DIN RAIL SMART UNIVERSAL TEMPERATURE TRANSMITTER

SEM215

- **UNIVERSAL INPUT**
- **QUICK SELECTOR / PC CONFIGURABLE**
- **GALVANICALLY ISOLATED**
- **LOOP POWERED**
- **COMPACT DIN RAIL MOUNTED**

INTRODUCTION

The SEM215 is a universal DIN rail mounted temperature transmitter that accepts most commonly used temperature sensors, slide wire transducers or millivolt signals, isolates and transmits them as a (4 to 20) mA signal to a host system. It can be configured by either of the following methods:

Configuration using "Quick Selector"
One of 57 pre-set ranges can be selected by using switches. The switch, located close to the rail clip, is inaccessible in normal use. This "Quick Selector" method does not require any additional calibration, and the transmitter can be put into service immediately after selection is made.

Configuration via PC
The sensor type and range are easily programmed using a PC and a simple Windows based software programme. Sensors can be changed without the need for re-calibration. Special sensors can be accommodated by using the type "X" option, the characterisation for these sensors are factory entered for later retrieval from the menus.

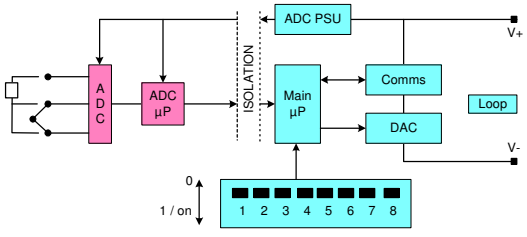
The transmitter is very compact enabling a high packing density to be achieved and by using the latest tension clamp technology for the two part terminals, connections are made in half the time taken to wire conventional screw terminals. These terminations are maintenance free and the tension clamp ensures that the contact is permanently under tension eliminating any potential problem of loosening due to temperature fluctuations or vibration.

INPUTS
Pt100 Platinum resistance sensors, Thermocouples, millivolts or Slidewire sensors may be connected to the unit, plus a 'type X' linearisation option which may be pre-configured at the factory to satisfy any custom characterisation requirements.

The Process Variable may be filtered to remove incoming signal noise using one of four settings. If the 'Adaptive' function is selected the filter continuously adjusts to the incoming signal to noise ratio in order to choose an appropriate level of filtering. In this way a slowly changing input can be heavily filtered but if the signal goes through a sudden change the filter quickly reduces allowing a rapid response, other settings are; off, 2 seconds, 10 seconds.

A user programmable offset is available to remove any system errors that may be present and sensor referencing enables the transmitter to be accurately matched to a particular sensor.

CURRENT OUTPUTS
In normal operation the current output varies between (4 to 20) mA. If the input sensor develops a fault, or the software in either of the two microprocessors detects an error, then the current output is driven either upscale (greater than 20 mA) or downscale (less than 4 mA) depending upon the sense of the burnout parameter selected.



STATUS INSTRUMENTS

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SPECIFICATION @ 20 °C & 24 VDC

RTD Input (Pt100)

Sensor Range	(-200 to +850) ℃ (18 to 390) Ω
Minimum Span [1]	25 ℃
Linearisation	BS EN 60751 (IEC 60751) DIN 43760, JISC 1604 CUSTOM [X] [3], Contact Sales Office
Basic Measurement Accuracy [2]	±0.01 % FRI [5] ±0.05 % Rdg
Thermal Drift	Zero 0.008 ℃ / ℃, Span 0.01 % / ℃
Excitation Current	(300 to 550) µA
Maximum Lead Resistance	50 Ω / leg
Lead Resistance Effect	0.002 ℃ / Ω
Preset Ranges	Refer to "Quick selector" section

Thermocouple Input

Sensor Ranges

Thermocouple Type	Measuring Range ℃ [4]	Minimum Span [1] ℃
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] [3] ± 9999 Custom	

Linearisation	BS EN 60584, IEC 60584
Basic Measurement Accuracy [2]	±0.04 % FRI [5] ±0.04 % Rdg or 0.5 ℃ (Which ever is greater)
Thermal Drift Zero	0.1 µV / ℃, Span 0.01 % / ℃
Cold Junction Error	±0.5 ℃
Cold Junction Tracking	0.05 ℃ / ℃
Cold Junction Range	(-40 to +70) ℃
Preset Ranges	Refer to "Quick selector" section

Millivolt Input

Input	Voltage Source
Range	(-10 to +75) mV
Characterisation	Linear. Custom [X] [3], 4th order polynomial
Minimum Span [1]	5 mV
Basic Measurement Accuracy [2]	±10 µV ±0.07 % Rdg
Input Impedance	10 MΩ
Thermal Drift Zero	0.1 µV / ℃, Span 0.01 % / ℃

Slidewire Input

Input	3 Wire potentiometer
Resistance Range	(10 to 390) Ω (End to End) For input with R > 390 Ω terminals 9 and 10 have to be linked.
Characterisation	Linear. Custom [X] [3], 4th order polynomial
Minimum Span [1]	5% of full range
Basic Measurement Accuracy [2]	0.1% FRI [5]
Temperature Drift	0.01 % / ℃

