TE41 || Digital Temperature Transmitter

The TE41 is the latest generation 4-20 mA output digital head transmitter for temperature measurement of fluids and gases.

It accepts an input signal from thermocouples (TC), resistance thermometers (RTD), resistance transmitters and voltage transmitters. It is easily installed in any industry-standard terminal head (form B, BUS, BUSH, S79, BBK).

Programmable Configuration

The TE41 is programmed for a particular application with the help of a programming kit and a PC. This can be done either before installation (off-line) or after installation (on-line). It can also be factory programmed, prior to delivery, per user requirements (see Ordering Code). The configuration settings are stored in the transmitter's non-volatile memory (EEPROM).

TZ41 Programming Kit

The TZ41 Programming Kit consists of a PC software package, a communication adaptor unit, and a PC connection cable.

The communication adaptor electrically isolates the transmitter from the PC.

Bi-directional data communication allows the TE41's configuration details and tag number to be called from the PC, using the programming kit.

Input

Resistance Type Temperature Sensor: The TE41 is compatible with Pt-100 / Ni100 RTD temperture sensors con. to EN 60751 characteristics and linear resistance transmitters up to 2 kΩ. Lead-wire compensation is possible up to 20Ω.

Thermocouple Sensor: The TE41 is compatible with standard thermocouple sensors con. to EN 60584. Cold junction is available as internal Pt100 or external temperature.

Output

User programmable for 4-20mA or 20-4mA output, with 2-wire loop connection. Sensor open or short condition results in output signal being driven downscale or upscale (user programmable) per NAMUR NE43 specifications.

The device is protected against reverse polarity.

Important Features

- 2-wire 4-20 mA output
- Compatible with thermocouples acc. to EN 60584
- Compatible with Pt-100 RTD sensors acc. to EN 60751 (IEC 751. DIN 43760)
- Unaffected by EMI
- Conform to EMC norms
- High accuracy
- Very low temperature coefficient
- PC programmable
- Sealed against moisture / humidity
- Sensor fault detection

Applications

- Food processing industries
- Heating, ventilation, air-conditioning
- Environmental systems
- Chemical process industries
- Petrochemicals

Specifications

General	
Power supply	24 V DC (8-35 V DC)
Min. input current	< 3.5 mA
Current limit	< 25 mA
Switch on delay	4 sec
Response time	1 sec
Sensor rupture	<3.6 mA >21.0 mA (configurable)
Influence of power supply	Negligible
Connection type	2-wire
Current output	4-20 mA or 20-4 mA
Max. load	(V_{ref} -8V) / 0.025 A
Long term stability	< 0.1 K / year
Temperature drift	0.1 % / K
Calibration temperature	23°C ± 5 K
Adjustable zero range	< 50% FS
Galvanic isolation (I/O)	3.75 kV AC
Damping (programmable)	0-8 sec
Ambient temperature	-40...+85°C
Climatic class	Cl. C, EN 60654-1
Weight	40 g
Protection class	IP 66 / IP 00
EMC immunity	Acc. EN 61326-1 and NAMUR NE 21
Vibration protection	4 g/2...150 Hz

TC Input	
Cold junction	Internal Pt 100 or external (0...80°C)
Cold junction accuracy	± 1 K
Sensor current	30 nA
	Measurement Accuracy
Type K, J, T, E, L, U	typ. 0.5 K
Type N, C, D	typ. 1.0 K
Type S, B, R	typ. 2.0 K

RTD Input	
	Measurement Accuracy
Pt 100, Ni 100	0.2 K or 0.08%
Pt 500, Ni 500	0.5 K or 0.20%
Pt 1000, Ni 1000	0.3 K or 0.12%
Sensor current	< 0.6 mA
Sensor cable resistance	11 Ω per cable
Cable resistance compensation (2-wire)	max. 20 Ω
	Resistance Transmitter
Min. measuring range	10 Ω
Max. measuring range	2000 Ω
	Measurement Accuracy
10...400 Ω	0.1 Ω or 0.08%
20...2000 Ω	1.5 Ω or 0.12%
	Voltage Transmitter
Min. measuring range	-10 mV
Max. measuring range	100 mV
Measurement accuracy	± 20 µV or 0.08%

Ex Versions

Ex approval	Atex II 1 G	EExia	
		IIC	IIB
Inductance	$C_i \cong 0$ F	$C_o \leq 709$ nF	$C_o \leq 1300$ nF
Capacitance	$L_i \cong 0$ H	$L_o \leq 4.5$ mH	$L_o \leq 8.5$ mH
Max. current	$I_i = 100$ mA	$I_o = 4.5$ mA	
Max. voltage	$U_i = 30$ V	$U_o = 9.6$ V	
Max. power	$P_i = 0.75$ W	$P_o = 11$ mW	
Max. ambient temperature	T4 = 85°C T5 = 70°C T6 = 55°C		

Thermocouple (TC) Input

Type	Min. Temperature	Max. Temperature	Min. Span
K	-200°C	1372°C	50 K
J	-200°C	1200°C	50 K
T	-200°C	400°C	50 K
E	-200°C	915°C	50 K
L	-200°C	900°C	50 K
U	-200°C	600°C	50 K
N	-270°C	1300°C	50 K
C	0°C	2320°C	500 K
D	0°C	2495°C	500 K
S	0°C	1768°C	500 K
B	0°C	1820°C	500 K
R	0°C	1768°C	500 K

