MONOGRAPH

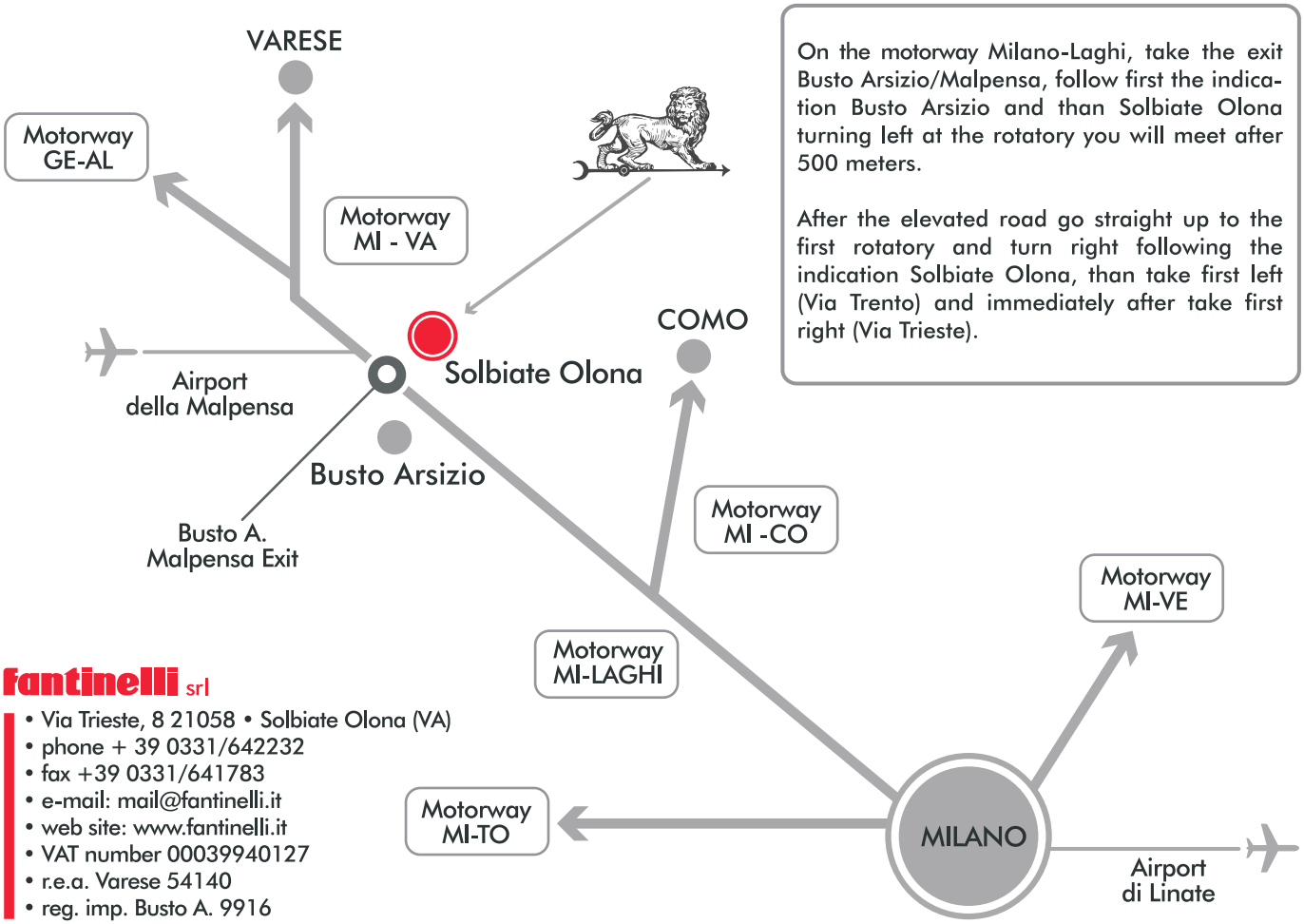
The Fantinelli firm was founded in Milan in **1878** by Diomiro Fantinelli, who was the first in Italy to produce pressure gauges. The firm was first moved to Busto Arsizio in **1921** land then, in 1990, established in Solbiate Olona.
Fantinelli family has always owned the firm and has managed it for four generations. Now the fifth one is present to continue its traditions.

Here follows we list some of the oldest and most significant achievements granted to Messr. Fantinelli:
- Honourable mention at the National Expo of Milan in **1881**;
- Second degree prize, with large bronze medal at the National Expo of Milan in **1885**;
- Silver medal at the National Expo of Milan in **1906**;
- Silver medal with diploma conferred by the Minister of Agriculture Industry and Commerce in **1909**;
- Diploma of Gold Medal granted by the Chamber of Commerce Industry and Agriculture in **1956** for firm seniority.

In **1938** Adelio Fantinelli patented a "compensated metallic expansion pyrometer" that enriched the already large products range.

The present-day **Fantinelli S.r.l.** boasts a range of products about traditional or special instruments and devices dealing with pressure and temperature measurement to meet specific requirements.
Our production organization is based on technologies and plants fit to achieve a high level quality.
Our constant aims are the study and satisfaction of our customers' technical and commercial needs. All this to grant readiness in giving our best services to the firms that honour us with their favour.
This is particularly true for those who make machineries and plants, where a reliable measurement of pressure and temperature values is important.

WE ARE HERE



On the motorway Milano-Laghi, take the exit Busto Arsizio/Malpensa, follow first the indication Busto Arsizio and than Solbiate Olona turning left at the rotatory you will meet after 500 meters.

After the elevated road go straight up to the first rotatory and turn right following the indication Solbiate Olona, than take first left (Via Trento) and immediately after take first right (Via Trieste).

fantinelli srl
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- VAT number 00039940127
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- reg. imp. Busto A. 9916

MEASURE UNITS AND GRADUATIONS

Table A1 (pressure gauges)

The table below gives conversion factors. To shift from a pressure value expressed in column I units to the corresponding value espressed in row II units, multiply by the value given in the table.

I \ II	bar	mbar	Pa N/m²	kPa	MPa	at kg/cm²	psi lbf/in²	mmH_2O	mmHg torr
bar	1	1000	10^5	100	0,1	1,01972	14,5038	$1,01972 \cdot 10^4$	750,064
mbar	0,001	1	100	0,1	10^{-4}	$1,01972 \cdot 10^{-3}$	0,0145038	10,1972	0,750064
Pa N/m²	10^{-5}	10^{-2}	1	0,001	10^{-6}	$1,01972 \cdot 10^{-5}$	$1,45038 \cdot 10^{-4}$	0,101972	$7,50064 \cdot 10^{-3}$
kPa	0,01	10	1000	1	0,001	0,0101972	0,145038	101,972	7,50064
MPa	10	10^4	10^6	1000	1	10,1972	145,038	$1,01972 \cdot 10^5$	7500,64
at kg/cm²	0,980665	980,665	$9,80665 \cdot 10^4$	98,0665	$9,80665 \cdot 10^{-2}$	1	14,2234	10^4	735,562
psi lbf/in²	$6,89476 \cdot 10^{-2}$	68,9476	$6,89476 \cdot 10^3$	6,89476	$6,89476 \cdot 10^{-3}$	$7,03067 \cdot 10^{-2}$	1	703,067	51,7146
mmH_2O	$9,80665 \cdot 10^{-5}$	$9,80665 \cdot 10^{-2}$	9,80665	$9,80665 \cdot 10^{-3}$	$9,80665 \cdot 10^{-6}$	10^{-4}	$1,42234 \cdot 10^{-3}$	1	$7,35562 \cdot 10^{-2}$
mmHg torr	$1,33322 \cdot 10^{-3}$	1,33322	133,322	0,133322	$1,33322 \cdot 10^{-4}$	$1,35951 \cdot 10^{-3}$	$1,93369 \cdot 10^{-2}$	13,5951	1

Table A2 (thermometers)

Units commonly used for thermometers graduations' dials are:
- °C (Celsius degrees);
- °F (Fahrenheit degrees).

Formulas shown below give conversion relations between the different measure units.

$$t\,(°C) = 5/9\,[t\,(°F) - 32] \qquad t\,(°F) = 9/5\,t\,(°C) + 32$$

Table C1 (pressure gauges)

Minimum graduation divisions of pressure gauges versus numeration and accuracy class as per EN

Graduation	Class 1,6 per SP/NP		Class 1/1,6 per SP/SF/DP/PQ/MP/BP/MA		Class 0,6 per SP/SF/TR		Class 0,25 per CP	
	Division	Division N.	Division	Division N.	Division	Division N.	Division	Division N.
0 ÷ 1	0,05	20	0,02	50	0,01	100	0,005	200
0 ÷ 10	0,5	20	0,2	50	0,1	100	0,05	200
0 ÷ 100	2	20	2	50	1	100	0,5	200
0 ÷ 1000	50	20	20	50	10	100	5	200
-1 ÷ 0	0,05	20	0,02	50	0,01	100	0,005	200
-1 ÷ +9	0,5	20	0,2	50	---	---	---	---
0 ÷ 1,6	0,05	32	0,02	80	0,02	80	0,01	160
0 ÷ 16	0,5	32	0,2	80	0,2	80	0,1	160
0 ÷ 160	5	32	2	80	2	80	1	160
0 ÷ 1600	50	32	20	80	20	80	10	160
-1 ÷ +0,6	0,05	32	0,02	80	---	---	---	---
-1 ÷ +15	0,5	32	0,2	80	---	---	---	---
0 ÷ 2,5	0,1	25	0,05	50	0,02	125	0,01	250
0 ÷ 25	1	25	0,5	50	0,2	125	0,1	250
0 ÷ 250	10	25	5	50	2	125	1	250
0 ÷ 2500	100	25	50	50	20	125	10	250
-1 ÷ +1,5	0,1	25	0,05	50	---	---	---	---
-1 ÷ +24	1	25	0,5	50	---	---	---	---
0 ÷ 0,4	0,01	40	---	---	---	---	---	---
0 ÷ 4	0,2	20	0,1	40	0,05	80	0,02	200
0 ÷ 40	2	20	1	40	0,5	80	0,2	200
0 ÷ 400	20	20	10	40	5	80	2	200
0 ÷ 4000	---	---	100	40	50	80	20	200
-1 ÷ +3	0,1	40	0,1	40	---	---	---	---
0 ÷ 0,6	0,02	30	0,01	60	0,005	120	0,002	300
0 ÷ 6	0,2	30	0,1	60	0,05	120	0,02	300
0 ÷ 60	2	30	1	60	0,5	120	0,2	300
0 ÷ 600	20	30	10	60	5	120	2	300
-1 ÷ +5	0,2	30	0,1	60	---	120	---	---

Table C2 (thermometers)

Minimum graduation divisions of ST and BT series thermometers versus numeration and accuracy class as per EN standard (for expansion or bimetallic thermometers scale ranges see the specific heading of the relevant series)

Graduation	Class 1		Graduation	Class 1	
	Division	Division N.		Division	Division N.
0 ÷ 60	1	60	0 ÷ 400	10	40
0 ÷ 100	2	50	0 ÷ 500	10	50
0 ÷ 120	2	60	0 ÷ 600	10	60
0 ÷ 160	2	80	-50 ÷ +50	2	50
0 ÷ 200	5	40	-40 ÷ +60	2	50
0 ÷ 250	5	50	-20 ÷ +40	1	60
0 ÷ 300	5	60	-20 ÷ +100	2	60

USE AND SAFETY PRECAUTIONS

PRESSURE GAUGES

THE FOLLOWING RECOMMANDATIONS AND NOTES ARE AN OVERVIEW OF THE PROVISIONS OF STANDARDS EN 837/1/2/3 AND ANSI B40.1

CONFORMITY TO PED

DIRECTIVE 2014/68/EU

GENERAL NOTE

All instruments by FANTINELLI s.r.l. are designed and manufactured in accordance with the safety requirements laid down in the applicable international regulations; particularly, they comply with the criteria set out in directive: 97/23/EC for the two categories:

- pressure up to 200 bar - designed and manufactured in accordance with the sound engineering practice must not bear the EC marking
- pressure greater than 200 bar - designed and manufactured in accordance with Pressure Equipment Directive, are classified in category I and certified according to Module A; therefore, the instrumentation dial bears the symbol EC.

The following recommendations and notes, that the user must be familiar with for a proper and safe commissioning, are an overview of the provisions laid down in standards EN 837/1/2/3 and ANSI B40.1.

Carefully select the instrumentation depending on its use and installation on the pressure equipment, in order to obtain a high degree of safety and comply with the maintenance procedures set out by the manufacturer.

See our online general catalogue on our web site http://www.fantinelli.it for a proper selection of our instruments.

The user is solely responsible for properly installing and maintaining the instrumentation.

The selection and installation of the instrumentation shall be made by qualified personnel who shall evaluate every aspect of the process that may jeopardise the proper operation of the instrumentation and avoid any damage or fault.

CONFORMITY TO ATEX

FANTINELLI s.r.l. may supply, upon request, products manufactured in accordance with

DIRECTIVE 2014/34/EU

in conformity with:
group II - category 2 G/D

SAFETY - SELECTION CRITERIA OF BOURDON TUBE GAUGES

As per table UNI EN 837-2 paragraph 4.2.2. indicated below, it is advisable to select the type of instruments with an adequate safety degree depending on the specific applications. Fantinelli gauges belong to code **S1** if equipped with a safety pressure relieve valve, which opens when the pressure inside the case exceeds a given safety value with external pressure discharge, and are of type **S3** when the back vent is the disruptive bottom (solid front pressure gauges) which is an additional personal protection.

Process fluid	Liquid								Gas or steam (see note 1)							
Case filling	Dry				Liquid				Dry				Liquid			
Nominal diameter	< 100		≥100		< 100		≥ 100		< 100		≥ 100		< 100		≥ 100	
Pressure range (bar)	≤25	>25	≤25	>25	≤25	>25	≤25	>25	≤25	>25	≤25	>25	≤25	>25	≤25	>25
Minimum safety design code	0	0	0	0	S1	S1	S1	S1	0	S2	S1	S3	S1	S2	S1	S3

Safety protection code

0 Pressure gauges with no safety device

S1 Pressure gauges with safety device

S2 Safety pressure gauges with no separating wall

S3 Safety pressure gauges with separating wall (guarantees a higher level of safety)

Note 1 - All oxygene and acetylene pressure gauges must be safety pressure gauges.

Note 2 - Pressure gauges filled with glycerine must not use with oxygen or other highly- oxidising processing fluids. For these applications, they may be filled with highly fluorinated or chlorated liquids.

Note 3 - This prospectus specifies the current safety design code. Users must be familiar with their special requirements and may use safety pressure gauges even at pressures lower than 25 bar.

WORKING PRESSURE

The range of the chosen instrument shall be such that the operating pressure is between 25% and 75% of the full scale value; it is a good rule to select a full scale value twice the working pressure. If the dial of the pressure gauge shows a black triangle at the bottom scale, the operating pressure can be raised to 90% of the full scale value for pulsating pressures and to 100% of the full scale value for static pressures.

PULSATING PRESSURES

Pulsating pressures normally occur with applications on pumps and compressors and are usually a cause of wear of displacement and potential failure of the sensing element due to fatigue; therefore, the instrument shall be equipped with a relevant anti-pulsator. It is also advisable to use instrumentation filled with cushion fluid that reduces the harmful effect of pulsations on the moving parts of the instrument.

OVER-PRESSURE

Over-pressure brings about stresses to the sensing element by consequently reducing its life span, accuracy and repeatability. It is suggested to use a pressure gauge whose full scale value is greater than the maximum working pressure which, as a result, absorbs more easily any overpressure or pressure flushes, which have a harmful effect on the sensing element. In these cases, it is advisable to equip the instrumentation with an automatic safety protection device (pressure relief device).

MATERIALS OF PARTS IN CONTACT WITH THE PROCESSING FLUID

Particular attention must be given to the choice of materials, of which the chemical compatibility with the processing fluid must be taken into consideration. If none of the available materials are adapt, a separator must be in place between the processing fluid and the pressure gauge.

OXYGEN USE

The gauges fit for oxygen use shows in red: **oxygen-use no oil - and the crossed oil feeder symbol.**
For this use, the gauges require special cleaning and degreasing, plastic bag sealed individual packaging and protection at the pressure inlet with a valve.
It is the end-user's responsibility to clean the gauges until dismantling.

VIBRATIONS

If the gauge is subject to vibrations, different solutions can be taken into account, such as:
- utilizing gauges filled with damping fluid;
- mounting the instrumentation spaced and connecting it to the pressure inlet through flexible tubes.

MECHANICAL STRESS

Any mechanical stress must be absolutely avoided; the instrumentation must therefore be placed in a safe location, free from any mechanical stress and connected to the pressure inlet through a flexible tube.

INSTRUMENTATION WITH CASE FILLED WITH DAMPING LIQUID

Selecting the right damping liquid is an important factor, depending both on the processing fluid to be measured and the ambient temperature at which the instrumentation is installed. If the intended use involves oxidising processing fluids, such as oxygen, chlorine, nitric acid, hydrogen peroxide, and so on, there may be a potential hazard of a chemical reaction and/or explosion; in this event, fluorine or chlorine-based filling liquids must be used. As for the ambient temperature, it is advisable to chose a damping liquid according to the table below:

FILLING FLUIDS

Filling fluids	Ambient temperature
Glycerine	+10..+60°C (+50..+140°F)
Silicone fluid	-30.. +60°C (-22.. +140°F)
Fluorinated fluid	-50.. +60°C (-58.. +140°F)

PROCESSING FLUID TEMPERATURE

In order to protect a pressure gauge from a too hot fluid (above 60 °C), it is advisable to insert a siphon or a similar device so that a condensated fluid reaches the sensing element. A siphon or similar device must always be placed close to the pressure gauge and filled with a condensated fluid before pressurizing the installation, in order for the hot fluid not to reach the pressure gauge as pressure raises during the initial phase. Process fluids cannot freeze and/or crystallize inside the sensing element. For high-temperature readings, it is advisable that the pressure inlet be connected to the pressure gauge through a tube of at least 6 mm internal bore and of about 2 m length, which shall bring down the processing temperature to a value similar to the ambient one. If the nature and temperature of the fluid cannot allow for the use of a small-bore connection tube, it is often necessary to apply a pressure separator to the pressure gauge, making sure that the transmission fluid is compatible with the processing temperatures.

HANDLING

Before use, make sure that the device is not damaged due to handling; ensure that the needle falls within the mark located on the zero. If the needle does not go back to the zero, the device may be significantly damaged, it shall be left out from the process and subject to verification and recalibration.

INSTALLATION

The end-user must make sure that the selected gauge is the correct one along with the correct range and fabrication. We suggest inserting a shut-off valve between the gauge and the pressure inlet in order to facilitate the removal due to maintenance.

The pressure coupling must be watertight:
- gauges with cylindrical threads - the pressure will be maintained on the sealing side of the instrument using a round gasket made of materials which are compatible with the processing fluid;
- gauges with cone-shaped threads - the pressure will be maintained by coupling with the threads; it is common to put a bead of PTFE on the male thread before coupling;
- gauges with flanged couplings must be installed in accordance with the recommendations of the relevant regulations.

In cases of directly mounting a gauge with threads, it is necessary to twist it by using two wrenches, one applied on the flat sides of the gauge coupling (the threaded pin) and the other at the pressure inlet of the system. Do not tighten by exercising pressure on the case, since such operation may damage the instrument. At initial pressurization, verify that the coupling is sealed. All the instruments must be mounted in such a way that the dials are in a vertical position, unless otherwise indicated on the same dial. When the gauge has incorporated a safety valve (blow out disk) or a rear safety valve (solid-front), a minimum distance of 20 mm must be assured from any obstacle.
For wall-mounted or panel-mounted versions, ensure that the tube carrying the pressurized fluid is inserted into the instrument coupling without being tensioned or forced.

EEFFECT OF THE LIQUID COLUMN
The installer must be aware of the fact that if the gauge works with a load due to a liquid column, the gauge must be calibrated by compensating for such force, and the compensation must be indicated on the dial.

USE
It is not advised to use the instruments to verify pressure values approaching zero since accuracy could be approximate in that area. For this reason the instruments must not be used to verify any possible residual pressures within the tanks or large-volume containers under pressure because, even though the instrument indicates zero pressure, there could still be a dangerous pressure inside the container which may be hazardous for the operator.

AMBIENT TEMPERATURE
It is difficult to isolate a gauge from an ambient temp rature which is too high or too low; a solution might be to remove the gauge from a heat or a cold source, when practicable. In the event that a gauge with accuracy class of 0.6 or better is used at an ambient temperature different from the reference one (20°C +/- 2°C), an adjustment must be made.

REUSING GAUGES AFTER VERIFICATION AND/OR RECALIBRATION
It is not advisable that the instruments be, at a later stage, installed on systems with different processing fluids, to avoid a chemical reaction which may cause explosions due to contamination of wet parts. Traces of the processing fluids, potentially corrosive or toxic, might remain trapped in the sensing element; therefore, this possible event must be taken into consideration when removing the pressure gauge from processing, to avoid injury to the operator as well as for subsequent storage.

FUNCTION CONTROL
Ensure that the constant indication of a pressure value on the dial, either for a long or abnormal time, is not due to clogging of the pressure feed duct to the sensing element; particularly, if the gauge indicates zero pressure, ensure that there is no pressure inside the system before disas-sembling the gauge from the system.

CLEANING
Some applications require that gauges be purchased specifying particular cleaning conditions; in these cases, the user must make sure that the instrument is properly defined and installed (for example, gauges without traces of oil for use with oxygen).

MAINTENANCE
The overall safety of an installation depends on the conditions of operation of the gauges that are installed on it. It is essential that the readings indicated on said gauges are dependable; therefore, each gauge in which the readings seem abnormal must be immediately removed, verified and recalibrated, if necessary.
Gauge accuracy should be maintained though routine checks. All verifications and recalibrations must be performed by competent personnel, using the relevant test equipment. The calibration fluid must be compatible with the processing fluid. Fluids containing hydrocarbons must not be used when the processing fluids to be measured are oxygen or other oxidants. Instruments stored in their original packaging (cardboard boxes) must be placed in closed areas and away from humidity; the suggested temperature for storage should be between -30/+60 °C, unless otherwise specified on the accompanying manuals.

GAUGES EQUIPPED WITH ELECTRICAL CONTACT
LFANTINELLI s.r.l. may furnish, upon request, a declaration of conformity relating to electrical contacts applied to gauges:
- snap-action contacts - in accordance with directive EEC 73/23;
- electronic contacts - in accordance with EN 60947-5-2;
- inductive contacts - PTB 99 ATEX 2219 X.

WARNING
LFANTINELLI s.r.l. is not responsible for any damage, direct or indirect, to the property or to personnel and for any consequences (for example, loss of production), due to actions non - conforming with the directions provided in this document and the precautions set out in our general catalogue that can be browsed online at http://www.fantinelli.it

THERMOMETERS

CONFORMITY TO ATEX
FANTINELLI s.r.l. may furnish, upon request, products manufactured in accordance with

DIRECTIVE 2014/34/EU

in conformity with:
group II - category 2 G/D

BIMETALLIC THERMOMETERS

INSTALLATION
It is good practice to instal the thermometers by attaching them to specific thermowels guaranteeing mechanical protection (i.e. speed and pressure of the processing fluid) or chemical protection (i.e. possible aggressivity of the processing fluid), allowing for disassembly for maintenance or replacement purposes, without affecting the operation of the system. In the event of first installation and the thermometer being equipped with a thermowell, it may be convenient to preinstall the thermowell on the system and then proceed to the instalation of the relevant thermometer in the thermowell area. As a rule, the thermometers are made with the threaded end spinning and sliding on the bulb: therefore, it is necessary to loosen the two nuts from the sliding coupling, insert the bulb thoroughly in the thermowell area, tighten the coupling with a wrench, then the upper counter nut blocking the nose cone or the gland. For thermometers with either rear or "every-angle" coupling, prior to tightening the upper counter nut, the dial of the thermometer must be orientated in the desired reading position. For thermometers with fixed coupling, it must be ascertained that the length of the bulb is compatible with the hole and the length of the thermowell and take into account the threaded pairing in the thermowell. When replacement of thermometers is needed, prior to installing the new thermometer on the thermowell of the existing system, it is advisable to verify that the dimensions of the bulb are compatible with the bulb itself (bore and relevant depth), in order to avoid any damage. Do not tighten the thermometers on the pocket by exercising pressure on the case, since such operation may damage the instrument.

USE
Avoid installation in points of the system with strong mechanical vibrations, since the relevant readings would be difficult due to the rotation of the needle and there could also be excessive wear of internal parts.
Fantinelli manufactures also thermometers with cases with damping fluid for those applications in which strong mechanical vibrations occur. It is also good practice to avoid subjecting the cases of the thermometers to temperatures above 70°C to avoid the deterioration of internal components and harm to the operators.

MAINTENANCE
With the exception of periodic verification of accuracy values through relevant equipment, no particular maintenance is needed.

RECALIBRATION
The thermometers are normally equipped with a micrometric reset system and sometimes this operation is necessary for the recalibration of thermometers as long as this latter is performed by using the relevant reference equipment.

CALIBRATION CHECK
It is advisable to verify calibration through constant-temperature baths, which may checked by means of sample thermometers, keeping well in mind both the immersion of the bulb in the fluid at the set temperature and the fact that its development time involves a few minutes for a convenient stabilization of the values. The verification and/or the resetting of the thermometers needle are approximate if the only reference value is the ambient temperature since air is a bad conductor of heat and there is also the potential risk that sudden changes in temperature may affect the reading of the thermometer.

WORKING TEMPERATURE
Do not exceed the limits of the measuring range limited by the two black triangles on the dial.

GAS EXPANSION THERMOMETERS

The same precautions and recommendations given for bimetallic thermometers apply, with the addition of the following additional clarifications:

INSTALLING CAPILLARY THERMOMETERS FOR REMOTE READING
The case of the thermometer must be positioned in a place of the system for easy reading, and the capillary must be flat and appropriately anchored; it is necessary to avoid that the capillary comes into contact with too hot surfaces (i.e. tubes which carry saturated vapour, or furnace walls or other hot surfaces) and avoid hard bending as well. Any surplus of the capillary must be wound with adequate distance (minimum 50 mm) and in no event be cut since the whole system may be jeopardized

THERMOMETERS EQUIPPED WITH ELECTRICAL CONTACT
Fantinelli s.r.l. may furnish, upon request, a declaration of conformity relating to electrical contacts applied to thermometers:
- snap action contacts – in accordance with directive EEC 73/23;
- electronic contacts – in accordance with EN 60947-5-2;
- inductive contacts – PTB 99 ATEX 2219 X.

WARNING
FANTINELLI s.r.l. is not responsible for any damage, direct or indirect, to the property or to personnel and for any consequences (for example, loss of production), due to not non-conforming with the directions provided in this document and the precautions set out in our general catalogue that can be browsed online at http://www.fantinelli.it

SP 200 SERIES

"All stainless steel" Bourdon tube pressure gauges

- watertight casing, dry or liquid filled execution;
- NS 63 - 100 - 150 - 200 - 250;
  (View SF serie for solid front execution)
- ranges included between -1 and 1000 bar.

made in ITALY

PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 63, 100, 150, 200 e 250.
- **Casing**
  - case and ring in AISI 304 stainless steel with bayonet bezel (execution B).
- **Protection degree (according to EN 60529)**
  - IP 55 for execution D (dry);
  - IP 67 for execution F (liquid filled) and for execution P (fillable).
- **Window**
  - tempered glass for NS 63, 100 and 150;
  - methacrylate for NS 200 and 250;
  - laminated safety glass (option V17).
- **Blow-out device**
  - blow out plug.
- **Filling liquid**
  - glycerine (standard);
  - silicone fluid (on request - option V64).
- **Pressure connection (according EN 837-1)**
  Gas (BSP), BSPT or NPT thread as F dimension shown in SP tables, otherwise only on request:
  - AISI 316L stainless steel (execution 2);
  - Monel 400 (option W04).
- **Pressure element**
  - AISI 316L stainless steel (execution 2);
  - Monel 400 (option M04 and W04).
- **Welding**
  - TIG.
- **Movement**
  - stainless steel.
- **Ranges (according to EN 837-1)**
  - o **Maximum value:**
    - 1600 bar.
  - o **Scale ranges for pressure values between –1 and 1600 bar:**
    - pressure gauges: see table C1 at page P04;
    - vacuum gauges and compound gauges: see table C1 at page P04;
    - other graduations not normalized for single or double range (on request).
  - o **Unit of pressure:**
    - bar, kPa, MPa, kg/cm2 and psi for single or double range.
  - o **Scale angle:**
    - 270 °.
- **Working pressure (referred to full scale deflection)**
  - steady from 1/10 to 3/4;
  - fluctuating from 1/10 to 2/3;
  - pulsating from 1/10 to 1/2.
- **Over-pressure (occasionally allowed)**
  - 130% of full scale value.
- **Pointer**
  - aluminium with micrometer adjustment;
  - aluminium not adjustable for NS 63.
- **Dial**
  - white aluminium with black figures (for dial modifications see available options).
- **Accuracy (according to EN 837-1)**
  - class 1 (± 1% of full scale deflection) for NS 100, 150, 200 and 250;
  - class 1,6 (± 1,6% of full scale deflection) for NS 63.
- **Ambient temperature**
  - -40 ÷ +60 °C dry execution;
  - -20 ÷ +60 °C glycerine filled execution;
  - -40 ÷ +60 °C silicone fluid filled execution.
- **Thermal drift**
  - out of optimum ambient temperature values included within +15 ÷ +25 °C, the thermal drift affects the instruments accuracy of 0,3% every 10 °C.
- **Operating temperature**
  - -40 ÷ +250 °C dry execution;
  - -20 ÷ +100 °C glycerine filled execution;
  - -40 ÷ +120 °C silicone fluid filled execution.

APPLICATIONS

- **Accessories** (see AM series)
- **Diaphragm seal** (see FP series)

OPTIONS

- **Maximum pointer**
  to indicate the maximum pressure reached:
  - zero setting on the window (only NS 100 and 150).
    (identification V11)
- **Red pointer on the dial**
  only NS 100 and 150. **(identification V14)**
- **Window**
  different from standard (only NS 63, 100 and 150):
  - methacrylate;
    (identification V16)
  - laminated safety glass.
    (identification V17)
- **External zero adjustment**
  only NS 100 and 150. **(identification V20)**
- **Damped movement**
  only NS 100 and 150. **(identification V23)**
- **Restrictor**
  applicable to pressure connection to reduce the process fluid entry speed.
  (identification V26)
- **High overpresseres device**
  allows to NS 100 and 150 for ranges up to 40 bar with-stand over-pressures up to:
  -160%
  (identification V25)
  -250%
  (identification V27)
  note: for higher over-pressures you must use over-pressure protector.
- **Degreasing for oxygen service**
  (identification V31)
- **Accuracy class 0,5**
  ± 0,5% of full scale deflection
  (NS 63 excluded).
  (identification V34)
- **Accuracy class 0,6**
  ± 0,6% of full scale deflection
  (NS 63 excluded).
  (identification V36)
- **Process connection**
  not standard.
  (identification V42)
- **Changes to the dial**
  - serial number;
    (identification V50)
  - specific dial;
    (identification V51)
  - red mark;
    (identification V52)
  - writings;
    (identification V53)
  - TAG number;
    (identification V54)
  - dial without logo;
    (identification V56)
  - double logo (Fantinelli + customer);
    (identification V57)
  - customer's logo.
    (identification V58)
- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel for NS 63, 100 and 150 (for model SP 208 only).
  (identification V61)
- **Silicone fluid**
  as alternative to glycerine.
  (identification V64)
- **Tropicalization**
  requires AISI 316 stainless steel case and ring.
  (identification V67)
- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)
- **Monel 400 pressure element**
  as alternative to AISI 316L st.st. pressure element on NS 100 and 150.
  (identification M04)
- **Monel 400 pressure element assembly**
  as alternative to AISI 316L st.st. pressure element assembly on NS 100 and 150 (sonly for model SP 208).
  (identification W04)

DOCUMENTATION

- **Fantinelli calibration certificate**
  rising pressure:
  - class 0,6;
    (identification V91)
  - class 1.
    (identification V92)
- **Complementary documents**
  o certificate of compliance with the order EN 10204 -2.2.
  o Technical documentation including:
  - drawings and technical informations;
  - installation and maintenance instructions.
  o inspection and test certificate EN 10204-3.1.
  o material certificate.
  o PED declaration.
  o ATEX declaration (II 2 G/D).

TECHNICAL INFORMATIONS

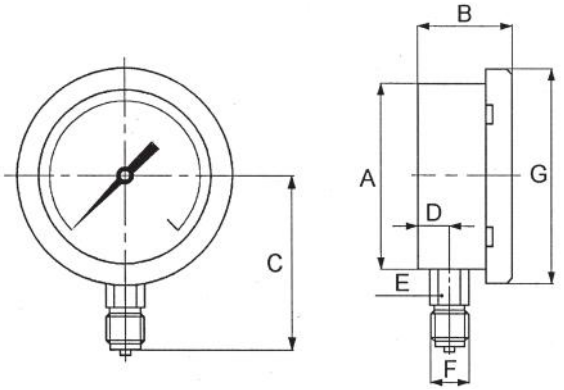


Table SP 208

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
63	62	32	56	10	14	1/4	69							0,16	0,23
100	100	49	90	15	22	1/2	112							0,57	0,91
150	151	49	114	15	22	1/2	166							0,92	1,79
200	202	51	144	15	17	1/2	216							1,32	
250	248	56	168	15	17	1/2	262							1,78	

Pressure gauge with bottom connection for local mounting.

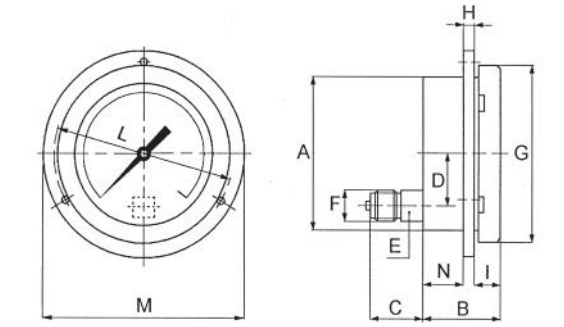


Table SP 211

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
63	64	31	23	0	14	1/4	69	2,5	12	75	84	16,5	3,6	0,18	0,25
100	100	50	35,5	28	22	1/2	110	3	16	116	134	31	5	0,56	0,90
150	150	50	35,5	33	17	1/2	166	7	19	178	192	27	5	1,04	1,88

Pressure gauge with back connection for flush mounting with 3 fixing holes.

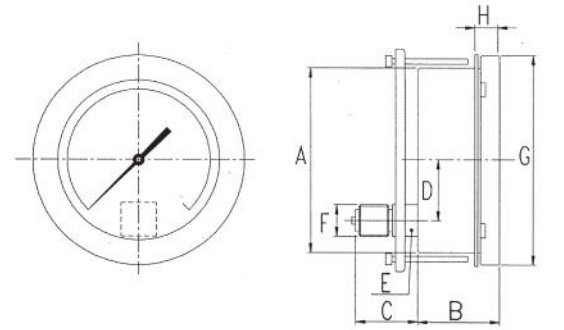


Table SP 212

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
63	62	31	23	0	14	1/4	69	12						0,19	0,26
100	100	50	35,5	28	22	1/2	110	15						0,58	0,92

Pressure gauge with back connection for flush mounting with clamp fixing.

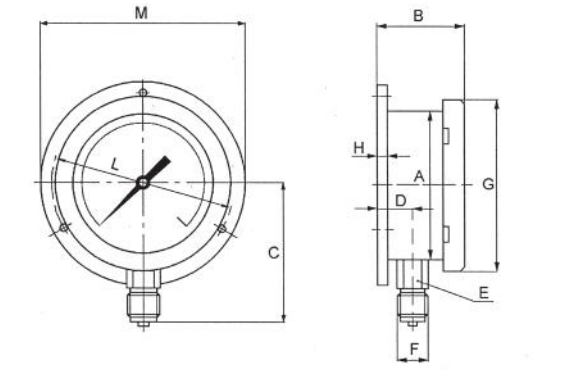


Table SP 213

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	100	49	90	15	22	1/2	112	1		116	132		5	0,62	0,96
150	151	56	114	22	22	1/2	166	7		178	192		5	1,16	2,03
200	202	60	144	24	17	1/2	216	9		220	240		6,5	1,92	
250	248	58	168	17	17	1/2	262	2		276	290		7	2,82	

Pressure gauge with bottom connection for surface mounting with 3 fixing holes

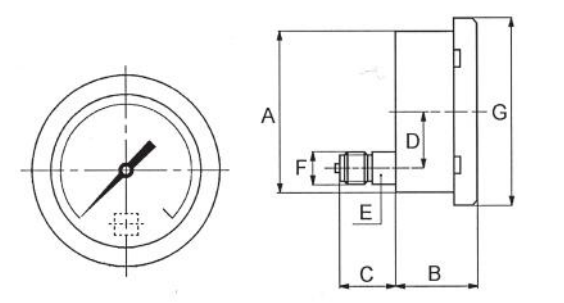


Table SP 215

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ es. D	es.
63	62	31	23	0	14	1/4	69							0,16	0,23
100	100	50	35,5	28	22	1/2	110							0,51	0,85
150	150	50	35,5	33	17	1/2	166							0,98	1,82

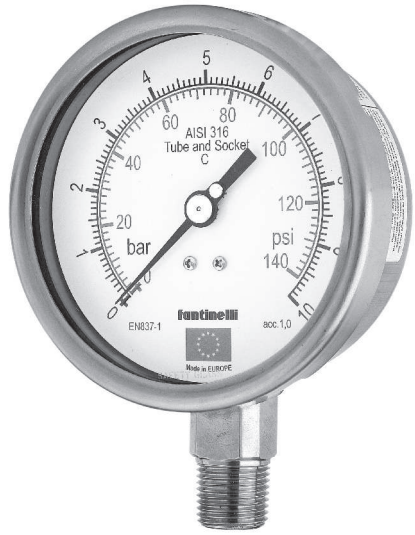
Pressure gauge with back connection for local mounting.

note: informations shown in this series may be changed at any time without prior notice.

SP 408 SERIES

"All stainless steel" Bourdon tube pressure gauges with compact element

- watertight casing, dry or liquid filled execution;
- NS - 100 - 150;
- ranges included between -1 and 1000 bar.



