



DT400 SERIES

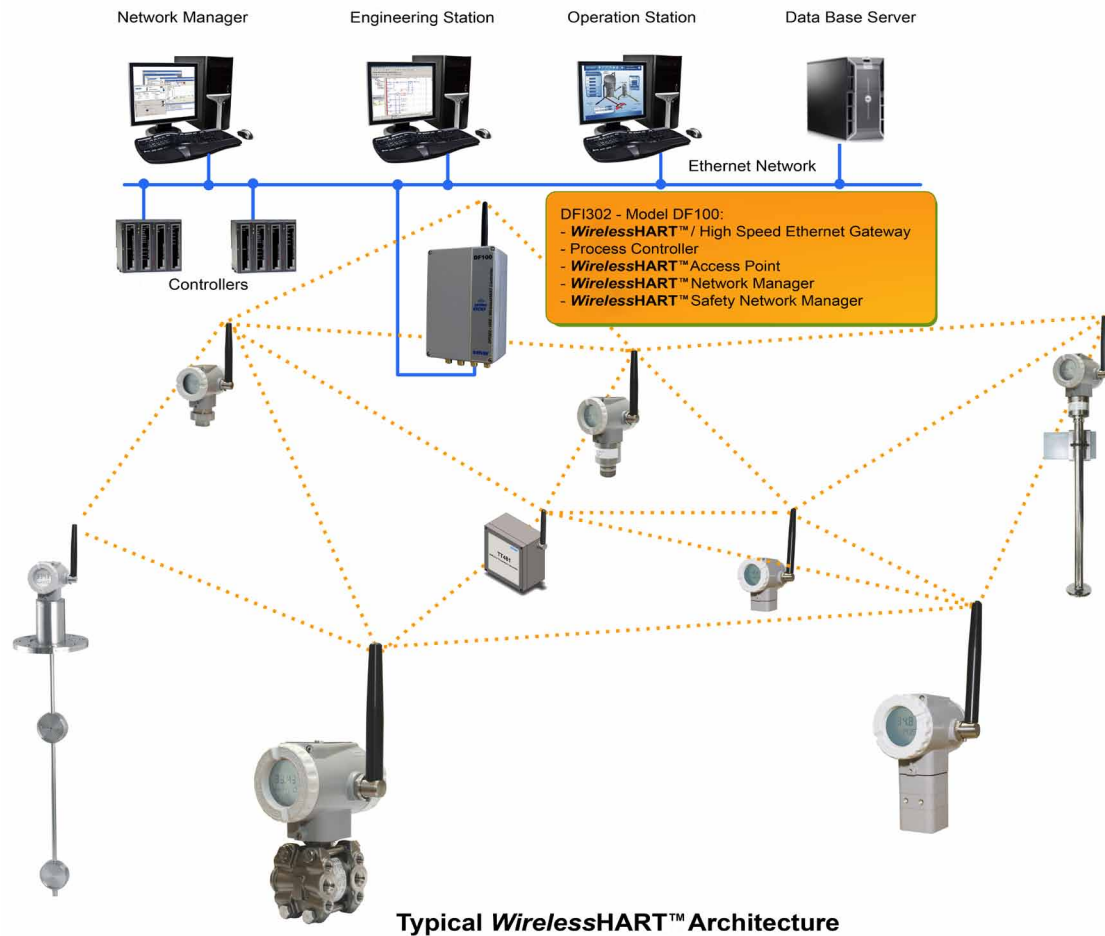
WirelessHART™

WIRELESS DENSITY TRANSMITTER

FOR DENSITY AND CONCENTRATION
APPLICATIONS

- **HART 7/WirelessHART™ Protocol**
- **Accuracy $\pm 0.0004 \text{ g/cm}^3$ (± 0.1 °Brix)**
- **Range $0.5 \text{ g/cm}^3 - 5 \text{ g/cm}^3$**
- **Direct Density or Concentration reading engineering units such as: g/cm^3 , Kg/m^3 , Relative Density, °Brix, °Baume, °Plato, °INPM, °GL, °API, % Solids, Concentration in %, etc**
- **Integral Temperature Sensor**
- **Suitable for Tank and Inline Installations**
- **Factory Calibration and Self Calibration**
- **Advanced Diagnostics**
- **Industrial and Sanitary Models**
- **Supports DD, EDDL and FDT/DTM**
- **Repeaters/Routers Function in the Mesh Network**
- **Powered by Long Life Battery (up to 5 years)**
- **Distance up to 250 m from other network equipment**
- **Wireless Standard IEEE 802.15.4-2006 @ 250 kbps**
- **Frequency band of 2.4 GHz**





WirelessHART™ Technology

The world dedicated HART® technology now offers a robust protocol designed for numerous applications, with the advantage of the wireless feature. Economy installation and efficient management of energy, quick access to information from the field, strength in communication and information integrity, network security: this and so many other advantages that make *WirelessHART™* technology (more on www.hartcomm.org) who came to the world of automation to innovate and revolutionize.

Based on a wireless mesh network communication protocol, the *WirelessHART™* ensures the compatibility between existing HART® devices, commands and tools. Basically, a *WirelessHART™* network, is composed of the elements like those shown on the figure above.

The figure elements, forming a network, make up what is called a mess network. They are:

- **Host** – workstation that allows interaction with the process. Through the *WirelessHART™* Gateway, the host gathers data from devices connected to the network. Uses protocols like Profibus, High Speed Ethernet (HSE), among others.
- **WirelessHART™ Gateway** – converts data between the host and devices connected to the network. The Gateway DF100 is used combined with the Smar wireless transmitters. It incorporates the Network Manager and the Access Point functionalities.
- **Network Manager** – distributes, among other duties, the network identity, by publishing its existence; distributes individual safety switches to the devices; attributes a communication range to them; manages communication routes between them, etc. It is a good application that may be incorporated to the *WirelessHART™* Gateway.
- **Access Point** – in a simple way, it can be understood as the *WirelessHART™* Radio installed on the Gateway.
- **WirelessHART™ Field Devices** – Smar DT400, TT400 and LD400 *WirelessHART™* constitute the field equipment for this type of network. The work, in addition to transmitters, as routers (repeaters), being capable of retransmitting messages from/to other network devices.

- **WirelessHART™ Adapter** – is a device serving as a “bridge”, that enables data from a HART® 4 a 20mA field device (with wire) to the host via *WirelessHART™* (without wire), allowing for a conventional HART® field device to make part of such a network.

WirelessHART™ devices must be installed on the field and configured the same way as conventional HART® devices. This is possible by using updated DD (Device Description) type files loaded on your configurator. In its turn, this can also be updated normally.

These instruments can be configured previously, in the banch or during the installation.

The Intelligent **DT400** “Touché” Density Transmitter is an equipment designed for continuous measurement of liquid concentration and density, directly on industrial processes.

Its pioneer technology consists of a capacitive type differential pressure sensor coupled to a pair of pressure repeaters immersed in the process. A temperature sensor located between the two pressure repeaters is used to compensate the temperature variations in the process fluid.

