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

Model
Measuring inputs
Power supply
Alarms
Retransmission
Communication
Options

Type Selection

Measuring inputs

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

Power supply

H: 90 to 260V AC/DC
L: 18 to 60V AC/DC

Communication

XX: None
SX: Serial port RS485

Alarms

0: None
1: single relay output, (AC1-5AAC, 250VAC)
2: Dual relay output, (AC1-5AAC, 250VAC)

Retransmission

XX: None
AV: Single analogue output, 0 to 20mA DC and 0 to 10V DC

Options

X: None
T: Tropicalization

Input Specifications

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

CARLO GAVAZZI

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	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	**(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
Alarm set-point	Adjustable from 0 to 100% of displayed range
Hysteresis	0 to 100% of displayed range
On-time delay	0 to 255 s
Off-time delay	0 to 255 s
Output status	Selectable: normally energized/de-energized
Min response time	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
Insulation	4000 V_{RMS} output to measuring input, 4000 V_{RMS} output to power supply input.

CARLO GAVAZZI

Output specifications

RS422/RS485	**(on request)**
Serial output	Bidirectional (static and dynamic variables).
Connections	Multidrop, 2 or 4 wires,
Distance	1000 m
Terminalization	Directly on the module by means of jumper
Addresses	1 to 255, selectable by means of the front key-pad
Protocol	MODBUS RTU/JBUS
Data (bidirectional)	
Dynamic (reading only)	Measurement, min value max value alarm status
Static (reading/writing)	All programming parameters, min max reset reset of latch alarm
Data format	8 data bit, no parity, 1 stop bit
Baud rate	Selectable 4800, 9600, and 19200 bit/s
Insulation	By means of opto-couplers 4000 V_{rms} output to measuring inputs, 4000 V_{rms} output to power supply input

Analogue output	**(on request)**
Range	0 to 20 mADC, 0 to 10 VDC
Scaling factor	Programmable within the entire retransmission range; allows to manage the retransmission of all the values from: 0 to 20 mA / 0 to 10V
Accuracy	± 0.2% FS (@ 25°C ± 5°C)
Response time	≤ 10 ms
Temperature drift	± 200 ppm/°C
Load: 20 mA output	≤ 700 Ω
10 V output	≥ 10 kΩ
Insulation	By means of opto-couplers 4000V_{rms} output to measuring input, 4000V_{rms} output to power supply input
Notes:	The two outputs cannot be used at the same time
Excitation output	LSE input only
Voltage	13 VDC ±10% max. 50 mA
Insulation	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
Password	Numeric code max 4 dgt 2 levels of data protection.
1st level	0 to 4999 fully protected.
2nd level	5000 to 9999 access to programming is protected . Alarm set-points are directly programmable from the measuring mode.
Measurement selection	Depending on the input: - measuring range - measuring type (TRMS or DC).
Integration time selection	Automatic or from 100.0 to 999.9 ms only in the current and voltage measurement.
Scaling factor	
Operating mode	Electrical scale compression, displayed scale compression/expansion (max. 2 without filter, up to 10 with filter)

Electrical range	Programmable within the whole measuring range
Decimal point position	Programmable within the displayed range
Displayed range	Programmable within the displayed range.
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.
Digital filter	
Filter operating range	0 to 9999
Filtering coefficient	1 to 32
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.

CARLO GAVAZZI

General Specifications

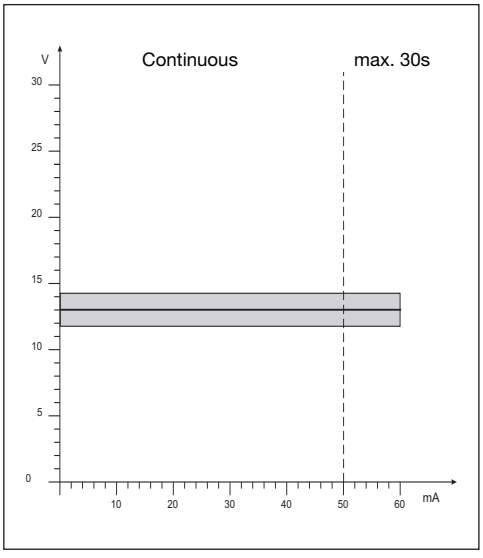
Operating temperature	0° to 50°C (32° to 122°F) (R. H. < 90% non-condensing)
Storage temperature	-10° to 60°C (14° to 140°F) (R.H. < 90% non-condensing)
Insulation reference voltage	300 V_{RMS} to ground (500V input)
Insulation	See table "Insulation between inputs and outputs"
Dielectric strength	4000 V_{RMS} for 1 minute
Rejection NMRR CMRR	 40 dB, 40 to 60 Hz 100 dB, 40 to 60 Hz
EMC	EN61000-6-2, IEC61000-6-2 EN61000-6-3, IEC61000-6-3

