Gantner instruments

e.series

Manual

e.bloxx A5CR

Vers.-Nr. 11

Important: Before commencing installation, commissioning, putting into service and before any maintenance work is carried out, it is essential that the relevant warning and safety instructions in this manual are read!

General warning and safety instructions:

Dear customer,

We congratulate you on having selected a product of Gantner Instruments Test & Measurement GMBH. So that our product functions in your installation with safety and to your complete satisfaction, we take this opportunity to familiarize you with the following ground rules:

1. Installation, commissioning, operation and maintenance of the product purchased must be carried out in accordance with instructions, i.e. in accordance with the technical conditions of operation, as described in the corresponding product documentation.

2. Before installation, commissioning, operation or maintenance it is therefore essential that you read the corresponding chapter of this manual and observe its instructions.

3. If there are still some points on which you are not entirely clear, please do not take a chance, but ask the customer adviser responsible for you, or ring the Gantner Instruments Test & Measurement GMBH hot line.

4. Where not otherwise specifically laid down, appropriate installation, commissioning, operation and maintenance of the appliance is the customer's responsibility.

5. Directly on receipt of the goods, inspect both the packaging and the appliance itself for any signs of damage. Also check that the delivery is complete (-> accessories, documentation, auxiliary devices, etc.).

6. If the packaging has been damaged in transport or should you suspect that it has been damaged or that it may have a fault, the appliance must not be put into service. In this case, contact your customer advisor. He will make every effort to resolve the problem as quickly as possible.

7. Installation, commissioning and servicing of our appliances must only be carried out by suitably trained personnel. In particular, correspondingly qualified specialists may only make electrical connections. Here, the appropriate installation provisions in accordance with the relative national Electrical Engineers construction regulations (e.g. ÖVE, [Austrian] VDE, [German]...) must be observed.

8. Where not otherwise stated, installation and maintenance work on our appliances is exclusively to be carried out when disconnected from the power supply. This applies in particular to appliances, which are normally supplied by low-tension current.

9. It is prohibited to make alterations to the appliances or to remove protective shields and covers.

10. Do not attempt yourself to repair an appliance after a defect, failure or damage, or to put it back into operation again. In such cases, it is essential you contact either your customer adviser or the Gantner Instruments Test & Measurement GMBH hot line. We will make every effort to resolve the problem as quickly as possible.

11. Gantner Instruments Test & Measurement GMBH accepts no responsibility for any injuries or damage caused as a result of improper use.

12. Although every care is taken and we are continuously aiming for improvement, we cannot exclude completely the possibility of errors appearing in our documentation. Gantner Instruments Test & Measurement GMBH therefore accepts no responsibility for the completeness or the accuracy of this manual. The right is reserved to make alterations, and we may carry out alterations at any time without giving prior notice.

13. Should you discover any fault with the product or in its accompanying documentation, or have any suggestions for improvement, you may confidently approach either your customer adviser or Gantner Instruments Test & Measurement GMBH directly.

14. However, even if you just want to tell us that everything has functioned perfectly, we still look forward to hearing from you.

We wish you a successful application of our appliances. We will be pleased to welcome you as a customer again soon.

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TABLE OF CONTENTS

1. ABOUT THIS MANUAL

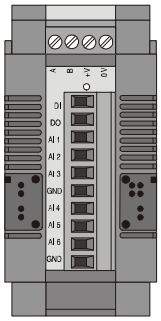
This manual describes the installation and setup of the e.bloxx A5-1CR module.

The following information can be found in this manual:
- Description of the e.bloxx system with detailed information on the hardware and module features.
- Installation description of the module and how it is connected to the power supply and bus lines.
- Description of the different types of measurement.
- A short introduction on how the e.bloxx modules are configured with the CONFIGURATION SOFTWARE ICP 100. This software has an integrated help including a detailed description of the configuration process.
- Possible errors and its solutions.
- Technical specifications of the modules.

2. MODULE DESCRIPTION

2.1. System Overview

The e.bloxx modules have been developed for the industrial and experimental testing technology, especially for the multi-channel measurement of electrical signals of thermal or mechanical data at test beds and test sites.



Picture 2.1 *- e.bloxx A5-1CR*

The e.bloxx A5-1CR, which is described in this manual, is a 2-channel module for temperature measurements with special Cryo sensors in 4 wire technique. Additional channels are available for calculations, alarms, setpoints and digital signals. They are part of a whole product line of different e.bloxx.

Due to the fast and precise signal conditioning the e.bloxx modules produce reliable and exact measurement data.

Standardized interfaces guarantee the integration of up to 127 modules into a single network.

With the e.gate module very high data rates via Profibus-DP and Ethernet can be realized. The customer-specific signal processing supplements the standard conditioning of the single e.bloxx modules.

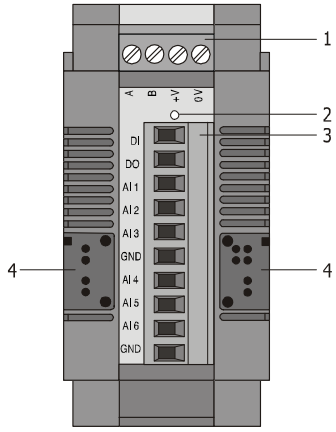
2.2. Types of Modules

There are several types of e.bloxx, which differ in their number and typeof analog and digital inputs and outputs.

	A1-1	A1-4	A1-8	A3-1	A3-4	A4-1	A4-4	A5-1	A5-1 CR	A6-1	A6-3	A6-2	A9-1	D1-1	D1-4	D2-1
Voltage Supply	10 - 30 VDC															
Power Consumption [W]	1,5	6	12	1,5	6	1,5	6	1,5	1,5	2	6	5	2,3	1,5	6	2
Variable / Channels	8	32	64	8	32	8	32	8	8	8	24	16	8	8	32	8
Analog Inputs	1	4	8	4	16	4	16	2/3/6	2	1	3	1	-	-	-	-
Analog Outputs	-	-	-	-	-	-	-	-	-	1	3	2	4	-	-	-
Relay Outputs	1	4	8	-	-	-	-	-	-	-	-	-	-	-	-	4
Digital Inputs	1	4	8	1	4	-	-	1	1	1	3	6	1	8	32	-
Digital Outputs	-	-	-	1	4	-	-	1	1	1	3	4	1	8	32	-
Fieldbus Interface	RS 485															
Protocols	ASCII - Modbus-RTU - Profibus-DP - LocalBus															
Quantity to measure Sensor Principle																
Voltage	x	x	x	x	x	x	x	-	-	-	-	-	-	-	-	-
Current	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-
Resistance	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-
Pt100 / Pt1000	x	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-
Cryo Sensor	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-
Thermocouple	x	x	x	-	-	x	x		-	-	-	-	-	-	-	-
Strain Gauge Full Bridge	x	x	x	-	-	-	-	-	-	x	x	x	-	-	-	-
Strain Gauge Half Bridge	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-
Strain Gauge Quarter Br.	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-
Inductive Full Brigde	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-
Inductive Half Bridge	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-
LVDT	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-
Potentiom. Transducer	x	x	x	-	-	-	-	-	-	-	-	x	-	-	-	-
Piezoresist. Transducer	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-
Status	x	x	x	x	x	-	-	x	x	x	x	x	x	x	x	-
Frequency	-	-	-	-	-	-	-	-	-	-	-	x	-	x	x	-
Counter	-	-	-	-	-	-	-	-	-	-	-	x	-	x	x	-

