**Energy management** 

## <sup>24</sup> Metering instruments and current transformers

WAVEFORM

Lovato DMG 900 RD

DMG 300

Single and three-phase energy meters

- MID certified versions with UTF certificates
- Digital voltmeters, ammeters, wattmeters, frequency meters and cosφ meters
- Digital multimeters and power analyzers, expandable, with graphic or icon LCD
- Connection to single, two and three-phase systems
- Ideal for distribution systems, electricity cogeneration and on-board machinery installations
- High measurement accuracy
- Totally programmable digital and analog inputs and outputs
- RS485, RS232, USB, Ethernet, Profibus DP and M-Bus communication ports

#### SEC. - PAGE

### Energy meters

30

AI

A2

Single-phase.	24	-	8
Single-phase, MID certified	24	-	9
Three-phase with or without neutral	24	-	10
Three-phase with neutral, MID certified	24	-	11
Three-phase with neutral, MID certified with UTF certificate	24	-	12
Current transformers with UTF certificates	24	-	13
Data concentrators			
General use	24	-	14
Digital metering instruments			
Modular LCD multimeters	24	-	15
Flush-mount LCD multimeters	24	-	17
Flush-mount touch-screen LCD power analyzers	24	-	19
Flush-mount LED measuring instruments	24	-	20
Flush-mount LED multimeters	24	-	22
Modular LED measuring instruments	24	-	25
Communication devices, protection covers, accessories	24	- ;	27
Converter, gateway, connecting cables	24	- ;	28
Current transformers	24	- 1	29
	• •		~~
Dimensions	24	- ;	32
Wiring diagrams	24	- ;	35
Technical characteristics	24	- ;	38

temote display unit



#### **ENERGY METERS**

- Single-phase, three-phase with neutral, three-phase with or without neutral
- Direct connection or by current transformers
- MID certified versions
- Versions expandable with EXM... expansion modules
- Versions with built-in RS485 or M-Bus communication ports.



## DIGITAL LCD MULTIMETERS AND POWER ANALYZERS

- · Graphic or icon LCD
- Modular and flush-mount 96x96mm versions
- Versions expandable with EXM... and EXP... expansion modules
- Version with built-in RS485 communication port.
- Version with current reading through Rogowski coils.



#### DATA CONCENTRATORS

- Energy consumption data storage for network
   usage
- Connection up to 14 energy meters equipped with static output
- Expandable with EXM... expansion modules
- Built-in RS485 communication port.



### PORTABLE POWER ANALYZERS

- IP65 housing
- With built-in USB interface
- GPRS/GSM communications
- Available kits of current clamps and cables.



#### LED MEASURING INSTRUMENTS

- Voltmeters, ammeters, frequency meters,  $\cos \phi$  meters and wattmeters.

#### **DIGITAL LED MULTIMETERS**

Basic version, with energy meters, with 2
 programmable outputs and built-in RS485
 communication port.



### CURRENT TRANSFORMERS

- Primary current: 50-4000A
- Secondary current: 5A
- · Solid and split-core types
- Instrument and accuracy versions.





# System management





WAVEFORM CURRENT

# DMG SERIES MULTIMETERS AND DME SERIES ENERGY METERS



Process data collection



Boolean logic combination





Lovato







Synergy





Cloud



MONITORING PAGES for the test of instantaneous data

Name Jospe Denter Page Data kg Chart J	iare Report Use Utilies		Maker Production Streamour	• • •
ieneral consumption (Δ)				
Date	R&D QE LV general - kWh	LV General - DMG900 - kWh	R&D QE LV general - Delta	LV General - DMG900 - Delta kW
12/14/2015 5:00:00 PM	2236319.8	3887477.25	5195.6	4580.01
12/11/2015 5:00:00 PM	2231124.2	3877900.63	2838.7	8053.45
12/10/2015 12:00:00 PM	2228285 5	3865847.18	47136.9	6892.05
11/16/2015 5:00:00 PM	2181148.6	3746956-87	6874.7	4543.21
11/12/2015 5:00:00 PM	2174273.9	3730740.53	8049.8	7260.26
11/8/2015 1:00:00 PM	2166224.1	3704870.68	5969	854.1
11/4/2015 5:00:00 PM	2160255 1	3686294.63	6227.4	6759.35
11/1/2015 4:00:00 PM	2154027.7	3667904.56	1089.3	859.47
10/31/2015 4:00:00 PM	2152938.4	3667045.09	3239.2	3694.45





 GRAPHICS for the representation over time of the data collected from the data logs



 REPORT for the processing of time band data or consumption users

Lovato

#### SINGLE-PHASE DIRECT CONNECTION

	DME D100 T1	DME D110 T1	DME D115 T1	DME D120 T1	DME D121	DME D122	DME D130 LM
Maximum current	40A	40A	40A	63A	63A	63A	63A
Display							
Vertical, no backlight	•	•					
Horizontal, backlight			•	•	•	•	•
Measurements							
kWh	•						
kWh, kW with average and max demand			•				
kWh, kvarh, kW with average and max demand, kvar, V, I, Hz, PF, total and partial hour counter		•		•	•	•	•
Interface							
Pulse output	•						
Programmable output (pulses/thresholds)		•	•	•			
Built-in Modbus RTU (RS485)					•		
Built-in M-Bus						•	
MID version availability	•	•		•	•	•	
Load management							•
Compatibility with Synergy,					•		

#### THREE-PHASE

	DME D300 T2	DME D301	DME D302	DME D305 T2	DME D330	DME D332	DME D310 T2
Maximum current	80A	80A	80A	CT /5 or CT /1	CT /5 or CT /1	CT /5 or CT /1	CT /5
Connection type							
Direct	•	•	•				
Via CT				•	•	•	•
Interface							
Programmable output (pulses/thresholds)	•			•			•
Built-in Modbus RTU (RS485)		•			•		
Built-in M-Bus			•			•	
Expandability							
Communication (RS485, Ethernet, USB)							•
Relay outputs for load disconnection							•
Data memory (Data logger)							•
MID version availability	•	•	•	•	•	•	•
Compatibility with Synergy,		•			•		•

• UTF-certified versions are available on request.

# 24 Metering instruments and current transformers Multimeters and power analyzers

#### Lova electric

### DIN RAIL MOUNTING (MODULAR)

	DMG 100	DMG 110	DMG 200	DMG 210	DMG 300
Maximum rated voltage	600VAC	600VAC	690VAC	690VAC	690VAC
Voltage and current measure accuracy	0.5%	0.5%	0.5%	0.5%	0.2%
Active energy measure accuracy	Class 1	Class 1	Class 1	Class 1	Class 0.5s
Single-phase energy meter	•	•			
Harmonic analysis	15° order	15° order	THD only	THD only	31° order
Boolean logic					•
Expandable with EXM modules					3 modules
Display type	Icons	Icons	Graphic	Graphic	Graphic
Built-in communication port		RS485		RS485	
Communication port with EXM modules					RS232 USB RS485 Ethernet
Ethernet-RS485 gateway function					•

FLUSH-MOUNTING (96x96mm/3.78"x3.78")						
	3959 3940 3872 3955	DMG 610	A013 4017 A017 4018	4013 4017 4017 4018		DMG 900T +
	Dina coo	DMG 611	bild roo		Billa 000	DMG 900RD
Maximum rated voltage	600VAC	600VAC	690VAC	690VAC	690VAC	690VAC
Current reading	CT /5A or /1A	CT /5A or /1A (for DMG 610) Rogowski coils (for DMG 611)	CT /5A	CT /5A or /1A	CT /5A or /1A	CT /5A or /1A
Voltage and current measure accuracy	0.5%	0.5%	0.5%	0.2%	0.2%	0.2%
Active energy measure accuracy	Class 1	Class 1	Class 1	Class 0.5s	Class 0.5s	Class 0.5s
Single-phase energy meter	•	•				
Harmonic analysis	15° order	15° order	THD only	31° order	63° order	63° order
Neutral-earth voltage						•
Neutral current	Calculated	Calculated	Calculated	Calculated	Calculated or measured via CT	Calculated or measured via CT
Boolean logic			•	•	•	•
Expandable with EXP modules	1 module	1 module	4 modules	4 modules	4 modules	4 modules
Display type	Icons	Icons	Graphic	Graphic	Graphic	Graphic (DMG900RD)
Built-in communication port		RS485				RS485 or RS232 selectable
Communication port with EXP modules	RS232 USB RS485 Ethernet	RS232 USB RS485 Ethernet	RS232 USB RS485 Ethernet	RS232 USB RS485 Ethernet Profibus DP slave	RS232 USB RS485 Ethernet Profibus DP slave GSM/GPRS	RS232 USB RS485 Ethernet Profibus DP slave GSM/GPRS
Ethernet-RS485 gateway function				•	•	•
Energy quality according to EN50160						•
Degree of protection	IP54	IP54	IP65	IP65	IP65	IP65 (DMG 900RD)

24-7

Description

32A direct connection, 1U

32A direct connection, 1U

40A direct connection, 1U

40A direct connection, 1U

40A direct connection, 1U

1 program. static output, multimeasurements 0, 220...240VAC

1 program. static output, multimeasurements@,110...120VAC

40A direct connection, 2U,

63A direct connection, 2U

1 program. static output, multi-

measurements @, 220-240VAC

1 program. static output, multi-

measurements 1, 220-240VAC

1 program. static output, multi-

63A direct connection 2U

63A direct connection, 2U,

RS485 interface multi-

M-Bus interface multi-

Description

Digital meter with backlight LCD display per load

measurements 0, 110...120VAC

measurements (0, 220-240VAC

measurements 0, 220-240VAC

63A direct connection, 4U,

2 inputs and 2 relay outputs

multi-measurement0,

for load management,

220...240VAC

1 pulse output

1 pulse output,

220...240VAC

1 pulse output,

110...120VAC

DME D110 T1 A120 40A direct connection, 1U

Digital meter with backlight LCD display.

DME D120 T1 A120 63A direct connection, 2U

Mechanical meter with mechanical display.

Digital meter, with LCD screen.

Order code

**DME M100** 

**DME M100 T1** 

**DME D100 T1** 

**DME D110 T1** 

**DME D115 T1** 

**DME D120 T1** 

**DME D121** 

**DME D122** 

Order code

management DME D130 LM

new

new

DME D100 T1 A120

Energy meters

#### Single-phase



**DME M100** 



DME D110 T1...



DME D115 T1... DME D120 T1.. DME D121 - DME D122

#### Single-phase Load management

	1	
Concession in	-	- 201
01123	20	part 1
·	-	
	01123	0112358



#### General characteristics

The energy meters are instruments for energy consumption measurement in single-phase installations with direct connection

#### **Operational characteristics**

#### DME M..

Qty

per

pkg

n°

1

1

1

1

1

Wt

[kg]

0 084

0.088

0.086

0.086

0.090

0.090

0.090

0.148

0.148

0.148

0 148

Wt

[kg]

0.148

1

1

Qty

per

pkg n°

- Mechanical meter with 6+1 digit count
- Rated supply voltage: 230VAC -20...+15%
- Direct connection
- 32A maximum current Active energy measurement and accuracy:
- Class 1 (IEC/EN 62053-21)
- Flashing LED for consumption indication
- Static pulse output for DME M100 T1 only
- Modular DIN 43880 housing, 1 module
- Sealable terminal blocks, standard supplied IEC degree of protection: IP40 on front; IP20 at terminals.

#### DME D100 T1 - DME D110 T1 - DME D115 T1

- DNE D120 T1 DME D110 T1 DME D122 DME D130LM
   LCD meter : with 5+1 digit count for DME D100 T1, DME D110 T1...; backlight with 6+1 digit count for DME D115 T1, DME D120 T1, DME D121, DME
- D122, DME D130LM
- Nominal supply voltage: 220...240VAC for DME D...T1
  - 110...120AC for DME D...T1 A120
- Voltage range:
- 187...264VAC for DME D...T1
  - 93...132VAC for DME D...T1 A120
- Direct connection
- Maximum current: 40A for DME D100 T1, DME D110 T1..., DME D115 T1 63A for DME D120 T1 - DME D121 - DME D122 -
- DME D130LM Active energy measurement and accuracy: Class 1 (IEC/EN 62053-21)
- Reactive energy measurement and accuracy: Class 2 (IEC/EN 62053-23)
- Metrological LED with pulse emission for consumption
- indication
- Clearable partial energy measurement One output: pulse for DME D100 T1; programmable static for all other types
- Built-in RS485 port for DME D121; compatible with Synergy e Xpress
- Built-in M-Bus port for DME D122
- Modular housing: 1 module for DME D100 T1, DME D110 T1; 2 module for all other types
- Sealable terminal blocks, standard supplied
- EN degree of protection: IP40 on front; IP20 at terminals.

#### Synergy supervision and energy management software See Section 29.

#### press configuration and remote control software See Section 29.

#### Certifications and compliance

Certifications obtained: EAC; UL Listed, for USA and Canada (File E346886), as Electrical Process Control Equipment -Energy meters, for DME D100..., DME D110..., DME D120... DMF D121 types

Compliant with standards: IEC/EN 61326-1 for DME M... type; IEC/EN 50470-1, IEC/EN 61010-1 for DME D... types; UL 61010-1, CSA C22-2 n° 61010-1 for DME D100..., DME D110..., DME D120..., DME D121.

#### Multi-measurements:

- Total and partial active energy Total and partial reactive energy
- Voltage
- Current
- Active and reactive power
- Power factor Frequency
- Total and partial hour counter
- Average active power
- (calculation made using the last 15 minutes of data) Maximum demand
- Multi-measurements:
  - Total and partial active energy
  - Active power
  - Average active power

Wiring diagrams

page 24-35

(calculation made using the last 15 minutes of data) Maximum demand

Software and accessories pages 24-27 and 28

Dimensions page 24-32







## Single-phase, **MID certified**





DME D110 T1 MID



DME D120 T1 MID

	Order code	Description	Qty per pkg	Wt
			n°	[kg]
	Digital meter with	LCD display.		
	DME D100 T1 MID	40A direct connection, 1U 1 pulse output, 230VAC	1	0.086
	DME D110 T1 MID	40A direct connection, 1U 1 programmable static output, multi-measurements <b>0</b> , 230VAC	1	0.090
	DME D120 T1 MID	63A direct connection, 2U 1 programmable static output, multi-measurements <b>0</b> , 230VAC	1	0.148
	DME D121 MID	63A direct connection, 2U, RS485 interface multi-measurements <b>0</b> , 220240VAC	1	0.148
W	DME D122 MID	63A direct connection, 2U, M-Bus interface multi-measurements <b>0</b> , 220240VAC	1	0.148

#### **General characteristics**

The DME series energy meters, MID certified, are needed for billing purposes between electricity suppliers and consumers and for energy consumption measurement in directly

connected single-phase installations. MID is the Measuring Instruments Directive of the European Union; instruments must be certified accordingly whenever used for monetary transactions in this territory.

#### **Operational characteristics**

- LCD meter:
   With 5+1 digit count for DME D100/110 T1 MID Backlight with 6+1 digit count for all other types
- Nominal supply voltage: 230VAC Voltage range: 187-264VAC 50Hz
- \_ Direct connection
- \_ Maximum current: 40A for DME D100/110 T1 MID 63A for DME D120 T1 MID, DME D121 MID, DME D122 MID
- Active energy measurement and accuracy: Class B (EN 50470-3)
- Reactive energy measurement and accuracy: Class 2 (IEC/EN 62053-23)
- Metrological LED with pulse emission for consumption indication
- Clearable partial energy measurements One output: pulse for DME D100 T1 MID; programmable static for other types
- Built-in RS485 port for DME D121 MID; compatible with Symergy and Xpress
- Built-in M-Bus port for DME D122 MID
- Modular housing, 1 module for DME D100 T1, DME D110 T1 MID; 2 module for other types \_
- Sealable terminal blocks, standard supplied
- EN degree of protection: IP40 on front; IP20 at terminals.

Synergy supervision and energy management software See Section 29.

press configuration and remote control software See Section 29.

#### **Certifications and compliance**

Certifications obtained: MID Class B (EN 50470-1, EN 50470-3), certifications per module B (type tests) + module D (production conformity). Compliant with standards: EN 50470-1, EN 50470-3, TR50579.

#### • Multi-measurements:

- Total and partial active energy
- Total and partial reactive energy
- Voltage
- Current
- Active and reactive power
- Power factor \_ \_
- Frequency
- Total and partial hour counter Average active power
- (calculation made using the last 15 minutes of data) Maximum demand.

Order code

Energy meters

new

new

new

## Three-phase with or without neutral, non expandable



		pkg	
		n°	[kg]
Digital meter for th connection.	nree-phase with neutral. 80A	direct	
DME D300 T2	4U, 2 programmable static outputs, multi-measurements <b>0</b>	1	0.360
DME D301	4U, RS485 interface, multi-measurements	1	0.360
DME D302	4U, M-Bus interface, multi-measurements	1	0.360
Digital meter for the Connection by CT	nree-phase with or without ne	eutral.	
DME D305 T2	4U, 2 programmable static outputs, multi-measurements <b>0</b>	1	0.332
DME D330	4U, RS485 interface, multi-measurements	1	0.332
DME D332	4U, M-Bus interface, multi-measurements	1	0.332

Description

....

2346

747

....

2344"

-	-	-	-	-	18	÷	-14	9	9	0	
•		•	-	-	-	а.	100	68	11	5	51.7

#### **DME D330**

# Three-phase with or without neutral, expandable



DME D310 T2



EXM10 10

#### Order code Description Qty Wt per pkg n° [kg] Digital meter for three-phase with or without neutral. Connection by CT /5A **DME D310 T2** 0.332 4U, 2 programmable 1 static outputs, multi-measurements 0, expandable

Order code	Description					
DME D310 T2 EXPANSION MODULES. Inputs and outputs.						
EXM10 00	2 digital inputs and 2 static outputs, opto-isolated					
EXM10 01	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC					
Communicatio	n ports.					
EXM10 10	Opto-isolated USB interface					
EXM10 11	Opto-isolated RS232 interface					
EXM10 12	Opto-isolated RS485 interface					
EXM10 13	Ethernet interface with Web server function					
EXM10 20	Opto-isolated RS485 interface and 2 relay outputs rated 5A 250VAC					
EXM10 30	Data storage, clock-calendar (RTC) with backup reserve energy for data logging					



#### **General characteristics**

Qty

per

Wt

The energy meters are digital meters/analyzers of electric energy for systems with direct three-phase connection or by CT.

Expandable with up to 3 module EXM series by optical interface.

#### **Operational characteristics**

- LCD multifunction meter
- Nominal supply voltage:
- 380...415VAC (L-L)
  - Voltage range: 323...456VAC (L-L)
- Active energy measurement and accuracy: Class 0.5s (IEC/EN 62053-22) for DME D305T2, DME D330 and DME D332, Class 1❷ (IEC/EN 62053-21) for DME D300T2, DME D301 and DME D302
- Active energy measurement and accuracy: Class 2 (IEC/EN 62053-23)
- Metrological LED with pulse emission for consumption indication
- Clearable partial active energy measurements
- 1 programmable digital input
- 2 programmable static outputs for DME D300T2, DME D305T2 and DME D310T2
- Built-in RS485 port for DME D301 and DME D330; compatible with Synergy and Xpress
  - Built-in M-Bus port for DME D302 and DME D332
  - Optical interface for EXM10... expansion modules with DME D310 T2
  - Modular housing, 4 module
- Sealable terminal blocks, standard supplied
- EN degree of protection: IP40 on front; IP20 at terminals.

## Synergy supervision and energy management software See Section 29.

Xpress configuration and remote control software Section 29.

#### EXM series expansion modules See page 30-3.

#### Certifications and compliance

Certifications obtained: EAC for all types, RCM for DME D305T2, DME D310T2, DME D330. Compliant with standards: IEC/EN 50470-1, IEC/EN 61010-1, IEC 61010-2-030.

- Multi-measurements:
  - Total and partial active energy
  - Total and partial reactive energy
  - Voltage
  - Current
  - Active and reactive power
  - Power factor
  - Frequency
- Total and partial hour counter
  - Average active power (calculation made using the last 15 minutes of data)
- Maximum demand.
- ❷ Class 1 according to IEC/EN 62053-21, accuracy measured in the 0.75A-80A range: 0.5%

Dim



Order code



#### Three-phase with neutral, non expandable, **MID certified**



DME D300 T2 MID

			per pkg n°	[kg]							
	Digital meter for three-phase with neutral. 80A direct connection.										
	DME D300 T2 MID	2 programmable static outputs, multi-measurements	1	0.360							
	DME D301 MID	4U, RS485 interface, multi-measurements	1	0.360							
	DME D302 MID	4U, M-Bus interface, multi-measurements	1	0.360							
€W	Digital meter for three-phase with neutral. Connection by CT /5A.										
	DME D305 T2 MID	2 programmable static outputs, multi-measurements	1	0.332							
	DME D330 MID	4U, RS485 interface, multi-measurements	1	0.332							
	DME D332 MID	4U, M-Bus interface, multi-measurements	1	0.332							

Description

### Three-phase with neutral, expandable, MID certified

## MID 0000.0000 001593.1 .... 000910.3= **ຉຉຉຉຉຉ∎ຉຉຉຉຉ**ຉ

#### DME D310 T2 MID



EXM10 10

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Digital meter for th Connection by CT	nree-phase with neutral. /5A.		

Order code	Description			
DME D310 T2 MID EXPANSION MODULES. Inputs and outputs.				
EXM10 00	2 digital inputs and 2 static outputs, opto-isolated			
EXM10 01	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC			
Communication ports.				
EXM10 10	Opto-isolated USB interface			
EXM10 11	Opto-isolated RS232 interface			
EXM10 12	Opto-isolated RS485 interface			
EXM10 13	Ethernet interface with Web server function			
EXM10 20	Opto-isolated RS485 interface and 2 relay outputs rated 5A 250VAC			
EXM10 30	Data storage, clock-calendar (RTC) with backup reserve energy for data logging			



#### **General characteristics**

Qtv Wt

The DME series energy meters, MID certified, are needed for billing purposes between electricity suppliers and consumers and for energy consumption measurement in directly or CT connected three-phase installations. Expandable with up to 3 module EXM series by optical interface.

#### **Operational characteristics**

- LCD multifunction meter
- Nominal supply voltage: 230VAC (L-N); 400VAC (L-L) \_
- Voltage range: 187...264VAC (L-N); 323...456VAC (L-L) \_
- \_ Active energy measurement and accuracy: Class B
- (EN 50470-3) Reactive energy measurement and accuracy: Class 2 (IEC/EN 62053-23)
- Metrological LED with pulse emission for consumption \_ indication
- Clearable partial energy measurements
- \_ 1 programmable digital input
- \_ 2 programmable static outputs DME D300 T2 MID, DME D305 T2 MID and DME 310 T2 MID
- Built-in RS485 port for DME D301 MID and
- DME D330 MID; compatible with Synergy and Xpress Built-in M-Bus port for DME D302 and DME D332
- \_ Optical interface for EXM10... expansion modules with DME D310 T2
- Modular housing 4 module
- Sealable terminal blocks, standard supplied
- EN degree of protection: IP40 on front; IP20 at terminals.

## Synergy supervision and energy management software See Section 29.

Xpress configuration and remote control software See Section 29.

EXM series expansion modules See page 30-3.

#### **Certifications and compliance**

Certifications obtained: MID Class B (EN 50470-1, EN 50470-3), certifications per module B (type tests) + per module D (production conformity). Compliant with standards: EN 50470-1, EN 50470-3, TR50579.

• Multi-measurements:

- Total and partial active energy
- Total and partial reactive energy
- Voltage
- Current
- Active and reactive power
- Power factor
- Frequency
- Total and partial hour counter Average active power
- (calculation made using the last 15 minutes of data) Maximum demand.

Dimensions page 24-32



**Energy meters** MID certified – With UTF certificates

Three-phase with neutral, Ouden and a Description

new

nev

## **MID** certified



**DME D300 F** 

Order code	Description	Qty per pkg	Wt	
		n°	[kg]	
Digital meter for th complete with UTF	nree-phase with neutral, non certificates for installations i	expand in Italy.	able,	
DME D300 F	DME D300 T2 MID, complete with UTF certificate	1	0.360	
 DME D301 F	DME D301 MID, complete with UTF certificate	1	0.381	
DME D305 F	DME D305 T2 MID, complete with UTF certificate	1	0.381	
DME D330 F	DME D330 MID, complete with UTF certificate	1	0.381	
Digital meter for three-phase with neutral, expandable, complete with UTF certificates for installations in Italy.				
DME D310 F	DME D310 T2 MID, complete with UTF certificate	1	0.381	

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EXM	່ອອອອອອອ 10 10

Order code	Description
DME D310 F E	XPANSION MODULES.
Inputs and out	puts.
EXM10 00	2 digital inputs and 2 static outputs, opto-isolated
EXM10 01	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
EXM10 02	4 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communicatio	n ports.
EXM10 10	Opto-isolated USB interface
EXM10 11	Opto-isolated RS232 interface
EXM10 12	Opto-isolated RS485 interface
EXM10 13	Ethernet interface with Web server function
EXM10 20	Opto-isolated RS485 interface and 2 relay outputs rated 5A 250VAC
EXM10 30	Data storage, clock-calendar (RTC) with backup reserve energy for data logging



#### General characteristics

The UTF (Finance Technical Office) certification is required in case of applications where taxes have to be paid due to energy production (Italian regulations for plants >20kW). The certificates must be associated to the energy meter (MID version) and to each single current transformer in needed (see page 24-13 for selection).

