

Tensiometer converter TP03

- isolated (1,5 kV / 1 minute) active and passive output metallic&semicon. tensiometers

INPUT SIGNALS	
Metalic tens. sensor	+/- 27 mV DC @ 10V (0 - 2,7mV / V)
Semiconductor tens. sensor	+/- 250mV DC @ 5V (0 - 50mV / V)

OUTPUT SIGNALS	
Preset signals	
CURRENT	0 – 20 mA DC
	4 – 20 mA DC
	due to wiring active / passive
VOLTAGE	0 – 10 V DC

TECHNICAL DATA	
POWER SUPPLY	24 V AC/DC : -15% / +20%
CONSUPTION	max. 2 W – device is protected by reversible fuse
Exc.power supply	5V @ 30mA (+/-5%), 10V @ 30mA (+/-5%)
INPUT RESIST.	more than 1 MΩ
CONVERSION	linear
MAXIMAL INPUT OVERLOAD	48 VDC continous
DIGITAL RESOL.	analogue input : 20 bits / analogue output : 14 bits
SIGNAL RESPONSE 10% to 90%	200 ms with basic filtration in normal mode
	25 ms (max.30 ms) w/out filtration in fast mode
SOFTWARE FILTRATION	basic filtration for 50 Hz
	moving avarage, trend filter, old vs. new value
	2nd order polynomial filter for frequencies : 0.1 Hz , 0.25 Hz , 0.5 Hz , 0.75 Hz , 1 Hz , 2 Hz , 5 Hz and higher
ACCURACY	+/- 0,1 % from full range
TEMP.COEFFIC.	0,005 % from full range / °C, Tref = 23 °C
ISOLATION STRENGHT	testing voltage : 1500 V DC / 1 min <i>input vs. output ; power supply vs.input, output</i>
	working voltage : 50 V AC, 75 V AC <i>input vs. output ; power supply vs.input, output</i>
ANALO.OUTPUT	max. 21mA or 10,5 VDC
OUTPUT IMPEDANCE	current output : max. 600 Ω
	voltage output : min. 5 kΩ
MAX. OUTPUT OVERLOAD	current : unlimited (<i>short-circuit resistant</i>)
	voltage : unlimited (<i>short-circuit resistant</i>)
CALIBRATION	valid for one year
MOUNTING	Plastic DIN rail box – 17,5 mm module
DIMMENSIONS	17.5 x 90 x 60 mm (W x H x D)
ENCLOSURE	IP20
WIRING CONNECT.	terminal strip - max. conductor cross-section is 2,5mm
WEIGHT	69 grams
STABILISATION	5 minutes
OPERATING TEMPERATURE	- 25 °C to +50 °C
OPERATION	continuos
SITE ALTITUDE	max. 2000 metres above the sea level
EMC radiation	ČSN EN 61326-1
	ČSN EN 55011/A1/A2 (pod limitem pro sk.1, tř. B)
EMC immunity influence	max. +/- 0,1% from full signal with unshielded wires
APPLICATION	intended solely for industrial or professional use

Tensiometer converter from TP03 line is intended for both metalic and semiconductor tensiometers type. TP03 is used as input interface for control systems. Control software offers various settings and configurations to fit many application. TP03 has several types signal filtration including advanced polynomial filters to suppress vibrations.

FUNCTIONS

SIGNAL CONVERSION

- Weight measure
- Torque measure

COMPACT DIMENSION 17,5 x 90 x 60 mm (1 DIN)

FAST SIGNAL CONVERSION with 25 ms response

DISPLAYING measured physical value in pc software

SOFTWARE FILTERS

- basic filtration 50 Hz
- moving average, trend filter, old vs. new value
- 2nd order polynomial filter for frequencies : 1 Hz , 0.25 Hz , 0.5 Hz , 0.75 Hz , 1 Hz , 2 Hz , 5 Hz and above

INPUT and OUTPUT SIGNAL SELECTION by user

- By PC (using comm.cable and SW MERCOS®) fully user adustable
- Due terminal strip wiring – active or passive current output

EXCITATION POWER SUPPLY for measuring bridge power supply

- 5 V DC @ 30 mA or 10 V DC @ 30 mA selectable by DIP switch

GALVANIC ISOLATION

- Input signal from output signal
- Input signal & output signal from power supply
- Output signal & power supply from exc.supply

DESCRIPTION

TP03 offers complete solution for torque and weight measuring on 6 or 4 wires tensiometer bridges. Measuring bridge is feeded by integrated excitation power supply with switchable voltage 5 V or 10 V @ 30mA. Measuring is realized by sigma-delta AD converter with two selectable configuration +/- 250mV @ 5 V SENSE or +/-27mV @ 10 V SENSE. Analogue output has 0 – 10 V voltage signal and 0 – 20 mA (4 – 20 mA) current signal which could be in active or passive mode.

Tensiometer converter TP 03 requires communication cable PU 01 (USB) for setting and calibration. Communication software Mercos® Office is free to download at: <http://www.mercos.cz/sw/cz/merconn.zip>.

