Rotary blade level indicators

Level limit switches for bulk goods

DF

Dust

Explosion protection information

and supplement to the operating instructions

Index

	Page
Marking	02
Details on type plate	03
Equipment category appropriation by zones	04
Ambient temperature	06
maximum surface temperature	07
Pressure, vacuum	08
Special conditions and instructions	10

MOLLET

Competence in explosion protection

Marking in accordance with ATEX and EN IEC 60079-0

Rotary blade level indicators as electrical device for use on the boundary from zone 20 to zone 21.

Ex II 1/2 D Ex ta/tb IIIC T86°C Da/Db

Equivalent to **valid ATEX-Product-Directive**
Equipment group **II** = everything except mining
Equipment category Category **1** for zone 20, 21 and 22
Category **2** for zone 21 and 22
/ = Level indicators, which are installed on the boundary between different zones
D = Dust - Type of explosive atmosphere
the **Ex** - symbol according to EN IEC 60079-0
t = Protection by enclosure
a = Device with „very high“ protection standard. . . .for zone 20, 21 and 22
b = Device with „high“ protection standard. . . . . .for zone 21 and 22
IIIC for flammable conductive dust, flammable non-conductive dust and flammable fibres and flyings
T..°C maximum surface temperature

Equipment Protection Level (EPL)
D = Dust - Type of explosive atmosphere
a = Device with “very high level of protection” for use in potentially explosive atmospheres where in normal operation, foreseeable or infrequent faults/malfunctions no ignition hazard is given.
b = Device with “high level of protection” for use in potentially explosive atmospheres where in normal operation or foreseeable faults/malfunctions no ignition hazard is given.

Rotary blade level indicator as electrical device for use in zone 20.

Ex 1D Ex ta IIIC T_{200}70°C Da

Equipment category Category **1** for zone 20, 21 and 22
D = Dust - Type of explosive atmosphere
t = Protection by enclosure
a = Device with „very high“ protection standard. . . .for zone 20, 21 and 22

Equipment Protection Level (EPL)
D = Dust - Type of explosive atmosphere
a = Device with “very high level of protection” for use in potentially explosive atmospheres where in normal operation, foreseeable or infrequent faults/malfunctions no ignition hazard is given.

Pressure decoupling bell housing as non-electrical device for use on the boundary from zone 20 to non-hazardous area.
for the installation of level indicator without ATEX certificate

