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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 and means, that a failure to observe the necessary precautions can result in death, serious injury and/or considerable material damage.
	WARNING 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	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 uwt.de). Otherwise please contact:

UWT GmbH
Westendstr. 5
87488 Betzigau
Germany

Tel. 0049-(0)831/ 57123-0
Fax. 0049-(0)831/ 76879
info@uwt.de
www.uwt.de

Introduction

Applications

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

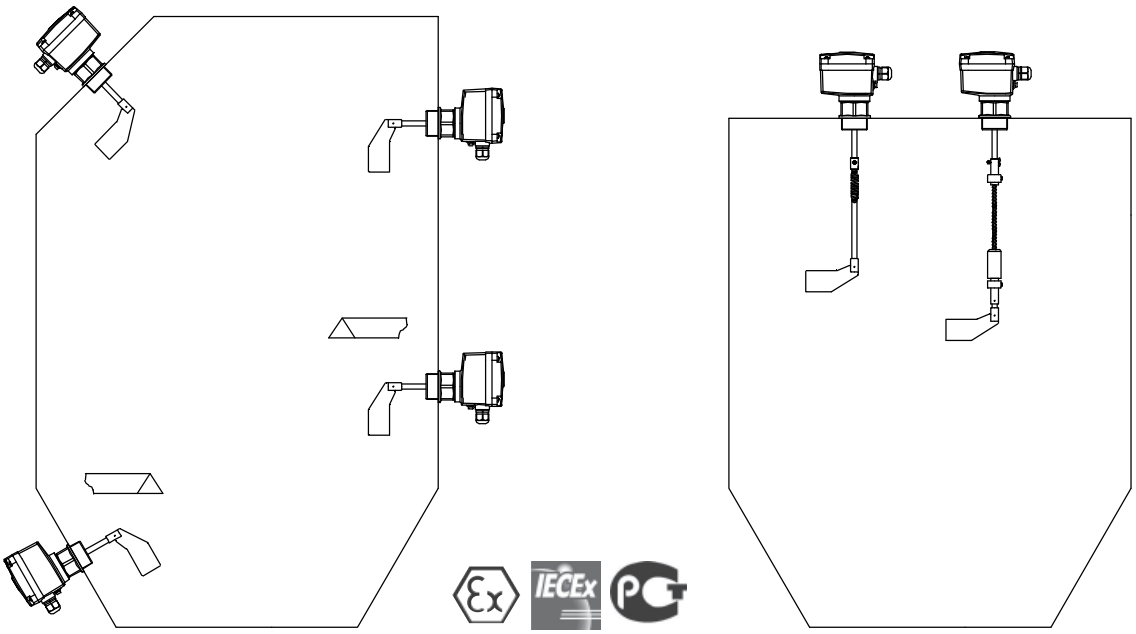
The units can be delivered with Ex-approvals for use in Hazardous Areas.

Selected applications:

- **building materials industry**
  lime, styrofoam, moulding sand, etc**.**
- **food industry**
  milk powder, flour, salt, 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 brushless synchronous motor drives a rotating measuring vane.

When the material level reaches the measuring vane, it is handicapped in its rotation. The motor is freely suspended within the housing. The caused reaction torque is used to operate a micro switch giving a signal output and to stop the motor (figure 2).

When the paddle becomes free again due to falling 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 output signal is switched back (figure 1).

Signal output delay:
The version "universal voltage" has an integrated adjustable delay for the signal output.

