Data Sheet DS/TTF300-EN Rev. E

# TTF300
# Field-mount temperature transmitter

Temperature transmitter for all communication protocols.
ABB common operating concept.
Redundancy when two sensors are connected.

## Measurement made easy


### Communication / output
- 4 to 20 mA, HART protocol, rev. 5 and rev. 7 switchable
- PROFIBUS PA
- FOUNDATION Fieldbus

### Input
- RTD, resistance thermometers, resistance-type remote sensor
- Thermocouples, voltages, mV voltages

### Electrical isolation of input circuit and output circuit

### Input functionality
- 1 or 2 sensors
- 2 x Pt100 three wire circuit

### Specific linearization
- Callendar-Van Dusen coefficients
- Table of variate pairs / 32 points

### Continuous sensor monitoring and self-monitoring
- Supply voltage monitoring
- Wire break and corrosion monitoring in accordance with NE 89
- Extended diagnostics in accordance with NE 107
- Sensor drift monitoring

### Functional safety
- SIL 2 / SIL 3 in accordance with IEC 61508 (for HART)

### Device safety in accordance with NE 53 and NE 79

### Configuration
- FIM, DTM, EDD
- Local LCD display with push buttons (optional)

### Global approvals for explosion protection
- ATEX, IECEx, Zone 0
- FM, CSA
- GOST, EAC Ex
- Inmetro, NEPSI, KOSHA

### For use in harsh environment
- Housing degree of protection IP 66 and IP 67, NEMA 4X, ENCL 4X
- Housing material: Aluminum or stainless steel (SST)
- Robust design of electrical connections
- Ambient temperature -40 to 85 °C

### SW write protection, HW write protection

### Service interface

# TTF300
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## Specifications

CE marking
— The device fulfills all requirements for CE marking in accordance with all applicable guidelines.

Electrical isolation
— 3.5 kV DC (approx. 2.5 kV AC), 60 s, input to output

MTBF time
— 28 years at 60 °C ambient temperature

Input filter
— 50 / 60 Hz

Switch-on delay
— HART: < 10 s ($I_a$ 3.6 mA during switch-on cycle)
— PROFIBUS: 10 s, max. 30 s
— FOUNDATION Fieldbus: < 10 s

Warm-up time
— 5 minutes

Rise time t90
— 400 … 1000 ms

Measured value update
— 10/s with 1 sensor, 5/s with 2 sensors, depending on sensor type and sensor circuit

Output filter
— Digital filter 1st order: 0 ... 100 s

Weight
— Die-cast aluminum: 1.25 kg (2.75 lb)
— Stainless steel: 2.75 kg (6.1 lb)

Material
— Housing: die-cast aluminum, epoxy-coated
— Color: gray RAL9002
— Stainless steel

Installation conditions
— Mounting position: no restrictions

Electrical connection
— Thread (selectable) 2 x M20 x 1.5 / 2 x 1/2“ NPT / 2 x 3/4“ NPT (via reducing piece),
— Ground screw external 6 $mm^2$, M5 internal 2 x 2.5 $mm^2$, M4 terminals for lines up to max 2.5 $mm^2$ and hand held terminal interface

Plastic cable gland 2 x M20 1.5:
— Cable outer diameter 6 ... 12 mm (0.24 ... 0.47 inch), Ex: 5 ... 10 mm (0.2 ... 0.39 inch)
— Temperature range -30 ... 80 °C (-22 ... 176 °F), Ex: -20 ... 80 °C (-4 ... 176 °F)
— For non-Ex
Polyamide gray
— For intrinsic safety design, Non-incendive and dust explosion protection-Ex
Polyamide, blue

Metal cable gland (2 x M20 x 1.5 / 2 x 1/2“ NPT):
— Flameproof enclosure, explosion proof
— Cable outer diameter 3.2 ... 8.7 mm (0.13 ... 0.34 inch)
— Temperature range: -50 ... 85 °C (-58 ... 185 °F)
— Additional cable outer diameters upon request

Lightning protection
— For cable gland M20 x 1.5
(see data sheet 10/63-6.15)
— Non-Ex: type NGV220-NO
— Intrinsic safety: type NGV220-EX

Dimensions
See chapter "Dimensions" on page 13.

### Ambient conditions

Ambient temperature
— Standard: -40 … 85 °C (-40 … 185 °F)
— Optional: -50 … 85 °C (-58 … 185 °F)
— Restricted range during operation with explosion-proof design: see corresponding certificate

Transport / storage temperature
— -50 … 85 °C (-58 … 185 °F)

Climate class in accordance with DIN EN 60654-1
— Cx -40 … 85 °C (-40 … 185 °F) at 5 … 95 % relative humidity

Max. permissible humidity in accordance with IEC 60068-2-30
— 100 % relative humidity

Vibration resistance in accordance with IEC 60068-2-6
— 10 … 2000 Hz at 5 g, during operation and transport

Shock in accordance with IEC 68-2-27
— gn = 30, during operation and transport

IP rating
— IP 66 and IP 67, NEMA 4X, ENCL 4X

## Electromagnetic compatibility

Emitted interference in accordance with IEC EN 61326 and Namur NE 21.

Interference immune in accordance with IEC 61326 and Namur NE 21.
Pt100: measuring range 0 ... 100 °C (32 ... 212 °F), span 100 K.

| Type of test | Testing accuracy | Effect |
|---|---|---|
| Burst to signal- / data lines | 2 kV | < 0,5 % |
| Static discharge | | |
| — Contact plate (indirect) | 8 kV | NO |
| — Supply terminals[1)] | 6 kV | NO |
| — Sensor terminals[1)] | 4 kV | NO |
| Radiated field 80 MHz ... 2 GHz | 10 V/m | < 0,5 % |
| Coupling 150 kHz ... 80 MHz | 10 V | < 0,5 % |
| Surge | | |
| between the supply lines | 0,5 kV | No malfunction |
| Line to ground | 1 kV | |

1) Air discharge (at 1 mm (0.04 inch) distance)

## SIL functional safety

Conforms with IEC 61508 as regards use in safety related applications, up to and including SIL 3 (redundant). While using the transmitter, the device fulfills the requirements in accordance with SIL 2. While using two redundant transmitters, the device fulfills the requirements in accordance with SIL 3. Applicable only for HART variant.

## Type B LCD indicator

CE marking
— The type B LCD display fulfills all requirements for CE marking in accordance with all applicable guidelines.

## Properties

Transmitter-controlled graphic (alphanumeric) LCD display
— Character height, mode-dependent
— Sign, 4 digits, 2 decimal places
— Bar graph display

Display options
— Sensor 1 process value
— Sensor 2 process value
— Electronics / ambient temperature
— Output value
— Output %

Display diagnostic information related to transmitter and sensor status

## Specifications

Temperature range
— -20 ... 70 °C (-4 ... 158 °F)

Restricted display function (contrast, reaction time) in the temperature ranges:
— -50 ... -20 °C (-58 ... -4 °F)
or
— 70 ... 85 °C (158 ... 185 °F)

Humidity
— 0 … 100 %, condensation permitted

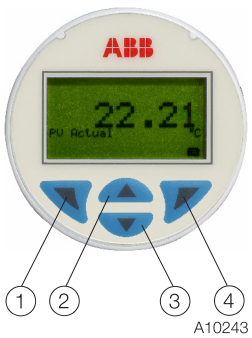


**Fig. 1: Type B LCD display**
**(1) Leave / Abort (2) Backwards (3) Forwards (4) Select**

# TTF300
# Field-mount temperature transmitter

## Configuration function
- Sensor configuration for standard sensors
- Measuring range
- Behavior in the event of a fault (HART)
- Software write protection for configuration data
- Device address for HART and PROFIBUS PA

## Input - resistance thermometer / resistances
Resistance thermometer
- Pt100 according to IEC 60751, JIS C1604, MIL-T-24388
- Ni according to DIN 43760
- Cu according to recommendation OIML R 84

Resistance measurement
- 0 … 500 Ω
- 0 … 5000 Ω

Sensor connection type
- Two-, Three-, Four wire-circuits

Connection lead
- Maximum sensor line resistance:
  of 50 Ω per line in accordance with NE 89
- Three-wire circuit:
  Symmetrical sensor line resistances
- Two-wire circuit:
  Compensation up to 100 Ω total lead resistance

Measurement current < 300 µA

Sensor short circuit < 5 Ω (for resistance thermometers)

Sensor wire break
- Measuring range: 0 ... 500 Ω > 0.6 ... 10 kΩ
- Measuring range: 0 ... 5 kΩ > 5.3 ... 10 kΩ

Corrosion detection in accordance with NE 89
- Three-wire resistance measurement > 50 Ω
- Four-wire resistance measurement > 50 Ω

Sensor error signaling
- Resistance thermometer: Sensor short circuit and sensor wire breakage
- Linear resistance measurement: Sensor wire break

