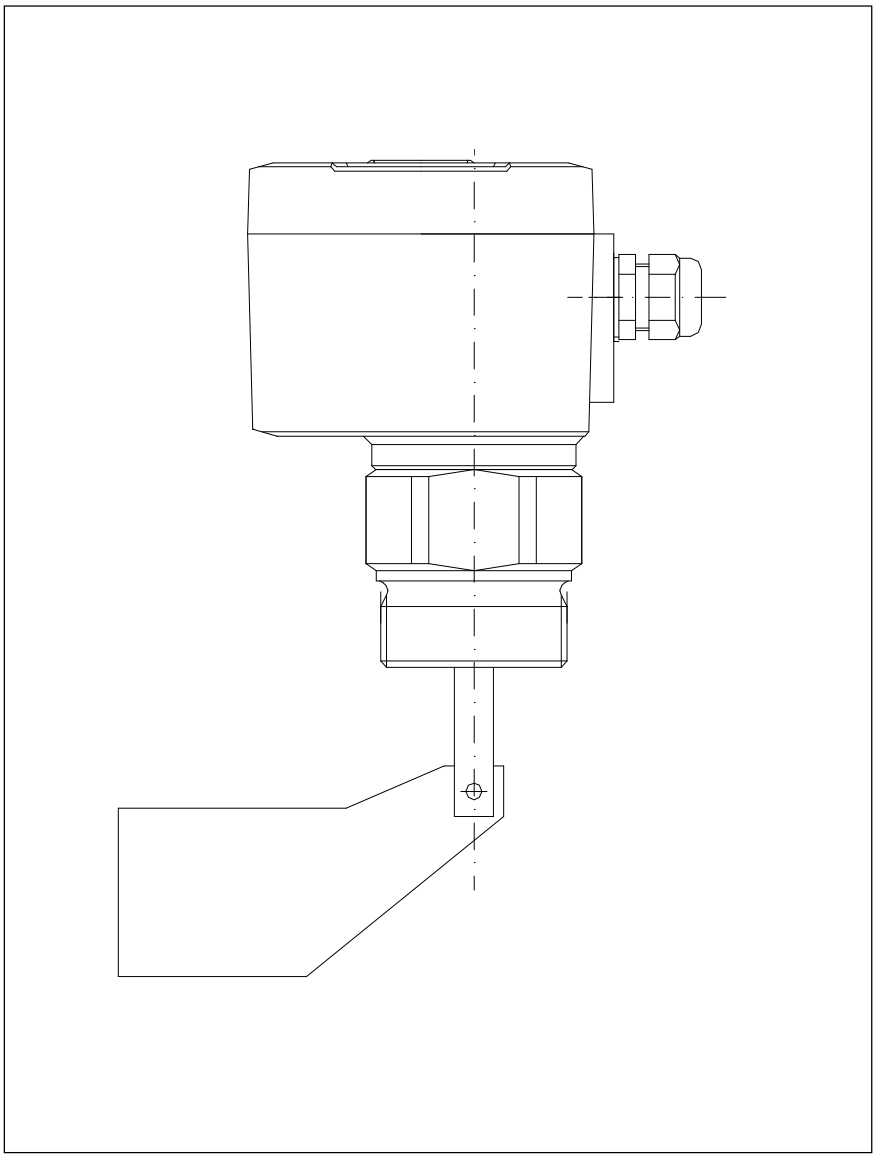
Level Measurement - Switching - Pressure

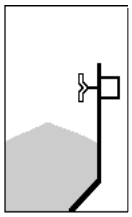
Technical informations

Rotating paddle level limit switch

VEGAPAL RN 3001

Metal version (housing, process connection and paddle)





Subject to technical change and price change.

All dimesions in mm.

All units of this information are CE certificated.

Introduction

The **VEGAPAL RN 3001** is an electromechanical level–limit–switch and is used for level monitoring of bulk goods.
It is used whereever
- dustlike
- powdery
- granulated
- granular

media are handled.

