Q.raxx XL A107 4M1

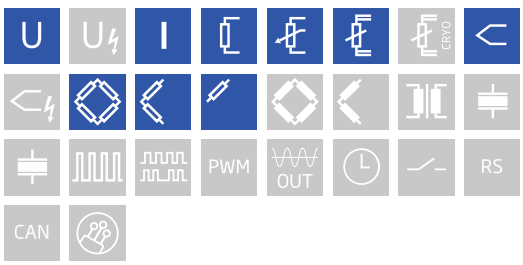
Universal Measurement Module with Sensor Supply

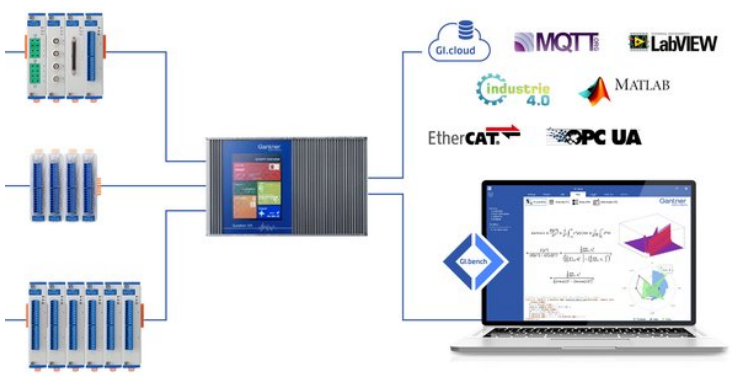
Q.raxx XL is a new addition to the Q.series product family - the ideal 19" rackmount DAQ solution for applications that require high channel density and custom sensor terminations. Q.raxx XL DAQ systems can utilize an integrated, high-performance controller for communication, control, and data logging purposes. With a controller, multiple Q.raxx XL systems can be synchronized to each other allowing for efficient DAQ distribution with low jitter and gradual expansion up to thousands of channels.

- High Density
  up to 13 I/O modules per Q.raxx 3U chassis with up to 16 channels per I/O module
- User Friendly
  front panel indicators for module status, power, and input range error
- Fully Customizable
  multiple front panel termination options available
- Maximum Flexibility
  parallel communication available in TCP/IP, CAN, PROFIBUS, Modbus, and EtherCAT
- Gantner's Quality Standard
  integrated filtering, galvanic isolation & signal/sensor conditioning per channel

Key Features

- For MEMS based sensors
  like single axis accelerometers
- 4 Universal analog input channels
  voltage, current, resistance, potentiometer, RTD (Pt100 / Pt1000), strain gage full and half bridge.
  Thermocouple and strain gage quarter bridge with completion termial
  Completion terminal is currently not available.
- Sensor supply for each channel
  15 VDC max 20 mA, galvanic isolated
- High-accuracy digitization
  24-bit ADC, 20 kHz sample rate per channel
- Signal conditioning
  linearization, filtering, average, scaling, min/max, RMS, arithmetic, alarm
- 3-Way galvanic isolation
  500 VDC channel to channel, channel to power supply, and channel to bus
- Electromagnetic compatibility (EMC)
  according to IEC 61000-4 and EN 55011





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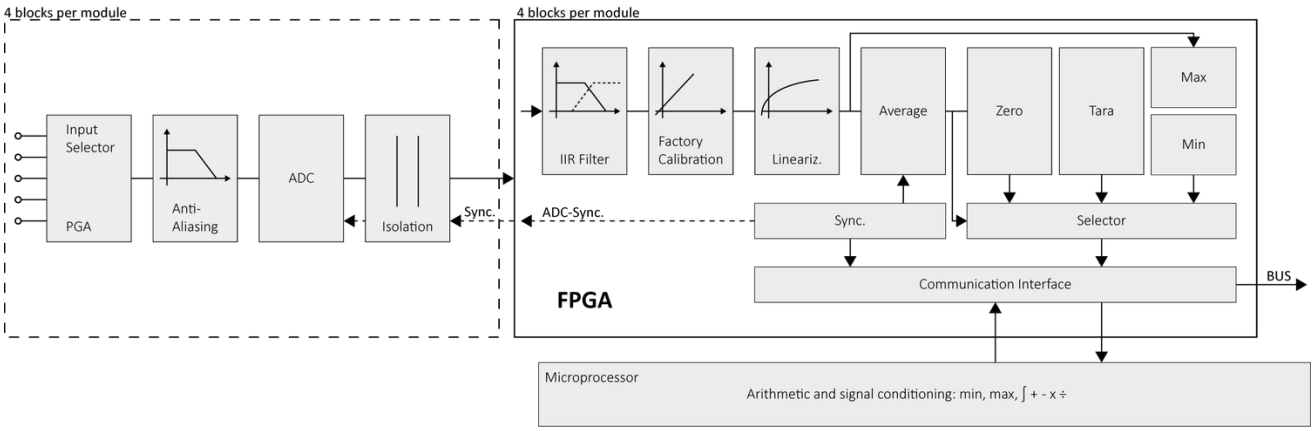
Block diagram

