# SERIES T7D

T7D series are Smart electronic differential pressure transmitters with 4 ÷ 20 mA output and HART® digital communication protocol.

Sensors are always calibrated individually together with their own seal.

These transmitters allow the measurement of differential pressure, level and volumetric flow in industrial, marine and off-shore.

Configurations and adjustments can be made locally by means of push buttons and display or remotely using HART® protocol compatible communicators.

The transmitters are intended for direct mounting on pipe or tank.

When remote seal and capillary are supplied, a bracket for wall or for 2" stand pipe mounting is also supplied.

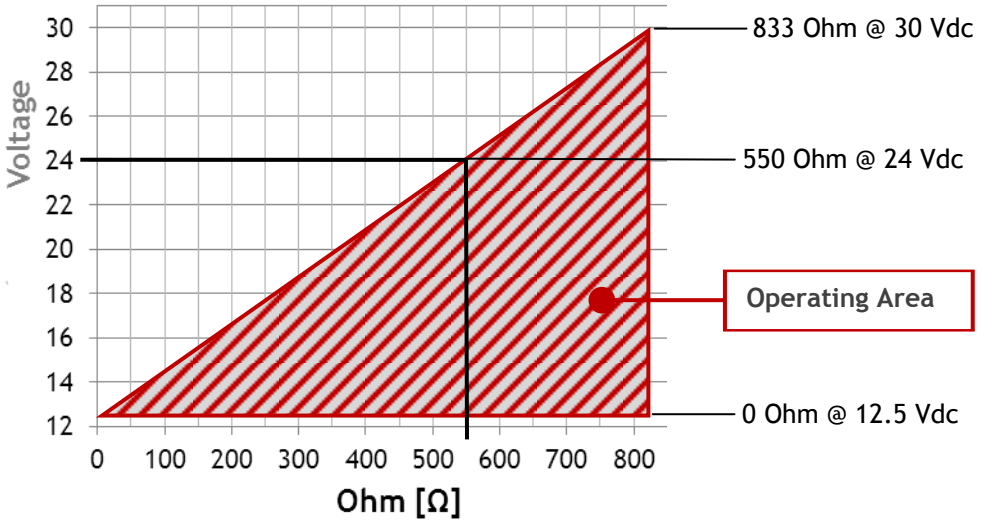
**APPLICATION FIELDS**

- Differential pressure, level and volumetric flow;
- Installation on chemical, Oil & Gas, pharmaceutical, alimentary, marine plants etc;
- Installation in areas with persistence of potentially explosive mixtures

# TECHNICAL FEATURES

## Electrical parameters

| | |
|---|---|
| **Supply:** | 12.5 ÷ 30 Vdc |
| **Output signal:** | 4 ÷ 20 mA + Hart® Rev6 |
| **Alarm values:** | 3.85 mA \ 21 mA |
| **Maximum load:** | As per chart<br>220 Ω < $R_L$ < 600 Ω (Hart®) |




## Measurement performance

| | |
|---|---|
| **Total accuracy (*):** | < 0.20 % FS (-25 ÷ 0°C)<br>< 0.07 % FS (0 ÷ 80°C) |
| **Measured value update frequency:** | 4 ÷ 20 mA + Hart®: ≈ 1 s<br>Hart®: ≈ 500 ms (On request) |
| **Polling time:** | 4 ÷ 20 mA + Hart®: ≈ 800 ms<br>Hart®: ≈ 500 ms (On request) |
| **Response time:** | < 256 ms (Standard Hart®) |
| **Allowable de-range:** | Down to 30 times the Nominal Range |
| **Damping:** | 0 ÷ 60 s |
| **Long term stability:** | < 0.1 % FS for year |

## Notes

(*) Including hysteresis, non-linearity, non-conformity and non-repeatability (IEC 60770) Accuracy and drifts are given for instruments with integral sensor and diaphragm; they may vary according to sensor type and diameter, thickness and material of the diaphragm.

