Digital Panel Meters
DC/AC Current and Voltage Indicator/Controller
Type LDM40

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- **Multi-input instrument 4-DGT LED**
- **0.1% RDG basic accuracy**
- **TRMS AC current and voltage measurements**
- **AC/DC current measurements: selectable full scales (200µA to 5A)**
- **AC/DC voltage measurements: selectable full scales (200mV to 500V)**
- **Up to 2 independent alarm set-points (optional)**
- **20mA/10V DC analogue output (optional)**
- **RS485 serial communication port (optional)**
- **Modbus, Jbus communication port**
- **Universal power supply: 18-60VAC/DC and 90-260VAC/DC**
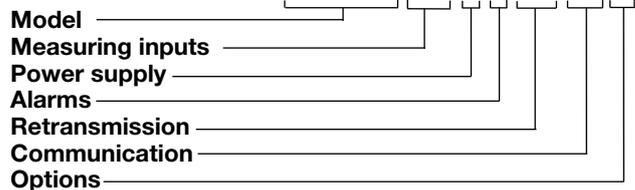- **Front protection degree: IP65**

Product Description

µP-based digital panel meter, 4-DGT LED indicator and controller, for current, voltage measurements. Measuring ranges and functions easily programmable from the front key-pad. LDM40 includes storage min-max functions and two-level protection password. One analogue output and serial communication port RS485 available on request. Housing for panel mounting with front protection degree: IP65.

How to order

LDM40 LSE H 0 XX XX X

Model
Measuring inputs
Power supply
Alarms
Retransmission
Communication
Options

Type Selection

Measuring inputs	Power supply	Alarms	Retransmission
LSE: signal inputs + AUX: 0.2-2-20mA DC/AC; 0.2-2-20V DC/AC	**H:** 90 to 260V AC/DC	**0:** None	**XX:** None
HSX: signal inputs: 0.2-2-5A DC/AC; 20-200-500V DC/AC	**L:** 18 to 60V AC/DC	**1:** single relay output, (AC1-5AAC, 250VAC)	**AV:** Single analogue output, 0 to 20mA DC and 0 to 10V DC
		2: Dual relay output, (AC1-5AAC, 250VAC)	

Communication	Options
XX: None	**X:** None
SX: Serial port RS485	**T:** Tropicalization

Input Specifications

Analogue inputs LSE type HSX type	Channels and variables 1, mA and V DC/AC + AUX 1, A and V DC/AC		height 14.2 mm Colour: red
Accuracy	See table "Measurement accuracy, temperature drifts, minimum and maximum indications"	**Max and min indication**	See table "Measurement accuracy, temperature drifts min and max indications"
Additional errors Humidity Input frequency Magnetic field	0.3% RDG, 60% to 90% R.H. 0.4% RDG, 62 to 440 Hz 0.5% RDG @ 400 A/m	**Measurements**	Current, voltage. For the current and voltage measurements: TRMS measurement of distorted sine waves.
Temperature drift	See table "Measurement accuracy, temperature drifts, min and max indications"	Coupling type Crest factor	Direct ≤3; $A_{Pmax}=1.7In$; $V_{Pmax}=1.7Un$
Sampling rate	500 samples/s @ 50Hz	**Input impedance**	See table "input impedances and overloads"
Display refresh time	200 msec @ 50Hz	**Frequency**	40 to 440 Hz
Display	4 DGT, 7 segments	**Overload**	See table "input impedances and overloads"

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Measurement accuracy, temperature drifts, min and max indications

All accuracies and min/max indications are referred to an ambient temperature range of 25°C ±5°C, relevant humidity ≤60% and scale ratio (electrical/displayed scale) equal to 1.

