

# LDM

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# Digital Panel Meters AC Ammeters and Voltmeters Type LDM30 AV1/AV5

CARLO GAVAZZI



- 3 dgt LED + dummy zero,  $\mu$ -based digital indicator, for TRMS AC current and voltage measurements
- Dip-switch-selectable ranges
- Front dimensions: 48 x 96 mm
- Front protection degree: IP 50 (IP 65 on request)

## Product Description

3-dgt plus dummy zero  $\mu$ P-based indicator, double input for AC current or voltage measurements. 112 selectable primary ranges. Housing for panel mounting and IP 50 front protection degree (IP65 on request).

## How to order

**LDM30 AV5D0 XX**

Model \_\_\_\_\_  
 Range code \_\_\_\_\_  
 Power Supply \_\_\_\_\_  
 Set points \_\_\_\_\_  
 Options \_\_\_\_\_

## Type Selection

Range code	Power supply	Options
<b>AV1:</b> 1A / 100V AC See Range table	<b>B:</b> 24/48 VAC, -15% +10%, 50/60 Hz	<b>XX:</b> None
<b>AV5:</b> 5A / 500V AC See Range table	<b>D:</b> 115/230 VAC, -15% +10%, 50/60 Hz	<b>IX:</b> IP65 protection degree <b>XT:</b> Tropicalization

## Specifications

<b>Rated input</b> <b>AV5</b>	5A ( $I_n$ ) / 500V AC ( $U_n$ ), 45 to 400 Hz, TRMS	<b>Input range selection</b>	DIP-Switch selectable
<b>AV1</b>	1A ( $I_n$ ) / 100V AC ( $U_n$ ), 45 to 400Hz, TRMS	<b>Decimal point position</b>	DIP-Switch selectable
<b>Overload protection</b>		<b>Operating temperature</b>	0° to 50°C (32° to 122°F) (R.H. < 90% non-condensing)
Continuous: Current: 1.2 x $I_n$ Voltage: 1.2 x $U_n$		<b>Storage temperature</b>	-10° to 60°C (14° to 140°F) (R.H. < 90% non-condensing)
For 1 s: Current: 5 x $I_n$ Voltage: 2 x $U_n$		<b>Insulation reference voltage</b>	300 V <sub>RMS</sub> to ground
<b>Accuracy</b> (@ 25°C ± 5°C, R.H. ≤ 60%)	± 0.5% F.S., ± 1 DGT (from 5% to 120% F.S.). ± 1% F.S., ± 1 DGT (from 0% to 5% F.S.)	<b>Dielectric strength</b>	4000 V <sub>RMS</sub> for 1 minute
<b>Temperature drift</b>	± 200 ppm/°C	<b>Noise rejection</b> CMRR	100 dB, from 40 to 60 Hz
<b>Input impedance</b>		<b>EMC</b>	IEC 60801-2, IEC 60801-3, IEC 60801-4 (level 2), EN 50 081-1, EN 50 082-1
AV1	1A: voltage drop 1V 100V: ≥ 1MΩ	<b>Safety standards</b>	EN 61010-1, IEC 61010-1
AV5	5A: voltage drop 250mV 500V: ≥ 1MΩ	<b>Connections</b>	Screw-type
<b>Display</b>	7-segment red LED, h 14.2 mm, 4 digits	<b>Housing</b> Dimensions Material	1/8 DIN, 48 x 96 x 83 mm ABS, self-extinguishing: UL 94 V-0
<b>Measurement refresh time</b>	2 measurements/sec @50Hz	<b>Degree of protection</b>	Front: IP 50 (IP 65 on request); Connections: IP20
<b>Display</b> Max./Min. Over range	9990/0000 EEEE Indication >120% $I_n/U_n$ or up to the maximum indication (9990)	<b>Weight</b>	250 g approx.
		<b>Approvals</b>	CE, cURus, CSA



## Power Supply Specifications

AC power supply

24/48 VAC, 115/230 VAC,  
-15% +10%,50/60 Hz

Power consumption

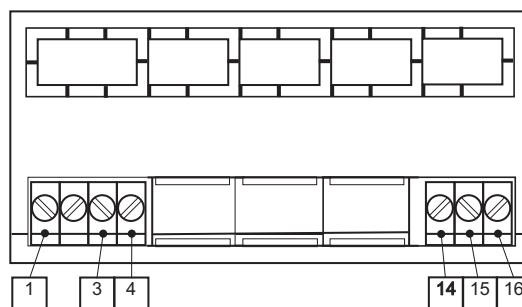
3.2 VA

## Range Table

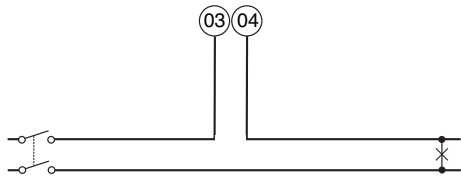
				A (Current)								V (Voltage)							
AV1: In=1A; Un=100V (110V) AV5: In=5A; Un=500V (600V)				In: 1A, 5A AC								Vn: 100V, 500V AC							
				ON				DIP											
				1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Decimal point selection or dummy zero				7	8	7	8	7	8	7	8	7	8	7	8	7	8	7	8
				ON	ON	OFF	ON	ON	OFF	OFF	OFF	ON	ON	OFF	ON	ON	OFF	OFF	OFF
				"X.XX"	"XX.X"	"XXX"	"XXX0"	"X.XX"	"XX.X"	"XXX"	"XXX0"	"X.XX"	"XX.X"	"XXX"	"XXX0"	"X.XX"	"XX.X"	"XXX"	"XXX0"
6																ON (110V F.S.) ON (110V F.S.)			
				OFF				OFF				OFF				OFF (100V F.S.) OFF (100V F.S.)			
2	3	4	5																
OFF	OFF	OFF	OFF	1.20A	12.0A	120A	1200A	-	-	-	-	11.0V	110V	1100V	1100V	1100V	1100V	1100V	
ON	OFF	OFF	OFF	1.25A	12.5A	125A	1250A	-	-	-	-	11.5V	115V	1150V	1150V	1150V	1150V	1150V	
OFF	ON	OFF	OFF	1.50A	15.0A	150A	1500A	-	-	-	-	22.0V	220V	2200V	2200V	2200V	2200V	2200V	
ON	ON	OFF	OFF	1.60A	16.0A	160A	1600A	-	-	-	-	23.0V	230V	2300V	2300V	2300V	2300V	2300V	
OFF	OFF	ON	OFF	1.75A	17.5A	175A	1750A	-	-	-	-	24.0V	240V	2400V	2400V	2400V	2400V	2400V	
ON	OFF	ON	OFF	2.00A	20.0A	200A	2000A	-	-	-	-	38.0V	380V	3800V	3800V	3800V	3800V	3800V	
OFF	ON	ON	OFF	2.50A	25.0A	250A	2500A	-	-	-	-	40.0V	400V	4000V	4000V	4000V	4000V	4000V	
ON	ON	ON	OFF	3.00A	30.0A	300A	3000A	-	-	-	-	44.0V	440V	4400V	4400V	4400V	4400V	4400V	
OFF	OFF	OFF	ON	3.50A	35.0A	350A	3500A	-	-	-	-	45.0V	450V	4500V	4500V	4500V	4500V	4500V	
ON	OFF	OFF	ON	4.00A	40.0A	400A	4000A	-	-	-	-	50.0V	500V	5000V	5000V	5000V	5000V	5000V	
OFF	ON	OFF	ON	5.00A	50.0A	500A	5000A	-	-	-	-	60.0V	600V	6000V	6000V	6000V	6000V	6000V	
ON	ON	OFF	ON	6.00A	60.0A	600A	6000A	-	-	-	-	66.0V	660V	6600V	6600V	6600V	6600V	6600V	
OFF	OFF	ON	ON	7.00A	70.0A	700A	7000A	-	-	-	-	69.0V	690V	6900V	6900V	6900V	6900V	6900V	
ON	OFF	ON	ON	7.50A	75.0A	750A	7500A	-	-	-	-	70.0V	700V	7000V	7000V	7000V	7000V	7000V	
OFF	ON	ON	ON	8.00A	80.0A	800A	8000A	-	-	-	-	80.0V	800V	8000V	8000V	8000V	8000V	8000V	
ON	ON	ON	ON	9.99A	99.9A	999A	9990A	-	-	-	-	99.9V	999V	9990V	9990V	9990V	9990V	9990V	
1				A, Current measurement								V, voltage measurement							
ON																			
OFF																			

