



POWER FACTOR AUTOMATIC *Regulator series ER-05 ER-07 ER-12*

Main Features

In a capacitor bank for power factor correction the automatic regulator represents the real heart of the whole system. This image underlines the importance of a device which must operate with the highest accuracy to reduce stress and to increase the life of all components.

Automatic regulators from the ER series, combined with the contactors for power factor correction, compose a unique product with high quality standards. Gruppo Energia ER regulators are equipped with a digital microprocessor and are suitable for the control of any type of power factor correction system.

Data acquisition in rms guarantees accurate elaboration of the power to correct.



CAPACITOR DUTY SWITCHING *Contactors CSC Series*

Main Features

CSC Capacitor Duty Contactors are specially designed to meet Capacitor Duty application. Contactors are fitted with block of three early make auxiliary contacts in series with quick discharge damping six - resistors - 2 per phase to limit peak current to value within Contactor making capacity such that normal rated capacitor current is carried by main contacts which, after closing, effectively short out the resistors.

During exact moment of switching, a capacitor effectively appears as short circuit. The magnitude of capacitor in-rush or charging current will depend upon value of AC Voltage level at instant of switching, together with impedance of feeders cable & supply transformers. In case of individual capacitors loads, charging current peaks of up to 30 times the rated capacitor current can occur. Whereas, for multi-stage capacitor, the in-rush current greater than 180 times the rated capacitor current can occur.

Such large-current can flow through contactor since initial in-rush current is taken from both mains-supply & capacitor already connected. As in-rush current of such high magnitude is undesirable and likely to weld main contacts of Standard Duty Contactors.



AUTOMATIC REGULATOR SERIES

SERIES ER-05
SERIES ER-07
SERIES ER-12

CAPACITOR DUTY CONTACTORS CSC SERIES

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CAPACITOR DUTY SWITCHING Contactors CSC Series >>

General Characteristics

- Digital microprocessor regulator for automatic power
- Factor correction systems
- 5 or 7 or 12 step version including programming for
- Alarm and cooling fan control
- Accurate readings and reliable power factor correction
- Even in presence of harmonics content
- Rms voltage and current measurements
- Average weekly power factor measurement
- Adjustable tripping sensivity
- Adjustable reconnection time
- No voltage release protection
- Protection against capacitor overload and panel overheating
- RS 232 interface (serial port)
- Easy installation to be combined with external ct
- Standard of reference: IEC/EN 61010-1

Technical Characteristics

- Supply voltage 380 V , 415 V other on request
- Rated frequency 50 / 60 Hz + -1% self configurable
- Power consumption 5,8 VA (ER 5 / ER 7) – 4,2 VA ER 12
- Rated current 5 A (1A on request)
- Operation range 0,125 – 6 A
- Power factor setting 0,8 inductive - 0,8 capacitive
- Temperature range - 40 c / + 100 c (measuring)
- Capacitor overload 0 – 250% (current)
- Reconnection time 5-240 s (same step)
- Tripping sensivity 5 – 600 s/step
- Housing flush mounting Flush Mounting
- Degree of protection IP 54 (ER5 – ER7) – IP 41 (ER 12)
- Service temperatre - 20 c / + 60 c
- Type of terminal Plug in
- Maximum cable section 2,5 sq mm

PRODUCT RANGE

From 10KVAR through 60 KVAR,
available in eight ratings, conforming to IEC - 60947

BENEFITS

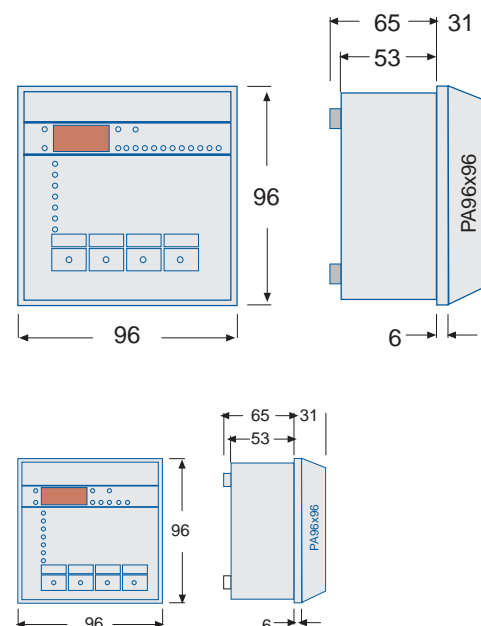
- Conforms to utilization category AC 6B
- Saves cost of expensive replacements
- High electrical life
- Reduced watt loss during 'ON' condition, saves energy
- High Safety
- No risk of dangerous voltage
- Switching of Capacitor bank in parallel without de-rating
- Less maintenance & down – time

