

Vibranivo®

Level limit switch



Information VN 4000

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Price list	P1 – P2

Subject to technical change and price change.

All dimension in mm.

All units of this information are
 -certificated.

We assume no liability for literal mistakes.

Of course there are other unit variations possible
than specified.

Please speak to our consulting technicians.

Information VN 4000

Introduction / Technical data

Introduction

Fields of application

The device is used for level monitoring in all types of containers and silos. It can be used with all powdery and granulated bulk materials with a density of min. 75g/l, that do not show a strong propensity to form crusts or deposits. A wide range of application is also found in foodstuff manufacturing.

For hazardous areas (dust explosion) the units can be delivered with ATEX approval for use in zone 20/21 (category 1/2 D).

A selection of fields of application

- industry of building materials (lime, styrofoam, moulding, sand, etc.)
- foodstuff industry (milk powder, flour, salt, etc.)
- plastics industry (plastics granules etc.)
- timber industry
- chemical industry
- mechanical engineering etc.

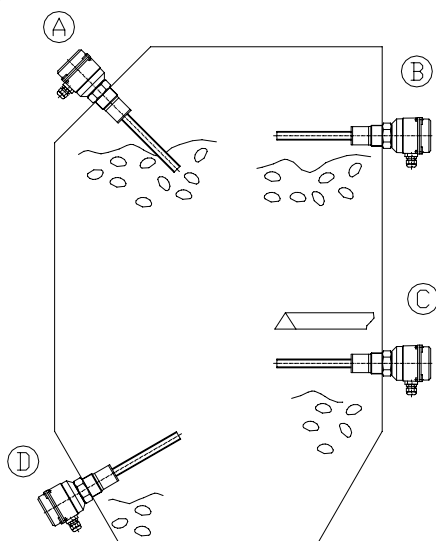
Function

The piezo electrically stimulated oscillating probe vibrates at its mechanical frequency of resonance of 125 Hz. If the probe is covered by the bulk material, the damping thus generated is registered electronically and a corresponding signal output is actuated.

The oscillation of the device ensures that it features certain self-cleaning properties.

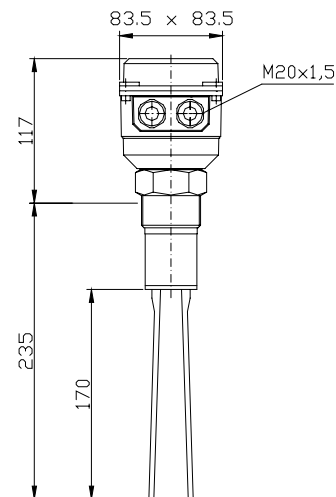
Range of application

The VIBRANIVO oscillating probe is normally screwed into the lateral container wall so that it is level with the filling height to be registered and monitored.



Technical data

Dimensions



Mechanical data

housing:	aluminium diecast housing RAL 5010 gentian blue lid black
enclosure:	IP 66 or EN 60529
screwed piece	
material:	stainless steel 1.4301/304
width across:	50mm
thread:	R 1½" tapered DIN 2999 or NPT 1½" tapered ANSI B 1.20.1 (any thread angle is possible)
oscillator	
material:	stainless steel 1.4301/304 electropolished
overall weight:	approx. 1,6kg
options:	weather-protection cover

Electrical data

mains voltage:	19..253V 50-60Hz 19..60V DC wide range max. ripple: 7 V _{SS} bei DC
	18V - 50V DC PNP (3-wire) max. ripple: 7 V _{SS}
	19..253V 50/60Hz/DC (2-wire)

Information VN 4000

Technical data

installed load:	max. 1VA (relay) max. 17mA (DC 3-wire)
connection terminal:	max. 2,5mm ²
cable entry :	M20 x 1,5 cable gland NPT ½" conduit connection
signal output:	Universal voltage with relay output: floating relay output AC max. 253V, 4A, 500VA at cos Phi = 1 DC max. 253V, 4A, 60W PNP 3-wire: open collector permanent load max. 0,4A short-circuit and overload proof turn-on voltage: max. 55V (reverse protection) 2-wire : load current: min. 10mA max. 500mA permanent load max. 2A < 200ms max. 5A < 50ms Voltage drop on the electronic module: max 7V with closed electric circuit Cutoff current with open electric circuit: max 5mA To enable a safe opening of relay contacts, the cutoff current will be set for some milliseconds to 0, when opening the electric circuit. Short-circuit- and overload-protected.
switch status delay:	by built-in LED
signal delay:	probe free → covered approx. 1 sec probe covered → free approx. 1..2 sec
safety operation: (FSL,FSH)	to be switched over for minimum/maximum safety
measuring delay:	approx. 125Hz
isolating:	mains voltage to signal output: 3700 Vrms
protection class:	I

