

Rotary blade level indicators

Level limit switches for bulk goods

DF

Dust



Explosion protection information and supplement to the operating instructions

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Marking in accordance with ATEX and DIN 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 T80°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 DIN 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 T₂₀₀70°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

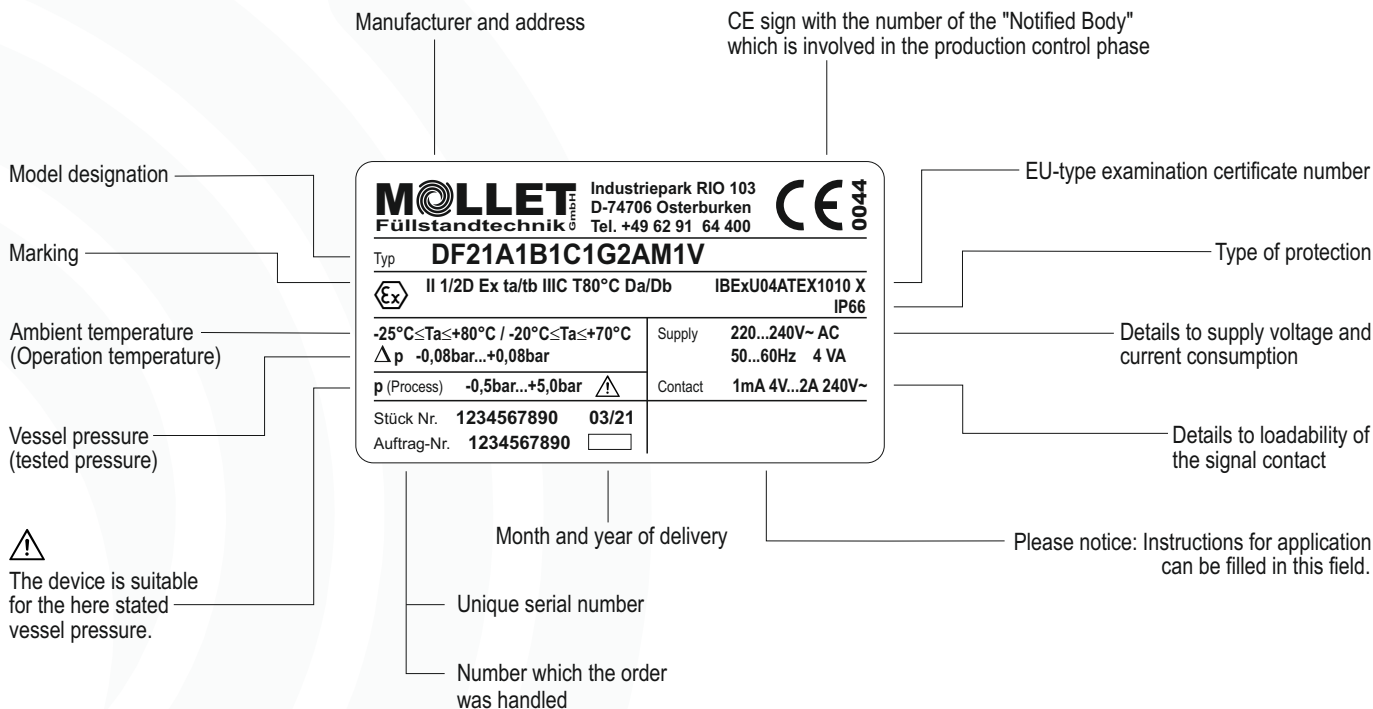
Equipment Protection Level (EPL)

