

**SAFETY ADDENDUM FOR PRESSURE TRANSMITTERS
SAFETY MODELS 266D/V/P AND 268D/V/P**



DIFFERENTIAL PRESSURE TRANSMITTERS

BS EN ISO 9001



St Neots, U.K. – Cert. No. Q5907
Stonehouse, U.K. – Cert. No. FM 21106

UNI EN ISO 9001



Lenno, Italy – Cert. No. 9/90A



Stonehouse, U.K. – Cert. No. 0255

Use of Instructions



Warning.

An instruction that draws attention to the risk of injury or death.



Note.

Clarification of an instruction or additional information.



Caution.

An instruction that draws attention to the risk of damage to the product, process or surroundings.



Information.

Further reference for more detailed information or technical details.

Although **Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it must be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process system performance leading to personal injury or death. Therefore, comply fully with all **Warning** and **Caution** notices.

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of Technical Communications Department, ABB Automation.

Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning labels on containers and packages must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given. Any deviation from these instructions, will transfer the complete liability to the user.
4. Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

PRODUCT IDENTIFICATION

The instrument is identified by the data plates shown in Figure 1.

The Nameplate (ref.A) provides information concerning the code number, maximum process working pressure, range and span limits, power supply and output signal. See code/specification sheet for detailed information. This plate also shows the transmitter serial number.

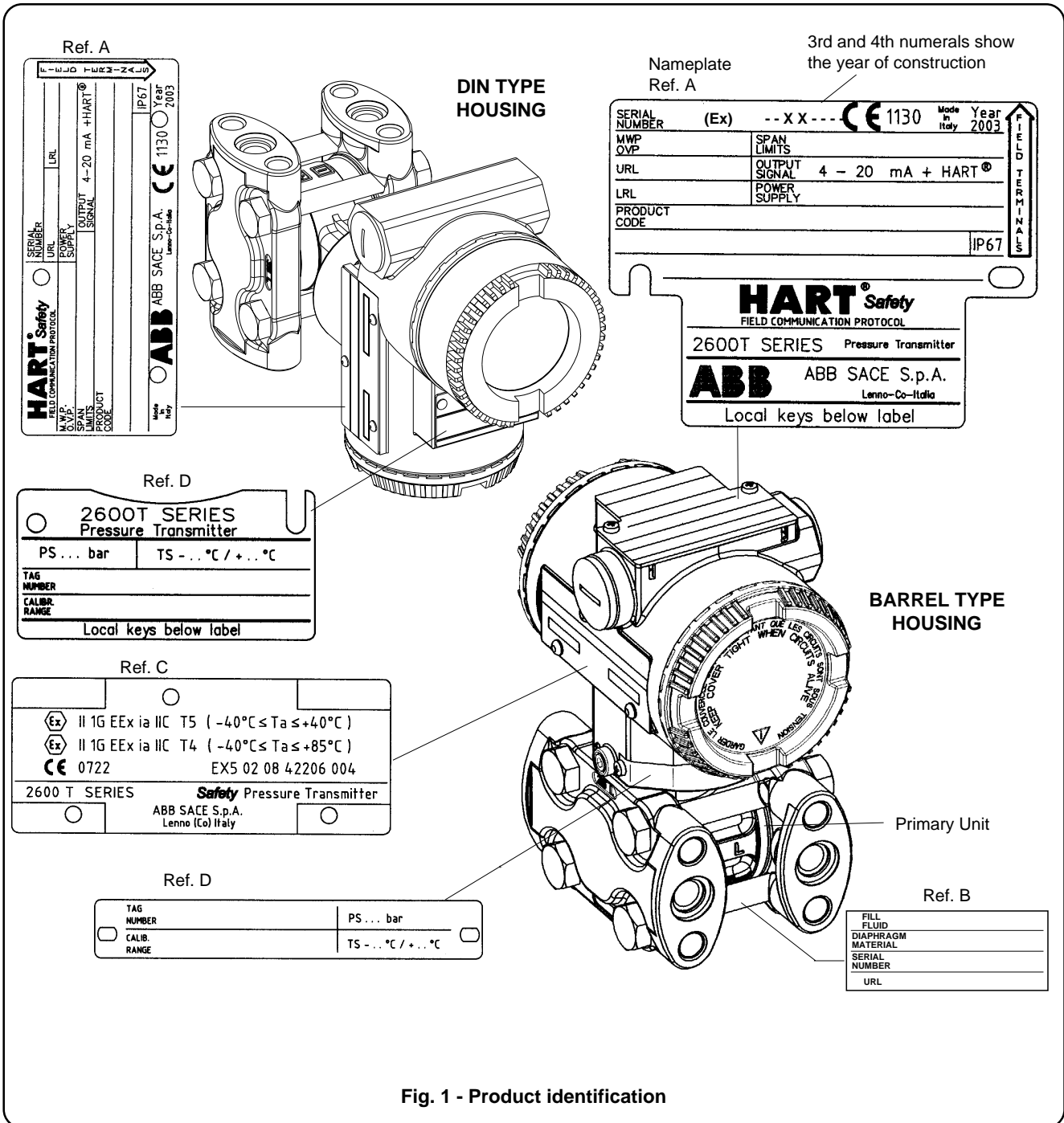
Please refer to this number when making enquiries.