## Input - thermocouples / voltages
Types
- B, E, J, K, N, R, S, T in accordance with IEC 60584
- U, L in accordance with DIN 43710
- C, D in accordance with ASTM E-988

Voltages
- -125 ... 125 mV
- -125 ... 1100 mV

Supply line
- Maximum sensor line resistance
  1.5 kΩ per wire, 3 kΩ in total

Sensor wire break monitoring in accordance with NE 89
- Pulsed with 1 µA outside measurement interval
- Thermocouple measurement 5.3 ... 10 kΩ
- Voltage measurement 5.3 ... 10 kΩ

Input resistance > 10 MΩ

Internal reference junction Pt1000, IEC 60751 Cl. B
(no additional jumpers necessary)

Sensor error signaling
- Thermocouple: wire break
- Linear voltage measurement: wire break

## Functionality input
Free style characteristic curve / 32-point -sampling point table
- Resistance measurement up to max. 5 kΩ
- Voltages up to max. 1.1 V

Sensor error adjustment
- Via Callendar-Van Dusen coefficients
- Via value table of 32 reference points
- Via single-point adjustment (offset adjustment)
- Via two-point adjustment

Input functionality
- 1 sensor
- 2 sensors:
  mean measurement,
  differential measurement,
  sensor redundancy,
  Sensor drift monitoring

## HART output

Transmission behavior
- Temperature linear
- Resistance linear
- Voltage linear

Output signal
- Configurable 4 ... 20 mA (standard)
- Configurable 20 ... 4 mA
  (Dynamic range: 3.8 ... 20.5 mA in accordance with NE 43)

Simulation mode 3.5 ... 23.6 mA

Induced current consumption < 3.5 mA

Maximum output current 23.6 mA

Configurable error current signal
- Overrange 22 mA (20.0 … 23.6 mA)
- Underrange 3.6 mA (3.5 … 4.0 mA)

## PROFIBUS PA output

Output signal
- PROFIBUS – MBP (IEC 61158-2)
- Baud rate 31.25 kbit/s
- PA profile 3.01
- FISCO compliant (IEC 60079-27)
- ID number: 0x3470 [0x9700]

Error current signal
- FDE (Fault Disconnection Electronic)

Block structure
- Physical Block
- Transducer Block 1 – temperature
- Transducer Block 2 – HMI (LCD indicator)
- Transducer Block 3 – enhanced diagnosis
- Analog Input 1 – Primary Value (Calculated Value[1])
- Analog Input 2 – SECONDARY VALUE_1 (sensor 1)
- Analog Input 3 – SECONDARY VALUE_2 (sensor 2)
- Analog Input 4 – SECONDARY VALUE_3 (reference junction temperature)
- Analog Output – optional HMI display (Transducer Block 2)
- Discrete Input 1 – enhanced diagnosis 1 (Transducer Block 3)
- Discrete Input 2 – enhanced diagnosis 2 (Transducer Block 3)

1) Sensor 1, sensor 2 or difference or mean

## FOUNDATION Fieldbus output

Output signal
- FOUNDATION Fieldbus H1 (IEC 611582-2)
- Baud rate 31.25 kbit/s, ITK 5.x
- FISCO compliant (IEC 60079-27)
- Device ID: 000320001F...

Error current signal
- FDE (Fault Disconnection Electronic)

Block structure[1)]
- Resource Block
- Transducer Block 1 – temperature
- Transducer Block 2 – HMI (LCD indicator)
- Transducer Block 3 – enhanced diagnosis
- Analog Input 1 – PRIMARY_VALUE_1 (sensor 1)
- Analog Input 2 – PRIMARY_VALUE_2 (sensor 2)
- Analog Input 3 – PRIMARY_VALUE_3 (calculated value[2)])
- Analog Input 4 – SECONDARY_VALUE (reference junction temp.)
- Analog Output – optional HMI display (Transducer Block 2)
- Discrete Input 1 – enhanced diagnosis 1 (Transducer Block 3)
- Discrete Input 2 – enhanced diagnosis 2 (Transducer Block 3)
- PID – PID controller

LAS (Link Active Scheduler) link master functionality

1) For the block description, block index, execution times, and block class, refer to the interface description
2) Sensor 1, sensor 2 or difference or mean

## Power supply

Two-wire technology, polarity safe; power supply lines = signal lines

**NOTICE**

Following calculations apply for standard applications. This should be taken into consideration when working with a higher maximum current.

## Power supply - HART

Input terminal voltage

- Non-Ex application:
  $U_S$ = 11 ... 42 V DC
- Ex applications:
  $U_S$ = 11 ... 30 V DC

Max. permissible residual ripple for input terminal voltage

- During communication in accordance with HART FSK "Physical Layer" specification.

Undervoltage detection on the transmitter

- If the terminal voltage on the transmitter falls below a value of 10 V, this may lead to an output current of $I_a \leq 3.6$ mA.

Maximum load

- $R_B$ = (supply voltage – 11 V) / 0.022 A

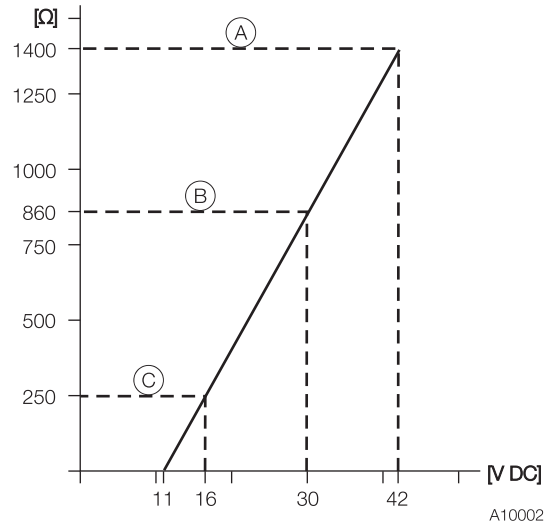


**Fig. 2: Maximum load depending on input terminal voltage**
**(A) TTF300 (B) TTF300 In Ex ia design (C) HART communication resistance**

Maximum power consumption

- $P = U_s \times 0.022$ A
- e. g. $U_s$ = 24 V → $P_{max}$ = 0.528 W

## Power supply - PROFIBUS / FOUNDATION Fieldbus

Input terminal voltage

- Non-Ex application:
  $U_S$ = 9 ... 32 V DC
- Ex applications:
  $U_S$ = 9 ... 17.5 V DC (FISCO)
  $U_S$ = 9 ... 24 V DC (Fieldbus Entity model I.S.)

Current consumption ≤ 12 mA

## Measuring accuracy

Includes Linearity error, repeatability / hysteresis at 23 °C (73.4 °F) ± 5 K and 20 V supply voltage.
Information on measuring accuracy corresponds to 3 σ (Gaussian distribution).

