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TSE-UN-LP

Low profile programmable converter

User Manual

TSE-UN-LP-GB-01-04-A

GENERAL INFORMATION

This instruction manual is an integral part of the Low profile programmable converter TSE-UN-LP and users should always make reference to it.

- The Low profile programmable converter TSE-UN-LP, 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

Low profile programmable converter TSE-UN-LP converts and isolates an analogue signal from Thermocouple, Thermal resistor, Voltage, Current, Potentiometer, Resistor, PTC, NTC, Frequency and mV with high linearity and precision in a Current output 4…20 mA.

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 Low profile programmable 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;
- 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 LOW PROFILE PROGRAMMABLE CONVERTER TSE-UN-LP

Low profile programmable converter TSE-UN-LP converts and isolates an analogue signal from Thermocouple, Thermal resistor, Voltage, Current, Potentiometer, Resistor, PTC, NTC, Frequency and mV with high linearity and precision in a Current output 4…20 mA. The output signal may be direct or inverse. The square root extraction function is available for current input. The device is galvanically isolated on two ways (input and output) for a valid protection against disturbances found in industrial environments. The device is totally programmable via software. The input type, the burnout function and the joint compensation on the temperature measurements, the scale field and the current output are programmable via the ELCOTSE-USB or ELCOTSE-Wi-Fi configurators.

The device is fully compatible with the applicable CE marking requirements and is housed in a strong, 7.5 mm thick plastic housing suitable for DIN rail mounting.

- Universal input configurable for mV, Thermocouple,
- PTC, NTC, Thermoresistor, Resistor, Potentiometer,
- Voltage, Current and Frequency
- Current output
- Power supply 14…30 VDC
- Maximum versatility with programming via PC or Android
- High precision and speed
- A/D converter controlled by a microprocessor
- Reduced absorption
- Isolation on two ways
- High accuracy (0.1%)
- Conversion of the 14-bit measurement
- Simplified installation with DIN rail mounting
- Extremely compact size (7.5 mm thick)
- Programming with ELCO TSE-CONF software and ELCOTES-USB or ELCOTSE-Wi-Fi configurators without the need for external wiring
- EMC compatibility meeting EN 50022 and EN 50035

Areas of use

- Industry, Energy, Control panels, Water treatment, Naval area

Applications

- Conversion and isolation of analog signals
- Signal processing in areas without external power supply
- Measurement of cathodic protection
- Reduction of dimensions in the control panels

TECHNICAL DATA LOW PROFILE PROGRAMMABLE CONVERTERTSE-UN-LP

POWER SUPPLY	14…30 Vdc (loop-powered)
CURRENT CONSUMPTION	25 mA max.
ABSORPTION	0.7 W (max.)
SENSORS POWER	Passive input, passive output (see note)
RESPONSE TIME	35 ms
ACCURACY CLASS	0.1%
INSULATION	1500 Vrms 1 minute on the two ways
OPERATING TEMPERATURE	-20°C…+70°C
STORAGE TEMPERATURE	-40 °C…+85 °C
HUMIDITY	0 ... 90% non-condensing
CONTAINER	ITALTRONIC
MATERIAL	Self-extinguishing plastic
PROTECTION DEGREE	IP 20
CALIBRATION	approx. 50 grams
CONNECTIONS	Screw terminals and cables applicable up to 2.5 mm^2
DIMENSIONS (W x H x D) in mm	7.5 x 112 x 90
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 and Thermoresistor	± 0.1% F.S.
mV, Voltage and Current	± 0.05% F.S.
INPUT IMPEDANCE:	
Thermocouple and mV	≥ 1 MΩ
Current	~ 56 Ω
SENSOR EXCITATION CURRENT	600 µA
INFLUENCE of LINE RESISTANCE:	
Thermocouple, mV	≤ 0,8 µV/Ohm
3-wire thermal resistor	0.05%/Ω (50 Ω max, balanced)
4-wire thermal resistor	0,005%/Ω (100 Ω max, balanced)
THERMAL DRIFT:	

