

# Digital Panel Meters Modular Indicator and Controller Type UDM35



- Front protection degree: IP67, NEMA12, NEMA4x "Indoor use only"
- Linearization of Hz inputs up to 16 points

- Multi-input modular 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)
- °C or °F temperature measurements (Pt100-250-500-1000, Ni100, TC J-K-S-T-E)
- Resistance measurements: selectable full scales (20Ω to 20kΩ)
- Dual rate, speed, frequency and period measurement (0.001Hz to 50kHz)
- Up to 4 independent alarm set-points (optional)
- 20mA/10VDC analog output (optional)
- Serial port RS485 or RS232 (optional)
- MODBUS, JBUS communication protocol

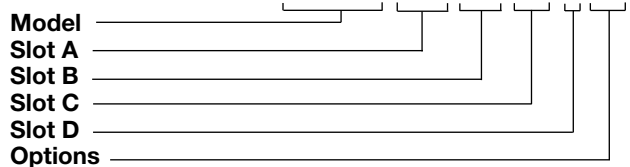
## Product Description

µp-based digital panel meter, 3 1/2 DGT LED indicator, for current, voltage, temperature, resistance, rate, frequency, speed and period measurements. Measuring ranges and functions easily programmable from the key-pad or from the PC

by means of optional UdmSoft software. UDM35 includes storage min-max functions and double level protection password. Housing for panel mounting with front protection degree: IP67, NEMA12, NEMA4x "Indoor use only".

## How to order

**UDM35 XXX XX XX X XX**



## How to order

**UdmSoft-kit**

**UdmSoft-kit:** software plus communication cable for programming UDM35 by means of PC.

**UdmSoft:** software for programming UDM35/40/60 by means of PC, downloadable from [www.carlogavazzi.com](http://www.carlogavazzi.com).

## Type Selection

| Slot A (measuring inputs)   | Slot B (communication)  | Slot C (communication and alarm)   | Slot D (power supply)   |
|---|---|--|---|
| <b>LSX:</b> signal inputs:<br>0.2-2-20mA DC/AC;<br>0.2-2-20V DC/AC<br><br><b>LSE/LSF:</b> signal inputs: + AUX:<br>0.2-2-20mA DC/AC;<br>0.2-2-20V DC/AC<br><br><b>HSX:</b> signal inputs:<br>0.2-2-5A DC/AC;<br>20-200-500V DC/AC<br><br><b>TRX:</b> signal inputs: TC temperature probes (J-K-S-T-E, Pt100-250-500-1000) and resistance (0.02-0.2-2-20kΩ)<br><br><b>TF1:</b> 0.001Hz to 50kHz for DC signals: PNP, NPN, NAMUR, TTL, free of voltage, contacts, voltages up to 14VDC<br><br><b>TF2:</b> 0.001Hz to 50kHz for AC signals: pick-up, voltages up to 500VAC | <b>XX:</b> None<br><b>SX:</b> Serial port RS485<br><b>SY:</b> Serial port RS232<br><b>AV(*):</b> Single analogue output, 0 to 20mA DC and 0 to 10V DC<br><br><b>(*):</b> The two analogue outputs cannot be used at the same time. It is possible to plug in only one module by instrument. | <b>XX:</b> None<br><b>R1:</b> Single relay output, (AC1-8AAC, 250VAC)<br><b>R2:</b> Dual relay output, (AC1-8AAC, 250VAC)<br><b>R4:</b> Dual relay output, (AC1-8AAC, 250VAC) + dual open collector output (NPN, 100mA)<br><b>R5:</b> 4 relay outputs (AC1-5AAC, 250VAC)<br><b>AV(*):</b> Single analogue output, 0 to 20mA DC and 0 to 10V DC | <b>H:</b> 90 to 260V AC/DC<br><b>L:</b> 18 to 60V AC/DC (24 to 48V AC/DC ± 25% according to UL)<br><b>3:</b> 10 to 28V DC (12 to 24V DC ± 15% according to UL)<br><br><b>Options</b><br><b>XX:</b> None<br><b>TX:</b> Tropicalization |

## Input specifications

|   |   |  |
|---|---|--|
| <b>Analogue inputs</b><br>BQ LSX module<br>BQ LSE/LSF module<br>BQ HSX module<br>BQ TRX module<br>BQ TRX module<br>BQTF1 module<br>BQTF2 module   | Channels and variable<br>1, mA and V DC/AC<br>1, mA and V DC/AC + AUX<br>1, A and V DC/AC<br>1, temperature<br>1, resistance<br>2, frequency<br>2, frequency  | Magnetic field<br>0.5% RDG (BQTFx: 0.05%)<br>@ 400 A/m   |
| <b>Type of input</b><br>NPN (DC)<br><br>PNP (DC)<br><br>NAMUR (DC)<br><br>TTL (DC)<br><br>Free of voltage contact(DC)<br><br>Voltage (AC) up to 100VAC<br><br>Voltage (AC) up to 500VAC | Signal level: ON < 2VDC,<br>OFF open collector (leak-<br>age current <=1mA).<br>Signal level: ON >10VDC,<br>OFF open collector (leak-<br>age current <=1mA).<br>Signal level: ON <= 1mADC,<br>OFF >= 2.2 mADC.<br>Signal level: ON >4VDC,<br>OFF<=2VDC.<br>Input load: ON <1kohm,<br>OFF >20kohm.<br>Signal level: ON > 2VAC<br>(5.65 Vpp).<br>Signal level: ON > 9VAC<br>(25.4 Vpp). | <b>Temperature drift</b><br>See table "Measurement<br>accuracy, temperature drifts,<br>and max/min indications"  |
| <b>Digital inputs</b><br>Number of inputs<br>Use<br><br>Contact reading signal<br><br>Close contact resistance<br>Open contact resistance<br>Insulation                                 | Incl. in the measuring module<br>1 (voltage-free)<br>key-pad lock<br>Display hold<br>Reset of latch alarms<br>BQ xxx: <0.1mA, <3,5V DC<br>BQ LSE/BQ LSF: <2.5mA,<br><14V DC<br>BQTF1: <6mA, <7VDC<br>BQTF2: <0.25mA, <3VDC<br>Max 1k $\Omega$<br>Min 500k $\Omega$ (BQTFx: 100k $\Omega$ )<br>Non-insulated   | <b>Sampling rate</b><br>500 samples/s @ 50 Hz<br>(escl. BQTFx)   |
| <b>Accuracy</b> (display, RS485)  | See table "Measuring<br>accuracy", temperature drifts<br>and minimum-maximum<br>indications"  | <b>Display refresh time</b><br>200 msec @ 50Hz<br>(escl. BQTFx)  |
| <b>Additional errors</b><br>Humidity<br><br>Input frequency   | 0.3% RDG (BQTFx: 0.05%),<br>60% to 90% R.H.<br><br>0.4% RDG, 62 to 440 Hz   | <b>Display</b><br>BQxxx: 3 1/2 DGT,<br>BQTFx: 4 DGT<br>7 segments<br>height 14.2 mm  |
|   |   | <b>Max and min indication</b><br>See table "Measurement<br>accuracy, temperature drifts<br>and max min indications"  |
|   |   | <b>Measurements</b><br>Current, voltage, tempera-<br>ture, resistance and frequen-<br>cy. For the current and volt-<br>age measurements: TRMS<br>measurement of distorted<br>sine waves.<br>Coupling type<br>Crest factor<br>Direct<br>$\leq 3$ ; $A_{Pmax}=1.7I_n$ ; $V_{Pmax}=1.7U_n$  |
|   |   | <b>Input impedance</b><br>See table "input<br>impedances and overloads"  |
|   |   | <b>Frequency</b><br>40 to 440 Hz   |
|   |   | <b>Overload</b><br>See table "input<br>impedances and overloads"   |
|   |   | <b>Compensation</b><br><br>Only temperature<br>measurement module.<br><br>RTD<br>- For Pt 100-250-500-1000,<br>3-wire connection: up to 10 $\Omega$<br>- For resistance measur. with<br>20 $\Omega$ range: up to max 0.1 $\Omega$<br>- For resistance measurements<br>with $\geq 200\Omega$ range: up to max 10 $\Omega$<br>Internal cold junction, within<br>temperature range from<br>0 to +50°C.<br>Automatic or manual com-<br>pensation from 0 to 50°C. |
|   |   | TC   |

