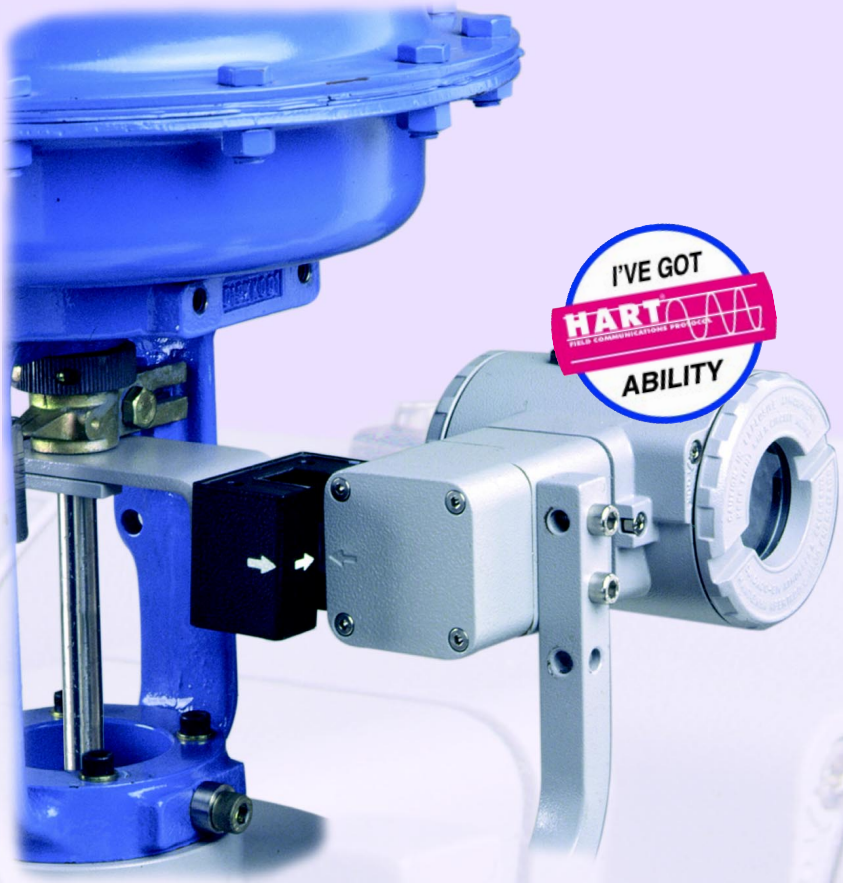
TP301

SMART POSITION TRANSMITTER

4 to 20 mA + HART® Digital Communication



smar

DESCRIPTION

The **TP301** is from the well-known HART® family of SMAR's devices. It is a smart position transmitter for position measurements. It can measure displacement or movement of rotary or linear type. The digital technology and communication provide an easy interface between the field and control room and several interesting features that considerably reduce the installation, operation and maintenance costs.

The TP301 is versatile and reliable, and has a very high accuracy. It may be used for control valve stem position measurement, or in any other position sensing application such as louvers, dampers, crushers etc. The TP301 is certified for operation in hazardous areas. Since the TP301 uses a non-contact magnetic coupling for position sensing, it is less sensitive to vibration than other solutions, resulting in longer operational life. Deadband due to mechanical imprecision is avoided. The TP301 mounts to any linear or rotary valve, actuator or a variety of other devices through the use of mounting kits conforming to international standards such as VDI/VDE and IEC/NAMUR etc. Users can perform remote identification and check from the control room to verify its operational status and self-diagnostics. Since the TP301 is very versatile, users can standardize one position indicator for all different kinds of control valves and other machines, keeping spares and training to a minimum.

From the TP301 the operators can get on-line feedback of the valve's or machine's true position. This information may be used to fine-tune the loop for optimum production output and tighter product uniformity and quality. As process control is getting more and more advanced, many control strategies depend on accurate valve stem or other position measurement

Dual-compartment weather proof and flame proof housing prevents water, oil and dust from reaching the electronics, even when the field terminal side is open for wiring. The Hall effect type position sensor is totally enclosed within the housing, protecting it from damage and subsequent failure or accuracy degradation. The problem of oil and water collection is eliminated.

The same Hand-Held Terminal which is used for the other Smar devices in the 301 and 291 families, may also configure the TP301 using the appropriate datapack. You may also use the CONF301 PC software for Windows 3.1 and 95, together with the HI311 serial port interface.

The TP301 has another unique feature, it may optionally be fitted with a digital indicator. This indicator may be used for local on-line monitoring of dynamic valve parameters, but also for local configuration using a special tool, a magnetic screw driver.

