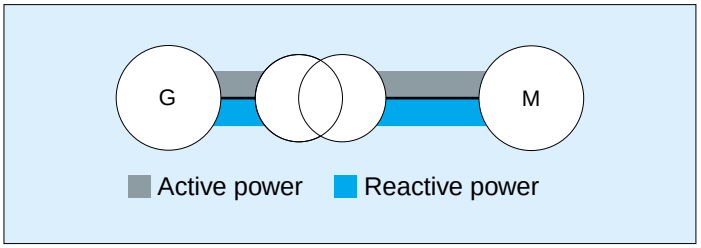
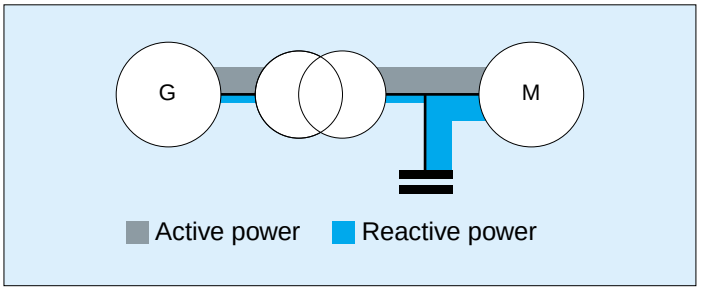
The power factor correction of electrical loads is a problem common to all industrial companies.
Every user which utilizes electrical power to obtain work in various forms continuously asks the mains to supply a certain quantity of active power, together with reactive power.
This reactive power is not transformed or used by the user, but the electricity supply company is forced to produce it, using generators, wires to carry and distribute it, transformers, switching gear, and so on.



The natural consequence is that the electricity supply company requires users to comply with a minimum power factor (cosø) below which a surcharge is imposed.



Moreover, the power factor correction can have other important results.

1) For any given Active Power (KW) the Apparent Power (KVA) is in reverse proportion to the cosø.

$$A = \frac{P}{\cos\phi}$$

Naturally, as the cosø increases, the size of the plant is reduced.

2) The Power Loss (Δp) on the line is given by:

$$\Delta p = K_1 \cdot \frac{1}{(\cos\phi)^2}$$

where K_1 is a ratio coefficient.
It is immediately clear that an increase in the cosø leads to a considerable reduction in the power loss (Joule effect), and so the plant will cost less and last longer.
3) VOLTAGE DROP (ΔV) on line is as follows:

$$\Delta V = K_2 \cdot \frac{1}{\cos\phi}$$

where K_2 is a proportionality factor.
This case too shows that an increase of cos reduces the on-line voltage drop, thus producing a better performance of the users since the voltage along the line is closer to the rated power.

A power factor correction system is properly dimensioned when both the quantitative and the qualitative aspects are considered. Thus, knowing the following items is necessary:
1) the power factor correction rate (kVAr) to be installed to eliminate surcharges, thanks to the consumption analysis;
2) ambient conditions as well as rating of the mains the condenser is going to operate on, in particular if any harmonics are present in the line.

Calculating of the kVAr required

Distributed power factor correction

1) Three-phase induction motor: it is one of the most commonly found loads.
In table 1 here below the power factor correction power required. The advantage is a power supply cable run by a lower current.

Tab. 1

THREE-PHASE INDUCTION MOTOR									
Rated power		2 poles 3000 rpm		4 poles 1500 rpm		6 poles 1000 rpm		8 poles 750 rpm	
HP	KW	operation	without load	operation	without load	operation	without load	operation	without load
5	**3.7**	1.7	2.2	1.9	2.5	2.1	2.8	2.6	3.4
7	**5.2**	2.3	3.0	2.5	3.4	2.8	3.7	3.3	4.4
10	**7.4**	3.0	4.4	3.6	4.8	4.1	5.4	4.6	6.1
15	**11.0**	5.0	6.5	5.5	7.2	6.0	8.0	7.0	9.0
30	**22.0**	10.0	12.5	11.0	13.5	12.0	15.0	13.0	16.0
50	**37.0**	18.0	24.0	20.0	27.0	22.0	30.0	26.0	34.0
100	**74.0**	28.0	45.0	32.0	49.0	37.0	54.0	41.0	60.0
150	**110.0**	40.0	64.0	46.0	70.0	52.0	76.0	58.0	85.0
200	**150.0**	50.0	81.0	58.0	89.0	65.0	95.0	73.0	105.0
250	**180.0**	60.0	98.0	72.0	105.0	82.0	115.0	92.0	130.0
350	**257.0**	70.0	113.0	80.0	120.0	90.0	130.0	100.0	140.0

For motors having wound rotor, these values should be increased by 5%.

2) Idle transformer losses: idle running of the MT/BT transformer, possible during the night or holidays, absorbs low cos power and needs to undergo power factor correction. The necessary power may be calculated from table 2 if the rated power of the transformer and its primary voltage are known.

Tab. 2

KVAR required for power factor correction of the losses without load of a MV/LV transformer		
Transformer power KVA	PRIMARY VOLTAGE	
	6 ÷ 15 kV	16 ÷ 30 kV
100	5	10
160	10	15
200	10	15
250	15	20
315	20	20
400	20	25
500	25	30
630	25	35
800	30	40
1000	40	50
1250	50	60
1600	70	80
2000	80	100

Centralised power factor correction

To achieve a precise calculation of the power factor correction needs for a system, the following items are needed: the maximum used power and the cos of the system; these values may be calculated from the invoices of the electricity supplier or by carrying out the necessary measurements. After calculating the cos value desired in the plant, by means of table 3 the coefficient K is determined: it is used to multiply the used kWs to calculate the power factor correction kVAr.

For example: a plant using P = 1000 kW with cosø = 0.70 requires power factor correction to cosø = 0.94. From the table 3 we obtain K = 0.66, and so the plant requires Q = 1000 x 0.66 = 660 kVAr, at the mains voltage.
If the power of the proposed power factor correction system refers to a voltage different from that of the mains, it should be accounted for by means of the following:

$$Q_{Vrif} = Q_{Vrete} \cdot \left(\frac{V_{rif}}{V_{rete}} \right)^2$$

For example: if the power of 660 kVAr amounts to 400V and the power factor correction proposed is 440V, at least the following will have to be considered:

$$660 \cdot \frac{440^2}{400^2} = 799\text{kVAr}$$

to compensate the load.

