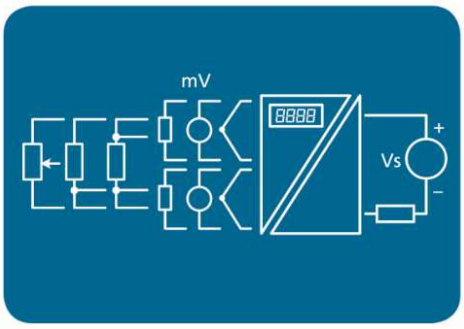
SEM320/55 HART TRANSMITTER WITH DISPLAY

- **HART 5,6,7 COMPATIBLE**
- **PROCESS VALUE, TEXT AND BARGRAPH DISPLAYS**
- **DUAL INPUTS WITH MATHS FUNCTIONS**
- **(4 to 20) mA OR HART MULTIDROP OUTPUT**
- **ATEX / IEC Ex APPROVALS PENDING**





INTRODUCTION

The SEM320 is a HART 5 upwards (generic device) compatible universal temperature transmitter with display. It accepts RTD, Thermocouple, Potentiometer or millivolt input signals and converts them to the industry standard (4 to 20) mA transmission signal. Alternatively, HART multidrop mode can be selected.
Housed in its own bespoke connection head, it is programmed using a communication lead (USB Config) together with our free configuration USBSpeedlink software. Standard HART features can also be programmed using HART communication.
The SEM320 has a rotational five-digit display for the process value and a 5-digit display for messaging, in addition to a bar graph for % of mA output.

FEATURE HIGHLIGHTS

SENSOR-REFERENCING
The SEM320 sensor-referencing, via the Windows based USBSpeedlink software, allows for close matching to a known reference sensor, eliminating possible sensor errors.

USER-CALIBRATION
In addition to sensor-referencing, current output trimming is possible via the USB and HART commands.

CUSTOM LINEARISATION
The SEM320 can be programmed with a custom linearisation to suit non-standard sensors, or sensors with unusual or unique characteristics. Consult the sales office for details.

SENSOR BURN-OUT DETECTION
If a sensor wire is broken or becomes disconnected, the SEM320 output will automatically go to its user-defined level (upscale or downscale) or pre-set value.

OUTPUT CURRENT PRESET
For ease of system calibration and commissioning, the output can be set to a pre-defined level anywhere within the (4 to 20) mA range.

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ELECTRICAL INPUT		**SPECIFICATIONS @20°C**
Range + Options	**Accuracy**	**Stability**
Resistance		
(10 to 10000) Ω Excitation 200 uA Lead resistance (0 to 20) Ω (2,3 or 4 Wire connection)	(10 to 500) Ω ± 0.055 Ω, (500 to 2500) Ω ± 0.5 Ω, (2500 to 10500) Ω ±0.2 % of reading (+ Lead error on 2 wire)	(0 to 500) Ω 0.013 Ω/°C, (500 to 2500) Ω 0.063 Ω/°C, (2500 to 10500) Ω 0.27 Ω/°C
Slide wire		
(0 to 100) % Travel Wire resistance (1 to 100) KΩ	± 0.1 %	±0.001%/°C
mV		
(-205 to 205) mV DC (-1000 to 1000) mV DC	±0.02 mV ±10.0 mV	±0.005 mV/°C ±0.02 mV/°C

SENSOR INPUT **RTD (Single/2 wire Dual Channel; isolated tip only for Dual operation)**		**SPECIFICATIONS @20°C**
Type	**Range**	**Accuracy/Stability**
Pt100 (IEC)	(-200 to 850) °C	0.2°C ± (°0.05% of reading) (Plus sensor error)
Pt500 (IEC)	(-200 to 850) °C	
Pt1000 (IEC)	(-200 to 600) °C	
Ni100	(-60 to 180) °C	
Ni120	(-70 to 180) °C	
Ni1000	(-40 to 150) °C	
Cu53	(-40 to 180) °C	
Cu100	(-80 to 260) °C	
Cu1000	(-80 to 260) °C	
Library contains more (standards/types) including silicon sensors		
Temperature stability: Refer to resistance stability values for thermal effect		

SENSOR INPUT **Thermocouple (Single/Dual Channel; isolated tip only for Dual operation)**		**SPECIFICATIONS @20°C**
Type	**Range**	**Accuracy/Stability**
K	(-150 to 1370) °C	±0.1 % of full scale ± 0.5 °C (Plus sensor error)
J	(-200 to 1200) °C	
N	(-270 to 1300) °C	
E	(-260 to 1000) °C	
T	(-150 to 400) °C	±0.2 % of full scale ± 0.5 °C (Plus sensor error)
R	(0 to 1760) °C	±0.1 % of full scale ± 0.5 °C over range (800 to 1760) °C (Plus sensor error)
S	(0 to 1760) °C	
L	(-200 to 900) °C	±0.1 % of full scale ± 0.5 °C (Plus sensor error)
U	(-200 to 600) °C	
B	(0 to 1820) °C	
C	(0 to 2300) °C	
D	(0 to 2300) °C	
G	0 to 2300) °C	
Library contains more (standards/types)		
Temperature stability: Refer to mV stability values for thermal effect		

