DMG 900

MAIN MENU

FREQUENCY
ASYMMETRY

LOG

I/O

Digital power analyzer

Digital multimeters and power analyzers DMG series

CURRENT HARMONICS

10%
6%
2%
0%

EDIT THD 05.2% 05.1% 05.3%

MENU

Digital multimeter

PH-PH VOLTAGE

401.3   401.7
401.7   401.6

MENU

Digital multimeter

DMG

DIGITAL MULTIMETERS AND POWER ANALYZERS

with backlight graphic LCD screen

® **Lovato** electric

For the control of energy distribution systems detecting when problems occur that could put the quality and availability of electricity at risk. The wide range of power supply and measurement, high measurement accuracy of electrical parameters and comprehensive expandability make these products unique to the market.

- ✔ Easy and intuitive menu navigation
- ✔ Graphic display with text in 5 languages
- ✔ Expandability
- ✔ Ethernet, USB, RS232, RS485 and Fieldbus connection
- ✔ High measurement accuracy
- ✔ Wide range for power supply, measurements and temperature
- ✔ Suitable for LV, MV and HV electric systems and installations

VERSATILITY, EXPANDABILITY AND HIGH MEASUREMENT QUALITY

MAIN FEATURES	Digital multimeters			Digital multimeters		Digital power analyzers	
	DMG 200	DMG 210	DMG 300	DMG 700	DMG 800	DMG 900	DMG 900T Transducer
Modular version, 4-modulie	●	●	●				
Flush-mount version, 96x96mm				●	●	●	
DIN rail fixing version, rear mount	●	●	●				●
Graphic 4-key LCD, 128x80 pixels	●	●	●	●	●		
Graphic touch-screen LCD, 128x112 pixels						●	
Expandability			●	●	●	●	●
Integrated RS485 interface		●					
Number of measured electrical parameters	>160	>160	>344	>160	>344	>590	>590
THD (Total Harmonic Distortion) measurement	●	●	●	●	●	●	●
Detail harmonic analysis			●		●	●	●

Certifications obtained: GOST, cULus.
Comply with standards: IEC/EN61010-1, IEC/EN61000-6-2, IEC/EN61000-6-3, UL 508, CSA C.22.2 n° 14.

Modular digital multimeters

Wide range of operation

- Auxiliary power supply: 100-240VAC/110-250VDC
- Maximum measured rated voltage: 690VAC L-L
  (600VAC UL/CSA rating)
- Input current: 5A (also 1A for DMG 300 only)
- Voltage measurement range: 20-830VAC L-L
- Current measurement range: 0.01-6A
- Frequency measurement range: 45-66Hz.

Accuracy

DMG 200 and DMG 210
- Voltage: ± 0.5% (50-830VAC)
- Current: ± 0.5% (0.1-1.2 In)
- Power: ± 1%
- Active energy: Class 1 (IEC/EN 62053-21)
- Reactive energy: Class 2 (IEC/EN 62053-23).

DMG 300
- Voltage: ± 0.2% (50-830VAC)
- Current: ± 0.2% (0.1-1.2 In)
- Power: ± 0.5%
- Active energy: Class 0.5S (IEC/EN 62053-21)
- Reactive energy: Class 2 (IEC/EN 62053-23).

USB connection

The PC for programming and
data download takes place in a fast and
easy way using the USB port, available on
the EXM 10 10 expansion module.

Ethernet connection

The EXM 10 13 expansion module allows
the DMG 300 multimeter to be connected
in a common Ethernet network and viewed
by one or more duly-connected system
computers.

Optic interface

The DMG 300 interface with the expansion
modules is made by infrared beam.
Special connectors provide for a solid and
secure fixing of expansion modules.
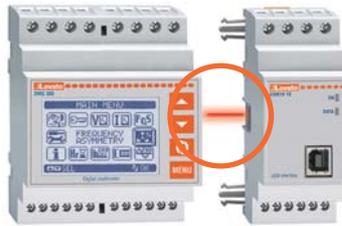
Compact housing

The multimeter housing is made to DIN standards.
The width is just 4 modules.

