



Page 23-6

DCRM SERIES

- 2 steps in modular housing
- Settings by front adjustment potentiometers
- 3 LED indications.



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DCRK SERIES

- 3, 5 or 7 steps in 96x96mm housing
- 8 or 12 steps in 144x144mm housing
- Capacitor overload protection
- Internal panel temperature sensor
- TTL/RS232 programming interface
- Automatic set-up function
- Configurable alarms.



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DCRG SERIES (EXPANDABLE)

- 8, 10, 12, 14 or 16 steps in 144x144mm housing
- Expandable with EXP modules such as inputs and outputs, step increment, capacitor protection, communication port, etc.
- Backlight graphic display, 128x80 pixels
- Optic interface port for programming, data download and diagnostics
- Independent voltage measurement input
- Capacitor overload protection
- Internal and external panel temperature sensor
- Voltage and current harmonic-content measurement
- Event logging
- Configurable alarms
- Suitable for medium-voltage systems
- Suitable for dynamic power factor correction.



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DCRJ SERIES

- 8 or 12 gradini in 144x144mm housing
- Independent voltage measurement input
- Capacitor overload protection
- Internal and external panel temperature sensor
- RS232 programming and supervision interface
- RS485 supervision interface
- Voltage and current harmonic-content measurement
- Event logging
- Automatic set-up function
- Configurable alarms
- Suitable for medium-voltage systems
- Suitable for dynamic power factor correction (DCRJ12F).



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THYRISTOR MODULES

- 30, 50, 100kvar step units
- Suitable for dynamic power factor correction
- Current flow zero-crossing controlled connection-disconnection
- Over-temperature protection
- Over-current protection at capacitor switching.



- Microprocessor supervision and control
- Accurate TRMS measurement circuit
- Automatic intelligent adjustment system
- Versions with 2, 3, 5, 7, 8, 12, 14 and 16 steps
- Versions with static outputs
- Use in co-generation and medium-voltage systems
- Various serial communication interface
- ASCII and MODBUS®-RTU communication protocols
- Thyristor modules for dynamic correction.

Reactive current controller

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Automatic power factor controllers

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Automatic power factor controllers



DCRK






DCRG

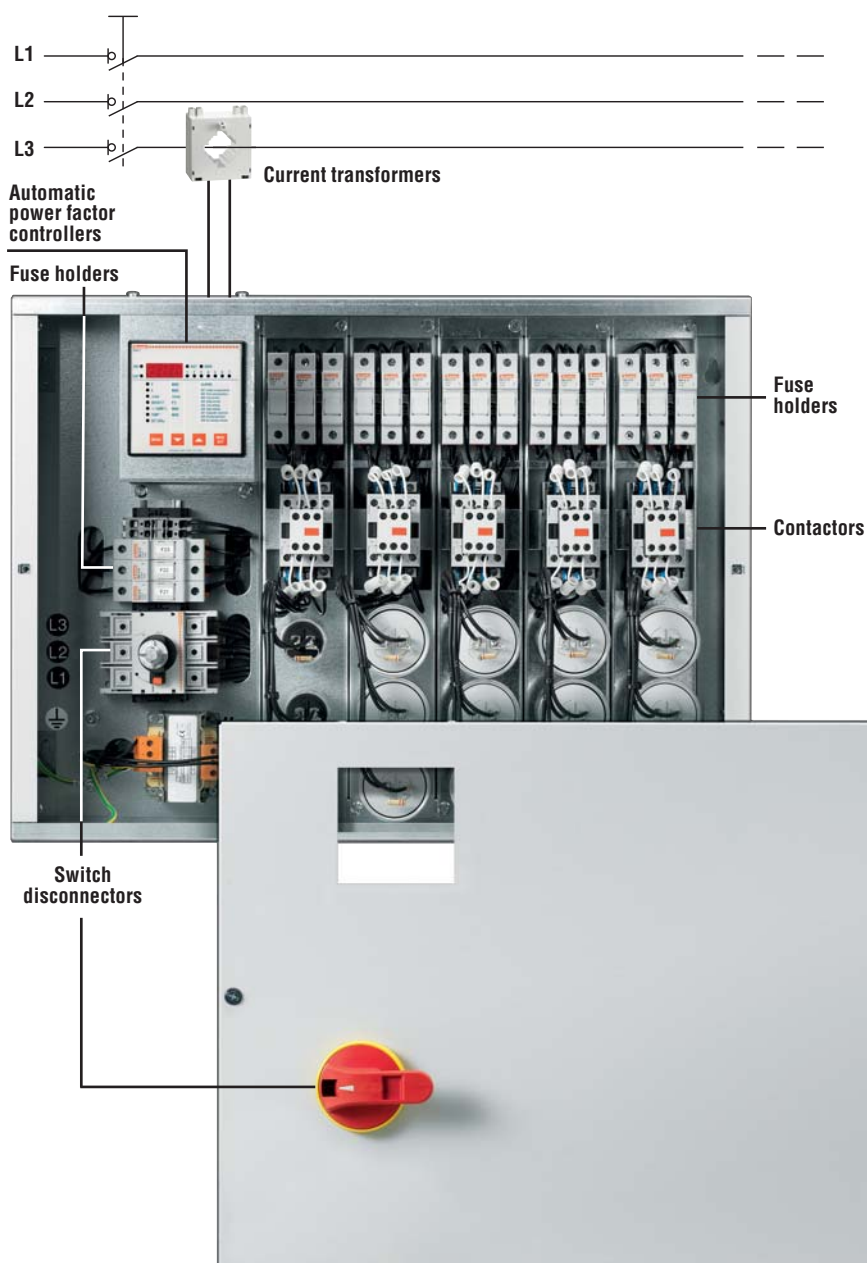


DCRJ

Number of steps	3, 5, 7, 8, 12	8 (10, 12, 14, 16 with EXP...)	8, 12
ON FRONT / HOUSING			
Display	One 3-digit LED	One graphic LCD	One 3-digit and one 4-digit LED
Languages		10 Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and customisable	
Dimensions	96x96mm/3.8x3.8" (DCRK 3/5/7) 144x144mm/5.7x5.7" (DCRK 8/12)	144x144mm 5.7x5.7"	144x144mm 5.7x5.7"
IEC degree of protection	IP54 (DCRK 3/5/7); IP41 (DCRK 8/12)	IP54	IP41
Expandable with EXP... modules		●	
CONTROL / FUNCTIONS			
Automatic recognition of current flow direction	●	●	●
4-quadrant operation	●	●	●
Master-slave technology		●	
Independent voltage input		●	●
Three-phase voltage control		●	●
Current input	1 (by CT, 5A secondary; 1A on request)	3 (by CTs, 5A or 1A)	1 (by CT, 5A secondary; 1A on request)
Dynamic (FAST) power factor correction usage		● (with EXP10 01 module)	● (with DCRJ12F only)
Medium-voltage usage		●	●
Independent power factor correction per phase		●	
Phase-neutral connection in three-phase systems		●	●
Programmable input as remote function or external/remote temperature sensor		● (with EXP10 04 module)	●
TTL/RS232 communication interface	●		
RS232 communication interface		● (with EXP10 11 module)	●
Opto-isolated RS485 communication interface		● (with EXP10 12 module)	●
ETHERNET communication interface with Web server function		● (with EXP10 13 module)	
Optical USB communication port on front		●	
Optical Wi-Fi communication port on front		●	
Automatic controller set-up (to configure)	●	●	● (DCRJ12F excluded)
Fast setting of current transformer	●	●	●
Set-up and automatic panel test software available	●	●	●
Remote control software available		●	●
Clock-calendar (RTC) with backup battery		● (with EXP10 30 module)	●
Voltage and current waveform capture and logging related to harmonic distortion events		●	●
Event logging: Alarms, set-up changes, etc.		●	●
MEASUREMENTS			
Rated measurement voltage	380...415VAC standard stock (220...240VAC, 415...440VAC, 440...480VAC, 480...525VAC on request)	100...690VAC	100...690VAC
Measurement voltage range	0.85...1.2 rated values	85...760VAC	85...760VAC
Instantaneous $\cos\varphi$ (power factor displacement)	●	●	●
Instantaneous and average weekly power factor values	●	●	●
Voltage and current	●	●	●
Reactive power to reach set-point and total values	●	●	●
Capacitor overload	●	●	●
Electric panel temperature	●	●	●
Maximum voltage and current value	●	●	●
Maximum capacitor overload value	●	●	●
Maximum panel temperature value	●	●	●
Maximum capacitor temperature value		● (with EXP10 04 module)	● (with NTC01)
Active and apparent power value		●	●
Current and voltage harmonic analysis		●	●
Current and voltage harmonic analysis waveforms logged at overload events		●	●
Var-measured value per step		●	●
Number of switching per step		●	●

