

# Digital Panel Meters DC/AC Current and Voltage Indicator/Controller Type LDM35H



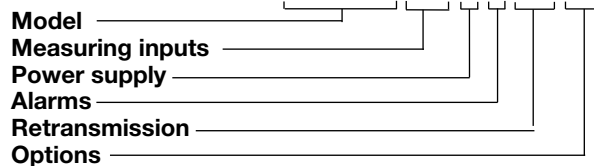
- Multi-input instrument 3 1/2 dgt LED
- 0.1% RDG basic accuracy
- TRMS AC current and voltage measurements
- AC/DC current measurements: selectable full scales (200µA to 5A)
- AC/DC voltage measurements: selectable full scales (200mV to 500V)
- Up to 2 independent alarm set-points (optional)
- Universal power supply: 18-60VAC/DC and 90-260VAC/DC
- Front protection degree: IP65

## Product Description

µP-based digital panel meter, 3 1/2 dgt LED indicator and controller, for current, voltage measurements. Measuring ranges and functions easily programmable from the key-pad. LDM35H includes storage min-max functions and double level protection password. Housing for panel mounting with front protection degree: IP65.

## How to order

**LDM35H LSE H 0 XX XX**



## Type Selection

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

## Input Specifications

<b>Analogue inputs</b> LSE type HSX type	Channels and variables 1, mA and V DC/AC + AUX 1, A and V DC/AC	<b>Temperature drift</b>	See table "Measurement accuracy, temperature drifts, min and max indications"
<b>Accuracy</b>	See table "Measurement accuracy", temperature drifts, minimum and maximum indications"	<b>Sampling rate</b>	500 samples/s @ 50Hz
<b>Additional errors</b> 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	<b>Display refresh time</b>	200 msec @ 50Hz
		<b>Display</b>	3 1/2 DGT, 7 segments height 14.2 mm Colour: red
		<b>Max and min indication</b>	See table "Measurement accuracy, temperature drifts min and max indications"

## Input specifications (cont.)

Measurements	Current, voltage. For the current and voltage measurements: TRMS measurement of distorted sine waves. Direct $\leq 3$ ; $A_{Pmax}=1.7I_n$ ; $V_{Pmax}=1.7U_n$	Input impedance	See table "input impedances and overloads"
Coupling type		Frequency	40 to 440 Hz
Crest factor		Overload	See table "input impedances and overloads"

## Measurement accuracy, temperature drifts, min and max indications

All accuracies and min/max indications are referred to an ambient temperature range of  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , relevant humidity  $\leq 60\%$  and scale ratio (electrical/displayed scale) equal to 1.

Module	Inputs	Type	Accuracy	Temp. drift	Min. indicat. (■)	Max. indicat. (■)
LSE	-200 $\mu\text{A}$ to +200 $\mu\text{A}$ -2mA to +2mA -20mA to +20mA -200mV to +200mV -2V to +2V -20V to +20V	DC/AC	DC: $\pm(0.1\%RDG+3DGT)$ 0% to 25% FS; $\pm(0.1\%RDG+2DGT)$ 25% to 110% FS. TRMS (45 to 65Hz)*: $\pm(0.3\%RDG+3DGT)$ 0% to 25% FS; $\pm(0.3\%RDG+2DGT)$ 25% to 110% FS.	$\pm 150$ ppm/ $^{\circ}\text{C}$	- 199.9 - 1.999 - 19.99 - 199.9 - 1.999 - 19.99	+ 199.9 + 1.999 + 19.99 + 199.9 + 1.999 + 19.99
HSX	-200mA to +200mA -2A to +2A -5A to +5A -20V to +20V -200V to +200V -500V to +500V	DC/AC	DC: $\pm(0.1\%RDG+3DGT)$ 0% to 25% FS; $\pm(0.1\%RDG+2DGT)$ 25% to 110% FS. TRMS (45 to 65Hz)*: $\pm(0.3\%RDG+3DGT)$ 0% to 25% FS; $\pm(0.3\%RDG+2DGT)$ 25% to 110% FS.	$\pm 150$ ppm/ $^{\circ}\text{C}$	- 199.9 - 1.999 - 5.00 - 19.99 - 199.9 - 500	+ 199.9 + 1.999 + 5.00 + 19.99 + 199.9 + 500

