

1. Important information

The instrument described in this manual has been designed and produced in conformity to the following standards EN 13190 and ASME B40.3. 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 thermometer in safe conditions. Therefore it is highly recommended to read carefully the following instructions before using the instrument.

The instrument works in safe conditions when correctly selected and installed in the system and when the 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. Therefore the staff in charge must be qualified technically and properly trained, and must carry out the procedures called for in 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 97/23/EC (P.E.D.) NUOVA FIMA thermometers must be designed and manufactured according to a "Correct Construction Practice" (SEP CE - Sound Engineering Practice)

In accordance with directive: BT 2006/95/CE

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 indicated the temperature locally and remote.

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

The installation with thermowell causes a delay of the response time which can be decreased 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. Check that the internal thermowell diameter is 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 by lengthening the thermometric bulb or by choosing the back connection 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 inside there is the sensing element which could be damaged and could not indicate the right temperature anymore.

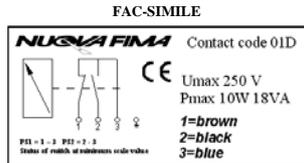
2.2 Remote mounting

Also in this case 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 crack or pinch. The minimum folding diameter is 30 cm.

2.3 Electrical connection

For electrical connection see the instrument label



2.4 Connection output

Disassemble the connector as shown in fig.1 and connect the cable as in fig.2.

Reassemble the connector and fix it on the transmitter.

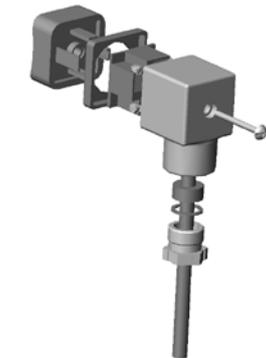


Figure 1 - Exploded view of the connection

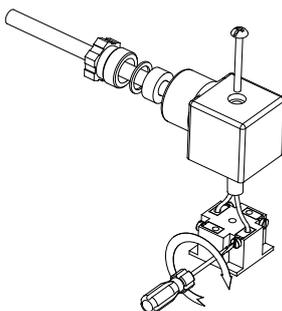
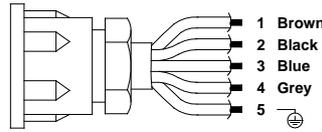


Figure 2 - Wires connection

The IP grade according to standard EN 60529-1:1992 is guaranteed only if the female connector equipped with a connection cable is mounted on the instrument and all the other components are assembled correctly.

2.5 Cable output

Connection cable combination with colours and numbers



2.6 Working current

VOLTAGE	SLIDING CONTACT		
	Volt	CC	CA
220	40mA	45mA	25mA
110	80mA	90mA	45mA
48	120mA	170mA	70mA
24	200mA	350mA	100mA

VOLTAGE	MAGNETIC RELEASE NON FILLED CONTACT		
	Volt	CA	CC
220	100mA	120mA	65mA
110	200mA	240mA	130mA
48	300mA	450mA	200mA
24	400mA	600mA	250mA

VOLTAGE	MAGNETIC RELEASE FILLED CONTACT		
	Volt	CC	CA
220	65mA	90mA	40mA
110	130mA	180mA	85mA
48	190mA	330mA	130mA
24	250mA	450mA	150mA

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

We recommend to choose an instrument nominal range which allows the maximum value of the measured temperature to stay within the measure range. The instrument is designed to measure temperatures included within the measure 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

If the installation is in contact, 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 on 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 EN 60529. This value concerns the hermetic tightness of the ring, the whole taps properly placed in their seat: IP55; IP65 for liquid filled instruments.

4. Wrong application

4.1 Vibration rupture

Vibrations most commonly cause an abnormal deterioration of the parts in movement bringing to a gradual loss of accuracy and then to a total block of the pointer. In case of radial mounting especially if the case is filled up with dampening liquid and the vibrations are very strong it is very likely that the instrument breaks for the serious mass of vibrations.

4.2 Liquid filled cases

The dampening liquid is commonly used to dampen the vibrations of the moving parts due to 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.

So it is very important to consider attentively the nature of the dampening liquids and their use limits according to the ambient temperature and the measuring range.

4.3 Overtemperature rupture

It is caused by a higher temperature than the maximum limit or lower than the minimum limit declared for the sensing bulb. This could bring to permanent functional damages of the instrument.

4.4 Mechanical stress

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

4.5 Vibrations

When the instrument support is under vibrations it is possible to consider different solutions such as:

- 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 noticed through continuous oscillations, often irregular, of the pointer point.

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 it is recommended to check the indication accuracy, the filling fluid level and/or the presence of condensate inside the case. If the instrument does not work correctly an unscheduled check is requested.

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 the temperature generator. In order to check indication accuracy a stable temperature value is generated in laboratory and applied to the instrument to be checked and to 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. If the instrument is not working correctly a non scheduled check is necessary. It is also recommended to control the possible sediments which could generate around the thermowell or the thermometer bulb due to the nature of the fluid to measure; 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. It is recommended to return the instrument to NUOVA FIMA for this procedure.

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

6. Disposal and demolition

Instruments mounted with thermowell can be disassembled even with the fluid in pressure. During remounting follow the recommendations for installation. If the instruments are mounted without thermowell, be sure that the pressure working on the thermometric bulb is the same as the atmospheric one.

The process fluid remaining outside the thermometric bulb should not pollute the environment and should not harm people. In case the fluid is dangerous or toxic be careful in manipulating it during removal.

We recommend to remove the glass and the blow out vents and then dispose it as aluminium or stainless steel.

	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 the instruments conforming to standard 94/9/CE (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 carefully the specific safety rules 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 residuals in the disassembled thermometer could affect people, the environment and the system. It is highly recommended to take proper precautions.

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 with the indication dial in vertical position with the exception of different instructions on the label. The thermometer's bulb length should be enough that the sensing element is exposed to the temperature to measure. In case of installation on pipes the sensing element must be centred compared 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