A dedicated label (ref. B) is welded as standard to the primary unit, carrying specific details of the transducer (diaphragms material, fill fluid, range limit and identification number).

A Safety Marking plate (ref. C) is fitted when the transmitter is required to comply with hazardous area regulations, e.g. flameproof or intrinsic safety protection.

Additionally Tag plate (ref. D) provides the customer tag number and calibrated range, maximum process working pressure (PS) and temperature (TS).

The instrument may be used as a safety accessory (category IV) as defined by the Pressure Equipment Directive 97/23/EC. In this case, near the CE mark, there is the number of the notified body (1130) that verified the compliance.



Important - The instrument serial number must always be quoted when making enquiries.

INSTALLATION - PRECAUTIONS



WARNING - For installation in Hazardous Areas, i.e. areas with dangerous concentrations of e.g. gases or dusts that may explode if ignited, the installation must be carried out in accordance with relative standards either EN 60079-14 or IEC 79-14 and/or with local authority regulations, for the relevant type of protection adopted.



WARNING - In order to ensure operator safety and plant safety it is essential that installation is carried out by suitably trained personnel according to the technical data provided in the "**Operative limits**" section in the following of the document.

The transmitter may be mounted on a vertical or horizontal 2-inch pipe by means of the same mounting bracket.



Note: for other installation details see the relevant Addendum.

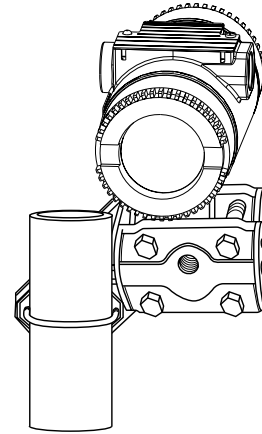


WARNING: the transmitter when installed in accordance with this instruction manual will not be subjected to mechanical stresses.

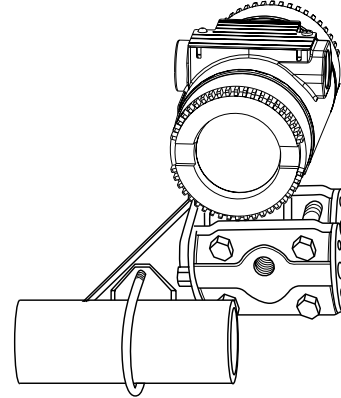


WARNING: the transmitter should not be installed where it may be subjected to mechanical and thermal stresses or where it may be attached by existing or foreseeable aggressive substances. ABB cannot guarantee that a construction material is suited to a particular process fluid under all possible process conditions. Therefore, it is complete responsibility of the user the selection of wetted parts and fill fluids. See also the paragraph on "Operative limits".

The secondary unit of the transmitter may be rotated through 360° approx. with respect to the primary unit without degrading performance or damaging the internal wiring. Do not force the primary unit to rotate; use the 2 mm Allen key supplied to unlock and lock the tang grub screw. This feature, obtained by unscrewing (one turn is sufficient) the Allen screw, is particularly useful for reaching optimum access to the electrical connections and visibility of the output indicator.



Mounting on 2" vertical pipe



Mounting on 2" horizontal pipe



CAUTION - Proper location of the transmitter with respect to the process pipe will depend upon the service for which the instrument is used. Care should be exercised to identify correct process connections.

OPERATIVE LIMITS

The transmitter operates on a minimum voltage of 10.5 Vdc to a maximum of 42Vdc and is protected against polarity inversion.

