



EX04AIO

EX04AIO

- ✓ I/O interface - remotable on RS485 fieldbus
- ✓ 4 analog input/output channels, 12 bits, isolated
- ✓ 10V / 20 mA configurable input and output
- ✓ Independent V / I selection for input and output
- ✓ Channels configurable separately from each other
- ✓ Input and output with high speed conversion
- ✓ I/O 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

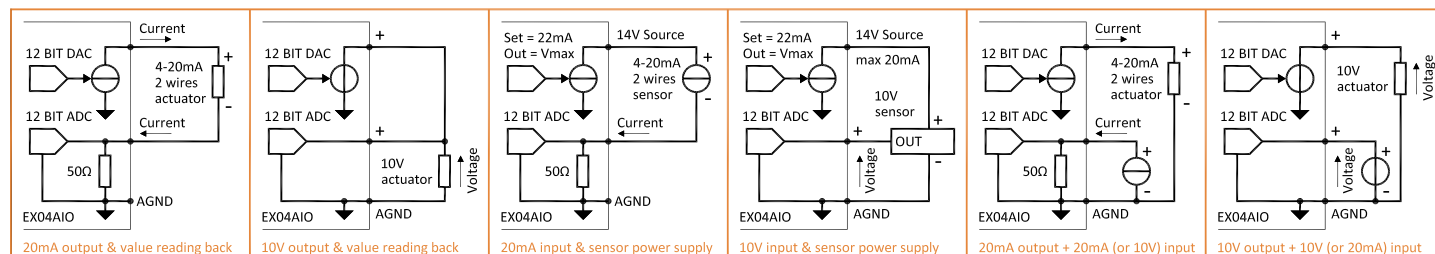
Compact module with 4 analog input/output channels, Modbus RTU protocol

The EX04AIO module is a flexible product that is suitable for all the needs of interfacing to analog sensors and actuators that use the 10V or 20mA standard.

Each of the four channels of the module have one analog input and one analog output and are independently configurable. The output does not require an external power supply because it provides a 10V voltage or 20mA current by its own internal source.

The arrangement of the connections simplifies the use of input for the verification of the correct value supplied by the output. However the input can also be used independently from the output.

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.



