



**6** YEARS  
GUARANTEE  
APPROVED  
QUALITY

## Rotonivo® 4000

### ROTARY PADDLE LEVEL SWITCH

The reliable solution with a plastic housing – versatile, robust construction, also for applications in hazardous locations. It is mainly suited for lower mechanical loads in a variety of materials, e.g. cement, detergent, feed, chalk, grains, plastic granulate and much more.



# Rotonivo® 4000



- Plastic version
- Suitable for nearly all bulk goods
- Simple and reliable measuring principle
- Easy and fast installation

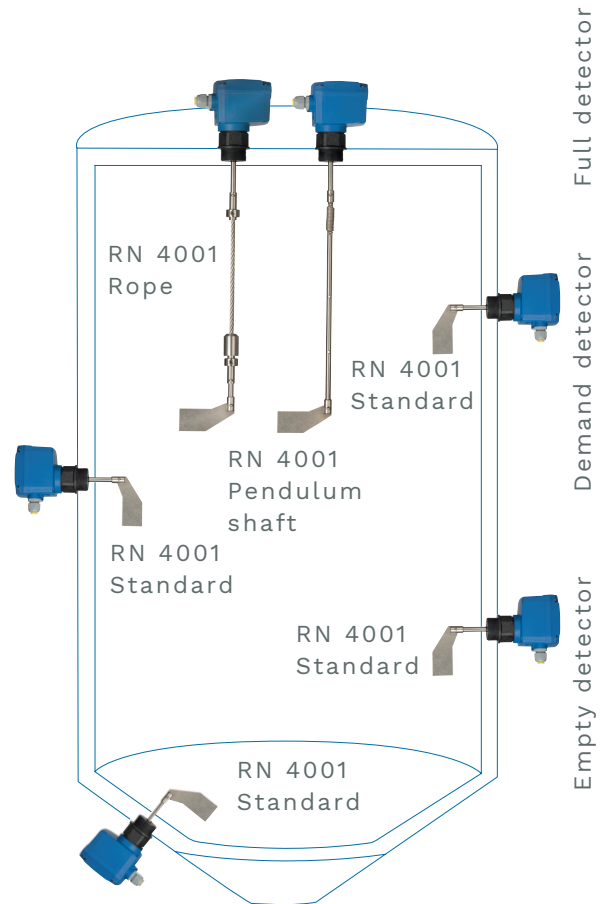
RN 4001 Standard  
Full, demand, empty  
detector  
Standard design,  
vertical, horizontal and  
oblique installation  
Extension up to  
1000 mm



RN 4001 Pend. Shaft  
Full detector  
Design with option  
pendulum shaft,  
vertical installation



RN 4001 Rope  
Full detector  
Design with rope  
extension, vertical  
installation



## TECHNICAL DATA

Housing	Plastic PA 6 GF, IP 66	
Certificates	ATEX, IEC-Ex, TR-CU, UKEX, CCC-Ex (Dust explosion-proof)	
Process temperature	-40 °C .. +80 °C (-40 °F .. +176 °F)	
Pressure	-0.9 .. +0.8 bar (-13.1 .. 11.6 psi)	
Sensitivity	From 100 g/l (6 lb/ft <sup>3</sup> ) – adjustable in 3 steps	
Supply voltage	Universal-Voltage-Electronic AC: 24 V / 48 V / 115 V / 230 V, DC: 24 V	
Process connection	G 1", G 1½" and G 1½", M30 x 1.5, M32 x 1.5 incl. sealing face	
Bearing	Process connection aluminium: ball bearing, dust tight Process connection plastics: slide bearing (maintenance-free, high-quality)	
Material	Process connection:	Plastic PA 6 GF, Aluminium
	Shaft:	Stainl. steal 1.4305 (SS303)
	Paddles:	Stainl. steal 1.4301 (SS304) Plastic PP

## Overview / Specification / Applications

- Level limit detection in bulk goods/ solids
- Compact unit
- Wide range of applications, no maintenance
- Full-, demand-, empty detector
- Flexible extensions (kits)
- ATEX/ UKEX/ IEC-Ex/ INMETRO/ TR-CU/ CCC approvals (Dust Ex)
- 2011/65/EU RoHS conform



Approvals	CE/ UKCA	
	ATEX/ UKEX/ IEC-Ex/ INMETRO/ CCC	Zone 20/21 (Dust Ignition Proof)
	TR-CU	Ordinary Locations Dust Ignition Proof

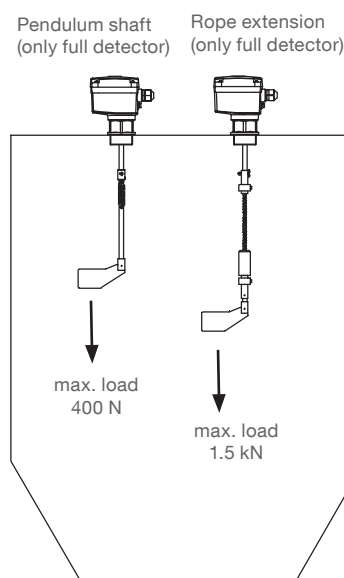
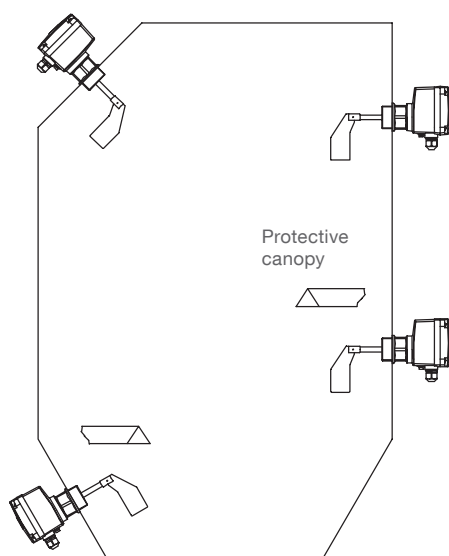
Technical data	Ambient temperature	-20 .. +60°C (-4 .. +140°F) -40 .. +60°C (-40 .. +140°F) with *heating *for certificate CE/ UKCA
	Process temperature	-20 .. +80°C (-4 .. +176°F) -40 .. +80°C (-40 .. +176°F) with *heating *for certificate CE/ UKCA
	Process pressure	-0.9 .. +0.8 bar (-13.1 .. 11.6 psi)
	Type of protection	IP66
	Material housing	Plastics PA6
	Material process connection	Aluminum or plastics PA6
	Material of measuring vane/ shaft/ extensions	1.4301 (SS304)/ 1.4305 (SS303)

Electronics						
Supply		Signal output				
		SPDT <sup>(1)</sup>	PNP	FSH/ FSL <sup>(2)</sup>	Adjust. delay	Fail safe alarm
AC version	24 V or 48 V or 115 V or 230 V AC	•	-	-	-	-
DC version	24 V DC	•	-	-	-	-
DC version	24 V DC PNP	-	•	•	•	-
Universal voltage	24 V DC/ 22 .. 230 V AC	•	-	•	•	option

<sup>(1)</sup> Micro switch, Relais for universal voltage

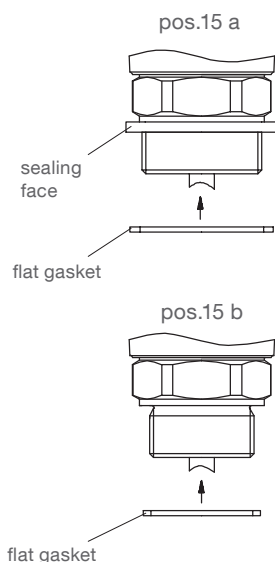
<sup>(2)</sup> Switchable signal output (Fail safe high/ low)

