

Q.raxx A107

Universal Measurement Module

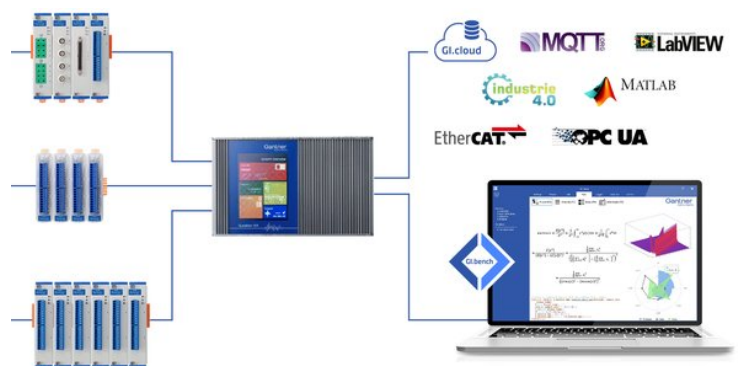
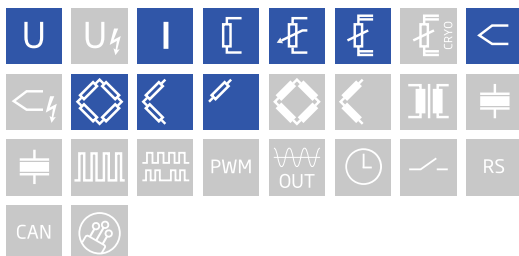
Q.raxx is the ideal 19" rackmount DAQ solution for applications that require high channel density. Q.raxx DAQ systems can utilize an integrated, high-performance controller for communication, control, and data logging purposes. With a controller, multiple Q.raxx systems can be synchronized to each other 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

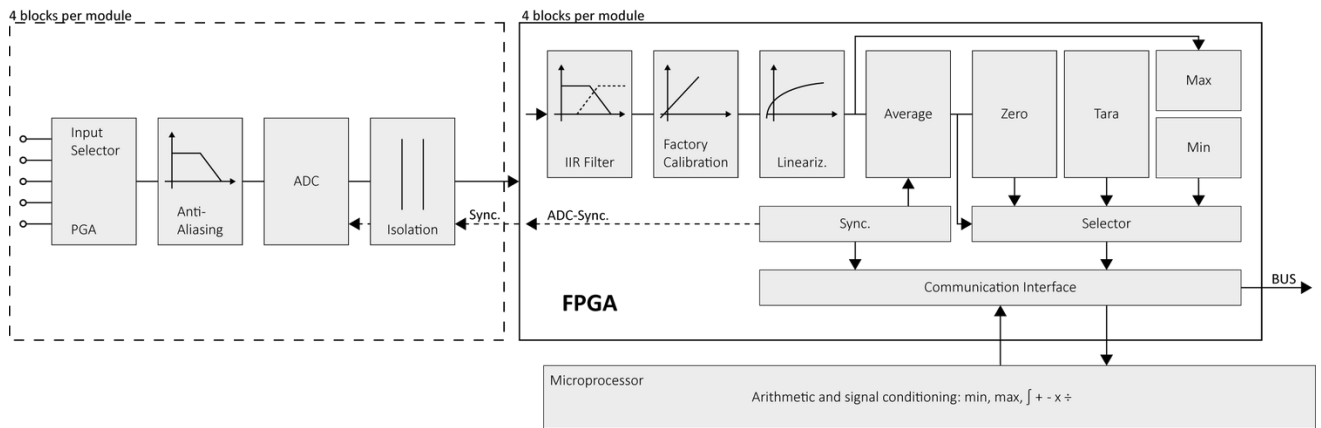


Key Features

- **4 Universal analog input channels**
voltage, current, resistance, potentiometer, RTD (Pt100 / Pt1000), thermocouple, strain gage
- **High-accuracy digitization**
24-bit ADC, 10 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



Block diagram



Technical Data

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

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

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 μ A	
Resolution	3 nA	
Long-term stability	< 0.5 μ A / 24 hrs	< 5 μ A / 8000 hrs
Temperature drift	< 1 μ A / 10 K Offset drift	< 0.03 % / 10 K Gain drift

Potentiometer Measurement

Resistance range	1 k Ω to 10 k Ω	
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 k Ω	± 100 Ω	12 m Ω
Resistance, 2-, 3- and 4-wire	4 k Ω	± 1 Ω	0.5 m Ω
Resistance, 2-, 3- and 4-wire	400 Ω	± 0.1 Ω	48 μ Ω
Pt100, 2-, 3- and 4-wire	-200 to +850 $^{\circ}$ C	± 0.25 $^{\circ}$ C	0.2 m $^{\circ}$ C
Pt1000, 2-, 3- and 4-wire	-200 to +850 $^{\circ}$ C	± 1 $^{\circ}$ C	0.2 m $^{\circ}$ C
Sensor excitation	640 μ A pulsed (< 4 k Ω) 15 μ A pulsed (> 4 k Ω)		
Long-term stability	< 10 m Ω / 24 hrs	< 100 m Ω / 8000 hrs	
Temperature drift (range 400 Ω)	< 10 m Ω / 10 K Offset drift	< 0.03 % / 10 K Gain drift	

Thermocouple Measurement

Range and error	Type	range	margin of error with CJC ¹
	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 μ V/V / 24 hrs	<1.25 μ V/V / 8000 hrs
Temperature drift (range 2.5 mV/V)	<0.2 μ V/V / 10 K Offset drift	<0.05 % / 10 K Gain drift

Analog to Digital Conversion

Resolution	24-bit
Sample rate	10 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

Communication Interface

Protocols	proprietary Localbus (115200 bps to 24 Mbps, latency <100 ns) ASCII (19200 bps to 115200 bps) Modbus RTU Profibus-DP (19200 bps to 12 Mbps) (special Firmware required)
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	2.5 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

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Mechanical information

Material	Aluminum
Measurements (W x H x D)	30 x 128 x 118 mm
Weight	approx. 100 g

Ordering Information

Article number	101822
Accessories	Terminal B4/120-A107, article number 894589
	Terminal B4/350-A107, article number 894690
	Terminal CJC-A107, article number 893790

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