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TSE-RT

Converter/Isolator

User Manual

Translation of the original instructions

TSERT-GB-02-04-A

GENERAL INFORMATION

This instruction manual is an integral part of the Converter/Isolator TSE-RT and users should always make reference to it.

- The signal converter Converter/Isolator TSE-RT, also referred herein as "product" or "device", to which this document refers, is provided for use by persons trained in its use. The instruction must provide for the knowledge of the product and of the maneuvers to be performed during the use, to allow its use in safe conditions.
- All persons trained to work with the product should carefully read this manual in all its sections and understand its contents.
- It is especially important that staff are informed on security with regard to general practices for the protection of people, the product and the surrounding environment.
- Only the correct use of the product as recommended will ensure its lasting and effective use, in full safety for the operators and for the product itself.
- EL.CO. S.r.l. reserves the right to make any formal or functional changes at any time without prior notice.
- The electrical installation where the component is installed must meet the safety requirements in force.
- EL.CO. S.r.l. and its legal representatives do not assume any responsibility for any damage to people, things or animals deriving from violation, misuse, wrong use or otherwise not in accordance with the device features.
- All rights to this documentation are reserved. Translations, reprints and copies of this manual, even if partial and/or otherwise expressly require the consent of EL.CO. S.r.l.

INTENDED USE

The Converter/Isolator TSE-RT may only be used in the following applications:

- Linearization and conversion of analog signals by thermal resistor, resistors, potentiometer, PTC and NTC.

Any other use of the product s not allowed and it is considered improper and therefore dangerous. EL.CO. S.r.l. shall not be liable in any way for damage to persons or property that could occur due to improper use.

Intended recipients of the manual

- This manual is intended for all authorized users and suitable to use the Converter/Isolator.
- All users must read and understand the contents of this manual, which they have to follow while working with the product.
- This manual is an integral part of the product to which it relates and shall be kept throughout its life cycle.
- In case of transfer or sale of the product, the manual and all accompanying documentation, or connected one, shall be maintained and delivered with it.

WARRANTY

The warranty provided by the manufacturer on the product is valid for one year. The following conditions will void the product warranty provided by EL.CO. S.r.l.:

- Improper use of the product, which is different than the expected one, as described in section Intended use *Intended use;*
- Use by unauthorized or untrained personnel;
- Total or partial disregard of these instructions;
- Power supply defects;
- Pollution coming from the outside;
- Changes and unauthorized repairs.

DESCRIPTION OF THE SIGNAL CONVERTER CONVERTER/ISOLATOR TSE-RT

The Converter/Isolator TSE-RT converts and insulates, with high accuracy, an analog signal from thermal resistor, resistor, potentiometer, PTC and NTC isolating it in output in voltage or current. The output signal may be direct or inverse. The device is galvanically isolated on the three ways (input, output and power supply). This is a good protection against interference encountered in industrial environments. The device is fully programmable through the software or via the DIP Switch. The type of input, the burnout function and junction compensation on temperature measurements, the scale range and output in mA or V are programmable via software ELCO TSE-CONF or via DIP switches. The device is housed in a sturdy plastic container, whose thickness is 7.5 mm, suitable for mounting on DIN rails.

- Configurable input for thermal resistor, resistor, potentiometer, PTC and NTC
- Configurable output in voltage or current
- Power supply 8 ... 28 Vdc and 9 ... 24 Vac
- Maximum versatility with programming via PC or Android
- High precision and speed
- A/D converter controlled by a microprocessor
- Reduced absorption
- Isolation on three ways
- High accuracy (0.1%)

- Conversion of the 14-bit measurement
- Voltage presence LED (blue) and off-scale (red) indicator
- Simplified installation with DIN rail mounting
- Extremely compact size (7.5mm thick)
- Programming with software ELCO TSE-CONF and programmerELCO TSE-USB or ELCO TSE-WIFI without the need for external wiring or alternatively via DIP Switch
- EMC compatibility meeting EN 50022 and EN 50035

Areas of use

- Energy, Control Panels, Food Industry

Applications

- Conversion and isolation of temperature signals
- Reduction of space in control cabinets

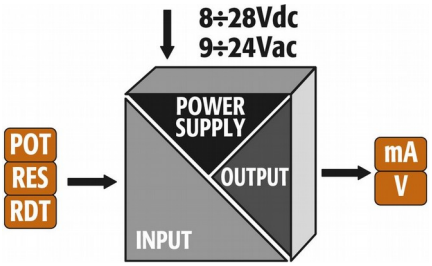
TECHNICAL DATA CONVERTER/ISOLATOR TSE-RT

