

ORTEA NE
XT

Innovative solutions for sustainable
power quality since 1969



LV POWER FACTOR CORRECTION PART & TRAYS



ORTEA ^{NE}_XT

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OUR BRANDS:

ORTEA
BY ORTEA NEXT

VOLTAGE STABILIZERS
SAG COMPENSATORS
LV TRANSFORMERS AND REACTORS

ICAR
BY ORTEA NEXT

POWER FACTOR CORRECTION SYSTEMS
ACTIVE HARMONIC FILTERS

ENERSOLVE
BY ORTEA NEXT

ENERGY EFFICIENCY SMART DEVICES

PowerSines
BY ORTEA NEXT

ENERGY SAVING VOLTAGE OPTIMIZERS

GENERAL
SALES
CONDITIONS



ABOUT US

Innovative solutions for sustainable power quality since 1969

Founded in 1969, Ortea is a leader in the design and manufacture of innovative products and customised solutions for power quality and energy efficiency.

Thanks to a network of offices and dealers on all continents, Ortea products are now installed, maintained and operating in more than 100 countries worldwide.

In line with the strategy of creating a global pole of excellence, the new brand Ortea Next is created in 2019, bringing together the 3 historical product brands - Ortea, Icar and Enersolve - in a single concept of integrated technological offer.

Alongside the standard production, Ortea Next develops and produces equipment that can be customised according to the client's specific requirements with extreme flexibility.

The process of renewal and continuous improvement strengthens Ortea Next's leadership as your ideal partner to meet the challenge of the global energy transition.

GLOBAL PRESENCE

Ortea Next solutions are already present in a large number of countries with positive, long-lasting results

Thanks to a network of offices and distributors that are strategically distributed, local, fast, and competent assistance is guaranteed.



ORTEA NEXT

MADE IN ITALY

Production quality, attention to details, design, and reliability represent the added value of Made in Italy. All the Ortea Next solutions are devised, designed, produced, and assembled in Italy.

EXPERIENCE

Founded in 1969, Ortea Next has accumulated experience and expertise that have contributed to continuous growth over time, until becoming an authoritative and innovative company in designing and producing power quality solutions on an international scale.

RELIABILITY

The certified Company Quality System of Ortea Next guarantees the reliability and longevity of the whole range of products, each of which is strictly controlled and tested.

CUSTOMIZED SOLUTIONS

In addition to standard production, Ortea Next is able to develop and produce complete and integrated solutions based on the specific needs of each client with extreme flexibility.

Ortea Next is always at your service to evaluate projects and study customised solutions, assisting and supporting the client at each stage of development.

QUALITY

Ortea Next's certified Company Quality System guarantees that all the production stages are controlled, from the verification of components to the choice of the most suitable packaging depending on the kind of transport.

RESEARCH & DEVELOPMENT

To ensure innovative solutions, Ortea Next continuously collaborates with universities, institutions, and technological partners in researching and developing new products and reliable technologies.

EXPERTISE

The experience and expertise of the Ortea Next technicians assist the customer both in the design and service stage, ensuring solidity and reliability in researching the best solution.

CUSTOMER CENTRIC

Listening to the customer and their requirements allows Ortea Next to continuously improve the service level offered.



CERTIFIED QUALITY

The conviction that product quality and customer satisfaction must be the main requirements of a modern company has led to the adoption of a certified Company Quality System

After having obtained the first ISO 9001 certification in 1996, today our Company Quality System is certified by Lloyd's Register in compliance with the main standards:

- ISO9001 Quality management system
- ISO14001 Environmental management system
- ISO45001 Occupational health and safety management system

This means that Ortea Next guarantees optimised performance in terms of the internal management of processes, engagement on environmental issues, and attention to occupational health and safety

POWER QUALITY SOLUTIONS

Paying little attention to the issue of power quality causes problems and damage to equipment and production processes

Ortea Next offers a complete range of integrated products and solutions for power quality and energy efficiency, thanks to the synergy between the Ortea Next brands, Ortea, Icar, Enersolve, and Powersines.

VOLTAGE VARIATION



VOLTAGE STABILIZERS

SAGs / DIPS



SAG COMPENSATORS

UNPROTECTED LOADS



LV TRANSFORMERS AND REACTORS

EXCESSIVE REACTIVE POWER



PFC SYSTEMS

HARMONIC POLLUTION



ACTIVE HARMONIC FILTERS

WASTE OF ENERGY



ENERGY EFFICIENCY
SMART DEVICES

WASTE OF ENERGY



ENERGY SAVING
VOLTAGE OPTIMIZERS



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CRT POWER CAPACITORS



The film used in the CRT power capacitors comes directly from the ORTEA experience in the high performance capacitors, in particular it is defined as “High density metallized polypropylene film”

The main difference in comparison to standard polypropylene capacitors is the way in which the dielectric film is metallized. In standard polypropylene capacitors the thickness of the metal layer deposited on the film surface is constant; in 1995, instead, it has developed a manufacturing process that enables obtaining a metal layer with properly modulated thickness and achieving extraordinary results in the capacitors field for direct current and energy accumulation applications.

Subsequently this technology has been extended to capacitors for alternating current applications, with same remarkable results in power factor correction of industrial facilities. The modulation of the metallization thickness, considerably betters capacitors performances (and therefore those of the power factor corrector systems of which they are the basic component) in terms of:

- Increased specific power (kvar/dm³) with resulting reduction of power factor corrector systems dimension.
- Improvement of the strengthens to continuous and temporaries overvoltage for a better reliability even in plants with voltage peaks due to the network or manoeuvres on the plant; CRT capacitors are in fact tested at three times the rated voltage (type test).
- Better reaction to the internal short circuit thanks to the special metallization with variable thickness.

General description

Main features

- Three phase windings delta connected in a cylindrical aluminum case.
- Rated power from 2,5kvar up to 50kvar.
- Rated voltage from 230V up to 800V.
- Rated frequency 50 / 60 Hz.
- IP20 terminal board.
- Reduced mounting cost thanks terminal lid connections.
- Up to 130.000 hours service life design.
- Dry, environment friendly construction.
- Suitable for any mounting position (vertical preferable for better cooling).
- Indoor installation.

Applications

- Individual fixed Power Factor Correction for motors, low voltage transformers, etc.
- Low voltage automatic Power Factor Correction Capacitor Banks.
- Low voltage detuned/tuned Capacitor Banks.

Damping of Inrush Current

Capacitors used for power factor correction have to withstand a lot of switching operations.

The switching of a capacitor in parallel with energized capacitor banks, produces extremely high inrush currents and voltage transients. The connection of a low voltage power factor correction capacitor without damping to an AC power supply, could lead to a reduced lifetime.

For this reason, capacitors should be protected during the switching operation by means of suitable contactors equipped with damping resistors (AC6b).

Harmonics

Harmonics are sinusoidal voltages and currents with multiple frequencies of the 50 or 60 Hz line frequency. In presence of harmonics the resonance phenomena can be avoided by connecting capacitors in series with reactors (detuned filters). Components for detuned filter must be carefully selected (see next chapter). Particular care has to be taken for capacitors because the voltage across them will be higher than the nominal voltage when they have a reactor in series.

Discharging

Capacitors must be discharged in 3 minutes to 75V or less. There shall be no switch, fuse or any other isolating device between the capacitor unit and the discharging device.

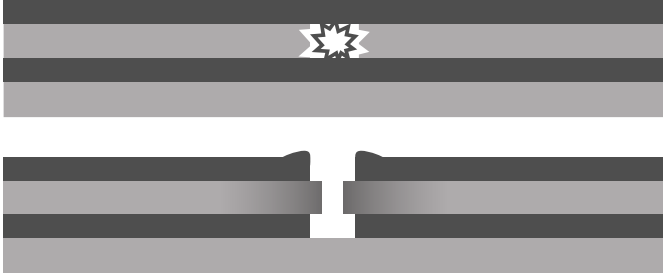
ORTEA supplies capacitor discharge resistors to all series.

Safety features

CRT capacitors are equipped with the most modern and reliable safety features to keep capacitor working in proper conditions and to prevent heavy breakdowns.

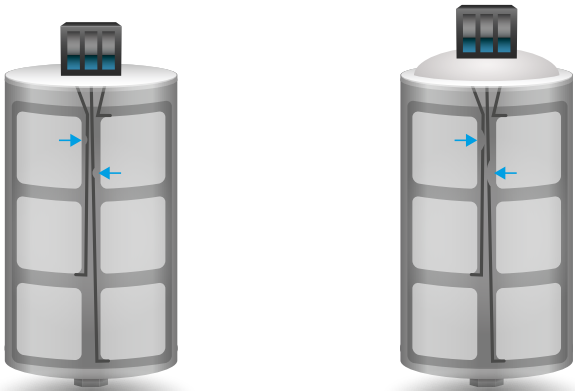
Self-healing metallized polypropylene

This metallized polypropylene feature is widely used in Power Capacitors as a mean to keep capacitors working even when voltage breakdown between the metal layers occurs. In case of arc, the metallized surface around is evaporated but the breakdown is kept in limited area and it does not enlarge its effects.



Over pressure safety device

In the case of fault, due to over voltage, overload or normal ageing, the self-healing process may accelerate and so to create a increasing pressure within the case. In order to prevent the case from bursting, capacitor is fitted with an over pressure device that set out of service the capacitor from the supply; two of the supply leads have reduced section, and while the pressure increases leads are strained by the top lid till breaking of cables.



CAPACITOR IN WORKING CONDITIONS

CAPACITOR WITH OPERATED MECHANISM

Dry technology

As CRT capacitor is filled with resin, there is no risk of leaking oil or gas.

Touch proof terminals

CRT is equipped with terminal board of IP20 protection degree (see product tables for specific feature application).

Inside layout

Metallized Polypropylene

The CRT capacitor has a peculiar metallization process that enables obtaining a metal layer with properly modulated thickness and achieving extraordinary performances in terms of voltage withstand and overall reliability. The film is then cut and wound on high precision and fully automated winding machines, sprayed with abundant metal contact layer to reduce the contact resistance.

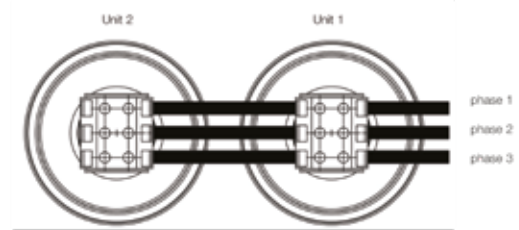
Wave cut film

CRT capacitors are also fitted with wave cut film to reduce the stress between the polypropylene film layers and the contact layer. This enable capacitors to withstand higher inrush currents during the switching operations.

Environmentally friendly filler

Capacitors need filler around capacitive elements in order to protect metal layers from oxidation and to help heat dissipation. Without this feature capacitors would cope with accelerated self healing and so a shorter service life. The filler are all PCB free.

Limits for parallel of CRT capacitors



The maximum number of parallel connected units should not have a total output higher than 40kvar. The cross section of cables in the Unit 1 (phase 1, 2, 3) have to be selected considering the total amount of the Unit 1 and Unit 2 output. Leave enough space to allow longitudinal expansion of the can for proper operation of the internal over pressure safety device (25 mm). A minimum space of 20 mm between capacitors is necessary to ensure proper cooling.

Installation and maintenance

Handling and Storage

Capacitors shall have to be handled and stored with care in order to avoid any mechanical damage during transportation. Protection against environmental influences shall also be taken.

Installation

Capacitors are suitable for indoor installation and vertical mounting position is preferable for better cooling. Capacitors must be installed in such a way that the specified limit temperature is not overcome. Not being in compliance with the above instructions will result as a reduction of the expected service life. Installation of capacitors shall have to be performed in such a way that any dangerous resonance phenomena due to harmonics is avoided.