## 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/<br>BQ LSE/<br>BQ LSF | -200 $\mu$ A to +200 $\mu$ A<br>-2mA to +2mA<br>-20mA to +20mA<br>-200mV to +200mV<br>-2V to +2V<br>-20V to +20V | DC/AC | DC: $\pm(0.1\%RDG+3DGT)$<br>0% to 25% FS;<br>$\pm(0.1\%RDG+2DGT)$<br>25% to 110% FS.                      | $\pm 150$ ppm/°C | - 199.9             | + 199.9           |
|                              |  |       | TRMS (da 45 a 65Hz)*:<br>$\pm(0.3\%RDG+3DGT)$<br>0% to 25% FS;<br>$\pm(0.3\%RDG+2DGT)$<br>25% to 110% FS. |                  | - 1.999             | + 1.999           |
|                              |  |       |   |                  | - 19.99             | + 19.99           |
|                              |  |       |   |                  | - 199.9             | + 199.9           |
|                              |  |       |   |                  | - 1.999             | + 1.999           |
|                              |  |       |   |                  | - 19.99             | + 19.99           |

\* <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, max and min indications (cont.)

All accuracies and min/max indications are referred to an ambient temp. range of 25°C ±5°C, rel. humidity ≤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 HSX                      | -200mA to +200mA<br>-2A to +2A<br>-5A to +5A<br>-20V to +20V<br>-200V to +200V<br>-500V to +500V   | DC/AC  | DC: ±(0.1%RDG+3DGT)<br>0% to 25% FS;<br>±(0.1%RDG+2DGT)<br>25% to 110% FS.<br>TRMS (45 to 65Hz)*:<br>±(0.3%RDG+3DGT)<br>0% to 25% FS;<br>±(0.3%RDG+2DGT)<br>25% to 110% FS.                | ±150 ppm/°C | - 199.9<br>- 1.999<br>- 5.00<br>- 19.99<br>- 199.9<br>- 500  | + 199.9<br>+ 1.999<br>+ 5.00<br>+ 19.99<br>+ 199.9<br>+ 500   |
| BQ TRX<br>Thermo-<br>couple | -50°C to +760°C<br>-58 °F to +1400 °F<br>-200°C to +1260°C<br>-328 °F to +2300°F<br>-200°C to +1000°C<br>-328°F to +1832°F<br>-50°C to +1750°C<br>-58°F to +3182°F<br>-200°C to +400°C<br>-328°F to +752°F | J<br>J<br>K<br>K<br>E<br>E<br>S<br>S<br>T<br>T | ±(0.2%RDG+1DGT)<br>±(0.2%RDG+2DGT)<br>±(0.2%RDG+2DGT)<br>±(0.2%RDG+4DGT)<br>±(0.2%RDG+2DGT)<br>±(0.2%RDG+4DGT)<br>±(0.2%RDG+2DGT)<br>±(0.2%RDG+4DGT)<br>±(0.2%RDG+2DGT)<br>±(0.2%RDG+4DGT) | ±150 ppm/°C | - 50°C<br>- 58°F<br>- 200°C<br>- 328°F<br>- 200°C<br>- 328°F<br>- 50°C<br>- 58°F<br>- 200°C<br>- 328°F | + 760°C<br>+ 1400°F<br>+ 1260°C<br>+ 2300°F<br>+ 1000°C<br>+ 1832°F<br>+ 1750°C<br>+ 3182°F<br>+ 400°C<br>+ 752°F |

\* <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.

| Module                               | Inputs  | Type   | Accuracy   | Temp. drift | Min. indication  | Max. indicat.   |
|--------------------------------------|---|--|--|-------------|--|---|
| BQ TRX<br>Ther-<br>moresis-<br>tance | -200°C to +850°C<br>-328°F to +1562°F<br>-200.0°C to +200.0°C<br>-328°F to +392°F<br>-200.0°C to +200.0°C<br>-328°F to +392°F<br>-200.0°C to +200.0°C<br>-328°F to +392°F<br>-200.0°C to +200.0°C<br>-328°F to +392°F<br>-60°C to +180°C<br>-76°F to +356°F | Pt100<br>Pt100<br>Pt100<br>Pt100<br>Pt250<br>Pt250<br>Pt500<br>Pt500<br>Pt1000<br>Pt1000<br>Ni100<br>Ni100 | ±(0.2%RDG +2DGT)<br>±(0.2%RDG +4DGT)<br>±(0.5%RDG +5DGT)<br>±(0.5%RDG +5DGT)<br>±(0.5%RDG +5DGT)<br>±(0.5%RDG +5DGT)<br>±(0.5%RDG +5DGT)<br>±(0.5%RDG +5DGT)<br>±(0.5%RDG +5DGT)<br>±(0.5%RDG +5DGT)<br>±(0.5%RDG +1DGT)<br>±(0.5%RDG +2DGT) | ±150 ppm/°C | - 200<br>- 328<br>- 200.0<br>- 328.0<br>- 200.0<br>- 328.0<br>- 200.0<br>- 328.0<br>- 200.0<br>- 328.0<br>- 60<br>- 76 | + 850<br>+ 1562<br>+ 200.0<br>+ 392.0<br>+ 200.0<br>+ 392.0<br>+ 200.0<br>+ 392.0<br>+ 200.0<br>+ 392.0<br>+ 180<br>+ 356 |
| BQ TRX<br>Resis-<br>tance            | 0 to 20Ω<br>0 to 200Ω<br>0 to 2000Ω<br>0 to 20.00kΩ   |  | ±(0.2%RDG+2DGT)<br>25% to 110% FS<br>±(0.2%RDG+3DGT)<br>0% to 25% FS   | ±150 ppm/°C | 0<br>0<br>0<br>0   | 19.99 (■)<br>199.9 (■)<br>1999 (■)<br>19.99 (■)   |
| BQ TF1                               | NPN (DC)<br>PNP (DC)<br>NAMUR (DC)<br>TTL (DC)<br>Free of voltage con-<br>tact (DC)   |  | 0.001% RDG<br>±3 digit   | ± 50 ppm/°C | 0.000 (*)<br>00.00 (*)<br>000.0 (*)<br>0000 (*)  | 9.999<br>99.99<br>999.9<br>9999   |
| BQ TF2                               | Pick-up (AC)<br>Voltage (AC) up to<br>100VAC<br>Voltage (AC) up to<br>500VAC  |  | 0.001% RDG<br>±3 digit   | ± 50 ppm/°C | 0.000 (*)<br>00.00 (*)<br>000.0 (*)<br>0000 (*)  | 9.999<br>99.99<br>999.9<br>9999   |

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

(\*) The min indication is -9.99999, ..., -999999 in case of "rotation speed detection" function