POWER SUPPLY	8…28 Vdc; 9…24 Vac Protection against reverse polarity 60Vdc max.
CURRENT CONSUMPTION	50 mA max
ABSORPTION	1 W (max)
SENSORS POWER	yes
RESPONSE TIME	35 ms
ACCURACY CLASS	0.1%
INSULATION	1500 Vrms 1 minute on all ways
OPERATING TEMPERATURE	-20°C…+70°C
STORAGE TEMPERATURE	-40 °C…+85 °C
HUMIDITY	0 ... 90% non-condensing
MATERIAL	Self-extinguishing plastic
PROTECTION DEGREE	IP 20
WEIGHT	approx. 50 grams
CONNECTIONS	Screw terminals and cables applicable up to 2.5 mm^2
DIMENSIONS (W x H x D)	90 x 112 x 7.5 mm
ASSEMBLY	on T35 DIN rail according to EN 50022
EMC (for industrial environments)	EN 61000-6-2 (Immunity); EN 61000-6-4 (Emission)
LINEARITY	
Thermal resistor	± 0.1% F.S.
PTC	± 0.1% F.S.
NTC	± 0.1% F.S.
SENSOR EXCITATION CURRENT	<1 mA
INFLUENCE of LINE RESISTANCE	
3-wire thermal resistor	0.05%/Ω (50 Ω max, balanced)
4-wire thermal resistor	0,005%/Ω (100 Ω max, bilanced)
THERMAL DRIFT	
Full-scale	± 0.01%/°C
CONFIGURATION	ELCO TSE-CONF
CALIBRATION (referred to the input span)	
Thermal resistor	the greater of ± 0.1% and ± 0.2°C
Resistor	the greater of ± 0.1% and ± 0.15°C
Potentiometer	± 0.05% F.S.
PTC	the greater of ± 0.1% , full scale
NTC	the greater of ± 0.1% , full scale
OUTPUT CALIBRATION	

Current	± 7 µA
Voltage	± 5 mV
AUXILIARY VOLTAGE	>18 V @ 20 mA
OVER RANGE VALUES	
Output value with input > full scale	22 mA and/or 10,5 V
Output value with input > initial scale	2 mA and/or 10,5 V
VALUES of WIRE BREAK or INPUT OVERLOAD	
Output value	24 mA or 11V
(NOTE: the values shown are those set by the manufacturer. On request it is possible to set the value of WIRE BREAK and output with input > full scale at 0 mA)	
LOAD RESISTANCE on OUTPUT - Rload	
Current output	<500 Ω
Voltage output	>10 kΩ
Short-circuit current	30 mA max

INPUT TYPES and RANGES		
THERMAL RESISTOR (2, 3, 4-wire programmable full scale start-bottom)		
PT 100	-200 ÷ +850 °C	minimum SPAN 50 °C
PT 1000	-85 ÷ +185 °C	minimum SPAN 30 °C
NI 100	-60 ÷ +180 °C	minimum SPAN 50 °C
NIFE 604	-60 ÷ +200 °C	minimum SPAN 30 °C
RESISTOR (2, 3, 4-wire programmable initial/full scale)		
	0…400 Ω	min. SPAN 50 Ω
	0…2000 Ω	min. SPAN 50 Ω
POTENTIOMETER (programmable initial/full scale)		
	0…100%	minimum SPAN 10%
PTC (programmable initial/full scale)		
KTY84-130	-40 ÷ +230 °C	minimum SPAN 50 °C
KTY84-150	-40 ÷ +230 °C	minimum SPAN 50 °C
KTY81-121	-55 ÷ 130 °C	minimum SPAN 50 °C
NTC (programmable initial/full scale)		
COSTER 1K	-10 ÷ +100 °C	minimum SPAN 50 °C
102 AT-2	5 ÷ 95 °C	minimum SPAN 50 °C
CURRENT		
OUPUT (programmable initial/full scale)		
	0…20 mA	min. SPAN 4 mA
	20…0 mA	min. SPAN 4 mA
	4…20 mA	min. SPAN 4 mA
	20…4 mA	min. SPAN 4 mA
VOLTAGE (programmable full scale)		
	0…10 V	min. SPAN 1 V
	10…0 V	min. SPAN 1 V
	0…5 V	min. SPAN 1 V

