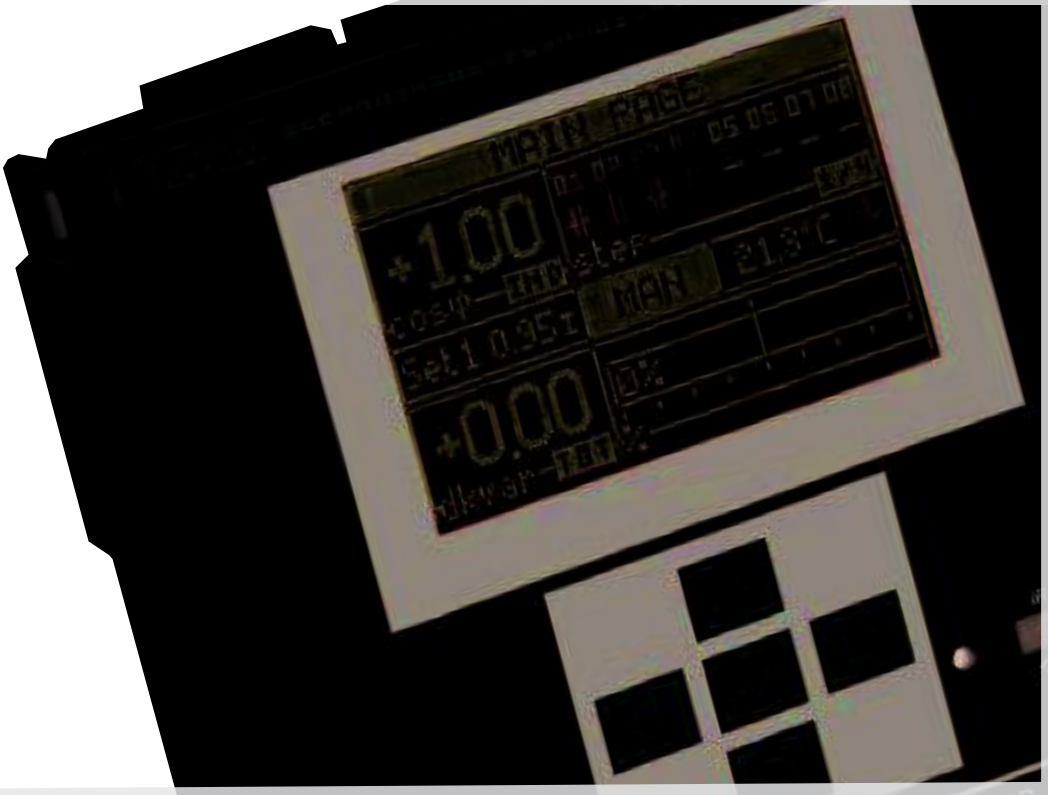
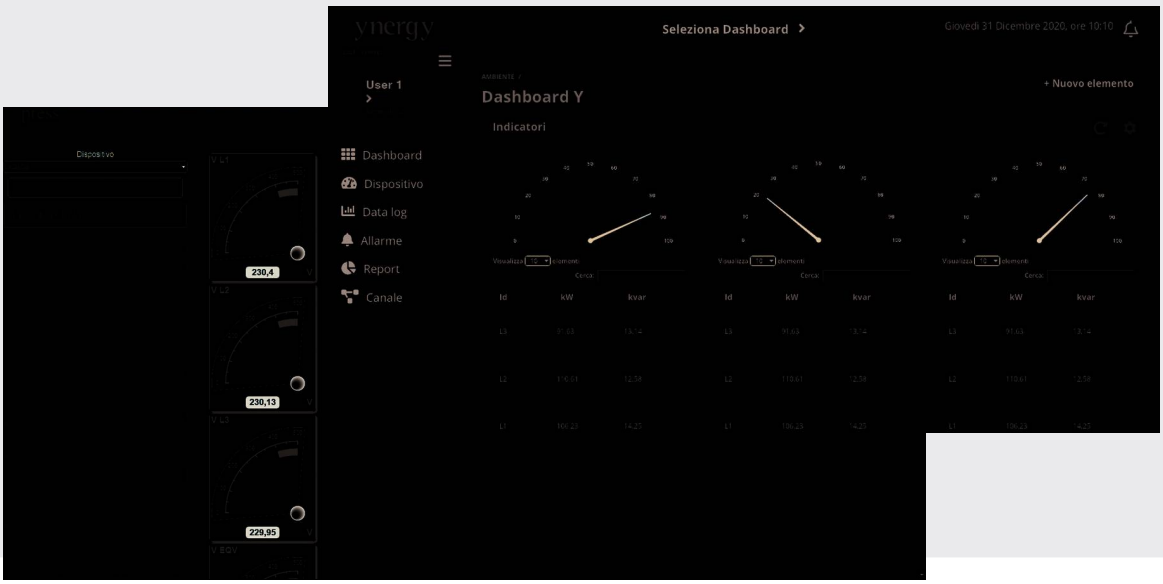
Energy management

Automatic power factor controllers and thyristor modules



- 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.

	Sec. - Page
Reactive current control relay	
DCRM series	30 - 8
Automatic power factor controllers	
DCRL series	30 - 9
DCRG series	30 - 10
Software	30 - 11
Communication devices, gateway data loggers, gateway, converter, GSM modem	30 - 12
Thyristor modules	**30 - 13**
Dimensions	**30 - 14**
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Technical characteristics	**30 - 17**





Page 30-8

DCRM SERIES

- Reactive current control relay
- Modular housing
- 2 steps
- Settings by front potentiometers
- 3 LED indications.



Page 30-9

DCRL SERIES (EXPANDABLE)

- Flush-mount housing: DCRL3 - DCRL5 (96x96mm/3.78x3.78") DCRL8 (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 DCRL8)
- 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.



Page 30-10

DCRG SERIES (EXPANDABLE)

- Flush-mount housing: DCRG8 - DCRG8F - DCRG8IND (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 from the 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 (DCRG8F version).
- Power factor correction by single phase (SPPFC)
- Capacitive reactive power factor correction (DCRG8IND version)
- Front optical USB and Wi-Fi communication port for PC, smartphone and tablet connection
- Programmable alarms
- Protection via 2-level password to prevent any 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.



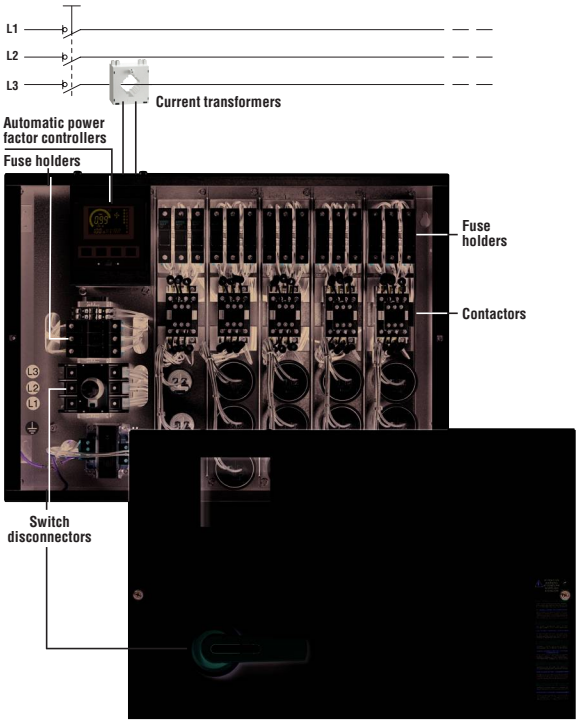
Page 30-13

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 DCRG8F controller.

					
	DCRL3	**DCRL5**	**DCRL8**	**DCRG8 / DCRG8IND**	**DCRG8F**
Steps	3 relay steps (up to 6 with EXP1007)	5 relay steps (up to 8 with EXP1007)	8 relay steps (up to 14 with EXP1007)	8 relay steps (up to 18 relay outputs with EXP1006 and EXP1007) (up to 24 mixed relay and static outputs with EXP1001)	8 static steps (up to 24 static outputs with EXP1001) (up to 23 mixed relays and static outputs with EXP1006, EXP1007 and EXP1001)
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				● (DCRG8 / DCRG8IND)	
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 EXP1001 (maximum 16 static outputs)	●
Power factor correction by single phase				●	
Possibility of connecting inductive steps				● (DCRG8IND)	
Possibility of use in medium voltage	●			●	
Possibility of phase-neutral insertion on a three-phase system	●			●	
Analog inputs				● with EXP1004	
Analog outputs				● with EXP1005	
Input programmable as function or external temperature sensor				● with EXP1004	
USB communication interface	● with EXP1010			● with EXP1010	
RS232 communication interface	● with EXP1011			● with EXP1011	
Opto-isolated RS485 communication interface	● with EXP1012			● with EXP1012	
Ethernet communication interface	● with EXP1013 (only for DCRL8)			● with EXP1013	
Opto-isolated Profibus-DP interface				● with EXP1014	
GPRS/GSM modem				● with EXP1015	
Optical USB communication port on front	● with CX01			● with CX01	
Optical Wi-Fi communication port on front	● with CX02			● with CX02	
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 EXP1030	
Event logging: alarms, setup changes, etc.				●	
Customisable internal counters				●	

	 DCRL3	 DCRL5	 DCRL8	 DCRG8 / DCRG8IND	DCRG8F
MEASUREMENTS					
Rated measurement voltage	600VAC max			600VAC max	
Measurement voltage range	50...720VAC			50...720VAC	
Instantaneous cosφ	●			●	
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 EXP1004 and EXP1016	
Active and apparent power value				●	
Active, reactive, apparent energy				●	
Current and voltage harmonic analysis	● up to 15th			● up to 31st	
Var-measured value for each 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	●			●	
Exceeding switching limits	●			●	
Exceeding of maximum harmonic distortion level limit	●			●	
Programmable alarm property (enable, trip delay, relay energising, etc.)	●			●	
Capacitor protection				● with EXP1016	



ESSENTIAL AND PERFORMANCE TOO!
DCRL3 - DCRL5



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.





CX01



CX02

USER INTERFACE

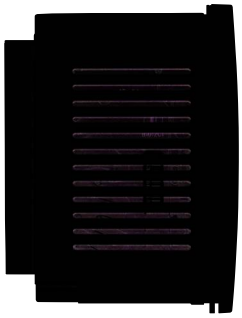
The backlit icon LCD ensures excellent legibility as well as the texts for the display of measurements and description of alarms. The 4 navigation buttons are for settings and functions.

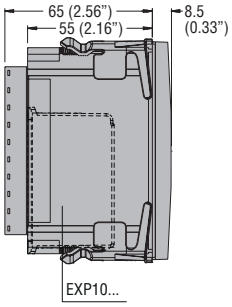
AN EXPANSION SLOT FOR EXP... SERIES MODULES

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.





FIXING SYSTEM

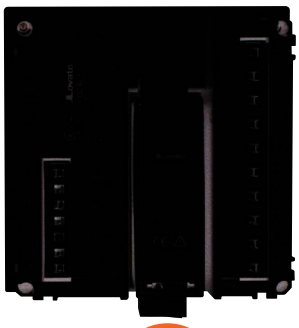
The fixing system with clips is simple, with a press to click into place and push to ensure retention over time.
Correct application of the standard seal and clips in the panel ensures a front **IP54** protection degree.





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

- Sarm1 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

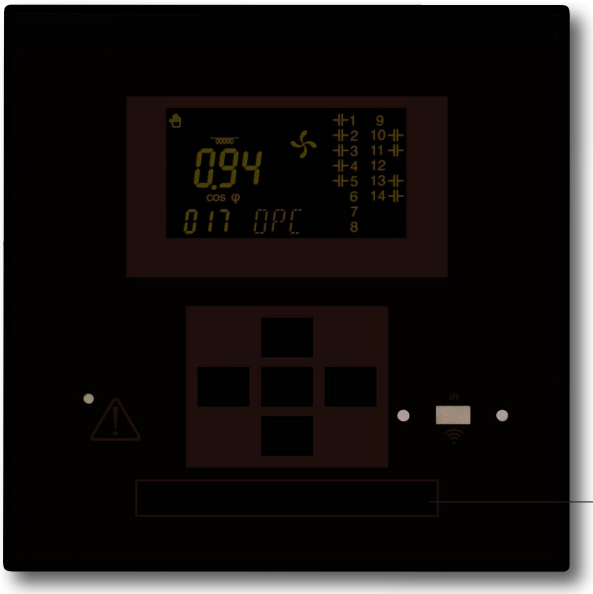
– **WIDE RANGE OF VOLTAGE MEASUREMENTS**
The wide measurement range between 50...720VAC L-L and between 50...415VAC L-N allows the controllers to be used in most applications.

– **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.

DCRL8



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

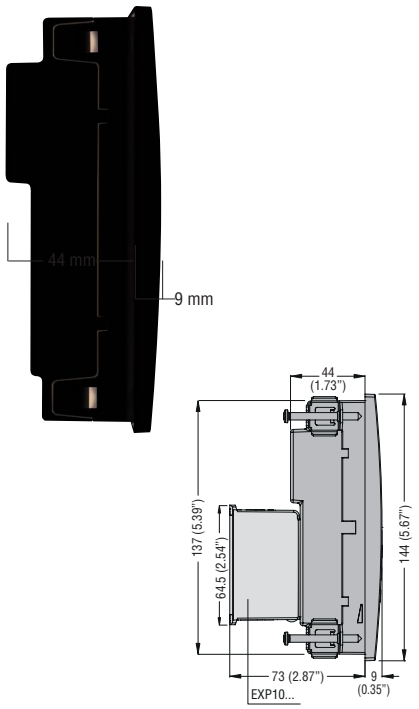
OPTICAL COMMUNICATION PORT
The optical port on the front permits communication with PCs, smartphones and tablets through the USB and Wi-Fi standards for carrying out programming, diagnostics and data download without disconnecting power to the electrical panel.

TWO EXPANSION SLOTS FOR EXP... SERIES MODULES

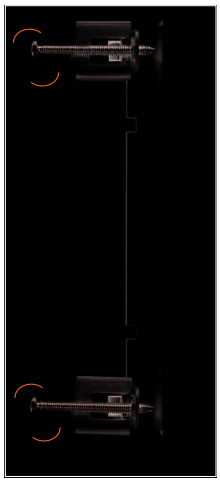
ETHERNET COMMUNICATION INTERFACE
By using the expansion module EXP1013.

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.

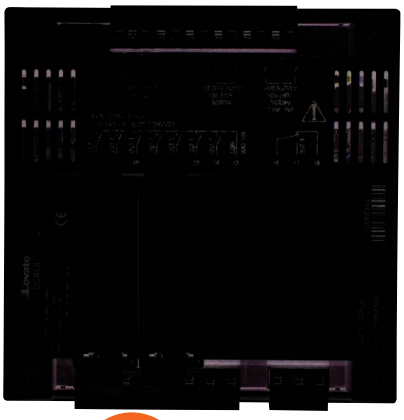


FIXING SYSTEM
The fixing system **with metal screws** guarantees excellent, lasting retention over time.



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 setting can easily allow to use 5A or 1A secondary current transformers.

– **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 of 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.

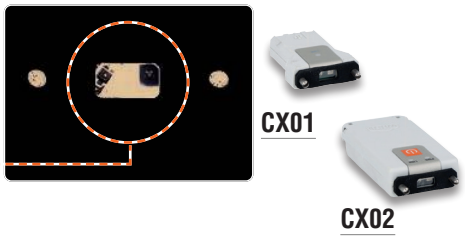
THE SOLUTION FOR ALL APPLICATIONS!
DCRG8

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

3 VERSIONS AVAILABLE:
- DCRG8: for traditional power factor correction with contactors or dynamic (fast) power factor correction with EXP1001
- DCRG8F: for dynamic (fast) power factor correction
- DCRG8IND: for capacitive reactive power factor correction.

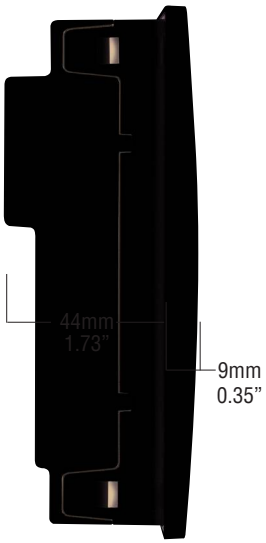


OPTICAL COMMUNICATION PORT
The optical port on the front permits communication with PCs, smartphones and tablets through the USB and Wi-Fi standards for carrying out programming, diagnostics and data download without disconnecting power to the electrical panel.

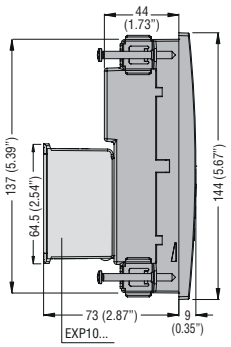


CUSTOMISATION
There is a customisation slot available on the front panel for the description of the controller by adding texts, logos, codes, etc.

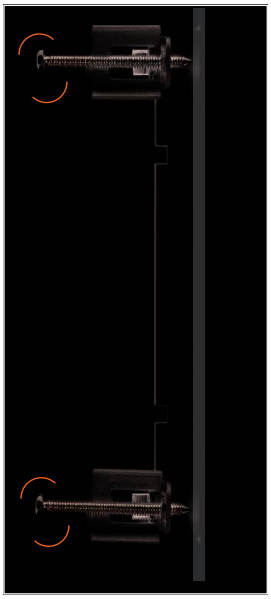
COMPACT SIZE



Slim 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 retention over time.

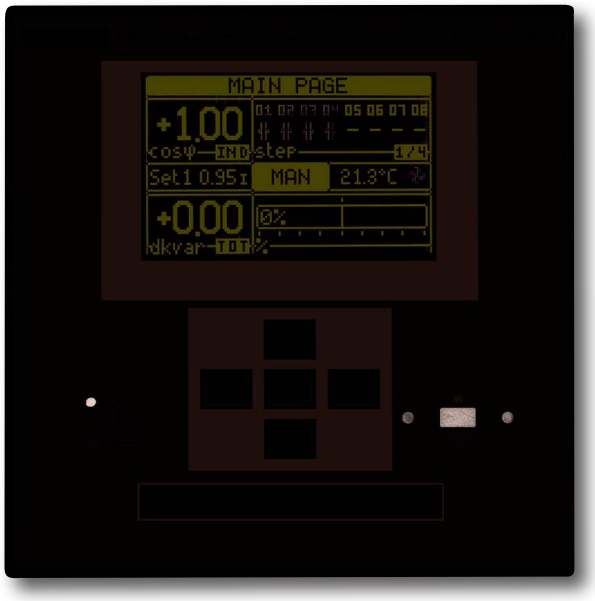
HIGH PROTECTION DEGREE
The controller front and the rear seal have been designed to warrant an **IP54** protection degree.

EXPANDABILITY



Basic controller functionality can be 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
- 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.

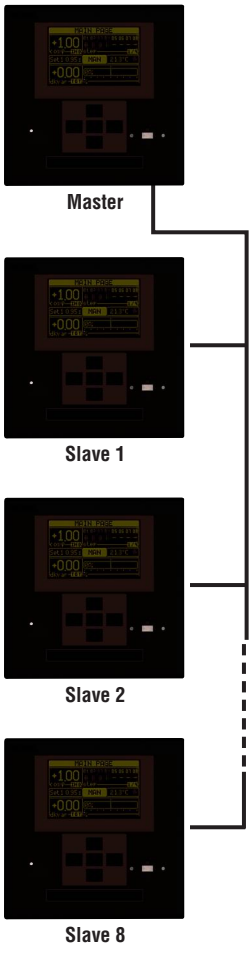


- SUITABLE FOR POWER FACTOR CORRECTION USING CONTACTORS AND THYRISTOR MODULES (WITH DCRG8F MODEL OR DCRG8 + EXP1001)
- INDEPENDENT POWER FACTOR CORRECTION FOR EACH SINGLE PHASE
- CAPACITIVE REACTIVE POWER FACTOR CORRECTION VIA INDUCTIVE STEP MANAGEMENT (WITH DCRG8IND MODEL)
- SMS SENDING FOR ALARM TRIGGERING
- DATA SENDING BY EMAIL OR FTP SERVER
- 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 compatible 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.



CAPACITOR PROTECTION

By adding the dedicated EXP1016 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.

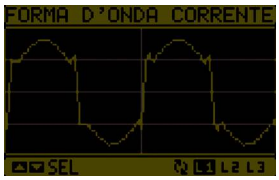
GSM/GPRS MODEM

With the EXP1015 expansion module, the controller is equipped with a GSM/GPRS modem, which it is automatically configured. 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.

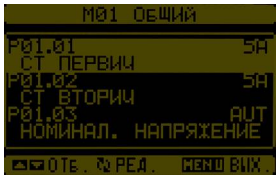
5A AND 1A BOTH IN THE SAME CONTROLLER

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. DCRG8F has 8 built-in static outputs, while DCRG8 + EXP1001, 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 (DCRG8IND).

The DCRG8IND 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.

DCRM series



DCRM2

Order code	Steps	Auxiliary supply voltage	Qty per pkg	Wt
	n°	[V]	n°	[kg]
Single and three-phase low-voltage systems.				
DCRM2	2	380...415VAC	1	0.284

General characteristics
The DCRM allows the reactive current of a system to be controlled.
It allows to reach 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: UL Listed, for USA and Canada (File E93601), as Auxiliary Devices-Modular ampere monitoring relays (with 415VAC maximum only); EAC.
Compliant with standards: IEC/EN/BS 60255-5, IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n°14.

DCRL series



DCRL3 - DCRL5



DCRL8



EXP8000



EXP10...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Single and three-phase low and medium-voltage systems.			
DCRL3	3 steps, expandable up to 6 steps, 100...440VAC	1	0.340
DCRL5	5 steps, expandable up to 8 steps, 100...440VAC	1	0.340
DCRL8	8 steps, expandable up to 14 steps, 100...440VAC	1	0.640
Accessory.			
EXP8000	Plastic insert for customisation label (only for DCRL3 and DCRL5)	10	0.050

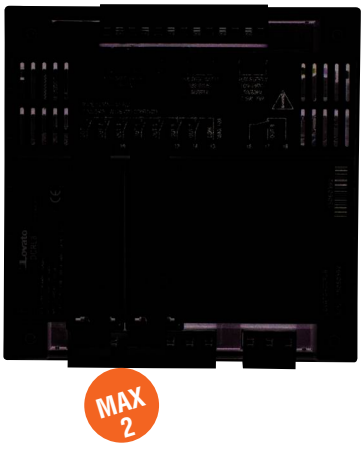
Order code	Description
EXPANSION MODULES. Additional steps.	
EXP1006	2 relay outputs to increase number of power factor correction steps
EXP1007	3 relay outputs to increase number of power factor correction steps
Inputs and outputs.	
EXP1003	2 relay outputs 5A 250VAC
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated ETHERNET interface (only for DCRL8)

Snap-in fixing of EXP... expansion modules

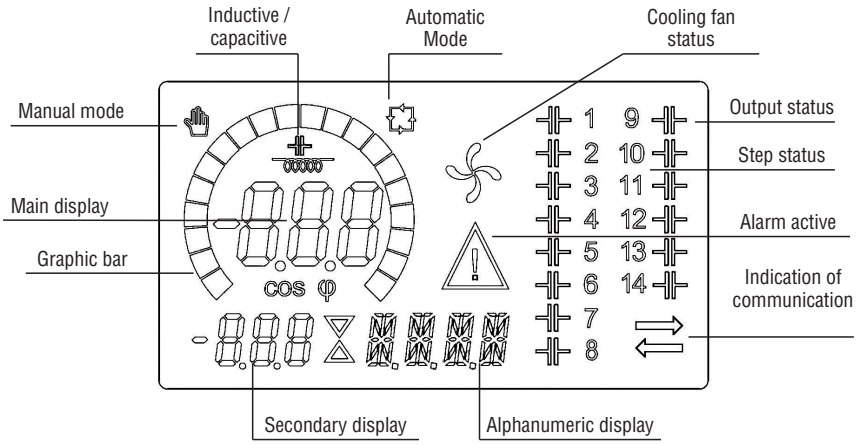
DCRL3 - DCRL5 with 1 module



DCRL8 with 2 modules



Backlit icon LCD



General characteristics

The DCRL series has been 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 from the supply and which can be used in medium-voltage lines with VTs
- Drastic reduction of the 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 (CX01 dongle) and Wi-Fi (CX02 dongle) communication port for PC, smartphone and tablet connection
- Compatible with Ethernet communication modules EXP1013 (only for DCRL8)
- 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
- Customisation with label on front (only for DCRL8).

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):
  - DRCL3: 3 outputs
  - DCRL5: 5 outputs
  - DCRL8: 8 outputs
  - Contact arrangement: NO; the last is a changeover
  - Rated current: 5A 250VAC AC1
- Flush-mount housing:
  DCRL3, DCRL 5 (96x96mm / 3.78x3.78"); DCRL8 (144x144mm / 5.67x5.67")
- IEC degree of protection:
  DCRL3, DCRL5 IP54 and DCRL8 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/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-3 (only for DCRL8), IEC/EN/BS 61000-6-4 (only for DCRL3-5), UL 508, CSA C22.2 n°14.

Contactors for power factor correction

See section 2, page 2-18.

Software Synergy , Synergy cloud , Xpress and Sam1

See section 36.

EXP expansion modules

See section 35.

DCRG series

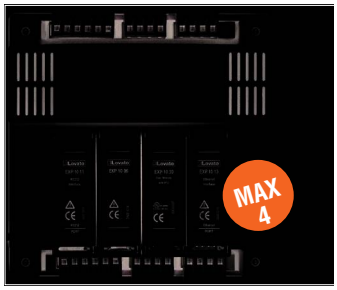


DCRG8



EXP10...

Snap-in fixing of 4 EXP... expansion modules
DCRG8 / DCRG8F / DCRG8IND



Order code	Description	Qty per pkg	Wt
		n°	[kg]
DCRG8	8 relay steps, expandable up to 24 steps, 100...415VAC	1	0.980
DCRG8F	8 static steps, expandable up to 24 steps, 100...415VAC	1	0.980
DCRG8IND	8 relay steps, expandable up to 24 steps, 100...415VAC, for capacitive reactive power factor correction	1	0.980
Accessories.			
NTC01	Remote temperature sensor, length 3m/3.3yd	1	0.150

Order code	Description
EXPANSION MODULES Additional steps.	
EXP1006	2 relay outputs to increase number of power factor correction steps
EXP1007	3 relay outputs to increase number of power factor correction steps
Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs to increase number of static steps
EXP1002	2 digital inputs and 2 opto-isolated static outputs
EXP1003	2 relay outputs 5A 250VAC
EXP1004	2 PT100 opto-isolated analogue inputs, either 0/4...20mA, 0...10V or 0...±5V
EXP1005	2 opto-isolated analogue inputs 0/4...20mA, 0...10V or 0...±5V
EXP1008	2 opto-isolated digital inputs and 2 relay outputs 5A 250VAC
EXP1016	Capacitor protection with 2 inputs for temperature measurement with NTC sensors and 2 three-phase measurement inputs
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated ETHERNET interface
EXP1014	Opto-isolated Profibus-DP interface
EXP1015	GPRS/GSM modem❶, without antenna
Other functions.	
EXP1030	Data memory, calendar-clock with backup reserve power for data logging

❶ For configuration via software, contact our Technical support.

Maximum expandability DCRG8 / DCRG8IND / DCRG8F

		EXP1006	EXP1007	EXP1001	TOTAL STEPS	
		Module with 2 relay outputs	Module with 3 relay outputs	Module with 4 static outputs		
Controller	Steps	no. of modules	no. of modules	no. of modules	Relay	Static
DCRG8 / DCRG8IND	8	4 (2 steps)	–	–	16	–
	8	2 (2 steps)	max 2 (3 steps)	–	18	–
	8	–	–	max 4 (4 steps)	8	16
DCRG8F	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 meets the technical requirements of modern electrical systems in industry. It is designed to comply and has the option to extend 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 (DCRG8IND only)
- Independent power factor correction for each single phase (SPPFC only for DCRG8 / DCRG8IND)
- Suitable for dynamic power factor correction with DCRG8F or DCRG8 + EXP1001
- Control of thyristor modules type DCTL... with static outputs or RS485 connection with DCRG8F controller
- Use with medium-voltage lines with VTs (DCRG8 / DCRG8IND 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 (CX01 dongle) and Wi-Fi (CX02 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 software, 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 EXP1015 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.

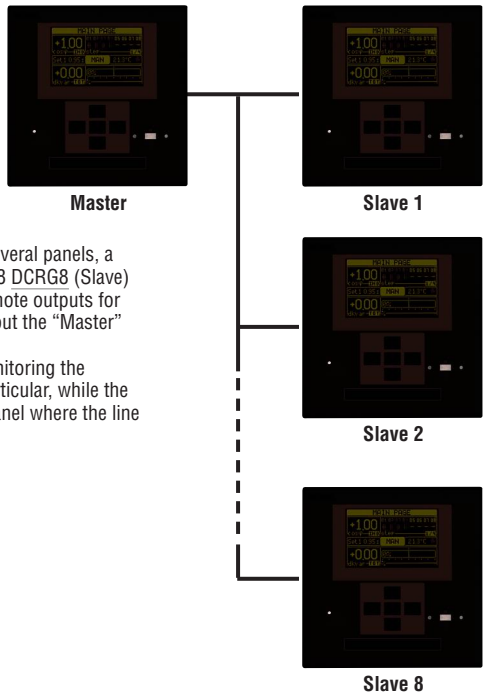
Certifications and compliance
Certifications obtained: UL Listing for USA and Canada (cULus - File E93601), as Auxiliary Devices - Electronic power factor regulator, RCM, EAC.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, UL508, CSA C22.2 n°14.

Contactors for power factor correction
See section 2, page 2-18.

Software Synergy , Synergy Cloud , Xpress and Sam1
See section 36.

EXP expansion modules
See section 35.

"Master-Slave" power factor correction system with DCRG8



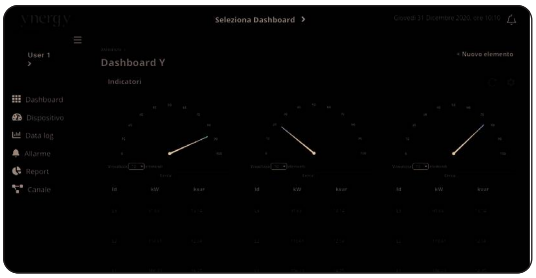
When the correction system is divided into several panels, a DCRG8 (Master) controller can control up to 8 DCRG8 (Slave) controllers. The "Slave" controllers act as remote outputs for the connection of capacitor banks that carry out the "Master" controller's commands.
The single controllers are responsible 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

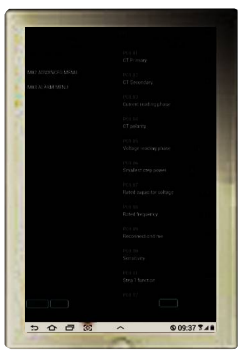


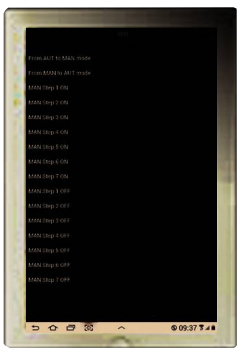
Synergy Supervision and energy management software



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 DCRG8... 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 DCRG8... controllers.
See section 36 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 CX02 device.
It is iOS and Android compatible.
For details, consult section 36 or our Technical support; see contact details on inside front cover.



Communication devices for DCRL and DCRG


CX01


CX02


CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC↔DCRL/DCRG with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi connection dongle PC↔DCRL/DCRG for data download, diagnostics and firmware upgrade, project upload/download and cloning	1	0.090
For DCRG8... type only.			
CX03	GSM penta-band antenna (850/900/1800/1900/2100MHz)	1	0.090

General characteristics
For general characteristics of these accessories see section 35.

Gateway data loggers


EXCGLB...

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

General characteristics
For general characteristics of these accessories see section 34.

Gateway


EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

General characteristics
For general characteristics of these accessories see section 34.

Converter


EXCCON02

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/TCP protocol conversion functionality	1	0.400

General characteristics
For general characteristics of these accessories see section 34.

Remote control and monitoring GSM modem via SMS

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA


EXCGSM01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340

General characteristics
For general characteristics of these accessories see section 34.

DCTL series



DCTL...

Order code	Step power	Qty per pkg	Wt
	[kvar]	n°	[kg]
Versions with rated voltage 400VAC.			
DCTLA4000075	7.5kvar at 400VAC step module	1	1.74
DCTLA4000150	15kvar at 400VAC step module	1	1.74
DCTLA4000300	30kvar at 400VAC step module	1	1.74
DCTLA4000500	50kvar at 400VAC step module	1	2.84
DCTLA4001000	100kvar at 400VAC step module	1	6.68
Versions with rated voltage 400...480VAC.			
DCTLA4800090	9kvar at 480VAC step module	1	1.74
DCTLA4800180	18kvar at 480VAC step module	1	1.74
DCTLA4800360	36kvar at 480VAC step module	1	1.74
DCTLA4800600	60kvar at 480VAC step module	1	2.84
DCTLA4801200	120kvar at 480VAC step module	1	6.68
Versions with rated voltage 600...690VAC IEC, 600VAC cULus.			
DCTLA6900300	30kvar at 690VAC step module	1	2.84
DCTLA6900500	50kvar at 690VAC step module	1	2.84
DCTLA6901000	100kvar at 690VAC step module	1	6.68

Accessories for DCTL


EXC1042


EXP8003


NTC01


EXA01


EXA02

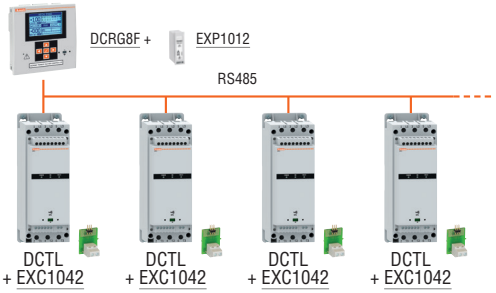
Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXC1042	RS485 communication board	1	0.020
EXP8003	DIN rail mount kit for DCTL up to 60kvar max	1	0.200
NTC01	Remote temperature sensor, 3m	1	0.150
CX01	USB connection dongle PC↔DCTL, for programming diagnostics and firmware update	1	0.090
CX02	Wi-Fi connection dongle PC↔DCTL, for programming, diagnostics and cloning	1	0.090
EXA01	Kit of 3 UL terminal lugs for DCTLA4001000, DCTLA4801200 and DCTLA6901000	1	0.141
EXA02	Kit of 3 terminal protection covers for DCTLA4001000, DCTLA4801200 and DCTLA6901000	1	0.125

Power connections with double lug clamps

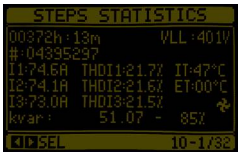


The thyristor modules type DCTL up to 60kvar are provided with power connections with double lug clamps which allows to simplify the wiring, in particular when is necessary to connect more thyristor modules in parallel.

