

Model xP4

Installation Manual
20/01 - Code:ISTR_I_xP4_E_01_--

Installation Manual

Contents

- General description
- Accessories
- Installation
- Electrical connections
- Electric safety

Modbus I/O expansion module Model xP4

8 AI configurable for:

- Pt1000
- NTC Semitec 103AT-2

4 AI configurable for:

- mA linear inputs
- V linear inputs

2 AO 0... 10 V only

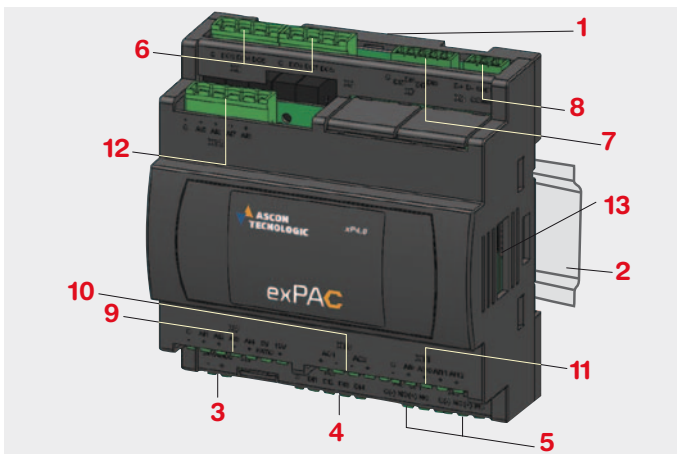
8 DI free of voltage

2 SPDT 5 A Relays

6 SPST-NO 2 A Relays



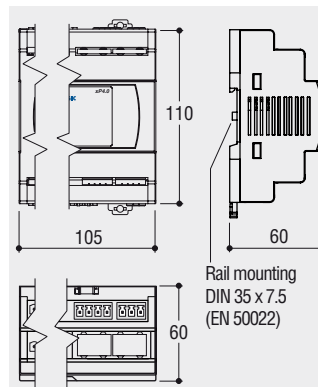
General description



- 1 Model identification label (on the back side of the module);
- 2 DIN RAIL 35 x 7.5 (EN50022);
- 3 X1 24 Vdc Power Supply plug;
- 4 X2 DI1... DI4 for free of voltage contacts;
- 5 X3 OP1 Digital Output SPDT 5 A 250 V relay (resistive load);
- 6 X4 OP2 Digital Output SPDT 5 A 250 V relay (resistive load);
- 7 X5 DO3... DO5 Digital Output SPST 2 A 250 V relays (resistive load);
- 8 X6 DO6... DO8 Digital Output SPST 2 A 250 V relays (resistive load);
- 9 X7 DI5... DI8 for free of voltage contacts or 12... 42.4 Vac/48 Vdc for NEC class 2 source;
- 10 X8 COM1 connector for RS485 communications;
- 11 X9 AI1... AI4 analogue inputs (and +5; +12 Vdc probes power supply);
- 12 X10 AO1... AO2 analogue outputs: 0... 10 V;
- 13 X11 AI9... AI12 analogue inputs for NTC/PT1000 probes;
- 14 X12 AI5... AI8 analogue inputs for NTC/PT1000 probes;
- 15 DIP switches to configure the COM1 Serial Communications port (inside the case).

Installation

Dimensions (mm)



Operating conditions

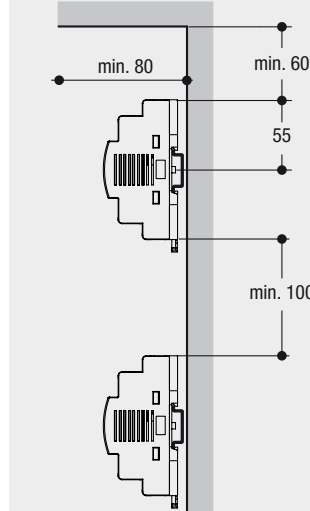
Environmental condition	ΔC _{CE}	Suggestion
Operating conditions	Temperature -20...+50°C %Rh Rh: 5... 95% non condensing	
Special conditions	Temperature > 50°C %Rh > 95% RH Conducting atmosphere Corrosive atmosphere	Use forced ventilation Warm up Use filter
Forbidden conditions	Explosive atmosphere	

For indoor use only, max. usage altitude: 2000 m on the sea level.

