

## Q.bloxx A106

### Universal Measurement Module for Bridges



The Q.series has been designed for the demanding measurements found in today's industrial measuring and testing environments. Applications range from single, stand-alone solutions to networked, multi-channel systems in real-world areas such as component testing, engine testing, materials testing and structural monitoring.

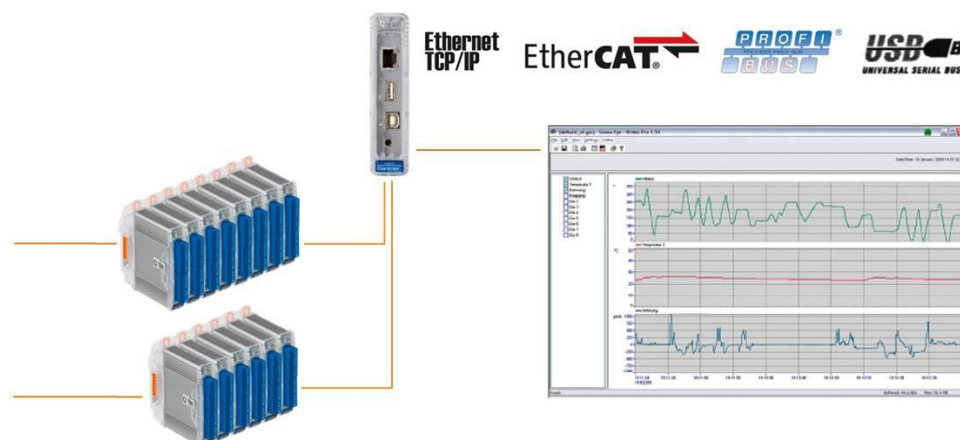
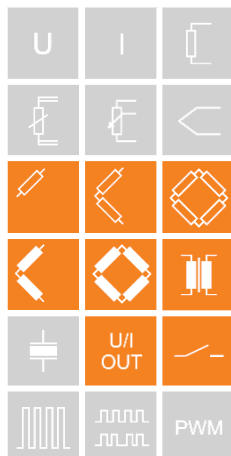
The range and flexibility of the modules allows for an optimized solution for each and every measurement and control point:

- Dynamic signal acquisition up to 100 kHz per channel
- inputs and outputs for all types of signals and sensors
- Galvanic isolation (up to 1200V) of inputs and outputs
- Multi-channel, High-density packaging
- Intelligent signal conditioning on every channel.

All modules connect to a Q.series test controller (Q.gate, Q.pac, or Q.station) for synchronization and buffering, and data exchange between the test controller and automation system is handled via Ethernet TCP/IP, EtherCAT, Profibus-DP, CANopen, or through additional industrial fieldbus standards.

### Key Features:

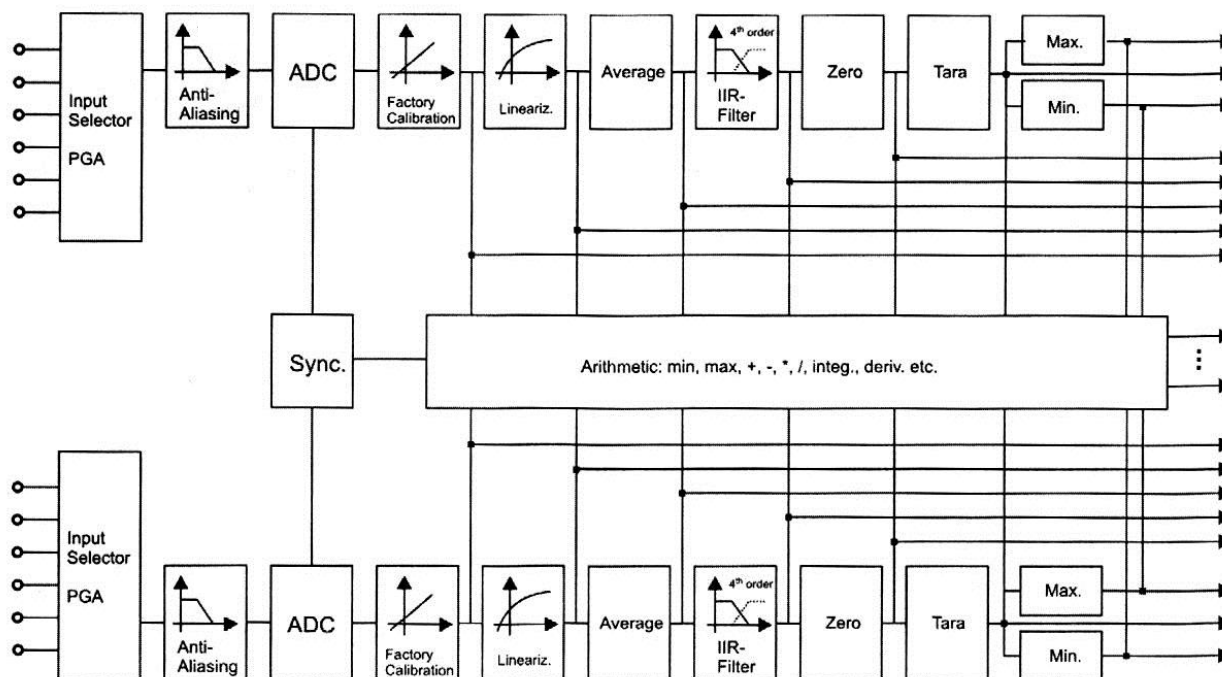
- **2 analog input channels**  
strain gauge and inductive bridges (full, half, quarter), LVDT, RVDT
- **DC and carrier frequency principle selectable**  
DC bridge excitation,  
CF 600 Hz bridge excitation,  
CF 4800 Hz bridge excitation
- **2 analog outputs**  
voltage  $\pm 10$  V, 10 kHz
- **Fast high accuracy digitalization**  
24 bit ADU, 10 kHz sample rate per channel
- **4 digital I/Os**  
input: state, tare, memory reset  
output: state alarm, thresh hold
- **Signal conditioning**  
16 virtual channels, linearization, digital filter, average, scaling, min/max storage, arithmetic, alarm
- **RS485 fieldbus interface**  
up to 48 Mbps: LocalBus  
up to 115.2 kbps: Modbus-RTU, ASCII
- **Galvanic isolation**  
of analog I/O-signals, power supply and interface  
Isolation voltage 500 VDC
- **Electromagnetic Compatibility**  
according EN 61000-4 and EN 55011
- **Power supply 10...30 VDC**
- **DIN rail mounting (EN 50022)**



