

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



- 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

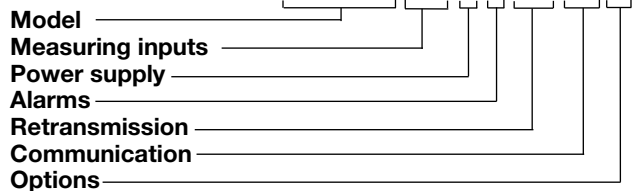
Product Description

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



Type Selection

Measuring inputs	Power supply	Alarms	Retransmission
LSE: signal inputs + AUX: 0.2-2-20mA DC/AC; 0.2-2-20V DC/AC HSX: signal inputs: 0.2-2-5A DC/AC; 20-200-500V DC/AC	H: 90 to 260V AC/DC L: 18 to 60V AC/DC Communication XX: None SX: Serial port RS485	0: None 1: single relay output, (AC1-5AAC, 250VAC) 2: Dual relay output, (AC1-5AAC, 250VAC)	XX: None AV: Single analogue output, 0 to 20mA DC and 0 to 10V DC Options X: None 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. Coupling type Crest factor Direct ≤3; A _{Pmax} =1.7I _n ; V _{Pmax} =1.7U _n
Temperature drift	See table "Measurement accuracy, temperature drifts, min and max indications"	Input impedance See table "input impedances and overloads"
Sampling rate	500 samples/s @ 50Hz	Frequency 40 to 440 Hz
Display refresh time	200 msec @ 50Hz	Overload See table "input impedances and overloads"
Display	4 DGT, 7 segments	

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	DC/AC	DC: ±(0.1%RDG+3DGT)	±150 ppm/°C	- 199.9	+ 200.0
	-2mA to +2mA		0% to 25% FS;		- 1.999	+ 2.000
LSE	-20mA to +20mA	DC/AC	±(0.1%RDG+2DGT)	±150 ppm/°C	- 19.99	+ 20.00
	-200mV to +200mV		25% to 110% FS.		- 199.9	+ 200.0
LSE	-2V to +2V	DC/AC	TRMS (45 to 65Hz)*:	±150 ppm/°C	- 1.999	+ 2.000
	-20V to +20V		±(0.3%RDG+3DGT)		- 199.9	+ 200.0
HSX	-200mA to +200mA	DC/AC	DC: ±(0.1%RDG+3DGT)	±150 ppm/°C	- 199.9	+ 200.0
	-2A to +2A		0% to 25% FS;		- 1.999	+ 2.000
HSX	-5A to +5A	DC/AC	±(0.1%RDG+2DGT)	±150 ppm/°C	- 1.999	+ 5.000
	-20V to +20V		25% to 110% FS.		- 19.99	+ 20.00
HSX	-200V to +200V	DC/AC	TRMS (45 to 65Hz)*:	±150 ppm/°C	- 199.9	+ 200.0
	-500V to +500V		±(0.3%RDG+3DGT)		- 199.9	+ 500.0
HSX	-200V to +200V	DC/AC	0% to 25% FS;	±150 ppm/°C	- 199.9	+ 200.0
	-500V to +500V		±(0.3%RDG+2DGT)		- 199.9	+ 500.0
HSX	-200V to +200V	DC/AC	25% to 110% FS.	±150 ppm/°C	- 199.9	+ 500.0
	-500V to +500V		±(0.3%RDG+2DGT)		- 199.9	+ 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	DC/AC	≤2.2kΩ	5mA	10mA
	-2mA to +2mA	DC/AC	≤22Ω	50mA	150mA
	-20mA to +20mA	DC/AC	≤22Ω	50mA	150mA
	-200mV to +200mV	DC/AC	≥2.2kΩ	10V	20V
	-2V to +2V	DC/AC	≥200kΩ	50V	100V
	-20V to +20V	DC/AC	≥200kΩ	50V	100V
HSX	-200mA to +200mA	DC/AC	≤1Ω	0.8A	1A
	-2A to +2A	DC/AC	≤0.012Ω	7.5A	100A
	-5A to +5A	DC/AC	≤0.012Ω	7.5A	100A
	-20V to +20V	DC/AC	≥2MΩ	750V	1000V
	-200V to +200V	DC/AC	≥2MΩ	750V	1000V
	-500V to +500V	DC/AC	≥2MΩ	750V	1000V