Safety Standards Safety	 EN 61010-1, IEC 61010-1
Connections Wire section	Screw type Max 2.5mm²
Housing Dimensions Material	 1/8 DIN, 48 x 96 x 83 mm PC-ABS, self-extinguishing: UL 94 V-0
Protection degree	Front: IP65 Connections: IP20
Weight	340 g approx (packing included)
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)

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)

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

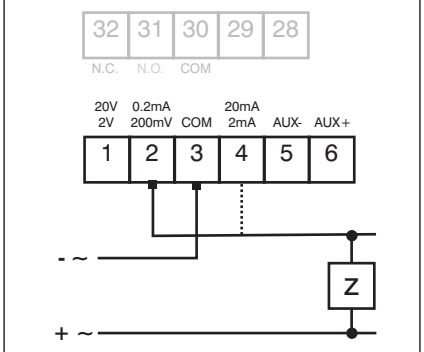
Instantaneous effective current (TRMS)

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

Wiring diagrams

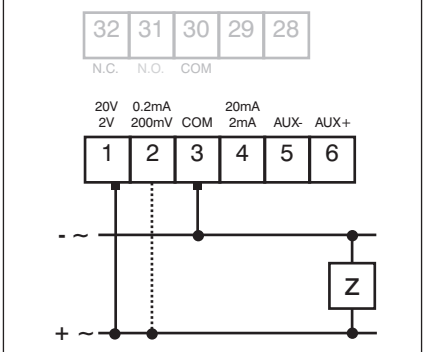
Process signal wiring diagrams

LSE Fig. 1



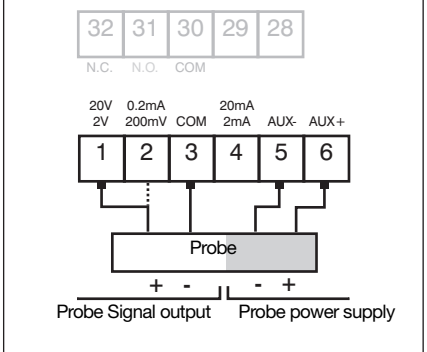
Current measurements

LSE Fig. 2



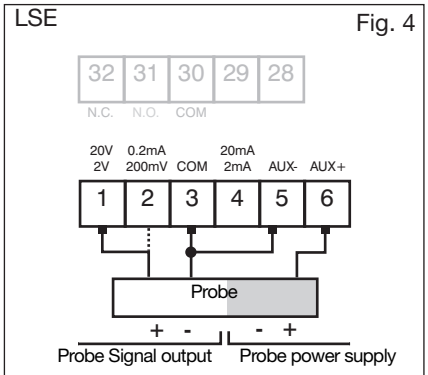
Voltage measurements

LSE Fig. 3



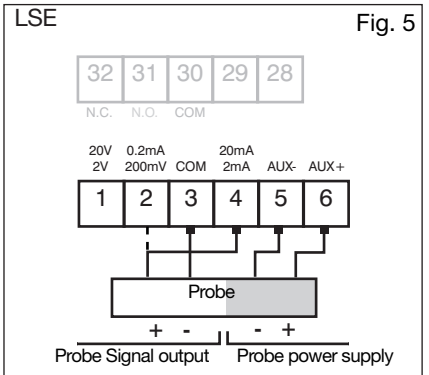
Voltage measurements
4-wire connection probe

