

OVERDIGIT

compact I/O modules



EX04AIS

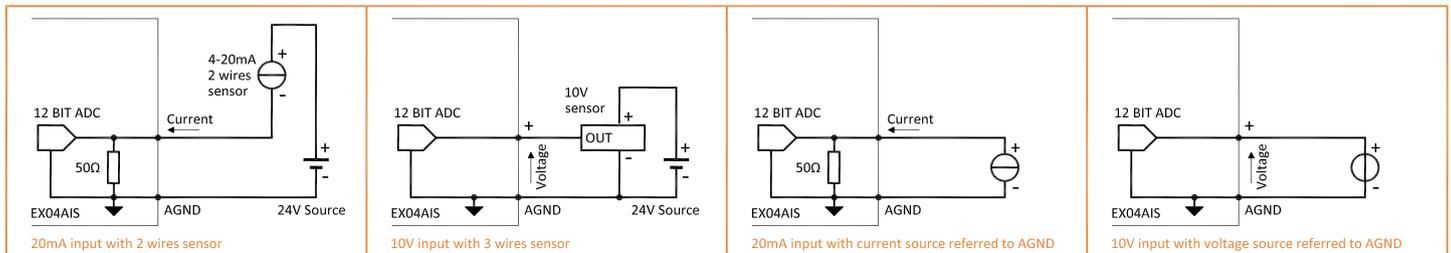
EX04AIS

- ✓ I/O interface - remotable on RS485 fieldbus
- ✓ 4 analog input channels, 12 bits, isolated
- ✓ 10V / 20 mA configurable input
- ✓ Channels configurable separately from each other
- ✓ High speed conversion
- ✓ Inputs protected from voltage and current over-load
- ✓ 12 bits channel with internal temperature sensor
- ✓ RS485 serial port with high speed (1Mb/s max)
- ✓ Modbus RTU protocol, configurable over RS485
- ✓ CoDeSys libraries for configuration and use
- ✓ PC tool for configuring and testing modules
- ✓ Compact dimension on 17.5mm of DIN rail

Compact module with 4 analog input channels, Modbus RTU protocol

The EX04AIS module is a reduced and low-cost version of the sophisticated EX04AIO model which preserves the analog inputs of channels for interfacing to the sensors that use 10V or 20mA standard.

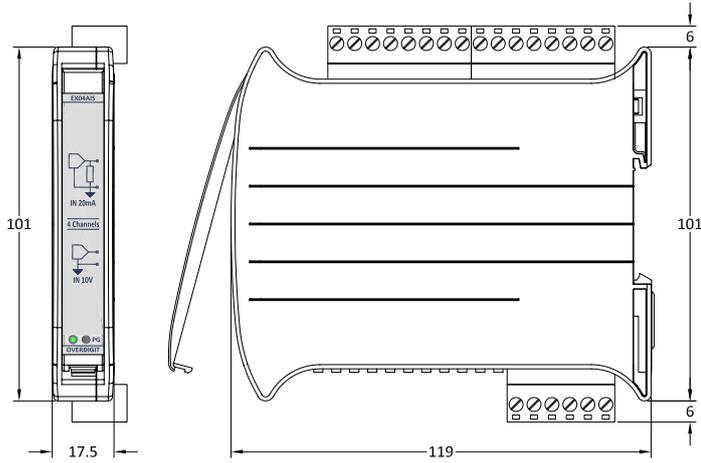
Configurable over fieldbus by IEC function block and easy integrable into "PLC Configuration" menu of CoDeSys using a configuration file. Extensions of the Modbus protocol for updating the I/O up to 1Mb/s in a single frames exchange.



GENERAL SPECIFICATIONS

Analog channels	4 single-ended input channels	Fieldbus	RS485 with EMI filter, thermal prot. / ESD 15kV
Isolation	1500Vac max (from bus and power supply)	Max nodes / Termin.	64 / insertable 120Ω load
Resolution	12 bits	Baudrate	300b/s ÷ 1Mb/s (continuously prog.)
Voltage input	0-10V, impedance > 100kΩ	Protocol	Modbus RTU, address 1 ÷ 247, parity N/O/E
Current input	0-20mA, 50Ω shunt resistor	Function codes	3, 4, 6, 16, 17, 23, 100, 101, 102, 109, 110
Acquisition time	Programmable filter from 10ms to 1s	Max performance	Complete I/O update within 500μs (@ 1Mb/s)
Inputs reading	+20% nominal value (word = 4914)	Power supply	24Vdc ±15% / 40mA max
Inputs protection	±80V max (10V input), ±26V max (20mA input)	Operative temp.	-20°C to 70°C
Accuracy	Precision: ±0.05% FS. Linearity: ±0.025% FS	Connections	Plug-in screw terminals 28÷12AWG / 2.5mm ²
Thermal drift	50 ppm/°C	Box	ABS with 35mm DIN rail mount / IP20
Temperature sensor	Internal NTC -20°C ÷ 80°C, res. 0.1°C, ±0.5°C	Max dimensions	113 x 17.5 x 119 mm (H x W x D)

Dimensions



Module configuration

To configure the Modbus communication parameters, refer to the “**EX_Modules-Configuration_EN.pdf**” document containing general and common information on the EX series.