Output specifications

Alarm outputs

Alarm type
Alarm set-point
Hysteresis
On-time delay
Off-time delay
Output status

(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
Adjustable from 0 to 100% of displayed range
0 to 100% of displayed range
0 to 255 s
0 to 255 s
Selectable: normally

Min response time

Output channels

Insulation

energized/de-energized
500 ms, with filter excluded, without alarm on-time delay
Up to 2
Type SPDT
AC 1: 5A, 250VAC
DC 12: 5A, 24VDC
AC 15: 2,5A, 250VAC
DC 13: 2,5A, 24VDC
4000 V_{RMS} output to measuring input,
4000 V_{RMS} output to power supply input.

Output specifications

RS422/RS485 Serial output Connections Distance Terminalization Addresses Protocol Data (bidirectional) Dynamic (reading only) Static (reading/writing) Data format Baud rate Insulation	(on request) Bidirectional (static and dynamic variables). Multidrop, 2 or 4 wires, 1000 m Directly on the module by means of jumper 1 to 255, selectable by means of the front key-pad MODBUS RTU/JBUS Measurement, min value max value alarm status All programming parameters, min max reset reset of latch alarm 8 data bit, no parity, 1 stop bit Selectable 4800, 9600, and 19200 bit/s By means of opto-couplers 4000 V _{rms} output to measuring inputs, 4000 V _{rms} output to power supply input	Analogue output Range Scaling factor Accuracy Response time Temperature drift Load: 20 mA output 10 V output Insulation Notes:	(on request) 0 to 20 mADC, 0 to 10 VDC Programmable within the entire retransmission range; allows to manage the retransmission of all the values from: 0 to 20 mA / 0 to 10V $\pm 0.2\%$ FS (@ 25°C $\pm 5^\circ$ C) ≤ 10 ms ± 200 ppm/°C $\leq 700 \Omega$ ≥ 10 k Ω By means of opto-couplers 4000V _{rms} output to measuring input, 4000V _{rms} output to power supply input The two outputs cannot be used at the same time
		Excitation output Voltage Insulation	LSE input only 13 VDC $\pm 10\%$ max. 50 mA 25V _{rms} output to measuring 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 Decimal point position Displayed range	Programmable within the whole measuring range Programmable within the displayed range Programmable within the displayed range.
Password 1st level 2nd level	Numeric code max 4 dgt 2 levels of data protection. 0 to 4999 fully protected. 5000 to 9999 access to programming is protected . Alarm set-points are directly programmable from the measuring mode.	Diagnostics	The display flashes when the limits of the displayed range are exceeded, the data are updated up to 20% of the rated displayed range.
Measurement selection	Depending on the input: - measuring range - measuring type (TRMS or DC).	Digital filter Filter operating range Filtering coefficient	0 to 9999 1 to 32
Integration time selection	Automatic or from 100.0 to 999.9 ms only in the current and voltage measurement.	Scaling	Selection of min value of the input range. Selection of max value of the input range. Selection of decimal point position. Selection of min displayable value. Selection of max displayable value.
Scaling factor Operating mode	Electrical scale compression, displayed scale compression/expansion (max. 2 without filter, up to 10 with filter)		

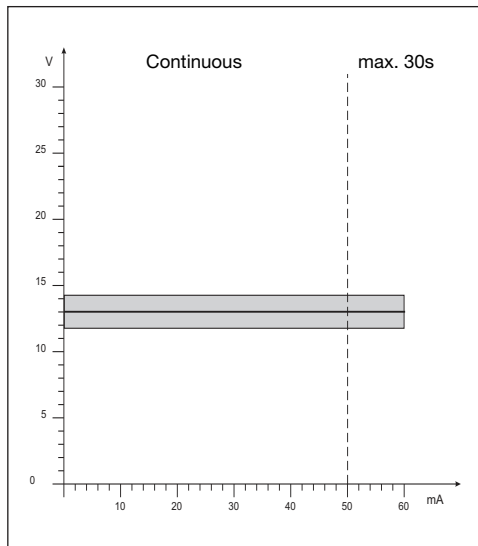
General Specifications

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

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)
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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)