## Applications

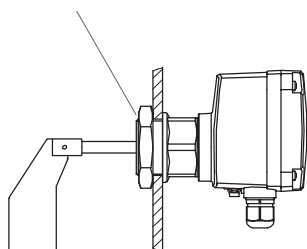


## Options

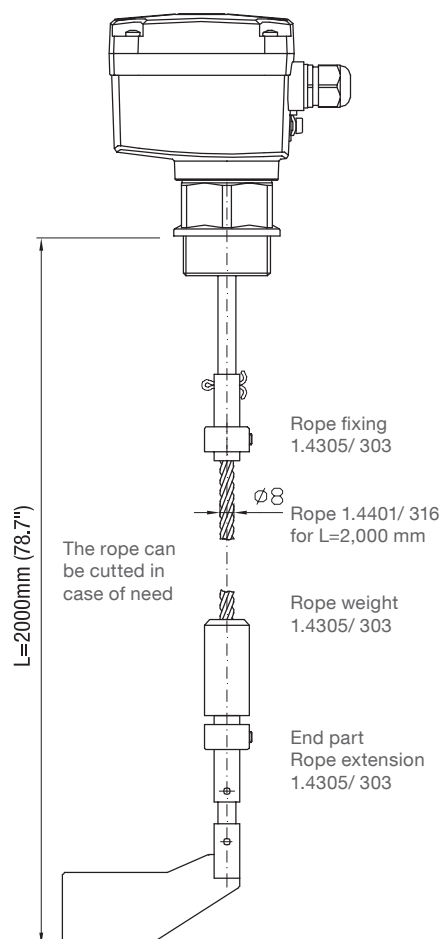
pos.15  
**Flat gasket**



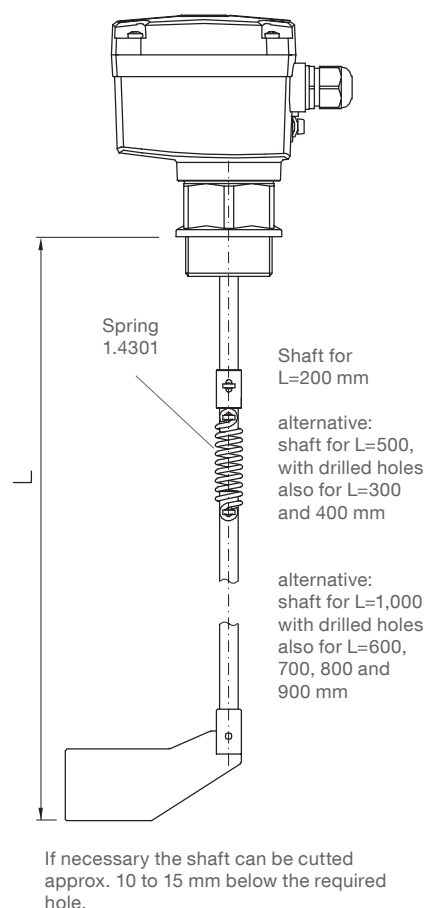
pos.24  
**Hexagon nut**



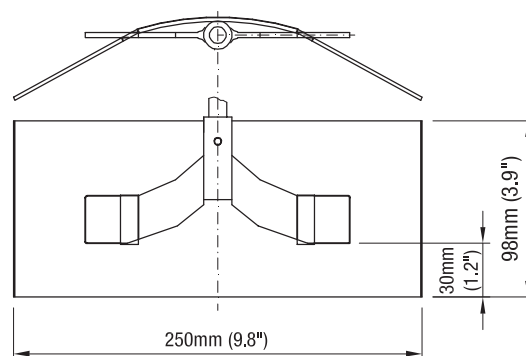
pos.39  
**Kit „rope extension“**



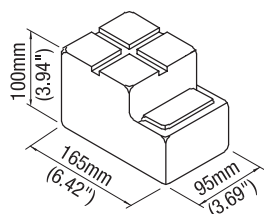
pos.40  
**Kit „pendulum shaft“**



pos.23 a  
**Vane extension (plastics)**

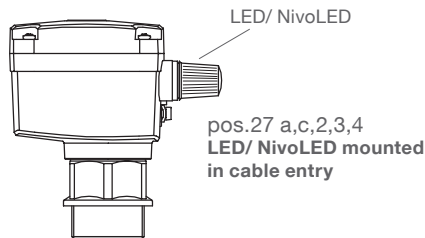


pos.21  
**Weather protection cover**

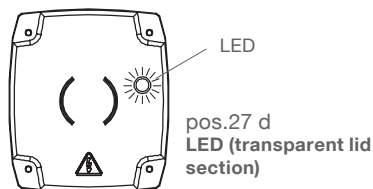


## Options

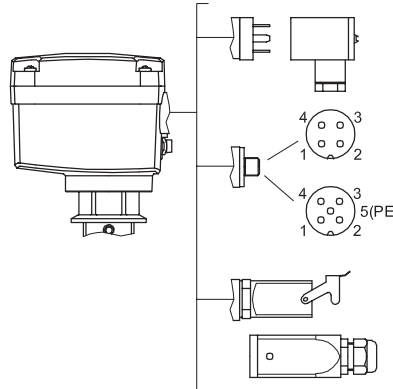
### Signal lamp



Connection of the wires to the internal terminals of the unit refer to documentation "Plugs and Signal lamps - Connecting diagram".



### Plug



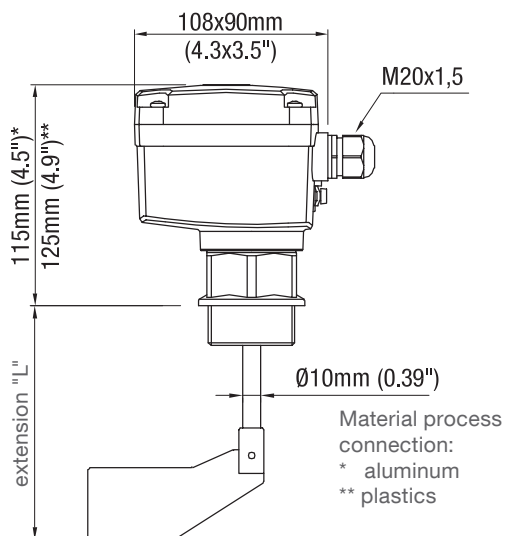
pos.35 x  
**Valve connector**  
 max. 230 V  
 Enclosure plastic  
 Protection IP65  
 $-40\text{ }^{\circ}\text{C} \leq T_a \leq +125\text{ }^{\circ}\text{C}$

pos.35 a,b  
**Plug M12**  
 max. 25 V (4-pole), 60 V (5-pole)  
 Enclosure brass  
 Protection IP66  
 $-25\text{ }^{\circ}\text{C} \leq T_a \leq +80\text{ }^{\circ}\text{C}$

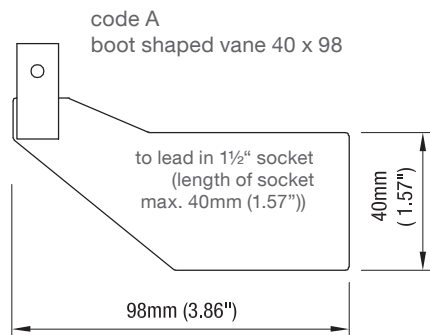
pos.35 c  
**Plug Han 4A**  
 max. 230 V  
 Enclosure zinc  
 Protection IP65  
 $-40\text{ }^{\circ}\text{C} \leq T_a \leq +125\text{ }^{\circ}\text{C}$

Connection of the plug wires to the internal terminals of the unit refer to documentation "Plugs and Signal lamps - Connecting diagram".

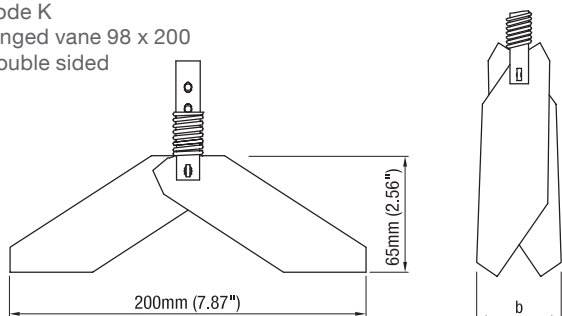
## Dimension



## Measuring vanes

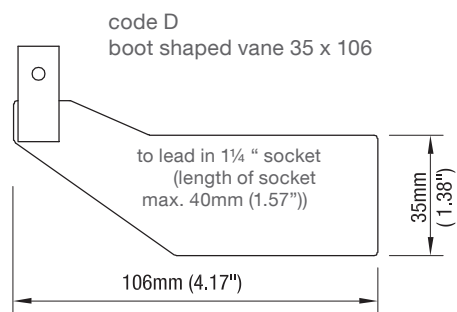


code K  
hinged vane 98 x 200  
double sided

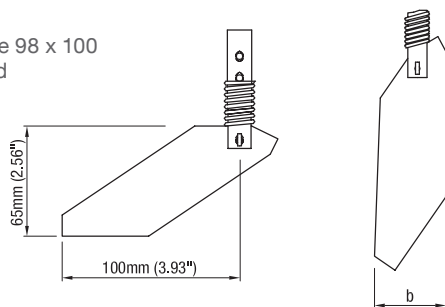


b=37 mm (1.46")  
for 1½"/ 1¼"

