INDUMART Canada
www.indumart.com

Smart Level Transmitter / (DP + seals)

SERIES: LTS360

Model with a direct diaphragm seal on the positive side and the low pressure can be connected to the tank's top without a diaphragm seal.

- 0.1% ACCURACY
- SELF-DIAGNOSIS MESSAGES
- HART® PROTOCOL COMMUNICATION
- LOCAL ZERO AND SPAN ADJUSTMENTS
- LONG-TERM STABILITY AND SERVICE LIFE
- AUTOMATIC TEMPERATURE COMPENSATION
- 4-20 mA OUTPUT & DIGITAL COMMUNICATION
- INTRINSICALLY SAFE AND EXPLOSION PROOF
- EXCELLENT ALTERNATING LOAD RESISTANCE
- 5-DIGIT & 4-DIGIT LCD'S INDICATORS WITH BACK LIGHT
- FULLY WELDED ELEMENTS WHICH GUARANTEES "NO LEAK"
- 3 YEARS ACCURACY STABILITY AND 5 YEARS LIMITED WARRANTY

WE'VE GOT HART FIELD COMMUNICATION PROTOCOL ABILITY

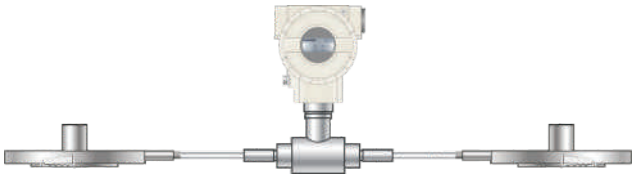
INTRODUCTION TO SMART TRANSMITTERS

Utilizing the smart technology in manufacturing of pressure 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 pressure 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.

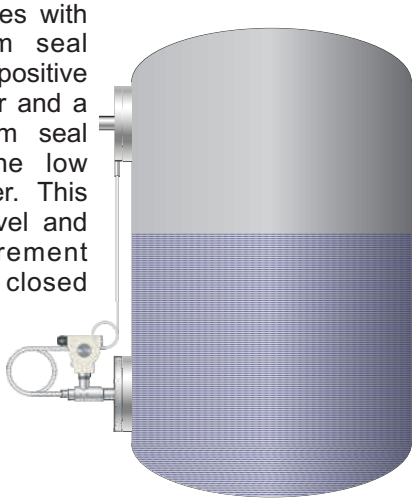
Moreover, smart transmitters reduce commissioning by allowing fast identification, fast configuration, fast loop tuning and improved self diagnostics. They can be configured and serviced in the field or from a remote location, such as the control room, along the 4-20 mA line. This ease of field service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



Model with two remote diaphragm seals is suitable for flow measurement and other applications, such as filter monitoring.

The LTS360 Series with direct diaphragm seal connected to the positive pressure chamber and a remote diaphragm seal connected to the low pressure chamber. This is suitable for level and density measurement applications in closed tanks.



SMART LTS360

Indumart *LTS360* Series of Smart Level Transmitters are two-wire microprocessor-based instruments, which can receive two pressure lines, and indicate the value of the differential pressure from these lines on its wide LCD display, and generate a 4-20 mA output signal directly or inversely proportional to the pressure differential of the input lines. Typical applications of the *LTS360* series are: hydrostatic measurements of level in both closed and open tanks, measurement of pressure loses at both sides of a filter to determine the filter cleaning, flow measurement with the aid of an orifice and also density and phase boundaries determinations. They may include one or two diaphragm seals to be directly or remotely attached to the sensor section of the transmitter; see the figures on page 1.

The *LTS360* Series utilize the proven piezoresistive silicon technology. Deflections of the diaphragms under pressure are transferred by a manometric fluid to the sensor to produce very highly accurate measurements.

Thermal drift is automatically compensated using the signal from a thermistor integrated into the pressure sensor. 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.

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.

The electronic circuit boards are ATEX intrinsically safe for use in hazardous areas and the enclosure of the instrument is ATEX 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 (zero, range, shift, characteristics and damping ratio) by means of pushbuttons on the transmitter, **(2)** by a PC with a dedicated interface and the Indumart smart configuration software (STS306); **(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 data interchange with the transmitter enables the user to identify the transmitter, calibrate the sensor, read the immediate measured value of the input and the current output of the transmitter. User may alter the measurement unit and the range, introduce zero elevation, apply measurement inversion, take a square root or squar the value of the measurement and set the damping time. Additionally the operator may force an output current with a set value.

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

HINTS TO THE BUYERS

1) The first question when purchasing a level transmitter is the **TYPE**: Smart or Analogue? Smart transmitters have remarkable advantages over the analogue ones. These features have been mentioned in the introduction part of this brochure. Cost comparison is also important, since the initial cost of a smart transmitters is higher than that of an analogue model, but in future, you will save on installation, start-up, calibration, spare parts inventory and maintenance costs.

