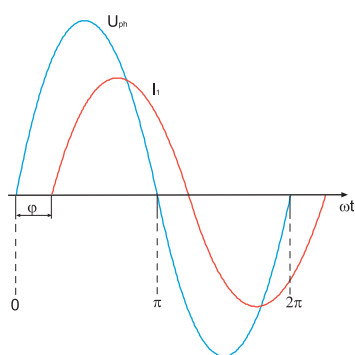


# Power Factor Controlling Systems



## Innovative Systems For Power Factor Correction





# Power Factor Controlling Systems



## Introduction

Power factor control systems are suitable to reduce high costs for reactive energy. Furthermore, they decrease high loads of electrical cables and distributions and increase their life expectancy. Besides of that, the environmental pollution is reduced by avoiding unnecessary CO<sub>2</sub> expulsion.

## Capacitors

Power capacitors in dry, gas filled technology with flat connection, failure protection, low loss dielectric of metallized polypropylene, PCB free, none flammable mineral filling with adhesive stabilisation.

## Dynamic Compensation

Dynamic compensation systems are used to compensate fast changing load, e.g. cranes or lifts etc. **The controller Propfi is the only one worldwide to make a so called mixed operation possible, which means it can compensate the basic load by contactors and the fast changing load with thyristor switches in one system!**

## Note

Unchoked systems may not be used when:

- the rectifier load is more but 15% of the total load
- the system power is more but 35% of the transformer power.
- other choked capacitors are connected in the mains.
- critical audio frequencies in the range of 270-425Hz and with audio frequency rejection filters.

In mains with audio frequencies, the following chokes can be used:

Audio frequency	Choke degree	Resonance frequency
>168Hz	p=14%	fr=134Hz
168-183Hz	p=14/5,67%	fr=134/210Hz
>250Hz	p=7%	fr=189Hz
>350Hz	p=5,67%	fr=210Hz

## Assembly

The space saving assembly of small format systems allows to build smaller systems for wall mounting (unchoked) or standing cabinets (choked) in low cost form. The slide-in construction makes it possible to build systems up to the highest power range.

Responsible consultants of electrical plants know, that the life expectancy of compensation systems is significantly increased by equipping the system with filter chokes. The power factor controller with its various functions offers more than just power factor correction. Putting the system into service has been made easy by the automatic configuration. While maintenance, the measurement of the single stage currents makes it easy to find defective capacitors.

As a unique application worldwide, the power factor control system in combination with the integrated Procont can be delivered as energy saving center. This combines power factor correction with perfect energy management, as Procont offers multiple measurements, maximum demand control and yearly switching clock additionally, so it is a low cost alternative for several costly applications.

# Power Factor Controlling Systems

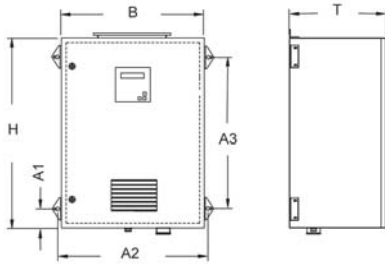
## Technical Data

Technical Data

Guidelines	DIN, VDE 0660 Teil 500, IEC 439-1 and VDE 0560 Teil 41			
Construction	DIN EN60439 Part 1: Partially type tested combinations			
Construction	Steel sheet housing for structure KB and ES. Mounting plate for structure MP Modules for structure MO			
Power factor controller	Prophi according to data sheet / selection table			
Rated voltage	400V, 50Hz; other voltage upon request			
Control voltage	230V, 50Hz			
Capacitor voltage	440V at 5,67 - 7%, 525V at 14%			
Voltage rating of the capacitors	at p=5,67-7%	440V	at p=14%	525V
	8h daily	484V		577V
	30 min daily	506V		604V
	5 min	528V		630V
	1 min	572V		682V
Loss	Capacitors <0,3W/kvar, system 4-7kvar			
Version	Allowed harm. current		Allowed harm. voltage	
	I <sub>250Hz</sub>	I <sub>350Hz</sub>	U <sub>250Hz</sub>	U <sub>350Hz</sub>
FK 5,67	0,565 I <sub>N</sub>	0,186 I <sub>N</sub>	5%	5%
FK 7	0,31 I <sub>N</sub>	0,134 I <sub>N</sub>	5%	5%
FK 14	0,086 I <sub>N</sub>	0,051 I <sub>N</sub>	5%	5%
Switchings of capacitors	100.000			
Optional thyristor switch	Unlimited			
Current transformer	.. /1A, .. /5A			
Rated power / current	See selection tables			
Stage ratio	See selection tables			
Disconnection	With discharge resistors according to VDE 0560, part 41 optionally with discharge chokes.			
Installation height	Up to 2000 m over zero			
Ambient temperature	According to DIN EN 60439 part 1			
Protection class	KB, ES: IP 32 and MP, MO: IP00			
Cooling	Self ventilation or forced ventilation			
Colour	KB, ES: RAL 7032 or RAL 7035, MP, MO: galvanized			
Noise emission (FK)	<60dB for closed systems in 1m distance			
Connection diameters and fuse	See selection tables page 11			