	5…0 V	min. SPAN 1 V



Overall dimensions (mm)

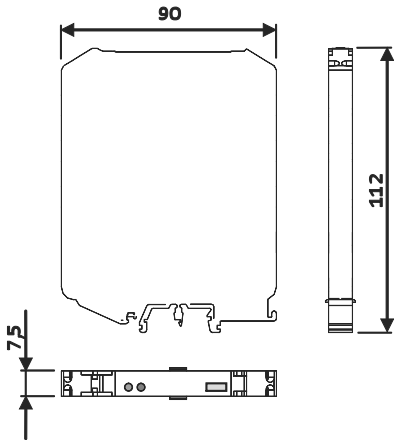


Figure 1- Overall dimensions

INSTALLATION

The device is suitable for mounting on DIN rails in the vertical position. For reliable operation and long life, follow the following guidelines:

- Do not allow the ventilation slots are obstructed by cable ducts or other objects close to them
- Avoid the mounting of the devices above equipment generating heat
- Install the device in a place without vibrations;

Connections

Make the connections according to the following diagrams (Figure 2-). Meet the following conditions:

- Use shielded cables and connect the shield to a ground terminal dedicated to the equipment.
- The cables must not be in the vicinity of cables for power installations as inverters, motors, induction furnaces and the like.

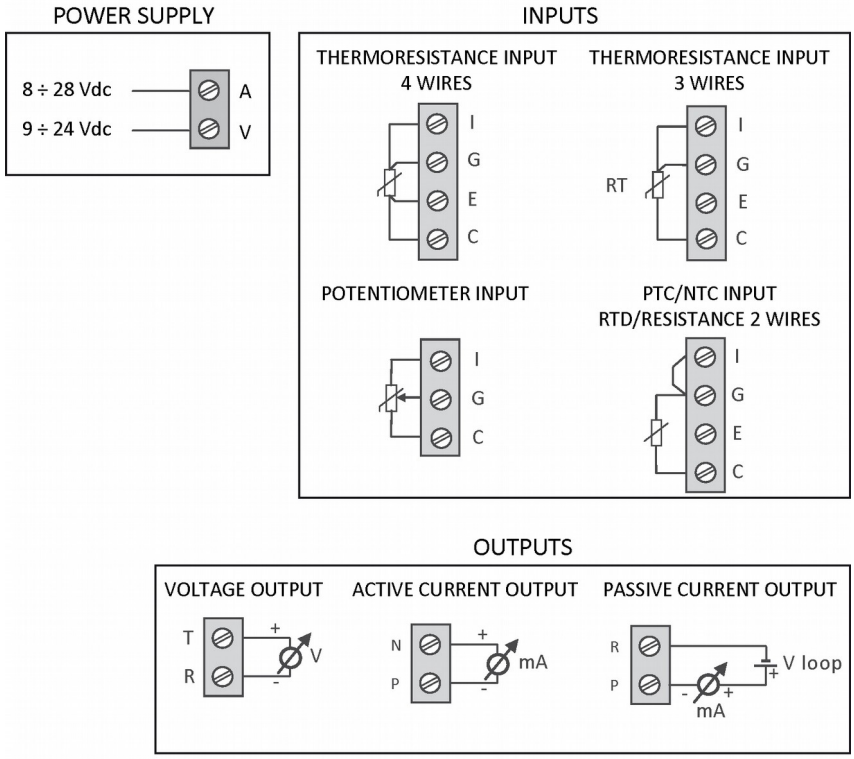


Figure 2- Connections

Use

Please refer to Connections and Figure 2- .

The device must be powered with a DC/AC voltage applied between the A and V terminals. The analog channel acquires the value from the sensor connected to the I, G, E, C terminals and transmits the output measure on the N, P, R and T terminals.

The device can be powered with DC voltage (8 to 28 Vdc) or with alternating voltage (9 to 24 Vac).

Signaling LEDs

BLUE LED - PS (power supply)	ON	Proper power
	OFF	Device not powered
	Flashing	Device under calibration (reserved)
RED LED - OL (out of scale)	ON	Device out of scale (Overload)
	OFF	Proper device range

Configuration via PC

The configuration is done through the software ELCO TSE-CONF and the programmer ELCO TSE-USB as follows.

1- Open the protection plastic door on the front of the device
2- Connect the controller to the PC and the device with a USB-micro USB cable m/m
3- The programmer is powered directly from the PC
4- Open the configuration program
5- When scanning is enabled , the configuration software ELCO TSE-CONF will automatically detect the connected device
6- Set the programming data
7- Press the buttons dedicated to read/write data to the device.

