

# DT303 Series

## PROFIBUS PA DENSITY/CONCENTRATION TRANSMITTER

### *Features*

- $\pm 0.1$  ° Brix or  $\pm 0.0004$  g/cm<sup>3</sup> accuracy.
- Temperature Compensation.
- 0.5 to 5 g/cm<sup>3</sup> range.
- Industrial and sanitary standard connections.
- Digital LCD display.
- Configuration through tools available in the market, e.g., based on PC or by the local adjustment with a magnetic screwdriver.
- Totally digital; including sensor, electronics and communication.
- Self diagnostics.
- Weather proof, explosion proof and intrinsically safe.



## Description

The **DT303** is a modern concentration and density transmitter designed to provide a continuous measurement of the concentration in a wide standard units, such as Brix, Baumé, Plato, INPM, etc.. There is an internal temperature sensor to compensate the process temperature variations, automatically. According to application needs, there are two models available: **DT303I** for general purpose and **DT303S** for sanitary applications (3A certification).

Both models have two mounting types: top mounting (straight type) and side mounting (curved type). Installation may be done either in open or pressurized tanks, or directly in pipes since the **DT303** is suitable for dynamic and static fluids. The Sanitary model has 3A certification and uses a Tri-Clamp connection to allow a quick and easy connection and disconnection from the process. 3A is the most widely accepted sanitary standard in the food, drug and beverage industry.

The digital technology used in the **DT303** enables an easy interface between the field and the control room and several interesting features that considerably reduce the installation, operation, and maintenance costs. The **DT303** is part of Smar's complete 303 Series of Profibus devices. Profibus is a complete system enabling distribution of the control function to equipment in the field, interconnecting several devices and the user can build control strategies suitable for his application by linking the function blocks. The user may now easily build and overview complex control strategy, just by instantiating or deleting the desired function blocks. Another advantage is the added flexibility, the control strategy may be edited without having to rewire or change any hardware.

The need for implementation of Profibus in small as well as large systems was considered when developing the entire 303 Series of Profibus devices. They have the common features of being able to act as a master on the network and be configured locally using a magnetic tool, eliminating the need for a configurator or console in many basic applications.

## Function Blocks Table

<i>BLOCK</i>	
<i>PHY</i>	<b>PHYSICAL</b> - This Function Block contains data regarding the device's identification, specific information of the hardware and firmware of the device and diagnosis information.
<i>TRD</i>	<b>TRANSDUCER</b> - The Transducer Block measures and calculates the density/concentration measurement in engineering units, provides calibration methods and temperature measurement. The built-in self-diagnostic provides device's operation reliability.
<i>DSP</i>	<b>DISPLAY</b> - This Transducer Block controls the LCD display and interfaces with the user providing local configuration capability.
<i>AI</i>	<b>ANALOG INPUT</b> - This block takes the input data from the transducer block and scales it, provides different types of linearization, filtering and fault state mechanism.

**Technical  
Characteristics**

**Functional Specifications**

<b>Communication Protocol</b>	PROFIBUS PA, Digital only, complies with IEC 61158-2 (H1): 31.25 kbit/s voltage mode with bus power.
<b>Power Supply</b>	Bus powered: 9 - 32 Vdc. Quiescent current consumption: 12 mA.
<b>Indicator</b>	4 ½-digit numerical and 5-character alphanumeric LCD indicator.
<b>Hazardous Area Certifications</b>	Explosion proof, weather proof and intrinsically safe: CEPEL, FM, EXAM and NEPSI standards.
<b>Other Certifications</b>	3A Sanitary standards ITK Device registration
<b>Temperature Limits</b>	Ambient:           -40 to 85 °C    (-40 to 185 °F). Process:           -20 to 150 °C   (-4 to 302 °F). Storage:           -40 to 100 °C   (-40 to 212 °F). Digital Display:   -10 to 60 °C   ( 14 to 140 °F)
<b>Static Pressure Limit</b>	7.0 Mpa (70 kgf/cm <sup>2</sup> ).
<b>Turn-on Time</b>	Approximately 5 seconds.
<b>Update Time</b>	Approximately 0.2 seconds.
<b>Humidity Limits</b>	0 to 100% RH.

