

## Pressure Transmitter: **Smart Series 2HT**

**2HT  
ISSUE F.2**

- **High Accuracy  $\pm 0.10\%$ .**
- **Ranges from 1 bar to 1000 bar.**
- **20 : 1 turndown.**
- **4-20mA analogue with digital communications.**
- **Fully HART ® compatible.**
- **Rugged 316 stainless steel investment cast enclosure.**
- **NEMA 4X, IP66 Environmental Rating.**
- **Stainless Steel, Monel and Hastelloy “Wetted Parts” options.**
- **NACE MR-01-75 compatibility.**
- **Compact, Robust design.**
- **All welded construction.**

### Performance **characteristics**

#### Enclosure options

- Weatherproof IP66 Protection – NEMA 4X.
- Intrinsically safe – EExia ATEX
- Flameproof – EExd ATEX

#### Wetted parts options

- Welded 316 stainless steel sensor and process connection.
- Welded Nickel Alloy (Monel) sensor and process connection.
- Welded Hastelloy sensor and process connection.

#### Signal output

- Refer to table 7.

#### Process connection

- $\frac{1}{2}$ " NPT External, G  $\frac{1}{2}$ " A to ISO 228 ( $\frac{1}{2}$ " BSP Parallel Male, spigotted), High pressure cone and thread (autoclave)  $\frac{9}{16}$ " UNF.

#### Unit weight

- Between 1.6 kg – 2.3 kg.

#### Accuracy

- For turndowns of 1:1 to 10:1  $\pm 0.1\%$  of span.
- For turndowns of 10:1 to 20:1  $\pm 0.15\%$  of span.



### Product **applications**

**The 2HT is suitable for a wide range of applications in many industry sectors:**

- Oil & Gas
- Chemical
- Petrochemical
- Water
- Power

**The choice of models available ensures that the 2HT is:**

- Suitable for use in corrosive atmospheres
- Resistant to chemical attack

#### How can we **help you?**

Delta Controls' range of reliable pressure and temperature measurement instruments can be customised to meet individual requirements. For technical advice or to discuss your application, please contact us on +44 (0) 20 8939 3500

## Enclosures

### FINISH

All enclosures are investment cast in 316 Stainless Steel and offer environmental protection to (NEMA TYPE 4X) IP66.

**NOTE:** *Instruments subject to National or International approval may be limited in terms of options available. See notes adjacent to relevant tables.*

TABLE 1

	Code
Intrinsically Safe to EN60079-0 & EN60079-11 & EN 60079-26 Ga Ex ia IIC T4 @ -20 to +80°	4
Flameproof to EN50 014 & EN50 018 EEx d IIC T4 @ -40 to +85°C (for Blind Instruments) EEx d IIC T6 @ -40 to +60°C (for Blind Instruments) EEx d IIB + H <sub>2</sub> T6 @ -40 °C to +60 °C (for Indicating Instruments) EEx d IIB + H <sub>2</sub> T6 @ -40 °C to +85 °C (for Indicating Instruments) Refer also to note on table 7	R
Weatherproof only IP66/NEMA 4X	A
Explosionproof Class I, II & III Div 1 Gp BCDEFG -40 to +85°C Intrinsically Safe Class I, II & III Div 1 Gp ABCDEFG -20 to +80°C	F

## Models

TABLE 2

	Code
Pressure transmitter	2HT

## Electrical Entry

M20 x 1.5 (ISO) and 1/2" NPT Internal threads available as standard. Other threads e.g. Pg 13.5, can be made available via adaptors.

TABLE 3

	Code
M20 x 1.5 Internal thread (standard)	1
1/2" NPT Internal thread	2

## Material of Wetted Parts

Options T, U and C are all compatible with the requirements of NACE MR 01-75. Other factors in highly aggressive chemical environments may determine the final choice.

For Sour-gas and Crude applications, Code C offers the most cost effective solution.

Monel Code T is preferred for highly oxidising media, such as pure Oxygen and Chlorine.