Designed to the modular system, the **VEGAPAL** level limit switch is used as
- full detector
- demand detector
- empty detector

at
- silos
- hoppers
- storage containers
- small containers
- bunkers
- weigher containers
- discharge pipes

The **VEGAPAL 3001** level limit switch is
- compact
- robust
- no maintenance
- simple
- reliable
- insensitive to enviro–mental influences

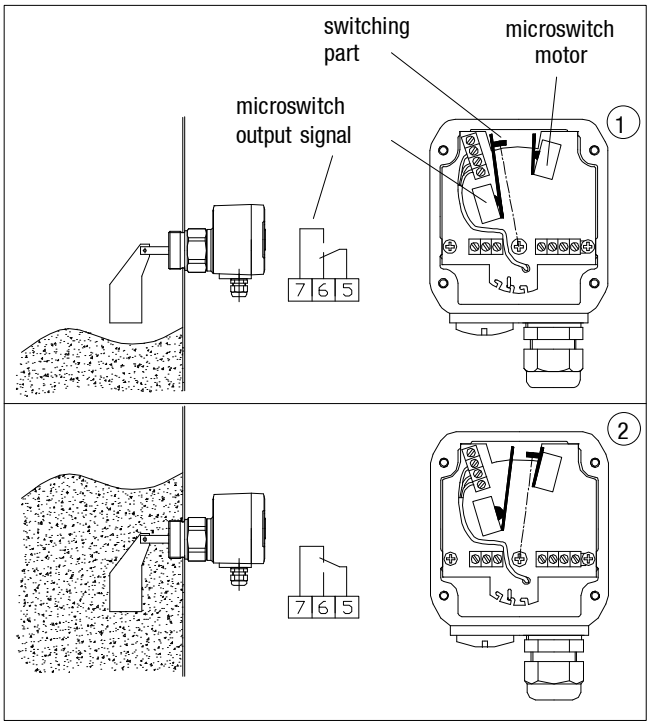
Thousands of **VEGAPAL** level limit switches has stood the test in several applications like
- chemical industry
- wood industry
- building materials industry
- food processing industry
- mechanical engineering
- plastics industry

Mode of operation

A low revolution synchronous induction gearing motor drives a rotating measuring vane, which is for example mounted at a container (picture 1).

As soon as the material level, which is to be checked, reaches the measuring vane, it is handicaped in his rotation.The syncronous induction motor is freely suspended within the housing. The caused reaction torque is used to operate a micro switch giving a suitable electrical signal and to stop the motor (picture 2).

When the vane becomes free again due to the drop in material level, a spring draws the motor back into his operating position, the micro switch returns to his initial position and the motor is switched on.
The electrical output signal is then switched over (picture 1).



Approvals

For the **VEGAPAL RN 3001** the approvals for the hazardous locations (dust explosion) category 1/2 D (zone 20/21) according directive 94/9/EG are available.

CE	EMC	EN 61326–A1
	Gen. purpose	EN 61010–1

Pressure Equipement Directive (97/23/EC):
The units are not subject to this directive, because they are classified as "pressure–keeping equipement" and do not have a pressurized housing (see Art.1, Abs. 2.1.4).
If the units should be used as "equipement part with safety function" (Art.1, Abs. 2.1.3), please contact the manufactorer.
The units are designed and manufactured in accordance to the Pressure Equipement Directive.

Mechanical data

Housing:	die–casted housing
Enclosure:	IP 65 to EN 60529
Process connection:	1"1/2 G, DIN 228
Material process–connection:	aluminium
Vane shaft and measuring vane:	stainless steel / L = 150 mm
Tolerance length "L":	±10mm
Bearing:	ball bearing, dusttight
Sealing:	radial rotary shaft sealing DIN 3760
Friction clutch:	protection of the gearing of impacts of the measuring vane
Pickup delay:	approx. 1.3 sec
Sensitivity:	adjustable via reset force of spring or geometry of measuring vane
Speed of measuring vane:	1 1/min

