

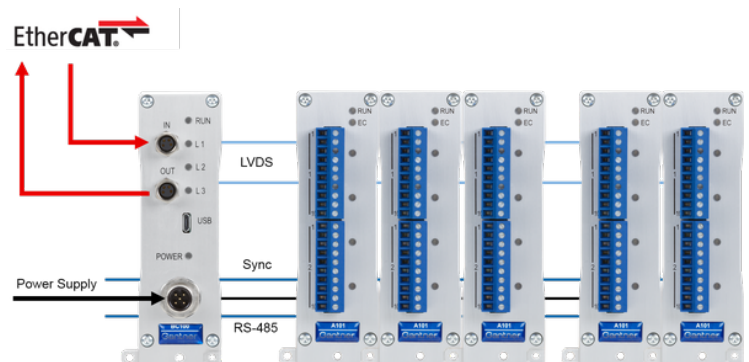
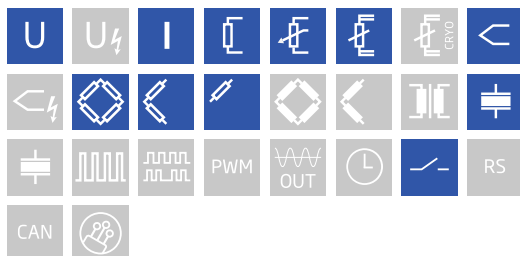
The Q.bloxx EC brings the high precision and performance of Q.bloxx to EtherCAT-based applications. Q.bloxx EC measurement modules possess integrated signal conditioning and arithmetic functions, packaged in environmentally secure (up to IP65), DIN Rail mountable enclosures that easily snap together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

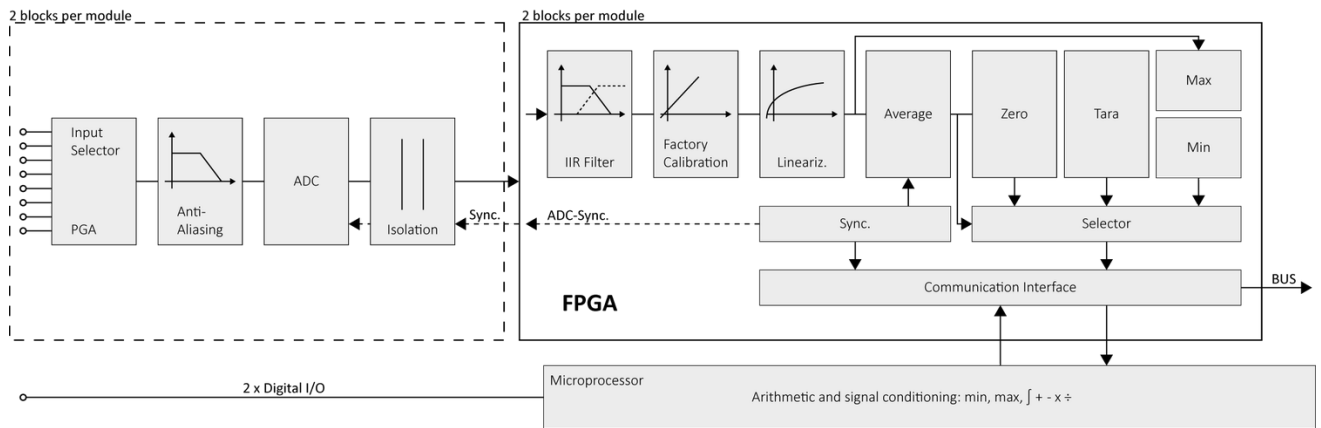


Key Features

- **2 Universal analog input channels**
Voltage, current, resistance, potentiometer, RTD, thermocouple, strain gage (full-, half-, and quarter-bridge configuration), IEPE
- **High-accuracy digitization**
24-bit ADC, 100 kHz sample rate per channel
- **2 Digital inputs or outputs**
Status, trigger, tare, alarm, command
- **Signal conditioning**
16 virtual channels, linearization, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm
- **3-Way galvanic isolation**
500 VDC channel to channel, channel to power supply, and bank

