Fieldbus Devices
Analog-Input-Bus-Converter AD-AEB 20 GX

Description

The AD-AEB 20 GX enables 2-channel analog signal acquisition while providing digitally processed process variables. The signals are provided via an RS485 bus interface. Analog values ??and scaling values ??can be called up via implemented MODBUS commands. All settings regarding scaling or filters are made via MODBUS commands.

The power supply and the RS485 bus connection are possible via the rear DIN rail connector. The device is equipped with two rotary coding switches with which the bus address can be set on the device.

The input current shunt is automatically switched on when reading the current value. With the input signal switches (E1 / E2), each signal input can be permanently connected to the 50 Ohm terminating resistor in order to safely complete current loops even if the supply voltage fails.

The operating voltage is indicated by a green LED. The data communication is signaled by a yellow LED. Invalid measurement signals outside the defined measuring range are detected. In this case, the green LED flashes.

As well as interface settings as well as the device address can be modified during operation by means of Modbus commands. All Modbus register addresses and associated commands are listed in the document attachment.

Application

Conversion of analog process variables in digital information, already in the cabinet. Drastic reduction of wiring work.

Specific characteristics

- Two analogue inputs can be used as voltage or current input
- Adjustable filter function
- Galvanically isolated RS485 bus interface
- Parameterizable interface settings
- Hardware switch for device address
- Galvanically isolated switching power supply
- Can be parameterized with PC via AD Studio configuration software
- Status LED for operating voltage and data communication
- Visual display for invalid measuring signals
- Modbus master mode

Business data

Order number
AD-AEB 20 GX

Accessory
Rail connector (5-pin)	AD-GX-Connector

Technical specifications

Current inputs
Measuring range	0 ... 20 mA
Input resistance	50 Ohm

Voltage inputs
Measuring range	0 ... 10 V
Input resistance	100 kOhm

Signal detection
Channel counts (U/I)	2
Basic accuracy	< +/- 0,3 %
Temperature influence	80 ppm/K
Sampling rate / resolution	100 ms / 10 bit

Transmission behaviour
Response time	max. 15 ms

RS485-Bus
Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no spur lines)
Cable	twisted and shielded

Supply
Supply voltage	18 ... 30 V DC
Max. power consumption	600 mW (24V DC)

Housing
Dimensions (WxHxD)	6,2 x 92 x 101 mm³
Manner of fastening	DIN rail mounting 35mm, EN 50022
Type of protection	IP 20
Connection method	screw clamp
Bolting torque terminals	0,5 Nm
Wire cross section	max. 2,5 mm^2
Weight	~ 70 g

Environmental conditions
Permissible ambient temperature	-10 ... +50 °C
Storage and transport	-10 ... +70 °C (no condensation)

EMC
Product family standard [1]	EN 613261
Emission [2]	EN 55011, CISPR11 Cl. A, Gr. 1

[1] During checking, slight signal deviations are possible.

[2] Warning:
This device is not intended to be used in residential areas and can not ensure adequate protection of radio reception in such environments.

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Analog-Input-Bus-Converter AD-AEB 20 GX

Technical specifications

Electrical safety requirements

Product family standard	EN 61010-1

Galvanic isolation, test voltages

|	
RS485 bus / power supply	1,5 kV, 50 Hz (1 min)
Analog inputs / power supply	1.5 kV, 50 Hz (1 min)
Analog input / RS485 bus	1,5 kV, 50 Hz (1 min)
Analog inputs between themselves	0 kV

Protection circuits

Power supply	electrical surge and reverse current protection

Display and operating elements
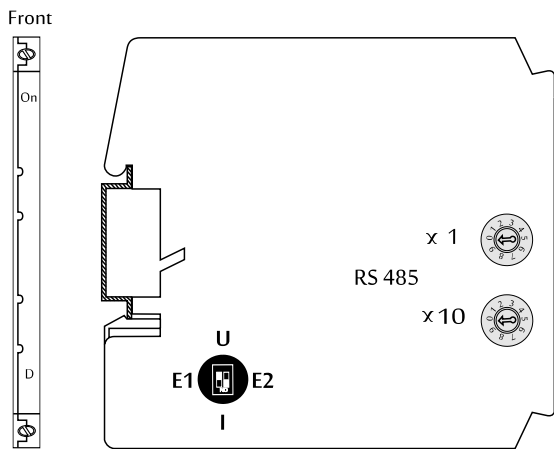
Designation	LED	Meaning
On	green	Power supply
D	yellow	RS485 Communication
RS485		Address switch(01...99)
E1		Input signal switch (U/I) channel 1
E2		Input signal switch (U/I) channel 2