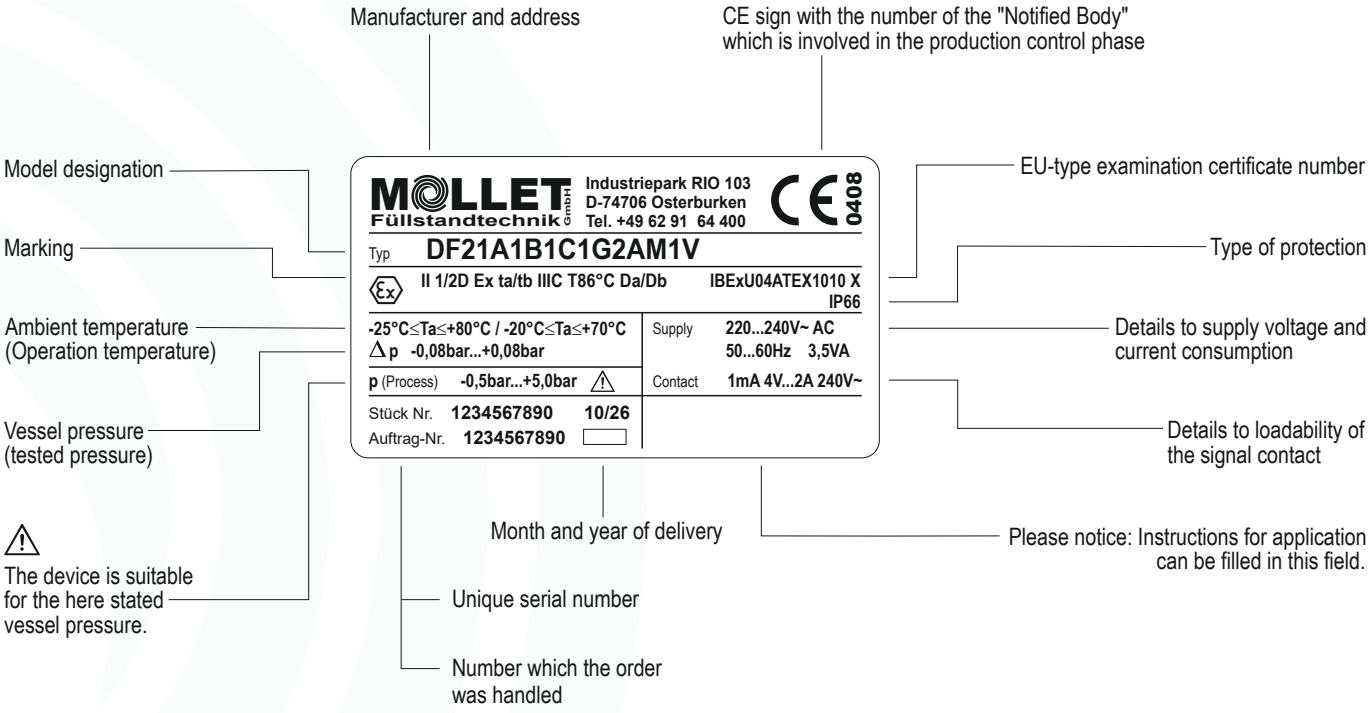
Ex II 1D/- Ex h IIIC T 80°C Da/-

Equipment category Category **1** for zone 20, 21 and 22
D = Dust - Type of explosive atmosphere
/ = Level indicators, which are installed on the boundary between different zones
- = non-hazardous area
Ex h = Protection through constructional safety
T..°C maximum surface temperature / no self-heating of the device

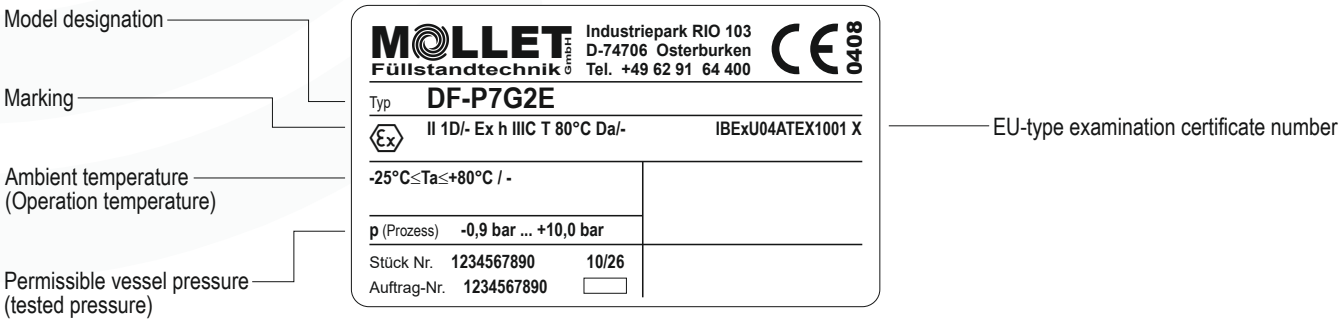
Equipment Protection Level (EPL)
D = Dust - Type of explosive atmosphere
a = Device with “very high level of protection” for use in potentially explosive atmospheres where in normal operation, foreseeable or infrequent faults/malfunctions no ignition hazard is given.

Type plate details Dust

Rotary blade level indicator as electrical device for use on the boundary from zone 20 to zone 21.



Pressure decoupling bell housing as non electrical device for use on the boundary from zone 20 to non-hazardous area.
for the installation on level indicators without ATEX certificate.



Note: The **X** behind the certification number indicates special conditions for the safe application of the equipment in the appendix to the EU-type examination certificate

Equipment category appropriation by zones

Installation on the boundary from zone 20 to zone 21 just as from **zone 21** to **Zone 22** resp. **non-hazardous area.**

The **B1** variant is the most used and versatile version and can be used in almost all cases.

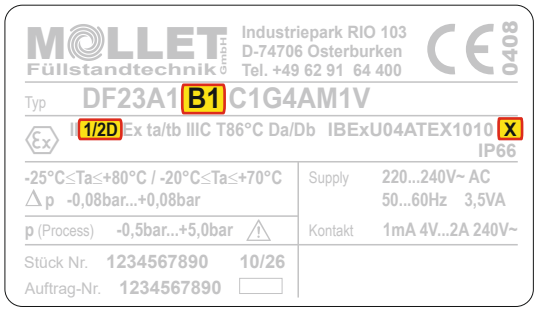
Special conditions:
The "X" behind the number of the EU-type-examination certificate means that the device can be installed in the walls of silos, vessels, machines, filters etc. when the inside is classified as zone 20.