Automatic power factor controllers

			
	DCRK	DCRG	DCRJ
PROTECTIONS			
Voltage too high and too low	•	•	•
Current too high and too low	•	•	•
Over compensation (all capacitors disconnected and $\cos\varphi$ value higher than set-point)	•	•	•
Under compensatpm (all capacitors connected and $\cos\varphi$ value lower than set-point)	•	•	•
Capacitor overload	•	•	•
Capacitor overload on all 3 phases		•	•
Over temperature	•	•	•
Mains micro-breakings	•	•	•
Capacitor bank failure		•	•
Over maximum harmonic distortion level limit		•	•
Programmable alarm property (enable, trip delay, relay energising, etc.)	•	•	•

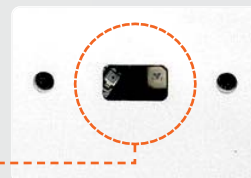


THE SOLUTION FOR ALL APPLICATIONS!

- **BACKLIGHT GRAPHIC DISPLAY**
128x80 pixels with excellent legibility, with adjustable intensity

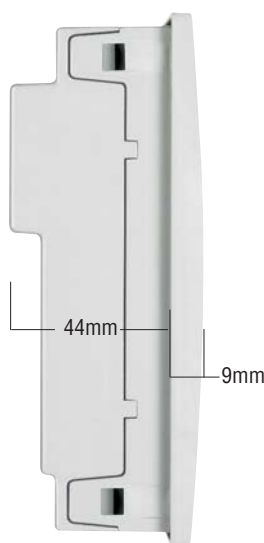


- **OPTICAL COMMUNICATION PORT**
The optical port on the front using a standard USB or Wi-Fi point, allows to communicate with a PC, smartphone and tablet, to carry out programming, diagnostics and data download without removing power to the electric panel.

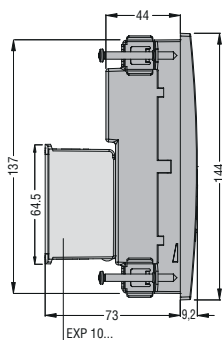


- **CUSTOMISING OPTION**
There is a customising slot available on the front to show controller brand name, logo, trademark, part number, brief indication or wording, etc.

COMPACT SIZE



Trim frame profile and reduced total depth simplify installation of the controller also in very compact electric panels.



FIXING SYSTEM



The fixing system with **metal screws** guarantees excellent adhesion over time.

- **HIGH PROTECTION DEGREE**
The controller front and the rear seal have been designed to warrant an **IP54** protection degree.

EXPANDABILITY



Basic controller functionality can be easily extended using the EXP series expansion modules:

- Relay outputs to increase the number of steps
- Capacitor protection
- Digital and analog inputs and outputs
- Opto-isolated static outputs
- Relay outputs
- Opto-isolated RS232 interface
- Opto-isolated RS485 interface
- Opto-isolated Ethernet interface with Web server function
- Opto-isolated Profibus-DP interface
- GPRS/GSM modem
- Data logging and clock-calendar (RTC).



- SUITABLE FOR POWER FACTOR CORRECTION USING CONTACTORS OR THYRISTOR MODULES
- SMS SENDING FOR ALARM CONDITIONS
- DATA SENDING BY EMAIL OR FTP SERVER
- WEB SERVER FOR DATA READING
- STREAMLINE DESIGN

The DCRG controller has an ergonomic design and, at the same time, particular care has been given to minimum detail aesthetics.

● MASTER-SLAVE FUNCTION

The DCRG controller can control the outputs of other analog controllers in addition to its own steps. In this way, it offers a **master-slave** architecture. Up to 3 slaves can be controlled to obtain a system with a total of 4 controllers, which means 64 steps.



Master



Slave 1



Slave 2



Slave 3

● WEB SERVER FUNCTION



By installing the **Ethernet** expansion module EXP10 13, the main measured values of the controller can be viewed by most common Web-client compatibles, on the market, using Java platform and with no need to install any additional PC software.

● CAPACITOR PROTECTION

By adding the apposite EXP10 16 expansion module, the DCRG controller can be equipped with additional capacitor protection functions. The module can measure the harmonic current values and the capacitor temperature on-site.

● THREE CURRENT INPUTS

- **Independent power factor correction** of each step can be done.
- Identification of capacitor failure on any of the phases being controlled.
- Analysis of all electrical parameters of the system by a multimeter.

● WIDE RANGE OF RATED VOLTAGE MEASUREMENTS

The wide measurement range between 100 to 690VAC allows to use the controller in most types of applications.

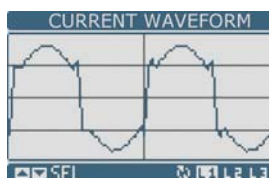
● GSM/GPRS MODEM

By fitting the EXP10 15 expansion module, the controller is automatically equipped and configures a GSM/GPRS modem. This simplifies installation and wiring. Once a data-enabled SIM card is inserted, alarm or event SMS, **email messages** and latest logged data can be transmitted by the controller to FTP servers.

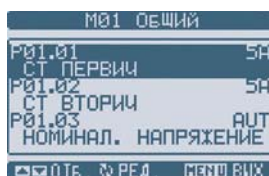
● 5A AND 1A BOTH ON THE SAME CONTROLLER

By configuring an apposite parameter, the controller can be enabled for use with either a 5A or 1A secondary current transformer.

● GRAPHS AND TEXT IN MULTI LANGUAGES



Viewing of waveforms, text, trend and bar graphs in 10 languages: Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and customisable.



● SUITABLE FOR MEDIUM-VOLTAGE SYSTEMS

The controllers can be installed in medium-voltage systems thanks to its configuration for voltage transformer ratio, thereby obtaining measurements with regards to the transformer primary value both for the correction adjustment and the display readouts.

● SUITABLE FOR DYNAMIC (FAST) POWER FACTOR CORRECTION

With the EXP10 01 static output expansion module installed, the controller can be used in dynamic power factor correction systems where the reactive load quickly varies over time. Also taking advantage of the built-in controller relay outputs, a mixed system of traditional relay and dynamic type of correction steps can be obtained.

Reactive current controller
DCRM series



DCRM 2



Order code	Steps	Auxiliary supply voltage	Qty per pkg	Wt
	n°	[V]	n°	[kg]
DCRM 2	2	380-415VAC	1	0.166

Single and three-phase low-voltage system.
Reactive current monitoring relay.

General characteristics

DCRM2 allows to control the reactive current of a plant, eliminating it from the total current drawn from the mains and correcting the cos-phi of the load to the best possible value.
It can control the connection of two capacitor banks maximum. Each one of the two banks can be individually enabled and its power can be set through a dedicated potentiometer.
It is also possible to adjust the time for connection and disconnection of the capacitor banks, thereby modifying the reaction speed of the system.
The controller can be used both in single-phase and three-phase wiring.