## Input impedances and overloads

| Module                          | Inputs   | Type   | Impedance  | Overload (continuous)   | Overloads (1s)  |
|---------------------------------|--|--|--|---|---|
| BQ LSX/<br>BQ LSE/<br>BQ LSF    | -200µA to +200µA<br>-2mA to +2mA<br>-20mA to +20mA<br>-200mV to +200mV<br>-2V to +2V<br>-20V to +20V   | DC/AC<br>DC/AC<br>DC/AC<br>DC/AC<br>DC/AC<br>DC/AC   | $\leq 2,2k\Omega$<br>$\leq 22\Omega$<br>$\leq 22\Omega$<br>$\geq 2,2k\Omega$<br>$\geq 200k\Omega$<br>$\geq 200k\Omega$ | 5mA<br>50mA<br>50mA<br>10V<br>50V<br>50V                      | 10mA<br>150mA<br>150mA<br>20V<br>100V<br>100V                 |
| BQ HSX                          | -200mA to +200mA<br>-2A to +2A<br>-5A to +5A<br>-20V to +20V<br>-200V to +200V<br>-500V to +500V   | DC/AC<br>DC/AC<br>DC/AC<br>DC/AC<br>DC/AC<br>DC/AC   | $\leq 1\Omega$<br>$\leq 0.012\Omega$<br>$\leq 0.012\Omega$<br>$\geq 2M\Omega$<br>$\geq 2M\Omega$<br>$\geq 2M\Omega$    | 0.8A<br>7.5A<br>7.5A<br>750V<br>750V<br>750V                  | 1A<br>100A<br>100A<br>1000V<br>1000V<br>1000V                 |
| BQ TRX<br>Thermo-<br>couple     | -50°C to +760°C<br>-58 °F to +1400 °F<br>-200°C to +1260°C<br>-328 °F to +2300°F<br>-200°C to +1000°C<br>-328°F to +1832°F<br>-50°C to +1750°C<br>-58°F to +3182°F<br>-200°C to +400°C<br>-328°F to +752°F | J<br>J<br>K<br>K<br>E<br>E<br>S<br>S<br>T<br>T   | $I_{LK} < 0.5\mu A$  | Max 5V  | Max 10V   |
| BQ TRX<br>Thermo-<br>resistance | -200°C to +850°C<br>-328°F to +1562°F<br>-200.0°C to +200,0°C<br>-328°F to +392°F<br>-200.0°C to +200,0°C<br>-328°F to +392°F<br>-60°C to +180°C<br>-76°F to +356°F  | Pt100<br>Pt100<br>Pt250/Pt100<br>Pt250/Pt100<br>Pt1000/Pt500<br>Pt1000/Pt500<br>Ni100<br>Ni100 | 800µA (*)<br>800µA (*)<br>90µA (*)<br>90µA (*)<br>800µA (*)<br>800µA (*)<br>800µA (*)<br>800µA (*)                     | Max 5V  | Max 10V   |
| BQ TRX<br>Resistance            | 0 to 20Ω<br>0 to 200Ω<br>0 to 2000Ω<br>0 to 20.0kΩ   |  | 800µA (*)<br>90µA (*)<br>800µA (*)<br>90µA (*)   | Max 5V  | Max 10V   |
| BQ TF1                          | NPN (DC)<br>PNP (DC)<br>NAMUR (DC)<br>TTL (DC)<br>Free of voltage contact<br>(DC)  |  | 600 Ω<br>600 Ω<br>600 Ω<br>600 Ω   | 15 VAC/DC<br>15 VAC/DC<br>15 VAC/DC<br>15 VAC/DC<br>15 VAC/DC | 20 VAC/DC<br>20 VAC/DC<br>20 VAC/DC<br>20 VAC/DC<br>20 VAC/DC |
| BQ TF2                          | Pick-up (AC)<br>Voltage (AC) up to<br>100VAC<br>Voltage (AC) up to<br>500VAC   |  | 220 kΩ<br>950 kΩ   | 120 VAC/DC<br>600 VAC/DC                                      | 200 VAC/DC<br>600 VAC/DC                                      |

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

## Output specifications

|  |  |   |  |
|--|--|---|--|
| <b>RS422/RS485</b>   | <b>(on request)</b><br>Module: BR SX<br>Bidirectional (static and dynamic variables).<br>Display of data reception/transmission<br>Multidrop, 2 or 4 wires, 1000 m<br>Directly on the module by means of jumper<br>1 to 247, selectable by means of key-pad<br>MODBUS RTU/JBUS | BO R2 (2 relay outputs).  | 4, independent with module<br>BO R4 (2 relay outputs + 2 open collector outputs).<br>BO R5 (4 relay outputs)   |
| Serial output  |  | Relay output BO R1, R2, R4  | Type SPST<br>AC 1: 8A, 250VAC<br>DC 12: 5A, 24VDC<br>AC 15: 2.5A, 250VAC<br>DC 13: 2.5A, 24VDC   |
| LED  |  | Relay output BO R5  | Type SPST (NO)<br>AC 1: 5A, 250VAC<br>DC 12: 3A, 24VDC<br>AC 15: 1.5A, 250VAC<br>DC 13: 1.5A, 24VDC  |
| Connections<br>Distance<br>Terminalization                 |  | Insulation  | 4000 V <sub>RMS</sub> output to measuring input,<br>4000 V <sub>RMS</sub> output to power supply input.<br>NPN transistor type<br>V <sub>ON</sub> 1.2 VDC/ max. 100 mA<br>V <sub>OFF</sub> 30 VDC max.                                       |
| Addresses  |  | Open collector output   | By means of opto-couplers<br>4000 V <sub>RMS</sub> output to measuring input<br>4000 V <sub>RMS</sub> output to power supply input   |
| Protocol<br>Data (bidirectional)<br>Dynamic (reading only) | Measurement, min value<br>max value<br>alarm status  | Insulation  |  |
| Static (reading/writing)                                   | All programming parameters,<br>min max reset<br>reset of latch alarm   |   |  |
| Data format  | 8 data bit, no parity,<br>1 stop bit   |   |  |
| Baud rate  | selectable 4800, 9600, 19200<br>and 38400 bit/s  |   |  |
| Insulation   | By means of opto-couplers<br>4000 V <sub>ms</sub> output to measuring inputs<br>4000 V <sub>ms</sub> output to power supply input  |   |  |
| <b>RS232</b>   | <b>(on request)</b><br>Module: BR SY<br>Bidirectional (static and dynamic variables)<br>3 wires,<br>max. 15m<br>1 start bit, 8 data bit,<br>no parity, 1 stop bit<br>Selectable 4800, 9600,<br>19200 and 38400 bit/s<br>Same as RS422/485                                      | <b>Analogue output</b>  | <b>(on request)</b><br>Module: BO AV<br>0 to 20 mADC, 0 to 10 VDC<br>Programmable within the entire retransmission range;<br>allows to manage the retransmission of all the values from<br>0 to 20 mA / 0 to 10V<br>± 0.2% FS (@ 25°C ± 5°C) |
| Serial output  |  | Range<br>Scaling factor   | ≤ 10 ms<br>± 200 ppm/°C<br>≤ 700 Ω<br>≥ 10 kΩ  |
| Connections<br>Distance<br>Data format                     |  | Accuracy<br>Response time<br>Temperature drift<br>Load: 20 mA output<br>10 V output | By means of opto-couplers<br>4000V <sub>ms</sub> output to measuring input<br>4000V <sub>ms</sub> output to power supply input   |
| Baud rate  |  | Insulation  | The two outputs cannot be used at the same time.   |
| Other features   |  | Notes:  |  |
| <b>Alarm outputs</b>                                       | <b>(on request)</b><br>Over-range alarm,<br>up alarm,<br>down alarm,<br>down alarm with start-up deactivation<br>up alarm with latch,<br>down alarm with latch   | <b>Excitation output</b>  | <b>(on request)</b>  |
| Alarm type   | Adjustable from 0 to 100% of displayed electric range  | BQ LSE Module<br>Voltage  | 13 VDC ±10%, max. 50 mA  |
| Alarm set-point  | 0 to 100% of displayed range   | BQ LSF Module<br>Voltage  | 25 VDC ±10%, max. 25 mA  |
| Hysteresis   | 0 to 255 s   | BQTF1 Module<br>Voltage 1<br>Voltage 2  | 8.2VDC ±10%, max 10mA.<br>13VDC ±10%, max 40mA.  |
| On-time delay  | 0 to 255 s   | Insulation  | 25V <sub>RMS</sub> output to measuring input<br>4000 V <sub>RMS</sub> output to power supply input   |
| Off-time delay   | Selectable: normally energized /de-energized   |   |  |
| Output status  | 500 ms, with filter excluded,<br>without alarm activation delay  |   |  |
| Min response time  | 1 with module BO R1 (relay output).<br>2, independent with module  |   |  |
| Output channels  |  |   |  |

