

Temperature head transmitter

GITT 01 / GITT 01-Ex

Universal head transmitter for resistance thermometers (RTD), thermocouples, resistance and voltage transmitters, settable using a PC, for installation in a sensor head (Form B)

Application areas

- PC programmable (PCP) temperature head transmitter for converting various input signals into an scalable 4 to 20 mA analogue output signal
- Input:
 - Resistance thermometer (RTD)
 - Thermocouple (TC)
 - Resistance transmitter (Ω)
 - Voltage transmitter (mV)
- Online configuration using PC with TMT 181A configuration kit

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Features and benefits

- Universally PC programmable for various signals
- Galvanic isolation
- 2 wire technology, 4 to 20 mA analogue output

- High accuracy in total ambient temperature range
- Fault signal on sensor break or short circuit, presettable to NAMUR NE 43
- EMC to NAMUR NE 21, CE
- UL recognized component to UL 3111-1
- GL Germanischer Lloyd marine approval
- Ex-Certification
 - ATEX Ex ia and dust zone 22 in compliance with EN 50281-1
 - FM IS
 - CSA IS
- Online configuration during measurement using SETUP connector
- Output simulation
- Customer specific measurement range settings or expanded SETUP (see questionnaire, page 5)



Operation and system construction

Measurement principle	Electronic measurement and conversion of input signals in industrial temperature measurement.
Measurement system	The GITT 01 temperature head transmitter is a two wire transmitter with an analogue output. It has measurement input for resistance thermometers (RTD) in 2-, 3- or 4-wire connection, thermocouples and voltage transmitters. Setting up of the TMT 181 is done using the TMT 181A configuration kit.

Input

Resistance thermometer (RTD)

Type	Measurement ranges	min. measurement range
Pt100 Pt500 Pt1000 according to IEC 751	-200 to 850 °C -200 to 250 °C -200 to 250 °C	-328 to 1562 °F -328 to 482 °F -328 to 482 °F
Ni100 Ni500 Ni1000 according to DIN 43760	-60 to 180 °C -60 to 150 °C -60 to 150 °C	-76 to 356 °F -76 to 302 °F -76 to 302 °F
Connection type	2-, 3- or 4-wire connection cable resistance compensation possible in the 2 wire system (0 to 20 Ω)	
Sensor cable resistance	max. 11 Ω per cable	
Sensor current	≤ 0.6 mA	

Resistance transmitter (Ω)

Type	Measurement range	min. measurement range
Resistance (Ω)	10 to 400 Ω 10 to 2000 Ω	10 Ω 100 Ω

Thermocouples (TC)

Type	Measurement range	min. measurement range
B (PtRh30-PtRh6)	0 to +1820 °C	32 to 3308 °F
C (W5Re-W26Re) ^[3]	0 to +2320 °C	32 to 4208 °F
D (W3Re-W25Re) ^[3]	0 to +2495 °C	32 to 4523 °F
E (NiCr-CuNi)	-200 to +915 °C	-328 to 1679 °F
J (Fe-CuNi)	-200 to +1200 °C	-328 to 2192 °F
K (NiCr-Ni)	-200 to +1372 °C	-328 to 2501 °F
L (Fe-CuNi) ^[2]	-200 to + 900 °C	-328 to 1652 °F
N (NiCrSi-NiSi)	-270 to +1300 °C	-454 to 2372 °F
R (PtRh13-Pt)	0 to +1768 °C	32 to 3214 °F
S (PtRh10-Pt)	0 to +1768 °C	32 to 3214 °F
T (Cu-CuNi)	-200 to + 400 °C	-328 to 752 °F
U (Cu-CuNi) ^[2]	-200 to + 600 °C	-328 to 1112 °F
MoRe5-MoRe41 ^[1] accord. to IEC 584 Part 1	0 to +2000 °C	32 to 3632 °F
Cold junction	internal (Pt100) or external (0 to 80 °C; 32 to 176 °F)	
Cold junction accuracy	± 1 K	
Sensor current	30 nA	

Voltage transmitters (mV)

Type	Measurement range	min. measurement range
Millivolt transmitter (mV)	-10 to 100 mV	5 mV

Output (analogue)

Output signal	4 to 20 mA, 20 to 4 mA
Transmission as	temperature linear, resistance linear, voltage linear
Max. load	(V _{power supply} - 8 V) / 0.025 A