DME energy meters, MID version, for three-phase systems with or without current transformers can be supplied with the certificates included (DME...F). DME D310 F... can be expanded up to 3 EXM modules.

If required, the fifth certificate relevant to the meter and current transformer combination can be supplied as well (see page 24-13).

#### **Operational characteristics**

- LCD multifunction meter
- Nominal supply voltage: 230VAC (L-N); 400VAC (L-L)
- \_ Voltage range: 187...264VAC (L-N); 323...456VAC (L-L) \_
- Active energy measurement and accuracy: Class B (EN 50470-3)
- Reactive energy measurement and accuracy: Class 2
- (IEC/EN 62053-23) Metrological LED with pulse emission for consumption indication
- Clearable partial energy measurements
- 1 programmable digital input
- 2 programmable static outputs for DME D300 F, DME D305 F and DME 310 F
- Built-in RS485 port for DME D301 F and DME D330 F; compatible with <u>Synergy</u> e <u>Xpress</u> Optic interface for EXM10... expansion modules with DME
- D310 F
- Modular housing 4 module
- \_
- Sealable terminal blocks, standard supplied EN degree of protection: IP40 on front; IP20 at terminals.

Multi-measurements

- Total and partial active energy Total and partial reactive energy
- Voltage \_
- \_ Current
- Active and reactive power \_
- \_ Power Factor
- \_ \_
- Frequency Total and partial hour counter
- \_ Average active power
- (calculation made using the last 15 minutes of data) Maximum demand.

ynergy supervision and energy management software See Section 29.

press configuration and remote control software See Section 29.

#### EXM series expansion modules See page 30-3.

#### Certifications and compliance

Certifications obtained: MID Class B (EN 50470-1, EN 50470-3), certifications per module B (type tests) + per module D (production conformity) for DME D300 F and DME D310 F energy meters. UTF certificates are standard supplied.

Compliant with standards: EN 50470-1, EN 50470-3, TR 50579.



### 24 Metering instruments and current transformers Current transformers

Order code

### **Current transformer kits** with UTF certificates



nev

DM...

			per			
			n°	[kg]		
	Kit comprising of three /5A and class 0.5s current transformers					
	DM1TP 0060 F KIT	3 DM1TP0060, complete with UTF certificate	1	1.440		
	DM1TP 0080 F KIT	3 DM1TP0080, complete with UTF certificate	1	1.440		
•	DM1TP 0100 F KIT	3 DM1TP0100, complete with UTF certificate	1	1.560		
	DM1TP 0150 F KIT	3 DM1TP0150, complete with UTF certificate	1	1.680		
.1	DM1TP 0200 F KIT	3 DM1TP0200, complete with UTF certificate	1	1.620		
•	DM1TP 0250 F KIT	3 DM1TP0250, complete with UTF certificate	1	1.620		
	DM1TP 0300 F KIT	3 DM1TP0300, complete with UTF certificate	1	1.680		
	DM1TP 0400 F KIT	3 DM1TP0400, complete with UTF certificate	1	1.680		
	DM3TP 0500 F KIT	3 DM3TP0500, complete with UTF certificate	1	2.160		
	DM3TP 0600 F KIT	3 DM3TP0600, complete with UTF certificate	1	2.160		
	DM3TP 0800 F KIT	3 DM3TP0800, complete with UTF certificate	1	2.280		
	DM5TP 1000 F KIT	3 DM5TP1000, complete with UTF certificate	1	2.820		
	DM5TP 1250 F KIT	3 DM5TP1250, complete with UTF certificate	1	2.760		
	DM5TP 1600 F KIT	3 DM5TP1600, complete with UTF certificate	1	2.880		
	DM5TP 2000 F KIT	3 DM5TP2000, complete with UTF certificate	1	2.940		
	DM5TP 2500 F KIT	3 DM5TP2500, complete with UTF certificate	1	3.120		
	DM5TP 3000 F KIT	3 DM5TP3000, complete with UTF certificate	1	2.940		

Description of CTs included Qty Wt

#### General characteristics

The UTF (Finance Technical Office) certification is required in case of applications where taxes have to be paid due to energy production (Italian regulations for plants >20kW). The certificates must be associated to the energy meter (MID version, see page 24-13 for selection) and to each single current transformer is needed.

DME energy meters, MID version, for three-phase systems with or without current transformers can be supplied with the certificates included (DME...F). DME D310 F... can be expanded up to 3 EXM modules.

If required, the fifth certificate relevant to the meter and current transformer combination can be supplied as well. The DM...TP type accuracy current transformers (CTs) are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the digital multimeters or protection relays.

DM...TP are accuracy current transformers in class 0.5s without a primary winding and are normally used for high primary current values starting from 60A.

The number of loops of the primary cable does not modify the accuracy but converts the primary current value proportional to secondary current (see page 24-30).

#### **Operational characteristics**

- Operating frequency: 50...60Hz
- Secondary output current: 5A
- \_ Overload withstand: 120% Ipn
- \_ Rated insulation voltage Ui: 720V
- Rated short time thermal current Ith: 40-60lpn for \_ 1 second
- Rated dynamic current ldyn: 2.5lth for 1 second
- Insulation (dry type): class E Screw fixing terminals \_
- Sealable terminal covers \_
- Fixing on 35mm DIN rail (IEC/EN 60715) or by screws (fixing elements standard supplied with the product) EN degree of protection: IP30. Ambient conditions \_
- \_
  - Operating temperature: -25...+50°C
  - Storage temperature: -40...+80°C.
- Relative humidity, non condensing: 90%.

#### Compliance

Compliant with standards: IEC/EN 61869-2, IEC/EN 61869-1.

#### **Certificate for whole system**

tem	Order code	Description
	DM CERT UTF	UTF system certificate

Data concentrator

#### **Expandable**



DME CD



EXM10 10

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Data concentrator for	general use.		
DME CD	With 8 programmable digital inputs, expandable, for data collection + pulse count from DMEM100T1 and DME D, RS485 port	1	0.337

Order code	Description				
DME CD EXPANSION MODULES.					
Inputs and outputs.					
EXM10 00 2 digital inputs and 2 static outputs, opto-isolate					
EXM10 01	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC				
EXM10 02	4 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC				
Communication ports.					
EXM10 10	Opto-isolated USB interface				
EXM10 11	Opto-isolated RS232 interface				
EXM10 12	Opto-isolated RS485 interface				
EXM10 13	Ethernet interface with Web server function				
EXM10 20 Opto-isolated RS485 interface and 2 relay outputs, rated 5A 250VAC					
EXM10 30	Data storage, clock-calendar (RTC) with backup				



#### **General characteristics**

DME CD is equipped with 8 inputs, which can be increased up to a maximum of 14 and allows to indirectly interface devices without communication as long as they have at least one pulse output.

It is capable of pulse counting that comes in from the outputs

of meters for energy, water, gas and other types of consumption: All data is viewed on its display or can also be available for PCs through its built-in RS485 interface using Synergy or Xpress software. It can be expanded with up to 3 EXM series modules by activation for the type of type of the type of type o

optical interface.

With the programmable functions, average values can be determined for instantaneous quantities, such as power, speed, production rate, gas and water consumption, etc.

#### **Operational characteristics**

- LCD multifunction meter
- Nominal supply voltage: 100...240VAC/110...250VDC Voltage range: 85...264VAC/93.5...300VDC
- \_ Backlight graphic LCD
- \_ 8 inputs, expandable with EXM 10... modules up to 14
- \_ Built-in RS485 communication port
- Modbus-RTU, ASCII and TCP communication protocol
- Clearable total and partial counters for each channel \_
- \_ Programmable general counters
- Calculation of derivative average values
- Mathematical operations among counters
- Modular housing, 4 module
- EN degree of protection: IP40 on front; IP20 at terminals.

Synergy supervision and energy management software See Section 29.

Xpress configuration and remote control software See Section 29.

#### EXM series expansion modules See page 30-3.

#### Certifications and compliance

Certifications obtained: EAC for all; UL listed for USA and Canada (cULus – File E346886), as Electrical Process Control Èquipment – Data concentrator for DME CD. Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3.



Digital metering instruments. Metering and current transformer kits

#### Modular LCD multimeters. non expandable



DMG 1...

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		Debra				

DMG 200 - DMG 210

Order code	Description	Qty per pkg.	Wt
		n°	[kg]
DMG 100	Icon LCD, auxiliary supply 100240VAC/120250VDC. Multilanguage: Italian, English, French, Spanish, Portuguese and German	1	0.294
DMG 110	Icon LCD, RS485 port, auxiliary supply 100240VAC/120250VDC. Multilanguage: Italian, English, French, Spanish, Portuguese and German	1	0.294
DMG 200	Graphic 128x80 pixel LCD, auxiliary supply 100-240VAC/110-250VDC. Multilanguage: Italian, English, French, Spanish and Portuguese	1	0.294
DMG 200 L01	Graphic 128x80 pixel LCD, auxiliary supply 100-240VAC/110-250VDC. Multilanguage: English, Czech, Polish, German and Russian	1	0.294
DMG 210	Graphic 128x80 pixel LCD, RS485 port, auxiliary supply 100-240VAC/110-250VDC. Multilanguage: Italian, English, French, Spanish and Portuguese	1	0.300
DMG 210 L01	Graphic 128x80 pixel LCD, RS485 port, auxiliary supply 100-240VAC/110-250VDC. Multilanguage: English, Czech, Polish, German and Russian	1	0.300

### Kits with CT



DMG KIT 100 150

Order code	Description	Qty per pkg	Wt
		n°	[kg]
DMG KIT 100 060	Composed of one DMG 100 multimeter and n°3 CTs 60/5A for Ø22mm cable	1	1.035
DMG KIT 100 100	Composed of one DMG 100 multimeter and n°3 CTs 100/5A for Ø22mm cable	1	1.035
DMG KIT 100 150	Composed of one DMG 100 multimeter and n°3 CTs 150/5A for Ø23mm cable	1	0.856
DMG KIT 100 250	Composed of one DMG 100 multimeter and n°3 CTs 200/5A for Ø23mm cable	1	0.856

#### General characteristics

DMG... digital multimeters are available with a modular housing, 4 module size, and are equipped with a graphic backlight LCD (except DMG 100/110 with icon display) capable of providing extremely clear, intuitive and flexible viewing of all electrical parameters of an installation.

For DMG 110 and DMG 210 versions, there is a built-in isolated RS485 interface.

#### Main measurements:

- Voltage: phase, line and system values
- Current: phase values (neutral current calculated) Power: apparent, active and reactive phase and total values
- \_ P.F.: Power Factor per phase and total
- Frequency of measured voltage value
- HIGH-LOW-AVERAGE value functions of all measurements \_
- Maximum demand of power and current values
- \_ Asymmetric voltage and current
- \_ Total harmonic distortion (THD) of voltage and current values
- Energy meters for active, reactive and apparent values
- Hour counter (total and partial, 1 on DMG 200/210,
- 4 programmable on DMG 100/110) Phase energy (DMG 100/110)
- Harmonic analysis up to the 15th order (DMG 100/110).

#### **Operational characteristic**

- Auxiliary supply voltage range: 100...240VAC / 110...250VDC
- Maximum rated measurement voltage • 600VAC (DMG 100/110)
- 690VAC (DMG 200/210)
- Voltage measurement range:
- 50...720VAC phase-to-phase (DMG 100/110) • 20...830VAC phase-to-phase (DMG 200/210)
- Usage in medium and high-voltage systems with voltage transformers
- Rated input current: With external CT /5A (also 1A for DMG 100/110)
- Current measurement range with CT up to 10,000A
- Frequency measurement range: 45-66Hz
- True RMS measurements for voltage and current values \_ Accuracy:
  - Voltage: ±0.5% (50...720VAC for DMG 1...) (50...830VAC) for DMG 2...
  - Current: ±0.5% (0.1...1.1ln)
  - Power: ±1% f.s
  - Frequency: ±0.05%
  - Active energy: Class 1 (IEC/EN 62053-21)
  - Reactive energy: Class 2 (IEC/EN 62053-23)
  - Non-volatile memory for data storage
- Communication protocol Modbus-RTU and ASCII
- (only for DMG 210 and DMG 110)
- Programming and remote control by software (only for DMG 210 and DMG 110; compatible with Synergy and press software)
- Modular housing, 4 module
- \_ EN degree of protection: IP40 on front; IP20 at terminals.
- CURRENT TRANSFORMERS OF DMG... KITS
- Operating frequency: 50...60Hz
- Secondary output current: 5A
- Overload withstand: 120% Ipn
  - Rated insulation voltage Ui: 720V
- Rated short time thermal current Ith: 40...60lpn for 1 second
- Rated dynamic current Idyn: 2.5lth for 1 second
- Insulation (dry type): class E
- \_ Faston terminals
- EN degree of protection: IP30.

#### Synergy supervision and energy management software See Section 29.

#### press configuration and remote control software See Section 29.

#### **Certifications and compliance**

Certifications and compliance Certifications obtained: EAC and RCM for all; UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Multimeter for DMG 1.../DMG 2... types. Compliant with standards: DMG100/110: IEC/EN 61010-1, IEC/EN 61010-2-030, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 61010-1, CEA 620, as 61010-1, UL 61010, D 020 UL 61010-1, CSA C22.2 n° 61010-1, UL 61010-2-030,

CSA 22.2 nº 61010-2-030. DMG200/210: IEC/EN 61010-1, IEC/EN 61000-6-2,

IEC/EN 61000-6-4, UL 61010-1, UL508, CSA C22.2 n°14.



Digital metering instruments

#### Modular LCD multimeters, expandable



DMG 300



EXM10 10

Order code	Description	Qty per pkg	Wt
		n°	[kg]
DMG 300	Graphic 128x80 pixel LCD, harmonic analysis, auxiliary supply 100-240VAC/110-250VDC, expandable with modules series EXM Multilanguage: Italian, English, French, Spanish and Portuguese	1	0.320
DMG 300 L01	Graphic 128x80 pixel LCD, harmonic analysis, auxiliary supply 100-240VAC/110-250VDC, expandable with modules series EXM Multilanguage: English, Czech, Polish, German and Russian	1	0.320

Description

Order code	Description
DMG 300 ANI Inputs and out	D DMG 300 L01 EXPANSION MODULES. tputs.
EXM10 00	2 digital inputs and 2 static outputs, opto-isolated
EXM10 01	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
EXM10 02	4 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communicatio	on ports.
EXM10 10	Opto-isolated USB interface
EXM10 11	Opto-isolated RS232 interface
EXM10 12	Opto-isolated RS485 interface
EXM10 13	Ethernet interface with Web server function
EXM10 20	Opto-isolated RS485 interface and 2 relay outputs rated 5A 250VAC
EXM10 30	Data storage, clock-calendar (RTC) with backup battery for data logging



#### General characteristics

0+1/ 1//+

DMG 300 digital multimeters are available with a modular housing, 4 module size, and are equipped with a graphic backlight LCD capable of providing extremely clear, intuitive and flexible viewing of all electrical parameters of a system. The very accurate measurements combined with their extreme compactness provide an ideal solution for every type of application.

Expandable with up to 3 module EXM series by optical interface. Main measurements:

- Voltage: phase, line and system values
- \_ Current: phase values (neutral current calculated)
- Power: apparent, active and reactive phase and total values
- P.F.: Power Factor per phase and total \_
- Frequency of measured voltage value
- HIGH-LOW-AVERAGE value functions for all measuements \_
- Maximum demand of power and current values
- Voltage and current asymmetry
- Total harmonic distortion (THD) of voltage and current values
- \_ Harmonic analysis of voltage and current up to 31° order
- Energy meters for active, reactive, apparent partial and total values, programmable tariff functions
- Hour counter for programmable total and partial hours \_
- Pulse counter for general use: consumption pulse counting for water, gas, etc. with expansion module only.

#### **Operational characteristics**

- Auxiliary supply voltage range:
- 85...264VAC / 93.5...300VDC
- Voltage measurement range: 20...830VAC phase-to-phase 10...480VAC phase-neutral
- Usage in medium and high-voltage systems with voltage transformers
- Rated input current: With external CT, 5A or 1A
- Current measurement range with CT up to 10,000A
- Frequency measurement range: 45-66Hz
- True RMS measurements for voltage and current values
  - Accuracy:
  - Voltage: ±0.2% (50...830VAC) Current: ±0.2% (0.1...1.1In)

  - Power:  $\pm 0.5\%$  f.s. Power factor:  $\pm 0.5\%$
  - Frequency: ±0.05%
  - Active energy: Class 0.5s (IEC/EN 62053-22)
     Reactive energy: Class 2 (IEC/EN 62053-23)
- Non-volatile memory for data storage
- Communication protocol Modbus RTU, ASCII and TCP (only with communication expansion modules)
- Programming and remote control by software (only with communication expansion modules); compatible
  - with Synergy and Xpress software Modular housing, 4 module
- \_ EN degree of protection: IP40 on front; IP20 at terminals.

Synergy supervision and energy management software See Section 29.

press configuration and remote control software See Section 29.

EXM series expansion modules See page 30-3.

#### Certifications and compliance

Certifications obtained: EAC and RCM for all; UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Multimeters.

Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4. UL508. CSA C22.2 nº 14.



Digital metering instruments



Flush-mount LCD multimeters, expandable	Order code	Description	Qty per pkg	Wt
and the second s			n°	[kg]
3850 3840: 3812 3855.	DMG 600	Backlight icon 72x46mm LCD, harmonic analysis, auxiliary supply 100440VAC/120 250VDC, front optical port. Multilanguage	1	0.300
DMG 600 - DMG 610	DMG 610	Backlight icon 72x46mm LCD, harmonic analysis, auxiliary supply 100440VAC/120 250VDC, front optical port, built-in RS485 serial port. Multilanguage●	1	0.350
$\mathcal{O}$	DMG 611 R 0100	Backlight icon 72x46mm LCD, harmonic analysis, auxiliary supply 100440VAC/120 250VDC, front optical port, built-in RS485 serial port. Multilanguage0. Current reading through 3 Rogowski coils included, max current 100A	1	0.350
	DMG 611 R 0500	Backlight icon 72x46mm LCD, harmonic analysis, auxiliary supply 100440VAC/120 250VDC, front optical port, built-in RS485 serial port. Multilanguage <b>0</b> . Current reading through 3 Rogowski coils included, max current 500A	1	0.350
new	DMG 611 R 3000	Backlight icon 72x46mm LCD, harmonic analysis, auxiliary supply 100440VAC/120 250VDC, front optical port, built-in RS485 serial port. Multilanguage <b>0</b> . Current reading through 3 Rogowski coils included, max current 3000A	1	0.350
<ul> <li>Italian, English, French, Spanish and Portuguese.</li> </ul>	DMG 611 R 6300	Backlight icon 72x46mm LCD, harmonic analysis, auxiliary supply 100440VAC/120 250VDC, front optical port, built-in RS485 serial port. Multilanguage <b>0</b> . Current reading through 3 Rogowski coils included, max current 6300A	1	0.350



EXP10...

Order code	Description
EXPANSION N Inputs and out	IODULES puts.
EXP10 00	4 opto-isolated digital inputs
EXP10 01	4 opto-isolated static outputs
EXP10 02	2 digital inputs and 2 static outputs, opto-isolated
EXP10 03	2 relay outputs rated 5A 250VAC
EXP10 08	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communicatio	n ports.
EXP10 10	Opto-isolated USB interface
EXP10 11	Opto-isolated RS232 interface
EXP10 12	Opto-isolated RS485 interface
EXP10 13	Opto-isolated Ethernet interface

#### General characteristics

DMG 600/610/611 digital multimeters are capable of viewing the measurements with high accuracy on the wide graphic LCD, which allow to control energy distribution networks. They are available with a flush-mount housing, (96x96mm/3.78"x3.78") and 1 expansion slot to fit plug-in expansion modules, suitable for numerous applications. The main features include an extended power supply voltage range, high measurement accuracy, expandability and graphic interactive interface for simple use. Main measurements:

- Voltage: phase, line and system values
- Current: phase values (neutral current calculated)
- \_ Power: apparent, active and reactive phase and total values
- \_ P.F.: Power Factor per phase and total
- Frequency of measured voltage value
- \_ HIGH-LOW-AVERAGE value functions for all measurements
- Maximum demand of power and current values \_
- Voltage and current asymmetry \_ Total harmonic distortion (THD): voltage and current
- Harmonic analysis of voltage and current up to the 15°
- order Energy meters for active, reactive, apparent partial and
- total values
- Hour counter for programmable total and partial hours.

#### **Operational characteristics**

- Auxiliary supply voltage range: 100...440VAC / 110...250VDC
- Voltage measurement range:
- 50...720VAC L-L
- Usage in medium and high voltage systems with voltage transformers
- Rated input current: By external CT 5A or 1A Current reading through Rogowski coils for DMG 611... Frequency measurement range 45...66Hz True RMS measurements: for voltage and current

- Measurement accuracy: Voltage: ±0.5% (50...720VAC) Current: ±0.5% (0.1...1.1ln)
- Power: ±1% f.s.
- Frequency: ±0.05%
- Active energy: Class 1 (IEC/EN 62053-21)
- Reactive energy: Class 2 (IEC/EN 62053-23)
- Non-volatile memory for data storage
- \_ Communication protocol Modbus-RTU, ASCII and TCP
- \_ Compatible Synergy and Xpress sofware
- Flush-mount housing 96x96mm/3.78"x3.78" \_
- EN degree of protection: IP54 on front.

#### Synergy supervision and energy management software See Section 29.

Xpress configuration and remote control software See Section 29.

#### EXM series expansion modules See page 30-2.

#### **Certifications and compliance**

Certifications obtained: EAC and RCM for all; UL listed for USA and Canada (cULus - File E93601), as Auxiliary Devices -Multimeters.

Compliant with standards: IEC/EN 61010-1, IEC/EN 61010-2-030, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 61010-1, CSA C22.2 n° 61010-1, UL 61010-2-030, CSA 22.2 nº 61010-2-030.

Digital metering instruments

#### Flush-mount LCD multimeters, expandable



DMG 700 - DMG 800



EXP10...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
DMG 700	Graphic 128x80 pixel LCD, auxiliary supply 100440VAC/110250VDC Multilanguage●	1	0.510
DMG 700 L01	Graphic 128x80 pixel LCD, auxiliary supply 100440VAC/110250VDC Multilanguage@	1	0.510
DMG 800	Graphic 128x80 pixel LCD, harmonic analysis, auxiliary supply 100440VAC/110250VDC Multilanguage	1	0.510
DMG 800 L01	Graphic 128x80 pixel LCD, harmonic analysis, auxiliary supply 100440VAC/110250VDC Multilanguage	1	0.510
DMG 800 D048	Graphic 128x80 pixel LCD, harmonic analysis, auxiliary supply 12-24-48VDC	1	0.520
Italian English E	rench Spanish and Portuguese		

English, Czech, Polish, German and Russian.

Order code	Description
EXPANSION N Inputs and out	IODULES :puts.
EXP10 00	4 opto-isolated digital inputs
EXP10 01	4 opto-isolated static outputs
EXP10 02	2 digital inputs and 2 static outputs, opto-isolated
EXP10 03	2 relay outputs rated 5A 250VAC
EXP10 04	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0±5V for DMG 800
EXP10 05	2 opto-isolated analog outputs 0/4-20mA or 0-10V or 0±5V for DMG 800
EXP10 08	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communicatio	n ports.
EXP10 10	Opto-isolated USB interface
EXP10 11	Opto-isolated RS232 interface
EXP10 12	Opto-isolated RS485 interface
EXP10 13	Opto-isolated Ethernet interface
EXP10 14	Opto-isolated Profibus-DP interface for DMG 800
EXP10 30	Data storage, clock-calendar (RTC) with backup reserve energy for data logging for DMG 800

#### General characteristics

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DMG 700 and DMG 800 digital multimeters are capable of viewing the measurements with high accuracy on the wide graphic LCD, which allow to control energy distribution networks.

They are available with a flush-mount housing, (96x96mm/3.78"x3.78") with 4 expansion slots to fit plug-in expansion modules, suitable for numerous applications. The main features include an extended power supply voltage range, high measurement accuracy, expandability and graphic interactive interface for simple use. Main measurements:

- Voltage: phase, line and system values
- Current: phase values (neutral current calculated) \_ Power: apparent, active and reactive phase and total values
- P.F.: Power Factor per phase and total
- \_ Frequency of measured voltage value
- HIGH-LOW-AVERAGE value functions for all measurements
- Maximum demand of power and current values
- Voltage and current asymmetry
- Harmonic analysis of voltage and current up to the 31° order (only DMG 800)
- Energy meters for active, reactive, apparent partial and total values
- Programmable tariff functions
- Hour counter for programmable total and partial hours Pulse counter for general use: consumption pulse
- counting for water, gas, etc., with expansion module.

