



# Automatic power factor controllers DCRL series



**Lovato**  
**electric**  
ENERGY AND AUTOMATION

# Automatic power factor controllers DCRL series

**DCRL** series has been developed with advanced functionality and made with a dedicated ultra compact housing. It combines modern front design with mounting and expandability ease.



- ✓ 3, 5 or 8 steps expandable up to 14 steps maximum
- ✓ Expandability with EXP... modules
- ✓ LCD display with text in 6 languages
- ✓ Optic interface port for programming, data download and diagnostics
- ✓ Voltage and current harmonic-content measurement up to 15° order
- ✓ Suitable for LV, MV and HV electric systems and installations.

# ALL UNDER YOUR COMPLETE CONTROL!



Main features and functions of the controllers include:

- 3 relay outputs built-in DCRL 3 (96x96mm), expandable up to 6
- 5 relay outputs built-in DCRL 5 (96x96mm), expandable up to 8
- 8 relay outputs built-in DCRL 8 (144x144mm), expandable up to 14
- Expansion bus for EXP series expansion modules:
  - Additional relay outputs (steps)
  - RS232, RS485, USB ports
  - Ethernet communications interface (DCRL 8 only)
- High accuracy TRMS measurements
- Connection in single or three phase lines and co-generation systems with 4-quadrant operation with dedicated setpoint cosphi
- Wide selection of electrical measurements, including voltage and current THD with harmonic analysis up to 15<sup>th</sup> order
- Voltage input separated from power supply, suitable for VTs connection in medium voltage applications
- Wide-range power supply (100-440VAC)
- Wide voltage measurement range (50-720VAC)
- Balanced use of steps with same power rating
- Reactive power measurement per step installed
- Capacitor over-current protection
- Step failure alarm
- Maintenance counter in hours and number of operations for the steps
- Configurable rated current input (1A or 5A)
- Programming from panel front, from PC or from tablet/smartphone
- Backup copy of default settings commissioning
- 2-level password protection for settings
- Compatible with Xpress configuration and remote control software, Synergy energy management software and Säm1 APP.

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### ● LCD display

New icon type display, with white backlight to ensure good visibility in environments with low light conditions.

Scrolling text with 4 characters to show:

- Alarm messages
- Setup menu descriptions
- Measurements
- Statistical Data.

The text is available in 6 languages (English, Italian, French, German, Spanish and Portuguese).



### ● Optical port

DCRLs are equipped with a front optical port to support programming through CX 01 dongle and to use the functionality of CX 02 Wi-Fi dongle.

Advantages:

- No need to remove power from the panel to connect to the controller
- Electrical safety (no electrical connection)
- IP54 and IP65 guaranteed
- Convenience of working on the front.



### ● USB and Wi-Fi dongle

Through the optical port, direct connection to a PC USB port (using CX 01) or via Wi-Fi (using CX 02) is obtained. CX 02 dongle (Wi-Fi) can furthermore make:

- Copy of the parameter settings  
All parameters in the DCRL can be saved in the CX 02 memory and if required loaded on the same device again (backup function) or on a different one of the same type (replication of the configuration).
- Clone of the device settings  
In addition to the copy of the parameters, the current values of the statistical data, counters and events can be saved in memory as well, in order to fully replicate a DCRL on another device of the same type or to restore the DCRL to a previously saved state.

