

# Q.brixx XE A136 120

Measurement Module for Strain Gage

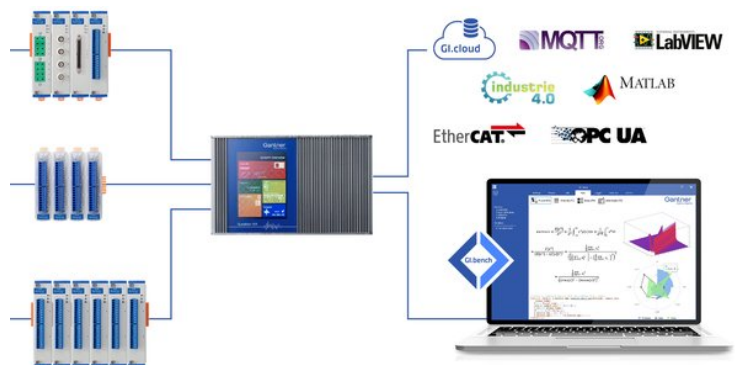
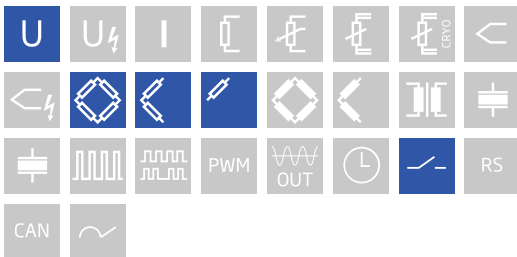
Q.brixx XE is a new addition to the Q.series product family - the ideal EtherCAT DAQ solution for on-the-go applications in potentially harsh environments. Q.brixx XE DAQ systems consist of up to 10 measurement modules capable of up to 100 kHz sampling per channel and an integrated EtherCAT bus coupler providing short cycle times and low jitter for accurate synchronization, all within a robust aluminum housing capable of withstanding severe shock and vibration without sacrificing performance.

- DC (distributed clock) for data synchronization
- 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

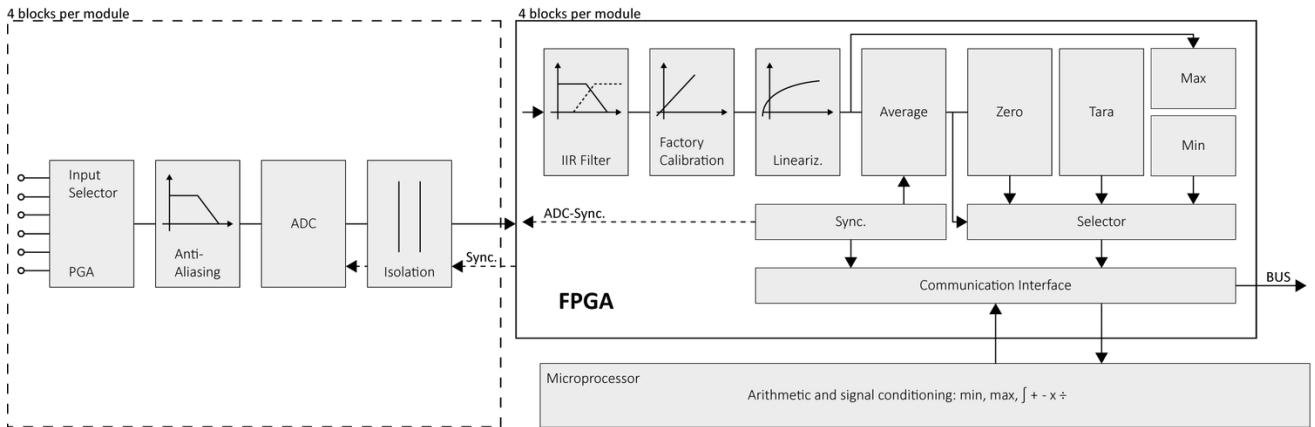


## Key Features

- Signal conditioning  
linearization, filtering, average, scaling, min/max, RMS, arithmetic, alarm
- Configurable excitation voltages  
10 V, 5 V 2.5 V and 1 V
- High-accuracy digitization  
24-bit ADC, 20 kHz sample rate per channel
- 4 digital inputs
- 4 galvanically isolated analog inputs channels  
strain gage full bridges, half and quarter bridge, voltage
- 3-Way galvanic isolation  
Channel to channel, channel to power supply, and channel to bus