#### **Operational characteristics**

- Auxiliary supply voltage range: 100...440VAC / 110...250VDC for DMG 700/800
- 12-24-48VDC for DMG 800 D048 Voltage measurement range:
- 20...830VAC L-L
- Usage in medium and high voltage systems with voltage transformers
- Rated input current: by external CT 5A for DMG 700; by external CT 5A or 1A for DMG 800
- Frequency measurement range 45...66Hz
- True RMS measurements: for voltage and current
  - Measurement accuracy for DMG 700:
- Voltage: ±0,5%
- Current: ±0,5% (0,1...1,1In)
- Power: ±1% f.s.
   Frequency: ±0,05%
- · Active energy: Class 1 (IEC/EN 62053-21)
- Reactive energy: Class 2 (IEC/EN 62053-23)
- Measurement accuracy for DMG 800..:
- Voltage: ±0,2% (50...830VAC)
  Current: ±0,2% (0,1...1,1ln)
- Power: ±0,5% f.s.
- Power factor: ±0,5%
- Frequency: ±0,05%
- Active energy: Class 0,5s (IEC/EN 62053-22)
- · Reactive energy: Class 2 (IEC/EN 62053-23)
- Non-volatile memory for data storage
- Communication protocol Modbus-RTU, ASCII and TCP
- Compatible with Synergy and Xpress software Flush-mount housing 96x96mm/3.78"x3.78"
- EN degree of protection: IP65 on front; IP20 at terminals.

Synergy supervision and energy management software See Section 29.

#### press configuration and remote control software See Section 29.

#### EXM series expansion modules

See page 30-2.

**Certifications and compliance** Certifications obtained: EAC and RCM for all; UL listed for USA and Canada (cULus - File E93601), as Auxiliary Devices Multimeters.

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



Order

Digital metering instruments

#### **Flush-mount LCD touch**screen power analyzers, expandable



DMG 900...



DMG M3 900 01



DMG 900T...



#### DMG 900RD



EXP10...

code		per pkg.	
		n°	[kg]
DMG 900	Graphic 128x112 pixel touch-screen LCD, harmonic analysis, 4 current channels, (neutral meas.), 100440VAC/110250VDC. Multilanguage: Italian, English, French, Spanish and Portuguese	1	0.566
DMG 900 L01	Graphic 128x112 pixel touch-screen LCD, harmonic analysis, 4 current channels, (neutral meas.), 100440VAC/110250VDC. Multilanguage: English, Czech, Polish, German and Russian	1	0.566
DMG 900 D048	Graphic 128x112 pixel touch-screen LCD, harmonic analysis, 4 current channels, auxiliary supply 12-24-48VDC	1	0.580
DMG M3 900 01	DMG 900 portable unit in M3N case, prewired for mobile applications, with USB port, without external cables (see page 24-28)	1	3.400
DMG 900T	Measurement transducer, harmonic analysis, 4 current channels (neutral meas.), 100440VAC/110250VDC, RS232 and RS485 ports <b>•</b>	1	0.570
DMG 900T D048	Measurement transducer, harmonic analysis, 4 current channels (neutral meas.), 12-24-48VDC, RS232 and RS485 ports ●	1	0.590
Remote display for	DMG 900T		
DMG 900RD	Graphic 128x112 pixel touch-screen LCD, with 3m long connecting cable®	1	0.396

Description

Consult Technical support for information (Tel. 035 4282422)

Bernall: service@LovaGElectric.com) or the instructions manual.
 Direct link to DMG 900T dedicated port: powered directly by DMG 900T.

Order code	Description
DMG 900 and	DMG 900 T EXPANSION MODULES.
	A sets is slated disited invests
EXP10 00	4 opto-isolated digital inputs
EXP10 01	4 opto-isolated static outputs
EXP10 02	2 digital inputs and 2 static outputs, opto-isolated
EXP10 03	2 relay outputs rated 5A 250VAC
EXP10 04	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0±5V
EXP10 05	2 opto-isolated analog outputs 0/4-20mA or 0-10V or 0±5V
EXP10 08	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communicatio	on ports.
EXP10 10	Opto-isolated USB interface
EXP10 11	Opto-isolated RS232 interface
EXP10 12	Opto-isolated RS485 interface
EXP10 13	Opto-isolated Ethernet interface with Web server function
EXP10 14	Opto-isolated Profibus-DP interface
EXP10 15	GPRS/GSM modem, without antenna
EXP10 30	Data storage, clock-calendar (RTC) with backup reserve energy for data logging
EXP10 31	Data storage, with Energy Quality (EN 50160 - class B), clock-calendar (RTC) with backup reserve energy for data logging

#### General characteristics

Otv Wt

DMG 900... expandable digital power analyzers are available with a flush-mount housing, 96x96mm/3.78"x3.78".

The wide graphic touch-screen display provides extremely simple interacting between the device and the user. The high performance of the power analyzers gives very accurate

measurements and can control energy distribution networks, to detect and prevent energy problems which could compromise quality and supply.

The main features include an extensive power supply voltage range, high measurement accuracy, expandability up to 4 plug-in expansion modules.

There also is available the DMG 900T measurement transducer which can be used with the DMG 900RD remote display. The DMG 900T, without display, is arranged for mounting inside the panel board, on 35mm DIN rail, and is an ideal solution for installations where the measurements of various multimeters must be remotely viewed.

The DMG 900RD remote display connected to the DMG 900T transducer can display the measurements on the panel front. Main measurements and functions include:

- Voltage: phase, phase-neutral and ground neutral-earth Supply voltage value (only DMG... D048) Current: phase values

- Neutral current calculated and true values \_
- Power: apparent, active and reactive phase and total values P.F.: Power Factor per phase and total
- \_ \_  $\cos \varphi$  per phase
- Frequency of measured voltage value Voltage and current asymmetry
- Total harmonic distortion (THD) of voltage and current \_ Harmonic analysis of voltage and current up to the 63° order
- HIGH-LOW-AVERAGE value functions for all measurements
- \_ Maximum demand of power and current values
- \_ Energy meters for active, reactive, apparent partial and total values with programmable tariff functions
- Hour counter for programmable total and partial hours
- Pulse counter for general use: consumption pulse counting for water, gas, etc., with expansion module only Energy quality analysis to EN 50160 Class B (with expansion
  - module)

#### **Onerational characteristics**

- Auxiliary supply voltage range: 110...440VAC / 110...250VDC for DMG 900 and DMG 900T; 12-24-48VDC for DMG 900 D048 and DMG 900T D048 Voltage measurement range: 20...830VAC phase-to-phase
- 10...480VAC phase-neutral
- Usage in medium and high-voltage systems with voltage transformers
- rated input current: 5A or 1A via CT
- Current measurement range: 0.05...10A o 0.01...1.2A
- \_ Current measurements via CT up to 10,000A
- \_ Frequency measurement range: 45...66Hz / 360...440Hz
  - True RMS measurements for voltage and current values
- Accuracy
  - Voltage: ±0.2% (50...830VAC) Current: ±0.2% (0.1...1.1In)

  - Power: ±0.5% f.s.
  - Power factor: ±0.5%
  - Frequency: ±0.05%
- \_
- Frequency: ±0.05%
   Active energy: Class 0.5s (IEC/EN 62053-22)
   Reactive energy: Class 2 (IEC/EN 62053-23)
   Non-volatile memory for data and event (last 100) storage Communication protocol Modbus-RTU, ASCII and TCP with communication expansion modules only
   Programming and remote control by software with communication expansion modules only
- Housing: 96x96mm/3.78"x3.78" flush-mount (for DMG 900... and DMG 900RD) and 35mm DIN rail (for DMG 900T...)
- EN degree of protection: IP65 on front for DMG 900 DMG 900RD; IP20 at terminals for DMG 900 - DMG 900T.

#### Synergy supervision and energy management software See Section 29.

press configuration and remote control software See Section 29.

EXM series expansion modules See page 30-2.

#### **Certifications and compliance**

Certifications obtained: EAC and RCM for all except DMG M3...; UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices-Multimeters for all except DMG M3... Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4, UL 508, CSA C22.2 n°14.

Expansion modules page 30-2

Dimensions page 24-32

Technical characteristics page 24-43



Digital metering instruments

#### Flush-mount LED instruments single-phase, non expandable



DMK 0...

Order code	Displayed measurements	Relay output	Qty per pkg	Wt
	n°	n°	n°	[kg]
Voltmeter.				
DMK 00	1 voltage value	-	1	0.290
DMK 00 R1@	1 max voltage value 1 min voltage value	1	1	0.323
Ammeter.				
DMK 01	1 current value	-	1	0.290
DMK 01 R1@	1 max current value 1 min current value	1	1	0.323
Voltmeter or an	nmeter.			
DMK 020	<ol> <li>voltage or current value</li> <li>maximum voltage or current value</li> <li>minimum voltage or current value</li> </ol>	-	1	0.290
Frequency meter	er.			
DMK 03 R1@	1 frequency value 1 max frequency value 1 min frequency value	1	1	0.323
$Cos\phi$ meter.				
DMK 04 R1@	1 cosφ value 1 power factor value	1	1	0.290

The DMK02 can operate as a voltmeter or ammeter. It is duly equipped with two front plates (V and A) which must be fitted by the user depending on which instrument is required and on the wiring scheme

Relay output for control and protection functions

#### General characteristics

The DMK 0... instruments are available with flush-mount housing, 96x48mm/3.78x1.89". Measurements are True RMS values and provide for reliable operation even in the presence of harmonics.

#### **Operational characteristics**

- Auxiliary supply voltage: 220-240VAC;
- Operating frequency: 50-60Hz True RMS measurements
- \_
  - Max. and min. measurement storage
- 1 relay output with 1 changeover contact (for DMK...R1 only)
- Housing: flush-mount 96x48mm/3.78x1.89" - Terminals: 4mm<sup>2</sup>
- Degree of protection: IP54 on front; IP20 at terminals.

#### DMK 00 - DMK 00 R1

- Voltage measurement range: 15-660VAC
- Operating frequency range: 45-65Hz
- Programmable VT ratio: 1.00-500.00
- Accuracy: ±0.25% f.s. ±1 digit

#### DMK 01 - DMK 01 R1

- Current measurement range: 0.05-5.75A
- Operating frequency range: 45-65Hz
- Programmable CT ratio: 5-10,000
- Accuracy: ±0.5% f.s. ±1 digit

#### DMK 02

- Voltage measurement range: 15-660VAC
- Current measurement range: 0.05-5.75A
- Operating frequency range: 45-65Hz Programmable VT ratio: 1.00-500.00 Programmable CT ratio: 0FF/5-10,000
- Accuracy: Voltage ±0.25% f.s. ±1 digit
- Current ±0.5% f.s. ±1 digit

#### DMK 03 R1

- Measurement input: 15-660VAC
- Frequency measurement range: 15-65Hz - Accuracy: ±1 digit

#### DMK 04 R1

- Cosφ measurement error: ±0.5° ±1 digit
- Cos $\phi$  measurement in 4 quadrants
- Accuracy: ±1° ±1 digit

### **Control and protection functions**

DMK 00 R1

- Voltage loss or failure: OFF/5-85%
- Maximum voltage: OFF/102-120% Minimum voltage: OFF/70-98%
- Time delay for max-min voltage or voltage loss . 0.0-900.0 seconds.

#### DMK 01 R1

- Current loss: OFF/2-100%
- Maximum current: OFF/102-200%
- Maximum current instantaneous tripping: OFF/110-600%
- Minimum current: OFF/5-98%
- Time delay for max-min current or current loss S: 0.0-900.0 seconds.

#### DMK 03 R1

- Maximum frequency: OFF/101-110%
- Minimum frequency: OFF/90-99%
- Time delay for min-max frequency 
   <sup>(3)</sup>: 0.5-900.0 seconds.

#### DMK 04 R1

- Minimum-maximum cosφ thresholds in 4 quadrants
   Minimum-maximum PF thresholds in 4 quadrants
- Delay time for max or min threshold @: 1-9,000 seconds.

#### **Certifications and compliance**

Certifications obtained: EAC; UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices-Multimeters. Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL508, CSA C22.2 nº 14.

Independent adjustable delays.



**•** •

Digital metering instruments

#### Flush-mount LED instruments three-phase, non expandable



DMK 1...

code	measurements	output	per pkg	VVL
	n°	n°	n°	[kg]
Voltmeter.				
DMK 10	3 phase voltage values	-	1	0.297
DMK 10 R1@	3 phase to phase	1	1	0.330
	<ul> <li>voltage values</li> <li>3 maximum phase voltage values</li> <li>3 maximum phase to phase voltage values</li> <li>3 minimum phase voltage values</li> <li>3 minimum phase to phase voltage values</li> </ul>			
Ammeter.				
DMK 11	3 phase current values	-	1	0.292
DMK 11 R1@	3 maximum phase	1	1	0.336
	current values			
	current values			
Voltmeter amm	eter and wattmeter			
DMK 15	3 phase voltage values	_	1	0 333
DMK 15 DIGO	3 phase to phase	-	1	0.002
Dink 13 11 00	voltage values 3 phase current values 4 active power values, phase and total 3 maximum phase voltage values 3 maximum phase to phase voltage values 3 maximum active power values, phase and total 3 minimum phase to voltage values 3 minimum phase to phase voltage values			

Participation Provide the American American Provided American A

General characteristics The DMK 1... instruments are available with flush-mount housing, 96x48mm/3.78x1.89". Measurements are True RMS values and provide for reliable operation even in the presence of harmonics.

#### **Operational characteristics**

- Auxiliary supply voltage: 220-240VAC; Operating frequency: 50-60Hz True RMS measurements Max and min measurement storage \_

- \_ 1 relay output with 1 changeover contact (for DMK...R1
- only)
- Housing: flush-mount 96x48mm/3.78x1.89"
- Terminals: 4mm<sup>2</sup> Degree of protection: IP54 on front; IP20 at terminals. \_
- DMK 10 DMK 10 B1
- Voltage measurement range: 15-660VAC Operating frequency range: 45-65Hz Programmable VT ratio: 1.00-500.00 Accuracy: ±0.25% f.s. ±1 digit.
- \_

#### DMK 11 - DMK 11 R1

- Current measurement range: 0.05-5.75A Operating frequency range: 45-65Hz Programmable CT ratio: 5-10,000
- Accuracy: ±0.5% f.s. ±1 digit.

- DMK 15 DMK 15 R1 Voltage measurement range: 35-660VAC Current measurement range: 0.05-5.75A Frequency measure range: 45-65Hz Programmable VT ratio: 1.00-500.00 Programmable CT ratio: 5-10,000 Accuracy: Voltage ±0.25% f.s. ±1 digit Current ±0.5% f.s. ±1 digit.

#### **Control and protection functions**

- Control and protection functions
  DMK 10 R1
  Phase loss or failure: OFF/5-85%
  Maximum voltage: OFF/102-120%
  Minimum voltage: OFF/70-98%
  Asymmetry: OFF/2-20%
  Phase sequence: OFF/L1-L2-L3/L3-L2-L1
  Erroguone
- \_
- Phase sequence. OFFL1 L2 Lore L2 L1
  Frequency
  Maximum frequency: OFF/101-110%
  Minimum frequency: OFF/90-99%
  Time delay for max-min voltage, phase loss, asymmetry and min-max frequency **③**: 0.5-900.0 seconds.

- DMK 11 R1 Current loss: OFF/2-100% Maximum current: OFF/102-200%
- Maximum current instantaneous tripping: OFF/110-600% Minimum current: OFF/5-98%
- \_
- Asymmetry: OFF/2-20% Time delay for max-min current or current loss and asymmetry **③**: 0.5-900.0 seconds.

#### DMK 15 B1

- Voltage

- Voltage
  Phase loss or failure: OFF/5-85%
  Maximum voltage: OFF/102-120%
  Minimum voltage: OFF/70-98%
  Asymmetry: OFF/2-20%
  Phase sequence: OFF/L1-L2-L3/L3-L2-L1
  Current
  Ourget loop: OFE/5 85%
- Current loss: OFF/5-85%
   Maximum current: OFF/102-200%
- Maximum current instantaneous tripping:
- OFF/110-600%
- Minimum current: OFF/5-98%
- Asymmetry: OFF/2-20%
- Power
- Rated power: 1-10,000 Maximum power: OFF/101-200%
- Max. power instantaneous tripping: OFF/110-600% Minimum power: OFF/10-99%
- Frequency

- Maximum frequency: OFF/101-110%
  Minimum frequency OFF/90-99%
  Time delay for max-min voltage, max-min current or current loss, phase loss, asymmetry and min-max power **1**: 0.0-900.0 seconds.

#### Certifications and compliance

Certifications obtained: EAC; UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices-Multimeters. Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 nº 14.

Independent adjustable delays.



Order

Displayed

Digital metering instruments

#### **Flush-mount LED multimeter** three-phase, non expandable

nonn =	1
111111	
V A KW kyar KVA	
	V A 100 KVA

**DMK 16** 

code	measurements	per pkg	
		n°	[kg]
DMK 16	<ul> <li>3 phase voltage values</li> <li>3 phase to phase voltage values</li> <li>3 phase current values</li> <li>4 active power values, phase and total</li> <li>4 reactive power values, phase and total</li> <li>4 apparent power values, phase and total</li> <li>3 phase power factor values</li> <li>1 frequency value</li> <li>1 active energy value in kWh</li> <li>1 reactive energy value</li> <li>1 hour counter</li> <li>3 maximum phase to phase</li> <li>4 maximum active power values, phase and total</li> <li>4 maximum phase voltage values</li> <li>3 maximum phase to phase</li> <li>3 maximum phase to total</li> <li>4 maximum aparent power values, phase and total</li> <li>3 minimum phase to phase</li> <li>3 minimum phase to phase</li> <li>4 maximum aparent power values, phase and total</li> <li>4 minimum phase to phase</li> <li>3 minimum phase to phase</li> <li>4 maxinum cotive power values, phase and total</li> <li>4 maximum phase to phase</li> <li>3 minimum phase to phase</li> <li>3 minimum phase to phase</li> <li>4 minimum phase to phase</li> <li>3 minimum phase to phase</li> <li>4 minimum phase</li> <li>5 minimum phase</li> <li>6 minimum phase</li> <li>7 minimum phase</li> <li>8 minimum phase</li> <li>9 minimum phase</li> <li>9</li></ul>	1	0.350

#### **General characteristics**

Qty Wt

The DMK 16 multimeter is available with flush-mount housing, 96x48mm/3.78x1.89". Measurements are True RMS values and provide for reliable operation even in the presence of harmonics.

#### **Operational characteristics**

- Auxiliary supply voltage: 220-240VAC
   Operating frequency: 50-60Hz
- True RMS measurements
- Accuracy: Voltage ±0.25% f.s. ±1 digit Current ±0.5% f.s. ±1 digit
- Active energy accuracy: Class 2 (IEC/EN 62053-21 and IEC/EN 62053-23)
- Max and min measurement storage
   Voltage measurement range: 35-660VAC
- \_ Current measurement range: 0.05-5.75A
- -Operating frequency range: 45-65Hz
- \_ Programmable VT ratio: 1.00-500.0
- \_ Programmable CT ratio: 5-10,000
- Housing: flush-mount 96x48mm/3.78x1.89"
- \_ Terminals: 4mm<sup>2</sup>
- EN degree of protection: IP54 on front; IP20 at terminals.

#### **Certifications and compliance**

Certifications obtained: EAC; UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices-Multimeters. Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL508, CSA C22.2 nº 14.



Digital metering instruments



Flush-mount LED multimeter three-phase,	Order code	Displayed measurements	Relay output	Qty per pkg	Wt	General characteristics The DMK 16 R1 multimeter is available with flush-mount housing, 96x48mm/3.78x1.89"
non expandable		n°	n°	n°	[ka]	Measurements are True RMS values and provide for reliable
<image/>	DMK 16 R1 <b>0</b>	<ul> <li>In<sup>o</sup></li> <li>3 phase voltage values</li> <li>3 phase to phase</li> <li>yoltage values</li> <li>3 phase current values,</li> <li>a phase and total</li> <li>4 reactive power values,</li> <li>phase and total</li> <li>4 reactive power values,</li> <li>phase and total</li> <li>4 apparent power</li> <li>values, phase and</li> <li>total</li> <li>3 phase power factor</li> <li>values, phase and</li> <li>total</li> <li>3 phase power factor</li> <li>values, phase and</li> <li>total</li> <li>3 phase power factor</li> <li>values</li> <li>1 frequency value</li> <li>1 active energy value</li> <li>in kWh</li> <li>1 reactive energy value</li> <li>in kWh</li> <li>1 reactive energy value</li> <li>in kWh</li> <li>1 reactive energy values</li> <li>3 maximum phase to</li> <li>phase voltage values</li> <li>3 maximum phase to</li> <li>phase voltage values, phase</li> <li>and total</li> <li>4 maximum active</li> <li>power values, phase</li> <li>and total</li> <li>4 maximum apparent</li> <li>power values, phase</li> <li>and total</li> <li>3 minimum phase to</li> <li>phase voltage values</li> <li>3 minimum phase</li> <li>and total</li> <li>4 maximum apparent</li> <li>power values, phase</li> <li>and total</li> <li>3 minimum phase to</li> <li>phase voltage values</li> <li>3 minimum phase to</li> <li>phase voltage values, phase</li> <li>and total</li> <li>4 minimum phase to</li> <li>phase voltage values</li> <li>3 minimum phase to</li> <li>phase voltage values, phase</li> <li>and total</li> <li>4 minimum phase to</li> <li>phase voltage values</li> <li>3 minimum phase to</li> <li>phase values, phase</li> <li>and total</li> <li>4 minimum apparent</li> <li>power values, phase</li> <li>and total</li> <li>4 minimum apparent</li> <li>power values, phase</li> <li>and total</li> <li>4 minimum apparent</li> <li>power values, phase</li> <li>and total</li> <li>2 minimum and</li> <li>maximum phase</li> <li>total</li> <li>2 minimum and</li> <li>maximum phase</li> </ul>	<u>n°</u> 1	<u>n</u> ° 1	<u>[kg]</u> 0.353	<ul> <li>operation even in the presence of harmonics.</li> <li><b>Operational characteristics</b> <ul> <li>Auxiliary supply voltage: 220-240VAC</li> <li>Operating frequency: 50-60Hz</li> <li>True RMS measurements</li> <li>Accuracy: Voltage ±0.25% f.s. ±1 digit Current ±0.5% f.s. ±1 digit</li> <li>Active energy accuracy: Class 2 (IEC/EN 62053-21 and IEC/EN 62053-23)</li> <li>Max and min measurement storage</li> <li>Voltage measurement range: 0.05-5.75A</li> <li>Frequency measurement range: 45-65Hz</li> <li>Programmable CT ratio: 5-10,000</li> <li>1 relay output with 1 changeover (SPDT) contact</li> <li>Housing: flush-mount 96x48mm/3.78x1.89"</li> <li>Terminals: 4mm<sup>2</sup></li> <li>EN degree of protection: IP54 on front; IP20 at terminals.</li> </ul> </li> <li><b>PROGRAMMABLE RELAY OUTPUT</b> <ul> <li>Voltage</li> <li>Phase loss or failure: OFF/5-85%</li> <li>Maximum voltage: OFF/102-120%</li> <li>Minimum voltage: OFF/102-120%</li> <li>Maximum voltage: OFF/102-120%</li> <li>Maximum current: OFF/2-88%</li> <li>Asymmetry: OFF/2-20%</li> <li>Phase sequence: OFF/L1-L2-L3/L3-L2-L1</li> </ul> </li> <li><b>Current</b> <ul> <li>Protection inhibition max current: OFF/2-100%</li> <li>Maximum current: OFF/5-98%</li> <li>Asymmetry: OFF/2-20%</li> <li>Phase sequence: OFF/L1-102-200%</li> <li>Maximum current: OFF/5-98%</li> <li>Asymmetry: OFF/2-20%</li> <li>Power factor</li> <li>Maximum power factor: 0.10-1.00</li> <li>Minimum power factor: 0.10-1.100</li> <li>Minimum power factor:</li></ul></li></ul>
	•	a de la composición d				

Connection also to single-phase.

**Digital metering instruments** 

#### Flush-mount LED multimeters. non expandable 47 electrical parameters

200 L 4		_
L1 5	38	•
L2 <mark>6</mark>	88	
L3 <mark>5</mark>	<u>9</u> <u>8</u> 300	i havet
	• 11.1	
	PR:	0
	• 1407 • 1588	( Arean

DMK 2...

