

# Digital Panel Meters

## DC/AC Current and Voltage Indicator/Controller

### Type LDM35H

CARLO GAVAZZI



- 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**

Model \_\_\_\_\_  
 Measuring inputs \_\_\_\_\_  
 Power supply \_\_\_\_\_  
 Alarms \_\_\_\_\_  
 Retransmission \_\_\_\_\_  
 Options \_\_\_\_\_

## 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.)

<b>Measurements</b>	Current, voltage. For the current and voltage measurements: TRMS measurement of distorted sine waves. Direct $\leq 3$ ; $A_{Pmax}=1.7I_n$ ; $V_{Pmax}=1.7U_n$	<b>Input impedance</b>	See table "input impedances and overloads"
Coupling type		<b>Frequency</b>	40 to 440 Hz
Crest factor		<b>Overload</b>	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: $\pm(0.1\%\text{RDG}+3\text{DGT})$ 0% to 25% FS; $\pm(0.1\%\text{RDG}+2\text{DGT})$ 25% to 110% FS. TRMS (45 to 65Hz)*: $\pm(0.3\%\text{RDG}+3\text{DGT})$ 0% to 25% FS; $\pm(0.3\%\text{RDG}+2\text{DGT})$ 25% to 110% FS.	$\pm 150 \text{ ppm}/^{\circ}\text{C}$	- 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: $\pm(0.1\%\text{RDG}+3\text{DGT})$ 0% to 25% FS; $\pm(0.1\%\text{RDG}+2\text{DGT})$ 25% to 110% FS. TRMS (45 to 65Hz)*: $\pm(0.3\%\text{RDG}+3\text{DGT})$ 0% to 25% FS; $\pm(0.3\%\text{RDG}+2\text{DGT})$ 25% to 110% FS.	$\pm 150 \text{ ppm}/^{\circ}\text{C}$	- 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 $\mu\text{A}$ -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	$\leq 2.2\text{k}\Omega$ $\leq 22\Omega$ $\leq 22\Omega$ $\geq 2.2\text{k}\Omega$ $\geq 200\text{k}\Omega$ $\geq 200\text{k}\Omega$	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	$\leq 1\Omega$ $\leq 0.012\Omega$ $\leq 0.012\Omega$ $\geq 2\text{M}\Omega$ $\geq 2\text{M}\Omega$ $\geq 2\text{M}\Omega$	0.8A 7.5A 7.5A 750V 750V 750V	1A 100A 100A 1000V 1000V 1000V

\*  $<45\text{Hz} > 65\text{Hz} = \pm(0.5\%\text{RDG}+3\text{DGT})$  0% to 25% FS;  $\pm(0.5\%\text{RDG}+2\text{DGT})$  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>		
Alarm type	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 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 $\pm 10\%$ max. 50 mA
On-time delay	0 to 255 s	Insulation	25V <sub>max</sub> output to measuring input, 4000 V <sub>max</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.	Displayed range	Programmable within the displayed range.
1st level	0 to 4999 completely protected.	<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.
2nd level	5000 to 9999 access to programming is protected . Alarm set-points are directly programmable from the measuring mode.	<b>Digital filter</b>	
<b>Measurement selection</b>	Depending on the input: - measuring range - measuring type (TRMS or DC).	Filter operating range	0 to 1999
<b>Integration time selection</b>	Automatic or from 100.0 to 999.9 ms only in the current and voltage measurement.	Filtering coefficient	1 to 32
<b>Scaling factor</b>		<b>Display selection</b>	3 1/2 DGT or 3 DGT plus dummy zero.
Operating mode	Electrical scale compression, displayed scale compression/expansion (max. 2 without filter, up to 10 with filter)	<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.
Electrical range	Programmable within the whole measuring range		