Output

[1] no reference

[2] according to DIN 43710

[3] according to ASTM E988

Digital filter 1st degree	0...8 s
Input current required	≤ 3.5 mA
Current limit	≤ 25 mA
Switch on delay	4 s (during power up $I_a = 3.8$ mA)
Reply time	1 s

Failure signal (fault monitoring)

Measurement range undercut	Linear drop to 3.8 mA
Exceeding measurement range	Linear rise to 20.5 mA
Sensor breakage; Sensor short circuit ^[1]	≤ 3.6 mA or ≥ 21.0 mA can be set up

Electrical connection

Power supply	$U_b = 8$ to 35 V DC, polarity protected
Galvanic isolation (In/out)	$\hat{U} = 3.75$ kV AC
Allowable ripple	$U_{SS} \leq 5$ V at $U_b \geq 13$ V, $f_{max.} = 1$ kHz

Reference conditions	Calibration temperature 23 °C (73.4 °F) ± 5 K
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Accuracy

Resistance thermometer (RTD)

Type	Measurement accuracy ^[2]
Pt100, Ni100	0.2 K or 0.08%
Pt500, Ni500	0.5 K or 0.20%
Pt1000, Ni1000	0.3 K or 0.12%

Resistance transmitter (Ω)

Type	Measurement accuracy ^[2]	Measurement range
Resistance (Ω)	$\pm 0.1 \Omega$ or 0.08%	10 to 400 Ω
	$\pm 1.5 \Omega$ or 0.12%	10 to 2000 Ω

Thermocouple (TC)

Type	Measurement accuracy ^[2]
K, J, T, E, L, U	typ. 0.5 K or 0.08%
N, C, D	typ. 1.0 K or 0.08%
S, B, R MoRe5-MoRe41	typ. 2.0 K or 0.08%
Influence of the internal reference junction	Pt100 DIN IEC 751 Cl. B

Voltage transmitter (mV)

Type	Measurement accuracy ^[2]	Measurement range
Millivolt transmitter (mV)	$\pm 20 \mu\text{V}$ or 0.08%	-10 to 100 mV

Influence of power supply	$\leq \pm 0.01\%/V$ deviation from 24 V ^[3]
Load influence	$\leq \pm 0.02\%/100 \Omega$ ^[3]

[1] Not for thermocouple

[2] % is related to the adjusted measurement range (the value to be applied is the greater)

[3] All data is related to a measurement end value (FSD) of 20 mA

Temperature drift	Resistive thermometer (RTD): $T_d = \pm (15 \text{ ppm/K} * \text{max. meas. range} + 50 \text{ ppm/K} * \text{preset meas. range}) * \Delta\vartheta$ Resistive thermometer Pt100: $T_d = \pm (15 \text{ ppm/K} * (\text{range end value} + 200) + 50 \text{ ppm/K} * \text{preset meas. range}) * \Delta\vartheta$ Thermocouple (TC): $T_d = \pm (50 \text{ ppm/K} * \text{max. meas. range} + 50 \text{ ppm/K} * \text{preset meas. range}) * \Delta\vartheta$ $\Delta\vartheta =$ Deviation of the ambient temperature accord. to the reference condition
	Long term stability

Installation conditions

Installation angle	No limit
Installation area	Connection head accord. to DIN 43 729 Form B; TAF 10 field housing

Application conditions

Ambient conditions

Ambient temperature	-40 to +85 °C (-40 to 185 °F), for Ex-areas see Ex-certification
Storage temperature	-40 to +100 °C (-40 to 212 °F)
Climatic class	To EN 60 654-1, Class C
Moisture condensation	Allowable
Ingress protection	IP 00 / IP66 installed
Vibration protection	4g / 2 to 150 Hz according to IEC 60 068-2-6
EMC immunity	Interference immunity and interference emission according to EN 61 326-1 and NAMUR NE 21

Mechanical construction

Dimensions	<p style="text-align: right;">Dimensions in mm (in)</p>
Weight	approx. 40 g
Materials	Housing: PC Potting: PUR
Terminals	Cable up to max. 1.75 mm ² (0.0027 in ²), secure screws

Terminal connections

Power supply and current output 	SETUP socket 			
Sensor connection 	TC 	2-wire RTD 	3-wire RTD 	4-wire RTD

[1] according to reference condition

[2] % is related to the adjusted measurement range (the value to be applied is the greater).

