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Dimensions (mm)



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)



Disposal



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

model sP4/sP8

M.I. sP4/sP8-01/20.09 Cod. ISTR_I_sP-LS_E_01_--

Installation Manual

Contents

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

Integrated system, CPU module with on-board I/O





Installation

Wiring rules Plugs of all terminals Description 0.2... 2.5 mm² (AWG24... AWG12) Pitch 5 mm Flexible cable section: Pitch 3.5 mm: 0.14... 1.5 mm² (AWG28... AWG16) Stripped wire Screw: 7mm Flat blade Pitch 5 mm: 0.6 x 3.5 mm screwdriver Pitch 3.5 mm: 0.4 x 2.5 mm Tightening Pitch 5 mm: 0.5... 0.6 Nm € Pitch 3.5 mm: 0.22... 0.25 Nm torque

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 cathegory/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.





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.

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 power lines and 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 only one side.



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.

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; Switch OFF the Power Supply. 3 Lower the spring slide by inserting a flat-blade screwdriver as indicated;

DIN rail Placing

4 Turn and lift the module upwards to remove the CPU from the DIN rail.

Mounting the module



Removing the module



Operating conditions

Environme	Suggestion		
Operating conditions	‡ ℃	Temperature -20+50°C	
	%Rh	Rh: 5 95% non condensing	
Special conditions	₽ c	Temperature > 50°C	Use forced ventilation
	%Rh	> 95% RH	Warm up
	22) 22)	Conducting atmosphere	Use filter
Forbidden conditions	W.	Corrosive atmosphere	
	*	Explosive atmosphere	

- For indoor use only. - Max. usage altitude: 2000 m on the sea level.

Electrical connections

Terminals connections and plugs

Warning!

In the tables that follow, are listed and briefly described all the terminals present on the PAC systems (sP4 and sP8).

The different Relay options (SPST-NO relay, SSR or SSR drive output for OP1... OP4 and OP6... OP9 Outputs) must be ordered as omogeneous in group of two (e.g.: When OP1 is ordered as SPST-NO relay, OP2 must be the same; if an SSR drive output is required it will be placed in a different output block). The other I/O can be freely ordered (except for the Strain Gauge input that has a fixed position as Input IN1 at connector X1 and PWM/Frequency Output that cannot be on Connector X17 outputs).



Conn.	Label	Connection	Signals
¥1		-	0 Vdc Power Supply
	1 111 24 1	+	+24 Vdc Power Supply
v 2	0.05	С	OP5 common
^2	UFJ	0P5	SPST NO relay (5 A)
		С	OP1, OP2 common
v 2		0P1/0P2	SPST-NO (2 A)/SSR (0.3 A)/SSR drive
^3	0F1 0F4	С	OP3, OP4 common
		0P3/0P4	SPST-NO (2 A)/SSR (0.3 A)/SSR drive
VA	800 100	24V	Power Supply source for Digital Outupt +24 Vdc 1.7 A max.
^4	DOT DOO	D01 D08	Digital Output 1 8 (Sync type 24 V, 200 mA max.)
¥5		24V	+24 Vdc Digital Inputs Power Supply
~5	DTT DI0	DI1 DI8	24 Vdc Digital Input 1 8 (EN61131 - type 1, 2 and 3)
VG	0T1 0T4	С	Generic Outputs 1 4 Common Terminal
~0		0T1 0T4	Generic Output 1 4 (V, mA, PWM/Frequency or 12 Vdc DO)
¥7	CN1 CN4	C	Special Inputs 1 4 Common Terminal
~′		CN1 CN4	Pulse Counter, Frequency Meter or Digital Input 1 4
	V	-	Power Supply source for IN1 IN4 Analogue Inputs
		+	(5 Vdc, 50 mA or 12 Vdc, 100 mA)
XR	IN1	-	Generic Input 1 terminals (DI, mA, TC, Pt100, Pt1000, NTC,
		+	Potentiometer, Ratiometric, Voltage and Strain Gauge)
	IN2 IN4	-	Generic Input 2 4 terminals (DI, mA, TC, Pt100, Pt1000,
		+	NTC, Potentiometer, Ratiometric, Voltage)
	LIN	-	External Display Power Supply, Negative Pole
X9		D	External Display Data Line
		+	External Display Power Supply, Positive Pole
X10	USB		MicroUSB type port
X11	ETHERNET		RJ45 10/100 Ethernet port
	СОМ	D-	
X12		D+	RS485 Serial Port
		C	

All the connectors and terminals described in the table that follows can be found only on the sP8 model.