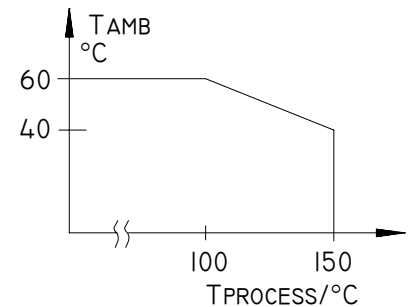
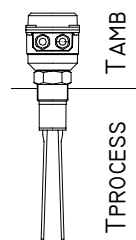
Operating conditions

ambient temp. at the housing:	-25°C .. +60°C
internal temp. the container:	of -25°C .. +150°C see also right column

min. powerdensity:	approx. 75g/l
features of bulk material:	no strong propensity to cake or deposit max. grain size 10mm
max. oscillator load:	max. 600N laterally (on oscillator rods)
max. container pressure:	10bar For versions with approvals according to ATEX 1/2 D (zone 20/21);see remarks on page G8

Protective measures in case of high loading:
mounting of an protective angle above the probe

Mounting in container with 150°C:



For versions with approvals according to ATEX 1/2 D (zone 20/21):
see remarks on page G8

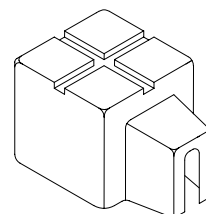
Options

Weather - protection - cover

When the measuring device is used in the open, use of the weather-
protection-cover is recommended. It protects the device from all
atmospheric influences such as:

- rain water
- condensation of water
- excessively high temperatures due to insolation
- excessively low temperatures in winter

material:
PE, weathering and
temperature stable



For use in hazardous areas:
approval available only
for category 3 (zone 22).

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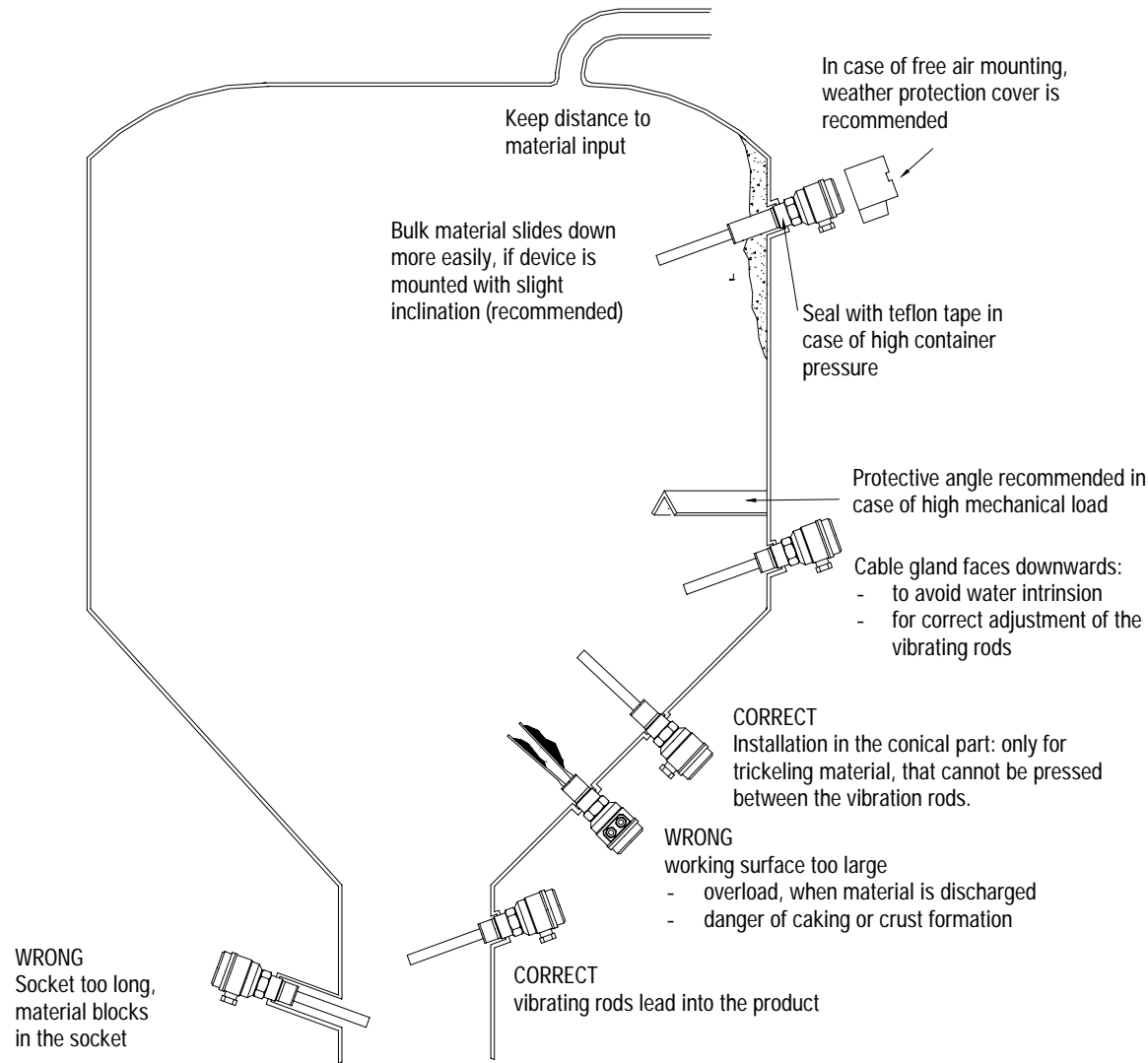
Level limit switch