Mounting position

- Mount the module vertically;
- In order to help the air ventilation flow, respect the distances between modules and walls or other modules.

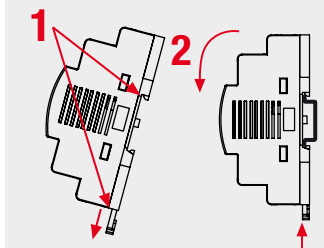
Mounting position (mm)



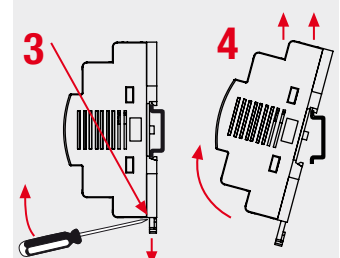
Mounting/removing the modules on/from the DIN rail

- 1 Open the 2 spring slides on the lower part of the CPU, clip the upper part of the module to the rail;
- 2 Rotate the module downwards, then close the 2 spring slides;
- 3 Switch OFF the Power Supply. Lower the spring slide by inserting a flat-blade screwdriver as indicated;
- 4 Turn and lift the module upwards to remove the CPU from the DIN rail.

Mounting the module



Removing the module



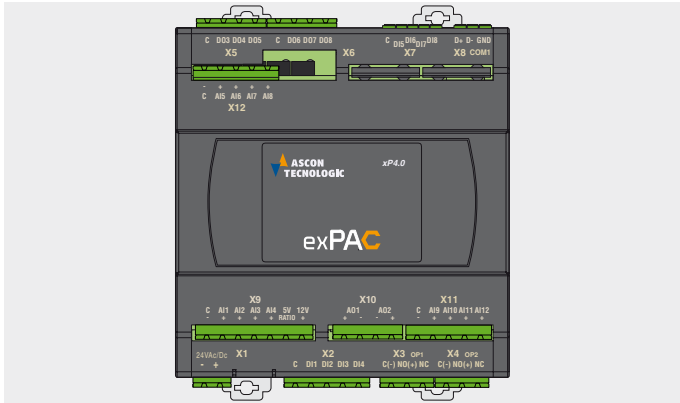
Disposal



The appliance (or the product) must be disposed of separately in compliance with the local standards in force on waste disposal.

Electrical connections

Terminals connections and plugs



Conn.	Label	Signals
X1	Supply	0 V Power Supply
	24 Vdc	+24 V Power Supply
X2	M	Common pole
	DI1... DI4	Digital inputs 1... 4
X3 OP1	C (-)	Common pole
	NO (+)	NO contact pole
	NC	NC contact pole
X4 OP2	C (-)	Common pole
	NO (+)	NO contact pole
	NC	NC contact pole

Conn.	Label	Signals
X9	C -	Common pole
	AI1... AI4 +	mA/V analog input channels
	5V RATIO	5 V power for ratiometric inputs
	12V	12 V power for passive transmitters
X10	A01 +	0... 10V
	A01 -	A01 negative pole
	A02 +	0... 10V
	A02 -	A02 negative pole

Description	Plugs of all terminals
Flexible cable section:	Pitch 5 mm: 0.2... 2.5 mm ² (AWG24... AWG12) Pitch 3.5 mm: 0.14... 1.5 mm ² (AWG28... AWG16)
Stripped wire	Screw: 7mm
Flat blade screwdriver	Pitch 5 mm: 0.6 x 3.5 mm Pitch 3.5 mm: 0.4 x 2.5 mm
Tightening torque	Pitch 5 mm: 0.5... 0.6 Nm Pitch 3.5 mm: 0.22... 0.25 Nm

Technical data:

- The green terminals are male connectors (pitch 3.5 or 5 mm), the correspondent female connectors have screw or spring terminals for connecting the wires;
- Made with self extinguishing material as required by UL94 V0 standard;
- Overvoltage category/pollution degree II/2;
- Max. load current/section 8A/2.5mm² at 65°C;
- Test pulse voltage: 4 kVp.

