

# Q.raxx XE A106

Measurement Module for Strain Gage and LVDT/RVDT

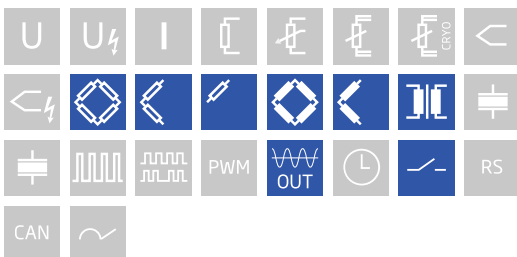
Q.raxx XE is an new addition to the Q.series product family - the ideal 19" rackmount EtherCAT DAQ solution for applications that require high channel density and custom sensor terminations. Q.raxx XE DAQ systems can consist of an integrated EtherCAT bus coupler for communication and 10 measurement modules capable of up to 100 kHz sampling per channel with short cycle times and low jitter for accurate synchronization

- According 19"-standard IEC
- Electromagnetic Compatibility according to EN61000-4 and EN55011
- High density and flexibility with 13 modules in one system in any constellation
- FoE ( file access over EtherCAT, ETG.1000.5) and CoE (CAN over EtherCAT, ETG.50001.1)



## Key Features

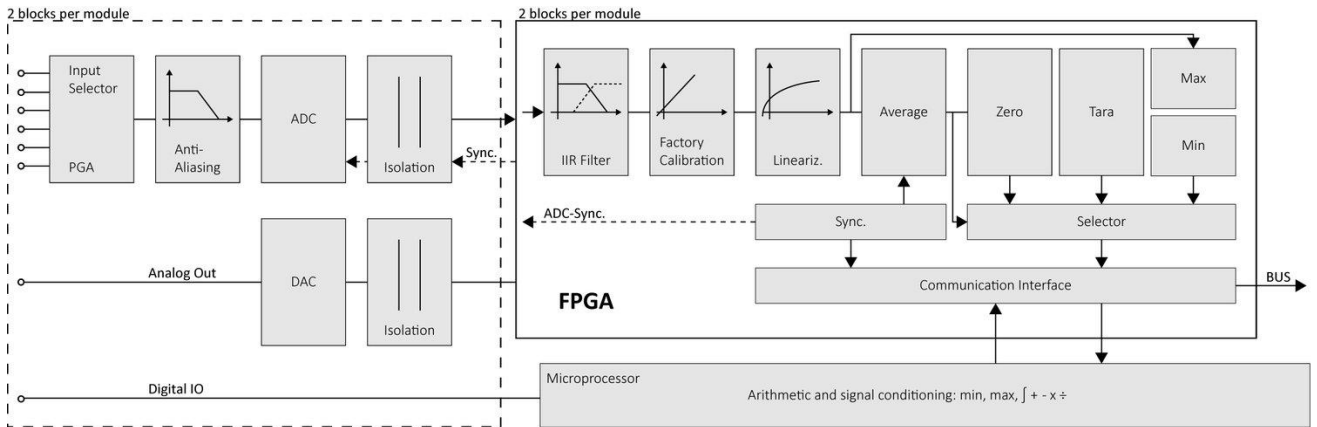
- 2 galvanically isolated analog inputs channels  
strain gage and inductive half and full bridges, LVDT, RVDT quarter bridge with completion terminal
- DC and carrier frequency (CF) principle  
2.5 and 5 VDC excitation, 2.5 and 5 VDCeff excitation carrier frequency, 600 Hz or 4.8 kHz configurable per channel
- 2 Analog output channels  
±10 VDC, 20 kHz update rate per channel
- High-accuracy digitization  
24-bit ADC, 20 kHz sample rate per channel
- 4 digital I/Os  
input: state, tare, memory reset, output: state, alarm, threshold
- Signal conditioning  
linearization, filtering, average, scaling, min/max, RMS, arithmetic, alarm
- 3-Way galvanic isolation  
Channel to channel, channel to power supply, and channel to bus



