

Digital Panel Meters Modular Indicator and Controller Type UDM40



- The alarm status can be coupled to the different colour of the display
- Linearization of V and A inputs up to 16 points

Product Description

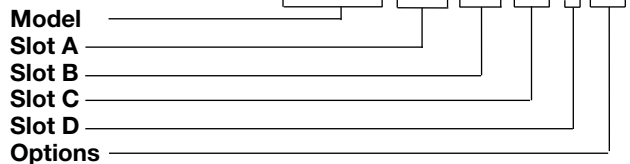
µp-based digital panel meter, 4-dgt LED indicator, for current, voltage, temperature and resistance measurements. Measuring ranges and functions easily programmable from the keypad or from the PC by

means of optional UdmSoft software. UDM40 includes storage min-max functions and double level protection password. Housing for panel mounting with front protection degree: IP67, NEMA4x.

- Multi-input modular 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)
- °C or °F temperature measurements (Pt100-250-500-1000, Ni100, TC J-K-S-T-E)
- Resistance measurements; selectable full scales (20Ω to 20kΩ)
- Up to 4 independent alarm set-points (optional)
- 20mA/10VDC analog output (optional)
- Serial port RS485 or RS232 (optional)
- MODBUS, JBUS communication protocol
- Front protection degree: IP67, NEMA4x
- LED display, selectable colour (red, amber, green)

How to order

UDM40 XXX XX XX X XX



How to order

UdmSoft-kit

UdmSoft-kit: software plus "UCOM1" communication cable for programming UDM40 by means of PC.

Type Selection

Slot A (measuring inputs)	Slot B (communication)	Slot C (communication and alarm)	Slot D (power supply)
LSX: signal inputs: 0.2-2-20mA DC/AC; 0.2-2-20V DC/AC LSE/LSF: 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 TRX: signal inputs: TC temperature probes (J-K-S-T-E, Pt100-250-500-1000) and resistance (0.02-0.2-2-20kΩ)	XX: None SX: Serial port RS485 SY: Serial port RS232 AV(*): Single analogue output, 0 to 20mA DC and 0 to 10V DC (*): The two analogue outputs cannot be used at the same time. It is possible to plug in only one module by instrument.	XX: None R1: Single relay output, (AC1-8AAC, 250VAC) R2: Dual relay output, (AC1-8AAC, 250VAC) R4: Dual relay output, (AC1-8AAC, 250VAC) + dual open collector output (NPN, 100mA) R5: 4 relay outputs (AC1-5AAC, 250VAC) AV(*): Single analogue output, 0 to 20mA DC and 0 to 10V DC	H: 90 to 260V AC/DC L: 18 to 60V AC/DC Options XX: None TX: Tropicalization

Input Specifications

Analogue inputs BQ LSX module BQ LSE/LSF module BQ HSX module BQ TRX module BQ TRX module	Channels and variable 1, mA and V DC/AC 1, mA and V DC/AC + AUX 1, A and V DC/AC 1, temperature 1, resistance	Contact reading signal Close contact resistance Open contact resistance Insulation	BQ xxx: <0.1mA, <3,5V DC BQ LSE/BQ LSF: <2.5mA, <14V DC Max 1kΩ Min 500kΩ Non-insulated
Digital inputs Number of inputs Use	Incl. in the measuring module 1 (voltage-free) key-pad lock Display hold Reset of latch alarms	Accuracy (display, RS485)	See table "Measuring accuracy", temperature drifts and minimum-maximum indications"

Input specifications (cont.)

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	Coupling type Crest factor	of distorted sine waves. Direct ≤ 3 ; $A_{Pmax}=1.7In$; $V_{Pmax}=1.7Un$
Temperature drift	See table "Measurement accuracy, temperature drifts, and max/min indications"		Input impedance	See table "input impedances and overloads"
Sampling rate	500 samples/s @ 50 Hz		Frequency	40 to 440 Hz
Display refresh time	200 msec @ 50Hz		Overload	See table "input impedances and overloads"
Display	4 DGT, 7 segments height 14.2 mm		Compensation	Only temperature measurement module.
Colour	Selectable (red, amber, green)		RTD	- For Pt 100-250-500-1000, 3-wire connection: up to 10 Ω - For resistance measur. with 20 Ω range: up to max 0.1 Ω - For resistance measurements with $\geq 200\Omega$ range: up to max 10 Ω
Max and min indication	See table "Measurement accuracy, temperature drifts and max min indications"		TC	Internal cold junction, within temperature range from 0 to +50°C. Automatic or manual com-
Measurements	Current, voltage, temperature and resistance. For the current and voltage measurements: TRMS measurement			

Measurement accuracy, temp. drifts, max and min indications

All accuracies and min/max indications are referred to an ambient temp. range of 25°C \pm 5°C, rel. humidity \leq 60% and scale ratio (electrical/displayed scale) equal to 1. The conversion into °F is obtained acting on the electrical/displayed scale ratio.