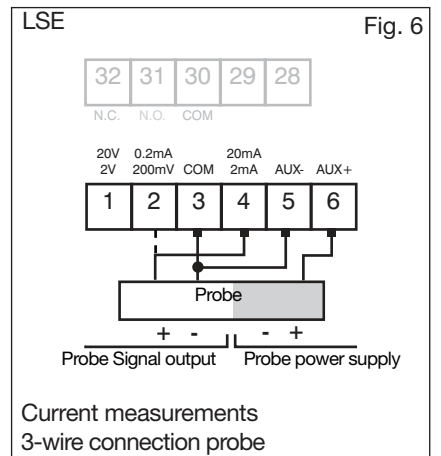
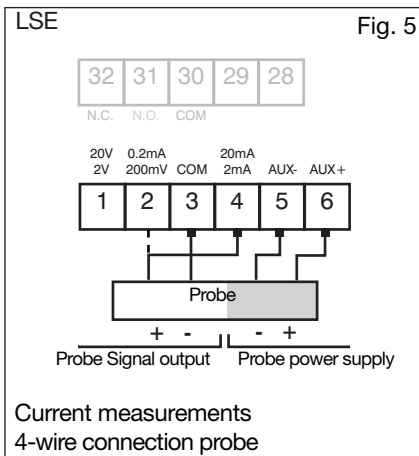
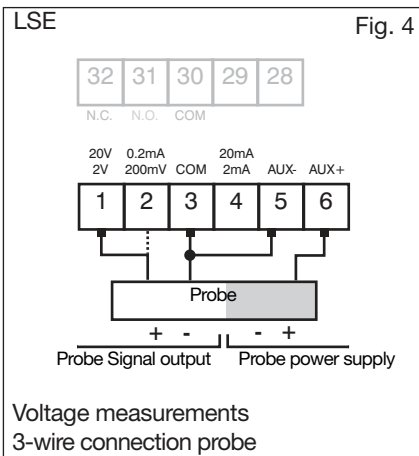
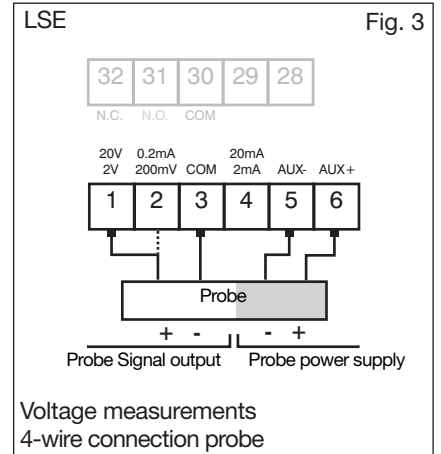
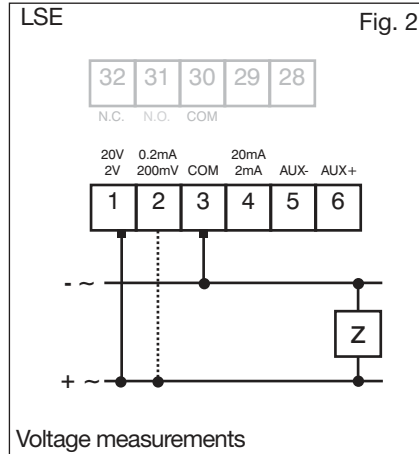
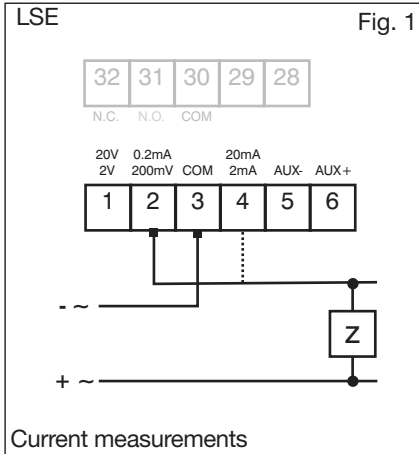
$$V_{1N} = \sqrt{\frac{1}{n} \cdot \sum_{i=1}^n (V_{1N})_i^2}$$