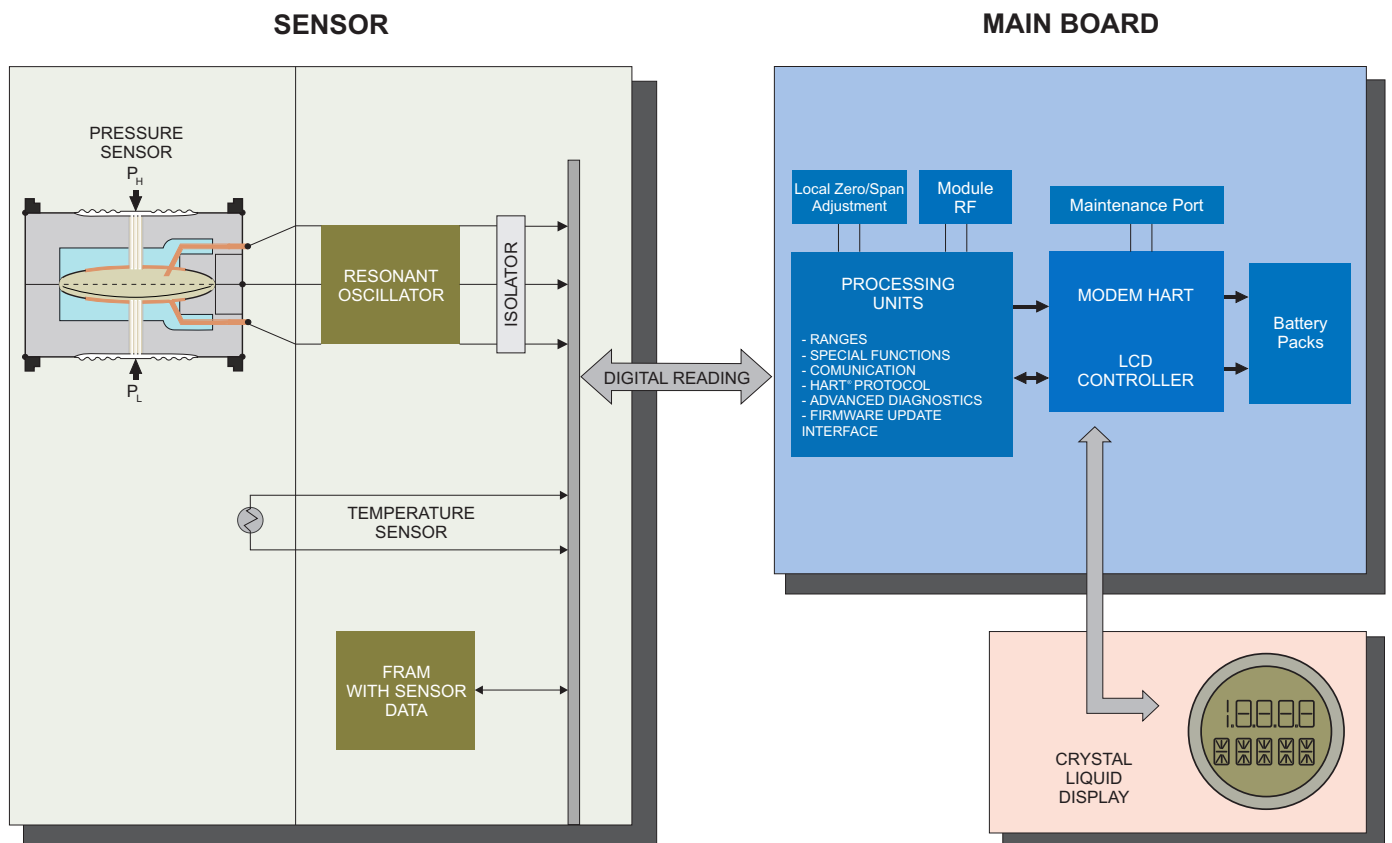
A software, using a dedicated algorithm, calculated the fluid density.

Depending on the industrial process, the density can be expressed in g/cm³, Kg/m³, lb/ft³, Relative Density, Brix, Gay-Lussac, Baumé, Plato, INPM degress, API, % de Solids, Concentration in %, etc.

Designed for process control and monitoring applications, these wireless transmitters generate a signal proportional to the concentration/density. Digital communication for calibration and monitoring through the *WirelessHART™* protocol is also supplied.



Block Diagram



DT400 WirelessHART™ “Touché” is available in two models:

- DT400I (Modelo Industrial) for general use;
- DT400S (Sanitary Model) for the food industry and other applications requiring sanitary connections.

Both models offer two types of mounting: top mounting (straight type) and lateral mounting (curve type).

The Sanitary model that meet 3-A Certification(Authorization n° 1399) uses a tri-Clamp connection to allow a quick and easy connection and disconnection from the process. the wetted surface finish is polished and then is free of crevices where food or bacteria can be collected. 3A is the most widely accepted sanitary standard in the food, drug and beverage industry.

Applications

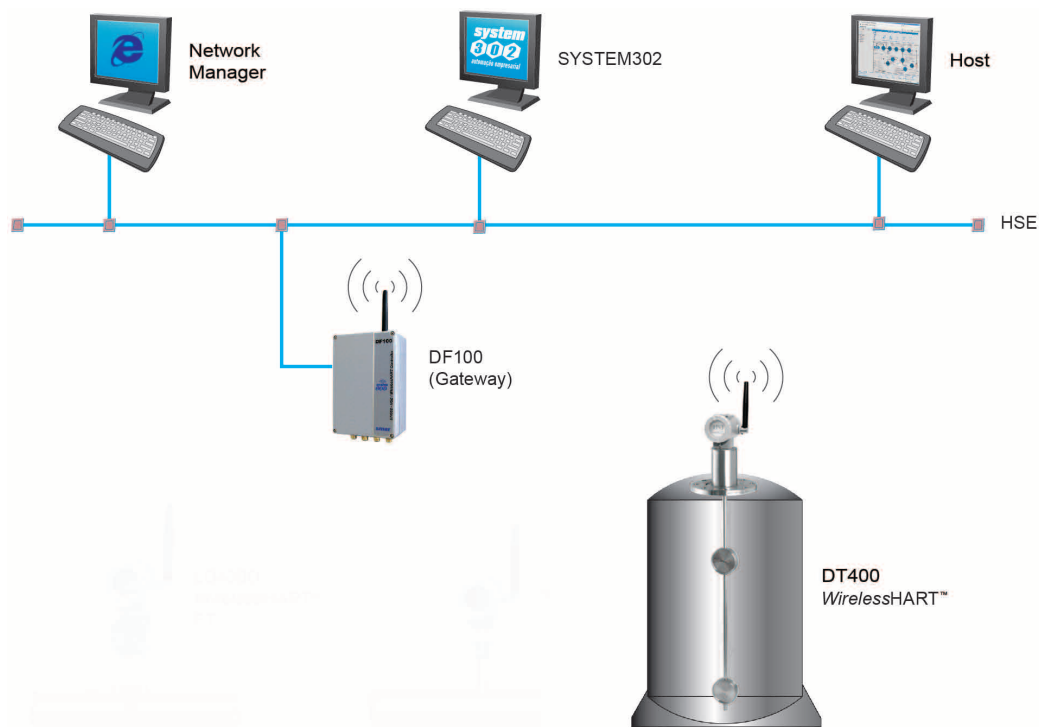
- **Sugar and Alcohol Mills:**
Mixed juice brix, must brix, syrup brix, honey brix, magma brix, dissolved cane brix, lime milk baumé, hexane cycle interface level, decanter mud density, hydrated alcohol INPM degree, anhydrous alcohol INPM degree, etc.
- **Dairy industry:**
Lactose, condensed milk, yoghurt, cream cheese, lactic acid, etc.
- **Food industry:**
Vegetable oils, miscella extraction, fruit syrup, starch dilution, glucose, jellies, jams, candies, honey, tomato pulp, citric juices, etc.
- **Pulp and Paper Industry:**
Black liqueur, Green liqueur, White liqueur, caustic soda concentration, lime mud, ashes dilution, talc dilution, red liqueur, paint concentration, pulp dilution potassium hydroxide, etc.
- **Beverage Industry:**
Beers (plato degree on fermentation process, cooking etc.) sodas (liquid sugar brix, etc.), liqueurs, wines, soluble coffee, malt, tequila, etc.
- **Chemical Industry:**
Acids: concentration/mixture, caustic soda, glycol, saline solution, detergents, toluene, urea, potassium, etc.
- **Mining:**
Mining ore, extraction of fines, flotation, thickener, acids concentration, starch dilution, scrapers, lime mud, etc.
- **Petrochemical Industry:**
Gas washing water, lubricating oils, extraction of aromatics, fuel oils, gasoline, kerosene, interface level water/oil etc.

