# **MECHTRIC**





## Power Quality

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Engine & Generator controllers		Lovato	F-12
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#### Engine & Generator controllers

#### Automatic mains failure (AMF) gen-set controllers

- · Engine protection
- · Programmable inputs and outputs / alarm properties
- · Automatic starting of generator and load switching to stand-by emergency source in case of mains failure
- · Supervision in "open transition" for contactors, motorised circuit breakers and changeover switches

digital digital description type inputs outputs

#### **RGK600** series

144 x 144 mm panel mounting

- Universal supply: 7 33 VDC

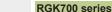
- Display: Graphic LCD 128 x 80 pixels with backlight - Measurement voltage: 50...576 VAC / Rated voltage: 480 VAC L-L - Current input:

- 3PH. /5A or /1A - Single, two and three phase voltage control - L1-L2-L3-N
- IR programming port on front panel for communication with PC
- 3 analog resistance input for oil pressure, engine temperature or fuel level control
- Modbus-RTU and Modbus-ASCII protocols with expansion modules (RGK610)

#### Automatic mains failure (AMF)

RGK600	4	6 basic AMF gen-set cont	roller
		with "W" or magnetic "pickup" for engine speed reading (no CAN	Vbus)
RGK601	4	6 basic AMF gen-set cont	roller
		with CANbus-J1939 (no "W" or magnetic "pic	kup")
RGK610*	4	6 basic AMF gen-set cont	roller
		with "W" or magnetic "pickup" for engine speed reading (no CAN	Vbus)

\* 1 slot to accept plug-in expansion modules EXP1010/1011/1012, see controller accessories



180 x 240 mm panel mounting

As above RGK600 but with the following additional features:

- Measurement voltage: 30...600 VAC / Rated voltage: 480 VAC L-L - Rated voltage: RGK700 - 600 VAC L-L / RGK750 - 480 VAC L-L

- 1 USB/optical and Wi-Fi on front panel for programming and PC communication
- PLC logic for inputs, outputs and internal status
- Expansion bus with 2 slots for EXP... series expansion modules (RGK750 only)
- Calendar-clock (RTC) with backup reserve energy

#### Automatic mains failure (AMF)

**RGK700** 7 grey AMF gen-set controller

#### **RGK800** series 180 x 240 mm panel mounting

As above RGK700 but with the following additional features:

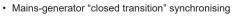
- RS-485 communication (+ CANBUS)
- Neutral current measurement range: 0.050...6A or 1.2A
- 400Hz frequency support
- 1 programmable analog input
- Expandable with rear plug-in expansion (up to 3) modules (see controller accessories)

#### Automatic mains failure (AMF)

**RGK800** 10 fully featured AMF gen-set controller

#### **RGK900** series

180 x 240 mm panel mounting



- · Mains-generator load sharing with source peak demand control
- Generator paralleling supervision (island mode with load sharing)
- Paralleling controllers for (mains mains) and (generator generator)

As above RGK800 but with the following additional features:

- Voltage measurement range: 50-720 VAC / Rated voltage: 600 VAC L-L 45...65Hz or 360...440Hz - Frequency measurement range:

- Display: Graphic LCD 128 x 112 pixels with backlight

- Customisable alarm text (16 alarms)

- Modbus-RTU, Modbus-ASCII and Modbus-TCP communication protocols
- 2 analog outputs for engine speed control (governor) / voltage regulator (AVR)

#### Paralleling controllers

RGK900SA 12 10 full featured stand alone gen-set controller **RGK900** 12 10 mains-generator paralleling control

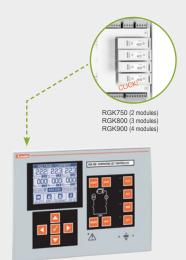
Control of mains, automatic transfer switching and paralleling on multiple generators controlled by RGK900SA

RGK900MC 13 10 Mains-ATS (Automatic Transfer Switching) controller





RGK700



RGK900















7)

**NFC** 

RGK400SA



**RGK400SA** series

· Engine protection

Stand alone gen-set controllers

· Programmable alarm properties



type digital digital description inputs outputs description

96 x 96 mm panel mounting

**RGK400SA** and **RGK420SA** with NFC technology are suitable for simple applications where only control, motor starting and monitoring of the electrical power alternator (*stand-alone applications*, *i.e. without the presence of the network*) are required.