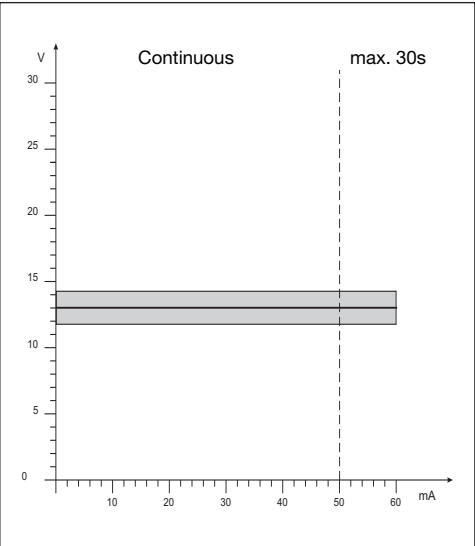
General Specifications

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 <sup>2</sup>
Insulation reference voltage	300 V <sub>RMS</sub> to ground (500V input)	Housing	Dimensions	1/8 DIN, 48 x 96 x 83 mm
Insulation	See table “Insulation between inputs and outputs”		Material	PC-ABS, self-extinguishing: UL 94 V-0
Dielectric strength	4000 V <sub>RMS</sub> for 1 minute	Protection degree		Front: IP65 Connections: IP20
Rejection		Weight		340 g approx (packing included)
NMRR	40 dB, 40 to 60 Hz	Approvals		CE, UL e CSA in progress
CMRR	100 dB, 40 to 60 Hz			
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)
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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

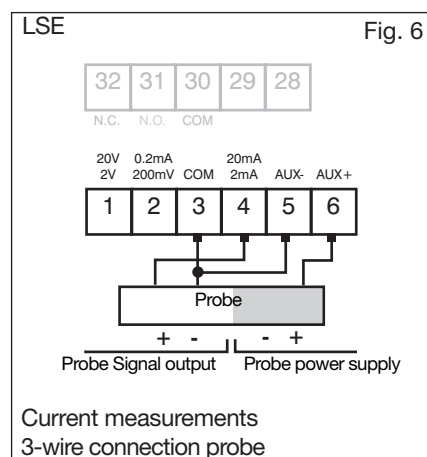
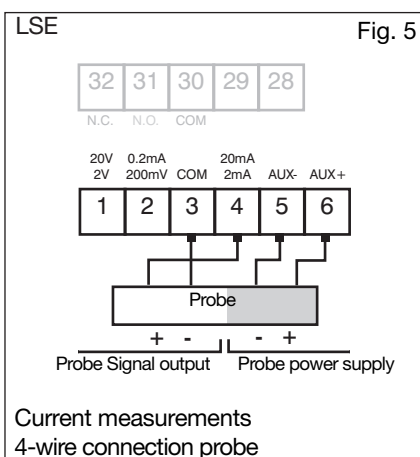
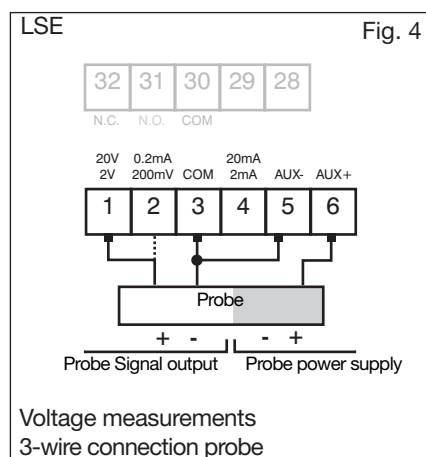
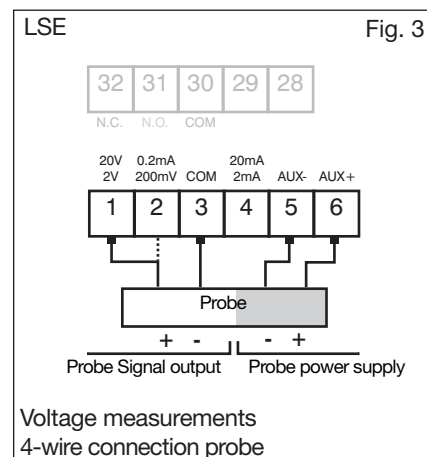
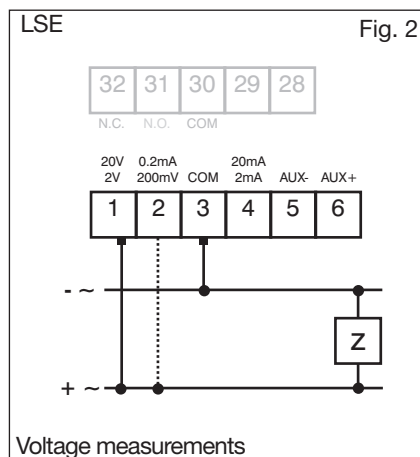
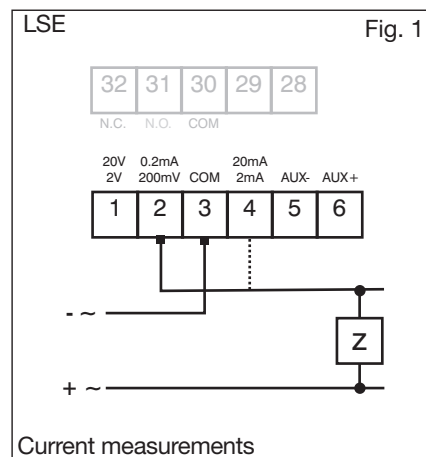
Only for TRMS Measurements