Parameterization and Diagnostics

The **DT400** is available on **WirelessHART™** technology and it is available in follow configuration options:

- By configurator connected in the maintenance port using the HART 7 communication protocol.
- By magnetic tools using the local adjustment holes.
- By **WirelessHART™** network.

WirelessHART™



Technical Features

Functional Specifications

Communications Protocol	HART Protocol Version 7, with DT400 WirelessHART™ set commands. HART transmitter specific revision must be managed according to the DT400 WirelessHART™ transmitter.
Battery Module	The Pack is made up of 2 primary Lithium batteries (Li-SOCI2) of 3.6 V, totaling 7.2 V. Duration - Burst Mode at 8 seconds, @25°C, network with at least three neighbor equipment: 4 years NOTE: The Battery Module used on the transmitters must be supplied exclusively by Smar (PACK DE BATERIA – Cód. 400-1209).
Display	LCD display of 4½-dígitos numerical digits and 5 alphanumeric characters. Functions and status icon.
Hazardous Area Certification	Explosion proof and intrinsically safe (pending).
Wireless Certification	Anatel (pending).
Zero and Span adjustment	Non interactive. Via local adjustment and digital communication. Local adjustment switch with two positions: Enabled and Disabled.
Failure Alarm (Diagnostics)	Detailed diagnostics through HART® configurator and display. Sensor failure and overpressure indication.

Functional Specifications

Temperature Limits	Environment: -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)
Operation Starting Time	Operates within specs in less than 10 seconds after powering the transmitter.
Configuration	Through digital communication (WirelessHART™ protocol), using CONF401 and DDCON 100 software for Windows, or HPC401 for Palms configuration software. It can also be configured with DD and FDT/TM tools, in addition to being partially configured by local adjustment. In order to keep the equipment configuration untouched, the DT400 WirelessHART™ has a protection mechanism against writing in the configuration memory, both for hardware and software. The hardware mechanism has priority over the software and is selected via H-H switch.
Static Pressure Limit	7 MPa (70 kgf/cm ²) (1015 psi).
Humidity Limits	0 to 100% RH.
Damping Adjustment	Via digital communication: 0 to 32 seconds added to the sensor response time (0.2 s).

Performance Specifications

Reference Conditions	Temperature of 25 °C (77 °F), atmospheric pressure, Power supply of 24 Vdc, filling fluid silicone oil, isolation diaphragms in Stainless Steel 316L and digital trim equal to the range upper and lower values.
Accuracy	For range 1: ±0.0004 g/cm ³ (±0.1 °Bx) For range 2: ±0.0007 g/cm ³ For range 3: ±0.0016 g/cm ³ Linearity, Hysteresis and Repeatability are included.
Stability (12 months)	For range 1: 0.021 x 10 ⁻³ g/cm ³ For range 2: 0.083 x 10 ⁻³ g/cm ³ For range 3: 0.521 x 10 ⁻³ g/cm ³
Ambient Temperature Effect	For range 1: 0.003 x 10 ⁻³ g/cm ³ For range 2: 0.013 x 10 ⁻³ g/cm ³ For range 3: 0.041 x 10 ⁻³ g/cm ³
Static Pressure Effect	Zero Static Pressure For range 1: 0.001 x 10 ⁻³ g/cm ³ For range 2: 0.004 x 10 ⁻³ g/cm ³ For range 3: 0.007 x 10 ⁻³ g/cm ³
Mounting Position Effect	It can be eliminated after installation. No span effect.

Physical Specifications

Electrical Connection (Antenna)	M20 X 1.5
Process Connection	Industrial Model: Flange ANSI B16.5 3” or 4” in Stainless Steel 316, Flange DIN 2526 D Shape DN80 or DN100 PN 25/40. Sanitary Model: Tri-clamp 4” in Stainless Steel 304.
Wetted Parts	Probe and Diaphragms: Stainless Steel 316L, Hastelloy C276 and AISI316L coated with ETFE (TEFZEL). Wetted o’rings (for Sanitary Model): Buna N, Viton™ or Teflon™.
Non Wetted Parts	Electronic Housing: Injected Aluminum with Polyester Painting or Stainless Steel 316. Compliant with NEMA 4X, IP66/68 W. Filling Fluid: Silicone (DC200/20, DC704), Glycerine and Water, Neobee M20 Propylene Glycol. Cover Rings: Buna N. Identification Plate: Stainless Steel 316.
Mounting	Side or Top.
Approximate Weight	8 kg (18 lb) – Sanitary Model. 12 kg (26 lb) – Industrial Model.

Viton and Teflon are E. I. DuPont de Nemours & Co registered trademarks.
HART® is Communication Foundation registered trademark.
This product is protected by American patents 6,234,019 e D439,855.