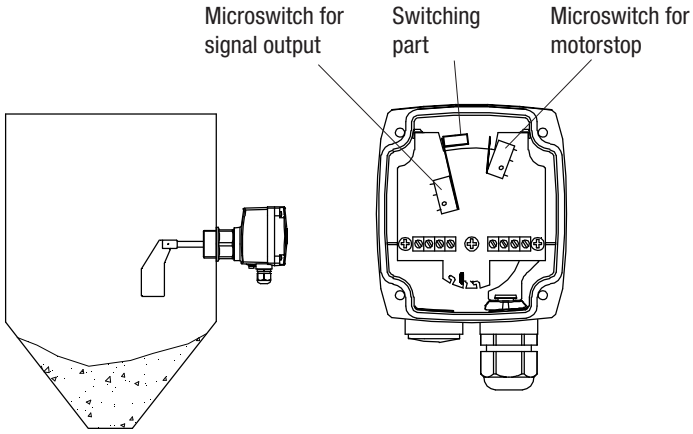


Figure 1

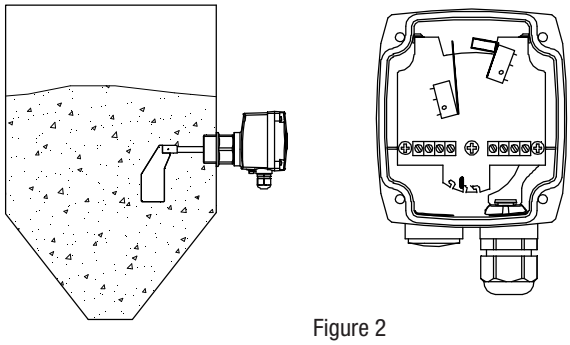
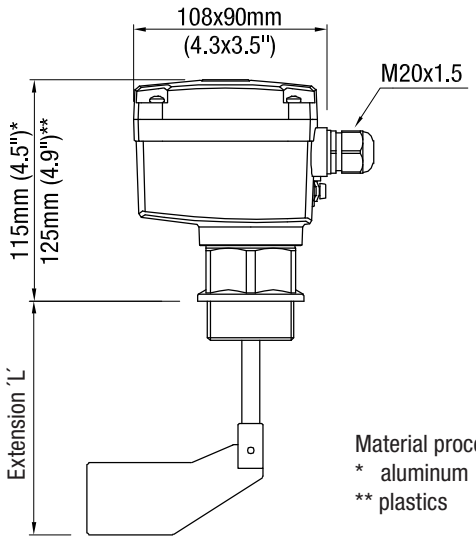


Figure 2

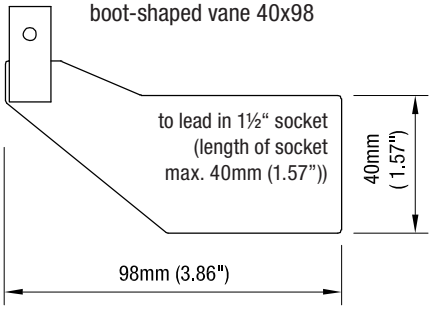
Technical Data



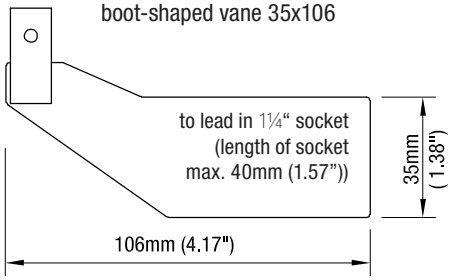
Material process connection:
* aluminum
** plastics