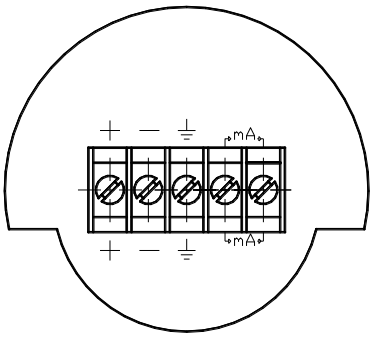
# ENVIRONMENTAL FEATURES

| Environmental Conditions | |
|---|---|
| Ambient temperature: | -40 ÷ +85°C<br>ATEX T6, T85°C: -40°C ≤ Tamb ≤ 60°C<br>ATEX T5, T100°C: -40°C ≤ Tamb ≤ 75°C |
| Process temperature: | -40 ÷ +85°C<br>Capillary: $T_{MAX}$ = 283°C |
| LCD working temperature: | -10 ÷ +65°C |
| Storage temperature: | -40 ÷ +90°C |
| Ingress protection degree: | AISI 316 Housing: IP67<br>Aluminum Housing: IP66 |
| Vibration Test: | in accordance with IEC 60068-2-6 |
| Relative Humidity: | < 98% RH not condensing |

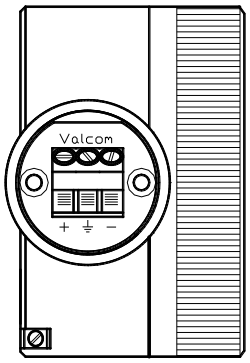
# APPROVALS

| Type approvals | | |
|---|---|---|
| Directive 2014/34/EU (ATEX) | Ⓔx II 1G Ex ia IIC T6, T5 Ga and Ⓔx II 1D Ex ia IIIC T85°C, T100°C Da or Ⓔx II 1/2G Ex ia IIC T6, T5 Ga/ | |
| Directive 2014/68/EU (PED) | Up to Category II, for fluids in Group 1 | |
| Directive 2014/30/EU (EMC) | Adequate level of electromagnetic compatibility | |
| Functional Safety | SIL2<br>SFF = 78.13 % | PFH [$Hours^{-1}$] = $9.2352 \cdot 10^{-8}$<br>DC = $\lambda_{DD}$ / ($\lambda_{DD}$ + $\lambda_{DU}$) = 83.7 % |
| Marine type approval | In compliance with applicable requirements of RINA type approval system | |