## Terminal boards

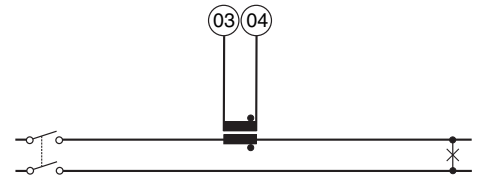
Back view of the instrument



### Wiring diagrams, current measurements

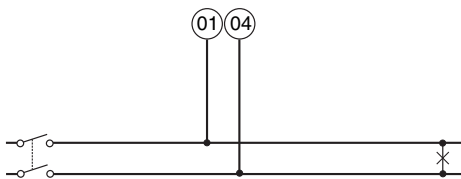


Direct connection

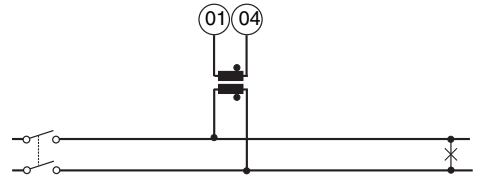


CT connection

### Wiring diagrams, voltage measurements

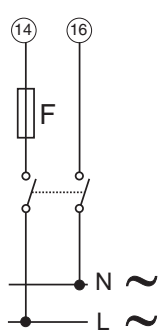


Direct connection



VT connection

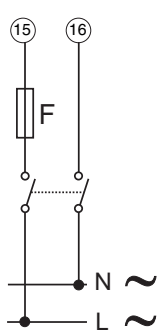
### Wiring diagrams, power supply



230VAC

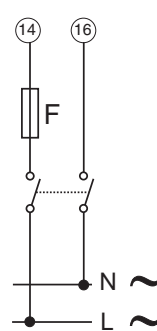
F= 500mA  
250V T

“D” power supply



115VAC

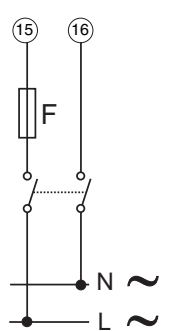
F= 500mA  
250V T



48VAC

F= 1A 250V T

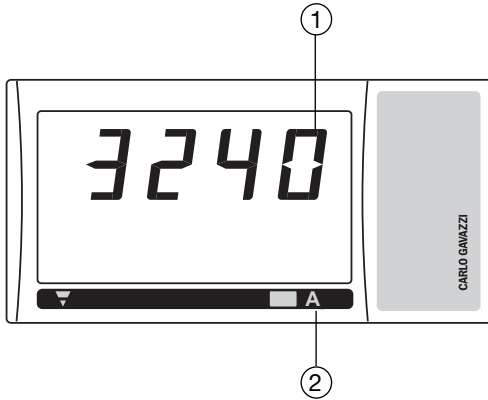
“B” power supply



24VAC

F= 1A 250V T

## Front panel description



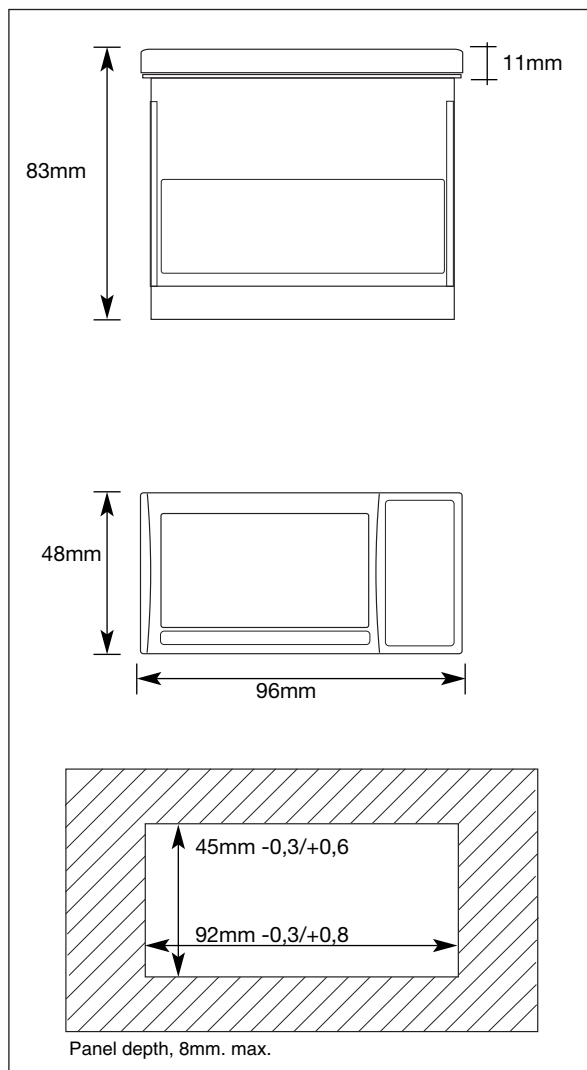
### 1. Display

3 dgts + dummy zero (maximum indications 9990).  
Alpha-numerical indication with 7-segment LCD to display measurement values and over range indication