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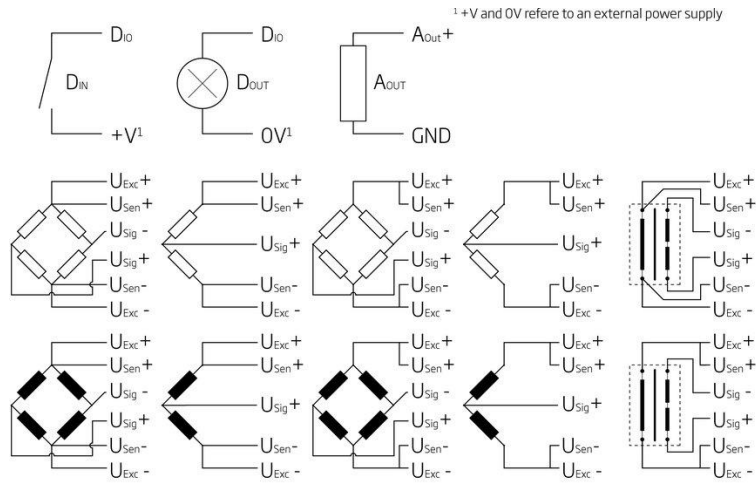
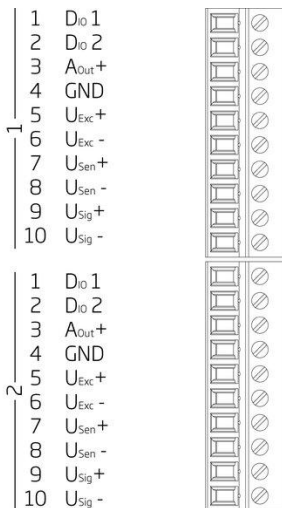
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## Block diagram



## Technical Data

### Terminal assignment 10pole screw



## Analog Input

Channels	2
Input impedance	>10 MΩ
Isolation voltage	500 VDC channel to channel, to power supply, channel to bus <sup>1</sup>

<sup>1</sup> noise pulses up to 1000 VDC, continuous up to 250 VDC

### Strain Gage Measurement

Bridge configuration(s)	resistive full-bridge (4/6-wire) resistive half-bridge (3/5-wire) resistive quarter-bridge 120 Ω or 350 Ω (3-wire, with bridge completion terminal)			
Allowable sensor cable length	< 30 m			
Shunt resistor	100 kΩ internal resistor			
Bridge excitation	2.5 - 5 VDC 2.5 - 5 V <sub>eff</sub> (Carrier Frequency)			
Bridge excitation stability	< 0.01% / 24 hrs			
Bridge excitation drift	< 0.02% / 10 K			
	<b>5 VDC</b>	<b>5 V<sub>eff</sub> (CF)</b>	<b>2.5 VDC</b>	<b>2.5 V<sub>eff</sub> (CF)</b>
Allowable sensor resistance	> 300 Ω	> 300 Ω	> 100 Ω	> 100 Ω
Input range	±1.25 mV/V	±1.25 mV/V	±2.5 mV/V	±2.5 mV/V
	±2.5 mV/V	±2.5 mV/V	±5 mV/V	±5 mV/V
	±25 mV/V	±25 mV/V	±50 mV/V	±50 mV/V
	±50 mV/V	±50 mV/V	±100 mV/V	±100 mV/V
	±100 mV/V	±100 mV/V	±200 mV/V	±200 mV/V
	±200 mV/V	±200 mV/V	±400 mV/V	±400 mV/V
	±500 mV/V	±500 mV/V	±1000 mV/V	±1000 mV/V
Long-term stability	< 0.2 μV/V / 24 hrs (DC excitation) < 0.1 μV/V / 24 hrs (CF excitation)		< 2 μV/V / 8000 hrs (DC excitation) < 1 μV/V / 8000 hrs (CF excitation)	
Temperature drift (range 2.5 mV/V)	< 0.2 μV/V / 10 K Offset drift		< 0.05 % / 10 K Gain drift	
Noise (range 2.5 mV/V)	0.3 μV/V at 0 up to 10 Hz		1 μV/V at 10 up to 1 kHz	

