Q.brixx XL A192

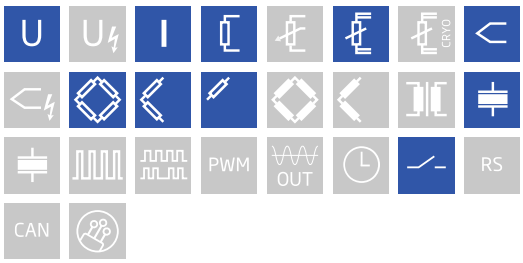
Universal Measurement Module with Analog Output

Q.brixx XL is a new addition to the Q.series product family - the ideal DAQ solution for on-the-go applications requiring higher performance in potentially harsh environments. Q.brixx XL DAQ systems consist of up to 16 measurement modules and an integrated, high-performance controller for communication, control, and data logging purposes, all within a robust aluminum housing capable of withstanding severe shock and vibration without sacrificing performance.

- High density and flexibility with16 modules in one system in any constellation
- Connectable to Controller Q.station
- Electromagnetic Compatibility according to EN61000-4 and EN55011
- Power supply 10 ... 30 VDC

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



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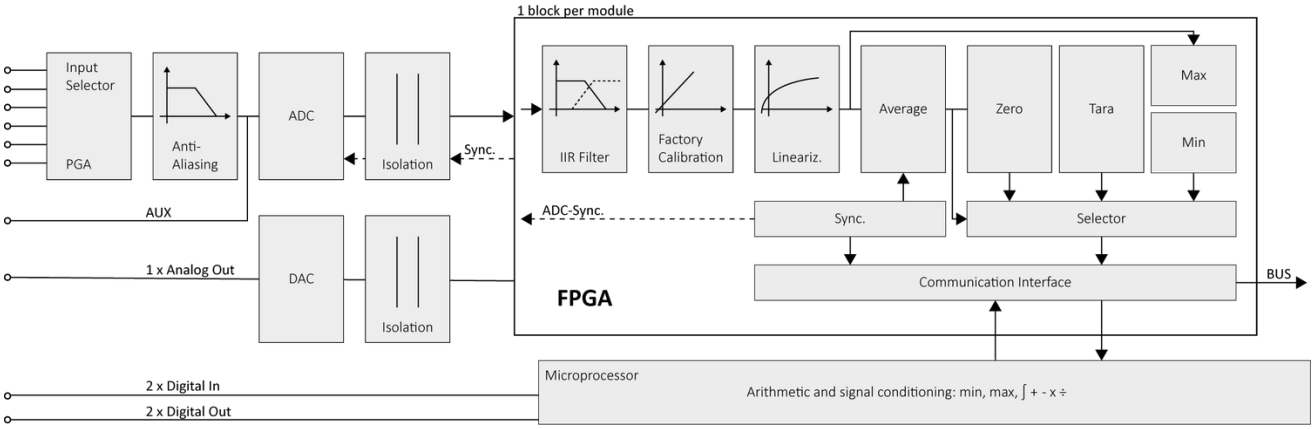
Block diagram



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 µA
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 µs

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

Protocols	proprietary Localbus (115200 bps to 48 Mbps, latency <100 ns) ASCII (19200 bps to 115200 bps) Modbus RTU
Data format	8E1
Electrical standard	ANSI/TIA/EIA-485-A, 2-wire