MODEL	INDUSTRIAL CONCENTRATION/DENSITY TRANSMITTER		
DT400I	<i>WirelessHART™</i>		
COD.	Measurement Range	Minimum Span	
1	0.5 to 1.8 g/cm ³	0.025 g/cm ³	
2	1.0 to 2.5 g/cm ³	0.025 g/cm ³	
3	2.0 to 5.0 g/cm ³	0.025 g/cm ³	
Note: For concentration units: °Brix, °Plato, °INPM, °GL and °Baumé, specify cod. 1.			
COD.	Diaphragm Material /Probe		
H	Hastelloy C276 / Hastelloy C276		
I	Stainless Steel 316L / Stainless Steel 316L		
U	Hastelloy C276 / Stainless Steel 316L		
V	Stainless Steel 316L coated with TEFZEL (ETFE) / Stainless Steel 316L coated with TEFZEL (ETFE)		
Z	Others – Specify		
COD.	Filling Fluid		
N	Neobee – M20 Propylene Glycol – Food Degree		
D	DC 704 – Silicone Oil		
S	DC 200/20 – Silicone Oil		
G	Glycerin and Water – Food Degree		
T	Syltherm 800		
H	Halocarbon 4.2		
COD.	Communication Protocol		
W	<i>WirelessHART™</i>		
COD.	Local display		
0	Without display		
1	With Digital display		
COD.	Electrical Connection (Antenna)		
A	M20 X 1.5		
COD.	Blind Plug		
I	Stainless Steel 316		
COD.	Mounting		
1	Straight - Between Centers of 500 mm Sensors		
2	Curve - Between Centers of 500 mm Sensors		
3	Straight - Between Centers of 800 mm Sensors		
4	Curve - Between Centers of 800 mm Sensors		
5	Straight - Between Centers of 250 mm Sensors		
COD.	Connection to Process		
1	3" ANSI B16.5 (1)		
4	3" ANSI B16.5 (1)		
5	4" ANSI B16.5 (2)		
9	DN80 DIN 2526 - Shape D (1)		
A	DN100 DIN 2526 - Shape D (2)		
Z	User Specification		
COD.	Pressure Class		
1	150#		
2	300#		
3	600#		
C	PN 25/40		
Z	Others – Specify		

1 | I | S | W | 1 | A | I | 1 | 1 | 1

← TYPICO MODEL

Notes
(1) Only available for straight model - between centers of 250 mm sensor.
(2) Not available for straight model - between centers of 250 mm sensor.

MODEL	INDUSTRIAL CONCENTRATOR/DENSITY TRANSMITTER (CONTINUATION)																																										
	<table border="1"> <tr> <th colspan="2">COD. Identification Plate</th> </tr> <tr> <td>A</td> <td>Aluminum (IP/Type)</td> </tr> <tr> <td>B</td> <td>Stainless Steel 316 (IP/Type)</td> </tr> <tr> <td>I</td> <td>Saline Atmosphere (IPW/TypeX)</td> </tr> <tr> <td>J</td> <td>Stainless Steel 316 for Saline Atmosphere (IPW/TypeX)</td> </tr> <tr> <th colspan="2">COD. Painting</th> </tr> <tr> <td>O</td> <td>Munzell Grey N 6.5 - Polyester</td> </tr> <tr> <td>8</td> <td>Without Painting</td> </tr> <tr> <td>9</td> <td>Safety Blue Epoxy –Electrostatic Painting</td> </tr> <tr> <td>C</td> <td>Safety Blue Polyester –Electrostatic Painting</td> </tr> <tr> <td>Z</td> <td>User Specification</td> </tr> <tr> <th colspan="2">COD. Type of Certification</th> </tr> <tr> <td>N</td> <td>Without Certification</td> </tr> <tr> <th colspan="2">COD. Certifying Body</th> </tr> <tr> <td>0</td> <td>Without Certifying Body</td> </tr> <tr> <th colspan="2">COD. Identification Tag</th> </tr> <tr> <td>0</td> <td>With Tag</td> </tr> <tr> <td>1</td> <td>Without Inscription</td> </tr> <tr> <td>Z</td> <td>User Specification</td> </tr> <tr> <th colspan="2">COD. Optional Items (*)</th> </tr> <tr> <td>ZZ</td> <td>Special Options</td> </tr> </table>	COD. Identification Plate		A	Aluminum (IP/Type)	B	Stainless Steel 316 (IP/Type)	I	Saline Atmosphere (IPW/TypeX)	J	Stainless Steel 316 for Saline Atmosphere (IPW/TypeX)	COD. Painting		O	Munzell Grey N 6.5 - Polyester	8	Without Painting	9	Safety Blue Epoxy –Electrostatic Painting	C	Safety Blue Polyester –Electrostatic Painting	Z	User Specification	COD. Type of Certification		N	Without Certification	COD. Certifying Body		0	Without Certifying Body	COD. Identification Tag		0	With Tag	1	Without Inscription	Z	User Specification	COD. Optional Items (*)		ZZ	Special Options
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DT400I	- A 0 N 0 0 0 / *																																										

← TYPICO MODEL

* Leave it blank if there are no optional items.

Optional Items

Diaphragm Width	N0 - Standard
	N1 - 0.1 mm
Probe Reinforcement	R1 - With Probe Reinforcement
Mounting Position	E1 - Reverse Position

MODEL		SANITARY CONCENTRATOR/DENSITY TRANSMITTER	
DT400S		WirelessHART™	
COD.	Measurement Range	Minimum Span	
1	0.5 to 1.8 g/cm³	0.025 g/cm³	
2	1.0 to 2.5 g/cm³	0.025 g/cm³	
3	2.0 to 5.0 g/cm³	0.025 g/cm³	
Note: For concentration units: °Brix, °Plato, °INPM, °GL and °Baumé, specify cod. 1.			
COD.	Diaphragm Material /Probe		
H	Hastelloy C276 / Hastelloy C276		
I	Stainless Steel 316L / Stainless Steel 316L		
U	Hastelloy C276 / Stainless Steel 316L		
V	Stainless Steel 316L coated with TEFZEL (ETFE) / Stainless Steel 316L coated with TEFZEL (ETFE)		
Z	Others - Specify		
COD.	Filling Fluid		
N	Neobee – M20 Propileno Glicol – Food Degree		
D	DC 704 – Silicone Oil		
S	DC 200/20 – Silicone Oil		
G	Glicerine and Water – Food Degree		
T	Syltherm 800		
H	Halocarbon 4.2		
COD.	Communication Protocol		
W	WirelessHART™		
COD.	Local Display		
0	Without Display		
1	With Digital Display		
COD.	Electrical Connection (Antenna)		
A	M20 x 1.5		
COD.	Blind Plug		
I	Stainless Steel 316		
COD.	Mounting		
1	Straight – Between Centers of 500 mm Sensors		
2	Curve – Between Centers of 500 mm Sensors		
COD.	Process Connection		
J	Triclamp – 4" x 300#		
COD.	Sealing Ring Material		
B	Buna N		
T	Teflon		
V	Viton		
Z	User Specification		
COD.	Tank Adaptor		
0	Without Tank Adaptor		
1	With Tank Adaptor		
COD.	Triclamp		
0	Without Triclamp		
1	With Triclamp		
COD.	Continued on next page		
	*		

DT400S | 1 | | N | W | 1 | A | | 1 | J | B | 1 | 1 | *

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* Leave blank if there are no optional items.