Instantaneous effective current (TRMS)

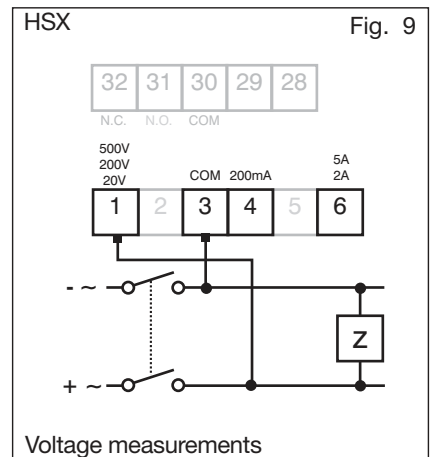
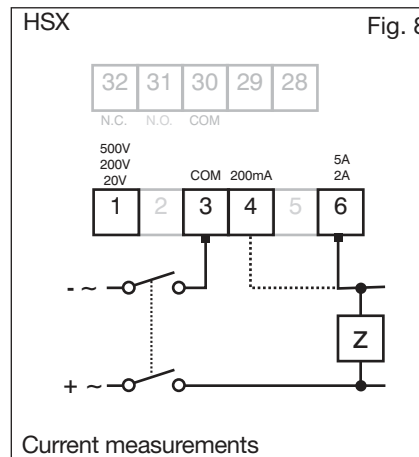
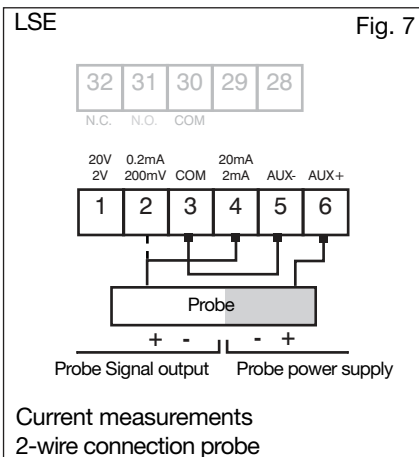
$$A_1 = \sqrt{\frac{1}{n} \cdot \sum_{i=1}^n (A_1)_i^2}$$