D = Dust - Type of explosive atmosphere

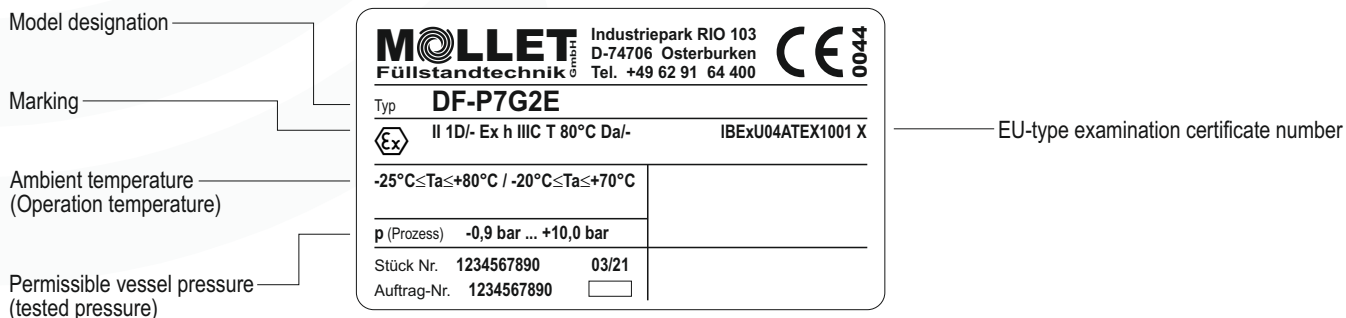
a = Device with “very high level of protection” for use in potentially explosive atmospheres where in normal operation, foreseeable or infrequent faults/malfunctions no ignition hazard is given.

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**

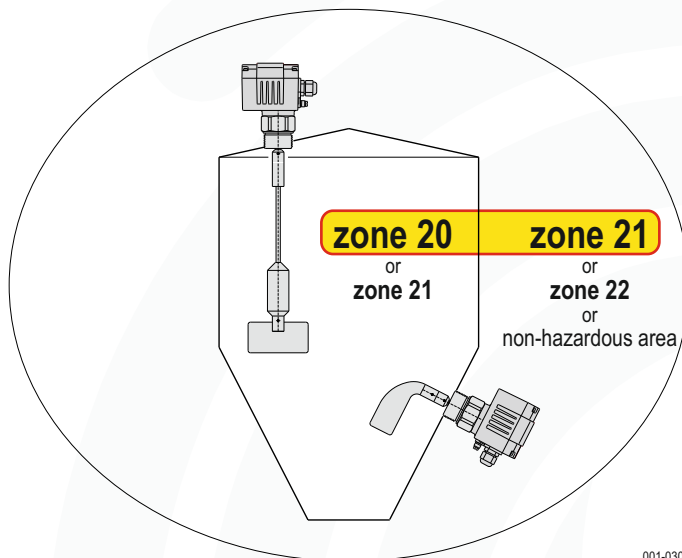
Marking:

II 1 / 2 D

Category 1 / Category 2



MOLLET Industriepark RIO 103 Füllstandtechnik GmbH D-74706 Osterburken Tel. +49 62 91 64 400		0044
Typ DF23A1 B1 C1G4AM1V		
I/2D Ex ta/tb IIIC T80°C Da/Db IBExU04ATEX1010 X IP66		
-25°C ≤ Ta ≤ +80°C / -20°C ≤ Ta ≤ +70°C	Supply	220...240V~ AC
Δp -0,08bar...+0,08bar		50...60Hz 4 VA
p (Process) -0,5bar...+5,0bar	Kontakt	1mA 4V...2A 240V~
Stück Nr. 1234567890 03/21		
Auftrag-Nr. 1234567890		



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 **A1B1** or **A2B1**

Marking:

II 1 / 2 D

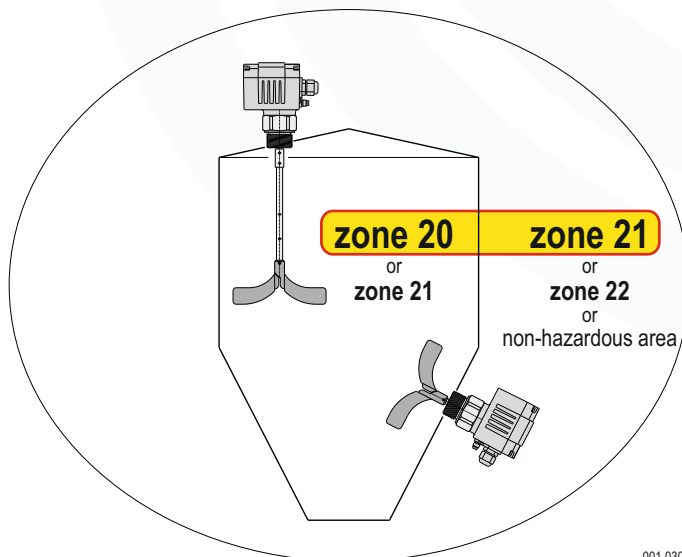
Category 1 / Category 2



ATTENTION:

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

MOLLET Industriepark RIO 103 Füllstandtechnik GmbH D-74706 Osterburken Tel. +49 62 91 64 400		0044
Typ DF11A1 B1 C1G3ATK		
I/2D Ex ta/tb IIIC T80°C Da/Db IBExU04ATEX1010 X IP66		
-25°C ≤ Ta ≤ +80°C / -20°C ≤ Ta ≤ +70°C	Supply	220...240V~ AC
Δp -0,08bar...+0,08bar		50...60Hz 4 VA
p (Process) -0,5bar...+1,0bar	Kontakt	1mA 4V...2A 240V~
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001-0300

Equipment category appropriation by zones

Installation 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.

Order code **A1B3** or **A2B3**





Marking:

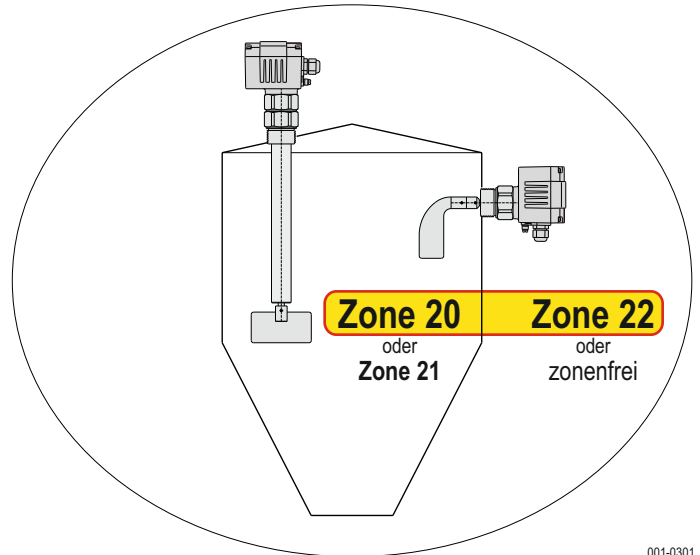
II 1 / 3 D
Category 1 / Category 3

Dust 

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.

MOLLET Füllstandtechnik GmbH		Industriepark RIO 103 D-74706 Osterburken Tel. +49 62 91 64 400		 0044	
Typ DF21A1 B3 C1G2AM1V					
 II 1/3D Ex ta/tc IIIB T80°C Da/Dc IBExU04ATEX1010  IP66					
-25°C ≤ Ta ≤ +80°C / -20°C ≤ Ta ≤ +70°C		Supply		220...240V~ AC	
Δ p -0,08bar...+0,08bar				50...60Hz 4 VA	
p (Process) -0,5bar...+5,0bar 		Contact		1mA 4V...2A 240V~	
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001-0301

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.