TABLE 4

	Code
For liquids and gases. Welded 316 stainless steel sensor and process connection. Ranges 0 to 1 bar up to 0 to 6 bar.	R
For liquids and gases. Welded 17-4 PH or 15-5 PH sensor to 316 stainless steel process connection. Ranges 0 to 10 bar up to 0 to 1000 bar.	S
Welded nickel alloy (Monel) sensor and process connection. Ranges 0 to 10 bar up to 0 to 1000 bar (Suitable for NACE MR-01-75).	T
Welded Hastelloy C sensor and process connection. Ranges 0 to 10 bar up to 0 to 1000 bar. (Suitable for NACE MR-01-75).	U
Welded Hastelloy C sensor to annealed stainless steel process connection. Ranges 0 to 10 bar up to 0 to 1000 bar. (Suitable for NACE MR-01-75)	C

## Setting Ranges

The values shown in this table are the UPPER RANGE LIMIT (URL); a 20:1 turndown facility enables full 4 to 20mA output to be obtained for a working span equal to 5% of URL.

Unless specified, the instruments are despatched with LOWER RANGE VALUE (LRV) set to LOWER RANGE LIMIT and UPPER RANGE VALUE (URV) set to UPPER RANGE LIMIT.

Ranges shown are to gauge (i.e. atmospheric reference) absolute pressure is called up by amending the last character of the three character range code:

**NOTE:** Model R 2HT is not available on ranges below 10bar.

TABLE 5

Bar	PSI	Code
0 to 1	0 to 16	DA
0 to 2	0 to 30	D2
0 to 6	0 to 100	DE
0 to 10	0 to 160	EA
0 to 16	0 to 250	EB
0 to 40	0 to 600	ED
0 to 100	0 to 1600	FA
0 to 400	0 to 6000	FD
0 to 600	0 to 10,000	FE
0 to 1000*	0 to 16,000	GA

\*NOTE: Range GA only available with SS or Hastelloy Process connection

## Units

TABLE 6

Units	Code
Gauge	G
Absolute	A

## Signal Output

Note: For Flameproof model R2HT, gas group reduced to IIB+H<sub>2</sub> when option codes 2 & B are selected. Also refer to table 1

All 4-20mA with digital signal based on the HART® protocol.

Codes A and B are only available with wetted part material codes C or U. Ref Table 4.

TABLE 7

	Code
50 V DC Maximum voltage between circuit and case, blind instrument	1
50 V DC Maximum voltage between circuit and case, instrument with indicator.	2
500 V AC Maximum voltage between circuit and case, blind instrument	A
500 V AC Maximum voltage between circuit and case, instrument with indicator.	B



## TECHNICAL SPECIFICATIONS

### Process

Liquid, gas or vapour applications.

### Ranges

0 to 1bar up to 0 to 1000bar. (0 to 16psi up to 0 to 16,000psi.)

### Outputs

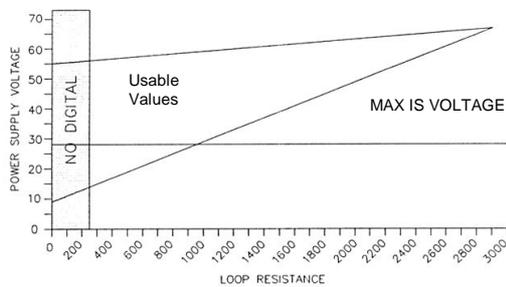
Two-wire, 4-20mA DC output with Digital AC signal superimposed onto it, using the HART® protocol.

### Power Supply

9 to 55 Volts DC. On intrinsically safe circuits the maximum voltage is limited to 28VDC.

### Load Limits

The maximum loop resistance is determined by the voltage level of the power supply.



Digital communication requires a minimum loop resistance of 230 ohms.

### Indication

Optional Local Display.

### Hazardous Area Certification

ATEX Intrinsically safe and flameproof. FM Intrinsically safe, flameproof and non-incendive.

### Zero Elevation & Suppression

Can be set anywhere within the sensor limits, providing the required span is greater or equal to the minimum span, the lower range value does not exceed the lower range limit, and the upper range value does not exceed the upper range limit.

### Normal or Reverse Action

Set by reversing the upper and lower range values.

### Overpressure

316 St. St. diaphragm 2 x URL  
17-4 PH or 15-5 PH diaphragm 2 x URL\*  
Monel diaphragm 1.5 x URL\*  
Hastelloy diaphragm 1.5 x URL\*

\*Subject to 1500 bar maximum.

### Temperature Limits

Process: -40 to +120°C (-40 to +240°F)  
Operating: -40 to +85°C (-40 to +185°F)  
Storage: -50 to +110°C (-58 to +230°F)

### Failure Mode Alarms

"Burnout" indication can be selected to be either minimum or maximum current output .