Note - The transmitter operates from 10.5 to 42 Vdc with no load (additional load allows operation over 42V dc). For EEx ia and intrinsically safe (FM, CSA and SAA) approval power supply must not exceed 30 Vdc. In some countries the maximum power supply voltage is limited to a lower value.

Installing optional devices the minimum voltage increases to:

- 10.5 Vdc with no option
- 10.7 Vdc with output analog indicator
- 12.5 Vdc with LCD ProMeter
- 12.3 Vdc with surge protection
- 13.3 Vdc with LCD CoMeter
- 15.3 Vdc with no link on output indicator plug

The total loop resistance is indicated in the expression below:

$$R \text{ (k}\Omega\text{)} = \frac{\text{Supply voltage} - \text{min. operating voltage (Vdc)}}{22.5}$$

The total loop resistance is the sum of the resistance of all elements of the loop, including wiring, conditioning resistor, safety barriers and additional indicators (excluding the equivalent resistance of the transmitter).

Where a configuration device (HART), such as the Hand Held Communicator or a Modem is likely to be used, a resistance of 250 ohm minimum should be present between the power supply and the point of insertion of these devices, to allow communication.

Several types of safety barriers, either passive or active, can be satisfactorily used in conjunction with the Smart 2600T transmitter. Nevertheless, in case of use of active barriers, check with the supplier if the model is suitable for use with smart transmitters allowing the connection of the configuration devices in the "safe" or non-hazardous area.

WARNING - The transmitter may be used as a safety accessory (as defined by the Pressure Equipment Directive 97/23/EC) i.e. as part of a shutdown system. In this case it is recommended to select the correct fail safe mode for the 4-20 mA signal (as per Namur NE43 recommendation). See also the instructions relevant to fail safe selection (Up/Down scale mode) in the addendum to the instruction manual on "Use of hardware links on the secondary electronics" .

Temperature limits °C (°F) :

Ambient (is the operating temperature)

Filling	Models 266/268D/P		Model 266/268V	
	Sensors F to S	Sensors B to E	Sensors F to S	Sensor code E
Silicone oil	-40 and +85 (-40 and +185)	-25 and +85 (-13 and +185)	-40 and +85 (-40 and +185)	-15 and +70 (+5 and +158)
Inert	-20 and +85 (-4 and +185)	-10 and +85 (+14 and +185)	-10 and +65 (+14 and +150)	not applicable
ABB fill	-40 and +85 (-40 and +185)	-10 and +85 (+14 and +185)	-10 and +85 (+14 and +185)	not applicable

Lower ambient limit for CoMeter and Prometer: -20°C (-4°F)

Upper ambient limit for CoMeter and Prometer: +70°C (+158°F)

Note : For Hazardous Atmosphere applications see the temperature range specified on the certificate/approval relevant to the aimed type of protection

Process

Lower limit

- refer to lower ambient limits
- 20°C (-4°F) for Viton gasket

Upper limit

- Silicone oil and ABB fill: 121°C (250°F) (1)
- Inert fluid: 100°C (212°F) (2)

- (1) 100°C (212°F) for application below atmospheric pressure
- (2) 65°C (150°F) for application below atmospheric pressure

Storage

Lower limit: -50°C (-58°F); -40°C (-40°F) for LCD indicators
Upper limit: +85°C (+185°F)

Pressure limits

Overpressure limits (without damage to the transmitter) 0.067kPa abs, 0.67mbar abs, 0.01psia (double with inert filling) to:

- 7MPa, 70bar, 1015psi for sensor code B
- 16MPa, 160bar, 2320psi for sensor code E
- 21MPa, 210bar, 3045psi for sensor codes F to S

Static pressure

Transmitters for differential pressure operate within specifications between the following limits:

- sensor code B:
1.3kPa abs, 13mbar abs, 0.2psia and 7MPa, 70bar, 1015psi
- sensor code E:
1.3kPa abs, 13mbar abs, 0.2psia and 16MPa, 160bar, 2320psi
- sensor codes F to S:
1.3kPa abs, 13mbar abs, 0.2psia and 21MPa, 210bar, 3045psi

... OPERATIVE LIMITS

Proof pressure

The transmitter can be exposed without leaking to line pressure of up to:
- 48MPa, 480bar, 6960psi for models 266_268 D/P/V.
Meet ANSI/ISA-S 82.03 hydrostatic test requirements and SAMA PMC 27.1.

