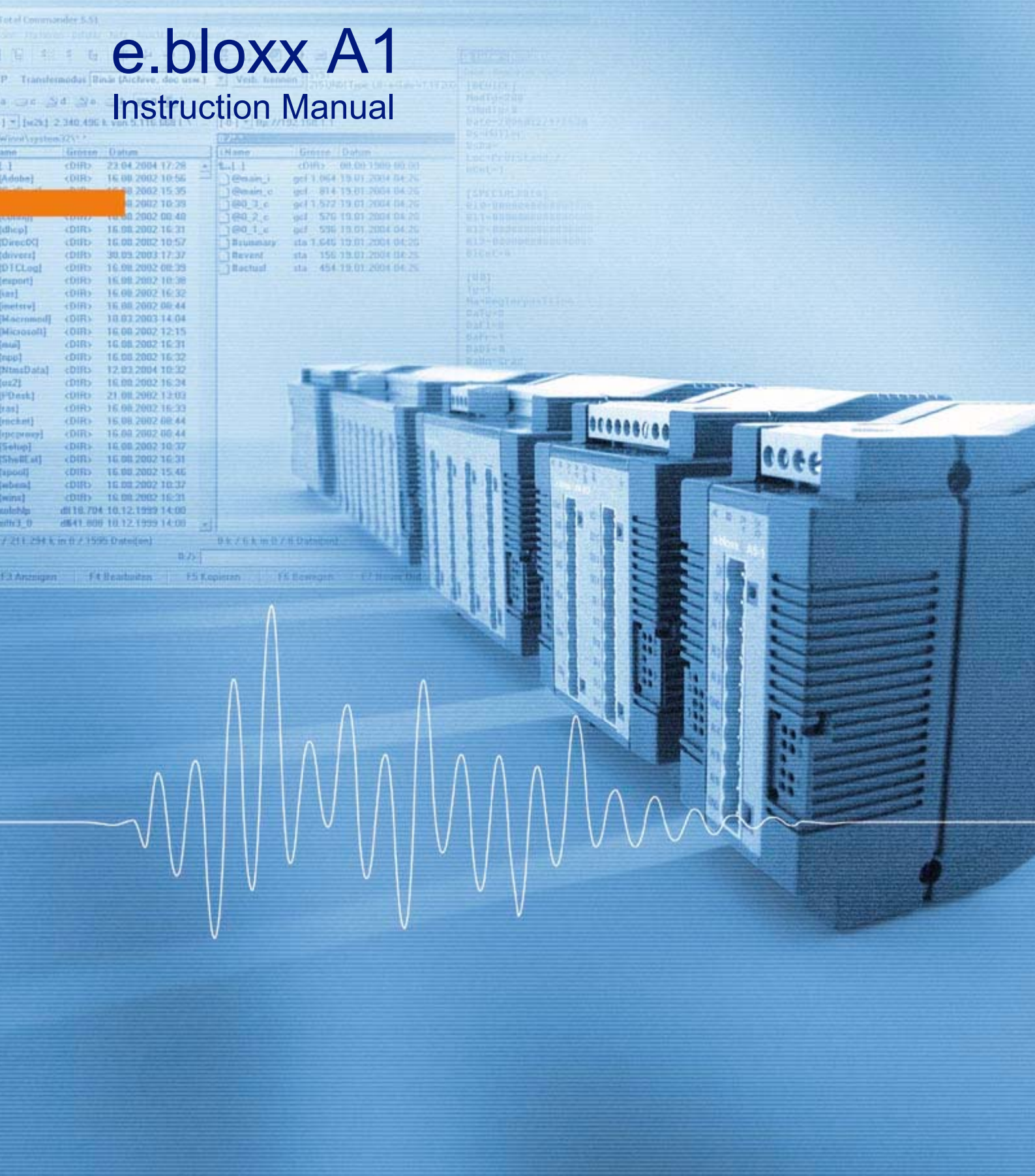
Gantner
instruments

e.bloxx A1

Instruction Manual



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 that 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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1. ABOUT THIS MANUAL

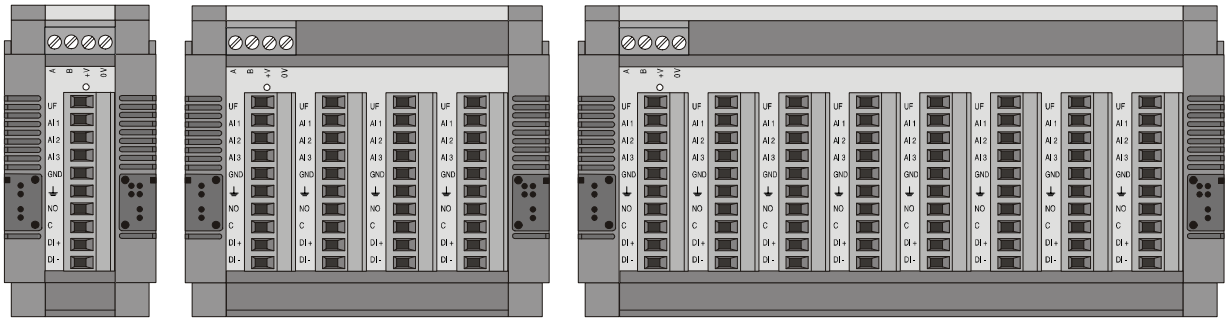
This manual describes the installation and setup of the e.bloxx A1-1, A1-4 and A1-8 modules. Those modules only differ in their amount of analog and digital inputs and outputs. In this manual the e.bloxx A1-1 is described and shown in the pictures and at every point where there are differences between the e.bloxx A1-1 and the other modules there will be a special note.

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 modules and how they are 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 A1-1, A1-4 and A1-8*

The e.bloxx A1-1, A1-4 and A1-8, which are described in this manual, are 1-, 4- or 8-channel modules for measurements of almost any kind of signals. They are part of a whole product line of different e.bloxx and differing by their number of inputs (analog or digital) and outputs. With each analog channel 7 additional channels are available for calculations, alarms, setpoints and digital signals.

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.