Operational characteristics

- Auxiliary supply voltage: 380-415VAC standard stock; 220-240VAC and 440-480VAC on request
- Rated frequency: 50/60Hz
- Voltage measurement input range: 80-528VAC
- Current input:
 - By CT /5A
 - Measurement range: 0.1-6A
 - TRMS measurements (True Root Mean Square)
 - Automatic identification of CT polarity connection (direct-reverse)
- Relay outputs
 - 2 outputs, each with 1 changeover contact (SPDT) rated 8A-250VAC (in AC1 IEC) / B300
 - Independent enabling of each
- Modular DIN 43880 housing, 3-module
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

- | | |
|------------------------|---|
| "C/K Step 1" | C/K ratio threshold for step 1
OFF/0.15-2 |
| "C/K Step 2" | C/K ratio threshold for step 2
OFF/0.15-2 |
| "Connection delay" | Step connection delay 1-60s |
| "Disconnection delay" | Step disconnection delay
1-60s |
| "System configuration" | Wiring selection for single or
three-phase system 1PH-3PH. |

INDICATIONS

- 1 green LED for power on and inhibition time
- 2 red LEDs for step connection.

Certifications and compliance

Certifications obtained: UL Listed, for USA and Canada (File E93601), as Auxiliary Devices-Modular ampere monitoring relays.
Compliant with standards: IEC/EN 60255-5, IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n°14.

Contactors for power factor correction

See section 2, page 2-12.

DCRK series



DCRK 3 - DCRK 5 - DCRK 7



DCRK 8 - DCRK 12

new

Order code	Steps	Flush-mount housing size	Qty per pkg	Wt
	n°	[mm (in)]	n°	[kg]
DCRK 3	3	96x96 (3.8x3.8)	1	0.355
DCRK 5	5	96x96 (3.8x3.8)	1	0.365
DCRK 7	7	96x96 (3.8x3.8)	1	0.375
DCRK 8	8	144x144 (5.7x5.7)	1	0.640
DCRK 12	12	144x144 (5.7x5.7)	1	0.660

Software.

Order code	Description	Qty per pkg	Wt
		n°	[kg]
DCRK SW	Set-up and automatic test software complete with 51 C11 cable	1	0.246

Accessories.

51 C11	PC ↔ DCRK connecting cable 2.8m/2yd long for TTL/RS232 communication port	1	0.090
31 PACR	Front IP54 protective cover for DCRK8 and DCRK12 types	1	0.107
31 PA 96X96	Front IP54 protective cover for DCRK3, DCRK5 and DCRK7 types	1	0.077

General characteristics

- 3, 5, 7, 8 and 12 step versions, the last two of which are programmable as alarm and/or fan control except for DCRK3
- Digital microprocessor controllers for automatic power factor correction systems with relay outputs for the connection and disconnection of capacitor banks
- Use in co-generation systems, 4-quadrant operation
- Accurate and reliable power factor control of a system even in presence of high current and voltage harmonic content
- Warrant balanced capacitor usage, to extend its life, obtained by intelligent adjustment interface based on number of switching operations and connection time of each step
- Average weekly power factor measurement (last 7 days)
- Adjustable tripping sensitivity (integral switching time)
- Adjustable reconnection time delay
- No-voltage release protection function
- Capacitor over-current and panel over-heating protection
- Programmable automatic set-up function
- TTL/RS232 communication interface with a personal computer for: quick set-up, function and alarm customising and automatic electric panel test.

Operational characteristics

- Voltage circuit
 - Auxiliary supply and control voltage U_e : 380-415VAC standard stock
 - Available on request: 220-240VAC, 415-440VAC, 440-480VAC, 480-525VAC
 - Rated frequency: 50/60Hz $\pm 1\%$ self configurable
 - Power consumption: 6.2VA for DCRK3, DCRK5 and DCRK7; 5VA for DCRK8 and DCRK12
- Current circuit
 - Rated current I_e : 5A (1A available on request)
 - Overload peak: 20Ie for 10ms
 - Power consumption: 0.65W
- Measurement and control
 - Power factor adjustment: 0.8 ind to 0.8 cap
 - Voltage measurement range: -15 to 10% U_e
 - Current measurement range: 2.5 to 120% I_e
 - Temperature measurement range: -30...+85°C
 - Capacitor over-current measurement range: 0-250%
 - TRMS voltage and current measurements
 - Reconnection time of same step: 5-240s
 - Tripping sensitivity: 5-600s/step
- Relay outputs
 - 3, 5, 7, 8 or 12 depending on type, of which the last one with independent common except for DCRK 3
 - Contact arrangement: Normally Open (NO / SPST) for all, except DCRK8 and DCRK12 have the last being a changeover (SPDT)
 - Rated capacity: 5A at 250VAC (in AC1 IEC) / B300
 - Maximum capacity of common terminal: 12A
 - Maximum switching voltage: 440VAC
- Housing
 - Flush mount
 - IEC degree of protection: IP20 at terminals for all, IP54 on front for DCRK3, DCRK5 and DCRK7, IP41 on front for DCRK8 and DCRK12; IP54 with 31 PACR cover.

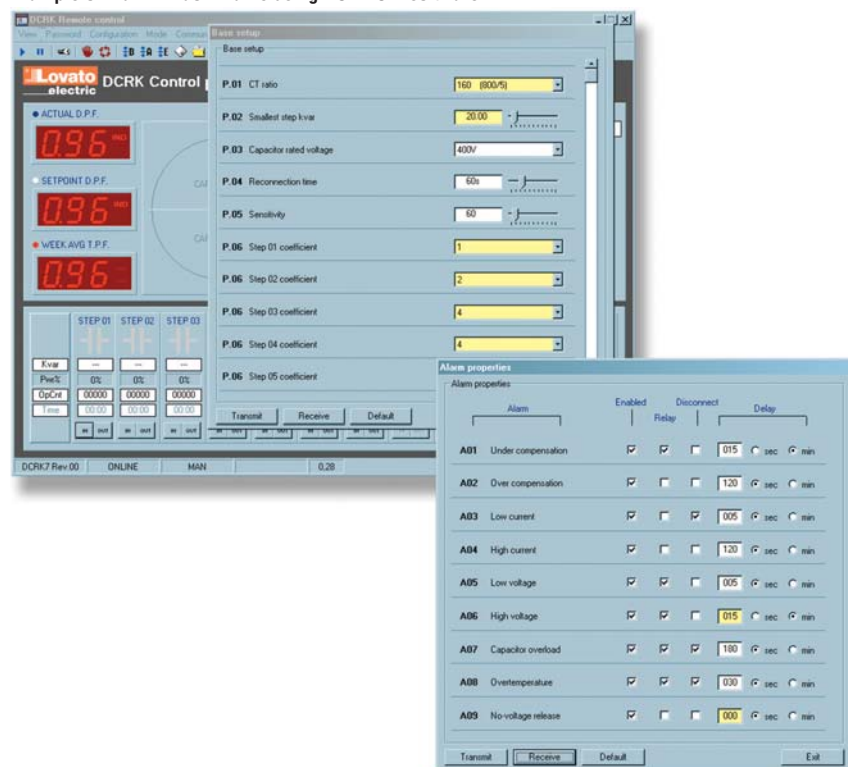
Certifications and compliance

Certifications obtained: GOST; UL Listed, for USA and Canada (File E93601), as Auxiliary Devices. Compliant with standard: IEC 61010-1; EN55011, IEC/EN 61000-6-2, UL 508, CSA C22.2 n° 14; also IEC/EN 60950-1 for 51 C11 cable.

Contactors for power factor correction

See section 2, page 2-12.

