

mod. IO-CB

M.I. IOA-CB-3/19.03
Cod.: ISTR-MI-S2-CBANA-ENG

Installation Manual

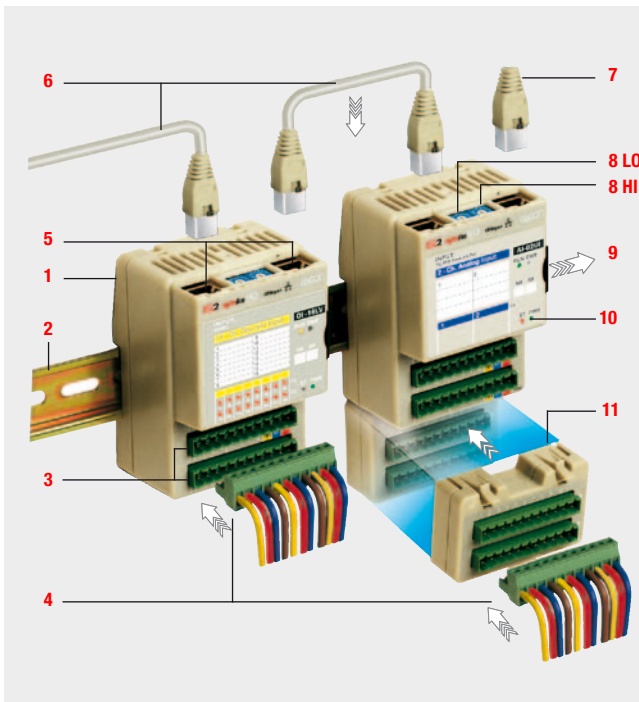
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- Accessories
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- Electric safety

CANopen Analogue I/O Modules

IO-CB/AI-02UI:	2 Isolated Analogue Inputs
IO-CB/AI-04RT:	4 Configurable Analogue Inputs
IO-CB/AI-08DP:	8 Voltage Analogue Inputs
IO-CB/AI-08HL:	8 Configurable Analogue Inputs
IO-CB/AI-08TC:	8 Thermocouple Analogue Inputs
IO-CB/AO-08DP:	8 Dual Polarity Output Channels
IO-CB/AO-08HL:	8 High Level Analogue Inputs

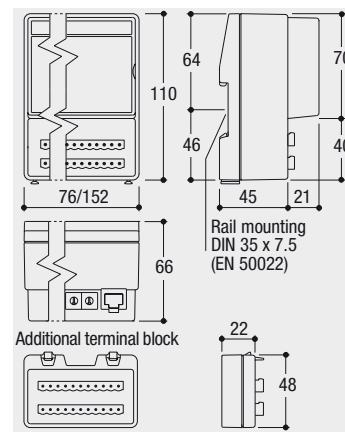
General description



- 1 - Model identification label (on the back side of the module)
- 2 - DIN RAIL 35 x 7.5 (EN50022)
- 3 - 2 male 11 pole plugs, pitch 5.0mm
- 4 - 2 + 2 female, 11 pole, fast snap-ON connectors, pitch 5.0mm, with screw or spring terminals to connect the power supply or the I/O (accessory)
- 5 - Two RJ45 plugs to connect the field bus
- 6 - CANOpen cable with two RJ45 connectors (accessory)
- 7 - RJ45 plugs with internal termination circuitry (accessory)
- 8 - 2 rotary switches having 16 positions to set Node ID and Baud rate
- 9 - Removable and writable label to identify the connected I/O (TAG number)
- 10 - 4 status LEDs: identify the diagnostic and the module status
- 11 - Additional terminal block 2 x 11 poles (accessory)

Installation

Dimensions (mm)

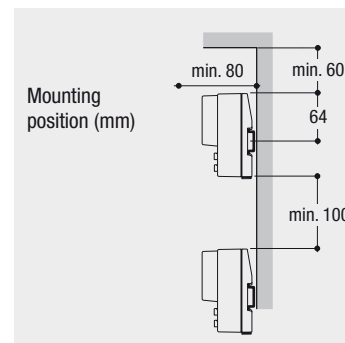


Operating conditions

Environmental condition	CE	Suggestion
Operating conditions	Temperature -10... +65°C %Rh Rh 5... 95% non condensing	
Special conditions	Temperature > 65°C %Rh Conducting atmosphere	Use forced ventilation Warm up
Forbidden conditions	Corrosive atmosphere Explosive atmosphere	Use filter

Mounting position

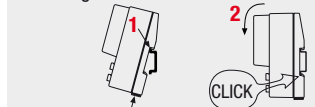
- Mount the module vertically;
- In order to help the ventilation flow of air, respect the distances between modules and walls or other modules.



