- Microprocessor supervision and control
- Accurate TRMS measurement circuit
- Automatic intelligent adjustment system
- Versions from 2 to 24 steps and up to 32 with Master-Slave function
- Versions with static outputs
- Versions for capacitive reactive power factor correction
- Use in cogeneration and medium-voltage systems
- Basic controller functionalities can be extended using the EXP series of expansion modules
- USB, serial, Ethernet communication interfaces
- Modbus-RTU and ASCII communication protocols
- Thyristor modules for dynamic correction.
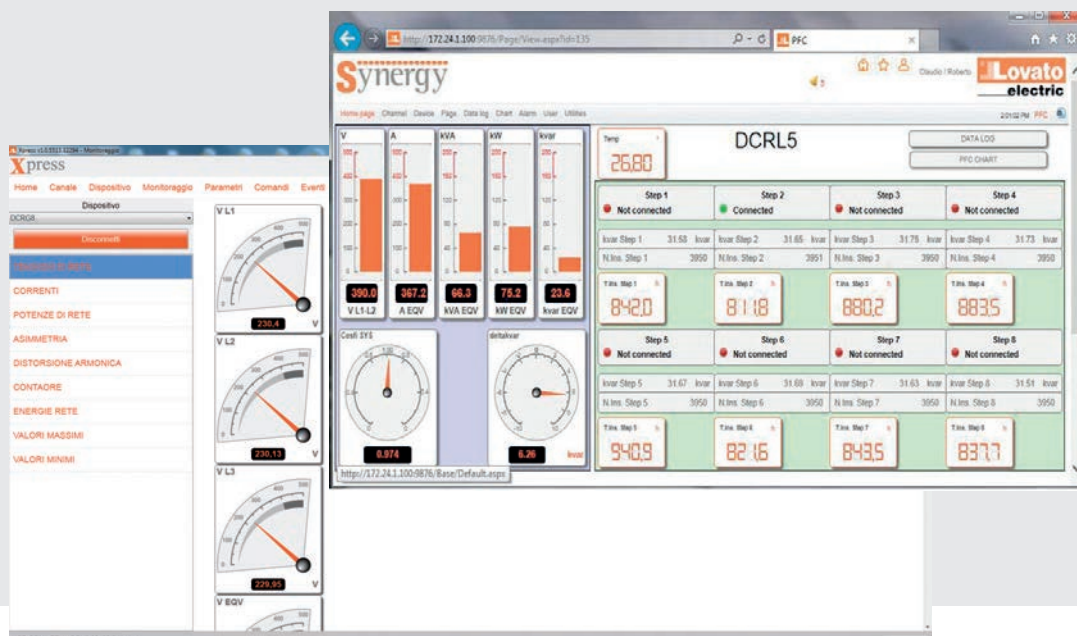
DCRM SERIES
• Modular housing
• 2 steps
• Settings by front potentiometers
• 3 LED indications.

DCRL SERIES (EXPANDABLE)
• Flush-mount housing:
  DCRL 3 - DCRL 5 (96x96mm/3.78x3.78")
  DCRL 8 (144x144mm/5.67x5.67")
• 3/5/8 steps, expandable with EXP series modules (step increment, digital outputs, communication ports, etc.)
• Backlit icon LCD
• Ethernet communication interface (only for DCRL 8)
• Alarm codes with scrolling texts, programmable in 6 languages (Italian, English, Spanish, French, German and Portuguese)
• Independent voltage measurement input
• Suitable for low and medium voltage systems
• Capacitor overload protection
• Internal panel temperature sensor
• Voltage and current harmonic-content measurement up to 15th order
• Front optical USB and Wi-Fi communication port for PC, smartphone and tablet connection
• Programmable alarms
• Protection via 2-level password to prevent all undesired access
• Compatible with **Synergy** and **Synergy**cloud, supervision and energy management software, **Xpress** configuration and remote control software and with the **Sam1** application for Android/iOS.

DCRG SERIES (EXPANDABLE)
• Flush-mount housing: DCRG 8 - DCRG 8F - DCRG 8IND (144x144mm/5.67x5.67")
• 8 steps, expandable with EXP series modules (step increment, inputs and outputs, communication ports, GPRS/GSM modem, data memory, etc.) and with Master-Slave function
• 128x80 backlit graphic LCD, facilitating data reading even in poor lighting conditions and the display of system information clearly and intuitively
• Ethernet communication interface
• Texts in 10 languages: Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and one customisable
• Voltage measurement input independent of supply input
• Suitable for low and medium voltage systems
• Capacitor overload protection
• Internal panel temperature sensor
• Voltage and current harmonic-content measurement up to 31st order
• Dynamic power factor correction (DCRG 8F version).
• Power factor correction by single phase (SPPFC)
• Capacitive reactive power factor correction (DCRG 8IND version)
• Front optical USB and Wi-Fi communication port for PC, smartphone and tablet connection
• Programmable alarms
• Protection via 2-level password to prevent all undesired access
• Calendar-clock with backup reserve energy
• Logging of up to 250 events
• Compatible with **Synergy** and **Synergy**cloud, supervision and energy management software, **Xpress** configuration and remote control software and with the **Sam1** application for Android/iOS.

NFC

THYRISTOR MODULES DCTL SERIES
• Version for steps from 7.5kvar to 120kvar
• Version with rated voltage from 400 to 690VAC
• Suitable for dynamic power factor correction
• Zero-crossing controlled connection-disconnection
• Over-temperature protection
• Monitoring and protection of current, power and current harmonics of the capacitor bank
• NFC connectivity for parameter settings and programming of protection thresholds with APP **NFC**
• Optical port for programming and diagnostic with software **Xpress** and APP **Sam1**
• Optional RS485 port for the command and monitoring by DCRG 8F controller.

Lovato electric

new

	DCRL 3	DCRL 5	DCRL 8	DCRG 8 / DCRG 8IND	DCRG 8F
Steps	3 relay steps (up to 6 with EXP10 07)	5 relay steps (up to 8 with EXP10 07)	8 relay steps (up to 14 with EXP10 07)	8 relay steps (up to 18 relay outputs with EXP10 06 and EXP10 07) (up to 24 mixed relay and static outputs with EXP10 01)	8 static steps (up to 24 static outputs with EXP10 01) (up to 23 mixed relays and static outputs with EXP10 06, EXP10 07 and EXP10 01)
ON FRONT/HOUSING					
Display	Backlit icon LCD			128x80 pixel backlit graphic LCD	
Languages	6 (scrolling text of alarm codes only) Italian, English, Spanish, French, German, Portuguese			10 Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and 1 customisable	
Dimensions	96x96mm/ 3.78x3.78"	96x96mm/ 3.78x3.78"	144x144mm/ 5.67x5.67"	144x144mm/ 5.67x5.67"	
Protection rating	IP54	IP54	IP65	IP65	
Expandable with EXP… modules	●			●	
CONTROL/FUNCTIONS					
Automatic recognition of current flow direction	●			●	
4-quadrant operation	●			●	
Master-Slave function				● (DCRG 8 / DCRG 8IND)	
Independent auxiliary supply input	●			●	
Three-phase voltage control				●	
Current inputs	1 (by 5A or 1A CTs)			3 (by 5A or 1A CTs)	
Dynamic (FAST) power factor correction				● with EXP10 01 (maximum 16 static outputs)	●
Power factor correction by single phase				● (DCRG 8 / DCRG 8IND)	
Possibility of connecting inductive steps				● (DCRG 8IND)	
Medium-voltage usage	●			●	
Phase-neutral connection in three-phase systems	●			●	
Analog inputs				● with EXP10 04	
Analog outputs				● with EXP10 05	
Input programmable as function or external temperature sensor				● with EXP10 04	
USB communication interface	● with EXP10 10			● with EXP10 10	
RS232 communication interface	● with EXP10 11			● with EXP10 11	
Opto-isolated RS485 communication interface	● with EXP10 12			● with EXP10 12	
Ethernet communication interface	● with EXP10 13 (only for DCRL 8)			● with EXP10 13 and web server function	
Opto-isolated Profibus-DP interface				● with EXP10 14	
GPRS/GSM modem				● with EXP10 15	
Optical USB communication port on front	● with CX 01			● with CX 01	
Optical Wi-Fi communication port on front	● with CX 02			● with CX 02	
Fast setting of current transformer	●			●	
Compatible with **Xpress** configuration and remote control software	●			●	
Compatible with **Synergy** and **Synergy%Cloud**, supervision and energy management software	●			●	
Compatible with **Sam1** App	●			●	
Calendar-clock with backup reserve power				●	
Data logging memory				● with EXP10 30	
Event logging: alarms, setup changes, etc.				●	
Customisable internal counters				●	

	DCRL 3	DCRL 5	DCRL 8	DCRG 8 / DCRG 8IND	DCRG 8F
MEASUREMENTS					
Rated measurement voltage		600VAC max		600VAC max	
Measurement voltage range		50...720VAC		50...720VAC	
Instantaneous cosφ (power factor displacement)		●		●	
Instantaneous and average weekly power factor values		●		●	
Voltage and current		●		●	
Reactive power to reach set-point and total values		●		●	
Capacitor overload		●		●	
Electrical panel temperature		●		●	
Maximum voltage and current value		●		●	
Maximum capacitor overload value		●		●	
Maximum panel temperature value		●		●	
Maximum capacitor temperature value				● with EXP10 04 and EXP10 15	
Active and apparent power value				●	
Active, reactive, apparent energy				●	
Current and voltage harmonic analysis		● up to 15th		● up to 31st	
Var-measured value per step		●		●	
Number of switches for each step		●		●	
PROTECTIONS					
Voltage too high and too low		●		●	
Current too high and too low		●		●	
Over compensation (capacitors disconnected and cosφ higher than set-point)		●		●	
Under compensation (capacitors connected and cosφ lower than set-point)		●		●	
Capacitor overload		●		●	
Capacitor overload on all 3 phases				●	
Over temperature		●		●	
Mains micro-breaking		●		●	
Capacitor bank failure		●		●	
Over maximum n° of switches		●		●	
Over maximum harmonic distortion level limit		●		●	
Programmable alarm property (enable, trip delay, relay energising, etc.)		●		●	
Capacitor protection				● with EXP10 16 (DCRG 8 / DCRG 8IND)	