Automatic power factor correction banks

The switching of a capacitor bank in parallel with energized capacitor(s), produces extremely high inrush currents and voltage transients. For this reason, it is extremely important to wait for the unit discharge before a new switching.

Assembly

Capacitors shall have to be assembled by means of the threaded M12 bottom stud. The maximum applicable tightening torque is 10Nm. The catalogue specifies the recommended cross section of the supplying cables. In order to ensure a proper operation of the internal overpressure safety device, an extra minimum 25mm clearance distance between the upper part of capacitors and assembly enclosures shall have to be provided. Capacitors shall be placed in such a way that there is an adequate dissipation by convection and radiation of the heat produced by the capacitor losses. The ventilation of the operating room and the arrangement of the capacitor units shall provide good air circulation around each unit. A minimum 20mm distance between the units has to be maintained.

Maintenance

Periodical checks and inspections are required to ensure reliable operation of capacitors. Monitoring and recording of the electrical service parameters are also recommended to become acquainted with progressive capacitors stress conditions.

Protections

Capacitors shall have to be protected against inrush peak currents during switching operations of automatic banks by means of suitable contactors equipped with pre-making resistors.

Safety Instructions

DO NOT MISAPPLY CAPACITORS FOR POWER FACTOR CORRECTION APPLICATIONS

Capacitors according to the Standards, are equipped with a suitable discharge device such as discharge resistors, permanently connected. They are able to reduce the residual voltage so that any dangerous resonance phenomena due to harmonics is avoided.

Automatic power factor correction banks

DO NOT TOUCH ANY CAPACITOR TERMINAL IF NOT SHORT CIRCUITED AND EARTHED IN ADVANCE to prevent damage to people and goods due to improper usage and/or application of capacitors, the "RECOMMENDATION FOR THE SAFE USE OF STATIC CAPACITORS, BANKS AND EQUIPMENT FOR POWERFACTOR CORRECTION" shall have to be strictly respected.

ORTEA SpA is not responsible for any kind of possible damages occurred to people or things, derived from the improper installation and application of Power Factor Correction capacitors.

Most common misapplication forms

- Current, voltage, harmonics and frequency above specification.
- Working or storage temperature beyond the specified limits.
- Unusual service conditions as mechanical shock and vibrations, corrosive or abrasive conductive parts in cooling air, oil or water vapour or corrosive substances, explosive gas or dust, radioactivity, excessive and fast variations of ambient conditions, service areas higher than 2000 m above sea level...

In case of doubt in choice or in performances of the capacitors ORTEA SpA technical service MUST be contacted.

Personal Safety

Electrical or mechanical misapplications of CRT capacitors may become hazardous. Personal injury or property damage may result from disruption of the capacitor and consequent expulsion of melted material.

Before using the capacitors in any application, please read carefully the technical information contained in "Installation and operating manual".

The energy stored in a capacitor may become lethal.

The capacitor should be short circuited and earthed before handling to prevent any chance of shock.

Special attention must be taken to make sure the capacitors are correctly used for each application and that warnings and instructions are strictly followed.

Capacitors are made with polypropylene that is a flammable material.

The risk of fire cannot be totally eliminated; therefore suitable precautions shall be taken. Reliability data have a statistical value (i.e. based on a large number of components), it is not possible to transfer automatically data from a limited quantity or even to a batch of capacitors.

This applies in particular to consequential damage caused by component failure.

CRT POWER CAPACITORS

Common technical characteristics

Dielectric	polypropylene metallized film
Winding connection	delta
Safety device	internal overpressure disconnecter
Capacitance tolerance	-5%, +10%
Over voltages	according to IEC Un +10% (up to 8 hours daily) Un +15% (up to 30 minutes daily) Un +20% (up to 5 minutes daily) Un +30% (up to 1 minute daily)
Maximum inrush current	200 In
Insulation level	3 / 12 kV
Voltage test between terminals (routine test)	2.15 Un, 50Hz, 10 seconds
Voltage test between terminals (type test)	3.00 Un, 50Hz, 60 seconds
Voltage test terminals/case	3000V, 50Hz, 10 seconds
Dielectric losses	< 0.2 W/kvar

Temperature class	-25/D
Cooling	natural air or forced ventilation
Permissible humidity	95%
Service life (hot spot 50°C)	130.000 operating hours
Service life (hot spot 55°C)	100.000 operating hours
Altitude above sea level	2000 m
Impregnation	resin filled, PCB free
Terminals	terminal board
Fixing and Ground	threaded M12 stud on case bottom
Mounting position	vertical preferable for better cooling
Protection degree	IP20
Installation	indoor
Discharge resistors	included
Discharge time	< 3 minutes to 75V or less
Applicable standards	IEC 60831-1/2

Un = 400V(415V)-50Hz

Part number	Model	Q Power	C Capacity	In Current	D Diameter	H Height	Pcs/box	Box dimensions	Discharge resistor
		[kvar]	[µF]	[A]	[mm]	[mm]		[mm]	
6DCRTX0500F50	CRT-X-75210-5-400	5	3 x 33.2	3 x 7.2	75	210	12	285x370x360	External
6DCRTX0750F50	CRT-X-75210-7.5-400	7.5	3 x 49.7	3 x 10.8	75	210	12	285x370x360	External
6DCRTX1000F50	CRT-X-85210-10-400	10	3 x 66.3	3 x 14.4	85	210	12	285x370x360	External
6DCRTX1250F50	CRT-X-85210-12.5-400	12.5	3 x 82.9	3 x 18	85	210	12	285x370x360	External
6DCRTX1500F50	CRT-X-100210-15-400	15	3 x 99.5	3 x 21.7	100	210	15	560x340x345	External
6DCRTX2000F50	CRT-X-100210-20-400	20	3 x 132.6	3 x 28.9	100	210	15	560x340x345	External
6DCRTX2500F50	CRT-X-120210-25-400	25	3 x 165.8	3 x 36.1	120	210	6	445x305x370	External
6DCRTX3000F50	CRT-X-120210-30-400	30	3 x 198.9	3 x 43.3	120	210	6	445x305x370	External
6DCRTX4000F50	CRT-X-120280-40-400	40	3 x 265.4	3 x 57.7	120	280	6	445x305x370	External
6DCRTX5000F50	CRT-X-120280-50-400	50	3 x 332	3 x 72.2	120	280	6	445x305x370	External

Un = 450V-50Hz

Part number	Model	Q Power	C Capacity	In Current	D Diameter	H Height	Pcs/box	Box dimensions	Discharge resistor
		[kvar]	[µF]	[A]	[mm]	[mm]		[mm]	
6DCRTX0500G50	CRT-X-75210-5-450	5	3 x 26.2	3 x 6.4	75	210	12	285x370x360	External
6DCRTX0750G50	CRT-X-75210-7.5-450	7.5	3 x 39.3	3 x 9.6	75	210	12	285x370x360	External
6DCRTX1000G50	CRT-X-85210-10-450	10	3 x 52.4	3 x 12.8	85	210	12	285x370x360	External
6DCRTX1250G50	CRT-X-85210-12.5-450	12.5	3 x 65.5	3 x 16	85	210	12	285x370x360	External
6DCRTX1500G50	CRT-X-100210-15-450	15	3 x 78.6	3 x 19.2	100	210	15	560x340x345	External
6DCRTX2000G50	CRT-X-100210-20-450	20	3 x 104.8	3 x 25.7	100	210	15	560x340x345	External
6DCRTX2500G50	CRT-X-120210-25-450	25	3 x 131	3 x 32.1	120	210	6	445x305x370	External
6DCRTX3000G50	CRT-X-120210-30-450	30	3 x 157.2	3 x 38.5	120	210	6	445x305x370	External
6DCRTX4000G50	CRT-X-120280-40-450	40	3 x 209.7	3 x 51.3	120	280	6	445x305x370	External
6DCRTX5000G50	CRT-X-120280-50-450	50	3 x 262.1	3 x 64.2	120	280	6	445x305x370	External

Un = 525V-50Hz

Part number	Model	Q Power	C Capacity	In Current	D Diameter	H Height	Pcs/box	Box dimensions	Discharge resistor
		[kvar]	[μF]	[A]	[mm]	[mm]		[mm]	
6DCRTX0500H50	CRT-X-75210-5-525	5	3 x 19.2	3 x 5.5	75	210	12	285x370x360	External
6DCRTX0750H50	CRT-X-75210-7.5-525	7.5	3 x 28.9	3 x 8.2	75	210	12	285x370x360	External
6DCRTX1000H50	CRT-X-75247-10-525	10	3 x 38.5	3 x 11	75	247	12	285x370x360	External
6DCRTX1250H50	CRT-X-75210-12.5-525	12.5	3 x 48.1	3 x 13.7	85	210	12	285x370x360	External
6DCRTX1500H50	CRT-X-85247-15-525	15	3 x 57.7	3 x 16.5	85	247	12	285x370x360	External
6DCRTX2000H50	CRT-X-100210-20-525	20	3 x 77	3 x 22	100	210	15	560x340x345	External
6DCRTX2500H50	CRT-X-120210-25-525	25	3 x 96.2	3 x 27.5	120	210	6	445x305x370	External
6DCRTX3000H50	CRT-X-120210-30-525	30	3 x 115.5	3 x 33	120	210	6	445x305x370	External
6DCRTX4000H50	CRT-X-120280-40-525	40	3 x 154	3 x 44	120	280	6	445x305x370	External
6DCRTX5000H50	CRT-X-120280-50-525	50	3 x 193	3 x 55	120	280	6	445x305x370	External

Un = 690V-50Hz

Part number	Model	Q Power	C Capacity	In Current	D Diameter	H Height	Pcs/box	Box dimensions	Discharge resistor
		[kvar]	[μF]	[A]	[mm]	[mm]		[mm]	
6DCRTX0500L50	CRT-X-75247-5-690	5	3 x 33.3	3 x 4.2	75	247	12	285x370x360	External
6DCRTX0750L50	CRT-X-75247-7.5-690	7.5	3 x 50.1	3 x 6.3	75	247	12	285x370x360	External
6DCRTX1000L50	CRT-X-75247-10-690	10	3 x 66.9	3 x 8.4	75	247	12	285x370x360	External
6DCRTX1250L50	CRT-X-75247-12.5-690	12.5	3 x 83.7	3 x 10.5	75	247	12	285x370x360	External
6DCRTX1500L50	CRT-X-85247-15-690	15	3 x 100.2	3 x 12.5	85	247	12	285x370x360	External
6DCRTX2000L50	CRT-X-100247-20-525	20	3 x 133.8	3 x 16.7	100	247	15	560x340x345	External
6DCRTX2500L50	CRT-X-100247-25-690	25	3 x 167.1	3 x 20.9	100	247	15	560x340x345	External
6DCRTX3000L50	CRT-X-100247-30-690	30	3 x 200.7	3 x 25.1	100	247	15	560x340x345	External
6DCRTX4000L50	CRT-X-120280-40-690	40	3 x 267.6	3 x 33.5	120	280	6	445x305x370	External

* Star connection.

