

The C Module - a highlight for the switchgear designer

The universal solution for all switchgear systems



Decisive advantages

- Compact compensation module
 - Ideal for mounting in all common switchgear systems
- High performance in the smallest possible space
 - Up to 100 kVAr for each module, optionally choked or unchoked
- Up to 4 modules per cabinet
 - Supplying 400 kVAr even with 7% detuned reactors
- Expandable
 - Power ratings 6.25; 12.5; 25 and 50 kVAr
- Easy to service with a common bus bar
 - Upright bus bar and NH fuse elements. No special cable required between the individual modules for systems with two or more units

Design

Mounted and fully-wired galvanized sheet steel chassis consisting of:

- Self-healing power capacitors with a low-loss polypropylene foil dielectric and PCB-free filler, type LKT with discharge resistors acc. to DIN VDE 0560 Parts 46 and 47, EN 60831-1 and 2 as well as IEC 831-1 and -2.
- Capacitor contactors with leading resistor contacts attenuate current peaks
- Common mounting rail with locking elements
- Fuse elements, 3-pin, NH00
- low-loss filter reactors with temperature switches for the following series resonance frequencies:

Version	Series resonance frequency	Detuning factor	For mains with utility audiofrequency ¹⁾
-P1	136 Hz	p = 13.5 %	≥ 166 Hz
-P8	177 Hz	p = 8 %	≥ 217 Hz
-P7	189 Hz	p = 7 %	≥ 228 Hz
-P5	210 Hz	p = 5.67 %	≥ 270 Hz

¹⁾ Please observe any deviation from utility company requirements.

In addition, also note version specifications given in our Manual of Power Factor Correction.

Quick mounting with multifunctional rails

When designing this series, special attention was given to the simplest way of installing modules in all commonly used switchgear systems. The mounting rails used (shown in grey in the dimensional sketch) can be supplied as an optional accessory. These replace the time-consuming work of installation and drilling. Only the control unit cutout and ventilation holes are required. Once the rails are mounted, the modules are simply inserted and firmly attached by two screws - it couldn't be simpler!

Connection

The cable is connected directly to the busbar. A connecting bracket CU-AW 1 can be supplied as an accessory for vertical connection.

Ideal for all common switchgear systems, e.g.

MT-C8-...	Cabinet type
ABB	MNS
ELEK	Unistar
Hensel	SAS 2008
Moeller	Modan, IVS, ID, GU
Mona	Mona 5000
Rittal	TS8, ES, PS
Siemens	SIKUS, Sivacon, 8MF, 8PU
Striebel & John	XA

Accessories / Options

- Complete power factor control relay package
STR-RM 8406, STR-RM 9606, STR-RM 9612 or **STR-EMR 1100**
- Control cables from the control terminal strip to the module are included with delivery together with pin connections
- Mounting plate **SB-C8**
- Module rails **MT-C8-...-cabinet depth** (see table)
- Bus connection bracket set **CU AW-1**
- Fan package **LP-LSFD**
- NH isolating switch instead of NH fuse elements for group protection type designation: **-SLT**
- Version without filter reactors, for future add-ons, type designation: **-PX** (instead of -P7 or other)