# Unchoked Power Factor Control Systems

Rated voltage: 400V, Rated power at 400V  
Capacitor voltage: 440V



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

## Small Format KB4, KB6, KB8, KB10

Rated power kvar	Stage power kvar	Stage ratio	Type	Part no.	Weight kg
7,5	2,5/5	1:2	JF440/7,5ER3KB4*	50.39.005	25
10	2,5/2,5/5	1:1:2	JF440/10ER4KB4 *	50.39.015	25
12,5	2,5/5/5	1:2:2	JF440/12,5ER5KB4*	50.39.030	25
15	5/10	1:2	JF440/15ER3KB4 *	50.39.045	26
17,5	2,5/5/10	1:2:4	JF440/17,5/ER7KB4*	50.39.060	26
20	5/5/10	1:1:2	JF440/20ER4KB4 *	50.39.075	29
25	5/10/10	1:2:2	JF440/25ER5KB4 *	50.39.095	27
27,5	2,5/5/10	1:2:4:4	JF440/27,5ER11KB4**	50.39.120	27
31	6,2/12,5	1:2:2	JF440/31ER5KB4 *	50.39.145	35
35	5/10/20	1:2:4	JF440/35ER7KB4 *	50.39.175	35
40	10/10/20	1:1:2	JF440/40ER4KB4*	50.39.195	36
45	5/10/15..	1:2:3:3	JF440/45ER9KB4 **	50.39.220	37
50	10/20/20	1:2:2	JF440/50ER5KB4 *	50.39.235	38
55	5/10/20	1:2:4:4	JF440/55ER11KB8**	50.39.270	77
60	10/20/30	1:2:3	JF440/60ER6KB8*	50.39.295	78
70	10/20/40	1:2:4	JF440/70ER7KB8*	50.39.320	78
75	12/12/25	1:1:2:2	JF440/75ER6KB8**	50.39.345	70
80	20/20/40	1:1:2	JF440/80ER4KB8*	50.39.370	92
90	10/20/30	1:2:3:3	JF440/90ER9KB8**	50.39.395	94
100	12/12/25	1:1:2:4	JF440/100ER8KB8**	50.39.420	95
100	20/40/40	1:2:2	JF440/100ER5KB8*	50.39.430	95
110	10/20/40	1:2:4:4	JF440/110ER11KB8**	50.39.440	96
120	20/20/40	1:1:2:2	JF440/120ER6KB8**	50.39.450	97

## Slide-in construction ES8124 W 800 x H 1200 x D 400 mm

50	10/20/20	1:2:2	JF440/50ER5ES8124 **	50.81.020	122
50	12/12/25	1:1:2	JF440/50ER4ES8124 **	50.81.000	122
75	12/12/25	1:1:2 ..	JF440/75ER6ES8124 **	50.81.050	123
100	25/25/25	1:1:1 ..	JF440/100ER4ES8124 **	50.81.075	125
100	10/10/20	1:1:2	JF440/100/ER10ES8124 **	50.81.090	125
100	12/12/25	1:1:2:4	JF440/100ER8ES8124 **	50.81.115	125
150	25/25/50	1:1:2 ..	JF440/150ER6ES8124 **	50.81.150	147
150	12/12/25	1:1:2:4 ..	JF440/150ER12ES8124 **	50.81.170	147
150	25/25/25	1:1:1 ..	JF440/150ER6ES8124 **	50.81.200	147

## Slide-in construction ES8184 W 800 x H 1800 x D 400 mm

150	25/25/50	1:1:2 ..	JF440/150ER6ES8184 **	50.81.400	208
150	12/12/25	1:1:2:4 ..	JF440/150ER12ES8184 **	50.81.415	208
150	25/25/25	1:1:1 ..	JF440/150ER6ES8184 **	50.81.425	208
160	20/20/40	1:1:2 ..	JF440/160ER8ES8184 **	50.81.450	209
175	25/50/50	1:2:2 ..	JF440/175ER7ES8184 **	50.81.475	210
175	12/12/25	1:1:2 ..	JF440/175ER14ES8184 ***	50.81.490	210
180	20/40/40	1:2:2 ..	JF440/180ER9ES8184 **	50.81.515	211
200	50/50	1:1 ..	JF440/200ER4ES8184 **	50.81.540	212
200	25/25/50	1:1:2 ..	JF440/200ER8ES8184 **	50.81.550	212
200	12/12/25	1:1:2:4 ..	JF440/200/ER16ES8184 **	50.81.560	212
200	20/20/40	1:1:2 ..	JF440/200ER10ES8184 **	50.81.570	212
240	20/20/40	1:1:2 ..	JF440/240ER12ES8184 ***	50.81.600	232
250	50	1:1:1 ..	JF440/250ER5ES8184**	50.81.625	233
250	25/25/50	1:1:2 ..	JF440/250ER10ES8184 **	50.81.635	233
250	12/12/25	1:1:2:4 ..	JF440/250ER20ES8184***	50.81.645	233
300	50/50	1:1:1 ..	JF440/300ER6ES8184**	50.81.670	236
300	25/25/50	1:1:2 ..	JF440/300ER12ES8184***	50.81.680	236
300	12/12/25	1:1:2:4 ..	JF440/300ER24ES8184***	50.81.690	236