Input	Range	Type	Accuracy	Temp. drift	Min. indicat. (■)	Max. indicat. (■)
LSE	-200µA to +200µA -2mA to +2mA -20mA to +20mA -200mV to +200mV -2V to +2V -20V to +20V	DC/AC	DC: ±(0.1%RDG+3DGT) 0% to 25% FS; ±(0.1%RDG+2DGT) 25% to 110% FS. TRMS (45 to 65Hz)*: ±(0.3%RDG+3DGT) 0% to 25% FS; ±(0.3%RDG+2DGT) 25% to 110% FS.	±150 ppm/°C	- 199.9 - 1.999 - 19.99 - 199.9 - 1.999 - 19.99	+ 200.0 + 2.000 + 20.00 + 200.0 + 2.000 + 20.00
HSX	-200mA to +200mA -2A to +2A -5A to +5A -20V to +20V -200V to +200V -500V to +500V	DC/AC	DC: ±(0.1%RDG+3DGT) 0% to 25% FS; ±(0.1%RDG+2DGT) 25% to 110% FS. TRMS (45 to 65Hz)*: ±(0.3%RDG+3DGT) 0% to 25% FS; ±(0.3%RDG+2DGT) 25% to 110% FS.	±150 ppm/°C	- 199.9 - 1.999 - 1.999 - 19.99 - 199.9 - 199.9	+ 200.0 + 2.000 + 5.000 + 20.00 + 200.0 + 500.0

* <45Hz >65Hz= ±(0.5%RDG+3DGT) 0% to 25% FS; ±(0.5%RDG+2DGT) 25% to 110% FS.
(■) The min. indication for TRMS measurement (AC or DC) is 0; it is possible to modify the decimal point position.
The max indication using the scaling capability of the instrument can be extended to 9999.

Input impedances and overloads

Input	Range	Type	Impedance	Overload (continuous)	Overload (1s)
LSE	-200µA to +200µA -2mA to +2mA -20mA to +20mA -200mV to +200mV -2V to +2V -20V to +20V	DC/AC DC/AC DC/AC DC/AC DC/AC DC/AC	≤2.2kΩ ≤22Ω ≤22Ω ≥2.2kΩ ≥200kΩ ≥200kΩ	5mA 50mA 50mA 10V 50V 50V	10mA 150mA 150mA 20V 100V 100V
HSX	-200mA to +200mA -2A to +2A -5A to +5A -20V to +20V -200V to +200V -500V to +500V	DC/AC DC/AC DC/AC DC/AC DC/AC DC/AC	≤1Ω ≤0.012Ω ≤0.012Ω ≥2MΩ ≥2MΩ ≥2MΩ	0.8A 7.5A 7.5A 750V 750V 750V	1A 100A 100A 1000V 1000V 1000V

Output specifications

Alarm outputs

Alarm type	(on request) Active alarm for out-of-range, up alarm, down alarm, down alarm with start-up deactivation, up alarm with latch, down alarm with latch	Min response time	energized/de-energized 500 ms, with filter excluded, without alarm on-time delay
		Output channels	Up to 2 Type SPDT AC 1: 5A, 250VAC DC 12: 5A, 24VDC AC 15: 2,5A, 250VAC DC 13: 2,5A, 24VDC
Alarm set-point	Adjustable from 0 to 100% of displayed range		
Hysteresis	0 to 100% of displayed range	Insulation	4000 V$_{RMS}$ output to measuring input, 4000 V$_{RMS}$ output to power supply input.
On-time delay	0 to 255 s		
Off-time delay	0 to 255 s		
Output status	Selectable: normally		

Specifications are subject to change without notice   LDM40DS 250707

Output specifications

RS422/RS485	(on request)	Analogue output	(on request)
Serial output	Bidirectional (static and dynamic variables).	Range Scaling factor	0 to 20 mADC, 0 to 10 VDC Programmable within the
Connections	Multidrop, 2 or 4 wires,		entire retransmission range;
Distance	1000 m		allows to manage the
Terminalization	Directly on the module		retransmission of all the
	by means of jumper		values from:
Addresses	1 to 255, selectable		0 to 20 mA / 0 to 10V
	by means of the front key-pad	Accuracy	± 0.2% FS (@ 25°C ± 5°C)
Protocol	MODBUS RTU/JBUS	Response time	≤ 10 ms
Data (bidirectional)		Temperature drift	± 200 ppm/°C
Dynamic (reading only)	Measurement, min value	Load: 20 mA output	≤ 700 Ω
	max value	10 V output	≥ 10 kΩ
	alarm status	Insulation	By means of opto-couplers
Static (reading/writing)	All programming parameters,		$4000V_{rms}$ output to
	min max reset		measuring input,
	reset of latch alarm		$4000V_{rms}$ output to
Data format	8 data bit, no parity,		power supply input
	1 stop bit	Notes:	The two outputs cannot be
Baud rate	Selectable 4800, 9600,		used at the same time
	and 19200 bit/s	**Excitation output**	LSE input only
Insulation	By means of opto-couplers	Voltage	13 VDC ±10%
	$4000 V_{rms}$ output to		max. 50 mA
	measuring inputs,	Insulation	$25V_{rms}$ output to
	$4000 V_{rms}$ output to		measuring input,
	power supply input		$4000 V_{rms}$ output to
			power supply input