With TP301 it is very easy to upgrade an existing valve or machine to make use of the smart technology. All you need to do is to remove the old 4-20 mA position transmitter and put a

TP301 in its place. Even the same wires, indicators and controllers etc. can be used. From there it is also easy to upgrade to Fieldbus. This enables old plants to make a smooth transition to Fieldbus.

The TP301, besides the normal function of position measurement and 4-20 mA output generation, offers the following functions:

- ✓ Linear or Rotary Travel type
- ✓ 0.1% F.S.
- ✓ Position Calibration (4 and 20 mA points) via Local Adjustment or Remote Calibration via Hand Held Terminal
- ✓ Non contact position sensing
- ✓ Optional LCD indicator
- ✓ Diagnostics and Configuration via HART communication

Reliable and Flexible

Elimination of many mechanical parts is one of advantages resulting higher reliability since to less parts that wear due there are less moving parts, TP301 is also more accurate since there is less deadband from mechanical imprecision.

Position sensing is done without any mechanical contact virtually eliminating subsequent degradation. The TP301 directly senses longitudinal or rotary movement based on Hall effect. This position signal generates the 4-20 mA output signal.

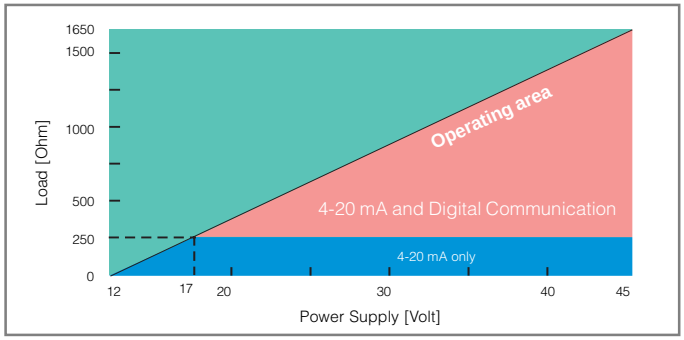
Functional Specifications

Travel
Linear Motion: 3 - 100 mm.
Rotary Motion: 30 - 120° rotation angle.
Extended Linear Motion: 100 - 1000 mm.

Output Signal
Two-wire, 4-20 mA with superimposed digital communication. (Bell 202 - HART® Protocol)

Reverse Polarity Protection
12 to 45 VDC.

Load Limitation



Indicator
Optional 4½-digit numerical and 5-character alphanumerical LCD indicator.

Hazardous Area Certifications
Explosion proof, weather proof and intrinsically safe (CEPEL, FM, CENELEC standards pending).

Zero and Span Adjustments
Non-interactive, via local adjustment or digital communication.

Temperature Limits
Ambient: -40 to 85 °C (-40 to 185 °F).
Process: -40 to 100 °C (-40 to 212 °F).
Storage: -40 to 100 °C (-40 to 212 °F).
Digital Display: -10 to 60 °C (14 to 140 °F).
-40 to 85 °C (-40 to 185 °F) without damage.

Failure Alarm
In case of sensor or circuit failure, the self-diagnostics drives the output to 3.9 or 21.0 mA, according to the user's choice.

Turn-on Time
Performs within specifications in less than 5.0 seconds after power is applied to the transmitter.

Update Time
Approximately 150 ms.

Humidity Limits
0 to 100% RH.

Output Action
Direct or Reverse.

Actual Position Sensing
Magnetic (Non-contact) via Hall Effect.

Configuration
Can be done through digital communication using the Hart Protocol or, partially, through local adjustment.

Performance Specifications
Reference conditions: range starting at zero, temperature 25 °C (77 °F), power supply of 24 Vdc.

Accuracy
Linearity, hysteresis and repeatability effects are included.

Resolution
≤ 0.1% F.S.

Repeatability
≤ 0.5% F.S.

Hysteresis
≤ 0.2% F.S.

Stability
±0.1% of F.S. for 12 months.

Temperature Effect
±0.8%/20 °C of F.S.

Power Supply Effect
±0.005% of calibrated F.S. per volt.

Electro-Magnetic Interference Effect
Designed to comply with IEC 801 and European Standards EN50081 and EN50082.

Physical Specifications

Electrical Connection
½ -14 NPT, Pg 13,5 or M20 x 1,5 metric.

Material of Construction
Injected low copper aluminum with polyester painting or 316 Stainless Steel housing, with Buna N O-Rings on cover (NEMA 4X, IP67).

Mounting Bracket
Plated carbon steel with polyester painting or 316 SST.

Identification Plate
316 SST.

Approximate Weights
Without display and mounting bracket: 0.80 kg.
Add for LCD display: 0.13 kg.
Add for mounting bracket: 0.60 kg.

