

SEM205P SERIES

Programmable Pt100 In-head Temperature Transmitter



Status Instruments Ltd, Green Lane Business Park, Tewkesbury, Glos. GL20 8DE

Tel: +44 (0)1684 296818 • Fax: +44 (0)1684 293746

Email: sales@status.co.uk • Web: www.status.co.uk

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1.0 DESCRIPTION

The transmitter is a second generation 'Smart' in-head Pt100 temperature transmitter that converts the output to a user specified mA transmission signal. The software package RCPW can be used to program the unit.

2.0 SPECIFICATION @ 20 °C

2.1 INPUT

Sensor	Pt100 (2 or 3 wire)
Sensor Range	(-200 to 850) °C, (18 to 390) Ω
Minimum Span*1	25 °C
Linearisation	BS EN60751 (IEC 751) BS 1904 (DIN 43760) JISC 1604
Basic Measurement Accuracy*2	± 0.01 % FRI ± 0.05 % Rdg (FRI = Full Range Input)
Thermal Drift	Zero 0.008 °C/°C Span 0.01 %/°C
Excitation Current	< 1 mA maximum
Maximum Lead Resistance	50 Ω/leg
Lead Resistance Effect	0.002 °C/Ω

2.2 OUTPUT

Output Range	(4 to 20) mA (> 3.8 to < 20.2) mA
Maximum Output	23 mA
Accuracy	± 5 µA
Voltage Effect	0.2 µA/V
Thermal Drift	1 µA/°C
Supply Voltage	(10 to 35) V
Maximum Output Load	[(Vsupply-10)/20] kΩ (e.g. 700 Ω @ 24 V)

2.3 GENERAL

Update Time	250 ms maximum
Time Constant (Filter Off)	< 1 s (Time to reach 63 % final value)
Filter Factor Programmable	Off, 2 s, 10 s or adaptive
Warm-up Time	120 s to full accuracy
Operating Voltage	(10 to 30) VDC

ENVIRONMENTAL

Ambient Operating Range	(-40 to 85) °C
Ambient Storage Temperature	(-50 to 100) °C
Ambient Humidity Range	(10 to 90) % RH non condensing

APPROVALS

EMC	BS EN61326
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MECHANICAL

Enclosure	DIN standard terminal block size
Material	ABS
Weight	33 g
Dimensions	(43 x 21) mm

COMMUNICATIONS

PC Interface	RS232 via configurator
Minimum Output Load	250 Ω for 'In loop' programming
Maximum Cable Length	1000 m
Configurable Parameters	Sensor type: Burnout: °C/°F: Output: Hi/Lo: Filter: Tag: User off-set
Comms Protocol	ANSI X3.28 1976
Data Rate	1200 baud

*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.

2.4 SEM205X VERSION - FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES

2.4.1 ATEX CERTIFICATE

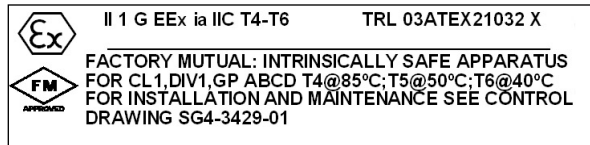
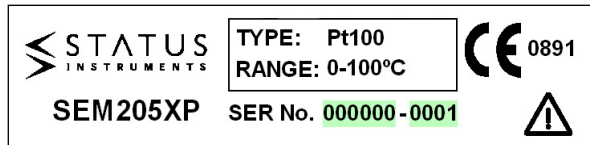
The SEM205X, has been issued with a EC-type examination certificate, confirming compliance with the European ATEX directive 94/9/EC for:

INTRINSIC SAFETY II 1 G EEx ia IIC T4...T6.

The equipment bears the Community Mark and subject to local codes of practice, may be installed in any of the European Economic Area (EEA) member countries. The SEM205X housing is coloured light blue to identify the equipment as suitable for Hazardous area use.

The equipment must be installed and maintained in accordance with local requirements for electrical equipment for use in potentially explosive atmospheres, e.g. EN60079-14 & EN60079-17. This instruction sheet describes installation which conforms with BS EN60079-14 & BS EN60079-17 Electrical Installation in Hazardous Areas. When designing systems outside the UK, the local Code of Practice should be consulted.