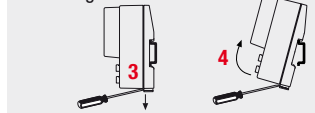
Mounting/removing the modules on/from the DIN rail

- 1 Close the spring slide, then clip the upper part of the module on the rail;
- 2 Rotate the module downwards till to the click;
- 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.

Mounting the module



Removing the module



Accessories

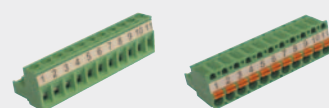
Power supply 24 Vdc

APS2ALNDR75-24 - 75 W 3.5 A
APS2ALED12024 - 120 W 5 A
APS2ALNDR240-24 - 240 W 10 A

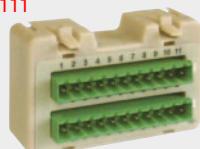


11 poles connectors

With screw terminals: APS2SPINAV11
With spring terminals: APS2SPINAM11



Additional terminal block
APS2TB2111



Field bus cables with RJ45 connectors

140 mm: APS2LOCALBUS76
220 mm: APS2LOCALBUS152
500 mm: APS2LOCALBUS500



Connector with termination circuitry
APS2TERMCAN



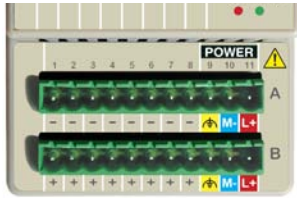
CAN connection

- 1 Install the modules on the DIN rail (max. 60, up to 127 with repeaters);
- 2 Connect the modules mounted side by side using the standard cables (140/220mm);
- 3 Connect the remote modules using a cable having the proper length (see the "Bit rate" paragraph);
- 4 Terminate the two ends of the CAN network using the connectors with the termination circuitry.

⚠ To substitute a broken module, see the "Hot swapping the modules" paragraph at the end of this manual.

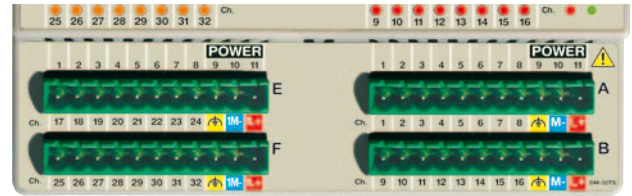
Electrical connections

Terminals connections and plugs



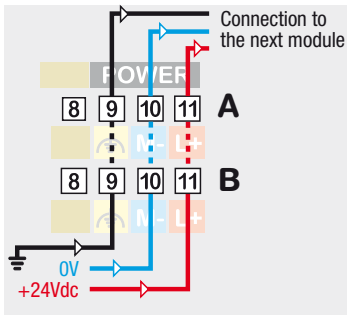
Technical data:

- Two/Four 11 poles plugs, pitch 5.0 mm
- 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.



Description	Terminals	CANopen
Flexible cable section:	0.2...2.5 mm ² AWG24... AWG12	CAT 5 UTP, 8 x AWG24
Stripped wire	Screw: 7mm; Spring: 10 mm	RJ45 mounting tool
Flat blade screwdriver	0.6 x 3.5 mm	
Tightening torque	0.5...0.6 Nm	

Power supply



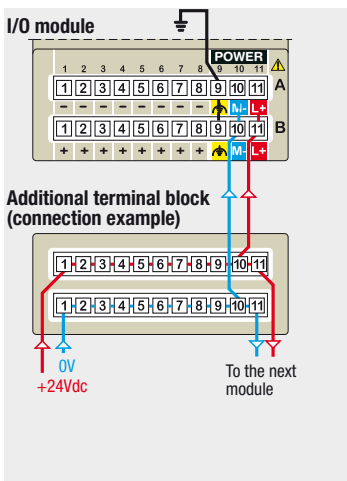
- 24Vdc (-15... +25%), 2.5W max.
- The power supply terminals A9 - B9, A10 - B10, A11 - B11 are internally connected; in this way it is possible to bring the power supply to other modules using terminals A10, A11 and B10, B11.

Functional earth terminal. This type of earthing does not protect against electrical shocks.

