

# SMART RTD / RESISTANCE / SLIDE WIRE / THERMOCOUPLE SIGNAL CONDITIONER



## SEM1600T

- SIMPLE CONFIGURATION VIA USB PORT
- RTD, RESISTANCE, SLIDE WIRE or THERMOCOUPLE INPUT
- POWERED BY 10 to 32VAC or 10 to 48VDC
- CURRENT, VOLTAGE or BIPOLAR VOLTAGE OUTPUT
- 22 SEGMENT USER LINEARIZATION
- SENSOR OFFSET and OUTPUT ALIGNMENT
- ADJUSTABLE INPUT FILTER • DIN RAIL MOUNT



## INTRODUCTION

The SEM1600T accepts resistance or mV signals from RTD, Slide Wire or Thermocouple sensors. The flexible design allows the use of any resistive sensor within the range of 10 to 10500Ω, including Pt100, 500, 1000, Ni or Cu sensors, Slide Wire sensors up to 100KΩ and 13 different thermocouple types. Other sensors characteristics or your own 22 point linearization characteristic (for slide wire, linear resistance or mV) can be downloaded into the product enabling you to adapt it exactly to your application.

The output stage offers either voltage, bipolar voltage or current re-transmission signals. The re-transmission signal can be ranged to a scale anywhere within the input process range. A transmitter power supply is provided on the output meaning the product can accept sink or source mA applications, while the voltage output will drive 2mA into 5KΩ @ 10V.

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 48VDC and 10 to 32VAC.

Our USB interface is fitted for quick and easy configuration by simply connecting a standard USB cable between the SEM1600T and your PC. Using our free configuration software, your PC will automatically upload the existing configuration data and guide you through any changes you wish to make. To further help save time, the SEM1600T does not need to be wired to a power supply during the configuration process as it is powered via the USB interface from your PC.

## SEM1600T INPUTS

Process Sensor	Range	Accuracy
Pt100 IEC 0.003851	-328 to 1,562°F	±0.36°F + (±0.05% of Rdg) <b>Note 2</b>
Pt100 IPTS-68 0.00391	-328 to 1,166°F	
Pt100 IPTS-68 0.00392		
Ni 100 DIN 0.00618	-76 to 356°F	
Ni 120 0.00672	-112 to 500°F	
Cu 100 0.00427	-58 to 356°F	
Cu 53	-58 to 356°F	
<b>BMS/HVAC Sensors</b>		
Pt 1000 IEC	-328 to 1,112°F	±0.36°F + (±0.05% of Rdg) <b>Note 2</b>
Pt 500 IEC	-328 to 1,382°F	
Ni 1000	-26 to 356°F	
Ni 1000 TK5000	-58 to 302°F	
Cu 1000	-112 to 500°F	
Ni 507.5	-112 to 680°F	
Ni 604	-328 to 392°F	
<b>Resistance</b>		
10 to 500 Ω	Auto	±0.055 Ω
500 to 2500 Ω	Auto	±0.5 Ω
2500 to 10500 Ω	Auto	±10.0 Ω

## SEM1600T INPUTS

BMS/HVAC Silicon Sensors	Range	Accuracy
KTY81-110 KTY81-120	-67 to 347°F	±0.36°F + (±0.05% of Rdg) <b>Note 2</b>
KTY81-121 KTY81-122		
KTY81-150 KTY81-210		
KTY81-220 KTY81-221		
KTY81-222 KTY81-250		
KTY82-110 KTY82-120		
KTY82-121 KTY82-122		
KTY82-150 KTY82-210		
KTY82-220 KTY82-221		
KTY82-222 KTY82-250		
KTY81-151 KTY82-151	-40 to 572°F	
KTY83-210 KTY83-220		
KTY83-250 KTY83-121		
KTY83-122		
KTY84-130 KTY84-150		
<b>Slide Wire</b>		
1 KΩ to 100 KΩ <b>Note 3</b>	0 to 100%	0.1%

