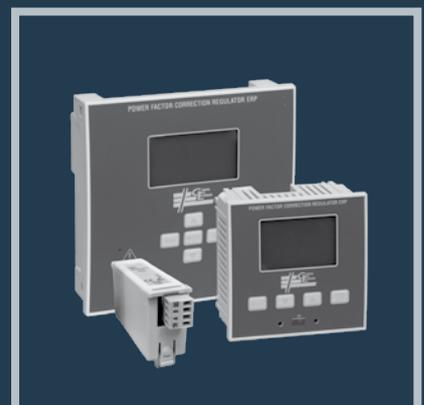
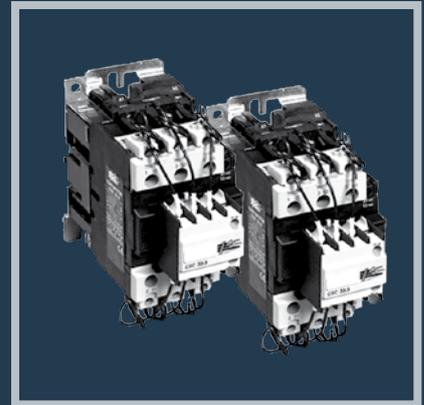




live with energy...

**POWER FACTOR CORRECTION
CAPACITORS AND COMPONENTS**

LV



MADE IN ITALY



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HOW TO CHOOSE LV CAPACITORS FOLLOWING YOUR OPERATING CONDITIONS



The operating conditions are very important to the capacitors and can strongly influence the life expectancy. This is why, different categories of capacitors, with different levels of resistance, must be chosen according to operating conditions.

Capacitors must be selected in function of:

- Ambient temperature,
- Expected over-current related to voltage disturbances including maximum sustained over voltage,
- Requested life expectancy,
- Maximum number of switching during the year.



HARMONICS AND CAPACITORS

Capacitors are strongly sensitive to harmonics and particularly to harmonic currents. Harmonic currents are caused by non-linear loads connected to the distribution system. The presence of harmonics in electrical systems means that current and voltage are distorted and deviate from sinusoidal waveforms.

This phenomenon is particularly dangerous for capacitors since their impedance decreases proportionally to the order of the harmonics present with consequent capacitor overload and shortening steadily the life.

In some situations, resonance effect can occur as a result of amplification of harmonic currents and a very high voltage distortion.



NON-LINEAR LOADS

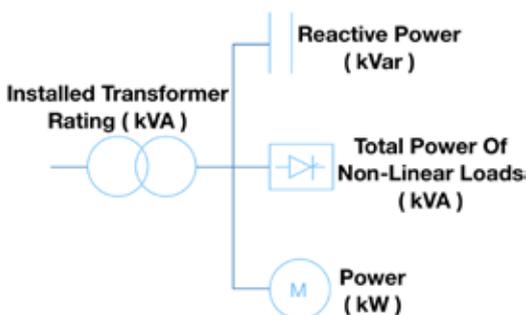
Considering what has been said before it is always necessary to keep in mind the level of harmonics in your network before choosing any kind of equipment especially Power Factor Correction one.

A significant parameter is the cumulated power of the non-linear loads generating harmonic currents.

Since the harmonics are caused by non-linear loads, an indicator for the magnitude of harmonics is the ratio of the total power of non-linear loads to the supply transformer rating.

$$N_{LL} = \frac{\text{Total Power of Non - Linear Loads}}{\text{Instaled Transformer Rating}}$$

EXAMPLE OF CALCULATIONS OF NON-LINEAR LOADS



Installed transformer rating: 500 kVA

Total power of non-linear loads: 115 kVA

$$N_{LL} = (115 / 500) \times 100 = 23\%$$



INTACT BASE RCM-INB-3: Capacitors designed to be used in standard conditions when there aren't any significant non-linear loads.

NLL < 10%

INTACT PLUS (Heavy Duty) RCM-INP-3: Capacitors for working in difficult conditions, resistant to voltage overloads or when the limited quantity of non-linear loads are installed.

Particularity – largely increased current resistance.

NLL < 20%

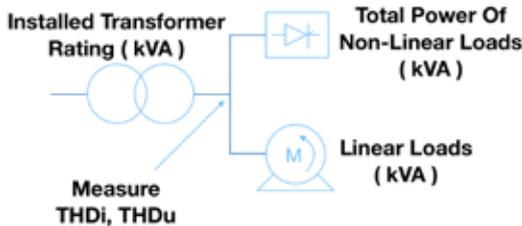
INTACT ALLPOWER (Extra Heavy Duty) RCM-INA-3: Highly reliable capacitors for operating in harsh environments or with a significant level of non-linear loads. Resistant to high overloads in current and voltage. Intact ALLPOWER is also resistant to high temperatures.

NLL < 25%

INTACT R-POWER RCM-INR-3: Capacitors to be used with detuned harmonic reactor. This is the optimal solution for reactive power compensation in networks where there is a significant quantity of non-linear loads, therefore the use of reactors is mandatory.

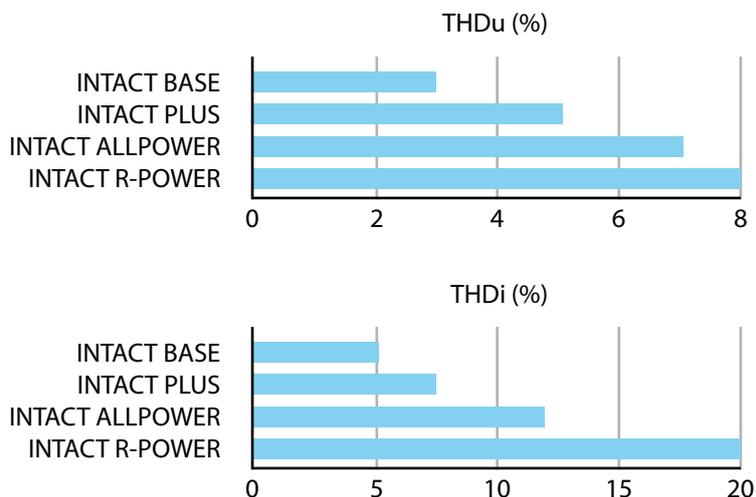
NLL < 30%

CAPACITORS SELECTION TAKING IN MIND LEVEL OF HARMONICS



As said before the percentage of non-linear loads NLL is a very important indicator of magnitude of harmonics but a more detailed estimation of the magnitude of harmonics can be made with measurements.

Significant indicators are current harmonic distortion THDi and voltage harmonic distortion THDu. Both values must be measured at the transformer secondary without connected capacitors. According to the measured distortion, different technologies of capacitors shall be selected.



Note:

The capacitor type should be selected according to the most restrictive measurement. For Example, a measurement is giving the following results:

- THDi = 14,0%
- THDu = 4,0%

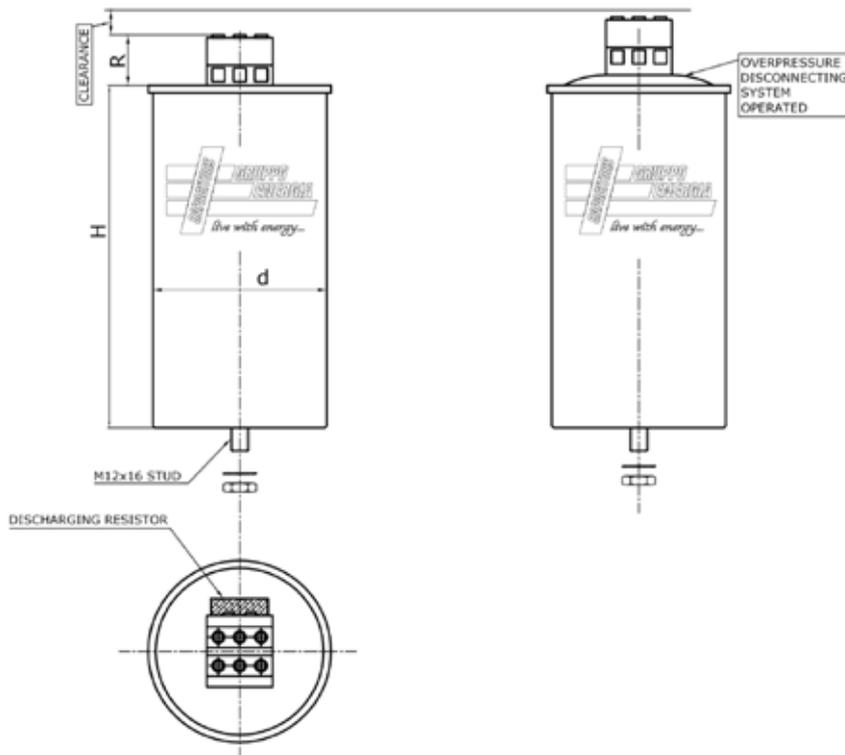
INTACT R-POWER with Detuned Reactor has to be selected.

Capacitor Family	Type	Applications	Max. Conditions
Intact Base RCM - INB - 3	Standard Capacitor	<ul style="list-style-type: none"> • Networks with non significant non-linear loads • Standard over-current • Standard operating temperature • Normal switching frequency • Standard life expectancy 	<ul style="list-style-type: none"> • NLL < 10% • 1,5 In • 55 °C • 5000 / year • Up to 100000 h*
Intact Plus RCM - INP - 3	Heavy Duty Capacitor	<ul style="list-style-type: none"> • Few non-linear loads • Significant over-current • High operating temperature • Significant switching frequency • Long life expectancy 	<ul style="list-style-type: none"> • NLL < 20% • 1,8 In • 60 °C • 7000 / year • Up to 160000 h*
Intact AllPower RCM - INA - 3	Extra Heavy Duty Capacitor	<ul style="list-style-type: none"> • Significant number of non-linear loads (up to 25%) • Significant over-current • Extreme temperature conditions • Frequent switching frequency • Extra long life expectancy 	<ul style="list-style-type: none"> • NLL < 25% • 2,5 In • 60 °C • 10000 / year • Up to 180000 h*
Intact R-Power + Detuned Harmonic Reactor RCM - INR - 3	Capacitor For Critical Applications	<ul style="list-style-type: none"> • High level of non-linear loads (up to 30%) • Significant over-current • Standard operating temperature • Significant switching frequency • Long life expectancy 	<ul style="list-style-type: none"> • NLL < 30% • 1,5 In • 55 °C • 7000 / year • Up to 160000 h*

Advise For You:

It is highly recommended to do harmonic study and detailed load study before selecting the capacitor family. For more informations don't hesitate to contact Gruppo Energia team.