Power supply warnings

- ⚠ Please note that the maximum current capacity for each terminal is 8A
- ⚠ 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.

Additional terminal block APS2TB2111



An additional terminal block can be installed on the I/O module using the two slides located in the lower part of the module case (item 11 in "General description" paragraph).

The additional terminal block has no active components inside, only two 11 contacts connectors.

All the 11 contacts of each connector (C and D) are internally connected and can be used to make multiple connections (see the example).

Hardware Set-up

Hexadecimal rotary switches, service and I/O LEDs

LED	Status	Meaning
RUN	ON	Operational
	Blinking	Pre-operational (CANopen)
	Single flash	STOPPED
ERR	OFF	Device in RESET state
	ON	BUS OFF
	Single flash	Warning limit reached
ST	Double flash	Error Control Event
	Triple flash	Sync Error (CANopen)
	OFF	No error. Device working
PWR	ON	DIAG Error
	Blinking	INIT and DIAG running
	Single flash	Baud rate setting
PWR	OFF	Module OK and ready
	ON	Module Power Supply ON
PWR	OFF	Module Power Supply OFF

Bit Rate/Node ID configuration/CAN signals

Bit rate

Lo switch	Baud rate	Bus length
1	20 kbps	2500 m
2	50 kbps	1000 m
3	100 kbps	500 m
4	125 kbps	500 m
5	250 kbps	250 m
6 *	500 kbps	100 m
7	800 kbps	50 m
8	1000 kbps	25 m

Node ID

Hi switch	Lo switch	Valid ID node
0	1	01h (address 1)
0	2	02h (address 2)
		↓
F	F	7Fh (address 127D)*

Note: * Default value

CAN Signals

The signals present in the two RJ45 connectors are connected in parallel in order to link the modules to CAN.

Pin	Signal
1	CANH
2	CANL
3	GNDCAN
4	Reserved
5	Reserved
6	GNDSHLD (1)
7	GNDCAN
8	CANV+

(1) Shield to protect the communication cables (when the bus network is longer than 100m).

Procedure for Node ID and Bit Rate configuration

The HI and LO hexadecimal rotary switches set the module's Bit Rate and CAN Node ID. During the configuration, the module must be **off line** and the CAN bus must be physically disconnected.

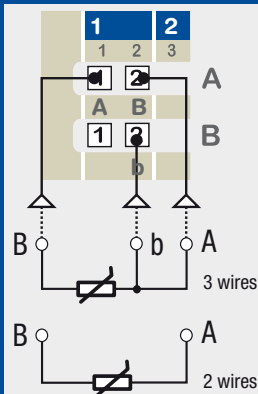
To configure the module, follow the procedure:

- 1 Turn the Power OFF
- 2 Set the HI switch to "F"
- 3 Select the desired Bit Rate value by setting the LO switch following the table (e.g. "8" for 1 Mbps)
- 4 Turn the Power ON
- 5 Shift the HI switch to "E" (all the module service LEDs should flash)
- 6 Turn the Power OFF. Now configure Node ID
- 7 Set the HI and LO switches to the desired valid Node ID following the table
- 8 Turn the Power ON.

Alternatively, at step 7 set the value 00h. Then, at the next Power ON, the last valid stored value will be resumed as Node ID.

Default values: Bit Rate = 500 kbps, Node ID = 127D

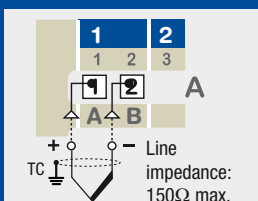
Inputs: Pt100, Pt1000 resistance thermometers (2, 3 wires)



- When 3 wires system is used, always use cables of the same section (1mm^2 min.)(max. resistance $20\Omega/\text{line}$);
- When 2 wires system is used and the distance between the module and the sensor is 15 m, the use of a 1.5 mm^2 section cable produces a 1°C (1.8°F) measure error.

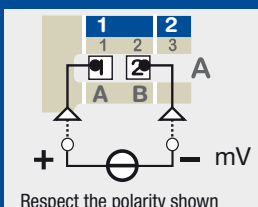
AI-04RT

Thermocouple input

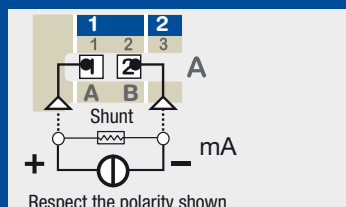


- To extend the connection, use always compensation cable of the correct type for the thermocouple used;
- When present the shield must be connected to a proper earth (at only one end).