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PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 100, 150.
- **Casing**
  - case and ring in AISI 304 stainless steel with bayonet bezel (execution B).
- **Protection degree (according to EN 60529)**
  - IP 55 for execution D (dry);
  - IP 67 for execution F (liquid filled) and for execution P (fillable).
- **Window**
  - tempered glass for NS 100 and 150;
  - laminated safety glass (option V17).
- **Blow-out device**
  - blow out plug.
- **Filling liquid**
  - glycerine (standard);
  - silicone fluid (on request - option V64).
- **Pressure connection (according EN 837-1)**
  Gas (BSP) or NPT thread as F dimension shown in SP tables, otherwise only on request:
  - AISI 316L stainless steel (execution 2).
- **Pressure element**
  - AISI 316L stainless steel (execution 2).
- **Welding**
  - TIG.
- **Movement**
  - stainless steel.
- **Ranges (according to EN 837-1)**
  - o **Maximum value:**
    - 1000 bar.
  - o **Scale ranges for pressure values between –1 and 1000 bar:**
    - pressure gauges: see table C1 at page P04;
    - vacuum gauges and compound gauges: see table C1 at page P04;
    - other graduations not normalized for single or double range (on request).
  - o **Unit of pressure:**
    - bar, kPa, MPa, kg/cm2 and psi for single or double range.
  - o **Scale angle:**
    - 270 °.
- **Working pressure (referred to full scale deflection)**
  - steady from 1/10 to 3/4;
  - fluctuating from 1/10 to 2/3;
  - pulsating from 1/10 to 1/2.
- **Over-pressure (occasionally allowed)**
  - 130% of full scale value.
- **Pointer**
  - aluminium with micrometer adjustment.
- **Dial**
  - white aluminium with black figures (for dial modifications see available options);
  - stop pin on "0".
- **Accuracy (according to EN 837-1)**
  - class 1 (± 1% of full scale deflection).
- **Ambient temperature**
  - -40 ÷ +60 °C dry execution;
  - -20 ÷ +60 °C glycerine filled execution;
  - -40 ÷ +60 °C silicone fluid filled execution.
- **Thermal drift**
  - out of optimum ambient temperature values included within +15 ÷ +25 °C, the thermal drift affects the instruments accuracy of 0,3% every 10 °C.
- **Operating temperature**
  - -40 ÷ +250 °C dry execution;
  - -20 ÷ +100 °C glycerine filled execution;
  - -40 ÷ +120 °C silicone fluid filled execution.

APPLICATIONS

- **Accessories (see AM series)**
- **Diaphragm seal (see FP series)**

OPTIONS

- **Maximum pointer**
  to indicate the maximum pressure reached:
  - zero setting on the window (only NS 100 and 150).
    (identification V11)

- **Red pointer on the dial**
  only NS 100 and 150. **(identification V14)**

- **Window**
  different from standard (only NS 63, 100 and 150):
  - methacrylate;
    (identification V16)
  - laminated safety glass.
    (identification V17)

- **Restrictor**
  applicable to pressure connection to reduce the process fluid entry speed.
  (identification V26)

- **Degreasing for oxygen service**
  (identification V31)

- **Process connection**
  not standard.
  (identification V42)

- **Changes to the dial**
  - serial number;
    (identification V50)
  - specific dial;
    (identification V51)
  - red mark;
    (identification V52)
  - writings;
    (identification V53)
  - TAG number;
    (identification V54)
  - dial without logo;
    (identification V56)
  - double logo (Fantinelli + customer);
    (identification V57)
  - customer's logo.
    (identification V58)

- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel for NS 100 and 150 (for model SP 208 only).
  (identification V61)

- **Silicone fluid**
  as alternative to glycerine.
  (identification V64)

- **Tropicalization**
  requires AISI 316 stainless steel case and ring.
  (identification V67)

- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

DOCUMENTATION

- **Fantinelli calibration certificate**
  - class 1.
    (identification V92)

- **Complementary documents**
  o certificate of compliance with the order EN 10204 -2.2.
  o Technical documentation including:
  - drawings and technical informations;
  - installation and maintenance instructions.
  o inspection and test certificate EN 10204-3.1.
  o material certificate.
  o PED declaration.
  o ATEX declaration (II 2 G/D).

TECHNICAL INFORMATIONS

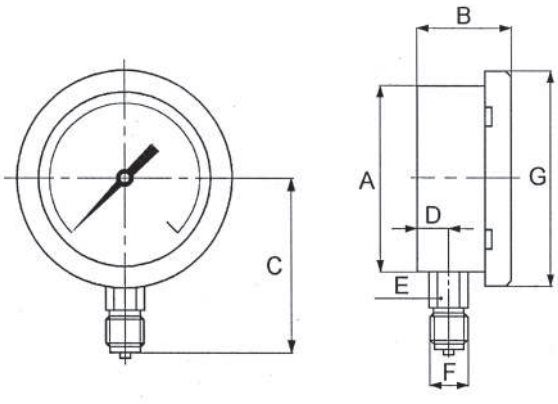


Table SP 408

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	100	49	90	15	22	1/2	112							0,57	0,91
150	151	49	114	15	22	1/2	166							0,92	1,79

Pressure gauge with bottom connection for local mounting.

note: informations shown in this series may be changed at any time without prior notice.

SP 100 SERIES

Bourdon tube pressure gauges for general purpose

◆ watertight casing, dry or liquid filled execution;

◆ NS 40 - 50 - 63 - 80 - 100;

◆ ranges included between 1 and 600 bar.

These instruments are manufactured for all those industry's sectors which require highest quality pressure gauges with stainless steel casing.

CE PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 40 - 50 - 63 - 80 and 100.

  Casing
  - case and crimped ring in AISI 304 st. st. (execution G).
- **Protection degree (according to EN 60529)**
  - IP 65.
- **Window**
  - plastic.
- **Blow-out device**
  - blow out plug.
- **Filling liquid**
  - glycerine.
- **Pressure connection (according to EN 837-1)**
  brass or AISI 316L stainless steel with Gas (BSP), BSPT or NPT thread as F dimension shown in SP tables, otherwise only on request, differenf from those indicated.
- **Pressure element**
  - phosphor bronze for execution 1;
  - AISI 316L stainless steel for execution 2.
- **Welding**
  - see table SP 3 at page SP11 for execution 1;
  - TIG for execution 2.
- **Movement**
  - brass for execution 1;
  - stainless steel for execution 2.
- **Ranges (according to EN 837-1)**
  - o **Maximum value:**
    - 600 bar.
  - o **Graduation:**
    - pressure gauges: 0÷1; 0÷1,6; 0÷2,5; 0÷4; 0÷6; 0÷10; 0÷16; 0÷25; 0÷40; 0÷60; 0÷100; 0÷160; 0÷250; 0÷400; 0÷600;
    - vacuum gauges: -1÷0.
      (divisions as per table C1 at page P08)
    - other graduations not normalized for single or double range (on request only).
  - o **Unit of pressure:**
    - bar, kPa, MPa, kg/cm2 and psi for single or double range.
  - o **Scale angle:**
    - 270°.
- **Working pressure (referred to full scale deflection)**
  - steady from 1/10 to 3/4;
  - fluctuating from 1/10 to 2/3;
  - pulsating from 1/10 to 1/2.
- **Over-pressure (occasionally allowed)**
  - 125% of full scale value for measuring range ≤ 100 bar;
  - 115% of full scale value for measuring ranges from >100 to ≤ 600 bar.
- **Pointer**
  - aluminium not adjustable.
- **Dial**
  - white aluminium with black figures.
- **Accuracy (according to EN 837-1)**
  - class 1,6.
- **Ambient temperature**
  - -20 ÷ +60 °C.
- **Service conditions**
  - see table SP 3 at page SP05.

Table SP 3
Welding – service conditions

Welding	Material		Service conditions		
	Connection	Pressure element	Temperature °C		Pressure bar
			min.	max	max
Tin alloy	Brass	Phosphor bronze	-10	80	100
Silver alloy	Brass	Phosphor bronze	-30	80	600

APPLICATIONS

- **Accessories**
  (see AM series)

OPTIONS

- **Silver alloy welding**
  (identification V22)
- **Restrictor**
  applicable to pressure connection to reduce the process fluid entry speed.
  (identification V26)
- **Process connection**
  not standard. **(identification V42)**
- **Changes to the dial**
  - serial number; **(identification V50)**
  - specific dial; **(identification V51)**
  - red mark; **(identification V52)**
  - writings; **(identification V53)**
  - TAG number; **(identification V54)**
  - dial without logo; **(identification V56)**
  - double logo (Fantinelli + customer); **(identification V57)**
  - customer's logo. **(sigla di identificationV58)**

DOCUMENTATION

- **Complementary documents**
  o certificate of compliance with the order EN 10204-2.2.
  o technical documentation.
  o PED declaration.

TECHNICAL INFORMATIONS

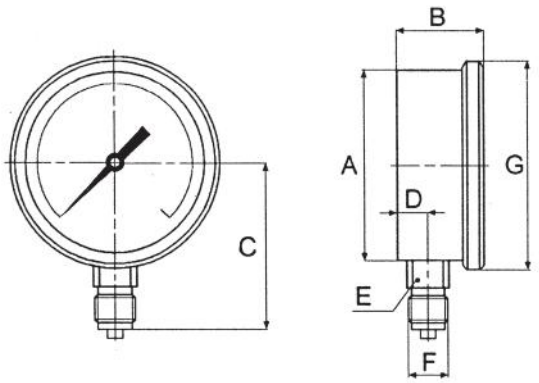


Table SP 108

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
40	41	25	42	8,5	11	1/8	47							0,06	0,08
50	51	29	51	9	14	1/4	59							0,10	0,14
63	61	31	53	9,5	14	1/4	69								0,18
80	80	31	65	10	14	1/4	89							0,21	0,36
100	101	34	87	11	22	1/2	110								0,89

Pressure gauge with bottom connection for local mounting.

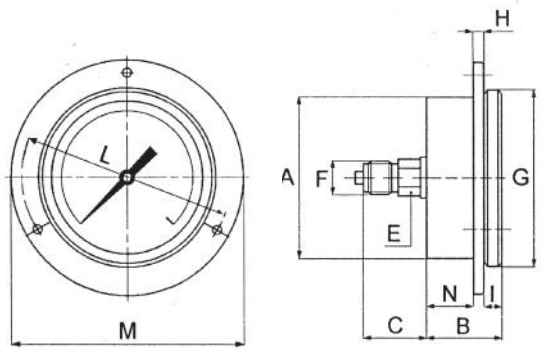


Table SP 111

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
63	63	30	27	0	14	1/4	69	2,5	6	75	84	21,5	3,6		0,21
80	82	31	27	19	14	1/4	89	1	12	95	110	18	5	0,25	0,40
100	101	34	40	29	22	1/2	110	1	17	118	132	16	6		0,92

Pressure gauge with back connection for flush mounting with 3 fixing holes.

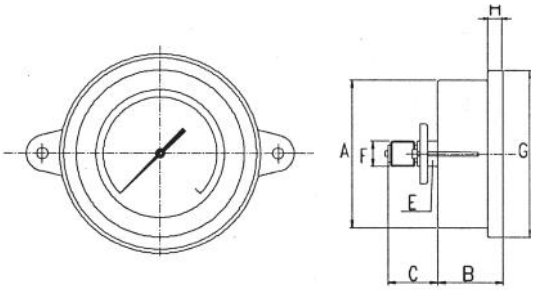


Table SP 112

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
63	61	30	27	0	14	1/4	69	6						0,22
100	101	34	40	29	22	1/2	110	8						0,93

Pressure gauge with back connection for flush mounting with clamp fixing.

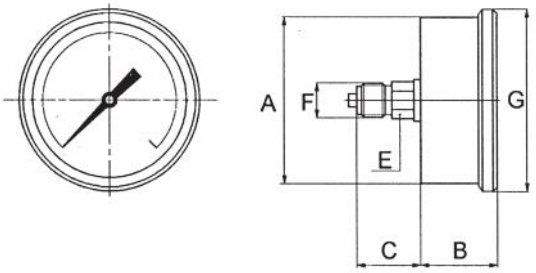


Table SP 115

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es.
63	61	30	27	0	14	1/4	69								0,19
80	80	31	27	19	14	1/4	89							0,20	0,30
100	101	34	40	29	22	1/2	110								0,86

Pressure gauge with back connection for local mounting.

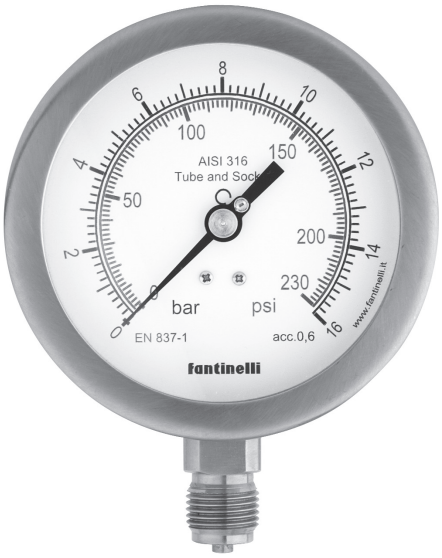
note: informations shown in this series may be changed at any time without prior notice.

SP SERIES 300

Bourdon tube pressure gauges

- stainless steel tube or Monel;
- watertight casing, dry or liquid filled execution;
- NS 100 - 150 - 200 - 260;
- ranges included between -1 and 1600 bar.

Instruments of SP 300 series are designed for special executions; with dial NS 100 and 150 are the base for the electric contact pressure gauges.



made in ITALY

PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal size**
  - 100, 150, 200 and 260.

- **Casing**
  - execution B:
    case and ring in AISI 304 stainless steel (AISI 316 on request for NS 100 and 150 - option V61) with bayonet bezel;
  - execution A:
    aluminium case and ring NS 260 painted with black epoxy powder with screw clamping.

- **Protection degree**
  (according to EN 60529)
  - IP 55 for execution D (dry);
  - IP 67 for execution F (liquid filled) and for execution P (fillable).

- **Window**
  - glass for dry execution NS 100 and 150;
  - methacrylate for liquid filled, fillable and for NS 200 and 260;
  - laminated safety glass (on request - option V17).

- **Blow-out device**
  - blow out plug for NS 100, 150 and 200 and for execution D (dry) NS 260;
  - calibrated valve for execution F (liquid filled) and for execution P (fillable) for NS 260.

  note: see SF SERIES for solid front execution.

- **Filling liquid**
  - glycerine (standard);
  - silicone fluid, standard if the instrument is provided with electrical contact or, on request, as alternative to glycerine - option V64;
  - special fluids (on request).

  note: see also headings "Service conditions" and "Ambient temperature".

- **Pressure connection**
  (according to EN 837-1)
  G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT) thread (others on request):
  - AISI 316L stainless steel (execution 2);
  - Monel 400 (option W04).

- **Pressure element**
  - AISI 316L stainless steel (execution 2);
  - Monel 400 (option M04 and W04).

  note: pressure element pierced inside connection body for a depth 7 mm, according to petrol-chemical industry specification.

- **Welding**
  - TIG.

- **Movement**
  - stainless steel.

- **Ranges**
  (according to EN 837-1)
  - o **Maximum values referred to NS:**
    - 1600 bar for NS 100 and 150;
    - 1000 bar for NS 200 and 260.
  - o **Divisions related for pressure values between -1 e 1600 bar:**
    - pressure gauges: see table C1 at page P04;
    - vacuum gauges and compound gauges: see table C1 at page P04;
    - other graduations not normalized for single or double range (on request).
  - o **Unit of pressure:**
    - bar, kPa, MPa, kg/cm2 and psi for single or double range.
  - o **Scale angle:**
    - 270°.

- **Working pressure**
  (referred to full scale deflection)
  - steady from 1/10 to 3/4;
  - fluctuating from 1/10 to 2/3;
  - pulsating from 1/10 to 1/2.

- **Over-pressure**
  (occasionally allowed)
  - 130% of full scale value (standard);
  - 160% of full scale value (option V25);
  - 250% of full scale value (option V27);
  - for others over-pressure values use over-pressure protectors (see AM series).

- **Pointer**
  - aluminium with micrometer adjustment for dry execution and for execution with electric contacts;
  - aluminium not adjustable for liquid filled or fillable execution.

- **Dial**
  - white aluminium with black figures (for dial modifications see available options).
- **Accuracy**
  (according to EN 837-1)
  - class 1 (± 1% of full scale deflection) standard.
  note 1: accuracy indicated on the pressure gauge does not consider the interference of an eventually applied electric contact.
  note 2: diaphragm seal can affect instrument accuracy according with the service conditions because of the pressure/temperature ratio.

- **Ambient temperature**
  - -40 ÷ +60 °C dry execution;
  - -20 ÷ +60 °C glycerine filled execution;
  - -40 ÷ +60 °C silicone fluid filled execution.

- **Thermal drift**
  - out of optimum ambient temperature values included within +15 ÷ +25°C, the thermal drift affects the instruments accuracy of 0,3% every 10°C.

- **Service conditions**
  - see table SP 5 at page SP10.

Table SP 5
Welding – service conditions

Welding	Material		Service conditions		
	Connection	Pressure element	Temperature °C		Pressure bar
			min.	max	max
TIG	Acciaio inox	Stainless steel	-30	250	1600
TIG	*Monel*	*Monel*	-30	250	1600

note:
80°C maximum process temperature for glycerine filled instruments, 120°C for silicone fluid filled ones.

APPLICATIONS

- **Diaphragm seal**
  (see FP series)
  applicable to pressure gauges with NS 100 and 150; in this case the instrument can be identified by the number of the chosen model, adding the reference of the suitable diaphragm seal among those of FP series.
  (identification FP...)

- **Electric contact**
  (see CE series)
  applicable to instruments with NS 100 and 150; in this case the instrument can be identified by the number of the chosen model, adding the reference of the switching action as shown in tables of the CE series. **(identification CE...)**

- **Accessories**
  (see AM series)
  - cooling siphons, recommended when high temperatures are involved;
  - valves;
  - dampers for control of process fluid entry speed into the instrument;
  - adjusting over-pressure protectors to cut automatically off the instrument from the circuit.

OPTIONS

- **Maximum pointer**
  to indicate the maximum pressure reached:
  - zero setting on the window;
  (identification V11)
  - zero setting outside the casing (suitable for dry execution instruments NS 100 and 150 with electric contacts).
  (identification V12)

- **Window**
  different from standard (only DN 100 and 150):
  - methacrylate; **(identification V16)**
  - laminated safety glass; **(identification V17)**
  - laminated safety glass increased thickness for instruments with electric contacts. **(identification V19)**

- **Elastic pointer stop**
  in cases of sudden return to zero of the pointer.
  (identification V21)

- **Restrictor**
  applicable to pressure connection to reduce the process fluid entry speed into the instrument.
  (identification V26)

- **High overpressures device**
  allows to NS 100 and NS 150 for ranges up to 40 bar to with-stand over-pressures up to:
  - 160%; **(identification V25)**
  - 250%. **(identification V27)**

note: for higher over-pressures you must use over-pressure protector.

- **Degreasing for oxygen service**
  (identification V31)
  note: if the instrument is supplied with diaphragm seal, the filling liquid is fluoride fluid.

- **Accuracy class 0,5**
  ± 0,5% of full scale deflection.
  (identification V34)

- **Dial with antiparallax mirror**
  for accuracy class 0,6 (0,5)
  NS 150 and 260.
  (identification V35)

- **Accuracy class 0,6**
  ± 0,6% of full scale deflection.
  (identification V36)

- **Process connection**
  not standard.
  (identificationV42)

- **Changes to the dial**
  - serial number; **(identification V50)**
  - specific dial; **(identificationV51)**
  - red mark; **(identification V52)**
  - writings; **(identification V53)**
  - TAG number; **(identification V54)**
  - dial without logo; **(identification V56)**
  - double logo (Fantinelli + customer); **(identification V57)**
  - customer's logo. **(identification V58)**

- **Fluoride fluid**
  as alternative to glycerine fluid for case filling.
  (identification V60)

- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel for NS 100 and 150 (for model SP 308 only, excluded the type with electric contact).
  (identification V61)

- **Silicone fluid**
  as alternative to glycerine for the case filling, where it is not already provided for.
  (identification V64)

- **Tropicalization**
  requires AISI 316 stainless steel case and ring.
  (identification V67)

- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

- **Monel 400 pressure element**
  as alternative to AISI 316L st.st. pressure element on NS 100 and 150.
  (identification M04)

- **Monel 400 pressure element assembly**
  as alternative to AISI 316L st.st. pressure element assembly on NS 100 and 150 (only for model SP 308 with the exclusion of model with electric contact).
  (identification W04)

DOCUMENTATION

- **Fantinelli calibration certificate**
  rising pressure:
  - class 0,6;
    (identification V91)
  - class 1;
    (identification V92)

- **ACCREDIA calibration certificate**
  (identification V98)

- **Complementary documents**
  o certificate of compliance with the order EN 10204-2.2.
  o technical documentation including:
  - drawings and technical informations;
  - installation and maintenance instructions.
  o inspection and test certificate EN 10204-3.1.
  o material certificates.
  o PED declaration.
  o ATEX declaration (II 2 G/D).

TECHNICAL INFORMATIONS

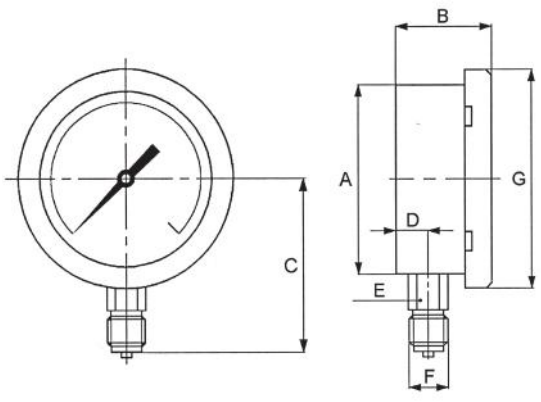


Table SP 308

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	103	50	90	15,5	22	1/2	118							0,61	0,98
150	150	50	114	15,5	22	1/2	166							0,98	1,82
200	199	68	158	26	17	1/2	240							1,93	3,93
260	258	64	177	18,5	17	1/2	280							3,32	5,72

Pressure gauge with bottom connection for local mounting.

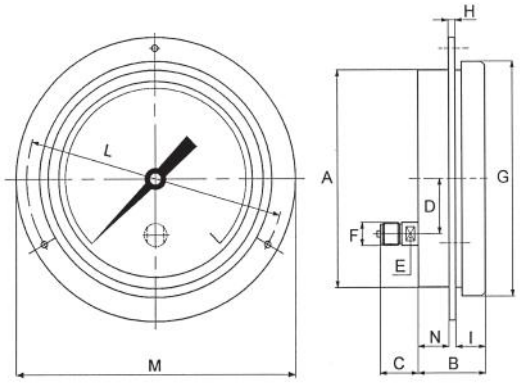


Table SP 311

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	103	50	35,5	33	17	1/2	118	7	19	126	140	27	5	0,70	1,07
150	150	50	35,5	33	17	1/2	166	7	19	178	192	27	5	1,04	1,88
200	199	54	39	51	17	1/2	240		9	220		45	6,5	2,06	3,56
260	258	64	34	48	17	1/2	280	6	27	298	315	31	6,5	3,64	6,04

Pressure gauge with back connection for flush mounting with 3 fixing holes

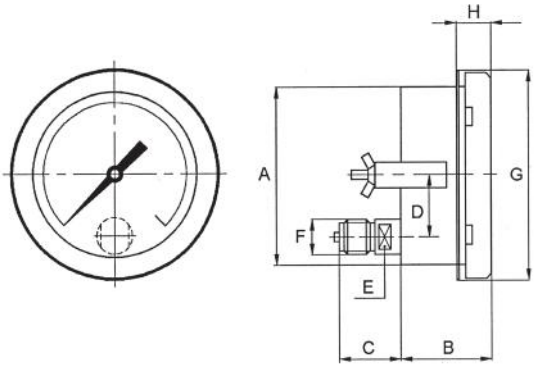


Table SP 312

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	103	50	35,5	33	17	1/2	121	20						0,76	1,13
150	150	50	35,5	33	17	1/2	168	20						1,17	2,01

Pressure gauge with back connection for flush mounting with clamp fixing.

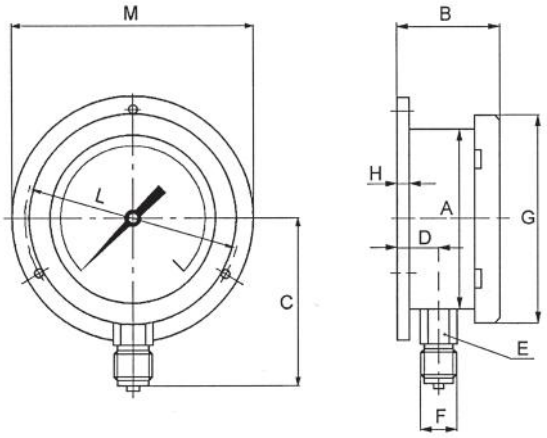


Table SP 313

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	103	57	90	22,5	22	1/2	118	7		126	140		5	0,74	1,11
150	150	57	114	22,5	22	1/2	166	7		178	192		5	1,22	2,06
200	199	77	158	35	17	1/2	240	9		220	240		6,5	2,22	4,22
260	258	67	177	21,5	17	1/2	280	3		290	322		6,5	5,25	7,65

Pressure gauge with bottom connection for surface mounting with 3 fixing holes.

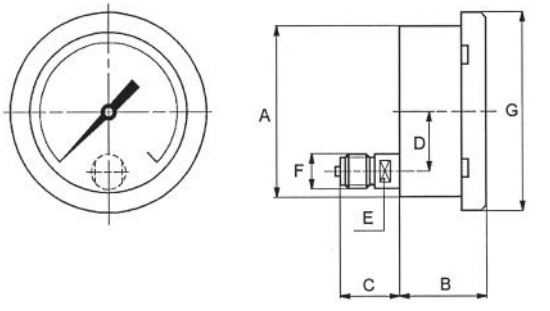


Table SP 315

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	103	50	35,5	33	17	1/2	118							0,61	0,98
150	150	50	35,5	33	17	1/2	166							0,98	1,82

Pressure gauge with back connection for direct mounting.

note: informations shown in this series may be changed at any time without prior notice.

SF SERIES

Solid front safety pressure gauges

- SF 316 with stainless steel casing
  - stainless steel or Ni-Span C or Monel Bourdon tube pressure element;
  - NS 100 - 150;
  - ranges included between -1 and 4000 bar.
- SF 317 with phenolic casing
  - stainless steel or Monel Bourdon tube pressure element;
  - NS 125 (4 1/2");
  - ranges included between 1 and 1000 bar.

Solid front pressure gauges are manufactured as per EN 837-1 and ASME B40.1. During the design of this type of pressure gauges, "safety" factor is taken into great consideration. Safety is guaranteed by a protection baffle wall positioned between the pressure element assembly and the dial, and by a blow-out device made of a back plate which allows an eventual pressure vent from the casing.

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ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - NS 100 and 150 for model SF 316;
  - NS 125 (4 1/2") (maximum scale value 1000 bar) for model SF 317.

  Casing
  - case and ring in AISI 304 stainless steel (AISI 316 on request - option V61) with bayonet bezel for model SF 316;
  - phenolic case for model SF 317.

- **Protection degree (according to EN 60529)**
  - IP 55 for execution D (dry);
  - IP 67 for execution F (liquid filled) and execution P (fillable - SF 317).

- **Window**
  - laminated safety glass for model SF 316;
  - polycarbonate for model SF 317.

- **Filling liquid**
  - glycerine (standard);
  - silicone fluid (on request for SF 316 only - option V64).

- **Pressure connection**
  - AISI 316L stainless steel G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT) thread for NS 100, 125 and 150 with ranges up to 1600 bar;
  - AISI 316L stainless steel 9/16-18 UNF or 5/8-18 UNF or M16x1,5 female thread with tapered seal, for NS 100 and 150 with ranges 2500 and 4000 bar;
  - Monel 400 (on request only - option V68).

- **Pressure element**
  - AISI 316L stainless steel for scale values up to 1600 bar;
  - Ni-Span C (Fe Ni Cr alloy) for scale values 2500 and 4000 bar;
  - Monel 400 (option V68).

- **Welding**
  - TIG.

- **Movement**
  - stainless steel.

- **Ranges (according to EN 837-1)**
  - o **Maximum values referred to NS:**
    - 1000 bar for NS 125;
    - 4000 bar for NS 100 and 150.
  - o **Divisions related for pressure values between -1 and 4000 bar:**
    - pressure gauges: see table C1 at page P04;
    - compound gauges: see table C1 at page P04;
    - other graduations not normalized for single or double range (on request).
  - o **Unit of pressure:**
    - bar, kPa, MPa, kg/cm2 and psi for single or double range.
  - o **Scale angle:**
    - 270 °.

- **Working pressure**
  - o referred to measuring ranges up to 1600 bar:
    - steady: from 1/10 to 3/4;
    - fluctuating: from 1/10 to 2/3;
    - pulsating: from 1/10 to 1/2.
  - o referred to measuring ranges of 2500 and 4000 bar:
    - steady: from 1/10 to 2/3;
    - fluctuating: from 1/10 to 1/2.

- **Over-pressure (occasionally allowed)**
  - 130% of full scale value for measuring ranges up to 1600 bar (standard);
  - 160% of full scale value for measuring ranges up to 60 bar (option V25);
  - 250% of full scale value for measuring ranges up to 60 bar (option V27);
  - not allowed for measuring ranges 2500 and 4000 bar.

- **Pointer**
  - aluminium with micrometer adjustment for dry execution;

- **Dial**
  - white aluminium with black figures (for dial modifications see available options).

- **Accuracy**
  (secondo EN 837-1)
  o SF 316:
  - class 1 (± 1% of full scale deflection) standard;
  - class 0,6 o 0,5 (± 0,6 o 0,5% of full scale deflection) on request - option V36 o V34 (full scale 4000 bar excluded).

  o SF 317:
  - class 0,5 (± 0,5% of full scale deflection) standard (according to BS and ANSI).

- **Ambient temperature**
  - -40 ÷ +60 °C dry execution;
  - -20 ÷ +60 °C glycerine filled execution;
  - -40 ÷ +60 °C silicone fluid filled execution.

- **Thermal drift**
  - out of optimum ambient temperature values included within +15 ÷ +25 °C, the thermal drift affects the instruments accuracy of 0,3% every 10 °C.

- **Operating temperature**
  - -40 ÷ +250 °C dry execution;
  - -20 ÷ +100 °C glycerine filled execution;
  - -40 ÷ +120 °C silicone fluid filled execution.

  note: 80 °C maximum operating temperature for glycerine filled instruments, 120 °C for silicone fluid filled ones.

APPLICATIONS

- **Diaphragm seal (see FP series)**
  when available.

- **Accessories (see AM series)**

OPTIONS

Maximum pointer
to indicate the maximum pressure reached:
- zero setting on the window.
  (identification V11)

- **Elastic pointer stop**
  in cases of sudden return to zero of the pointer.
  (identification V21)

- **Restrictor**
  applicable to pressure connection to reduce the process fluid entry speed into the instrument.
  (identification V26)

- **High over-pressures device**
  allows to NS 100 and 150, for ranges up to 60 bar to with-stand over-pressures up to:
  - 160%; **(identification V25)**
  - 250% **(identification V27)**

  nota: for higher over-pressures you must use over-pressure protector.

- **Degreasing for oxygen service**
  (identification V31)

- **Accuracy class 0,5**
  ± 0,5% of full scale deflection.
  (identification V34)

- **Accuracy class 0,6**
  ± 0,6% of full scale deflection.
  (identification V36)

Threaded pressure connection
different from standard.
(identification V42)

- **Changes to the dial**
  - serial number;
    (identification V50)
  - specific dial;
    (identification V51)
  - red mark;
    (identification V52)
  - writings;
    (identification V53)
  - TAG number;
    (identification V54)
  - dial without logo;
    (identification V56)
  - double logo (Fantinelli + customer);
    (identification V57)
  - customer's logo.
    (identification V58)

- **Fluoride fluid**
  as alternative to glycerine fluid for case filling.
  (identification V60)

- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel.
  (identification V61)

- **Silicone fluid**
  as alternative to glycerine. **(identification V64)**

- **Tropicalization**
  requires AISI 316 stainless steel case and ring.
  (identification V67)

- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

- **Monel 400 pressure element**
  as alternative to AISI 316L stainless steel pressure element.
  (identification M04)

- **Monel 400 pressure element assembly**
  as alternative to AISI 316L stainless steel pressure element assembly. **(identification W04)**

DOCUMENTATION

- **Fantinelli calibration certificate**
  rising pressure:
  - class 0,6 or 0,5;
    (identification V91)
  - class 1.
    (identification V92)

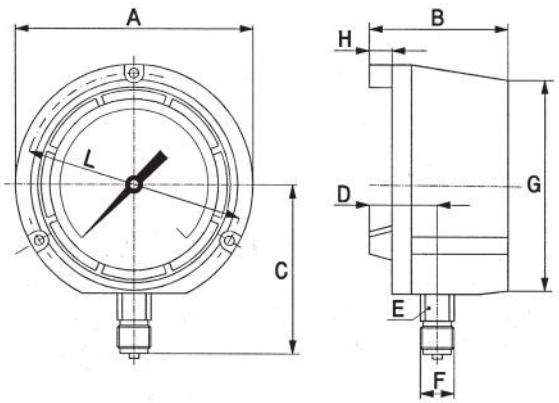
- **ACCREDIA calibration certificate**
  (identification V98)

- **Complementary documents**
  o acertificate of compliance with the order EN 10204-2.2.
  o technical documentation including:
  - drawings and technical informations;
  - installation and maintenance instructions.
  o inspection and test certificate EN 10204-3.1.
  o material certificates.
  o PED declaration.
  o ATEX declaration (II 2 G/D).

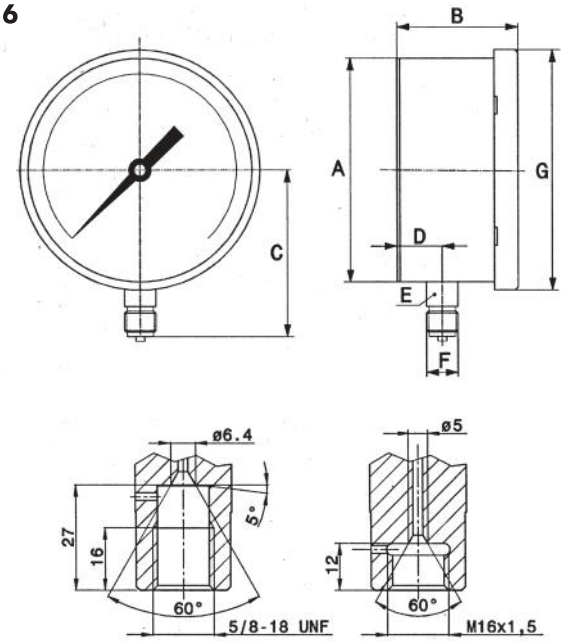
TECHNICAL INFORMATIONS

SF 317

Solid front pressure gauge with bottom connection for local or surface mounting.



SF 316



Pressure connection for ranges 2500 and 4000 bar.

Table SF

Model	DN	A	B	C	D	E	F	G	H	L	Ø fori 120°	PESO ~ kg es. D	es. F
SF316	100	100	50	90	16	22	1/2	112				0,70	1,04
	150	151	52	114	16	22	1/2	166				1,15	2,02
SF317	125	148	86	103	42	22	1/2	129	14	137	6	1,00	1,50

nota: informations shown in this series may be changed at any time without prior notice.

DP SERIES 370

Single diaphragm differential pressure gauges

- **DP 370**
  - ranges included between 160 mbar and 25 bar;
  - static pressure100 bar both ports;
  - scale angle 270°;
  - accuracy class 1,6.

made in ITALY

PED 2014/68/EU
ATEX 2014/68/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 100 and 150.
- **Execution**
  - A... direct mounting;
  - B... surface mounting with clamp;
  - C... back panel flush mounting;
  - D... 2" pipe mounting;
  - ...D dry;
  - ...F liquid filled;
  - ...P fillable.
- **Casing**
  - case and ring in AISI 304 stainless steel (AISI 316 on request - option V61) with bayonet bezel.
- **Protection degree (according to EN 60529)**
  - IP 55 for execution D;
  - IP 67 for execution F and P.
- **Window**
  - glass for execution D;
  - methacrylate for execution F and P;
  - laminated safety glass (on request - option V17).
- **Casing filling liquid**
  - silicon oil (standard);
  - silicone fluid (on request - option V64).
- **Pressure connections (according to EN 837)**
  - o AISI 316L stainless steel:
    - 1/4-18 NPT (1/4 NPT female) - standard;
    - G 1/2 B (1/2 Gas or BSP male) or 1/2-14 NPT EXT (1/2 NPT male) (on request - option V43).
- **Pressure element**
  - AISI 316L or Duratherm stainless steel diaphragm, according with selected ranges.
- **Static pressure**
  for all scale ranges, apart from the pressure entry in both connections:
  - 100 bar (both ports).
- **Overpressure**
  - 2 x full scale value on one port.
- **Differential cell**
  - o **material:**
    - AISI 316L stainless steel.
- **Diaphragm stop**
  - polyurethane resin.
- **Differential cell bolts and nuts**
  - di acciaio inox AISI 304.
- **Differential cell gaskets**
  - nitril rubber (NBR) standard;
  - FPM (Viton) on request.
- **Movement**
  - stainless steel.
- **Torsion shaft**
  - stainless steel.
- **Ranges (according to EN 837)**
  - o **Scale ranges for pressure values between 160 mbar and 25 bar:**
    - see table C1 at page P04;
      (divisions as per table C1 at page P04).
    - other graduations not normalized for single or double range (on request).
  - o **Unit of pressure:**
    - mbar, bar, kPa, kg/cm2 and psi for single or double range.
  - o **Scale angle:**
    - 270 °.

note: scale angle is 180° with ranges and 0 ÷ 100/160 mbar for model DP 370.

- **Pointer**
  - aluminium with micrometer adjustment.
- **Dial**
  - white aluminium with black figures (for dial modifications see available options).
- **Accuracy**
  (according to EN 837)
  - class 1,6 (± 1,6% of full scale deflection).
  note1: accuracy indicated on the pressure gauge does not consider the interference of an eventually applied electric contact.
  note2: il diaphragm seal can affect instrument accuracy according with the service conditions because of the pressure/temperature ratio.
- **Ambient temperature**
  - -30 ÷ +60 °C.
- **Operating temperature**
  - max 120 °C.

APPLICATIONS

- **Diaphragm seals**
  (see FP series)
  with stainless steel or exotic materials diaphragm, are applicable to the instruments with ranges included between 250 mbar and 25 bar; in this case the instrument can be identified by the number of the chosen model, adding the reference of the suitable diaphragm seal among those of FP series.
  (identification FP...)
- **Electric contact (see CE series)**
  the instrument can be identified by the number of the chosen model, adding the reference of the switching action as shown in tables of CE series. Differential pressure gauges equipped with electric contacts are available in dry execution only.
  (identification CE...)
- **Accessories (see AM series)**
  manifold valve.