Full-scale	± 0.01%/°C
CJC	± 0.01%/°C
CJC COMPENSATION	± 0.5°C
CONFIGURATION	ELCOTSE-CONF
CALIBRATION (referred to the input span)	
mV or Thermocouple	the greater of ± 0.1% and ± 12µA
Thermal resistor	the greater of ± 0.1% and ± 0.2 °C
Resistor	the greater of ± 0.1% and ± 0.15
Potentiometer	± 0.05% F.S.
Voltage	the greater of ± 0.1% and ± 2mV
Current	the greater of ± 0.1% and ± 6µA
OUTPUT CALIBRATION	
Current	± 5 µA
OVER RANGE VALUES	
Output value with input > full scale	22 mA
Output value with input > initial scale	4 mA
VALUES of WIRE BREAK or INPUT OVERLOAD	
Output value	24 mA
LOAD RESISTANCE on OUTPUT - Rload	
Current output	see load curve
Short-circuit current	30 mA max.

INPUT TYPES AND SCALE FIELDS

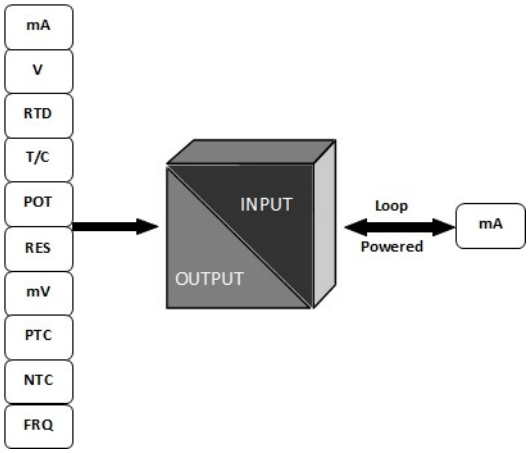
THERMOCOUPLE (internal/external CJC, programmable initial/full scale)		
J	-50 ÷ +1200 °C	minimum SPAN 100°C
K	-50 ÷ +1300 °C	minimum SPAN 100°C
S	-50 ÷ +1750 °C	minimum SPAN 400 °C
R	-50 ÷ +1750 °C	minimum SPAN 400 °C
B	0 ÷ 1850 °C	minimum SPAN 400 °C
E	-50 ÷ +1000 °C	minimum SPAN 100°C
T	-50 ÷ +400 °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
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…500Ω	minimum SPAN 50Ω
	0…2000Ω	minimum SPAN 50Ω
POTENTIOMETER (3 wires, programmable initial/full scale)		
	0…100%	minimum SPAN 10%
PTC (2, 3, 4-wire programmable initial/full scale)		

KTY84-130	-55 ÷ +250 °C	minimum SPAN 50 °C
KTY84-150	-55 ÷ +250 °C	minimum SPAN 50 °C
NTC (2, 3, 4-wire programmable initial/full scale)		
COSTER 1K (SAF 001)	-40 ÷ +40 °C	
FREQUENCY (programmable initial/full scale)		
	0 ÷ 2000Hz	duty cycle 20% ~ 80%
VOLTAGE (programmable initial/full scale)		
	± 0…10V	minimum SPAN 1V
CURRENT (programmable initial/full scale)		
	± 0…20mA	Minimum SPAN 4mA

Output

Current (programmable initial scale >4 mA)		
	4…20 mA	min. SPAN 4 mA
	20…4 mA	min. SPAN 4 mA

NOTE: Usually, recalibration is not necessary and is not performed by the user.