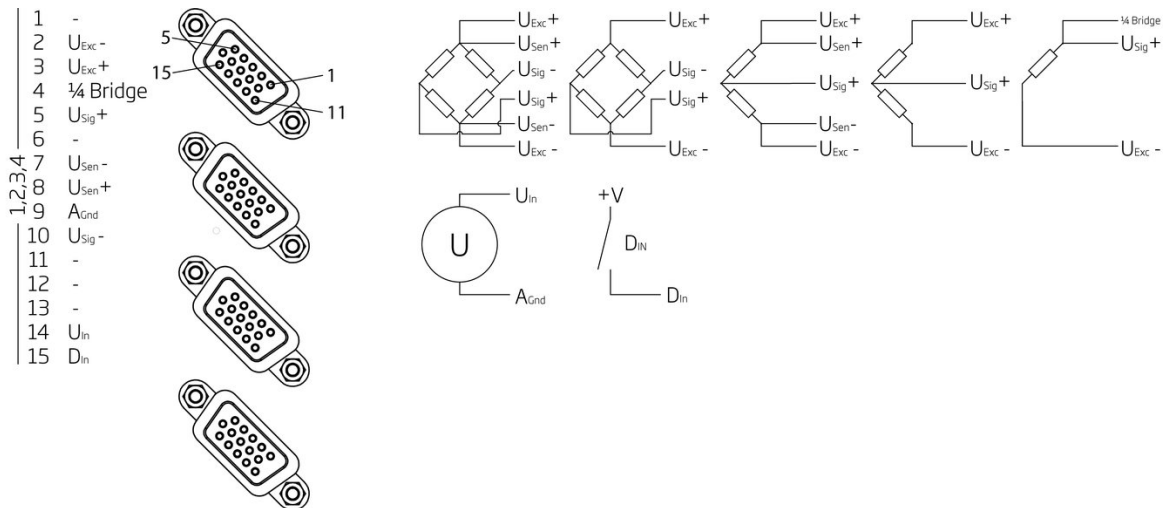


### Block diagram



### Technical Data

#### Terminal assignment - DSUB 15 - female



### Analog Input

Channels	4
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

### Analog to Digital Conversion

Resolution	24-bit
Sample rate	20 kHz per channel
Modulation method	sigma-delta
Anti-aliasing filter	4 kHz, 3rd order
Digital filters	Infinite impulse response (IIR), low-pass, high-pass, band-pass, band-stop, to 8th order Butterworth or Bessel, 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

### Strain Gage Measurement

Bridge configuration(s)	resistive full-bridge (4/6-wire) resistive half-bridge (3/5-wire) resistive quarter-bridge 1 k $\Omega$			
Allowable sensor cable length	30 m			
Shunt resistor	100 k $\Omega$ internal resistor			
Temperature influence bridge completion resistor	0.2 ppm/K			
Bridge excitation	10 V			
Allowable sensor resistance	>300 $\Omega$			
Measurement range	$\pm 1$ mV/V	$\pm 2.5$ mV/V	$\pm 10$ mV/V	$\pm 100$ mV/V
Margin of error	0.5 $\mu$ V/V	1 $\mu$ V/V	4 $\mu$ V/V	40 $\mu$ V/V
Long-term stability 24h	0.1 $\mu$ V/V	0.2 $\mu$ V/V	1 $\mu$ V/V	10 $\mu$ V/V
Long-term stability 8000h	1 $\mu$ V/V	2 $\mu$ V/V	10 $\mu$ V/V	100 $\mu$ V/V
Temperature drift Offset drift	0.1 $\mu$ V/V / 10 K	0.2 $\mu$ V/V / 10 K	1 $\mu$ V/V / 10 K	10 $\mu$ V/V / 10 K
Measuring range end value	0.05 % / 10 K	0.05 % / 10 K	0.05 % / 10 K	0.05 % / 10 K
Noise without filter	0.8 $\mu$ V/Vpp	0.8 $\mu$ V/Vpp	1.2 $\mu$ V/Vpp	8 $\mu$ V/Vpp
Noise with 1kHz filter	0.3 $\mu$ V/Vpp	0.3 $\mu$ V/Vpp	0.5 $\mu$ V/Vpp	3 $\mu$ V/Vpp
Noise with 10 Hz filter	0.02 $\mu$ V/Vpp	0.02 $\mu$ V/Vpp	0.03 $\mu$ V/Vpp	0.3 $\mu$ V/Vpp
Bridge excitation	5 V			
Allowable sensor resistance	>100 $\Omega$			
Measurement range	$\pm 1$ mV/V	$\pm 2.5$ mV/V	$\pm 10$ mV/V	$\pm 100$ mV/V
Margin of error	0.5 $\mu$ V/V	1 $\mu$ V/V	4 $\mu$ V/V	40 $\mu$ V/V
Long-term stability 24h	0.1 $\mu$ V/V	0.2 $\mu$ V/V	1 $\mu$ V/V	10 $\mu$ V/V
Long-term stability 8000h	1 $\mu$ V/V	2 $\mu$ V/V	10 $\mu$ V/V	100 $\mu$ V/V
Temperature drift Offset drift	0.1 $\mu$ V/V / 10 K	0.2 $\mu$ V/V / 10 K	1 $\mu$ V/V / 10 K	10 $\mu$ V/V / 10 K
Measuring range end value	0.05 % / 10 K	0.05 % / 10 K	0.05 % / 10 K	0.05 % / 10 K
Noise without filter	1.2 $\mu$ V/Vpp	1.2 $\mu$ V/Vpp	1.6 $\mu$ V/Vpp	10 $\mu$ V/Vpp
Noise with 1kHz filter	0.6 $\mu$ V/Vpp	0.7 $\mu$ V/Vpp	0.7 $\mu$ V/Vpp	3.3 $\mu$ V/Vpp
Noise with 10 Hz filter	0.06 $\mu$ V/Vpp	0.06 $\mu$ V/Vpp	0.1 $\mu$ V/Vpp	0.4 $\mu$ V/Vpp
Bridge excitation	2.5 V			
Allowable sensor resistance	>100 $\Omega$			
Measurement range	$\pm 1$ mV/V	$\pm 2.5$ mV/V	$\pm 10$ mV/V	$\pm 100$ mV/V
Margin of error	1 $\mu$ V/V	2 $\mu$ V/V	4 $\mu$ V/V	40 $\mu$ V/V
Long-term stability 24h	0.1 $\mu$ V/V	0.2 $\mu$ V/V	1 $\mu$ V/V	10 $\mu$ V/V
Long-term stability 8000h	1 $\mu$ V/V	2 $\mu$ V/V	10 $\mu$ V/V	100 $\mu$ V/V
Temperature drift Offset drift	0.1 $\mu$ V/V / 10 K	0.2 $\mu$ V/V / 10 K	1 $\mu$ V/V / 10 K	10 $\mu$ V/V / 10 K
Measuring range end value	0.05 % / 10 K	0.05 % / 10 K	0.05 % / 10 K	0.05 % / 10 K
Noise without filter	2.5 $\mu$ V/Vpp	2.5 $\mu$ V/Vpp	3 $\mu$ V/Vpp	11 $\mu$ V/Vpp
Noise with 1kHz filter	1.2 $\mu$ V/Vpp	1.2 $\mu$ V/Vpp	1.5 $\mu$ V/Vpp	5 $\mu$ V/Vpp
Noise with 10 Hz filter	0.08 $\mu$ V/Vpp	0.12 $\mu$ V/Vpp	0.15 $\mu$ V/Vpp	0.7 $\mu$ V/Vpp
Bridge excitation	1 V			
Allowable sensor resistance	>100 $\Omega$			