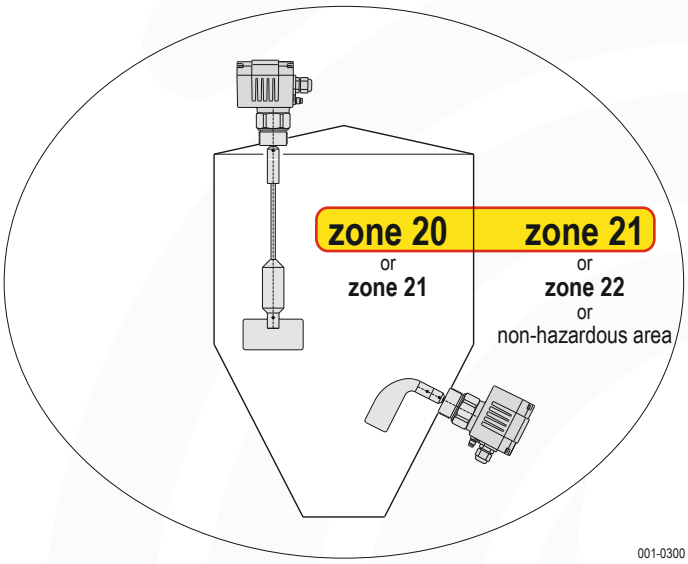
Order code A1B1 or A2B1

Marking:

II 1 / 2 D
Category 1 / Category 2

Dust Ex





001-0300

Installation on the boundary from zone 20 to zone 21 just as from **zone 21** to **Zone 22** resp. **non-hazardous area.**

The **B1** variant is the most used and versatile version and can be used in almost all cases.

Special conditions:
The "X" behind the number of the EU-type-examination certificate means that the device can be installed in the walls of silos, vessels, machines, filters etc. when the inside is classified as zone 20.

Order code B1

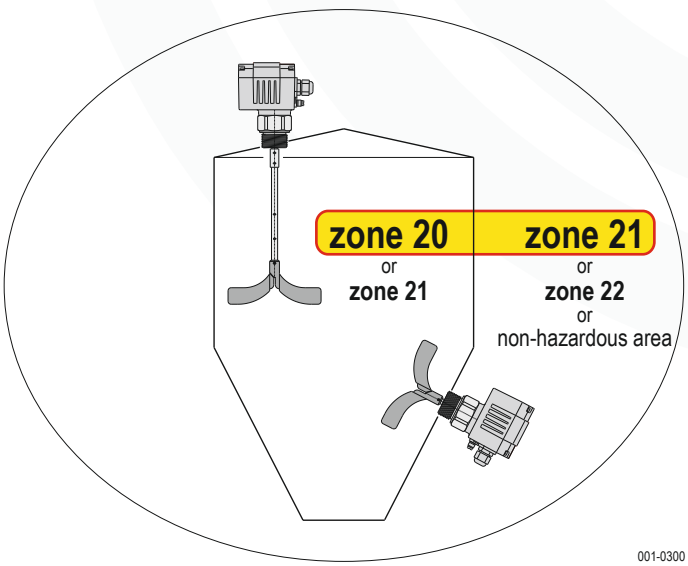
Marking:

II 1 / 2 D
Category 1 / Category 2

Dust Ex

ATTENTION:
The measuring vane **TK150** must not be used in containers that are filled with a pneumatic conveying device.





001-0300

Equipment category appropriation by zones

Installion on the boundary from zone 20 to zone 22.

The version **B3** is, as well as version **B1,** especially versatile and therefore can also be used in many cases.

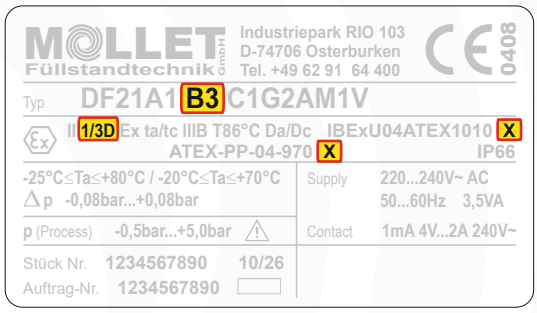
Special conditions:
The "X" behind the number of the test report means that the device can be installed in the walls of silos, vessels, machines, filters etc. when the inside is classified as zone 20.