Un = 400V-60Hz

Part number	Model	Q Power	C Capacity	In Current	D Diameter	H Height	Pcs/box	Box dimensions	Discharge resistor
		[kvar]	[μF]	[A]	[mm]	[mm]		[mm]	
6DCRTX0500D60	CRT-X-75210-5-400-60	5	3 x 27.6	3 x 7.2	75	210	12	285x370x360	External
6DCRTX1000D60	CRT-X-75210-10-400-60	10	3 x 55.3	3 x 14.4	75	210	12	285x370x360	External
6DCRTX1250D60	CRT-X-85210-12.5-400-60	12.5	3 x 69.1	3 x 18	85	210	12	285x370x360	External
6DCRTX1500D60	CRT-X-85210-15-400-60	15	3 x 82.9	3 x 21.7	85	210	12	285x370x360	External
6DCRTX2500D60	CRT-X-100247-25-400-60	25	3 x 138.2	3 x 36.1	100	247	15	560x340x345	External
6DCRTX3000D60	CRT-X-120210-30-400-60	30	3 x 165.9	3 x 43.3	120	210	6	445x305x370	External

Un = 480V-60Hz

Part number	Model	Q Power	C Capacity	In Current	D Diameter	H Height	Pcs/box	Box dimensions	Discharge resistor
		[kvar]	[μF]	[A]	[mm]	[mm]		[mm]	
6DCRTX0500K60	CRT-X-750210-5-480-60	5	3 x 19.2	3 x 6	75	210	12	285x370x360	External
6DCRTX0750K60	CRT-X-75210-7.5-480-60	7.5	3 x 28.9	3 x 9	75	210	12	285x370x360	External
6DCRTX1000K60	CRT-X-75210-10-480-60	10	3 x 38.5	3 x 12	75	210	12	285x370x360	External
6DCRTX1250K60	CRT-X-85210-12.5-480-60	12.5	3 x 48.1	3 x 15	85	210	12	285x370x360	External
6DCRTX1500K60	CRT-X-85210-15-480-60	15	3 x 57.7	3 x 18	85	210	12	285x370x360	External
6DCRTX2000K60	CRT-X-100210-20-480-60	20	3 x 77	3 x 24.1	100	210	15	560x340x345	External
6DCRTX2500K60	CRT-X-100247-25-480-60	25	3 x 96.2	3 x 30.1	100	247	15	560x340x345	External
6DCRTX3000K60	CRT-X-100210-30-480-60	30	3 x 115.5	3 x 36.1	100	210	15	560x340x345	External
6DCRTX4000K60	CRT-X-120247-40-480-60	40	3 x 154	3 x 48.1	120	247	6	445x305x370	External
6DCRTX5000K60	CRT-X-120280-50-480-60	50	3 x 192	3 x 60.1	120	280	6	445x305x370	External

HARMONIC BLOCKING REACTORS



The growing use of power electronic devices is causing an increasing level of harmonic distortion in the electrical systems, which frequently leads to problems with capacitor installations. This is the reason why energy suppliers and actual conditions require the usage of harmonic blocking reactors

A detuned capacitor system works out the function of power factor correction whilst preventing any amplification of harmonic currents and voltages caused by resonance between capacitor and inductance impedances of the electrical system. By adding an appropriately rated series reactor to the power capacitor, both elements form a low-pass resonant circuit (usually below the 5th) which prevents higher order harmonics to flow into capacitors.

ORTEA harmonic blocking reactors are made of high-class transformer sheets and aluminium or copper coils. They are fully manufactured at our premises, dried and impregnated in a vacuum with environmentally-friendly, low-styrole resin which ensures high voltage withstand, low noise levels, and enjoys a long operating life.

Parameters and selection

Coupling of Capacitors and Reactors

Combination of capacitors and reactors is a delicate procedure which has to be properly done. The ORTEA scheme is proposing in following pages comes from its experience in the Automatic Power Factor Correction systems design and manufacturing and it considers all of the aspects involved, such as:

- Voltage increase across capacitor terminals.
- Allowable harmonic overload of reactors and capacitors.
- Actual reactive power output.

It is then warmly recommended to respect the proposed coupling of capacitance and reactance, as well as capacitor rated voltage.

Detuning frequency [f_D]

Harmonic blocking reactor choice is based on the actual harmonic current spectrum; the most relevant and lowest harmonic current determines the harmonic blocking frequency, hence the reactor selection. In detail:

- 12.7% will be used if the 5TH harmonic current is higher than 25%.
- 5.4% or 7% will be used if the 5TH harmonic current is lower than 25%.

Rated inductance [L]

Inductance rating of reactor, measured at rated current I_n, expressed in mH (Milli-Henry) is the main component feature.

Capacitance [C]

It comes from the delta connection of three single phase capacitive elements. Stated value is the multiple by three of each element and it is expressed in µF (micro Farad).

Capacitor Rated voltage [V]

The series connection of capacitor and reactor causes a voltage rise at the capacitor terminals as described by the following formula which must be considered when selecting a capacitor for the case.

$$U_c = \frac{U_N}{\left[1 - \frac{p}{100\%}\right]}$$

where

$$p = 100\% \cdot \frac{X_L}{X_C}$$

Examples:

Detuning factor p	Detuning frequency f _D	
	f = 50Hz	f = 60Hz
5.4%	NA	258Hz
7%	189Hz	227Hz
12.7%	140Hz	NA

Rated capacitor power [Q]

The rated capacitor output is defined as the power the capacitor can generate if supplied at rated voltage; it is important to follow the manufacturer recommendation in terms of voltage selection. This parameter also makes easier the selection of proper CRT capacitor in series to reactor.

Real output [Q_c]

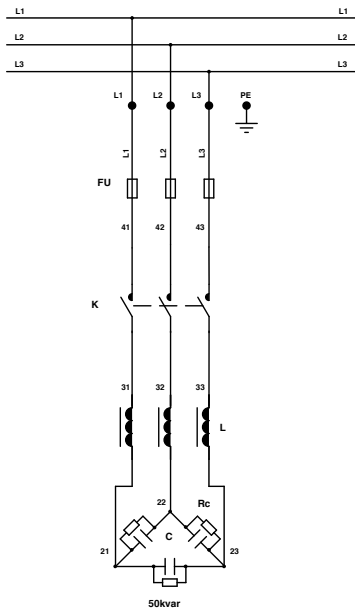
Actual capacitor output is increased respect to the rated value by the higher voltage at capacitor terminals. However this effect is already incorporated in the table Q_c Reactive Power.

RSS current [I_{rms}]

Actual load flowing on the reactor in permanent operation, it is composed by the fundamental wave plus harmonic currents. Component selections described in this catalogue are made in respect to the maximum reactor and capacitor allowed manufacturer limits.

Recommended connecting scheme

Reactors shown in this catalogue are designed for the following scheme of wiring.



Installation and maintenance

Handling and Storage

Reactors shall have to be handled and stored with care in order to avoid any mechanical damage during transportation. Protection against environmental influences shall also be taken.

Installation

Reactors are suitable for indoor installation and for vertical position. Reactors must be installed in such a way that the specified limit temperature is not overcome. Not being in compliance with the above instructions will result as a reduction of the expected service life.

Assembly

Total losses are sum of all iron, winding, and stray field losses at max. specified over voltage and harmonic content. Depending on the detuning factor, actual dissipation power of our reactors is between 4 and 6W/kvar. While using capacitors and reactors within a capacitor bank, suitable means for heat dissipation and cooling of components shall be taken. A minimum 20mm distance between the units has to be maintained.

Maintenance

Periodical checks and inspections are required to ensure reliable operation of reactors. Monitoring and recording of the electrical service parameters are also recommended to become acquainted with progressive reactors stress conditions.

Protections

All reactors are provided with a separate screw terminal for the temperature switch (opening switch) which is located inside every coil. These leads shall be wired in series to contactor coils to switch off in case of over load.

Safety instructions

DO NOT MISAPPLY REACTORS FOR POWER FACTOR CORRECTION APPLICATIONS.

To prevent damage to people and goods due to improper usage and/or application of reactors, the "RECOMMENDATION FOR THE SAFE USE OF STATIC CAPACITORS, BANKS AND EQUIPMENT FOR POWERFACTOR CORRECTION". Published by ANIE shall have to be strictly respected. ORTEA SpA is not responsible for any kind of possible damages occurred to people or things, derived from the improper installation and application of Power Factor Correction capacitors and reactors.

Most common misapplication forms

Current, voltage, harmonics and frequency above specification:

- Working or storage temperature beyond the specified limits.
- Unusual service conditions as mechanical shock and vibrations, corrosive or abrasive conductive parts in cooling air, oil or water vapour or corrosive substances, explosive gas or dust, radioactivity, excessive and fast variations of ambient conditions, service areas higher than 2000 m above sea level...

In case of doubt in choice or in performances of the capacitors and reactors ORTEA SpA technical service MUST be contacted.

Personal Safety

Electrical or mechanical misapplications of Harmonic Blocking Reactors capacitors may become hazardous.

Special attention must be taken to make sure the reactors are correctly used for each application and that warnings and instructions are strictly followed.

Reactors are made not only but also with iron, aluminium, paper and resin that are partially flammable materials. The risk of fire cannot be totally eliminated; therefore suitable precautions shall be taken.

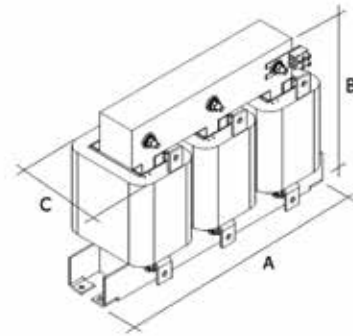
Reliability data quoted by ORTEA SpA should be considered as statistical i.e. based on a number of components, and does not guarantee properties or performance in the legal sense.

ORTEA SpA liability is limited to the replacement of defective components. This applies in particular to consequential damage caused by component failure.

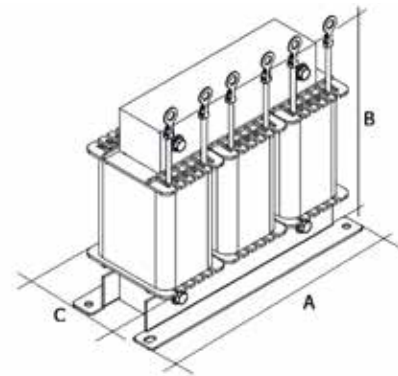
HARMONIC BLOCKING REACTORS

Common technical characteristics

Applicable standards	IEC 60076-6
Rated voltages	230V...1.1kV
Inductance tolerance	±5% (average value in the three phases)
Linearity	$I_{lin} = 1.6...1.8 I_n$
Insulation (winding-core)	3 kV
Temperature class	F (155°C)
Maximum Ambient Temperature	40°C
Protection class	IP00 indoor mounting
Humidity	95%
Cooling	natural air
Design	Three phase, iron core with double air gap
Winding material	Aluminium foil/copper wires
Impregnation	Polyester resin, class H
Terminals	Aluminium bar with hole, or cable lugs.
Temperature Switch	Reactors with a current higher than 33A are provided with a separate screw terminal for the temperature switch (opening switch) which is located inside each coil
Switching temperature	140°C
Voltage	250Vac (<5A)
Tolerance	±5K



ALUMINIUM



COPPER

U _e	f	f _D	I _{250Hz} %*
400V	50Hz	189Hz	≤25%

* Percentage of the 5th harmonic.

Part number	Q _c at 400V	L	I _{rms}	Material	Dimensions (AxBxC)	Weight	Capacitor Part number	Q _c at rated voltage	Capacitor rated voltage	Capacitance
	[kvar]	[mH]	[A]					[kvar]	[V]	[µF]
RHF5300H001	5	8.3	8	copper	205x170x65	6	6DCRTX0750H50	7.5	525	87
RHG0012H001	10	4.2	17	copper	205x181x79	7.7	6DCRTX1250G50	12.5	450	196
RHG0015H001	12.5	3.465	21	copper	240x142x100	13	6DCRTX1500G50	15	450	236
PRG0032DAB57528	20	2.2	37	aluminium	340x215x120	18	6DCRTX2500G50	25	450	393
PRG0028DAB57538	25	1.73	40	aluminium	340x215x110	17	6DCRTX3000G50	30	450	471
PRG0064DAB57527	40	1.1	75	aluminium	340x215x145	27	6DCRTX2500G50 + 6DCRTX3000H50	25+30	450+525	738
PRG0050DAB57567	50	0.786	79	aluminium	340x215x140	28	2 x 6DCRTX3000G50	60	450	942

U _e	f	f _D	I _{250Hz} %*
400V	50Hz	140Hz	>25%

* Percentage of the 5th harmonic.