L1
L2
L3

Current transformers

Automatic power factor controllers

Fuse holders

Fuse holders

Contactors

Switch disconnectors
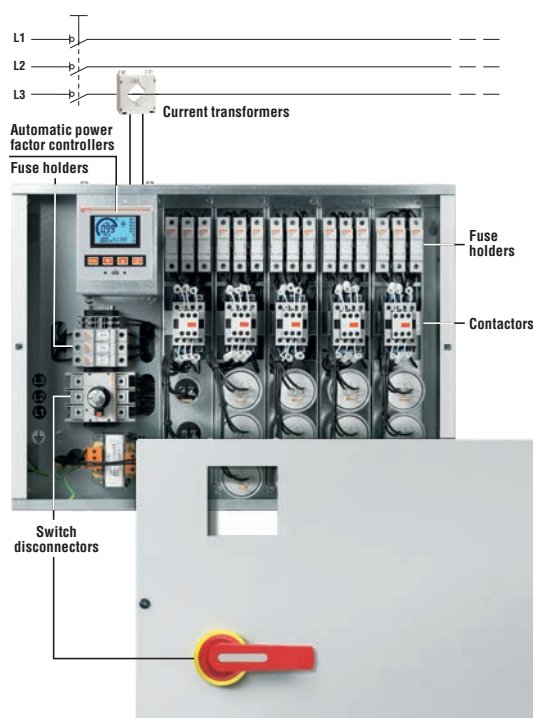
ESSENTIAL AND PERFORMANCE TOO!
DCRL 3 - DCRL 5

⬤ **OPTICAL COMMUNICATION PORT**
The optical port on the front permits communication with PCs, smartphones and tablets through the USB and Wi-Fi standards for carrying out programming, diagnostics and data download without disconnecting power to the electrical panel.

CX 01

CX 02

⬤ **USER INTERFACE**
The backlit icon LCD ensures excellent legibility as well as the texts for the display of measurements and description of alarms. The 4 navigation buttons are for settings and functions.

⬤ **AN EXPANSION SLOT FOR EXP... SERIES MODULES**

⬤ **EXPANDABLE UP TO 8 STEPS**

⬤ **COMPACT SIZE**
The space taken by the housing does not increase (96x96x73mm / 3.78x3.78x2.87") even with the expansion module fitted.

65
55
8.5

EXP 10...
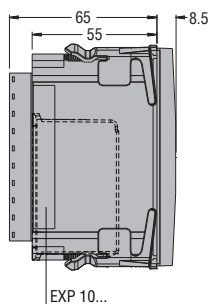
⬤ **FIXING SYSTEM**
The system of **fixing with clips** is simple, with a press to click into place and push to ensure retention over time.
Correct application of the standard seal and clips in the panel ensures a front **IP54** protection degree.

CLICK!!

⬤ **EXPANDABILITY**
Basic controller functionality can be extended easily using the EXP series expansion modules:
– digital outputs
– relay outputs to increase number of steps
– opto-isolated USB interface
– opto-isolated RS232 interface
– opto-isolated RS485 interface.

MAX 1

⬤ **SOFTWARE COMPATIBILITY**
- **Sam1** Application for Android and iOS
- **Xpress** for configuration and remote control
- **Synergy** and **Synergy**cloud for supervision and energy management.

⬤ **CHARACTERISTICS OF THE DCRL SERIES**

– **WIDE RANGE OF VOLTAGE MEASUREMENTS**
The wide measurement range between 50...720VAC L-L and between 50...415VAC L-N allows the controllers to be used in most applications.

– **SUITABLE FOR LOW- AND MEDIUM-VOLTAGE SYSTEMS**
The controllers can be used in medium-voltage systems thanks to the ability to set a voltage transformer ratio, obtaining measurements regarding the transformer primary value both for adjustment and for the display.
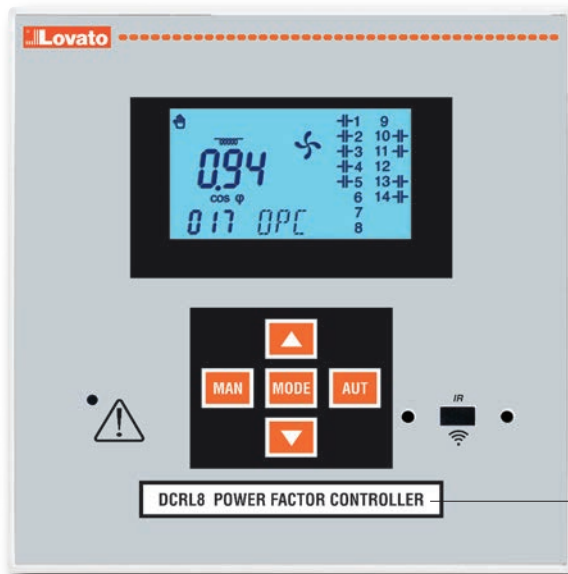
– **ALARM MESSAGES IN 6 LANGUAGES**
The alarm texts can be displayed in Italian, English, French, German, Portuguese and Spanish.

– **DEFECTIVE STEP**
The DCRL measures the percentage of residual power for each step, comparing it with the value set in the main menu.
The defective step alarm is generated if this value is below the set limit.

DCRL 8

DCRL8 POWER FACTOR CONTROLLER

● **USER INTERFACE**
The backlit icon LCD ensures excellent legibility as well as the texts for the display of measurements and description of alarms. The 5 navigation buttons are for settings and functions, while an LED indicates the alarms and the optical port for communication via USB and Wi-Fi.

● **EXPANDABLE UP TO 14 STEPS**

● **OPTICAL COMMUNICATION PORT**
The optical port on the front permits communication with PCs, smartphones and tablets through the USB and Wi-Fi standards for carrying out programming, diagnostics and data download without disconnecting power to the electrical panel.

● **TWO EXPANSION SLOTS FOR EXP… SERIES MODULES**

● **ETHERNET COMMUNICATION INTERFACE**
By using the expansion module EXP 1013.

● **CUSTOMISATION**
An insert for labels customised with text, logos, codes, etc. is available, to be fixed onto the controller frames.

● **COMPACT SIZE**
Reduced profile and depth simplify installation of the power factor controller even in very compact electrical panels.
The total depth of the controller is 73mm (2.87") inside the panel with the expansion modules installed.

44 mm

9 mm

44
137
64.5
144
73
9
EXP 10...
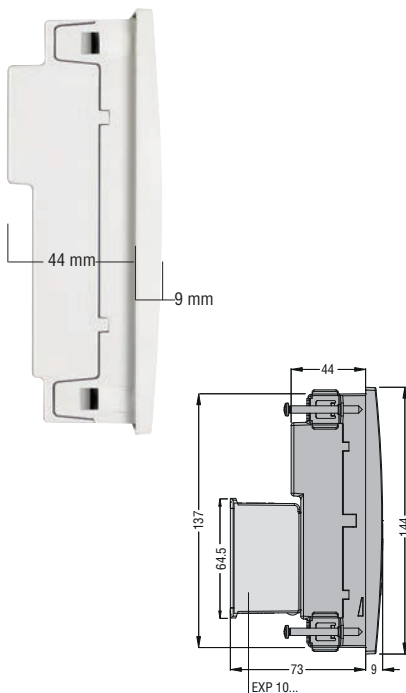
● **FIXING SYSTEM**
The fixing system **with metal screws** guarantees excellent, lasting retention over time.

● **HIGH PROTECTION RATING**
The front of the controller and seal have been designed to ensure a front protection rating of **IP65**.

● **EXPANDABILITY**
Basic controller functionality can be extended easily using the EXP series expansion modules:
– relay outputs to increase number of steps
– digital outputs
– opto-isolated RS232 interface
– opto-isolated RS485 interface
– opto-isolated ETHERNET interface.
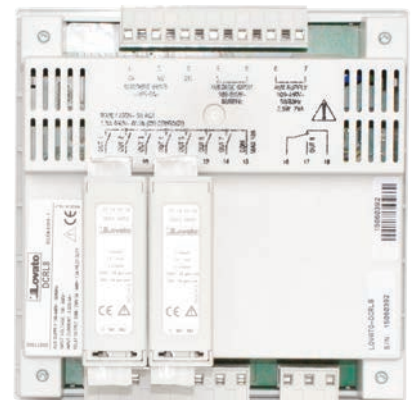
MAX 2

● **SOFTWARE COMPATIBILITY**
- **Sam1** Application for Android and iOS
- **Xpress** for configuration and remote control
- **Synergy** and **Synergy**cloud for supervision and energy management.

● **CHARACTERISTICS OF THE DCRL SERIES**

– **5A OR 1A IN THE SAME CONTROLLER**
A parameter can enable the controller for use with a 5A or 1A secondary current transformer.

– **WHITE BACKLIT DISPLAY**
It can be programmed to flash during alarm conditions.

– **HARMONIC ANALYSIS**
It includes voltage and current THD measurements and single harmonic measurement up to the 15th order and they can be shown on the display.

– **MAINTENANCE INTERVALS**
There are 2 counters: one to count the operating hours for the steps and the other for the number of interventions of each step. An alarm threshold can be set for both counters.

– **BUILT-IN TEMPERATURE SENSOR**
The internal temperature of the controller is monitored constantly by the built-in sensor.
The user can program the thresholds to activate and stop the cooling fan and/or generate the temperature alarm.

THE SOLUTION FOR ALL APPLICATIONS!
DCRG 8

● **BACKLIT GRAPHIC LCD**
High-legibility 128x80 pixels, with adjustable brightness.

● **3 VERSIONS AVAILABLE:**
– DCRG 8: for traditional power factor correction with contactors or dynamic (fast) power factor correction with EXP10 01
– DCRG 8F: for dynamic (fast) power factor correction
– DCRG 8IND: for capacitive reactive power factor correction.