Capacitor Modules Type C

The universal solution for every type of switchgear system

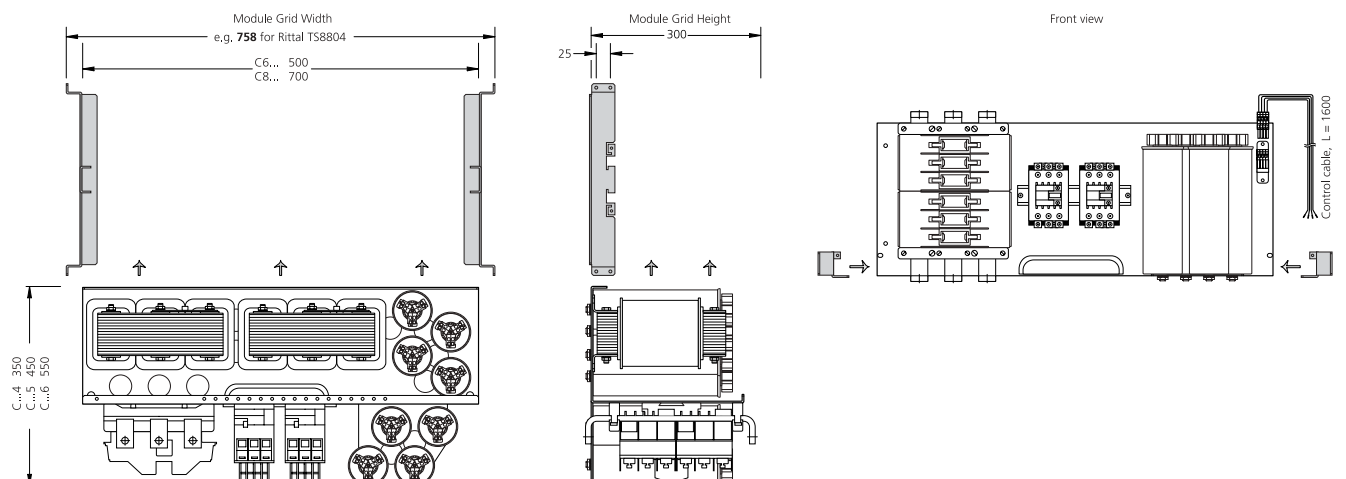


Design	Sheet steel chassis with premounted capacitors, fuses and contactors	Air humidity	max. 90 %, no condensation
Nominal voltage	min 440 V / 50 Hz	Discharge	With discharge resistors acc. to VDE 0560, Part 46
Nominal power	see table (at 400 V mains voltage)	Power loss	Capacitors: 0.5 W / kVAr
International protection	IP 00 acc. to DIN 40 050, for control cabinet mounting	Standards	acc. to VDE 0560 Parts 46 and 47, EN 60831-1 and -2 together with IEC 831-1 and -2, VDE 0660 Part 500 and EN 60439-1 with type test TSK
Ambient temperature	-5 ° to +60 °C acc. to DIN VDE 0660 Part 500 Sect. 6.1.1.1 (when assembled)	Nominal capacity determination	see FRAKO Manual of Power Factor Correction

Minimum nominal voltage of capacitors 440 V / 50 Hz · **Nominal capacity at 400 V / 50 Hz mains voltage** · other voltages on request

Nominal capacity	Step rating	Switching sequence	Type and order designation	Type and order designation
kVAr	kVAr		For enclosure min. (WxD): 600x400mm	For housing min. (WxD): 800x400mm
25	3.13	1:1:2:4	C64C 25- 3.13 -211 -400	C84C 25- 3.13- 211 -400
25	6.25	1:1:2	C64C 25- 6.25-21 -400	C84C 25- 6.25- 21 -400
25	12.5	1:1	C64C 25- 12.5-2 -400	C84C 25- 12.5- 2 -400
