

Table of contents

	Page
Overview	2

Specifications	3

Applications	4

NB 3000 Solids measurement	6

NB 3000 Interface measurement (solids in water)	8

Accessories	10

Dimensions	11

Spare parts	14

Electrical installation	16

Subject to change.

All dimensions in mm (inches).

All prices in Euro (€) or USD (\$),
 excluding VAT.

All EURO prices are EXW Betzigau,
 all USD prices are EXW Memphis,
 excluding packaging costs.

Valid: From 01.04.2018 until 31.03.2019, unless otherwise agreed.

By publishing this selection list all other lists become invalid.

We assume no liability for typing errors.

Different variations to those specified are possible.
 Please contact our technical consultants.

Overview

Features

Continuous level measurement of solids and interface applications

Process

- Independent of bulk material properties
- Very accurate measurement

Service

- Simple installation and commissioning
- Rope, tape and (optional) motor with increased service life
- Low maintenance

Approvals

- Approval for use in Hazardous Areas
- 2011/65/EU RoHS conform

Mechanics

- Measurement range up to 50 m (164 ft)
- 1½" process connection possible
- Internal tape cleaner for difficult materials
- Window in lid and outside start button (optional)

Electronics

- Micro processor controlled measurement
- Comprehensive diagnostic possibilities
- Output 0/ 4-20 mA/ Modbus/ Profibus DP/ counting pulses
- Programmable Relais (can be used as level limit switch outputs)

Solids measurement



NB 3100
 Rope version
 (fig. with process connection thread and stainless steel weight)

NB 3200
 Tape version
 (fig. with process connection thread and stainless steel weight)

Interface measurement



NB 3300
 Rope version

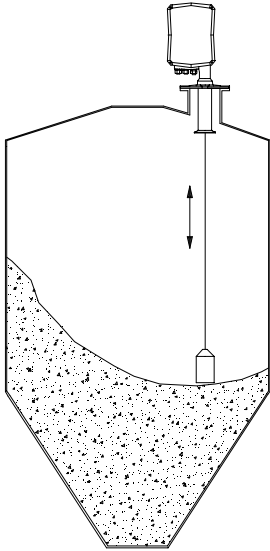
NB 3400
 Tape version

Specifications

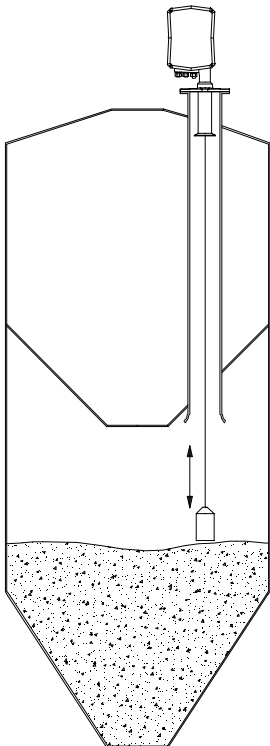
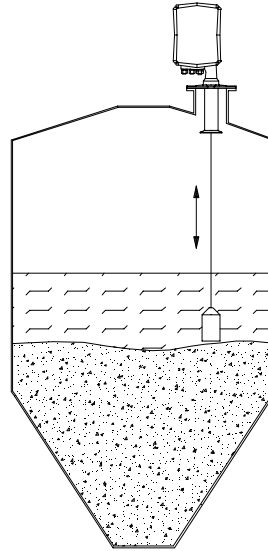
				NB 3100/ 3200 Solids measurement	NB 3300/ 3400 Interface measurement
Process	Measurement range	Rope version	30 m (98.4 ft)	•	•
		Tape version	40 m (131 ft)/ 50 m (164 ft)	•	•
	Process temperature		80°C (176°F)	•	•
			150°C (302°F)	•	
			250°C (482°F)	•	
	Process overpressure		-0.3 .. +0.3 bar (-4.35 .. + 4.35 psi)	•	•
			-0.5 .. +1.7 bar (-7.3 .. +25 psi)	•	•
Electronics	Power supply	AC version	98 .. 253 V 50 - 60 Hz	•	•
		DC version	20 .. 28 V	•	•
	Output		0/ 4-20 mA	•	•
			4 relais	•	•
			Modbus RTU	•	•
			Profibus DP	•	•
Approvals	Dust Ex		ATEX 1/2D	•	•
			FM Cl. II, III Div. 1	•	•
			TR-CU	•	•
	Ordinary Locations		CE, FM, TR-CU	•	•