LSE Fig. 4



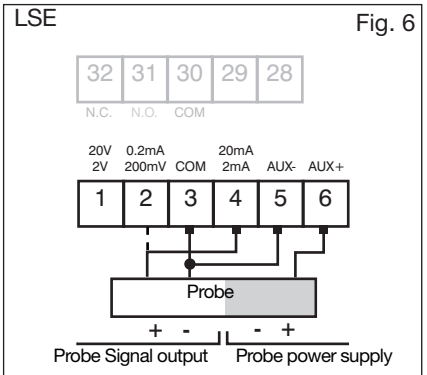
Voltage measurements
3-wire connection probe

LSE Fig. 5



Current measurements
4-wire connection probe

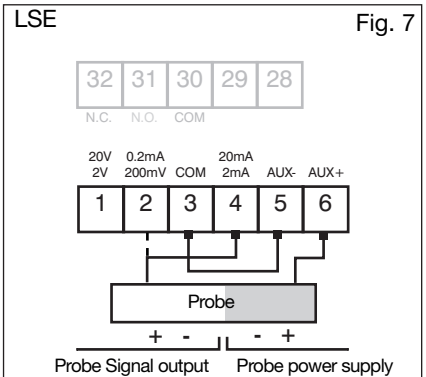
LSE Fig. 6



Current measurements
3-wire connection probe

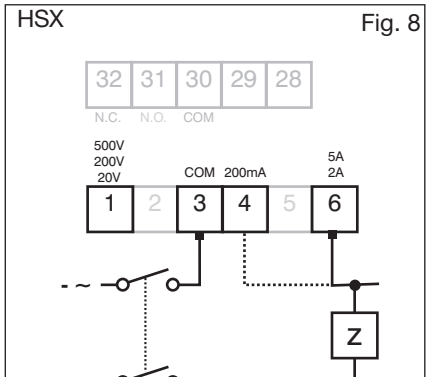
High-level signals wiring diagrams

LSE Fig. 7



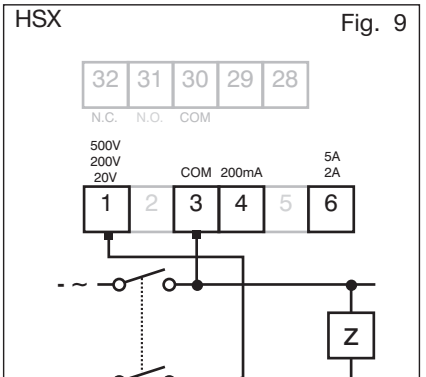
Current measurements
2-wire connection probe