Measuring vanes

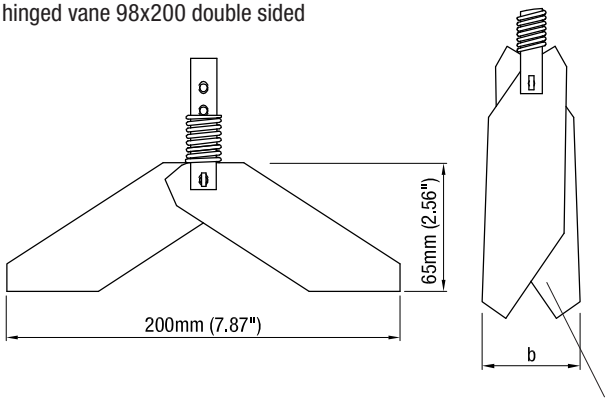
code A
boot-shaped vane 40x98



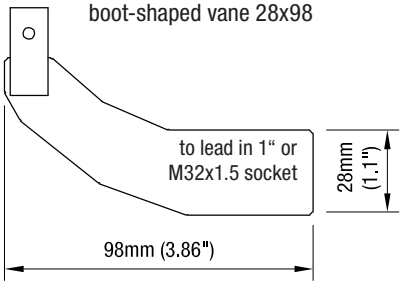
code D
boot-shaped vane 35x106



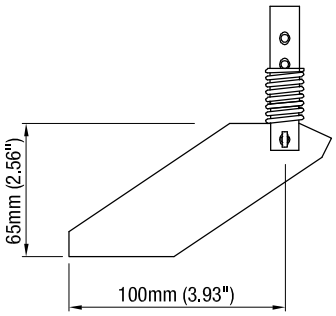
code K
hinged vane 98x200 double sided

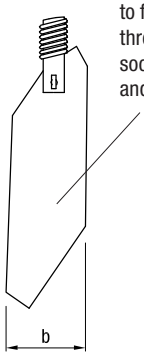


code R
boot-shaped vane 28x98



code S
hinged vane 98x100 single sided

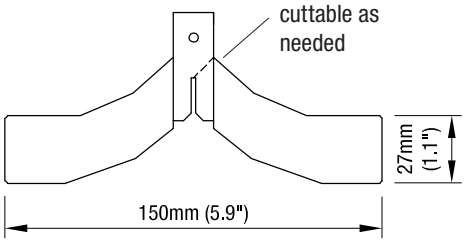




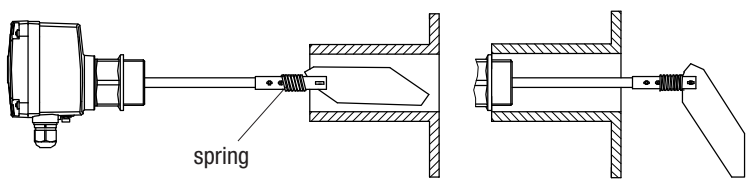
socket	b
1½“ / 1¼“	37mm (1.46")
1" / M32x1.5	28mm (1.1")

* delivery according to selected thread size

code U
universal vane (plastics)



insertion of the hinged vane through a long socket



Technical Data

Electrical data

Connection terminals	max. 1.5mm² (AWG 16)
Cable entry	M20 x 1,5 screwed cable gland
Protection class	I
Installation category	III
Pollution degree	2

Electronics

	AC version	**DC version**	**Multivoltage version**	**Universal voltage**
Power supply	24V or 48V or 115V or 230V 50/60Hz All voltages ±15% (including 10% of EN 61010)	24V DC ±15% (including 10% of EN 61010)	24V DC or 115V 50/60Hz or 230V 50Hz All voltages ±15% (including 10% of EN 61010)	24V DC 20 .. 230V 50/60Hz 24V DC ±15% 20 .. 230V +10% (including 10% of EN 61010)
Installed load	max. 4VA	max. 2.5W	24V DC max. 2.5W 115V AC max. 4VA 230V AC max. 6VA	24V DC max. 4W 20 .. 230V max.10VA
Signal output	Microswitch or Relais SPDT contact:		max. 250V AC, 2A, 500VA (cosφ= 1) max. 300V DC, 2A, 60W	
Indicating light	—		Status of signal output by built-in LED	
Isolation	Power supply to signal output: 2225 Vrms			

Mechanical data

Housing	Plastics PA6 GF, RAL 5010 gentian blue
Degree of protection	IP 66 (EN 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"	± 10mm (± 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

Technical Data / Approvals

Operating conditions

Ambient temp. (housing)	-20 .. +60°C (-4 .. +140°F) -40 .. +60°C (-40 .. +140°F) Version with heating of housing (pos. 26)
Process temperature	-20 .. + 80°C (-4 .. +176°F) -40 .. +80°C (-40 .. +176°F) Version with heating of housing (pos. 26)
Min. powder density / Sensitivity	see section “Sensitivity” on page G14.