Applications

Solids measurement



**Interface measurement
(solids in water)**



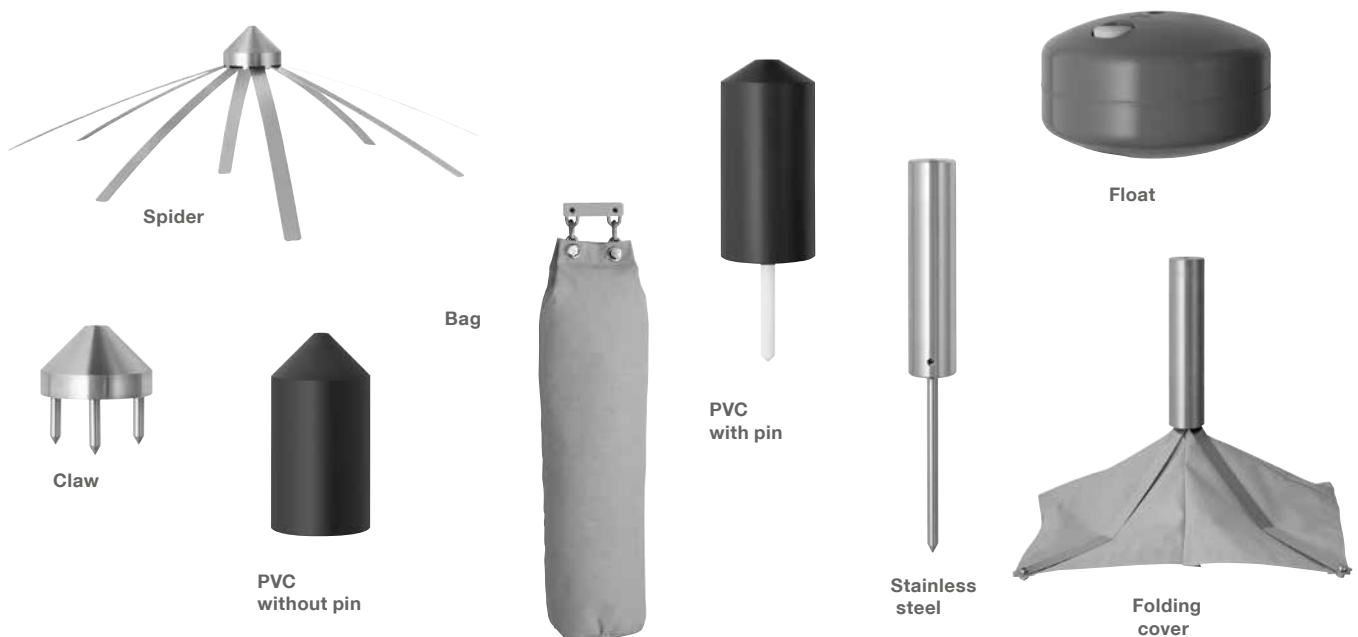
For measurements through a long pipe in a double chamber silo we recommend the use of NB 3200 (tape version).

Applications

Sensor weight guide (solids measurement)

Sensor weight	Application				Note	Fits through mounting hole				
	* Material density g/l (lb/ft³)	Material consistence	Angle of repose	Max. process temp.		Thread		Flange		
						1½"	3"	2"	3"	DN100 / 4"
PVC without pin	>300 (18)	granulate	flat	80°C (176°F)	Standard weight					•
PVC with pin	>300 (18)	granulate, powder	steep	80°C (176°F)	The pin penetrates into the material and avoids slipping or tilting of the sensor weight on the steep bulk surface.					•
Stainl. steel	>300 (18)	granulate, powder	flat, steep	250°C (482°F)	The pin penetrates into the material and avoids slipping or tilting of the sensor weight on the steep bulk surface.	•	•	•	•	•
Claw	>200 (12)	coarse (e.g. stones)	steep	250°C (482°F)	Avoids slipping or tilting on the steep bulk surface.					•
Folding cover	>20 (1.2)	light powder	flat, steep	80°C (176°F)	Big surface prevents the sensor weight from sinking into the material.	•	•	•	•	•
Spider	>40 (1.4)	light powder	flat, steep	250°C (482°F)	Big surface prevents the sensor weight from sinking into the material.					•
Bag	>300 (18)	granulate, powder	flat	80°C (176°F)	Prevents damage of the conveying screw. To be filled with bulk material.					•
Float	-	liquids only	-	80°C (176°F)	To be filled with material.					

