

# Q.bloxx EC A116

## Strain Gage Measurement Module

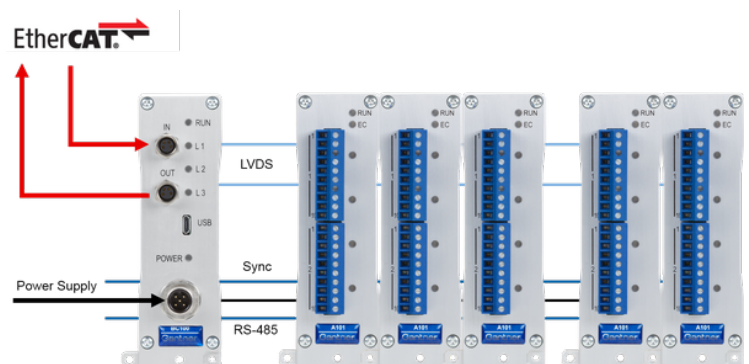
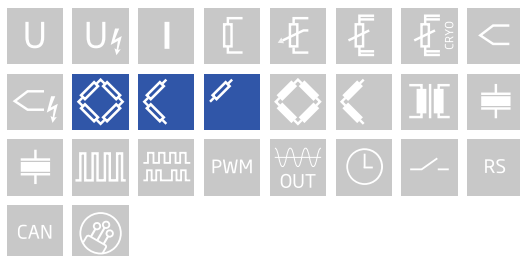
The Q.bloxx EC brings the high precision and performance of Q.bloxx to EtherCAT-based applications. Q.bloxx EC measurement modules possess integrated signal conditioning and arithmetic functions, packaged in environmentally secure (up to IP65), DIN Rail mountable enclosures that easily snap together for system expansion. With measurement speeds of up to 100 kHz per channel, short cycle times, and low jitter for accurate synchronization, Q.bloxx EC is the ideal solution for EtherCAT applications.

- CoE (CAN over EtherCAT) according to Modular Device Profil ETG.5001.1
- XFC technology for oversampling, oscilloscope function, cycle times 1 ms up to 0.1 ms, oversampling  $\leq 100$
- Configurable PDO Mapping to optimize the data throughput
- Module Configuration via SDO or FoE and alternative via configuration software
- Modular design for DIN Rail Mounting



### Key Features

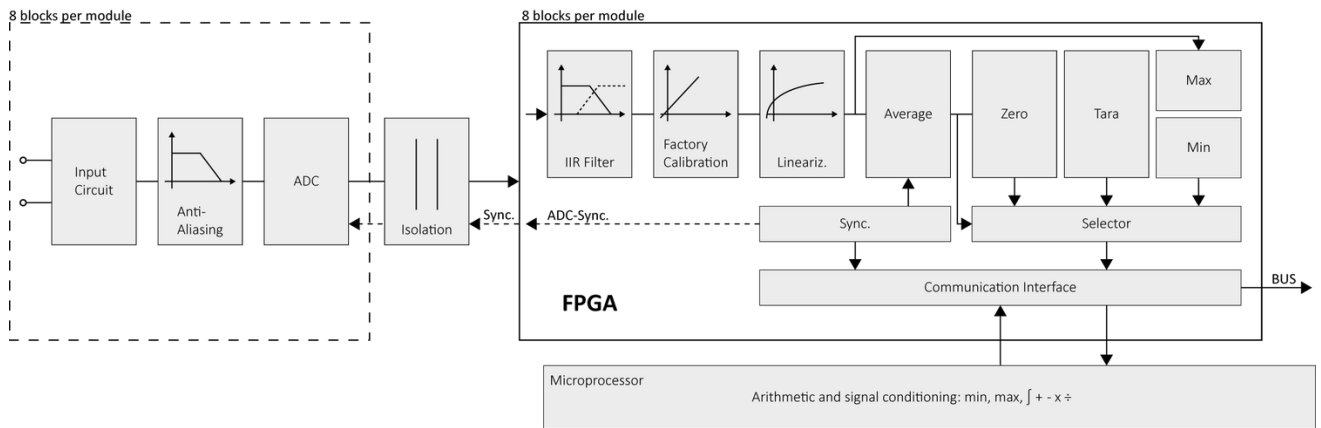
- 8 analog input channels for strain gages  
full-, half-, and quarter-bridge configuration, configurable per channel
- Selectable input ranges for optimal signal-to-noise ratio  
2.5 or 10 mV/V for half- and full-bridge, 1 or 10 mV/V for quarter-bridge
- High-accuracy digitization  
24-bit ADC, 20 kHz sample rate per channel
- Active lead wire resistance compensation  
online compensation signal (OCS) for continuous compensation of lead wire resistance changes
- Shunt calibration per channel
- Build-in shunt resistor  
Shunt verification of the complete measurement chain.
- Galvanic Isolation  
channel to supply to interface