Display and operating system

Remote operation

Configuration set	Configuration kit GITT01 Programming Tool
Configuration	Using PC programme (ReadWin® 2000)
Interface	PC interface connection cable TTL +/- RS 232 with plug
Configurable parameters	Sensor type and connection type, engineering units (°C/°F), measurement range, internal/external cold junction compensation, cable resistance compensation on 2 wire connection, fault conditioning, output signal (4 to 20 / 20 to 4 mA), digital filter (damping), offset, measurement point identification (8 characters), output simulation

Certification

CE mark	This unit complies with the legal requirements laid out within the EU regulations.
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Ex-certification	For further details on the available Ex versions (ATEX, CSA, FM, etc.), please contact us All relevant data for hazardous areas can be found in separate Ex documentation. If required, please request copies from us
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Questionnaire

Customer specific setup / Kundenspezifische Einstellung	
Standard setup / Standardeinstellung	
Sensor	TC <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> J <input type="checkbox"/> K <input type="checkbox"/> L <input type="checkbox"/> N <input type="checkbox"/> R <input type="checkbox"/> S <input type="checkbox"/> T <input type="checkbox"/> U RTD <input type="checkbox"/> Pt100 <input type="checkbox"/> Pt500 <input type="checkbox"/> Pt1000 <input type="checkbox"/> Ni100 <input type="checkbox"/> Ni500 <input type="checkbox"/> Ni1000 <input type="checkbox"/> 2 wire <input type="checkbox"/> 3 wire <input type="checkbox"/> 4 wire Unit / Einheit <input type="checkbox"/> °C <input type="checkbox"/> °F
Range / Messbereich (not / nicht PROFIBUS-PA)	Low scale Anfang <input style="width: 20px;" type="text"/> <input style="width: 20px;" type="text"/> <input style="width: 20px;" type="text"/> <input style="width: 20px;" type="text"/> <input style="width: 20px;" type="text"/> , <input style="width: 20px;" type="text"/> High scale Ende <input style="width: 20px;" type="text"/> <input style="width: 20px;" type="text"/> <input style="width: 20px;" type="text"/> <input style="width: 20px;" type="text"/> <input style="width: 20px;" type="text"/> , <input style="width: 20px;" type="text"/>
Bus address / Busadresse (only / nur PROFIBUS-PA) <input style="width: 30px;" type="text"/> <input style="width: 30px;" type="text"/> <input style="width: 30px;" type="text"/> <input style="width: 30px;" type="text"/> [0...126]	
Expanded setup / Erweiterte Einstellung	
Reference junction / Vergleichsstelle	<input type="checkbox"/> intern <input type="checkbox"/> extern (only / nur TC) <input style="width: 30px;" type="text"/> <input style="width: 30px;" type="text"/> [0...80°C; 32...176°F]
Compensation wire resistance / Kompensation Leitungswiderstand	<input style="width: 30px;" type="text"/> [0...20 Ohm] (only / nur RTD 2 wire) <input style="width: 30px;" type="text"/> [0...30 Ohm] (only / nur HART, PA RTD 2 wire)
Failure mode / Fehlerverhalten	<input type="checkbox"/> ≤ 3,6 mA <input type="checkbox"/> ≥ 21,0 mA (not / nicht PROFIBUS-PA)
Output / Ausgang	<input type="checkbox"/> 4...20 mA <input type="checkbox"/> 20...4 mA (not / nicht PROFIBUS-PA)
Damping / Dämpfung	<input style="width: 30px;" type="text"/> [0, 1, 2, ..., 8s] (only / nur PCP) <input style="width: 30px;" type="text"/> [0, 1, 2, ..., 100s]
Offset	<input style="width: 30px;" type="text"/> , <input style="width: 30px;" type="text"/> [-9,9...0...+9,9K]
TAG	PCP <input style="width: 100px;" type="text"/> HART (HART: 8 char. TAG + 16 char. Descriptor, PROFIBUS-PA: 32 char.) PROFIBUS-PA <input style="width: 100px;" type="text"/>

Accessories

Programming Tool for GITT01
Setup programme (ReadWin® 2000) and PC serial interface connection cable (TTL-/RS 232C) for configuration of the GITT 01