Module	Inputs	Type	Accuracy	Temp. drift	Min. indication (■)	Max. indicat. (■)
BQ LSX/ BQ LSE/ BQ LSF	-200 μ A to +200 μ 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 (da 45 a 65Hz)*: $\pm(0.3\%RDG+3DGT)$ 0% to 25% FS; $\pm(0.3\%RDG+2DGT)$ 25% to 110% FS.	± 150 ppm/°C	- 200.0 - 2.000 - 20.00 - 200.0 - 2.000 - 20.00	+ 200.0 + 2.000 + 20.00 + 200.0 + 2.000 + 20.00
BQ 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.	± 150 ppm/°C	- 200.0 - 2.000 - 5.000 - 20.00 - 200.0 - 500.0	+ 200.0 + 2.000 + 5.000 + 20.00 + 200.0 + 500.0
BQ TRX Thermo- couple	-50°C to +760°C -58 °F to +1400 °F -200°C to +1260°C -328 °F to +2300°F -200°C to +1000°C -328°F to +1832°F -50°C to +1750°C -58°F to +3182°F -200°C to +400°C -328°F to +752°F	J J K K E E S S T T	$\pm(0.2\%RDG+1DGT)$ $\pm(0.2\%RDG+2DGT)$ $\pm(0.2\%RDG+2DGT)$ $\pm(0.2\%RDG+4DGT)$ $\pm(0.2\%RDG+2DGT)$ $\pm(0.2\%RDG+4DGT)$ $\pm(0.2\%RDG+2DGT)$ $\pm(0.2\%RDG+4DGT)$ $\pm(0.2\%RDG+2DGT)$ $\pm(0.2\%RDG+4DGT)$	± 150 ppm/°C	- 50°C - 58°F - 200°C - 328°F - 200°C - 328°F - 50°C - 58°F - 200°C - 328°F	+ 760°C + 1400°F + 1260°C + 2300°F + 1000°C + 1832°F + 1750°C + 3182°F + 400°C + 752°F

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

Measurement accuracy, temp. drifts, min max indications (cont.)

All accuracies and min/max indications refer to an ambient temperature range of 25°C ±5°C, relevant humidity ≤60% and scale ratio (electrical scale / displayed scale) equal to 1. The conversion into °F is obtained acting on the electrical/displayed scale ratio.

Module	Inputs	Type	Accuracy	Temp. Drift	Min. Indication	Max. Indication
BQ TRX Thermoresistance	-200°C to +850°C	Pt100	±(0.2%RDG +2DGT)	±150 ppm/°C	- 200	+ 850
	-328°F to +1562°F	Pt100	±(0.2%RDG +4DGT)		- 328	+ 1562
	-200.0°C to +200.0°C	Pt100	±(0.5%RDG +5DGT)		- 200.0	+ 200.0
	-328°F to +392°F	Pt100	±(0.5%RDG +5DGT)		- 328.0	+ 392.0
	-200.0°C to +200.0°C	Pt250	±(0.5%RDG +5DGT)		- 200.0	+ 200.0
	-328°F to +392°F	Pt250	±(0.5%RDG +5DGT)		- 328.0	+ 392.0
	-200.0°C to +200.0°C	Pt500	±(0.5%RDG +5DGT)		- 200.0	+ 200.0
	-328°F to +392°F	Pt500	±(0.5%RDG +5DGT)		- 328.0	+ 392.0
	-200.0°C to +200.0°C	Pt1000	±(0.5%RDG +5DGT)		- 200.0	+ 200.0
	-328°F to +392°F	Pt1000	±(0.5%RDG +5DGT)		- 328.0	+ 392.0
BQ TRX Resistance	-60°C to +180°C	Ni100	±(0.5%RDG +1DGT)	±150 ppm/°C	- 60	+ 180
	-76°F to +356°F	Ni100	±(0.5%RDG +2DGT)		- 76	+ 356
BQ TRX Resistance	0 to 20Ω	Ω	±(0.2%RDG+2DGT)	±150 ppm/°C	0	20.00 (■)
	0 to 200Ω		25% to 110% FS		0	200.0 (■)
	0 to 2000Ω		±(0.2%RDG+3DGT)		0	2000 (■)
	0 to 20.00kΩ		0% to 25% FS		0	20.00 (■)

(■) It is possible to modify the decimal point position.

Input impedances and overloads

Module	Inputs	Type	Impedance	Overload (continuous)	Overloads (1s)			
BQ LSX/ BQ LSE/ BQ LSF	-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			
BQ HSX	-20V to +20V	DC/AC	≥200kΩ	50V	100V			
	-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			
BQ TRX Thermocouple	-200V to +200V	DC/AC	≥2MΩ	750V	1000V			
	-500V to +500V	DC/AC	≥2MΩ	750V	1000V			
	-50°C to +760°C	J	I _{LK} < 0.5μA	Max 5V	Max 10V			
	-58 °F to +1400 °F	J						
	-200°C to +1260°C	K						
-328 °F to +2300°F	K							
-200°C to +1000°C	E							
BQ TRX Thermoresistance	-328°F to +1832°F	E	I _{LK} < 0.5μA	Max 5V	Max 10V			
	-50°C to +1750°C	S						
	-58°F to +3182°F	S						
	-200°C to +400°C	T						
	-328°F to +752°F	T						
	-200°C to +850°C	Pt100				800μA (*)	Max 5V	Max 10V
	-328°F to +1562°F	Pt100				800μA (*)		
-200.0°C to +200.0°C	Pt250/Pt100	90μA (*)						
-328°F to +392°F	Pt250/Pt100	90μA (*)						
-200.0°C to +200.0°C	Pt1000/Pt500	800μA (*)						
-328°F to +392°F	Pt1000/Pt500	800μA (*)						
-60°C to +180°C	Ni100	800μA (*)						
BQ TRX Resistance	-76°F to +356°F	Ni100	800μA (*)	Max 5V	Max 10V			
	0 to 20Ω	Ω	800μA (*)					
	0 to 200Ω		90μA (*)					
	0 to 2000Ω		800μA (*)					
0 to 20.00kΩ	90μA (*)							