Example of main window frame using DCRK SW software



DCRG series



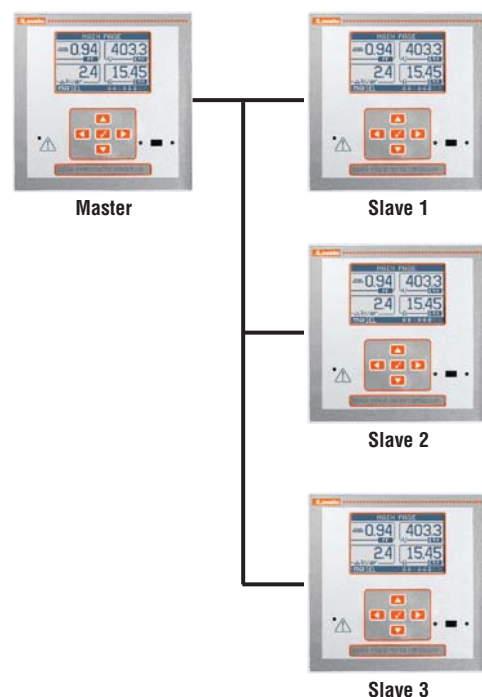
DCRG 8



Order code	Steps	Flush-mount housing size	Qty per pkg	Wt
	n°	[mm(in)]	n°	[kg]
DCRG 8	8	144x144 (5.7x5.7)	1	0.980

Maximum DCRG 8 expandability

DCRG 8	EXP10 06	EXP10 01	TOTAL STEPS	
Controller	2 relay-output module	4 static-output module	Relay	Static
N° of steps	N° of modules	N° of modules	Relay	Static
8	1 (2 steps)	-	10	-
8	1 (2 steps)	1 (4 steps)	10	4
8	2 (4 steps)	-	12	-
8	2 (4 steps)	1 (4 steps)	12	4
8	3 (6 steps)	-	14	-
8	4 (8 steps)	-	16	-
8	-	-	8	-
8	-	1 (4 steps)	8	4
8	-	2 (8 steps)	8	8



When the correction system is subdivided into various panel boards, a DCRG8 "Master" controller can control up to 3 DCRG8 "Slave" controllers. The "Slave" controllers serve as remote outputs for the connection of the capacitor banks by carrying out the "Master" controller commands.

General characteristics

The DCRG8 controller has been designed to satisfy technical characteristics of modern electrical installations in industry and of new users' needs.

Main power factor controller characteristics include:

reliability, capability of working in all conditions and the ability to detect critical operating conditions and all this to protect the power factor correction system.

DCRG8 is created to satisfy these requirements and with the option to extend its own functionality by using specific expansion modules. A standard-supplied USB optic port is also available for controller programming, diagnosis and data downloads.

User's interface is easy thanks to the backlight graphic LCD that contributes to excellent data reading even with bad lighting conditions and to view information clearly and comprehensively.

Main features are:

- Backlight graphic 128x80 pixel LCD with text in 10 languages: Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and customisable
- 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 medium-voltage lines
- Capability to correctly operate also in systems having high harmonic content
- 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 and ASCII communication protocols
- Set-up and remote control software
- SMS sending for alarm conditions with EXP10 15 expansion module.

Operational characteristics

- Voltage circuit
 - Auxiliary power supply: 100-240VAC
 - Rated frequency: 50/60Hz $\pm 10\%$
- Current circuit
 - Single and three-phase input
 - Rated current Ie: 5A (1A programmable)
- Measurement and control
 - Power factor adjustment: 0.8 ind to 0.8 cap
 - Voltage measurement range: 85-760VAC
 - Current measurement range: 0.125-6A
 - Temperature measurement range: -30...+85°C
 - Capacitor over-current measurement: 0-250%
 - TRMS voltage and current measurements
 - Reconnection delay time of the same step: 5-3600s
 - Tripping sensitivity: 5-600s/step
- Relay outputs
 - 8 outputs, each with 1 Normally Open (NO / SPST) contact, except the last being a changeover (SPDT)
 - Rated capacity: 5A 250VAC (in AC1 IEC) / B300
- IEC degree of protection: IP54 on front; IP20 at terminals
- Flush-mount housing.

Certifications and compliance

Certifications obtained: cULus pending completion at time of catalogue printing.

Compliant with standards: IEC 61010-1, IEC/EN 61000-6-2, EN 55011, UL508, CSA C22.2 n° 14.

Contactors for power factor correction

See section 2, page 2-12.

Expansion modules for DCRG 8



EXP10...

new

new

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Inputs and outputs.			
EXP10 06	2 relay outputs to increase number of steps	1	0.064
EXP10 01	4 static outputs, opto-isolated, to increase number of steps	1	0.054
EXP10 16	Capacitor both protection	1	0.080
EXP10 00	4 digital inputs, opto-isolated	1	0.060
EXP10 02	2 digital inputs and 2 static outputs, opto-isolated	1	0.058
EXP10 03	2 relay outputs, rated 5A 250VAC	1	0.050
EXP10 04	2 analog inputs, opto-isolated, 0/4-20mA, PT100, 0-10V or 0...±5V	1	0.056
EXP10 05	2 analog outputs, opto-isolated 0/4-20mA, 0-10V or 0...±5V	1	0.064
Communication ports.			
EXP10 11	Opto-isolated RS232 interface	1	0.040
EXP10 12	Opto-isolated RS485 interface	1	0.050
EXP10 13	Opto-isolated Ethernet interface with Web server function	1	0.060
EXP10 14	Opto-isolated Profibus-DP interface	1	0.080
Various functionality.			
EXP10 15	GPRS/GSM modem	1	0.080
EXP10 30	Data storage, clock-calendar with backup battery for data logging	1	0.050

General characteristics

EXP series expansion modules can add extra functions to the DCRG series power factor controllers. Each controller can mount a maximum of four expansion modules.

These modules snap on to the rear of the controller and allow to:

- Increase the number of steps to connect
- Use in applications with static real-time (fast) power factor correction
- Add analog type of inputs and outputs to have 0/4...20mA, 0...10V, -5...+5V or PT100 function
- Add RS232 and RS485 communication ports supporting SMS and modem
- predispose the controller for connection to Ethernet TCP/IP, Profibus-DP, GPRS/GSM.

Certifications and compliance

Certifications obtained: UL Listed, for USA and Canada (File E93601), as Listed Accessory under Auxiliary Devices, for EXP... modules only.

Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL508, CSA C22.2 n° 14.

For overall dimensions, wiring diagrams and technical characteristics, consult the instructions manuals online in the LOVATO Electric website; see details on inside front cover.

Communication devices for DCRG 8



CX 01

new

Order code	Description	Qty per conf.	Wt
		n°	[kg]
CX 01	PC↔DCRG8 connecting cable, with USB optic connector for programming, data download, diagnosis and firmware upgrade	1	0.090
CX 02	PC ↔ DCRG8 Wi-Fi connecting device for programming, data download, diagnosis and firmware upgrade	1	0.090
CX 03	GSM quad-band antenna (800/900/1800/1900MHz) for EXP10 15 expansion module	1	0.090

General characteristics

Communication and connection devices allow the DCRG8 controller to be linked to:

- Personal computer (PC)
- Smartphone
- Tablet
- Various types of modem
- BUS converter drives.

CX 01

This USB optic connector, complete with cable, provides for connection of the DCRG8 controller with a PC without even disconnecting the power supply of the electric panel board and to be able to:

- Program parameters
- Download data and event logs
- Complete diagnosis.

The PC identifies the connection as a standard USB.

CX 02

Using Wi-Fi connection, the DCRG8 power factor controllers can be viewed by a PC, smartphone and tablet without having to connect cables and allows to:

- Program parameters
- Download data and event logs
- Complete diagnosis.

CX 03

Compatible with major worldwide mobile phone networks, thanks to the 800/900/1800/1900MHz frequencies.

For overall dimensions, wiring diagrams and technical characteristics, consult the instructions manual online in the LOVATO Electric website; see details on inside front cover.