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

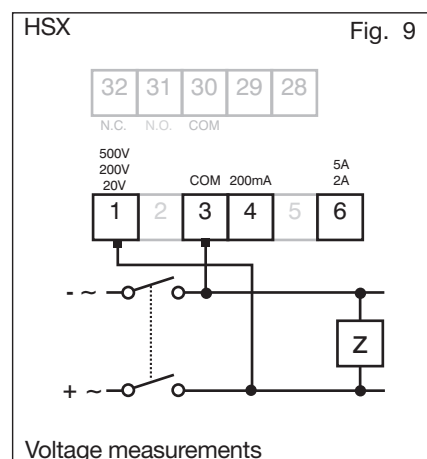
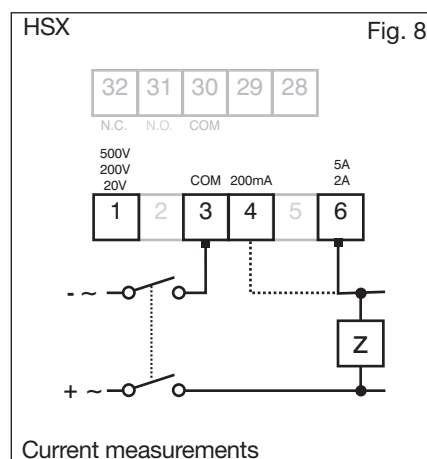
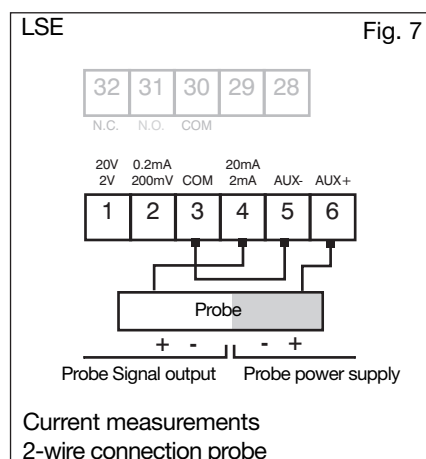
Instantaneous effective current (TRMS)
$$A_1 = \sqrt{\frac{1}{n} \cdot \sum_1^n (A_1)_i^2}$$

## Wiring diagrams

### Process signal wiring diagrams



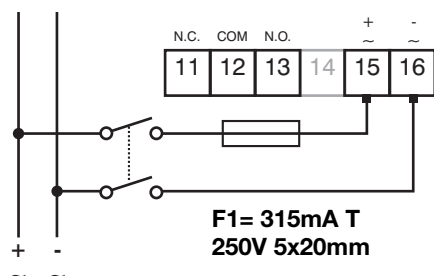
### High-level signals wiring diagrams



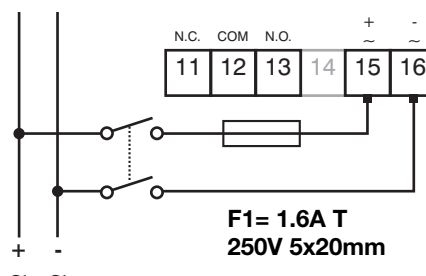
## Wiring diagrams (cont.)

