

# TEMPERATURE

Product Data Sheet

DS3003

## Hart In-Head Temp Transmitter

### GEN310 SERIES

The GEN310 is an encapsulated in-head temperature transmitter with an integral spring mounting kit that replaces the standard connecting block in the sensor head. It is small in size yet has a performance superior to other larger and more expensive transmitters. The GEN310 has full HART communications protocol which allows the user to quickly and easily download information or interrogate the device enabling the following:-

- Simple re-ranging of sensor type and range.
- Easy on site re-calibration
- Self documentation.
- Operation with proprietary software packages such as AMS Plant Web™ and Cornerstone™
- Remote configuration over the 4-20mA loop using a hand held communicator or a PC & HART modem.
- On-line digital communication concurrent with a 4-20mA analogue signal

All the standard HART universal and common usage commands are fully implemented, with other device specific commands that enable access to the enhanced performance parameters of the GEN310. Some of the enhanced GEN310 features are as follows;

#### Sensor Referencing

The GEN310 sensor referencing via the Windows based M-config software allows for close matching to a known reference sensor eliminating possible sensor errors.

#### User Calibration

In addition to sensor referencing user offset and current output trimming is possible via the HART commands.

#### Custom Linearisation

The [X]\*1 facility allows the GEN310 to be programmed with a custom linearisation to suit non standard sensors or sensors with unusual or unique characteristics. Consult the sales office for details.

#### Sensor Burn Out Detection

If any sensor wire is broken or becomes disconnected the GEN310 output will automatically go to its user defined level (upscale or downscale). This happens irrespectively of which wire is broken.

#### Output Current Preset

For ease of system calibration and commissioning the output can be set to a predefined level anywhere in the 4-20mA range.

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## SPECIFICATION @ 20°C

### RTD (Pt100 Sensors)

Sensor Range		-200 to 850°C (18-390ohm)
Linearisation		BS-EN60751/BS1904/ DIN43760/JISC 1604/Custom (X) <sup>1</sup>
Thermal Drift	Zero	0.008°C/°C
	Span	100 ppm/°C
Lead Resistance Effect		0.002°C/ohm
Minimum Span <sup>1</sup>		25°C
Basic Measurement Accuracy		±0.01% FRI ±0.07% rdg
Excitation Current		300µA to 500µA
Max Lead Resistance		50 ohms/leg

### Thermocouples

Thermocouple Type	Measuring Range <sup>3</sup> °C	Minimum Span <sup>5</sup> °C
TC Type K	-200 to 1370	50
TC Type J	-200 to 1200	50
TC Type T	-210 to 400	25
TC Type R	-10 to 1760	100
TC Type S	-10 to 1760	100
TC Type E	-200 to 1000	50
TC Type L	-100 to 600	25
TC Type N	-180 to 1300	50
TC Type [X] <sup>1</sup>	±9999	Custom

Basic Measurement Accuracy	0.04% FRI ±0.04% rdg or 0.5°C Whichever is greater
Linearisation	BS60584-01/BS 4937/IEC 584-1
Cold Junction Tracking	0.05°C/°C
Cold Junction Range	-40 to +85°C
Thermal Drift	Span 100 ppm/°C

### Millivolt Inputs

Input	Voltage Source
Range	-10 to +75mV
Characterisation	Linear Custom [X] <sup>3</sup> (4th Order Polynomial)
Minimum Span <sup>5</sup>	Custom [X] <sup>1</sup>
Basic Measurement Accuracy <sup>2</sup>	5mV ±10µV ±0.07% rdg
Input Impedance	10M ohm
Thermal Drift	Zero 0.1µV/°C Span 100 ppm/°C

### Slidewire

Input	3 Wire Potentiometer
Resistance Range	10 ohm to 390 ohm [end to end] (larger values can be accommodated by fitting an external resistor)
Characterisation	Linear or Custom [X] <sup>1</sup>
Minimum Span <sup>5</sup>	5% of FRI
Basic Measurement Accuracy <sup>2</sup>	0.1% FRI
Thermal Drift	Zero 0.005% of span/°C Span 100 ppm/°C

### Output

Output Range	<3.8 to >20.2mA
Accuracy	±5µA
Voltage Effect	0.2µA/V
Thermal Drift	1µA/°C
Burnout Low	<3.8mA Input Saturated high 20.5mA
Burnout High	>21mA Input Saturated Low 3.8mA

Supply Voltage	10 to 40V
Max Output Load	$\frac{V_{Supply} - 10}{21}$ K ohms
Min Output Load	250 ohms <sup>6</sup>

### General

Input/Output Isolation	500 V AC rms (Tested to 3000 V AC)
Time Constant (Filter OFF)	0.5 secs (to 90% of val)
Filter Factor Prog Warm Up	Off, 1 to 32 secs or Adaptive 2 mins to full accuracy
Re-calibration Interval	

### Approvals

EMC	BSEN61326
Intrinsic Safety	EEx is IIC T4...T6 FM3610 Ex N IIC
Non Incendive	

### Environmental

Ambient Operating Range	-40 to 85°C
Ambient Storage Temp Range	-50 to 85°C
Ambient Humidity Range	10 to 95% Non-condensing

