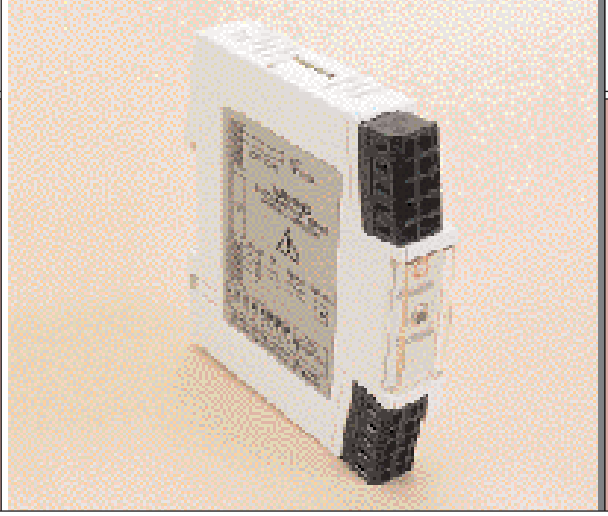
- UNIVERSAL INPUT
- COMPACT DIN RAIL MOUNTED
- GALVANICALLY ISOLATED
- LOOP POWERED
- QUICK SELECTOR/PC CONFIGURABLE
- 'FAST WIRING' 2 PART CONNECTORS



TRANSMITTERS

DIN RAIL UNIVERSAL TEMPERATURE TRANSMITTER
SEM215

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 4-20 mA signal to a host system. It can be configured by either of the following methods:

Configuration using "Quick Selector"

One of 59 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. This allows for reprogramming or interrogation of the SEM215 while it is installed in the loop. Sensors can be changed without the need for recalibration. 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.

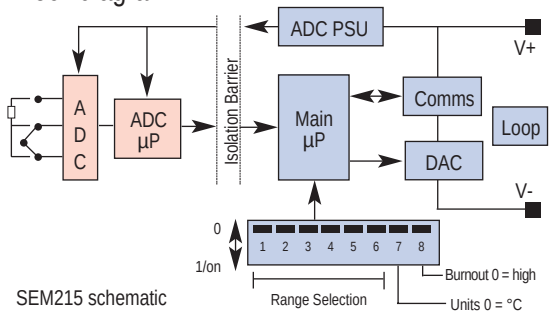
The Process Variable may be filtered to remove incoming signal noise using one of four settings. If the 'Adaptive' function is selected the filter continuously adjusts to the incoming signal to noise ratio in order to choose an appropriate level of filtering. In this way a slowly changing input can be 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 OUTPUT

In normal operation the current output varies between 4 and 20mA. 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 20mA) or downscale (less than 4mA) depending upon the sense of the burnout parameter selected.

Block diagram



SEM215 schematic

52-215-2198-02

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SPECIFICATION @ 20°C @ 24V DC

INPUT SENSORS AND RANGES

RTD (Pt100)

2 or 3 wire

Sensor Range		-200 to +850°C [18-390ohm]
Minimum Span[1] 25°C		
Linearisation	Standard	BS-EN60751 (IEC 751) BS 1904 (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°C/°C
	Span	100 ppm/°C
Excitation current		300µA to 550µA
Maximum lead resistance		50 ohms/leg
Lead Resistance effect		0.002°C/ohm

THERMOCOUPLE

THERMOCOUPLE TYPE	MEASURING RANGE[*4] °C	MINIMUM SPAN[*1] °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 F (L)	-100 to 600	25
TC Type N	-180 to 1300	50
TC Type [X][*3]	±9999	Custom

Basic Measurement Accuracy[*2]		±0.04% FRI[*5] ±0.04% Rdg or 0.5°C (whichever is greater)
Linearisation		IEC 584-1 / BS 4937
Cold Junction Error		±0.5°C
Cold Junction Tracking		0.05°C/°C
Cold Junction Range		-40 to +70°C
Thermal drift	Zero	0.1µV/°C
	Span	100 ppm/°C

MILLIVOLTS

Input		Voltage Source
Range		-10 to +75mV
Characterisation		Linear Custom [X][*3] (4th Order Polynomial)
Minimum Span[*1]		5 mV
Basic Measurement Accuracy[*2]		±10µV ±0.07% rdg
Input Impedance		10 M 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 a link between terminals 9 & 10)
Characterisation	Linear Custom [X][*3] (4th Order Polynomial)
Minimum Span[*1]	5%
Basic Measurement Accuracy[*2]	0.1%
Temperature Drift	100 ppm/°C

OUTPUT

Output Range		4-20 mA (Min3.8 to Max20.2 mA)
Max Output		23mA
Protection		Reverse connection, over voltage 35V
Accuracy		±5µA
Voltage effect	0.2µA/V	
Thermal drift	1µA/°C	
Max. output load[*6]		[(V supply -10)/20] Kohms (700 ohms @ 24V)

