

SERIES: TTS360



- **0.075% ACCURACY**
- **SELF-DIAGNOSIS MESSAGES**
- **HART® PROTOCOL COMMUNICATION**
- **INPUT/OUTPUT GALVANICALLY ISOLATED**
- **LOCAL AND REMOTE CONFIGURATIONS**
- **LONG-TERM STABILITY AND SERVICE LIFE**
- **4-20 mA OUTPUT & DIGITAL COMMUNICATION**
- **INTRINSICALLY SAFE AND EXPLOSION PROOF**
- **AUTOMATIC AMBIENT TEMPERATURE COMPENSATION**
- **5-DIGIT & 4-DIGIT LCD'S INDICATORS WITH BACK LIGHT**
- **FULLY WELDED ELEMENTS WHICH GUARANTEES “NO LEAK”**



INTRODUCTION TO SMART TRANSMITTERS

Utilizing the smart technology in manufacturing of temperature transmitters resulted in introduction of a new transmitter with a lot more features than the old analogue model.

When deciding about purchasing analogue or smart transmitters for temperature systems, you will find that smart transmitters have higher accuracy and precision along with faster dynamic response than the analogue ones. This will give the smart models an advantage to produce tighter process control.

Moreover, smart transmitters reduce commissioning by allowing fast identification, fast configuration, fast loop tuning and improved self diagnostics. They can be configured and serviced in the field or from a remote location, such as the control room, along the 4-20 mA line. This ease of field service can be very important to quick field troubleshooting and improves maintenance issues.

Smart transmitters communicate through HART™ (Highway Addressable Remote Transducer) protocol, a platform ready for complete digital integration of your process system. The HART communication protocol is capable of performing simultaneous analogue and digital communications. HART protocol allows multi-drop instrument installation, operation over remote telephone communication lines and transmission of multiple variables when operating digitally.

SMART TTS360

Indumart TTS360 Series of Smart Temperature Transmitters are two-wire microprocessor-based instruments, which can sense temperature via their Pt100 or type “K” thermocouple, and indicate the value of temperature on the wide LCD display, and generate a 4-20 mA output signal directly or inversely proportional to the temperature input. The transmitter's output is fitted with a radio-noise filter and other elements protecting against ESD.

The measuring signal of sensor has a galvanic separation from the measuring line. Therefore the measurement susceptibility at interferences is reduced and also the safety of work in the Ex and flameproof applications is enhanced.

The TTS360 monitors the operation of its measuring system and the correctness of conversions. In case when discrepancies occur, it will inform about the error by displaying a message on its LCD display. It may also generate an alarm current in the current loop (depending on configuration).

Ambient temperature effect is automatically compensated. The high accuracy sensor coupled with the temperature compensation feature give a measurement precision, which is more than adequate for even the most demanding applications.

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Due to the materials and technology used in the construction of these pressure transmitters, these instruments are excellent in reliability, resistance to corrosion against the majority of chemically aggressive media and withstanding mechanical shocks.

When ordered as EX versions, the electronic circuit boards are intrinsically safe for use in hazardous areas and the enclosure of the instrument is explosion proof type II 1/2 Exia/d IIC T5/T6

Digital communication for remote calibration and monitoring is also provided, superimposing a digital signal on the same pair of wires that carries the 4-20 mA signal. These transmitters can be configured utilizing any of the three following methods: **(1)** locally configuring the instrument, **(2)** by a PC with a dedicated interface and the Indumart smart configuration software, **(3)** with having the capability of digital communication, they may be configured using Indumart hand-held terminal with HART protocol or other hand-held communicators*.

The *TTS360 Series* transmitters are manufactured in accordance with the requirements of the following standards: EN 60079-0:2006, EN 60079-11:2007, EN 60079-26:2006, EN 61241-0:2006, EN 61241-11:2006, EN 50303:2000.

* Some hand-held communicators make transmitter configuration possible in the range of basic commands.

HINTS TO THE BUYERS

1) The first question when purchasing a temperature transmitter is the **TYPE**: Smart or Analogue? Smart transmitters have remarkable advantages over the analogue ones.

1) **ACCURACY** of the transmitter utilized in a process is often very important. The standard accuracy of the *TTS360* series is better than 0.075%.

2) Wide **RANGEABILITY** is an asset when you are concerned about keeping the number of spare transmitter in the stock. The *TTS360* series with wide rangeability will give the user a good flexibility for application of these transmitters and keeps the spare transmitters at its minimum.