Environmental limits

Electromagnetic compatibility (EMC)

Comply with EN 50081-1 for emission and EN 50082-2 for immunity requirements and test;
Radiated electromagnetic immunity level: 30V/m (according to IEC 1000-4-3, EN61000-4-3)
Conducted electromagnetic immunity level : 30V (according to IEC 1000-4-6, EN 61000-4-6)
Surge immunity level (with surge protector): 4kV (according to IEC 1000-4-5 EN 61000-4-5)
Fast transient (Burst) immunity level: 4kV (according to IEC 1000-4-4 EN 61000-4-4)

Humidity

Relative humidity: up to 100% annual average
Condensing, icing: admissible

Vibration resistance

Accelerations up to 2g at frequency up to 1000Hz (according to IEC 60068-2-26)

Shock resistance

Acceleration: 50g
Duration: 11ms
(according to IEC 60068-2-27)

Wet and dust-laden atmospheres

The transmitter is dust and sand tight and protected against immersion effects as defined by IEC 60529 (1989) to IP 67 (IP 68 on request) or by NEMA to 4X or by JIS to C0920.

Fill fluid warning

Be sure that the fill fluid can mix safely with the process fluid in case of rupture of the sensor membrane.

CORROSION

A fluid/material compatibility table is available at: www.abb.com - searching for: CORROSION.pdf or from local ABB representatives.



NOTE

Data of the table are based on information from manufacturers.
All data is based on a temperature of 20°C, 70°F unless noted otherwise.
Since corrosion involves many more variables than this table considers, such as trace contaminants, aeration or temperature-concentration profile, stress corrosion cracking and pitting, the table should be used only as a reference in narrowing the choice of materials that merit further investigation. Suitability of a particular material is best determined by field test. At this purpose, please contact out local ABB representatives.



WARNING

For safety purpose the design corrosion allowance of differential pressure instrument flanges is of about 1.5 mm 0.04 in. Therefore from the viewpoint of safe containment of liquids compatible with a specific material according to the following table, the expected instrument lifetime is more than 10 years, but the previous note apply.

DISMANTLING AND REASSEMBLY



WARNING - Process fluids and/or pressure retained in the transmitter primary unit can cause severe injury and death or damage to the equipment. It is the user responsibility to make sure that no pressure is applied before removing the instrument from service or when draining or venting.

Dangerous fluids

In case of toxic or otherwise dangerous process fluid, take any precautions as recommended in the relevant Material Safety Data Sheet.



CAUTION - Dismantling and reassembly should not be carried out on site because of the risk of damage to components and printed circuits as a result of adverse environmental conditions such as humidity, dust, etc. The dismantling and reassembly procedures given below should be carried out in the listed order to avoid instrument damage.

Required tools

- 2 mm Allen key
- 3 mm Allen key
- Small Phillips screwdriver
- Small flat-bladed screwdriver
- 17 mm spanner
- 17 mm torque wrench - (Range > 52 Nm - 39 foot lbs)

Dismantling

- a) Screw down completely the cover locking screw, electronics side, using the 3 mm Allen key
- b) Unscrew and remove the covers
- c) Unscrew the two fixing screws and remove the secondary electronic assembly
- d) Unplug the sensor cable
- e) Remove the tang grub screw using the 2 mm Allen key
- f) Unscrew the housing taking care not to damage the sensor cable or the connector
- g) Loosen and remove the four flange fixing bolts using a 17 mm. spanner.

Reassembly

Check that the "O" rings are not damaged: otherwise replace.



WARNING - Assembling flanges with incorrect fixing bolts and nuts and improper "O rings" can cause fracture or overstressing of bolts and release of pressurized process material. Use only official spare parts (*) included in the supplementary documentation, follow the reassembly procedure herebelow described and do not exceed the specified torque limits. **DO NOT REMOVE** the "O ring" fitted in the sensor neck: it provides the housing a degree of protection.

- a) Refit the flange fixing bolts with a torque of 20 Nm (15 ft lbs) using a 17 mm. torque wrench (52 Nm - 39 ft lbs)
Note: 1 Nm is equivalent to 0.738 ft lbs (8.85 in lbs)
- b) Insert the sensor cable in its recess at the bottom of the housing.
- c) Screw the housing down completely until the nesting of housing/sensor assy is reached, then unscrew by one complete turn maximum. Rotate the topwork in the desired position and lock it with the tang grub screw previously removed.
- d) Plug the sensor cable to the secondary electronics. Fix the electronic circuit by its screws.
- e) Refit the covers and tighten securely.



