SEM210 SERIES

>	UNIVERSAL INPUT
>	GALVANICALLY ISOLATED
>	10 YEAR WARRANTY
>	ATEX APPROVED
>	EASILY RE-PROGRAMMED
>	IN LOOP INTERROGATION
>	HIGH ACCURACY AND STABILITY



INTRODUCTION

The SEM210 is a second generation 'Smart' Universal input in-head temperature transmitter that accepts any commonly used temperature sensor, 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 a simple Windows based software program. Connection from the PC serial port is made using the same wires that carry the (4 to 20) mA output signal. This simplifies connection and allows for re-programming or interrogation of the SEM210 while it is installed in the loop. 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 (see the schematic below). 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.

INTRODUCTION

INPUTS

Pt100 Platinum resistance sensors, Thermocouples, millivolts or Slidewire sensors may be connected to the unit. The Type "X" option allows for custom sensor characterisation. This option is factory pre-configured to customers specification.

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.

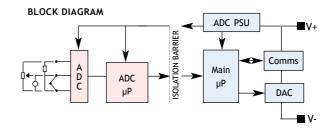
A user programmable offset is available to remove any system errors that may be present and sensor referencing enables the transmitter to be accurately matched to a particular sensor

CURRENT OUTPUT

In normal operation the current output varies between 4 and 20 mA. If the input sensor develops a fault, or the software in either of the two micro- processors 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.

COMMS OPERATION

The transmitter is accessed via the comms interface adaptor for re-programming or examination of the process variable and status information. The interface adaptor converts the special communications signals on the transmitter power connection cables to the standard RS232 in order to connect directly to a PC serial port. There are two methods of connecting the interface adaptor to the transmitter i.e. using the adaptor's own power supply or using the power from an existing loop.





SPECIFICATIONS @ 20 °C

INPUT SENSORS AND RANGES

RTD (Pt100)

Sensor Range (-200 to 850) $^{\circ}$ F, (18 to 390 Ω)

Minimum Span*1 25 °C Linearisation BS-EN60751 BS1904

DIN43760 JISC 1604 CUSTOM [X]*3

Basic Measurement Accuracy ± 0.01 % FRI ± 0.05 % rdg

FRI = Full Range Input 0.008 °C/°C

Thermal Drift 7ero Span 0.01 %/°C **Excitation Current** (300 to 550) μA

Maximum Lead Resistance 50 Ω/leg Lead Resistance Effect 0.002 $^{\circ}$ C/ Ω

 \pm 0.04 % FRI \pm 0.04 % rdg or Basic Measurement Accuracy*2

0.5 °C (whichever is greater)

Linearisation BS 4937/EC 584-3 Cold Junction Error ± 0.5 °C 0.05 °C/°C Cold Junction Tracking Cold Junction Range (-40 to 85) °C Thermal Drift Zero $0.1 \, \mu V/\,^{\circ} C$

0.01 %/°C Span

MILLIVOLTS

Input Voltage source Range (-10 to 75) mV Characterisation Linear Custom [X]*3 (5th Order Polynomial)

Minimum Span*1 5 mV

Basic Measurement Accuracy*2

Input Impedance

10 $M\Omega$ Thermal Drift $0.1~\mu V/^{\circ} C$ 0.01 %/°C Span

SLIDEWIRE

Input 3 wire potentiometer (10 to 390) Ω [End to End] Resistance Range (Larger values can be

accommodated by fitting an external resistor)

Characterisation Linear Custom [X]*3

(5th Order Polynomial)

 $\pm 10 \mu V \pm 0.07\% rdg$

Minimum Span*1 5 % 0.1% Basic Measurement Accuracy*2 0.01 %/°C Temperature Drift

OUTPUT

< 3.8 to > 20.2 mA Output Range

Max Output 23 mA Accuracy \pm 5 μA Voltage Effect $0.2 \, \mu A/V$ 1 uA/°C Thermal Drift Supply Voltage (10 to 35) V

[(V supply -10)/20] $K\Omega$ Max. Output Load

(700 Ω @ 24 V)

GENERAL SPECIFICATION

Input/Output Breakdown Isolation 500 V AC rms Update Time 250 mS maximum

Response Time (Filter OFF) < 1 s

Programmable: Off, 2 s, 10 s or Filter Factor

Adaptive

120 s to full accuracy Warm up 0.1 % FRI or 0.1 °C/year Stability

APPROVALS

BS EN61326 EMC

ATEX II 1G EEx ia IIC T4-T6

ENVIRONMENTAL

(-40 to 85) °C Ambient Operating Range (-50 to 100) °C Ambient Storage Temperature