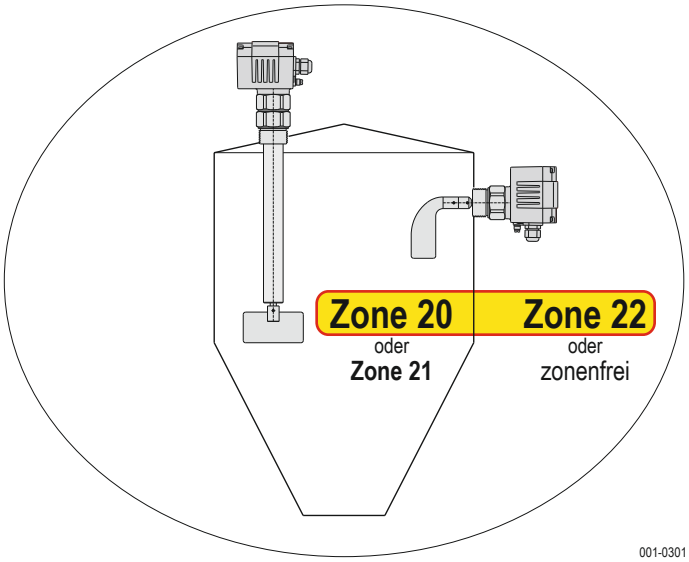
Order code A1B3 or A2B3

Marking:

II 1 / 3 D
Category 1 / Category 3

Dust Ex





Complete installation in vessels with zone 20 inside.

B2 version for special cases of application where the level indicators including the control head has to be installed completely within zone 20.

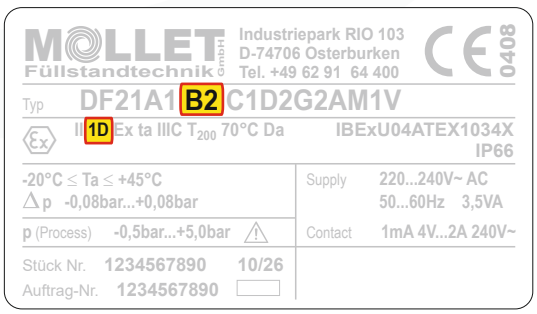
ATTENTION:
The design of the equipment version **B2** allows a complete cover of the entire level indicator by bulk goods.

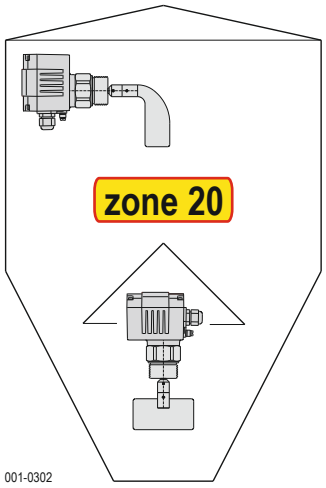
Order code A1B2 or A2B2

Marking:

II 1 D
Category 1

Dust Ex

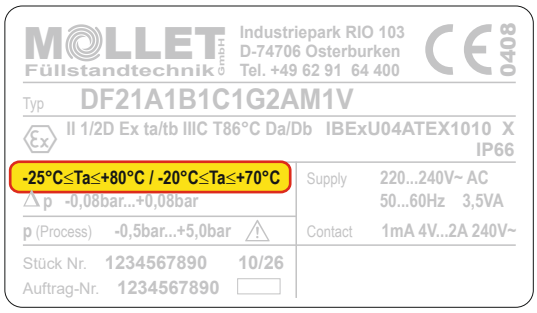


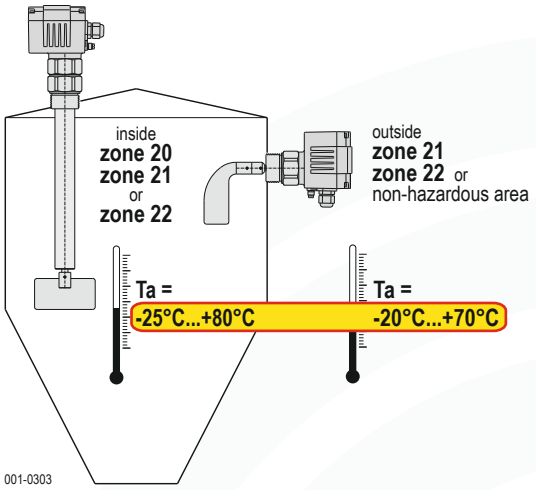


Ambient temperatures Ta

Inside process temperature, outside ambient temperature.

The ambient temperature **Ta** defines the maximum operating temperature of the indicators.
Inside the vessel this is process temperature (the air or the bulk goods temperature) nearby the device.