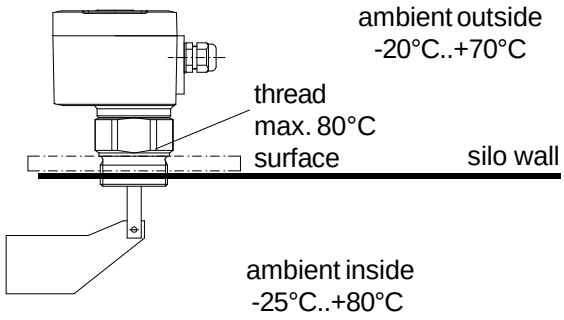
Electrical data

Mains voltage:	220..240V 50–60Hz 48V 50–60Hz all voltages +10% / –15%
Installed load:	3VA (3W)
Connection terminal:	1x max. 1.5mm²
Cable entry:	1x M20x1.5
Signal output:	floating microswitch AC max. 250V, 2A, 500VA (cosφ=1) DC max. 300V, 2A, 60W
Connection diagram:	inside of cover, datasheet
Protection class:	I

Operating conditions

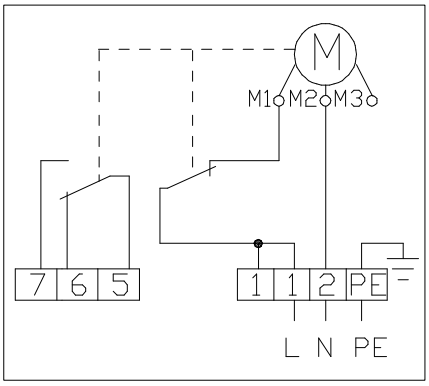
Container over–pressure:	max. 0.8 bar
	versions with approvals according to ATEX 1/2 D (zone 20/21): see page 9
Powderdensity:	depends on mounting position (see in addition page 8)
Feature of bulk material:	suitable for nearly all materials
Maintenance:	not required

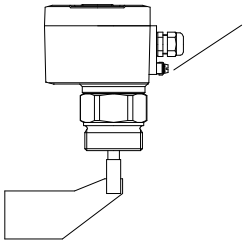
Operating temperatures



Max. surface temperature for use in hazardous locations (dust explosion) according to ATEX 100a: see page 9.

