

Q.bloxx XE A192

Universal Measurement Module with Analog Output

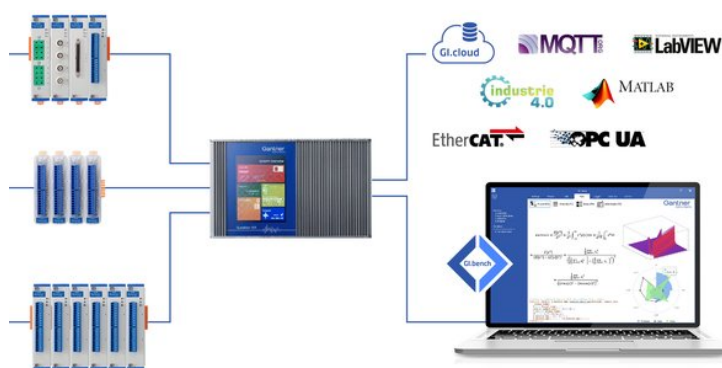
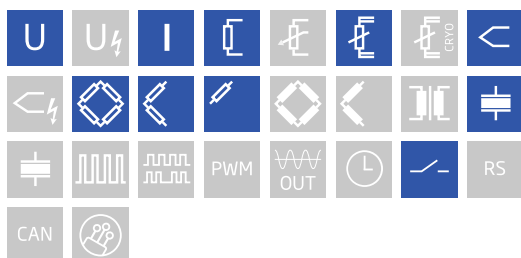
Q.bloxx XE is a new addition to the Q.series product family - the ideal EtherCAT DAQ solution for widely distributed installations that require higher performance and custom sensor terminations. Q.bloxx XE measurement modules possess integrated signal conditioning and arithmetic functions, packaged in modular, DIN Rail mountable enclosures that easily snap together for system expansion and are capable of measuring up to 100 kHz per channel with short cycle times and low jitter for accurate synchronization.

- RS-485, 2-wire, EtherCAT (LVDS)
- FoE (file access over EtherCAT, ETG.1000.5) and CoE (CAN over EtherCAT, ETG.50001.1)
- Configurable PDO mapping to optimize the data throughput
- Electromagnetic Compatibility according to EN61000-4 and EN55011
- Power supply 10 ... 30 VDC and DIN rail mounting (EN60715)

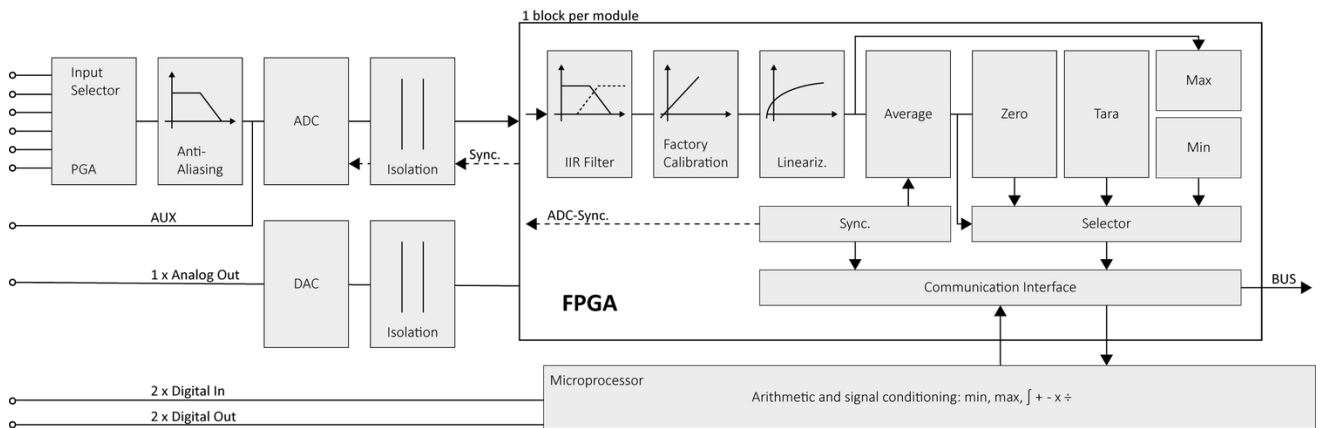


Key Features

- 1 Universal analog input channel
voltage, current, resistance, RTD, thermocouple, strain gage (full-, half-, and quarter-bridge configuration), IEPE
- 1 Analog output channel
voltage (± 10 VDC) or current (± 20 mA)
- 2 digital in and 2 digital outputs
state, tare, reset
- High-accuracy digitization
24-bit ADC, 100 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



