complementa con un armario eléctrico y un grupo oleo-hidráulico motorizado, que son los que gobiernan todo el conjunto.

Cuando se pulse el botón de apertura en el armario eléctrico, el grupo oleo-hidráulico se pondrá en marcha y accionará el cilindro hidráulico abriendo la válvula. Entonces empieza a pasar el flujo a una velocidad determinada, que será inferior a la necesaria para activar el detector de sobre-velocidad (fig. 22).

En cuanto se produzca una rotura en la conducción o alguna anomalía que cause el aumento de la velocidad del flujo, el detector de sobre-velocidad activará el final de carrera, esté mandará la señal de sobre-velocidad al armario eléctrico y se cortará el suministro de aceite a presión al cilindro hidráulico, con lo que debido al contrapeso, se cerrará la válvula (fig. 23).

Esta permanecerá cerrada, hasta que el operario venga a verificar el estado de la conducción, o la causa de la anomalía. Después de que se haya solucionado el problema, se procederá al rearme del armario eléctrico y se podrá volver a abrir la válvula.

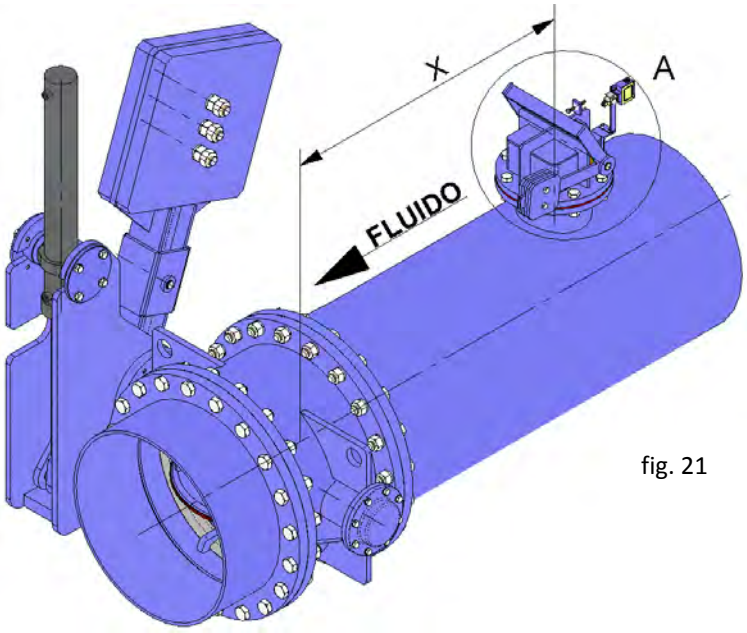
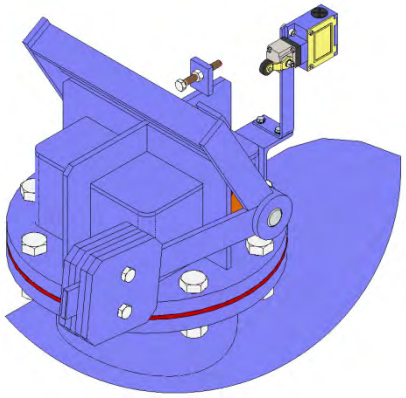


fig. 21



DETALLE A

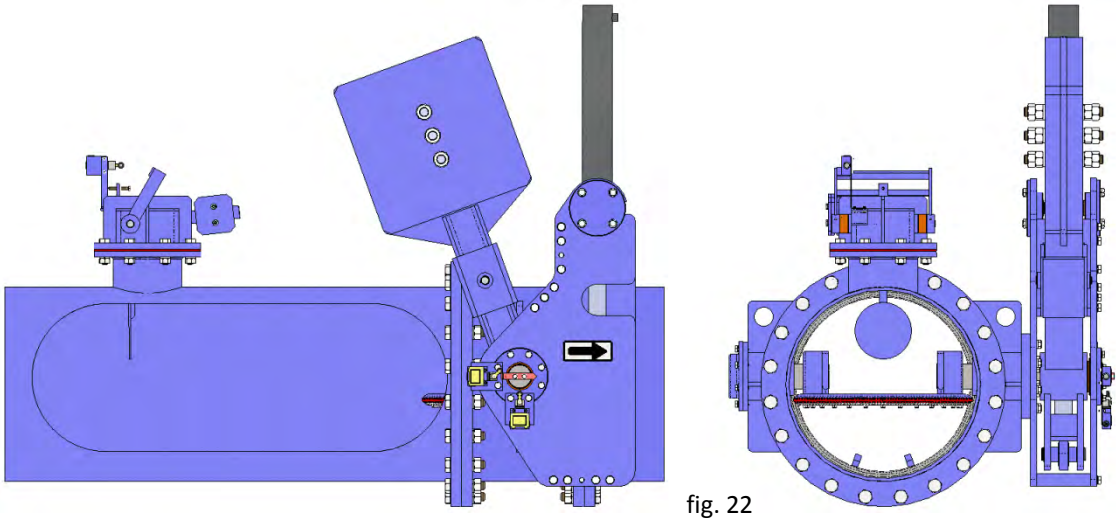


fig. 22

El detector de sobre-velocidad esta en reposo ➔ Válvula de mariposa **ME** se mantiene abierta.

VALVULA DE MARIPOSA SERIE ME

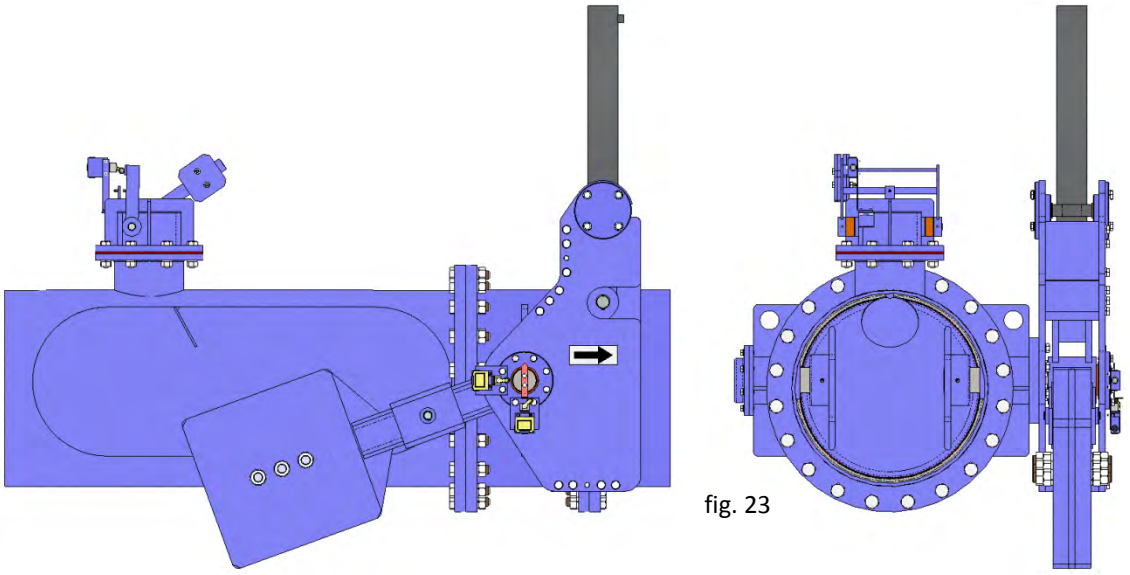


fig. 23

El detector de sobre-velocidad se activa por la velocidad del fluido ➜ Válvula de mariposa **ME** se cierra.

CONJUNTO MECANICO

Consta de un detector de sobre-velocidad mecánico con una válvula de mariposa **ME** con cilindro hidráulico y contrapeso, complementado con un grupo oleo-hidráulico manual que gobierna el cilindro hidráulico.

Este tipo de conjunto es ideal para las instalaciones que carezcan de suministro eléctrico.

Para empezar a trabajar con la válvula de mariposa **ME**, el primer paso será abrir la válvula, y para ello hay que introducir presión en el cilindro hidráulico por medio del grupo oleo-hidráulico manual.

Entonces empieza a pasar el flujo a una velocidad determinada, que será inferior a la necesaria para activar el detector de sobre-velocidad.

En cuanto se produzca una rotura en la conducción o alguna anomalía que cause el aumento de la velocidad del flujo, el detector de sobre-velocidad actúa sobre la válvula hidráulica, abriendo el paso entre la tubería de alimentación del cilindro hidráulico con el grupo oleo-hidráulico manual, con lo que cae la presión de alimentación y debido al contrapeso se cierra la válvula.

Esta permanecerá cerrada, aunque se intente meter presión por medio del grupo oleo-hidráulico manual, ya que la válvula hidráulica del detector de sobre-velocidad se mantiene abierta. Después de que el operario verifique el estado de la conducción o solucione la causa de la anomalía, se podrá proceder al rearme del detector de sobre-velocidad mecánico y posteriormente a introducir presión al cilindro hidráulico para volver a abrir la válvula de mariposa.

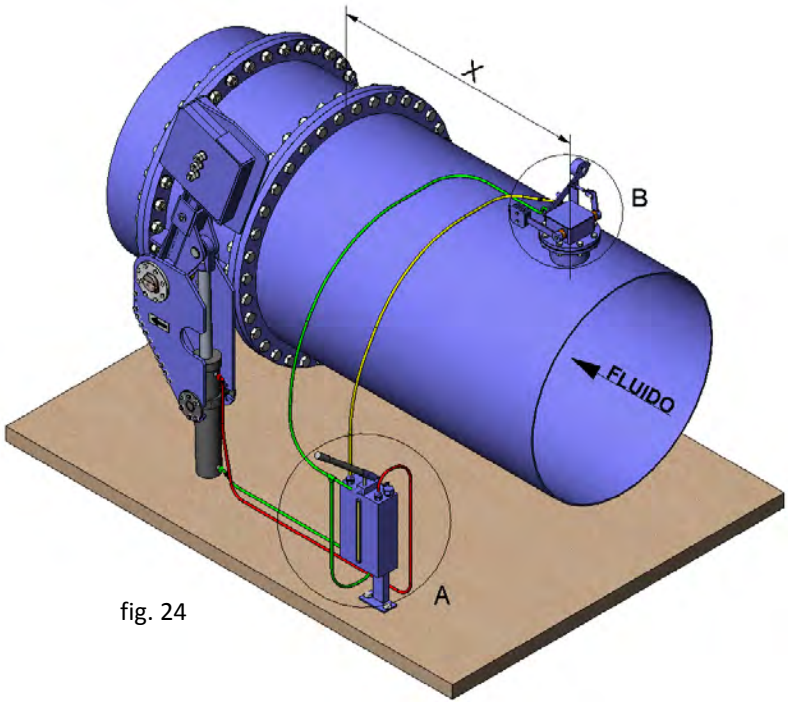


fig. 24

VALVULA DE MARIPOSA SERIE ME

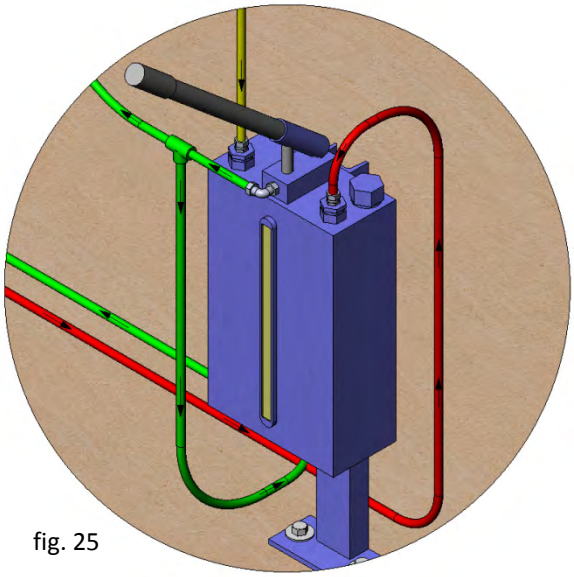


fig. 25

DETALLE A

Tubería verde: Salida del grupo oleo-hidráulico manual.

Tubería roja: Retorno del cilindro hidráulico.

Tubería amarilla: Retorno del detector de sobre-velocidad mecánico.

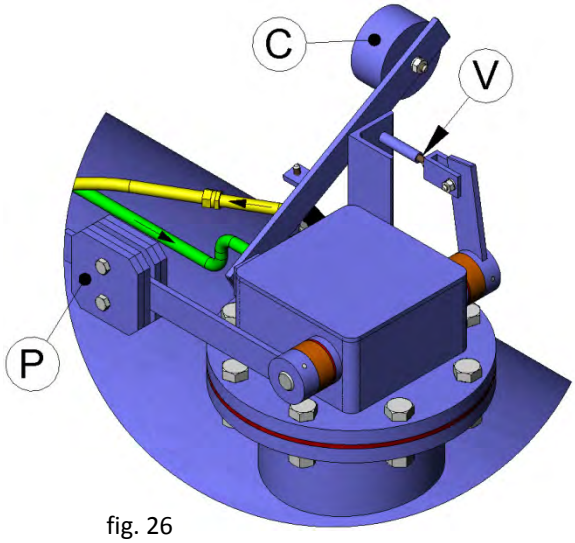


fig. 26

DETALLE B

Tubería verde: Entrada a la válvula hidráulica del detector de sobre-velocidad mecánico.

Tubería amarilla: Salida de la válvula hidráulica del detector de sobre-velocidad mecánico.

Instrucciones para el rearme del detector de sobre-velocidad mecánico (fig.26):

Después de que la válvula de mariposa **ME** se cierre por causa de la sobre-velocidad del fluido, para volver a abrir la válvula, hay que seguir estos pasos:

- Elevar el contrapeso "P" del detector para que retroceda la varilla "V".
- Manteniendo el contrapeso "P" levantado, subir el otro contrapeso "C".
- Cuando tengamos los dos contrapesos levantados "P" y "C", primero dejar bajar el contrapeso "P", y posterior dejar bajar el contrapeso "C" dejando apoyado sobre la varilla "V".
- Ya está listo para que mediante el grupo oleo-hidráulico manual se pueda volver a introducir presión en el cilindro hidráulico y abrir la válvula de mariposa **ME**.

Sea cual sea el tipo de detector de sobre-velocidad, mecánico o eléctrico, se deberá instalar aguas arriba de la válvula de mariposa **ME**, a una distancia de 1,5 veces el diámetro de la válvula (cota "X" en fig. 21 y fig. 24) siempre y cuando se respete una distancia mínima de 500 mm.

La válvula de mariposa **ME** que se monta en este tipo de conjuntos es común tanto para el detector mecánico como para el eléctrico. La característica principal es que el sistema de accionamiento de la válvula de mariposa **ME** lo componen un cilindro hidráulico y un contrapeso.

El explosionado que se muestra a continuación (fig. 27) pertenece a este tipo de válvula.

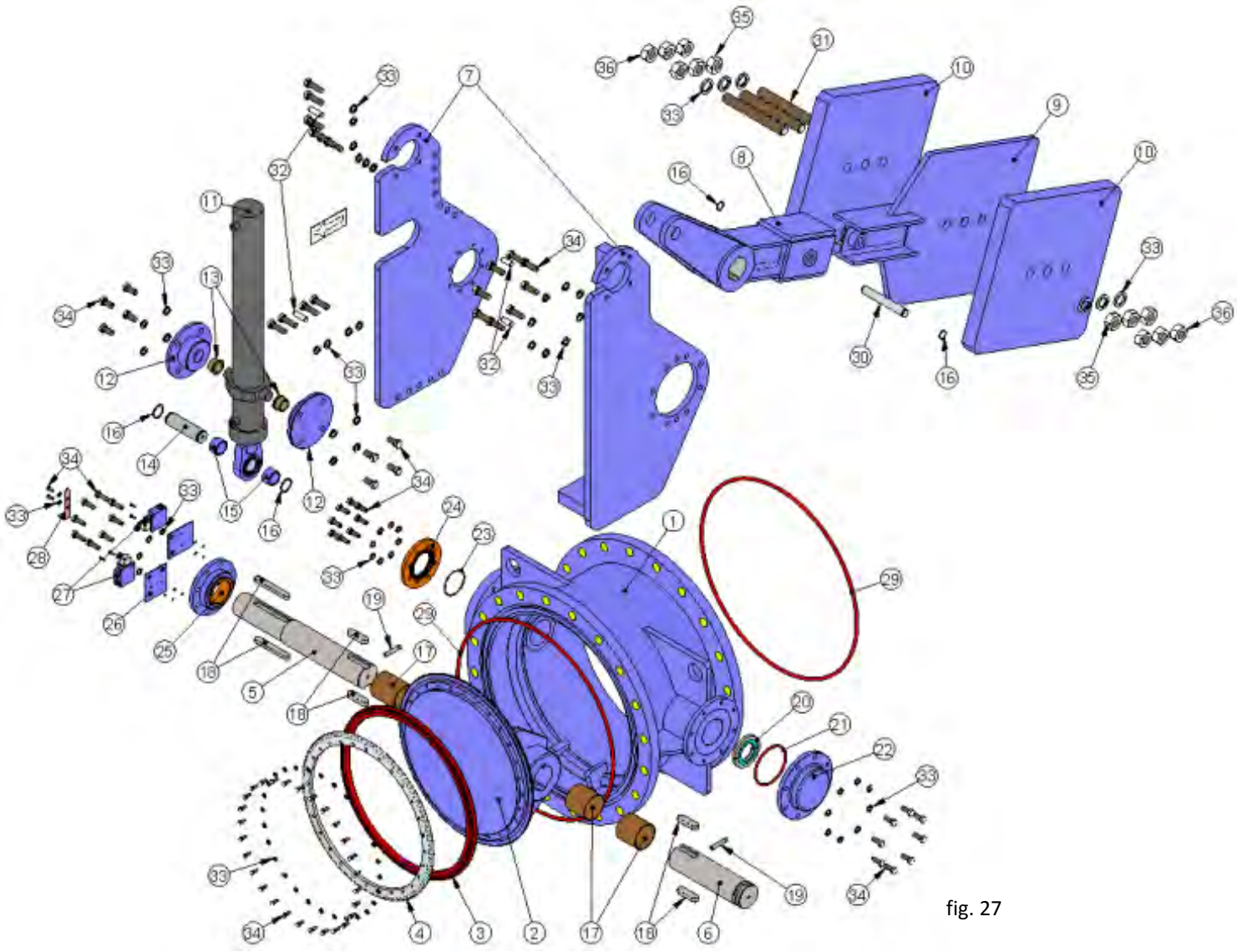


fig. 27

LISTA DE COMPONENTES VALVULA DE MARIPOSA DE SOBREVELOCIDAD					
POS.	**COMPONENTE**	**POS.**	**COMPONENTE**	**POS.**	**COMPONENTE**
1	CUERPO	13	COJINETE	25	TAPA SOPORTE
2	CLAPETA	14	BULON	26	SOP. FINAL CARRERA
3	JUNTA	15	CASQUILLO DISTANCIADOR	27	FINAL DE CARRERA
4	BRIDA JUNTA	16	CIR-CLIP	28	INDICADOR DE POSICION
5	EJE ACCIONAMIENTO	17	COJINETE	29	JUNTA TORICA
6	EJE	18	CHAVETA	30	BULON
7	SOPORTE ACCIONAMIENTO	19	PASADOR	31	VARILLA ROSCADA
8	BRAZO CONTRAPESO	20	ARANDELA DE FRICCION	32	PASADOR
9	SOPORTE CONTRAPESO	21	HILO TORICO	33	ARANDELA
10	CONTRAPESO	22	TAPA CIEGA	34	TORNILLO
11	ACTUADOR	23	HILO TORICO	35	TUERCA
12	TAPA SOPORTE	24	TAPA GUIA	36	CONTRATUERCA

tabla 3

INFORMACION SOBRE DIMENSIONES DE BRIDAS Y ENTRECARAS

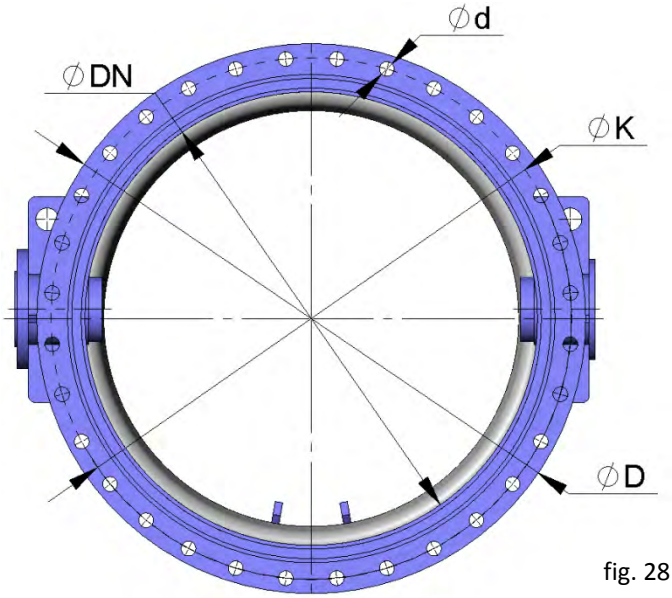
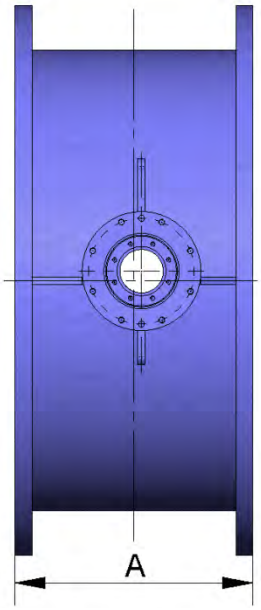


fig. 28



DN	TALADRADO DE BRIDAS s/EN 1092-2 PN10						PARES APRIETE
	A1*	A2*	Cant.	Ød	ØD	ØK	(Nm)
200	152	230	8	22	340	295	126
250	165	250	12	22	395	350	126
300	178	270	12	22	445	400	126
350	190	290	16	22	505	460	126
400	216	310	16	26	565	515	309
500	229	350	20	26	670	620	309
600	267	390	20	30	780	725	455
700	292	430	24	30	895	840	455
800	318	470	24	33	1015	950	615
900	330	510	28	33	1115	1050	615
1000	410	550	28	36	1230	1160	821
1200	470	630	32	39	1455	1380	1089
1400	530	710	36	42	1675	1590	1320
1600	600	790	40	48	1915	1820	1978
1800	670	870	44	48	2115	2020	1978
2000	760	950	48	48	2325	2230	1978
2200	---	1030	52	56	2550	2440	2976
2400	---	1110	56	56	2760	2650	2976
2600	---	1190	60	56	2960	2850	2976
2800	---	1270	64	56	3180	3070	2976
3000	---	1350	68	62	3405	3290	3776
* ➔ **A1: Serie corta** s/EN 558 SERIE 13 **A2: Serie larga** s/EN 558 SERIE 14							
OBSERVACIONES: Otros tamaños y otras normas bajo consulta.							

tabla 4

Las válvulas de mariposa **ME** de CMO tienen dos opciones de distancia de entre caras (cota "A" fig. 28) serie corta y serie larga.