## 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>Input engineering unit</b>   | BQTFx only: programmable among Hz, kHz, rpm, krpm, rph, krph   |
| <b>Password</b>                   | Numeric code max 4 dgt<br>2 levels of data protection.<br>0 to 4999 completely protected.<br>5000 to 9999 access to programming is protected .<br>Alarm set-points are directly programmable from the measuring mode. | <b>Diagnostics</b>              | 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.<br>Only temperature inputs<br>Opening of probe's connection: EEE indication<br>Opening of probe's connection: EEE indication<br>probe's short circuit: -EEE indication.<br>Exceeding of frequency range: Err indication |
| 1st level<br>2nd level            |   | Burn-out:<br>TC<br>RTD<br>BQTFx |  |
| <b>Measurement selection</b>      | Depending on the module: measuring range and type of probe (resistance, RTD thermoresistance, TC thermocouple) or measuring type (TRMS or DC).  | <b>Digital filter</b>           | Filter operating range<br>Filtering coefficient  |
| <b>Function (only BQTFx)</b>      | Displayed functions of channel A and B:<br>F1: scaled value of channel A;<br>F2: 1/A;<br>F3: A-B;<br>F4: (A-B)/B*100;<br>F5: A/B;<br>F6: B/(A+B)+100;<br>F7: rotation sensing.  | <b>Display selection</b>        | 3 1/2 DGT or 3 DGT plus dummy zero (BQTFx excluded)<br>4 DGT on BQTFx  |
| <b>Integration time selection</b> | Automatic or from 100.0 to 999.9 ms only in the current and voltage measurement. (BQTFx excluded)   | <b>Scaling</b>                  | Selection of min value of the input range.<br>Selection of max value of the input range.<br>Selection of decimal point position.<br>Selection of min display value.<br>Selection of max display value.   |
| <b>Scaling factors</b>            |   | <b>UdmSoft</b>                  | Software for programming UDM35 by means of PC (Windows 95, 98se, ME, XP) by means of serial port RS485 and relevant connection cable.<br>The software is available in English, Spanish, Italian, German and French. See also "Programming of UDM35 by means of PC".  |
| Operating mode                    | Electrical scale compression, displayed scale compression/expansion (max. 2 without filter, up to 10 with filter)   |                                 |  |
| Electrical range                  | Programmable within the whole measuring range   |                                 |  |
| Decimal point position            | Programmable within the display range   |                                 |  |
| Displayed range of the variable   | Programmable within the display range   |                                 |  |
| Pulse per revolution              | BQTFx only: programmable from 1 to 9999   |                                 |  |

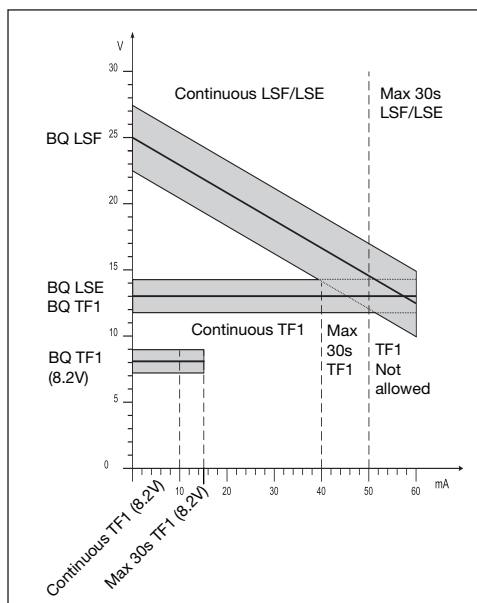
## Supply Specifications

|                        |  |                           |  |
|------------------------|--|---------------------------|--|
| <b>AC/DC voltage</b>   | 90 to 260V (standard)<br>18 to 60V (on request)<br>(24 to 48V AC/DC $\pm$ 25% according to UL) | <b>Energy consumption</b> | $\leq$ 30VA/12W (90 to 260V)<br>$\leq$ 20VA/12W (18 to 60V)<br>$\leq$ 7.5W (10 to 28V) |
| <b>DC voltage only</b> | 10 to 28V (on request)<br>(12 to 24V DC $\pm$ 15% according to UL)                             |                           |  |

## General Specifications

|                                     |  |  |   |
|-------------------------------------|--|--|---|
| <b>Operating temperature</b>        | 0° to 50°C (32° to 122°F)<br>(H.R. < 90% non-condensing)   | <b>Safety Standards</b><br>Safety              | EN 61010-1, IEC 61010-1   |
| <b>Storage temperature</b>          | -10° to 60°C (14° to 140°F)<br>(H.R. < 90% non-condensing) | <b>Connections</b><br>Cable cross-section area | Screw type<br>Max. 2.5 mm <sup>2</sup> ;<br>Min./Max. screws tightening torque: 0.4 Nm / 0.6 Nm |
| <b>Insulation reference voltage</b> | 300 V <sub>RMS</sub> to ground<br>(500V input)             | <b>Housing</b><br>Dimensions<br>Material       | 1/8 DIN, 48 x 96 x 105 mm<br>PC-ABS,<br>self-extinguishing: UL 94 V-0                           |
| <b>Insulation</b>                   | See table "Insulation between inputs and outputs"          | <b>Protection degree</b>                       | Front: IP67, NEMA12,<br>NEMA4x "Indoor use only"<br>Connections: IP20                           |
| <b>Dielectric strength</b>          | 4000 V <sub>RMS</sub> for 1 minute                         | <b>Weight</b>                                  | 520 g approx (included all modules and packing)   |
| <b>Rejection</b><br>NMRR<br>CMRR    | 40 dB, 40 to 60 Hz<br>100 dB, 40 to 60 Hz                  | <b>Approvals</b>                               | CE, cCSA UL e cRU US  |
| <b>EMC</b>                          | EN61000-6-2, IEC61000-6-2<br>EN61000-6-3, IEC61000-6-3     |  |   |

## 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     |
|---|----------------|-------------------|
| UDM35 main unit   |                | BD 35             |
| DC/AC input: 200 $\mu$ A, 2mA, 20mA, 200mA, 2V, 20V                     | 1              | BQ LSX            |
| DC/AC input: 200 $\mu$ A, 2mA, 20mA, 200mA, 2V, 20V + excitation output | 1              | BQ LSE/<br>BQ LSF |
| DC/AC input: 200mA, 2A, 5A, 20V, 200V, 500V                             | 1              | BQ HSX            |
| Input: 20 $\Omega$ , 200 $\Omega$ , 2k $\Omega$ , 20k $\Omega$          | 1              | BQ TRX            |
| TC: J-K-S-T-E, Pt100-250-500-1000                                       | 1              | BQ TRX            |
| Pulse signals input: 0.001Hz to 50kHz for DC signals                    | 2              | BQ TF1            |
| Pulse signals input: 0.001Hz to 50kHz for AC signals                    | 2              | BQ TF2            |
| 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              |
| Power supply 10 to 28V DC   |                | BP 3              |

## Possible module combinations

| Basic Unit  | Slot A | Slot B | Slot C | Slot D |
|---|--------|--------|--------|--------|
| Measuring inputs: LSX, LSE, LSF, HSX, TRX, TF1, TF2 | ●      |        |        |        |
| 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, 3                               |        |        |        | ●      |

(\*) Up to 1 module max.