Connection to the automatic power factor controller type DCRG8F via RS485



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 EXC1042), 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 NTC01 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 freely downloadable from Google Play Store and App Store
- Optical port for programming and diagnostic with software Xpress and App Sam1 ,connection with USB dongle (CX01) or Wi-Fi dongle (CX02)
- 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 EXC1042) for the command and monitoring from power factor controller type DCRG8F; from the display of DCRG8F is also possible to monitor the status and the measurements (temperature, power,...) of each DCTL
- 1 programmable relay output with changeover contact for the signalling 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 EXP8003 (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 DCTLA400...
  - 400...480VAC (IEC and cULus) for version DCTLA480...
  - 600...690VAC (IEC), 600VAC (cULus) for version DCTLA690...
- Rated frequency 50/60Hz
- Auxiliary supply voltage: 100...240VAC ± 10%
- Command circuit: 8...30VDC or dry contact or RS485 connection from DCRG8F controller
- Controlled phases: 2
- Forced ventilation monitored from the control logic
- Operating temperature: -20...+45°C (up to 55°C with derating)

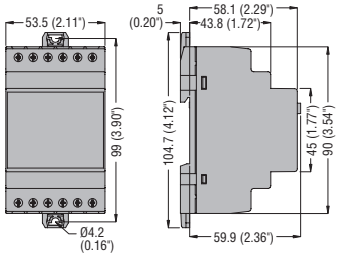
INDICATIONS
- LED POWER: presence of supply
- LED FAULT: alarm active (n° flashes = type of alarm)
- LED ON: command active.

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

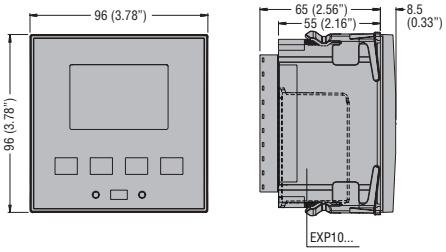
Automatic power factor controllers and thyristor modules

Dimensions [mm (in)]

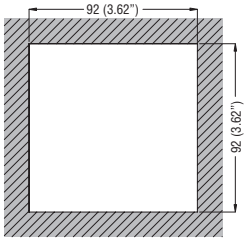
REACTIVE CURRENT CONTROL RELAY
DCRM2



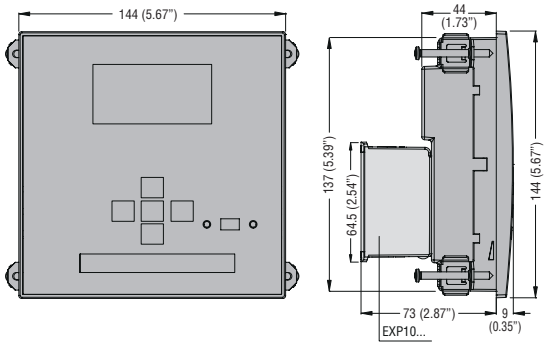
AUTOMATIC POWER FACTOR CONTROLLERS
DCRL3 - DCRL5



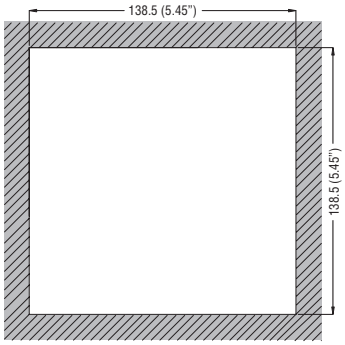
Cutout



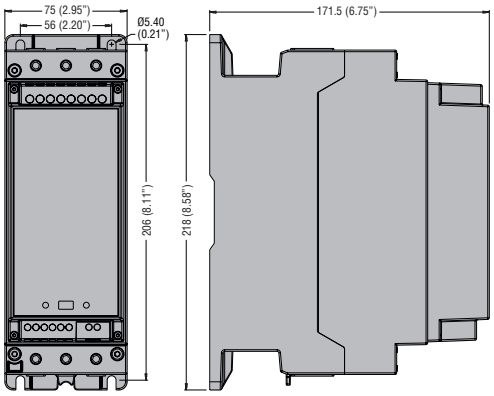
DCRL8 - DCRG8...



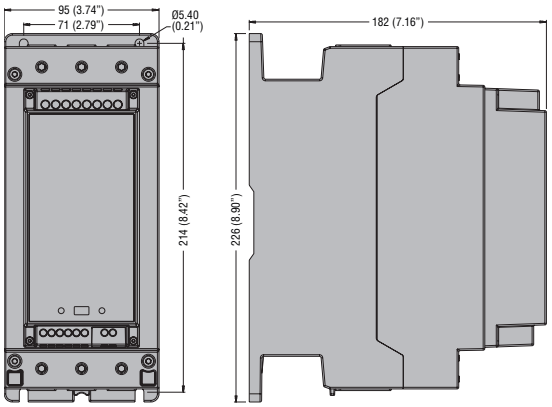
Cutout



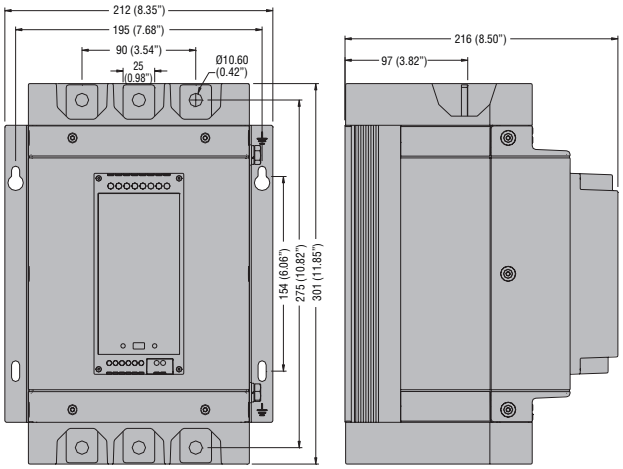
THYRISTOR MODULES
DCTLA4000075 - DCTLA4000150 - DCTLA4000300
DCTLA4800090 - DCTLA4800180 - DCTLA4800360

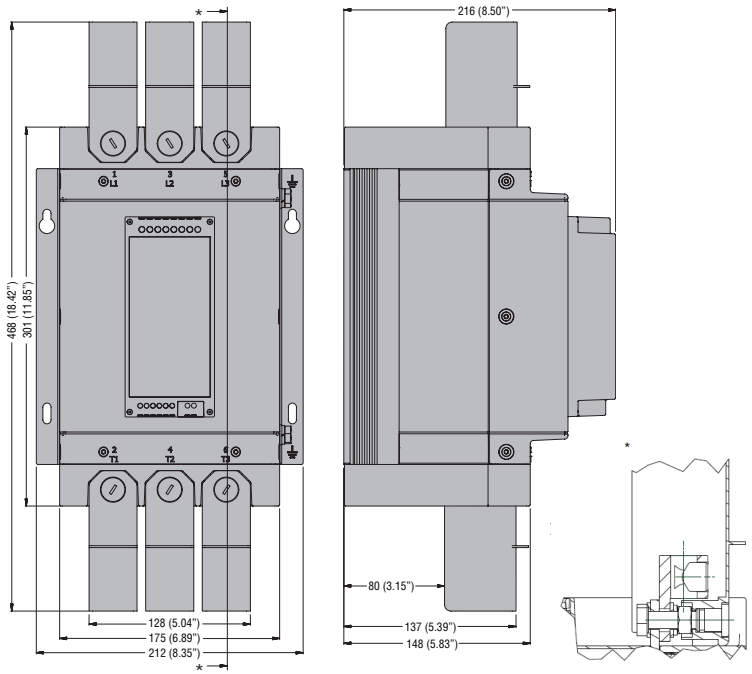


DCTLA4000500 - DCTLA4800600
DCTLA6900300 - DCTLA6900500



DCTLA4001000 - DCTLA4801200
DCTLA6901000

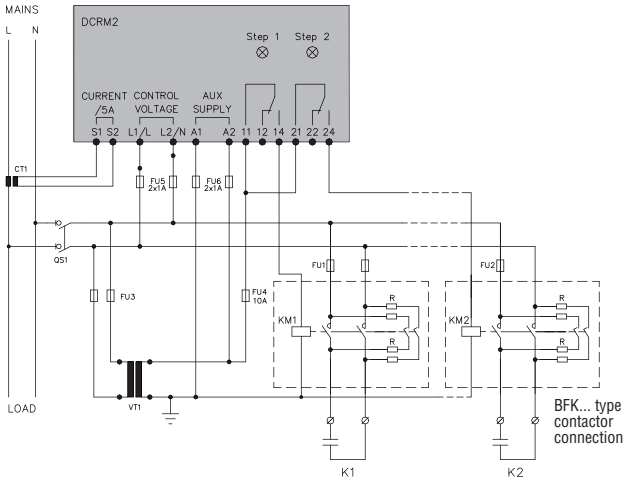




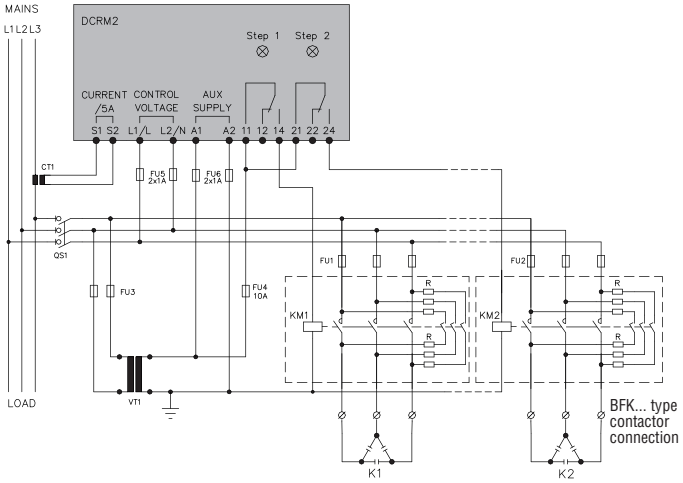
DCTLA4001000, DCTLA4801200, DCTLA6901000 complete with terminal lugs kit EXA01 and terminals protection kit EXA02 (necessary only for cULus compliance).

REACTIVE CURRENT CONTROL RELAY
DCRM2

Single-phase connection



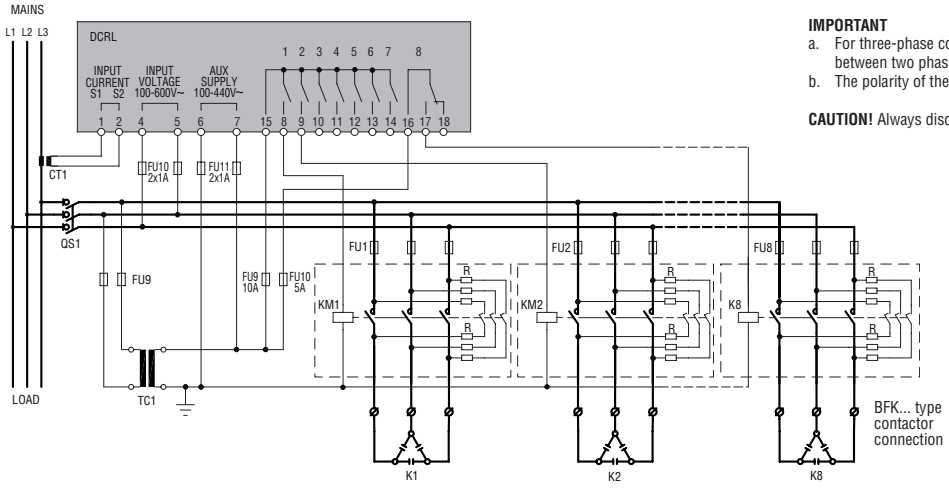
Three-phase connection



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.

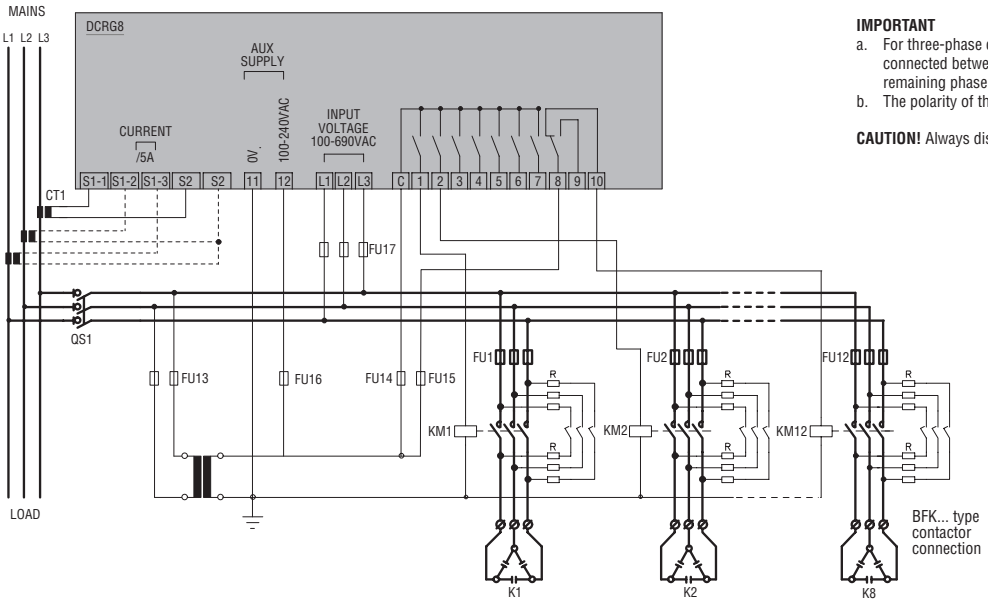
AUTOMATIC POWER FACTOR CONTROLLERS
DCRL... with BFK... type contactors



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.

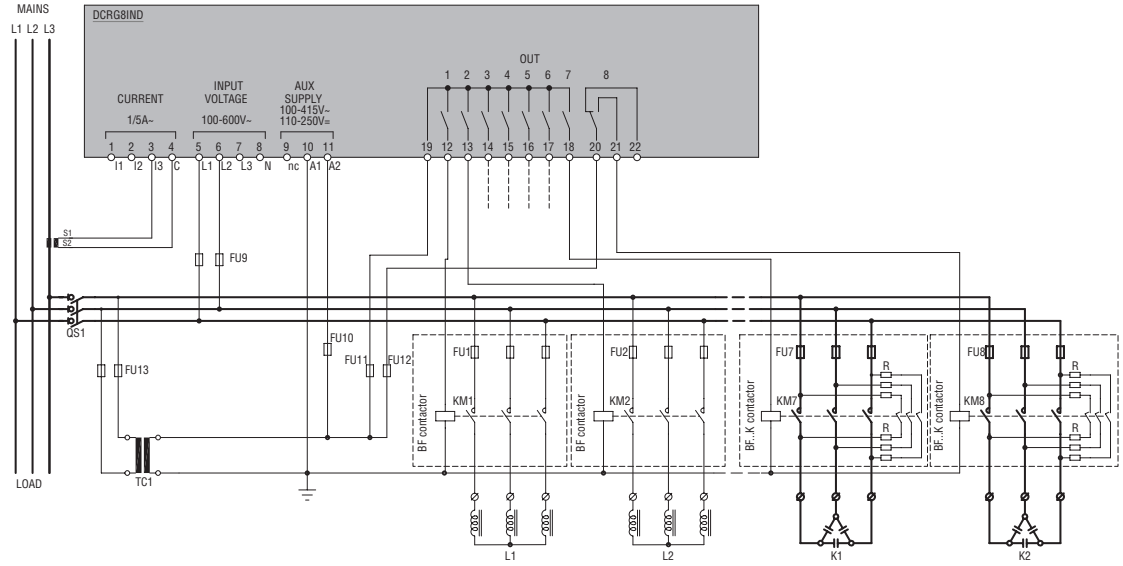
AUTOMATIC POWER FACTOR CONTROLLERS
DCRG8 with BF...K type contactors



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.

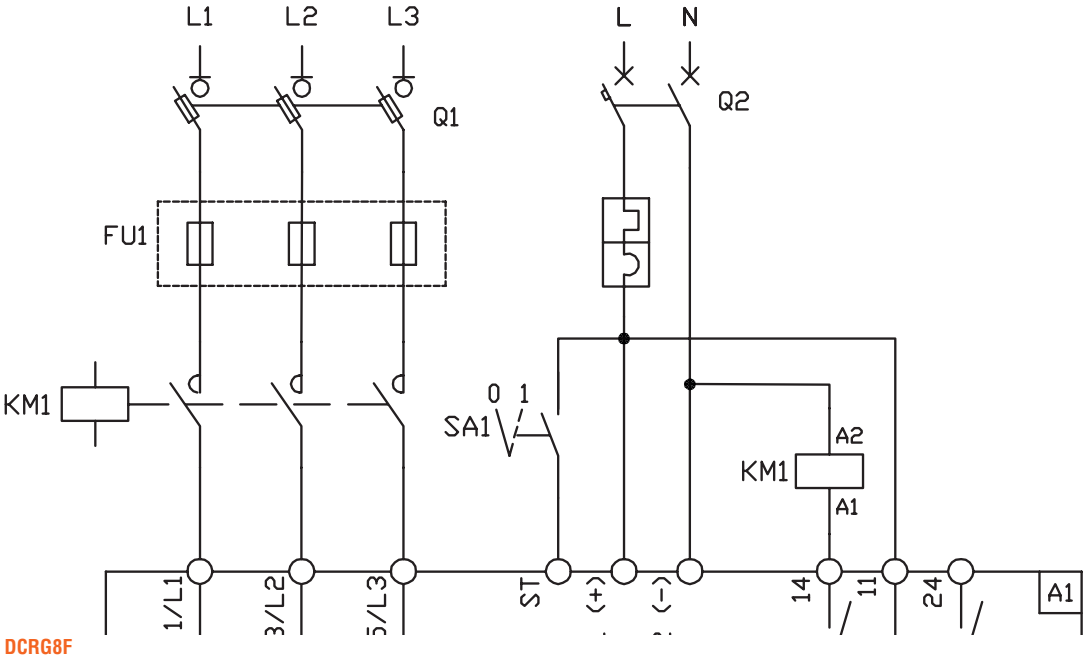
CAUTION! Always disconnect the power supply when operating on the terminals.

DCRG8IND



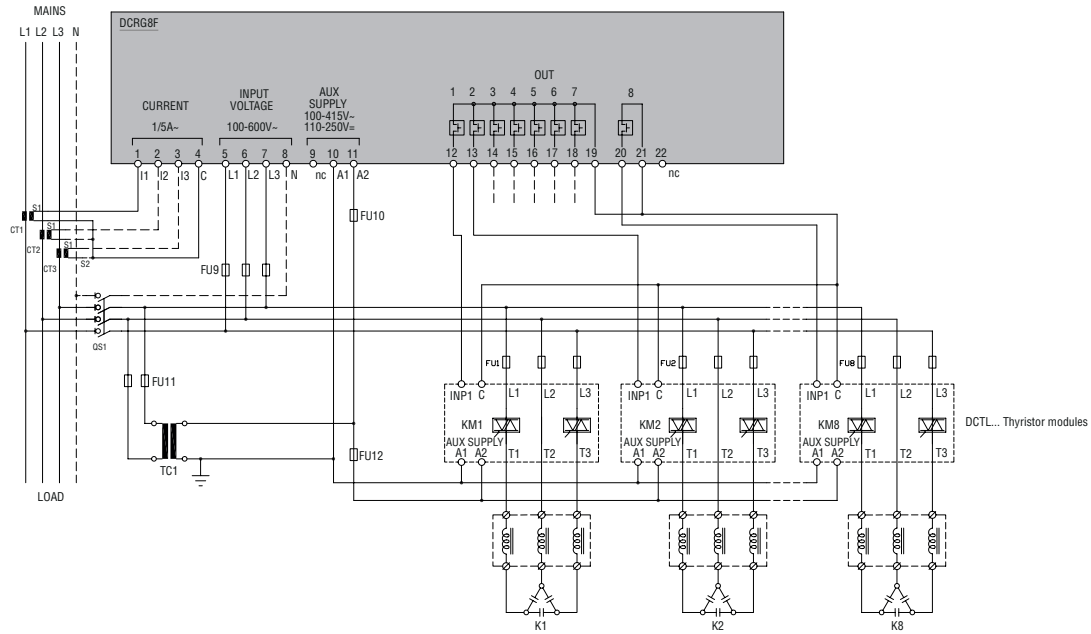
DCRG8F

Thyristor module control via 8 ... 30VDC signal



DCRG8F

Thyristor module control via clean contact (only with DCTL)



TYPE	DCRM2
AUXILIARY SUPPLY CIRCUIT	
Rated auxiliary voltage (Us)	380...415VAC standard 220...240VAC and 440...480VAC on request❶
Operating range	0.85...1.1Us
Rated frequency	50/60Hz ±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 L-N
CURRENT INPUT	
Type of connection	By current transformer (CT)
Rated current Ie	5AAC
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/BS 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 (7lb.in; 9lb.in according to UL/CSA)
Conductor section min....max.	0.2...4.0mm² (24...12AWG; 18...12AWG according to UL/CSA)
AMBIENT CONDITIONS	
Operating temperature	–20...+60°C
Storage temperature	–30...+80°C
HOUSING	
Material	Self-extinguishing polyamide

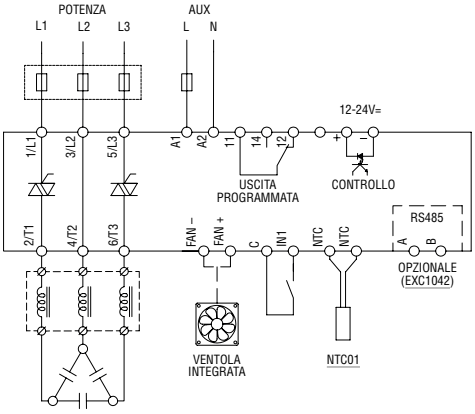
❶ UL/CSA certification obtained with 415VAC maximum.

TYPE	DCRL3	DCRL5	DCRL8	DCRG8 / DCRG8IND	DCRG8F
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...66Hz			45...66Hz; 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	1.2 Ie				
Overload peak	50A for 1 second				
Power consumption	0.6VA				
MEASUREMENT DATA					
Type of voltage and current measurement	True RMS value				
Power factor adjustment	0.5 ind...0.5 cap.				
Type of temperature sensor type	Internal			Internal + PT100 with EXP1004 + NTC with EXP1016 (DCRG8 / DCRG8IND)	
Temperature measurement range	0...+212°C			0...+212°C	
RELAY OUTPUTS					
Number of outputs	3 (up to 6 with EXP1006 - EXP1007)	5 (up to 8 with EXP1006 - EXP1007)	8 (up to 14 with EXP1006 - EXP1007)	8 (up to 18 with EXP1006 - EXP1007)	0 (up to 10 with EXP1006 - EXP1007)
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/BS 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 EXP1001 (55mA)	8 (120mA) (up to 24 with EXP1001)
INSULATION					
Rated insulation voltage Ui	600VAC				
Rated impulse withstand voltage Uimp	9.5kV				
Rated impulse withstand voltage Uimp	5.2kV				
CONNECTIONS					
Type of terminal	Removable				
Conductor section min....max	0.2...2.5mm² (24...12AWG; 18...12AWG 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		

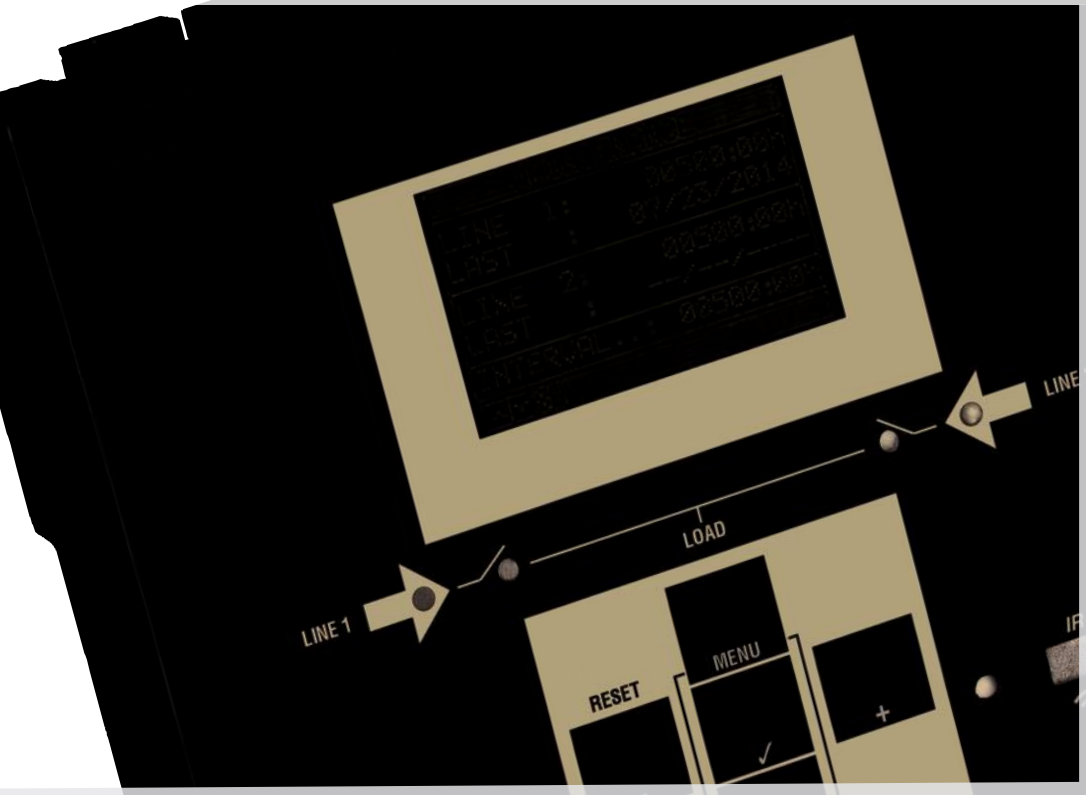
TYPE		DCTLA 4000075	DCTLA 4000150	DCTLA 4000300	DCTLA 4000500	DCTLA 4001000	DCTLA 4800090	DCTLA 4800180	DCTLA 4800360	DCTLA 4800600	DCTLA 4801200	DCTLA 6900300	DCTLA 6900500	DCTLA 6901000
Rated operating voltage Us		400VAC					400...480VAC					600...690VAC		
Rated frequency		50/60Hz												
Rated 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 EXC1042 in combination with controller DCRG8F + EXP1012)												
Over-temperature protection		Yes, via integrated probe or optional external probe NTC01												
Cooling		Forced ventilation												
Operating temperature		-20...+45°C without derating (up to 55°C with derating)❶												

❶ Consult our Technical support for more information; see contact details on front cover.

THYRISTOR MODULES
DCTL



Automatic transfer switch controllers



- Supervision of two or three power sources
- Emergency demand supervision for standby generating set
- Tie-breaker management
- Control of contactors, motorised circuit breakers and motorised changeover switches
- Closed transition
- Automatic non-priority load management
- Event logging
- Remote control and supervision
- Front optical port
- Built-in NFC technology
- Expandable with EXP modules
- Communication protocols Modbus-ASCII, RTU and TCP
- Real time clock
- Enclosed automatic transfer switches ATS.

SEC. - PAGE

Automatic transfer switch controllers for 2 power sources
ATL100 type modular version for controlling 2 power sources with single-phase control ..... 31 - 7
ATL500 type non expandable with synoptic and NFC for controlling 2 power sources ..... 31 - 7
ATL600 and ATL601 type non expandable for controlling 2 power sources ..... 31 - 8
ATL610 type expandable with EXP modules for controlling 2 power sources ..... 31 - 8
ATL800 type expandable with EXP modules for controlling 2 power sources and 1 tie breaker ..... 31 - 9

Automatic transfer switch controllers for 3 power sources
ATL900 type expandable with EXP modules for controlling 3 power sources and 2 tie breakers ..... 31 - 10

Enclosed automatic transfer switches ATS
ATS with ATL600 automatic transfer switch controller type and contactors ..... 31 - 11

Accessories
Dual power supply module ..... 31 - 12
Communication devices, gateway data loggers, gateway, converter, GSM modem ..... 31 - 13

Dimensions ..... 31 - 14
Wiring diagrams ..... 31 - 15
Technical characteristics ..... 31 - 18





Page 31-7

ATL100
- Modular housing
- Management of two power sources
- Single-phase control.



Page 31-7

ATL500
- Management of two power sources
- Self-seeking power supply
- 2 programmable digital inputs
- 3 programmable digital outputs
- Built-in NFC technology for parameter settings with App NFC.



Page 31-8

ATL600 - ATL601
- Management of two power sources
- AC or DC power supply
- 6 programmable digital inputs
- 7 programmable relay outputs.



Page 31-8

ATL610
- Management of two power sources
- AC and DC power supply
- 6 programmable digital inputs
- 7 programmable relay outputs
- Real time clock (RTC)
- Expandable with EXP series modules (inputs and outputs, communication ports).



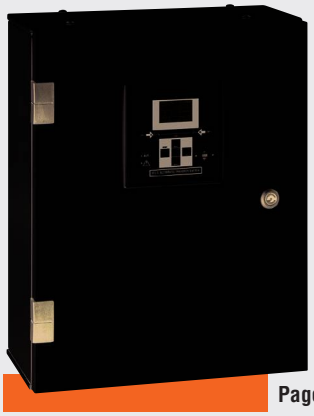
Page 31-9

ATL800
- Management of 2 power sources and 1 tie breaker
- AC and DC power supply
- 8 programmable digital inputs
- 7 programmable relay outputs
- Built-in NFC technology for parameter settings with App NFC
- Real time clock (RTC)
- Non-priority load management
- Closed transition with brief parallel configuration
- Built-in RS485 communication
- Built-in PLC logic
- Expandable with EXP series modules (inputs and outputs, communication ports).



Page 31-10

ATL900
- Management of 3 power sources and 2 tie breakers
- AC and DC power supply
- 12 programmable digital inputs
- 4 current inputs
- 10 programmable relay outputs
- 1 programmable static output
- Built-in NFC technology for parameter settings with App NFC
- Real time clock (RTC)
- Non-priority load management
- Closed transition with brief parallel configuration
- Built-in RS485 communication
- Built-in PLC logic
- Expandable with EXP series modules (inputs and outputs, communication ports).



Page 31-11

ENCLOSED AUTOMATIC TRANSFER SWITCHES ATS
- Enclosed automatic transfer switches from 45 to 160A
- Management of 2 power sources
- Four-pole interlocked contactors
- Automatic transfer switch controller type ATL600
- Dual power supply module type ATLDPS1 for the measurement and control of voltages present at supply inputs
- Miniature circuit breakers for the protection of the measuring lines
- Metallic enclosure IP65.



Page 31-12

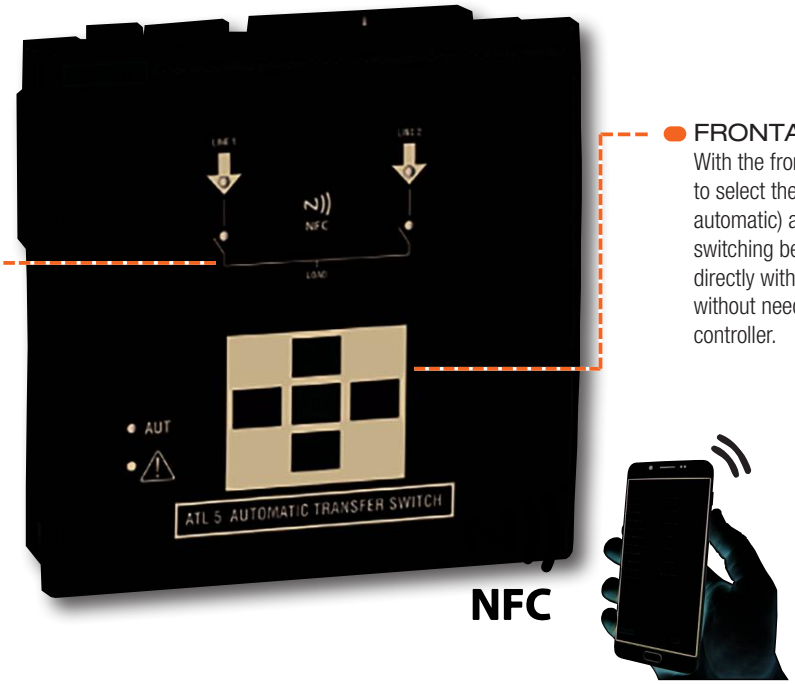
ATLDPS1
- Module specifically designed to control power supply voltage of motorised circuit breakers and changeover switches
- Continuous monitoring of supply line status
- Management via microcontroller management.

Lovato electric

SIMPLE AND READY TO USE

SYNOPTIC

The frontal synoptic provides a simple and clear view of the status of the plant, signalling with LEDs the status of the power sources and the status of the changeover devices.

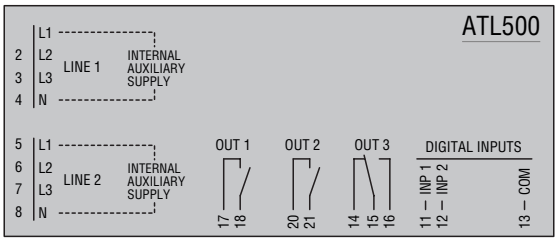


FRONTAL KEYBOARD

With the frontal keyboard it is possible to select the operating mode (manual or automatic) and command manually the switching between the power sources directly with the buttons I-0-II on the front, without need to program any setting on the controller.

SELF-SEEKING POWER SUPPLY

ATL500 has a self-seeking power supply, which automatically selects the best of the two available power sources for the internal supply, taken directly from the two measuring inputs (rated voltage 110...240VAC L-N), without the need of an external circuit or dual power supply module for the selection of the power for the auxiliary supply.



THREE-PHASE WITH NEUTRAL VOLTAGE MONITORING INPUTS

ATL500 is provided with three-phase with neutral voltage monitoring inputs for a complete monitoring of the voltage and frequency of both power sources. The controller can be configured to be used in three-phase with neutral, single-phase or two-phase systems.

PROGRAMMABLE DIGITAL INPUTS AND OUTPUTS

The function of the programmable digital inputs and outputs can be configured via NFC to satisfy different application needs.

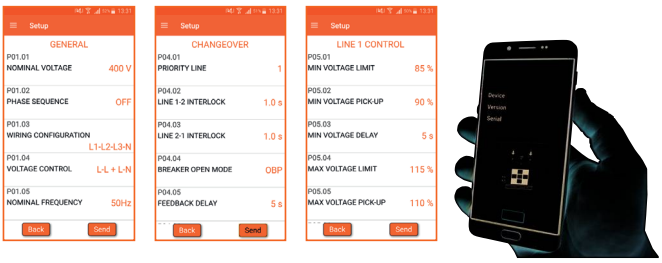
HIGH PROTECTION DEGREE

The controller front and the optional frame seal have been designed to warrant an **IP65** protection degree.

NFC CONNECTION

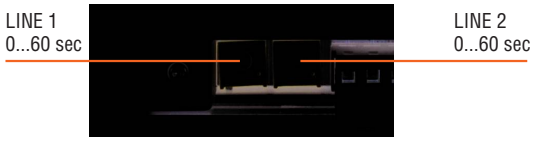
ATL500 is provided with built-in NFC connectivity for the programming via Android and iOS smart devices (smartphone and tablets) with the LOVATO NFC App in a simple, fast and innovative way, which does not need any connection cable and is able to operate even without power supply on the controller.
With the LOVATO NFC App it is possible to configure:

- system parameters: rated system voltage, rated frequency, type of wiring, voltage control mode, etc.
- password for the protection of the access to the settings
- changeover settings: priority line selection, interlock times, feedback delays, etc.
- protection thresholds and tripping delays: min/max voltage, min/max frequency, phase sequence, asymmetry
- function of the programmable digital inputs and outputs
- function of the potentiometers
- alarms properties.