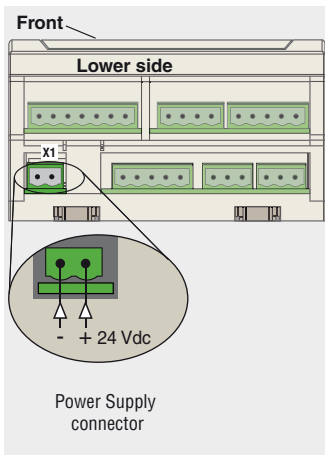
⚠ Make sure that the overall current absorption (modules and field devices) matches the power supply;

⚠ In order to avoid excessive voltage drops, install the most power consuming modules closer to the power supply.

Conn.	Label	Signals
X5	C	Common pole
	DO3... DO5	SPST NO pole
X6	C	Common pole
	DO6... DO8	SPST NO pole
X7	C	Common pole
	DI5... DI8	Digital Input pole
X8	D+	COM1-RS485
	D-	
	GND	

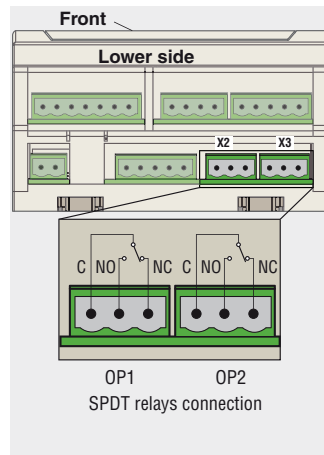
Conn.	Label	Signals
X11	C -	Common pole
	AI9... AI12 +	NTC/Pt1000 analogue inputs
X12	C -	Common pole
	AI5... AI8 +	NTC/Pt1000 analogue inputs

X1 - Power supply



- Connector **X1**: 24 Vdc (±10%), 5.5 W max..

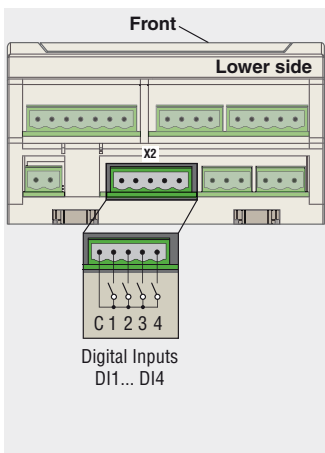
X3, X4 - Digital outputs OP1... OP2: SPDT Relays



Relays:

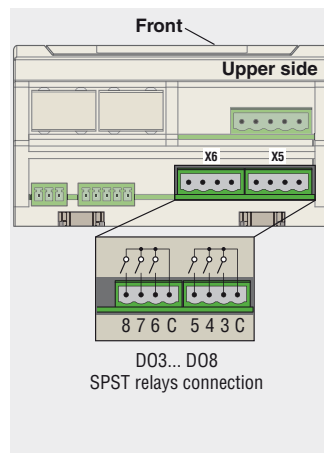
- Rate: 5 A (for resistive loads).

X2 - Digital Inputs DI1... DI4 Connections



- Example of connection of DI1... DI4 Digital Inputs.