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Mounting

Mounting



Tips for the installation

switch point:
heavy bulk material
→ cover of a few mm
light bulk material
→ cover of a few cm

oscillating rods:
do not bend, shorten or extend the oscillating rods since this will destroy the device

screwing the device in:
use a 50mm open-end wrench (do not turn the housing)

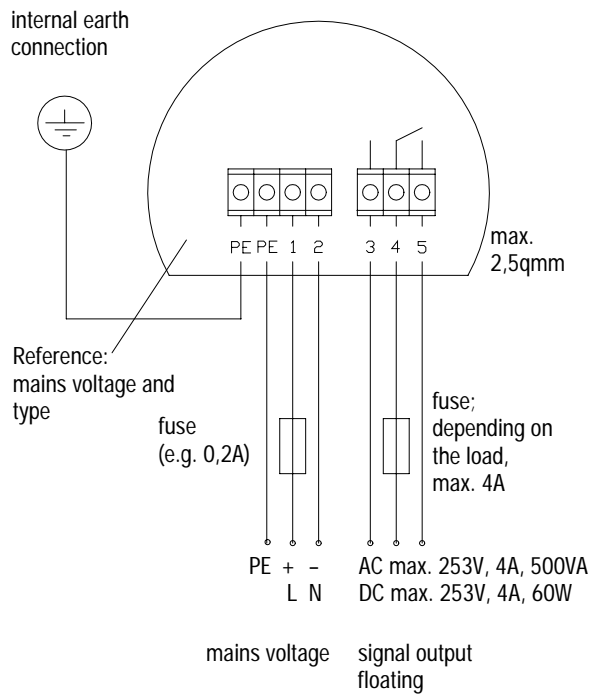
The electrical connections are made in accordance with the connection diagram. Make sure, that the cable in the screwed cable gland is seated tightly without fail. For devices with ATEX-approval a pull relief must be provided for the connection cables.

In case of using a conduit system (with NPT thread) instead of a cable gland the regulations of the country, where the unit is installed, must be observed. The conduit must have a tapered thread 1/2" according to ANSI B 1.20.1. Not used inlets must be tight closed with a metal closing element. If this instruction is not observed, the tightness of the housing (and the explosion protection for version according to ATEX 1/2D) is not ensured.

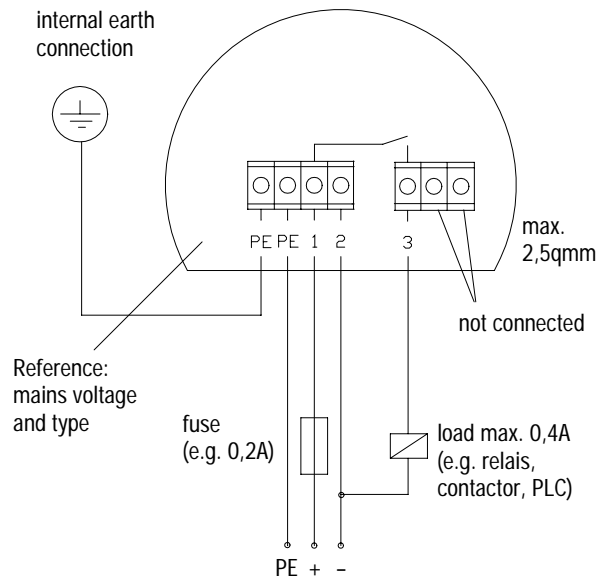
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Electrical connection

