

# Q.bloxx XL A101

## Universal Measurement Module

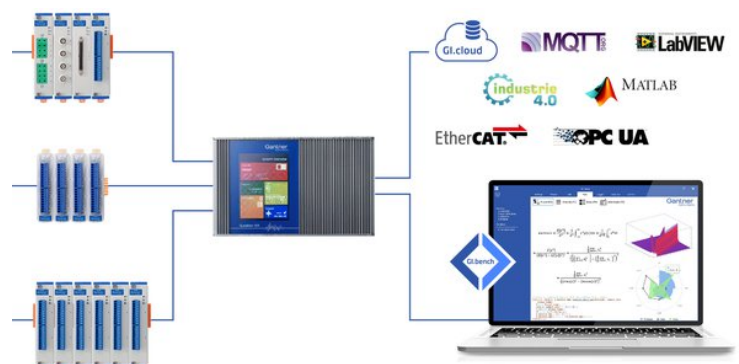
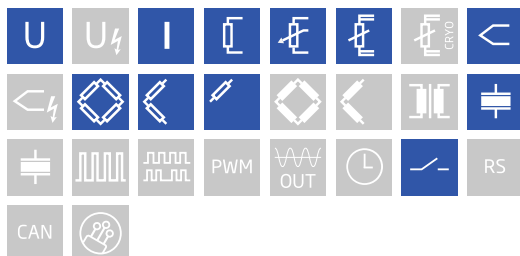
Q.bloxx XL is a new addition to the Q.series product family - the ideal DAQ solution for widely distributed installations that require higher performance and custom sensor terminations. Q.bloxx XL products are packaged in modular, DIN Rail mountable enclosures that easily snap together for system expansion. Flexibility in distribution allows for highly synchronized data that is less prone to noise due to shorter sensor cable runs to the subject.

- RS485 fieldbus interface up to 48 Mbps: LocalBus, up to 115.2 kbps: Modbus-RTU, ASCII
- Connectable to Controller Q.station X
- Electromagnetic Compatibility according to EN61000-4 and EN55011
- Power supply 10 ... 30 VDC
- DIN rail mounting (EN60715)

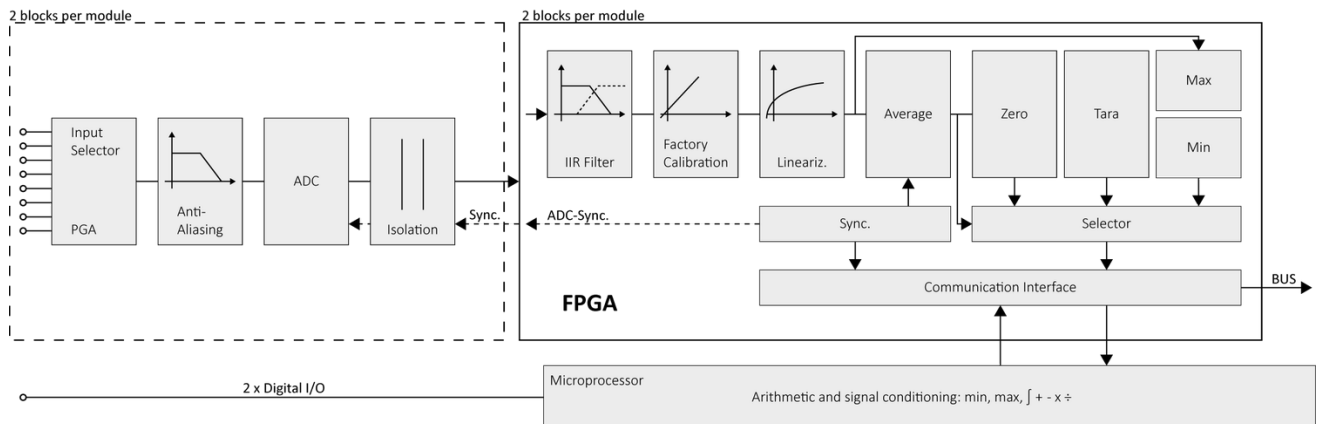


### Key Features

- **2 Universal analog input channels**  
Voltage, current, resistance, potentiometer, RTD, thermocouple, strain gage (full-, half-, and quarter-bridge configuration), IEPE
- **High-accuracy digitization**  
24-bit ADC, 100 kHz sample rate per channel
- **2 Digital inputs or outputs**  
Status, trigger, tare, alarm, command
- **Signal conditioning**  
16 virtual channels, linearization, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm
- **3-Way galvanic isolation**  
500 VDC channel to channel, channel to power supply, and bank



### Block diagram



### Technical Data

#### Analog Input

|                   |                                                                        |
|-------------------|------------------------------------------------------------------------|
| Channels          | 2                                                                      |
| Accuracy          | 0.01 % typical                                                         |
|                   | 0.025 % in controlled environment <sup>1</sup>                         |
|                   | 0.05 % in industrial area <sup>2</sup>                                 |
| Linearity error   | 0.01 % typical full-scale                                              |
| Repeatability     | 0.003 % typical (within 24 h)                                          |
| Isolation voltage | 500 VDC channel to channel to power supply channel to bus <sup>3</sup> |

