PLIO03 MULTIFUNCTION DIGITAL AND ANALOG I/O MODULE

PLIO03: -20 digital inputs including multifunction counter/timer channels
-12 digital outputs
-8 single-ended (or 4 differential) analog inputs for voltage and current measurement
-1 PT100 (RTD) input for temperature measurement or for cold junction compensation of thermocouples
-4 analog (voltage or current) outputs

The PLIO03 is a hardware module you can easily plug into an existing eTOP series 500. The PLIO03 is a highly flexible, programmable module extending your HMI applications.

Specifications

DIGITAL INPUTS
Note on input filter delay

Description	Specifications
Input channels	20 digital optoisolated (industrial standard) source active high (+24VDC) inputs. All inputs are internally connected to 0VDC of power supply.
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	6VDC max, 1mA
Input impedance	3,3K Ohm
Input filter delay max	200 ns for E input, 50 μs for S input (see note below)
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

The encoder, counter and frequency inputs are high speed digital inputs (the other characteristics are the same as described in the table above). Each digital input can be used as standard, encoder or counter/timer . Refer to the table below.

Input type/input filter delay	Input list
E/200 ns	IN1, IN2, IN5, IN6, IN9, IN10, IN13, IN14
S/50 μs	IN3, IN5, IN7, IN8, IN11, IN12, IN15, IN16, IN17, IN18, IN19, IN20

ANALOG INPUTS

Description	Specifications
Input channels	4 multifunction analog not isolated input channels. All analog common inputs (COM) are internally connected to M pin of panel supply connector.
Input or measurement type	Voltage input Current input Temperature measurement (various types of thermocouples or PT100 RTD) with incorporated external cold junction compensation
A/D resolution	12 bits
Accuracy @ 25 °C	0.1%
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 (± 100mV, ± 1V, ± 5V, ± 10V) Unipolar (0 ÷ 100mV, 0 ÷ 1V, 0 ÷ 5V, 0 ÷ 10V)
Voltage input linearity error	0.1%
Voltage input accuracy	Bipolar (±100mV) or unipolar (0÷100mV): 0.1% F.S. Bipolar (±500mV) or unipolar (0÷500mV): 0.2% F.S. Bipolar (±1V) or unipolar (0÷1V): 0.1% F.S. Bipolar (±5V) or unipolar (0÷5V): 0.1% F.S. Bipolar (±10V) or unipolar (0÷10V): 0.1% F.S.
Voltage input absolute maximum ratings	±15V (AGND referenced)
Current input type	4 differential ones with external supply transmitter
Current input range	0 ÷ 20mA or 4 ÷ 20mA
Current mode input impedance	47 Ω
Voltage mode input	> 10 MΩ
Accuracy	0.1%
Current input linearity	0.1%
Current input absolute maximum ratings	±15V (AGND referenced)
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

ENCODER CHANNELS

Description	Specifications
Encoder channels	4 (Phase A, Phase B, Zero encoder and Machine zero index pulse inputs per channel). All inputs are internally connected to 0VDC of power supply.
A & B & Z & M channel inputs	IN1 & IN2 & IN3 & IN4, IN5 & IN6 & IN7 & IN8, IN9 & IN10 & IN11 & IN12, IN13 & IN14 & IN15 & IN16
Input frequency	1 MHz max
Pulse width	500 ns min
Count range	32 bit

COUNTER INPUTS

Description	Specifications
Counter channels	4 (pulse and gate input per channel). All inputs are internally connected to 0VDC of power supply. The gate input enables the count of input pulses; the count could be enabled only by SW (so the gate input is available as a general digital input)
Pulse & gate input pairs	IN1 & IN2, IN5 & IN6, IN9 & IN10, IN13 & IN14
Input frequency	1 MHz max
Pulse width	500 ns min
Count range	32 bit

FREQUENCY INPUTS

Description	Specifications
Frequency channels	4 (one input per channel). All inputs are internally connected to 0VDC of power supply.
Frequency inputs	IN1, IN5, IN9, IN13
Input frequency	20KHz max, 1 Hz min
Pulse width	50 μs min
Accuracy	0.005%

DIGITAL OUTPUTS

Description	Specifications
Output channels	12 digital source type optoisolated outputs with feedback of output driver fault status.
Output voltage	12÷30VDC
Output current	0.5A, 1.4A max (protection threshold)
Output delay time	150 μs max
Output protection	Overcurrent and overtemperature protected driver
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

Measurement temp. range	-100°C÷850°C
PT100 accuracy @ 25 °C There are 4 selectable ranges for resistor measurements.	Range 1: 0÷157Ohm, 0.1% accuracy Range 2: 0÷530Ohm, 0.1% accuracy Range 3: 0÷1020Ohm, 0.1% accuracy Range 4: 0÷8800Ohm, 0.1% 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 for thermocouple cold junction compensation. The characteristics of this input are the same of PT100 one described in the above table.