Part number	Q _c at 400V	L	I _{rms}	Material	Dimensions (AxBxC)	Weight	Capacitor Part number	Q _c at rated voltage	Capacitor rated voltage	Capacitance
	[kvar]	[mH]	[A]					[kvar]	[V]	[µF]
RHG001BH001	5	14.8	9	copper	205x170x78	7.4	6DCRTX0750H50	7.5	525	87
RHG0022H001	10	7.4	18	copper	205x180x113	12.8	6DCRTX1500H50	15	525	173
RHG0023H002	12.5	6.3	19	copper	205x170x113	13.5	6DCRTX2000H50	20	525	231
RHG0043H002	20	3.7	35	copper	270x215x90	21	6DCRTX3000H50	30	525	345
PRG0056DAB57235	25	2.595	43	aluminium	340x215x135	27	6DCRTX4000H50	40	525	462
PRG0076DAB57664	40	2.12	61	aluminium	340x215x135	35	2 x 6DCRTX3000H50	60	525	692
PRG0093DAB57418	50	1.57	77	aluminium	380x215x165	37	6DCRTX2500H50 + 6DCRTX5000H50	75	525	867

U _e	f	f _D	I _{300Hz} %*
400V	60Hz	227Hz	≤25%

* Percentage of the 5th harmonic.

Part number	Q _c at 400V	L	I _{rms}	Material	Dimensions (AxBxC)	Weight	Capacitor Part number	Q _c at rated voltage	Capacitor rated voltage	Capacitance
	[kvar]	[mH]	[A]					[kvar]	[V]	[μF]
RR46015810	5	5.8	8	copper	205x167x68	5.5	6DCRTX0750K60	7.5	480	87
RR46012910	10	2.9	16	copper	205x184x68	8.6	6DCRTX1500K60	15	480	173
RHG0023H001	12.5	2.1	33	copper	205x160x113	13	6DCRTX2000K60	20	480	231
RR46011451	20	1.45	32	copper	205x184x88	9.5	6DCRTX3000K60	30	480	346
PRG0019DAB57872	25	1.22	40	aluminium	340x215x110	18	6DCRTX3000K60 + 6DCRTX0750K60	37.5	480	433
PRG0030DAB57579	40	0.73	65	aluminium	340x215x110	18	2 x 6DCRTX3000K60	60	480	692
PRG0037DAB57692	50	0.6	78	aluminium	340x215x120	21	6DCRTX5000K60 + 6DCRTX2500K60	75	480	864

U _e	f	f _D	I _{300Hz} %*
400V	60Hz	258Hz	≤25%

* Percentage of the 5th harmonic.

Part number	Q _c at 400V	L	I _{rms}	Material	Dimensions (AxBxC)	Weight	Capacitor Part number	Q _c at rated voltage	Capacitor rated voltage	Capacitance
	[kvar]	[mH]	[A]					[kvar]	[V]	[μF]
RHG0012H001	5	4.2	17	copper	205x181x79	8	6DCRTX0750K60	7.5	480	87
RR46012401	10	2.4	18	copper	205x184x68	6	6DCRTX1500K60	15	480	173
RHG0023H001	12.5	2.1	33	copper	205x160x113	14	6DCRTX1000K60 + 6DCRTX0750K60	17.5	480	202
PRG0019DAB57872	20	1.22	40	aluminium	340x215x110	18	6DCRTX1500K60 + 6DCRTX1250K60	27.5	480	317
PRG004GDAB57571	25	1.045	66	aluminium	340x215x120	22	6DCRTX2000K60 + 6DCRTX1500K60	35	480	404
PRG0030DAB57579	40	0.6	78	aluminium	340x215x120	21	6DCRTX3000K60 + 6DCRTX2500K60	55	480	634
PRG0093DAB57626	50	0.523	133	aluminium	380x215x170	38	6DCRTX5000K60 + 6DCRTX2000K60	70	480	807

U _e	f	f _D	I _{300Hz} %*
230V	60Hz	227Hz	≤25%

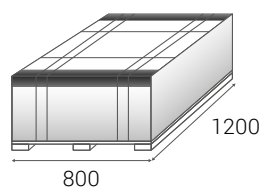
* Percentage of the 5th harmonic.

Part number	Q _c at 400V	L	I _{rms}	Material	Dimensions (AxBxC)	Weight	Capacitor Part number	Q _c at rated voltage	Capacitor rated voltage	Capacitance
	[kvar]	[mH]	[A]					[kvar]	[V]	[μF]
RR46012401	5	2.4	19	copper	205x185x90	6	6DCRTX1500D60	15	400	249
PRG0019DAB57872	10	1.22	40	aluminium	340x215x110	18	6DCRTX3000D60	30	400	497
PRG0039DAB57871	20	0.6	78	aluminium	340x215x120	21	2 x 6DCRTX3000D60	60	400	996
PRG0035DAB57693	25	0.45	88	aluminium	320x220x130	19	3 x 6DCRTX2500D60	75	400	1242
PRG0033DAB57694	40	0.273	109	aluminium	320x220x120	18.5	3 x 6DCRTX3000D60 + 6DCRTX2500D60	115	400	1908
PRG0043DAB57695	50	0.2	146	aluminium	320x220x135	21.5	4 x 6DCRTX3000D60 + 6DCRTX2500D60	145	400	2406

Packing details

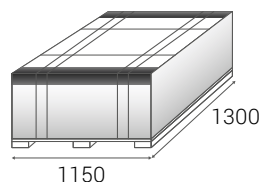
Pallet

Reactor type	Reactors per package
Copper winding	20
Aluminium winding	16



Wooden box

Reactor type	Reactors per package
Copper winding	90
Aluminium winding	72





REACTIVE POWER REGULATOR

The reactive power regulator is, together with the capacitors and reactors (in detuned filter cabinets), the key component of the automatic power factor correction system

It is in fact the "intelligent" element, responsible for the verification of the power factor of the load, in function of which controls the switching on and off of the capacitors batteries in order to maintain the power factor of the system beyond the target.

The reactive power regulators RPC used in ICAR branded automatic power factor correction systems are designed to provide the desired power factor while minimizing the wearing on the banks of capacitors, accurate and reliable in measuring and control functions are simple and intuitive in installation and consultation.

By purchasing a branded ICAR automatic power factor correction system you receive it ready for commissioning. In fact, the controller is already set, you just need to connect it to the line CT and set the value of the primary current (for 7MGA and 8MGA controllers only, it will also be necessary to set the language and the type of system if single-phase or three-phase). The controller automatically recognizes the current direction of the CT secondary, to correct any wiring errors.

The flexibility of our regulators allows you to modify all the parameters to customize its operation to fit the actual characteristics of the system to be corrected (threshold power factor, sensitivity of step switching, reconnecting time of the steps, presence of photovoltaics, etc.).

As described below, the regulators offer important features as for the maintenance and management of the power factor correction bank, aimed at identifying and solving problems, which could lead to its damage with consequent life expectancy reduction

System	Regulator
MICROmatic	RPC 5LGA
MINImatic	RPC 5LGA / RPC 7MGA
MIDImatic	RPC 8LGA / RPC 8MGA
MIDImatic <i>(with detuning reactor)</i>	RPC 8BGA + MCP5
MULTImatic	RPC 8BGA + MCP5 (optional)
MULTImatic <i>(with detuning reactor)</i>	RPC 8BGA + MCP5

The 7MGA controller is perfectly interchangeable with the 5LGA controller, as is the 8MGA controller with the 8LGA controller. The measurement, calculation, and protection functions are identical for all four models so that optimum operation is always guaranteed.



RPC 5LGA



RPC 7MGA



RPC 8LGA

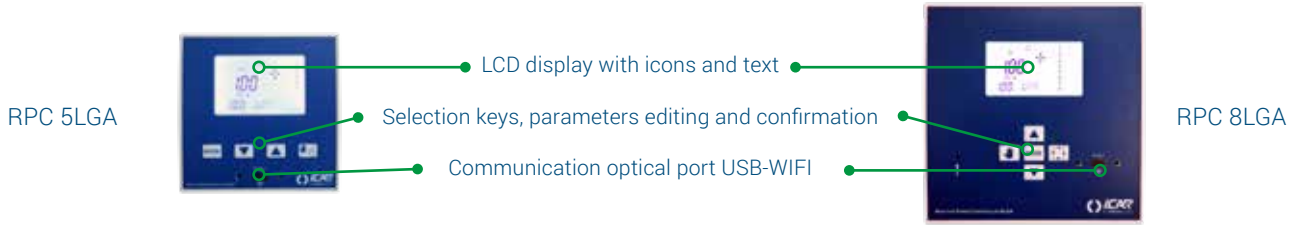


RPC 8MGA



RPC 8BGA

Reactive power regulators RPC 5LGA and RPC 8LGA



The reactive power regulator RPC 5LGA equips MICROMatic and MINImatic automatic power factor correction systems, while the new regulator RPC 8LGA equips MIDImatic. Both are managed by a microprocessor and offer many features maintaining a simple user interface locally or from a PC.

They are characterized by a large LCD display with text messages (in 6 languages: ITA, ENG, FRA, SPA, POR, GER) and icons for quick and intuitive navigation.

The regulators are very flexible: they are in fact able to adjust the power factor between 0.5 inductive and 0.5 capacitive, to operating with power from 100 to 440 VAC, to run on the 4 quadrants for cogeneration installations, to accept in Input CT secondary 5A or 1A.

The regulators have standard temperature control and the ability to configure one of the available relays for activating visual alarms sound at a distance; also control the distortion of current and voltage.

Regulators RPC 5LGA-8LGA can operate in automatic or manual mode: in the first case in complete autonomy by switching batteries available up to the desired power factor; in the second case it will be the operator to force the insertion and disconnection of the battery: the regulator still oversee operations to prevent potential damage to the capacitors (for example by assessing compliance of discharge times before a subsequent insertion).

Data sheet	RPC 5LGA	RPC 8LGA
Control	microprocessor	
Auxiliary supply voltage	100÷440Vac	
Frequency	50Hz/60Hz	
Voltage measuring input	100÷600V	
Current measuring input	5A (1A programmable)	
Current reading range	from 25mA to 6A (from 25mA to 1.2A)	
Automatic current way sensing	yes	
Operation in systems with cogeneration	yes	
Power consumption	9,5VA	
Output relay	5A - 250Vac	
Cosφ adjustment	from 0,5 ind. to 0,5 cap.	
Step switching time	1s ÷ 1000s	
Alarm relay	yes	
Degree of protection	IP54 on front, IP20 at terminals	
Operating temperature	from -20°C to +60°C	
Storage temperature	from -30°C to + 80°C	
Front optical port	for communication USB or WIFI with dedicated accessories	
Compliance with the standards	IEC 61010-1; IEC 61000-6-2; IEC 61000-6-4; UL508; CSA C22-2 nr.14	
Output relay number	5 (expandable up to 7)	8 (expandable up to 12)
Dimensions	96x96mm	144x144mm
Weight	0,35kg	0,65kg
Part number	6CF46411050	6CF025

Measurement functions

Regulators RPC 5LGA and 8LGA provide many standard measurements in order to check and monitor the correct electrical and temperature conditions of the power factor correction system.

Display shows the following values: power factor, voltage, current, delta kvar (reactive power missing to reach the target power factor), average weekly power factor, total harmonic distortion of the current system (THDI_R%) with detailed harmonic for harmonic from 2nd to 15th, total harmonic distortion of the voltage (THD_V%) with detail for harmonic from 2nd to 15th, total harmonic distortion in the current % (THDI_C%) capacitor, temperature.

The controller stores and makes available for consultation the maximum value of each of these variables, to evaluate the most severe stress suffered by the automatic power factor correction since the last reset: the temperature, the voltage and the total harmonic distortion have a strong impact on the capacitors as if they hold more than the nominal values can drastically reduce the service life.