25	25	1	C64C 25- 25- 1 -400	C84C 25- 25- 1 -400
31.25	6.25	1:2:2	C64C 31.25- 6.25-12 -400	C84C 31.25- 6.25- 12 -400
34.38	3.13	1:2:4...	C64C 34.38- 3.13-112 -400	C84C 34.38- 3.13- 112 -400
37.5	6.25	1:1:2...	C64C 37.5- 6.25-22 -400	C84C 37.5- 6.25- 22 -400
37.5	12.5	1:2	C64C 37.5- 12.5-11 -400	C84C 37.5- 12.5- 11 -400
43.75	6.25	1:2:4	C64C 43.75- 6.25-111 -400	C84C 43.75- 6.25- 111 -400
46.88	3.13	1:2:4:8	C64C 46.88- 3.13-1111 -400	C84C 46.88- 3.13- 1111 -400
50	3.13	1:1:2:4:8	C64C 50- 3.13-2111 -400	C84C 50- 3.13- 2111 -400
50	6.25	1:1:2:4	C64C 50- 6.25-211 -400	C84C 50- 6.25- 211 -400
50	12.5	1:1:2	C64C 50- 12.5-21 -400	C84C 50- 12.5- 21 -400
50	25	1:1	C64C 50- 25- 2 -400	C84C 50- 25- 2 -400
50	50	1	C64C 50- 50- 1 -400	C84C 50- 50- 1 -400
62.5	12.5	1:2:2	C64C 62.5- 12.5-12 -400	C84C 62.5- 12.5- 12 -400
68.75	6.25	1:2:4...	C64C 68.75- 6.25-112 -400	C84C 68.75- 6.25- 112 -400
75	12.5	1:1:2...	C64C 75- 12.5-22 -400	C84C 75- 12.5- 22 -400
75	25	1:2	C64C 75- 25- 11 -400	C84C 75- 25- 11 -400
87.5	12.5	1:2:4	C64C 87.5- 12.5-111 -400	C84C 87.5- 12.5- 111 -400
93.75	6.25	1:2:4:8	C64C 93.75- 6.25-1111 -400	C84C 93.75- 6.25- 1111 -400
100	12.5	1:1:2:4	C64C 100- 12.5-211 -400	C84C 100- 12.5- 211 -400
100	25	1:1:2	C64C 100- 25- 21 -400	C84C 100- 25- 21 -400
100	50	1:1	C64C 100- 50- 2 -400	C84C 100- 50- 2 -400