(*) Maximum measuring current generated for resistance equal to 0

Software functions

Min / Max storage	Automatic storage (in the EEPROM) of the minimum and maximum measured value from the previous memory reset	TC	Opening of probe's connection: EEE indication
Password	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.	RTD	Opening of probe's connection: EEE indication probe's short circuit: -EEE indication.
1st level		Digital filter	
2nd level		Filter operating range	0 to 9999
		Filtering coefficient	1 to 32
Measurement selection	Depending on the module: measuring range and type of probe (resistance, RTD thermoresistance, TC thermocouple) or measuring type (TRMS or DC).	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 display value. Selection of max display value.
Integration time selection	Automatic or from 100.0 to 999.9 ms only in the current and voltage measurement.	Linearization	
Scaling factors		Points	Up to 16
Operating mode	Electrical scale compression, displayed scale compression/expansion (max. 2 without filter, up to 10 with filter)	Input range	Selectable by every single point
Electrical range	Programmable within the whole measuring range	Output range	Selectable by every single point
Decimal point position	Programmable within the display range	UdmSoft	Software for programming UDM40 by means of PC (Windows 95, 98se, ME, XP) by means of serial port RS485 and relevant connection cable. The software is available in English, Spanish, Italian, German, French. See also "Programming of UDM40 by means of PC" .
Displayed range of the variable	Programmable within the display range		
Diagnostics	The display flashes when the limits of the display range are exceeded and the data are updated up to 20% of the rated display range.		
Burn-out:	Only temperature inputs		

General Specifications

Operating temperature	0° to 50°C (32° to 122°F) (H.R. < 90% non-condensing)	Safety Standards	
Storage temperature	-10° to 60°C (14° to 140°F) (H.R. < 90% non-condensing)	Safety	EN 61010-1, IEC 61010-1
Insulation reference voltage	300 V _{RMS} to ground (500V input)	Connections	
Insulation	See table "Insulation between inputs and outputs"	Wire section	Screw type Max 2.5mm ²
Dielectric strength	4000 V _{RMS} for 1 minute	Housing	
Rejection		Dimensions	1/8 DIN, 48 x 96 x 105 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: IP67, NEMA4x Connections: IP20
EMC		Weight	520 g approx (included all modules and packing)
	EN61000-6-2, IEC61000-6-2 EN61000-6-3, IEC61000-6-3	Approvals	CE, UR, CSA

Supply Specifications

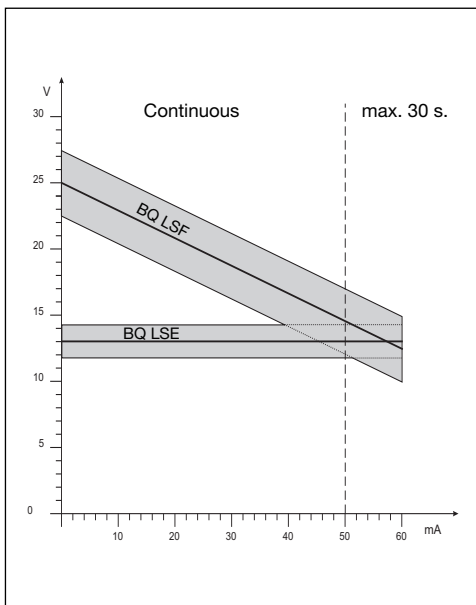
AC/DC voltage

90 to 260V (standard)
18 to 60V (on request)

Energy consumption

≤ 30VA/12W (90 to 260V)
≤ 20VA/12W (18 to 60V)

Excitation output



Insulation between inputs and outputs

	Meas. inputs	Relay output	Static output	Analogue output	Serial Port	AUX p.supply	90-260VAC/ DC p.supply	18-60VAC/ DC p.supply
Meas. inputs	-	4kV	4kV	4kV	4kV	25V	4kV	4kV
Relay Output	4kV	-	2kV	4kV	4kV	4kV	4kV	4kV
Static Output	4kV	2kV	-	4kV	4kV	4kV	4kV	4kV
Analogue Output	4kV	4kV	4kV	-	4kV	4kV	4kV	4kV
Serial Port	4kV	4kV	4kV	4kV	-	4kV	4kV	4kV
AUX p.supply	25V	4kV	4kV	4kV	4kV	-	4kV	4kV
90-260VAC/ DC p.supply	4kV	4kV	4kV	4kV	4kV	4kV	-	-
18-60VAC/ DC p.supply	4kV	4kV	4kV	4kV	4kV	4kV	-	-