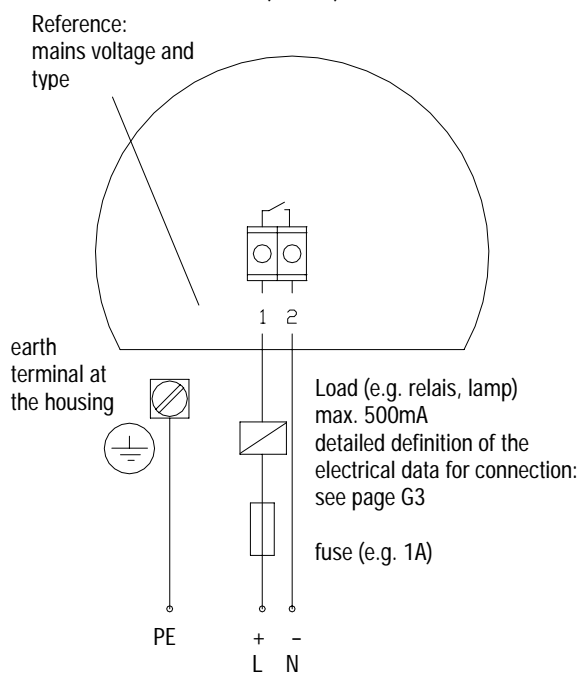
19..253V 50-60Hz 19..60V DC
(wide range)



18..50V PNP
(3-wire)

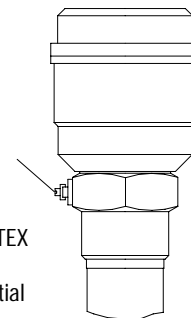


19..253V AC/DC
(2-wire)



external equipotential bonding terminal

For hazardous areas ATEX 1/2 D (zone 20/21): connect with equipotential bonding of the plant



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Safety items – Approvals

Safety items

- Installation, maintenance and commissioning may be accomplished only by qualified technical personnel.
- The respectively valid installation instructions must be observed.
- For terminal connection of the device, the local regulations or VDE 0100 (Regulations of German electrotechnical Engineers) must be observed.
- Use a fuse for the mains voltage (max. 4A).
- Provide protection for relay contacts and output transistors to protect the device against spikes with inductive loads.
- Compare the mains voltage applied with the specifications given on the electronic module before switching the device on.
- Make sure that max. 8mm of the pigtails are bared (danger of contact with live parts).
- Make sure that the boots for protecting cable terminations are not longer than 8mm (danger of contact with live parts).
- Make sure that the screwed cable gland safely seals the cable and that it is tight (danger of water intrusion).
- A voltage-disconnecting switch must be provided near the device.
- In the case of a defect, the distribution voltage must automatically be cut off by a RCCB protection switch so as to protect the user of the device from indirect contact with dangerous electric tensions.
- In the case of inexpert handling or handling malpractice, the electric safety of the device cannot be guaranteed.
- Switch off the supply voltage before opening the device.

Safety items for hazardous areas

For devices to use in hazardous areas (dust explosion) zone 20/21 the respectively valid installation regulations must be observed.

- Only the manufacturer is allowed to repair devices with ATEX-approval.
- For devices to use in hazardous areas (dust explosion) zone 20/21 the respectively valid installation instructions must be observed.
- For devices with ATEX 1/2D -approval a pull relief must be provided for the connection cables.
- The requirements of the EN 50281-1-2 (e. g. regarding dust deposits and temperatures) must be observed.
- Commissioning only with closed lid.
- Switch off the supply voltage before opening the device.
- Before opening the lid take care, that no dust deposits or whirlings are present.

Approvals

For the **VIBRANIVO** type **VN 4000** the approvals for the hazardous locations (dust explosion) category 1/2 D (zone 20/21) according ATEX 110a (directive 94/9/EG) are available.

CE	EMV	EN61326/A1
	Security	EN61010-1

Pressure Equipment Directive (97/23/EC):

The units are not subject to this directive, because they are classified as "pressure-keeping equipment" and do not have a pressurized housing (see Art.1, Abs. 2.1.4).