Table 2.1. *- Characteristics of the e.bloxx modules*

2.3. Module Parts



1 … Pluggable Screw-Type Terminal Strip for Connection of RS-485 Bus and Power Supply
2 … Power/Error-LED (red/green)
3 … Pluggable Screw-Type Terminal Strip for Sensor Connection
4 … Rapid Bus Link Plugs

Picture 2.2. *- Parts of the e-bloxx A5-1CR*

Terminal Strip for RS 485 and Power Supply

Terminal	Description
A	RS 485 Bus Interface A
B	RS 485 Bus Interface B
+V	Power Supply +
0V	Power Supply -

Table 2.2. *- Description of Terminal Strip for RS 485 Bus and Power Supply*

Terminal Strip for Sensor Connection

Terminal	Description
DI	Digital Input
DO	Digital Output
AI 1	Sensor 1 +Input
AI 2	Sensor 1 +Sense Lead
AI 3	Sensor 1 -Sense Lead
GND	Sensor 1 -Input (Ground)
AI 4	Sensor 2 +Input
AI 5	Sensor 2 +Sense Lead
AI 6	Sensor 2 -Sense lead
GND	Sensor 2 -Input (Ground)

Table 2.3. *- Description of Terminal Strip for Sensor Connection*

2.4. Functional Overview

This manual describes the e.bloxx module A5-1CR. This module is an 8-channel module (real plus virtual).

Each e.bloxx module has 8 channels that can be defined, the other channels can be used to do arithmetical calculations or process the measured value (scaling, min/max, alarm), to preset a certain value that can be changed later via interface and for threshold monitoring. The channels are defined in the configuration table of the Configuration Software ICP 100.

2.5. Front-LED

The LED at the front of the e.bloxx modules provides the following information:

LED green	Module works well, no signal overflow, no communication error…
LED red	general error like signal overflow, broken sense leads
LED red + short off period	general error like signal overflow, broken sense leads + communication timeout
LED green + short red flash	Signal ok + communication timeout
LED red fast flashing	global error, no suitable firmware

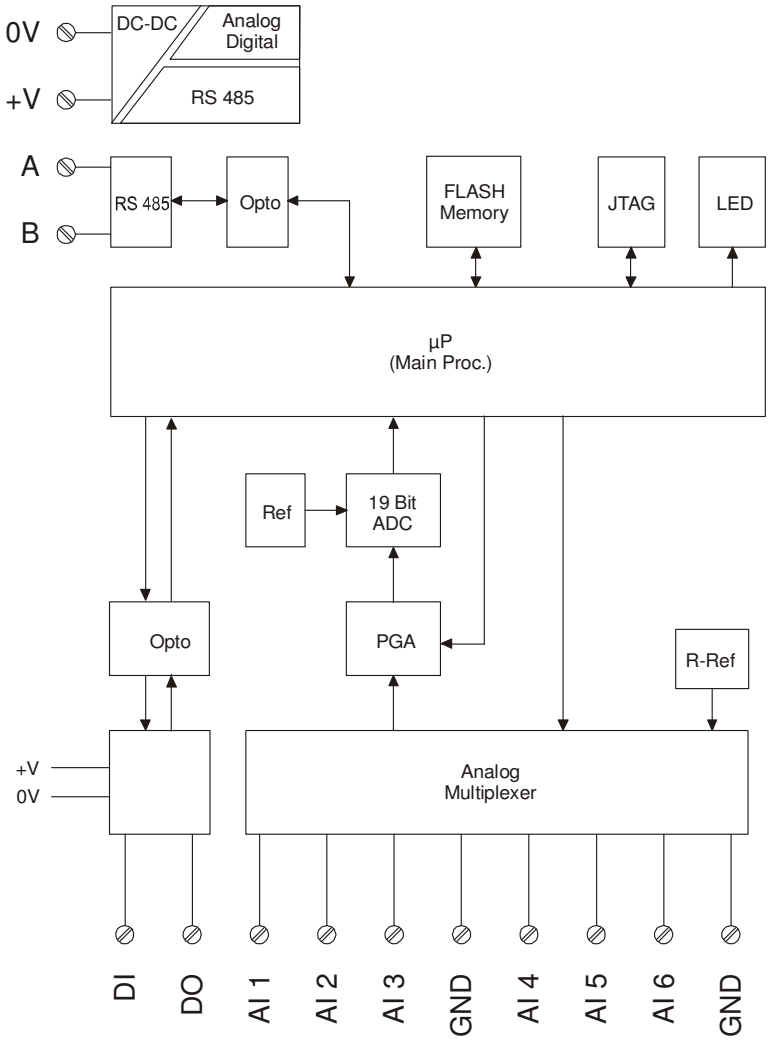
Notice: The LED will get red when the signal leaves the selected range and the error checking is activated (see ICP 100 column Range/Error).

2.6. DC-Isolation

The power supply, bus interface, analog inputs are DC-isolated from each other.

2.7. Functional Diagram

The following picture can describe the e.bloxx A5-1CR.



Picture 2.3. *- Functional Diagram of the e.bloxx A5-1CR*

3. MOUNTING e.bloxx AND CONNECTING WIRES

3.1. Environmental Conditions

The e.bloxx modules are protected against water and dirt according IP 20. If required by the conditions of the operating site the modules have to be installed accordingly, e.g. in a water-resistant or water-proof case, compliant with the regulations of electrical engineering.
For the allowed ambient temperatures for the e.bloxx A5-1CR see the Technical Specifications at the end of this manual.

3.2. Connection Technique

The wires are connected to the modules via screw-type terminals. The captive terminal screws are part of the terminal strips. All terminal strips are of plug-in type and can be detached from the modules.

Not more than 2 leads should be connected with one clamp. In this case both leads should have the same conductor cross-section. For the precise clamping of stranded wire we recommend the use of wire-end ferrules.

Notice: Connecting wires respectively the plugging-in and -out of the terminal strip is only allowed with modules in power-off status.
In order to prevent interference with sensors, signals and modules, shielded cables have to be used for the power supply, bus connection and signal lines.
We strongly recommend using a single screened cable each input signal. To use more signals in one cable could generate interacting influences.

Notice: For optimal performance the e.bloxx modules must be grounded properly. This is achieved by utilizing the Ground/Earth screw on the back of each e.bloxx module. The screen of the sensor cable has to be grounded at the same potential.