General Characteristics

- Capacitor Switching Contactors fitted with 2 per phase quick discharge resistors to limit inrush peak currents
- Early make auxiliary contacts in series with resistors
- Conform to utilization category AC 6B
- Contacts design assuring high electrical life
- Limited losses during "on" conditions
- Standard of reference : IEC - 60947
- Clip on mounting:
 - Din rail 35 mm up to CSC 25
 - Din rail 75 mm from CSC 33 and above
- Suitable for connection outside the delta configuration

Measurement

- Istantaneous power factor displacement (cos-phi)
- Istantaneous and average weekly power factor
- Voltage and current
- Reactive power to reach set-point value
- Total reactive power
- Capacitor overload
- Temperature of capacitor bank cabinet
- Maximum voltage and current value
- Maximum capacitor overload value
- Active and apparent power
- Current and voltage harmonic analysis



Description

- Front plate 3 – digit display
- Led indicators 7 for main functions
- Automatic recognition of current flow
- 4 quadrant operation

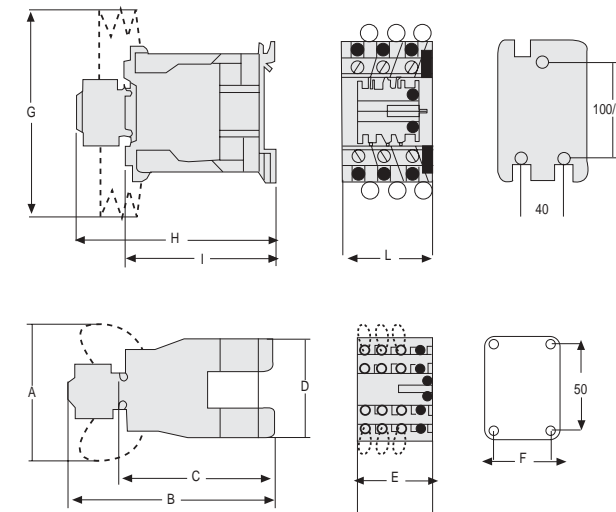
Protections

- High voltage – low voltage
- High current – low current
- Over compensation
- Under compensation
- Capacitor overload
- Over temperature
- No voltage release

ORDER CODE	STEPS	Flush Mount housing size (mm)	Quantity per PKG	Weight (Kg)
ER 5	5	96x96	1	0,375
ER 7	7	96x96	1	0,375
ER 12	12	144x144	1	0,66

Technical Advice

- During switching operations capacitors are affected by very high currents. Inrush current can reach values 180 times the rated current of the capacitor. To limit the inrush current and the damages on the capacitors it is advisable to limit the current surge by inserting quick discharge series damping resistors like in our CSC contactors.



Kvar	A	B	C	D	E	F	Kvar	G	I	H	L
12,5	130	117	80	74	45	35	33,3	180	114	150	75
16,7	130	122	85	75	45	35	40	180	150	114	75
20	140	130	93	84	56	40	60	200	157	125	85
25	140	135	98	84	56	40					

TYPE	RATED VOLTAGE V	Kvar rating at 50/60 Hz -5+55 C (*)	Electrical life at rated current operation	Maximum operating rate operations/hours	NO Auxiliary	NA Contacts
CSC - 10	400, 440	10	200.0000	240	1	1
CSC - 12.5	400, 440	12.5	200.0000	240	1	1
CSC - 16.7	400, 440	16.7	200.0000	240	1	1
CSC - 20	400, 440	20	100.0000	240	1	1
CSC - 25	400, 440	25	100.0000	240	1	1
CSC - 33	400, 440	33	100.0000	240	1	2
CSC - 40	400, 440	40	100.0000	100	1	2
CSC - 60	400, 440	60	100.0000	100	1	2

Aux. Coil voltages: (Volts) 24 - 48 - 110 - 220 - 380 - 400 - 415 - 440

Voltage Tolerance -20% - +10%

Rated insulating voltage 690 V

(*) Average temperature over a 24-hour period, according with IEC-70 and IEC-831

For ambient temperature up to 70 °C de-rating the power contactor by a percentage equal to the difference between the operating ambient temperature and 50