AC design

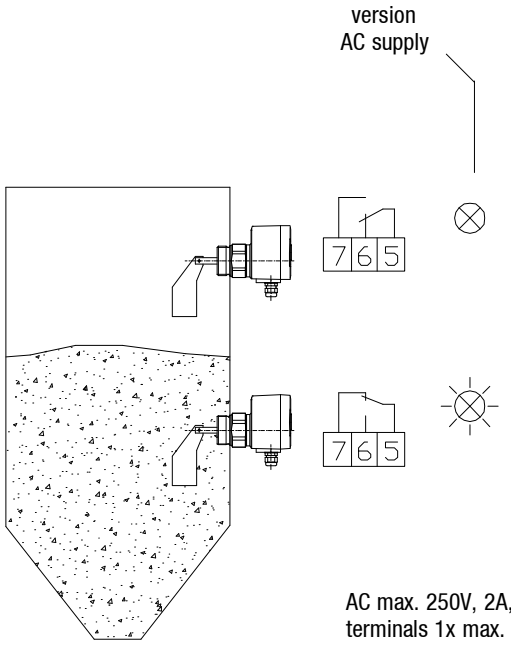




external equipotential bonding terminal

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

Switching logic



AC max. 250V, 2A, 500VA ($\cos\varphi$=1)
terminals 1x max. 1.5mm²

Safety instructions

- Installation, maintenance and commissioning may be accomplished only by qualified technical personnel.
- For devices to use in hazardous locations (dust explosion) zone 20/21 the requirements of the EN 50281–1–2 (e. g. regarding dust deposits and temperatures) must be observed.
- Switch off the mains voltage before opening the housing. **Dangerous voltage!**
- Set into operation only with closed lid of the housing.
- Use a fuse for the mains voltage (max. 4A).
- A voltage disconnecting switch must be provided near the switch. A RCCB protection switch is necessary.
- Compare the mains voltage applied with the specifications given on the label before switching the device on.
- For terminal connection of the device, the local regulations or VDE 0100 (regulations of German electrotechnical engineers) must be observed.
- In the case of inexpert handling or handling malpractice, the electric safety of the device cannot be guaranteed.
- For devices to use in hazardous locations (dust explosion) zone 20/21 the respectively valid installation regulations must be observed.
- Isolating signal output – mains voltage: 3kV~
- Provide protection for relay contacts to protect the device against spikes, if inductive loads are connected.

Mounting

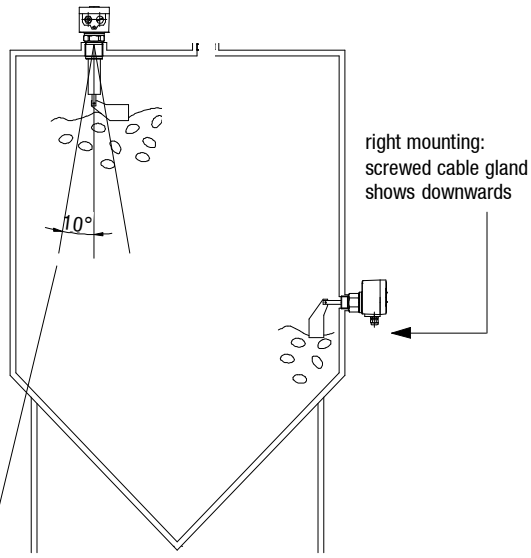
The unit must be mounted with the thread or the flange on the container. Mounting may be vertical, oblique or horizontal.

The electrical connections are made in accorcance with the connection diagram. Make sure, that the cable in the screwed cable gland is seated tightly without fail. For VEGAPAL version according to ATEX 1/2D a pull relief must be provided for the connection cables.

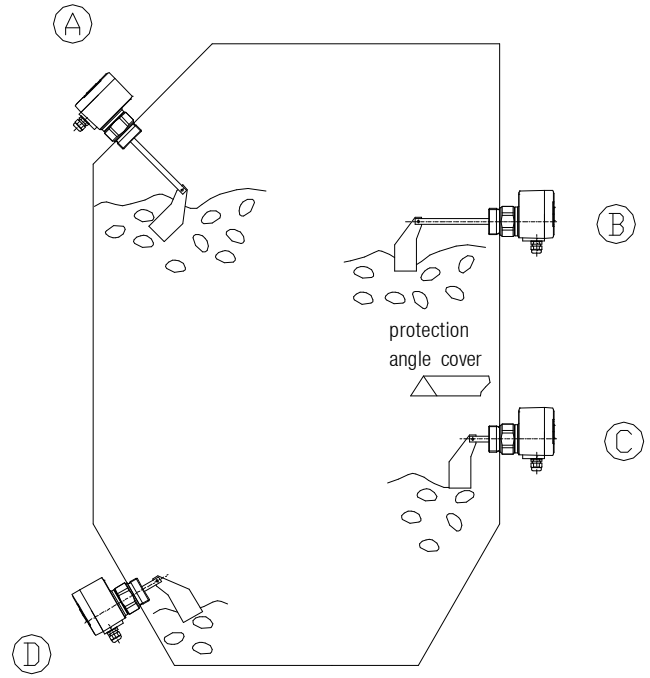
In case of using a conduit system (with NPT thread) instead of a cable gland the regulations of the country, where the unit is installed, must be observed. The conduit must have a tapered thread 1/2" according to ANSI B 1.20.1. Not used inlets must be tight closed with a metal closing element. If this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

After mounting, turn the housing in the right direction. The screwed cable gland (or plug) must show downwards (see drawing right hand). This makes sure, that the unit works fine and protects, that water enters into the housing through the screwed cable gland.