### Power supply wiring diagrams

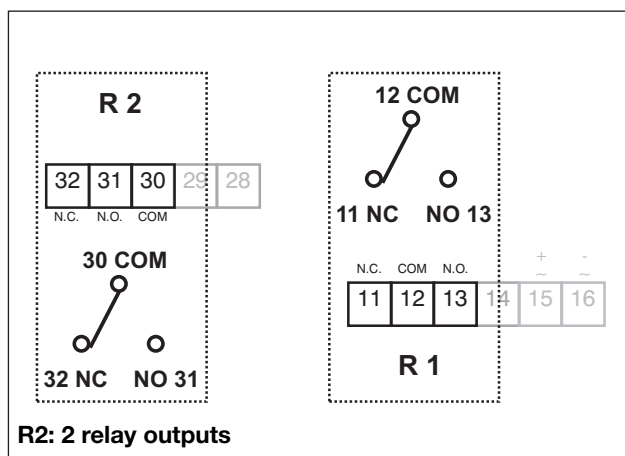
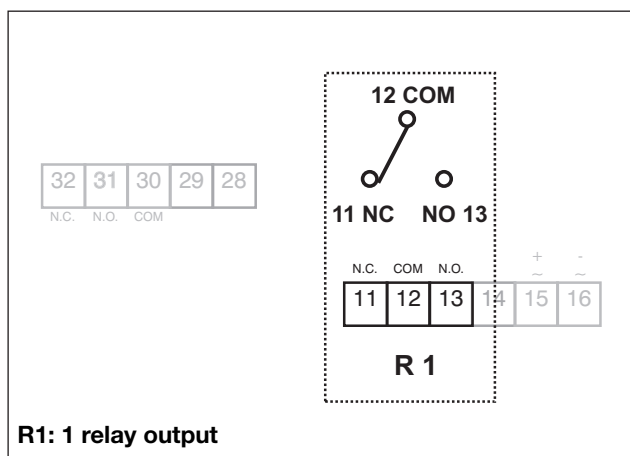
**H:** power supply 90-260VAC/DC



