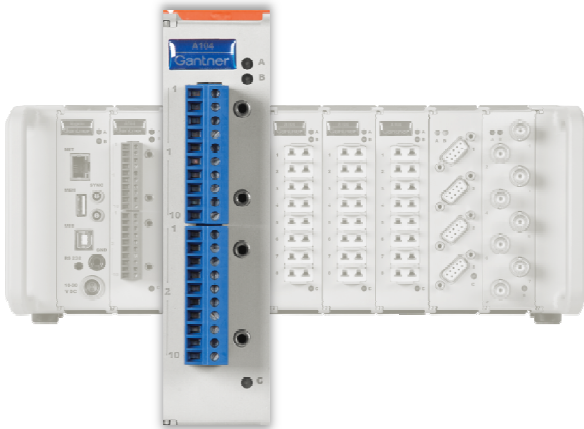# Q.brixx A101

Universal Measurement Module

The Q.brixx product line is designed for portable measurements with a high level of flexibility, reliability and accuracy. The range of applications starts from small stand-alone solutions up to networked multi-channel applications in the field of mobile and stationary performance testing and structural monitoring.

The wide range of available modules and the flexibility of the system configuration allows an optimized solution for each single task. Up to 16 modules in one system plus a Controller Unit provide a powerful package with PAC functionality, logging possibilities and an Ethernet TCP/IP interface.
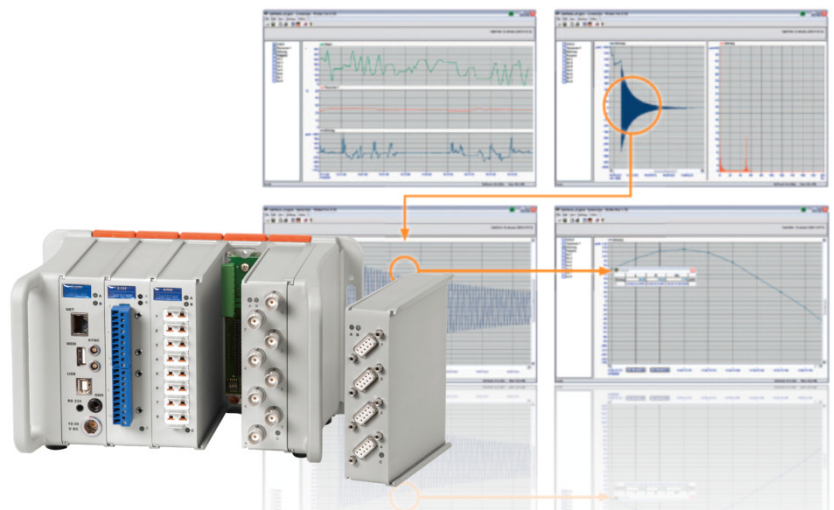
Conclusion: Dynamic signal acquisition up to 100 kHz, inputs and outputs for all types of signals, galvanic isolation of inputs and outputs, multi-channel solutions, high density packaging and intelligent signal conditioning for mobile application.

Most important features of the system:

- **High density and flexibility**
  up to 16 modules in one system in any constellation, flexible plug selection

- **Test Controller inclusive**
  Ethernet TCP/IP for configuration and data transfer, 16 MByte data memory, expandable by USB device, logging features, PAC functionality, IRIG synchronization

- **Robust and reliable**
  stable and compact aluminum housing, easy to carry electromagnetic compatibility according EN 61000-4 and EN 55011
  Temperature range -20 up to +60 °C
  power supply 10 up to 30 VDC

Most important features of the module A101:

- **2 universal analog input channels**
  voltage, current, resistance, potentiometer, Pt100, Pt1000, thermocouples, full and half bridges, IEPE-sensors

- **Fast high accuracy digitalization**
  24 bit ADC, 100 kHz sample rate per channel

- **1 digital in or output per channel**
  input: state, tare, memory reset, alarm, threshold
  output: state alarm, thresh hold

- **Signal conditioning**
  virtual channels, linearization, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm

- **TEDS**
  class 1 and class 2, according IEEE 1451.4

- **Galvanic isolation**
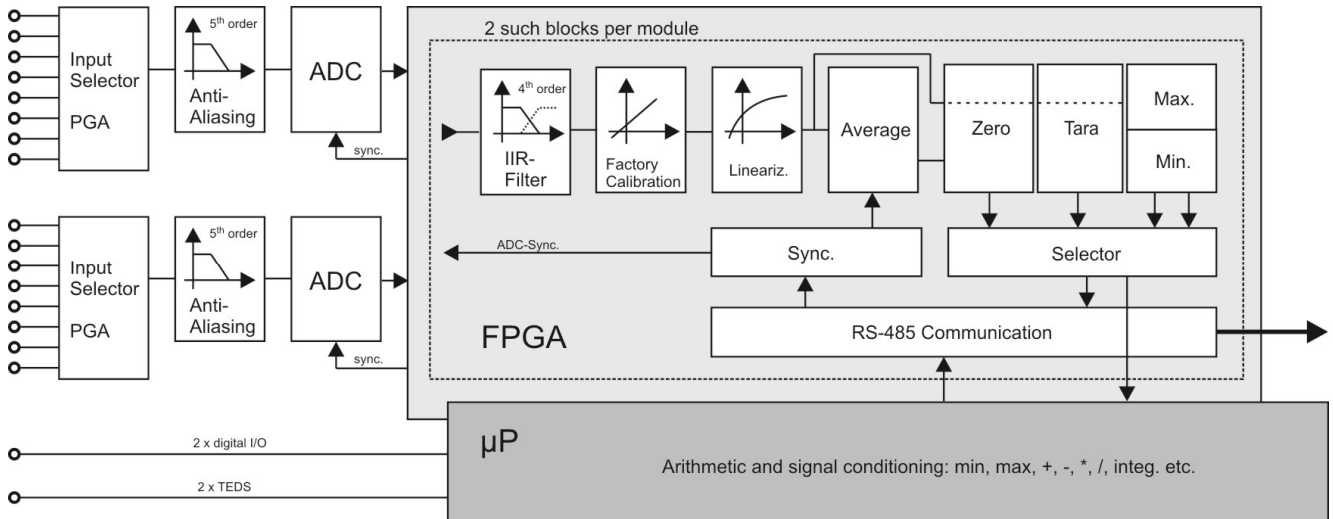 channel to channel to power supply and to interface, V_{iso} 500 VDC

