

TS130 Digital thermometer

GB ENGLISH

1 GETTING STARTED

1.1 Important

Read these instructions carefully before installing and using the instrument and follow all additional information for installation and electrical connection; keep these instructions close to the instrument for future consultations.

The instrument must be disposed according to the local legislation about the collection for electrical and electronic equipment.

2 INTRODUCTION

2.1 Introduction

TS130 is a family of digital thermometers.

The family is made of the following models:

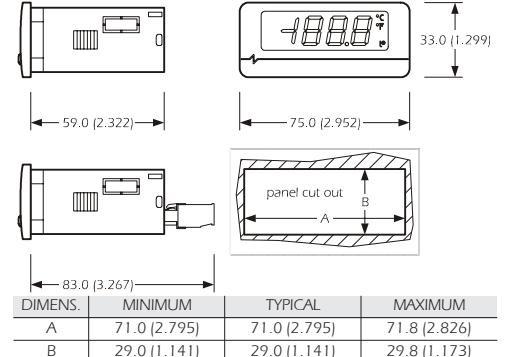
- TS130M* - thermometer working with PTC/NTC probes, J/K thermocouples, 2/3 wires Pt 100, Pt 1000 and Ni 120 probes, 0-20/4-20 mA and 0-10/2-10 V transducers (universal measure input)
- TS130P* and TS130N* - thermometer working with PTC/NTC probes
- TS130J* and TS130K* - thermometer working with J/K thermocouples
- TS130C* - thermometer working with 2/3 wires Pt 100 and Ni 120 probes
- TS130Z* - thermometer working with 2/3 wires Pt 1000 probes
- TS130I* - thermometer working with 0-20/4-20 mA and transducers
- TS130V* - thermometer working with 0-10/2-10 V transducers.

The setting procedures can only be done through the programming key TSKEY (hereinafter only called TSKEY); make sure to have one. Even all TS130 have got the serial port, only TS130M* can work with the supervision system.

3 SIZE AND INSTALLATION

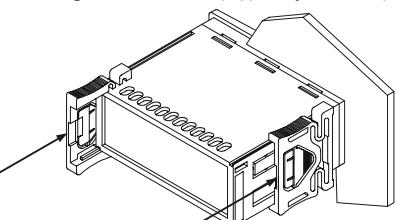
3.1 Size

Size in mm (in).



3.2 Installation

Panel mounting, with click brackets (supplied by the builder).



3.3 Additional information for installation

- 59.0 (2.322) is the maximum depth with screw terminal blocks
- 83.0 (3.267) is the maximum depth with extractable terminal blocks
- the panel thickness must not be higher than 8.0 mm (0.314 in)
- working conditions (working temperature, humidity, etc.) must be between the limits indicated in the technical data
- do not install the instrument close to heating sources (heaters, hot air ducts, etc.), devices provided with big magnetics (big speakers, etc.), locations subject to direct sunlight, rain, humidity, dust, mechanical vibrations or bumps
- according to the safety legislation, the protection against electrical parts must be ensured by a correct installation of the instrument; the parts that ensure the protection must be installed so that you can not remove them if not by using a tool.

5 USER INTERFACE

5.1 Turning on/off TS130

To turn on TS130 you have to supply it; to turn it off it is enough to cut off the power supply.

5.2 The display

If TS130 is turned on, during the normal operation the display will show the room temperature.

6 SETTINGS

6.1 Preliminary information

The setting procedures can only be done through TSKEY; make sure to have one.

The same procedures can be done both if TS130 is supplied and not; in this last case it takes to use the power supplier TSPS (not supplied) and supply TS130 through TSPS via TSKEY.

The power supplier TSPS only supports the setting procedures and not the full operation of TS130.

6.2 Setting configuration parameters

To gain access the procedure:

- cut off the power supply of TS130
- connect TSKEY to the serial port of TS130
- supply TS130: to the end of the internal test the display will show "PC" and the LED of TSKEY will shed green light.

Otherwise:

- supply TS130
- connect TSKEY to the serial port of TS130
- press the button of TSKEY 4 s: the display will show "PC" and the LED of TSKEY will shed green light.

To select a parameter:

- press and release the button of TSKEY.

To modify a parameter:

- press the button of TSKEY 2 s
- press and release the button of TSKEY in 1 s: the parameter value will be increased (in order that the parameter value is decreased, press the button of TSKEY 2 s: the LED of TSKEY will shed red light)
- press the button of TSKEY 4 s.

To quit the procedure:

- press and release the button of TSKEY as long as the display shows the room temperature (press and release the button of TSKEY in 1 min to gain access the procedure again) or do not operate 60 s
- disconnect TSKEY from the serial port of TS130.