# ELECTRICAL WIRING

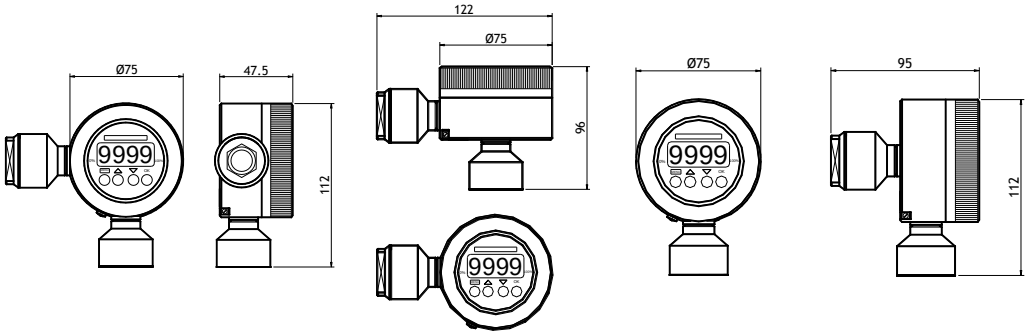



AISI 316 Housing 2 covers &
Aluminum Housing



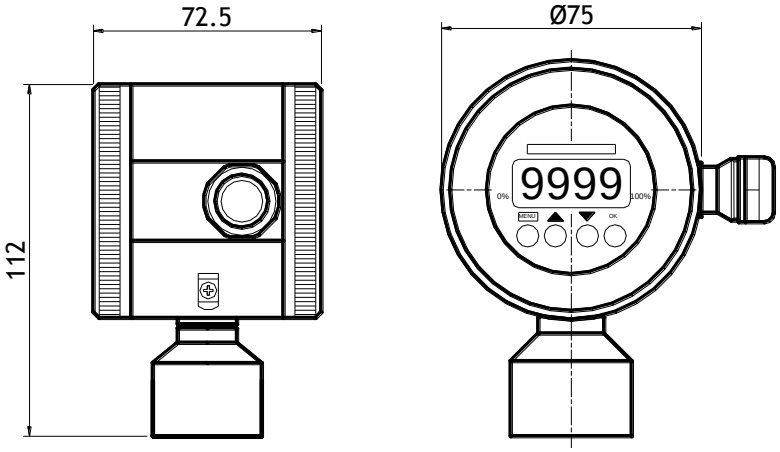

AISI 316 Housing 1 cover

# HOUSING MATERIAL AND TYPE



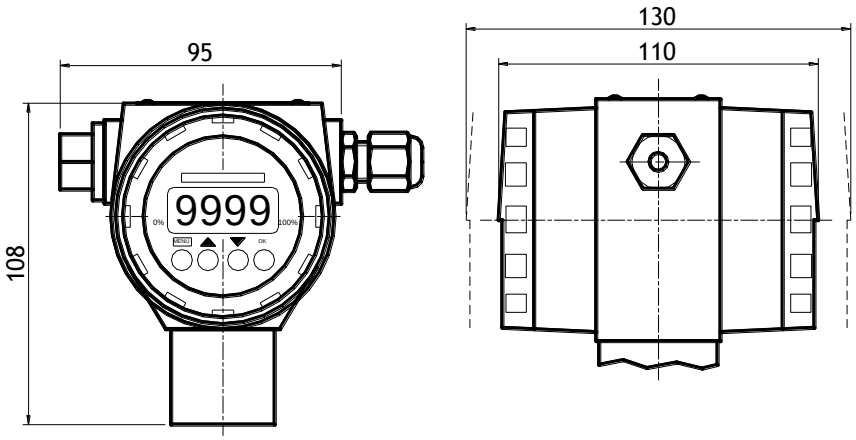

- **Material:** AISI 316
- **Zone:** Ⓔx II 1GD
- **Protection Degree:** IP67

A10 - AISI 316 Ø 75 mm back connection
A11 - AISI 316 Ø 75 mm bottom connection




- **Material:** AISI 316
- **Zone:** Ⓔx II 1GD
- **Protection Degree:** IP67

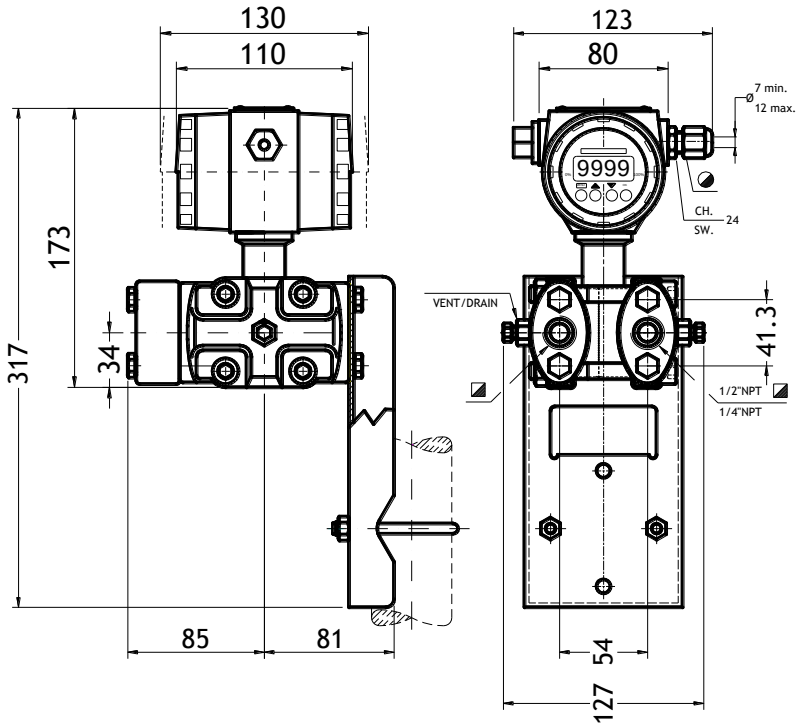
A16 - Fixed head
A17 - Rotating head



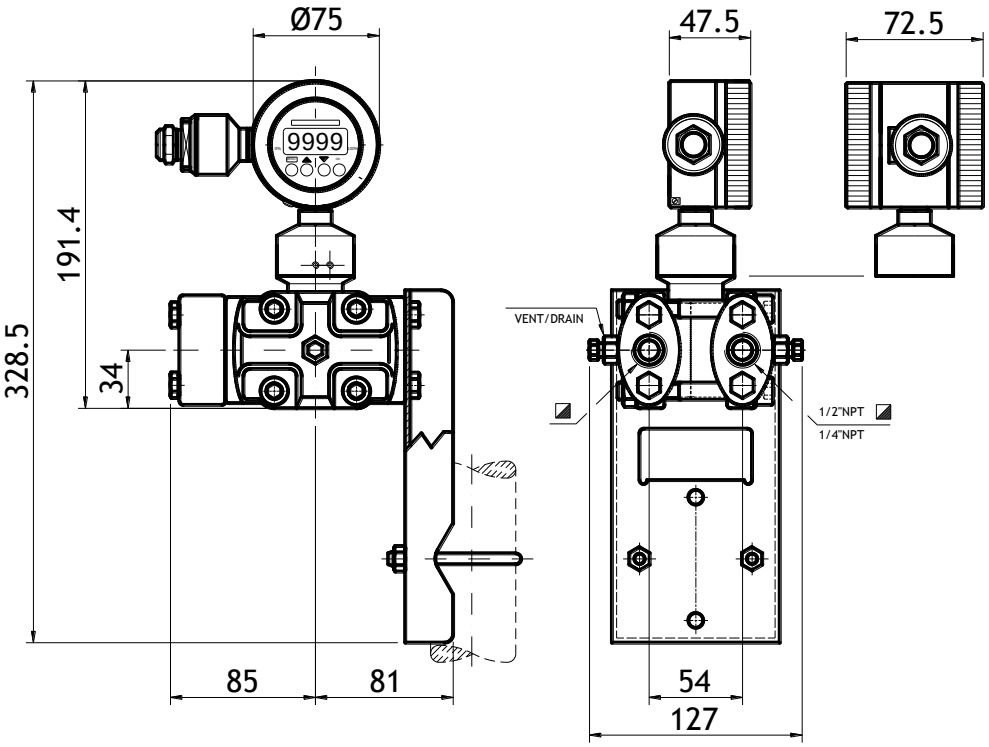

- **Material:** Aluminum
- **Zone:** Ⓔx II 1/2G
- **Protection Degree:** IP66

D04 - Alluminum housing

# DIMENSIONAL DRAWINGS

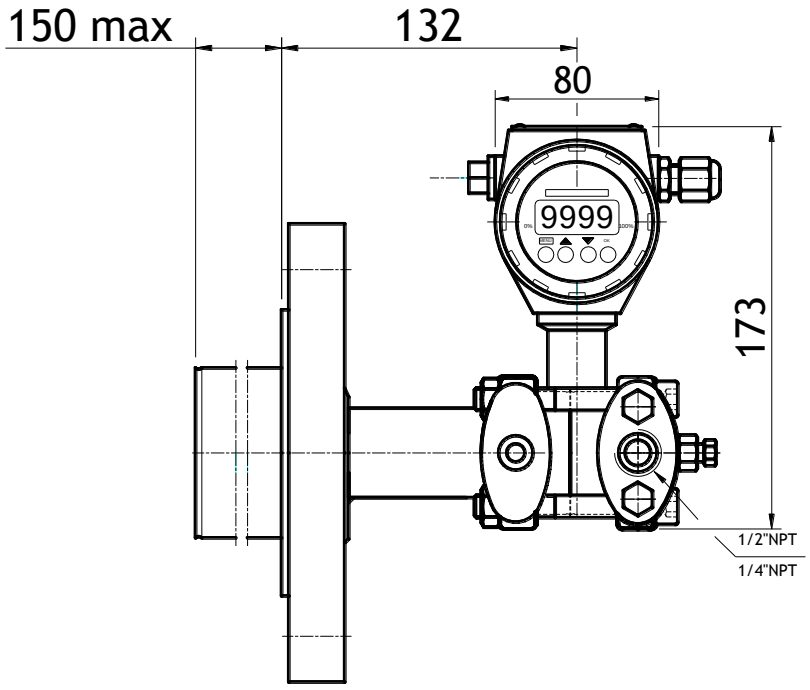



