# HART DIN RAIL TEMPERATURE TRANSMITTER

## SEM315

> **ACCEPTS  PT100, T/C & SLIDEWIRE SENSORS**

> **HART® PROTOCOL**

> **UNIVERSAL INPUT**

> **SENSOR BURNOUT DETECT**



> ### INTRODUCTION

The SEM315 has the HART communications protocol which allows the user to quickly and easily down-load information or interrogate the device enabling the following:

- Simple re-ranging of sensor type and range.
- Easy on site re-calibration.
- Operation with proprietary software packages such as AMS Plant Web™ and Cornerstone™.
- Remote configuration on the (4 to 20) mA loop with a hand held communicator or with a PC & HART modem.
- Online Digital communication concurrent with a (4 to 20) mA analogue signal.

The standard HART universal and common usage commands are implemented, with other device specific commands that enable access to the enhanced performance parameters of the SEM315.

> ### ENHANCED FEATURES

Some of the enhanced SEM315 features are as follows:

**Sensor Referencing**
The SEM315 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 SEM315 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 SEM315 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 pre-defined level anywhere in the (4 to 20) mA range.

Hart® Registered trademark of the HART Communication Foundation.

# HART DIN RAIL TEMPERATURE TRANSMITTER

## ➤ SPECIFICATIONS @ 20 ºC

| | |
|---|---|
| Input Types | Pt100, Thermocouple, mV or Slidewire. (Ni100, via Custom[X]*1 facility) |
| Time Constant (Filter off) | 0.5 s (to 90 % of final value) Filter Factor Off/selectable between 1 and 32 seconds/ or Adaptive |
| Warm-up Time | 120 s to full accuracy |
| Input/Output Breakdown Isolation | 500 VAC |

### ENVIRONMENTAL
| | |
|---|---|
| Operating Range | (-40 to 85) ˚C |
| Storage Temperature | (-50 to 85) ˚C |
| Humidity Range | (0 to 95) % non condensing |

### APPROVALS
| | |
|---|---|
| EMC | BS EN61326 |

### OUTPUT
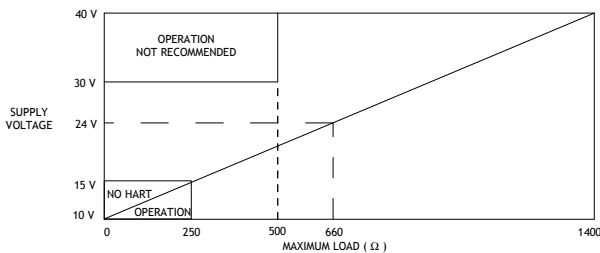


| | |
|---|---|
| Max Output Load | [(Vsupply -10)/21.5] KΩ, 250 Ω minimum loop load. Supply voltages over 30 V a minimum loop load of 500 Ω is necessary. |
| Burnout Levels | Low 3.75 mA, High 21.5 mA |
| Input Out of Range | Low 3.8 mA, High 20.5 mA |
| Output Range | (4 to 20) mA, Min. 3.75 mA, Maximum 21.5 mA |
| Accuracy | ± 5 µA |
| Thermal Drift | 1 µA/ ˚C |
| Supply Voltage | (10 to 40) VDC |
| Supply Voltage Effect | 0.2 µA/V |

Hart TrimDac function available.

### ENCLOSURE
| | |
|---|---|
| Material | ABS |
| Flammability | SEI UL94-V0 |

### INPUT SENSORS & RANGES

#### Pt100 (RTD) 2, 3 or 4 Wire
| | |
|---|---|
| Sensor Range | (-200 to -850) ˚C [18 to 390 Ω] |
| Minimum Span | 25 ˚C |
| Linearisation | BS EN 60751/BS 1904/ DIN 43760/JIS1604/ CUSTOM [X]*1 |
| Max. Lead Resistance | 50 Ω per leg (balanced for 3 wire) |
| Basic Measurement Accuracy*2 | 0.01 % FRI*3 ± 0.07 % rdg |
| RTD Excitation Current | (300 to 500) µA |
| Thermal Drift  Zero | 0.008 ˚C/˚C |
| Span | 0.01 %/˚C |

#### THERMOCOUPLE

| Type | Range ˚C | Minimum span ˚C |
|---|---|---|
| Type K | -200 to 1370 | 50 |
| Type J | -200 to 1200 | 50 |
| Type T | -210 to 400 | 25 |
| Type R | -10 to 1760 | 100 |
| Type S | -10 to 1760 | 100 |
| Type E | -200 to 1000 | 50 |
| Type L | -100 to 600 | 25 |
| Type N | -180 to 1300 | 50 |
| Others | Custom*1 | |

| | |
|---|---|
| Linearisation | BS EN 60584-01/ BS 4937/ IEC 584-1 |
| Basic Measurement Accuracy*2 | 0.04 %FRI*3 ± 0.04 % rdg or 0.5 ˚C (whichever is greater) |
| Cold Junction | ± 0.5 ˚C tracking 0.05 ˚C /˚C range (-40 to 85) ˚C |
| Thermal Drift  Span | 0.01 %/˚C |

#### MILLIVOLTS
| | |
|---|---|
| Input | Voltage source |
| Range | (-10 to 75) mV |
| Characterisation | Linear, Custom [X]*1 |
| Minimum Span | 5 mV |
| Basic Measurement Accuracy*2 | ± 10 µV ± 0.07 % rdg |
| Input Impedance | 10 MΩ |
| Thermal Drift  Zero | 0.1 µV/˚C |
| Span | 0.01 %/˚C |