● **OPTICAL COMMUNICATION PORT**
The optical port on the front permits communication with PCs, smartphones and tablets through the USB and Wi-Fi standards for carrying out programming, diagnostics and data download without disconnecting power to the electrical panel.
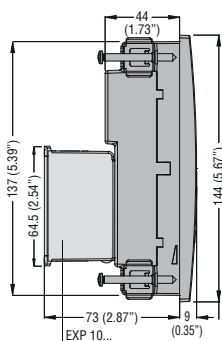
CX 01

CX 02
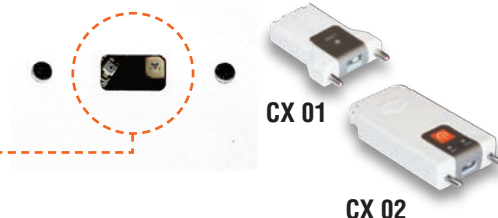
● **CUSTOMISATION**
There is a customisation slot available on the front panel for the description of the controller by adding texts, logos, codes, etc.

● **COMPACT SIZE**

Trim

44mm
1.73"

9mm
0.35"
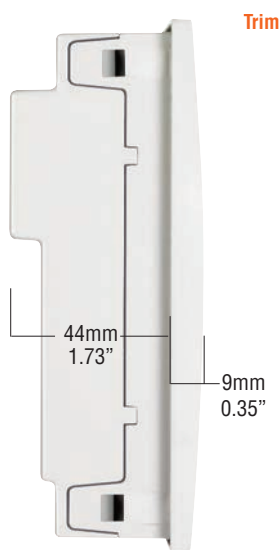
Frame profile and reduced total depth simplify installation of the controller also in very compact electric panels.

44 (1.73")
137 (5.39")
64.5 (2.54")
144 (5.67")
73 (2.87")
9 (0.35")
EXP 10...

● **FIXING SYSTEM**

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

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

● **EXPANDABILITY**

EXP 10 11   EXP 10 06   EXP 10 30   EXP 10 13

MAX 4

Basic controller functionality can be extended easily using the EXP series expansion modules:
- Relay outputs to increase the number of steps
- Opto-isolated static outputs (also for dynamic correction)
- Capacitor protection
- Digital and analog inputs and outputs
- Expandable up to 24 mixed 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 memory, calendar-clock with backup reserve power for data logging.

● **SOFTWARE COMPATIBILITY**
- **Sam1** Application for Android and iOS
- **Xpress** for configuration and remote control
- **Synergy** and **Synergy**cloud for supervision and energy management.

DCRG8 POWER FACTOR CONTROLLER
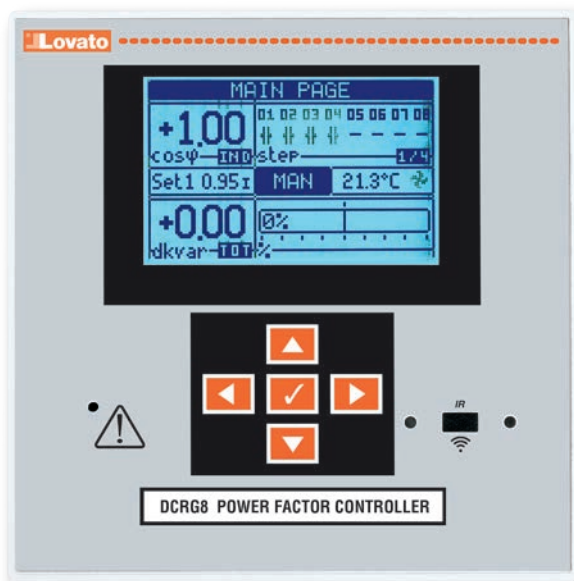
● SUITABLE FOR POWER FACTOR CORRECTION USING CONTACTORS AND THYRISTOR MODULES (WITH DCRG 8F MODEL OR DCRG 8 + EXP10 01)

● INDEPENDENT POWER FACTOR CORRECTION FOR EACH SINGLE PHASE

● CAPACITIVE REACTIVE POWER FACTOR CORRECTION VIA INDUCTIVE STEP MANAGEMENT (WITH DCRG 8IND MODEL)

● 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 details.

● **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 8 slaves can be controlled to create a system with a maximum of 32 steps.

Master

Slave 1

Slave 2

Slave 8
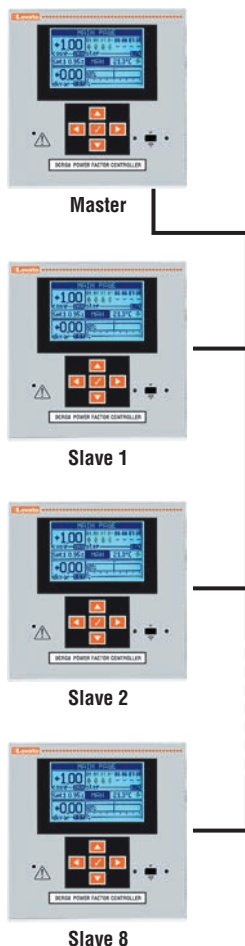
● **WEB SERVER FUNCTION**

By installing the **Ethernet** expansion module EXP10 13, the main measured values of the controller can be viewed by the most common web clients on the market compatible with Java, with no need to install any additional software on the PC.

● **CAPACITOR PROTECTION**
By adding the dedicated 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 as well as detecting malfunction on any phase.

● **3 CURRENT INPUTS**
- **Independent power factor correction** for each single phase
- Analysis of all electrical measurements in the system (multimeter).

● **WIDE RANGE OF RATED VOLTAGE MEASUREMENTS**
The wide measurement range between 100...600VAC allows the controller to be used in most applications.

● **GSM/GPRS MODEM**
With the EXP10 15 expansion module, the controller is equipped with a GSM/GPRS modem, which it automatically configures. This simplifies installation and wiring. Once a data-enabled SIM card is inserted, the controller can send alarm or event SMS and **e-mails** and data files can be transmitted to FTP servers.
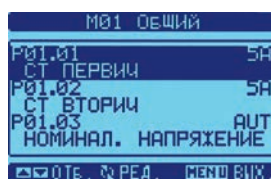
● **5A AND 1A BOTH IN THE SAME CONTROLLER**
By configuring a specific parameter, the controller can be enabled for use with either a 5A or 1A secondary current transformer.

● **GRAPHS AND TEXTS IN 10 LANGUAGES**

Display of waveforms, graphs and texts in 10 languages: Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and one customisable.

● **SUITABLE FOR MEDIUM-VOLTAGE SYSTEMS**
The controller can be used in medium-voltage systems thanks to the ability to set a voltage transformer ratio, obtaining measurements regarding the transformer primary value both for adjustment and for the display.

● **DYNAMIC (FAST) POWER FACTOR CORRECTION**
Thyristor-based dynamic power factor correction systems are necessary where the reactive load varies rapidly over time. DCRG 8F has 8 built-in static outputs, while DCRG 8 + EXP10 01, by taking advantage of the built-in relay outputs as well, realizes a mixed traditional (relay) and dynamic system.

● **INDEPENDENT POWER FACTOR CORRECTION FOR EACH SINGLE PHASE (SPPFC)**
In highly unbalanced three-phase systems, power factor correction by single phase can be implemented. The DCRG controller can monitor the cosφ of each single phase and correct through the joint use of single- and three-phase capacitor banks.

● **CAPACITIVE REACTIVE POWER FACTOR CORRECTION (DCRG 8IND).**
The DCRG 8IND version can connect both capacitors and inductors to achieve the desired cosφ should it be necessary to correct the capacitive reactive power factor as well.

25

DCRM series

DCRM 2

Order code	Steps	Auxiliary supply voltage	Qty per pkg	Wt
	no.	[V]	n°	[kg]
Single and three-phase low-voltage systems.				
DCRM 2	2	380...415VAC	1	0.284

General characteristics
The DCRM allows the reactive current of a system to be controlled.
It can correct to the best cosφ value possible, reducing the request for reactive current from the mains.
It can control the connection of two capacitor banks. Each one can be individually enabled and its power can be set through a dedicated trimmer.
It is also possible to adjust the time for connection and disconnection of the capacitors, 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
  • 220...240VAC and 440...480VAC on request
– Rated frequency: 50/60Hz
– 80...528VAC voltage measurement input
– Current measurement input:
  • By CT /5A
  • Measuring range: 0.1...6A
  • Measurement type: true root mean square (TRMS)
  • Automatic identification of CT connection polarity (straight / inverted)
– Relay outputs:
  • 2 relays (steps), each with 1 changeover contact
  • Rated current: 8A 250VAC (AC1)
  • Individual enablement of control of the two relays
– Modular DIN 43880 housing (3 modules)
– IEC degree of protection: IP40 on front (if placed in IP40 housing and/or electrical panel), IP20 terminals.

ADJUSTMENTS
"C/K Step 1"	C/K ratio step 1 (0.15...2)
"C/K Step 2"	C/K ratio step 2 (0.15...2)
"Connection delay"	Step connection delay 1...60s
"Disconnection delay"	Step disconnection delay 0.1...60s
"System configuration"	Single- or three-phase wiring selection.

INDICATIONS
– 1 green LED for power on and inhibition time
– 2 red LEDs for relay connection.

