

1. Important information

The instrument described in this manual has been designed and produced in conformity to the following standards:
EN 837-1-2 and ASME B40.1. All components are submitted to severe quality and traceability controls. The quality management system is certified according to the ISO 9001 standard. This manual contains important information about the use and the installation of the gauge in safe conditions. Therefore, reading the following instructions carefully before use is highly recommended.

The instrument works in safe conditions when selected and installed correctly 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 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 established by the plant regulations.

Conformity to standards

NUOVA FIMA instruments are designed and manufactured according to the safety rules included in the safety international standards in force. In terms of Directive 2014/68/EU (P.E.D.) NUOVA FIMA thermometers must be designed and manufactured according to a "Correct Construction Practice" (SEP CE - Sound Engineering Practice)

1.1 Intended use

These instruments are designed for a use in food, beverage, pharmaceutical, cryogenics, chemical and petrochemical processing industries environment and the process medium. The instrument is intended for indicating the temperature locally and remotely.

sensing element get in contact with the temperature to measure. In case of installation on pipes the sensing element must be centred to the central axis of the pipe.

Bulb (mm)	Sensing element TB (mm)	
	≤300°C	>300°C
6...6,4	150	
8...9,6	100	150

Bulb (mm)	Sensing element TG (mm)	
	Capillary ≤15m	Capillary >15m
8	120	170
9,6	90	130
11,5	60	90

If the thermometer is combined to a thermowell causes the response time may be delayed but this inconvenience is easily solved by filling up the thermometer with a heat transmission fluid (mineral oil or aluminium dust or copper dust or graphite, graphite and glycerine) compatible with the process fluid temperature.

The internal thermowell diameter has to be always wider than the external diameter of the thermometer bulb.

2.1 Local mounting

The case temperature should not be higher than 65°C. For that reason, the case should be far enough from the process therefore the bulb should be longer or the connection should be suitable for horizontal mounting:

Case-process (mm) distance	Process fluid temperature
50	80
75	95
100	130
150	195
200	290
250	440

Screw the connection through special wrench without forcing on the case or on the stem because it contains the sensing element which could be damaged and could become inaccurate in measuring.

2.2 Remote mounting

The case should not be exposed to the process heat. It is also necessary to consider the delay in the response time caused by the capillary according to its extension. Do not fold the capillary roughly in order to prevent any crick or pinch. The minimum folding diameter is 30 cm.

3. Application limits

3.1 Ambient temperature

This instrument is designed to be used in safety conditions in an ambient temperature between -40...+65°C

3.2 Thermowells

For a correct mounting, thermowells are recommended as a protection in case of corrosion, of higher pressures than those indicated in the working limits and/or in case of high velocity
In case of high temperatures it is possible to order an extension as a thermal insulation of the instrument to dissipate the process heat. Moreover, thermowells allow to remove the instrument for cleaning or maintenance without affecting the plant.

3.3 Working temperature

An instrument nominal range which allows the maximum value of the measured temperature is recommended in order to stay within the measuring range.
The instrument is designed to measure temperatures included within the measuring range which is delimited by two triangles on the dial according to standard EN 13190

3.4 Overtemperature

Instruments resist to temporary temperature values as shown in the table below:

Nominal Range (°C)	Overtemperature	
	TB	TG
≤ 400	+30% VFS	+25% VFS
> 400	500°C	600°C

3.5 Working pressure

In case of contact installation, the maximum pressure supported by the bulb is 15 bar for the bi-metal thermometers and 25 bar for the inert gas models. If the installation is carried out using a thermowell it is necessary to check which temperature it can resist to in the thermowell catalogue sheet.

The instrument is designed to work with atmospheric pressures between 0,8 and 1,1 bar.

3.6 Protection degree

The protection degree value is established in accordance with standards CEI EN 60529. This value concerns the hermetic tightness of the ring, the whole taps properly placed in their seat: IP55 or IP65; IP67 for liquid filled instruments.

4. Wrong application

4.1 Vibration failure

Vibrations generally produce an abnormal deterioration of the parts in movement up to a gradual loss of accuracy and to a complete stop of the pointer.
In case of vertical mounting, especially when the case is filled up with dampening liquid and vibrations are severe, it is very likely that the instrument breaks because of the massive vibration shock that it receives.

