Q.raxx A107

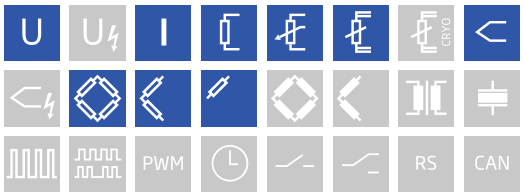
Universal Measurement Module

Q.raxx is the ideal 19" rackmount DAQ solution for applications that require high channel density and custom sensor terminations. 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



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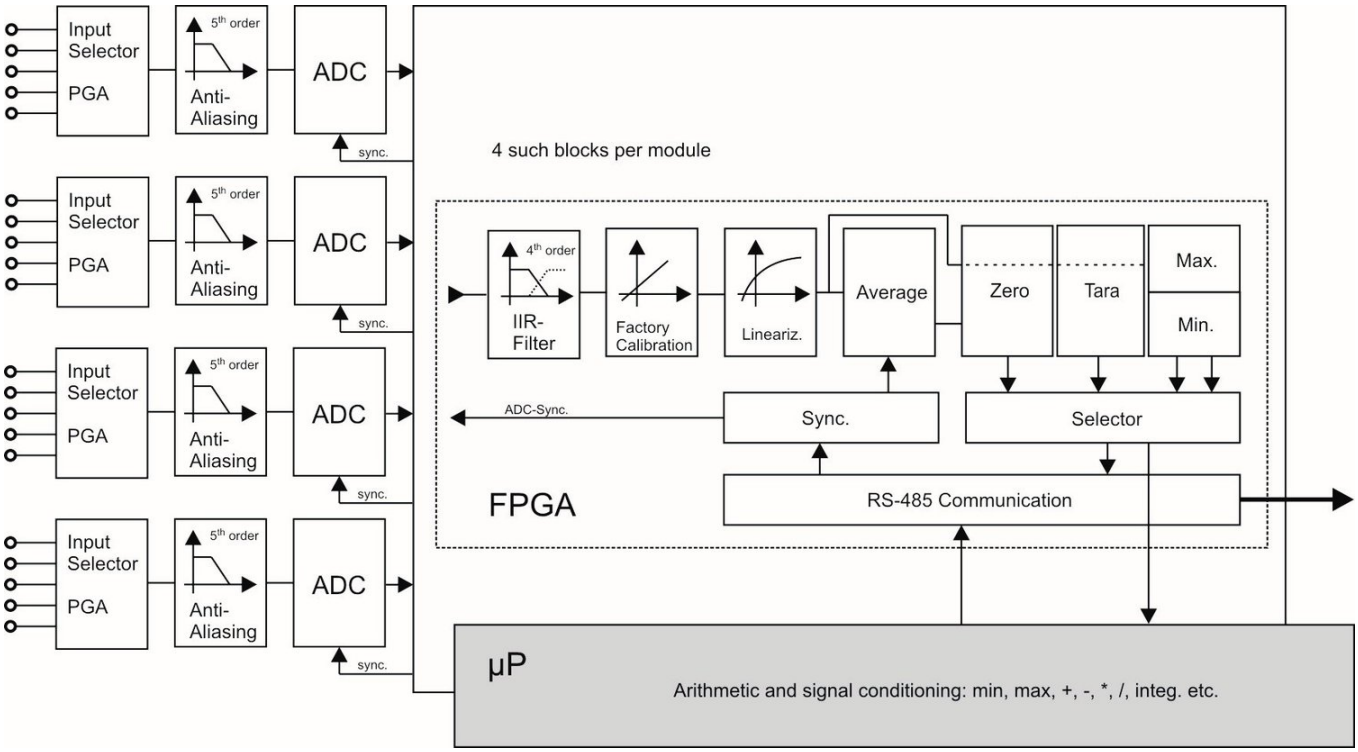
Block diagram



Technical Data

Analog Input

Channels	4
Accuracy	0.01 % typical
	0.025 % in controlled environment [1]
	0.05 % in industrial area [2]
Linearity error	0.01 % typical full-scale
Repeatability	0.003 % typical (within 24 hrs)
Input impedance	>100 MΩ (unless otherwise stated)
Isolation voltage	500 VDC channel to channel, 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, permanent up to 250 VDC

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Analog to Digital Conversion

Resolution	24-bit
Sample rate	10 kHz per channel (thermocouple 8 Hz)
Modulation method	sigma-delta (group delay time 600 µs)
Anti-aliasing filter	2 kHz, 5th order
Digital filters	Infinite impulse response (IIR), low-pass, high-pass, 8th order Butterworth or Bessel, band-pass, band-stop, frequency range 1 Hz to 1 kHz
Averaging	configurable or automatic according to the user-defined data rate

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	

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

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Resistance / RTD Measurement

Range and error	input range	margin of error	resolution
Resistance, 2-wire	100 kΩ	±100 Ω	12 mΩ
Resistance, 2- and 4-wire	4 kΩ	±1 Ω	0.5 mΩ
Resistance, 2- and 4-wire	400 Ω	±0.1 Ω	48 µΩ
Pt100, 2- and 4-wire	-200 to +850°C	±0.25°C	0.2 m°C
Pt1000, 2- and 4-wire	-200 to +850°C	±1°C	0.2 m°C
Sensor excitation	150 µA pulsed (<4 kΩ) 10 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	<0.025 % / 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 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

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Communication Interface

Electrical standard	RS-485, 2-wire
Data format	8E1
Protocols	local bus (115200 bps to 24 Mbps) ASCII (19200 bps to 115200 bps) Modbus RTU

Input Power

Input voltage	10 - 30 VDC, overvoltage and overcurrent protection
Power consumption	2 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

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