Signal delay

Version	AC, DC, Multivoltage	Universal voltage
Sensor free -> covered*	ca. 1.3 sec	ca. 1,5 sec + 0 ..20 sec adjustable
Sensor covered -> free	ca. 0.2 sec	ca. 0,2 sec + 0 ..60 sec adjustable

*after blocking of the measuring vane

Features of bulk material	Hardly any limitations.
Max. permitted mechanical torque (lateral)	Process connection aluminium: max. 50 Nm Process connection plastics: max. 25 Nm Protective measures in case of high loading: mounting of an protective canopy above the probe.
Max. tractive force	Pendulum shaft: 400N (applicable only as full detector) Rope extension: 1,5kN (applicable only as full detector)
Max. process pressure	-0,5 .. +0,8bar (-6.8 .. 11.6psi) Versions with Ex-approvals: see remarks on page G15.
Relative Humidity	0-100%, suitable for outdoor use
Altitude	max. 2.000m (6.562ft)

Approvals

Non-hazardous Locations	CE	EN 61010-1 (IEC/CB)	
Hazardous Locations *	ATEX IEC-Ex GOST-R Ex/ RTN Ex	Dust explosion Dust explosion Dust explosion	ATEX II 1/2 D IEC-Ex ta/tb IIIC T! Da/Db IP66
EMC	EN 61326 -A1		
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, clause 2.1.4). The units are designed and manufactured in accordance to the Pressure Equipment Directive. The unit is NOT intended for use as a "equipment part with safety function" (Art.1, clause 2.1.3). If the units should be used as "equipment part with safety function", please contact the manufacturer.		

!

* Depending on selected version

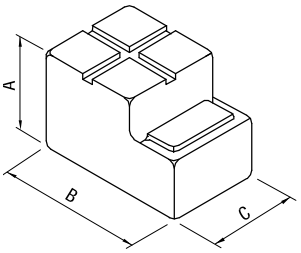
Options

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

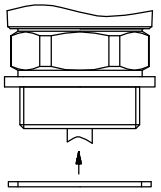
Material: PE, weather and temperature stable



For use in Hazardous Locations:
only permitted for zone 22

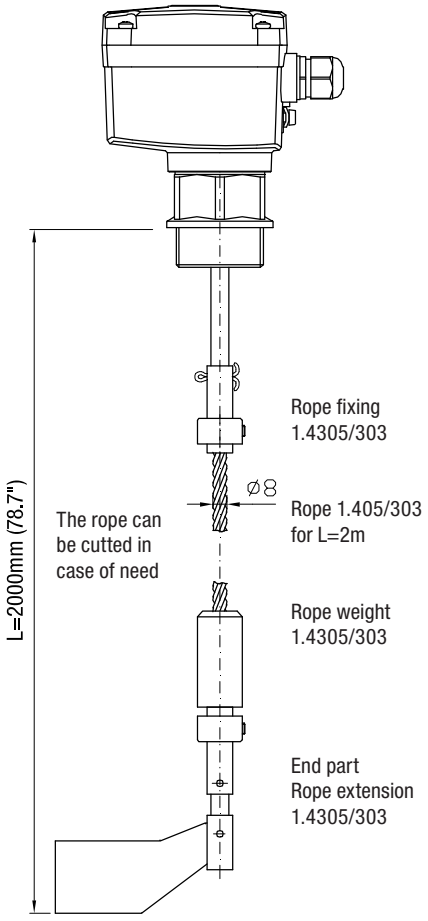
Flat gasket

On the face sealing of the process connection thread.
Incl. sealing face for version with process connection G 1 1/2" thread aluminium.