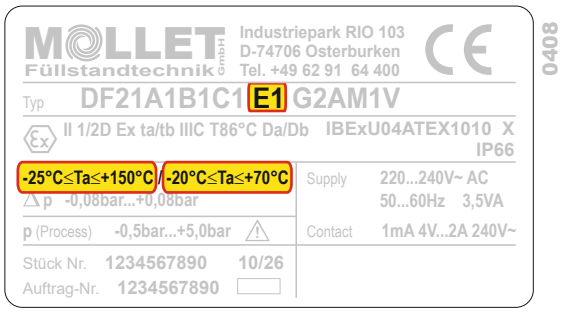


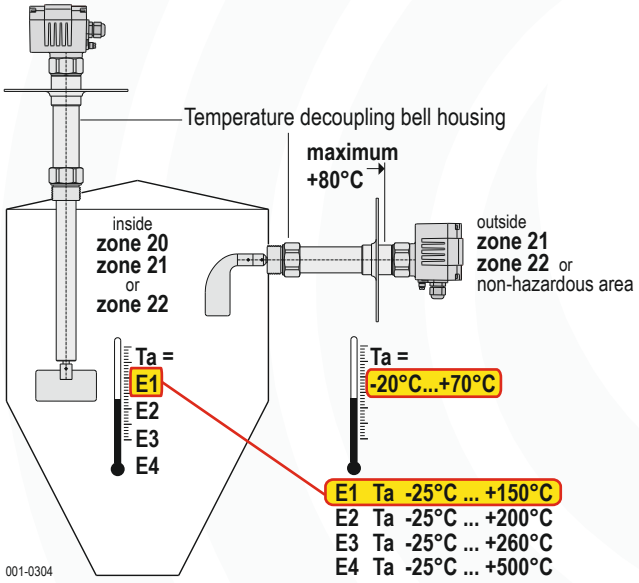
Ambient temperatures Ta

Inside high process temperature, outside ambient temperature.

The ambient temperature **Ta** defines the maximum operating temperature of the indicators.
Inside the vessel this can be the ambient and/or the bulk goods temperature and therefore the process temperature.

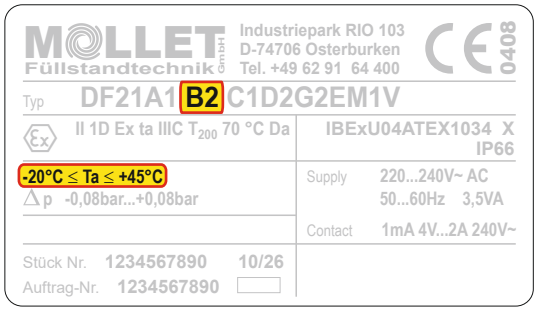
The temperature decoupling bell housing works as a cooling lane.
A maximum of 80 °C are allowed to reach the control head.

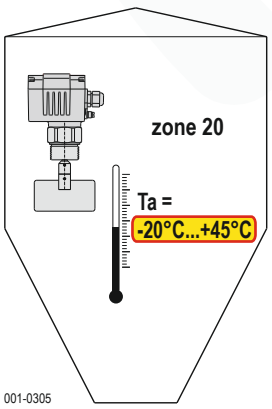




Ambient temperatures Ta

If the indicator is completely installed in the vessel.



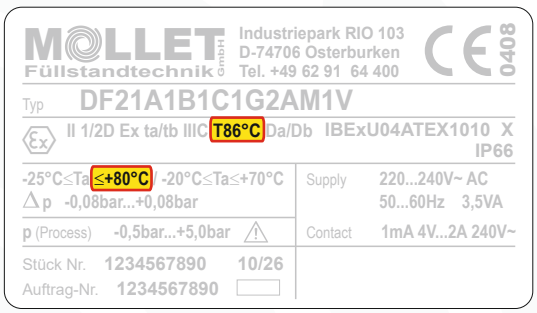


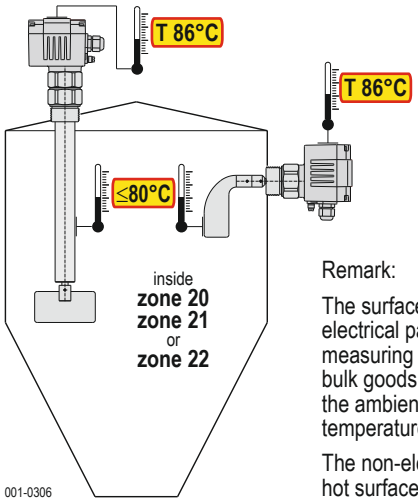
The ambient temperature **Ta** defines the maximum operating temperature of the indicators. Inside the vessel this can be the ambient and/or the bulk goods temperature and therefore the process temperature.

maximum surface temperature T

Inside process temperature, outside ambient temperature.

The maximum surface temperature means the hottest point that can occur at the equipment in the case of a fault.





Remark:

The surface temperature of the non-electrical part of the device (jib and measuring blade) depends on the bulk goods temperature respectively the ambient temperature (process temperature).