b=28 mm (1.1")  
for 1"/ M32 x 1.5

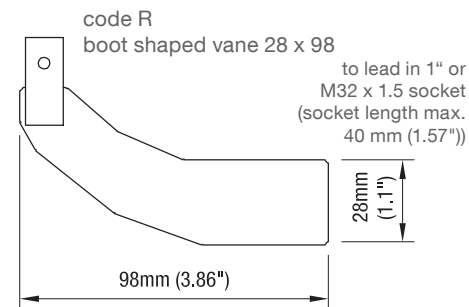


code S  
hinged vane 98 x 100  
single sided

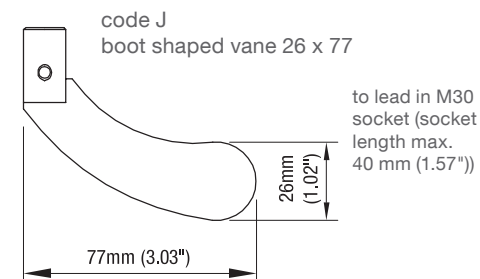
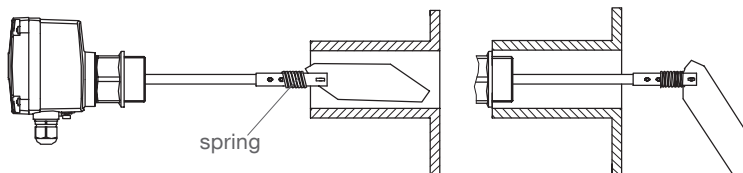


b=37 mm (1.46")  
für 1½"/ 1¼"

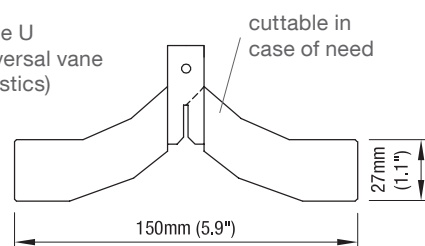
b=28 mm (1.1")  
for 1"/ M32 x 1.5



Insertion of the hinged vane through a long socket



code U  
universal vane  
(plastics)



## Dimension

### Sensitivity

The table shows approximate values for the minimum densities, at which a normal function should be possible.

Vane	*Minimum density in g/l = kg/m³ (lb/ft³) (without guarantee)			
	Vane completely covered with bulk material		Bulk material covers vane up to 100 mm (3.93")	
	Spring adjustment		Spring adjustment	
	fine	medium (Factory setting)	fine	medium (Factory setting)
Boot shaped vane 40 x 98	200 (12)	300 (18)	100 (6)	150 (9)
Boot shaped vane 35 x 106	200 (12)	300 (18)	100 (6)	150 (9)
Boot shaped vane 28 x 98	300 (18)	500 (30)	150 (9)	200 (12)
Boot shaped vane 26 x 77	350 (21)	560 (33)	200 (12)	250 (15)
Hinged vane 98 x 200 b=37 double sided	70 (4.2)	100 (6)	35 (2.16)	50 (3)
Hinged vane 98 x 200 b=28 double sided	100 (6)	150 (9)	50 (3)	75 (4.5)
Hinged vane 98 x 100 b=37 single sided	200 (12)	300 (18)	100 (6)	150 (9)
Hinged vane 98 x 100 b=28 single sided	300 (18)	500 (30)	150 (9)	250 (15)

The above mentioned data is a guideline and is for loose, non compacted material.

During the filling the bulk density can change (e. g. for fluidised material).

\*For versions with option 26 (heating of housing) the above mentioned data must be multiplied by 1.5.

## Electrical installation

### Version:

- AC
- DC
- **Universal voltage**

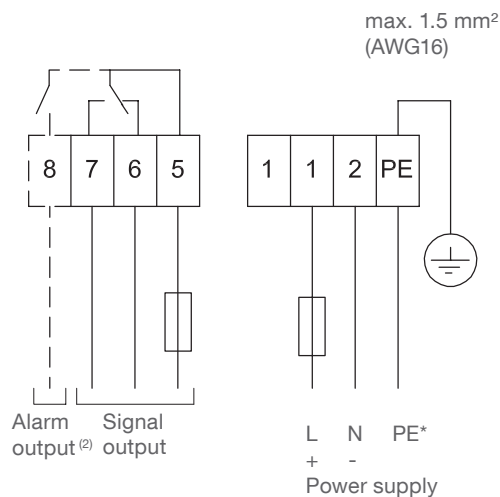
### Power supply:

- **AC version:**  
24 V or 48 V or 115 V or 230 V 50/60 Hz max. 4 VA  
All voltages  $\pm 10\%$  <sup>(1)</sup>  
Supply voltage as selected.  
External fuse: max. 10 A, fast or slow, HBC, 250 V
- **DC version:**  
24 V DC  $\pm 15\%$  <sup>(1)</sup> max. 2.5 W  
External fuse: not required
- **Universal voltage:**  
24 V DC  $\pm 15\%$  <sup>(1)</sup> max. 4 W  
22 .. 230 V 50/60 Hz  $\pm 10\%$  <sup>(1)</sup> max. 10 VA  
External fuse: not required

<sup>(1)</sup> including  $\pm 10\%$  of EN 61010

### Signal and alarm output:

Micro switch or relay, SPDT contact  
max. 250 V AC, 2 A, 500 VA ( $\cos\phi = 1$ )  
max. 250 V DC, 2 A, 60 W  
External fuse: max. 10 A, fast or slow, HBC, 250 V



<sup>(2)</sup> With option Fail safe alarm (rotation control)  
Contact open when de-energised

### Version:

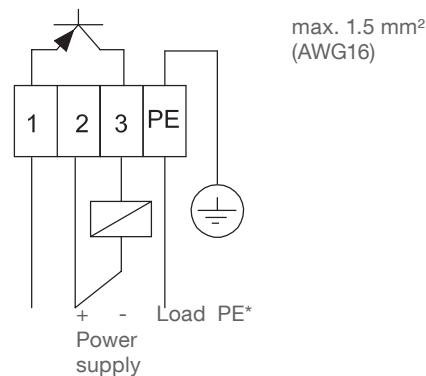
- PNP

### Power supply:

24 V DC  $\pm 15\%$  <sup>(1)</sup>  
<sup>(1)</sup> including  $\pm 10\%$  of EN 61010  
Input current: max. 0.6 A

### Signal output:

Load max. 0.4 A  
Output voltage equal to input voltage, drop <2.5 V  
Open collector  
Protected against short circuit and overload



### \* Protection against static charge:

- The PE terminal of the unit must be grounded to avoid static charging of the unit.
- This is particularly important for applications with pneumatic conveying.

## Table of contents

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	Page
Safety notes/ Technical support	2
-----	
Introduction	3
-----	
Function	4
-----	
Technical data	5
-----	
Approvals	8
-----	
Options	9
-----	
Mounting	10
-----	
Electrical installation	12
-----	
Signal and Alarm output	15
-----	
Settings sensitivity	17
-----	
Maintenance	18
-----	
Notes for use in Hazardous Locations	19
-----	
Disposal	20

Subject to technical change  
 All dimensions in mm (inches).

We assume no liability for typing errors.  
 Different variations than specified are possible.  
 Please contact our technical consultants.

## Safety notes / Technical support

### Notes

- Installation, maintenance and commissioning must be carried out only by qualified technical personnel.
- The product must be used only in the manner outlined in this instruction manual.

Special attention must be paid to warnings and notes as follows:

#### WARNING



Relates to a caution symbol on the product: A failure to observe the necessary precautions can result in death, serious injury and/ or considerable material damage.

#### WARNING



Relates to a caution symbol on the product: Risk of electric shock

#### WARNING



A failure to observe the necessary precautions can result in death, serious injury and/ or considerable material damage.

This symbol is used, when there is no corresponding caution symbol on the product.

#### CAUTION

A failure to observe the necessary precautions can result in considerable material damage.

### Safety symbols

In manual and on product	Description
	CAUTION: refer to accompanying documents (manual) for details.
	Earth (ground) Terminal
	Protective Conductor Terminal

### Technical support

Please contact your local supplier (address details at [www.uwtgroup.com](http://www.uwtgroup.com)). Otherwise please contact:

UWT GmbH  
Westendstr. 5  
87488 Betzigau  
Germany

Tel. 0049-(0)831/ 57123-0  
Fax. 0049-(0)831/ 76879  
[info@uwtgroup.com](mailto:info@uwtgroup.com)  
[www.uwtgroup.com](http://www.uwtgroup.com)



## Introduction

### Applications

The ROTONIVO is an electromechanical Level limit switch and is used for level monitoring of bulk goods.