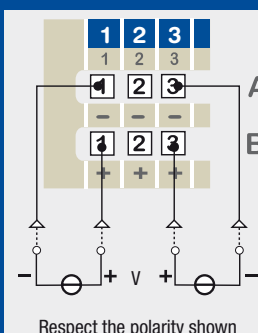
Input: mV



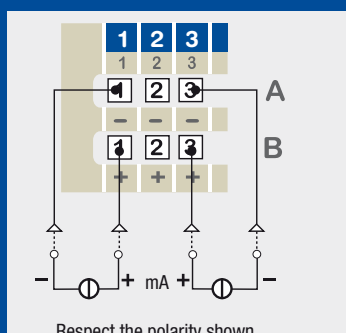
Input: mA



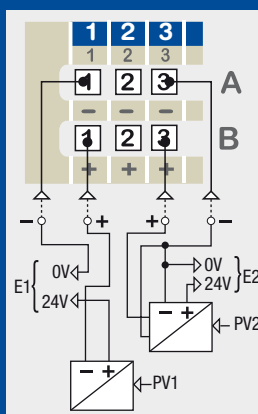
Input: V



Input: mA



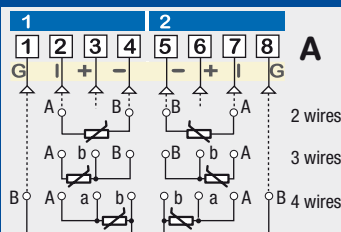
Inputs: 2-3 wires transmitters



- Both two and three wires transmitters must be powered with an external power supply. To maintain the isolation between the 2 inputs, use 2 distinct power supply sources (E1 - E2);
- If isolation is not required the transmitter can be powered through the module power line.

AI-08HL

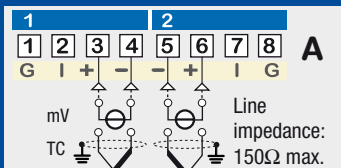
Inputs: Pt100, Pt1000 resistance thermometers (2, 3, 4 wires)



- When 3 or 4 wires system is used, always use cables of the same section (1mm^2 min.)(max. resistance $20\Omega/\text{line}$);
- When 2 wires system is used and the distance between the module and the sensor is 15 m, the use of a 1.5 mm^2 section cable produces a 1°C (1.8°F) measure error.

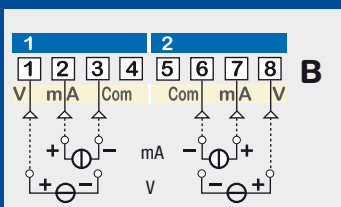
AI-02UI

Inputs: mV and J, K, L, N, R, S, T thermocouple type

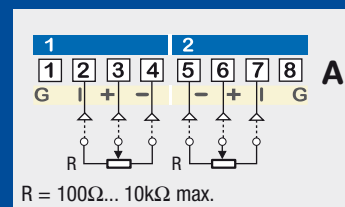


- Respect the polarity shown;
- To extend the connection, use always compensation cable of the correct type for the thermocouple used;
- When present the shield must be connected to a proper earth (at only one end).

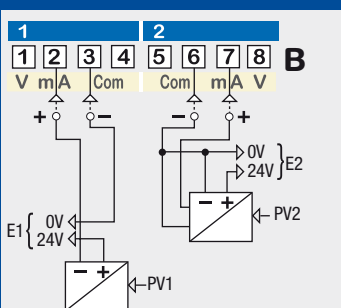
Inputs: V and mA



Input: potentiometer

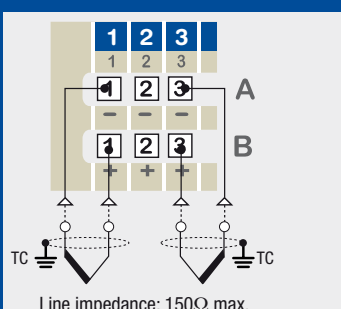


Inputs: 2-3 wires transmitters

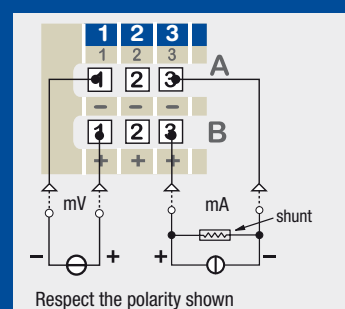


- Both two and three wires transmitters must be powered with an external power supply. To maintain the isolation between the 2 inputs, use 2 distinct power supply sources (E1 - E2);
- If isolation is not required the transmitter can be powered through the module power line.