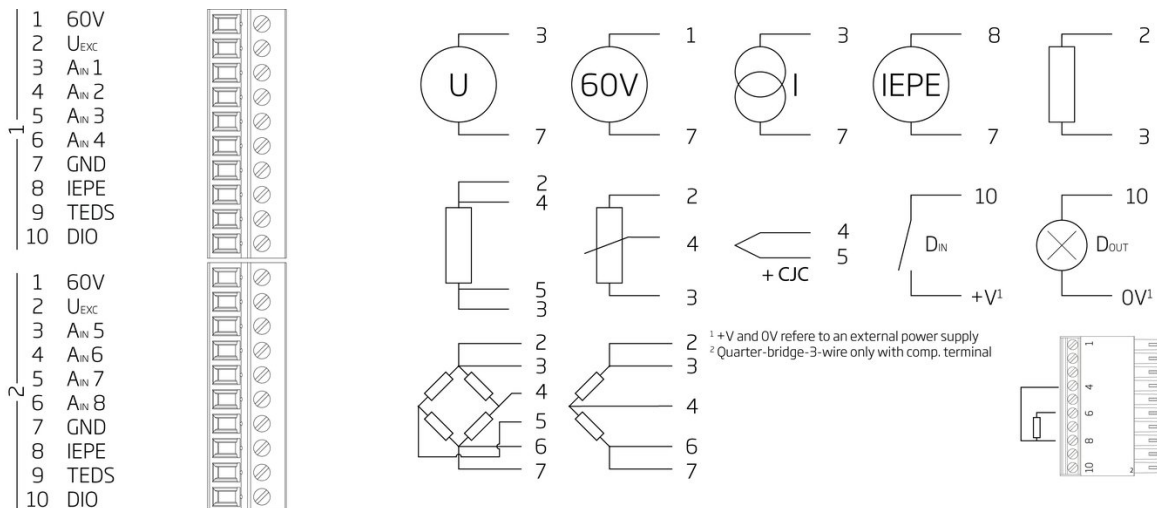


Block diagram



Technical Data

Terminal assignment



Analog Input

Channels	2
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 h)
Isolation voltage	500 VDC channel to channel to power supply channel to bus 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

Measurement Mode Voltage

	Range	max. Error	Resolution
	±60 V	±15 mV	7.2 µV
	±10 V	±2 mV	1.2 µV
	±1 V	±200 µV	120 nV
	±100 mV	±20 µV	12 nV
Input impedance > 10 MΩ	Range ±10 V	Range ±60 V	
	> 1 MΩ	> 3 MΩ	
Long-term drift at input range ± 1 V	< 20 µV / 24 h		< 200 µV / 8000 h
Temperature influence at input range ± 1 V	Offset drift		Gain drift
	< 50 µV / 10 K		< 0.01 % / 10 K
Signal-to-noise ratio	> 90 dB at 1 kHz		> 120 dB at 1 Hz

Measurement Mode Current

Error	Range	max. Error	Resolution
Internal shunt resistor 50 Ω	±25 mA	±5 µA	3.0 nA
Long-term drift	< 0.5 µA / 24 h		< 5 µA / 8000 h
Temperature influence	Offset drift		Gain drift
	< 1 µA / 10 K		< 0.025 % / 10 K

Measurement Mode Resistance / RTD

Error	Range	max. Error	Resolution
Resistance, 2-wire	100 kΩ	±100 Ω	12 mΩ
Resistance, 2- and 4-wire	4 kΩ	±1 Ω	0.5 mΩ
Resistance, 2- and 4-wire	400 Ω	±0.1 Ω	48 µΩ
Pt100, 2- and 4-wire	-200 to +850°C	±0.25°C	0.2 m°C
Pt1000, 2- and 4-wire	-200 to +850°C	±1°C	0.2 m°C
Long-term drift	< 0.01°C / 24 h		< 0.1°C / 8000 h
Temperature influence	Offset drift (range 400 Ω)		Gain drift
	< 10 mΩ / 10 K		< 0.025 % / 10 K

Measurement Mode Potentiometer, Relative Measurement

Allowable potentiometer resistance	1 kΩ to 10 kΩ		
Long-term drift	< 0.01 % / 24 h		< 0.1 % / 8000 h
Temperature influence	Offset drift (Range 1)		Gain drift
	< 0.0001 / 10 K		< 0.02 % / 10 K

Measurement Mode Bridge

Bridge configuration(s)	half- and full-bridge, (5-/6-wire), quarter-bridge with completion terminal, (3-wire)		
Accuracy class	0.05		
Bridge resistance	>100 Ω		
Bridge excitation	2.5 VDC, nominal		
Measurement range	± 2.4 mV/V	± 20 mV/V	± 500 mV/V
Long-term drift	<0.12 μ V/V / 24 h	<1.2 μ V/V / 8000 h	
Temperature influence	Offset drift (Range 2.4 mV/V)		Gain drift
	<0.2 μ V/V / 10 K		<0.05 % / 10 K

Measurement Mode Thermocouple

Deviation in the relevant Temperature range	Type	Range	Adjusted with cold junction compensation	Not adjusted, with CJC terminal
	Type B	400°C to 1820°C	< ±1.5 °C	< ±2.5°C
	Type E, J, K	-100 to 1000°C	< ±0.7°C	< ±1.2°C
	Type E	-270°C to 1000°C	< ±1°C	< ±1.2°C
	Type K	-270°C to 1372°C	< ±1°C	< ±1.2°C
	Type L	-200°C to 900°C	< ±0.7°C	< ±1.2°C
	Type N	-100°C to 1000°C	< ±0.7°C	< ±1.2°C
	Type N	-270°C to 1300°C	< ±1°C	< ±1.2°C
	Type R, S	-50°C to 1768°C	< ±1.2°C	< ±1.5°C
	Type T, U	-100°C to 400°C	< ±0.7°C	< ±1.2°C
	Type T	-270°C to 400°C	< ±1°C	< ±1.2°C
Input impedance	> 10 MΩ			
Long-term drift	<0.1°C / 24 h		<0.2°C / 8000 h	
Temperature influence	Offset drift		Gain drift	
	<0.1°C / 10 K		<0.02% / 10 K	
Uncertainty CJC	<0.3°C			

Measurement Mode IEPE Sensor

Error	Range	max. Error	Resolution
	± 10 V	± 10 mV	1.2 μ V
	± 1 V	± 1 mV	120 nV
Supply	constant current 4 mA		
Input frequency range	0.5 Hz to 10 kHz		
Temperature influence	Offset drift (range 10 V)		Gain drift
	<10 μ V / 10 K		<0.025 % / 10 K

Analog to Digital Conversion

Resolution	24-bit
Update rate	100 kHz (measurement thermocouple 8 Hz)
Modulation method	Sigma-Delta
Anti-aliasing filter	20 kHz, 3rd order
Digital filters	Infinite impulse response (IIR), low-pass, high-pass, band-pass, Butterworth or Bessel (2nd, 4th, 6th or 8th order), frequency range 0.1 Hz to 10 kHz (adjustable via software)
Averaging	configurable or automatic according to the selected data rate

Digital In-/Outputs

Channels	2 (1 digital I/O per channel)
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)

Power Supply

Input voltage	10 to 30 VDC, overvoltage and overcurrent protection
Power consumption	approx. 2 W
Input voltage influence	< 0.001 %/V

Environmental

Operating temperature	-20°C to +60°C
Storage temperature	-40°C to +85°C
Relative humidity	5 % to 95 % at 50°C, non-condensing

Remarks

Warm-up time	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

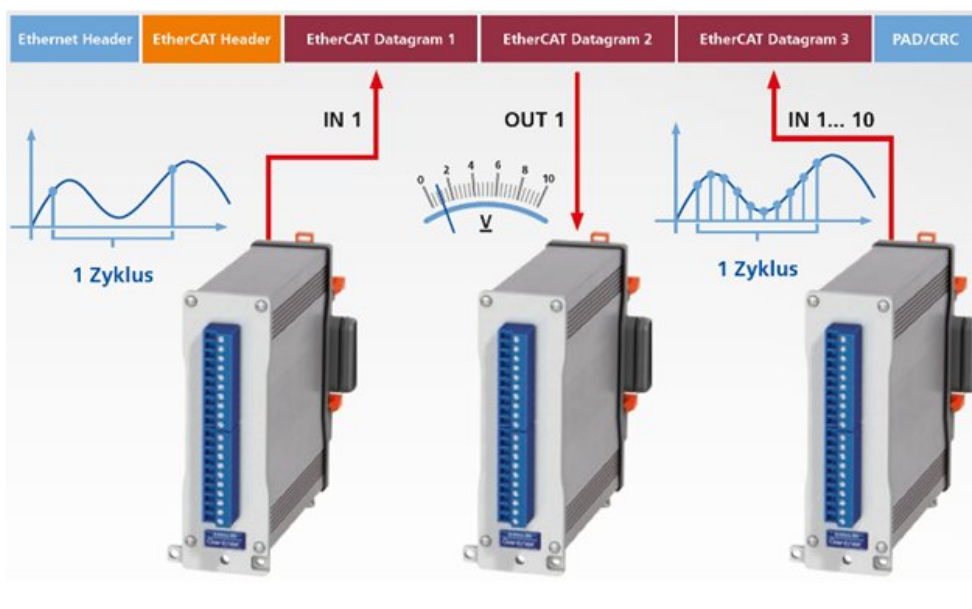
Oversampling

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	527834
Accessories	Terminal B4/120-A101, article number 897895
	Terminal B4/350-A101, article number 897996
	Terminal CJC-A101, article number 890787

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