Universal supply: 12 / 24 VDC
Display: LCD icon display
Measurement voltage: 5...576 VAC
Rated voltage: 480 VAC L-L
Current Input: 1PH, /5A or /1A

- Engine protection: With "W" or magnetic "pickup" for engine speed reading

- 1 analog resistance input for oil pressure / engine temperature or fuel level control

- Single, two and three phase voltage control - L1-L2-L3-N

- IR programming port on front panel for communication with PC (CX01, see controller accessories)

- NFC technology for parameter setup via smartphone or tablet

#### Stand alone controller

RGK400SA5+1 (E/stop)5stand alone gen-set controllerRGK420SA\*5+1 (E/stop)5stand alone gen-set controller

\* Incorporates 3 position key switch (OFF, local start, remote start)

#### Expansion modules for above RGK400SA series (rear plug-in)

EXP1040 additional - 2 digital / resistance inputs, 2 static outputs
EXP1041 additional - 2 thermocouple inputs, 2 static outputs
EXP8005 housing gasket to increase protection to IP65

#### **RGK600SA** series

144 x 144 mm panel mounting

As above RGK400SA but with following additional features:

Universal supply:12 / 24 VDC

Display: Graphic LCD 128 x 80 pixels with backlight

Measurement voltage: 50...576 VAC
Rated voltage: 480 VAC L-L
Current Input: 3PH, /5A or /1A
Operating temperature: -30...+70°C

- 3 analog resistance input for oil pressure, engine temperature or fuel level control

No NFC technology

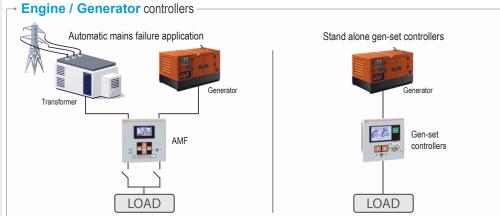
- Modbus-RTU and Modbus-ASCII protocols

#### Stand alone controller

RGK600SA 4 6 stand alone gen-set controller with "W" or magnetic "pickup" for engine speed reading (no CANbus)

RGK601SA 4 6 stand alone gen-set controller with CANbus-J1939 (no "W" or magnetic "pickup")







RGK420SA

RGK600SA



#### Automatic transfer switch controllers

# 

#### **Automatic Transfer Switch (ATS) controllers**

- · Tie-breaker management
- · Remote control and supervision / Event logging
- · Supervision of two or three three-phase power sources
- · Automatic non-priority load management (ATL800, ATL900)
- · Modbus-RTU, Modbus-ASCII and Modbus-TCP communication protocols
- IR programming port on front panel for communication with PC (NFC on some models)

type digital relay description inputs outputs

#### ATL100 series (econo)

#### (no display)

54 mm DIN mounting

**ATL100** with its modular housing is suitable for monitoring two independent power sources and to manage switching between the two sources with single phase control.

- Supply voltage: 110...230 VAC Rated voltage: 110...230 VAC L-L
- 2 single phase inputs and outputs L+N
- · Response thresholds of min and max voltage: 80% and 120% of nominal setting
- LED indication: 2 x (green) presence of both input voltages, 1 x presence of output voltage
  - 1 x (red) indicates presence voltage out of limits on inputs

#### **Automatic Transfer Switch (ATS)**

ATL100 2 3 single phase automatic transfer switch controller

#### ATL500 series (econo)

(no display)

144 x 144 mm panel mounting

144 x 144 mm panel mounting

The ATL500 is an automatic transfer switch that enables load commutation between two different source lines: a main line (LINE 1) and a standby or emergency secondary line (LINE 2).

Supply voltage: Self seeking power supply - 110...240 VAC LN
 Measurement inputs: 3-ph+N (suitable for 1 and 2 phase lines)
 Supported switching devices: Contactors and motorised changeovers
 Output relay: 2 NO for contactors / 1 NC to start genset

#### **Automatic Transfer Switch (ATS)**

ATL500 2 3 3-ph+N automatic transfer switch controller

(with LCD)

#### ...

- AC power supply 110...240 VAC Rated voltage: 100...480 VAC L-L
- Management of two power sources
- Measurement inputs for 3-ph+N voltage values (suitable for 1 and 2-phase lines)
- 128 x 80 pixel backlit graphic LCD to view measurements, events and alarms

#### **Automatic Transfer Switch (ATS)**

ATL600	6	7	automatic transfer switch controller for 2 sources
ATL601*	6	7	automatic transfer switch controller for 2 sources