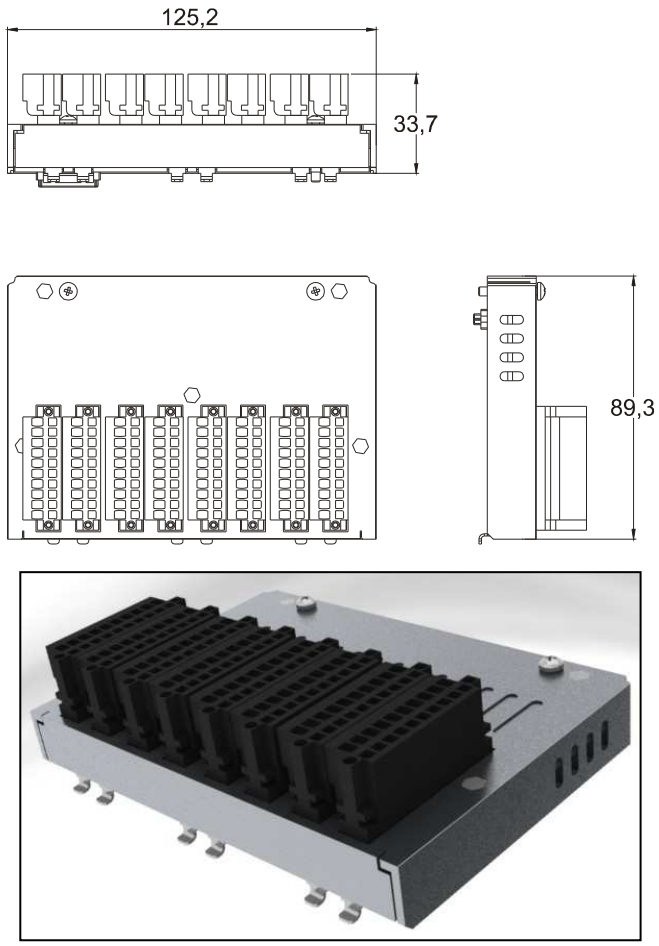
ANALOG OUTPUTS

Description	Specifications
Output channels	4 analog output not isolated channels (voltage or current output).
Resolution	12 bit
Output voltage type	Single-ended
Output voltage range	±10VDC
Output voltage load impedance	1K minimum
Output voltage load capacitance	10nF max
Output voltage linearity error	0.15%
Output current type	Current source
Output current range	0÷20mA or 4÷20mA
Output current load impedance	470 Ω max
Output current linearity error	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

ENVIRONMENTAL CONDITIONS

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

Dimensions



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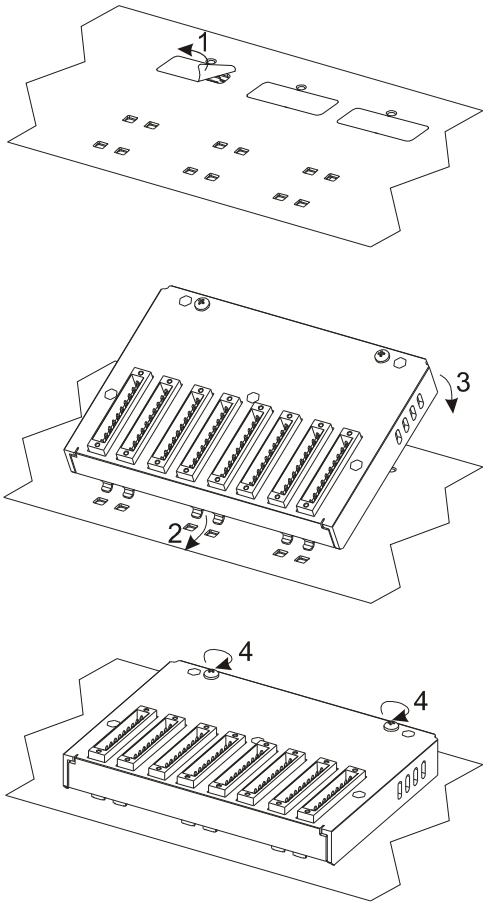
Mountig the module