Alarms

The RPC regulators offer many different alarms as standard, which help in the correct operation of the system.

The alarms are set to the following values:

- Under-compensation: the alarm is activated if, with all the steps of power factor correction switched on, the power factor is lower than the desired value.
- Over-compensation: the alarm is activated if, with all the steps of power factor correction switched off, the power factor is greater than the desired value.
- Minimum and maximum current: to assess the condition of the system load.
- Minimum and maximum voltage: to evaluate the stresses due to the variations of the supply voltage.
- Maximum THD%: to assess the pollution of network as regards to harmonic current.
- Maximum temperature in the enclosure: to monitor the capacitor climatic conditions.
- Short voltage interruptions.

Alarms are programmable (enable, threshold, time of activation / deactivation).

Display Indications

The LCD display icons and text provides the following information for quick identification of the state of the system:

- Operating mode automatic/manual.
- Status of each battery (on / off).
- Recognition power factor inductive / capacitive.
- Type of value displayed.
- Active alarm code, and explanatory text (in a language of choice among the 6 available: ITA, ENG, FRA, SPA, POR, GER).

Safety

The RPC 5LGA and 8LGA controllers have passwords to prevent not authorized access. A backup copy of the factory settings is always available in memory.

Contacts

The regulators RPC 5LGA and 8LGA have power contacts for controlling the steps, to control the eventual cooling fan and for the activation of alarms to distance; contacts are NO and have a range of 5A at 250Vac or 1.5A at 440Vac. A contact is in exchange for alarm functions (NO or NC).

Additional module

The regulator RPC 5LGA has the ability to accommodate, in the back slot, an additional module.

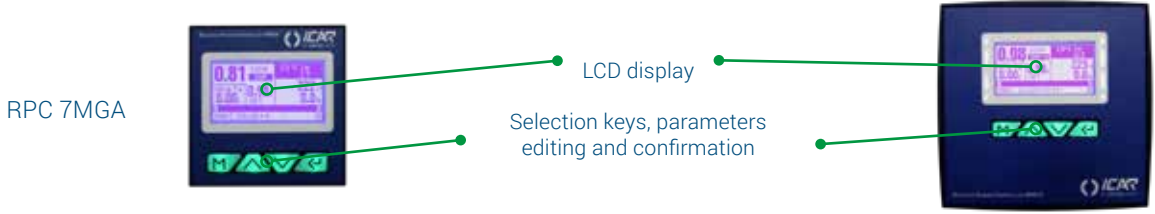
The regulator RPC 8LGA has two rear slots to accommodate up to two additional modules.

Once installed an additional module, the controller recognizes and activates the menu for its programming. Additional modules can be installed even in the bank already in service. Slots for additional module may be already used to implement necessary functions to the context in which the controller is mounted.

If you decide to add a module to an already operating, ensure that there is an available slot.

Module	
OUT2NO	two digital outputs module for additional step control (two 5A 250Vac relays)
COM232	isolated RS232 interface
COM485	isolated RS485 interface
WEBETH	Ethernet interface (only for RPC 8LGA)

Reactive power regulators RPC 7MGA and RPC 8MGA



The reactive power regulator RPC 7MGA equips MINImatic automatic power factor correction systems, while the regulator RPC 8MGA equips MIDImatic. Both are managed by a microprocessor and offer many features maintaining a simple user interface locally or from a PC using a rear RS485 serial port with which they are equipped as standard. They are characterized by a large LCD display with text messages (in 5 languages: ITA, ENG, FRA, ESP, RUS) for quick and intuitive navigation. The regulators are very flexible: they are in fact able to adjust the power factor between 0.85 inductive and 0.9 capacitive, to operating with auxiliary supply 110Vac or 230Vac, to run on the 4 quadrants for cogeneration installations, to accept in Input CT secondary 5A or 1A.

The regulators have standard temperature control and the ability to configure one of the available relays for activating visual alarms sound at a distance; also control the distortion of current and voltage. Regulators RPC 7MGA-8MGA can operate in automatic or manual mode: in the first case in complete autonomy by switching batteries available up to the desired power factor; in the second case it will be the operator to force the insertion and disconnection of the battery: the regulator still oversee operations to prevent potential damage to the capacitors (for example by assessing compliance of discharge times before a subsequent insertion).

Data sheet	RPC 7MGA	RPC 8MGA
Control	microprocessor	
Auxiliary supply voltage	110Vac or 230Vac	
Frequency	50Hz/60Hz	
Voltage measuring input	10÷460V	
Current measuring input	5A (1A programmable)	
Current reading range	from 20mA to 5,5A	
Current way sensing	yes (with alarm in case of inversion)	
Operation in systems with cogeneration	yes	
Power consumption	5,8VA	6,1VA
Output relay	8A - 250Vac - AC1	
Cosφ adjustment	from 0,85 ind. to 0,9 cap.	
Step switching time	5s ÷ 600s	
Alarm relay	yes	
Degree of protection	IP41 on front, IP20 at terminals	
Operating temperature	from -20°C to +60°C	
Storage temperature	from -30°C to + 70°C	
Rear RS485 serial port	for communication with dedicated accessories	
Compliance with the standards	IEC 61010-1; IEC 61010-2-030; IEC 61326-1	
Output relay number	7	8
Dimensions	96x96mm	144x144mm
Weight	0,52kg	0,65kg
Part number	6CF033	6CF034

Measurement functions

Regulators RPC 7MGA and 8MGA provide many standard measurements in order to check and monitor the correct electrical and temperature conditions of the power factor correction system.

Display shows the following values: power factor, voltage, current, delta kvar (reactive power missing to reach the target power factor), average weekly power factor, total harmonic distortion of the current system (THDI_R%) with detailed harmonic for harmonic from 2nd to 64th, total harmonic distortion of the voltage (THDV_R%) with detail for harmonic from 2nd to 64th, total harmonic distortion in the current % (THDI_C%) capacitor, temperature, active power, reactive power, apparent power, active energy, reactive energy and apparent energy.

The controller stores and makes available for consultation the maximum value of: voltage, current, THDV%, THDI%, temperature. This makes it possible to evaluate the heaviest stress suffered by the automatic power factor correction system. Temperature, voltage and harmonic distortion rate have a strong impact on capacitors because if they remain above their rated values, they can drastically reduce the service life.

Alarms

The RPC regulators offer many different alarms as standard, which help in the correct operation of the system.

The alarms are set to the following values:

- Under-compensation: the alarm is activated if, with all the steps of power factor correction switched on, the power factor is lower than the desired value.
- Over-compensation: the alarm is activated if, with all the steps of power factor correction switched off, the power factor is greater than the desired value.
- Minimum and maximum current: to assess the condition of the system load.
- Minimum and maximum voltage: to evaluate the stresses due to the variations of the supply voltage.
- Maximum THD%: to assess the pollution of network as regards to harmonic current.
- Maximum temperature in the enclosure: to monitor the capacitor climatic conditions.
- Short voltage interruptions.
- Reversed CT (in the case of a current transformer connection error).

Alarms are programmable (enable, threshold, time of activation / deactivation).

Display Indications

The LCD display provides the following information for quick identification of the state of the system:

- Operating mode automatic/manual.
- Status of each battery (on / off).
- Recognition power factor inductive / capacitive.
- System voltage.
- System current.
- Average weekly power factor.
- Percentage overload of capacitors.
- Internal temperature of the equipment.
- Active alarm via red keypad illumination and explanatory text on the relevant alarm page (in a language to be chosen from the 5 available).

Safety

The RPC 7MGA and 8MGA controllers have passwords to prevent not authorized access.

Contacts

The regulators RPC 7MGA and 8MGA have power contacts for controlling the steps, to control the eventual cooling fan and for the activation of alarms to distance; contacts are NO and have a range of 8A at 250Vac. A contact is in exchange for alarm functions (NO or NC).

Reactive power regulators RPC 8BGA



The RPC 8BGA reactive power regulator equips MULTImatic automatic power factor correction systems. It is a very innovative controller, with exclusive features:

- High electrical performance
- Extended Capabilities
- High readability graphical display
- Advanced communication
- Upgradability, even after installation
- Powerful supervision software
- Choice language (10 languages available on board)

More details below, referring to the following page tables and manuals for further information.

High electrical performance

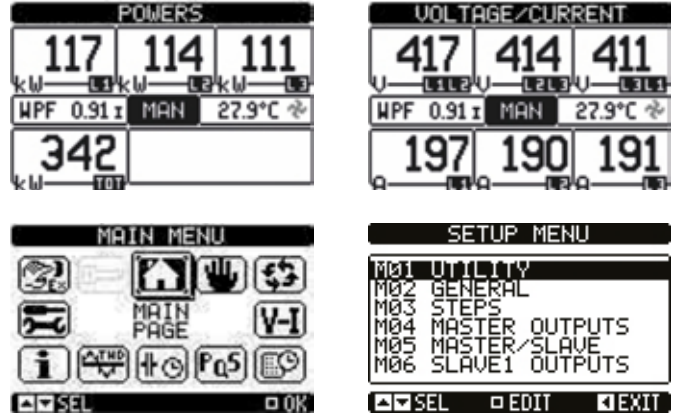
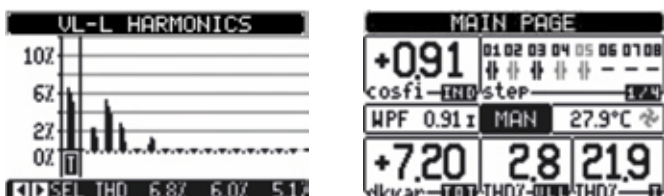
The 8BGA controller is equipped with powerful hardware, which allows a considerable electrical performances: it can be connected to the CT secondary 5A or 1A, it can work on networks with voltages from 100 to 600Vac with a measuring range from 75Vac to 760Vac, it can be connected to a single CT (typical configuration of the power factor correction) or three-CTs (for a more accurate measurement of the power factor, and this fact makes the 8BGA controller to refocus and to be a multimeter as well).

Extended Capabilities

The 8BGA reactive power regulator is controlled by a powerful microprocessor that allows a set of new functions to solve problems even in complex plant. 8BGA can work master-slave functions, handles up to 10 languages simultaneously, can be used in MV systems managing the transformation ratio of the VT, it can support multiple inputs and outputs via optional modules, it can handle target cos phi from 0.5 inductive to 0.5 capacitive. 8BGA can build a network of 4 wired units (one master three slaves) to be able to handle up to 32 steps of power factor correction in a consistent and uniform way.

Graphical display with high readability

Forget the regulators with small displays and difficult to read: 8BGA will amaze you with its display matrix graphic LCD 128x80 pixels. The detail and sharpness allow intuitive navigation between the different menus, represented with text and icons.



Advanced communication

8BGA born to be a regulator able to communicate in a manner in line with the latest technology: Ethernet, RS485, USB, WIFI. Now you can see the information of the company cos phi, without having to go in front of the regulator. Now you can consult it by a PC. The information about the cos phi is important, because it impacts heavily on the company's income statement.

Evolutivity

The "basic" 8BGA regulator can be enhanced with up to four additional modules "plug and play" which greatly expands its performance. It is possible to add additional control relays (up to a total of 16), even for a static control (thyristors), digital and analog inputs, analog outputs, communication modules. Your controller can become a small PLC, and the PFC system can become a point of data aggregation, for remote communication.