Tab. 3

K-Coefficient to calculate reactive power

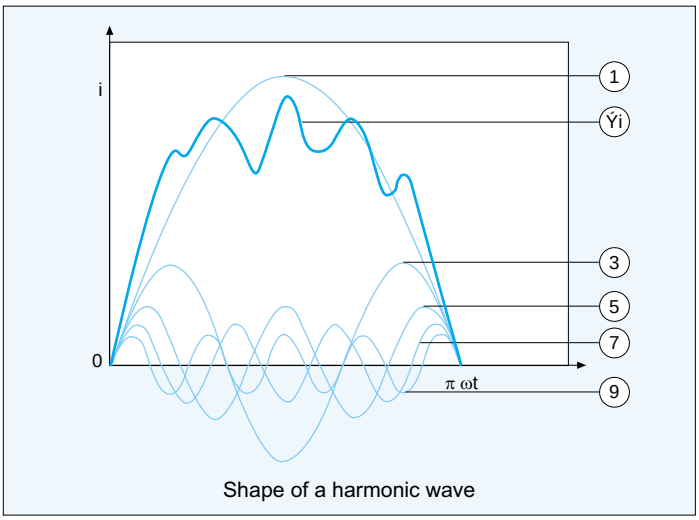
ER = Reactive Energy EA = Active Energy tanφ i = ER/EA		cosφ f values								
tanφi	cosφi	0.84	0.86	0.88	0.90	0.92	0.94	0.96	0.98	1.00
4.90	0.20	4.26	4.31	4.36	4.42	4.48	4.54	4.61	4.70	4.90
3.88	0.25	3.23	3.28	3.33	3.39	3.45	3.51	3.58	3.67	3.88
3.18	0.30	2.53	2.59	2.65	2.70	2.76	2.82	2.89	2.98	3.18
2.68	0.35	2.03	2.08	2.14	2.19	2.25	2.31	2.38	2.47	2.68
2.29	0.40	1.65	1.70	1.76	1.81	1.87	1.93	2.00	2.09	2.29
1.98	0.45	1.34	1.40	1.45	1.59	1.56	1.62	1.69	1.78	1.99
1.73	0.50	1.09	1.14	1.20	1.25	1.31	1.37	1.44	1.53	1.73
1.64	0.52	1.00	1.05	1.11	1.16	1.22	1.28	1.35	1.44	1.64
1.56	0.54	0.92	0.97	1.02	1.08	1.14	1.20	1.27	1.36	1.56
1.48	0.56	0.84	0.89	0.94	1.00	1.05	1.12	1.19	1.28	1.48
1.41	0.58	0.76	0.81	0.87	0.92	0.98	1.04	1.11	1.20	1.41
1.33	0.60	0.69	0.74	0.80	0.85	0.91	0.97	1.04	1.13	1.33
1.30	0.61	0.65	0.71	0.76	0.82	0.87	0.94	1.01	1.10	1.30
1.27	0.62	0.62	0.67	0.73	0.78	0.84	0.90	0.97	1.06	1.27
1.23	0.63	0.59	0.64	0.69	0.75	0.81	0.87	0.94	1.03	1.23
1.20	0.64	0.56	0.61	0.67	0.72	0.78	0.84	0.91	1.00	1.20
1.17	0.65	0.52	0.58	0.63	0.68	0.74	0.81	0.88	0.97	1.17
1.14	0.66	0.49	0.55	0.60	0.66	0.71	0.78	0.85	0.94	1.14
1.11	0.67	0.46	0.52	0.57	0.62	0.68	0.75	0.82	0.91	1.11
1.08	0.68	0.43	0.49	0.54	0.60	0.65	0.72	0.79	0.88	1.08
1.05	0.69	0.40	0.46	0.51	0.57	0.62	0.69	0.76	0.85	1.05
1.02	0.70	0.38	0.43	0.49	0.54	0.60	0.66	0.73	0.82	0.02
0.99	0.71	0.35	0.40	0.45	0.51	0.57	0.63	0.70	0.79	0.99
0.96	0.72	0.32	0.37	0.43	0.48	0.54	0.60	0.67	0.76	0.97
0.94	0.73	0.29	0.34	0.40	0.45	0.51	0.57	0.64	0.73	0.94
0.91	0.74	0.26	0.32	0.37	0.43	0.48	0.55	0.62	0.71	0.91
0.89	0.75	0.24	0.29	0.34	0.40	0.46	0.52	0.59	0.68	0.88
0.86	0.76	0.21	0.26	0.32	0.37	0.43	0.50	0.56	0.65	0.86
0.83	0.77	0.18	0.24	0.29	0.35	0.40	0.47	0.54	0.63	0.83
0.80	0.78	0.16	0.21	0.27	0.32	0.38	0.44	0.51	0.60	0.80
0.78	0.79	0.13	0.18	0.24	0.29	0.35	0.41	0.48	0.57	0.78
0.75	0.80	0.10	0.16	0.21	0.27	0.33	0.39	0.46	0.55	0.75
0.72	0.81	0.08	0.13	0.18	0.24	0.30	0.36	0.43	0.52	0.72
0.70	0.82	0.05	0.10	0.16	0.22	0.27	0.33	0.40	0.49	0.70
0.67	0.83	0.03	0.08	0.13	0.19	0.25	0.31	0.38	0.47	0.67
0.65	0.84	-	0.05	0.11	0.16	0.22	0.28	0.35	0.44	0.65
0.62	0.85	-	0.03	0.08	0.14	0.19	0.26	0.33	0.42	0.62
0.59	0.86	-	-	0.06	0.11	0.17	0.23	0.30	0.39	0.59
0.57	0.87	-	-	0.03	0.08	0.14	0.20	0.28	0.36	0.57
0.54	0.88	-	-	-	0.06	0.11	0.18	0.25	0.34	0.54
0.51	0.89	-	-	-	0.03	0.09	0.15	0.22	0.31	0.51
0.48	0.90	-	-	-	-	0.06	0.12	0.19	0.28	0.48
0.43	0.92	-	-	-	-	-	0.06	0.13	0.22	0.43
0.36	0.94	-	-	-	-	-	-	0.07	0.16	0.36

The problem of harmonics

Harmonics are produced by non linear loads, i.e.:

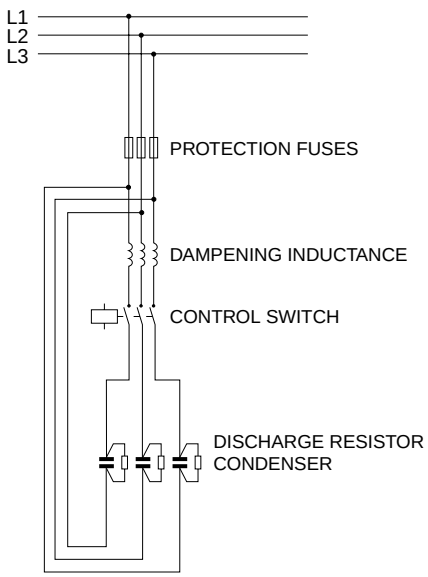
- office appliances (PCs, photocopy machines, etc.),
- gas discharge lamp,
- UPS,
- engines controlled by static converters,
- static converters,
- arch furnaces.

Harmonics produce a non-sinusoid voltage and current wave as shown in the picture below:

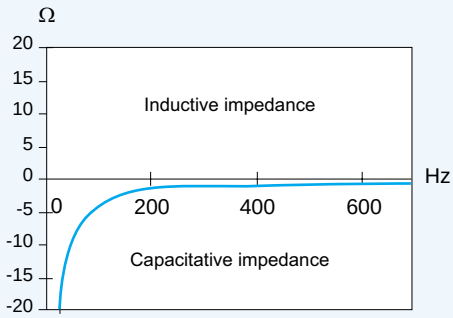


Shape of a harmonic wave

The harmonics created on line by non-linear loads overload the power factor correction condensers, the dimensions of which should be such as to effectively bear the added stress.



Standard battery wiring diagram

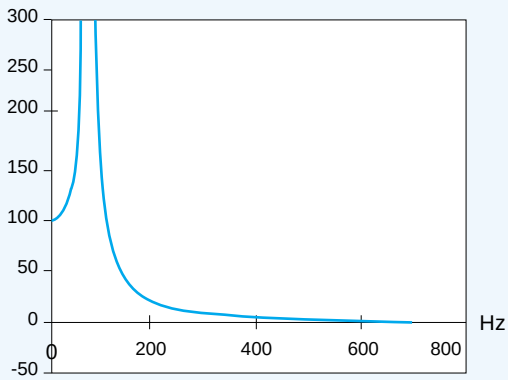


Impedance behaviour for a condenser bank in relation to the frequency

When on line distortion reaches high levels the danger of parallel resonances between power factor correction system and mains becomes apparent. I.e., a current may arise such as to seriously damage condensers and other on line appliances.
Knowing the short circuit power of the system (S in kVA) and the power factor correction condenser power (Q in kVAr), calculating the parallel resonance frequency is possible by means of the following:

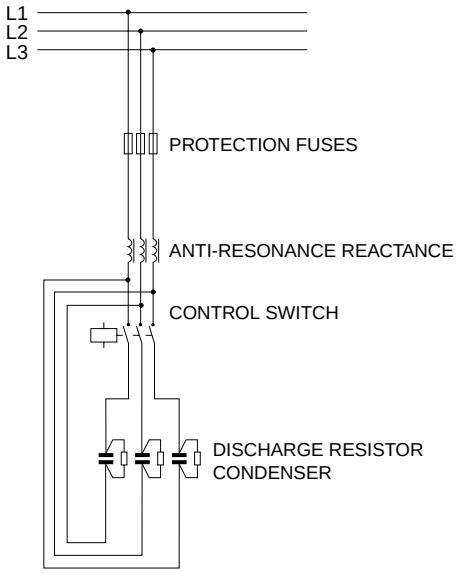
$$f_r = f_1 \cdot \sqrt{\frac{S}{Q}}$$

where fr and f_1 are the parallel resonance frequency and the fundamental frequency (50/60 Hz).
If the calculated frequency is near the frequency of a harmonic present in the system, a parallel resonance between condensers and system takes place according to the frequency of the harmonic.

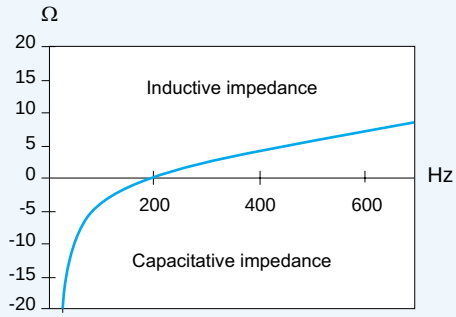


Resonance

To avoid this danger, there is a need to implement dedicated power factor correction systems including anti-resonance reactances.