El taladrado de bridas varía en función de las necesidades del cliente, pero lo más habitual suele ser que el taladrado sea según la norma EN 1092-2 PN10.

En la tabla 4 se detallan las cotas más características del taladrado de bridas y el entre caras. También se detalla el par de apriete necesario para instalarla entre bridas.

ANEXO V –VALVULAS HIDRAULICAS BERMAD–

IR-900-M Hydrometer
with Magnetic Drive



The BERMAD Model IR-900-M is a unique product integrating both a vertical turbine Woltman-type water meter and a diaphragm actuated hydraulic control valve. The vertical turbine impeller drive is magnetically coupled to a vacuum-sealed meter register in the control head. Both the magnetic drive control head and its register(s) are hermetically sealed and are not affected by dirty water nor environmental humidity.

The highly sensitive magnetic drive provides superior accuracy that exceeds all water meter standards. The available Reed Switch and Opto-Electric 4-20 mA transmitter options provide greater flexibility in electrical pulse generation. Serving as Flow Meter and Main Valve, the BERMAD Model IR-900-M controls irrigation together with the irrigation controller.

The IR-900-M provides the full spectrum of metering functions – from simple visual readout, to pulse output for computerized data capture and control – while simultaneously allowing for numerous control valve features such as pressure, level and flow control.



Ranging in size from $1^{1}/_{2}$"; DN40 through 10"; DN250, the 900-M Series is specifically designed for metering and control applications in agricultural and landscape irrigation as well as in municipal & industrial water supply systems. The flow metering unit is vertical to the pipeline and includes an impeller with integrated inlet and outlet flow straighteners. This internal design eliminates the need for straightening distances, enables vertical or horizontal installation, and ensures accuracy even when the valve is partially open during pressure or flow control tasks. The impeller assembly shaft serves as the closure assembly guide, while also centralizing and tightening all internal parts both in their position and to one another.

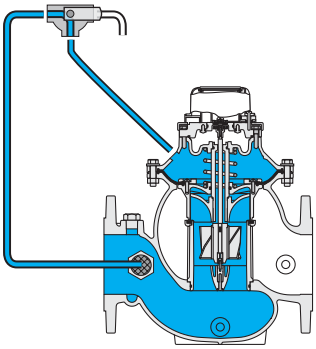
The basic Model IR-900-M combines simple and reliable construction with superior performance, while at the same time being virtually free of the typical limitations associated with other single chambered valves. The relatively high impeller housing raises the location of the vulcanized seal seat above the valve body. This results in remarkable cavitation resistance and a smooth mushroom-shaped flow where the valve body is distanced from the flow.



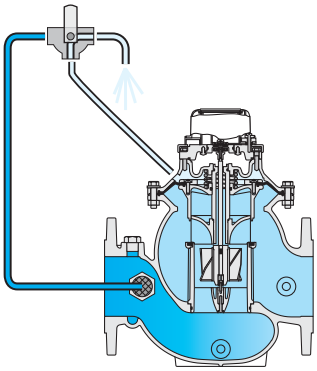
The closure assembly, combining a rugged radial disk harnessed to a flexible fiber reinforced diaphragm, slides on the guide along the full valve travel. The diaphragm is carefully balanced and peripherally supported to avoid distortion, resulting in long-life and controlled actuation even under harsh conditions. One diaphragm and spring fully meets the valve's operating pressure range requirements. The cover is removable via fastening bolts for quick in-line inspection and service. All the internal assemblies can be easily removed from the valve body with no need for disassembling the valve from the line.

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On-Off Modes, Local Manual Control



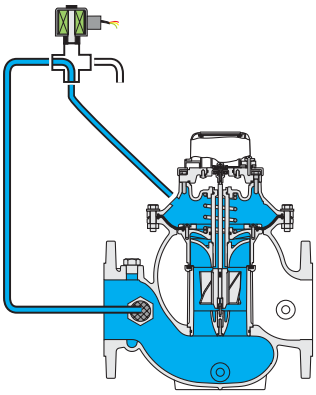
Hydrometer Closed



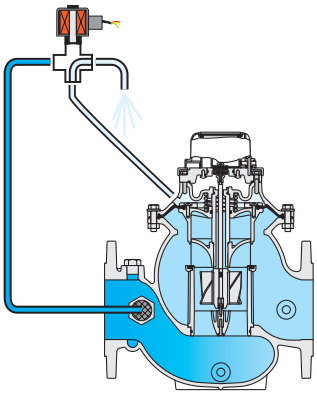
Hydrometer Open

Line pressure is applied to the control chamber of the hydrometer, through the override Cock-Valve. This creates a hydraulic force that moves the valve to the closed position and provides drip tight sealing. Discharging pressure from the control chamber to the atmosphere causes the line pressure under the plug to open the hydrometer, measuring the flow rate.

On-Off Modes, Solenoid Controlled



Solenoid Open
Hydrometer Closed

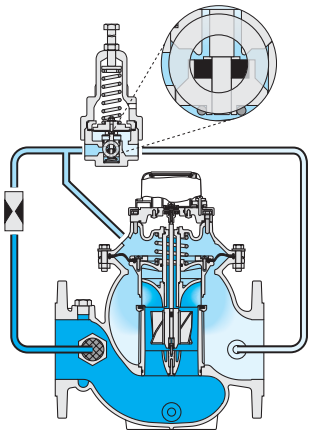


Solenoid Closed
Hydrometer Open

Line pressure is applied to the control chamber of the hydrometer, through the opened 3-way solenoid. This creates a hydraulic force that moves the valve to the closed position and provides drip tight sealing. Closing the Solenoid causes it to switch, discharging pressure from the control chamber.
This in turn causes the line pressure under the plug to open the hydrometer, measuring the flow.

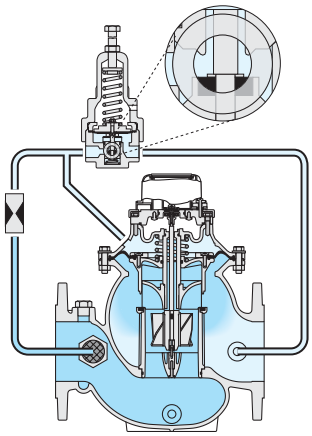
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2-Way Modulating Modes, Pressure Reducing Pilot



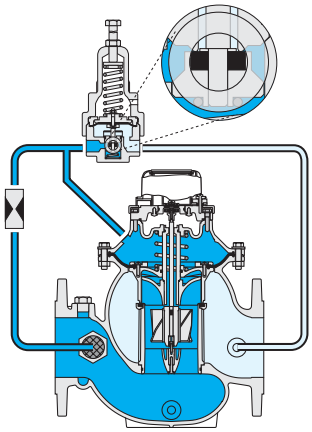
Modulating to Close

The restrictor continuously allows line pressure into the control chamber, while the pilot controls outflow from the control chamber. Throttling when it senses a pressure rise, the pilot causes pressure to accumulate in the control chamber, forcing the valve to modulate closed.



Modulating to Open

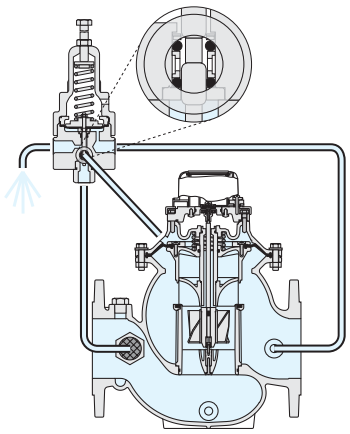
The pilot modulates open when it senses a pressure drop, releasing greater flow from the control chamber than the restrictor can allow in. This causes the accumulated pressure in the control chamber to drop, and the valve to modulate open.



Zero Flow Position

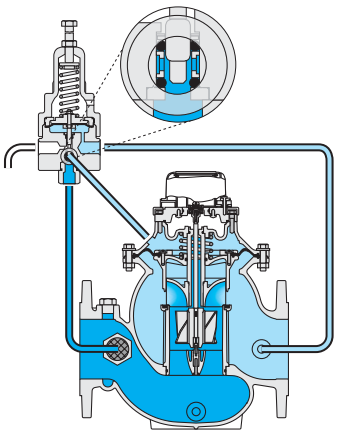
When demand drops to zero, downstream pressure begins to rise as the flow enters a closed line. The pilot closes, initiating the valve's irreversible closing process, eventually causing it to seal drip tight.

3-Way Control Modes, Pressure Reducing



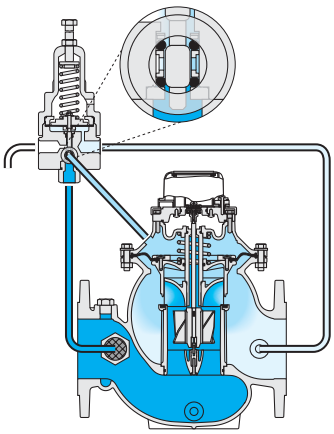
Fully Open Position

When upstream pressure drops, the pilot blocks the supply pressure port and opens the drain port, venting the control chamber to the atmosphere. This fully opens the hydrometer, minimizing head loss.



Modulating to Close

The pilot switches upon pressure rise, blocking the drain port and opening the supply pressure port. This pressurizes the control chamber, forcing the hydrometer to modulate closed.

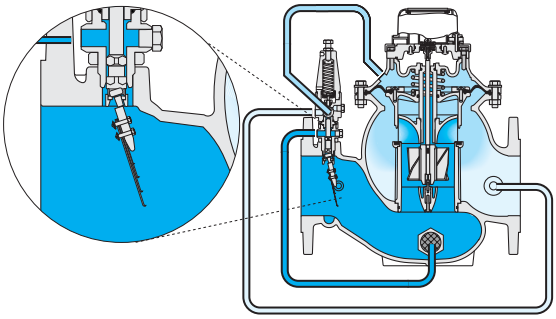


Locked Position

When sensed pressure is equal to setting, the pilot blocks both the drain and the supply pressure ports. This locks the pressure in the control chamber, freezing the hydrometer opening in its last position until conditions change.

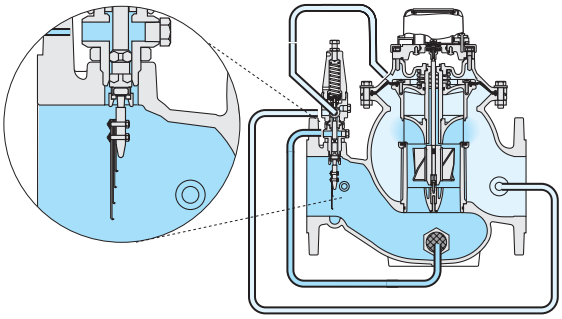
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2/3-Way Modulating Modes, Flow Control



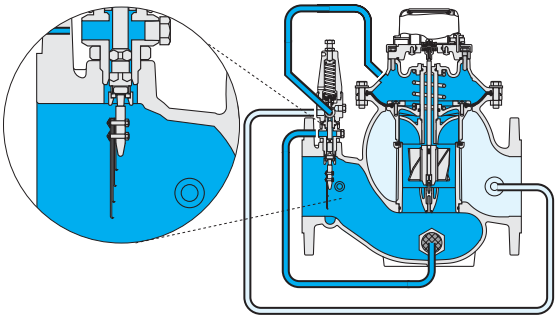
Modulating to Close

Should demand rise above setting, the increasing flow dynamic-force moves the paddle, which thereby pushes up the pilot trim, causing a negative ratio between water flow into and out of the control chamber. Pressure then accumulates in the control chamber, forcing the hydrometer to throttle closed.



Modulating to Open

When demand is below setting, the pilot's spring force pushes the pilot trim down, thereby causing a negative ratio between water flow into and out of the control chamber. Pressure is then released from the control chamber, enabling the hydrometer to modulate open.



Stable Conditions

As long as flow is per pilot setting, the pilot freezes the control chamber inlet and outlet flow ratio. This keeps the hydrometer opening rate constant, allowing the hydrometer to react "on-line" to any anticipated changes in supply and/or demand conditions.

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[1] Control Head

Includes: Vacuum-sealed meter register, magnetically coupled to the impeller drive. Hermetically sealed control head and its register(s). High sensitivity, providing superior accuracy that exceeds all water meter standards. Range of Reed Switch and Opto-Electric 4-20 mA transmitter options provide greater flexibility in electrical pulse generation.

[2] Valve Cover

Locates, centralizes and fastens diaphragm, spring, and impeller assembly ensuring smooth and accurate performance. Simple and light construction enables quick in-line inspection and service.

[3] Auxiliary Closing Spring

One single spring fully meets valve requirements for operating pressure range, ensuring low opening pressure and secured closing.

[4] Closure Assembly

Combining a rugged radial disk harnessed to a flexible fiber reinforced diaphragm. The fully guided closure assembly and the carefully balanced and peripherally supported diaphragm prevent distortion and protect the elastomer, resulting in long-life and controlled actuation even under harsh conditions. One diaphragm and spring fully meet the valve's operating pressure range requirements.

[5] Impeller Assembly

[5.1] Guide – Carries the transmission shaft, guides the closure assembly, and centralizes and tightens all internal parts.

[5.2] Upper Flow Straightener – Tightens the seal seat in place, straightens outlet flow, and creates mushroom-shaped flow.

[5.3] Impeller – Woltman-type impeller with tungsten carbide shaft tips and bearings for high, long-term accuracy and negligible wear.

[6] Impeller Housing

[6.1] Lower Flow Straightener – Straightens inlet flow, eliminating the need for straight upstream pipe required in standard water meters.

[6.2] Seal Seat – Metal ring vulcanized with elastomeric seal, raised and remote from valve body to prevent cavitation damage.

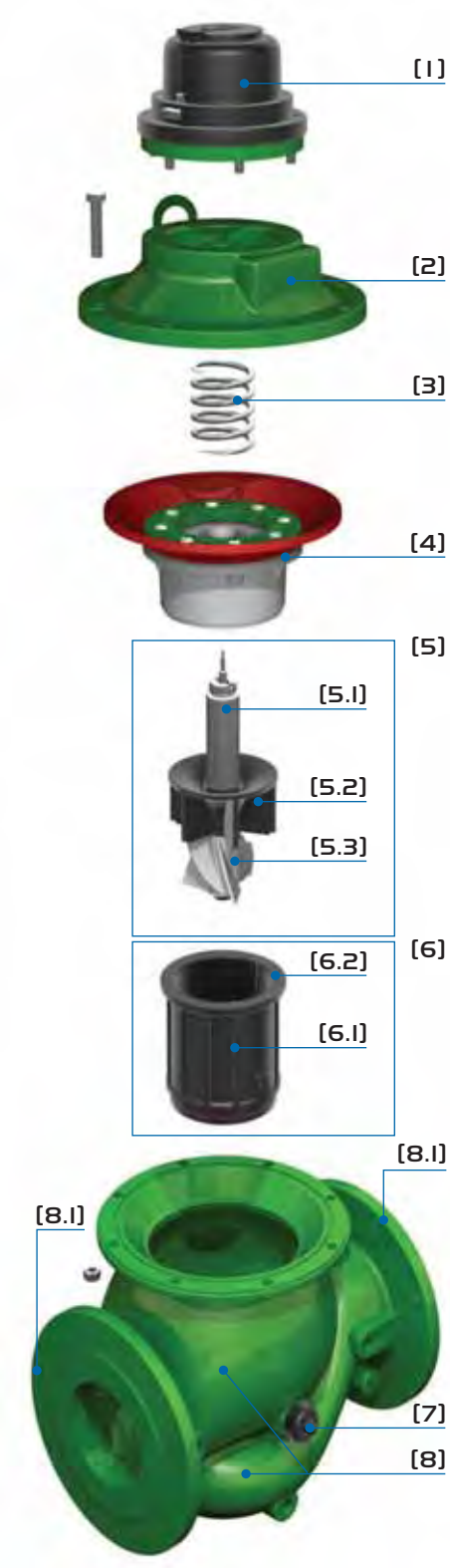
[7] Integrated Calibration Device

Enables recalibration instead of renovation when the recommended standard accuracy period has elapsed (The Calibration Device is stamped closed with a metal seal).

[8] Wide Body

Hydro-dynamically designed for efficient flow with minimal pressure loss and excellent resistance to cavitation.

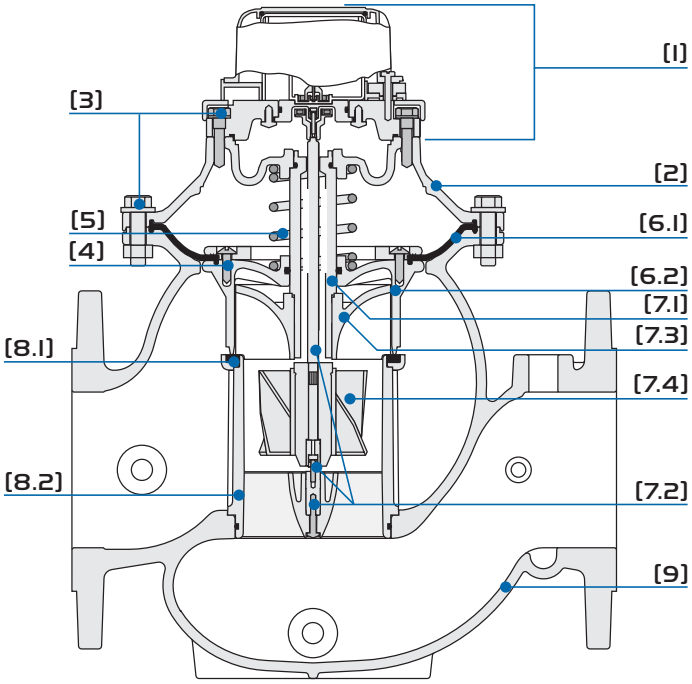
[8.1] End Connections conform to pressure ratings and standards: ISO, ANSI, JIS, BS, and others.