Measurement functions and help to maintain

8BGA is a real evolved multimeter, thanks also to the graphic display of excellent readability and to the powerful microprocessor. The measured parameters are the basic ones (cosφ, PF, V, I, P, Q, A, Ea, Er) with the addition of the distortion of the voltage and current (THD, histogram of the value of each harmonic, waveform graphic visualization). If 8BGA is connected to three CT, the harmonic analysis is detailed for each phase, in order to identify any anomalies of single phase loads. 8BGA measure and count values that can help in ruling the PFC (temperature, number of switching of each step). 8BGA also suggests the maintenance to be carried out by means of simple messages on the display. Keep efficient capacitor becomes much easier. 8BGA stores the maximum values of current, voltage, temperature, each associated with the date and time of the event for a better analysis of what happened.

Alarms

The set of alarms (maximum and minimum voltage, maximum and minimum current, over and undercompensation, overload of the capacitors, maximum temperature, microinterruption) associated with the readability of the messages on the display allows a better understanding of what happened. Even alarm programming (enable / disable, delay, relapse etc.) is easier and faster.

Data sheet	RPC 8BGA
Control	microprocessor
Auxiliary supply voltage	100÷440Vac
Frequency	50Hz/60Hz
Voltage measuring input	100÷600V (-15% / +10%)
Current measuring input	5A (1A programmable)
Current reading range	from 25mA to 6A (from 10mA to 1.2A)
Automatic current way sensing	yes
Operation in systems with cogeneration	yes
Power consumption	12VA (10,5W)
Output relay	5A - 250Vac
Cosφ adjustment	from 0.5 ind. to 0.5 cap. (tan φ da -1.732 a +1.732)
Step switching time	1s ÷ 1000s (20ms with STR4NO module)
Alarm relay	yes
Degree of protection	IP55 on front, IP20 at terminals
Operating temperature	from -30°C to +70°C
Storage temperature	from -30°C to +80°C
Front optical port	for communication USB or WIFI with dedicated accessories
Temperature control	from -30°C to +85°C
Compliance with the standards	IEC 61010-1; IEC 61000-6-2; IEC 61000-6-4; UL508; CSA C22-2 nr.14
Output relay number	8 (expandable up to 16)
Dimensions	144x144mm
Weight	0,98kg
Part number	6CF46411000

Additional modules

The RPC 8BGA controller accommodates up to 4 additional modules "plug & play". Once you have added an additional module, the controller recognizes and activates the menu for its programming. Additional modules can also be installed retrospectively (consult us).

Digital inputs and outputs

Questi moduli permettono di potenziare la dotazione di contatti per comando dei gradini a contattori (modulo OUT2NO) o a tiristori (modulo STR4NO) bordo quadro, oppure di aggiungere ingressi e/o uscite digitali/analogiche per acquisizione di grandezze e implementazione di semplici logiche da parte del regolatore.

- **OUT2NO** modulo 2 uscite digitali per comando gradini aggiuntivi (due relè 5A 250 Vac)
- **STR4NO** modulo 4 uscite statiche per comando gradini a tiristori (famiglie SPEED)
- **INP40C** modulo 4 ingressi digitali

Protection functions

The control and protection module MCP5 allows a more detailed inspection of the electrical parameter and temperature that can damage the capacitors.

Thanks to algorithms particularly suitable for automatic equipment consisting of capacitors and reactors.

- **MCP5** module for protection and control for additional safety of capacitors, especially suitable in the detuned banks

MULTImatic detuned systems are equipped with RPC 8BGA controller with MCP5 module.

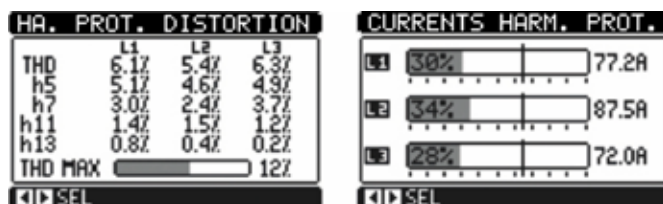
This module has very important function: it directly monitors, through two CTs installed inside, the current in the capacitors analyzing the harmonic content.

In case of harmonic content increases (for example, due to the aging of the capacitors) exceeding a certain limit value, the PFC system is taken out of service, excluding the risk of bursting or overcharging of the capacitors.

The MCP5 module allows the harmonic currents affecting the capacitors to be monitored directly on the RPC 8BGA controller screens, as can be seen in the two pictures shown below.

The individual harmonics are kept under control, with the possibility of setting an alarm level and an intervention level on each. The MCP5 module also allows to monitor two additional temperatures in order to avoid excessive overheating even inside the panel.

Without this functionality, the regulator would carry out the evaluation of the harmonic content with greater difficulty and less precision.



Analisi della corrente armonica assorbita dai condensatori, in valore percentuale, dettagliato armonica per armonica, e assoluto.

Communication functions

RPC 8BGA regulator is very powerful in terms of communication. The modules dedicated to these functions allow multiple solutions to remotely control the power factor system and all other variables measured, calculated or obtained from the instrument.

Module	
COM232	isolated RS232 interface
COM485	isolated RS485 interface
WEBETH	Ethernet interface
COMPRO	isolated Profibus-DP interface
CX01	cable connection from the RPC 8BGA optical port to the USB port of the computer for programming, downloading / uploading data, diagnostics etc
CX02	device to connect the optical port in the RPC 8BGA via WIFI: for programming, downloading / uploading data, diagnostics etc



ELECTRONIC FAST SWITCHES



Electronic Fast Switches is the best and sometimes the sole choice when it is necessary to compensate loads over short periods of time

Examples are steel companies, lifting apparatus (cranes, quay cranes, etc), cable makers (extruders, etc), welding machines, robots, compressors, skiing lift stations, LV industrial networks (chemical plants, paper mills, automotive suppliers). Thyristor switched capacitor bank are also an ergonomic solution where noise can be problematic, like hotels, banks, offices, service infrastructures (telecommunications board, informatics boards, hospitals, malls).

Limits of the traditional contactor switched banks

- High inrush current and over voltages.
- Risk of over voltages due to the arc breaking.
- Longer reconnecting time: more than 30 sec.
- More demanding maintenance compared with static switches.

General advantages of Power Factor Correction

- Reduced losses on mains and power transformers.
- Increase of plant available power.
- Less voltage drop in the plant.

Electronic Fast Switches benefits include

- Minimises network disturbances such as Voltage Drop and Flicker.
- No moving parts therefore reduced maintenance (i.e. no Electro-magnetic contactors).
- Enhanced capacitor life expectancy.

In general there is a comprehensive plant efficiency, because power factor correction is fast, the power transformer and line design can be done considering only the actual load. Therefore longer working life and reliability of plant. Static switches allow unlimited operations. Steps switching is also done limiting transient phenomena that inside normal plants stresses the capacitors reducing their working life.

General characteristics

Electronic fast switches features are described below:

- Switching speed: 20ms ON - 20ms OFF.
- Electronic components: SCR.
- Connectable power: up to 100kvar-400/415V.
- Possibility to switch capacitors without reactor.
- Fan dedicated to the cooling radiator.
- Protection circuit with signalling LED.

Further advantages

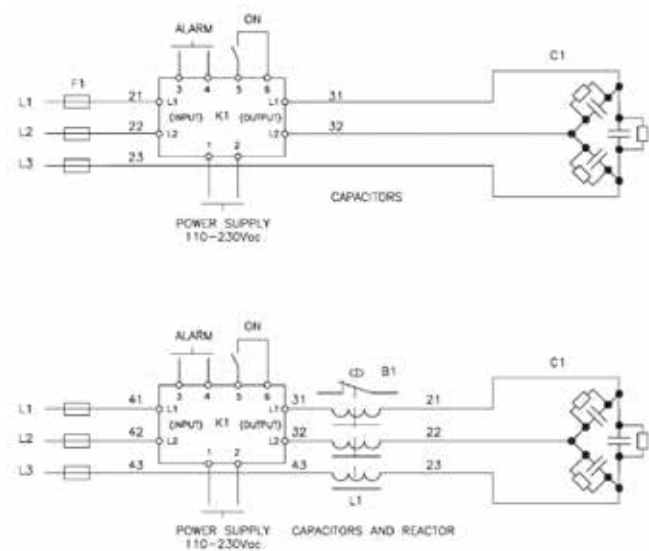
- The control technology adopted doesn't allow switching that could generate self damage.
- Very small dimensions.
- High temperature protection.
- Protection from high speed switching.
- Electronic Fast Switch doesn't need any external supply.

Technical characteristics

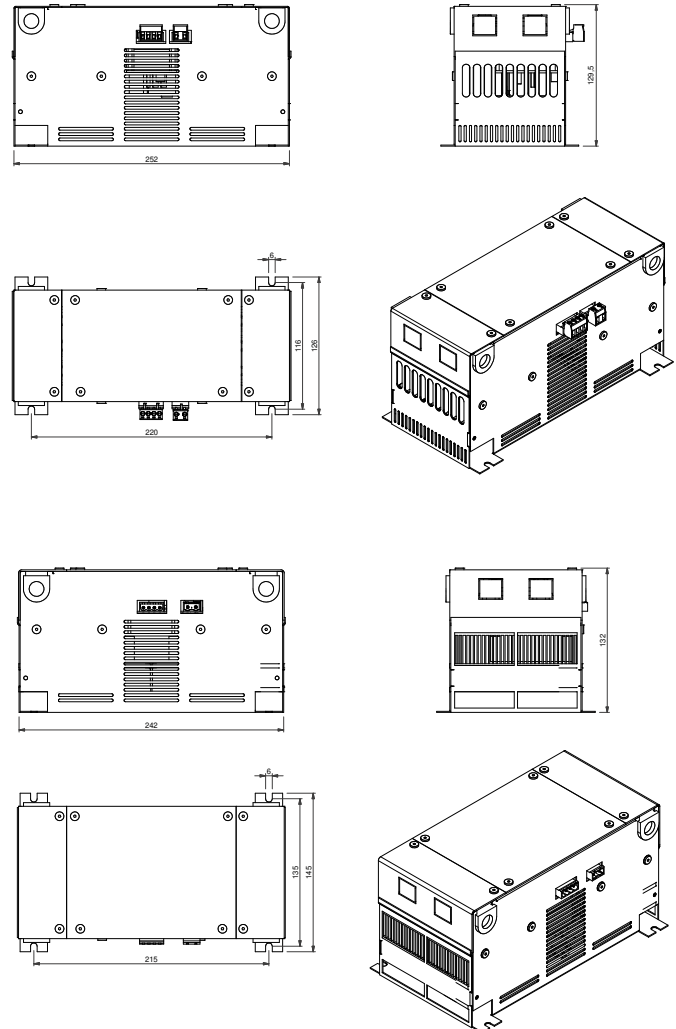
Voltage	230V...415V
Frequency	50Hz / 60Hz
Activation	Using external contact voltage free (type SSR Bi-directional opto-mos recommended); no need for 24Vdc
Duty cycle max speed	20ms ON – 20ms OFF
Operating ambient temperature	-5/+45°C

Part number	Max Power	Dimensions (WxDxH)	Weight
	[KVAR]	[mm]	[kg]
IS050K0IE050K	50	252x126x129.5	3
IS100K0IE100K	100	242x145x132	3.5

Connecting diagram



Drawings





11 65kWh
pi 401
us 60kWh

ICPS

1960128 65kWh
Dash cu 401
24/401 P200 60kWh

5A

4022

EUORACK TRAYS



Design features

Every tray is complete of:

- Capacitor Contactors (230Vac coil).
- Self-extinguish cable harness according to EN 50525 - EN 50575 - EN 50575/A1 standards.
- Power fuses NH00-gG.
- Three phase self-healing polypropylene capacitors with 525V rated voltage (HP30-FH20-FH30- 50Hz only).
- Three-phase tinned copper bus bar system.
- Discharge resistors.
- Three phase detuning chokes (FH only) with dedicated frequency detuning; each coil winding temperature sensor and NC switch.

Standard accessories

(supplied along with each tray)

- Connecting tinned copper bars and bolts.
- IP20 plexiglass protection.