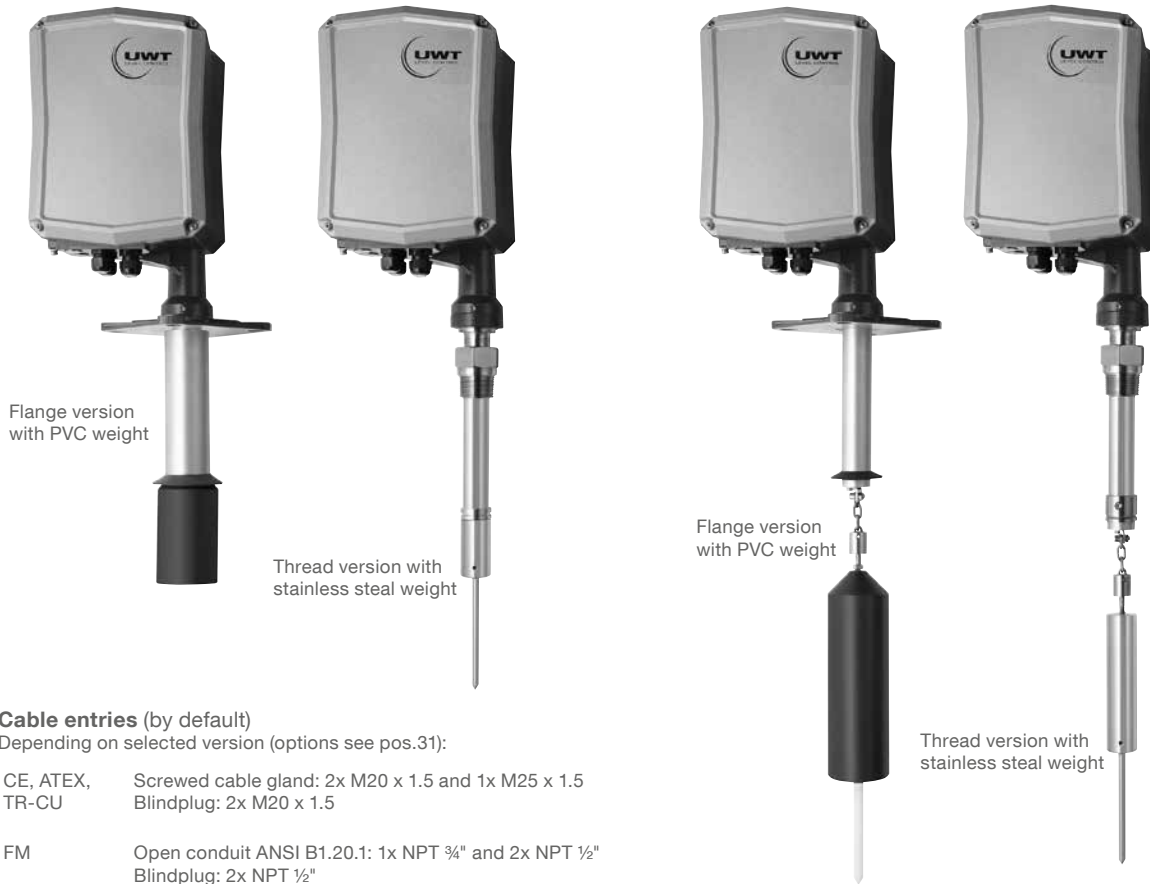
* The above mentioned data is a guideline and is valid for material which has settled after filling. During the filling the bulk density can change (e. g. for fluidised material).



Solids measurement

NB 3100
Rope version

NB 3200
Tape version



Cable entries (by default)

Depending on selected version (options see pos.31):

- CE, ATEX, TR-CU Screwed cable gland: 2x M20 x 1.5 and 1x M25 x 1.5
 Blindplug: 2x M20 x 1.5
- FM Open conduit ANSI B1.20.1: 1x NPT 3/4" and 2x NPT 1/2"
 Blindplug: 2x NPT 1/2"

Dimensions see page 12

pos.1	<p>Basic type</p> <p>C NB 3100 Rope version (30 m)</p> <p>D NB 3200 Tape version (40 m)</p>	• •
pos.2	<p>Certificate</p> <p>0 CE ⁽¹⁾</p> <p>W ATEX II 1/2 D</p> <p>M FM general purpose</p> <p>N FM Class II, III Div.1 Group E-G</p> <p>E TR-CU Ex ta/tb IIIC T! Da/Db X</p>	• • • • •
pos.3	<p>Process temperature</p> <p>A max. +80°C (176°F)</p> <p>S max. +150°C (302°F)</p> <p>T max. +250°C (482°F)</p>	• • •
pos.4	<p>Power supply</p> <p>1 98 .. 253 V 50 - 60 Hz</p> <p>3 20 .. 28 V DC</p>	• •
pos.5	<p>Signal output</p> <p>D 0/ 4-20 mA Modbus Relay counting pulse (5 cm 10 cm 1/6 ft 1/3 ft)</p> <p>B 0/ 4-20 mA Modbus Electronic counting pulse (1 cm 2.5 cm 1/20 ft 1/10 ft)</p> <p>E 0/ 4-20 mA Profibus DP Relay counting pulse (5 cm 10 cm 1/6 ft 1/3 ft)</p>	• • •
pos.6	<p>Process connection</p> <p>X Flange DN100 PN16 (EN 1092-1) and flange 4" 150lbs ANSI B16.5 (unit is fitting to this flange)</p> <p>Y Flange 2" and flange 3" 150 lbs ANSI B16.5 (unit is fitting to this flange)</p> <p>A Thread R 1½" tapered EN 10226-1</p> <p>B Thread NPT 1½" tapered ANSI B1.20.1</p> <p>C Thread NPT 3" tapered ANSI B1.20.1</p>	• • • • •