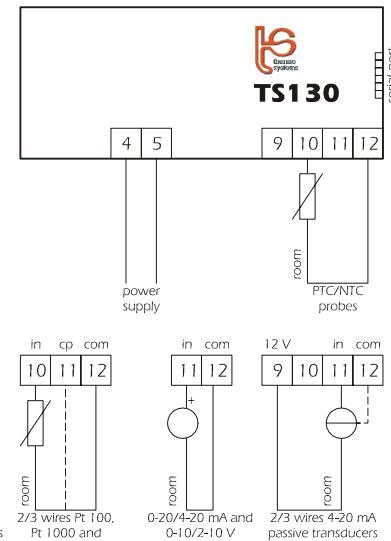
Switch off/on the power supply of TS130 after the modification of the parameters.

4 ELECTRICAL CONNECTION

4.1 Electrical connection

With reference to the wiring diagram:

- the serial port is the port for the communication with the supervision system (through a serial interface, via TTL, with MODBUS communication protocol) or with TSKEY; the port must not be used at the same time for the same purposes
- even all TS130 have got the serial port, only TS130M* can work with the supervision system.



4.3 Restoring the default value of configuration parameters

4.3.1 Electrical connection

- cut off the power supply of TS130
- connect TSKEY to the serial port of TS130
- keep pressed the button of TSKEY
- supply TS130: to the end of the internal test the display will show "Pr" and the LED of TSKEY will shed green light
- release the button of TSKEY
- press and release the button of TSKEY in 60 s to select "Pd"
- press the button of TSKEY 2 s: TS130 will quit the procedure
- disconnect TSKEY from the serial port of TS130.

Make sure the default value of the parameters is appropriate.

4.4 Copying the configuration parameters from TS130 to TSKEY (upload)

4.4.1 Electrical connection

- cut off the power supply of TS130
- connect TSKEY to the serial port of TS130
- keep pressed the button of TSKEY
- supply TS130: to the end of the internal test the display will show "Pr" and the LED of TSKEY will shed green light
- release the button of TSKEY
- press and release the button of TSKEY in 60 s to select "Pp"
- press the button of TSKEY 2 s: the LED of TSKEY will shed red light for a moment, after which TS130 will quit the procedure
- disconnect TSKEY from the serial port of TS130.

The copy of parameters takes 10 s at most; if in this time TSKEY does not signal the operation has successfully been completed (or the LED of TSKEY stops shedding red light to shed green light again), it takes to repeat the copy.

4.5 Copying the configuration parameters from TSKEY to TS130 (download)

4.5.1 Electrical connection

- cut off the power supply of TS130
- connect TSKEY to the serial port of TS130
- keep pressed the button of TSKEY
- supply TS130: to the end of the internal test the display will show "Pr" and the LED of TSKEY will shed green light
- release the button of TSKEY
- press the button of TSKEY 2 s: the LED of TSKEY will shed red light for a moment, after which TS130 will quit the procedure
- disconnect TSKEY from the serial port of TS130.

The copy of parameters from TSKEY to TS130 (download) is only allowed if the original firmware of TS130 and the destination one coincide.

The copy of parameters takes 10 s at most; if in this time TSKEY does not signal the operation has successfully been completed (or the LED of TSKEY stops shedding red light to shed green light again), it takes to repeat the copy.

7 SIGNALS

7.1 Signals of TS130

LED

MEANING

- | | |
|----|---|
| °C | LED Celsius degree
if it is lit, the unit of measure of the temperatures will be Celsius degree (parameter P2) |
| °F | LED Fahrenheit degree
if it is lit, the unit of measure of the temperatures will be Fahrenheit degree (parameter P2) |

7.2 Signals of TSKEY

LED COL

MEANING

- | | |
|-------|--|
| green | pressing and releasing the button of TSKEY the configuration parameter value of TS130 is increased |
| red | pressing and releasing the button of TSKEY the configuration parameter value of TS130 is decreased |

8 ALARMS

8.1 Alarms

CODE

MEANING

- | | |
|-----|---|
| Est | The copy of configuration parameters from TS130 to TSKEY (upload) is failed
Remedies:
▪ disconnect TSKEY from the serial port of TS130
▪ switch off/on the power supply of TS130
▪ repeat the copy
Effects:
▪ no effect |
|-----|---|

Cer

The original firmware of TS130 and the destination one do not coincide

Remedies:

- disconnect TSKEY from the serial port of TS130
- switch off/on the power supply of TS130
- check the original firmware of TS130 and the destination one coincide [check the date of production]

Effects:

- no effect

Erd

The copy of configuration parameters from TSKEY to TS130 (download) is failed

Remedies:

- disconnect TSKEY from the serial port of TS130
- switch off/on the power supply of TS130
- restore the default value of configuration parameters

Effects:

- TS130 could not work properly

9 INTERNAL DIAGNOSTICS

9.1 Internal diagnostics

CODE

MEANING

Pr1	Room probe error Remedies: ▪ look at parameter P0 ▪ check the integrity of the probe ▪ check the connection TS130-room probe ▪ check the room temperature Effects: ▪ the display will not show the room temperature
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When the cause that has provoked the alarm disappears, TS130 restores the normal operation.