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### Block Diagram



Analog Inputs			
Number	2		
Accuracy	0.02 % typical		
	0.05 % in controlled environment <sup>1</sup>		
	0.1 % in industrial area <sup>2</sup>		
Repeatability	0.01 % typical (within 24 h)		
Input resistance	>10 MΩ		
Isolation voltage	500 VDC channel to channel to power supply to interface <sup>3</sup>		
	<b>DC Mode</b>	<b>600 Hz Carrier Mode (AC)</b>	<b>4.8 kHz Carrier Mode (AC)</b>
Sensor type	resistive full and half bridge (5/6 wire), quarter bridge with completion terminal (3 wire)	resistive full and half bridge (5/6 wire), quarter bridge with completion terminal (3 wire)	resistive full and half bridge (5/6 wire), quarter bridge with completion terminal (3 wire) inductive full and half bridges, LVDT and RVDT sensors
Permitted sensor cable length	<300 m	<300 m	<100 m
Sensor connection	with or without sense leads for compensation of cable influences full bridge 4 or 6 wire half bridge 3 or 5 wire quarter bridge 3 wire in combination with completion terminal 120 Ω or 350 Ω		
Shunt Calibration	Internal resistor 100 kΩ, Vexc+ - Vsig+		

<sup>1</sup> according EN 61326: 2006, appendix B

<sup>2</sup> according EN 61326: 2006, appendix A

<sup>3</sup> noise pulses up to 1000 VDC, permanent up to 250 VDC



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Sensor excitation (selectable)	DC: 5 VDC	CF: 5 Veff	DC: 2.5 VDC	CF: 2.5 Veff
Permitted sensor resistance	>300 Ω	>300 Ω	>100 Ω	>100 Ω
Measuring range	±1.25 mV/V	±1.25 mV/V	±2.5 mV/V	±2.5 mV/V
	±2.5 mV/V	±2.5 mV/V	±5 mV/V	±5 mV/V
	±25 mV/V	±25 mV/V	±50 mV/V	±50 mV/V
	±50 mV/V	±50 mV/V	±100 mV/V	±100 mV/V
	±100 mV/V	±100 mV/V	±200 mV/V	±200 mV/V
	±250 mV/V	±250 mV/V	±500 mV/V	±500 mV/V
	±500 mV/V	±500 mV/V	±1000 mV/V	±1000 mV/V
Temperature influence on zero (range 2.5 mV/V)	<1 μV / 10 K	<1 μV / 10 K	<1 μV / 10 K	<1 μV / 10 K
Temperature influence on sensitivity (measuring value)	<0.05 % / 10 K	<0.05 % / 10 K	<0.05 % / 10 K	<0.05 % / 10 K
Long term drift	<1 μV/V / 24 h	<0.5 μV/V / 24 h	<1 μV/V / 24 h	<0.5 μV/V / 24 h
	<2.5 μV / V/8000h	<1.25 μV/V / 8000 h	<2.5 μV / V/8000h	<1.25 μV/V / 8000 h
Linearity Error	<0.02 % f.s.			
Noise voltage at 10 Hz	<0.3 μV/V			
Noise voltage at 100 Hz	<1 μV/V			
<b>Analog Digital Conversion</b>				
Resolution	24 bit			
Sample rate	10 kHz			
Conversion method	Sigma-Delta (group delay time 600 μs)			
Anti-aliasing Filter	DC: 1 kHz 5 <sup>th</sup> order	4.8 kHz CF: 1 kHz 5 <sup>th</sup> order	600 Hz CF: 100 Hz, 5 <sup>th</sup> order	
Digital filter	IIR, low pass, high pass, band pass, 4 <sup>th</sup> order, 1 Hz up to 1 kHz in steps 1, 2, 5			
Averaging	configurable or automated according the selected data rate			
<b>Analog Outputs</b>				
Number	2 voltage outputs			
Accuracy	0.02 %			
DAU resolution	16 bit			
Sample rate	10 kHz			
Output voltage	±10 VDC			
Perm. load resistance	>2 kΩ			
Temperature influence	on zero		on sensitivity	
	<1 mV / 10 K		<0.05 % / 10 K	
Noise voltage in the range of	<10 mV at 1 kHz		<2 mV at 10 Hz	
Long term drift	<1 mV / 24h			