| Sensor | | Measuring range limits | Minimum span | Digital measuring accuracy (24-Bit AD-converter) | D/A measuring accuracy[1] (16-Bit D/A) |
|---|---|---|---|---|---|
| Resistance thermometer/resistor | | | | | |
| DIN IEC 60751 | Pt10 (a=0.003850) | -200 ... 850 °C (-328 ... 1562 °F) | 10 °C (18 °F) | ± 0.80 °C (± 1.44 °F) | ± 0.05 % |
| | Pt50 (a=0.003850) | | | ± 0.16 °C (± 0.29 °F) | ± 0.05 % |
| | Pt100 (a=0.003850)[2] | | | ± 0.08 °C (± 0.14 °F) | ± 0.05 % |
| | Pt200 (a=0.003850) | | | ± 0.24 °C (± 0.43 °F) | ± 0.05 % |
| | Pt500 (a=0.003850) | | | ± 0.16 °C (± 0.29 °F) | ± 0.05 % |
| | Pt1000 (a=0.003850) | | | ± 0.08 °C (± 0.14 °F) | ± 0.05 % |
| JIS C1604 | Pt10 (a=0.003916) | -200 ... 645 °C (-328 ... 1193 °F) | 10 °C (18 °F) | ± 0.80 °C (± 1.44 °F) | ± 0.05 % |
| | Pt50 (a=0.003916) | | | ± 0.16 °C (± 0.29 °F) | ± 0.05 % |
| | Pt100 (a=0.003916) | | | ± 0.08 °C (± 0.14 °F) | ± 0.05 % |
| MIL-T-24388 | Pt10 (a=0.003920) | -200 ... 850 °C (-328 ... 1562 °F) | 10 °C (18 °F) | ± 0.80 °C (± 1.44 °F) | ± 0.05 % |
| | Pt50 (a=0.003920) | | | ± 0.16 °C (± 0.29 °F) | ± 0.05 % |
| | Pt100 (a=0.003920) | | | ± 0.08 °C (± 0.14 °F) | ± 0.05 % |
| | Pt200 (a=0.003920) | | | ± 0.24 °C (± 0.43 °F) | ± 0.05 % |
| | Pt1000 (a=0.003920) | | | ± 0.08 °C (± 0.14 °F) | ± 0.05 % |
| DIN 43760 | Ni50 (a=0.006180) | -60 ... 250 °C (-76 ... 482 °F) | 10 °C (18 °F) | ± 0.16 °C (± 0.29 °F) | ± 0.05 % |
| | Ni100 (a=0.006180) | | | ± 0.08 °C (± 0.14 °F) | ± 0.05 % |
| | Ni120 (a=0.006180) | | | | ± 0.05 % |
| | Ni1000 (a=0.006180) | | | | ± 0.05 % |
| OIML R 84 | Cu10 (a=0.004270) | -50 ... 200 °C (-58 ... 392 °F) | 10 °C (18 °F) | ± 0.80 °C (± 1.44 °F) | ± 0.05 % |
| | Cu100 (a=0.004270) | | | ± 0.08 °C (± 0.14 °F) | ± 0.05 % |
| | Resistance measurement | 0 ... 500 Ω | 4 Ω | ± 32 mΩ | ± 0.05 % |
| | | 0 ... 5000 Ω | 40 Ω | ± 320 mΩ | ± 0.05 % |
| Thermocouples[3]/voltages | | | | | |
| IEC 60584 | Type K (Ni10Cr-Ni5) | -270 ... 1372 °C (-454 ... 2502 °F) | 50 °C (90 °F) | ± 0.35 °C (± 0.63 °F) | ± 0.05 % |
| | Type J (Fe-Cu45Ni) | -210 ... 1200 °C (-346 ... 2192 °F) | | | ± 0.05 % |
| | Type N (Ni14CrSi-NiSi) | -270 ... 1300 °C (-454 ... 2372 °F) | | | ± 0.05 % |
| | Type T (Cu-Cu45Ni) | -270 ... 400 °C (-454 ... 752 °F) | | | ± 0.05 % |
| | Type E (Ni10Cr-Cu45Ni) | -270 ... 1000 °C (-454 ... 1832 °F) | | | ± 0.05 % |
| | Type R (Pt13Rh-Pt) | -50 ... 1768 °C (-58 ... 3215 °F) | 100 °C (180 °F) | ± 0.95 °C (± 1.71 °F) | ± 0.05 % |
| | Type S (Pt10Rh-Pt) | | | | ± 0.05 % |
| | Type B (Pt30Rh-Pt6Rh) | -0 ... 1820 °C (32 ... 3308 °F) | | | ± 0.05 % |
| DIN 43710 | Type L (Fe-CuNi) | -200 ... 900 °C (-328 ... 1652 °F) | 50 °C (90 °F) | ± 0.35 °C (± 0.63 °F) | ± 0.05 % |
| | Type U (Cu-CuNi) | -200 ... 600 °C (-328 ... 1112 °F) | | | ± 0.05 % |
| ASTM E 988 | Type C | -0 ... 2315 °C (32 ... 4200 °F) | 100 °C (180 °F) | ± 1.35 °C (± 2.43 °F) | ± 0.05 % |
| | Type D | | | | ± 0.05 % |
| | Voltage measurement | -125 ... 125 mV | 2 mV | ± 12 µV | ± 0.05 % |
| | | -125 ... 1100 mV | 20 mV | ± 120 µV | ± 0.05 % |

Long-term drift: ± 0.05 °C (± 0.09 °F) or ± 0.05 %[1] per year; the larger value applies.

1) Percentages refer to the configured measuring span, omitted for PROFIBUS and FOUNDATION Fieldbus
2) Standard model
3) For digital measurement accuracy, the internal reference junction error must be added: Pt1000, DIN IEC 60751 Cl. B

## Operating influence

The percentages refer to the configured measuring span.

Input terminal voltage effect / load effect: within the specified limit values for the voltage / load, the total influence is less than 0.001% per volt.

Differential-mode rejection ratio: > 65 dB at 50 / 60 Hz
Common-mode rejection ratio: > 120 dB at 50 / 60 Hz

Ambient temperature effect: based on 23 °C (73.4 °F) for an ambient temperature range of -40 ... 85 °C (-40 ... 185 °F)[4]

| Sensor | | Ambient temperature effect per 1 °C (1.8 °F) deviation from 23 °C (73.4 °F) for digital measured value | Ambient temperature effect[1] [2] per 1 °C (1.8 °F) deviation from 23 °C (73.4 °F) for DA-converter |
|---|---|---|---|
| Resistance thermometer for two-, three- and four-wire circuits | | | |
| IEC, JIS, MIL | Pt10 | ± 0.04 °C (± 0.072 °F) | ± 0.003 % |
| | Pt50 | ± 0.008 °C (± 0.014 °F) | ± 0.003 % |
| | Pt100 | ± 0.004 °C (± 0.007 °F) | ± 0.003 % |
| IEC, MIL | Pt200 | ± 0.02 °C (± 0.036 °F) | ± 0.003 % |
| | Pt500 | ± 0.008 °C (± 0.014 °F) | ± 0.003 % |
| | Pt1000 | ± 0.004 °C (± 0.007 °F) | ± 0.003 % |
| DIN 43760 | Ni50 | ± 0.008 °C (± 0.014 °F) | ± 0.003 % |
| | Ni100 | ± 0.004 °C (± 0.007 °F) | ± 0.003 % |
| | Ni120 | ± 0.003 °C (± 0.005 °F) | ± 0.003 % |
| | Ni1000 | ± 0.004 °C (± 0.007 °F) | ± 0.003 % |
| OIML R 84 | Cu10 | ± 0.04 °C (± 0.072 °F) | ± 0.003 % |
| | Cu100 | ± 0.004 °C (± 0.007 °F) | ± 0.003 % |
| Resistance measurement | | | |
| | 0 ... 500 Ω | ± 0.002 Ω | ± 0.003 % |
| | 0 ... 5000 Ω | ± 0.02 Ω | ± 0.003 % |
| Thermocouple, for all defined types | | ± [(0.001 % x (ME[mV] / MS[mv]) + (100 % x (0.009 °C / MS [°C])][3] | ± 0.003 % |
| Voltage measurement | | | |
| | -125 ... 125 mV | ± 1.5 µV | ± 0.003 % |
| | -125 ... 1100 mV | ± 15 µV | ± 0.003 % |

1) Percentages refer to the configured measuring span of the analog output signal
2) Influence of the DA-converter omitted for PROFIBUS PA and FOUNDATION Fieldbus
3) ME = voltage value of the thermocouple at the upper range value in accordance with the standard
   MA = voltage value of the thermocouple at the lower range value in accordance with the standard
   MS = voltage value of the thermocouple over the measuring span in accordance with the standard. MS = (ME - MA)
4) If the optional extended ambient temperature range down to -50 °C (-58 °F) applies, the causal variables are doubled in the range between -50 ... -40 °C (-58 ... -40 °F)

# Electrical connections

## Pin assignment

### Resistance thermometers (RTD) / resistors (potentiometers)

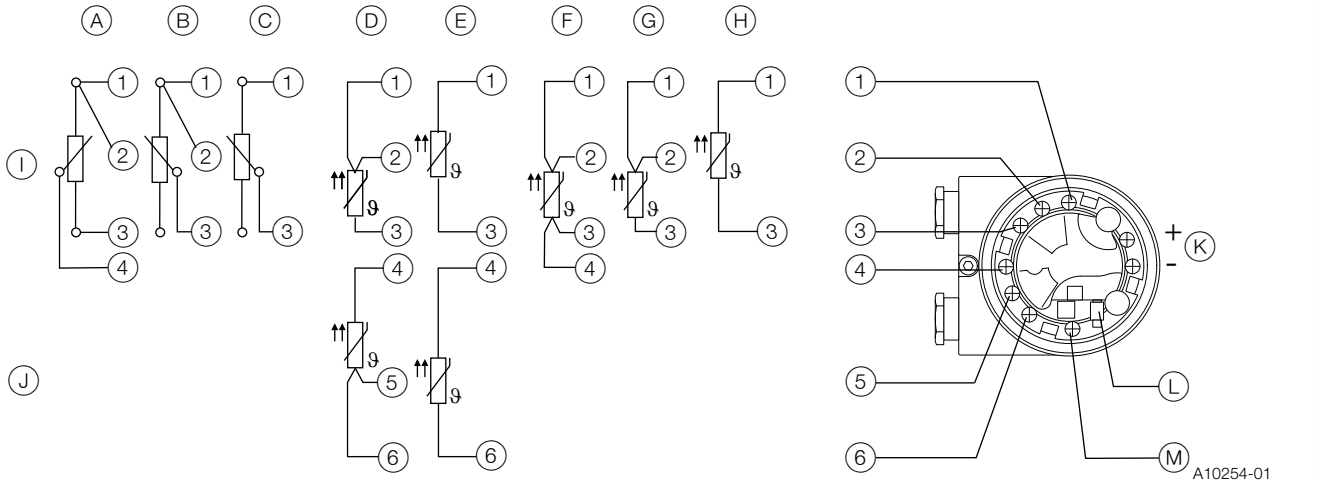


**Fig. 3**

**(A) Potentiometer, Four-wire circuit (B) Potentiometer, Three-wire circuit (C) Potentiometer, Two-wire circuit (D) 2 x RTD, Three-wire circuit[1)] (E) 2 x RTD, Two-wire circuit[1)] (F) RTD, Four-wire circuit (G) RTD, Three-wire circuit (H) RTD, Two-wire circuit (I) Sensor 1 (J) Sensor 2[1)] (K) 4 ... 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus (L) Interface for LCD-indicator and Service (M) Grounding brackets for sensor and supply / signal line - shielding**

