

1. General information

This instrument works in safe conditions when selected carefully and installed correctly in the system and when the related instructions 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 be, therefore, technically qualified and properly trained, to carry out the procedures established by the plant regulations.

Standards

Directive P.E.D. 2014/68/EU

Nuova Fima instruments are designed and manufactured according to the safety rules included in the safety international standards in force. According to the 2014/68/EU standard, the NUOVA FIMA pressure gauges are classified into 2 categories:

PS <200 bar These instruments may not satisfy completely the essential safety standards but they have to be designed and manufactured according to a SEP-Sound Engineering Practice. No CE marking is required on them.

PS >200 bar These instruments should satisfy the essential safety standards established by the PED, they are classified as category I and they are certified according to Form A. They should bring the CE marking as the one shown below.



1.1 Intended use

These instruments are used to check differential pressures of gaseous liquids which do not have high viscosity and do not crystallize.

In the presence of high temperature, high viscosity and corrosive process fluid or which can crystallize these instruments can be fitted with remote mounting diaphragm seals.

2. Installation and commissioning

Before installation and commissioning, the connection distance of the instrument process connection and the possible valve where it will be installed must be verified.

INSTRUMENT	CONNECTION DISTANCE
MD 13	50mm
MD 14	50mm
MD 15	50mm
MD 16	50mm
MD 17	54mm
MD 18	23mm

Tighten the instrument thread forcing on the process connection area with a special wrench avoiding forcing by the hands.

As for cylindrical threading process connections (GAS-metric), a head gasket compatible with the gas or fluid medium should be used.

If the connection thread is conic simply screw on the connection. To tighten the thread more effectively it is recommended wrapping the male thread with PTFE tape.

Not suitable for cylindrical threading.



In both cases twist by two hexagonal wrenches: the first applied on the plane faces of the connection and the other on the pressure connection.

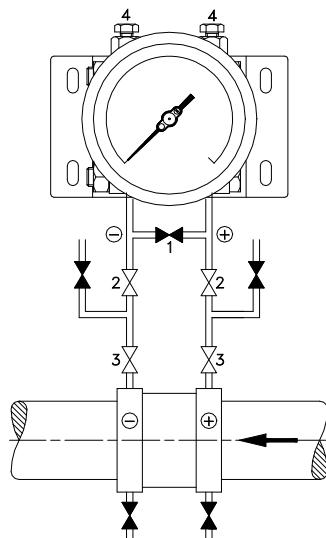
We recommend fastening the instrument through a pipe or panel mounting bracket. The instrument's dial should be in a vertical position unless otherwise indicated on the instrument.

To make the removal of the instrument easier when maintenance is required, it is recommended applying a shut-off valve between the instrument and the system.

2.1 Installation

Installation should be carried out always extremely carefully to prevent any pressure spike or sudden temperature fluctuations.

Therefore, the shut-off valves should be opened slowly to check if any restrictions, sediments or condensation could affect the real values.



The following instructions should be followed:

1. open the by-pass valve "1";
 2. open the root valve "3";
 3. open the shut-off valve "2" of the plus side (+);
 4. verify that the chambers are filled up through the blow-out vents placed on the top of the instrument.
 5. close the by-pass valve "1";
- open the shut-off valve "2" of the minus side (-).

3. Operation limits

3.1 Process and ambient temperature

This instrument is designed to be used in safety conditions namely in an ambient temperature between -40 and +65°C. As for the filled model please see the paragraph "DAMPENING LIQUID FILLING"

3.2 Working pressure

This instrument is designed to work with a differential pressure of 100% of the full-scale range.

Static pressure one-side

INSTRUMENT	STATIC ONE-SIDE
MD 13	-
MD 14	100÷1600mbar
MD 15	25÷200bar
MD 16	-
MD 17	250 bar
MD 18	0,72÷40 bar

For missing data on the one-side pressure function of the instrument range, please see the relevant data sheet on our website www.nuovafima.com

Static pressure both-side

INSTRUMENT	STATIC BOTH-SIDE
MD 13	100bar
MD 14	max 25bar
MD 15	200 bar
MD 16	100 bar
MD 17	400 bar
MD 18	max 40 bar

3.3 Dynamic and cyclic pressures

Not accepted.

3.4 Overpressure

The instrument is protected against overpressure only in case of short-period overpressure disturbances. In case of longer unilateral overpressure, the O-ring can adhere so strongly to the clamps that they cannot detach normally, not even when the differential pressure decreases.