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SI Metric

Construction Materials



[1] Control Head: Plastic, Stainless Steel and Brass

[2] Cover: Polyester Coated Ductile Iron to EN 1563

[3] External Bolts / Nuts: Zinc-Cobalt Plated Steel

[4] Internal Bolts, Nuts and Washers: Stainless Steel 304 and 316

[5] Spring: Stainless Steel 302

[6] Closure Assembly:

- [6.1] **Diaphragm:** Reinforced Natural Rubber (NR)
- [6.2] **Closure:** Glass Fiber Reinforced Nylon

[7] Impeller Assembly:

- [7.1] **Guide:** Stainless Steel 303
- [7.2] **Pivots, Bearings, and Thrust Bearings:** Tungsten Carbide
- [7.3] **Upper Flow Straightener:** Glass Fiber Reinforced Nylon
- [7.4] **Impeller:** Polypropylene

[8] Impeller Housing Assembly:

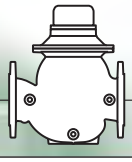
- [8.1] **Seal Seat:** NBR (Buna-N) Vulcanized Brass
- [8.2] **Impeller Housing and Lower Flow Straightener:** Glass Fiber Reinforced Nylon

[9] Valve Body: Polyester Coated Ductile Iron to EN 1563 or Cast Iron

O-Rings: NBR (Buna-N)

Coating: Electrostatic Powder Polyester Green RAL 6017, 150 mμ

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SI Metric

Technical Specifications

Available Patterns, Sizes & End Connections:

Connections	DN40	DN50	DN65	DN80R	DN80	DN100	DN150	DN200	DN250
Threaded	G	G & A		G					
Threaded (Male)	G	G							
Flanged			H*	G	G & A	G, A & H	G & A	G & A	G
Flange Inlet \ Thread Outlet		A	H*	G		H			

G = Globe, A = Angle 90°, H=Hydrant (Angle 120°) * Triangle Flange Inlet

Connections Standard:

Flanged: ISO 7005-2 (PN10 & 16)
Triangle Flange (DN65 inlet only)
Threaded: Rp ISO 7/1 (BSP.P) or NPT

Pressure Rating: PN16

Operating Pressure Ranges:

PN10: 0.5-10 bar
PN16: 0.5-16 bar
For lower pressure requirements, consult factory

Temperature: Water up to 50°C

Pulse Options:

Register Type	Reed Switch - Single				Reed Switch - Combined	
Pulse Per / Size Range	10 liter	100 liter	1 m^3	10 m^3	10 liter + 100 liter	100 liter + 1 m^3
DN40-DN100	■	■	■		■	■
DN150-DN250			■	■		

Register Type	Opto-Electric		Opto-Electric + Reed Switch - Combined			
Pulse Per / Size Range	1 liter	10 liter	1 liter (Opto) + 100 liter (Reed)	1 liter (Opto) + 1 m^3 (Reed)	10 liter (Opto) + 1 m^3 (Reed)	10 liter (Opto) + 10 m^3 (Reed)
DN40-DN100	■		■	■		
DN150-DN250		■			■	■

Pulse Electric Data:

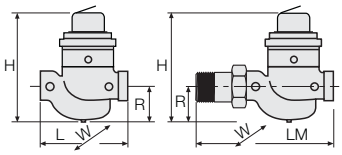
Reed-Switch: Switching voltage: 48 VAC/DC max
Switching current: 0.2A max
Switching power: 4W max

Opto-Electric: Supply voltage: 5-12 VDC
Output type: complementary
Output current: 200 mA

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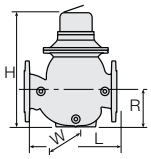
SI Metric

Globe Pattern



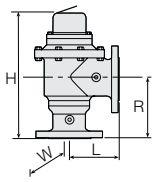
Connection Type	Threaded		
Size	DN40	DN50	DN80R
L (mm)	250	250	250
LM (mm)	317	327	N/A
W (mm)	137	137	137
H (mm)	270	277	277
R (mm)	95	95	79
Weight (kg)	7.2	7.3	7.3

Globe Pattern



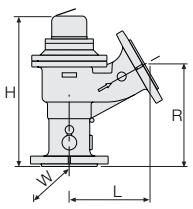
Connection Type	Flanged					
Size	DN80R	DN80	DN100	DN150	DN200	DN250
L (mm)	310	300	350	500	600	600
W (mm)	200	210	250	380	380	405
H (mm)	298	382	447	602	617	617
R (mm)	100	123	137	216	228	228
Weight (kg)	16.0	23.0	31.0	71.0	93.0	140.5

90° Angle Pattern



Connection Type	Threaded	Flanged			
Size	DN50	DN80	DN100	DN150	DN200
L (mm)	120	150	180	250	250
W (mm)	137	210	250	380	380
H (mm)	300	402	481	585	585
R (mm)	125	196	225	306	280
Weight (kg)	8.1	25.8	36.1	76.7	82.5

120° Angle Pattern



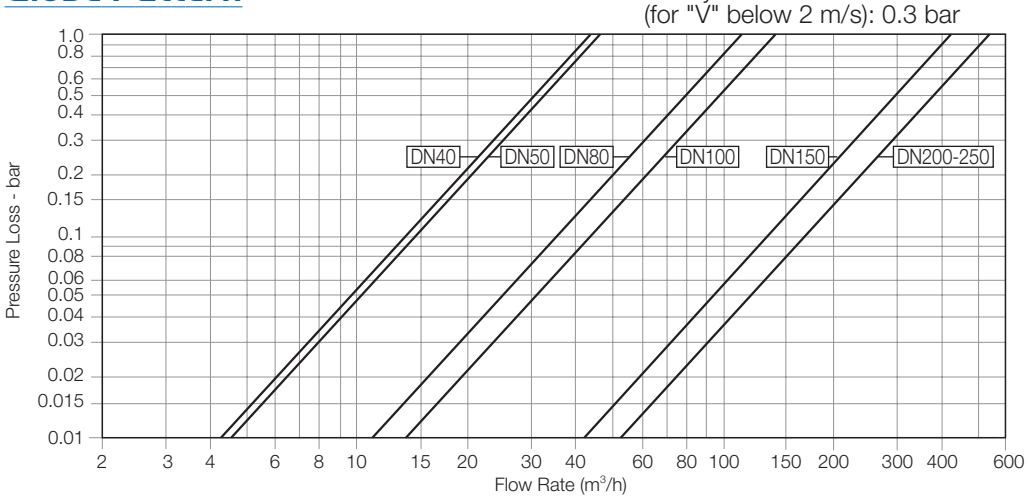
Connection Type	Flanged Inlet / Threaded Outlet		Flanged Inlet and Outlet	
Size	DN65	DN100	DN65	DN100
L (mm)	143	208	143	208
W (mm)	137	217	200	223
H (mm)	410	450	410	450
R (mm)	273	283	273	283
Weight (kg)	10.5	24.8	12.9	27.9

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SI Metric

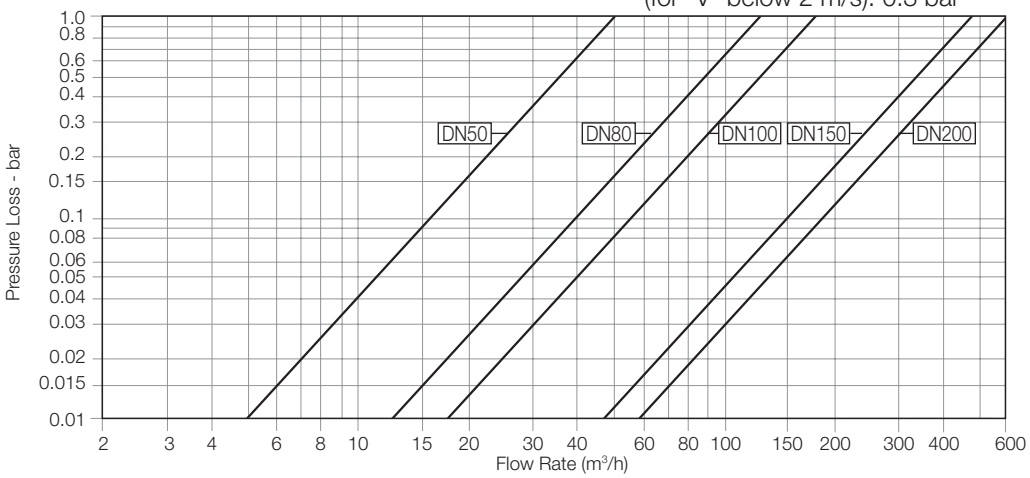
Globe Pattern

2-Way circuit "Added Head Loss"
(for "V" below 2 m/s): 0.3 bar



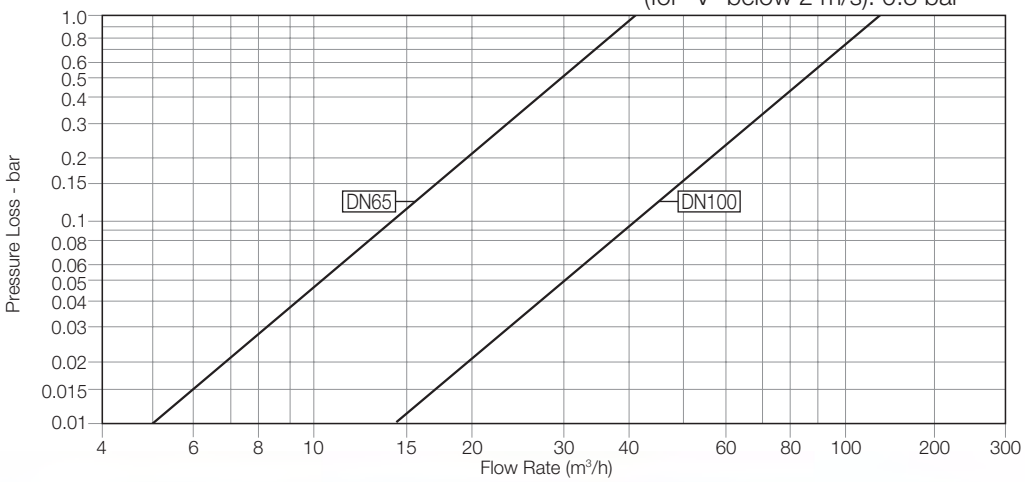
90° Angle Pattern

2-Way circuit "Added Head Loss"
(for "V" below 2 m/s): 0.3 bar

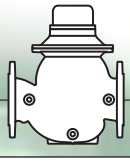


120° Angle Pattern

2-Way circuit "Added Head Loss"
(for "V" below 2 m/s): 0.3 bar



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Flow Properties

900-M Series

SI Metric

		Size	DN40	DN50	DN65	DN80R	DN80	DN100	DN150	DN200	DN250
Globe Pattern		Kv	41	46	N/A	50	115	147	430	550	550
		K	2.4	4.6	N/A	24.7	4.9	7.3	4.3	8.3	20.2
		Leq - m	4.8	12.9	N/A	109.7	21.6	42.7	42.9	110.5	337.2
90°Angle Pattern		Kv	N/A	51	N/A	N/A	126	180	473	605	N/A
		K	N/A	3.8	N/A	N/A	4.0	4.8	3.5	6.8	N/A
		Leq - m	N/A	10.5	N/A	N/A	18.0	28.4	35.5	91.3	N/A
120°Angle Pattern		Kv	N/A	N/A	51	N/A	N/A	147	N/A	N/A	N/A
		K	N/A	N/A	3.8	N/A	N/A	7.3	N/A	N/A	N/A
		Leq - m	N/A	N/A	10.5	N/A	N/A	42.7	N/A	N/A	N/A

Valve flow coefficient, Kv or Cv $Kv(Cv)=Q\sqrt{\frac{G_f}{\Delta P}}$

Where:
Kv = Valve flow coefficient (flow in m^3/h at 1bar Diff. Press.)
Cv = Valve flow coefficient (flow in gpm at Diff. Press. 1psi)
Q = Flow rate (m^3/h ; gpm)
ΔP = Differential pressure (bar ; psi)
Gf = Liquid specific gravity (Water = 1.0)

Kv = 0.865 Cv

Flow resistance or Head loss coefficient, $K = \Delta H \frac{2g}{V^2}$

Where:
K = Flow resistance or Head loss coefficient (dimensionless)
ΔH = Head loss (m ; feet)
V = Nominal size flow velocity (m/sec ; feet/sec.)
g = Acceleration of gravity (9.81 m/sec^2 ; 32.18 $feet/sec^2$)

Equivalent Pipe Length, Leq $Leq = Lk \cdot D$

Where:
Leq = Equivalent nominal pipe length (m ; feet)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (m ; feet)

Note:
The Leq values given are for general consideration only.

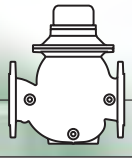
Accuracy Table

	Accuracy	DN40	DN50	DN65	DN80	DN100	DN150	DN200	DN250
Q1 Minimum Flow	±5%	0.8	0.8	1.2	1.2	1.8	4	6.3	6.3
Q2 Transitional Flow	±2%	1.3	1.3	1.9	3	4.5	10	15.8	15.8
Qn Nominal Flow ISO 4064-1-1993	±2%	15	15	25	40	60	150	250	400
Q3 Permanent Flow	±2%	25	40	40	100	160	250	400	400
Q4 Maximum Flow (Short Time)	±2%	31	50	50	125	200	313	500	500
Q2/Q1	-	1.6	1.6	1.6	2.5	2.5	2.5	2.5	2.5
Q3/Q1	-	50	50	33	83	89	63	63	63
Class ISO 4064-1-1993	-	A	A	A	B	B	B	B	B

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BERMAD Irrigation

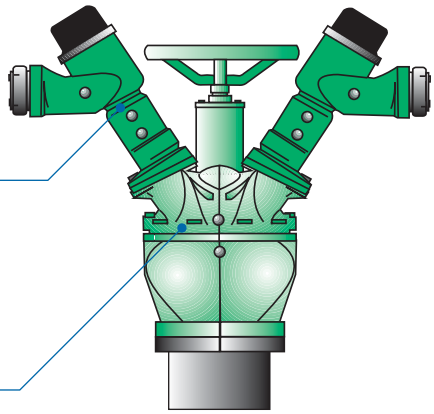
Irrigation Hydrant Valve



900-M Series

SI Metric

The Irrigation Hydrant is a unique valve assembly unit designed for irrigation and water supply distribution for multiple farm units.
The Irrigation Hydrant consists of two main parts: an Irrigation Hydrant Valve and Hydrometers Type H mounted on top of the Irrigation Hydrant Valve.



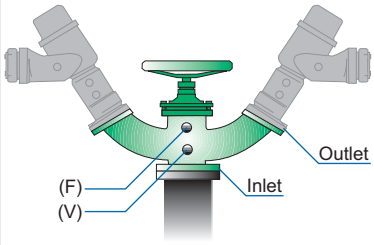
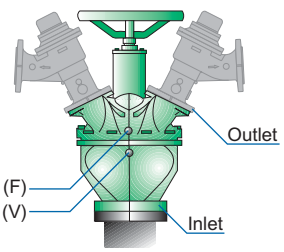
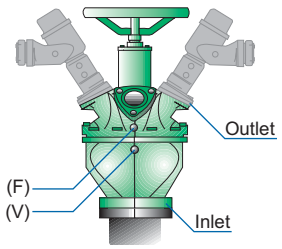
Hydrometer Type H

The Hydrometer Type H is a 120-degree elbow-shaped Hydrometer that integrates both a vertical turbine Woltman-type water meter, with a diaphragm actuated hydraulic control valve. It meets the full range of applications of the BERMAD 900-M Series.
The Hydrometer Type H is available in two sizes: DN: 65 & 100.

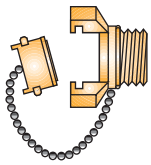
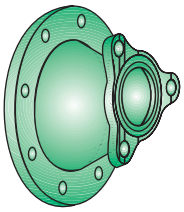
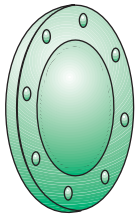
Irrigation Hydrant Valve

The Irrigation Hydrant Valve is available in three inlet sizes: DN: 80, 100 & 150.
It is an on/off hand-wheel operated valve with a single flange inlet and one, two, three or four distribution outlets.

The Irrigation Hydrant Valve is available in three Model Types:

			
Description	**Type F-82**	**Type A-102**	**Type A-104**
Inlet Diameter	DN80 (Optional DN100)(1)	DN100(1)	DN100(1)
Outlets	2	2	4
Outlet Diameter	DN65 (Triangle)	DN100(1)	DN65 (Triangle)
Optional Type	F-81 with single outlet	A-152 with DN150 inlet	A-154 with DN150 inlet

(1) Conforming to major standards
(F) Optional port for Automatic Anti-Freezing Cock Valve
(V) Optional port for Air Venting Cock Valve

				
Description	**Quick Coupling & Plug (Guillemin Coupling)**	**Flange Adapter**	**Cover (Blind Triangle Flange)**	**Cover (Blind Flange)**
Size	DN65	DN100 X DN65	DN65	DN100
Note	For use on DN65 Hydrometer with threaded outlet	For installing DN65 Hydrometer on A-102 irrigation Hydrant Valve	For blocking unused F-82 and F-104 Irrigation Hydrant Valve outlets	For blocking unused DN100 flange outlets

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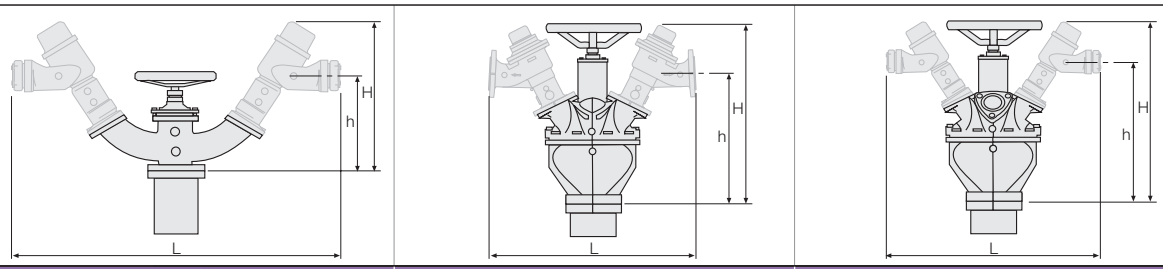
BERMAD Irrigation

Irrigation Hydrant Valve

900-M Series

SI Metric

Dimensions & Weights

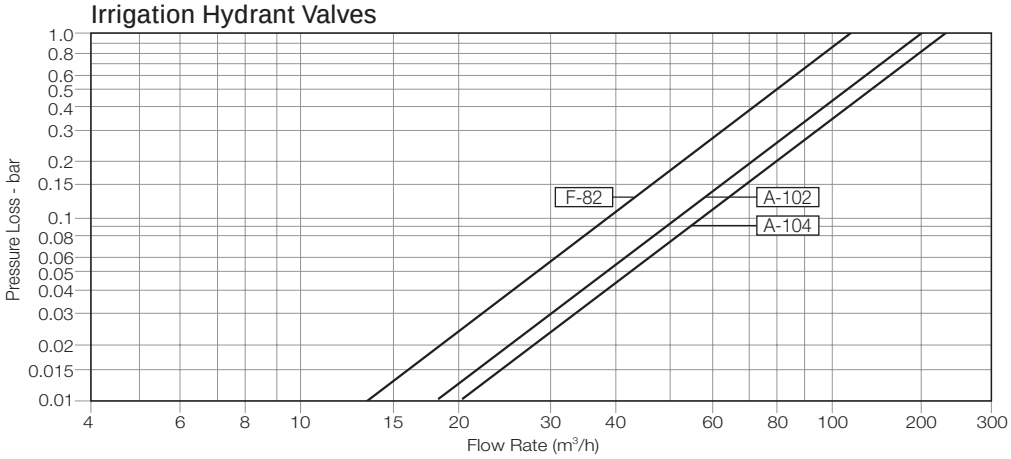


Type	F-82	F-102	F-104
L (mm)	1040	1100	970
H (mm)	600	730	700
h (mm)	360	580	510
Weight (kg)	27.0	65.5	51.5
Weight 1*(kg)	36.0	90.5	76.5
Weight 2*(kg)	45.0	115.5	101.5
Weight 3*(kg)	N/A	N/A	126.5
Weight 4*(kg)	N/A	N/A	151.5

* Number of Hydrometers installed.