Block diagram



Technical Data

Analog Input

Channels	1
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)
Isolation voltage	500 VDC channel to channel, to power supply, channel to bus ³
Input impedance	100 MΩ
Overvoltage protection	±100 VDC
CMRR	> 110 dB at DC 50 / 60 Hz
CMV	± 300 V

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

Analog to Digital Conversion

Resolution	24-bit
Sample rate	100 kHz per channel
Modulation method	sigma-delta
Anti-aliasing filter	20 kHz, 3rd order
Digital filters	Infinite impulse response (IIR), low-pass, band-pass, band-stop, high-pass, Butterworth or Bessel (8th order), frequency range 1 Hz to 10 kHz (adjustable via software)
Averaging	configurable or automatic according to the user-defined data rate

Voltage Measurement

Range	±10 V	±5 V	±1 V	±100 mV	±10 mV
Accuracy	±2 mV	±1 mV	±0.2 mV	±40 µV	±10 µV
Offset Drift	<0.2 mV / 10 K	<0.1 mV / 10 K	<20 µV / 10 K	<2 µV / 10 K	<1 µV / 10 K
Gain Drift	<0.01 % / 10 K	<0.01 % / 10 K	<0.01 % / 10 K	<0.01 % / 10 K	<0.01 % / 10 K
Long-term offset stability	<0.2 mV / 24 h	<0.1 mV / 24 h	<20 µV / 24 h	<2 µV / 24 h	<1 µV / 24 h
	<1 mV / 8000 h	<0.5 mV / 8000 h	<0.1 mV / 8000 h	<10 µV / 8000 h	<5 µV / 8000 h
Long-term stability	<0.005 % / 24 h				
	<0.01 % / 8000 h				

Current Measurement

Range	±25 mA
Internal shunt resistor	20 Ω
Accuracy	±5 µA
Offset Drift	<2.5 µA / 10 K
Gain Drift	<0.01 % / 10 K
Long-term offset stability	<1 µA / 24 h
	<3 µA / 8000 h
Long-term stability	<0.005 % / 24 h
	<0.01 % / 8000 h

Resistance / RTD Measurement

Range	5000 Ω	500 Ω	Pt100	Pt500	Pt1000
Accuracy (4-Wire)	0.5 Ω	0.05 Ω	0.2 °C	0.6 °C	0.3 °C
Accuracy (2-Wire)	1 Ω	0.25 Ω	0.5 °C	0.6 °C	0.3 °C
Sensor excitation	0.1 mA	1 mA	1 mA	0.1 mA	0.1 mA
Offset Drift	<0.5 Ω / 10 K	<0.05 Ω / 10 K			
Gain Drift	<0.01 % / 10 K	<0.01 % / 10 K			
Long-term offset stability	<0.1 Ω / 24 h	<0.01 Ω / 24 h			
	<0.3 Ω / 8000 h	<0.03 Ω / 8000 h			
Long-term stability	<0.005 % / 24 h				
	<0.01 % / 8000 h				

Thermocouple Measurement

Type	Range	Accuracy ¹
Type A	-100 °C to 1000 °C	< ±0.7 °C
Type B	400 °C to 1820 °C	< ±1.5 °C
Type C	0 °C to 2315 °C	< ±1.5 °C
Type E, J, K	-100 °C 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
Long-term stability	< 0.1 °C / 24 h	< 0.2 °C / 8000 h
Temperature drift	Offset drift	Gain drift
	< 0.1 °C / 10 K	< 0.02 % / 10 K
CJC uncertainty	< 0.3 °C	