WARNING - For Hazardous Location installations, at least eight (8) threads on the cover must be engaged in order to meet the flameproof (explosion-proof) requirements.

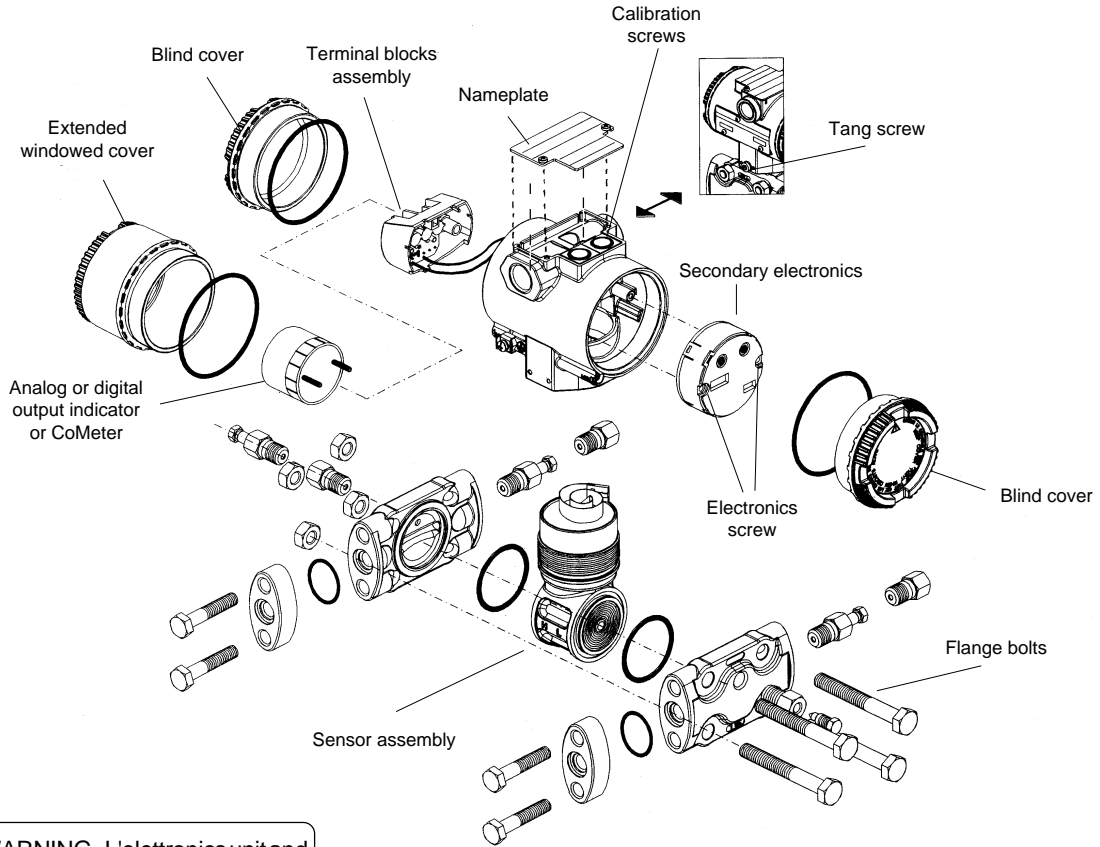
- f) Unscrew the cover locking screw to secure the covers. This is **mandatory** to meet "**Flameproof requirements for Hazardous Areas installation.**"



PRESSURE TEST WARNING

Once reassembled the process flanges and the transducer, a pressure test is required. At this purpose, apply a hydrostatic pressure of the maximum overrange pressure rating to both process connections simultaneously. Wait for one minute, then verify that no leakages occurred, otherwise repeat the assembly procedure and the pressure test.

- (*) The spare parts list is available at: www.abb.com
- searching for: SL262_4D.pdf
or from local ABB representatives.



WARNING - The electronics unit and transducer are inseparable parts of the 2600T Safety transmitters. Any replace of these two parts outside the factory will result of a less of the claimed SIL.