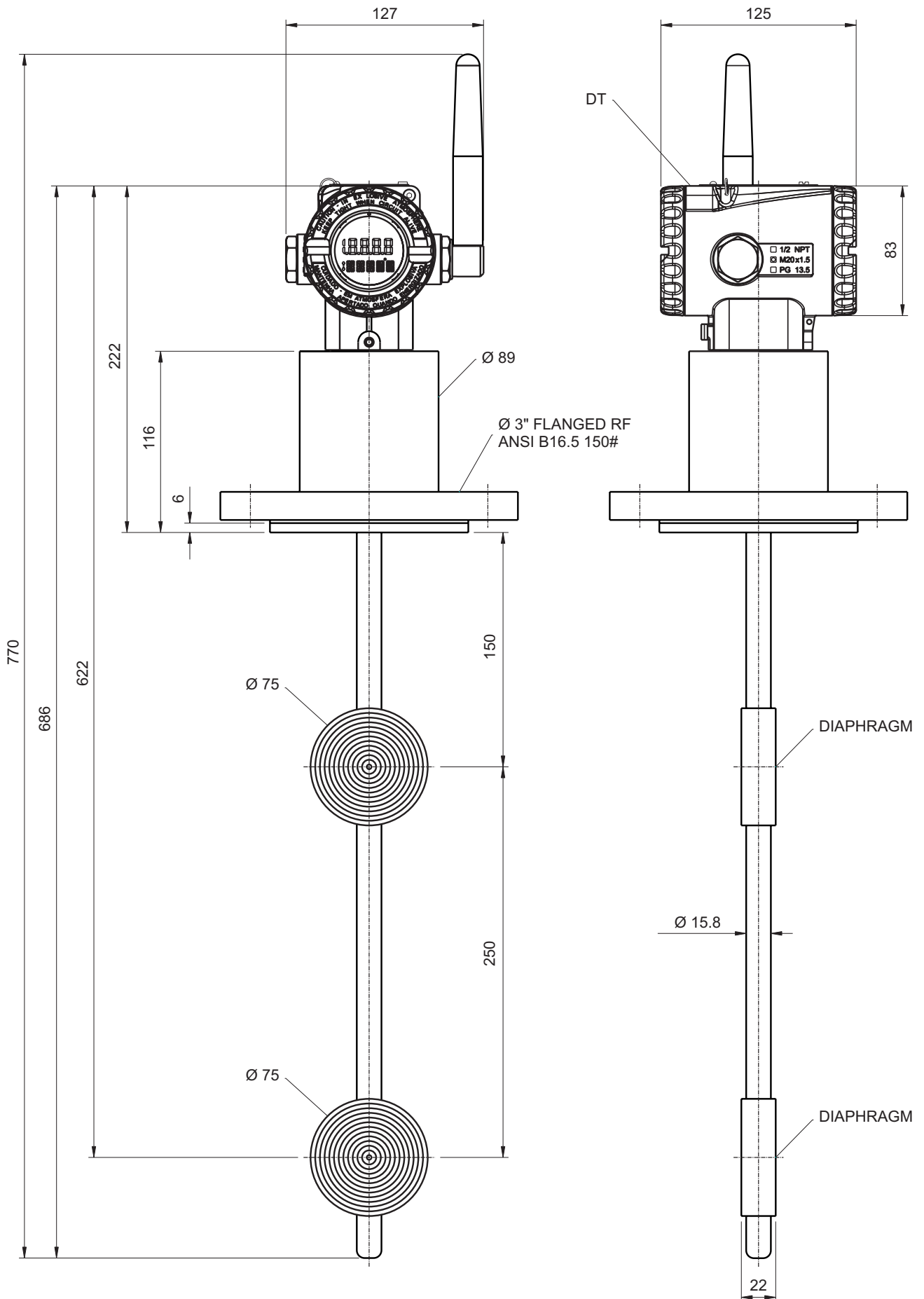
MODEL	SANITARY CONCENTRATION/SAFETY TRANSMITTER (CONTINUATION)					
	COD.	Housing Material				
	A	Aluminum (IP/Type)				
	B	Aluminum for Saline Atmosphere (IPW/TypeX)				
	I	Stainless Steel 316 (IP/Type)				
	J	Stainless Steel 316 for Saline Atmosphere (IPW/TypeX)				
	COD.	Painting				
	0	Munzell Grey N 6.5 – Polyester				
	8	Without Painting				
	9	Safety Blue Epoxy – Electrostatic Painting				
	C	Safety Blue Polyester – Electrostatic Painting				
	Z	User specification				
	COD.	Type of Certification				
	N	Without Certification				
	COD.	Certifying Organ				
	0	Without Certifying Organ				
	COD.	Identification Tag				
	0	With Tag, when specified				
	1	In White				
	z	User Specification				
	COD.	Optional Items (*)				
	ZZ	Special Items				

