

STT 3000 Series STT250

Smart Temperature Transmitters Specifications

Models STT25H, STT25S, STT25T, STT25M, STT25D

EN01-6031 April 2011



Introduction

Honeywell's STT 3000 family of microprocessor based smart temperature transmitters include the Series STT170 designed for temperature monitoring applications, STT250 described in this specification sheet for use with control and safety applications and the higher performance STT350 described in Product Specification Sheet EN01-5222 created for critical control applications. The STT250 units offer competitive performance in a more compact module and with a wider range of smart communications protocols.

- STT25H with HART™ protocol (Version 5 and 6*) when this popular protocol is preferred. Configuration of the HART unit can be made with any of the listed HART Communication Foundation tools.
- STT25S with HART 6 protocol and TUV SIL 2 approval. Configuration of the HART unit can be made with any of the listed HART tools.
- STT25T Dual Input model with HART™ protocol (Version 5 and 6*) and TUV* SIL 2 Approval. The two sensor inputs may be used for sensor cross checking or for sensor redundancy. User is alerted in case the sensor difference exceeds the defined limits, hence unreliable measurement is avoided. Dual* sensor inputs can also be configured for split range configuration, differential temperature measurement, averaging temperature measurement or as single sensor measurement.
- STT25D with digital DE protocol for either 4-20mA operation or digital integration into the TDC 3000™/ TPS 3000™ control system. Configuration can be done via Honeywell's digital DE protocol from the Smart Field Communicator (SFC), Smart Configuration Toolkit PC based software (SCT) or the MC Toolkit configuration tool.



- STT25M for 4-20mA operation and local/ remote configuration via Honeywell's digital DE protocol from the Smart Field Communicator (SFC), Smart Configuration Toolkit PC based software (SCT) or the MC Toolkit configuration tool.

All units support the same wide range of primary sensor types, are 2 wire powered and give an output linearized to temperature over the 2 power wires. Lead wire compensation is provided for RTD (Resistance Temperature Detectors) and internal digital cold junction compensation is provided for Thermocouples. Millivolt and Ohms sensor inputs can also be accepted.

**Check with the factory for availability*

Features

- Smart communication protocols available include HART or DE Honeywell.
- Enhanced HART device descriptions provide better visualization of device and its diagnostics. Graphical representation (Trend, Gauge and Horizontal bar chart) of process parameters provide the operators and maintenance personnel with better readability and insight into the process.

Features (continued)

- Advanced diagnostics (HART devices) ensure lower maintenance costs. These include time tracking functions, tracking the primary and secondary variable limits and sensor related information.
- Direct sensor head mounting in DIN Form A housing. Housing materials available include plastic, aluminum, 316SS and cast iron.
- Mounting options include wall, pipe, DIN rail or direct sensor head mounting with or without housing.
- Single model accepts input signal from a wide choice of primary sensors to satisfy varying application requirements with minimum transmitter inventory.
- Suitable for 4, 3 or 2 wire Pt100 and Pt200 measurement for all the single input models.
- Hard wired upscale/ downscale failsafe link to ensure secure operation in the event of a failure.
- Open circuit sensor analysis carried out in every measurement cycle.
- Sensor Matching Function is available in all the STT250 Models with HART protocol. This enables the programming of Callender–vanDusen coefficients of specific RTDs into the transmitter to improve the overall measurement accuracy.
- Selectable latching/non-latching failsafe operation for open circuit sensor.
- Integral analog or digital indication meter option.
- Analog to Digital converter validated frequently

Description

The STT250 transmitters are suitable as replacements for any conventional or most smart temperature transmitters in use today. The memory contains the characteristics of most commonly used temperature sensors.

You can easily use the hand held communicator or PC tool to configure the transmitter for any of these sensors and it will automatically correct.

Accuracies stated below are available merely by selecting the sensor type and range (i.e. without user calibration).

Calibration of the LRV/URV end points will typically give accuracy improvements of 2 times. Sensor errors can be calibrated out by calibration to the specific sensor either by having it at the LRV/URV temperatures or by simulation of the known values.

In addition, all units pass through Environmental Stress Screening by fast cycling between -40°C and $+85^{\circ}\text{C}$ to ensure maximum product reliability. During this process the ambient temperature coefficients are determined for each unit and burned into memory to ensure temperature compensation over a wide range of operating conditions.

Configuration adjustments and diagnostics checks can be made either locally or remotely over the signal wires from anywhere along their route. This enables major savings in manpower time during commissioning, start up and maintenance activities.