Certifications and compliance
Certifications obained: EAC; UL Listed, for USA and Canada (File E93601), as Auxliary Devices-Modular ampere monitoring relays (with 415VAC maximum only).
Compliant with standards: IEC/EN 60255-5, IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL508, CSA C22.2 n°14.
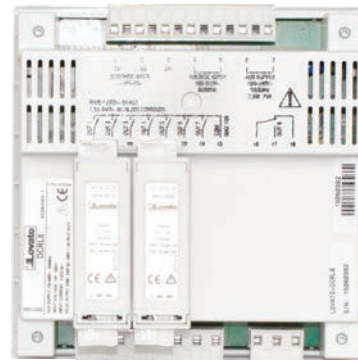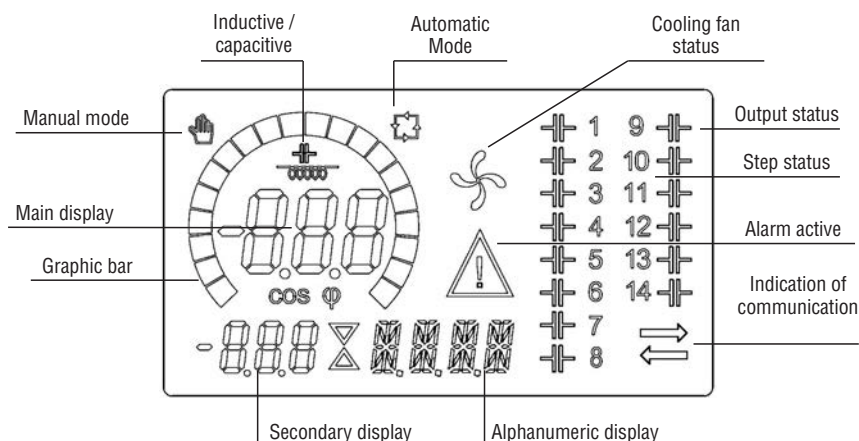
DCRL series

DCRL 3 - DCRL 5

DCRL 8

EXP80 00

EXP 10…

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Single and three-phase low and medium-voltage systems.			
DCRL 3	3 steps, expandable up to 6 steps, 100…440VAC	1	0.340
DCRL 5	5 steps, expandable up to 8 steps, 100…440VAC	1	0.340
DCRL 8	8 steps, expandable up to 14 steps, 100…440VAC	1	0.640
Accessory.			
EXP80 00	Plastic insert for customisation label (only for DCRL 8)	10	0.050

Order code	Description
EXPANSION MODULES. Additional steps.	
EXP10 06	2 relay outputs to increase number of power factor correction steps
EXP10 07	3 relay outputs to increase number of power factor correction steps
Inputs and outputs.	
EXP10 03	2 relay outputs 5A 250VAC
Communication ports.	
EXP10 10	Opto-isolated USB interface
EXP10 11	Opto-isolated RS232 interface
EXP10 12	Opto-isolated RS485 interface
EXP10 13	Opto-isolated ETHERNET interface (only for DCRL 8)

Snap-in fixing of EXP… expansion modules
DCRL 3 - DCRL 5 with 1 module

DCRL 8 with 2 modules

MAX 1

MAX 2

Backlit icon LCD

Manual mode
Inductive / capacitive
Automatic Mode
Cooling fan status
Main display
Graphic bar
Output status
Step status
Alarm active
Indication of communication
Secondary display
Alphanumeric display

General characteristics
The DCRL series was developed with advanced functionality and produced with a dedicated ultra-compact housing. It combines modern front design with practical mounting and expandability (EXP… modules).
Its main features are:
– Backlit icon LCD with excellent information display
– Alarm codes with scrolling texts, programmable in 6 languages (Italian, English, Spanish, French, German and Portuguese)
– Connection in single or three phase lines and co-generation systems with 4-quadrant operation
– Voltage measurement input independent of supply and which can be used in medium-voltage lines with VTs
– Drastic reduction in the number of switching operations
– Balanced use of steps with same power rating
– Measurement of reactive power installed for each step
– Capacitor over-current protection
– Panel over-temperature protection via internal sensor
– Accurate micro-breaking protection
– Vast choice of measurements available, including voltage and current THD with single harmonic analysis up to the 15th order
– Wide voltage measurement range
– High accuracy of true root mean square (TRMS) measurements
– Front optical USB (CX 01 dongle) and Wi-Fi (CX 02 dongle) communication port for PC, smartphone and tablet connection
– Compatible with Ethernet communication modules EXP10 13 (only for DCRL 8)
– Compatible with **S**ynergy and **S**ynergy_cloud supervision and energy management softwares, **X**press configuration and remote control software and with the **S**am1 application for Android/iOS
– Customisation with label on front (only for DCRL 8).

Operational characteristics
– Supply:
  • Auxiliary voltage: 100…440VAC
  • Frequency: 50/60Hz ±10%
– Voltage input:
  • Rated voltage: 600VAC L-L (346VAC L-N)
  • Frequency range: 45…65Hz
– Current input:
  • Single-phase connection
  • Rated current: 1A or 5A, configurable
– Measurements and control:
  • Power factor adjustment: 0.5ind….0.5cap.
  • Voltage measurement range: 50…720VAC L-L; 50…415VAC L-N
  • Current measurement range: 0.025…1.2A for 1A full scale; 0.025…6A for 5A full scale
  • Type of voltage and current measurement: true root mean square (TRMS)
– Relay outputs (steps):
  • DRCL 3: 3 outputs
  • DCRL 5: 5 outputs
  • DCRL 8: 8 outputs
  • Contact arrangement: NO; the last is a changeover
  • Rated current: 5A 250VAC AC1
– Flush-mount housing:
  DCRL 3, DCRL 5 (96x96mm / 3.78x3.78”);
  DCRL 8 (144x144mm / 5.67x5.67”)
– IEC degree of protection:
  DCRL 3, DCRL 5 IP54 and DCRL 8 IP65 on front;
  IP20 on terminals for all.

Certifications and compliance:
Certifications obtained: UL Listing for USA and Canada (cULus - File E93601), as Auxiliary Devices - Power factor controllers, EAC, RCM.
Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL508, CSA C22.2 n°14.

Contactors for power factor correction
See section 2, page 2-14.

Software **S**ynergy , **S**ynergy_cloud , **X**press and **S**am1
See section 29.

EXP expansion modules
See section 30.

25

DCRG series

new

DCRG 8

EXP 10…

Snap-in fixing of 4 EXP… expansion modules
DCRG 8 / DCRG 8F / DCRG 8IND

MAX 4

Order code	Description	Qty per pkg	Wt
		n°	[kg]
DCRG 8	8 relay steps, expandable up to 24 steps, 100…415VAC	1	0.980
DCRG 8F	8 static steps, expandable up to 24 steps, 100...415VAC	1	0.980
DCRG 8IND	8 relay steps, expandable up to 24 steps, 100…415VAC, for capacitive reactive power factor correction	1	0.980
Accessories.			
NTC 01	Remote temperature sensor, length 3m/3.3yd	1	0.150

Order code	Description
EXPANSION MODULES Additional steps.	
EXP10 06	2 relay outputs to increase number of power factor correction steps
EXP10 07	3 relay outputs to increase number of power factor correction steps
Inputs and outputs.	
EXP10 00	4 opto-isolated digital inputs
EXP10 01	4 opto-isolated static outputs to increase number of static steps
EXP10 02	2 digital inputs and 2 opto-isolated static outputs
EXP10 03	2 relay outputs 5A 250VAC
EXP10 04	2 PT100 opto-isolated analogue inputs, either 0/4...20mA, 0...10V or 0...±5V
EXP10 05	2 opto-isolated analogue inputs 0/4…20mA, 0…10V or 0…±5V
EXP10 08	2 opto-isolated digital inputs and 2 relay outputs 5A 250VAC
EXP10 16	Capacitor protection with 2 inputs for temperature measurement with NTC sensors and 2 three-phase measurement inputs
Communication ports.	
EXP10 10	Opto-isolated USB interface
EXP10 11	Opto-isolated RS232 interface
EXP10 12	Opto-isolated RS485 interface
EXP10 13	Opto-isolated ETHERNET interface with web server function
EXP10 14	Opto-isolated Profibus-DP interface
EXP10 15	GPRS/GSM modem❶, without antenna
Other functions.	
EXP10 30	Data memory, calendar-clock with backup reserve power for data logging

❶ For configuration via software, contact our Technical support.

Maximum expandibility DCRG 8 / DCRG 8IND / DCRG 8F

Controller	Steps	EXP10 06 Module with 2 relay outputs no. of modules	EXP10 07 Module with 3 relay outputs no. of modules	EXP10 01 Module with 4 static outputs no. of modules	TOTAL STEPS Relay	Static
DCRG 8 / DCRG 8IND	8	4 (2 steps)	–	–	16	–
	8	2 (2 steps)	max 2 (3 steps)	–	18	–
	8	–	–	max 4 (4 steps)	8	16
DCRG 8F	8	4 (2 steps)	–	–	8	8
	8	2 (2 steps)	max 2 (3 steps)	–	10	8
	8	–	–	max 4 (4 steps)	–	24

General characteristics

The DCRG automatic power factor controller satisfies the technical requirements of modern electrical systems in industry. It is designed to satisfy them, with the option of extending its functionality by using specific EXP series expansion modules. Mention should also be made of the optical communication port as standard, for programming the controller, diagnostics and data download.
The backlit graphic LCD facilitates data reading even in poor lighting conditions and permits the display of system information clearly and intuitively.
Its main features are:
– 128x80-pixel backlit graphic LCD with texts in 10 languages: Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and one customisable
– Connection in single and three-phase lines as well as three-phase lines with neutral control and cogeneration systems (4 quadrants)
– Capacitive reactive power factor correction (DCRG 8IND only)
– Independent power factor correction for each single phase (SPPFC only for DCRG 8 / DCRG 8IND)
– Suitable for dynamic power factor correction with DCRG 8F or DCRG 8 + EXP10 01
– Control of thyristor modules type DCTL... with static outputs or RS485 connection with DCRG 8F controller
– Use with medium-voltage lines with VTs (DCRG 8 / DCRG 8IND only)
– Capability for correct operation even in systems characterised by high harmonic content
– Drastic reduction in the number of switching operations
– Balanced use of steps with same power rating
– Measurement of reactive power installed for each step
– Recording of the number of connections for each step
– Capacitor over-current protection on all three phases
– Panel over-temperature protection via internal sensor and external sensor
– Accurate micro-breaking protection
– Current and voltage harmonic analysis
– Quick CT programming function
– USB (CX 01 dongle) and Wi-Fi (CX 02 dongle) communication port for PC, smartphone and tablet connection
– Modbus-RTU TCP and ASCII communication protocol
– Compatible with **Synergy** and **Synergy**cloud supervision and energy management softwares, **Xpress** configuration and remote control software and with the **Sam1** application for Android/iOS
– Sending and reception of SMS, sending of e-mails with alarm diagnosis and data files, FTP Client function (with EXP10 15 module).