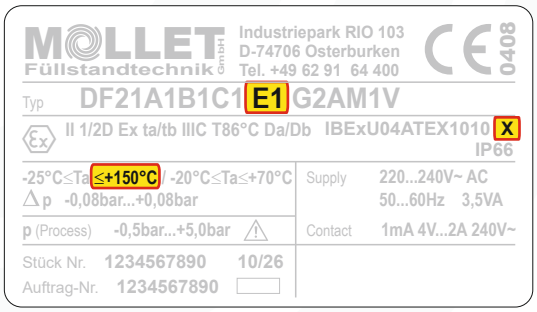
The non-electrical parts produce no hot surface by itself.

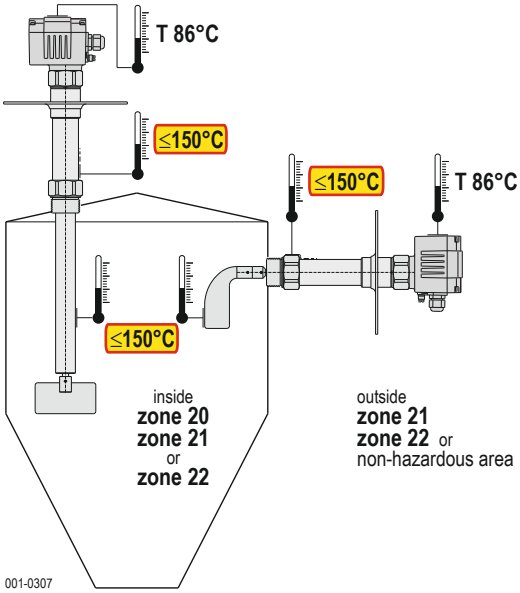
maximum surface temperature T

Inside high process temperature, outside ambient temperature.

The X refers to hints in the EU-type-examination certificate:

The non-electrical part of the device (jib, measuring blade and decoupling bell housing) produces no elevation of the temperature by itself, but can transfer high temperatures from inside the vessel. Because of this reason the surface temperature has to be defined according to the process temperature (bulk goods temperature respectively the ambient temperature) from the interior of the vessel.

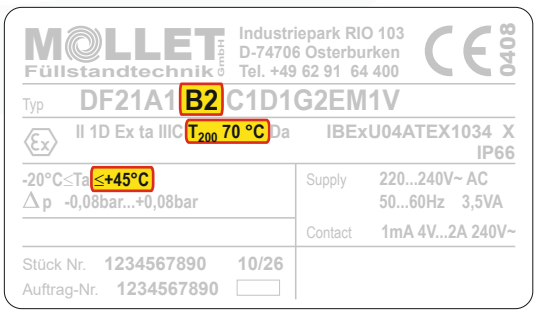


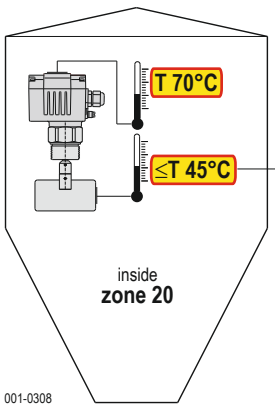


maximum surface temperature T

If the indicator is completely installed in the vessel.

The maximum surface temperature means the hottest point that can occur at the equipment in the case of a fault.





Remark:

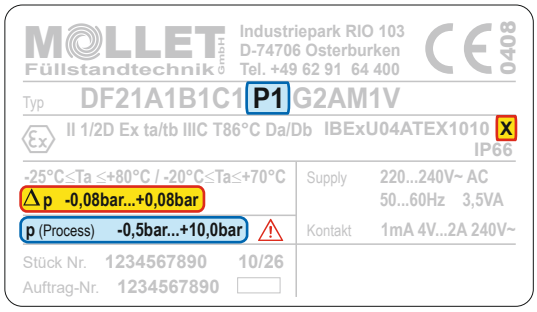
The surface temperature of the non-electrical part of the device (jib and measuring blade) depends on the bulk goods temperature respectively the ambient temperature (process temperature).

The non-electrical parts produce no hot surface by itself.

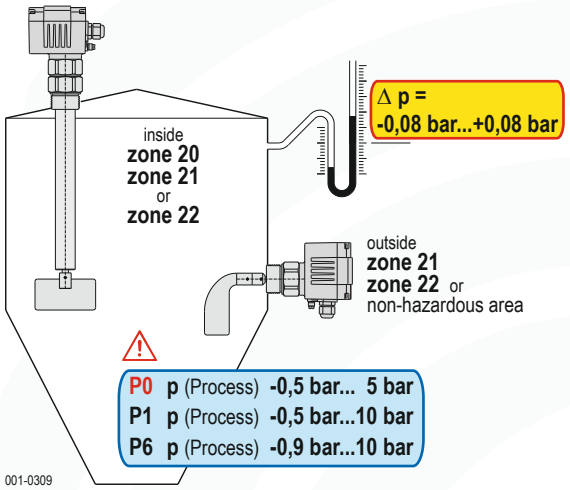
Pressure, vacuum Δp, p (Process)

High and low pressures in the case of deviations as well as in atmospheric and in non-atmospheric conditions.