Overall dimensions (mm)

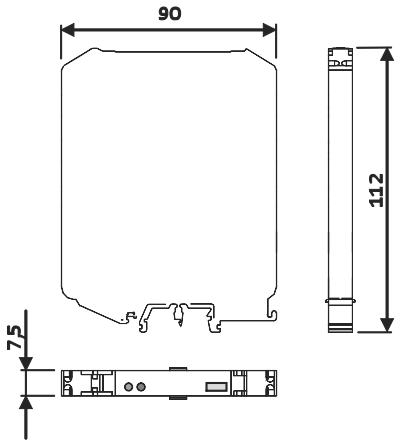


Figure 1- Overall dimensions

INSTALLATION

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

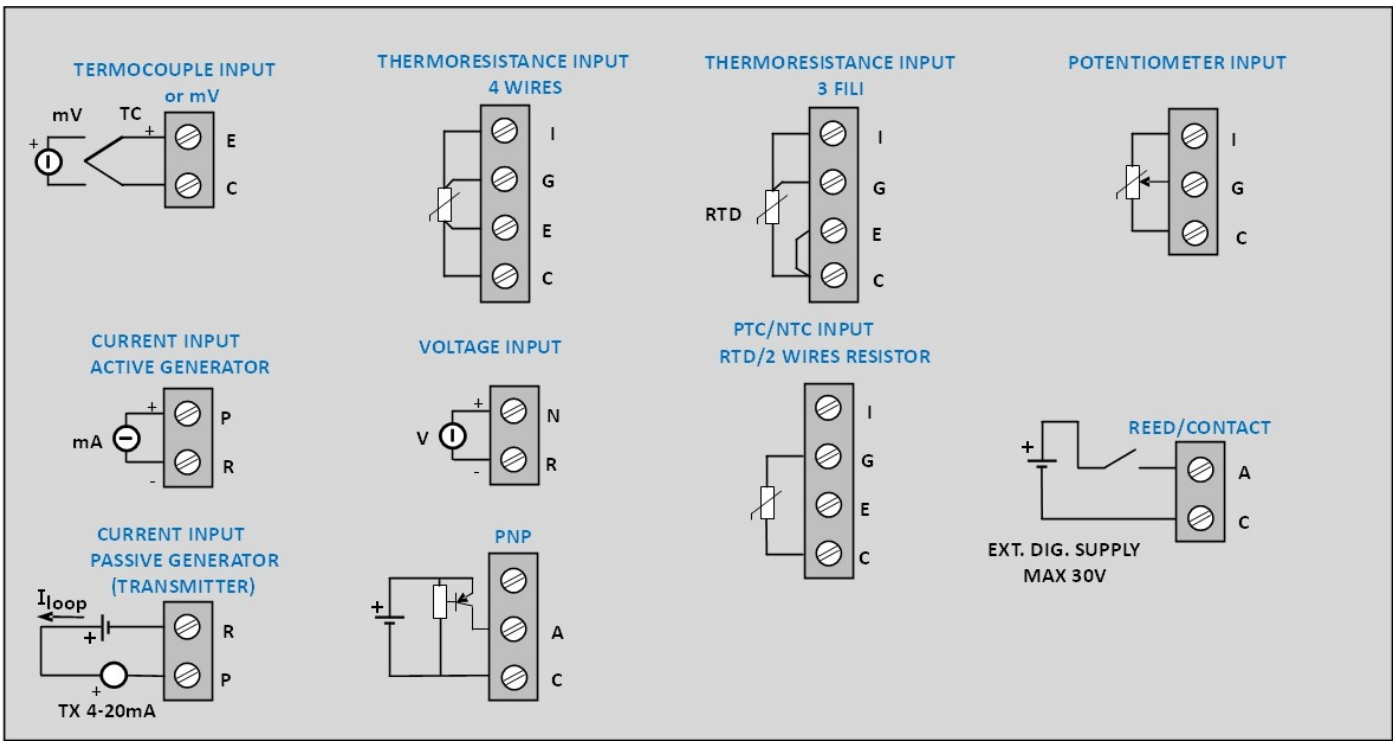
- Do not allow the ventilation slots are obstructed by cable ducts or other objects close to them
- Avoid the mounting of the devices above equipment generating heat
- Install the device in a place without vibrations;

Connections

Make the connections according to the following diagrams (Errore: sorgente del riferimento non trovata). 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.