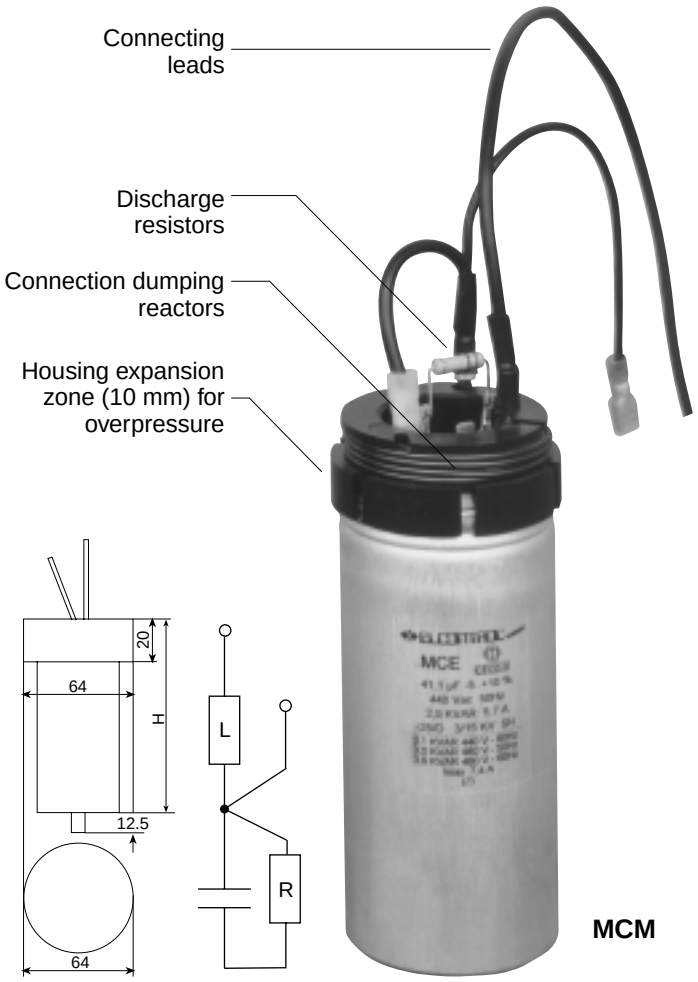
Wiring diagram of anti-resonance reactance battery



Behaviour of a condenser bank including an anti-resonance reactance in relation to the frequency

As shown in the picture above, in the case of frequencies higher than the reactance-condense frequency, the power factor correction bank is treated by the system as an inductance, thus eliminating the danger of a resonance within the distribution system.

MCE - MCM Single-phase Capacitors



MCM

Self-healing capacitors.
Low dielectric losses.
Easy heat dispersal.
Specifications constant over time.
Strict control of most sensitive processes (winding, sprying, impregnation).
Each capacitor is equipped with an overpressure circuit-breaker tripped in case of failures which cannot be repaired by self-healing (anti-explosion device).
Discharge resistor to reduce the capacitor's residual voltage to less than 75 Volts in 3 min. (CEI 33.5).
Connection dumping reactor to attenuate transient currents **(only MCM type)**.
Impregnated with a non-toxic, biodegradable substance.
Standard reference: CEI EN 60831/1-2, IEC 831/1-2 and VDE 560/4.
Parallel- and triangle-connected, mounted on bar hold, MCM and MCE capacitors can be used to build up the capacitive steps of any power factor correction bank with automatic regulation. In particular, they can be used as spares on ELCONTROL ENERGY equipments.

GENERAL SPECIFICATIONS

Rated frequency:	50Hz (60Hz on request)
Capacitance tolerance:	-5% +10%
Max. voltage:	1.1 Vn
Max. permitted current:	1.3 In
Dielectric:	Metal polypropilene
Dielectric losses:	-0.4 W/Kvar
Ambient temperature class:	-25/D (-25 +55°C)
Standard reference:	CEI EN 60831/1-2, IEC 831/1-2, VDE 560/4

TECHNICAL SPECIFICATIONS AND MODELS

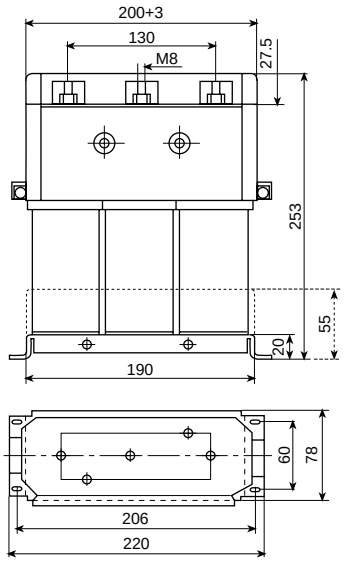
TYPE	Kvar	Vn	In (A)	Cn (uF)	Homologation	Dimensions (Øxh mm)	Tang	Weight (gr)
MCE 0.83-230	0.83	230	3.6	50	–	60x160	12 MA	388
MCM 0.83-230						64x160		530
MCE 1.67-230	1.67	230	7.3	100	–	60x160	12 MA	371
MCM 1.67-230						64x160		513
MCE 3.38-320	3.38	320	10.6	105	–	60x160	12 MA	380
MCM 3.38-320						64x160		522
MCE 0.83-400	0.83	400	2.1	16.5	IMQ	40x125	8 MA	141
MCM 0.83-400						64x125		283
MCE 1.67-400	1.67	400	4.1	33.3	IMQ	60x120	12 MA	275
MCM 1.67-400						64x120		417
MCE 3.33-400	3.33	400	8.3	66.6	IMQ	60x160	12 MA	385
MCM 3.33-400						64x160		527
MCE 0.83-440	0.83	440	1.9	13.7	IMQ	40x125	8 MA	125
MCM 0.83-440						64x125		267
MCE 1.67-440	1.67	440	3.8	27.4	IMQ	60x120	12 MA	243
MCM 1.67-440						64x120		385
MCE 3.33-440	3.33	440	7.6	54.8	IMQ	60x160	12 MA	390
MCM 3.33-440						64x160		501
MCE 3.00-480	3.00	480	6.2	41.1	IMQ	60x160	12 MA	385
MCM 3.00-480						64x160		525
MCE 3.70-480	3.70	480	7.7	51.3	IMQ	60x160	12 MA	390
MCM 3.7-480						64x160		500
MCE 3.33-550	3.33	550	6.1	35.1	IMQ	60x160	12 MA	363
MCM 3.33-550						64x160		505

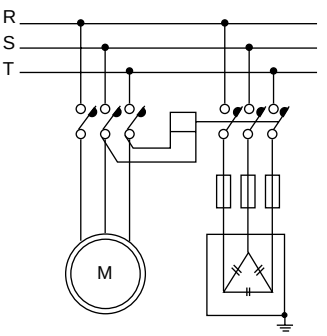
MCT Three-phase Capacitors

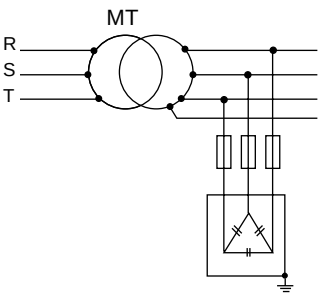
Capacitors for the fixed power factor connection of transformers or single motors, or for power factor correction with automatic regulation.
In addition to the features listed for MCM, the MCT three-phase capacitor is equipped with a plastic lid which covers the capacitor terminals in order to protect against accidental contacts (IP33 protection). MCT capacitors have IMQ approval.
Higher power capacitors (up to max. 25 kvar - 230V or 50 kvar - 400, 440, 550V), can be constructed by combining two or more MCT capacitors, which are parallel-connected using aluminium busbars (supplied in the kit).
The parallel connection bars are also protected by the lids of the individual MCT units.
Three-phase capacitor complete with support and mounting base and protective lid; 3 bars of parallel-connection of 2 MCTs; screws for connection of 2 adjacent bases if required; washer nuts for parallel connection.