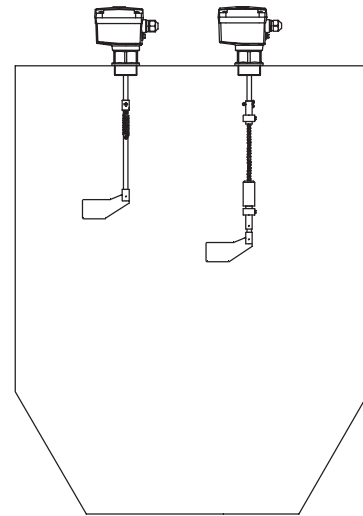
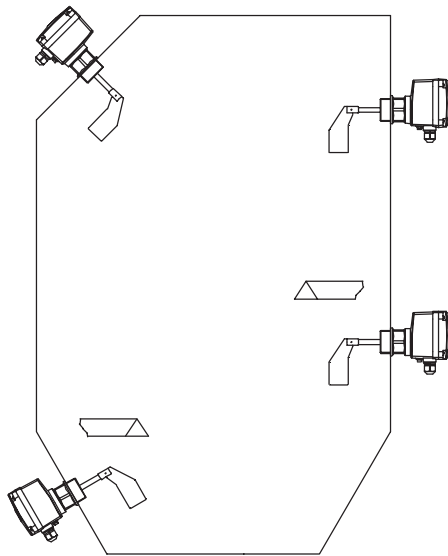
The units can be delivered with Ex-approvals for use in Hazardous Areas.

Selected applications:

- **building materials industry**  
lime, styrofoam, moulding sand, etc.
- **plastics industry**  
plastics granules etc.
- **timber industry**
- **chemical industry**
- **mechanical engineering**

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

The device can also be mounted from the top of the container. In this case an extension piece is used to mount the probe level with the height to be registered (full detector).



## Function

A measuring vane is driven by a synchronous motor. The bearing of the motor inside the housing allows it to swing. The motor is fixed to a switching lug.

If the vane is uncovered, a spring pulls the motor and switching lug to the left position (figure 1).

When material covers the vane and thus stops the rotation, the motor and switching lug swings to the right position (figure 2). The signal output indicates "covered" and the motor is stopped.

When the vane becomes uncovered due to falling material, the spring pulls the motor and switching lug back to the left position (figure 1). The motor is started and the signal output indicates "uncovered".

### Signal output delay

The version "universal voltage" and "PNP" has an integrated adjustable delay for the signal output.

### Option fail safe alarm

With the fail safe alarm it is possible to recognize a fault of the unit in time and to initiate an alarm relay. The following faults are observed:

- Motor
- Gear
- Electronic for motor power supply
- Supply voltage failure
- Defect of the connecting wires

### Switchable signal output (Fail safe high/ low)

With version "Universal voltage" and "PNP" a switchable signal output FSH/ FSL is integrated.

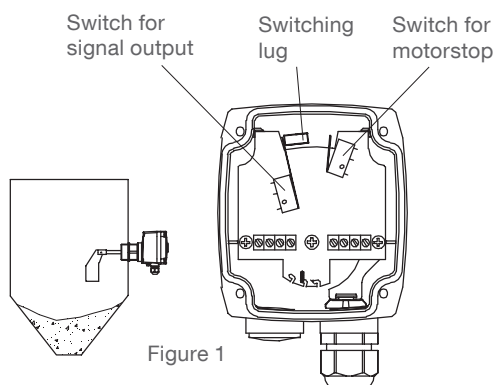


Figure 1

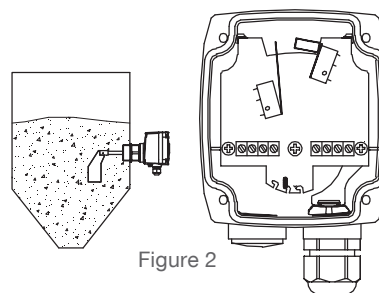


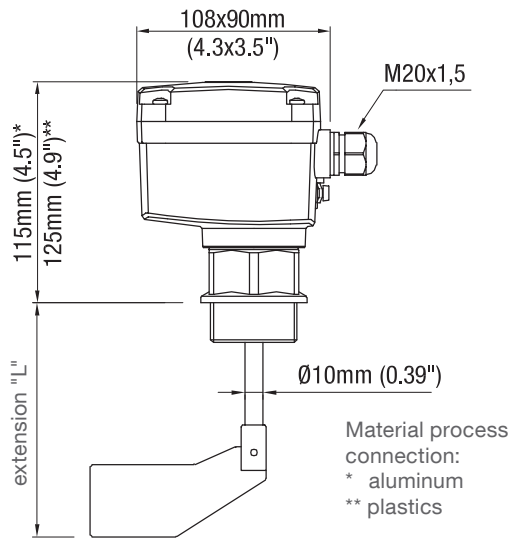
Figure 2

Electronics						
Supply		Signal output				
		SPDT <sup>(1)</sup>	PNP	FSH/ FSL <sup>(2)</sup>	Adjust. delay	Fail safe alarm
AC version	24 V or 48 V or 115 V or 230 V AC	•	-	-	-	-
DC version	24 V DC	•	-	-	-	-
DC version	24 V DC PNP	-	•	•	•	-
Universal voltage	24V DC/ 22 .. 230 V AC	•	-	•	•	option

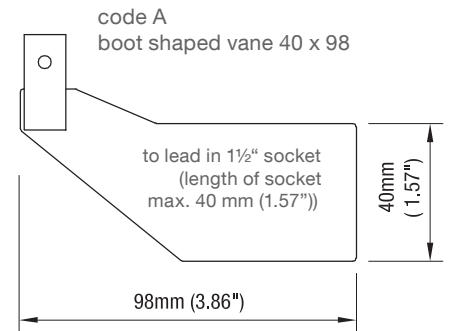
<sup>(1)</sup> Micro switch, Relais for universal voltage

<sup>(2)</sup> Switchable signal output (Fail safe high/ low)

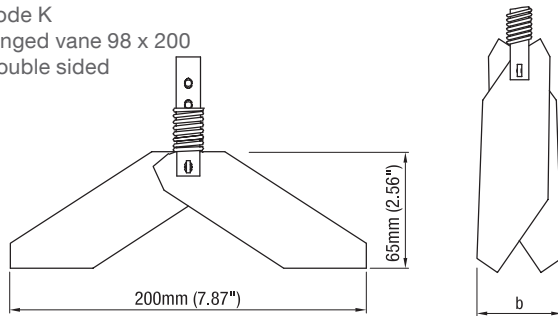
## Technical Data



## Measuring vanes

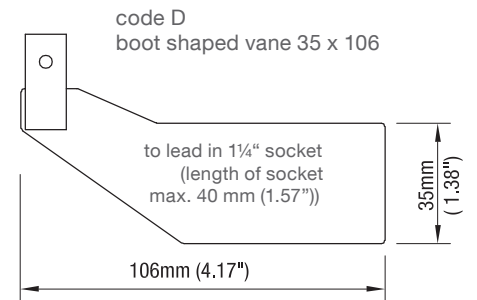


code K  
 hinged vane 98 x 200  
 double sided

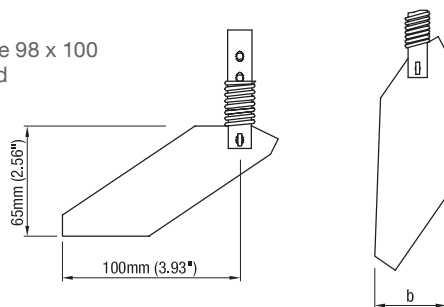


b=37 mm (1.46")  
 for 1½"/ 1¼"