Solids measurement

pos.7	Motor for high measurement frequency ⁽¹⁾	
	1 Standard	•
	2 Brushless motor ⁽²⁾	•
pos.8	Sensor weight ^(3,4)	
	Y without ⁽⁵⁾	•
	A PVC without pin only with rope version pos.1 C, max. 80°C	•
	B PVC with pin max. 80°C	•
	C Stainless steel	•
	D Claw stainless steel	•
	E Folding cover max. 80°C, stainless steel, PA canvas	•
	F Spider stainless steel	•
	G Bag max. 80°C, PA canvas	•
	H Float max. 80°C, PP	•

NB 3..00										← Order code
Position	1	2	3	4	5	6	7	8		

All positions are available in special design (use code "Z").

- (1) TR-CU (Ordinary Locations) included
- (2) Motor with increased service life
- (3) For use in Hazardous Locations (Dust Ex): It must be ensured, that no static discharge from the material surface can occur. Sensor weights, which can be used in case of possible static discharge, on request.
- (4) See Sensor weight guide on page 5
- (5) Including mounting set for sensor weight (see page 14: Sensor weights)

Options

pos.11	x	Guarantee extension to 5 years	•
		Wear and tear parts rope/tape and standard motor pos.7 1 not included	
pos.21		Weather protection cover	•
		For Ex only approved for Zone 22 or Division 2	
pos.23		Measurement range 50 m	•
		Available with tape version pos.1 D, not with sensor weight pos.8 G,H	
pos.25		Window in lid and external start button	•
pos.26		Internal heater	•
		Needed for: ambient temp. < -20°C (-4°F) or condense water inside silo or wet process atmosphere (Note: < -20°C (-4°F) with ATEX, FM Class II or TR-CU possible on request)	
pos.27		Length of socket pipe	
	A	500 mm (19.7")	•
	B	1,000 mm (39.4")	•
pos.28		Compressed air connector	•
		Quick coupling including counter part, for hose diameter 9 mm (0.35")	
pos.29		Increased corrosion resistance	•
		All metal parts on process side coated, rope with plastic coating, use of stainless steel bearings Available with: Rope version (pos.1 C), CE or FM gen.purp. (pos.2 0,M), 80°C (pos.3 A), PVC weight (pos.8 A,B)	
pos.30		Increased process overpressure	•
		-0.5 to 1.7 bar (-7.3 to 25 psi) (for CE and ATEX, pos.2 0,W) -0.5 to 1.1 bar (-7.3 to 16 psi) (for FM general purpose, pos.2 M)	
pos.31		Cable entry	
		Selection of the following options only necessary, if a deviation from the default cable gland/ conduit is required:	
	0	Screwed cable gland 1x M25 x 1.5 + 2x M20 x 1.5 + blindplug 2x M20 x 1.5	•
	A	Conduit 1x NPT ¾" + 2x NPT ½" + blindplug 2x NPT ½"	•
pos.33		Preset fieldbus address (Modbus)	•
		Enables easy commissioning with Nivotec Level Monitoring System Preset from address = "1" to "amount of ordered units". Address label on enclosure. Termination resistor set on unit with highest address. Other addresses possible on request.	

Interface measurement (solids in water)

NB 3300 Rope version

For applications with soft/ muddy or compact material surface



NB 3400 Tape version

For applications with compact material surface



Implemented

- Internal heater
- Rope/ tape roller with rubber coating to avoid slipping
- Plastic coated steel weight (rope version)
- Adjustment possibility for applications with soft/muddy material surface (rope version)

Cable entries (by default)

Depending on selected version (options see pos. 31):

CE, ATEX, TR-CU Screwed cable gland: 2x M20 x 1.5 and 1x M25 x 1.5
 Blindplug: 2x M20 x 1.5

FM Open conduit ANSI B1.20.1: 1x NPT ¾" and 2x NPT ½"
 Blindplug: 2x NPT ½"

Dimensions see page 12

Interface measurement (solids in water)

pos.1	Basic unit								
	E	NB 3300	Rope version (30 m) incl. sensor weight	.....					•
	F	NB 3400	Tape version (40 m) incl. sensor weight	.....					•
pos.2	Certificate								
	0	CE ⁽¹⁾						•
	W	ATEX II 1/2 D	.....						•
	M	FM general purpose	.....						•
	N	FM Class II, III Div.1 Group E-G	.....						•
	E	TR-CU Ex ta/tb IIIC T! Da/Db X	.....						•
pos.4	Power supply								
	1	98 .. 253 V 50 - 60 Hz	.....						•
	3	20 .. 28 V DC	.....						•
pos.5	Signal output								
	D	0/ 4-20 mA Modbus	Relay counting pulse (5 cm 10 cm 1/6 ft 1/3 ft)	.....					•
	B	0/ 4-20 mA Modbus	Electronic counting pulse (1 cm 2.5 cm 1/20 ft 1/10 ft)	.....					•
	E	0/ 4-20 mA Profibus DP	Relay counting pulse (5 cm 10 cm 1/6 ft 1/3 ft)	.....					•
pos.6	Process connection								
	X	Flange DN100 PN16, EN 1092-1 and flange 4" 150lbs ANSI B16.5 (unit is fitting to this flange)	.....						•
pos.7	Motor for high measurement frequency								
	1	Standard	.....						•
	2	Brushless motor ⁽²⁾						•

NB 3..00			A			X		1	← Order code
Basic type	1	2	3	4	5	6	7	8	

All positions are available in special design (use code "Z").