## Performance Specifications

Reference conditions: temperature 25 °C (77 °F), atmospheric pressure, power supply of 24 Vdc, silicone oil fill fluid, isolating diaphragms in 316L SS and range full-scale calibration.

<b>Accuracy</b>	Range 1: $\pm 0.0004$ g/cm <sup>3</sup> ( $\pm 0.1$ °Brix). Range 2: $\pm 0.0007$ g/cm <sup>3</sup> . Range 3: $\pm 0.0016$ g/cm <sup>3</sup> .
<b>Stability for 12 months</b>	Range 1: 0.021 kg/m <sup>3</sup> . Range 2: 0.083 kg/m <sup>3</sup> . Range 3: 0.521 kg/m <sup>3</sup> .
<b>Ambient Temperature Effect / 10 °C</b>	Range 1: 0.003 kg/m <sup>3</sup> . Range 2: 0.013 kg/m <sup>3</sup> . Range 3: 0.041 kg/m <sup>3</sup> .
<b>Static Pressure Effect (*) (per 1kgf/cm<sup>2</sup>)</b>	Range 1: 0.001 kg/m <sup>3</sup> . Range 2: 0.004 kg/m <sup>3</sup> . Range 3: 0.007 kg/m <sup>3</sup> . (* ) - This is a systematic error that can be eliminated by calibrating at the operating static pressure.
<b>Power Supply Effect</b>	$\pm 0.005\%$ of calibrated FS per volt.
<b>Electro-Magnetic Interference Effect</b>	Designed to comply with IEC801 and European Standards EN50081 and EN50082.

## Physical Specifications

<b>Electrical Connection</b>	$\frac{1}{2}$ -14 NPT, Pg 13.5 or M20 x 1.5.
<b>Process Connection</b>	Industrial model: 316 SST flange ANSI B16.5, 4". Sanitary model: 304 SST Tri-clamp, 4".
<b>Wetted Parts</b>	Isolating diaphragms: 316L SST or Hastelloy C276. Probe material: 316L SST or Hastelloy C276 O-ring for Sanitary model: Buna N, Viton™ or Teflon™.
<b>Non-wetted Parts</b>	Electronic housing: injected low copper aluminum with polyester painting or 316 SST, with Buna N O-rings on cover (NEMA 4X, IP67). Fill fluid: Silicone (DC200/20, DC704), Syltherm 800, Glycerin and water, or Neobee-M20 Propylene Glycol. Identification plate: 316 SST.
<b>Mounting</b>	Side or Top mounting.
<b>Weight</b>	Sanitary model: 8 kg (18 lb) - Industrial model: 12 kg (26 lb)

**Note:** Hastelloy is a trademark of the Cabot Corp. Viton and Teflon are trademarks of E. I. DuPont de Nemours & Co. The Smar density and concentration transmitters are protected by US patent numbers: 6,662,653, 6,234,019, D439,855 and 5,827,963.

# Ordering Code

## Sanitary Model



### MODEL DT303S SANITARY CONCENTRATION/DENSITY TRANSMITTER

CODE	Range	Minimum span
1	0.5 to 1.8 g/cm <sup>3</sup>	0.025 g/cm <sup>3</sup>
2	1.0 to 2.5 g/cm <sup>3</sup>	0.050 g/cm <sup>3</sup>
3	2.0 to 5.0 g/cm <sup>3</sup>	0.250 g/cm <sup>3</sup>

Note: For the concentration units: °Brix, °Plato, °INPM, °GL and °Baumé, specify code 1.