Resistance Thermometer (RTD) Input

Type	Min. Temperature	Max. Temperature	Min. Temp. Range
Pt 100	-200°C	850°C	10 K
Pt 500	-200°C	250°C	10 K
Pt 1000	-200°C	250°C	10 K
Ni 100	-60°C	180°C	10 K
Ni 500	-60°C	150°C	10 K
Ni 1000	-60°C	150°C	10 K

Adjustment Features

By means of PC configuration kit TZ41

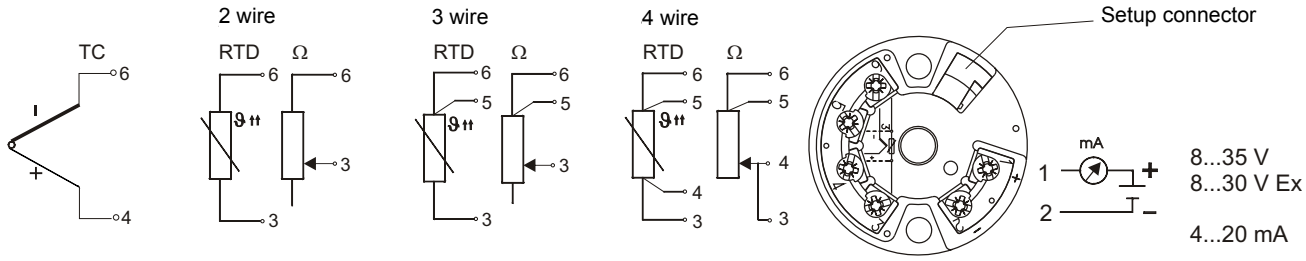
Input

Resistance Thermometer (RTD)	Resistance Transmitter	Thermocouple (TC)	Voltage Transmitter
Pt100, Pt500, Pt1000 acc. to DIN EN 60751 Ni100, Ni500, Ni1000 acc. to DIN 43760	10 Ω ... 2 kΩ	Type B, C, D, E, J, K, L ,N R, S, T, U acc. to DIN EN 60584	-10 mV ... 100 mV
2 wire 3 wire 4 wire			
Measuring range___ - ___ °C	Meas. range ___ - ___ Ω	Meas. range ___ - ___ °C	Meas. range ___ - ___ mV
Extended Adjustments			
Cable resistance compensation: ___ Ω (0...20 Ω) (2 wire RTDs only)		Cold junction: internal (Thermocouples only) external ___ °C (0...80 °C)	
TAG no.: _____(max. 8 digits)			

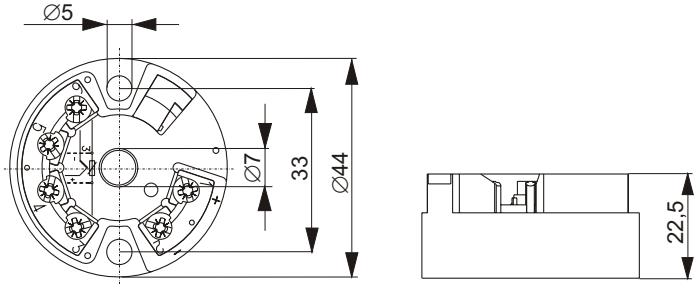
Output

Fault Signal	Signal	Damping
< 3.6 mA (NAMUR)	4-20 mA	0-60 sec.
> 21.0 mA (NAMUR)	20-4 mA	

Terminal Connections



Dimensions (all units in mm unless stated otherwise)



Ordering Code

Digital Temperature Transmitter	TE 41		1						9

Type

Standard ..... > 0
EExiaIICT4/T6 / ATEX II 1 G ..... > 1

Galvanic Isolation 1

Factory Configuration

Without ..... > 0 0 0 0 0

Sensor Type

Pt100 ..... > 1
Ni100 ..... > 2
Pt500 ..... > 3
Ni500 ..... > 4
Pt1000 ..... > 5
Ni1000 ..... > 6
Resistance Transmitter ..... > 7
Voltage Transmitter ..... > 8
Thermocouple Type B ..... > B
Thermocouple Type C ..... > C
Thermocouple Type D ..... > D
Thermocouple Type E ..... > E
Thermocouple Type J ..... > J
Thermocouple Type K ..... > K
Thermocouple Type L ..... > L
Thermocouple Type N ..... > N
Thermocouple Type R ..... > R
Thermocouple Type S ..... > S
Thermocouple Type T ..... > T
Thermocouple Type U ..... > U

Linearisation

With ..... > 1

Input

For RTDs
Input R/Pt100/Ni100-2-wire (specify cable resistance max. 20Ω) ..... > 1
Input R/Pt100/Ni100-3-wire ..... > 2
Input R/Pt100/Ni100-4-wire ..... > 3
For thermocouples
Internal cold junction ..... > 4
External cold junction (specify temperature 0...80°C) ..... > 8

Output

4-20 mA ..... > 1
20-4 mA ..... > 2

Fault Signal

< 3.6 mA (NAMUR) ..... > 2
> 21.0 mA (NAMUR) ..... > 3

Measuring Range_____ - _____ °C / mV / Ω

Accessory: PC Configuration Kit TZ41

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