Option

Adaptation bracket, for fitting of 600 mm width trays in 800 mm width cabinets, and 800 mm width trays in 1000 mm width cabinets.

General characteristics

EUORack system is ideal solution for OEM and switchgears manufacturers, they are indeed suitable to the most common switchgears sizes, in addition:

- EUORack is compact and with high power density.
- EUORack is available detuned and not detuned.
- Powers from 12.5 kvar to 150kvar in a single tray.
- Bus bars suitable to bear up to 400kvar detuned or not detuned.
- Easy to assembly as power bus bars and NH fuses are incorporated in the tray support.

EUORacks are suitable for plants where the current Total Harmonic Distortion is as much as 100% (detuned FH20/ FH30).

EUORacks are equipped with high energy density metallized polypropylene capacitors which assure elevated performances with low losses and small dimensions.

Cabinet fitting

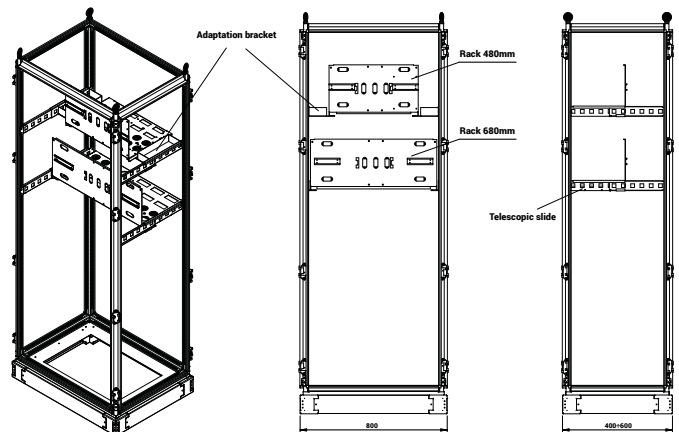
EUORacks trays are easy to fit inside any standard cabinet thanks to sliding and adjustable side supports.

Furthermore thanks to extensible brackets, 480 mm width racks could be also fitted in 800 mm width cabinet (see drawing below), allowing a very flexible combination of steps and total reactive power.

The maximum reactive power the bus bar system can bear is 400kvar 415V 50Hz, both detuned and not detuned.

Extensions of additional trays is possible at any time.

Every rack auxiliary and control component is supplied already wired to the terminal board, which is available on a DIN rail of any tray support.



HP10

EUROrack trays 400-415V 50Hz

U _e	U _N	U _{MAX} *	f	THDI _R %	THDI _C %**
400-415V	415V	455V	50Hz	≤12%	≤50%

* Maximum admissible value according to IEC 60831-1.

** Attention: in this conditions of load network harmonic amplification phenomena is possible.

Main characteristics

Power factor correction banks indicated for the plants where the current harmonic distortion, without capacitors installed, has values lower than 12%.

Use of high energy density metallised polypropylene capacitors assures elevated performances, high resistance to strong voltage overload and low losses.

Generalities

- Special contactors with damping resistors to limit capacitors inrush current (AC6b).
- FS17 450/750V self-extinguish cable according to EN 50525 - EN 50575 - EN 50575/A1.
- Power fuses NH00-gG.
- Three-phase self-healing metallized polypropylene capacitor with UN=415V rated voltage.
- Discharge devices.
- Degree of protection: IP20.

Technical characteristics

Rated operational voltage	U _e =400-415V
Rated frequency	50Hz
Max current overload I _n (tray)	1.3 I _n
Max overload V _n (tray)	1.1xU _e
Insulation voltage (tray)	690V
Capacitors insulation level	3/12kV
Temperature range	-5/+40°C
Discharge resistors	on each capacitor
Installation	indoor
Service	continuous
Internal connection	delta
Operation devices	capacitors contactors (AC6b)
Total tray losses	~ 2W/kvar
Inner surface finish	zinc passivation
Standards (tray)	IEC 61439-1/2 IEC 61921
Standards (capacitors)	IEC 60831-1/2

Part number	Power [kvar]			Steps U _e =400V	Dim. number	Fix dist. number
	U _N 415V	U _e 415V	U _e 400V			
IY0AKK225050359	25	25	25	25	97	91
IY0AKK250050359	50	50	50	2x25	97	91
IY0AKK275050359	75	75	75	3x25	97	91
IY0AKK310050359	100	100	100	4x25	97	91
Contact us	100	100	100	2x12.5-25-50	97	91
IY0AKK312550359	125	125	125	5x25	98	92
IY0AKK315050359	150	150	150	6x25	98	92
Contact us	150	150	150	2x12.5-25-2x50	98	92

HP20

EUROrack trays 400-415V 50Hz

U _e	U _N	U _{MAX} *	f	THDI _R %	THDI _C %**
400-415V	450V	495V	50Hz	≤20%	≤70%

* Maximum admissible value according to IEC 60831-1.

** Attention: in this conditions of load network harmonic amplification phenomena is possible.

Main characteristics

Power factor correction banks indicated for the plants where the current harmonic distortion, without capacitors installed, has values lower than 20%.

Use of high energy density metallised polypropylene capacitors assures elevated performances, high resistance to strong voltage overload and low losses.

Generalities

- Special contactors with damping resistors to limit capacitors inrush current (AC6b).
- FS17 450/750V self-extinguish cable according to EN 50525 - EN 50575 - EN 50575/A1.
- Power fuses NH00-gG.
- Three-phase self-healing metallized polypropylene capacitor with UN=450V rated voltage.
- Discharge devices.
- Degree of protection: IP20.

Technical characteristics

Rated operational voltage	U _e =400-415V
Rated frequency	50Hz
Max current overload I _n (tray)	1.3 I _n
Max overload V _n (tray)	1.1xU _e
Insulation voltage (tray)	690V
Capacitors insulation level	3/12kV
Temperature range	-5/+40°C
Discharge resistors	on each capacitor
Installation	indoor
Service	continuous
Internal connection	delta
Operation devices	capacitors contactors (AC6b)
Total tray losses	~ 2W/kvar
Inner surface finish	zinc passivation
Standards (tray)	IEC 61439-1/2 IEC 61921
Standards (capacitors)	IEC 60831-1/2

Part number	Power [kvar]			Steps U _e =400V	Dim. number	Fix dist. number
	U _N 450V	U _e 415V	U _e 400V			
IY0JHK230050359	30	26	25	25	97	91
IY0JHK260050359	60	52	50	2x25	97	91
IY0JHK290050359	90	78	75	3x25	97	91
IY0JHK312050359	120	104	100	4x25	97	91
Contact us	120	104	100	2x12.5-25-50	97	91
IY0JHK315050359	150	134	125	5x25	98	92
IY0JHK318050359	180	160	150	6x25	98	92
Contact us	180	160	150	2x12.5-25-2x50	98	92

HP30

EUROrack trays 415V 50Hz

U _e	U _N	U _{MAX} *	f	THDI _R %	THDI _C %**
415V	525V	580V	50Hz	≤27%	≤85%

* Maximum admissible value according to IEC 60831-1.

** Attention: in this conditions of load network harmonic amplification phenomena is possible.

Main characteristics

Power factor correction banks indicated for the plants where the current harmonic distortion, without capacitors installed, has values lower than 27%.

Use of high energy density metallised polypropylene capacitors assures elevated performances, high resistance to strong voltage overload and low losses.

Generalities

- Special contactors with damping resistors to limit capacitors inrush current (AC6b).
- FS17 450/750V self-extinguish cable according to EN 50525 - EN 50575 - EN 50575/A1.
- Power fuses NH00-gG.
- Three-phase self-healing metallized polypropylene capacitor with UN=525V rated voltage.
- Discharge devices.
- Degree of protection: IP20.

Technical characteristics

Rated operational voltage	U _e =415V
Rated frequency	50Hz
Max current overload I _n (tray)	1.3 I _n
Max overload V _n (tray)	1.1xU _e
Insulation voltage (tray)	690V
Capacitors insulation level	3/12kV
Temperature range	-5/+40°C
Discharge resistors	on each capacitor
Installation	indoor
Service	continuous
Internal connection	delta
Operation devices	capacitors contactors (AC6b)
Total tray losses	~ 2W/kvar
Inner surface finish	zinc passivation
Standards (tray)	IEC 61439-1/2 IEC 61921
Standards (capacitors)	IEC 60831-1/2

Part number	Power [kvar]		Steps U _e =415V	Dim. number	Fix dist. number
	U _N 525V	U _e 415V			
IY0SQK240050359	40	25	25	97	93
IY0SQK280050359	80	50	2x25	97	93
IY0SQK312050805	120	75	3x25	97	93
IY0SQK316050359	160	100	4x25	97	93
IY0SQK316050803	160	100	2x12.5-25-50	97	93
IY0SQK320050359	200	125	5x25	98	94
IY0SQK324050359	240	150	6x25	98	94
IY0SQK324050804	240	150	2x12.5-25-2x50	98	94

FH20

EUROrack detuned trays 400-415V 50Hz

U _e	U _N	U _{MAX} *	f	THDI _R %	I _{250Hz} %**	THDV _R %	f _D
400-415V	525V	580V	50Hz	100%	≤25%	≤6%	180Hz

* Maximum admissible value according to IEC 60831-1.

** Percent current of 5TH harmonic.

Main characteristics

Power factor correction banks indicated for the plants where the current harmonic distortion, without capacitors installed, has values up to 100%.

Use of high energy density metallised polypropylene capacitors assures elevated performances, high resistance to strong voltage overload and low losses.

Generalities

- Contactors for capacitive loads.
- FS17 450/750V self-extinguish cable according to EN 50525 - EN 50575 - EN 50575/A1.
- Power fuses NH00-gG.
- Three-phase self-healing metallized polypropylene capacitor with UN=525V rated voltage.
- Discharge devices.
- Degree of protection: IP20.
- Three phase detuning choke with tuning frequency f_D=180Hz (N=3.6-p%=7.7%).

Technical characteristics

Rated operational voltage	U _e =400-415V
Rated frequency	50Hz
Max current overload I _n (tray)	1.3 I _n
Max overload V _n (tray)	1.1xU _e
Insulation voltage (tray)	690V
Capacitors insulation level	3/12kV
Temperature range	-5/+40°C
Discharge resistors	on each capacitor
Installation	indoor
Service	continuous
Internal connection	delta
Operation devices	capacitors contactors
Total tray losses	~ 6W/kvar
Inner surface finish	zinc passivation
Standards (tray)	IEC 61439-1/2 IEC 61921 IEC 61642
Standards (capacitors)	IEC 60831-1/2

Part number	Power [kvar]		Steps U _e =400V	Dim. number	Fix dist. number
	U _e 415V	U _e 400V			
IY7TFK212550360	13.5	12.5	12.5	97	93
IY7TFK218850360	20	18.75	6.25-12.5	97	93
IY7TFK225050362	27	25	2x12.5	97	93
IY7TFK225050360	27	25	25	97	93
IY7TFK250050422	54	50	2x25	97	93
IY7TFK250050360	54	50	50	97	93
IY7TFK275050360	80	75	25-50	98	94
IY7TFK310050360	107	100	50-50	98	94

FH30

EUROrack detuned trays 400-415V 50Hz

U _e	U _N	U _{MAX} *	f	THDI _R %	I _{250Hz} %**	THDV _R %	f _D
400-415V	525V	580V	50Hz	100%	>25%	≤6%	135Hz

* Maximum admissible value according to IEC 60831-1.

** Percent current of 5TH harmonic.

Main characteristics

Power factor correction banks indicated for the plants where the current harmonic distortion, without capacitors installed, has values up to 100%.

Use of high energy density metallised polypropylene capacitors assures elevated performances, high resistance to strong voltage overload and low losses.