DT400S	-	A	0	N	0	0	0	/	*
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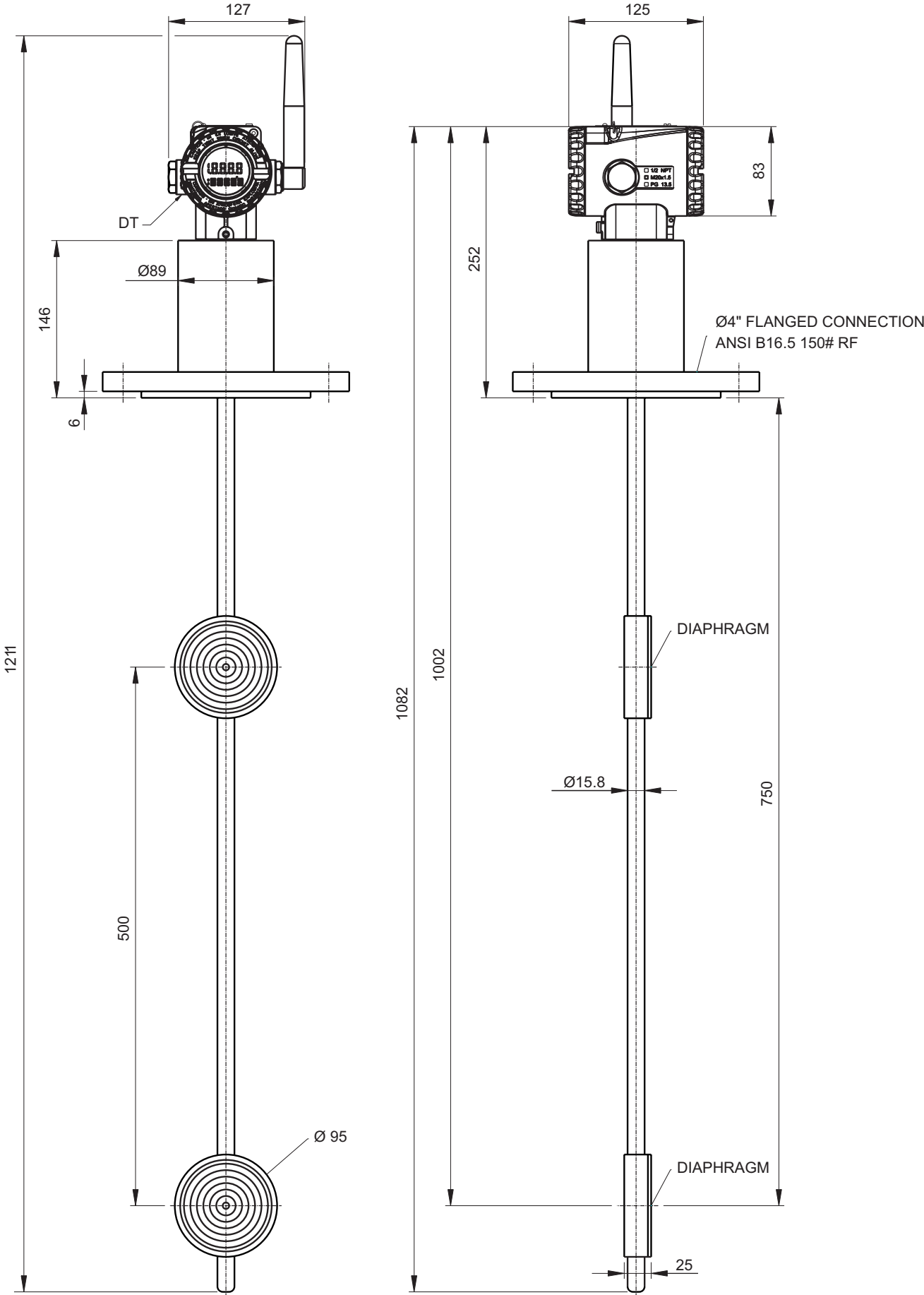
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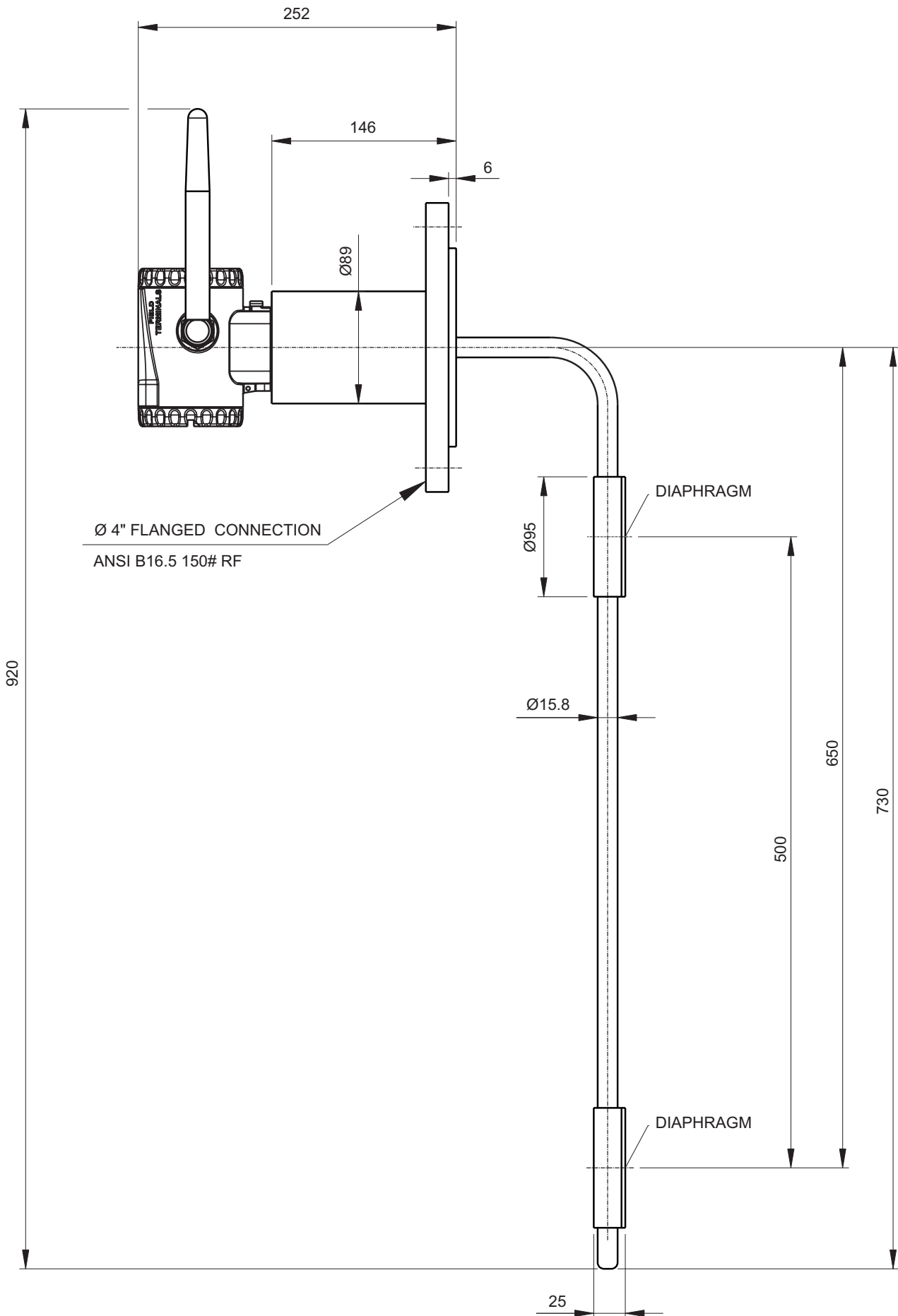
Straight Type Industrial Model - 250 mm