⁽¹⁾ TR-CU (Ordinary Locations) included

⁽²⁾ Motor with increased service life

Options

pos.11	x	Warranty extension to 5 years	.....						•
		Wear and tear parts rope/ tape and standard motor pos.7 1 not included							
pos.21		Weather protection cover	.....						•
		For Ex only approved for Zone 22 or Division 2							
pos.25		Window in lid and external start button	.....						•
pos.27		Length of socket pipe							
	A	500 mm (19.7")	.....						•
	B	1,000 mm (39.4")	.....						•
pos.28		Compressed air connector	.....						•
		Quick coupling including counter part, for hose diameter 9 mm (0.35")							
pos.29		Increased corrosion resistance	.....						•
		All metal parts on process side coated, rope with plastic coating, use of stainless steel bearings							
		Available with rope version (pos.1 E), CE or FM gen.purp. (pos.2 0,M)							
pos.30		Increased process overpressure	.....						•
		-0.5 to 1.7 bar (-7.3 to 25 psi) (for CE, pos.2 0)							
		-0.5 to 1.1 bar (-7.3 to 16 psi) (for FM general purpose, pos.2 M)							
pos.31		Cable entry							
		Selection of the following options only necessary, if a deviation from the default cable gland/ conduit is required:							
	0	Screwed cable gland 1x M25 x 1.5 + 2x M20 x 1.5 + blindplug 2x M20 x 1.5	.....						•
	A	Conduit 1x NPT ¾" + 2x NPT ½" + blindplug 2x NPT ½"	.....						•
pos.33		Preset fieldbus address (Modbus)	.....						•
		Enables easy commissioning with Nivotec Level Monitoring System.							
		Preset from address = "1" to "amount of ordered units". Address label on enclosure.							
		Termination resistor set on unit with highest address. Other addresses possible on request.							

Accessories

Mounting Kit

Bolts, washers and nuts for mounting the unit on a flange

	material	bolts	washers	nuts
zu107000	stainless steel/ A2	4 pieces M16 x 60	8 pieces	4 pieces

Flange sealings

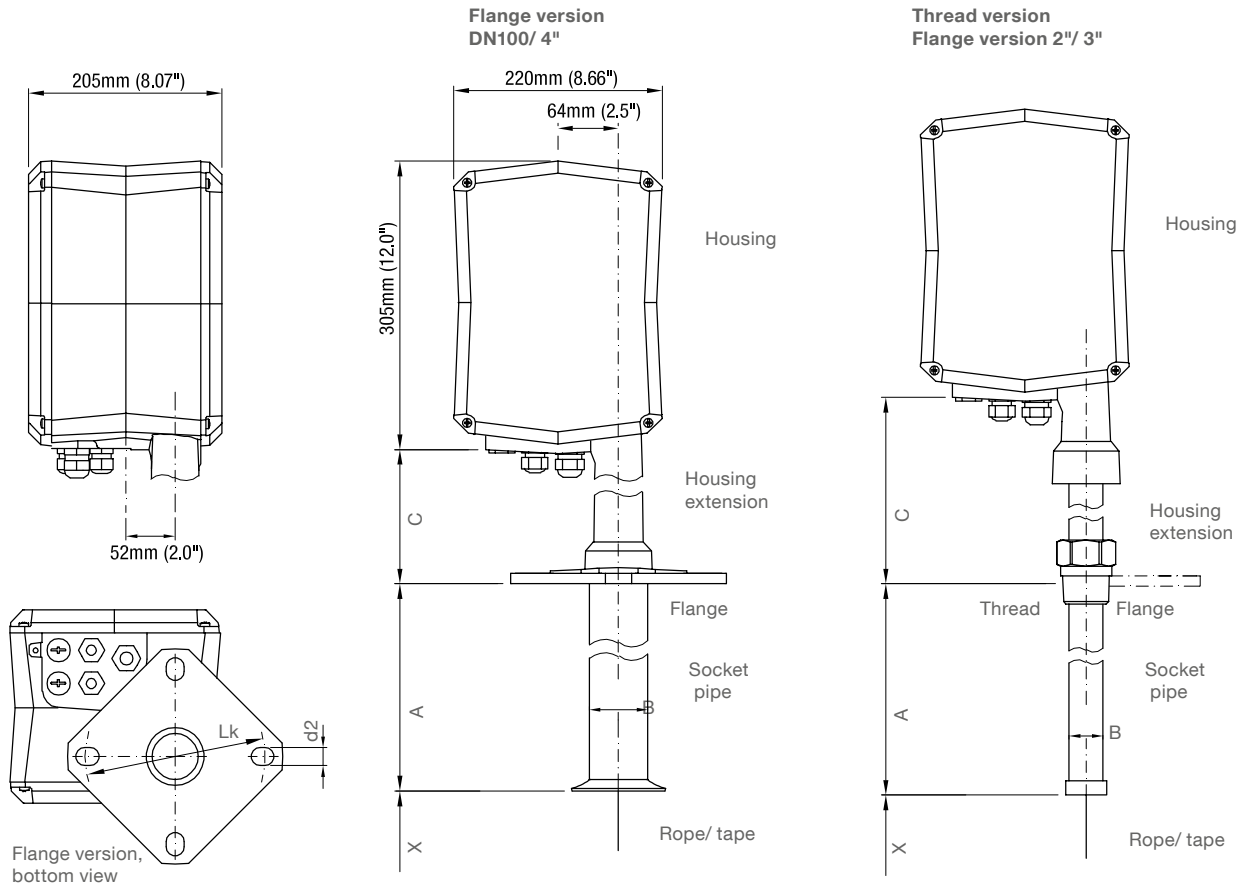
Sealings for mounting the unit on a flange.