GENERAL SPECIFICATION

Input/Output Isolation		500 V AC rms
Update time		250 mS Maximum
Response time (Filter OFF)		< 1 second (to reach 63% of final value)
Filter Factor	Programmable:	Off, 2 seconds, 10 seconds or Adaptive
Supply voltage		10 to 35V DC
Warm up	2 minutes to full accuracy	
Stability	0.1% FRI[*5] or 0.1°C / year	
Burn out	Upscale or downscale	

APPROVALS

EMC	Emissions	BS EN50081-1
	Immunity	BS EN50082-2
	Hazardous Area	EEx ia IIC T4..T6

ENVIRONMENTAL

Ambient operating range	-10 to +70°C[*7]
Ambient storage temperature	-40 to +70°C
Ambient humidity range	10 to 90% RH non-condensing

ENCLOSURE

Material	ABS
Flammability	SEI UL94-V0

Notes

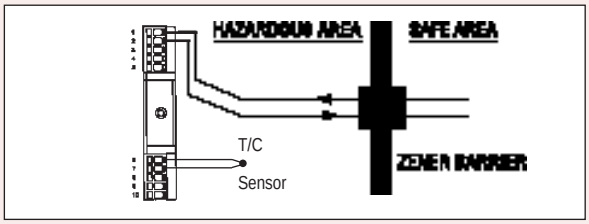
1. Any span may be selected but full accuracy is only guaranteed for spans greater than the minimum recommended.
2. Basic Measurement Accuracy includes the effects of calibration, linearisation and repeatability.
3. Customer linearisation is available pre-programmed at the factory, contact sales office for details.
4. Consult Thermocouple reference standards for practical temperature ranges.
5. FRI = Full Range Input
6. Restricted to 300 ohms for in loop programming.
7. -40 to 70°C operation with Tropicalised Option.

COMMUNICATIONS

PC Interface	RS 232 via interface adapter
Comms protocol	ANSI X3.28 1976
Data Rate	1200 baud
Minimum output load	100 - 300 ohms for 'In loop' programming
Maximum cable length	1000 metres
Configurable Parameters	Sensor type: Burnout: °C /°F: Output, available as "Quick Selector" or via PC, Hi/Lo: filter: Tag: User offset, available via PC programming only.

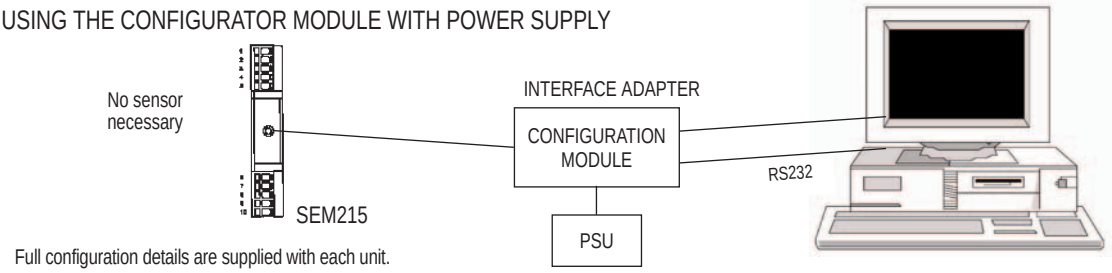
HAZARDOUS AREA

Available for mounting in flammable atmospheres approved to EEx ia IIc T4..T6, FM3610.



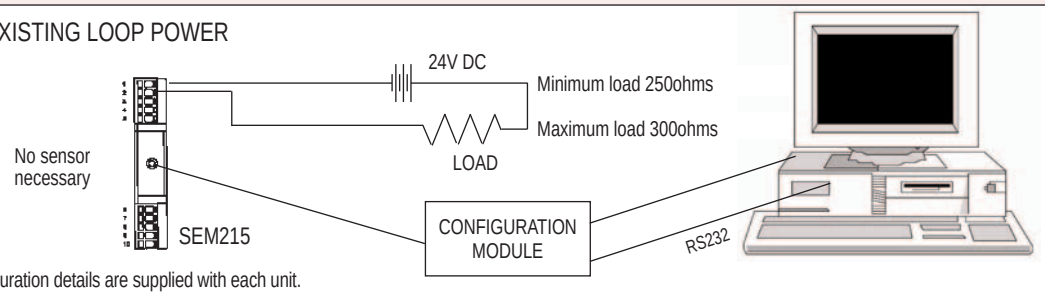
CONFIGURATION DIAGRAM

USING THE CONFIGURATOR MODULE WITH POWER SUPPLY



Full configuration details are supplied with each unit.