**(1) – (6) Sensor connection (of measuring inset)**

1) Sensor backup / sensor redundancy, sensor drift monitoring, mean measurement, or differential measurement

## Thermocouples / voltages and resistance thermometer (RTD) / thermocouple combinations

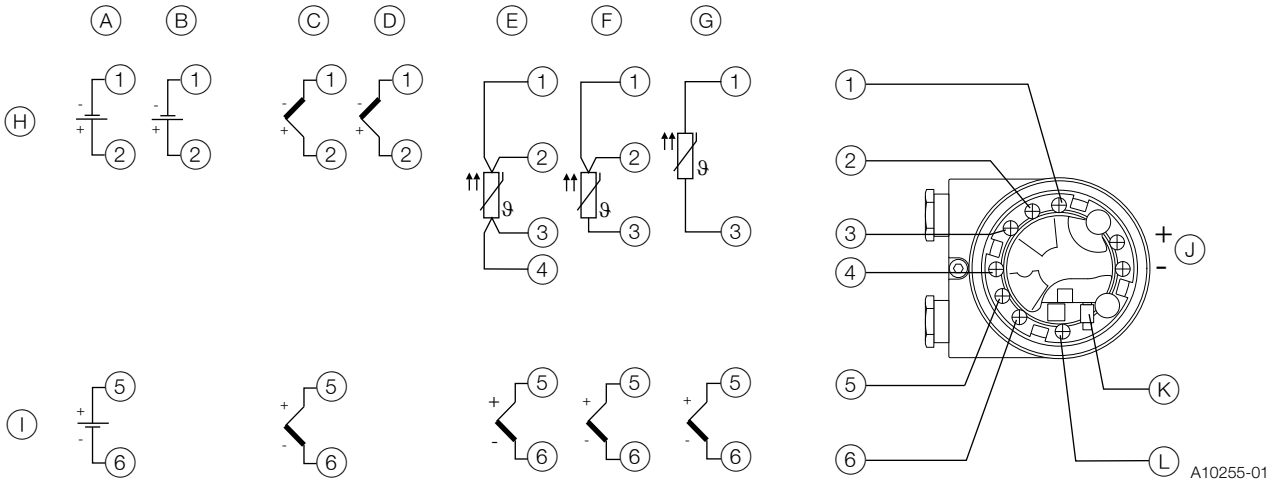


**Fig. 4**
**(A) 2 x Voltage measure [1] (B) 1 x Voltage measure (C) 2 x Thermocouples element[1] (D) 1 x Thermocouples (E) 1 x RTD, Four-wire circuit and thermocouple[1] (F) 1 x RTD, Three-wire circuit and thermocouple[1] (G) 1 x RTD, Two-wire circuit and thermocouple[1] (H) Sensor 1 (I) Sensor 2[1] (J) 4 ... 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus (K) Interface for LCD-indicator and service (L) Grounding brackets for sensor and supply / Signal line - shielding**
**(1) – (6) Sensor connection (of measuring inset)**

1) Sensor backup / sensor redundancy, sensor drift monitoring, mean measurement, or differential measurement

# Communication

## Configuration parameters

Measurement type
- Sensor type, connection type
- Error signaling
- Measuring range
- General information, e.g. TAG number
- Damping
- Warning and alarm limits
- Output signal simulation
- Details "Order form configuration" on page 22

Write protection
- Software write protection

Diagnostic information in accordance with NE 107
Standard:
- Sensor error signaling (wire break or short circuit)
- Device error
- Over / under limit values
- Over / under measuring range
- Simulation active

Advanced:
- Sensor redundancy / sensor backup active (in case sensor fails) with configurable analog alarm pulse signaling
- Drift monitoring with configurable alarm pulse signaling
- Sensor / sensor line corrosion
- Supply voltage undershoot
- Drag indicator for sensor 1, sensor 2 and ambient temperature
- Over ambient temperature
- Under ambient temperature
- Operating hours counter

## HART

The device is listed with the FieldComm Group.

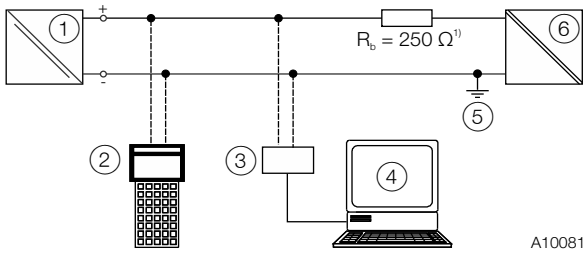


**Fig. 5: Example for HART interface connection**
**(1) Transmitter (2) Handheld Terminal (3) HART-Modem (4) FDT / DTM Technology (5) Grounding (optional) (6) Power supply unit (Process Interface)**

1) If required

| | |
|---|---|
| Manufacturer ID | 0x1A |
| Device ID | 0x0A |
| Profile | HART 5.1 (can be switched to HART 7) |
| Configuration | On device using LCD display<br>DTM<br>EDD |
| Transmission signal | BELL Standard 202 |

Operating modes
- Point-to-point communication mode – standard (general address 0)
- Multidrop mode (addressing 1 ... 15)
- Burst mode

Configuration options and tools
Driver-independent:
- HMI LCD display with configuration function

Driver-dependent:
- Device management / asset management tools
- FDT / DTM technology – via TTX300 DTM driver
- EDD - via TTX300 EDD driver

Diagnostic message
- Overrange / underrange in accordance with NE 43
- HART diagnosis

## PROFIBUS PA

The interface conforms to profile 3.01 (PROFIBUS standard, EN 50170, DIN 1924 [PRO91]).

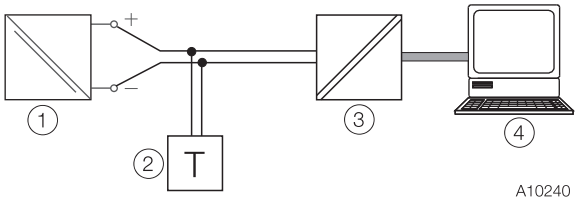


**Fig. 6: Example for PROFIBUS PA interface connection**
**(1) Transmitter (2) Bus termination (3) Segment coupler (4) PC / DCS**

| | |
|---|---|
| Manufacturer ID | 0x1A |
| ID number | 0x3470 [0x9700] |
| Profile | PA 3.01 |
| Configuration | On device using LCD display<br>DTM<br>EDD<br>GSD |
| Transmission signal | IEC 61158-2 |

Voltage / current consumption

— Mean current consumption: 12 mA.
In the event of an error, the FDE function (=Fault Disconnection Electronic) integrated in the device ensures that the current consumption cannot exceed a maximum of 20 mA.

## FOUNDATION Fieldbus

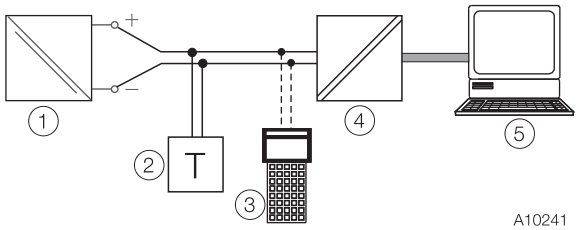


**Fig. 7: Example for FOUNDATION Fieldbus connection**
**(1) Transmitter (2) Bus termination (3) Handheld terminal (4) Linking Device (5) PC / DCS**

| | |
|---|---|
| Device ID | 000320001F... |
| ITK | 5.x |
| Configuration | On device using LCD<br>EDD |
| Transmission signal | IEC 61158-2 |

Voltage / current consumption

— Mean current consumption: 12 mA.
In the event of an error, the FDE function (=Fault Disconnection Electronic) integrated in the device ensures that the current consumption cannot exceed a maximum of 20 mA.

