

# SEM1600T RTD/TC/SLIDE WIRE SIGNAL CONDITIONER

- **RTD, THERMOCOUPLE, THERMISTOR (BMS SENSORS), SLIDE WIRE, mV AND RESISTANCE INPUTS**
- **mA, V OR BIPOLAR VOLTAGE OUTPUT**
- **SENSOR OFFSET (TEMPERATURE)**
- **22 SEGMENT USER LINEARISATION (PROCESS)**
- **USB PC CONFIGURATION, ANDROID VIEW**

## ➤ INTRODUCTION

The SEM1600T accepts temperature or mV and resistive type inputs. The flexible design allows the use of any resistive sensor within the range of (10 to 10500)  $\Omega$ . Including Pt100, 500, 1000, Ni or Cu sensors, as well as thermistor sensors, and multiple different thermocouple types, slide wire sensors up to 100 K $\Omega$  and direct resistances.

Flexible output configuration offers active or passive mA and bi-polar voltage ranges.

For ease of use, a high-efficiency switch-mode power supply is fitted as standard and does not require any adjustment between ac or dc applications. Operating voltages are (10 to 48) VDC and (10 to 32) VAC.

The free USBSpeedLink programming software offers two programming modes for the SEM1600T: temperature and process. These modes enable the user to configure the product exactly to requirements.

## ➤ FEATURE HIGHLIGHTS

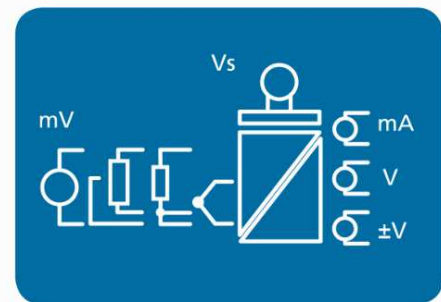
**TEMPERATURE MODE** For use with RTD, thermistor, and thermocouple sensors, the SEM1600T has an isolated input and can be programmed in either  $^{\circ}\text{C}$  or  $^{\circ}\text{F}$ . The SEM1600T sensor-referencing feature allows for close matching to a known reference sensor, eliminating possible sensor errors.

**PROCESS MODE** The SEM1600T is for use with slide-wire sensors and can also accept mV and resistance inputs. A 22 segment user linearisation table allows for profiling of the input signal for sensors that do not have a "straight line" input to output relationship.

**SENSOR LIBRARY** The USBSpeedLink software will load each temperature sensor profile to the unit as required. The software library includes all common RTD and thermocouple sensors. The library also includes thermistor sensors, PTC and NTC types; if a required sensor type is not currently in the library, it is possible to create the profile and add it to the library for selection

**USB PC CONFIGURATION** The SEM1600T does not need to be wired to a power supply during the configuration process; it is powered (for programming only) via the USB interface from a PC.

**SIGNAL RETRANSMISSION SCALING** The input signal range for retransmission can be selected from any part of the maximum input capability. The output signal range can be selected from any part of the total output capability, for example (0 to 50)  $^{\circ}\text{C}$  input to (1 to 5) mA output.



## USB PC CONFIGURATION

The SEM1600T is quick and easy to configure using a standard-type USB lead and the free-of-charge USBSpeedLink Windows software.

**USB ANDROID VIEW** The SEM1600T can be connected to an Android phone or tablet using an OTG USB adaptor. Running a free App, the Android device can then be used to view live data from the SEM1600T

# SEM1600T RTD/TC/SLIDE WIRE SIGNAL CONDITIONER

<b>SIGNAL INPUT SPECIFICATIONS @20°C RESISTANCE</b>		
Type	Range	Accuracy / Stability
Ohms	(10 to 500) Ω (500 to 2500) Ω (2500 to 10500) Ω	± 0.055 Ω ± 0.5 Ω ±10.0 Ω
Excitation current		< 200 uA
Maximum lead resistance		20 Ω
Thermal stability	Zero error at 20 °C (10 to 500) Ω (500 to 2500) Ω (2500 to 10500) Ω	± 0.013 Ω/°C ± 0.063 Ω/°C ± 0.27 Ω/°C

<b>SIGNAL INPUT SPECIFICATIONS @20°C SLIDE-WIRE</b>		
Type	Range	Accuracy / Stability
Potentiometer 3 wire Minimum Maximum	(0 to 1) KΩ (0 to 100) KΩ	± 0.1% of full range ± 0.1% of full range
Excitation current		< 200 uA
Maximum lead resistance	2 or 3 wires	20 Ω
Thermal stability	Zero error at 20 °C,	See resistance stability figures

<b>SIGNAL INPUT SPECIFICATIONS @20°C mV</b>		
Type	Range	Accuracy / Stability
mV	(-100 to 200) mV *1	± 0.06 mV
*1 The SEM1600T can be configured to any input value between (-200 to 200) mV but accuracies are not given below -100 mV		