Performance Under Rated Conditions

| Sensor | Digital Accuracy over Normal Range | | D/A Accuracy % of span | Digital Accuracy over Maximum Range | | Standards |
|----------|--|------|---------------------------|---|------|------------------------------------|
| | °C | (°F) | | °C | (°F) | |
| Pt100 | 0.15°C for -200 to 450°C (-328 to 842°F) | | 0.025% | 0.25°C for -200 to 850°C (-328 to 1562°F) | | IEC751(ITS-90)($\alpha=0.00385$) |
| Pt200 | 0.30°C for -200 to 450°C (-328 to 842°F) | | 0.025% | 0.40°C for -200 to 850°C (-328 to 1562°F) | | IEC751(ITS-90)($\alpha=0.00385$) |
| Pt100J | 0.15°C for -200 to 450°C (-328 to 842°F) | | 0.025% | 0.25°C for -200 to 640°C (-328 to 1184°F) | | JISC1604-81($\alpha=0.00392$) |
| Ω | 0.40 Ω for 0 to 1000 Ω | | 0.025% | 0.40 Ω for 0 to 2,000 Ω | | |
| mV | 15 μ V for -20 to 120mV | | 0.025% | 15 μ V for -20 to 120mV | | |
| B | 1.0°C for 550 to 1820°C (1022 to 3308°F) | | 0.025% | 3.0°C for 200 to 1,820°C (392 to 3308°F) | | IEC 584-1(ITS-90) |
| E | 0.30°C for 0 to 1000°C (32 to 1832°F) | | 0.025% | 0.60°C for -200 to 1,000°C (-328 to 1832°F) | | IEC 584-1(ITS-90) |
| J | 0.30°C for 0 to 800°C (32 to 1472°F) | | 0.025% | 0.70°C for -200 to 1,200°C (-328 to 2192°F) | | IEC 584-1(ITS-90) |
| K | 0.60°C for -120 to 1370°C (-191 to 2498°F) | | 0.025% | 0.90°C for -200 to 1370°C (-328 to 2498°F) | | IEC 584-1(ITS-90) |
| N | 0.40°C for 0 to 1300°C (32 to 2372°F) | | 0.025% | 1.5°C for -200 to 1300°C (-328 to 2372°F) | | IEC 584-1(ITS-90) |
| R | 0.60°C for 500 to 1760°C (932 to 3200°F) | | 0.025% | 1.0°C for -50 to 1760°C (-58 to 3200°F) | | IEC 584-1(ITS-90) |
| S | 0.60°C for 500 to 1760°C (932 to 3200°F) | | 0.025% | 1.0°C for -50 to 1760°C (-58 to 3200°F) | | IEC 584-1(ITS-90) |
| T | 0.30°C for -100 to 400°C (-148 to 752°F) | | 0.025% | 0.5°C for -250 to 400°C (-418 to 752°F) | | IEC 584-1(ITS-90) |

- **Note:** 4 wire RTD and 4 wire ohms inputs are not applicable for STT25T Model.

Specifications

Operation Conditions

| Parameter | Reference Condition | Rated Condition | Operative Limits | Transportation And Storage |
|------------------------|---|-----------------|------------------|----------------------------|
| Ambient temperature °C | 23 °C \pm 2 | -40 to +85 | -40 to +85 | -50 to +100 |
| Humidity | | | | |
| Rack mounted % RH | 10 to 55 | 5 to 95 | 5 to 100 | 5 to 100 |
| In field housing % RH | 10 to 55 | 5 to 100 | 5 to 100 | 5 to 100 |
| Supply voltage | Voltage range 10.8 to 35 Vdc at the transmitter terminals (To be verified) | | | |
| Output current | Current over range 3.8 to 20.8 mA. Failsafe limits < 3.8 and 21.8 mA | | | |
| Load resistance | 0 to 1110 Ω | | | |
| Vibration | Maximum of 4g over 15 to 200Hz (restricted to 3g with indication meter). | | | |
| Shock | Maximum of 40g. | | | |

Note: All STT250 models support Namur 43 Functionality except STT25D

Specifications

Performance Specifications

Output D/A accuracy: $\pm 0.025\%$ of span

Cold Junction accuracy: $\pm 0.5^\circ\text{C}$

Total reference accuracy: Analogue 4-20mA mode = Digital accuracy + Output D/A accuracy + CJ accuracy (T/Cs only)

Total reference accuracy: Digital DE mode = Digital accuracy + CJ accuracy (T/Cs only).

(example: transmitter operating in analogue mode with Pt100 sensor and 0 to 200°C range.

Total reference accuracy = $0.15 + (200/100) * 0.025 = 0.2^\circ\text{C}$.