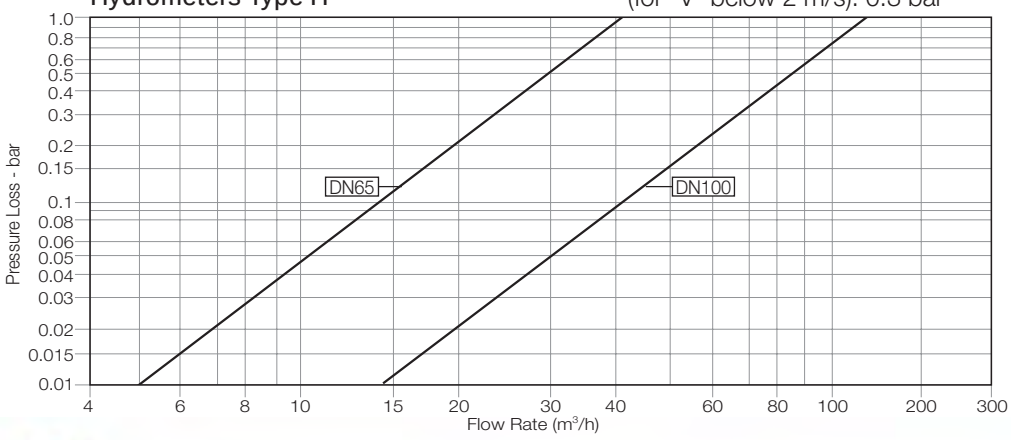
Flow Charts

Irrigation Hydrant Valves



Hydrometers Type H

2-Way circuit "Added Head Loss" (for "V" below 2 m/s): 0.3 bar

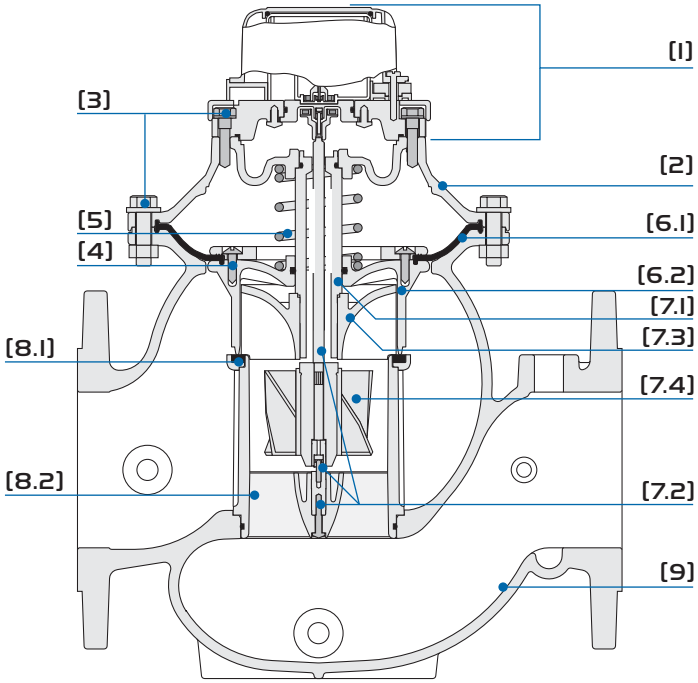


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US English

Construction Materials



[1] Control Head: Plastic, Stainless Steel and Brass

[2] Cover: Polyester Coated Ductile Iron to ASTM A536

[3] External Bolts / Nuts: Zinc-Cobalt Plated Steel

[4] Internal Bolts, Nuts and Washers: Stainless Steel 304 and 316

[5] Spring: Stainless Steel 302

[6] Closure Assembly:
- [6.1] **Diaphragm:** Reinforced Natural Rubber (NR)
- [6.2] **Closure:** Glass Fiber Reinforced Nylon

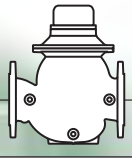
[7] Impeller Assembly:
- [7.1] **Guide:** Stainless Steel 303
- [7.2] **Pivots, Bearings, and Thrust Bearings:** Tungsten Carbide
- [7.3] **Upper Flow Straightener:** Glass Fiber Reinforced Nylon
- [7.4] **Impeller:** Polypropylene

[8] Impeller Housing Assembly:
- [8.1] **Seal Seat:** NBR (Buna-N) Vulcanized Brass
- [8.2] **Impeller Housing and Lower Flow Straightener:** Glass Fiber Reinforced Nylon

[9] Valve Body: Polyester Coated Ductile Iron to ASTM A-536 or Cast Iron to ASTM A-126 Class B

O-Rings: NBR (Buna-N)
Coating: Electrostatic Powder Polyester Green RAL 6017, 150 mμ

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US English

Technical Specifications

Available Patterns, Sizes & End Connections:

Connections	1½"	2"	2½"	3"R	3"	4"	6"	8"	10"
Threaded	G	G & A		G					
Threaded (Male)	G	G							
Flanged			H*	G	G & A	G, A & H	G & A	G & A	G
Flange Inlet \ Thread Outlet		A	H*	G		H			

G = Globe, A = Angle 90°, H= Hydrant (Angle 120°) * Triangle Flange Inlet

Connections Standard:

Flanged: ANSI B16.41 (Cast Iron)
ANSI B16.42 (Ductile Iron)
Triangle Flange (2½" inlet only)

Threaded: NPT or Rp ISO 7/1 (BSP.P)

Pressure Rating Classes: Cast Iron - #125; Ductile Iron - #150

Operating Pressure Ranges:

Class #125: 7-150 psi; Class #150: 7-250 psi

For lower pressure requirements, consult factory

Temperature: Water up to 122°F

Pulse Options:

Register Type	Reed Switch - Single				Reed Switch - Combined	
Pulse Per / Size Range	1 gallon	10 gallon	100 gallon	1000 gallon	1 galon + 10 gallon	10 galon + 100 gallon
1½"-4"	■	■	■		■	■
6"-10"		■	■	■		

Register Type	Opto-Electric		Opto-Electric + Reed Switch - Combined			
Pulse Per / Size Range	0.1 gallon	1 gallon	0.1 gallon (Opto) + 1 gallon (Reed)	0.1 gallon (Opto) + 10 gallon (Reed)	1 gallon (Opto) + 100 (Reed)	1 gallon (Opto) + 1000 (Reed)
1½"-4"	■		■	■		
6"-10"		■			■	■

Pulse Electric Data:

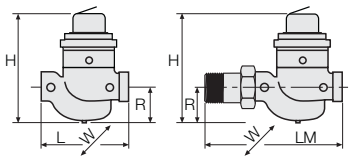
Reed-Switch: Switching voltage: 48 VAC/DC max
Switching current: 0.2A max
Switching power: 4W max

Opto-Electric: Supply voltage: 5-12 VDC
Output type: complementary
Output current: 200 mA

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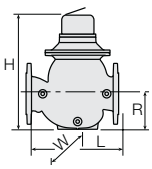
US English

Globe Pattern



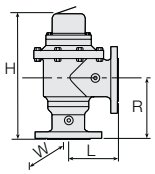
Connection Type	Threaded		
Size	1 1/2"	2"	3"R
L (inch)	9 13/16	9 13/16	9 13/16
LM (inch)	12 17/16	12 13/16	N/A
W (inch)	5 3/8	5 3/8	5 3/8
H (inch)	10 5/8	10 15/16	10 15/16
R (inch)	3.	3 3/4	3 1/8
Weight (lb)	15.9	16.1	16.1

Globe Pattern



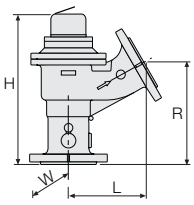
Connection Type	Flanged					
Size	3"R	3"	4"	6"	8"	10"
L (inch)	12 3/16	11 13/16	13 3/4	19 11/16	23 5/8	23 5/8
W (inch)	7 7/8	8 1/4	9 13/16	14 15/16	14 15/16	15 15/16
H (inch)	11 3/4	15 1/16	17 5/8	23 11/16	24 5/16	24 5/16
R (inch)	3 15/16	4 13/16	5 3/8	8 1/2	9	9
Weight (lb)	35.3	50.7	66.1	154.3	202.8	309.1

90° Angle Pattern



Connection Type	Threaded	Flanged			
Size	2"	3"	4"	6"	8"
L (inch)	4 3/4	5 15/16	7 1/16	9 13/16	9 13/16
W (inch)	5 3/8	8 1/4	9 13/16	14 15/16	14 15/16
H (inch)	11 13/16	15 13/16	18 15/16	23	23
R (inch)	4 15/16	7 3/4	8 7/8	12 1/16	11
Weight (lb)	17.4	56.2	78.9	168.4	181.2

120° Angle Pattern

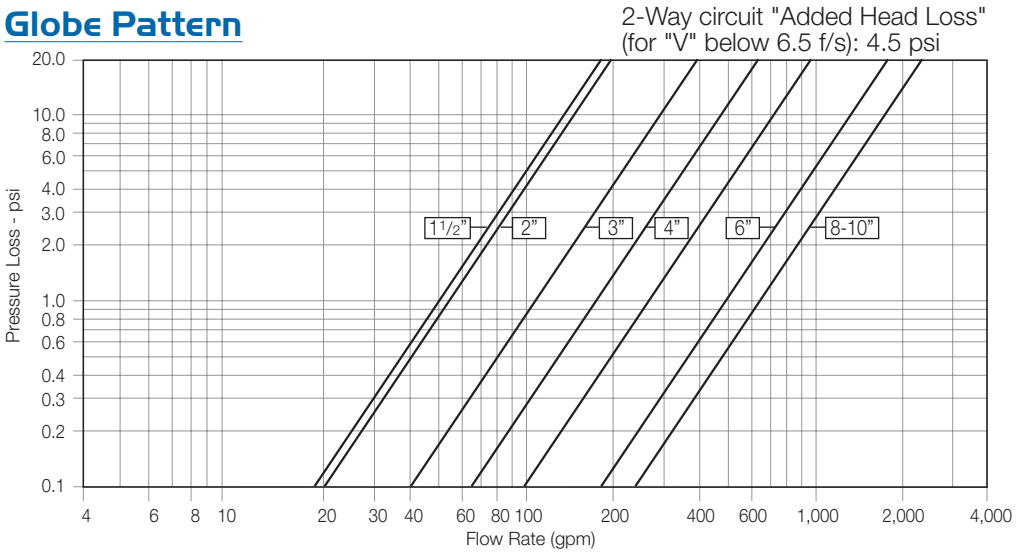


Connection Type	Flanged Inlet / Threaded Outlet		Flanged Inlet and Outlet	
Size	2 1/2"	4"	2 1/2"	4"
L (inch)	5 5/8	8 3/16	5 5/8	8 3/16
W (inch)	5 3/8	8 9/16	7 7/8	8 3/4
H (inch)	16 1/8	17 11/16	16 1/8	17 11/16
R (inch)	10 3/4	11 1/8	10 3/4	11 1/8
Weight (lb)	22.7	54.0	28.0	60.8

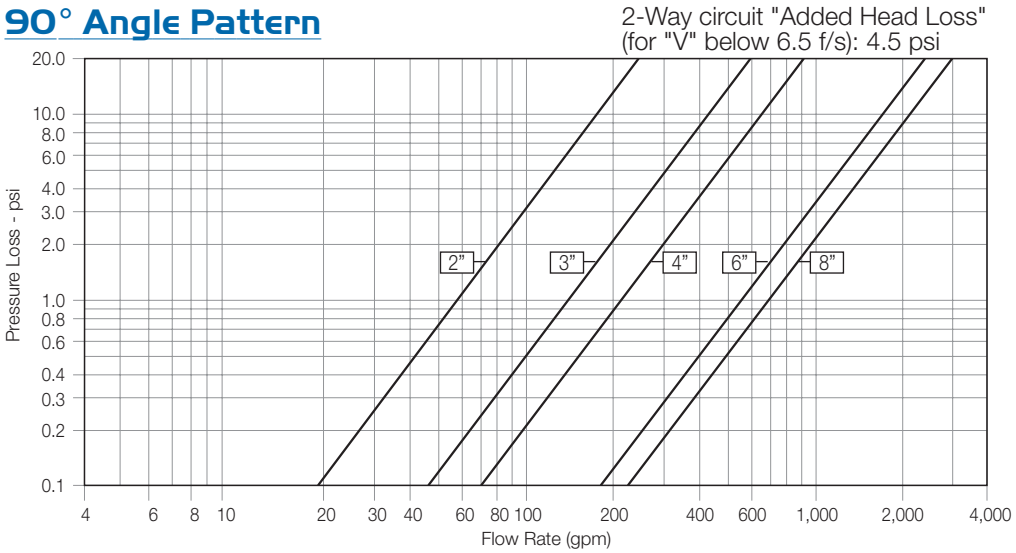
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US English

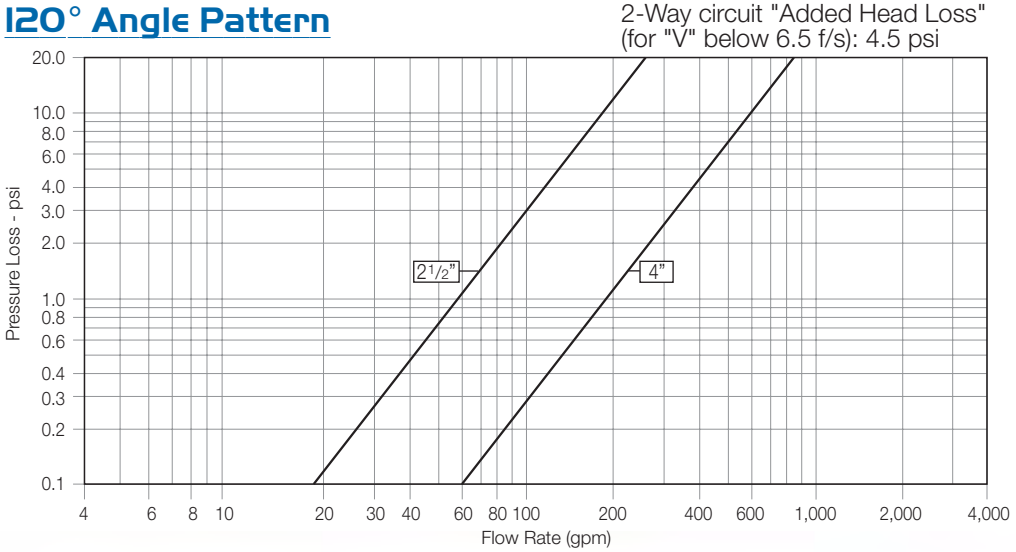
Globe Pattern



90° Angle Pattern



120° Angle Pattern



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US English

		Size	1 1/2"	2"	2 1/2"	3"R	3"	4"	6"	8"	10"
Globe Pattern		Cv	47	53	N/A	58	133	170	497	636	636
		K	2.4	4.6	N/A	24.7	4.9	7.3	4.3	8.3	20.2
		Leq - f	15.7	42.2	N/A	359.8	70.8	139.9	140.8	362.5	1106.4
90°Angle Pattern		Cv	N/A	59	N/A	N/A	146	208	547	699	N/A
		K	N/A	3.8	N/A	N/A	4.0	4.8	3.5	6.8	N/A
		Leq - f	N/A	34.3	N/A	N/A	58.9	93.3	116.3	299.6	N/A
120°Angle Pattern		Cv	N/A	N/A	59	N/A	N/A	170	N/A	N/A	N/A
		K	N/A	N/A	3.8	N/A	N/A	7.3	N/A	N/A	N/A
		Leq - f	N/A	N/A	34.3	N/A	N/A	139.9	N/A	N/A	N/A

Valve flow coefficient, Cv or Kv $Cv(Kv)=Q\sqrt{\frac{Gf}{\Delta P}}$

Where:
Kv = Valve flow coefficient (flow in m^3/h at 1bar Diff. Press.)
Cv = Valve flow coefficient (flow in gpm at Diff. Press. 1psi)
Q = Flow rate (gpm ; m^3/h)
ΔP = Differential pressure (psi ; bar)
Gf = Liquid specific gravity (Water = 1.0)

Cv = 1.155 Kv

Flow resistance or Head loss coefficient, $K = \Delta H \frac{2g}{V^2}$

Where:
K = Flow resistance or Head loss coefficient (dimensionless)
ΔH = Head loss (feet ; m)
V = Nominal size flow velocity (feet/sec ; m/sec.)
g = Acceleration of gravity (32.18 $feet/sec^2$; 9.81 m/sec^2)

Equivalent Pipe Length, Leq Leq = Lk·D

Where:
Leq = Equivalent nominal pipe length (feet ; m)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (feet ; m)

Note:
The Leq values given are for general consideration only.
Actual Leq may vary somewhat with each of the valve sizes.

Accuracy Table

	Accuracy	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"
Q1 Minimum Flow	±5%	3.5	3.5	5.3	5.3	7.9	17.6	27.7	27.7
Q2 Transitional Flow	±2%	5.7	5.7	8.4	13.2	19.8	44	69.6	69.6
Nominal Flow ISO 4064-1-1993	±2%	66	66	110	176	264	660	1100	1761
Q3 Permanent Flow	±2%	110	176	176	440	704	1100	1761	1761
Q4 Flow Maximum (Short Time)	±2%	136	220	220	550	880	1378	2201	2201
Q2/Q1	-	1.6	1.6	1.6	2.5	2.5	2.5	2.5	2.5
Q3/Q1	-	50	50	33	83	89	63	63	63
Class ISO 4064-1-1993	-	A	A	A	B	B	B	B	B

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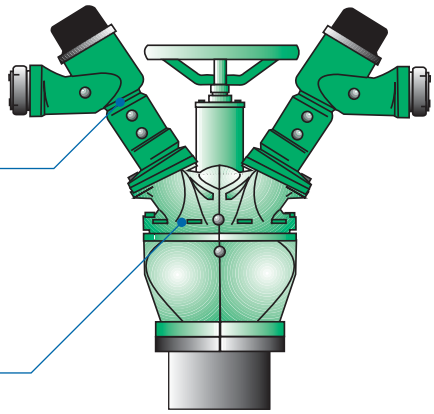
BERMAD Irrigation

Irrigation Hydrant Valve

900-M Series

US English

The Irrigation Hydrant is a unique valve assembly unit designed for irrigation and water supply distribution for multiple farm units.
The Irrigation Hydrant consists of two main parts: an Irrigation Hydrant Valve and Hydrometers Type H mounted on top of the Irrigation Hydrant Valve.



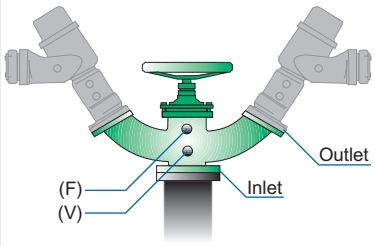
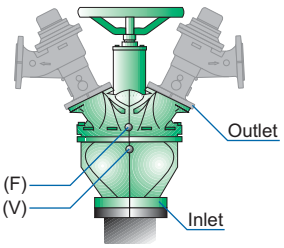
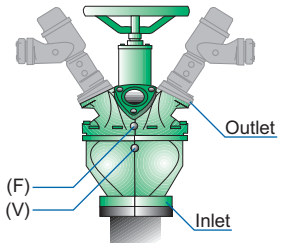
Hydrometer Type H

The Hydrometer Type H is a 120-degree elbow-shaped Hydrometer that integrates both a vertical turbine Woltman-type water meter, with a diaphragm actuated hydraulic control valve. It meets the full range of applications of the BERMAD 900-M Series.
The Hydrometer Type H is available in two sizes: 2 1/2" & 4".

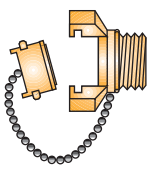
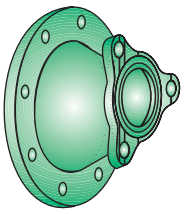
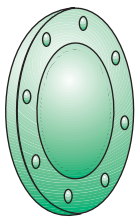
Irrigation Hydrant Valve

The Irrigation Hydrant Valve is available in three inlet sizes: 3", 4" & 6".
It is an on/off hand-wheel operated valve with a single flange inlet and one, two, three or four distribution outlets.

The Irrigation Hydrant Valve is available in three Model Types:

			
Description	**Type F-82**	**Type A-102**	**Type A-104**
Inlet Diameter	3" (Optional 4")(1)	4"(1)	4"(1)
Outlets	2	2	4
Outlet Diameter	2 1/2" (Triangle)	4"(1)	2 1/2" (Triangle)
Optional Type	F-81 with single outlet	A-152 with 6" inlet	A-154 with 6" inlet

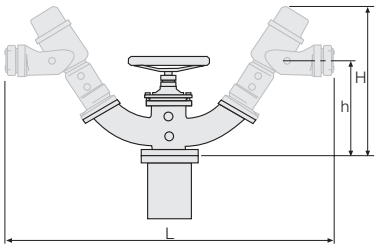
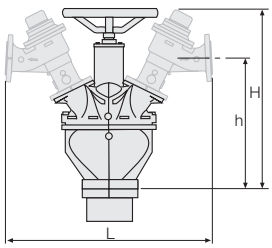
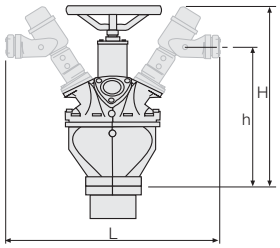
(1) Conforming to major standards
(F) Optional port for Automatic Anti-Freezing Cock Valve
(V) Optional port for Air Venting Cock Valve

				
Description	**Quick Coupling & Plug (Guillemin Coupling)**	**Flange Adapter**	**Cover (Blind Triangle Flange)**	**Cover (Blind Flange)**
Size	2 1/2"	4" X 2 1/2"	2 1/2"	4"
Note	For use on 2 1/2" Hydrometer with threaded outlet	For installing 2 1/2" Hydrometer on A-102 irrigation Hydrant Valve	For blocking unused F-82 and F-104 Irrigation Hydrant Valve outlets	For blocking unused 4" flange outlets

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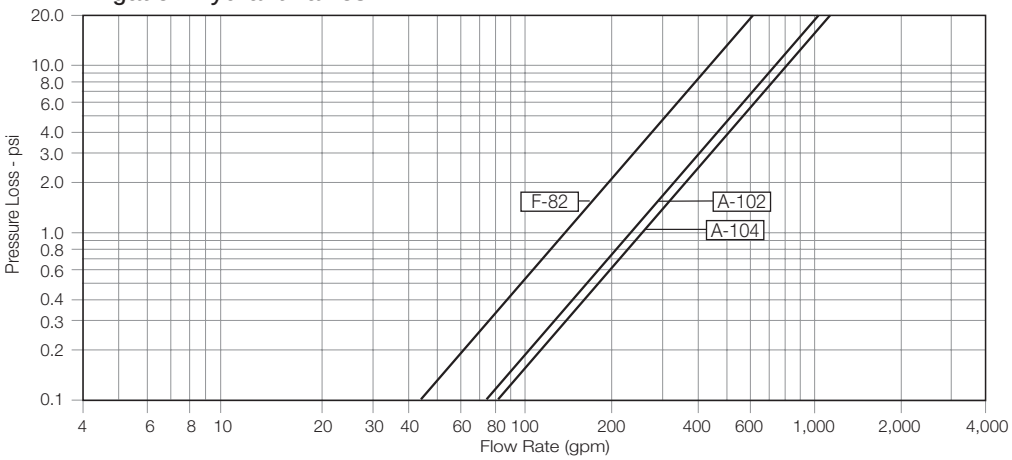
Dimensions & Weights

Dimensions Drawing			
Type	F-82	F-102	F-104
L (inch)	$40^{15}/_{16}$	$43^{5}/_{16}$	$38^{3}/_{16}$
H (inch)	$23^{5}/_{8}$	$28^{3}/_{4}$	$27^{9}/_{16}$
h (inch)	$14^{3}/_{16}$	$22^{13}/_{16}$	$20^{1}/_{16}$
Weight (lb)	59.6	144.4	113.6
Weight 1* (lb)	79.4	199.5	168.7
Weight 2* (lb)	99.2	254.6	223.8
Weight 3* (lb)	N/A	N/A	278.9
Weight 4* (lb)	N/A	N/A	334.0

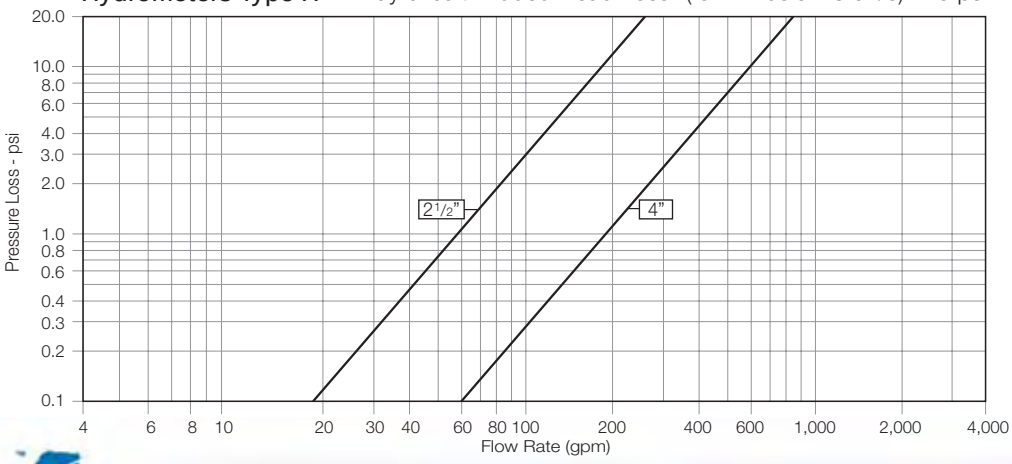
* Number of Hydrometers installed.