## Used calculation formulas

Only for TRMS Measurements

Instantaneous effective voltage (TRMS)

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

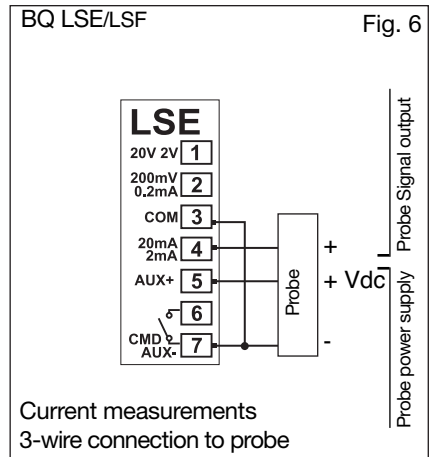
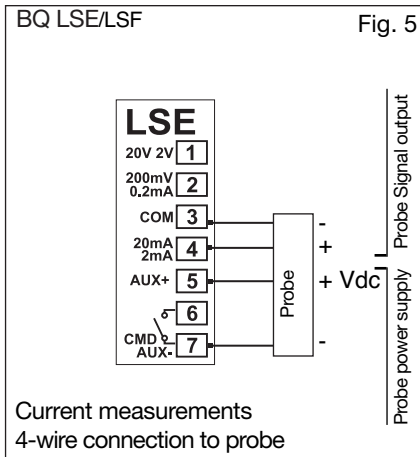
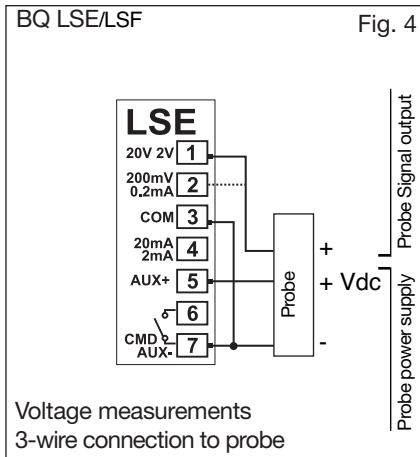
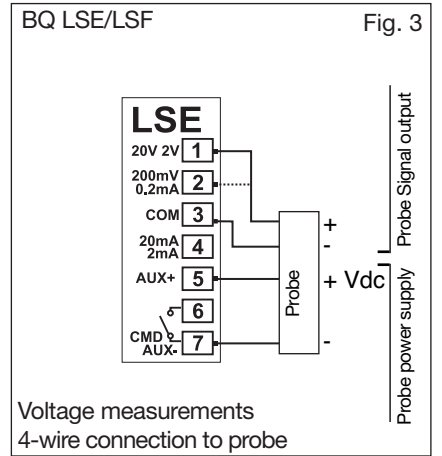
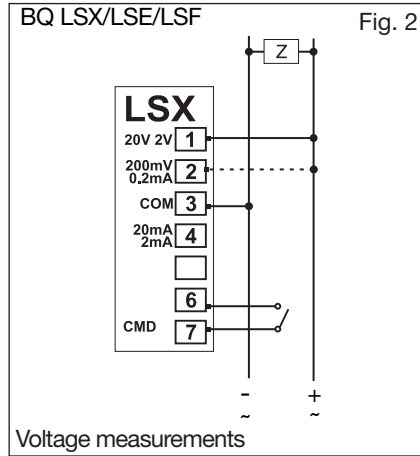
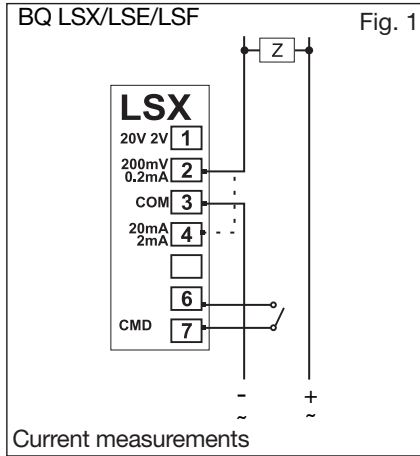
Instantaneous effective current (TRMS)

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

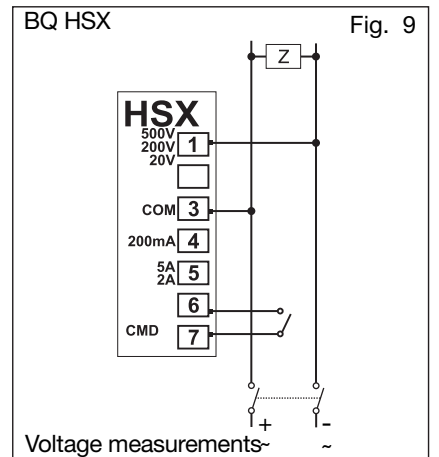
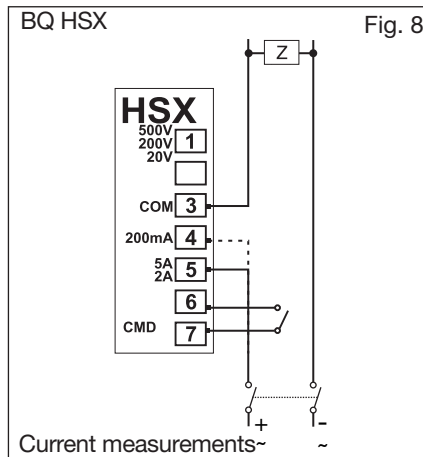
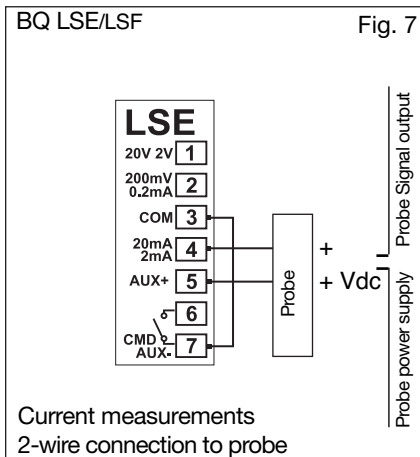


# Wiring diagrams

## Process signal wiring diagrams

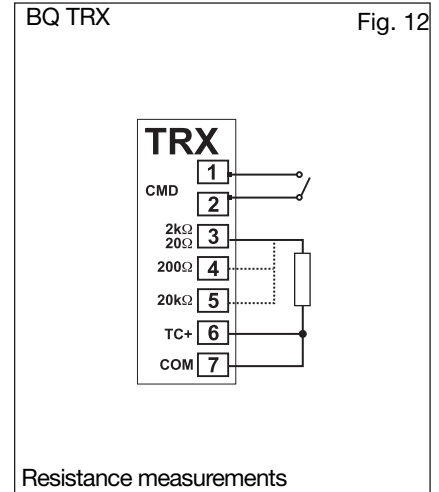
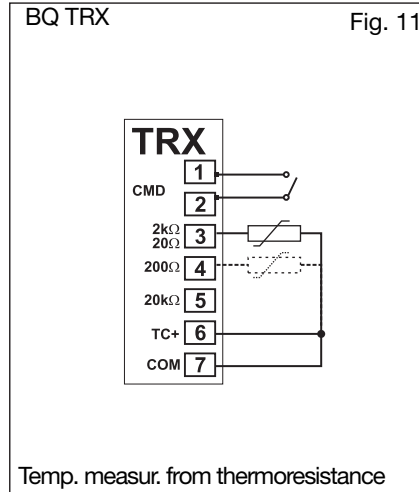
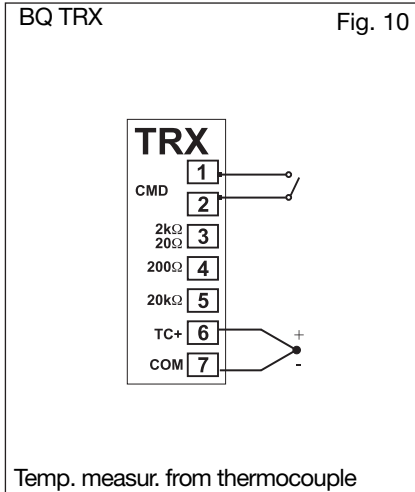