SETTINGS – MERCOS® OFFICE

File Settings (CZ | EN)
Device connection

Devices found:

Communication port:

Auto reconnect

Demo mode:

Search for device and connection

1. We select COM port, where is TP 03 connected and click on „Search device“ button
2. Founded devices are listed in table „Devices found“
3. We select „TP 03“ line which will establish active connection
4. Under „Devices found“ table will appear bargraph, which shows actual progress of configuration data loading from TP 03
5. Once are data loaded, configuration screen is displayed on the right side

Demo mode

1. We select „TP 03“ option from listbox
2. By clicking on button is configuration screen displayed in demo mode – we cannot change values.
3. By clicking on button we exit demo mode.

Notice

To properly exit configuration screen we have to click on button. By clicking on button with active connection, we will be asked to properly exit configuration screen.

To refresh available COM ports please click on button.

NOTICES

FAST MODE

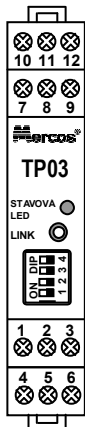
- TP 03 converter only converts signals and it is not possible to establish connection with it. TP 03 has to be in normal mode to establish connection via PU 01.
- To activate FAST MODE we have to set 4th position to ON on DIP switch

OPERATING ZEROING – DIP switch 1st position

- Operating zeroing is available on the 1st position on DIP switch and it is designed to be used only under specific conditions. To process operating zeroing we click on TARE button in communication software MERCOS® Office.
- At the moment of switching the 1st position of DIP switch to ON position is operating zeroing performed and it is active till 1st position of DIP switch is in ON position. By switching 1st position of DIP switch to OFF position is operating zeroing disabled.

ORDER CODE	
TP 03	Tensimetric converter with excitation supply for tensiometric bridge.

TERMINAL STRIP of TP 03 converter

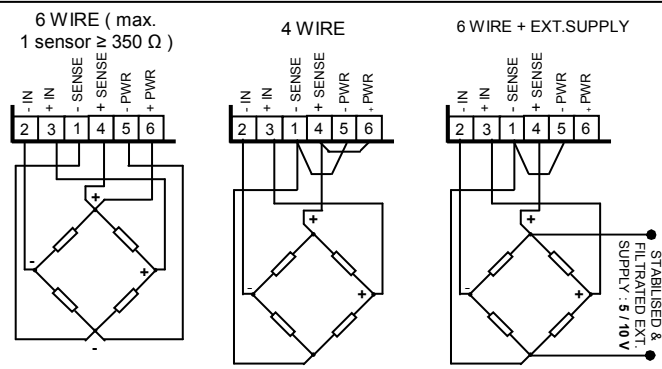


- LEGEND**
- sv. 1, 4 sense
 - sv. 2, 3 IN
 - sv. 5, 6 excitation power supply (PN)
 - 5V @ 30 mA , 10V @ 30mA
 - sv. 7 – 9, 12 analogue output
 - current active and passive
 - voltage
 - sv. 10 – 11 TP03 power supply
 - 24 VAC or 24 VDC (polarity is not important)
 - STATUS LED** shows converter status
 - LINK*** communication socket for PC connection
 - DIP** direct TP 03 configuration
 - 1th pos. : **ON** = OPERATING ZERO , **OFF** = NO OPER. ZERO
 - 2nd pos. : **ON** = 5 V DC (+/- 5%) , **OFF** = 10 V DC (+/- 5%)
 - 4th pos. : **ON** = FAST MODE, **OFF** = STANDART MODE

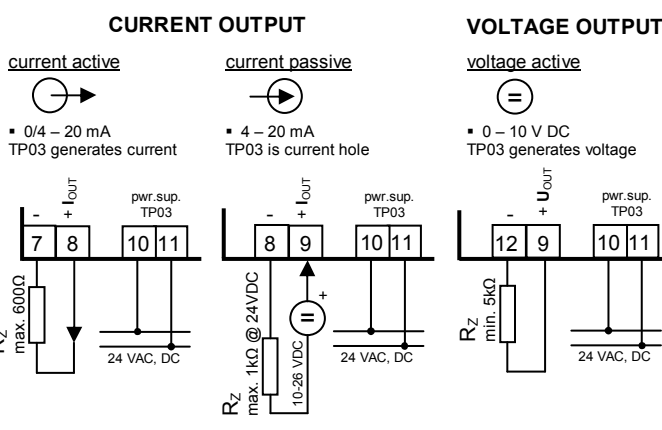
STATUSLED	
Continuous light	TP 03 is in measuring mode and working properly
Slow blinking (two times a second)	Output signal is controlled by PC communication SW – cursor is in „correction of analogue output“
TP 03 is in setup mode – no conversion at this time.	
Fast blinking (ten times a second)	TP 03 converter malfunction, please contact manufacturer.