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## Measurement Module for Strain Gage

Measurement range	±1 mV/V	±2.5 mV/V	±10 mV/V	±100 mV/V
Margin of error	2 µV/V	2.5 µV/V	10 µV/V	100 µV/V
Long-term stability 24h	0.2 µV/V	0.25 µV/V	1 µV/V	10 µV/V
Long-term stability 8000h	2 µV/V	2.5 µV/V	10 µV/V	100 µV/V
Temperature drift Offset drift	0.2 µV/V / 10 K	0.25 µV/V / 10 K	1 µV/V / 10 K	10 µV/V / 10 K
Measuring range end value	0.05 % / 10 K	0.05 % / 10 K	0.05 % / 10 K	0.05 % / 10 K
Noise without filter	6 µV/Vpp	6 µV/Vpp	7 µV/Vpp	20 µV/Vpp
Noise with 1kHz filter	3 µV/Vpp	3 µV/Vpp	4 µV/Vpp	10 µV/Vpp
Noise with 10 Hz filter	0.2 µV/Vpp	0.2 µV/Vpp	0.4 µV/Vpp	1.5 µV/Vpp

### Voltage Measurement

Input impedance	>1 MΩ		
Overvoltage protection	±30 V		
Measurement range	±10 V	±5 V	±1 V
Margin of error	±2 mV	±1 mV	±200 µV
Resolution	1.2 µV	0.6 µV	120 nV
Long-term stability 24h	200 µV	100 µV	20 µV
Long-term stability 8000h	2000 µV	1000 µV	200 µV
Temperature drift Offset drift	500 µV/V / 10 K	250 µV/V / 10 K	50 µV/V / 10 K
Measuring range end value	0.01 % / 10 K	0.01 % / 10 K	0.01 % / 10 K
Noise without filter	0.8 mVpp	0.5 mVpp	0.3 mVpp
Noise with 1kHz filter	0.4 mVpp	0.3 mVpp	0.2 mVpp
Noise with 10 Hz filter	0.03 mVpp	0.02 mVpp	0.01 mVpp

### Digital Inputs

Channels	4
Mode(s) of operation	status
Logic levels	<2 VDC (Low) <10 VDH (High)
Input kind	PNP (current sinking)
Input voltage	30 VDC max.

### 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	7 W (approx.)
Input voltage influence	<0.001 % / V

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## Measurement Module for Strain Gage

### 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 137 x 135mm
Weight	approx. 500 g
Protection class	IP40

### Ordering Information

Article number	780023
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### Gantner Instruments

Austria | Germany | France | Sweden | India | USA | China | Singapore  
Montafonerstraße 4 · A-6780 Schruns · T +43 55 56 · 77 463-0

office@gantner-instruments.com  
www.gantner-instruments.com