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Sytem Pushbutton and Status LEDs



- The 5 Status LEDs are: COM (green), USB (white), MSG (RED), RUN (green) and

- PWR (blue). The meaning of the various LEDs
- behaviours are fully described in the "sP4/sP8 User Manual".

The system pushbutton performs different operations accorndingly to the system status but does not restart the CPU or the 1131 application.



Conn.	Label	Connection	Signals	
X13	OP10	С	Common teminal	
		NC	NC terminal of SPDT relay (5 A)	
		NO	NO terminal of SPDT relay (5 A)	
	OP6 OP9	С	OP6, OP7 common terminal	
¥14		0P6, 0P7	SPST-NO (2 A)/SSR (0.3 A)	
A14		С	OP8, OP9 common terminal	
		0P8, 0P9	SPST-NO (2 A)/SSR (0.3 A)	
VIE	D09 D016	24V	Power Supply source for Digital Outupt +24 Vdc 1.7 A m	
XI3		D09 D016	Digital Outputs 9 16 (Sync type 24 Vdc, 200 mA max.)	
X16	DI9 DI16	24V	+24 Vdc Digital Inputs Power Supply	
		DI9 DI16	Digital Input 9 16 (EN61131 - type 1, 2 and 3)	
X17	0T5 0T8	С	Generic Outputs 5 8 Common Terminal	
		OT5 OT8	Generic Outputs 5 8 (V, mA or 12 Vdc DO)	
	V	-	Power Supply source for IN5 IN8 Inputs	
X18		+	(12 Vdc, 100 mA)	
	IN5 IN8	-	Generic Input 5 8 terminals (DI, mA, TC, Pt100, Pt1000,	
		+	NTC, Potentiometer, Ratiometric, Voltage)	

On both the PAC systems are present, near the X12 COM Connector, a block with 4 microswitches (POL+, POL-, NONE and TERM) decribed later in this manual and, under the microswitches block, 5 diagnostic LEDs (COM, USB, MSG, RUN, PWR) fully described in the sPx User Guide.



- Connector X1: 24 Vdc (-10... +15%);
- Device power consumption:
- 10 W max. (SP4); 15 W max. (SP8).

X09, X10, X11 - USB port + Ethernet + LIN Port

X13 - COM1 RS485 Serial Communications Port

Upper side

1.1

C D- D+ • • • **RS485 COM1**

connector



Front

SW1 X12

• • •

TERN POL+

DIP switches DIP switch settings

- The LIN Port allows to connect a digital display through a dedicated cable;
- µUSB type AB port (X11) to connect a flash drive (Firmware, system files upload/download or data logging).
- The Ethernet connection is made through a standard RJ45 connector, the 2 green LEDs in the Ethernet connector show the port status and the communication traffic.

X8 - IN1... IN4 Analogue Input Connections

Front Lower side ********* IN3 - + IN4 IN1 IN2 IN1 Strain 5 V for Gauge input Strain Gauge input 35

- Respect the polarity shown; Pay attention to correctly connect

- the power source (5/12 Vdc); When the Strain Gauge or the Ratiometric Inputs are chosen the V+ terminal supplies the 5 Vdc nec-
- essary to power the inputs; Type: Strain Gauge (IN1), Ratiometric, 0/4... 20 mA, 0/1... 5 V, 0/2... 10 V, T/c (J, K, L, N, R, S, T) PT100 (2
- wires), PT1000, NTC, Potentiometer; Resolution: 16 bit;
- Accuracy: 0.5% of span (linear inputs), 0.5% (temp.) ±1°C (cold junction);
- Input impedance: 120 k Ω (V), <200 Ω (mA).
- Verify the option ordered for ∕? IN1... IN4 Inputs.

V IN1 IN2 IN3 IN4

TC Inputs
TC Inputs
TC Inputs



PT100/PT1000 2 wires Inputs

IN3



- PLC can connect a fieldbus network; Isolation from Main electronics: 800 V (optional).
- The line settings can be configured using the specific DIP switches:

SW	Description	Default	
1	110 Ω line termination OFF		
2	Not used		
3	Line polarization Pull-Down	OFF	
4	Line polarization Pull-Up	OFF	

Ń 12 < 0... 5 Vdc Ratiometric Inputs 3 wires IN1 IN2 IN3 IN4

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IN1 IN2 IN3

+12 V	7	3 ¹ [3 ² [33	4 3 4
 00.					

