Industrial instrumentation for Pressure and Temperature

User guide

BOURDON TUBE PRESSURE GAUGE

SP – OM

MI-SP-OM-ENG_5
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1. General information

The instrument described in this manual has been designed and produced in conformity with the following standards: EN 837-1-2 ed alla ASME B40.1. All instruments are subjected to calibration with reference to national and/or international samples according to regulations established by the UNI EN ISO 9001:2015 quality management system.
All components are submitted to severe quality and traceability controls. This manual contains important information about the use and the installation of the gauge in safe conditions. Therefore, the following instructions have to be read carefully before use of the instrument.

The instrument works in safe conditions when correctly selected and installed in the system and when rules concerning the product, as well as the maintenance procedures established by the manufacturer, are respected.
The staff charged with the selection, installation and maintenance of the instrument must be able to recognize the conditions that may negatively affect the instrument's ability to work and which may lead to premature breakage. The staff must, therefore, be technically qualified and properly trained, and must carry out the procedures required by the plant regulations.

Standards
- Directive P.E.D. **2014/68/EU**

Nuova Fima's instruments are designed and manufactured according to the safety rules described in the safety international standards in force. According to the **2014/68/EU** standard the NUOVA FIMA pressure gauges are classified in 2 categories

PS ≤1000 bar these instruments do not need to satisfy the essential safety standards but they just have to be designed and manufactured according to a SEP-Sound Engineering Practice and do not need any CE marking.
PS >1000 bar these instruments should satisfy the essential safety standards established by the PED, they are classified as category I and certified according to Form A. They need to show the CE marking as reproduced below.

CE

1.1 Intended use

These instrument are designed for Sanitary, Food Process and Pharmaceutical Industries in compliance with standard n° 74-07 of 3-A.

The absence of interstices and the mirror finishing of the components ensure the highest level of hygiene.
To reduce the effects of severe operating conditions like vibrations and pulsation, the instrument can be liquid filled

2. Installation

Attention	**Before installation ensure that the right instrument has been selected according to the working conditions and, in particular the range, the working temperature and the compatibility between the material used and the process fluid.**
Attention	**This manual does not concern instruments which conform to standard 2014/34/EU (ATEX).**
Attention	**The product warranty is no longer valid in case of non-authorized modifications and of misuse of the product.**
Warning	**The manufacturer disclaims all responsibility in case of damages caused by the improper use of the product and by the non-respect of the instructions reported in this manual.**

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Attention	**The user is totally responsible for the instrument installation and maintenance.**
Warning	**Instruments should be disconnected only after depressurization of the system.**
Warning	**The process fluids residuals in the disassembled gauges could affect people, the environment and the system. Proper precautions are highly recommended.**

In order to verify the working and manufacturing features of the instruments read the catalogue sheets in the most up-dated edition available on-line on **www.nuovafima.com**

The instrument installation should be carried out according to standard EN 837-2 (Recommendation for pressure gauges installation and selection)

- Remove the diaphragm protection just before mounting and handle it with extreme care. Scratches on the diaphragm are the main risk of chemical corrosion while crashing pressure on the concentric waves may affect the operating system.
- A chemical compatibility check between the process medium and the wetted parts is required before installation. A description of the instrument material is laser-marked on the upper and lower body of the instrument as well as on the tag.
- Tags approved for food treatment are recommended. The fast-connection components such as clamps, pulleys, flanges and nuts are not included in the supply and they are not described in this manual.
- Instruments with the DIN 11851 connection must be installed using special gaskets type SKS.
- Instruments with process connection conformed to ISO 2853 (IDS/ISS) must be installed using gaskets provided with supporting ring as described in the above-mentioned directive.
- In case of fluid leakage during mounting, clean carefully.
- During installation of gauges with security device, installation should guarantee at least 20mm free space on the back side must be .
- In order to guarantee the instrument's accuracy in measuring, it is necessary to respect the working limits described in the relevant catalogue sheet.
- Instruments should be installed in vibrations proof positions. If the mounting point is not stable because of vibrations a support for the instrument fixing should be used such as a clamp or a flange , possibly use a flexible capillary.
- If vibrations cannot be avoided during installation, the use of liquid filled instruments is recommended.
- Standard EN 837-1/9.6.7 requires the vertical position as a standard mounting of the instrument. Calibration and mounting positions different from standard (when requested) are shown on the dial.
- Instruments must be protected from large ambient temperature variations.
- Instruments must be protected from sun radiations during operation in order to prevent overheating.
- Liquid filled instruments operating in temperatures lower than 20°C, may have prolonged response times because of the increase of the filling liquid viscosity.
- During installation be sure that no deviation above or below the fluid allowed and the ambient temperatures, takes place considering the heating radiations. It is necessary to consider the temperature influence on the accuracy value.
- During the first operating procedure pressure spikes should be prevented. The interception valves should be opened slowly.
- The use of instruments measuring the zero values is not recommended especially in gauges in which the first part of the scale is suppressed.
- It is not recommended reinstalling the instruments on plants working with various process fluids in order to prevent any chemical reaction which could cause explosions owing to contamination of the wetted parts.
- If the pressure indication is not been changing for a long time be sure that this is not due to a closing up of the pipe bringing pressure to the sensing element. Before disassembling, especially in case of zero pressure, isolating the instrument through the interception valve is recommended to ensure that no pressure remains inside of it.