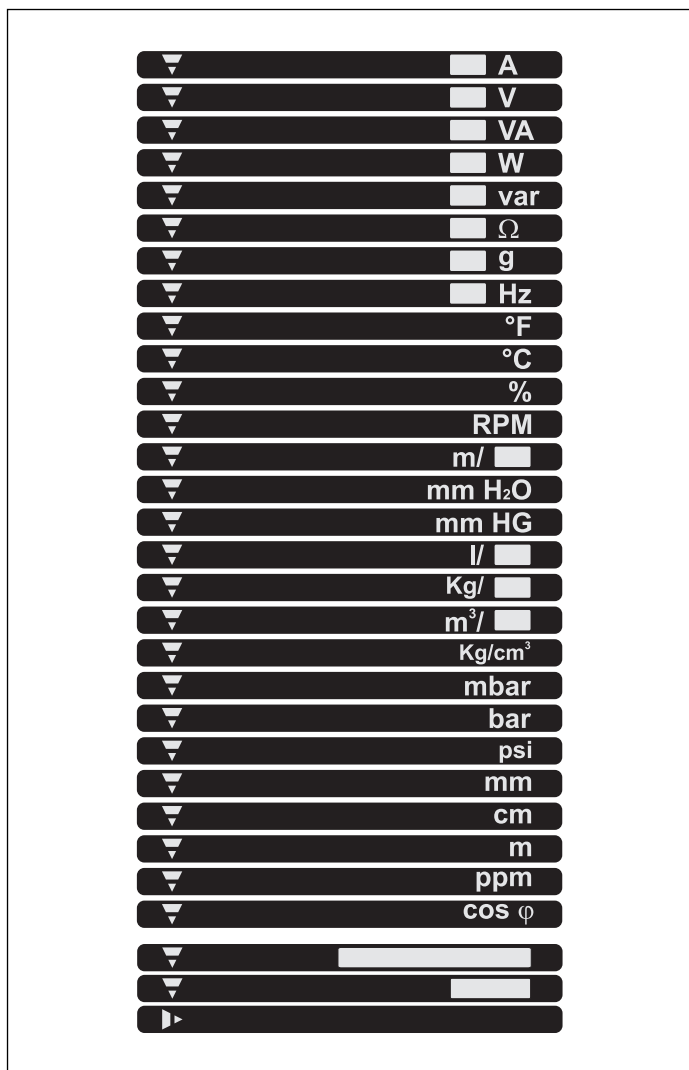
### 2. Engineering unit

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

## Dimensions



## Engineering units



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



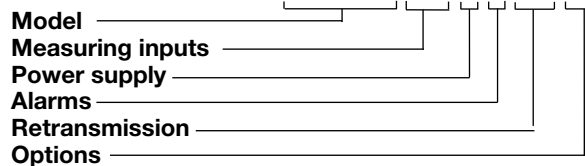
- Multi-input instrument 3 1/2 dgt LED
- 0.1% RDG basic accuracy
- TRMS AC current and voltage measurements
- AC/DC current measurements: selectable full scales (200µA to 5A)
- AC/DC voltage measurements: selectable full scales (200mV to 500V)
- Up to 2 independent alarm set-points (optional)
- Universal 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 $\mu\text{A}$ -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

\*  $<45\text{Hz} > 65\text{Hz} = \pm(0.5\%RDG+3DGT)$  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			



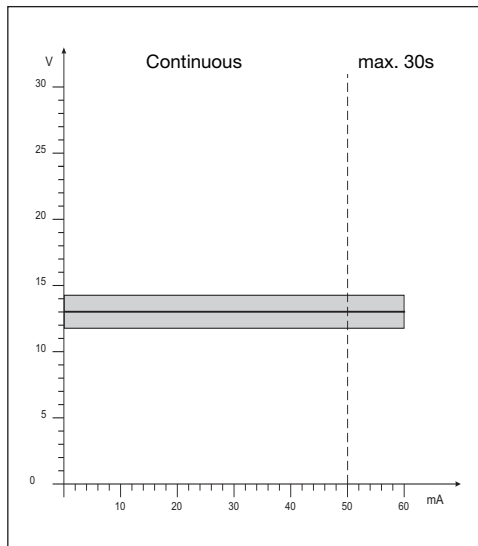
## General Specifications

<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)	Safety	EN 61010-1, IEC 61010-1
<b>Insulation reference voltage</b>	300 V <sub>RMS</sub> to ground (500V input)	<b>Connections</b>	
<b>Insulation</b>	See table "Insulation between inputs and outputs"	Wire section	Screw type Max 2.5mm <sup>2</sup>
<b>Dielectric strength</b>	4000 V <sub>RMS</sub> for 1 minute	<b>Housing</b>	
<b>Rejection</b>		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	<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)

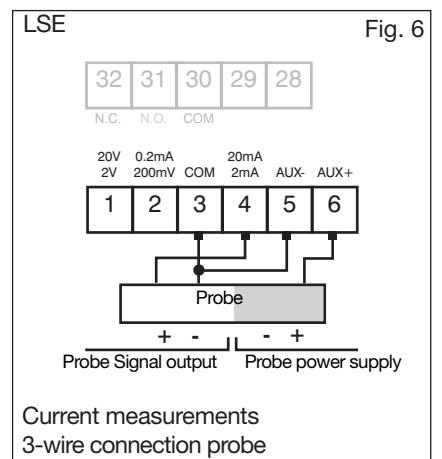
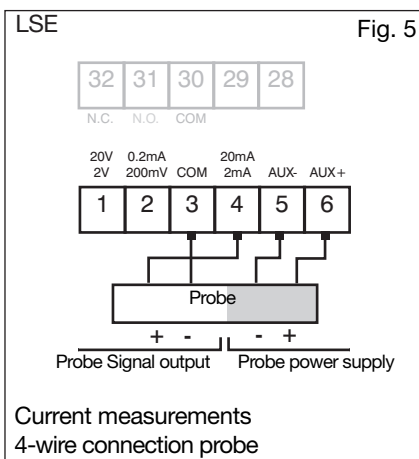
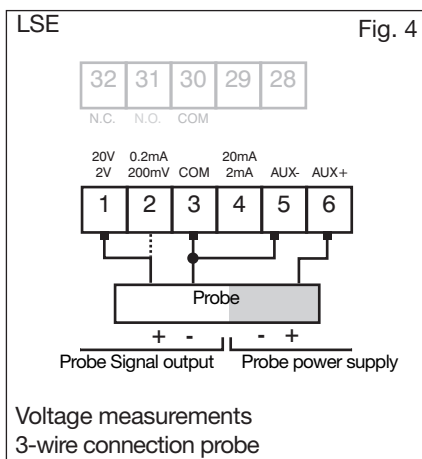
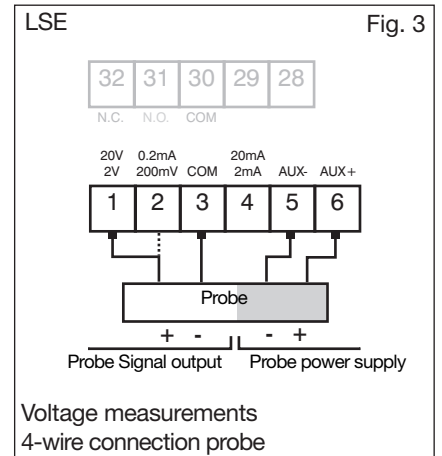
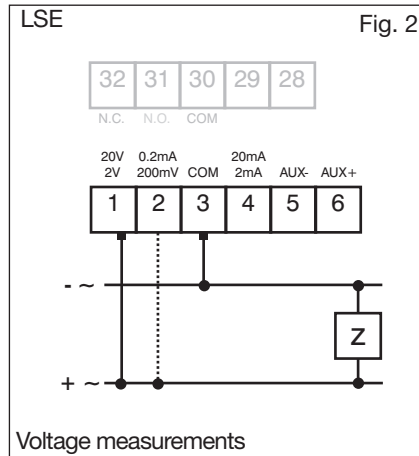
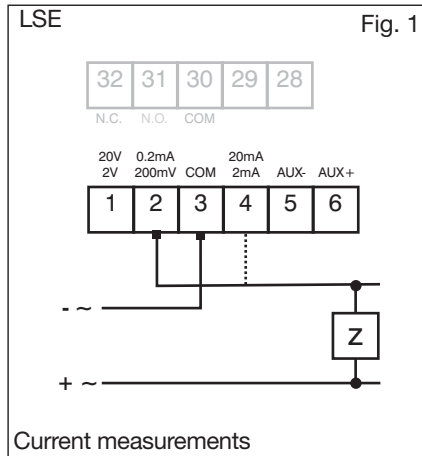
$$V_1 = \sqrt{\frac{1}{n} \cdot \sum_1^n (V_1)_i^2}$$

