

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



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 user defined range are easily programmed using a PC and a simple Windows based software program. 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 characterization for these sensors are factory entered for later retrieval from the menus.

The transmitter uses a two part terminal connection which employs the latest in tension clamp technology. Connections are therefore quick and easy to make. Terminations are maintenance free since the contacts are always under tension. This also eliminates the problem of contacts loosening due to temperature fluctuations or vibration.

INPUTS

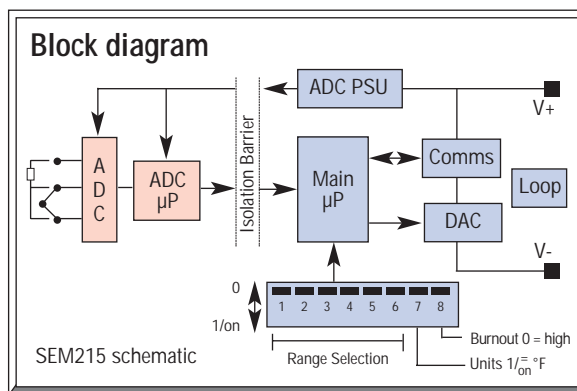
Pt100 Platinum resistance sensors, Thermocouples, millivolts or Slidewire sensors may be connected to the unit, plus a 'type X' linearization option which may be pre-configured at the factory to satisfy any custom characterization requirements.

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.



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SEM215 7-02/PDF

SPECIFICATION @ 68°F @ 24V DC

INPUT SENSORS AND RANGES

RTD (Pt100)		2 or 3 wire
Sensor Range	-328 to +1562°F [18-390ohm]	
Minimum Span ^{*1}	50°F	
Linearization	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°F/°F
	Span	50 ppm/°F
Excitation current	300µA to 550µA	
Maximum lead resistance	50 ohms/leg	
Lead Resistance effect	0.004°F/ohm	

THERMOCOUPLE

THERMOCOUPLE TYPE	MEASURING RANGE ^{*4} °F	MINIMUM SPAN ^{*1} °F
TC Type K	-328 to 2450	90
TC Type J	-328 to 2192	90
TC Type T	-346 to 752	45
TC Type R	14 to 3200	180
TC Type S	14 to 3200	180
TC Type E	-328 to 1832	90
TC Type F (L)	-148 to 1112	45
TC Type N	-292 to 2372	90
TC Type [X] ^{*3}	±9999	Custom

Basic Measurement Accuracy ^{*2}	±0.04% FRI ^{*5} ±0.04% Rdg or 0.25°F (whichever is greater)	
Linearization	IEC 584-3 / BS 4937	
Cold Junction Error	±0.25°F	
Cold Junction Tracking	0.05°F/°F	
Cold Junction Range	-40 to +185°F	
Thermal drift	Zero	0.05µV/°F
	Span	50 ppm/°F

MILLIVOLTS

Input	Voltage Source	
Range	-10 to +75mV	
Characterization	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	0.05µV/°F
	Span	50 ppm/°F

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)
Characterization	Linear Custom [X] ^{*3} (4th Order Polynomial)
Minimum Span ^{*1}	5%
Basic Measurement Accuracy ^{*2}	0.1%
Temperature Drift	50 ppm/°F

OUTPUT

Output Range	4-20 mA (>3.8 to <20.2 mA)
Max Output	23mA
Protection	Reverse connection, over voltage 35V
Accuracy	±5µA
Voltage effect	0.2µA/V
Thermal drift	0.05µA/F
Supply voltage	10 to 35V
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
Warm up	2 minutes to full accuracy
Stability	0.1% FRI ^{*5} or 0.2°F / year
Burn out	Upscale or downscale

APPROVALS

EMC	Emissions	BS EN50081-1
	Immunity	BS EN50082-2
	Hazardous Area	FM3610
	Hazardous Area	EE ia IIC T4..T6

ENVIRONMENTAL

Ambient operating range	-14 to 160°F ^{*7}
Ambient storage temperature	-40 to 160°F
Ambient humidity range	10 to 90% RH non-condensing

ENCLOSURE

Material	ABS
Flammability	SEI UL94-V0

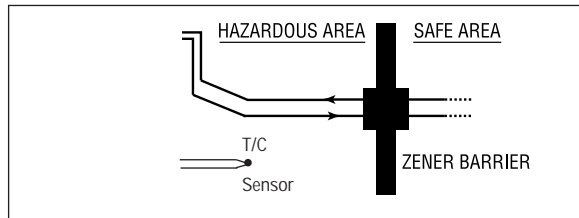
- Notes
- Any span may be selected but full accuracy is only guaranteed for spans greater than the minimum recommended.
 - Basic Measurement Accuracy includes the effects of calibration, linearization and repeatability.
 - Customer linearization is available pre-programmed at the factory, contact sales office for details.
 - Consult Thermocouple reference standards for practical temperature ranges.
 - FRI = Full Range Input
 - Restricted to 300 ohms for in loop programming.
 - 40 to +160°F operation with Tropicalized 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 yards
Configurable Parameters	Sensor type: Burnout: °F/°C: Output, available as "Quick Selector" or via PC, Hi/Lo: filter: Tag: User offset, available via PC programming only.