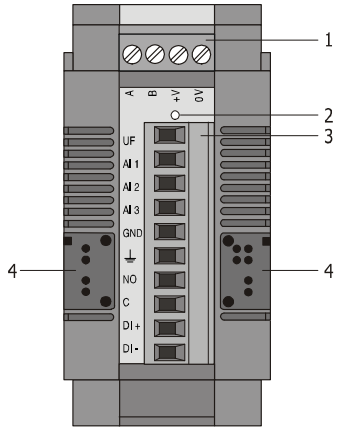
2.2. Types of Modules

There are several types of e.bloxx, which differ in their number and type of 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 A1-1*

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
UF	Force Output to Supply Measurement Voltage
AI 1	Analog Input 1
AI 2	Analog Input 2
AI 3	Analog Input 3
GND	Analog Ground
⏚	Grounding
NO	Solid State Relay Output - Normally Open
C	Solid State Relay Output - Common
DI +	Digital Input +
DI -	Digital Input -

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

2.4. Functional Overview

This manual describes the e.bloxx modules A1-1, A1-4 and A1-8. These modules are all 8-channel modules (real plus virtual). They differ only in the number and kind of inputs and outputs. The e.bloxx A1-1 has one analog input, one digital input and one solid state relay output (opto MOSFET). The e.bloxx A1-4 has four of each and the e.bloxx A1-8 eight and all of them can be configured separately.

Each e.bloxx module has 8 channels that can be defined. The first channel always defines the type of measurement. The other channels can be used to output a value at the relay output, to process the digital input which can be used for example as a trigger, to make arithmetical calculations or to process the measured value (scaling, min/max, alarm). The channels are defined in the configuration table of the Configuration Software ICP 100.

The values of each channel can be read out via the RS 485 bus. It is possible to set a filter frequency of up to 1 kHz for the analog input. It determines how fast the measured value will be updated. The resulting update time depends on the type of measurement, for example for a resistance measurement in 3-wire technology 2 measurements are required which means that the update time is decreased accordingly. The measuring rate is specified in the part Technical Specification.

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

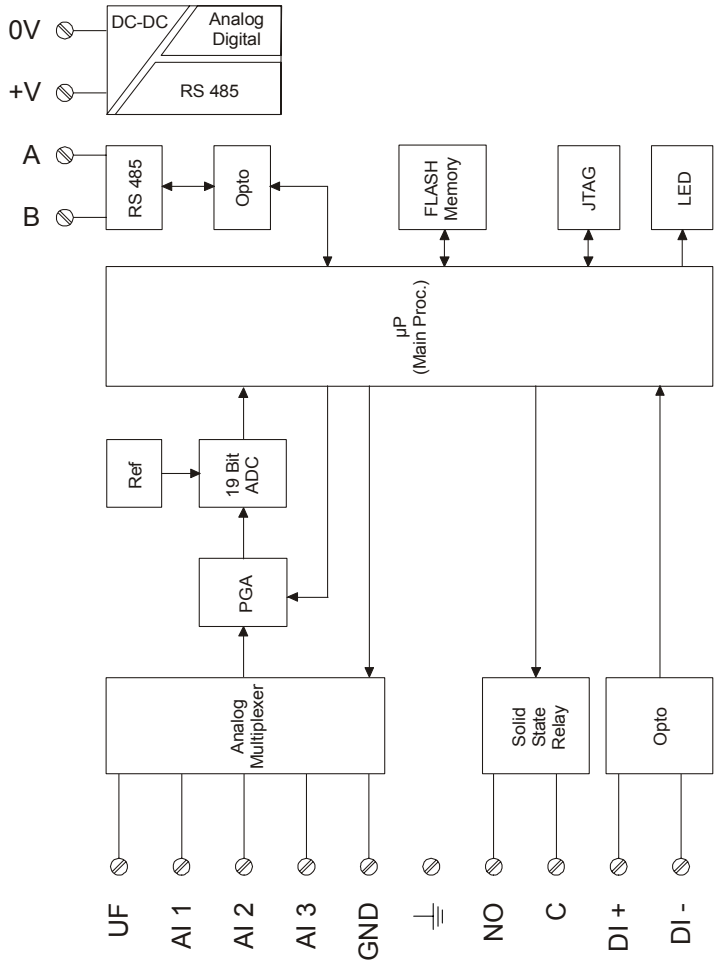
Notice: The LED will get red when the signal leaves the selected range and the error checking is activated (see ICP 100 column Range/Error).

2.6. DC-Isolation

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

2.7. Functional Diagram

The following picture can describe the e.bloxx A1-1.



Picture 2.3. *- Functional Diagram of the e.bloxx A1-1*

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 A1-1, e.bloxx A1-4 and e.bloxx A1-8 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.

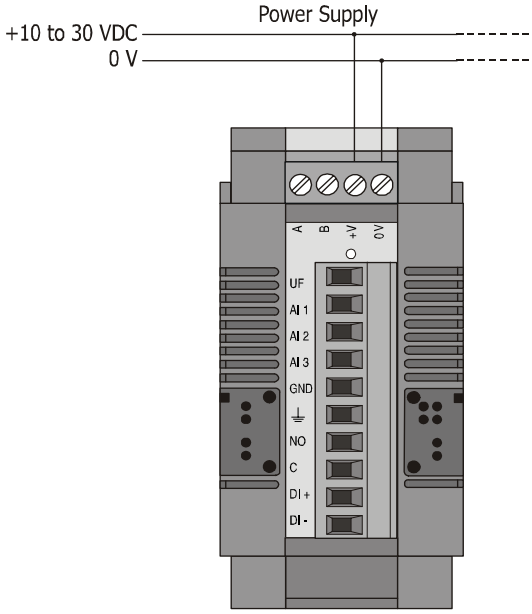
3.3. Power Supply

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.



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

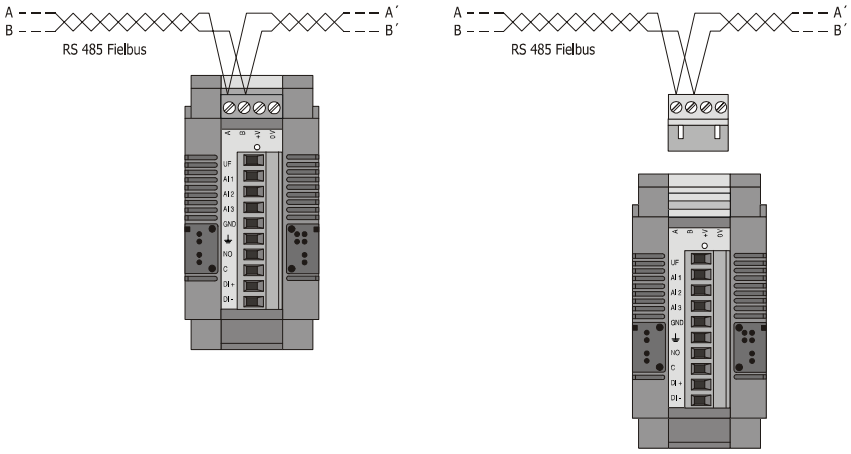
3.4. Bus Connection

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.

