

ELCO S.r.l.

Via Lago di Molveno, 20

36015 SCHIO (VI) ITALY

TEL. +39 0445 661722

FAX+39 0445 661792

Website: <http://www.elco-italy.com>

e-mail: info@elco-italy.com

support@elco-italy.com

TSE-TC



Signal converter for thermocouples and signals in mV

User Manual

TSETC-GB-02-04-A

Translation of the original instructions

General information.....	2
Intended use.....	2
Intended recipients of the manual.....	2
Warranty.....	2
Description of the signal converter Signal converter TSE-TC.....	2
Areas of use.....	3
Applications.....	3
Technical data Signal converter TSE-TC.....	3
Overall dimensions (mm).....	5
Installation.....	5
Connections.....	5
USE.....	6
Signaling LEDs.....	6
Programming the Signal converter TSE-TC.....	6
Configuration via PC.....	6
Configuration via smartphone or tablet.....	7
Setting via DIP Switch.....	8

GENERAL INFORMATION

This instruction manual is an integral part of the Signal converter TSE-TC and users should always make reference to it.

- The Signal converter TSE-TC, 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 Signal converter TSE-TC may only be used in the following applications:

- Linearization and conversion of analog signals from thermocouples or signals in mV into an isolated current or voltage signal.

Any other use of the product is 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 signal converter Signal converter.
- 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 SIGNAL CONVERTER TSE-TC

The signal converter TSE-TC linearizes and converts, with high accuracy, an analog signal from thermocouple or signals in mV into a voltage or current signal. The output signal may be direct or inverse. The device is galvanically isolated on the three ways (input, output and power supply), thus ensuring effective protection against interference encountered in industrial environments. The device is fully programmable through the ELCO TSE-CONF software or via the DIP Switch. The device is housed in a sturdy plastic container, whose thickness is 7.5 mm, suitable for mounting on DIN rails.

- Configurable input for thermocouple and voltage in mV
- Configurable output in voltage or current
- Power 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 (7.5 mm thick)
- Programming with software ELCO TSE-CONF and programmer ELCO 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, Industry, Food

Applications

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

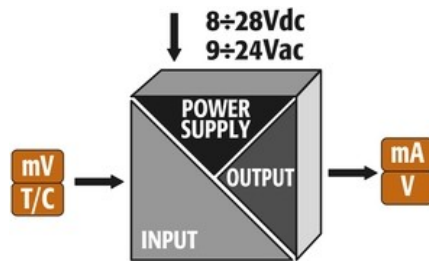
TECHNICAL DATA SIGNAL CONVERTER TSE-TC

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	Wire-break detection
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) in mm	90 x 112 x 7.5
ASSEMBLY	on T35 DIN rail according to EN 50022
EMC (for industrial environments)	EN 61000-6-2 (Immunity); EN 61000-6-4 (Emission)
LINEARITY	
Thermocouple	± 0.1% F.S.
mV	± 0.05% F.S.
INPUT IMPEDANCE	
Thermocouple and mV	≥ 1 MΩ
SENSOR EXCITATION CURRENT	
INFLUENCE of LINE RESISTANCE	
Thermocouple, mV	≤ 0,8 μV/Ohm
THERMAL DRIFT:	
Full-scale	
CJC	
CJC COMPENSATION	± 0.5°C
CONFIGURATION	ELCO TSE-CONF
CALIBRATION (referred to the input span)	
mV or Thermocouple	the greater of ± 0.1% and ± 12 μV
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	22 mA and/or 10,5 V
VALUES of WIRE BREAK or INPUT OVERLOAD	
Output value	24 mA or 11 V
(NOTE: the values shown are those standards set by DEFAULT. 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

