# e.bloxx A5CR

2-Channel Module (RTD) for Cryo Application

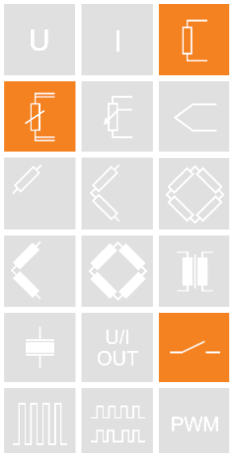
**Application**
Seamless measurement of temperatures from ~3 K to 300 K at an accuracy of 0,5 K

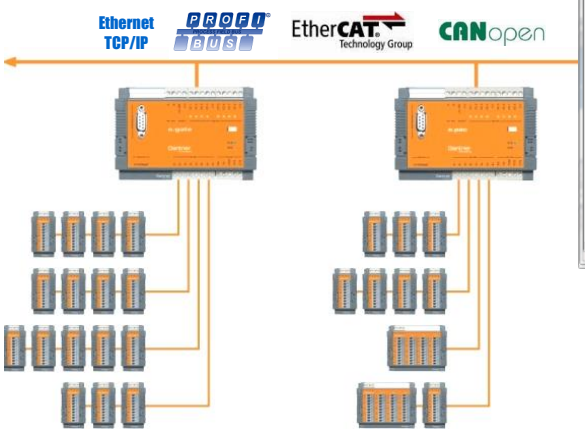

*e.bloxx A5CR*

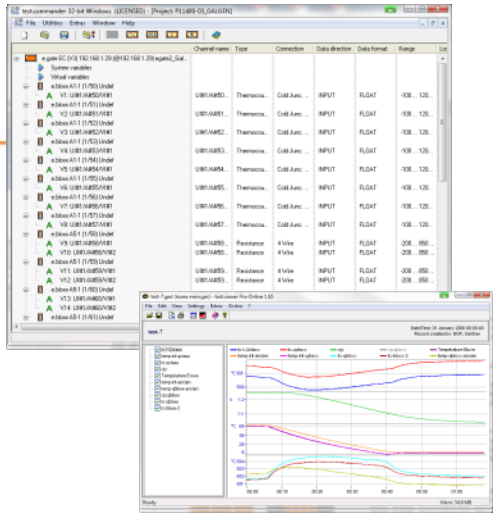
The e.bloxx series is designed for industrial and experimental test systems requiring precise high speed measurement of electrical, thermal, and mechanical quantities in engine and component test beds.
All units are based on a clean modular design, and easily connect to the wide variety of field devices 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 $\mu A_{eff}$ / 5 $\mu A_{eff}$ 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)**



**Gantner Instruments Test & Measurement GmbH ■ www.gantner-instruments.com ■ office@gantner-instruments.com**

Silvrettastraße 13 6780 Schruns / Austria T +43 (0) 5556 77463-0 F +43 (0) 5556 77463-300
Heidelberger Landstraße 74 64297 Darmstadt / Germany T +49 (0) 6151 95136-0 F +49 (0) 6151 95136-26

# e.bloxx A5CR Technical Data

## Analog Input

| | |
|---|---|
| Accuracy | 0.01 % typical<br>0.02 % in controlled environment[1]<br>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<br>8 $\mu A_{eff}$ using 1 channel<br>5 $\mu A_{eff}$ 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<br>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<br>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<br>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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