COLD JUNCTION (Ambient sensor)		**SPECIFICATIONS @20°C**
Type	**Range**	**Accuracy/Stability**
Thermistor 10K Beta 3380	(-40 to 85) °C	±0.2 °C
Thermal drift	Zero at 20 °C	±0.05 °C/°C

DUAL CHANNEL OPERATION	
Thermocouples A & B	Functions: Average, Redundancy, A + B, A – B, Highest, Lowest
mV A & B	Functions: Average, A + B, A – B, Highest, Lowest
RTD A & B	Two wire connection. Functions; Average, A + B, A – B, Highest, Lowest

OUTPUT		**SPECIFICATIONS @20°C**
Type/Options	**Range**	**Accuracy/Stability/Notes**
Two wire current	(4 to 20) mA	(mA out/2000) or 5 uA whichever is the greater
Thermal drift	Zero at 20 °C	1 uA/°C
User-set minimum current	(3.5 to 4.0) mA 3.8 mA default	
User-set maximum current	(20 to 23.0) mA 20.5 mA default	
User-set error current	(3.5 to 23.0) mA	
User pre-set current	(3.5 to 23.0) mA	For diagnostics
Current loop off	3.5 mA	
Loop effect	± 0.2 uA/V	
Loop supply	(12 to 30) V DC, > 35 mA	SELV
Max load	[(V supply – 12)/20] KΩ	600 Ω @ 24 V DC
Protection	Reverse and over-voltage	± 30 Vdc, ± 100 mA

Display	
Type	LCD TN positive reflective
Digits	5 numeric digits height 12.34 mm display process, 4 decimal point
Numeric	5 off 14 segment characters 9.08 mm height display units and message
Bar and % scales	Act on mA output 10 bar graph plus 0 to 100% display user-set on or off.
Icons	Warning, °C, °F, mA, communication icon
Temperature limits due to LCD display	Display working range (-25 to 85) °C Below -5 °C the scrolling display is ineffective

USB USER INTERFACE Approved USB configuration lead required		
Type/Function	**Description**	**Notes**
USB 2.0	Mini B USB Approved configuration lead	USB powers device for configuration only. Power loop for live data.
Sensor configuration	Sensor type Sensor offset Sensor fail high or low Pre-set sensor value Set damping Set No. wires resistance Input Set fixed or auto cold junction	TC/mV/RTD/Ohms/Slide wire Dual TC/mV/RTD Dual use separate offsets Dual Share sensor fail For diagnostics 2, 3 or 4 wire
Profiler configuration	Set profiler input range Set profiler segments Enter profile X~Y values Set profiler output units Set the output process range TC & RTD input only set units	In sensor units (4 to 22) segments Profiler set up

Type/Function	Description	Notes
Output signal	Select the process range for re-transmission Set minimum current Set maximum current Set the error current Trim 4.0 mA signal Trim 20 mA signal Pre-set Loop current	 Set in profiler out units (3.5 to 4.0) mA (20 to 23.0) mA (3.5 to 23.0) mA (3.8 to 4.5) mA (19.5 to 20.5) mA (3.5 to 23.0) mA
Damping	User set process variable (PV) damping	(1 to 32) seconds to reach 70% of final value
Display Message	Display message option 32 character per message mA Bar scale and %	Seven user-set process bands with two independent message capabilities. Including ambient temperature, loop mA, signal error and units. User can select Off, Bar,%, Bar + %
Diagnostics	Detect open circuit sensor wire Calibration date, certificate number, calibrated by	

Type/Function	Description	
Live Data	Read process variable (PV) Read profiler input signal Read profiler output signal	: Read ambient temperature : Read % output : Read mA output
HART information	Read/write tag number Read/write tag date Set polling address Read/write description	: Read/write message : Read/write final assembly number : Read/write long tag
HART specification	Read manufacturers ID Read short ID Read HART revision Read device revision Read software revision Read hardware revision Read unique ID Device ID1, ID2 & ID3	: Read No. pre-ambles : Read maximum No. variables : Read No. of configuration changes : Extended device status : Extended manufacturers ID : Extended distributes ID : Device profile

HART INTERFACE		
Type/Function	**Command Number**	
HART Protocol 1200 board Version HART 5 to 7 compatible Universal commands	1.Read primary variable (PV) 2.Read loop current and percentage of range 3.Read dynamic variables and loop current 7.Read loop configuration 9.Read device variables with status 12.Read message 14.Read primary variable transducer information 15.Read device information 17.Write message 19.Write final assembly number 22. Write long tag 48.Read additional device status	8.Read dynamic variable classifications 13.Read tag, descriptor and date 16.Read final assembly number 18.Write tag, descriptor and date 20.Read long tag 38.Reset configuration changed flag
Additional universal commands	0. Read unique ID 11. Read unique ID associated with tag 21. Read unique ID associated with long tag	6. Write polling address
Common practice commands	34. Write PV damping value 40. Enter/exit fixed current mode 42. Perform device reset 46. Trim loop current gain 49. Write primary variable transducer serial number 71. Lock device	35. Write PV range 41. Perform self-test 45. Trim loop current zero 76. Read lock device state