GENERAL SPECIFICATIONS

Rated frequency:	50Hz (60Hz on request)
Capacitance tolerance:	-5% +10%
Max. voltage:	1.1 Vn
Max. permitted current:	1.3 In
Dielectric:	Polipropilene metallizzato
Dielectric losses:	-0,4W/Kvar
Ambient temperature class:	-25/D (-25 +55°C)
Standard reference:	CEI EN 60831/1-2, IEC 831/1-2, VDE 560/4







TECHNICAL SPECIFICATIONS AND MODELS

TYPE	Kvar	Vn	In (A)	Cn (uF)	Homologation	Weight (Kg)
MCT 2.5-230	2.5	230	6.3	3x50	–	2
MCT 5-230	5	230	12.6	3x100	–	2.3
MCT 5-400	5	400	7.2	3x33.3	IMQ	2
MCT 10-400	10	400	14.4	3x66.6	IMQ	2.3
MCT 5-440	5	440	6.6	3x27.4	IMQ	2
MCT 7.5-440	7.5	440	9.8	3x41.1	IMQ	2.3
MCT 10-440	10	440	13.1	3x54.8	IMQ	2.3
MCT 5-550	5	550	5.3	3x52.6	–	2.3
MCT 10-550	10	550	10.6	3x35.1	–	2.6

The metal ***structure*** is suitable for indoor installation in dust-free environments protected against accidental shock, heat sources and direct sunlight taking care that adequate ventilation is provided. IP30 protection class with closed doors. Colour RAL 7030. Reference ***standards*** CEI EN 60439-1, CEI 17/13-1 and IEC 439/1-2 where applicable. Power supply ***cables enter*** from above, to be connected directly to the terminals of the three-pole load break switch with door interlock. On the ***front of the panel*** a green lamp illuminates when the power supply is connected and a red lamp when the safety fuses have blown. ***Protection*** using triad of fuses with high breaking power complete with signalling device. Power factor correction ***banks*** in a single step constructed using self-healing, metal-coated polypropylene film capacitors impregnated with non-toxic, biodegradable liquid; each element is single-phase and is enclosed in a metal casing with overpressure device and discharge resistor. Class -25D. Complies with CEI EN 60831/1-2, IEC 831/1-2 and VDE 560/4 standards.
Ambient temperature must be between -25 °C and +40 °C, maximum relative humidity 90% at 20 °C and altitude less than 2000 m.

For networks at 230V - 50Hz

For loads with maximum current harmonic distortion 5%

TYPE	Power at 230V (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
STPF 5-230	5	12	350x185x535	8	40
STPF 10-230	10	25	350x185x535	11	40
STPF 15-230	15	37	350x185x535	15	63
STPF 20-230	20	50	385x260x660	19	80
STPF 30-230	30	75	385x260x660	23	125
QAMF 40-230	40	100	580x270x700	35	250
QAMF 50-230	50	125	580x270x1060	40	250
QAMF 60-230	60	150	580x270x1060	47	250
QAMF 80-230	80	200	580x270x1060	52	400
QAMF 100-230	100	250	580x270x1400	60	400

For loads with maximum current harmonic distortion 20%

TYPE	Power at 250V (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
STPF/R 6.25-250	6.25	13	350x185x535	10	40
STPF/R 12.5-250	12.5	26	350x185x535	12	40
STPF/R 18.75-250	18.75	40	350x185x535	14	63
STPF/R 25-250	25	52	385x260x660	18	80
STPF/R 37.5-250	37.5	80	385x260x660	22	125
QAMF/R 50-250	50	104	580x270x700	34	250
QAMF/R 62.5-250	62.5	132	580x270x1060	40	250
QAMF/R 75-250	75	160	580x270x1060	45	400
QAMF/R 100-250	100	208	580x270x1060	51	400
QAMF/R 125-250	125	264	580x270x1400	62	400

For networks at 400V - 50Hz

For loads with no harmonic content (...-400)

For loads with maximum current harmonic distortion 5% (...-440)

TYPE at 400V	TYPE at 440V	Power (kVAr)	Current type 400V (A)	Current type 440V (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
STPF 10-400	STPF 10-440	10	14	12	350x185x535	11	40
STPF 15-400	STPF 15-440	15	21	18	350x185x535	13	40
STPF 20-400	STPF 20-440	20	28	24	350x185x535	14	40
STPF 25-400	STPF 25-440	25	36	30	350x185x535	15	63
STPF 30-400	STPF 30-440	30	42	36	350x185x535	16	80
STPF 35-400	STPF 35-440	35	51	42	385x260x660	17	125
STPF 40-400	STPF 40-440	40	58	48	385x260x660	19	125
STPF 50-400	STPF 50-440	50	72	60	385x260x660	21	125
STPF 60-400	STPF 60-440	60	87	72	385x260x660	23	160
QAMF 70-400	QAMF 70-440	70	101	84	580x270x700	34	160
QAMF 80-400	QAMF 80-440	80	116	96	580x270x700	36	250
QAMF 100-400	QAMF 100-440	100	144	119	580x270x1060	40	250

For loads with maximum current harmonic distortion 20%

TYPE	Power at 440V (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
STPF/R 7.5-440	7.5	9	350x185x535	11	40
STPF/R 15-440	15	18	350x185x535	14	40
STPF/R 22.5-440	22.5	27	350x185x535	16	40
STPF/R 30-440	30	36	385x260x660	18	80
STPF/R 37.5-440	37.5	45	385x260x660	21	125
STPF/R 45-440	45	54	385x260x660	23	125
QAMF/R 52.5-440	52.5	63	580x270x700	39	125
QAMF/R 60-440	60	72	580x270x700	42	125
QAMF/R 75-440	75	89	580x270x1060	45	160
QAMF/R 90-440	90	107	580x270x1060	68	250
QAMF/R 105-440	105	125	580x270x1060	71	250

For loads with maximum current harmonic distortion 30%

TYPE	Power at 440V (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
STPF/S 13-440	13	15	350x185x535	14	40
STPF/S 20-440	20	24	350x185x535	16	40
STPF/S 30-440	30	36	385x260x660	21	80
STPF/S 40-440	40	48	385x260x660	23	80
QAMF/S 50-440	50	60	580x270x700	55	160
QAMF/S 60-440	60	72	580x270x1060	62	160
QAMF/S 80-440	80	95	580x270x1060	68	160
QAMF/S 100-440	100	119	580x270x1060	75	250

PFCD - PFR - PFRMD Automatic regulators

All regulators are able to carry on measurements in varmetric modality and are supplied with filter for cosfi regulation even in presence of high harmonic disturbance.
The TA to be used must have secondary of 5A.

CESI approved

PFCD

Automatic power factor regulator for DIN Rail mounting
Automatic or manual functionning.
Insertion time 30 sec, or 5 sec. on request.
LED Signalling of following functions: mains-on condition, inductive/capacitive load, bank of capacitors connected, overheating alarm with discharge of the batteries in case that the temperature is above 55 °C and automatic re-insertion at the minimum threshold of 45 °C. Sensitivity adjustment.
Cosø adjustment from 0.8 inductive to 0.9 capacitive.

CESI approved

PFR

Automatic power factor regulator in 144x144 dimensions
Automatic or manual functionning. LED Signalling of following functions: mains-on condition, inductive/capacitive load, bank of capacitors connected.
Cosfi adjustment from 0.8 inductive to 0.9 capacitive.

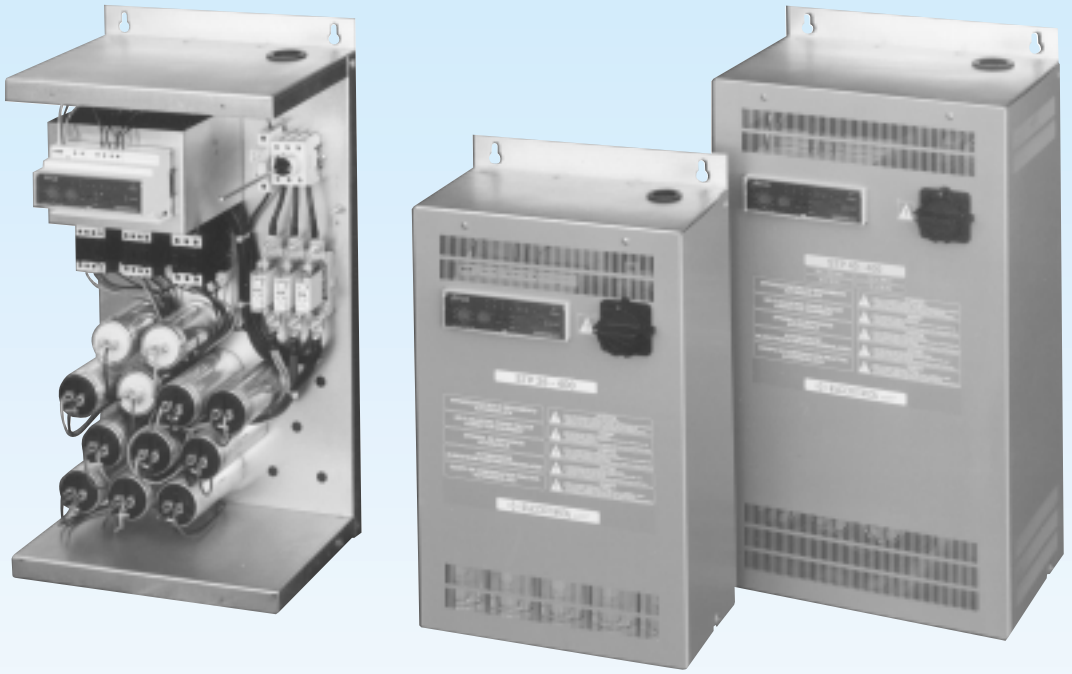
PFR-F	Insertion time from 6 to 30 sec.
PFR-FI	Insertion time from 6 to 30 sec. Indication of istantaneous cosfi through LED
PFR-T	Fixed insertion time at 30 sec.
PFR-TI	Fixed insertion time at 30 sec. Indication of istantaneous cosfi through LED
PFR-HTA	Fixed insertion time at 30 sec. Harmonic overload control device with LED indication and disconnection of the capacitor banks, automatic reconnection at preset threshold.