Order code **A1B2** or **A2B2**


Marking:

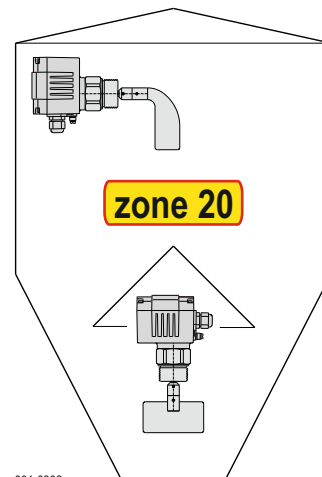
II 1 D
Category 1

Dust 

ATTENTION:

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

MOLLET Füllstandtechnik GmbH		Industriepark RIO 103 D-74706 Osterburken Tel. +49 62 91 64 400		 0044	
Typ DF21A1 B2 C1D2G2AM1V					
 I 1D Ex ta IIIC T ₂₀₀ 70°C Da IBExU04ATEX1034X IP66					
-25°C ≤ Ta ≤ +45°C		Supply		220...240V~ AC	
Δ p -0,08bar...+0,08bar				50...60Hz 4 VA	
p (Process) -0,5bar...+5,0bar 		Contact		1mA 4V...2A 240V~	
Stück Nr. 1234567890		03/21			
Auftrag-Nr. 1234567890					

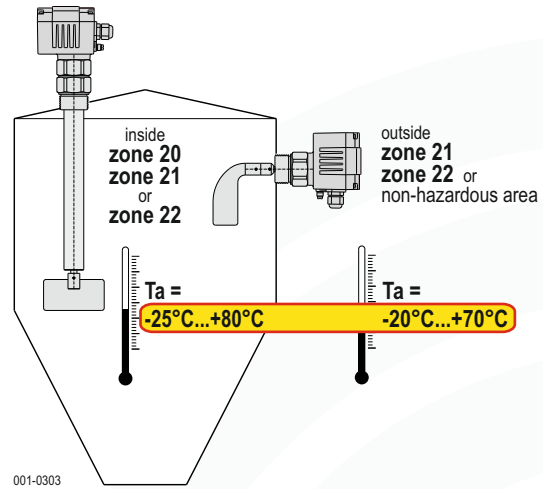


001-0302

Ambient temperatures Ta Inside process temperature, outside ambient temperature.

The ambient temperature T_a 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.

MOLLET Industriepark RIO 103 Füllstandtechnik GmbH D-74706 Osterburken Tel. +49 62 91 64 400		
Typ DF21A1B1C1G2AM1V		
II 1/2D Ex ta/tb IIIC T80°C Da/Db IBExU04ATEX1010 X IP66		
$-25^{\circ}\text{C} \leq T_a \leq +80^{\circ}\text{C}$ / $-20^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$	Supply	220...240V~ AC
Δp -0,08bar...+0,08bar		50...60Hz 4 VA
p (Process) -0,5bar...+5,0bar	Contact	1mA 4V...2A 240V~
Stück Nr. 1234567890 03/21		
Auftrag-Nr. 1234567890		

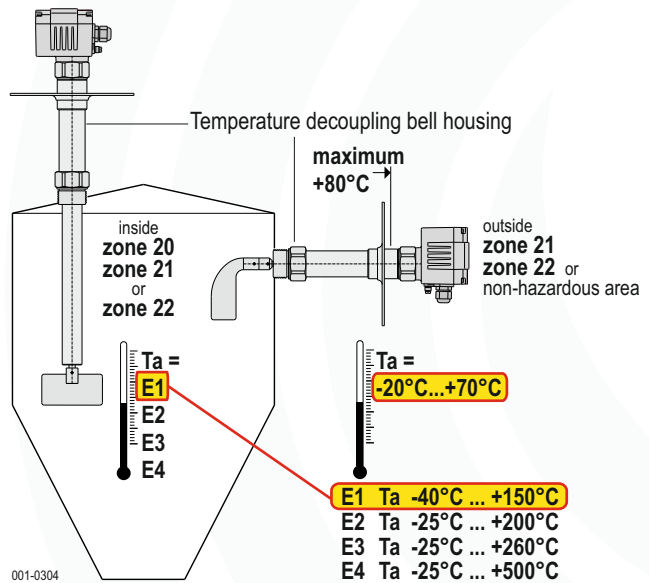


Ambient temperatures Ta Inside high process temperature, outside ambient temperature.