T7D complete with Aluminum Housing

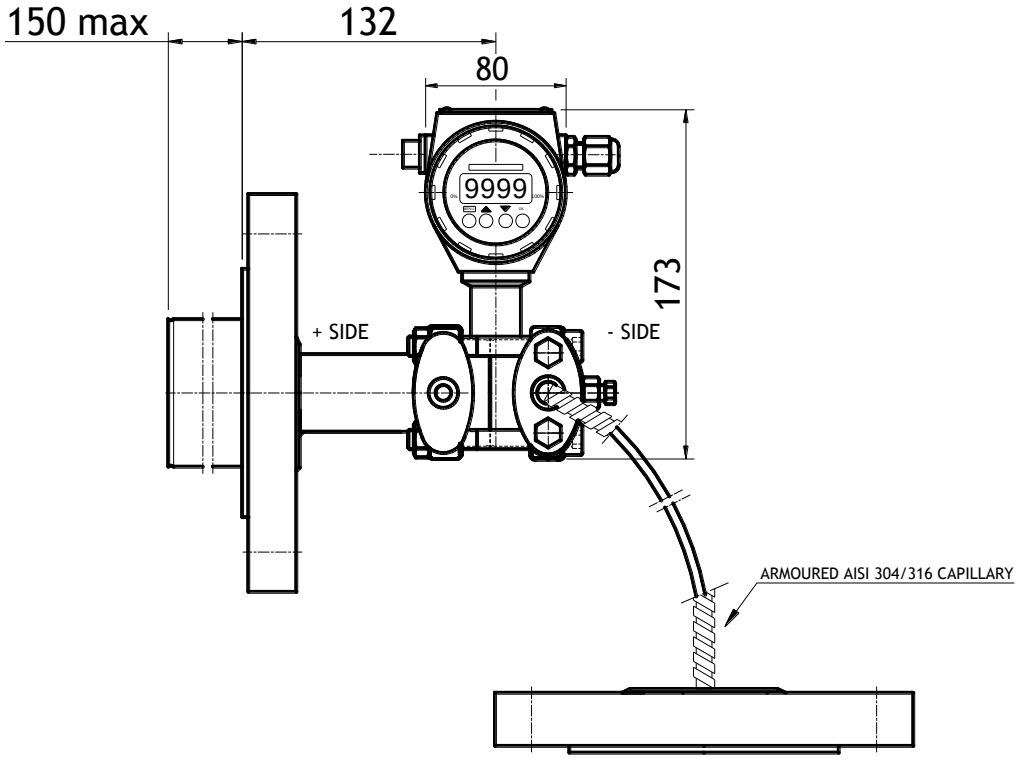



T7D complete with St.Inox housing

# DIMENSIONAL DRAWINGS




T7D complete with Aluminum Housing for level measurement in open vessels




T7D complete with Aluminum Housing for level measurement in closed vessels

# ORDERING CODE

**T7D** Electronic Smart differential pressure transmitter

## 01 Type of measure

| | |
|---|---|
| **D** | Differential Pressure |

## 02 Sensor type

| | |
|---|---|
| **PI** | Piezoresistive Integral |

## 03 Measuring range

| | | | |
|---|---|---|---|
| **S01** | 18 mbar | Piezo | Overpressure: 50 bar |
| **S02** | 60 mbar | Piezo | Overpressure: 50 bar |
| **S03** | 350 mbar | Piezo | Overpressure: 140 bar |
| **S04** | 350 mbar | Piezo | Overpressure: 210 bar |
| **S05** | 1000 mbar | Piezo | Overpressure: 140 bar |
| **S06** | 1000 mbar | Piezo | Overpressure: 210 bar |
| **S07** | 2500 mbar | Piezo | Overpressure: 140 bar |
| **S08** | 2500 mbar | Piezo | Overpressure: 210 bar |
| **S09** | 5 bar | Piezo | Overpressure: 140 bar |
| **S10** | 5 bar | Piezo | Overpressure: 210 bar |
| **S11** | 10 bar | Piezo | Overpressure: 140 bar |
| **S12** | 10 bar | Piezo | Overpressure: 210 bar |
| **S13** | 30 bar | Piezo | Overpressure: 400 bar |
| **S14** | 100 bar | Piezo | Overpressure: 400 bar |
| **S15** | 400 bar | Piezo | Overpressure: 400 bar |
| **P51** | 10 mbar | Piezo | No overpressure |
| **P52** | 55 mbar | Piezo | No overpressure |
| **P53** | 206 mbar | Piezo | No overpressure |

**NOTES**

1) Negative or compound ranges are possible.