71.6mm

DIGITAL MULTIMETER
4 module size

DMG 200: More than 160 measured electrical parameters.
DMG 210: More than 160 measured electrical parameters, with RS485 interface
DMG 300: More than 344 measured electrical parameters, expandable.
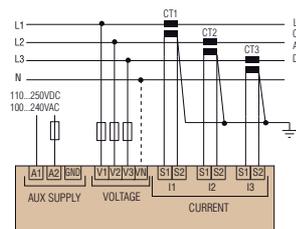
Maximum of 3 expansion modules

Up to 3 EXM... expansion modules can
be fitted on a DMG 300 and permit to:
- Communicate
- Control alarms, pulses and tariffs
- Store events with time stamp.

Wiring diagrams

Type of connections:
- Single-phase
- Two-phase
- Three-phase with or without neutral
- Three-phase without neutral, ARON connection
- Balanced three-phase, with or without neutral.

Expansion modules for DMG 300

The DMG 300 multimeter can integrate its functions with the use of the following modules:
- Digital inputs and outputs, static and relay type
- USB, RS232, RS485 and Ethernet interface communications
- Data storage with clock calendar (RTC) for events.

MAX 3

CLICK

Wide range of operation

- Auxiliary power supply: 100-40VAC/110-250VDC
- Maximum measured rated voltage: 690VAC L-L (600VAC UL/CSA rating)
- Input current with CT: 5A only for DMG 700; 5A or 1A for DMG 800/900/900T
- Voltage measurement range: 20...830V L-L; 10...480V L-N
- Current measurement range for 5A full scale: 0.01-6A for DMG 700/800; 0.01-10A for DMG 900/900T
- Current measurement range for 1A full scale: 0.01-1.2A
- Frequency measurement range: 45-66Hz for all type; also 360-440Hz for DMG 900/900T.

Wide range of voltage measurement 20…830VAC L-L

The wide measurement range of voltage inputs allows DMG multimeters to be used in an infinite number of applications.

Accuracy

DMG 700
- Voltage: ± 0.5% (50÷830VAC)
- Current: ± 0.5% (0.1-1.2 In)
- Power: ± 1%
- Active energy: Class 1 (IEC/EN 62053-21)
- Reactive energy: Class 2 (IEC/EN 62053-23).

DMG 800, DMG 900 and DMG 900T
- Voltage: ± 0.2% (50÷830VAC)
- Current: ± 0.2% (0.1-1.2 In)
- Power: ± 0.5%
- Active energy: Class 0.5S (IEC/EN 62053-21)
- Reactive energy: Class 2 (IEC/EN 62053-23).

DC version

DMG 800/900/900T models are also available with 12-24-48VDC.

Multiple energy metering with tariff function

More than 20 partial energy meters, clearable.

DIGITAL MULTIMETER
96x96mm

IP54

DMG 700: More than 160 measured electrical parameters, expandable.
DMG 800: More than 344 measured electrical parameters, expandable.
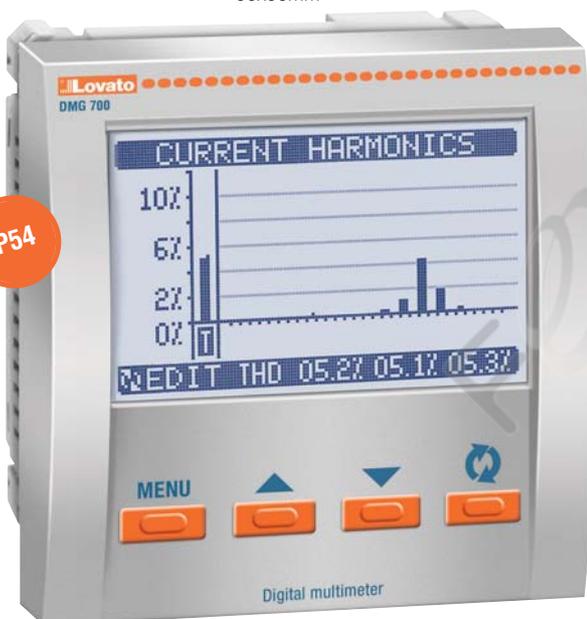
DIGITAL POWER ANALYZER
96x96mm

IP65

TOUCH SCREEN

BEEP!