POTENTIOMETERS

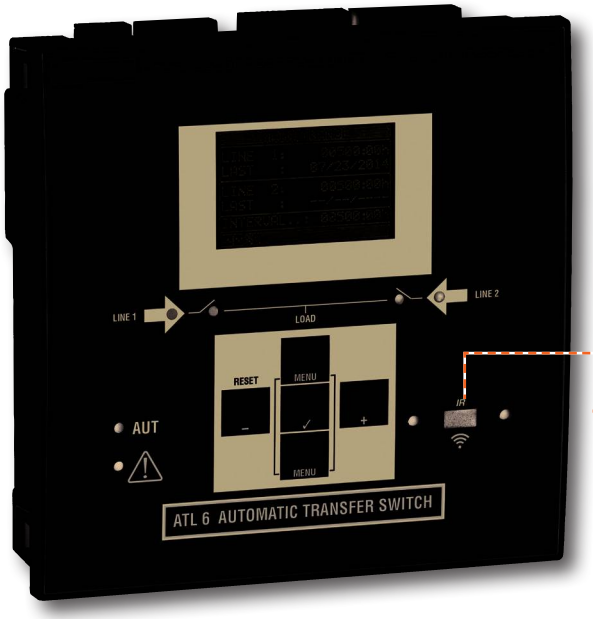
ATL500 is provided with two potentiometers on the back, one for each power source, which can be used for the manual setting of the line presence delays (default setting) or to set the tripping delays of the protection thresholds, in alternative to the setting via NFC. The function of the potentiometers can be modified with the LOVATO NFC App.

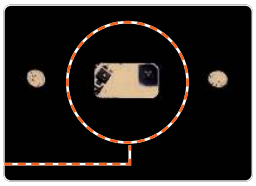


STAY IN CONTROL!

BACKLIT GRAPHIC LCD DISPLAY

128x80 pixel, with excellent legibility with adjustable brightness and display of events, alarms and measurements in 5 languages: English, Italian, French, Spanish and German.

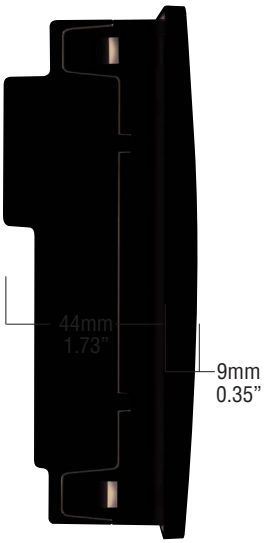




OPTICAL COMMUNICATION PORT

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

COMPACT SIZE



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

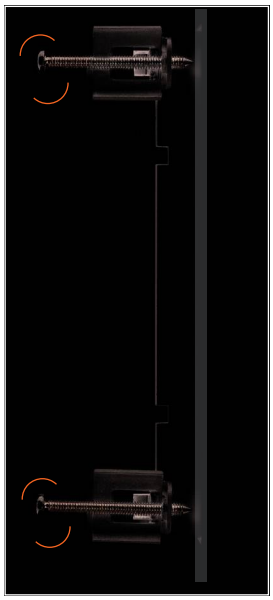
HIGH PROTECTION DEGREE

The controller front and the optional frame seal have been designed to warrant an **IP65** protection degree.

MAINTENANCE COUNTERS

ATL features two counters used for maintenance; the first monitors the operating time and the second counts the number of switching operations. Exceeding the limit set on the counters activates the corresponding alarm.

FIXING SYSTEM



The fixing system with **metal screws** guarantees excellent, lasting hold over time.

STATISTICS AND EVENTS

The recorded statistical data is available to the user for understanding how the system operates. A cyclical internal memory records up to 100 events.

EMERGENCY DEMAND SUPERVISION FOR STANDBY GENERATING SET

In applications where one of the two supply sources is a generating set, the transfer switch controller has specific functions to supervise the generator starting and stopping operations.

INPUTS, OUTPUTS, INTERNAL VARIABLES, COUNTERS

The inputs and outputs can be configured by the user to manage the various application requirements. Also available to the user are limit thresholds, counters, user alarms and remote control variables (ATL610 only) to customise the control functions. The limit and counter statuses, if enabled, are shown in the appropriate pages on the display.

CALENDAR CLOCK (ATL610)

Built-in calendar-clock with backup reserve power.

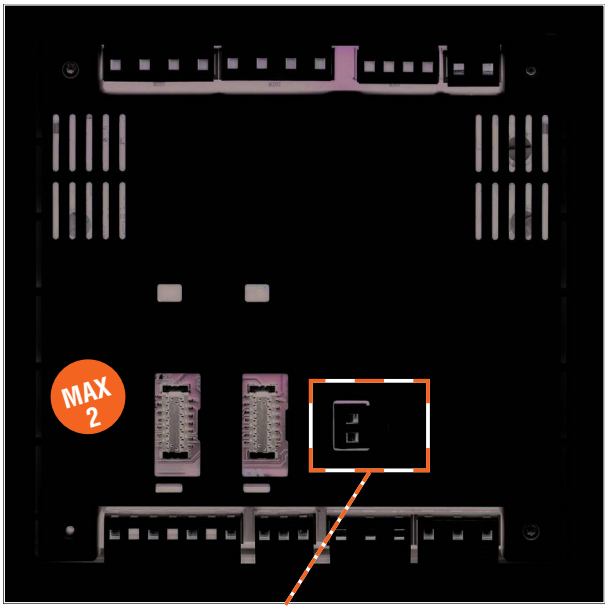
DUAL POWER SUPPLY (ATL610)

110...240VAC and 12/24VDC supply.

EXPANDABILITY (ATL610)

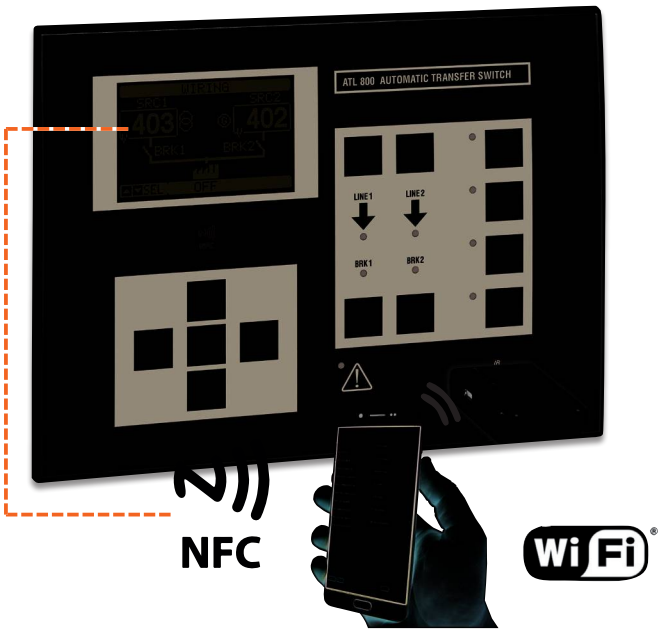
Basic functions of the transfer switch controllers can be easily extended using EXP series expansion modules:
- Relay outputs
- Digital and analogue inputs and outputs
- Opto-isolated RS232 interface
- Opto-isolated RS485 interface
- Opto-isolated Ethernet interface.

Using modules dedicated to communications the device can be controlled and supervised by the Synergy and Synergy Cloud softwares and controlled remotely and configured with the Xpress software.



12/24VDC battery supply input (only for ATL601 and ATL610)

VERSATILE CONFIGURATION



ATL800

- Management of 2 energy sources and 1 tie breaker.
- 6 preconfigured system layouts.
- Non-priority load management.
- Management of transition with brief parallel configuration.
- RS485 built-in.
- Built-in NFC technology for parameter settings with the NFC App.
- App and software: Synergy, Xpress, Sam1, NFC .



GRAPHIC LCD AND 8 LANGUAGE TEXT
The backlit graphic display simplifies the user interface and permits good visibility in environments with poor lighting.
For ATL800 and ATL900 the texts are available in 8 languages: English, Italian, French, Spanish, German, Portuguese, Polish and Russian.
The new interface allows the user to see, clearly and simply:
- System status
- Measurements
- Statistical data
- Threshold control
- Alarm pop-up windows.

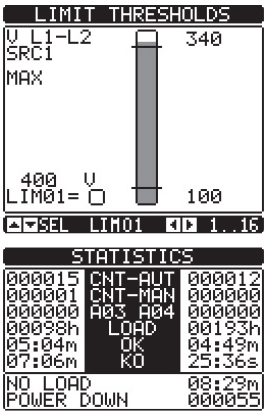


MAINTENANCE COUNTERS
Two counters can be used for scheduling maintenance on the transfer systems installed: the first for recording the operating time and the second for monitoring the number of switching operations. Exceeding the limit set on the counters activates the corresponding alarm.



INPUTS, OUTPUTS, INTERNAL VARIABLES, COUNTERS
The input and output functions are preconfigured with the most frequently used settings; the user can easily modify the predefined configuration and adapt the switch to their application requirements.
All the inputs and outputs can be configured. There are various types of programmable internal variables:
- Limit thresholds
- Remote control variables
- User alarms
- Programmable counters
- Timer.

The limit, counter and enabled timer statuses are available for display on dedicated pages.



HIGH PROTECTION RATING
The controller front and the frame seal have been designed to warrant an IP65 protection degree.

STATISTICS AND EVENTS
The statistical data recorded by the transfer switch controller is available to the user for analysing the performance of the switching system. A cyclical internal memory records up to 250 events, providing useful information on the history of the system controlled.

BUILT-IN CALENDAR CLOCK
A built-in calendar clock with backup reserve energy permits each event to be identified using the time and date on which it occurred.

BUILT-IN RS485 COMMUNICATION
Thanks to the built-in RS485 communication port, ATL800 and ATL900 are already set up for remote supervision and control.
In addition to this communication port, the user can install two further types of communication from those available in the EXP... expansion modules.

DUAL AC/DC SUPPLY
ATL switches can deal with all supply solutions demanded by the market. The best and safest solution is the simultaneous use of AC and DC supply. The switches can then be supplied by the AC line available and, during switching, in the absence of the AC line, the switch will be supplied by the battery via the DC inputs. Non-stop control!
AC supply ensures supply during system monitoring and DC supply guarantees constant supply during switching.

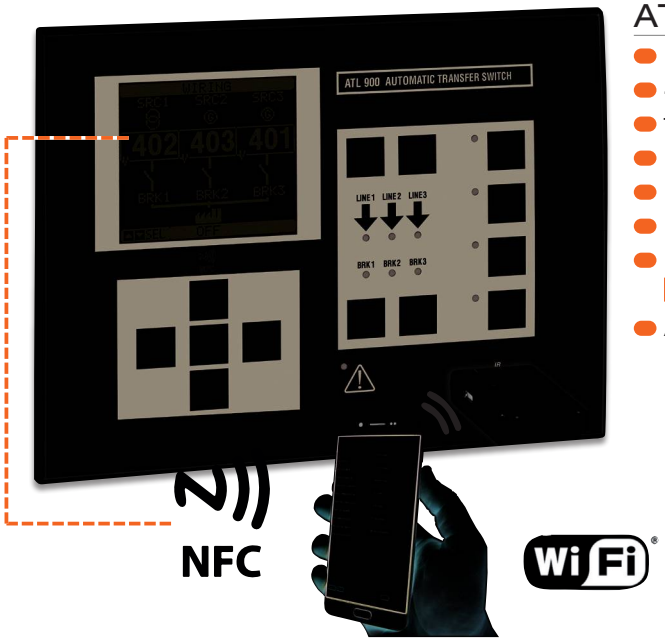
PROGRAMMABLE PLC LOGIC (ATL900 only)
With the built-in PLC functions, new switching logic can be defined through appropriate combinations of input, output and internal variable signals.

TIMER
8 timer variables are available for use in the system's PLC logic, in combination with the outputs or user alarms. Each timer variable has an input variable that controls it. When this variable changes state, so does the timer variable, but it remains in the new state only for the time specified then returns automatically to the starting condition.

NFC CONNECTION
Programming the parameters via tablet and smartphone is now possible also through NFC wireless technology.
Bringing a smartphone or tablet with NFC connection enabled close to the display of the ATL800-900 activates the NFC App LOVATO and the switch connected is recognised automatically. It will then be possible to modify the parameters and program the ATL.

USB AND WI-FI COMMUNICATION INTERFACES
ATL800 and ATL900 feature a front optical port for programming via optional USB (CX01) or Wi-Fi (CX02) communication interface.
Advantages:
- Not necessary to disconnect the supply from the panel to connect to the switch
- Electrical safety (no physical connection)
- Convenience of operating on the front.

FLEXIBILITY FOR EVERY REQUIREMENT



ATL900

- Management of 3 energy power sources and 2 tie breakers.
- 4 current inputs for the three-phases and neutral.
- 14 preconfigured system layouts.
- Non-priority load management.
- Management of transition with brief parallel configuration.
- RS485 built-in.
- Built-in NFC technology for parameter settings with the NFC App.
- App and software: Synergy, Xpress, Sam1, NFC .



WI-FI COMMUNICATION INTERFACE (VIA CX02)

This connection can be used to:
- Copy the parameters.
  All the parameters of the ATL can be saved in the CX02 memory and if necessary loaded back into the same device (backup function) or a new switch (replication of the configuration).
- Clone the device settings.
  In addition to copying the parameters, the current values of the statistical data, counters and events can be saved in the memory in order to completely replicate an ATL on another device of the same type or restore the ATL to a previously saved state.

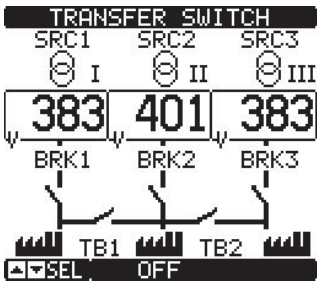
THREE TYPES OF TRANSITION AVAILABLE

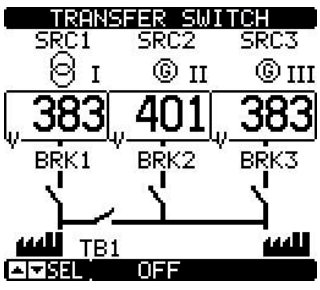
Open transition
The switch transfers the load between the two sources, interrupting the supply for a period of time that can be programmed by the user.

In-phase transition
The switch transfers the load between the two sources, interrupting the supply for a period of time that can be programmed. In this case the load is passed to a new source if spontaneous synchronisation is found;
the amplitude, phase and frequency of the two sources must not differ from the maximum value set.

Closed transition
With switches and external protections, configured appropriately, the two sources will be synchronised (where possible) or spontaneous synchronisation will be expected within a limit time. In presence of all synchronisation conditions the load will be transferred with closed transition and instantaneous parallel without interrupting supply.

ATL900: management of three sources and two tie breakers





A single transfer switch controller can be used to manage applications which in the past required several transfer switch controllers in a cascade connection.
24 system layouts are available.

4 current inputs
The current inputs permit the monitoring of the demand load and defining of the correct switching strategy. Knowing the power demanded by the system and the rated power of the sources, ATL900 can select the best source available that can supply the loads correctly.

EXPANDABILITY

ATL800 and ATL900 functionality can be extended thanks to the EXP... series expansion modules. Three expansion slots are available, and while the switch is restarting the modules are recognised and configured entirely automatically. The following EXP... modules are available:
- Digital I/O modules
- Analogue I/O modules
- USB, RS232, RS485, Ethernet and Profibus communication modules
- GPRS/GSM modem

Since the additional modules are shared with other LOVATO Electric products, it is possible to save in management costs, guaranteeing flexibility and ease of installation, above all when the system has already been commissioned.



EXP10...



Automatic transfer switch controllers
ATL series

						
	ATL100	**ATL500**	**ATL600 - ATL601**	**ATL610**	**ATL800**	**ATL900**
POWER SUPPLY						
Rated DC supply voltage	—	—	12/24VDC (ATL601)	12/24VDC	12/24/48VDC	12/24/48VDC
Rated AC supply voltage	110...230VAC	110...240VAC (self-powered)	110...240VAC (ATL600)	110...240VAC	110...240VAC	110...240VAC
Frequency	45...66Hz	45...66Hz	45...66Hz (ATL600)	45...66Hz	45...66Hz	45...66Hz
FRONT PANEL / HOUSING						
Backlit display	—	—	LCD graphic 128x80 pixel	LCD graphic 128x80 pixel	LCD graphic 128x80 pixel	LCD graphic 128x112 pixel
Languages	—	—	5	5	8	8
Size	Modular housing (3U)	144x144x52.2mm/ 5.67x5.67x2.05”	144x144x52.2mm/ 5.67x5.67x2.05”	144x144x52.2mm/ 5.67x5.67x2.05”	240x180x45mm/ 9.45x7.09x1.77”	240x180x45mm/ 9.45x7.09x1.77”
Degree of protection	IP40 on front / IP20 terminals	IP40 / optional IP65	IP40 / optional IP65	IP40 / optional IP65	IP65	IP65
Expandable with EXP... series modules	—	—	—	2 modules	3 modules	3 modules
VOLTAGE AND CURRENT MEASUREMENT INPUT						
Power sources that can be controlled	—	2	2	2	2	3
Voltage inputs per line	1 phase + neutral	3 phases + neutral	3 phases + neutral	3 phases + neutral	3 phases + neutral	3 phases + neutral
Rated voltage Ue	110...230VAC	110...240VAC L-N	480VAC	480VAC	600VAC	600VAC
Current inputs	—	—	—	—	—	4 (by 5A or 1A)
Frequency range	45...66Hz	45...66Hz	45...66Hz	45...66Hz	45...66Hz	45...66Hz
BUILT-IN DIGITAL INPUTS AND OUTPUTS						
Number of inputs	—	2	6	6	8	12
Number of outputs	3	3	7	7	7	11
Contact configuration	3 NO	2 NO + 1 changeover	6 NO + 1 changeover	6 NO + 1 changeover	4 NO + 3 changeover	6 NO + 4 changeover + 1 SSR
INTERFACE						
Programming with NFC technology	—	●	—	—	●	●
Front optical USB communication port	—	—	● with CX01	● with CX01	● with CX01	● with CX01
Front optical Wi-Fi communication port	—	—	● with CX02	● with CX02	● with CX02	● with CX02
USB communication	—	—	—	● EXP1010	● EXP1010	● EXP1010
RS232 communication	—	—	—	● EXP1011	● EXP1011	● EXP1011
RS485 communication	—	—	—	● EXP1012	● (built-in)	● (built-in)
Ethernet communication	—	—	—	● EXP1013	● EXP1013	● EXP1013
Profibus communication	—	—	—	● EXP1014	● EXP1014	● EXP1014
Communication via Modem	—	—	—	—	● EXP1015	● EXP1015
FUNCTIONS						
Number of tie breakers that can be managed	—	—	—	—	1	2
Programmable source type (utility or generation)	—	●	●	●	●	●
Closed transition	—	—	—	—	●	●
Non-priority load management	—	—	—	—	●	●
Switching management with power thresholds	—	—	—	—	—	●
PLC logic	—	—	—	—	●	●
Timers	—	—	—	—	●	●
System layout available on display	—	—	—	—	6	14
Custom system layouts	—	—	—	—	●	●
User alarms	—	—	●	●	●	●
Limits	—	—	●	●	●	●
Counters	—	—	●	●	●	●
Event logging	—	—	100	100	250	250
Real time clock with backup reserve energy	—	—	—	●	●	●
Acoustic alarms	—	—	—	—	●	●
Analogue inputs	—	—	—	—	● EXP1004	● EXP1004
Analogue outputs	—	—	—	—	● EXP1005	● EXP1005
Accessory for remote alarm status	—	—	—	—	—	● RGKRR

Non expandable modular



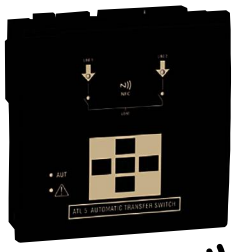
ATL100

Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL100	Automatic transfer switch controller for 2 power sources with single-phase control, modular housing, 110...230VAC supply	1	0.300

General characteristics ATL100
ATL100 is a single-phase automatic transfer switch controller in modular housing. It monitors 2 single-phase voltage inputs and it connects to the output the line that is within the limits. The priority line is the line 1. The 2 outputs can control contactors or motorized changeover switches to perform the transfer between the lines.

Operational characteristics ATL100
- Self-powered
- Input voltage range: 80...300VAC
- Frequency range: 45...66Hz
- 2 relay outputs with 1 NO contact 4A 250VAC
- 1 relay output with 1 NO contact 3A 250VAC.

Non expandable flush-mount



ATL500



Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL500	Automatic transfer switch controller with NFC technology and synoptic, for 2 power sources with three-phase control (144x144mm/5.7x5.7") self-seeking power supply 110...240VAC	1	0.580

General characteristics ATL500
ATL500 is an automatic transfer switch controller for the automatic or manual switching of the load from the MAIN LINE to a stand-by or emergency SECONDARY LINE and vice versa.
With the integrated outputs, it is possible to control contactors or motorised changeover switches.
The main features are:
- Self-seeking power supply from the two measurement inputs
- Measurement inputs for three-phase + neutral voltage values, also suitable for 1 and 2 phase lines
- Synoptic on front with LEDs for a simple and clear visualisation of the status of the lines and the changeover devices
- Parameter programming via NFC technology and LOVATO NFC App downloadable from Google Play Store and App Store. With LOVATO NFC App is possible to set: rated system parameters, line control settings, changeover settings, password and I/O functions
- Frontal keyboard for the selection of the operating mode and the manual command of the changeover devices
- 2 programmable digital inputs
- 3 programmable relay outputs
- Potentiometers on the back for the manual setting of the line presence delays or the tripping delays of the protection thresholds.

Operational characteristics ATL500
- Power supply:
  - Self-seeking power supply from the measurement inputs 110...240VAC L-N (range: 90...300VAC L-N)
- Voltage measurement inputs:
  - Rated voltage Ue: 110...240VAC L-N / 190...415VAC L-L
  - Measuring range: 90...300VAC L-N / 155...519VAC L-L
  - Frequency range: 45...66Hz
- Programmable digital inputs:
  - Negative inputs
- Programmable relay outputs:
  - 2 each with 1 normally open contact (NO - SPST) rated 8A 250VAC
  - 1 with 1 changeover contact (NO/NC - SPDT) rated 8A 250VAC
- Enclosure:
  - Flush-mount housing: 144x144mm/5.7x5.7"
  - IEC degree of protection: IP40 on front; IP65 with optional seal EXP8001; IP20 at rear.

Accessories

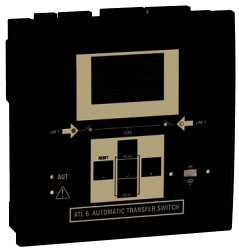


EXP8001

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8001	IP65 gasket seal for ATL500/600/601/610	1	0.009

Certifications and compliance
Certifications obtained: EAC, RCM (only for ATL500).
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

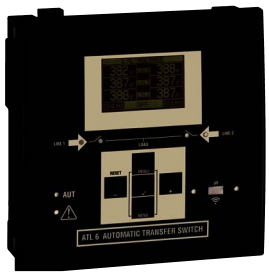
Non expandable



ATL600

Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL600	Automatic transfer switch controller with LCD display and optical port for 2 power sources with three-phase control (144x144mm/5.7x5.7"), 110...240VAC supply	1	0.600
ATL601	Automatic transfer switch controller with LCD display and optical port for 2 power sources with three-phase control (144x144mm/5.7x5.7"), 12...24VDC supply	1	0.600

Expandable with EXP... modules



ATL610

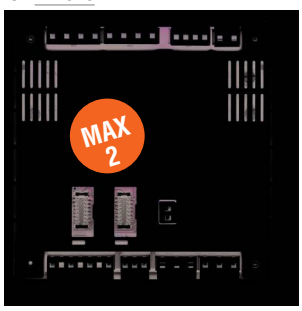
Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL610	Automatic transfer switch controller with LCD display and optical port for 2 power sources with three-phase control (144x144mm/5.7x5.7"), 110...240VAC and 12/24VDC, supply expandable with EXP... series modules	1	0.680



EXP10...

Order code	Description
EXPANSION MODULES FOR ATL610 Snap on fixing of two modules on ATL610 rear. Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs with changeover contact 5A 250VAC
EXP1006	2 relay outputs, normally open contact 5A 250VAC
EXP1007	3 relay outputs, normally open contact 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 5A relay outputs, normally open contact 250VAC
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated Ethernet interface
EXP1014	Opto-isolated Profibus-DP interface

EXP... expansion modules fixing on ATL610



Accessories



EXP8001



51C4

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8001	Protective seal IP65 for ATL500/600/601/610	1	0.150
For ATL610 - ATL800 - ATL900.			
51C2	Connection cable PC ↔ ATL610/800/900 with EXP1011, length 1.8m	1	0.090
51C4	Connection cable PC ↔ product RS232/RS485, length 1.8m	1	0.147

General characteristics ATL600 - ATL601 - ATL610
The automatic transfer switch controllers ATL600 / ATL601 / ATL610 are used for the automatic or manual switching of the load from the MAIN LINE to a stand-by or emergency SECONDARY LINE and vice versa. They have two outputs for the "automatic" and/or "manual" control of contactors or motorised circuit breakers and switches.
The main features are:
- Supply input:
  - Single in AC for ATL600
  - Single in DC for ATL601
  - Dual in AC and DC for ATL610
- Measurement inputs for three-phase + neutral voltage values; also suitable for 1 and 2 phase lines
- 128x80 pixel backlit graphic LCD to view measurements, events and alarms in 5 languages (English, Italian, French, Spanish and German)
- 2 status indication LEDs
- 6 programmable digital inputs
- 7 programmable relay outputs
- Viewing of L-L and L-N voltage values of the controlled lines
- Status viewing of contactor or motorised circuit breakers and switches
- Configuration programming of lines, control and supervision parameters for emergency demand of generating set
- Event logging
- Microprocessor supervision of functions; including virtual real time clock for ATL610
- Communication interface by front optical port with CX01 or CX02 dongle using USB or Wi-Fi
- Compatible with Synergy, supervision and energy management software, Xpress remote control and configuration software and with the Sam1 application for Android/iOS
- Modbus-RTU, ASCII and TCP communication protocol.

CONTROL FUNCTIONS OF THE LINES
- Phase sequence and phase loss
- Minimum and maximum voltage
- Voltage asymmetry
- Minimum and maximum frequency.

Operational characteristics ATL600 - ATL601 - ATL610
- Power supply:
  - Power supply voltage: 110...240VAC (ATL600); 12/24VDC (ATL601); 12/24VDC - 110...240VAC (ATL610)
- Voltage measurement inputs:
  - Rated voltage Ue: 100...480VAC (L-L)
  - Measuring range: 50...576VAC (L-L)
  - Frequency range: 45...66Hz
- Programmable digital inputs:
  - Negative inputs
- Programmable relay outputs:
  - 6 each with 1 normally open contact (NO - SPST) rated 8A 250VAC
  - 1 with changeover contact (NO/NC - SPDT) rated 8A 250VAC
- Enclosure:
  - Flush-mount housing: 144x144mm/5.7x5.7"
  - IEC degree of protection: IP40 on front; IP65 with optional seal EXP8001; IP20 at rear.

Synergy, Synergy Cloud, Xpress, Sam1 software and App
See section 36.

EXP expansion modules
See page 35-2.

Certifications and compliance
Certifications obtained: cULus, RCM, LOVAG (only for ATL600 - ATL610), EAC.
Compliant with standards: IEC/EN/BS 61000-6-3 (only for ATL601), IEC/EN/BS 61000-6-4 (only for ATL600 - ATL610), IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

Expandable with EXP... modules



ATL800



Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL800	Automatic transfer switch controller (240x180mm/ 9.45"-7.09") with LCD display, optical port and NFC for 2 lines control and 1 tie breaker, 110...240VAC supply and 12/24/48VDC, expandable with EXP... series modules	1	1.000



EXP10...

Order code	Description
EXPANSION MODULES. Snap on fixing of three modules on rear of ATL800. Digital inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs 5A 250VAC, changeover contact
EXP1006	2 relay outputs, normally open contact 5A 250VAC
EXP1007	3 relay outputs, normally open contact 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 5A relay outputs, normally open contact 250VAC
Analogue inputs and outputs.	
EXP1004	2 opto-isolated analogue inputs 0/4...20mA or PT100 or 0...10V or 0...+-5V
EXP1005	2 opto-isolated analogue outputs 0/4...20mA or 0...10V or 0...+-5V
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated Ethernet interface
EXP1014	Opto-isolated Profibus-DP interface
EXP1015	GPRS/GSM modem

EXP... expansion module fixing on ATL800



Accessories



51C4

Order code	Description	Qty per pkg	Wt
		n°	[kg]
51C2	Connection cable PC ↔ ATL610/800/900 with EXP1011, length 1.8m	1	0.090
51C4	Connection cable PC ↔ product RS232/RS485, length 1.8m	1	0.147

General characteristics
The automatic transfer switch controller ATL800 is used for the automatic or manual switching of the load between two lines in accordance with the selected switching logic.
It has outputs for the "automatic" and/or "manual" control of contactors or motorised circuit breakers and switches.
It can also manage a third control device as tie breaker or non-priority load management. The layout and system status are displayed directly on the graphic LCD.
The main features are:
- AC and DC supply inputs
- Measurement inputs for three-phase + neutral voltage values; also suitable for 1 and 2 phase lines
- 128x80 pixel backlit graphic LCD to view measurements, events and alarms in 8 languages (English, Italian, French, Spanish, German, Portuguese, Polish and Russian)
- Active operating mode indicator LED
- Viewing of L-L and L-N voltage values of the controlled lines
- Viewing the status of contactors or motorised circuit breakers both via display and LED
- 6 system layouts available
- Management of a tie breaker
- 8 programmable digital inputs
- 7 programmable relay outputs
- Viewing of L-L and L-N voltage values of the controlled lines
- Configuration programming of lines, type of source (line/generator), control and supervision parameters for emergency demand of generating set
- Possibility of transferring load with closed transition and spontaneous or controlled genset synchronisation
- Non-priority load management
- Built-in programmable PLC logic
- Built-in RS485 communication
- Event logging
- Virtual calendar clock (RTC)
- Communication interface by front optical port with CX01 or CX02 dongle using USB or Wi-Fi
- Parameter programming via NFC technology and the App NFC downloadable from Google Play Store and App Store
- Compatible with Synergy, supervision and energy management software, Xpress remote control and configuration software and with the Sam1 application for Android/iOS
- Modbus-RTU, ASCII and TCP communication protocol.

CONTROL FUNCTIONS OF THE LINES
- Phase sequence and phase loss
- Minimum and maximum voltage
- Voltage asymmetry
- Minimum and maximum frequency.

Operational characteristics
- Power supply:
  - Power supply voltage: 100...240VAC; 12/24/48VDC
- Voltage measurement inputs:
  - Rated voltage Ue: 100...600VAC (L-L)
  - Frequency range: 45...66Hz
- Programmable digital inputs:
  - Negative inputs
- Programmable relay outputs:
  - 2 each with 1 normally open contact (NO - SPST) rated 12A 250VAC
  - 2 each with 1 normally open contact (NO - SPST) rated 8A 250VAC
  - 3 each with 1 changeover contact (NO/NC - SPDT) rated 8A 250VAC
- Enclosure:
  - Flush-mount housing: 180x240mm/7.09x9.45"
  - IEC degree of protection: IP65 on front; IP20 at back.

Synergy, Synergy Cloud, Xpress, Sam1 and NFC software and App
See section 36.

EXP expansion modules
See page 35-2.

Certifications and compliance
Certifications obtained: cULus, EAC, RCM, LOVAG.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, UL508 and CSA C22.2 n° 14.

Expandable with EXP... modules



ATL900



Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL900	Automatic transfer switch controller (240x180mm/ 9.45"-7.09") with LCD display, optical port and NFC for 3 lines control and 2 tie breakers, 110...240VAC supply and 12/24/48VDC, expandable with EXP... series modules	1	1.800



EXP10...

Order code	Description
EXPANSION MODULES. Snap on fixing of three modules on rear of ATL900. Digital inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs 5A 250VAC, changeover contact
EXP1006	2 relay outputs, normally open contact 5A 250VAC
EXP1007	3 relay outputs, normally open contact 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 5A relay outputs, normally open contact 250VAC
Analogue inputs and outputs.	
EXP1004	2 opto-isolated analogue inputs 0/4...20mA or PT100 or 0...10V or 0...+-5V
EXP1005	2 opto-isolated analogue outputs 0/4...20mA or 0...10V or 0...+-5V
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated Ethernet interface
EXP1014	Opto-isolated Profibus-DP interface
EXP1015	GPRS/GSM modem

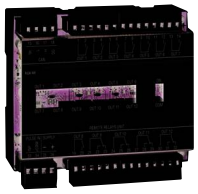
EXP... expansion module fixing on ATL900



Accessories



51C4



RGKRR

Order code	Description	Qty per pkg	Wt
		n°	[kg]
51C2	Connection cable PC ↔ ATL610/800/900 with EXP1011, length 1.8m	1	0.090
51C4	Connection cable PC ↔ product RS232/RS485, length 1.8m	1	0.147
RGKRR	Remote unit for status and alarms, 12/24 VDC, 12 relay outputs, pulse input	1	0.420

RGKRR is an expansion unit for remote status and alarms.
RGKRR can be connected at a maximum distance of 1000m/39.37" using the static output of the ATL900.
RGK RR has 12 output relays, 7 normally open (2.5A 250VAC/C38) and 5 changeover contacts (5A 250VAC/B300).

General characteristics
The automatic transfer switch controller ATL900 is used for the automatic or manual switching of the load between three lines in accordance with the selected switching logic.
It has outputs for the "automatic" and/or "manual" control of contactors or motorised circuit breakers and switches.
It can also manage two more control devices as tie breakers or non-priority load management. It has four current inputs for managing switching with power thresholds. The layout and system status are displayed directly on the graphic LCD.
The main features are:
- AC and DC supply inputs
- Measurement inputs for three-phase + neutral voltage values; also suitable for 1 and 2 phase lines
- 4 current measurement inputs
- 128x112 pixel backlit graphic LCD to view measurements, events and alarms in 8 languages (English, Italian, French, Spanish, German, Portuguese, Polish and Russian)
- Active operating mode indicator LED
- Viewing of L-L and L-N voltage values of the controlled lines
- Viewing the status of contactors or motorised circuit breakers both via display and LED
- 6 system layouts available
- Management of a tie breaker
- 12 programmable digital inputs
- 10 programmable relay outputs
- 1 static output
- Viewing of L-L and L-N voltage values of the controlled lines
- Configuration programming of lines, type of source (line/generator), control and supervision parameters for emergency demand of generating set
- Possibility of transferring load with closed transition and spontaneous or controlled genset synchronisation
- Non-priority load management
- Built-in programmable PLC logic
- Built-in RS485 communication
- Event logging
- Virtual calendar clock (RTC)
- Communication interface by front optical port using USB CX01 or Wi-Fi CX02 dongle
- Parameter programming via NFC technology and the App NFC downloadable from Google Play Store and App Store
- Compatible with Synergy, supervision and energy management software, Xpress remote control and configuration software and with the Sam1 application for Android/iOS
- Modbus-RTU ASCII and TCP communication protocol.

CONTROL FUNCTIONS OF THE LINES
- Phase sequence and phase loss
- Minimum and maximum voltage
- Voltage asymmetry
- Minimum and maximum frequency.