<sup>1</sup> according to EN 61326 2006: appendix B

<sup>2</sup> according to EN 61326 2006: appendix A

<sup>3</sup> noise pulses up to 1000 VDC, continuous up to 250 VDC

#### Measurement Mode Voltage

|                                            | Range            | max. Error        | Resolution |
|--------------------------------------------|------------------|-------------------|------------|
|                                            | ±60 V            | ±15 mV            | 7.2 µV     |
|                                            | ±10 V            | ±2 mV             | 1.2 µV     |
|                                            | ±1 V             | ±200 µV           | 120 nV     |
|                                            | ±100 mV          | ±20 µV            | 12 nV      |
|                                            | Range ±10 V      | Range ±60 V       |            |
| Input impedance > 10 MΩ                    | > 1 MΩ           | > 3 MΩ            |            |
| Long term drift at input range ± 1 V       | < 20 µV / 24 h   | < 200 µV / 8000 h |            |
| Temperature influence at input range ± 1 V | Offset drift     | Gain drift        |            |
|                                            | < 50 µV / 10 K   | < 0.01 % / 10 K   |            |
| Signal-to-noise ratio                      | > 90 dB at 1 kHz | > 120 dB at 1 Hz  |            |

### Measurement Mode Current

| Error                               | Range                | max. Error       | Resolution |
|-------------------------------------|----------------------|------------------|------------|
| Internal shunt resistor 50 $\Omega$ | $\pm 25$ mA          | $\pm 5$ $\mu$ A  | 3.0 nA     |
| Long term drift                     | < 0.5 $\mu$ A / 24 h |                  |            |
| Temperature influence               | Offset drift         | Gain drift       |            |
|                                     | < 1 $\mu$ A / 10 K   | < 0.025 % / 10 K |            |

### Measurement Mode Resistance / RTD

| Error                     | Range                              | max. Error         | Resolution        |
|---------------------------|------------------------------------|--------------------|-------------------|
| Resistance, 2-wire        | 100 k $\Omega$                     | $\pm 100$ $\Omega$ | 12 m $\Omega$     |
| Resistance, 2- and 4-wire | 4 k $\Omega$                       | $\pm 1$ $\Omega$   | 0.5 m $\Omega$    |
| Resistance, 2- and 4-wire | 400 $\Omega$                       | $\pm 0.1$ $\Omega$ | 48 $\mu$ $\Omega$ |
| Pt100, 2- and 4-wire      | -200 to +850°C                     | $\pm 0.25$ °C      | 0.2 m°C           |
| Pt1000, 2- and 4-wire     | -200 to +850°C                     | $\pm 1$ °C         | 0.2 m°C           |
| Long term drift           | < 0.01°C / 24 h                    |                    |                   |
| Temperature influence     | Offset drift (range 400 $\Omega$ ) | Gain drift         |                   |
|                           | < 10 m $\Omega$ / 10 K             | < 0.025 % / 10 K   |                   |

### Measurement Mode Potentiometer, Relative Measurement

|                                    |                               |                  |  |
|------------------------------------|-------------------------------|------------------|--|
| Allowable potentiometer resistance | 1 k $\Omega$ to 10 k $\Omega$ |                  |  |
| Long term drift                    | < 0.01 % / 24 h               | < 0.1 % / 8000 h |  |
| Temperature influence              | Offset drift (Range 1)        | Gain drift       |  |
|                                    | < 0.0001 / 10 K               | < 0.02 % / 10 K  |  |

### Measurement Mode Bridge

|                         |                                                                                       |                          |                |
|-------------------------|---------------------------------------------------------------------------------------|--------------------------|----------------|
| Bridge configuration(s) | half- and full-bridge, (5-/6-wire), quarter-bridge with completion terminal, (3-wire) |                          |                |
| Accuracy class          | 0.05                                                                                  |                          |                |
| Bridge resistance       | > 100 $\Omega$                                                                        |                          |                |
| Bridge excitation       | 2.5 VDC, nominal                                                                      |                          |                |
| Measurement range       | $\pm 2.4$ mV/V                                                                        | $\pm 20$ mV/V            | $\pm 500$ mV/V |
| Long term drift         | < 0.12 $\mu$ V/V / 24 h                                                               | < 1.2 $\mu$ V/V / 8000 h |                |
| Temperature influence   | Offset drift (Range 2.4 mV/V)                                                         | Gain drift               |                |
|                         | < 0.2 $\mu$ V/V / 10 K                                                                | < 0.05 % / 10 K          |                |