Material: neoprene (85°C), temperature resistive plastic AFM30 (250°C)

	suitable for flanges	max. temp.	suitable mounting kit
di300125	DN100 PN16/ 4"	+85°C (185°F)	zu107000
di300108	DN100 PN16/ 4"	+250°C (482°F)	zu107000
di300127	2" / 3" 150lbs	+85°C (185°F)	zu107000
di300128	2" / 3" 150lbs	+250°C (482°F)	zu107000

Dimensions

Basic type



Dimensions

X = Length to bottom of sensor weight
(in upper stop position): see next page

A = Length of socket pipe
 200 mm (7.9")
 Optional 500 mm (19.7")/ 1,000 mm (39.4")

B = Diameter of socket pipe	
Rope version with Flange DN100/ 4"	ø60 mm (ø2.36")
All other versions	ø40 mm (ø1.57")

C = Housing extension		
Flange version DN 100/4"	80°C/ 150°C	95 mm (3.74")
	250°C	340 mm (13.4")
Other Versions	80°C/ 150°C	160 mm (6.3")
	250°C	340 mm (13.4")

Rope	ø1.0 mm (ø0.04")
Tape	12 x 0.2 mm (0.47 x 0.008")

Flanges	
fitting to: DN100 PN16/ 4" 150lbs	Lk = ø180 - 190.5 mm (ø7.1 - 7.5") slot d2 = ø19 mm (ø0.75")
fitting to: 2" / 3" 150lbs	Lk = ø120.7 - 152.4 mm (ø4.75 - 6.0") slot d2 = ø19 mm (ø0.75")

Materials

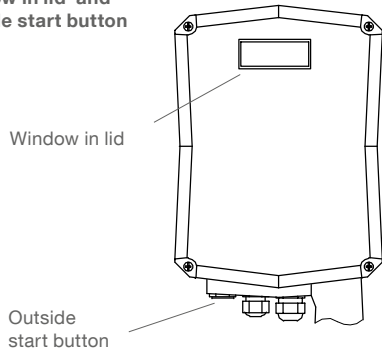
Housing outside	Aluminium, powder coated
Housing inside	Aluminium
Housing extension	Aluminium, powder coated or 1.4305 (303)
Flange	80°C/ 150°C: Aluminium, powder coated 250°C: 1.4305 (303)
Thread	1.4301 (304)
Socket pipe	Flange version DN100/ 4", 80°C/ 150°C: Aluminium All other versions: 1.4301 (304)
Rope	1.4401 (316)
Tape	1.4310 (301)

With option "Increased corrosion resistance":
 All metal parts in contact with the process are coated.
 The rope is plastic coated with PA.
 The internal bearings are made of stainless steel.