3.3. Power Supply

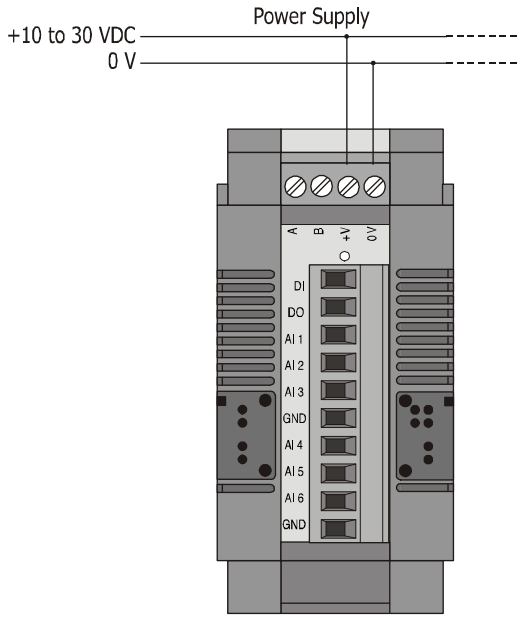
Non-regulated DC voltage between +10 and +30 VDC is sufficient for the power supply of the modules. The input is protected against excess voltage and polarity connecting error. The power consumption remains approximately constant over the total voltage range, due to the integrated switching regulator.

Due to their low current consumption the modules can also be remotely supplied via longer lines. Several modules can be supplied in parallel within the permissible voltage range and drop in the lines. If required, the supply lines together with the bus line may be incorporated in one cable.

In order not to overload the module power supply needlessly and to avoid unnecessary line troubles, a separate power supply is recommended for sensors with a large current drain.

The distribution voltage for the e.bloxx modules has to be protected by a fuse with maximum 1 A (inert). The modules have an internal fuse (reversible) for protection against excess voltage, excess current and wrong polarity.

Notice: It depends on the power supply unit and its noise and internal grounding issues whether it is helpful to connect earth of the power supply unit with ground/earth of the e.bloxx module.



Picture 3.1. *- Power Supply of the e.bloxx Modules*

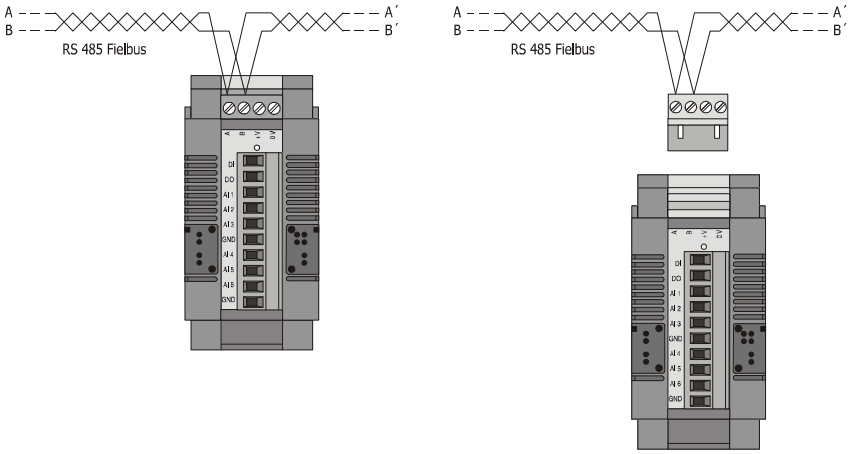
3.4. Bus Connection

Only the connection of the e.bloxx modules to the bus is described in here. A detailed description of the bus and the communication of the modules can be found in the Communication Guide of the e.bloxx/e.gate modules.

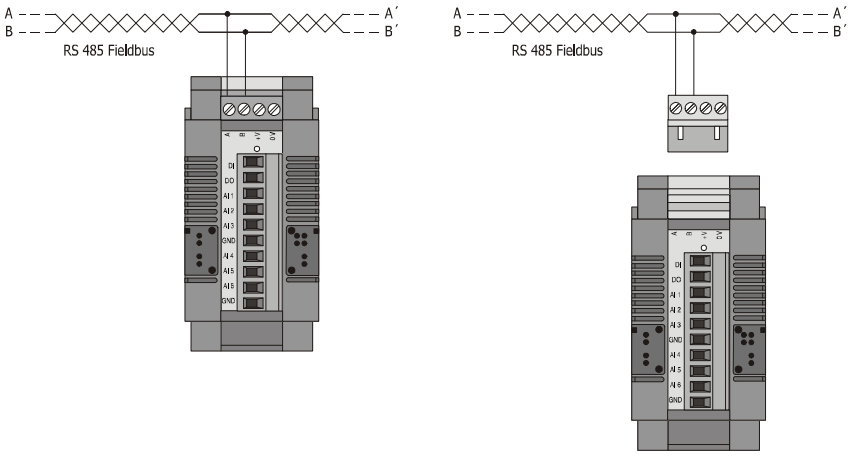
The e.bloxx modules have an RS 485 bus interface for connection to the serial fieldbus. The bus has to be terminated on both sides with a characteristic impedance. The maximum line length depends on the transmission speed (refer to the Communication Guide for details) and can never be higher than 1.2 km per bus segment or 4.8 km via a physical bus string by using 3 repeaters. A maximum of 32 devices are possible with each bus segment and up to 127 devices via a physical bus string.

Wiring

In general, the e.bloxx is connected to the bus by connecting both signal leads A and B of the incoming bus cable and A' and B' of the outgoing bus cable together to one terminal on the module (Picture 3.2). Alternatively, the bus can also be connected by a "stub cable" (Picture 3.3). This guarantees that the bus connection to other modules remains in place, even if one module has to be exchanged, due to the removable terminal strip.



Picture 3.2. *- Bus Connection of an e.bloxx A5-1CR to the RS 485 Fieldbus with Derivation*



Picture 3.3. *- Bus Connection of an e.bloxx A5-1CR to the RS 485 Fieldbus via Stub Cable*

The stub-cable should be as short as possible, not longer than 30 cm.

Notice: The terminal designations A and B of all modules of the e.bloxx series are exchanged compared with the PROFIBUS-definitions. Consequently, in multi-vendor systems the bus lines A and B have to be exchanged when connecting them to the e.bloxx.

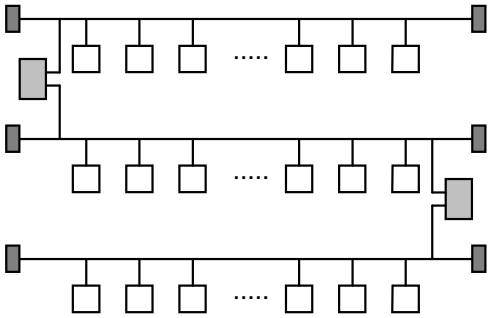
Bus Structure

The bus structure is a line structure where each bus segment will be terminated with an characteristic impedance on both ends. Branches can be set up by means of a bi-directional signal amplifier, so-called repeaters. Other types of branches are not permitted (no tree topology). The max. stub-length to a user may not exceed 30 cm.