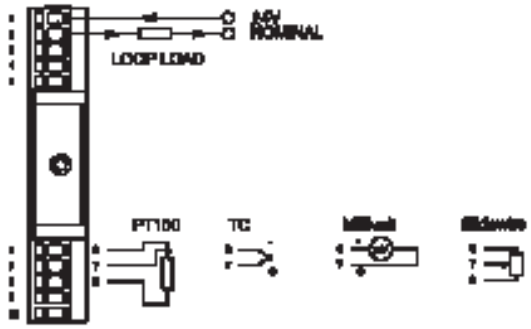
USING EXISTING LOOP POWER



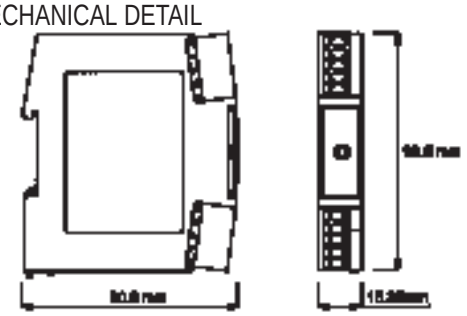
Full configuration details are supplied with each unit.

CONFIGURATION

ELECTRICAL CONNECTION



MECHANICAL DETAIL



Connector approvals	IEC 947-7-1/EN	
Environmental tests		
	Low Temperature	IEC 68-2-1
	Dry Heat	IEC 512-6-9
	Damp Heat	IEC 512-6-3
	Damp Heat Cyclical	IEC 68-2-30
	Salt Spray	IEC 512-6-6
	Sulphur Dioxide	IEC 68-2-46
	Hydrogen Sulphide	IEC 68-2-16
	Gas Tightness	IEC 512-Pr.11n
Wire Size	0.5 - 1.5 mm^2	

*Alternative connectors with screw terminals are available at extra cost

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.

RANGE CODE*	SENSOR TYPE	TEMPERATURE RANGE	RANGE CODE*	SENSOR TYPE	TEMPERATURE RANGE
0*	PROG.	PROG.	32	Type K T/C	0 to 800
1	Pt100 EN60751	-100 to 100	33	Type K T/C	0 to 1000
2	Pt100 EN60751	-50 to 50	34	Type K T/C	0 to 1200
3	Pt100 EN60751	-50 to 100	35	Type J T/C	0 to 100
4	Pt100 EN60751	-50 to 150	36	Type J T/C	0 to 150
5	Pt100 EN60751	0 to 50	37	Type J T/C	0 to 200
6	Pt100 EN60751	0 to 100	38	Type J T/C	0 to 400
7	Pt100 EN60751	0 to 150	39	Type J T/C	0 to 600
8	Pt100 EN60751	0 to 200	40	Type T T/C	-50 to 50
9	Pt100 EN60751	0 to 300	41	Type T T/C	-50 to 100
10	Pt100 EN60751	0 to 400	42	Type T T/C	0 to 100
11	Pt100 EN60751	0 to 500	43	Type T T/C	-100 to 100
12	Pt100 EN60751	0 to 600	44	Type T T/C	0 to 200
13	Pt100 EN60751	50 to 150	45	Type T T/C	0 to 400
14	Pt100 BS1904	-25 to 125	46	Type R T/C	0 to 1000
15	Pt100 BS1904	0 to 100	47	Type R T/C	0 to 1600
16	Pt100 BS1904	0 to 250	48	Type S T/C	0 to 1000
17	Pt100 BS1904	250 to 500	49	Type S T/C	0 to 1600
18	Pt100 BS1904	-50 to 150	50	Type N T/C	0 to 100
19	Pt100 BS1904	0 to 200	51	Type N T/C	0 to 200
20	Pt100 BS1904	50 to 150	52	Type N T/C	0 to 400
21	Pt100 JISC 1604	-25 to 125	53	Type N T/C	0 to 600
22	Pt100 JISC 1604	0 to 100	54	Type N T/C	0 to 800
23	Pt100 JISC 1604	0 to 250	55	Type N T/C	0 to 1000
24	Pt100 JISC 1604	250 to 500	56	Type N T/C	0 to 1200
25	Pt100 JISC 1604	-50 to 150	57	Type E T/C	0 to 1000
26	Pt100 JISC 1604	0 to 200	58	Type J T/C	0 to 2000*1
27	Pt100 JISC 1604	50 to 150	59	Type K T/C	0 to 2400*1
28	Type K T/C	0 to 100	60	–	–
29	Type K T/C	0 to 200	61	–	–
30	Type K T/C	0 to 500	62	–	–
31	Type K T/C	0 to 600	63	TEST MODE	TEST MODE

*All switches must be set UP (to 'off') in order to programme parameters via a PC. See instruction guide for switch positions
An additional switch position selects °C or °F and another selects Up-scale or Down-scale burnout.*1°F Only
Full details of the switch settings are provided with each transmitter.

ORDER CODE

SEM215	Standard Unit
SEM215X	Approved for Hazardous Area Use to EEx ia IIC T4..T6
SEM215XM	Approved for Hazardous Area Use to FM3610
RCPW-KIT-UK	Programming kit comprising I/F adapter box, RCPW software, PSU for UK use supplied in a carry case
RCPW-KIT-EUR	With plug for European use
RCPW-KIT-USA	With plug for use in the USA
RCPW-KIT-AUS	With plug for use in Australia

Option Opt-215-01 -40° to +70°C Tropicalised
ACC001 Pack of 10 x 5 way screw connectors