3. Use limits

3.1 Process and ambient temperature
This standard type instrument is designed to be used in safety conditions in an ambient temperature between –20 and +65°C. As for the filled model please see the paragraph "DAMPENING LIQUID FILLING"
In case of temperatures below 0°C, the use of liquid filled gauges is recommended preventing the freezing of the components, such as the measuring system toothing. The fluid must not freeze or crystallize inside the sensing element.

3.2 Working pressure
The instrument should be chosen considering the scale range which should be between 25% and 75% of the full scale range. The full scale range should be approximately twice the working pressure value.

3.3 Dynamic and cyclic pressures
When the pointer starts to vibrate, dynamic and cyclic pressures are occurring affecting the sensing element and the amplifying movement's life.
Therefore, it is necessary to reduce the pulsating pressures installing a dampener or an interception valve between the pressure source and the instrument. The harmful effect of pulsations could also be reduced by filling the case with a dampening liquid. If the wrong instrument is selected, a stress failure may occur.

3.4 Overpressure
Not applicable

3.5 Vibration
Vibrations can be detected through continuous and often irregular vibrations of the pointer or of the case.
When the instrument is affected by vibrations during operation, it is recommended using a liquid filled pressure gauge.

3.6 Safety device
In systems working with compressed gas, the use of an instrument provided with a proper safety device is recommended in accordance to standard EN 837-2. In case of unexpected failure of the sensing element the compressed gas can be released outside the case through the safety device.

3.7 Dampening liquid filling
The dampening liquid is generally used to reduce vibrations of the moving parts due to vibrations and/or pulsations. It prevents the rotating parts wear out significantly increasing the instrument resistance to stress. Subsequently, the instrument's readability improves and the sudden loss of pressure is prevented.
The dampening liquid type should also be chosen considering the working temperature, the liquid viscosity level and the expected damping level.
As for working temperatures of the liquid filled instruments please see the relevant catalogue sheet.

3.8 Protection in explosive atmosphere
In case pressure gauges are used in potentially explosive atmospheres special procedures are requested. Directive 2014/34/EU regarding the ATEX products is applied to pressure gauges provided with electrical devices as well as to mechanical pressure gauges.
In order to choose the right product featuring the above-described requirements please see the relevant catalogue sheet and manual.

4. Wrong use

4.1 Fatigue failure
The elastic element's life may be reduced by a continuous pressure variation shown by the pointer's vibrations.
This type of failure, which could be more dangerous if compressed gas is involved rather than liquids, brings about a pressure increase inside the case and, therefore, the opening of the safety device. In case of operation with high pressure the breakage could degenerate in an explosion. It is recommended using dampening liquid filled instruments and decreasing the pressure entrance conduit through a restrictor screw or an adjustable dampener.

4.2 Failure due to vibrations and shocks
Vibrations usually cause an abnormal deterioration of the moving parts that lead to a gradual loss of accuracy and to the complete failure of the pointer.
Vibrations could also cause stress cracks of the sensing element structure leading to liquid leakage and even to explosion.

5. Maintenance

The instrument's original characteristics should be maintained during time through a specific maintenance program which must be managed and applied by qualified technicians.
All diaphragm seals are assembled and fastened to the instrument. OM models are also provided with a tag. If the tag or the assembling are altered improperly the whole system functioning may be affected and the relevant guarantee is no longer valid.

WARNING: Do not remove or slack the filling valve and do not separate the instrument from the diaphragm seal. In case of leakage the assembling is out of order and must be returned for a new separating circuit refilling.