Software and accessories for DCRG 8



51 C4

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Software.			
DCRJ SW	Set-up, automatic panel test and remote control software, with 51 C2 connecting cable	1	0.246
Accessories.			
51 C2	PC↔DCRG8 c/w EXP10 11 connecting cable, 1.8m/2yd long	1	0.090
51 C4	PC↔4 PX1 converter drive connecting cable, 1.8m/2yd long	1	0.147
51 C5	Analog modem ↔DCRG8 c/w EXP10 11 connecting cable, 1.8m/2yd long①	1	0.111
51 C6	4 PX1 converter drive↔DCRG8 c/w EXP10 11 connecting cable 1.8m/2yd long	1	0.102
51 C9	PC↔Analog modem connecting cable, 1.8m/2yd long	1	0.137
4 PX1	RS232/RS485 converter drive, galvanically isolated, 220-240VAC (110-120VAC on request)②	1	0.600

① Consult Customer Service for information; see contact details on inside front cover.

② RS232/RS485 opto-isolated converter drive, 38,400 Baud rate maximum, automatic or manual TRANSMIT line supervision, 220...240VAC ±10% power supply (110...120VAC on request).

DCRJ series



DCRJ 8 - DCRJ 12
DCRJ 12F

- ❶ Consult Customer Service for modem details; see contact details on inside front cover.
❷ RS232/RS485 opto-isolated converter drive, 38,400 Baud rate maximum, automatic or manual TRANSMIT line supervision, 220...240VAC $\pm 10\%$ power supply (110...120VAC supply on request).

Order code	Steps	Flush-mount housing size	Qty per pkg	Wt
	n°	[mm (in)]	n°	[kg]

Version with relay outputs.

DCRJ 8	8	144x144 (5.7x5.7)	1	0.940
DCRJ 12	12	144x144 (5.7x5.7)	1	0.980

Version with static outputs.

DCRJ 12F	11 static + 1 relay	144x144 (5.7x5.7)	1	0.950
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Software.

Order code	Description	Qty per pkg	Wt
		n°	[kg]
DCRJ SW	Set-up, automatic panel test and remote control software complete with 51 C2 connecting cable	1	0.246

Accessories.

51 C2	PC ↔ DCRJ connecting cable, 1.8m/2yd long	1	0.090
51 C4	PC ↔ 4 PX1 converter drive connecting cable 1.8m/2yd long	1	0.147
51 C5	Analog modem ↔ DCRJ connecting cable, 1.8m/2yd long❶	1	0.111
51 C6	DCRJ ↔ 4 PX1 converter drive connecting cable, 1.8m/2yd long	1	0.102
51 C9	PC ↔ analog modem connecting cable, 1.8m/2yd long	1	0.137
4 PX1	RS232/RS485 converter drive, galvanically isolated, 220-240VAC power supply (110-120VAC on request)❷	1	0.600
NTC 01	External temperature sensor, with 3m/3.3yd long cable	1	0.150
31 PACR	Front IP54 protective cover	1	0.107

General characteristics

- 8 and 12 step versions (DCRJ8-DCRJ12), the last two of which are programmable as alarm and/or fan control
- DCRJ12F version with 11 static outputs plus 1 alarm relay output
- Digital microprocessor controller for automatic power factor correction systems with outputs for the connection and disconnection of capacitor banks
- Use in medium-voltage systems (independent voltage input) and co-generation systems with 4-quadrant operation
- Accurate power factor control even in presence of high current and voltage harmonic content
- Warrant balanced capacitor usage
- TRMS current and voltage measurements
- Measurements of average weekly power factor measurement (last 7 days), capacitor over-current, panel temperature and voltage and current harmonic content
- Event viewing when harmonic overload limit is exceeded
- Harmonic content analysis at event conditions on logged waveforms
- Adjustable tripping sensitivity
- Adjustable reconnection time delay for DCRJ8-DCRJ12 only
- No-voltage release protection function
- Capacitor over-current and panel over-temperature protection
- Panel temperature measurement
- Remote temperature sensor NTC 01 connection
- Programmable automatic set-up for DCRJ8-DCRJ12 only
- RS232-RS485 communication interface
- PC software for quick set-up, function and alarm customising, automatic panel testing and remote control
- MODBUS-RTU and ASCII communication protocols
- Mixed configuration of static and electromechanical steps with DCRJ12F only.

Operational characteristics

- Supply circuit
 - Auxiliary power supply U_e : 110-127/220-240VAC (dual voltage)
 - Rated frequency: 50/60Hz $\pm 5\%$
 - Power consumption: 9.7VA for DCRJ8-DCRJ12 9.2VA for DCRJ12F
- Voltage circuit
 - Three phase without neutral
 - Rated measurement voltage: 100-690VAC
 - Frequency: 50/60Hz $\pm 5\%$ self configurable
- Current circuit
 - Rated current I_e : 5A (1A on request)
 - Overload peak: 20I_e for 10ms
 - Power consumption: 0.3VA
- Measurement and control
 - TRMS voltage-current measurement
 - Voltage measurement range: 85-760VAC
 - Current measurement range: 2.5÷120%I_e
 - External temperature measurement range: -40...+85°C
 - Capacitor over-current measurement range: 0-250%
 - Power factor adjustment: 0.8 ind to 0.8 cap
 - Reconnection time delay of the same step: 5-240s for DCRJ8-DCRJ12 only
 - Tripping sensitivity: 5-600s/step
 - Sampling time: ≈ 20 ms for DCRJ12F only
- DCRJ8-DCRJ12 outputs
 - 8 or 12 uscite of which the last is isolated
 - Contact arrangement: all Normally Open (NO / SPST) except the last one being a changeover (SPDT)
 - Rated capacity: 5A 250VAC (in AC1 IEC) / B300
 - Maximum capacity of common terminal of contacts: 12A
 - Rated operational voltage: 250VAC
 - Maximum switching voltage: 440VAC
- DCRJ12F outputs
 - 11 static outputs for static contactor control
 - 1 alarm relay output
 - Opto-isolated bi-directional static outputs (Opto-Mosfet)
 - Maximum operating voltage: 40VDC; 30VAC
 - Maximum operating current: 55mA
- Housing
 - Flush mount
 - IEC degree of protection: IP41 on front (IP54 with 31 PACR cover); IP20 at terminals.

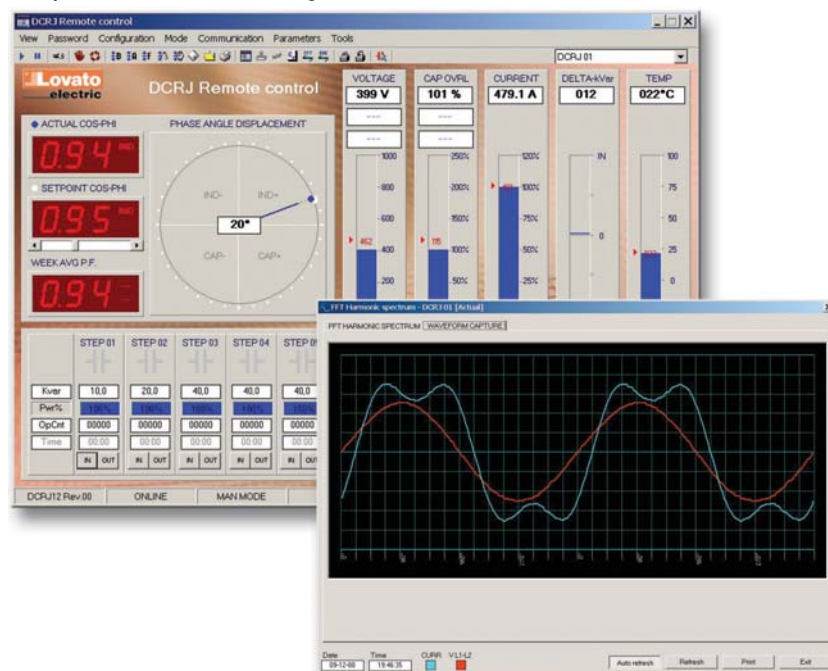
Certifications and compliance

Certifications obtained: GOST; UL Listed, for USA and Canada (File E93601), as Auxiliary Devices.
Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, EN 55011, UL 508, CSA C22.2 n° 14.

Contactor for power factor correction

For use with DCRJ8 and DCRJ12 only; see section 2, page 2-12.