Generalities

- Contactors for capacitive loads.
- FS17 450/750V self-extinguish cable according to EN 50525 - EN 50575 - EN 50575/A1.
- Power fuses NH00-gG.
- Three-phase self-healing metallized polypropylene capacitor with UN=525V rated voltage.
- Discharge devices.
- Degree of protection: IP20
- Three phase detuning choke with tuning frequency f_D=135Hz (N=2.7-p%=13.7%).

Technical characteristics

Rated operational voltage	U _e =400-415V
Rated frequency	50Hz
Max current overload I _n (tray)	1.3 I _n
Max overload V _n (tray)	1.1xU _e
Insulation voltage (tray)	690V
Capacitors insulation level	3/12kV
Temperature range	-5/+40°C
Discharge resistors	on each capacitor
Installation	indoor
Service	continuous
Internal connection	delta
Operation devices	capacitors contactors
Total tray losses	~ 6W/kvar
Inner surface finish	zinc passivation
Standards (tray)	IEC 61439-1/2 IEC 61921 IEC 61642
Standards (capacitors)	IEC 60831-1/2

Part number	Power [kvar]		Steps U _e =400V	Dim. number	Fix dist. number
	U _e 415V	U _e 400V			
IY7NFK212550426	13.5	12.5	12.5	97	91
IY7NFK218850426	20	18.75	6.25-12.5	97	91
IY7NFK225050427	27	25	2x12.5	97	91
IY7NFK225050426	27	25	25	97	93
IY7NFK250050426	54	50	50	97	91
IY7NFK275050426	80	75	25-50	98	94

HP10

EUROrack trays 400V 60Hz

U _e	U _N	U _{MAX} *	f	THDI _R %	THDI _C %**
400V	400V	440V	60Hz	≤12%	≤50%

* Maximum admissible value according to IEC 60831-1.

** Attention: in this conditions of load network harmonic amplification phenomena is possible.

Main characteristics

Power factor correction banks indicated for the plants where the current harmonic distortion, without capacitors installed, has values lower than 12%.

Use of high energy density metallised polypropylene capacitors assures elevated performances, high resistance to strong voltage overload and low losses.

Generalities

- Special contactors with damping resistors to limit capacitors inrush current (AC6b).
- FS17 450/750V self-extinguish cable according to EN 50525 - EN 50575 - EN 50575/A1.
- Power fuses NH00-gG.
- Three-phase self-healing metallized polypropylene capacitor with UN=400V rated voltage.
- Discharge devices.
- Degree of protection: IP20.

Technical characteristics

Rated operational voltage	U _e =400V
Rated frequency	60Hz
Max current overload I _n (tray)	1.3 I _n
Max overload V _n (tray)	1.1xU _e
Insulation voltage (tray)	690V
Capacitors insulation level	3/12kV
Temperature range	-5/+40°C
Discharge resistors	on each capacitor
Installation	indoor
Service	continuous
Internal connection	delta
Operation devices	capacitors contactors (AC6b)
Total tray losses	~ 2W/kvar
Inner surface finish	zinc passivation
Standards (tray)	IEC 61439-1/2 IEC 61921
Standards (capacitors)	IEC 60831-1/2

Part number	Power [kvar]	Steps U _e =400V	Dim. number	Fix dist. number
	U _e 400V			
IY0AFF225060359	25	25	95	91
IY0AFF250060359	50	2x25	95	91
IY0AFF275060359	75	3x25	95	91
IY0AFF310060359	100	4x25	95	91

HP30

EUROrack trays 480V 60Hz

U _e	U _N	U _{MAX} *	f	THDI _R %	THDI _C %**
480V	480V	530V	60Hz	≤12%	≤50%

* Maximum admissible value according to IEC 60831-1.

** Attention: in this conditions of load network harmonic amplification phenomena is possible.

Main characteristics

Power factor correction banks indicated for the plants where the current harmonic distortion, without capacitors installed, has values lower than 12%.

Use of high energy density metallised polypropylene capacitors assures elevated performances, high resistance to strong voltage overload and low losses.

Generalities

- Special contactors with damping resistors to limit capacitors inrush current (AC6b).
- FS17 450/750V self-extinguish cable according to EN 50525 - EN 50575 - EN 50575/A1.
- Power fuses NH00-gG.
- Three-phase self-healing metallized polypropylene capacitor with UN=480V rated voltage.
- Discharge devices.
- Degree of protection: IP20.

Technical characteristics

Rated operational voltage	U _e =480V
Rated frequency	60Hz
Max current overload I _n (tray)	1.3 I _n
Max overload V _n (tray)	1.1xU _e
Insulation voltage (tray)	690V
Capacitors insulation level	3/12kV
Temperature range	-5/+40°C
Discharge resistors	on each capacitor
Installation	indoor
Service	continuous
Internal connection	delta
Operation devices	capacitors contactors (AC6b)
Total tray losses	~ 2W/kvar
Inner surface finish	zinc passivation
Standards (tray)	IEC 61439-1/2 IEC 61921
Standards (capacitors)	IEC 60831-1/2

Part number	Power [kvar]		Steps U _e =480V	Dim. number	Fix dist. number
	U _N 480V	U _e 480V			
IY0SGG225060359	25	25	25	95	91
IY0SGG250060359	50	50	2x25	95	91
IY0SGG275060359	75	75	3x25	95	91
IY0SGG310060359	100	100	4x25	95	91

FH20

EUROrack detuned trays 400V 60Hz

U _e	U _N	U _{MAX} *	f	THDI _R %	I _{300Hz} %**	THDV _R %	f _D
400V	480V	530V	60Hz	100%	≤25%	≤6%	216Hz

* Maximum admissible value according to IEC 60831-1.

** Percent current of 5TH harmonic.

Main characteristics

Power factor correction banks indicated for the plants where the current harmonic distortion, without capacitors installed, has values up to 100%.

Use of high energy density metallised polypropylene capacitors assures elevated performances, high resistance to strong voltage overload and low losses.

Generalities

- Contactors for capacitive loads.
- FS17 450/750V self-extinguish cable according to EN 50525 - EN 50575 - EN 50575/A1.
- Power fuses NH00-gG.
- Three-phase self-healing metallized polypropylene capacitor with UN=480V rated voltage.
- Discharge devices.
- Degree of protection: IP20.
- Three phase detuning choke with tuning frequency f_D=216Hz (N=3.6-p%=7.7%).

Technical characteristics

Rated operational voltage	U _e =400V
Rated frequency	60Hz
Max current overload I _n (tray)	1.3 I _n
Max overload V _n (tray)	1.1xU _e
Insulation voltage (tray)	690V
Capacitors insulation level	3/12kV
Temperature range	-5/+40°C
Discharge resistors	on each capacitor
Installation	indoor
Service	continuous
Internal connection	delta
Operation devices	capacitors contactors
Total tray losses	~ 6W/kvar
Inner surface finish	zinc passivation
Standards (tray)	IEC 61439-1/2 IEC 61921 IEC 61642
Standards (capacitors)	IEC 60831-1/2

Part number	Power [kvar]		Steps U _e =400V	Dim. number	Fix dist. number
	U _e 400V				
IY7TFF225060360	25		25	97	91
IY7TFF250060360	50		50	97	91

FH20

EUROrack detuned trays 480V 60Hz

U _e	U _N	U _{MAX} *	f	THDI _R %	I _{250Hz} %**	THDV _R %	f _D
480V	575V	760V	60Hz	100%	≤25%	≤6%	216Hz

* Maximum admissible value according to IEC 60831-1.

** Percent current of 5TH harmonic.

Main characteristics

Power factor correction banks indicated for the plants where the current harmonic distortion, without capacitors installed, has values up to 100%.

Use of high energy density metallised polypropylene capacitors assures elevated performances, high resistance to strong voltage overload and low losses.

Generalities

- Contactors for capacitive loads.
- FS17 450/750V self-extinguish cable according to EN 50525 - EN 50575 - EN 50575/A1.
- Power fuses NH00-gG.
- Three-phase self-healing metallized polypropylene capacitor with UN=575V rated voltage.
- Discharge devices.
- Degree of protection: IP20.
- Three phase detuning choke with tuning frequency $f_D=216\text{Hz}$ ($N=3.6-p\%=7.7\%$).

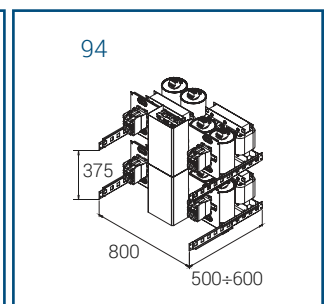
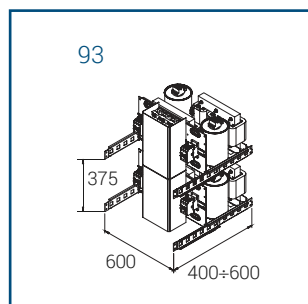
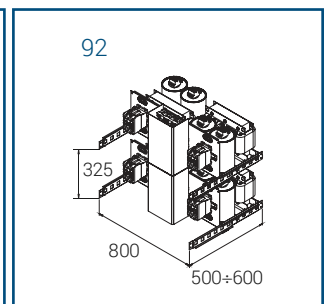
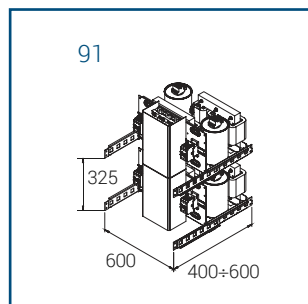
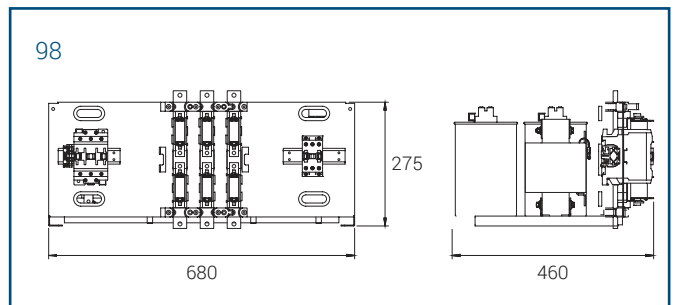
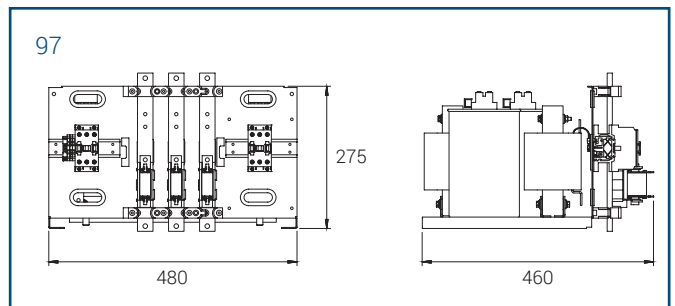
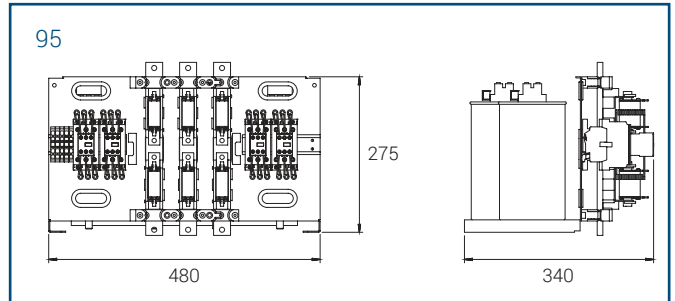
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Part number	Power [kvar]		Steps U _e =480V	Dim. number	Fix dist. number
	U _e 480V				
IY7TGG225060360	25		25	97	93
IY7TGG250060360	50		50	97	93

DRAWINGS

Dimensional number	Dimensions [mm]			Fixing distance number	For cabinets:	
	W	D	H		W	D
95	480	340	275	91	600	400÷600
97	480	460	275	91/93	600	500÷600
98	680	460	275	92/94	800	500÷600



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