Q.raxx A101

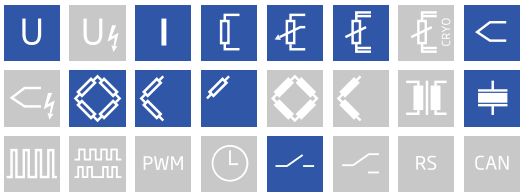
Universal Measurement Module

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

- 2 Universal analog input channels
  voltage, current, resistance, potentiometer, RTD, thermocouple, strain gage (full-, half-, and quarter-bridge configuration), IEPE
- 2 Digital inputs or outputs
  status, trigger, tare, alarm, command
- High-accuracy digitization
  24-bit ADC, 100 kHz sample rate per channel
- Signal conditioning
  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



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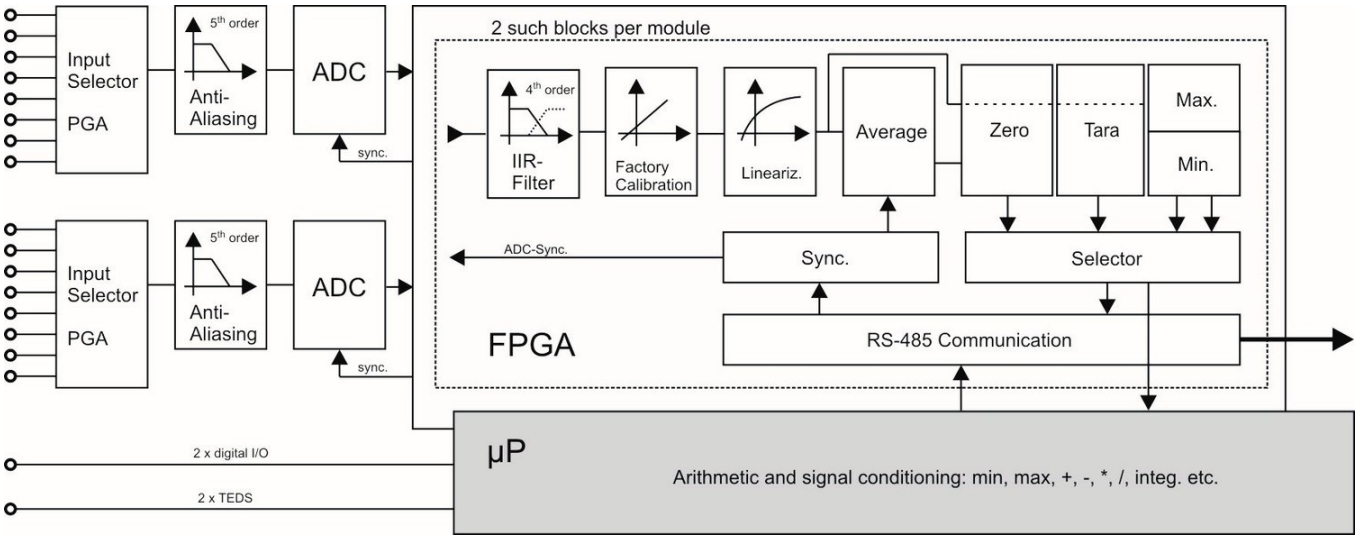
Block diagram



Technical Data

Analog Input

Channels	2
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 h)
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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Gantner instruments

Measurement Mode Voltage

Error	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
Input impedance	range ±100 mV, ±1 V	range ±10 V	range ±60 V
	>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 internal shunt resistor 50 Ω	range	max. error	resolution
	±25 mA	±5 µA	3.0 nA
Long term drift	<0.5 µA / 24 h	<5 µA / 8000 h	
Temperature influence	offset drift	gain drift	
	<1 µA / 10 K	<0.025 % / 10 K	

Measurement Mode Resistance / RTD

Error	range	max. 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
Long term drift	<0.01°C / 24 h	<0.1°C / 8000 h	
Temperature influence	offset drift (range 400 Ω)	gain drift	
	<10 mΩ / 10 K	<0.025 % / 10 K	

Measurement Mode Potentiometer, Relative Measurement

Allowable potentiometer resistance	1 kΩ to 10 kΩ	
Long term drift	<0.01 % / 24 h	<0.1 % / 8000 h
Temperature influence	offset drift	gain drift
	<0.0001 / 10 K	<0.02 % / 10 K

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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 Ω		
Bridge excitation	2.5 VDC, nominal		
Measurement range	±2.4 mV/V	±20 mV/V	±500 mV/V
Long term drift	<0.12 µV/V / 24 h	<1.2 µV/V / 8000 h	
Temperature influence	offset drift	gain drift	
	<0.2 µV/V / 10 K	<0.05 % / 10 K	

Measurement Mode Thermocouple

Deviation in the relevant Temperature range The specifications are valid with enabled mains frequency rejection 50 Hz resp. 60 Hz	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

Error	range	max. error	resolution
	±10 V	±10 mV	40 µV
	±1 V	±1 mV	4 µV
Supply	constant current 4 mA		
Input frequency range	0.5 Hz to 20 kHz		
Temperature influence	offset drift (range 10 V)	gain drift	
	<10 µV / 10 K	<0.025 % / 10 K	

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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	IIR, low-pass, high-pass, band-pass, 4th order, 1 Hz to 10 kHz in steps of 1, 2, 5
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

Electrical standard	RS-485, 2-wire
Protocols	local bus: 115200 bps to 48 Mbps, Format 8e1, Modbus RTU, ASCII: 19200 bps to 115200 bps

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

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Ordering Information

Article number	101519
Accessories	Terminal B4/120-A101, article number 897895
	Terminal B4/350-A101, article number 897996
	Terminal CJC-A101, article number 890787