DIN rail temperature converter PP03

❑ **isolated (1,5 kV / 1 min)** ❑ **user configuration via PC** ❑ **active and passive output**

INPUT SIGNALS	
Termocouples	**J, K, S, B**
	E, R, N, T
RTD sensors	**PT 100, PT 1000**
	Ni 1000, Ni 891
	KTY 81_XXX
Resist.meas.	**0 Ω – 4000 Ω**

OUTPUT SIGNALS ISOLATED	
CURRENT	**0 – 20 mA DC**
	4 – 20 mA DC
due to wirring	**active / passive**
VOLTAGE	**0 – 10 V DC**

PP03 series temperature converters for above specified input signals are used as input interface for control systems, monitoring systems, data collection, controllers and everywhere else, where is conversion form temperature sensors to industry standard (current and voltage output) signals needed. Converter also offers three level galvanic isolation.

FUNCTIONS

- ❑ **TEMPERATURE SIGNAL CONVERSION & LINEARIZATION**
- ❑ **SMALL SIZE 17,5 x 90 x 60 mm**
- ❑ **LINE RESIST COMPENSATION** for RTD sensors
- ❑ **COLD JUNCTION COMPENSATION** for thermocouples
  - without compensation
  - input terminal temperature measuring (internal compensation)
  - fixed temperature compensation (set by user)
- ❑ **TEMPERATURE RANGE ASSIGNMENT TO OUTPUT SIGNAL**
  - by user via communication software* (e.g. 150°C – 500°C → 4-20mA)
- ❑ **INPUT & OUTPUT SIGNAL SELECTION** by user
  - via communication software*
  - active or passive current output signal due to wirring
- ❑ **SIGNALIZATION OF INPUT SIGNAL SENSOR MALFUNCTION**
  - 3 types (signal tracking, signal drop to 2mA, maximal signal)
- ❑ **GALVANIC ÍSOLATION (three level)**
  - input signal from output signal
  - input signal and output signal from power supply

DESCRIPTION

PP03 parameters settings is performed via communication software NP01_T and MERCOS® cable link PU 01 (USB) or PS 01 (RS232). MERCOS® cable link galvanically isolates PP03 from PC.

Communication software allows:

- input and output signal selection
- output signal limitation to 20mA or 10V (w/out limitation 21 mA or 10,5V)
- type of sensor malfunction signalisation selection
- signal filtration selection (polynomial filter, moving average)

PP 03 converter is based on:

- Three-level isolation – pwr.supply X input , pwr.supply X output , input X output
- Measuring input signal by 20-bits AD converter, signal processing by Intel MCU and if selected than mathematical filters are applied (polynomial filter, moving average), galvanic isolation and digital signal conversion by 14-bits DA converter back to analogue output signal.

Input signal sensor malfunction signalisation:

- **signal tracking**: if input signal is out of norm defined range, output signal will drop to zero if input is bellow minimal range or set to maximum if input is above maximum range.
- **drop to 2 mA**: if input signal is out of norm defined range, output signal will drop to 2mA (valid only if 4-20mA output signal is specified)
- **maximal signal**: if input signal is out of norm defined range, output signal will be set to maximum range.

TECHNICAL DATA	
POWER SUPPLY	24 V AC/DC : -15% / +20%
CONSUPTION	max. 2 W – device is protected by reversible fuse
INPUT SIGNAL RTD sensors **continous meas. current 200µA**	**PT100** Ω : -200°C to 850°C, T_k = 3850ppm
	PT1000 Ω : -200°C to 850°C, T_k = 3850ppm
	Ni1000 Ω (5000ppm) : -60°C to 250°C
	Ni1000 Ω (6180ppm) : -60°C to 300°C
	Ni 891 Ω : -50°C to 200°C
	KTY 81/xxx : -50°C to 150°C
Thermocouples	**J** : -210°C to 1200°C
	K : -270°C to 1370°C
	S : -50°C to 1760°C
	B : 50°C to 1820°C
	E : -270°C to 1000°C
	R : -50°C to 1760°C
	N : -270°C to 1300°C
	T : -270°C to 400°C
OUTPUT SIGNAL **linearization due**	PT100/1000 Ω due **ČSN IEC 751**
	thermocouples J,K,S,B,E,R,N,T due **ČSN EN 60584-1**
	KTY 81/xxx due **NXP Semiconductors manuf.**
MAXIMUM INPUT OVERLOAD	PT100, PT1000, Ni1000 : 24 VDC continous
	thermocouples : 48 VDC continous
DIGITAL RESOLUTION	analogue input : 20 bits
	analogue output : 14 bits
COMPENSATION for RTD sensors	line resist: max. 47 Ω for each wire
	wirring connection: 2, 3 or 4 wires
	mathematical line resist compensation : -9,99 to 99,99 Ω
COLD JUNCTION compensation	without compensation
	internal terminal strip temp.measure(resolution 0,1°C)
	fixed temperature (eg.compenastion box): -99 to 999 °C
ACCURACY	max.+/-0,1% from full range of input signal *notice. thermocouple B : bellow 150°C accur. +/- 2°C*
ACCURACY of cold junction internal compensation	+/- 1°C
TEMP.COEFFIC.	0,005% from full range / °C (T_{ref} = 23°C)
ANALOG. OUTPUT signal range	0 – 10 VDC (max. 10,5 VDC if output limitation is disabled)
	0/4 – 20 mA DC (max. 21 mA DC if output limitation is disabled)
ANALOG. OUTPUT signal response time	180 ms (signal change 0-100%) without filtration
	0,4 sec to 4 sec with filtration
ANALOG. OUTPUT impedance	0 – 10 VDC : more than 5 kΩ
	0/4 – 20 mA DC : less than 600 Ω
ANALOG. OUTPUT maximum overload	current : unlimited *(short-circuit resistant)*
	voltage : unlimited *(short-circuit resistant)*
MINIMAL TEMP. RANGE	recommended minimal temp. range is 100°C (e.g. 50°C to 150°C → range is 100°C)
MOUNTING	Plastic DIN rail box – 17,5 mm module
DIMMENSIONS	17.5 x 90 x 60 mm (W x H x D)
ENCLOSURE	IP20