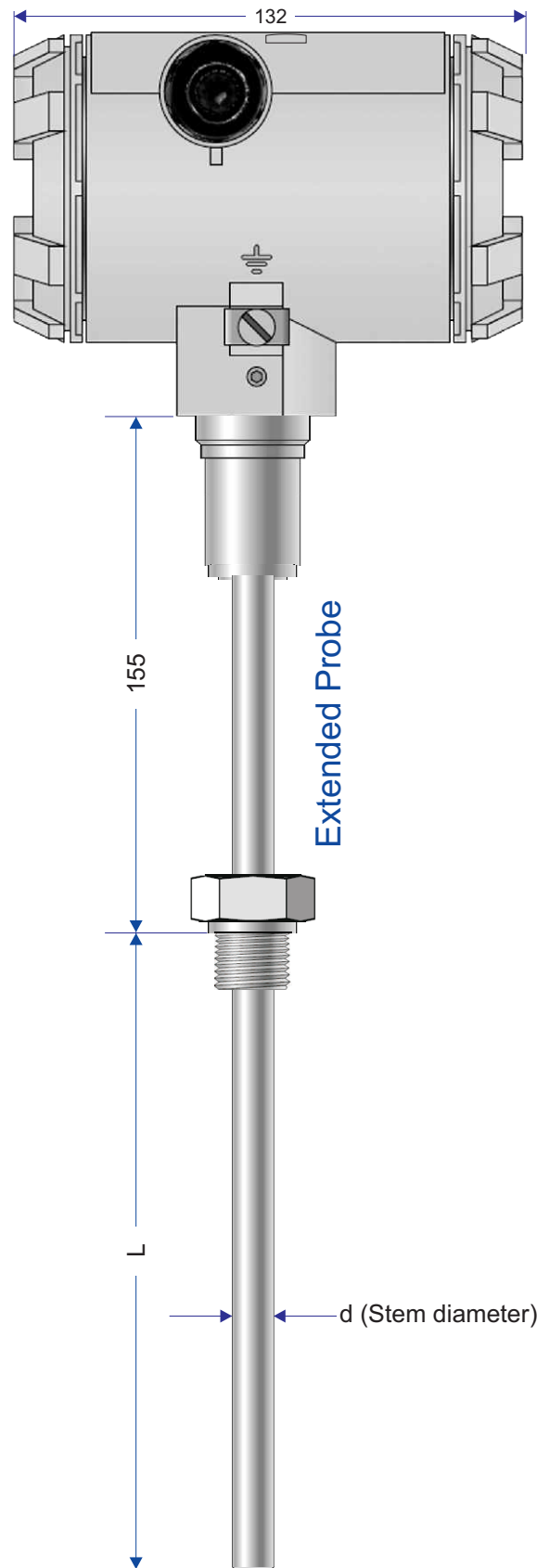
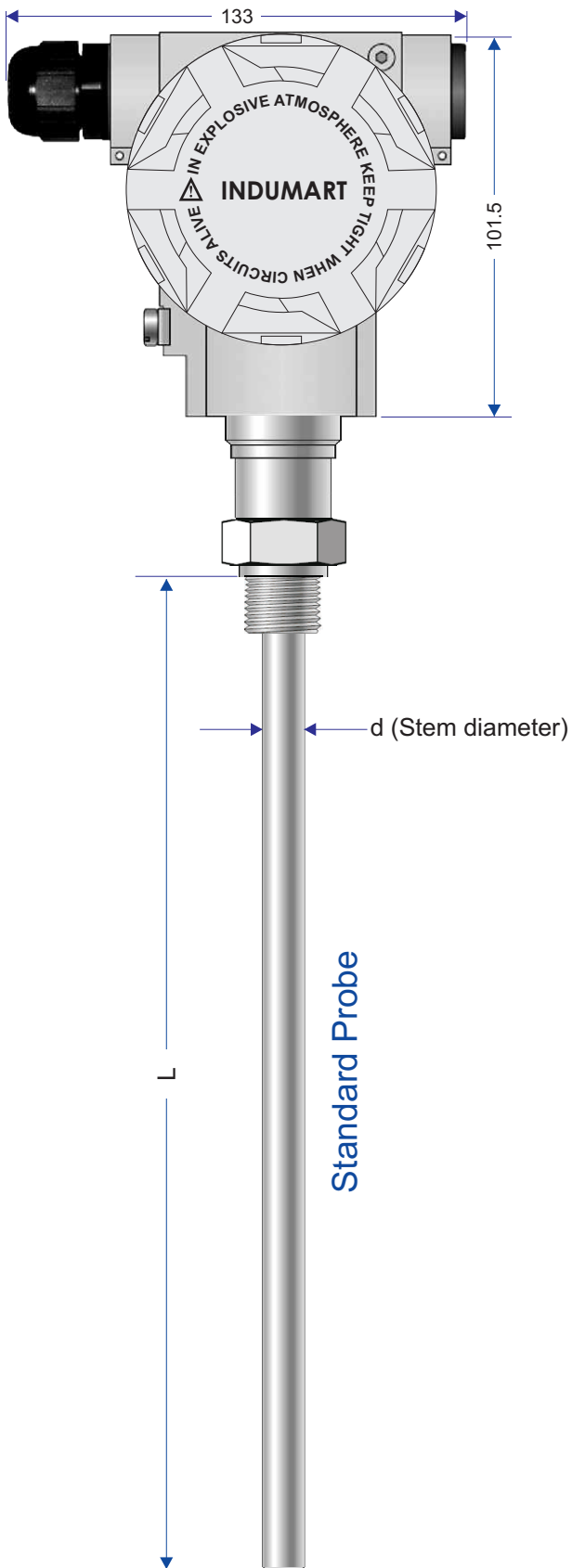
3) Among the advantages of using **HART** protocol is the fact that different brands of smart transmitters can use the same hand-held terminal.