CODE	Wetted Parts Material
H	Hastelloy C276
I	316L SST
U	Probe in 316L SST and Diaphragms in Hastelloy C276
Z	Others – Specify

CODE	Fill Fluid
N	Neobee- M20 Propylene Glycol - Food Grade (Compliant with 3A Standard - 7402)
D	DC-704 Silicone Oil
S	DC 200/20 Silicone Oil
G	Glycerin and Water - Food Grade
T	Syltherm 800
Z	Others – Specify

CODE	Local Indicator
0	Without Indicator
1	With Digital Indicator

CODE	Electrical Connection
0	½ - 14 NPT
A	M20 X 1.5
B	Pg 13.5 DIN
Z	Others – Specify

CODE	Mounting
1	Top
2	Side

CODE	Process Connection
J	Tri-clamp - 4" 300#
Z	Others – Specify

CODE	Wetted O-Rings Material
B	Buna-N
V	Viton
T	Teflon
Z	Others – Specify

CODE	Tank Adapter
0	Without Tank Adapter (Supplied by Customer)
1	With Tank Adapter 316 SST

CODE	Tri-Clamp
0	Without Tri-clamp
1	With Tri-clamp in 304 SST

CODE	Optional Items (*)
H1	316 SST Housing
ZZ	Special Options – Specify

DT303S - 1 I N - 1 0 2 - J B 1 1 / \* ◀ TYPICAL MODEL NUMBER

\* Leave it blank for no optional items.

Ordering Code



Industrial Model

MODEL DT303I INDUSTRIAL CONCENTRATION/DENSITY TRANSMITTER

CODE	Range	Minimum span
1	0.5 to 1.8 g/cm <sup>3</sup>	0.025 g/cm <sup>3</sup>
2	1.0 to 2.5 g/cm <sup>3</sup>	0.050 g/cm <sup>3</sup>
3	2.0 to 5.0 g/cm <sup>3</sup>	0.250 g/cm <sup>3</sup>

*Note:* For the concentration units: °Brix, °Plato, °INPM, °GL and °Baumé, specify code 1.

CODE	Wetted Parts Material
H	Hastelloy C276
I	316L SST
U	Probe in 316L SST and Diaphragms in Hastelloy C276
Z	Others – Specify

CODE	Fill Fluid
N	Neobee- M20 Propylene Glycol - Food Grade (Compliant with 3A Standard - 7402)
D	DC-704 Silicone Oil
S	DC 200/20 Silicone Oil
G	Glycerin and Water - Food Grade
T	Syltherm 800
Z	Others – Specify

CODE	Local Indicator
0	Without Indicator
1	With Digital Indicator

CODE	Electrical Connection
0	1/2 - 14 NPT
A	M20 X 1.5
B	Pg 13.5 DIN
Z	Others – Specify

CODE	Mounting
1	Top
2	Side

CODE	Process Connection Size, Rating and Standard
4 1	4" 150# ANSI B-16.5
4 2	4" 300# ANSI B-16.5
4 3	4" 600# ANSI B-16.5
9 C	DN 100 PN25/40 DIN 2526 - FORM D
Z Z	Others - Specify