The regulations, legislation and ordinances must be strictly observed when using rotary blade level indicators in vessels with high and low pressures.



The X refers to hints in the EU-type-examination certificate:
The device can be installed in the walls of vessels with deviating atmospheric conditions with a difference in pressure up to 80 mbar at the shaft passage.



Please note!

The design of the devices is suitable for vessel pressures:

-0,5 bar... 5 bar in the version **P0** (Standard)
-0,5 bar...10 bar in the version **P1**
-0,9 bar...10 bar in the version **P6**

These pressures are outside the atmospheric conditions defined by the directive 2014/34/EU (ATEX).

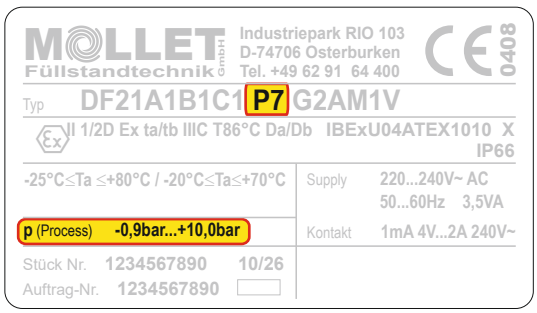
For pressure with the device models **P0**, **P1** and **P6** the EU-type-examination certificates are not valid. These devices are under the responsibility of the user (please consider: there maybe national laws and regulations).

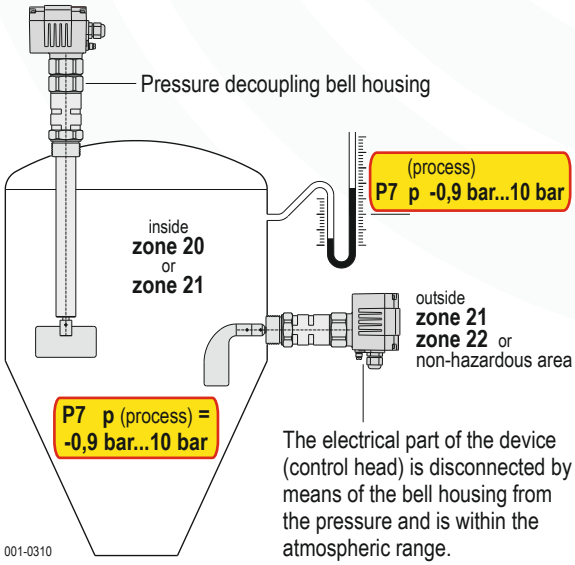
Pressure, vacuum p (process) If inside the vessel is zone 20 or zone 21.

Pressure decoupling bell housing P7

Pressure decoupling bell housings has to be used by vessel pressures above 0.08 bar.

The pressure decoupling bell housing **P7** is type examined and certificated for the use in explosive hazardous areas with pressures from -0.9 bar up to 10 bar.





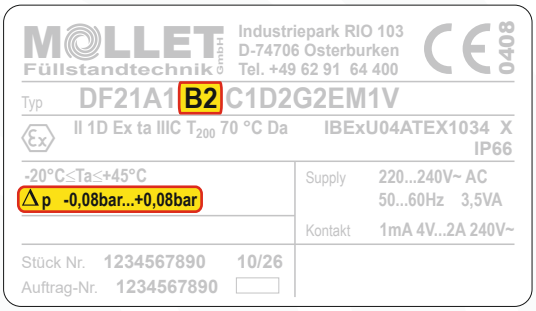
The electrical part of the device (control head) is disconnected by means of the bell housing from the pressure and is within the atmospheric range.

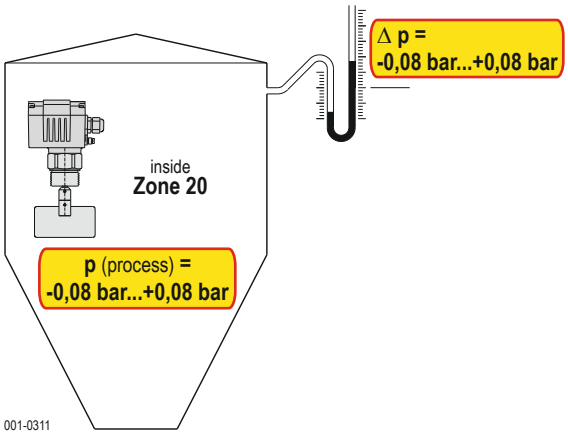
Pressure, vacuum Δp, p (process)

If the indicator is completely installed in the vessel.