DMG 900: More than 590 measured electrical parameters, expandable.

Expansion modules

These DMGs can increase their features with the use of the following expansion modules and satisfy the many diverse needs of Customers. They include:
- Digital inputs and outputs, static and relay type
- Analog inputs and outputs
- USB, RS232, RS485, Ethernet and Profibus-DP interface communications
- Data storage with clock calendar (RTC) for events and data logging
- Data storage with clock calendar (RTC) for events, data logging with Energy Quality.

Multifunction analog inputs and outputs

The programmable analog outputs can be configured in voltage or current. The analog inputs can read signals in the form of voltage, current or temperature from PT100 sensor.

Ethernet gateway function

It allows to read data from a group of DMGs connected together in a RS485 network, using one Ethernet port.

Storage module with clock calendar

It provides for data logging of the measurement trends and storing events and alarms with time stamp.

Energy Quality (EN 50160) module

It permits to control the energy quality to EN 50160 normative, storing events (micro breakings, voltage dips, etc.) with time stamp.

High expandability

The EXP expansion modules are common to all the flush-mount models and transducer. The fitting on the multimeters is done with no need of tools and the connection is made with plug connectors.

MAX 4

CLICK

multimeters and power analyzers

▶ **Front panel mounting ease**

The mounting on and removal from the panel door are done with no need of tools. A special fixing system provides a quick and immediate operation during both device installation and removal from the panel front.

▶ **Programmable alarms with Boolean logic**

▶ **Temperature detection**

The analog input provides for the temperature measurement by sensors, e.g. PT100.
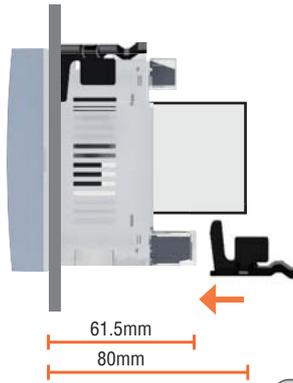
61.5mm
80mm

▶ **Low-profile housing**

DMG 700, DMG 800 and DMG 900 types are only 60mm deep (61.5mm with the terminals covers in place.) With the expansion modules mounted, this becomes 80mm.

▶ **Safety**

Being equipped with sealable switches, the models can have set-up and clearing locks. To avoid connection tampering, sealable terminal covers are also included.

MEASUREMENT TRANSDUCER

REMOTE DISPLAY UNIT
96x96mm

IP65

WAVEFORM CAPTURE

MENU

BEEP!

TOUCH SCREEN

DMG 900T: More than 590 measured electrical parameters expandable, DIN rail fixing.
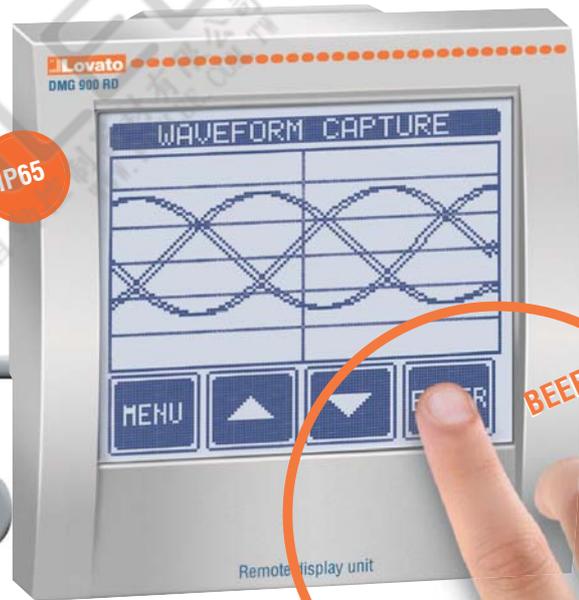
DMG 900RD: Remote terminal for viewing electrical parameters measured by the DMG 900T transducer.

