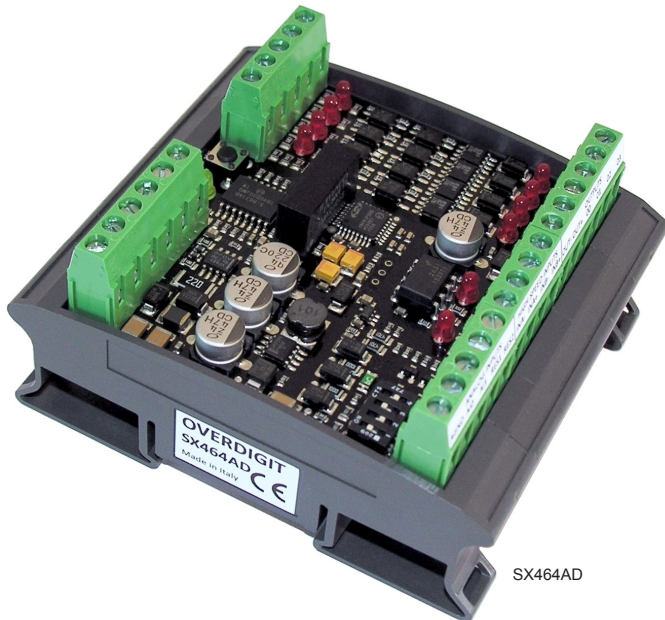


OVERDIGIT

Modbus I/O interfaces



SX464AD

SX464AD

- ✓ I/O interface - remotable on RS485 fieldbus
- ✓ 2 analog inputs, 12 bits, config. for 10V / 20mA
- ✓ 2 analog inputs, 12 bits, config. for thermoresistances
- ✓ 6 digital inputs, 24V PNP optoisolated (2 high speed)
- ✓ 4 digital outputs, 24V / 2A PNP optoisolated
- ✓ RS485 serial port with high speed (1Mb/s max)
- ✓ Modbus RTU protocol, configurable over RS485
- ✓ Security timer for communication supervisory
- ✓ CoDeSys libraries for configuration and use
- ✓ PC tool for configuring and testing modules
- ✓ Plastic support with DIN rail mounting

Interface with 4 analog in, 6 digital in, 4 digital out, Modbus RTU protocol

Interface module that satisfies, with a single product of small size, various necessities of digital and analog I/O.

The digital I/O are galvanically isolated and equipped with LEDs for status signalling.

Two of the inputs are high speed type and also manage counting functions of the rising/falling edges and pulses of AB encoder.

The static outputs, designed with high-current MOSFET, are fully protected against permanent short-circuit, over-voltage and over-temperature.

Programmable timer for forcing outputs in the inactive state in case of the communication fault.

Two of the analog inputs are individually configurable to read a voltage of 10V or a current of 20mA.

Two other analog inputs are individually configurable to read directly the temperature from standard resistive sensors such as 10kΩ NTC (linearised for five different curves), PT1000, KTY81 and KTY84.

Configurable over fieldbus with Modbus direct commands, function block of CoDeSys library and PC software.

Easy integration 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.