ORDERING CODE

MODEL TP301	SMART POSITION TRANSMITTER - 4 to 20 mA + HART® Digital Communication

CODE	Local Indicator
0	Without Digital Indicator
1	With Digital Indicator

CODE	Mounting Bracket
0	Without Bracket
1	With Bracket

CODE	Electrical Connections
0	½ - 14 NPT
A	M20 X 1,5
B	Pg 13,5 DIN

CODE	Type of Motion
1	Rotary
3	Linear Stroke Up to 15 mm
5	Linear Stroke Up to 50 mm
7	Linear Stroke Up to 100 mm
Z	Others Specify

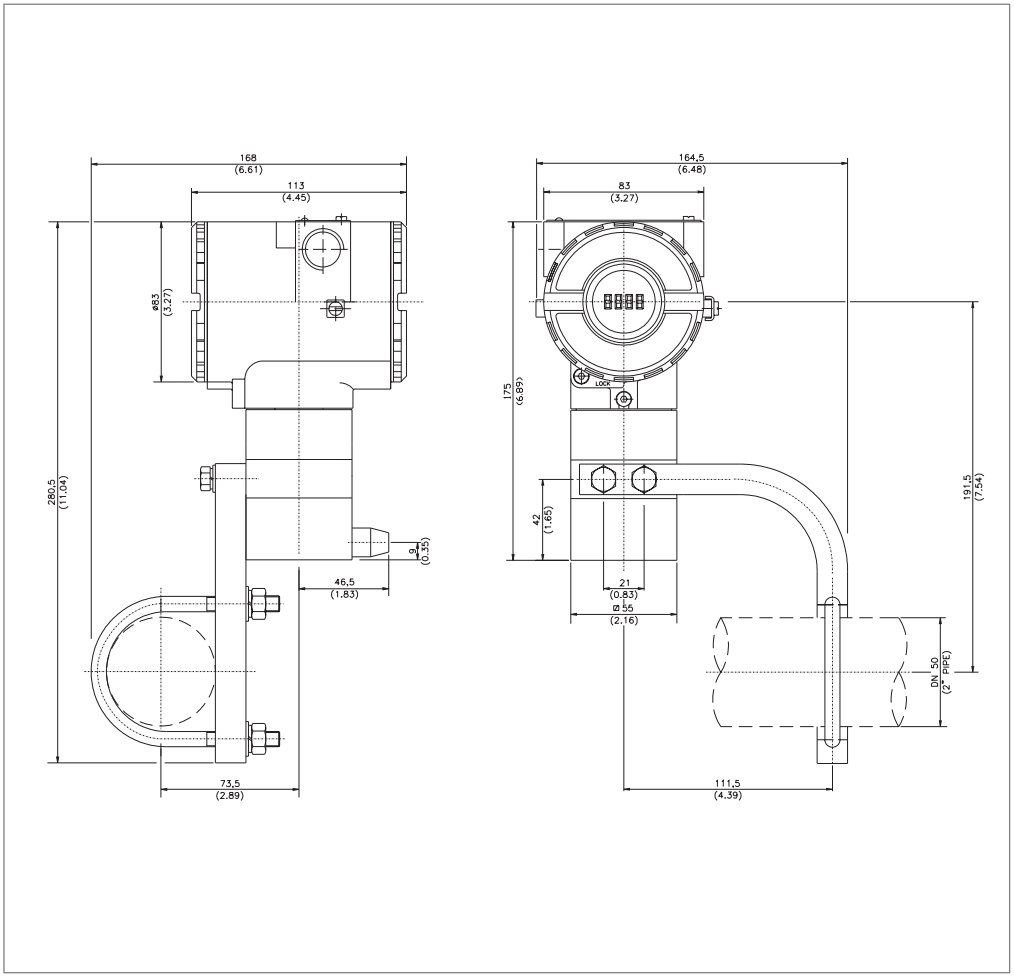
CODE	Optional Items*
ZZ	Special Options - Specify

TP301 - 1 | 0 - 0 | 1 / * ← TYPICAL MODEL NUMBER

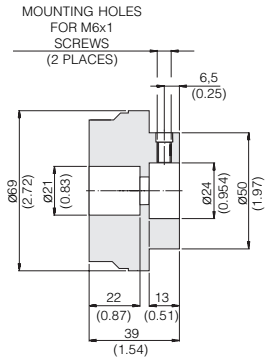
* Leave it blank for no optional items

DIMENSIONS

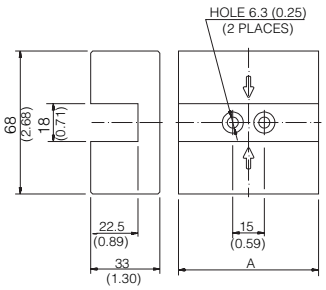
Dimensions are mm (in)



Rotary Magnet



Linear Magnet



TRAVEL	DIMENSION A
UP TO 15 mm (0.59)	44 mm (1.73)
UP TO 50 mm (1.97)	109 mm (4.29)
UP TO 100 mm (3.94)	185 mm (7.28)