



Automatic PFC-Systems (without reactors)

Quality components for a long lifespan

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Automatic PFC-systems for central compensation in low voltage distribution boards or group compensation of system parts. Due to exclusive use of quality components from leading manufacturers, the Prophi® power factor controller, as a central control unit, guarantees the best safety and a long lifespan thanks to the years of experience in the field of PFC- systems.

PFC-systems without reactors are considered for use in applications with a low proportion of non-linear loads i.e. low harmonic loads. There are four different designs customised to suit your individual application.

PQS - Power Quality Solutions

Technical data conventional and detuned automatic PFC-systems

Information

PFC-systems without reactors must not be used (refer to DIN EN 61921 and other norms) in the following situations:

- Converter power (non-linear loads) > 15 % of the connection power
- Overall harmonic distortion of THD-U > 3 %
- Networks with de-tuned capacitors
- Critical ripple control systems within a range of 270 - 425 Hz
- PFC output > 35 % of the transformer or connection power

Technical data

Standards	DIN, VDE 0660 part 500, EN 60439-1 and EN 60831-1/2			
Design in accordance with:	DIN EN 60439 part 1, partially type tested combination			
Construction form	Steel plate cabinet for KB and ES versions Mounting plate for MP version Module for MO version			
Power factor controller	Prophi® according to data sheet or selection table			
Nominal voltage	400 V, 50 Hz; other voltages upon request			
Control voltage	230 V, 50 Hz			
Capacitor voltage	440 V (without reactors) and 5.67 - 7 % (with reactors), 525 V at 14 % (with reactors)			
Voltage rating of the capacitor	at p = 5.67 - 7 %	440 V	at p = 14 %	525 V
	8 h each day	484 V		577 V
	30 min each day	506 V		604 V
	5 min	528 V		630 V
	1 min	572 V		682 V
Power losses	Capacitors <0.2 W/kvar, systems 4-7 W/kvar			

System design	Permitted harmonic currents		harmonic voltage	
	I 250 Hz	I 350 Hz	U 250 Hz	U 350 Hz
FK 5.67	0.565 IN	0.186 IN	5 %	5 %
FK 7	0.31 IN	0.134 IN	5 %	5 %
FK 14	0.086 IN	0.051 IN	5 %	5 %
Capacitor contactor switching cycles	Max 100,000 switching cycles			
Optional thyristor actuator	Unlimited switching cycles			
Current transformer connection	.. /1A, ../5A			
Nominal power / nominal current	Refer to option overview			
Switching ratio	Refer to option overview			
Discharging	With discharge resistors in accordance with EN 60831-1/2			
Installation height	Up to 2,000 m above sea level			
Environmental temperature	According to DIN EN 60439 part 1			
Protection class	KB, ES: IP32 and MP, MO: IP00			
Cooling	Self-ventilating or forced ventilation depending on type			
Colour	RAL 7035			
Noise emissions (FK)	< 60 dB at a distance of 1 m from the closed unit			
Connection cable diameters and fuses	Refer to option overview			

The following detuning can be applied in networks with ripple control systems:

Power utility ripple control frequency	Detuning factor	Series resonance frequency
< 168Hz	p = 14 %	fr = 134 Hz
168 - 183Hz	p = 14 / 5.67 %	fr = 134 / 210 Hz
> 228Hz	p = 7 %	fr = 189 Hz
> 350Hz	p = 5.67 %	fr = 210 Hz

Compact design

Applications

This is a space-saving design for smaller nominal power levels and wall mounting, for grids with low harmonic content.

Nominal voltage: 400 V, 3-phase, 50 Hz
 Protection class: IP32
 Cooling: Self convection – take care of sufficient convection
 Controller: Prophi® 6R with AUTO configuration
 Reactor: No reactor