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



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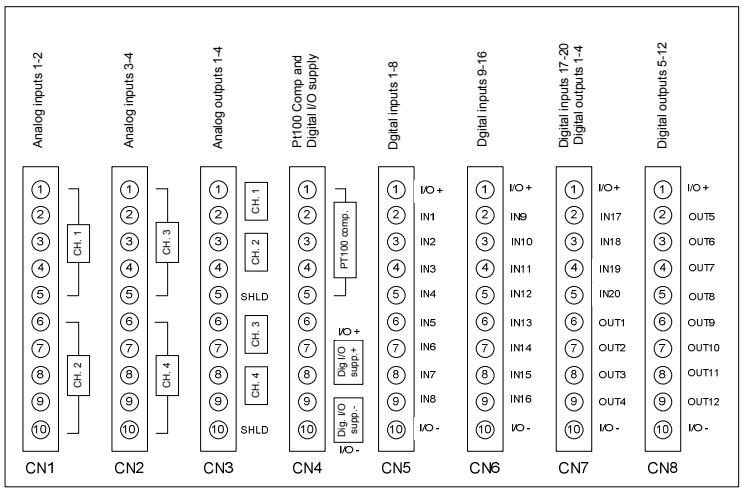
Pin assignment/connectors view



CN1 (An. Inp.)	CN2 (An. Inp.)	CN3 (An. out.)	CN4 (mixed)
1 PT100_1 supp.	1 PT100_3 supp.	1 CH1	1 PT100_5 supp.
2 CH_1 + input	2 CH_3 + input	2 COM-AGND	2 CH_5 + input
3 CH_1 - input	3 CH _3 - input	3 CH2	3 CH –5 - input
4 COM-AGND	4 COM-AGND	4 COM-AGND	4 COM_AGND
5 SHIELD (case)	5 SHIELD (case)	5 SHIELD (case)	5 SHIELD (case)
6 PT100_2 supp.	6 PT100_4 supp.	6 COM-CH3	6 NC (not conn.)
7 CH_2 + input	7 CH_4 + input	7 AGND	7 I/O supp. +
8 CH_2 - input	8 CH_4 - input	8 CH4	8 I/O supp. +
9 COM-AGND	9 COM-AGND	9 COM-AGND	9 I/O supp. -
10 SHIELD (case)	10 SHIELD (case)	10 SHIELD (case)	10 I/O supp. -

CN5 (Dig inp.)	CN6 (Dig inp.)	CN7 (Mixed.)	CN8 (Dig outp.)
1 I/O supp. +	1 I/O supp. +	1 I/O supp. +	1 I/O supp. +
2 Dig. input 1	2 Dig. input 9	2 Dig. input 17	2 Dig. output 5
3 Dig. input 2	3 Dig. input 10	3 Dig. input 18	3 Dig. output 6
4 Dig. input 3	4 Dig. input 11	4 Dig. input 19	4 Dig. output 7
5 Dig. input 4	5 Dig. input 12	5 Dig. input 20	5 Dig. output 8
6 Dig. input 5	6 Dig. input 13	6 Dig. output 1	6 Dig. output 9
7 Dig. input 6	7 Dig. input 14	7 Dig. output 2	7 Dig. output 10
8 Dig. input 7	8 Dig. input 15	8 Dig. output 3	8 Dig. output 11
9 Dig. input 8	9 Dig. input 16	9 Dig. output 4	9 Dig. output 12
10 I/O supp. -	10 I/O supp. -	10 I/O supp. -	10 I/O supp. -