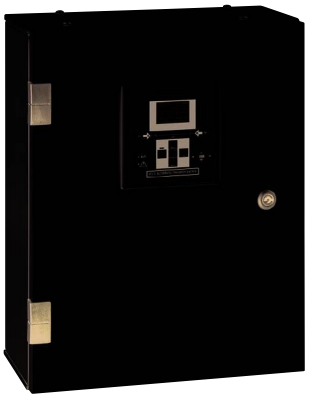
Operational characteristics
- Power supply:
  - Power supply voltage: 100...240VAC; 12/24/48VDC
- Voltage measurement inputs:
  - Rated voltage Ue: 100...600VAC (L-L)
  - Frequency range: 45...665Hz
- Programmable digital inputs:
  - Negative inputs
- Programmable relay outputs:
  - 3 each with 1 normally open contact (NO - SPST) rated 12A 250VAC
  - 3 each with 1 normally open contact (NO - SPST) rated 8A 250VAC
  - 4 each with 1 changeover contact (NO/NC - SPDT) rated 8A 250VAC
  - 1 30VDC 50mA static output
- Enclosure:
  - Flush-mount housing: 180x240mm/5.7x5.7"
  - IEC degree of protection: IP65 on front; IP20 at back.

Synergy, Synergy Cloud, Xpress, Sam1 and NFC software and App
See section 36.

EXP expansion modules
See page 35-2.

Certifications and compliance
Certifications obtained: cULus, EAC, RCM, LOVAG.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, UL508 and CSA C22.2 n° 14.

ATS with ATL600 automatic transfer switch controller type and contactors



ATP...

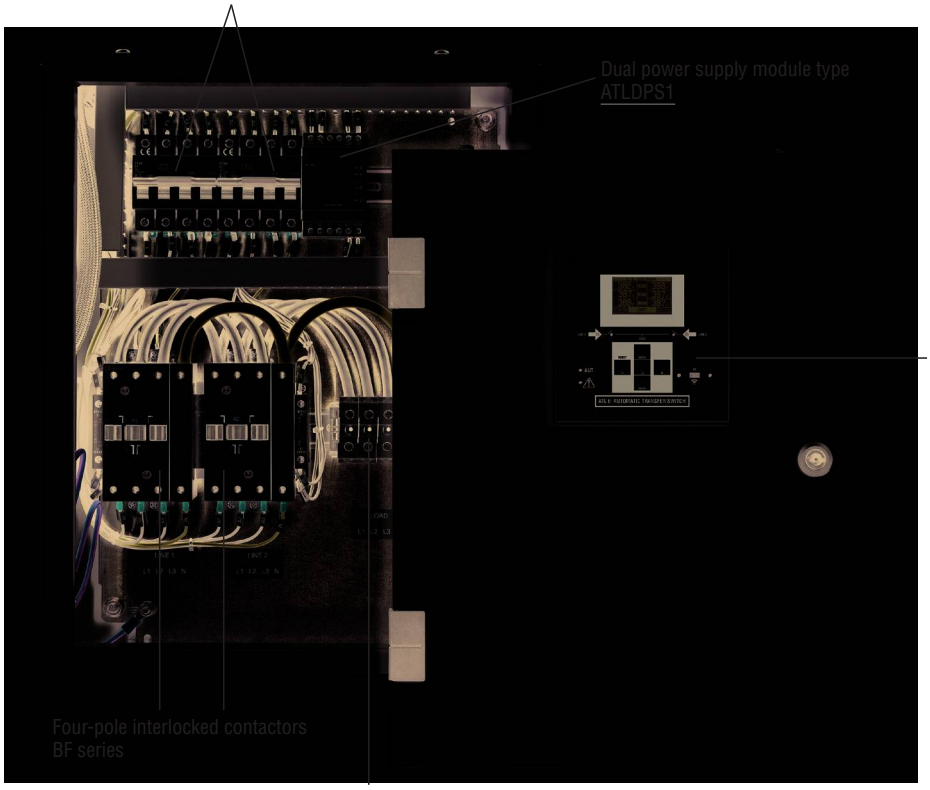
Order code	Operating current AC1	Power (400V)	Dimensions
	[A]	[kVA]	[mm]
Auxiliary supply 230VAC, with four-pole contactors versions.			
ATP0045T4A230C600A	45	31	500x400x200 (19.68x15.75x7.87")
ATP0060T4A230C600A	60	42	500x400x200 (19.68x15.75x7.87")
ATP0080T4A230C600A	80	55	500x400x200 (19.68x15.75x7.87")
ATP0100T4A230C600A	100	69	500x400x200 (19.68x15.75x7.87")
ATP0125T4A230C600A	125	87	600x400x250 (23.62x15.75x9.84")
ATP0160T4A230C600A	160	111	600x400x250 (23.62x15.75x9.84")

General characteristics
The enclosed automatic transfer switches ATP series are supplied in a IP65 metallic enclosure, complete with automatic transfer switch controller type ATL600, four-pole contactors BF series, dual power supply module type ATLDPS1 and miniature circuit breakers (MCB) type P1MB for the protection of the measuring lines.
They are used for the automatic or manual switching of the load between two lines ("MAIN LINE" and "SECONDARY LINE").
They are available in versions from 45 to 160A in four-pole configuration.

CONTROL FUNCTIONS OF THE LINES
– Phase sequence and phase loss
– Minimum and maximum voltage
– Voltage asymmetry
– Minimum and maximum frequency

Operational characteristics
– Power supply:
  • Auxiliary supply voltage: 230VAC (taken from the input lines)
– Voltage measurement inputs:
  • Rated voltage Ue: 100...480VAC (L-L)
  • Measuring range: 50...576VAC (L-L)
  • Frequency range: 45...66Hz
– 6 programmable digital inputs
– 7 programmable relay outputs:
  • 6 each with 1 normally open contact (NO-SPST) rated 8A 250VAC
  • 1 with 1 changeover contact (NO/NC – SPDT) rated 8A 250VAC
– Enclosure:
  • Metallic enclosure
  • Flanges for cable entries in the top and bottom sides
  • PVC locking system with double-comb tool insert
  • Opening with left hinges
  • IEC degree of protection: IP65.

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 61439-2.



Dual power supply module

Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATLDPS1	For controlling and selecting supply for motorised circuit breakers and changeover switches 110...230VAC configurable	1	0.300



ATLDPS1

	110VAC		230VAC	
	MIN	MAX	MIN	MAX
Line absent	< 88V	> 152V	< 176V	> 288V
Line present	> 92V	< 144V	> 185V	< 273V

Using the thresholds above ATLDPS1 outputs one of the power supplies available according to the logic shown in the table:

Status Line 1	LED Line 1	Status Line 2	LED Line 2	Output	LED Output	ATLDPS1	Alarm contact	LED Fault
OK	ON	<MIN OR >MAX	OFF	ON - from line 1	ON	ON - OK	Closed	OFF
OK	ON	OK	ON	ON - from line 1	ON	ON - OK	Closed	OFF
<MIN OR >MAX	OFF	OK	ON	ON - from line 2	ON	ON - OK	Closed	OFF
<MIN	OFF	<MIN	OFF	OFF	OFF	OFF	Open	OFF
>MAX	OFF	<MIN OR >MAX	OFF	OFF	OFF	ON	Open	ON
<MIN OR >MAX	OFF	>MAX	OFF	OFF	OFF	ON	Open	ON
>MIN	ON	OK	ON	OFF	OFF	ON - Fault Internal relays	Open	ON
		<MIN OR >MAX	OFF					
OK	ON	>MIN	ON	OFF	OFF	ON - Fault Internal relays	Open	ON
<MIN O >MAX	OFF							

General characteristics

ATLDPS1 is capable of measuring and controlling voltages at its inputs selecting the most ideal to connect to the output. It is suitable to supply motorised circuit breakers and changeover switches in automatic switching systems of 2 three-phase supply lines.
The two voltage inputs of the module are independent and insulated; each is capable of supplying the internal measuring circuit managed by the microcontroller.
It reduces the number of components and improves installation safety.
Main ATLDPS1 features include:
- Voltage value selectable via bypass terminals
- Minimum and maximum voltage tripping thresholds
- 2 single-phase L+N inputs
- 1 single-phase L+N output
- L1 priority line
- Use with motorised control units powered at 110VAC or 230VAC
- Output voltage monitoring
- Internal relay self-diagnosis
- Indicating LEDs for abnormal conditions and status of inputs and outputs.

Operational characteristics
- Rated supply voltage: 110...230VAC configurable
- Frequency: 50/60Hz
- Input voltage range: 80...300VAC
- Voltage tripping thresholds min / max: 80% and 120% of preset value
- 2 line inputs L1-L2: Single-phase, between phase and neutral
- Current output: 4A max.
- Priority line: L1 when both input values are within limits
- Fixed delay time between line switching: 0.5s
- 4 status indication LEDs for voltage of each line within limits, voltage present at output, relay output anomaly
- Mounting: 35mm DIN rail (IEC/EN/BS 60715) or screw-type by means of removable clips
- Modular housing, 3 module
- IEC degree of protection: IP40 on front; IP20 at rear.

Certifications and compliance

Certifications obtained: cULus, EAC, RCM, LOVAG.
Compliant with standards: IEC/EN/BS 61010-2-030, IEC/EN/BS 61010-2, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, UL508 and C22.2 n° 14.

Communication devices


CX01


CX02


CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC↔ATL600/610/800/900 with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi connection dongle PC↔ATL600/610/800/900 for data download, diagnostics and firmware upgrade, project upload/ download and cloning	1	0.090
CX03	GSM penta-band antenna (850/900/1800/1900/2100MHz)	1	0.090

General characteristics
For general characteristics of these accessories see section 35.

Gateway data loggers


EXCGLB...

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

General characteristics
For general characteristics of these accessories see section 34.

Gateway


EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

General characteristics
For general characteristics of these accessories see section 34.

Converter


EXCCON02

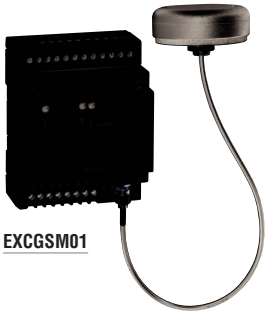
new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/ TCP protocol conversion functionality	1	0.400

General characteristics
For general characteristics of these accessories see section 34.

Remote control and monitoring GSM modem via SMS

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

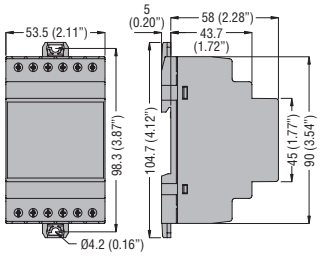

EXCGSM01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340

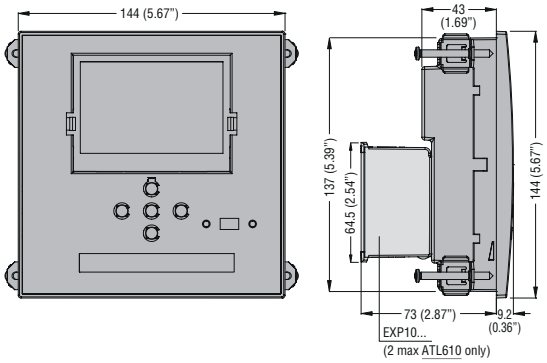
General characteristics
For general characteristics of these accessories see section 34.

AUTOMATIC TRANSFER SWITCH CONTROLLERS

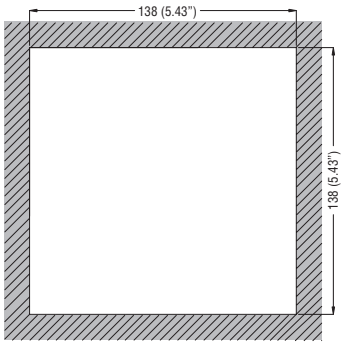
ATL100



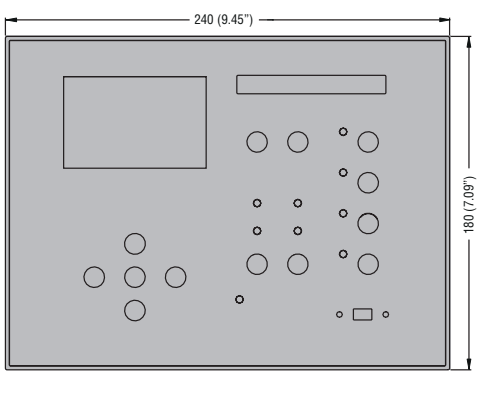
ATL500 - ATL600 - ATL601 - ATL610

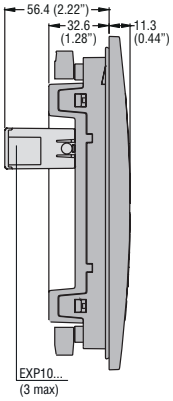


Cutout

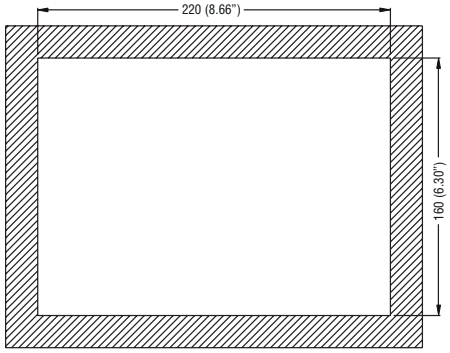


ATL800 - ATL900



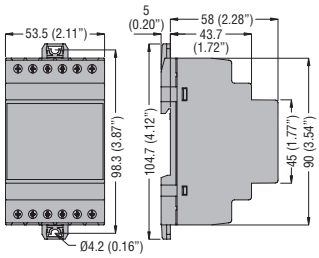


Cutout



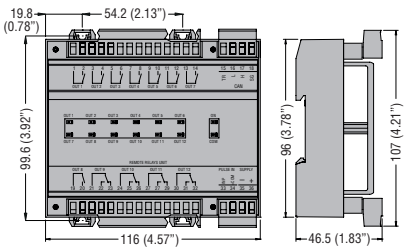
DUAL POWER SUPPLY MODULE

ATLDPS1



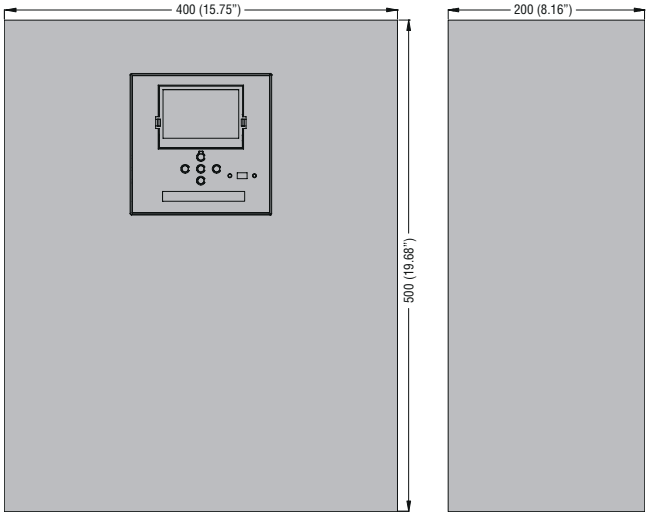
EXPANSION UNIT

RGKRR

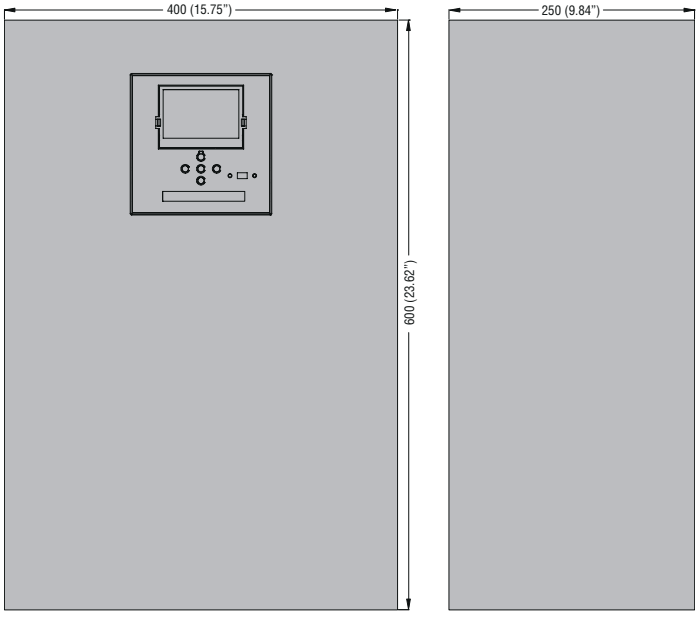


ENCLOSED AUTOMATIC TRANSFER SWITCHES ATS

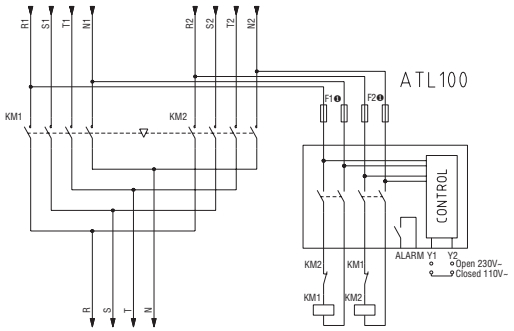
ATP0045... - ATP0060... - ATP0080... - ATP0100...

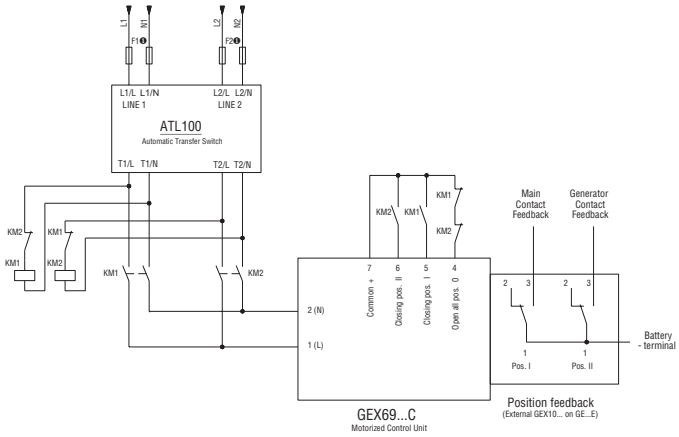


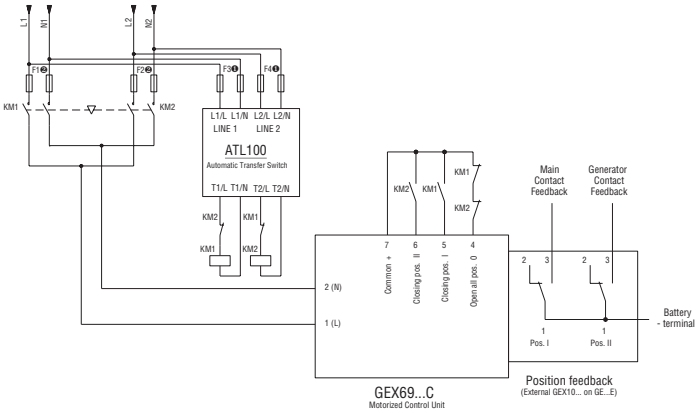
ATP0125... - ATP0160...



ATL100
Connection diagrams

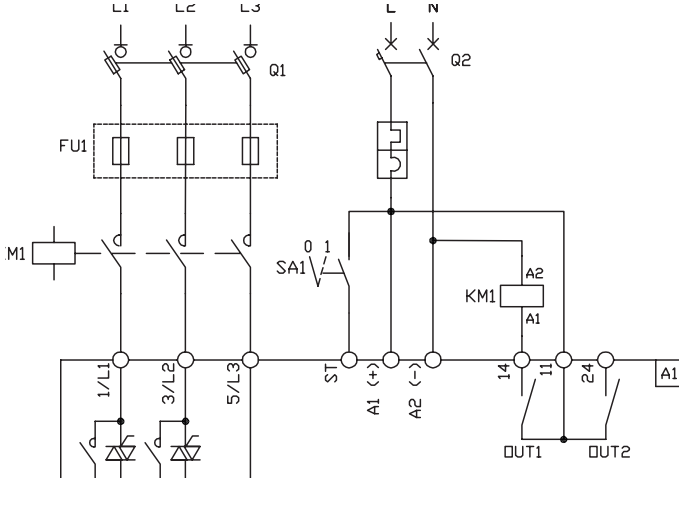




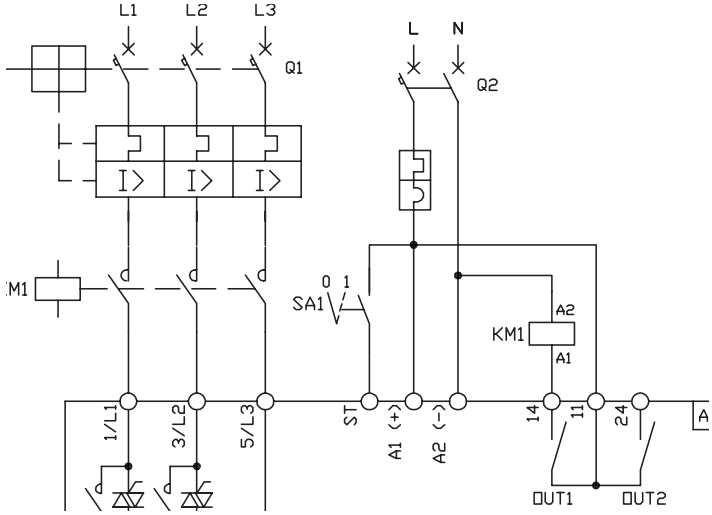


❶ 4A maximum fuses.
❷ 1A maximum fuses.

ATL500 ❸
Connection diagrams
Contactors control



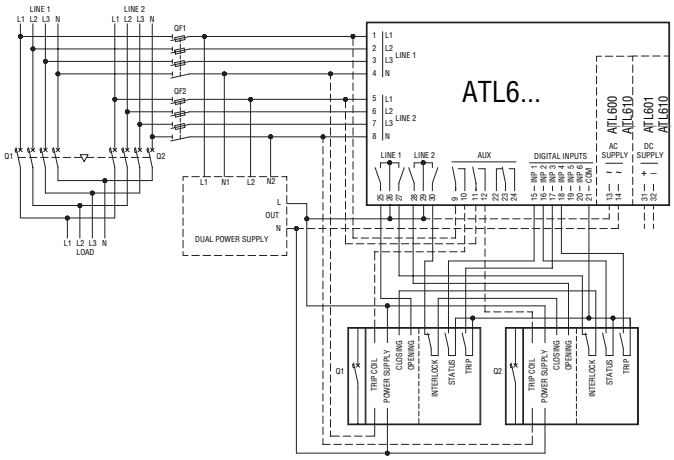
Connection diagrams
Motorised changeover switches control



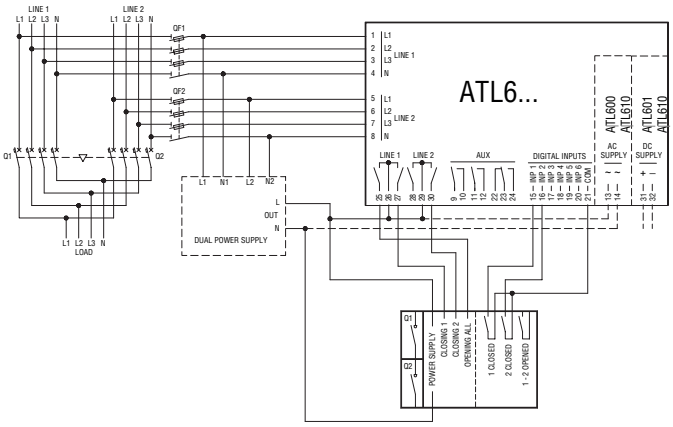
❸ For the correct programming of inputs and outputs, consult the installation manuals available at www.LovatoElectric.com.

ATL600 - ATL601 - ATL610 ❶

Connection diagrams
Motorised breaker control



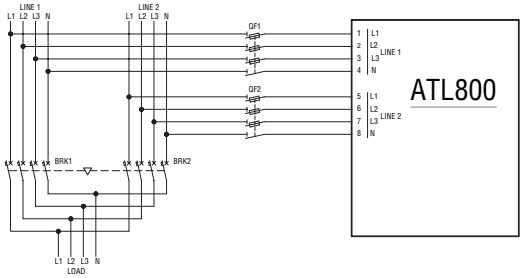
Connection diagrams
Motorised changeover switches control



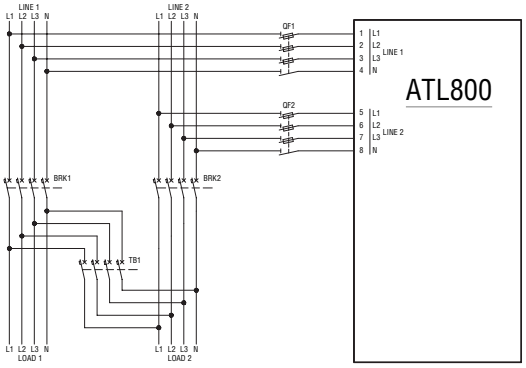
❶ For the correct programming of inputs and outputs, consult the installation manuals available at www.LovatoElectric.com.

ATL800 ❶

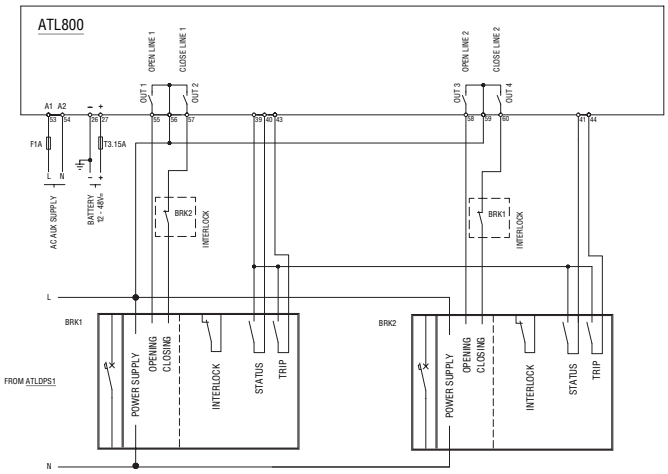
Power connection diagrams
Two breakers



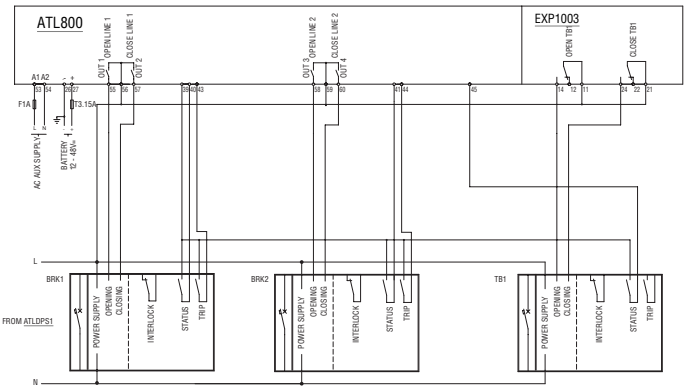
Power connection diagrams
Two breakers and a tie breaker



Control connection diagrams
Two breakers



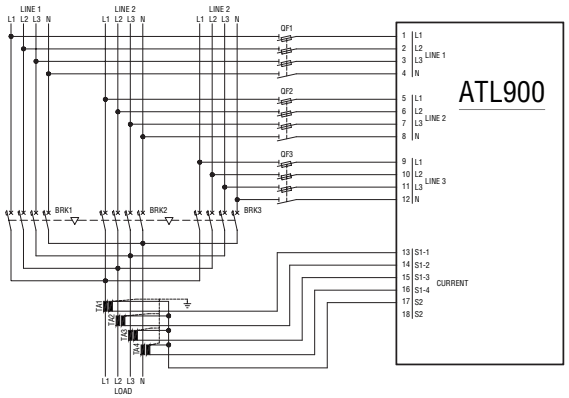
Control connection diagrams
Two breakers and a tie breaker



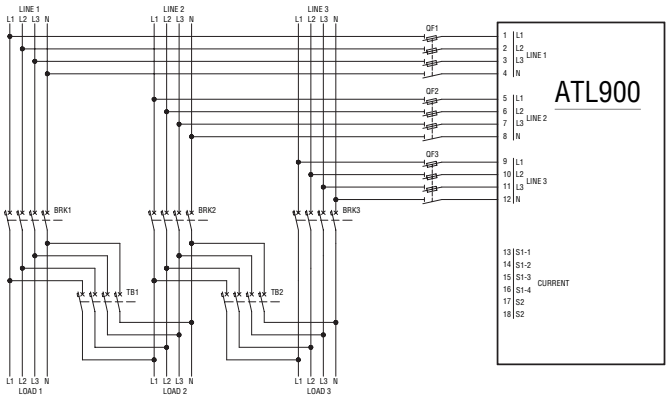
❶ For the correct programming of inputs and outputs, consult the installation manuals available at www.LovatoElectric.com.

ATL900 ❶

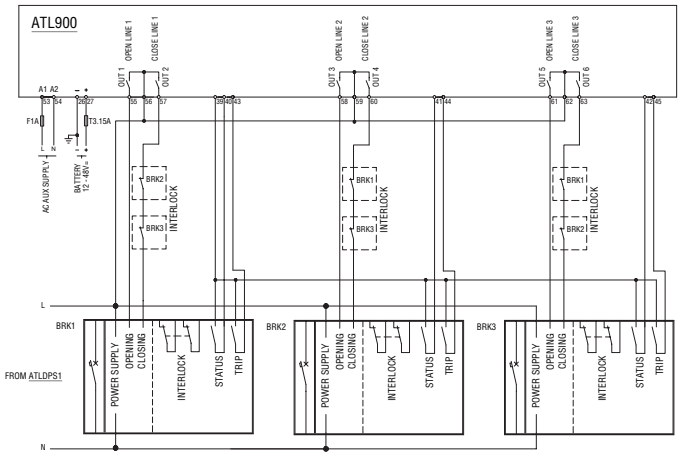
Power connection diagrams
Three breakers



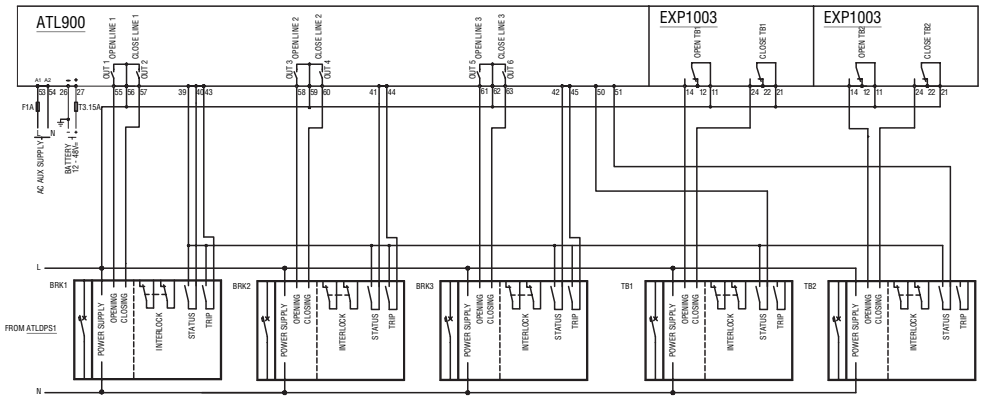
Power connection diagrams
Three breakers and two tie breakers



Control connection diagrams
Three breakers

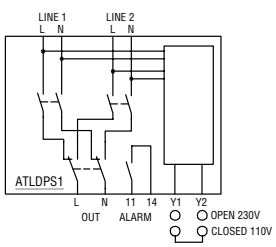


Control connection diagrams
Three breakers and two tie breakers



ATLDPS1 ❶

Connection diagram



❶ For the correct programming of inputs and outputs, consult the installation manuals available at www.LovatoElectric.com.