# Dimensions

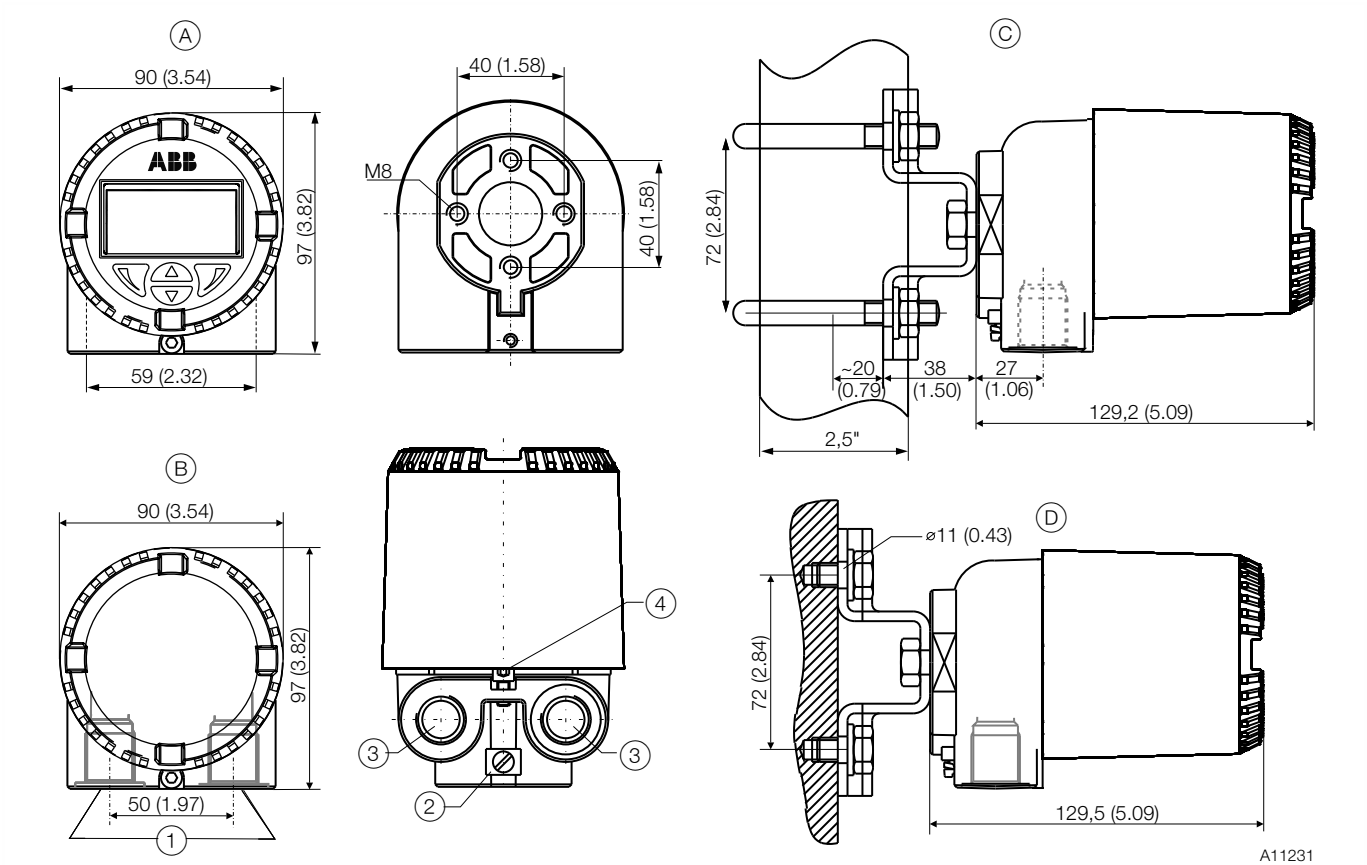


**Fig. 8: Dimensions in mm (inch)**

**(A) Housing with window cover for the display (B) Closed housing (C) Tube mounting (D) Wall mounting, 4-hole-wall mounting, Ø 11 mm (0.43 inch) quadratically aligned, distance 72 mm (2.84 inch)**

**(1) Electrical connections (2) Potential equalization screw M5 (3) Thread M20 x 1.5 or 1/2"NPT (4) Cover lock screw**

## Use in potentially explosive atmospheres according to ATEX and IECEx

**NOTICE**

- Further information on the approval of devices for use in potentially explosive atmospheres can be found in the explosion protection test certificates (at www.abb.com/temperature).
- Depending on the design, a specific marking in accordance with ATEX or IECEx applies.

### Ex-marking

### Transmitter

**ATEX intrinsic safety**

The device fulfills the requirements of Directive 2014/34/EU in case of corresponding purchase orders and is approved for use in Zone 0, 1 and 2.

| Model TTF300-E1H | |
|---|---|
| Type Examination Test Certificate: | PTB 05 ATEX 2017 X |
| II 1 G Ex ia IIC T6 Ga | |
| II 2 (1) G Ex [ia] ib IIC T6 Gb (Ga) | |
| II 2 G (1D) Ex [iaD] ib IIC T6 Gb (Da) | |

| Model TTF300-E1P and TTF300-E1F | |
|---|---|
| Type Examination Test Certificate: | PTB 09 ATEX 2016 X |
| II 1G Ex ia IIC T6 | |
| II 2(1)G Ex [ia] ib IIC T6 | |
| II 2G(1D) Ex [iaD] ib IIC T6 | |

**ATEX non-sparking and dust explosion protection**

Approved for use in Zone 2 and 22.

| Model TTF300-E5X | |
|---|---|
| Declaration of conformity | |
| II 3 G Ex nA IIC T1-T6 Gc | |
| II 3 D Ex tc IIIB T135°C Dc | |

**ATEX dust explosion protection:**

Approved for use in Zone 20, 21, and 22.

| Model TTF300-D1X | |
|---|---|
| Type Examination Test Certificate: | BVS 06 ATEX E 029 |
| II 1D Ex tD A20 IP66 T135°C | |

**ATEX dust explosion protection and intrinsic safety**

Permitted for zone 20, 21, 22 and Zone 0, 1 and 2.

| Model TTF300-D2X | |
|---|---|
| Type Examination Test Certificate: | BVS 06 ATEX E 029<br>PTB 05 ATEX 2017 X<br>PTB 05 ATEX 2016 X |
| II 1D Ex tD A20 P66 T135°C | |
| II 1G Ex ia IIC T6 Ga | |

**ATEX flameproof enclosure**

Approved for use in Zone 1 and 2.

| Model TTF300-E3X | |
|---|---|
| Type Examination Test Certificate: | PTB 99 ATEX 1144 |
| II 2G Ex d IIC T6 Gb | |

**ATEX flameproof enclosure and intrinsic safety**

Approved for use in Zone 1 and 2.

| Model TTF300-E4X | |
|---|---|
| Type Examination Test Certificate: | PTB 99 ATEX 1144<br>PTB 05 ATEX 2017 X<br>PTB 05 ATEX 2016 X |
| II 2G Ex d IIC T6 Gb | |
| II 1G Ex ia IIC T6 Ga | |

**IECEx intrinsic safety**

Approved for use in Zone 0, 1, and 2.

| Model TTF300-H1H | |
|---|---|
| IECEx certificate of conformity | IECEx PTB 09.0014X |
| **Model TTF300-H1P and TTF300-H1F** | |
| IECEx certificate of conformity | IECEx PTB 11.0108X |
| Ex ia IIC T6...T1 Ga | |
| Ex [ia] ib IIC T6...T1 Gb (Ga) | |
| Ex [ia IIIC Da] ib IIC T6...T1 Gb | |

**IECEx flameproof enclosure**

Approved for use in Zone 1 and 2.

| Model TTF300-H5X | |
|---|---|
| IECEx certificate of conformity | IECEx PTB 12.0039 |
| Ex d IIC T1-T6 Gb | |

## LCD indicators

### ATEX intrinsic safety

The device fulfills the requirements of Directive 2014/34/EU in case of corresponding purchase orders and is approved for use in Zone 0, 1 and 2.

| | |
|---|---|
| Type Examination Test Certificate: | PTB 05 ATEX 2079 X |
| II 1G Ex ia IIC T6 Ga | |

### ATEX Non-sparking

The device fulfills the requirements of Directive 2014/34/EU in case of corresponding purchase orders and is approved for use in Zone 2.

| | |
|---|---|
| Declaration of conformity | |
| II 3 G Ex nA IIC T1-T6 Gc | |

### IECEx intrinsic safety

Approved for use in Zone 0, 1, and 2.

| | |
|---|---|
| IECEx certificate of conformity | IECEx PTB 12.0028X |
| Ex ia IIC T6 | |