2) **ACCURACY** of the transmitter utilized in a process is often very important. Using piezoresistive silicon technology in *LTS360* results in a very high accuracy instrument which keeps its calibration for years in harsh conditions. The standard accuracy of the *LTS360* series is better than 0.1% of the calibrated range for ranges above 30% of the nominal range.

3) Wide **TURNDOWN RATIO** is an asset when you are concerned about keeping the number of spare transmitter in the stock. The *LTS360* series with wide rangeabilities will give the user a good flexibility for application of these transmitters and keeps the spare transmitters at its minimum. However, in order to receive the most accurate reading from any level transmitter available in the market, the user should choose the one with the closest nominal range to the application, and try not to use the turndown ratio in high extend. Increasing the turndown ratio decreases accuracy of the instrument.

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

5) 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 *LTS360* transmitters. Cost of the *306 series* software is substantially lower than purchasing an Indumart HART communicator.

SPECIFICATIONS

Accuracy	Better than 0.1% of calibrated range (used between 30% and 100% of the nominal range)
Measuring Span	Up to 100% of the nominal span (See the Range Tables)
Accuracy Stability	Accuracy will be held for the nominal range for a minimum of 3 years
Over-pressure Limit	4 MPa (580 psi or 40 bar) standard 10 MPa and 16 MPa as option
Static Press. Error	Per 1 MPa shift in static pressure: 0.03% for the K model 0.08% for the E, M & N models Zeroing the transmitter in conditions of static pressure can eliminate this error.
Output Signals	4...20 mA, 2-wire
Transfer Function	Linear, square or square root (selectable)
Damping	Digitally adjustable from 0 to 60 sec.
Response Time	0.5 second
Fill Liquid	Silicon or inert fill

Specification (continue....)

Process Connection One or two diaphragm seals; see the order code
Flange Material 316L SS
Diaphragm Material 316L SS (std.), others upon availability
Wetted Part Standard NACE MR - 01 - 75 compatible
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 Ex ia IIC T4/T5
Explosion-proof II 1/2 G Exia/d IIC T5/T6; for ≤25 kPa
II 1/2 D Exia/D 20/tD A21 T85/T100 for pressure > 25 kPa
Indicator 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

Thermal Drift Effect of environmental temp. change ≤±0.08% (FS) /10°C; ±0.3% (FS) max.
Temp. Comp. Range -25...80°C
Power Supply 13.5 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
Maximum Load R=(V-16.5*)/0.0236
* without the backlit (V-13.5*)/0.0236
Power Supply Effect 0.002% FS / V
Communic. Distant 2 km when using CEV cable
Medium Temp. -25...+120°C; non-freezing
Storage & Ambient -25...+85°C, EEx version up to 80°C
IP Rating IP66
EMC Immunity EN 61000-4-3: 2007 + A1:2008

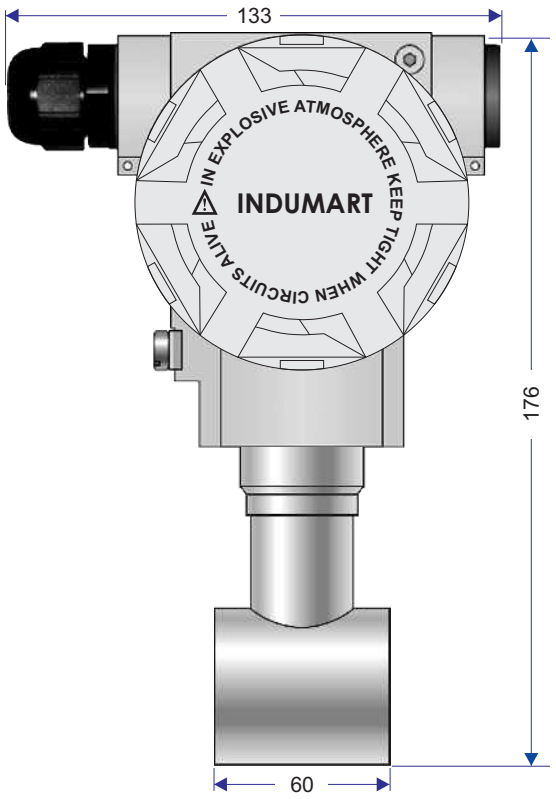
Measuring Ranges for Series LTS360 Smart Level Transmitters