CODE	Optional Items (**)
H1	316 SST Housing
ZZ	Special Options – Specify

DT303I - 1 I N - 1 0 1 - 4 1 / \*

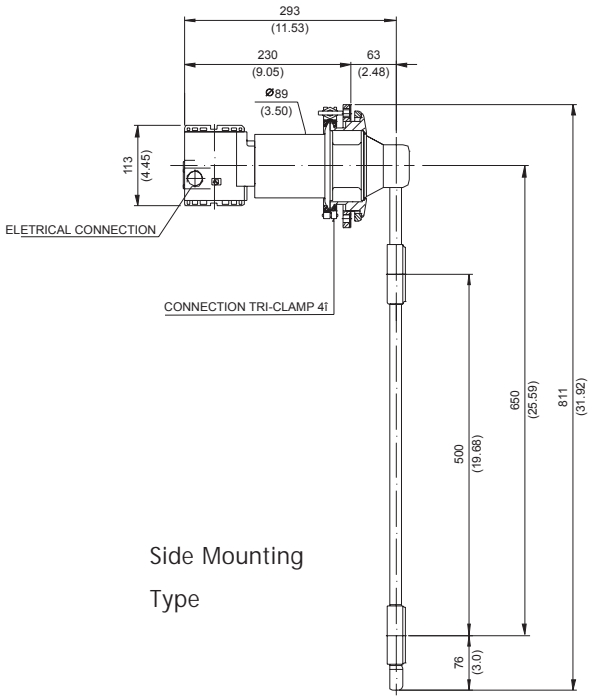
◀ TYPICAL MODEL NUMBER

\* Leave it blank for no optional items.

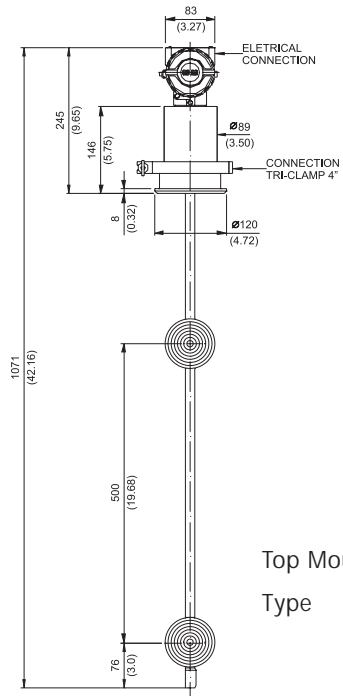
# Dimensional

## Sanitary Model

Dimensions are mm (inches)



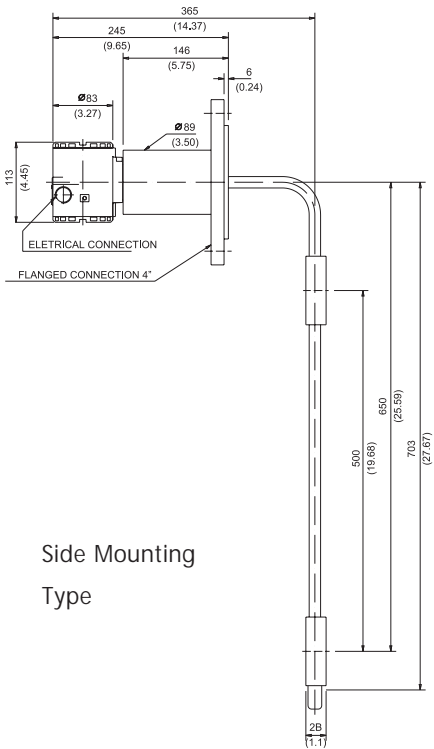
Side Mounting Type



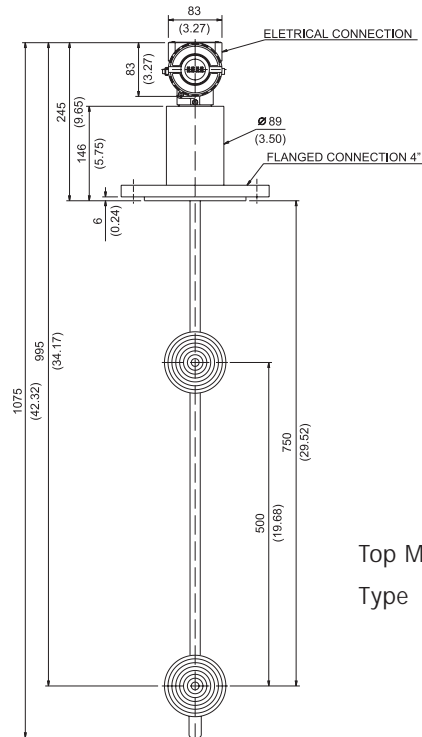
Top Mounting Type

## Industrial Model

Dimensions are mm (inches)



Side Mounting Type



Top Mounting Type

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