## Accessories

Socket 100mm high	SO 100/800/400	2903317	5
Socket 200mm high	SO 200/800/400	2903322	10

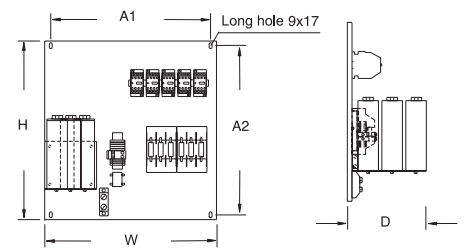
\*with power factor controller Prophi 3R \*\*with power factor controller Prophi 6R

\*\*\*with power factor controller Prophi 12R, Expansion units upon request,

Systems in insulated housing upon request, Audio remote filtering systems upon request

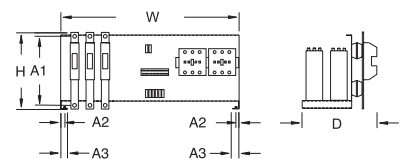
# Power Factor Controlling Systems

Mounting Plates MP4, MP6, MP8, MP10					
Rated power kvar	Stage power kvar	Stage ratio	Type	Part no.	Weight kg
7,5	2,5/5	1:2	JF440/7,5ER3MP4*	50.33.005	10
10	2,5/2,5/5	1:1:2	JF440/10ER4MP4 *	50.33.015	10
12,5	2,5/5/5	1:2:2	JF440/12,5ER5MP4*	50.33.030	10
15	5/10	1:2	JF440/15ER3MP4 *	50.33.045	11
17,5	2,5/5/10	1:2:4	JF440/17,5/ER7MP4*	50.33.060	11
20	5/5/10	1:1:2	JF440/20ER4MP4 *	50.33.075	14
25	5/10/10	1:2:2	JF440/25ER5MP4 *	50.33.095	14
27,5	2,5/5/10	1:2:4:4	JF440/27,5ER11MP8**	50.33.120	24
31	6,2/12,5	1:2:2	JF440/31ER5MP4*	50.33.145	26
35	5/10/20	1:2:4	JF440/35ER7MP4*	50.33.175	26
40	10/10/20	1:1:2	JF440/40ER4MP4*	50.33.195	28
45	5/10/15	1:2:3:3	JF440/45ER9MP4 **	50.33.220	28
50	10/20/20	1:2:2	JF440/50ER5MP4 *	50.33.245	29
55	5/10/20	1:2:4:4	JF440/55ER11MP8**	50.33.270	29
60	10/20/30	1:2:3	JF440/60ER6MP8 *	50.33.295	30
70	10/20/40	1:2:4	JF440/70ER7MP8*	50.33.320	31
75	12/12/25	1:1:2:2	JF440/75ER6MP8 **	50.33.345	32
80	20/20/40	1:1:2	JF440/80ER4MP8*	50.33.370	35
90	10/20/30	1:2:3	JF440/90ER9MP8**	50.33.395	37
100	12/12/25	1:1:2:4	JF440/100ER8MP8**	50.33.420	38
100	20/40/40	1:2:2	JF440/100ER5MP8*	50.33.430	38
110	10/20/40	1:2:4	JF440/110ER11MP8**	50.33.440	39
120	20/20/40	1:1:2:2	JF440/120ER6MP8**	50.33.450	40



**MP4:** H=555, W=350, D=250, A1=323, A2=525  
**MP8:** H=750, W=550, D=250, A1=525, A2=723

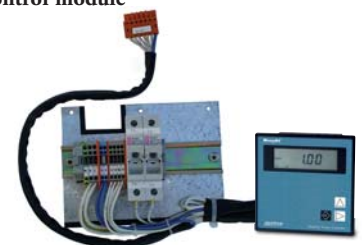
Capacitor Modules MO84					
Rated power kvar	Stage power kvar	Stage ratio	Type	Part no.	Weight kg
50	50		JF440/50EK1MO84	50.80.700	22
50	25/25	1:1	JF440/50/2EK2MO84	50.80.740	22
50	10/20/20	1:2:2	JF440/50/3EK5MO84	50.80.770	22
50	12/12/25	1:1:2	JF440/50/3/EK4MO84	50.80.774	22
60	20/40	1:2	JF440/60/2EK3MO84	50.80.775	23
60	10/10/20	1:1:2	JF440/60/4EK6MO84	50.80.776	23
75	25/50	1:2	JF440/75/2EK3MO84	50.80.800	24
75	25/25/25	1:1	JF440/75/3EK3MO84	50.80.810	24
75	12/12/25	1:1:2:2	JF440/75/4EK6MO84	50.80.811	24
80	40/40	1:1	JF440/80/2EK2MO84	50.80.835	24
80	20/20/40	1:1:2	JF440/80/3EK4MO84	50.80.837	24
100	50/50	1:1	JF440/100/2EK2MO84	50.80.875	25
100	25/25/50	1:1:2	JF440/100/3EK4MO84	50.80.880	25
100	25/25/25	1:1:1	JF440/100/4EK4MO84	50.80.900	25
100	20/40/40	1:2:2	JF440/100/3EK5MO84	50.80.902	25
100	12/12/25	1:1:2:4	JF440/100/4EK8MO84	50.80.903	25