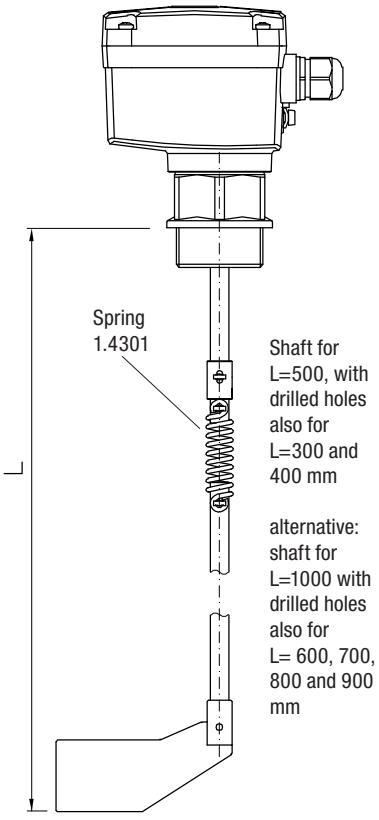


Extensions
(Kits, application only as full detector)

Rope extension



Pendulum shaft



If necessary the shaft can be cutted approx. 10 to 15mm 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 choosen 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 G7 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.

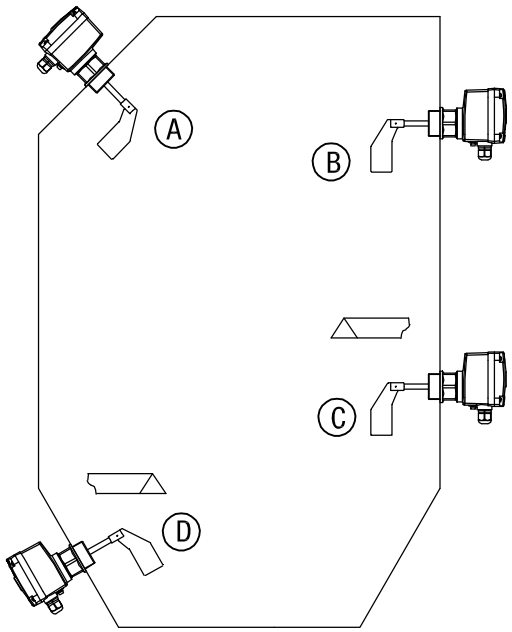
Additional Safety Instructions for Hazardous Locations

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

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 Teflon tape or a flat gasket against process pressure.

Mounting



A Full detector vertical and oblique from the top

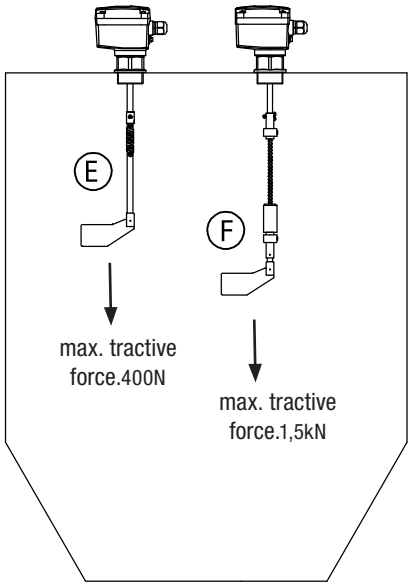
B Full detector horizontal

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).

Mounting/Electrical Installation



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

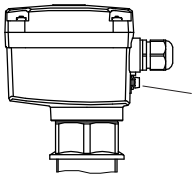
General Safety Instructions

Handling	! In the case of improper handling or handling malpractice, the electric safety of the device cannot be guaranteed.
Installation regulations	The local regulations or VDE 0100 (Regulations of German Electrotechnical Engineers) must be observed.
Fuse	Use a fuse as stated in the connection diagrams (see pages G12).
RCCB protection	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.
Power supply switch	A voltage disconnection switch must be provided near the device.
Wiring diagram	The electrical connections are made in accordance with the wiring diagram.
Supply voltage	Compare the supply voltage applied with the specifications given on the electronic module and name plate before switching the device on.
Cable gland	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.
Field wiring cables	All field wirings must have insulation suitable for at least 250V AC. The temperature rating must be at least 90°C (194°F).
Microswitch protection	Provide protection for microswitch contacts to protect the device against inductive load surges.
Protection against static charging	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