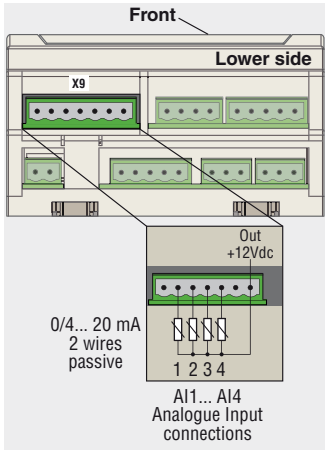
X5, X6 - Digital Outputs DO3... DO8: SPST Relays



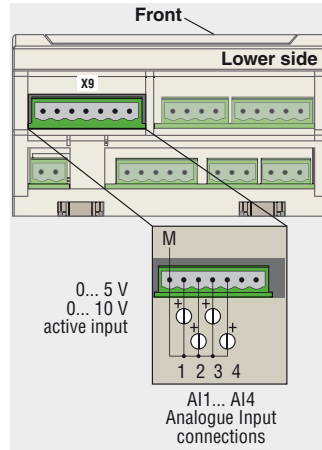
Relays:

- Rate: 2 A; 250V (for resistive loads).

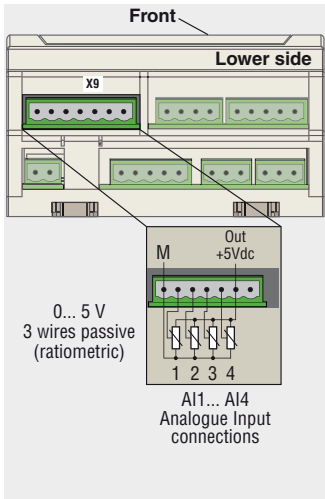
X9 - AI1... AI4 Analogue Input connections



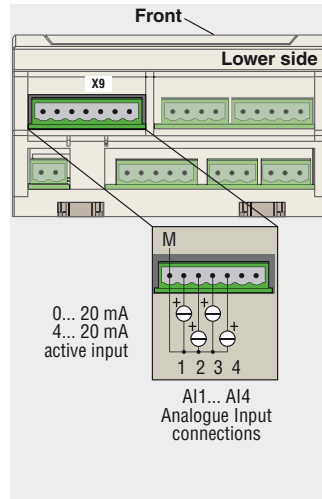
- For the analogue input, respect the polarity shown;
- Pay attention to connect the power source to each external sensor;
- Type: 4... 20 mA passive 2 wires;
- Resolution: 12 bit;
- Accuracy: 0.1% of span;
- Input impedance: >100 k Ω (mA/V).



- For the analogue input, respect the polarity shown;
- Type: 0... 5 V, 0... 10 V active analogue inputs;
- Resolution: 12 bit;
- Accuracy: 0.1% of span;
- Input impedance: >100 k Ω (mA/V).

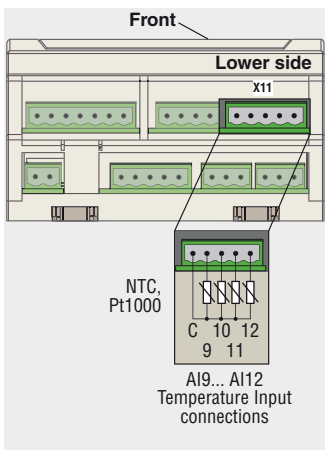


- For the analogue input, respect the polarity shown;
- Pay attention to connect the power source to each external sensor;
- Type: 0... 5 V (ratiometric) passive 3 wires;
- Resolution: 12 bit;
- Accuracy: 0.1% of span;
- Input impedance: >100 k Ω (mA/V).



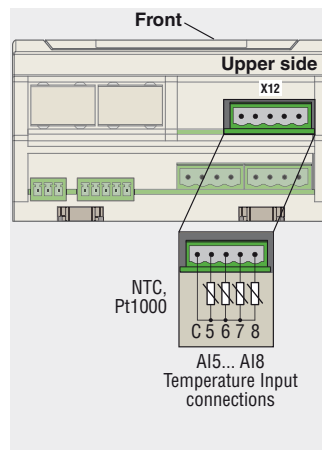
- For the analogue input, respect the polarity shown;
- Type: 0/4... 20 mA active analogue inputs;
- Resolution: 12 bit;
- Accuracy: 0.1% of span;
- Input impedance: >100 k Ω (mA/V).