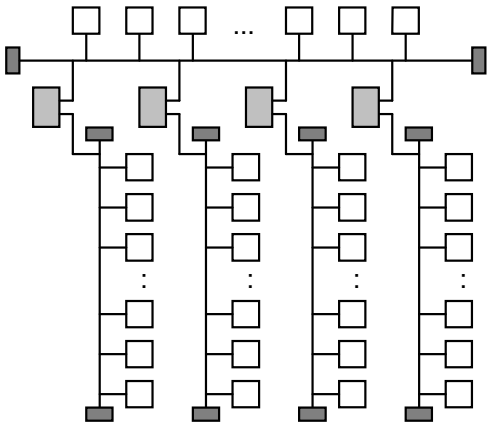
The following figures show a few examples of possible bus topology structures. The meanings of the symbols are as follows:

... Bus User
... Repeater
... Bus Termination

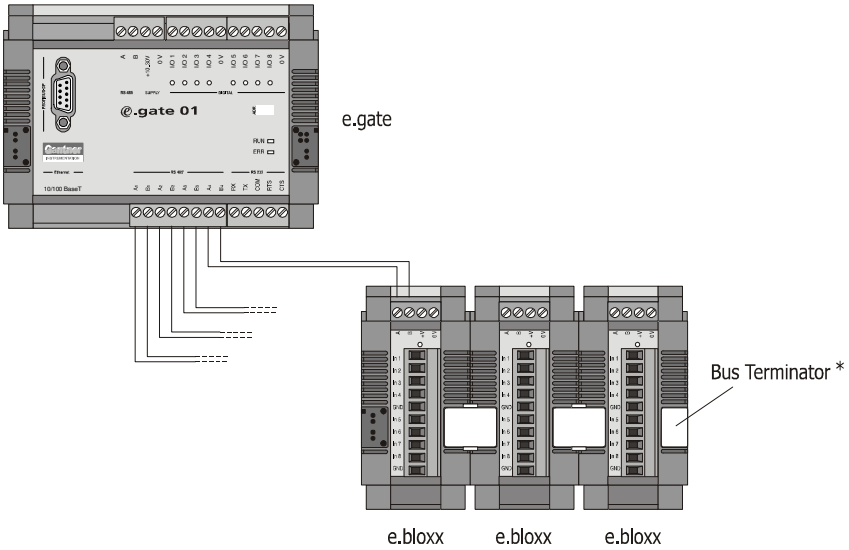
Picture 3.4. *- Simple Line Structure*



Picture 3.5. *– Extended Line Structure*



Picture 3.6. *- Line Structure with Branches*



Picture 3.7. *- e.bloxx A5-1CR connected to e.gate*

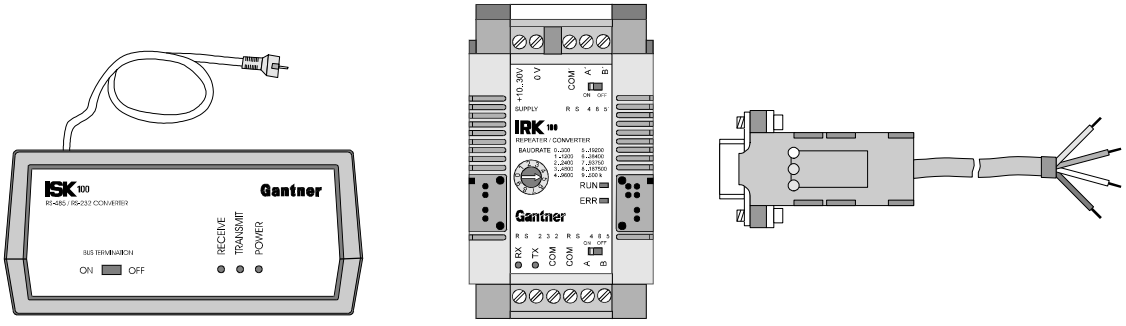
* ... If the e.bloxx A5-1CR is used together with an e.gate, which is used to collect the data of all connected e.bloxx modules and processes them for fast transmission via the further network, a bus termination must be connected to the last e.bloxx in each bus line.

Bus Connection to PC

The bus interface of the e.bloxx is based on the RS 485 standard. Since most hosts are "only" equipped with RS-232 interfaces, an interface converter or a plug-in board with RS 485 drivers is required for conversion purposes.

Gantner Instruments Test & Measurement GMBH offers a compact interface converter, called ISK 200, with an integrated power supply and automatic baud rate detection. The power supply, bus connection and a separate 24 VDC-output are DC-isolated. Therefore, the interface converter ISK 200 is also applicable as a power supply for remote applications. Additionally, the interface converter ISK 200 features the option of connecting the required bus termination via a switch. The converter is designed to be used as a desk device.

Another module IRK 100 from Gantner Instruments Test & Measurement GMBH is available which may be used as an RS 485 repeater or RS 485/RS 232 converter. The baud rate can be adjusted at the IRK 100. Also, for this module the required bus termination may be connected with a switch. The Repeater/ Converter IRK 100 has a snap-on mounting mechanism for the installation on standard profile rails (DIN rail) 35 mm according to DIN EN 50022.



Interface Converter ISK 200 **Repeater/Converter IRK 100** **Interface Converter ISK 101**

Picture 3.8. *- Interface Converters ISK 200 and IRK 100*

Bus Connection to Profibus-DP

For the installation of the bus cable and bus interface, 9-channel D-subminiature plugs and sockets are used. The pin assignment for the RS 485 connection according to PROFIBUS is shown in Table 3.1.

Plug	Pin	RS 485 Notation	Signal	Identification
 DB 9	1	-	Shield	Shield, Protective Ground
	2	-	RP	Reserved for Power
	3	B / B´	RxD/TxD-P	Receive/Transmit-Data-P
	4	-	CNTR-P	Control-P
	5	C / C´	DGND	Data Ground
	6	-	VP	Voltage Plus
	7	-	RP	Reserved for Power
	8	A / A´	RxD/TxD-N	Receive/Transmit-Data-N
	9	-	CNTR-N	Control-N

Table 3.1. *- Pin Assignment D-Subminiature Plug According to PROFIBUS*

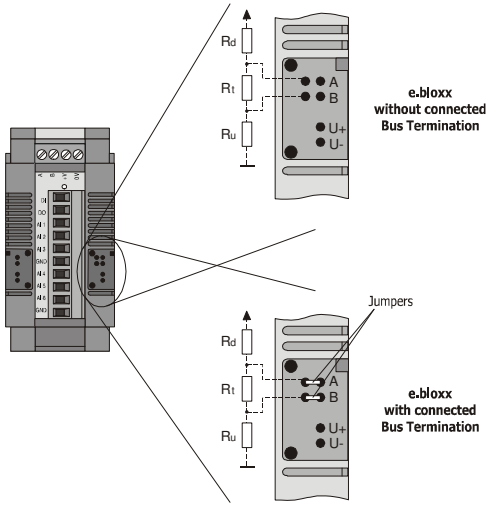
The signal leads A and B (and Shield) are mandatory for a (shielded) connection. Additional signal leads may be installed if required.