. 20 mA, 2 wires passive Transmitter

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NTC Inputs

V IN1 IN2 IN3 IN4

IN3

IN1 IN2

4... 20 mA Active Transmitter V IN1 IN2 IN3 IN4 Ø Φ 0/1/2... 5/10 V Active Transmitter

Potentiometer Inputs

X4 - DO1... DO8 Digital Outputs Connections

- The 8 digital output loads must not exceed 0.2 A each;
- In the drawing are connected only 2 outputs as an example (DO3 and DO6);
- The load circuit is closed by the System positive (+) pole (connector X1).



- DI1... DI8 connection example;
 - The input circuit is internally closed to the System negative (-) pole (connector X1).

X7 - CN1... CN4 Special Inputs Connections



In the drawing are connected only 2 counter inputs as an example (CN2 and CN4).

- Frequency meter input:
- The channels can manage up to 10 kHz signals having a duty-cycle that guarantees minimum of ON signal of 20 µs;
- Impulse counter input:
- The minimum time of an impluse must be 20 μ s
- **Digital input:**
- The input circuit is internally closed to the System negative (-) pole (connector X1).

Verify the option ordered for CN1... CN4 Inputs.

Front Upper side ******* ШT 24V D02 D04 D06 D08 D01 D03 D05 D07 24V ****** .OAD . Ad D02 D05 Digital Outputs DO1... DO8

X6 - OT1... OT4 Generic Output Connections



- Respect the polarity shown;
- Resolution: 14 bit;
- Accuracy: 0.1%;
- In the drawing are connected only 2 outputs as an example (OT3 and OT4).
- 0/4... 20 mA analogue output:
 - Type: 0/4... 20 mA;
 Load: < 500 Ω;
- 0/1... 5 V, 0/2... 10 V analogue output:
- Type: 0/1... 5 V, 0/2... 10 V; Load: > 1 kΩ.
- Digital output:
- Output voltage: 12 V;
 - Max. supplied current: 10 mA.

Verify the option ordered for OT1... OT4 Outputs.

X6 - OT1... OT4 PWM/Frequency Output Connections



- Respect the polarity shown;
 Output range: 0.1... 200000 Hz;
 Max. Output load: 10 mA;
- PWM Output:
 - 0.1... 500 Hz selectable dutycycle with 0.1% accuracy,
 - 0.5... 3 kHz selectable duty-cycle with 1% accuracy,
- Frequency Output:
 - 3... 10 kHz duty-cycle: fixed at 50%.

Verify the option ordered for OT1... OT4 Outputs.

X14 - OP6... OP9 SPST Relays

The connection characteristics are the

same described for the "X3 - OP1 ... OP4

X15 - DO9... DO16 Outputs

The connection characteristics are the

same described for the "X4 - D01 ...

X16 - DI9... DI16 Inputs

The connection characteristics are the

same described for the "X5 - DI1 ...

DI8 Digital Inputs Connections".

DO8 Digital Outputs Connections".

Outputs Connections" except for the

SPST-NO Relays/SSR/SSR drives

fact that cannot be SSR drives.

Connections that can be present on the sP8 System

X13 - OP10 SPDT Relay (5A)



SPDT Relay:

- Rate: 5 A (for resistive loads);
- Isolation: 3 kV rms between the channel and Main electronics.

X17 - OT5... OT8 Generic Outputs

The connection characteristics are the same described for the "*X6 - 0T1... 0T4 Generic Output Connections*" except for the fact that cannot be **PWM/Frequency outputs**.

X18 - IN5... IN8 Analogue Inputs

The connection characteristics are the same described for the "*X8 - IN1... IN4 Analogue Input Connections*" except for the V terminal that, in this connector, gives only 12 Vdc and IN1 that does not accept the Strain Gauge sensor.

Front Lower side

SSR

LOAD

5

Fuse

LOAD

5

Voltage output 0/12 Vdc;
 Respect the polarity shown;

SSR drives:

- Output not isolated.

and main electronics.

X2 - OP5 SPST-NO 5 A Relay Output Connections

X3 - OP1... OP4 SPST-NO Relays/SSR/SSR drives Outputs Connections

Rate: 5 A (for resistive loads);
Isolation: 3 kV rms between the channel and Main electronics;

- The Output terminals are: OP1... OP4

of connector X3 (see "Terminals

All these type of outputs are pro-

Rate: 2 A (for resistive loads);

channel and Main electronics.

tected with varistors.

Relays:

SSR

connections and plugs" for details);

Isolation: 3 kV rms between each

- Rate: 0.3 A, 250 Vac or 2 A, 24 Vdc;

Zero Crossing Function (Vac type);

Isolation: 2500V between channel

This output is protected with a varistor

Note: Whatever in red refers to the sP8 only!