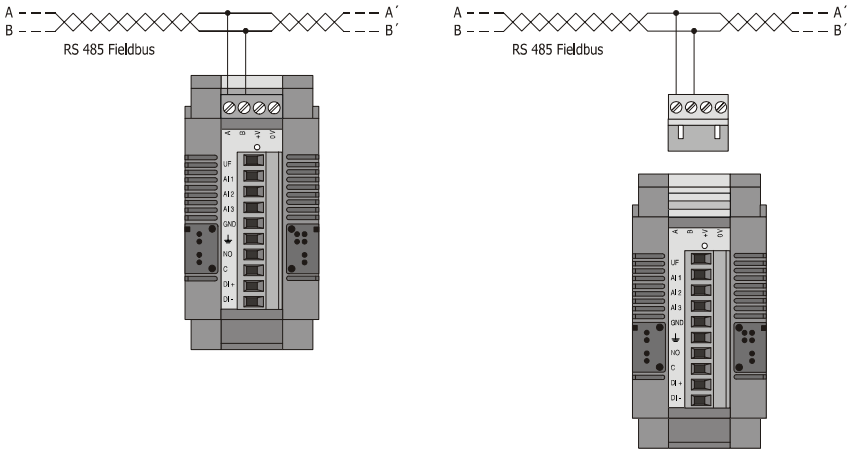
The e.bloxx modules have an RS 485 bus interface for connection to the serial fieldbus. The bus has to be terminated on both sides with a characteristic impedance. The maximum line length depends on the transmission speed (refer to the Communication Guide for details) and can never be higher than 1.2 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 A1-1 to the RS 485 Fieldbus with Derivation*



Picture 3.3. *- Bus Connection of an e.bloxx A1-1 to the RS 485 Fieldbus via Stub Cable*

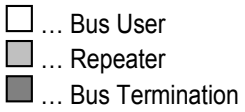
The stub-cable should be as short as possible, not longer than 30 cm.

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.

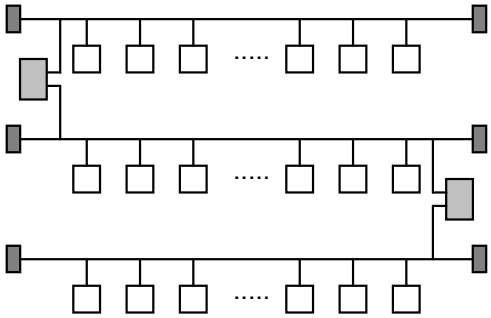
Bus Structure

The bus structure is a line structure where each bus segment will be terminated with 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.

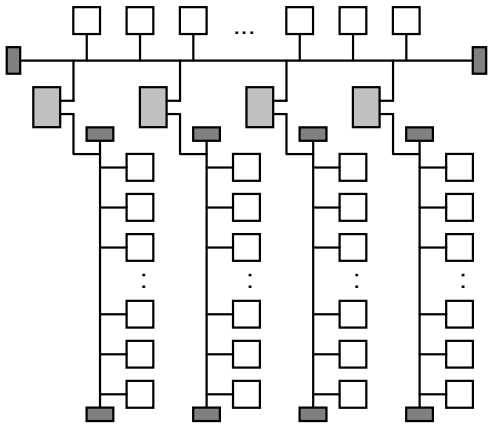
The following figures show a few examples of possible bus topology structures. The meanings of the symbols are as follows:



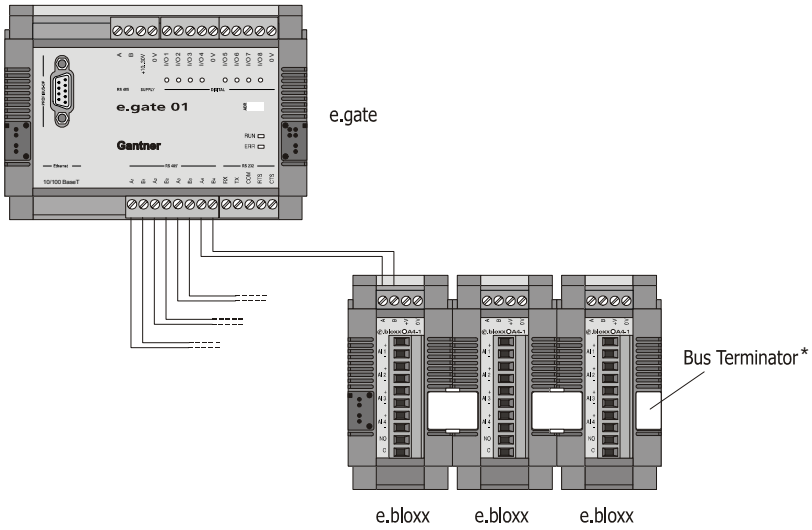
Picture 3.4. *- Simple Line Structure*



Picture 3.5. *– Extended Line Structure*



Picture 3.6. *- Line Structure with Branches*



Picture 3.7. *- e.bloxx A1-1, A1-4 and A1-8 connected to e.gate*

* ... If the e.bloxx A1-1, A1-4 and A1-8 are 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.

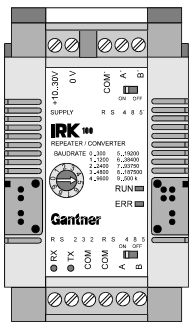
Bus Connection to PC

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.

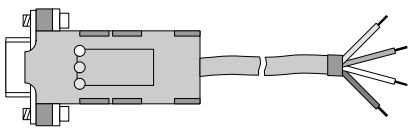
Gantner Instruments Test & Measurement GMBH offers a compact interface converter, called ISK 200, with an integrated power supply and automatic baud rate detection. The power supply, bus connection and a separate 24 VDC-output are DC-isolated. Therefore, the interface converter ISK 200 is also applicable 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, IRK 100 and ISK 101*

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.