Instantaneous effective current (TRMS)

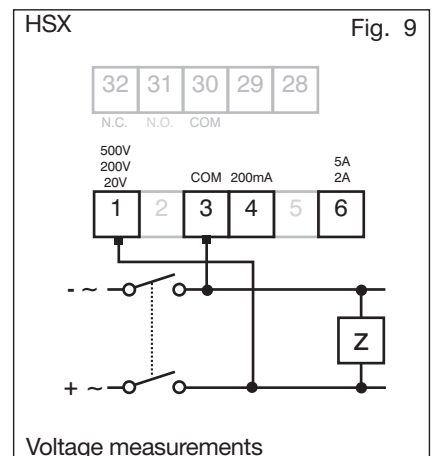
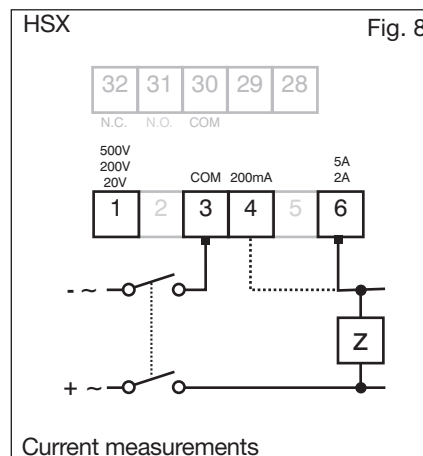
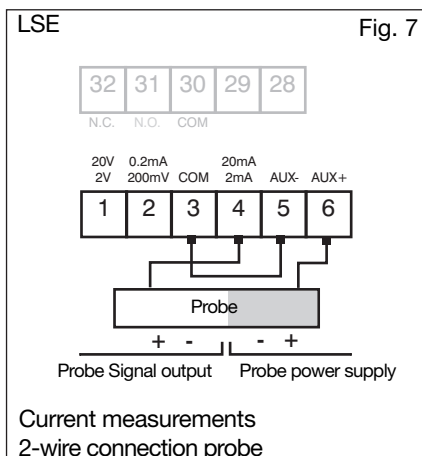
$$A_1 = \sqrt{\frac{1}{n} \cdot \sum_1^n (A_1)_i^2}$$

# Wiring diagrams

## Process signal wiring diagrams



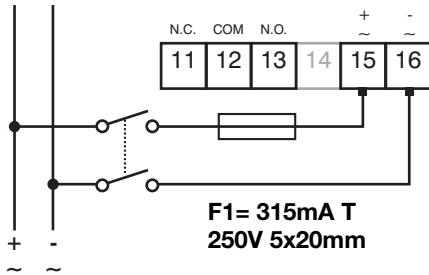
## High-level signals wiring diagrams



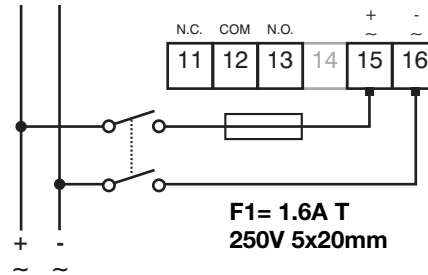
## Wiring diagrams (cont.)

### Power supply wiring diagrams

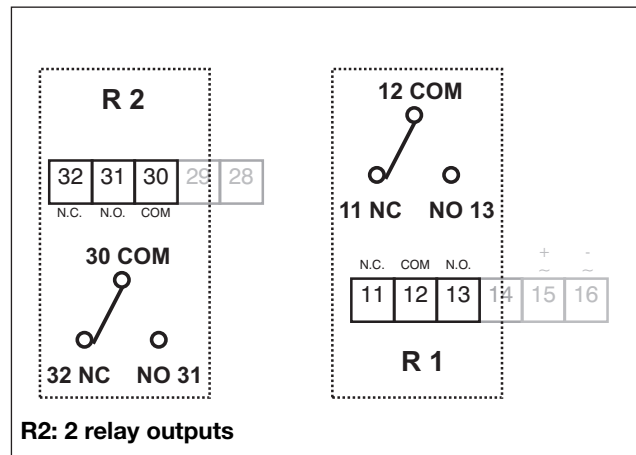
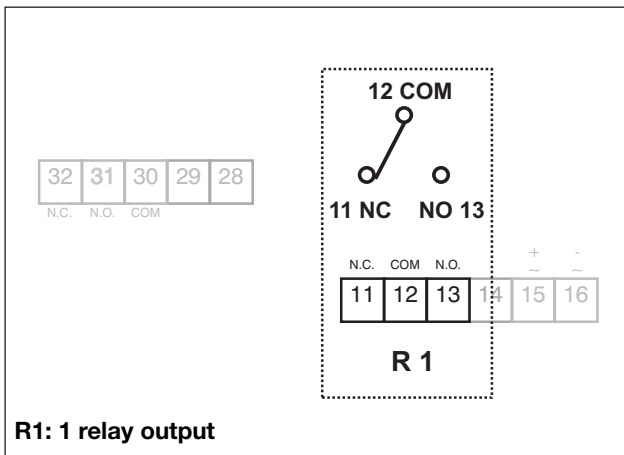
H: power supply 90-260VAC/DC