10 TECHNICAL DATA

10.1 Technical data

Box:

self-extinguishing grey.

Frontal protection:

IP 65.

Connections:

screw terminal blocks (power supply and input), 6 poles connector (serial port); extractable terminal blocks (power supply and input) by request.

Working temperature:

from 0 to 55 °C (32 to 131 °F, 10 ... 90% of relative humidity without condensate).

Power supply:

230 VAC, 50/60 Hz, 3 VA (approximate); 115 VAC or 12-24 VAC/DC or 12 VAC/DC by request.

Measure inputs:

1 (room probe) for PTC/NTC probes, J/K thermocouples,

2/3 wires Pt 100, Pt 1000 and Ni 120 probes, 0-20/4-20 mA and 0-10/2-10 V transducers (according to the model; look at paragraph 2.1).

Working range:

from -50 to 150 °C (-50 to 300 °F) for PTC probe,

from -40 to 110 °C (-40 to 230 °F) for NTC probe, from -100 to 800 °C (-140 to 1,450 °F) for J thermocouple, from -100 to 1,300 °C (-140 to 2,350 °F) for K thermocouple, from -200 to 650 °C (-320 to 1,200 °F) for 2/3 wires Pt 100 probe, from -200 to 650 °C (-320 to 1,200 °F) for 2/3 wires Pt 1000 probe, from -80 to 300 °C (-110 to 570 °F) for 2/3 wires Ni 120 probe.

Resolution:

0.1 °C/1 °C/1 °F.

Copy of parameters takes 10 s at most; if in this time TSKEY does not signal the operation has successfully been completed (or the LED of TSKEY stops shedding red light to shed green light again), it takes to repeat

10 DATI TECNICI**10.1 Dati tecnici****Contenitore:** autoestinguente grigio.**Grado di protezione del frontale:** IP 65.**Connessioni:** morsettiere a vite (alimentazione e ingresso), connettore a 6 poli (porta seriale); morsettiere estraibili (alimentazione e ingresso su richiesta).**Temperatura di impiego:** da 0 a 55 °C (10 ... 90% di umidità relativa senza condensa).**Alimentazione:** 230 VCA, 50/60 Hz, 3 VA (approssimativi); 115 VCA o 12-24 VCA/CC o 12 VCA/CC su richiesta.**Ingressi di misura:** 1 (sonda ambiente) per sonde PTC/NTC, termocoppie J/K, sonde Pt 100, Pt 1000 e Ni 120 2/3 fili, trasduttore 0-20/4-20 mA e 0-10/2-10 V (a seconda del modello; si veda il paragrafo 2.1).**Campo di misura:** da -50 a 150 °C per sonda PTC, da -40 a 110 °C per sonda NTC, da -100 a 800 °C per termocoppia J, da -100 a

1.300 °C per termocoppia K, da -200 a 650 °C per sonda Pt 100 2/3 fili, da -200 a 650 °C per sonda Pt 1000 2/3 fili, da -80 a 300 °C per sonda Ni 120 2/3 fili.

Risoluzione: 0,1 °C/1 °F.**Porta seriale:** porta per la comunicazione con il sistema di supervisione (attraverso un'interfaccia seriale, via TTL, con protocollo di comunicazione MODBUS) o con la chiave di programmazione TSKEY.

Sebbene tutti gli TS130 dispongano di porta seriale, solo TS130M* può funzionare con il sistema di supervisione.