Input Power

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

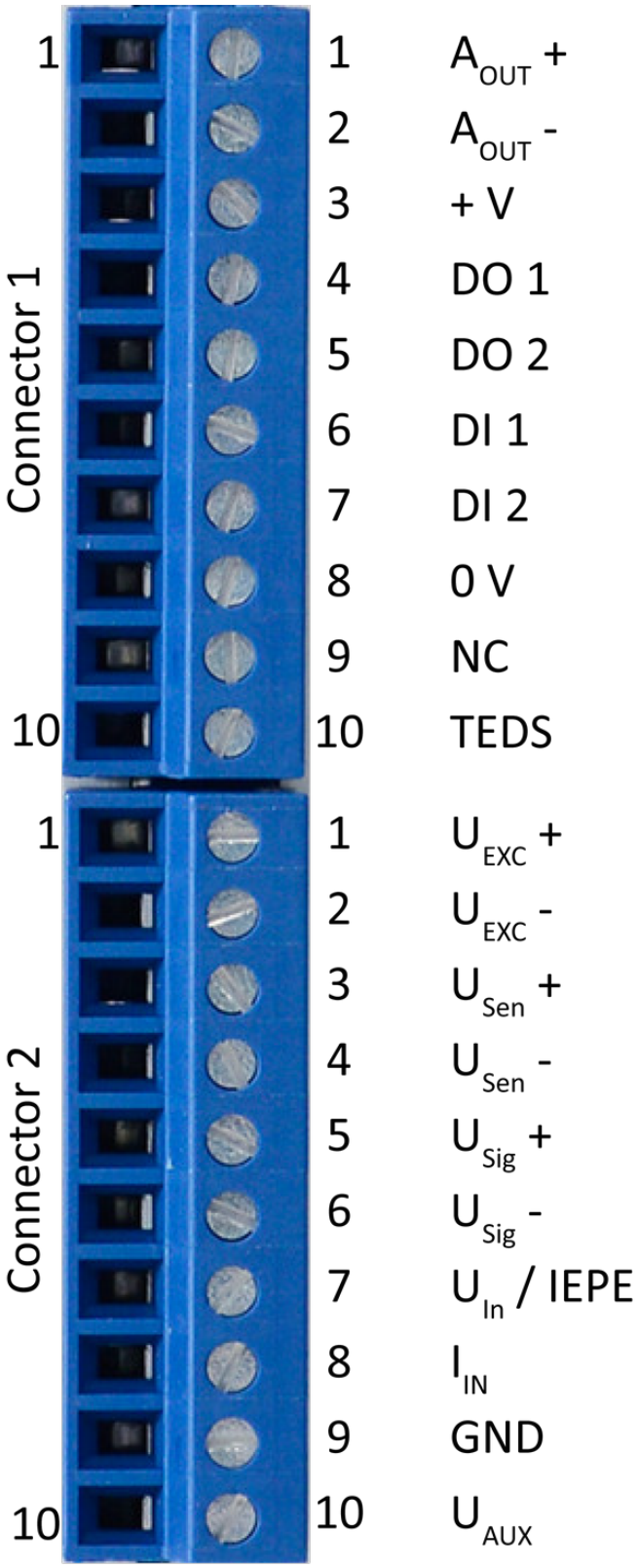
Environmental Specifications

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

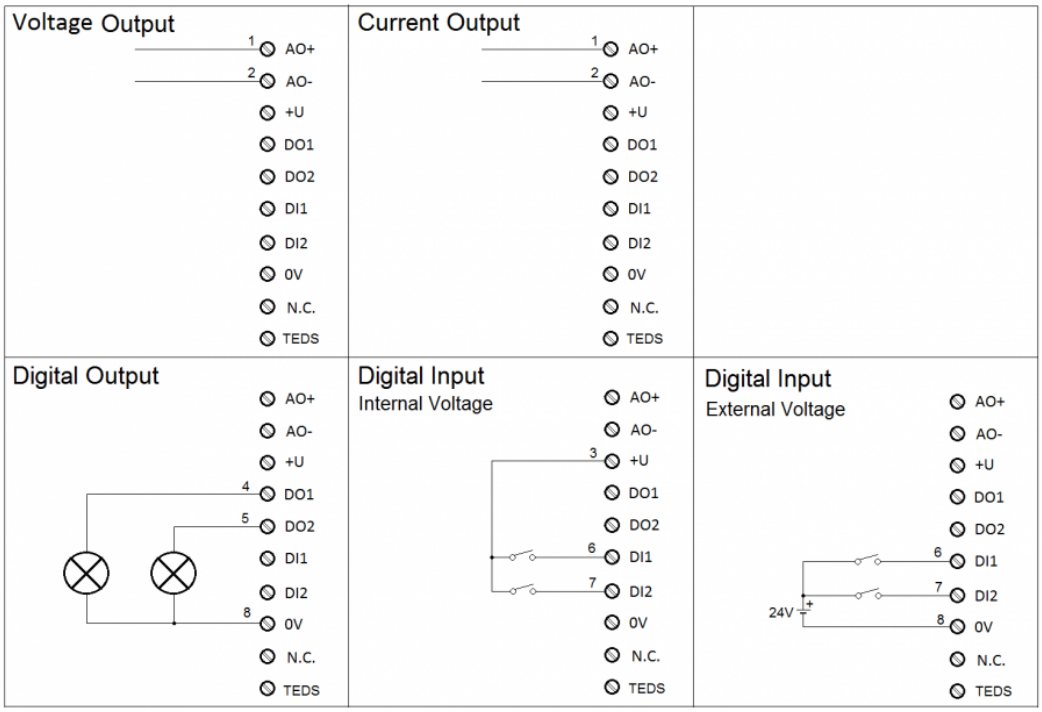
Validity of all listed specifications are subject to a warm-up period of at least 45 minutes
Specifications subject to change without notice