Wiring diagrams

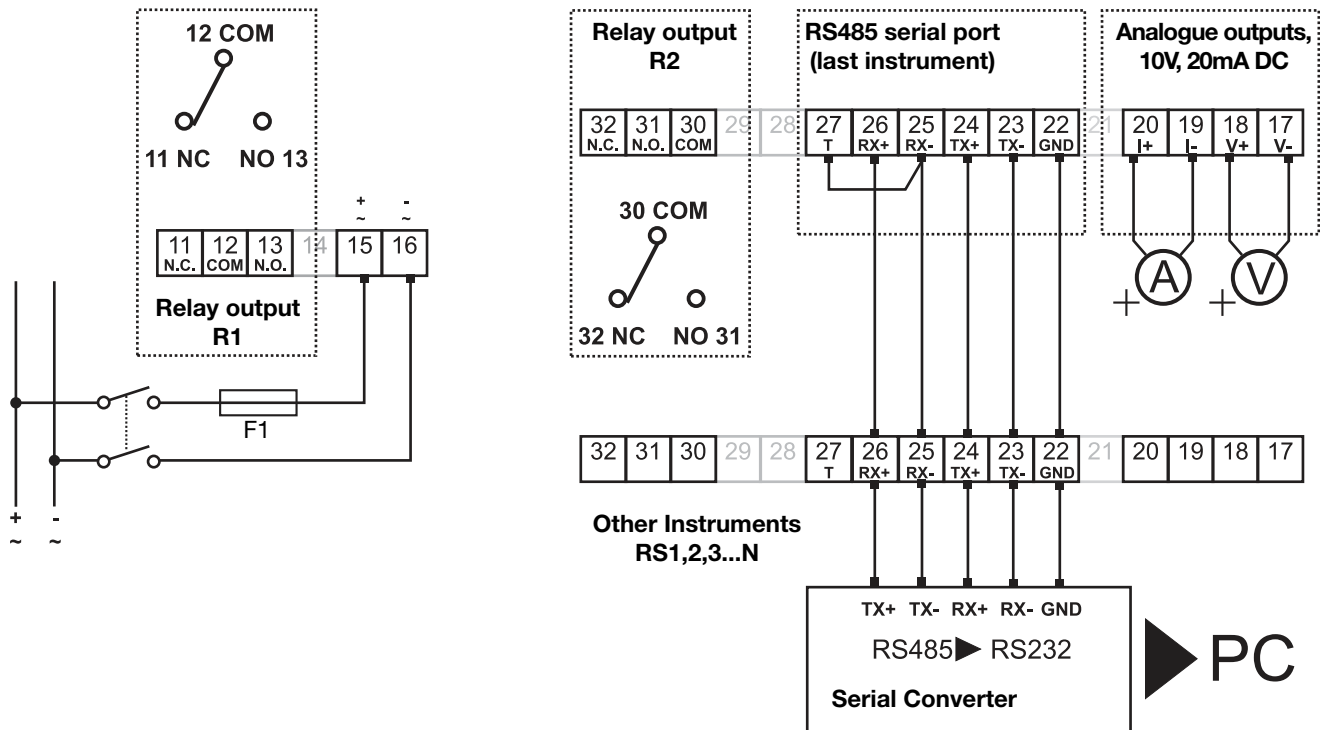
Process signal wiring diagrams



High-level signals wiring diagrams



Power supply and output connections wiring diagrams



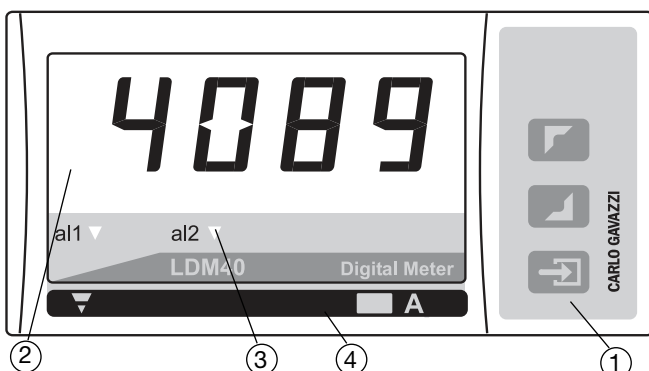
H: power supply 90-260VAC/DC,
F1= 315mA T 250V 5x20mm

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



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

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.