⚠	Do not disconnect the device during the programming procedure

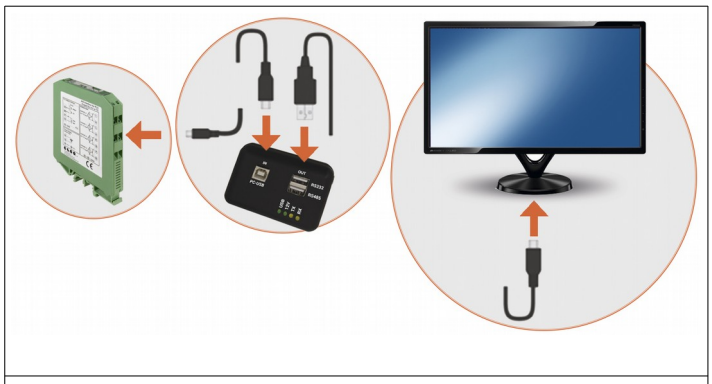
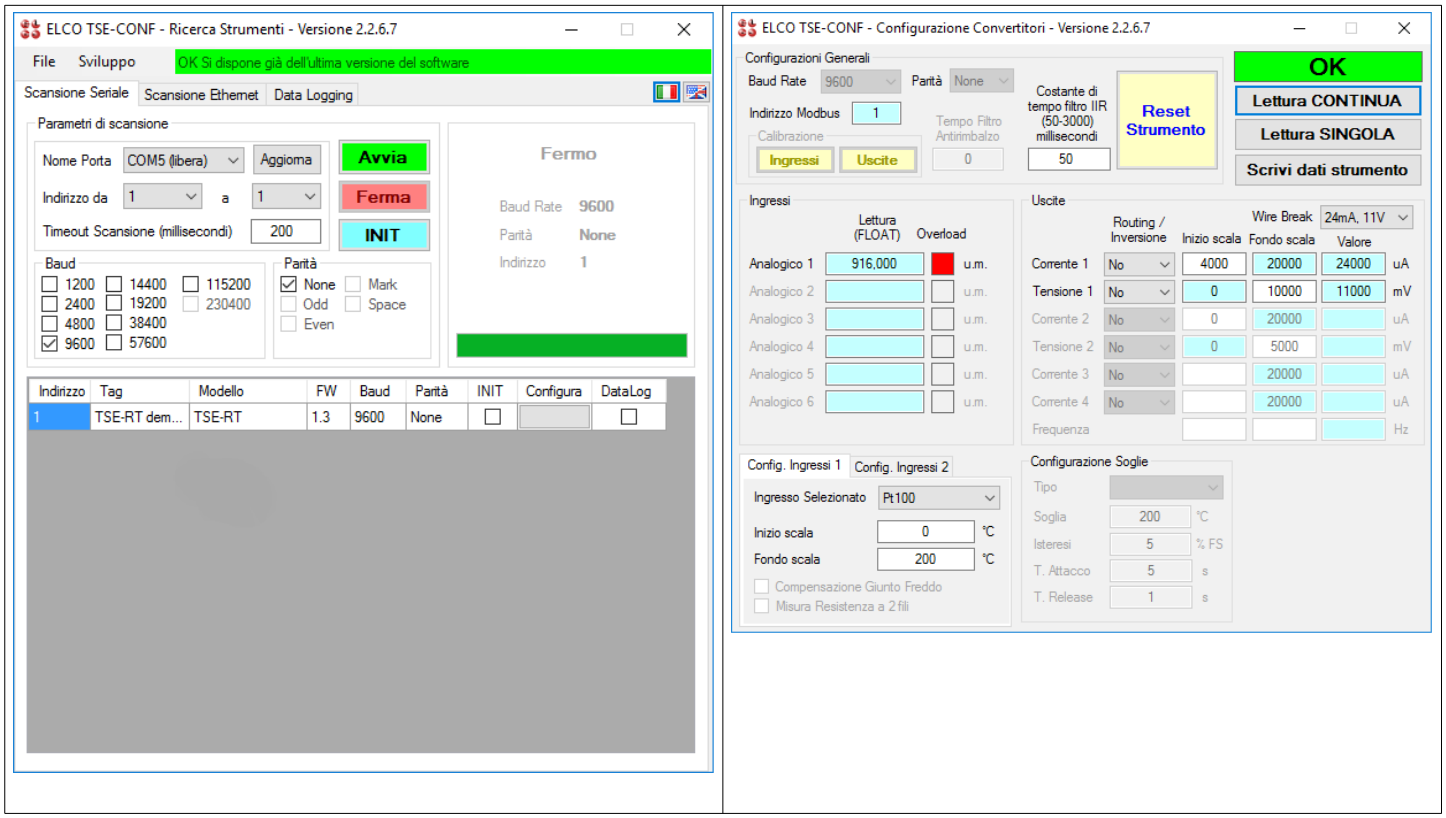