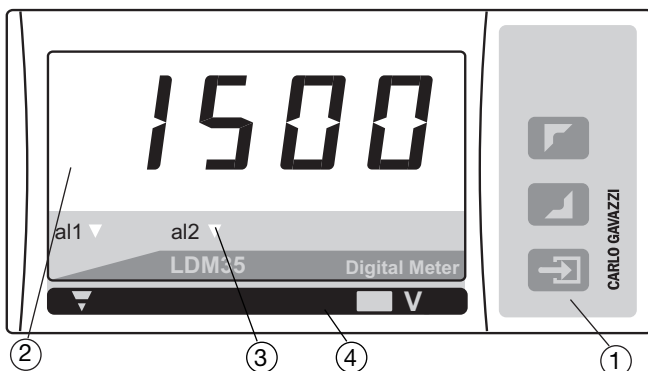
L: power supply 18-60VAC/DC



## 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.

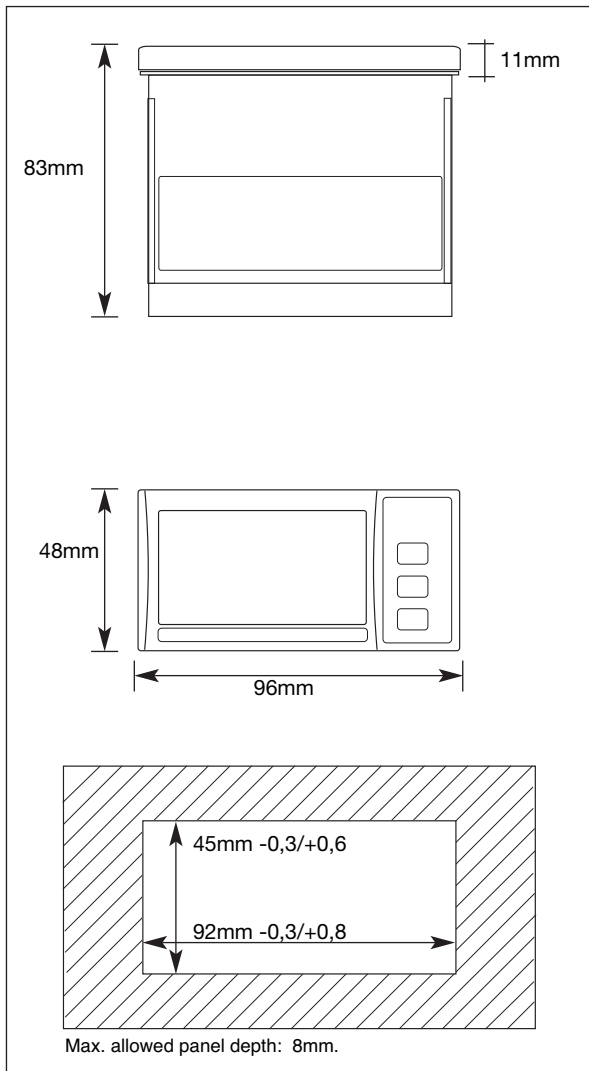
### 3. Alarm status LED

Display any alarm condition

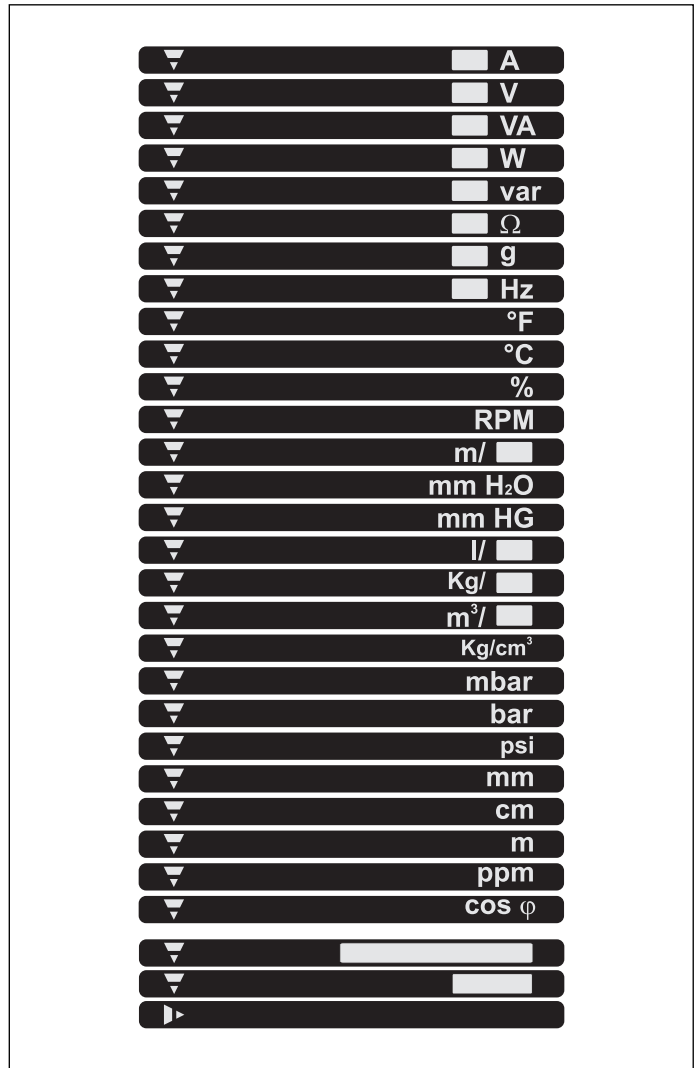
### 4. Engineering unit

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

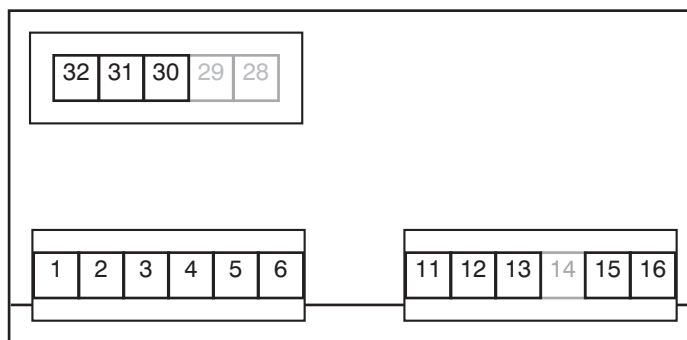
### Dimensions



### Engineering Units



### Terminal blocks



Instrument back view

# 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

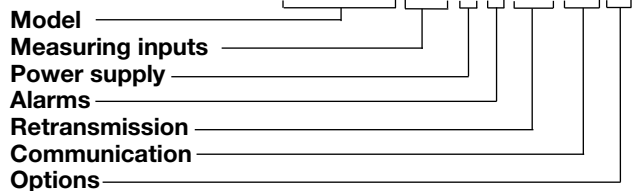
## Product Description

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
<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>Communication</b>  <b>XX:</b> None <b>SX:</b> Serial port RS485	<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>AV:</b> Single analogue output, 0 to 20mA DC and 0 to 10V DC  <b>Options</b>  <b>X:</b> None <b>T:</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	height 14.2 mm Colour: red
<b>Accuracy</b>	See table "Measurement accuracy, temperature drifts, minimum and maximum indications"	<b>Max and min indication</b> See table "Measurement accuracy, temperature drifts min and max indications"
<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>Measurements</b> Current, voltage. For the current and voltage measurements: TRMS measurement of distorted sine waves. Coupling type Crest factor Direct ≤3; A <sub>Pmax</sub> =1.7I <sub>n</sub> ; V <sub>Pmax</sub> =1.7U <sub>n</sub>
<b>Temperature drift</b>	See table "Measurement accuracy, temperature drifts, min and max indications"	<b>Input impedance</b> See table "input impedances and overloads"
<b>Sampling rate</b>	500 samples/s @ 50Hz	<b>Frequency</b> 40 to 440 Hz
<b>Display refresh time</b>	200 msec @ 50Hz	<b>Overload</b> See table "input impedances and overloads"
<b>Display</b>	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 -2mA to +2mA -20mA to +20mA -200mV to +200mV -2V to +2V -20V to +20V	DC/AC	DC: ±(0.1%RDG+3DGT)	±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
			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.						
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)	±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
			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.						