**MO84:** H=330, B=703, T=333, A1=290, A2=14, A3=26.5

<b>Control module with Controller Prophi 3R,</b> Control fuses, transformer terminals and 3m connection cable (mounted on capacitor module)	50.80.002
<b>Control module with Controller Prophi 6R,</b> Control fuses, transformer terminals and 3m connection cable (mounted on capacitor module)	50.80.003
<b>Control module with Controller Prophi 12R,</b> Control fuses, transformer terminals and 3m connection cable (mounted on capacitor module)	50.80.004
<b>Accessories</b>	
Fixing bars for Rittal cabinets, left	29.12.435
Fixing bars for Rittal cabinets, right	29.12.436

## Control module

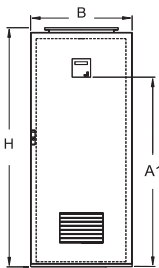


\*With controller Prophi 3R \*\*with controller Prophi 6R  
 Audio frequency rejection filters upon request

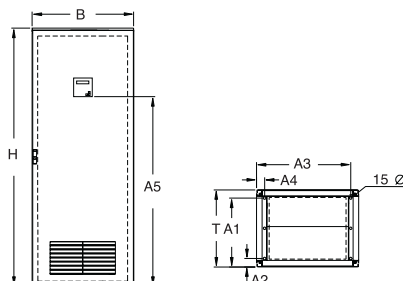
# Choked Power Factor Control Systems

Rated voltage: 400V, Capacitor voltage: 440V

Protection class: IP 32, 7%-chokes according to a resonance frequency of 189 Hz



**KB6825:** H=600, W=800, D=250, A1=410  
**KB6123:** H=600, W=1200, D=300, A1=655



**ES8206:** H=2020, W=800, D=600,  
 A1=537, A2=63, A3=737,  
 A4=62, A5=1480

Small Format KB6825, KB6123			W 600 x H 1200 x D 400 mm		
Rated power kvar	Stage power kvar	Stage ratio	Type	Part no.	Weight kg
15	5/10	1:2	JF440/15ER3KB6825FK7*	50.52.020	112
20	5/5/10	1:1:2	JF440/20ER4KB6825FK7*	50.52.040	113
25	5/10/10	1:2:2	JF440/25ER5KB6825FK7*	50.52.080	116
31	6,25/12,5	1:2:2	JF440/31/ER5KB6825FK7*	50.52.110	118
35	5/10/20	1:2:4	JF440/35ER7KB6123FK7*	50.52.150	122
43,75	6/12/25	1:2:4 ..	JF440/43,75ER7KB6123FK7*	50.52.180	138
50	10/20/20	1:2:2	JF440/50ER5KB6123FK7*	50.52.210	142
60	10/20/30	1:2:3	JF440/60ER6KB6123FK7*	50.52.225	158
75	12/25/37	1:2:3	JF440/75ER6KB6123FK7*	50.52.240	167

Slide-in construction ES8206FK7 W800 x H2000 x D600 mm (per housing)					
Rated power kvar	Stage power kvar	Stage ratio	Type	Part no.	Weight kg
60	10/20/30	1:2:3 ..	JF440/60ER6ES8206FK7 **	50.89.040	278
75	12/12/25	1:1:2 ..	JF440/75ER6ES8206FK7 **	50.89.080	278
100	25/25/50	1:1:2 ..	JF440/100ER4ES8206FK7 **	50.89.120	288
100	20/40/40	1:2:2	JF440/100/ER5ES8206FK7 **	50.89.160	288
100	12/12/25	1:1:2:4 ..	JF440/100ER8ES8206FK7 **	50.89.200	288
100	10/20/30/40	1:2:3:4	JF440/100ER10ES8206FK7 **	50.89.250	288
110	10/20/40	1:2:4 ..	JF440/110ER11ES8206FK7 **	50.89.280	329
120	20/20/40	1:1:2 ..	JF440/120ER6ES8206FK7 **	50.89.320	340
140	20/40/40	1:2:2 ..	JF440/140ER7ES8206FK7 **	50.89.360	361
150	25/25/50	1:1:2 ..	JF440/150ER6ES8206FK7 **	50.89.400	344
175	25/50/50	1:2:2 ..	JF440/175ER7ES8206FK7 **	50.89.440	367
200	50	1:1:1 ..	JF440/200ER4ES8206FK7 **	50.89.480	314
200	25/25	1:1:2 ..	JF440/200ER8ES8206FK7 **	50.89.520	314
200	12/12/25	1:1:2:4 ..	JF440/200ER16ES8206FK7 **	50.89.560	314
250	50	1:1:1 ..	JF440/250/ER5ES8206FK7 **	50.89.600	437
250	25/25/50	1:1:2 ..	JF440/250ER10ES8206FK7 **	50.89.640	437
300	50	1:1:1 ..	JF440/300ER6ES8206FK7 **	50.89.685	487
300	25/25/50	1:1:2 ..	JF440/300ER12ES8206FK7 ***	50.89.687	498
350	50	1:1:1 ..	JF440/350ER7ES8206FK7 ***	50.89.722	352/347
400	50	1:1:1 ..	JF440/400ER8ES8206FK7 ***	50.89.740	2x370
450	50	1:1:1 ..	JF440/450ER9ES8206FK7 ***	50.89.770	437/347
500	50	1:1:1 ..	JF440/500ER10ES8206FK7 ***	50.89.800	479/359
550	50	1:1:1 ..	JF440/550ER11ES8206FK7 ***	50.89.805	2x431
600	50	1:1:1 ..	JF440/600ER12ES8206FK7 ***	50.89.820	2x481