Within maintenance program the following activities must be included: the cleaning of the instrument's outer parts by means of a humid cloth, the pressure indication check, the gaskets tightness check, the condensation check inside the case, the glass, case and safety device integrity.
As for heavy work instruments operating in severe conditions plants (vibrations, pulsating pressures, corrosive or sediment fluids, fuel or inflammable fluids) it is recommend scheduling their replacement according to the maintenance program. In case the instrument does not work properly it is necessary to proceed to an unscheduled checking procedure.
Instruments should be kept in their original packaging and stored indoor, in a damp-proof environment. The storing area temperature should be between –25…and +65°C, unless otherwise required.
If the instrument is carelessly handled, the metrological features may be affected even if it is properly packed.
Instruments should be checked before use. As for the zero-free instruments in particular, it could occur that the null-pressure pointer position is within the zero span.

5.1 Routine check
In order to verify the sensing element condition, it is advisable to mount the instrument on the pressure generator adding an interception valve between them. Apply the maximum pressure value to the gauge and exclude it form the pressure source through the valve. Any possible leakage of the sensing element can be detected because the pointer returns to zero very slowly.

5.2 Recalibration
If after recalibration results are different from the nominal values declared in the catalogue sheet, the recalibration procedure should be repeated. It is recommended returning the instrument to **NUOVA FIMA** for this procedure.

NUOVA FIMA will not be responsible for any non authorized intervention on the instrument. Also, the contract warranty and the CE Conformity Declaration will be no longer valid.

6. Disposal

An inappropriate disposal of the instrument may be dangerous for the environment. Instrument components and packing materials must be disposed of without endangering the environment and following specific national procedures. The fluid remaining inside the instrument could be dangerous or toxic for the environment, for people and for the plant.

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DICHIARAZIONE DI CONFORMITA'
DECLARATION OF CONFORMITY

Materiali e Oggetti destinati al Contatto con prodotti Alimentari

Regolamento 1935/2004/CE[1] – Regolamento 2023/2006/CE[2] –
D.M. 21 Marzo 1973 e s.m.i.[3] – D.P.R 23 Agosto 1982 n.777 e s.m.i.[4]

Materials and objects suitable for contact with food products

Regulation 1935/2004/EC[1] – Regulation 2023/2006/EC[2] –
M.D. March 21, 1973[3] – D.P.R August 23rd, 1982 n.777[4]

NUOVA FIMA S.r.l dichiara che gli strumenti di seguito elencati, realizzati con le parti a contatto del fluido di processo in acciaio inossidabile AISI 316 L (1.4404/1.4432), sono idonei all'impiego a contatto con prodotti alimentari e soddisfano i requisiti previsti dalle leggi indicate.

NUOVA FIMA S.r.l. declares that all the following instruments which wetted parts are manufactured in stainless steel AISI 316 L (1.4404/1.4432), are suitable for contact with foods and they comply with the requirements of the above-mentioned laws.

Modello/*Model*	**DN/*DS***	**Codice/*Code***
OM	100	01.OM
SP	63 – 100	01.SP
MGS 9/SA	-	4.SAN
MGS 9/AL	-	4.ALI
MGS 9/AS	-	/
MT OM	100	8.MOM
ST SA	-	8.SSA
SX SA	-	8.XSA
SDM OM	100	8.DOM

Il controllo della fabbricazione interna degli strumenti è assicurato dal Sistema Qualità secondo ISO 9001:2015 operante in azienda e certificato da ICIM S.p.A.
The instruments internal manufacturing control is assured by the company's Quality System according to ISO 9001:2015, certified by ICIM S.p.A.

Amministratore Delegato
Managing Director
F.Zaveri

Il documento è prodotto mediante sistema informatico ed è valido senza firme.
This document is produced by the company's information system and it is valid without signature.

(1) Regolamento riguardante i materiali e gli oggetti destinati a venire a contatto con i prodotti alimentari
Regulations regarding materials and articles intended to come into contact with food

(2) Regolamento sulle buone pratiche di fabbricazione (GMP) dei materiali e degli oggetti destinati a venire a contatto con prodotti alimentari
Regulation regarding the good manufacturing practice of materials and articles intended to come into contact with food

(3) Disciplina igienica degli imballaggi, recipienti, utensili, destinati a venire in contatto con le sostanze alimentari o con sostanze d'uso personale
Hygienic regulation regarding packaging, containers, utensils, intended to come into contact with food items or with materials for personal use

(4) Decreto del Presidente della Repubblica riguardante i materiali e gli oggetti destinati a venire a contatto con i prodotti alimentari
Decree of the President of the Italian Republic regarding materials and articles intended to come into contact with food