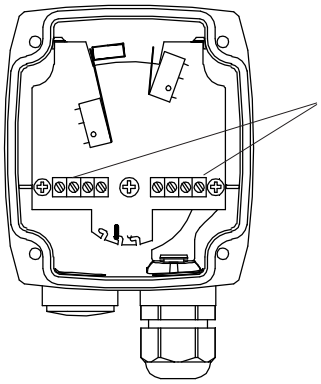
! Additional Safety Instructions for Hazardous Locations

Extenal equipotential bonding terminal



Field wiring	A strain relief must be provided for the field wiring cables, when the device is installed with the factory provided cable glands.
Cable glands for ATEX / IEC-Ex	Installation according to the regulations of the country, where the product is installed. Not used entries have to be closed with blanking elements certified for this purpose. Where applicable the factory provided parts must be used. A strain relief must be provided for the field wiring cables, when the device is installed with the factory provided cable glands. The diameter of the field wiring cable must match to the clamping range of the cable clamp. 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 10K. The parts must be mounted according to the instructions of the supplier.
Commissioning	Commissioning only with closed lid.
Opening the lid	Before opening the lid take care, that no dust deposits or whirlings are present. Do not remove the lid (cover) while circuits are alive.

Connection



Electrical installation

Version:
- AC
- DC
- Universal voltage

Power supply AC version:
24V or 48V or 115V or 230V 50/60Hz
max. 4VA

Supply voltage as selected.

All voltages ±15% (1)
Fuse on power supply: max 10A

Power supply DC version:
24V DC max. 2.5W

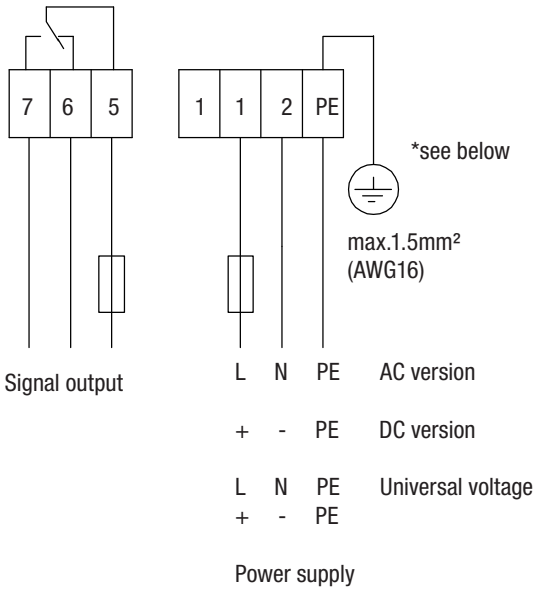
Voltage ±15% (1)
Fuse on power supply: not necessary

Power supply Universal voltage:
24V DC max. 4W
20 .. 230V 50/60Hz max. 10VA

Voltages:
24V DC ±15% (1), 20 .. 230V AC +10% (1)
Fuse on power supply: not necessary

Signal output:
Micro switch (with universal voltage: relay) SPDT contact:
max. 250V AC, 2A, 500VA (cosφ = 1)
max. 300V DC, 2A, 60W
Fuse on signal output: max 10A

(1) including 10% of EN 61010

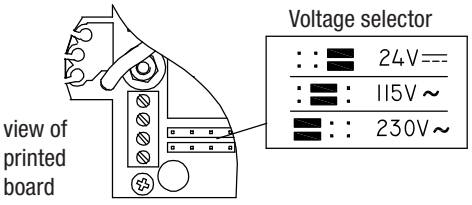


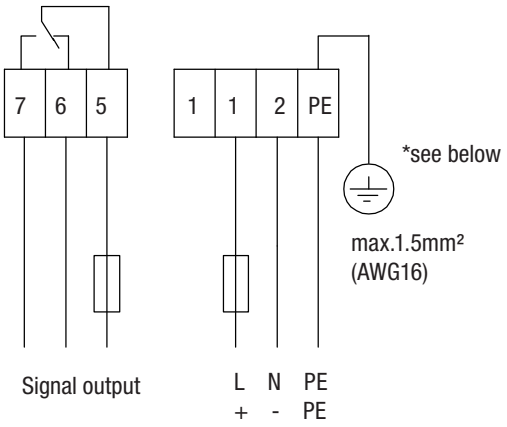
Version Multivoltage

Power supply:

24V DC	max. 2.5W	or
115V 50/60Hz	max. 4VA	or
230V 50Hz	max. 6VA	

Set the voltage-selector on the PCB to the desired voltage.





Signal output:
Micro switch SPDT contact:
max. 250V AC, 2A, 500VA (cosφ = 1)
max. 300V DC, 2A, 60W

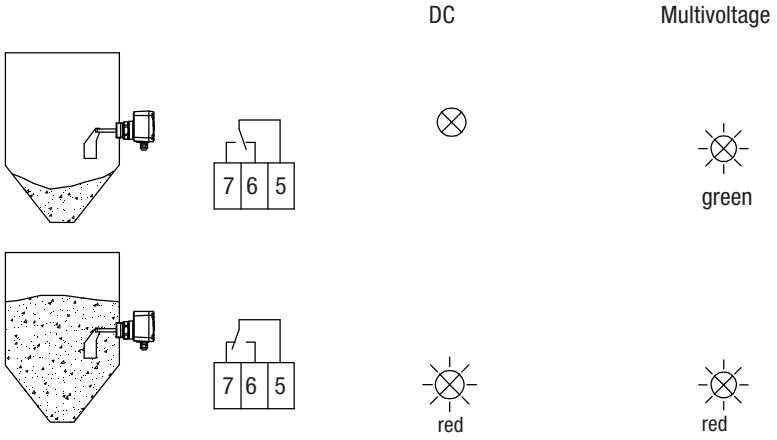
Fuse on signal output: max 10A

* **Protection against static charching:**
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.

Switching logic

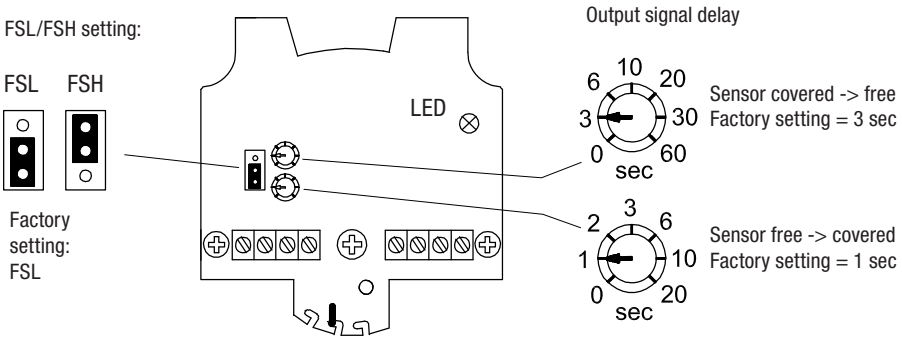
Version: AC, DC, Multivoltage

Signal output



Version: Universal voltage

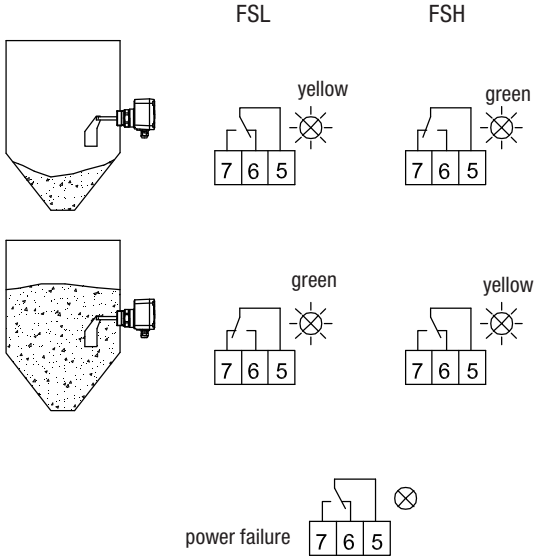
Control elements



FSH: Set in case of using the sensor as a full detector:
Power failure or line break is regarded as „full“ signal (protection against overcharging).