¹ specifications are only valid with mains frequency rejection enabled

Strain Gage Measurement

Bridge excitation	Voltage	1 V to 12 V adjustable in steps of 1 mV (continuous short circuit proof)			
	Current	max. 50 mA			
	Accuracy	±0.05 %			
	Drift	±0.05 % / 10 K			
Accuracy class	0.05 %				
Gain-Drift	< 0.05 % / 10 K				
Long-term drift	< 0.02 % / 24 h				
	< 0.03 % / 8000 h				
bridge excitation	1 V	2.5 V	5 V	10 V	Gain
bridge resistance	> 20 Ω	> 50 Ω	> 100 Ω	> 200 Ω	
Range	±1000 mV/V	±400 mV/V	±200 mV/V	±100 mV/V	1
	±100 mV/V	±40 mV/V	±20 mV/V	±10 mV/V	10
	±50 mV/V	±20 mV/V	±10 mV/V	±5 mV/V	20
	±20 mV/V	±8 mV/V	±4 mV/V	±2 mV/V	50
	±10 mV/V	±4 mV/V	±2 mV/V	±1 mV/V	100
	±5 mV/V	±2 mV/V	±1 mV/V	±0.5 mV/V	200
	±2 mV/V	±0.8 mV/V	±0.4 mV/V	±0.2 mV/V	500
	±1 mV/V	±0.4 mV/V	±0.2 mV/V	±0.1 mV/V	1000

IEPE Vibration Measurement

Sensor excitation current	1 mA to 12 mA adjustable in steps of 10 μ A
Sensor excitation accuracy	0.5 %
Range	± 10 V
Input frequency range	0.5 Hz to 20 kHz
Accuracy	± 10 mV
Offset drift	< 1 mV / 10 K
Gain drift	< 0.01 % / 10 K
Long-term offset stability	< 1 mV / 24 h
	< 3 mV / 8000 h
Long-term gain drift	< 0.02 % / 24 h
	< 0.05 % / 8000 h

Analog Output

Channels	1
Accuracy	0.02 % typical
Output type	voltage or current
Rated output resistance	< 1 Ω , continuous short circuit proof

Digital to Analog Conversion

Resolution	16-bit
Update rate	100 kHz per channel
Settling time	3 μ s

Voltage Output

Output voltage	±10 VDC	
Allowable load resistance	>1 kΩ	
Long-term drift	<1 mV / 24 h	<2.5 mV / 8000 h
Temperature influence	<2 mV / 10 K Offset drift	<0.05 % / 10 K Gain drift
Noise voltage	<10 mV at 1 kHz	<2 mV at 10 Hz

Current Output

Output current	0 to ±20 mA	
load burden	<500 Ω	
burden influence	<0.02 μA / Ω	
Long-term stability	<2 μA / 24 h	<5 μA / 8000 h
Temperature drift	<4 μA / 10 K Offset drift	<0.05 % / 10 K Gain drift
Noise current	<20 μA at 1 kHz	<4 μA at 10 Hz

Digital I/Os

Channels	2 inputs, 2 outputs
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	EtherCAT (LVDS)

Input Power

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

Environmental Specifications

Electromagnetic compatibility	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

Validity of all listed specifications are subject to a warm-up period of at least 45 minutes

Specifications subject to change without notice

Module Pins

Connector 1	1	1	A_{OUT}^{+}
		2	A_{OUT}^{-}
		3	+ V
		4	DO 1
		5	DO 2
		6	DI 1
		7	DI 2
		8	0 V
		9	NC
	10	10	TEDS
Connector 2	1	1	U_{EXC}^{+}
		2	U_{EXC}^{-}
		3	U_{Sen}^{+}
		4	U_{Sen}^{-}
		5	U_{Sig}^{+}
		6	U_{Sig}^{-}
		7	$U_{In} / IEPE$
		8	I_{IN}
		9	GND
	10	10	U_{AUX}

Connection

Connector 1

Voltage Output	Current Output	
Digital Output	Digital Input Internal Voltage	Digital Input External Voltage

Connector 2

Voltage	Current	IEPE	TC
Bridge 6w	Bridge 4w	Half Bridge 5w	
Resistance 4w	Resistance 2w	Half Bridge 3w	

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Universal Measurement Module with Analog Output

Mechanical information

Material	Aluminum and ABS
Measurements (W x H x D)	30x 145 x 135mm
Weight	approx. 500 g

Ordering Information

Article number	646024
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