Example of main window frame using DCRJ SW software



Thyristor modules



DCTM3 400...

Order code	Step description	Qty per pkg	Wt
		n°	[kg]
DCTM3 400 030	30-kvar step module, 400...480VAC	1	4.300
DCTM3 400 050	50-kvar step module, 400...525VAC	1	4.300
DCTM3 400 100	100-kvar step module, 400...525VAC	1	5.600

Power rating available depending on voltage

	DCTM3 400 030	DCTM3 400 050	DCTM3 400 100
Current I _e [A]	43A	72A	144A
Voltage [VAC]	Power [kvar]	Power [kvar]	Power [kvar]
400	30	50	100
440	33	55	110
480	36	60	120
525	—	66	131

General characteristics

- Suitable for dynamic (fast) power factor correction
- Capacitor switching at current flow zero-crossing
- Protection against high in-rush currents at capacitor switching
- Protection against over temperature obtained by the built-in sensor.

Operational characteristics

- 30-kvar, 50-kvar and 100-kvar steps
- Rated operational voltage:
 - 400-480VAC for DCTM3 400 030 type
 - 400-525VAC for DCTM3 400 050 and DCTM3 400 100 types
- Auxiliary fan power supply: 230VAC (DCTM3 400 100 only)
- Rated frequency: 50/60Hz
- Control circuit input range: 8-30VDC
- Controlled phases: 2
- Forced ventilation: DCTM3 400 100 only
- Ambient conditions
 - Operating temperature: -10...+45°C
 - Use at higher temperatures with power derating, refer to page 23-17
 - IEC degree of protection: IP10.

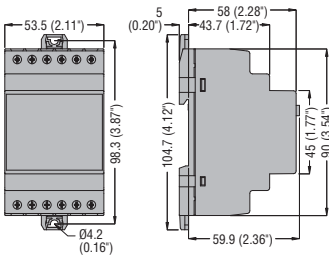
INDICATIONS

- Auxiliary power on
- Over temperature alarm
- Trigger LED.

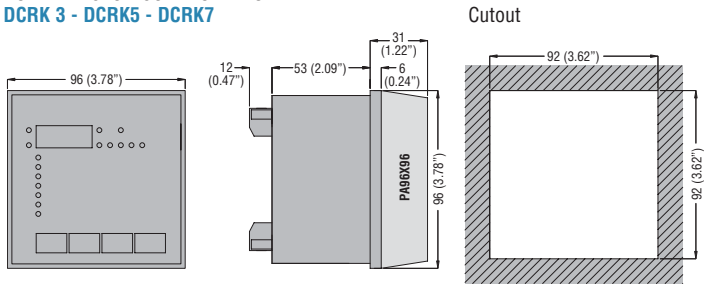
Reference standards

Compliant with standards: EN 50178.

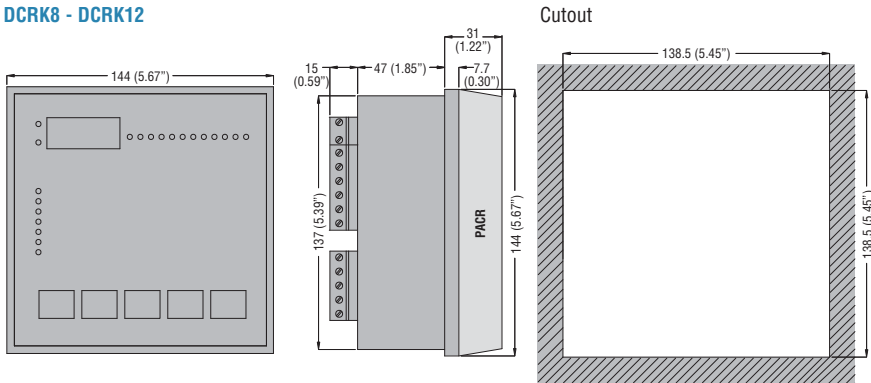
REACTIVE CURRENT CONTROLLER
DCRM 2



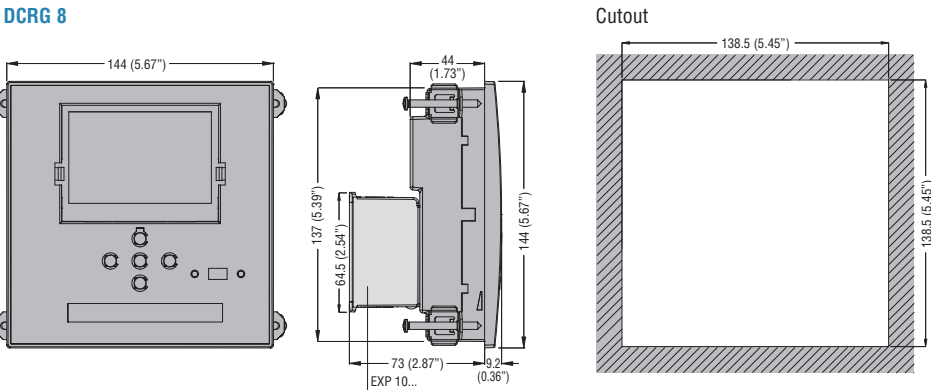
POWER FACTOR CONTROLLERS
DCRK 3 - DCRK5 - DCRK7



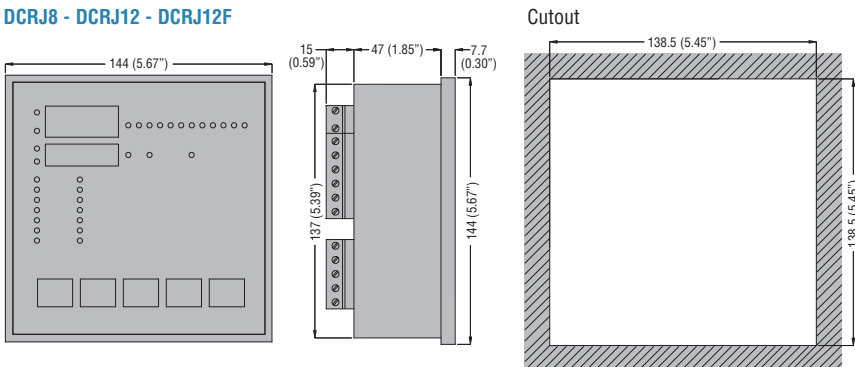
DCRK8 - DCRK12



DCRG 8

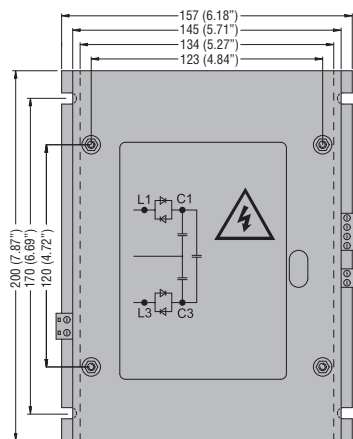


DCRJ8 - DCRJ12 - DCRJ12F

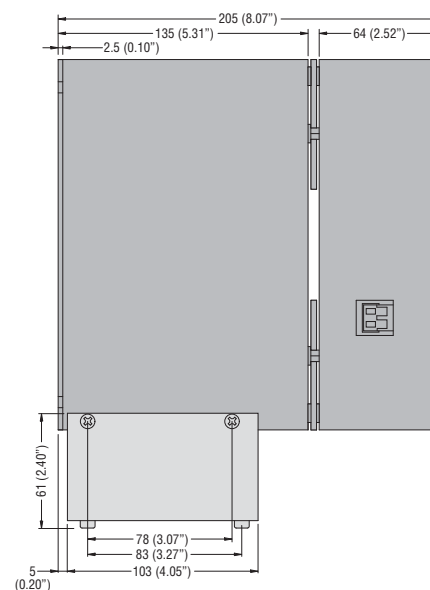
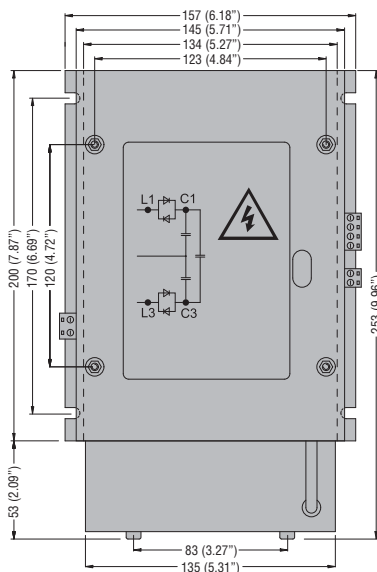


