



USER MANUAL

Issue 1



Multifunction Meters
Transducers & Isolators
Temperature Controllers
Converters & Recorders
Digital Panel Meters
Current Transformers
kWh Energy Meters
Analogue Panel Meters
Shunts
Digital Bargraphs
Digital Multimeters
Protection Relays
Synchroscope Series
Rotary Switches
Power Supplies
Test & Measurement

THETA PI-102 PROGRAMMABLE DUAL OUTPUT DC ISOLATOR

SUBJECT TO CHANGE WITHOUT NOTICE

This datasheet superseded all previous versions – please keep for future reference

Operating Instructions

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1. Read first and then



The proper and safe operation of the device assumes that the Operating Instructions are read and the safety warnings given in the various sections are observed.



The device should only be handled by appropriately trained personnel who are familiar within and authorised to work in electrical installations.

2. Scope of Supply



- (1) **Signal Isolator**
- (2) **Operating Instructions**

3. Variants

Auxiliary supply voltage

60....300V AC/DC

20....40V AC / 20...60V DC

4. Brief description

The purpose of the device is to electrically isolate input, outputs and power supply. The isolator fulfills all requirements and regulation concerning electromagnetic compatibility EMC and safety (IEC61326-1 and IEC 61010-1:2010). The device has one input and provides two independent outputs in an extremely small space.

5. Overview of the parts

Fig. 1 shows those parts of the device which are used for mounting, electrical connections and other operations described in the Operating instructions.

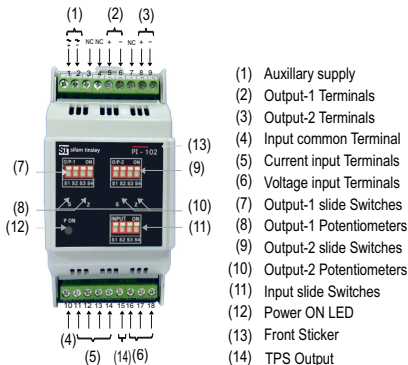


Fig. 1

6. Configuration

The device inputs and outputs can be configured using slide switches. Table A and B contains the switch position information for the configuration of input and output-1/output-2 respectively. When ever configuration is changed output-1 and output-2 Fine adjustment must be accomplished using "Z" (Zero) and "S" (Span) potentiometers provided on front panel separately for both the outputs i.e. output-1 and output-2

Refer Fig.1 Front panel view of device

TABLE A: INPUT RANGE SELECTION

Input	S1	S2	S3	S4
0...20mA	OFF	OFF	OFF	OFF
0...10mA	OFF	OFF	OFF	ON
0...24mA	OFF	OFF	ON	OFF
4...20mA	OFF	OFF	ON	ON
0...10V	OFF	ON	OFF	OFF
0...12V	OFF	ON	OFF	ON
0...5V	OFF	ON	ON	OFF
1...5V	OFF	ON	ON	ON

TABLE B: O/P1 & O/P2 RANGE SELECTION

Output	S1 & S2	S3	S4
0...10mA	OFF	OFF	OFF
0...20mA	OFF	OFF	ON
2...10mA	OFF	ON	OFF
4...20mA	OFF	ON	ON
0...5V	ON	OFF	OFF
0...10V	ON	OFF	ON
1...5V	ON	ON	OFF
2...10V	ON	ON	ON

7. Technical Data

Measuring Input

DC Current :

Standard ranges :

1) 0 - 20 mA	
2) 0 - 10 mA	
3) 4 - 20 mA	$R_i \leq 15.5\Omega$
4) 0 - 24 mA	

DC Voltage :

Standard ranges:

1) 0 - 12 V	} $R_i \geq 100K\Omega$
2) 0 - 10 V	
3) 0 - 5 V	} $R_i \geq 60K\Omega$
4) 1 - 5 V	

Measuring outputs 1 & 2

- 1) 2...10mA
- 2) 4...20mA
- 3) 0...10mA
- 4) 0...20mA

TPS Output

24V DC (+/- 15%), MAX 26mA

Burden voltage

15V

External Resistance

$R_{ext\ max.} [\Omega] = 15V / I_{AN} [mA]$
 I_{AN} =Output circuit full scale value

DC voltage:

- 1) 0...5V
- 2) 1...5V
- 3) 0...10V
- 4) 2...10V

Burden

$R_{ext\ min.} [k \Omega] = U_{AN} [V] / 5\ mA$
 U_{AN} =Output circuit full scale value

Residual ripple in Output: < 1.2% p.p.