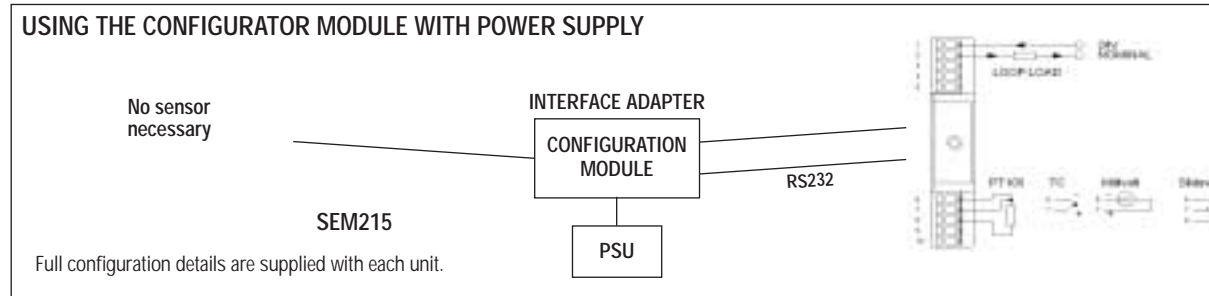
HAZARDOUS AREA

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

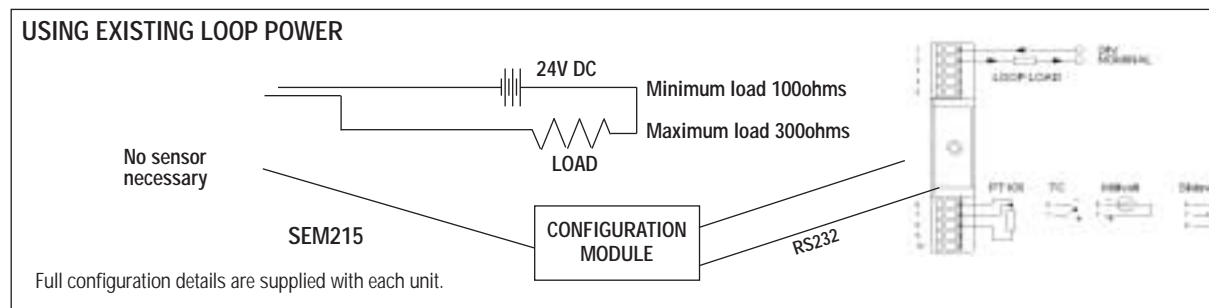


CONFIGURATION DIAGRAM

USING THE CONFIGURATOR MODULE WITH POWER SUPPLY



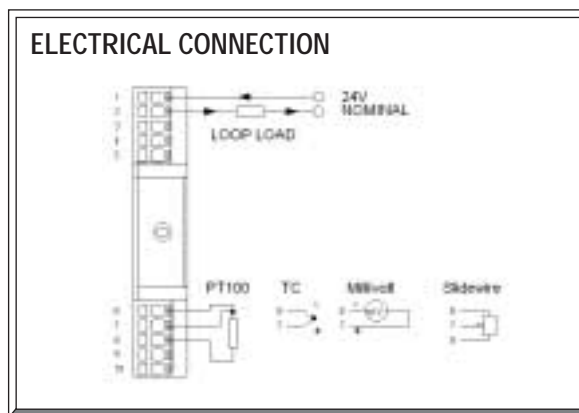
USING EXISTING LOOP POWER



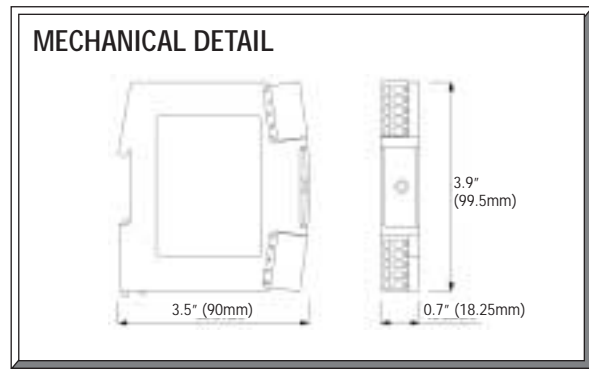
CONFIGURATION



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 0.2" - .0625" dia
 *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
27	Pt100 JISC 1604	50 to 150	59	Type K T/C	0 to 2500
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. Full details of the switch settings are provided with each transmitter.

LOCAL REPRESENTATION

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-USA** Programming kit comprising I/F adapter box, RCPW software, PSU in a carry case
- Option SEM-215-01** -40° to +160°F Tropicalized
- ACC001** Pack of 10 x 5 way screw connectors

Every effort has been taken to ensure the accuracy of this specification, however we do not accept responsibility for damage, injury, loss or expense resulting from errors and omissions, and we reserve the right of amendment without notice.