



Temperature measurement



Type:
Thermocont® TU4S

Universal temperature transmitter / temperature switch for general industrial applications

Technical information TI11.18

In brief



Application

- Machinery and plant engineering
- Air-conditioning and refrigeration plant engineering
- Hydraulic and pneumatic systems
- Process industry
- Environmental technology
- Facility and building automation

Main features

- Measuring ranges from -50°C up to +200°C
- Wide variety of process connections
- Sensor length up to 600mm
- Long term stable platinum sensor class A – DIN EN 60751
- Extremely short response times
- Drift monitoring and redundancy function
- High process pressure tightness up to 100 bar
- Fully welded robust steel enclosure
- High protection class IP69K/IP67
- Very high accuracy to $\leq 0,1\%$
- Electronic 4...20mA HART® / RS485 Modbus®-RTU / IO-Link®

Description

The device is an electronic temperature transmitter / temperature switch for monitoring, control and continuous measurement of temperatures.

A high variety of versions of process connections and electronic types allows the use for a wide range of applications, also for demanding measuring requirements.

Due to its high accuracy and the digital adjustability by HART®, RS485 Modbus®-RTU or IO-Link® the device can be suited to a wide variety of applications.

The optional drift monitoring and redundancy function increases the process safety. At exceedance of the set drift limit a signal will be generated immediately and thus, the product quality will be improved significantly. Due to the use of two redundantly working sensors, which are

mutually monitored, the calibration intervals can be increased and thus calibrations can be saved.

The pressure switch with front-flush O-ring gasket has been specifically designed for the measurement of viscous, paste-like, adhesive, crystallizing, particle-laden and contaminated media.

The robust design and the high-quality workmanship turns the device into a very high quality product, which even the most adverse environmental conditions cannot affect, whether the lowest temperatures when used outdoors, extreme shock and vibration stress or aggressive media.

A captive laser marking of the type label ensures the identifiability throughout the entire lifetime of the device.

Obviously is the optional marking of a measurement point designation resp.

TAG, a customer label or of a neutral type label, of course also per laser marking.

A LABS- resp. silicone-free version, a factory calibration with calibration certificate and a customer specific configuration resp. preset is also optionally available like a material test certificate EN10204 3.1 or a factory certifications for drink water suitability. Customer specific special versions can be realized short-term on request, e.g. special designs for the process connection or other process materials.





Technical Data

Measuring range	
Nominal temperature	-50/0°C ... +50/+100/+150/+200°C
Output type A – Current 4...20mA HART®	
Analogue output 4...20mA	3,9...20,5mA / $\geq 3,8\text{mA}$ / $\leq 22\text{mA}$ / $dI \leq 1\mu\text{A}$
Time behavior	$T90 \leq 8\text{ms}$ / $t_{on} \leq 0,2\text{s}$
Interface	HART®-compliant (7.0) / 1200 Bit/s
Output type V – RS485 Modbus®-RTU	
Interface	RS485, bidirectional / Modbus®-RTU / 9600 Baud (4800...38400 Baud)
Time behavior	$T90 \leq 2\text{ms}$ ($t_d = 0\text{s}$) / $t_{on} \leq 0,1\text{s}$ ($t_d = 0\text{s}$)
Output type L – IO-Link®	
Interface	IO-Link® V1.1 / Com2 (38400 Baud)
Analogue output	0...20mA: $0...20,5\text{mA}$ / $\leq 0,05\text{mA}$ / $\leq 22\text{mA}$ / $dI \leq 1\mu\text{A}$ 4...20mA: $3,8...20,5\text{mA}$ / $\geq 3,6\text{mA}$ / $\leq 22\text{mA}$ / $dI \leq 1\mu\text{A}$
Switch output	2x PP (Push-Pull), switch to +L/-L
Output	$U_{out} \leq 0,2\text{V}$, $\geq U_s - 2\text{V}$ / $I_{out} 0...200\text{mA}$ (current limited $\leq 450\text{mA}$, short circuit protected)
Time behavior	$T90 \leq 2\text{ms}$ / $t_{on} \leq 0,1\text{s}$
Auxiliary power	
Supply voltage U_s polarity protected	Type A – 4...20mA HART®: 9...35VDC Type V – RS485 Modbus®-RTU: 6...35VDC Type L – IO-Link®: 9...35VDC, without IO-Link® / 18...30VDC, with IO-Link®
Measuring accuracy	
Characteristic deviation	$\leq \pm(0,25\text{K} + 0,002 \cdot [t])$
Long term drift	$\leq \pm 0,1\text{K/year}$
Temperature deviation	$\leq \pm 0,2\text{K}$
Process conditions	
Process temperature	Standard: -50°C...+100°C Extended: -50°C...+200°C
Pressure pressure	$\leq 100\text{ bar}$
Environmental conditions	
Environmental temperature	-40°C...+100°C
Protection level	IP69K/IP67 (EN/IEC 60529)
MTTF	463 years

Electrical connection

Electronic output type A Current 4...20mA HART®	Electronic output type V RS485 Modbus®-RTU	Electronic output type L IO-Link®

<p>Terminal enclosure</p>	<p>Process connection type 0 – without</p>
<p>Process connection type 1 – Thread G$\frac{1}{2}$"A Neck tube – without</p>	<p>Process connection type 1 – Thread G$\frac{1}{2}$"A Neck tube</p>
<p>Process connection type 3 – Thread G$\frac{1}{4}$"A Neck tube – without</p>	<p>Process connection type 3 – Thread G$\frac{1}{4}$"A Neck tube</p>
<p>Process connection type 4 – Thread G$\frac{1}{2}$"A, front-flush gasket Neck tube – without</p>	<p>Process connection type 4 – Thread G$\frac{1}{2}$"A, front-flush gasket Neck tube</p>

Order code



Type

TU4SStandard

Measuring system

SResistance sensor Pt100-A
DResistance sensor Pt100-A / semiconductor sensor, self-supervision function

Approval

SStandard

Process connection

0without thread, for compression fitting
1Thread ISO 228-1 – G½" B
3Thread ISO 228-1 – G½" B
4Thread ISO 228-1 – G½" B, front-flush gasket
Yothers

Material process gaskets (process wetted)

0without
1FPM – fluorelastomere (e.g. Viton®)
3EPDM – ethylene-propylene-dienmonomere, FDA-listed
Yothers

Material process connection (process wetted)

VCrNi-steel

Material terminal enclosure

CCrNi-steel

Measuring range – Adjustment output

010°C...+50°C
020°C...+100°C
030°C...+150°C
040°C...+200°C
11–50°C...+50°C
12–50°C...+100°C
13–50°C...+150°C
14–50°C...+200°C
YYSpecial measuring range

Electronic – output

ACurrent 4...20mA, HART®-compliant, 2-wire
VRS485 Modbus®-RTU, 4-wire
LIO-Link®, 1x current 0/4...20mA / 2x switch, 4-wire

Electronic – function

SStandard

Process temperature

0Standard –50°C...+100°C
1Extended –50°C...+200°C, neck tube

Material sensor / diameter (process wetted)

NCrNi-steel, Ø6mm

Measuring system – accuracy

30,1%

Electrical connection

SPlug M12x1

Length L1 – Sensor / mm (L1 ≤ 600mm)

Additional options

-SF LABS-free, silicone-free / paint compatible version
-ML Measurement point designation / TAG – Laser marking
-KL Customer label on device – Laser marking
-TN Type label neutral
-MZ Material test certificate – EN10204 3.1
-WT Factory certification – drink water suitability
-KF Configuration / Preset
-WK Factory calibration – calibration certificate

Thermocont® TU4S

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Stand 11/2018