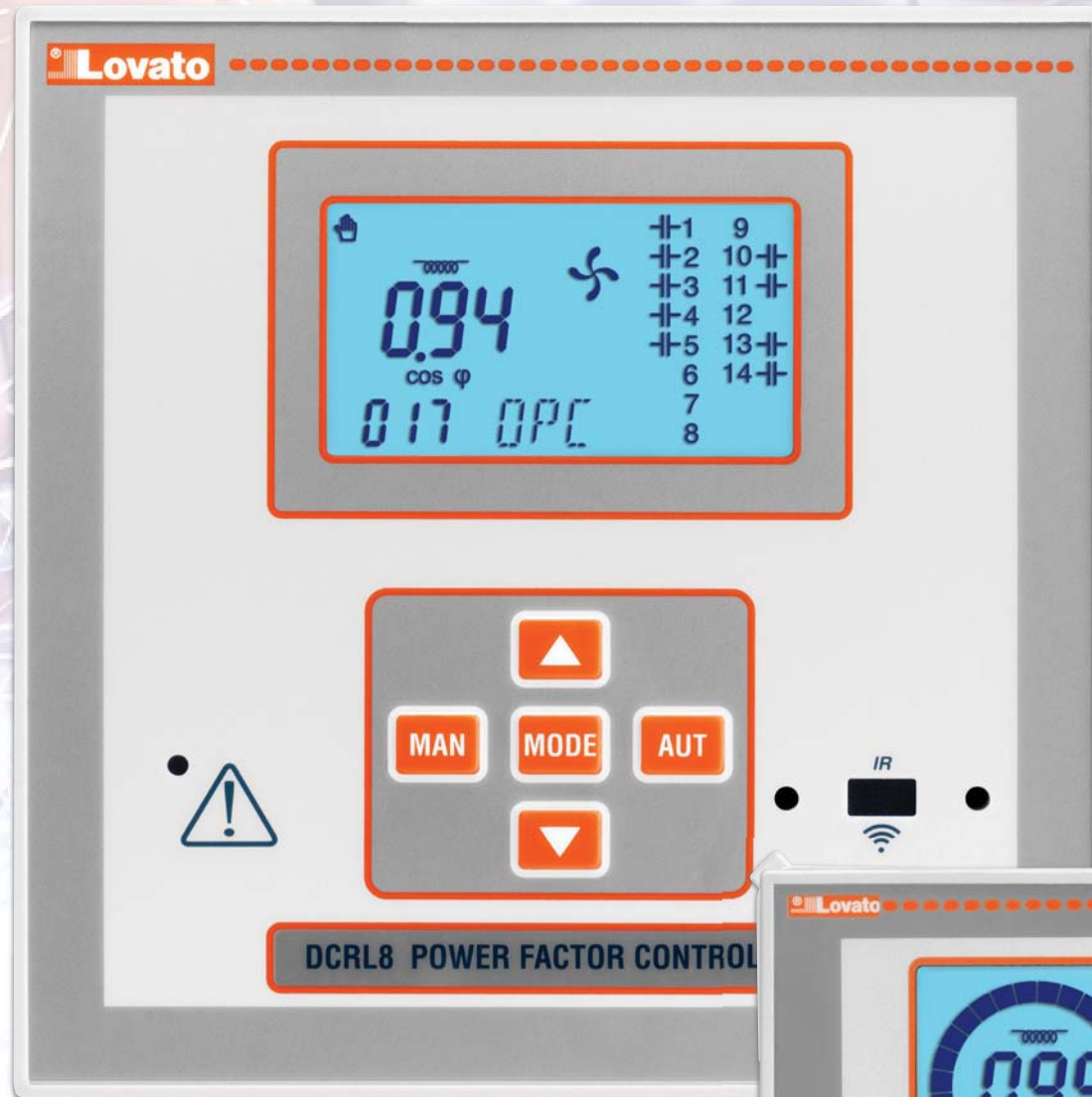


### ● Auxiliary supply and voltage measurement wide range

The DCRL series optimises the management because of the wide voltage range for auxiliary power supply (100-440VAC). The need to have products for different power supplies is satisfied by a single standard unit. The voltage inputs have a wide range (50-720VAC) and are isolated from the power supply inputs; this solution allows to use the DCRL series in medium-voltage applications with VT configuration.

### ● Step failure

The DCRLs measure the percentage of the residual power of the steps which is compared with the original power programmed in main menu. When the percentage results to be below the threshold set, the relative alarm is tripped.



### ● Maintenance counters

In the DCRLs, there are two counters, used for maintenance purposes; the first one monitors the working hours of the steps and the second counts the number of step operations. When the counters reach the set limits, the relative alarms trip.

### ● Built-in temperature sensor

The temperature inside the power factor controller panel is continually monitored by the temperature sensor integrated in the DCRL controller.

The user can define the thresholds for:

- Starting and stopping the fan
- The temperature alarm.



### ● Expandability for DCRL 3-5 (1 slot) DCRL 8 (2 slots)

The configuration of the devices in different installations can have many variants, for instance, the type of communication (USB, RS485, Ethernet) or the number of inputs and outputs required. DCRL supports expandability by EXP... modules.