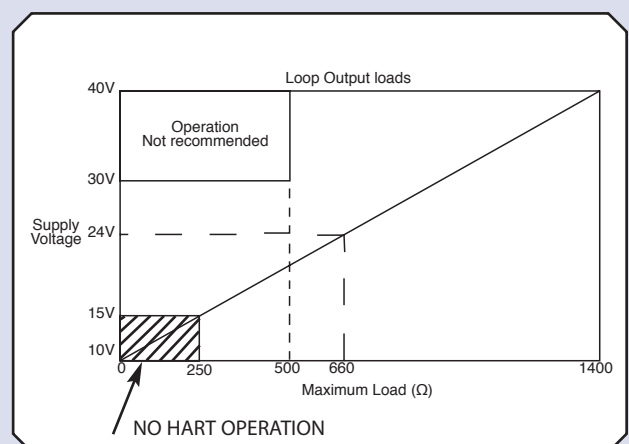
### Mechanical

Material	ABS
Flammability	SEI UL94-V0
Enclosure	DIN std terminal block size
Weight	27g
Dimensions	44mm diameter x 21mm
Spring Mounting	Free Kit with each Transmitter

### Notes

1. Customer linearisation is available pre-programmed at the factory, contact sales office for details.
2. Basic Measurement Accuracy includes the effects of calibration, linearisation and repeatability.
3. Consult reference tables for practical Thermocouples Material Limitations.
4. FRI - Full Range Input.
5. Any span may be selected, but full accuracy is only guaranteed for spans greater than the minimum recommended.
6. See graph for recommended loop loads.

## INSTALLATION

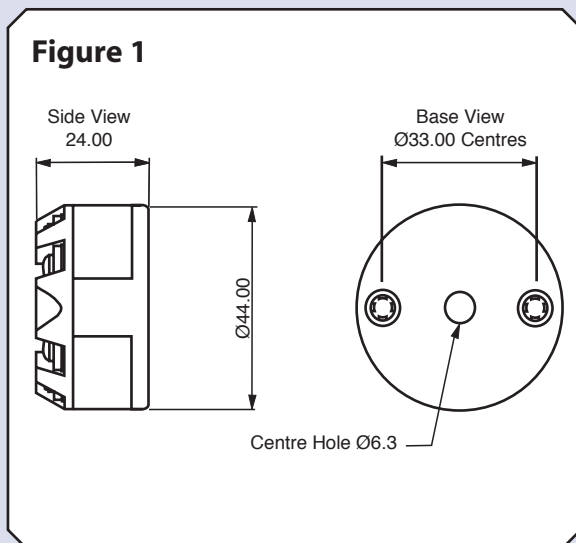


## Mechanical

The transmitter is mounted using integral spring loaded screws (supplied), on standard 33 mm fixing centres and will fit a DIN standard termination head. The transmitter should be installed with adequate protection from moisture and corrosive atmospheres.

A Ø6.3mm hole is provided through the centre of the transmitter to allow sensor wires to be threaded through the transmitter body direct to the input screw terminals. The screw terminals have been designed to allow all connection wires to enter from an inner or an outer direction.

Care must be taken when locating the transmitter to ensure the ambient temperature remains within the specified operating range.



## Electrical

Connections to the transmitter are made to the screw terminals provided on the top face. No special wires are required for the output connections, but screened twisted pair cable is the most suitable for long runs. It is recommended that screened cable is used for the sensor connection wires for cable runs greater than one metre. All input wires must have the same core diameter to maintain equal lead resistance in each wire.

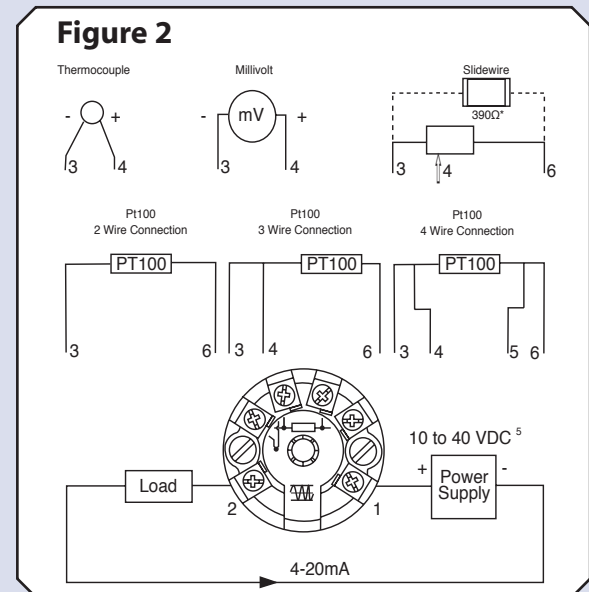
Figure 2 shows the method of connection to provide a 4-20 mA current loop output. The Pt100 sensor shown would normally take the form of a probe assembly with a three wire connection. The output loop has a voltage power supply used to provide

loop excitation. The load symbol represents other equipment in the loop, normally indicators, controllers or loggers. Care must be taken when designing the 4-20mA circuit to ensure that the total voltage requirements of all the equipment in the loop added together, does not exceed the power supply voltage. If a number of instruments are connected in the loop, ensure that only one instrument is tied to ground. Grounding the loop at two points will cause a short circuit of part of the loop leading to measurement errors.