Notice: Due to the fact that the RS 485 interface is used for different protocols, in case of using Profibus-DP the leads A and B has to be crossed.

Bus Termination at the e.bloxx Modules

In order to avoid signal reflections on the bus, each bus segment has to be terminated at its physical beginning and at its end with the characteristic impedance. A terminating resistor is installed between the bus leads A and B for this purpose. In addition, the bus lead A is connected via a pull-up resistor to potential (VP) and the bus lead B is connected via a pull-down resistor to ground (DataGround). These resistors provide a defined quiescent potential in case there is no data transmission on the bus. This quiescent potential is level high.

The e.bloxx modules have built in these bus termination resistors. They can be connect to the bus by plugging the Bus *Termination Plug IBT 100*, which is available as accessory, into the rapid bus link plug on the front side of the module. Instead of the bus termination plug *IBT 100*, also separate jumpers may be used for the bus termination. In this case, it is mandatory that the jumper clips are installed as indicated below, and that the bus leads or the bus termination are not short-circuited by mistake.



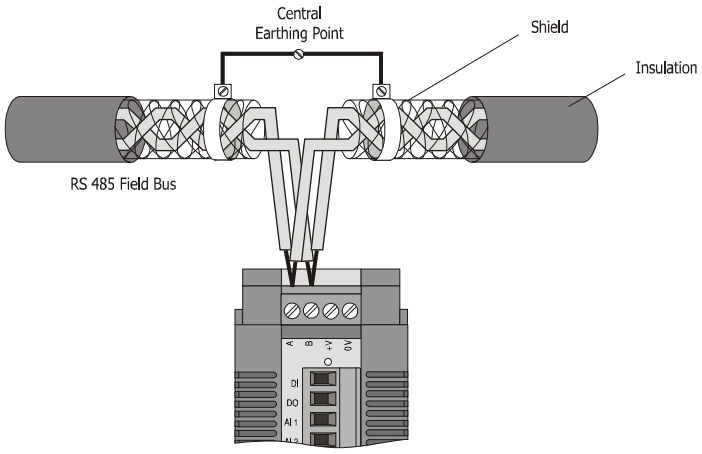
Picture 3.9. *- Bus Termination at the e.bloxx Modules*

3.5. Shielding

In case of increased interference, such as in industrial areas, we recommend shielding of bus and signal cables. In general, the shield should be connected to the protective grounding (not DataGround!) at each bus connection. If necessary, the shield should also be applied along the course of the cable several times. For shorter distances, e.g. with stub cables, the interference response is often improved if the shielding is only applied to the stub cable exit.

Bus users such as controllers (PLCs), computers (PCs), repeaters and interface converters (ISK), etc., generally feature the possibility of applying the shield directly to the appliance or to separate shield rails. Shield rails offer the advantage of preventing possible interfering signals from reaching the appliance. The shields, which are connected to protective grounding, conduct interference signals off before reaching the module.

The e.bloxx do not have a direct shield connection at the module. Here the shield of the bus cable can be connected to earth e.g. by so-called shield clamps.



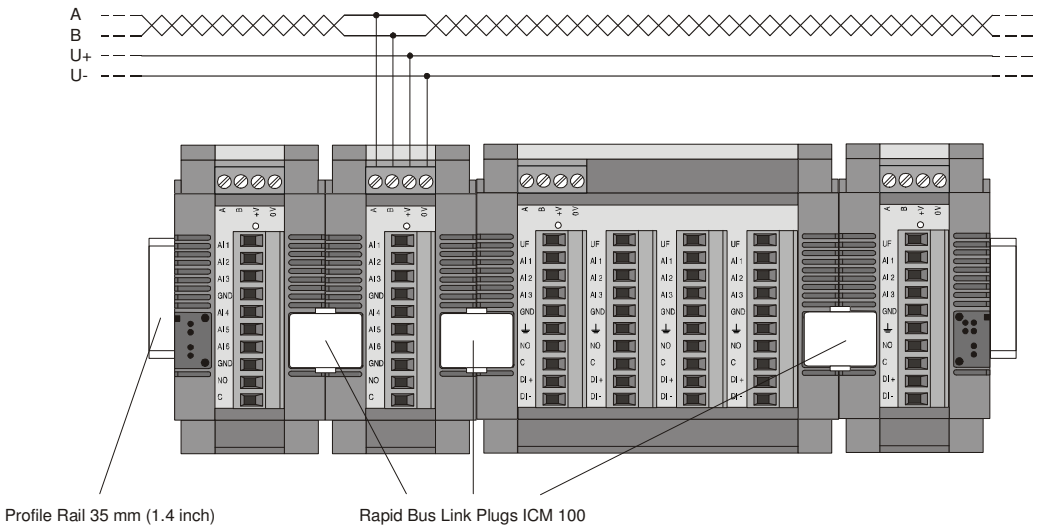
***Picture 3.10**. - Grounding of the Bus Line Shield at an e.bloxx*

Notice: The shielding screen must not be connected to the ground (0V) of the power supply and it should always be connected to earth with a large surface and low-inductance.

3.6. Rapid Bus Link Plug

The e.bloxx have plugs on the left and right side which allow to connect the bus and power supply from one module to the next with a Rapid Bus Link Plug (type designation: *ICM 100*). This novel kind of connecting bus and power supply is particularly advantageous if several modules are mounted on one common profile rail side by side. In this case, only the terminal of one module has to be connected. Furthermore, various modules of the e.bloxx series may be connected with the Rapid Bus Link Plug.

Notice: The current flowing through the Rapid Bus Link Plug Jack and the e.bloxx must not exceed 1 A. Thus, the power supply should preferably be connected to the middle of several modules and no more than 6 pieces of e.bloxx may be connected via the Rapid Bus Link Plug *ICM 100* in one line.



Picture 3.11. *- Connection of four e.bloxx Modules with Rapid Bus Link Plugs ICM 100*

4. MEASUREMENTS

4.1. General

The e.bloxx A5-1CR has 2 analog inputs and one digital in- and one digital output. The configuration of the inputs and outputs is done with the Configuration Software ICP 100 as required by the application.

