

# SMART UNIVERSAL TEMPERATURE TRANSMITTER

## SEM210 SERIES

- **UNIVERSAL INPUT, RTD, T/C, mV and SLIDEWIRE**
- **GALVANICALLY ISOLATED**
- **HIGH ACCURACY AND STABILITY**
- **ATEX APPROVED VERSION**



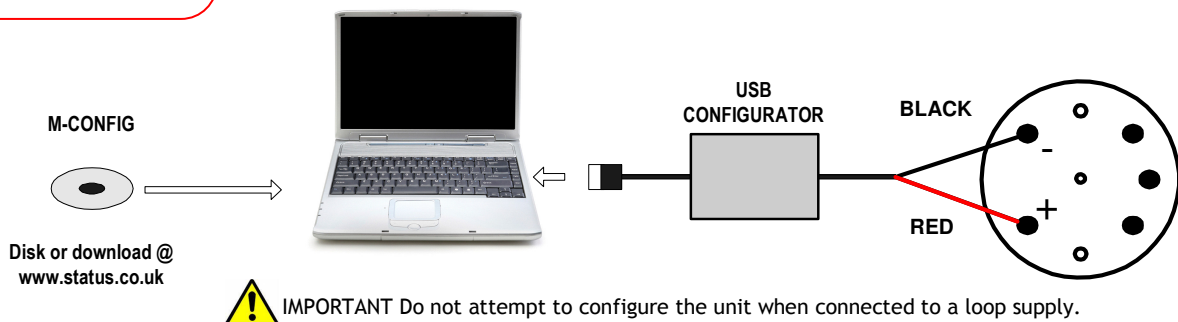
### INTRODUCTION

The SEM210 is a second generation 'Smart' Universal input in-head temperature transmitter that accepts RTD, Thermocouple, Potentiometer, Slidewire transducer or Millivolt signal and converts the output to the industry standard (4 to 20) mA transmission signal. The sensor type and range are easily programmed using a PC and our free configuration software download from our web site. Connection from the PC USB port and the SEM210 is made using the USB port powered configurator. This simplifies connection and allows for re-programming or interrogation of the SEM210 while it is installed in the loop or not. Sensors can be changed without the need for re-calibration.

Isolation is a standard feature, removing all ground loop effects as the input is electrically and physically isolated from the loop power supply. The use of two micro-processors results in error free data transmission across the isolation barrier.

The very small size coupled with the versatility of this universal transmitter make it the ideal choice for every temperature measurement application, resulting in lower inventory, greater operational flexibility and, in common with our other products, a low cost of ownership. SEM210X also offers ATEX approved option.

### CONFIGURATION



### SPECIFICATION @ 20 °C

#### INPUT SENSORS AND RANGES

##### RTD (PT100)

Sensor Range		(-200 to 850) °C
Minimum Span*1		25 °C
Linearisation		BS-EN60751 BS1904 DIN43760 JISC 1604
Basic Measurement Accuracy		± 0.01 % FRI ± 0.05 % reading
Thermal Drift	Zero Span	FRI = Full Range Input 0.008 °C/°C 0.01 %/°C
Excitation Current		(300 to 550) µA
Maximum Lead Resistance		50 Ω/ leg
Lead Resistance Effect		0.002 °C/ Ω

##### THERMOCOUPLE

Sensor Type	Range (°C) *3	Minimum Span (°C) *1
K	-200 to 1370	50
J	-200 to 1200	50
E	-200 to 1000	50
N	-180 to 1300	50
T	-210 to 400	25
R	-10 to 1760	100
S	-10 to 1760	100
L	-100 to 600	50

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## THERMOCOUPLE (Continued)

Basic Measurement Accuracy*2		$\pm 0.04\% \text{ FRI} \pm 0.04\%$ reading or $0.5\text{ }^\circ\text{C}$ (whichever is greater)
Linearisation		FRI = Full Range Input BS 4937/EC 584-3
Cold Junction Error		$\pm 0.5\text{ }^\circ\text{C}$
Cold Junction Tracking		$0.05\text{ }^\circ\text{C} / \text{ }^\circ\text{C}$
Cold Junction Range		$(-40 \text{ to } 85)\text{ }^\circ\text{C}$
Thermal Drift	Zero	$0.1\text{ } \mu\text{V} / \text{ }^\circ\text{C}$
	Span	$0.01\% / \text{ }^\circ\text{C}$