Accessories					
Socket 100mm high	SO 100/800/600	2903325 & 26	8		
Socket 200mm high	SO 200/800/600	2903327 & 19	15		

\*With power factor controller Prophi 3R \*\*with Prophi 6R \*\*\*with Prophi 12R  
 Expansion cabinets and other dimensions upon request  
 The above mentioned slide-in construction is available in 500mm depth as well  
 The systems can be delivered with a choke degree of 5.67% against additional price

# Power Factor Controlling Systems

## Choked Compensation Modules

Rated Voltage: 400V; 50Hz, Protection Class: IP00

Capacitor Voltage: 440V at 7% and 525V at 14%

Capacitor Modules MO86FK7 Width 800mm Depth 600mm					
Rated power kvar	Stage power kvar	Stage ratio	Type	Part no.	Weight kg
10	10		JF440/10EK1MO86FK7	50.88.650	24
12,5	12,5		JF440/12,5EK1MO86FK7	50.88.680	26
20	20		JF440/20EK1MO86FK7	50.88.710	33
25	25		JF440/25/EK1MO86FK7	50.88.740	33
40	40		JF440/40EK1MO86FK7	50.88.770	43
50	50		JF440/50EK1MO86FK7	50.88.800	45
20/2	10	1:1	JF440/20/2EK2MO86FK7	50.88.801	36
25/2	12,5	1:1	JF440/25/2EK2MO86FK7	50.88.830	38
30/2	10/20	1:2	JF440/30/2EK2MO86FK7	50.88.860	42
40/2	20	1:1	JF440/40/2EK2MO86FK7	50.88.890	55
40/3	10/10/20	1:1:2	JF440/40/3EK2MO86FK7	50.88.891	55
50/2	25	1:1	JF440/50/2EK2MO86FK7	50.88.930	56
75/2	25/50	1:2	JF440/75/2EK2MO86FK7	50.88.932	72
80/2	40	1:1	JF440/80/2EK2MO86FK7	50.88.933	72
100/2	50	1:1	JF440/100/2EK2MO86FK7	50.88.931	86

Capacitor Modules MO86FK14 Width 800mm Depth 600mm					
Rated power kvar	Stage power kvar	Stage ratio	Type	Part no.	Weight kg
10	10		JF525/10EK1MO86FK14	50.92.650	34
12,5	12,5		JF525/12,5EK1MO86FK14	50.92.680	35
20	20		JF525/20EK1MO86FK14	50.92.710	40
25	25		JF525/25EK1MO86FK14	50.92.740	40
40	40		JF525/40EK1MO86FK14	50.92.770	52
50	50		JF525/50EK1MO86FK14	50.92.800	54
20/2	10	1:1	JF525/20/2E2MO86FK14	50.92.803	53
25/2	12,5	1:1	JF525/25/2EK2MO86FK14	50.92.804	60
30/2	10/20	1:2	JF525/30/2EK2MO86FK14	50.92.849	45
40/2	20	1:1	JF525/40/2EK2MO86FK14	50.92.850	67
50/2	25	1:1	JF525/50/2EK2MO86FK14	50.92.890	69
75/2	25/50	1:2	JF525/75/2EK2MO86FK14	50.92.893	78
80/2	40	1:1	JF525/80/2EK2MO86FK14	50.92.896	78
100/2	50	1:1	JF525/100/2EK2MO86FK14	50.92.892	92

<b>Control module with Controller Prophi 3R,</b>	50.80.002
Control fuses, transformer terminals and 3m connection cable (mounted on capacitor module)	

<b>Control module with Controller Prophi 6R,</b>	50.80.003
Control fuses, transformer terminals and 3m connection cable (mounted on capacitor module)	

<b>Control module with Controller Prophi 12R,</b>	50.80.004
Control fuses, transformer terminals and 3m connection cable (mounted on capacitor module)	

Accessories	
Fixing bars for Rittal cabinets, left	29.12.435
Fixing bars for Rittal cabinets, right	29.12.436

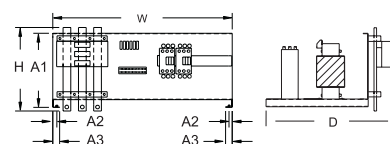
\*with power factor controller Prophi 6R \*\* with Prophi 12R  
The above mentioned modules (50.92.892 excepted) can be delivered in a depth of 500mm, other dimensions can be delivered upon request. The Modules can be delivered with a choke degree of 5.67% upon request.