4.2 Liquid filled cases

The dampening liquid is commonly used to protect the moving parts from vibrations. If the atmosphere is affected by oxidant agents there is a possible risk of a chemical reaction, of inflammability or explosion of the instrument.

The type of dampening liquids and their use limits have to be considered attentively according to the ambient temperature and the measuring range.

Dampening liquid	Ambient temperature
Glycerine 98%	+15...+65°C (+60...+150°F)
Silicon oil	-20...+65°C (-4...+150°F)

LOCAL MOUNTING		
Dampening liquid	Measuring range (°C)	
	TB	TG
Glycerine 98%	≤ 160	≤ 160
Silicon oil		
Fluorinated fluid	≤ 250	≤ 250

REMOTE MOUNTING		
Dampening liquid	Measuring range (°C)	
	TG	
Glycerine 98%		
Silicon oil	≤ 600	
Fluorinated fluid		

4.3 Overtemperature failure

If temperature is higher than the maximum limit or lower than the minimum limit declared for the sensing bulb, an overtemperature failure may occur and the instrument may be damaged permanently.

4.4 Mechanical stress

Instruments should not be stressed. If the installation points are mechanically stressed, instruments should be remote mounted and connected through a capillary. Instruments should be inert gas model and supplied with a fixing device for wall or surface mounting.

4.5 Vibrations

When the instrument support is stressed by vibrations different solutions should be taken into account:

- The use of liquid filled instruments with threaded process connection ≥ 1/2"
- remote mounted instruments connected through flexible pipes (for strong and irregular vibrations).
Vibrations can be detected through continuous and often irregular oscillations of the pointer.

5. Maintenance

The maintenance during time of the original features of the mechanical products should be guaranteed by an accurate maintenance program optimized and run by qualified technicians. Every 3/6 months an indication accuracy check is recommended as well as a check of the filling fluid level and/or the presence of condensate inside the case. In case the instrument does not work properly it is necessary to proceed to an extra checking procedure.

5.1 Routine check

The glass should not be cracked. The filling up and blow out vent should be properly placed in their seats. The pointer should be within the graduated scale. In order to check the sensing element conditions it is necessary to install the instrument on a temperature generator. In order to check the indication accuracy, a stable temperature value is generated in laboratory and applied to the instrument to check as well as to a primary /sample thermo-element.

As for instruments used on heavy work conditions plants (vibrations, corrosive fluids) it is necessary to schedule their replacement following the maintenance program. In case the instrument does not work properly it is necessary to proceed to an extra checking procedure.

A check on sediments which could develop around the thermowell or the thermometer bulb due to the nature of the fluid to measure is also recommended: in this case proceed to the periodic removal of the sediments.

5.2 Recalibration

If after recalibration results are different from the nominal values declared on the catalogue sheet the recalibration procedure should be repeated. The instrument should be returned to NUOVA FIMA for this procedure.

NUOVA FIMA will not be responsible for all non-authorized intervention on the instrument. In case of non-authorized modification of the instrument the contract warranty and the CE Conformity Declaration is no longer valid.

6. Disposal and demolition

Instruments assembled with a thermowell can be disassembled even when the fluid is under pressure. When a remounting process is required, the installation instructions should be followed. If instruments are not combined with a thermowell, the thermometric bulb should receive the same pressure value as the atmospheric pressure one.

The process fluid remaining outside the thermometric bulb should not pollute the environment and should not harm people. In case of dangerous or toxic fluid removal must be performed with extreme care.

Dispose of glass and blow out vents as aluminium or stainless steel after removal.



Before installation be sure that the right instrument has been selected following the working conditions and in particular the range, the working temperature and the compatibility between the material used and the process fluid.



This manual does not concern instruments conforming to standard 2014/34/UE (ATEX)



The product warranty is no longer valid in case of non-authorized modifications and of wrong use of the product.



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.



Follow the specific safety rules carefully in case of measuring oxygen pressure, acetylene, inflammable or toxic gas or liquids.



The user is totally responsible for the instrument installation and maintenance.



Disconnect the instruments only after depressurization of the system.



The process fluids remaining 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

2. Installation

All instruments must be installed in vertical position unless otherwise indicated on the label. The thermometer's bulb should be long enough to let the