CONSTRUCTION DIAGRAM



CASE

- Expansion: Maximum 12 mm.
- Clearance: Minimum 15 mm.

MOUNTING

- M12 threaded bolt
- Tightening torque: T= 10 Nm.
- Toothed washer: DIN 6789.
- Hexagonal nut: DIN 439.

TERMINALS

- Finger-proof terminal: Yes.
- **MT 16**
 - For 16 mmq cable.
 - M4 terminal screw.
 - Tightening torque: T= 1,3 Nm
 - R = 33 ±2
- **MT 25**
 - For 25 mmq cable.
 - M5 terminal screw.
 - Tightening torque: T= 2,5 Nm
 - R = 33 ±2
- **MT 35**
 - For 35 mmq cable.
 - M5 terminal screw.
 - Tightening torque: T= 3,0 Nm
 - R = 43 ±2

* The maximum life expectancy is given considering standard operating conditions as rated voltage (Un), rated current (In), 35 °C ambient temperature.

* Attention: The life expectancy will be reduced if capacitors are used at maximum working conditions.

TECHNICAL CHARACTERISTICS INTACT BASE RCM-INB

General

Standards:	IEC 60831-1:2014, UL810, VDE 0560-46:2014-11
Origin:	100% made in Italy
Voltage range:	220 V to 690 V
Frequency:	50 Hz / 60 Hz
Power range:	1 kVar to 62,5 kVar
Dielectric losses:	< 0,2 W/kVar
Total losses:	< 0,5 W/kVar
Capacitance tolerance:	± 5%
Voltage test between terminals:	2,15 Un, 50 Hz, 10 seconds (routine test)
Voltage test between terminals:	3,00 Un, 50 Hz, 60 seconds (type test)
Voltage test terminal / case:	≤ 525 V 3000 V, 50 Hz for 10 seconds or > 525 V 3660 V, 50 Hz for 10 seconds
Insulation level:	3 / 8 kV
External discharge resistor:	50 V in 1 min. 1 kVar - 30 kVar or 75 V in 3 min. 30,5 kVar - 62,5 kVar
Cooling:	Natural air or forced ventilation

Operating Conditions

Ambient temperature:	-25 °C / 55 °C
Humidity:	up to 95%
Altitude above sea level:	2000 m.
Overvoltage:	Un+10% for 8 hrs. daily Un+15% for 30 min. daily Un+20% for 5 min. daily Un+30% for 1 min. daily
Overcurrent:	up to 1,5 x In (Including Harmonics)
Inrush current:	up to 180 x In
Service life:	up to 100.000 hrs.
Harmonic presence:	NLL < 10%

Safety Features

Safety:	Overpressure disconnecter on 3 phase + Incorporated fuses + Self-healing + Discharge device
Protection degree:	IP20

Construction

Casing:	Aluminium can
Dielectric:	Polypropylene film with slope metallisation and wave-cut
Impregnation:	Polyurethane resin, Non-PCB

Installation

Mounting position:	Vertical preferable for better cooling
Fastening & Earthing:	Through 1 point, screw M12 at the bottom

RCM-INB CAPACITOR RATED VOLTAGE 400 V / 415 V - 3 PHASE - 50 Hz / 60 Hz

POWER AT SYSTEM VOLTAGE 50 Hz		POWER AT SYSTEM VOLTAGE 60 Hz		In 50 Hz CURRENT		In 60 Hz CURRENT		RATED CAPACITANCE	AVAILABLE DIMENSIONS*			TERMINAL TYPE	PCS/BOX	PCS/BOX	PCS/BOX
400 V kVar	415 V kVar	400 V kVar	415 V kVar	400 V A	415 V A	400 V A	415 V A		3 x μ F	\varnothing x H (7)	\varnothing x H (8)				
2,5	2,7	3,0	3,2	3,6	3,7	4,3	4,5	16,6	85 x 130	85 x 185	-	MT 16	9	-	-
5	5,4	6,0	6,5	7	7,5	8,7	9,0	33,2	85 x 130	85 x 185	-	MT 16	9	-	-
6,25	6,72	7,5	8,1	9,02	9,34	10,8	11,2	41,4	85 x 130	85 x 185	-	MT 16	9	-	-
10	10,8	12,0	12,9	14	15,0	17,3	18,0	66,3	85 x 225	-	-	MT 16	9	-	-
12,5	13,4	15,0	16,1	18,0	18,7	21,6	22,5	82,9	85 x 225	-	-	MT 16	9	-	-
15	16,1	18,0	19,4	22	22,5	26,0	26,9	99,5	100 x 225	85 x 260	-	MT 25/16	9	5	-
20	21,5	24,0	25,8	29	29,9	34,6	35,9	132,6	116 x 225	100 x 260	85 x 285	MT 25	9	5	-
25	26,9	30,0	32,3	36	37,4	43,3	44,9	165,8	116 x 225	-	100 x 300	MT 25	-	5	-
30	32,3	36,0	38,7	43	44,9	51,9	53,9	198,9	136 x 225	116 x 260	116 x 285	MT 25	-	5	4
40	43,0	48,0	51,6	58	59,9	69,3	71,9	265,3	116 x 285	-	-	MT 25	-	5	-
50	53,8	60,0	64,6	72	74,8	86,6	89,8	331,6	136 x 300	-	-	MT 35	-	-	4
62,5	67,3	-	-	90,2	93,6	-	-	414,6	136 x 375	-	-	MT 35	-	-	2

RCM-INB CAPACITOR RATED VOLTAGE 440 V / 450 V - 3 PHASE - 50 Hz / 60 Hz

POWER AT SYSTEM VOLTAGE 50 Hz		POWER AT SYSTEM VOLTAGE 60 Hz		In 50 Hz CURRENT		In 60 Hz CURRENT		RATED CAPACITANCE	AVAILABLE DIMENSIONS*			TERMINAL TYPE	PCS/BOX	PCS/BOX	PCS/BOX
440 V kVar	450 V kVar	440 V kVar	450 V kVar	440 V A	450 V A	440 V A	450 V A		3 x μ F	\varnothing x H (7)	\varnothing x H (8)				
2,5	2,6	3,0	3,1	3,3	3,4	3,9	4,0	13,7	85 x 130	85 x 185	-	MT 16	9	-	-
5	5,2	6,0	6,3	7	6,7	7,9	8,0	27,4	85 x 130	85 x 185	-	MT 16	9	-	-
6,25	6,5	7,5	7,9	8,20	8,4	9,8	10,1	34,3	85 x 130	85 x 185	-	MT 16	9	-	-
10	10,5	12,0	12,5	13	13,4	15,7	16,1	54,8	85 x 225	85 x 185	-	MT 16	9	-	-
12,5	13,1	15,0	15,7	16,4	16,8	19,7	20,1	68,5	85 x 225	-	-	MT 16	9	-	-
15	15,7	18,0	18,8	20	20,1	23,6	24,1	82,2	100 x 225	85 x 260	-	MT 25 / 16	9	5	-
20	20,9	24,0	25,1	26	26,8	31,5	32,2	109,6	116 x 225	100 x 260	85 x 285	MT 25	9	5	-
25	26,1	30,0	31,4	33	33,5	39,3	40,2	137	116 x 225	-	100 x 300	MT 25	-	5	-
30	31,4	36,0	37,6	39	40,2	47,2	48,3	164,4	136 x 225	116 x 260	100 x 300	MT 25	-	5	4
40	41,8	48,0	50,2	52	53,6	62,9	64,4	219,2	116 x 285	-	-	MT 25	-	5	-
50	52,3	60,0	62,7	66	67,1	78,7	80,5	274	136 x 300	-	-	MT 35	-	-	4
62,5	65,3	-	-	82,0	83,8	-	-	342,5	136 x 375	-	-	MT 35	-	-	2

RCM-INB CAPACITOR RATED VOLTAGE 525 V / 550 V - 3 PHASE - 50 Hz / 60 Hz

POWER AT SYSTEM VOLTAGE 50 Hz		POWER AT SYSTEM VOLTAGE 60 Hz		In 50 Hz CURRENT		In 60 Hz CURRENT		RATED CAPACITANCE	AVAILABLE DIMENSIONS*			TERMINAL TYPE	PCS/BOX	PCS/BOX	PCS/BOX
525 V kVar	550 V kVar	525 V kVar	550 V kVar	525 V A	550 V A	525 V A	550 V A		3 x μ F	\varnothing x H (7)	\varnothing x H (8)				
2,5	2,7	3,0	3,3	2,7	2,9	3,3	3,4	9,6	85 x 130	85 x 185	-	MT 16	9	-	-
5	5,5	6,0	6,6	5	5,7	6,6	6,9	19,2	85 x 130	85 x 185	-	MT 16	9	-	-
6,25	6,9	7,5	8,2	6,87	7,2	8,3	8,7	24,1	85 x 225	85 x 185	-	MT 16	9	-	-
10	11,0	12,0	13,2	11	11,5	13,2	13,8	38,5	100 x 225	85 x 260	-	MT 25 / 16	9	5	-
12,5	13,7	15,0	16,4	13,7	14,4	16,5	17,3	48,1	100 x 225	100 x 260	85 x 285	MT 25 / 16	9	5	-
15	16,4	18,0	19,7	16	17,3	19,8	20,7	57,7	116 x 225	100 x 260	100 x 300	MT 25	-	5	-
20	21,9	24,0	26,3	22	23,0	26,4	27,6	77,0	136 x 225	116 x 260	100 x 300	MT 25	-	5	-
25	27,4	30,0	32,9	27	28,8	33,0	34,5	96,2	136 x 225	-	116 x 285	MT 25	-	5	4
30	32,9	36,0	39,5	33	34,5	39,6	41,5	115,5	136 x 300	-	-	MT 25	-	-	4
40	43,9	48,0	52,7	44	46,1	52,8	55,3	154,0	136 x 300	-	-	MT 25	-	-	4
50	54,9	60,0	65,8	55	57,6	66,0	69,1	192,5	136 x 375	-	-	MT 25	-	-	2

Up to 37,5 kVar 400 V or 50 kVar 525 V capacitors are also available in single-phase version.
Other capacitor powers and voltages are available on request. Contact us info@gruppoenergia.it

*All dimensions are in "mm" and will be confirmed at the time of order.