b=28 mm (1.1")  
 for 1"/ M32 x 1.5

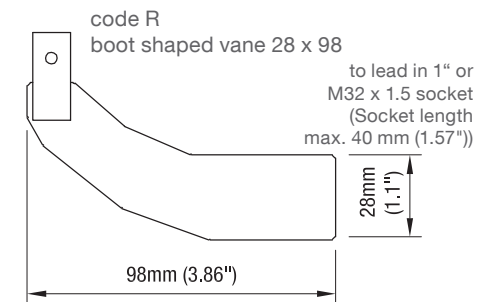


code S  
 hinged vane 98 x 100  
 single sided

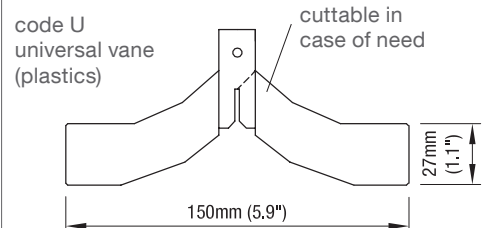
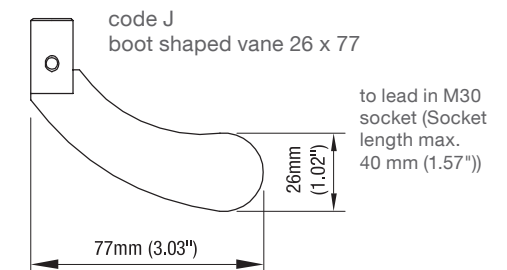
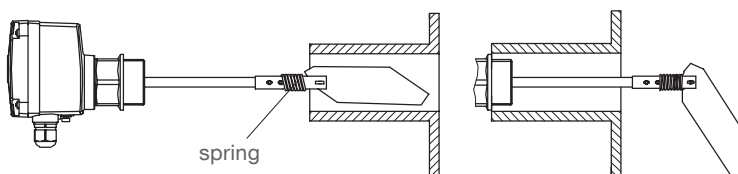


b=37 mm (1.46")  
 für 1½"/ 1¼"

b=28 mm (1.1")  
 for 1"/ M32 x 1.5



Insertion of the hinged vane through a long socket



## Technical Data

### Electrical data

Connection terminals	max. 1.5 mm <sup>2</sup> (AWG 16)
Cable entry	M20 x 1.5 screwed cable gland  Clamping range (diameter) of the factory provided cable glands: M20 x 1.5: 6 .. 12 mm (0.24 .. 0.47")
Protection class	I III (Version 24V DC PNP)
Overvoltage category	II
Pollution degree	2 (inside housing)
Power supply	see page 14
Installed load	see page 14
Signal and alarm output	see page 14
Isolation	Power to signal and alarm output: 2,225 Vrms
Indicating light	By built-in LED (not with AC version)

### Mechanical data

Housing	Plastics PA6 GF, RAL 5010 gentian blue Seal between housing and lid: NBR Seal between housing and process connection: NBR Nameplate: polyester film
Degree of protection	IP66 (IEC/EN/NBR 60529)
Process connection	Aluminium or plastics PA6 GF Thread: Metric or G (DIN 228) according to selection
Vane shaft and measuring vane	Material: stainless steel 1.4301 (304)/ 1.4305 (303), Universal vane in plastics PP
Tolerance length "L"	±10 mm (±0.39")
Bearing	Process connection aluminium: ball bearing, dust tight Process connection plastics: slide bearing (maintenance-free, high-quality)
Sealing	Radial rotary shaft sealing. Material: NBR (Acrylnitril-Butadien-rubber)
Friction clutch	Protects the gear unit against impacts of the measuring vane
Speed of measuring vane	1 rotation or 5 rotations per minute
Sound level	max. 50 dBA



## Technical Data

### Operating conditions

<b>Ambient temp. (housing)</b>	-20 .. +60°C (-4 .. +140°F) -40 .. +60°C (-40 .. +140°F) Version with heating of housing (pos.26)		
<b>Process temperature</b>	-20 .. + 80°C (-4 .. +176°F) -40 .. +80°C (-40 .. +176°F) Version with heating of housing (pos.26)		
<b>Ventilation</b>	Ventilation is not required		
<b>Min. powder density/ Sensitivity</b>	see section "Sensitivity" on page 17		
<b>Signal delay</b>	Version Sensor free -> covered* Sensor covered -> free	AC, DC, Multivoltage ca. 1.3 sec ca. 0.2 sec	Universal voltage ca. 1.5 sec + 0 .. 20 sec adjustable ca. 0.2 sec + 0 .. 60 sec adjustable
*after blocking of the measuring vane			
<b>Features of bulk material</b>	Hardly any limitations		
<b>Max. permitted mechanical torque (lateral)</b>	Process connection aluminium: Process connection plastics:	max. 50 Nm max. 25 Nm	Protective measures in case of high loading: mounting of an protective canopy above the probe.
<b>Max. tractive force</b>	Pendulum shaft: Rope extension:	400 N (applicable only as full detector) 1.5 kN (applicable only as full detector)	
<b>Max. process pressure</b>	-0.9 .. +0.8 bar (-13.1 .. +11.6 psi) Versions with Ex-approvals: see remarks on page 19.		
<b>Vibration</b>	1.5 (m/s <sup>2</sup> ) <sup>2</sup> /Hz according to EN 60068-2-64		
<b>Relative Humidity</b>	0 - 100%, suitable for outdoor use		
<b>Altitude</b>	max. 3.000 m (9.843 ft)		
<b>Expected product lifetime</b>	Following parameters have a negative influence on the expected product lifetime: High ambient- and process temperature, corrosive environment, high vibration, high flow rate of abradable bulk material passing the sensor element, high amount of measurement cycles.		

### Transport and Storage

<b>Transport</b>	Observe the instructions as stated on the transport packaging, otherwise the products may get damaged. Transport temperature: -40 .. +80°C (-40 .. +176°F) Transport humidity: 20 .. 85% Transport incoming inspections must be carried out to check for possible transport damage.
<b>Storage</b>	Products must be stored at a dry and clean place. They must be protected from influence of corrosive environment, vibration and exposure to direct sunlight. Storage temperature: -40 .. +80°C (-40 .. +176°F) Storage humidity: 20 .. 85%

## Approvals

Non-hazardous Locations	CE UKCA TR-CU	EN 61010-1 (IEC/CB)	
Hazardous Locations *	ATEX UKEX IEC-Ex TR-CU INMETRO CCC	Dust explosion Dust explosion Dust explosion Dust explosion Dust explosion Dust explosion	ATEX II 1/2D Ex ta/tb IIIC T! Da/Db UKEX II 1/2D Ex ta/tb IIIC T! Da/Db IEC-Ex ta/tb IIIC T! Da/Db Ex ta/tb IIIC T90°C...T250°C Da/Db X Ex ta/tb IIIC T250°C...T90°C Da/Db IP6X Ex ta/tb IIIC T! Da/Db
EMC	EN 61326 - A1		
RoHS conform	According to directive 2011/65/EU and Statutory Instruments S.I. 2012/3032		
Pressure Equipment Directive (2014/68/EU)	As the equipment does not have pressure-bearing housings of its own, it is not subject to the PED: - as "pressure accessory" (see 2014/68/EU Art. 2 (5) and PED Guidelines A-08, A-40) - as "safety accessory" (see 2014/68/EU Art. 2 (4) and PED Guidelines A-20, A-25)		

\* Depending on selected version

## Options

### Weather protection cover

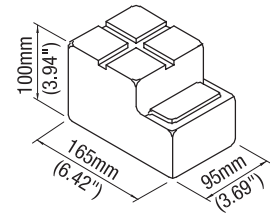
If the measuring device is used outdoors, the use of the weather-protection-cover is recommended. It protects the device from all atmospheric influences such as:

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

Material: PE, weather and temperature stable

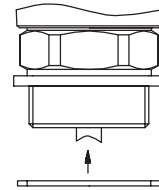


For use in Hazardous Locations:  
 only permitted for zone 22



### Flat gasket

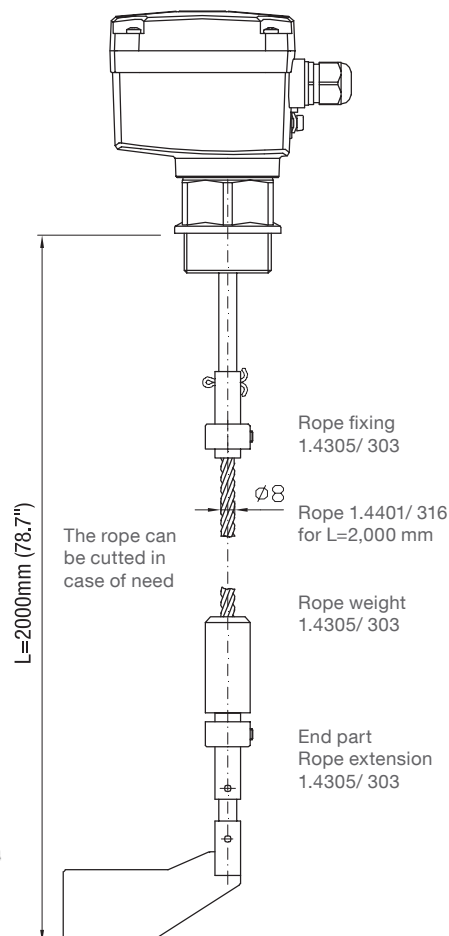
On the face sealing of the process connection thread.  
 Incl. sealing face for version with process connection  
 G 1½" thread aluminium.



