INDUMART Canada
www.indumart.com

Smart Differential Pressure Transmitter

SERIES: DTS360

- 0.075% ACCURACY (STD.) ; 0.04% & 0.02% (OPTION)
- 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
- BRACKET FOR 2" PIPE OR SURFACE MOUNTING
- 5-DIGIT & 4-DIGIT LCD'S INDICATORS WITH BACK LIGHT
- SUITABLE FOR APPLICATION IN TROPICAL ENVIRONMENT (IP67)
- 3 YEARS ACCURACY STABILITY AND 5 YEARS LIMITED WARRANTY

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.

SMART DTS360

Indumart *DTS360* Series of Smart Differential Pressure 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. 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.

The *DTS360* 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, showing resistance to corrosion against the many chemically aggressive media, functioning well in tropical environment 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

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 differential pressure 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 *DTS360* results in a very high accuracy instrument which keeps its calibration for years in harsh conditions. The standard accuracy of the *DTS360* series is better than 0.075% of the calibrated range for ranges above 30% of the nominal range. Transmitters with 0.04% and 0.02% accuracies are also available as option.

3) Wide **TURNDOWN RATIO** is an asset when you are concerned about keeping the number of spare transmitter in the stock. The *DTS360* 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 pressure 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 *DTS360* transmitters. Cost of the *306 series* software is substantially lower than purchasing an Indumart HART communicator.

SPECIFICATIONS

Accuracy	Better than 0.075% of calibrated range (used between 30% and 100% of the nominal range) 0.04% and 0.02% as option
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	25 MPa (3600 psi or 250 bar) standard except for ranges A and T. See the note in the order code section. 32 MPa and 42 MPa as option
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
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
Intrinsically Safe	II 1/2 Ex ia IIC T4/T5
Explosion-proof	II 1/2 Exia/d IIC T5/T6
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
Process Connection	¼" NPTF (std.) ½" NPTF with adaptor
Flange Material	316L SS (std.)
Diaphragm Material	316L SS (std.), Hastelloy C, AU (option)
Vent/Drain Material	316L SS (std.)
Housing Material	Aluminum alloy with polyurethane paint Stainless steel housing (option)
Wetted Part Standard	NACE MR - 01 - 75 compatible
Conduit Entry Size	½" NPTF (std.); M20x1.5 conduit (option)
Fill Liquid	Silicon or inert fill
Medium Temp.	-25...+120°C; non-freezing
Storage & Ambient	-25...+85°C, EEx version up to 80°C
IP Rating	IP67 (suitable for tropical environment)
EMC Immunity	EN 61000-4-3: 2007 + A1:2008
Static Press. Error	Per 1 MPa shift in static pressure: 0.01% for the D model 0.03% for the B & C models 0.08% for the E, F, G & N models Zeroing the transmitter in conditions of static pressure can eliminate this error.

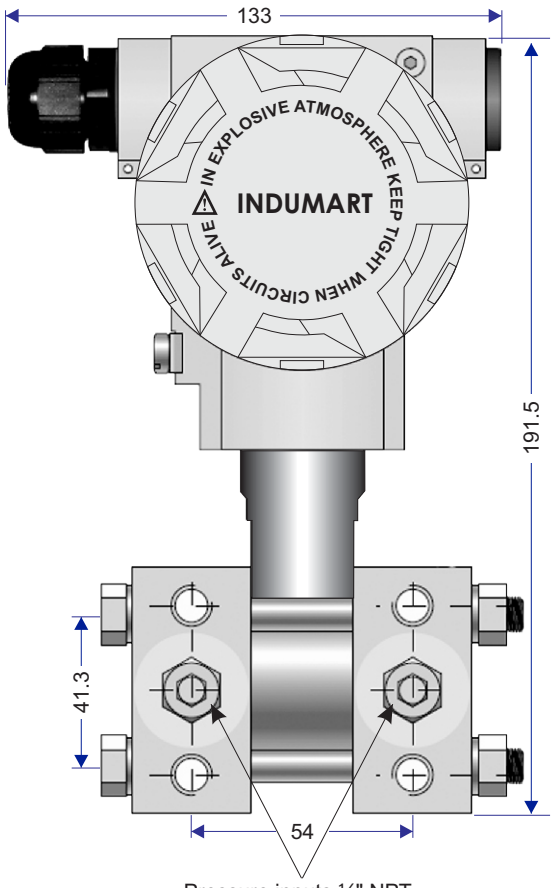
Measuring Ranges for Series DTS360 Differential Pressure Transmitters