Operational characteristics

– Voltage measurement circuit:
  • Auxiliary supply voltage: 100...415VAC
  • Rated frequency: 50/60Hz (±10%)
– Current measurement circuit:
  • Single and three-phase input
  • Rated current: 5A (1A programmable)
– Measurements and control:
  • Power factor adjustment: 0.5ind....0.5cap.
  • Voltage measurement range: 50...720VAC
  • Current measurement range: 0.025...6A
  • Temperature measurement range: -30...+85°C
  • Capacitor overload current measurement range: 0...250%
  • Type of voltage and current measurement: true root mean square (TRMS)
– Relay outputs:
  • 7 each with NO contact and the last as changeover
  • Rated current: 5A 250VAC AC1
– Flush-mount housing (144x144mm / 5.67x5.67")
– IEC degree of protection: IP65 on front; IP20 on terminals.

Certifications and compliance

Certifications obtained: UL Listing for USA and Canada (cULus - File E93601), as Auxiliary Devices - Electronic power factor regulator, RCM, EAC.
Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4, UL508, CSA C22.2 n°14.

Contactors for power factor correction
See section 2, page 2-14.
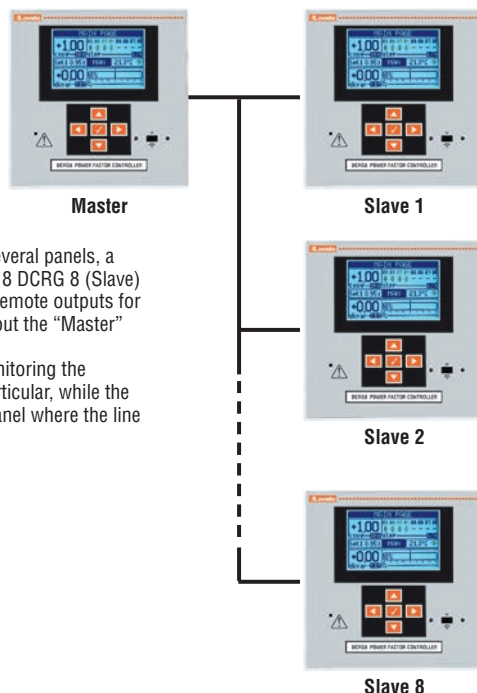
Software Synergy , Synergycloud**, Xpress and Sam1**
See section 29.

EXP expansion modules
See section 30.

25-10

Accessories page 25-12	Expansion modules page 30-2	Dimensions page 25-14	Wiring diagrams pages 25-15 and 16	Technical characteristics page 25-18

"Master-Slave" power factor correction system with DCRG 8

Master

Slave 1

Slave 2

Slave 8

When the correction system is divided into several panels, a DCRG 8 (Master) controller can control up to 8 DCRG 8 (Slave) controllers. The "Slave" controllers serve as remote outputs for the connection of capacitor banks that carry out the "Master" controller's commands.
The single controllers are responsible for monitoring the electrical panel and the capacitor banks in particular, while the cosφ reading is centralised in the "Master" panel where the line arrives.

Software and APP

Xpress configuration and remote control software

Synergy Supervision and energy management software

Sam1 APP

General characteristics
By using the **Xpress** software, the quick setup of the controllers can be carried out via PC, avoiding parameter programming errors.
The parameter programming of a DCRL… or DCRG 8… controller can also be saved on PC and quickly loaded into another device requiring the same programming.
It permits the following operations:
– System operation monitoring:
  • Graphical and numerical display of measurements
  • Controller status
– Capacitor efficiency control
  • Current kvar measurement for each step
  • Counters for the number of connections for each step
  • Total hour counter for connection time for each individual step
  • Access all setup parameters
  • Saving / loading parameters
  • Highlighting of changed values
  • Resetting to default values.

The **Synergy** software permits remote control and supervision of the DCRL... and DCRG 8... controllers.
See section 29 for details.
This software has structures and applications based on MS SQL relational databases, and the data can be consulted using the most popular browsers.
It is a highly versatile system, simultaneously accessible to a large number of users/workstations via intranets, VPN or Internet.

APP for smartphone and tablet
The **Sam1** application allows the user to program the controller, view alarms, send commands, read measurements, download statistical data and events and send retrieved data by e-mail. The connection is made by Wi-Fi with a smartphone or tablet using the CX 02 device.
It is iOS and Android compatible.
For details, consult section 29 or our Technical support; see contact details on inside front cover.

25

WiFi

Accessories for DCRL and DCRG

51 C4

Order code	Description	Qty per pkg	Wt
		n°	[kg]
51 C2	Connection cable PC↔DCRL/DCRG+ EXP10 11 length 1.8m/2yd	1	0.090
51 C4	Connection cable PC↔product RS232/RS485 length 1.8m/2yd	1	0.147
51 C5	Connection cable DCRL/DCRG+ EXP1011↔Modem length 1.8m/2yd❶	1	0.111
51 C9	Connection cable PC↔Modem, length 1.8m/2yd	1	0.137
EXC CON 01	RS485/ Ethernet converter, 12...48VDC, including DIN rail fixing kit	1	0.400
EXC M3G 01	RS485 Gateway/3G modem, 9.5…27VAC/9.5…35VDC, including antenna and programming cable	1	0.340

❶ Consult our Technical support for modem details; see contact details on inside front cover.

Communication devices

CX 01

CX 02

CX 03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX 01	USB/optical dongle PC↔DCRL/DCRG, for programming, data download, diagnostics and updating firmware	1	0.090
CX 02	Wi-Fi connection device for PC↔DCRL/DCRG, for downloading data, programming, diagnostics and cloning	1	0.090
For DCRG8... type only.			
CX 03	GSM penta-band antenna (850/900/1800/1900/2100MHz) for EXP10 15 expansion module	1	0.090

General characteristics
Communication and connection devices to connect the DCRL and DCRG power factor controllers to personal computers, smartphones and tablets.

CX 01
This USB dongle, complete with cable, permits connection of the power factor controller with a PC without needing to disconnect the electrical panel supply, in order to:
– Program parameters
– Copy the settings to external units
– Download data and events
– Carry out diagnostics
– Update the firmware.
The PC identifies the connection as a standard USB.

CX 02
Via Wi-Fi connection, the power factor controllers can be viewed from PCs, smartphones and tablets without having to connect cables, in order to:
– Program parameters
– Download data and events
– Carry out diagnosis and cloning of the device.

CX 03
Compatible with major worldwide mobile phone networks, thanks to the use of 850/900/1800/1900/2100MHz frequencies.
IEC degree of protection: IP67.
Fixing hole Ø10mm (0.40").
Cable length 2.5m/2.73yd.

For dimensions, wiring diagrams and technical characteristics, consult the manuals available online in the Download section of the following website:
www.LovatoElectric.com

DCTL series

new

NFC

DCTL…

Order code	Step power	Qty per pkg	Wt
	[kvar]	n°	[kg]
Versions with rated voltage 400VAC			
DCTLA 400 0075	7.5kvar at 400VAC step module	1	1.74
DCTLA 400 0150	15kvar at 400VAC step module	1	1.74
DCTLA 400 0300	30kvar at 400VAC step module	1	1.74
DCTLA 400 0500	50kvar at 400VAC step module	1	2.84
DCTLA 400 1000	100kvar at 400VAC step module	1	6.68
Versions with rated voltage 400...480VAC			
DCTLA 480 0090	9kvar at 480VAC step module	1	1.74
DCTLA 480 0180	18kvar at 480VAC step module	1	1.74
DCTLA 480 0360	36kvar at 480VAC step module	1	1.74
DCTLA 480 0600	60kvar at 480VAC step module	1	2.84
DCTLA 480 1200	120kvar at 480VAC step module	1	6.68
Versions with rated voltage 600...690VAC IEC, 600VAC cULus			
DCTLA 690 0300	30kvar at 690VAC step module	1	2.84
DCTLA 690 0500	50kvar at 690VAC step module	1	2.84
DCTLA 690 1000	100kvar at 690VAC step module	1	6.68

Accessories for DCTL

EXC 1042

EXP80 03

NTC 01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXC 1042	RS485 communication board	1	0.020
EXP80 03	DIN rail mount kit for DCTL up to 60kvar max	1	0.200
NTC 01	Remote temperature sensor, 3m	1	0.150
CX 01	USB connection dongle PC↔DCTL, for programming diagnostics and firmware update	1	0.090
CX 02	Wi-Fi connection dongle PC↔DCTL, for programming, diagnostics and cloning	1	0.090
EXA 01	Kit of 3 UL terminal lugs for DCTLA 400 1000, DCTLA 480 1200 and DCTLA 690 1000	1	0.141
EXA 02	Kit of 3 terminal protection covers for DCTLA 400 1000, DCTLA 480 1200 and DCTLA 690 1000	1	0.125

Power connections with double lug clamps

The thyristor modules type DCTL up to 60kvar are provided with power connections with double lug clamps which allows to simplify the wiring, in particular when is necessary to connect more thyristor modules in parallel.

Connection to the automatic power factor controller type DCRG8F via RS485

DCRG 8F + EXP10 12

RS485

DCTL + EXC 1042   DCTL + EXC 1042   DCTL + EXC 1042   DCTL + EXC 1042
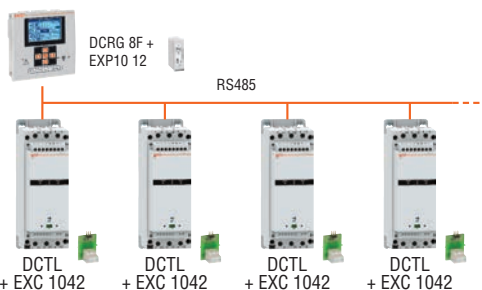
Alternatively to the standard command from static outputs, the thyristor modules type DCTL can be connected to the automatic power factor controller type DCRG8F with the RS485 optional port (code EXC 10 42), obtaining a simple and linear wiring.
In this configuration, it is possible to monitor from the display of the DCRG8F controller the status and measures of each DCTL module such as step power, currents, harmonics, temperature, working hours, etc.