## MILLIVOLTS

Input	Voltage source
Range	$(-10 \text{ to } 75)\text{ mV}$
Characterisation	Linear

Minimum Span*1	5 mV	
Basic Measurement Accuracy*2	$\pm 10\text{ } \mu\text{V} \pm 0.07\% \text{ rdg}$	
Input Impedance	10 M $\Omega$	
Thermal Drift	Zero	
	Span	
		$0.1\text{ } \mu\text{V} / \text{ }^\circ\text{C}$
		$0.01\% / \text{ }^\circ\text{C}$

## SLIDEWIRE

Input	3 wire potentiometer
Resistance Range	$(10 \text{ to } 390)\text{ } \Omega$ [End to End] (Larger values can be accommodated by fitting an external resistor)
Characterisation	Linear

Minimum Span*1	5 %
Basic Measurement Accuracy*2	0.1 %
Temperature Drift	$0.01\% / \text{ }^\circ\text{C}$

## OUTPUT

Output Range	$(< 3.8 \text{ to } > 20.2)\text{ mA}$
Max Output	23 mA
Accuracy	$\pm 5\text{ } \mu\text{A}$
Voltage Effect	$0.2\text{ } \mu\text{A} / \text{ V}$
Thermal Drift	$1\text{ } \mu\text{A} / \text{ }^\circ\text{C}$
Supply Voltage	$(10 \text{ to } 35)\text{ V}$
Max. Output Load	$[(V \text{ supply} - 10) / 20]\text{ k}\Omega$ $(700\text{ } \Omega @ 24\text{ V})$

## GENERAL SPECIFICATION

Input/Output Breakdown Isolation	500 V AC rms
Update Time	250 ms maximum
Response Time (Filter OFF)	$< 1\text{ s}$
Filter Factor	Programmable: Off, 2 s, 10 s or Adaptive
Warm up	120 s to full accuracy
Stability	$0.1\% \text{ FRI}$ or $0.1\text{ }^\circ\text{C}/\text{year}$ FRI = Full Range Input

## APPROVALS

EMC	BS EN61326
ATEX	II 1G EEx ia IIC T4-T6
FM (IS Version)	IS/I/1/ABCD/T4

## ENVIRONMENTAL

Ambient Operating Range	$(-40 \text{ to } 85)\text{ }^\circ\text{C}$
Ambient Storage Temperature	$(-50 \text{ to } 100)\text{ }^\circ\text{C}$
Ambient Humidity Range	$(10 \text{ to } 90)\% \text{ RH}$ non- condensing
I.S. Version	$(0 \text{ to } 100)\% \text{ RH}$

## ENCLOSURE

Material	NORYLtm
Flammability	SEI UL94-V1

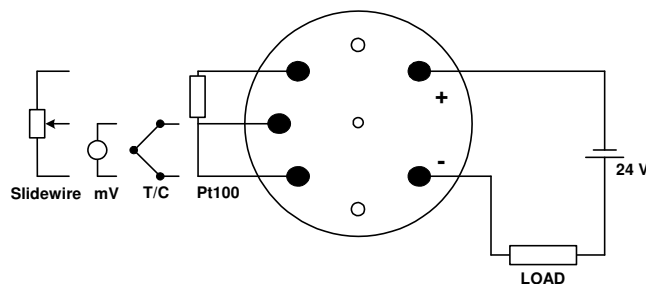
## COMMUNICATIONS

PC Interface	USB Connector
Maximum Cable Length	1000 m
Configurable Parameters	Sensor type: Burnout: $^\circ\text{C} / \text{ }^\circ\text{F}$ Output Hi/Lo: Filter: Tag: User offset

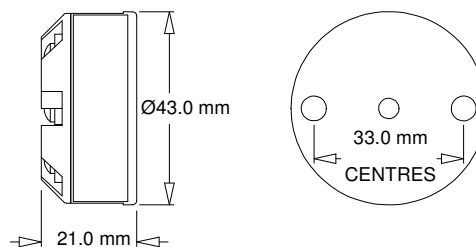
## \*Notes:

- 1 Any span may be selected but 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 Consult thermocouple reference standards for practical temperature.

## CONNECTIONS



## MECHANICAL



## ORDER CODE:

IS Version:

**SEM210**

**SEM210X**

## ASSOCIATED PRODUCTS

USB CONFIG-UNIT  
M-CONFIG Software

## ORDER CODES

USB CONFIGURATOR  
48-605-1150-06 FOC