## Temperature data

## Transmitter

### ATEX/IECEx intrinsic safety, ATEX non-sparking

| Temperature class | Permissible ambient temperature range | |
|---|---|---|
| | Device category 1 use | Device category 2 / 3 use |
| T6 | -50 … 44 °C<br>(-58 ... 111.2 °F) | -50 … 56 °C<br>(-58 ... 132.8 °F) |
| T5 | -50 … 56 °C<br>(-58 ... 132.8 °F) | -50 … 71 °C<br>(-58 ... 159.8 °F) |
| T4-T1 | -50 … 60 °C<br>(-58 ... 140.0 °F) | -50 … 85 °C<br>(-58 ... 185.0 °F) |

## LCD indicators

### ATEX/IECEx intrinsic safety, ATEX non-sparking

| Temperature class | Permissible ambient temperature range | |
|---|---|---|
| | Device category 1 use | Device category 2 / 3 use |
| T6 | -40 … 44 °C<br>(-40 … 111.2 °F) | -40 … 56 °C<br>(-40 … 132.8 °F) |
| T5 | -40 … 56 °C<br>(-40 … 132.8 °F) | -40 … 71 °C<br>(-40 … 159.8 °F) |
| T4-T1 | -40 … 60 °C<br>(-40 … 140 °F) | -40 … 85 °C<br>(-40 … 185 °F) |

## Electrical data

## Transmitter

### Intrinsic safety type of protection Ex ia IIC (part 1)

| Supply circuit | | | |
|---|---|---|---|
| | TTF300-E1H<br>TTF300-H1H | TTF300-E1P / -H1P<br>TTF300-E1F / -H1F | |
| | | FISCO[1] | ENTITY |
| Max. voltage | $U_i$ = 30 V | $U_i$ ≤ 17,5 V | $U_i$ ≤ 24,0 V |
| Short-circuit current | $I_i$ = 130 mA | $I_i$ ≤ 183 mA[2] | $I_i$ ≤ 250 mA |
| Max. power | $P_i$ = 0,8 W | $P_i$ ≤ 2,56 W[2] | $P_i$ ≤ 1,2 W |
| Internal inductance | $L_i$ = 0,5 mH | $L_i$ ≤ 10 µH | $L_i$ ≤ 10 µH |
| Internal capacitance | $C_i$ = 0,57 nF[3] | $C_i$ ≤ 5 nF | $C_i$ ≤ 5 nF |

1) FISCO in accordance with 60079-27
2) II B FISCO: Ii ≤ 380 mA, Pi ≤ 5.32 W
3) Only applies to HART variants. From HW rev. 1.07, previously 5 nF

### Intrinsic safety type of protection Ex ia IIC (part 2)

| Measurement current circuit | | |
|---|---|---|
| | Resistance thermometers, resistors | Thermocouples, voltages |
| Max. voltage | $U_o$ = 6,5 V | $U_o$ = 1,2 V |
| Short-circuit current | $I_o$ = 25 mA | $I_o$ = 50 mA |
| Max. power | $P_o$ = 38 mW | $P_o$ = 60 mW |
| Internal inductance | $L_i$ = 0 mH | $L_i$ = 0 mH |
| Internal capacitance | $C_i$ = 49 nF | $C_i$ = 49 nF |
| Maximum permissible external inductance | $L_o$ = 5 mH | $L_o$ = 5 mH |
| Maximum permissible external capacitance | $C_o$ = 1,55 µF | $C_o$ = 1,05 µF |

### Intrinsic safety type of protection Ex ia IIC (part 3)

| LCD indicator interface | |
|---|---|
| Max. voltage | $U_o$ = 6,2 V |
| Short-circuit current | $I_o$ = 65,2 mA |
| Max. power | $P_o$ = 101 mW |
| Internal inductance | $L_i$ = 0 mH |
| Internal capacitance | $C_i$ = 0 nF |
| Maximum permissible external inductance | $L_o$ = 5 mH |
| Maximum permissible external capacitance | $C_o$ = 1,4 µF |

## LCD indicators

### Intrinsic safety type of protection Ex ia IIC

| Supply circuit | |
|---|---|
| Max. voltage | $U_i$ = 9 V |
| Short-circuit current | $I_i$ = 65.2 mA |
| Max. power | $P_i$ = 101 mW |
| Internal inductance | $L_i$ = 0 mH |
| Internal capacitance | $C_i$ = 0 nF |

# Use in potentially explosive atmospheres in accordance with FM and CSA

**NOTICE**

- Further information on the approval of devices for use in potentially explosive atmospheres can be found in the explosion protection test certificates (at www.abb.com/temperature).
- Depending on the design, a specific marking in accordance with FM or CSA applies.

## Ex-marking

## Transmitter

### FM Intrinsically Safe

| Model TTF300-L1H | |
|---|---|
| Control Drawing | SAP_214832 |
| **Model TTF300-L1P** | |
| Control Drawing | TTF300-L1..P (IS) |
| **Model TTF300-L1F** | |
| Control Drawing | TTF300-L1..F (IS) |
| Class I, Div. 1 + 2, Groups A, B, C, D<br>Class I, Zone 0, AEx ia IIC | |

### FM Non-Incendive

| Model TTF300-L2H | |
|---|---|
| Control Drawing | SAP_214830 (NI_PS)<br>SAP_214828 (NI_AA) |
| **Model TTF300-L2P** | |
| Control Drawing | TTF300-L2..P (NI_PS)<br>TTF300-L2..P (NI_AA) |
| **Model TTF300-L2F** | |
| Control Drawing | TTF300-L2..F (NI_PS)<br>TTF300-L2..F (NI_AA) |
| Class I, Div. 2, Groups A, B, C, D<br>Class I Zone 2 Group IIC T6 | |

### FM Explosion proof

| Model TTF300-L3X |
|---|
| XP,NI, DIP Class I, II, III, Div. 1 + 2, Groups A-G, factory sealed |

### FM Explosion Proof and Intrinsically Safe

| **Model TTF300-L7H (L1H + L3H)** | |
|---|---|
| Control Drawing | SAP_214832 |
| **Model TTF300-L7P (L1P + L3P)** | |
| Control Drawing | TTF300-L1..P (IS) |
| **Model TTF300-L7F (L1F + L3F)** | |
| Control Drawing | TTF300-L1..F (IS) |
| XP, NI, DIP Class I, II, III, Div. 1 + 2, Groups A-G, factory sealed<br>Class I, Div. 1 + 2, Groups A, B, C, D<br>Class I, Zone 0, AEx ia IIC T6 | |

### CSA Intrinsically Safe

| **Model TTF300-R1H** | |
|---|---|
| Control Drawing | SAP_214825 |
| **Model TTF300-R1P** | |
| Control Drawing | TTF300-R1..P (IS) |
| **Model TTF300-R1F** | |
| Control Drawing | TTF300-R1..F (IS) |
| Class I, Div. 1 + 2, Groups A, B, C, D<br>Class I, Zone 0, Ex ia IIC | |

### CSA Non-Incendive

| **Model TTF300-R2H** | |
|---|---|
| Control Drawing | SAP_214827 (NI_PS)<br>SAP_214895 (NI_AA) |
| **Model TTF300-R2P** | |
| Control Drawing | TTF300-R2..P (NI_PS)<br>TTF300-R2..P (NI_AA) |
| **Model TTF300-R2F** | |
| Control Drawing | TTF300-R2..F (NI_PS)<br>TTF300-R2..F (NI_AA) |
| Class I, Div. 2, Groups A, B, C, D | |

### CSA Explosion proof

| **Model TTF300-R3X** |
|---|
| XP,NI, DIP Class I, II, III, Div. 1 + 2, Groups A-G, factory sealed |

### CSA Explosion Proof and Intrinsically Safe

| **Model TTF300-R7H (R1H + R3H)** | |
|---|---|
| Control Drawing | SAP_214825 |
| **Model TTF300-R7P (R1P + R3P)** | |
| Control Drawing | TTF300-R1..P (IS) |
| **Model TTF300-R7F (R1F + R3F)** | |
| Control Drawing | TTF300-R1..F (IS) |
| XP,NI, DIP Class I, II, III, Div. 1 + 2, Groups A-G, factory sealed<br>Class I, Div. 1 + 2, Groups A, B, C, D<br>Class I, Zone 0, Ex ia Group IIC T6 | |

## LCD indicators

### FM Intrinsically Safe

| Control Drawing | SAP_214 748 |
|---|---|
| I.S. Class I Div 1 and Div 2, Group: A, B, C, D or<br>I.S. Class I Zone 0 AEx ia IIC T[1)] | |
| $U_i$ / $V_{max}$ = 9 V, $I_i$ / $I_{max}$ < 65.2 mA, $P_i$ = 101 mW, $C_i$ = 0.4 µF, $L_i$ = 0 | |

### FM Non-Incendive

| Control Drawing | SAP_214 751 |
|---|---|
| N.I. Class I Div 2, Group: A, B, C, D or Ex nL IIC T[2)], Class I Zone 2 | |
| $U_i$ / $V_{max}$ = 9 V, $I_i$ / $I_{max}$ < 65.2 mA, $P_i$ = 101 mW, $C_i$ = 0.4 µF, $L_i$ = 0 | |