Digital ambient temperature effect (per 10°C change from 23°C ref.)
: RTDs or Ohms : 0.050% of reading in Ohms.
: T/Cs or mV : 0.080% of reading in mV.

Output D/A ambient temp. effect (per 10°C change from 23°C ref.):
 $\pm 0.045\%$ of span.

Cold Junction ambient temperature effect: 40: 1 rejection for ambient temperature changes from 23°C reference.

Total Reference Accuracy
(Reference – Includes combined effects of linearity, hysteresis, and repeatability)

Total output ambient temperature effect : Analogue 4-20mA mode = Digital effect + Output D/A effect + CJ effect (T/Cs only).

Total output ambient temperature effect: Digital DE mA mode = Digital effect + CJ effect (T/Cs only).

Power supply voltage effect: 0.005% of Max span per Volt.

Stability/time drift: 0.05% of max span per year.

Additional Parameters

Output:
4-20mA or Honeywell digital DE protocol. HART and DE available with 4-20mA output.

Adjustment range:
No limits to adjustments within the Maximum Range except minimum span limit of 1 engineering unit e.g. 1°C

Damping time constant:
Adjustable from 0 to 102 seconds digital damping.

Output response time:
1 second to reach 63% of final value with 0 secs damping.

Output update time:
0.5 secs approximately.

Input/ output galvanic isolation
Withstands 500Vac dielectric strength test for 1 minute.

Sensor open circuit:
Open circuit/ burnout detection is user selectable. Upscale or downscale with critical status message. Latching or non-latching sensor burnout action.

Common mode rejection:
120dB (1 million to 1) from 50Hz to 50 kHz.

Series mode rejection:
40dB (100 to 1) for 50 or 60Hz $\pm 0.5\text{Hz}$. (with internal software filter set to local power line frequency).

EMC compliance:
In compliance with 2004/108/EC, Electromagnetic Compatibility (EMC) Directive.

Radiated RF Immunity:
0.1% of span at (10V/m) over 80 to 1,000MHz. 3V/m over 1.4GHz to 2 GHz. 1V/m over 2GHz to 2.7GHz.

Physical Mounting and Construction

The STT250 Temperature Transmitter is designed to be mounted in a DIN Form A housing for direct installation with the temperature sensor or can be provided in a remote pipe or wall mount housing. Details for the various housings available are referenced in the table below. The STT250 Temperature Transmitter module can also be DIN rail mounted to a top hat or “G” rail via a clip. Integral meters available

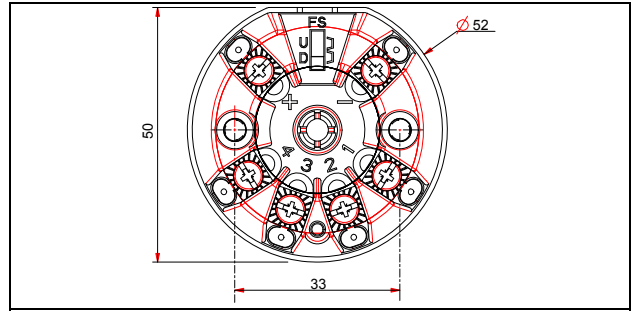
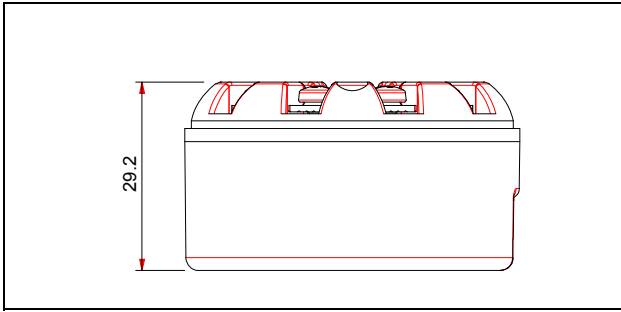
Integral Meters

Honeywell’s Series STT250 Temperature Transmitters can be supplied with local or remote indication. An Analog, Engineering Units or a Smart meter can be mounted integral to the transmitter inside the field mount housing. Order an integral meter as part of the model number; Table II __ M, __ E and __ S, respectively. Order a remote meter as model RMA300. The analogue meter is a 4-20mA moving coil type and displays the temperature in 0 to 100% span.