\* With 12/24 VDC supply

ATL600 series

#### ATL610 series as above ATL600 but with following additional features:

- Real time clock RTC
- Dual power supply (110...240 VAC line and 12...24 VDC battery supply)
- Expandable with I/O and communication modules

#### Automatic Transfer Switch (ATS)

**ATL610\*** 6

automatic transfer switch controller for 2 sources

180 x 240 mm panel mounting

\* 2 slot to accept plug-in expansion modules EXP1010/1011/1012/1013/1014, see page F-6

### ATL800 series (with backlit LCD)

As above ATL610 but with following additional features:

- Rated voltage: 100...600 VAC L-L
- Management of 2 energy sources and 1 tie breaker
- Built-in RS-485 communication / Built-in programmable PLC logic
- Expandable with up to 3 rear plug-in expansion modules **EXP...** (see controller accessories)

#### **Automatic Transfer Switch (ATS)**

ATL800 8 7 automatic transfer switch controller for 2 sources

#### ATL900 series (with backlit LCD) 180 x 240 mm panel mounting

As above ATL800 but with following additional features:

- Management of 3 energy power sources and 2 tie breakers
- 4 current inputs for the three phases and neutral
- 128 x 112 backlit graphic LCD to view measurements, events and alarms

#### **Automatic Transfer Switch (ATS)**

ATL900 12 11 automatic transfer switch controller for 3 sources













#### **Battery chargers**

- · For lead acid battery
- · Automatic reset at end of alarm conditions
- · Charging cycle in accordance with DIN 41773 standards

output	output	output	max. p		description	dime	nsions (	mm)
type	voltage	current	consumption VA W	•	description	(H)	(W)	(D)



#### **BCF** series - Modular automatic switching battery chargers

- Alarm output relay (3A 250 VAC) AC1 duty
- Modular DIN-rail mounting (aligns with standard MCB's) orwww chassis mount
- Wide auxiliary supply range 100...240 VAC (±10%) 50/60Hz
- Protection: - Mains input fuse (non replaceable)
  - Battery output fuse
  - Electronic lock in case of short circuit on battery terminals, reverse
  - battery polarity and output overload
- · LED indication of: - Correct output voltage - Reverse battery polarity

#### Switching battery chargers

BCF025012	12V	2.5A	80	40	auto battery charger	96	90	56
BCF045012	12V	4.5A	150	70	auto battery charger	96	90	56
BCF012524	24V	1.25A	80	39	auto battery charger	96	90	56
BCF025024	24V	2.5A	150	77	auto battery charger	96	90	56

#### BCG series - DIN-rail mount switching battery chargers

- Alarm output relay (5A 30 VDC duty)
- Wide auxiliary supply range 110...240 VAC (±10%) 50/60Hz
- DIN-rail or chassis mounting (can be mounted vertically with adaptor)
- · Boost signal controlled by external contact
- · Hiccup function for battery recharging when its voltage is lower than 50% rated value
- Maximum charging current limiting trimmer 20...100% (adjustable from front)
- Protection: - Mains input fuse
  - Electronic lock in case of short circuit on battery terminals, reverse
  - battery polarity and output overload
- Power ON · LED indication of:
  - Charging operation I>30% Ic
  - Overload or short circuit condition
  - Reverse battery polarity

#### Switching battery chargers

	, ,							
BCG0612	12V	6A	230	97	auto battery charger	150	162	63
BCG1212	12V	12A	284	190	auto battery charger	150	213	63
BCG0524	24V	5A	364	158	auto battery charger	150	162	63
BCG1024	24V	10A	630	311	auto battery charger	150	213	63

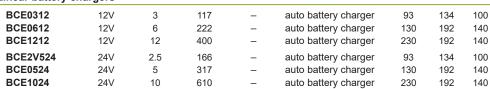
#### Accessories for above BCG battery chargers

BCGX00 vertical side mount adaptor (for space saving) for BCG0612 and BCG0524

#### **BCE** series - Linear battery chargers

- Auxiliary supply voltage: 220...240 VAC (±10%) 50/60Hz
- Charging current: 30 100% le (adjustable)
- · Protection: - Mains input fuse (except BCE2V524 and BCE0312)
  - Battery output fuse
  - Electronic lock in case of short circuit on battery terminals, reverse Battery polarity output overload (<0.5 Ue) and disconnected battery
- · LED indication of: - Power ON
  - Charge (I>0.2 Ic)
  - Alarm for protection tripping
- Static NPN transistor BCE2V5 and BCE03 others relay (5A 250 VAC) · Alarm output:











#### Power factor controllers

# 300 HAN

#### **DCRL / DCRG** Power Factor Controllers

DCRL/DCRG controllers incorporate latest technological advanced monitoring to provide accurate measurement and control of network parameters in power factor correction applications, providing total protection of capacitors and systems.