Inputs



Outputs

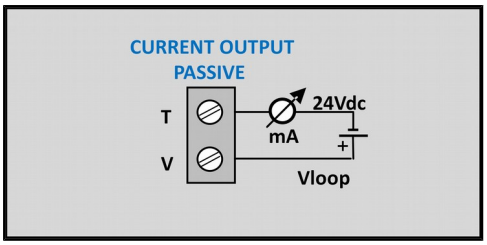


Figure 2- Connections

Use

The device must be powered by a direct voltage between 14 and 30 V applied between V (V+) and T (V-) terminals. The analogue channel acquires the value from the sensor connected to E-G-I-N-P-R-C-A terminals and transfers the output measurement on V-T terminals.

The input and output connections must be made as indicated on Connections and in Figure 2- .

Reconfiguration via software is possible as shown on Programming the Low profile programmable converter TSE-UN-LP.

Programming the Low profile programmable converter TSE-UN-LP

Configuration via PC

The configuration is performed using the ELCO TSE-CONF software and the ELCOTSE-USB configurator as shown below.

1- Open the protection plastic door on the front of the device
2- Connect the configurator to the PC and to the device with a USB-micro USB m/m cable
3- Power the TSE-UN-LP throught terminals V-T
4- Open the configuration program
5- When scanning is enabled, the ELCOTSE-CONF configuration software will automatically detect the connected device
6- Set the programming data
7- Press the buttons dedicated to read/write data in the device.

⚠	Do not disconnect the device during the programming procedure

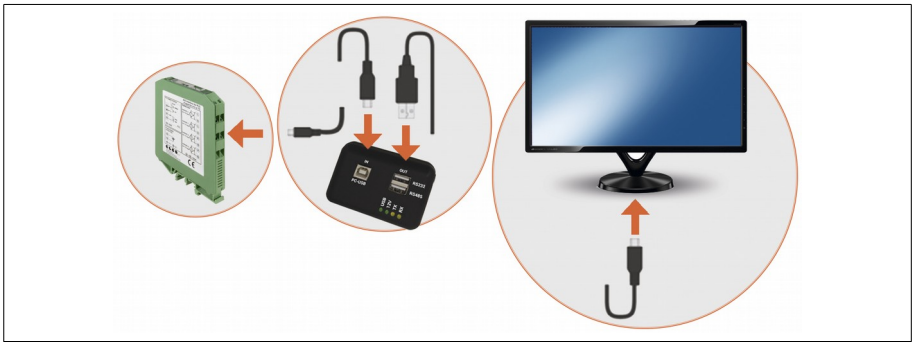
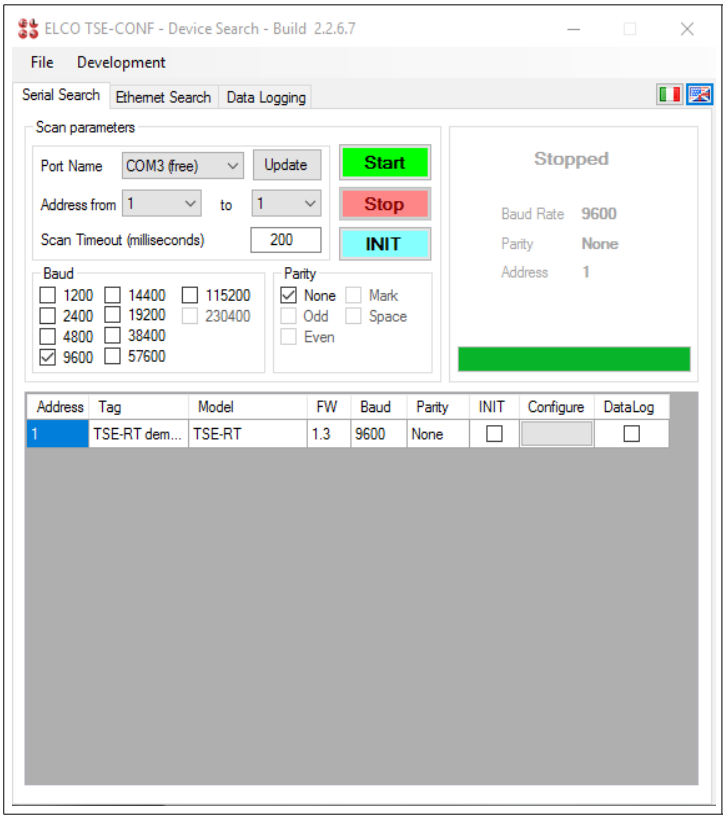