Analog Input
The analog input collects and processes the signals of Cryo sensors like Cernox or TVO and resistors. The acquisition of various measuring values with these sensors has the following principles of measurement:

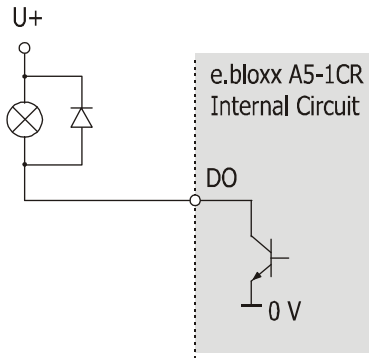
- Measurement of resistance

This measurement is carried out in 4-wire technique.

Digital Output
The digital output of the e.bloxx can be configured as threshold switch with definable threshold-settings and may then be used e.g. as an alarm or limit monitor of the analog input.

Since the Open Collector output is "passive" the process of external elements always require an external voltage. In case of larger loads this current supply should be independent of the module supply. When connecting inductive loads a freewheeling diode is recommended in order to prevent possible disturbances e.g. by induced voltage (see picture 4.1).

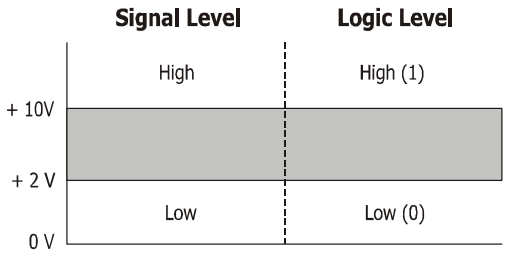
To the digital output you can directly connect: signal lamps, small relays, switching relays for larger loads, acoustic signal installations, buzzers or beepers etc., as long as the connected loads do not exceed the values described in the Technical Specifications.



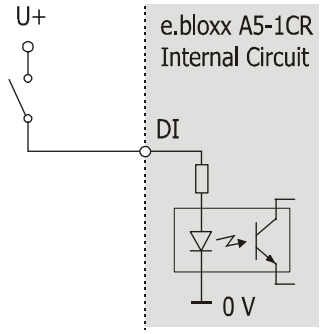
Picture 4.1. *- Wiring of the Digital Output*

Digital Input

The digital input of the e.bloxx can be used for collecting status information. The maximum permissible input voltage amounts to 30 V. Input voltages between 10 VDC and 30 VDC are interpreted as logic HIGH ("1"), input voltages lower than 2 V as logic LOW ("0"). The maximum fan-in current amounts to 1.5 mA.



Picture 4.2. *- Definition of Signal Levels and Logic Levels*

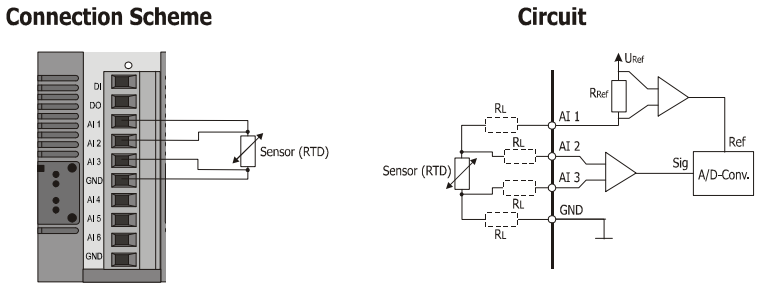


Picture 4.3. *- Wiring of the Digital Input*

Internal Reference Voltage

An internal reference voltage serves to balance the entire analog signal processing automatically.

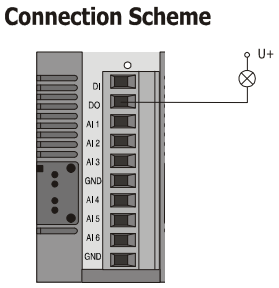
4.2. Analog Input - Measurement with Cryo sensors



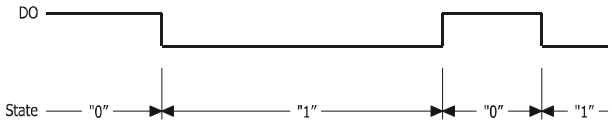
Picture 4.6. *- Measurement in 4-Wire Technique*

The e.bloxx support sensor measurements in 4-wire technique. Especially 4-wire technique compensates the influence of non-symmetric cable resistances. To avoid self heading effects of the Cryo sensor the sensor excitation is a switched current with an max. amplitude of 16 µA. The effective current using 1 sensor is 8µA, using 2 sensors it is 5,3 µA. The resistive measuring range is 0 to 6500 Ω. Usually Cryo sensors have a working range between 5000 Ω at the lower temperature (e.g.3 Kelvin) and about 60 Ω at the higher temperature (e.g. 300 Kelvin). So the power consumption of the sensor at low temperatures is approx. 50 nW. The individual non-linear characteristic of the Cryo sensors could be compensated by importing a set of sensor data e.g. as txt or csv file into the module e.bloxx A5CR.

4.3. Digital Output - Status



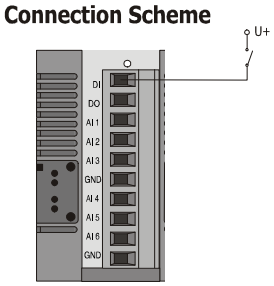
Picture 4.7. *– Digital Output used as Status Output*



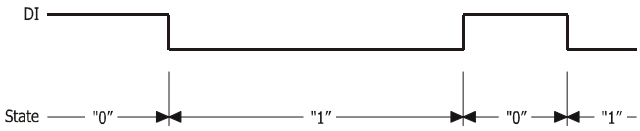
Picture 4.8. *- Signal Diagram of Status Output*

The digital output can be used to output *host-controlled* or *process-controlled* status signals.
With the host-controlled digital status output, the digital output is set according to the status information received by the e.bloxx via bus.
With the process-controlled output of status information the e.bloxx monitors measured values, resp. sensor variables as to certain threshold values. The digital output is set if one or several threshold conditions are fulfilled. The user via the Configuration Software ICP 100 can freely define the threshold values. The user can also preset the logical signal level.
The distribution voltage can amount from 10 up to 30 VDC. It has to be supplied externally or picked up by the power supply of the e.bloxx.
The status of the digital output can be scanned as 1/0 information via bus.

4.4. Digital Input - Status Recording



Picture 4.9. *- Digital Status Recording*



Picture 4.9 *- Signal Diagram of Status Recording*

For the acquisition of digital status information (on/off, closed/open, left/right, etc.) the signal applied to the digital input is collected and is held ready for further processing in the e.bloxx or for transmission via bus.
The digital input is set (switch closed) as long as the applied signal voltage remains over the threshold value of 10 V.
The digital information can be scanned as 1/0 information via bus.