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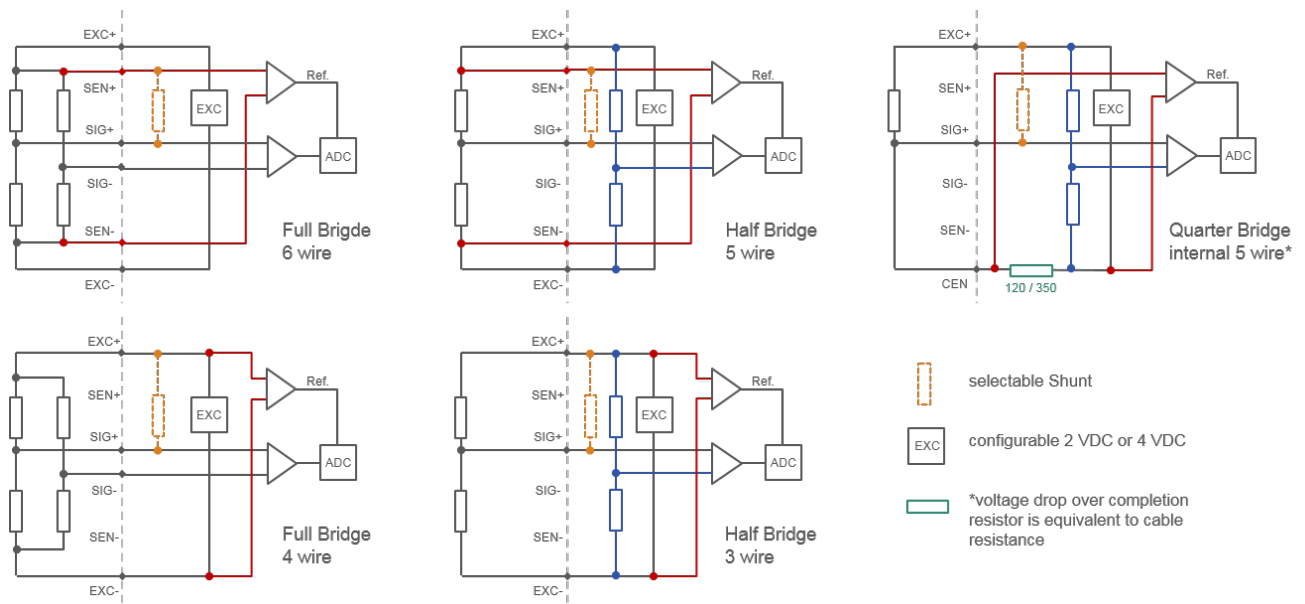
## Strain Gage Measurement Module

### Block diagram



### Technical Data

#### Strain Gage Wiring Diagram



### Analog Input

Channels	8
Accuracy	0.02 % typical
	0.05 % in controlled environment <sup>1</sup>
	0.1 % in industrial area <sup>2</sup>
Linearity error	0.01 % typical (within 24 h)
Input impedance	> 10 MΩ
Isolation voltage	500 VDC channel to input voltage to interface <sup>3</sup>

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

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

<sup>3</sup> noise pulses up to 1000 VDC, continuous up to 250 VDC

### Analog to Digital Conversion

Resolution	24-bit
Sample rate	10 kHz per channel
Modulation method	sigma-delta
Anti-aliasing filter	1 kHz, 3rd order
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 2 kHz
Averaging	configurable or automatic according to the user-defined data rate