\* <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<sub>RMS</sub> output to measuring input,  
4000 V<sub>RMS</sub> output to power supply input.

## Output specifications

<b>RS422/RS485</b> Serial output  Connections Distance Terminalization  Addresses  Protocol Data (bidirectional) Dynamic (reading only)  Static (reading/writing)  Data format  Baud rate  Insulation	<b>(on request)</b> 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 <sub>rms</sub> output to measuring inputs, 4000 V <sub>rms</sub> output to power supply input	<b>Analogue output</b> Range Scaling factor          Accuracy Response time Temperature drift Load: 20 mA output 10 V output Insulation    Notes:	<b>(on request)</b> 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°C) $\leq 10$ ms $\pm 200$ ppm/°C $\leq 700 \Omega$ $\geq 10$ k $\Omega$ By means of opto-couplers 4000V <sub>rms</sub> output to measuring input, 4000V <sub>rms</sub> output to power supply input The two outputs cannot be used at the same time
		<b>Excitation output</b> Voltage   Insulation	LSE input only 13 VDC $\pm 10\%$ max. 50 mA 25V <sub>rms</sub> output to measuring input, 4000 V <sub>rms</sub> output to power supply input

## Software functions

<b>Min / Max storage</b>	Automatic storage (in the EEPROM) of the minimum and maximum measured value from the previous memory reset	<b>Electrical range</b>  Decimal point position  Displayed range	Programmable within the whole measuring range Programmable within the displayed range Programmable within the displayed range.
<b>Password</b>  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.	<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> Filter operating range Filtering coefficient	0 to 9999 1 to 32
<b>Integration time selection</b>	Automatic or from 100.0 to 999.9 ms only in the current and voltage measurement.	<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.
<b>Scaling factor</b> Operating mode	Electrical scale compression, displayed scale compression/expansion (max. 2 without filter, up to 10 with filter)		

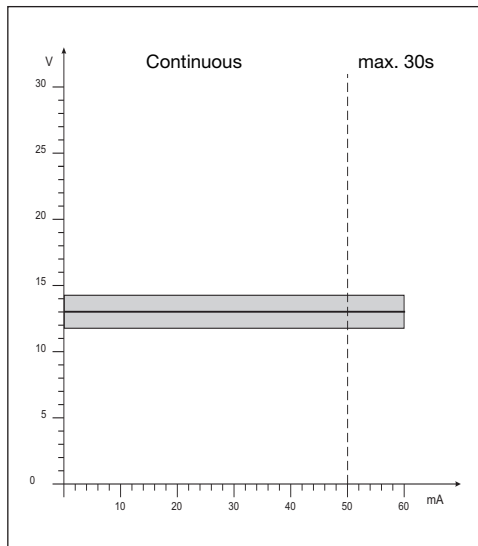
## General Specifications

<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)	Safety	EN 61010-1, IEC 61010-1
<b>Insulation reference voltage</b>	300 V <sub>RMS</sub> to ground (500V input)	<b>Connections</b>	
<b>Insulation</b>	See table "Insulation between inputs and outputs"	Wire section	Screw type Max 2.5mm <sup>2</sup>
<b>Dielectric strength</b>	4000 V <sub>RMS</sub> for 1 minute	<b>Housing</b>	
<b>Rejection</b>		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	<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 and 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. 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)

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

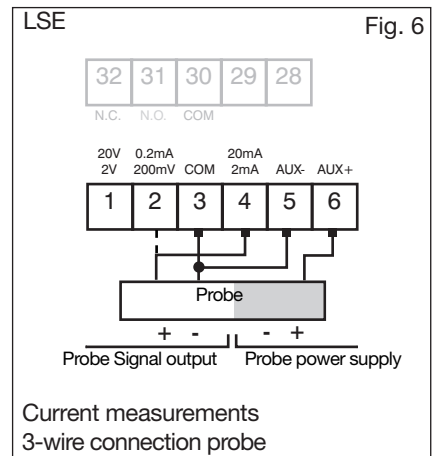
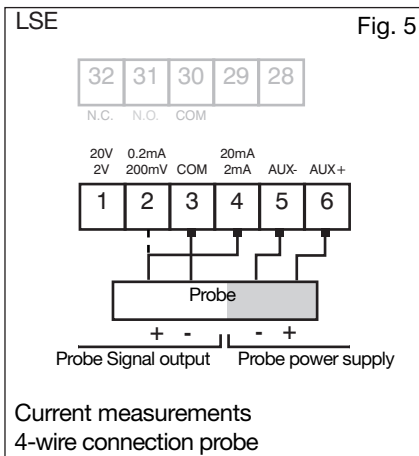
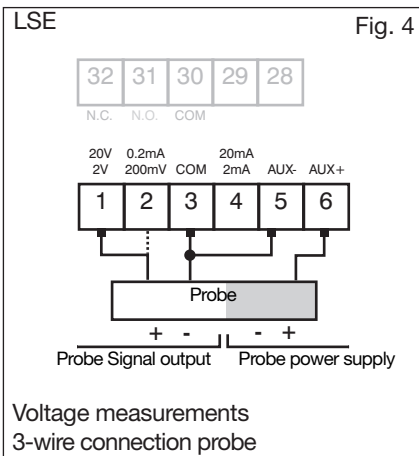
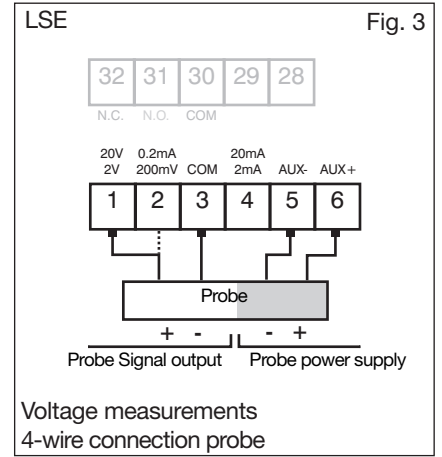
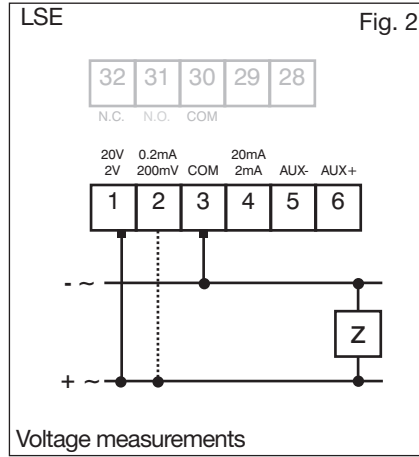
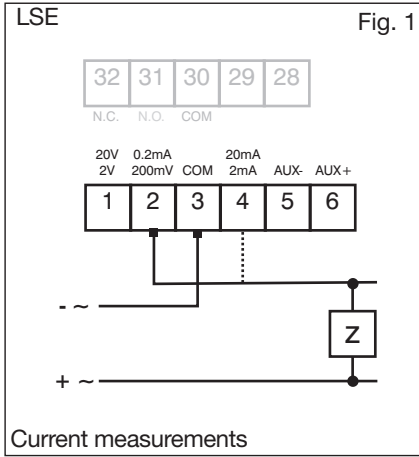
Instantaneous effective current (TRMS)