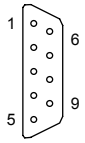
Plug	Pin	RS 485 Notation	Signal	Identification
 DB 9	1	-	Shield	Shield, Protective Ground
	2	-	RP	Reserved for Power
	3	B / B´	RxD/TxD-P	Receive/Transmit-Data-P
	4	-	CNTR-P	Control-P
	5	C / C´	DGND	Data Ground
	6	-	VP	Voltage Plus
	7	-	RP	Reserved for Power
	8	A / A´	RxD/TxD-N	Receive/Transmit-Data-N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

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

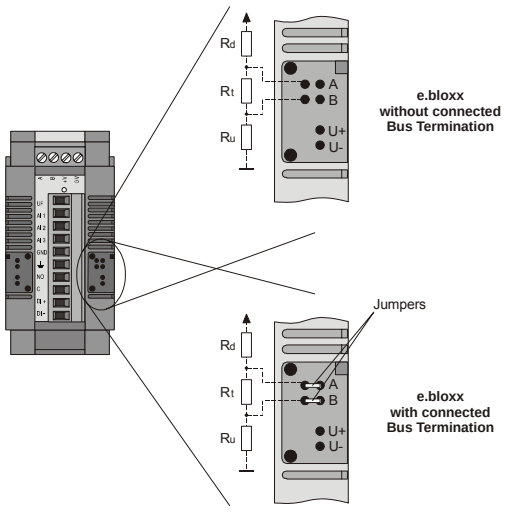
The signal leads A and B (and Shield) are mandatory for a (shielded) connection. Additional signal leads may be installed if required.

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.



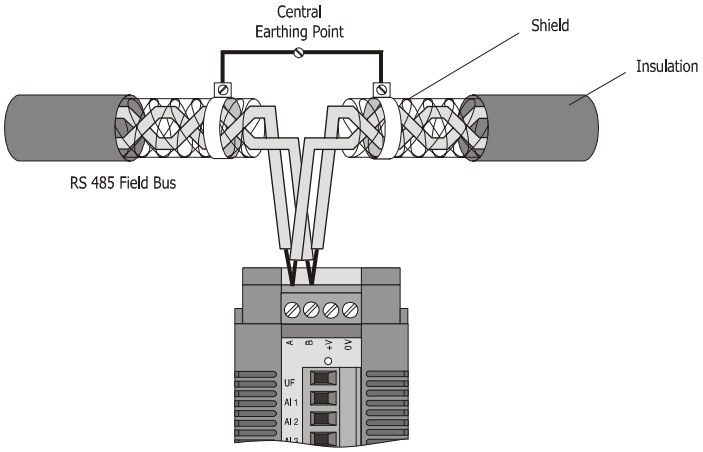
Picture 3.9. *- Bus Termination at the e.bloxx Modules*

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.



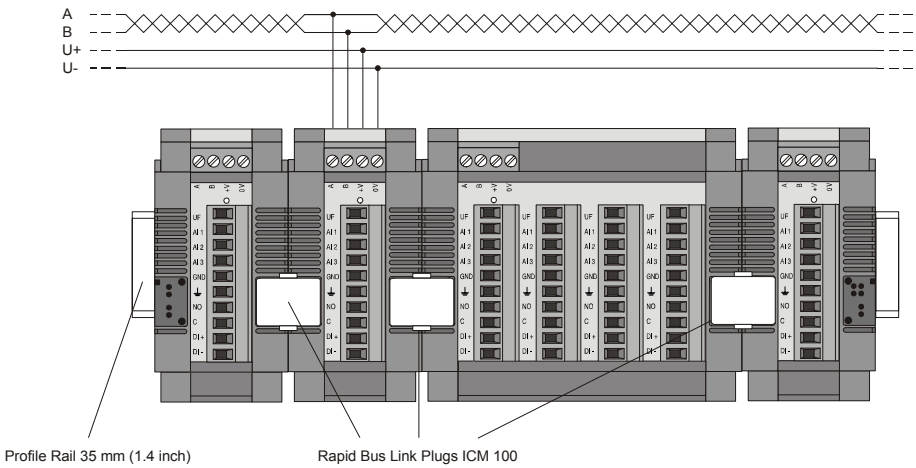
***Picture 3.10**. - Grounding of the Bus Line Shield at an e.bloxx*

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 connecting the bus and power supply from one module to the next with a Rapid Bus Link Plug (type designation: *ICM 100*). This 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 A1-1, A1-4 and A1-8 have 1, 4 and 8 analog input(s), relay output(s) and digital input(s). Depending on the type of sensor, which is connected to the analog input(s), various numbers of terminals have to be used. The configuration of the inputs and outputs is done with the Configuration Software ICP 100 as required by the application. For the e.bloxx A1-4 and A1-8 the 4 resp. 8 physical in-/outputs can be configured independently from each other.

Analog Input
The analog input collects and processes the signals of the most common transducers. Currently data of a large number of standardized and proprietary sensors are stored in the e.bloxx. The user can input further sensor data. The acquisition of various measuring values with these sensors may be reduced to a few principles of measurement, which are:

- Measurement of Voltage
- Measurement of Current
- Measurement of Resistance incl. Pt100 and Pt1000
- Measuring with a Resistance Bridge
- Measurement of Temperature with Thermocouples

For some of these measurements the e.bloxx offers several types of measurement. Currents up to ±24 mA may directly be measured by the e.bloxx. Measuring the voltage drop at an external shunt can carry out measurements of currents over ±24 mA. Resistance measurements can be carried out in 2-, 3- and 4-wire technique, or with resistance bridges in 4-wire technique. When measuring temperature with thermocouples, the user can choose between internal and external cold junction compensation.

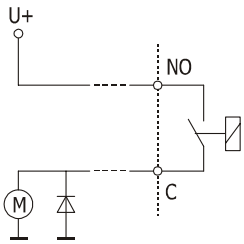
The analog input is protected against excess voltages.

Notice: Overloads of more than ±10 VDC will result in false measurement data at the analog input channel.

Solid State Relay Output (Opto MOSFET)
The relay 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 relay output is "passive" the process of external elements always requires an external current supply. 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).

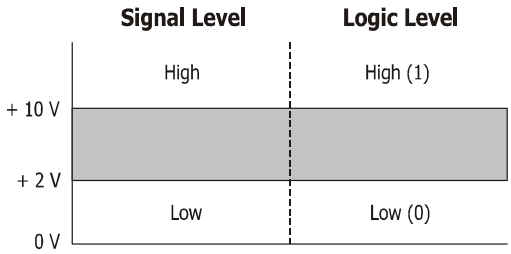
To the relay output you can directly connect: signal lamps, small relays, switching relays for larger loads, acoustic signal installations, buzzers or beepers etc., as long as the connected loads do not exceed the values described in the Technical Specifications.