THERMOCOUPLE (internal/external CJC, programmable initial/full scale)		
J	-50 ÷ +1200 °C	minimum SPAN 100°C
K	-50 ÷ +1300 °C	minimum SPAN 100°C
S	-50 ÷ +1750 °C	minimum SPAN 400 °C
R	-50 ÷ +1750 °C	minimum SPAN 400 °C
B	0 ÷ 1850 °C	minimum SPAN 400 °C
E	-50 ÷ +1000 °C	minimum SPAN 100°C
T	-50 ÷ +400 °C	minimum SPAN 100°C
N	-50 ÷ +1300 °C	minimum SPAN 100°C
MILLIVOLTMETER (programmable initial/full scale)		
mV	0...100 mV	min. SPAN 5 mV
CURRENT		
OUTPUT (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

NOTE: the recalibration of the device - typically not required and not performed by the consumer - must be performed with external power supply to ensure the integrity of stored data



Overall dimensions (mm)

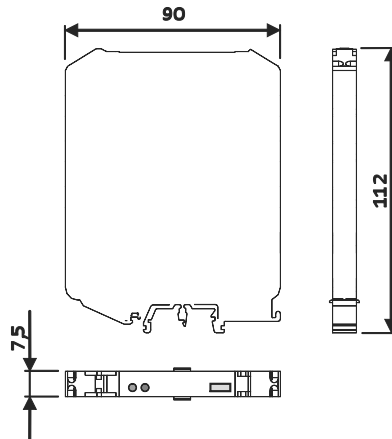


Figure 1- Overall dimensions

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.

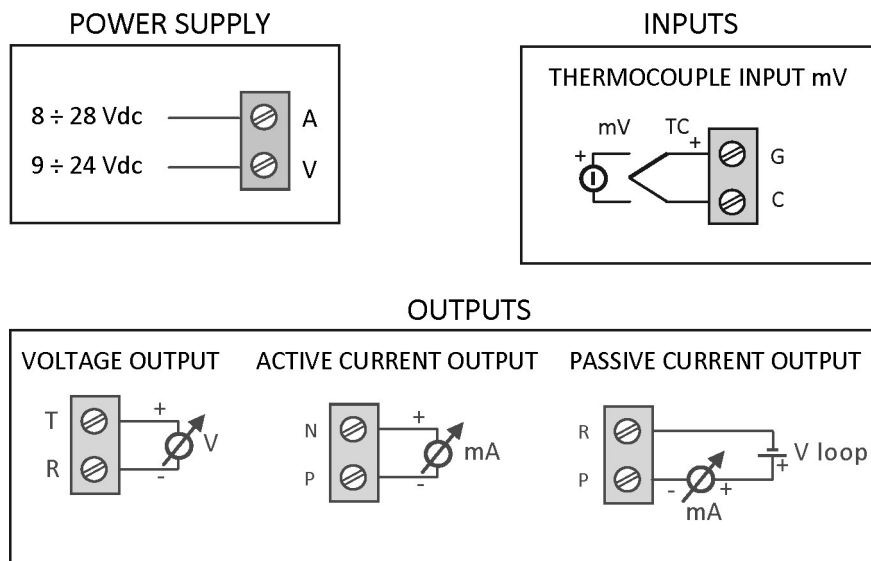


Figure 2- Connections

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 E, C, G and I 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