X11 - AI9... AI12 Temperature Input connections



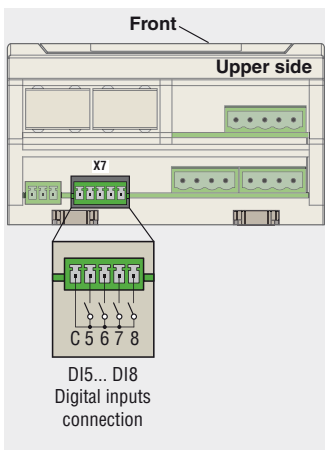
- For the temperature input, respect the polarity shown;
- NTC, PT1000;
- Resolution: 12 bit;
- Accuracy: 0.3% (PT1000), 0.5% (NTC);
- Input impedance: >1 M Ω .

X12 - AI5... AI8 Temperature Input connections



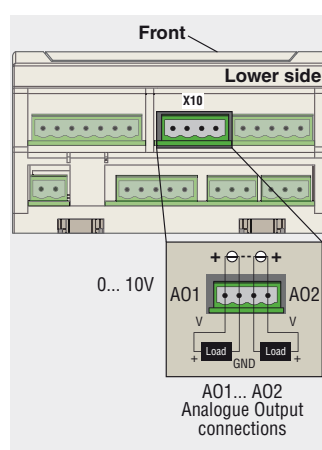
- For the temperature input, respect the polarity shown;
- NTC, PT1000;
- Resolution: 12 bit;
- Accuracy: 0.3% (PT1000), 0.5% (NTC);
- Input impedance: >1 M Ω .

X7 - Digital Inputs DI5... DI8 Connections



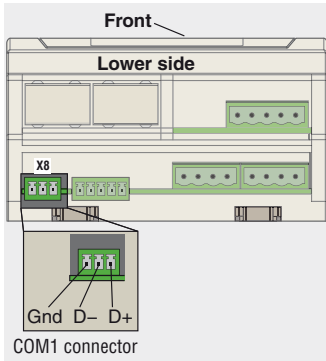
- Example of connection of DI5... DI8 Digital Inputs.

X10 - AO1... AO2 Current Analogue Output Connections



- Respect the polarity shown;
- Type: 0... 10 V;
- Load: > 1 k Ω ;
- Resolution: 12 bit;
- Accuracy: 0.3%.

X8 - COM1 RS485 Serial Communication Port



- RS485 communications port with Modbus protocol (slave);
- Isolation from Main electronics: always 800 V.
- RS485 line settings can be configured using the specific DIP switches:

SW	Description	Default
1	Node address bit 0	ON
2	Node address bit 1	ON
3	Node address bit 2	ON
4	Node address bit 3	ON
5	Node address bit 4	ON
6	Baud rate bit 0	ON
7	Baud rate bit 1	ON
8	Protocol	OFF

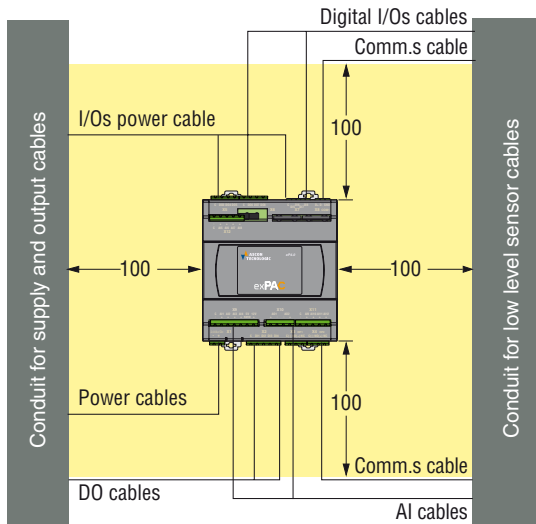
⚠ The DIP Switches bank is located on the internal lower right side of the case. To change the default configuration, open the case or operate through the ventilation holes.