Block Diagram

Analog Inputs	
Number	2
Accuracy	0.01 % typical
	0.025 % in controlled environment[1]
	0.05 % in industrial area[2]
Linearity error	0.01 % of the final value typical
Repeatability	0.003 % typical (within 24 h)
Isolation voltage	500 VDC channel to channel to power supply to interface[3]
Sensor identification	TEDS prepared

Measurement Voltage	Range	max. Deviation	Resolution
	±60 V	±0.2 V	7.2 µV
	±10 V	±2 mV	1.2 µV
	±1 V	±0.2 mV	120 nV
	±100 mV	±20 µV	12 nV
Input resistance	>10 MΩ (range ±10 V = 1 MΩ; range ±60 V = 3 MΩ)		
Long term drift	<20 µV / 24 h;< 200 µV / 8000 h		range ±1 V
Temperature influence	on zero	on sensitivity	
	<50 µV / 10 K	<0.01 % / 10 K	
Signal-noise-ratio	> 90 dB at 1 kHz	>120 dB at 1 Hz	

[1] according EN 61326: 2006, appendix B
[2] according EN 61326: 2006, appendix A
[3] noise pulses up to 1000 VDC, permanent up to 250 VDC

Measurement Current (internal shunt 50 Ω)	**Range**	**max. Deviation**	**Resolution**
	±25 mA	±5 µA	3.0 nA
Long term drift	<0.5 µA / 24 h, <5 µA / 8000 h		
Temperature influence	on zero		on sensitivity
	<1 µA / 10 K		<0.025 % / 10 K

Measurement Resistance / RTD	**Range**	**max. Deviation**	**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 up to +850 °C	±0.25 °C	0.2 m °C
Pt1000, 2- and 4-wire	-200 up to +850 °C	±1 °C	0.2 m °C
Long term drift	<0.01 °C / 24 h; <0.1 °C / 8000 h		
Temperature influence	on zero (range 400 Ω)		on sensitivity
	<10 mΩ / 10 K		<0.025 % / 10 K

Measuring Potentiometer	**Relative measurement**		
Zulässiger Potentiometer-Widerstand	1 kΩ bis 10 kΩ		
Long term drift	<0.01 % / 24 h, <0.1 % / 8000 h		
Temperature influence	on zero (range 1)		on sensitivity
	<0.0001 / 10 K		<0.02 %/10 K

Measuring Bridge	**Full and half bridge, 5-/6-wire, quarter bridge with completion terminal 3-wire**		
Accuracy class	0.05		
Sensor resistance	>100 Ω		
Supply	2.5 V, nominal		
Measurement range	±2.4 mV/V	±20 mV/V	±500 mV/V
Long term drift	<0.12 µV/V / 24 h, <1.2 µV/V / 8000 h		
Temperature influence	on zero (range 2.4 mV/V)		on sensitivity
	<0.2 µV/V / 10 K		<0.05 % / 10 K

Measurement Thermo Couple	**Whole range**	**-100 °C...upper limit**
Type B	better than ±5 °C	better than ±2.5 °C
Type E, J, K, L, T, U	better than ±1 °C	better than ±0.5 °C
Type N	better than ±2 °C	better than ±1 °C
Type R, S	better than ±3 °C	better than ±1.5 °C
Input resistance	>10 MΩ	
Long term drift	<0.02 °C / 24 h, <0.2 °C / 8000 h	
Temperature influence	on zero	on sensitivity
	<0.025 °C / 10 K	<0.02% / 10 K
Uncertainty cold junction compens..	<0.3 °C	

Measurement IEPE sensor	Range	max. Deviation	Resolution
	±10 V	±10 mV	40 µV
Supply	Constant current 4 mA		
Minimum input frequency	2 Hz		
Limit frequency	10 kHz		
Temperature influence	on zero		on sensitivity
	<10 µV / 10 K		<0.025 % / 10 K

Analog/Digital-Conversion

Resolution	24 bit
Sample rate	100 kHz (measurement thermocouple 8 Hz)
Conversion method	Sigma-Delta (group delay time 380 µs)
Anti-aliasing filter	20 kHz, 5th order
Digital filter	IIR, low pass, high pass, band pass, 4th order, 1 Hz up to 10 kHz in steps 1, 2, 5
Averaging	configurable or automated according the selected data rate

Digital In/Outputs

Number	2 (1 digital I/O per channel)
Responde time	0.2 ms
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
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 W
Influence of the voltage	<0.001 %/V

Environmental

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

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