The ambient temperature T_a 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.

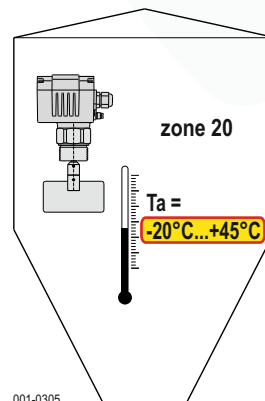
The temperature decoupling bell housing works as a cooling lane.
A maximum of 80 °C are allowed to reach the control head.

MOLLET Industriepark RIO 103 Füllstandtechnik GmbH D-74706 Osterburken Tel. +49 62 91 64 400		
Typ DF21A1B1C1E1G2AM1V		
II 1/2D Ex ta/tb IIIC T80°C Da/Db IBExU04ATEX1010 X IP66		
$-40^{\circ}\text{C} \leq T_a \leq +150^{\circ}\text{C}$ / $-20^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$	Supply	220...240V~ AC
Δp -0,08bar...+0,08bar		50...60Hz 4 VA
p (Process) -0,5bar...+5,0bar	Contact	1mA 4V...2A 240V~
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Ambient temperatures Ta If the indicator is completely installed in the vessel.

MOLLET Industriepark RIO 103 Füllstandtechnik GmbH D-74706 Osterburken Tel. +49 62 91 64 400		
Typ DF21A1B2C1D2G2EM1V		
II 1D Ex ta IIIC T200 70 °C Da IBExU04ATEX1034 X IP66		
$-20^{\circ}\text{C} \leq T_a \leq +45^{\circ}\text{C}$	Supply	220...240V~ AC
Δp -0,08bar...+0,08bar		50...60Hz 4 VA
	Contact	1mA 4V...2A 240V~
Stück Nr. 1234567890 03/21		
Auftrag-Nr. 1234567890		

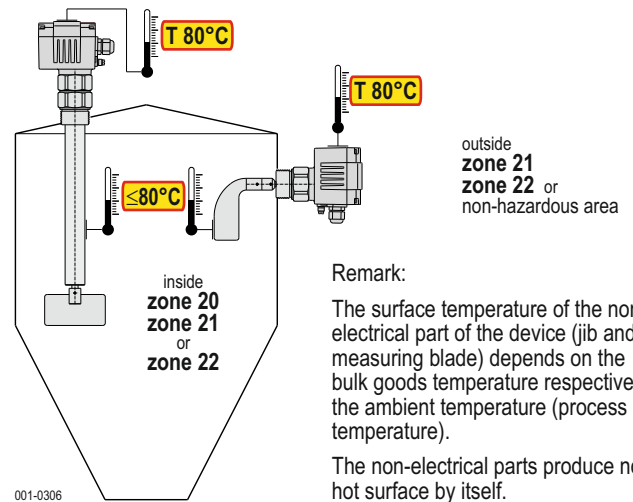


The ambient temperature T_a defines the maximum operating temperature of the indicators.
Inside the vessel this can be the ambient and/or the bulk goods temperature and therefore the process temperature.

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.

MOLLET Füllstandtechnik GmbH Industriepark RIO 103 D-74706 Osterburken Tel. +49 62 91 64 400		
Typ DF21A1B1C1G2AM1V		
II 1/2D Ex ta/tb IIIC T80°C Da/Db IBEExU04ATEX1010 X IP66		
$-25^{\circ}\text{C} \leq T_{\text{a}} \leq +80^{\circ}\text{C}$ / $-20^{\circ}\text{C} \leq T_{\text{a}} \leq +70^{\circ}\text{C}$	Supply	220...240V~ AC
Δp -0,08bar...+0,08bar		50...60Hz 4 VA
p (Process) -0,5bar...+5,0bar	Contact	1mA 4V...2A 240V~
Stück Nr. 1234567890 03/21		
Auftrag-Nr. 1234567890		