Figure 3- ELCOTSE-USB



Configuration via smartphone or tablet

The configuration is performed using the ELCO TSE-CONF software and the ELCOTSE-Wi-Fi programmer as shown below.

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- Power the TSE-UN-LP throught terminals V-T
4- Open the configuration program
5- When scanning is enabled, the configuration software will automatically detect the connected device
6- Set the programming data
7- Press the buttons dedicated to read/write data in the device.

⚠	Do not disconnect the device during the programming procedure

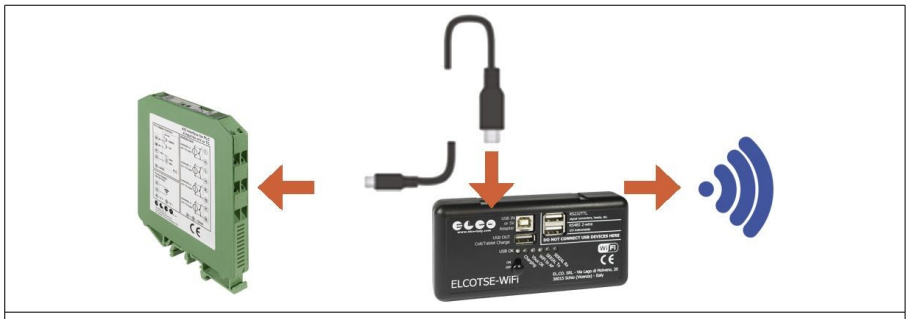
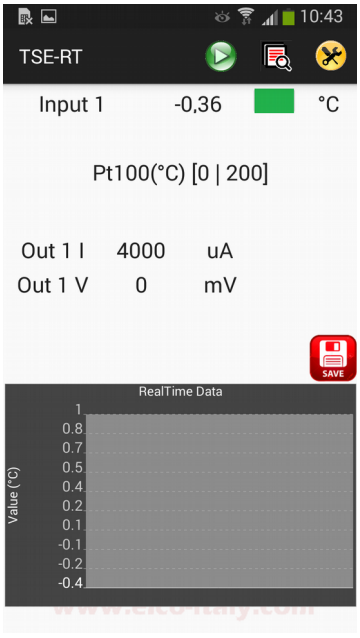
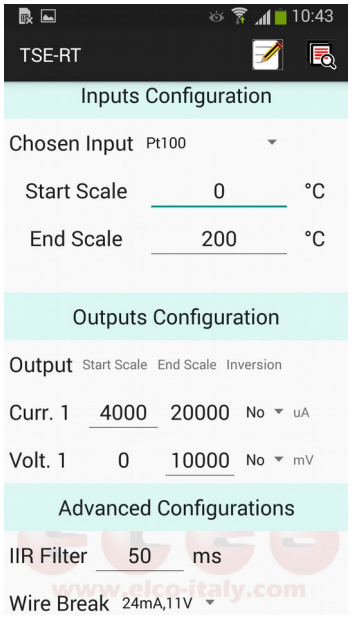


Figure 4- ELCO TSE WI-FI





ORDERING DATA

The device comes pre-configured with the following parameters:

- Entry ticket: Pt100
- Field of the input scale 0-100 °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-UN-LP - Pt100 - 0...20 °C - 0...10 V