

Q.bloxx EC A116

Strain Gage Measurement Module

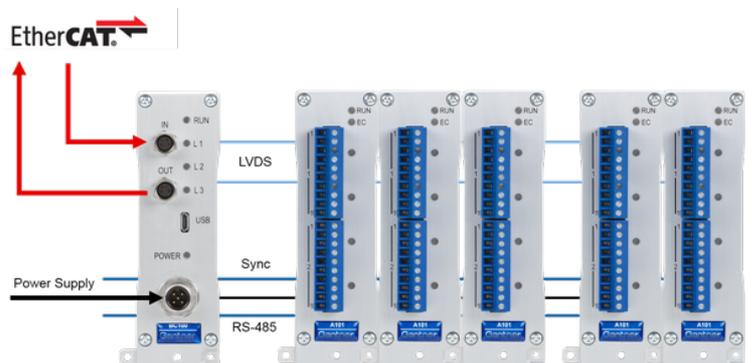
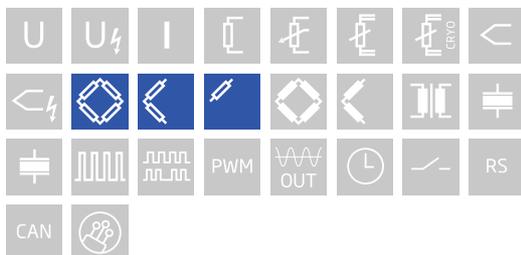
The Q.bloxx EC brings the high precision and performance of Q.bloxx to EtherCAT-based applications. Q.bloxx EC measurement modules possess integrated signal conditioning and arithmetic functions, packaged in environmentally secure (up to IP65), DIN Rail mountable enclosures that easily snap together 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 ≤ 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

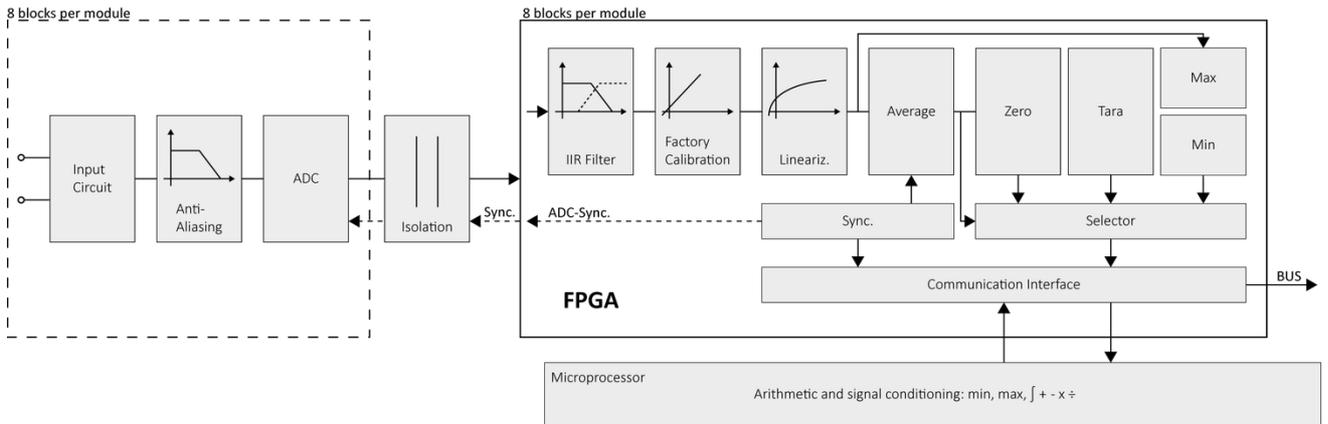
- 8 analog input channels for strain gages
full-, half-, and quarter-bridge configuration, configurable per channel
- Selectable input ranges for optimal signal-to-noise ratio
2.5 or 10 mV/V for half- and full-bridge, 1 or 10 mV/V for quarter-bridge
- High-accuracy digitization
24-bit ADC, 20 kHz sample 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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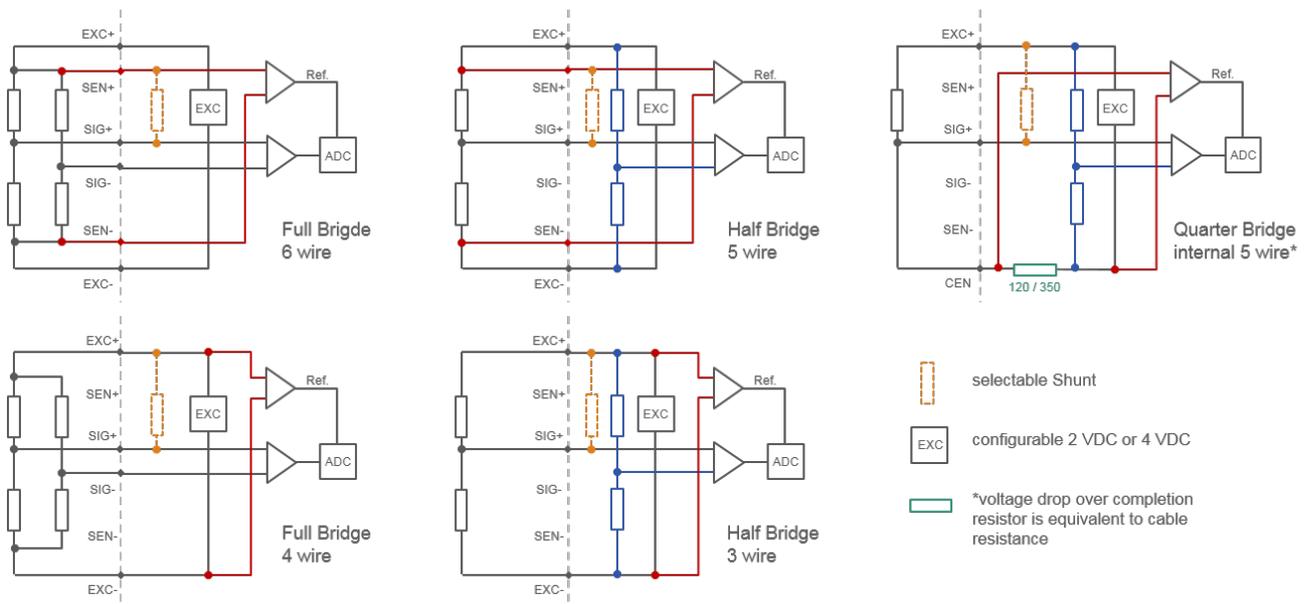
Strain Gage Measurement Module