HSX Fig. 8



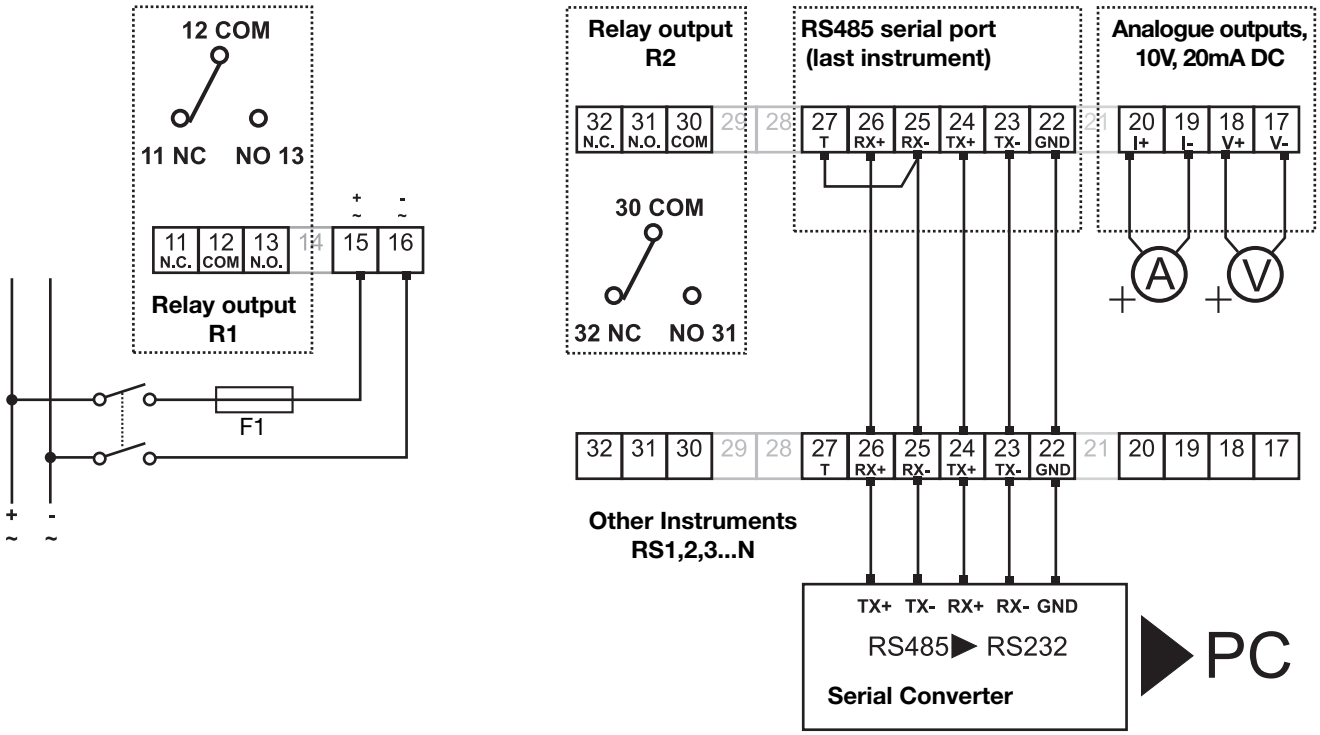
Current measurements

HSX Fig. 9



Voltage measurements

Power supply and output connections wiring diagrams

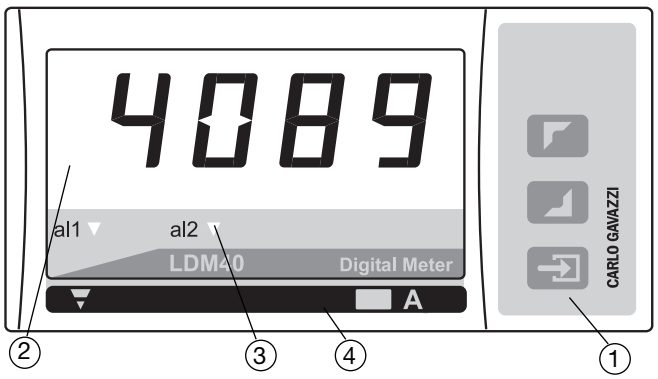


H: power supply 90-260VAC/DC,
F1= 315mA T 250V 5x20mm

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



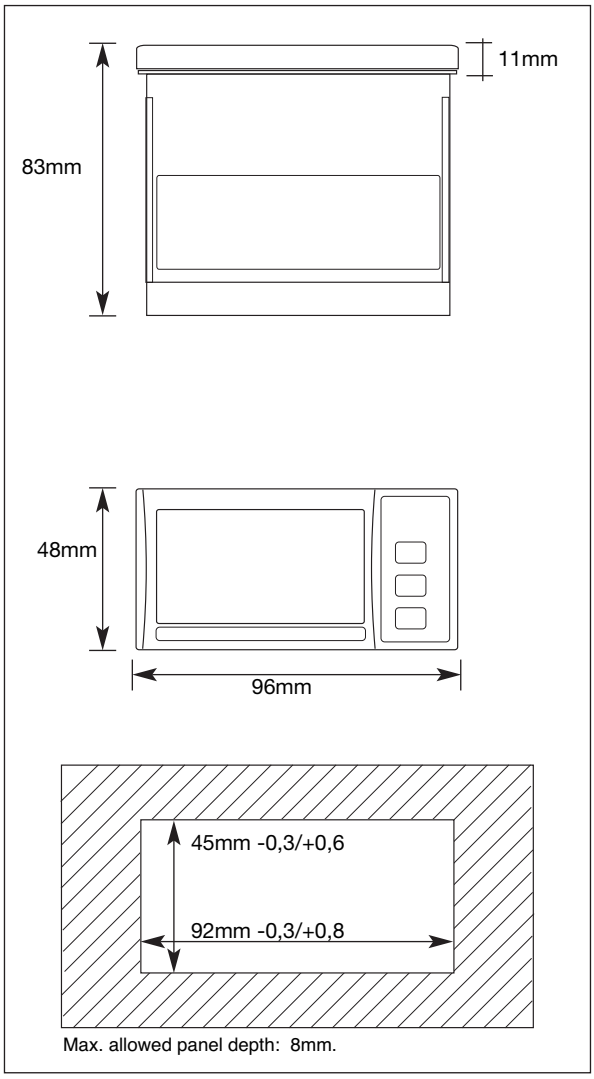
1. **Key-pad**
The programming of the configuration parameters and the display are easily controlled by means of the 3 function keys.
: to enter the programming procedure and to confirm the password.
:
- to program values;
- to select functions;
- to scroll display pages.