CESI approved

PFRMD

Microprocessor-based power factor regulator in 144x144 dimensions
Automatic or manual functionning. LED Signalling of following functions: mains-on condition, inductive/capacitive load, bank of capacitors connected, minimum and maximum temperature intervention, harmonic distortion, resonance control.
Management of display: cosø of the network, cosø selected, voltage, current, temperature. Automatic sensitivity adjustment.
Cosfi adjustment from 0.8 inductive to 0.9 capacitive.
Equalization of the number of step operations.
Additional alarms for: lack of P.F. correction, mains failure, weighting not possible, high applied voltage.
The model **PFRMD-OF** is equipped with a serial output for PC connection able to monitoring the network.

Further specifications are showed on the catalogue about automatic power factor regulators.



The ***structure*** is suitable for indoor installation in non-dusty environments, protected against accidental impacts, heat sources and direct sunlight, taking care that adequate ventilation is provided. Protection degree IP30 with doors closed. Colour RAL7030.
The metal structure is in pre-galvanized steel plate with removable plastic-coated steel plate front panel and safety screws. It is also equipped with air inlets for natural ventilation on front up to size 350x185x535 mm and also on the sides in size 385x260x660 mm.
The structure is wall-mounted using the brackets provided. Reference ***rules***: CEI EN 60439-1, CEI 17/13-1 and IEC 439/1-2 as far as applicable. ***Power supply cables*** enter from above and are directly connected to the terminals of the load break switch, which is of three-pole main switch type with door interlock and pre-opening limit stop. The ***regulator*** is PFCD series.
The capacitor ***banks*** are protected by HBC fuses.
Power factor correction banks on several steps, each controlled by a dedicated switch.
The capacitors are MCE series. The ***ambient service conditions*** must be: temperature between -25 °C and +40 °C, maximum relative humidity of 90% at 20 °C and altitude less than 2000 meters above sea level.

On request:
- **PFCD with battery insertion at 5 sec.**
- **Protection degree IP54.**

The ***structure*** is suitable for indoor installation in non-dusty environments, protected against accidental impacts, heat sources and direct sunlight, taking care that adequate ventilation is provided. Protection degree IP30 with doors closed. Colour RAL7030. The metal structure is in pre-galvanized steel plate with removable painted steel plate front panel and safety screws. It is also equipped with air inlets for natural ventilation (forced by means of a fan for h = 1400 mm) on cover and on sides. Reference ***rules***: CEI EN 60439-1, CEI 17/13-1 and IEC 439/1-2 as far as applicable.

The ***power supply*** is provided from above, directly to the terminals of the load break switch, which is of three-pole main switch type with door interlock and pre-opening limit stop. Power factor correction banks, with various steps, each controlled by a dedicated switch and including pre-switch coils. The ***regulator*** is PFCD series. The capacitor banks are ***protected*** by HBC fuses. The capacitors are MCE series. The ***ambient service conditions*** must be: temperature between -25 °C and +40 °C, maximum relative humidity of 90% at 20 °C and altitude less than 2000 meters above sea level.

On request:

- **PFCD with battery insertion at 5 sec.**
- **Protection degree IP54.**

The ***structure*** is suitable for indoor installation in non-dusty environments, protected against accidental impacts, heat sources and direct sunlight, taking care that adequate ventilation is provided. Protection degree IP30 with doors closed. Colour RAL7030.
The metal structure is in pressed steel plate for fixing to the floor, painted with dry-state epoxy resins after phosphating to prevent rust. Lifting eye-bolts are provided. Ventilation is by means of air intakes and fans controlled by temperature sensors. Reference ***rules***: CEI EN 60439-1, CEI 17/13-1 and IEC 439/1-2 as far as applicable. ***Cables enter*** from above for h=1500 mm, from below for h=2000 mm. They are directly connected to the terminals of the load break switch, which is of three-pole main switch type with door interlock and pre-opening limit stop. The ***regulator*** is PFR or PFRMD series. The capacitor banks are ***protected*** by HBC fuses. The capacitors are installed on plates which can be removed from the front of the panel, separate from the control and protective devices. Their feeding is implemented by means of non-insulated electrolytic copper bars with sharp edges, connected in series. Each battery is controlled by a dedicated switch, inductances are also present to limit switching current peaks. The capacitors are MCE series.
The ***ambient service conditions*** must be: temperature between -25 °C and +40 °C, maximum relative humidity of 90% at 20 °C and altitude less than 2000 meters above sea level.

On request:
- **Protection degree IP31, IP40, IP54.**
- **PFR regulator different from the standard one or PFRMD.**

For loads with maximum current harmonic distortion of 5%

TYPE	Power at 230V (kVAr)	Banks (kVAr)	Steps n. x kVAr	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
STP 10-230	10	2.5-2.5-5	4x2.5	25	350x185x535	13	40
STP 12.5-230	12.5	2.5-5-5	5x2.5	31	350x185x535	15	63
STP 17.5-230	17.5	2.5-5-10	7x2.5	44	385x260x660	19	80
STP 25-230	25	5-10-10	5x5	63	385x260x660	23	125
QAM 30-230	30	5-5-10-10	6x5	75	580x270x700	35	160
QAM 30-230/A60	30	5-5-10-10-10*-20* (ampli. with n. 1 M2 30-230)	6x5	75	580x270x1060	38	250
QAM 45-230	45	5-10-10-20	9x5	113	580x270x1060	42	160
QAM 60-230	60	10-10-20-20	6x10	150	580x270x1060	48	250
QAM 60-230/A80	60	10-10-20-20-20* (ampli. with n. 1 M1 20-230)	6x10	150	580x270x1400	55	400
QAM 75-230	75	5-10-20-20-20	15x5	188	580x270x1400	65	400
QAM 90-230	90	10-10-10-20-20-20	9x10	226	580x270x1400	71	400
ARCM 105-230	105	15-15-15-30-30	7x15	264	600x600x1500	145	400
ARCM 105-230/A165	105	15-15-15-30-30-60* (ampli. with n. 1 MR1 60-230)	7x15	264	600x600x1500	145	630
ARCM 120-230	120	15-15-30-30-30	8x15	301	600x600x1500	157	630
ARCM 120-230/A180	120	15-15-30-30-30-60* (ampli. with n. 1 MR1 60-230)	8x15	301	600x600x1500	157	630
ARCM 150-230	150	15-15-30-30-30-30	10x15	377	600x600x1500	188	630
ARCM 180-230	180	15-15-30-30-30-60	15x15	452	600x600x1500	200	630
ARCM 210-230	210	30-30-30-30-30-60	7x30	527	600x600x2000	234	800
ARCM 210-230/A270	210	30-30-30-30-30-60-60* (ampli. with n. 1 MR1 60-230)	7x30	527	600x600x2000	234	1000
ARCM 240-230	240	30-30-30-30-60-60	8x30	602	600x600x2000	267	1000
ARCM 270-230	270	30-30-30-60-60-60	9x30	678	600x600x2000	295	1250
ARCM 300-230	300	30-30-60-60-60-60	10x30	753	600x600x2000	313	1250
ARCM 360-230	360	30-30-60-60-60-120	12x30	904	1200x600x2000	445	1600
ARCM 360-230/A480	360	30-30-60-60-60-120-120* (ampli. with n. 2 MR1 60-230)	12x30	904	1200x600x2000	450	2000
ARCM 420-230	420	30-30-60-60-120-120	14x30	1055	1200x600x2000	480	1600
ARCM 480-230	480	30-30-60-120-120-120	16x30	1206	1200x600x2000	520	2000
ARCM 480-230/A600	480	30-30-60-120-120-120-120* (ampli. with n. 2 MR1 60-230)	16x30	1206	1200x600x2000	525	2500
ARCM 540-230	540	60-60-60-120-120-120	9x60	1357	1200x600x2000	560	2500
ARCM 600-230	600	60-60-120-120-120-120	10x60	1507	1200x600x2000	590	2500

Capacitors: MCExx-230
Standard regulator: PFR-T on ARCM, PFCD on STP and QAM

Modules for equipments expansion

TYPE THD <5%	Power at 230V (kVAr)	Banks (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)
M1 20-230	25	20	50	580x270x200	13
M2 30-230	30	10-20	75	580x270x200	18
MR1 60-230	60	60	150	520x520x240	25