OPTIONS

- **Maximum pointer**
  to indicate the maximum pressure reached:
  - zero setting on the window (suitable also for liquid filled instruments).
    (identification V11)
- **Window**
  - laminated safety glass.
    (identification V17)
- **External zero adjustment**
  (identification V20)
- **Oxygen service**
  degreased for oxygen service.
  (identification V31)
- **Accuracy class 1**
  - ± 1% of full scale deflection hysteresis excluded (for dry execution only).
    (identification V37)
- **Not standard connections**
  (identification V42)
- **Male or female threaded pressure connections (according to EN 837)**
  - G 1/2 B (1/2 Gas or BSP);
  - 1/2-14 NPT (1/2 NPT);
  - others (on request - option V42).
    (identification V43)
- **Changes to the dial**
  - serial number;
    (identification V50)
  - specific dial;
    (identification V51)
  - red mark;
    (identification V52)
  - writings;
    (identification V53)
  - TAG number;
    (identification V54)
  - dial without logo;
    (identification V56)
  - double logo (Fantinelli + customer);
    (identification V57)
  - customer's logo.
    (identification V58)
- **Fluoride fluid**
  as alternative to glycerine fluid for case filling and added to option V31.
  (identification V60)
- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel.
  (identification V61)
- **Solid front execution casing**
  (identification V65)
- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

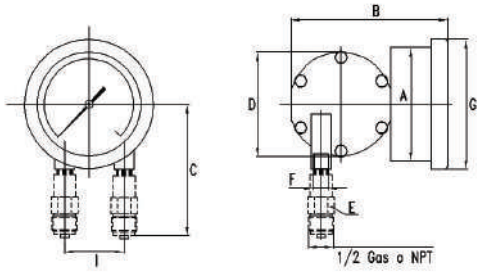
DOCUMENTATION

- **Fantinelli calibration certificate**
  rising pressure:
  - class 1; **(identification V92) (Hysteresis excluded)**
  - class 1,6. **(identification V93)**

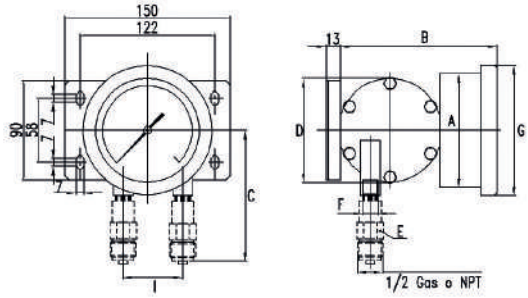
- **Complementary documents**
  o certificate of compliance with the order EN 10204-2.2.
  o technical documentation including:
  - drawings and technical informations;
  - installation and maintenance instructions.
  o inspection and test certificate EN 10204-3.1.
  o material certificates .
  o PED declaration.
  o ATEX declaration (II 2 G/D).

TECHNICAL INFORMATIONS

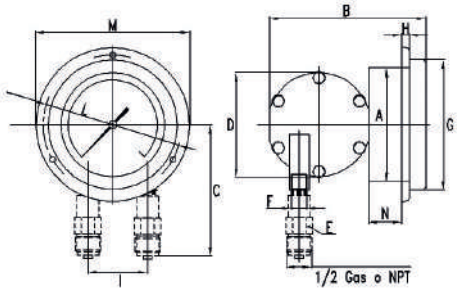
DP 370-A



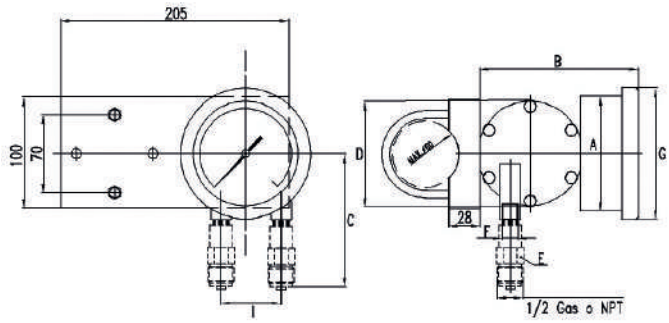
DP 370-B



DP 370-C



DP 370-D



DIMENSIONS TABLE														
Model	**Dial**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**L**	**M**	**N**	**Holes**
DP 370	NS100	103	142	120	95	22	¼"	118	7	54	126	140	27	Ø 5
	NS150	150	142	120	95	22	¼"	166	7	54	178	192	27	Ø 5

WEIGHT TABLE							
Model (Dry IP55/67)		**NS100**	**NS150**	**Model (Filled IP67)**		**NS100**	**NS150**
DP 370 AD/AP	kg	1,9	2,1	DP 370 AF	kg	2,2	2,8
DP 370 BD/BP	kg	2,2	2,4	DP 370 BF	kg	2,5	3,1
DP 370 CD/CP	kg	2,0	2,2	DP 370 CF	kg	2,3	2,9
DP 370 DD/DP	kg	2,5	2,7	DP 370 DF	kg	2,8	3,4

note: informations shown in this series may be changed at any time without prior notice.

DP 360/460 SERIES

Indipendent diaphragms differential pressure gauges

- **DP 360**
  - ranges included between 100 mbar and 25 bar;
  - static pressure 100 bar;
  - scale angle 270°;
  - accuracy class 1,6.
- **DP 460**
  - ranges included between 25 and 100 mbar;
  - static pressure 25 bar;
  - scale angle 270°;
  - accuracy class 1,6.

made in ITALY

PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 100 and 150.
- **Execution**
  - A... direct mounting;
  - B... surface mounting with clamp;
  - C... back panel flush mounting;
  - D... 2" pipe mounting;
  - ...D dry;
  - ...F liquid filled;
  - ...P illable.
- **Casing**
  - case and ring in AISI 304 stainless steel (AISI 316 on request - option V61) with bayonet bezel.
- **Protection degree (according to EN 60529)**
  - IP 55 for execution D;
  - IP 67 or execution F and P.
- **Window**
  - glass for execution D;
  - methacrylate for execution F and P;
  - laminated safety glass (on request - option V17).
- **Casing filling liquid**
  - glycerine (standard);
  - silicone fluid (on request - option V64).

  note: all instruments with filled casing have the external zero adjustment standard.
- **Pressure connections (according EN 837)**

  o AISI 316L stainless steel:
  - 1/4-18 NPT (1/4 NPT female) - standard;
  - G 1/2 B (1/2 Gas or BSP male) or 1/2-14 NPT EXT (1/2 NPT male) (on request - option V43).

  o exotic materials (options W04 or W06).
- **Pressure element**
  - AISI 316Ti or AISI 316L st. st. indipendent diaphragm, according with selected ranges;
  - exotic materials (options M04 o M06)
- **Static pressure**

  for all scale ranges, apart from the pressure entry in one or both connections:
  - 100 bar for model DP 360;
  - 25 bar for model DP 460;
  - 250 bar for model DP 360 (on request - option V47);
  - 400 bar for model DP 360 (on request - option V45);
  - 100 bar for model DP 460 (on request - option V44).
- **Differential cell**

  o **material:**
  - AISI 316L stainless steel;
  - Monel 400 (option W04);
  - Hastelloy C276 (option W06).

  o **sizes:**
  - DP 360, mm 100 x 100;
  - DP 460, mm 150 x 150.
- **Differential element filling liquid**
  - silicone fluid (standard);
  - food compatible fluid (on request).
- **Differential cell bolts and nuts**
  - stainless steel AISI 304;
  - galvanized steel for DP 360 static 600.
- **Differential cell gaskets**
  - nitril rubber (NBR), standard;
  - FPM (Viton) on request.
- **Movement**
  - stainless steel.
- **Torsion shaft**
  - stainless steel.
- **Ranges (according EN 837)**

  o **Scale ranges for pressure values between 16 mbar and 25 bar:**
  - see table C1 at page P04; (divisions as per table C1 at page P04).
  - other graduations not normalized for single or double range (on request).

o **Unit of pressure:**
- mbar, bar, kPa, kg/cm2 and psi for single or double range.

o **Scale angle:**
- 270 °.

nota: scale angle is 180° with ranges 0 ÷ 25 mbar for model DP 460 and 0 ÷ 100 mbar for model DP 360.

- **Pointer**
  - aluminium with micrometer adjustment.

- **Dial**
  - white aluminium with black figures (for dial modifications see available options).

- **Accuracy (according EN 837)**
  - classe1,6 (± 1,6% of full scale deflection).

note1: accuracy indicated on the pressure gauge does not consider the interference of an eventually applied electric contact.
note2: diaphragm seal can affect instrument accuracy according with the service conditions because of the pressure/temperature ratio.

- **Ambient temperature**
  - -30 ÷ +60 °C.

- **Operating temperature**
  - max 120 °C.

- **Thermal drift**
  - with reference to the ambient temperature of 20°C, hermal drift affects the instrument accuracy as ± 0,6% every 10°C of variations.

APPLICATIONS

- **Diaphragm seals (see FP series)**
  with stainless steel or exotic materials diaphragm, are applicable to the instruments with ranges included between 60 mbar and 25 bar; in this case the instrument can be identified by the number of the chosen model, adding the reference of the suitable diaphragm seal among those of FP series.
  (identification FP...)

- **Electric contact (see CE series)**
  the instrument can be identified by the number of the chosen model, adding the reference of the switching action as shown in tables of CE series. Differential pressure gauges equipped with electric contacts are available in dry execution only.
  (identification CE...)

- **Accessories (see AM series)**
  manifold valve.

OPTIONS

- **Maximum pointer**
  to indicate the maximum pressure reached:
  - zero setting on the window (suitable also for liquid filled instruments).

  (identification V11)

- **Window**
  - laminated safety glass.

  (identification V17)

- **External zero adjustment**
  (identification V20)

- **Oxygen service**
  in this case the pressure gauge is degreased and the differential element filling liquid is fluoride fluid.
  (identification V31)

- **Accuracy class 1**
  ± 1% of full scale deflection
  (only rising pressure and for dry execution only).
  (identification V37)

- **Not standard connections**
  (identification V42)

- **Male or female threaded pressure connections (according EN 837)**
  - G 1/2 B (1/2 Gas or BSP);
  - 1/2-14 NPT (1/2 NPT);
  - others (on request - option V42).

  (identification V43)

- **Static pressure 100 bar**
  for model DP 460.
  (identification V44)

- **Static pressure 400 bar**
  for model DP 360.
  (identification V45)

- **Changes to the dial**
  - serial number;
    (identification V50)
  - specific dial;
    (identification V51)
  - red mark;
    (identification V52)
  - writings;
    (identification V53)
  - TAG number;
    (identification V54)
  - dial without logo;
    (identification V56)
  - double logo (Fantinelli + customer);
    (identification V57)
  - customer's logo.
    (identification V58)

- **Fluoride fluid**
  as alternative to glycerine fluid for case filling and added to option V31.
  (identification V60)

- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel.
  (identification V61)

- **AISI 316 complete kit**
  (identification K61)

- **Silicone fluid**
  as alternative to glycerine.
  (identification V64)

- **Solid front execution casing**
  (identification V65)

- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

- **Exotic materials diaphragm**
  - Monel 400 (for ranges see option W04)
    (identification M04)
  - Hastelloy C276 (for ranges see option W06)
    (identification M06)

- **Monel 400 wetted parts**
  minimum pressure range available:
  - 0 ÷ 250 mbar on 180° for DP 360
    (for range 160 mbar is foreseen model DP 460);
  note: for range 250 and 400 mbar, maximum static pressure is 100 bar.
  - 0 ÷ 60 mbar on 180° for DP 460.
    (identification W04)

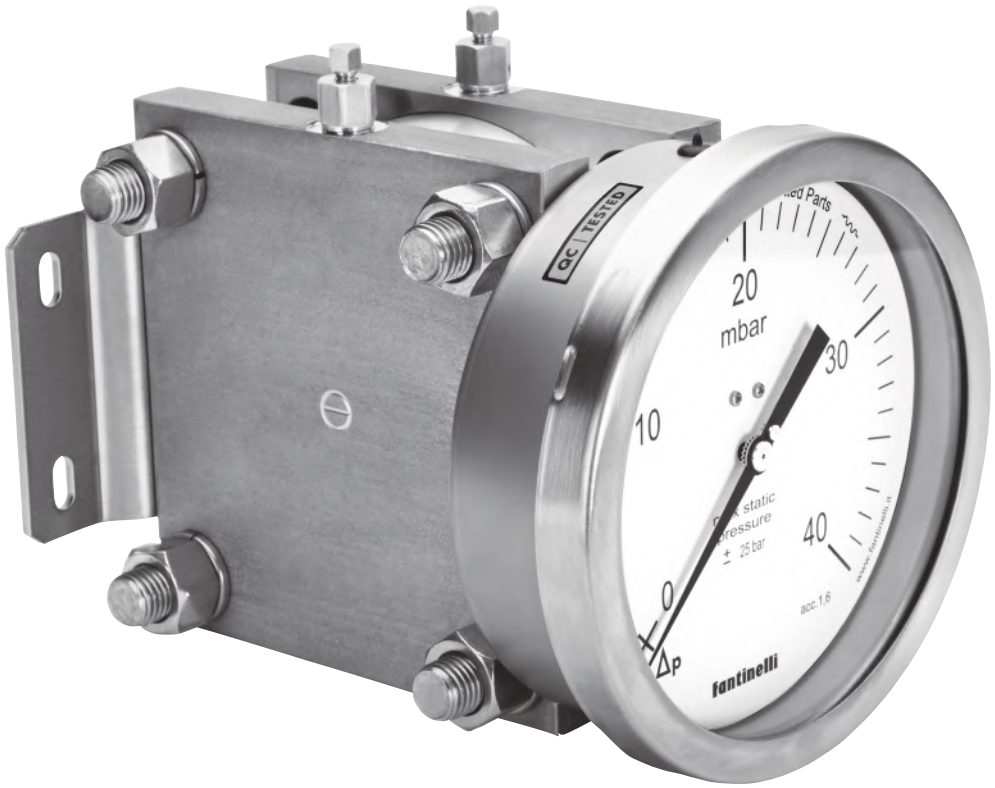
- **Hastelloy C276 wetted parts**
  minimum pressure range available:
  - 0 ÷ 250 mbar on 180° for DP 360
    (for range 160 mbar is foreseen model DP 460);
  note: for range 250 and 400 mbar, maximum static pressure is 100 bar.
  - 0 ÷ 60 mbar on 180° for DP 460.
    (identification W06)

DOCUMENTATION

- **Fantinelli calibration certificate**
  rising pressure:
  - class 1; **(identification V92)**
  - class 1,6; **(identification V93)**

- **Complementary documents**
  o certificate of compliance with the order EN 10204-2.2.
  o technical documentation including:
  - drawings and technical informations;
  - installation and maintenance instructions.
  o inspection and test certificate EN 10204-3.1.
  o material certificates.
  o PED declaration.
  o ATEX declaration (II 2 G/D).

DP 460-B



TECHNICAL INFORMATIONS

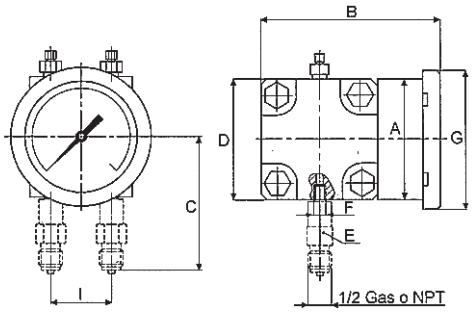


Table DP 360/460-A

Model	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
DP 360-A	100	103	150	112	100	22	1/4	118		54					4,8	5,1
	150	150	150	112	100	22	1/4	166		54					5,0	5,7
DP 460-A	100	103	200	137	150	22	1/4	118		54					10,7	11,0
	150	150	200	137	150	22	1/4	166		54					10,9	11,6

Execution A

Pressure gauge for direct mounting.

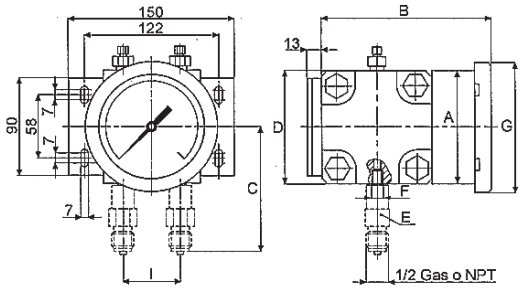


Table DP 360/460-B

Model	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
DP 360-B	100	103	150	112	100	22	1/4	118		54					5,1	5,4
	150	150	150	112	100	22	1/4	166		54					5,3	6,0
DP 460-B	100	103	200	137	150	22	1/4	118		54					11,0	11,3
	150	150	200	137	150	22	1/4	166		54					11,2	11,9

Execution B

Pressure gauge for surface mounting with clamp.

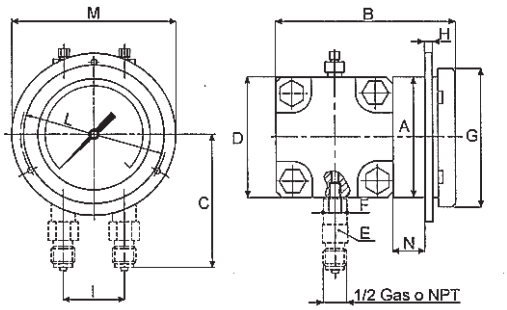


Table DP 360/460-C

Model	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
DP 360-C	100	103	150	112	100	22	1/4	118	7	54	126	140	27	5	4,9	5,2
	150	150	150	112	100	22	1/4	166	7	54	178	192	27	5	5,1	5,8
DP 460-C	100	103	200	137	150	22	1/4	118	7	54	126	140	27	5	10,8	11,1
	150	150	200	137	150	22	1/4	166	7	54	178	192	27	5	11,0	11,7

Execution C

Pressure gauge for back panel flush mounting with 3 fixing holes.

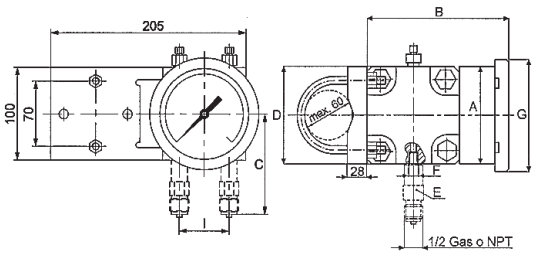


Table DP 360/460-D

Model	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
DP 360-D	100	103	150	112	100	22	1/4	118		54					5,4	5,7
	150	150	150	112	100	22	1/4	166		54					5,6	6,3
DP 460-D	100	103	200	137	150	22	1/4	118		54					11,3	11,6
	150	150	200	137	150	22	1/4	166		54					11,5	12,2

Execution D

Pressure gauge for 2" pipe mounting with AISI 304 st. st. support.

note: informations shown in this series may be changed at any time without prior notice.

DP 361 SERIES

Bellows differential pressure gauges

- ranges included between 10 and 40 mbar;
- scale angle 180°;
- accuracy class 1,6.

made in ITALY

CE PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 100 and 150.
- **Execution**
  - A... direct mounting;
  - B... surface mounting with clamp;
  - C... back panel flush mounting;
  - D... 2" pipe mounting;
  - ...D dry;
  - ...F liquid filled;
  - ...P fillable.
- **Casing**
  - case and ring in AISI 304 stainless steel (AISI 316 on request - option V61) with bayonet bezel.
- **Protection degree (according to EN 60529)**
  - IP 55 for execution D;
  - IP 67 for execution F and P.
- **Window**
  - glass for execution D;
  - methacrylate for execution F and P;
  - laminated safety glass (on request – option V17).
- **Casing filling liquid**
  - silicone fluid.
- **Pressure connections (according to EN 837)**
  AISI 316L stainless steel:
  - 1/4-18 NPT (1/4 NPT female) - standard;
  - G 1/2 B (1/2 Gas or BSP male) or 1/2-14 NPT EXT (1/2 NPT male) (on request - option V43).
- **Pressure element**
  - AISI 316L st. st. bellows.
- **Static pressure**
  - o **range 0 ÷ 10 mbar:**
    - 100 mbar one side;
    - 10 bar both side.
  - o **range 0 ÷ 16 mbar:**
    - 160 mbar one side;
    - 10 bar both side.
  - o **range 0 ÷ 25 mbar:**
    - 250 mbar one side;
    - 10 bar both side.
  - o **range 0 ÷ 40 mbar:**
    - 400 mbar one side;
    - 10 bar both side.
- **Differential cell**
  - o **material:**
    - AISI 316L stainless steel.
  - o **size:**
    - mm 100 x 110.
- **Differential cell gaskets**
  - P.T.F.E..
- **Differential cell bolts and nuts**
  - AISI 304 stainless steel.
- **Movement**
  - stainless steel.
- **Ranges (according to EN 837)**
  - o **Graduation:**
    - 0 ÷ 10; 0 ÷ 16; 0 ÷ 25; 0 ÷ 40; (divisions as per table C1 at page P08)
    - other graduations not normalized.
  - o **Unit of pressure:**
    - mbar, kPa, and psi for single or double range.
  - o **Scale angle:**
    - 180 °.
- **Pointer**
  - aluminium with micrometer adjustment.
- **Dial**
  - white aluminium with black figures (for dial modifications see available options).
- **Accuracy (according to EN 837)**
  - class 1,6 (± 1,6% of full scale deflection).

  note1: accuracy indicated on the pressure gauge does not consider the interference of an eventually applied electric contact.
- **Ambient temperature**
  - - 20 ÷ + 60 °C.
- **Operating temperature**
  - - 25 ÷ + 65 °C.

APPLICATIONS

- **Electric contact (see CE series)**

VARIANTI

- **Maximum pointer**
  to indicate the maximum pressure reached:
  - zero setting on the window (suitable also for liquid filled instruments).
    (identification V11)

- **Window**
  - laminated safety glass.
    (identification V17)

- **Not standard connections (identification V42)**

- **Male or female threaded pressure connections (according to EN 837)**
  - G 1/2 B (1/2 Gas or BSP);
  - 1/2-14 NPT (1/2 NPT);
  - others (on request - option V42).
    (identification V43)

- **Changes to the dial**
  - serial number;
    (identification V50)
  - specific dial;
    (identification V51)
  - red mark;
    (identification V52)
  - writings;
    (identification V53)
  - TAG number;
    (identification V54)
  - dial without logo;
    (identification V56)
  - double logo (Fantinelli + customer);
    (identification V57)
  - customer's logo.
    (identification V58)

- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel.
  (identification V61)

- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

DOCUMENTATION

- **Fantinelli calibration certificate class 1,6**
  rising pressure.
  (identification V93)

Complementary documents
o certificate of compliance with the order EN 10204-2.2.
o technical documentation including:
  - drawings and technical informations;
  - installation and maintenance instructions.
o inspection and test certificate EN 10204-3.1.
o material certificates.
o PED declaration.
o ATEX declaration (II 2 G/D)

TECHNICAL INFORMATIONS

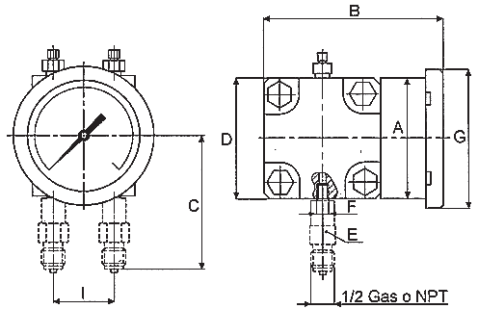


Table DP 361-A

Model	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
DP 361-A	100	103	150	117	110	22	1/4	118		54					4,8	5,1
	150	150	150	117	110	22	1/4	166		54					5,0	5,7

Execution A
Pressure gauge for direct mounting.

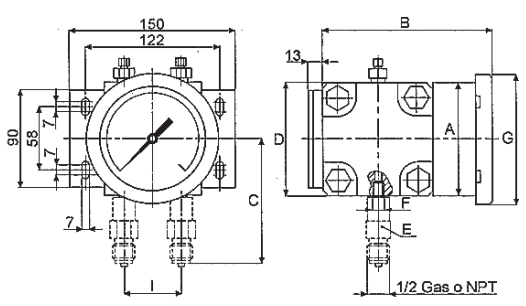


Table DP 361-B

Model	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
DP 361-B	100	103	150	117	110	22	1/4	118		54					5,1	5,4
	150	150	150	117	110	22	1/4	166		54					5,3	6,0

Execution B
Pressure gauge for surface mounting with clamp.

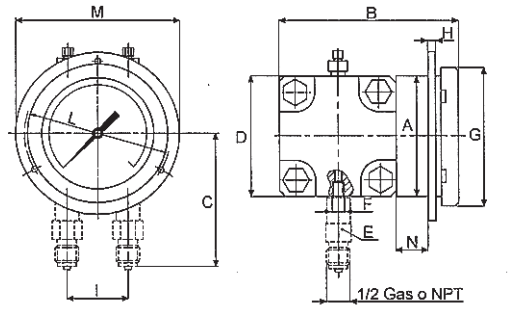


Table DP 361-C

Model	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
DP 361-C	100	103	150	117	110	22	1/4	118	7	54	126	140	27	5	4,9	5,2
	150	150	150	117	110	22	1/4	166	7	54	178	192	27	5	5,1	5,8

Execution C

Pressure gauge for back panel flush mounting with 3 fixing holes.

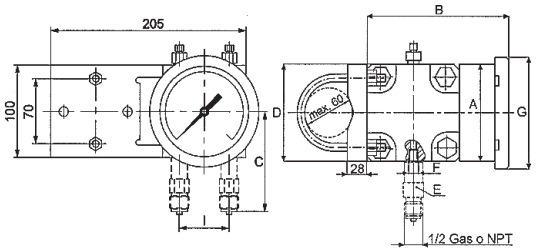


Table DP 361-D

Model	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
DP 361-D	100	103	150	117	110	22	1/4	118		54					5,4	5,7
	150	150	150	117	110	22	1/4	166		54					5,6	6,3

Execution D

Pressure gauge for 2" pipe mounting with AISI 304 st. st. support.

note: informations shown in this series may be changed at any time without prior notice.

DP 358 SERIES

Double C-Bourdon tube differential pressure gauges

- watertight casing for dry or liquid filled execution;
- NS 100;
- ranges included between 1 and 60 bar;
- accuracy class 1,6.

made in ITALY

PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal size**
  - 100.
- **Execution**
  - A... direct mounting;
  - B... surface mounting with 3-hole;
  - C... back panel flush mounting with pegs;
  - ...D dry;
  - ...F liquid filled.
- **Casing**
  - case and ring in AISI 304 stainless steel (AISI 316 on request - option V61) with bayonet bezel.
- **Protection degree (according to EN 60529)**
  - IP 67.
- **Window**
  - glass for execution D;
  - methacrylate for execution F;
  - laminated safety glass (on request - option V17).
- **Filling liquid**
  - silicone fluid.
- **Pressure connections (according to EN 837)**
  AISI 316L stainless steel:
  - 1/4-18 NPT (1/4 NPT female).
- **Pressure element**
  - double C-Bourdon tube in AISI 316L st.st.
- **Static pressure**
  - twice full scale value apart from the pressure entry in one or both connections;
  - three times full scale value (special execution, on request only - option V48).

Movement
- stainless steel.

- **Ranges (according to EN 837)**
  - o **Graduation:**
    - 0 ÷ 1; 0 ÷ 1,6; 0 ÷ 2,5; 0 ÷ 4; 0 ÷ 6; 0 ÷ 10; 0 ÷ 16; 0 ÷ 25; 0 ÷ 40; 0 ÷ 60; (divisions as per table C1 at page P04)
    - other graduations not normalized.
  - o **Unit of pressure:**
    - mbar, bar, kPa, kg/cm² and psi for single or double range.
  - o **Scale angle:**
    - 270°.
- **Pointer**
  - aluminium with micrometer adjustment.
- **Dial**
  white aluminium with black figures (for dial modifications see available options).
- **Accuracy (according to EN 837)**
  - class 1,6 (± 1,6% r.v.f.s.).
- **Ambient temperature**
  - - 20 ÷ + 60 °C.
- **Operating temperature**
  - max 120 °C.

OPTIONS

- **Window**
  different from standard:
  - laminated safety glass.
    (identification V17)
- **Deagresing for oxygen service (identification V31)**
- **Special static pressure**
  three times full scale value.
  (identification V48)
- **Change to the dial**
  - serial number;
    (identification V50)
  - specific dial;
    (identification V51)
  - red mark;
    (identification V52)
    writings;
    (identification V53)
  - TAG number;
    (identification V54)

- dial without logo;
  (identification V56)
- double logo (Fantinelli + customer);
  (identification V57)
- customer's logo.
  (identification V58)

- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel.
  (identification V61)

- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

- **Monel 400 pressure element assembly**
  as alternative to AISI 316 stainless steel.
  (identification W04)

DOCUMENTATION

- **Fantinelli calibration certificate class 1,6**
  rising pressure.
  (identification V93)

- **Complementary documents**
  o certificate of compliance with the order EN 10204-2.2.
  o technical documentation including:
  - drawings and technical informations;
  - installation and maintenance instructions.
  o inspection and test certificate EN 10204-3.1.
  o material certificates.
  o PED declaration.
  o ATEX declaration (II 2 G/D).

TECHNICAL INFORMATIONS

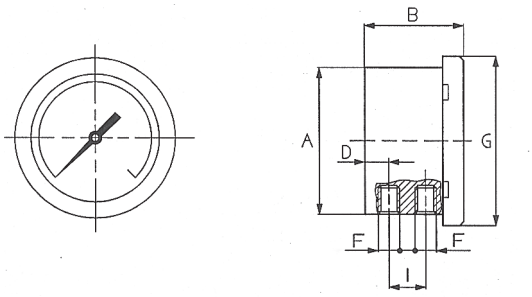


Table DP 358-A

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	103	64		14		1/4	118		23					0,55	1,05

Execution A
Pressure gauge for direct mounting.

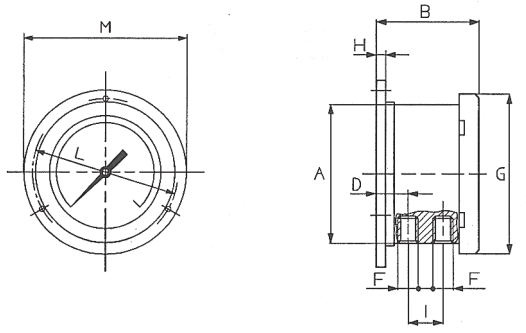


Table DP 358-B

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	103	70		20		1/4	118	7	23	126	140		5	0,64	1,14

Execution B
Pressure gauge for surface mounting with 3 fixing holes.

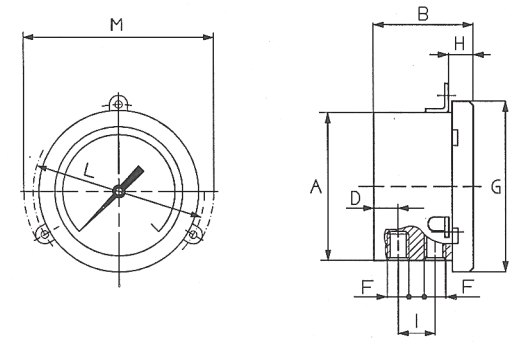


Table DP 358-C

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	103	64		14		1/4	118	16	23	130	142,5		M5	0,57	1,07

Execution C
Pressure gauge for back panel flush mounting with pegs.

note: informations shown in this series may be changed at any time without prior notice.

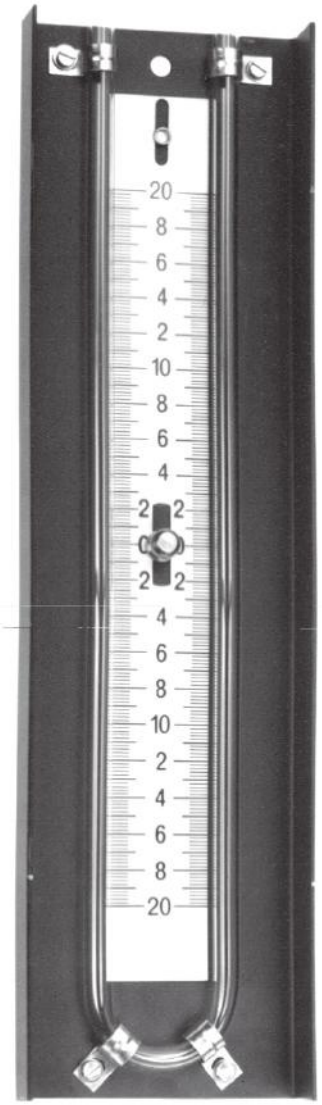
DP 334 SERIES

Glass tube differential pressure gauges

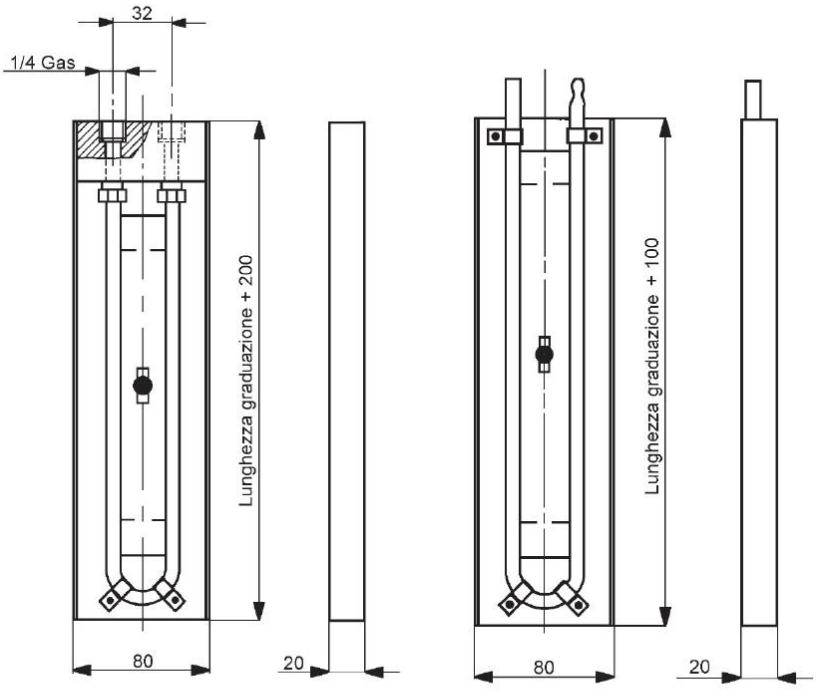
- ◆ casing in profiled steel sheet or wood;
- ◆ ranges included between 100 and 1500 mm.

TECHNICAL FEATURES

- **Casing**
  - "U" profiled steel sheet, painted with black epoxy powder (methacrylate cover on request) standard for model DP 334-1and DP 334-2;
- **Head (DP 334-1)**
  - plastic.
- **Manometric tube ("U" crooked)**
  - glass (standard);
  - methacrylate (on request).
- **Dial**
  - white aluminium with black figures.
- **Ranges (unit of length in mm)**
  - 100 ÷ 0 ÷ 100; 200 ÷ 0 ÷ 200; 300 ÷ 0 ÷ 300; 400 ÷ 0 ÷ 400; 500 ÷ 0 ÷ 500; 600 ÷ 0 ÷ 600; 800 ÷ 0 ÷ 800; 1000 ÷ 0 ÷ 1000; 1500 ÷ 0 ÷ 1500.
- **Static pressure**
  - 6 bar (DP 334-1);
  - 2,5 bar (DP 334-2).
- **Dial adjustment**
  - manual.
- **Manometric liquid**
  - mercury (only on request);
  - water.
- **Pressure connections**
  - PVC, G 1/4 (1/4 Gas female) (DP 334-1);
  - for rubber tube (DP 334-2).



DP 334



DP 334-1 **DP 334-2**

Glass tube differential pressure gauge
execution 1: threaded connections
execution 2: connections for rubber tube

note: informations shown in this series may be changed at any time without prior notice.

FP SERIES

Diaphragm seals

Diaphragm seal consists of an elastic element that insulates the process fluid from the sensing element, transmitting pressure through the compression of a liquid in a separation chamber.
It is necessary to adapt this device where there are particular physical and chemical characteristics incompatible with the sensing element. This way the instrument is no more subject to drawbacks caused by particularly aggressive fluids or by highly viscous, crystallizable or solidifiable process fluid.

The diaphragm seal is an integral part of the instrument, so there is no possibility of disassembling.
Diaphragm seals shown below are suitable born for SP 200 and SP 300 series (Bourdon tube pressure gauges), for DP series (differential pressure gauges), for TR series (pressure gauges with integrated trasmitter) and SE series (transmitters or pressure switches).
Our equipped shop and the filling sophisticated equipments, allow us to also apply the seals to all the electronic field process instrumentations supplied by clients.

TECHNICAL FEATURES

- **Mounting**
  - direct;
    (identification R)
  - remote by flexible capillary
    (identification S followed by the number indicating the capillary length in meters)
    note: the remote mounting requires seal and pressure gauge set at the same level to avoid false calibration.

- **Capillary material**
  - AISI 316L stainless steel with flexible armour of AISI 316;
  - AISI 316L stainless steel with flexible armour of AISI 316 and PVC protection (option V79).

- **Element (see special materials)**
  o diaphragm:
  - AISI 316L st. st.
  - AISI 316L st. st. with P.T.F.E. coating;
  - special materials (Monel 400, Hastelloy C276, titanium, tantalum).
  - AISI 316L st. st. 40 micron gold plating.

  o bellows:
  - AISI 304 stainless steel (FP 344).

  note: cas indicated in the specific models, the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures.

- **Body material**
  (see specific models)
  o upper part (where scheduled):
  - AISI 304 or AISI 316L stainless steel.

  o pressure connection:
  - AISI 316L stainless steel;
  - AISI 316L stainless steel with P.T.F.E. coating;
  - galvanized carbon steel (FP344);
  - exotic materials (Monel 400, Hastelloy C276, titanium, tantalum).

- **Pressure connection**
  (see specific models)
  - threaded;
  - flanged;
  - sanitary.

- **Diaphragm position**
  (see specific models)
  - facing;
  - back side.

- **Filling fluid**
  (see specific models)
  - silicone fluid suitable for temperatures -30 ÷ +200 °C (this fluid is food compliant);
  - diathermic fluid suitable for temperatures > +200 ÷ +400 °C;
  - fluorinated fluid suitable for oxygen service and temperatures -30 ÷ +150 °C.

- **Thermal drift**
  diaphragm seal can affect instrument accuracy according with the service conditions because of the pressure/temperature ratio.