## Wirings for high-level signals

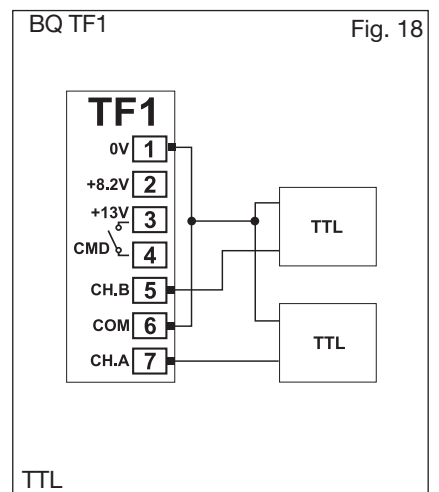
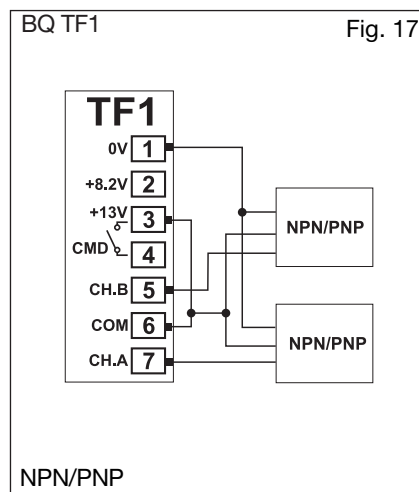
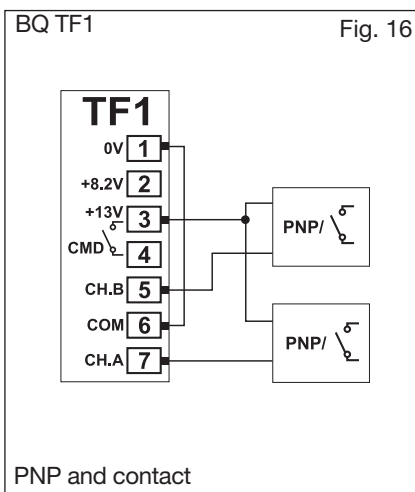
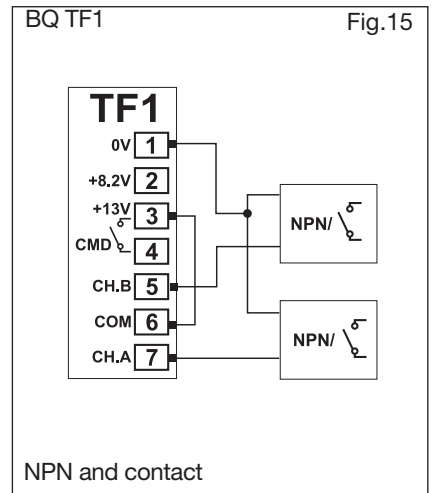
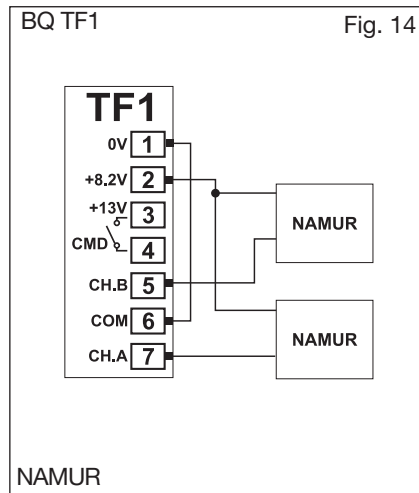
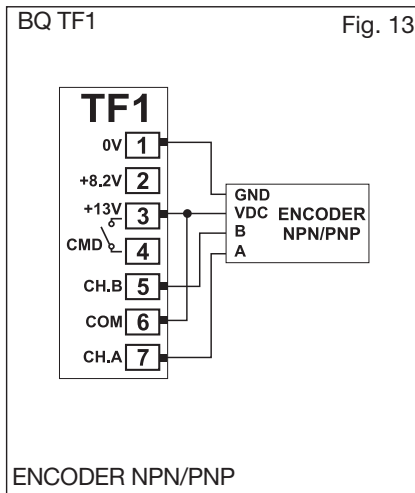


## Wiring diagrams (cont.)

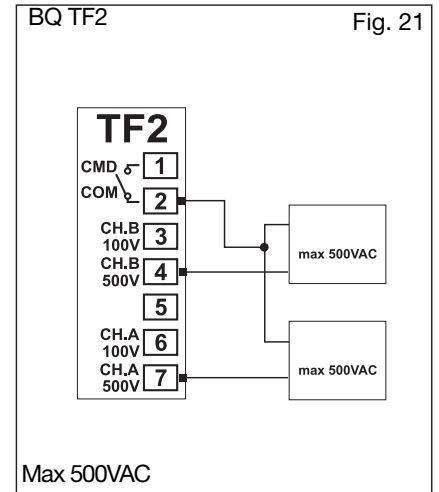
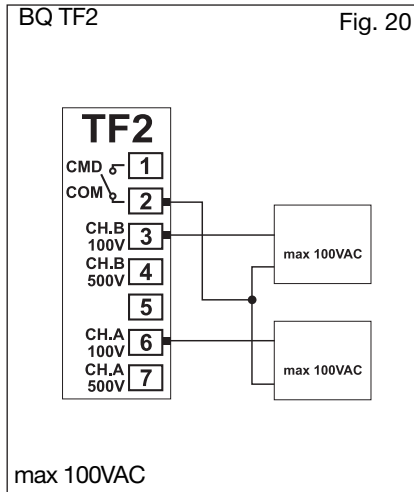
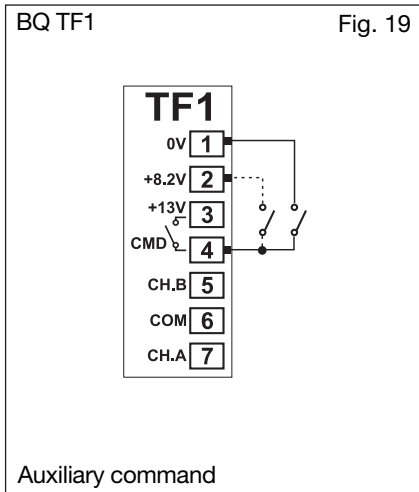
### Wiring diagrams for temperature measurements



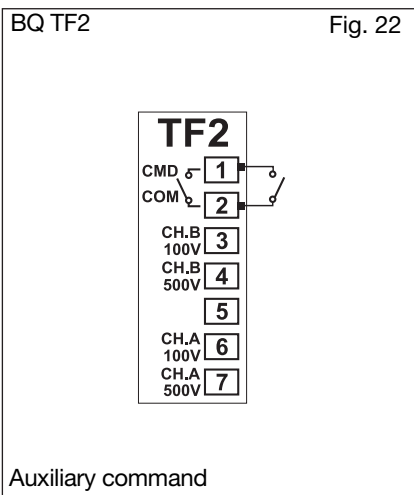
### Wiring diagrams for frequency measurements



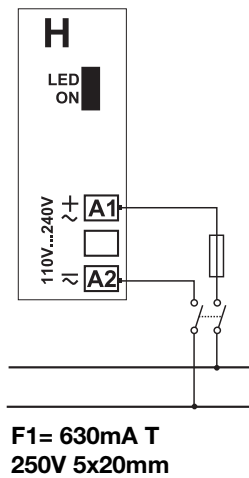
## Wiring diagrams (cont.)