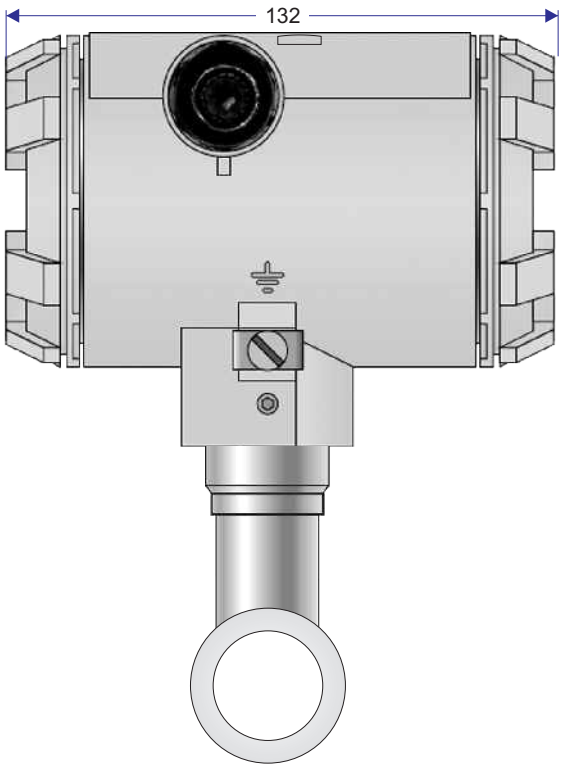
Model Code	Nominal Range (shown in three mostly used pressure units)						Rangeability	Minimum Span (shown in three pressure units)					
C	1.6 ~ 1.6	mH2O	-2.3 ~ +2.3	psi	-160...+160	mbar	16:1	0.1	mH2O	0.15	psi	10	mbar
D*	0~2.5	mH2O	0 ~ 3.6	psi	0...250	mbar	25:1	0.1	mH2O	0.15	psi	10	mbar
E	-5...+5	mH2O	-7.5 ~ +7.5	psi	-500...+500	mbar	10:1	0.5	mH2O	0.75	psi	50	mbar
F*	0...10	mH2O	0 ~ 14.5	psi	0...1	bar	14:1	0.7	mH2O	1.04	psi	70	mbar
G*	0...25	mH2O	0...36	psi	0 ~ 2.5	bar	10:1	2.5	mH2O	3.63	psi	250	mbar
M	-16...+20	mH2O	-23...+29	psi	-1.6 ~ +2	bar	13:1	1.5	mH2O	2.2	psi	150	mbar
N	-15...160	mH2O	-22... +230	psi	-1.5 ~ +16	bar	16:1	10	mH2O	14.5	psi	1	bar

1 bar = 100 kPa = 14.504 psi = 10.1972 mH2O = 401.47 in. H2O

* Recommended for one side direct seal only.

DIMENSIONS (mm)





ORDER CODE

SMART LEVEL TRANSMITTERS

Model: **LTS360** ☐☐-☐☐☐☐☐-☐☐☐☐☐-☐☐

PROCESS CONNECTION
High side direct diaphragm seal	DX
High side remote diaphragm seal	RX
High side direct & low side remote seals	DR
Both sides remote diaphragm seals	RR
Special (according to customer order)	SS

NOMINAL RANGE
Please choose a code from the Table ☐

MAX. STATIC PRESSURE
4 MPa (580 psi; 40 bar) standard	0
10 MPa (1450 psi; 100 bar)	1
16 MPa (2300 psi; 160 bar)	2

ELECTRICAL ENCLOSURE
Aluminum with polyurethane paint (std.)	0
Stainless Steel (option)	S

ELECTRICAL CONDUIT ENTRY SIZE
1/2" NPTF (std)	0
M20x1.5 (packing gland)	1

MOUNTING SEAL (high pressure side)†
3" ANSI 150#; 316L SS Diaphragm	1
3" ANSI 300#; 316L SS Diaphragm	2
DN80, PN40; 316L SS Diaphragm	3
Special	9

SEAL EXTENSION (high pressure side)
Without extension	0
100 mm (4") extension	1
150 mm (6") extension	2
Special	9

MOUNTING SEAL (low pressure side)†
Without seal	0
3" ANSI 150#; 316L SS Diaphragm	1
3" ANSI 300#; 316L SS Diaphragm	2
DN80, PN40; 316L SS Diaphragm	3
Special	9

SEAL EXTENSION (low pressure side)
Without extension	0
100 mm (4") extension	1
150 mm (6") extension	2
Special	9

CERTIFICATE
None	0
Intrinsically Safe (EEX ia IIC T5)	1
Explosion Proof (EEX d ia IIC T5)	2
Marine Certificate - DNV	3

CALIBRATED RANGE
Same as the nominal Range (std)	0
Other - please specify the range	X

† Please specify the capillary length for the required remote seal(s).
Extended Temperature Compensation Ranges are also available as option. Please enquire.
Mounting bracket for 2" pipe mounting is a standard feature for the LTS360D with two remote diaphragms.

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