Available modules

Type	N. of channels	Ordering code
UDM40 main unit		BD 40
DC/AC input: 200μA, 2mA, 20mA, 200mA, 2V, 20V	1	BQ LSX
DC/AC input: 200μA, 2mA, 20mA, 200mA, 2V, 20V + excitation output	1	BQ LSE/ BQ LSF
DC/AC input: 200mA, 2A, 5A, 20V, 200V, 500V	1	BQ HSX
Input: 20Ω, 200Ω, 2kΩ, 20kΩ	1	BQ TRX
TC: J-K-S-T-E, Pt100-250-500-1000	1	BQ TRX
Analogue output 0 to 20mA, 0 to 10VDC	1	BO AV
Relay output	1	BO R1
Relay output	2	BO R2
Outputs: 2 relays + 2 open collectors	4	BO R4
Relay output	4	BO R5
RS485 Serial Port	1	BR SX
RS232 Serial Port	1	BR SY
Power supply 18 to 60V AC/DC		BP L
Power supply 90 to 260V AC/DC		BP H

Possible module combinations

Basic Unit	Slot A	Slot B	Slot C	Slot D
Measuring inputs: LSX, LSE, LSF, HSX, TRX	●			
RS485 Serial port: SX		●		
RS232 Serial port: SY		●		
Analogue output: AV (*)		●	●	
Relay outputs and/or open collector: R1, R2, R4, R5			●	
Power supply: H, L				●

(*) Up to 1 module max.

Used calculation formulas

Only for TRMS Measurements

Instantaneous effective voltage (TRMS)

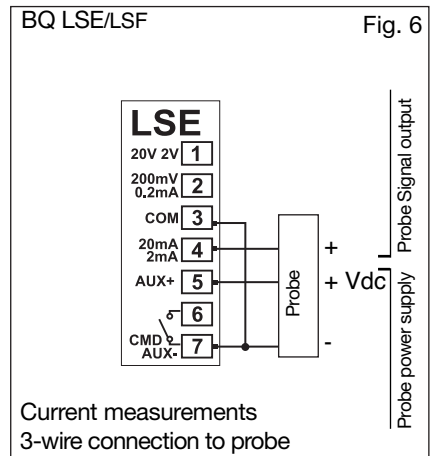
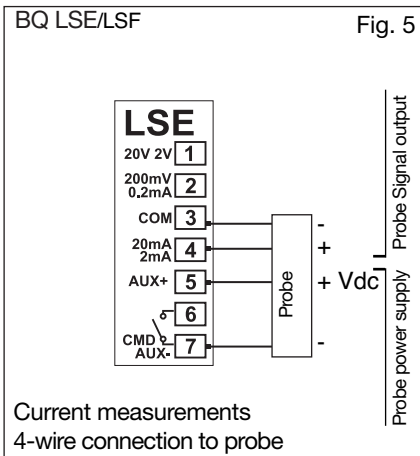
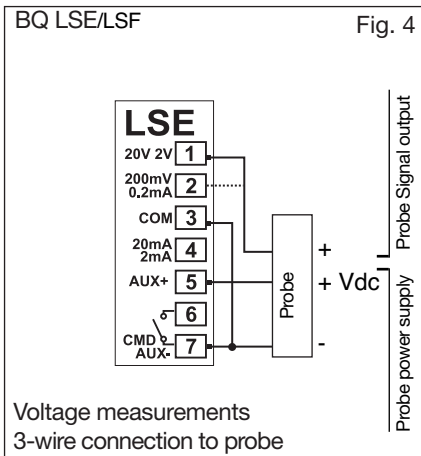
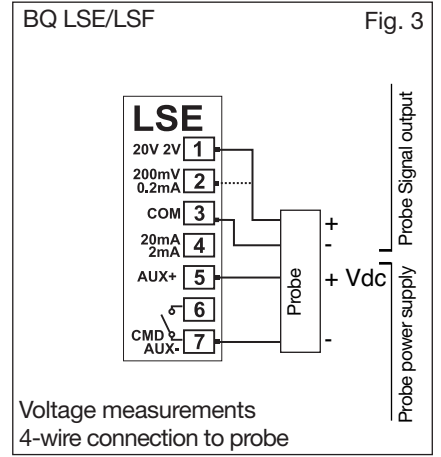
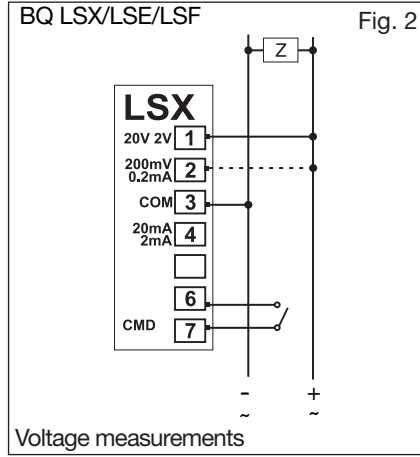
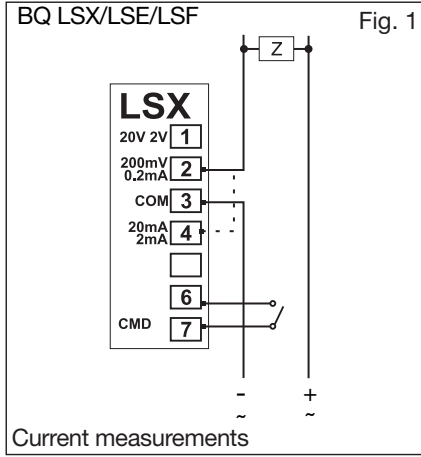
$$V_1 = \sqrt{\frac{1}{n} \cdot \sum_1^n (V_1)_i^2}$$