Flow Charts

Irrigation Hydrant Valves



Hydrometers Type H 2-Way circuit "Added Head Loss" (for "V" below 6.5 f/s): 4.5 psi



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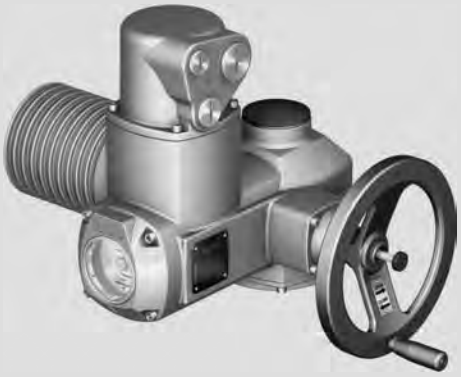
ANEXO V –VALVULAS MOTORIZADAS AUMA–

auma®
Solutions for a world in motion

Actuadores multivueltas

SA 07.2 – SA 16.2/SAR 07.2 – SAR 16.2

AUMA NORM (sin control)



Instrucciones de servicio Montaje, operación y puesta en servicio

¡Lea primero las instrucciones!

- Observe las instrucciones de seguridad.
- Estas instrucciones son parte del producto.
- Conserve las instrucciones durante la vida útil del producto.
- Entregue las instrucciones al usuario o propietario posterior del producto.

Finalidad de este documento:

Este documento contiene información destinada al personal de instalación, puesta en servicio, operación y mantenimiento. Su objetivo es ayudar a instalar y poner en servicio el equipo.

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1. Instrucciones de seguridad

1.1 Instrucciones básicas de seguridad

Normas/Directivas

Los productos de AUMA se construyen y fabrican bajo observancia de las normas y directivas reconocidas. Ello viene certificado mediante una Declaración de Incorporación y una Declaración de Conformidad de la CE.

El usuario de la instalación y el constructor de la misma deberán observar todos los requisitos legales, directivas, disposiciones, reglamentos nacionales y recomendaciones en lo tocante a montaje, instalación eléctrica, puesta en servicio y funcionamiento en el lugar de instalación.

Instrucciones de seguridad/Avisos

Las personas que trabajen con este equipo deben familiarizarse con las instrucciones de seguridad y las indicaciones de aviso de estas instrucciones y deben observarlas. Las instrucciones de seguridad y las indicaciones de aviso en el producto se deben observar para evitar daños personales y materiales.

Cualificación del personal

El montaje, la conexión eléctrica, la puesta en servicio, la operación y el mantenimiento deben ser realizados sólo por personal especializado y formado que haya sido autorizado por el usuario de la instalación o por el constructor de la misma.

Antes de proceder a trabajar con este producto, el personal debe haber leído y entendido estas instrucciones, así como conocer y observar los reglamentos reconocidos en materia de seguridad laboral.

Puesta en servicio

Antes de proceder a la puesta en servicio es importante comprobar si todos los ajustes coinciden con los requisitos de la aplicación. Un ajuste incorrecto puede suponer peligros relacionados con la aplicación, como p. ej., el deterioro de la válvula o de la instalación. El fabricante no se hará responsable de los posibles daños resultantes de ello. Ese riesgo será asumido completamente por el usuario.

Operación

Condiciones para una operación correcta y segura:

- Transporte, almacenamiento, colocación, montaje y puesta en servicio correctos.
- Operar el producto sólo en un estado perfecto bajo observancia de estas instrucciones.
- Informar inmediatamente de fallos y daños y eliminarlos (encomendar su eliminación).
- Observar los reglamentos reconocidos de seguridad laboral.
- Observar las disposiciones nacionales.
- Durante el funcionamiento, la carcasa se calienta y las temperaturas de sus superficies pueden llegar a ser > 60 °C. Como protección contra posibles quemaduras, recomendamos medir la temperatura del aparato con un termómetro adecuado antes de proceder a realizar los trabajos y, de ser necesario, utilizar guantes protectores.

Medidas de seguridad

El responsable de la toma de las medidas de seguridad necesarias en el lugar de la instalación, como cubiertas o dispositivos de protección personal, es el usuario de la instalación o el constructor de la misma.

Mantenimiento

Las instrucciones de mantenimiento aquí descritas deben ser observadas para poder garantizar un funcionamiento seguro del aparato.

Los cambios en el aparato sólo están permitidos previo consentimiento del fabricante.

1.2 Rango de aplicación

Los actuadores multivueltas AUMA están diseñados para la maniobra de válvulas industriales, p.ej., válvulas de globo, compuerta, mariposa, bola, etc.

Otras aplicaciones precisan de la autorización expresa (por escrito) del fabricante.

Así, su uso no está permitido para:

- Vehículos industriales terrestres según EN ISO 3691
- Elevadores según EN 14502

- Ascensores para personas según DIN 15306 y 15309
- Montacargas según EN 81-1/A1
- Escaleras mecánicas
- Funcionamiento permanente
- Montaje bajo tierra
- Utilización subacuática permanente (obsérvese el grado de protección ambiental)
- Zonas con peligro de explosión con excepción de la zona 22
- Zonas expuestas a la radiación en plantas nucleares

No nos responsabilizaremos por las consecuencias que pueda acarrear un uso incorrecto o no adecuado.

La observancia de estas instrucciones se considera como parte del uso adecuado del actuador.

Información Las instrucciones tienen validez para el modelo estándar con “giro en sentido horario”, es decir, el eje accionado gira en sentido horario para cerrar la válvula.

1.3 Campo de aplicación en zona Ex 22 (opcional)

Los actuadores de la serie que se indica aquí son adecuados para el uso en zonas polvorientas con peligro de explosión de la zona 22 según la directiva ATEX 94/9/CE.

Los actuadores tienen grado de protección ambiental IP 68 y cumplen las disposiciones de la EN 50281-1-1:1998 Párrafo 6 – Medios eléctricos para el uso en entornos cargados de polvo inflamable, requisitos para medios eléctricos de la categoría 3 – Protección mediante carcasa.

Para cumplir todos los requisitos de la EN 50281-1-1: 1998, es imprescindible observar lo siguiente:

- Según la directiva ATEX 94/9/CE, los actuadores deben disponer de una identificación adicional – II3D IP6X T150 °C.
- La temperatura máxima de la superficie de los actuadores referida a una temperatura ambiente de +40 °C según EN 50281-1-1 sec. 10.4 es de +150 °C. Conforme a la sec. 10.4, no se ha tenido en cuenta una elevada sedimentación de polvo sobre el medio de operación a la hora de determinar la temperatura máx. de la superficie.
- La correcta conexión de los termostatos o de los termistores, así como la observancia del modo de operación y de los datos técnicos son condición para el mantenimiento de la temperatura máxima de la superficie de los aparatos.
- El conector se debe enchufar o desenchufar sólo en ausencia de tensión.
- Los prensaestopas utilizados deben cumplir también los requisitos de la categoría II3D y tener como mínimo grado de protección ambiental IP 67.
- Los actuadores deben conectarse mediante una toma de tierra externa (accesorio) a la conexión equipotencial o deben conectarse a un sistema de tuberías con puesta a tierra.
- Es imprescindible montar el tapón roscado (pieza n° 511.0) o el tubo de protección del husillo con tapa (pieza n° 568.1 y 568.2) de sellado del eje hueco para asegurar la estanqueidad y, así, proteger contra la explosión.
- De forma general, en las zonas polvorientas con peligro de explosión se deben observar los requisitos de la EN 50281-1-1. La correspondiente obligación de diligencia y un personal formado para la puesta en servicio, los trabajos de servicio y de mantenimiento son condición para que el actuador funcione de forma segura.

1.4 Avisos y advertencias

Para resaltar procesos relevantes para la seguridad en estas instrucciones, tienen validez las siguientes indicaciones de aviso que vienen caracterizadas con la palabra de advertencia correspondiente (PELIGRO, ADVERTENCIA, ATENCIÓN, AVISO).

⚠ PELIGRO	**Situación peligrosa inmediata con alto riesgo. La no observancia de este aviso puede suponer la muerte o graves lesiones para la salud.**
⚠ ADVERTENCIA	**Situación posiblemente peligrosa con riesgo medio. La no observancia de este aviso puede suponer la muerte o graves lesiones para la salud.**
⚠ ATENCIÓN	**Situación posiblemente peligrosa con riesgo bajo. La no observancia de este aviso puede suponer lesiones leves o de gravedad media. Puede utilizarse también en combinación con la advertencia de daños materiales.**
AVISO	**Situación posiblemente peligrosa. La no observancia de este aviso puede acarrear daños materiales. No se utiliza para advertir de daños personales.**

Estructura y tipografía de las indicaciones de aviso

⚠ PELIGRO	**¡El tipo de peligro y su fuente!** *Consecuencia(s) posible(s) en caso de no observancia (opcional)* → Medidas para evitar el peligro → Otras medidas

El símbolo de seguridad ⚠ avisa del peligro de sufrir lesiones.

La palabra señalizadora (aquí, PELIGRO) indica el grado del riesgo.

1.5 Indicaciones y símbolos

En estas instrucciones se utilizan las siguientes indicaciones y símbolos:

Información El término **Información** que precede al texto da importantes indicaciones e informaciones.

Símbolo para CERRADO (válvula cerrada).

Símbolo para ABIERTO (válvula abierta).

✓ De interés antes del paso siguiente. Este símbolo indica aquello que es condición, que se debe preparar o que se debe observar en el paso siguiente.

< > Referencias a otros puntos del texto

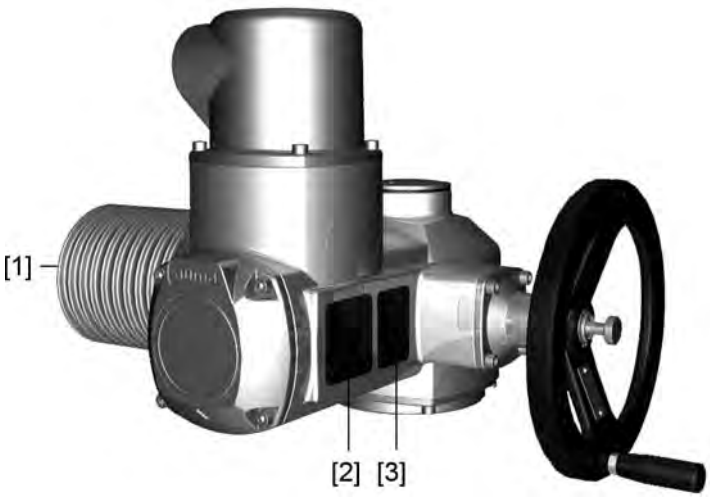
Los términos con estos signos entre paréntesis son referencias en el documento a otros puntos del texto sobre el mismo tema. Estos términos se indican en el índice, en un encabezado o en la tabla de contenidos y se pueden encontrar rápidamente.

2. Identificación

2.1 Placa de características

Cada componente del aparato (actuador, motor) tiene una placa de características.

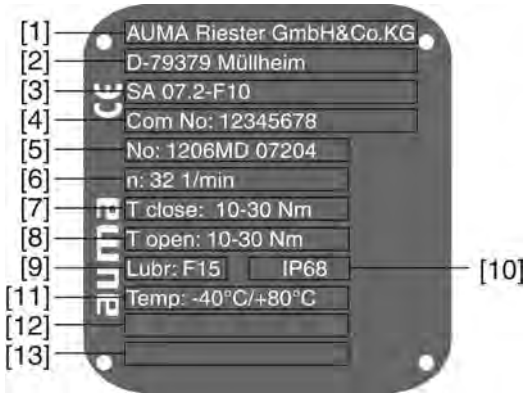
Figura 1: Disposición de las placas de características



[1] Placa de características del motor
[2] Placa de características del actuador
[3] Placa adicional, p. ej., placa KKS

Descripción de la placa de características del actuador

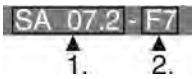
Figura 2: Placa de características de actuador (ejemplo)



[1] Nombre del fabricante
[2] Dirección del fabricante
[3] **Denominación del tipo** (explicación, véase abajo)
[4] **Número de comisión** (explicación, véase abajo)
[5] **Número de serie del actuador** (explicación, véase abajo)
[6] Velocidad
[7] Rango de par en sentido CERRAR
[8] Rango de par en sentido ABRIR
[9] Tipo de lubricante – [10] Grado de protección ambiental
[11] Temperatura ambiente admis.
[12] A utilizar libremente por el cliente
[13] A utilizar libremente por el cliente

Denominación del tipo

Figura 3: Denominación del tipo (ejemplo)



1. Tipo y tamaño del actuador
2. Tamaño de brida

Tipo y tamaño

Estas instrucciones tienen validez para los siguientes tipos de aparato y tamaños:

Actuadores multivueltas para servicio todo-nada: SA 07.2, 07.6, 10.2, 14.2, 14.6, 16.2

Actuadores multivueltas para servicio de regulación: SA**R** 07.2, 07.6, 10.2, 14.2, 14.6, 16.2

Numero de comisión

A cada aparato se le asigna un numero de comisión (número de pedido). Con este número se pueden descargar diagramas de cableado (en alemán y en inglés), protocolos de inspección y otras informaciones del aparato del Internet bajo **http://www.auma.com**. Para acceder a algunas informaciones, es necesario introducir un número de cliente.

Número de serie del actuador

Tabla 1: Descripción del número de serie (con ejemplo)

05	**12**	**M D 12345**	
1ª+2ª posiciones: Semana de montaje			
05	En el ejemplo: Semana de calendario 05		
3ª+4ª posiciones: Año de fabricación			
	12	En el ejemplo: Año de la fabricación: 2012	
Todas las demás posiciones			
		M D 12345	Número de fabricación interno para una identificación inequívoca del producto

2.2 Descripción breve

Actuador multivueltas

Definición según EN ISO 5210:

Un actuador multivueltas es un actuador que transmite a la válvula un par de una revolución completa como mínimo. Puede absorber fuerzas de empuje.

Los actuadores multivueltas AUMA son actuados mediante un motor eléctrico y pueden absorber fuerzas de empuje en combinación con el tipo de acoplamiento A. Para la operación manual, se dispone de un volante. La desconexión en las posiciones finales se puede realizar por final de carrera o por limitador de par. Para el control y el procesamiento de las señales del actuador, es imprescindible un control.

Los actuadores sin control se pueden equipar posteriormente con un control AUMA. Para consultas al respecto, es necesario indicar nuestro número de comisión (véase la placa de características del actuador).

3. Transporte, almacenamiento y embalaje

3.1 Transporte

El transporte hasta el lugar de colocación se debe realizar en un embalaje resistente.

⚠ PELIGRO

¡Carga en suspensión!

Peligro de muerte o de graves lesiones.

→ NO permanezca bajo cargas en suspensión.

→ Fije el elevador a la carcasa, no al volante.

→ En caso de actuadores montados en una válvula: fije el elevador a la válvula, NO al actuador.

→ En caso de actuadores montados con un reductor: fije el elevador al reductor con ayuda de orejetas, NO lo fije al actuador.

→ En caso de actuadores con un control: fije el elevador al actuador y NO al control.

3.2 Almacenamiento

AVISO

¡Peligro de corrosión por un almacenamiento incorrecto!

→ El almacenamiento debe tener lugar en un recinto bien ventilado y seco.

→ Como protección contra la humedad, almacénese en una estantería o sobre una rejilla de madera.

→ Cúbrase para protegerlo contra el polvo y la suciedad.

→ Trate las superficies sin pintar con un agente protector contra la corrosión.

Almacenamiento prolongado

Si el almacenamiento se va a realizar durante un tiempo prolongado (más de 6 meses), se deben observar además los siguientes puntos:

1. Antes de almacenar:
   Proteja las superficies metálicas con un agente protector contra la corrosión de efecto duradero, sobre todo las partes de salida y las superficies de montaje.
2. A intervalos de aprox. 6 meses:
   Controle si se ha formado corrosión. Aplique nuevamente agente protector si es necesario.

3.3 Embalaje

Nuestros productos se protegen en fábrica con embalajes especiales para el transporte. Éstos están compuestos de materiales respetuosos con el medio ambiente que se pueden separar fácilmente y también reciclar. Nuestros materiales de embalaje son madera, cartón, papel y lámina de PE. Para la disposición del embalaje, se recomienda enviar a los centros locales de reciclado.

4. Montaje

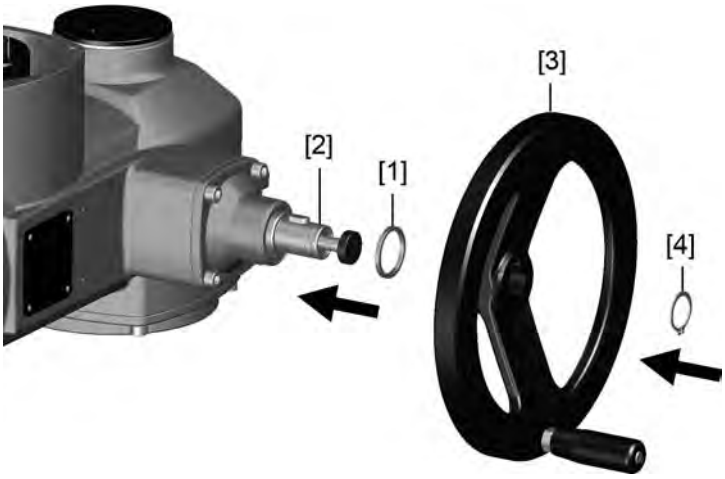
4.1 Posición de montaje

Los actuadores de AUMA se pueden operar en cualquier posición de montaje sin restricciones.

4.2 Montar el volante

Información Para el transporte, los volantes con un diámetro a partir de 400 mm se entregan sueltos.

Figura 4: Volante



[1] Distanciador
[2] Eje de entrada
[3] Volante
[4] Circlip

1. En caso necesario, inserte el distanciador [1] en el eje de entrada [2].
2. Inserte el volante [3] en el eje de entrada.
3. Fije el volante [3] con el circlip [4] suministrado.

4.3 Montar el actuador en la válvula/reductor

AVISO

¡Peligro de corrosión por daños en la pintura o por la formación de agua de condensación!

→ Después de realizar trabajos en el aparato, retoque los daños en la pintura.

→ Una vez montado el aparato, realice inmediatamente su conexión eléctrica para que la calefacción evite la formación de condensación.

4.3.1 Acoplamientos tipo B, B1 – B4 y E

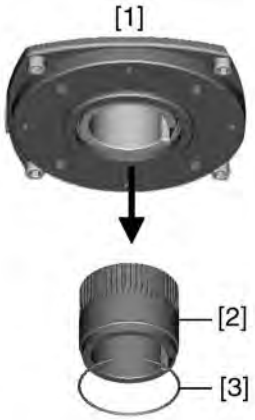
Aplicación

- Para husillos giratorios no ascendentes
- No adecuados para absorber fuerzas de empuje

Estructura Acoplamiento con orificio y chavetero:

- Acoplamientos B1 – B4 con orificio según ISO 5210
- Acoplamientos B y E con orificio según DIN 3210
- Es posible el cambio posterior de B1 a B3, B4 ó E.

Figura 5: Tipo de acoplamiento



[1] Acoplamientos tipo B, B1 – B4, E y C
[2] Manguito de salida/Eje hueco con orificio y chavetero
[3] Circlip

Información Efectúe el centraje de las bridas de las válvulas con juego.

4.3.1.1 Montaje del actuador multivueltas (con acoplamientos tipo B1 – B4 ó E) en válvula/reductor

1. Compruebe si las bridas de conexión cuadran.
2. Compruebe si el orificio y el chavetero coinciden con el eje de entrada.
3. Engrase levemente el eje de entrada.
4. Coloque el actuador multivueltas.
   Información: Tenga en cuenta el centraje y el pleno contacto de la brida.
5. Fije el actuador multivueltas con tornillos según la tabla.
   Información: Para evitar la corrosión por contacto, recomendamos aplicar sellador de roscas a los tornillos.
6. Apriete los tornillos en diagonal con los pares de la tabla.