Block diagram



Technical Data

Strain Gage Wiring Diagram



Analog Input

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

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 | 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) |

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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 |

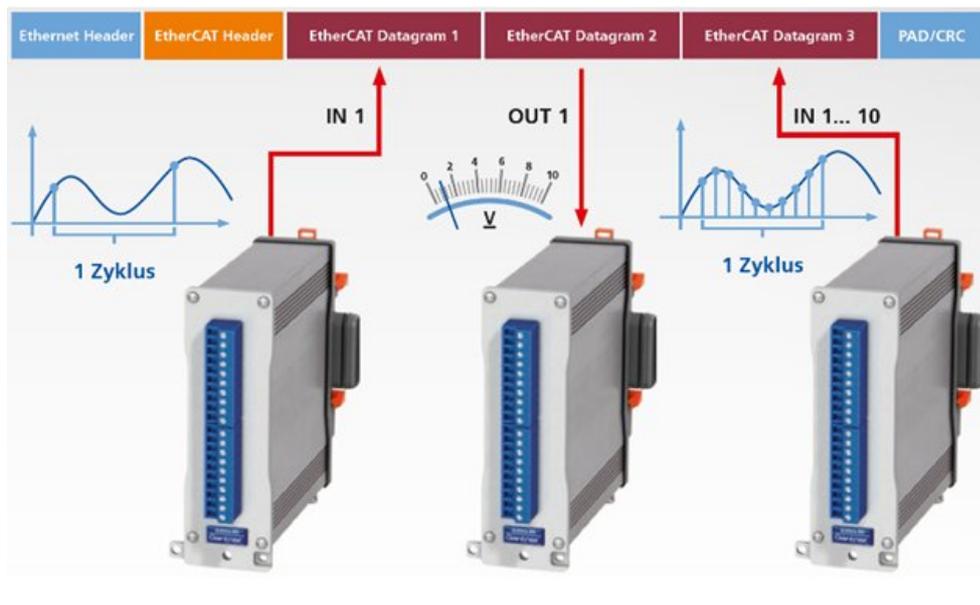
Oversampling

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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