Order code	Description	Qty per pkg.	Wt
		n°	[kg]
DMK 20	Basic version, auxiliary supply 208240VAC	1	0.434
DMK 22	Version with energy meters and RS485 port included, auxiliary supply 208240VAC	1	0.477

#### General characteristics

bolk 2... digital multimeters are available with flush-mount housing, 96x96mm/3.78x3.78". They monitor and view reliable readings of electrical parameters, even in the presence of critical operating conditions, such as voltages and currents with high harmonic content and variable frequency. The total and partial hour counter provides an interesting

feature for electric panels of emergency generating sets. The diversified and accurate measurements give the multimeters valuable technical and cost effective advantages with respect to traditional analog instrumentation.

DMK2... digital multimeters view 47 electrical parameters: - Voltage: phase, line and system values

- Current: phase values
- \_ Power: active and reactive values, apparent phase.
- \_ P.F.: power factor per phase
- Frequency (measured voltage frequency)
- HIGH/LOW: instantaneous minimum and maximum values of each phase voltage and current, total active power  $(\Sigma W)$ , total reactive power  $(\Sigma var)$  and total apparent power  $(\Sigma VA)$  values
- Total hours: non-volatile clearable log for DMK 20
- Partial hours: non-volatile configurable log for DMK 20
- Active and reactive energy meters for DMK22 only.

#### **Operational characteristics**

- Auxiliary supply voltage range:
- 154-288VAC for DMK 20
- 177-264VAC for DMK 22
- Voltage measurement range: 60-830VAC phase-phase 30-480VAC phase-neutral
- Current measurement range: 0.05-6A
   Frequency measurement range: 45-65Hz
- Programmable CT ratio: 1.0-2,000
- Voltage accuracy: Class 0.5  $\pm$ 0.35% f.s. (830V) Current accuracy: Class 0.5  $\pm$ 0.5% f.s. (6A)

- Active energy accuracy: Class 2 Total and partial hour counter (can be used as maintenance with optical alarm and separate resetting) (DMK 20) HIGH and LOW value functions to read and log
- instantaneous voltage, current and power values
- Delayed automatic resetting of default measurements
- Averaging function to slow down repetitive fluctuations to obtain more stable readouts
- Current connection in ARON configuration by 2 current transformers (CTs) only
- Single, two, three-phase, with or without neutral,
- \_ True RMS measurements
- \_ RS485 serial port, compatible with Synergy software for DMK 22
- Housing: flush-mount 96x96mm/3.78x3.78"
- EN degree of protection: IP54 on front; IP20 at terminals.

Synergy supervision and energy management software See Section 29.