### CSA Intrinsically Safe

| Control Drawing | SAP_214 749 |
|---|---|
| I.S. Class I Div 1 and Div 2; Group: A, B, C, D or<br>I.S Zone 0 Ex ia IIC T[1)] | |
| $U_i$ / $V_{max}$ = 9 V, $I_i$ / $I_{max}$ < 65.2 mA, $P_i$ = 101 mW, $C_i$ < 0.4 µF, $L_i$ = 0 | |

### CSA Non-Incendive

| Control Drawing | SAP_214 750 |
|---|---|
| N.I. Class I Div 2, Group: A, B, C, D oder Ex nL IIC T[2)], Class I Zone 2 | |
| $U_i$ / $V_{max}$ = 9 V, $I_i$ / $I_{max}$ < 65.2 mA, $P_i$ = 101 mW, $C_i$ < 0.4 µF, $L_i$ = 0 | |

1) Temp. Ident: T6 $T_{amb}$ 56 °C, T4 $T_{amb}$ 85 °C
2) Temp. Ident: T6 $T_{amb}$ 60 °C, T4 $T_{amb}$ 85 °C

# TTF300
# Field-mount temperature transmitter

## Ordering Information

### Ordering information TTF300

| Base model | | TTF300 | XX | X | X | X | XX |
|---|---|---|---|---|---|---|---|
| TTF300 Field Mounted Temperature Transmitter, Pt100 (RTD), thermocouples, electrical isolation | | | | | | | |
| **Explosion Protection** | | | | Continued see next page | | | |
| Without explosion protection | | | Y0 | | | | |
| ATEX Intrinsic Safety type of protection: Zone 0: II 1 G Ex ia IIC T6, Zone 1 (0): II 2 (1) G Ex [ia] ib IIC T6, Zone 1 (20): II 2 G (1D) Ex [iaD] ib IIC T6 | | | E1 | | | | |
| ATEX Non-sparking type of protection: Zone 2 / Zone 22: II 3 G Ex nA II T6 and II 3 D IP 65 T 135 °C (Not for application in hybrid mixtures) | | 1) | E5 | | | | |
| ATEX Dust Explosion Protection: Zone 20: II 1 D IP 65 T 135 °C | | | D1 | | | | |
| ATEX Dust Explosion Protection and Intrinsic Safety (IS): Zone 0 / Zone 20: II 1 G Ex ia IIC T6 and II 1 D IP 65 T 135 °C (Not for application in hybrid mixtures) | | 1) | D2 | | | | |
| ATEX Flameproof type of protection: Zone 1: II 2 G Ex d IIC T6 | | | E3 | | | | |
| ATEX Flameproof and Intrinsic Safety type of protection: Zone 1 / Zone 0: II 2 G Ex d IIC T6 and II 1 G Ex ia IIC T6 | | | E4 | | | | |
| IECEx Intrinsic Safety type of protection: Zone 0: Ex ia IIC T6, Zone 1 (0): Ex [ia] ib IIC T6, Zone 1 (20): Ex [iaD] ib IIC T6 | | | H1 | | | | |
| IECEx d IIC T1 - T6 Gb | | | H5 | | | | |
| FM Intrinsic Safety (IS): Class I, Div. 1+2, Groups A, B, C, D, Class II, E, F, G, Class III, Class I, Zone 0, AEx ia IIC T6 | | | L1 | | | | |
| FM Non-incendive (NI): Class I, Div. 2, Groups A, B, C, D, Class II, E, F, G, Class III | | | L2 | | | | |
| FM Explosion-proof (XP): XP, NI, DIP, Class I, II, III, Div. 1+2, Groups A-G, factory sealed | | | L3 | | | | |
| FM Explosion-proof (XP) and Intrinsic Safety (IS): XP, NI, DIP, Class I, II, III, Div. 1+2, Groups A-G, factory sealed and IS, Class I, Div. 1+2, Groups A, B, C, D, Class II, E, F, G, Class III, Class I, Zone 0, AEx ia IIC T6 | | | L7 | | | | |
| CSA Intrinsic Safety (IS): Class I, Div. 1+2, Groups A, B, C, D, Class II, E, F, G, Class III | | | R1 | | | | |
| CSA Non-incendive (NI): Class I, Div. 2, Groups A, B, C, D, Class II, E, F, G, Class III | | | R2 | | | | |
| CSA Explosionproof (XP): XP, NI, DIP, Class I, II, III, Div. 1+2, Groups A-G, factory sealed | | | R3 | | | | |
| CSA Explosionproof (XP) and Intrinsic Safety (IS): XP, NI, DIP, Class I, II, III, Div. 1+2, Groups A-G, factory sealed and IS, Class I, Div. 1+2, Groups A, B, C, D, Class II, E, F, G, Class III | | | R7 | | | | |
| GOST Russia - metrological approval | | | G1 | | | | |
| GOST Russia - metrological approval and EAC-Ex, Ex i - Zone 0 | | | P2 | | | | |
| GOST Russia - metrological approval and EAC-Ex, Ex d | | | P3 | | | | |
| GOST Kazakhstan - metrological approval | | | G3 | | | | |
| GOST Kazakhstan - metrological approval and EAC-Ex, Ex i - Zone 0 | | | T2 | | | | |
| GOST Kazakhstan - metrological approval and EAC-Ex, Ex d | | | T3 | | | | |
| GOST Belarus - metrological approval | | | M5 | | | | |
| GOST Belarus - metrological approval and EAC-Ex, Ex i - Zone 0 | | | U2 | | | | |
| GOST Belarus - metrological approval and EAC-Ex, Ex d | | | U3 | | | | |
| Inmetro Ex ia IIC T6...T4 Ga, Ex ib [ia Ga] IIC T6...T4 Gb Exib [ia IIIC Da] IIC T6...T4 Gb | | | C1 | | | | |
| NEPSI Ex ia IIC T6 | | | S1 | | | | |
| KOSHA Ex ia IIC T6 | | | S5 | | | | |

| Main ordering information TTF300 | X | X | X | XX |
|---|---|---|---|---|
| **Housing / Display** | | | | |
| Single-compartment housing (aluminium) / Without display | A | | | |
| Single-compartment housing (stainless steel) / Without display | B | | | |
| Single-compartment housing (aluminium) / With LCD-display HMI | C | | | |
| Single-compartment housing (stainless steel) / With LCD-display HMI | D | | | |
| **Cable Entry** | | | | |
| Thread 2 x M20 x 1.5 | 2) | 1 | | |
| Thread 2 x 1/2 in. NPT | | 2 | | |
| Thread 2 x 3/4 in. NPT | 3) | 3 | | |
| Cable gland 2 x M20 x 1.5 (plastic version with limited temperature range) | 4) | 4 | | |
| **Communication Protocol** | | | | |
| HART, programmable, output signal 4 ... 20 mA, dual input | | | H | |
| PROFIBUS PA | | | P | |
| FOUNDATION fieldbus | | | F | |
| **Configuration** | | | | |
| Standard configuration | | | | BS |
| Customer-specific configuration, except user curve | | | 5) | BF |
| Customer-specific configuration, including user curve | | | | BG |

# TTF300
# Field-mount temperature transmitter

## Additional ordering information TTF300

| | | XX | XX | XXX | XX | XX | XX | XX | XX | XX | XX |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Certificates** | | | | | | | | | | | |
| SIL2 - Declaration of Conformity | 6) | CS | | | | | | | | | |
| Declaration of compliance according EN 10204-2.1, with the order | | C4 | | | | | | | | | |
| Inspection certificate according EN 10204-3.1, visual, dimensional and functional test | | C6 | | | | | | | | | |
| **Calibration Certificates** | | | | | | | | | | | |
| With 5-point factory certificate | | | EM | | | | | | | | |
| Inspection certificate according EN 10204-3.1, 5-point calibration | | | EP | | | | | | | | |
| **Handling of Certificates** | | | | | | | | | | | |
| Send via e-mail | | | | GHE | | | | | | | |
| Send via mail | | | | GHP | | | | | | | |
| Send via mail express | | | | GHD | | | | | | | |
| Send with instrument | | | | GHA | | | | | | | |
| Only archived | | | | GHS | | | | | | | |
| **Mounting Bracket** | | | | | | | | | | | |
| Wall mounting / 2 in. pipe mounting bracket (stainless steel) | | | | | K2 | | | | | | |
| **Cable Entry Options** | | | | | | | | | | | |
| Cable gland 2 x 1/2 in. NPT | | | | | 7) | U5 | | | | | |
| **Extended Ambient Temperature Range** | | | | | | | | | | | |
| -50 ... 85 °C (-58 ... 185 °F) | | | | | | 8) | SE | | | | |
| **Device Identification Plate** | | | | | | | | | | | |
| Stainless steel | | | | | | | | T0 | | | |
| **Additional Tag Plate** | | | | | | | | | | | |
| Stainless steel | | | | | | | | | I1 | | |
| **Customer-specific Versions** | | | | | | | | | | | |
| (Please specify) | | | | | | | | | | Z9 | |
| **Documentation Language** | | | | | | | | | | | |
| German | | | | | | | | | | | M1 |
| English | | | | | | | | | | | M5 |
| Language package Western Europe / Scandinavia (Languages: DE, EN, DA, ES, FR, IT, NL, PT, FI, SV) | | | | | | | | | | | MW |
| Language package Eastern Europe (Languages: DE, EL, CS, ET, LV, LT, HU, PL, SK, SL, RO, BG) | | | | | | | | | | | ME |