Picture 4.1. *– Free-Wheeling Diode at Relay Output*

Digital Input

The 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 5 mA.

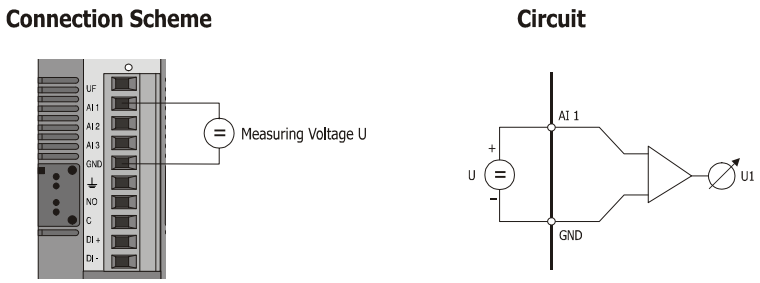


Picture 4.2. *- Definition of Signal Levels and Logic Levels*

Internal Reference Voltage

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

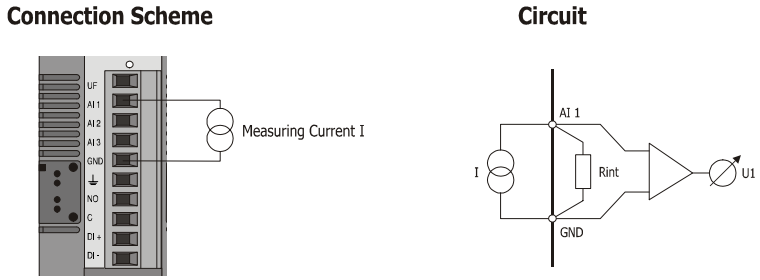
4.2. Analog Input - Measurement of Voltage



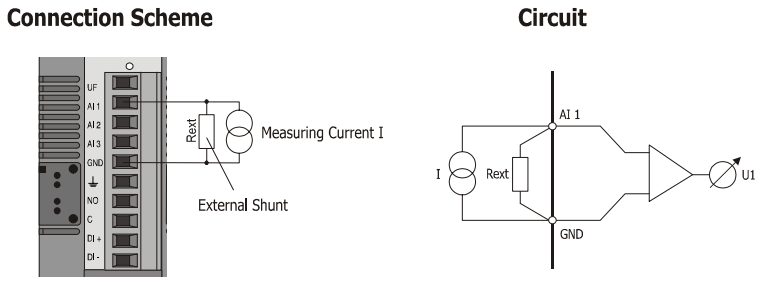
Picture 4.3. *- Measurement of Voltage - Single-Ended*

With the single-ended type of measurement the voltage to be measured is connected between an analog input (AI 1 .. 3) and analog ground (GND). The measurement voltage may not exceed 10 VDC.

4.3. Analog Input - Measurement of Current



Picture 4.4. *- Measurement of Current with Internal Shunt*



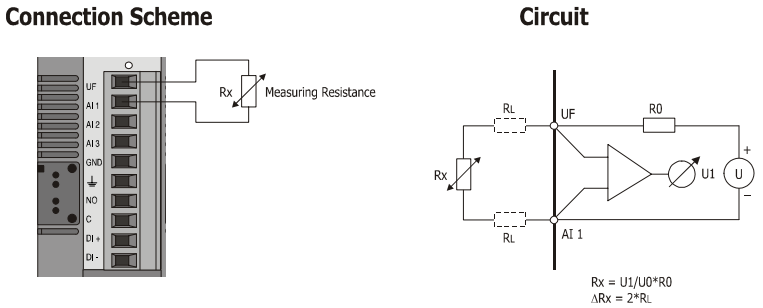
Picture 4.5. *- Measurement of Current with External Shunt*

For measurements of current with the e.bloxx the source of electricity is connected to an analog input AI 1 and the analog ground GND. For the measurement, the required load on the current source is regulated by an internal resistor R_{int} with a value of 100 Ω. The maximum power of this shunt is limited to 0.25 W, resulting in a measuring range of up to 25 mA maximum.

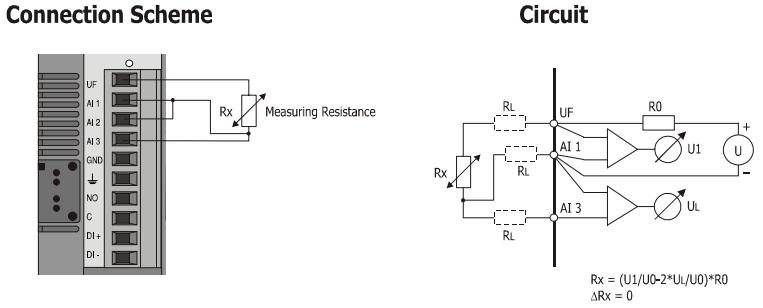
If higher currents need to be measured, an external resistor that is connected parallel to the source of current should be used. Terminals are connected to the analog voltage input AI 1 and analog ground GND. The power of the external shunt has to be adapted to the source of current to be measured in order to limit the voltage at the analog input to ±10 V. The analog input is configured as voltage input. The voltage has to be divided by R_{ext}.

Notice: The precision of the current measurement with external shunt depends on the accuracy of the resistor that is used.

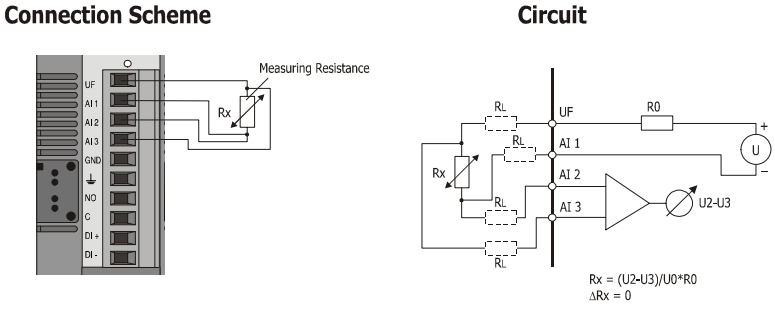
4.4. Analog Input - Measurement of Resistance and RTD (Pt100, Pt1000)