SW8	SW7	SW6	Protocol	Baud Rate
OFF	OFF	OFF	Modbus	9.6 kbps
OFF	OFF	ON		19.2 kbps
OFF	ON	OFF		38.4 kbps
OFF	ON	ON	Reserved	57.2 kbps
ON	OFF	OFF		Reserved
ON	OFF	ON		
ON	ON	OFF		
ON	ON	ON		

SW5	SW4	SW3	SW2	SW1	Node Address
OFF	OFF	OFF	OFF	OFF	Reserved
OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	ON	ON	3
OFF	OFF	ON	OFF	OFF	4
OFF	OFF	ON	OFF	ON	5
OFF	OFF	ON	ON	OFF	6
OFF	OFF	ON	ON	ON	7
OFF	ON	OFF	OFF	OFF	8
OFF	ON	OFF	OFF	ON	9
OFF	ON	OFF	ON	OFF	10
OFF	ON	OFF	ON	ON	11
OFF	ON	ON	OFF	ON	12
OFF	ON	ON	OFF	OFF	13
OFF	ON	ON	ON	ON	14
OFF	ON	ON	ON	OFF	15
ON	OFF	OFF	OFF	ON	16
ON	OFF	OFF	OFF	ON	17
ON	OFF	OFF	ON	OFF	18
ON	OFF	OFF	ON	ON	19
ON	OFF	ON	OFF	OFF	20

SW5	SW4	SW3	SW2	SW1	Node Address
ON	OFF	ON	OFF	ON	21
ON	OFF	ON	ON	ON	22
ON	OFF	ON	ON	OFF	23
ON	ON	OFF	OFF	ON	24
ON	ON	OFF	OFF	OFF	25
ON	ON	OFF	ON	ON	26
ON	ON	OFF	ON	ON	27
ON	ON	ON	OFF	OFF	28
ON	ON	ON	OFF	ON	29
ON	ON	ON	ON	OFF	30
ON	ON	ON	ON	ON	31

Suggested wires routing



⚠ Despite the fact that the instrument has been designed to work in an harsh and noisy environment, it is strongly recommended to follow the following suggestions.

All the wiring must comply with the local regulations.

The supply wiring should be routed away from the power cables. Avoid to use electromagnetic contactors, power relays and high power motors nearby.

Avoid power units nearby, especially if controlled in phase angle. Keep the low level sensor input wires away from the power lines and the output cables.

Power lines and output cables must also be at **100 mm** (min.) away from the CPU. If this is not achievable, use shielded cables on the sensor inputs, with the shield connected to earth at one side only.



Warning!

Whenever a failure or a malfunction of the device may cause dangerous situations for persons, things or animals, please remember that the plant must be equipped with additional devices which will guarantee safety.

How to order

xP4 = Expansion Module for PAC CPUs

A: Display

- = No Display

B: Optional Digital Outputs

- = None

R = 6 Relays SPST 2A + 2 Relays SPDT 8A

C: Analogue Inputs

- = None

4 = 4 High Level Analogue Inputs

8 = 8 Temperature Analogue Inputs

F = 4 High Level + 8 Temperature Analogue Inputs

D: Analogue Outputs

- = None

2 = 2 not isolated 0... 10 V Analogue Outputs

E: Digital Inputs

-- = None

8- = 8 free of voltage

8L = 4 free of voltage + 4 voltage 12... 48 Vdc

F: Field bus

M = ModBus RTU Slave

G: Communications Interface

4I = Isolated RS485

H: Case and Packaging

G = Grey case + AT package

W = White case + AT package

XP4 - M 4I