## SEM1600T INPUTS

Sensor	Range	Accuracy
K	-328 to 2,498°F	±0.1% of F.S. ±0.9°F (plus sensor error)
J	-148 to 2,192°F	
E	-328 to 1,832°F	
N	-292 to 2,372°F	
T	-328 to 752°F	
R	14 to 3,200°F	±0.1% of F.S. ±0.9°F over the range 1,472 to 2,912°F (plus sensor error)
S		
L	-148 to 1,112°F	±0.1% of F.S. ±0.9F (plus sensor error)
U	32 to 1,112°F	
B	32 to 3,272°F	
C(W5)	32 to 4,172°F	
D(W3)		
G(W)		
<b>Millivolts</b>		
mV	-100 to 200 mV	±0.02% of full scale

**Key: Rdg = Reading; FS = Full Scale**

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

**Note 2** Basic measurement accuracy includes the effects of calibration, linearization and repeatability.

**Note 3** Slide wire end to end resistance, range 0 to 100% represents end to end travel.

**Note 4** Data files are available for °F °C

## SPECIFICATIONS @ 68°F

### RESISTANCE RTD INPUT

Standard RTD	Pt100, Pt500, Pt1000, Cu100, Cu1000, Ni100, Ni120, Ni1000, Cu53, Library
Slide Wire	Pot range 1 to 100KΩ, Signal 0 to 100% Accuracy 0.1%
Resistance	10 to 500Ω ± 0.055Ω, 500 to 2500Ω ± 0.5Ω 2500 to 10500Ω ± 10.0Ω
Thermal Drift	0 to 500Ω 0.013Ω/°C, 500 to 2500Ω 0.063Ω/°C 2500 to 10500Ω 0.27Ω/°C
Excitation Current	less than 200μA
Lead Effect	Max lead resistance 20Ω/leg, Effect 0.002°C/Ω

### THERMOCOUPLE mV INPUT

Standard Thermocouples	Types K,J,E,N,T,R,S,L,U,B,C(W5),D(W3),G(W), Library
mV	-100 to 200mV ± 0.02% of full scale.
Thermal Drift	Thermocouple Offset 0.18°F/°F, Span 0.09°F/°F
Cold Junction	Range -40 to 185°F; Accuracy ±0.9°F/°F

### OUTPUT CURRENT

Current Source	Range 0 to 21.5mA, Max. Load 750Ω
Current Sink	Range 0 to 21.5mA, Supply Voltage 10 to 30VDC Voltage effect 0.2μA/V (mA output / 2000) or 5μA (whichever is greater), Drift 1μA/°C
Accuracy	

### OUTPUT VOLTAGE

Range	0 to 10.1VDC; -10.1 to 10.1VDC
Accuracy	± 5mV
Current Drive	± 2mA, Min Load 5000 Ω @ 10VDC

### SUPPLY

Range	10 to 48VDC, 10 to 32VAC RMS
Power	less than 1 watt @ full output current
Protection	Internal resettable fuse 0.5A and Over Voltage protection.

### GENERAL

Update Time	300mS
Response Time	400mS
Start Up Time	5 seconds (Current out less than 4mA during start up)
Warm Up Time	2 minute to full accuracy
Indication	LED, Green when Output -0.1 to 100.1% else Red

### ISOLATION

Supply to Input to Output	500VDC
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### USER INTERFACE

Type	USB 2.0
Baud Rate	19,200 baud
Equipment	PC running XP or later, USB Cable.

### USER INTERFACE FUNCTIONS

Scaling	User signal to process value scaling, for simplified setup.
Filter	Adjustable time constant 0 to 100 Seconds.
User Linearization	2 to 22 segments Ω (Slide Wire) to process.
Process Units	4 Characters (signal input only).
Temperature Units	°C or °F (RTD inputs only).
Tag Number	20 Characters
Process Output	Range in process units.
Signal Output	Select type, signal range and (temperature only) error signal. Enter sensor offset (temperature only).
User Offset	Set output process range against active sensor input.
Active Scaling	