## 04 Filling oil

| | |
|---|---|
| **1** | Siliconic Oil for high temperature -40/+308°C |
| **6** | Fluoride and Inert Oil -40/+200°C |
| **8** | Standard siliconic Oil -40/+200°C |
| **9** | Oil for food use -10/+220°C |
| **Z** | Special |

## 05 Process temperature limits

| | |
|---|---|
| **B** | -40 ÷ 85°C Standard |
| **M** | -40 ÷ 283°C Capillary |
| **Z** | Special |

## 06 Housing material and type

| | |
|---|---|
| **...** | See “Housing material and type” section |
| **Z99** | Special |

## 07 Process connection

| | |
|---|---|
| **S16** | Screwed 1/4" NPT-F x 2 distance between axes 54 mm |
| **F97** | Oval Flanges 1/2" NPT-F with bolts and gaskets |
| **F44** | Flange Non Rotating |
| **F45** | Flange Rotating |
| **F47** | Flange with extension on Ø75 Non Rotating |
| **F48** | Flange with extension on Ø75 Rotating |
| **Z02** | 1 welding connection for capillary |
| **Z03** | 2 welding connections for capillary |

## 08 Extension length

| | |
|---|---|
| **L02** | Diaphragm extension < 50 mm |
| **LZZ** | Diaphragm extension L = special |
| **N00** | No extension |

# ORDERING CODE

| | | |
|---|---|---|
| **09** | **Sensor material (diaphragm)** | |
| | **A** | AISI 316 |
| | **B** | AISI 316 L |
| | **K** | Hastelloy C |
| **10** | **Process gasket material** | |
| | **C** | EPDM |
| | **D** | FKM Viton |
| | **G** | PTFE |
| **11** | **Wetted parts material** | |
| | **A** | AISI 316 |
| | **B** | AISI 316 L |
| | **N** | Hastelloy C |
| **12** | **Electrical connection** | |
| | **19** | AISI 316 Cable Gland PG9 IP67 cable ø 5 ÷ 7 mm |
| | **20** | AISI 316 Cable Gland PG13 IP67 for cable ø 8 ÷ 12 mm |
| | **21** | AISI 316 Cable Gland PG16F |
| | **36** | Nipple AISI 316 1/2" G-F |
| | **37** | Nipple AISI 316 1/2" NPT-F |
| | **39** | Nipple AISI 316 M20 x 1.5 F |
| | **81** | Screwed 2 x M20 |
| **13** | **Electrical output** | |
| | **J** | 4 ÷ 20 mA 2 fili + HART (0.2 % FS) With LCD and blind cover |
| | **K** | 4 ÷ 20 mA 2 fili + HART (0.2 % FS) With LCD and transparent cover |
| | **R** | 4 ÷ 20 mA 2 fili + HART (0.1 % FS) With LCD and blind cover |
| | **S** | 4 ÷ 20 mA 2 fili + HART (0.1 % FS) With LCD and transparent cover |
| **14** | **Ex type approval** | |
| | **A1** | Ⓔx II 1G Ex ia IIC T6, T5 Ga and Ⓔx II 1D Ex ia IIIC T85°C, T100°C Da |
| | **A5** | Ⓔx II 1/2G Ex ia IIC T6, T5 Ga/Gb |
| | **N0** | No Ex certification |
| **15** | **Options and accessories** | |
| | **02** | Marine type approval |
| | **22** | PED Certificate |
| | **21** | SIL Certificate |
| | **10** | Calibration report on 5 points |
| | **01** | Test and material report according to EN 10204 |
| | **12** | Degreasing |
| | **S5** | Mounting bracket for 2” pipe |
| | **NN** | No options |

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## ACCESSORIES

Cod. M5
Five ways and five valves manifold

Cod. ORI
Calibrated flanges

Cod. SEP
Process seals

Cod. SUN Sunshade protection

Cod. T7V
Digital field indicator

## and MORE

- Degreasing for Oxygen service
- Wall mounting bracket
- SS 316 capillary L=...m
- Armoured capillary