High and low pressure in the case of installation in the vessel.

If the device is completely installed inside the vessel, the high and low pressure must not exceed 80 mbar.





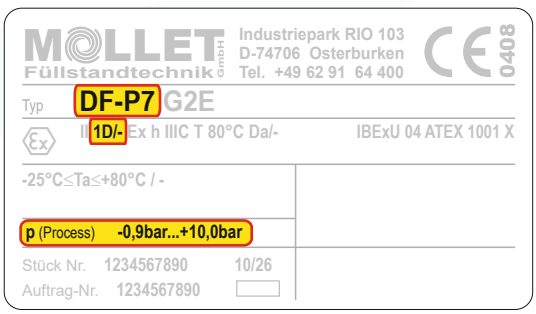
Pressure, vacuum p (process)

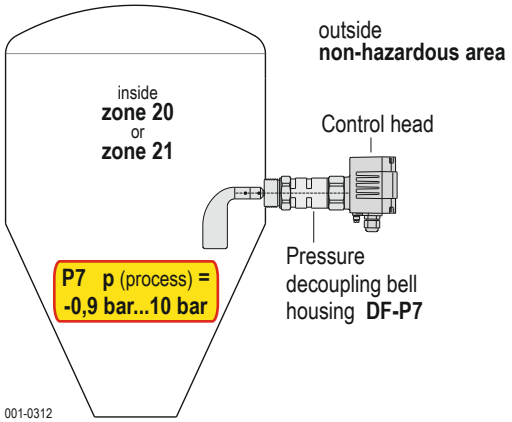
Inside the vessel zone 20 or zone 21, outside non-hazardous area.

Pressure decoupling bell housing DF-P7.

The explosive hazardous area and the vessel pressure are separated from the non-hazardous area outside by the type-examined bell housing.

Within the non-hazardous area outside the vessel the control head can be used without ATEX certificate.





1. Special conditions and instructions for safe application

1.1 The installation, maintenance, commissioning and removal of the device must be supervised or checked by a „authorized person" in explosion protection.

1.2 The device may only be repaired by the manufacturer.

1.3 Take notice of the requirements of EN 60079-14, EN 60079-17 and EN 1127-1, especially regarding the dust deposits and temperatures and follow the pertinent rules and regulations.

1.4 As soon as the device will be brought into the explosion hazardous area it has to be mounted immediately at the precaused place and a cable has to be brought into the cable gland.

1.5 Using the device in ambient temperatures > +60 °C, the applied connection cables have to be made fortemperatures of min. +80 °C.

1.6 To achieve the type of protection, the union nut of the cable gland must be tightened with a mounting torque of 3 Nm.
ATTENTION! Excessive tightening can impair the IP protection.

1.7 Take notice of the specifications on the data plate.

1.8 The earth connection of the device has to be installed in such a way that mechanical damage will be excluded.

1.9 The level indicators may only be supplemented by such non-electrical components (Jib and measuring blade) which are in accordance with the demands of the directive 2014/34/EU.

1.10 The maximum difference in pressure at the shaft passage must not exceed 80 mbar and the working temperature on the shaft seal must not exceed +80 °C, when installing level indicators in the silo wall under deviating atmospheric conditions.

1.11 The process connection, jib and measuring blade must be made of stainless steel in the case of combustible dusts with a minimum ignition energy under 3 mJ or a minimum ignition temperature under +300 °C (BAM assessment).

1.12 The plastic measuring blade TK 150 must not be installed, should the container be filled by a pneumatic conveying system.

1.13 The cables and wires inserted into the explosion proofed cable gland must be securely installed, and adequate strain relief must also be ensured.

II 1D

2. Additional special conditiones and instructions for safe application for the versions DF..A1B2 and DF..A2B2

2.1 It must be ensured that the measuring blade is always covered with material before control head housing by selecting an appropriate installation position.

2.2 If the level indicator DF is completely installed within the zone 20 and combustible dust with a minimum ignition energy under 3 mJ or a minimum ignition temperature under +300 °C (BAM assessment) exists, then the control head housing must be made of stainless steel.

2.3 By means of an appropriate circuit it must be ensured that the level indicator is completely disconnected from the main power supply when the temperature cut-out responds and an automatic restart is prevented.