

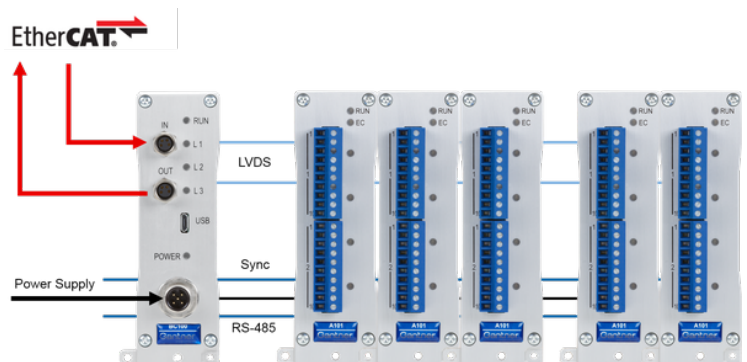
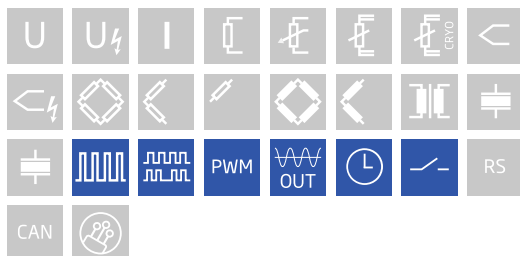
The Q.bloxx EC brings the high precision and performance of Q.bloxx to EtherCAT-based applications. Q.bloxx EC measurement modules possess integrated signal conditioning and arithmetic functions, packaged in environmentally secure (up to IP65), DIN Rail mountable enclosures that easily snap together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

- 4 Analog output channels  
voltage ( $\pm 10$  VDC) or current (0 - 20 mA), configurable per channel
- DAC-resolution 16 bit  
100 kHz each channel
- Outputs freely scalable
- 4 digital inputs and outputs  
configurable as 2 counter, 2 frequency, or 2 PWM inputs, 4 frequency out, 4 PWM output or 4 state out
- Frequency measurement  
Frequency measurement up to 1 MHz, direction detection
- Counter  
Forward-backward counter, quadrature counter with reference position recognition (reset/enable), up to 1 MHz
- PWM input  
Measurement of duty cycle and frequency
- 3-Way galvanic isolation  
500 VDC channel to channel, channel to power supply, and bank



### Technical Data

#### Analog Output

Channels	4
Accuracy	0.02 % typical
Output type	voltage or current, configurable per channel
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

#### Output Mode Voltage

Output voltage	±10 VDC	
Allowable load resistance	>2 kΩ	
Long-term drift	<1 mV / 24 hrs	<2.5 mV / 8000 hrs
Temperature influence	<2 mV / 10 K Offset drift	<0.05 % / 10 K Gain drift
Noise voltage	<10 mV at 1000 Hz	< 2 mV at 10 Hz

#### Current Output

Output current	0 - 20 mA	
Load burden	<400 Ω	
burden influence	<0.1 μA / Ω	
Long-term stability	<2 μA / 24 hrs	<5 μA / 8000 hrs
Temperature drift	<4 μA / 10 K Offset drift	<0.05 % / 10 K Gain drift
Noise current	<20 μA at 1000 Hz	<4 μA at 10 Hz

#### Digital Input

Channels	4
Logic levels	TTL or 24 VDC according to IEC 61131-2, Type 1
TTL logic voltage	< 0.8 VDC (Low) > 3 VDC (High)
24 VDC logic voltage	-3 to 5 VDC (Low) 11 to 30 VDC (High)
Input type	PNP (current sinking)
Input voltage	30 VDC max.
Input current	2 mA max.
Isolation voltage	500 VDC, group to group, group to power supply, channel to bus <sup>1</sup>