Picture 4.6. *- Measurement of Resistance in 2-Wire Technique*



Picture 4.7. *- Measurement of Resistance in 3-Wire Technique*



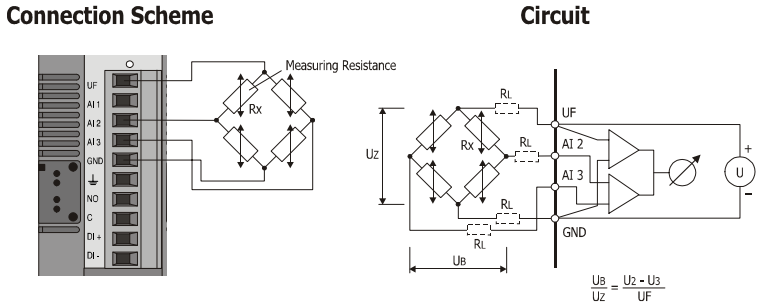
Picture 4.8. *- Measurement of Resistance in 4-Wire Technique*

Resistance measurement is carried out by means of measurements of voltages at a current-carrying resistor. In this case the occurring voltage drop is measured via the resistance sensor. The current feed required for the resistance measurements provides the internal supply of the module.

For this purpose the sensor module connects a supply point internally with the analog measurement input via a reference resistor R_0. The drop of voltage U_0 via the resistor R_0 is required as a reference for further signal processing by the module. The value of resistance of the sensor can be calculated from the input signals U_i as a multiple of the reference resistor R_0. The measuring range amounts to between 0 and 4 kΩ.

Notice: The e.bloxx support resistance measurement in 2-, 3- and 4-wire technique. With resistance measurement in 2-wire technique the supply lines cause an additional drop of voltage, thus distorting the measuring result and influencing the measuring accuracy. Therefore it is necessary to pay attention especially with resistance measurement in 2-wire-technique to use as low-impedance leads as possible to the sensors and to make sure that the leads are well-connected with the sensor module and the sensor. With resistance measurement in 3-wire technique the drop of voltage via the supply lines is eliminated from the measuring result ($-2 \cdot U_L/U_0 \cdot R_0$). In this case 2 measurements are required (for U_1/U_0 and U_L/U_0). With resistance measurement in 4-wire technique the drop of voltage is picked up directly at the sensor, so that the supply lines do not influence the measuring results any longer. The measuring frequency for these resistance and Pt100 measurements is 10 Hz

4.5. Analog Input - Measurement with a Resistance Bridge



Picture 4.9. *- Measurement by a Resistance Bridge*

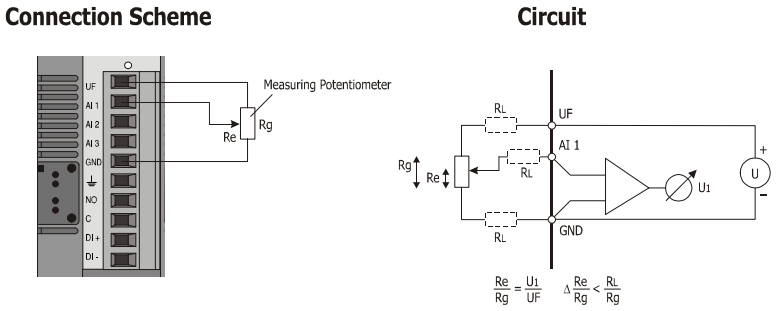
Bridge connections consist of 2 arms with two resistors each. The resistance bridge is supplied by the voltage output UF at the e.bloxx.

The quantity to be measured with resistance bridges is the relation between bridge voltage U_Z and the voltage between the two resistance arms U_B (ratio measurement). The measuring ranges are ±2 mV/V, ±8 mV/V, 20 mV/V, 200 mV/V and 1000 mV/V.

Mostly there are four variable resistors (e.g. strain gauges) in resistance bridges, so that the resistance bridge can easily be balanced via the controllable resistor ($U_B = 0$ for the balanced state). Variations of the sensor signal characteristically influence the fourth resistor and cause a change in the quantity to be measured.

Notice: The supply lines cause an additional voltage drop, which leads to a slight diminishing of the bridge voltage. This distorts the measuring result and thus influences the measuring accuracy. Therefore it is necessary to pay attention to use as low-impedance leads as possible to the sensors and to make sure that the leads are well connected with the e.bloxx and the sensor.

4.6. Analog Input - Potentiometer Measurement



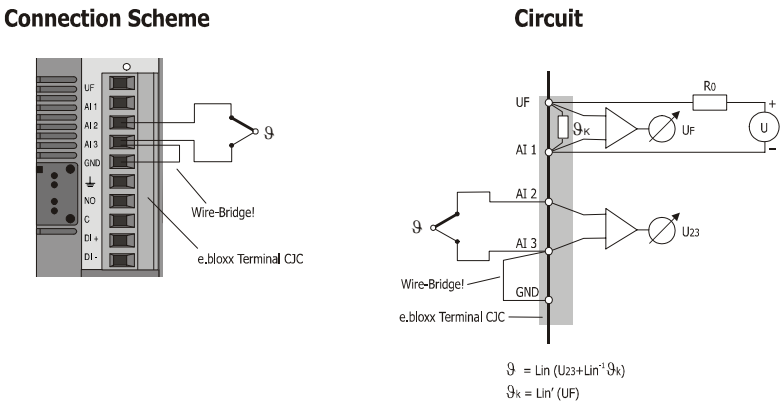
Picture 4.10. *- Potentiometer Measurement*

Potentiometer measurements are measurements with voltage relations, the division ratio of which can be adjusted (e.g. by a sliding contact on a resistance regulator). The quantity to be measured is the relation between the adjusted resistance R_E and the combined resistance R_G of such a potentiometer (ratio measurement).

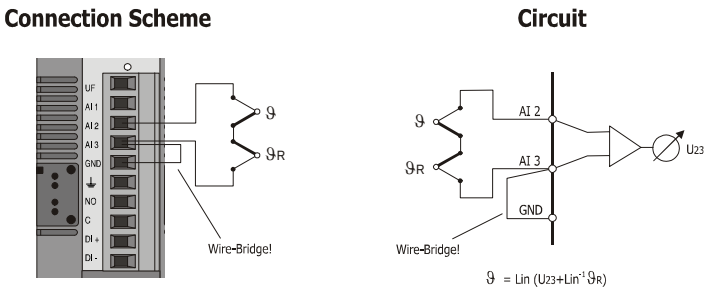
With the e.bloxx the potentiometer is supplied by the voltage output UF on the e.bloxx. The signal is picked up at the resistor.