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

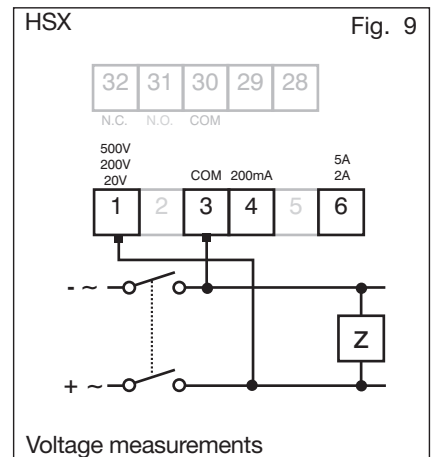
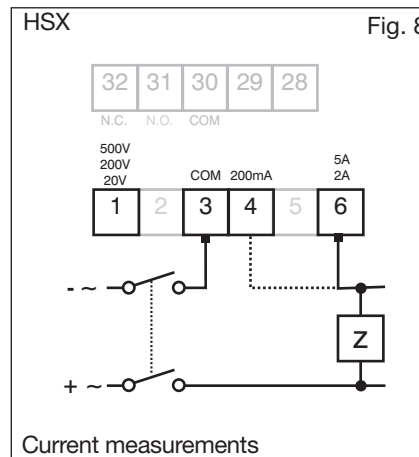
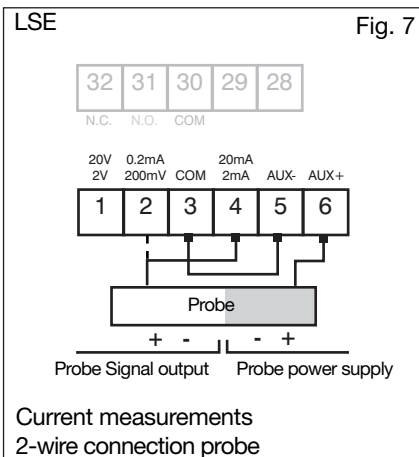


# Wiring diagrams

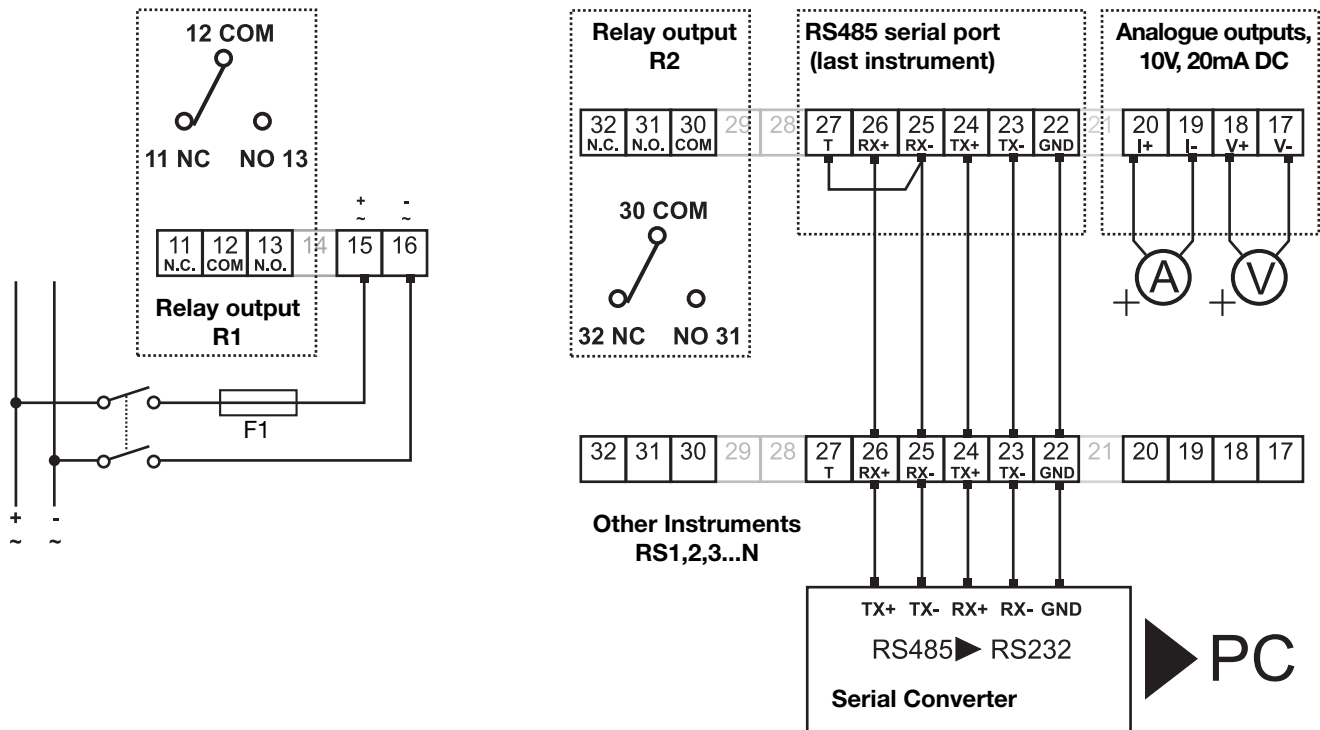
## Process signal wiring diagrams



## High-level signals wiring diagrams



## Power supply and output connections wiring diagrams



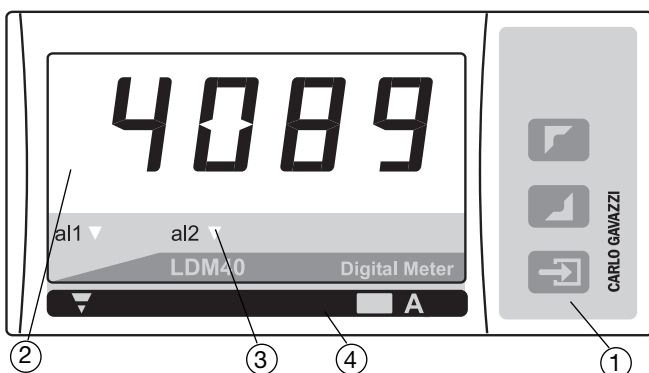
**H:** power supply 90-260VAC/DC,  
F1= 315mA T 250V 5x20mm