\*1 Capacitor modules with thyristor switches upon request.

### M086FK7 / FK14

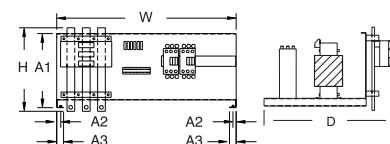


Cabinet depth 600mm



H=330, W=703, D=533, A1=290, A2=14, A3=26.5

Cabinet depth 500mm



H=330, W=703, D=433, A1=290, A2=14, A3=26.5

### Control module

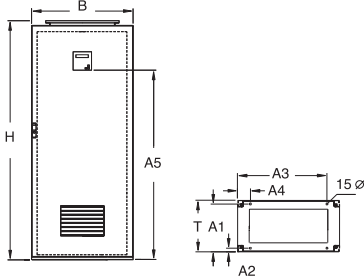


### M086FK7 / FK 14 Thy \*1



# Choked Power Factor Correction Systems

Rated Voltage: 400V, Capacitor Voltage: 525V, Protection Class: IP 32,  
14%-Chokes corresponding to a resonance frequency of 134Hz



**KB6825:** H=600, W=800, D=250, A1=410  
**KB6123:** H=600, W=1200, D=300, A1=655



**ES8206:** H=2020, W=800, D=600,  
A1=537, A2=63, A3=737,  
A4=62, A5=1480

Small Format KB6124FK14			W 600 x H 1200 x D 400 mm		
Rated power kvar	Stage power kvar	Stage ratio	Type	Part no.	Weight kg
15	5/10	1:2	JF525/15ER3KB6825FK14*	50.52.520	123
20	5/5/10	1:1:2	JF525/20ER4KB6825FK14*	50.52.540	124
25	5/10/10	1:2:2	JF525/25ER5KB6825FK14*	50.52.580	128
31	6,25/12,5	1:2:2	JF525/31/ER5KB6825FK14*	50.52.610	130
35	5/10/20	1:2:4	JF525/35ER7KB6123FK14*	50.52.650	134
43,75	6/12/25	1:2:4	JF525/43,75ER7KB6123FK14*	50.52.680	152
50	10/20/20	1:2:2	JF525/50ER5KB6123FK14*	50.52.710	173
60	10/20/30	1:2:3	JF525/60ER6KB6123FK14*	50.52.725	184
75	12/25/37	1:2:3	JF525/75ER6KB6123FK14*	50.52.729	195

### Slide-in construction ES8206FK14 W800 x H2000 x D600 mm (per housing)

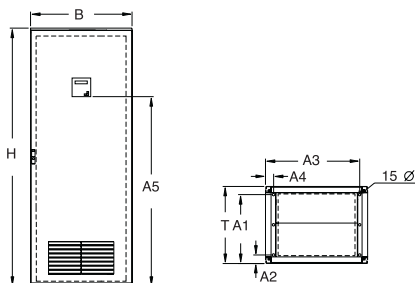
60	10/20/30	1:2:3	JF525/60ER6ES8206FK14**	50.93.040	317
75	12/12/25	1:1:2 ..	JF525/75ER6ES8206FK14**	50.93.080	318
100	25/25/50	1:1:1 ..	JF525/100ER4ES8206FK14**	50.93.120	368
100	20/40/40	1:2:2	JF525/100/ER5ES8206FK14**	50.93.160	413
100	12/12/25	1:1:2:4 ..	JF525/100ER8ES8206FK14**	50.93.200	380
100	10/20/30/40	1:2:3:4	JF525/100ER10ES8206FK14**	50.93.250	387
110	10/20/40	1:2:4:4	JF525/110ER11ES8206FK14**	50.93.280	397
120	20/20/40	1:1:2 ..	JF525/120ER6ES8206FK14**	50.93.320	379
140	20/40/40	1:2:2 ..	JF525/140ER7ES8206FK14**	50.93.360	400
150	25/25/50	1:1:2 ..	JF525/150ER6ES8206FK14**	50.93.400	375
175	25/50/50	1:2:2 ..	JF525/175ER7ES8206FK14**	50.93.440	407
200	50	1:1:1 ..	JF525/200ER4ES8206FK14**	50.93.480	420
200	25/25	1:1:2 ..	JF525/200ER8ES8206FK14**	50.93.520	421
200	12/12/25	1:1:2:4 ..	JF525/200ER16ES8206FK14**	50.93.560	371
250	50	1:1:1 ..	JF525/250/ER5ES8206FK14**	50.93.600	478
250	25/25/50	1:1:2 ..	JF525/250ER10ES8206FK14**	50.93.640	490
300	50	1:1:1 ..	JF525/300ER6ES8206FK14**	50.93.685	500
300	25/25/50	1:1:2 ..	JF525/300ER12ES8206FK14***	50.93.690	500
350	50	1:1:1 ..	JF525/350ER7ES8206FK14***	50.93.722	424/365
400	50	1:1:1 ..	JF525/400ER8ES8206FK14***	50.93.742	2x424
450	50	1:1:1 ..	JF525/450ER9ES8206FK14***	50.93.770	2x478
500	50	1:1:1 ..	JF525/500ER10ES8206FK14***	50.93.800	364/484
550	50	1:1:1 ..	JF525/550ER11ES8206FK14***	50.93.805	3x365
600	50	1:1:1 ..	JF525/600ER12ES8206FK14***	50.93.920	3x424