When the unit is used in the open, we recommend to use a weather–protection–cover. It protects the unit against moisture, heat, cold and prevents the formation of condensation water in the interior of the housing. Adjusting the unit at site is not required.



VEGAPAL RN3001:
vertical installation.



Application:

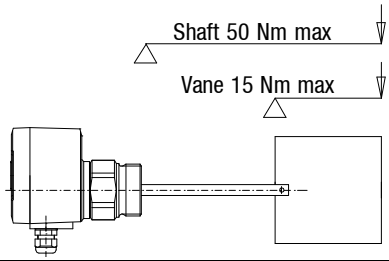
A max level oblique

B max level horizontal

C min level horizontal,
protection angle cover recommanded

D min level oblique,
protection angle cover recommanded

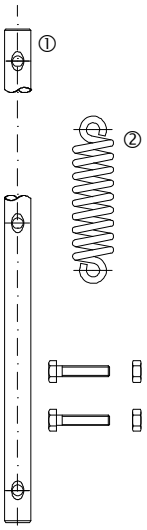
Take care of max permitted loads!



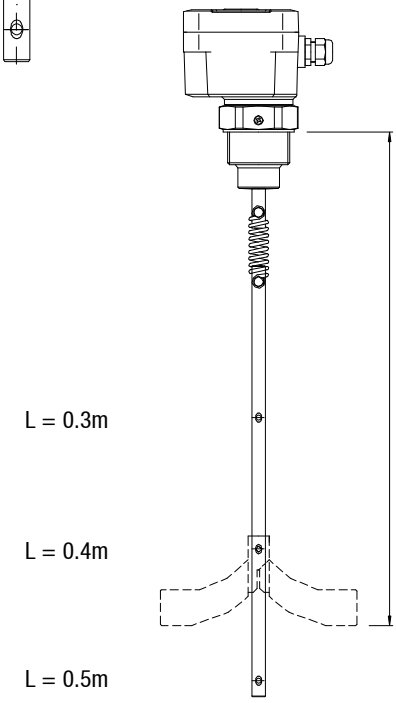
Shaft extensions (option)

There are two different shaft extensions available:Either upto 1m with the kit "pendulum shaft" or more robust upto 2m with the kit "rope extension". The rope can be cut to the desired length.

kit "pendulum shaft"

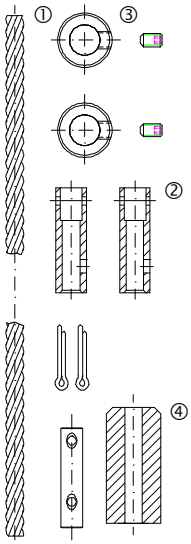


The kit "pendulum shaft" consists of an extension shaft (1) to be mounted with a spring (2) on the shaft of the **VEGAPAL RN 3001**. Each 100mm there are drilled holes in the shaft for mounting the measuring vane. This enables to mount the vane at different extension length ´L´. In case of high material density it is recommended to cut the shaft below the vane.The kit "pendulum shaft" is available for max. L=0.5m or max. L=1.0m. Each kit will be delivered with a mounting instruction in different languages.



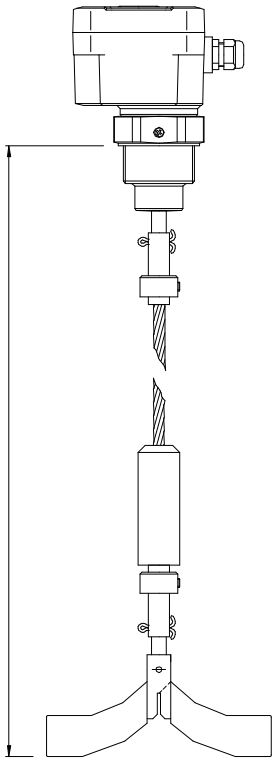
example:
VEGAPAL RN 3001 with pendulum shaft
L = 0.5m;
measuring vane mounted at
L = 0.4m;