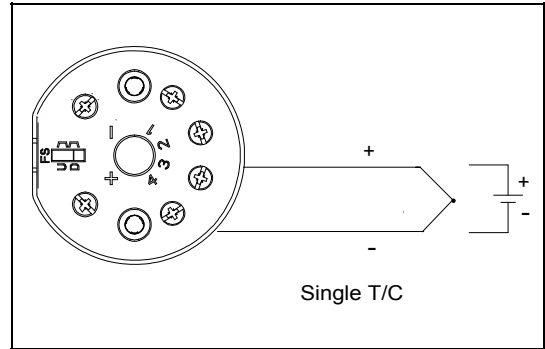
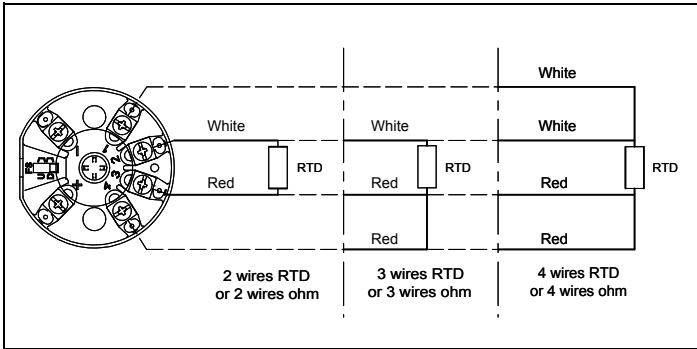
The E. U. meter displays temperature in engineering units with the STT25H, STT25T and STT25S HART units. Refer to 34-ST-25-08D for more details. The Smart meter accepts 4-20mA or DE protocol and displays temperature on a LCD in engineering units or 0 to 100% span.

The remote digital meter reads DE protocol and displays temperature on a LCD in 0 to 100% span. Refer to 34-ST-25-07A for details.

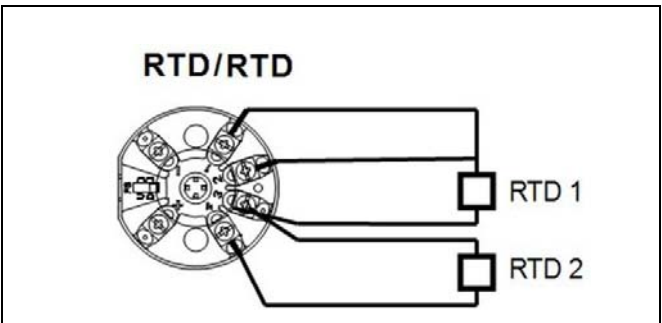
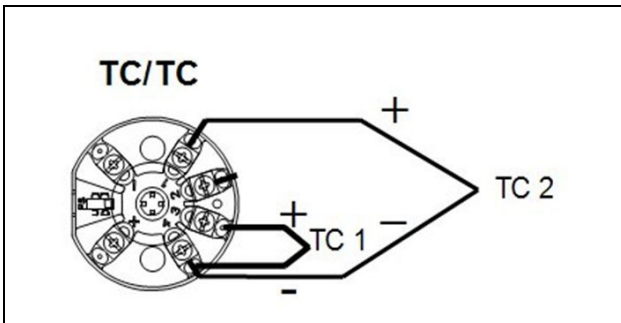
STT250 Module Dimensions (in/mm)



STT250 Single Input Connections



STT250 Dual Input Connections



Materials of Construction

| | |
|-------------------|--|
| Terminal Block | Noryl |
| Connection Screws | M3 Nickel plated brass |
| Module Housing | Cycloy (PC/ABS) with metallized interior surface |
| Weight | 0.075 kg (0.2 lbs) |

Approvals

The STT250 Temperature Transmitter module is Intrinsically Safe to ATEX, IECEx , SAEx, FM and CSA standards when used with a suitable safety barrier. It is zone 2 and explosion-proof to ATEX, IECEx, SAEx, FM and CSA standards when installed in a suitable housing. See the Model Selection Guide Table VII in this Specification Sheet for detailed safety approvals covering both the STT250 module only or for the STT250 module supplied in a housing.

Other Honeywell STT 3000 Temperature Solutions

| | |
|---------------|---|
| STT170 Series | 34-TT-03-07, STT 3000 Smart Temperature Transmitter Specification |
| STT350 Series | EN01-5222, STT 3000 Smart Temperature Transmitter Specification |
| STT800 Series | 34-TT-03-08, STT 3000 Temperature Probe Assemblies Specification |

For More Information

Learn more about how Honeywell's STT 3000 Smart Temperature Transmitters can increase performance, reduce downtime and decrease configuration costs, visit our website <http://www.honeywell.com/ps/hfs> or contact your Honeywell account manager.

Honeywell Process Solutions

1860 West Rose Garden Lane

Phoenix, AZ 85027

Tel: 1-800-423-9883 or 1-800-343-0228

www.honeywell.com/ps/hfs

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