If the units should be used as "equipment part with safety function" (Art.1, Abs. 2.1.3), please contact the manufacturer.

The units are designed and manufactured in accordance to the Pressure Equipment Directive.

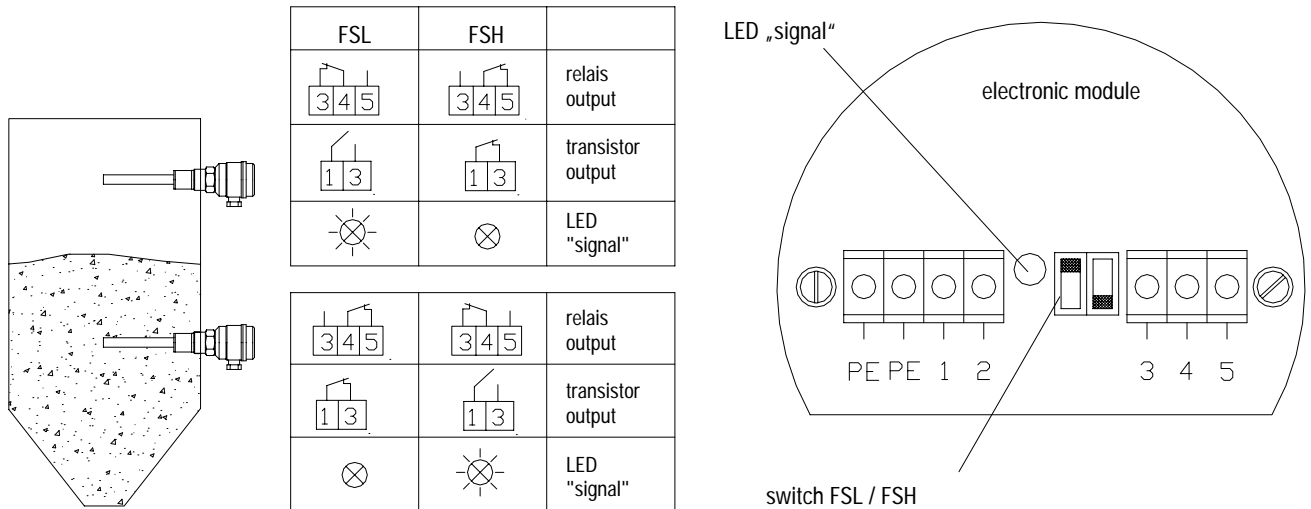
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Switching logic – Maintenance

Switching logic



Minimum / maximum safety level

If the probe is used to indicate empty load
➔ set to minimum safety level FSL

If the probe is used to indicate full load
➔ set to maximum safety level FSH

Power failure or line break is regarded as "empty" signal
(protection against running dry)

Power failure or line break is regarded as "full" signal
(protection against overcharging)

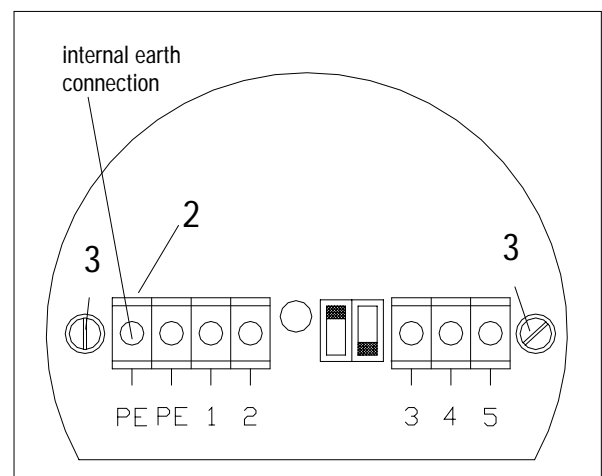
Maintenance

Normally, the device requires no maintenance. However, depending on the individual field of application, the following should be observed and inspected:

- mechanically damaged oscillating rods
- coarse cleaning of the oscillating rods

Changing the electronic module:

1. Open the housing lid, remove the pigtails from the device.
2. Disconnect internal wire for earth connection from terminal PE (not at electronic module 2-wire).
3. Unscrew two fastening screw of the electronic module.
4. Pull out electronic module.
5. Insert new electronic module (until it locks into place).
6. Fix internal wire for earth connection to terminal and screw down the fastening screws.
7. Connect the pigtails to the device.