TECHNICAL CHARACTERISTICS INTACT PLUS RCM-INP

General

Standards:	IEC 60831-1:2014, UL810, VDE 0560-46:2014-11
Origin:	100% made in Italy
Voltage range:	220 V to 550 V
Frequency:	50 Hz / 60 Hz
Power range:	2,5 kVar to 50 kVar
Dielectric losses:	< 0,2 W/kVar
Total losses:	< 0,5 W/kVar
Capacitance tolerance:	± 5%
Voltage test between terminals:	2,15 Un, 50 Hz, 10 seconds (routine test)
Voltage test between terminals:	3,00 Un, 50 Hz, 60 seconds (type test)
Voltage test terminal / case:	≤ 525 V 3000 V, 50 Hz for 10 seconds or > 525 V 3660 V, 50 Hz for 10 seconds
Insulation level:	3 / 8 kV
External discharge resistor:	50 V in 1 min. 1 kVar - 30 kVar or 75 V in 3 min. 30,5 kVar - 62,5 kVar
Cooling:	Natural air or forced ventilation

Operating Conditions

Ambient temperature:	-45 °C / 60 °C
Humidity:	up to 95%
Altitude above sea level:	2000 m.
Overvoltage:	Un+10% for 8 hrs. daily Un+15% for 30 min. daily Un+20% for 5 min. daily Un+30% for 1 min. daily
Overcurrent:	up to 1,8 x In (Including Harmonics)
Inrush current:	up to 250 x In
Service life:	up to 160.000 hrs.
Harmonic presence:	NLL < 20%

Safety Features

Safety:	Overpressure disconnecter on 3 phase + Incorporated fuses + Self-healing + Discharge device
Protection degree:	IP20

Construction

Casing:	Aluminium can
Dielectric:	Special polypropylene film with slope metallisation and wave-cut
Impregnation:	Special polyurethane resin, Non-PCB

Installation

Mounting position:	Vertical preferable for better cooling
Fastening & Earthing:	Through 1 point, screw M12 at the bottom

RCM-INP CAPACITOR RATED VOLTAGE 400 V / 415 V - 3 PHASE - 50 Hz / 60 Hz

POWER AT SYSTEM VOLTAGE 50 Hz		POWER AT SYSTEM VOLTAGE 60 Hz		In 50 Hz CURRENT		In 60 Hz CURRENT		RATED CAPACITANCE	AVAILABLE DIMENSIONS*			TERMINAL TYPE	PCS/BOX	PCS/BOX	PCS/BOX
400 V kVar	415 V kVar	400 V kVar	415 V kVar	400 V A	415 V A	400 V A	415 V A		3 x μ F	\varnothing x H (7)	\varnothing x H (8)				
2,5	2,7	3,0	3,2	3,6	3,7	4,3	4,5	16,6	85 x 130	85 x 185	-	MT 16	9	-	-
5	5,4	6,0	6,5	7	7,5	8,7	9,0	33,2	85 x 130	85 x 185	-	MT 16	9	-	-
6,25	6,72	7,5	8,1	9,02	9,34	10,8	11,2	41,4	85 x 185	-	-	MT 16	9	-	-
10	10,8	12,0	12,9	14	15,0	17,3	18,0	66,3	85 x 225	-	-	MT 16	9	-	-
12,5	13,4	15,0	16,1	18,0	18,7	21,6	22,5	82,9	100 x 225	85 x 260	-	MT 25 / 16	9	5	-
15	16,1	18,0	19,4	22	22,5	26,0	26,9	99,5	100 x 225	-	85 x 285	MT 25 / 16	9	5	-
20	21,5	24,0	25,8	29	29,9	34,6	35,9	132,6	116 x 225	100 x 260	100 x 300	MT 25	9	5	-
25	26,9	30,0	32,3	36	37,4	43,3	44,9	165,8	136 x 225	116 x 260	100 x 300	MT 25	-	5	4
30	32,3	36,0	38,7	43	44,9	51,9	53,9	198,9	136 x 225	-	116 x 285	MT 25	-	5	4
40	43,0	48,0	51,6	58	59,9	69,3	71,9	265,3	136 x 300	-	-	MT 35	-	-	4
50	53,8	60,0	64,6	72	74,8	86,6	89,8	331,6	136 x 375	-	-	MT 35	-	-	2

RCM-INP CAPACITOR RATED VOLTAGE 440 V / 450 V - 3 PHASE - 50 Hz / 60 Hz

POWER AT SYSTEM VOLTAGE 50 Hz		POWER AT SYSTEM VOLTAGE 60 Hz		In 50 Hz CURRENT		In 60 Hz CURRENT		RATED CAPACITANCE	AVAILABLE DIMENSIONS*			TERMINAL TYPE	PCS/BOX	PCS/BOX	PCS/BOX
440 V kVar	450 V kVar	440 V kVar	450 V kVar	440 V A	450 V A	440 V A	450 V A		3 x μ F	\varnothing x H (7)	\varnothing x H (8)				
2,5	2,6	3,0	3,1	3,3	3,4	3,9	4,0	13,7	85 x 130	85 x 185	-	MT 16	9	-	-
5	5,2	6,0	6,3	7	6,7	7,9	8,0	27,4	85 x 130	85 x 185	-	MT 16	9	-	-
6,25	6,5	7,5	7,9	8,20	8,4	9,8	10,1	34,3	85 x 185	-	-	MT 16	9	-	-
10	10,5	12,0	12,5	13	13,4	15,7	16,1	54,8	85 x 225	-	-	MT 16	9	-	-
12,5	13,1	15,0	15,7	16,4	16,8	19,7	20,1	68,5	100 x 225	85 x 260	-	MT 25 / 16	9	5	-
15	15,7	18,0	18,8	20	20,1	23,6	24,1	82,2	100 x 225	85 x 260	-	MT 25 / 16	9	5	-
20	20,9	24,0	25,1	26	26,8	31,5	32,2	109,6	116 x 225	100 x 260	-	MT 25	9	5	-
25	26,1	30,0	31,4	33	33,5	39,3	40,2	137	136 x 225	116 x 260	100 x 300	MT 25	-	5	4
30	31,4	36,0	37,6	39	40,2	47,2	48,3	164,4	136 x 225	-	116 x 285	MT 25	-	5	4
40	41,8	48,0	50,2	52	53,6	62,9	64,4	219,2	136 x 300	-	-	MT 35	-	-	4
50	52,3	60,0	62,7	66	67,1	78,7	80,5	274	136 x 375	-	-	MT 35	-	-	2

RCM-INP CAPACITOR RATED VOLTAGE 525 V / 550 V - 3 PHASE - 50 Hz / 60 Hz

POWER AT SYSTEM VOLTAGE 50 Hz		POWER AT SYSTEM VOLTAGE 60 Hz		In 50 Hz CURRENT		In 60 Hz CURRENT		RATED CAPACITANCE	AVAILABLE DIMENSIONS*			TERMINAL TYPE	PCS/BOX	PCS/BOX	PCS/BOX
525 V kVar	550 V kVar	525 V kVar	550 V kVar	525 V A	550 V A	525 V A	550 V A		3 x μ F	\varnothing x H (7)	\varnothing x H (8)				
2,5	2,7	3,0	3,3	2,7	2,9	3,3	3,4	9,6	85 x 130	85 x 185	-	MT 16	9	-	-
5	5,5	6,0	6,6	5	5,7	6,6	6,9	19,2	85 x 130	85 x 185	-	MT 16	9	-	-
6,25	6,9	7,5	8,2	6,87	7,2	8,3	8,7	24,1	85 x 225	85 x 185	-	MT 16	9	-	-
10	11,0	12,0	13,2	11	11,5	13,2	13,8	38,5	100 x 225	85 x 260	-	MT 25 / 16	9	5	-
12,5	13,7	15,0	16,4	13,7	14,4	16,5	17,3	48,1	100 x 225	100 x 260	85 x 285	MT 25 / 16	9	5	-
15	16,4	18,0	19,7	16	17,3	19,8	20,7	57,7	116 x 225	100 x 260	100 x 300	MT 25	-	5	-
20	21,9	24,0	26,3	22	23,0	26,4	27,6	77,0	136 x 225	116 x 260	100 x 300	MT 25	-	5	-
25	27,4	30,0	32,9	27	28,8	33,0	34,5	96,2	136 x 225	-	116 x 285	MT 25	-	5	4
30	32,9	36,0	39,5	33	34,5	39,6	41,5	115,5	136 x 300	-	-	MT 25	-	-	4
40	43,9	48,0	52,7	44	46,1	52,8	55,3	154,0	136 x 300	-	-	MT 35	-	-	4
50	54,9	60,0	65,8	55	57,6	66,0	69,1	192,5	136 x 375	-	-	MT 35	-	-	2

Up to 37,5 kVar 400 V or 50 kVar 525 V capacitors are also available in single-phase version.
Other capacitor powers and voltages are available on request. Contact us info@gruppoenergia.it

*All dimensions are in "mm" and will be confirmed at the time of order.