### Humidity Limits

0 to 100% relative humidity.

### Turn-on Time

Performs within specifications in less than 3 seconds, after power is applied to the transmitter including full self-diagnosis.

### Volumetric Displacement

Less than 0.01cm<sup>3</sup>

### Damping

Adjustable 0 to 39 seconds. This is in addition to the sensor response time of 150mS.

## PERFORMANCE SPECIFICATIONS

### Accuracy

For turndowns of 1:1 to 10:1 ±0.1% of Span  
For turndowns of 10:1 to 20:1 ±0.15% of Span

Accuracy stated includes the combined effects of Linearity, Hysteresis, and Repeatability.

### Stability

Typically less than ±0.1% URL per annum.

### Linearity

±0.05% of calibrated span.

### Ambient Temperature Effects

Total effect ±0.1% at maximum span.

### Overrange Effect

Zero shift, 0.2% URL.

### Step Response

Less than 150mS.

### Vibration Effect

5g Peak sinusoidal at 5Hz to 200Hz.

### Power Supply Effect

0.005% of calibrated span per volt.

### Mounting Position Effect

Zero shift of up to 2mbar for a 10° tilt in any place.

### RFI Effect

With lid on, in accordance with IEC801, level 3 (30V/m) over the range 20Mhz to 1000Mhz.

**PHYSICAL SPECIFICATIONS**

**Electrical Entry**

M20 x 1.5 Internal or 1/2" NPT Internal.

**Process Connections**

1/2" NPT External (Standard).  
 Autoclave, 'Cone and Thread' 9/16" UNF (For pressure ranges up to 1000bar.)  
 External G 1/2" A to ISO 228.

**Process Wetted Parts**

316 St. St.  
 17-4 PH St. St. or 15-5 PH.  
 Hastelloy.  
 Monel.

**Non-Wetted Parts**

Lowerbody, Case and Lid 316 Stainless Steel.  
 Mounting Hardware 316 Stainless Steel.

**Environmental Protection**

IEC IP66, NEMA 4X.

**Mounting**

Direct process mounting as standard.  
 Optional 2" pipe mounting bracket.  
 Optional wall mounting bracket.

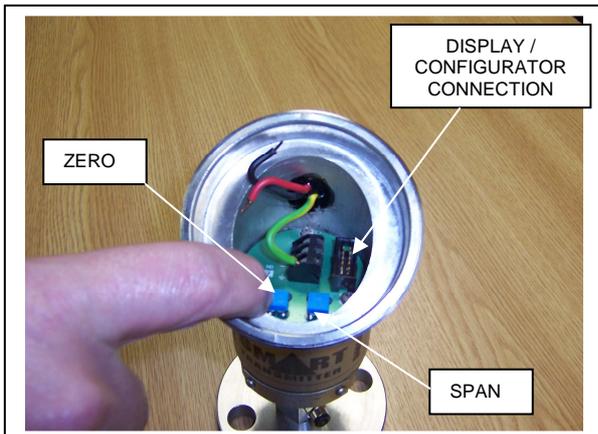
**Weight**

1.6Kg Without local display.  
 1.8Kg With optional local display.  
 0.2Kg Wall mount bracket.  
 0.5Kg Pipe mounting bracket.  
 0.2Kg Remote D-CAL unit.

**PROGRAMMING, CONFIGURATION & DISPLAY FUNCTIONS**

The model 2HT SMART transmitter uses the HART® protocol, enabling digital communications with host computer systems, universal hand-held communicator and any other process control system that supports the HART® protocol; as a result it can be configured and calibrated remotely.

In addition to remote digital communications, the Model 2HT has a standard local Zero and Span adjustments at the touch of a button.



If more than just local Zero and Span is required, there is the unique D-CAL local display option.

The Delta D-CAL local display is more than just a local indicator, it is, in fact, a local configurator, that can directly access more than 80% of the SMART transmitter commands, for installation, commissioning and maintenance checks.



The D-CAL local display unit is constructed from a single, stainless steel disc and when fitted gives the transmitter an environmental rating of IP65 with the lid removed.

The display gives diagnostic capabilities and shows prime variable and temperature, it also contains a user friendly, alphanumeric menu allowing access to internal functions including password protection. Passwords can be enabled to limit operation access to critical parameters during operation.