### Strain Gage Measurement

Bridge configuration(s)	resistance full-bridge (4/6-wire) resistance half-bridge (3/5-wire) resistance quarter-bridge (3-wire, with lead wire resistance compensation)	
Accuracy class	0.05	
Bridge completion resistor	selectable 120 Ω or 350 Ω per channel (others upon request)	
Temp. Coefficient of Resistance (TCR)	0.05 ppm/K	
Input range	full-bridge ±2.5 mV/V or ±10 mV/V half-bridge ±2.5 mV/V or ±10 mV/V quarter-bridge ±1 mV/V or ±10 mV/V (±2000 µm/m or ±20000 µm/m with k=2) selectable per channel	
Shunt resistor	100 kΩ internal resistor	
Bridge excitation	selectable 2 VDC or 4 VDC per channel	
Allowable sensor resistance	>200 Ω at 4 VDC >100 Ω at 2 VDC	
Maximum sensor cable length	full-bridge 300 m half-bridge 300 m quarter-bridge 100 m	
Long-term stability	<0.2 µV/V / 24 hrs	<2 µV/V / 8000 hrs
Temperature drift	<0.5 µV/V / 10 K Offset drift	0.05 % / 10 K Gain drift
Noise	<0.3 µV/V (at 10 Hz)	
Linearity deviation	<0.02 % f.s.	

### Communication Interface EtherCAT

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

### Input Power

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

### Environmental Specifications

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

### Mechanical information

Material	Aluminum and ABS
Measurements (W x H x D)	35.6 x 118.8 x 124 mm
Weight	approx. 400 g

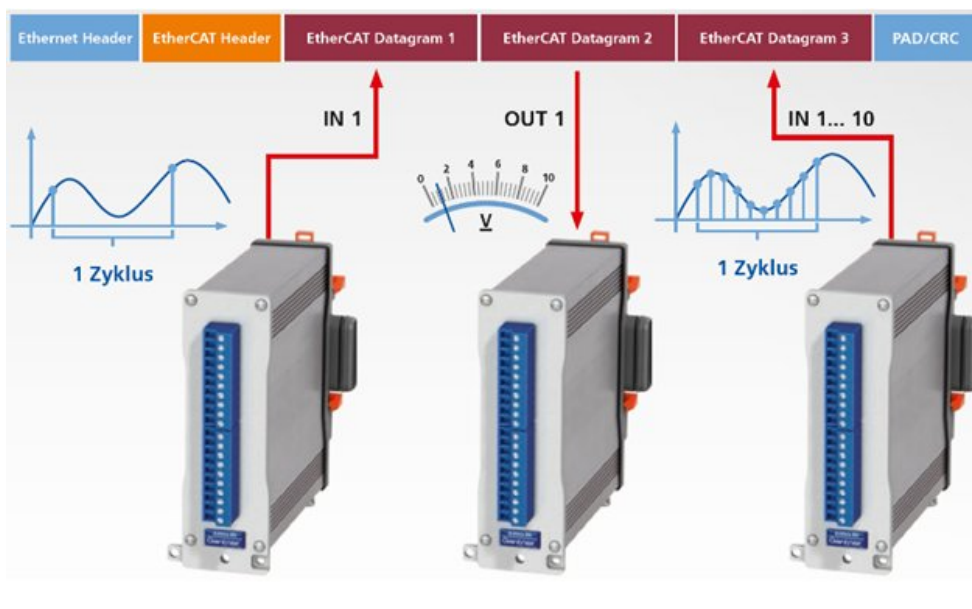
### Oversampling

EtherCAT also enables transmitting of very high data rates at low bus cycle by over sampling. In this case, a higher number of values of one channel per PDO transmitted so as to reduce protocol overhead.

Example: bus cycle 1 kHz, 100 times over sampling

= > 100 values are transferred per bus cycle

= > effective sample rate 100 kHz



### Ordering Information

Article number	590834
Accessories	Connection Terminal A116, article number 600725

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