The configuration of the type (**10V** or **20mA**) of analog input and analog output of each channel requires the setting of a **numerical coding** on the relative Holding Register.

The code can be written (even once because the value is stored permanently in the module) with the **Modbus-Tool** software or by integrating in the PLC application the necessary calls to the Modbus functions. There is also a **CoDeSys program** for configuring and testing the module with graphical visualization interface (EX04AIO_Configurator).

Each channel can be configured independently from the others by setting the value of a specific Holding Register with a numerical code:

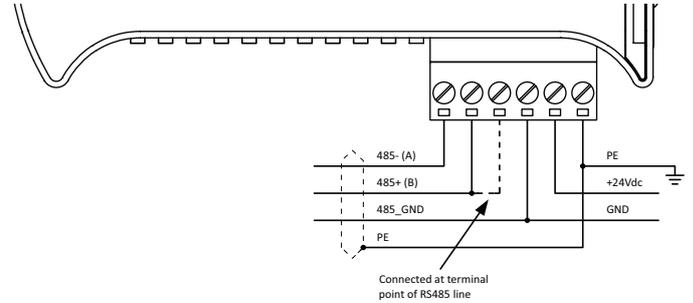
- **Code 0** disables input of channel
- **Code 1** configures input to **10V**
- **Code 2** configures input to **20mA**

For the analog input it is also possible to configure a **filter** obtained by the arithmetic mean of several readings. In this case a specific filter code must be added to the previous channel code:

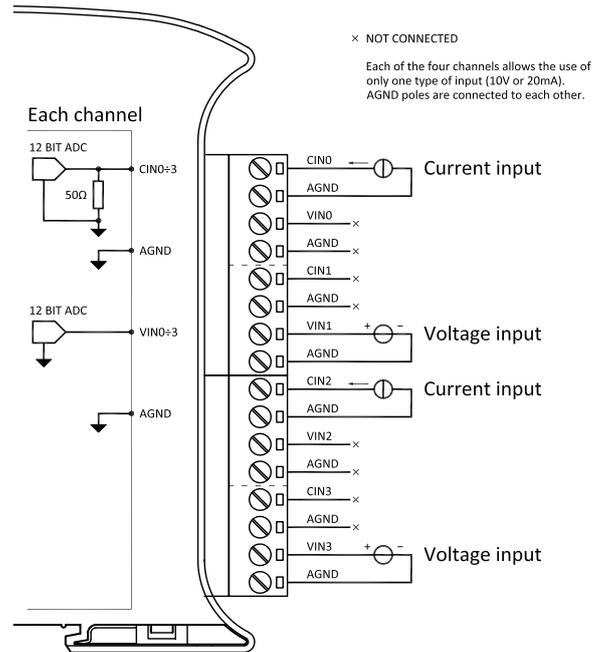
Code	Filter	Code	Filter	Code	Filter
16	10 ms	96	60 ms	176	150 ms
32	20 ms	112	70 ms	192	200 ms
48	30 ms	128	80 ms	208	250 ms
64	40 ms	144	90 ms	224	500ms
80	50 ms	160	100 ms	240	1 s

If nothing is added (Code = 0) for the input filter it is considered the **default (50ms)** value.

Power supply and RS485 fieldbus



Analog inputs

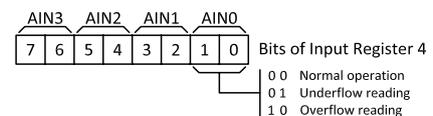


Modbus data model

The resources available in the module are mapped to Modbus data areas using the following format:

Address	Fun. codes	Description
Input Registers		
0 ÷ 3	4	Input words AIN0 ÷ AIN3
4	4	Errors of input channels
5	4	Internal temperature (x 0.1°C)
Holding Registers		
0 ÷ 3	3, 6, 16, 23	CH0 ÷ CH3 configuration words

The value of the Input Register with address 4 contains two flags for the **signaling error** of each of the 4 input channels:



Order codes	
EX04AIS	Modbus slave, 4 channels 12 bits analog inputs

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