#### Certifications and compliance

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

Order

Digital metering instruments

### **Modular LED instruments** single-phase, non expandable



	-	
	4	,

**DMK 80** 

```
DMK 80 R1
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.....

**DMK 81** 

DMK 81 B1







**DMK 83** 



Qty code measurements output per pkg n° n° n° [kg] Voltmeter. **DMK 80** 0.237 1 voltage value 1 1 max voltage value DMK 80 R1@ 1 0.268 1 1 min voltage value Ammeter. **DMK 81** 0.237 1 current value 1 1 max current value DMK 81 R1@ 1 0.268 1 1 min current value Voltmeter or ammeter. DMK 820 1 voltage or current 0.241 1 value 1 maximum voltage or current value 1 minimum voltage or current value Frequency meter. I

Displayed

Relay

Wt

DMK 83 R1@	1 frequency value 1 max frequency value 1 min frequency value	1	1	0.268
$Cos\phi$ meter.				
DMK 84 R1@	1 cosφ value 1 power factor value	1	1	0.272

 The DMK82 can operate as a voltmeter or ammeter. It is duly equipped with two front plates (V and A) which must be fitted by the user depending on which instrument is required and on the wiring scheme

Prelay output with control and protection functions

#### General characteristics

The DMK 8... instruments are available with modular housing, 3 module size.

Measurements are True RMS values and provide for reliable operation even in the presence of harmonics.

#### **Operational characteristics**

- Auxiliary supply voltage: 220-240VAC Operating frequency: 50-60Hz
- \_ True RMS measurements
- Max and min measurement storage
- \_ 1 relay output with 1 changeover contact (SPDT) for DMK...R1 version only
- Modular DIN 43880 housing, 3 modules
- Terminals: 4mm<sup>2</sup>
- \_ EN degree of protection: IP40 on front; IP20 on terminals.

#### DMK 80 - DMK 80 R1

- Voltage measurement range: 15-660VAC \_
- Operating frequency range: 45-65Hz
- \_ Programmable VT ratio: 1.00-500.00
- Accuracy: ±0.25% f.s. ±1 digit

#### DMK 81 - DMK 81 R1

- Current measurement range: 0.05-5.75A
- Operating frequency range: 45-65Hz Programmable CT ratio: 5-10,000
- \_ \_ Accuracy: ±0.5% f.s. ±1 digit

#### DMK 82

\_

- Voltage measurement range: 15-660VAC
- Current measurement range: 0.05-5.75A
- Operating frequency range: 45-65Hz Programmable VT ratio: 1.00-500.00
- Programmable CT ratio: OFF/5-10,000 \_
- Accuracy: Voltage  $\pm 0.25\%$  f.s.  $\pm 1$  digit Accuracy: Current  $\pm 0.5\%$  f.s.  $\pm 1$  digit \_ \_

#### DMK 83 B1

- Measurement input: 15-660VAC
- Frequency measurement range: 50-60Hz ±10% \_
- Measurement accuracy: ±1 digit Accuracy: ±1 digit

#### DMK 84 R1

- $Cos\phi$  measurement error: ±0.5° ±1 digit
- $\cos \phi$  measurement in 4 quadrants Accuracy: ±1° ±1 digit

#### **Control and protection functions**

- DMK 80 R1
- Voltage loss or failure: OFF/5-85%
- Maximum voltage: OFF/102-120%
- Minimum voltage: OFF/70-98%
- Time delay for max-min voltage or voltage loss . 0.0-900.0 seconds.

#### DMK 81 R1

- Current loss: OFF/2-100% Maximum current: OFF/102-200%
- Maximum current instantaneous tripping: OFF/110-600%
- Minimum current: OFF/5-98%
- Time delay for max-min current or current loss @: 0.0-900.0 seconds.

#### DMK 83 R1

- Maximum frequency: OFF/101-110%
- Minimum frequency: OFF/90-99%

DMK 84 R1

- Minimum-maximum PF thresholds in 4 guadrants

Technical characteristics

pages 24-44 and 45

Delay time for max or min threshold 6: 1-9.000 seconds.

#### **Certifications and compliance**

Certifications obtained: FAC Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Independent adjustable delays





**Digital metering instruments** 



9r 9	Displayed measurements	Relay output	Qty per pkg	Wt
	n°	n°	n°	[kg]
neter.				
( 70	3 phase voltage values	-	1	0.233
(70 R1@	<ul> <li>3 phase to phase voltage values</li> <li>3 max phase voltage values</li> <li>3 max phase to phase</li> <li>3 max phase to phase voltage values</li> <li>3 min phase voltage values</li> <li>3 min phase to phase voltage values</li> </ul>	1	1	0.264
neter.				
(71	3 phase current values	-	1	0.241
( 71 R1@	3 max phase current values 3 min phase current values	1	1	0.272
bined voltmet	er, ammeter and wattme	ter.		
( 75	3 phase voltage values	-	1	0.271
(75 R1 <b>0</b> @	<ul> <li>3 phase to phase voltage values</li> <li>3 phase current values, phase and total</li> <li>3 maximum phase voltage values</li> <li>3 maximum phase to phase voltage values</li> <li>3 maximum phase to phase voltage values</li> <li>4 max active power, phase and total</li> <li>3 minimum phase to phase voltage values</li> <li>3 minimum phase to phase and total</li> <li>4 min active power, phase and total</li> </ul>	1	1	0.280

O Connection also to single-phase. Provide the second s

#### General characteristics

The DMK 7... instruments are available with modular

housing, 3 module size. Measurements are True RMS values and provide for reliable operation even in the presence of harmonics.

#### **Operational characteristics**

- Auxiliary supply voltage: 220-240VAC Operating frequency: 50-60Hz
- True RMS measurements
- \_ Max and min measurement storage 1 relay output with 1 changeover contact (SPDT) for
- DMK...R1 version only Modular DIN 43880 housing, 3 module
- Terminals: 4mm<sup>2</sup>
- EN degree of protection: IP40 on front; IP20 on terminals.

DMK 70 - DMK 70 R1

- Voltage measurement range: 15-660VAC
- Operating frequency range: 45-65Hz Programmable VT ratio: 1.00-500.00 Accuracy: ±0.25% f.s. ±1 digit

#### DMK 71 - DMK 71 R1

- Current measurement range: 0.05-5.75A
- Operating frequency range: 45-65Hz
   Programmable CT ratio: 5-10,000
   Accuracy: ±0.5% f.s. ±1 digit

DMK 75 - DMK 75 R1

- Voltage measurement range: 35-660VAC
- Current measurement range: 0.05-5.75A
- Frequency measure range: 45-65Hz
- \_
- Programmable VT ratio: 1.00-500.00 Programmable CT ratio: 5-10,000 Accuracy: Voltage ±0.25% f.s. ±1 digit Accuracy: Current ±0.5% f.s. ±1 digit

#### **Control and protection functions** DMK 70 R1

- Phase loss or failure: OFF/5-85%
  Maximum voltage: OFF/102-120%
  Minimum voltage: OFF/70-98%
  Asymmetry: OFF/2-20%
  Phase sequence: OFF/1-L2-L3/L3-L2-L1
- Maximum frequency: OFF/101-110%
- \_ Minimum frequency: OFF/90-99% \_ Time delay for max-min voltage, phase loss, asymmetry and min-max frequency S: 0.0-900.0 seconds.

DMK 71 R1

- Current loss: OFF/2-100%
- Maximum current: OFF/102-200%
- Maximum current instantaneous tripping:
- OFF/110-600%
- Minimum current: OFF/5-98% Asymmetry: OFF/2-20% Time delay for max-min current or current loss and asymmetry **③**: 0.0-900.0 seconds.

#### DMK 75 R1

- Voltage
- Phase loss or failure: OFF/5-85%
  Maximum voltage: OFF/102-120%
  Minimum voltage: OFF/70-98%
  Asymmetry: OFF/2-20%

- Phase sequence: OFF/L1-L2-L3/L3-L2-L1
- Current
- Current loss: OFF/2-100% \_
- Maximum current: OFF/102-200%
- Maximum current instantaneous tripping: OFF/110-600% Minimum current: OFF/5-98%
- \_
- Asymmetry: OFF/2-20%
- Power
- Rated power: 1-10,000 Maximum power: OFF/101-200%
- Maximum power instantaneous tripping: OFF/110-600% \_
- Minimum power: OFF/10-99%

- Frequency
   Maximum frequency: OFF/101-110%
   Minimum frequency: OFF/90-99%
   Minimum frequency: orF/90-99% Time delay for max-min voltage, max-min current or current loss, phase loss, asymmetry and min-max power **G**: 0.0-900.0 seconds.

#### **Certifications and compliance**

Certifications obtained: EAC Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

Independent adjustable delays

Wiring diagrams

page 24-37

24-26

Dimensions page 24-33





**DMK 75** 

DMK 75 R1

Order code

PA 96X48

EXP80 00

EXM80 04

Description

for DMK 0/1... 31 PA 96X96 Front protection cover, IEC IP54

Accessories for metering instruments

#### **Communication devices**







#### Protection covers



31 PA96x96

#### Accessories

EXP80 00

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX 01	USB/optical dongle with PC ↔ LOVATO Electric product connecting cable, for programming, data download, diagnostics and firmware upgrade	1	0.090
CX 02	Wi-Fi dongle for PC ↔ LOVATO Electric product programming, data download, diagnostics and cloning	1	0.090
CX 03	GSM/GPRS penta-band antenna (850/900/1800/1900/2100Mhz) for EXP1015 expansion module	1	0.090

#### **General characteristics**

Communication devices for connection of LOVATO Electric products to personal computers, smartphones and tablets.

#### CX 01

The USB/optical dongle, complete with cable, allows the connection of products compatible with PCs without having to disconnect the power supply from the electric panel. The PC identifies the connection as a standard USB.

#### CX 02

By Wi-Fi connection, compatible LOVATO Electric products can be viewed on PCs, smartphones and tablets with no need for cabling.

#### CX 03

Antenna compatible with the major part of worldwide mobile networks thanks to the available frequencies at 850/900/1800/1900/2100MHz. Degree of protection: IP67. Fixing by Ø10mm drilling.

Cable length: 2.5mm

For dimensions, wiring schemes and technical characteristics, refer to technical instructions in the Downloads section at: www.LovatoElectric.com

#### **General characteristics**

Qty Wt

[kg]

0.048

0.077

0.005

0.020

10

1

per pkg

n°

1

1

When a higher front IP protection degree is needed, the covers can be installed on the corresponding devices and also provide a sealing feature.

	for DMK 2		
Order code	Description	Qty per pkg	Wt
		n°	[kg]

Plastic insert for customising

Set of sealable terminal covers

for DMG 100/110/200/210/300

label fixing for DMG 600/610/611..

Front protection cover, IEC IP65

24-27



Accessories for metering instruments

#### Converter



Order code	Description	Qty per pkg.	Wt
		n°	[kg]
EXC CON 01	RS485/Ethernet 1248VDC converter, including DIN rail fixing kit	1	0.400

Gateway	Order code	Description	Qty per pkg	Wt
Ť			n°	[kg]
	EXC M3G 01	RS485 Gateway/3G modem, 9.527VAC/9.535VDC, including antenna and programming cables	1	0.340
new	EXC GL A01	Gateway data logger for the data collecting via Modbus from the device in the field. Publishing of the data to supervision software, also in Cloud	1	0.6
EXC M3G 01	EXC GL AX1	2G/3G modem communication module for EXC GL A01	1	-



EXC GL A01



EXC GL AX1

### **Connecting cables**



51 C4



Order code	Description	Qty per pkg.	Wt
		n°	[kg]
51 C2	For PC-multimeter RS232 port, 1.8m long	1	0.090
51 C4	For PC-4 PX1 converter drive, 1.8m long	1	0.147
51 C5	For analog modem-multimeter RS232 port, 1.8m long	1	0.111
51 C9	For 4PX 1 converter drive-analog modem, 1.8m long	1	0.137
Current clamp k	kits for DMG M3 portable dev	vices	
DMG M3 KIT01	Composed of 3 current clamps 1000/1 and 4 alligator clip cables for voltage measurements	1	6.900
DMG M3 KIT02	Composed of 1 current clamps 1000/1 and 1 alligator clip cable for voltage measurements. For DMGM3900, if measuring inputs for neutral-earth/ground and neutral current are used too	1	0.860

#### General characteristics

The EXC CON 01 converter allows "Slave" devices connected on an RS485 network to interface with a "Master" featuring Ethernet port:

- kit comprising converter and DIN rail mounting accessory;
- programming via web interface;
- power supply not included.

#### Certifications

Certifications obtained: cULus (UL 60950-1) Listed Fcc CLASS A.

#### EXC M3G 01 general characteristics

The EXC M3G 01 gateway allows "Slave" devices connected on an RS485 network to interface with a "Master" via 3G network:

- TCP server connection via 3G or 2G network;
- Transparent operating mode: the data is transferred from 3G side to serial side and vice versa without protocol conversion;
- 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)
- RJ45 port for parameter programming and diagnosis with a simple software application.
- Compatible with major worldwide mobile phone networks, thanks to the use of 850/900/1800/1900/2100MHz frequencies
- Protection rating IP67
- Fixing hole Ø10mm. Cable length 2.5m.
- **Reference standards**

Compliant with standards: EN 60950-1.

#### EXC GL A01 general characteristics

EXC GL A01 gateway is able to collect data from devices which are connected through ethernet or RS485 port. Modbus RTU, ASCII and TCP protocols are supported. The data can be reviewed by a connection to Synergy Cloud service or to ethernet local web server and a browser. The access to internet for data sending can be achieved with ethernet port or by adding EXC GL AX1 2G/3G modem.

- CPU ARM 1 GHz
- 2 ethernet port
- 1 RS232/RS422/RS485 serial port \_
- 24VDC (10...32VDC) power supply
- Operating temperature -20...+60°C
- Simplified connection to Lovato Electric devices Compatible with Synergy and Synergy<sub>cont</sub> software.

#### **Reference standards**

Compliant with standards: emissions EN 61000-6-4, immunity EN61000-6-2, for installation in industrial environment.

CONNECTING CABLES 51 C...

- To connect energy meters and/or multimeters with:
- Personal computers
- Modems
- Bus converters.

#### Electrical safety for DMG M3 KIT... (IEC/EN 61010-1 and IEC/EN 611-2-032)

- **CURRENT CLAMPS**
- 600V category III
- 300V category IV.
- VOLTAGE MEASURING CABLES
- 1000V category III.

#### **Reference standards**

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

For dimensions, wiring schemes and technical characteristics, refer to technical instructions in Downloads at www.LovatoElectric.com.



Current transformers

#### Solid-core



DM0T...



DM3T...



DM35T...



DM4T...

Order code	Primary	Burden		Qty	Weight
	Ipn	cl. 0.5	cl. 1	pkg.	
	/5 [A]	[VA]	[VA]	n°	[kg]
For Ø22mm/0.87	7" cable.				
DM0T 0050	50	—	1.25	1	0.200
DMOT 0060	60	_	1.5	1	0.200
DMOT 0080	80	—	1.5	1	0.200
DM0T 0100	100	—	1.5	1	0.200
DMOT 0150	150	—	2	1	0.200
For Ø23mm/0.90 For 30x10mm/1 20x15mm/0.79x	)" cable. .18x0.39", 2 :0.59" busba	5x12.5m ars.	ım/0.98x	0.49",	
DM2T 0100	100	—	1	1	0.130
DM2T 0150	150	_	1.5	1	0.130
DM2T 0200	200	_	2	1	0.130
DM2T 0250	250	-	2.5	1	0.130
DM2T 0300	300	1.5	3	1	0.130
DM2T 0400	400	2	3	1	0.130
For Ø30mm/1.18 For 40x10mm1. 25x25mm/0.98x	3" cable. 57x0.39", 3( :0.98" busba	Dx20mm, ars.	/1.18x0.7	79",	
DM3T 0200	200	—	5	1	0.260
DM3T 0250	250	-	5	1	0.260
DM3T 0300	300	2.5	5	1	0.260
DM3T 0400	400	2.5	5	1	0.260
DM3T 0500	500	2.5	5	1	0.260
DM3T 0600	600	5	10	1	0.260
DM3T 0800	800	5	10	1	0.260
For Ø66mm/2.60 For 80x12,5mm, 50x50mm/1.97x	)" cable. /3.15"x0.49' :1.97" busba	', 60x30r ars.	nm/2.36	x1.18"	,
DM35T 0800	800	10	15	1	0.460
DM35T 1000	1000	15	20	1	0.460
DM35T 1250	1250	15	20	1	0.460
For Ø86mm/3.38 For 100x30mm/ 70x60mm/2.75x	3" cable. 3.94x1.18", 2.36" busba	80x50m ars.	m/3.15x <sup>-</sup>	1,97",	
DM4T 1000	1000	10	20	1	0.700
DM4T 1250	1250	15	30	1	0.760
DM4T 1500	1500	20	30	1	0.760
	1.000			4	0 000
DM4T 1600	1600	20	30	1	0.000
DM4T 1600 DM4T 2000	1600 2000	20 30	30 45	1	0.840
DM4T 1600 DM4T 2000 DM4T 2500	1600 2000 2500	20 30 35	30 45 45	1 1	0.840
DM4T 1600 DM4T 2000 DM4T 2500 DM4T 3000	1600 2000 2500 3000	20 30 35 45	30 45 45 45	1 1 1 1	0.840 0.900 0.900
DM4T 1600 DM4T 2000 DM4T 2500 DM4T 3000 DM4T 3500	1600           2000           2500           3000           3500	20 30 35 45 50	30 45 45 45 50	1 1 1 1 1	0.800 0.840 0.900 0.900 0.900

#### **General characteristics**

The current transformers (CTs) in the DM series are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the digital multimeters or protection relays.

multimeters or protection relays. DM... are instrument transformers in class 1/0.5 without a primary winding and are normally used for high primary current values starting from 50A.

The number of loops of the primary cable does not modify the accuracy but converts the primary current value proportional to secondary current.



Current transformers

#### **Accuracy solid-core**



DM1TP...







DM5TP...



Order code	Primary current	Burden		Qty per	Weight
	Ipn	cl. 0.5s	cl. 0.5	pkg.	
	/5 [A]	[VA]	[VA]	n°	[kg]

For Ø28mm/1.10" Cable. For 30x10mm/1.18x0.39", 25x12.5mm/0.98x0.49". 20x20mm/0.79x0.79" busbar.

DM1TP 0060	60	1.5	1.5	1	0.560
DM1TP 0080	80	2,5	2,5	1	0.580
DM1TP 0100	100	2.5	3.75	1	0.480
DM1TP 0150	150	2.5	3.75	1	0.480
DM1TP 0200	200	2.5	3.75	1	0.480
DM1TP 0250	250	2.5	5	1	0.480
DM1TP 0300	300	2.5	5	1	0.480
DM1TP 0400@	400	5	5	1	0.480
DM1TP 0500@	500	5	5	1	0.480
For Ø52mm/2 0/1" cable					

For 60x20mm/2.36x0.79", 50x25mm/1.97x0.98" busbar. 3.75 5 DM3TP 0500 500 1 0.700

DM3TP 0600	600	5	10	1	0.700	
DM3TP 0800	800	5	10	1	0.700	
DM3TP 1000	1000	5	10	1	0.700	
For Ø85 5mm/3 37" Cable						

For 100x20mm/3.94x0.79", 80x45mm/3.15x1.77" busbar.							
DM5TP 1000	1000	5	10	1	0.900		
DM5TP 1250	1250	7.5	10	1	0.900		
DM5TP 1600	1600	7.5	10	1	0.900		
DM5TP 2000	2000	10	15	1	0.900		
<b>DM5TP 2500</b> 2500 10 15 1 0.900							
<b>DM5TP 3000</b> 3000 10 15 1 0.900							
Consult Technical support to inquiry about versions with Italian IITE							

certificates

For Ø33mm cable. For 40x10mm, 30x20mm, 25x25mm busbar.

#### General characteristics

General characteristics The DM...TP type accuracy current transformers (CTs) are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the digital multimeters or protection relays. DM...TP are accuracy current transformers in class 0.5s without a primary winding and are normally used for high primary surrent upon a thereing from COA.

current values starting from 60A. The number of loops of the primary cable does not modify

the accuracy but converts the primary current value proportional to secondary current.



- Seadable terminal covers
   Fixing on 35mm DIN rail (IEC/EN 60715) or by screws (fixing elements standard supplied with the product)
   EN degree of protection: IP30
   Ambient conditions:
- - Operating temperature: -25...+50°C
    Storage temperature: -40...+80°C.
    Relative humidity, non condensing: 90%.

**Certifications and compliance** 

Certifications obtained: EAC. Compliant with standards: IEC/EN 61869-2, IEC/EN 61869-1.





Order code

DM1TA 0250

DM1TA 0300

DM1TA 0400

DM1TA 0500

DM1TA 0600

DM1TA 0800

DM1TA 1000

DM2TA 0250

DM2TA 0300

DM2TA 0400

DM2TA 0500

DM2TA 0600

DM2TA 0800

**DM2TA 1000** 

DM3TA 0500

Current transformers

#### **Compact prewired split-core**



DM1TMA



DM2TMA...

#### Split-core



DM1TA...



DM2TA..



DM3TA...



DM4TA..

Order code	Primary current	Burden		Qty per	Weight
	Ipn	cl. 0.5	cl. 1	pkg.	
	/5 [A]	[VA]	[VA]	n°	[kg]
24x24mm/0.94x0.94" hole. Cable supplied as standard,					

longth this						
DM1TMA 0100	100		1.2	1	0.200	
DM1TMA 0150	150		1.2	1	0.200	
DM1TMA 0200	200		1.2	1	0.200	
<b>DM1TMA 0250</b> 250 — 1.2 1 0.200						
36v38mm/1 42v1 50" hole. Cable supplied as standard						

length 1m

Primary

current

lpn

50x80mm/1.97x3.15" hole.

80x80mm/3.15x3.15" hole

80x120mm/3.15x4.72" hole

/5 [A]

250

300

400

500

600

800

1000

250

300

400

500

600

800

500

1000

Burden

cl. 0.5

[VA]

1.5

1.5

2.5

2.5

3

5

15

1.5

25

2.5

3

5

cl. 1

[VA]

2

3

3

5

5

7.5

10

2

3

3

5

5

7.5

10

4

Qty

per

pkg

n°

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

Weight

[kg]

0.900

0.900

0.900

0.900

0.900

0.900

0.900

1.050

1.050

1.050

1.050

1.050

1.050

1.050

1.250

1.250

1.250

1.250

1.250

1.250

3.160

3.340

3.500

3.760

iongth him					
DM2TMA 0250	250		1.5	1	0.380
DM2TMA 0300	300		1.5	1	0.380
DM2TMA 0400	400		1.5	1	0.380
DM2TMA 0500	500		1.5	1	0.380

#### General characteristics

The DD...TMA type current transformers (CTs) are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the divide publication of the second the digital multimeters or protection relays. DM...TMA are instrument transformers in class 1 without a primary winding and are normally used for high primary current values starting from 100Å.

#### **Operational characteristics**

- Operating frequency: 50-60Hz
- \_ Secondary output current: 5A
- Overload withstand: 120% Ipn
- \_ IEC rated insulation voltage Ui: 720V IEC rated short-time thermal current Ith:
- 40-60 lpn for 1 second IEC rated dynamic current Idyn: 2.5 Ith for 1 second
- Cable supplied as standard, length 1m.
- Insulation (dry type): Class E
- Ambient conditions:
- Operating temperature: -25...+50°C
- Storage temperature: -40...+80°C
- · Relative humidity, non condensing: 90%.

#### **Certifications and compliance**

Certifications obtained: EAC. Compliant with standards: IEC/EN 61869-2, IEC/EN 61869-1.

#### **General characteristics**

The DM...TA type current transformers (CTs) are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the digital multimeters or protection relays.

DM...TA are instrument transformers in class 0.5/1 without a primary winding and are normally used for high primary current values starting from 250Å.

#### **Operational characteristics**

- Operating frequency: 50-60Hz Secondary output current: 5A
- Overload withstand: 120% Ipn \_
- IEC rated insulation voltage Ui: 720V IEC rated short-time thermal current Ith:
- 40-60 lpn for 1 second
- IEC rated dynamic current Idyn: 2.5 Ith for 1 second
- Insulation (dry type): Class E
- \_ Screw terminals
- Sealable terminal covers \_ Screw fixing (fixing elements standard supplied with the product)
- IEC degree of protection: IP30
- Ambient conditions:
  - Operating temperature: -25...+50°C
  - Storage temperature: -40...+80°C.
  - · Relative humidity, non condensing: 90%.

#### **Certifications and compliance**

Certifications obtained: EAC. Compliant with standards: IEC/EN 61869-2, IEC/EN 61869-1.

DM3TA 0600 600 5 DM3TA 0800 800 3 7.5 DM3TA 1000 1000 10 5 DM3TA 1250 1250 7.5 15 DM3TA 1500 1500 8 17 80x160mm/3.15x6.30" hole DM4TA 2000 2000 15 20 DM4TA 2500 2500 15 20 DM4TA 3000 3000 20 25 DM4TA 4000 4000 20 25

Dimensions page 24-33





Dimensions [mm(in)]





#### DIGITAL METERING INSTRUMENTS DMK 7... - DMK 8...



#### **CURRENT TRANSFORMERS**









#### DM1TP0060... - DM1TP0300



DM3TP...



16 (0.63")



















24

- 55 (2.16") -

Dimensions [mm(in)]

## Compact prewired split-core **DM1TMA**...













\_\_ovato

#### DM4TA...



•



100...240VAC 110...250VDC

_		00240V/ 110VDC	AC	1,1,1,
	A1 A2	11	TR	B SG
	Aux Supply	Tariff Input	R	S485
		2 x 4 Insulate	groups ed inputs	
-OAA4	11.1	0M2 12.1	0M3 13.1	00044 14.1
## 24 Metering instruments and current transformers Wiring diagrams



#### MULTIMETERS DMG 100 - DMG 110 - DMG 200 - DMG 210 - DMG 300 Single-phase Two-phase





Three-phase without neutral in ARON connection















Three-phase with or without neutral

100

S1 S2 S1 S2 S1 S

CURRENT

Balanced 3-phase connection with or without neutral

S1 S2 S1 S2 I2 I3

CURRENT

11

L2 -L3 -

110...250V 100...240V

L1

L2

L3 -

N -----100...240VAC 110...250VDC

þ

 $\begin{array}{c} \simeq & \widetilde{+} \\ A1 & A2 \end{array}$ 

AUX SUPPLY

0 000

V1 V2 V3 V

VOLTAGE

D

AUX SUPPLY



Three-phase with or without neutral



Three-phase without neutral in ARON connection





• For DMG 800... D048 only.

#### Three-phase with or without neutral



Three-phase without neutral in ARON connection





Two-phase with neutral. Measurement of neutral current and neutral-earth voltage



Three-phase with neutral. Measurement of neutral current and neutral-earth voltage



❷ For DMG 900... D048 only.

24-36





24-37

# 24 Metering instruments and current transformers Technical characteristics

Single-phase energy meters



ТҮРЕ	DME M100	DME D100 T1	DME D100 T1 A120	DME D100 T1 MID	DME D110 T1	DME D110 T1 A120	
	Single-phase	Single-phase	Single-phase	Single-phase	Single-phase	Single-phase	
AUXILIARY SUPPLY	•						-
Rated voltage(Ue)	230VAC	220240VAC	110120VAC	230VAC	220240VAC	110120VAC	
Operating voltage range	184264VAC	187264VAC	93132VAC	187264VAC	187264VAC	93132VAC	
Rated frequency	50/60Hz	50/60Hz	60Hz	50Hz	50/60Hz	60Hz	
Maximum power consumption	<7VA			7VA			
Maximum power dissipation	-			0.45W			
CURRENT							
IEC maximum current (Imax)	32A			40A			
IEC minimum current (Imin)	-			0.25A			
IEC rated current (Iref-Ib)	5A			5A			
IEC start current (Ist)	20mA			20mA			
Transition current (ltr)	-			0.5A			
ACCURACY							1
Active energy (per IEC/EN 62053-21)	Class 1	Cla	iss 1	Class B (EN 50470-3)	Cla	iss 1	
OUTPUTS	I	1		, ,			1
LED rate	640 flash/kWh			1000 flash/kWh			
Pulse rate	640 pulses/kWh			1000 pulses/kWh			
	(only for DMF M100 T1)						
Pulse duration	-			30ms			
STATIC OUTPUTS							1
Pulse rate	-		10 pulses/kWh		1-10-100-100 progra	00 pulses/kWh mmable	
Pulse duration	_			100ms	progra		
External voltage	_			10_30VDC			
Maximum current				50mA			
				001111			<u> </u>
IFC rated insulation voltage IIi	_			250\/\0C			1
IFC rated impulse withstand voltage Llimp	_			6kV			
IFC power frequency withstand voltage				4kV			
SUPPLY/MEASUBEMENT CONNECTION C				inte			<u> </u>
Type of terminals	Fixed			Fixed			T
Conductor section (min_max)	2.5 6mm <sup>2</sup>		1	15 10mm <sup>2</sup> (16 6AWG	)		
	2.50			1.5Tomin (100Awd	)		
Maximum tightening torque	1.2Nm			1.5Nm (14lbin)			
CONNECTION (PULSE OUTPUT/RS485)							
Type of terminals	Fixed			Fixed			
Conductor section (minmax)	115mm <sup>2</sup> (only for DME M100 T1)		(	).24mm² (2412AWG	)		
Maximum tightening torque	0.6Nm			0.8Nm (7lbin)			
AMBIENT CONDITIONS	•						-
Operating temperature	-25+55°C			-25+55°C			
Storage temperature	-30+80°C			-25+70°C			
Relative humidity	-			<80%			
Maximum pollution degree	2			2			1
Mechanical environment	-	-	-	Class M1	-	-	
Magnetic environment	-	-	-	Class E1	-	-	
HOUSING							•
Material	Polvamide			Polvamide			

Technical characteristics Single-phase energy meters



DME D110 T1 MID	DME D115 T1	DME D120 T1	DME D120 T1 A120	DME D120 T1 MID	DME D121 - DME D122	DME D130 LM
Single-phase	Single-phase	Single-phase	Single-phase	Single-phase	Single-phase	Single-phase
				1		
230VAC	220240VAC	220240VAC	110120VAC	230VAC	220240VAC	
187264VAC	187264VAC	187264VAC	93132VAC	187264VAC	187264VAC	
50Hz	50/60Hz	50/60Hz	60Hz	50Hz	50/60	Hz
7VA		7	'VA		4.8V	A
0.45W		0.	45W		1.4V	V
40A	40A	6	63A		63A	
0.25A		0	.5A		0.5/	ł
5A		1	0A		10A	
20mA		40	)mA		40m	A
0.5A			1A		1A	
Class B (EN 50470-3)		Class 1		Class B (EN 50470-3)	Class	1
1000 flash/kWh		1000 f	ash/kWh		1000 flas	h/kWh
1000 pulses/kWh		1000 pi	ılses/kWh		1000 pulse	es/kWh
30ms		3	Jms		30m	s
Conto			51110			0
1-10-100-1000 pulses/kWh		1-10-100-1	00 pulses/kWh		-	
programmable		progra	immable			
100ms		10	0ms		-	
1030VDC		10	30VDC		-	
50mA		50	)mA		-	
250VAC		25	OVAC		250V/	AC
6kV		6	6kV		6kV	1
4kV		2	lkV		4kV	1
Fixed		F	xed		Fixe	d
1.510mm <sup>2</sup> (166AWG)		2.516mm	² (146AWG;		2.516mm <sup>2</sup> (	146AWG;
		141	UAWG)		1410A	WG)
1.5Nm (14lbin)		2Nm (	26.51bin)		2Nm (26.	5lbin)
E					<b></b>	J
 FIXED		F			FIXe	
0.24mm <sup>2</sup> (2412AWG)		0.54mm <sup>2</sup>	(2011AWG)		0.54mm² (20	JTTAWG)
0.8Nm (7lbin)		1.3Nm	(12.1lbin)		1.3Nm (12	2.1lbin)
-25+55°C		-25	.+55°C		-25+5	55°C
-25+70°C		-25	.+70°C		-25+7	′0°C
<80%		<	30%		<80%	//
2			2		2	
Class M1	-	-	-	Class M1	-	-
Class E1	-	-	-	Class E1	-	-
Polyamide		Poly	amide		Polyan	nide

Technical characteristics Three-phase energy meters



ТҮРЕ	DME D300 T2 DME D301 DME D302	DME D300 T2 MID DME D301 MID DME D300 MID	DME D310 T2 DME D305 T2	DME D310 T2 MID DME D305 T2 MID	DME D330 DME D332	DME D330 MID DME D332 MID
	3 phase with neutral	3 phase with neutral	3 phase with and without neutral	3 phase with neutral	3 phase with and without neutral	3 phase with neutral
AUXILIARY SUPPLY					I	1]