If a local display is not required, but the ability to check and configure the model 2HT is still needed, then our unique hand held configuration is a low cost alternative, when purchasing two or more transmitters.



Once the first unit is configured, simply unplug the D-CAL unit and move onto the next unit.

## Approvals

### CENELEC / INTERTEK / ATEX

Intrinsically Safe.  
 Certified to ATEX EN 50 014 and EN50 020 for use in Zone 1 hazardous areas.

Enclosure Codes 4 and all ranges.



Certificate No ITS03ATEX21213X  
 System Certificate

### FACTORY MUTUAL RESEARCH CORPORATION

FM Approved for use in Divisions 1 and 2.



Enclosure Code F; see Table 5 for limitations on ranges.

Report number 1B5A6.AE

### CENELEC / INTERTEK

Flameproof / Weatherproof  
 Certified to ATEX EN 50 014 and EN50 018 for use in Zone 1 hazardous areas.

Enclosure Code R and all ranges

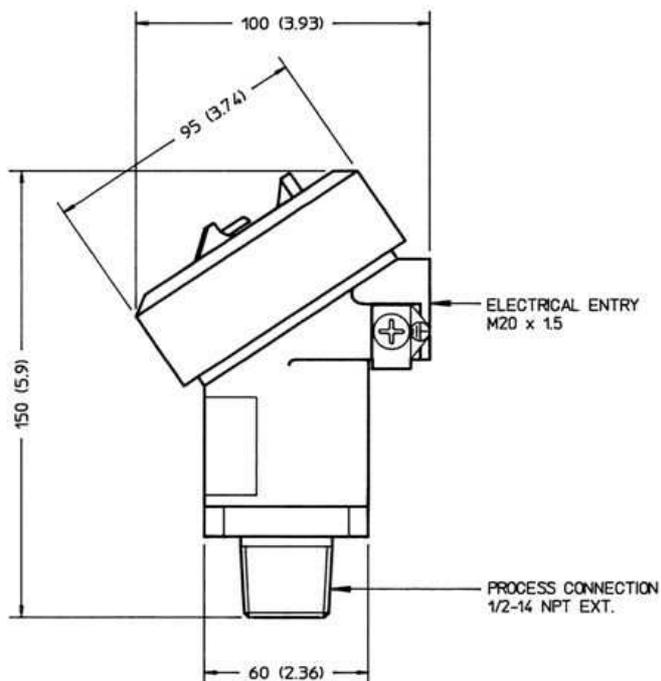


II 2 G

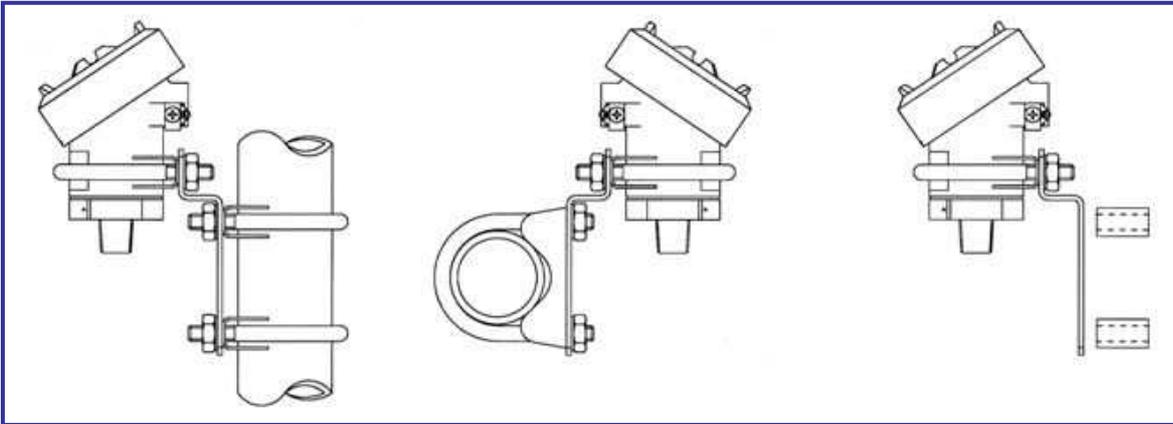
Certificate No ITS03ATEX11187 Issue 2

## Dimensions

All dimensions mm (Inches)



## Mounting Brackets



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*We retain the right to supply Hastelloy Sensors as an alternative. If you require Stainless Steel please confirm with sales department.*



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