General characteristics
– Suitable for dynamic (fast) power factor correction
– Silent operation
– Zero-crossing switching
– Monitoring and protection of the current, power and current harmonics of the capacitor bank: thanks to the presence of integrated current transformers, it is possible to monitor and protect the capacitor bank against overcurrents caused by events like the distortion of the voltage waveform. It is also possible to monitor electrical measurements of the capacitor bank such as the residual power three-phase voltages and currents, temperatures, THDI, morning hours, etc...
– Over-temperature protection via built-in sensor and input for the optional external temperature sensor NTC 01 for the measure of the temperature in the area of installation of the capacitors
– Ready to work without need of any programming when used with standard features
– NFC connectivity for parameter settings and programming of the protection thresholds (overtemperature, overcurrent, overvoltage,...) with the APP Lovato NFC
– Optical port for programming and diagnostic with software Xpress and APP Sam1 ,connection with USB dongle (CX 01) or Wi-Fi dongle (CX 02)
– Command circuit made by 8...30VDC signal or dry contact (which allows to save the use of a power supply)
– Optional RS485 communication card (code EXC 1042) for the command and monitoring from power factor controller type DCRG8F; from the display of DCRG 8F is also possible to monitor the status and the measurements (temperature, power,...) of each DCTL
– 1 programmable relay output with changeover contact for the signaling of alarms or fan command
– Possibility to install the thyristor modules DCTL in both vertical and horizontal position without derating, thanks to the built-in fans
– Monitoring of the functioning of the fans with the analog measure of the current through integrated sensor, which allows to control the status of the fan and recognize automatically any fault like jamming or disconnection
– Power connections with double screw terminals (for sizes up to 60kvar), which simplify the wiring, in particular for the connection of more thyristor modules in parallel; it is also possible to decide to cable or not the central phase according to the layout of the power factor correction panel
– Panel fixing with screw or on DIN guide with the optional accessory EXP80 03 (only for sizes up to 60kvar).

Operational characteristics
– Step power:
  • 7.5, 15, 30, 50 and 100kvar at 400VAC
  • 9, 18, 36, 60 and 120kvar at 480VAC
  • 30, 50 and 100kvar at 600...690VAC
– Rated operating voltage:
  • 400VAC (IEC and cULus) for version DCTLA 400...
  • 400...480VAC (IEC and cULus) for version DCTLA 480...
  • 600...690VAC (IEC), 600VAC (cULus) for version DCTLA 690...
– Rated frequency 50/60Hz
– Auxiliary supply voltage: 100...240VAC ± 10%
– Command circuit: 8...30VDC or dry contact or RS485 connection from DCRG 8F controller
– Controlled phases: 2
– Forced ventilation monitored from the control logic
– Operating temperature: -20...+45°C (up to 55°C with derating)

INDICATIONS
– LED POWER: presence of supply
– LED FAULT: alarm active (n° flashes = type of alarm)
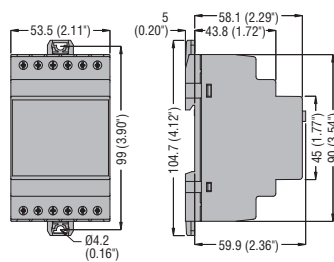– LED ON: command active.

Certifications and compliance:
Certifications obtained: cULus.
Compliant with standards: IEC/EN 60947-4-3, IEC/EN 61000-6-2, IEC/EN 61000-6-4.
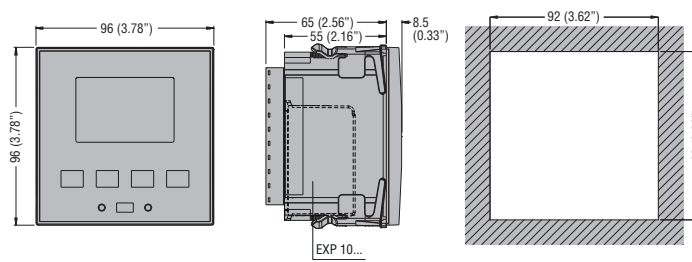
25

REACTIVE CURRENT CONTROL RELAY
DCRM 2

AUTOMATIC POWER FACTOR CONTROLLERS
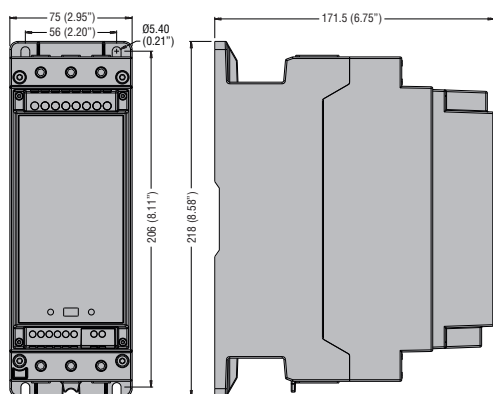**DCRL 3 - DCRL 5**

Cutout
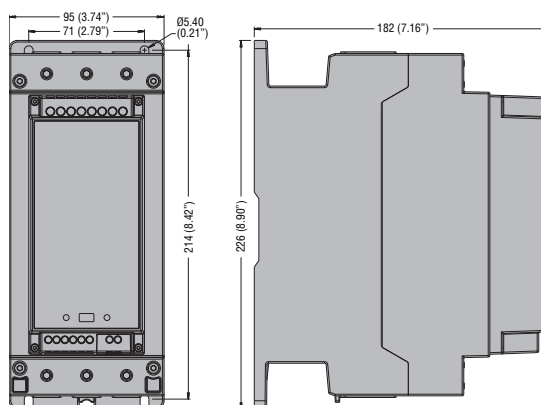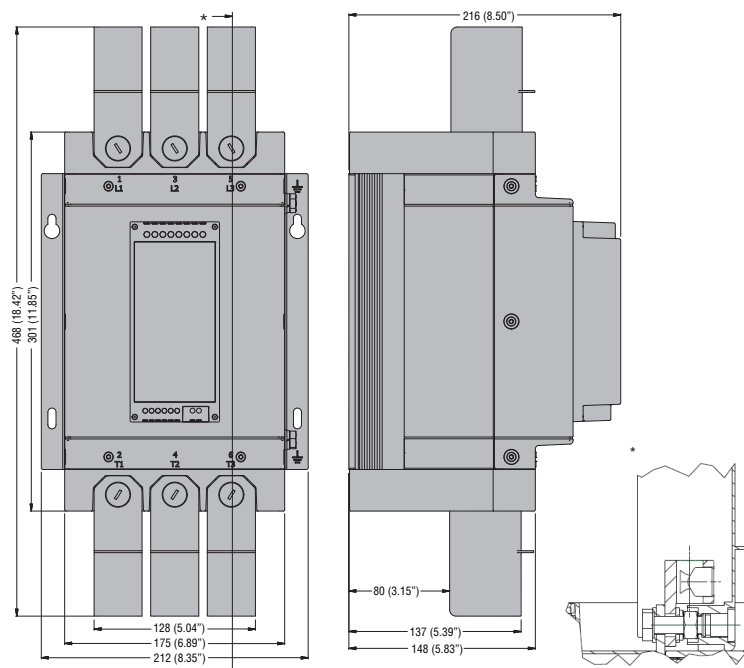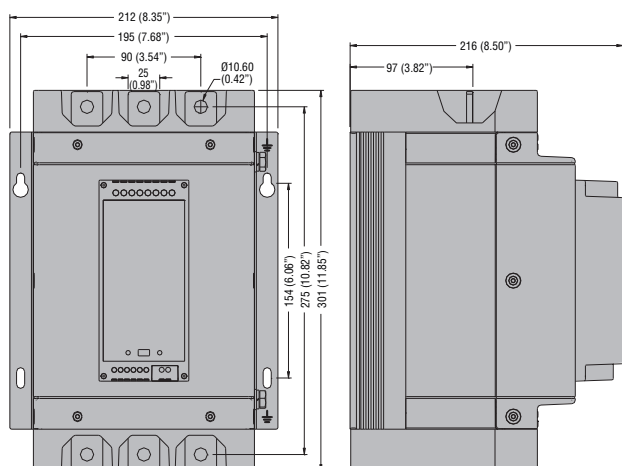
DCRL 8 - DCRG 8…

Cutout
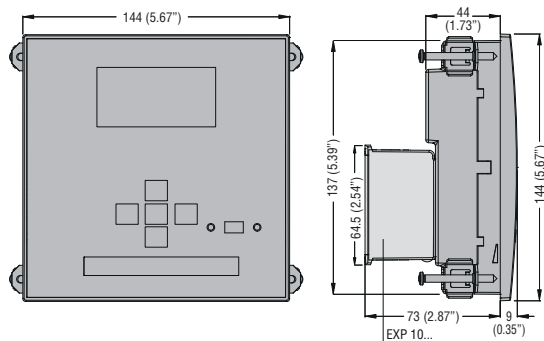
THYRISTOR MODULES
DCTLA 400 0075 - DCTLA 400 0150 - DCTLA 400 0300
DCTLA 480 0090 - DCTLA 480 0180 - DCTLA 480 0360

DCTLA 400 0500 - DCTLA 480 0600
DCTLA 690 0300 - DCTLA 690 0500
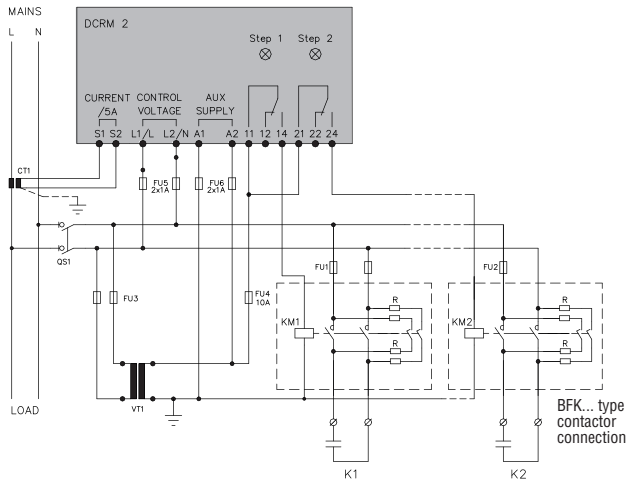
DCTLA 400 1000 - DCTLA 480 1200
DCTLA 690 1000