Software functions

| Min / Max storage	Automatic storage (in the EEPROM) of the minimum and maximum measured value from the previous memory reset	Electrical range	Programmable within the whole measuring range
		Decimal point position	Programmable within the displayed range
		Displayed range	Programmable within the displayed range.
Password	Numeric code max 4 dgt 2 levels of data protection.	**Diagnostics**	The display flashes when the limits of the displayed range
1st level	0 to 4999 fully protected.		are exceeded, the data
2nd level	5000 to 9999 access to		are updated up to 20%
	programming is protected .		of the rated displayed range.
	Alarm set-points are directly programmable from the measuring mode.	**Digital filter**	
		Filter operating range	0 to 9999
Measurement selection	Depending on the input: - measuring range - measuring type (TRMS or DC).	Filtering coefficient	1 to 32
		Scaling	Selection of min value of the input range.
Integration time selection	Automatic or from 100.0 to 999.9 ms only in the current and voltage measurement.		Selection of max value of the input range.
			Selection of decimal point position.
Scaling factor			Selection of min
Operating mode	Electrical scale compression, displayed scale compression/expansion (max. 2 without filter, up to 10 with filter)		displayable value. Selection of max displayable value.

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General Specifications

Operating temperature	0° to 50°C (32° to 122°F) (R. H. < 90% non-condensing)	**Safety Standards** Safety	EN 61010-1, IEC 61010-1
Storage temperature	-10° to 60°C (14° to 140°F) (R.H. < 90% non-condensing)	**Connections** Wire section	Screw type Max 2.5mm^2
Insulation reference voltage	300 V$_{RMS}$ to ground (500V input)	**Housing** Dimensions Material	1/8 DIN, 48 x 96 x 83 mm PC-ABS, self-extinguishing: UL 94 V-0
Insulation	See table "Insulation between inputs and outputs"	**Protection degree**	Front: IP65 Connections: IP20
Dielectric strength	4000 V$_{RMS}$ for 1 minute	**Weight**	340 g approx (packing included)
Rejection NMRR CMRR	40 dB, 40 to 60 Hz 100 dB, 40 to 60 Hz	**Approvals**	CE, UL and CSA in progress
EMC	EN61000-6-2, IEC61000-6-2 EN61000-6-3, IEC61000-6-3		

Supply Specifications

AC/DC voltage	90 to 260V (standard) 18 to 60V (on request)	**Energy consumption**	≤ 8VA/4W (90 to 260V) ≤ 8VA/4W (18 to 60V)

Excitation output
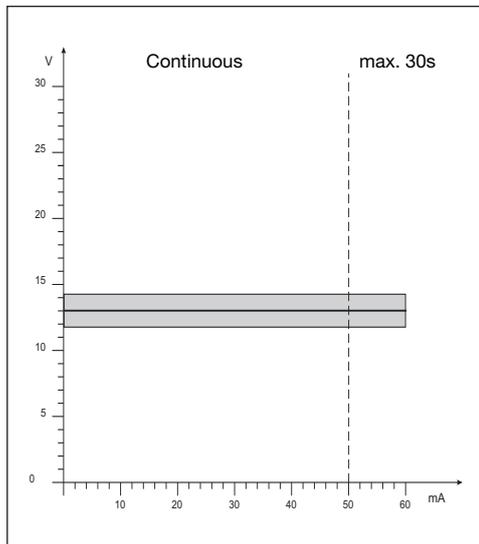
The excitation output is constant and independent of power supply's voltage.

Insulation between inputs and outputs

	Meas. input	Relay output	Analogue output	Serial port	Excit. output	90-260VAC/ DC p.supply	18-60VAC/ DC p.supply
Meas. input	-	4kV	4kV	4kV	25V	4kV	4kV
Relay output	4kV	-	4kV	4kV	4kV	4kV	4kV
Analogue output	4kV	4kV	-	4kV	4kV	4kV	4kV
Serial port	4kV	4kV	4kV	-	4kV	4kV	4kV
Excit. output	25V	4kV	4kV	4kV	-	4kV	4kV
90-260VAC/ DC p.supply	4kV	4kV	4kV	4kV	4kV	-	-
18-60VAC/ DC p.supply	4kV	4kV	4kV	4kV	4kV	-	-

