

# Q.bloxx EC D101

## Digital Measurement Module

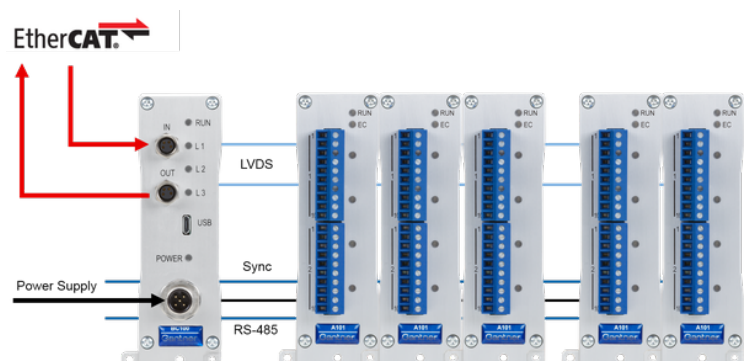
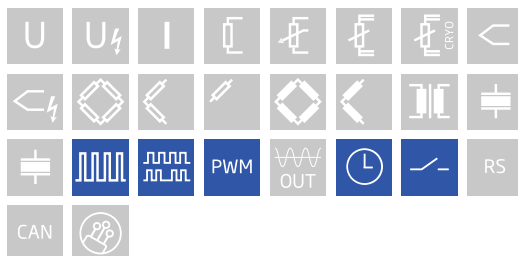
The Q.bloxx EC brings the high precision and performance of Q.bloxx to EtherCAT-based applications. Q.bloxx EC measurement modules possess integrated signal conditioning and arithmetic functions, packaged in environmentally secure (up to IP65), DIN Rail mountable enclosures that easily snap together 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 digital inputs and 8 digital outputs configurable as counter, frequency and PWM only 4 inputs can be used for frequency
- State in and output process- and host controlled
- Frequency in and output frequency measurement up to 1 MHz (Chronos method), frequency output up to 10 kHz
- Counter for/backward counter, quadrature counter with reference zero recognition and missing teeth detection, up to 1 MHz
- PWM in and output measurement of duty cycle and frequency, output with variable frequency and/or duty cycle
- Time measurement
- Galvanic isolation I/O-signals ( 4 x 4 I/Os) to power supply and to interface Isolation voltage 500 VDC



### Technical Data

#### Digital Inputs

Channels	8
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 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

### Function Digital Inputs

Status	
Response time	10 µs
8-fold bit set	specification such as simple state-input, but the binary coded information of 8 inputs can be transmitted as a single variable. This functionality covers all 8 inputs even if they are already used by other functionalities such as counter or frequency measurement. in case of a conflict the Bit-Set is lower prior.
Frequency measurement	
Method	Chronos optimized by combination of the time measurement and pulse counting, recognition of direction of rotation (0 deg./90 deg.)
Frequency range	0.1 Hz to 1 MHz
Time base	0.001 s to 10 s
Reference frequency	48 MHz
Accuracy	0.01% at timebase > 1ms (-20°C to +60°C)
Frequency measurement with recognition of direction of rotation	specification like frequency measurement, for the recognition of the rotation direction the phasing of both inputs is being used
Pulse counting	
Counter depth	32-bit (±31-bit)
Counter frequency	max. 1 Mhz
Forward and reverse counting	with an additional input for the direction of counting
Quadrature counter	with an additional input for the direction recognition for phasing the inputs
Quadrature counter with zero reference and reset/enable	like quadrature counter but with two additional inputs for the 0-reference recognition and enabling the 0-reference recognition
PWM measurement (duty cycle)	
Input frequency	0.1 Hz to 1 MHz
Accuracy	0.01% Freq < 2 kHz, 0.1% 2 kHz to 20 kHz, 3% > 20 kHz (-20°C to +60°C)
Resolution	21 ns

With a D101 - 2 x 4 terminals for digital inputs are available. Those will accept all mentioned signals as it required. The following combinations are possible.