Modules for equipments expansion

TYPE THD <20%	Power at 250V (kVAr)	Banks (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)
M1/R 25-250	25	25	53	580x270x200	13
MR1/R 50-250	50	50	106	520x520x240	24
MR1/R 75-250	75	75	160	520x520x240	25

Modules for equipments expansion

TYPE THD >20%	Power at 250V (kVAr)	Banks (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)
MR1/H 40-250	40	40	100	520x520x240	48

For loads with maximum current harmonic distortion of 20%

TYPE	Power at 250V (kVAr)	Banks (kVAr)	Steps n. x kVAr	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
QAM/R 37.5-250	37.5	12.5-12.5-12.5	3x12.5	79	580x270x700	35	160
QAM/R 62.5-250	62.5	12.5-25-25	5x12.5	133	580x270x1060	38	250
QAM/R 75-250	75	12.5-12.5-25-25	6x12.5	160	580x270x1060	42	250
QAM/R 75-250/A100	75	12.5-12.5-25-25-25* (ampli. with n. 1 M1/R 25-250)	6X12.5	160	580x270x1400	55	400
QAM/R 112.5-250	112.5	12.5-12.5-12.5-25-25-25	9x12.5	213	580x270x1400	65	400
ARCM/R 125-250	125	12.5-12.5-25-25-25-25	10x12.5	266	600x600x1500	145	400
ARCM/R 125-250/A175	125	12.5-12.5-25-25-25-25-50* (ampli. with n. 1 MR1/R 50-250)	10x12.5	266	600x600x1500	145	400
ARCM/R 150-250	150	12.5-12.5-25-25-25-50	12x12.5	319	600x600x1500	157	630
ARCM/R 175-250	175	25-25-25-50-50	7x25	372	600x600x1500	157	630
ARCM/R 200-250	200	25-25-25-25-50-50	8x25	425	600x600x1500	188	630
ARCM/R 225-250	225	37.5-37.5-37.5-37.5-37.5-37.5	6x37.5	479	600x600x2000	200	800
ARCM/R 262.5-250	262.5	37.5-37.5-37.5-37.5-37.5-75	7x37.5	558	600x600x2000	234	1000
ARCM/R 300-250	300	37.5-37.5-37.5-37.5-75-75	8x37.5	638	600x600x2000	267	1000
ARCM/R 300-250/A375	300	37.5-37.5-37.5-37.5-75-75-75* (ampli. with n. 1 MR1/R 75-250)	8x37.5	638	600x600x2000	270	1250
ARCM/R 375-250	375	37.5-37.5-75-75-75-75	10x37.5	798	600x600x2000	313	1250
ARCM/R 450-250	450	37.5-37.5-75-75-75-75-75	12x37.5	957	1200x600x2000	413	1600
ARCM/R 525-250	525	37.5-37.5-75-75-75-75-150	14x37.5	1117	1200x600x2000	445	2000
ARCM/R 600-250	600	37.5-37.5-75-75-75-150-150	16x37.5	1276	1200x600x2000	475	2000
ARCM/R 675-250	675	75-75-75-75-75-150-150	9x75	1436	1200x600x2000	503	2500
ARCM/R 750-250	750	75-75-75-75-150-150-150	10x75	1595	1200x600x2000	548	2500

Capacitors: MCE 3,38-320
Standard regulator: PFCD on QAM, PFR-T on ARCM

For loads with high harmonic distortion

TYPE	Power at 250V (kVAr)	Banks (kVAr)	Steps n° x kVAr	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
ARCM/H 80-250	80	20-20-40	4x20	201	600x600x1500	145	400
ARCM/H 80-250/A120	80	20-20-40-40* (ampli. with n. 1 MR1/H 40-250)	4x20	201	600x600x1500	145	630
ARCM/H 100-250	100	20-40-40	5x20	251	600x600x1500	157	400
ARCM/H 100-250/A140	100	20-40-40-40* (ampli. with n. 1 MR1/H 40-250)	5x20	251	600x600x1500	145	630
ARCM/H 140-250	140	20-40-40-40	7x20	351	600x600x1500	163	630
ARCM/H 160-250	160	20-20-40-40-40	8x20	402	600x600x1500	163	630
ARCM/H 200-250	200	20-20-40-40-80	10x20	502	600x600x2000	188	800
ARCM/H 240-250	240	20-20-40-80-80	12x20	602	1200x600x2000	267	1000
ARCM/H 240-250/A320	240	20-20-40-80-80-80* (ampli. with n. 2 MR1/H 40-250)	12x20	602	1200x600x2000	270	1250
ARCM/H 280-250	280	40-40-40-40-40-80	7x40	703	1200x600x2000	313	1250
ARCM/H 320-250	320	40-40-40-40-80-80	8x40	803	1200x600x2000	330	1250
ARCM/H 360-250	360	40-40-40-80-80-80	9x40	904	1200x600x2000	345	1600
ARCM/H 400-250	400	40-40-80-80-80-80	10x40	1004	1200x600x2000	360	1600
ARCM/H 440-250	440	40-80-80-80-80-80	11x40	1104	1200x600x2000	378	2000

Capacitors: MCE 3,38-320
Antiresonance reactance: L-C tuning frequency 189 Hz with three-phase capacitors in core consisting of low-loss sheets with oriented cristals and high linearity
Standard regulator: PFRMD

For loads with maximum current harmonic distortion of - 5%

TYPE	Power at 440V (kVAr)	Banks (kVAr)	Steps n. x kVAr	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
STP 10-440	10	2.5-2.5-5	4x2.5	14	350x185x535	13	40
STP 12.5-440	12.5	2.5-5-5	5x2.5	18	350x185x535	14	40
STP 17.5-440	17.5	2.5-5-10	7x2.5	25	350x185x535	15	40
STP 25-440	25	5-10-10	5x5	37	350x185x535	16	63
STP 35-440	35	5-10-20	7x5	51	385x260x660	19	80
STP 40-440	40	10-10-20	4x10	58	385x260x660	21	125
STP 50-440	50	10-20-20	5x20	72	385x260x660	23	125
QAM 60-440	60	10-10-20-20	6x10	87	580x270x700	37	160
QAM 60-440/A120	60	10-10-20-20-20*-40* (ampli. with n. 1 M2 60-440)	6x10	87	580x270x1060	40	250
QAM 80-440	80	10-10-20-40	8x10	115	580x270x1060	42	160
QAM 80-440/A120	80	10-10-20-40-40* (ampli. with n. 1 M1 40-440)	8x10	115	580x270x1400	51	250
QAM 100-440	100	20-20-20-40	5x20	144	580x270x1060	48	250
QAM 100-440/A140	100	20-20-20-40-40* (ampli. with n. 1 M1 40-440)	5x20	144	580x270x1400	51	400
QAM 120-440	120	20-20-40-40	6x20	173	580x270x1060	54	250
QAM 120-440/A160	120	20-20-40-40-40* (ampli. with n. 1 M1 40-440)	6x20	173	580x270x1400	58	400
QAM 140-440	140	20-20-20-40-40	7x20	201	580x270x1400	61	400
QAM 160-440	160	20-20-40-40-40	8x20	230	580x270x1400	68	400
QAM 180-440	180	20-20-20-40-40-40	9x20	260	580x270x1400	77	400
ARCM 200-440	200	20-20-40-40-40-40	10x20	289	600x600x1500	146	400
ARCM 200-440/A280	200	20-20-40-40-40-40-80* (ampli. with n. 1 MR1 80-440)	10x20	289	600x600x1500	146	630
ARCM 220-440	220	20-40-40-40-40-40	11x20	318	600x600x1500	154	630
ARCM 220-440/A300	220	20-40-40-40-40-40-80* (ampli. with n. 1 MR1 80-440)	11x20	318	600x600x1500	154	630
ARCM 240-440	240	20-20-40-40-40-80	12x20	346	600x600x1500	160	630
ARCM 260-440	260	20-40-40-40-40-80	13x20	375	600x600x1500	172	630
ARCM 280-440	280	20-20-40-40-80-80	14x20	404	600x600x1500	181	630
ARCM 300-440	300	20-40-40-40-80-80	15x20	433	600x600x1500	193	630
ARCM 350-440	350	50-50-50-50-50-100	7x50	505	600x600x2000	270	800
ARCM 350-440/A450	350	50-50-50-50-50-100-100* (ampli. with n. 1 MR1 100-440)	7x50	505	600x600x2000	270	1000
ARCM 400-440	400	50-50-50-50-100-100	8x50	577	600x600x2000	283	800
ARCM 400-440/A500	400	50-50-50-50-100-100-100* (ampli. with n. 1 MR1 100-440)	8x50	577	600x600x2000	283	1250
ARCM 450-440	450	50-50-50-100-100-100	9x50	650	600x600x2000	305	1000
ARCM 500-440	500	50-50-100-100-100-100	10x50	722	600x600x2000	319	1250
ARCM 550-440	550	50-50-50-100-100-100-100	11x50	794	1200x600x2000	450	1250
ARCM 600-440	600	50-50-50-50-100-100-200	12x50	866	1200x600x2000	485	1250
ARCM 650-440	650	50-50-50-100-100-100-200	13x50	938	1200x600x2000	510	1250
ARCM 700-440	700	50-50-100-100-100-100-200	14x50	1010	1200x600x2000	525	1600
ARCM 750-440	750	50-50-50-100-100-200-200	15x50	1083	1200x600x2000	540	1600
ARCM 800-440	800	50-50-100-100-100-200-200	16x50	1155	1200x600x2000	555	1600
ARCM 900-440	900	50-50-100-100-200-200-200	18x50	1300	1200x600x2000	570	2000
ARCM 1000-440	1000	50-50-100-200-200-200-200	20x50	1443	1200x600x2000	585	2000

For power factor correction with no harmonic distortion use 400V series. Ex.: STP 17,5-400.
Capacitors: MCExx-400 for .....400 series, MCExx-440 for .....440 series. Standard regulators: PFCD on STP and QAM, PFR-T on ARCM.