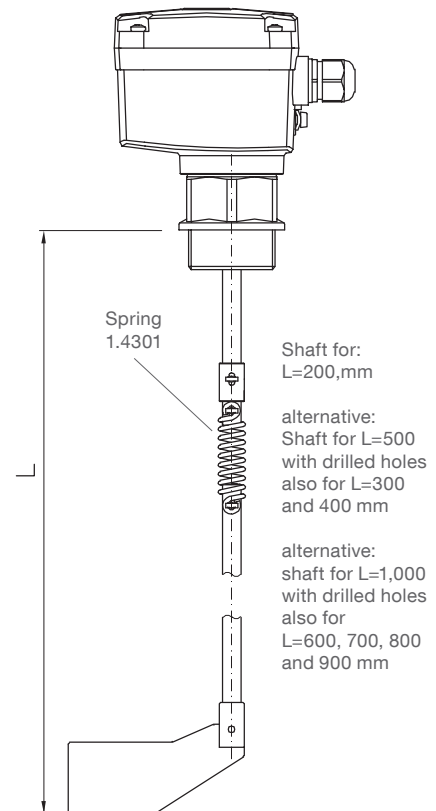
### Extensions

(Kits, application only as full detector)

#### Rope extension



#### Pendulum shaft



If necessary the shaft can be cutted approx. 10 to 15 mm below the required hole.

## Mounting

### ! General Safety Instructions

Process pressure	Improper installation may result in loss of process pressure.
Chemical resistance against the medium	Materials of construction are chosen based on their chemical compatibility (or inertness) for general purposes. For exposure to specific environments, check with chemical compatibility charts before installing.
Mechanical load	The torque at the fastening spot must not exceed the specified ratings. See page 7 for details.
Mounting location	Keep away from incoming material and from silo walls. The installation has to be carried out, that the sensor elements cannot hit the wall of the silo. The flow of the medium and fixtures in the container must be considered.

### ! Additional Safety Instructions for Hazardous Locations

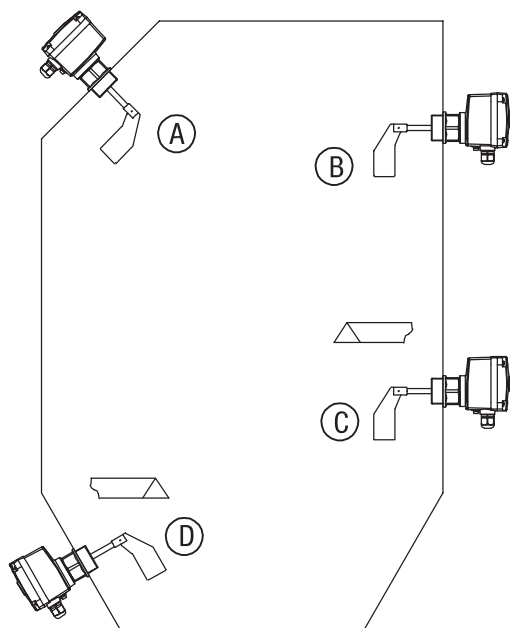
Installation regulations	For devices to be used in Hazardous Locations the respective valid installation regulations must be observed.
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## Mounting instructions

Rotatable housing	The housing can be rotated against the threaded connection after mounting.
Direction of the cable glands	When the unit is mounted from the side, ensure, that the cable glands face downwards and are closed to avoid water penetration into the housing.
Sealing	Seal the process connection thread with PTFE sealing tape or a flat gasket against process pressure.
Precaution for later dismantling	Use PTFE sealing tape to avoid seizing of aluminium process connection thread with the socket

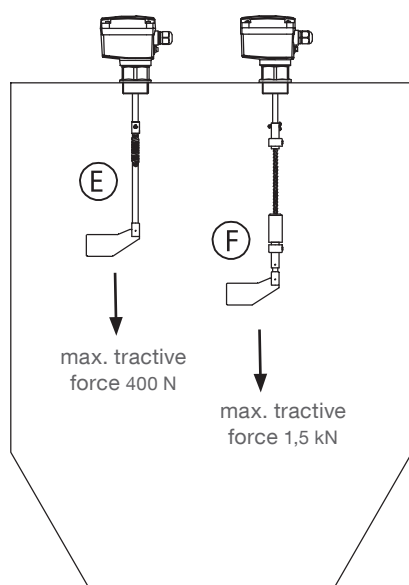
## Mounting/Electrical Installation

### Mounting



- A Full detector vertical and oblique from the top
- B Full detector horizontal
- C Demand or empty detector horizontal  
Protective angle recommended, depending on load
- D Empty detector oblique from the bottom  
Protective angle recommended, depending on load

Horizontal mounting (except full detector) : Boot shaped vane recommended (min. mech. load, because the vane aligns to the movement of the material).



- E With pendulum shaft: Full detector vertical from the top  
Observe max. tractive force.
- F With rope extension: Full detector vertical from the top  
Observe max. tractive force.

## Electrical Installation

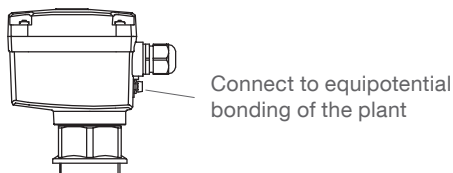
### ! General Safety Instructions

<b>Handling</b>	In the case of improper handling or handling malpractice, the electric safety of the device cannot be guaranteed.
<b>Installation regulations</b>	The local regulations (Regulations of German Electrotechnical Engineers) must be observed. With use of 24 V supply voltage, an approved power supply with reinforced isolation to mains is required
<b>Fuse</b>	Use a fuse as stated in the connection diagrams (see pages 14).
<b>RCCB protection</b>	In the case of a fault, the supply voltage must be automatically switched off by a RCCB protection switch to protect against indirect contact with dangerous voltages.
<b>Power supply switch</b>	A voltage disconnection switch must be provided near the device.
<b>Wiring diagram</b>	The electrical connections are made in accordance with the wiring diagram.
<b>Supply voltage</b>	Compare the supply voltage applied with the specifications given on the electronic module and name plate before switching the device on.
<b>Cable gland</b>	The screwed cable gland and closing element must have following specifications: Ingress protection IP66, temperature range from -40°C to +70°C, certified depending on the country where the unit is installed, pull relief. Make sure that the screwed cable gland safely seals the cable and that it is tight (danger of water intrusion). Cable glands that are not used have to be sealed with a blanking element.
<b>Field wiring cables</b>	<ul style="list-style-type: none"> <li>• The diameter has to match to the clamping range of the used cable gland.</li> <li>• The cross section has to match with the clamping range of the connection terminals and consider the max. current.</li> <li>• All field wirings must have insulation suitable for at least 250 V AC.</li> <li>• The temperature rating must be at least 90°C (194°F).</li> <li>• If higher immunity interferences as specified in the stated EMC standards are present (see chapter approval), a shielded cable is required, otherwise an unshielded instrumentation cable is satisfactory.</li> </ul>
<b>Guiding the cables in the terminal box</b>	Cut the field wiring cables to appropriate length to fit properly into the terminal box.
<b>Microswitch protection</b>	Provide protection for microswitch contacts to protect the device against inductive load surges.
<b>Protection against static charging</b>	The housing of the unit must be grounded to avoid static charging of the unit. This is particularly important for applications with pneumatic conveying and non-metallic containers.

