

# PLIO04 MULTIFUNCTION DIGITAL AND ANALOG I/O MODULE

**PLIO04** is a highly flexible, programmable module extending your HMI applications.

- 10 optically isolated digital inputs
- 10 optically isolated digital outputs SSR
- 4 non-isolated 16 bit analog inputs configurable as 4 differential channels for voltage, resistance, temperature (PT100 and thermocouple) measurement
- 4 non-isolated 16 bit analog inputs for ratiometric voltage only
- 1 dedicated PT100 input for cold junction compensation of thermocouples

PLIO04 is a hardware module designed as plug-in for HMI products of Series 500/600/700.

## Specifications

### DIGITAL INPUTS

Description	Specifications
Input channels	10 digital optoisolated (industrial standard) source active high (+24VDC) inputs with separate pins for positive and negative connection
Input voltage range	12÷30VDC (min 3mA), 35VDC max for 500 ms
ON-state voltage/current	12÷30VDC (min 3mA) 6mA @ 24VDC, 9mA @ 30VDC
OFF-state voltage/current	5VDC max, 1mA
Input impedance	3.3K Ohm
Input filter delay	50 µs max
Debounce filter	Programmable 0.1ms to 20ms
Isolation	1500 Vrms
Connector type	Omnimate Range header/plugs 3.5mm-10 contacts (two piece terminal blocks) SL-SMT 3.5/180F Box + BLZF 3.5/180F

### DIGITAL OUTPUTS

Description	Specifications
Output channels	10 digital optoisolated SSR type outputs, 2 contacts each.
Max load voltage	30VDC
Max load current	1.4A
Output delay time	5ms max
Isolation	1500 Vrms
Connector type	Omnimate Range header/plugs 3.5mm-10 contacts (two piece terminal blocks) SL-SMT 3.5/180F Box + BLZF 3.5/180F

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### ANALOG MULTIFUNCTION INPUTS

Description	Specifications
Input channels	4 multifunction analog not isolated input channels. All analog common inputs (AGND) are internally connected to M pin of panel supply connector
Input or measurement type	Voltage input Temperature measurement (various types of thermocouples or PT100 RTD) with external cold junction compensation
A/D resolution	16 bits
Accuracy @ 25 °C	0.2%
Connector type	Omnimate Range header/plugs 3.5mm-10 contacts (two piece terminal blocks) SL-SMT 3.5/180F Box + BLZF 3.5/180F
Voltage input type	Single-ended (up 8 inputs) or differential configuration (up 4 inputs)
Voltage input range	Bipolar ( $\pm 100\text{mV}$ , $\pm 1\text{V}$ , $\pm 5\text{V}$ , $\pm 10\text{V}$ ) Unipolar (0÷100mV, 0÷1V, 0÷5V, 0÷10V)
Voltage input linearity error	0.1%
Voltage input accuracy	Bipolar ( $\pm 100\text{mV}$ ) or unipolar (0÷100mV): 0.1% F.S. Bipolar ( $\pm 500\text{mV}$ ) or unipolar (0÷500mV): 0.2% F.S. Bipolar ( $\pm 1\text{V}$ ) or unipolar (0÷1V): 0.1% F.S. Bipolar ( $\pm 5\text{V}$ ) or unipolar (0÷5V): 0.1% F.S. Bipolar ( $\pm 10\text{V}$ ) or unipolar (0÷10V): 0.1% F.S.
Voltage input absolute maximum ratings	±15V (AGND referenced)
Voltage mode input	> 2 MΩ
Thermocouple inputs	4 with tested break condition
Thermocouple types	E (-270/1000°C) J (-210/760°C) K (-270/1370°C) R (0/1768°C) S (0/1768°C) T (-270/400°C)
Cold Junction Compensation	External via dedicated PT100 input (see note below)
PT100 (RTD) input	4 for two, three or four wires configuration (in two and three wires configuration, 4 inputs remain free for single-ended measurements); break or short circuit detected
Supply	Local 1.2 mA
Analog multifunction inputs	CH_1, CH_2, CH_3, CH_4

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### ANALOG SINGLE-ENDED VOLTAGE INPUTS