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).

Signal output



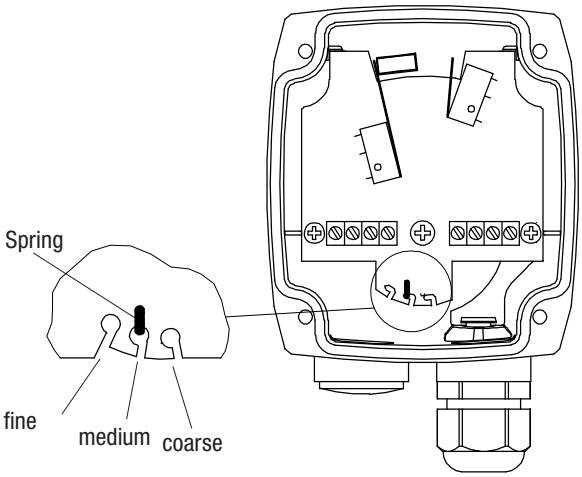
Settings: Sensitivity / Maintenance

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 100mm (3.93“)	
	Spring adjustment		Spring adjustment	
	fine	medium (Werkseinstellung)	fine	medium (Werkseinstellung)
Boot shaped vane 40x98	200 (12)	300 (18)	100 (60)	150 (9)
Boot shaped vane 35x106	200 (12)	300 (18)	100 (60)	150 (9)
Boot shaped vane 28x98	300 (18)	500 (30)	150 (9)	200 (12)
Hinged vane 98x200 b=37 double sided	70 (4.2)	100 (60)	35 (2.16)	50 (3)
Hinged vane 98x200 b=28 double sided	100 (60)	150 (9)	50 (3)	75 (4.5)
Hinged vane 98x100 b=37 single sided	200 (12)	300 (18)	100 (60)	150 (9)
Hinged vane 98x100 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 multipied by 1.5.

Maintenance

Generally the device requires no maintenance.

Notes for use in Hazardous Locations

Zone classification

	Useable in zone	ATEX Category	IEC-Ex 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 for ATEX / IEC-Ex

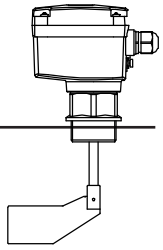
The device construction allows process over-pressure upto 0.8 bar (11.6 psi). These pressures are allowed for test purposes. The definition of the ATEX and IEC-Ex is only valid for a container-over-pressure between -0.2..+0.1 bar (-2.9..+1.45psi).
For higher or lower pressures the approval is not valid.

Process and ambient temperature

The permitted temperature ranges are marked on the name plate.

Permitted zones for mounting in partition wall

EPL (IEC-Ex)	Db
Category (ATEX)	2D
Zone	21
EPL (IEC-Ex)	Da
Category (ATEX)	1D
Zone	20

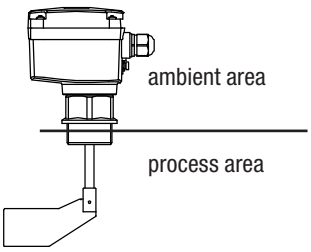


Max. Surface Temperature and Temperature Code

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	Temperature class
40°C (104°F)	60°C (140°F)	100°C (212°F) 120°C (248°F) (1)	T5 T4 (1)
50°C (122°F)	70°C (158°F)	110°C (230°F) 120°C (248°F) (1)	T4
60°C (140°F)	80°C (176°F)	120°C (248°F)	T4



(1) With use of electronic "Universal voltage"