Kit "rope extension"

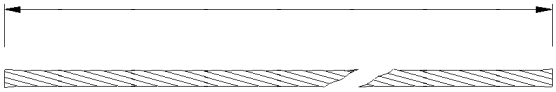


With the kit "rope extension" the shaft of the **VEGAPAL RN 3001** is extended by a 8mm stainless steel rope (1). The rope is mounted with the shaft and the measuring vane by each a bush (2) and a clamp ring (3). The rope weight (4) is put over the rope to tight it.The kit is available for L=2m. By cutting of the rope it is possible to realize other extension length.

VEGAPAL RN 3001 with rope extension



Length of the rope:

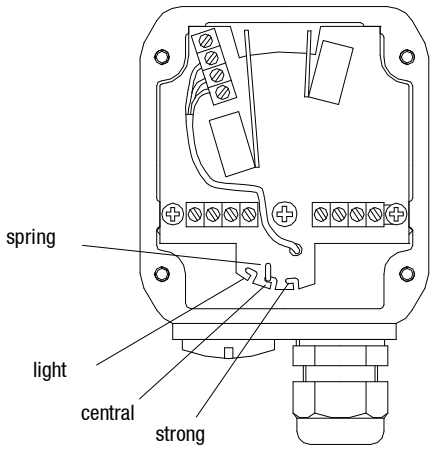


Adjustment of the spring

The spring is adjustable in 3 positions. It should be changed only if necessary.

"light": for light material;
"central": suitable for nearly every material;
"strong": for strong cacking material;
Factory setting is "central".

The spring can be changed via a small plier.



Density

The table shows approximate values for the minimum densities, at which a safe function is possible.

paddle	minimum density in g/l (kg/m³) (without guarantee)			
	Paddle completely covered with bulk material		Bulk material covers the paddle upto 10 cm	
	Spring adjustment		Spring adjustment	
	light	medium (factory adjusted)	light	medium (factory adjusted))
bootshaped vane 40x98	200	300	100	150

The above mentioned data are a directive and are valid with loose poured material without movement. During the filling the bulk density can change (e. g. for fluidised material).

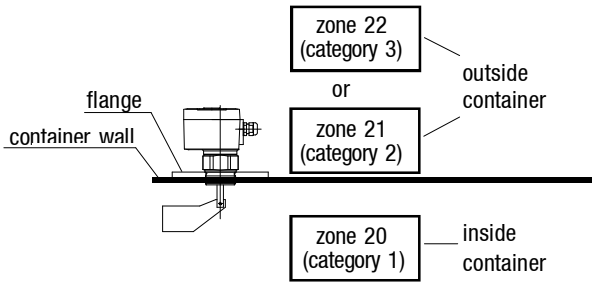
Remarks for use in hazardous locations (dust explosion) acc. to ATEX 100a

Zone classification

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

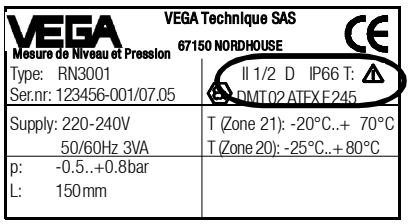
device category to 94/9/EG	usable in zone
1 D	20, 21, 22
2 D	21, 22
3 D*)	22

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



Marking

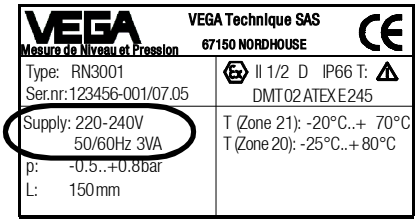
devices with ATEX approval are specially marked on the type plate (see example right hand).