Input: Thermocouple

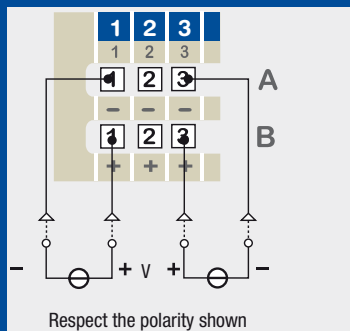


Input: mV or mA



AI-08TC

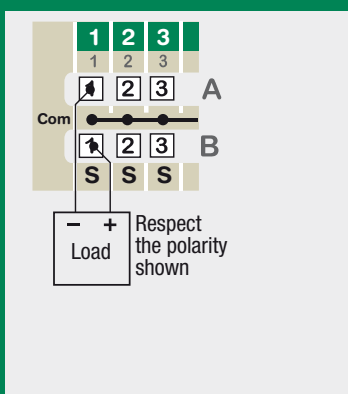
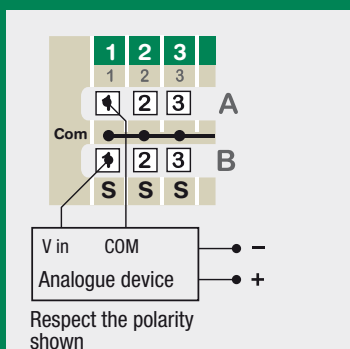
Input: V



AI-08DP

Output: analogue device (V)

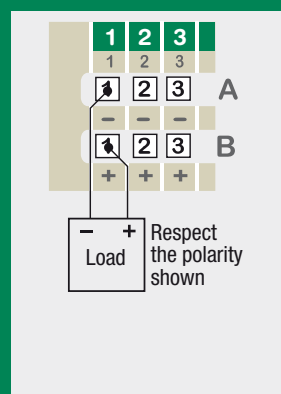
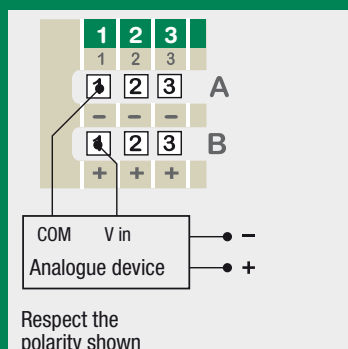
Output: load (mA)



AO-08DP

Output: analogue device (V)

Output: load (mA)



AO-08HL

CE

Electric safety and electromagnetic compatibility

Class II instrument, rear panel mounting.

This instrument has been designed in compliance with:

Regulations on electrical equipment:

according to regulations on the essential protection requirements in electrical equipment EN 61010-1


Regulations on Electromagnetic

Compatibility according to:

- Regulations on RF emissions: EN61000-6-4 industrial environments;
- Regulation on RF immunity: EN61000-6-2 industrial equipment and system.

It is important to understand that it's responsibility of the installer to ensure the compliance of the regulations on safety requirements and EMC.

This controller has no user serviceable parts and requires special equipments and specialised engineers to be repaired. For this purpose, the manufacturer provides technical assistance and the repair service for its Customers. Please, contact your nearest Agent for further information.

All the information and warnings about safety and electromagnetic compatibility are marked with the  sign, at the side of the note.

Before installing the module read the following instructions

Precautions

CE

Notes

All wirings 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. If this is not achievable, use shielded cables on the sensor input, with the shield connected to earth.

- 1 Make sure that the power supply voltage is the same indicated on the instrument label
- 2 Switch ON the power supply only after all the electrical connections have been completed

Hot swapping the modules

Node ID and Baud rate of the new module must already be correctly set.

The procedure to minimize the CAN disconnection time follows:

- 1 Remove all the cabled connectors from their plugs (item 4 in "General description" paragraph), do not extract the RJ45 connectors yet
- 2 Remove the module from the DIN rail
- 3 Mount the new and already configured module on the DIN rail
- 4 Extract the left side RJ45 connector from the module and insert it in the new module
- 5 Extract the right side RJ45 connector from the module and insert it in the new module
- 6 Insert all the cabled connectors in the new module.