### LVDT/RVDT Measurement

Sensor connection	4- / 6-wire	
Sensor excitation (selectable)	<b>5 V<sub>eff</sub></b>	<b>2.5 V<sub>eff</sub></b>
Allowable sensor resistance	> 300 Ω	> 100 Ω
Input range	±1.25 mV/V	±2.5 mV/V
	±2.5 mV/V	±5 mV/V
	±25 mV/V	±50 mV/V
	±50 mV/V	±100 mV/V
	±100 mV/V	±200 mV/V
	±200 mV/V	±400 mV/V
	±500 mV/V	±1000 mV/V
Allowable sensor cable length	< 100 m <sup>1</sup>	
Long-term stability	< 0.1 μV/V / 24 hrs	< 1 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
Signal-to-noise ratio	< 0.3 μV/V at 10 Hz	< 1 μV/V at 100 Hz

<sup>1</sup> low capacity sensor cable is strongly recommended

### Analog Output

Channels	2	
Accuracy	0.02 % typical	
Voltage output	±10 VDC	
Allowable load resistance	>2 kΩ	
Long-term drift	<1 mV / 24 hrs	<2.5 mV / 8000 hrs
Temperature drift	<1 mV / 10 K Offset drift	<0.05 % / 10 K Gain drift
Noise voltage	<2 mV at 10 Hz	<10 mV at 1 kHz

### Digital Input & Output

Channels	4 configurable I/Os	
Mode(s) of operation	status	
Logic voltage	<2 VDC (Low) >10 VDC (High)	
Input type	PNP (current sinking)	
Input voltage	30 VDC max.	
Output voltage	10 to 30 VDC (external supply required)	
Contact	open drain p-channel MOSFET	
Load capacity	30 VDC / 100 mA (ohmic load)	

### Analog-to-Digital Conversion

Resolution	24-bit	
Sample rate	20 kHz per channel	
Modulation method	sigma-delta	
Anti-aliasing filter	2 kHz, 3rd order (DC excitation) 1 kHz, 3rd order (4.8 kHz CF excitation) 100 Hz, 3rd order (600 Hz CF excitation)	
Digital filters	Infinite impulse response (IIR), low-pass, high-pass, band-pass, band-stop, Butterworth or Bessel (2nd, 4th, 6th or 8th order), frequency range 0.1 Hz to 1 kHz in steps of 0.1 (adjustable via software)	
Averaging	configurable or automatic according to the user-defined data rate	

### Digital-to-Analog Conversion

Resolution	16-bit	
Update rate	20 kHz per channel	
Settling time	3 μs	

### Communication Interface EtherCAT

Electrical standard	RS-485, 2-wire	
Protocols	EtherCAT (LVDS)	

### Power Supply

Input voltage	10 to 30 VDC, overvoltage and overcurrent protection	
Power consumption	2.5 W (approx.)	
Input voltage influence	<0.001 % / V	

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## Environmental Specifications

Electromagnetic compatibility (EMC)	according to IEC 61000-4 and EN 55011
Operating temperature	-20°C to +60°C
Storage temperature	-40°C to +85°C
Relative humidity	5 - 95 % at 50°C (non-condensing)

## Remarks

Are subject to a warm-up period of at least 45 minutes

in a controlled electromagnetic environment<sup>1</sup>

With configuration: Low-pass 10Hz<sup>2</sup>

Specifications subject to change without notice

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

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

## Mechanical information

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

## Ordering Information

Article number	517425
Accessories	Terminal B4/120-A106, article number 894387
	Terminal B4/350-A106, article number 894488

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