

Product information

# 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 (Wide-range power supply)	: 85...250 V AC(47..63Hz), <1,5 W, <3 VA 20..125 V DC, < 1,5W
TC125L/LP (DC and Power Rail)	: 24 V DC +/-15 %, < 1,5 W

## 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)

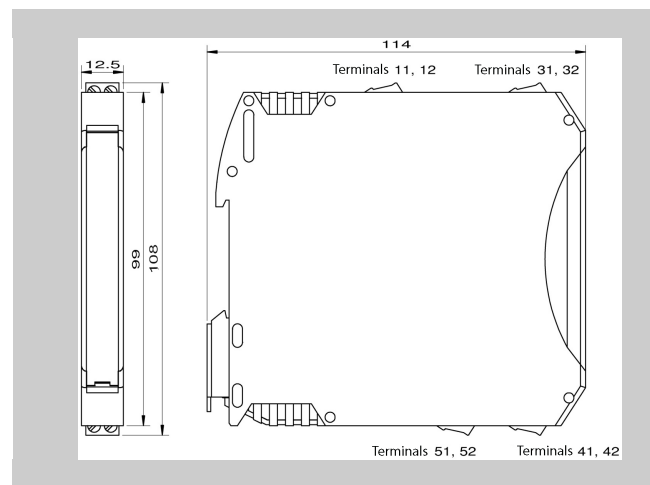
#### Transmission path

Step response T90	: <800 msec
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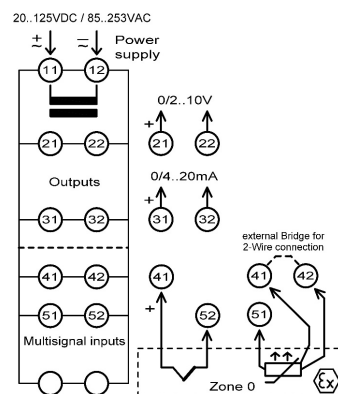
#### Housing

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.  
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<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 (plugable)
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".