1) According EN 60079-0 and EN 61241-0, the application in hybrid mixtures (concomitance of potentially explosive dust and gas) is currently not allowed
2) Not available with Explosion Protection code L1, L2, L3, L7, R1, R2, R3, R7, D1, D2
3) Only available with Housing / Display code A, C
4) Not available with Explosion Protection code L3, L7, R3, R7
5) E.g. set measuring range, TAG no.
6) Only available with Communication Protocol code H (HART)
7) Only available with Cable Entry code 2
8) Not available with Explosion Protection code D1, D2, E3, E4, L1, L2, L3,L7, R1, R2, R2, R3, R7, G1, P2, P3, G3, T2, T3, M5, U2, U3, C1, S1, S5

| Accessories | Order code |
|---|---|
| TTF300 Commissioning Instruction, German | 3KXT221001R4403 |
| TTF300 Commissioning Instruction, English | 3KXT221001R4401 |
| TTF300 Commissioning Instruction, Language package Western Europe / Scandinavia | 3KXT221001R4493 |
| TTF300 Commissioning Instruction, Language package Eastern Europe | 3KXT221001R4494 |

## Trademarks

® HART is a registered trademark of FieldComm Group, Austin, Texas, USA

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# TTF300
# Field-mount temperature transmitter

## Order form configuration

### HART device design: Instructions for customer-specific configuration

| Configuration | | Selection |
|---|---|---|
| Number of sensors | | ☐ 1 sensor (standard) ☐ 2 sensors |
| Measurement type<br>(for 2-sensor selection only) | | ☐ Sensor redundancy / sensor backup<br>☐ Sensor drift monitoring ____°C / K sensor drift differential ____s time limit for drift overshoot<br>☐ Difference measurement<br>☐ Average measurement |
| IEC 60751<br>JIS C1604<br>MIL-T-24388<br>DIN 43760<br>OIML R 84 | Resistance thermometer | ☐ Pt10 ☐ Pt50 ☐ Pt100 (Standard) ☐ Pt200 ☐ Pt500 ☐ Pt1000<br>☐ Pt10 ☐ Pt50 ☐ Pt100<br>☐ Pt10 ☐ Pt50 ☐ Pt100 ☐ Pt200 ☐ Pt1000<br>☐ Ni50 ☐ Ni100 ☐ Ni120 ☐ Ni1000<br>☐ Cu10 ☐ Cu100 |
| | Resistance measurement | ☐ 0 … 500 Ω ☐ 0 … 5000 |
| IEC 60584<br>DIN 43710<br>ASTM E-988 | Thermocouple | ☐ Type K ☐ Type J ☐ Type N ☐ Type R ☐ Type S ☐ Type T ☐ Type E ☐ Type B<br>☐ Type L ☐ Type U<br>☐ Type C ☐ Type D |
| | Voltage measurement | ☐ -125 … 125 mV ☐ -125 … 1100 mV |
| Sensor circuit<br>(for resistance thermometer and resistance measurement only) | | ☐Two-wire ☐ Three-wire (standard) ☐ Four-wire<br>Two-wire circuit: Compensation of Sensor Line Resistance max. 100 Ω<br>☐ Sensor 1: ____ Ω ☐ Sensor 2: ____ Ω |
| Reference junction<br>(for thermocouples only) | | ☐ Internal (for standard thermocouple, except type B) ☐ None (type B)<br>☐ External / temperature: ____°C |
| Measuring range | | ☐ Lower range value : _____ (standard: 0)<br>☐ Upper range value : _____ (standard: 100) |
| Unit | | ☐Celsius (default) ☐ Fahrenheit ☐ Rankine ☐ Kelvin |
| Characteristic behavior | | ☐ Rising 4 ... 20 mA (standard) ☐ Falling 20 ... 4 mA |
| Output behavior for error | | ☐ Overrange / 22 mA (standard) ☐ Underrange / 3.6 mA |
| Output attenuation ($T_{63}$) | | ☐ Off (standard) ☐ ____ seconds (1 … 100 s) |
| Sensor number | | ☐ Sensor 1: _____ ☐ Sensor 2: _____ |
| Resistance value at 0 °C / $R_o$<br>Callendar-Van Dusen coefficient A<br>Callendar-Van Dusen coefficient B<br>Callendar-Van Dusen coefficient C<br>(optional, for resistance thermometers only) | | Sensor 1: $R_o$: _____ Sensor 2: $R_o$: _____<br>A: _____ A: _____<br>B: _____ B: _____<br>C: _____ C: _____ |
| User characteristics based on linearization table | | ☐ Based on attached table of variate pairs |
| TAG number | | ☐ _____ (maximum 8 characters) |
| HART revision | | ☐ HART5 (standard) ☐ HART7 |
| Software write protection | | ☐ Off (standard) ☐ On |
| "Maintenance required" alarm pulse or<br>continuous signaling in accordance with NE 107 | | ☐ Off (standard) pulse width ____ s (0.5 ... 59.5 s increment 0.5 s) |

## PROFIBUS PA / FOUNDATION Fieldbus device design: Instructions for customer-specific configuration

| Configuration | | Selection |
|---|---|---|
| Number of sensors | | ☐ 1 sensor (standard) ☐ 2 sensors |
| Measurement type<br>(for 2-sensor selection only) | | ☐ Sensor redundancy / sensor backup<br>☐ Sensor drift monitoring ____°C / K sensor drift differential ____s time limit for drift overshoot<br>☐ Difference measurement<br>☐ Average measurement |
| IEC 60751<br>JIS C1604<br>MIL-T-24388<br>DIN 43760<br>OIML R 84 | Resistance thermometer | ☐ Pt10 ☐ Pt50 ☐ Pt100 (Standard) ☐ Pt200 ☐ Pt500 ☐ Pt1000<br>☐ Pt10 ☐ Pt50 ☐ Pt100<br>☐ Pt10 ☐ Pt50 ☐ Pt100 ☐ Pt200 ☐ Pt1000<br>☐ Ni50 ☐ Ni100 ☐ Ni120 ☐ Ni1000<br>☐ Cu10 ☐ Cu100 |
| | Resistance measurement | ☐ 0 … 500 Ω ☐ 0 … 5000 |
| IEC 60584<br>DIN 43710<br>ASTM E-988 | Thermocouple | ☐ Type K ☐ Type J ☐ Type N ☐ Type R ☐ Type S ☐ Type T ☐ Type E ☐ Type B<br>☐ Type L ☐ Type U<br>☐ Type C ☐ Type D |
| | Voltage measurement | ☐ -125 … 125 mV ☐ -125 … 1100 mV |
| Sensor circuit<br>(for resistance thermometer and resistance measurement only) | | ☐Two-wire ☐ Three-wire (standard) ☐ Four-wire<br>Two-wire circuit: Compensation of Sensor Line Resistance max. 100 Ω<br>☐ Sensor 1: ____ Ω ☐ Sensor 2: ____ Ω |
| Reference junction<br>(for thermocouples only) | | ☐ Internal (for standard thermocouple, except type B) ☐ None (type B)<br>☐ External / temperature: ____°C |
| Unit | | ☐Celsius (default) ☐ Fahrenheit ☐ Rankine ☐ Kelvin |
| Resistance value at 0 °C / $R_0$<br>Callendar-Van Dusen coefficient A<br>Callendar-Van Dusen coefficient B<br>Callendar-Van Dusen coefficient C<br>(optional, for resistance thermometers only) | | Sensor 1: $R_0$: _____ Sensor 2: $R_0$: _____<br>A: _____ A: _____<br>B: _____ B: _____<br>C: _____ C: _____ |
| IDENT_number (PROFIBUS) | | ☐ Device-specific 0x3470 (standard) ☐ Profile 0x9700 (1 AI Block) |
| Bus address PROFIBUS PA | | ☐ PA: 0 ... 125 ☐ Standard PA: 126 |
| TAG number | | ☐ _____ (maximum 16 characters) |
| Software write protection | | ☐ Off (standard) ☐ On |

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Sales

Service

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