OPTIONS

- **Integrated over-pressure protector**
  this device allows the diaphragm to withstand overpressure temporarily high, according with the units of the used diaphragm seal; the device is available for models FP 337, FP 338 and all flanged models with welded diaphragm.
  (identification V28)

- **Fluorinated fluid filling**
  (identification V29)

- **Flushing ring**
  AISI 316L stainless steel, for diaphragm inspection, with double cleaning hole, available for model FP 337.
  (identification V62)

- **FPM (Viton) gaskets**
  for models FP 337/437/338/341/441/342/343.
  (identification V74)

- **PVC protection**
  PVC coating of capillary flexible armour.
  (identification V79)

- **Cooling tower**
  (identification V89)


AISI 316
Socket and Diaphragm
bar
psi
EN 837-1
acc.1,0
fantinelli


METRONIC
fantinelli

Table FP 1
Model of available diaphragm seal according with flange size - as per EN 1092

DN \ PN	6	10	16	25	40	64	100	160
15	FP 341 FP 342	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...
20	FP 341 FP 342	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...
25	FP 341 FP 342	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...
40	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341	FP 339 FP 340 FP 341	FP 339 FP 340
50	FP 339 FP 340 FP 341 FP 343	FP 339 FP 340 FP 343 FP 350	FP 339 FP 340 FP 343 FP 350	FP 339 FP 340 FP 343 FP 350	FP 339 FP 340 FP 343 FP 350	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340
80	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340

Table FP 2
Model of available diaphragm seal according with flange size - as per ASME standards

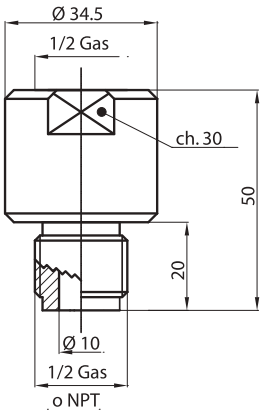
DN \ CLASS	150	300	600	900	1500	2500		
1/2"	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...	...	...
3/4"	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...	...	...
1"	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342 FP 350	FP 341 FP 342	FP 341 FP 342	...	...	...
1" 1/2	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 341	FP 339 FP 340 FP 341	FP 339 FP 340	...	...
2"	FP 339 FP 340 FP 341 FP 342 FP 350	FP 339 FP 340 FP 342 FP 343 FP 350	FP 339 FP 340 FP 342 FP 343 FP 350	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340	...	...
2" 1/2	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340	...	...
3"	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340 FP 343	FP 339 FP 340	...	...

note: above models makes reference to Bourdon tube pressure gauges

FP 235

Compact diaphragm seal with welded body and diaphragm for general applications

- **Mounting**
  - direct;
  - remote.
- **Element**
  o back side welded diaphragm:
  - AISI 316L stainless steel, standard;
  - exotic materials.
- **Welded body**
  - AISI 316L stainless steel, standard;
  - Monel 400 wetted parts (W04);
  - Hastelloy C276 wetted parts (W06);
  - titanium wetted parts (W07).
- **Screwed pressure connection**
  - G 1/2 B (1/2 Gas or BSP) male;
  - 1/2-14 NPT EXT (1/2 NPT)male.
- **Filling liquid**
  - silicone fluid, standard;
  - fluorinated fluid (on request - option V29).
- **Service conditions**
  - pressure 10 ÷ 400 bar;
  - temperature -30 ÷ +200 °C.

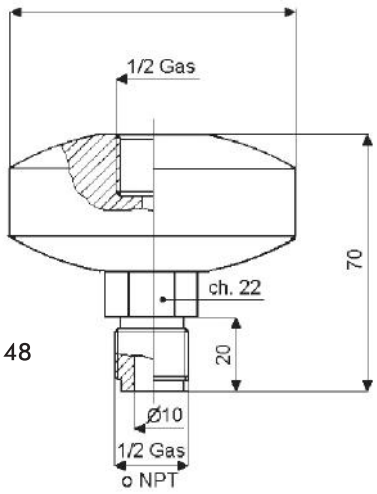


Diaphragm diameter mm 28
Weight ~ kg 0,20

FP 335

Diaphragm seal with welded body and diaphragm for general applications

- **Mounting**
  - direct;
  - remote.
- **Element**
  - back side welded diaphragm in AISI 316L stainless steel.
- **Welded body**
  - AISI 316L stainless steel.
- **Screwed pressure connection**
  - G 1/2 B (1/2 Gas or BSP) male;
  - 1/2-14 NPT EXT (1/2 NPT) male.
- **Filling liquid**
  - silicone fluid for operating temperature included between -30 and +200 °C;
  - diathermic fluid for operating temperature > +200 °C;
  - fluorinated fluid (on request - option V29).
- **Service conditions**
  - pressure 4 ÷ 60 bar;
  - temperature -30 ÷ +350 °C.



Diaphragm diameter mm 48
Weight ~ kg 0,56

note: informations shown in this series may be changed at any time without prior notice

FP 337 / 437

Diaphragm seal for specific applications

- **Application**
  - FP 337 for Bourdon tube and differential pressure gauges;
  - FP 437 for differential pressure gauges.

- **Mounting**
  - direct;
  - remote.

- **Element**
  o back side welded diaphragm to the upper part, in:
  - AISI 316L stainless steel, standard;
  - AISI 316L st.st. 40 micron gold plating **(M01)**
  - AISI 316L st. st. P.T.F.E. coated **(M03)**;
  - Monel 400 **(M04)**;
  - Hastelloy C276 **(M06)**;
  - titanium **(M07)**;
  - tantalum**(M08)**;
  - other exotic materials **(M...)**.

  note 1: the diaphragm of exotic materials, for vacuum gauges and compound gauges, is installed with gasket.
  note 2: the separation chamber has a shaped upper part,that allows the diaphragm to stop without demages, in presence of over-pressures, according with the limit of diaphragm seal.

- **Body**
  o AISI 316L st. st. upper part.
  o pressure connection in:
  - AISI 316L st. st., standard;
  - AISI 316L st. st. P.T.F.E. coated **(W03)**;
  - Monel 400 **(W04)**
  - Hastelloy 276**(W06)**;
  - titanium **(W07)**;
  - other exotic materials **(W...)**.

- **Sealed gasket**
  - nitrilic rubber (NBR), standard;
  - FPM (Viton) (on request - option V74).

- **Screwed pressure connection**
  - G 1/2 B (1/2 Gas or BSP);
  - 1/2-14 NPT EXT (1/2 NPT) (P.T.F.E. coating is unforeseen for tapered thread).

- **Filling liquid**
  - silicone fluid, standard;
  - fluorinated fluid (on request - option V29).

- **Service conditions**
  o FP 337 - pressure:
  - -1 ÷ 100 bar for Bourdon tube press. gauges;
  - 0,6 ÷ 25 bar (static 100 bar) for differential press. gauges;
  - 40 bar maximun with P.T.F.E. coating.

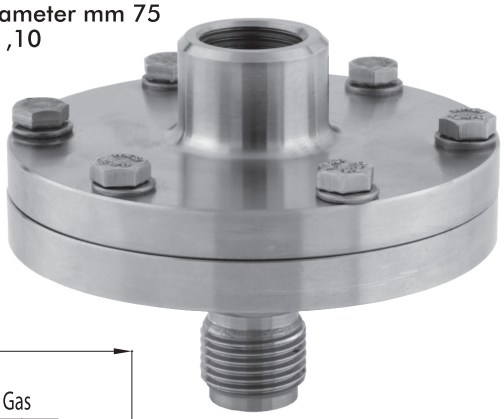
  o FP 337 - temperature:
  - -30 ÷ +200 °C for Bourdon tube press. gauges;
  - -20 ÷ +120 °C for differential press. gauges;
  - -20 ÷ +150 °C for P.T.F.E. coating.

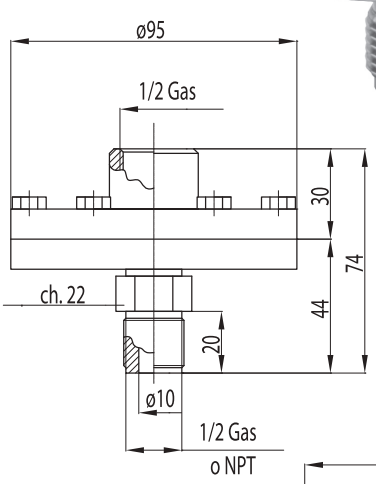
  o FP 437 - pressure:
  - 60 ÷ 400 mbar (static 25 bar).

  o FP 437 - temperature:
  - -20 ÷ +120 °C.

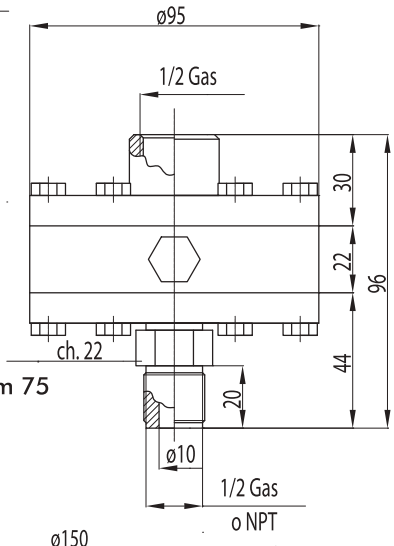
- **Flushing ring**
  - AISI 316L st. st. for diaphragm inspection, with double cleaning (on request for FP 337- option V62).

FP 337
Diaphragm diameter mm 75
Weight kg ~ 1,10

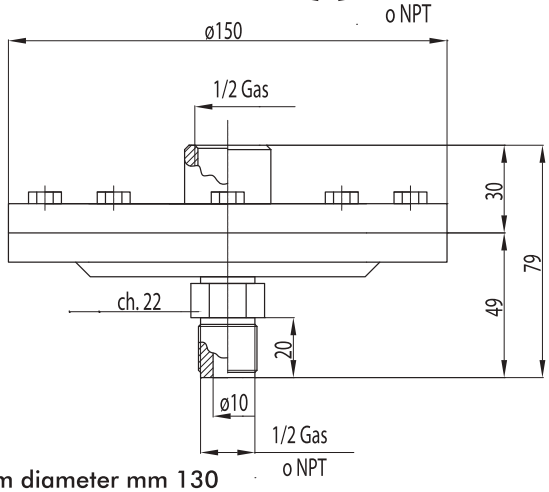




FP 337-V62
Diaphragm diameter mm 75
Weight kg ~ 1,70



FP 437
Diaphragm diameter mm 130
Weight kg ~ 2,60



note: informations shown in this series may be changed at any time without prior notice

FP 338

Diaphragm seal suitable for high pressures with removable process connection for a possible inspection

- **Mounting**
  - direct;
  - remote.

- **Element**
  o back side welded diaphragm to the upper part in:
  - AISI 316L stainless steel, standard;
  - AISI 316L st. st. P.T.F.E. coated **(M03)**;
  - Monel 400 **(M04)**;
  - Hastelloy C276 **(M06)**;
  - titanium **(M07)**;
  - tantalum **(M08)**;
  - AISI 316L st.st. 40 micron gold plating **(M01)**
  - other exotic materials **(M...)**.

  note: the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures, according with the limit of diaphragm seal.

- **Body**
  o upper part in AISI 316L stainless steel;
  o pressure connection in:
  - AISI 316L st. st., standard;
  - AISI 316L st. st. P.T.F.E. coated **(W03)**;
  - Monel 400 **(W04)**
  - Hastelloy 276**(W06)**;
  - titanium **(W07)**;
  - other exotic materials **(W...)**.

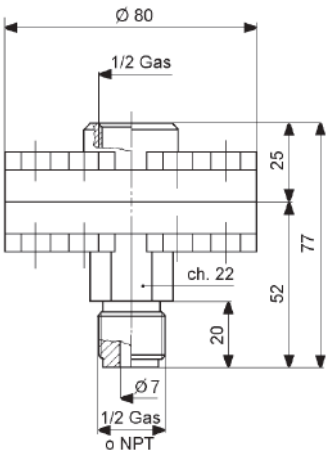
- **Sealed gasket**
  - nitrilic rubber series (NBR), standard;
  - FPM (Viton) (on request - option V74).

- **Screwed pressure connection**
  - G 1/2 B (1/2 Gas or BSP);
  - 1/2-14 NPT EXT (1/2 NPT).

- **Filling liquid**
  - silicone fluid.

- **Service conditions**
  - pressure 6 ÷ 400 bar;
  - temperature 0 ÷ +200 °C.

FP 338



Diaphragm diameter mm 36
Weight ~ kg 1,06

note: informations shown in this series may be changed at any time without prior notice.

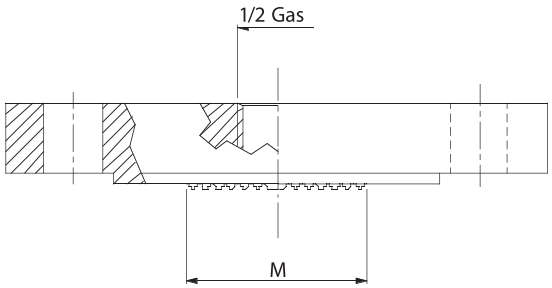
FP 340

Facing diaphragm seal with flanged connection also available with extension

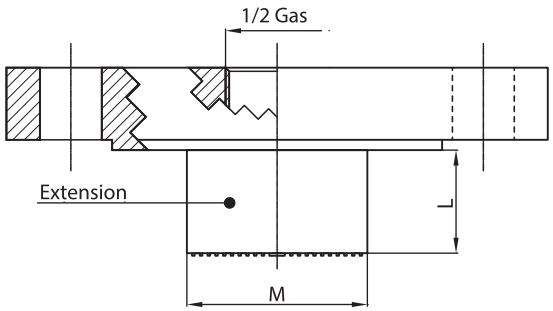
- **Mounting**
  - direct;
  - remote.
- **Element**
  - facing welded diaphragm in AISI 316L st. st.

  note: the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures, according with the limit of diaphragm seal.
- **Body**
  - AISI 316L stainless steel.
- **Flanged pressure connection**
  - as per EN and ASME (see tables FP 1 and 2 at page FP03).
- **Extension (if required)**
  - to a max of 150 mm, in AISI 316L st. st. or exotic materials.
- **Filling liquid**
  - silicone fluid for operating temperaure included between - 30 and +200 °C;
  - diathermic fluid for operating temperature > +200 °C.
- **Service conditions**
  - pressure -1 ÷ 160 bar;
  - temperature -30 ÷ +350 °C.

FP 340



Weight kg ~ 2,5
(ref. to DN 40 PN 16)



DN	PN	M
40	4÷160	36
50	2,5÷160	48
65	≤2,5÷160	58
80	≤2,5÷160	75

DN	CLASS	M
1"1/2	150 ÷ 2500	36
2"	150 ÷ 2500	48
2"1/2	150 ÷ 2500	58
3"	150 ÷ 2500	75

note: informations shown in this series may be changed at any time without prior notice.

FP 341 / 441

Flanged connection diaphragm seal with back side diaphragm and threaded blind holes

- **Application**
  - FP 341 for Bourdon tube pressure gauges;
  - FP 441 for differential pressure gauges.

- **Mounting**
  - direct;
  - remote.

- **Element**
  o back side welded diaphragm to the upper part, in:
  - AISI 316L stainless steel, standard;
  - AISI 316L st. st. P.T.F.E. coated **(M3)**;
  - Monel 400 **(M4)**;
  - Hastelloy C276 **(M6)**;
  - titanium **(M7)**;
  - tantalum **(M8)**;
  - AISI 316L st. st. 40 micron gold plating **(M01);**
  - other exotic materials **(M...)**.

  note 1: the diaphragm of exotic materials, for vacuum gauges or compound gauges, is installed with gasket.
  note 2: the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures, according with the limit of diaphragm seal.

- **Body**
  o AISI 316L st. st. upper part.
  o pressure connection in:
  - AISI 316L st. st., standard;
  - AISI 316L st. st. P.T.F.E. coated **(W3)**;
  - AISI 316L st. st. with Monel 400 wetted parts **(W4)**;
  - AISI 316L st. st. with Hastelloy C276 wetted parts **(W6)**.

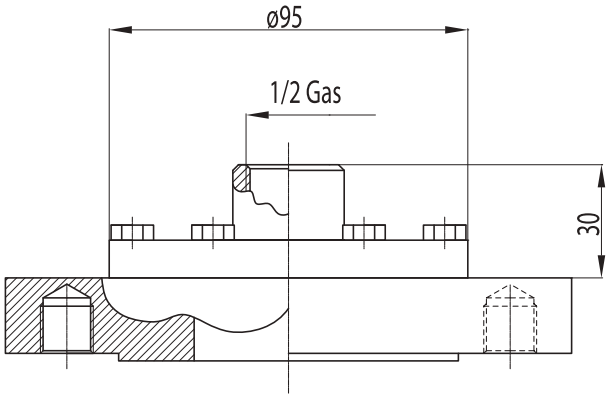
- **Sealing gasket**
  - nitrilic rubber (NBR), standard;
  - FPM (Viton) (on request - option V74).

- **Flanged pressure connection**
  - as per EN and ASME (see tables FP 1 and FP 2 at page FP03).

- **Filling liquid**
  - silicone fluid.

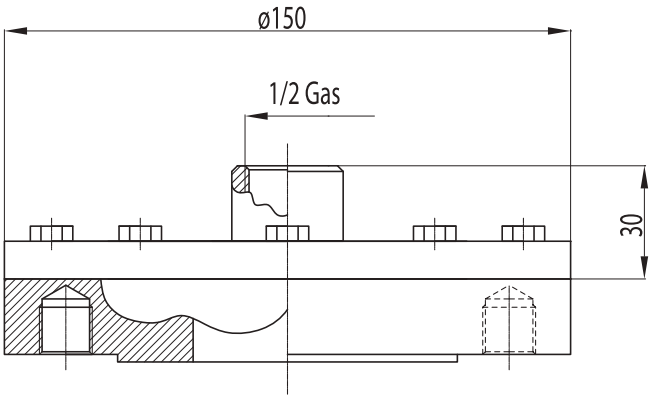
- **Service conditions**
  - pressure -1 ÷ 100 bar for FP 341 (-1 ÷ 40 bar with P.T.F.E. coating);
  - temperature -30 ÷ +200 °C for FP 341 (-20 ÷ +150 °C with P.T.F.E. coating);
  - pressure 60 mbar ÷ 25 bar for FP 441;
  - temperature -20 ÷ +120 °C for FP 441.

FP 341



Diaphragm diameter mm 75
Weight ~ kg 3,80
(ref. to DN 40 PN 16)

FP 441



Diaphragm diameter mm 130
Weight ~ kg 5,30
(ref. to DN 40 PN 16)

note: informations shown in this series may be changed at any time without prior notice.

FP 342

Diaphragm seal with back side diaphragm and through fixing hole on lower flange

- **Mounting**
  - direct;
  - remote.

- **Element**
  o back side welded diaphragm to the upper part, in:
  - AISI 316L stainless steel, standard;
  - AISI 316L st. st. P.T.F.E. coated **(M3)**;
  - Monel 400 **(M4)**;
  - Hastelloy C276 **(M6)**;
  - titanium **(M7)**;
  - tantalum **(M8)**;
  - AISI 316L st. st. 40 micron gold plating **(M01);**
  - other exotic materials **(M...)**;

  note 1: the diaphragm of exotic materials, for vacuum gauges or compound gauges, is installed with gasket.
  note 2: the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures.

- **Body**
  o AISI 316L st. st. upper part.
  o apressure connection in:
  - AISI 316L st. st., standard;
  - AISI 316L st. st. P.T.F.E. coated **(W3)**.

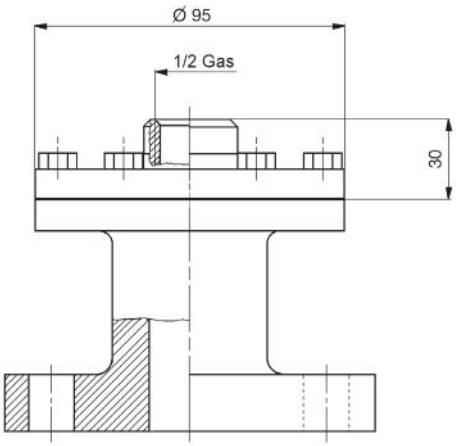
- **Sealing gasket**
  - nitrilic rubber (NBR), standard;
  - FPM (Viton) (on request - option V74).

- **Flanged pressure connection**
  - as per EN and ASME (see tables FP 1/2).

- **Filling liquid**
  - silicone fluid.

- **Service conditions**
  - pressure -1 ÷ 100 bar
    (-1 ÷ 40 bar with P.T.F.E. coating);
  - temperature -30 ÷ +200 °C
    (-20 ÷ +150 °C with P.T.F.E. coating).

FP 342



Diaphragm diameter mm 75
Weight ~ kg 4,00
(ref. to DN 40 PN 16)

note: informations shown in this series may be changed at any time without prior notice.

FP 343

Flanged connection diaphragm seal with back side diaphragm and through holes

- **Mounting**
  - direct;
  - remote.

- **Element**
  o back side welded diaphragm to the upper part, in:
  - AISI 316L stainless steel, standard;
  - AISI 316L st. st. P.T.F.E. coated **(M3)**;
  - Monel 400 **(M4)**;
  - Hastelloy C276 **(M6)**;
  - titanium **(M7)**;
  - tantalum **(M8)**;
  - AISI 316L st. st. 40 micron gold plating **(M01);**
  - other exotic materials **(M...)**.

  note 1: the diaphragm of exotic materials, for vacuum gauges or compound gauges, is installed with gasket.
  note 2: the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures, according with the limit of diaphragm seal.

- **Body**
  o AISI 316L st. st. upper part.
  o pressure connection in:
  - AISI 316L st. st., standard;
  - AISI 316L st. st. P.T.F.E. coated (W3).

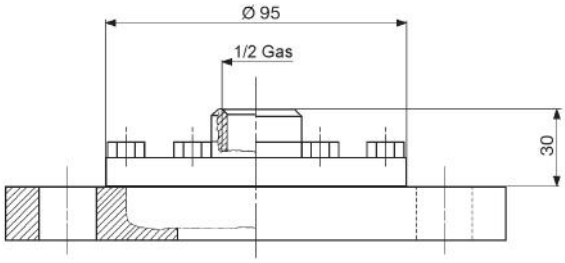
- **Sealing gasket**
  - nitrilic rubber (NBR), standard;
  - FPM (Viton) (on request - option V74).

- **Flanged pressure connection**
  - as per EN and ASME (see tables FP 1 and FP 2 at page FP03).

- **Filling liquid**
  - silicone fluid.

- **Service conditions**
  - pressure -1 ÷ 100 bar (-1 ÷ 40 bar with P.T.F.E. coating);
  - temperature -30 ÷ +200 °C (-20 ÷ +150 °C with P.T.F.E. coating).

FP 343



Diaphragm diameter mm 75
Weight ~ kg 3,80

note: informations shown in this series may be changed at any time without prior notice.

FP 350

Diaphragm seal with flanged connection

- **Mounting**
  - direct;
  - remote.

- **Element**
  o facing welded diaphragm, in:
  - AISI 316L st. st., standard;
  - AISI 316L st. st. P.T.F.E. coated **(M03)**;
  - Monel 400 **(M04)**;
  - Hastelloy C276 **(M06)**;
  - titanium **(M07)**;
  - tantalum **(M08)**;
  - AISI 316L st. st. 40 micron gold plating **(M01);**
  - other exotic materials **(M...)**.

  note: the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures, according with the limit of diaphragm seal.

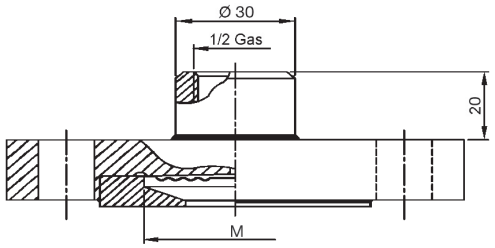
- **Wetted parts**
  o pressure connection in:
  - AISI 316L st. st., standard;
  - AISI 316L st. st. P.T.F.E. coated **(W03)**;
  - Monel 400 **(W04)**;
  - Hastelloy C276 **(W06)**;
  - titanium **(W07)**;
  - tantalum **(W08)**;
  - other exotic materials **(W...)**.

- **Flanged pressure connection**
  - as per EN and ASME (see tables FP 1 and FP 2 at page FP04).

- **Filling fluid**
  - silicone fluid, standard;
  - diathermic fluid for operating temperature > +200 °C;
  - fluorinated fluid (on request - option V29).

- **Service conditions**
  - pressure -1 ÷ 100 bar (1 ÷ 40 bar for P.T.F.E.);
  - temperature -30÷ +350 °C for stainless steel;
  - temperature -30÷ +120 °C for P.T.F.E., exotic materials and vacuum gauges.

FP 350



Weight ~ kg 2,20
(ref. to DN 40 PN 16)

DN	PN	M
15	10÷40	36
20	10÷40	36
25	10÷40	48
40	10÷40	48
50	10÷40	48

DN	CLASS	M
1/2"	150 ÷ 600	30
3/4"	150 ÷ 600	36
1"	150 ÷ 600	36
1" 1/2	150 ÷ 600	48
2"	150 ÷ 600	48

FP 339

Full covering flanged diaphragm seal - exotic materials

Mounting
- direct;
- remote.

- **Element**
exotic material diaphragm fully covers the facing of the cell:
- Monel 400 **(W04);**
- Hastelloy C276 **(W06);**
- titanium **(W07);**
- tantalum **(W08);**
- other exotic materials (**W...).**

note: the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures, according with the limit of diaphragm seal.

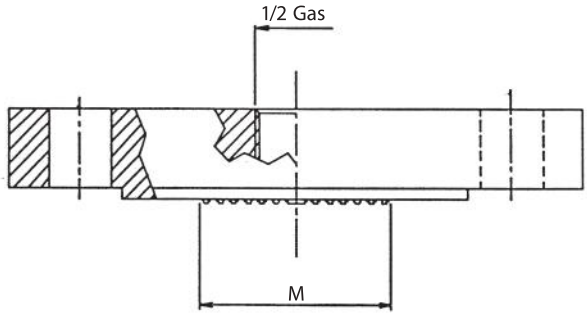
- **Body**
- AISI 316L stainless steel.
note: the requirement for exotic materials is guaranteed by the diaphragm according to the above indicated specifications.

- **Flanged pressure connection**
- sas per EN and ASME (see tables FP 1 and FP 2 at page FP03).

- **Filling liquid**
- silicone fluid.

- **Service conditions**
- pressure -1 ÷ 160 bar;
- temperature -30 ÷ +350 °C for pressure gauges;
- temperature -30 ÷ +120 °C for vacuum gauges and compound gauges.

FP 339



Weight ~Kg 2,90
(ref.to DN50 PN16)

DN	PN	M
40	4÷160	36
50	2,5÷160	48
65	≤2,5÷160	58
80	≤2,5÷160	75

DN	CLASS	M
1" 1/2	150÷2500	36
2"	150÷2500	48
2" 1/2	150÷2500	58
3"	150÷2500	75

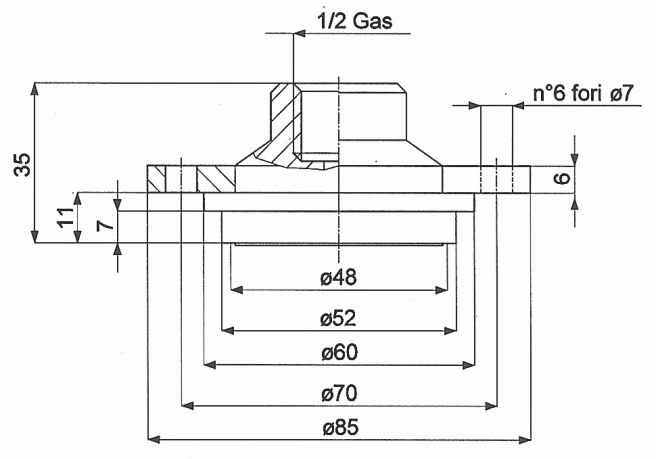
note: informations shown in this series may be changed at any time without prior notice.

FP 345

Diaphragm seal for paper industry

- **Mounting**
  - direct;
  - remote.
- **Element**
  - facing welded diaphragm in AISI 316L st. st..
  note: the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures, according with the limit of diaphragm seal.
- **Body**
  - AISI 316L stainless steel.
- **Connection fixing**
  - AISI 304 stainless steel flange.
- **Filling liquid**
  - silicone fluid.
- **Service conditions**
  - pressure 2,5 ÷ 16 bar;
  - temperature +10 ÷ +100 °C.

FP 345



Weight ~ kg 0,53

note: informations shown in this series may be changed at any time without prior notice.

FP 346/347/348

Diaphragm seals for food and pharmaceutic industries

Mounting
- direct;
- remote.

- **Element**
  - facing welded diaphragm in AISI 316L st. st..
  note: the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures, according with the limit of diaphragm seal.

- **Body**
  - AISI 316L stainless steel.

- **Pressure connection**
  (Sanitary process connection)
  o FP 346:
  - nut as per DIN 11851 - DN 32, 40 e 50 (DN 25 on request only);
  - nut as per SMS - DN 38 (1 1/2") e 51 (2");
  - nut as per other international standards (RJT-BS, ISS-IDF) on request only.

  o FP 347:
  - fixed connection as per DIN 11851 - DN 32, 40 e 50 (DN 25 on request only);
  - fixed connection as per SMS - DN 38 (1 1/2") e 51 (2");
  - fixed connection as per other international standards (RJT-BS, ISS-IDF) on request only.

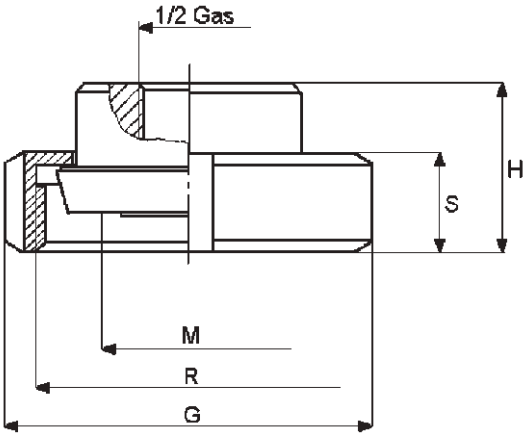
  o FP 348:
  - Clamp - DN 1 1/2", 2" e 2 1/2" connection.

- **Filling liquid**
  - food compatible fluid.

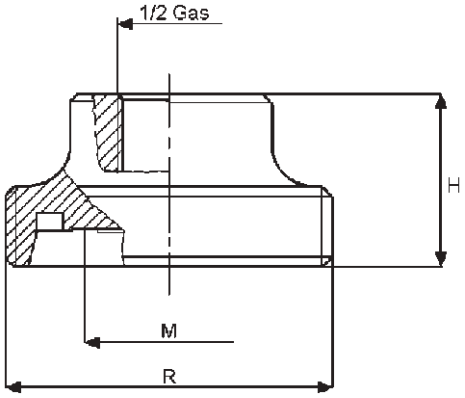
- **Service conditions**
  - pressure 2,5 ÷ 40 bar (2,5 ÷ 16 bar for FP 348);
  - temperature - 20 ÷ +120 °C.

note: sterilization cycle doesn't affect the good performance of the instrument.

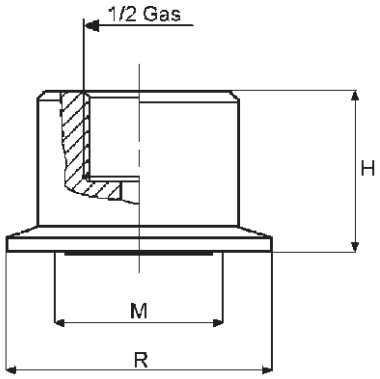
FP 346



FP 347



FP 348



Model	DN	Range min bar	M	R	G	S	H	Weight ~ kg
FP 346 DIN 11851	32	0 ÷ 4	30	Rd 58x1/6	70	21	35	0,48
	40	0 ÷ 2,5	36	Rd 65x1/6	78	21	38	0,62
	50	0 ÷ 2,5	48	Rd 78x1/6	92	22	39	0,82
FP 346 SMS	38 (1 1/2")	0 ÷ 2,5	36	Rd 60x1/6	74	25	38	0,60
	51 (2")	0 ÷ 2,5	48	Rd 70x1/6	84	26	39	0,70
FP 347 DIN 11851	32	0 ÷ 4	30	Rd 58x1/6	-	-	34	0,25
	40	0 ÷ 2,5	36	Rd 65x1/6	-	-	34	0,38
	50	0 ÷ 2,5	48	Rd 78x1/6	-	-	34	0,45
FP 347 SMS	38 (1 1/2")	0 ÷ 2,5	36	Rd 60x1/6	-	-	36	0,40
	51 (2")	0 ÷ 2,5	48	Rd 70x1/6	-	-	36	0,50
FP 348 CLAMP	1 1/2"	0 ÷ 4	30	50,5	-	-	30	0,25
	2"	0 ÷ 2,5	36	64	-	-	30	0,48
	2 1/2"	0 ÷ 2, 5	48	77,5	-	-	30	0,63

note: informations shown in this series may be changed at any time without prior notice.

FP 333

Facing diaphragm seal with saddle connection

- **Mounting**
  - direct;
  - remote.

- **Element**
  - facing welded diaphragm in AISI 316L st. st..
  note: the separation chamber has a shaped upper part, that allows the diaphragm to stop without demages, in presence of over-pressures, according with the limit of diaphragm seal.

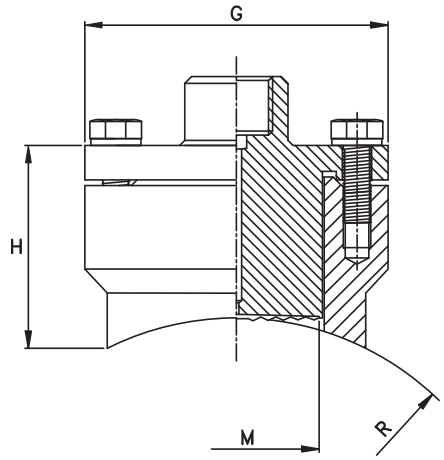
- **Body**
  - AISI 316L stainless steel.

- **Saddle connection to be welded**
  - on pipe 2″ ÷ 16″.

- **Filling liquid**
  - silicone fluid for operating temperature included between
  - 30 and +200 °C;
  - diathermic fluid for operating temperature > +200 °C.

- **Service conditions**
  - pressure 6 ÷ 250 bar;
  - temperature -30 ÷ +350 °C.

FP 333



DN	M	R	G	H	PESO - Kg
2″	36	30.2	76	65	1.800
3″	48	44.5	88	70	2.400
4″	48	57.2	88	65	2.400
6″	48	84.2	88	60	2.400
8″	48	109.6	88	58	2.400
10″	48	136.6	88	56	2.400
12″	48	162	88	56	2.400
14″	48	177.9	88	55	2.400
16″	48	203.2	88	55	2.400

note: informations shown in this series may be changed at any time without prior notice.

PQ SERIES

Square casing pressure gauges

- stainless steel C-Bourdon tube pressure element;
- NS 96x96 - 144x144;
- ranges included between -1 and 600 bar.

made in ITALY

CE PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 96x96 and 144x144.
- **Casing**
  - back plate in AISI 304 stainless steel sheet and plastic front rim.
- **Window**
  - methacrylate.
- **Blow-out device**
  - rubber plug.
- **Pressure connection (according to EN 837-1)**
  - AISI 316L stainless steel with Gas (BSP) or NPT thread as per PQ table F dimension, otherwise only on request, different from those indicated.
- **Pressure element**
  - AISI 316L stainless steel.
- **Welding**
  - TIG.
- **Movement**
  - stainless steel.
- **Ranges (according to EN 837-1)**
  - o **Graduation:**
    - pressure gauges: 0 ÷ 0,6; 0 ÷ 1;0 ÷ 1,6; 0 2,5; 0 ÷ 4; 0 ÷ 6; 0 ÷ 10; 0 ÷ 16; 0 ÷ 25; 0 ÷ 40; 0 ÷ 60; 0 ÷ 100; 0 ÷ 160; 0 ÷ 250; 0 ÷ 400; 0 ÷ 600;
    - vacuum gauges: -1 ÷ 0;
    - compound gauges: -1 ÷ 0,6; -1 ÷ 1,5; -1 ÷ 3; -1 ÷ 5; -1 ÷ 9; -1 ÷ 15; -1 ÷ 24;
      (divisions as per table C1 at page P08)
    - aother graduations not normalized for single or double range (on request).
  - o **Unit of pressure:**
    - bar, kPa, MPa, kg/cm2 and psi for single or double range.
  - o **Scale angle:**
    - 270 °.
- **Working pressure (referred to full scale deflection)**
  - steady from 1/10 to 3/4;
  - fluctuating from 1/10 to 2/3.
- **Over-pressure (occasionally allowed)**
  - 130% of full scale value.
- **Pointer**
  - aluminium not adjustable.
- **Dial**
  - white aluminium with black figures (for dial modifications see available options).
- **Accuracy (according to EN 837-1)**
  - class 1 (± 1% of full scale deflection).

  note 1: accuracy indicated on the pressure gauge does not consider the interference of an eventually applied electric contact.

  note 2: diaphragm seal affects the accuracy of the instruments according to table FP 1 at page FP03.
- **Ambient temperature**
  - -10 ÷ +60 °C.
- **Operating temperature**
  - -10 ÷ +120 °C.

APPLICATIONS

- **Diaphragm seal (see FP series)**
  the instrument is identified with the code of choosen model, adding the seal reference, only for model FP 235, FP 335 and FP 337 (see relating series).
  (identification FP...)
- **Electric contact (see CE series)**
  instrument can be identified by the number of the chosen model, adding the reference of the switching action as shown in tables of the CE series.
  (identification CE...)
- **Accessories (see AM series)**
  - cooling siphons, recommended when high temperatures are involved;
  - valves;
  - dampers for control of process fluid entry speed into the instrument;
  - adjusting over-pressure protectors to cut automatically off the instrument from the circuit.

OPTIONS

- **Restrictor**
  applicable to pressure connection to reduce the process fluid entry speed into the instrument.
  (identification V26)
- **Degreasing for oxygen service**
  (identification V31)
- **Pressure connection**
  different from standard. **(identification V42)**
- **Changes to the dial**
  - serial number; **(identification V50)**
  - spedific dial; **(identification V51)**
  - red mark; **(identification V52)**
  - writings; **(identification V53)**
  - TAG number; **(identification V54)**
  - dial without logo; **(identificationV56)**
  - double logo (Fantinelli + customer); **(identification V57)**
  - customer's logo. **(identification V58)**

DOCUMENTATION

- **Fantinelli calibration certificate class 1**
  rising pressure.
  (identification V92)
- **Complementary documents**
  o certificate of compliance EN 10204-2.2.
  o technical documentation including;
  - drawings and technical informations;
  - installation and maintenance instructions;

  o PED declaration.

TECHNICAL INFORMATIONS

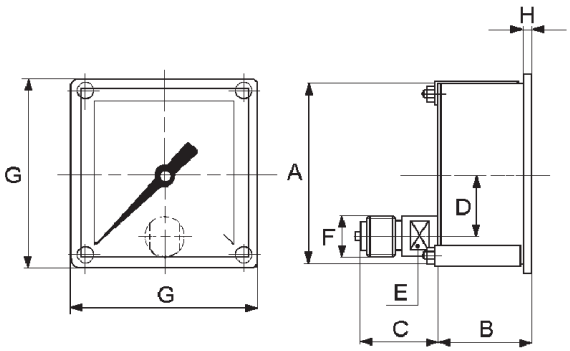


Table PQ 318

DN	A	B	C	D	E	F	G	H	I	L	M	PESO ~ kg
96x96	91x91	49	37	31	17	1/2	96	7				0,55
144x144	137x137	50	36	33	17	1/2	144	7				1,06

Pressure gauge for flush mounting with clamp fixing.

note: informations shown in this series may be changed at any time without prior notice.