<b>SENSOR INPUT SPECIFICATIONS @20°C RTD</b>		
Type	Range	Accuracy / Stability
PT100 (IEC)	(-200 to 850) °C	±0.2°C ±(0.05% of reading) *1
PT100 0.391	(-200 to 630) °C	
PT100 0.392	(-200 to 630) °C	
PT100 0.393	(-200 to 630) °C	
PT500 (IEC)	(-200 to 850) °C	
Pt1000 (IEC)	(-200 to 600) °C	
Cu53	(-40 to 180) °C	
Cu100	(-80 to 260) °C	
Cu1000	(-80 to 260) °C	
Ni100	(-60 to 180) °C	
Ni120	(-70 to 180) °C	
Ni1000	(-40 to 150) °C	
Excitation current		
Maximum lead resistance	2 or 3 wire	20 Ω per leg
Lead effect		0.002 °C / °C
Thermal stability	Zero error at 20 °C	see resistance stability figures
*1 plus any sensor error		
Library contains more sensor standards/types		

# SEM1600T RTD/TC/SLIDE WIRE SIGNAL CONDITIONER

SENSOR INPUT THERMISTOR (BMS sensors) SPECIFICATIONS @20°C		
Type	Range	Accuracy / Stability
KTY81, KTY82 -110 -120 KTY81, KTY82 -121 KTY81, KTY82 -210 -220 KTY81, KTY82 -221 KTY81, KTY82 -222 KTY83-110 -210 KTY83-121	(-60 to 155) °C	Refer to resistance table and thermistor data sheet for ohms = °C relationship to calculate error, or contact sales@status.co.uk *1
KTY84-130	(-40 to 300) °C	
MGC13	(125 to 240) °C	
PT&-312	(0 to 500) °C	
Thermal stability		Refer to resistance table and thermistor data sheet for ohms = °C relationship
Library contains more sensor standards/types		
*1 plus any sensor error		

SENSOR INPUT THERMOCOUPLE SPECIFICATIONS @20°C		
Type	Range	Accuracy / Stability
K	(-200 to 1370) °C	± 0.1% of full input range ± CJ error *1
J	(-100 to 1200) °C	
E	(-200 to 1000) °C	
N	(-180 to 1300) °C	± 0.2% of full input range ± CJ error *1
T	(-200 to 400) °C	
R	(-10 to 1760) °C	± 0.1% of full input range ± CJ error *1 over the range (800 to 1600) °C
S		
mV	(-10 to 70) mV	± 0.02 % of full input range
Thermal drift	(-20 to 50) °C	( ± 0.15 °C/°C @ zero ) + ( ± 0.1 °C /°C @ span )
	(50 to 70) °C	Typically as above
Any span may be selected; full accuracy is only guaranteed for spans greater than 25°C		
Basic measurement accuracy includes the effects of calibration, linearization and repeatability		
Library contains more standards/types		
*1 plus any sensor error		

COLD JUNCTION (CJ) SPECIFICATIONS @20°C		
Type	Range °C	Accuracy/ Stability
Thermistor bead	(-40 to 85)°C	± 0.5 °C
Thermal drift	Zero at 20 °C	± 0.05 °C/ °C

OUTPUT ANALOGUE mA CURRENT SPECIFICATIONS @20°C		
Type / Function	Range / Description	Accuracy / Stability / Notes
Two wire current	(0 to 20) mA (4 to 20) mA	(mA output /2000) or 5 uA (Whichever is the greater)
Current source	(0 to 20) mA	Maximum load 750 Ω
Current sink	Supply voltage (10 to 30) Vdc	SELV
Loop voltage effect		0.2 uA/ V (sink mode)
Maximum output		21.5 mA
Thermal stability	Zero at 20 °C	1 uA/ °C
The mA output range can be set to anywhere within the maximum capability		

# SEM1600T RTD/TC/SLIDE WIRE SIGNAL CONDITIONER

OUTPUT ANALOGUE VOLTAGE		SPECIFICATIONS @20°C
Type / function	Range / description	Accuracy / stability / notes
Two wire voltage	(0 to 10) VDC (-10 to 10) VDC	± 5 mV
Maximum output		10.1 VDC, -10.1 VDC
Current drive		± 2 mA, minimum load 5 KΩ @ 10 V
Thermal stability	Zero at 20 °C	± 10 uV/°C
The voltage output range can be set to anywhere within the maximum capability		

USB CONFIGURATION USER INTERFACE		
Type / options / function	Description	Notes
Configuration hardware	USB mini B	Cable not included
Configuration software	USBSpeedLink	Download <a href="http://www.status.co.uk">www.status.co.uk</a>
Operating system	Microsoft Windows	Windows 7 or later