Dimensional sketch



Capacitor/Reactor Modules Type C

The universal solution for every type of switchgear system



Design	Sheet steel chassis with premounted capacitors, filter reactors, fuses and contactors	Discharge	With discharge resistors acc. to VDE 0560, Part 46
Nominal voltage	min. 440 V / 50 Hz	Power loss	Capacitors: 0.5 W / kVAr Filter reactors: 3.5-6 W/kVAr (depending on version and harmonic distortion)
Nominal power	see table (at 400 V mains voltage)	Standards	acc. to VDE 0560 Parts 46 and 47, EN 60831-1 and -2 as well as IEC 831-1 and -2, VDE 0660 Part 500 and EN 60439-1 with type test TSK
International protection	IP 00 acc. to DIN 40 050, for cabinet mounting	Nominal capacity determination	see FRAKO Manual of Power Factor Correction
Ambient temperature	-5 ° to +60 °C acc. to DIN VDE 0660 Part 500 Sect. 6.1.1.1 (when assembled)		
Air humidity	max. 90 %, no condensation		

Minimum nominal voltage of capacitors 440 V / 50 Hz · **Nominal capacity at 400 V / 50 Hz mains voltage** · other voltages on request

Nominal capacity	Step rating	Switching sequence	Type and order designation	Nom. voltage of capacitors min. /...V at 50Hz Version with resonance frequency			
kVAr	kVAr		For enclosure min. (WxD): 600x400mm	210	189	177	136
25	3.13	1:1:2:4	C64D 25- 3.13- 211 -400	-P5	-P7	-P8	
25	6.25	1:1:2	C64D 25- 6.25- 21 -400	-P5	-P7	-P8	-P1
25	12.5	1:1	C64D 25- 12.5- 2 -400	-P5	-P7	-P8	-P1
25	25	1	C64D 25- 25- 1 -400	-P5	-P7	-P8	-P1
31.25	6.25	1:2:2	C64D 31.25- 6.25- 12 -400	-P5	-P7	-P8	
37.5	12.5	1:2	C64D 37.5- 12.5- 11 -400	-P5	-P7	-P8	
43.75	6.25	1:2:4	C64D 43.75- 6.25- 111 -400	-P5	-P7	-P8	
50	12.5	1:1:2	C64D 50- 12.5- 21 -400	-P5	-P7	-P8	
50	25	1:1	C64D 50- 25- 2 -400	-P5	-P7	-P8	
50	50	1	C64D 50- 50- 1 -400	-P5	-P7	-P8	-P1
75	25	1:2	C65D 75- 25- 11 -400	-P5¹⁾	-P7¹⁾	-P8¹⁾	
100	12.5	1:1:2:4	C66D 100- 12.5- 211 -400	-P5²⁾	-P7²⁾	-P8²⁾	
100	25	1:1:2	C66D 100- 25- 21 -400	-P5²⁾	-P7²⁾	-P8²⁾	
100	50	1:1	C66D 100- 50- 2 -400	-P5²⁾	-P7²⁾	-P8²⁾	-P1²⁾
For enclosure min. (WxD): 800x400mm							
25	3.13	1:1:2:4	C84D 25- 3.13- 211 -400	-P5	-P7	-P8	
25	6.25	1:1:2	C84D 25- 6.25- 21 -400	-P5	-P7	-P8	-P1
25	12.5	1:1	C84D 25- 12.5- 2 -400	-P5	-P7	-P8	-P1
25	25	1	C84D 25- 25- 1 -400	-P5	-P7	-P8	-P1
31.25	6.25	1:2:2	C84D 31.25- 6.25- 12 -400	-P5	-P7	-P8	-P1
34.38	3.13	1:2:4...	C84D 34.38- 3.13- 112 -400	-P5	-P7	-P8	
37.5	6.25	1:1:2...	C84D 37.5- 6.25- 22 -400	-P5	-P7	-P8	-P1
37.5	12.5	1:2	C84D 37.5- 12.5- 11 -400	-P5	-P7	-P8	-P1
43.75	6.25	1:2:4	C84D 43.75- 6.25- 111 -400	-P5	-P7	-P8	-P1
46.88	3.13	1:2:4:8	C84D 46.88- 3.13- 1111 -400	-P5	-P7	-P8	
50	6.25	1:1:2:4	C84D 50- 6.25- 211 -400	-P5	-P7	-P8	
50	12.5	1:1:2	C84D 50- 12.5- 21 -400	-P5	-P7	-P8	-P1
50	25	1:1	C84D 50- 25- 2 -400	-P5	-P7	-P8	-P1
50	50	1	C84D 50- 50- 1 -400	-P5	-P7	-P8	-P1
62.5	12.5	1:2:2	C84D 62.5- 12.5- 12 -400	-P5	-P7	-P8	
68.75	6.25	1:2:4...	C84D 68.75- 6.25- 112 -400	-P5	-P7	-P8	
75	12.5	1:1:2...	C84D 75- 12.5- 22 -400	-P5	-P7	-P8	
75	25	1:2	C84D 75- 25- 11 -400	-P5	-P7	-P8	-P1
87.5	12.5	1:2:4	C84D 87.5- 12.5- 111 -400	-P5	-P7	-P8	
100	25	1:1:2	C84D 100- 25- 21 -400	-P5	-P7	-P8	
100	50	1:1	C84D 100- 50- 2 -400	-P5	-P7	-P8	
100	50	1:1	C85D 100- 50- 2 -400				-P1¹⁾