2.4.2 ATEX MARKING



COMMON INFORMATION

Manufacturer Status Instruments Ltd
Type Number SEM205X

CE Marking 

Explosive Protection Marking 

INTRINSIC SAFETY (Type ia)

II 1 Equipment group and category
G Type of explosive atmosphere (Gas)
EEx ia IIC T4..T6 Intrinsic safety information
TRL03ATEX21032X Certificate reference

2.4.3 SPECIAL CONDITIONS FOR SAFE USE

As indicated by the Certificate Reference "X" suffix, special conditions apply for safe use for both intrinsic safety and energy limitation applications. They are as follows:

ZONES, GAS GROUPS, AND T RATING.

When connected to a approved system the SEM205X may be installed in:

Zone 0	Explosive gas air mixture continuously present
Zone 1	Explosive gas air mixture likely to occur in normal use
Zone 2	Explosive gas air mixture not likely to occur and if it does, it will only occur for a short time.

Be used in gas groups:

Group A	Propane
Group B	Ethylene
Group C	Hydrogen

Allowable Temperature classification/ambient temperature:

INTRINSIC SAFETY (Type ia)

CLASS	AMBIENT TEMPERATURE RANGE °C	
T1	450 °C	-25 to 85
T2	300 °C	-25 to 85
T3	200 °C	-25 to 85
T4	135 °C	-25 to 85
T5	100 °C	-25 to 50
T6	85 °C	-25 to 40

2.4.4 ENVIRONMENTAL PROTECTION

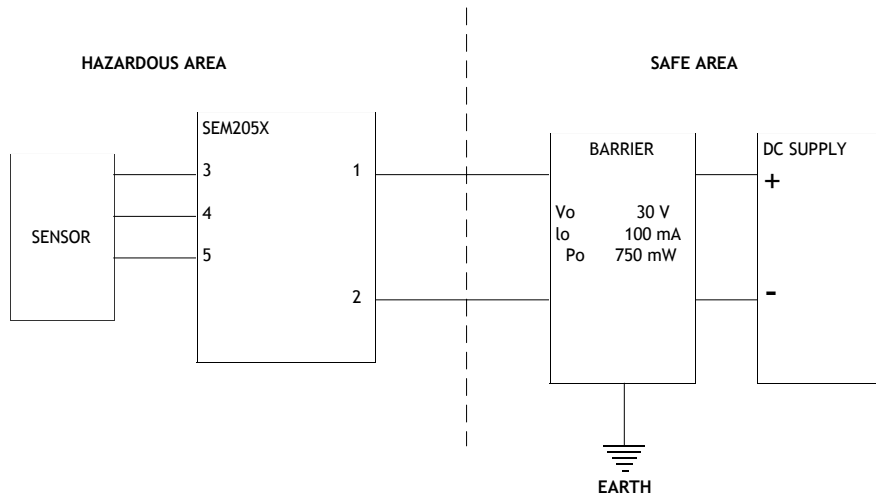
This equipment must be housed in an enclosure which provides a degree of protection of at least IP54. The enclosure must be suitable for the atmosphere and environment in which it is installed. (e.g. If of a plastic material, must be resistant to chemical corrosion, UV light, temperature, humidity, etc).

2.4.5 MAINTENANCE

This intrinsically safe equipment contains no user serviceable, adjustable or replaceable parts. No attempt should be made to repair a faulty SEM205X transmitter, all units must be returned to the manufacture for repair or replacement. Attempt service or replacement of parts may invalidate the explosive protection features of the equipment.

2.5 CONNECTION DIAGRAM

They equipment must be electrically connected as shown below:



SEM205X WORKING PARAMETERS

U _i	30 V
I _i	100 mA
P _i	750 mW
C _i	10 nF
L _i	0 μH

2.6 FM APPLICATIONS

Factory mutual: Intrinsically safe apparatus for CLI, DIV1, GP ABCD T4 @ 85 °C; T5 @ 50 °C; T6 @ 40 °C for installation and maintenance see drawing SA4-3429-01.

3.0 INSTALLATION

3.1 MECHANICAL

The transmitter is mounted using two 5.5 mm diameter holes, on standard 33 mm fixing centres and will fit a DIN standard termination head. The transmitter should be installed with adequate protection from moisture and corrosive atmospheres.