Since the expansion modules are common with other LOVATO Electric devices, this saves on management costs and, above all, guarantees configuration flexibility as well as working ease at installation time especially when the system is already in operation.

The following EXP modules are available:

- Relay outputs
- USB, RS232, RS485 serial communication
- Ethernet communication (only for DCRL 8).

The module is recognised automatically by the base device when installed.

### ● Ethernet interface (only DCRL 8)

The DCRL 8 supports the EXP10 13 module that implements the opto-isolated Ethernet serial interface. The module connection is done simply by plugging it into the expansion slot of the base device. At power-up the device will automatically recognise the module. The EXP parameter setup can then be done directly through the proper device menu in an easy way.

### ● Built-in alarms

The DCRLs have alarms dedicated to the protection of the installation and the capacitor banks. The propriety of each alarm is customisable. Available alarms given:

- Under compensation
- Over compensation
- Current too low
- Current too high
- Voltage too low
- Voltage too high
- Capacitor current overload
- Temperature too high
- No-voltage release
- Voltage THD too high
- Current THD too high
- Maintenance required
- Step failure.

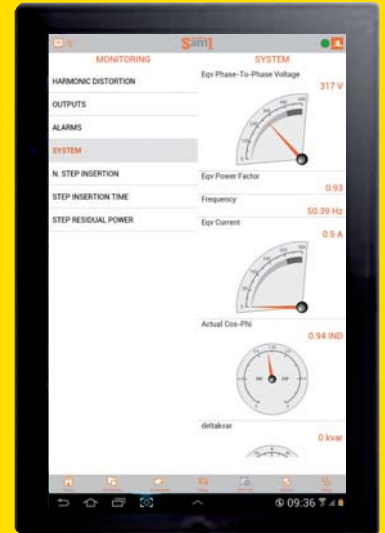


● **Sām1 APP**

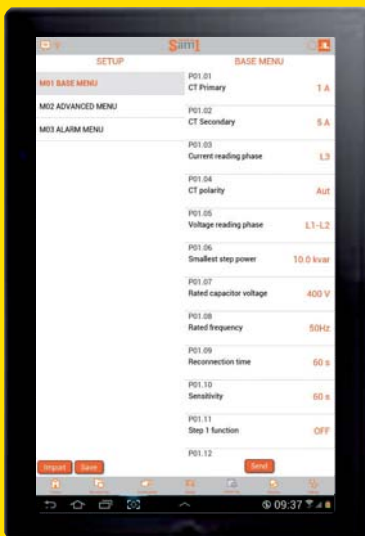
CX.02 dongle is the access point to the DCRL through the **Sām1** APP. Thanks to **Sām1**, one can:

- See all the DCRL measurements on smartphones or tablets.
- Send commands, such as counters reset or enabling and disabling of DCRL outputs.
- Set parameters, save a copy in a file and retrieve it in case of need; the file can be sent via email as well
- See active user alarms.

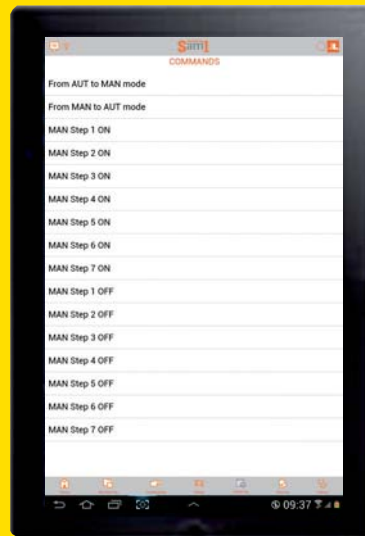
**Sām1** APP is downloadable from Google Play Store or Apple iTunes.