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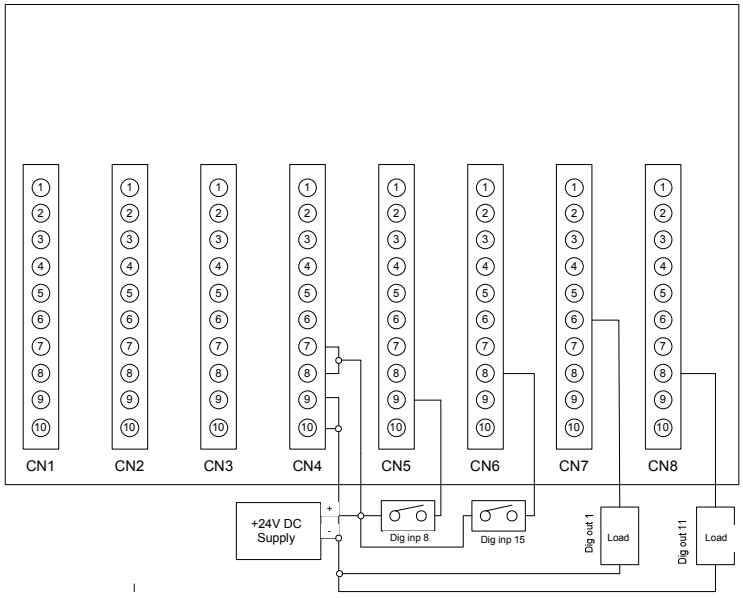
Wiring examples (standard digital inputs and outputs)



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

Attention: Pins 1 of CN5,CN6,CN7 and CN8 are locally connected to main supply I/O pins (I/O supply +) and can be used in order to simplify external connecting (for example, external switches could be supplied from these pins, instead from main supply).

Attention: Pins 10 of CN5,CN6,CN7 and CN8 are locally connected to main supply I/O pins (I/O supply -) and can be used in order to simplify external connecting (for example, external load return wire could be connected to these pins, instead to main supply)

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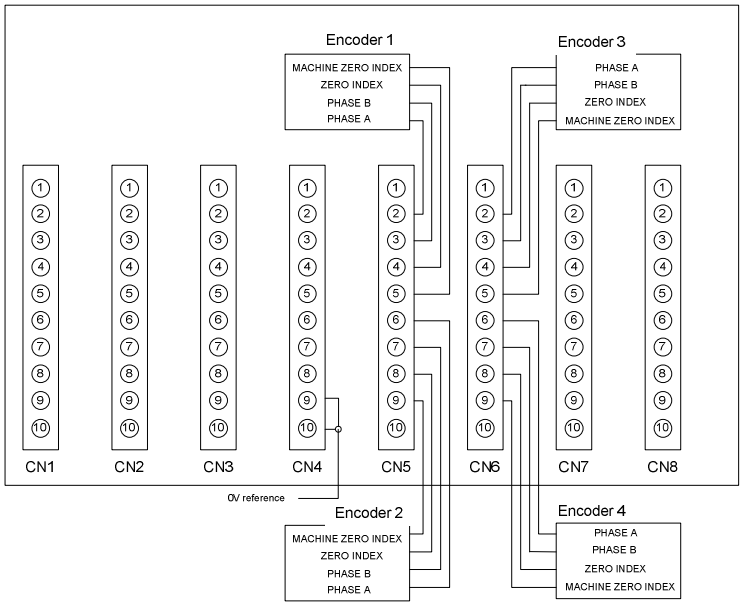
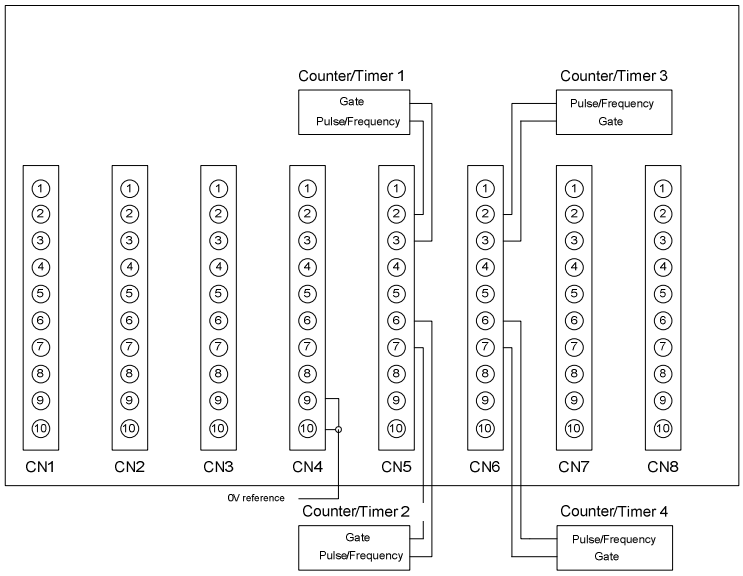
Wiring examples (encoder connection)