Rated voltage (Ue)	220240VAC phase-neutral 380415VAC phase-phase	230VAC phase-neutral 400VAC phase-phase	220240VAC phase-neutral 380415VAC phase-phase	230VAC phase-neutral 400VAC phase-phase	220240VAC phase-neutral 380415VAC phase-phase	230VAC phase-neutral 400VAC phase-phase
Voltage range		187	264VAC phase-neutral	/ 323456VAC phase-j	phase	
Rated frequency	50/60Hz	50Hz	50/60Hz	50Hz	50/60Hz	50Hz
Maximum power consumption	20	VA		3.5VA		3.5VA
Maximum power dissipation	1.3	5W		2.7W		2.7W
CURRENT						
IEC maximum current (Imax)	63A - 80A fo	r DME D301	5	A	5A	5A
IEC minimum current (Imin)	0.	5A	0.0	5A	0.05A	0.05A
IEC rated current (Iref-Ib)	1(	)A	5	A	5A	5A
IEC start current (Ist)	40	mA	0.0	05A	0.005A	0.005A
IEC transition current (ltr)	1	A	0.2	5A	0.25A	0.25A
ACCURACY						I]
Active energy (per IEC/EN 62053-21)	Class 1	Class B (EN50470-3)	Class 0.5s DME D305 T2 Class 1 DME D310 T2	Class B (EN50470-3)	Class 0.5s	Class B (EN50470-3)
TARIFF CIRCUIT INPUT						
Rated voltage (Uc)			1002	40VAC		
Voltage range			8526	64VAC		
Frequency			50/6	60Hz		
Maximum power consumption			0.2	5VA		
Maximum power dissipation			0.1	8W		
LED						
Pulse rate			1000 pul	ses/kWh		
Pulse duration			30	ms		
STATIC OUTPUTS						
Pulse rate	1-10-100-1000 pulse (except D	s/kWh programmable ME D301)	0,1-1-10-100 pulses	/kWh programmable	_	_
Pulse duration	100ms for 1- <sup>-</sup> (except D) 60ms for 1000 pulse	10-100 pulses ME D301) s (except DME D301)	100	)ms	_	_
External voltage	1030VDC (exc	cept DME D301)	103	OVDC		
Maximum current		50mA (excep	t DME D301)			
INSULATION						
IEC rated insulation voltage Ui			250	VAC		
IEC rated impulse withstand voltage Uimp			61	٨٧		
IEC power frequency withstand voltage			41	٧V		
SUPPLY/MEASURMENT CIRCUIT CONNECT	TIONS					
Type of terminals	Fix	ed		Fix	æd	
Conductor section (minmax)	2.516mm <sup>2</sup>	(166AWG)	0.2 <sup>4</sup> 0.2	4mm² (2412AWG) for 2.5mm² (2412AWG	supply/voltage measure ) for current measurem	ement; nent
Maximum tightening torque	2Nm (	14lbin)		0.8Nm	(7lbin)	
TARIFF CONTROL CIRCUIT CONNECTIONS	3					
Type of terminals	Fix	ed		Fix	ked	
Conductor section (minmax)	0.22.5mm <sup>2</sup>	(2412AWG)		0.24mm² (	2412AWG)	
Maximum tightening torque	0.49Nm	(4.4lbin)	0.8Nm (7lb	in) (0.44Nm / 4lbin for	current measurement	DME D320)
CONNECTIONS (PULSE OUTPUT/RS485)						
Type of terminals	Fix	ced		Fix	ced	
Conductor section (minmax)	0.21.3mm <sup>2</sup>	(2416AWG)		0.22.5mm <sup>2</sup>	(2412AWG)	
Maximum tightening torque	0.15Nm	(1.7lbin)		0.44Nm	n (4lbin)	
AMBIENT CONDITIONS						
Operating temperature			-25	+55°C		
Storage temperature			-25	+70°C		
Relative humidity			<80% non	condensing		
Maximum pollution degree		2		2		2
Mechanical environment		Class M1		Class M1		Class M1
Magnetic environment		Class E1		Class E1		Class E1
HOUSING						
Material	Polya	ımide		Polya	amide	

# 24 Metering instruments and current transformers Technical characteristics

Data concentrator



TVDE	DME CD
	DINIC ÇD
Vollage Talige	60204VAU/93.5300VDU
	50/60HZ
Maximum power consumption	8.8VA
Maximum power dissipation	3.6W
Number of inputs	8
Input separations	1 common for every 2 inputs (insulated between each pair 500VRMS)
Type of input	Negative (NPN)
Maximum voltage at inputs	15VDC
Maximum input current	18mA (15mA typical)
High input signal	≥7.6V
Low input signal	<2V
Maximum frequency	2000Hz
TARIFF CONTROL CIRCUIT	
Rated voltage (Uc)	100240VAC/110VDC
Voltage range	85264VAC/93.5140VDC
Frequency	50/60Hz
Maximum power consumption	0.25VA
Maximum power dissipation	0.18W
RS485 SERIAL INTERFACE	
Baud-rate	Programmable 120038400bps
Insulation	1500VAC towards energy meter inputs. Double insulation towards supply and tariff inputs
INSULATION	
IEC rated insulation voltage Ui	250VAC
IEC rated impulse withstand voltage Uimp	6.5kV
IEC power frequency withstand voltage	3.6kV
SUPPLY CIRCUIT CONNECTIONS	
Type of terminals	Fixed
Conductor section (minmax)	0.24mm <sup>2</sup> (2412AWG)
Maximum tightening torque	0.8Nm (7lbin)
TARIFF INPUT CIRCUIT CONNECTIONS	
Type of terminals	Fixed
Conductor section (minmax)	0.24mm <sup>2</sup> (2412AWG)
Maximum tightening torgue	0.8Nm (7lbin)
RS485 CONNECTION	
Type of terminals	Fixed
Conductor section (minmax)	0.24mm <sup>2</sup> (2412AWG)
Maximum tightening torque	0.8Nm (71bin)
ENERGY METER INPUT CONNECTIONS	
Type of terminals	Fixed
Conductor section (min_max)	0.2 2.5mm <sup>2</sup> (24 12AWG)
Maximum tightening torque	0.2
AMBIENT CONDITIONS	אוועוד)
	-20 ±60°C
Storage temperature	-30 ±80°C
Belative humidity	00/_
Maximum pollution degree	2 2
	۷
Matarial	Dolyamida
ויומנסוומו	Fuyannue

Technical characteristics LCD multimeters and power analyzers



ТҮРЕ	DMG 100 - DMG 1100	DMG 200	DMG 210	DMG 300	
AUXILIARY SUPPLY				·	
Rated voltage Us		1002 1102	40VAC/ 50VDC		
Voltage range		8526 93.53	64VAC/ 800VDC		
Frequency range		45	66Hz		
Maximum power consumption	3.5VA	3.5VA	4.5VA	3.2VA	
Maximum power dissipation	1.2W	1.2W	1.7W	1.3W	
Microbreaking immunity	≥50ms	≥50ms	≥50ms	≥50ms	
VOLTAGE INPUTS					-
Type of input		Three-phas	se + neutral		
Maximum rated voltage Ue		690VAC phase-phase (	400VAC phase-neutral)		
Measurement range		20830VAC phase-phase (	10480VAC phase-neutral)		
Frequency range		45	66Hz		
Method of measurement		True	RMS		
Method of connection	Single, two	o, three-phase with or withou	t neutral, balanced three-pha	se systems	
CURRENT INPUTS	1				<u>.</u>
Rated current le	5A	5A	5A	1A/5A	
Current reading through Rogowski coils	-	-	_	-	
Measurement range	0.016A	0.016A	0.016A	0.011.2A / 0.016A	
Method of measurement		True	RMS		
Overload capacity		+20% le through extern	al CT with 5A secondary		
Overload peak		50A 1	ior 1s		
INSULATION	1				
IEC rated insulation voltage Ui		690	VAC		
IEC rated impulse withstand voltage Uimp		9.5	ikV		
IEC power frequency withstand voltage		5.2	2kV		
SUPPLY CIRCUIT/VOLTAGE MEASUREMENT CONNECTION	S				
Type of terminal		Fix	ced		
Conductor section (minmax)		0.24.0mm <sup>2</sup>	(2412 AWG)		
Maximum tightening torque		0.8Nm	(7lbin)		
CURRENT MEASUREMENT CIRCUIT AND RS4850	1				
Type of terminal		Fix	ced		
Conductor section (minmax)		0.22.5mm <sup>2</sup>	(2412AWG)		
Maximum tightening torque		0.44Nm	n (4lbin)		
AMBIENT CONDITIONS					-
Operating temperature		-20	+60°C		
Storage temperature		-30	+80°C		
Relative humidity		<9	0%		
Maximum pollution degree			2		
Measurement class					
HOUSING					
Material		Polya	amide		

RS485 communication port for DMG 110, DMG 210, DMG 610 and DMG 900T only.
 For DMG 800 D048, DMG 900 D048 and DMG 900T D048 only.



Technical characteristics LCD multimeters and power analyzers

1					
DMG 600	DMG 610 - DMG 611	DMG 700	DMG 800	DMG 900	DMG 900 T
1					
1004 1202	440VAC 250VDC		1004 - 110250VDC	40VAC (1248VDC❷)	
904 93.53	84VAC 300VDC		904 93.5300VDC	34VAC - (970VDC❷)	
45	.65Hz		45	66Hz	
9.8	5VA		3.9	VA	
3.	5W		3.4	łW	
≥5	Oms		≥50	)ms	
					,
Three-pha	se + neutral		Three-phas	e + neutral	
600VAC phase-phase	(300VAC phase-neutral)		690VAC phase-phase (	400VAC phase-neutral)	
50720VAC phase-phase	(30360VAC phase-neutral)		20830VAC phase-phase (	10480VAC phase-neutral)	
45	.66Hz	45	66Hz	4566Hz an	d 360440Hz
True	RMS		True	RMS	
	Single, two, t	three-phase with or without	neutral, balanced three-phas	e systems	
			1		
1A	/5A	5A	1A/5A	1A	/5A
-	206300A (for DMG 611)	-	-		-
0.011.24	A / 0.016A	0.016A	0.011.2A / 0.016A	0.0021.24	A / 0.0110A
Irue	RMS	. 200/ la by outernal C	T with EA accordant	RMS	
			T WILL DA SECOLUARY		
		JUAIL	JI 15		
600	)VAC		690	VAC	
9.5	5kV		9.5	ikV	
5.1	2kV		5.2	kV	
		Remov	/able		
		0.22.5mm <sup>2</sup> (	2412AWG)		
		0.5Nm (4	4.5lbin)		
Fi	xed		Fix	ed	
 0.21.5mm <sup>2</sup>	(2412 AWG)	0.5	54mm <sup>2</sup> (2610 AWG); 0.21	.5mm <sup>2</sup> (2412 AWG) for RS4	485
 0.8Nm	n (7lbin)		0.8Nm	(7lbin)	
1					1
		-20+	60°C		
		-30+	80°C		
		<90	%		
		2	1		
		Delver	mido		
<u> </u>		Polyar	IIIue		

Technical characteristics Metering instruments

TYPE		DMK 00 - DMK 00 R1 DMK 80 - DMK 80 R1	DMK 01 - DMK 01 R1 DMK 81 - DMK 81 R1	
AUXILIARY SUPPLY				
Rated voltage Us		24V/ 11012 2202 38041	4CO .7VACO 40VAC 5VACO	
Operating voltage range		0.85	1.1 Us	
Rated frequency		5060H	z ±10%	
Maximum power consumption	on	3.3VA (I 3.6VA (DI	DMK) MK R1)	
Maximum power dissipation				
VOLTAGE INPUTS				I
Rated voltage Ue		600VAC	—	
Operating voltage range		15660VAC	—	
Operating voltage range, pha	ise-phase	—		
Rated frequency		5060Hz ±10%	—	
Method of measuring		True RMS		
CURRENT INPUTS				
Rated current le		_	5A	
Measuring range		-	0.055.75A	
Rated frequency		_	5060Hz ±10%	
Type of input		_	Shunts connected by external low voltage CT 5A max	
Type of measuring		_	True RMS	
Overload capacity		_	+20% le	
FREQUENCY INPUTS	I			I
Measuring range and type				
Voltage range				
Input rated voltage				
MEASUBING ACCURACY				
Measurement conditions	00500			
(Temperature $\pm 23^{\circ}C \pm 1^{\circ}C$ )	voltane	+0.25% fs. +1 digit		
(Relative humidity	current		+0.5% f s +1 digit	
45 ±15% R.H.)	frequency		±0.5 % 1.5. ±1 digit	
	nequency			
Polativo humidity		1 digit 60%	00% P H	
			)90 /0 N.H	
		±1 digit -2	20+60°C	
RELAY UUIPUI FUR DIVIK	RITTES			
Number and type of contact			geover	
Rated Voltage		250		
IEC/EN 60947-5-1 designation		AC1 8A 250	VAC / B300	
Electrical life		10	<u>J°</u>	
Mechanical life		30x	10°	
INSULATION				
Rated insulation voltage Ui		600VAC	415VAC	
CONNECTIONS				
Type of terminals		Fixed (DI Removable	MK 8); (DMK 0)	
Maximum tightening torque		0.8Nm (7lbin) for DMK 0	/ 0.5Nm (4.5lbin) for DMK 8	
Conductor section (minma	x)	0.22.5mm² (241 0.24.0mm² (241	2AWG) for DMK 0 2AWG) for DMK 8	
AMBIENT CONDITIONS				
Operating temperature		-20+	+60°C	
Storage temperature		-30+	+80°C	
HOUSING				
Material		Thermoplastic (DMK 0	) / Polyamide (DMK 8)	

On specific request.



Technical characteristics Metering instruments



DMK 02 DMK 82	DMK 03 - DMK 03 R1 DMK 83 - DMK 83 R1	DMK 04 - DMK 04 R1 DMK 84 - DMK 84 R1
	24VAC 110127VAC 220240VAC 380415VAC	
	0.851.1 Us	
	5060Hz ±10%	
3.3VA 3.6VA (DMK R1)	3.3VA	(DMK)
1.5W 1.8W (DMK R1)	1.5W	(DMK)
0001/4.0		0001/4.0
		600VAC
15660VAC	—	
_	25660VAC (DMK R1)	15000VAC (DIVIK)
5060Hz ±10%	-	5060Hz ±10%
True RMS		True RMS
 <b>F</b> A		<b>F</b> A
5A		
0.055.75A	_	0.055.75A (DMK) 0.15.75A (DMK R1)
5060Hz ±10%	_	5060Hz ±10%
Shunts connected by external low voltage CT 5A max	_	Shunts connected by external low voltage CT 5A max
True RMS	_	True RMS
+20% le		+20% le
—	1565Hz ±10% True RMS	—
_	15660VAC	_
—	600VAC	—
	_	± 1° ±1 digit
 ±0.25% f.s. ±1 digit		—
±0.5% f.S. ±1 digit	.1 diait	
	±Tuigit	_
	+1 digit 60% 90% B H	
	+1 digit -20 +60°C	
	1 changeover	
	250VAC	
	AC1 8A 250VAC / B300	
	105	
	30x10 <sup>6</sup>	
	600VAC	
	Fixed (DMK 8); Removable (DMK 0)	
 	0.8Nm (7lbin) for DMK 0 / 0.5Nm (4.5lbin) for DMK 8	3
	0.22.5mm <sup>2</sup> (2412AWG) for DMK 0 0.24.0mm <sup>2</sup> (2412AWG) for DMK 8	
	-20+60°C	
	-30+80°C	
	(hermoplastic (DMK 0) / Polvamide (DMK 8)	

0 On specific request.

# 24 Metering instruments and current transformers Technical characteristics

Multimeters

ТҮРЕ		DMK 10 - DMK 10 R1	DMK 11 - DMK 11 R1	DMK 15 - DMK 15 R1	DMK 16
		DMK /U - DMK /U R1	DINK /1 - DINK /1 R1	DINK /5 - DINK /5 R1	DINK 16 K1
AUXILIARY SUPPLY			2.41/4	<b>^</b>	
			24VA 11012 22024 38041	TVACO 40VAC 5VACO	
Operating voltage range			0.85	.1.1 Us	
Rated frequency			5060H	Hz ±10%	
Maximum power consum	ption	3.3VA (DMK) 3.6VA (DMK R1)	3.3VA (DMK) 3.6VA (DMK R1)	3.3VA (DMK) 3.6VA (DMK R1)	3.6VA (DMK) 3.9VA (DMK R1)
Maximum power dissipat	ion	1.5W (DMK) 1.8W (DMK R1)	1.5W (DMK) 1.8W (DMK R1)	1.5W (DMK) 1.8W (DMK R1)	1.8W (DMK) 2.1W (DMK R1)
VOLTAGE INPUTS			1		
Rated voltage Ue	phase-phase	600VAC	_	600VAC	600VAC
	phase-neutral	347VAC	_	347VAC	347VAC
Operating voltage range	phase-phase	15660VAC	-	35660VAC	35660VAC
	phase-neutral	10382VAC		20382VAC	20382VAC
Frequency range		5060Hz ±10%	_	5060Hz ±10%	5060Hz ±10%
Method of measuring		True RMS		True RMS	True RMS
CURRENT INPUTS					
Rated current le			5A	5A	5A
Measuring range			0.056A	0.055.75A	0.055.75A
Frequency range		_	5060HZ ±10%	5060HZ ±10%	5060HZ ±10%
Type of input				external low voltage CT 5A max	
Type of measuring			True RMS	True RMS	True RMS
Overload capacity			+20% le	+20% le	+20% le
MEASURING ACCURACY					
Measurement conditions (Temperature +23°C ±1°	C) voltage	±0.25% f.s. ±1 digit	_	±0.25% f.s. ±1 digit	±0.25% f.s. ±1 digit
(Relative humidity	current		±0.5% f.s. ±1 digit	±0.5% f.s. ±1 digit	±0.5% f.s. ±1 digit
45 ±15 /6 11.11.)	power		_	1% f.s. ±1 digit	1% f.s. ±1 digit
	energy			_	Class 2
	frequency		_	±1 digit	±1 digit
RELAY OUTPUT FOR DM	K R1 TYPES ON	ILY			
Number and type of conta	act	1 changeover	1 changeover	1 changeover@	1 changeover
Rated voltage		250VAC	250VAC	250VAC	250VAC
IEC/EN 60947-5-1 design	ation	AC1 8A 250VAC / B300	AC1 8A 250VAC / B300	AC1 8A 250VAC / B300	AC1 8A 250VAC / B300
Electrical life		105	105	105	105
Mechanical life		30x10 <sup>6</sup>	30x10 <sup>6</sup>	30x10 <sup>6</sup>	30x10 <sup>6</sup>
INSULATION			-	-	
Rated insulation voltage L	Ji	600VAC	415VAC	600VAC	600VAC
CONNECTIONS					
Type of terminals			Removable (DMK 1	); fixed (DMK /)	
Maximum tightening torq	ue		0.5Nm (4.5lbin) for DIVIK 1	.; U.8Nm (71bin) for DMK 7	
Conductor section (min	max)		0.22.5mm² (241 0.24.0mm² (241	2AWG) for DMK 0 2AWG) for DMK 7	
AMBIENT CONDITIONS					
Operating temperature		-20+60°C	-20+60°C	-20+60°C	-20+60°C
Storage temperature		-30+80°C	-30+80°C	-30+80°C	-30+80°C
HOUSING					
Material			Thermoplastic (DMK 1	.) / Polyamide (DMK 7)	
On apositio request					

One contact NO for DMK 75 R1.



# 24 Metering instruments and current transformers Technical characteristics

Multimeters



ТҮРЕ		DMK 20 - DMK 22
AUXILIARY SUPPLY		
Rated supply voltage Us		208240VAC
Operating voltage range		154288VAC for DMK 20 177 264VAC for DMK 22
Frequency		4565Hz
Maximum power consumption		5.5VA (Us=240V) for DMK 20 6VA (Us=240V) for DMK 22
Maximum power dissipation		2.5W (Us=240V) for DMK 20 2.8W (Us=240V) for DMK 22
Immunity time of microbreakings		20ms
VOLTAGE INPUTS		
Maximum rated voltage (Ue)		690VAC phase-phase (400VAC phase-neutral)
Operating voltage range		60830V phase-phase (30480VAC phase-neutral)
Frequency range		4565Hz
Method of measuring		True RMS
Measuring input impedance		$>1.1M\Omega$ phase-phase and $>570k\Omega$ phase-neutral
Method of connections		Single-phase, two-phase, three-phase, or balanced three-phase system
Measuring error		±0.25% full scale ±1digit (Class 0.5)
CURRENT INPUTS		
Rated current le		5A (1A on request)
Measuring range		0.056A
Method of measuring		True RMS
Overload capacity		+20% le by external CT with 5A secondary
Overload peak		50A for 1s
Dynamic peak		125A for 10ms
Power consumption		<0.6W per phase
Measuring error		Class 0.5 ±0.25% f.s. ±1digit
MEASURING ACCURACY		
Measurement conditions	voltage	Class 0.5 ±0.35% f.s. (830V)
(Temperature $\pm 23^{\circ}$ $\pm 1^{\circ}$ $\pm$ $1^{\circ}$ Humidity 45 $\pm 15\%$ R H )	current	Class 0.5 ±0.5% f.s. (6A)
	active energy	Class 2
	frequency	—
	harmonic distortion	—
OUTPUTS		
Relay (1 changeover contact)		_
Static (with 1 two-way MOSFET output)		—
		0001/
IEC rated insulation voltage UI		6907
		Demoushin
lype of terminals		
Maximum tightening torque		
		U.22.5mm² (2412AWG)
AMBIENT CONDITIONS		20
		-2U+0U U 
		-50+60 0 >00%
Maximum pollution degree		<۳U% ۲
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Matarial		Salf-avtinguishing black plastic
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• For DMK 32D 048 only.

Energy management

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<sup>27</sup> Engine and generator controllers

valo -----

## 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.

### SEC. - PAGE

Engine and generator controllers	•===		
Engine protection controllers	. 27	-	6
Stand alone gen-set controllers	. 27	-	7
Automatic mains failure (AMF) gen-set controllers	27	-	8
Paralleling controllers for mains-generator and generator-generator	27	-	9
Remote and alarm-status relay units	. 27	-	10
Communication devices and accessories	. 27	-	11
Software	. 27	-	12
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#### **ENGINE PROTECTION CONTROLLERS**

- Starting with or without power key switch
- Programmable inputs and outputs
- Front LED indicators for engine alarm conditions and diagnostics.



#### STAND ALONE GEN-SET CONTROLLERS

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



# AUTOMATIC MAINS FAILURE (AMF) GEN-SET CONTROLLERS

- 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 motorised changeover switches
- Engine protection
- Programmable inputs, outputs and alarms.



#### PARALLELING CONTROLLERS FOR MAINS-GENERATOR AND GENERATOR-GENERATOR

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



#### **REMOTE UNITS**

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

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# COMMUNICATION DEVICES, ACCESSORIES AND SOFTWARE

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







	ENGINE PROTECT	ION CONTROLLERS		STAND ALONE GEN	-SET CONTROLLERS	
	RGK 30	RGK 20	RGK 400SA RGK 420SA	RGK 600SA RGK 601SA	RGK 700SA	RGK 800SA
Generator voltage control	-	L-N O	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	50/60Hz	50/60/400Hz
Digital inputs n°	4	4	5 neg.+1 pos. (emergency)	4 neg.+1 pos. (emergency)	6 neg.+1 pos. (emergency)	8 neg.+1 pos. (emergency)
Digital outputs n°	2 (Relay)	3 (SSR)	5 (SSR)	6 (SSR)	3 (Relay) + 4 (SSR)	3 (Relay)+6 (SSR)+1(SO)
Engine running inputs	"D+" and "AC"	"D+", "AC", Hz	"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	-	-	-	RGK 601SA	•	•
Rated battery voltage	12/24VDC	12/24VDC	12/24VDC	12/24VDC	12/24VDC	12/24VDC
Power supply range	933VDC	935VDC	733VDC	733VDC	733VDC	733VDC
Mains voltage control	-	-	-	-	-	-
Rated voltage range	-	10277VAC	100480VAC	100480VAC	30600VAC	30600VAC
VT programming	-	-	•	•	•	•
Rated input current	-	-	5A/1A	5A/1A	5A/1A	5A/1A
TRMS voltage measurement	-	-	•	•	•	•
TRMS current measurement	-	-	•	•	•	•
Display	_	7 digit LCD	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	-	-	•	RGK 600SA	•	•
Engine speed input	"W"	"W" or generator frequency	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up" (RGK 600SA)	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"
Auxiliary analog input	-	-	-	-	-	•
I/O expansion	-	-	1 x EXP1040	RGK RR	RGK RR	3 x EXP + RGK RR
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	-	🗕 (TTL)	-	-	•	EXP1011
RS485 serial port	-	-	-	-	-	•
Event logging	-	-	-	•	•	•
RTC (Real Time Clock)	-	-	-	-	-	•
Programmable Inputs/Outputs	-	•	•	•	•	•
PLC logic function	-	-	-	-	•	•
Alarms	•	•	•	•	•	•
User alarms n°	-	1	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)❷	5 (GB - I - F - P - E)❷	5 (GB - I - F - P - E)@
Upload languages	-	-	-	•	•	•
Load sharing	-	-	-	-	-	-
Generator paralleling	-	-	-	-	-	-
Mains-generator synchronising (closed transition)	-	-	-	-	-	-
IEC front degree of protection	IP40	IP40	IP40, IP65 with optional gasket seal ③	IP40, IP65 with optional gasket seal	IP65	IP65
Certifications	cULus, EAC	cULus, EAC	cULus, EAC	cULus, EAC	cULus, EAC	cULus, EAC
Frequency only.		For RGK 400SA or	nly.			

Frequency only.Controller uploading of other mutilanguage sets.



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	AUTOMAT	IC MAINS FAILURE	(AMF) GEN-SET CON	TROLLERS	PARALI Load Sharing	.ELING / Controllers
	RGK 600 RGK 601 RGK 610	RGK 700	RGK 750	RGK 800	RGK 900	RGK 900SA
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	RGK 610	•	•	•	•	•
CANbus interface	RGK 601	•	•	•	•	•
Bated 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	1-  2-  3-N	1-  2-  3-N	1-  2-  3-N	1-  2-  3-N	1-  2-  3-N	-
Rated voltage control	100_480VAC	30_600VAC	100 480\/AC	30_600VAC	30_600VAC	30 600\/AC
VT programming	100400 VA0	00000VA0	100400 VA0	50000VA0	00000VA0	00000 VA0
Pated input current	54/14	54/14	50/10	50/10	54/14	50/10
TDMS voltage massurement				JAVIA		JA/ 1A
TRMS voltage measurement						
	Craphia baaklight	Craphia baaklight	Craphic backlight	Craphic backlight	Craphic backlight	Craphia baaklight
Періау	LCD, 128x80 pixels	LCD, 128x80 pixels	LCD, 128x80 pixels	LCD, 128x80 pixels	LCD, 128x112 pixels	LCD, 128x112 pixels
Engine running magnetic pick-up input	RGK 600/RGK 610	•	•	•	•	•
Engine speed input	"W"/"Pick-up" (RGK 600/RGK 610) or generator frequency	"W" or generator frequency or "Pick-up"				
Auxiliary analog input	-		•	•	•	•
I/O expansion	1 x FXP + BGK BB	BGK BB	2 x EXP + BGK BB	3 x EXP + BGK BB	4 x FXP + BGK BB	4 x FXP + BGK BB
USB/Ontical port on front						
Wi-Fi port on front						
	EXP1010 (BGK 610)		EXP1010	EXP1010	EXP1010	EXP1010
Ethernet port with Web server function		_	EXP1013	EXP1013	EXP1013	EXP1013
CDDS/CSM modern			EVD1015	EVD1015	EXD1015	EVD1015
BS222 parial part		-		EXPIDIO	EXPIDIO	
RS252 Selial port	EXP1011 (NGK 010)			EXPTUTT	EXPTUTT	EAFIUIT
Fuent logging		-	EAFIUIZ			
Event logging						
RTC (Real Tille Clock)	-	-				
Programmable inputs/Outputs	-		•		•	•
	-		•	•	•	•
Alarms	•	•	-	-	-	
User alarms n°	4	8	8	8	16	16
Alarm property customising	•	•	•	•	•	•
I lexts for alarms, events and parameters						
Multilanguage (type) n°	5 (GB - I - F - P - E)❷	5 (GB - I - F - P - É)❷	5 (GB - I - F - P - E)@	5 (GB - I - F - P - E)❷	5 (GB - I - F - P - E)@	5 (GB - I - F - P - E)@
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 (1.30)" **RGK 700** RGK 800 RGK 900

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



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.



RGK 800 RGK 900

**EXPANDABILITY** 

- Basic RGK 750, RGK 800 and RGK 900 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 with Web server function GPRS/GSM modem.



-----

RGK 750 (2 modules) RGK 800 (3 modules) RGK 900 (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 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, RGK 750 - RGK 800 -RGK 900 controllers can send SMS and email messages with alarm and event conditions as well as the latest logged events to a FTP server.

#### OPTO-ISOLATED ETHERNET INTERFACE WITH WEB SERVER FUNCTION



Web Browsing of the single controller connected in Ethernet by EXP10 13 expansion module.

• 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:

- RGK 700 RGK 750 RGK 800 types: load shedding and dummy
- load modes - RGK 900 types: base-load and peak shaving modes.

#### PARALLELING

RGK 900 and RGK 900SA 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 RGK 900MC can control and synchronise mains parallel operation with a power bus composed by a series of generating sets



**REMOTE UNITS** 



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.

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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  $Symergy_{col}$  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 abgrad by the active letter.

shared by the entire latest generation of RGK gen-set controllers with communication port.



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**RGK 30** 



Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK 30	12/24VDC, for external start-stop key switch, 96x48mm/3.78x1.89"	1	0.160
RGK 20	12/24VDC, LCD display, built-in power supply key switch, with TTL programming port, 72x72mm/2.83x2.83"	1	0.270



- \_
- 1 LED indicator for glow plug pre-heating 5 LED indicators for alarm status \_
- \_ Remote starting only.

### INPUTS/OUTPUTS

- Digital inputs: 3 negative and 1 positive
- (start/stop by remote key switch)
- Digital outputs: 2 relay (1 programmable).

#### **Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus-File E93601), as Auxiliary Devices-Generator controllers; EAC.

Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, EN 55011, UL 508, CSA C22.2 nº 14.

## **General characteristics for RGK 20**

- **OPERATOR INTERFACE**
- 1 ON-OFF power supply key selector switch
- 1 semi-automatic engine START button

- 2 programmable key butons
   7 digit LCD display (Hours, Hz, VBatt)
   1 LED indicator for engine status
- 1 LED indicator for glow plug pre-heating \_
- 5 LED indicators for alarm status
- Local or remote starting.

#### INPUTS/OUTPUTS

Programmable functions:

- Generator frequency input
- Digital inputs: 3 negative and 1 positive
- Digital outputs: 3 static (1 programmable)
- \_ Inputs, outputs and alarms, all with programmable properties.

#### **Certifications and compliance**

Certifications obtained: UL Listed, for USA and Canada (cULus-File E93601), as Auxiliary Devices-Generator controllers; EAC.

Compliant with standards: IEC/EN 61010-1,

IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 nº 14.



#### Stand alone gen-set controllers



RGK 400SA



RGK 420SA



#### RGK 600SA - RGK 601SA



**RGK 700SA - RGK 800SA** 



new

EXP 10...

#### STAND ALONE APPLICATION



LOAD

	Description	per pkg	VVL
		n°	[kg]
RGK 400SA	12/24VDC, icon LCD display, 5 inputs, 5 outputs	1	0.410
RGK 420SA	12/24VDC, icon LCD display, built-in 3 position key switch, 5 inputs, 5 outputs	1	0.430
RGK 600SA	12/24VDC, graphic LCD display, w/Pick-up speed input, 4 inputs, 6 outputs	1	0.540
RGK 601SA	12/24VDC, graphic LCD display, CANbus port, 4 inputs, 6 outputs	1	0.530
RGK 700SA	12/24VDC, graphic LCD display, RS232 serial port, CANbus port, 6 inputs, 7 outputs	1	0.900
RGK 800SA	12/24VDC, graphic LCD display, RS485 serial port, CANbus port. Expandable with EXP modules, 8 inputs, 10 outputs	1	0.980

Programmable functions and properties

Outransla Description

Order code Description

Charact.	RGK 4SA	RGK 6SA	RGK 700SA	RGK 800SA
Inputs	5	4	6	8
Relay outputs	-	-	3	3
Protected static outputs	5	6	4	7
Resistive/ Digital inputs	1	3	3	4

Urder code	Description				
ACCESSORIE	S FOR RGK 4SA				
EXP00 05	IP65 housing gasket				
ACCESSORIE	S FOR RGK 600SA AND RGK 601SA				
EXP80 01	IP65 housing gasket				
EXPANSION MODULES FOR RGK 4SA AND RGK 800SA Inputs and outputs.					
EXP10 40	2 digital/resistive inputs, 2 static outputs				
EXP10 41	2 thermocouple inputs, 2 static outputs				
EXP10 42T	6 digital inputs, PCB tropicalized				
EXP10 43T	4 digital input and 2 static outputs, PCB tropicalized				
EXPANSION N Inputs and ou	IODULES FOR RGK 800SA tputs.				
EXP10 00	4 opto-isolated digital inputs				
EXP10 01	4 opto-isolated static outputs				
EXP10 02	2 digital inputs and 2 static outputs, opto-isolated				
EXP10 03	2 relay outputs rated 5A 250VAC				
EXP10 04	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0±5V				
EXP10 05	2 opto-isolated analog outputs 0/4-20mA or 0-10V or 0±5V				
EXP10 08	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC				
Communicatio	ons interfaces.				
EXP10 10	Opto-isolated USB interface				
EXP10 11	Opto-isolated RS232 interface				
EXP10 12	Opto-isolated RS485 interface				
EXP10 13	Ethernet interface with Web server function				
EXP10 15	GPRS/GSM modem				

- General characteristics for RGK 400SA RGK 420SA Key with 3 positions (OFF, local start, remote start), removable in OFF and remote start position (for RGK 420SA)
- 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
- Compatible with Synergy, Synergy and Xpress software.

#### General characteristics for

- 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 RGK 600SA and RGK 601SA
- 30...600VAC for RGK 700SA and RGK 800SA
- \_
- 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" (RGK 601SA excluded)
- 1 CANbus-J1939 port (RGK 600SA 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°Ć