Connector 1				Connector 2			
Terminal 1.6	Terminal 1.7	Terminal 1.8	Terminal 1.9	Terminal 2.6	Terminal 2.7	Terminal 2.8	Terminal 2.9
Status	Status	Status	Status	Status	Status	Status	Status
1 ch. signal	Status	1 ch. signal	Status	1 ch. signal	Status	1 ch. signal	Status
Status	Status	Status	Status	Status	Status	2 channel signal <sup>1</sup>	
Status	Status	Status	Status	2 channel signal <sup>1</sup>		2 channel signal <sup>1</sup>	
Status	Status	Status	Status	4 channel signal <sup>2</sup>			
Status	Status	2 channel signal <sup>1</sup>		2 channel signal <sup>1</sup>		2 channel signal <sup>1</sup>	
Status	Status	2 channel signal <sup>1</sup>		4 channel signal <sup>2</sup>			
2 channel signal <sup>1</sup>		2 channel signal <sup>1</sup>		4 channel signal <sup>2</sup>			
2 channel signal <sup>1</sup>		2 channel signal <sup>1</sup>		2 channel signal <sup>1</sup>		2 channel signal <sup>1</sup>	
4 channel signal <sup>2</sup>				4 channel signal <sup>2</sup>			
<sup>1</sup> All digital functionalities except status and quadrature counter with zero reference and reset/enable				<sup>2</sup> Quadrature counter with zero reference and reset/enable			
Time measurement							
Function		Measuring of time between two edges, measuring of high time, low time and high/low relation					

Time range	1 µs to 32 s
Resolution	21 ns

### Digital Outputs

Channels	8
Output voltage	12 V to 30 VDC
Load capacity	30 VDC / 500 mA (ohmic load)
Contact	open drain p-channel MOSFET

### Function Digital Outputs

Status			
Response time (depending on load capacity)	> 0.5 A 10 µs	> 0.1 A 100 µs	< 0.1 A 1000 µs
8-fold bit set	specification such as simple state-output, but the binary coded information of 8 outputs can be transmitted as a single variable. This functionality covers all 8 outputs even if they are already used by other functionalities such as counter or frequency measurement. in case of a conflict the Bit-Set is lower prior.		
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		

### 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

### 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

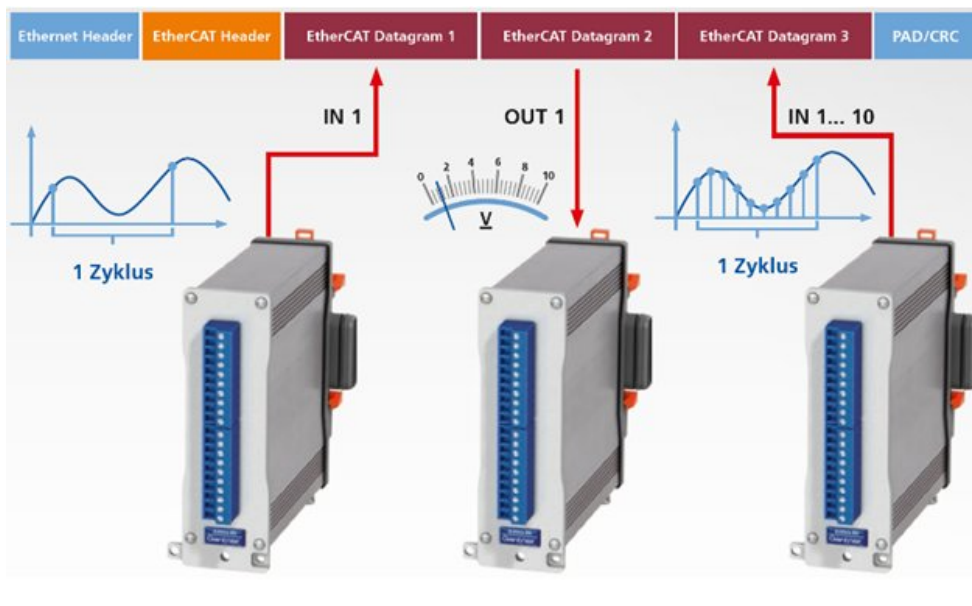
### Oversampling

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	529028
----------------	--------

### 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