2. Display

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

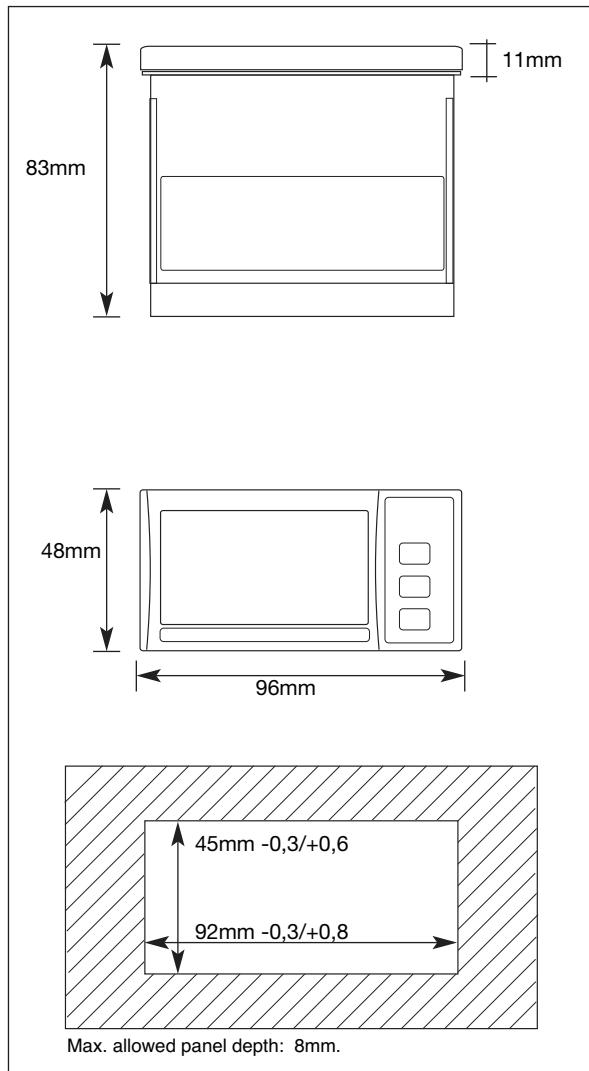
3. Alarm status LED

Display any alarm condition

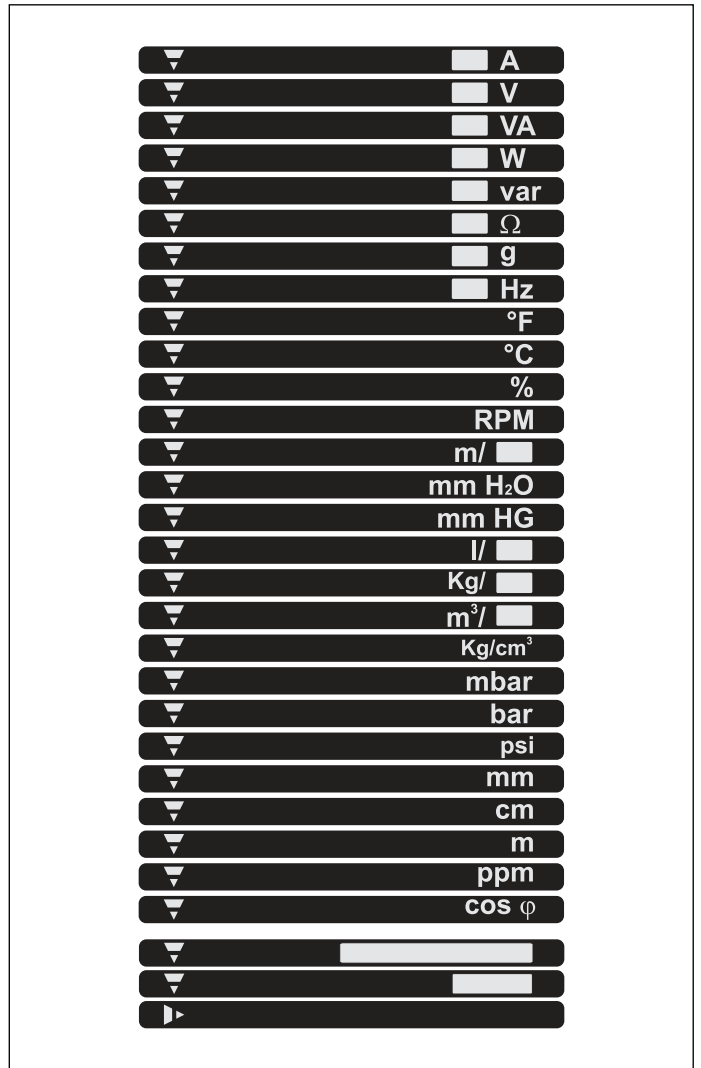
4. Engineering unit

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

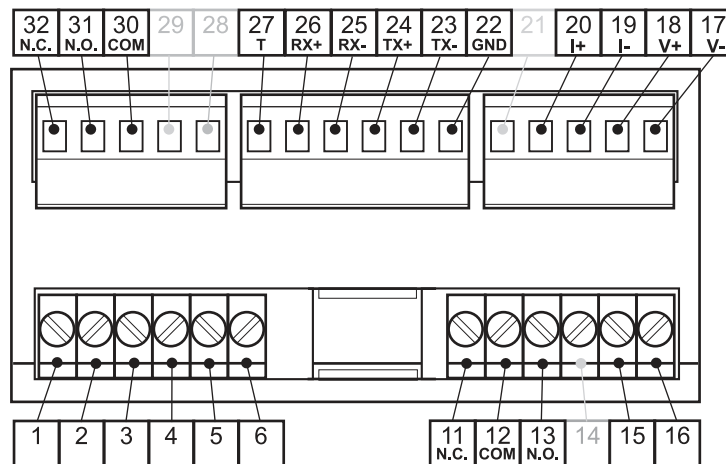
Dimensions



Engineering Units



Terminal blocks



Instrument back view