¹⁾ for enclosure depths 500 mm only

²⁾ for enclosure depths 600 mm only

Power Factor Correction Module Type C

The universal solution for every type of switchgear system



Application / Installation

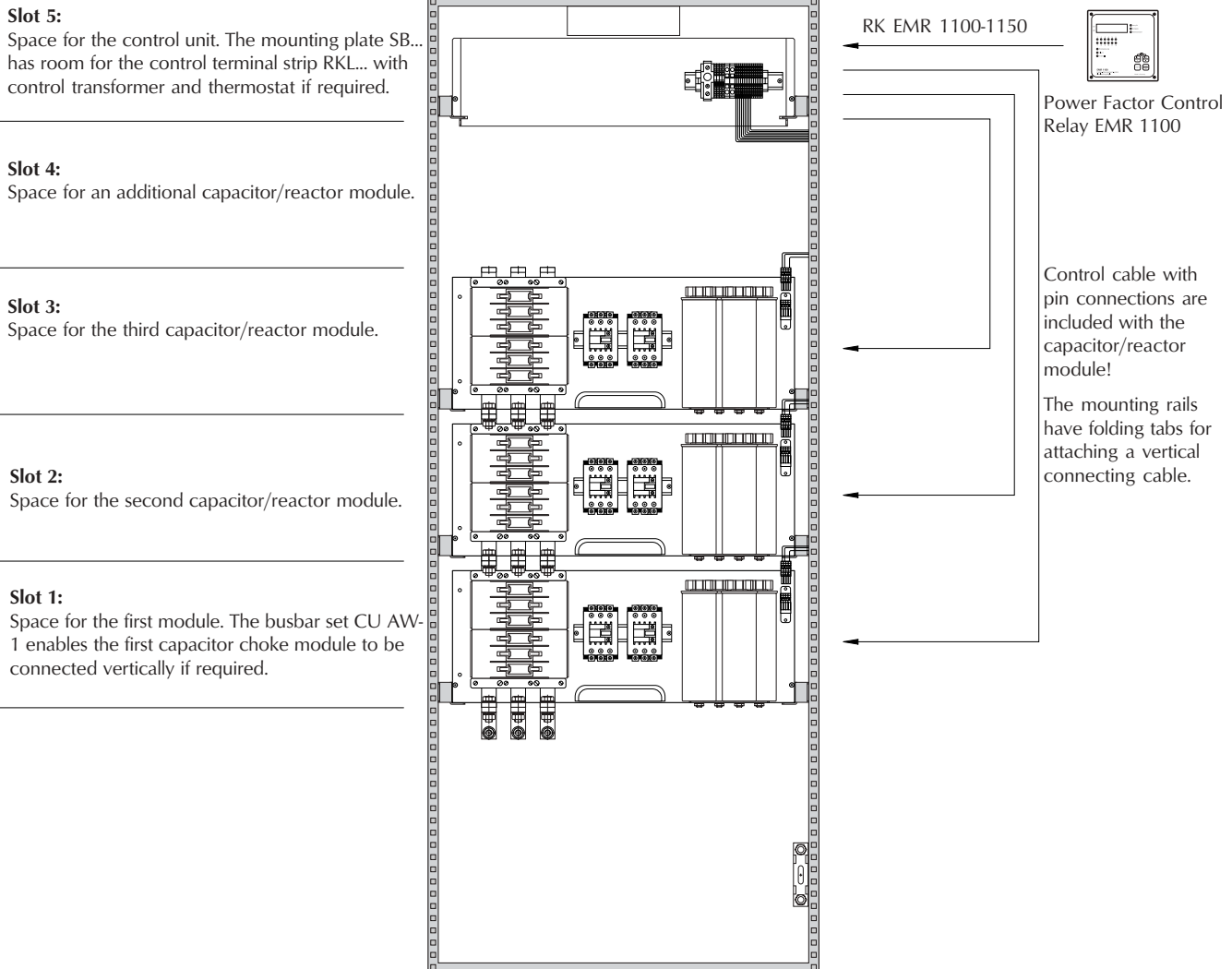
The Power Factor Correction Module Type C is the ideal answer for designing power factor correction systems. It can be choked or unchoked and reach a capacity of up to 400 kVAr per enclosure. The enclosure can be up to 2.000 mm high and **400 mm deep**. When installing several modules, they should be mounted first at the bottom, working upwards. This enables additional modules to be installed at a later date without disconnecting the cable. If the feed-in is at the top of the enclosure the modules should be mounted from top to bottom. Prewired control cabling can be used for connecting the power factor control relay to the control terminal strip and the individual modules. The mounting rails of the module have folding tabs to which a vertical connecting cable can be attached. To ensure that the system can be extended at a later date, the cable and its protective device as well as any audiofrequency rejector circuit required should be designed to meet the final specifications of the system.

Example

Design of a power factor correction system with reactors in an enclosure (Rittal TS8804) with dimensions 800x2000x400 mm (HxWxD), with a nominal capacity of 300 kVAr, with 6 steps each of 50 kVAr, Switching sequence 1:1:2...

Components required:

- 1 complete power factor control relay package **STR-EMR 1100**, consisting of EMR 1100, RKL-EMR 1100 and RK EMR 1100-1150
- 1 mounting plate **SB-C8**
- 3 capacitor choke modules **C84D 100-50-2-400-P...**
The control cable from the control terminal strip to the modules together with pin connections are included in delivery.
- 10 mounting rails **MT-C8-Rittal TS8-400**
- 1 connecting bracket set **CU AW-1**
- 1 fan package **LP-LSFC**
- 1 audiofrequency rejector circuit (optional) **C84T 300-400-T...**



Reliable energy solutions.

FRAKO Kondensatoren- und Anlagenbau GmbH
Tscheulinstr. 21a • D-79331 Teningen • Germany
Phone +49 7641/4 53-0 • Fax +49 7641/4 53-5 45
http://www.frako.de • E-Mail: info@frako.de

Your representative: