

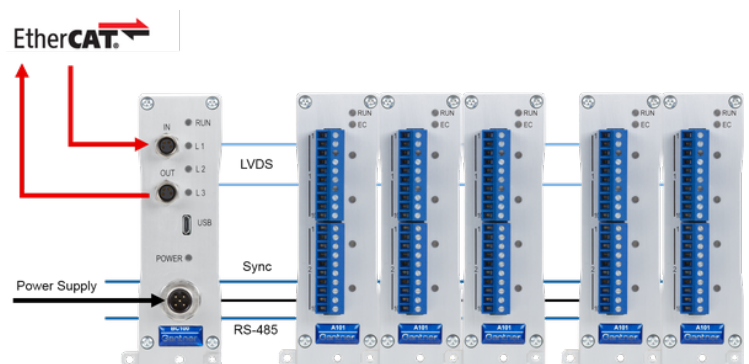
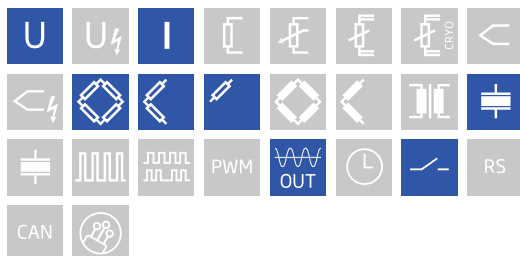
The Q.bloxx EC brings the high precision and performance of Q.bloxx to EtherCAT-based applications. Q.bloxx EC measurement modules possess integrated signal conditioning and arithmetic functions, packaged in environmentally secure (up to IP65), DIN Rail mountable enclosures that easily snap together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

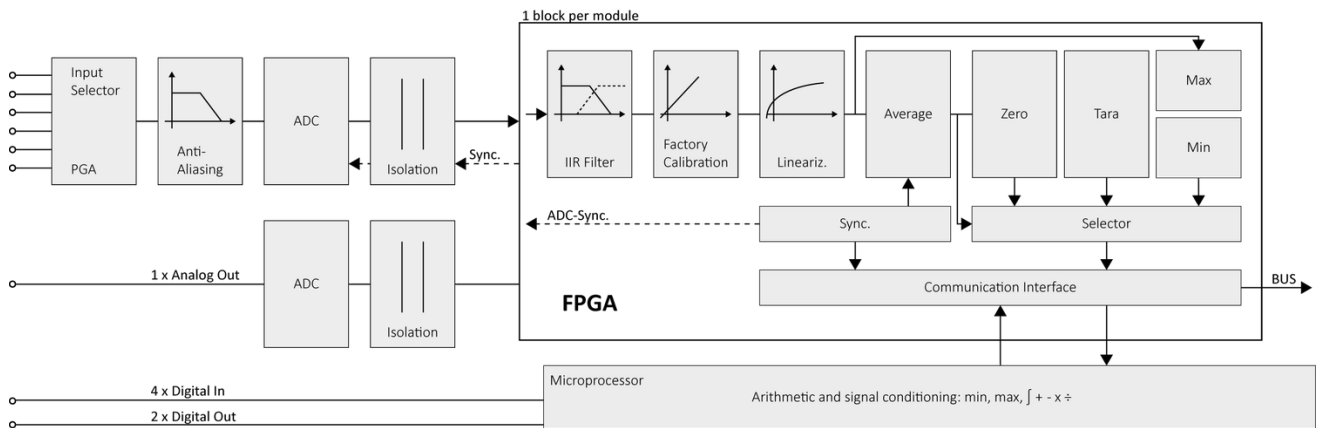


### Key Features

- 1 Analog input channel  
measuring half and full bridge, IEPE-sensor, voltage, current, quarter bridge with completion terminal
- 1 Analog output channel  
voltage ( $\pm 10$  V) or current (0 - 20 mA), 100 kHz update rate
- High-accuracy digitization  
19-bit SAR ADC, 100 kHz sample rate
- 4 Digital inputs and 2 digital outputs  
status, trigger, tare, alarm, command
- Signal conditioning  
32 virtual channels, linearization, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm
- Additional RS 485 fieldbus interface  
to control an 8 or 16 or 24 channel multiplexer for multi channel systems, 10Hz per channel
- 3-Way galvanic isolation  
500 VDC channel to channel, channel to power supply, and bank



### Block diagram



### Technical Data

#### Analog Input

Channels	1
Accuracy	0.01 % typical
	0.025 % in controlled environment <sup>1</sup>
	0.05 % in industrial area <sup>2</sup>
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 <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

#### Voltage Measurement

Error	Range	max. Error	Resolution
	±10 V	±2 mV	40 µV
	±1 V	±200 µV	4 µV
	±100 mV	±20 µV	0.4 µV
Input impedance	> 10 MΩ (Range ±10 V = 1 MΩ)		
Long-term drift at input range ±1 V	<10 µV / 24 h	<100 µV / 8000 h	
Temperature influence at input range ±1 V	Offset drift	Gain drift	
	<50 µV / 10 K	<0.02 % / 10 K	
Signal-to-noise ratio	>90 dB at 1 kHz	>120 dB at 1 Hz	

