NUOVA FIMA

Industrial instrumentation for Pressure and Temperature

Installation, use and maintenance manual

T SERIES THERMOMETERS, MODEL B8, ATEX VERSIONS 2G2-2D2-2D0-2D5-2D6, ZONES 1, 2, 21, 22

MI-TB-2G2-2D2-2D0-2D5-2D6-ENG_6 02/2021

Index

1. Safety

- The safest ambient conditions for the instrument to operate properly depend on the correct selection and installation of it in the system, as well as on the compliance with the maintenance procedures set out by the manufacturer. The user is entirely responsible for a correct installation and maintenance.
- This manual is supplied with the instrument and should be properly stored. It is advisable to read it carefully before using the instrument.
- In order to specify the functional and constructive characteristics of the instruments, consulting the most updated version of the catalogue and data sheets which are available on the website www.nuovafima.com is recommended
- An improper use may damage the instrument and the operator or the entire plant.
  - The operators responsible for the selection, installation and maintenance of the instrument should be aware of the environmental conditions that may negatively affect the instrument operational activity and which may lead to its premature failure. Therefore, only technically qualified and trained staff should carry out the procedures established by the plant regulations.

2. Directives

T series thermometers, installed using a thermometric sheath conform to the Essential Health and Safety Requirements laid down in European Directive 2014/34/EU for Group II, Category 2G or 2GD equipment in the T6…T1 temperature class.

VERSION	MARKING
2G2 (gas)	CE Ex **II 2G Ex h IIC T6…T1 Gb -20°C ≤ Ta ≤ 60°C**
2D2 (gas and dust)	CE Ex **II 2G Ex h IIC T6…T1 Gb II 2D Ex h IIIC T85°C…T450°C Db -20°C ≤ Ta ≤ 60°C**
2D0 (gas and dust)	CE Ex **II 2G Ex h IIC T6…T1 Gb II 2D Ex h IIIC T85°C…T450°C Db 0°C ≤ Ta ≤ 60°C**
2D5 (gas and dust)	CE Ex **II 2G Ex h IIC T6…T1 Gb II 2D Ex h IIIC T85°C…T450°C Db -53°C ≤ Ta ≤ 60°C**
2D6 (gas and dust)	CE Ex **II 2G Ex h IIC T6…T1 Gb II 2D Ex h IIIC T85°C…T450°C Db -60°C ≤ Ta ≤ 60°C**

This instrument is NOT suitable for ZONES 0 and 20.

EMC Directive **2014/30/EU** on electromagnetic compatibility (EMC) does not apply to this product.
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 Œ - Sound Engineering Practice)

3. Standards

NUOVA FIMA instruments are designed and constructed to comply with the safety requirements prescribed by the international regulations in force, extracts of which are given in this manual. A full knowledge of these and complete compliance of the same are necessary for installing and commissioning the instrumentation: EN13190, UNI EN1127-1, UNI CEI EN ISO 80079-36, UNI CEI EN ISO 80079-37. All instruments are calibrated according to national and/or international samples and to requirements of UNI EN ISO 9001:2015 quality management system.

4. Operating principle

The bimetal sensing element rotates according to the temperature which is applied to it. One part of the bimetal element is fixed to the measuring bulb, while the other part is free and is connected to a rotating pin that transmits the rotation of the bimetal element to a pointer.
This pointer indicates the temperature value on a graduated scale printed on the dial.

5. Materials

The bulb is made of AISI 316 stainless steel. The case is made of AISI 304 or AISI 316 L stainless steel. The gaskets and vent and filling caps are made of EPDM, VITON or SILICONE RUBBER. The transparent part is made of safety glass. The dial and indicator are manufactured in aluminium.

6. Data-sheets

Detailed information on the construction and operating characteristics, as well as drawings showing overall dimensions are available on the catalogue sheets for the **TB8** DN100-125-150 models **2G2** for Gas, **2D2-2D0-2D5-2D6** for Gas and Dust.

7. Function

This instrument is designed to measure temperature locally or remotely and to be installed in a measuring thermowell.
This instrument does not pose any risk of fires when operating normally or when not in use, and should be used within the operating limits, avoiding the incorrect uses as described below.