TECHNICAL CHARACTERISTICS INTACT ALLPOWER RCM-INA

General

Standards:	IEC 60831-1:2014, UL810, VDE 0560-46:2014-11
Origin:	100% made in Italy
Voltage range:	220 V to 550 V
Frequency:	50 Hz / 60 Hz
Power range:	2,5 kVar to 30 kVar
Dielectric losses:	< 0,2 W/kVar
Total losses:	< 0,5 W/kVar
Capacitance tolerance:	± 5%
Voltage test between terminals:	2,15 Un, 50 Hz, 10 seconds (routine test)
Voltage test between terminals:	3,00 Un, 50 Hz, 60 seconds (type test)
Voltage test terminal / case:	≤ 525 V 3000 V, 50 Hz for 10 seconds or > 525 V 3660 V, 50 Hz for 10 seconds
Insulation level:	3 / 8 kV
External discharge resistor:	50 V in 1 min. 1 kVar - 30 kVar or 75 V in 3 min. 30,5 kVar - 62,5 kVar
Cooling:	Natural air or forced ventilation

Operating Conditions

Ambient temperature:	- 45 °C / 60 °C
Humidity:	up to 95%
Altitude above sea level:	2000 m.
Overvoltage:	Un+10% continuous operation Un+15% for 30 min. daily Un+20% for 5 min. daily Un+30% for 1 min. daily
Overcurrent:	up to 2,5 x In (Including Harmonics)
Inrush current:	up to 280 x In
Service life:	up to 180.000 hrs.
Harmonic presence:	NLL < 25%

Safety Features

Safety:	Overpressure disconnecter on 3 phase + Incorporated fuses + Self-healing + Discharge device
Protection degree:	IP20

Construction

Casing:	Aluminium can
Dielectric:	Special polypropylene film with slope metallisation and wave-cut
Impregnation:	Special polyurethane resin, Non-PCB

Installation

Mounting position:	Vertical preferable for better cooling
Fastening & Earthing:	Through 1 point, screw M12 at the bottom

RCM-INA CAPACITOR RATED VOLTAGE 400 V / 415 V — 3 PHASE — 50 Hz / 60 Hz

POWER AT SYSTEM VOLTAGE 50 Hz		POWER AT SYSTEM VOLTAGE 60 Hz		In 50 Hz CURRENT		In 60 Hz CURRENT		RATED CAPACITANCE	AVAILABLE DIMENSIONS*			TERMINAL TYPE	PCS/BOX	PCS/BOX	PCS/BOX
400 V kVar	415 V kVar	400 V kVar	415 V kVar	400 V A	415 V A	400 V A	415 V A	3 x μ F	ϕ x H (7)	ϕ x H (8)	ϕ x H (9)	mmq	ϕ 85	ϕ 100 ϕ 116	ϕ 136
2,5	2,7	3,0	3,2	3,6	3,7	4,3	4,5	16,6	85 x 225	85 x 185	-	MT 16	9	-	-
5	5,4	6,0	6,5	7	7,5	8,7	9,0	33,2	85 x 225	85 x 185	-	MT 16	9	-	-
6,25	6,72	7,5	8,1	9,02	9,34	10,8	11,2	41,4	85 x 225	85 x 185	-	MT 16	9	-	-
10	10,8	12,0	12,9	14	15,0	17,3	18,0	66,3	85 x 225	-	-	MT 16	9	-	-
12,5	13,4	15,0	16,1	18,0	18,7	21,6	22,5	82,9	100 x 225	85 x 260	-	MT 25	-	5	-
15	16,1	18,0	19,4	22	22,5	26,0	26,9	99,5	100 x 225	-	85 x 285	MT 25	9	5	-
20	21,5	24,0	25,8	29	29,9	34,6	35,9	132,6	136 x 225	116 x 260	-	MT 35	-	5	4
25	26,9	30,0	32,3	36	37,4	43,3	44,9	165,8	136 x 225	-	116 x 285	MT 35	-	5	4
30	32,3	36,0	38,7	43	44,9	51,9	53,9	198,9	136 x 300	-	-	MT 35	-	-	4

RCM-INA CAPACITOR RATED VOLTAGE 440 V / 450 V — 3 PHASE — 50 Hz / 60 Hz

POWER AT SYSTEM VOLTAGE 50 Hz		POWER AT SYSTEM VOLTAGE 60 Hz		In 50 Hz CURRENT		In 60 Hz CURRENT		RATED CAPACITANCE	AVAILABLE DIMENSIONS*			TERMINAL TYPE	PCS/BOX	PCS/BOX	PCS/BOX
440 V kVar	450 V kVar	440 V kVar	450 V kVar	440 V A	450 V A	440 V A	450 V A	3 x μ F	ϕ x H (7)	ϕ x H (8)	ϕ x H (9)	mmq	ϕ 85	ϕ 100 ϕ 116	ϕ 136
2,5	2,6	3,0	3,1	3,3	3,4	3,9	4,0	13,7	85 x 225	85 x 185	-	MT 16	9	-	-
5	5,2	6,0	6,3	7	6,7	7,9	8,0	27,4	85 x 225	85 x 185	-	MT 16	9	-	-
6,25	6,5	7,5	7,9	8,20	8,4	9,8	10,1	34,3	85 x 225	85 x 185	-	MT 16	9	-	-
10	10,5	12,0	12,5	13	13,4	15,7	16,1	54,8	100 x 225	85 x 260	-	MT 25 / 16	9	5	-
12,5	13,1	15,0	15,7	16,4	16,8	19,7	20,1	68,5	100 x 225	-	85 x 285	MT 25	9	5	-
15	15,7	18,0	18,8	20	20,1	23,6	24,1	82,2	116 x 225	100 x 260	85 x 285	MT 25	9	5	-
20	20,9	24,0	25,1	26	26,8	31,5	32,2	109,6	136 x 225	116 x 260	-	MT 25	-	5	4
25	26,1	30,0	31,4	33	33,5	39,3	40,2	137	136 x 225	116 x 260	-	MT 35	-	5	4
30	31,4	36,0	37,6	39	40,2	47,2	48,3	164,4	136 x 225	-	116 x 285	MT 35	-	5	4

RCM-INA CAPACITOR RATED VOLTAGE 525 V / 550 V — 3 PHASE — 50 Hz / 60 Hz

POWER AT SYSTEM VOLTAGE 50 Hz		POWER AT SYSTEM VOLTAGE 60 Hz		In 50 Hz CURRENT		In 60 Hz CURRENT		RATED CAPACITANCE	AVAILABLE DIMENSIONS*			TERMINAL TYPE	PCS/BOX	PCS/BOX	PCS/BOX
525 V kVar	550 V kVar	525 V kVar	550 V kVar	525 V A	550 V A	525 V A	550 V A	3 x μ F	ϕ x H (7)	ϕ x H (8)	ϕ x H (9)	mmq	ϕ 85	ϕ 100 ϕ 116	ϕ 136
2,5	2,7	3,0	3,3	2,7	2,9	3,3	3,4	9,6	85 x 225	85 x 185	-	MT 16	9	-	-
5	5,5	6,0	6,6	5	5,7	6,6	6,9	19,2	85 x 225	-	-	MT 16	9	-	-
6,25	6,9	7,5	8,2	6,87	7,2	8,3	8,7	24,1	100 x 225	85 x 225	-	MT 25 / 16	9	5	-
10	11,0	12,0	13,2	11	11,5	13,2	13,8	38,5	116 x 225	-	85 x 285	MT 25 / 16	9	5	-
12,5	13,7	15,0	16,4	13,7	14,4	16,5	17,3	48,1	136 x 225	-	100 x 300	MT 25	-	5	4
15	16,4	18,0	19,7	16	17,3	19,8	20,7	57,7	136 x 225	-	116 x 285	MT 25	-	5	4
20	21,9	24,0	26,3	22	23,0	26,4	27,6	77,0	136 x 300	-	116 x 285	MT 25	-	5	4
25	27,4	30,0	32,9	27	28,8	33,0	34,5	96,2	136 x 300	-	-	MT 25	-	-	4
30	32,9	36,0	39,5	33	34,5	39,6	41,5	115,5	136 x 375	-	-	MT 35	-	-	2

Up to 30 kVar 400 V or 30 kVar 525 V capacitors are also available in single-phase version.
Other capacitor powers and voltages are available on request. Contact us info@gruppenergia.it

*All dimensions are in "mm" and will be confirmed at the time of order.