Response time: < 50 ms

Current limiter at $R_{ext}=0$: < 42 mA for voltage output

Voltage limiter at $R_{ext}=\infty$: < 20V for Current output

Power supply H → ○

Rated operating Voltage: 60 to 300 V AC/DC
20 to 40 VAC / 20 to 60 VDC

Rated operating frequency: 45 ... 50-60 ... 65 Hz

Power input : ≤ 5 VA

Accuracy data (acc. to IEC 60688)

Basic accuracy : Limit error $\leq \pm 0.2\%$
Including linearity and reproducibility errors

Reference conditions

Ambient temperature $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Output burden
Current: $0.5 \cdot R_{ext} \text{ max.}$
Voltage: $2 \cdot R_{ext} \text{ min.}$

Influencing Factors:

Temperature $< \pm 0.1\%$ per 10°C

Burden influence $< \pm 0.1\%$

Longtime drift $< \pm 0.3\%$ / 12 months

Switch- on drift $< \pm 0.2\%$

Installation Data:

Mounting position Rail mounting

Weight Approx. 0.25 kg

Connection Terminal:

Connection Element	Conventional Screw type terminal with indirect wire pressure
Permissible cross section of the connection lead	$\leq 4.0 \text{ mm}^2$ single wire or $2 \times 2.5 \text{ mm}^2$ fine wire
Permissible Vibrations:	2 g acc. to EN 60 068-2-6
Shocks :	3 x 50 g 2 shocks each in 6 directions Acc. to EN 60 068-2-27
Electrical :	All circuits (measuring inputs/ insulation measuring outputs/power supply) are electrically insulated

Regulation

Electromagnetic Compatibility :	Acc. to IEC 61326-1
Protection :	For Housing : IP 40 For Terminals : IP 20
Pollution degree:	2 Acc. to IEC 61010-1 resp.
Electrical standards :	EN 61010-1
Test voltage :	-All 3.7 kV, 50 Hz 1 min (Leakage current 5mA) Measuring inputs versus : -Measuring outputs 2.3 kV, 50 Hz 1min & O/P1 to O/P 2: 500 V ,50 Hz ,1 min -All circuits versus case: 3.7kV, 50 Hz ,1min

Environmental conditions

Climatic rating :	Climate class 3 acc. to VDI/VDE 3540
Nominal Range of Use	0 °C to 45 °C (Usage group II)
Operating temperature	-10...23...55°C
Storage temperature	-40...70°C
Annual mean Relative humidity	≤ 75%

8. Mounting

The Isolator can be mounted on a top-hat rail.



Make sure that the ambient temperature stays within the permissible limits :
-10 and 55°C



Fig. 2 Top-hat rail Mounting

As the front of the enclosure conforms to IP 40. The terminals of the product should be protected from liquids. Transducer should be mounted in a reasonably stable ambient temperature and where the operating temperature is within the range - 10 to 55°C. Vibration should be kept to a minimum and the product should not be mounted where it will be subjected to excessive direct sunlight.

Caution

1. In the interest of safety and functionality this product must be installed by qualified engineer abiding by any local regulations.
2. Voltages dangerous to human life are present at some of the terminal connections of this unit. Ensure that all supplies are de-energised before attempting any connection or disconnection.
3. This product do not have internal fuses therefore external fuses must be used to ensure safety under fault conditions.

9. Electrical Connections

Input connections are made directly to screw-type terminals with indirect wire pressure. Choice of cable should meet local regulations. Terminal for Current inputs will accept up to $\leq 4.0 \text{ mm}^2$ single wire or $2 \times 2.5 \text{ mm}^2$ ne wire.



Make sure that the cables are not live when making the connections !

The 230 V power supply is potentially dangerous !



Note that, ...

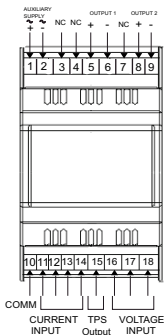
...the data required to perform the electrical insulation task agree with the data on the nameplate of the Isolator (→ input E, → output A1 & A2 and → power supply H !)

...the total loop resistance connected to the output (receiver plus leads) does not exceed the maximum permissible value $R_{ext} \text{ max}$. See "Measuring Output" in sec. 7. Technical data" for the maximum values of R_{ext} !

...the input and output cables should be twisted pairs and run as far as possible away from heavy current cables !

In all other respects, observe all local regulations when selecting the type of electrical cable and installing them !

Connection	Terminal details	
Measuring Current input	+	-
A)0.....24mA	11	10
B)4.....20mA	12	10
C)0.....20mA	13	10
D)0.....10mA	14	10
TPS Output	15	11/12/13/14 (As per sensor full scale value)
Measuring Voltage input		
B)0.....05V	16	10
C)0.....12V	17	10
D)0.....10V	18	10
Measuring output 1	5	6
Measuring output 2	8	9
Auxiliary supply	1	2



E = Input
 H = Power supply
 A1 = Output 1
 A2 = Output 2

Fig.3 Front View of Device for electrical Connections

10. Commissioning

Switch on the measuring inputs and the power supply. The green LED lights continuously after switching on.



The power supply unit must be capable of supplying a brief current surge when switching on. The instruments presents a low impedance at the instant of switching ON which requires a current I_{start} of ≥ 35 mA

11. Maintenance

No maintenance is required.

12. Dimensional Drawings

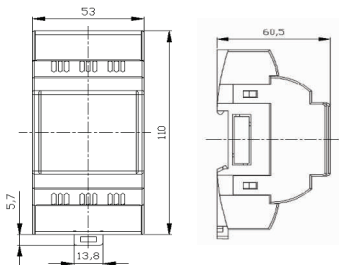


Fig.4 Side view and Front view



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