DCTLA 400 1000, DCTLA 480 1200, DCTLA 690 1000 complete with terminal lugs kit EXA01 and terminals protection kit EXA02 (necessary only for cULus compliance).
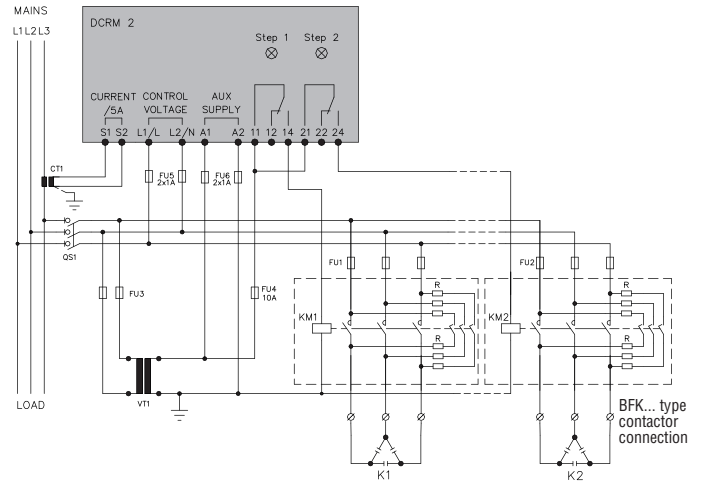
REACTIVE CURRENT CONTROL RELAY
DCRM 2
Single-phase connection

Three-phase connection

IMPORTANT
a. For three-phase connection, the voltage measurement input must be connected between two phases; the line CT must be connected on the remaining phase.
b. The polarity of the current measurement input is irrelevant.

CAUTION! Always disconnect the power supply when operating on the terminals.

AUTOMATIC POWER FACTOR CONTROLLERS
DCRL... with BFK… type contactors

IMPORTANT
a. For three-phase connection, the voltage measurement input must be connected between two phases; the line CT must be connected on the remaining phase.
b. The polarity of the current measurement input is irrelevant.

CAUTION! Always disconnect the power supply when operating on the terminals.

AUTOMATIC POWER FACTOR CONTROLLERS
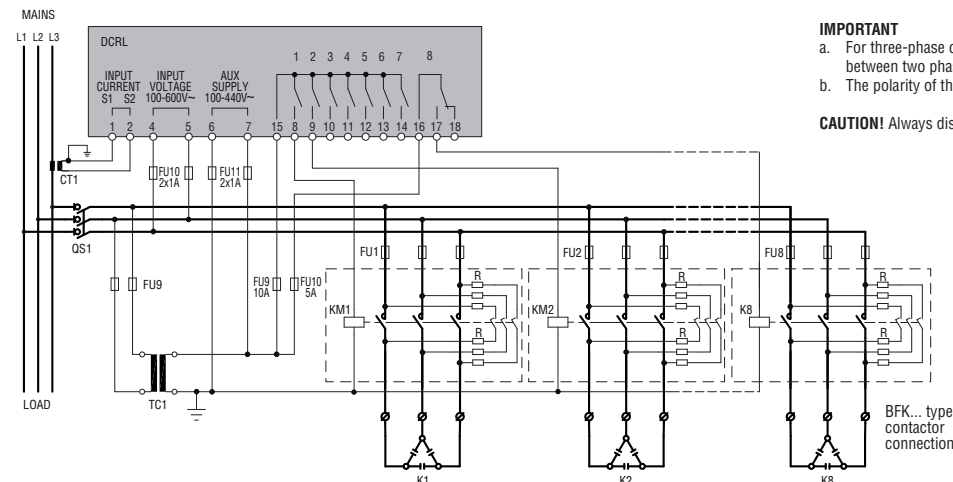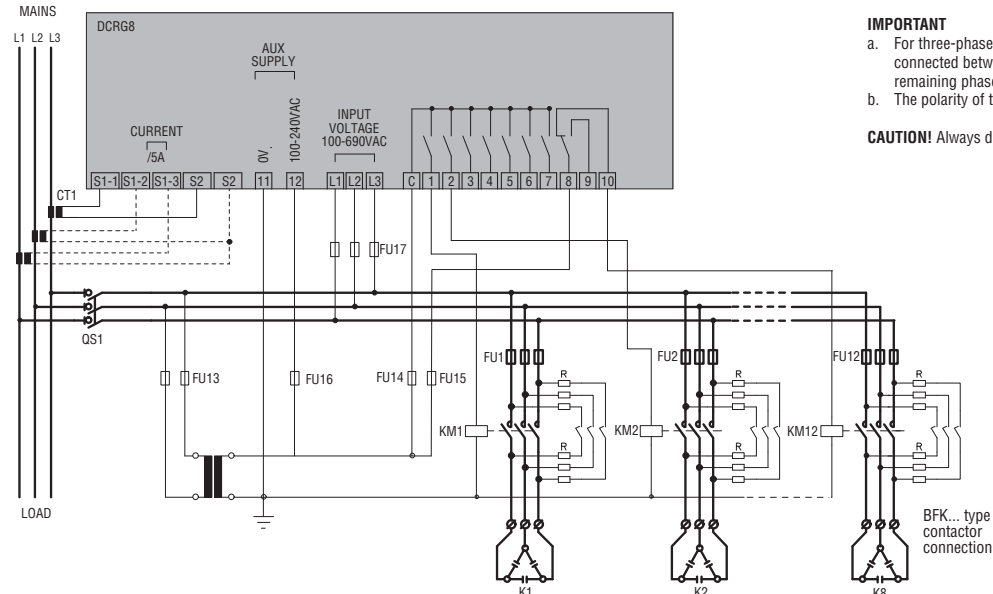### DCRG 8 with BF...K type contactors

IMPORTANT
a. For three-phase connection, the voltage measurement input must be connected between two phases; the line CT must be connected on the remaining phase.
b. The polarity of the current measurement input is irrelevant.

CAUTION! Always disconnect the power supply when operating on the terminals.

DCRG 8IND
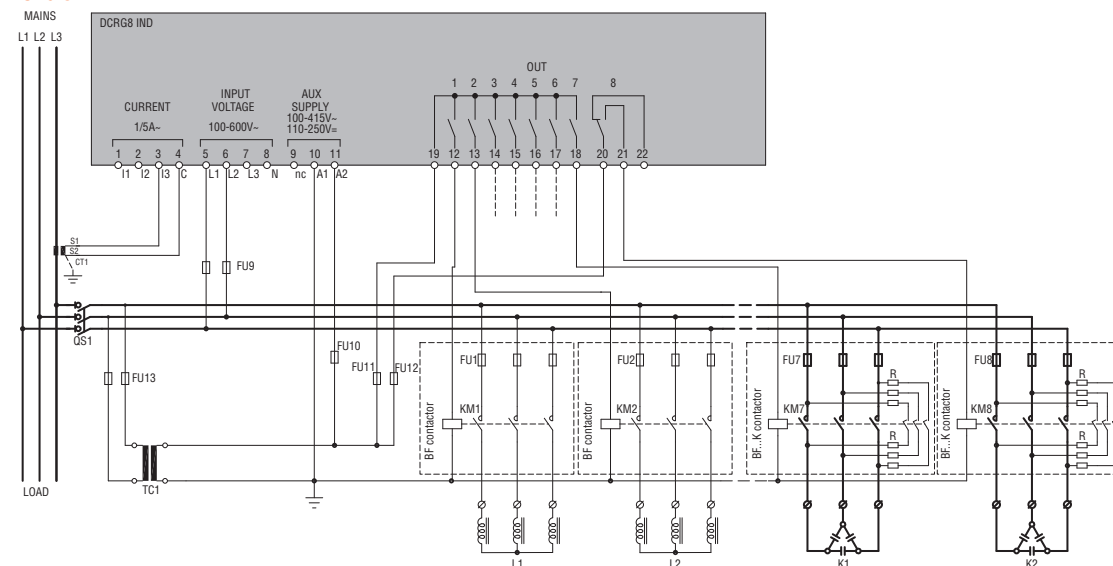
DCRG 8F
Thyristor module control via 8 ... 30VDC signal