## Electrical installation

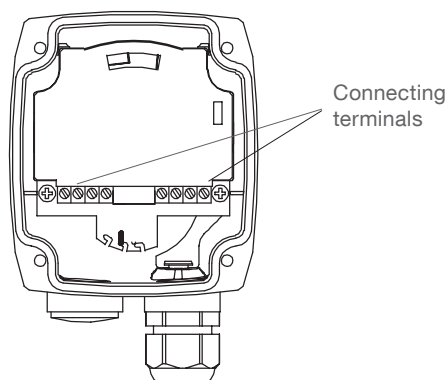
### ! Additional Safety Instructions for Hazardous Locations

#### Extenal equipotential bonding terminal



<b>Field wiring</b>	A strain relief must be provided for the field wiring cables, when the device is installed with the factory provided cable glands.
<b>Cable glands</b>	<p>Installation according to the regulations of the country, where the product is installed.</p> <p>Not used entries have to be closed with blanking elements certified for this purpose.</p> <p>Where applicable the factory provided parts must be used.</p> <p>A strain relief must be provided for the field wiring cables, when the device is installed with the factory provided cable glands.</p> <p>The diameter of the field wiring cable must match to the clamping range of the cable clamp.</p> <p>If other than the factory provided parts are used, following must be ensured:          The parts must have an approval adequate to the approval of the level sensor (certificate and type of protection).          The approved temperature range must be from the min. ambient temperature of the level sensor to the max. ambient temperature of the level sensor increased by 10 K.          The parts must be mounted according to the instructions of the supplier.</p>
<b>Commissioning</b>	Commissioning only with closed lid.
<b>Opening the lid</b>	<p>Before opening the lid take care, that no dust deposits or whirlings are present.</p> <p>Do not remove the lid (cover) while circuits are alive.</p>

## Connection



## Electrical installation

### Version:

- AC
- DC
- Universal voltage

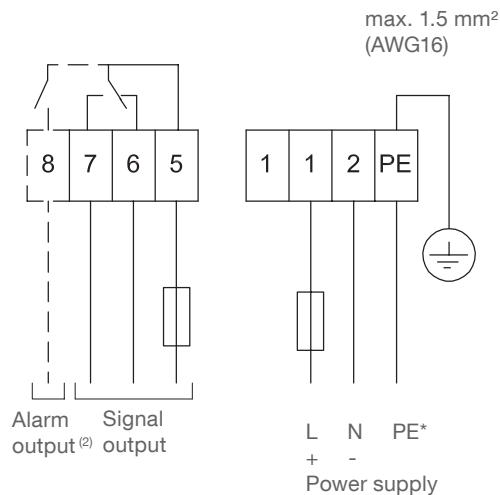
### Power supply:

- **AC version:**  
24 V or 48 V or 115 V or 230 V 50/60 Hz max. 4 VA  
All voltages  $\pm 10\%$  <sup>(1)</sup>  
Supply voltage as selected.  
External fuse: max. 10 A, fast or slow, HBC, 250 V
- **DC version:**  
24 V DC  $\pm 15\%$  <sup>(1)</sup> max. 2.5 W  
External fuse: not required
- **Universal voltage:**  
24 V DC  $\pm 15\%$  <sup>(1)</sup> max. 4 W  
22 .. 230 V 50/60 Hz  $\pm 10\%$  <sup>(1)</sup> max. 10 VA  
External fuse: not required

<sup>(1)</sup> including  $\pm 10\%$  of EN 61010

### Signal and alarm output:

Micro switch or relay, SPDT contact  
max. 250 V AC, 2 A, 500 VA ( $\cos\phi = 1$ )  
max. 250 V DC, 2 A, 60 W  
External fuse: max. 10 A, fast or slow, HBC, 250 V



<sup>(2)</sup> With option Fail safe alarm (rotation control)  
Contact open when de-energised

### Version:

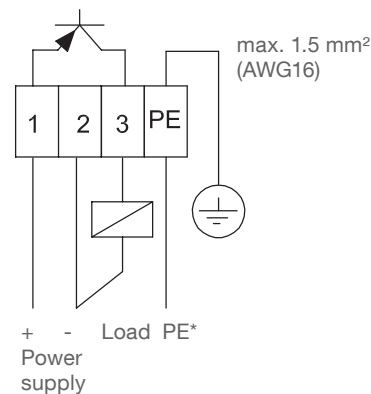
- PNP

### Power supply:

24 V DC  $\pm 15\%$  <sup>(1)</sup>  
<sup>(1)</sup> including  $\pm 10\%$  of EN 61010  
Input current: max. 0.6 A

### Signal output:

Load max. 0.4 A  
Output voltage equal to input voltage, drop  $< 2.5$  V  
Open collector  
Protected against short circuit and overload



### \* Protection against static charge:

- The PE terminal of the unit must be grounded to avoid static charging of the unit.
- This is particularly important for applications with pneumatic conveying.

## Signal and alarm output

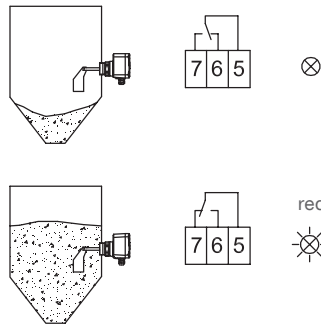
## Overview

Overview of signal and alarm output for the different electronics versions: see page 4

## Signal output: Switching logic

## Versions

- AC
- DC



## Versions

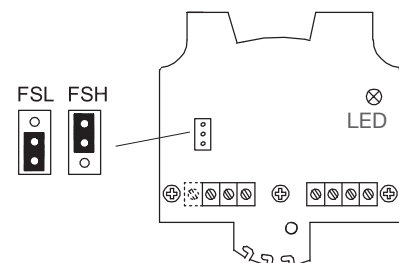
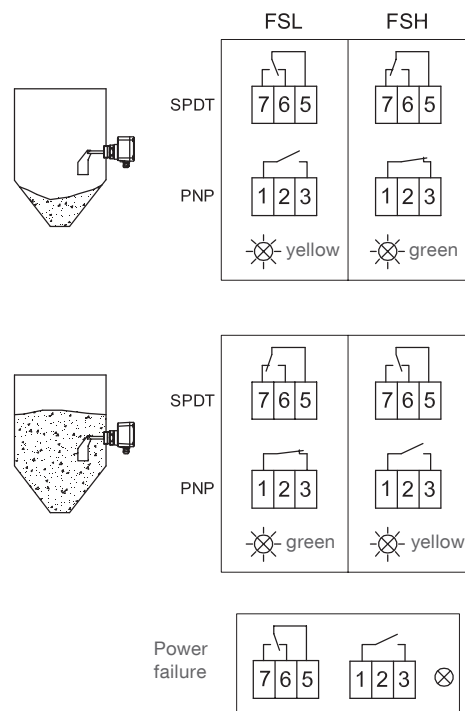
- PNP
- Universal voltage

FSH: Set in case of using the sensor as a full detector.

Power failure or line break is regarded as „full“ signal (protection against overfilling).

FSL: Set in case of using the sensor as an empty detector.

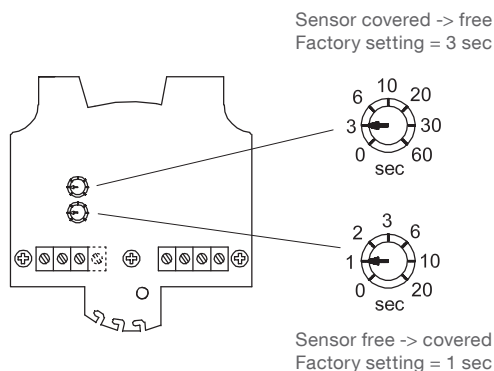
Power failure or line break is regarded as „empty“ signal (protection against running dry).



Factory setting: FSL

## Signal and alarm output

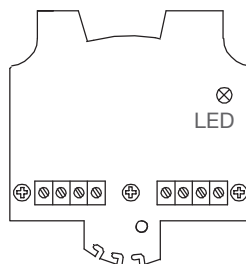
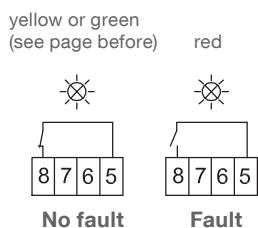
### Signal output: Delay



### Alarm output (Fail safe alarm)

#### Switching and timing behaviour:

If the sensor is not covered, the rotating paddle shaft will send pulses at 20 sec intervals. In case of fault, the pulses are missed. After 30 sec the alarm relay will open.