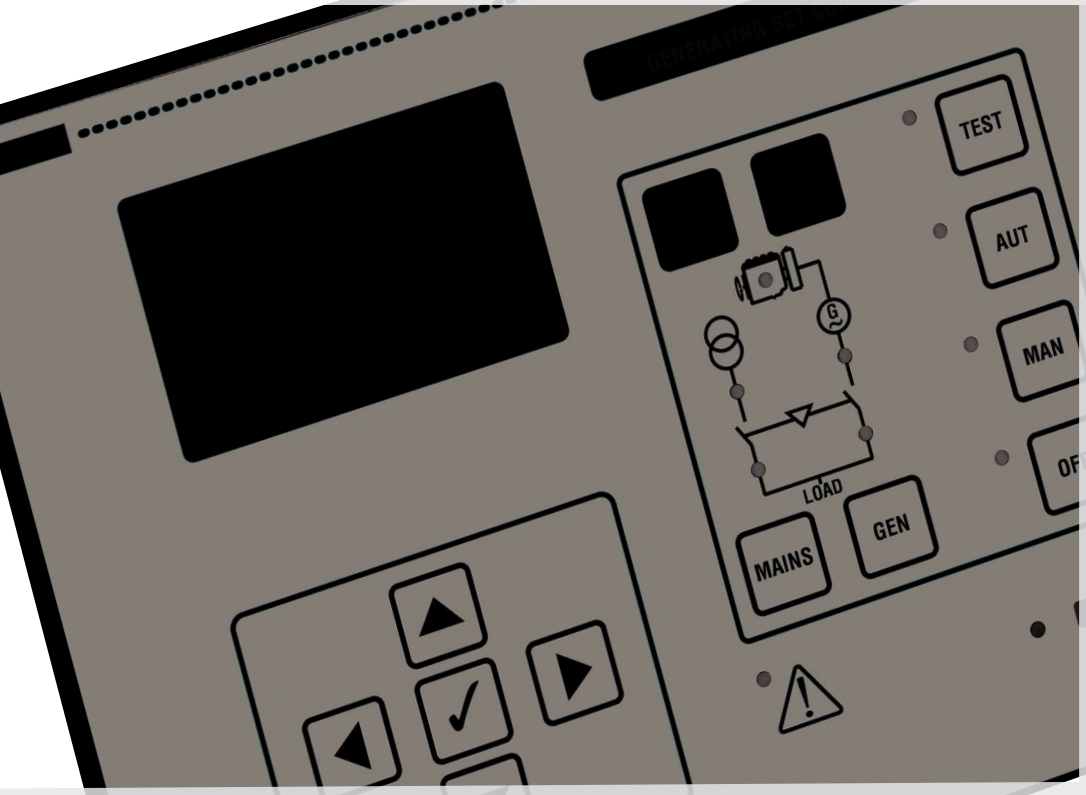
Automatic transfer switch controllers

Technical characteristics

TYPE	ATL100	ATL500	ATL600 - ATL601 - ATL610	ATL800	ATL900
AC POWER					
IEC rated supply voltage Us	110...230VAC	100...240VAC	100...240VAC (ATL600, ATL610)	100...240VAC	100...240VAC
Operating range	80...300VAC	90...300VAC	90...264VAC (ATL600, ATL610)	90...264VAC	90...264VAC
Frequency	45...66Hz	45...66Hz	45...66Hz	45...66Hz	45...66Hz
Immunity time for micro-breaking	—	≤200ms (110VAC) ≤400ms (220VAC)	≤50ms (110VAC) ≤250ms (220VAC)	≤40ms (110VAC) ≤200ms (220VAC)	≤40ms (110VAC) ≤200ms (220VAC)
Immunity time for micro-breaking (with EXP expansions)	—	—	≤25ms (110VAC) ≤120ms (220VAC)	≤20ms (110VAC) ≤100ms (220VAC)	≤20ms (110VAC) ≤100ms (220VAC)
DC POWER					
Rated battery voltage	—	—	12-24VDC (ATL601, ATL610)	12-24-48VDC	12-24-48VDC
Operating range	—	—	7.5...33VDC (ATL601, ATL610)	7.5...57.6VDC	7.5...57.6VDC
Maximum current consumption	—	—	230mA at 12VDC; 120mA at 24VDC	400mA at 12VAC; 220mA at 24VDC; 100mA at 48VDC	510mA at 12VAC; 260mA at 24VDC; 135mA at 48VDC
Maximum power consumption/dissipation	—	—	2.9W	4.8W	6.5W
VOLTMETER INPUTS					
Maximum rated voltage Ue	110...230VAC	415VAC L-L (240VAC L-N)	480VAC L-L (277VAC L-N)	600VAC L-L (346VAC L-N)	600VAC L-L (346VAC L-N)
Measuring range	80...300VAC	155...519VAC L-L (300VAC L-N)	50...576VAC L-L (333VAC L-N)	50...720VAC L-L (415VAC L-N)	50...720VAC L-L (415VAC L-N)
Frequency range	45...66Hz	45...66Hz	45...66Hz	45...66Hz	45...66Hz
Measurement method	True root mean square (TRMS)	True root mean square (TRMS)	True root mean square (TRMS)	True root mean square (TRMS)	True root mean square (TRMS)
Measuring input impedance	L-N >8MΩ	>0.5MΩ L-N, >1.0MΩ L-L	>0.5MΩ L-N, >1.0MΩ L-L	>0.55MΩ L-N, >1.10MΩ L-L	>0.55MΩ L-N, >1.10MΩ L-L
Wiring method	Single-phase and neutral	Single-phase, two-phase, three-phase line with neutral	Single-phase, two-phase, three-phase line with or without neutral		
AMMETER INPUTS					
Rated current Ie	—	—	—	—	1A~ or 5A~
Measuring range	—	—	—	—	for scale 5A: 0.02 - 6A~ for scale 1A: 0.02 - 1.2A~
Type of input	—	—	—	—	Shunt supplied by current transformer external (low voltage) 5A max.
Measurement type	—	—	—	—	True root mean square (TRMS)
Overload capacity	—	—	—	—	-20% Ie
Overload peak	—	—	—	—	50A for 1 second
Burden	—	—	—	—	<0.6VA
MEASUREMENT ACCURACY					
Mains and genset voltage	±0.25% f.s.	±0.25% f.s.	±0.25% f.s. ±1 digit	±0.25% f.s. ±1 digit	±0.25% f.s. ±1 digit
DIGITAL INPUTS					
Number of inputs	—	2	6	8	12
Type of input	—	Negative	Negative	Negative	Negative
Input current	—	≤5mA	<8mA	<8mA	<8mA
Low input signal	—	≤2.6V	≤2.2V	≤2.2V	≤2.2V
High input signal	—	≥3.1V	≥3.4V	≥3.4V	≥3.4V
Input signal delay	—	≥50ms	≥50ms	≥50ms	≥50ms
CALENDAR CLOCK					
Backup reserve power	—	—	Backup capacitor (ATL610)	Backup capacitor	Backup capacitor
Operation without power voltage	—	—	5 min approx. (ATL610)	14 days approx.	14 days approx.
RELAY OUTPUTS					
Number of outputs	3	3	7	7	10
Configuration	– 2NO: AC1 - 4A 250VAC; 1.5A 250V~ AC15 – 1NO: AC1 - 3A 250VAC; DC1 - 3A 30VDC	– 2NO: AC1 - 8A 250VAC; AC15 -1.5A 250VAC; – 1 changeover: AC1 - 8A 250VAC, DC1 - 8A 30VDC; AC15 - 1.5A 250VAC	– 6NO: AC1 - 8A 250VAC; AC15 -1.5A 250VAC; B300 – 1 changeover: AC1 - 8A 250VAC, DC1 - 8A 30VDC; AC15 - 1.5A 250VAC, B300 30VDC1A Auxiliary service	– 2NO: AC1 - 12A 250VAC; AC15 - 1.5A 250VAC; B300 – 2NO: AC1 - 8A 250VAC; AC15 - 1.5A 250VAC; B300 – 3 changeover: AC1 - 8A 250VAC, DC1 - 8A 30VDC; AC15 - 1.5A 250VAC; B300 30VDC 1A Auxiliary service	– 3NO: AC1 - 12A 250VAC; AC15 - 1.5A 250VAC; B300 – 3NO: AC1 - 8A 250VAC; AC15 - 1.5A 250VAC; B300 – 4 changeover: AC1 - 8A 250VAC, DC1 - 8A 30VDC; AC15 - 1.5A 250VAC; B300 30VDC 1A Auxiliary service
Mechanical / electrical endurance	$1x10^7$ / $1x10^5$ operations	$1x10^7$ / $1x10^5$ operations	$1x10^7$ / $1x10^5$ operations	$1x10^7$ / $1x10^5$ operations	$1x10^7$ / $1x10^5$ operations

TYPE	ATL100	ATL500	ATL600 - ATL601 - ATL610	ATL800	ATL900
STATIC OUTPUT					
Output type	—	—	—	—	NO
Operating voltage	—	—	—	—	10-30V
Maximum current	—	—	—	—	50mA
AMBIENT CONDITIONS					
Operating temperature	-30...+70°C				
Storage temperature	-30...+80°C				
Relative humidity	<80% (IEC/EN/BS 60068-2-78)				
Maximum pollution degree	2				
Overvoltage category	3				
Climatic sequence	III				
Climatic sequence	Z/ABDM (IEC/EN/BS 60068-2-61)				
Shock resistance	15g (IEC/EN/BS 60068-2-27)				
Vibration resistance	0.7g (IEC/EN/BS 60058-2-6)				
HOUSING					
Version	Modular housing 3 modules (DIN 43880)	Flush-mount			
Material	Polyamide RAL 7035	Polycarbonate			
IEC degree of protection	IP40 on front IP20 on terminals	IP40 on front IP65 with optional gasket IP20 on terminals		IP65 on front IP20 on terminals	
Weight	300g	580g	600g (ATL600 - ATL601) 680g (ATL610)	1000g	1090g
CERTIFICATIONS AND COMPLIANCE					
Certifications obtained	EAC	EAC, RCM	cULus, RCM (except ATL601), EAC, LOVAG (ATL610, ATL800, ATL900)		
Compliance with standards	IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1	IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1	IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61010-2, IEC/EN/BS 61000-6-2,IEC/EN/BS 61000-6-4, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, UL508 e CSA C22.2 n°14		

Engine and generator controllers



- Extensive selection of functions to satisfy all application requirements
- Power supply range 12-24VDC for each single product
- Totally programmable inputs, outputs and alarms
- RS232, RS485, USB, Ethernet communication interface
- Engine control by CANbus
- Setup and supervision software
- Modem control for sending alarm messages and emails.

Engine and generator controllers — SEC. - PAGE

Engine protection controllers ..... 32 - 6
Stand alone gen-set controllers ..... 32 - 7
Automatic mains failure (AMF) gen-set controllers ..... 32 - 8
Paralleling controllers for mains-generator and generator-generator ..... 32 - 9
Remote and alarm-status relay units ..... 32 - 10
Communication devices, gateway data loggers, gateway, converter, GSM modem ..... 32 - 11
Software ..... 32 - 12

Dimensions ..... **32 - 13**

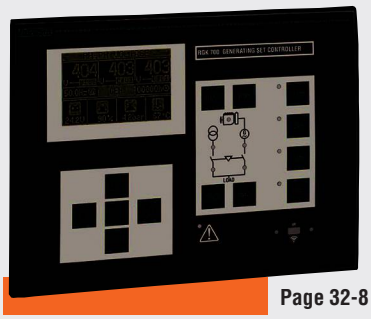




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STAND ALONE GEN-SET CONTROLLERS

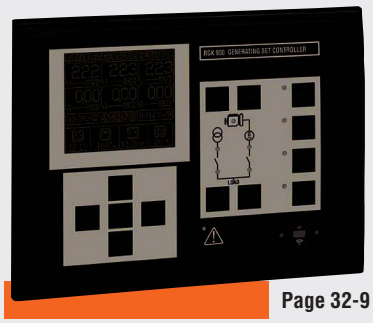
- Generator voltage and current control
- Engine protection
- Programmable inputs and outputs
- Programmable alarm properties.



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AUTOMATIC MAINS FAILURE (AMF) GEN-SET CONTROLLERS

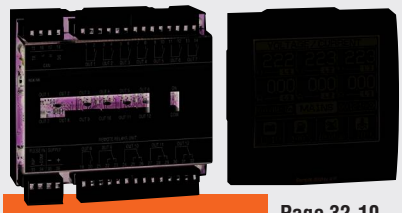
- Automatic starting of generator and load switching to stand-by emergency source in case of mains failure
- Management in “open transition” for contactors, motorised circuit breakers and motorised changeover switches
- Engine protection
- Programmable inputs, outputs and alarms.



Page 32-9

PARALLELING CONTROLLERS FOR MAINS-GENERATOR AND GENERATOR-GENERATOR

- Mains-generator synchronising “closed transition”
- Mains-generator load sharing with source peak demand control
- Generator paralleling management (island mode with load sharing).



Page 32-10

REMOTE UNITS

- Remote viewing and control panels
- Remote annunciator for alarm and status indication
- Digital outputs for alarm and status condition remotely.



Page 32-11

COMMUNICATION DEVICES, GATEWAYS AND SOFTWARE

- Communication interfaces
- Additional digital and analog inputs and outputs
- GPRS-GSM module
- Setup and supervision software
- APP.







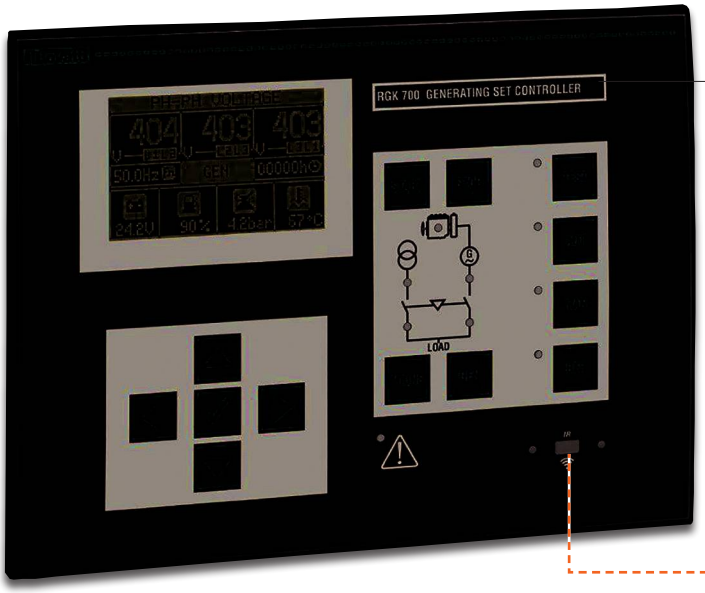
	STAND ALONE GEN-SET CONTROLLERS			
	RGK400SA RGK420SA	**RGK600SA RGK601SA**	**RGK700SA**	**RGK800SA**
Generator voltage control	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N
Current control	L1	L1-L2-L3	L1-L2-L3	L1-L2-L3-N
Rated frequency	50/60Hz	50/60Hz	50/60Hz	50/60/400Hz
Digital inputs n°	5 neg.+1 pos. (emergency)	4 neg.+1 pos. (emergency)	6 neg.+1 pos. (emergency)	8 neg.+1 pos. (emergency)
Digital outputs n°	5 (SSR)	6 (SSR)	3 (Relay) + 4 (SSR)	3 (Relay)+6 (SSR)+1(SO)
Engine running inputs	"D+", Hz	"D+", Hz	"D+", "AC", Hz	"D+", "AC", Hz
Ohmic inputs for fuel-pressure-temperature (programmable as digital inputs)	1+2 (EXP1040)	●	●	●
Remote supervision	–	–	●	●
CANbus interface	–	RGK601SA	●	●
Rated battery voltage	12/24VDC	12/24VDC	12/24VDC	12/24VDC
Power supply range	7...33VDC	7...33VDC	7...33VDC	7...33VDC
Mains voltage control	–	–	–	–
Rated voltage range	100...480VAC	100...480VAC	30...600VAC	30...600VAC
VT programming	●	●	●	●
Rated input current	5A/1A	5A/1A	5A/1A	5A/1A
TRMS voltage measurement	●	●	●	●
TRMS current measurement	●	●	●	●
Display	LCD with icons and backlight	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x80 pixels
Engine running magnetic pick-up input	●	RGK600SA	●	●
Engine speed input	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up" (RGK600SA)	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"
Auxiliary analog input	–	–	–	●
I/O expansion	1 x EXP1040	RGKRR	RGKRR	3 x EXP... + RGKRR
USB/Optical port on front	●	●	●	●
Wi-Fi port on front	●	●	●	●
USB port at rear	–	–	–	EXP1010
Ethernet port with Web server function	–	–	–	EXP1013
GPRS/GSM modem	–	–	–	EXP1015
RS232 serial port	–	–	●	EXP1011
RS485 serial port	–	–	–	●
Event logging	–	●	●	●
RTC (Real Time Clock)	–	–	–	●
Programmable Inputs/Outputs	●	●	●	●
PLC logic function	–	–	●	●
Alarms	●	●	●	●
User alarms n°	2	4	8	8
Alarm property customising	●	●	●	●
Texts for alarms, events and parameters	●	●	●	●
Multilanguage (type) n°	5 (GB - I - F - E - D)	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶
Upload languages	–	●	●	●
Load sharing	–	–	–	–
Generator paralleling	–	–	–	–
Mains-generator synchronising (closed transition)	–	–	–	–
IEC front degree of protection	IP40, IP65 with optional gasket seal❷	IP40, IP65 with optional gasket seal	IP65	IP65
Certifications	cULus, EAC	cULus, EAC	cULus, EAC	cULus, EAC

❶ Controller uploading of other mutilanguage sets.
❷ For RGK400SA only.



	AUTOMATIC MAINS FAILURE (AMF) GEN-SET CONTROLLERS				PARALLELING / LOAD SHARING CONTROLLERS	
	RGK600 RGK601 RGK610	**RGK700**	**RGK750**	**RGK800**	**RGK900**	**RGK900SA**
Generator voltage control	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N
Current control	L1-L2-L3	L1-L2-L3	L1-L2-L3	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N
Rated frequency	50/60Hz	50/60Hz	50/60Hz	50/60/400Hz	50/60/400Hz	50/60/400Hz
Digital inputs n°	4 neg.+1 pos. (emergency)	6 neg.+1 pos. (emergency)	8 neg.+1 pos. (emergency)	8 neg.+1 pos. (emergency)	12 neg.+1 pos. (emergency)	12 neg.+1 pos. (emergency)
Digital outputs n°	6 (SSR)	3 (Relay) + 4 (SSR)	3 (Relay) + 6 (SSR) + 1(SO)	3 (Relay) + 6 (SSR) + 1(SO)	3 (Relay) + 6 (SSR) + 1(SO)	3 (Relay) + 6 (SSR) + 1(SO)
Engine running inputs	"D+", Hz	"D+", "AC", Hz	"D+", "AC", Hz	"D+", "AC", Hz	"D+", "AC", Hz	"D+", "AC", Hz
Ohmic inputs for fuel-pressure-temperature	●	●	●	●	●	●
Remote supervision	RGK610	●	●	●	●	●
CANbus interface	RGK601	●	●	●	●	●
Rated battery voltage	12/24VDC	12/24VDC	12/24VDC	12/24VDC	12/24VDC	12/24VDC
Power supply range	7...33VDC	7...33VDC	7...33VDC	7...33VDC	7...36VDC	7...36VDC
Mains voltage control	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	–
Rated voltage range	100...480VAC	30...600VAC	100...480VAC	30...600VAC	30...600VAC	30...600VAC
VT programming	●	●	●	●	●	●
Rated input current	5A/1A	5A/1A	5A/1A	5A/1A	5A/1A	5A/1A
TRMS voltage measurement	●	●	●	●	●	●
TRMS current measurement	●	●	●	●	●	●
Display	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x112 pixels	Graphic backlight LCD, 128x112 pixels
Engine running magnetic pick-up input	RGK600/RGK610	●	●	●	●	●
Engine speed input	"W"/"Pick-up" (RGK600/RGK610) or generator frequency	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"
Auxiliary analog input	–	–	●	●	●	●
I/O expansion	1 x EXP... + RGKRR	RGKRR	2 x EXP... + RGKRR	3 x EXP... + RGKRR	4 x EXP... + RGKRR	4 x EXP... + RGKRR
USB/Optical port on front	●	●	●	●	●	●
Wi-Fi port on front	●	●	●	●	●	●
USB port at rear	EXP1010 (RGK610)	–	EXP1010	EXP1010	EXP1010	EXP1010
Ethernet port with Web server function	–	–	EXP1013	EXP1013	EXP1013	EXP1013
GPRS/GSM modem	–	–	EXP1015	EXP1015	EXP1015	EXP1015
RS232 serial port	EXP1011 (RGK610)	●	EXP1011	EXP1011	EXP1011	EXP1011
RS485 serial port	EXP1012 (RGK610)	–	EXP1012	●	●	●
Event logging	●	●	●	●	●	●
RTC (Real Time Clock)	–	–	●	●	●	●
Programmable Inputs/Outputs	●	●	●	●	●	●
PLC logic function	–	●	●	●	●	●
Alarms	●	●	●	●	●	●
User alarms n°	4	8	8	8	16	16
Alarm property customising	●	●	●	●	●	●
Texts for alarms, events and parameters	●	●	●	●	●	●
Multilanguage (type) n°	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶
Upload languages	–	●	●	●	●	●
Load sharing	–	–	–	–	●	●
Generator paralleling	–	–	–	–	–	
Mains-generator synchronising (closed transition)	–	–	–	–	●	–
IEC front degree of protection	IP40, IP65 with optional gasket seal	IP65	IP65	IP65	IP65	IP65
Certifications	cULus, EAC	cULus, EAC		cULus, EAC	cULus, EAC	cULus, EAC

A SUPERIOR CLASS!

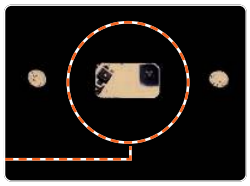


CUSTOMISING OPTION

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

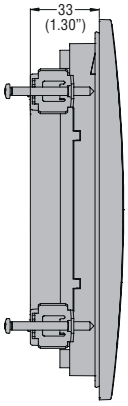
PROGRAMMING OPTICAL PORT

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



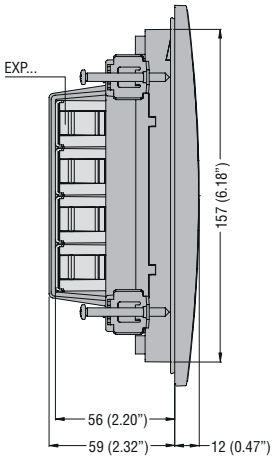


COMPACT SIZE



RGK700
RGK800
RGK900

Slim frame profile and reduced total depth simplify installation of the controllers in very compact electric panels.



RGK800
RGK900

IP65 DEGREE OF PROTECTION

The controller front and the internal display frame seal have been designed to warrant an **IP65** protection degree. This with the **UV film** also allow outdoor installation.



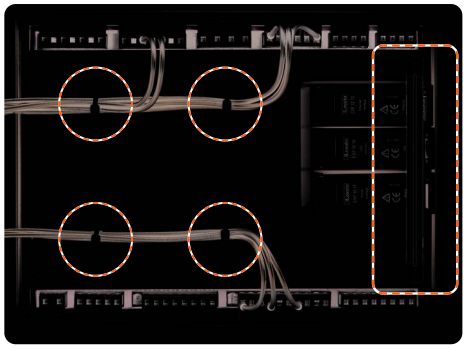
INSTALLATION

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



CABLING AND EXPANSION MODULE FIXING SYSTEM

The controller rear has 4 fitting slots to secure cables connected to the terminals with cable ties, in an orderly way inside the electric panel. In addition, a plastic retainer is supplied as standard to keep the expansion modules in place when installed in applications with strong vibrations.



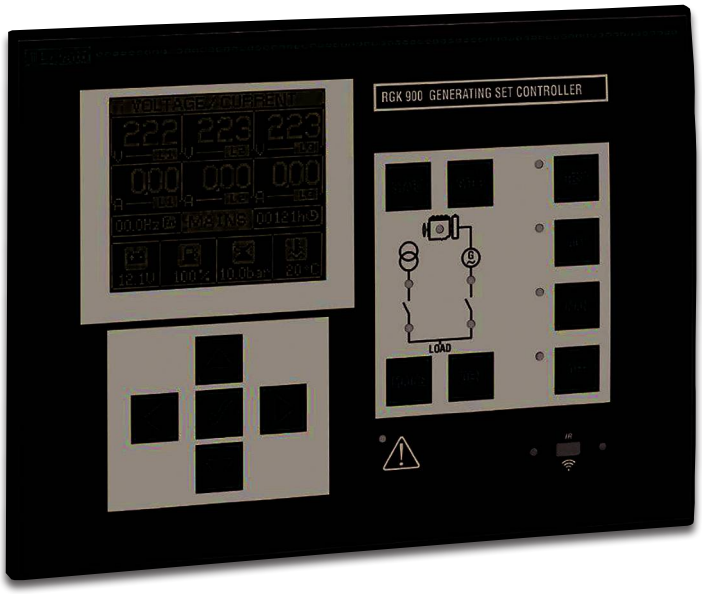
RGK800
RGK900

EXPANDABILITY

Basic RGK750, RGK800 and RGK900 controller functions can be easily extended using up to 4 EXP series expansion modules:
- Digital and analog inputs and outputs
- Opto-isolated static outputs
- Relay outputs
- Opto-isolated RS232 interface
- Opto-isolated RS485 interface
- Opto-isolated Ethernet interface
- GPRS/GSM modem.



RGK750 (2 modules)
RGK800 (3 modules)
RGK900 (4 modules)



EXPANDABILITY
An extensive selection of modules is available to increase the controller functionality.

GPRS/GSM MODEM
Among the expansion modules, there is a GPRS/GSM modem, automatically configured by the genset controller.

MAINTENANCE
Maintenance supervision at programmed intervals.

STREAMLINE DESIGN
The controller has an ergonomic design and, at the same time, particular care has been given to details.

GPRS/GSM MODEM



Once a data-enabled SIM card is inserted, RGK750 - RGK800 - RGK900 controllers can send SMS with alarm and event conditions as well as the latest logged events to a FTP server.

CANBUS COMMUNICATION PORT
Most models are standard equipped with CAN-J1939 communication port.

PLC FUNCTION



Capability to combine together internal status of controllers with signals incoming from the field to activate outputs and generate alarms.

LOAD MANAGEMENT
There are different methods of controlling the load conditions; each controller has special parameters functions as follows:
- RGK700 - RGK750 - RGK800 types: load shedding and dummy load modes
- RGK900 types: base-load and peak shaving modes.

PARALLELING
RGK900 and RGK900SA controllers can control the switching between the mains and generators without having to switch off the power supply to the load.
In addition, they can control the paralleling connection of two or more generators sharing in this way the load on more than one source.
The RGK900MC can control and synchronise mains parallel operation with a power bus composed by a series of generating sets.

REMOTE UNITS

Remote display panels



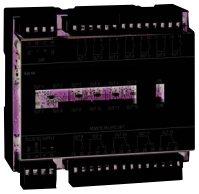
There are "**mirror**" display units available to remotely operate as if in front of the generating set.

Remote annunciator

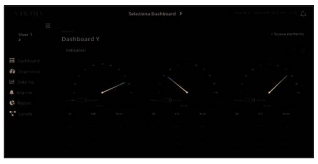


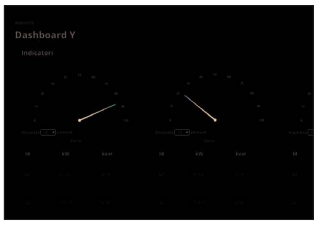
A remote display can view alarm conditions and can be operated for silencing them.

Alarm-state relay unit
The relay unit allows to transmit, on voltage-free contacts, the status and alarms of RGK... controllers.



SUPERVISION SOFTWARE
Synergy is web-based and provides for an easy and efficient way to monitor and control electrical installations as well as field equipment.





It is a server-multiclient system based on MS SQL RDBMS with web-browser interface.
Simultaneous management of different communication channels with independent configuration (protocols, speed rate, RS232, RS485, Ethernet, modem) is possible.
Live page view, data log tables, charts and alarms are available.

CLOUD SOLUTION
The supervision software is ready as Synergy Cloud solution as well, so that the user does not have to install any package on its own servers.

CONFIGURATION AND REMOTE CONTROL SOFTWARE
Xpress is a parameter configuration and remote monitoring software shared by the entire latest generation of RGK gen-set controllers with communication port.

Engine protection controllers



NFC

RGK400SA



NFC

RGK420SA

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK400SA	12/24VDC, icon LCD display	1	0.410
RGK420SA	12/24VDC, icon LCD display, built-in 3 position key switch	1	0.430



The app can be downloaded from Google Play Store and App Store.

ANDROID APP ON Google play

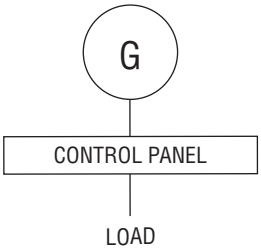
Available on the App Store



EXP10…

Order code	Description
ACCESSORIES FOR RGK4...SA	
RGK400SA	12/24VDC, icon LCD display
EXPANSION MODULES FOR RGK4...SA Inputs and outputs.	
EXP1040	2 digital/resistive inputs, 2 static outputs
EXP1043T	4 digital input and 2 static outputs, PCB tropicalized
Communications interfaces.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Ethernet interface
EXP1015	GPRS/GSM modem

STAND ALONE APPLICATION



Accessories



EXP8005

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8005	IP65 110mm/4.33" housing gasket for RGK4...SA	1	0.009

General characteristics for RGK400SA - RGK420SA

- Key with 3 positions (OFF, local start, remote start), removable in OFF and remote start position (for RGK420SA)
- Power supply: 7...33VDC
- VAC inputs: Generator L1-L2-L3-N
- Single, two and three phase voltage control
- Rated measurement voltage range: 100...480VLL (3PH+N)
- Programmable VT ratio
- Frequency measurement range: 45...65Hz
- Current input: 1PH, /5A or /1A
- Display: LCD with icons (52x35mm/2.05x1.38")
- Programming port: IR with support of CX01 (USB) and CX02 (Wi-Fi) dongles
- NFC technology for parameter setup
- Powersave mode
- Inputs: 5 negative + 1 positive for emergency
- Outputs: 5 positive, 2A, protected
- Common pin dedicated to EV and START outputs to be used with emergency push button
- Engine running detection: "D+", Hz
- Engine speed inputs: "W" or Magnetic "Pick-up"
- 1 analog ohmic input for oil pressure, engine temperature or fuel level control
- Alarm and parameter text in 5 languages
- Customisable alarm text (2 alarms)
- Operating temperature: -30...+60°C
- Parameter configuration by NFC technology with NFC App freely downloadable from Google Play Store and App Store
- Compatible with Xpress software.

Certification and compliance

Certifications obtained: IEC/BS 61010-1, IEC/BS 61010-2-030, IEC/BS 61000-6-2, IEC/BS 61000-6-4, UL508, CSA C22.2 n. 14.

Stand alone gen-set controllers



RGK600SA - RGK601SA



RGK700SA - RGK800SA

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK600SA	12/24VDC, graphic LCD display, w/Pick-up speed input	1	0.540
RGK601SA	12/24VDC, graphic LCD display, CANbus port	1	0.530
RGK700SA	12/24VDC, graphic LCD display, RS232 serial port, CANbus port	1	0.900
RGK800SA	12/24VDC, graphic LCD display, RS485 serial port, CANbus port. Expandable with EXP... modules	1	0.980

Programmable functions and properties

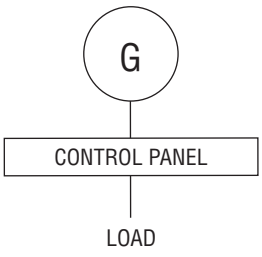
Charact.	RGK6...SA	RGK700SA	RGK800SA
Inputs	4	6	8
Relay outputs	–	3	3
Protected static outputs	6	4	7
Resistive/ Digital inputs	3	3	4



EXP10...

Order code	Description
ACCESSORIES FOR RGK600SA AND RGK601SA	
EXP8001	IP65 housing gasket
EXPANSION MODULES FOR RGK800SA Inputs and outputs.	
EXP1041	2 thermocouple inputs, 2 static outputs
EXP1042T	6 digital inputs, PCB tropicalized
EXP1043T	4 digital input and 2 static outputs, PCB tropicalized
Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs rated 5A 250VAC
EXP1004	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0...±5V
EXP1005	2 opto-isolated analog outputs 0/4-20mA or 0-10V or 0...±5V
EXP1008	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communications interfaces.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Ethernet interface
EXP1015	GPRS/GSM modem

STAND ALONE APPLICATION



Accessories



EXP8001

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8001	IP65 gasket seal for RGK600..., RGK601... and RGK610 controllers	1	0.009

General characteristics for RGK600SA - RGK601SA - RGK700SA - RGK800SA

- Power supply: 7...33VDC
- VAC inputs: Generator L1-L2-L3-N
- Single, two and three phase voltage control
- Rated measurement voltage range:
  - 100...480VAC for RGK600SA and RGK601SA
  - 30...600VAC for RGK700SA and RGK800SA
- Programmable VT ratio
- Frequency measurement range: 45...65Hz
- Current input: 3PH, /5A or /1A
- Graphic LCD: 128x80 pixels with backlight
- Programming port: IR with support of CX01 (USB) and CX02 (Wi-Fi) dongles
- Common pin dedicated to EV and START outputs to be used with emergency push button
- Engine running detection: "D+", Hz
- Engine speed inputs: "W" or Magnetic "Pick-up" (RGK601SA excluded)
- 1 CANbus-J1939 port (RGK600SA excluded)
- 3 analog ohmic inputs for oil pressure, engine temperature and fuel level control
- 1 built-in alarm remote port
- Non-volatile memory for event storage
- Alarm, event and parameter text in 5 languages
- Customisable alarm text (8 alarms)
- Operating temperature: -30...+70°C
- Modbus-RTU and Modbus-ASCII protocols
- Compatible with Synergy, Synergy Cloud and Xpress software.

For RGK700SA – RGK800SA only

- PLC logic for inputs, outputs and internal status
- 1 communication port: RS232 for RGK700SA; RS485 for RGK800SA
- Degree of protection: IEC IP65 on front; suitable for use with UL/CSA Type 4X outdoor enclosure installation.

For RGK800SA only

- Neutral current measurement range: 0.050...6A or 0.050...1.2A
- 400Hz frequency support
- 1 programmable analog input
- Modbus-TCP communication protocol
- Current leakage control towards earth/ground
- Clock-calendar (RTC)

Certification and compliance

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Generator controllers; EAC. Compliant with standards for RGK600/601: IEC/BS 61010-1, IEC/BS 61010-2-030, IEC/BS 61000-6-2, IEC/BS 61000-6-3, UL508, CSA C22.2 n. 14.
Compliant with standards for RGK700 and RGK800: IEC/BS 61010-1, IEC/BS 61000-6-2, IEC/BS 61000-6-3, UL508, CSA C22.2 n. 14.

Synergy, Synergy Cloud, and Xpress software
See Section 36.

EXP series expansion modules
See Section 35, page 2.

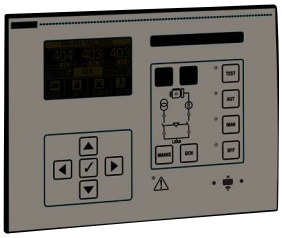
Automatic mains failure (AMF) gen-set controllers



RGK600 - RGK601 - RGK610



RGK700 - RGK800

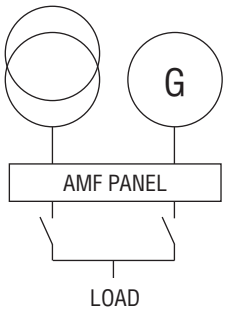


RGK750



EXP10...

AMF (AUTOMATIC MAINS FAILURE) APPLICATION



Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK600	W/Pick-up speed input	1	0.540
RGK601	CANbus port	1	0.540
RGK610	W/Pick-up speed input, expandable with EXP... modules	1	0.600
RGK700	RS232 serial port, CANbus port	1	0.880
RGK750	CANbus port, expandable with EXP... modules	1	0.960
RGK800	RS485 serial port, CANbus port, expandable with EXP... modules	1	0.960

Programmable functions and properties

Characteristic	RGK600 RGK601 RGK610	RGK700	RGK750	RGK800
Inputs	4	6	8	8
Relay outputs	–	3	3	3
Protected static outputs	6	4	7	7
Resistive/ Digital inputs	3	3	3	4

Order code	Description
EXPANSION MODULES FOR RGK610, RGK750 AND RGK800 Communications interfaces.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
Inputs and outputs.	
EXP1042T	6 digital inputs, PCB tropicalized
EXP1043T	4 digital input and 2 static outputs, PCB tropicalized
EXPANSION MODULES FOR RGK750 Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs rated 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
EXPANSION MODULES FOR RGK800 Inputs and outputs.	
EXP1004	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0...±5V
EXP1005	2 opto-isolated analog outputs 0/4-20mA or 0-10V or 0...±5V
EXP1040	2 digital/resistive inputs, 2 static outputs
EXP1041	2 thermocouple inputs, 2 static outputs
Communications interfaces.	
EXP1013	Ethernet interface with Web server function
EXP1015	GPRS/GSM modem

Accessories



EXP8001

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8001	IP65 gasket seal for RGK600..., RGK601... and RGK610 controllers	1	0.009

General characteristics for RGK600 - RGK601 - RGK610 - RGK700 - RGK750 - RGK800
- Power supply: 7...33VDC
- VAC inputs: mains and generator L1-L2-L3-N
- Voltage control for one, two and three phase systems with or without neutral
- Rated measurement voltage range:
  - 100...480VAC for RGK600, RGK601, RGK610 and RGK750
  - 30...600VAC for RGK700 and RGK800
- Frequency measurement range: 45...65Hz
- Programmable VT ratio
- Current measurement range (3 PH): 0.050...6A or 0.050...1.2A
- Graphic LCD: 128x80 pixels with backlight
- 1 USB/optical and Wi-Fi port on front for programming
- Engine running detection: "D+", generator voltage and frequency
- Engine speed inputs: "W" or Magnetic "Pick-up"(RGK601 excluded)
- 1 CANbus-J1939 port (RGK600 and RGK610 excluded)
- 3 analog ohmic inputs for oil pressure, engine temperature and fuel level control
- 1 built-in alarm remote port
- Non-volatile memory for event storage
- Alarm, event and parameter text in 5 languages
- Alarm text customisable (8 alarms)
- Event log
- Modbus-RTU and Modbus-ASCII communication protocols (RGK600 and RGK601 excluded)
- Compatible with Synergy, Synergy Net and Xpress software
- 1 slot for EXP modules for RGK610
- 2 slots for EXP modules for RGK750
- 3 slots for EXP modules for RGK800.

For RGK700 - RGK750 - RGK800 only
- PLC logic for inputs, outputs and internal status
- Degree of protection: IEC IP65 on front.

For RGK700 - RGK800 only
- 1 communication port: RS232 for RGK700; RS485 for RGK800
- Degree of protection: IEC IP65 on front; suitable for use with UL/CSA Type 4X outdoor enclosure installation.

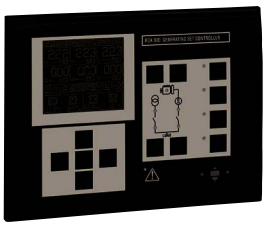
For RGK800 only
- Neutral current measurement range: 0.050...6A or 0.050...1.2A
- 400Hz frequency support
- 1 programmable analog input
- Modbus-TCP communication protocol
- Current leakage control towards earth/ground
- Clock-calendar (RTC).

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Generator controllers except for RGK750; EAC (except for RGK750). Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

Synergy, Synergy Net, and Xpress software
See Section 36.