▶ **Wiring diagrams**

DMG 700 - DMG 800
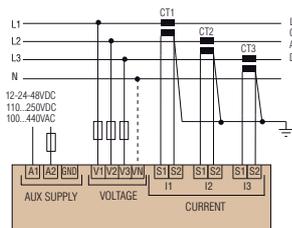
L1
L2
L3
N
12-24-48VDC
110...250VDC
100...440VAC

CT1
CT2
CT3

L O A D

A1 A2 GND | V1 V2 V3 VN | S1 S2 S1 S2 S1 S2
AUX SUPPLY | VOLTAGE | I1 I2 I3
CURRENT

DMG 900 - DMG 900T

L1
L2
L3
N
12-24-48VDC
110...250VDC
100...440VAC

CT1
CT2
CT3
CT4

L O A D

A1 A2 GND | V1 V2 V3 V4 VN | S1 S2 S1 S2 S1 S2 S1 S2
AUX SUPPLY | VOLTAGE | I1 I2 I3 I4
CURRENT

Type of connections:
- Single-phase
- Two-phase
- Three-phase with or without neutral
- Three-phase without neutral, ARON connection
- Balanced three-phase, with or without neutral.
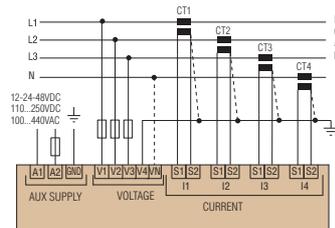
Type of connections:
- Single-phase
- Two-phase
- Two-phase with neutral, measurement of neutral current and neutral-earth voltage
- Three-phase with or without neutral

- Three-phase without neutral, ARON connection
- Balanced three-phase, with or without neutral
- Three-phase with neutral, measurements of neutral current and neutral-earth voltage.

▶ **Five voltage and four current inputs**

The DMG 900 and DMG 900T types can also provide measurements of neutral current and neutral-earth voltage.

Communications

The DMG instruments provide for communications using the following interface:
Ethernet, USB, RS232, RS485 and Fieldbus (Modbus®, Profibus, etc.).

Page customising

The user can freely define by selecting information and measurements to view on the display.

Software

The new DMG series digital multimeters are compatible with the DMK SW and DMK SW 10 remote control software, already used with the DMK series multimeters.

DMK SW
The remote control software is capable of supervising up to 250 digital multimeters connected on one single bus.

DMK SW 10
It includes a data-logger supervision software and the DMK SW remote control software.

▶ **2 configurable password levels**

The page with the measurements can be freely consulted while the pages with parameter settings and commands are locked with 2 access levels:
- User
- Installer.

▶ **Wiring test**

- The wiring test allows to check if the multimeter installation has been carried out correctly.

- The test permits to check the following points:
  ✔ Reading of the three voltages
  ✔ Reading of the three currents
  ✔ Phase sequence
  ✔ Voltage imbalance
  ✔ Polarity reversal of one or more CTs
  ✔ Phase swap between voltage/current.

Graphic LCD screen

White backlight with intensity adjustment.

5-language texts facilitate:

Measurement consultation
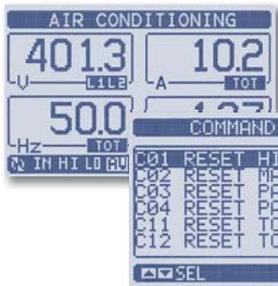
Parameter setting

Executing commands
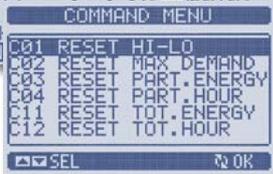
Graphic symbology:

Function choice
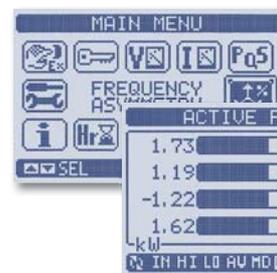
Acces status

Measurement range

Various types of graphs:

Histograms for harmonics
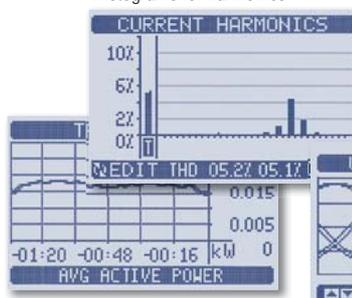
Waveforms
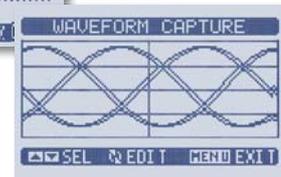
Measurement (consumption) trends

▶ **Extensive temperature range display**

-20 +60°C

Main parameters and measurement inputs

SINGLE, TWO, THREE-PHASE INSTRUMENTS WITH OR WITHOUT NEUTRAL	Digital multimeters			Digital multimeters		Power analyzers	
	DMG 200	DMG 210	DMG 300	DMG 700	DMG 800	DMG 900	DMG 900T
Voltage (phase, phase-to-phase and system values)	•	•	•	•	•	•	•
Neutral-earth voltage						•	•
Phase current values	•	•	•	•	•	•	•
Phase current values (actual neutral current)						•	•
Power Factor (PF)	•	•	•	•	•	•	•
Cosφ for each phase						•	•
Frequency	•	•	•	•	•	•	•
Maximum and minimum value function (HIGH / LOW) for reading and storage of peak voltage, current, power, PF and frequency values	•	•	•	•	•	•	•
Voltage and current asymmetry	•	•	•	•	•	•	•
Averaging function	•	•	•	•	•	•	•
Peak values (maximum demand) of power and current	•	•	•	•	•	•	•
Hour counter (programmable total and partial)	•	•	•	•	•	•	•
Total Harmonic Distortion (THD) of voltage and current values	•	•	•	•	•	•	•
Harmonic analysis of voltage and current up to 31° order			•		•		
Harmonic analysis of voltage and current up to 63° order						•	•
Direction of harmonic power flow						•	•
Active, reactive, apparent, imported and exported energy meters (partial and total)	•	•	•	•	•	•	•
Pulse counter for general use (pulse count for consumption of water, gas, etc.., with expansion module only)				•	•	•	•
Measurement inputs — 3ph+N voltage, 690VAC max	•	•	•	•	•		
Measurement inputs — 3ph+N+GND voltage, 690VAC max						•	•
Measurement inputs — 3ph current, CT /5A	•	•		•			
Measurement inputs — 3ph current, CT /5A or /1A			•		•		
Measurement inputs — 3ph+N current, CT /5A or /1A						•	•
Event storage						•	•

Expandability

	Digital multimeters			Digital multimeters		Power analyzers	
	DMG 200	DMG 210	DMG 300	DMG 700	DMG 800	DMG 900	DMG 900T
3 optic modules maximum			•				
4 plug-in modules maximum				•	•	•	•
Digital inputs/outputs			•	•	•	•	•
Analog inputs/outputs				•	•	•	•
RS232, RS485, USB communications			•	•	•	•	•
Ethernet communications				•	•	•	•
Profibus-DP communications				•	•	•	•
Data logger + clock calendar (RTC)				•	•	•	•
Energy Quality (EN 50160) analysis						•	•
RS485 built-in interface			•				

HOW TO ORDER

MODULAR DIGITAL MULTIMETER

DMG 200	Graphic 128x80 pixel LCD multimeter, 100-240VAC / 110-250VDC, multi language Italian, English, French, Spanish and Portughese
DMG 200 L01	Graphic 128x80 pixel LCD multimeter, 100-240VAC / 110-250VDC, multi language English, German, Czech, Polish and Russian
DMG 210	Graphic 128x80 pixel LCD multimeter, RS485 port included, 100-240VAC / 110-250VDC, multi language Italian, English, French, Spanish and Portughese
DMG 210 L01	Graphic 128x80 pixel LCD multimeter, RS485 port included, 100-240VAC / 110-250VDC, multi language English, German, Czech, Polish and Russian
DMG 300	Graphic 128x80 pixel LCD multimeter, harmonic analysis, ezpandable, 100-240VAC / 110-250VDC, multi language Italian, English, French, Spanish and Portughese
DMG 300 L01	Graphic 128x80 pixel LCD multimeter, harmonic analysis, ezpandable, 100-240VAC / 110-250VDC, multi language English, German, Czech, Polish and Russian

Expansion modules for DMG 300...