5. CONFIGURATION

5.1. General Information about Configuration Software ICP 100

The e.bloxx modules can be configured with the Configuration Software ICP 100. This software includes all functions to set the module parameters like baud rate, measurement rate, etc. and to define the input and output functions like the type of measurements and the processing of the measured values.
The Configuration Software ICP 100 also includes a function to display measured values in real-time. There are also several software packages from other companies that are adapted to the specific measurement tasks.
In the Configuration Software ICP 100 the two register cards "Variable Settings" and "Module Settings" will be displayed if you are configuring an e.bloxx, which is not online, and also the two additional register cards "Info" and "Measure" when configuring an online e.bloxx.

- On the register card "Info" several module information will be displayed.
- On the register card "Measure" the channel values of the online e.bloxx will be displayed in real time.
- On the register card "Variable Settings" the different channels of the e.bloxx can be configured. This will be done in the Variable Settings Table being displayed on this register card.
- On the register card "Module Settings" different general settings like the baud rate, address, etc. can be defined for each e.bloxx.

This manual only gives a brief description on how to set up and configure an e.bloxx module. A detailed description of all the functions of the Configuration Software ICP 100 is included in the help function of the software.

5.2. Setting Address and Baud Rate of an e.bloxx

Before a control (PLC) or a computer (PC) can interchange data with an e.bloxx via the bus, address and baud rate of the e.bloxx have to be defined. The following points have to be taken into consideration in this connection:
- All devices have to be adjusted to the same baud rate.
- The same address must not appear twice in the bus topology.

The setting variants for the bus parameters for e.bloxx are:

Bus Parameter	ASCII Protocol	MODBUS Protocol	Profibus-DP	LOCAL-BUS Protocol
Address	1 127	1 127	1.....126	1 127
Baud Rate	19,200 bps	19,200 bps	19,200 bps	19,200 bps
	38,400 bps	38,400 bps	-	38,400 bps
	57,600 bps	57,600 bps	-	57,600 bps
	93,750 bps	93,750 bps	93,750 bps	93,750 bps
	115,200 bps	115,200 bps	-	115,200 bps
	-	-	187,500 bps	187,500 bps
	-	-	500,000 bps	500 kbps
	-	-	1.500 kbps	1500 kbps

Table 5.1 - *Setting variants for address and baud rate for the e.bloxx*

If no other specifications are made on delivery, the e.bloxx have address 1 and baud rate 1.5 Mbps as default. The adjustment can be changed via the bus by means of the *Configuration Software ICP 100*.

Adjustment via bus by means of the Configuration Software ICP 100:
The address and baud rate of an e.bloxx can be set in the Configuration Software ICP 100. On the dialog box "Module Information" the address and baud rate of the actual e.bloxx is displayed. After changing these settings, the new settings have to be loaded into the e.bloxx in order to take effect. To do this the menu item **Send to Module** or **Send to Module As...** in the menu **File** or the corresponding button () in the icon bar has to be selected.

Notice: The address 0 is provided for the PC in case of a transmission via PROFIBUS-DP. This address therefore cannot be assigned to the e.bloxx. Also the address 127 is reserved for broadcast transmission in the PROFIBUS-DP protocol and may only be assigned for these cases.

5.3. e.bloxx Settings

On the register card "Module Settings" the following settings of an e.bloxx can be defined.

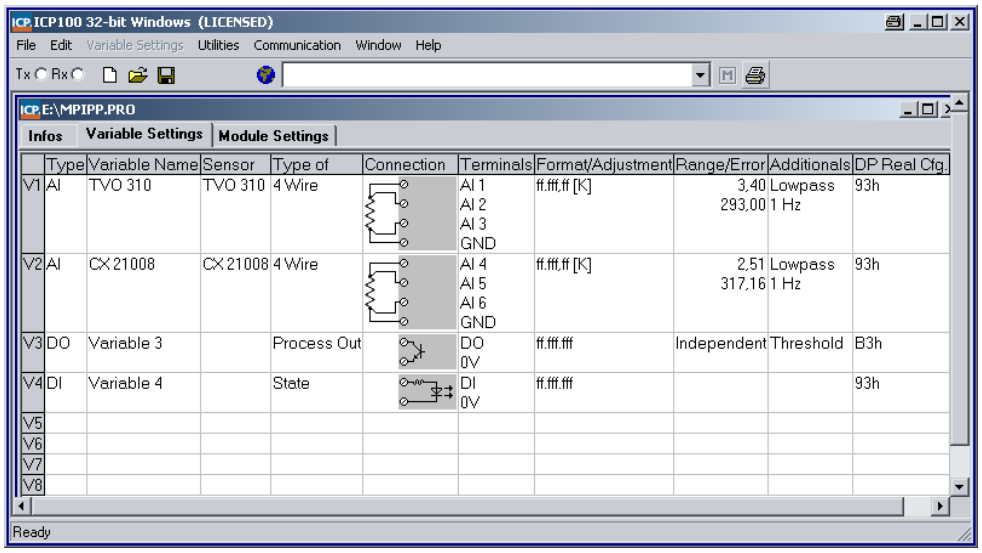
- Location: Description of each e.bloxx.
- User Name: Possibility to enter the name of the person that has configured the module.
- Config. Date: Displays the date of configuration.
- Address: Address of the online e.bloxx. Will only be displayed if the e.bloxx is online.
- Protocol: Bus protocol being used for communication between PC and e.bloxx. Will only be displayed if the e.bloxx is online. In the configuration software ICP 100 only the LocalBus protocol is displayed. Nevertheless all the protocols mentioned in chapter 2.2 are available and the e.bloxx uses the required protocol automatically.
- Character Format: Determines the number of data, parity and stop bits for transmission between PC and e.bloxx. Will only be displayed if e.bloxx is online. With the e.bloxx the character format is fixed to 8E1.
- Answer Delay: Determines how long an e.bloxx will wait before it sends an answer to a host request.
- Timeout: A timeout means that there is no communication with the module during the time period that is set here. All host-controlled functions (output via the Digital and Analog Output Variables and the Setpoint Variable) can be defined to pass into a safe, definable status. As soon as the communication recommences, the values are assumed again, depending on the configuration.
- Special Data: If a special program (firmware) is loaded in the e.bloxx it may need some special data that can be input here.

After changing some of these settings, the new settings have to be loaded into the corresponding e.bloxx, so they can take effect. Therefore select the menu item **Send to Module** or **Send to Module as...** in the menu **File** or the corresponding button () in the icon bar.

5.4. Definition of Channels

Up to 8 channels (real plus virtual) can be defined for an e.bloxx. They define how the signals at the in- and outputs of the e.bloxx will be processed. The value of every channel can be read out via the fieldbus. The channels are defined in the Variable Settings Table in the Configuration Software ICP 100.

The Variable Settings Table is displayed on the corresponding register card in the Configuration Software ICP 100.