EXP series expansion modules
See Section 35, page 2.

Paralleling controllers for mains-generator and generator-generator



RGK900SA - RGK900

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RS485 port and USB/optical and Wi-Fi point programming port on front. Expandable with EXP... modules			
RGK900SA	Stand-alone controller. Paralleling control among generating sets	1	1.040
RGK900	AMF (Automatic Mains Failure) controller. Mains-generator paralleling control	1	1.040
RGK900MC	Mains-ATS (Automatic Transfer Switching) controller. Control of mains, automatic transfer switching (ATS) and paralleling on multiple generators controlled by RGK900SA	1	1.040



EXP10...

Order code	Description
EXPANSION MODULES FOR RGK900... Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs rated 5A 250VAC
EXP1004	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0...±5V
EXP1005	2 opto-isolated static outputs 0/4-20mA or 0-10V or 0...±5V
EXP1008	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
EXP1041	2 thermocouple inputs, 2 static outputs
Inputs and outputs.	
EXP1042T	6 digital inputs, PCB tropicalized
EXP1043T	4 digital input and 2 static outputs, PCB tropicalized
Communications interfaces.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Ethernet interface with web server function
EXP1015	GPRS/GSM modem

EXP series expansion modules
See Section 35, page 2.

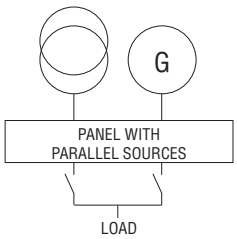
General characteristics
- Power supply: 7...36VDC
- VAC inputs: mains L1-L2-L3-N (not RGK900SA)
- VAC inputs: generator L1-L2-L3-N
- Voltage measurement rated value: 600VAC (UL/CSA)
- Voltage measurement range: 30...720VAC
- Frequency measurement range: 45...65Hz or 360...440Hz
- Programmable VT ratio
- Current measurement input (3 PH+N): 0.05...6A or 0.05...1.2A
- Fourth CT for neutral measurement or earth/ground leakage detection
- Graphic LCD, 128x112 pixels with backlight
- 13 digital inputs
- 3 relay outputs rated 8A 250VAC
- 6 static outputs rated 2A, protected
- 1 static output 50mA
- Engine running detection: “D+” generator voltage and frequency
- 1 engine speed input: “W” or “Magnetic Pick-up”
- 3 analog ohmic inputs for oil pressure, engine temperature and fuel level control
- 1 programmable analog input
- 2 analog outputs for engine speed control (governor) / voltage regulator (AVR)
- Alarm-event-parameter text in 5 languages
- Alarm text customisable (16 alarms)
- Event log
- Modbus-RTU, Modbus-ASCII and Modbus-TCP communication protocols
- PLC logic for inputs, outputs and internal status
- Compatible with Synergy, Synergy Cloud and Xpress software
- Degree of protection: IEC IP65 on front; suitable for use with UL/CSA Type 4X outdoor enclosure installation
- Built-in buzzer
- Multi-level passwords
- Sleep function (power saving mode)
- Synchronising and load sharing.

MAIN FUNCTIONS
- Menus for quick selection of rated parameter settings
- Mains / Generator controls: phase sequence, phase loss, max and min voltage and frequency, voltage asymmetry
- Programmable maintenance at various intervals
- Current leakage control towards earth/ground
- Mains-generator synchronising (ATS closed transition)
- Base-load or peak shaving management
- Paralleling supervision of generators (island mode)
- Generating set start scheduling.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices, Generator controllers; EAC.
Compliant with standards for RGK900: IEC/BS 61010-1, IEC/BS 61010-2-030, IEC/BS 61000-6-2, IEC/BS 61000-6-3, UL508, CSA C22.2 n. 14

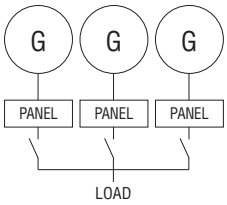
Synergy, Synergy Cloud, and Xpress software
See Section 36.

MAINS-GENERATOR PARALLELING



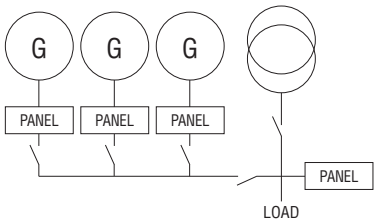
RGK900 is designed for mains-generator synchronising applications, such as:
a) Single generator in maintained parallel with the mains in “base-load” mode (generator power supplied at a steady rate)
b) Single generator in maintained parallel with the mains, in peak-shaving mode (import-export – mains power is limited to constant value and load peaks during heavy demand for power are supplied by generator)
c) Single generator in AMF with temporary parallel with the mains (for emergency, with AMF in closed transition).

ISLAND MODE



RGK900SA is designed for applications with load sharing on an isolated bus, without mains:
a) Parallel among generators working together in island mode on power bus with load shared among them
b) Generators connected together to maintain the power reserve (total power available minus load power) within a preset range, switching on and off generators according to a priority level.

ATS AND PARALLELING OF MAINS WITH MULTIPLE GENSETS



Combination of RGK900SA and RGK900MC units is designed for load govern controls with multiple generators in parallel on power bus and mains.
In these circumstances, the **RGK900MC** unit controls, in base-load or peak-shaving mode, the mains and power bus composed by multiple generators, each controlled by an **RGK900SA**.

Remote units



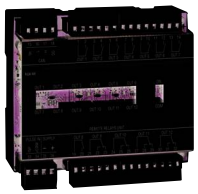
RGK900RD



RGKRA

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK900RDSA	Remote display panel for RGK900SA controllers	1	0.980
RGK900RD	Remote display panel for RGK900 controllers	1	0.980
RGKRA	For RGK7..., RGK8..., RGK9..., controllers graphic LCD, touch screen 128x112 pixels	1	0.360

Alarm-status relay unit



RGKRR

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGKRR	Alarms-status relay unit 12/24VDC, 12 relay outputs, pulse input, CANbus communication port	1	0.420

Remote display panel RGK...RD characteristics
For remote control supervision and viewing, the user operates the remote display panel as if directly in front of the generating set.
- 12/24VDC battery power supply
- Graphic LCD with backlight, 128x112 pixels
- 13 function and setting keys
- 10 Indication LEDs for operating modes and status
- Built-in buzzer
- 4 digital inputs
- 2 digital outputs
- Front degree of protection: IEC IP65; UL/CSA Type 4X outdoor enclosure installation
- Serial interface ports: opto-isolated RS485.

Remote display panel RGKRA characteristics
Alarm conditions can be viewed on the remote display and alarm silencing can also be activated.
- Dual 100-240VAC / 12-24VDC power supply
- Touch screen 128x112 pixel backlight graphic LCD
- Built-in buzzer
- Static (SSR) output for global alarm signalling
- Opto-isolated RS485 interface port
- Front degree of protection: IEC IP54; UL Type 1.

Alarm-status relay unit RGKRR characteristics
External relay expansion unit for alarm and status remoting.
Fixing on 35mm DIN rail (IEC/EN/BS 60715).
Communication with RGK... controllers by CANbus or pulse inputs:
- 12 relay outputs of which 5 with changeover (SPDT) contact rated 5A 250VAC / B300 and 7 N/O (SPST) contact rated 2.5A 250VAC / C300
- 12/24VDC power supply
- Up to 2 RGKRR units can be connected in cascade for a total of 24 relays
- Maximum installation distance from the RGK6... and RGK700... RGK900 controllers:
  - CANbus: 30m/33yd (high speed)
  - Inputs/Outputs: 1,000m/1,094yd (low speed).

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus – File E93601), as Auxiliary Devices, Generator controllers remote and relay units; EAC.
Comply with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/BS 61000-6-3, UL508, CSA C22.2 n° 14.

For wiring schemes and technical characteristics, refer to technical instructions in Downloads area of local or global website www.LovatoElectric.com or consult Technical support; see contact details on inside front cover.

Communication devices



CX01



CX02



CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC↔RGK4/RGK6/RGK7/RGK8/ RGK9 with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi connection dongle PC↔RGK4/RGK6/RGK7/RGK8/ RGK9 for data download, diagnostics and firmware upgrade, project upload/download and cloning	1	0.090
CX03	GSM penta-band antenna (850/900/1800/1900/2100MHz)	1	0.090

General characteristics
For general characteristics of these accessories see section 35.

Gateway data loggers



EXCGLB...

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

General characteristics
For general characteristics of these accessories see section 34.

Gateway



EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

General characteristics
For general characteristics of these accessories see section 34.

Converter



EXCCON02

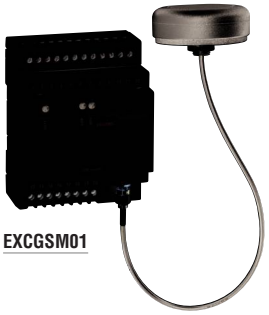
new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/ TCP protocol conversion functionality	1	0.400

General characteristics
For general characteristics of these accessories see section 34.

Remote control and monitoring GSM modem via SMS

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

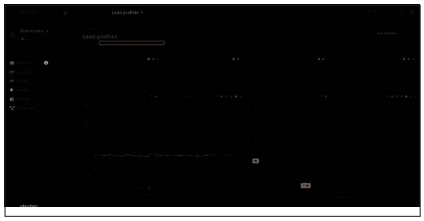


EXCGSM01

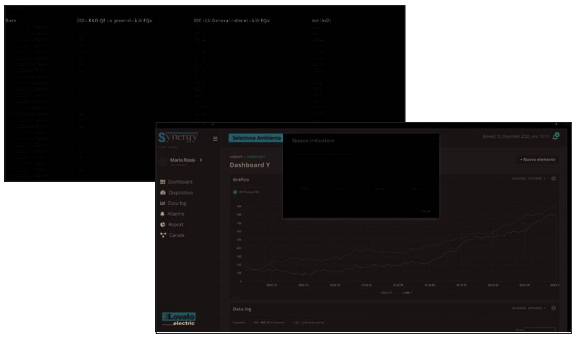
Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340

General characteristics
For general characteristics of these accessories see section 34.

Synergy Supervision and Energy management software



Synergy Visual

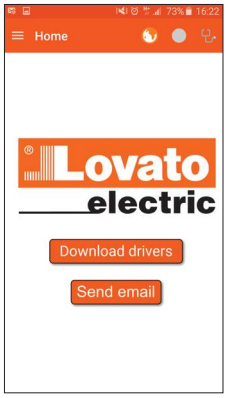


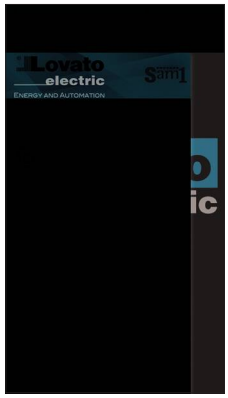
Xpress Parameter configuration and remote control software



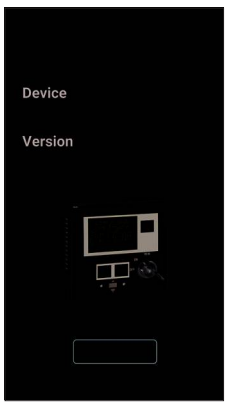
Sam1 APP







NFC APP



Supervision and Energy management software

The Synergy and Synergy Visual softwares provides for the remote control and supervision of the RGK... controllers.
See details given in Section 36.
Its structure and applications are based on MS SQL relational database management system. Consulting is made through popular programs for Internet browsing available across different platforms and operating systems.
It is a highly versatile system, simultaneously accessible to a large number of users/workstations via intranets, VPN or Internet.

Parameter configuration and remote control software

The Xpress at the beginning and just say "Express is a parameter configuration and remote monitoring software shared by the entire latest generation of RGK gen-set controllers with communication port. It can be installed in the Windows® environment and connect individually (one node at a time) to the RGK gen-set controller connected to the network.

- Supports connection via CX01 (USB) or CX02 (Wi-Fi) dongle, USB, RS232, RS485, Ethernet and modem
- Product configuration:
  - Parameter setting
  - Project file management
- Product firmware upgrade (via CX01)
- Remote control:
  - Monitoring of main measurements
  - Sending commands to products
- Reading alarms and events memory.

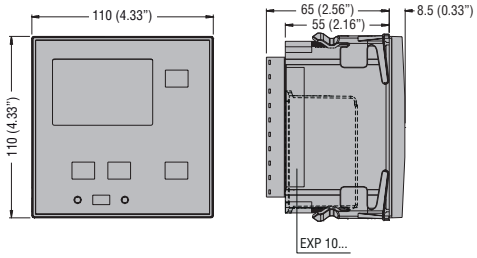
See details given in Section 36.

APP for smartphone and tablets

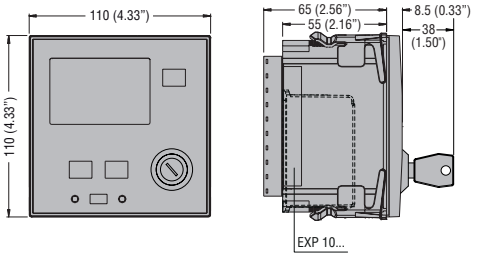
Sam1 application allows the user to program the controller, view alarm conditions, send commands, read measurements, download statistical data and events and send retrieved data by email. The connection is made by Wi-Fi with a smartphone or tablet using CX02 dongle. It is iOS and Android compatible. For more details, see Section 36 or consult Technical support; see contact details on inside front cover.

NFC App for RGK4...SA, with integrated NFC technology, allows remote parameter configuration.
The parameters can be saved in a file for archive purposes.
It is Android and iOs compatible. For more details, see Section 36 or consult Technical support; see contact details on inside front cover.

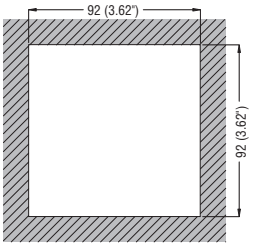
STAND-ALONE GEN-SET CONTROLLERS
RGK400SA



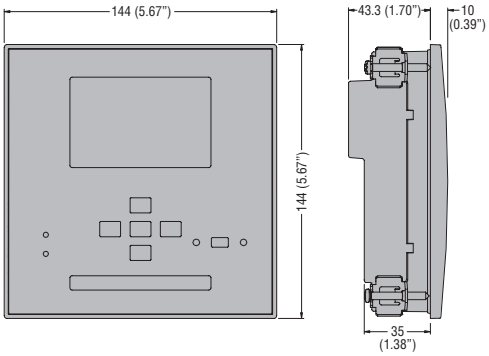
RGK420SA



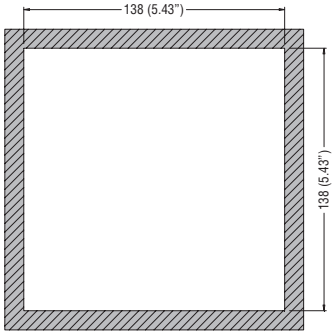
Cutout



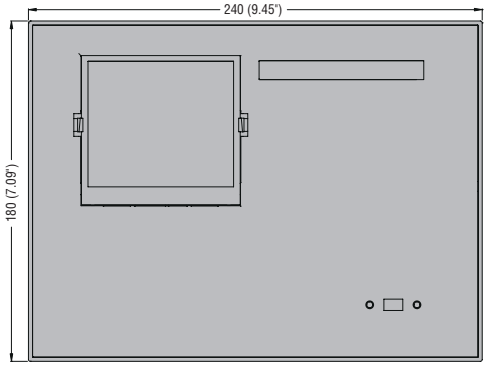
GEN-SET CONTROLLERS **RGK600... - RGK601... - RGK610**



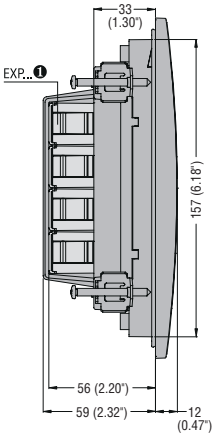
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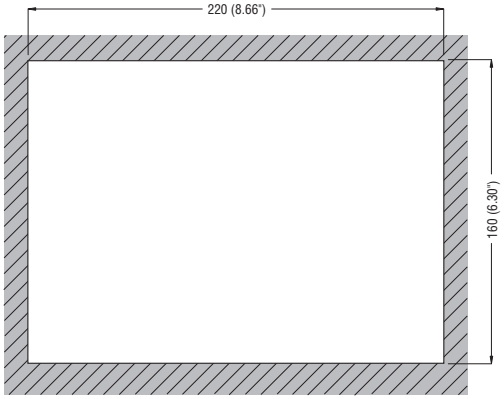
GEN-SET CONTROLLERS **RGK700... - RGK750... - RGK800... - RGK900...** - REMOTE DISPLAY PANELS **RGK900RD - RGK900RDSA**



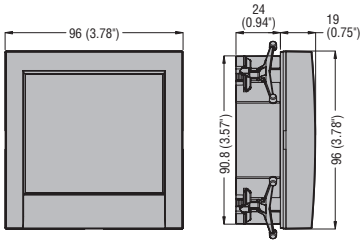
❶ RGK700, RGK900RD... excluded.



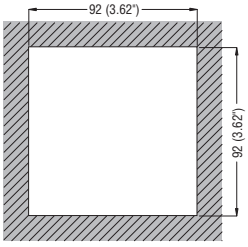
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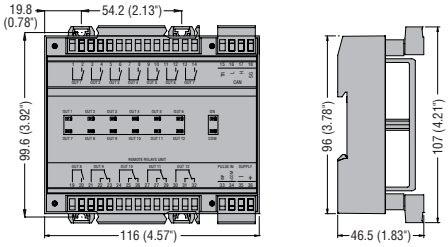
REMOTE DISPLAY UNIT **RGKRA**



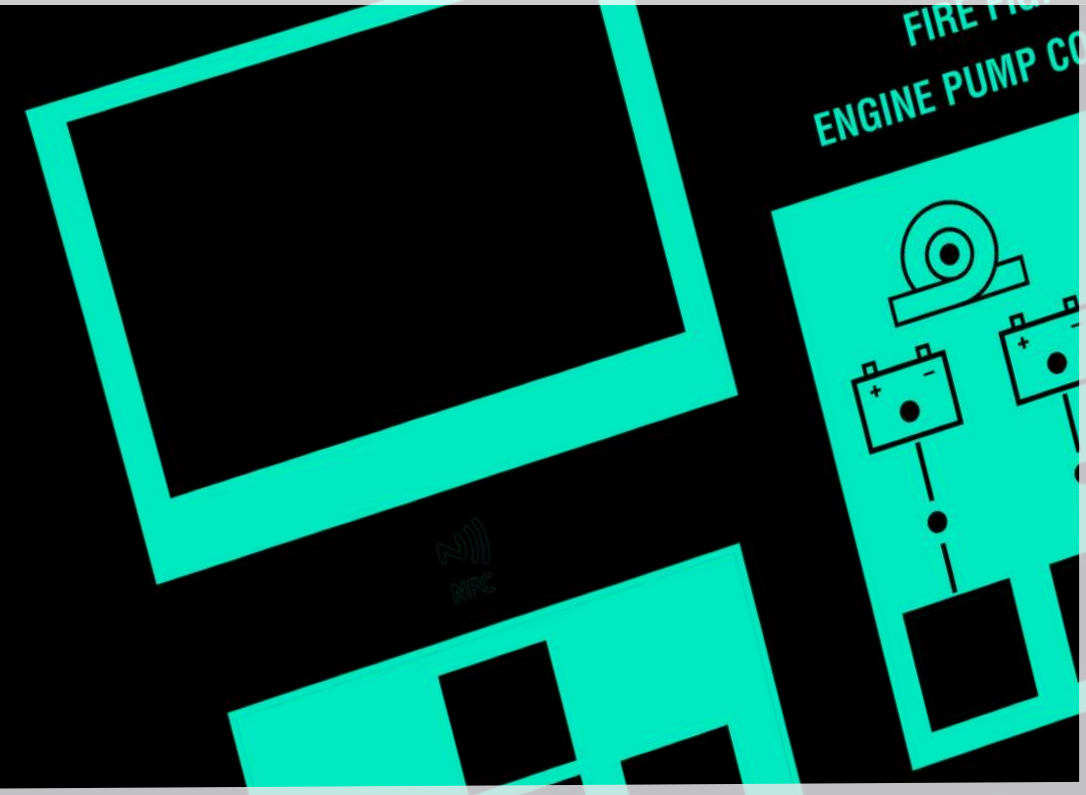
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ALARM-STATUS RELAY UNIT **RGKRR**



Fire pump controllers

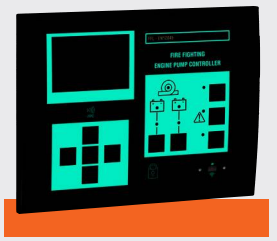


- Fire pump controllers according to EN/BS 12845
- Remote alarm panels according to EN/BS 12845
- Advanced programmable I/O functions to control the fire fighting system
- Expandable with EXP modules
- Controllers and expansion modules with tropicalized PCB
- Controllers with built-in NFC technology
- RS485 and Ethernet communication interfaces
- Setup and supervision software
- Modem control for sending alarm messages and emails.

SEC. - PAGE

Fire pump controllers
Diesel engine fire pump controllers ..... 33 - 2
Electric fire pump controllers ..... 33 - 3
Remote alarm panels for fire pump applications ..... 33 - 4
Accessories
Communication devices, gateway data loggers, gateway, converter, GSM modem ..... 33 - 5

Dimensions ..... 33 - 6
Technical characteristics ..... 33 - 7



Page 33-2

DIESEL ENGINE FIRE PUMP CONTROLLERS

- Crank cycle according to EN/BS 12845
- Batteries monitoring
- Advanced programmable functions for fire fighting systems
- AC voltage monitoring
- Possibility of setup via NFC technology and APP
- Built-in RS485 communication
- PLC logic integrated.



Page 33-3

ELECTRIC FIRE PUMP CONTROLLERS

- Designed in accordance to EN/BS 12845
- 1 phase or 3 phase voltage measure inputs
- 1 phase or 3 phase current measure inputs
- 24VAC or 230VAC power supply
- Advanced programmable functions for fire fighting systems
- Possibility of setup via NFC technology and APP
- Built-in RS485 communication
- PLC logic integrated.



Page 33-4

REMOTE ALARM PANELS FOR FIRE PUMP APPLICATIONS

- Remote panels according to EN/BS 12845
- LED or LCD display versions
- Pushbutton to silence the siren and test the LEDs
- Built-in buzzer.

Diesel engine fire pump controllers



FFL...DP

Order code	Description	Qty per pkg	Wt
		n°	[kg]
FFL700DP	Controller for diesel engine fire pumps in accordance with EN/BS 12845, power supply 12/24VDC, built-in RS485	1	0.980
FFL800DP	Controller for diesel engine fire pumps in accordance with EN/BS 12845, power supply 12/24VDC, built-in RS485, expandable with EXP... expansion modules	1	0.980



The app can be downloaded from Google Play Store and App Store.

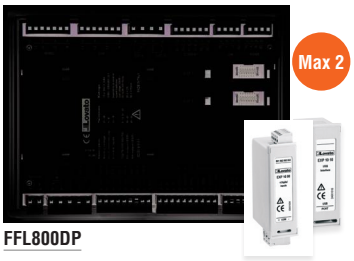
ANDROID APP ON Google play

Available on the App Store

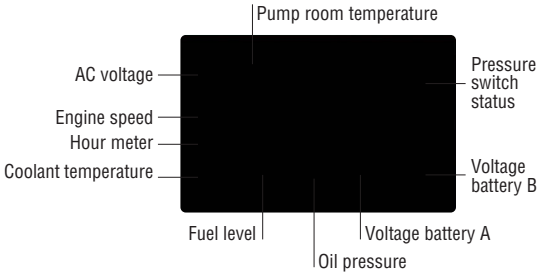


EXP...

Order code	Description
EXPANSION MODULES. Inputs and outputs.	
EXP1008T	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VA, tropicalized PCB
EXP1042T	6 digital inputs, tropicalized PCB
EXP1043T	4 digital inputs and 2 static outputs, tropicalized PCB
EXP1004T	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0...±5V, tropicalized PC
Communication ports.	
EXP1012T	Opto-isolated RS485 interface, tropicalized PCB
EXP1013T	Ethernet interface, tropicalized PCB
EXP1015	GPRS/GSM modem



FFL800DP



General characteristics
FFL...DP controllers integrate all the functions required by the EN/BS 12845 standard regarding the diesel engine fire pump management and help the user to monitor and maintain the performance of the entire firefighting system.
The backlit graphic 128x80 pixel LCD display ensures high visibility in low light conditions.
Inputs and outputs are programmable and the number can be increased with the I/O expansion modules (FFL800DP), moreover they can be managed by the integrated PLC logic. This all means a complete solution with less wiring, less components and less programming to set up the firefighting system. Within the main page, it is possible to see all the information about the engine fire pump.
Functions for the maintenance and the test of the firefighting system are available directly on the display. Furthermore there is the possibility to receive remotely this information by the digital outputs or the Modbus communication through the built-in RS485.
The controller monitors constantly the temperature inside the pump room using the integrated or an external temperature sensor and the status of the auxiliary voltage with the single-phase AC voltage measurement input.

Features
- Automatic diesel engine fire pump control
- Backlit graphic LCD display with 5 languages (ENG, ITA, FRA, SPA, DEU)
- Synoptic with 9 LEDs to display operating modes and status
- Dual DC power supply from two separate batteries 12/24VDC
- Dedicated page for LED test and commissioning
- Dedicated page for jockey pump monitoring
- Automatic starting sequence according to EN/BS 12845
- Input of single-phase AC voltage measurement for charger power supply monitoring
- 10 programmable digital inputs
- Input to monitor the starter pinion
- Input for engine speed reading W and pick-up
- Input for monitor the D + voltage from alternator battery charger
- 10 programmable relay outputs
- 1 programmable static output
- 3 analog inputs for resistive sensors programmable usable for the monitoring of oil pressure, coolant temperature, oil temperature and fuel level
- Built-in NTC temperature sensor
- Input for remotable NTC temperature sensor (measuring range: -40...+85°C)
- 2 password levels
- Advanced I/O functions
- Built-in isolated RS485 communication port
- Integrated PLC logic with thresholds, counters, alarms, status
- Built-in real time clock
- Storage of last 128 events
- Communication interface with front optical port, compatible with USB (CX01) and Wi-Fi (CX02) devices
- NFC connectivity for programming via LOVATO NFC App, freely downloadable from Google Play Store and App Store
- Expandability with 2 EXP... modules with tropicalized PCB (only FFL800DP)
- Compatible with FFLRA... remote alarm panels
- Compatible with software Xpress, Synergy, Synergy Cloud and App NFC and Sam1.

Operational characteristics
- Power supply voltage: 12 or 24VDC
- Voltage measurement inputs:
  - Rated voltage Ue: 100...240VAC
  - Measurement range: 50...264VAC
  - Frequency range: 45...65Hz
- Operating temperature: -25...+70°C
- PCB tropicalized
- Degree of protection: IP65 on front. IP20 on terminals.

Synergy, Xpress and Sam1 software, NFC App
See Section 36.

EXP... series expansion modules
See Section 35, page 2.

Compliance
Compliant with standards: UNI EN/BS 12845, IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Electric fire pump controllers



FFL...EP

Order code	Description	Qty per pkg	Wt
		n°	[kg]
FFL700EP	Controller for electric fire pumps in accordance with EN/BS 12845, power supply 24VAC, built-in RS485	1	0.980
FFL800EP	Controller for electric fire pumps in accordance with EN/BS 12845, power supply 24VAC or 110...240VAC, built-in RS485, expandable with EXP... expansion modules	1	0.980



The app can be downloaded from Google Play Store and App Store.

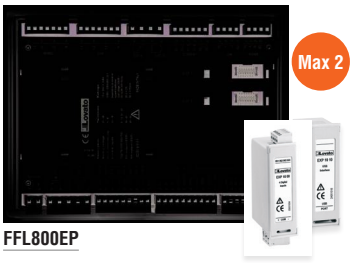
ANDROID APP ON Google play

Available on the App Store

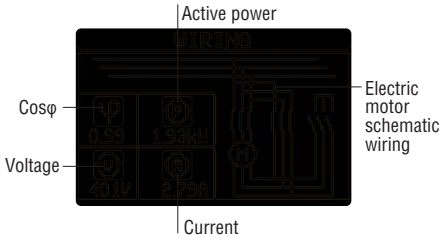


EXP...

Order code	Description
EXPANSION MODULES. Inputs and outputs.	
EXP1008T	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VA, tropicalized PCB
EXP1042T	6 digital inputs, tropicalized PCB
EXP1043T	4 digital inputs and 2 static outputs, tropicalized PCB
EXP1004T	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0...±5V, tropicalized PCB
Communication ports.	
EXP1012T	Opto-isolated RS485 interface, tropicalized PCB
EXP1013T	Ethernet interface, tropicalized PCB
EXP1015	GPRS/GSM modem



FFL800EP



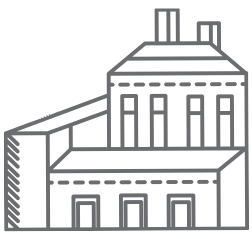
Single phase pump applications:

- Skyscrapers
- Residences
- Civil Buildings.



3-phase pump applications:

- Industry
- Shopping malls
- Hospitals
- Warehouses.
- Etc.



General characteristics
FFL...EP controllers integrate all the functions required by the EN/BS 12845 standard regarding the electric fire pump management and help the user to monitor and maintain the performance of the entire firefighting system.
The backlit graphic 128x80 pixel LCD display ensures high visibility in low light conditions.
Inputs and outputs are programmable and the number can be increased with the I/O expansion modules (FFL800EP), moreover they can be managed by the integrated PLC logic. This all means a complete solution with less wiring, less components and less programming to set up the firefighting system. Within the main page, it is possible to see all the information about fire pump and the electrical engine. Functions for the maintenance and the test of the firefighting system are available directly on the display. Furthermore there is the possibility to receive remotely this information by the digital outputs or the Modbus communication through the built-in RS485.
The controller monitors constantly the temperature inside the pump room using the integrated or an external temperature sensor.

Features
- Possibility to control single phase or three phase electric fire pump
- Backlit graphic LCD display with 5 languages (ENG, ITA, FRA, SPA, DEU)
- Synoptic with 8 LEDs: electric pump running, main status, electric motor status, starting request, global alarm, failure to start, stop enabled, automatic start excluded
- Dedicated page for LED test and commissioning
- Dedicated page for jockey pump monitoring
- single phase or three phase current measurements inputs: 1/5A
- 8 programmable digital inputs
- 7 (FFL700EP) or 9 (FFL800EP) programmable relay outputs
- 1 programmable static output
- Built-in NTC temperature sensor
- Input for remotable NTC temperature sensor (measuring range: -40...+85°C)
- 2 password levels
- Advanced I/O functions
- Built-in isolated RS485 communication port
- Integrated PLC logic with thresholds, counters, alarms, status
- Built-in real time clock
- Storage of last 128 events
- Communication interface with front optical port, compatible with USB (CX01) and Wi-Fi (CX02) devices
- NFC connectivity for programming via LOVATO NFC App, freely downloadable from Google Play Store and App Store
- Expandability with 2 EXP... modules with tropicalized PCB (only FFL800EP)
- Compatible with FFLRA... remote alarm panels
- Compatible with software Xpress, Synergy, Synergy Cloud and App NFC and Sam1.

Operational characteristics
- Power supply voltage: 24VAC (FFL700EP), 24VAC and 110...240VAC (FFL800EP)
- Voltage measurement inputs:
  - single phase or three phase
  - Rated voltage Ue: 100...600VAC
  - Measurement range: 80...720VAC
  - Frequency range: 45...65Hz
- Operating temperature: -25...+70°C
- PCB tropicalized
- Degree of protection: IP65 on front. IP20 on terminals.

Synergy, Xpress and Sam1 software, NFC App
See Section 36.

EXP... series expansion modules
See Section 35, page 2.

Compliance
Compliant with standards: UNI EN/BS 12845, IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Remote alarm panels for fire pump applications



FFLRA200



FFLRA400



EXP...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
FFLRA200	Remote alarm panel with LED, buzzer, pushbutton to silence the siren and test the LEDs. It supports up to 2 fire pump controllers	1	1.120
FFLRA400	Remote alarm panel with LCD graphic display (128x80pxls), buzzer, expandable with 2 EXP... expansion modules. It supports up to 3 fire pump controllers	1	2.670



The app can be downloaded from Google Play Store and App Store.

ANDROID APP ON Google play

Available on the App Store

Order code	Description
EXPANSION MODULES FOR FFLRA400 (2 AVAILABLE SLOTS) Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 5A relay outputs 250VAC
EXP1042T	6 digital inputs, tropicalized PCB
EXP1043T	4 digital inputs and 2 static outputs, tropicalized PCB
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated Ethernet interface
EXP1015	GPRS/GSM modem

General characteristics FFLRA200

FFLRA200 is a simple remote annunciator for the displaying via LEDs of the alarm status of two motor pump or electric pump controllers FFL... series.
The communication between the remote indicator and the FFL... controllers takes place via a pulsed digital signal.
On the front of the panel there are two columns of LEDs referring to each of the fire pump controllers. The LEDs are equipped with user-customizable labels to identify alarms, that are included in the package. A template of alarm labels model can be downloaded from www.LovatoElectric.com.
FFLRA200 is also equipped with a buzzer with sound level in compliance with the EN12845 standard, as well as buttons for silencing the alarms and for the LED test. The alarms notified on the remote panel are configurable directly on the FFL controllers. No setup on the FFLRA200 remote panel is required.
3 status LEDs indicate the presence of the power supply, the status of the communication and general failure.
FFLRA200 is supplied with voltage 100...240VAC and it supports a backup battery 12VDC (not included) whose buffer charge is maintained automatically.

Operational characteristics

- Power supply rated voltage: 100...240VAC
- Voltage operating range: 90...264VAC
- Frequency range: 45...66Hz
- Arrangement for internal battery 12VDC support is built-in (battery is not included)
- Compatible software: NFC App freely downloadable from Google Play Store and App Store
- Operating temperature: -25...+50°C
- Degree of protection: IP40.

Compliance

Compliant with standards: UNI EN/BS 12845, IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

General characteristics FFLRA400

FFLRA400 is an advanced remote annunciator with backlit graphic LCD display. It is expandable with 2 EXP modules to increase its features in terms of communication, digital inputs and digital outputs.
The communication between the remote panel and the FFL controller is performed by means of a pulsed signal or through RS485 if the EXP1012 expansion module is added. Up to 3 FFL controllers can be connected to one FFLRA400 with RS485 communication. On the front of the remote alarm panel, LEDs and a buzzer are present to display and notify the alarms and to see them from a distance; at the same time a complete description of the alarms is available on the graphic LCD display.
The texts are available in 10 different languages: English, Italian, French, Spanish, German, Portuguese, Russian, Polish, Czech and Turkish.
By fitting the EXP1015 expansion module, the remote annunciator is automatically equipped and configured with a GSM/GPRS modem. Once a data-enabled SIM card is inserted, SMS with alarms or events and email messages can be transmitted by the remote annunciator.

Operational characteristics

- Power supply rated voltage: 100...240VAC
- Voltage operating range: 90...264VAC
- Frequency range: 47...63Hz
- Arrangement for internal battery 12VDC support (battery not included) is built-in
- 6 digital inputs, 5 of which are programmable
- 3 programmable relay outputs
- Expandibility with EXP... modules (2 available slots)
- Optical port on front for CX01 and CX02 device
- Compatible software: Sam1, Xpress, NFC, Synergy and Synergy Cloud software (see section 36)
- Degree of protection: IP40
- Operating temperature: -25...+50°C.