#### General features:

- · Suitable for medium voltage systems (with VT's)
- · High accuracy (TRMS) measurements with configurable alarms
- Wide voltage measurement range: 50...720 VAC L-L, 50....415 VAC L-N
- Expandable through clip-in expansion modules (I/Os, Comm ports etc.)
- · Front mounted optic interface port for programming, data download, diagnostics

tyne	number	evpand to:	description	dimen	sions (	mm)
type	of steps	ехрани ю.	description	(H)	(W)	(D)

#### DCRL controllers 3, 5 and 8 step (one CT connection)

**DCRL** series power factor controllers with advanced functionality in a dedicated ultra compact housing, combine modern front design with ease of mounting and expendability.

- Reactive power measurement per step installed

3 and 5 step controllers

8 relay step controller

- 3, 5 or 8 steps (expandable with expansion module)
- Voltage and current THD with single harmonic analysis up to 15° order
- Backlit icon LCD display (alarm codes with scrolling text) 128 x 80 pixels



#### 1 expansion slot

DCRL 3 DCRL 5	3 step 5 step	6 step 8 step	panel mount power factor controller panel mount power factor controller	96 96	96 96	65 65
8 step contro	ollers	2	expansion slots			
DCRL 8	8 step	14 step	panel mount power factor controller	144	144	44

#### DCRG controllers 8 step single and three-phase CT connection

**DCRG** series power factor controllers are designed to satisfy technical characteristics of modern electrical installation requirements in all industries and working conditions, to detect critical operating conditions and offer total protection of power factor systems.

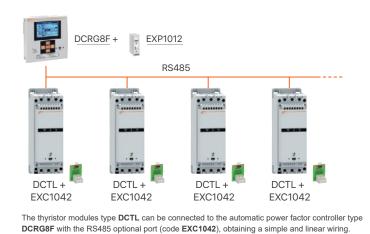
- Recording of number of connections per step
- Capacitor over-current protection on all three phases
- Voltage and current THD with single harmonic analysis up to 31° order
- 8 steps (expandable by up to another 10 steps with plug-in expansion modules)
- Backlit graphic LCD display (permits reading in bar-graph and wave form format)
- Configurable for fast dynamic (thyristor) switching or a combination of static and relay
- Quick CT programming function / Automatic identification of direction of CT current flow
- Calendar-clock (RTC) with backup reserve for event logging: Alarms, setup changes, etc.
- Connection to 1/3 ph lines, 3 ph + N and co-generation systems with 4 quadrant operation
- Three current inputs permit per phase analysis of all electrical parameters in the installation

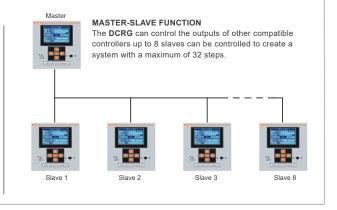
1 8	+1.00   10.00	
	*1000 RE	
5.2	POCAGE POWER RACING CONTROLLER	
ì		DCRG 8F

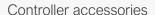
#### 4 expansion slots

			,			
DCRG 8	8 step	18 step	panel mount power factor controller	144	144	44
8 thyristor sta	tic step con	troller (expand	dable up to 24 steps with expansion mod	lules)		
DCRG 8F	8 step	24 step	static step power factor controller	144	144	44
For expansion r	nodules optio	ns see <b>F-6</b>				

#### DCRG - Power factor controllers















#### **Expansion modules for PFC controllers**

**EXP...** series expansion modules add extra functionality to following panel mount products:

DMG 600/7000/8000/9000 - Digital multimeters and power analysers
DCRL and DCRG - Automatic power factor controllers
ATL 610/800/900 - Automatic transfer controllers