- \_ Modbus-RTU and Modbus-ASCII protocols
- \_ Compatible with Synergy Synergy and Xpress software.

#### For RGK 700SA - RGK 800SA only

- PLC logic for inputs, outputs and internal status 1 communication port: RS232 for RGK 700SA; RS485 for
- **RGK 800SA** Degree of protection: IEC IP65 on front; suitable for use with
- UL/CSA Type 4X outdoor enclosure installation.

#### For RGK 800SA 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: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 nº 14.

Synergy Synergy, and Xpress software, NFC app See Section 29.

**EXP** series expansion modules See Section 30, page 2.

Accessories and software Expansion modules pages 27-11 and 12 page 30-2

Dimensions page 27-13

Order code

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



RGK 600 - RGK 601 - RGK 610





RGK 700 - RGK 800



**RGK 750** 



#### AMF (AUTOMATIC MAINS FAILURE) APPLICATION



		per pkg	
		n°	[kg]
RGK 600	12/24VDC, graphic LCD display, w/Pick-up speed input, 4 inputs, 6 outputs	1	0.540
RGK 601	12/24VDC, graphic LCD display, CANbus port, 4 inputs, 6 outputs	1	0.540
RGK 610	12/24VDC, graphic LCD display, w/Pick-up speed input, 4 inputs, 6 outputs, expandable with EXP modules	1	0.600
RGK 700	12/24VDC, graphic LCD display, RS232 serial port, CANbus port, 6 inputs, 7 outputs	1	0.880
RGK 750	12/24VDC, graphic LCD display, CANbus port, 8 inputs, 10 outputs expandible with EXP modules	1	0.960
RGK 800	12/24VDC, graphic LCD display, RS485 serial port, CANbus port, 8 inputs, 10 outputs, expandable with EXP modules,	1	0.960

Description

Programmable functions and properties

Characteristic	RGK 600 RGK 601 RGK 610	RGK 700	RGK 750	RGK 800
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		
ACCESSORY FOR RGK 600, RGK 601 AND RGK 610			
EXP80 01	IP65 housing gasket		
EXPANSION N	10DULES FOR RGK 610, RGK 750 AND RGK 800		
Communicati	ons interfaces.		
EXP10 10	Opto-isolated USB interface		
EXP10 11	Opto-isolated RS232 interface		
EXP10 12	Opto-isolated RS485 interface		
Inputs and ou	itputs.		
EXP10 42T	6 digital inputs, PCB tropicalized		
EXP10 43T	4 digital input and 2 static outputs, PCB tropicalized		
EXPANSION N Inputs and ou	IODULES FOR RGK 800 Itputs.		
EXP10 00	4 opto-isolated digital inputs		
EXP10 01	4 opto-isolated static outputs		
EXP10 02	2 digital inputs and 2 static outputs, opto-isolated		
EXP10 03	2 relay outputs rated 5A 250VAC		
EXP10 04	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0±5V		
EXP10 05	2 opto-isolated analog outputs 0/4-20mA or 0-10V or 0±5V		
EXP10 08	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC		
EXP10 40	2 digital/resistive inputs, 2 static outputs		
EXP10 41	2 thermocouple inputs, 2 static outputs		
Communicati	ons interfaces.		
EXP10 13	Ethernet interface with Web server function		
EXP10 15	GPRS/GSM modem		

General characteristics for

Qty Wt

#### RGK 600 - RGK 601 - RGK 610 - RGK 700 - RGK 750 -**RGK 800**

- 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: 480VAC for RGK 600, RGK 601, RGK 610 and RGK 750 • 600VAC for RGK 700 and RGK 800
- Rated measurement voltage range:
- 100...480VAC for RGK 600, RGK 601, RGK 610 and RGK 750
- 30...600VAC for RGK 700 and RGK 800
- 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" (RGK 601 excluded)
- 1 CANbus-J1939 port (RGK 600 and RGK 610 excluded) 3 analog ohmic inputs for oil pressure, engine temperture
- 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 (RGK 600 and RGK 601 excluded) Compatible with Synergy, Synergy, and Xpress software 1 slot for EXP modules for RGK 610

- 2 slots for EXP modules for RGK 750 \_
  - 3 slots for EXP modules for RGK 800.

#### For RGK 700 - RGK 750 - RGK 800 only

- PLC logic for inputs, outputs and internal status
- Degree of protection: IEC IP65 on front.

#### For RGK 700 - RGK 800 only

- 1 communication port: RS232 for RGK 700; RS485 for **RGK 800**
- \_ Degree of protection: IEC IP65 on front; suitable for use with UL/CSA Type 4X outdoor enclosure installation.

#### For RGK 800 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 RGK 750; EAC (except for RGK 750). Compliant with standards: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 nº 14.

Synergy, Synergy, and Xpress software See Section 29.

**EXP** series expansion modules See Section 30, page 2.

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new

Dimensions page 27-13



Order code

RGK 900SA

Stand-alone controller.

Description

AMF (Automatic Mains Failure) controller.

Paralleling control among

generating sets. 12/24VDC, graphic LCD, RS485 port and

USB/optical and Wi-Fi point

programming port on front.

Expandable with EXP... modules

#### Paralleling controllers for mains-generator and generator-generator

222 223 223	
	· <b>A</b> · <b>•</b> ·

RGK 900SA - RGK 900

	,	,		
	RGK 900	Mains-generator paralleling control. 12/24VDC, graphic LCD, with RS485 port, USB/optical and Wi-Fi point programming port on front. Expandable with EXP modules	1	1.040
	Mains-ATS (Au	utomatic Transfer Switching) cont	roller.	
	RGK 900MC	Control of mains, automatic transfer switching (ATS), and paralleling on multiple generators controlled by RGK 900SA. 12/24VDC, graphic LCD, with RS485 port and USB/optical and Wi-Fi point programming port. Expandable with EXP modules	1	1.040
	Order code	Description		
	EXPANSION N Inputs and ou	MODULES FOR RGK 900 utputs.		
	EXP10 00	4 opto-isolated digital inputs		
	EXP10 01	4 opto-isolated static outputs		
	EXP10 02	2 digital inputs and 2 static outputs, opto-isolated		
	EXP10 03	2 relay outputs rated 5A 250VAC		
	EXP10 04	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0±5V		
	EXP10 05	2 opto-isolated static outputs 0/4-20mA or 0-10V or 0 $\pm$ 5V		\ or
	EXP10 08	2 opto-isolated digital inputs and outputs rated 5A 250VAC	2 rela	/
	EXP10 40	2 digital/resistive inputs, 2 static of	outputs	<u> </u>
	EXP10 41	2 thermocouple inputs, 2 static ou	itputs	
	Inputs and ou	utputs.		
	EXP10 42T	6 digital inputs, PCB tropicalized		
<b>W</b>	EXP10 43T	4 digital input and 2 static outputs, PCB tropicalized		
	Communicati	ons interfaces.		
	EXP10 10	Opto-isolated USB interface		
	EXP10 11	Opto-isolated RS232 interface		
	EXP10 12	Opto-isolated RS485 interface		
	EXP10 13	Ethernet interface with web serve	r func	tion
	EXP10 15	GPRS/GSM modem		

#### General characteristics

Wt

1.040

Qty

per

pkg

n° [kg]

1

- Power supply: 7...36VDC VAC inputs: Mains L1-L2-L3-N for RGK 900 only
- 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 (Web upload)
- Alarm text customisable (16 alarms)
- Event log \_
- Modbus-RTU, Modbus-ASCII and Modbus-TCP communication protocols
- Boolean logic for inputs, outputs and internal status
- Compatible with Synergy, Snergy, and Kpress 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 "Autocall" function for automatic sending of emails and/or SMS at predefined events/alarms
- Mains (for RGK 900 only) / 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)
- \_ Mains in base-load with generator in peak shaving
- \_ 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: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22 2 nº 14

synergy synergy, and Xpress software See Section 29.

#### **EXP** series expansion modules See Section 30, page 2.



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Accessories and software Expansion modules pages 27-11 and 12 page 30-2

AI

EXP 10...

## 27 Engine and generator controllers

#### **Remote units**



RGK 800RD



**RGK RA** 

#### Alarm-status relay unit



**RGK RR** 

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK 800RD SA	Remote display panel for RGK 800SA, 12/24VDC, IP65 protection degree	1	0.820
RGK 800RD	Remote display panel for RGK 800, 12/24VDC, IP65 protection degree	1	0.820
RGK 900RD SA	Remote display panel for RGK 900SA, 12/24VDC, IP65 protection degree	1	0.980
RGK 900RD	Remote display panel for RGK 900, 12/24VDC, IP65 protection degree	1	0.980
RGK RA	Remote display unit for RGK 7, RGK 8, RGK 9, graphic LCD, touch screen 128x112 pixels, IP54 protection	1	0.360

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK RR	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 controller 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:
- 128x80 pixels for RGK 800.
- 128x112 pixels for RGK 900...
- 13 function and setting keys
- 10 Indication LEDs for operating modes and status
- \_ Built-in buzzer \_
- 4 digital inputs \_ 2 digital outputs
- Conductor cross section: 0.2...2.5mm<sup>2</sup> (24...12 AWG; 18...12 AWG per UL/CSA)
- Tightening torque: 0.56Nm (4.5lbin)
- Front degree of protection: IEC IP65; UL/CSA Type 4X outdoor enclosure installation
- Serial interface ports: opto-isolated RS485 (RGK...RD); CANbus-J1979 (RGK...SA).

#### **Remote display unit RGK RA 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 120x112 pixel backlight graphic LCD
- Built-in buzzer \_
- \_ Static (SSR) output for global alarm signalling
- Opto-isolated RS485 interface port \_ Conductor cross section: 0.2...2.5mm<sup>2</sup> (24...12 AWG;
- 18...12 AWG per UL/CSA)
- Tightening torque: 0.56Nm (4.5lbin) - Front degree of protection: IEC IP54; UL Type 1.

Alarm-status relay unit characteristics External relay expansion unit for alarm and status remoting.

Fixing on 35mm DIN rail (IEC/EN 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 RGK RR units can be connected in cascade for a \_ total of 24 relays
- Maximum installation distance from the RGK 6... and RGK 700... RGK 900 controllers: • CANbus: 30m/33yd (high speed)
- Inputs/Outputs: 1,000m/1,094yd (low speed) Conductor cross section: 0.2...2.5mm<sup>2</sup> (24...12 AWG)
- Tightening torque: 0.56 Nm/4.5lbin.

#### **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 61010-1, IEC/EN 61000-6-2, IEC 61000-6-3, UL508, CSA C22.2 nº 14.

For 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.





Communication devices for RGK 4 RGK 6 RGK 7	Order code	Description	Qty per pkg
nuk o nuk j			n°
	CX 01	USB/optical dongle with PC↔controller connecting cable for programming, data download, diagnostics and firmware upgrade	1
CX 01	CX 02	Wi-Fi dongle for PC ↔ controller programming, data download, diagnostics, project upload/download and controller cloning	1





		pry	
		n°	[kg]
CX 01	USB/optical dongle with PC↔controller connecting cable for programming, data download, diagnostics and firmware upgrade	1	0.090
CX 02	Wi-Fi dongle for PC ↔ controller programming, data download, diagnostics, project upload/download and controller cloning	1	0.090
CX 03	GSM/GPRS penta-band antenna (850/900/1800/1900/2100MHz) for EXP10 15 expansion module for RGK 800 RGK 900	1	0.090

#### **General characteristics**

Communication and connection devices for generator set controllers RGK 4... - RGK 6... - RGK 7... - RGK 8... - RGK 9... for personal computers, smartphones, tablets, modems, bus drives.

#### CX 01

Wt

The USB/optical connector, complete with cable, allows to connect RGK 4... - RGK 6... - RGK 7... - RGK 8... - RGK 9... controllers to a PC without having to disconnect the power supply from the electric panel and to carry out parameter programming, data and event download, diagnostics and firmware upgrade.

The PC identifies the connection as a standard USB.

#### CX 02

By Wi-Fi connection, RGK 4... - RGK 6... - RGK 7... -RGK 8... - RGK 9... controllers can 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.

#### CX 03

Antenna compatible with the major part 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/7.23yd.

For 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.

#### **General characteristics**

For general characteristics of converters and gateway see section 30.

#### Accessories



51 C4



EXC CON 01



4 PX1



Order code	Description	Qty per pkg	Wt
		n°	[kg]
Connecting c	ables.		
51 C2	For PC ↔ controller, 1.8m/2yd long	1	0.090
51 C3	For PC ↔ GSM modem 1.8/2yd long	1	0.210
51 C4	For PC ↔ RS232/RS485, converter drive, 1.8m/2yd long	1	0.147
Converters.			
EXC CON 01	RS485/ Ethernet converter, 1248VDC, including DIN rail fixing kit	1	0.400
4 PX1	RS232/RS485 converter drive, opto-isolated, 220240VAC power supply (110120VAC on request). Repeater drive for RS485 bus extention	1	0.600
Gateway.			
EXC M3G 01	RS485 Gateway/3G modem, 9.527VAC/9.535VDC, including antenna (with 2.5m cable) and programming cable	1	0.340
For RGK 600	, RGK 601 and RGK 610 contr	ollers.	
EXP80 01	IP65 144mm/5.67" housing gask	et	
For RGK 4S	SA.		
EXP80 05	IP65 110mm/4.33" housing gask	et	
<b>1</b> RS232/RS485	opto-isolated converter drive, 38,400 Bau	ud rate	

maximum, automatic or manual TRANSMIT line supervision, 220...240VAC ±10% (110...120VAC supply on request)



#### Synergy Supervision and Energy management software

Pour links consists

#### Synergy

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#### Xpress Parameter configuration and remote control software



#### Sam1 APP



#### NFC APP



#### Supervision and Energy management software

The Synergy and Sinergy softwares provides for the remote control and supervision of the RGK... controllers. See details given in Section 29.

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 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<sup>®</sup> 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 29.

#### APP for smartphone and tablets

Sam1 (Setup And Maintenance 1) 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 29 or consult Technical support; see contact details on inside front cover.

NFC App for RGK 4...SA, with integrated NFC technology, allows remote parameter configuration.

The parameters can be saved in a file for archive purposes. It is Android compatible. For more details, see Section 29 or consult Technical support; see contact details on inside front cover.

27 Engine and generator controllers

Dimensions [mm (in)]



28 Fire pump controllers	
FIRE PLINE UNI 12845	FIRE FIGH
FIRE PLINE UNI 12845	ENGINE PUMP

- Fire pump controllers according to EN 12845
- Remote alarm panels according to EN 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

START

- RS485 and Ethernet communication interfaces
- Setup and supervision software
- Modem control for sending alarm messages and emails.

Fire pump controllers	<b>U</b> EU.	_	TAGE
Diesel engine fire pump controllers	28	-	2
Electric fire pump controllers	28	-	3
Remote alarm panels for fire pump applications	28	-	4
Communication devices, accessories and software	28	-	5
Dimensions	28	-	6
Technical characteristics	28	-	7

#### SEC PAGE



#### **DIESEL ENGINE FIRE PUMP CONTROLLERS**

- Crank cycle according to EN 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.



#### **ELECTRIC FIRE PUMP CONTROLLERS**

- Designed in accordance to EN 12845
- 3 phase voltage measure inputs
- 3 phase current measure inputs
- 24VAC or 230VAC power supply
- Advaced programmable functions for fire
- fighting systems

  Possibility of setup via NFC technology
- and APP • Built-in RS485 communication
- PLC logic integrated.



REMOTE ALARM PANELS FOR FIRE PUMP APPLICATIONS

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



# COMMUNICATION DEVICES, ACCESSORIES AND SOFTWARE

- Communication interfaces
- Additional digital and analog inputs and outputs
- GPRS-GSM module
- Gateway
- Supervision, setup and remote control software
- APP.



Diesel engine fire pump controllers

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## **Diesel engine fire pump** controllers

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EXP 10...

der codes	Description	Qty per pkg	Wt
		n°	[kg]
L 700DP	Controller for diesel engine fire pumps in accordance with EN 12845, power supply 12/24VDC, built-in RS485	1	0.980
L 800DP	Controller for diesel engine fire pumps in accordance with EN 12845, power supply 12/24VDC, built-in RS485, expandable with EXP expansion modules	1	0.980

	Order code	Description
	EXPANSION I Inputs and ou	MODULES. Itputs.
	EXP10 08T	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VA, PCB tropicalized
	EXP10 42T	6 digital inputs, PCB tropicalized
	EXP10 43T	4 digital input and 2 static outputs, PCB tropicalized
	EXP10 04T	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0±5V, PCB tropicalized
	Communicati	on ports.
	EXP10 12T	Opto-isolated RS485 interface, PCB tropicalized
	EXP10 13T	Ethernet interface, PCB tropicalized
	EXP10 15	GPRS/GSM modem





#### General characteristics

FFL...DP controllers integrate all the functions required by the EN 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 LCD display 128x80 pixel ensures high

visibility in low light conditions.

Inputs and outputs are programmable and the number can be increased with the I/O expansion modules, moreover they can be managed in the PLC logic integrated.

This all means an integrated 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 with 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 singlephase AC voltage measurement input.

#### Features

- Engine control, monitoring and protection
- Backlit graphic LCD display with multilingual text and synoptic
- Texts in 5 languages (ENG, ITA, FRA, SPA, DEU)
- Customizable texts via Xpress software (see section 29) Dedicated page for LED test and commisioning \_
- \_
- Dedicated page for jockey pump monitoring Dual DC power from two separate batteries12/24VDC Input of single-phase AC voltage measurement for network monitoring
- 9 LED indicators: mode selection, batteries selection, battery status, pump activated, warning
- 2 password levels
- Built-in RS485 port \_ \_
- Built-in real time clock
- Built-in NTC temperature sensor \_
- Storage of last 64 events
- Automatic starting sequence in accordance to EN 12845 \_ Communication interface by front optical port with CX 01 and CX 02 dongle using USB or Wi-Fi connections \_
- NFC contactless interface for programming via NFC app \_
- Isolated RS485 serial port for supervision (compatibility with Synergy and Synergy software) Expandability with EXP... modules tropicalized
- (only FFL 800DP)
  - Compatibility with FFL RA... remote alarm panels.

#### **Operational characteristics**

- Power supply voltage: 12 or 24VDC
- Voltage measurement inputs:
- Rated voltage Ue: 100...240VAC Measurement range: 50...264VAC
- Frequency range: 45...65Hz
- Input to monitor the starter pinion
- NTC probe input: measuring range: -40...+85°C
- Engine running input (D+)
- Programmable digital inputs: 10 Negative
- Programmable relay outputs: 10
- Programmable static outputs: 1 3 programmable resistive sensors
- Compatible software: Sam1, Xpress, NFC , Synergy
- and <u>Synergy</u> software (see section 29) Degree of protection: IP 20 at rear. IP65 on front
- PCB tropicalized
- Operating temperature: -25...+70°C.

# Synergy and Xpress software, NFC app See Section 29.

#### **EXP** series expansion modules See Section 30, page 2.

#### Compliance

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

Dimensions

page 28-6



Electric fire pump controllers

### **Electric fire pump** controllers



Order codes	Description	Qty per pkg	Wt
		n°	[kg]
FFL 700EP	Controller for electric fire pumps in accordance with EN 12845, power supply 24VAC, built-in RS485	1	0.980
FFL 800EP	Controller for electric fire pumps in accordance with EN 12845, power supply 24VAC or 110240VAC, built-in RS485, expandable with EXP expansion modules	1	0.980

(Autority) Servers 200	
≜_  =-	
EXP 10	

1 1000

	EXPANSION Inputs and out	MODULES. utputs.
	EXP10 08T	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VA, PCB tropicalized
	EXP10 42T	6 digital inputs, PCB tropicalized
V	EXP10 43T	4 digital input and 2 static outputs, PCB tropicalized
	EXP10 04T	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0±5V, PCB tropicalized
_	Communicati	on ports.
	EXP10 12T	Opto-isolated RS485 interface, PCB tropicalized
V	EXP10 13T	Ethernet interface, PCB tropicalized
	EXP10 15	GPRS/GSM modem

Description

Order

code



(P

Pump status -Hour meters (A)

4	01V 2.7	78 1.93	k <b>m</b> 0.9
	3-ph line	Motor	Motor
	voltage	current	power

#### **General characteristics**

FIL...EP controllers integrate all the functions required by the EN 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 LCD display 128x80 pixel ensures high visibility in low light conditions.

Inputs and outputs are programmable and the number can be increased with the I/O expansion modules, moreover they can be managed in the PLC logic integrated.

This all means an integrated 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 with 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

- Electric motor control, monitoring and protection \_ Backlit graphic LCD display with multilingual text and
- synoptic
- Texts in 5 languages (ENG, ITA, FRA, SPA, DEU) Customizable texts via Xpress software (see section 29) Dedicated page for LED test and commisionning
- Dedicated page for LCD test and commissioning Dedicated page for jockey pump monitoring 8 LED indicators: electric pump running, main status, electric motor status, starting request, global alarm, failure to start, stop enabled, automatic start excluded 2 password level
- \_ Built-in RS485 port
- \_ Built-in real time clock
- Built-in NTC temperature sensor
- Storage of last 64 events \_
- Communication interface by front optical port with CX 01 and CX 02 dongle using USB or Wi-Fi connections
- NFC contactless interface for programming via NFC app \_
- Isolated RS485 serial port for supervision (compatibility with Synergy and Synergy software)
- Expandability with EXP... modules tropicalized (only FFL 800EP)
- Compatibility with FFL RA... remote alarm panels.

- Operational characteristics Power supply voltage: 24VAC (FFL 700EP), 24 and 110...240VAC (FFL 800EP)
- Voltage measurement inputs:
- 3 phases
- Rated voltage Ue: 100...600VAC
- Measurement range: 80...720VAC
- Frequency range: 45...65Hz
- 3 phases current measurements inputs: 1/5A
- NTC probe input:
- measuring range: -40...+85°C Programmable digital inputs: 8 - Negative
- \_ Programmable relay outputs: 9
- Programmable static outputs: 1
- Compatible software: Sam1, Xpress, NFC , Synergy and Synergy software (see section 29)
- Degree of protection: IP 20 at rear. IP65 on front
- Tropicalized PCB
- Operating temperature: -25...+70°C.

Synergy and Xpress software, NFC app See Section 29.

**EXP** series expansion modules See Section 30, page 2.

#### Compliance

Coso

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



Remote alarm panels for fire pump applications

Orde

### **Remote alarm panels for** fire pump applications



Order codes	Description	Qty per pkg	Wt
		n°	[kg]
FFL RA 200	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
FFL RA 400	Remote alarm panel with LCD graphic display (128x80pxls), buzzer, expandable with EXP expansion modules. It supports up to 3 fire pump controllers	1	2.670

Order code	Description
EXPANSION N Inputs and ou	10DULES FOR FFL RA 400 (2 AVAILABLE SLOTS) 1tputs.
EXP10 00	4 opto-isolated digital inputs
EXP10 01	4 opto-isolated static outputs
EXP10 02	2 digital inputs and 2 static outputs, opto-isolated
EXP10 03	2 relay outputs 5A 250VAC
EXP10 08	2 opto-isolated digital inputs and 2 5A relay outputs 250VAC
EXP10 42T	6 digital inputs, PCB tropicalized
EXP10 43T	4 digital input and 2 static outputs, PCB tropicalized
Communicati	on ports.
EXP10 11	Opto-isolated RS232 interface
EXP10 12	Opto-isolated RS485 interface
EXP10 13	Opto-isolated Ethernet interface
EXP10 15	GPRS/GSM modem

#### General characteristics FFL RA 200

FFL RA 200 is a simple remote annunciator: the buzzer will sound in case of alarm and the LEDs will indicate the presence of the relative alarms.

The labels for LEDs descriptions are included in the package. A template can be downloaded from www.LovatoElectric.com to le the user enter the proper alarm descriptions. The communication between the remote annunciator and the FFL controller is performed by means of a pulsed signal and up to 2 FFL controllers can be connected. Using the front buttons, it is possible to silence the alarm occurred and test the LEDs. The alarms notified on the remote panel are configurable directly on FFL controllers. No setup on the remote panel is required. Two LEDs display the status of the communication and the remote panel power supply.

#### **Operational characteristics**

- Power supply voltage: 100...240VAC AC voltage range: 90...264VAC
- \_ Frequency range: 45...66Hz \_
- Arrangement for internal battery support (battery not included) is built-in Compatible software: NFC app
- \_ Degree of protection: IP40
- Operating temperature: -20...+60°C.

#### Compliance

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

#### **General characteristics FFL RA 400**

FFL RA 400 is an advanced remote annunciator with backlit graphic LCD display. It is expandable with the 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 trough RS485 if the EXP10 12 expansion module is added. With RS485 connection, the FFL RA 400 can read more data from the FFL controller, for example the start statistics, the jockey pump statistics, the battery status and battery charger status

Up to 3 FFL controllers can be connected to one FFL RA 400 with RS485 communication. On the front of the remote alarm panel, LEDs and 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 EXP10 15 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 voltage: 100...240VAC
- \_ AC voltage range: 90...264VAC
- Frequency range: 47...63Hz
- Arrangement for internal battery support (battery not included) is built-in
- 5 digital inputs
- 2 digital outputs \_
- Expandibility with EXP... modules (2 available slots) Optical port on front for CX 01 and CX 02 dongle
- Compatible software: Sam1, Xpress, NFC , Synergy
- and <u>synergy</u> software (see section 29) Degree of protection: IP40
- Operating temperature: -30...+51°C.

Synergy and Xpress software, NFC app See Section 29.

**EXP** series expansion modules See Section 30, page 2.

Compliance

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

**FFL RA 400** 



Communication devices, software and accessories

#### **Communication devices**







Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX 01	USB connection dongle PC↔FFL with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX 02	Wi-Fi connection dongle PC↔FFL for data download, diagnostics and firmware upgrade, project upload/download and controller cloning	1	0.090
CX 03	GSM/GPRS penta-band antenna (850/900/1800/1900/2100MHz) for EXP10 15 expansion module	1	0.090



#### **General characteristics**

Communication and connection devices for fire pump controllers FFL 700... - FFL 800... - FFL RA 400 for personal computers, smartphones, tablets, modems, bus drives.

#### CX 01

The USB/optical connector, complete with cable, allows to connect fire pump controllers to a PC without having to disconnect the power supply from the electric panel and to carry out:

- parameter programming
- \_ settings copy to external units
- \_ data and event download
- carry out the diagnostics
- firmware upgrade.

The PC identifies the connection as a standard USB.

#### CX 02

By Wi-Fi connection, FFL 700... - FFL 800... controllers and FFL RA 400 remote alarm panel can 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.

#### CX 03

Wt

Qty

per

pkg