## Input impedances and overloads

Module	Inputs	Type	Impedance	Overload (continuous)	Overload (1s)
LSE	-200 $\mu\text{A}$ to +200 $\mu\text{A}$	DC/AC	$\leq 2.2\text{k}\Omega$	5mA	10mA
	-2mA to +2mA	DC/AC	$\leq 22\Omega$	50mA	150mA
	-20mA to +20mA	DC/AC	$\leq 22\Omega$	50mA	150mA
	-200mV to +200mV	DC/AC	$\geq 2.2\text{k}\Omega$	10V	20V
	-2V to +2V	DC/AC	$\geq 200\text{k}\Omega$	50V	100V
	-20V to +20V	DC/AC	$\geq 200\text{k}\Omega$	50V	100V
HSX	-200mA to +200mA	DC/AC	$\leq 1\Omega$	0.8A	1A
	-2A to +2A	DC/AC	$\leq 0.012\Omega$	7.5A	100A
	-5A to +5A	DC/AC	$\leq 0.012\Omega$	7.5A	100A
	-20V to +20V	DC/AC	$\geq 2\text{M}\Omega$	750V	1000V
	-200V to +200V	DC/AC	$\geq 2\text{M}\Omega$	750V	1000V
	-500V to +500V	DC/AC	$\geq 2\text{M}\Omega$	750V	1000V

\*  $<45\text{Hz} > 65\text{Hz} = \pm(0.5\%RDG+3DGT)$  0% to 25% FS;  $\pm(0.5\%RDG+2DGT)$  25% to 110% FS.

(■) The min. indication for TRMS measurement (AC or DC) is 0; it is possible to modify the decimal point position.

## Output specifications

<b>Alarm outputs</b>	<b>(on request)</b> Active alarm for out-of-range, up alarm, down alarm, down alarm with start-up deactivation, up alarm with latch, down alarm with latch	Insulation	AC 1: 5A, 250VAC DC 12: 5A, 24VDC AC 15: 2,5A, 250VAC DC 13: 2,5A, 24VDC 4000 V <sub>RMS</sub> output to measuring input, 4000 V <sub>RMS</sub> output to power supply input.
Alarm type			
Alarm set-point	Adjustable from 0 to 100% of displayed range	<b>Excitation output</b>	LSE input
Hysteresis	0 to 100% of displayed range	Voltage	13 VDC ±10% max. 50 mA
On-time delay	0 to 255 s	Insulation	25V <sub>rms</sub> output to measuring input, 4000 V <sub>rms</sub> output to power supply input
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		

## Software functions

<b>Min / Max storage</b>	Automatic storage (in the EEPROM) of the minimum and maximum measured value from the previous memory reset	Decimal point position	Programmable within the displayed range
<b>Password</b>	Numeric code max 4 dgt 2 levels of data protection. 0 to 4999 completely protected. 5000 to 9999 access to programming is protected . Alarm set-points are directly programmable from the measuring mode.	Displayed range	Programmable within the displayed range.
		<b>Diagnostics</b>	The display flashes when the limits of the displayed range are exceeded, the data are updated up to 20% of the rated displayed range.
<b>Measurement selection</b>	Depending on the input: - measuring range - measuring type (TRMS or DC).	<b>Digital filter</b>	
<b>Integration time selection</b>	Automatic or from 100.0 to 999.9 ms only in the current and voltage measurement.	Filter operating range	0 to 1999
		Filtering coefficient	1 to 32
<b>Scaling factor</b>	Electrical scale compression, displayed scale compression/expansion (max. 2 without filter, up to 10 with filter) Programmable within the whole measuring range	<b>Display selection</b>	3 1/2 DGT or 3 DGT plus dummy zero.
		<b>Scaling</b>	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.
Operating mode			
Electrical range			