Synergy, Xpress and Sam1 software, NFC App
See Section 36.

EXP... series expansion modules
See Section 35, page 2.

Compliance

Compliant with standards: UNI EN/BS 12845, IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Communication devices


CX01


CX02


CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC↔FFL... with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi connection dongle PC↔FFL... for data download, diagnostics and firmware upgrade, project upload/download and cloning	1	0.090
CX03	GSM penta-band antenna (850/900/1800/1900/2100MHz)	1	0.090

General characteristics
For general characteristics of these accessories see section 35.

Gateway data loggers


EXCGLB...

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

General characteristics
For general characteristics of these accessories see section 34.

Gateway


EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

General characteristics
For general characteristics of these accessories see section 34.

Converter


EXCCON02

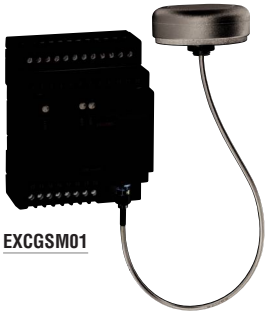
new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/TCP protocol conversion functionality	1	0.400

General characteristics
For general characteristics of these accessories see section 34.

Remote control and monitoring GSM modem via SMS

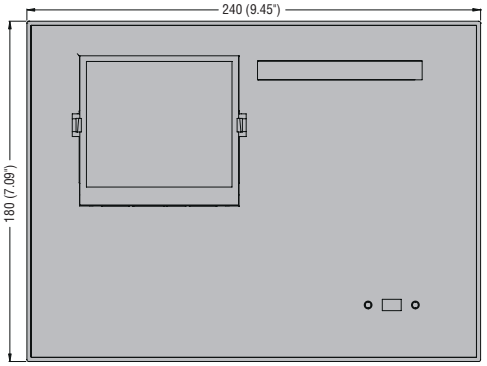
Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

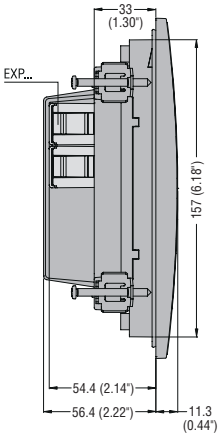

EXCGSM01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340

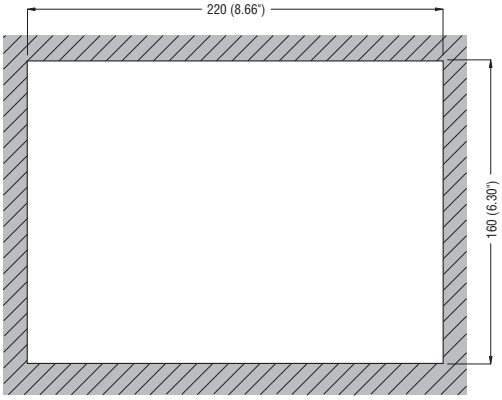
General characteristics
For general characteristics of these accessories see section 34.

FFL700... - FFL800...

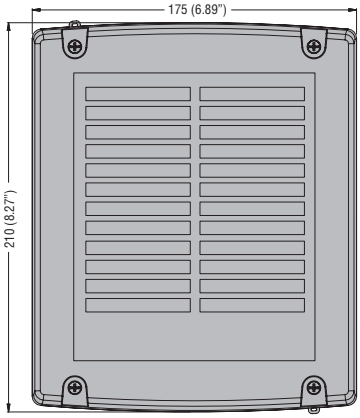


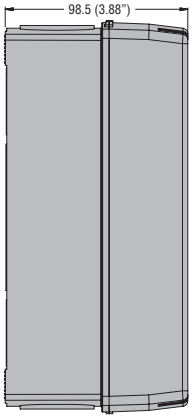


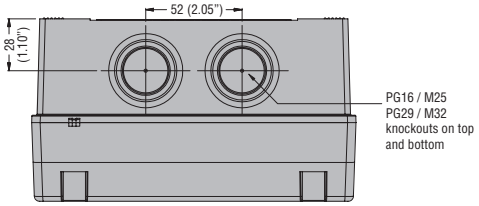
Drilling for surface fixing



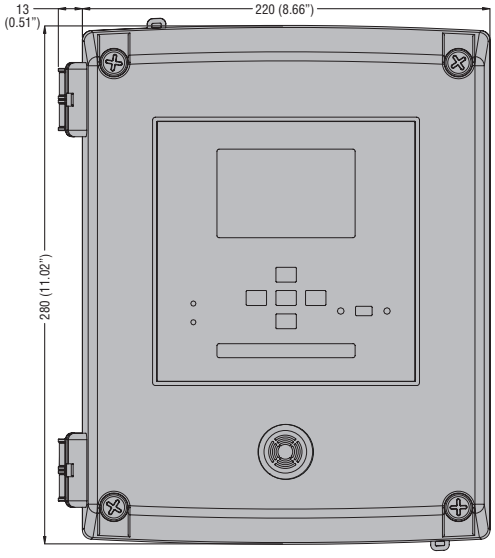
FFLRA200

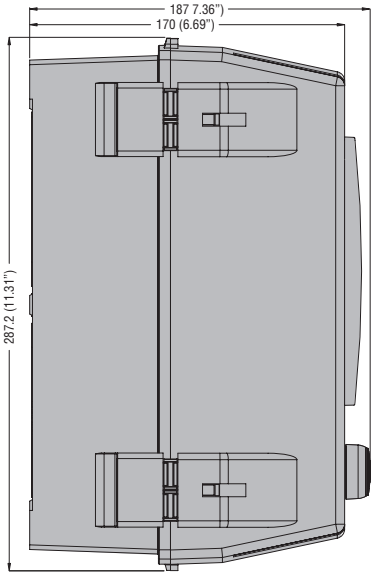






FFLRA400





TYPE	FFL...DP	FFL...EP
SUPPLY		
Rated voltage	12...24VDC	24VAC (FFL700EP); 24VAC/110...240VAC (FFL800EP)
MAIN VOLTAGE INPUT		
Rated voltage Ue	100...250VAC	100...600VAC
Measuring range	50...264VAC	80...720VAC
Frequency range	45...66Hz	
ENGINE RUNNING INPUT (D+) FOR PRE-EXCITED ALTERNATOR		
Voltage range	0...36VDC	—
Maximum input current	0.5mA	—
Maximum voltage at D+ terminal	12 or 24VDC (battery voltage)	—
Excitation current	210mA 12VDC / 130mA 24VDC	—
ENGINE SPEED INPUT (PICK-UP/W)		
Input type	AC	—
Minimum reading frequency voltage: high sensitivity	≥2.8Vpp (1Vrms) at 40Hz ≥10Vpp (3.5Vrms) at 20000Hz	—
Minimum reading frequency voltage: low sensitivity	≥3.7Vpp (1.3Vrms) at 40Hz ≥7Vpp (2.5Vrms) at 2000Hz	—
Measurement input impedance	> 100kΩ	—
Maximum voltage	84Vpp (30Vrms)	—
PINION INPUT		
Voltage range	0...33VDC	—
Current input	≤8mA	—
Threshold	Adjustable	—
Input delay	Adjustable	—
NTC PROBE INPUT		
Type of sensor	NTC (LOVATO code NTC01)	
Measuring range	-40...+85°C	
Maximum connection length	3m	
DIGITAL INPUTS		
Input type	Negative	
Input current	≤6mA	
Low input signal	≤1.25V (tipical 1.9V)	
High input signal	≥4.9V (tipical 3.8V)	
Input signal delay	≥50ms	
RELAY OUTPUTS		
Outputs 1-2	2 x 1NO - 12A 30VAC/DC	—
Output 3	1NO 8A 30VDC (DC1); 30VDC 1A pilot duty	—
Output 4	1NO 4A 30VDC (DC1)	—
Outputs 5-10	6 x 1C/O - 8A 250VAC (AC1); 1.5A 250VAC (AC15)	—
Alarm outputs	—	4 x C/O - 8A 250VAC (FFL700EP) 6 x C/O - 8A 250VAC (FFL800EP)
Motor command output	—	3NA - 16A 250VAC (AC1)
STATIC OUTPUT		
Output type	NO	
Rated voltage	10...30VDC	
Maximum current	50mA	
RS485 SERIAL INTERFACE		
Interface type	Isolated	
Baud-rate	Programmable 1200...115200bps	
Insulation voltage (RS485 – V Batt.)	1kV=	
AMBIENT CONDITIONS		
Operating temperature	-25...+70°C	
Storage temperature	-30...+80°C	
Relative humidity	<80% (IEC/EN/BS 60068-2-78)	
CONNECTIONS		
Terminals type	Removable screw-type	
Wire cross-section (min. and max.)	0.2...2.5mm² (24...12AWG)	
Tightening torque	0.56Nm (5lb.in)	
HOUSING		
Installation	Flush-mount	
Material	Polycarbonate	
Degree of protection	IP65 Frontal; IP20 on terminals	

Communication devices



- Gateway
- Data storage on local memory
- Data transfer via internet
- Ethernet cable, Wi-Fi or mobile connection to the internet
- Geolocation.

SEC. - PAGE

Communication devices
Gateway data loggers ..... 34 - 4
Gateway ..... 34 - 5
Converter ..... 34 - 5
Antennas ..... 34 - 5
Remote control and monitoring GSM modem via SMS ..... 34 - 6

Dimensions ..... 34 - 7



Page 34-4

GATEWAYS
- Data loggers
- RS485 serial communication port
- 1 or 2 Ethernet ports
- Connection to Wi-Fi access point
- 4G (LTE) mobile connections
- GNSS (GPS) support.



Page 34-5

CONVERTER
- RS485-Ethernet converter
- Modbus RTU-TCP protocol conversion.

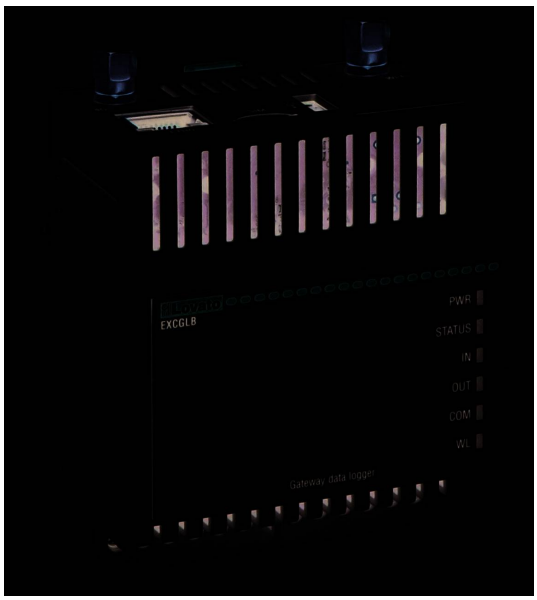


Page 34-5

ANTENNAS
- Antenna for 4G networks
- Antenna for GNSS receivers
- Antenna for Wi-Fi networks
- SMA male connectors.

EXCGLB... GATEWAY DATA LOGGERS

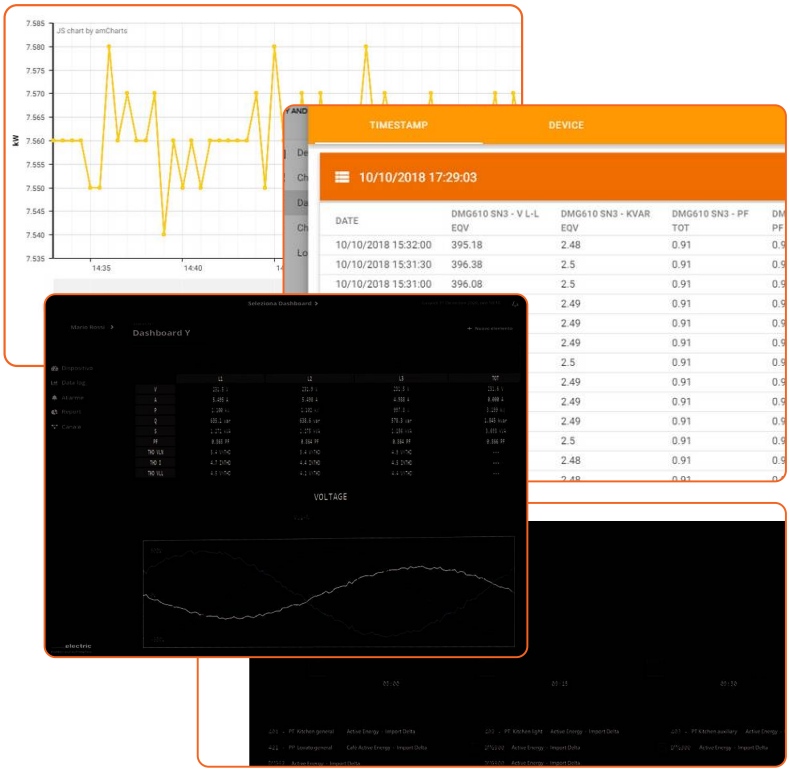
The EXCGLB... is a combined gateway and data logger and is key to the construction of modern, functional and efficient monitoring systems. The device logs data from LOVATO Electric devices or ambient sensors running compatible protocols and monitors all kinds of energy vector (water, air, gas, electricity or steam). Logged data can be consulted via the built-in web server and transmitted either to LOVATO Electric's Synergy supervision software or to remote servers in suitable formats for further processing.



WEB SERVER INTEGRATION

The EXCGLB... is equipped with a built-in web server that lets you:

- consult and download collected data
- view time-referenced charts and tables for historic analyses
- define what categories of collected data must be sent automatically to the Synergy supervision software or other destinations.





THIRD PARTY COMPATIBILITY

- Regular transfer of data to third party software in encrypted mode in XML via http/https or CSV files via sftp/ftp
- mqtt live data transfer
- Third party Modbus devices support.

INTEGRATION WITH Synergy

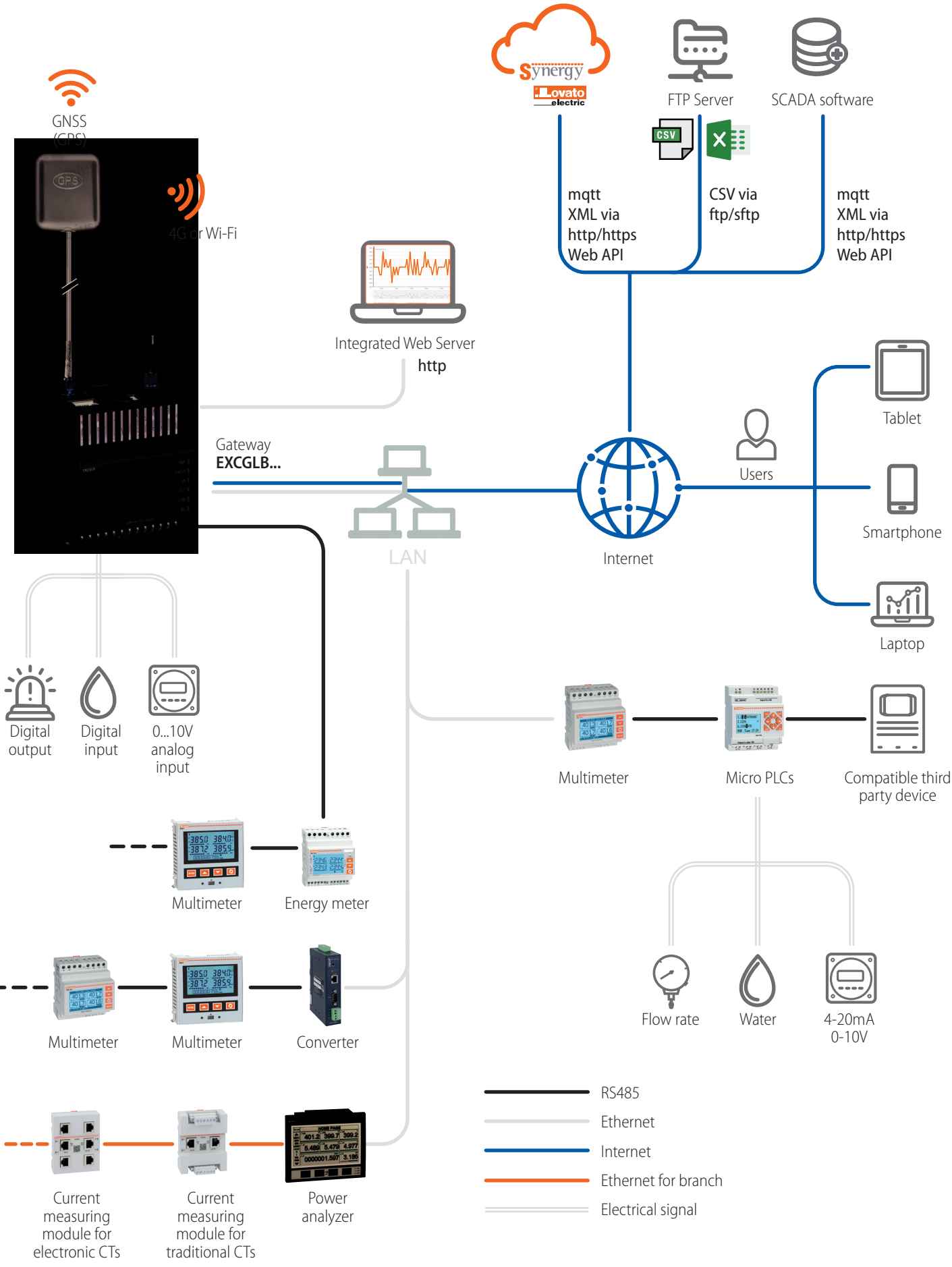
The Synergy energy supervision system is the result of LOVATO Electric's extensive experience in four different but synergic areas: hardware devices, monitoring software, technical assistance and training.
Connecting the EXCGLB... to LOVATO Electric's Synergy cloud monitoring services delivers the following advantages:

- automatic access to data loggers, synoptic pages and graphics in a standard configuration that does not require any user intervention
- transmitted data can be processed freely and displayed graphically on web pages that can be customised to meet specific customer needs
- guaranteed data security even in the event of internet instability.

FUNCTIONAL CHARACTERISTICS

- Connection to field devices via RS485 and/or Ethernet
- Internet connection via cabled network, Wi-Fi or 4G modem
- Geolocation via GNSS (GPS)
- Communication with remote servers via http, https, ftp and sftp protocols: neither static public IP addresses nor specific TCP ports are needed
- Regular transfer of data to Synergy supervision software in encrypted mode in XML files via http/https or CSV files via sftp/ftp
- mqtt live data transfer to Synergy
- Data and report export via web servers in Excel or CSV format
- Plug and play: auto-recognition of compatible devices connected via the Ethernet or serial channel
- Automatic data bank creation based on a set of typical measurements.

NETWORK TYPE



Gateway data loggers



new

EXCGLB...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

Available versions

Communication	EXCGLB01	EXCGLB02	EXCGLB03
RS485 port	● (Modbus RTU master)	● (Modbus RTU master)	● (Modbus RTU master)
Ethernet port	1	1	2 (independent networks)
Wi-Fi connection	●	-	-
4G mobile connection (built-in)	-	● (MicroSim)	● (MicroSim)
GNSS (GPS) function	-	●	-
Digital/Analog input, digital output	1 digital input 1 analog input 0...10V 1 digital output @24VDC	1 digital input 1 analog input 0...10V 1 digital output @24VDC	1 digital input 1 analog input 0...10V 1 digital output @24VDC
Network protocols and services	MQTT http/https VPN client Modbus TCP master (device side) FTP	MQTT http/https VPN client Modbus TCP master (device side) FTP	MQTT http/https VPN client Modbus TCP master (device side) FTP

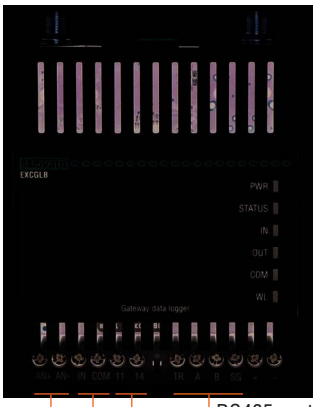
Typical applications

	EXCGLB01	EXCGLB02	EXCGLB03
Metering instruments (power analyzer, energy meter...)	●	-	●
Power factor controllers	●	-	-
Power factor controllers (with advanced analysis requirements)	-	-	●
Soft starters	●	●	-
Variable speed drives	●	●	-
Micro PLCs	●	●	-
Automatic transfer switch controllers	●	-	-
Engine and generator controllers	-	●	-

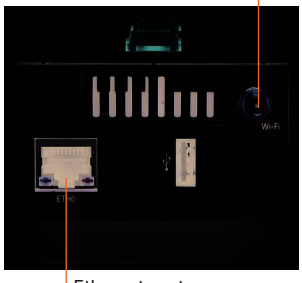
General characteristics EXCGLB...
The EXCGLB... gateway data loggers have been designed to concentrate field data and make them available for consultation via a local web interface or remote software. They are suitable for use in monitoring simple systems such as pumps driven by soft starters, machines equipped with motors with variable speed drives or microPLCs, power factor correction systems, or for the supervision of complex systems such as shopping centers or industries. With the version equipped with GPS it is also possible to geolocate machines, such as rental generators.
Communication with the devices in the field takes place via RS485 serial port or Ethernet, while the connection to the data collection software can be via the integrated Ethernet ports or via the 4G (LTE) mobile network.

Operational characteristics
- Power supply: 12...24VDC
- RS485 serial port: TR – A – B – GND
- Ethernet port (1 or 2, independent)
- 1 digital input
- 1 analog input 0...10
- 1 static NO output
- 4G antenna connector
- GPS antenna connector
- LED: power, device status, data, input status, output status, wireless communication
- Native integration with Synergy and Synergy cloud
- Third party software support
- Third-party device support
- Data storage in flash memory
- Operating temperature: -20...+60°C
- Modular DIN 43880 housing (4 modules)
- IEC degree of protection: IP20.

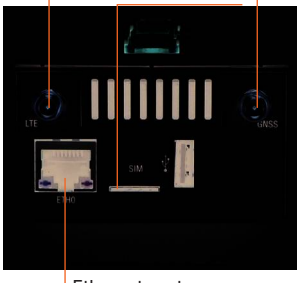
Compliance
Compliance with standards: EN/BS 60950-1.



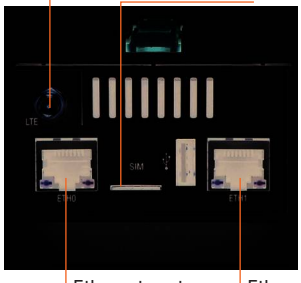
EXCGLB01



EXCGLB02



EXCGLB03



Gateway



EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

EXCM4G01 general characteristics

The EXCM4G01 gateway can interface "Slave" devices connected in a RS485 with a "Master" using a 4G network:

- Connection to TCP server through 4G or 2G network
- Operating mode either as transparent or Modbus-RTU/TCP protocol conversion from serial side to mobile network
- Settable parameters: TCP server IP and remote port, network operator apn (with username and password), SIM card pin (with enabling), connection time-out, serial parameters (baud rate from 1,200 bps to 115,200 bps, stop bit, character length, parity)
- Programming via built-in web server
- 1 Ethernet port 10/100Mbps
- 1 RS485 port
- Supply 9...36VDC
- Operating temperature -40...75°C.

Compliance

Compliance with standards: EN/BS 60950-1.

Converter



EXCCON02

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/TCP protocol conversion functionality	1	0.400

General characteristics EXCCON02

EXCCON02 converter lets the "Slaves" devices connected to an RS485 network be interfaced with a "Master" equipped of Ethernet ports:

- Modbus RTU/TCP protocol conversion
- Programming via web interface
- Power supply excluded.

Compliance

Compliant with standards: IEC/EN/BS 55032, IEC/EN/BS 55024, IEC/EN/BS 55035.

Antennas



CX05

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX05	4G (LTE) antenna 698-960MHz/1710-2700MHz	1	0.030
CX06	GNSS (GPS, BeiDou/COMPASS) antenna 1575.42MHz/1561.098 MHz	1	0.150
CX07	Wi-Fi antenna 2.4-2.5GHz/4.9-5.825GHz	1	0.010



CX06

Compatibility of antennas with LOVATO Electric products

	GATEWAY DATA LOGGERS			GATEWAY
TIPO	EXCGLB01	EXCGLB02	EXCGLB03	EXCM4G01
CX05		●	●	●
CX06		●		
CX07	●			



CX07

General characteristics

CX05

Omnidirectional antenna for use with 4G (LTE) networks in the 698-960MHz/1710-2700MHz frequency bands. SMA male plug directly connected to the antenna connector.

CX06

Active antenna for GNSS receivers (GPS, BeiDou/COMPASS) in the 1575.42MHz ± 3MHz and 1561.098 MHz ± 5MHz bands.
SMA male plug connected to the receiver via a 3m cable.
IP65 protection rating.
Fixing via magnetic base.

CX07

Omnidirectional antenna for use with 2.4GHz and 5GHz Wi-Fi networks in the 2.4-2.5GHz/4.9-5.825GHz frequency bands.
SMA male plug directly connected to the antenna connector.

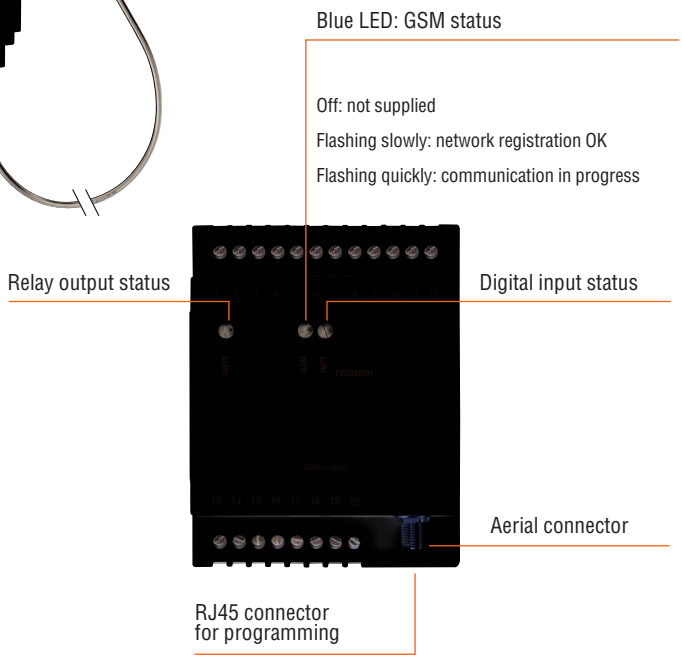
Remote control and monitoring GSM modem via SMS

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340



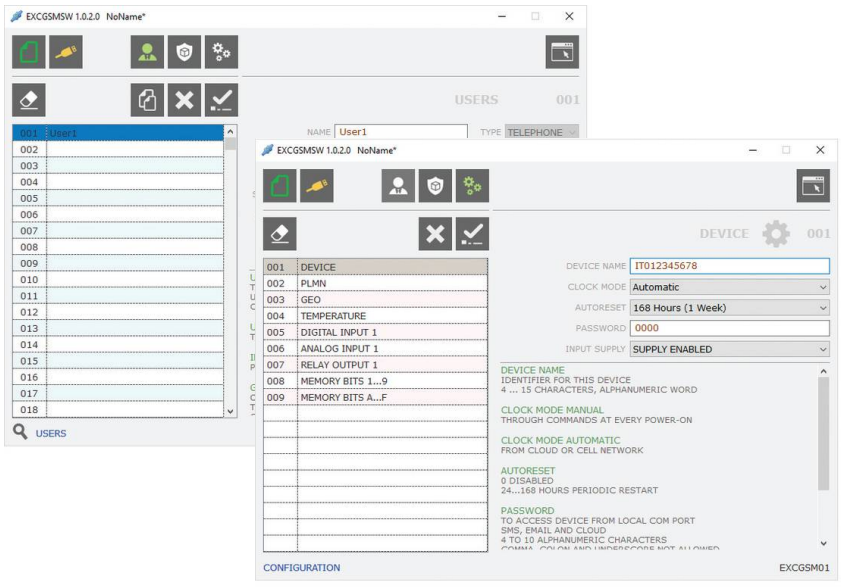
EXCGSM01



Software

To configure the EXCGSM01 modem (using the RJ45-USB programming cable included), the EXCGSMSW software must be used. This can be downloaded for free from the **www.LovatoElectric.com** website.
The software allows you to set:
- The users enabled to exchange messages with the modem
- The identifier of the modem, for example the active customer code (POD) in CEI 0-16 applications
- The functions assigned to the digital output and input and to analog input
- The texts of the SMS associated with the commands
- The logic of the actions taken following the SMS arrival, change of input status, alarm situations.

Configuration is also possible off-line, creating a file to transfer to the modem at another time.



Application requirements
With EXCGSM01 it is possible to remotely operate a relay output and obtain information on the system by sending programmable SMS.
Using the configuration software (available for download free of charge from www.lovatoelectric.com) the user can control the relay output and both the digital and analog inputs.
The logic is based on events (for example, the activation of the digital input or the arrival of an SMS with specific text), to which the user can decide specific actions (reply either by SMS or voice message, or by switching the relay output).
The analog input can be connected to detectors of physical measures like pressure, fluid tank level or temperature to allow remote reading of values or sending text messages via SMS or alarms.
The EXCGSM01 modem interfaces with the cellular network to regularly update its internal clock and dawn/dusk settings, so that it can manage time-scheduled events properly.
Information can be retrieved from phone network cells relative to the position of the modem (reading position information and sending alarms via SMS).
Applications:
- Detection of boiler temperature thresholds
- Fluid tank level alarms
- Time and date based load management
- Remote lighting and air conditioning system control
- Detection of moving of rental equipment.

Use with CEI 0-16
The CEI 0-16 standard in paragraph 8.8.6.5 and in attachment M prescribes that the electricity production plants powered by wind or solar photovoltaic sources with power greater than or equal to 100kW, connected or to be connected to medium voltage grids, are equipped with GSM modem.
Thanks to this modem it is possible to manage the disconnection of the generation through the messages sent by the energy distributor.

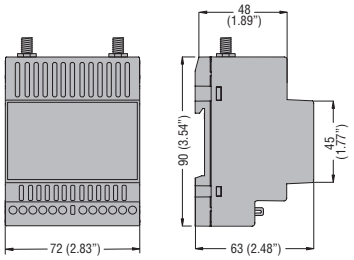
Functional characteristics
- Connection to the GSM network for sending and receiving SMS messages
- Programmable message texts
- Command output piloted by SMS or internal logic, for example to send the remote disconnection command to the interface switch CEI 0-16
- Programmable digital input, for example to detect the status of the Interface switch (IS) and sending of successful IS opening and closing SMSs
- POD management (active user code)
- Management of the list of caller IDs (CLI) up to 5000 callers enabled
- Detection of mobile network coverage
- Full compatibility with medium-voltage IP LOVATO Electric PMVF30: no software/hardware updates or programming required
- **Compatibility with third-party IPs where the remote disconnection signal is transmitted via digital input (dry contact)**For additional information contact our Technical support
  Tel. + 39 035 4282422; E-mail: service@LovatoElectric.com.

Operational characteristics
MODEM
- 35mm DIN (IEC/EN/BS 60715) rail fixing
- 4 modules
- Supply: 100...240VAC
- Consumption: 5VAC
- 1 digital output 3A 250VAC
- 1 self-supplied digital input
- 1 analog input 0...10V, 0...20mA, NTC
- Housing for 3V and 1.8V SIM card
- SIM PIN management
- Temperature sensor
- Update time, sunrise and sunset via GSM network
- Position update via GSM
- Certified according to FCC rules, part 15B
- Operating temperature: -20...+60°C
- Protection rating: IP40 on front; IP20 on terminals.

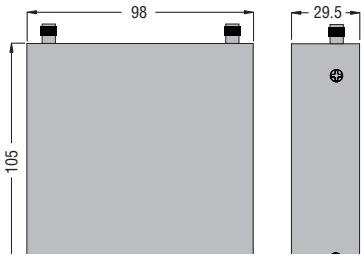
AERIAL
- Quad band 850/900/1800/1900MHz
- Degree of protection: outside IP69K
- 2.5m cable
- Fixing via M10 hole:
  - with adhesive seal
  - with threaded pin and nut.

Compliance
Compliant with standards: EN/BS 62368, EN/BS 62311.

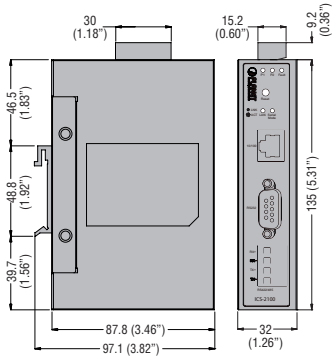
GATEWAY DATA LOGGERS
EXCGLB...



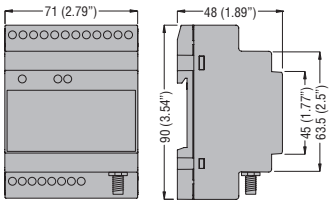
GATEWAY
EXCM4G01



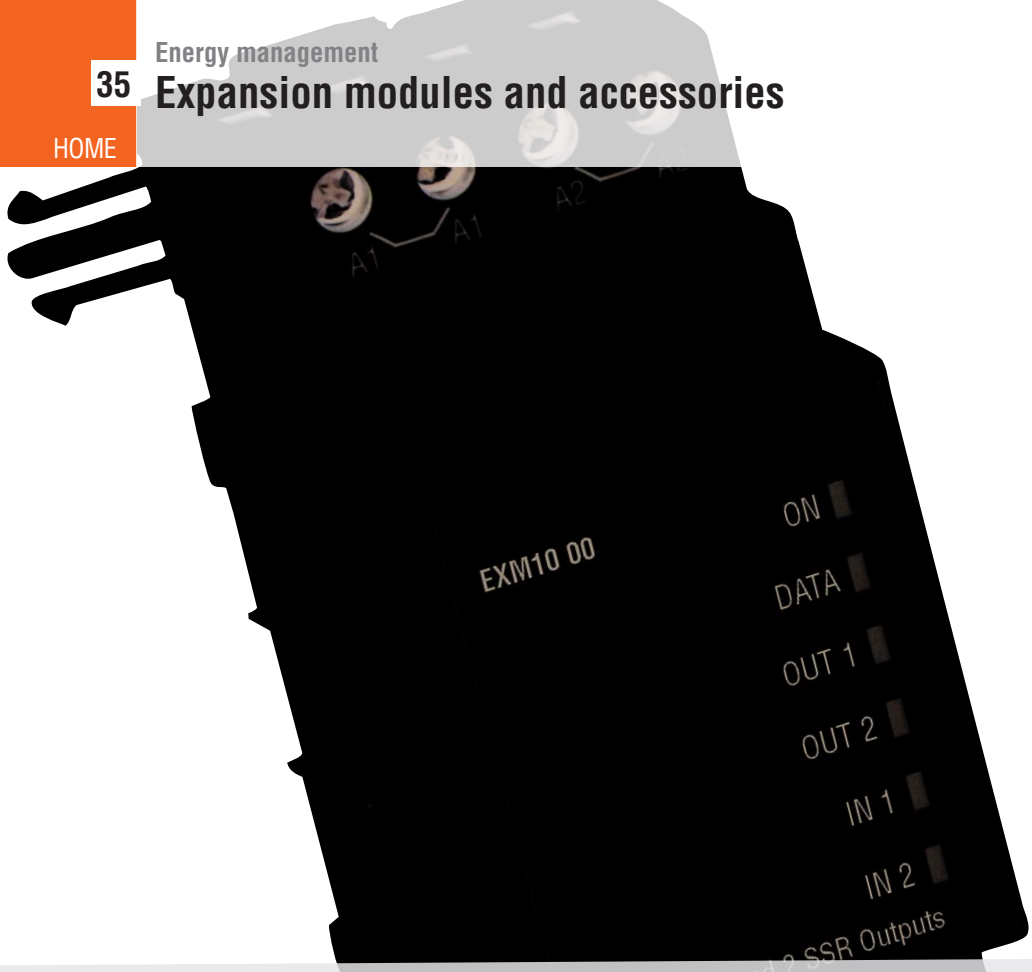
CONVERTER
EXCCON02



REMOTE CONTROL AND MONITORING GSM MODEM VIA SMS
EXCGSM01



Expansion modules and accessories



- Digital inputs and outputs
- Analog inputs and outputs
- Communication interfaces
- Data storage with clock-calendar
- Communication devices and cables to connect LOVATO Electric products to personal computers, smartphones and tablets.