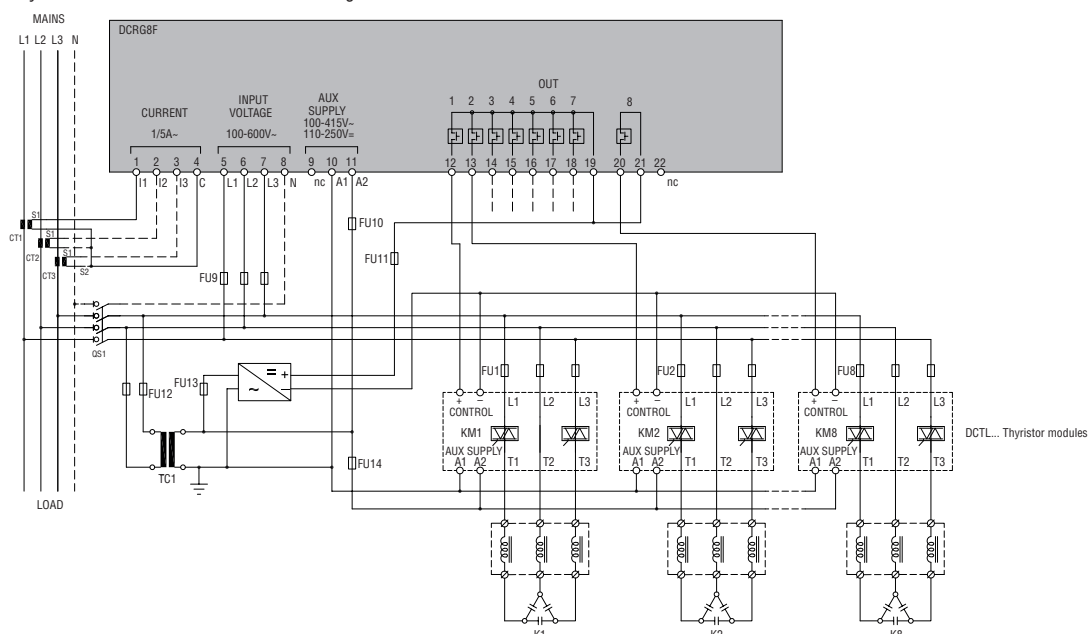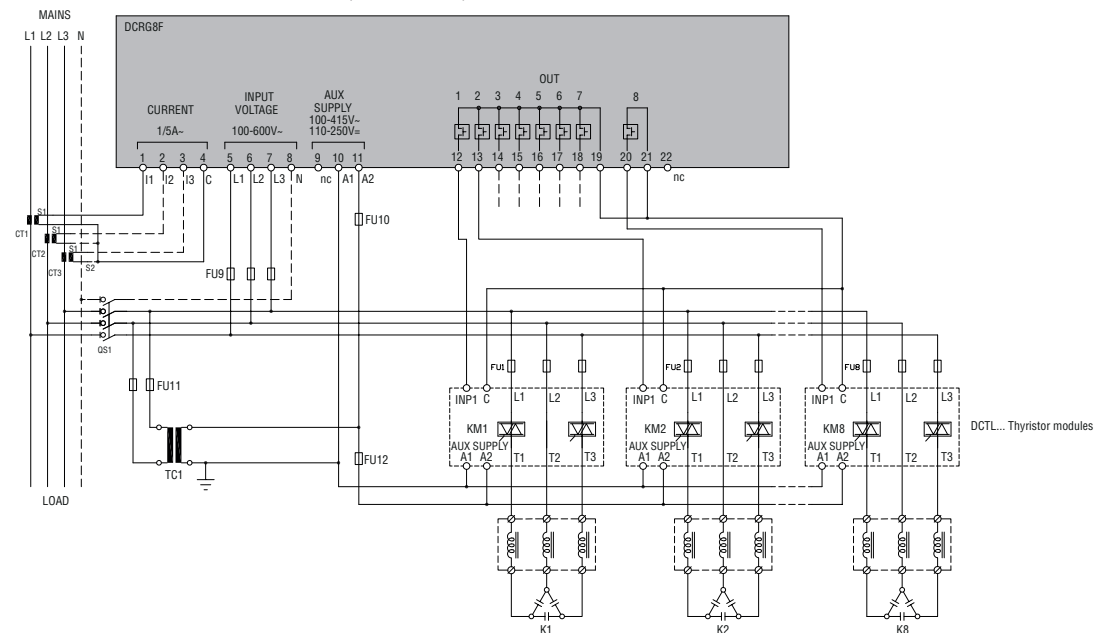## DCRG 8F
Thyristor module control via clean contact (only for DCTL)

25 **Automatic power factor controllers and thyristor modules**
Technical characteristics
DCRM series reactive current control relay

TYPE	DCRM 2
AUXILIARY SUPPLY CIRCUIT	
Rated auxiliary voltage (Us)	380...415VAC standard 220...240VAC and 440...480VAC on request❶
Operating range	0.85...1.1 Us
Rated frequency50/60Hz ±5%	
Maximum power consumption/dissipation	4.4VA / 2.4W
Micro-breaking immunity	≤17ms
No-voltage release	≥8ms
VOLTAGE INPUT	
Maximum rated voltage Ue	480VAC❶
Measuring range	80...528VAC
Frequency range	50 or 60Hz ±1% self configurable
Measurement input impedance	>1MΩ
Type of connection	L1-L2 or -N
CURRENT INPUT	
Type of connection	By current transformer (CT)
Rated current Ie	5A AC
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	≤0.6W
ADJUSTMENTS	
C/K step 1 and 2	OFF / 0.15...2
Connection / disconnection	1...60s
System configuration	3-phase - 1-phase
RELAY OUTPUTS	
Number of relays	2 (each with 1 changeover)
Rated operational voltage	250VAC
Maximum switching voltage	400VAC
IEC conventional free air thermal current (Ith)	8A
IEC/EN 60947-5-1 and UL/CSA designation	B300
Electrical life with rated load	10^5 cycles
Mechanical life	$30x10^6$ cycles
INSULATION (input-output)	
Rated insulation voltage	480VAC
CONNECTIONS	
Maximum tightening torque	0.8Nm (7 lbin; 7-9 lbin according to UL/CSA)
Conductor section min....max.	0.2...4.0mm^2 (24...12 AWG; 18...12 AWG according to UL/CSA)
AMBIENT CONDITIONS	
Operating temperature	−20...+60°C
Storage temperature	−30...+80°C
HOUSING	
Material	Self-extinguishing polyamide

❶ UL/CSA certification obtained with 415VAC maximum.

25 **Automatic power factor controllers and thyristor modules**
Technical characteristics
DCRL... and DCRG series automatic power factor controllers

Lovato electric

TYPE	DCRL 3	DCRL 5	DCRL 8	DCRG 8 / DCRG 8IND	DCRG8 F
AUXILIARY SUPPLY CIRCUIT					
Rated supply voltage (Us)	100...440VAC			100...415VAC	
Operating range	90...484VAC			90...456VAC	
Rated frequency	50Hz; 60Hz			50Hz; 60Hz	
Maximum power consumption	9.5VA		7VA	27VA	
Maximum power dissipation (excluding power dissipation from the output contacts)	3.5W		2.5W	10.5W	
VOLTAGE CIRCUIT					
Control voltage	100...600VAC L-L; 100...346VAC L-N			100...600VAC L-L; 100...346VAC L-N	
Operating range	50...720VAC L-L; 50...415VAC L-N			50...720VAC L-L; 50...415VAC L-N	
Frequency range	45...65Hz			46...65Hz; 360...440Hz	
Immunity time for microbreaking	<25ms			35ms (110VAC) - 80ms (220...415VAC)	
No-voltage relay release	≥8ms			≥8ms	
CURRENT CIRCUIT					
Rated current Ie	Programmable 5A or 1A				
Operating range	0.025...6A for 5A full scale; 0.025...1.2A for 1A full scale				
Constant overload	1.2Ie				
Overload peak	50A for 1 second				
Power consumption	0.6VA				
MEASUREMENT DATA					
Type of voltage and current measurement	True RMS value				
Power factor adjustment	0.5ind....0.5cap.				
Type of temperature sensor type	Internal			Internal + PT100 with EXP10 04 + NTC with EXP10 16 (DCRG 8 / DCRG 8IND)	
Temperature measurement range	0...+212°C			0...+212°C	
RELAY OUTPUTS					
Number of outputs	3 (up to 6 with EXP10 06 - EXP10 07)	5 (up to 8 with EXP10 06 - EXP10 07)	8 (up to 14 with EXP10 06 - EXP10 07)	8 (up to 18 with EXP10 06 - EXP10 07)	0 (up to 10 with EXP10 06 - EXP10 07)
Contact arrangement	2 NO contacts + 1 changeover	4 NO contacts + 1 changeover	7 NO contacts + 1 changeover	7 NO contacts + 1 changeover	–
IEC rated current	5A 250V AC1			5A 250V AC1	
Maximum current at common contact terminal	10A				
Maximum switching voltage	415VAC				
IEC/EN 60947-5-1 and UL/CSA designation	B300				
Electrical life with rated load	10^5 cycles				
Mechanical life	$30x10^6$ cycles				
STATIC OUTPUTS					
Number of outputs	—			4 or 8 with EXP10 01 (55mA)	8 (120mA) (up to 24 with EXP10 01)
INSULATION					
Rated insulation voltage Ui	600VAC				
Rated impulse withstand voltage Uimp	9.5kV				
Power frequency withstand voltage	5.2kV				
CONNECTIONS					
Type of terminal	Removable				
Conductor section min....max	0.2...2.5mm² (24...12 AWG; 18...12 AWG according to UL)				
AMBIENT CONDITIONS					
Operating temperature	-20...+60°C			-20...+70°C	
Storage temperature	-30...+80°C			-30...+80°C	
HOUSING					
Version	Flush-mount 96x96mm (3.78x3.78")			Flush-mount 144x144mm (5.67x5.67")	
Material	Polycarbonate			Polycarbonate	
IEC degree of protection	IP54			IP65	

25 **Automatic power factor controllers and thyristor modules**
Technical characteristics
Thyristor modules DCTL...

Lovato electric

TYPE		DCTLA 400 0075	DCTLA 400 0150	DCTLA 400 0300	DCTLA 400 0500	DCTLA 400 1000	DCTLA 480 0090	DCTLA 480 0180	DCTLA 480 0360	DCTLA 480 0600	DCTLA 480 1200	DCTLA 690 0300	DCTLA 690 0500	DCTLA 690 1000
Rated operating voltage Us		400VAC					400...480VAC					600...690VAC		
Rated frequency		50/60Hz												
Rated current Ie		11A	22A	43A	72A	144A	11A	22A	43A	72A	144A	29A	48A	96A
Step power	400VAC	7.5kvar	15kvar	30kvar	50kvar	100kvar	7.5kvar	15kvar	30kvar	50kvar	100kvar	20kvar	33kvar	67kvar
	440VAC	–	–	–	–	–	8kvar	16.5kvar	33kvar	55kvar	110kvar	22kvar	37kvar	73kvar
	480VAC	–	–	–	–	–	9kvar	18kvar	36kvar	60kvar	120kvar	24kvar	40kvar	80kvar
	525VAC	–	–	–	–	–	–	–	–	–	–	26kvar	44kvar	87kvar
	600VAC	–	–	–	–	–	–	–	–	–	–	30kvar	50kvar	100kvar
	690VAC	–	–	–	–	–	–	–	–	–	–	30kvar	50kvar	100kvar
Peak Inverse Voltage (PIV)		1800VAC					2200VAC					3600VAC		
Number of controlled phases		2												
Auxiliary supply		100...240VAC												
Control circuit		8...30VDC or dry contact or via RS485 serial port (with optional card EXC10 42 in combination with controller DCRG 8F + EXP10 12												
Over-temperature protection		Yes, via integrated probe or optional external probe NTC 01												
Cooling		Forced ventilation												
Operating temperature		-20...+45°C without derating (up to 55°C with derating)												

THYRISTOR MODULES
DCTL