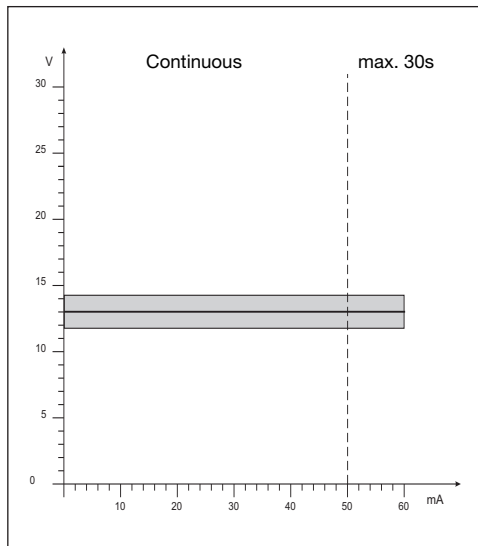
## General Specifications

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

## Supply Specifications

<b>AC/DC voltage</b>	90 to 260V (standard) 18 to 60V (on request)	<b>Energy consumption</b>	≤ 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. inputs	Relay output	AUX p. supply	90-260VAC/ DC p.supply	18-60VAC/ DC p.supply
Meas. inputs	-	4kV	25V	4kV	4kV
Relay output	4kV	-	4kV	4kV	4kV
AUX p. supply	25V	4kV	-	4kV	4kV
90-260VAC/ DC p.supply	4kV	4kV	4kV	-	-
18-60VAC/ DC p.supply	4kV	4kV	4kV	-	-

## Used calculation formulas

Only for TRMS Measurements

Instantaneous effective voltage (TRMS)

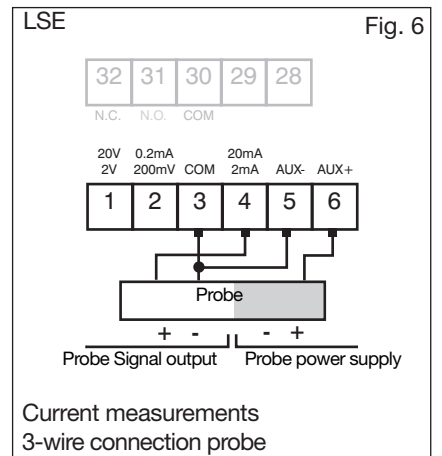
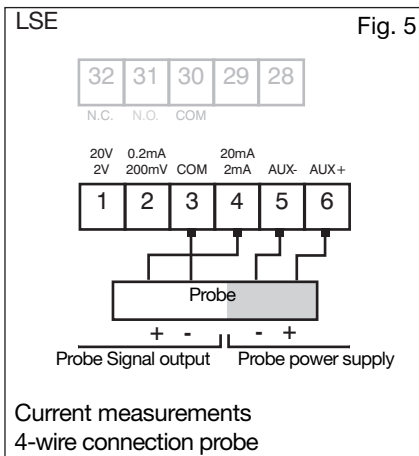
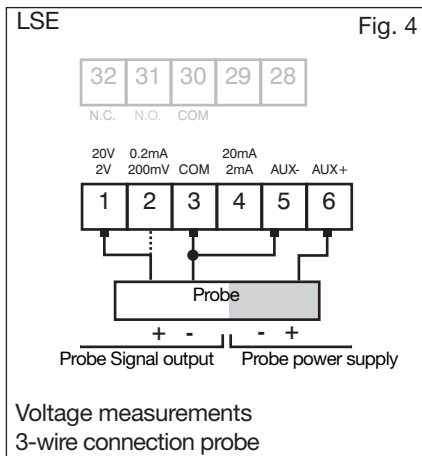
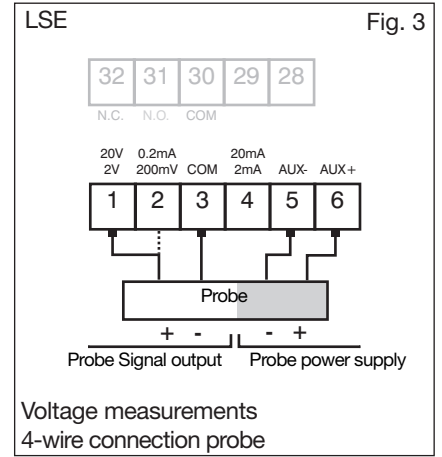
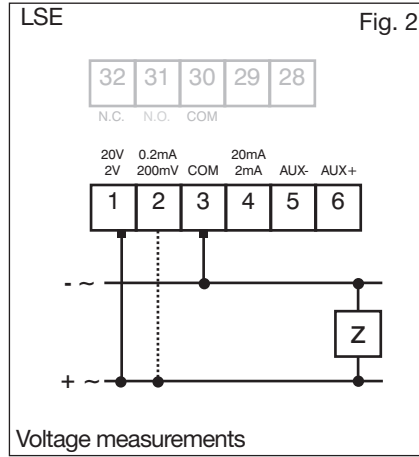
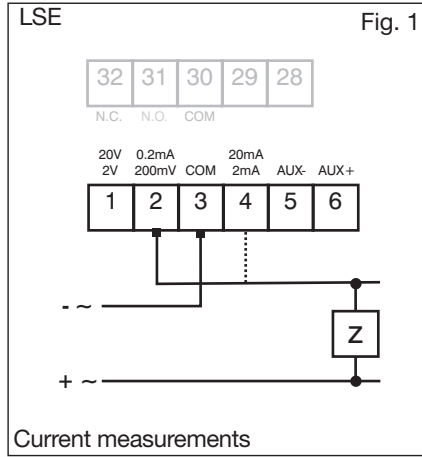
$$V_1 = \sqrt{\frac{1}{n} \cdot \sum_1^n (V_1)_i^2}$$

