

## Product information

## Temperature

# Temperature Measuring Transducer TC125



- Universal input for Pt100, Pt1000, thermocouple J / K / S
- Thermocouples with temperature compensation that can be switched off
- Development conforms to EN 61508
- Available with intrinsically safe inputs, type of protection ia, Zone 0/20
- 24 pre-scalings that can be adjusted using trimmer potentiometers
- Analog output 0 (4) .. 20 mA and 0 / (2)..10 V, simultaneously
- Wide range AC / DC or 24 V DC supply
- Optional auxiliary voltage supply via DIN rail bus

## Characteristics

The TC125 temperature transmitters convert signal of temperature resistance (Pt100 / Pt1000) or thermocouples (J, K, S) into standard signals (0 / 4..20 mA and 0 / 2..10 V).

Applications with signals from the Ex area or requirements of higher environmental immunity, require galvanic isolation. This applies especially to grounded temperature sensors.

The TC125 therefore has a 3-way electrical isolation between input, output and auxiliary voltage. PT100, Pt1000 and thermocouples have 8 preconfigured measuring ranges available. With trim potentiometers in the front, zero point and range can be adjusted easily. When using thermocouples, an internal temperature compensation - by measuring the terminal temperature - can be activate or deactivate.

With an intrinsically safe input (EX) the use in Ex-applications is possible.

## Measurement inputs

The following measuring ranges can be configured via DIP switches and adaptable with a trim potentiometer.

Measuring ranges resistance thermometer	
Pt100	Pt1000
-50..50 °C	-50..50 °C
0..50 °C	-30..70 °C
0..100 °C	-20..40 °C
0..150 °C	0..50 °C
0..200 °C	0..100 °C
0..300 °C	0..150 °C
0..500 °C	0..200 °C
0..850 °C	0..250 °C

Measuring ranges thermocouple		
Type J (FeCuNi)	Type K (NiCrNi)	Type S (PtRhPt)
0..250 °C	-50..250 °C	0..1500 °C
0..500 °C	0..500 °C	
	0..750 °C	
	0..1000 °C	
	0..1250 °C	

## Technical data

### Explosion protection

Ignition protection typ ia	Intrinsically safe Inputs
Type	: TC125L-Ex / TC125LP-Ex / TC125M-Ex
Zone 0/1/2	: II (1) G [Ex ia Ga] IIC
Zone 20/21/22	: II (1) D [Ex ia Da] IIIC

Ignition protection typ ic	Intrinsically safe Inputs + Zone 2 installation
Type	: TC125L-Ex / TC125LP-Ex
Zone 2	: II 3 G Ex ec [ic] IIB T4 Gc

Limit values	
Intrinsically safe circuit	U <sub>o</sub> = 2,2V; I <sub>o</sub> = 4,2mA; P <sub>o</sub> = 2,4mW C <sub>i</sub> = 33nF; L <sub>i</sub> ≈ 0mH C <sub>o</sub> = 10,9uF with L <sub>o</sub> = 50mH

Ignition protection typ ec	Without intrinsically safe Inputs, Zone 2 installation
Type	: TC125L / TC125LP
Zone 2	: II 3 G Ex ec IIB T4 Gc

Auxiliary voltage	
TC125M	: 85..250 V AC(47..63Hz), <1,5 W, <3 VA
(Wide-range power supply)	20..125 V DC, < 1,5W

TC125L/LP	: 24 V DC +/-15 %, < 1,5 W
(DC and Power Rail)	

**Product information**

**Temperature**

**Combined data**

**CE conformity**

Low-voltage directive : 2014/35/EU : EN 61010-1  
 EN 60664-1  
 EMC : 2014/30/EU : EN 61326-1  
 ATEX : 2014/34/EU : EN 60079-0  
 EN 60079-11  
 EN 60079-7  
 Rated voltage :  
 EN 60664-1 : 250 V AC, overvoltage category 2,  
 degree of contamination II  
 EN 60079-11 : 250 V AC / 125 V DC  
 Test voltage : 3kV AC between supply / input / output  
 Ambient temperature : -10..60 °C  
 Storage temperature : -20..80 °C  
 Relative air humidity : 10..90 % (no condensation)

**Input**

**Accuracy**

Standard error : 0,2 %  
 Linearity error : 0,05 %  
 Temperature coefficient : 0,01 %/K  
 Output current / voltage : 0,1 %

**Resistance temperature sensor**

Input circuit : 3-wire-compensation,  
 (2-wire connection with elect. bridge)  
 Line resistance : 100 Ohm, max.  
 (integration of safety barriers possible)  
 Break of sensor detection: yes  
 Short circuit detection : yes