PARAMETER SETTING



SEND COMMANDS



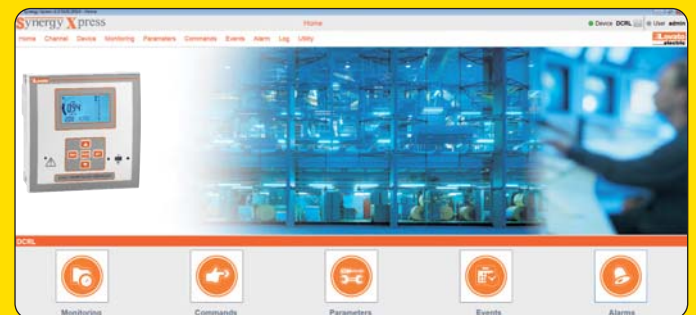
ALARM VIEWING



● **Xpress configuration and remote control software**

is a software that permits to:

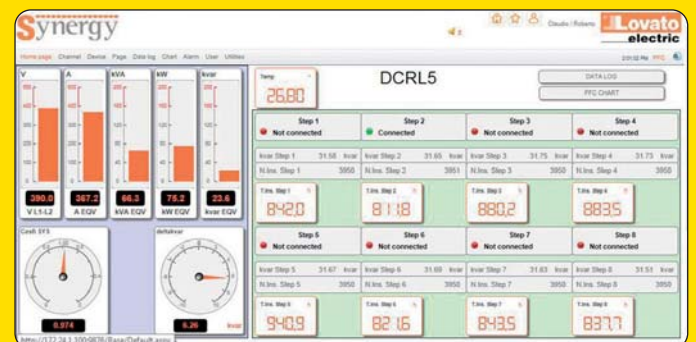
- Transfer setup parameters from DCRL to PC or vice versa
- Read measurements
- See events and alarms
- Send commands.



● **Synergy energy management software**

DCRL series is compatible with the current version of **Synergy**.

Thanks to the expansion modules, DCRLs can be immediately added to an existing network. DCRL 8 can be equipped with the EXP10 13, adding an Ethernet port, suitable to work with both static IP and dynamic IP address, making the DCRL 8 network configuration similar to what is normally carried out by PCs.



# HOW TO ORDER

## Automatic power factor controllers



DCRL 3 - DCRL 5



DCRL 8

### Order code Description

DCRL 3	3 step automatic power factor controller with optical port. Expandable up to 6, power supply 100-440VAC, flush-mount 96x96mm housing
DCRL 5	5 step automatic power factor controller with optical port. Expandable up to 8, power supply 100-440VAC, flush-mount 96x96mm housing
DCRL 8	8 step automatic power factor controller with optical port. Expandable up to 14, power supply 100-440VAC, flush-mount 144x144mm housing

### Operational characteristics

- Voltage circuit:
  - Auxiliary supply: 100-440VAC
  - Frequency: 50/60Hz  $\pm 10\%$
- 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
- Measurement and control:
  - Power factor adjustment: 0.5 ind to 0.5 cap
  - 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: TRMS
- Relay outputs (steps):
  - DCRL 3: 3 outputs built-in
  - DCRL 5: 5 outputs built-in
  - DCRL 8: 8 outputs built-in
  - Output arrangement: normally open (NO/SPST) contact; except the last being a changeover (SPDT)
  - Rated capacity: IEC AC1 5A 250VAC and AC15 1.5A 440VAC; UL/CSA B300 general use
- Communication protocol: Modbus-RTU, ASCII and TCP (DCRL 8 only)
- IEC degree of protection: IP54 (DCRL 3 - DCRL 5) and IP65 (DCRL 8) on front; IP20 at terminals.

### Certifications and compliance

Certifications obtained: cULus, EAC.

Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4, UL508, CSA C22.2 n°14.

## Expansion modules



EXP10...

### Order code Description

Inputs and outputs.

EXP10 06	2 relay outputs to increase number of capacitor steps
EXP10 07	3 relay outputs to increase number of capacitor steps
EXP10 03	2 relay outputs rated 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 with web server function (DCRL 8 only)

### Communication ports and accessories



CX 01



CX 02



EXP80 00

### Order code Description

CX 01	USB dongle for PC – DCRL connection, for programming, data download, diagnostics and firmware upgrade. Complete with 1.8m long cable
CX 02	Wi-Fi dongle for PC – DCRL programming, data download, diagnostics and cloning
EXP80 00	Plastic insert for customising label fixing on DCRL 3 and 5



[www.LovatoElectric.com](http://www.LovatoElectric.com)

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