TECHNICAL CHARACTERISTICS INTACT R-POWER + DETUNED HARMONIC REACTOR RCM-INR

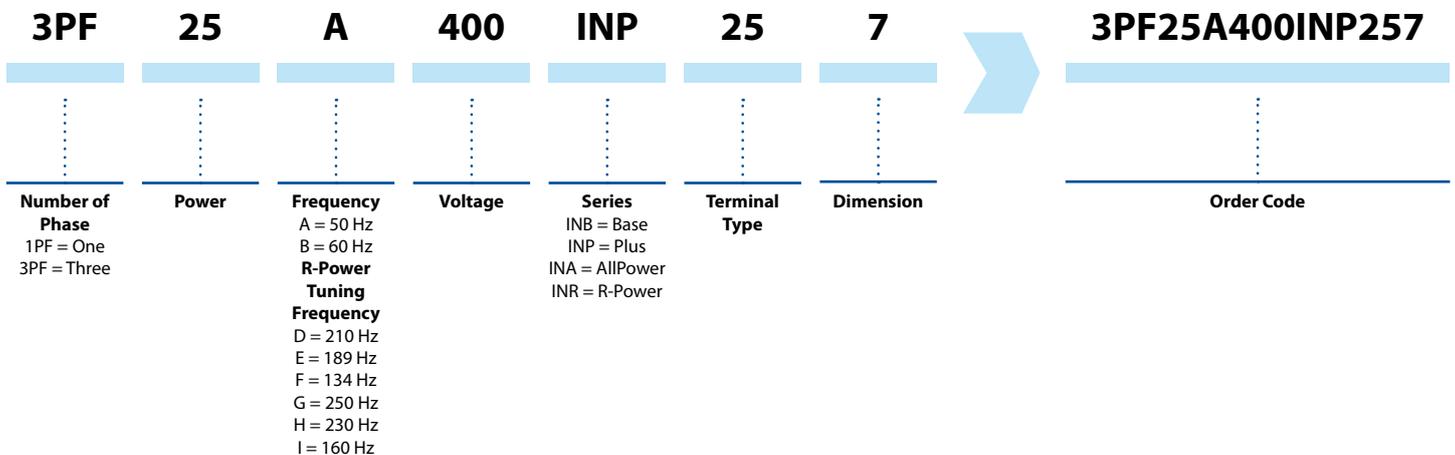
General	
Standards:	IEC 60831-1:2014, UL810, VDE 0560-46:2014-11
Origin:	100% made in Italy
Voltage range:	220 V to 550 V
Frequency:	50 Hz / 60 Hz
Power range:	2,5 kVar to 50 kVar
Dielectric losses:	< 0,2 W/kVar
Total losses:	< 0,5 W/kVar
Capacitance tolerance:	± 5%
Voltage test between terminals:	2,15 Un, 50 Hz, 10 seconds (routine test)
Voltage test between terminals:	3,00 Un, 50 Hz, 60 seconds (type test)
Voltage test terminal / case:	≤ 525 V 3000 V, 50 Hz for 10 seconds or > 525 V 3660 V, 50 Hz for 10 seconds
Insulation level:	3 / 8 kV
External discharge resistor:	50 V in 1 min. 1 kVar - 30 kVar or 75 V in 3 min. 30,5 kVar - 62,5 kVar
Cooling:	Forced ventilation
Operating Conditions	
Ambient temperature:	- 45 °C / 55 °C
Humidity:	up to 95%
Altitude above sea level:	2000 m.
Overvoltage:	Un+10% continuous operation Un+15% for 30 min. daily Un+20% for 5 min. daily Un+30% for 1 min. daily
Overcurrent:	up to 1,8 x In (Including Harmonics)
Inrush current:	up to 250 x In
Service life:	up to 160.000 hrs.
Harmonic presence:	NLL < 30%
Safety Features	
Safety:	Overpressure disconnecter on 3 phase + Incorporated fuses + Self-healing + Discharge device
Protection degree:	IP20
Construction	
Casing:	Aluminium can
Dielectric:	Special polypropylene film with slope metallisation and wave-cut
Impreganation:	Special polyurethane resin, Non-PCB
Installation	
Mounting position:	Vertical preferable for better cooling
Fastening & Earthing:	Through 1 point, screw M12 at the bottom

RCM-INR CAPACITOR RATED VOLTAGE 440 V / 525 V - 3 PHASE - 50 Hz
REACTOR RATED VOLTAGE 400 V - 189 Hz - P=7%

CAPACITOR POWER		POWER REACTOR	TOTAL POWER LC CAPACITOR + REACTOR		RATED CAPACITANCE	RATED INDUCTANCE	In CURRENT	AVAILABLE DIMENSIONS*		TERMINAL TYPE	PCS/BOX	PCS/BOX	PCS/BOX
440 V kVar	525 V kVar	400 V kVar	400 V kVar	400 V kVar	3 x µF	3 x mH	400 V	ø x H 440 V (7)	ø x H 525 V (8)	mmq	ø 85	ø 100 ø 116	ø 136
2,5	3,6	2,2	2,2	2,2	13,7	17,30	3,2	85 x 225	85 x 225	MT 16	9	-	-
2,8	4,0	2,5	2,5	2,5	15,4	15,33	3,6	85 x 225	85 x 225	MT 16	9	-	-
5	7,1	4,4	4,4	4,4	27,4	8,64	6,4	85 x 225	85 x 225	MT 16	9	-	-
5,6	8,0	5,0	5	5	30,8	7,66	7,2	85 x 225	85 x 225	MT 16	9	-	-
6,25	8,9	5,5	5,5	5,5	34,3	6,90	8,0	85 x 225	85 x 225	MT 16	9	-	-
7	10,0	6,25	6,25	6,25	38,6	6,13	9,0	85 x 225	85 x 225	MT 16	9	-	-
10	14,2	8,9	8,9	8,9	54,8	4,32	12,8	85 x 285	85 x 285	MT 16	9	-	-
11,3	16,0	10	10	10	61,7	3,83	14,4	85 x 285	85 x 285	MT 16	9	-	-
12,5	17,8	11,1	11,1	11,1	68,5	3,46	16,0	85 x 285	100 x 300	MT 16 / 25	9	5	-
14,1	20,0	12,5	12,5	12,5	77,1	3,07	18,0	85 x 285	100 x 300	MT 16 / 25	9	5	-
15	21,3	13,3	13,3	13,3	82,2	2,88	19,2	85 x 285	100 x 300	MT 16 / 25	9	5	-
16,9	24,0	15	15	15	92,6	2,50	21,7	100 x 300	100 x 300	MT 25	-	5	-
20	28,5	17,8	17,8	17,8	109,6	2,17	25,6	100 x 300	116 x 285	MT 25	-	5	-
22,5	32,0	20	20	20	123,4	1,90	28,9	116 x 285	116 x 285	MT 25	-	5	-
25	35,6	22,2	22,2	22,2	137,0	1,73	32,0	116 x 285	136 x 300	MT 25	-	5	4
28,1	40,0	25	25	25	154,0	1,53	36,0	116 x 285	136 x 300	MT 25	-	5	4
30	42,7	26,7	26,7	26,7	164,4	1,44	38,4	116 x 285	136 x 300	MT 25	-	5	4
33,8	48,1	30	30	30	185,1	1,30	43,3	136 x 300	136 x 300	MT 25	-	-	4
40	56,9	35,5	35,5	35,5	219,2	1,08	51,3	136 x 300	136 x 375	MT 25	-	-	4 / 2
45	64,1	40	40	40	246,8	0,96	57,7	136 x 300	136 x 375	MT 25	-	-	4 / 2
50	2 x 35,6	44,4	44,4	44,4	274,0	0,86	64,1	136 x 375	-	MT 35	-	-	2
56,3	2 x 40	50	50	50	308,5	0,77	72,1	136 x 375	-	MT 35	-	-	2
2 x 33,8	2 x 48,1	66	66	66	407,6	0,58	95,3	-	-	-	-	-	-
2 x 40	3 x 40	75	75	75	463,6	0,51	108,4	-	-	-	-	-	-
2 x 50	4 x 35,6	90	90	90	549,8	0,43	128,6	-	-	-	-	-	-
2 x 56,3	4 x 40	100	100	100	622,2	0,38	145,5	-	-	-	-	-	-

Other capacitor powers and voltages are available on request. Contact us info@gruppenergia.it

HOW TO ORDER?



*All dimensions are in "mm" and will be confirmed at the time of order.

The detuned reactors are designed to protect the capacitors by preventing amplification of the harmonics present on the network.



As we know systems with significant non-linear loads generate harmonics and harmonics shortening steadily operating life of capacitors.

Amplification of harmonic currents is very high when the natural resonance frequency of the capacitor and the network combined happened to be close to any of the harmonic frequencies present.

To avoid this possibility detuned reactors have to be associated to Power Factor Correction capacitors. Capacitors and reactors are configured in a series resonant circuit in the way that the series resonant frequency is below the lowest harmonic frequency present in the system.

Detuned harmonic reactors prevents harmonic resonance problems, avoids the risk of overloading the capacitors and contributes to reducing voltage harmonic distortion in the network.

The most common values of reactors tuning frequency are 189 Hz and 134 Hz. (134 Hz is used with high level of 3rd harmonic voltages).

CAPACITORS RATED VOLTAGE WITH DETUNED REACTORS

INTACT R-POWER capacitors are oppositely designed to be used with detuned GE-RT3 reactors. This is because, capacitance and inductance must be chosen properly for series resonant circuit. Moreover the rated voltage of capacitors must be higher than network service voltage.

The recommended rated voltage of capacitors to be used with detuned harmonic reactors with respect to different network service voltage, relative tuning frequency and capacitance - inductive connection is given in the table below.

Network Service Voltage	Network Service Frequency	Tuning Frequency	Relative Impedance	INTACT R-POWER Rated Voltage	
400 V	50 Hz / 60 Hz	189 Hz	7 %	440 V	STANDARD SOLUTION
		134 Hz	14 %		
400 V	50 Hz / 60 Hz	189 Hz	7 %	525 V	EXTRA LIFE SOLUTION
		134 Hz	14 %		

EXAMPLE OF CAPACITOR SELECTION WITH A DETUNED REACTOR

Case:

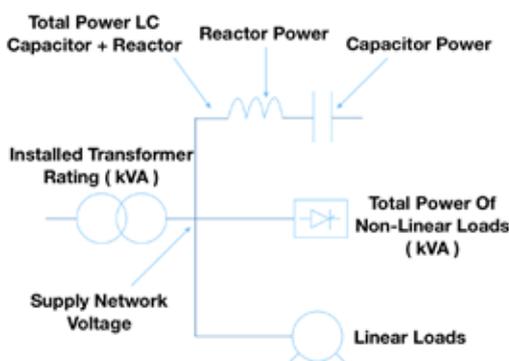
For a 400 V 50 Hz system, it is required to compensate 25 kVar reactive power with a detuned reactor, tuning frequency 189 Hz and 7% relative impedance.

Step 1:

Go to page 11 and check for 25 kVar in the "Total Power LC Capacitor + Reactor" column. Select the capacitor power from standard solution at 440 V or extra life solution at 525 V. The selection of the 25 kVar detuned reactor can be made on the page 13.

Step 2:

Combination of capacitor with order code **3PF28,1E440INR257** and detuned reactor with order code **GE3RTM25.400R189** will give 25 kVar reactive power as required.