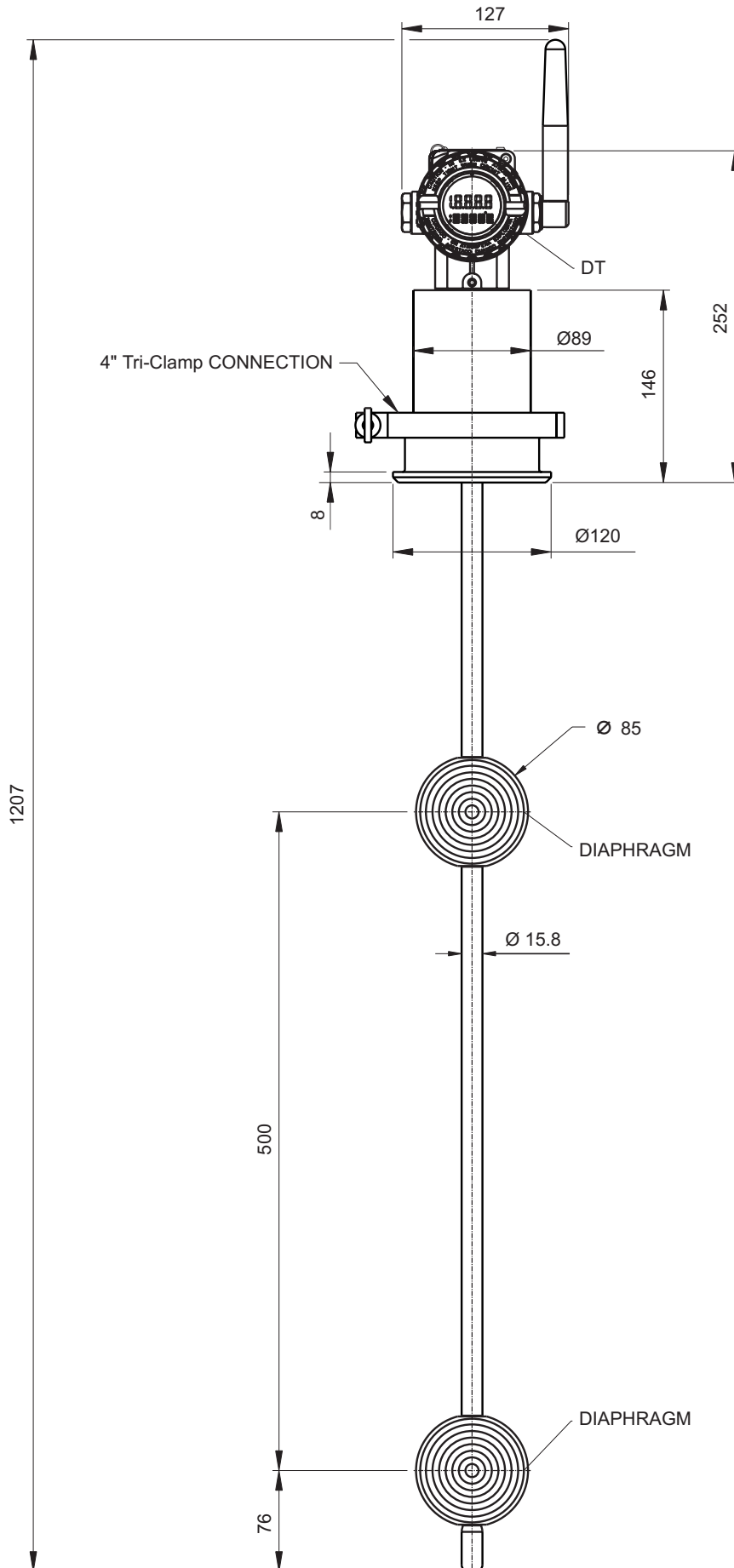
Straight Type Industrial Model - 500 mm



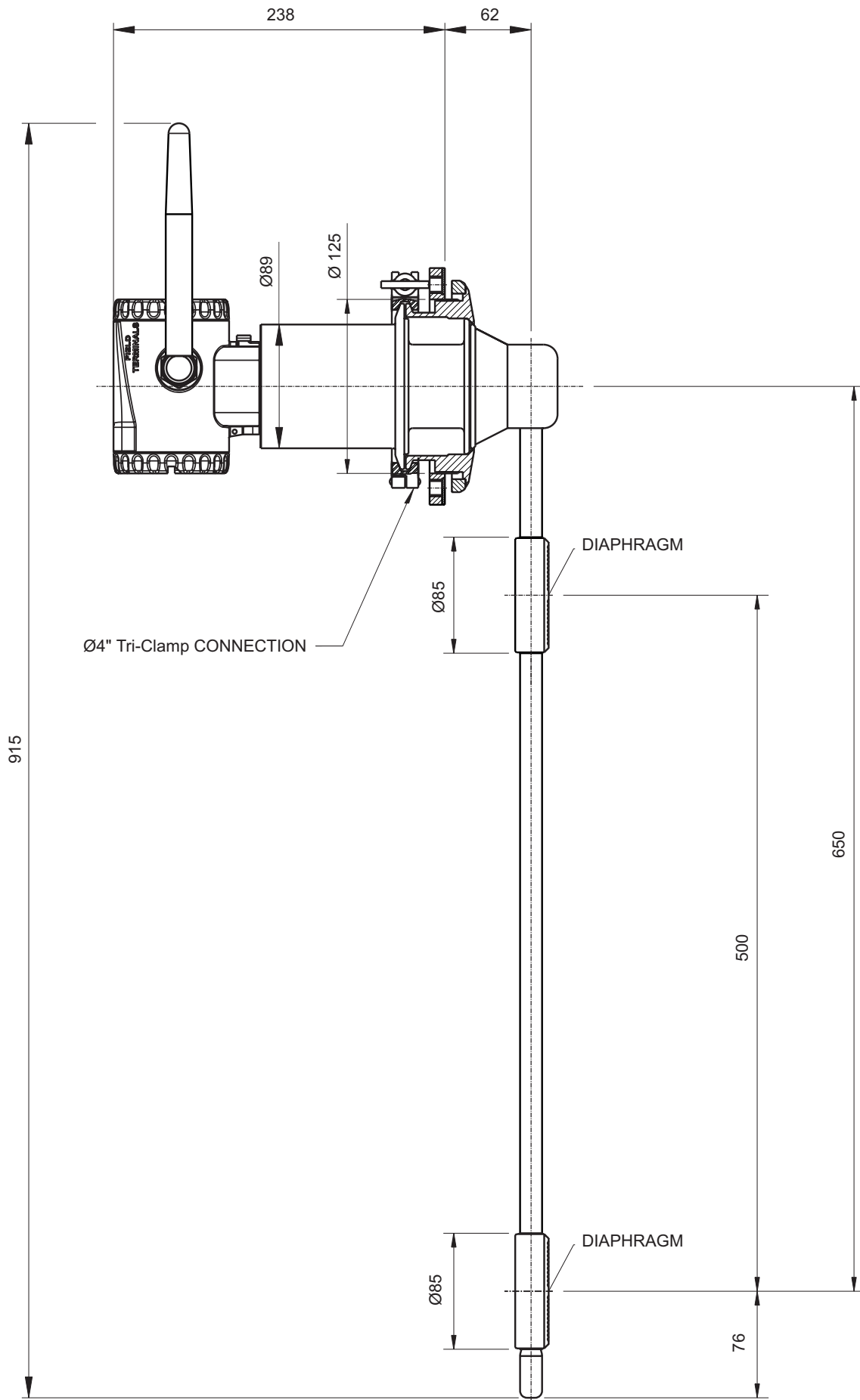
Curve Type Industrial Model - 500 mm



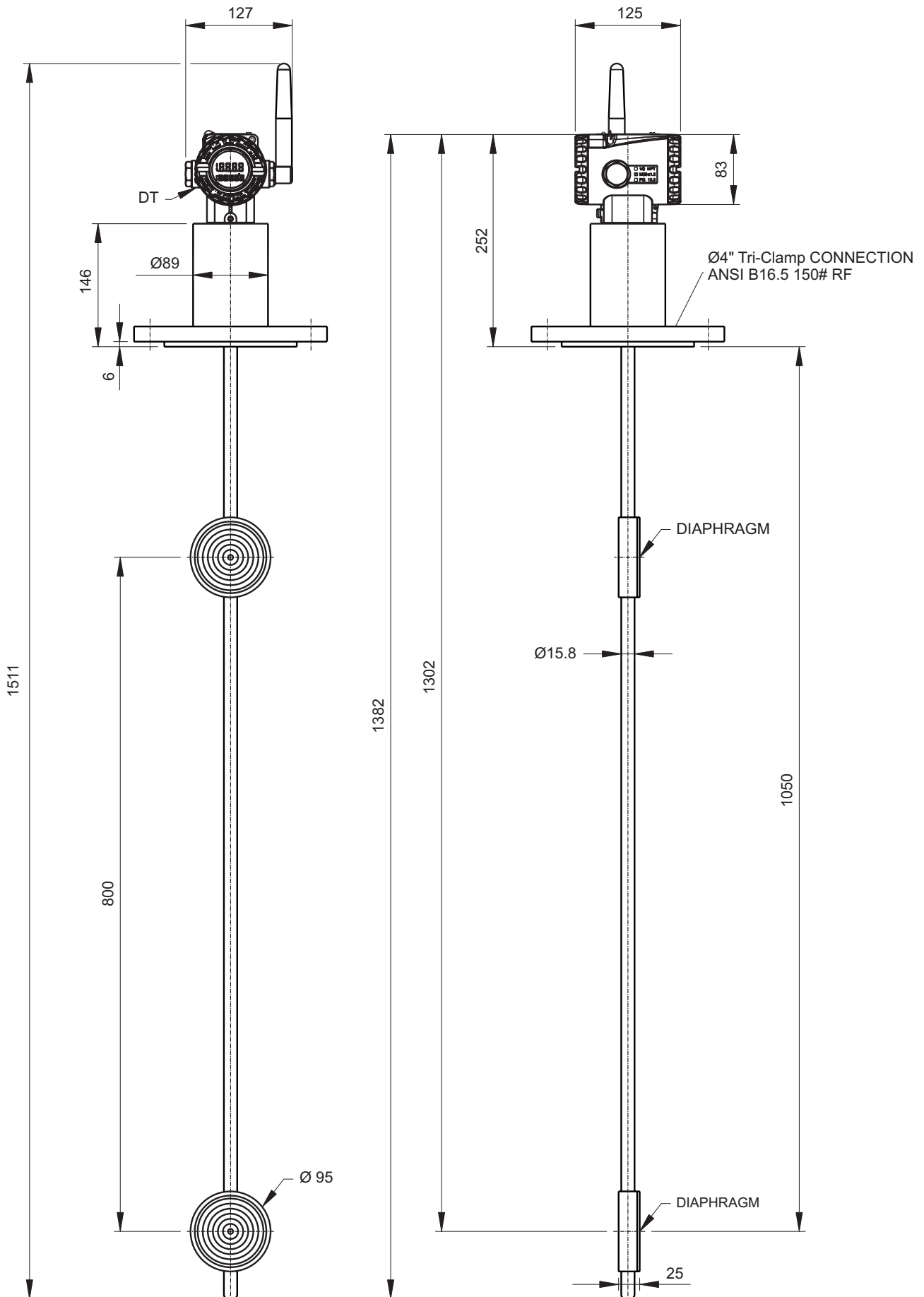
Straight Type Sanitary Model - 500 mm



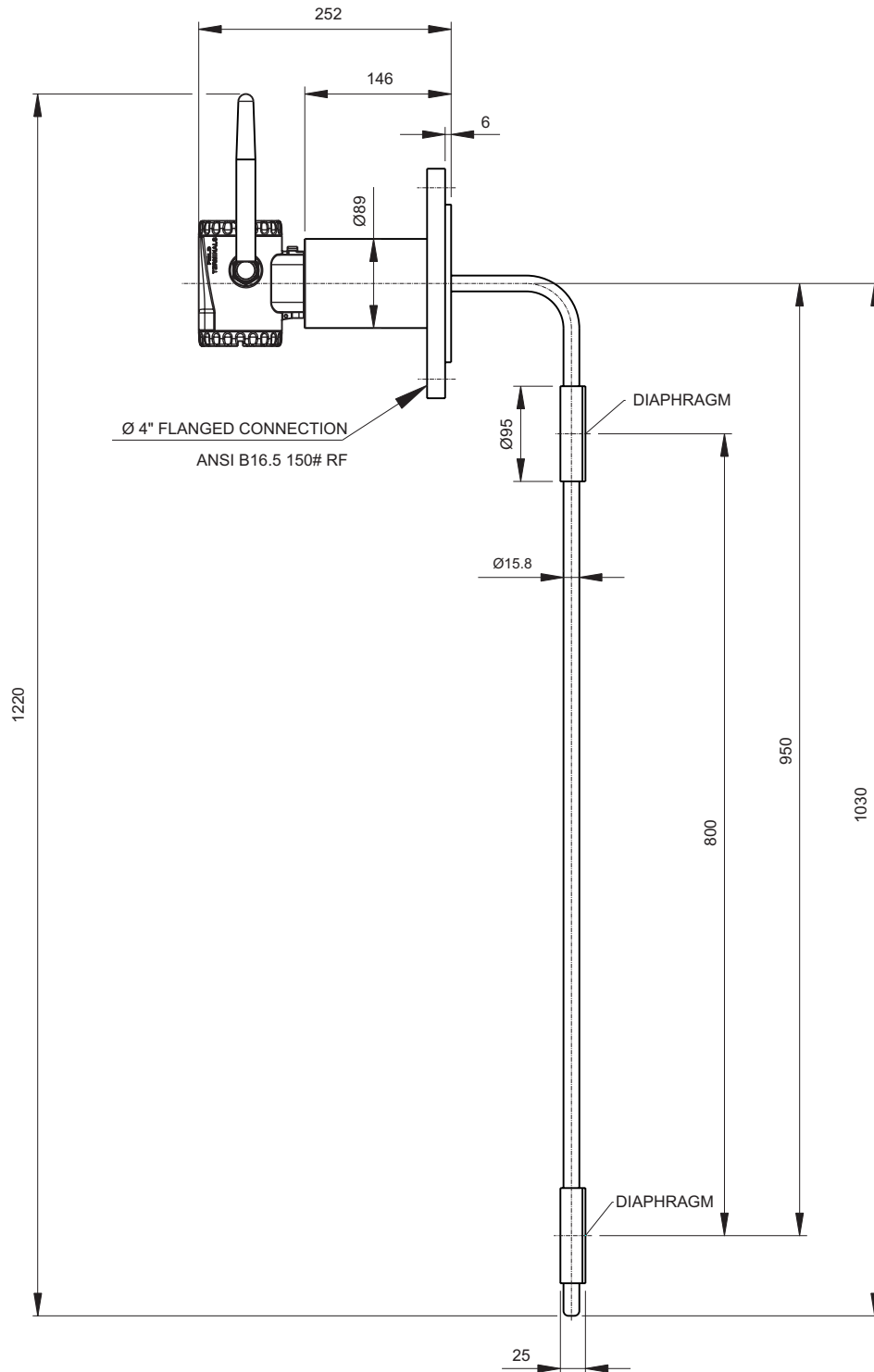
Curve Type Sanitary Model - 500 mm



Straight Type Industrial Model - 800 mm



Curve Type Industrial Model - 800 mm



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Specifications and information are subject to change without notice.
Up-to-date address information is available on our website.

web: www.smar.com/contactus.asp