Programming the Signal converter TSE-TC

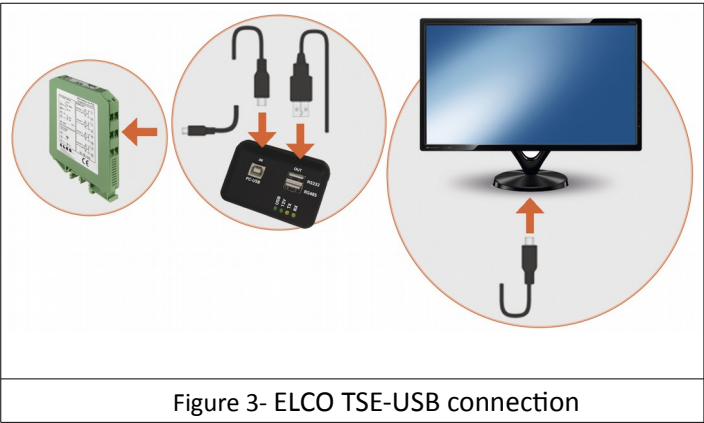
Configuration via PC

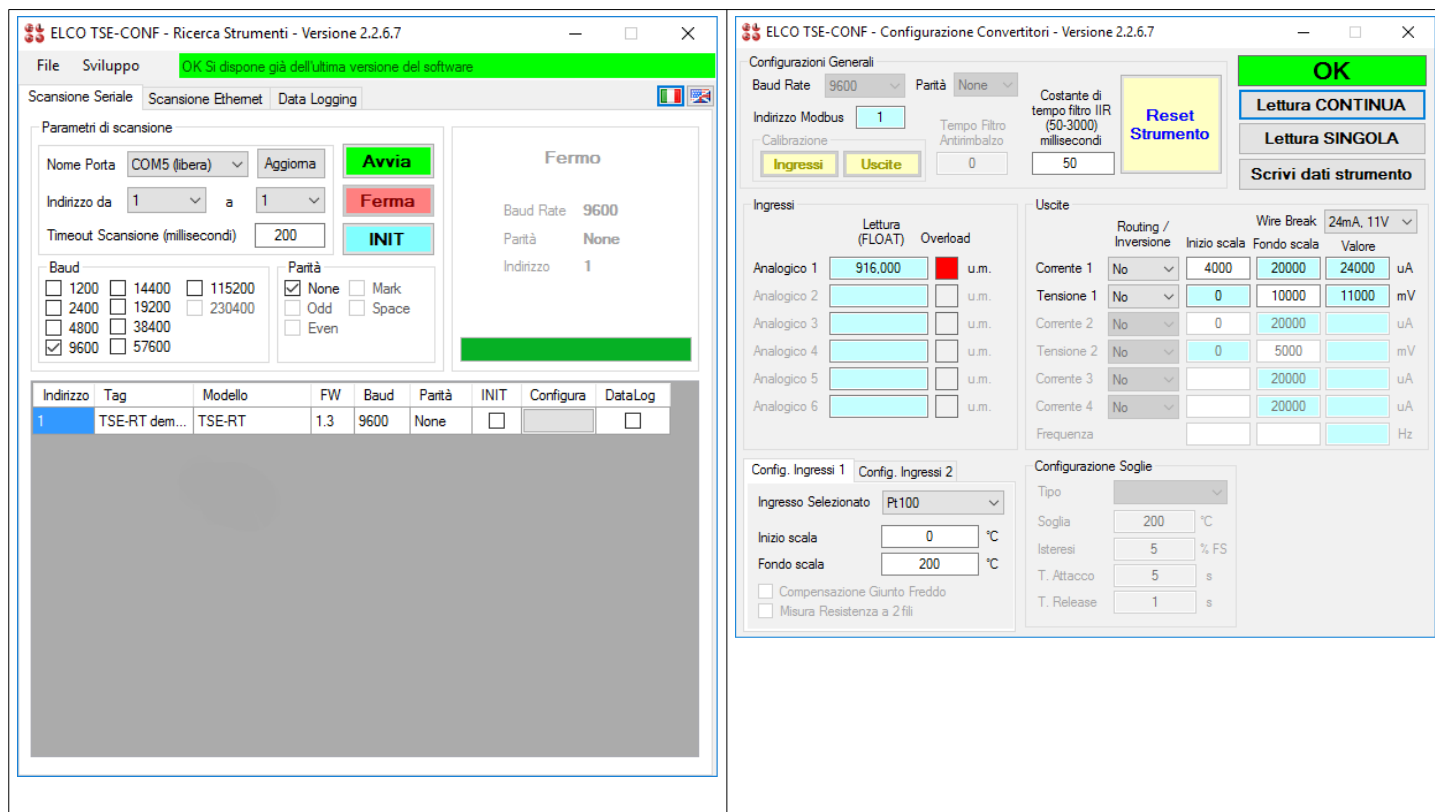
The configuration is done through the software ELCO TSE-CONF and the programmer ELCO TSE-USB as follows.