Care must be taken when locating the transmitter to ensure the ambient temperature remains within the specified operating range. Figure 1 shows the mechanical layout and a typical application of the transmitter mounted inside a termination head enclosure, with sensor wires entering through the centre of the transmitter body.

Figure 1

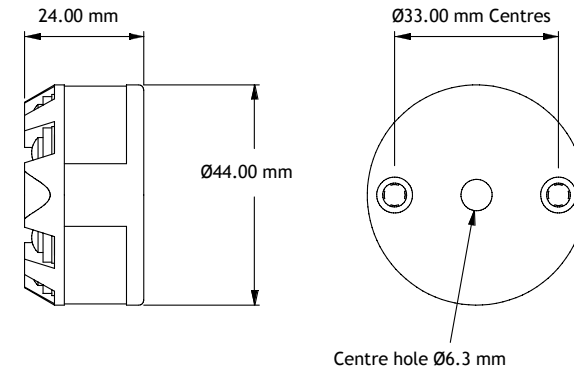
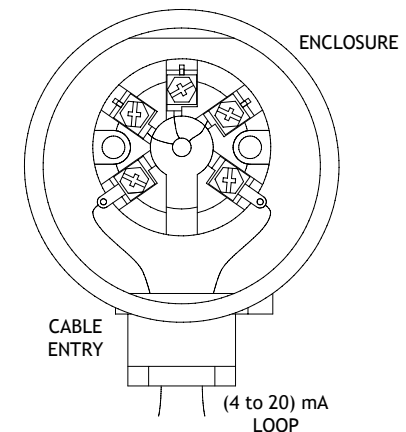


Figure 2



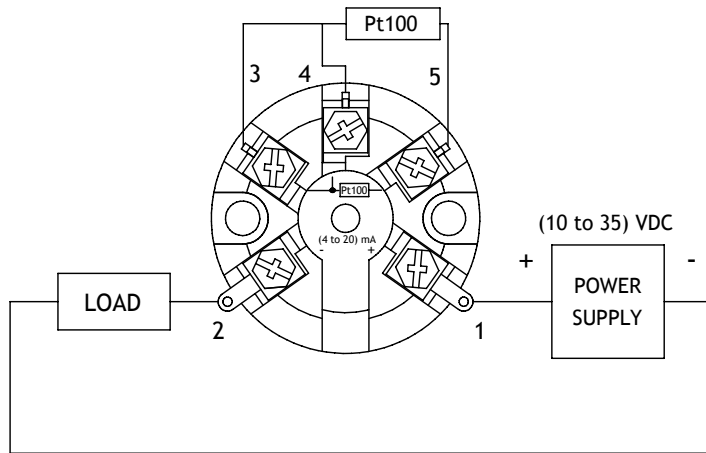
3.2 ELECTRICAL

Connections to the transmitter are made to the screw terminals provided on the top face. No special wires are required for the output connections, but screened twisted pair cable are the most suitable for long runs. It is recommended that screened cable is used for the three input signal wires for cable runs greater than one metre. All three input wires must have the same core diameter to maintain equal lead resistance in each wire. A $\text{Ø}4.5$ mm hole is provided through the centre of the transmitter to allow sensor wires to be threaded through the transmitter body direct to the input screw terminals. The screw terminals have been designed to allow all connection wires to enter from an inner or an outer direction.

Figure 2 shows the method of connection to provide a (4 to 20) mA current loop output. The Pt100 sensor shown would normally take the form of a probe assembly with a three wire connection. The output loop has a voltage power supply used to provide loop excitation. The load symbol represents other equipment in the loop, normally indicators, controllers or loggers. Care must be taken when designing the (4 to 20) mA circuit to ensure that the total voltage requirements of all the equipment in the loop added together, does not exceed the power supply voltage. If a number of instruments are connected in the loop, ensure that only one instrument is tied to ground. Grounding the loop at two points will cause a short circuit of part of the loop leading to measurement errors.

To guarantee CE compliance, sensor leads must be less than 3 m long and the transmitter housing should prevent access to the transmitter during normal operation.

Figure 3



ALSO AVAILABLE:

- Smart In Head Temperature Transmitters
- DIN Rail Mounted Temperature Transmitters
- Panel & Field Temperature Indicators
- Temperature Probes
- Trip Amplifiers
- Signal Conditioners
- And many other products

For further information on all products:



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