**RGK** 400/600/750/800/900 - Generator controllers

type inputs outputs description

#### **EXP** expansion modules (plug into rear of controller to add more functionality) Inputs/Outputs **EXP1006** 2 relay to increase number of capacitor steps **EXP1007** 3 relay to increase number of capacitor steps EXP1000 opto-isolated digital inputs 4 digital EXP1001 opto isolated to increase static steps 4 static EXP1002 2 digital 2 static opto-isolated digital inputs and static outputs **EXP1003** outputs rated 5A 250 VAC 2 relay **EXP1004** opto-isolated PT100, 0/4-20mA, 0-10V, 0...±5V 2 analog **EXP1005** opto-isolated 0/4-20mA or 0-10V or 0...±5V 2 analog EXP1016 3ph (A) + 2 x NTC for capacitor bank protection Communication EXP1010 USB opto-isolated USB interface EXP1011 RS-232 opto-isolated RS-232 interface EXP1012 RS-485 opto-isolated RS-485 interface **EXP1013** Ethernet opto-isolated Ethernet with web server function EXP1014 Profibus opto-isolated Profibus-DP interface Accessories 51C2 PC - DCRL/DCRG connecting cable + EXP1011 module C9 cable PC - Analog modem connecting cable PC - controller USB dongle with connecting cable CX01

PC - Controller Wi-Fi dongle for programming, data download, diagnostics













#### **Test the Polar Platform today!**

CX02

Access the Polar Demo Portal via the QR code for a hands-on experience of everything Polar has to offer.





#### Special configuration contactors



#### Capacitor switching contactors AC control circuit - 230/400V

Contactors for PFC with AC control circuits equipped with early-make limiting resistors limiting in-rush currents initially before making contact. Resistors are disconnected from the circuit when contactor closing operation is complete.

type	kvar 400V	kvar 440V	rated current	control	description	auxiliary contacts
PFC contactors						
BFK1210A	12.5	14	18A	AC	capacitor switching contactor	1NO
BFK1810A	15	17	23A	AC	capacitor switching contactor	1NO
BFK2600A	20	22	30A	AC	capacitor switching contactor	_
BFK3200A	25	27.5	36A	AC	capacitor switching contactor	_
BFK3800A	30	33	43A	AC	capacitor switching contactor	_
BFK5000A	40	41	58A	AC	capacitor switching contactor	_
BFK8000A	50	56	75A	AC	capacitor switching contactor	_
BFK11500A	75	85	115A	AC	capacitor switching contactor	_
BFK15000A	100	115	144A	AC	capacitor switching contactor	_
Kit to assemble B	FK contac	ctors from	standard I	BF contac	tors	for contactor
G460 kit to assemble standard contactors for capacitor switching BFX10K3 kit to assemble standard contactors for capacitor switching BFX10K4 kit to assemble standard contactors for capacitor switching						BF0938A BF5094A BF95150A

#### Thyristor switching modules

Suitable for dynamic (fast) PFC

**DCTL** series thyristor modules are ideal for dynamic power factor correction. Zero cross switching guarantees very short switching times, reducing current peaks generated by capacitor insertion without voltage peaks on disconnection. Integrated current transformers permit complete monitoring and protection of capacitor banks.

- · Prevents high in-rush currents at capacitor switching
- Operational voltage: 400...480 VAC (690V available on request)

Advanced communication functions:

- · NFC connectivity for programming via smart devices
- Optical port for frontal connection to a PC via USB or WiFi via CX01 or CX02
- Optional RS-485 card (EXC1042) for connection to DCRG8F controller

type	kvar	kvar	rated	description	dimensions (mm)			
	400V	480V	current		(H)	(W)	(D)	
								Ī
Thyristor switching modules								
DCTLA4800180	15	18	22A	thyristor switching module	218	75	172	
DCTLA4800360	30	36	43A	thyristor switching module	218	75	172	
DCTLA4800600	50	60	72A	thyristor switching module	226	95	182	
DCTLA4801200	100	120	144A	thyristor switching module	301	212	216	



#### DCTLA - Thyristor switching modules



- DEDICATED TO THE DYNAMIC POWER FACTOR CORRECTION (FAST)
- VERSIONS WITH RATED VOLTAGE 400VAC, 480VAC AND 600...690VAC
- POWER FOR STEPS FROM 7.5KVAR TO 120KVAR
- NOISE REDUCTION 😯
- SWITCHING ON AT ZERO-CROSSING

#### **Advanced communication functions:**

- NFC connectivity for programming via smart devices and App
- Frontal optical port for connection to a PC via USB or Wi-Fi
- Optional RS485 card





### Notes



## World Class Innovation, Local Commitment

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