- 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





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

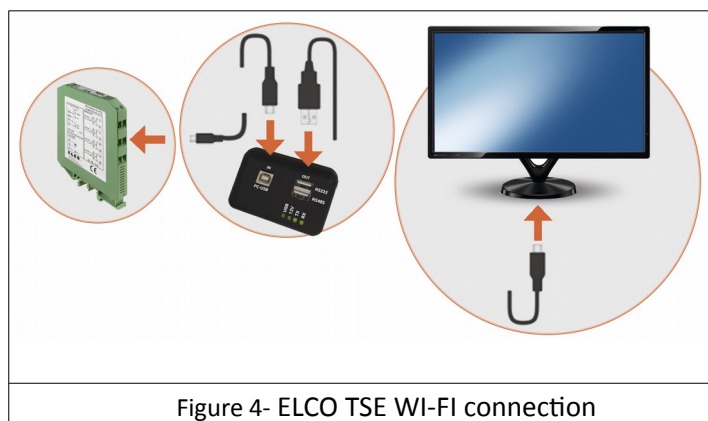
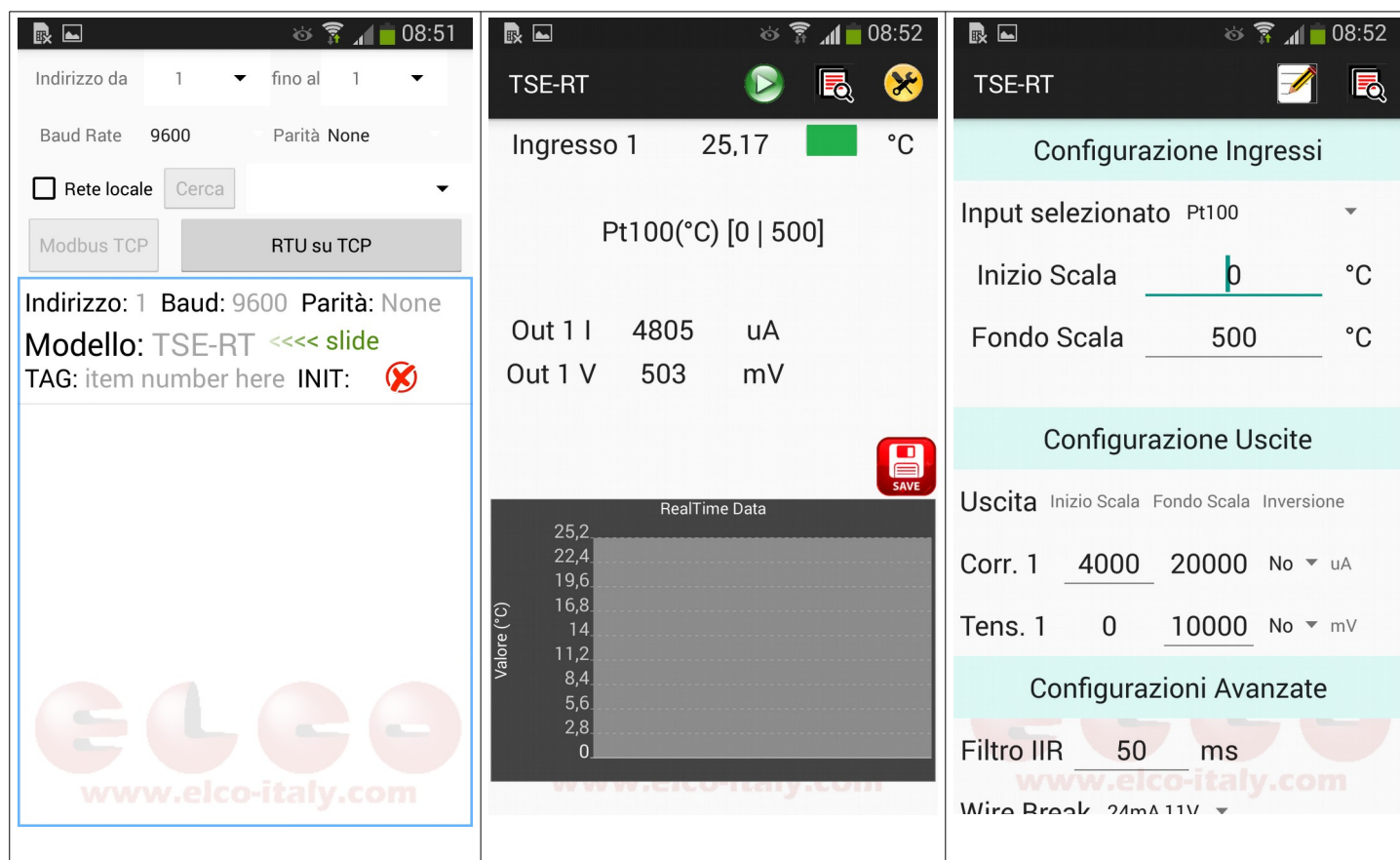
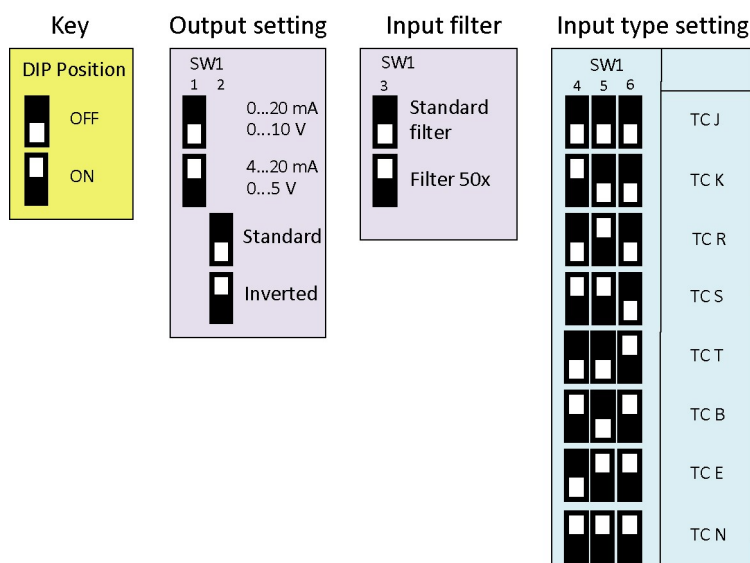


Figure 4- ELCO TSE WI-FI connection



Also refer to the manual for the configuration software.

Setting via DIP Switch



Zero					Full scale																							
SW1		SW2		°C	3		SW2		°C	3		SW2		°C	3		SW2		°C	3		SW2		°C				
7	8	1	2		4	5	6	7	8		4	5	6	7	8		4	5	6	7	8		4	5	6	7	8	
				eeeprom						eeeprom						75							220					700
				-200						a						80							240					750
				-100						5						85							260					800
				-80						10						90							275					850
				-60						15						95							300					900
				-50						20						100							325					950
				-40						25						110							350					1000
				-30						30						120							375					1100
				-20						35						130							400					1200
				-10						40						140							425					1300
				0						45						150							450					1400
				10						50						160							475					1500
				20						55						170							500					1600
				50						60						180							550					1750
				100						65						190							600					1800
				150						70						200							650					1850

Table 1 - Setting the Scale field by Thermocouples

ORDERING DATA

The device comes pre-configured with the following parameters:

- Input: T/C "K" (with cold junction compensation)
- Input scale field: 0-1200°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
- Field of the input scale
- Output Type
- Field of the output scale

Example: TSE-TC - T/C type "K" – 0...1200 °C – 4...20 mA