### Accessories

Socket 100mm high	SO 100/800/600	2903325 & 26	8
Socket 200mm high	SO 200/800/600	2903327 & 19	15

\*with power factor controller Prophi 3R \*\*with Prophi 6R \*\*\*with Prophi 12R  
Expansion cabinets or other dimensions upon request

The combined filtering system 14/5,67% is available under the type description FKK instead of FK14.



# Power Factor Controlling Systems

## Unchoked AC Power Capacitors In Delta Connection with Discharge Resistors

Protection Class: IP00; Connection: AMP Plug W6,3xH8mm

Ambient Temperature: -10 up to +60°C, Fixing Bolts: M12x12mm; Frequency: 50Hz

Rated power in kvar at a voltage of:	Type					Part no.	Capacity in $\mu\text{F}$ +10% -5%	Dimensions	Weight kg
	400V	415V	440V	480V	525V				
2,4	2,6	2,9	3,5	4,17	LKT5,8-620-D52	19.02.575	3x16	D60xH225mm	0,71
2,5	2,7	3,0	3,6	4,3	LKT4,3-525-D52	19.02.505	3x16,6	D60xH150mm	0,48
4,8	5,2	5,8	7	8,33	LKT9,8-570-D52	19.02.549	3x32	D70xH225mm	0,93
5	5,4	6	7,2	8,6	LKT8,6-525-D52	19.02.510	3x33,2	D60xH225mm	0,77
5,8	6,3	7	8,33	10	LKT10-525-D52	19.02.550	3x38,5	D70xH225mm	0,80
6,25	6,8	7,6	-	-	LKT7,6-440-D52	19.02.511	3x41,7	D60xH225mm	0,69
7,2	7,8	8,7	10,5	12,5	LKT12,5-525-D52	19.02.580	3x47,9	D70xH225mm	1,13
7,5	8,1	9,1	-	-	LKT9,1-440-D52	19.02.515	3x49,9	D60xH225mm	0,71
3,5	3,77	4,17	5	5,9	LKT8,0-610-D52	19.02.570	3x22	D60xH225mm	0,75
9,3	10	11,2	-	-	LKT11,2-440-D52	19.02.519	3x61,4	D70xH225mm	1,10
10	10,8	12,1	-	-	LKT12,1-440-D52	19.02.520	3x66,3	D70xH253mm	1,04
12,5	13,4	15,1	-	-	LKT15,1-440-D52	19.02.525	3x82,9	D70xH293mm	1,03
Protective cover with cable inlet, Height +77mm					SK60	19.02.620	For capacitors of a diameter of 60mm		
Protective cover with cable inlet, Height +75mm					SK70	19.02.621	For capacitors of a diameter of 70mm		
Joint part for MKP capacitors, Height +22mm					ASS	19.02.610			

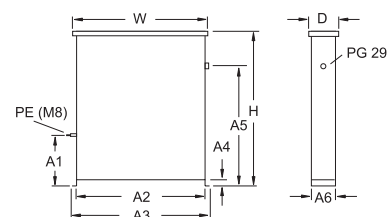


## Unchoked AC Power Capacitors

Protection Class: IP53, Rated Voltage: 400V/50Hz, Capacitor Voltage: 440V/50Hz

Power Capacitors LK-440 V			
Rated power kvar	Type	Part no.	Weight kg
2,5	JF440/2,5H/LK	50.61.000	5
5	JF440/5H/LK	50.61.050	5
8,3	JF440/8,3H/LK	50.61.100	7
10	JF440/10H/LK	50.61.150	8
12,5	JF440/12,5H/LK	50.61.200	8
15	JF440/15H/LK	50.61.250	9
16,7	JF440/16,7H/LK	50.61.300	9
20	JF440/20H/LK	50.61.350	10
25	JF440/25H/LK	50.61.400	10
30	JF440/30H/LK	50.61.450	15
33	JF440/33H/LK	50.61.600	15
40	JF440/40H/LK	50.61.650	19
50	JF440/50H/LK	50.61.700	19
60	JF440/60I/LK	50.61.750	20
70	JF440/70I/LK	50.61.780	20
75	JF440/75I/LK	50.61.820	20
80	JF440/80K/LK	50.61.860	21
90	JF440/90K/LK	50.61.900	21
100	JF440/100K/LK	50.61.945	21

Other voltage upon request (example 525V)



**Drawing H:** H=500, W=465, D=135, A1=120, A2=450, A3=500, A4=20, A5=395, A6=130

**Drawing I + K:** H=500, W=645, D=165, A1=120, A2=630, A3=680, A4=20, A5=395, A6=160

## Power Capacitors with filter chokes

Protection Class: IP32

Rated Voltage: 400V/50Hz

7%-Chokes corresponding to a resonance frequency of 189Hz.