Block and wiring diagram

[C]onnector

Dimensions

Analog-Input-Bus-Converter AD-AEB 20 GX
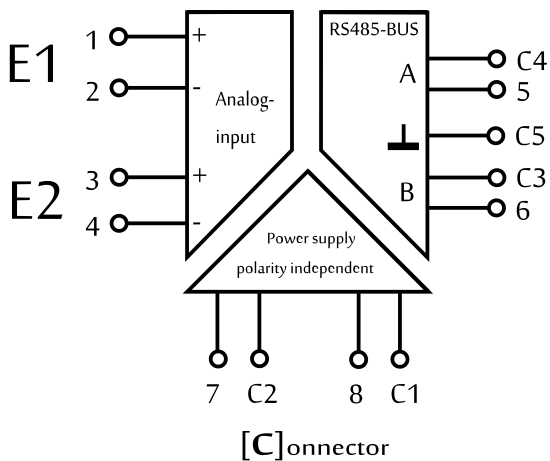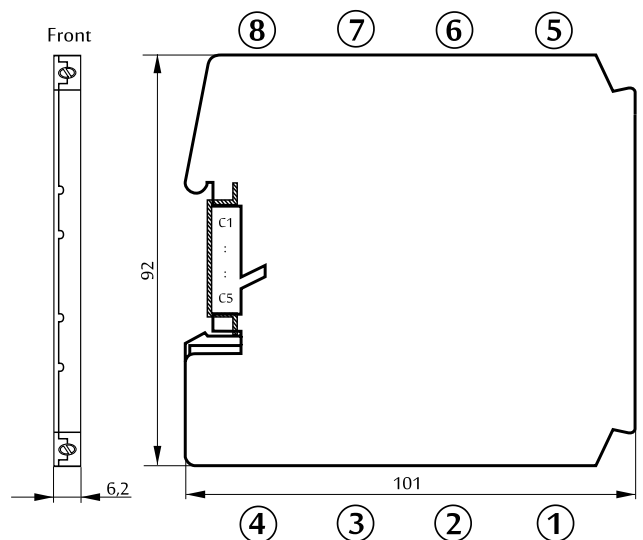
Modbus Communication

The AD-AEB 20 GX contains a RS485 bus interface on which the Modbus RTU protocol is used. All control functions of the device can be executed via this bus interface. The preset standard data format is 19200,e,8,1. Adaptation to a different data format is possible at any time. The bus address (1...99) is set to the side-mounted rotary switches. The address 0 is not permitted for the bus operation. However, on this zero position the device is accessible only via the standard data format (19200, e, 8.1). The position 0 thus represents a service position (slaveaddress = 0), the example can be used during parameterization error.

The AD-AEB 20 GX supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Holding Registers" (0x10)**. With the **"Read Holding Registers"** function data can be read from the device and written with **"Write Holding Registers"** data. The individual register width is 16 bits. Please see the Modbus specification for detailed explanations of the Modbus communication. This is online available for free and can be downloaded from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

Start address	Reg. number	Name	Datatype	[Code] = Value	read	write
40501	1	Address switch	U16	1...99...247	yes	yes
40502	1	Flashing function	U16	0/1...255	yes	yes
42905	1	Signal input type 1	U16	U=0 / I=1	yes	yes
42906	1	Signal input type 2	U16	U=0 / I=1	yes	yes
40211	1	Damping U/I 1	U16	0...1000 s	yes	yes
40212	1	Damping U/I 2	U16	0...1000 s	yes	yes
43001	2	In signal begin U/I 1	FLOAT	V / mA	yes	yes
43003	2	In signal end U/I 1	FLOAT	V / mA	yes	yes
43005	2	Scale begin 1	FLOAT	-99999 ...	yes	yes
43007	2	Scale end 1	FLOAT	... 99999	yes	yes
43009	2	In signal begin U/I 2	FLOAT	V / mA	yes	yes
43011	2	In signal end U/I 2	FLOAT	V / mA	yes	yes
43013	2	Scale begin 2	FLOAT	-99999 ...	yes	yes
43015	2	Scale end 2	FLOAT	... 99999	yes	yes
40901	2	Analog intput U1	FLOAT	0...10V	yes	no
40903	2	Analog intput I1	FLOAT	0...20mA	yes	no
40905	2	Analog intput U2	FLOAT	0...10V	yes	no
40907	2	Analog intput I2	FLOAT	0...20mA	yes	no
40909	2	Scaled value 1	FLOAT	Begin ... End	yes	no
40911	2	Scaled value 2	FLOAT	Begin ... End	yes	no
42901	1	Baud rate	U16	Index, see list below	yes	yes
42902	1	Parity	U16	[0]=even; [1]=odd; [2]=no	yes	yes
42903	1	Modbus Master	U16	0/1	yes	yes
49102	1	Device reset	U16	0	no	yes
49105	6	Device type	String	AEB20GX	yes	no
49119	1	Firmware version	U16	MSB/LSB	yes	no

Coding baudrate list

Index	0	1	2	3	4	5	6	7	8	9
baud	2400	4800	9600	14400	19200	28800	38400	57600	76800	115200

After changing the interface parameters, a device reset is required.

Modbus master mode
The device can even work in Modbus master mode to transfer data between any devices within an RS485 line.
For Modbus master operation, starting with Modbus register 40611, there are 38 consecutive data transfer sets,
with 5 configuration registers each.

Start address	Reg. number	Name	Datatype	[Code] = Value	read	write
40611	1	Source address [1]	U16	1...99	yes	yes
40612	1	Source register [1]	U16	nnnnn	yes	yes
40613	1	Target address [1]	U16	1...98	yes	yes
40614	1	Target register [1]	U16	nnnnn	yes	yes
40615	1	Register count [1]	U16	1/2	yes	yes
40796	1	Source address [38]	U16	1...99	yes	yes
40797	1	Source register [38]	U16	nnnnn	yes	yes
40798	1	Target address [38]	U16	1...98	yes	yes
40799	1	Target register [38]	U16	nnnnn	yes	yes
40800	1	Register count [38]	U16	1/2	yes	yes

For the Modbus master mode, the parameter "Modbus master" must be activated and the address switch set to position 99.
Data transfer begins six seconds after activation or device restart.
A flashing green LED indicates a communication error.