EXM 10 00	2 digital outputs and 2 static outputs, opto-isolated
EXM 10 01	2 opto-isolated digital inputs and 2 output relays rated 5A 250VAC
EXM 10 10	Opto-isolated USB interface
EXM 10 11	Opto-isolated RS232 interface
EXM 10 12	Opto-isolated RS485 interface
EXM 10 13	Opto-isolated Ethernet interface
EXM 10 20	Opto-isolated RS485 interface and 2 output relays rated 5A 250VAC
EXM 10 30	Data storage, clock-calendar (RTC) with backup battery for event logging

FLUSH-MOUNT DIGITAL MULTIMETERS AND POWER ANALYZERS

DMG 700	Graphic 128x80 pixel LCD multimeter, 100-440VAC / 110-250VDC multi language Italian, English, French, Spanish and Portughese
DMG 700 L01	Graphic 128x80 pixel LCD multimeter, 100-440VAC / 110-250VDC multi language English, German, Czech, Polish and Russian
DMG 800	Graphic 128x80 pixel LCD multimeter, harmonic analysis, 100-440VAC / 110-250VDC, multi language Italian, English, French, Spanish and Portughese
DMG 800 L01	Graphic 128x80 pixel LCD multimeter, harmonic analysis, 100-440VAC / 110-250VDC, multi language English, German, Czech, Polish and Russian
DMG 800 D048	Graphic 128x80 pixel LCD multimeter, harmonic analysis, 12-24-48VDC
DMG 900	Graphic 128x112 pixel touch screen LCD multimeter, harmonic analysis 100-440VAC / 110-250VDC, multi language Italian, English, French, Spanish and Portughese
DMG 900 L01	Graphic 128x112 pixel touch screen LCD multimeter, harmonic analysis 100-440VAC / 110-250VDC, multi language English, German, Czech, Polish and Russian
DMG 900 D048	Graphic 128x112 pixel touch screen LCD multimeter, harmonic analysis, 12-24-48VDC
DMG 900T	Measurement transducer, harmonic analysis, 4 V/I channels 100-440VAC / 110-250VDC, multi language Italian, English, French, Spanish and Portughese
DMG 900T L01	Measurement transducer, harmonic analysis, 4 V/I channels 100-440VAC / 110-250VDC, multi language English, German, Czech, Polish and Russian
DMG 900T D048	Measurement transducer, harmonic analysis, 4 V/I channels 12-24-48VDC
DMG 900RD	Graphic 128x112 pixel touch screen LCD remote display unit, with 3m long connecting cable

Moduli di espansione per DMG 700, DMG 800, DMG 900 e DMG 900T

EXP 10 00	4 digital opto-isolated inputs
EXP 10 01	4 digital opto-isolated outputs
EXP 10 02	2 digital inputs and 2 static outputs, opto-isolated
EXP 10 03	2 output relays rated 5A 250VAC
EXP 10 04	2 analog opto-isolated inputs, 0/4-20mA or 0-10V or 0...±5V for DMG 800/900/900T only
EXP 10 05	2 analog opto-isolated putputs, 0/4-20mA or 0-10V or 0...±5V for DMG 800/900/900T only
EXP 10 10	Opto-isolated USB interface
EXP 10 11	Opto-isolated RS232 interface
EXP 10 12	Opto-isolated RS485 interface
EXP 10 13	Opto-isolated Ethernet interface for DMG 800/900/900T only
EXP 10 14	Opto-isolated Profibus-DP interface for DMG 800/900/900T only
EXP 10 30	Data storage, clock-calendar (RTC), with back up battery for events and data logging, for DMG 800/900/900T only
EXP 10 31	Data storage with Energy Quality (EN 50160), clock-calendar (RTC) with back up battery for events and data logging, for DMG 900/900T only