### ENVIRONMENTAL

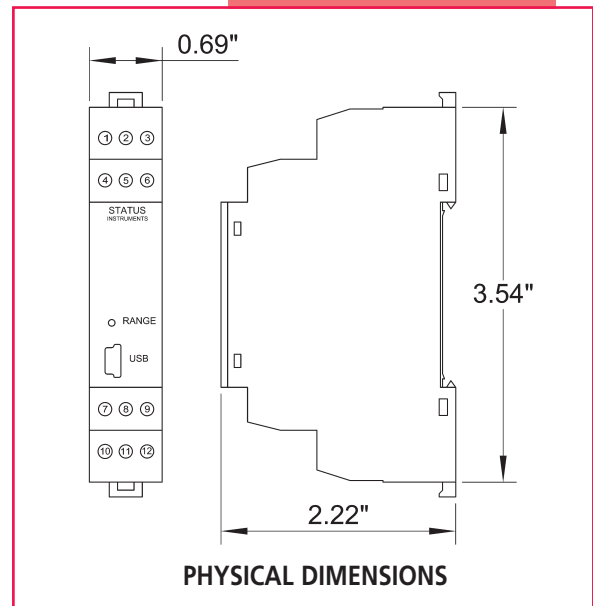
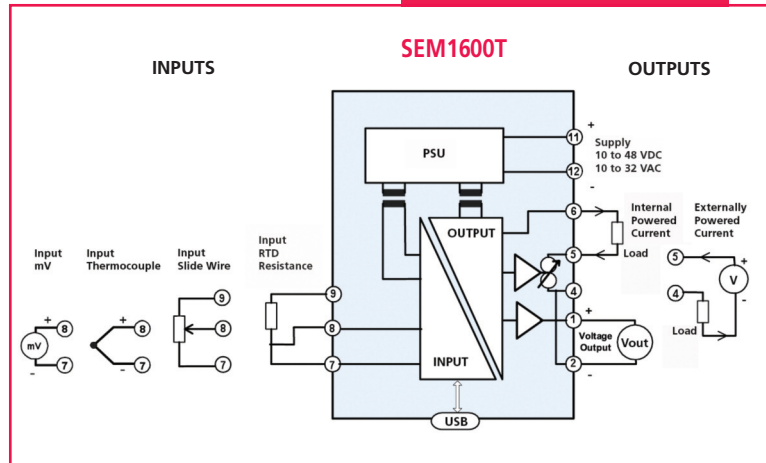
Operating Ambient	-22 to +158°F; 10 to 90% RH Non Condensing
Storage Ambient	-22 to +158°F; 10 to 90% RH Non Condensing
Configuration Ambient	50 to 86°F
Installation Enclosure	DIN rail enclosure offering Protection >= IP65

### APPROVALS

CE	BS EN 61326
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### MECHANICAL

Style	DIN 43880 (1 Module)
Color	Gray
Material	Polymide 6.6 self-extinguishing
Terminals	2.5mm Maximum
Weight	< 70 grams



### ORDER CODES:

<b>SEM1600T</b>	RTD – RESISTANCE – SLIDE WIRE – T/C INPUT / CURRENT or VOLTAGE OUTPUT
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#### Accessories

USB KIT	USB CONFIGURATION KIT
USB SPEED LINK	SOFTWARE (FREE FROM INTERNET SITE)

#### Associated Products

SEM1600VI	CURRENT or VOLTAGE INPUT / CURRENT or VOLTAGE OUTPUT
SEM1603P	RTD INPUT / CURRENT OUTPUT
SEM1603TC	THERMOCOUPLE INPUT / CURRENT OUTPUT
SEM1610	UNIVERSAL INPUT / CURRENT OUTPUT
SEM1620	UNIVERSAL INPUT / VOLTAGE OUTPUT
SEM1630	UNIVERSAL INPUT / DUAL TRIP ALARM
SEM1633	RTD – RESISTANCE – SLIDE WIRE INPUT / DUAL SPDT TRIP ALARM
SEM1636	LOOP POWERED INPUT / DUAL TRIP ALARM



## Local Representation

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