Instantaneous effective current (TRMS)

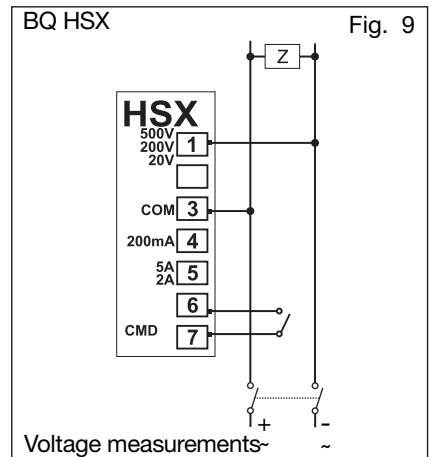
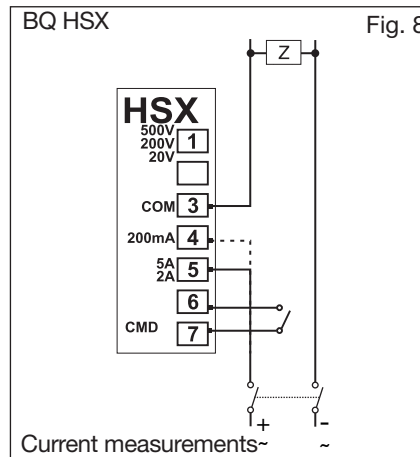
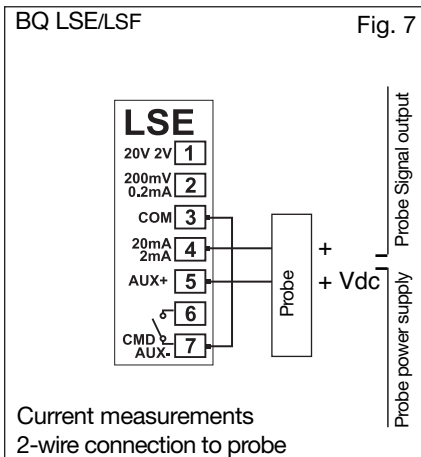
$$A_1 = \sqrt{\frac{1}{n} \cdot \sum_1^n (A_1)_i^2}$$

Wiring diagrams

Process signal wiring diagrams

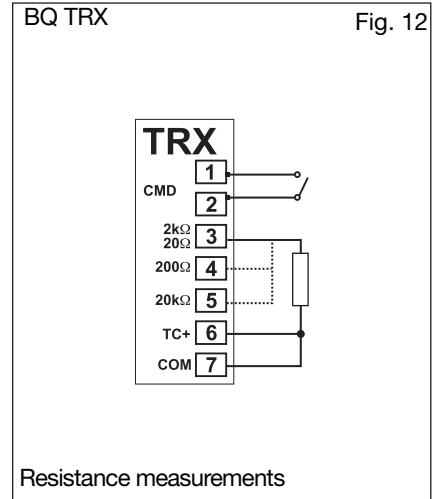
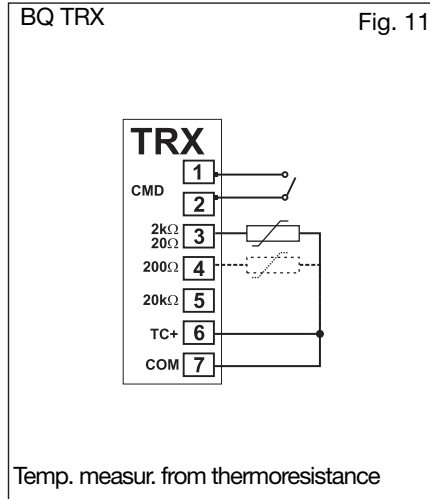
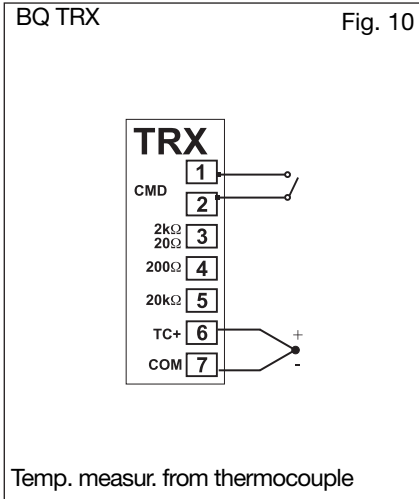