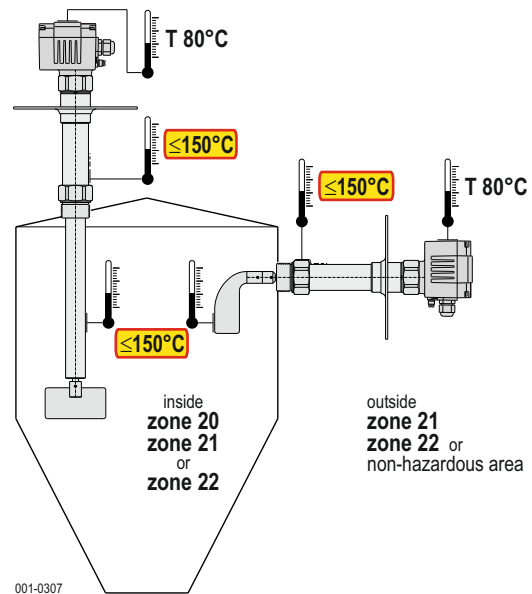


maximum surface temperature T Inside high process temperature, outside ambient temperature.

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.

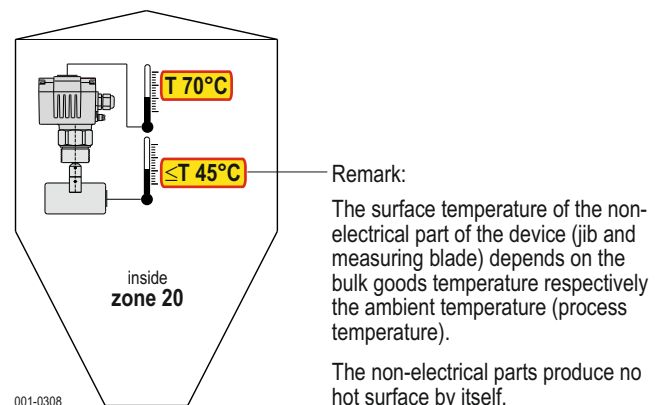
MOLLET Füllstandtechnik GmbH Industriepark RIO 103 D-74706 Osterburken Tel. +49 62 91 64 400		
Typ DF21A1B1C1E1G2AM1V		
II 1/2D Ex ta/tb IIIC T80°C Da/Db IBEExU04ATEX1010 X IP66		
$-40^{\circ}\text{C} \leq T_{\text{a}} \leq +150^{\circ}\text{C}$ / $-20^{\circ}\text{C} \leq T_{\text{a}} \leq +70^{\circ}\text{C}$	Supply	220...240V~ AC
Δp -0,08bar...+0,08bar		50...60Hz 4 VA
p (Process) -0,5bar...+5,0bar	Contact	1mA 4V...2A 240V~
Stück Nr. 1234567890 03/21		
Auftrag-Nr. 1234567890		



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.

MOLLET Füllstandtechnik GmbH Industriepark RIO 103 D-74706 Osterburken Tel. +49 62 91 64 400		
Typ DF21A1B2C1D1G2EM1V		
II 1D Ex ta IIIC T200 70°C Da IBEExU04ATEX1034 X IP66		
$-20^{\circ}\text{C} \leq T_{\text{a}} \leq +45^{\circ}\text{C}$	Supply	220...240V~ AC
Δp -0,08bar...+0,08bar		50...60Hz 4 VA
	Contact	1mA 4V...2A 240V~
Stück Nr. 1234567890 03/21		
Auftrag-Nr. 1234567890		



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.