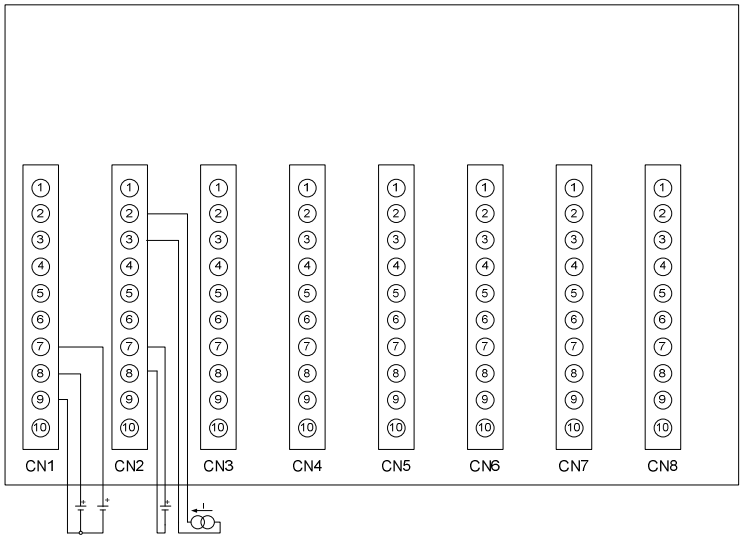
Example: Logic connection of four encoder modules. The encoder modules must be 24V powered (connect 0V reference of the encoder to the 0V of PLIO03 digital I/O supply)

Wiring examples (counter or frequency inputs)



Example: Logic connection for four counter/timer measurement.
Connection is suitable for counter inputs (pulse and gate) and/or frequency inputs (frequency and gate).
The external modules must be 24V powered (connect 0V reference of the external module to the 0V of PLIO03 digital I/O supply)

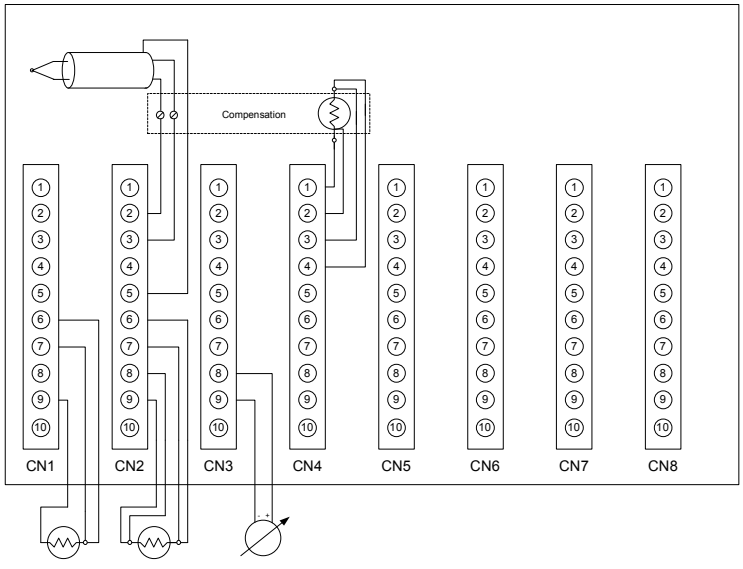
Wiring examples (voltage single ended, differential or current inputs)



Example: Logic connection for various configurations:

1) Two single ended analog inputs on the same channel (for example used CH_2+ , CH_2- and COM-AGND.
2) One differential voltage source, connected as differential channel at CH_4+ CH_4- pair.
3) One current input connected to CH_3+ CH_3- pair.

Wiring examples (PT100, Thermocouple, and analog outputs)



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 CH5 and used for thermocouple input compensation.
5) One analog output (CH4)

The product has been designed for use on UniOP eTOP 500 Series in an industrial environment in compliance with the 2004/108/CE directive

The product has been designed in compliance with:

EN 61000-6-4	EN 55011 Class A
EN 61000-6-2	EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-4-8

The installation of this device into the residential, commercial and light-industrial environments is allowed only in the case that special measures are taken in order to get the conformity to EN-61000-6.3.

Then the product has been designed in compliance with the 2004/108/EC directive according to the corresponding parts of EN60945 for use in maritime environment.

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