Used calculation formulas

Only for TRMS Measurements
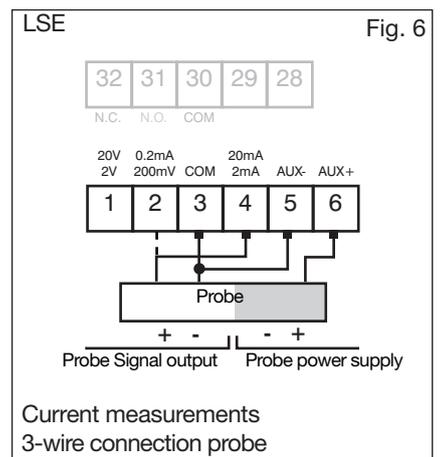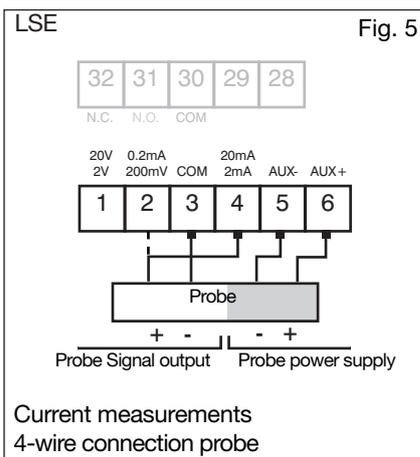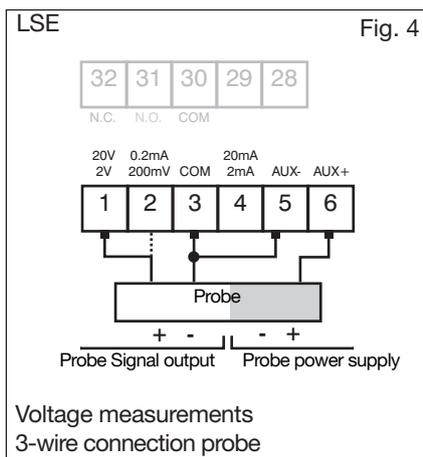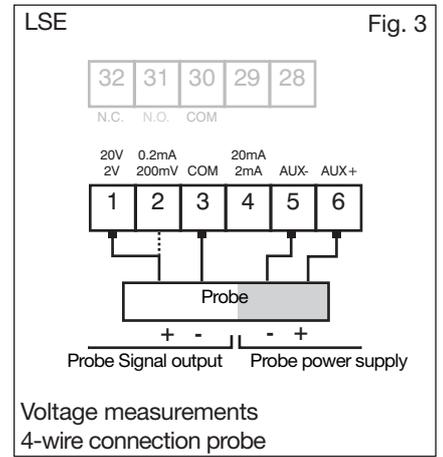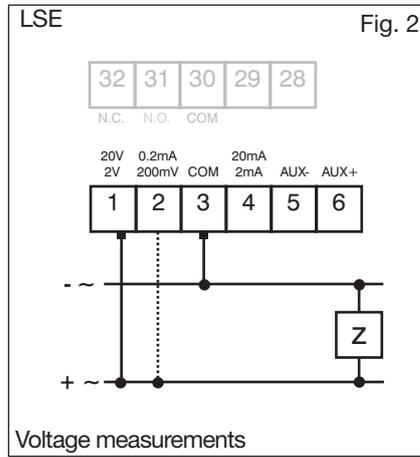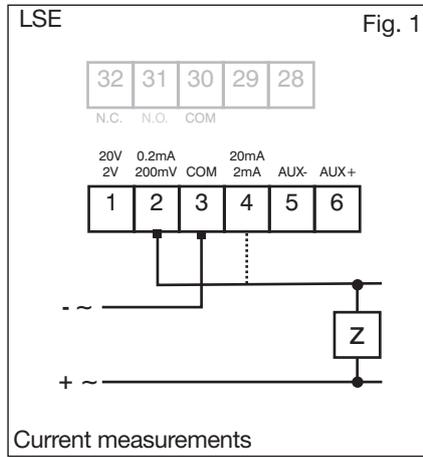
Instantaneous effective voltage (TRMS)

$$V_{1N} = \sqrt{\frac{1}{n} \cdot \sum_{i=1}^{n} (V_{1N})_i^2}$$

Instantaneous effective current (TRMS)