Model	Nominal Range (shown in three mostly used pressure units)						Rangeability	Minimum Span (shown in three pressure units)					
A	-2...+2	kPa	-0.3 ~ +0.3	psi	-20...+20	mbar	20:1	0.2	kPa	0.03	psi	2	mbar
B	-0.5 ~ 7	kPa	0.07 ~ 1	psi	-5...+70	mbar	18:1	0.4	kPa	0.06	psi	4	mbar
C	-10...+10	kPa	-1.5 ~ +1.5	psi	-100...+100	mbar	20:1	1	kPa	0.15	psi	10	mbar
D	0...25	kPa	0 ~ 3.6	psi	0...250	mbar	25:1	1	kPa	0.15	psi	10	mbar
E	-50...+50	kPa	-7... +7	psi	-500...+500	mbar	10:1	10	kPa	1.5	psi	100	mbar
F	0...100	kPa	0 ~ 14.5	psi	0...1	bar	20:1	5	kPa	0.75	psi	50	mbar
G	0...250	kPa	0...36	psi	0 ~2.5	bar	12.5:1	20	kPa	3	psi	200	mbar
N	0...1600	kPa	0...230	psi	0 ...16	bar	10:1	160	kPa	23.2	psi	1.6	bar
T	0...7000	kPa	0...1000	psi	0 ...70	bar	10:1	700	kPa	102	psi	7.0	bar

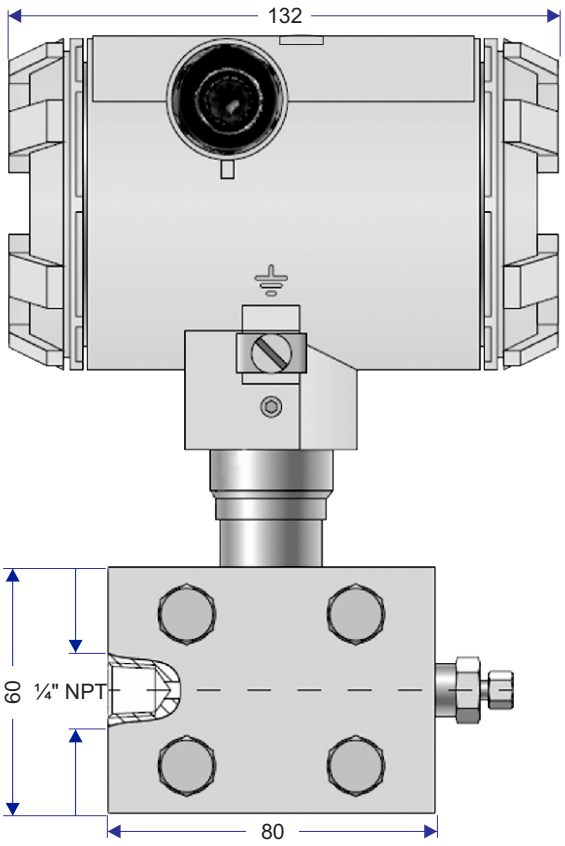
100 kPa = 1 bar = 14.504 psi = 10.1972 mH2O = 401.47 in. H2O

Please contact Indumart Inc. for special ranges.
DP transmitter with -0.7 ~ +0.7 kPa (-7...+7 mbar) nominal range with 1 MPa (10 bar) static line pressure limit is available.

DIMENSIONS (mm)



Pressure inputs ¼" NPT
without use of flange adaptors



If optional flange adaptors are ordered, the pressure inputs size will be ½" NPT.

ORDER CODE

SMART DIFFERENTIAL PRESSURE TRANSMITTERS

Model: **DTS360 -** ☐ ☐ ☐ ☐ - ☐ ☐ ☐ ☐ ☐ ☐ ☐

NOMINAL RANGE
Please choose a code from the Table ☐

DIAPHRAGM MATERIAL
316L Stainless Steel S
Hastelloy C276 H
Gold Plated G

MAX. STATIC PRESSURE*
25 MPa (3600 psi; 250 bar) std. *(see note for ranges A and T[1])* 0
32 MPa (4600 psi; 320 bar) 3
42 MPa (6100 psi; 420 bar) 4

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

PROCESS CONNECTION
¼" NPTF (std) 0
½" NPTF with Flange Adaptors 1

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

ACCURACY
0.075% (std) 0
0.04% 4
0.02% 2

VERSION
Standard - Silicon Fill & FPM Viton Gasket 0
Oxygen services - Fluorolube & NBR Gasket 1

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

REMOTE SEALS
Not Required 0
One Side* 1
Both Sides* 2

1) IMPORTANT: Maximum static pressure or over-pressure for range A is 1 MPa (10 bar or 145 psi) and for range T is 7 MPa (70 bar or 1000 psi).
Extended Temperature Compensation Ranges are also available as option. Please enquire.
Mounting bracket for 2" pipe mounting is a standard feature.