Description	Specifications
Input channels	4 single ended analog input channels: voltage inputs. All analog common inputs (AGND) are internally connected to M pin of panel supply connector
Input or measurement type	Voltage input
A/D resolution	16 bits
Accuracy @ 25 °C	0.2%
Connector type	Omnimate Range header/plugs 3.5mm-10 contacts (two piece terminal blocks) SL-SMT 3.5/180F Box + BLZF 3.5/180F
Voltage input type	4 Single-ended inputs
Voltage input range	Unipolar (0÷100mV, 0÷1V, 0÷5V, 0÷10V)
Voltage input linearity error	0.1%
Voltage input accuracy	Unipolar (0÷100mV): 0.1% F.S. Unipolar (0÷500mV): 0.2% F.S. Unipolar (0÷1V): 0.1% F.S. Unipolar (0÷5V): 0.1% F.S. Unipolar (0÷10V): 0.1% F.S.
Voltage input absolute maximum ratings	+15V (AGND referenced)
Voltage mode input	> 2 MΩ
Analog single-ended voltage inputs	CH_5, CH_6, CH_7, CH_8

Measurement temp. range	-100°C÷850°C
PT100 accuracy @ 25 °C	There are 4 selectable ranges for resistor measurements. Range 1: 0÷1570Ohm, 0.2% accuracy Range 2: 0÷5300Ohm, 0.3% accuracy Range 3: 0÷10200Ohm, 0.4% accuracy Range 4: 0÷88000Ohm, 0.5% accuracy
Connector type	Omnimate Range header/plugs 3.5mm-10 contacts (two piece terminal blocks) SL-SMT 3.5/180F Box + BLZF 3.5/180F

### PT100 (RTD) INPUT

This input is dedicated to thermocouple cold junction compensation. The characteristics of this input are the same of PT100 as described in table above.

### ENVIRONMENTAL CONDITIONS

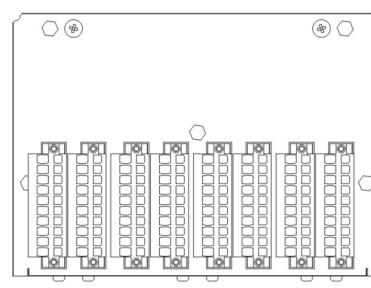
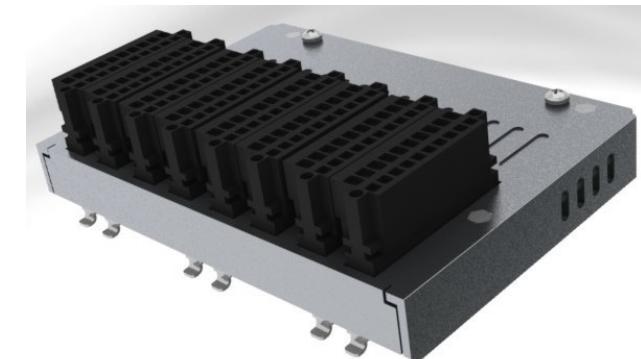
Description	Specifications
Operating Temperature	0÷50 °C
Storage Temperature	-20÷70 °C
Operating Humidity	5÷85% relative humidity, non condensing

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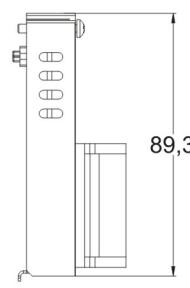
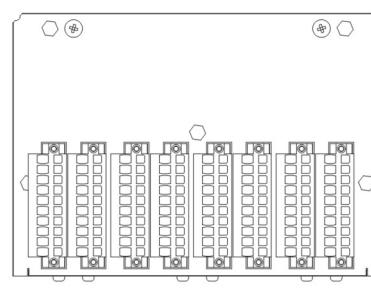
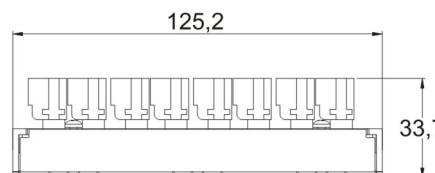
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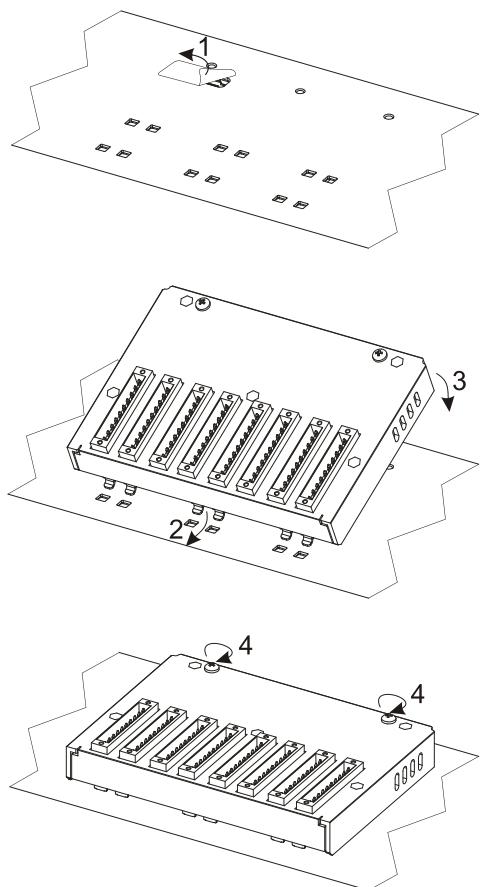