THYRISTOR MODULES

DCTM3 400 030 - DCTM3 400 050



DCTM3 400 100

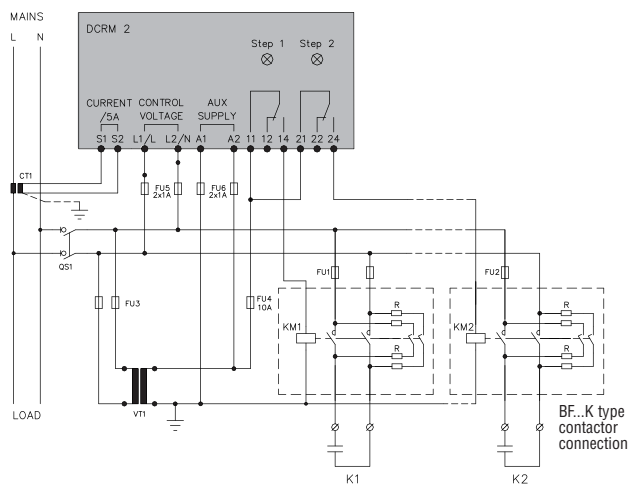


Wiring diagrams

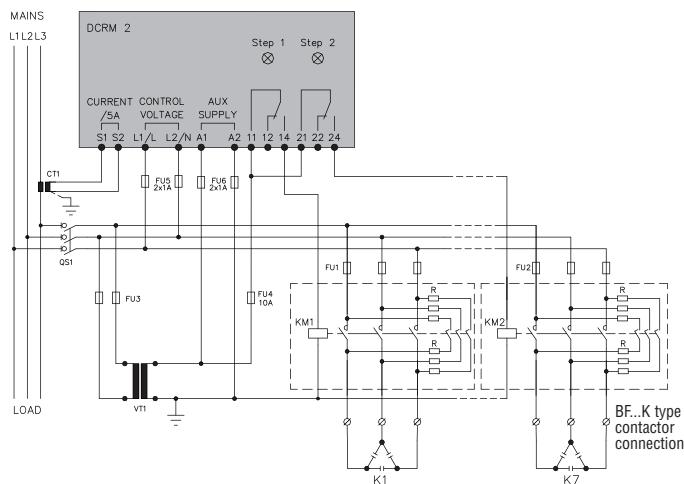
REACTIVE CURRENT CONTROLLER

DCRM 2

Single-phase connection

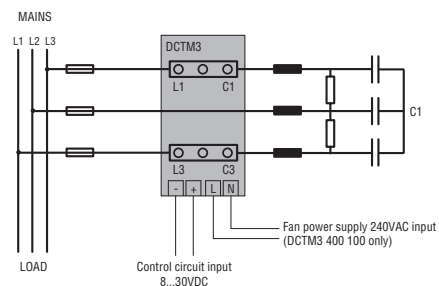


Three-phase connection



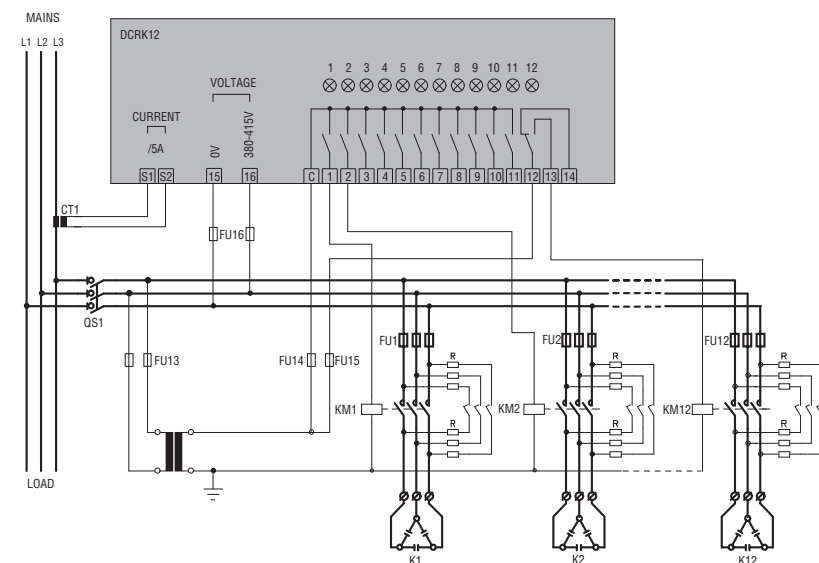
THYRISTOR MODULES

DCTM3 400...



POWER FACTOR CONTROLLERS

DCRK... with BFK... type contactor

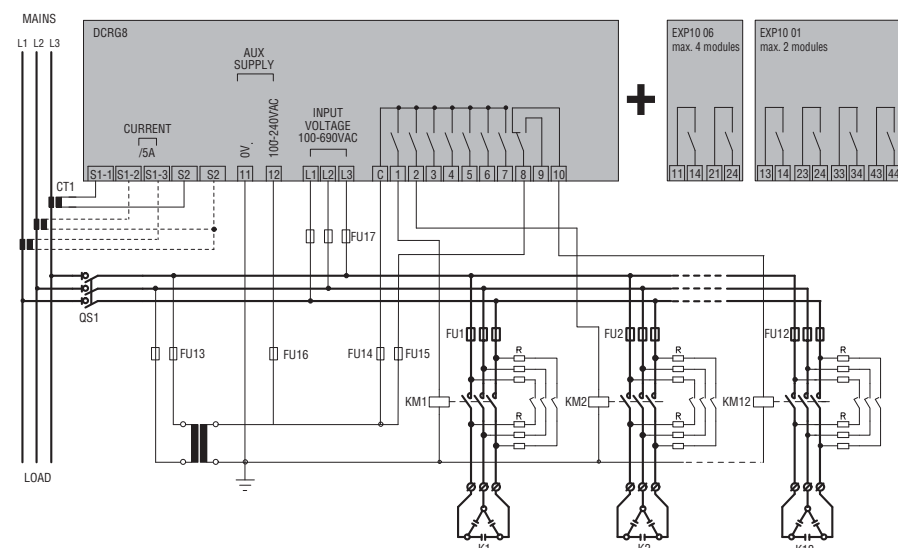


IMPORTANT

- For three-phase connection, the voltage input must be connected between two phases only; the line current transformer must be connected on the remaining free phase.
- The polarity of the current input is irrelevant.

CAUTION! Always remove the power supply before operating on the terminals.

DCRG 8 with BFK... type contactors

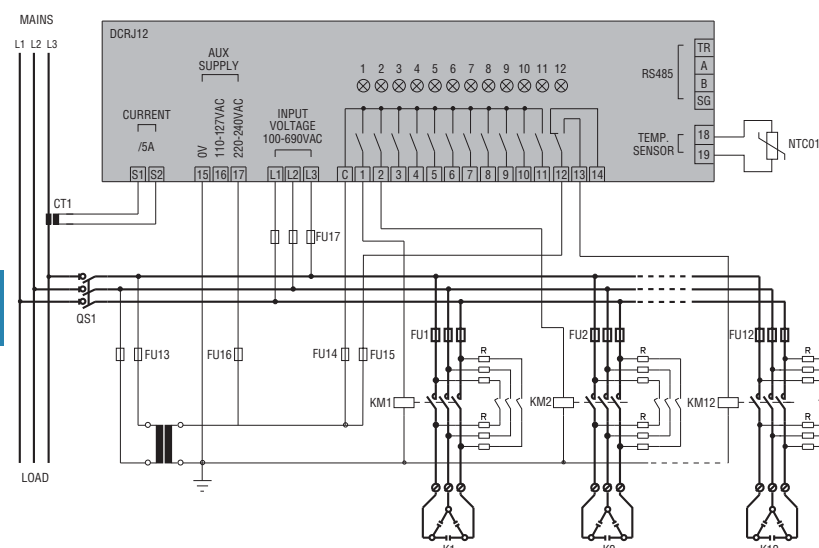


IMPORTANT

- For three-phase connection, the voltage input must be connected between two phases only; the line current transformer must be connected on the remaining free phase.
- The polarity of the current input is irrelevant.