$$A_1 = \sqrt{\frac{1}{n} \cdot \sum_{i=1}^{n} (A_1)_i^2}$$

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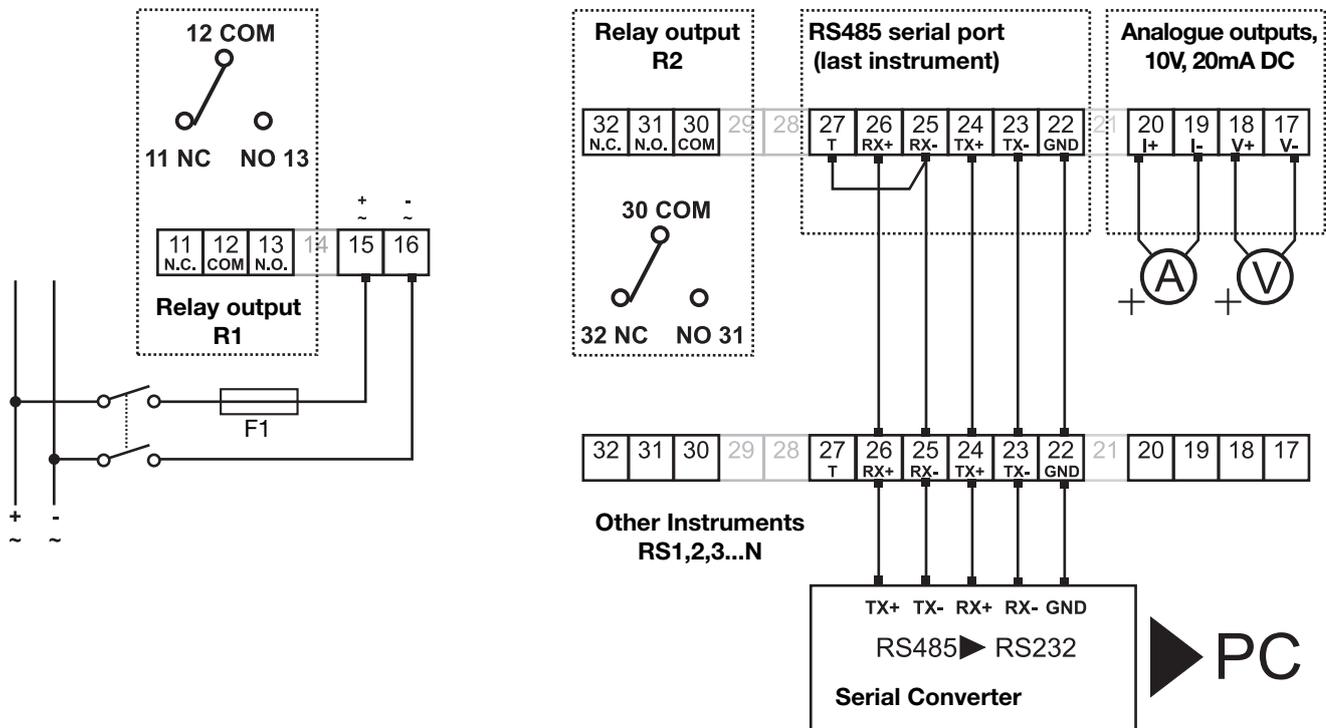
Wiring diagrams