Instantaneous effective current (TRMS)

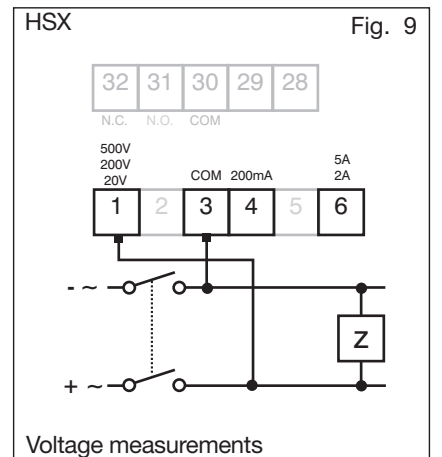
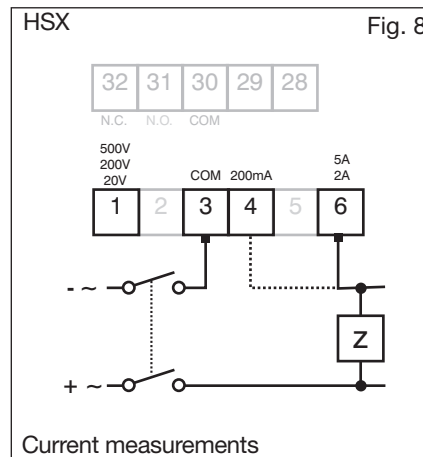
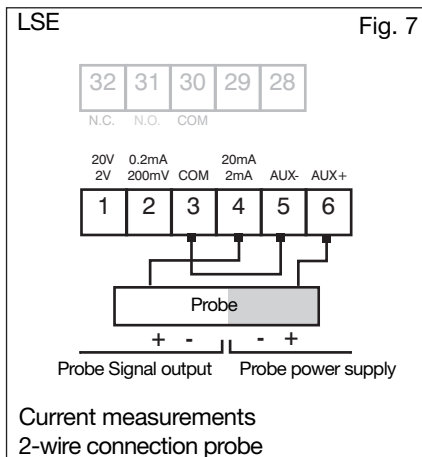
$$A_1 = \sqrt{\frac{1}{n} \cdot \sum_1^n (A_1)_i^2}$$

# Wiring diagrams

## Process signal wiring diagrams



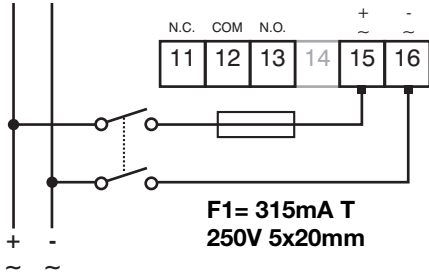
## High-level signals wiring diagrams



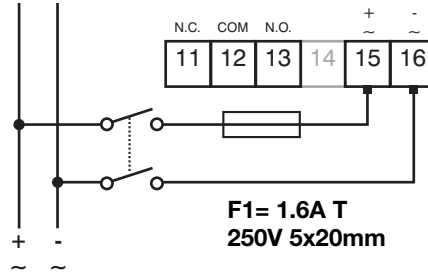
## Wiring diagrams (cont.)