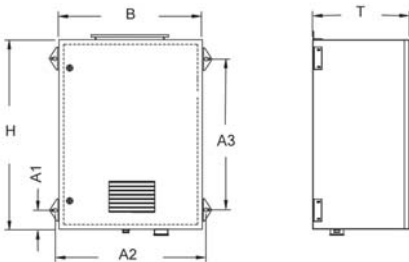
Power Capacitors LK-FK7			
Rated power kvar	Type	Part no.	Weight in kg
5	JF440/5LK-KB4-FK7	50.24.050	23
10	JF440/10LK-KB4-FK7	50.24.100	28
12,5	JF440/12,5LK-KB4-FK7	50.24.130	29
20	JF440/20LK-KB4-FK7	50.24.170	36
25	JF440/25LK-KB8-FK7	50.24.220	38
30	JF440/30LK-KB8-FK7	50.24.280	40
40	JF440/40LK-KB8-FK7	50.24.350	49
50	JF440/50LK-KB8-FK7	50.24.450	82

## Power Capacitors with filter chokes

Protection Class: IP32

Rated Voltage: 400V/50Hz

14%-Chokes corresponding to a resonance frequency of 134Hz.



KB4: H=600, W=400, D=250, A1=23, A2=430, A3=535

KB8: H=800, W=600, D=250, A1=23, A2=630, A3=735

Power Capacitors LK-FK14			
Rated power kvar	Type	Part no.	Weight kg
5	JF525/5LK-KB4-FK14	50.25.050	24
10	JF525/10LK-KB4-FK14	50.25.100	29
12,5	JF525/12,5LK-KB4-FK14	50.25.130	30
20	JF525/20LK-KB8-FK14	50.25.170	37
25	JF525/25LK-KB8-FK14	50.25.220	39
30	JF525/30LK-KB8-FK14	50.25.280	51
40	JF525/40LK-KB8-FK14	50.25.350	63
50	JF525/50LK-KB8-FK14	50.25.420	83

Other choke degrees and insertion of a fuse breaker upon request

# Connection diameters and fuses

## Selection table for feeding cables and fuses

Rated voltage: 400V, 50 Hz				Rated voltage: 525V, 50 Hz			Rated voltage: 525V, 50 Hz		
Power kvar	Rated current A	Fuse per phase	Feeding cable-diameter NYJ-J mm <sup>2</sup>	Rated current A	Fuse per phase	Feeding cable diameter NYJ-J mm <sup>2</sup>	Rated current A	Fuse per phase	Feeding cable diameter NYJ-J mm <sup>2</sup>
5	7	20	4x2,5	6	10	4x2,5	4	20	4x2,5
7,5	11	20	4x2,5	8	20	4x2,5	6	20	4x2,5
10	14	25	4x4	11	20	4x2,5	8	20	4x2,5
12,5	18	36	4x6	14	25	4x4	10	20	4x2,5
17,5	25	50	4x10	19	36	4x6	15	25	4x4
25	36	63	4x16	28	50	4x10	21	36	4x6
30	43	63	4x16	33	63	4x16	25	50	4x10
37,5	54	80	4x25	41	63	4x16	31	50	4x16
40	58	80	4x25	44	63	4x16	34	50	4x16
45	65	100	3x35/16	50	80	4x25	38	63	4x16
50	72	100	3x35/16	55	100	4x25	42	63	4x16
55	79	125	3x35/16	61	100	3x35/16	46	80	4x16
65	94	160	3x35/16	72	125	3x35/16	54	80	4x25
70	101	160	3x70/35	77	125	3x35/16	59	100	3x35/16
75	108	160	3x70/35	83	125	3x50/25	63	100	3x35/16
80	116	200	3x70/35	88	200	3x70/35	67	100	3x35/16
100	144	200	3x95/50	110	200	3x70/35	84	125	3x50/25
110	159	250	3x120/70	121	200	3x70/35	92	160	3x70/35
125	181	315	3x150/70	138	200	3x70/35	105	200	3x70/35
150	217	315	3x185/95	165	250	3x120/70	126	200	3x70/35
160	231	400	2"3x95/50	176	315	3x150/70	134	200	3x70/35
175	253	400	2"3x95/50	193	315	3x150/70	147	250	3x120/70
200	289	400	2"3x120/70	220	400	2"3x95/50	168	250	3x120/70
225	325	500	2"3x120/70	248	400	2"3x95/50	188	315	3x120/70
250	361	500	2"3x150/70	275	400	2"3x120/70	209	315	3x185/95
275	397	630	2"3x185/95	303	500	2"3x120/70	230	400	2"3x95/50
300	433	630	2"3x185/95	330	500	2"3x150/70	251	400	2"3x95/50

**Note:**

- 1.) This table is valid for unchoked and choked compensation systems.
- 2.) The feeding cables are based on PVC-three phase cables with copper conductor and free laying in air at ambient temperature of +35°.
- 3.) In case of differs, the respective regulations ( DIN VDE 0298 part 2) have to be respected. Compensation systems with a power over 300kvar have two separated busbars and require two separated feedings.

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Representative