3.5 Vibrations

When the instrument support is subjected to vibrations different solutions can be considered: a) the use of liquid-filled instruments; b) remote-mounted instruments connected through hoses (suitable for strong or irregular vibrations). Vibrations can be noticed by the continuous fluctuations of the pointer.

3.6 Dampening liquid filling

The dampening liquid is generally used to reduce the vibrations of the moving parts due to vibrations and/or pulsations. The dampening liquid must be chosen very carefully when the instrument operates with oxidant media such as oxygen, chlorine, nitric acid, hydrogen peroxide, etc. In the presence of oxidant agents, there is a potential risk of chemical reaction, flammability and explosion of the instrument. In this case, proper filling liquids must be used.

The type of the filling liquid as well as its ambient temperature use limits should be taken into consideration.

Dampening liquids	Working temperature
Glycerine 98%	+15...+65°C (+30...+150°F)
Silicon oil	-45...+65°C (-50...+150°F)

4. Wrong uses

4.1 Failure for corrosion

A failure for corrosion may occur when the sensing element material is subject to chemical attack by the substances contained in the medium to be measured or in the ambient surrounding the pressure system. The damage may appear as a punctiform leakage or a stress crack due to the material weakening.

The sensing element is normally characterised by a reduced thickness, so it works in conditions of strong mechanical stress. Therefore, the sensing element should be chemically compatible with the fluid to be measured. No common material is safe from a chemical attack which can be triggered by different conditions: concentration, temperature and mixture of different chemical substances.

4.2 Failure for explosion

After a violent release of thermal energy due to some chemical reactions such as the adiabatic compression of oxygen in the presence of hydrocarbons/combustibles an explosion may occur. It is commonly accepted that it is impossible to prevent the effects of this kind of damage.

Pressure gauges suitable for use with oxygen are marked:



"Oxygen - No lubrication" and/or they are marked with a crossed-out oil can symbol on the dial

Also, models with double diaphragm seal are filled up between the two diaphragms with a special neutral

fluoro lube fluid. Instruments are supplied properly cleaned and degreased with special products and packed in polyethylene bags. The user must take the necessary precautions to ensure that the connection and the elastic element are kept clean after the pressure gauge has been unpacked.

4.3 Failure for vibrations

Vibrations cause an abnormal deterioration of the parts in motion. The instrument is progressively less accurate until the pointer stops permanently.

4.4 Dangerous process fluids

In models 13 and 14 it is recommended to check that fluids affecting the positive and the negative sides do not cause dangerous chemical reactions when they come into contact. If this occurs, we recommend choosing models 15, 16 or 17.

When the instrument does not work correctly the sensing element can break or crack; if the medium measured is flammable and the measurement activity is continuous an explosive atmosphere could be generated inside and outside the instrument case. In this case, an appropriate maintenance program is essential so that the damaged instruments are replaced before the leakage occurs.

4.5 Mechanical stress

If the installation points are subjected to stress instruments should be remotely mounted and connected through hoses. Instruments should be chosen among those suitable for surface or panel mounting.

6. Maintenance

The instrument's characteristics should be maintained over time through a special maintenance program on which skilled personnel should work.

The instrument features must be maintained to prevent damages due to high temperatures, risk of fire and explosion due to abnormal instrument working.

As for heavy work instruments (vibrations, pulsating pressures, corrosive or sediment fluids, combustible or flammable media), we recommend scheduling their replacement according to the maintenance program. It is recommended to verify the sensing element condition, the indication pressure, the sensing element corrosion level (as far as the diaphragm seals are concerned), the gasket tightness, and the condensation presence inside the case. In case the instrument does not work properly it is necessary to proceed to an extra examination procedure.

6.1 Routine check

To verify the sensing element condition the instrument should be installed on the pressure generator introducing a shut-off valve between them. A maximum pressure value must be applied to the gauge and it should be isolated from the pressure source through the valve. If the sensing element leaks the pointer goes back slowly to zero. To verify the accuracy of indication a stable pressure value should be developed in the laboratory and applied to the instrument to be examined and to a pressure test/primary testing instrument.

6.2 Recalibration

If after recalibration results are different from the nominal values declared on 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.

7. Disposal

It is recommended removing the window and blow-out vent before disposal as aluminium and stainless steel. The fluid remaining inside the instrument can be dangerous or toxic.

To verify the working and manufacturing features of the instruments read the catalogue sheets in the most updated edition available online on www.nuovafima.com