### Power supply wiring diagrams

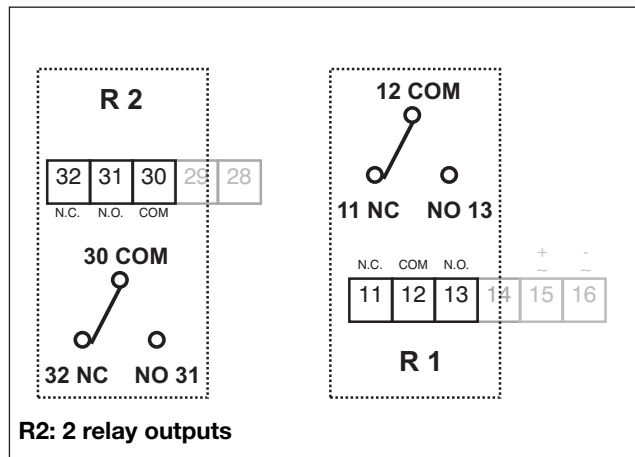
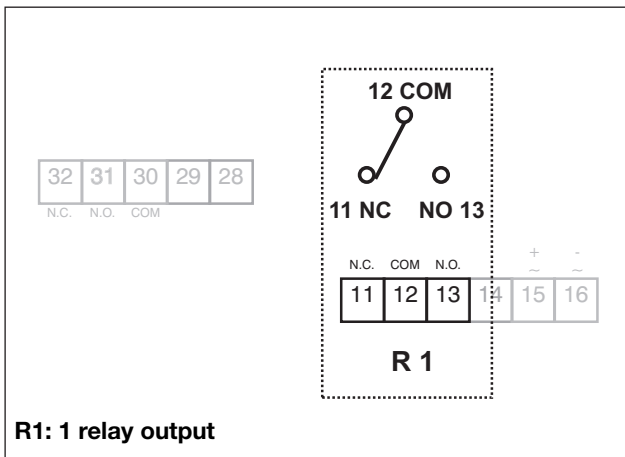
H: power supply 90-260VAC/DC



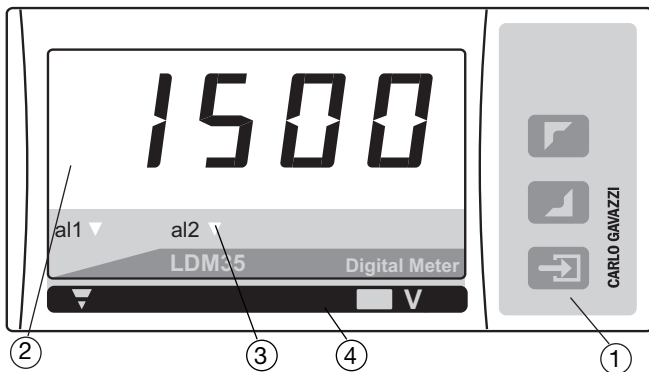
L: power supply 18-60VAC/DC



## Wiring diagrams of outputs



## 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:
- 3 1/2 digit (max display 1999).
- Alphanumeric indications by means of LED display for:
- Display of configuration parameters;
  - The measured variable.