NP SERIES

Standard Bourdon tube pressure gauges

- copper alloy pressure element assembly;
- DN 40 - 50 - 63 - 80 - 100;
- ranges included between -1 and 400 bar.

CE PED 2014/68/EU

Table NP 1
Available models and casing type

NP / DN	301	304	305	306
40	FK XK	FF	FF	FK XK
50	FK XK	FF	FF	FK XK
63	FK XK	FF	FF	FK XK
80	FF	FF	FF	FF
100	FF	FF	FF	FF

Caption:

FF = painted steel case with painted or chromate steel slip-on ring and glass window
FK = painted steel case and plastic snap-fit window
XK = stainless steel case and plastic snap-fit window

TECHNICAL FEATURES

- **Nominal sizes**
  - 40, 50, 63, 80 e 100.
- **Casing**
  - see table NP 1.
- **Window**
  - see table NP 1.
- **Pressure connection (according to EN 837-1)**
  - brass with Gas (BSP), BSPT or NPT thread as F dime sion shown in NP tables, otherwise only on request, different from those indicated.
- **Pressure element**
  - phosphor bronze.
- **Welding**
  - tin alloy;
  - tin/silver alloy for temperatures > 65°C and/or pressures > 60 bar.
- **Movement**
  - brass.
- **Ranges (according to EN 837-1)**
  - o **Graduation:**
    - pressure gauges: 0 ÷ 1; 0 ÷ 1,6; 0 ÷ 2,5; 0 ÷ 4; 0 ÷ 6; 0 ÷ 10; 0 ÷ 16; 0 ÷ 25; 0 ÷ 40; 0 ÷ 60; 0 ÷ 100; 0 ÷ 160; 0 ÷ 250; 0 ÷ 400;
    - vacuum gauges: -1 ÷ 0;
    - compound gauges: -1 ÷ 0,6; -1 ÷ 1,5; -1 ÷ 3; -1 ÷ 5; -1 ÷ 9; -1 ÷ 15; -1 ÷ 24; (divisions as per table C1 at page P08)
    - other graduations not normalized for single or double range (on request).

o **Unit of pressure:**
- bar, kPa, MPa, kg/cm2 and psi for single or double scale.

o **Scale angle:**
- 270 °.

note: working pressure, if constant, has to be included between 1/10 and about 3/4 of full scale value; for fluctuating or pulsating pressures it is suitable to choose a liquid filled instruments of SP series.

- **Over-pressure**
  - not allowed.
- **Pointer**
  - burnished steel - not adjustable.
- **Dial**
  - white aluminium with black figures.
- **Accuracy (according to EN 837-1)**
  - class 1,6 (± 1,6% of full scale deflection) for NS 63, 80 and 100;
  - class 2,5 (± 2,5% of full scale deflection) for NS 40 e 50.
- **Ambient temperature**
  - -10 ÷ +60 °C.
- **Operating temperature**
  - 0 ÷ + 65 °C with tin alloy welding;
  - -10 ÷ +120 °C with tin/silver alloy welding.

APPLICATIONS

- **Accessories (see AM series)**

OPTION

- **Adjustable red pointer on the window (identification V13)**
- **Red pointer on the dial (identification V14)**
- **Restrictor**
  applicable to pressure connection to reduce the process fluid entry speed into the instrument.
  (identification V26)

DOCUMENTATION

- **Complementary documents**
  o certificate of compliance with the order EN 10204-2.2.
  o PED declaration.

TECHNICAL INFORMATIONS

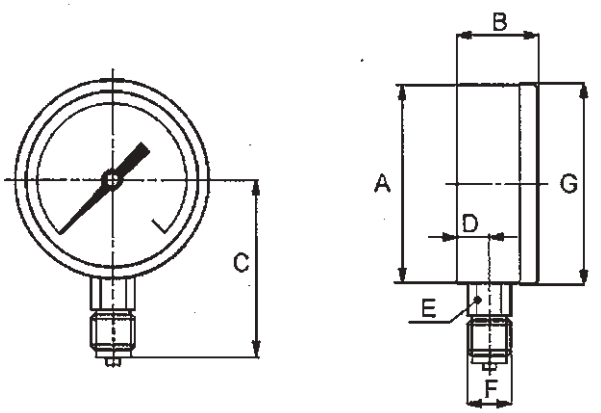


Table NP 301

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
40	40	25	36	8,8	12	1/8	40							0,06
50	51	27	46	9,5	14	1/4	51							0,10
63	63	27	53	10	14	1/4	63							0,13
80	79	32	66	10	14	1/4	81							0,21
100	99	51	87	15	22	1/2	102							0,60

Pressure gauge with bottom connection for local mounting.

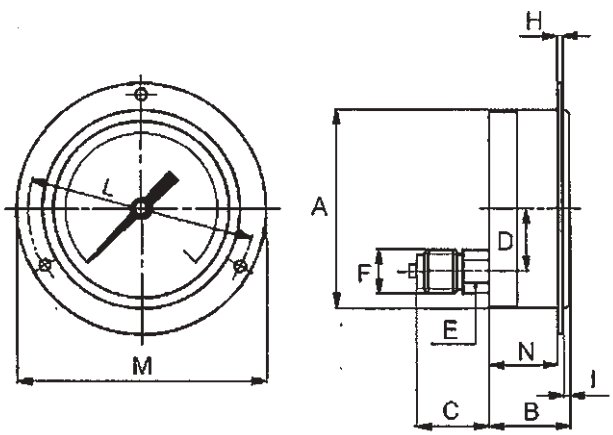
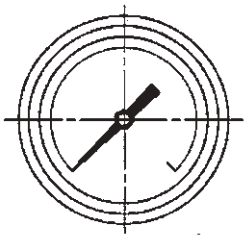


Table NP 304

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
40	41	28	16	0	12	1/8		2	2	51	61	24	3,6	0,10
50	52	30	20	0	14	1/4		2	2	60	71	26	3,6	0,16
63	64	30	20	0	14	1/4		2	1,5	75	85	26,5	3,6	0,20
80	81	30	20	0	14	1/4		2	2,5	95	110	25,5	5	0,26
100	101	51	35	30	17	1/2		2,5	3,5	118	132	45	6	0,65

Pressure gauge with back connection for flush mounting with 3 fixing holes.



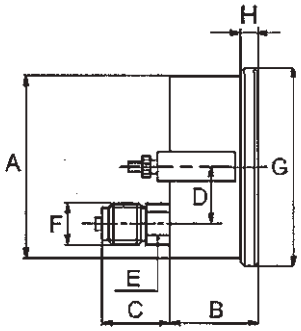
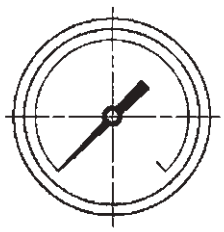


Table NP 305

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
40	40	28	25	0	12	1/8	44	4,5						0,09
50	51	30	27	0	14	1/4	55	5,5						0,15
63	63	30	27	0	14	1/4	68	7						0,17
80	79	30	27	0	14	1/4	84	7						0,23
100	101	51	35	30	17	1/2	132	7						0,71

Pressure gauge with back connection for flush mounting with clamp fixing.



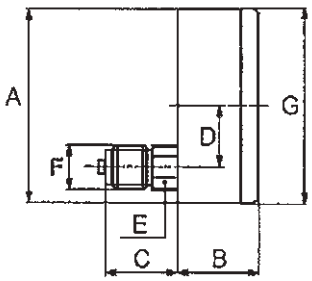


Table NP 306

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
40	40	25	16	0	12	1/8	40							0,06
50	51	27	20	0	14	1/4	51							0,10
63	63	27	20	0	14	1/4	63							0,13
80	79	32	20	0	14	1/4	81							0,22
100	99	51	35	30	17	1/2	102							0,60

Pressure gauge with back connection for direct mounting.

note: informations shown in this series may be changed at any time without prior notice.

MP SERIES

Diaphragm pressure gauges

- cwatertight casing;
- NS 100 - 150;
- ranges included between -16 mbar and 25 bar.

This instrument has a diaphragm that, under the process fluid pressure, acts directly on the movement. This type of instrument can detect the pressure of highly viscous or crystallizable or solidifiable fluids.

made in ITALY

PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 100 and 150.

- **Models**
  - MP 319/320/321:
    ranges included between 0,6 and 25 bar;
  - MP 419/420/421:
    ranges included between 16 and 400 mbar.

  Casing
  - case and ring in AISI 304 stainless steel (AISI 316 on request - option V61) with bayonet bezel.

- **Protection degree**
  (according to EN 60529)
  - IP 55 for dry execution;
  - IP 67 (option V66 and V72).

- **Window**
  - glass for dry execution;
  - methacrylate for liquid filled execution;
  - laminated safety glass (on request - option V17).

- **Blow-out device**
  - blow out plug.

- **Pressure connection**
  (according to EN 837-3)
  o G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT) thread (MP 319/419);
  o flanged connection as per EN and ASME standards (see tables MP 1 and 2 at page MP06):
  - flange with through holes (MP 320/420);
  - flange with threaded blind or through holes (MP 321/421).

- **Pressure connection material**
  - AISI 316L stainless steel, standard;
  - AISI 316L stainless steel with P.T.F.E. coating;
  - special materials (see specific heading).

- **Pressure element**
  - AISI 316Ti stainless steel diaphragm;
  - diaphragm coated (see specific heading).

- **Movement**
  - stainless steel.

- **Ranges (according to EN 837-3)**
  o **Graduation:**
  - pressure gauges: 0 ÷ 16; 0 ÷ 25; 0 ÷ 40; 0 ÷ 60; 0 ÷ 100; 0 ÷ 160; 0 ÷ 250; 0 ÷ 400 (unit of pressure mbar); 0 ÷ 0,6; 0 ÷ 1; 0 ÷ 1,6; 0 ÷ 2,5; 0 ÷ 4; 0 ÷ 6; 0 ÷ 10; 0 ÷ 16; 0 ÷ 25 (unit of pressure bar);
  - vacuum gauges: -16 ÷ 0; -25 ÷ 0; -40 ÷ 0; -60 ÷ 0; -100 ÷ 0; -160 ÷ 0; -250 ÷ 0; -400 ÷ 0 (unità di vuoto mbar); -1 ÷ 0 (unit of vacuum bar);
  - compound gauges: -1 ÷ 0,6; -1 ÷ 1,5; -1 ÷ 3; -1 ÷ 5; -1 ÷ 9; -1 ÷ 15; -1 ÷ 24 (unità di pressione bar) - su request (unit of pressure mbar).
    (divisions as per table C1 at page P08)
  - other graduations not normalized for single or double range (on request).
  o **Unit of pressure:**
  - mbar, bar, kPa, kg/cm2 and psi for single or double range.
  o **Scale angle:**
  - 270 °.

- **Working pressure**
  (referred to full scale deflection)
  - steady from 1/10 to 3/4;
  - fluctuating from 1/10 to 2/3.

- **Over-pressure**
  (referred to full scale deflection)
  - 115% standard (occasionally allowed);
  - special, on request only – option V28.

- **Pointer**
  - aluminium with micrometric adjustment for dry exection;
  - aluminium not adjustable for filled execution.

- **Dial**
  - white aluminium with black figures (for dial modifications see available options).

- **Accuracy**
  (according to EN 837-3)
  - class 1,6 (± 1,6% of full scale deflection).

  note: accuracy indicated on the pressure gauge does not consider the interference of an eventually applied electric contact.

- **Ambient temperature**
  - -20 ÷ +60 °C.

- **Thermal drift**
  out of the optimum ambient temperature values included within +15 ÷ +25 °C, the thermal drift affects the instruments accuracy as follows:
  - 0,4% every 10 °C for models MP 319/320/321;
  - 0,8% every 10 °C for models MP 419/420/421.

- **Operating temperature**
  - -20 ÷ +100 °C standard execution;
  - -20 ÷ +150 °C execution with special gaskets (except compound pressure gauges) (option V74);
  - -20 ÷ +100 °C P.T.F.E. coated diaphragm.

APPLICATIONS

- **Electric contact**
  (see CE series)
  the instrument can be identified by the number of the chosen model, adding the reference of the switching action as shown in tables of the CE series.
  (identification CE...)

SPECIAL MATERIALS

- **Diaphragm coatings**
  - P.T.F.E.; **(identification M03)**
  - Monel 400; **(identification M04)**
  - Hastelloy C276; **(identification M06)**
  - titanium; **(identification M07)**
  - tantalum; **(identification M08)**
  - other exotic materials.(**(identification M...)**

- **Connection materials or coatings**
  special material pressure connection requires a diaphragm with the same coating material:
  - P.T.F.E.; **(identification W03)**
  - Monel 400; **(identification W04)**
  - Hastelloy C276; **(identification W06)**
  - titanium; **(identification W07)**
  - tantalum; **(identification W08)**
  - other exotic materials. **(identification W...)**

OPTIONS

Maximum pointer
to indicate the maximum pressure reached:
- zero-setting on the window.
  (identification V11)

- **Window**
  different from standard:
  - laminated safety glass.
    (identification V17)

- **Diaphragm stop**
  allows the diaphragm to withstand to overpressure 10 time full scale value with a maximum of 2,5 bar for ranges within 16 and 400 mbar. (models with electric contacts excluded).
  (identification V28)

- **Threaded pressure connection**
  different from standard. **(identification V42)**

- **Changes to the dial**
  - serial number; **(identification V50)**
  - specific dial; **(identification V51)**
  - red mark; **(identification V52)**
  - writings; **(identification V53)**
  - TAG number; **(identification V54)**
  - dial without logo; **(identification V56)**
  - double logo (Fantinelli + customer); **(identification V57)**
  - customer's logo. **(identification V58)**

- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel.
  (identification V61)

- **Spacer (for MP 319 only)**
  to remove the threaded connection for diaphragm inspection and n. 2 flushing plugs allowing the washing:
  - AISI 316L stainless steel. **(identification V62)**

- **Solid front execution casing**
  (identification V65)

- **Liquid filling**
  silicone fluid filled casing
  (minimum range 250 mbar pressure).
  (identification V66)

- **IP 67 casing**
  to grant the calibration, the instrument is not fillable by the enduser.
  (identification V72)

- **Operating temperature higher than 100 °C**
  execution with special gaskets
  (except compound pressure gauges).
  (identification V74)

- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

DOCUMENTATION

- **Fantinelli calibration certificate class 1,6**
  rising pressure.
  (identification V93)

- **ACCREDIA calibration certificate**
  (identification V98)

- **Complementary documents**
  - o certificate of compliance with the order EN 10204 2.2.
  - o technical documentation including;
    - drawings and technical informations ;
    - installation and maintenance instructions.
  - o inspection and test certificate EN 10204-3.1.
  - o material certificates.
  - o PED declaration.
  - o ATEX declaration (II 2 G/D).

Table MP 1
Model of available instruments according with flange size - as per UNI / DIN standards

DN \ PN	6	10	16	25
15	MP 320/420 MP 321/421	MP 320/420 MP 321/421	MP 320/420 MP 321/421	MP 320/420 MP 321/421
20	MP 320/420 MP 321/421	MP 320/420 MP 321/421	MP 320/420 MP 321/421	MP 320/420 MP 321/421
25	MP 320/420 MP 321/421	MP 320/420 MP 321/421	MP 320/420 MP 321/421	MP 320/420 MP 321/421
40	MP 320/420 MP 321/421	MP 320/420 MP 321/421	MP 320/420 MP 321/421	MP 320/420 MP 321/421
50	MP 320/420 MP 321/421	MP 420 MP 321*/421	MP 420 MP 321*/421	MP 420 MP 321*/421
80	MP 420 MP 321*/421	MP 420 MP 321*/421	MP 420 MP 321*/421	MP 420 MP 321*/421

Model marked with "*" have through holes flange

Table MP 2
Model of available instruments according with flange size - as per ASME standards

DN \ CLASS	150	300
1/2"	MP 320/420 MP 321/421	MP 320/420 MP 321/421
3/4"	MP 320/420 MP 321/421	MP 320/420 MP 321/421
1"	MP 320/420 MP 321/421	MP 320/420 MP 321/421
1" 1/2	MP 320/420 MP 321/421	MP 320/420 MP 321/421
2"	MP 320/420 MP 321/421	MP 320/420 MP 321/421
2" 1/2	MP 420 MP 321*/421	MP 420 MP 321*/421

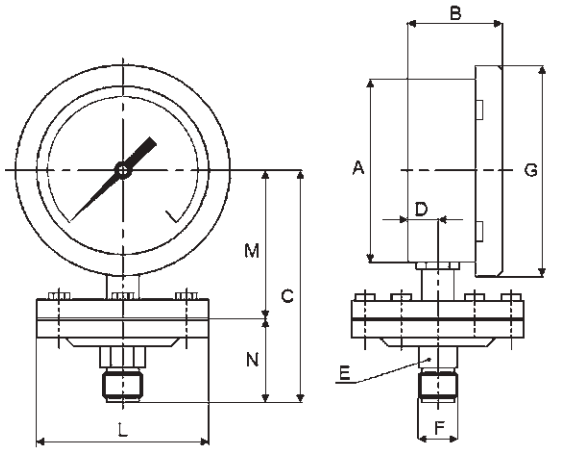


Table MP 319

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50	132	16,5	22	1/2	118			95	88	44		1,40
150	150	50	156	16,5	22	1/2	166			95	112	44		1,70

Pressure gauge with ranges 0,6/25 bar.

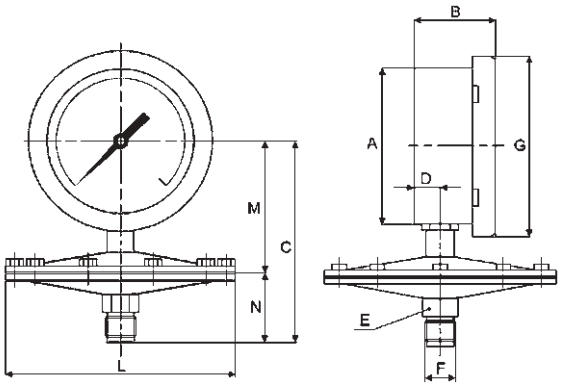


Table MP 419

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50	142	16,5	22	1/2	118			150	93	49		1,55
150	150	50	166	16,5	22	1/2	166			150	117	49		1,85

Pressure gauge with ranges 16/400 mbar.

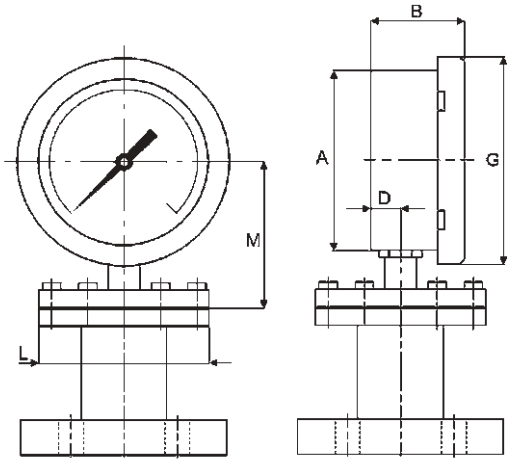


Table MP 320

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50		16,5			118			95	88			
150	150	50		16,5			166			95	112			

Pressure gauge with flanged connection, with fixing through holes - ranges included between 0,6 and 25 bar.

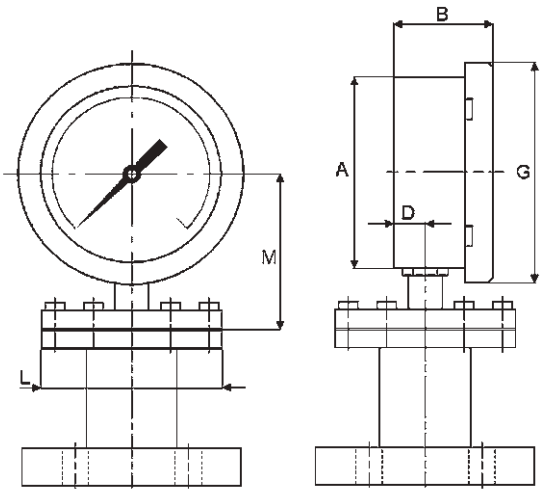


Table MP 420

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50		165			118			150	93			
150	150	50		165			166			150	117			

Pressure gauge with flanged connection, with fixing through holes
- ranges included between 16 and 400 mbar.

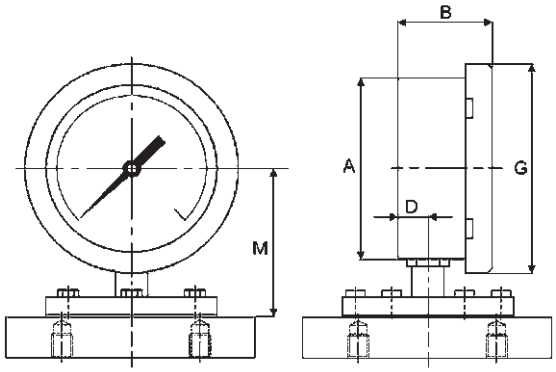


Table MP 321

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50		165			118				88			
150	150	50		165			166				112			

Pressure gauge with flanged connection, with fixing blind or through holes as per MP 1and MP 2 tables
- ranges included between 0,6 and 25 bar.

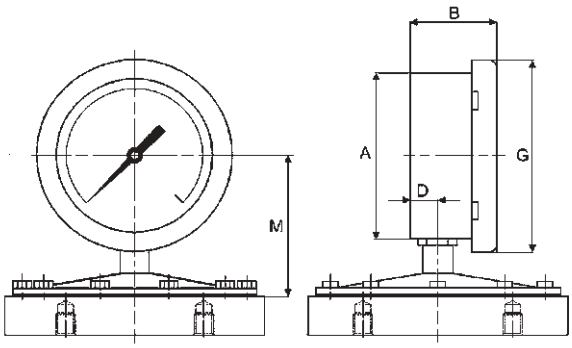


Table MP 421

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50		165			118				93			
150	150	50		165			166				117			

Pressure gauge with flanged connection, with fixing blind holes
- ranges included between 16 and 400 mbar.

note: informations shown in this series may be changed at any time without prior notice.

MA SERIES

Diaphragms absolute pressure gauges

- watertight casing;
- NS 100 - 150;
- ranges included between 60 mbar and 2,5 bar abs.

The absolute pressure gauges are employed for those applications that require to measure the pressure without depending from the fluctuations of the atmospheric pressure. This function is carried on with an vacuum chamber used as a reference.

made in ITALY

PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 100 e 150.
- **Models**
  - MA 325:
    ranges included between 0,6 and 2,5 bar absolute;
  - MA 425:
    ranges included between 60 and 400 mbar absolute;
- **Casing**
  - case and ring in AISI 304 stainless steel (AISI 316 on request - option V61) with bayonet bezel.
- **Protection degree (according to EN 60529)**
  - IP 55 standard - dry execution;
  - IP 67 not fillable (option V72).
- **Window**
  - glass;
  - laminated safety glass (on request - option V17).
- **Blow out device**
  - blow out plug.
- **Pressure connection (according to EN 837)**
  AISI 316L stainless steel threaded G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT
- **Flange process connection on request**
- **Pressure element**
  - AISI 316Ti stainless steel diaphragm.
- **Movement**
  - stainless steel.
- **Ranges (according to EN 837)**
  - **Scale ranges for pressure values between 60 mbar and 2,5 bar abs:**
    - see table B1 at page P06;
      (divisions as per table C1 at page P04);
    - other graduations not normalized for single or double range (on request).
  - **Unit of pressure:**
    - mbar, bar, kPa, kg/cm2 and psi for single or double range.
  - **Scale angle:**
    - 270 ° (180 ° for range 0÷60 mbar).
- **Pointer**
  - aluminium with micrometer adjustment.
- **Dial**
  - white aluminium with black figures
    (for dial modifications see available options).
- **Accuracy (according to EN 837)**
  - class 1,6 (± 1,6% of full scale deflection).

  note 1: accuracy class is not affected by atmospheric pressure changes.

  note 2: accuracy indicated on the pressure gauge does not consider the interference of on eventually applied electric contact.
- **Ambient temperature**
  - -20÷+60°C.
- **Operating temperature**
  - max 120°C.
- **Thermal drift**
  out of the optimum ambient temperature values included within +15 ÷ +25°C, the thermal drift affects the instruments accuracy as follows:
  - 0,3% every 10°C for model MA 325;
  - 0,5% every 10°C for model MA 425.

APPLICATIONS

- **Electric contact (see CE series)**
  the instrument can be identified by the number of the choosen model, adding the reference of the switching action as shown in tables of CE series. **(identification CE...)**

OPTIONS

- **Window**
  different from standard:
  - laminated safety glass.
    (identification V17)
- **Degreasing for oxygen service**
  (identification V31)
- **Threaded pressure connection**
  different from standard. **(identification V42)**
- **Changes to the dial**
  - serial number; **(identification V50)**
  - specific dial; **(identification V51)**
  - red mark; **(identification V52)**
  - writings; **(identification V53)**
  - TAG number; **(identification V54)**
  - dial without logo; **(identification V56)**
  - double logo (Fantinelli + customer);
    (identification V57)
  - customer's logo.
    (identification V58)
- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel.
  (identification V61)
- **IP 67 casing**
  not fillable.
  (identification V72)
- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

DOCUMENTATION

Fantinelli calibration certificate class 1,6
pressiorising pressure.
(identification V93)

- **Complementary documents**
  o certificate of compliance with the order EN 10204 2.2.
  o technical documentation including;
  - drawings and technical informations ;
  - installation and maintenance instructions.

  o inspection and test certificate EN 10204-3.1.
  o material certificates.
  o PED declaration.
  o ATEX declaration (II 2 G/D).

TECHNICAL INFORMATIONS

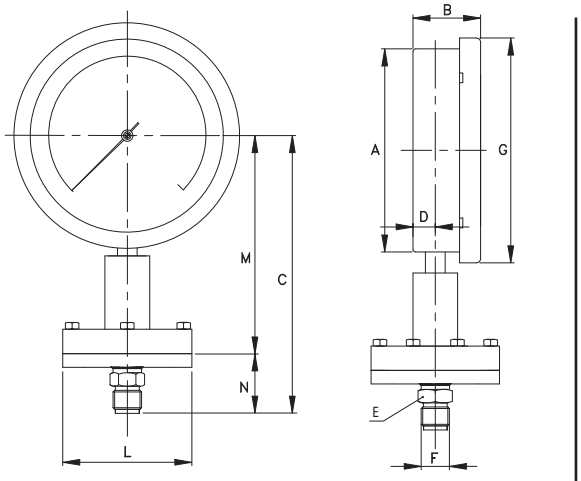


Table MA 325

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50	183	16,5	22	1/2	118			100	139	44		2,30
150	150	50	207	16,5	22	1/2	166			100	163	44		2,63

Absolute pressure gauge ranges included between 0,6 and 2,5 bar.

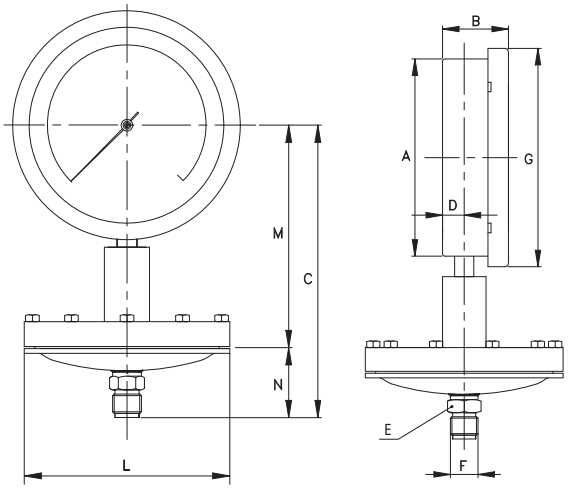


Table MA 425

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50	188	16,5	22	1/2	118			165	139	49		5,80
150	150	50	212	16,5	22	1/2	166			165	163	49		6,13

Absolute pressure gauge ranges included between 25 and 400 mbar.

nota: informations shown in this series may be changed at any time without prior notice.

BP SERIES

Pressure gauges for low pressures generally used for gas

- ◆ capsule pressure element;
- ◆ copper-berillium or stainless steel capsule;
- ◆ NS 63 - 100 - 150;
- ◆ ranges included between -6 and 400 mbar.

made in ITALY

PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 63 (minimum range 60 mbar);
  - 100 (minimum range 6 mbar);
  - 150 (minimum range 6 mbar).

- **Execution**
  - A... direct vertical mounting;
  - B... surface mounting;
  - C... flush mounting;
  - D... direct horizontal mounting;
  - ...2 stainless steel capsule, brass movement, AISI 316L stainless steel pressure connection (NS 100 and 150);
  - ...3 copper-berillium capsule, brass movement, brass pressure connection (NS 63 and 100).

- **Casing**
  - case and ring in AISI 304 stainless steel with bayonet bezel for execution 2 as an alternative for execution 3 NS 100;
  - black painted steel case for execution 3.

- **Protection degree (according to EN 60529)**
  - IP 55 for dry execution 2;
  - IP 43 for execution 3.
  - IP 67 (option V66 and V72) for execution 2;

- **Window**
  - glass for NS 100 and 150;
  - plastic snap-fit for NS 63.

- **Blow-out device**
  - blow out plug for NS 100 and 150.

- **Pressure connection (according EN 837-3)**
  Gas (BSP) or NPT thread as F dimension shown in BP tables:
  - brass (execution 3);
  - AISI 316L (execution 2).

- **Pressure element**
  - copper-berillium capsule (execution 3);
  - stainless steel capsule AISI 316Ti (execution 2).

- **Movement**
  - stainless steel.

- **Zero adjustment**
  - on the dial.

- **Ranges (according to EN 837-3)**
  - o **Graduation:**
    - pressure gauges: 0 ÷ 6; 0 ÷ 10; 0 ÷ 16; 0 ÷ 25; 0 ÷ 40; 0 ÷ 60; 0 ÷ 100; 0 ÷ 160; 0 ÷ 250; 0 ÷ 400;
    - vacuum gauges: -6 ÷ 0; -10 ÷ 0; -16 ÷ 0; -25 ÷ 0; -40 ÷ 0; -60 ÷ 0; -100 ÷ 0; -160 ÷ 0; -250 ÷ 0; -400 ÷ 0;
    - compound gauges: on request. (divisions as per table C1 at page P04)
    - other graduations not normalized.
  - o **Unit of pressure:**
    - mbar, kPa, and psi for single or double range.
  - o **Scale angle:**
    - 270 °.

- **Working pressure (referred to full scale deflection)**
  - from 1/10 to 2/3.

- **Over-pressure (referred to full scale deflection)**
  - not allowed.

- **Pointer**
  - aluminium not adjustable.

- **Dial**
  - white aluminium with black figures (for dial modifications see available options).

- **Accuracy (according to EN 837-3)**
  - class 1,6 (± 1,6% of full scale deflection).

- **Ambient temperature**
  - -10 ÷+50 °C.

- **Thermal drift**
  - out of optimum ambient temperature values included within +15 ÷ +25 °C, the thermal drift affects the instruments accuracy of 0,5% every 10 °C.

- **Operating temperature**
  - -10 ÷ +60 °C for execution 3;
  - -10 ÷ +120 °C for execution 2.

APPLICATIONS

- **Accessories (see AM series)**
  - cooling siphons, recommended when high temperature are involved;
  - valves;
  - dampers for control of process fluid entry speed into the instrument;
  - adjusting over-pressure protectors to cut automatically off the instrument from the circuit.

OPTIONS

- **Window**
  laminated safety glass for NS 100 and 150.
  (identification V17)
- **Degreasing for oxygen service**
  for execution 2. **(identification V31)**
- **Screwed pressure connection**
  different from standard. **(identification V42)**
- **Changes to the dial**
  - serial number; **(identification V50)**
  - specific dial; **(identification V51)**
  - red mark; **(identification V52)**
  - writings; **(identification V53)**
  - TAG number; **(identification V54)**
  - dial without logo; **(identification V56)**
  - double logo (Fantinelli + customer); **(identification V57)**
  - customer's logo. **(identification V58)**
- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel for execution 2.
  (identification V61)
- **Liquid filling**
  silicone fluid filled casing
  (minimum range 100 mbar pressure).
  (identification V66)
- **IP 67 casing**
  not fillable.
  (identification V72)
- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

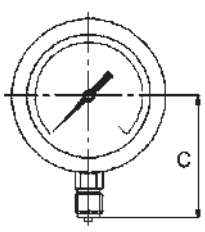
DOCUMENTATION

- **Fantinelli calibration certificate class 1,6**
  rising pressure.
  (identification V93)
- **ACCREDIA calibration certificate**
  (identification V98)
- **Complementary documents**
  - o certificate of compliance with the order EN 10204 2.2.
  - o technical documentation including;
    - drawings and technical informations ;
    - installation and maintenance instructions.
  - o inspection and test certificate EN 10204-3.1.
  - o material certificates (execution 2 only).
  - o PED declaration.
  - o ATEX declaration (II 2 G/D).

TECHNICAL INFORMATIONS

Capsule pressure gauge

execution A2/A3: bottom connection for direct mounting.
execution B2: bottom connection for surface mounting with 3-hole fixing.
execution C2/C3: back connection for flush mounting with 3-hole fixing.
execution D2/D3: back connection for direct mounting.



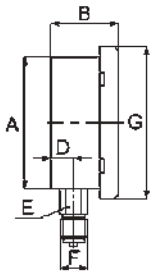
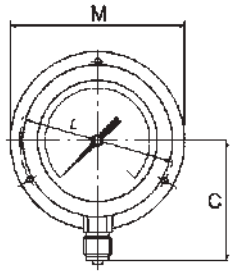


Table BP 322-A2/A3

Model BP322	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
A3	63	63	34	52	10	14	1/4	63							0,17
A2	100	103	50	92	16,5	22	1/2	118							0,51
A3	100	98	49	85	16	22	1/2	100							0,49
A2	150	150	50	116	16,5	22	1/2	166							0,78



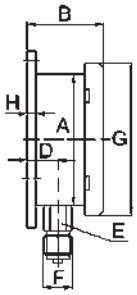
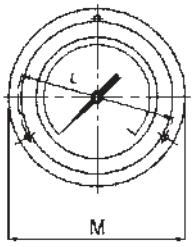


Table BP 322-B2

Model BP322	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
B2	100	103	57	92	23,5	22	1/2	118	7		126	140		5	0,64
B2	150	150	57	116	23,5	22	1/2	166	7		178	192		5	1,02



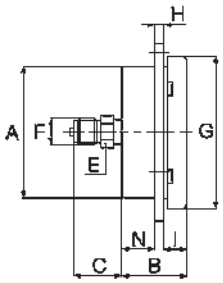


Table BP 322-C2/C3

Model BP322	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
C3	63	64	38	15		14	1/4	62	2	1,5	75	85	34,5	3,6	0,21
C2	100	103	50	38		22	1/2	118	7	19	126	140	24	5	0,60
C2	150	150	50	38		22	1/2	166	7	19	178	192	24	5	0,91

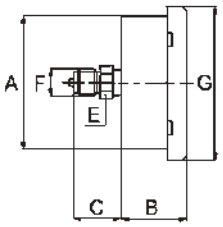


Table BP 322-D2/D3

Model BP322	DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
D3	63	63	38	15		14	1/4	63							0,14
D2	100	103	50	38		22	1/2	118							0,51
D3	100	98	49	38		22	1/2	100							0,49
D2	150	150	50	38		22	1/2	166							0,78

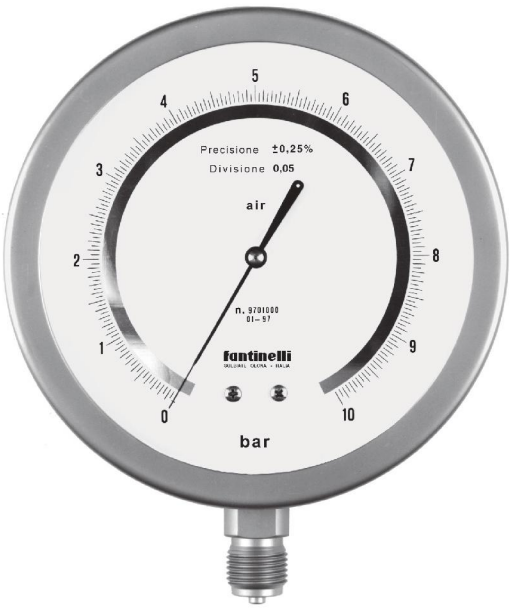
note: informations shown in this series may be changed at any time without prior notice.

CP SERIES section 1

Test gauges

- accuracy class 0,25;
- C-Bourdon tube pressure element;
- NS 150 - 260;
- ranges included between -1 and 1000 bar.

Our metrological laboratory beside others testing equipment has two RUSKA deadweight testers with 0,0035% accuracy class and 0,0001% sensitivity with values ranging from absolute vacuum up to 5000 bar.



made in ITALY

PED 2014/68/EU
ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 150 and 260.
- **Casing**
  - case and ring in AISI 304 stainless steel with bayonet bezel for NS 150;
  - case and ring in AISI 304 stainless steel with bayonet bezel for solid front execution (for CP 331-A NS 150 only) - option V65 (for technical features and dimensions see SF series);
  - aluminium case and ring painted with black epoxy powder with screw clamping, for NS 260.
- **Protection degree (according to EN 60529)**
  - IP 55.
- **Window**
  - glass for NS 150;
  - methacrylate for NS 260;
  - laminated safety glass (standard for solid front execution and on request for CP 330 and CP 331 NS 150 - option V17).
- **Blow-out device**
  - rubber plug;
  - solid front execution (see SF series).
- **Pressure connection (according to EN 837-1)**
  - with G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT) thread in AISI 316 stainless steel.
- **Pressure element**
  - copper berillium for scale values up to 600 bar;
  - Ni-Span C (Fe Ni Cr alloy) for scale value 1000 bar.
- **Welding**
  - silver alloy for copper berillium pressure element;
  - TIG for Ni-Span C pressure element.
- **Movement**
  - high precision.
- **Ranges (according to EN 837-1)**
  - o **Graduation:**
    - pressure gauges: 0 ÷ 1; 0 ÷ 1,6; 0 ÷ 2,5; 0 ÷ 4; 0 ÷ 6; 0 ÷ 10; 0 ÷ 16; 0 ÷ 25; 0 ÷ 40; 0 ÷ 60; 0 ÷ 100; 0 ÷ 160; 0 ÷ 250; 0 ÷ 400; 0 ÷ 600; 0 ÷ 1000;
    - vacuum gauges: -1 ÷ 0;
    (divisions as per table C1 at page P04)
  - o **Unit of pressure:**
    - bar, kPa, MPa, kg/cm2 and psi for single, double or triple range.
  - o **Scale angle:**
    - 300 °.
- **Working pressure referred to full scale deflection)**
  - from1/10 to 3/4.
- **Over-pressure, vibrations and hard pressure pulsations**
  - not allowed.
- **Accuracy (according to EN 837 -1)**
  - class 0,25 (± 0,25% of full scale deflection).

  note 1: instrument is calibrated at an ambient temperature included between +15 and +25 °C; over these values instrument accuracy is influenced by a thermal drift of about 0,05% every 10 °C;

  note2: the instrument must be installed with dial in vertical position.
- **Pointer**
  - balanced and knife edged.
- **Dial**
  - dlight green aluminium with black figures, with anti-parallax mirror, for single range;

  note: tall instruments are identified by a serial number written on the dial.
- **Calibration certificate**

  rising and falling pressure:
  - Fantinelli (standard);
  - ACCREDIA (on request).
- **Carrying case**

  to protect and transport the instrument; only on request for DN 150.