Output

Output Range	(4 to 20) mA (Min. 3.8 to Max. 20.2) mA
Maximum Output	23 mA
Accuracy	±5 µA
Voltage Effect	0.2 µA / V
Thermal Drift	1µA / ℃
Supply Voltage	(10 to 35) V
Maximum Output Load	[(Vsupply -10) / 20] KΩ (eg 700 Ω @ 24 V) Restricted to 300 Ω maximum for in loop programming
Protection	Reverse connection overvoltage 35 V

General

Input/Output Isolation	500 VAC rms (galvanically isolated)
Update Time	250 ms Maximum
Time Constant (Filter Off)	< 1 second (Time to reach 63 % of final value)
Filter Factor Programmable	Off, 2 seconds, 10 seconds or Adaptive
Warm-up Time	2 minutes to full accuracy
Stability	0.1 % FRI [5] or 0.1 ℃ / year

Environmental

Ambient Operating Range	(-10 to 70) ℃ [6]
Ambient Storage Temperature	(-25 to 70) ℃
Ambient Humidity Range	(10 to 90) % RH non condensing

EMC BS EN 61326

Mechanical

Enclosure	Din Rail mounted to fit Din EN 50022-35
Material	ABS
Weight	70 g
Flammability	SEI UL 94-VO
Dimensions	(90 x 99.5 x 18.25) mm
Connections	Tension clamp two part terminals and 3.5 mm jack for comms
Wire Size	(0.5 to 1.5) mm^2

***Alternative connectors with screw terminals are available at extra cost**

Communications

PC Interface	RS232 via Configurator
Minimum Output Load	250 Ω for 'In Loop' programming (Available as quick selector or via PC)
Maximum Cable Length	1000 metres
Configurable Parameters	
Quick Switch Selection	Sensor type, Burnout, Units (℃ or ℉)
PC / Configurator	Range: Hi/Lo: Filter: Tag: User Offset

Notes.

1) Any span may be selected, full accuracy is only guaranteed for spans greater than the minimum recommended.
2) Basic Measurement Accuracy includes the effects of calibration, linearisation and repeatability.
3) Customer linearisation requirements are available pre-programmed at the factory, contact your supplier for details.
4) Consult thermocouple reference standards for thermocouple material limitation.
5) FRI = Full Range Input
6) (-40 to 70) ℃ operation with Tropicalised Option

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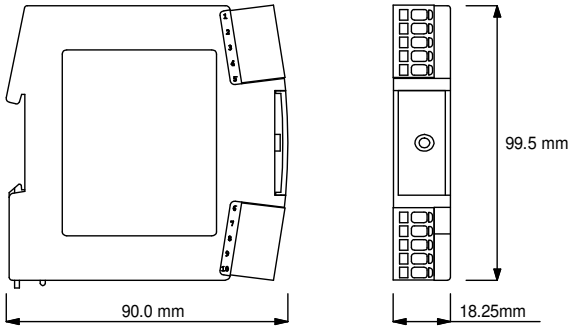
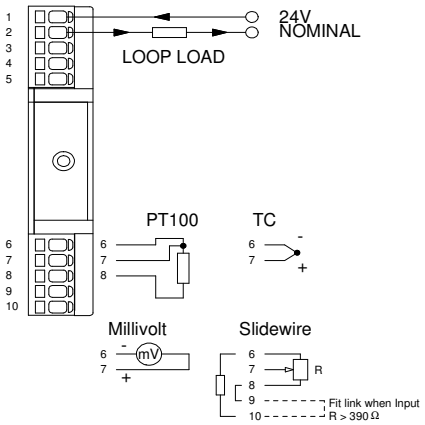
MECHANICAL DETAIL

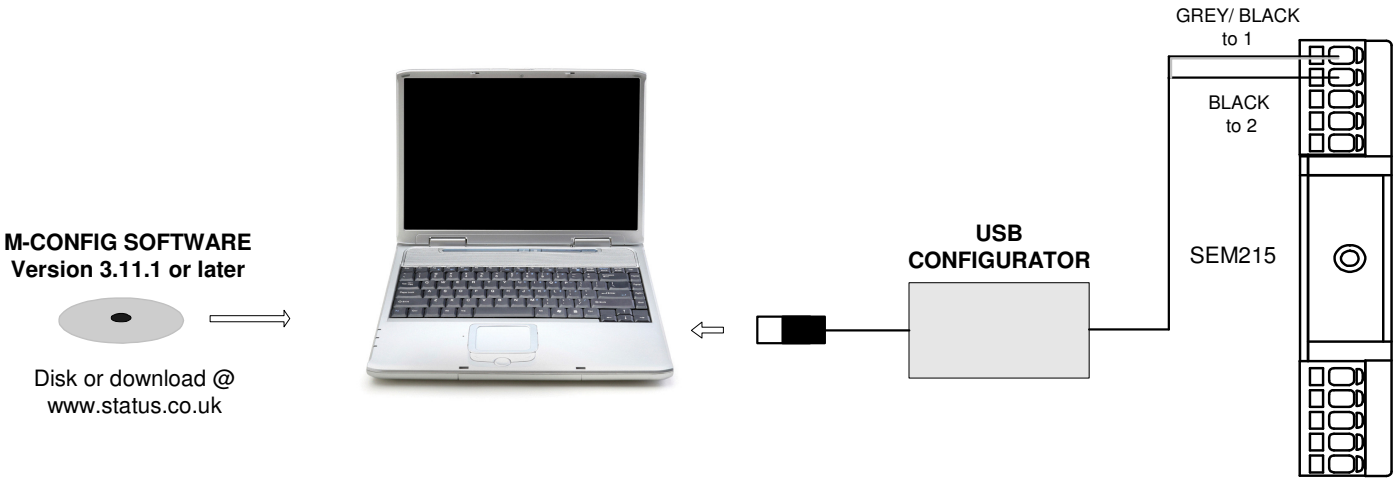
(All dimensions in mm)