GE-RT3 DETUNED HARMONIC REACTORS GENERAL CHARACTERISTICS

General

Standards:	IEC 61558-2-20 EN 61558-2-20
Origin:	100% made in Italy
Voltage range:	220 V to 690 V
Frequency:	50 Hz — 60 Hz
Relative impedance:	5,7%, 7%, 14%
Tuning frequency:	189 Hz / 230 Hz, 134 Hz / 160 Hz, 210 Hz / 250 Hz (at 50 Hz / 60 Hz)
Power range:	2,5 kVar to 100 kVar
Insulation class:	Class H
Winding material:	Al (Cu on request)
Working class:	Class F
Protection degree:	IP00
Test voltage:	3kV/1'
Maximum ambient temperature:	Ta 40 °C

GE-RT3 REACTORS - REACTORS RATED VOLTAGE: 400 V - 189 Hz - P=7%

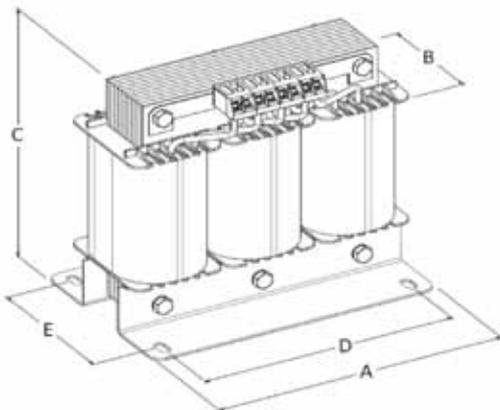
ORDER CODE	POWER	RATED INDUCTANCE	REACTOR CURRENT	REACTOR LOSSES	DIMENSIONS*			WEIGHT	TERMINAL TYPE	CLAMP SIZE	TYPE
	400 V kVar	3 x mH	A	At 75° C W	A (mm)	B (mm)	C (mm)	Kg	mmq		
GE3RTM5.400R189	5	7,66	7,2	47	180	90	173	5	Connector	6 sqmm	1
GE3RTM10.400R189	10	3,84	14,4	68	180	102	173	7	Connector	6 sqmm	1
GE3RTM12,5.400R189	12,5	3,07	18	72	180	113	173	10	Connector	6 sqmm	1
GE3RTM15.400R189	15	2,50	22	75	180	128	173	12	Connector	6 sqmm	1
GE3RTM20.400R189	20	1,90	29	108	240	160	185	15	Bars	25 x 3 mm M8	2
GE3RTM25.400R189	25	1,53	36	120	240	160	185	16	Bars	25 x 3 mm M8	2
GE3RTM50.400R189	50	0,77	72,1	177	250	175	205	24	Bars	25 x 3 mm M8	2
GE3RTM75.400R189	75	0,51	108,2	240	300	175	260	31	Bars	30 x 3 mm M8	2
GE3RTM100.400R189	100	0,38	144,3	320	300	200	260	42	Bars	30 x 3 mm M8	2

Other reactor powers and voltages are available on request. Contact us info@gruppenergia.it

CONSTRUCTION DIAGRAM

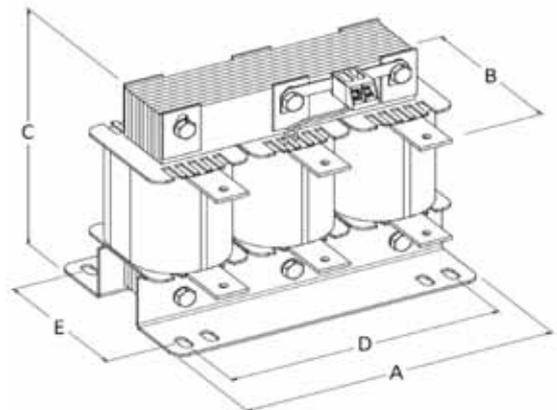
TYPE 1

Thermal PTC inserted in the middle coil



TYPE 2

Thermal PTC inserted in the middle coil



*All dimensions are in "mm" and will be confirmed at the time of order.

- Excellent damping of inrush current.
- Reduced watt loss during "ON" condition to save energy.
- Capacitor bank switching in parallel without derating.
- Enhanced equipment life.
- Low maintenance and down-time.
- Power quality improvement.
- Optimized solution cost.

CSC Duty Contactors are appositely designed for switching three phase, single or multiple step, capacitor banks without choke inductors.

SPECIAL CONTACTORS

CSC capacitor contactors are specially designed to meet stringent requirements of capacitors switching as this operation is associated with high inrush current all CSC contactors are fitted with front-mounted block of three early make auxiliary contact in series with six quick discharge damping resistors, 2 per phase. These auxiliary contacts limit peak current in first stage of switching. Subsequently the nominal current is transferred through main contacts which are switched in next stage and the auxiliary contacts are switched - off at the same time.

CSC CONTACTORS GENERAL CHARACTERISTICS

General	
Standards:	IEC 60947-4-1 EN 60947-4-1
Origin:	100% made in Italy
Voltage range:	220 V to 690 V
Frequency:	50 Hz — 60 Hz
Coil operating voltage:	220 V — 240 V
Number of pole:	3
Terminal:	Screw

CSC CONTACTORS SELECTION TABLE

ORDER CODE	POWER			DIMENSIONS*			WEIGHT	TIGHTENING TORQUE	MAXIMUM OPERATING RATE	MECHANICAL LIFE
	400 V-440 V kVar	220 V-240 V kVar	660 V-690 V kVar	W (mm)	D (mm)	H (mm)	Kg	Nm	Operations / Hour	Operations
CSC010	10	5,5	12,5	45	130	117	0,51	1,2	240	200000
CSC012,5	12,5	6,7	18	45	130	117	0,52	1,2	240	200000
CSC016,7	16,7	8,5	24	45	130	122	0,60	1,7	240	200000
CSC020	20	10	30	56	140	130	0,76	1,9	240	100000
CSC025	25	15	36	56	140	135	0,78	2,5	240	100000
CSC033,3	33,3	20	48	75	180	150	1,71	5,0	240	100000
CSC040	40	25	58	75	180	150	1,72	5,0	240	100000
CSC050	50	30	72	75	180	150	1,72	5,0	240	100000
CSO060	60	40	92	85	200	157	1,88	9,0	240	100000
CSS075	75	50	120	85	200	157	1,90	9,0	240	100000

CONSTRUCTION DIAGRAM



*All dimensions are in "mm" and will be confirmed at the time of order.

- Efficient and reliable construction.
- Efficient switching and long life.
- Flexibility to suit application.
- Safety built-in.
- Convenient and swift.

Main switch disconnecter installed on capacitor bank is used to disconnect power factor correction panel from the main circuit. The choice of Circuit breaker will depending on rating of the PFC equipment and the required fault current handling capacity.

The rating must be chosen as following:

$$\bullet 1,5 \times (\text{Total Power} / (\text{System voltage} \times 1,73))$$

Example:

Capacitor bank with Intact PLUS capacitors.

Total Power: 250 kVar at 400 V, 50 Hz

$$\implies 1,5 \times (250 \text{ kVar} / (0,4 \text{ V} \times 1,73)) = 1,5 \times 361,3 \text{ A} = 542 \text{ A}$$

Select a 630 A switch disconnecter, order code GE630K3

GE-VC-3 SWITCH DISCONNECTORS GENERAL CHARACTERISTICS

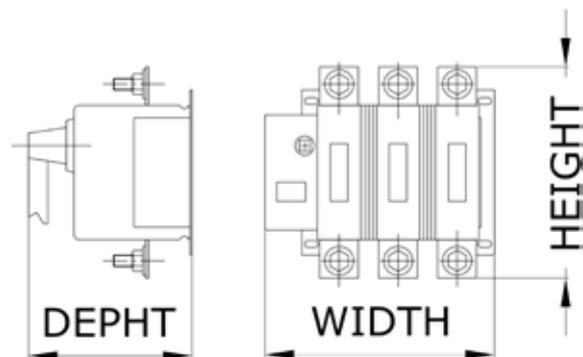
General

Standards:	IEC 60947-3 EN 60947-3
Origin:	100% made in Italy
Frequency:	50 Hz — 60 Hz
Ambient / Cubicle service temp.:	55 °C
IP level after mounting:	IP 54

GE-VC-3 SELECTION TABLE

ORDER CODE	RATED CURRENT	OPERATED VOLTAGE	INSULATION VOLTAGE	DIMENSIONS*			WEIGHT	TERMINAL TIGHTENING TORQUE	IMPULSE WITHSTAND VOLTAGE	MINIMUM CONDUCTOR CROSS SECTION	NUMBER of POLE
	A	V	V	W (mm)	D (mm)	H (mm)	Kg	Nm	kV	Cu mmq	
GE160DM3	160	415	750	190	90	142	1,8	8	8,0	70	3
GE200DM3	200	415	750	198	105	163	3	30...44	12,0	95	3
GE250DM3	250	415	750	198	105	163	3	30...44	12,0	120	3
GE315DM3	315	415	750	198	105	163	3	30...44	12,0	185	3
GE400K3	400	415	1000	211	130	205	5,2	30...44	12,0	2 x 150	3
GE630K3	630	415	1000	244	130	223	6,2	50...75	12,0	2 x 185	3
GE800K3	800	415	1000	260	130	223	6,2	50...75	12,0	2 x 240	3
GE1000K3	1000	415	1000	383	125	352	16,3	50...75	12,0	2 x (60 x 5)	3
GE1250K3	1250	415	1000	383	125	352	16,3	50...75	12,0	2 x (80 x 5)	3
GE1600K3	1600	415	1000	383	125	352	17,5	50...75	12,0	2 x (100 x 5)	3
GE2000K3	2000	415	1000	468	271	352	37	50...75	12,0	3 x (100 x 5)	3
GE2500K3	2500	415	1000	468	271	352	37	50...75	12,0	4 x (100 x 5)	3
GE3150K3	3150	415	1000	468	271	352	37	50...75	12,0	3 x (100 x 10)	3

CONSTRUCTION DIAGRAM



*All dimensions are in "mm" and will be confirmed at the time of order.

ERN 11005 / ERN 11007 ADVANCED KEY FEATURES:

- Current measurement sensitivity 20 mA
- Perfect for smaller less demanding applications
- Features automatic control section recognition
- Independent alarm warnings
- Precise measurement and control even under conditions of voltage or current waveform distortion
- Measurement 1 U and 1 I.
- Automatic set up.
- Capacitor protection.
- Programmable alarms.
- Measurement U, I, P and Q.
- Control of PF, $\cos\phi$ and THD control.
- Power import / export.
- Measurement up to 19-th harmonic.
- Integrated thermometer.