Transmitter Sectional View

ADDENDUM FOR "EX SAFETY" ASPECTS AND "IP" PROTECTION (EUROPE)

According to ATEX Directive (European Directive 94/9/EC of 23 March 1994) and relative European Standards which can assure compliance with Essential Safety Requirements, i.e., EN 50014 (General requirements) EN 50018 (Flameproof enclosures "d") EN 50020 (Intrinsic safety "i") EN 50284 (Equipments, group II, category 1G), the pressure transmitters of the 2600T SERIES have been certified for the following group, categories, media of dangerous atmosphere, temperature classes, types of protection. Examples of application are also shown below by simple sketches.

- a) Certificate ATEX II 1G, EEx ia IIC T5 ($-40^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$)
respectively, EEx ia IIC T4 ($-40^{\circ}\text{C} \leq T_a \leq +85^{\circ}\text{C}$)

TUV Certificate number Ex 5 02 08 42206 004.

The meaning of ATEX code is as follows:

II : Group for surface areas (not mines)

1 : Category

G : Gas (dangerous media)

(Note: the number close to the CE marking of the transmitter safety label identifies the Notified Body which carries out the surveillance for the production of the transmitter)

The other marking refers to the protection type used according to relevant EN standards:

EEx ia : Intrinsic safety, protection level "a"

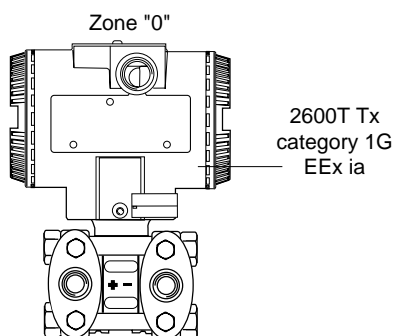
IIC : Gas group

T5 : Temperature class of the transmitter (which corresponds to 85°C max)
with a T_a (ambient temperature) $+40^{\circ}\text{C}$

T4 : Temperature class of the transmitter (which corresponds to 135°C max)
with a T_a (ambient temperature) $+85^{\circ}\text{C}$

About the applications, this transmitter can be used in "Zone 0" (Gas) classified area (continuous hazard) as it is shown on the following sketch:

Application with Gas



Note: the transmitter must be connected to a supply (associated apparatus) certified [EEx ia]

... ADDENDUM FOR "EX SAFETY" ASPECTS AND "IP" PROTECTION (EUROPE)

b) Certificate ATEX II 1/2 GD, EEx d IIC T6
IP67 T85°C (-40°C ≤ Ta ≤ +75°C)

CESI Certificate number CESI 02 ATEX 027

The meaning of ATEX code is as follows:

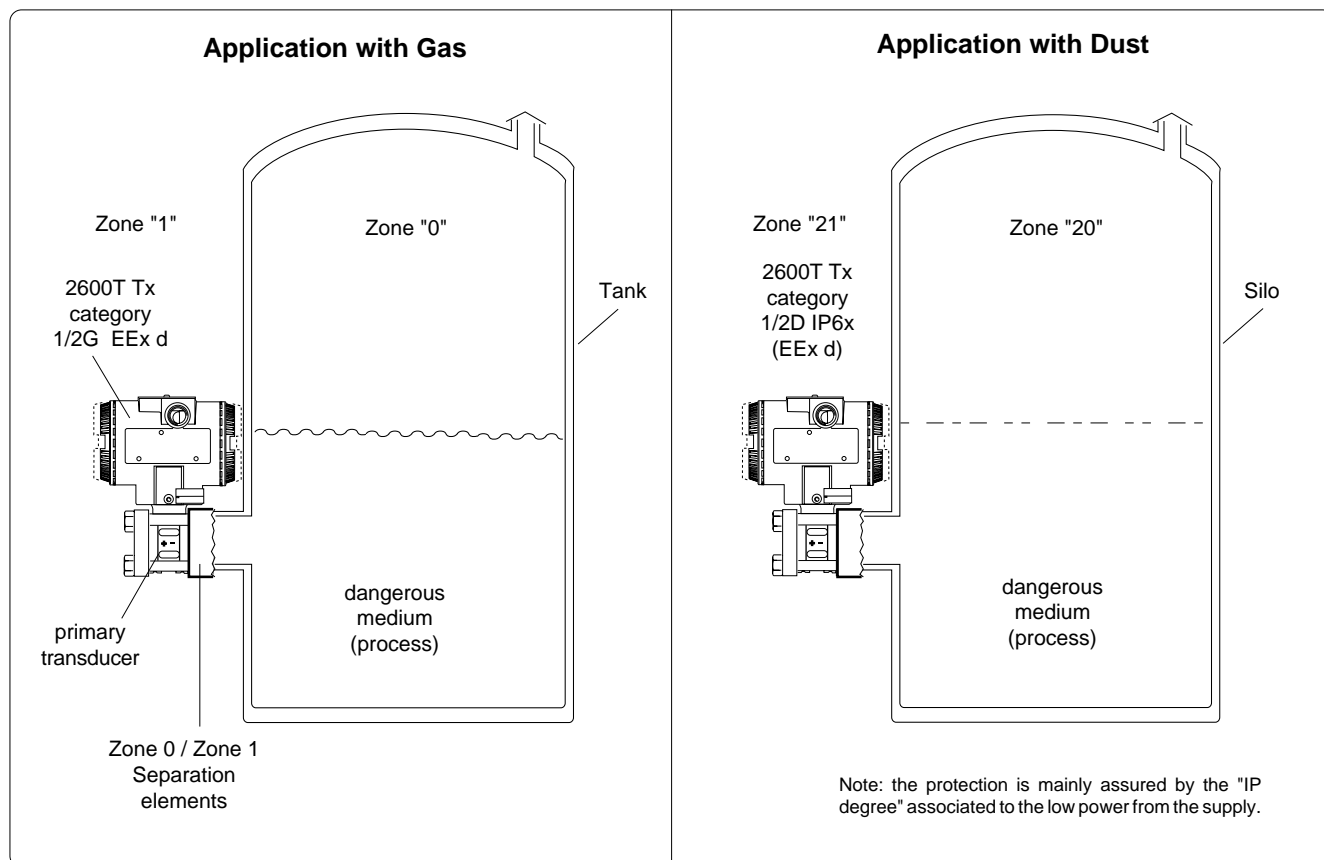
- II : Group for surface areas (not mines)
- 1/2 : Category - It means that only a part of the transmitter complies with category 1 and a second part complies with category 2 (see next application sketch)
- G : Gas (dangerous media)
- D : Dust (dangerous media)
- T85°C: Maximum surface temperature of the transmitter enclosure with a Ta (ambient temperature) +75°C for Dust (not Gas) with a dust layer up to 50 mm depth.

Note: the number close to the CE marking of the transmitter safety label identifies the Notified Body which carries out the Surveillance for the production of the transmitter.

The other marking refers to the protection type used according to relevant EN Standards:

- EEx d: Flameproof
- IIC : Gas group
- T6 : Temperature class of the transmitter (which corresponds to 85°C max) with a Ta (ambient temperature) +75°C

About the applications, this transmitter can be used in Zone "0" (Gas) classified areas (continuous hazard) with its "process part" only, whereas the remaining part of the transmitter, i.e. its enclosure, can be used in Zone 1 (Gas), only (see sketch below). Reason of this is the process part of the transmitter (normally called primary transducer) that provides inside separation elements to seal off the electrical sensor from the continuously hazardous process, according to the EN50284 and EN50018. About Dust application, the transmitter is suitable for "Zone 21" according to the EN 50281 as it is shown on the relevant part of the sketch:



IP code

About the degree of protection provided by the enclosure of the pressure transmitter, the 2600T SERIES has been certified IP67 according to EN 60529 standard (corresponding to IEC 529).

The first characteristic numeral indicates the protection of the inside electronics against ingress of solid foreign objects including dusts. The assigned "6" means an enclosure dust-tight (no ingress of dust).

The second characteristic numeral indicates the protection of the inside electronics against ingress of water. The assigned "7" means an enclosure water-protected against a temporary immersion in water under standardized conditions of pressure and time.



EC DECLARATION OF CONFORMITY

We: ABB SACE S.p.A.
Via Statale, 113
22016 Lenno (Como)
Italy

declares under our sole responsibility that the pressure transmitters of 600T and 2600T series, as below specified:

are in compliance with the requirements of 97/23/CE PED Directive

in details, when applicable, have been used for the compliance demonstration, as defined in the annex III of the Directive considering the transmitter as category IV, the D and B modules.