Wirings for high-level signals

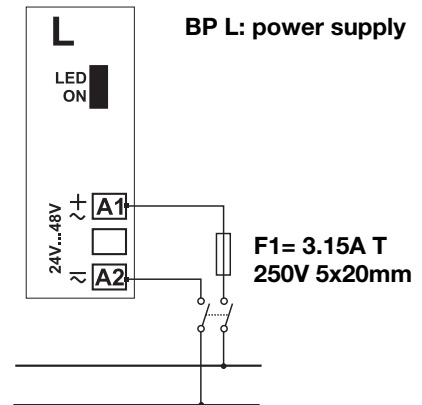
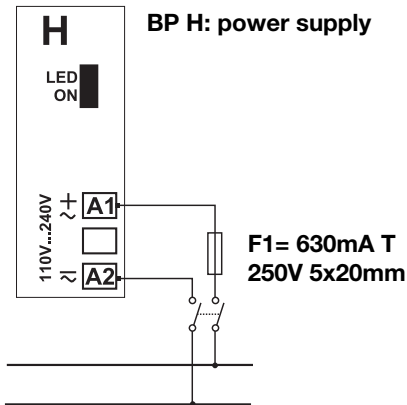


Wiring diagrams (cont.)

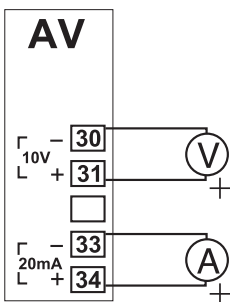
Wiring diagrams for temperature measurements



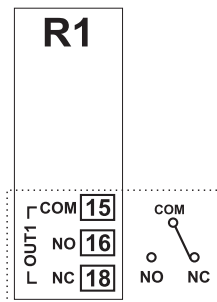
Wiring diagrams for power supply



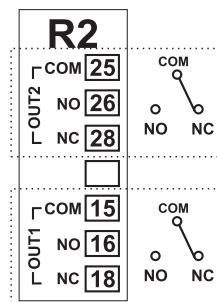
Wiring diagrams of optional modules



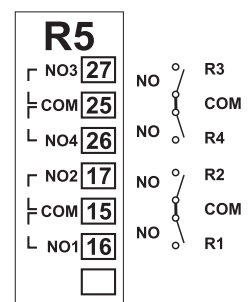
BO AV: analogue output
(10V, 20mA DC)



BO R1: 1 relay output

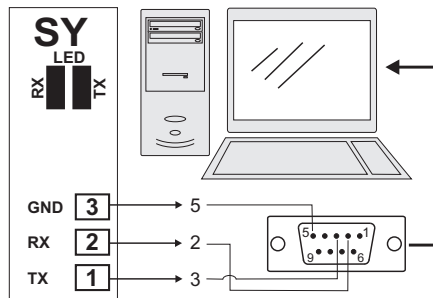
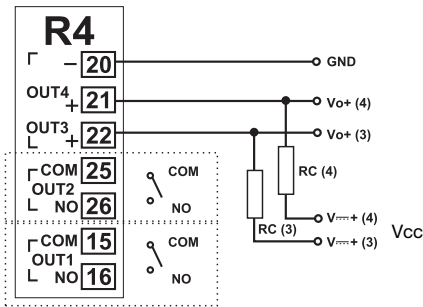


BO R2: 2 relay outputs



BO R5: 4 relay outputs

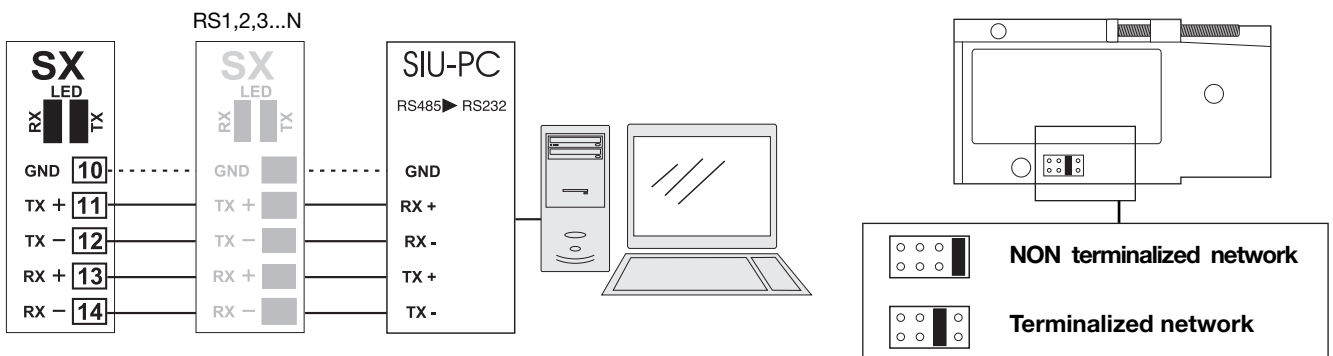
Wiring diagrams of optional modules (cont.)



BO SY: RS232 direct connection to PC by means of COM port. RS232 has no termination.

BO R4: dual relay output + dual open collector output: the load resistances (R_c) must be designed so that the close contact current is lower than 100mA; the VDC voltage must be lower than or equal to 30VDC.

