

HBS5600

Temperature Transmitter & Indicator

HART 5 / 6 / 7 Compatible

ATEX / UKEX / IEC EX Approvals

Process Value, text and bar graph displays

Dual Sensor input with maths function

4-20mA or HART multidrop output



Introduction

The intrinsically safe **HBS5600** is a premium high accuracy all-in-one HART Exia temperature transmitter and indicator with ATEX, IECEx and UKEX approvals. The 5 digit LCD display provides local indication of the process value, a bar graph of the percentage of mA and custom text displays which can be configured through the PC software.

The HBS5600 is suitable for **Pt100** and **Pt1000** RTDs (2 wire, 3 wire, 4 wire) or **thermocouple** (types B, E, J, K, L, N, R, S, T, U, W3, W5) temperature sensor inputs.

The HBS5600 has been designed to be installed within our **Type 55 housing** which is available in either aluminium or 316 stainless steel. This transmitter-display can be rotated through 360 degrees within the housing to ensure it is always installed in the preferred orientation.

This transmitter-indicator has a number of additional features including advanced maths functions and sensor redundancy using dual channel operation. Transmitter diagnostics can be accessed through our software and include data such as maximum and minimum values.

The HBS5600 is a loop powered temperature transmitter which converts the sensor input into a standard industrial **4 to 20 mA** output signal over the configured range.

The temperature range, temperature units and upscale or downscale sensor error detection can be easily programmed via a HART handheld communicator, HART modem or PC using our software and USB configuration kit **HBSUSB9**.

Product features

User Calibration

In addition to sensor referencing, user offset and current output trimming is possible via the USB and HART® commands.

Custom Linearisation

The custom linearization facility allows the HBS5600 to be programmed with a custom linearisation to suit non standard sensors or sensors with unusual or unique characteristics.

Sensor Burn Out Detection

If any sensor wire is broken or becomes disconnected the HBS56 output will automatically go to its user defined level (upscale or downscale). This happens irrespective of which wire is broken.

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.

Electrical Input

Range & Options	Accuracy	Stability
Resistance		
(10 to 10000) Ω	(10 to 500) $\Omega \pm 0.055 \Omega$	(0 to 500) $\Omega \ 0.013 \Omega/^{\circ}\text{C}$,
Excitation 200 μA	(500 to 2500) $\Omega \pm 0.5 \Omega$,	(500 to 2500) $\Omega \ 0.063 \Omega/^{\circ}\text{C}$,
Lead resistance (0 to 20) Ω	(2500 to 10500) $\Omega \pm 0.2 \%$ of reading	(2500 to 10500) $\Omega \ 0.27 \Omega/^{\circ}\text{C}$
(2,3 or 4 Wire connection)	(+ Lead error on 2 wire)	
Slide Wire		
(0 to 100) % Travel	$\pm 0.1 \%$	$\pm 0.001\%/^{\circ}\text{C}$
Wire resistance (1 to 100) $\text{K}\Omega$	$\pm 0.1 \%$	$\pm 0.001\%/^{\circ}\text{C}$
mV		
(-205 to 205) mV DC	$\pm 0.02 \text{ mV}$	$\pm 0.005 \text{ mV}/^{\circ}\text{C}$
(-1000 to 1000) mV DC	$\pm 10.0 \text{ mV}$	$\pm 0.02 \text{ mV}/^{\circ}\text{C}$

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	
Library contains more (standards/types) including silicon sensors		
Temperature stability: Refer to resistance stability values for thermal effect		

Sensor input Thermocouple (Single / 2 wire 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	
Library contains more (standards/types) including silicon sensors		
Temperature stability: Refer to resistance 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	±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	RANGE	ACCURACY/STABILITY
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	
Current loop off	3.5 mA	For diagnostics
Loop effect	$\pm 0.2 \text{ uA/V}$	
Loop supply	(12 to 30) V DC, > 35 mA	SELV
Max load	$[(V \text{ supply} - 12)/20] \text{ K}\Omega$	600 Ω @ 24 V DC
Protection	Reverse and over-voltage	$\pm 30 \text{ Vdc}$, $\pm 100 \text{ mA}$

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 (HBSUSB9)

Type/Function	Description	Notes
HBSUSB9 Connection lead required	HBSUSB9	USB powers device for configuration only. Power loop for live data.
Sensor configuratio	<i>Sensor type</i> Sensor offset Sensor fail high or low Pre-set sensor value Set damping Set No. wires resistance Input Set fixed or auto cold junction	<i>TC/mV/RTD/Ohms/Slide wire</i> <i>Dual TC/mV/RTD</i> 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

USB User Interface (HBSUSB9) Continued

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.
Diagnostics	Detect open circuit sensor wire, Calibration date, certificate number, calibrated by	User can select Off, Bar, %, Bar + %
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-ambls : Read maximum No. variables : Read No. of configuration changes : Extended device status : Extended manufacturers ID : Extended distributors 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 8.Read dynamic variable classifications 9.Read device variables with status 12.Read message 13.Read tag, descriptor and date	14.Read primary variable transducer information 15.Read device information 16.Read final assembly number 17.Write message 18.Write tag, descriptor and date 19.Write final assembly number 20.Read long tag 22. Write long tag 38.Reset configuration changed flag 48.Read additional device status
Additional universal commands	0. Read unique ID 6. Write polling address 11. Read unique ID associated with tag	21. Read unique ID associated with long tag
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	35. Write PV range 41. Perform self-test 45. Trim loop current zero 76. Read lock device state 71. Lock device

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

Mechanical - Housed in Type 55 Connection head

Enclosure	Type 55 Connection Head
Mounting Options	Flash tested 5 Seconds 4 KV DC, working voltage 50 V AC
Housing Material	Aluminium (Type 55 A) / Stainless Steel (Type 55 S)
Window Material	Glass
Display Orientation	Rotatable through 360°
Dimensions	See below
Weight	Approx 1,2KG
Fixing Internal	1 x M5 Earth Point
Fixing External	2 x 9mm dia holes / 1 x M5 Earth Point
Cable Entries	2 x M20 (In-Line) 1 x ½" BSP (@ 90° to M20 entries)
Housing Colour	Aluminium - Blue / Stainless - Natural

Connections

Function	Description
Output	Two-part screw terminals
Input	Two-part screw terminals
USB (HBSUSB9)	Configuration lead

Approvals

EMC	BS EN 61326 Industrial
Output	BS EN 60529
Hazardous Area	See below
RoHS	Directive 2011/65/EU incorporating RoHS 3 Amendment directive EU2015/863 and UK designated standard

Hazardous area approvals

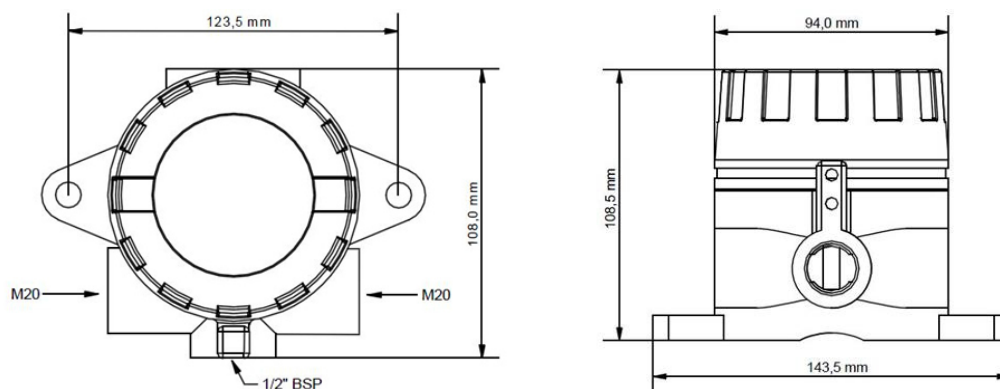
Approval	Classification	Certificate
ATEX Exia	 II 1 G D Ex i IIC T4 Ga Ex ia IIIC T135°C Da Ta = -40°C to +85°C	CML 20ATEX2111X
ATEX Exd	 II 2 GD Ex db IIC T* Gb Ex tb IIIC T**°C Db T6 - Ta = -40°C to +65°C T5 - Ta = -40°C to +80°C T4 - Ta = -40°C to +85°C	CML 20ATEX1109X
IECEX Exd	Ex db IIC T6 Gb Ex tb IIIC T85°C Db Tamb = -40°C to +65°C Ex db IIC T5 Gb Ex tb IIIC T100°C Db Tamb = -40°C to +80°C Ex db IIC T4 Gb Ex tb IIIC T135°C Db Tamb = -40°C to +85°C	IECEX CML 20.0070X
IECEX Exia	Ex ia IIC T4 Gb Ex ia IIIC T135°C Db -40°C to +85°C	IECEX CML 20.0072X
SIL	SIL 2	C21021-1, rev 1.0

Certificates available for download on the [HBS5600 Product Page](#)

Accessories

USB configuration software	Free of charge from www.hbsensors.com
HBSUSB9	Configuration lead, contact sales@hbsensors.com
U bolt	For fitment to 50mm pipe
Custom brackets	Stainless mounting plates customised to order
Stopping plugs	Available to seal spare entries, brass or stainless steel, ATEX approved
Cable entry adaptors	M20 (M) x 1/2" NPT (F) ATEX approved available
Temperature Probe Options	Refer to www.hbsensors.com or contact sales@hbsensors.com

Type 55 housing dimensions



The data in this document is subject to change. H&B Sensors assumes no responsibility for errors
To maintain full accuracy, annual calibration is required. Contact info@hbsensors.com for details