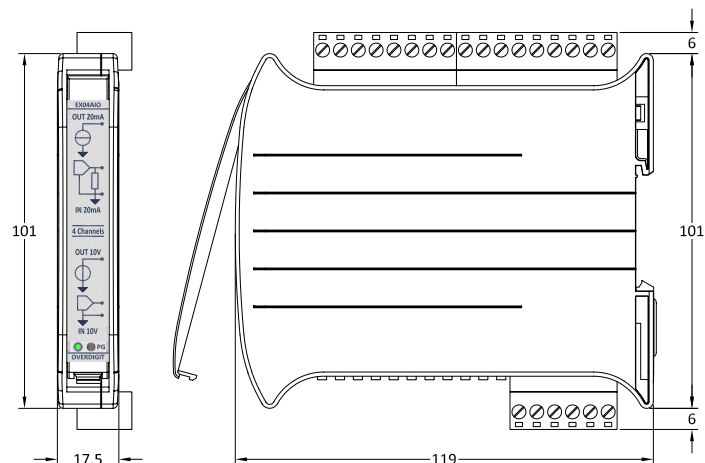
GENERAL SPECIFICATION

Analog channels	4 single-ended input and output channels	Thermal drift	50 ppm/°C
Isolation	1500Vac max (from bus and power supply)	Temperature sensor	Internal NTC -20°C ÷ 80°C, res. 0.1°C, ±0.5°C
Voltage input	0-10V, 12 bits, impedance > 100kΩ	Fieldbus	RS485 with EMI filter, thermal prot. / ESD 15kV
Current input	0-20mA, 12 bits, 50Ω shunt resistor	Max nodes / Termin.	64 / insertable 120Ω load
Inputs speed	Programmable filter from 10ms to 1s	Baudrate	300b/s ÷ 1Mb/s (continuously prog.)
Inputs reading	+20% nominal value (word = 4914)	Protocol	Modbus RTU, address 1 ÷ 247, parity N/O/E
Inputs protection	±80V max (10V input), ±26V max (20mA input)	Function codes	3, 4, 6, 16, 17, 23, 100, 101, 102, 109, 110
Voltage output	0-10V, 12 bits, min load 1kΩ (short-cir. 24mA)	Max performance	Complete I/O update within 600μs (@ 1Mb/s)
Current output	0-20mA, 12 bits, max load 600Ω (@ 4x20mA)	Power supply	24Vdc ±15% / 80mA ÷ 160mA max (@ 4x20mA)
Outputs speed	15ms (99% of final value)	Operative temp.	-20°C to 70°C
Outputs driving	+10% nominal value, 14.5V max on mA output	Connections	Plug-in screw terminals 28÷12AWG / 2.5mm²
Output protection	+26V max applied on 10V and 20mA outputs	Box	ABS with 35mm DIN rail mount / IP20
In/Out accuracy	Precision: ±0.05% FS. Linearity: ±0.025% FS	Max dimensions	113 x 17.5 x 119 mm (H x W x D)

EX04AIO

Analog I/O module with Modbus RTU protocol
Made in Italy

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. The least significant byte of the word configures the analog input while the most significant byte configures the analog output of the channel:

Channel code = 256 x (Output code) + (Input code)

- **Code 0 disables** input or output of channel
- **Code 1 configures** input or output to **10V**
- **Code 2 configures** input or output 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:

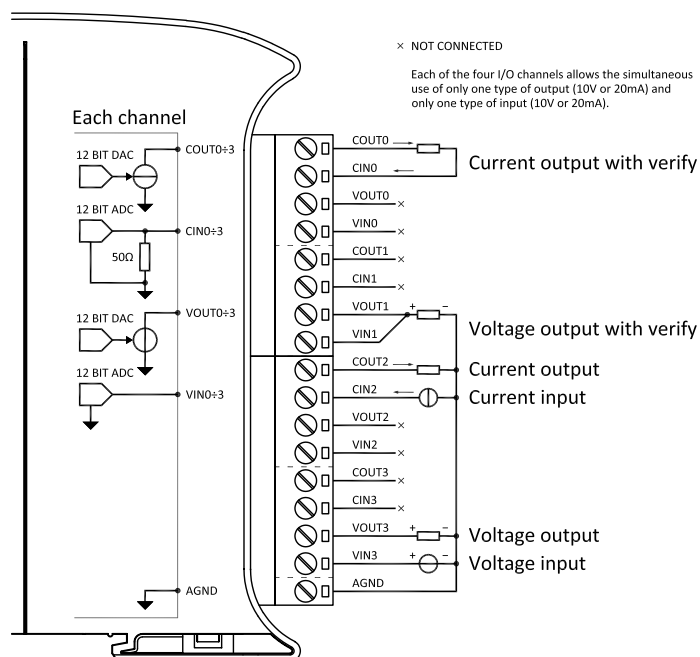
Code	Filter	Code	Filter	Code	Filter
16	10 ms	96	60 ms	176	150 ms
32	20 ms	112	70 ms	192	200 ms
48	30 ms	128	80 ms	208	250 ms
64	40 ms	144	90 ms	224	500ms
80	50 ms	160	100 ms	240	1 s

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

The analog output can also be used as **power source** for sensors applied to the input. It is preferable to use the current output because capable of saturating to about **14V** while the voltage output can reach up to 11V. For this purpose the output word must be forced to the value 4505 equivalent to +10% of the nominal value or at a higher value than the required maximum supply current of sensor.

Power supply and RS485 fieldbus

Analog inputs / outputs



Order codes

EX04AIO	Modbus slave, 4 channels 12 bits analog In/Out
----------------	--