Electrical connection

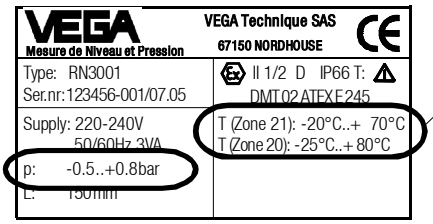
– Power supply:
"Take note of the voltage information on the type plate!"
(see example right hand)

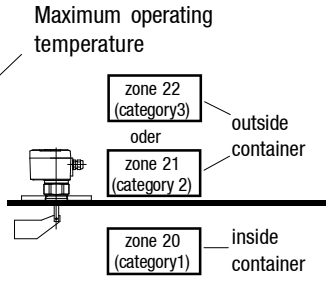
– Cable glands, that are not used, have to be locked with a closing element.
Due to protection against explosion it is necessary to use original parts from the manufactorer.



Operating conditions

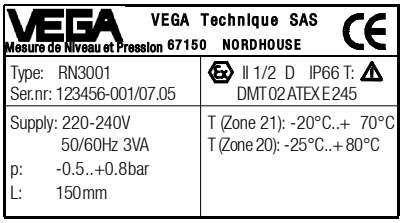
Pressure information:
The device construction allows over–pressure upto 0.8 bar (see type plate). This pressure is allowed for test puposes. The definition of the ATEX is only valid for a container–over–pressure between –0.2..+0.1 bar. For higher or lower pressures the approval is not valid.



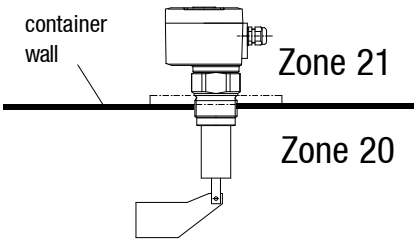


Maximum surface temperature

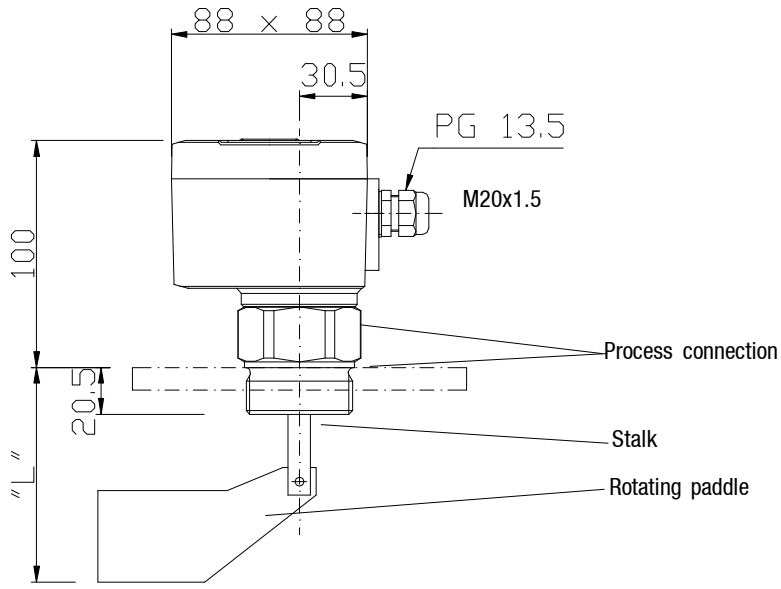
The following informations show the maximum surface temperature at the warmest part of the unit which can happen in failure case (according to ATEX definiton).



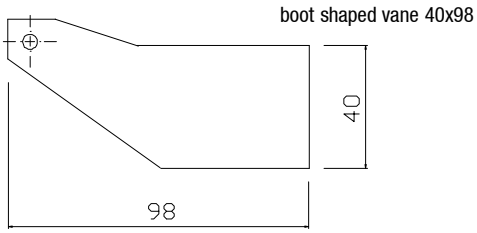
Max surface temperature T in °C	Ambient temperature in Zone 21 in °C	Product temperature in Zone 20 in °C
64	40	50
74	50	60
84	60	70
94	70	80



For medium température 80°C max



Rotating paddle



Level measurement
Switching - Pressure

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