Notice: With potentiometer measurements the supply lines cause an additional voltage drop, which can lead to a slight decrease in signal voltage, thus distorting the measuring result and influencing the measuring accuracy. Therefore it is necessary to pay attention with potentiometer measurement to use as low-impedance leads as possible to the sensors and to make sure that the leads are well connected with the e.bloxx and the sensor.

4.7. Analog Input - Measurement of Temperature with Thermocouples



Picture 4.11. *- Measurement of Temperature with Thermocouple - Internal Cold Junction Compensation with the e.bloxx Terminal CJC*



Picture 4.12. *- Measurement of Temperature with Thermocouple - External Cold Junction Compensation*

Thermocouples consist of two "thermoelectric wires" made of different materials (e.g. platinum and platinum rhodium) that are welded to each other at one end. If the contact position and the other ends of the thermoelectric wires have different temperatures, a "thermoelectric voltage" U_{th} appears at the contact position of both thermoelectric wires. This voltage is largely proportional to the temperature difference. It can be measured and can be used for temperature measurement purposes.

Since thermocouples can only measure a temperature difference (difference between temperature to be measured and temperature at the connecting terminals on the e.bloxx), a terminal temperature or a known temperature reference also have to be determined. In the first case this is called internal cold junction compensation (TC_{int}), in the second case external cold junction compensation (TC_{ext}).

When measuring the temperature with internal cold junction compensation a temperature sensor will be connected at an additional analog input next to the thermocouple. Or by means of Cold Junction Terminal – e.bloxx Terminal CJC - where a Pt1000 temperature sensor is integrated directly in the terminal block between the terminal connections UF and AI 1, the temperature ϑk will be entered. The temperature of the test point is determined by the e.bloxx because of linearization trace to

$$\vartheta x = Lin(Ux+Lin^{-1}\vartheta k), \text{ where } \vartheta k = Lin'(UF).$$

The sensor module will be informed about the measuring channel through which the temperature of terminals can be calculated via the Configuration Software ICP 100 (Cold Junction Channel).

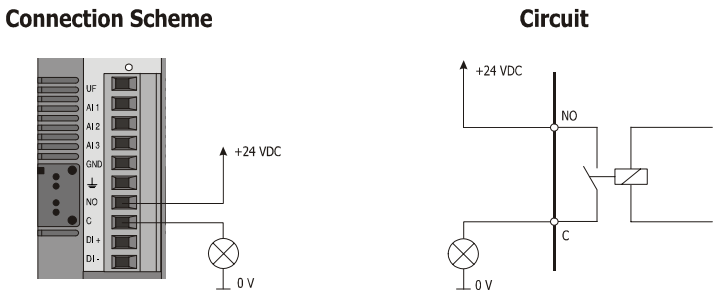
If the temperature is measured by external cold junction compensation, a second thermocouple of the same type is required, which is connected in series with the first one. The polarity is selected in a way that the thermoelectric voltages subtract each other. The second thermocouple is set to a fixed reference temperature ϑr (mainly ϑr = 0 °C). Then the e.bloxx calculates the temperature at the measuring position by means of the linearization curve as

$$\vartheta x = Lin(Ux+Lin^{-1}\vartheta r).$$

The e.bloxx will be informed about the reference temperature ϑr via the Configuration Software ICP 100 (Cold Junction Temperature).

A wire bridge has to be placed between the GND and one of the thermocouple inputs (see pictures 4.11 and 4.12).

4.8. Solid State Relay Output – Status



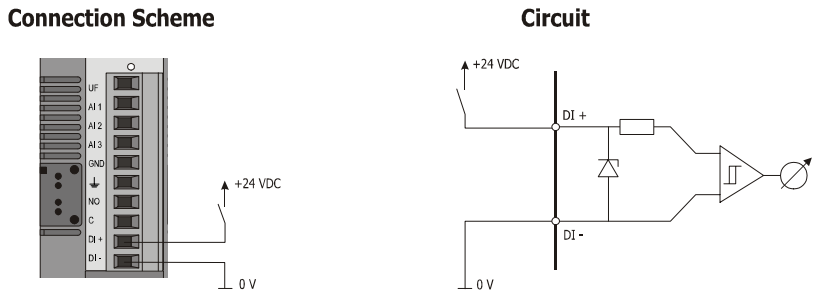
Picture 4.13. *- Relay Output used for Status Output*

The relay 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 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.

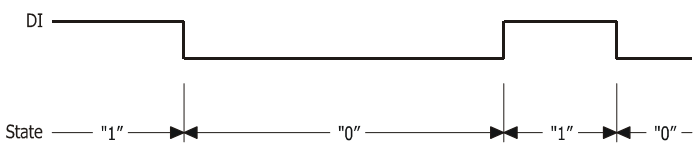
The distribution voltage can amount from 10 up to 30 VDC. It has to be supplied externally or picked up by the power supply of the e.bloxx.

The status of the digital output can be scanned as 1/0 information via bus.

4.9. Digital Input - Status Recording



Picture 4.16 *- Digital Status Recording*



Picture 4.17 *- 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 Protocol	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	1.500 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.