Modules for equipments expansion

TYPE THD0%	TYPE THD -5%	Power at 400/440V (kVAr)	Banks (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)
M1 40-400	M1 40-400	40	40	58	580x270x200	20
M2 60-400	M2 60-440	60	20-40	87	580x270x200	25
MR1 80-400	MR1 80-440	80	80	115	520x520x240	25
MR1 100-400	MR1 100-440	100	100	144	520x520x240	28

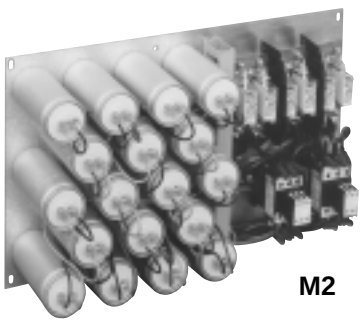
For loads with maximum current harmonic distortion of - 20%

TYPE	Power at 440V (kVAr)	Banks (kVAr)	Steps n. x kVAr	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
QAM/R 37.5-440	37.5	7.5-15-15	5x7.5	45	580x270x700	36	160
QAM/R 37.5-440/A82.5	37.5	7.5-15-15-15*-30* (ampli. with n. 1 M2/R 45-440)	5x7.5	45	580x270x1060	37	250
QAM/R 52.5-440	52.5	7.5-15-30	7x7.5	63	580x270x1060	42	160
QAM/R 75-440	75	15-15-15-30	5x15	89	580x270x1060	48	160
QAM/R 90-440	90	15-15-30-30	6x15	107	580x270x1060	54	250
QAM/R 90-440/A120	90	15-15-30-30-30* (ampli. with n. 1 M1/R 30-440)	6x15	107	580x270x1400	55	250
QAM/R 105-440	105	15-30-30-30	7x15	125	580x270x1400	61	250
QAM/R 120-440	120	15-15-30-30-30	8x15	143	580x270x1400	68	250
QAM/R 135-440	135	15-15-15-30-30-30	9x15	161	580x270x1400	77	250
ARCM/R 150-440	150	15-15-30-30-30-30	10x15	179	600x600x1500	145	400
ARCM/R 150-440/A210	150	15-15-30-30-30-30-60* (ampli. with n. 1 MR1/R 60-440)	10x15	179	600x600x1500	145	400
ARCM/R 180-440	180	15-15-30-30-30-60	12x15	215	600x600x1500	155	400
ARCM/R 210-440	210	15-15-30-30-60-60	14x15	251	600x600x1500	170	400
ARCM/R 240-440	240	30-30-30-30-60-60	8x30	286	600x600x1500	205	630
ARCM/R 270-440	270	45-45-45-45-45-45	6x45	322	600x600x1500	220	630
ARCM/R 270-440/A315	270	45-45-45-45-45-45-45* (ampli. with n. 1 MR1/R 45-440)	6x45	322	600x600x1500	220	630
ARCM/R 315-440	315	45-45-45-45-45-90	7x45	376	600x600x1500	235	630
ARCM/R 360-440	360	45-45-45-45-90-90	8x45	429	600x600x2000	320	800
ARCM/R 360-440/A450	360	45-45-45-45-90-90-90* (ampli. with n. 1 MR1/R 90-440)	8x45	429	600x600x2000	322	1000
ARCM/R 405-440	405	45-45-45-90-90-90	9x45	483	600x600x2000	295	800
ARCM/R 450-440	450	45-45-90-90-90-90	10x45	537	600x600x2000	310	1000
ARCM/R 495-440	495	45-45-45-90-90-90-90	11x45	590	1200x600x2000	450	1000
ARCM/R 540-440	540	45-45-90-90-90-90-90	12x45	644	1200x600x2000	470	1000
ARCM/R 585-440	585	45-90-90-90-90-90-90	13x45	698	1200x600x2000	495	1000
ARCM/R 630-440	630	45-45-90-90-90-90-180	14x45	752	1200x600x2000	510	1250
ARCM/R 675-440	675	45-90-90-90-90-90-180	15x45	805	1200x600x2000	530	1250
ARCM/R 720-440	720	45-45-90-90-90-180-180	16x45	859	1200x600x2000	550	1600
ARCM/R 765-440	765	45-90-90-90-90-180-180	17x45	913	1200x600x2000	565	1600
ARCM/R 810-440	810	90-90-90-90-90-180-180	9x90	966	1200x600x2000	585	1600
ARCM/R 900-440	900	90-90-90-90-180-180-180	10x90	1073	1200x600x2000	600	1600

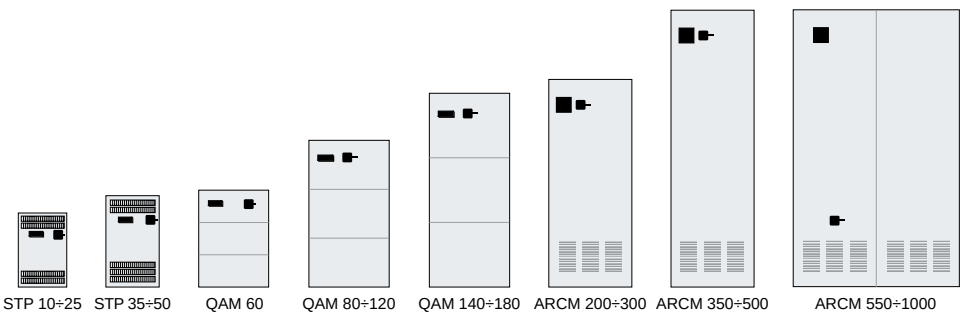
Capacitors: MCE 3,00-480.
Standard regulator: PFCD on QAM, PFR-T on ARCM.

Modules for equipments expansion

TYPE THD -20%	Power at 440V (kVAr)	Banks (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)
M1/R 30-440	30	30	36	580x270x200	14
M2/R 45-440	45	15-30	53	580x270x200	17
MR1/R 45-440	45	45	53	520x520x240	22
MR1/R 60-440	60	60	72	520x520x240	25
MR1/R 90-440	90	90	107	520x520x240	27



M2



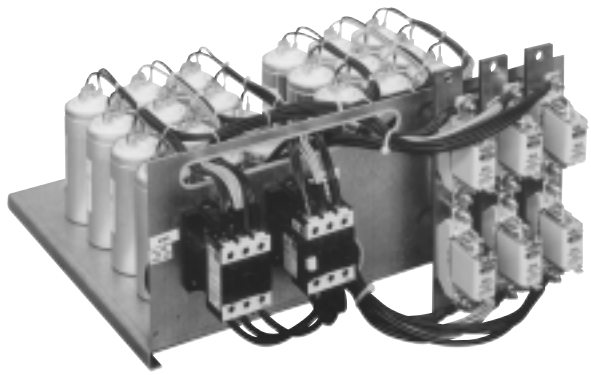
For loads with maximum current harmonic distortion of - 30%