MOLLET Industriepark RIO 103 Füllstandtechnik GmbH D-74706 Osterburken Tel. +49 62 91 64 400		0044
Typ DF21A1B1C1 P1 G2AM1V		
II 1/2D Ex ta/tb IIC T80°C Da/Db IBExU04ATEX1010 X IP66		
$-25^{\circ}\text{C} \leq T_a \leq +80^{\circ}\text{C} / -20^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$		Supply 220...240V~ AC 50...60Hz 4 VA
Δp -0,08bar...+0,08bar		Kontakt 1mA 4V...2A 240V~
p (Process) -0,5bar...+10,0bar		
Stück Nr. 1234567890 03/21		
Auftrag-Nr. 1234567890		

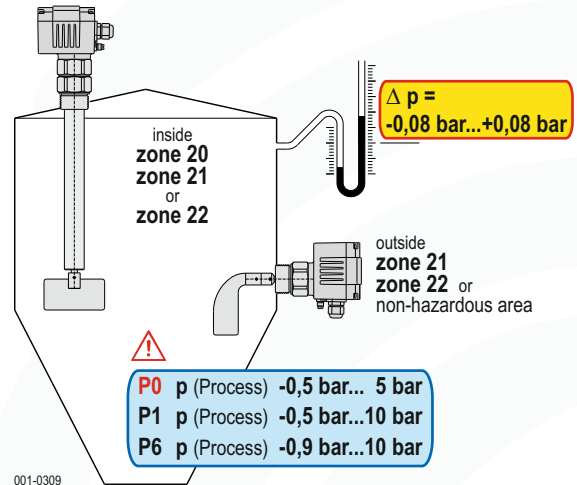
The **X** refers to hints in the EU-type-examination certificate:

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).

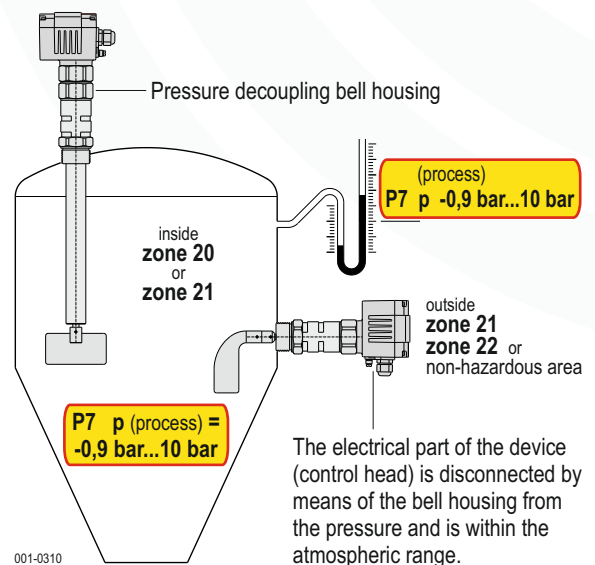
Pressure, vacuum p (process) If inside the vessel is zone 20 or zone 21.

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.

MOLLET Industriepark RIO 103 Füllstandtechnik GmbH D-74706 Osterburken Tel. +49 62 91 64 400		0044
Typ DF21A1B1C1 P7 G2AM1V		
II 1/2D Ex ta/tb IIC T80°C Da/Db IBExU04ATEX1010 X IP66		
$-25^{\circ}\text{C} \leq T_a \leq +80^{\circ}\text{C} / -20^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$		Supply 220...240V~ AC 50...60Hz 4 VA
p (Process) -0,9bar...+10,0bar		Kontakt 1mA 4V...2A 240V~
Stück Nr. 1234567890 03/21		
Auftrag-Nr. 1234567890		

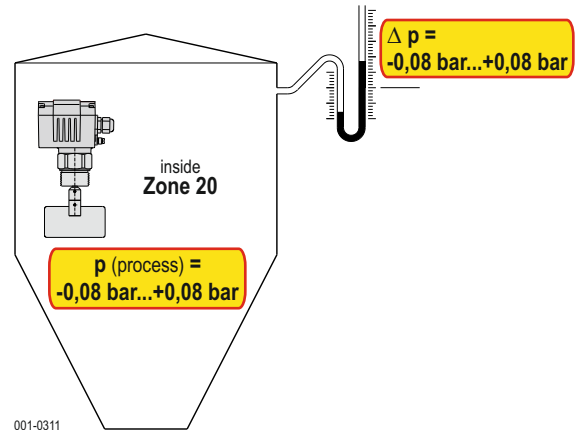


Pressure, vacuum Δp , p (process) If the indicator is completely installed in the vessel.