Antenna compatible with the major part 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/7.23yd.

For 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

#### General characteristics

For general characteristics of these accessories see section 30.

#### Accessories





n° [kg] Connecting cables. 51 C2  $PC \leftrightarrow FFL...$  connecting cable, 1 0.090 1,8m/6ft long Converters. EXC CON 01 RS485/ Ethernet converter, 0.400 1 12...48VDC, including DIN rail fixing kit Gateway. EXC M3G 01 0.340 RS485 Gateway/3G modem, 1 9.5...27VAC/9.5...35VDC, including antenna and programming cable EXC GL A01 Gateway data logger for data 0.600 1 collecting via Modbus from the device in the field. Publishing of the data to supervision new software, also in Cloud EXC GL AX1 2G/3G modem communication 0.160 1 module for EXC GL A01

Order code

Description

EXC GL A01



EXC GL AX1

# 28 Fire pump controllers Dimensions [mm(in)]

#### FFL 700... - FFL 800...







#### FFL RA 200

















Lovato electric



TYPE	FFLDP	FFLEP			
SUPPLY					
Rated voltage	1224VDC	24VAC (FFL 700EP); 24VAC/110240VAC (FFL 800EP)			
MAIN VOLTAGE INPUT					
Rated voltage Us	10025	OVAC			
Measuring range	9026	4VAC			
Frequency range	456	6Hz			
ENGINE RUNNING INPUT (D+) FOR PRE-	EXCITED ALTERNATOR				
Voltage range	036VDC	_			
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					
Input type	AC	_			
Minimum reading frequency voltage: high sensitivity	≥2.8Vpp (1Vrms) at 40Hz ≥10Vpp (3.5Vrms) at 20000Hz	_			
Minimum reading frequency voltage:	≥3.7Vpp (1.3Vrms) at 40Hz ≥7Vpp (2.5Vrms) at 2000Hz	_			
Measurement input impedance	> 100kQ	_			
Maximum voltage	84Vnn (30Vrms)	_			
PINION INPLIT	orabb (opanno)				
Voltage range	0_33VDC				
Current input	-8mA				
Threshold					
	adjustable				
	aujustavie	_			
		anda NITCO1)			
Neceuring range					
Meximum connection length	-40+	00 U			
	311				
	News	1			
	Nega				
	≤6mA				
Low input signal	≤1.25V (tipical 1.9V)				
High input signal	≥4.9V (tipical 3.8V)				
Input signal delay	≥501	≥50ms			
OUTPUIS					
Outputs 1-2	2 x 1NO - 12A 30VAC/DC	—			
Battery voltage output	2NO + 1 common terminal	—			
Output 3	8A 30VDC (DC1); 30VDC 1A pilot duty	—			
Output 4	4A 30VDC (DC1)	—			
Outputs 5-10	6 x 1C/0 - 8A 250VAC (AC1); 1.5A 250VAC (AC15)	—			
Alarm outputs	—	6 x C/O - 5A 250VAC			
Motor command output		3NO - 16A 250VAC			
STATIC OUTPUT	1				
Output type	NC				
Rated voltage	1030	VDC			
Maximum current	50n	nA			
RS485 SERIAL INTERFACE					
Interface type	Isola	ted			
Baud-rate	Programmable 12	00115200bps			
Insulation voltage (RS485 – V Batt.)	1kV	'=			
AMBIENT CONDITIONS					
Operating temperature	-25+	70°C			
Storage temperature	-30+	80°C			
Relative humidity	<80% (IEC/EN	60068-2-78)			
CONNECTIONS	1				
Terminals type	Removable	screw-type			
Wire cross-section (min. and max.)	0.22 5mm² (	24÷12 AWG)			
Tightening torque	0.56Nm	(5Lbin)			
HOUSING	0.001111	λ- · · /			
Installation	Flush-n	nount			
Material	Dolucari	ponate			
Degree of protection	IP65 Frontal: IP2	n on terminals			
	ii uu ii uu ii uu ii uu				



Sam1: APP for smartphone and tablet	29	-	6
NFC : APP for programming via NFC technology	29	-	7



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Page 29-2

#### SUPERVISION AND ENERGY MANAGEMENT SOFTWARE

- Structure and applications based on MS SQL relational database management system
- Data consultation through popular Internet browsers
- Versatile system, accessible to a large number of users/workstations via intranets, VPN or Internet
- Cloud version available on LOVATO Electric portal.



#### CONFIGURATION AND REMOTE CONTROL **SOFTWARE - FREE OF CHARGE**

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



#### 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.



#### APP FOR PROGRAMMING VIA NFC TECHNOLOGY

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












Synergy is supervision and energy management web-based software that provides the monitoring and control of the electrical installation, 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 of both data logging and trend graphs; it is also possible to manage alarms, exported files and e-mail and/or FTP

server transmission functions for notification and reporting. Third party softwares are able to access Synergy database by means of a web API call. Third party MODBUS devices are able to access to Synergy by means customizable

(interface) drivers.

# FUNCTIONALITY

- Communication with all LOVATO Electric measurement and control devices, via serial ports, Ethernet or modem
- Third party MODBUS devices integration
- Database of instantaneous values
- Creation of custom graph pages
- Datalog files
- Data logging, accessible by excel export or web API applications
- Energy consumption reports
- Graphic display of trends
- Automatic reports of consumption periods (e.g. time bands) in both analytical and graphic format
- Alarm management, both locally and via e-mail
- Energy quality analysis
- Field equipment parameterising
- Access level management.

#### INTERFACE

Synergy permits the creation of an unlimited number of pages to monitor the system in real time.

With great simplicity, it is possible to insert static images and dynamic objects of various types, to make pages with system overviews, synoptic and/or topographic representations of the electrical network with all detailed information. The buttons can be used to send commands to the systems (provided that there are appropriate field actuators) or navigate among the pages.

The dynamic objects available are: – analog instruments at 90° and 270°

- digital instrumentation
- digital instrumentation with vertical or horizontal bar graphs
- 10-digit hour counter
- simple label or with dynamic image
- \_ normal or reduced multi-measurement panel
- specific power factor controller panel
- specific generating set controller panel
- \_ customizable page for each device
- \_ dynamic maps
- chart of single measurements
- harmonics graph
- live data prompt
- control and/or page navigation buttons



#### ALARMS

Each value recorded in the archives (datalog) 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. The home page always indicates the last 10 alarms, while the 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.

#### HOME PAGE

The Synergy start page summarises the main diagnostic information, to permit immediate verification of the state of the system.



FURTHER INFORMATION http://em.LovatoElectric.com



# Synergy Software

Order code	Description	Details	Provisioning
Software.			
SYN1 SET	Supervision and energy management software	Installation on PC with server function and Windows operating system. Customization, measurement, monitoring and control via web by sending e-mail notifications or FTP file. Monitoring of one LOVATO Electric device included	Permanent licence purchasing
Licence.			
SYN1 SLL	Synergy licence for LOVATO Electric device	Monitoring function for each LOVATO Electric device equipped by MODBUS-RTU communication port	Permanent licence for single device
SYN1 SLX	Synergy licence for THIRD PARTY devices	Monitoring function for each THIRD PARTY device equipped by MODBUS-RTU communication port	Permanent licence for single device
SYN1 SDLWS	Licence to access to Synergy database	Access function by WEB API to Synergy MS SQL database by THIRD PARTY software	Permanent licence for single device
SYN1 SLM	Licence to access to Synergy updates	Access to <u>Synergy</u> updates (e.g. compliant with new operating systems and new <u>Synergy</u> features for each LOVATO Electric or THIRD PARTY devices)	Annual subscription licence for single device
Technical support.			
SYN1 SCS00	Synergy technical support	Synergy technical support by phone or team viewer	Hourly rate
SYN1 SCS11	Synergy on site commissioning	<ul> <li>On site Synergy technical support:         <ul> <li>check on field devices configuration</li> <li>SYN1 SET setup on customer PC</li> <li>check of exchanging data between Synergy and on field devices</li> <li>Synergy configuration based on customer needs</li> <li>travel costs and labour hours to set up Synergy and on field devices</li> </ul> </li> </ul>	On site cost
SYN1 SCSDRV	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
SYN1 TRAINING	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	To be confermed



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# **Synergy**

The Synergy cloud solution is specifically designed to make the Synergy software functions described previously available and accessible via PC or tablet on the cloud.LovatoElectric.com Internet portal.

With Synergy Cloud, it is possible to collects and view production and consumption data for energy supplies such as electricity, water, gas and air, using hardware measurement equipment which monitors the main parameters and communicates with the management software without installing software and without a physical server. This saves on server purchasing, configuration and maintenance costs and eliminates commissioning time and costs.

The on field devices are configured as Clients sending monitored data to Synergy Cloud server, according to two possible configurations:

- directly through a specific communication port assigned by Cloud server

- indirectly via FTP thanks to the local datalogger gateway EXC GL A01 (see details in section 24)

Further details on Synergy Cloud offer are available at http://em.LovatoElectric.com/

# 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 stateof-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.			
SYN1 CLL	Synergy Cloud licence for LOVATO Electric device	Monitoring function for each LOVATO Electric device equipped by MODBUS-RTU communication port	Annual subscription licence for each device
SYN1 CLX	Synergy Cloud licence for THIRD PARTY devices	Monitoring function for each THIRD PARTY device equipped by MODBUS-RTU communication port	Annual subscription licence for each device
SYN1 SDLWS	Licence to access to Synergy database	Access function by WEB API to Synergy MS SQL database by THIRD PARTY software	Annual subscription licence for each device
Technical support.			
SYN1 SCS00	Synergy technical support	Synergy technical support by phone or team viewer	Hourly rate
SYN1 SCS11	Synergy on site commissioning	On site Synergy Technical support: - check on field devices configuration - SYN1 SET 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	On site cost
SYN1 SCSDRV	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
SYN1 TRAINING	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	To be confermed

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



# **X**press

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 connect individually (one node at a time) to the LOVATO Electric products connected to the network.

- Supports connection via CX01 (USB) or CX02 (Wi-Fi) dongle, USB, RS232,
- RS485, Ethernet or modem.
- Product configuration:
   Decomptor potting
- Parameter setting
  Project file management for the family of controllers for RGK series generating
- sets - Product firmware update (via CX01)
- Remote control:
- Monitoring of main measurements
- Measurements graphic trends
- Measurements graphic trends
  Sending commands to products
- Sending commands to products
   Reading alarms and events memory
- Memory modules management EXP10 30, EXM10 30, EXP10 31.

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

Xpress can be ordered using code SYN1 XP00 or downloaded for free from: http://www.LovatoElectric.com/xpressdownload.aspx

### 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

Construction of the second second

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 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.



Xpress		Parameters
Home Channel Device Mor	storing Parameters Commands Events Alarm	Log Utility
Device DMG800	- Send param	Optional guarantees within a State guarantees within a state of the guarantees within the device within the device of the guarantees withi
02 UTILITY 03 PASSWORD 04 INTEGRATION	P01.01 Language P01.02 Set clock at power-on	Ratano
05 HOUR COUNTERS 06 TREND	P01.03 Op. Mode At Power On	OFF Mode
07 COMMUNICATION     08 LIMIT THRESHOLDS	P01.04 Display contrast	75 %
10 COUNTERS	P01.05 High backlight level	100 %
11 ENERGY PULSES 12 BOOLEAN LOGIC	P01.05 Low backlight level	25 %

## 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.

X press					Log off line
Home Channel	Device	Monitoring Par	ameters Comm	ands Events Ala	rm Log Utility
				Device DMG800	Disconnect
		a course paran resource		rand increases	interventional interventional interventional
		Head consigura	and all all all all all all all all all al	Show chain	Set COCK Set Loop/set: Set Set
		Fri	m 2015-02-10T09	27 00 : .	THE REPORT OF TH
		To	2015-02-11709	27.00 : .	
Configuration Data					
Coniguration Usia	I & Anti-	Revent 1.2 Author Re	and 13 Autors Ber	une Author Ensures for	and Em Artist Barren
11/02/2016 07 42 11	246.34	267.02	107.38	and Active Energy - in	200 FO
11/02/2015 07 42 11	245,30	257.02	107 37	2230030 72	700.00
11/02/2016 07 42 31	246.43	267.0	107 37	2230040.42	750.7
11/02/2015 07 42 41	245.43	257.9	107 37	2230042.36	700.7
11/02/2015 07 42 51	245.43	257.9	197 37	2239044 31	700 7
11/02/2015 07 43 01	245.43	257.9	197.37	2230046.26	700.7
11/02/2015 07 43 11	245.43	257.9	197.37	2239048.2	700.7
11/02/2015 07 43 21	245.43	257.9	197.37	2239050 15	700.7
11/02/2015 07 43 31	245.43	257.9	197.37	2239052.09	700.7
11/02/2015 07 43 41	245.43	257.9	197.37	2239054.04	700.7
11/02/2015 07:43:51	245.43	257.9	197.37	2239055.99	700.7
11/02/2015 07 44 01	245.43	257.9	197.37	2239057.93	700.7
11/02/2015 07:44 11	245.43	257.9	197.37	2239059.88	700.7
11/02/2015 07:44:21	245.43	257.9	197.37	2239061.83	700.7
11 00:00+6 07 44 34	A 40. 40.	0470	407.07	2220223 22	250.7

29









29



# Digital inputs and outputs

- Analog inputs and outputs
- Communication interface
- Data storage with clock-calendar
- Communication devices to connect LOVATO Electric products to personal computers, smartphones and tablets
- Connecting cables to link LOVATO Electric products to personal computers, modems and converter drives
- Gateway data logger.

#### PAGE SEC

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# **EXP SERIES EXPANSION MODULES**

- For flush-mount productsDigital 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.



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## 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.



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# ACCESSORIES

- Communication devices
- Remote display unit
- Protective covers
- Converters
- Gateway
- Connecting cables.



Order code

Description

**EXP** series

Expa	ansior	ı mo	dules	s foi
flus	h-mou	int p	rodu	cts

# -----100 001 (100 001 (100 001 DPN N m A I Æ ......

EXP10...

S			per pkg				
			n°	[kg]			
	Inputs and out	puts.					
	EXP10 00	4 digital inputs, opto-isolated	1	0.060			
	EXP10 01	4 static outputs, opto-isolated	1	0.054			
	EXP10 02	2 digital inputs and 2 static outputs, opto-isolated	1	0.058			
	EXP10 03	2 relay outputs, rated 5A 250VAC	1	0.050			
ew	EXP10 04 EXP10 04T@	2 analog inputs, opto-isolated 0/420mA or PT100 or 010V or 0±5V	1	0.056			
	EXP10 05	2 analog outputs, opto-isolated 0/420mA, 0-10V or 0±5V	1	0.064			
	EXP10 06	2 relay outputs to increase number of steps	1	0.064			
	EXP10 07	3 relay outputs to increase number of steps	1	0.085			
	EXP10 08 EXP10 08T@	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC	1	0.058			
ew	EXP10 42T@	6 digital inputs	1	0.054			
	EXP10 43T@	4 digital inputs and 2 static outputs	1	0.054			
	Communication ports.						
	EXP10 10	Opto-isolated USB interface	1	0.060			
	EXP10 11	Opto-isolated RS232 interface	1	0.040			
0.11/	EXP10 12 EXP10 12T@	Opto-isolated RS485 interface	1	0.050			
	EXP10 13 EXP10 13T@	Opto-isolated Ethernet interface	1	0.060			
	EXP10 14	Opto-isolated Profibus-DP interface	1	0.080			
	EXP10 180	IEC/EN 61850 interface	1	0.060			
	Various functio	nalities.					
only when the	EXP10 15	GPRS/GSM modem	1	0.080			
hed the exact	EXP10 16	Capacitor bank protection	1	0.080			
atalogue	EXP10 30	Data storage, clock-calendar	1	0.050			
pecified in the ards).	EXP10 31	Data storage, clock-calendar with Energy Quality (EN 50160)	1	0.060			

# IEC/EN 61850 protocol

The module will be made available o competent authorities have establish terms of the supervision and contro specific commands (at the time of c printing, currently under study as sp Italian CEI 0-16 and CEI 0-21 stand

PCB tropicalized.

EXP series co	ompatibility	with LOVA	TO Electric	; products											
	IP	DIGI	TAL MULTIME	TERS	Digital Power Analyzers	F	POWER FACTO	R	AUTOMATIC SWITCH CO	TRANSFER	FIRE I Contro	PUMP DLLERS	ENG	NE AND GENER	ATOR S
TYPE	PMVF20 PMVF30	DMG 600/ 610/611	DMG 700	DMG 800	DMG 900 DMG 900T	DCRL 3/5	DCRL 8	DCRG 8	ATL 610	ATL 800/900	FFL 800	FFL RA 400	RGK 4	RGK 610	RGK 750 RGK 8 RGK 9
EXP10 00		•	•	•	•			•	•	•		•			•
EXP10 01		•	•	•	•			•	•	•		•			•
EXP10 02		•	•	•	•			•	•	•		•			•
EXP10 03	•	•	•	•	•	•		•	•	•		•			•
EXP10 04				•	•			•		•	EXP10 04T				e (no RGK 750)
EXP10 05				•	•			•		•					e (no RGK 750)
EXP10 06						•		•	•	•					
EXP10 07						•		•	•	•					
EXP10 08		•	•	•	•			•	•	•	EXP10 08T	•			•
EXP10 10	•	•	•	•	•	•		•	•	•				•	•
EXP10 11	•	•	•	•	•	•		•	•	•		•		•	•
EXP10 12 EXP10 12T	•	•	•	•	•	•		•	•	•	EXP10 12T	•		•	•
EXP10 13 EXP10 13T	•	•	•	•	•		•	•	•	•	EXP10 13T	•			•
EXP10 14				•	•			•		•					
EXP10 15					•			•		•	•	•			•
EXP10 16								•		•					
EXP10 18	•														
EXP10 30				•	•			•							
EXP10 31					•										
EXP10 42T											•	•		•	•
EXP10 43T											•	•	•	•	•
Max n° of modules addable	2	1	4	4	4	1	2	4	2	3	2	2	1	1	2 3 4



#### General characteristics

EXP series expansion modules can increase the functionality of the LOVATO Electric products, such as:

• Digital inputs

Qty Wt

- 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 30-4)
- 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; EXP10 18 excluded, EAC. Compliant with standards:

- For EXP10 18: IEC/EN 61850 and Italian CEI 0-16, CEI 0-21
- For EXP10 04 and EXP10 10: IEC/EN 61010-1, \_ IEC/EN 61000-6-2, IEC/EN 61000-6-4, UL508, CSA C22.2 nº 14
- For EXP10 15: IEC/EN 61010-1, IEC/EN 62311, ETSI EN 301 489-1, ETSI EN 301 469-7, EN 301511, USA/FCC 47 CFR part 15, Subpart B, CAN/ICES-003
- For all other types: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL508 (pending for EXP10 40 and EXP10 41), CSA C22.2 n° 14 (pending for EXP10 40 and EXP10 41)
- EXP10 13: IEC/EN 61010-1, IEC/EN 61000-6-2, \_ IEC/EN 61000-6-4, 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.





# 30 Expansion modules and accessories EXM series

**Expansion modules for** modular products



EXM10 00



EXM10 10

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Inputs and ou	tputs.		
EXM10 00	2 digital inputs and 2 static outputs, opto-isolated	1	0.137
EXM10 01	2 digital inputs, opto-isolated and 2 relay outputs, rated 5A 250VAC	1	0.147
EXM10 02	4 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC	1	0.155
Communicati	on ports.		
EXM10 10	Opto-isolated USB interface	1	0.140
EXM10 11	Opto-isolated RS232 interface	1	0.125
EXM10 12	Opto-isolated RS485 interface	1	0.140
EXM10 13	Opto-isolated Ethernet interface	1	0.140
EXM10 180	IEC/EN 61850 interface	1	0.140
EXM10 20	Opto-isolated RS485 interface and 2 relay outputs, rated 5A 250VAC		0.140
EXM10 30	Data storage, RTC with backup reserve energy for data logging	1	0.140

IEC/EN 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
- ٠ Relay outputs .
- Static outputs
- ٠ Communication interface .
- Data storage.
- \_ Connection to base product by IR (infrared beam) port Automatic identification by the base product
- -\_ Side base product mounting.

#### **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 EXM10 18: IEC/EN 61850 and Italian CEI 0-21
- For EXM10, 10 20, 10 13: IEC(EN 61010-1,
- IEC/EN 61000-6-2, IEC/EN 61000-6-4, UL 508, CSA C22.2 n° 14
- For all other types: IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL508, CSA C22.2 nº 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



#### EXM series compatibility with LOVATO Electric products

	INTERFACE PRO. SYSTEM UNITS	ENERGY METERS	DATA CONCENTRATORS	DIGITAL MULTIMETER
	PMVF51/60/70	DME D310 T2	DME CD	DMG 300
EXM10 00		•	•	•
EXM10 01	•	•	•	•
EXM10 02		•	•	•
EXM10 10	•	•	•	•
EXM10 11	•	•	•	•
EXM10 12	•	•	•	•
EXM10 13	•	•	•	•
EXM10 18	•			
EXM10 20		•	•	•
EXM10 30		•	•	•
Max n° of modules addable	2	3	3	3

Accessories

# **Communication devices**







# **Remote display unit**



## EXC RDU 1

order code	Description	Qty per pkg	VVT
		n°	[kg]
CX 01	PC ↔ LOVATO Electric product dongle, with USB optic connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX 02	PC ↔ LOVATO Electric product Wi-Fi dongle for programming, data download, diagnostics and firmware upgrade	1	0.090
CX 03	GSM penta-band (850/900/1800/1900/2100MHz) for EXP10 15 expansion module	1	0.090

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXC RDU 1	Remote display unit, graphic LCD, touch screen 128x112 pixels, IP65 protection. Compatible with ADXL soft starter and VLB3 variable speed drives	1	0.360

# **Protective covers**



31 PA96x96

# Accessories

# EXP80 00



EXP80 01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
PA 96X48	Front IP65 protective cover for multimeters DMK 0/1	1	0.048
31 PA96X96	Front IP54 protective cover for multimeters DMK 2	1	0.077

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP80 00	Plastic insert for customising label for DMG 600/610/611 and DCRL	10	0.005
EXP80 01	IP65 gasket seal for ATL600/ 610/611 and DCRL8	1	0.150
EXP80 03	35mm DIN rail mounting accessory for ADXL soft starter	1	0.002
EXP80 04	Fan for ADXL soft starter	1	0.004
EXM80 04	Set of sealable terminal covers for DMG 100/101/110/200/ 210/300	1	0.020
NTC 01	External/remote temperature sensor, with 3m/3.3vd long cable		0.150

#### **General characteristics**

- Communication devices to link LOVATO Electric products to: Personal computers (PC)
- Smartphones
- Smartpi Tablets.

### CX 01

This USB/optical dongle, complete with cable, allows to connect compatible LOVATO Electric products with a PC without having to disconnect the power supply from the electric panel.

The PC identifies the connection as a standard USB. CX 02

This Wi-Fi point connection, lets LOVATO Electric products be viewed by a PC, smartphone and tablet without having to connect cables.

#### CX 03

Antenna compatible with major part of worldwide mobile networks, thanks to the 850/900/1800/1900/2100MHz frequencies.

IEC degree of protection: IP67. Fixing by Ø10mm/0.39" drilling. Cable length 2.5m/2.73yd.

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

#### General 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 \_
- Conductor cross section: 0.2...2.5mm<sup>2</sup> (24...12 AWG; \_ 18...12 AWG per UL/CSA)
- Tightening torque: 0.56Nm (4.5lbin) \_
- \_ Compatible with ADXL... soft starter and VLB3... variable speed drives.

#### Certification and compliance

Certification obtained: cULus, EAC.

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

#### **General characteristics**

If high IEC degree of protection is needed, the protective covers give to the device the necessary protection required.



Accessories

# **Converters**



Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXC CON 01	RS485/ Ethernet converter, 1248VDC, including DIN rail fixing kit	1	0.400

Gateway	<b>D</b>	Order code	Description		Qty per pkg	Wt
					n°	[kg]
600		EXC M3G 01	RS485 Gateway/3 9.527VAC/9.5. including antenna programming cat	BG modem, 35VDC, a and ble	1	0.340
EXC M3G 01	new	EXC GL A01	Gateway data logo collecting via Moo devices in the fiel of the data to sup software, also in	ger for data dbus from the d. Publishing gervision Cloud	1	0.6
		EXC GL AX1	2G/3G modem co module for EXC G	ommunication GL A01	1	-
EXC O	GL A01	EXC GL AX1		Ĩ		
	EXC GL A01 + EXC GL AX1	EXC M3 G	3 G01 EXP10 15			
Transmission technology	2G/3G	2G/3G	GSM – GPRS (20		2G)	
Connectivity with Synergy and Xpress	Yes	Yes	Yes		Yes	
Device setup and supervision	Yes	Yes		Yes		
Local memory	Yes	No		No		
SMS and mail sending	No	No	No Yes			
Support for multiple devices	Yes, with RS485 or ethernet	Yes, with F	RS485	No		
Device compatibility	Devices with RS485 or ethernet and modbus slave role, third party ones included	Devices w and modb third party	ith RS485 us slave role, rones included	Only LOVATO E devices	lectric	

# **Connecting cables**



51 C4

Order code	Description	Qty per pkg	Wt
		n°	[kg]
51 C2	For PC ↔ LOVATO Electric device, 1.8m/2yd long	1	0.090
51 C3	For PC ↔ GSM modem, 1.8m/2yd long❶	1	0.210
51 C4	For PC ↔ RS232/RS485 converter drive, 1.8m/2yd long	1	0.147
51 C5	For Analog modem ↔ LOVATO Electric device, 1.8m/2yd long <b>0</b>	1	0.111
51 C7	For GSM modem ↔ LOVATO Electric device, 1.8m/2yd long <b>0</b>	1	0.101
51 C8	For ADX ↔ remote keypad, 3m/3.3yd long	1	0.080

• Consult Technical support for information; see contact details on inside front cover.

#### **EXC CON 01 General characteristics**

The EXC CON 01 converter can interface "Slave" devices connected in a RS485 bus with a "Master" equipped with an Ethernet interface port:

- Kit consisting of a converter and DIN rail mounting accessory
- Web interface programming
- \_ No power pack included.
- **Certifications and compliance**

Certifications obtained: cULus (UL 60950-1) Listed, FCC CLASS A.

#### **EXC M3G 01 General characteristics**

The EXC M3G 01 gateway can interface "Slave" devices connected in a RS485 with a "Master" using a 3G network:

- Connection TCP server through 3G or 2G network
- Transparent mode: data is transferred from the 3G side to
- the serial side and vice versa without protocol conversion 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) RJ45 port for programming parameters and diagnostics
- with simple software tool
- Antenna compatible with major part of worldwide mobile networks, thanks to the 850/900/1800/1900/2100MHz frequencies.

IEC degree of protection: IP67. Fixing by Ø10mm/0.39" drilling.

Cable length 2.5m/2.73yd.

#### Compliance

Compliance with standards: EN 60950-1.

#### EXC GL A01 General characteristics

EXC GL A01 gateway is able to collect data from devices which are connected through ethernet or RS485 port. Modbus RTU, ASCII and TCP protocols are supported. The data can be reviewed by a connection to Synergy Cloud service or to ethernet local web server and a browser. The access to internet for data sending can be achieved with ethernet port or by adding EXC GL AX1 2G/3G modem.

- CPU ARM 1 GHz
- \_ 2 ethernet port
- 1 RS232/RS422/RS485 serial port
- \_ 24VDC (10...32VDC) power supply
- \_ Operating temperature -20...+60°C
- \_ Simplified connection to Lovato Electric devices
- Compatible with Synergy and Synergy and softwares.

#### Compliance

Compliance with standards: EN 61000-6-4 emissions, EN61000-6-2 immunity, for installations in an industrial environment.

#### **General characteristics**

Connecting cables to link LOVATO Electric devices to:

- Personal computer (PC)
- Modem
- \_ Bus converter.

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

#### Certification

Certification obtained: EAC