Tabla 2: Pares de apriete de tornillos

Tornillos	**Par de apriete T_A [Nm]**
Rosca	**Grado de resistencia 8.8**
M8	25
M10	51
M12	87
M16	214
M20	431

4.3.2 Tipo de acoplamiento A

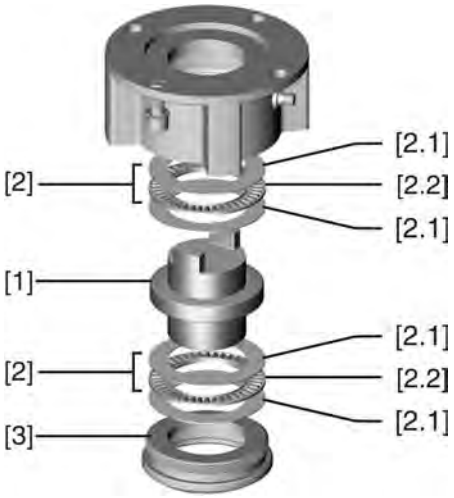
Aplicación
- Tipo de acoplamiento para husillo ascendente no giratorio
- Adecuado para la absorción de fuerzas de empuje

Información Para adaptar el actuador a los tipos de acoplamiento del cliente tipo A con tamaños de brida F10 y F14 de los años de construcción 2009 y anteriores es necesario un adaptador. Éste se puede pedir a AUMA.

4.3.2.1 Mecanización de la tuerca de roce

✔ Este paso de trabajo sólo es necesario con tuercas de roce en bruto o con orificio piloto.

Figura 6: Estructura del acoplamiento tipo A



[1] Tuerca de roce
[2] Rodamiento
[2.1] Pista de rodamiento
[2.2] Corona
[3] Anillo de centraje

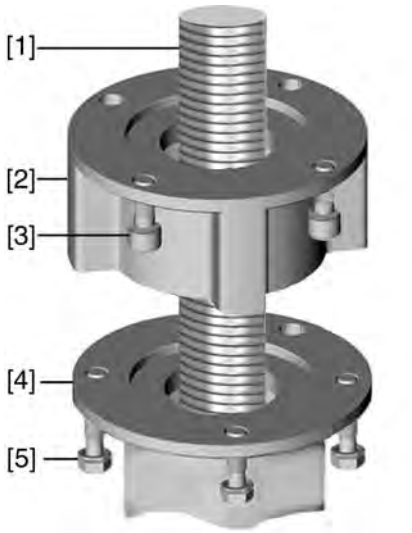
1. Desenrosque el anillo de centraje [3] del acoplamiento.
2. Saque la tuerca de roce [1] junto con los rodamientos [2].
3. Retire las pistas de rodamiento [2.1] y las coronas [2.2] de la tuerca de roce [1].
4. Taladre la tuerca de roce [1], tornéela y corte la rosca.

   Información: ¡A la hora de fijar el portaherramientas, asegúrese de que la marcha sea circular y plana!
5. Limpie la tuerca de roce mecanizada.
6. Lubrique las coronas [2.2] y las pistas [2.1] con suficiente grasa multiuso EP de litio saponificado de modo que todos los espacios huecos queden llenos de grasa.
7. Inserte las coronas [2.2] y pistas [2.1] engrasadas en la tuerca de roce [1].
8. Coloque la tuerca de roce [1] con los rodamientos [2] de nuevo en el acoplamiento.

   Información: Asegúrese de que las garras o el dentado entren correctamente en la ranura del eje hueco.
9. Enrosque el anillo de centraje [3] y apriételo hasta el tope.

4.3.2.2 Montaje del actuador multivueltas (con acoplamiento tipo A) en la válvula

Figura 7: Montaje con tipo de acoplamiento A



[1] Husillo de la válvula
[2] Tipo de acoplamiento A
[3] Tornillos al actuador
[4] Brida de la válvula
[5] Tornillos al acoplamiento

1. Si el acoplamiento A ya está montado en el actuador: suelte los tornillos [3] y retire el acoplamiento A [2].
2. Compruebe si la brida del acoplamiento A es adecuada para la brida de la válvula [4].
3. Engrase levemente el husillo de la válvula [1].
4. Coloque el acoplamiento A sobre el husillo de la válvula y enrósquelo hasta que descanse sobre la brida de la válvula.
5. Gire el acoplamiento A hasta que los agujeros de fijación coincidan.
6. Enrosque los tornillos de fijación [5], pero no los apriete aún.
7. Coloque el actuador sobre el husillo de la válvula de modo que los arrastradores de la tuerca de roce entren en el manguito de salida.

➥ En tal caso, las bridas quedan superpuestas y a ras.

8. Oriente el actuador multivueltas de modo que los agujeros de fijación coincidan.
9. Fije el actuador multivueltas con los tornillos [3].
10. Apriete los tornillos [3] en diagonal con los pares de la tabla.

Tabla 3: Pares de apriete de tornillos

Tornillos	**Par de apriete T_A [Nm]**
Rosca	**Grado de resistencia 8.8**
M6	11
M8	25
M10	51
M12	87
M16	214
M20	431

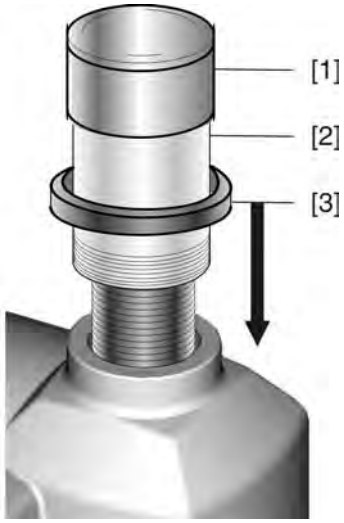
11. En el modo manual, gire el actuador multivueltas en sentido a ABRIR hasta que la brida de la válvula y el acoplamiento A queden superpuestos y fijos.
12. Apriete los tornillos de fijación [5] entre la válvula y el acoplamiento A en diagonal con los pares indicados en la tabla.

4.4 Accesorios de montaje

4.4.1 Tubo de protección para válvulas de husillo ascendente

— Opción —

Figura 8: Montaje del tubo de protección de husillo



[1] Tapón para tubo de protección de husillo
[2] Tubo de protección de husillo
[3] Junta tórica

1. Selle la rosca con estopa, cinta de teflón o sellador de roscas.
2. Enrosque el tubo de protección de husillo [2] en la rosca y apriételo.
3. Baje la junta tórica [3] hasta que entre en contacto con la carcasa.
4. Compruebe si el tapón del tubo de protección de husillo [1] está en su sitio y no presenta deterioros.

5. Conexión eléctrica

5.1 Notas generales

⚠ ADVERTENCIA

¡Peligro en caso de conexión eléctrica incorrecta!

La no observancia puede suponer la muerte, graves lesiones para la salud o daños materiales.

→ La conexión eléctrica debe ser realizada sólo por personal especializado y formado.

→ Antes de proceder a la conexión, obsérvense las notas generales de este capítulo.

→ Después de la conexión pero antes de conectar la tensión, observe los capítulos <Puesta en servicio> y <Maniobra de prueba>.

Diagrama de cableado/Esquema eléctrico

El diagrama de cableado/esquema eléctrico aplicable (en alemán y en inglés) se encuentra dentro de una bolsa impermeable junto con estas instrucciones de servicio en el dispositivo. Éste se puede obtener también de AUMA indicando el número de comisión (véase la placa de características) o descargar directamente de Internet (http://www.auma.com).

AVISO

¡Daños en la válvula en caso de conexión sin control!

→ Los actuadores NORM necesitan un control externo: Conecte el motor sólo mediante un control (conexión de contactor-inversor).

→ Observe el tipo de desconexión prescrito por el fabricante de la válvula.

→ Observe el diagrama de cableado.

Retardo de desconexión

El retardo es el tiempo que transcurre entre la actuación de un interruptor (final de carrera o limitador de par) y la desconexión del motor. Con el fin de proteger la válvula y el actuador, recomendamos un retardo <50 ms. Son posibles retardos de desconexión mayores bajo observación del tiempo de maniobra, del tipo de acoplamiento, del tipo de válvula y de la estructura. Se recomienda desconectar el contactor correspondiente directamente con el interruptor de final de carrera o par.

Protección por parte del cliente

Para proteger contra cortocircuito y para desconectar el actuador del suministro eléctrico, son necesarios fusibles y seccionadores del cliente.

El valor de corriente para el dimensionamiento del mismo resulta del consumo de corriente del motor (véase la hoja de datos eléctricos).

Interruptores de final de carrera y limitadores de par

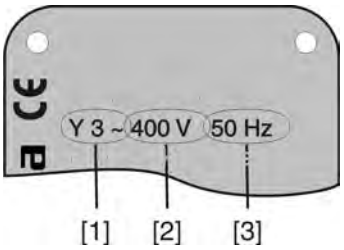
Los finales de carrera y los limitadores de par pueden ser interruptores sencillos, tándem o triples. Sólo se puede conectar el mismo potencial en los dos circuitos del interruptor (contacto NO/NC). Si se tienen que conectar distintos potenciales simultáneamente, se deben utilizar interruptores tándem o triples. Si se usan interruptores tándem/triples:

- Para señalización, se deben utilizar los contactos anticipados LPC1 (DSR1), LPA1 (DÖL1), FCC1 (WSR1), FCA (WÖL1).
- Para señalización, se deben utilizar los contactos retardados LPC (DSR), LPA (DÖL), FCC (WSR), FCA (WÖL).

Tipo de corriente, tensión de red y frecuencia de red

El tipo de corriente, la tensión de red y la frecuencia de red deben coincidir con los datos de la placa de características del motor.

Figura 9: Placa de características del motor (ejemplo)



[1] Tipo de corriente
[2] Tensión de red
[3] Frecuencia de red (para motores de corriente alterna trifásica)

Cables de conexión

- Para garantizar el aislamiento del dispositivo, utilice cables adecuados (resistentes a la tensión). Dimensione los cables para la tensión nominal máxima posible.
- Utilice un cable de conexión con una temperatura nominal mínima adecuada.
- Si los cables de conexión se van a ver sometidos a radiación UV (p. ej., al aire libre), se deben utilizar cables resistentes a la radiación UV.

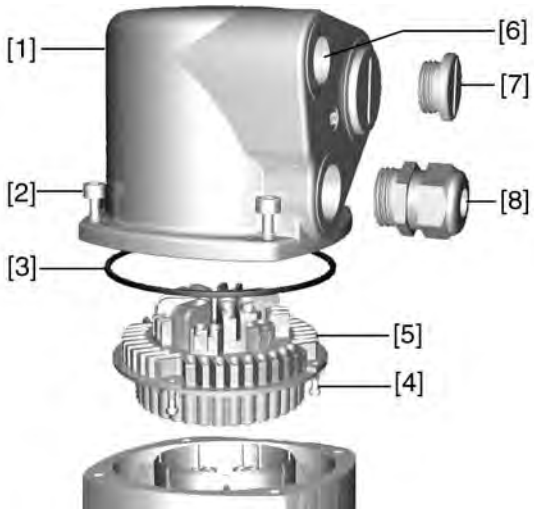
5.2 Conexión con conector múltiple AUMA

Secciones transversales de conexión en el conector múltiple AUMA:

- Terminales de fuerza (U1, V1, W1, U2, V2, W2): máx. 6 mm² flexible/10 mm² rígido
- Conexión del conductor de toma de tierra ⏚: máx. 6 mm² flexible/10 mm² rígido
- Contactos de mando (1 a 50): máx. 2,5 mm²

5.2.1 Abrir el recinto de terminales

Figura 10: Conexión con conector múltiple AUMA, versión S



[1] Tapa
[2] Tornillos de la tapa
[3] Junta tórica
[4] Tornillos del conector hembra
[5] Conector hembra
[6] Entrada de cable
[7] Tapón
[8] Prensaestopas (no incluido en el volumen de suministro)

⚠ PELIGRO

¡Tensión peligrosa!

Posibilidad de descarga eléctrica.

→ Antes de abrir, desconecte la tensión.

1. Afloje los tornillos [2] y retire la tapa [1].
2. Afloje los tornillos [4] y saque el conector hembra [5] de la tapa [1].
3. Coloque los prensaestopas [8] adecuados para el tamaño de los cables de conexión.

➥ El grado de protección ambiental IP... indicado en la placa de características sólo se puede asegurar utilizando los prensaestopas adecuados. Ejemplo: Protección ambiental IP 68.



4. Selle las entradas de cables no utilizadas [6] con tapones adecuados [7].
5. Introduzca los cables en los prensaestopas [8].

5.2.2 Conexión de los cables

✔ Observe las secciones transversales de conexión admisibles.

1. Pele los cables.
2. Retire el aislamiento de los hilos.
3. En caso de cables flexibles: utilice hilo trenzado con terminal según DIN 46228.
4. Conecte los cables de acuerdo con el diagrama de cableado correspondiente.

⚠ ADVERTENCIA

En caso de fallo: ¡Tensión peligrosa si el conductor de toma de tierra NO está conectado!

Posibilidad de descarga eléctrica.

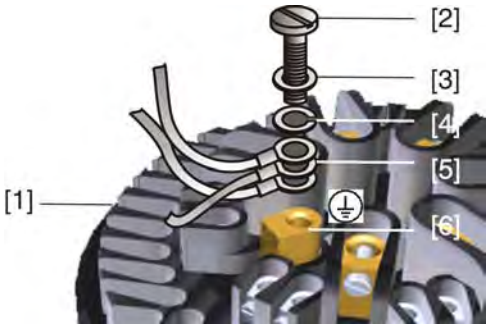
→ Conecte todos los conductores de toma de tierra.

→ Conecte la conexión del conductor de toma de tierra con el conductor de toma de tierra externo del cable de conexión.

→ ¡Ponga en marcha el aparato sólo con el conductor de toma de tierra conectado!

5. Atornille el conductor de toma de tierra con orejetas (cables flexibles) o con anillos (cables rígidos) a la conexión del conductor de toma de tierra.

Figura 12: Conexión del conductor de toma de tierra



[1] Conector hembra
[2] Tornillo
[3] Arandela
[4] Arandela
[5] Conductor de toma de tierra con orejetas/anillos
[6] Conexión del conductor de toma de tierra, símbolo: ⏚

AVISO

Peligro de daños en el motor si los termistores o los termostatos no están conectados.

Si no se conecta la protección del motor, se pierde la garantía del motor.

→ Conecte los termistores o los termostatos a un control externo.

AVISO

¡Peligro de corrosión por la formación de agua de condensación!

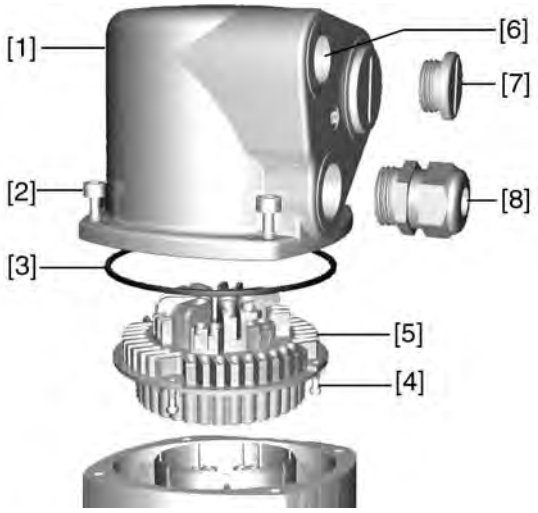
→ Una vez montado el aparato, realice inmediatamente su conexión eléctrica para que la calefacción evite la formación de condensación.

Información

Algunos actuadores llevan adicionalmente una calefacción para el motor. La calefacción del motor evita la formación de agua de condensación y mejora el comportamiento de arranque a temperaturas extremadamente bajas.

5.2.3 Cerrar el recinto de terminales

Figura 13: Ejemplo: Versión S



[1] Tapa
[2] Tornillos de la tapa
[3] Junta tórica
[4] Tornillos del conector hembra
[5] Conector hembra
[6] Entrada de cable
[7] Tapón
[8] Prensaestopas (no incluido en el volumen de suministro)

⚠ ADVERTENCIA

Cortocircuito si los cables se quedan atrapados.

Posibilidad de descarga eléctrica y de fallos de funcionamiento.

→ Coloque cuidadosamente el conector hembra de modo que ningún cable quede atrapado.

1. Coloque el conector hembra [5] en la tapa [1] y fíjelo con tornillos [4].
2. Limpie las superficies de contacto de la tapa [1] y de la carcasa.
3. Compruebe que la junta tórica [3] no está dañada, en caso de estarlo, sustitúyala por una nueva.
4. Aplique una fina capa de grasa no ácida (p. ej., vaselina) a la junta tórica.
5. Coloque la tapa [1] y apriete uniformemente los tornillos [2] en diagonal.
6. Apriete los prensaestopas [8] al par prescrito para garantizar el grado de protección ambiental correspondiente.

5.3 Accesorios para la conexión eléctrica

— Opción —

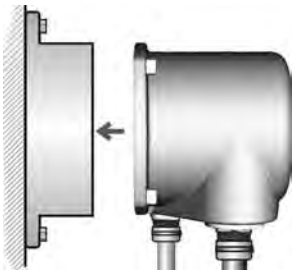
5.3.1 Marco

Aplicación

Marco para guardar de forma segura un conector desenchufado.

Protección contra el contacto directo con los contactos y contra las influencias ambientales.

Figura 14: Marco



5.3.2 Tapa protectora

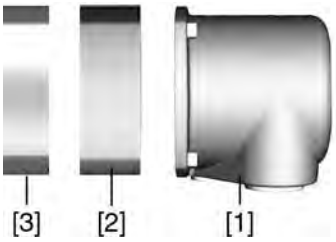
Tapa protectora para recinto de terminales, con el conector desenchufado.

El recinto de terminales abierto se puede cerrar con una tapa protectora (sin ilustración).

5.3.3 Bastidor intermedio de doble sellado

Cuando se retira la conexión eléctrica o si los prensaestopas presentan falta de estanqueidad, puede penetrar polvo y humedad en el interior de la carcasa. El montaje del bastidor intermedio de doble sellado (2) entre la conexión eléctrica (1) y la carcasa del aparato lo evita de forma efectiva. El grado de protección ambiental del aparato (IP 68) se mantiene también cuando se ha retirado la conexión eléctrica [1].

Figura 15: Conexión eléctrica con bastidor intermedio de doble sellado



[1] Conexión eléctrica

[2] Bastidor intermedio de doble sellado

[3] Carcasa del actuador

5.3.4 Toma de tierra exterior

Opcionalmente, se puede disponer de una toma de tierra exterior en la carcasa para integrar el aparato en la conexión equipotencial.

Figura 16: Toma de tierra



6. Operación

6.1 Operación manual

Para realizar ajustes y para la puesta en servicio, así como en caso de fallo del motor o de la red eléctrica, el actuador se puede operar en el modo manual. La operación manual se acopla mediante una mecánica de conmutación integrada.

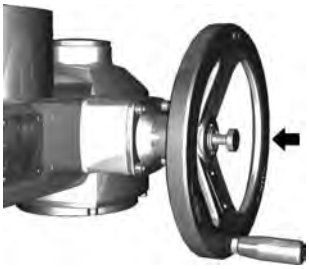
6.1.1 Activar la operación manual

AVISO

¡Daños en el acoplamiento del motor por una operación incorrecta!

→ Acople la operación manual sólo con el motor parado.

1. Pulse el botón.



2. Gire el volante en el sentido que desee.

→ Para cerrar la válvula, gire el volante en sentido horario:

➥ El eje del actuador (válvula) gira en sentido horario en sentido CERRAR.



6.1.2 Desacoplar la operación manual

La operación manual se desacopla automáticamente cuando se conecta el motor. Durante el funcionamiento del motor, el volante está parado.

6.2 Operación motorizada

AVISO

!Daños en la válvula en caso de un ajuste incorrecto!

→ Antes de poner en marcha el motor, realice todos los ajustes de puesta en servicio y la maniobra de prueba.

En la operación motorizada se precisa un control. Si el actuador se va operar en modo local, se precisarán unos mandos locales adicionales.

1. Conecte la tensión de alimentación.
2. Para cerrar la válvula, conecte la operación motorizada en sentido CERRAR.

➥ El eje de la válvula gira en sentido horario en sentido CERRAR.

7. Indicaciones

7.1 Indicador mecánico de posición/marcha

— Opción —

El indicador mecánico de posición:

- muestra continuamente la posición de la válvula
  (El disco indicador [2] gira al atravesar el recorrido de operación de ABIERTO a CERRADO o viceversa aprox. 180° a 230°).
- indica si el actuador está en marcha (indicador de marcha)
- indica que se han alcanzado las posiciones finales (mediante la marca [3])

Figura 19: Indicador mecánico de posición



[1] Tapa
[2] Disco indicador
[3] Marca
[4] Símbolo para posición ABRIR
[5] Símbolo para posición CERRAR

8. Señales

8.1 Señales del actuador

Información Los interruptores pueden ser sencillos (1 NC + 1 NO), tándem (2 NC + 2 NO) o triples (3 NC + 3 NO). El modelo exacto se indica en el esquema eléctrico o en la hoja de datos técnicos del pedido.