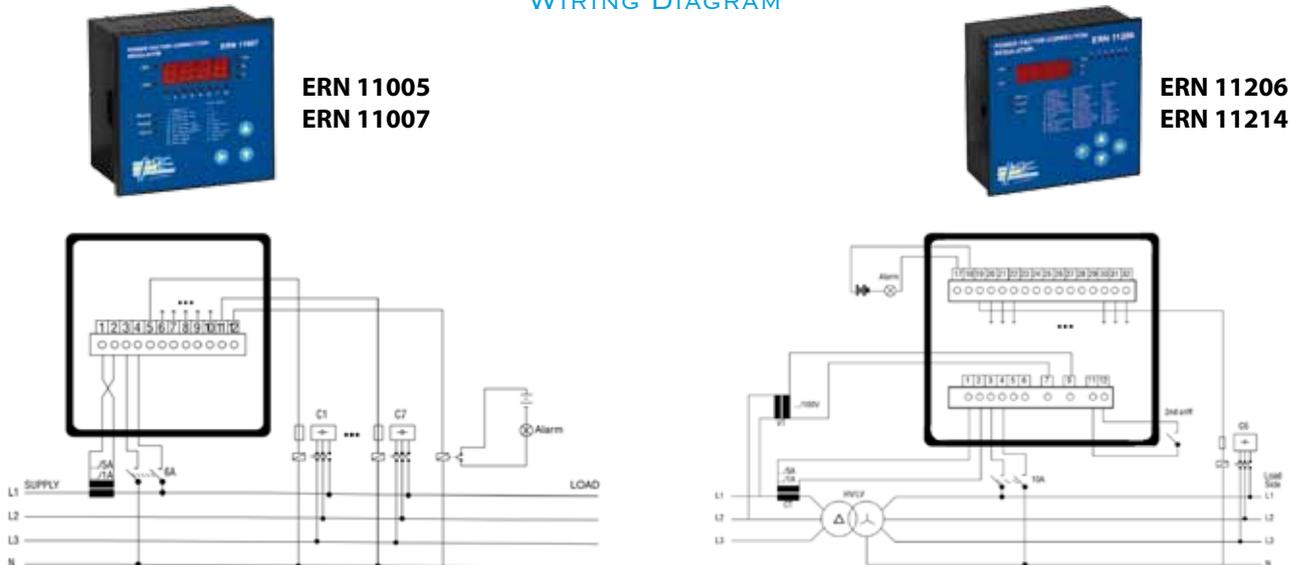
ERN 11206 / ERN 11214 SMART KEY FEATURES:

- Current measurement sensitivity 2 mA
- Input for 2nd tariff
- Suitable for LV and HV application
- 2-nd rate inputs
- Separate AC / DC supply
- Ethernet port (optional)
- RS485 port (optional)
- Modbus (optional)
- Features automatic control section recognition
- Independent alarm warnings
- Precise measurement and control even under conditions of voltage or current waveform distortion
- Measurement 1 U and 1 I.
- Automatic set up.
- Capacitor protection.
- Programmable alarms.
- Measurement U, I, P and Q.
- Control of PF, $\cos\phi$ and THD control.
- Power import / export.
- Measurement up to 19-th harmonic.
- Integrated thermometer.

ERN TECHNICAL SPECIFICATIONS

	ERN 11005	ERN 11007	ERN 11206	ERN 11214		ERN 11005	ERN 11007	ERN 11206	ERN 11214
Power factor desired	0,80 ind. through 0,80 cap.				Measurement current (galv. isolated)	0,02 ÷ 7 A		0,002 ÷ 7 A	
Connection time	5 to 1200 seconds				Peak overload	70 A / 1 second; maximum repetition frequency > 5 minutes			
Smallest capacitor current	(0,02 A ÷ 2 A) x CT		(0,002 A ÷ 2 A) x CT ratio		Number of output relays	6	8	6	14
Compensation section values setting	Automatic or Manual				Output relay load rating	250 V AC / 4 A 110 V DC / 0.3 A			
Connection configuration setting	Automatic or Manual				Enclosure IP front panel	IP 40 (IP 54 option)			
Power supply	80 ÷ 275 V AC 43 ÷ 67 Hz, 5VA		90 ÷ 275 V AC (43÷67 Hz) or 100÷300 V DC, 7VA		Enclosure IP back panel	IP 20			
Measurement voltage	The same as power supply voltage		57.7 ÷ 690 V AC, +10/-20%, 43 ÷ 67 Hz		Dimensions*	96x96	96x96	144x144	144x144
Operating temperature	-40 °C +60 °C				Weight	0,3 kg max.	0,3 kg max.	0,7 kg max.	0,7 kg max.

WIRING DIAGRAM



ERP3/ERP5/ERP8 STANDARD PLUS SERIES KEY FEATURES:

- 3 Relay outputs built-in ERP 3 (96x96 mm), expandable up to 6
- 5 Relay outputs built-in ERP 5 (96x96 mm), expandable up to 8
- 8 Relay outputs built-in ERP 8 (144x144 mm), expandable up to 14
- Expansion bus for MERP series expansion modules:
 - Additional relay outputs (steps)
 - RS232, RS485, USB ports
 - Ethernet communications interface (ERP 8 only)
- High accuracy TRMS measurements
- Connection in single or three phase lines and co-generation systems with 4-quadrant operation with dedicated set point $\cos\theta$
- Wide selection of electrical measurements, including voltage and current THD with harmonic analysis up to 15-th order
- Voltage input separated from power supply, suitable for its connection in MV applications
- Wide range power supply (100-440 Vac)
- Wide voltage measurement range (50-720 Vac)
- Balanced use of steps with same power rating
- Reactive power measurement per step installed
- Capacitor over-current protection
- Step failure alarm
- Maintenance counter in hours and number of operations for the steps
- Configurable rated current input (1 A or 5 A)
- Programming from panel front, from PC or from tablet/ smartphone
- Backup copy of default settings commissioning
- 2-level password protection for settings
- Built-in temperature sensor
- LCD display
- Programmable alarms

ERGP 8 HIGH PERFORMANCE SERIES KEY FEATURES:

- **This regulator includes all the features of the ERP 3/5/8 series in addition to the features listed below:**
- 8 Relay outputs built-in (144x144 mm), expandable up to 24
- Expansion bus for MERP series expansion modules
- Backlight graphic display 128x80 pixel LCD with text in 10 languages: Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese.
- Automatic identification of sense of CT current flow
- Connection to single and three-phase lines, three-phase lines with neutral control and co-generation systems with 4-quadrant operation
- Use with MV lines
- Capability to correctly operate also in systems having high harmonic current
- Extreme reduction of the number of switching operations
- Balanced use of steps with same power rating
- Reactive power measurement per installed step
- Recording of the number of connections per step
- Capacitor over-current protection on all three phases
- Over-temperature protection by internal sensor
- Accurate no-voltage release protection function
- Current and voltage harmonic analysis
- Harmonic analysis of current and voltage waveforms recorded for overload events
- Quick CT programming function
- USB and WI-FI communication interface for personal computer, smartphone and tablet connection
- Modbus-RTU, TCP and ASCII communication protocols
- Set-up and remote control software
- SMS sending for alarm conditions with MERP1015 expansion module

ERP / ERGP TECHNICAL SPECIFICATIONS

	ERP 3	ERP 5	ERP 8	ERGP 8		ERP 3	ERP 5	ERP 8	ERGP 8
Supply rated voltage	100 - 440 Vac 110 - 250 Vdc				Overload peak	50 A for 1 second		0,002 ÷ 7 A	
Supply rated frequency	45 - 66 Hz				Enclosure IP front panel	IP 54	IP 54	IP 65	IP 65
Measuring voltage range	50 - 720 V L-L 415 Vac L-N				Enclosure IP back panel	IP 20			
Maximum rated voltage inputs Ue	600 Vac L-L (346 Vac L-N)				Dimensions*	96x96	96x96	144x144	144x144
Rated current input	1A or 5 A				Weight	0,32 kg max.	0,32 kg max.	0,64 kg max.	0,98 kg max.

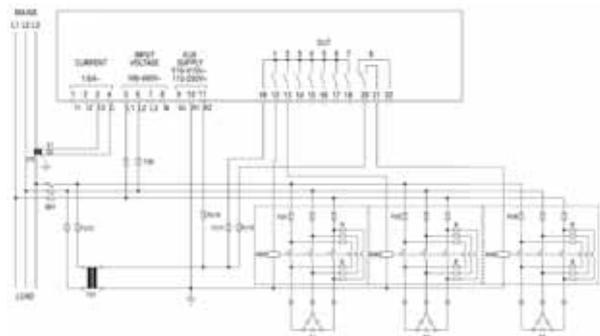
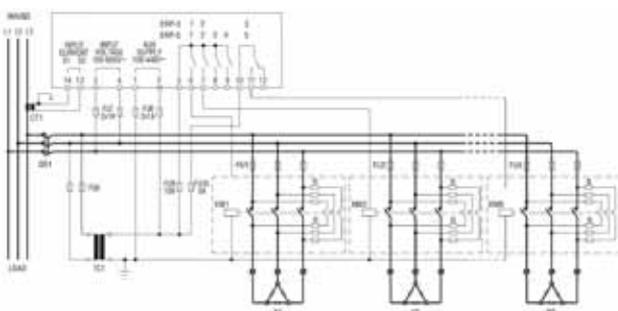
WIRING DIAGRAM



ERP 3
ERP 5
ERP 8



ERGP 8



*All dimensions are in "mm" and will be confirmed at the time of order.

Optimize Energy

- By reducing electricity bills.
- By reducing power losses.
- By reducing CO2 emissions.

Increase Power

- Compensate for voltage sags detrimental to process operation.
- Avoid nuisance tripping and supply interruptions.

Improve Your Business Performance

- Compensate for voltage sags detrimental to process operation.
- Avoid nuisance tripping and supply interruptions.