Process signal wiring diagrams

LSE — Fig. 1

| 32 | 31 | 30 | 29 | 28 |
| N.C. | N.O. | COM | | |

20V / 2V | 0.2mA / 200mV | COM | 20mA / 2mA | AUX- | AUX+

| 1 | 2 | 3 | 4 | 5 | 6 |

Current measurements

LSE — Fig. 2

| 32 | 31 | 30 | 29 | 28 |
| N.C. | N.O. | COM | | |

20V / 2V | 0.2mA / 200mV | COM | 20mA / 2mA | AUX- | AUX+

| 1 | 2 | 3 | 4 | 5 | 6 |

Voltage measurements

LSE — Fig. 3

| 32 | 31 | 30 | 29 | 28 |
| N.C. | N.O. | COM | | |

20V / 2V | 0.2mA / 200mV | COM | 20mA / 2mA | AUX- | AUX+

| 1 | 2 | 3 | 4 | 5 | 6 |

Probe
+ − − +
Probe Signal output   Probe power supply

Voltage measurements
4-wire connection probe

LSE — Fig. 4

| 32 | 31 | 30 | 29 | 28 |
| N.C. | N.O. | COM | | |

20V / 2V | 0.2mA / 200mV | COM | 20mA / 2mA | AUX- | AUX+

| 1 | 2 | 3 | 4 | 5 | 6 |

Probe
+ − − +
Probe Signal output   Probe power supply

Voltage measurements
3-wire connection probe

LSE — Fig. 5

| 32 | 31 | 30 | 29 | 28 |
| N.C. | N.O. | COM | | |

20V / 2V | 0.2mA / 200mV | COM | 20mA / 2mA | AUX- | AUX+

| 1 | 2 | 3 | 4 | 5 | 6 |

Probe
+ − − +
Probe Signal output   Probe power supply

Current measurements
4-wire connection probe

LSE — Fig. 6

| 32 | 31 | 30 | 29 | 28 |
| N.C. | N.O. | COM | | |

20V / 2V | 0.2mA / 200mV | COM | 20mA / 2mA | AUX- | AUX+

| 1 | 2 | 3 | 4 | 5 | 6 |

Probe
+ − − +
Probe Signal output   Probe power supply

Current measurements
3-wire connection probe

High-level signals wiring diagrams

LSE — Fig. 7

| 32 | 31 | 30 | 29 | 28 |
| N.C. | N.O. | COM | | |

20V / 2V | 0.2mA / 200mV | COM | 20mA / 2mA | AUX- | AUX+

| 1 | 2 | 3 | 4 | 5 | 6 |

Probe
+ − − +
Probe Signal output   Probe power supply

Current measurements
2-wire connection probe

HSX — Fig. 8

| 32 | 31 | 30 | 29 | 28 |
| N.C. | N.O. | COM | | |

500V / 200V / 20V | | COM | 200mA | | 5A / 2A

| 1 | 2 | 3 | 4 | 5 | 6 |

Current measurements

HSX — Fig. 9

| 32 | 31 | 30 | 29 | 28 |
| N.C. | N.O. | COM | | |

500V / 200V / 20V | | COM | 200mA | | 5A / 2A

| 1 | 2 | 3 | 4 | 5 | 6 |

Voltage measurements

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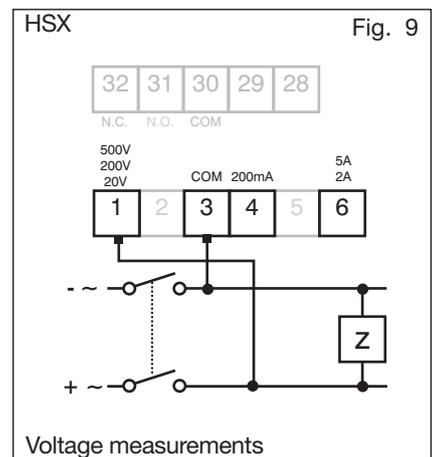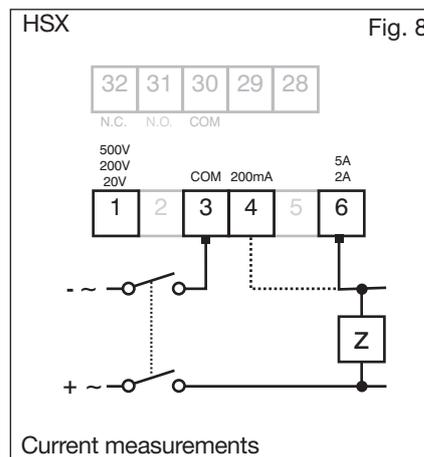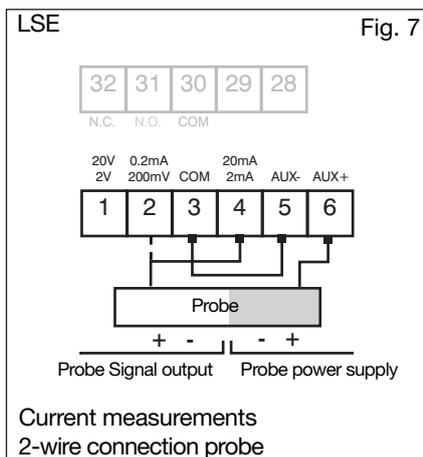
# Power supply and output connections wiring diagrams

H: power supply 90-260VAC/DC,
F1= 315mA T 250V 5x20mm

L: power supply 18-60VAC/DC,
F1= 1.6A T 250V 5x20mm

RS485 4-wire connection: additional devices provided with RS485 port (indicated as RS1,2,3...N) are connected in parallel. The termination of the serial port is carried out only on the last instrument of the network with a jumper from 25 to 27 connections.
Note: particular types of cables or plants may require an external termination. For the network connections use twisted cable type AWG26.