Señal	Tipo y nombre en el diagrama de cableado	
Posición final ABIERTO/CERRADO alcanzada	Ajuste mediante final de carrera Interruptores: 1 NC y 1 NO (estándar)	
	FCC (WSR)	Final de carrera Cerrar Marcha a derechas
	FCA (WÖL)	Final de carrera Abrir Marcha a izquierdas
Posición intermedia alcanzada (opción)	Ajuste mediante final de carrera DUO Interruptores: 1 NC y 1 NO (estándar)	
	WDR	Final de carrera DUO Marcha a derechas
	WDL	Final de carrera DUO Marcha a izquierdas
Par ABRIR/CERRAR alcanzado	Ajuste mediante limitadores de par Interruptores: 1 NC y 1 NO (estándar)	
	LPC (DSR)	Limitador de par Cerrar Marcha a derechas
	LPA (DÖL)	Limitador de par Abrir Marcha a izquierdas
La protección del motor se ha activado	Dependiendo del modelo, mediante termostatos o termistores	
	F1, Th	Termostato
	R3	Termistor
Indicador de marcha (opción)	Interruptores: 1 NC (estándar)	
	S5, BL	Intermitente
Ajuste de válvula (opcional)	Dependiendo del modelo, mediante potenciómetro o transmisor electrónico de posición RWG	
	R2	Potenciómetro
	R2/2	Potenciómetro en disposición tándem (opción)
	B1/B2, RWG	Sistema de 3 ó 4 hilos (0/4 – 20 mA)
	B3/B4, RWG	Sistema de 2 hilos (4 – 20 mA)
Operación manual activa (opcional)		Interruptores

9. Puesta en servicio

9.1 Abrir el recinto de interruptores

El recinto de interruptores se debe abrir para realizar los siguientes ajustes (opciones).

1. Afloje los tornillos [2] y retire la tapa [1] del recinto de interruptores.
   Figura 20:



2. Si hay un disco indicador [3]:
   Extraiga el disco indicador [3] con una llave fija (haciendo palanca).
   Información: Para evitar daños en la pintura, coloque un objeto suave, por ejemplo un paño, debajo de la llave fija.
   Figura 21:



9.2 Ajuste de los limitadores de par

Cuando se alcanza el par de desconexión ajustado aquí, se accionan los limitadores de par (protección contra sobrecarga de la válvula).

Información El limitador de par puede activarse también en el modo manual.

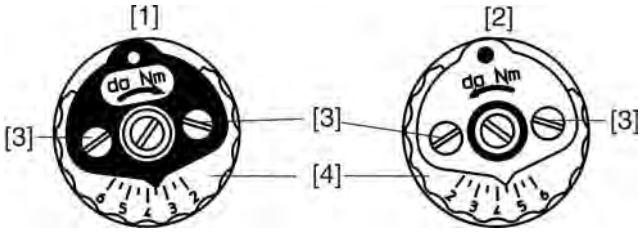
AVISO

¡Daños en la válvula por un ajuste demasiado elevado del par de desconexión!

→ El par de desconexión debe ser adecuado para la válvula.

→ El ajuste sólo se debe cambiar previo consentimiento del fabricante de la válvula.

Figura 22: Diales de los limitadores de par



[1] Dial negro para par en sentido CERRAR
[2] Dial blanco para par en sentido ABRIR
[3] Tornillos de seguridad
[4] Discos

1. Afloje los dos tornillos de seguridad [3] del dial.
2. Gire el disco [4] hasta el valor de par deseado (1 da Nm = 10 Nm).
3. Apriete de nuevo los tornillos de seguridad [3].
   Información: Par máximo de apriete: 0,3 – 0,4 Nm

➥ El limitador de par queda ajustado.

Ejemplo: La figura anterior muestra el siguiente ajuste:

- 3,5 da Nm = 35 Nm para sentido CERRAR
- 4,5 da Nm = 45 Nm para sentido ABRIR

9.3 Ajustar el final de carrera

El final de carrera registra el recorrido de operación. Cuando se alcanza la posición ajustada, se accionan interruptores.

Figura 23: Elementos de ajuste para el final de carrera



Sector negro:
[1] Tornillo de ajuste: Posición CERRADO
[2] Indicador: Posición CERRADO
[3] Punto: Posición final CERRADO ajustada
Sector blanco:
[4] Tornillo de ajuste: Posición ABIERTO
[5] Indicador: Posición ABIERTO
[6] Punto: Posición final ABIERTO ajustada

9.3.1 Ajuste de la posición final CERRADO (sector negro)

1. Active el mando manual.
2. Gire el volante en sentido horario hasta que la válvula esté cerrada.

3. Gire en sentido contrario el volante aprox. ½ vuelta (post-recorrido).
4. Con ayuda de un destornillador, gire el tornillo de ajuste [1] **presionándolo constantemente** en el sentido de la flecha y observando el indicador [2]: Cuando se siente y se escucha un ruido de carraca, el indicador [2] salta 90°.
5. Si el indicador [2] se encuentra 90° delante del punto [3]: Gire más lentamente.
6. Si el indicador [2] salta al punto [3]: No siga girando y suelte el tornillo de ajuste.

➥ La posición final CERRADO está ajustada.

7. Si se ha girado demasiado (ruido de carraca después de que el indicador haya saltado): Siga girando el tornillo de ajuste en el mismo sentido y repita el proceso de ajuste.

9.3.2 Ajuste de la posición final ABIERTO (sector blanco)

1. Active el mando manual.
2. Gire el volante en sentido anti-horario hasta que la válvula esté abierta.
3. Gire en sentido contrario el volante aprox. ½ vuelta (post-recorrido).
4. Con ayuda de un destornillador, gire el tornillo de ajuste [4] (figura) **presionándolo constantemente** en el sentido de la flecha y observando el indicador [5]: Cuando se siente y se escucha un ruido de carraca, el indicador [5] salta 90°.
5. Si el indicador [5] se encuentra 90° delante del punto [6]: Gire más lentamente.
6. Si el indicador [5] salta al punto [6]: No siga girando y suelte el tornillo de ajuste.

➥ La posición final ABIERTO está ajustada.

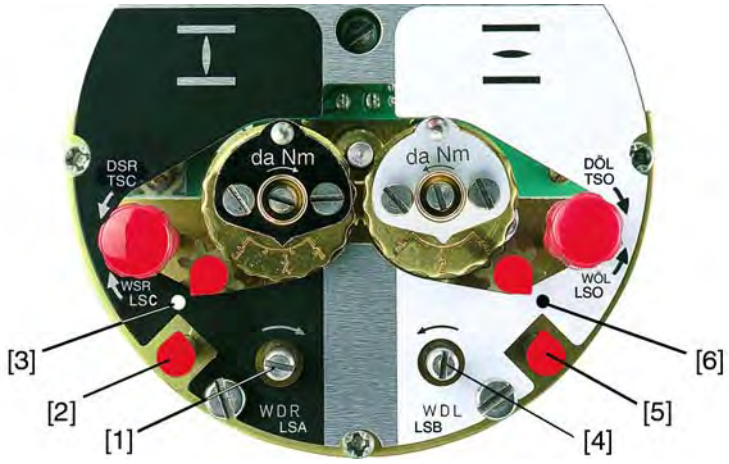
7. Si se ha girado demasiado (ruido de carraca después de que el indicador haya saltado): Siga girando el tornillo de ajuste en el mismo sentido y repita el proceso de ajuste.

9.4 Ajuste de posiciones intermedias

— Opción —

Los actuadores con final de carrera DUO tienen dos interruptores de posiciones intermedias. Se puede ajustar una posición intermedia por cada sentido de marcha.

Figura 24: Elementos de ajuste para el final de carrera



Sector negro:

[1] Tornillo de ajuste: Sentido CERRAR
[2] Indicador: Sentido CERRAR
[3] Punto: Posición intermedia CERRADO ajustado

Sector blanco:

[4] Tornillo de ajuste: Sentido de marcha ABRIR
[5] Indicador: Sentido de marcha ABRIR
[6] Punto: Posición intermedia ABIERTO ajustado

Información Los interruptores de posición intermedia liberan de nuevo el contacto tras 177 vueltas (unidad de mando para 1 – 500 vueltas/carrera) o tras 1.769 vueltas (unidad de mando para 1 – 5.000 vueltas/carrera).

9.4.1 Ajuste del sentido de marcha CERRAR (sector negro)

1. Opere la válvula en sentido CERRAR hasta alcanzar la posición intermedia deseada.
2. Si ha girado demasiado: Gire la válvula en sentido contrario y opere de nuevo a la posición intermedia en sentido CERRAR.
   Información: La operación a la posición intermedia se debe realizar siempre en el mismo sentido que en la operación eléctrica posterior.
3. Con ayuda de un destornillador, gire el tornillo de ajuste [1] **presionándolo constantemente** en el sentido de la flecha y observando el indicador [2]: Cuando se siente y se escucha un ruido de carraca, el indicador [2] salta 90°.
4. Si el indicador [2] se encuentra 90° delante del punto [3]: Gire más lentamente.
5. Si el indicador [2] salta al punto [3]: No siga girando y suelte el tornillo de ajuste.

➥ La posición intermedia en el sentido de marcha CERRAR está ajustada.

6. Si se ha girado demasiado (ruido de carraca después de que el indicador haya saltado): Siga girando el tornillo de ajuste en el mismo sentido y repita el proceso de ajuste.

9.4.2 Ajuste del sentido de marcha ABRIR (sector blanco)

1. Opere la válvula en sentido ABRIR hasta alcanzar la posición intermedia deseada.
2. Si ha girado demasiado: Gire la válvula en sentido contrario y opere la posición intermedia en sentido ABRIR (la operación a la posición intermedia se debe realizar siempre en el mismo sentido que en la operación eléctrica posterior).
3. Con ayuda de un destornillador, gire el tornillo de ajuste [4] **presionándolo constantemente** en el sentido de la flecha y observando el indicador [5]: Cuando se siente y se escucha un ruido de carraca, el indicador [5] salta 90°.
4. Si el indicador [5] se encuentra 90° delante del punto [6]: Gire más lentamente.
5. Si el indicador [5] salta al punto [6]: No siga girando y suelte el tornillo de ajuste.

➥ La posición intermedia en el sentido de marcha ABRIR está ajustada.

6. Si se ha girado demasiado (ruido de carraca después de que el indicador haya saltado): Siga girando el tornillo de ajuste en el mismo sentido y repita el proceso de ajuste.

9.5 Maniobra de prueba

Realice la maniobra de prueba sólo cuando se hayan llevado a cabo todos los ajustes descritos anteriormente.

9.5.1 Comprobación del sentido de giro

AVISO

¡Daños en la válvula por un sentido de giro incorrecto!

→ Si el sentido de giro no es el correcto, desconecte inmediatamente.

→ Corrija la secuencia de fases.

→ Repita la maniobra de prueba.

1. En el modo manual, lleve el actuador a la posición intermedia u opérelo a una distancia suficiente de la posición final.

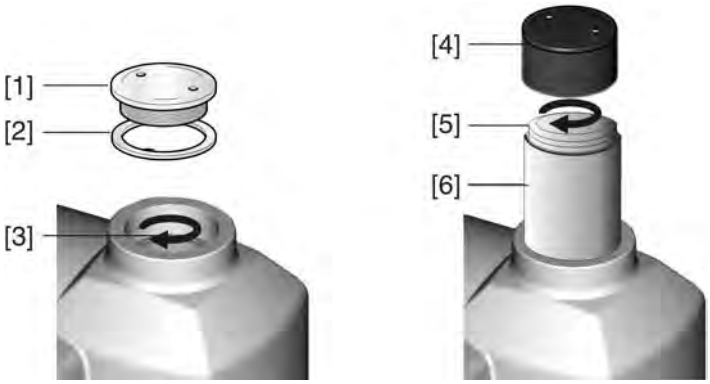
2. Conecte el actuador en sentido CERRAR y observe el sentido de giro:
   Con disco indicador: Paso 3
   Sin disco indicador: Paso 4 (eje hueco)
   → Antes de alcanzar la posición final, desconéctelo.
3. Con disco indicador:
   → Compruebe el sentido de giro.
      ➥ El sentido de giro es el correcto cuando: **El actuador opera en sentido CERRAR** y **el disco indicador gira en sentido anti-horario** .



4. Sin disco indicador:
   → Desenrosque el tapón roscado [1] y la junta [2] o la tapa protectora del tubo de protección del husillo [4] y observe el sentido de giro del eje hueco [3] o del husillo [5].

➥ El sentido de giro es el correcto cuando: **El actuador opera en sentido CERRAR** y el eje hueco o el husillo gira **en sentido horario** .

Figura 26: Eje hueco/Husillo



[1] Tapón roscado
[2] Junta
[3] Eje hueco
[4] Tapón para tubo de protección de husillo
[5] Husillo
[6] Tubo de protección de husillo

9.5.2 Comprobar los finales de carrera

1. En el modo manual, lleve el actuador a ambas posiciones finales de la válvula.

➥ El final de carrera está bien ajustado si:

- El interruptor WSR actúa en Posición final CERRADO
- El interruptor WÖL actúa en Posición final ABIERTO
- Después de girar el volante en sentido contrario, el interruptor libera de nuevo los contactos

2. Si las posiciones finales están mal ajustadas: Ajuste de nuevo el final de carrera.
3. Si las posiciones finales están bien ajustadas y no hay otras opciones (como p. ej., potenciómetro, transmisor de posición): Cierre el recinto de interruptores.

9.6 Ajuste del potenciómetro

— Opción —

El potenciómetro sirve de sensor de recorrido para detectar la posición de la válvula.

Información Debido a la graduación del engranaje reductor, no siempre se opera todo el rango de resistencia/carrera. Por ello se debe prever una posibilidad de compensación externa (potenciómetro de ajuste).

Figura 27: Vista de la unidad de mando



[1] Gire el potenciómetro

1. Opere la válvula hasta la posición final CERRADO.
2. Gire el potenciómetro [1] en sentido horario hasta el tope.

➥ La posición final CERRADO corresponde a 0 %

➥ La posición final ABIERTO corresponde a 100 %

3. Gire parcialmente en sentido contrario el potenciómetro [1].
4. Realice el ajuste fino del punto cero mediante un potenciómetro externo de ajuste (para visualización remota).

9.7 Ajuste del transmisor electrónico de posición RWG

— Opción —

El transmisor electrónico de posición RWG sirve para detectar la posición de la válvula. A partir del valor real de posición registrado por el potenciómetro (sensor de recorrido), genera una señal de corriente de 0 – 20 mA ó 4 – 20 mA.

Tabla 4: Datos técnicos del RWG 4020

Cableado		Sistema de 3/4 hilos	Sistema de 2 hilos
Esquema eléctrico	TPA	9ª posición = E o H	9ª posición = C, D o G
Corriente de salida	I_A	0 – 20 mA, 4 – 20 mA	4 – 20 mA
Tensión de alimentación	U_V	24 V DC, ± 15 % filtrada	14 V DC +(I x R_B), máx. 30 V
Intensidad máx. de entrada	I	24 mA con 20 mA intensidad de salida	20 mA
Carga máx.	R_B	600 Ω	(U_V – 14 V) /20 mA

Figura 28: Vista de la unidad de mando



[1] Potenciómetro (sensor de recorrido)
[2] Potenciómetro mín. (0/4 mA)
[3] Potenciómetro máx. (20 mA)
[4] Punto de medida (+) 0/4 – 20 mA
[5] Punto de medida (-) 0/4 – 20 mA

1. Conecte la tensión del transmisor electrónico de posición.
2. Opere la válvula hasta la posición final CERRADO.
3. Conecte el miliamperímetro para 0 – 20 mA a los puntos de medida [4 y 5]. Si no se mide ningún valor:
   3.1 Compruebe si en la conexión del cliente XK (terminales 23/24) hay carga externa conectada (observe la carga máx. R_B), o
   3.2 Instale un puente en la conexión del cliente XK (terminales 23/24).
4. Gire el potenciómetro [1] en sentido horario hasta el tope.
5. Gire parcialmente en sentido contrario el potenciómetro [1].
6. Gire el potenciómetro [2] en el sentido horario hasta que la corriente de salida aumente.
7. Gire en sentido contrario el potenciómetro [2] hasta que se alcance el siguiente valor:

- para 0 – 20 mA aprox. 0,1 mA
- para 4 – 20 mA aprox. 4,1 mA

➥ De este modo se asegura que la señal estará siempre por encima del punto cero eléctrico.

8. Opere la válvula hasta la posición final ABIERTO.
9. Con el potenciómetro [3], ajuste al valor final a 20 mA.
10. Opere la válvula de nuevo a la posición final CERRADO y compruebe el valor mínimo (0,1 mA ó 4,1 mA). Reajuste si es necesario.

Información Si no se alcanza el valor máximo, se debe comprobar si se ha elegido el engranaje reductor adecuado. (Las vueltas o la carrera máximas posibles se encuentran en la hoja de datos técnicos correspondiente del actuador).

9.8 Ajuste del indicador mecánico de posición

— Opción —

1. Coloque el disco indicador sobre el eje.
2. Lleve la válvula hasta la posición final CERRADO.
3. Gire el disco indicador inferior hasta que el símbolo ⊥ (CERRADO) esté alineado con la marca ▲ de la tapa.



4. Lleve el actuador hasta la posición final ABIERTO.
5. Sujete el disco inferior en su posición y gire el disco superior con el símbolo ⊤ (ABIERTO) hasta que esté alineado con la marca ▲ de la tapa.



6. Lleve la válvula de nuevo hasta la posición final CERRADO.
7. Comprobar el ajuste:

   Si el símbolo ⊥ (CERRADO) deja de estar alineado con la marca ▲ de la tapa:

   7.1 Repita el ajuste.

   7.2 En caso necesario, compruebe la elección del engranaje reductor.

9.9 Cerrar el recinto de interruptores

AVISO

¡Peligro de corrosión por daños en la pintura!

→ Después de realizar trabajos en el aparato, retoque los daños en la pintura.

1. Limpie las superficies de contacto de la tapa y de la carcasa.
2. Compruebe que la junta tórica [3] no está dañada, en caso de estarlo, sustitúyala por una nueva.
3. Aplique una fina capa de grasa no ácida (p. ej., vaselina) a la junta tórica.



4. Coloque la tapa [1] del recinto de interruptores.

5. Apriete los tornillos [2] homogéneamente en diagonal.

10. Solución de fallos

10.1 Fallos durante la puesta en servicio

Tabla 5: Fallos durante la puesta en servicio

Descripción del fallo	Causas posibles	Remedio
No se puede ajustar el indicador mecánico de posición.	El engranaje reductor no es adecuado para las vueltas/carrera del actuador.	Cambie el engranaje reductor.
Fallo en posición final El actuador se desplaza al tope final aunque los finales de carrera funcionan correctamente.	Durante el ajuste del final de carrera no se ha tenido en cuenta el post-recorrido. El post-recorrido se genera por la inercia del actuador y de la válvula y por el retardo de desconexión del control.	Mida el post-recorrido: Post-recorrido = Trayecto recorrido entre la desconexión y la parada. Ajuste de nuevo el final de carrera teniendo en consideración el post-recorrido (gire en sentido contrario el volante el recorrido correspondiente al post-recorrido).
Transmisor electrónico de posición RWG No se mide ningún valor en los puntos de medida.	El bluce de corriente del RWG está abierto. (El retorno de 0/4 – 20 mA funciona sólo cuando el bucle de corriente del RWG está cerrado).	Instale un puente sobre el RWG en la conexión XK (terminales 23/24). Conecte la carga externa a la XK, p. ej., indicación remota. Observe la carga máxima R_B.
Transmisor electrónico de posición RWG El rango de 4 – 20 mA o el valor máximo de 20 mA no se pueden ajustar.	El engranaje reductor no es adecuado para las vueltas/carrera del actuador.	Cambie el engranaje reductor.
Los interruptores de final de carrera y/o limitadores de par no conmutan.	Interruptores/Limitadores defectuosos o mal ajustados.	Compruebe el ajuste, en caso necesario, reajuste las posiciones finales. → **Compruebe los interruptores/limitadores**, en caso necesario, cámbielos.

Comprobar el interruptor

Los interruptores se pueden accionar manualmente mediante los botones de prueba [1] y [2]:



1. Girar el botón de prueba [1] en el sentido de la flecha LPC (DSR): El limitador de par CERRAR se activa.
2. Girar el botón de prueba [2] en el sentido de la flecha TSO (DÖL): El limitador de par ABRIR se activa.

Si el actuador lleva integrado un final de carrera DUO (opcional), los interruptores de posiciones intermedias se activan también con los limitadores de par.

1. Girar el botón de prueba [1] en el sentido de la flecha LSC (WSR): El final de carrera CERRAR se activa.
2. Girar el botón de prueba [2] en el sentido de la flecha WÖL: El final de carrera ABRIR se activa.

10.2 Protección de motor (vigilancia térmica)

Como protección contra el sobrecalentamiento y las temperaturas inadmisiblemente altas en la superficie del actuador, en el devanado del motor se han integrado termistores o termostatos. Éstos se activan en cuanto se alcanza la temperatura máxima admisible en el devanado.

Comportamiento en caso de fallo

Si las señales se han cableado correctamente en el control, el actuador se para, para poder continuar maniobrando, el motor se debe enfriar.

Causas posibles

Sobrecarga, tiempo de marcha sobrepasado, demasiadas arrancadas, temperatura ambiente demasiado alta.

Remedio Comprobar las causas y eliminarlas de ser posible.

11. Mantenimiento y reparaciones

⚠ ATENCIÓN

¡Daños por un mantenimiento incorrecto!

→ Los trabajos de reparación y mantenimiento deben ser realizados sólo por personal especializado que haya sido autorizado por el usuario de la instalación o por el constructor de la misma. Para tales actividades, recomendamos ponerse en contacto con nuestro servicio.

→ Los trabajos de reparación y mantenimiento deben ser realizados sólo con el equipo fuera de servicio.

AUMA Service & Support

AUMA ofrece amplias prestaciones de servicio, como reparación y mantenimiento, o también cursillos para los clientes. Las direcciones de contacto se pueden encontrar en este documento en la sección <Direcciones> y en Internet (www.auma.com) .