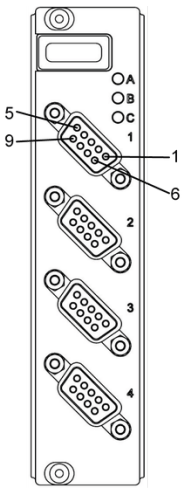


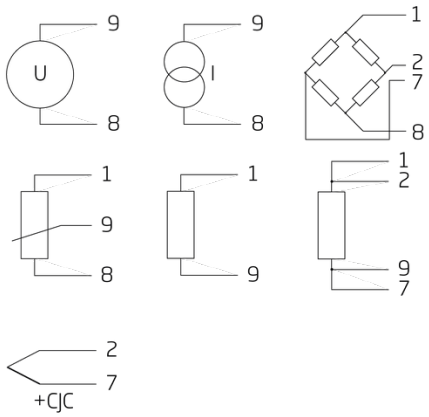
Technical Data

Terminal assignment DSUB 9 female

1, 2, 3, 4
1 UF
2 Ain2
3 n.c.
4 GND-se
5 +15V-se
6 n.c.
7 Ain3
8 GND
9 Ain1

se = sensor excitation





Analog Input

Channels	4
Accuracy	0.01 % typical
	0.02 % in controlled environment [1]
	0.05 % in industrial area [2]
Linearity error	0.01 % typical full-scale
Repeatability	0.003 % typical (within 24 hrs)
Isolation voltage	500 VDC channel to channel, to power supply, channel to bus [3]
Connector type	DSUB 9 pole (female)

1 according to EN 61326 2006: appendix B
2 according to EN 61326 2006: appendix A
3 noise pulses up to 1000 VDC, continuous up to 250 VDC

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Voltage Measurement

Range and error	**input range**	**margin of error**	**resolution**
	±10 V	±2 mV	1.2 µV
	±1 V	±200 µV	120 nV
	±100 mV	±20 µV	12 nV
Long-term stability	**input range**	**24 hrs**	**8000 hrs**
	±10 V	<200 µV	<2000 µV
	±1 V	<20 µV	<200 µV
	±100 mV	<2 µV	<20 µV
Temperature drift	**input range**	**Offset drift**	**Gain drift**
	±10 V	<500 µV / 10 K	<0.01 % / 10 K
	±1 V	<50 µV / 10 K	<0.01 % / 10 K
	±100 mV	<5 µV / 10 K	<0.01 % / 10 K
Signal-to-noise ratio	>90 dB at 1 kHz	>120 dB at 1 Hz	
input impedance	> 100 MΩ		
Overvoltage protection	± 20 V (± 30 V for 5 sec)		

Current Measurement

Input range	±25 mA (Internal shunt resistor 50 Ω)	
Margin of error	±5 µA	
Resolution	3 nA	
Long-term stability	<0.5 µA / 24 hrs	<5 µA / 8000 hrs
Temperature drift	<1 µA / 10 K Offset drift	<0.03 % / 10 K Gain drift

Potentiometer Measurement

Resistance range	1 kΩ to 10 kΩ	
Long-term stability	<0.02 % / 24 hrs	<0.2 % / 8000 hrs
Temperature drift	<0.0001 / 10 K Offset drift	<0.03 % / 10 K Gain drift