Front panel description
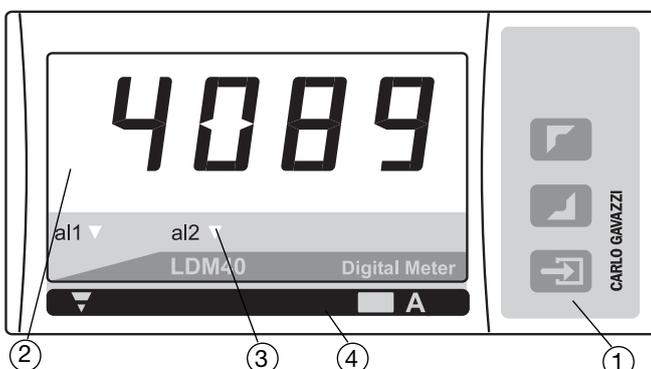
1. Key-pad
The programming of the configuration parameters and the display are easily controlled by means of the 3 function keys.
: to enter the programming procedure and to confirm the password.

:
- to program values;
- to select functions;
- to scroll display pages.

2. Display
Instantaneous measurements:
- 4 digit (max display 9999).
Alphanumeric indications by means of LED display for:
- Display of configuration parameters;
- The measured variable.

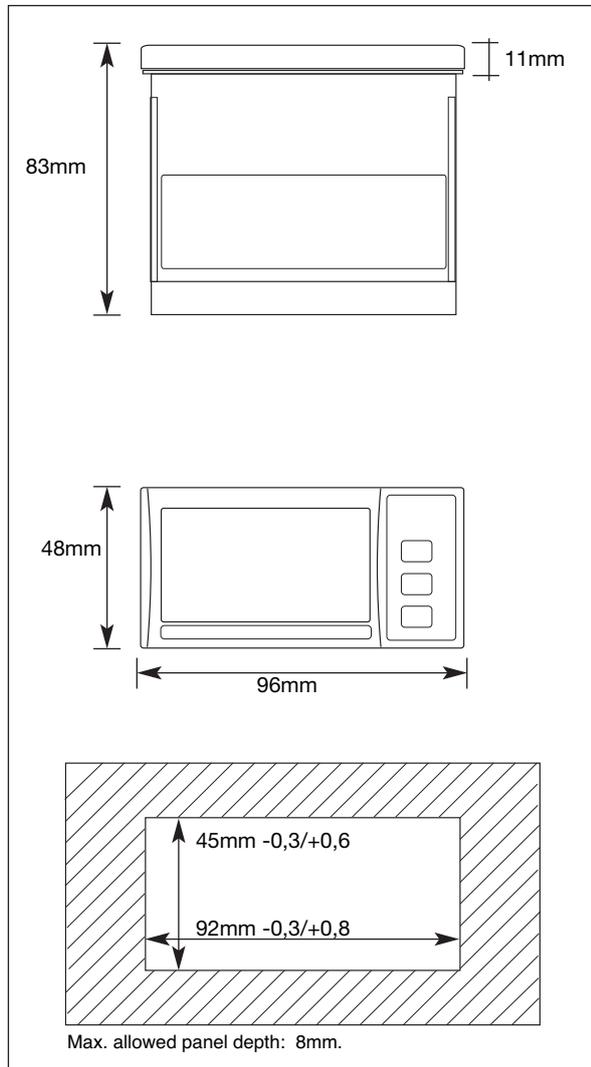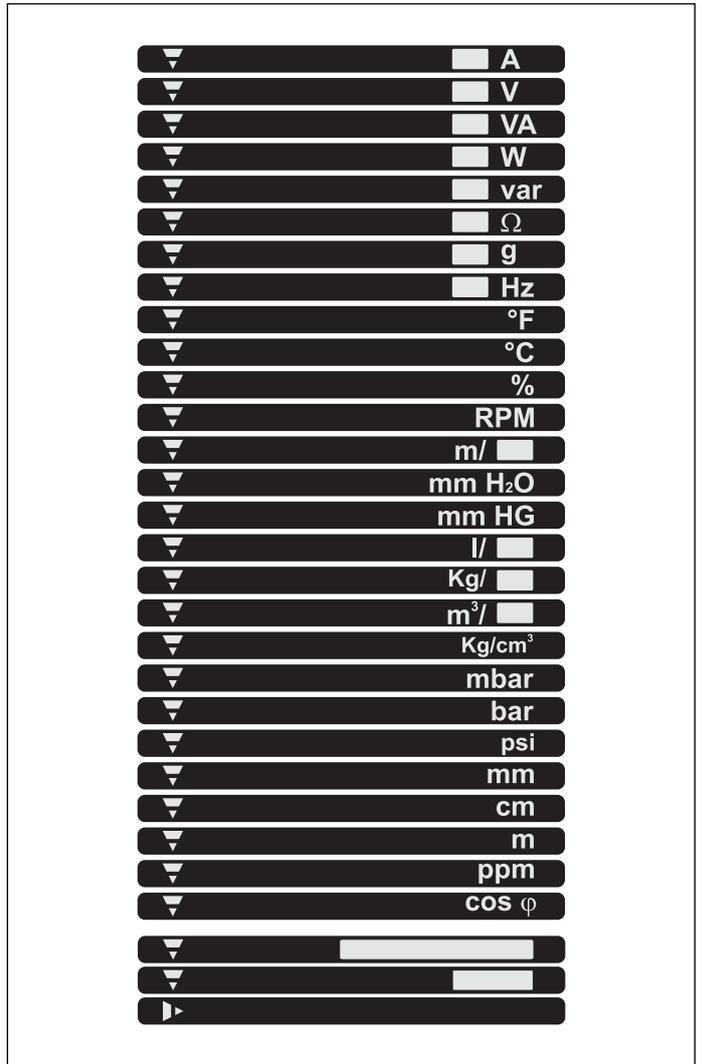**3. Alarm status LED**
Display any alarm condition