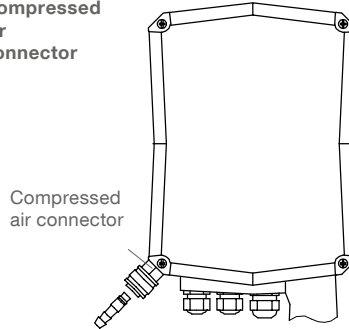
Dimensions

Options and Accessories

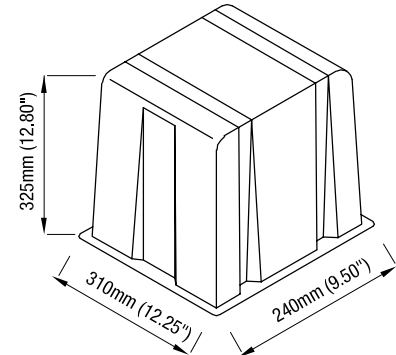
pos.25
Window in lid and outside start button



pos.28
Compressed air connector



pos.21
Weather protection cover

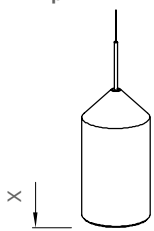


Sensor weights

Solids measurement: Rope version

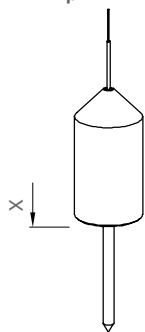
All weights ca. 1,0 kg (2.2 lbs)

PVC without pin



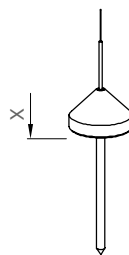
ø81 mm (ø3.2")
 X = 137 mm (5.4")
 Material: PVC

PVC with pin

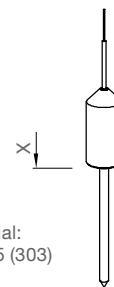


ø81 mm (ø3.2")
 X = 137 mm (5.4")
 Pin: 130 mm (5.1")
 Material: PVC (pin POM)

Stainless steel



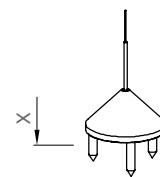
Version with
 Flange DN100/ 4"
 ø75 mm (ø3.0")
 X = 25 mm (1.0")
 Pin: 130 mm (5.1")



Material:
 1.4305 (303)

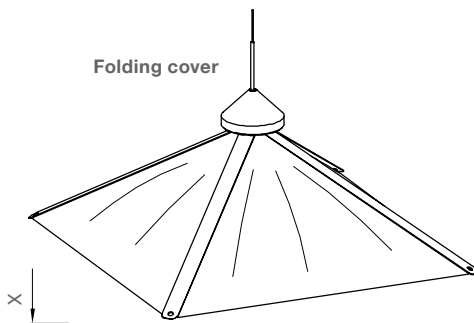
All other versions
 ø42 mm (ø1.65")
 X = 81 mm (3.19")
 Pin: 130 mm (5.1")

Claw



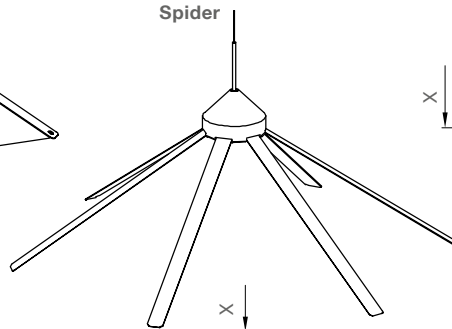
ø95 mm (ø3.7")
 X = 71 mm (2.8")
 Material: 1.4305 (303)

Folding cover



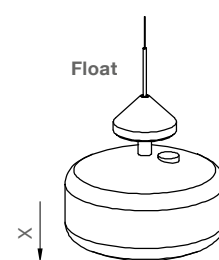
380 x 380 mm (15 x 15")
 X = 150 mm (5.9")
 Material: 1.4310 (301)/ 1.4305 (303)
 PA canvas

Spider



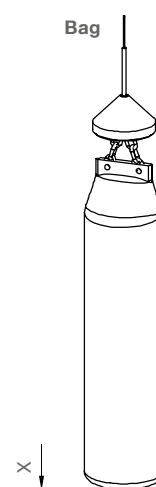
ø600 mm (ø23.6")
 X = 160 mm (6.3")
 Material: 1.4301 (304)/ 1.4305 (303)
 1.4310 (301)