Module Pins

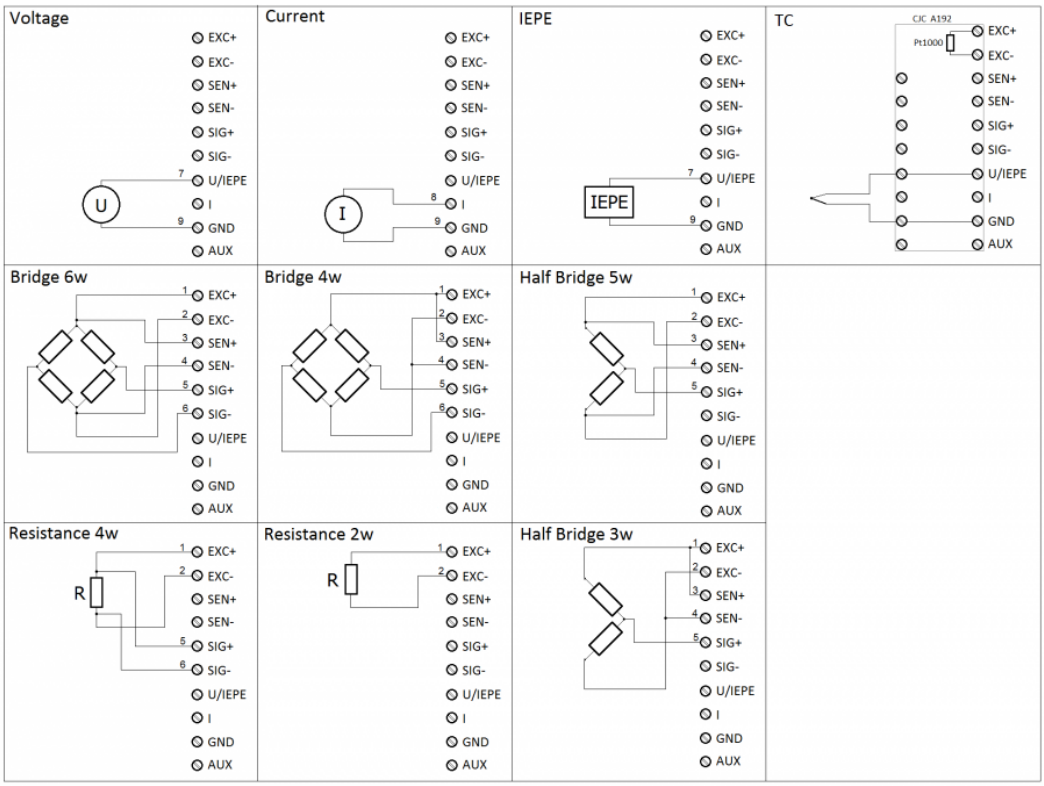

Connector 1
1
10
1 A_{OUT} +
2 A_{OUT} -
3 + V
4 DO 1
5 DO 2
6 DI 1
7 DI 2
8 0 V
9 NC
10 TEDS
Connector 2
1
10
1 U_{EXC} +
2 U_{EXC} -
3 U_{Sen} +
4 U_{Sen} -
5 U_{Sig} +
6 U_{Sig} -
7 U_{In} / IEPE
8 I_{IN}
9 GND
10 U_{AUX}

Connection

Connector 1



Connector 2



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Mechanical information

Material	Aluminum
Measurements (W x H x D)	30x 137 x 135mm
Weight	approx. 500 g

Ordering Information

Article number	645831

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