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

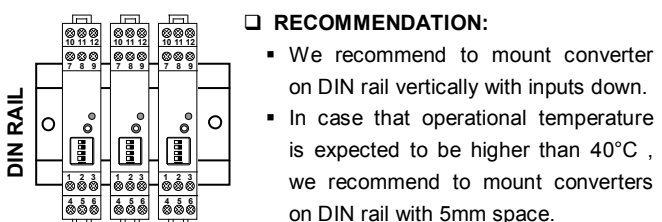
INPUT SIGNALS WIRINGS for TP03



OUTPUT SIGNALS WIRINGS for TP03



MOUNTING EXAMPLE



SETTINGS – MERCOS® OFFICE - continue

Configuration screen

TP 03 - Tensiometer converter

Tensiometer sensor type

- Metallic sensor : 0 - 27mV DC @ 10V (0 - 2,7mV / V)
- Semiconduc. sensor : 0 - 250mV DC @ 5V (0 - 50mV / V)

Analogue output settings

0 - 20 mA 4 - 20 mA 0 - 10 V

Begin of AD scale:

End of AD scale:

Measuring mode selection

Scale Torque measuring

Decimal point

Decimal point:

Weighting capacity settings and scale calibration

Begin of scale:

End of scale:

Empty scale: Tare

Ballast weight: Weight

Correction of analogue output

0 mA: 0 V:

20 mA: 10 V:

Filtration settings

Basic filter

- Basic 50Hz filter
- Trend filter
- Old vs. New

2nd order polynomial filters

- F 0.1Hz (5,8s)
- F 0.25Hz (2,8s)
- F 0.5Hz (1,5s)
- F 0.75Hz (1,1s)
- F 1Hz (0,9s)
- F 1.5Hz (0,7s)
- F 2Hz (0,6s)
- F 5Hz (0,44s)

Fast 2nd order poly.filters

- F 5Hz (0,2s)

Display

Configuration screen introduction

- Options where we select one options from many eg. Metallic sensor, reacts immediately and the selected option is directly stored in TP 03.
- Fields which required number input eg. is red cross displayed in top right corner **X** when value has been changed. This red cross gives us an information that value has been changed but not stored into TP03. By pressing **ENTER** key we store changed number into TP03 and red cross disappears.
- Last type of input field is for eg. . Once we set cursor into this field, TP03 enters **direct analogue output control mode and stops measure**. If value is changed the text is colored into red and as in previous example it has to same behaviour as red cross – when is text red coloured value has not been saved into TP03. This field has specific function, each change of the value leads to sending actual value into converter, which **directly controls analogue output** to simulate analogue output. By pressing **ENTER** key we store changed number into TP03 and TP03 returns back into **measuring mode**.

Measure mode selection

TP 03 has two measuring modes. Each one has own calibrating data stored independently.

- **Weight measure** (standart measure system) works with calibration guidelines and it is possible to perform repeated tare function without influencing weight calibration.
- **Torque measure** (optimal measure system) is calibrated in two points (1st point eg. negative torque and 2nd point positive torque).

Weighting capacity settings and weight calibration

- Select decimal point due to application demands.
 - Set the scale begin value and end value.
 - Clean the weight from any dirt and click button. Service value (direct AD value) is displayed above the button. (The value should be stable and we can repeat measure by clicking button again)
- We have successfully done TARE of the weight.**
- Now we load weight with a defined ballast and enter its weight into field. By clicking button application will return a **calibration status**, based on the difference in service data (TARE and WEGHT) – **weight resolution** (the higher number means better weighting accuracy):
 - (RECOMMENDED) Very good weight resolution (more than 3000)
 - (NOT RECOMMENDED) Very low weight resolution (bellow 300)
 - (WITH A REMINDER) Low weight resolution (between 300 and 3000)**Weight is now calibrated!** We get the best measure results with RECOMMENDED and WITH A REMINDER calibration.
 - (ERROR) Weight calibration was not successful, please check the wires polarity or any short-circuits in wirrings.

Torgue calibration

Kalibrace momentu

1. bod:

2. bod:

- Select decimal point due to application demands.
- Set the scale begin value of the 1st point calibration and simulate corresponding input signal. Now we click button and TP03 will store 1st point calibrating data.
- Continue the same way with the 2nd point.
- Service value is displayd above the button.

Analogue output settings

- select output type (0 - 20 mA / 4 - 20 mA or 0 - 10 V)
- Set the scale begin value of AO and scale end value. (We recommend to set same values as scale weight begin and end values).
- Analogue output correction** offers the trim of TP03's analogue output with control system input to get same displayed value.
 - click on the field, TP03 enters direct analogue output control (see. point 3 configuration screen introduction)
 - now we trim the value to get required value displayed in control systém on its analogue input.

Filtration settings

- In the environments with higher vibration levels and heavy EMC emissions we recommend to enable software filtering and due the situation select filter with the corresponding frequency.

Displaying measured value – in-application only feature

- Click button and the application will enter display mode to display measured value (act as panel display). In display mode is not possible to change configuration.
- Activated display mode is signalized by blinking green spot next to the displayed value.

In case of using more than one tensiometer in application, please use ZPN10_10 power supply which is designed to feed up to 8 tensiometers.