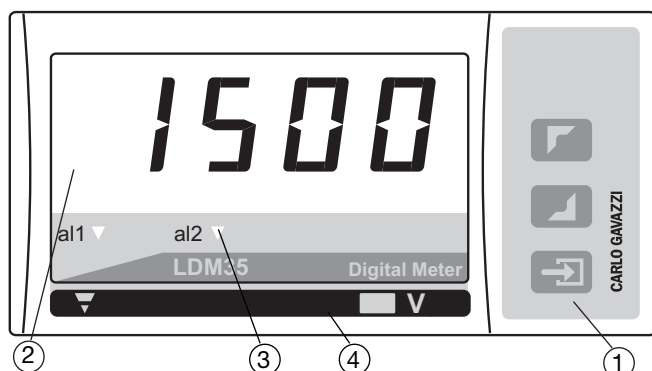
**L:** power supply 18-60VAC/DC



## 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.

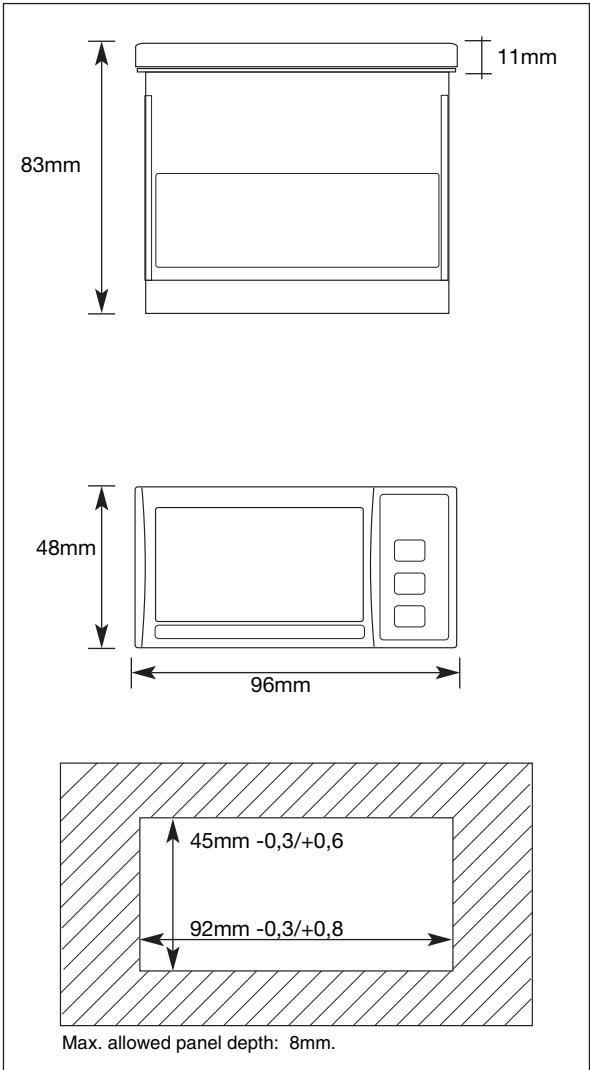
### 3. Alarm status LED

Display any alarm condition

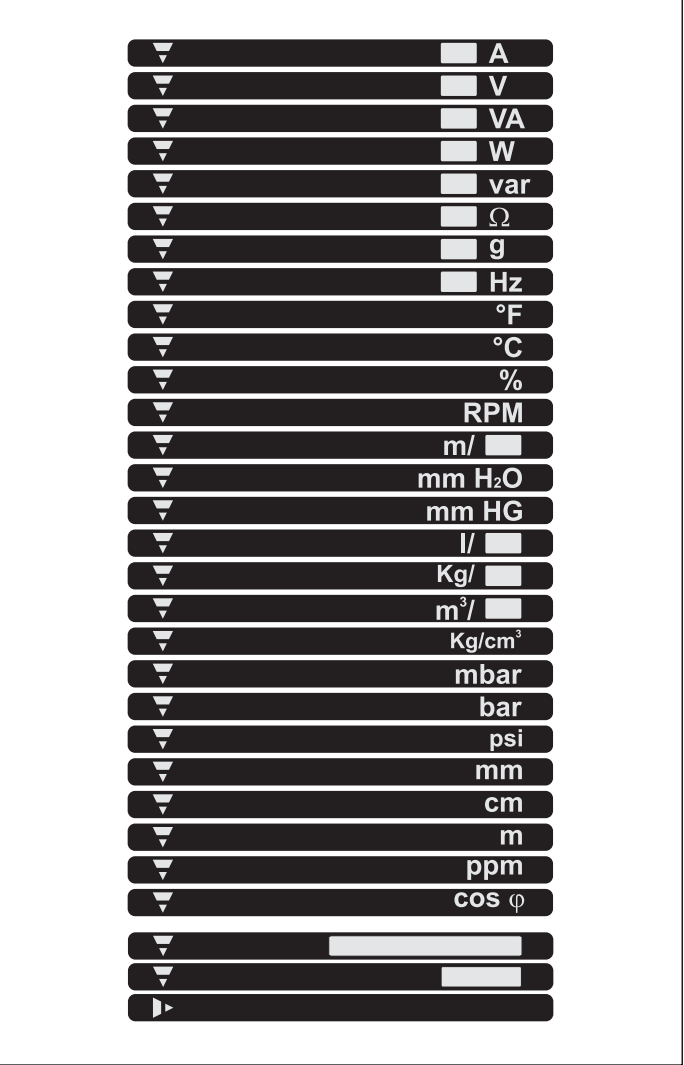
### 4. Engineering unit

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

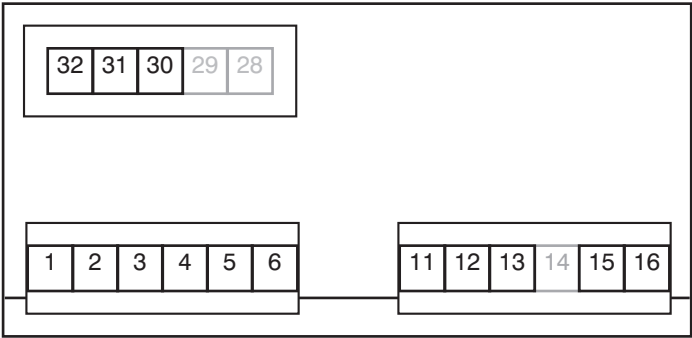
Dimensions



Engineering Units



Terminal blocks



Instrument back view