8. Intended use limits

Maximum surface temperature - It can only be produced by the fluid temperature. The temperature produced by the combination between the ambient temperature and the process fluid temperature must be below the one intended for the ATEX temperature class, and should not affect the instrument operating functioning.
The process fluid temperature (Pt) must therefore be kept within the following limits as shown in the table below:

Class (Tmax)	Pt (°C)
T6 (85°C)	80
T5 (100°C)	95
T4 (135°C)	130
T3 (200°C)	195
T2 (300°C)	290
T1 (450°C)	440

When reading results are too high, the installer should insulate the measuring point properly to prevent thermal conduction which may bring to dangerous maximum surface temperatures.
Ambient temperature - This instrument is designed to be used safely at the following ambient temperatures:
0°C…60°C (2D0 version)
-20°C ... 60 °C (2G2 and 2D2 version)
-53°C…60°C (2D5 version)
-60°C…60°C (2D6 version)
Nominal temperature range – Choosing a nominal range for your instrument is recommended so that the maximum temperature measured is lower than the upper limit for the measuring range.
Measurement temperature range – This instrument is designed to measure temperatures ranging within the measuring range appearing on the dial and indicated by two triangular symbols, according to EN 13190 standard.
Overtemperature – It should be within the measuring range.
Operating pressure - The 2G2, 2D2, 2D0, 2D5 and 2D6 version of the bimetal TB8 thermometer is designed to work combined with a thermowell. The catalogue sheet regarding the thermowell should therefore be checked to determine the maximum pressure level it is designed for.
Ambient pressure - This instrument is designed to work at an atmospheric pressure ranging between 0,8 and 1,1 bar.

Case protection level - As per CEI EN 60529 standard. Concerning to hermetically sealed ring conditions, with built-in caps properly located.

Version	IP rating *(instrument case)*
2G2	IP 55 *(dry)*
2D2	IP65/67 *(dry) (filled)*
2D0, 2D6	IP65/67 *(filled)*
2D5	IP 65/67 *(vented)*

Liquid filled Cases - Liquid filling is generally used to dampen vibrations on parts in motion due to other vibrations. In order to prevent the dampening liquid from leaking from the case, these instruments are manufactured and delivered sealed. Where oxidising agents are involved, there is a potential risk of a chemical reaction, fire or explosion of the instrument. Particular care must be taken in terms of the nature of the filling liquid used and its use limitations in terms of ambient temperature.

Filling liquid	Ambient temperature
Glycerine 98%	0°C...60°C
Silicon oil	-20°C...60°C
Low temperature silicone oil	-60°C...60°C

9. Wrong uses

The following applications may be dangerous and must be considered carefully:
Vibration Failure - The most common vibrations may wear the movement components out because of high cyclic loading resulting in a gradual loss of accuracy and, eventually, in a failure of the pointer in indicating a pressure change.
Failure due to overtemperature – If the instrument is subjected to a temperature that exceeds the maximum limit or that is below the minimum limit accepted for the sensing bulb, a failure may occur and damage the instrument permanently.

10. Transport

The characteristics of the instruments may be affected during transport, despite adequate packaging. Instruments should be checked carefully before use.

11. Storage

Instruments should stay packaged in their original standard box until installation and stored in dry, indoor spaces. If instruments are supplied with special packaging (in wooden boxes lined with tar paper or in barrier bags), it is always best to keep them indoor, and always protected from the atmospheric agents. The condition of the packaging materials must be checked every 3-4 months, especially if the boxes are exposed to the weather. The storage area temperature should range between –20 and +65 °C, unless otherwise specified in the catalogue data sheets.