### Measurement Mode Thermocouple

|                                             |               |                  |                                          |                                 |
|---------------------------------------------|---------------|------------------|------------------------------------------|---------------------------------|
| Deviation in the relevant Temperature range | Type          | Range            | Adjusted with cold junction compensation | Not adjusted, with CJC terminal |
|                                             | Type B        | 400°C to 1820°C  | < ±1.5 °C                                | < ±2.5°C                        |
|                                             | Type E, J, K  | -100 to 1000°C   | < ±0.7°C                                 | < ±1.2°C                        |
|                                             | Type E        | -270°C to 1000°C | < ±1°C                                   | < ±1.2°C                        |
|                                             | Type K        | -270°C to 1372°C | < ±1°C                                   | < ±1.2°C                        |
|                                             | Type L        | -200°C to 900°C  | < ±0.7°C                                 | < ±1.2°C                        |
|                                             | Type N        | -100°C to 1000°C | < ±0.7°C                                 | < ±1.2°C                        |
|                                             | Type N        | -270°C to 1300°C | < ±1°C                                   | < ±1.2°C                        |
|                                             | Type R, S     | -50°C to 1768°C  | < ±1.2°C                                 | < ±1.5°C                        |
|                                             | Type T, U     | -100°C to 400°C  | < ±0.7°C                                 | < ±1.2°C                        |
|                                             | Type T        | -270°C to 400°C  | < ±1°C                                   | < ±1.2°C                        |
| Input impedance                             | > 10 MΩ       |                  |                                          |                                 |
| Long term drift                             | <0.1°C / 24 h |                  | <0.2°C / 8000 h                          |                                 |
| Temperature influence                       | Offset drift  |                  | Gain drift                               |                                 |
|                                             | <0.1°C / 10 K |                  | <0.02% / 10 K                            |                                 |
| Uncertainty CJC                             | <0.3°C        |                  |                                          |                                 |

### Measurement Mode IEPE Sensor

|                       | Range                     | max. Error | Resolution       |
|-----------------------|---------------------------|------------|------------------|
| Error                 | ±10 V                     | ±10 mV     | 1.2 µV           |
|                       | ±1 V                      | ±1 mV      | 120 nV           |
| Supply                | constant current 4 mA     |            |                  |
| Input frequency range | 0.5 Hz to 10 kHz          |            |                  |
| Temperature influence | Offset drift (range 10 V) |            | Gain drift       |
|                       | < 10 µV / 10 K            |            | < 0.025 % / 10 K |

### Analog to Digital Conversion

|                      |                                                                                                                                                                                   |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resolution           | 24-bit                                                                                                                                                                            |
| Update rate          | 100 kHz (measurement thermocouple 8 Hz)                                                                                                                                           |
| Modulation method    | Sigma-Delta (group delay time 380 µs)                                                                                                                                             |
| Anti-aliasing filter | 20 kHz, 3rd order                                                                                                                                                                 |
| Digital filters      | Infinite impulse response (IIR), low-pass, high-pass, band-pass, , Butterworth or Bessel (2nd, 4th, 6th or 8th order), frequency range 0.1 Hz to 10 kHz (adjustable via software) |
| Averaging            | configurable or automatic according to the selected data rate                                                                                                                     |

### Digital In-/Outputs

|                               |                               |
|-------------------------------|-------------------------------|
| Channels                      | 2 (1 digital I/O per channel) |
| Response time                 | 0.2 ms                        |
| Input                         | status, tare, reset           |
| Input voltage / input current | max. 30 VDC / max. 0,5 mA     |
| Lower / upper threshold       | < 2.0 V (low) / > 10 V (high) |
| Output                        | status, alarm                 |
| Contact                       | open drain p-channel MOSFET   |
| Load capacity                 | 30 VDC / 100 mA (ohmic load)  |

### Communication Interface

|                     |                                                                                                                |
|---------------------|----------------------------------------------------------------------------------------------------------------|
| Protocols           | proprietary Localbus (115200 bps to 48 Mbps, latency <100 ns)<br>ASCII (19200 bps to 115200 bps)<br>Modbus RTU |
| Data format         | 8E1                                                                                                            |
| Electrical standard | ANSI/TIA/EIA-485-A, 2-wire                                                                                     |

### Power Supply

|                         |                                                      |
|-------------------------|------------------------------------------------------|
| Input voltage           | 10 to 30 VDC, overvoltage and overcurrent protection |
| Power consumption       | approx.. 2 W                                         |
| Input voltage influence | < 0.001 %/V                                          |

### Environmental

|                       |                                     |
|-----------------------|-------------------------------------|
| Operating temperature | -20°C to +60°C                      |
| Storage temperature   | -40°C to +85°C                      |
| Relative humidity     | 5 % to 95 % at 50°C, non-condensing |

### Remarks

|              |                                                                                              |
|--------------|----------------------------------------------------------------------------------------------|
| Warm-up time | Validity of all listed specifications are subject to a warm-up period of at least 45 minutes |
|              | Specifications subject to change without notice                                              |

### Mechanical information

|                          |                  |
|--------------------------|------------------|
| Material                 | Aluminum and ABS |
| Measurements (W x H x D) | 30x 145 x 135mm  |
| Weight                   | approx. 500 g    |

### Ordering Information

|                |                                             |
|----------------|---------------------------------------------|
| Article number | 495026                                      |
| Accessories    | Terminal B4/120-A101, article number 897895 |
|                | Terminal B4/350-A101, article number 897996 |
|                | Terminal CJC-A101, article number 890787    |



# Q.bloxx XL A101

Universal Measurement Module

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