### Dimensions



## Mounting the Module

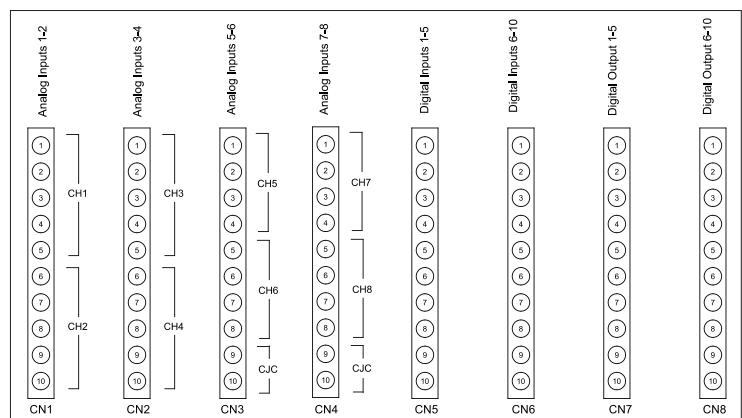
Remove the connector protective cover from the equipment before installing the module.



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## Pin Assignment/Connector View



CN1 (An. Inp.)

1 PT100\_1 supp.  
2 CH\_1 + input  
3 CH\_1 - input  
4 AGND  
5 SHIELD (case)  
6 PT100\_2 supp.  
7 CH\_2 + input  
8 CH\_2 - input  
9 AGND  
10 SHIELD (case)

CN2 (An. Inp.)

1 PT100\_3 supp.  
2 CH\_3 + input  
3 CH\_3 - input  
4 AGND  
5 SHIELD (case)  
6 PT100\_4 supp.  
7 CH\_4 + input  
8 CH\_4 - input  
9 AGND  
10 SHIELD (case)

CN3 (mixed)

1 +5V sup.  
2 CH\_5 + input  
3 AGND  
4 SHIELD (case)  
5 +5V sup.  
6 CH\_6 + input  
7 AGND  
8 SHIELD (case)  
9 T/R+  
10 T/R-

CN4 (mixed)

1 +5V sup.  
2 CH\_7 + input  
3 AGND  
4 SHIELD (case)  
5 +5V sup.  
6 CH\_8 + input  
7 AGND  
8 SHIELD (case)  
9 T/R+  
10 T/R-

CN5 (Dig inp.)

1 Dig. input 1+  
2 Dig. input 1-  
3 Dig. input 2+  
4 Dig. input 2-  
5 Dig. input 3+  
6 Dig. input 3-  
7 Dig. input 4+  
8 Dig. input 4-  
9 Dig. input 5+  
10 Dig. input 5-

CN6 (Dig inp.)

1 Dig. input 6+  
2 Dig. input 6-  
3 Dig. input 7+  
4 Dig. input 7-  
5 Dig. input 8+  
6 Dig. input 8-  
7 Dig. input 9+  
8 Dig. input 9-  
9 Dig. input 10+  
10 Dig. input 10-

CN7 (Dig outp.)

1 Dig. output 1A  
2 Dig. output 1B  
3 Dig. output 2A  
4 Dig. output 2B  
5 Dig. output 3A  
6 Dig. output 3B  
7 Dig. output 4A  
8 Dig. output 4B  
9 Dig. output 5A  
10 Dig. output 5B

CN8 (Dig outp.)