CAUTION! Always remove the power supply before operating on the terminals.

DCRJ... with BFK... type contactors



IMPORTANT

- For three-phase connection, the voltage input must be connected between two phases only; the line current transformer must be connected on the remaining free phase.
- The polarity of the current input is irrelevant.

CAUTION! Always remove the power supply before operating on the terminals.

TYPE	DCRM 2
AUXILIARY SUPPLY CIRCUIT	
Rated auxiliary voltage Us	380-415VAC (standard); 220-240VAC and 440-480VAC on request
Operating range	0.85-1.1 Us
Rated frequency	50/60Hz $\pm 5\%$
Power consumption/dissipation maximum	4.4VA / 2.4W
Micro-breaking immunity	$\leq 17\text{ms}$
No-voltage release	$\geq 8\text{ms}$
VOLTAGE INPUT	
Maximum rated voltage Ue	480VAC
Measurement range	80-528VAC
Frequency range	50 or 60Hz $\pm 1\%$ self configurable
Measurement input impedance	$> 1\text{M}\Omega$
Type of connection	L1-L2 or L-N
CURRENT INPUT	
Type of connection	By current transformer (CT)
Rated current Ie	5A~
Measurement range	0.1...6A
Type of input	Shunt supplied by external current transformer (low voltage). Max. 5A
Measurement method	True RMS value
Overload capacity	+20% Ie
Overload peak	10In for 1s
Dynamic limit	160A for 10ms
Burden	$\leq 0.6\text{W}$
ADJUSTMENTS	
C/K step 1 and 2	OFF / 0.15-2
Connection and disconnection time delays	1 - 60s
System configuration	3 phase or 1 phase
RELAY OUTPUTS	
Number of outputs	2 each with 1 changeover contact (SPDT)
Rated operational voltage	250VAC
Maximum switching voltage	400VAC
IEC conventional free air thermal current Ith	8A
UL/CSA and IEC/EN 60947-5-1 designation	B300
Electrical life (with rated load)	10^5 cycles
Mechanical life	30×10^6 cycles
CONNECTIONS	
Maximum tightening torque	0.8Nm (7 lbin)
Conductor section min-max	0.2-4.0mm ² (24-12AWG)
INSULATION (input-output)	
Rated insulation voltage	480VAC
AMBIENT CONDITIONS	
Operating temperature	-20...+60°C
Storage temperature	-30...+80°C
HOUSING	
Material	Self-extinguishing polyamide

Automatic power factor controllers and thyristors modules

Technical characteristics

DCRK and DCRJ series - Power factor controllers

TYPE	DCRK3 - DCRK5 - DCRK7	DCRK8 - DCRK12	DCRG8	DCRJ8 - DCRJ12	DCRJ12F
AUXILIARY SUPPLY CIRCUIT					
Rated auxiliary voltage Us	❶	❶	100-240VAC	110-127 / 220-240VAC dual voltage	110-127 / 220-240VAC dual voltage
Operating range	—		-15 to +10%		
Rated frequency	—		50Hz o 60Hz ±5%		
Power consumption maximum	—		7VA	9.7VA	9.2VA
Power dissipation maximum (output contacts excluded)	—		5.5W		
VOLTAGE CIRCUIT					
Control voltage	380-415VAC standard❷ (self powered)		100-690VAC		
Operating range	-15 to +20%		85-760VAC		
Rated voltage	50 or 60Hz ±1% self configurable				
Power consumption	6.2VA	5VA	0.03VA		
Power dissipation maximum (output contacts excluded) dissipatadai contatti di uscita)	2.7W	3W	—		
Power dissipation by contact of one output / with 5A load at 250VAC)	0,5W				
Immunity time for microbreakings	≤65ms		≤45ms		
No-voltage release	≥8ms				
CURRENT CIRCUIT					
Rated current Ie	5A (1A on request)		Programmable 5A/1A	5A (1A on request)	
Operating range	0.125-6A				
Constant overload	1.2 Ie				
Short time withstand current	10 Ie for 1s				
Current consumption	0.65W		0.27VA		
MEASUREMENT DATA					
Type of voltage-current measurement	TRMS				
Power factor adjustment	0.8 inductive to 0.8 capacitive				
Type of temperature sensor	Semiconductor (internal)		Internal+PT100 w/EXP...	Semiconductor (internal)+NTC01 (external)	
Temperature measurement range	-30...+85°C		—	-40...+85°C for external	
RELAY OUTPUTS					
Number of outputs	3, 5 or 7	8 or 12	8 (10, 12, 14, 16 w/EXP...)	8 or 12	1
Contact arrangement	3, 5 or 7 NO (SPST) contacts	7 or 11 NO (SPST) contacts + 1 changeover (SPDT)			1 changeover (SPDT)
IEC rated capacity	5A 250V (AC1)				
Maximum capacity of common terminal of contacts	12A				
Maximum switching voltage	440VAC				
UL/CSA and IEC/EN 60947-5-1 designation	B300				
Electrical life (at rated load)	10 ⁵ cycles				
Mechanical life	30x10 ⁶ cycles				
STATIC OUTPUTS					
Number of outputs	—		4 or 8 with EXP10 01	—	11
Type of output	—				Opto-isolated bi-directional (Opto-Mosfet)
Rated operational voltage	—				40VDC - 30VAC
Rated operational current	—				55mA at 60°C
CONNECTIONS					
Type of terminal	Removable/plug-in				
Conductor section min-max	0.2-2.5mm² (24-12AWG)				
AMBIENT CONDITIONS					
Operating temperature	-20...+60°C				
Storage temperature	-30...+80°C				
HOUSING					
Version	Flush mount	Flush mount			
Material	Self-extinguishing Noryl		Self-extinguishing LEXAN		
IEC degree of protection	IP54	IP41	IP54	IP41	IP41

❶ Refer to data given under voltage circuit.

❷ Other voltages on request: 220-240VAC; 415-440VAC; 440-480VAC; 480-525VAC.

TYPE	DCTM3 400 30	DCTM3 400 50	DCTM3 400 100
AUXILIARY SUPPLY CIRCUIT			
Rated auxiliary voltage Us	400-480VAC	400-525VAC	400-525VAC
Rated current Ie	43A	72A	144A
Step power at 400VAC	30kvars	50kvars	100kvars
Maximum inverse voltage	2200VAC	2800VAC	2800VAC
Number of controlled phases	2		
Self powered	Yes		
Auxiliary fan power supply input	—	—	230VAC
Power consumption maximum	9VA		
Control circuit	8-30VDC (2mA at 12VDC)		
Over-temperature protection	Yes		
Cooling system	Natural	Natural	Forced ventilation (fan control voltage 230VAC input)
IEC degree of protection	IP10		
AMBIENT CONDITIONS			
Operating temperature	-10...+45°C (Ie<50A) -10...+50°C (Ie<48A) -10...+55°C (Ie<46A)	-10...+45°C (Ie<100A) -10...+50°C (Ie<90A) -10...+55°C (Ie<85A)	-10...+45°C (Ie<190A) -10...+50°C (Ie<180A) -10...+55°C (Ie<170A)
Storage temperature	-30...+80°C		
HOUSING			
Material	Metal		