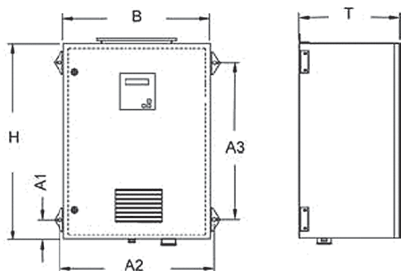


Technical data

Nominal power	Step power kvar	Switching ratio	Type	Item no.	Version	kg
7.5	2.5/5	1:2	JF440/7,5ER3KB4	50.39.005	KB4	25
10	2.5/2.5/5	1:1:2	JF440/10ER4KB4	50.39.015	KB4	25
12.5	2.5/5/5	1:2:2	JF440/12,5ER5KB4	50.39.030	KB4	25
15	5/10	1:2	JF440/15ER3KB4	50.39.045	KB4	26
17.5	2.5/5/10	1:2:4	JF440/17,5/ER7KB4	50.39.060	KB4	26
20	5/5/10	1:1:2	JF440/20ER4KB4	50.39.075	KB4	29
25	5/10/10	1:2:2	JF440/25ER5KB4	50.39.095	KB4	27
31	6.2/12.5/12.5	1:2:2	JF440/31ER5KB4	50.39.145	KB4	35
35	5/10/20	1:2:4	JF440/35ER7KB4	50.39.175	KB4	35
40	10/10/20	1:1:2	JF440/40ER4KB4	50.39.195	KB4	36
50	10/20/20	1:2:2	JF440/50ER5KB4	50.39.235	KB4	38
55	5/10/20/20	1:2:4:4	JF440/55ER11KB8	50.39.270	KB8	77
60	10/20/30	1:2:3	JF440/60ER6KB8	50.39.295	KB8	78
75	12.5/12.5/25/25	1:1:2:2	JF440/75ER6KB8	50.39.345	KB8	70
80	20/20/40	1:1:2	JF440/80ER4KB8	50.39.370	KB8	92
100	12.5/12.5/25/50	1:1:2:4	JF440/100ER8KB8	50.39.420	KB8	95
100	20/40/40	1:2:2	JF440/100ER5KB8	50.39.430	KB8	95
110	10/20/40/40	1:2:4:4	JF440/110ER11KB8	50.39.440	KB8	96
120	20/20/40/40	1:1:2:2	JF440/120ER6KB8	50.39.450	KB8	97

Other nominal voltages, frequencies, powers, mechanical designs or versions with circuit breaker are available upon request. Extension units, units in ISO housing and audio frequency blocking circuits are available upon request.

Dimensional drawing



KB4: H = 600, W = 400, D = 210, A1 = 23, A2 = 421, A3 = 560
KB8: H = 800, W = 600, D = 250, A1 = 23, A2 = 620, A3 = 756

All measurements in mm.

Power factor correction systems in modular design (without reactors)

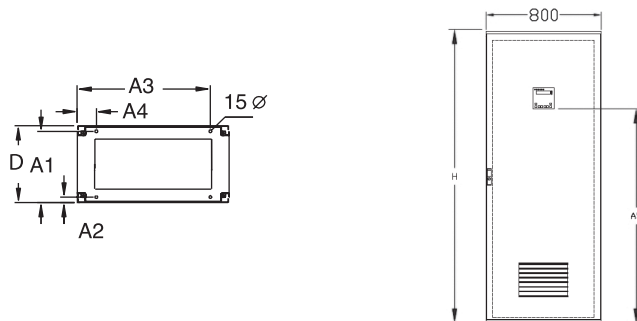
Applications

These are automatically regulated PFC systems in steel cabinets in modular design. The output can be easily expanded inside the cabinet or with additional cabinets. For grids with low harmonic content.

Nominal voltage: 400 V, 3-phase, 50 Hz
Protection class: IP32
Cooling: Self convection – take care of sufficient convection
Controller: Prophi® with AUTO configuration
Reactor: No reactor



Dimensional drawing



ES8184:

H = 1820, W = 800, D = 400,
A1 = 374, A2 = 25, A3 = 700, A4 = 100, A5 = 1480

All measurements in mm.

PQS - Power Quality Solutions
Power factor correction systems in modular design (without reactors)

Modular design ES8184 (B= as bellow x H= 1820 mm x T= 400 mm)

Nominal power kvar	Step power kvar	Switching ratio	Type	Item no.	Width	kg
150	25/25/50/50	1:1:2:2	JF440/150ER6ES8184**	50.81.400	800 mm	208
150	12.5/12.5/25/50/50	1:1:2:4:4	JF440/150ER12ES8184**	50.81.415	800 mm	208
150	25/25/25...	1:1:1:1:1:1	JF440/150ER6ES8184**	50.81.425	800 mm	208
160	20/20/40...	1:1:2:2:2	JF440/160ER8ES8184**	50.81.450	800 mm	209
175	25/50/50/50	1:2:2:2	JF440/175ER7ES8184**	50.81.475	800 mm	210
175	12.5/12.5/25/25/50...	1:1:2:2:4:4	JF440/175ER14ES8184***	50.81.490	800 mm	210
180	20/40/40...	1:2:2:2:2	JF440/180ER9ES8184**	50.81.515	800 mm	211
200	50/50...	1:1:1:1	JF440/200ER4ES8184**	50.81.540	800 mm	212
200	25/25/50...	1:1:2:2:2	JF440/200ER8ES8184**	50.81.550	800 mm	212
200	12.5/12.5/25/50...	1:1:2:4:4...	JF440/200/ER16ES8184**	50.81.560	800 mm	212
200	20/20/40...	1:1:2:2:2:2	JF440/200ER10ES8184**	50.81.570	800 mm	212
240	20/20/40...	1:1:2:2...	JF440/240ER12ES8184***	50.81.600	800 mm	232
250	50...	1:1:1:1:1	JF440/250ER5ES8184**	50.81.625	800 mm	233
250	25/25/50...	1:1:2:2...	JF440/250ER10ES8184**	50.81.635	800 mm	233
250	12.5/12.5/25/50...	1:1:2:4:4...	JF440/250ER20ES8184***	50.81.645	800 mm	233
300	50/50...	1:1:1:1:1:1	JF440/300ER6ES8184**	50.81.670	800 mm	236
300	25/25/50...	1:1:2:2...	JF440/300ER12ES8184***	50.81.680	800 mm	236
300	12.5/12.5/25/50...	1:1:2:4:4...	JF440/300ER24ES8184***	50.81.690	800 mm	236
400	50/50/50...	1:1...	JF440/400ER8ES8184***	50.81.693	2 x 800 mm	475
500	50/50/50...	1:1...	JF440/500ER10ES8184***	50.81.696	2 x 800 mm	500
600	50/50/50...	1:1...	JF440/600ER12ES8184***	50.81.900	2 x 800 mm	525
Accessories						
Socket 100 mm high	SO 100 / 800 / 400			29.03.317		5
Socket 100 mm high	SO 200 / 800 / 400			29.03.322		10