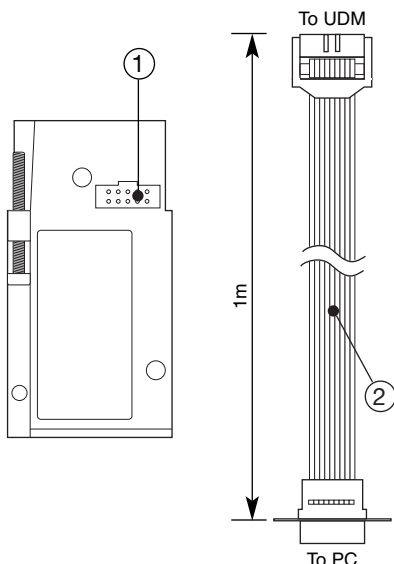
VDC: power supply output
 Vo+: positive output (open collector transistor).
 GND: ground collector (open collector transistor).



BR SX: 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. The serial module is provided with a jumper for the termination of the RS485 network as shown in the figure above.

Note: particular types of cables or plants may require an external termination. For the network connections use twisted cable type AWG26.

Programming UDM40 by means of PC

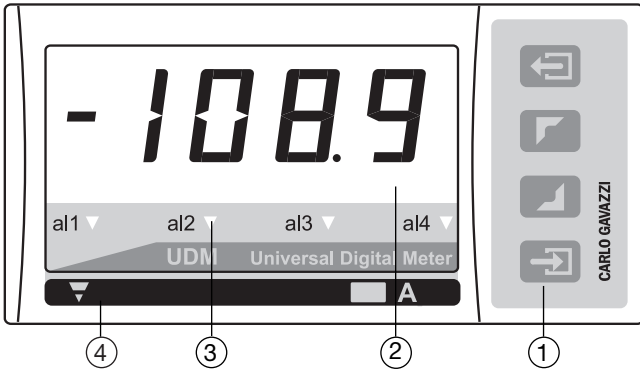


UDM40 is programmable by PC by means of the UdmSoft software (available on request). The user can program all parameters of UDM40 that will be subsequently uploaded and set in the instrument by the RS485 network (BR SX). Should UDM40 be without the RS485 serial module, all programming parameters will be uploaded and set in the instrument by the RS232 auxiliary serial connection (1) located on the side of the measuring input module using the special connection cable (2) available on request, as shown in the figures on the left. It is also possible to program the instrument using the dot connector (1) by means of the HyperTerminal Windows functions of a PC.

Note: the RS232 auxiliary port IS NOT insulated from the measuring inputs.


Ordering code of the cable (2): UCOM1

Front panel description



1. Key-pad

The programming of the configuration parameters and the display may be easily controlled by means of the 4 function keys.

 : to enter the programming phase and to confirm the password.



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



: for special functions.

2. Display

Instantaneous measurements:

- 4 digit (max display 9999).

Alphanumeric indications by means of LED display for:

- Display of configuration parameters;
- The measured variable.

