e.bloxx A5CR

2-Channel Module (RTD) for Cryo Application

Application
Seamless measurement of temperatures from ~3 K to 300 K at an accuracy of 0,5 K

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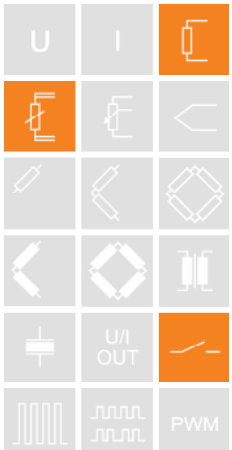
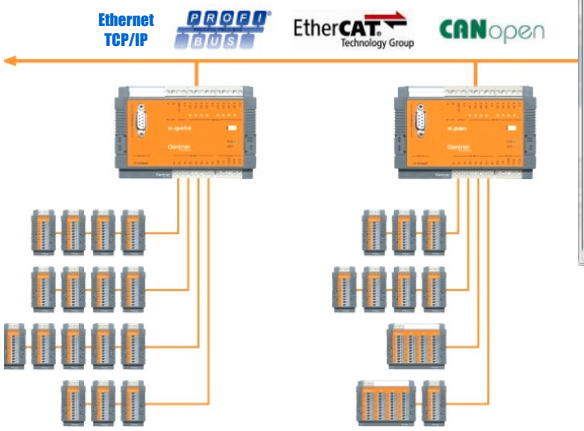
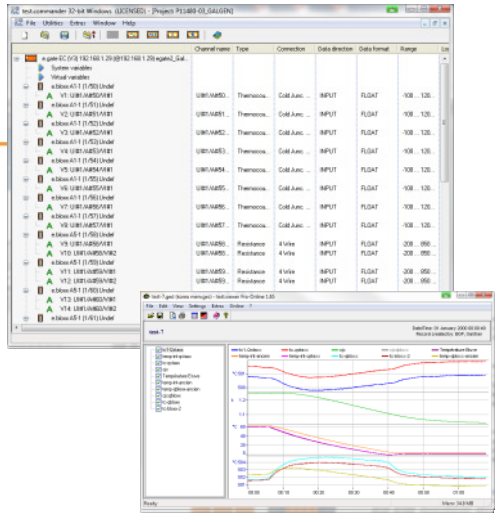
The e.bloxx series is designed for industrial and experimental test systems requiring precise high speed measurement of electrical, thermal, and mechanical quantities in engine and component test beds.
All units are based on a clean modular design, and easily connect to the wide variety of field devices used in today's test beds. Sample rates up to 1000 Hz and resolutions up to 19 bit are possible depending on the module and signal type used. Standardized communication protocols (Profibus-DP and Modbus-RTU) allow the e.bloxx family to work with a wide variety of application hardware and software.
Adding an e.series Test Controller dramatically increases the system's throughput and connectivity options. An e.series Test Controller is a data concentrator, communication gateway, and optionally a Programmable Automation Controller (PAC) with 100Mbps Ethernet, Profibus-DP, EtherCAT, or CANopen.

Most important features:

- **2 input channels for Cryo sensors**
  e.g. Cernox or TVO
- **Sensor excitation of 8 μA_{eff} / 5 μA_{eff} only**
  Avoids self heading of the sensor
- **Individual linearization of the sensor characteristics**
  Sensor specific linearization by using 64 nodes and archive in a sensor data file. Import of manufacturers calibration data
- **High accuracy digitalization**
  19 bit ADC, 10 Hz sampling rate per channel
- **Signal conditioning**
  Digital filtering, averaging, minimum/maximum, arithmetic, alarm
- **1 digital input and 1 digital output**
  Status, tare, reset peak hold
  Status, alarm, limit value, tolerance band
- **RS 485 fieldbus interface**
  Profibus-DP, Modbus-RTU, ASCII
  as well as connectable to any e.series Test Controller
- **Galvanic isolation**
  of 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 (EN500022)**







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e.bloxx A5CR Technical Data

Analog Input

Accuracy	0.01 % typical 0.02 % in controlled environment[1] 0.05 % in industrial area[2]
Repeatability	0.003 % typical (within 24 h)
Type of measurement	Resistance
Measuring range	0 Ω to 6500 Ω
Accuracy	0.65 Ω
Resolution	0.02 Ω
Temperature drift	0.6 Ω / 10 K
Measuring current	16 µA switched 8 μA_{eff} using 1 channel 5 μA_{eff} using 2 channels
Linearity deviation	0.01 % of final value

Exemplified at test measurements at a research institute using two Cryo-sensors (references) shows the following results:

Type TVO	Deviation [K]	[% of actual value]
at 3.8 K (3684 Ω)	0.012	0.32
at 77.5 K (1135 Ω)	0.2	0.26
at 273.7 K (1455 Ω)	0.7	0.26

Type Cernox	Deviation [K]	[% of actual value]
at 2.5 K (3405 Ω)	0	0,00
at 72.9 K (154,5 Ω)	0.015	0.02
at 316.3 K (44.83 Ω)	0.86	0.27

Analog/Digital Conversion

Resolution	19 bit
Sample rate	1 sample/sec (2 sensors, 4-wire)
Conversion method	Sigma-Delta
Filter	variable digital low pass filter 1st order averaging

Digital In/output

Input	Status, tare, reset
Input voltage	max. 30 VDC
Input current	max. 1.5 mA
Upper switching threshold	> 10 V (high)
Lower switching threshold	< 2.0 V (low)
Output	Process or host controlled
Type of output	Open Collector
Output voltage	max. 30 V
Output current	max. 100 mA

Communication Interface

Standard	RS 485, 2-wire
Data format	8E1
Protocols	ASCII, Modbus-RTU, Profibus-DP Local-Bus
Baud rate	
ASCII and ModBus-RTU	19.2; 38.4; 57.6; 93.75; 115.2 kBaud
Profibus-DP	19.2; 93.75; 187.5; 500; 1500 kBaud
Local-Bus	19.2; 38.4; 57.6; 93.75; 115.2; 187.5; 500; 1500 kBaud
Connectable devices	up to 32
Galvanic isolation	500 V

Power Supply

Power supply	10 to 30 VDC overvoltage and overload protection
Power consumption	approx. 1.5 W
Influence of the voltage	0.001 %/V

Mechanical

Case	Aluminium and ABS
Dimensions (W x H x D) and weight	45 x 90 x 83 mm, 160 g
Protective system	IP20
Mounting	DIN EN-Rail

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

Warm Up Time

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

[1] according to EN 61326: 1997, appendix B
[2] according to EN 61326: 1997, appendix A

Valid from Nov. 2010. Specification subject to change without notice.
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