<sup>1</sup> noise pulses up to 1000 VDC, continuous up to 250 VDC

### Digital Input Modes

<b>Status</b>	
Response time	10 µs
<b>Frequency measurement</b>	
Method	Chronos method (optimized by a combination of time measurement and pulse counting), detection of rotational direction (0 deg. / 90 deg.)
Frequency range	0.1 Hz to 1 MHz
Time base	0.001 s to 1 s
Internal reference frequency	48 MHz
Accuracy	0.01% at timebase > 1ms
Resolution	21 ns
<b>Pulse counting</b>	
Accuracy	0.01% at timebase > 1ms
Resolution	21 ns
Counter frequency	1 MHz
Mode(s) of operation	<ul style="list-style-type: none"> <li>- Forward and reverse counting (additional input for direction of counting)</li> <li>- Quadrature counter (additional input for detection of rotational direction)</li> <li>- Quadrature counter with zero reference and reset/enable (two additional inputs)</li> </ul>
<b>Pulse-width measurement</b>	
Input frequency	0.1 Hz to 1 MHz
Accuracy	0.01% at timebase > 1ms
Resolution	21 ns

### Digital Output

Channels	4
Contact	open drain p-channel MOSFET
Output voltage	12 to 30 VDC (external supply required)
Load capacity	30 VDC / 500 mA (ohmic load)
Isolation voltage	500 VDC, group to group, group to power supply, channel to bus <sup>1</sup>

<sup>1</sup> noise pulses up to 1000 VDC, continuous up to 250 VDC

### Digital Output Modes

Status				
	Response time	10 μs (>0.5 A)	100 μs (>0.1 A)	1000 μs (<0.1 A)
Frequency output				
	Frequency range	0.1 Hz to 1 kHz / 10 kHz (depending on load capacity)		
	Accuracy	0.1 %		
	Resolution	1 μs		
PWM output				
	Frequency range	0.1 Hz to 1 kHz / 10 kHz (depending on load capacity)		
	Accuracy	0.1 %		
	Resolution	1 μs		

# Q.bloxx EC A109

Analog Output Module with Digital I/Os

## Digital to Analog Conversion

Resolution	16-bit
Update rate	100 kHz per channel
Settling time	3 $\mu$ 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 W (approx.)
Input voltage influence	<0.001 % / V

## Environmental Specifications

Electromagnetic compatibility	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

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

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Analog Output Module with Digital I/Os

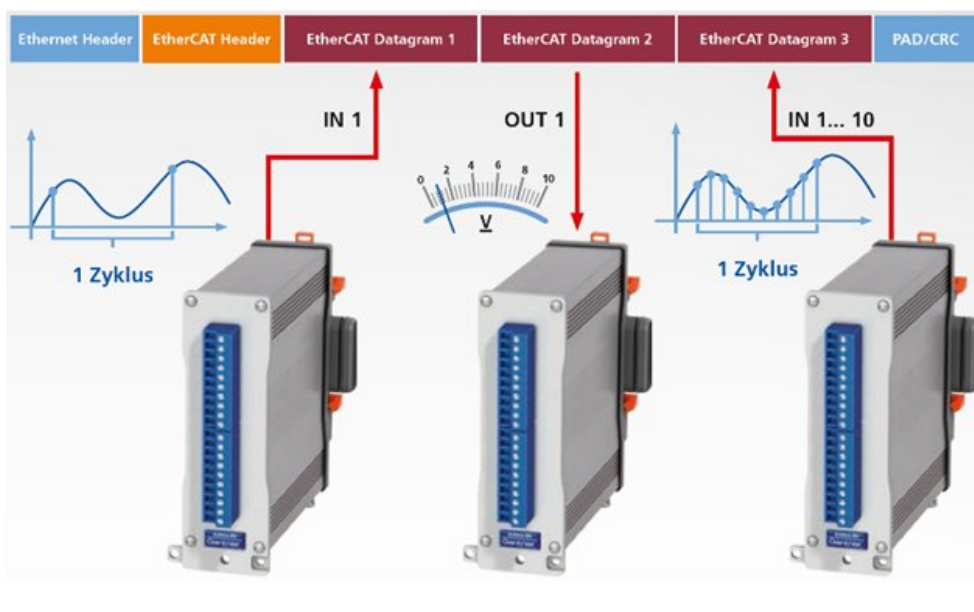
## Oversampling

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	528532
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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