** With Prophi® 6R
*** With Prophi® 12R

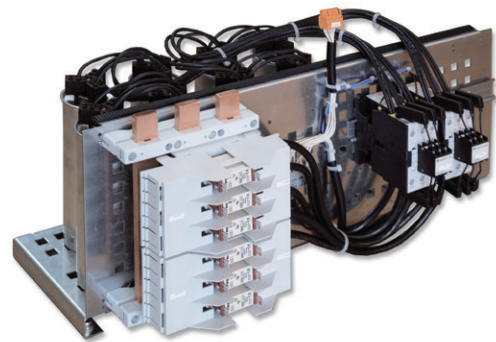
Other nominal voltages, frequencies, powers, mechanical designs or versions with circuit breakers are available upon request. Extension units, units in ISO housing and audio frequency blocks are available upon request.

Power factor correction system on extractable module – M084 (without reactor)

Application

This is a ready to install extractable PFC module for installation in existing switchboard cabinets or low voltage distribution boards. The module includes capacitors, contactors, 630 A bus bar system, HRC fuses and fuse sockets, discharge resistors...

Nominal voltage: 400 V, 3-phase, 50 Hz
 Protection class: IP00
 Cooling: Self convection – take care of sufficient convection
 Controller: None
 Reactor: No reactor



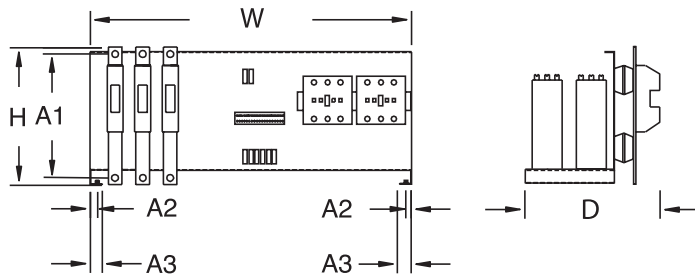
PFC Module M084

Nominal power kvar	Step power kvar	Switching ratio	Type	Item no.	kg
50	50		JF440/50EK1M084	50.80.700	22
50	25/25	1:1	JF440/50/2EK2M084	50.80.740	22
50	10/20/20	1:2:2	JF440/50/3EK5M084	50.80.770	22
50	12.5/12.5/25	1:1:2	JF440/50/3/EK4M084	50.80.774	22
60	20/40	1:2	JF440/60/2EK3M084	50.80.775	23
60	10/10/20/20	1:1:2:2	JF440/60/4EK6M084	50.80.776	23
75	25/50	1:2	JF440/75/2EK3M084	50.80.800	24
75	25/25/25	1:1:1	JF440/75/3EK3M084	50.80.810	24
75	12.5/12.5/25/25	1:1:2:2	JF440/75/4EK6M084	50.80.811	24
80	40/40	1:1	JF440/80/2EK2M084	50.80.835	24
80	20/20/40	1:1:2	JF440/80/3EK4M084	50.80.837	24
100	50/50	1:1	JF440/100/2EK2M084	50.80.875	25
100	25/25/50	1:1:2	JF440/100/3EK4M084	50.80.880	25
100	25/25/25/25	1:1:1:1	JF440/100/4EK4M084	50.80.900	25
100	20/40/40	1:2:2	JF440/100/3EK5M084	50.80.902	25
100	12.5/12.5/25/50	1:1:2:4	JF440/100/4EK8M084	50.80.903	25
Control module with Prophi® 6R controller, Fuse separation switch, current transformer clamp and 2 m connection cable (mounted on the capacitor module)				50.80.003	
Control module with Prophi® 12R controller, Fuse separation switch, current transformer clamp and 2 m connection cable (mounted on the capacitor module)				50.80.004	
Accessories Set module fixing rail for Rittal cabinet left / right, with accessories (for Rittal cabinet M084)				50.00.100	



Other nominal voltages, frequencies, powers, mechanical designs or versions with circuit breakers are available upon request.

Dimensional drawing



MO84:

$H = 330, W = 703, D = 333,$
 $A1 = 290, A2 = 14, A3 = 26.5$

All measurements in mm.