**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



### 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.

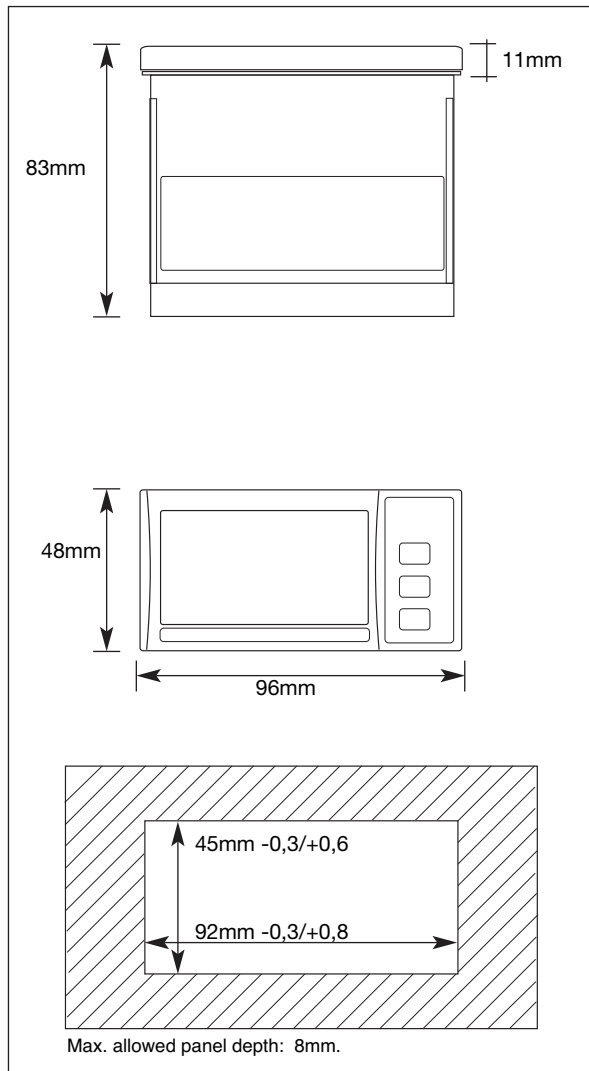
### 3. Alarm status LED

Display any alarm condition

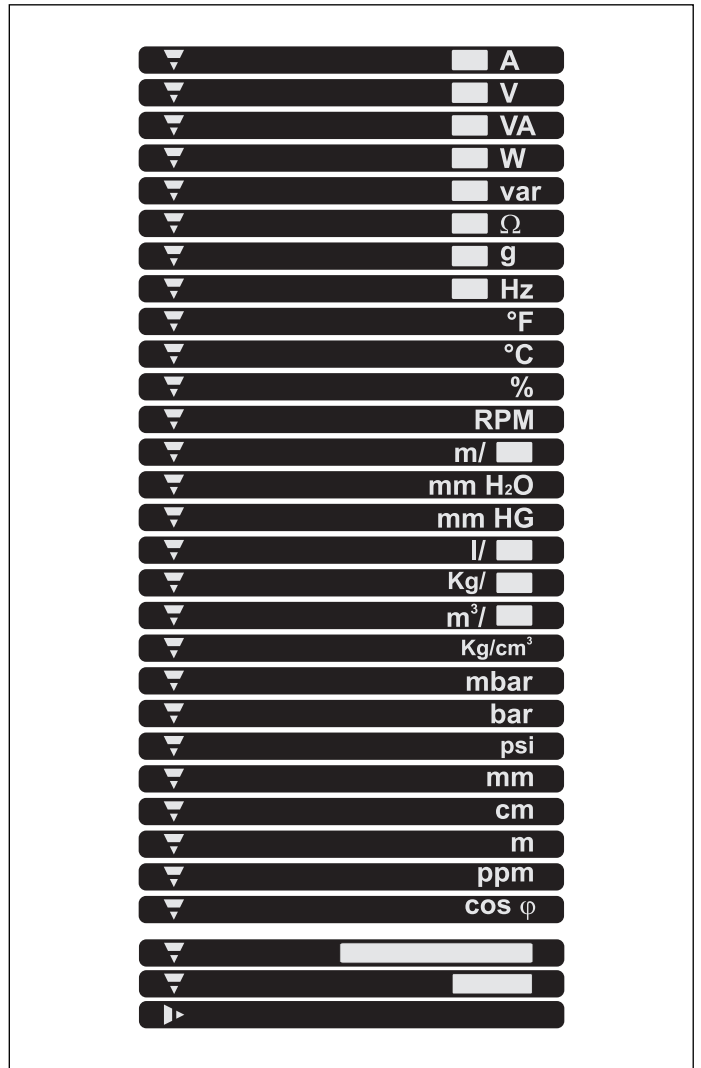
### 4. Engineering unit

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

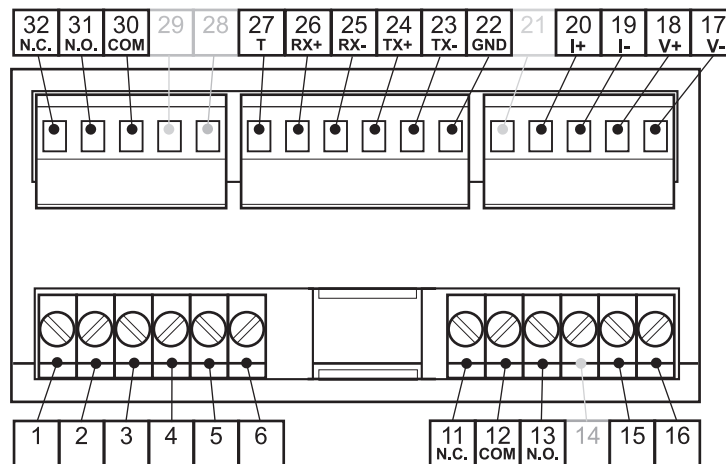
## Dimensions



## Engineering Units



## Terminal blocks



Instrument back view

**По вопросам продаж и поддержки обращайтесь:**

Алматы (7273)495-231  
Архангельск (8182)63-90-72  
Астрахань (8512)99-46-04  
Барнаул (3852)73-04-60  
Белгород (4722)40-23-64  
Брянск (4832)59-03-52  
Владивосток (423)249-28-31  
Волгоград (844)278-03-48  
Вологда (8172)26-41-59  
Воронеж (473)204-51-73  
Екатеринбург (343)384-55-89  
Иваново (4932)77-34-06  
Ижевск (3412)26-03-58  
Иркутск (395)279-98-46  
Россия (495)268-04-70

Казань (843)206-01-48  
Калининград (4012)72-03-81  
Калуга (4842)92-23-67  
Кемерово (3842)65-04-62  
Киров (8332)68-02-04  
Краснодар (861)203-40-90  
Красноярск (391)204-63-61  
Курск (4712)77-13-04  
Липецк (4742)52-20-81  
Магнитогорск (3519)55-03-13  
Москва (495)268-04-70  
Мурманск (8152)59-64-93  
Набережные Челны (8552)20-53-41  
Нижний Новгород (831)429-08-12  
Киргизия (996)312-96-26-47

Новокузнецк (3843)20-46-81  
Новосибирск (383)227-86-73  
Омск (3812)21-46-40  
Орел (4862)44-53-42  
Оренбург (3532)37-68-04  
Пенза (8412)22-31-16  
Пермь (342)205-81-47  
Ростов-на-Дону (863)308-18-15  
Рязань (4912)46-61-64  
Самара (846)206-03-16  
Санкт-Петербург (812)309-46-40  
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