12. Installation

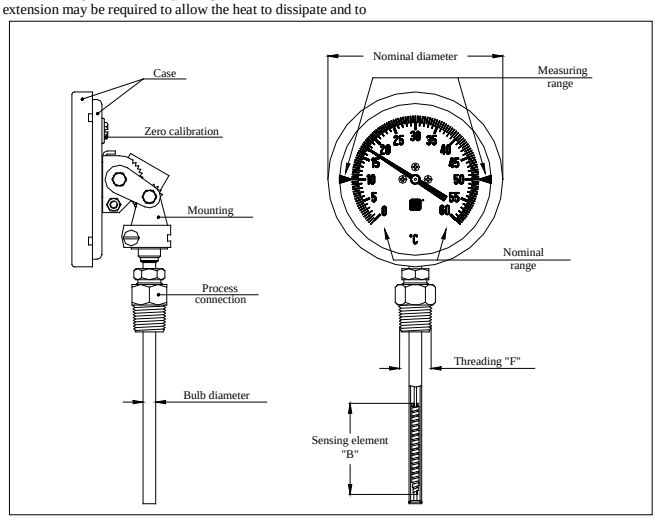
T series thermometers 2G2, 2D2, 2D0, 2D5 and 2D6 versions must be installed in accordance with the requirements of European Standards EN 13190.
Install the instrument in a position in which magnetic and electromagnetic induction, ionising radiation, ultrasound and exposure to sunlight do not increase the instrument's surface temperature.
Installing a measuring thermowell between the thermometer and the system allows to remove the instrument for maintenance purposes, without affecting the plant. The thermometer must be fastened to the thermowell to form a watertight seal. Do not use the case as a means of tightening as this may damage the instrument. All instruments must be fitted in such a way that the dial is vertical, unless otherwise indicated on the tag. The thermometer's bulb must be long enough to allow the sensing part to be exposed to the temperature to be measured. When fitting on pipes, the sensing part must be centered on the central axis of the pipe.
Direct installation - The temperature on the case must not exceed 60°C. To this end, the case must be kept at a suitable distance from the process by sizing the length of the thermometric bulb correctly and/or using a coupling on the back for installing it horizontally.

Distance case or pipe (mm)	Tp (°C)
50	80
75	95
100	130
150	195
200	290

Mechanical stress – The instruments should not be affected by mechanical stress.
Vibrations – When the instrument support receives vibrations, consider using an instrument filled with damping liquid and a threaded process coupling ≥ 1/2". Vibrations can be picked up by continuous oscillation of the pointer that is often irregular.
Equipotentiality - The instrument is made equipotent with the plant it is fitted on by means of an Ohmic contact between the threaded connections, of the instruments and the plant. This last one must be metallic and connected to the ground.

13. Accessories

Thermowells – Thermowells are required as protection of the thermometers in case of corrosion, against pressures that exceed those indicated as operating limits, high speed and/or flammable liquids. When high temperatures are involved, an extension may be required to allow the heat to dissipate and to insulate the instrument thermally from the process. This causes a delay in response time that can be shortened by filling the thermowell with a heat transmission fluid (oil, graphite powder) which has to be chemically compatible with the process and the ATEX atmosphere.



14. Use

The user must be aware of the risks related to the chemical and physical characteristics of the gases, vapors, and/or dust in the system.
Caps – The filling and vent caps must not be removed during operation of the system.

15. Disfunction

- **Indication steady on the same value**: Sensing element broken.
- **Indication steady outside the graduated scale**: Excess pressure temporary or permanent reading error.
- **Indication error exceeds that declared for the instrument**: Calibration altered. Delay in transmitting the temperature.

16. Maintenance

Maintenance of the original mechanical and construction characteristics must be ensured through a specific maintenance program, drawn up and managed by qualified technicians. Mechanical parts should not be affected by high temperatures, in order to prevent the risk of fire and explosion.
The sensing element should be checked every 3/6 months, as well as the accuracy of indication, the filling fluid level and/or the presence of condensation inside the case. If the instrument does not operate properly, an extra check is advisable.
Ordinary checking - During checking procedure the instrument should be isolated from the plant, disassembled, and subjected to the calibration checking procedure. **Gaskets and the subsequent IP protection level should also be checked.**
Recalibration - If the calibration check gives measured values out from the nominal accuracy values indicated in the catalogue, the instrument must be recalibrated. The instrument has to be returned to NUOVA FIMA for recalibration through the **Product Return Service**.

Cleaning - Dust deposits on the instrument should not be thicker than 5mm otherwise they must be removed and the instrument cleaned by means of a cloth soaked in a water and soap solution.

NUOVA FIMA does not accept any responsibility for misuse of the instruments or for instruments operating in non-authorised working conditions. In this case the CE Declaration of Conformity and Contractual Guarantee is no longer valid.