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

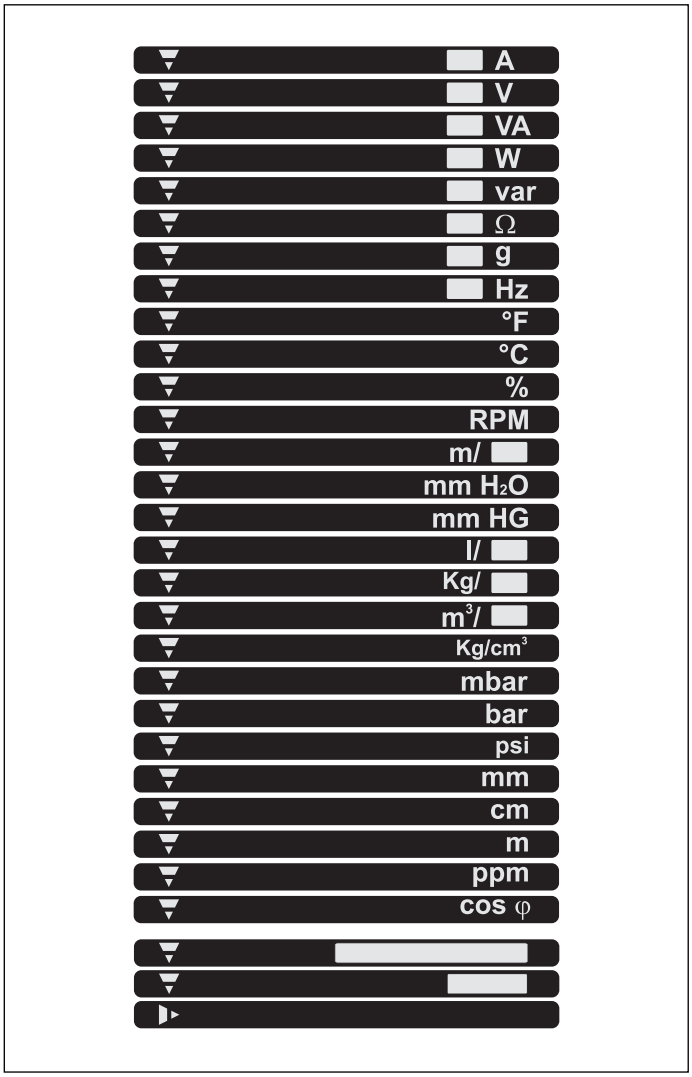
4. **Engineering unit**
The instrument is supplied with a complete set of self-sticking labels with the main engineering units.

Dimensions

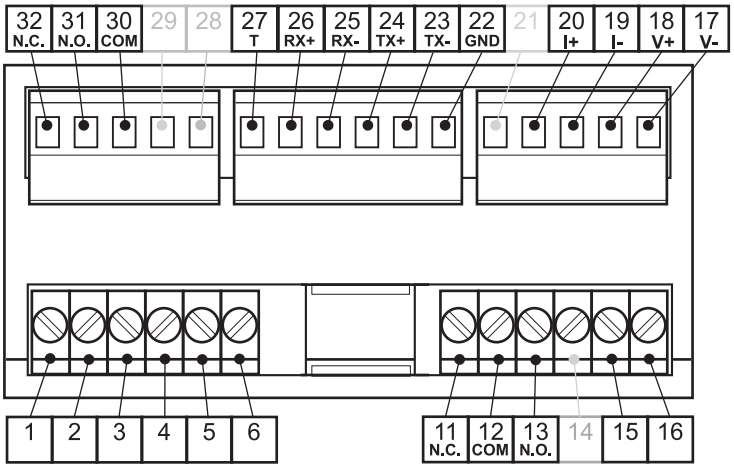


Max. allowed panel depth: 8mm.

Engineering Units



Terminal blocks



Instrument back view