#### SLIDEWIRE
| | |
|---|---|
| Input | 3 wire potentiometer |
| Resistance Range | (10 to 390) Ω end to end (Larger values can be accommodated with an external resistor) |
| Range  (0 to 100) % | |
| Characterisation | Linear, Custom [X]*1 |
| Minimum Span*5 | 5 % of FRI*3 |
| Thermal Drift  Zero | 0.005 % of Span/˚C |
| Span | 0.01 %/˚C |
| Basic Measurement Accuracy*2 | 0.1 % of FRI*3 |

*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. FRI = Full Range Input

# HART DIN RAIL TEMPERATURE TRANSMITTER

**M-CONFIG SOFTWARE**

**COMMUNICATING WITH THE SEM315 HART TRANSMITTERS**
The SEM315 can communicate digitally, concurrent with the analogue (4 to 20) mA 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 SEM315 will communicate with any proprietary HART communicator and access to 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.

**COMMUNICATING WITH PLC'S OR DCS'S**
Any system that supports HART field devices using such software packages as AMS-Plant Web™ or Cornerstone™ will communicate with the SEM315 enabling access to advanced system features such as self documentation and diagnostics. The correct DD must be installed for full access to all parameters.

**COMMUNICATION 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 product from Status Instruments which runs under Windows 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 (TrimDac, user offset).
- Monitor sensor status and read transmitter diagnostics.
- Real-time reading of process variable.
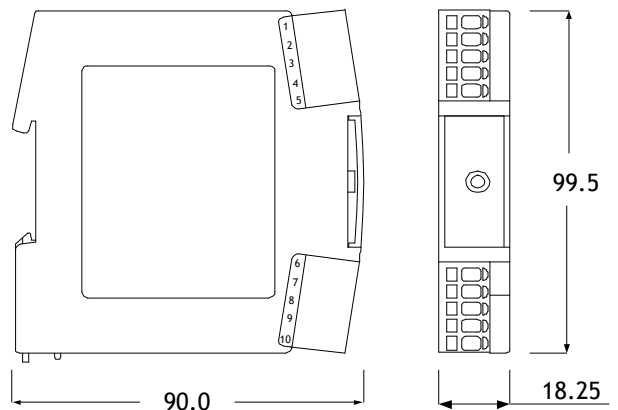- Supports up to 15 devices in multi-drop mode.

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 as a free download on www.status.co.uk

**MULTIDROP HART**
As well as operating in standard mode the SEM315 supports HART Multidrop mode whereby up to 15 devices can be connected to the same pair of wires enabling full digital functionality with each device.
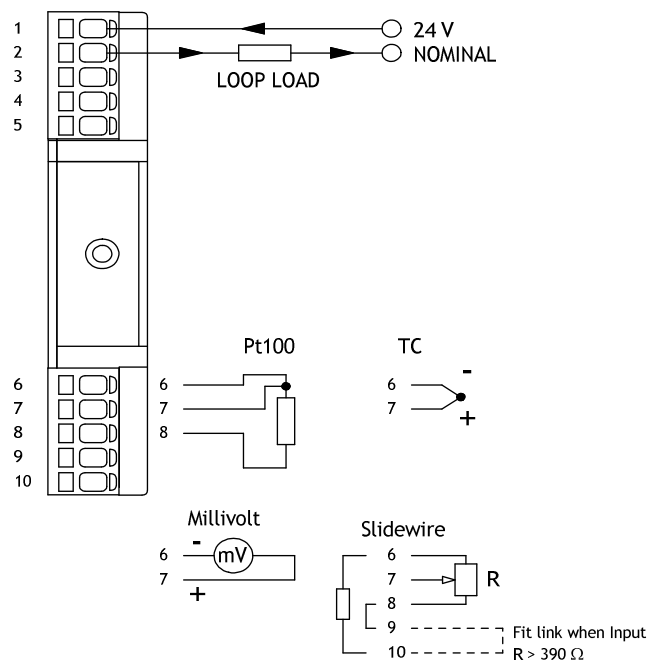


DEVICE 1   DEVICE 2   DEVICE 15

RLoad
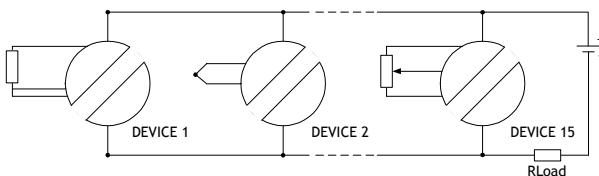
*In multi-drop mode the current output is set at 4 mA.

## MECHANICAL DETAILS (All dimensions in mm)



99.5

90.0

18.25

## CONNECTIONS



24 V
NOMINAL
LOOP LOAD

Pt100     TC

Millivolt     Slidewire

R

Fit link when Input
R > 390 Ω

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## ORDER CODE

| | |
|---|---|
| **SEM315:** | Universal DIN rail transmitter with HART communication |
| **M-Config:** | Software and manual for the RCP2 Comms Kit are available free from www.status.co.uk |
| **RCP2-KIT-UK** | Kit for UK use |
| **RCP2-KIT-EUR** | Kit for European use |
| **RCP2-KIT-USA** | Kit for use in USA / Canada |
| **RCP2-KIT-AUS** | Kit for use in Australia |
| **All Kits comprise:** | M-Config, PSU, CONFIG-03 & Hart Modem |

**STATUS INSTRUMENTS**