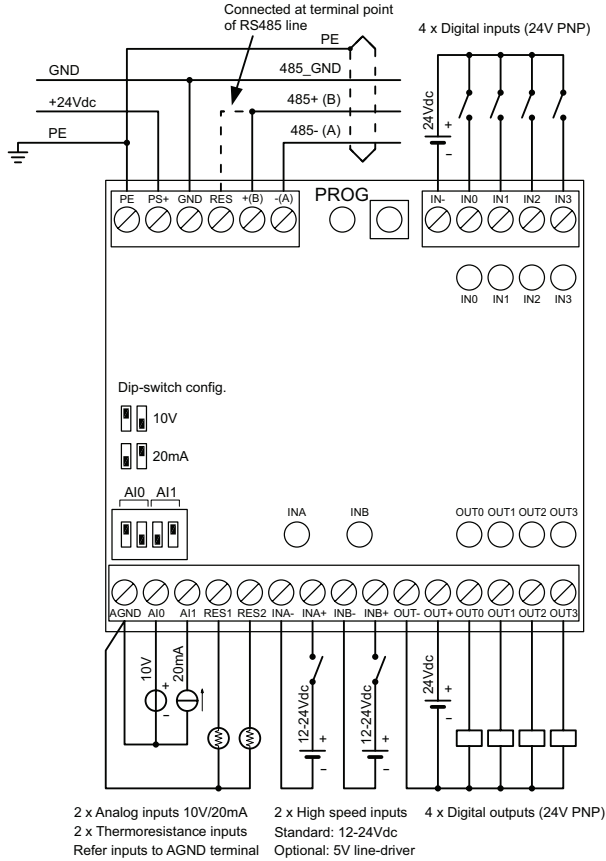
GENERAL SPECIFICATIONS

Analog channels	2 channels 10V / 20mA + 2 thermoresistances	Encoder counting	1 bidirectional AB with 32 bits, presettable
Isolation	1500Vac max (from bus and power supply)	Edges counting	4 monodir. with 32 bits (A/B rising/falling edges)
Resolution	12 bits	Digital outputs	4 outputs (24V PNP)
Voltage input	0-10V, impedance > 120kΩ	Max current	2A for channel (8A total)
Current input	0-20mA, 100Ω shunt resistor	Power supply	20 ÷ 30Vdc
Thermoresistances	10kΩ NTC (5 curves), PT1000, KTY81-1/2, KTY84	Isolation / Vmax	Optocoupled / 2000Vac
Acquisition time	Programmable filter from 10ms to 1s	Protection	Short / Over-voltage / Thermal
10V/20mA reading	Nominal 0-4095, Max +20% (word = 4914)	Fieldbus	RS485 (fully compliant to TIA/EIA-485A)
Temperature reading	Signed integer value of tenths of a degree	Max nodes / Termin.	64 / insertable 120Ω load
Temp. resolution (over entire range)	NTC: 0.1°C, PT1000: 0.5°C KTY81-1: 0.2°C, KTY81-2: 0.1°C, KTY84: 0.2°C	Baudrate	300b/s ÷ 1Mb/s (continuously prog.)
Inputs protection	±80V max (10V), ±26V max (20mA and resist.)	Protocol	Modbus RTU, address 1 ÷ 247, parity N/O/E
Accuracy	Precision: ±0.05% FS. Linearity: ±0.025% FS	Function codes	1, 2, 3, 4, 5, 6, 16, 17, 23, 100, 101, 102, 109, 110
Thermal drift	50 ppm/°C	Security timer	0 ÷ 600" (10ms step prog.)
Digital inputs	4 inputs (24V PNP) + 2 high speed inputs (12-24V)	Max performance	Complete I/O update within 500µs (@ 1Mb/s)
Impedance / Vmin	6.6kΩ / 10V	Power supply	24Vdc ±15% / 35mA max
Isolation / Vmax	Optocoupled / 2000Vac	Operative temp.	-20°C to 70°C
Filtering	0 ÷ 100ms (10ms step prog.)	Connections	Screw terminals for 28+12AWG / 2.5mm ² cables
High speed inputs	12KHz max frequency, individually isolated	Support	ABS with 35mm DIN rail mount
		Max dimensions	90 x 80 x 66 mm (H x W x D)

web-plc.com
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SX464AD
Analog/Digital interface with Modbus RTU protocol
Made in Italy

Module connections

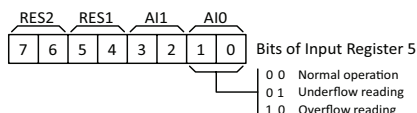


Modbus data model

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

Address	Fun. codes	Description
Discrete Inputs		
0 ÷ 5	2	Input bits IN0 ÷ IN3, INA, INB
Coils		
0 ÷ 3	1, 5, 15	Output bits OUT0 ÷ OUT3
Input Registers		
0	4	IN0 ÷ IN3, INA, INB inputs word
1 ÷ 4	4	Input words AI0 ÷ AI1, RES1, RES2
5	4	Errors of analog input channels
Holding Registers		
0	3, 6, 16, 23	OUT0 ÷ OUT3 outputs word
1	3, 6, 16, 23	Digital In filter 0 ÷ 10 (x10ms) 0=No
2 ÷ 5	3, 6, 16, 23	AI0 ÷ AI1, RES1, RES2 config. words
6 ÷ 7	3, 6, 16, 23	AB encoder value (signed dword)
8 ÷ 9	3, 6, 16, 23	Counting of A rising edges (dword)
10 ÷ 11	3, 6, 16, 23	Counting of A falling edges (dword)
12 ÷ 13	3, 6, 16, 23	Counting of B rising edges (dword)
14 ÷ 15	3, 6, 16, 23	Counting of B falling edges (dword)

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



The **two digital inputs A and B** of SX464AD module also manage the counting functions using 5 values of Dword type.

The first counter is **bidirectional** and it increments/decrements according to the two **quadrature signals A and B**. The other four are monodirectional and count the number of **rising/falling edges** of the single signals A and B. All the counters can be forced to zero or to a preset by writing the registers.

NOTE: all the high speed counters have no permanent memory and are always reset to zero when the module is powered up.

Module configuration

The modules of “**SX series**” are fully compatible with the “**EX series**” modules. All the functional features and programming mode remain unchanged from the EX series to which reference is made for further documentation.

The SX464AD module has **2 analog inputs** configurable at **10V** or **20mA**. The configuration of each channel requires the setting of the two **dip-switches** and the writing of a **numerical coding** on the relative Holding Register (addresses 2 and 3):

Code	Input	Input Register (add. 1 and 2) reading
0	Disabled	The reading returns Word = 0
1	10V	Word: 0=0V, 4095=10V, 4914=12V
2	20mA	Word: 0=0mA, 4095=20mA, 4914=24mA

The module also has **2 analog inputs** for thermoresistance reading. The configuration of each channel requires the writing of a **numerical code** on the relative Holding Register (addresses 4 and 5):

Code	Input	Input Register (add. 3 and 4) reading
0	Disabled	The reading returns Word = 0
1	10kΩ NTC	3435 curve, Word: -400=-40°C, 1500=150°C
2	10kΩ NTC	3610 curve, Word: -400=-40°C, 1500=150°C
3	10kΩ NTC	3960 curve, Word: -400=-40°C, 1550=155°C
4	10kΩ NTC	3977 curve, Word: -400=-40°C, 1500=150°C
5	10kΩ NTC	3984 curve, Word: -400=-40°C, 1500=150°C
6	PT1000	Word: -2000=-200°C, 8500=850°C
7	KTY81-1	Word: -550=-55°C, 1500=150°C
8	KTY81-2	Word: -550=-55°C, 1500=150°C
9	KTY84	Word: -400=-40°C, 3000=300°C

For all four 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 it is considered the **default (50ms)**.

Order codes	
SX464AD	Modbus slave, 4 analog In, 6 digital In, 4 digital Out

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