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Remarks: ATEX 100a

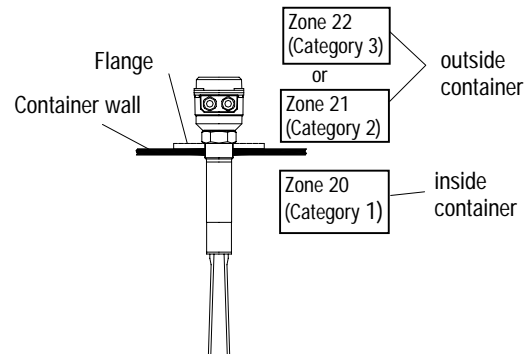
Remarks for use in hazardous locations (dust explosion) according to ATEX 100a

Zone classification

The approval according to ATEX 100a (directive 94/9/EC) for the hazardous areas (dust explosion) category 1/2 D (zone 20/21) determines the following classification:

device category to 94/9/EG	usable in zone
1 D	20, 21, 22
2 D	21, 22
3 D*	22

*) in case of conductive dust additional demands for the installation are possible.



Marking

devices with ATEX approval are specially marked on the type plate (see example right hand).

UWT LEVEL CONTROL	UWT GmbH D-87488 Betzigau	CE
Type: VN4001 Ser.nr.:12345-001/07.01	II 1/2 D IP66 T: DMT 01ATEX E110	
Supply : 19-253V AC 19-60V DC p: -1..+10bar	T (Zone 21): -25°C..+ 60°C T (Zone 20): -25°C..+150°C	

Electrical connection

Power supply:
"Take note of the voltage information on the type plate!"
(see example right hand)

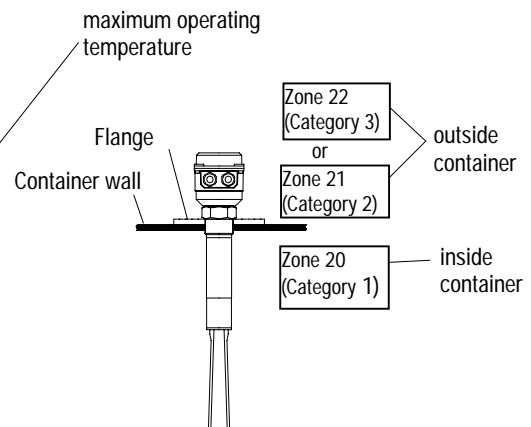
Cable glands that are not used, have to be locked with a closing element. Due to protection against explosion it is necessary to use original parts from the manufacturer.

UWT LEVEL CONTROL	UWT GmbH D-87488 Betzigau	CE
Type: VN4001 Ser.nr.:12345-001/07.01	II 1/2 D IP66 T: DMT 01ATEX E110	
Supply : 19-253V AC 19-60V DC p: -1..+10bar	T (Zone 21): -25°C..+ 60°C T (Zone 20): -25°C..+150°C	

Operating conditions

UWT LEVEL CONTROL	UWT GmbH D-87488 Betzigau	CE
Type: VN4001 Ser.nr.:12345-001/07.01	II 1/2 D IP66 T: DMT 01ATEX E110	
Supply : 19-253V AC 19-60V DC p: -1..+10bar	T (Zone 21): -25°C..+ 60°C T (Zone 20): -25°C..+150°C	

Pressure information:
The device construction allows over-pressure 10 bars (see type plate). These pressures are allowed for test purposes. The definition of the ATEX is only valid for a container-over-pressure between -0.2..+0.1 bars. For higher or lower pressures the approval is not valid.



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Remarks: ATEX 100a

Maximum surface temperature

The following informations show the maximum surface temperature at the warmest part of the unit which can happen in failure case (according to ATEX-definition).

UWT LEVEL CONTROL		UWT GmbH D-87488 Betzigau	CE
Type: VN4001	II 1/2 D IP66	T:	see following table
Ser.nr.:12345-001/07.01	DMT 01ATEX	E110	
Supply : 19-253V AC	T (Zone 21): -25°C..+ 60°C		
19-60V DC	T (Zone 20): -25°C..+150°C		
p: -1..+10bar			

Maximum surface temperature T in zone 21 in °C	Maximum surface temperature T in zone 20 in °C	Ambient temperature in zone 21 in °C	Medium temperature in zone 20 in °C
93	90	60	90
	100		100
	110		110
	120		120
	130		130
	140		140
	150		150

The data of the table are valid, if it is guaranteed due to the installation, that the thread part has a maximum temperature of 80°C at normal use.