Figure 3- ELCO TSE-USB connection



Also refer to the manual for the configuration software.

Configuration via smartphone or tablet

The configuration is done through the software ELCO TSE-CONF and the programmer ELCO TSE-WIFI as follows.

1- Open the protection plastic door on the front of the device
2- Connect the programmer to your smartphone or tablet via Wi-Fi and to the device via a USB-micro USB cable m/m
3- The programmer is powered directly from its internal battery
4- Open the configuration program
5- When scanning is enabled , the configuration software ELCO TSE-CONF will automatically detect the connected device
6- Set the programming data
7- Press the buttons dedicated to read/write data to the device.

⚠	Do not disconnect the device during the programming procedure

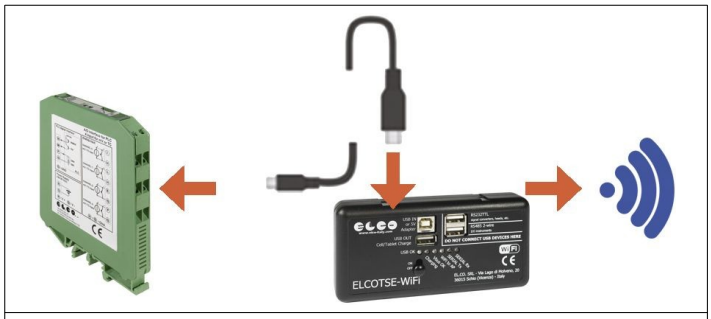
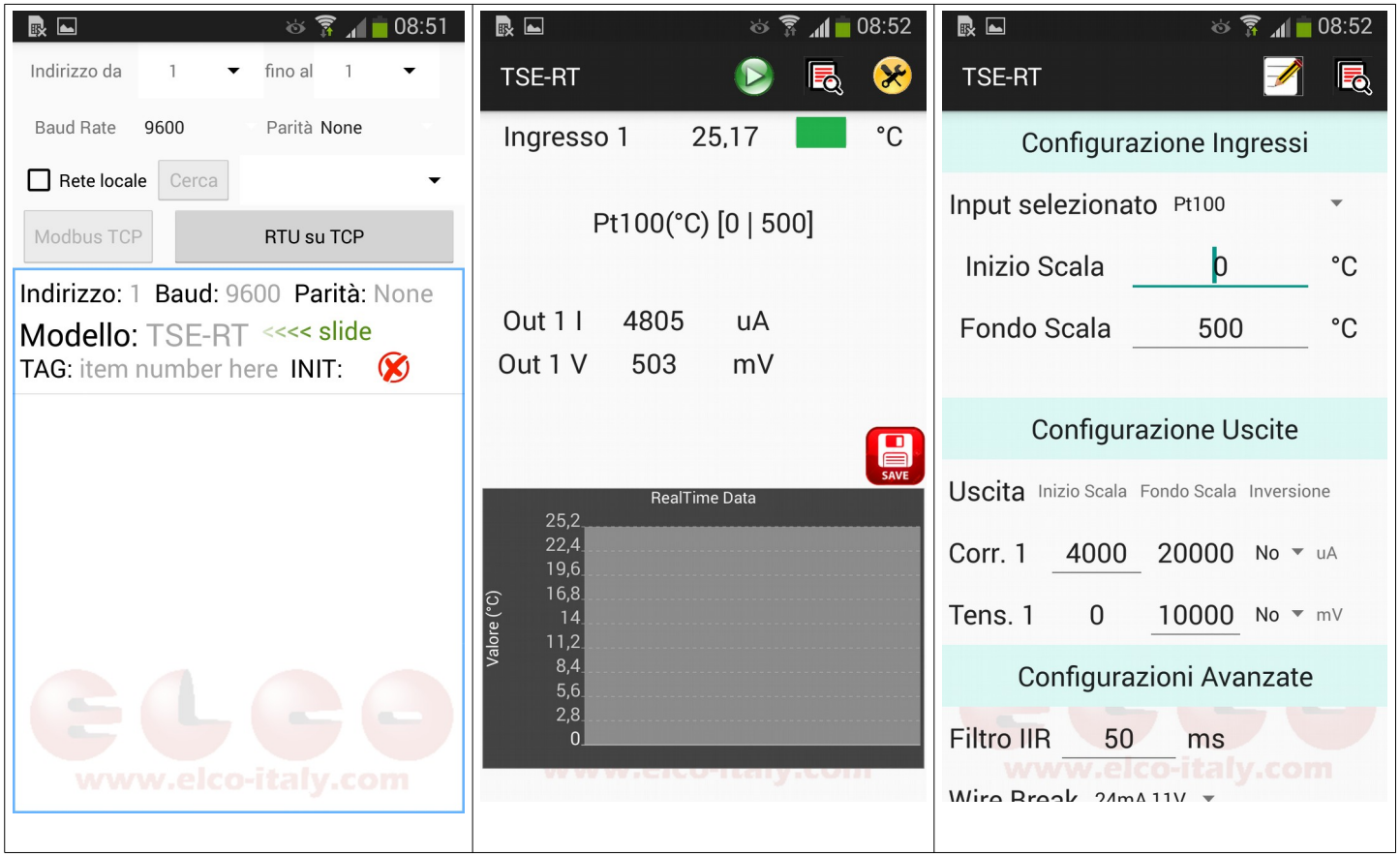
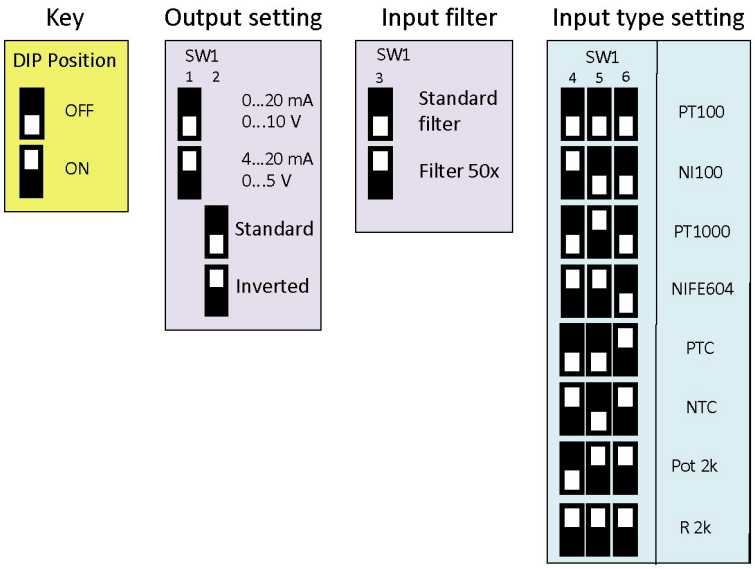