OPTIONS

- **Window**
  - laminated safety glass (NS 150 only).
  (identification V17)
- **Degreasing for oxygen service**
  (identification V31)
- **Screwed pressure connection**
  different from standard. **(identification V42)**
- **Flanged pressure connection**
  Ø 40 mm and clamp for NS 150 with scale value included between -1 e 100 bar.
  (identification V71)
- **Not standard single range dial**
  (identification S59)
- **Double range dial**
  (identification D59)
- **Solid front execution casing**
  only for CP 331-A NS 150 (see SF series for technical features and dimensions).
  (identification V65)

DOCUMENTATION

- **ACCREDIA calibration certificate**
  (identification V98)
- **Complementary documents**
  o certificate of compliance EN 10204-2.2.
  o technical documentation including;
  - drawings and technical informations ;
  - installation and maintenance instructions.
  o PED declaration.
  o ATEX declaration.

CARRYNG CASE

TECHNICAL INFORMATIONS

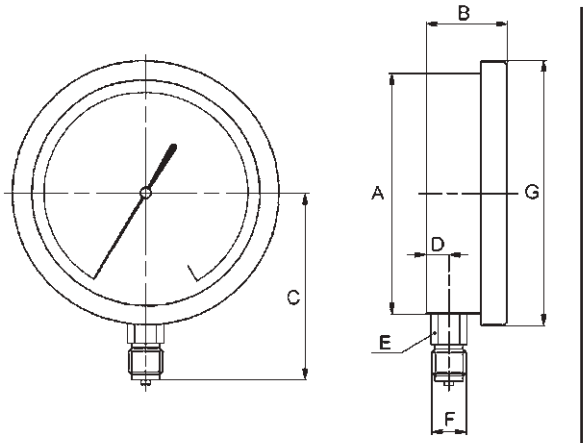


Table CP 331-A

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
150	150	50	114	15,5	22	1/2	166							0,94
260	258	64	177	18,5	17	1/2	280							3,32

Note: See SF series for solid front version dimensions

Pressure gauge with bottom connection for local mounting.

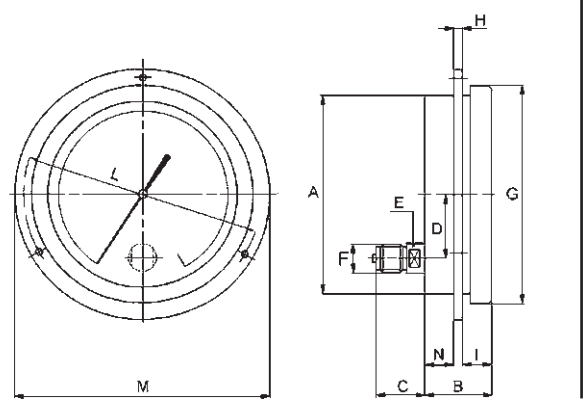


Table CP 331-C

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
150	150	53	35,5	51	17	1/2	166	7	19	178	192	27	5	1,09
260	258	64	34	48	17	1/2	280	6	27	298	315	31	6,5	3,64

Pressure gauge with back connection for flush mounting with 3 fixing holes.

note: informations shown in this series may be changed at any time without prior notice.

CP SERIES section 2

Hand pumps CP

The CP type hand pumps are used for testing and calibration of a wide range of pressure devices, such as dial gauges, sensors and switches.
The hand pumps can be used as a stand alone device or in conjunction with reference standard instruments, for example, the digital pressure gauges.

TECHNICAL FEATURES

- **Pressure ranges**
  - vacuum: - 0,95 ÷ 0 bar;
  - pneumatic pressure: 0 ÷ 35 bar;
  - hydraulic pressure: 0 ÷ 350 bar.
- **Main generation system**
  - scissor hand device for pressure, with ergonomically designed handle;
- **Fine adjustment**
  - volume adjuster for fine setting of the generated pressure.

PRODUCT CODING

- **CP 40**
  - pump -0,95 ÷ 40 bar with connection 1/2 BSP F revolving for reference instrument;
  - flexible tube lenght 500 mm with connection 1/4 BSP F;
  - on request - set adapters BSP, NPT with seals - carrying case.
- **CP 350**
  - pump 0 ÷ 350 bar with connection 1/4 NPT for reference instrument;
  - flexible tube lenght 1000 mm with connection 1/4 BSP F and set adapters;
  - carrying case.

CP SERIES section 3

Digital pressure gauge CP 332

CP 332 is a family of digital pressure gauges that grants important accuracy specification and can be used for both pressure measurement and pressure calibration on gauges, sensor and switches.

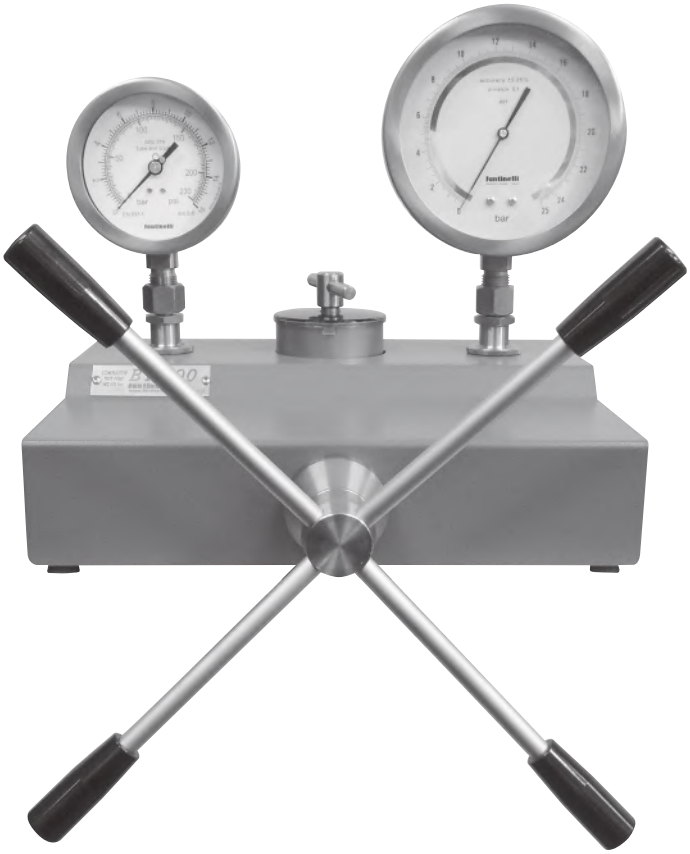
Dimensions
132 x 80 x depht 48 mm

TECHNICAL FEATURES

- **Pressure ranges**
  - - 1÷0; -1÷1; -1÷2,5; -1÷5; -1÷10; -1÷20; 0÷1; 0÷2,5; 0÷5; 0÷10; 0÷20; 0÷50; 0÷100; 0÷250; 0÷350; ÷500; 0÷700; 0÷1000; 0÷1500; 0÷2000 (unit of pressure bar).
- **Accuracy**
  - ± 0,05% of full scale.
- **Overpressure**
  - 150% of full scale.
- **Display**
  - LCD, 5 digit (99999).
- **Selectable engineering units**
  - mbar, bar, kPa, MPa and psi.
- **Pressure connection**
  - G 1/2 B (1/2 Gas or BSP).
- **Material of sensor**
  - stainless steel 17-4 PH.

CP SERIES section 5

Hydraulic comparison calibration pumps CP 328



The pumps CP 328 make it possible to generate hydraulic pressures up to 800 bar necessary for the comparison calibration of pressure gauges, pressure switches and transducers with standard gauges. Their sturdiness and compactness make them easy to use both in the work shop and in the field. Their installation and maintenance have been simplified as muche as possible so that they may be used immediately.

TECHNICAL FEATURES

Operating fluid
- model suitable to work with oil or water.

- **Ranges of use**
  - CP 328/400: 0 ÷ 400 bar;
  - CP 328/400-OX: 0 ÷ 400 bar for oxygen;
  - CP 328/400-V: 0 ÷ 400 bar with gaskets for chemical agents;
  - CP 328/400+: 0 ÷ 600 bar;
  - CP 328/800: 0 ÷ 800 bar.

note: informations shown in this series may be changed at any time without prior notice.

ST SERIES

Expansion thermometers

- inert gas filling;
- sensitive bulb rigidly connected to the casing (local thermometers) or by capillary (distance reading thermometers);
- NS 100 and 150 watertight casing;
- indication ranges included between -80 and +600 °C.

made in ITALY

CE ATEX 2014/34/EU

TECHNICAL FEATURES

- **Nominal sizes**
  - 100 and 150.
- **Casing**
  - case and ring in AISI 304 stainless steel (AISI 316 on request - option V61) with bayonet bezel.
- **Protection degree (according to EN 60529)**
  - IP 55 for dry execution;
  - IP 67 (option V66 and V72).
- **Window**
  - glass for dry execution;
  - laminated safety glass for liquid filled execution or on request (option V17).
- **Thermometric element**
  - Cr Mo steel spiral tube.
- **Movement**
  - stainless steel.
- **Ranges (according to EN 13190)**
  - o **Graduation:**
    - 0 ÷ 60; 0 ÷ 100; 0 ÷ 120; 0 ÷ 160; 0 ÷ 200; 0 ÷ 250; 0 ÷ 300; 0 ÷ 400; 0 ÷ 500; 0 ÷ 600; -40 ÷ +60; -20 ÷ +40; -20 ÷ +100; (divisions as per table C2 at page P04)
    - other graduations not normalized for single or double range (on request).
  - o **Unit of temperature:**
    - °C (Celsius) and °F (Fahrenheit) for single or double range.
  - o **Scale angle:**
    - 270 °.
- **Working temperature (referred to full scale value)**
  - from1/10 to 9/10.
- **Over-temperature (occasionally allowed)**
  - 115% of full scale value for all ranges except 0÷600 °C.
- **Pointer**
  - aluminium with micrometer adjustment also for execution with electric contacts.
- **Dial**
  - white aluminium with black figures (for dial modification see available options).
- **Accuracy (according to EN 13190)**
  - class 1;
  - class 0,6 (on request - option V36).

  note: accuracy indicated on the thermometer does not consider the interference of an eventually applied electric contact.
- **Capillary**
  - AISI 316 stainless steel, plain; **(identification KZ)**
  - dAISI 316 stainless steel with flexible AISI 304 stainless steel armour. **(identification KY)**

  note: distance reading thermometers can be identified with the picture number, adding the relating reference of the capillary (K identification), to its material and its armouring (Z or Y identification), followed by the number indicating the length in meters of the same capillary.
- **Capillary length**
  - sstandard: 1, 2, 3 and 4 meters;
  - special: on request;
  - maximum: 25 meters.
- **Sensitive bulb (see pages ST05 and ST06)**
  - 12 mm standard cylindrical diameter;
  - 8 mm standard cylindrical diameter.
- **Thermowell (see at pages PZ01 and PZ02)**
  - built-up from pipe - P2 and P4 type;
  - drilled from solid bar stock - P3 and P5 type (dimensions and materials are decided by the customer).
- **Thermal drift**
  - with reference to the ambient temperature of 20 °C and due to the length of the capillary, thermal drift affects the instrument accuracy as ± 0,15% per meter every 10 °C of variations.

APPLICATIONS

Electric contact
(see CE series)
the instrument can be identified by the number of the chosen model, adding the reference of the switching action as shown in tables of CE series.
(identification CE...)

OPTIONS

- **Maximum pointer**
  indicating the maximum value reached:
  - zero setting on the window;
    (identification V11)
  - zero setting from outside the casing (with electric contacts).
    (identification V12)

- **Window**
  different from standard:
  - laminated safety glass.
    (identification V17)

- **Accuracy class 0,6**
  (identification V36)

- **Changes to the dial**
  - serial number; **(identification V50)**
  - qspecific dial; **(identification V51)**
  - writings; **(identification V53)**
  - TAG number; **(identification V54)**
  - dial without logo; **(identification V56)**
  - double logo (Fantinelli + customer);
    (identification V57)
  - customer's logo. **(identification V58)**

- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel.
  (identification V61)

- **Liquid filling**
  silicone fluid filled casing with laminated safety glass window.
  (identification V66)

- **Compensation**
  of ambient temperature by a bimetal link on the movement.
  (identification V69)

- **IP 67 casing**
  not fillable.
  (identification V72)

- **Sensitive bulb diameter**
  not standard.
  (identification V75)

- **Indication ranges lower than -40 °C**
  (identification V76)

- **Support**
  for model ST 379 fixing in AISI 304 stainless steel.
  (identification V81)

- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

DOCUMENTATION

- **Fantinelli calibration certificate**
  rising temperature:
  - class 0,6;
  - class 1. **(identification V92)**

- **Complementary documents**
  o certificate of compliance with the order EN 10204-2.2.
  o technical documentation including:
  - drawings and technical informations;
  - installation and maintenance instructions.
  o inspection and test certificate EN10204-3.1.
  o material certificates.
  o ATEX declaration (II 2 G/D).

TECHNICAL INFORMATIONS

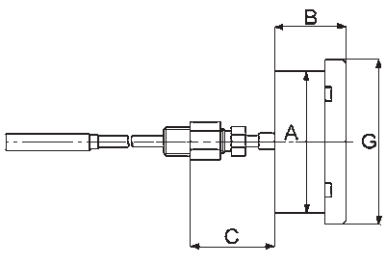


Table ST 374

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50	60				118							0,56
150	150	50	60				166							0,80

Thermometer for direct horizontal mounting.

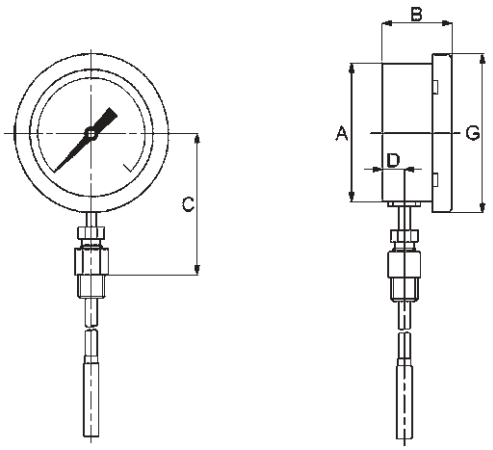


Table ST 375

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50	110	16,5			118							0,56
150	150	50	134	16,5			166							0,80

Thermometer for direct vertical mounting.

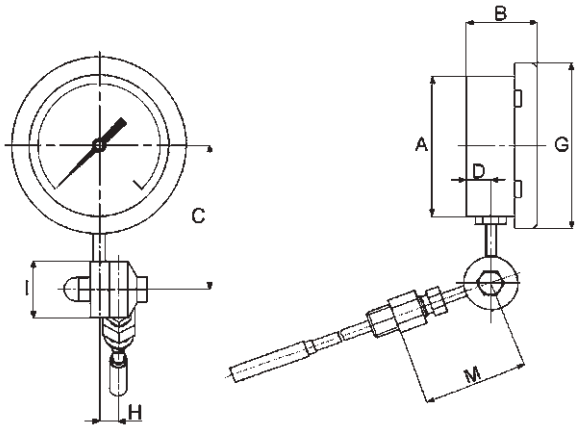


Table ST 378

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50	110	16,5			118	13	40		65			0,70
150	150	50	134	16,5			166	13	40		65			0,94

Every angle thermometer for direct vertical mounting.

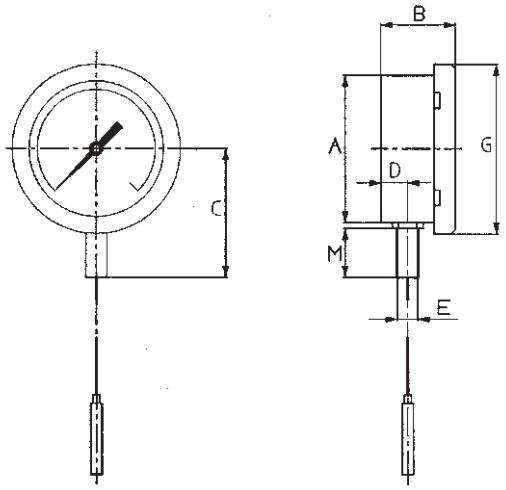
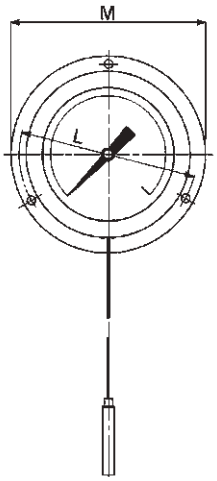


Table ST 379

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50	100	16,5	14,5		118				35			0,52
150	150	50	124	16,5	14,5		166				35			0,76

Distance reading thermometer for surface mounting with support fixing.



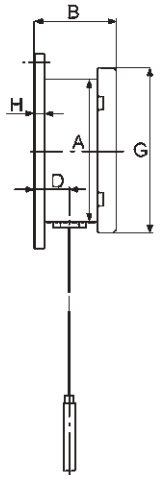
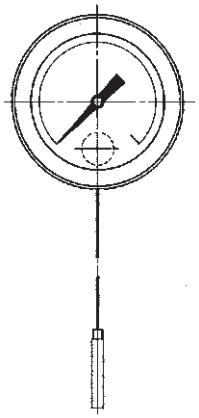


Table ST 380

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	57		23,5			118	7		126	140		5	0,82
150	150	57		23,5			166	7		178	192		5	1,18

Distance reading thermometer for surface mounting with 3 fixing holes.



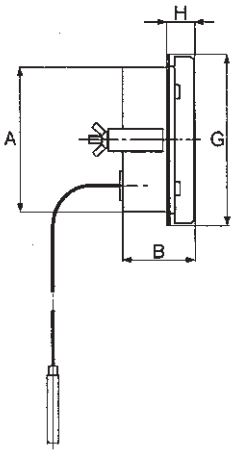
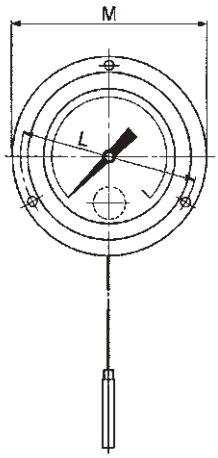


Table ST 381

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50					121	20						0,73
150	150	50					168	20						0,98

Distance reading thermometer for flush mounting with clamp fixing.



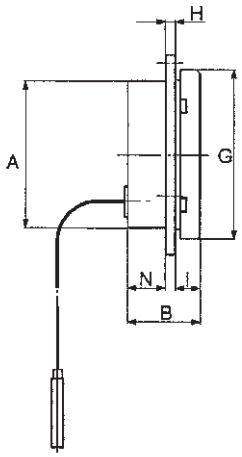


Table ST 383

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	103	50					118	7	19	126	140	24	5	0,82
150	150	50					166	7	19	178	192	24	5	1,18

Distance reading thermometer for flush mounting with 3 fixing holes.

note: informations shown in this series may be changed at any time without prior notice.

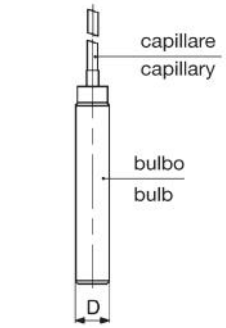
Table ST 1
Sensitive bulbs' and thermowells' length

Range °C	Lenght L sensitive bulbs (thread included)				Immersion U thermowell (thread escluded) for bulbs D 12 mm			
	D 8 mm		D 12 mm		min	standard	max	special
	min	standard	min	standard	mm	mm	mm	mm
-40 ÷ +60	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
-20 ÷ +40	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
-20 ÷ +100	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
0 ÷ 60	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
0 ÷ 100	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
0 ÷ 120	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
0 ÷ 160	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
0 ÷ 200	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
0 ÷ 250	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
0 ÷ 300	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
0 ÷ 400	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
0 ÷ 500	170	200 – 250 300 – 400	85	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	1000	to be agreed
0 ÷ 600	- - -	- - -	120	150 200 – 250 300 – 400	105	150 200 – 250 300 – 400	1000	to be agreed

note: on request, sensitive bulbs with diameters (9,6 - 11,5 - others) and lenghts different from those above indicate can be realized.

SENSITIVE BULBS AND CONNECTIONS

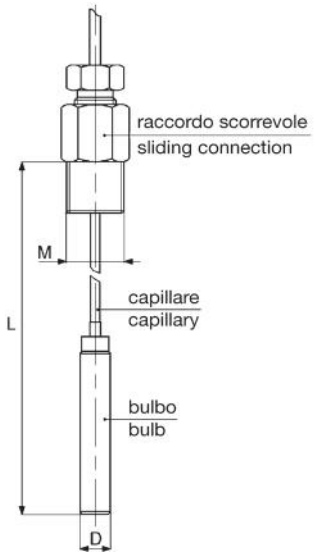
C1



Cylindrical plain sensitive bulb

o AISI 316L stainless steel;
o diameter D 12 or D 8 mm ;
o connected to the thermometer by a capillary;
o without process connection (suitable for free immersion).

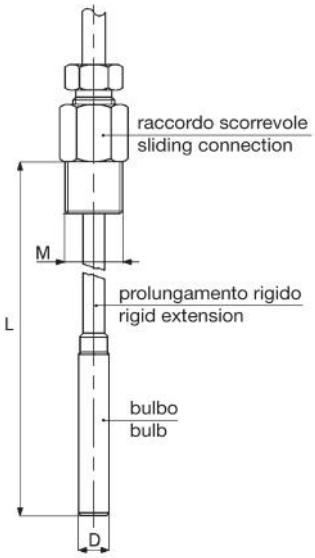
C6



Cylindrical plain sensitive bulb

o AISI 316L stainless steel;
o diameter D 12 or D 8 mm;
o connected to the thermometer by a capillary;
o AISI 316L st. st. male threaded process connection M sliding on the capillary:
- G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT) process connection;
- 1/2-14 NPT EXT (1/2 NPT) connection to an eventual thermowell.

C7



Cylindrical plain sensitive bulb

o AISI 316L stainless steel;
o diameter D 12 or D 8 mm;
o connected to the thermometer by an AISI 316L stainless steel rigid extension diameter 8 mm;
o AISI 316L st. st. male threaded process connection M sliding on the extension :
- G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT) process connection;
- 1/2-14 NPT EXT (1/2 NPT) connection to an eventual thermowell.

FOR THERMOWELLS SEE AT PAGE PZ01 AND PZ02

BT SERIES

Bimetal thermometers

- with rigid or every angle stem;
- watertight casing stainless steel execution;
- NS 80 - 100 - 125 -150;
- indication ranges included between -50 and +600 °C

made in ITALY

CE ATEX 2014/34/EU

Ex

TECHNICAL FEATURES

- **Nominal sizes**
  - 80,100,125 and 150.
- **Casing**
  - case and ring in AISI 304 stainless steel (AISI 316 on request - option V61) with bayonet bezel.
- **Adjustment device**
  of the calibration from outside (only case AISI 304).
- **Protection degree**
  (according to EN 60529)
  - IP 55 for dry execution;
  - IP 67 (option V66 and V72).
- **Window**
  - glass for dry execution;
  - laminated safety glass for liquid filled execution or on request (option V17).
- **Thermometric element**
  - bimetal spiral.
- **Ranges (according to EN 13190)**
  - o **Graduation:**
    - 0 ÷ 60; 0 ÷ 100; 0 ÷ 120; 0 ÷ 160; 0 ÷ 200; 0 ÷ 250; 0 ÷ 300; 0 ÷ 400; 0 ÷ 500; 0 ÷ 600; -50 ÷ +50; -40 ÷ +60; -20 ÷ +40; -20 ÷ +100; (divisions as per table C2 at page P04)
    - other graduations not normalized for single or double range (on request).
  - o **Unit of temperature:**
    - °C (Celsius) and °F (Fahrenheit) for single or double range.
  - o **Scale angle:**
    - 270 °.
- **Working temperature**
  (referred to full scale value)
  - from 1/10 to 9/10.
- **Over-temperature**
  (occasionally allowed)
  - 115% of full scale value.
- **Pointer**
  - aluminium with micrometer adjustement.
- **Dial**
  - white aluminium with black figures (for dial modifications see available options).
- **Accuracy**
  (according to EN 13190)
  - class 1.
- **Sensitive stem**
  - see page BT02 e BT03.

  note: instruments are manufactured with G8 (fixed) or G9 (sliding) connection also suitable for an eventual thermowell connection.
- **Thermowell**
  (see page PZ01 and PZ02)
  - built-up from pipe - P2 and P4 type;
  - drilled from solid bar stock - P3 and P5 type (dimensions and materials are decided by customer).

OPTIONS

- **Window**
  different from standard:
  - laminated safety glass.
    (identification V17)
- **Changes to the dial**
  - serial number; **(identification V50)**
  - specific dial; **(identification V51)**
  - writings; **(identification V53)**
  - TAG number; **(identification V54)**
  - dial without logo; **(identification V56)**
  - double logo (Fantinelli + customer); **(identification V57)**
  - customer's logo. **(identification V58)**
- **AISI 316 stainless steel case and ring**
  as alternative to AISI 304 stainless steel.
  (identification V61)

- **Liquid filling**
  silicone fluid filled casing with laminated safety glass window for scale ≤ 120°C.
  (identification V66)
- **IP 67 casing**
  not fillable. **(identification V72)**
- **Sensitive stem diameter**
  not standard.
  (identification V75)
- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

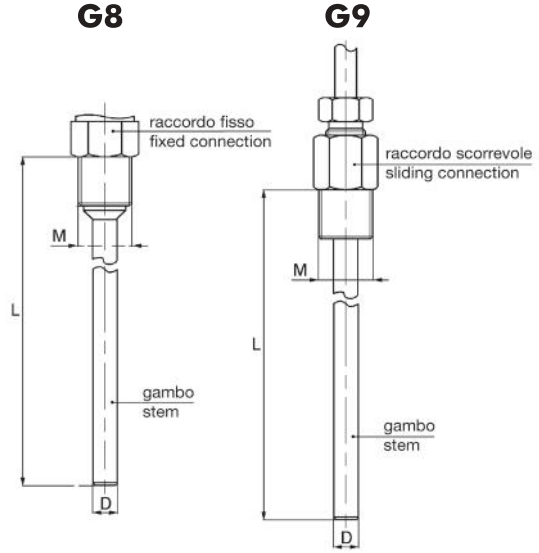
DOCUMENTATION

- **Fantinelli calibration certificate class 1**
  rising temperature.
  (identification V92)
- **Documenti complementari**
  o certificate of compliance with the order EN 10204-2.2.

o technical documentation including:
- drawings and technical informations;
- installation and maintenance instructions.

o inspection and test certificate EN 10204-3.1.
o material certificates.
o ATEX declaration (II 2 G/D).

SENSITIVE STEMS AND CONNECTIONS



Cilindrical sensitive stem

o AISI 316L stainless steel;
o D diameter:
- 6 and 8 mm;

o length L:
- standard 100, 150, 200, 250, 300 and 400 mm;
- special length included between 100 and 700 mm;

o AISI 316L st.st. male threaded process connection M:
- fixed (G8) G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT);
- sliding (G9) G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT);
- 1/2-14 NPT EXT (1/2 NPT) connection to an eventual thermowell.

FOR THERMOWELLS SEE AT PAGES PZ01 E PZ02

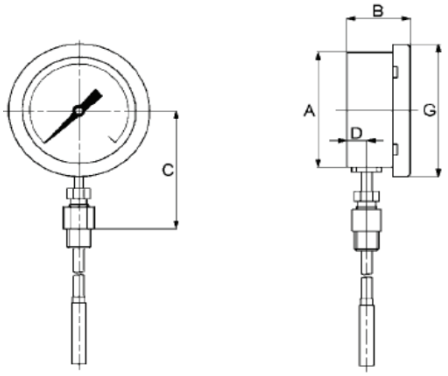


Table BT 385

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	100	49	110	16,5			112							0,56
150	150	49	135	16,5			166							0,80

Thermometer for direct vertical mounting.

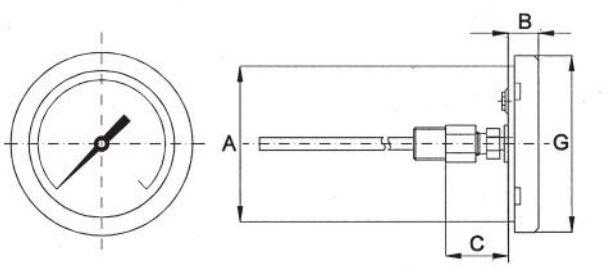
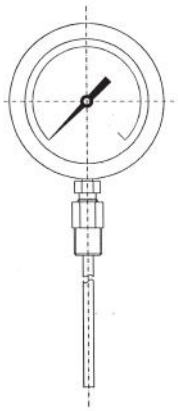


Table BT 387

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
80	74	14	58				80							0,17
100	100	21	58				111							0,38
125	126	30	58				129							0,48
150	150	24	58				161							0,60

Thermometer for direct horizontal mounting.

note: informations shown in this series may be changed at any time without prior notice.



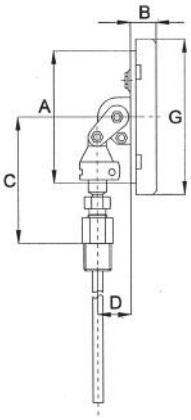


Table BT 392

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg
100	100	21	90	40			111							0,56
125	126	30	90	40			129							0,66
150	150	24	90	40			161							0,78

Every angle thermometer for direct mounting.

Table BT 1
Sensitive stems' and thermowells' length

Range °C	Lenght L sensitive stems (thread included)				Immersion U thermowell (thread escluded			
	D 6 mm		D 8 mm		min	standard	max	special
	min	standard	min	standard	mm	mm	mm	mm
-50 ÷ +50	90	100 – 150 200 – 250 300 – 400	90	100 – 150 200 – 250 300 – 400	75	100 – 150 200 – 250 300 – 400	500	to be agreed
-40 ÷ +60	90	100 – 150 200 – 250 300 – 400	90	100 – 150 200 – 250 300 – 400	75	100 – 150 200 – 250 300 – 400	500	to be agreed
-20 ÷ +40	110	150 200 – 250 300 – 400	110	150 200 – 250 300 – 400	95	100 – 150 200 – 250 300 – 400	500	to be agreed
-20 ÷ +100	70	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	55	100 – 150 200 – 250 300 – 400	500	to be agreed
0 ÷ 60	110	150 200 – 250 300 – 400	110	150 200 – 250 300 – 400	95	100 – 150 200 – 250 300 – 400	500	to be agreed
0 ÷ 100	90	100 – 150 200 – 250 300 – 400	90	100 – 150 200 – 250 300 – 400	75	100 – 150 200 – 250 300 – 400	500	to be agreed
0 ÷ 120	70	100 – 150 200 – 250 300 – 400	70	100 – 150 200 – 250 300 – 400	55	100 – 150 200 – 250 300 – 400	500	to be agreed
0 ÷ 160	60	100 – 150 200 – 250 300 – 400	60	100 – 150 200 – 250 300 – 400	45	100 – 150 200 – 250 300 – 400	500	to be agreed
0 ÷ 200	80	100 – 150 200 – 250 300 – 400	80	100 – 150 200 – 250 300 – 400	65	100 – 150 200 – 250 300 – 400	500	to be agreed
0 ÷ 250	110	150 200 – 250 300 – 400	110	150 200 – 250 300 – 400	95	100 – 150 200 – 250 300 – 400	500	to be agreed
0 ÷ 300	80	150 200 – 250 300 – 400	80	150 200 – 250 300 – 400	65	100 – 150 200 – 250 300 – 400	500	to be agreed
0 ÷ 400	80	100 – 150 200 – 250 300 – 400	80	100 – 150 200 – 250 300 – 400	65	100 – 150 200 – 250 300 – 400	500	to be agreed
0 ÷ 500	80	100 – 150 200 – 250 300 – 400	80	100 – 150 200 – 250 300 – 400	65	100 – 150 200 – 250 300 – 400	500	to be agreed
0 ÷ 600	60	150 200 – 250 300 – 400	60	150 200 – 250 300 – 400	45	100 – 150 200 – 250 300 – 400	500	to be agreed

note: on request, sensitive stems with diameters (6,4 - 9,6) and lenghts different from those above indicate can be realized.

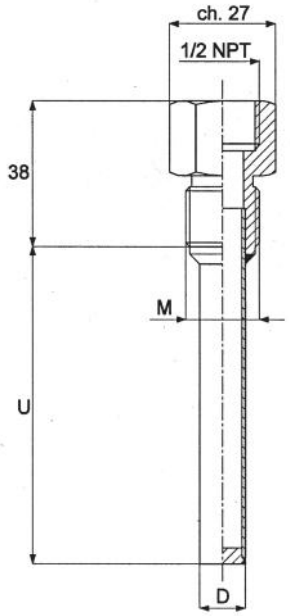
THERMOWELLS

Thermowells

- from pipe or bar stock;
- threaded or flanged;
- AISI 316L st.st. or special materials.

- **H = head**
- **U = immersion**
- **T = extension**

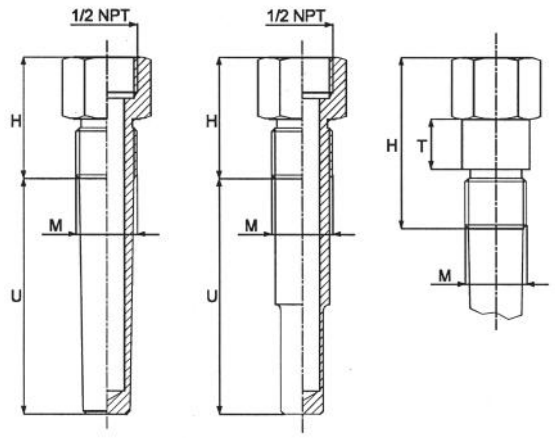
P2



Threaded thermowell PN 25 and PN 100 built-up from pipe

o AISI 316L stainless steel;
o diameter D 15 mm (ST series) or D 12 mm (BT series) - PN 25;
o diameter D 21,34 mm (ST series) or D 13,72 (BT series) - PN 100;
o length U to be agreed;
o male threaded process connection M:
- G 1/2 B (1/2 Gas or BSP) - PN 25 (ST and BT series) - PN 100 (BT series);
- 1/2-14 NPT EXT (1/2 NPT) - PN 25 (ST and BT series) - PN 100 (BT series);
- G 3/4 B (3/4 Gas or BSP) - PN 25 and PN 100;
- 3/4-14 NPT EXT (3/4 NPT) - PN 25 and PN 100;
- others on request.

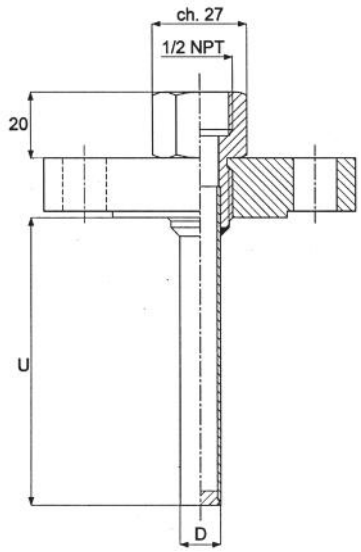
P3



Threaded thermowell drilled from bar stock

o material:
- AISI 316L stainless steel standard;
- special material on request;
o 1/2, 3/4, 1 M male threaded connection, Gas or NPT or other type to be agreed;
o dimensions and eventual insulation extension T to be agreed.

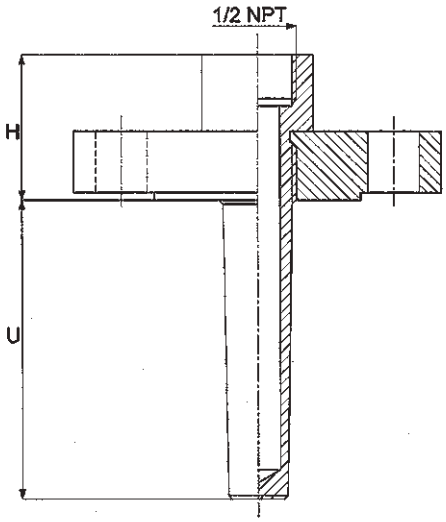
P4



Flanged thermowell PN 25 built-up from pipe

o AISI 316L stainless steel;
o diameter D 15 mm (ST series) or D 12 mm (BT series);
o length U to be agreed;
o flanged process connection;
o dimensions to be agreed.

P5



Flanged thermowell drilled from bar stock

o material:
  - AISI 316L stainless steel standard;
  - special material on request;
o flanged process connection;
o dimensions to be agreed.

40 mm must be added to thermometers L lenght if a thermowell is fitted (may be increased in case of flanged thermowell)

TV SERIES

Glass thermometers

TV 424

- painted aluminium watertight rectangular casing;
- adjustable or rigid stem;
- ranges included between -30 and +600 °C.

TV 426

- anodized aluminium V-shaped casing;
- rigid stem;
- ranges included between -100 and +650 °C.

TV 424 TECHNICAL FEATURES

- **Nominal sizes**
  - 180 x 55 e 250 x 55.
- **Casing**
  - aluminium painted with black epoxy powder.
- **Protection (according to EN 60529)**
  - IP 54.
- **Window**
  - glass.
- **Thermometric capillary**
  - glass prismatic section, with coloured reflection.
- **Ranges (see table TV 1)**
  - o **Graduation:**
    - 0 ÷ 80; 0 ÷ 100; 0 ÷ 120; 0 ÷ 160; 0 ÷ 250; -30 ÷ +70; -20 ÷ +80; -20 ÷ +140; -10 ÷ +50; +100 ÷ +500; +200 ÷ +600.
  - o **Unit of temperature:**
    - °C (Celsius degrees).
  - o **Execution:**
    - standard as per table TV 1;
    - special execution.