TYPE	Power at 440V (kVAr)	Banks (kVAr)	Steps n. x kVAr	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
QAM/S 31.25-440	31.25	6.25-12.5-12.5	5x6.25	41	580x270x700	36	160
QAM/S 50-440	50	12.5-12.5-25	4x12.5	60	580x270x1060	42	160
QAM/S 50-440/A75	50	12.5-12.5-25-25* ampli. with n. 1 M1/S 25-440	4x12.5	60	580x270x1400	43	160
QAM/S 75-440	75	12.5-12.5-25-25	6x12.5	89	580x270x1060	48	160
QAM/S 75-440/A100	75	12.5-12.5-25-25-25* ampli. with n. 1 M1/S 25-440	6x12.5	89	580x270x1400	49	250
QAM/S 100-440	100	12.5-12.5-25-25-25	8x12.5	119	580x270x1400	62	250
QAM/S 112.5-440	112.5	12.5-12.5-12.5-25-25-25	9x12.5	134	580x270x1400	75	250
ARCM/S 120-440	120	20-20-40-40	6x20	143	600x600x1500	170	250
ARCM/S 120-440/A280	120	20-20-40-40-80*-80* ampli. with n. 2 MR1/S 80-440	6x20	143	600x600x1500	170	630
ARCM/S 140-440	140	20-40-40-40	7x20	167	600x600x1500	185	250
ARCM/S 140-440/A300	140	20-40-40-40-80*-80* ampli. with n. 2 MR1/S 80-440	7x20	167	600x600x1500	185	630
ARCM/S 160-440	160	20-20-40-40-40	8x20	191	600x600x1500	200	400
ARCM/S 160-440/A240	160	20-20-40-40-40-80* ampli. with n. 1 MR1/S 80-440	8x20	191	600x600x1500	200	630
ARCM/S 180-440	180	20-40-40-40-40	9x20	215	600x600x1500	210	400
ARCM/S 180-440/A260	180	20-40-40-40-40-80* ampli. with n. 1 MR1/S 80-440	9x20	215	600x600x1500	210	630
ARCM/S 200-440	200	20-20-40-40-80	10x20	239	600x600x1500	225	400
ARCM/S 200-440/A280	200	20-20-40-40-80-80* ampli. with n. 1 MR1/S 80-440	10x20	239	600x600x1500	225	630
ARCM/S 220-440	220	20-40-40-40-80	11x20	262	600x600x1500	240	400
ARCM/S 220-440/A300	220	20-40-40-40-80-80* ampli. with n. 1 MR1/S 80-440	11x20	262	600x600x1500	240	630
ARCM/S 260-440	260	20-40-40-80-80	13x20	310	600x600x1500	265	630
ARCM/S 300-440	300	20-40-80-80-80	15x20	358	600x600x1500	280	630
ARCM/S 320-440	320	20-20-40-80-80-80	16x20	382	600x600x2000	290	630
ARCM/S 360-440	360	40-40-40-80-80-80	9x40	429	600x600x2000	320	800
ARCM/S 400-440	400	40-40-80-80-80-80	10x40	477	600x600x2000	335	800
ARCM/S 440-440	440	40-40-40-80-80-80-80	11x40	525	1200x600x2000	460	800
ARCM/S 480-440	480	40-40-80-80-80-80-80	12x40	573	1200x600x2000	485	1000
ARCM/S 520-440	520	40-80-80-80-80-80-80	13x40	620	1200x600x2000	500	1000
ARCM/S 560-440	560	40-40-80-80-80-80-160	14x40	668	1200x600x2000	515	1000
ARCM/S 600-440	600	40-80-80-80-80-80-160	15x40	716	1200x600x2000	530	1250
ARCM/S 640-440	640	40-40-80-80-80-160-160	16x40	763	1200x600x2000	545	1250
ARCM/S 680-440	680	40-80-80-80-80-160-160	17x40	811	1200x600x2000	560	1250
ARCM/S 720-440	720	80-80-80-80-80-160-160	9x80	859	1200x600x2000	585	1600
ARCM/S 800-440	800	80-80-80-80-160-160-160	10x80	954	1200x600x2000	600	1600
ARCM/S 960-440	960	80-80-160-160-160-160-160	12x80	1145	1800x600x2000	680	2000

Capacitor: MCE 3,33-550.
Standard regulator: PFCD on QAM, PFR-HTA on ARCM.

Modules for equipments expansion

TYPE THD -30%	Power at 400/440V (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)
M1/S 25-440	25	30	580x270x200	16
MR1/S 80-440	80	95	520x520x240	30



MR2

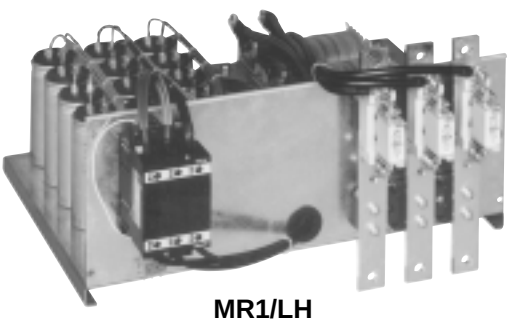
For loads with maximum current harmonic distortion of - 40%

TYPE	Power at 425V (kVAr)	Banks (kVAr)	Steps n. x kVAr	Current (A)	Dimensions (mm)	Weight (Kg)	Circuit break. (A)
ARCM/LH 90-425	90	30-30-30	3x30	115	600x600x1500	160	250
ARCM/LH 90-425/A150	90	30-30-30-60* ampli. with n. 1 MR1/LH 60-425	3x30	115	600x600x1500	160	400
ARCM/LH 120-425	120	30-30-60	4x30	153	600x600x1500	180	250
ARCM/LH 120-425/A180	120	30-30-60-60* ampli. with n. 1 MR1/LH 60-425	4x30	153	600x600x1500	180	400
ARCM/LH 150-425	150	30-30-30-60	5x30	192	600x600x1500	200	400
ARCM/LH 150-425/A210	150	30-30-30-60-60* ampli. with n. 1 MR1/LH 60-425	5x30	192	600x600x1500	200	400
ARCM/LH 180-425	180	30-30-60-60	6x30	230	600x600x1500	235	400
ARCM/LH 180-425/A240	180	30-30-60-60-60* ampli. with n. 1 MR1/LH 60-425	6x30	230	600x600x1500	235	630
ARCM/LH 210-425	210	30-60-60-60	7x30	268	600x600x1500	275	400
ARCM/LH 240-425	240	30-30-60-60-60	8x30	307	600x600x1500	300	630
ARCM/LH 270-425	270	30-60-60-60-60	9x30	345	600x600x2000	360	630
ARCM/LH 300-425	300	30-30-60-60-120	10x30	384	600x600x2000	400	630
ARCM/LH 330-425	330	30-60-60-60-120	11x30	422	1200x600x2000	510	630
ARCM/LH 360-425	360	60-60-60-60-60-60	6x60	460	1200x600x2000	540	800
ARCM/LH 390-425	390	30-60-60-60-60-120	13x30	499	1200x600x2000	565	800
ARCM/LH 420-425	420	60-60-60-60-60-120	7x60	537	1200x600x2000	595	800
ARCM/LH 450-425	450	30-60-60-60-120-120	15x30	575	1200x600x2000	620	1000
ARCM/LH 510-425	510	30-60-60-120-120-120	17x30	652	1200x600x2000	645	1000
ARCM/LH 540-425	540	60-60-60-120-120-120	9x60	690	1200x600x2000	670	1000
ARCM/LH 600-425	600	60-60-120-120-120-120	10x60	767	1200x600x2000	695	1250
ARCM/LH 660-425	660	60-60-60-120-120-240	11x60	844	1200x600x2000	720	1250
ARCM/LH 720-425	720	60-60-60-60-120-120-240	12x60	921	1800x600x2000	860	1600
ARCM/LH 780-425	780	60-60-60-120-120-120-240	13x60	997	1800x600x2000	910	1600
ARCM/LH 840-425	840	60-60-120-120-120-120-240	14x60	1074	1800x600x2000	960	1600
ARCM/LH 900-425	900	60-60-60-120-120-240-240	15x60	1151	1800x600x2000	695	2000
ARCM/LH 960-425	960	60-60-120-120-120-240-240	16x60	1227	1800x600x2000	1045	2000
ARCM/LH 1020-425	1020	60-60-60-120-240-240-240	17x60	1304	2400x600x2000	1380	2000
ARCM/LH 1080-425	1080	60-60-120-120-240-240-240	18x60	1381	2400x600x2000	1420	2500
ARCM/LH 1140-425	1140	60-120-120-120-240-240-240	19x60	1458	2400x600x2000	1460	2500
ARCM/LH 1200-425	1200	60-60-120-240-240-240-240	20x60	1534	2400x600x2000	1500	2500
ARCM/LH 1320-425	1320	120-120-120-240-240-240-240	11x120	1688	2400x600x2000	1535	2500

Capacitor: MCE 3,33-440.
Antiresonance reactance: L-C tuning frequency 189 Hz with three-phase capacitors in core consisting of low-loss sheets with oriented cristals and high linearity.
Standard regulator: PFR-TI.

Modules for equipments expansion

TYPE THD -40%	Power at 400/440V (kVAr)	Current (A)	Dimensions (mm)	Weight (Kg)
MR1/LH 60-425	60	65	520x520x240	22



MR1/LH