CBAM-3 GENERAL CHARACTERISTICS

General

Standards:	IEC 60439-1/2, IEC 61921, IEC 60831-1/2
Origin:	100% made in Italy
Construction:	Three phase INTACT PLUS capacitors or INTACT R—POWER capacitors
Frequency:	50 Hz — 60 Hz
Temperature range:	-25 °C / 55 °C
Insulating voltage:	690 V
Service:	Continuous
IP level after mounting:	IP 54
Inner surface finish:	Zinc passivation
Use:	Indoor (Outdoor on request)

CBAM-3 AUTOMATIC POWER FACTOR CORRECTION SYSTEMS 400 V / 415 V - 3 PHASE - 50 HZ / 60 HZ

POWER AT SYSTEM VOLTAGE 50 Hz		POWER AT SYSTEM VOLTAGE 60 Hz		BANKS POWER								STEPS	In 50 Hz			SWITCH DISCONNECTOR		AVAILABLE DIMENSIONS IP 54		
400 V kVar	415 V kVar	400 V kVar	415 V kVar	400 V 50 Hz kVar									400 V A	50Hz A	60Hz A	W (mm)	D (mm)	H (mm)		
50	54	60	65	5	5	10	10	20				10	72	160	160	600	600	1510		
75	81	90	97	5	10	20	40					15	108	160	200	600	600	1510		
100	108	120	129	12,5	12,5	25	50					8	144	250	250	600	600	1510		
125	135	150	162	12,5	25	37,5	50					10	180	250	315	600	600	1510		
150	162	180	194	12,5	25	37,5	75					12	217	315	400	600	600	1510		
175	188	210	226	25	50	50	50					7	253	400	630	600	600	1510		
200	215	240	258	25	50	50	75					8	289	400	630	600	600	1510		
250	269	300	323	25	25	50	75	75				10	361	630	630	600	600	1710		
300	323	360	388	25	50	75	75	75				12	433	630	800	600	600	1710		
400	431	480	517	25	50	75	100	150				16	577	800	1250	600	600	1710		
500	538	600	646	50	100	100	100	150				10	722	1000	1600	600	600	2110		
600	646	720	775	50	100	150	150	150				12	866	1250	1600	600	600	2110		
750	807	900	969	75	75	150	150	150	150			10	1083	1600	2 x 1000	1200	600	2110		
825	888	990	1066	75	150	150	150	150	150			11	1191	2 x 1000	2 x 1250	1200	600	2110		
900	969	1080	1163	50	100	150	150	150	150	150		18	1299	2 x 1250	2 x 1250	1200	600	2110		
975	1050	1170	1259	75	150	150	150	150	150	150		13	1407	2 x 1250	2 x 1600	1200	600	2110		
1125	1211	1350	1453	75	150	150	150	150	150	150	150	15	1624	2 x 1600	2 x 1600	1200	600	2110		

Other banks powers and steps configurations are available on request. Contact us info@gruppenergia.it

*All dimensions are in "mm" and will be confirmed at the time of order.

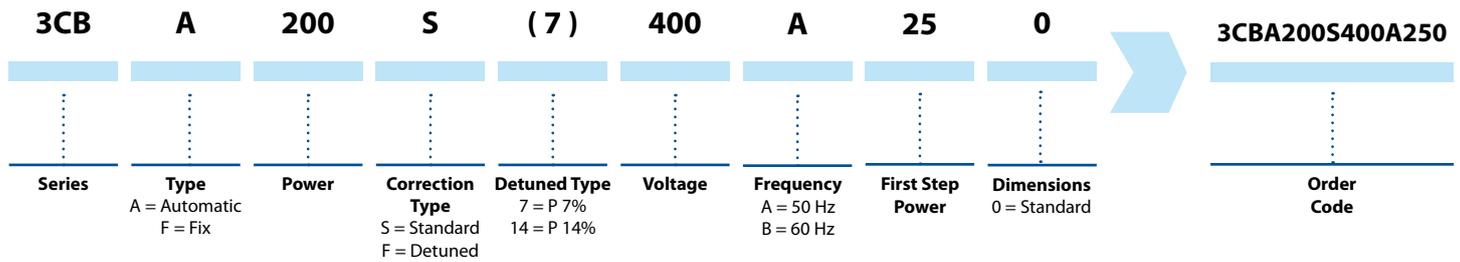
DETUNED AUTOMATIC POWER FACTOR CORRECTION SYSTEMS

CBAMF-3 DETUNED AUTOMATIC POWER FACTOR CORRECTION SYSTEMS 400 V / 415 V - 3 PHASE - WITH 189 HZ - P=7% FILTER

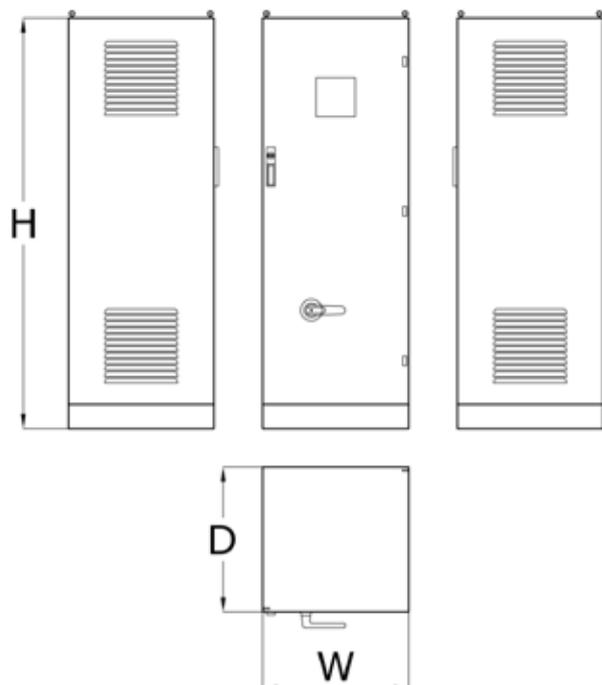
POWER AT SYSTEM VOLTAGE 50 Hz	POWER AT SYSTEM VOLTAGE 60 Hz	BANKS POWER								STEPS	In 50 Hz	SWITCH DISCONNECTOR	AVAILABLE DIMENSIONS IP 54		
		400 V 50 Hz kVar											400 V A	50Hz A	W (mm)
56	60	18,75	37,5							3	81	160	600	600	1510
75	80	25	50							3	108	160	600	600	1710
88	94	12,5	25	50						7	126	160	600	600	1710
131	140	18,75	37,5	75						7	189	250	600	600	1710
150	161	25	50	75						6	217	250	600	600	2110
206	221	18,75	37,5	75	75					11	298	400	600	600	2110
300	321	25	50	75	75	75				12	433	630	1200	600	1710
356	381	18,75	37,5	75	75	75	75			19	514	630	1200	600	1710
450	482	25	50	75	75	75	75	75		18	650	800	1200	600	2110
506	542	18,75	37,5	75	75	75	75	75	75	27	731	800	1200	600	2110

Other banks powers and steps configurations are available on request. Contact us info@gruppenergia.it

HOW TO ORDER?



CONSTRUCTION DIAGRAM



*All dimensions are in "mm" and will be confirmed at the time of order.



3 IN 1

- 1 → Eliminate Harmonics
- 2 → Perform Power Factor Correction
- 3 → Stabilizes Voltage

AFC-3 low voltage active filter is the newest generation and completely digital harmonic elimination device perfect to solve power quality problems.

Comparing with traditional technology AFC-3 active filter has following advantages:

- Faster speed.
- Smaller appearances.
- Stronger function.
- Realise power compensation (no dynamic compensation).
- Solve voltage fluctuations and flicker.
- Easy to install, debug and maintain.
- Adopts the most advanced control technology to achieve full automation.

AFC - 3 GENERAL CHARACTERISTICS

General	
Origin:	100% made in Italy
Wiring type:	3P4L / 3P3L
Work voltage:	380 V \pm 20%
Work frequency:	50 Hz — 60 Hz
Compensation current:	30 — 1200 A
Dynamic full response time:	Open loop \leq 5 ms / Closed loop \leq 10 ms
Filtering range:	2 - 51 harmonic orders
Filtering effect:	Filtering rate > 90%
Protection type:	Short circuit, under voltage, overload, phase loss, overpressure, over temperature, over current protection
Protection grade:	IP 30, other on request
Cooling way:	Forced air cooling
Working environment temperature:	-25 °C / +40 °C
Installation:	Indoor

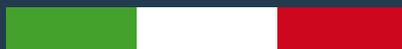
AFC - 3 ACTIVE POWER FILTERS

ORDER CODE	COMPENSATION CURRENT	SYSTEM FREQUENCY	SYSTEM VOLTAGE	WRITING TYPE	INSTALLATION TYPE	AVAILABLE DIMENSIONS* IP 30		
	A	Hz	Vac			W (mm)	D (mm)	H (mm)
AFC3A35W400L4	35	50	400	3P4L	Wall Hanging	463	265	703
AFC3A50W400L4	50	50	400	3P4L	Wall Hanging	463	265	703
AFC3A50C400L4	50	50	400	3P4L	Cabinet	800	800	2200
AFC3A75W400L4	75	50	400	3P4L	Wall Hanging	463	265	703
AFC3A75C400L4	75	50	400	3P4L	Cabinet	800	800	2200
AFC3A100W400L4	100	50	400	3P4L	Wall Hanging	463	265	703
AFC3A100C400L4	100	50	400	3P4L	Cabinet	800	800	2200
AFC3A150C400L4	150	50	400	3P4L	Cabinet	800	800	2200
AFC3A200C400L4	200	50	400	3P4L	Cabinet	800	800	2200
AFC3A250C400L4	250	50	400	3P4L	Cabinet	800	800	2200
AFC3A300C400L4	300	50	400	3P4L	Cabinet	800	800	2200
AFC3A400C400L4	400	50	400	3P4L	Cabinet	800	800	2200

*All dimensions are in "mm" and will be confirmed at the time of order.



MADE IN ITALY



WWW.GRUPPOENERGIA.IT

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Certification
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