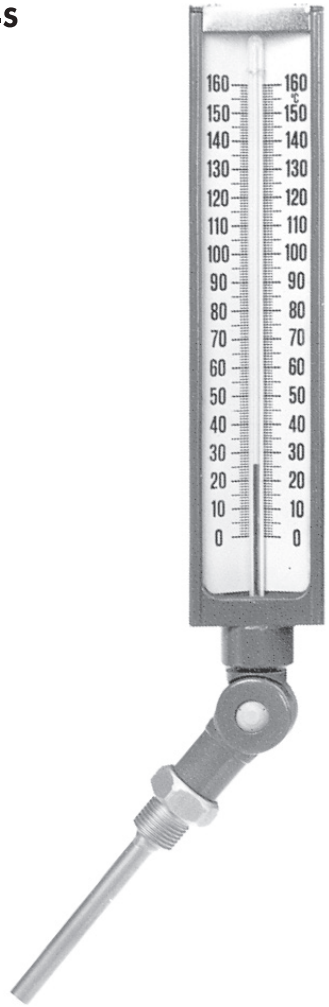
  note: ranges +100 ÷ +500 °C and +200 ÷ +600 °C are not available for model TV 424-S.
- **Dial**
  - white aluminium with black figures.
- **Accuracy**
  - class 1 (± 1% of full scale deflection).
- **Every angle (TV 424-S)**
  light alloy with screw clamping - it allows changes of the thermowell stem angle when there are positioning difficulties; besides, a further right-hand or left-hand rotation of the casing after installation allows to improve the instrument reading.
- **Sensitive stem**
  cyilindrical diameter 12 mm, length L to be agreed (thread included), between a minimum of 80 mm and a maximum of 400 mm:
  - brass (execution G1);
  - AISI 316 stainless steel (execution G2).
- **Connection**
  male threaded M:
  - G 1/2 B (1/2 Gas or BSP);
  - 1/2-14 NPT EXT (1/2 NPT);
  - others on request.
- **Thermowell**
  - o **Material:**
    pipe diameter 15 mm, length U (thread escluded) to be agreed:
    - brass (execution P1);
    - AISI 316 stainless steel (execution P2).
  - o **Male threaded connection M:**
    - G 1/2 B (1/2 Gas or BSP);
    - 1/2-14 NPT EXT (1/2 NPT);
    - others on request.

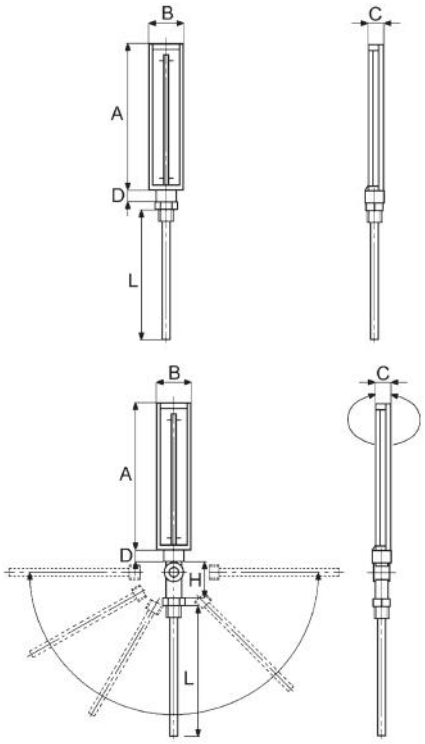
Table TV 1
TV 424 glass thermometers graduation divisionsaccording to range and nominal size

Range °C	DN - NS	
	180 x 55	250 x 55
	Division °C	Division °C
0 ÷ 80	1	1
0 ÷ 100	1	1
0 ÷ 120	2	1
0 ÷ 160	2	1
0 ÷ 250	5	2
-30 ÷ +70	1	1
-20 ÷ +80	1	1
-20 ÷ +140	2	1
-10 ÷ +50	1	1
+100 ÷ +500	5	5
+200 ÷ +600	5	5

TECHNICAL INFORMATION

TV 424-S





TV 424

TV 424-S

Glass thermometers with watertight rectangular casing

Table TV 424

DN	A	B	C	D	E	F	G	H	I	L	M	N	PESO ~ kg
180x55	180	55	24	15				58					0,50
250x55	250	55	24	15				58					0,70

TV 426 TECHNICAL FEATURES

- **Nominal sizes**
  - 110x35 - 150x35 - 200x35.
- **Casing**
  - brass-coloured anodized aluminium.
- **Thermometric capillary**
  - glass.
- **Ranges**
  - o **Graduation:**
    - 0 ÷ 50; 0 ÷ 100; 0 ÷ 120; 0 ÷ 150; 0 ÷ 160; 0 ÷ 200; 0 ÷ 250; 0 ÷ 300; 0 ÷ 400; 0 ÷ 500; 0 ÷ 600; -100 ÷ +30; -60 ÷ +40; -50 ÷ +50; -40 ÷ +40; -30 ÷ +50; -10 ÷ +50; -10 ÷ +110; +20 ÷ +70; +100 ÷ +650.
  - o **Unit of temperature:**
    - °C (Celsius degrees).
  - o **Execution:**
    - standard as per table TV 2;
    - special execution.
- **Graduation**
  vetrified, indelible on thermometric capillary with length:
  - 58 mm for NS 110x35;
  - 90 mm for NS 150x35;
  - 125 mm for NS 200x35.
- **Numeration and unit of temperature**
  - indelible black on a side of the casing.
- **Accuracy**
  - class 1 (± 1% of full scale deflection).
- **Sensitive stem**
  cylindrical diameter 10 mm:
  - o **Lenght:**
    - standard (thread included) 35, 40, 48, 63, 80, 100, 160, 200 and 300 mm.
  - o **Material:**
    - brass (execution G1);
    - AISI 316 stainless steel (execution G2).
- **Connection**
  threaded:
  - G 1/2 B male fixed (1/2 Gas or BSP);
  - 1/2-14 NPT EXT male fixed (1/2 NPT);
  - others on request.
- **Thermowell**
  - o **Material:**
    pipe diameter 13 mm, lenght U (thread escluded) to be agreed:
    - brass (execution P1);
    - AISI 316 stainless steel (execution P2).
  - o **Male threaded connection M:**
    - G 1/2 B (1/2 Gas or BSP);
    - 1/2-14 NPT EXT (1/2 NPT);
    - others on request.

Table TV 2

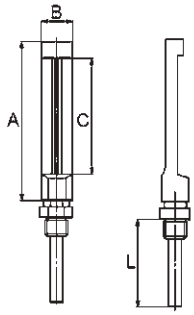
TV 426 glass thermometers measuring ranges and divisions according to nominal size

DN 110 x 35		DN 150 x 35		DN 200 x 35	
Range	**Div.°C**	**Range**	**Div.°C**	**Range**	**Div.°C**
		0 ÷ 100	2	0 ÷ 120	1
		0 ÷ 120	2	0 ÷ 150	1
		0 ÷ 150	2	0 ÷ 160	2
		0 ÷ 160	2	0 ÷ 200	2
0 ÷ 50	1	0 ÷ 200	5	0 ÷ 400	5
0 ÷ 100	2	0 ÷ 250	5	0 ÷ 500	5
0 ÷ 120	2	0 ÷ 300	5	0 ÷ 600	5
0 ÷ 160	2	0 ÷ 400	5	-100 ÷ +30	1
0 ÷ 200	5	0 ÷ 500	10	-50 ÷ +50	1
-40 ÷ +40	1	0 ÷ 600	10	-30 ÷ +50	1
		-60 ÷ +40	2	-10 ÷ +50	1
		-40 ÷ +40	1	-10 ÷ +110	1
		-30 ÷ +50	1	+20 ÷ +70	1
		-10 ÷ +50	1	+100 ÷ +650	5

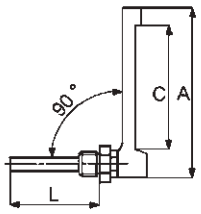
TV 426

TV 426-A

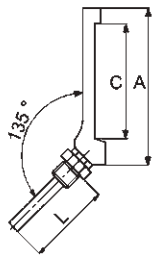
Glass thermometers with anodized aluminium V-shaped casing.



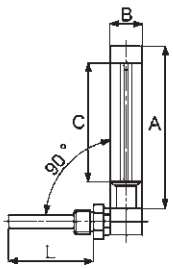
TV 426 -A



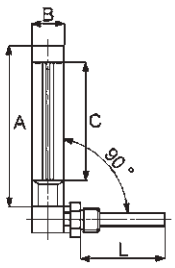
TV 426 -B



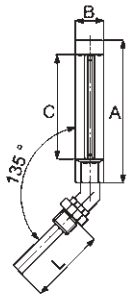
TV 426 -C



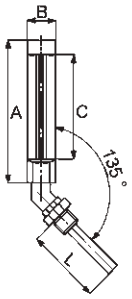
TV 426 -D



TV 426 -E



TV 426 -F



TV 426 -G

Table TV 426

DN	A	B	C	D	E	F	G	H	I	L	M	N	PESO ~ kg
110x35	110	30	70										0,25
150x35	150	35	110										0,32
200x35	200	35	150										0,44

Model TV 426-C is not available in NS 150x35

note: informations shown in this series may be changed at any time without prior notice.

CE SERIES

Electric contacts

- ◆ snap-action contacts
- ◆ electronic contacts
- ◆ inductive contacts
- ◆ micro switch contacts

When you need a continously instrument reading (pressure gauge or thermometer) and in the same time open or close an electric circuit system, you shall apply to the instrument electric contacts.
Three types are available:
- snap-action;
- electronic;
- inductive

A micro switch contacts are also available.

Instruments provided with electric contacts shown in this series are in accordance with standard CEI EN 60947

CE

Note about weights:
values to be added to standard execution weight for chosen instruments are:
~ Kg 0,20 for execution D (dry) DN 100 e 96x96;
~ Kg 0,46 for execution F (filled) DN 100;
~ Kg 0,21 for execution D (dry) DN 150 e 144x144;
~ Kg 0,79 for execution F (filled) DN 150.

SNAP-ACTION CONTACTS

They are substancially real switches, driven by the instrument pointer. It is possible, by means of a device, to predetermine from outside the value at which you request the switching. Setting is possible on the entire range. When instrument pointer clashes with the set limit value, the contact elements, touching each other, cause the switching.
With double contact, this occurs at two values.
Characteristic of these devices is to have a permanent magnet fixed near the contact, it speeds up both opening and closure, indipendently from the instrument pointer rotation speed, and sparkling is minimized.
Magnetic attraction makes contact almost insensible to vibrations; the intensity of this attraction could be changed according to the customer's needs.

TECHNICAL FEATURES

- **Applications**
  for instruments of SP, PQ, DP, MP, MA and ST series.

- **Switching action**
  (see table CE 3 at pages CE05 and CE06)
  - single or double contact;
  - separate circuit double contact;
  - SPDT or DPDT contacts;
  - triple contac (available on request).

- **Casing**
  - high case for under dial contact;*
    (identification H)
  - case with hood for contact on dial.
    (identification Q)

  ***note:** on dial for series DP, MP, ST, MA.

- **Execution**
  - dry version;
  - liquid filled version (silicone fluid).

- **Ambient temperature**
  - - 20 ÷ + 60 °C.
- **Working**
  - entire range extension.
- **Dimensions**
  - see table CE 2 at page CE04.
- **Window**
  - methacrylate disk (H);
  - laminated safety glass disk thickness 6 mm (option V19) (H);
  - methacrylate hood (if foreseen) (Q).
- **Adjusting lock**
  - fixed key (standard);
  - removable key (on request).
- **Electrical wiring**
  junction box with grounding:
  - cable-gland PG 9;
  - cable-gland M20 x 1,5.
- **Magnetic snap-action**
  interference advance (in closure) or delay (in opening) between 2% and 4% of full scale value, referred to the set limit value. Deviation depends on the instrument pointer speed and on the magnetic attraction intensity.
  When the customer gives no advice, the standard deviation is about 3% (chaange-over contacts are usually supplied without magnet).
  note: the accuracy level of instrument is that stated in specific series but you read it differently in the contact intervention area.
- **Contact materials**
  - golden silver alloy (standard);
  - gold alloy (on request);
  - platinum alloy (on request).

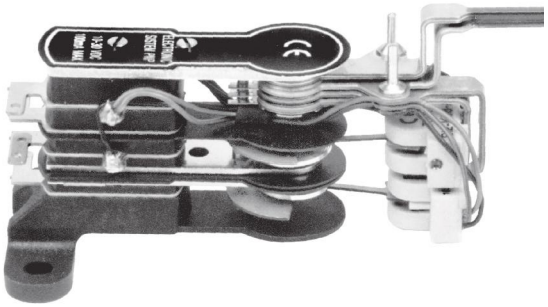
Table CE 1
Electrical parameters

Voltage	Direct current	Control catergory	Alternating current	Control catergory
230 V	100 mA	DC 12	120 mA	AC 12
	55 mA	DC 13	65 mA	AC 14
110 V	200 mA	DC 12	240 mA	AC 12
	100 mA	DC 13	130 mA	AC 14
50 V	300 mA	DC 12	450 mA	AC 12
	160 mA	DC 13	200 mA	AC 14
24 V	400 mA	DC 12	600 mA	AC 12
	200 mA	DC 13	250 mA	AC 14
Maximun load: =30 W / ~50 VA		**Maximum thermal current: 0,7 A**		

note: change-over contacts are usually supplied without magnets, so the maximun load and thermal current value are: =10 W/ ~18VA - 0,4A; for other electrical parameters feel free to consult our technical departement

ELECTRONIC CONTACTS

Due to their proximity type of switching, electronics contacts may be used for almost all industrial applications.
For their switching accuracy, these contacts are suitable for precision measuring instruments, for liquid filled or low pressure instruments.
Compared to inductive contacts, this system is cheaper because it avoids the use of an amplifier relay.
Electronics contacts with a PNP output are particularly suitable for switching small DC loads (10 ÷30 V DC, ≤100 mA), for instance PLC signals inputs.



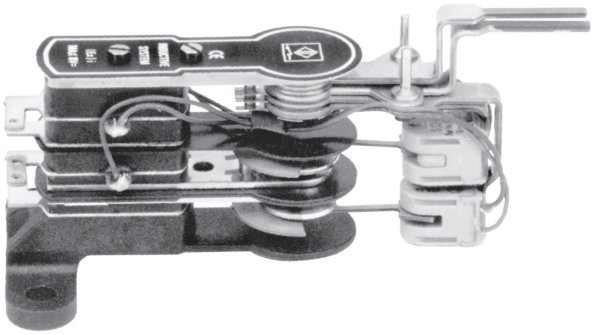
TECHNICAL FEATURES

- **Applications**
  for instruments of SP, PQ, DP, MP, MA and ST series.
- **Switching action**
  (see table CE 4 at page CE07)
  - single contact or duoble.
- **Casing**
  - high case for under dial contact;*
    (identification H)
  - case with hood for contact on dial.
    (identification Q)
  ***note:** on dial for series DP, MP, ST, MA.
- **Execution**
  - dry version;
  - liquid filled version (silicone fluid).
- **Ambient temperature**
  - - 20 ÷ + 60 °C.
- **Working**
  - entire range extension.
- **Dimensions**
  - see table CE 2 at page CE04.
- **Window**
  - methacrylate disk (H);
  - laminated safety glass disk thickness 6 mm (option V19) (H);
  - methacrylate hood (if foreseen) (Q).
- **Adjusting lock**
  - fixed key (standard);
  - removable key (on request).
- **Electrical wiring**
  junction box with grounding:
  - cable-gland PG 9;
  - cable-gland M20 x 1,5.

INDUCTIVE CONTACTS

Intrinsically safe

They work like electrical switches, but here interference is made by a relay that receive (by means of an amplifier), the signal coming from an inductive coupling.
The instrument pointer drives, with its movement, a metal flag; in a set position, the flag interacts with a high frequency magnetic field producing a signal that is supplied to the relay.
For their operating performance, inductive contacts are intrinsically safe, so they are used in all dangerous areas where there are explosive gases and mixtures, like in chemical and oil-bearing plants.
The absence of every type of contact between the coupling elements avoids any wear problem and ensures an unlimited and maintenance-free service life.



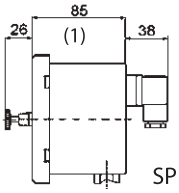
TECHNICAL FEATURES

- **Classification**
  - II 2 G EEx ia IIC T6.
- **Applications**
  for instruments of SP, PQ, DP, MP, MA and ST series.
- **Switching action**
  (see table CE 5 at page CE08)
  - single or double contact.
- **Supply voltage**
  - 8 V CC.
- **Casing**
  - high case for under dial contact;*
    (identification H)
  - case with hood for contact on dial.
    (identification Q)
  ***note:** on dial for series DP, MP, ST, MA.
- **Execution**
  - dry version;
  - liquid filled version (silicone fluid).
- **Ambient temperature**
  - - 20 ÷ + 60 °C.
- **Working**
  - entire range extension.
- **Dimensions**
  - see table CE 2 at page CE 04
- **Window**
  - methacrylate disk (Es. H);
  - aminated safety glass disk thickness 6 mm (option V19) (Es. H);
  - methacrylate hood (if foreseen) (Es. Q).
- **Adjusting lock**
  - fixed key (standard);
  - removable key (on request).
- **Electrical wiring**
  junction box with grounding:
  - cable-gland PG 9;
  - cable-gland M20 x 1,5.
- **Amplifier relay**
  supplied only on request.

Table CE 2
Dimensions of instruments with electric contacts or with transducer

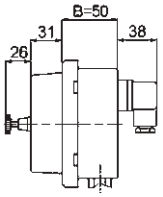
Bottom direct mounting

high case



SP 308

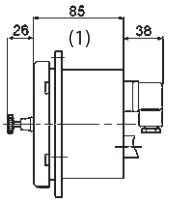
hood



SP 308 - MP 319 / 419 / 320 / 420 / 321 / 421
MA 325 / 425 - ST 375 / 378 / 379

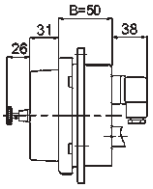
Flush mounting with 3-hole fixing

high case



SP 311

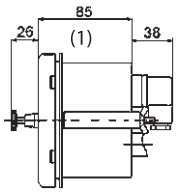
hood



ST 383

Flush mounting with clamp

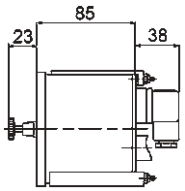
high case



SP 312

Flush mounting with clamp

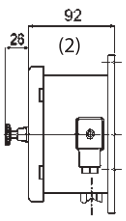
high case



PQ 318

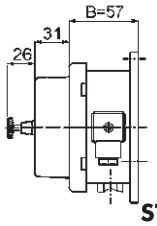
Surface mounting with 3-hole fixing

high case



SP 313

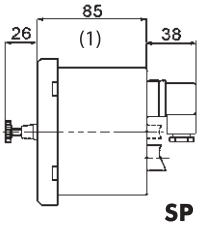
hood



ST 380

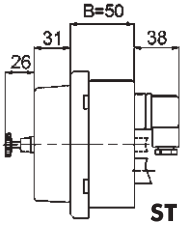
Back direct mounting

high case



SP 315

hood

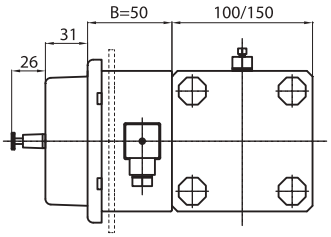


ST 374

(1) For instruments series SP and ST with micro switch contacts the size is 57 mm.

(2) For instruments series SP and ST with micro switch contacts the size is 64 mm.

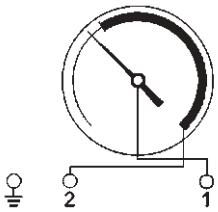
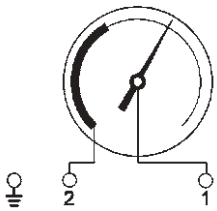
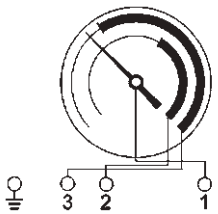
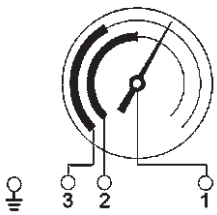
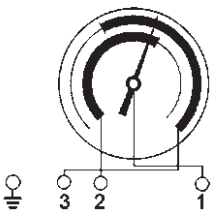
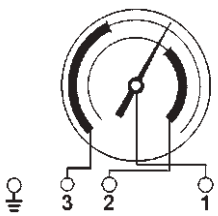
Differential pressure gauge



DP 360 / 460 / 361

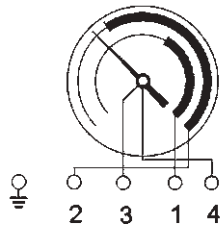
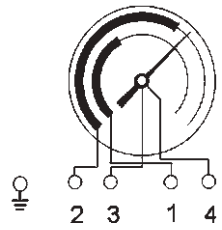
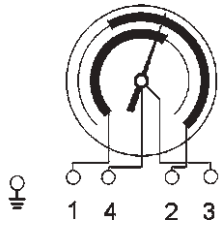
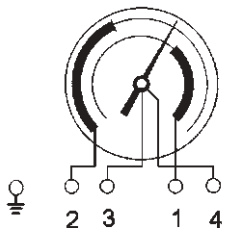
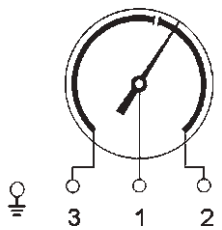
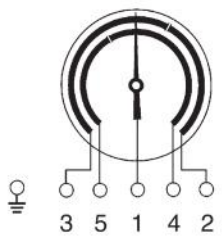
note: **Usually instruments with electric contact are supplied with high case. (identification H)**
The case with methacrylate hood (id. Q) is foreseen for SP308 model "low cost", for gauges series MP, MA, DP, TP, for thermometers series ST and instruments with triple contact or DPDT (for triple contact or DPDT dimension B = 50 or 57 mm has to be increased of 16 mm).

Table CE 3.1
Single and double snap-action contacts interference types

Wiring scheme	Type	The instrument pointer moves clockwise and when it reaches the set limit value...	After the interference ...
	**CM 01**	...makes the contact	... i circuit is closed
	**CM 02**	...breaks the contact	... circuit is open
	**CM 11**	...makes the 1st contact ...makes the 2nd contact	... 1st circuit is closed ... 2nd circuit is closed
	**CM 22**	...breaks the 1st contact ...breaks the 2nd contact	... 1st circuit is open ... 2nd circuit is open
	**CM 12**	...makes the 1st contact ...breaks the 2nd contact	... 1st circuit is closed ... 2nd circuit is open
	**CM 21**	...breaks the 1st contact ...makes the 2nd contact	... 1st circuit is open ... 2nd circuit is closed

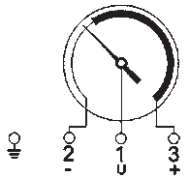
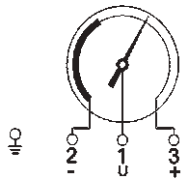
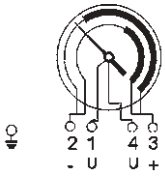
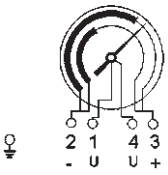
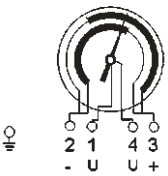
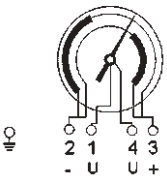
note: for vacuum gauges interferences are opposite to those above indicated for the pointer usually rotates anticlockwise

Table CE 3.2
Separate and change-over snap-action contacts interference types

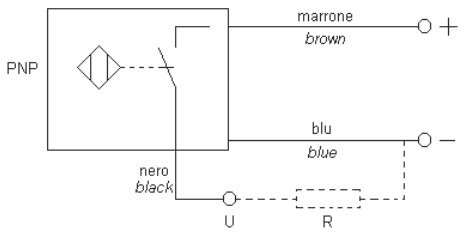
Wiring scheme	Type	The instrument pointer moves clockwise and when it reaches the set limit value...	After the interference ...
	**CS 11** separate	...makes the 1st contact ...makes the 2nd contact	... 1st circuit is closed ... 2nd circuit is closed
	**CS 22** separate	...breaks the 1st contact ...breaks the 2nd contact	... 1st circuit is open ... 2nd circuit is open
	**CS 12** separate	...makes the 1st contact ...breaks the 2nd contact	... 1st circuit is closed ... 2nd circuit is open
	**CS 21** separate	...breaks the 1st contact ...makes the 2nd contact	... 1st circuit is open ... 2nd circuit is closed
	**CM 03** change-over	... makes and in the same time breaks the contact	SPDT
	**CM 33** change-over	... makes and in the same time breaks the 1st contact ... makes and in the same time breaks the 2nd contact	DPDT

note: for vacuum gauges interferences are opposite to those above indicated for the pointer usually rotates anticlockwise

Table CE 4
Electronic contacts interference types

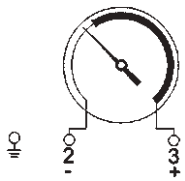
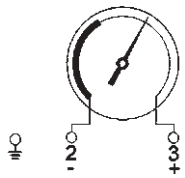
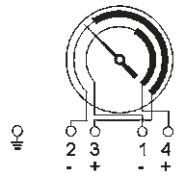
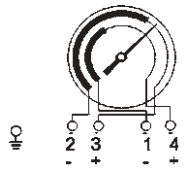
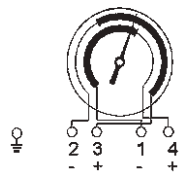
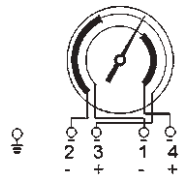
Wiring scheme	Type	The instrument pointer moves clockwise and when it reaches the set limit value carries the metal flag...	After the interference ...
	**CT 01**	...into the control head	... control circuit is closed
	**CT 02**	...out of the control head	... control circuit is open
	**CT 11**	...1st contact into the control head ...2nd contact into the control head	... control circuit is closed ... control circuit is closed
	**CT 22**	...1st contact out of the control head ...2nd contact out of the control head	... control circuit is open ... control circuit is open
	**CT 12**	...1st contact into the control head ...2nd contact out of the control head	... control circuit is closed ... control circuit is open
	**CT 21**	...1st contact out of the control head ...2nd contact into the control head	... control circuit is open ... control circuit is closed

With a PNP switching apparatus, the switched output (U) is a connection towards "+" (brown).
The load (R) between (U) and the connection towards "-" (blue) should be selected in the way not to exceed the maximum switching current (100 mA).
No direct connection between U con "-"



note: for vacuum gauges interferences are opposite to those above indicated for the pointer usually rotates anticlockwise

Table CE 5
Inductive contacts interference types

Wiring scheme	Type	The instrument pointer moves clockwise and when it reaches the set limit value carries the metal flag...	After the interference ...
	**CI 01**	...out of the control head	... control circuit is closed
	**CI 02**	...into the control head	... control circuit is open
	**CI 11**	...1st contact out of the control head ...2nd contact out of the control head	... control circuit is closed ... control circuit is closed
	**CI 22**	...1st contact into the control head ...2nd contact into the control head	... control circuit is open ... control circuit is open
	**CI 12**	...1st contact out of the control head ...2nd contact into the control head	... control circuit is closed ... control circuit is open
	**CI 21**	...1st contact into the control head ...2nd contact out of the control head	... control circuit is open ... control circuit is closed

Connecting cable
"+" (brown)
"-" (blue)

Basic functions
As long as the metal flag is in the control head, a low control current of ≤1 mA flows and the initiator is at high impedance. Whenever the metal flag is outside the control head, a high control current of ≥ 3 mA flows and the initiator is at low impedance. Upon reversal of operation mode from operating current to rest current, the types description must be changed accordingly.

note: for vacuum gauges interferences are opposite to those above indicated for the pointer usually rotates anticlockwise

MICRO SWITCH CONTACTS

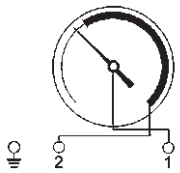
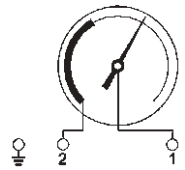
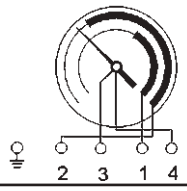
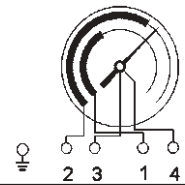
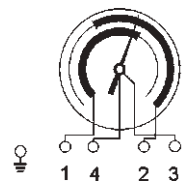
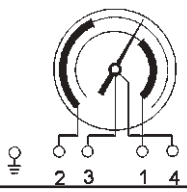
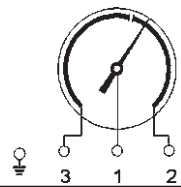
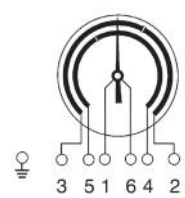
Those devices represent a valid alternative to the traditional contact snap-action.
The less sensibility of the electric action is compensated by the higher switching and of a longer life of the device.

Instrument with micro-switch contact

TECHNICAL FEATURES

- **Applications**
  for instruments of SP and ST series.
- **Switching action**
  (see table CE 7 at page CE10)
  - single contact;
  - separate circuit double contact;
  - SPDT o DPDT contacts.
- **Working current**
  - 250 V CA max - 5 A max.
- **Execution**
  - dry version.
- **Ambient temperature**
  - - 20 ÷ + 60 °C.
- **Working**
  - entire range extension.
- **Dimensions**
  - see table CE 2 at page CE04.
- **Window**
  - methacrylate disk.
- **Adjusting lock**
  - removable key.
- **Electrical wiring**
  junction box with grounding:
  - cable-gland PG 9 for single or SPDT contact;
  - cable-gland M20 x 1,5 for double or DPDT contact.
- **Contact material**
  - pure silver 999,9.
- **Switching accuracy**
  - 2÷5% of full scale value.

Table CE 7
Single and double micro switch contacts interference types

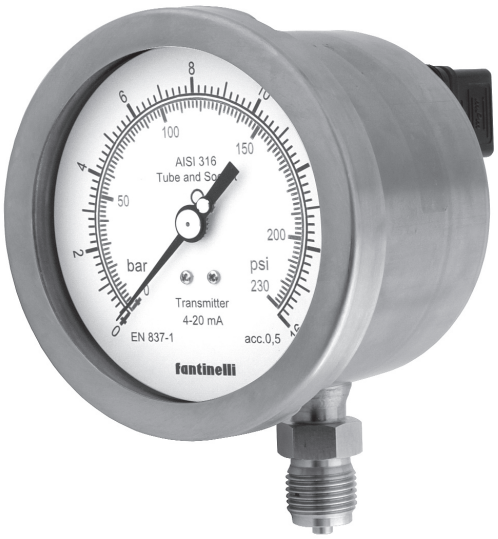
Wiring scheme	Type	The instrument pointer moves clockwise and when it reaches the set limit value...	After the interference ...
	**MS 01**	...makes the contact	... circuit is closed
	**MS 02**	...breaks the contact	... circuit is open
	**MS 11** separate	...makes the 1st contact ...makes the 2nd contact	... 1st circuit is closed ... 2nd circuit is closed
	**MS 22** separate	...breaks the 1st contact ...breaks the 2nd contact	... 1st circuit is open ... 2nd circuit is open
	**MS 12** separate	...makes the 1st contact ...breaks the 2nd contact	... 1st circuit is closed ... 2nd circuit is open
	**MS 21** separate	...breaks the 1st contact ...makes the 2nd contact	... 1st circuit is open ... 2nd circuit is closed
	**MS 03** change-over	...makes and in the same time breaks the contact	SPDT
	**MS 33** change-over	...makes and in the same time breaks the 1st contact ...makes and in the same time breaks the 2nd contact	DPDT

note: for vacuum gauges interferences are opposite to those above indicated for the pointer usually rotates anticlockwise

TR SERIES

Bourdon tube pressure gauges with integrated pressure transmitter 4 ÷ 20 mA

- all stainless steel pressure gauge:
  - NS 100 and 150 waterthight casing in dry or liquid filled execution;
  - ranges included between –1 and 400 bar.
- transmitter with 4 ÷ 20 mA output.



made in ITALY

CE PED 2014/68/EU

PRESSURE GAUGE FEATURES

- **Application**
  - local mounting with bottom connection (standard);
  - surface or flush mounting (only on request).
- **Nominal sizes**
  - 100 and 150.
- **Casing**
  - case and ring in AISI 304 stainless steel with bayonet bezel.
- **Protection degree (according to EN 60529)**
  - IP 55 for dry execution;
  - IP 67 for liquid filled execution (on request - option V66).
- **Window**
  - glass (standard);
  - methacrylate for liquid filled execution;
  - laminated safety glass (on request - option V17).
- **Blow-out device**
  - EPDM rubber plug for dry execution and FPM (Viton) rubber plug for liquid filled execution.
- **Filling liquid**
  - silicone fluid.
- **Pressure connection (according to EN 837-1)**
  G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT) thread in AISI 316L stainless steel (others on request).
- **Pressure element**
  - AISI 316L stainless steel.
- **Welding**
  - TIG.
- **Movement**
  - stainless steel.
- **Ranges (according EN 837-1)**
  - o **Graduation:**
    - pressure gauges: 0 ÷ 1; 0 ÷ 2,5; 0 ÷ 4; 0 ÷ 6; 0 ÷ 10; 0 ÷ 16; 0 ÷ 25; 0 ÷ 40; 0 ÷ 100; 0 ÷160; 0 ÷ 250; 0 ÷ 400;
    - vacuum gauges : -1 ÷ 0; (division as per table C1 a pag. P04)
    - other graduations not normalised for single or double range (on request).
  - o **Unit of pressure:**
    - bar, kPa and MPa for single or double range (others on request only).
  - o **Scale angle:**
    - 270 °.
- **Over-pressure (occasionally allowed)**
  - 130% of full scale value.
- **Pointer**
  - aluminium with micrometrer adjustment.
- **Dial**
  - white aluminium with black figures (for dial modifications see available options).
- **Accuracy (according to EN 837-1)**
  - class 0,5 (± 0,5% of full scale deflection) for dry execution;
  - class 1 (± 1% of full scale deflection) for liquid filled execution.
- **Ambient temperature**
  - -25 ÷ +60 °C.
- **Operating temperature**
  - -25 ÷ +125 °C.

TRANSMITTER FEATURES

- **Sensor**
  - thick film on ceramic for ranges -1 ÷ 40 bar;
  - thin film on AISI 630 stainless still for ranges100 ÷ 400 bar.
- **Signal output**
  - 4 ÷ 20 mA.
- **Supply voltage**
  - 9 ÷ 30 V CC.

- **Electrical wiring**
  junction box with grounding:
  - cable-gland PG9.

- **Wetted parts**
  - AISI 316L stainless steel for ranges -1 ÷ 40 bar;
  - AISI 304 stainless steel for ranges 100 ÷ 400 bar.

- **Zero and span adjustment**
  - factory set to grant the gauge and transmitter calibration tuning.

- **Accuracy**
  - ± 0,5% of full scale deflection.

- **Over-pressure**
  - conform to that of the gauge.

APPLICATIONS

- **Diaphragm seal**
  (see FP series)
  in this case the instrument can be identified by the number of the chosen model, adding the reference of the suitable diaphragm seal among those of FP series.
  (identification FP...)

- **Accessories (see AM series)**
  - cooling siphons, recommended when process temperature is over 80 °C;
  - valves;
  - dampers for control of process fluid entry speed into the instrument;
  - adjusting over-pressure protectors to cut automatically off the instrument from the circuit.

OPTIONS

- **Window**
  different from standard:
  - laminated safety glass
    (identification V17)

- **Restrictor**
  applicable to pressure connection to reduce the process fluid entry speed into the instrument.
  (identification V26)

- **Process connection**
  not standard.
  (identification V42)

- **Pressure unit**
  not standard.
  (identification V49)

- **Changes to the dial**
  - serial number;
    (identification V50)
  - specific dial;
    (identification V51)
  - red mark;
    (identification V52)
  - writings;
    (identification V53)
  - TAG number;
    (identification V54)
  - dial without logo;
    (identification V56)
  - double logo (Fantinelli + customer);
    (identification V57)
  - customer's logo. **(identification V58)**

- **Liquid filling**
  silicone fluid filled casing.
  (identification V66)

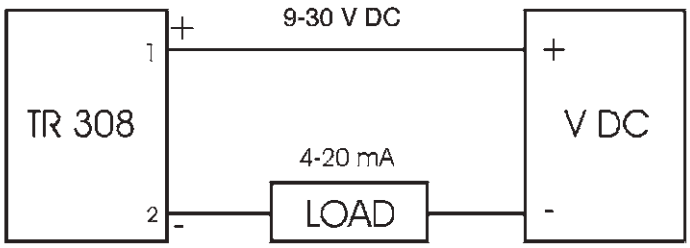
- **Metal tag plate**
  AISI 316 stainless steel for tag number.
  (identification V82)

DOCUMENTATION

- **Fantinelli calibration certificate**
  rising pressure:
  - class 0,5;
    (identification V91)
  - class 1.
    (identification V92)

- **Complementary documents**
  o certificate of compliance with the order EN 10204-2.2.
  o technical documentation including:
  - drawings and technical informations;
  - installation and maintenance instructions.
  o inspection and test certificate EN 10204 3.1.
  o material certificates.
  o PED declaration.

Wiring scheme



TECHNICAL INFORMATION

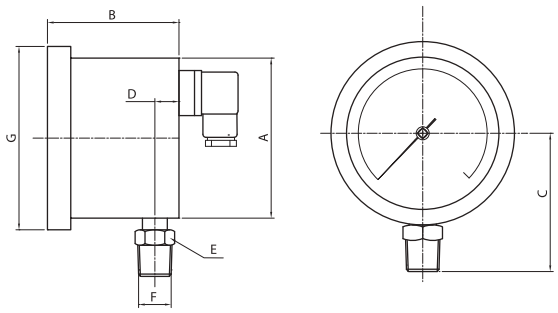


Table TR 308

DN	A	B	C	D	E	F	G	H	I	L	M	N	Ø fori 120°	PESO ~ kg es. D	es. F
100	103	85	92	15,5	22	1/2	118							0,84	1,36
150	150	85	116	15,5	22	1/2	166							1,10	2,33

Pressure gauge with integrated pressure transmitter bottom connection for local mounting

note: informations shown in this series may be changed at any time without prior notice.

SE SERIES

Electronic instrumentation

The operation of this instruments is based on the sensor deflection on which surface a resistance circuit is fixed. The deflection caused by process fluid pressure produces a resistances circuit unbalance, which due to such effect causes a variation of electrical signal proportional to the applied pressure.

CE PED 2014/68/EU

SE 398

Pressure transmitter

- **Sensor**
  - thick film on ceramic for ranges -1 ÷ 40 bar;
  - thin film on AISI 630 stainless steel for ranges 100 ÷ 400 bar.

- **Ranges (unit of measurement in bar)**
  - 0÷1; 0÷2,5; 0÷4; 0÷6; 0÷10; 0÷16; 0÷25; 0÷40; 0÷100; 0÷160; 0÷250; 0÷400; -1÷0; -1÷3.
  (others ranges and unit of measurement)
  - on request.

- **Over-pressure**
  - 200% of full scale deflection.

- **Output / Supply voltage**
  - 4÷20 mA / 9÷30 V DC, 2 wires;
  - 0÷5 V CC / 10÷30 V DC, 3 wires;
  - 0÷10 V CC / 15÷30 V DC, 3 wires;

- **Accuracy**
  - ± 0,3% of full scale deflection.

- **Housing**
  - AISI 304 stainless steel.

- **Housing protection degree**
  - IP 65.

- **Wetted parts**
  - AISI 316L stainless steel for ranges -1 ÷ 40 bar;
  - AISI 304 stainless steel for ranges 100 ÷ 400 bar.