**Pt100**

Measuring current : approx. 1 mA  
 Detection range : -70..+850 °C  
 Zeropoint adjustment : approx. +/-8 Ohm (approx. +/-20 °C)  
 End-value adjustment : approx. +/- 15 % of factory end value

**Pt1000**

Measuring current : approx. 100 µA  
 Detection range : -70..+260 °C  
 Zeropoint adjustment : approx. +/- 80 Ohm (approx. +/- 20 °C)  
 End-value adjustment : approx. +/- 15 % of factory end value

**Thermocouple**

Cold junction compensation: yes, selectable  
 Break of sensor detection: yes  
 Detection range : J, Fe-CuNi: -70..+900 °C  
 K, NiCr-Ni: -100..+1250 °C  
 S, PtRh-Pt90/10: 0..1800 °C  
 Zeropoint adjustment : approx. +/- 10 % of factory end value  
 End-value adjustment : approx. +/- 15 % of factory end value

**Analogue outputs**

0/2..10 V : switchable, load <5 mA,  
 short circuit proof  
 0/4..20 mA : switchable, burden <600 Ohm,  
 simultaneous use with voltage  
 output possible

**Behavior in case of error**

Standard : 0 mA; 0 V (downscaling)  
 Option 02 : >21 mA; > 10,5 V (upscaling)

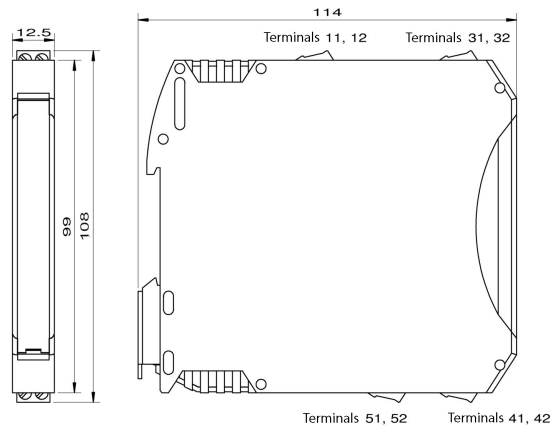
**Transmission path**

Step response T90 : <800 msec

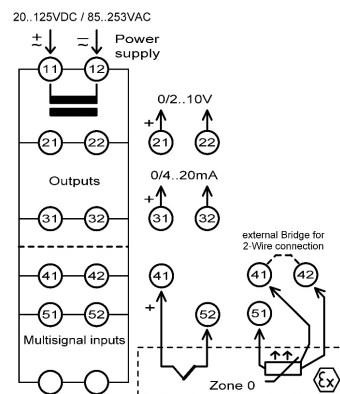
**Housing**

Dimensions (W x D x H) : 12,5 x 114 x 108 mm  
 Material : Polyamid (PA) 6.6, light grey,  
 flammability class V0 (UL94)  
 Weight : 120 g  
 Protection class : IP20  
 Screw terminals : 0,2..2,5 mm<sup>2</sup>, AWG 24..14,  
 removable encoded  
 Push-In terminals : 0,5..1,5 mm<sup>2</sup>, AWG 25..16,  
 (spring clamps) double connection  
 (12A between the connectors),  
 removable encoded  
 Power Rail : 8A over entire bus system  
 (supply via removable terminals  
 0,2..2,5 mm<sup>2</sup>, AWG 24..14

**Dimensions**



**Connection diagram**



**Product information**

**Order code**

1.    2.    3.    4.  
 -  -  -

<b>1. Device version</b>	
TC125L	Supply voltage 24 V DC +/- 15%
TC125LP	Supply voltage 24 V DC +/- 15% Powerrail supply, including rail bus connector
TC125M	Wide-range supply 20..125 V DC / 85..253 V AC
<b>2. Explosion protection</b>	
00*	Installation of devices type TC125 in zone 2, acc. to ATEX ignition protection typ "ec" possible
Ex	In case of installing the devices out of the ex-zone: Input and transmitter feed are intrinsically safe in accordance to ignition protection type "ia" for zones 0 and 20. The devices types TC125L and TC125LP may be installed in zone 2 according to ATEX-ignition protection type „ic
<b>3. Options</b>	
00	Without option
01	Push-In terminals (pluggable)
02	Upscaling output behavior, error state > 21mA, > 10,5V (Standard: Downscaling, output 0mA, 0V)

\*) TC125L / LP-00 may be installed in Zone 2 according to ATEX type of protection "ec". This requires installation in a clean environment in a conductive, earthed housing (control cabinet) with a minimum of IP54 protection.

\*\*) Type of protection permitted when installing the devices outside the Ex area. TC125L / LP-Ex may be installed in Zone 2 according to ATEX type of protection "ic".