17. Disposal

Window and caps should be removed before disposal and disposed of as aluminium and stainless steel.

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DICHIARAZIONE UE DI CONFORMITÀ
EU DECLARATION OF CONFORMITY
Direttiva 2014/34/UE – *Directive 2014/34/EU*

Apparecchi e sistemi di protezione destinati ad essere utilizzati in atmosfera potenzialmente esplosiva

Equipment and protective systems intended for use in potentially explosive atmospheres.

NUOVA FIMA s.r.l. dichiara sotto la propria responsabilità che i termometri in esecuzione 2G2, 2G0, 2D2, 2D0, 2D5 e 2D6 di seguito elencati sono in accordo con la direttiva.

NUOVA FIMA s.r.l. declares on its sole responsibility that the following thermometers 2G2, 2G0, 2D2, 2D0, 2D5 and 2D6 version comply with the above-mentioned directive.

Modello *Model*	Installazione *Mounting*	DN *DS*	Campo *Range*	Tipo custodia *Case type*	Versione *Version*	Marcatura *Marking*
TB8	/	100 125* 150	Tutti *All*	Secco IP 55 *Dry IP55*	2G2	CE Ex **II 2G Ex h IIC T6...T1 Gb** **-20°C ≤ Ta ≤ 60°C**
TG8	Locale *Local*					
TG8	A distanza *Remote*	100 150	Tutti *All*	Secco IP 55 *Dry IP55*	2G0	CE Ex **II 2G Ex h IIC T6...T1 Gb** **0°C ≤ Ta ≤ 60°C**
TB8	/	100 125* 150	250°C max	Riempita *Filled*	2D2	CE Ex **II 2G Ex h IIC T6...T1 Gb** **II 2D Ex h IIIC T85°C...T450°C Db** **-20°C ≤ Ta ≤ 60°C**
TG8	Locale *Local*					
TG8	A distanza *Remote*	100 150	Tutti *All*			
TB8	/	100 125* 150	Tutti *All*	Secco IP65/67 *Dry IP65/67*		
TG8	Locale e a distanza *Local and remote*					
TB8	/	100 125 150	160°C max	Riempita *Filled*	2D0	CE Ex **II 2G Ex h IIC T6...T1 Gb** **II 2D Ex h IIIC T85°C...T450°C Db** **0°C ≤ Ta ≤ 60°C**
TG8	Locale *Local*	100 150	160°C max			
	A distanza *Remote*		Tutti *All*			
TB8	/	100 125* 150	Tutti *All*	Ventilata *Vented*	2D5	CE Ex **II 2G Ex h IIC T6...T1 Gb** **II 2D Ex h IIIC T85°C...T450°C Db** **-53°C ≤ Ta ≤ 60°C**
TG8	Locale e a distanza *Local and remote*					
TB8	/	100 125* 150	250°C max	Riempita *Filled*	2D6	CE Ex **II 2G Ex h IIC T6...T1 Gb** **II 2D Ex h IIIC T85°C...T450°C Db** **-60°C ≤ Ta ≤ 60°C**
TG8	Locale *Local*					
TG8	A distanza *Remote*	100 150	Tutti *All*			

*DN125 solo per modello TB8
**DS125 only for TB8 model*

Norme di riferimento - *Reference standards*
EN 1127-1:2019, UNI CEI EN ISO 80079-36:2016, UNI CEI EN ISO 80079-37:2016

Il fascicolo tecnico è depositato presso l'Organismo Notificato:
The technical file is retained at the following Notified Body: **ICIM - 0425**

Il fascicolo tecnico è denominato:
The technical file is named: **TF3 (2016 ATEX 2909)**

La revisione e la data di revisione sono:
The revision number and the revision date are: **Rev.2 del 11/01/2021**

Il controllo della fabbricazione interna degli strumenti è assicurato dal Sistema Qualità secondo ISO 9001:2015 operante in azienda e certificato da ICIM SpA.

The control of internal manufacturing of the instruments is assured by the Quality System according to ISO 9001:2015 of the factory, certified by ICIM SpA.

Invorio, 29/01/2021

NUOVA FIMA
Responsabile ATEX-*ATEX Responsible*
F.Zaveri