- **Pressure connection**
  o thread:
  - G 1/4 B (1/4 Gas or BSP male);
  - G 1/2 B (1/2 Gas or BSP male), on request;
  - 1/4 - 18 NPT EXT (1/4 NPT), on request.
  o others, on request.

- **Electrical wiring**
  - junction box DIN 43650A for ranges -1 ÷ 40 bar;
  - junction box DIN 43650C for ranges 100 ÷ 400 bar;
  - junction box M12X1 (on request);
  - cable (son request).

- **Ambient temperature**
  - -25 ÷ +85 °C.

- **Operating temperature**
  - -25 ÷ +125 °C.

APPLICATIONS

- **Diaphragm seal (see FP series)**
  in this case the instrument can be identified by the number of the chosen model, adding the reference of the suitable diaphragm seal among those of FP series.
  (identification FP...)

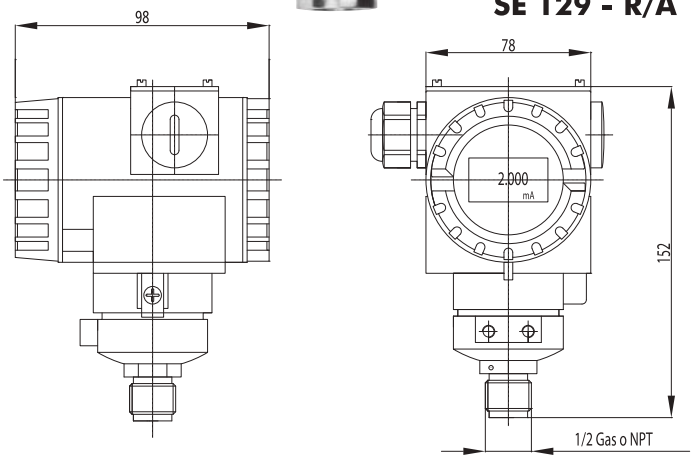
- **Display digital display**
  suitable for direct installation on pressure transmitter with output 4 ÷ 20 mA;
  o general features:
  - no additional power supply required;
  - high contrast 4-digit LCD display;
  - to connect junction box DIN 43650A;
  o setting:
  - zero point;
  - span;
  - decimal point;
  - damping;
  - switching point;
  - direction of switching.

SE 129 - R/A

Smart pressure transmitter with HART ® protocol

- **Execution**
  - R relative pressure;
  - A absolute pressure.
- **Sensors range**
  - see table SE 1.
- **Over-pressure**
  - two times of full sensor range (70 MPa for range 0/35÷60 MPa).
- **Output signal**
  - 4 ÷ 20 mA, withHART ® digital signal superimposed.
- **Supply voltage**
  - 14 ÷ 36 V DC, 2 wires.
- **Accuracy**
  - ± 0,1% of sensor range (± 0,25% for range 0/3÷10 kPa), standard;
  - ± 0,075% of sensor range, on request.
- **Housing**
  - die cast aluminium alloy painted with epoxy resin - 90° revolving.
- **Housing protection degree**
  - IP 65.
- **Display**
  - LCD.
- **Window**
  - laminated safety glass.
- **Sensor**
  - silicon.
- **Wetted parts**
  - AISI 316L stainless steel;
  - exotic materials on request.
- **Pressure connection**
  - G 1/2 B (1/2 Gas or BSP male) or 1/2 - 14 NPT EXT (1/2 NPT male) thread
  - others on request.
- **Ambient temperature**
  - -20 ÷ +85 °C.
- **Operating temperature**
  - -25 ÷ +100 °C.
- **Ambient humidity**
  - 5 ÷ 95% RH.
- **Weight**
  - ~1,050 kg.

SE 129 - R/A



Tablese SE 1
Sensor range

Code	kPa	Code	MPa
01	0/3 ÷ 10	06	0/0,7 ÷ 1,7
02	0/10 ÷ 35	07	0/1,7 ÷ 3,5
03	0/35 ÷ 100	08	0/3,5 ÷ 7
04	0/100 ÷ 200	09	0/7 ÷ 35
05	0/200 ÷ 700	10	0/35 ÷ 60

APPLICATIONS

- **Diaphragm seal**
  (see FP series)
  in this case the instrument can be identified by the number of the chosen model, adding the reference of the suitable diaphragm seal among those of FP series.
  (identification FP...)
- **2" pipe mounting clamp**
- **PC software**
- **PC connection cable RS 232**
- **PC connection cable USB**

note: informations shown in this series may be changed at any time without prior notice.

SE 129 - D

Smart differential pressure transmitter with HART ® protocol

- **Sensor range**
  - see table SE 2.
- **Static pressures**
  - see table SE 2.
- **Output signal**
  - 4 ÷ 20 mA, with HART ® digital signal superimposed.
- **Supply voltage**
  - 16 ÷ 48 V DC, 2 wires.
- **Housing**
  - die cast aluminium alloy painted with epoxy resin - 90° revolving.
- **Housing protection degree**
  - IP 65.
- **Display**
  - LCD.
- **Window**
  - laminated safety glass.
- **Sensor**
  - capacitive.
- **Wetted parts**
  - AISI 316L stainless steel.;
  - exotic materials.
- **Differential element filling liquid**
  - silicone fluid.
- **Bolt and nut fastenings**
  - carbon steel plated with cadmium.
- **Pressure connections**
  - 1/4 - 18 NPT (1/4 NPT female) thread.
- **Mounting**
  - 2" pipe clamp, standard;
  - surface bracket, on request.
- **Ambient temperature**
  - -20 ÷ +85 °C.
- **Operating temperature**
  - -20 ÷ +80 °C.
- **Ambient humidity**
  - 5 ÷ 95% RH.
- **Weight**
  - ~ 2,650 kg

SE 129 - D

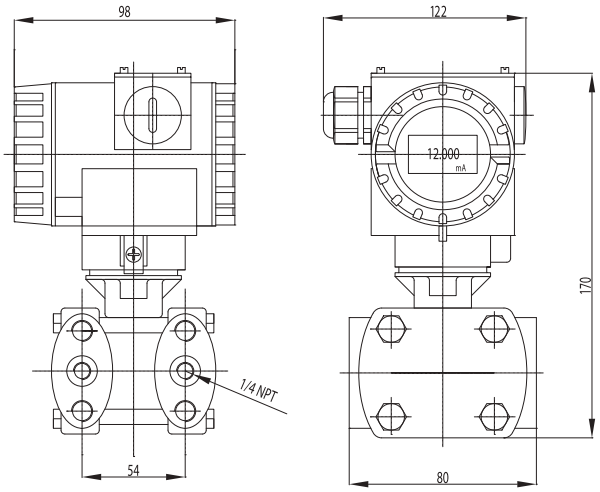


Table SE 2
Sensors range and static pressure

Sensor range		Static pressure	Sensor range		Static pressure
Code	kPa	MPa	Code	kPa	MPa
1	0/0,06 ÷ 0,3	0,4	6	0/160 ÷ 1000	40
2	0/0,25 ÷ 1,5	0,4	7	0/400 ÷ 2500	40
3	0/1,2 ÷ 10	40	8	0/1600 ÷ 8000	40
4	0/6 ÷ 40	40	9	0/4000 ÷ 25000	40
5	0/30 ÷ 180	40	0	0/7000 ÷ 40000	40

APPLICATIONS

- **Diaphragm seal (see FP series)**
  in this case the instrument can be identified by the number of the chosen model, adding the reference of the suitable diaphragm seal among those of FP series.
  (identification FP...)
- **PC Software**
- **PC connection cable RS 232**
- **PC connection cable USB**

note: informations shown in this series may be changed at any time without prior notice.

HART® PROTOCOL PRESSURE TRANSMITTERS SE 129 SERIES

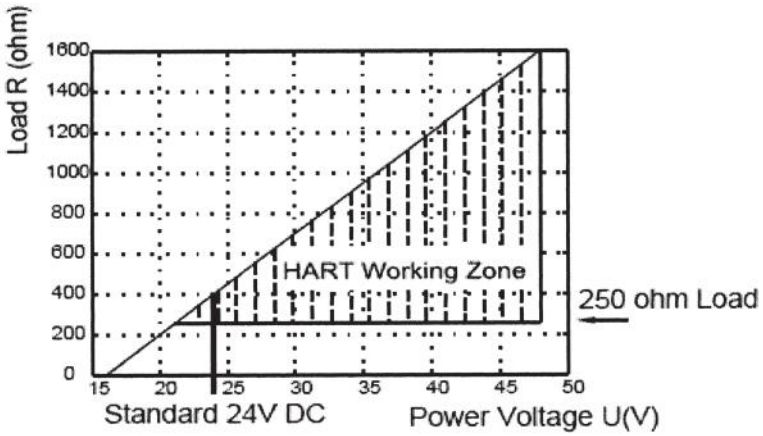
SE 129 Series Digital *Intelligent Pressure/Differential Pressure Transmitter is a multipurpose digitalized intelligent instrument developed by Fantinelli srl , including capacitance pressure /differential pressure transmitter and directcoupled pressure/ level transmitter.
It is made on the basis of the mature and dependable sensing technology, combining the advanced single-chip computer technology and sensor digital convert technology. 16-bit single chip is adopted as its core element, with its powerful function and high-speed calculation capacity ensuring the excellent quality of the transmitter. The whole design frame focuses on its dependability, stability and high precision and intelligentization, meeting the growing demand in on-site industrial use. To get this goal, digitalized signal processing technology is used in the software to ensure its disturbance capacity and zero point stability. Meanwhile, it has the Zero Stability Capacity (ZSC) and Temperature Supplementing Capacity (TSC). The powerful interface functions guarantees an excellent interactivity with no need of manual operator. Its digitalized meter head can display 3 physical parameters including pressure, temperature and current, and 0-100% analogue indications. Keystroke operation can finish the basic settings of zero shift, range setting, damping setting under the circumstance of no standard pressure, greatly convenient for the onsite debugging.
Note: the users are recommended to use in the above ranges, and adopt 100:1 in the extreme state.
The compressed range adopts the following formula to calculate its precision:

$$0.05 + \left(0.05 \times \frac{\text{Rating Range}}{\text{Setting Range - Zero Point Transfer Amount}}\right) \% \text{ FS}$$

1 Functional indices

1.1 Technical indices of SE 129 Series Digital•Intelligent Pressure/Differential Pressure Transmitter

Functional specifications:
(Reference conditions: no-transfer state, silicone oil fill fluid, 316L isolating diaphragm)
Output signal: 4-20mA DC/HART protocol digital communications
Transmission mode: 2-wire



Precision:
Linear output: ±0.075 - ±0.1% (rangeability is 1:1), including the linear, differential and repeated errors).
Square root output: at the output pressure of 4 - 100%, the value is ±(0.2% marked range + the upper limit of 0.05%).
Stability: for DP code 3, 4 and 5, it is ±0.2% of the maximum range, for other codes, ±0.25% of the maximum range.
Humidity: relative humidity 0 - 100%.
Startup time: at the minimum damping, within 2 sec.
Cubage absorbing amount: less than 0.16 cm^3.
Damping: electrical damping is 0-32 sec.
In addition, the sensor has an extra 0.2 sec invariable damping time (0.4 sec for range code 3).

Static pressure effect (DP transmitter):
Zero error: as for 14 MPa, it is ±0.25% in the maximum; for the range code 3, ±0.5% of the maximum. It can be calibrated through zero point adjustment.
Range error: it can be calibrated to ±0.25% of the input reading for each 6 Mpa; or for range code 3, it is ±0.5%. This error can be eliminated before mounting.

Static pressure effect (HP transmitter):
Zero error: as for 32 MPa, it is ±1.0% in the maximum; it can be calibrated through zero point adjustment.

Temperature effect:
Zero point error at the maximum range:
For each 56 °C, it is ± 0.5% of the range. The overall effect includes range error and zero point error: for each 56°C , it is ±1.0% of the range.
For range code 3, the effect is doubled.
Zero point error at the minimum range:
For each 56 °C , it is ±3.0% of the range. The overall effect includes range error and zero point error: for each 56 °C, it is ±3.5% of the range.
For range code 3, the effect is doubled.

Vibration effect:
At a frequency of 0 - 200 Hz, each g on any directions is the upper limit value of ±0.05%.

Power effect:
Less than 0.005%/V of marked range

Mounting position effect:
Zero point excursion not more than (0.25 kPa); this error can be eliminated with no influence on the range.

Electromagnetic disturbance/radioactive frequency effect:
Test is done according to SAMA PMC33.1 in the range of 20÷1000 MHz, the magnetic strength can be as high as 30 V/m.

Structural specifications:
Materials touching agents:
Isolating diaphragm: 316L stainless steel, Hastelloy C276, Monel or tantalum (optional).
Vent/drain valve: 316 stainless steel, Hastelloy C276, Monel or tantalum.
Flange and connector:
316 stainless steel, Hastelloy C276, Monel alloy or tantalum.
- O-ring touching agents: fluorine rubber, Buna-N rubber (optional).
- Fill fluid: silicone oil.
- Bolt: carbon steel plated with cadmium.
- O-ring sealing: Buna-N rubber, fluorine rubber (optional).
- Painting: polyurethane.

Connector:
For the transmitters with range code 3, 4 and 5, the center connection holes distance between two flanges is 54 mm, with the upper hole part of NPT 1/4-18; for the transmitters with range 6 and 7, they 56 mm and NPT 1/4-18; for range code 8, they are 57.2 mm and NPT 1/4-18.
For the transmitters with range code 3, 4 and 5, pressure-introducing hole of the 2 connectors is NPT 1/4-14, the flange connector can be turn over to have the center distances of respective 50.8 mm, 54 mm or 57.2 mm.
Electrical connectors: with the terminals for on-site test weight: excluding optional pieces, AP, DP, GP and HP weighs respectively 2,650 kg.

1.2 Usage conditions:

Power supply:
16 -48 V DC intrinsically safety type explosion-proof products are
required to get a power supply from the corresponding safe barrier (Standard 24 V DC)
Using environment of product:
Using temperature: -20 - +80 °C
Storage temperature: -40 - +104 °C
Humidity: 0 - 90%
Using environment conditions for explosion-proof product:
Using temperature: -20 - +40 °C
Relative humidity: 5 - 95%
Atmosphere pressure: 86 - 106 kPa

Parameters for intrinsically safety type outsourcing safe barrier:
U0 ≤ 28 V DC,
I0 ≤ 30 mA,
PO ≤ 0.84 W

2 Accessories
Our digital intelligent transmitter is attached with the following accessories for the user's convenience.
User's manual 1 copy
Mounting bracket 1 set *
M10 bolt 4 pieces*
*(Note: direct-coupled is not attached with mounting bracket and M10 bolts).

3 Precautions
1) Correctly wiring as per the requirements described in the instructions.
2) This product is precise measuring instrument. Do not beat it, strike it, or forcedly bind it, nor dismantle it, thrust the pressure introducing hole or metal diaphragm with sharp articles.
3) The transmitter should be mounted in a place where is ventilated, dry, free from corrosion and cool.
4) If the measurement agent is a viscid fluid or the one with floating granules, avoid the diaphragm being struck and the probe being jammed.
5) It is prohibited that the system is overloaded, exceeding the limitation stipulated in the instruction.
6) Keep the cable connector being sealed to avoid letting in the water or humidity, which may affect the integral performance and longevity.
7) In the case of abnormal output, shut down the transmitter for a check. If it is due to the product quality problem, please bring the product with the qualification certificate back to our company for a maintenance or change.
8) With the constant improvement of the product technology, no separate notice will be given concerning the alternation of product performance.

4 Additional declarations to SE 129 transmitter

4.1 Keys functions

1) The external key is used to calibrate the transmitter at no differential pressure. So when press down this key, the differential pressure to the transmitter must be zero.
2) If press down "DOWN" buttons for at least 5 sec, zero setting will be performed.
3) If press down "MOVE" and "DOWN" buttons for at least 5 sec, setting of lower range value will be performed.
4) If press down "UP" buttons for at least 5 sec, the setting of upper range value will be performed.

4.2 Engineering units

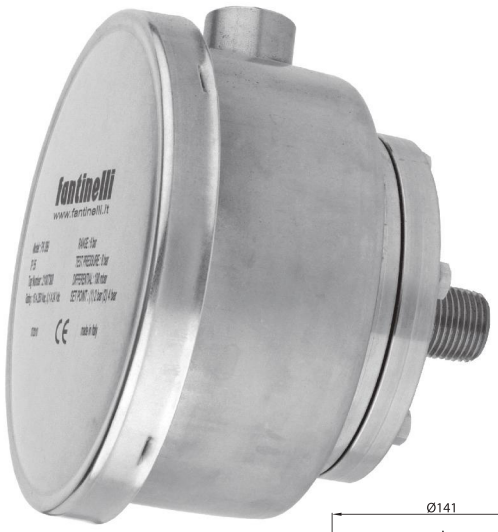
Our transmitter supports up to 18 units. These units are: "kPa", "MPa", "mA", "%", " ? ", "inH2O" "inHg" "ftH2O" "mmH2O" "mmHg" "psi" "bar" "mbar" "g/cm2" "kg/cm2" "Pa" "torr", "atm". But the latter 13 units can't be display on the LCD, so the LCD only displays the code.
According to HART protocol, followings are the pairs of code and unit :
1—"inH2O", 2—"inHg", 3—"ftH2O", 4—"mmH2O", 5—"mmHg", 6—"psi", 7—"bar", 8—"mbar", 9—"g/cm2", 10—"kg/cm2", 11- "Pa", 13—"torr", 14—"atm".
When changing unit, the corresponding unit will occur on the LCD, except for that the unit is one of the latter 13 units. In case of that, the HART unit code will be displayed on the LCD.
When unit has been changed for pressure, the range values of transmitter will be changed correspondingly.

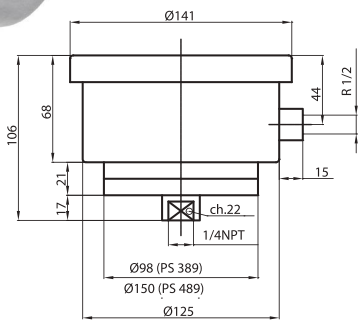
PS SERIES section 1

Diaphragm pressure switchs

- watertight casing;
- ranges included between -6 mbar and 160 bar.

This instrument has a diaphragm that, under the process fluid pressure, acts directly on the microswitch, through a self-centering pivot. The simple structure of the instrument grants a reliable mechanic switch and a long working life.





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CE PED 2014/68/EU

PS 389/489

Weight ~ kg 2,00
(ref. to PS 389)

Weight ~ kg 3,00
(ref. to PS 489)

TECHNICAL FEATURES

- **Models**
  - PS 389:
    ranges included between 1 and 160 bar;
  - PS 489:
    ranges included between 6 and 600 mbar.
- **Casing**
  - case and cover in AISI 304 stainless steel with bayonet lock.
- **Protection degree (according to EN 60529)**
  - IP 65.
- **Pressure connection**
  AISI 316L stainless steel:
  - 1/4-18 NPT (1/4 NPT female) - standard;
  - G 1/2 B (1/2 Gas or BSP male) or 1/2-14 NPT EXT (1/2 NPT male) - on request.
- **Pressure element**
  - AISI 316 stainlees steel diaphragm;
  - diaphragm coated (see specific heading).
- **Pressure element gasket**
  - di P.T.F.E..
- **Setting ranges**
  - see table PS 1.
- **Electrical specifications**
  - 1 or 2 microswitches with change-over contacts (SPDT) - see table PS 2.
- **Differential**
  - Fixed, of adjustable 10÷.50% of setting range for ranges ≥ 1 bar - see tables PS 1 and PS 2.
- **Repeatability**
  - ≤ 1% of Full scale deflection.
- **Set-point adjustment**
  - internal, micrometric adjustable.
- **Electrical wiring**
  - terminal box.
- **Electrical connection**
  R 1/2 (1/2 Gas or BSPT female) thread (others on request).
- **Ambient temperature**
  - -25 ÷ +65 °C.
- **Operating temperature**
  - max 100 °C.
- **Thermal drift**
  - ≤ 0,05% every °C of variations.

SPECIAL MATERIALS

- **Diaphragm coatings**
  - P.T.F.E.;
  - Monel 400;
  - Hastelloy C276;
  - tantalum.

OPTIONS

- **Special over-pressure**
  - see table PS 1.
- **Degreasing for oxygen service**
- **Tropicalization**
- **Wall mounting clamp**
- **2" pipe mounting clamp**

Table PS 1
Setting ranges and relative parameters

Model	Setting range	Test pressure	Special over-pressure	Differential 1 micro	Differential 2 micro
PS 489	0,7 ÷ 6 mbar (1)	10 mbar		0,5 mbar	
PS 489	1 ÷ 16 mbar (1)	20 mbar		0,8 mbar	
PS 489	2 ÷ 25 mbar (1)	30 mbar		1,2 mbar	
PS 489	5 ÷ 40 mbar (1)	0,5 bar	400 mbar	4 mbar	5 mbar
PS 489	5 ÷ 60 mbar (1)	0,5 bar	600 mbar	4 mbar	5 mbar
PS 489	6 ÷ 100 mbar (1)	0,5 bar	1 bar	4 mbar	6 mbar
PS 489	9 ÷ 160 mbar (1)	0,5 bar	1,6 bar	6 mbar	9 mbar
PS 489	9 ÷ 250 mbar (1)	1 bar	2,5 bar	6 mbar	9 mbar
PS 489	15 ÷ 400 mbar (1)	1 bar	4 bar	10 mbar	15 mbar
PS 489	18 ÷ 600 mbar (1)	1 bar	6 bar	12 mbar	18 mbar
PS 389	0,06 ÷ 1 bar (1)	1,2 bar	10 bar	25 mbar	60 mbar
PS 389	0,06 ÷ 1,6 bar (1)	2 bar	16 bar	30 mbar	60 mbar
PS 389	0,06 ÷ 2,5 bar (1)	3 bar	25 bar	40 mbar	60 mbar
PS 389	0,08 ÷ 4 bar	5 bar	40 bar	50 mbar	80 mbar
PS 389	0,09 ÷ 6 bar	8 bar	40 bar	60 mbar	90 mbar
PS 389	0,15 ÷ 10 bar	12 bar	40 bar	100 mbar	150 mbar
PS 389	0,25 ÷ 16 bar	20 bar	40 bar	160 mbar	250 mbar
PS 389	0,4 ÷ 25 bar	30 bar	40 bar	250 mbar	400 mbar
PS 389	0,6 ÷ 40 bar	48 bar	60 bar	400 mbar	600 mbar
PS 389	0,9 ÷ 60 bar	70 bar	80 bar	600 mbar	900 mbar
PS 389	6 ÷ 100 bar	120 bar		4 bar	6 bar
PS 389	8 ÷ 160 bar	185 bar		5 bar	8 bar

note 1: setting ranges also available fo vacuum and compound
note 2: differential and minimun set-point value, for micro (see table PS 2) type S3, S5, S7 and S8, are 300% of those shown in table

Table PS 2
Microswitches - ohmic load

	Type	V DC 24	V AC 125	V AC 250
S1	Standard	0,1 A	15 A	15 A
S2 (1)	SPLASH	0,1 A	15 A	15 A
S3 (1)	Goldplated	0,1 A	1 A	
S4 (1)	Inert gas filled	0,1 A	15 A	15 A
S5 (1)	Goldplated and inert gas filled	0,1 A	1 A	
S6 (2)	Adjustable dead band	0,1 A	20 A	20 A
S7 (1)	SPLASH V DC	6 A	15 A	15 A
S8 (1)	Inert gas filled	6 A	15 A	15 A

(1) For range ≥ 40 mbar
(2) For range ≥ 1 bar

note: informations shown in this series may be changed at any time without prior notice.

PS SERIES section 2

Diaphragm differential pressure switchs

- watertight casing;
- ranges included between 250 mbar and 10 bar.

This instrument has a diaphragm with double bellows, that acts directly on the microswitch, through a selfcentering pivot. The simple structure of the instrument grants a reliable mechanic switch and a long working life.

made in ITALY

CE PED 97/23/CE

TECHNICAL FEATURES

- **Models**
  - PS 399: ranges included between 1 and 10 bar;
  - PS 499: ranges included between 250 and 600 mbar.
- **Casing**
  - case and cover in AISI 304 stainless steel with bayonet lock.
- **Protection degree (according to EN 60529)**
  - IP 65.
- **Pressure connection**
  AISI 316L stainless steel:
  - 1/4-18 NPT (1/4 NPT female) - standard;
  - G 1/2 B (1/2 Gas o BSP male) or 1/2-14 NPT EXT (1/2 NPT male) - on request.
- **Pressure element**
  - AISI 316 stainlees steel diaphragm with 2 AISI 321 stainless steel bellows.
- **Pressure element gasket**
  - di P.T.F.E..
- **Setting ranges**
  - see table PS 3.
- **Static pressure**
  - see table PS 3.
- **Electrical specifications**
  - 1 or 2 microswitches with change-over contacts (SPDT) - see table PS 4.
- **Differential**
  - Fixed, of adjustable 10÷.50% of setting range for ranges ≥ 1 bar - see tables PS 3 and PS 4.
- **Repeatability**
  - ≤ 1% of Full scale deflection.
- **Set-point adjustment**
  - internal, micrometric adjustable.
- **Electrical wiring**
  - terminal box.
- **Electrical connection**
  - R 1/2 (1/2 Gas or BSPT female) thread (others on request).
- **Ambient temperature**
  - -25 ÷ +65 °C.
- **Operating temperature**
  - max 100 °C.
- **Thermal drift**
  - ≤ 0,05% ogni °C di variazione.

OPTIONS

- **Lower connections**
- **Degreasing for oxygen service**
- **Tropicalization**
- **Wall mounting clamp**
- **2" pipe mounting clamp**

Table PS 3
Setting ranges and relative parameters

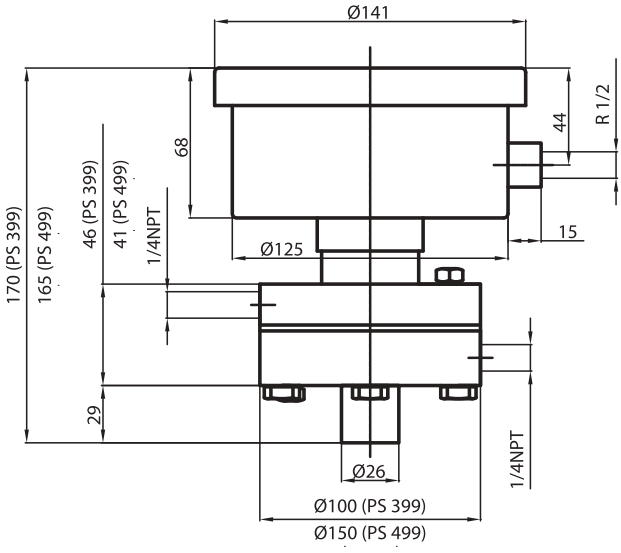
Model	Setting range	One side static pressure	Both side static pressure	Differential 1 micro	Differential 2 micro
PS 499	20 ÷ 250 mbar	2,5 bar	4 bar	10 mbar	15 mbar
PS 499	25 ÷ 400 mbar	4 bar	4 bar	16 mbar	20 mbar
PS 499	35 ÷ 600 mbar	4 bar	4 bar	20 mbar	30 mbar
PS 399	0,1 ÷ 1 bar	10 bar	25 bar	60 mbar	80 mbar
PS 399	0,1 ÷ 2,5 bar	15 bar	25 bar	60 mbar	80 mbar
PS 399	0,2 ÷ 4 bar	15 bar	25 bar	70 mbar	100 mbar
PS 399	0,2 ÷ 6 bar	15 bar	25 bar	100 mbar	150 mbar
PS 399	0,2 ÷ 10 bar	15 bar	25 bar	120 mbar	170 mbar

note: differential and minimun set-point value, for micro (see table PS 4) type S3, S5, S7 and S8, are 300% of those shown in table

Table PS 4
Microswitches - ohmic load

Tipo		V DC 24	V AC 125	V AC 250
S1	Standard	0,1 A	15 A	15 A
S2	SPLASH	0,1 A	15 A	15 A
S3	Goldplated	0,1 A	1 A	
S4	Inert gas filled	0,1 A	15 A	15 A
S5	Goldplated and inert gas filled	0,1 A	1 A	
S6 (1)	Adjustable dead band	0,1 A	20 A	20 A
S7	SPLASH V DC	6 A	15 A	15 A
S8	Inert gas filled V DC	6 A	15 A	15 A

(1) For ranges ≥ 1 bar



PS 399/499

Weight ~ kg 3,85
(rif. a PS 399)

Weight ~ kg 6,20
(rif. a PS 499)

note: informations shown in this series may be changed at any time without prior notice.

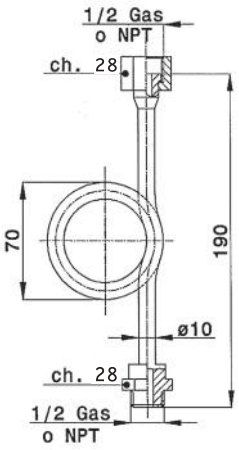
AM SERIES

Accessories for pressure gauges

AM 401

Siphon for low pressures

- AISI 316 stainless steel pipe;
- AISI 316 stainless steel threaded connections, fixed male and revolving female G 1/2 B (1/2 Gas or BSP) or fixed male and female 1/2-14 NPT (1/2 NPT);
- TIG welding;
- working pressure max 60 bar;
- operating temperature max 300 °C.

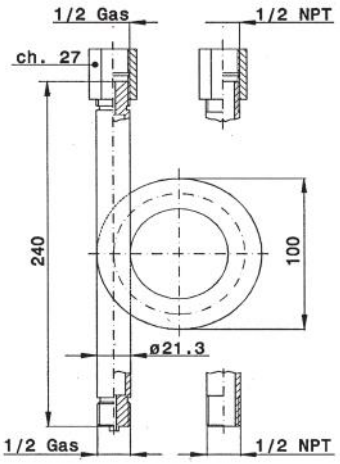


AM 401 weight ~ kg 0,28

AM 403

Siphon for high pressures

- AISI 316L stainless steel pipe;
- AISI 316L stainless steel threaded connections, fixed male and revolving female G 1/2 B (1/2 Gas or BSP) or fixed male and female 1/2-14 NPT (1/2 NPT), TIG welded or made on pipe for 1/2 NPT;
- working pressure max 180 bar;
- operating temperature max 400 °C.



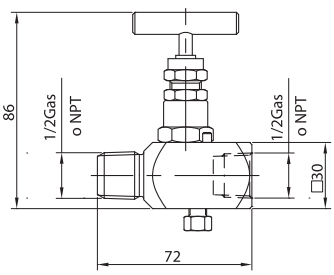
AM 403 weight ~ kg 0,88

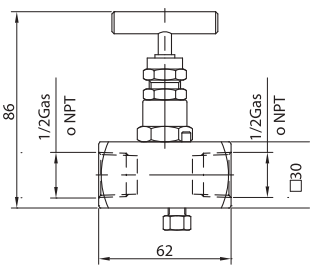
AM 409 / 410

AM 409 - Pressure gauge two-way valve
AM 410 - Pressure gauge three-way valve

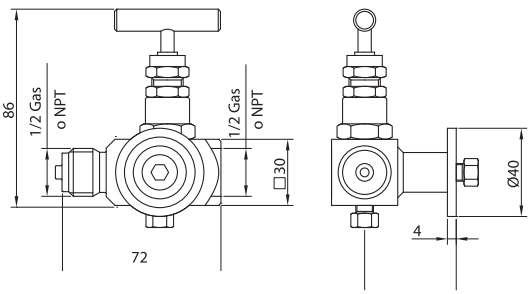
- AISI 316L stainless steel body;
- AISI 316L stainless steel needle plug;
- fixed male/female or female/female (only AM 409) G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT (1/2 NPT) threaded connections;
- little flange Ø 40 for test gauge **(AM 410)**;
- AISI 304 stainless steel handles;
- drain plug;
- working pressure max 400 bar;
- operating temperature max 210 °C (500 °C on request).

AM 409





AM 409 weight ~ kg 0,46

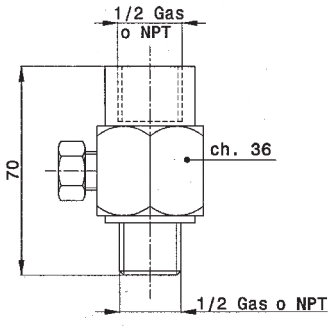


AM 410 weight ~ kg 0,55

AM 411

Adjustable screw damper

- AISI 316 stainless steel body;
- fixed male and female G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT (1/2 NPT) threaded connections;
- AISI 316 stainless steel adjusting screw;
- working pressure max 400 bar;
- operating temperature max 150 °C.



AM 411 weight ~ kg 0,22

AM 413/415/417

Manifold

- AISI 316L stainless steel body;
- AISI 316L stainless steel needle plugs;
- AISI 304 stainless steel handles;
- working pressure max 400 bar;
- operating temperature max 210 °C (500 °C on request).

AM 413 - Three valve

- input connections:
  - o male G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT);
  - o 1/4-18 NPT (1/4 NPT) female;
  - o others threaded on request;
- output connections revolving female G 1/2 B (1/2 Gas or BSP).

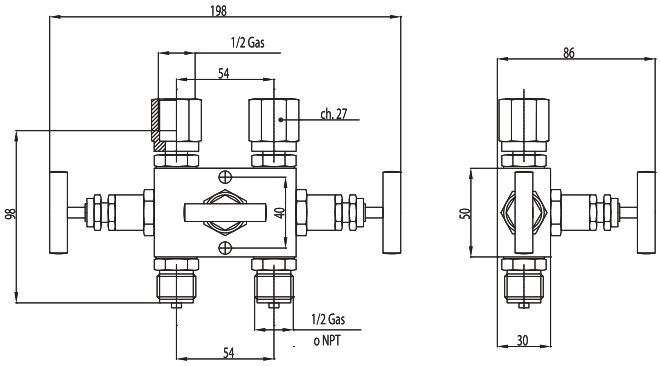
AM 415 - Five valve

- 1/2-14 NPT (1/2 NPT) female input and output connections;
- 1/4-18 NPT (1/4 NPT) drain plugs.

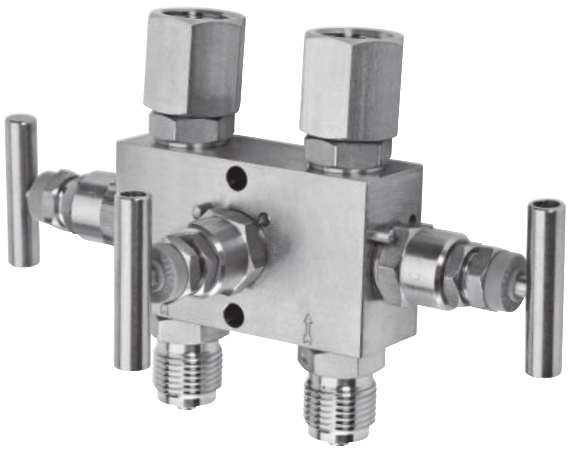
AM 417 - Five valve

- input connections:
  - o male G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT EXT (1/2 NPT);
  - o others threaded on request;
- output connections revolving female G 1/2 B (1/2 Gas or BSP);
- 1/4-18 NPT (1/4 NPT) drain plugs.

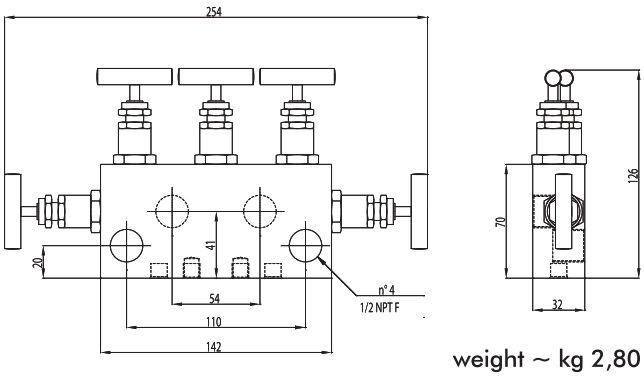
AM 413



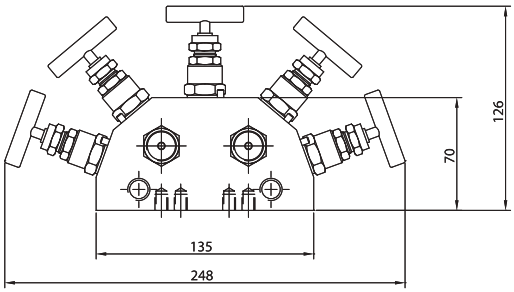
weight ~ kg 1,70



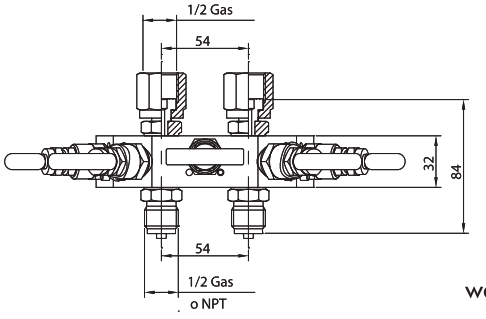
AM 415



weight ~ kg 2,80



AM 417



weight ~ kg 3,20

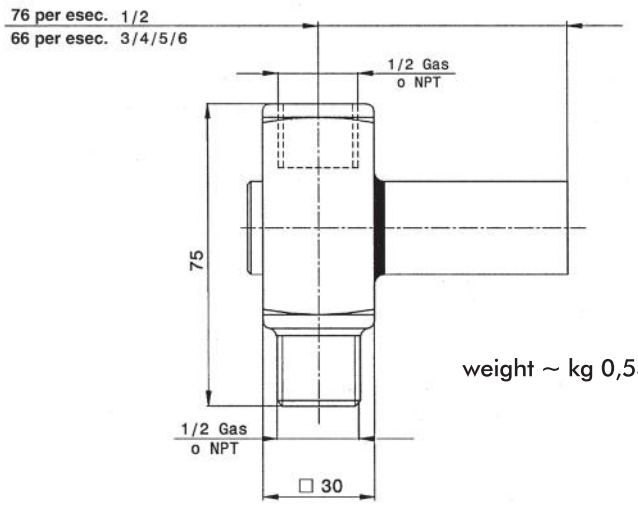
AM 416

Adjusting over-pressure protector

- AISI 316L stainless steel body;
- AISI 316L stainless steel stopper;
- fixed male and female G 1/2 B (1/2 Gas or BSP) or 1/2-14 NPT (1/2 NPT) threaded connections;
- FPM (Viton) seals;
- resetting value -30% of setting value;
- working pressure max 500 bar;
- operating temperature max 100 °C.

- **Execution 1**
  - setting range 200 mbar ÷1 bar;
- **Execution 2**
  - setting range 1 bar ÷ 3 bar;
- **Execution 3**
  - setting range 3 bar ÷ 16 bar;
- **Execution 4**
  - setting range 16 bar ÷ 35 bar;
- **Execution 5**
  - setting range 35 bar ÷ 160 bar;
- **Execution 6**
  - setting range 160 bar ÷ 350 bar.

AM 416



weight ~ kg 0,53