Resistance / RTD Measurement

Range and error	**input range**	**margin of error**	**resolution**
Resistance, 2-wire	100 kΩ	±100 Ω	12 mΩ
Resistance, 2-, 3- and 4-wire	4 kΩ	±1 Ω	0.5 mΩ
Resistance, 2-, 3- and 4-wire	400 Ω	±0.1 Ω	48 µΩ
Pt100, 2-, 3- and 4-wire	-200 to +850°C	±0.25°C	0.2 m°C
Pt1000, 2-, 3- and 4-wire	-200 to +850°C	±1°C	0.2 m°C
Sensor excitation	640 µA pulsed (<4 kΩ) 15 µA pulsed (>4 kΩ)		
Long-term stability	<10 mΩ / 24 hrs	<100 mΩ / 8000 hrs	
Temperature drift (range 400 Ω)	<10 mΩ / 10 K Offset drift	<0.03 % / 10 K Gain drift	

Thermocouple Measurement

	Type	range	margin of error with CJC [1]
Range and error	Type B	400°C to 1820°C	< ±1.5 °C
	Type E, J, K	-100 to 1000°C	< ±0.7°C
	Type E	-270°C to 1000°C	< ±1°C
	Type K	-270°C to 1372°C	< ±1°C
	Type L	-200°C to 900°C	< ±0.7°C
	Type N	-100°C to 1000°C	< ±0.7°C
	Type N	-270°C to 1300°C	< ±1°C
	Type R, S	-50°C to 1768°C	< ±1.2°C
	Type T, U	-100°C to 400°C	< ±0.7°C
	Type T	-270°C to 400°C	< ±1°C
Input impedance	> 10 MΩ		
Long-term stability	<0.1°C / 24 hrs	<0.2°C / 8000 hrs	
Temperature drift	<0.2°C / 10 K Offset drift	<0.025% / 10 K Gain drift	
CJC uncertainty	<0.3°C		

1 specifications are only valid with mains frequency rejection enabled

Strain Gage Measurement

Bridge configuration(s)	resistive full-bridge (4-wire) resistive half-bridge (3-wire, with bridge completion terminal) resistive quarter-bridge 120 Ω or 350 Ω (3-wire, with bridge completion terminal)	
Accuracy class	0.05	
Allowable bridge resistance	>100 Ω	
Bridge excitation (nominal)	2.5 VDC	
Input range	±2.5 mV/V ±50 mV/V ±500 mV/V	
Long-term stability (range 2.5 mV/V)	<0.12 µV/V / 24 hrs	<1.25 µV/V / 8000 hrs
Temperature drift (range 2.5 mV/V)	<0.2 µV/V / 10 K Offset drift	<0.05 % / 10 K Gain drift

Analog-to-Digital Conversion

Resolution	24-bit
Sample rate	20 kHz per channel (thermocouple 10 Hz)
Modulation method	sigma-delta
Anti-aliasing filter	2 kHz, 3rd order
Digital filters	Infinite impulse response (IIR), low-pass, high-pass, Butterworth or Bessel (2nd, 4th, 6th or 8th order), frequency range 0.1 Hz to 1 kHz (adjustable via software)
Averaging	configurable or automatic according to the user-defined data rate

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Sensor excitation

Channels	4
Voltage	15 V
Current	max. 20 mA (short circuit proof)
Accuracy	< 3 %
Load regulation	< 0.1 %
Noise	1.2 mV (RMS)

Communications Interface Localbus

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

Input Power

Input voltage	10 to 30 VDC, overvoltage and overcurrent protection
Power consumption	3 W (approx.)
Input voltage influence	<0.001 % / V

Environmental Specifications

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

Remarks

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
Measurements (W x H x D)	30x 128 x 120mm
Weight	approx. 200 g

Ordering Information

Article number	659331

Gantner Instruments

Austria | Germany | France | Sweden | India | USA | China | Singapore

Montafonerstraße 4 · A-6780 Schruns · T +43 55 56 · 77 463-0

office@gantner-instruments.com

www.gantner-instruments.com