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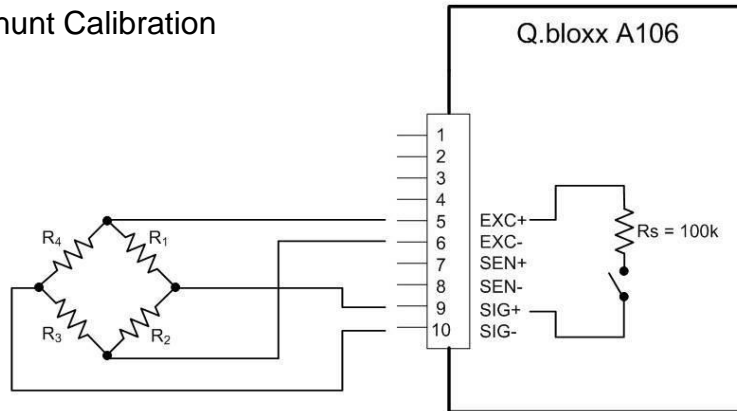
Digital In/Outputs	
Number	4 configurable I/Os
Input	state, tare, reset
Input voltage	max. 30 VDC
Input current	max. 0.5 mA
Upper threshold	>10 V (high)
Lower threshold	<2.0 V (low)
Output	state, alarm, limit switch
Contact	open drain p-channel MOSFET
Load	30 VDC/100 mA (ohmic load)
Power Supply	
Power supply	10 up to 30 VDC, overvoltage and overload protection
Power consumption	approx. 2.5 W
Influence of the voltage	0.001 %/V
Environmental	
Operating temperature	-20°C up to +60°C
Storage temperature	-40°C up to +85°C
Relative humidity	5 % up to 95 % at 50°C, non condensing
Communication Interface	
Standard	RS-485, 2-wire
Data format	8e1
Protocols	Local-Bus: 115200 bps up to 48 Mbps Modbus-RTU, ASCII: 19200 bps up to 115200 bps
Connectable devices	max. 32
Mechanical	
Case	Aluminum and ABS
Dimensions (W x H x D)	(27 x 120 x 105) mm
Weight	approx. 200 g
Mounting	DIN EN-rail

### Warm Up Time

All declarations are valid after a warm up time of 45 minutes.

Specification subject to change without notice  
gantner-q.bloxx-a106.pdf (Version 1213)

Schematic of a Shunt Calibration



The shunt calibration resistance  $R_s = 100\text{ k}\Omega$  is placed across  $R_1$  of the Wheatstone bridge between Pin 5 (EXC+) and Pin 9 (SIG+). The shunt resistance can be activated/deactivated using a switch (S1).

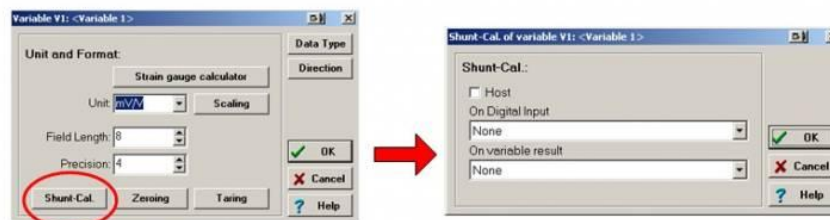
Activate/Deactivate Shunt Resistance

There are 3 possible ways to open/close the switch (S1).

- Via Host
- On Digital Input
- On Variable Result

These settings can be configured via ICP100 in the “Format/Adjustment” section:

Type	Variable Name	Sensor	Type of	Connection	Terminals	Format/Adjustment	Range/Error	Additional
V1	AI	Variable 1	Bridge (5V,5mV/V)	Full 4 Wire Supply 5V		Connector 2 fff.ffff [mV/V]	-5.0000 Average 5.0000 Auto	



Via Host:

This can be achieved by writing online values directly to the channel. Therefore the checkbox “Host” has to be selected and data direction of the channel has to be set to INPUT/OUTPUT.

Available values are:

- 16 > set resistance to active (switch S1 closed) until it is reset
- 0 > reset (switch S1 open)