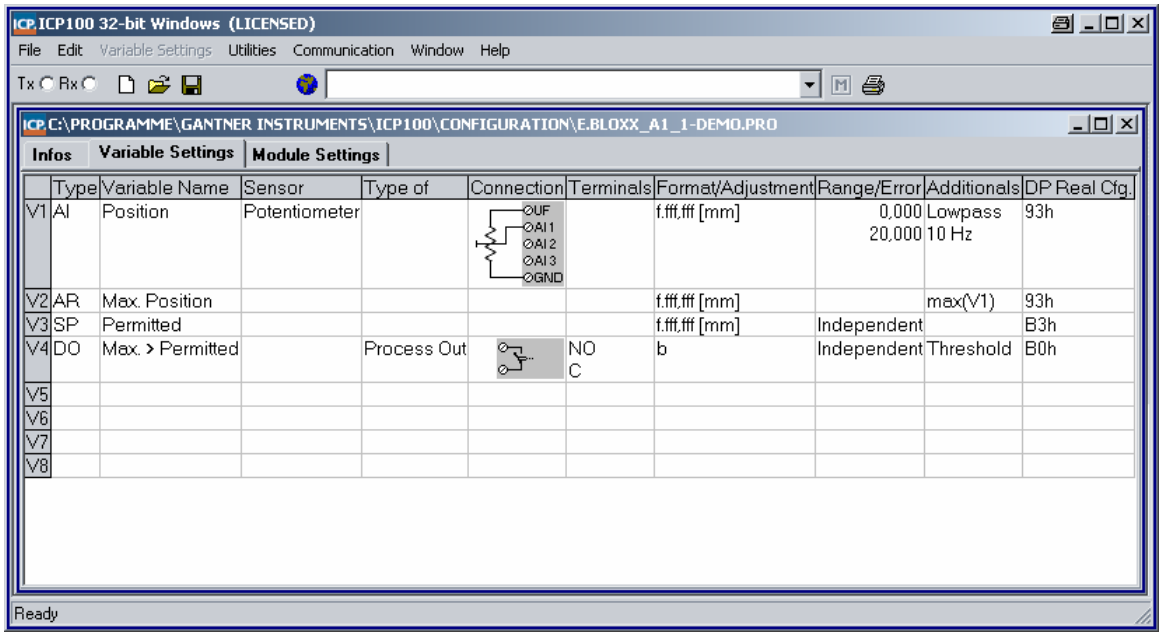
- Location: Description of each e.bloxx.
- User Name: Possibility to enter the name of the person that has configured the module.
- Config. Date: Displays the date of configuration.
- Address: Address of the online e.bloxx. Will only be displayed if the e.bloxx is online.
- Protocol: Bus protocol being 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.



	Type	Variable Name	Sensor	Type of	Connection	Terminals	Format/Adjustment	Range/Error	Additionals	DP Real Cfg.
V1	AI	Position	Potentiometer		UF AI1 AI2 AI3 GND		f.fff,fff [mm]	0,000 20,000	Lowpass 10 Hz	93h
V2	AR	Max. Position					f.fff,fff [mm]		max(V1)	93h
V3	SP	Permitted					f.fff,fff [mm]	Independent		B3h
V4	DO	Max. > Permitted		Process Out		NO C	b	Independent	Threshold	B0h
V5										
V6										
V7										
V8										

***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 6 different types of channels:

- Analog Input Channel: Used to measure analog sensor signals. In the column *Sensor* the type of connected sensor is selected (voltage, current, resistance, temperature) and in the next column the corresponding *Type of Measurement* is set (refer to chapter 4).
- Digital Input Channel: Used to record digital status signals. In the column *Type of Measurement* it is only possible to select the measurement function state recording (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 (process controlled) or it is possible to set the state of the output via bus(refer to chapter 4).
- 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, one digital input and one relay output could 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	Range	Accuracy	Resolution
Voltage	±10 V	±2 mV	40 µV
	±1 V	±0.2 mV	4 µV
	±100 mV	±20 µV	0.4 µV
	±10 mV	±10 µV	0.04 µV
Current	4-20 mA	±4 µA	80 nA
internal shunt 100Ω	±20 mA	±2 µA	80 nA
Resistance	4 kΩ	±1 Ω	0.05 Ω
(2-, 3- and 4-wire)	2 kΩ	±0.6 Ω	0.03 Ω
measuring current 1 mA DC			
Bridge	±1000 mV/V	1 mV/V	100 µV/V
Excitation 5 VDC/120 Ω	±200 mV/V	200 µV/V	10 µV/V
	±20 mV/V	20 µV/V	1 µV/V
	±8 mV/V	±8 µV/V	0.4 µV/V
	±2 mV/V	±2 µV/V	0.1 µV/V
RTD (2-, 3- and 4-wire)			
Pt100	-200 to + 850°C	±0.5 °C	±0.1 °C
Pt100	-200 to + 250°C	±0.2 °C	±0.01 °C
Pt1000	-200 to + 850°C	±1 °C	±0.1 °C
Pt1000	-200 to + 140°C	±0.3 °C	±0.01 °C
Thermocouples	Type B	better than ± 5°	
	Type E, J, K, L, T, U	better than ± 1°	
	Type N:	better than ± 2°	
	Type R, S:	better than ± 3°	
Common mode voltage	500 V permanent		
Linearity deviation:	0.01% of the final value		
Temperature influence			
on zero	1 µV / 10 °K		
on sensitivity	0.02 % / 10 °K		
Long-time drift	1 µV / 24 h; 0.1 µA per 24 h		

6.2. Analog/Digital Conversion

Resolution	19 bit
Sample Rate	1,000 samples/sec for voltage, current, potentiometer, bridge 10 samples/sec for resistance, RTD 4 samples/sec for thermocouples
Conversion method	Sigma Delta
Filter	Anti aliasing Bessel 4th order 200 Hz variable digital low pass filter 1st order Averaging, sliding averaging

6.3. Digital In- and Output

Input	
Function	Status
Input voltage	max. +30 VDC
Input current	max. 1,5 mA
Switching threshold	>10 VDC (high)
Switching threshold	<2.0 VDc (low)
Output	Solid State Relay output
Contact	Opto – MOSFET
Nominal load	60 VDC / 100 mA (ohmic load)
Galvanic isolation	500 V

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 VDC to 30 VDC over voltage and overload protection
Power consumption	
e.bloxx A1-1	approx. 1.5 W
e.bloxx A1-4	approx. 6 W
e.bloxx A1-8	approx. 12 W

Influence of voltage:	0.001 % / V

6.6. Mechanical

Case	Aluminium and ABS
Dimensions (W x H x D) and weight	e.bloxx A1-1: 45 x 90 x 83 mm (1.8 x 3.5 x 3.3 inch), 160 g e.bloxx A1-4: 104 x 90 x 83 mm (4.1 x 3.5 x 3.3 inch), 500 g e.bloxx A1-8: 186 x 90 x 83 mm (7.3 x 3.5 x 3.3 inch), 900 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 A1-1
Certificate Ref No: **040330WG-01**

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

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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 A1-4
Certificate Ref No: 040330WG-02

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

Gantner Instruments
Test and Measurement GmbH
Montafonerstr. 8, A-6780 Schruns
www.gantner-instruments.com

Werner Ganahl, General Manager

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 A1-8
Certificate Ref No: **040330WG-03**

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
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	X	EN 61326: 1997+A1+A2	Electrical equipment for measurement, control and laboratory use – EMC requirements
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		EN 60335 : 2002	Safety of household and similar electrical appliances
		EN 60601 : 1988	Safety requirements for medical electrical equipment
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		EN 954-1: 1996	Safety of machinery – Safety-related parts of control system
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Schruns, 30th March 2004

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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.

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