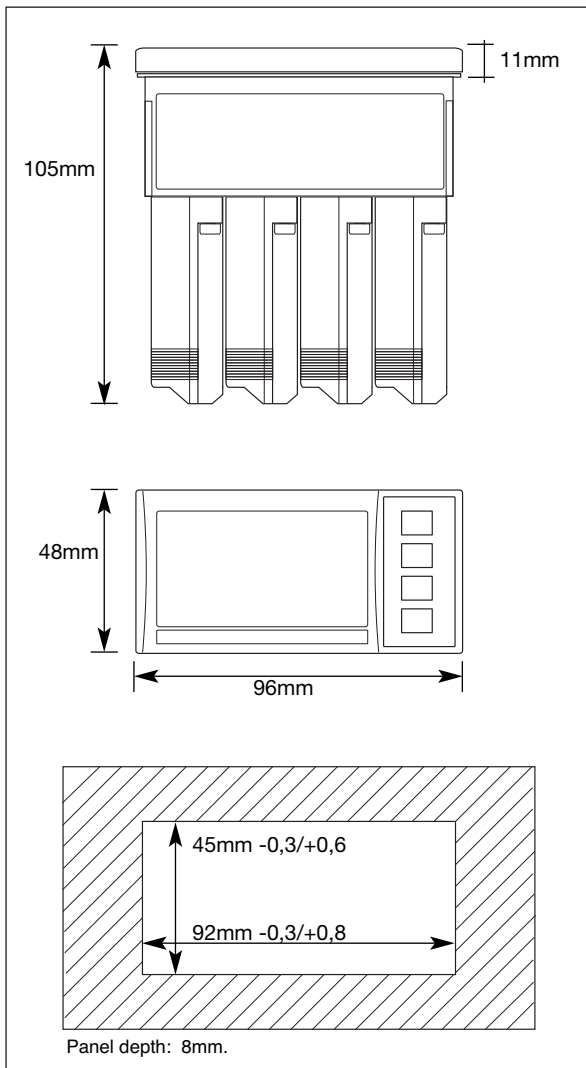
3. Alarm status LED

Display any alarm condition

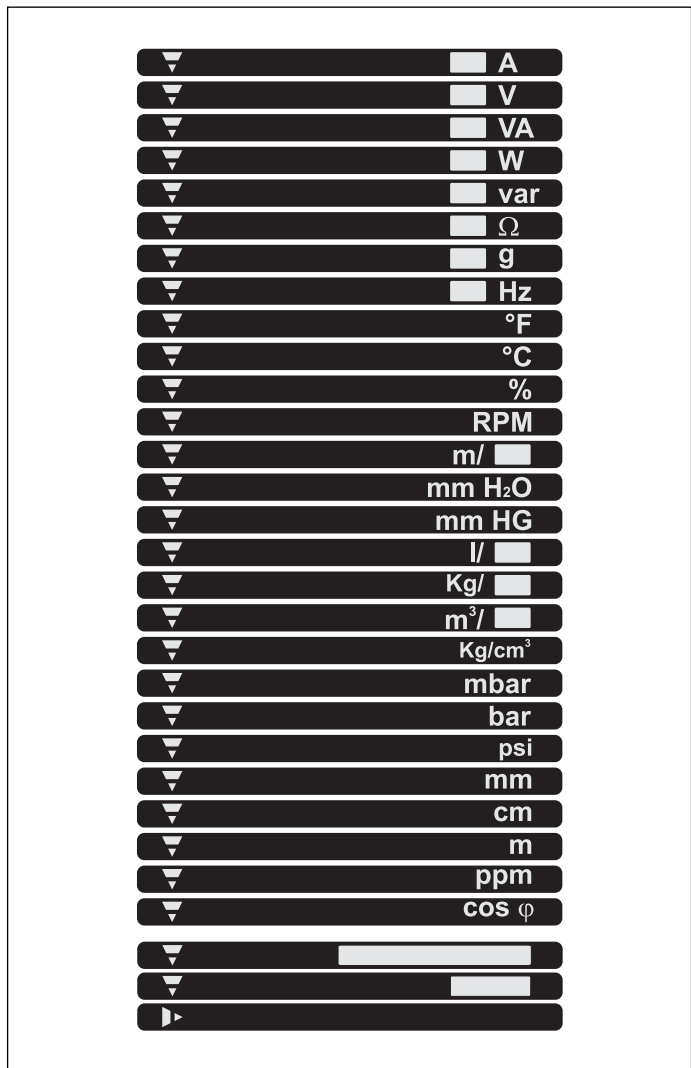
4. Engineering unit

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

Dimensions

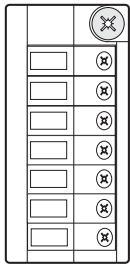


Engineering Units



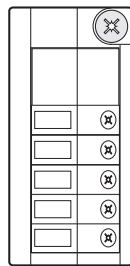
Modules

Input modules

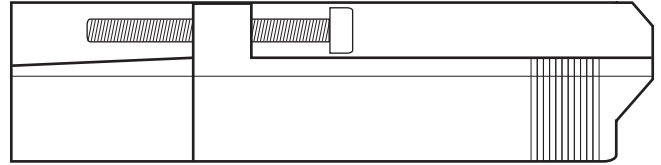


BQ LSX, BQ LSE, BQ LSF, BQ HSX, BQ TRX
Measuring inputs

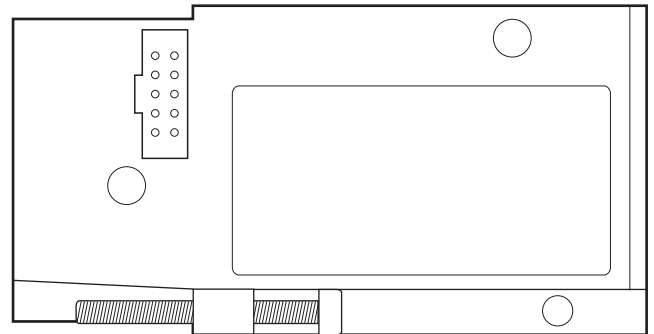
Output modules



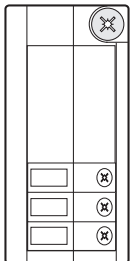
BO AV
Single analogue output 10V, 20mA DC



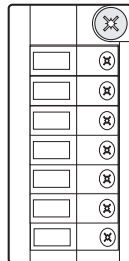
Scale 1:1



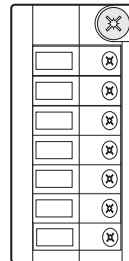
Output modules



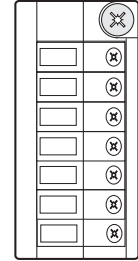
BO R1
Single relay output



BO R2
Dual relay output

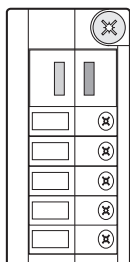


BO R4
Dual relay output +
Dual open collector

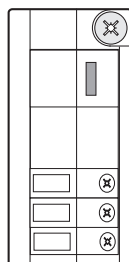


BO R5
4 relay outputs

Serial port modules

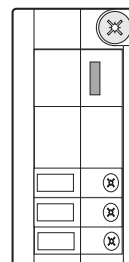


BR SX
RS485 Serial port

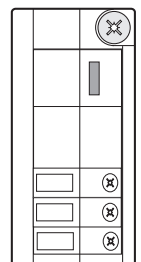


BR SY
RS232 Serial port

Power supply modules



BP H
Power supply:
60 to 260V AC/DC



BP L
Power supply:
18 to 60V AC/DC