SEC. - PAGE

Expansion modules
EXP series ..... 35 - 2
EXM series ..... 35 - 3

Accessories
Communication devices ..... 35 - 4
Remote display unit ..... 35 - 4
Protective cover ..... 35 - 7
Other accessories ..... 35 - 7
Connecting cable ..... 35 - 7



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EXP SERIES EXPANSION MODULES

- For flush-mount products
- Digital inputs and outputs
- Analog inputs and outputs
- Inputs for PT100 sensors
- Communication modules (RS232, RS485, Ethernet, etc.)
- GSM/GPRS modem
- Data storage with clock-calendar (RTC)
- Powered directly by the base product
- Automatic identification by base product
- Tropicalized versions.



Page 35-3

EXM SERIES EXPANSION MODULES

- For modular products.
- Digital inputs and outputs
- Communication modules (RS232, RS485, Ethernet, etc.)
- Data storage with clock-calendar (RTC)
- Separate auxiliary power supply
- Base product connection by IR port
- Automatic identification by base product.



Page 35-4

ACCESSORIES

- Communication devices
- Remote display unit
- Protective cover
- Connecting cable.

Expansion modules for flush-mount products



EXP10...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Inputs and outputs.			
EXP1000	4 digital inputs, opto-isolated	1	0.060
EXP1001	4 static outputs, opto-isolated	1	0.054
EXP1002	2 digital inputs and 2 static outputs, opto-isolated	1	0.058
EXP1003	2 relay outputs, rated 5A 250VAC	1	0.050
EXP1004 **EXP1004T❷**	2 analog inputs, opto-isolated 0/4...20mA or PT100 or 0...10V or 0...±5V	1	0.056
EXP1005	2 analog outputs, opto-isolated 0/4...20mA, 0-10V or 0...±5V	1	0.064
EXP1006	2 relay outputs to increase number of steps	1	0.064
EXP1007	3 relay outputs to increase number of steps	1	0.085
EXP1008 **EXP1008T❷**	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC	1	0.058
EXP1040	2 digital/resistive inp. 2 static out.	1	0.054
EXP1041	2 thermocouple inp. 2 static out.	1	0.054
EXP1042T❷	6 digital inputs	1	0.054
EXP1043T❷	4 digital inputs and 2 static outputs	1	0.054
Communication ports.			
EXP1010	Opto-isolated USB interface	1	0.060
EXP1011	Opto-isolated RS232 interface	1	0.040
EXP1012 **EXP1012T❷**	Opto-isolated RS485 interface	1	0.050
EXP1013 **EXP1013T❷**	Opto-isolated Ethernet interface	1	0.060
EXP1014	Opto-isolated Profibus-DP interface	1	0.080
EXP1018❶	IEC/EN/BS 61850 interface	1	0.060
Various functionalities.			
EXP1015	GPRS/GSM modem	1	0.080
EXP1016	Capacitor bank protection	1	0.080
EXP1030	Data storage, clock-calendar	1	0.050

❶ **IEC/EN/BS 61850 protocol**
The module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (at the time of catalogue printing, currently under study as specified in the Italian CEI 0-16 and CEI 0-21 standards).
❷ PCB tropicalized.

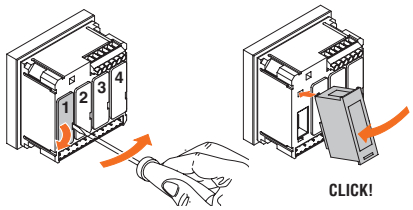
General characteristics
EXP series expansion modules can increase the functionality of the LOVATO Electric products, such as:
- Digital inputs
- Relay outputs
- Static outputs
- Analog inputs
- Inputs for PT100 temperature sensor
- Thermocouple inputs “J” or “K” types
- Analog outputs
- Communication interface
- GPRS/GSM modem (without antenna, see page 35-4)
- Data storage.

– Powered directly by the base product
– Automatic identification by the base product
– Rear base product mounting with no need of tools
– **T suffixed versions have tropicalized PCB.**

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus File E93601), as Listed Accessory under Auxiliary Devices; EXP1018 excluded, EAC.
Compliant with standards:
– For EXP1018: IEC/EN/BS 61850 and Italian CEI 0-16, CEI 0-21
– For EXP1004, EXP1010 and EXP1013: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, UL508, CSA C22.2 n° 14
– For EXP1015: IEC/EN/BS 61010-1, IEC/EN/BS 62311, ETSI EN 301 489-1, ETSI EN 301 469-7, EN 301 511, USA/FCC 47 CFR part 15, Subpart B, CAN/ICES-003
– For all other types: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

For overall dimensions, wiring diagrams and technical characteristics, consult the technical instructions in Downloads of the local or global websites; see details on inside front cover.

Expansion module fixing



EXP series compatibility with LOVATO Electric products

	INTERFACE PROTECT. SYSTEM UNIT	DIGITAL MULTIMETERS		AUTOMATIC POWER FACTOR CONTROLLERS			AUTOMATIC TRANSFER SWITCH CONTROLLERS		FIRE PUMP CONTROLLERS		ENGINE AND GENERATOR CONTROLLERS			MOTORIZED CHANGEOVER SWITHCES
TYPE	PMVF3000	DMG 6...	DMG7000 DMG7500 DMG8000 DMG9000	DCRL3/5	DCRL8	DCRG8 DCRG8F	ATL610	ATL800/900	FFL800...	FFLRA400	RGK4...	RGK610	RGK750 RGK8... RGK9...	GLCM...
EXP1000		●	●			●	●	●		●			●	
EXP1001		●	●			●	●	●		●			●	
EXP1002		●	●			●	●	●		●			●	
EXP1003	●	●	●	●	●	●	●	●		●			●	●
EXP1004...			●			●		●	**EXP1004T**				● (not RGK750)	
EXP1005			●			●		●					● (not RGK750)	
EXP1006				●	●	●	●	●						●
EXP1007				●	●	●	●	●						
EXP1008...		●	●			●	●	●	**EXP1008T**	●			●	
EXP1010	●	●	●	●	●	●	●	●		●		●	●	
EXP1011	●	●	●	●	●	●	●	●		●		●	●	
EXP1012...	●	●	●	●	●	●	●	●	**EXP1012T**	●		●	●	●
EXP1013...	●	●	●		●	●	●	●	**EXP1013T**	●			●	
EXP1014			●			●	●	●						
EXP1015						●		●	●	●			●	
EXP1016						● (not DCRG8F)								
EXP1018	●													
EXP1030						●								
EXP1040											●			
EXP1041													●	
EXP1042T									●	●		●	●	
EXP1043T									●	●	●	●	●	
Max n° of	2	1	3	1	2	4	2	3	2	2	1	1	2/3/4	1

Expansion modules for modular products



EXM1000



EXM1010

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Inputs and outputs.			
EXM1000	2 digital inputs and 2 static outputs, opto-isolated	1	0.137
EXM1001	2 digital inputs, opto-isolated and 2 relay outputs, rated 5A 250VAC	1	0.147
EXM1002	4 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC	1	0.155
Communication ports.			
EXM1010	Opto-isolated USB interface	1	0.140
EXM1011	Opto-isolated RS232 interface	1	0.125
EXM1012	Opto-isolated RS485 interface	1	0.140
EXM1013	Opto-isolated Ethernet interface	1	0.140
EXM1018❶	IEC/EN/BS 61850 interface	1	0.140
EXM1020	Opto-isolated RS485 interface and 2 relay outputs, rated 5A 250VAC	1	0.140
EXM1030	Data storage, RTC with backup reserve energy for data logging	1	0.140

❶ **IEC/EN/BS 61850 protocol**
The module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (at the time of catalogue printing, currently under study as specified in the Italian CEI 0-21 standard).

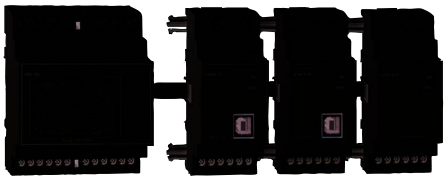
General characteristics
EXM series expansion modules can increase functionality of LOVATO Electric products, such as:
- Digital inputs
- Relay outputs
- Static outputs
- Communication interfaces
- Data storage.

– Connection to base product by IR (infrared beam) port
– Automatic identification by the base product
– Side base product mounting
– Auxiliary power supply: 100-240VAC 50/60Hz.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus File E93601), as Listed Accessory under Auxiliary Devices; EXM10 18 excluded, EAC.
Compliant with standards:
– For EXM1018: IEC/EN/BS 61850 and Italian CEI 0-21
– For EXM1012, 1020, 1013: IEC(EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, UL 508, CSA C22.2 n° 14
– For all other types: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

For overall dimensions, wiring diagrams and technical characteristics, consult technical instructions online in Downloads of the local or global website; see details on inside front cover.

Expansion module fixing



CLICK!

EXM series compatibility with LOVATO Electric products

TYPE	INTERFACE PRO. SYSTEM UNITS	ENERGY METER	DATA CONCENTRATOR	DIGITAL MULTIMETER
	PMVF52/61/71/81/90	DMED310T2	DMECD	DMG300
EXM1000		●	●	●
EXM1001	●	●	●	●
EXM1002			●	●
EXM1010	●	●	●	●
EXM1011	●	●	●	●
EXM1012	●	●	●	●
EXM1013	●	●	●	●
EXM1018	●			
EXM1020		●	●	●
EXM1030		●	●	●
Max n° of modules addable	2	3	3	3

Communication devices



CX01



CX02



CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC↔LOVATO Electric device with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi connection dongle PC↔LOVATO Electric device for data download, diagnostics and firmware upgrade, project upload/ download and cloning	1	0.090
CX03	GSM penta-band antenna (850/900/1800/1900/2100MHz)	1	0.090



General characteristics
Communication devices to link LOVATO Electric products to:
– Personal computers (PC)
– Smartphones
– Tablets.

CX01
The USB/optical device, complete with cable, allows to connect LOVATO Electric products to a PC without having to disconnect the power supply from the electric panel and to carry out:
– Parameter programming
– Copy of the settings
– Data and event download
– Carry out the diagnostics
– Firmware upgrade.
The PC identifies the connection as a standard USB.

CX02
This Wi-Fi point connection lets LOVATO Electric products be viewed by PC, smartphone and tablet with no need for cabling and to carry out:
– Parameter programming
– Data and event download
– Diagnostics project upload/download and controller cloning.

CX03
Antenna compatible with the majority of worldwide mobile networks thanks to the available frequencies at 850/900/1800/1900/2100MHz.
– IP67 IEC protection degree.
– Fixing by Ø10mm/0.39" drilling.
– Cable length 2.5m/2.73yd.

For dimensions, wiring schemes and technical characteristics, refer to technical instructions in downloads of local or global website or consult Technical support; see contact details on inside front cover.

Compliance for CX02
Compliant with standards: EN/BS 60950-1, EN 62311, EN 301 489-1 V2.2.0, EN 301 489-17 V3.2.0, EN300 328 V2.1.1.

Remote display unit



new

EXCRDU2

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCRDU2	Remote display unit, widescreen colour LCD graphic display, built-in RS485 port, for the monitoring and control of max 32 starters, IP65, 3m cable included	1	0.420

General characteristics
With the EXCRDU2 remote display unit it is possible to command and monitor up to 32 starters via RS485 communication, at choiche between soft starters ADXL... or ADXNP... series and variable speed drives VLB... series.
– Auxiliary power supply: 100...240VAC 50/60Hz, 110...250VDC
– Widescreen colour LCD graphic display 118x96mm
– Isolated RS485 communication port, Modbus-RTU protocol
– Configurable communication parameters
– Integrated optical port for firmware update
– Flush mount, standard 92x92mm cut-out
– Compatible with:
  • soft starters ADXL... series equipped with RS485 communication card code EXC1042
  • soft starters ADXNP... series equipped with RS485 communication module, code CX04
  • variable speed drives VLB... series equipped with RS485 logic unit, code VLBXL06 (already built-in on complete drives type VLB3...A480)
– RS485 cable included, 3m length
– IEC degree of protection: IP65 frontal with gasket (provided as standard), IP20 housing and terminals.

Certifications and compliance
Certifications: cETLus.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC61000-6-4.

Accessories



EXP8000



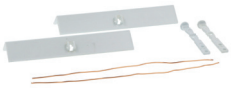
EXP8001



EXP8003



EXP8004



EXM8004



DMXP03



DMXP04



NTC01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8000	Plastic insert for customising label for DMG6... and DCRL3/5	10	0.005
EXP8001	IP65 gasket seal for ATL500/600/601/610 and DCRL8	1	0.009
EXP8003	35mm/1.38” DIN rail mounting accessory for ADXL0018600..., ADXL0115600 and DCTL... up to 60Kvar	1	0.200
EXP8004	Fan for ADXL... soft starter and DCTL... thyristor modules	1	0.004
EXM8004	Set of sealable terminal covers for DMG100/110/200/210/300	1	0.020
DMXP03	Panel mounting for 3 modules devices	1	0.052
DMXP04	Panel mounting for 4 modules devices	1	0.054
NTC01	External/remote temperature sensor, with 3m/10ft long cable	1	0.150

Connecting cable



51C2

Order code	Description	Qty per pkg	Wt
		n°	[kg]
51C2	For PC ↔ LOVATO Electric device, 1.8m/6ft long	1	0.090

General characteristics
Connecting cable to link LOVATO Electric devices with RS232 port to personal computers.

Certification
Certification obtained: EAC.

Software and Apps



- Multiclient web based monitoring software, Cloud and on premises solutions.
- Software to monitor and configure LOVATO Electric devices.
- APP for monitoring and configuration via Wi-Fi or NFC.

Software — SEC. - PAGE

Synergy: supervision and Energy Management software ..... 36 - 2

Xpress: configuration and remote control software ..... 36 - 5

APP

Sam1: APP for smartphone and tablet to setup and monitor LOVATO Electric devices ..... 36 - 6

NFC: APP for programming LOVATO Electric devices via NFC technology ..... 36 - 7

Synergy



Page 36-2

SUPERVISION AND ENERGY MANAGEMENT SOFTWARE

- Windows services and web applications to collect and publish device data on the most popular browsers
- Data management in MS SQL database
- Multi-user access either in local area networks or internet
- Cloud service available on LOVATO Electric portal.

Xpress



Page 36-5

CONFIGURATION AND REMOTE CONTROL SOFTWARE - FREE OF CHARGE

- Parameter setting
- Point-by-point monitoring
- Memory module management.

Sam1



Page 36-6

APP FOR SMARTPHONES AND TABLETS

- Users can program the device, view alarm conditions, send commands, read measurements, download statistical data and events and send retrieved data by email
- iOS and Android compatible.

NFC



Page 36-7

APP FOR PROGRAMMING VIA NFC TECHNOLOGY

- Parameter setting with NFC technology
- Access without the need to power up the LOVATO Electric device
- iOS and Android compatible.

Synergy

Synergy is a supervision and Energy Management web-based software that provides the monitoring and control of the electrical installation, from every computer or mobile device through the most popular web browsers in a simple and efficient way.
It is valid software to sustain the activities indicated by the standard EN ISO 50001 “Energy Management systems. Requirements with guidance for use”.
In addition to electrical quantities, it allows to check all environmental and process information (operating status, alarms, etc.), acquired from LOVATO Electric products, equipped with communication port, and thereby to carry out commands and parameterising.
It is possible to create, without limitations, browsable pages with widgets for charts, data tables, measure indicators and alarm conditions. Data is available to be downloaded to user's computers and possibly to be sent to either a list of e-mail recipients or to FTP servers. Users can configure the exported files according to their needs.
Synergy's flexibility lets third party devices which are able to exchange data through Modbus RTU/TCP protocol be included in the monitoring system and third party softwares gather data for further elaborations by connecting to web API service.
Third party softwares are able to access Synergy database by means of web API call. Third party Modbus devices are able to access to Synergy by means of customizable interface drivers.

FUNCTIONALITY

- Communication with all LOVATO Electric measurement and control devices, via serial ports, Ethernet or modem
- Integration of third party devices with Modbus
- Reading of instantaneous values
- Definition of custom pages with charts, data tables, measure indicators and alarm conditions
- Data tables which can be exported to customisable files, for example to generate reports with user's logo and post-processing elaborations
- Data access through web API service
- Energy consumption, minimum, maximum and average values of the instantaneous measures divided per time slots
- Alarm management with e-mail notification
- Parameter changing of devices in the field
- User's access level management.



ALARMS

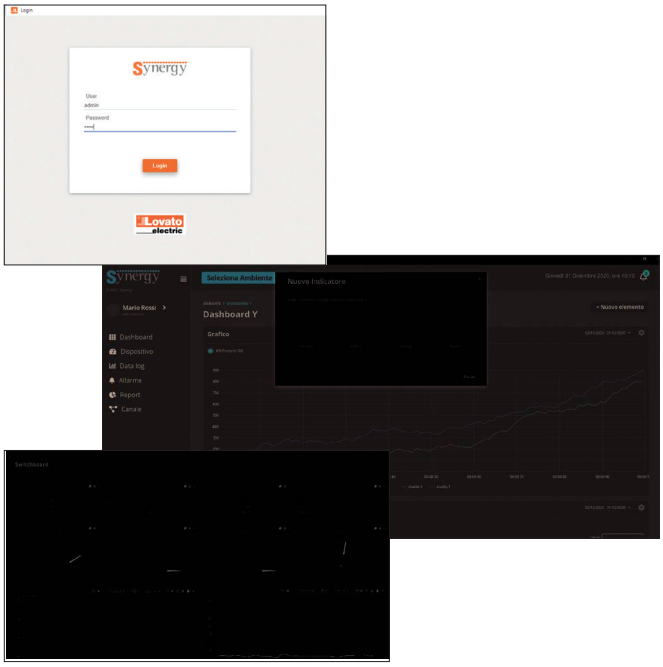
Each value recorded in the archives (datalogs) can be associated with one or more alarms, defining for each one: an upper and lower limit, a reference calendar (for enabling/disabling), any representation in trend graphs and the option of automatically sending an e-mail. If the limits are exceeded, Synergy records the anomaly and reports it in the software header. A specific menu allows the display of detailed information, silencing of alarms and consultation of the datalog.

SIMPLE, GUIDED, INTUITIVE CONFIGURATION

Programming Synergy does not require any particular computer knowledge since specific configuring instruments have been developed to guide through the configuration of product networks, graphic pages, datalog reports and charts, in a simple and intuitive way.

SERVER-MULTICLIENT SYSTEM

Synergy structure and applications are based on a MS SQL relational database management system.
Synergy is consulted through the most popular browsers, so it’s available on various platforms and operating systems. These characteristics make Synergy a highly versatile system, simultaneously accessible to a large number of users/workstations via intranets, VPN or Internet.

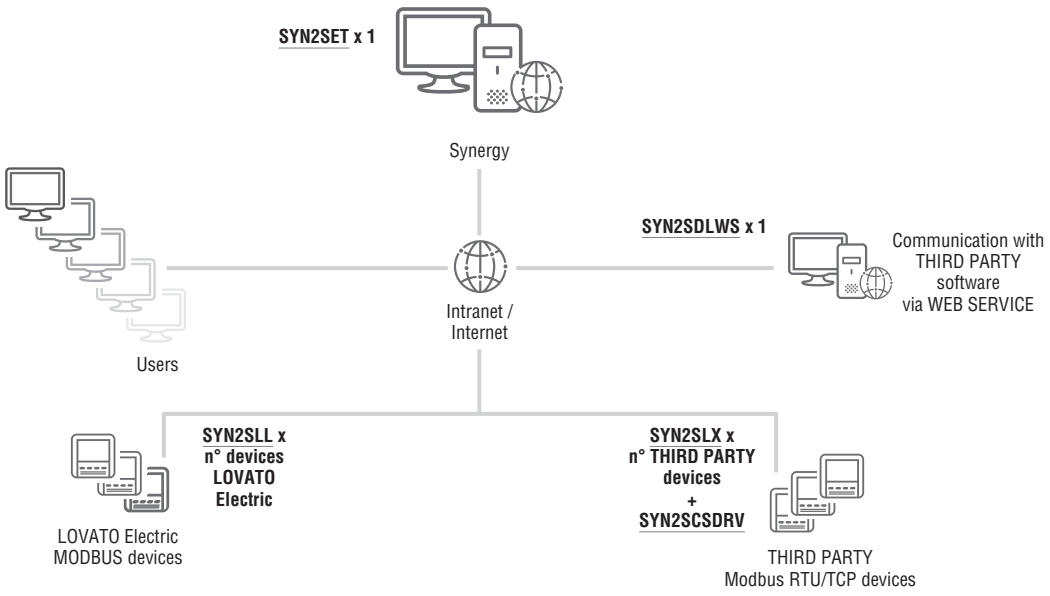


FURTHER INFORMATION
For further information on the software, consult the site:
http://**em.LovatoElectric.com**

Synergy Software

Order code	Description	Details	Provisioning
Software.			
SYN2SET	Supervision and Energy Management Synergy software	Supervision and Energy Management software web based for Windows operating system	Permanent licence
Licence.			
SYN2SLL	Synergy licence for LOVATO Electric device	Monitoring function for each LOVATO Electric device equipped by Modbus communication port	Permanent licence for single device
SYN2SLX	Synergy licence for THIRD PARTY devices	Monitoring function for each THIRD PARTY device equipped by Modbus communication port	Permanent licence for single device
SYN2SDLWS	Licence to access to Synergy database	Access function by WEB API to Synergy MS SQL database by THIRD PARTY software	Permanent licence
SYN2SLM	Licence to access to Synergy updates	Access to Synergy updates (e.g. compliant with new operating systems and new Synergy features for each LOVATO Electric or THIRD PARTY devices)	Annual subscription licence for single device
SYN2UPG	Update to Synergy2	Update from Synergy to Synergy2	Permanent licence for single device
Technical support and training.			
SYN2SCS00	Synergy technical support	Synergy technical support by phone or team viewer	Hourly rate
SYN2SCS11	Synergy commissioning	On site Synergy technical support: – check on field devices configuration – SYN2SET setup on customer PC – check of exchanging data between Synergy and on field devices – Synergy configuration based on customer needs – travel costs and labour hours to setup Synergy and on field devices	Commissioning cost
SYN2SCSDRV	Interface driver development for THIRD PARTY devices	Synergy support to develop the interface driver between Synergy and THIRD PARTY devices for a maximum of 5 measurements and feasibility study by LOVATO Electric Technical support (Tel. + 39 035 4282422; E-mail: service@LovatoElectric.com)	Cost for each driver
SYN2TRAINING	Synergy training sessions (basic and advanced courses)	Introduction to Energy Management topics. Measurement devices: range and selection criteria with case studies. Synergy software key features for monitoring and supervisioning: architecture and access, channels, tools, graphs, data logs, pages and access criteria. Practical exercises. For further information visit EVENTS section on **www.LovatoElectric.com**	Based on requirements

Example of a Synergy on premises solution:



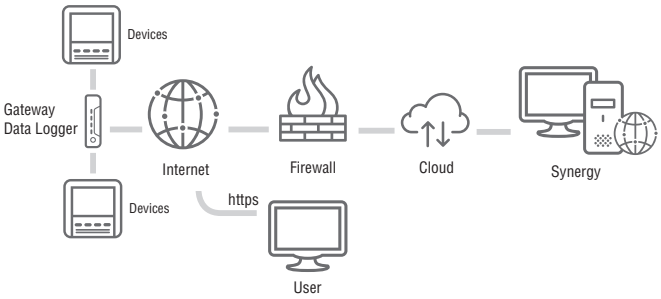
Synergy cloud

Synergy Cloud is a subscription service that allows the supervision and control of systems via LOVATO Electric Cloud server accessible from any computer or mobile device through the most common web browsers. The functions of the Synergy Cloud software are the same as those made available with the local installation of the Synergy software but without the need to install any software and without the need of a dedicated server at company premises.
The costs of purchase, configuration and maintenance of the hardware and software necessary for energy monitoring are saved.
The devices in the field send the monitored data to the Gateway Data Logger (EXCGLB...) device which collects and represents them at the integrated web server. Synergy Cloud lets the user remotely view the instantaneous monitored data, receive reports about alarms via email and execute commands (SYN2CLRW licence).
With the appropriate licence for supervision and Energy Management (SYN2CLL licence), Synergy Cloud periodically receives via Internet (either wired or mobile network) the data collected by the Gateway Data Logger in order to store historical data, process and represent them graphically as well.

SECURITY

The security of the data is guaranteed by HTTPS encryption with certificate between server and client PC, by daily backup of the data collected and by state-of-the-art firewall for server access.

The Synergy Cloud solution:



FEATURES

- Extremely intuitive interface: no particular technical background required
- Data access from all over the world thanks to the Internet and common browsers
- Specific design for client requirements (selection of measurement scenarios)
- Low data traffic thanks to the extreme economy of the protocol used (Modbus)
- Instantaneous data acquisition from various devices that can even be located in different sites
- Simple and clear reporting of all energy data
- No investment in software database or server
- Extremely secure data thanks to HTTPS and daily backup
- Automatic updates included
- Limited subscription cost.

Order code	Description	Details	Provisioning
Licence.			
SYN2CLRW	Synergy licence for basic remote view	Remote view of instantaneous data, creation of alarms and relevant mail sending, execution of commands	Annual subscription licence (365 days) for each device
SYN2CLL	Synergy Cloud licence for LOVATO Electric device	Supervision, Energy Management, data storage functions for a LOVATO Electric device with Modbus communication	Annual subscription licence (365 days) for each device
SYN2CLX	Synergy Cloud licence for THIRD PARTY devices	Supervision, Energy Management, data storage functions for a third party device with Modbus communication	Annual subscription licence (365 days) for each device
SYN2CDLWS	Licence to access to Synergy database	Access function by WEB API to Synergy MS SQL database by THIRD PARTY software	Annual subscription licence (365 days)
Technical support.			
SYN2SCS00	Synergy Technical support	Synergy Technical support by phone or team viewer	Hourly rate
SYN2SCS11	Synergy commissioning	On site Synergy technical support: – check on field devices configuration – SYN2SET setup on customer PC – check of exchanging data between Synergy and on field devices – Synergy configuration based on customer needs – travel costs and labour hours to set up Synergy and on field devices	Commissioning cost
SYN2SCSDRV	Interface driver development for THIRD PARTY devices	Synergy support to develop the interface driver between Synergy and third party devices for a maximum of 5 measurements and feasibility study by LOVATO Electric Technical support	Cost for each driver
SYN2TRAINING	Synergy training sessions (basic and advanced courses)	Introduction to Energy Management topics. Measurement devices: range and selection criteria with case studies. Synergy software key features for monitoring and supervision architecture and access, channels, tools, graphs, data logs, pages and access criteria. Practical exercises. For further information visit EVENTS section on **www.LovatoElectric.com**	Based on requirements

Note: every monitored device has a defined set of measures that are stored and available for a customizable period.
Further information available on: **http://em.LovatoElectric.com.**

Xpress

Xpress is parameter configuration and remote monitoring software shared by the entire latest generation of LOVATO Electric products with communication port.
It can be installed in the Windows environment and connected individually (one node at a time) to the LOVATO Electric products.

- Supports connection via CX01 (USB) or CX02 (Wi-Fi) device, USB, RS232, RS485, Ethernet or modem
- Product configuration:
  - Parameter setting
  - Project file management
- Product firmware update (via CX01)
- Remote control:
  - Monitoring of main measurements
  - Measurements graphic trends
  - Sending commands to products
- Reading alarms and events memory
- Memory modules management EXP1030, EXM1030, EXP1031.

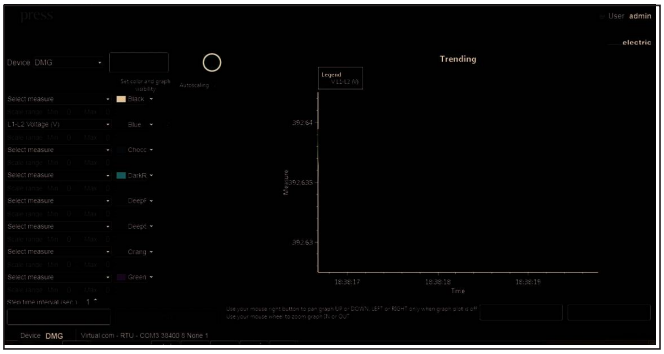
Consult the **www.LovatoElectric.com** site for the list of products supported by Xpress.

Xpress can be ordered using code SYN1XP00 or downloaded for free from:
www.LovatoElectric.com



MONITORING

The measurements of the product connected are divided into context menus to make searching for the right value easy and shown on appropriate graphical gauges. It is also possible to show measurements trends.



PARAMETERS

The options in the setup menu and parameters on the product connected are replicated in the software to allow the user to operate using the terms that they already know. Parameters that differ from the factory values are highlighted in a different colour.
The parameters can be saved to a file and recalled in subsequent installations, or defined even in the absence of a connection to the product, to permit preparation of a project to send later.

EVENTS

If the product connected features an event memory, the complete list can be downloaded for saving as an external file, in text or spreadsheet format.

DATA-LOGGER MEMORY MANAGEMENT

Xpress can be used to configure and manage the EXP1030, EXP1031 or EXM1030 memory modules, in order to create tables indicating the history of the measurements selected by the user.
In particular, the software can be used to set:

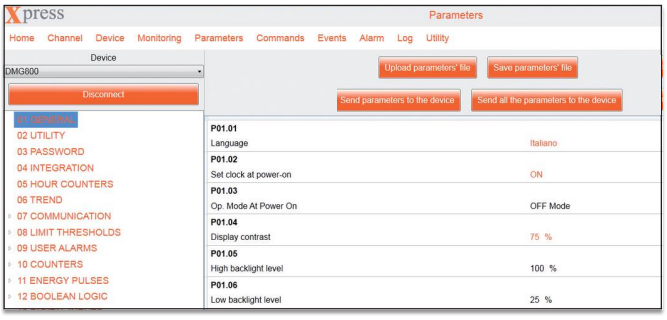
- The measurements to be sampled
- The sampling time
- The event that triggers and ends sampling
- Memory capacity management (FIFO or stop when memory is full).

The software can show the waveforms stored in EXP1031 Energy Quality module as well.
The data acquired can be displayed in graphs and exported to text files or spreadsheets.

COMMANDS

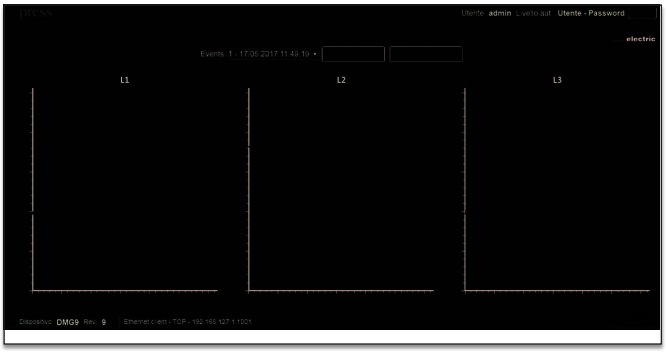
A command can be sent to the product connected to energise outputs or reset energy consumption or operating time counters for maintenance.





ALARMS

The alarms active on the product connected can be displayed in the software, for a single screen with the complete list of the faults detected.



APP Sam1



General characteristics

Configuration and maintenance operations, often done in intolerable or awkward environments due to weather or noisy conditions or narrow places, are now easier to do for all LOVATO Electric devices with communication interface on the front, compatible with CX02 device. Tablets and smartphones with Android or iOS operating systems can connect to them using the new application called Sam1 . Therefore, it is no longer necessary to connect and switch on a PC using cables to change configurations, setup parameters etc.

With this APP, a file previously saved can be uploaded; commands can be sent; measured quantities can be read from LOVATO Electric devices. The events can be viewed and saved in a text file and later shared.

The Sam1 App LOVATO can be downloaded from Google Play Store or App store.

ANDROID APP ON Google play

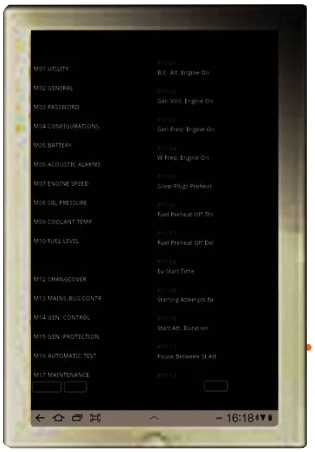
Available on the App Store

Updating driver

Sending e-mail (events, parameters)



PARAMETERS SETTING



SENDING COMMANDS



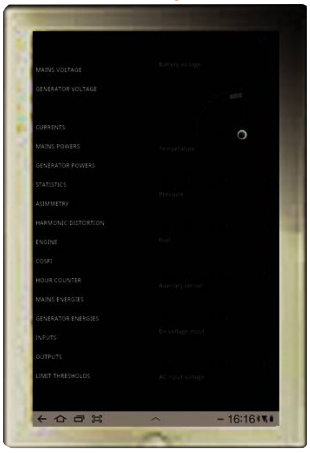
EVENT LOG VIEWING



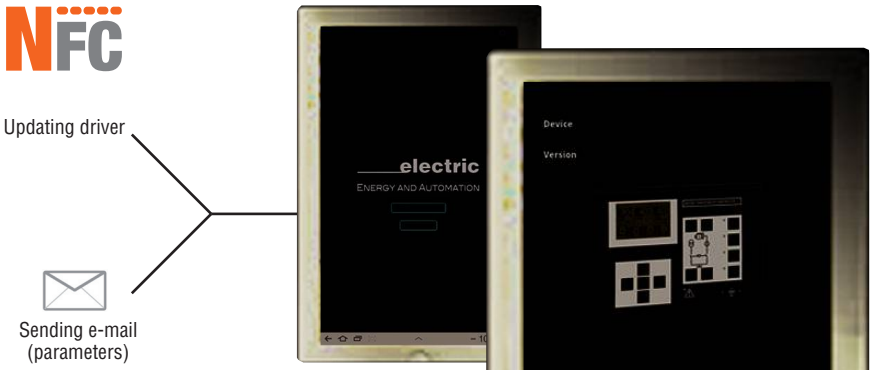
ALARMS VIEWING



MEASUREMENTS VIEWING



APP



General characteristics

The parameter setting for some LOVATO Electric products is now possible via tablet and smartphone through NFC wireless technology.

Bringing the display of a smartphone or tablet (with NFC connection enabled) in close proximity to a LOVATO Electric product, activates the LOVATO NFC App and the device connected is recognised automatically.

The parameters can be set without powering up the LOVATO Electric device.

The application allows you to:

- Set the parameters for the product connected
- Save the parameters in a file and share it
- Load a parameter file saved previously
- Simple, fast and intuitive programming
- Very high accuracy and repeatability of the settings.

The app can be downloaded from Google Play Store and App Store.

ANDROID APP ON Google play

Available on the App Store

PARAMETERS SETTING