CONNECTIONS



CONFIGURATION DIAGRAM



WARNING! **DO NOT CONNECT A POWERED CONFIG MODULE TO A UNIT ON A POWERED LOOP**

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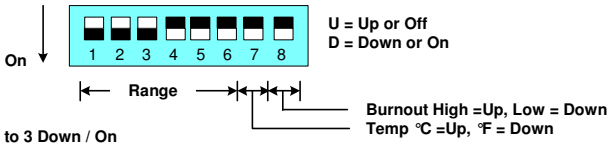
Quick Selector –

A small switch, located between the rail clips and inaccessible in normal use, enables sensors and ranges to be selected without the need to use a computer. This 'Quick Select' method does not require any additional calibration and the unit can be used immediately after selection. Sensor and range settings are shown below.



Example: **1 to 3 Down / On**
4 to 6 Up / Off
7 Up = ℃
8 Up = Burnout High

=Pt100, EN60751 (0 to 150) ℃, Burnout High

Range	123456	Code
Computer Programmable		
Prog	UUUUUU	00
Use this code to configure unit using RCPW software		

Pt100, EN60751		
-100 to 100	DUUUUU	01
-50 to 50	UDUUUU	02
-50 to 100	DDUUUU	03
-50 to 150	UUDUUU	04
0 to 50	DUDUUU	05
0 to 100	UDDUUU	06
0 to 150	DDDUUU	07
0 to 200	UUUDUU	08
0 to 300	DUUDUU	09
0 to 400	UDUDUU	10
0 to 500	DDUDUU	11
0 to 600	UUDDUU	12
50 to 150	DUDDUU	13

Pt100, IEC 584-1		
-25 to 125	UDDDUU	14
0 to 100	DDDDUU	15
0 to 250	UUUUDU	16
250 to 500	DUUUDU	17
-50 to 150	UDUUDU	18
0 to 200	DDUUDU	19
50 to 150	UUDUDU	20

Pt100, JISC 1604		
-25 to 125	DUDUDU	21
0 to 100	UDDUDU	22
0 to 250	DDDUDU	23
250 to 500	UUUDDU	24
-50 to 150	DUUDDU	25
0 to 200	UDUDDU	26
50 to 150	DDUDDU	27

Range	123456	Code
Type K, IEC 584-3 BS 4937		
0 to 100	UUDDDU	28
0 to 200	DUDDDU	29
0 to 500	UDDDDU	30
0 to 600	DDDDDU	31
0 to 800	UUUUUD	32
0 to 1000	DUUUUD	33
0 to 1200	UDUUUD	34

Type J, IEC 584-3 BS 4937		
0 to 100	DDUUUD	35
0 to 150	UUDUUD	36
0 to 200	DUDUUD	37
0 to 400	UDDUUD	38
0 to 600	DDDUUD	39

Type T, IEC 584-3 BS 4937		
-50 to 50	UUUDUD	40
-50 to 100	DUUDUD	41
0 to 100	UDUDUD	42
-100 to 100	DDUDUD	43
0 to 200	UUDDUD	44
0 to 400	DUDDUD	45

Type R, IEC 584-3 BS 4937		
0 to1000	UDDDUD	46
0 to1600	DDDDUD	47

Type S, IEC 584-3 BS 4937		
0 to1000	UUUUDD	48
0 to1600	DUUUDD	49

Type N, IEC 584-3 BS 4937		
0 to 100	UDUUDD	50
0 to 200	DDUUDD	51
0 to 400	UUDUDD	52
0 to 600	DUDUDD	53
0 to 800	UDDUDD	54
0 to1000	DDDUDD	55
0 to1200	UUUDDD	56

Type E, IEC 584-3 BS 4937		
0 to1000	DUUDDD	57

An additional switch position selects ℃ or ℉ and another selects Up-scale or Down-scale burnout.

ORDER CODE : SEM215
Options: Tropicalised
Screw Terminals

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