11.1 Medidas preventivas para la reparación y para un funcionamiento seguro

Las siguientes medidas son necesarias para que el producto funcione de forma segura durante la operación.

6 meses después de la puesta en servicio y, después, anualmente

- Control visual:
  Compruebe la fijación y la estanqueidad de entradas de cables, prensaestopas, tapones, etc.
  Mantenga los pares indicados por el fabricante.
- Compruebe si los tornillos de fijación entre el actuador y la válvula/reductor están bien apretados. En caso necesario, apriete los tornillos con los pares indicados en el capítulo <Montaje>.
- En caso de operación poco frecuente: realice una maniobra de prueba.
- En aparatos con tipo de acoplamiento A: con ayuda de una bomba de engrase, inyecte grasa multiuso EP de litio saponificado en base a aceite mineral a través del engrasador.
- La lubricación del husillo de la válvula se debe realizar por separado.

Figura 33: Tipo de acoplamiento A



[1] Tipo de acoplamiento A
[2] Engrasador

Tabla 6: Cantidad de grasa para el rodamiento del tipo de acoplamiento A

Tipo de acoplamiento	A 07.2	A 10.2	A 14.2	A 16.2
Cantidad [g] 1)	1,5	2	3	5

1) Para grasa con una densidad r = 0,9 kg/dm³

Con grado de protección ambiental IP 68

Tras una inundación:

- Comprobar el actuador.
- En caso de penetración de agua, busque y elimine las fugas, deje que el aparato se seque y compruebe su capacidad de funcionamiento.

11.2 Mantenimiento

Lubricación

- En fábrica, el actuador se rellena de grasa de alta calidad.
- El cambio de grasa se realiza durante el mantenimiento.
  - Para servicio de regulación, se recomienda cada 4 – 6 años.
  - Para servicio todo-nada, operación frecuente, se recomienda cada 6 – 8 años.
  - Para servicio todo-nada, operación esporádica, se recomienda cada 10 – 12 años.
- Recomendamos también sustituir la grasa cuando se cambian las juntas.
- Durante la operación, no es necesaria una lubricación adicional del actuador.

11.3 Disposición y reciclado

Nuestros aparatos son productos que disfrutan de una larga vida útil. En cualquier caso, siempre llegará un momento en el que tengan que ser sustituidos. Los aparatos tienen una estructura modular, por lo que se pueden separar y clasificar en función de sus materiales por:

- Chatarra electrónica
- Metales varios
- Plásticos
- Grasas y aceites

Recomendaciones generales:

- Las grasas y aceites polucionan el agua y no deben llegar al medio ambiente.
- El material desmontado se debe eliminar correctamente o llevar a su reciclaje por separado.
- Observar las regulaciones nacionales en relación al tratamiento de residuos.

12. Datos técnicos

Información En las tablas siguientes se indican, además de la versión estándar, diversas opciones. La versión exacta se debe consultar en la hoja de datos técnicos del pedido. La hoja de datos técnicos del pedido se puede descargar en Internet en **http://www.auma.com** en alemán y en inglés (previa entrada del número de comisión).

12.1 Equipamiento y funciones del actuador

Modo de operación[1)]	Estándar: • SA: Operación breve S2 - 15 min • SAR: Operación intermitente S4 - 25 % Opciones: • SA: Operación breve S2 - 30 min • SAR: Operación intermitente S4 - 50 % • SAR: Operación intermitente S5 - 25 %
Rango de par	Véase la placa de características del actuador
Velocidad	Véase la placa de características del actuador
Motor	Estándar: Motor asíncrono de corriente trifásica, diseño IM B9 según IEC 60034
Tensión del motor y frecuencia	Véase la placa de características del motor
Clase de aislamiento	Estándar: F, tropicalizado Opción: H, tropicalizado
Protección del motor	Estándar: Termostato (NC) Opción: Termistor (PTC según DIN 44082)[2)]
Autobloqueo	Autoblocante: Velocidades de hasta 90 1/min (50 Hz), 108 1/min (60 Hz) NO autoblocante: Velocidades desde 125 1/min (50 Hz), 150 1/min (60 Hz) Los actuadores multivueltas son autoblocantes cuando por efecto del par en la salida del actuador la posición de parada de la válvula no cambia.
Final de carrera	Mecanismo cuenta-vueltas para posiciones finales ABIERTO y CERRADO Vueltas por carrera: 2 a 500 (estándar) ó 2 a 5.000 (opción) Estándar: • Interruptor sencillo (1 NC y 1 NO; sin aislamiento galvánico) por cada posición final Opciones: • Interruptor tándem (2 NC y 2 NO) para cada posición final, con aislamiento galvánico • Interruptor triple (3 NC y 3 NO) por cada posición final, con aislamiento galvánico • Interruptores de posiciones intermedias (final de carrera DUO), de libre ajuste.
Limitadores de par	Limitadores de par ajustables para los sentidos ABRIR y CERRAR Estándar: Interruptor sencillo (1 NC y 1 NO) por sentido, sin aislamiento galvánico Opción: Interruptor tándem (2 NC + 2 NO) por cada sentido, con aislamiento galvánico
Señal de posición, analógica (opción)	Potenciómetro ó 0/4 – 20 mA (RWG)
Indicador mecánico de posición (opcional)	Indicador continuo, disco indicador ajustable con símbolos ABRIR y CERRAR
Indicador de marcha	Intermitente (estándar para SA, opción para SAR)
Calefacción en el recinto de interruptores	Estándar: Calefacción PTC autoregulada, 5 – 20 W, 110 – 250 V AC/DC Opción: 24 – 48 V AC/DC o 380 – 400 V AC
Calefacción del motor (opcional)	Tensiones: 110 – 120 V AC, 220 – 240 V AC ó 400 V AC (alimentación externa) Potencia en función del tamaño 12,5 – 25 W
Mando manual	Mando manual para el ajuste y la operación de emergencia, parado en operación eléctrica. Opción: Volante con candado
Conexión eléctrica	Estándar: Conector múltiple AUMA con terminales para atornillar Opciones: Terminales o conexión crimpada
Rosca para entradas de cable	Estándar: Uniones roscadas métricas Opciones: Roscas Pg, NPT, G
Esquema eléctrico	Esquema eléctrico de acuerdo con el número de comisión del suministro

Conexión a la válvula	Estándar: B1 según EN ISO 5210 Opciones: A, B2, B3, B4 según EN ISO 5210 A, B, D, E según DIN 3210 C según DIN 3338 Tipos de acoplamiento especiales: AF, B3D, ED, DD, IB1, IB3 A con lubricación de husillo
Sensores	
Señalización de operación manual (opcional)	Señal de operación manual activa/no activa mediante interruptor (1 contacto conmutado)

1) Con la tensión nominal y a una temperatura ambiente de 40 °C y bajo una carga media con par de operación o par de regulación según los datos técnicos por separado. No están permitidos otros modos de operación.
2) Los termistores necesitan además un dispositivo de disparo adecuado en el control

Datos técnicos de interruptores de final de carrera y limitadores de par	
Vida útil mecánica	2 x 10^6 arrancadas
Contactos recubiertos de plata:	
1/min mín.	30 V AC/DC
1/min máx.	250 V AC/DC
I mín.	20 mA
I máx. corriente alterna	5 A a 250 V (carga resistiva) 3 A a 250 V (carga inductiva, cos phi = 0,6)
I máx. corriente continua	0,4 A a 250 V (carga resistiva) 0,03 A a 250 V (carga inductiva, L/R = 3 µs) 7 A a 30 V (carga resistiva) 5 A a 30 V (carga inductiva, L/R = 3 µs)
Contactos recubiertos de oro:	
1/min mín.	5 V
1/min máx.	30 V
I mín.	4 mA
I máx.	400 mA

Datos técnicos del interruptor intermitente	
Vida útil mecánica	10^7 arrancadas
Contactos recubiertos de plata:	
1/min mín.	10 V AC/DC
1/min máx.	250 V AC/DC
I máx. corriente alterna	3 A a 250 V (carga resistiva) 2 A a 250 V (carga inductiva, cos phi ≈ 0,8)
I máx. corriente continua	0,25 A a 250 V (carga resistiva)

Datos técnicos del interruptor de activación del volante	
Vida útil mecánica	10^6 arrancadas
Contactos recubiertos de plata:	
1/min mín.	12 V DC
1/min máx.	250 V AC
I máx. corriente alterna	3 A a 250 V (carga inductiva, cos phi = 0,8)
I máx. corriente continua	3 A a 12 V (carga resistiva)

12.2 Condiciones de servicio

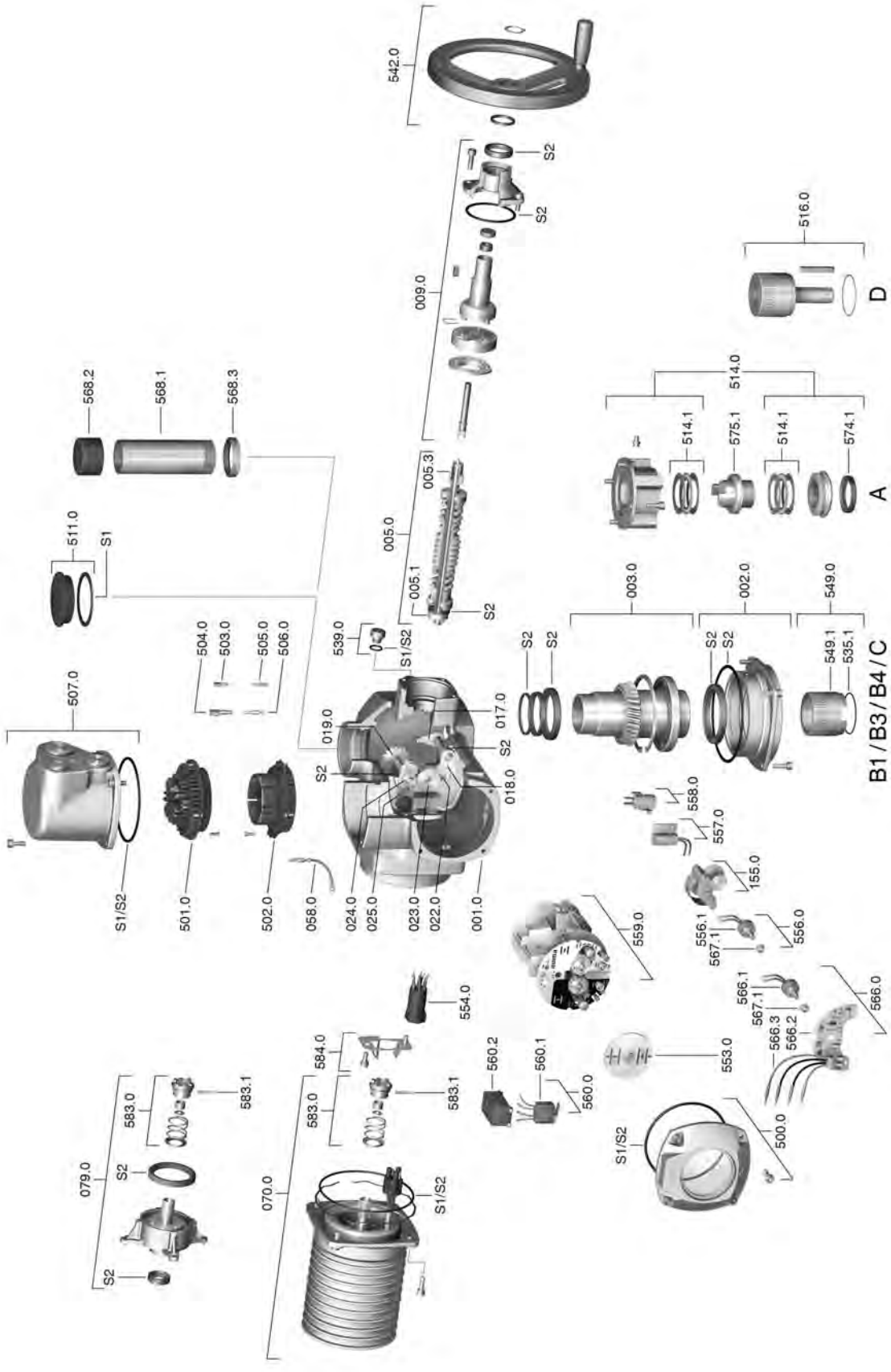
Uso	Uso permitido en recintos interiores y en el exterior
Posición de montaje	cualquiera
Grado de protección ambiental según EN 60529	Estándar: IP 68 con motor de corrriente trifásica/monofásica de AUMA El grado de protección ambiental IP 68 cumple los siguientes requerimientos según AUMA: • Profundidad de agua: máximo 8 m de columna de agua • Duración de la inmersión bajo agua: máximo 96 horas • Hasta 10 operaciones durante la inmersión • El servicio de regulación no es posible durante la inmersión. Modelo exacto, véase la placa de características del actuador
Protección anti-corrosión	Estándar: • KS: Indicada para instalación bajo atmósferas ocasional o permanentemente agresivas con moderada concentración de agentes corrosivos (p. ej., en centrales de depuración de agua, industria química) Opciones: • KX: adecuada para instalación bajo atmósferas extremadamente agresivas con alta humedad y alta concentración de agentes corrosivos • KX-G: igual a KX, con partes exteriores libres de aluminio
Altitud de instalación	Estándar: ≤ 2.000 m sobre el nivel del mar Opción: > 2.000 m sobre el nivel del mar, previa consulta en fábrica
Grado de polución	Grado de polución 4 (en estado cerrado) según EN 50178
Pintura	Estándar: Pintura en base a poliuretano (pintura en polvo)
Color	Estándar: Gris plateado AUMA (similar a RAL 7037)
Temperatura ambiente	Estándar: • Servicio todo-nada: –40 °C hasta +80 °C • Servicio de regulación: –40 °C hasta +60 °C Modelo exacto, véase la placa de características del actuador
Resistencia a vibraciones según IEC 60068-2-6	2 g, de 10 a 200 Hz Resistente a las oscilaciones y vibraciones durante el arranque de la instalación y en caso de fallo de la misma. Ello no significa que la resistencia sea permanente. No tiene validez en combinación con reductores.
Vida útil	Los actuadores multivueltas AUMA cumplen o superan los requistos de vida útil de la norma EN 15714-2. Puede obtener más información previa solicitud.
Peso	Véanse datos técnicos por separado

12.3 Otras informaciones

Directivas de la UE	• Compatibilidad Electromagnética (CEM): (2004/108/CE) • Directiva sobre Baja Tensión: (2006/95/CE) • Directiva sobre Máquinas: (2006/42/CE)

13. Lista de piezas de repuesto

13.1 Actuador multivueltas SA 07.2 – SA 16.2/SAR 07.2 – SAR 16.2



Información: Con cada pedido de piezas de repuesto, especificar el tipo de aparato y nuestro número de comisión (ver placa de características). Sólo se deben utilizar piezas originales de AUMA. El uso de otras piezas de repuesto supone la pérdida de los derechos de garantía y de reclamaciones de responsabilidad. Las piezas de repuesto que se suministren pueden tener un aspecto distinto al representado aquí.

N°	Denominación	Tipo	N°	Denominación	Tipo
001.0	Carcasa	Sub-conj.	539.0	Tapón roscado	Sub-conj.
002.0	Brida	Sub-conj.	542.0	Volante con maneta	Sub-conj.
003.0	Eje hueco con corona	Sub-conj.	549.0	Acoplamiento tipo B1/B3/B4/C	Sub-conj.
005.0	Eje motriz	Sub-conj.	549.1	Casquillo B1/B3/B4/C	
005.1	Embrague motor con eje motriz		553.0	Indicador mecánico de posición	Sub-conj.
005.3	Embrague mando manual		554.0	Conector hembra con haz de cables motor	Sub-conj.
009.0	Planetario para mando manual	Sub-conj.	556.0	Potenciómetro para transmisor de posición	Sub-conj.
017.0	Palanca limitador de par	Sub-conj.	556.1	Potenciómetro sin piñón	Sub-conj.
018.0	Segmento dentado		557.0	Calefacción	Sub-conj.
019.0	Corona de transmisión		558.0	Intermitente, con terminales incluidos (sin disco de impulso ni placa aislante)	Sub-conj.
022.0	Piñón II para limitador de par	Sub-conj.	559.0-1	Unidad de mandos con discos de par e interruptores	Sub-conj.
023.0	Rueda de transmisión final de carrera	Sub-conj.	559.0-2	Unidad de mando con transmisor magnético de carrera y par (MWG), para versión no intrusiva en combinación con control integrado AUMATIC	Sub-conj.
024.0	Piñón final de carrera	Sub-conj.	560.0-1	Bloque de interruptores sentido ABRIR	Sub-conj.
025.0	Placa de retención	Sub-conj.	560.0-2	Bloque de interruptores sentido CERRAR	Sub-conj.
058.0	Cable de tierra (pin)	Sub-conj.	560.1	Interruptor carrera o par	Sub-conj.
070.0	Motor (motor VD incluye 079.0)	Sub-conj.	560.2	Cassete para interruptores	
079.0	Planetario motor (SA/SAR 07.2 – 16.2 para motor VD)	Sub-conj.	566.0	Transmisor de posición RWG	Sub-conj.
155.0	Engranaje reductor	Sub-conj.	566.1	Potenciómetro para RWG sin piñón	Sub-conj.
500.0	Tapa recinto interruptores	Sub-conj.	566.2	Tarjeta electrónica RWG	Sub-conj.
501.0	Conector hembra completo con terminales	Sub-conj.	566.3	Cables para RWG	Sub-conj.
502.0	Conector macho sin terminales	Sub-conj.	567.1	Piñón para potenciómetro/RWG	Sub-conj.
503.0	Terminal hembra mando	Sub-conj.	568.1	Tubo de protección de husillo (sin tapón)	
504.0	Terminal hembra motor	Sub-conj.	568.2	Tapón del tubo de protección	
505.0	Terminal macho mando	Sub-conj.	568.3	Junta en V	
506.0	Terminal macho motor	Sub-conj.	574.1	Junta radial acopl. tipo A para brida ISO	
507.0	Tapa conector	Sub-conj.	575.1	Tuerca de roce A	
511.0	Tapón roscado	Sub-conj.	583.0	Embrague motor en eje motor	Sub-conj.
514.0	Acoplamiento tipo A (sin tuerca de roce)	Sub-conj.	583.1	Pin para embrague motor	
514.1	Juego rodamientos	Sub-conj.	584.0	Muelle de retención para embrague motor	Sub-conj.
516.0	Acoplamiento tipo D		S1	Juego de juntas, pequeño	Juego
535.1	Anillo elástico		S2	Juego de juntas, grande	Juego

14. Certificados

14.1 Declaración de Incorporación y Declaración de Conformidad de la CE

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auma®
Solutions for a world in motion

Declaración Original de Incorporación para Cuasi Máquinas (EG-RL 2006/42/CE) y Declaración de Conformidad de la CE según la Directiva sobre Compatibilidad Electromagnética y la Directiva sobre Baja Tensión

para los actuadores multivueltas AUMA de las series **SA 07.2 – SA 16.2** y **SAR 07.2 – SAR 16.2** en las versiones **AUMA NORM**, **AUMA SEMIPACT**, **AUMA MATIC** o **AUMATIC**.

El fabricante AUMA Riester GmbH & Co. KG declara por la presente que los actuadores multivueltas antes indicados cumplen los siguientes requisitos básicos de la Directiva sobre Máquinas de la CE 2006/42/CE: Anexo I, artículos 1.1.2, 1.1.3, 1.1.5, 1.2.1; 1.2.6, 1.3.1, 1.3.7, 1.5.1, 1.6.3, 1.7.1, 1.7.3, 1.7.4

Se han aplicado las siguientes normas armonizadas según la Directiva sobre Máquinas:

EN 12100-1: 2003	ISO 5210: 1996
EN 12100-2: 2003	EN 60204-1: 2006

El fabricante se compromete a enviar por vía electrónica la documentación de la cuasi máquina a las autoridades nacionales cuando éstas lo soliciten. La documentación técnica especial perteneciente a la máquina se ha elaborado conforme al Anexo VII parte B.

Los actuadores multivueltas AUMA está diseñados para el ensamblaje en válvulas. La puesta en servicio está prohibida hasta que la máquina completa en la que se monten los actuadores multivueltas AUMA cumpla las disposiciones de la Directiva de la CE 2006/42/CE.

Responsable de la documentación: Peter Malus, Aumastraße 1, D-79379 Müllheim, Alemania

En su calidad de cuasi máquinas, los actuadores multivueltas cumplen los requisitos de las siguientes Directivas Europeas y las disposiciones nacionales legales a cumplir, así como las normas armonizadas que se indican a continuación:

(1) Directiva sobre Compatibilidad Electromagnética (CEM) (2004/108/CE)
EN 61000-6-4: 2007
EN 61000-6-2: 2005

(2) Directiva sobre Baja Tensión (2006/95/CE)

EN 60204-1: 2006	EN 60034-1: 2004
EN 50178: 1997	EN 61010-1: 2001

Año de colocación de la marca CE: 2010

Müllheim, 2009-12-29
H. Newerla, Director Gerente

Esta declaración no supone ningún tipo de garantía. Se deben observar las instrucciones de seguridad de la documentación del producto suministrada. Esta declaración pierde su validez si en los equipos se realizan cambios no acordados con el fabricante.

Y004.924/004/es

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Vigilancia térmica 33
Volante 10

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