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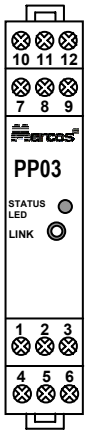
TECHNICAL DATA - continued

WIRRING CONNECTION	terminal strip *max. conductor cross-section is 2,5mm*
WEIGHT	69 grams
STABILISATION	10 minutes
OPERATING TEMPERATURE	- 10 °C / +50 °C
OPERATION	continuos
SITE ALTITUDE	max. 2000 metres above the sea level
EMC radiation	ČSN EN 61326-1 artilce 7 (2006)
	ČSN EN 55011/A1/A2, article 5.2, table 3, article 16 *(bellow limit for group 1 class B)*
EMC immunity influence	max. +/- 0,1% from full signal with unshielded wires

ORDER CODE

PP 03	DIN rail temperature converter PP03. *(see more in order example)*

PP03 converter TERMINAL STRIP



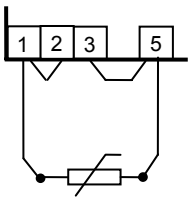
LEGEND

- ❑ **strips 1 – 5** …….…….. analogue input
  - thermocouples
  - RTD sensors
  - direct resistance measure
- ❑ **strips 7 – 9, 12** ……..…… analogue output
  - current active
  - current passive
  - voltage
- ❑ **strips 10 – 11** …….. PP03 power supply
  - 24 VAC or 24 VDC (polarity is not important)
- ❑ **LINK** …….. communication socket for PC connection

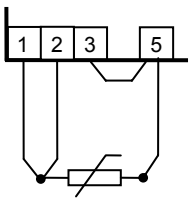
INPUT SIGNALS WIRRINGS for PP03

RTD SENSORS

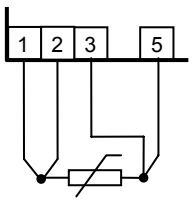
2 wires connection



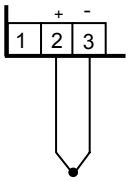
3 wires connection



4 wires connection



THERMOCOUPLES



TERMINAL STRIP CONVERSION TABLE
PP01 to PP03

D = 1	**G = 7**
A = 2	**H = 8**
B = 3	**K = 10**
C = 5	**L = 11**

HOW TO SET PP03

Settings via communication software

ATTENTION: communication socket (LINK) has the potential of input terminal strips. Galvanic isolation of communication is realized by communication cable PS 01 (PU 01).

To setup PP03 converter communication software NP01_T and MERCOS® cable link PS 01 (RS232) or PU 01 (USB) is needed. Actual version of NP01_T communication software is free to download from our webpage: http://www.mercos.eu , where you can also find addtional informations.
NP01_T allows user to:

- select input and output signal type
- set temperature range for analogue output
- select digital filtering for enviroment with high EMC disturbances
- easily configurate multiple converters using templates and automatic reconnection mode
- store upto 30 characters long note into converter (e.g. application description)
- store last configuration date into converter
- select signalisation type if input signal sensor malfunction occurs
- set cold junction compensation for thermocouples

LED diode STATUS

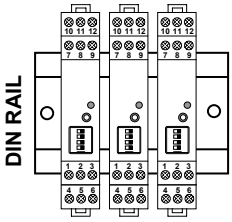
The status LED diode is situated in the middle of the front panel. It has red color and informs user about actual converter status.

STATUS LED	
Continous light	Measuring mode
Slow blinking (two times a second) *Converter does not convert signal.*	Output signal is controled by PC (output signal setup)
	input signal is out of norm defined range
Fast blinking (ten times a second)	Analogue signal converter malfunction, please contact manufacturer.

ORDER EXAMPLE

PP 03: input signal / output signal
- converter is factory set (if no further specified) **:**
input**: thermocouple K**
output**: 4 – 20 mA**
temperature range**: 0 – 1200 °C**
cold junction compensation: **internal terminal strip temp. measure**

MOUNTING EXAMPLE



❑ **RECOMMENDATION:**

- We recommned to mount converter on DIN rail vertically with inputs down.
- In case that operational temperature is expected to be higher than 40°C , we recommned to mount converters on DIN rail with 5mm space.

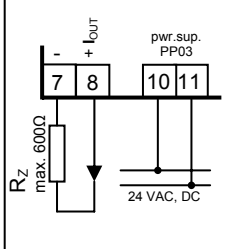
OUTPUT SIGNALS WIRRINGS for PP03

CURRENT OUTPUT

current active

- 0/4 – 20 mA

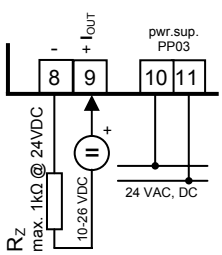
PP03 generates current



current passive

- 4 – 20 mA

PP03 is current whole

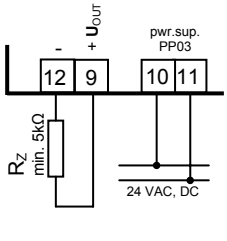


VOLTAGE OUTPUT

voltage active

- 0 – 10 V DC

PP03 generates voltage



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