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.

MOLLET Industriepark RIO 103 Füllstandtechnik GmbH D-74706 Osterburken Tel. +49 62 91 64 400		
Typ DF21A1 B2 C1D2G2EM1V		
Ex II 1D Ex ta IIIC T ₂₀₀ 70 °C Da IBExU04ATEX1034 X IP66		
-20°C ≤ Ta ≤ +45°C Δp -0,08bar...+0,08bar		Supply 220...240V~ AC 50...60Hz 4 VA Kontakt 1mA 4V...2A 240V~
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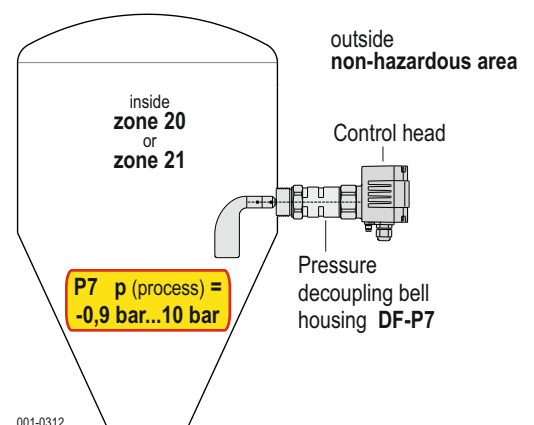
Pressure, vacuum p (process) Inside the vessel zone 20 or zone 21, outside non-hazardous area.

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.

MOLLET Industriepark RIO 103 Füllstandtechnik GmbH D-74706 Osterburken Tel. +49 62 91 64 400		
Typ DF-P7 G2E		
Ex II 1D/- Ex h IIIC T 80°C Da/- IBExU 04 ATEX 1001 X		
-25°C ≤ Ta ≤ +80°C / -		
p (Process) -0,9bar...+10,0bar		
Stück Nr. 1234567890 03/21 Auftrag-Nr. 1234567890		





1. Special conditions and instructions for safe application

- 1.1 The installation, maintenance, initial operation, removal and repair have to be controlled resp. checked by an “authorized person” for explosion protection.
- 1.2 Take notice of the requirements of DIN EN 60079-14, DIN EN 60079-17 and DIN EN 1127-1, especially regarding the dust deposits and temperatures and follow the pertinent rules and regulations.
- 1.3 As soon as the device will be brought into the explosion hazardous area it has to be mounted immediately at the pre-caused place and a cable has to be brought into the cable gland.
- 1.4 Using the device in ambient temperatures $> +60\text{ °C}$, the applied connection cables have to be made for temperatures of min. $+80\text{ °C}$.
- 1.5 To secure the type of protection, the screw nut of the cable gland has to be fixed at the installation with a torsional force of min. 5.0 Nm. **ATTENTION!** If it will be fastened too strong, the IP-protection can be affected.
- 1.6 Take notice of the specifications on the data plate.
- 1.7 The earth connection of the device has to be installed in such a way that mechanical damage will be excluded.
- 1.8 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.
- 1.9 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 $+80\text{ °C}$, when installing level indicators in the silo wall under deviating atmospheric conditions.
- 1.10 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 $+300\text{ °C}$ (BAM assessment).
- 1.11 The plastic measuring blade TK 150 must not be installed, should the container be filled by a pneumatic conveying system.



II 1D

2. Additional special conditions 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 $+300\text{ °C}$ (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.