Ambient Humidity Range (10 to 90) % RH non-condensing

I.S. Version (0 to 100) % RH

ENCLOSURE

Material **NORYL**TM Flammability SEI UL94-V1

COMMUNICATIONS

PC Interface RS 232 via interface adapter

Comms Protocol ANSI X 3.28 1976 Data Rate 1200 baud

Minimum Output load 100 Ω for 'In loop' programming

Maximum Cable Length 3280 feet (1000 m)

Configurable Parameters Sensor type: Burnout: °C/°F

Output Hi/Lo: Filter: Tag: User offset

Software RCPW/ Windows based PC tool

*NOTES:

1. Any span may be selected but full accuracy is only guaranteed for spans greater than the minimum recommended.

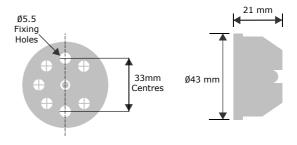
2. Basic Measurement Accuracy includes the effects of calibration, linearisation and repeatability.

3. Customer linearisation is available pre-programmed at the factory, contact sales office for details.

4. Consult thermocouple reference standards for practical temperature.

MECHANICAL DETAILS

(All dimensions in mm)



25 g Standard version Weight 40 g I.S. version

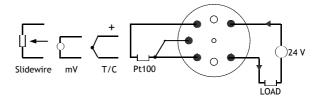


CONNECTIONS

ELECTRICAL CONNECTIONS

Connections to the transmitter are made via the screw terminals provided on the top face. The transmitter is protected against reverse connection so that incorrect connection of the output wires results in near zero current flow in the loop.

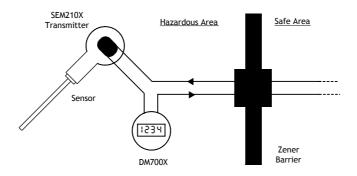
SEM210 CONNECTIONS



HAZARDOUS AREA

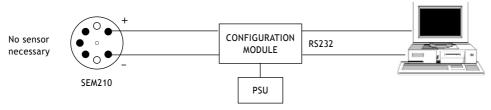
Available for mounting in flammable atmospheres approved to EEx ia IIC T4-T6, FM3610 or Ex NII.

SEM210X TRANSMITTER

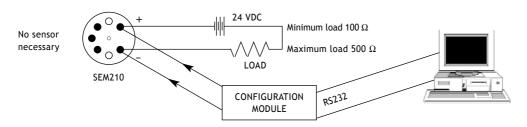


APPLICATIONS

USING THE CONFIGURATOR MODULE WITH POWER SUPPLY



USING EXISTING LOOP POWER







SEM210 Showing the RCPW-210 configuration kit and computer

ASSOCIATED PRODUCTS:

SEM104 The SEM104 is a low cost (4 to 20) mA transmitter for use with standard Pt100

platinum resistance sensors in the size of a

standard DIN terminal block.

SEM205P SEM205P is a second generation "Smart" Head

Mount temperature transmitter which accepts Pt100 temperature sensors and generates an industry standard (4 to 20) mA transmission signal.

SFM203 A simple push button operation ranges and

calibrates the SEM203 (4 to 20) mA temperature transmitter, eliminating the need for soldering

links, potentiometers or PC's.

SEM1000 Analogue signal Isolator

SEM1020 Loop Booster

SEM1100 Line powered process isolator

SEM1200 Signal Splitter SEM1300 Power supply unit

SEM1400 Loop powered trip amplifiers

SEM1503/1504 Pt100 transmitters SEM1500TC Isolating TC transmitter

DM600 The DM600 series of Battery Powered Field

Indicators accept either a RTD sensor or a thermocouple sensor, depending upon the model, and displays the temperature on a 4

digit LCD display.

DM700 The DM700 series is a 4 Digit LED Loop Powered

Field Indicator. It is available with a choice of (4 to 20) mA, RTD or Thermocouple input.

SENSORS A complete range of sensors and accessories

are available:

Platinum resistance temperature detectors

Thermocouples

Thermistors

ACCESSORIES DIN Rail Mounting kits are available in "Top Hat"

and "G" profiles.

ORDER CODE

SEM210

Standard Unit

SEM210X

Intrinsically Safe Version ATEX, ExN and

FM approved

SEM210N

Approved to ExN II

RCPW-210-UK

Programming kit for SEM210 comprising I.F adaptor box, RCPW* software, PSU

and carry case. UK use.

RCPW-210-EUR

For European use

RCPW-210-USA

For use in USA/Canada

RCPW-210-AUS

For use in Australia

*Free updates and demo software available from our website.



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