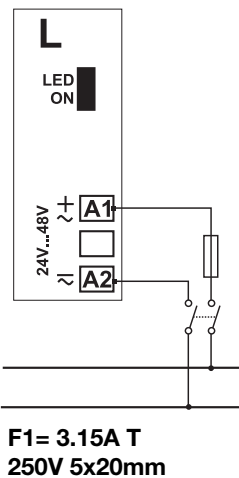
### Wiring diagrams for power supply



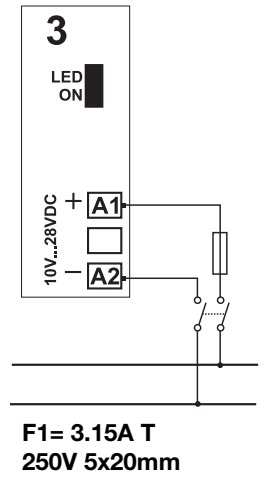
#### BP H: power supply



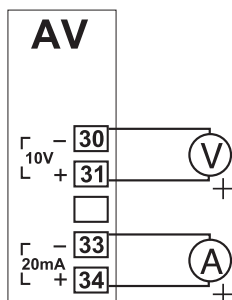
#### BP L: power supply



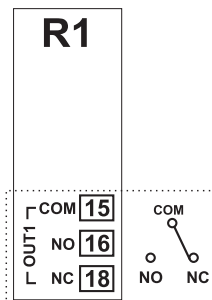
#### BP 3: power supply



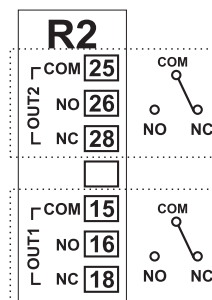
## Wiring diagrams of optional modules



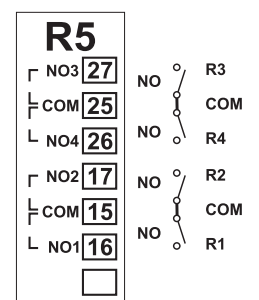
BO AV: analogue output (10V, 20mA DC)



BO R1: 1 relay output

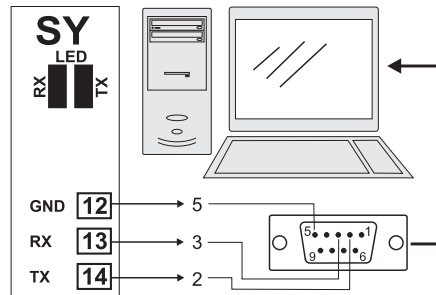
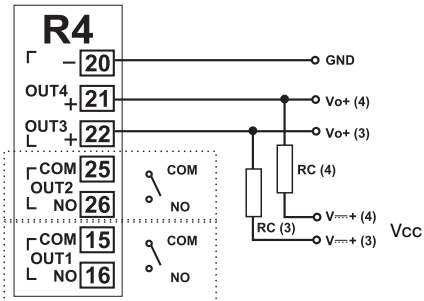


BO R2: 2 relay outputs



BO R5: 4 relay outputs

## Wiring diagrams of optional modules (cont.)



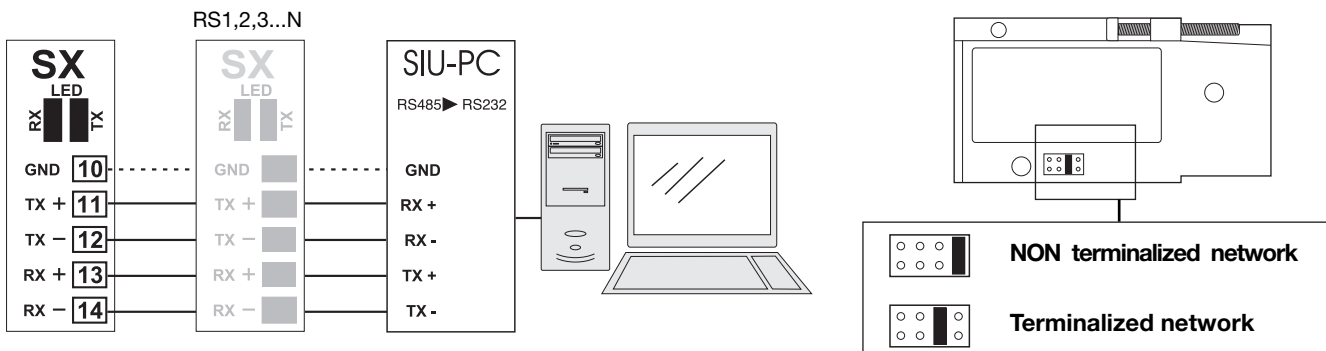
**BO SY:** RS232 direct connection to PC by means of COM port. RS232 has no termination.

**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).

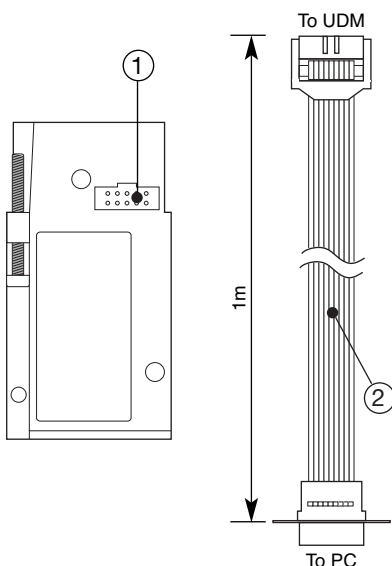
GND: ground (open collector transistor).



**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.

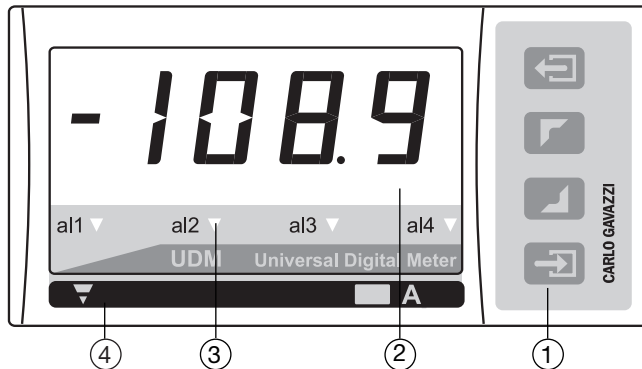
## Programming UDM35 by means of PC



UDM35 is programmable by PC by means of the UdmSoft software (available on request). The user can program all parameters of UDM35 that will be subsequently uploaded and set in the instrument by the RS485 network (BRSX). Should UDM35 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.

## 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:

- 3 1/2 digit (max display 1999).
  - 4 digit (max display 9999) for tachometer measurements.
- Alphanumeric indications by means of LED display for:
- Display of configuration parameters;
  - The measured variable.