1 Dig. output 6A  
2 Dig. output 6B  
3 Dig. output 7A  
4 Dig. output 7B  
5 Dig. output 8A  
6 Dig. output 8B  
7 Dig. output 9A  
8 Dig. output 9B  
9 Dig. output 10A  
10 Dig. output 10B

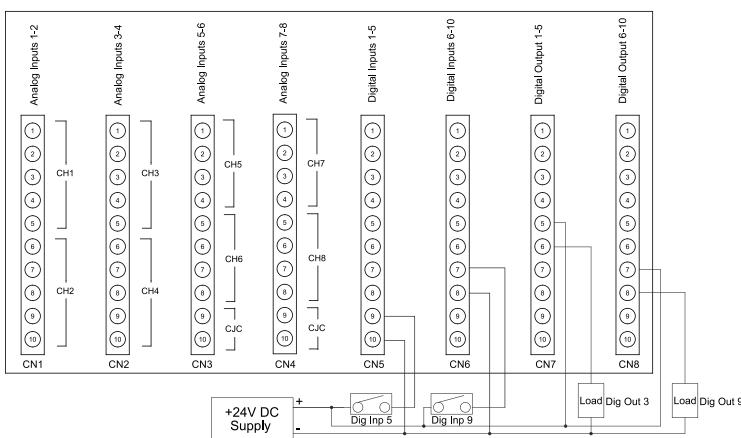
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## Wiring Examples (standard digital inputs and outputs)

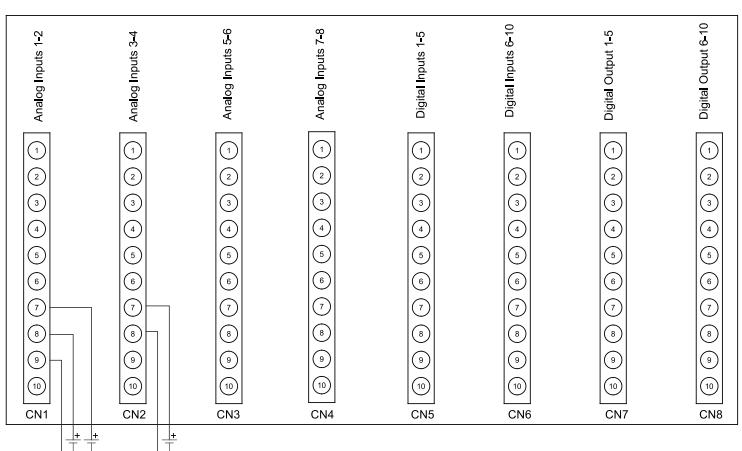
### Note on wiring

The cables must not be longer than 30m.



**Example:** Two digital inputs (switches) and two digital outputs connection.

## Wiring examples (voltage single ended, differential inputs)



### Example: Logic connection for various configurations:

- 1) Two single ended analog inputs on the same channel (for example used CH\_2+, CH\_2- and AGND).
- 2) One differential voltage source, connected as differential channel at CH\_4+ CH\_4- pair.

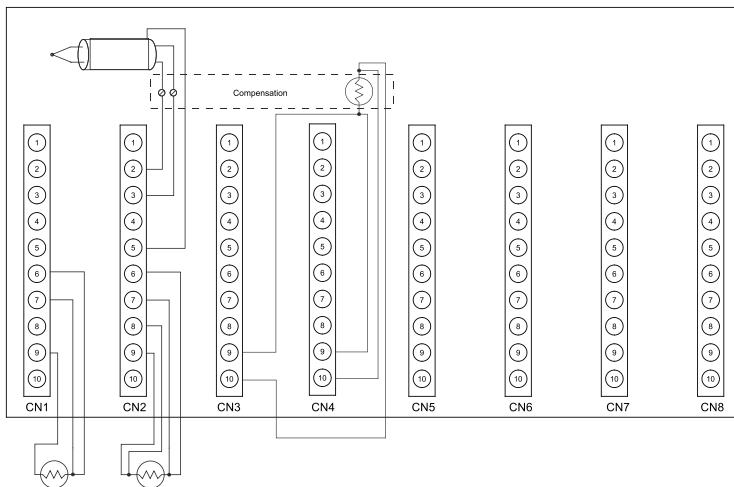
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## Wiring examples (PT100, Thermocouple)



**Example:** Logic connection for various configurations:

- 1) One PT100 (three wire) connected to CH2.
- 2) One PT100 (four wire) connected to CH4.
- 3) One thermocouple, connected to CH3.
- 4) One PT100 connected to CJC and used for thermocouple input compensation.

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The product has been designed for use on Exor products with expansion slot for plugin module for use in an industrial environment in compliance with the 2014/30/EU directive

The product has been designed in compliance with:

EN 61000-6-4	EN 55011 Class A
EN 61000-6-3	EN 55022 Class B

EN 61000-6-2	EN 61000-4-2
EN 61000-6-1	EN 61000-4-3
	EN 61000-4-4
	EN 61000-4-5
	EN 61000-4-6
	EN 61000-4-8



This device cannot be disposed of as a domestic waste but according to WEEE European Directive 2012/19/EU



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