To guarantee CE compliance, sensor leads must be less than 3 metres long and the transmitter housing should prevent access to the transmitter during normal operation.

\* Resistance Range, 10 W to 390 W (End to End). Larger values can be accommodated by fitting 390 W resistor (not supplied) as shown.

## M-CONFIG SOFTWARE



## Communicating with the GEN310 HART Transmitters

The GEN310 can communicate digitally, concurrent with the analogue 4-20mA output signal. This can be achieved in a number of ways namely:

- Proprietary hand held communicator
- PLC's, DCS's etc with HART interface
- PC Computers using M-Config and a HART modem

## Communicating with a Hand Held Communicator

The GEN310 will communicate with any proprietary

HART communicator and access to all universal commands is available from the communicator. In order to access all the parameters available, the communicator must have the correct HART Device Description (DD) installed. Contact the communicator provider or 'Support @ Status' to enable up-grading of communicators that do not contain the correct DD.

#### **Communicating with PLC's or DCSs**

Any system that supports HART field devices using such software packages as AMS-Plant Web™ or Cornerstone™ will communicate with the GEN310 enabling access to advanced system features such as self documentation and diagnostics. The correct DD must be installed for full access to all parameters.

#### **Communicating with a PC**

Communication with a PC is easily accomplished by using the HART modem supplied with the communications kit, and M-Config software. M-Config is the menu-driven software which runs under Windows 95, 98, Windows 2000, WINXP or NT and enables the following functions to be quickly and easily performed:

- Change sensor type, range, select burnout direction, filter (damping) factor.
- Set tag numbers, assembly numbers, calibration details, messages, etc.
- Print or save to file all relevant documentary information
- Read next calibration date
- Perform basic calibration
- Monitor sensor status and read transmitter diagnostics
- Read-time reading of process variable
- Supports up to 15 devices in multi-drop mode

M-Config software is very 'user-friendly' and can be used immediately without extensive training. The user is guided through a series of simple menu screens where the information is clearly and logically represented. It is available in English and many other languages (contact sales office for latest information).

## **ORDER CODES**

<b>Code</b>	<b>Description</b>
SHX0028	Standard unit
SHX0029	Intrinsically safe to EEx ia IIC T4
SHX0030	Programming kit comprising M-Config software, power supply, lead and HART modem.

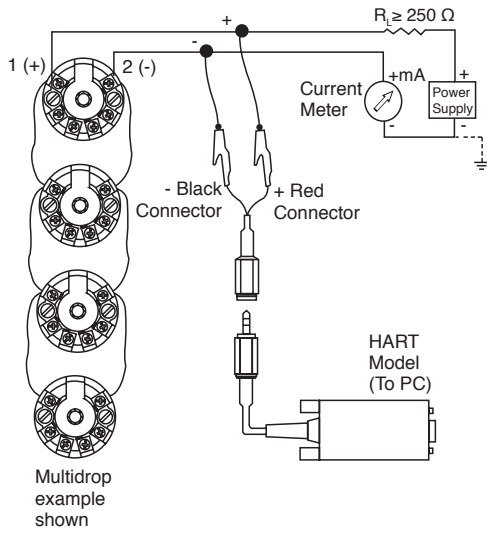
#### **Note:**

Transmitters must be configured individually for multidrop mode (using RCP2), by setting the Device Number between 1 and 15.

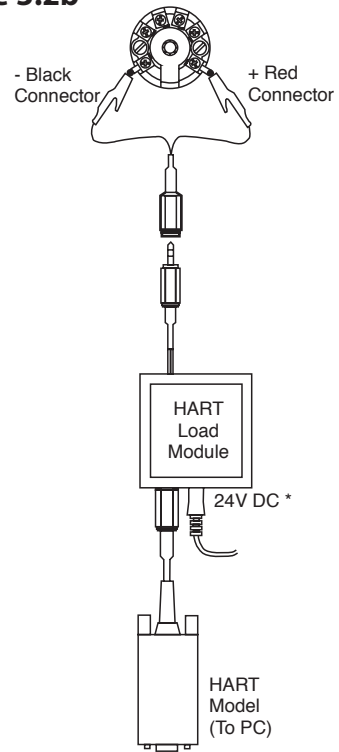
This cannot be done while the transmitters are connected together.

The GEN310 can also be configured by connecting the Communicator or HART modem across the load in figure 3.1a and 3.2b respectively.

**Figure 3.2a**



**Figure 3.2b**



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Head Office: 2 Downgate Drive, Sheffield, S4 8BT, England  
 Tel: +44(0)114 244 2521 Fax: +44(0)114 243 4838



2 Downgate Drive, Sheffield, S4 8BT, England  
 Tel: +44(0)114 244 2521 Fax: +44(0)114 243 4838  
 email: [sales@roxspur.com](mailto:sales@roxspur.com) [www.roxspur.com](http://www.roxspur.com)



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