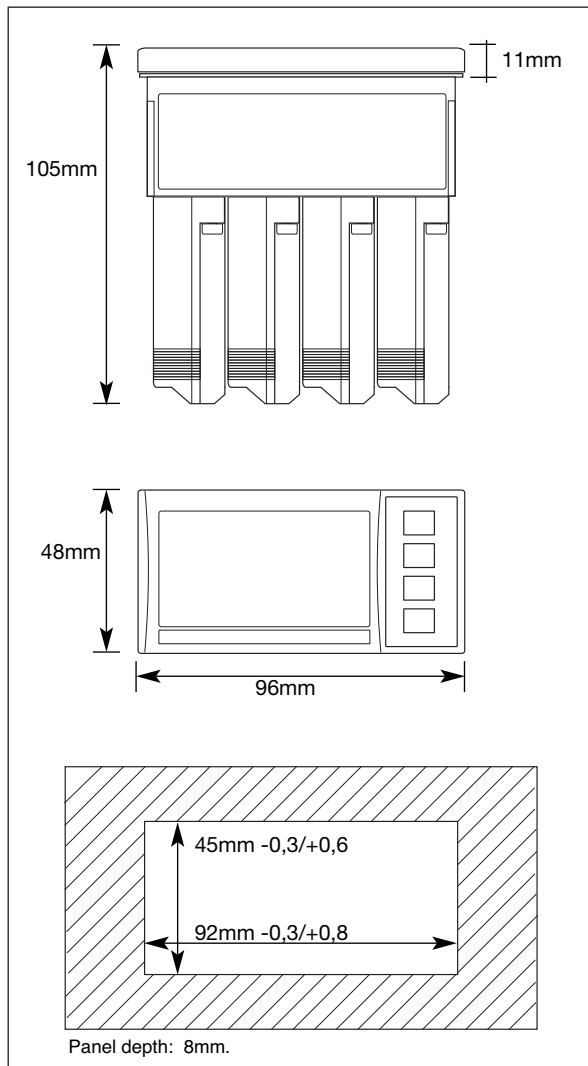
### 3. Alarm status LED

Display any alarm condition

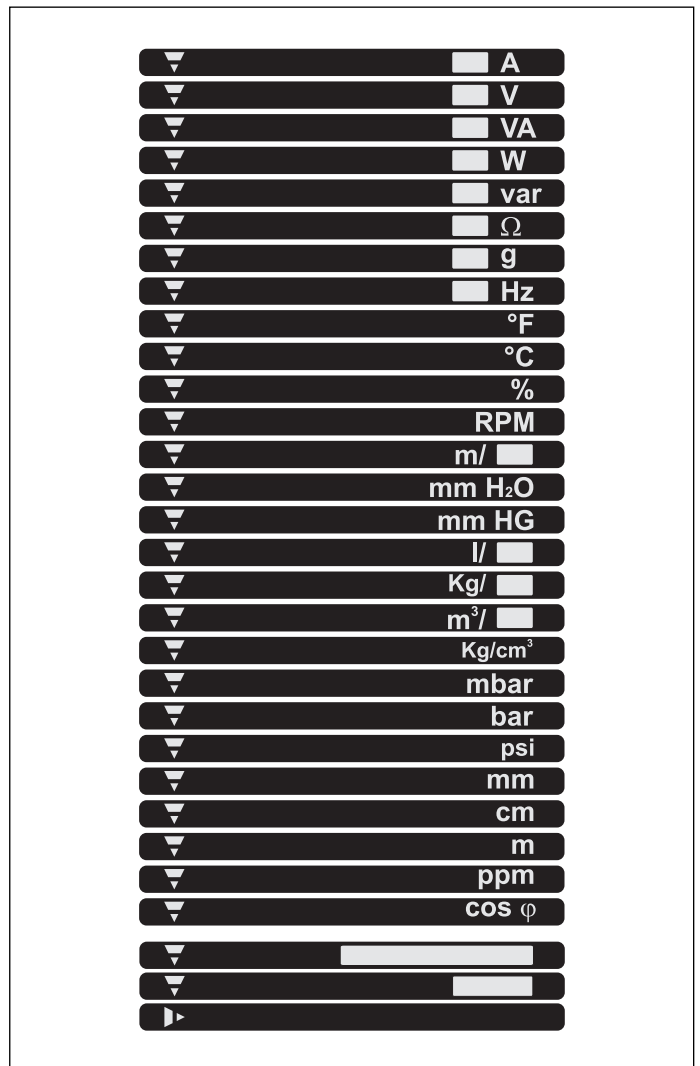
### 4. Engineering unit

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

## Dimensions

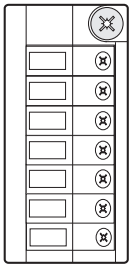


## Engineering Units



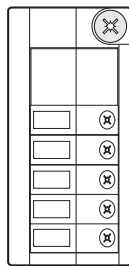
## Modules

### Input modules

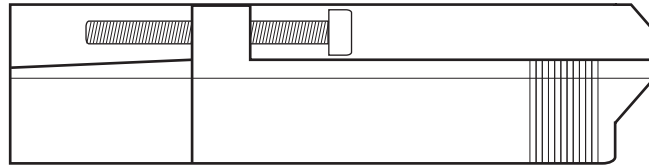


**BQ LSX, BQ LSE, BQ LSF, BQ HSX, BQ TRX, BQ TF1, BQ TF2**  
Measuring inputs

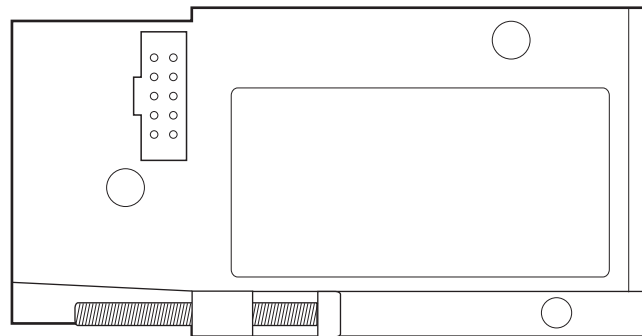
### Output modules



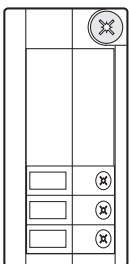
**BO AV**  
Single analogue  
output 10V, 20mA DC



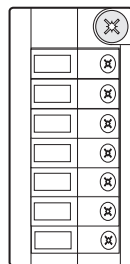
Scale 1:1



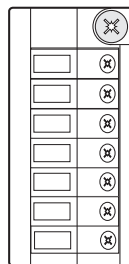
### Output modules



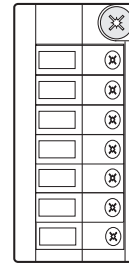
**BO R1**  
Single relay output



**BO R2**  
Dual relay output

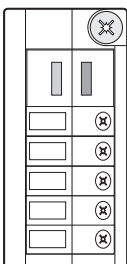


**BO R4**  
Dual relay output +  
Dual open collector

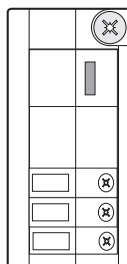


**BO R5**  
4 relay outputs

### Serial port modules

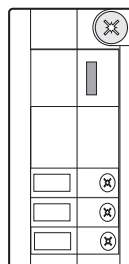


**BR SX**  
RS485 Serial port

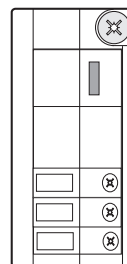


**BR SY**  
RS232 Serial port

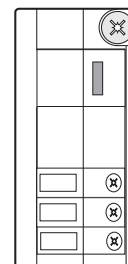
### Power supply modules



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



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



**BP 3**  
Power supply:  
10 to 28V DC

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