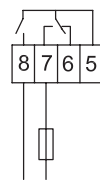


#### Connection example:

Full detector with maximum safety:

The output signal opens in case of:

- full signal or
- failure of supply voltage or
- defect of the connection wires or
- defective unit



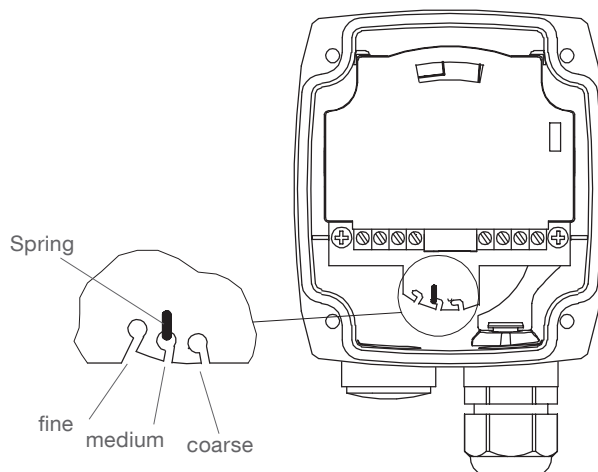
## Settings: Sensitivity

### Adjustment of the spring

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

„Fine“: for light material  
 „Medium“: suitable for nearly every material (factory setting)  
 „Coarse“: for very sticky material

The spring can be changed via a small plier.



### Sensitivity

The table shows approximate values for the minimum densities, at which a normal function should be possible.

Vane	*Minimum density in g/l = kg/m³ (lb/ft³) (without guarantee)			
	Vane completely covered with bulk material		Bulk material covers vane up to 100 mm (3.93")	
	Spring adjustment		Spring adjustment	
	fine	medium (Factory setting)	fine	medium (Factory setting)
Boot shaped vane 40 x 98	200 (12)	300 (18)	100 (6)	150 (9)
Boot shaped vane 35 x 106	200 (12)	300 (18)	100 (6)	150 (9)
Boot shaped vane 28 x 98	300 (18)	500 (30)	150 (9)	200 (12)
Boot shaped vane 26 x 77	350 (21)	560 (33)	200 (12)	250 (15)
Hinged vane 98 x 200 b=37 double sided	70 (4.2)	100 (6)	35 (2.16)	50 (3)
Hinged vane 98 x 200 b=28 double sided	100 (6)	150 (9)	50 (3)	75 (4.5)
Hinged vane 98 x 100 b=37 single sided	200 (12)	300 (18)	100 (6)	150 (9)
Hinged vane 98 x 100 b=28 single sided	300 (18)	500 (30)	150 (9)	250 (15)

The above mentioned data is a guideline and is for loose, non compacted material.  
 During the filling the bulk density can change (e. g. for fluidised material).

\*For versions with option 26 (heating of housing) the above mentioned data must be multiplied by 1.5.

## Maintenance

<b>Opening the lid (cover)</b>	<p>Before opening the lid for maintenance reasons observe following items:</p> <ul style="list-style-type: none"> <li>• Do not remove the lid while circuits are alive.</li> <li>• No dust deposits or whirlings are present.</li> <li>• No rain can enter into the housing.</li> </ul>
<b>Frequent check of the unit</b>	<p>To ensure durable safety in hazardous locations and with electrical safety, following items must be checked frequently depending on the application:</p> <ul style="list-style-type: none"> <li>• Mechanical damage or corrosion of any components (housing side and sensor side) and of the field wiring cables.</li> <li>• Tight sealing of the process connection, cable glands and enclosure lid.</li> <li>• Properly connected external PE cable (if present).</li> </ul>
<b>Cleaning</b>	<p>If cleaning is required by the application, following must be observed:</p> <ul style="list-style-type: none"> <li>• Cleaning agent must comply with the materials of the unit (chemical resistance). Mainly the shaft sealing, lid sealing, cable gland and the surface of the unit must be considered.</li> </ul> <p>The cleaning process must be done in a way, that:</p> <ul style="list-style-type: none"> <li>• The cleaning agent cannot enter into the unit through the shaft sealing, lid sealing or cable gland.</li> <li>• No mechanical damage of the shaft sealing, lid sealing, cable gland or other parts can happen.</li> </ul> <p>A possible accumulation of dust on the unit does not increase the maximum surface temperature and must therefore not be removed for purposes of maintaining the surface temperature in hazardous locations.</p>
<b>Function test</b>	<p>A frequent function test may be required depending on the application.</p> <p>Observe all relevant safety precautions related with a safe work depending on the application (e.g. hazardous locations, hazardous bulk material, electric safety, process pressure).</p> <p>This test does not proof if the sensor is sensitive enough to measure the material of the application.</p> <p>Function test is done by stopping the rotating paddle with appropriate means and monitor if a correct change of the signal output from uncovered to covered happens.</p>
<b>Production date</b>	<p>The production date can be traced by the serial number on the typeplate. Please contact the manufacturer or your local distributor.</p>
<b>Spare parts</b>	<p>All available spare parts are stated in the selection list</p>

## Notes for use in Hazardous Locations

### Zone classification

	Useable in zone	Category	Equipement Protection Level (EPL)
Dust applications	20, 21, 22	1 D	Da
	21, 22	2 D	Db
	22	3 D *	Dc

\* in case of conductive dust additional requirements for the installation are necessary.

### General Notes

#### Marking

Devices with Ex approval are marked on name plate.

#### Process pressure



Devices with Ex Approval are approved for atmospheric pressure.  
 A detailed explanation is given below for ATEX and applies analogously for other Ex approvals:  
 The scope of the ATEX directive is generally limited to atmospheric pressure, see ATEX directive 2014\_34\_EU Chapter 1 Art.2 (4).  
 Atmospheric pressure is defined as absolute pressure 0.8bar to 1.1bar, see ATEX guideline §50 and IEC 60079-0 chapter 1 Scope.  
 The technical background is that an explosive atmosphere which is compressed (overpressure) or released (underpressure) can exhibit different explosion behaviour than under atmospheric conditions. The standards for the types of protection against explosion (IEC 60079 series), on which a type approval according to the ATEX directive is based, are designed for atmospheric conditions and do not automatically cover deviating pressure conditions.  
 Thus, an ATEX type approval issued in accordance with this directive only covers atmospheric pressure. This applies to all manufacturers.  
 A deviating operating pressure can be assessed and approved by an expert for the respective application.  
 Regardless of this, the design of the level indicators is suitable for a vessel overpressure / underpressure in accordance with the specified technical data.

#### Process and ambient temperature

The permitted temperature ranges are marked on the name plate.

### ATEX/ UKEX: Year of manufacturing

Marking on the name plate is done according to IEC 60062 as follows:

Year of manufacturing	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Marking code	K	L	M	N	P	R	S	T	U	V	W	X

### ! Specific conditions of use

#### Electrostatic charge

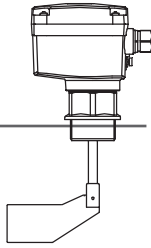
The apparatus shall be installed in a way that danger caused by electrostatic charges is avoided.

## Notes for use in Hazardous Locations / Disposal

### Permitted zones for mounting in partition wall

EPL	Db
Category	2D
Zone	21

EPL	Da
Category	1D
Zone	20

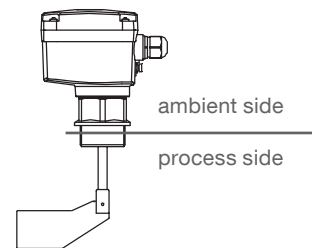


### Max. Surface Temperature and Temperature Code

The temperature marking on the name plate  refers to the instruction manual.  
 In the following tables the relevant temperature ratings are shown.

The maximum surface temperature (resp. temperature class) is the warmest temperature of the unit which could occur during malfunction (according to Ex-definition).

Max. ambient temperature	Max. process temperature	Max. surface temperature (EPL Db)	Max. surface temperature (EPL Da)	Temperature class
30°C (86°F)	50°C (122°F)	90°C (194°F) 120°C (248°F) <sup>(1)</sup>	T <sub>200</sub> 90°C (194°F) T <sub>200</sub> 120°C (248°F) <sup>(1)</sup>	T5 T4 <sup>(1)</sup>
40°C (104°F)	60°C (140°F)	100°C (212°F) 120°C (248°F) <sup>(1)</sup>	T <sub>200</sub> 100°C (212°F) T <sub>200</sub> 120°C (248°F) <sup>(1)</sup>	T4
50°C (122°F)	70°C (158°F)	110°C (230°F) 120°C (248°F) <sup>(1)</sup>	T <sub>200</sub> 110°C (230°F) T <sub>200</sub> 120°C (248°F) <sup>(1)</sup>	T4
60°C (140°F)	80°C (176°F)	120°C (248°F)	T <sub>200</sub> 120°C (248°F)	T4



<sup>(1)</sup> With use of electronic "Universal voltage"

### Disposal

The product consists of materials which can be recycled, details of the used materials see chapter "Technical data - mechanical data".  
 Recycling must be done by a specialised recycling company.