Figure 4- ELCO TSE WI-FI connection



Also refer to the manual for the configuration software.

Setting via DIP Switch



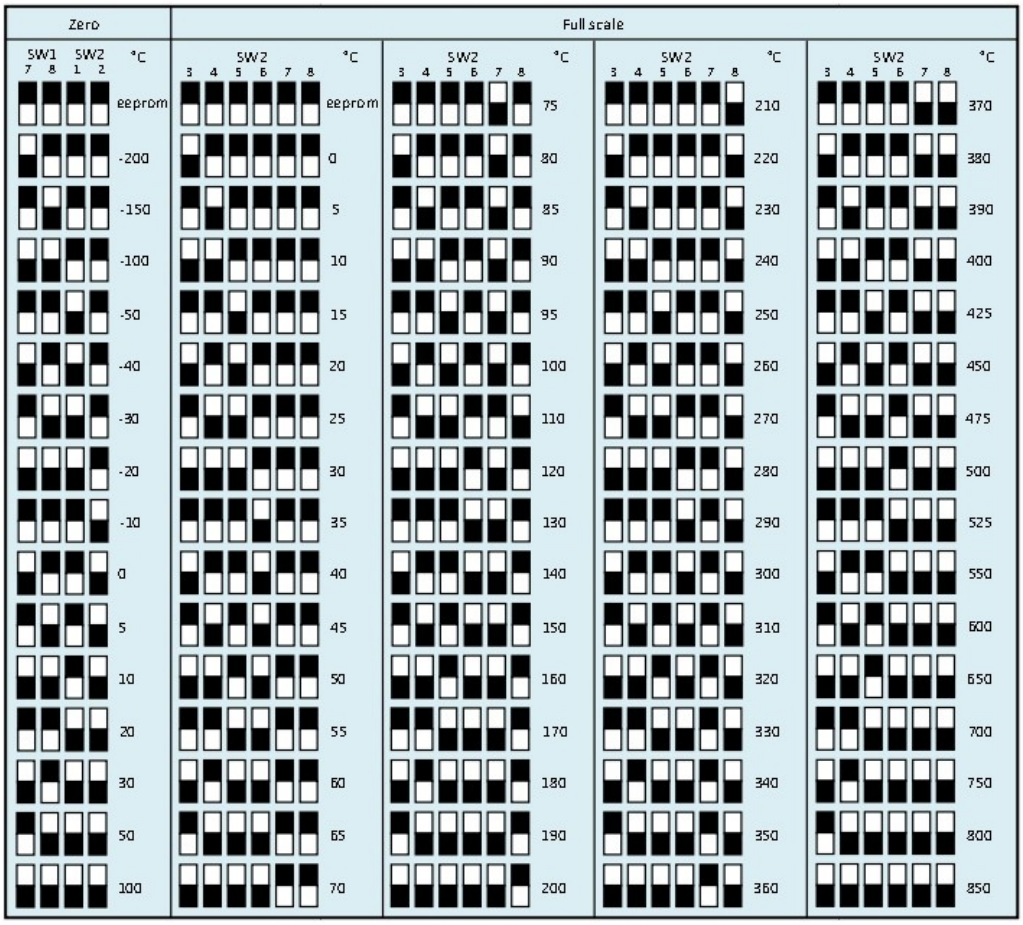


Table 1 - Setting the Scale field for Pt100, Pt1000, NI100, NIFE604

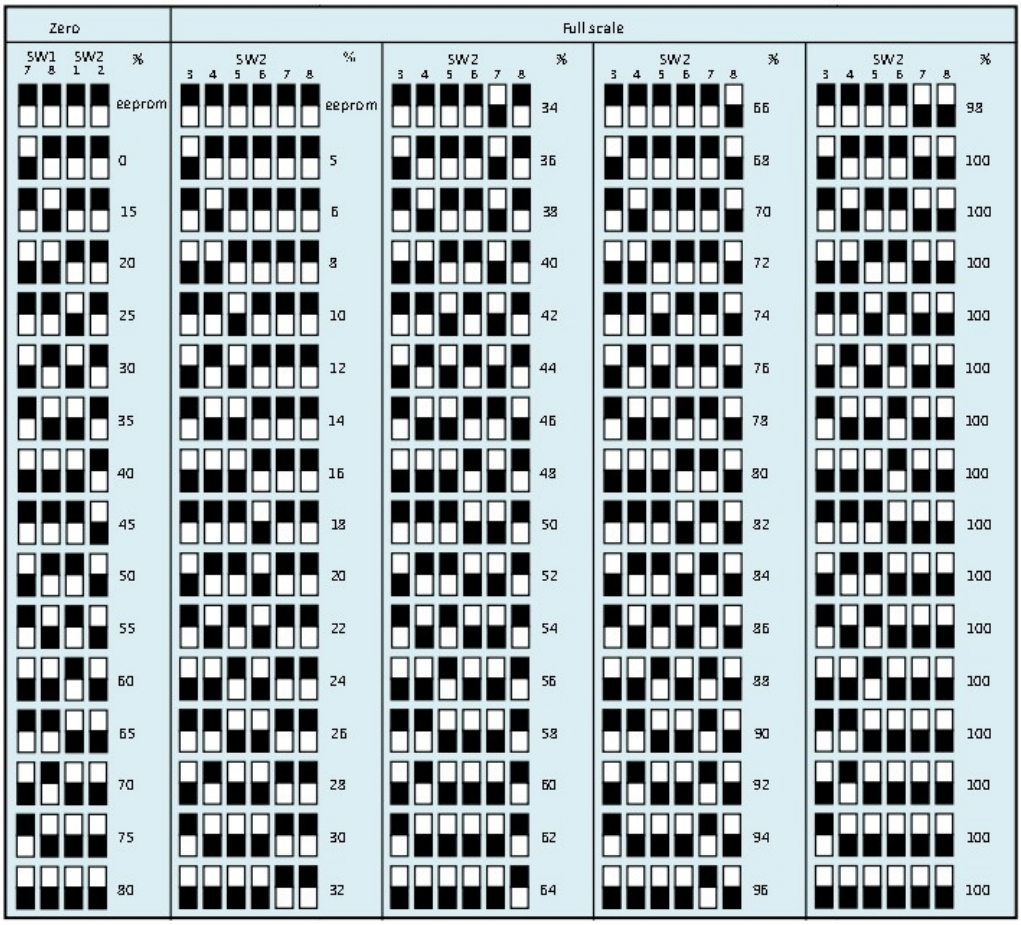


Table 2 - Setting the Scale field for the potentiometer

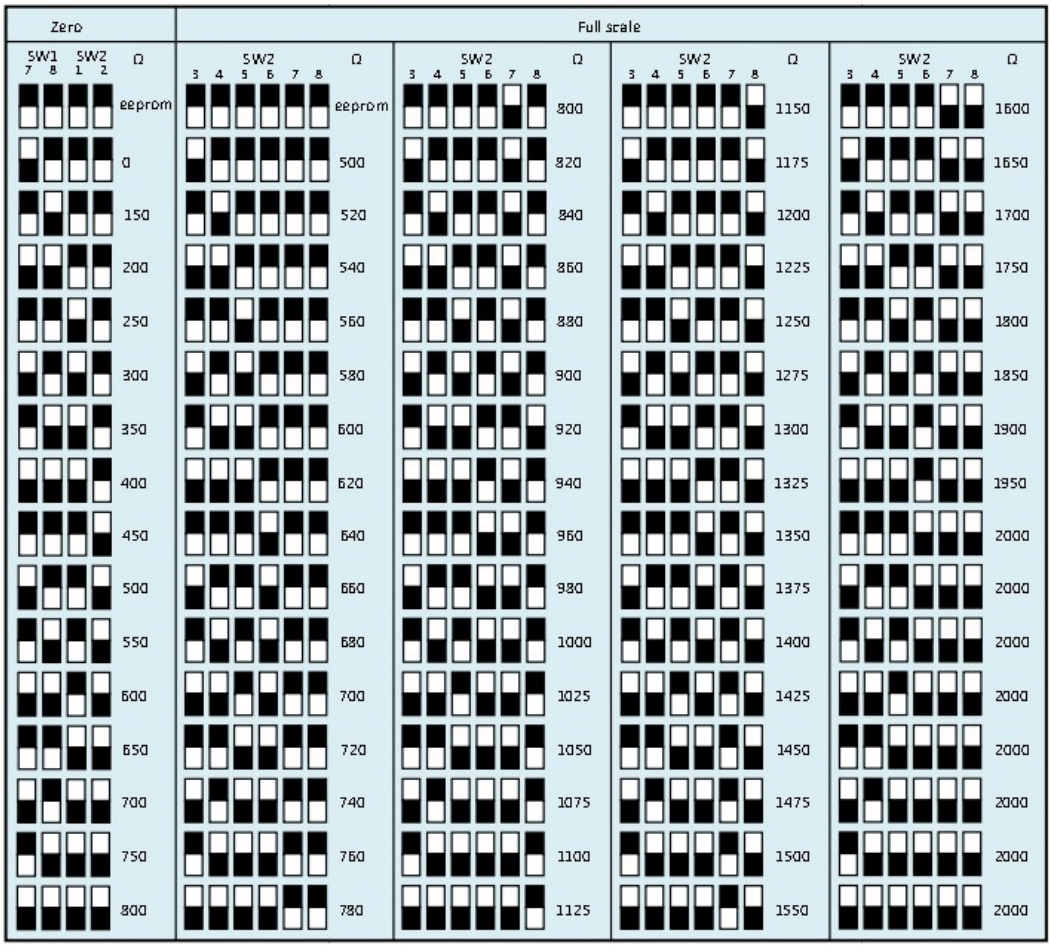


Table 3 - Setting the Scale field for the resistor < 2 kΩ

ORDERING DATA

The device comes pre-configured with the following parameters:

- Entry ticket: PT100
- Temperature range: -200 ÷ 800 °C
- Output: 4-20 mA

Other configurations will be set by the final user.

When ordering, you can require the configuration of the device that will be provided at no extra charge. The order must show:

- Input Type
- Temperature range
- Output Type
- Field of the output scale

Example: TSE-RT - PT100 – 0…200 °C – 0…10V