Picture 5.1. *- Example for Variable Settings Table*

Here all 8 possible channels will be listed. To define a new channel just click on a free line in the table or change the type of channel clicking on the first column *Type* in the corresponding line. In both cases a dialog box will be opened where the type of the new channel has to be selected. There are 5 different types of channels:

- Analog Input Channel: Used to measure analog sensor signals. In the column *Sensor* the type of connected sensor is selected (Resistance) and in the next column the corresponding *Type of Measurement* is set (refer to chapter 4).
- Digital Output Channel: This is the relay output of the e.bloxx. Status signals can be output automatically by the e.bloxx according to values of other channels or it is possible to set the state of the output via bus.
- Arithmetic Channel: With this channel it is possible to perform calculations with the actual values of other channels and with constant values. The results of the calculations are assigned to the arithmetic channel and so arithmetic channels can also be used by other arithmetic channels for calculations.
- Alarm Channel: An Alarm Channel can be used to monitor another channel and to generate an alarm message if one of up to 4 definable thresholds are exceeded. The alarm messages can be read via bus.
- Setpoint Channel: The value of this channel can be set via bus. This way it is possible to set a value via bus which can be used by an arithmetic channel for further processing, e.g. to set a factor for measurement by the user.

The settings for all defined channels will be displayed in the corresponding column of the channels. To change these settings click on the corresponding field in the Variable Settings Table. One analog input can be defined.

6. SPECIFICATIONS

All following data are valid after a warm-up time of approx. 45 minutes.

6.1. Analog Inputs

Accuracy	0.01 % typical 0.02 % in controlled magnetically environment according EN61326: 1997, appendix B 0.05 % in industrial area according to EN61326: 1997, appendix A
Repeatability	0.003 % typical (within 24 hours)
Type of measurement	Resistance
Range	0 Ω to 6500 Ω
Accuracy	0.65 Ω
Resolution	0.02 Ω
Effect on temperature	0.6 Ω / 10 °K
Measurement current:	16 µA switched 8 μA_{eff} using 1 sensor 5.3 μA_{eff} using 2 sensors
Linearity deviation:	0.01 % of the final value

6.2. Analog/Digital Conversion

Resolution	19 bit
Sample rate	1 samples/sec for 2 connected sensors
Conversion method	Sigma delta
Filter	Variable digital low pass filter 1st order Averaging

6.3. Digital In- and Output

Input	
Function	Status
Input voltage	max. +30 VDC
Input current	max. 5 mA
Switching threshold	>10 VDC (high)
Switching threshold	<2.0 VDC (low)
Output	
Function:	process-, host controlled
Type of output:	Open Collector
Output voltage:	max. 30 V
Output current:	max. 100 mA

6.4. Communication Interface

Standard	RS 485, 2-wire
Data format	8E1
Protocols	ASCII, Modbus-RTU, Profibus-DP, Local-Bus
Baud rates	
ASCII and Modbus-RTU	19.2, 38.4, 57.6, 93.75, 115.2 kbit/s
Profibus-DP	19.2, 93.75, 187.5, 500, 1500 kbit/s
Local-Bus	19.2, 38.4, 57.6, 93.75, 115.2, 187.5, 500, 1500 kbit/s
Connectable devices	up to 32 without repeater up to 127 with repeater
Galvanic isolation	500 V

6.5. Power Supply

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

6.6. Mechanical

Case	Aluminium and ABS
Dimensions (W x H x D) and weight	45 x 90 x 83 mm (1.8 x 3.5 x 3.3 inch), 160 g
Protective system	IP 20
Mounting	DIN EN-Rail

6.7. Connection

Plug-in screw terminals	wire cross-section up to 1.5 mm²
Rapid bus Connector	4-pin plug in ABS-housing

6.8. Environmental Conditions

Operating temperature	-20 °C to +60 °C (-4 °F to +140 °F)
Storage temperature	-30 °C to +85 °C (-22 °F to +185 °F)
Relative humidity	0% to 95% at +50 °C (+122 °F), non-condensing

7. DECLERATION OF CONFORMITY

Konformitätserklärung – Declaration of Conformity – Déclaration de Conformité

The undersigned, representing:

Gantner Instruments Test & Measurement GmbH
Montafonerstr. 8 – A-6780 Schruns /Austria
tel: +43/5556-73748-410 – www.gantner-instruments.com

herewith declares, that the product:

e.bloxx A5-1
Certificate Ref No: **040330WG-06**

is in conformity with the following EC directive(s), including all applicable amendments:

Directives		Short Title
X	89 / 336 / EEC	EMC Directive
	99 / 5 / EEC	R&TTE Directive
	73 / 23 / EEC	Low Voltage Directive
	98 / 37 / EEC	Machinery Directive
	99 / 519 / EEC	Limitation of human exposure to electromagnetic Fields

Only "x"-marked directives are relevant for the product and for this declaration of conformity !

and that the standards and/or technical specifications referenced below have been applied:

Standards			Short Title
EMC		EN 61000-6-1 : 2001	Generic immunity standard for residential, commercial and light-industrial environments
	X	EN 61000-6-2 : 1999	Generic immunity standard for industrial environments
		EN 61000-6-3 : 2001	Generic emission standard for residential, commercial and light-industrial environments
	X	EN 61000-6-4 : 2001	Generic emission standard for industrial environments
	X	EN 61326: 1997+A1+A2	Electrical equipment for measurement, control and laboratory use – EMC requirements
R&TTE		EN 300220-1/3 : 2000	Electromagnetic compatibility for Short Range Devices (SRDs) from 25 to 1000 MHz
		EN 300330-1/2 : 2001	Electromagnetic compatibility for Short Range Devices (SRDs) from 9 kHz to 25 MHz
		EN 301489-1/3 : 2001	Electromagnetic compatibility for Short Range Devices (SRDs) from 9 kHz to 40 GHz
Safety		EN 61010 : 2001	Safety requirements for electrical equipment for measurement, control and laboratory use
		EN 60950 : 2000	Safety requirements for information technology equipment
		EN 60335 : 2002	Safety of household and similar electrical appliances
		EN 60601 : 1988	Safety requirements for medical electrical equipment
Machinery		EN 292-1/2: 1991	Safety of machinery – Basic concepts, general principles for design
		EN 954-1: 1996	Safety of machinery – Safety-related parts of control system
		EN 60204-1:1997	Safety of machinery – Electrical equipment
Human Expos.		EN 50364 : 2001	Limitation of human exposure to electromagnetic fields
		EN 50371 : 2002	Limitation of human exposure to electromagnetic fields (10MHz-300GHz) – Generic Standard

Remarks: Only "x"-marked standards are relevant for the product and for this declaration of conformity! Concerning safety aspects, the general and the product specific warning and safety instruction in the product accompanying documents must also be regarded!

This declaration is based upon the respective technical documentation held by the manufacturer.

CE

Schruns, 30th March 2004

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Werner Ganahl, General Manager

e.bloxx A5-1CR

Notice:

Information in this manual are valid from March 2006 until revocation.
Further changes and completion of the manual are reserved and possible without notice.

www.gantner-instruments.com

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