4) For those users who are reluctant to spend to purchase an Indumart HART communicator (HHC315 or HHC315X), they may order **series 306 programming software** separately to configure the *TTS360* transmitters. Cost of the *306 series* software is substantially lower than purchasing an Indumart HART communicator.

SPECIFICATIONS

Accuracy	0.075%
Measuring Span	Pt100 sensor: -200...+550°C T/C type "K" sensor: -40...+550°C
Minimum Span	10°C
Pressure Limit	360 psi or 25 bar
Digital Value Error	Pt100: $\pm(0.05 + 0.05 \times Z + 0.001 \times T)$ °C T/C "K" when temperature above 375°C: $\pm(0.05 + 0.05 \times Z + 0.002(T-375))$ °C T/C (up to 375°C): $\pm(0.05 + 0.05 \times Z)$ °C T: value of measured temperature °C Z: the span value °C T : the absolute value of T °C
Output Signals	4...20 mA, 2-wire
Error (Output)	$\pm 0.04 \times Z$ °C
Transfer Function	Linear, square or square root (selectable)
Damping	Digitally adjustable from 0 to 60 sec.
Wetted Part Standard	316L stainless steel
Stem Diameter	12 mm (std.), others on request (option)
Housing Material	Aluminum alloy with polyurethane paint Stainless steel housing (option)
Conduit Entry Size	½" NPTF (std.); M20x1.5 conduit (option)
Intrinsically Safe	II 1/2 G Exia IIC T5/T6
Explosion-proof Indicator	II 1/2 D Exia/D 20/tD A21 T85/T100 2 LCD's and a 10-segment bargraph with bright back light; large display: 5-digit, 7.5 mm high small display: 4-digit, 5 mm high
Temp. Comp. Range	-25...80°C
Power Supply	12 to 28 VDC without backlit display. If not used in the explosive atmosphere, power supply can be 13.5 to 55 VDC. Add 3 Volts to the minimum voltage, when the backlit is ON $R=(V-15^*)/0.0236$ * without the backlit $(V-12)/0.0236$
Maximum Load	500 VAC or 750 VDC (not for Exi version)
In/Out Isolation	0.002% FS / V
Power Supply Effect	-40...+85°C, Ex version up to 80°C
Storage & Ambient	IP67

DIMENSIONS (mm)



ORDER CODE

SMART TEMPERATURE TRANSMITTERS

Model: TTS360 - -

PROBE

Pt100
Thermocouple "K"

P
K

THREAD OR FLANGE CONNECTION

½" NPT
G ½
M20 X 1.5
2" ANSI 150 RF
2" ANSI 300 RF
2" ANSI 600 RF
DN50, PN40
Special (please specify)

0
1
2
3
4
5
6
9

ELECTRICAL ENCLOSURE

Aluminum with polyurethane paint (std.)
Stainless Steel (option)

0
S

ELECTRICAL CONDUIT ENTRY SIZE

1/2" NPTF (std)
M20x1.5 (packing gland)

0
1

STEM DIAMETER

Standard (12 mm)
Other (please specify in the order)

S
X

PROBE EXTENSION

Standard
Extended (High Temperature)

0
1

CERTIFICATE

None
Intrinsically Safe (EEX ia IIC T5)
Explosion Proof (EEX d ia IIC T5)

0
1
2

CALIBRATED RANGE

Same as the nominal Range (std)
Other - please specify the range

0
1

IMMERSION LENGTH (L)

Please specify in mm

NOTE: Thermowells for the above temperature transmitters must be ordered separately.
Please refer to Indumart thermowell catalogue.



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