USB CONFIGURATION USER INTERFACE TEMPERATURE MODE		
Type / options / function	Description	Notes
Input configuration Input type		Thermocouple, RTD, Thermistor (selected from RTD library)
Sensor type		Multiple options from list and library
Input scale	High, low	°C, °F any within input range
Sensor offset		°C, °F
Filter		(0 to 100) s
Output configuration Type	Output signal	mA, V, ±V
Output scale	High, low	mA, V, ±V any within output range
Error signal	Sensor fail detect	Any value within output range
Other device options	Tag number Record live data Store configuration to PC	20 Characters Save data to CSV file Save data to file
Live data	Input Signal Output signal Output % Output signal	Ω, mV, % (for slide wire) °C, °F % of full-scale output mA, V, ±V

USB CONFIGURATION USER INTERFACE PROCESS MODE		
Type / options / function	Description	Notes
Input configuration Input type		Ω, mV, % (for slide wire)
Input scale	High, low	Ω, mV, % any within input range
Damping	Rise, fall seconds for full range swing	(0 to 3600) s
Process linearisation	Table segments	(3 to 22)
Process table	Input to output relationships	Ω, mV, % = engineering units
Filter		(0 to 100) s
Engineering units	User defined	4 Characters
Output configuration Process output	Engineering units high, low	Any within range
Type	Output signal	mA, V, ±V
Output scale	High, low	mA, V, ±V any within output range
Other device options	Tag number Record live data Store configuration to PC	20 Characters Save data to CSV file Save data to file

# SEM1600T RTD/TC/SLIDE WIRE SIGNAL CONDITIONER

USB CONFIGURATION USER INTERFACE PROCESS MODE (continued)		
Live data	Input electrical value Input Process value Output % Output signal	$\Omega$ , mV In engineering units % of full scale output mA, V, $\pm V$

ANDROID USER INTERFACE		
Type/Function	Range/Description	Accuracy/Stability/Notes
Hardware	USB Lead	OTG plus A to Mini B
Software	USBVeiwLink	Download from Google play store
Read live data	Signal Output	$^{\circ}C$ , $^{\circ}F$ , $\Omega$ , mV, % mA, V, $\pm V$

GENERAL	
Function	Description
Update time	300 ms
Response time	400 ms
Start-up time	5 s (output condition lags)
Warm-up time	120 s until full accuracy
Galvanic isolation	Three way (input, output, supply) 500 VDC
Default configuration	PT100 (0 to 100) $^{\circ}C$ = (4 to 20) mA, high burnout, no filter, no offset
State LED	Red = fault, green = OK, input and output condition monitored
Supply range	(10 to 32) VAC rms, (10 to 48) VDC SELV
Power	< 1 W @ full output current
Protection	Internal resettable fuse (0.5 A) + over-voltage protection

MECHANICAL	
Function	Description
Dimensions	17.5 mm width, 56.4 mm depth from rail, 90 mm height
Enclosure	DIN rail mount
Material	Polymide 6.6 self-extinguishing: Grey
Connections	Screw terminals 2.5 mm wire maximum
Weight	55 g approximate

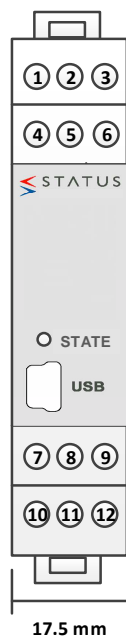
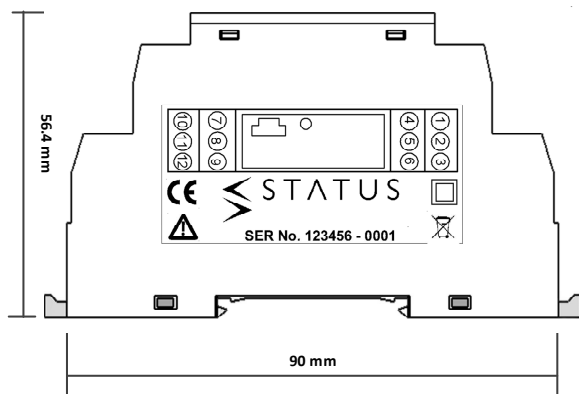
ENVIRONMENTAL	
Function	Description
Ambient temperature	Operating/Storage (-30 to 70) $^{\circ}C$
Ambient Humidity	Operating/Storage (10 to 90) %RH non-condensing
Protection requirement	Device must be installed in an enclosure offering =>IP64 Protection
USB configuration ambient	(10 to 30) $^{\circ}C$

APPROVALS	
EMC	BS EN 61326: Note - Sensor input wires to be less than 30 m to comply
Ingress protection	BS EN 60529
RoHS	Directive 2011/65/EU

# SEM1600T RTD / TC / SLIDE WIRE SIGNAL CONDITIONER

## MECHANICAL

Dimensions in mm



REFER TO  
INSTRUCTION MANUAL  
BEFORE USE



### MECHANICAL DETAIL

Material Polymide 6.6  
self extinguishing

Terminals Screw terminal

Cable 2.5 mm Max

Colour Grey