SOFTWARE AND ACCESSORIES

DMK SW	Remote control software for PC - DMG 210/300/700/800/900/900T, complete with 51 C4 connecting cable
DMK SW 10	Data-logger software for DMG 300/800/900/900T, complete with 51 C2 connecting cable; includes DMK SW software
51 C2	PC - multimeter RS232 connecting cable (1.8m)
51 C4	PC - 4 PX1 converter connecting cable (1.8m)
51 C5	Analog modem - multimeter RS232 connecting cable (1.8m)
51 C9	Analog modem - 4 PX1 converter connecting cable (1.8m)
4 PX1	RS232/RS485 converter drive 220-240VAC ❶
EXM 80 04	Sealable set of terminal covers for DMG 200, DMG 210 and DMG 300

❶ 110-120VAC on request.

Left margin product labels: DMG 200 / DMG 210 / DMG 300, EXM…, DMG 700 - DMG 800, DMG 900, DMG 900T, DMG 900RD, EXP…, 4 PX1

![Lovato electric logo] **Lovato**
electric
100% electricity
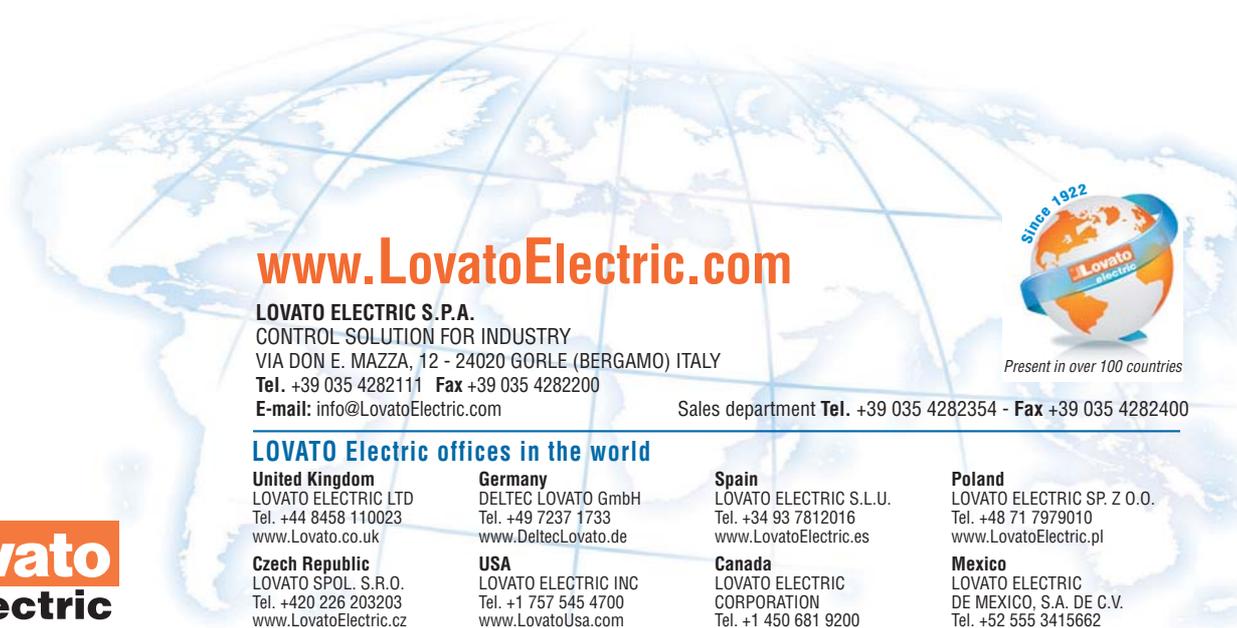
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