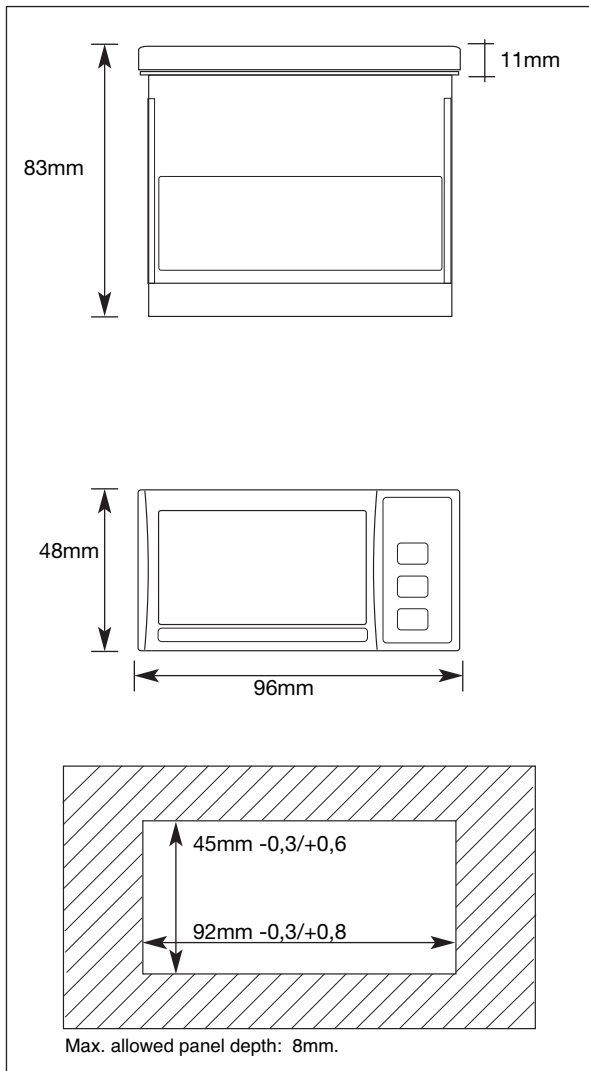
### 3. Alarm status LED

Display any alarm condition

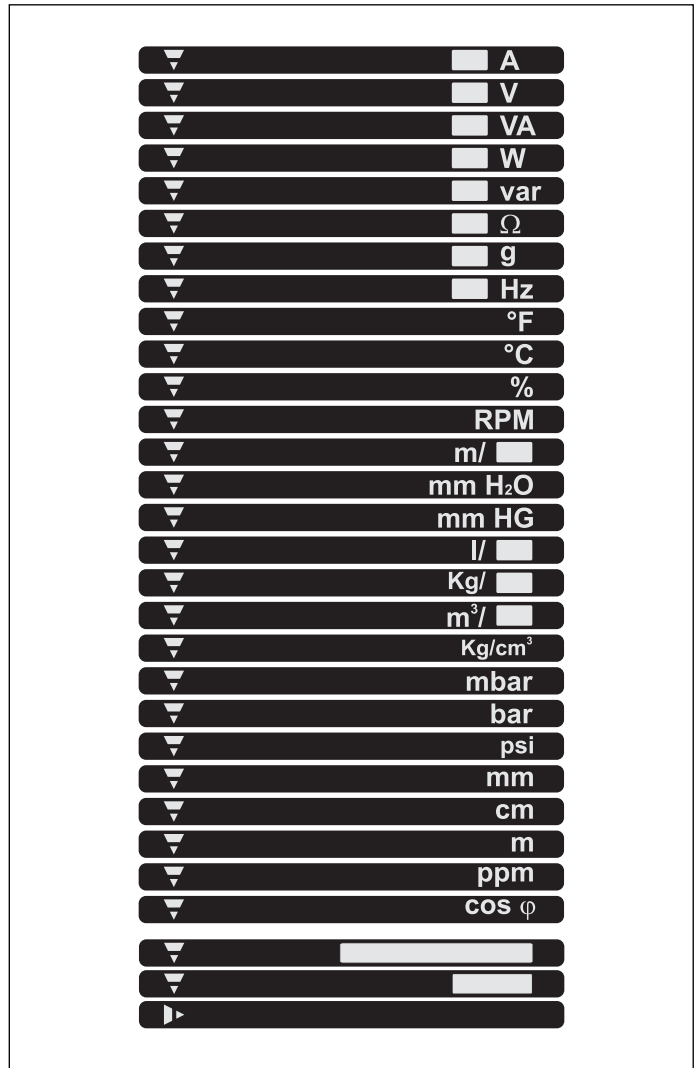
### 4. Engineering unit

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

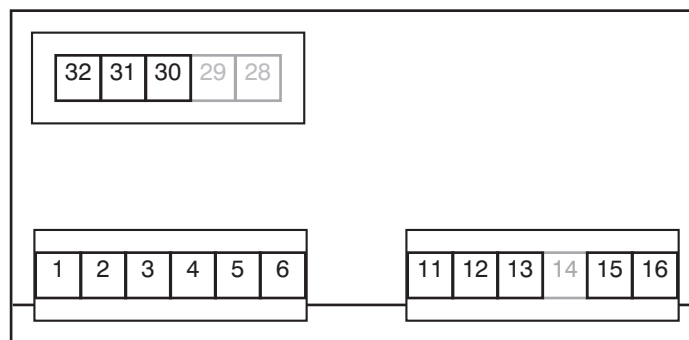
### Dimensions



### Engineering Units



### Terminal blocks



Instrument back view