GENERAL	
Function	**Description**
Isolation	Flash tested 5 Seconds 4 KV DC, working voltage 50 V AC
Reading update	200 ms
Response time	500 ms to reach 70% final value
Warm up	2 minutes
Start-up time	5 seconds

AMBIENT	
Function	**Description**
Temperature	Operating/Storage (-40 to 85) °C
Display	Operating (-25 to 85) °C
Humidity	Operating/Storage (10 to 90) %RH non-condensing
Protection	Enclosure dependent
USB configuration ambient	(10 to 30) °C

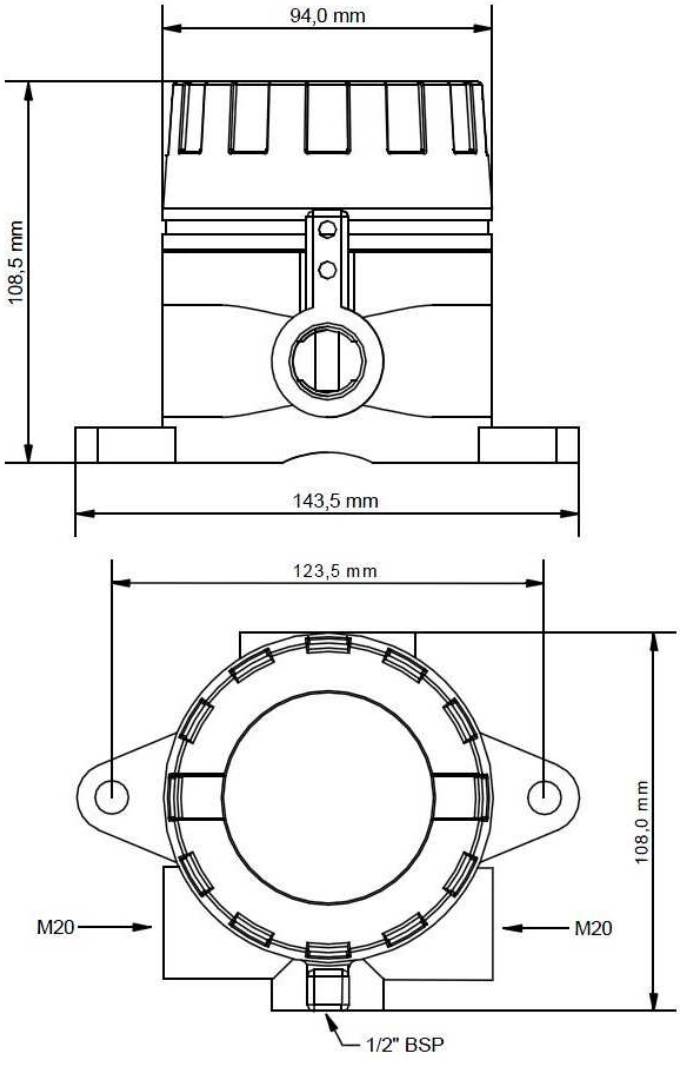
MECHANICAL – HOUSED IN SCH55 CONNECTION HEAD	
Enclosure	SCH55 head
Mounting options	The SCH55 housing can be probe or wall/surface mounted
Material body	Aluminium
Material window	Glass
Display orientation	Rotatable through 360°
Mechanical dimensions	See mechanical dimensions layout below
Weight	1200 g approximately
Fixing internal	1 x M5 Earth point
Fixing external	2 x 9 mm diameter holes on 123.5 mm centres, 1 x M5 Earth point
Entries	2 x M20 (in line) with 1 x ½ inch BSP (at 90° to M20 entries)
Colour body	Blue

CONNECTIONS	
Function	**Description**
Output	Two-part screw terminals
Input	Two-part screw terminals
USB	Configuration lead for SEM320

APPROVALS	
EMC	BS EN 61326 Industrial
Ingress protection	BS EN 60529
RoHS	Directive 2011/65/EU incorporating RoHS 3 Advanced directive EU2015/863

ORDER CODES	
SEM320/55	Safe area version
SEM320X/55/Exia (Pending)	Exia area version
SEM320/55/ExD (Pending)	ExD area version – must be supplied with temperature probe fitted
31-620-0013-01	M20 blanking plug (one supplied)
31-620-0012-01 (Pending)	M20 blanking plug ExD Version

Mechanical Dimensions



ACCESSORIES	
USB configuration software	USBSpeedLink free of charge from www.status.co.uk
Programming lead	Configuration lead for SEM320 contact sales@status.co.uk
Temperature probe options	Refer to www.status.co.uk or contact sales@status.co.uk

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To maintain full accuracy, annual calibration is required. Contact support@status.co.uk for details

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