4. Engineering unit
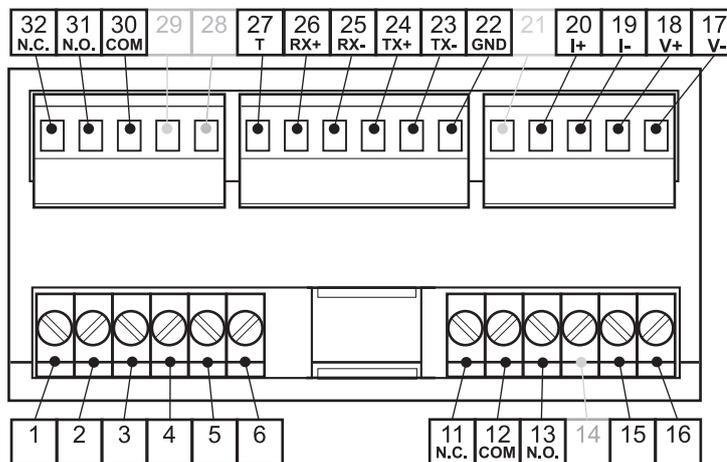The instrument is supplied with a complete set of self-sticking labels with the main engineering units.

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Dimensions

11mm

83mm

48mm

96mm

45mm -0,3/+0,6

92mm -0,3/+0,8

Max. allowed panel depth: 8mm.

Engineering Units

▽	☐ A
▽	☐ V
▽	☐ VA
▽	☐ W
▽	☐ var
▽	☐ Ω
▽	☐ g
▽	☐ Hz
▽	°F
▽	°C
▽	%
▽	RPM
▽	m/ ☐
▽	mm H$_2$O
▽	mm HG
▽	l/ ☐
▽	Kg/ ☐
▽	m^3/ ☐
▽	Kg/cm^3
▽	mbar
▽	bar
▽	psi
▽	mm
▽	cm
▽	m
▽	ppm
▽	cos φ
▽	☐
▽	☐
▶	

Terminal blocks

32	31	30	29	28		27	26	25	24	23	22	21		20	19	18	17
N.C.	N.O.	COM				T	RX+	RX-	TX+	TX-	GND			I+	I-	V+	V-

1	2	3	4	5	6		11	12	13	14	15	16
							N.C.	COM	N.O.			

Instrument back view