For the D Module has been released by Consorzio RINA OMECO the certificate n° D/1 2002 MI PP 11

For the B Module have been released by Consorzio RINA OMECO the certificates:

n° B/1 2002 MI PP 11 for the models:

611ED, 621ED, 611EE, 621EE, 611EG, 621EG, 611EA, 621EA, 611EH, 621EH, 262DS, 264DS, 262PS, 264PS, 262VS, 264VS, 266DS, 268DS, 266PS, 268PS, 266VS, 268VS, 262DF, 264DF, 262PF, 264PF, 262VF, 264VF

n° B/2 2002 MI PP 11 for the models:

614EG, 624EG, 614EA, 624EA, 262NS, 264NS, 262HS, 264HS, 266NS, 268NS, 266HS, 268HS, 262NF, 264NF, 262HF, 264HF

n° B/3 2002 MI PP 11 for the models:

614EGS, 624EGS, 614EAS, 624EAS, 262HSxT, 264HSxT, 262NSxT, 264NSxT

Lenno, 2nd January 2003

ABB SACE S.p.A.
BU Instrumentation Technical Manager
A. Moroni

ABB SACE S.p.A.

Business Unit Instrumentation

1001MK600

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Registro delle imprese di Milano e Codice
Fiscale: 0109949 015 1
R.E.A. Milano: 1066547+

Unità produttive/Factories:
Lenno (CO)
Ossuccio (CO)
Sesto S. Giovanni (MI)



EC DECLARATION OF CONFORMITY

We: ABB SACE S.p.A.
Via Statale, 113
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Italy

declares under our sole responsibility that the products:

50T Series: 51G/A, 53G/A, 54G/A, 55G/A

600T Series: 611ED, 621ED, 611EE, 621EE, 611EG, 621EG, 611EA, 621EA, 611EH, 621EH, 621SA, 614EG, 624EG, 614EA, 624EA, 614EGS, 624EGS, 614EAS, 624EDS, 611ES, 621ES, 614ES, 624ES, 621EM, S6 Seals.

2600T Series: 262DC, 264DC, 262DG, 264DG, 262DL, 264DL, 262DH, 264DH, 262DR, 264DR, 262HC, 264HC, 262HG, 264HG, 262HP, 264HP, 262HR, 264HR, 262NC, 264NC, 262NG, 264NG, 262NP, 264NP, 262NR, 264NR, 268DC, 268DG, 268DL, 268DH, 268DR, 268HC, 268HG, 268HP, 268HR, 268NC, 268NG, 268NP, 268NR, 262G, 264G, 262A, 264A, 262B, 264B, S264 Seals

Deltapi Series: NAA, NAB, NAD, NAE, NBC, NBD, NDA, NDB, NDC, NDD, N6 Seals

Campo Series: JAA, JAF, JAG, JBA, JBG, JCA, JCF, JCG, BBA, DBT

Others: =18311, WPP, WEP

are in compliance with the requirements of 97/23/CE PED Directive

in accordance with article 3, comma 3, of the Directive itself because designed following the sound engineering practice (SEP).

Lenno, 1st October 2003

ABB SACE S.p.A.
BU Instrumentation Technical Manager
A. Moroni

ABB SACE S.p.A.

Business Unit Instrumentation



EC DECLARATION OF CONFORMITY

We: ABB SACE S.p.A.
Via Statale, 113
22016 Lenno (Como)
Italy

declares under our sole responsibility that the products:

2600T EN Series (Transmitters models 262/264/266/268, Hand Held Terminal, Field Indicator) in all the communication configurations (4-20 mA + HART®, Profibus, Foundation Fieldbus, Safety)

are in conformity with the following standards:

EN 61000-6-3 (2001) Electromagnetic compatibility (EMC) - Generic standards - Emission standard for residential, commercial and light-industrial environments

according to: EN55022 (2001)

EN 61000-6-2 (2001) Electromagnetic compatibility (EMC) - Generic standards - Immunity for industrial environments

according to: EN 61000-4-2 (2001)
EN 61000-4-3 (2002)
EN 61000-4-4 (2001)
EN 61000-4-5 (2001)
EN 61000-4-6 (2001)

following the provisions of the EMC Directives 89/336/EEC and 93/68/EEC.

Lenno, 2nd January 2003

ABB SACE S.p.A.
BU Instrumentation Technical Manager
A. Moroni

ABB SACE S.p.A.

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