#### Current Measurement

Error (Internal shunt resistor 50 Ω)	range	max. error	resolution
	±25 mA	±6 µA	100 nA
Long-term drift	<0.5 µA / 24 h	<5 µA / 8000 h	
Temperature influence	Offset drift	Gain drift	
	<1 µA / 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			
Internal shunt resistor resistance	100 kΩ			
Bridge excitation (nominal)	10.0 VDC	5.0 VDC	2.5 VDC	1.0 VDC
Allowable bridge resistance	>300 Ω	>100 Ω	>80 Ω	>50 Ω
Measurement range	±100 mV/V	±200 mV/V	±500 mV/V	±1000 mV/V
	±25 mV/V	±50 mV/V	±100 mV/V	±200 mV/V
	±2.5 mV/V	±5 mV/V	±10 mV/V	±20 mV/V
	±1 mV/V	±2.5 mV/V	±5 mV/V	±10 mV/V
Temperature influence	Offset drift (range 2.5 mV/V)		Gain drift	
	<0.2 μV/V / 10 K		<0.05 % / 10 K	

### Measurement Mode IEPE Sensor

Error	Range	max. Error	Resolution
	±10 V	±10 mV	40 μV
Supply	constant current 4 mA		
Input frequency	2 Hz		
Limit frequency	10 kHz		
Temperature influence	Offset drift	Gain drift	
	<10 μV / 10 K	<0.025 % / 10 K	

### Analog to Digital Conversion

Resolution	19-bit
Update rate	100 kHz
Modulation method	SAR (successive approximation)
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 user-defined data rate

### Analog Output

Accuracy	0.02 %	
Output type	configurable: voltage or current	
DAC resolution	16-bit	
Update rate	100 kHz	
Voltage output	±10 VDC	
Allowable load resistance	> 2 kΩ	
Temperature influence	Offset drift	Gain drift
	< 2 mV / 10 K	< 0.05 % / 10 K
Noise voltage	< 10 mV at 1 kHz	< 2 mV / 10 Hz
Long-term drift	< 1 mV / 24 h	< 2,5 mV / 8000 h
Current output	0 to 20 mA	
Allowable load burden	< 400 Ω	
Burden influence	Accuracy at 100 Ω	Gain drift
	± 4 μA	< 0.25 μA / Ω
Temperature influence	Offset drift	Gain drift
	4 μA / 10 K	0.05 % / 10 K
Noise current	< 20 μA at 1 kHz	< 4 μA / 10 Hz
Long-term drift	< 2 μA / 24 h	< 5 μA / 8000 h

### Digital In- / Outputs

Channels	4 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 EtherCAT

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

### Enviromental

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

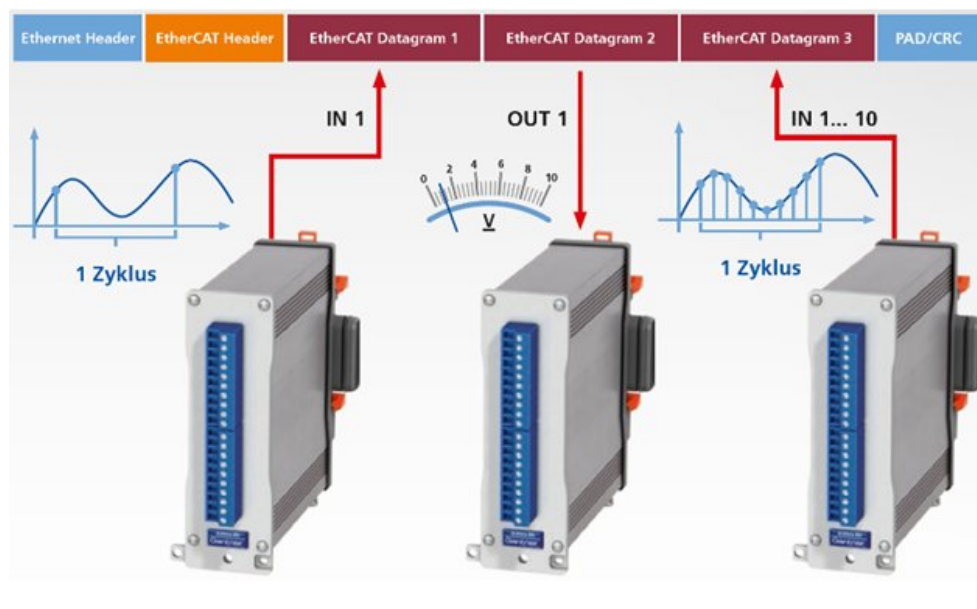
### Oversampling

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	527935
Accessories	Terminal B4/120-A102, article number 894185
	Terminal B4/350-A102, article number 894286

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