GB ENGLISH**11 CONFIGURATION PARAMETERS****11.1 Configuration parameters**

PARAM	MIN.	MAX.	U.M.	DEF	MEASURE INPUTS
PC	-250	250	°C/F (I)	0	room probe offset
P0	(2)	(2)	---	(2)	kind of probe 0 = PTC 1 = NTC 2 = J 3 = K 4 = 3 wires Pt 100 5 = 2 wires Pt 100 6 = 3 wires Pt 1000 7 = 2 wires Pt 1000 8 = 4-20 mA 9 = 0-20 mA 10 = 2-10 V 11 = 0-10 V 12 = 3 wires Ni 120 13 = 2 wires Ni 120
P1	0	1	---	1	if P0 = 0 ... 7 or 12 ... 13, decimal point Celsius degree (2) 1 = YES if P0 = 8 ... 11, decimal point position (2) 0 = no decimal point 1 = on the digit of ten
P2	0	2	---	0	unit of measure temperature [influential only on LED Celsius degree and on LED Fahrenheit if P0 = 8 ... 11] (2) (3) 0 = °C 1 = °F 2 = LED Celsius degree and LED Fahrenheit degree will remain turned off
P3	-1990	1990	points (4)	0	minimum value of the range of the transducer [only available in TS130M*, TS130I* and TS130V*]
P4	-1990	1990	points (4)	1000	maximum value of the range of the transducer [only available in TS130M*, TS130I* and TS130V*]
PARAM	MIN.	MAX.	U.M.	DEF	SERIAL NETWORK (MODBUS; only available in TS130M*)
LA	1	247	---	247	instrument address
Lb	0	3	---	2	baud rate 0 = 2,400 baud 1 = 4,800 baud 2 = 9,600 baud 3 = 19,200 baud
LP	0	2	---	2	parity 0 = none 1 = odd 2 = even
PARAM	MIN.	MAX.	U.M.	DEF	RESERVED (only available in TS130M*)
E9	0	1	---	1	reserved

(1) the unit of measure depends on parameter P2; parameter PC is in tenths (1 = 0.1 °C/°F; 10 = 1 °C/°F)

(2) the setting range and the default value of parameter P0 depend on the model, as follows

MODEL	SELECTABLE VALUES (DEF)
TS130M*	from 0 to 13 (5)
TS130P*	0 and 1 (0)
TS130N*	0 and 1 (1)
TS130J*	2 and 3 (2)
TS130K*	2 and 3 (3)
TS130C*	4, 5, 12 and 13 (5)
TS130Z*	6 and 7 (7)
TS130I*	8 and 9 (8)
TS130V*	10 and 11 (11)

(3) if parameter P0 has value 0 ... 7 or 12 ... 13 and parameter P2 has value 2, the instrument will work as if parameter P2 had value 0

(4) parameters P3 and P4 are in tenths (1 = 0.1 points, 10 = 1 punto).

ITALIANO**11 PARAMETRI DI CONFIGURAZ.****11.1 Parametri di configurazione****INGRESSI DI MISURA**

offset sonda ambiente

tipo di sonda

0 = PTC

1 = NTC

2 = J

3 = K

4 = Pt 100 3 fili

5 = Pt 100 2 fili

6 = Pt 1000 3 fili

7 = Pt 1000 2 fili

8 = 4-20 mA

9 = 0-20 mA

10 = 2-10 V

11 = 0-10 V

12 = Ni 120 3 fili

13 = Ni 120 2 fili

se P0 = 0 ... 7 o 12 ... 13, punto decimale grado Celsius (2)

1 = SI

se P0 = 8 ... 11, posizione del punto decimale (2)

0 = nessun punto decimale

1 = sul digit delle decine

unità di misura temperatura [influenza solo sul LED grado Celsius e sul LED grado Fahrenheit se P0 = 8 ... 11] (2) (3)

0 = °C

1 = °F

2 = il LED grado Celsius e il LED grado Fahrenheit rimarranno spenti

valore minimo della taratura del trasduttore [disponibile solo nel TS130M*, nel TS130I* e nel TS130V*]

valore massimo della taratura del trasduttore [disponibile solo nel TS130M*, nel TS130I* e nel TS130V*]

RETE SERIALE (MODBUS; disponibile solo nel TS130M*)

indirizzo strumento

baud rate

0 = 2.400 baud

1 = 4.800 baud

2 = 9.600 baud

3 = 19.200 baud

parità

0 = nessuna parità

1 = dispari

2 = pari

RISERVATO (disponibile solo nel TS130M*)

riservato

(1) l'unità di misura dipende dal parametro P2; il parametro PC è espresso in decimi (1 = 0.1 °C/°F, 10 = 1 °C/°F)

(2) il campo di impostazione e il valore di default del parametro P0 dipendono dal modello, nel modo indicato:

MODELLO

VALORI SELEZIONABILI (DEF)

TS130M*

da 0 a 13 (5)

TS130P*

0 e 1 (0)

TS130N*

0 e 1 (1)

TS130J*

2 e 3 (2)

TS130K*

2 e 3 (3)

TS130C*

4, 5, 12 e 13 (5)

TS130Z*

6 e 7 (7)

TS130I*

8 e 9 (8)

TS130V*

10 e 11 (11)

(3) se il parametro P0 è impostato a 0 ... 7 o a 12 ... 13 e il parametro P2 è impostato a 2, lo strumento funzionerà come se il parametro P2 fosse impostato a 0

(4) i parametri P3 e P4 sono espressi in decimi (1 = 0.1 punti, 10 = 1 punto).

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