Float



ø190 mm (ø7.5")
 X = 175 mm (6.9")
 Material: Float PP,
 Cone: aluminium

Bag

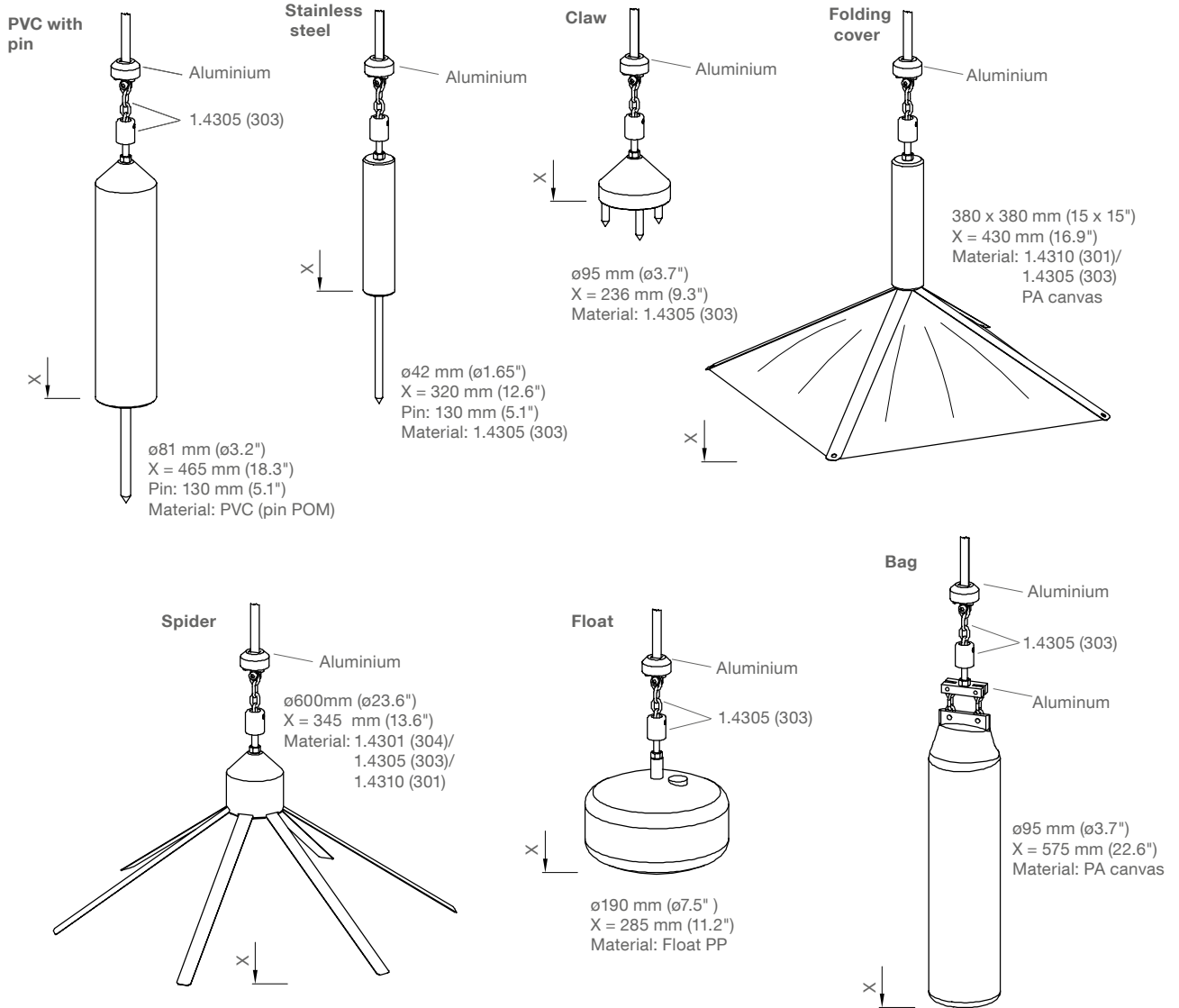


ø95 mm (ø3.7")
 X = 460 mm (18.1")
 Material: PA canvas,
 Chain: 1.4305 (303)
 Cone: aluminium

Dimensions

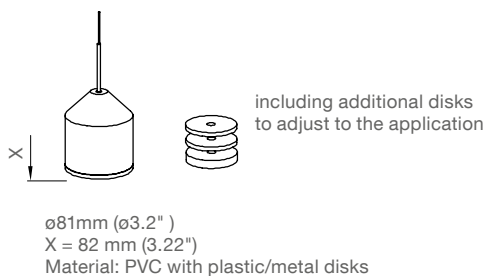
Solids measurement: Tape version

All weights ca. 2.1 kg (4.6 lbs)



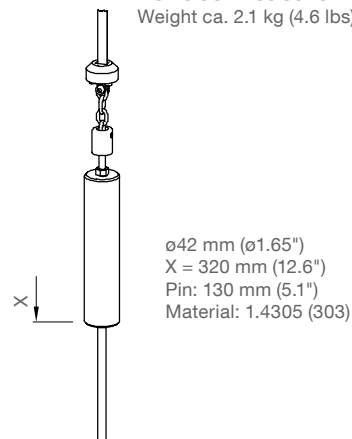
Interface measurement: Rope version

Weight ca. 1.0 kg (2.2 lbs)



Interface measurement: Tape version

Weight ca. 2.1 kg (4.6 lbs)



Spare parts

Rope roller

sl102243	Rope roller with 30 m rope (13 mm* rope chamber) Process temperature max. 80°C	•
sl102240	Rope roller with 30 m rope (33 mm* rope chamber) Process temperature max. 80°C	•
sl102242	Rope roller with 30 m rope for increased corrosion resistance (plastic coated)	•

*For safe function 13 mm and 33 mm rope chamber must be substituted only by the same type.

Tape roller

sb102240	Tape roller with 40 m tape	•
-----------------	----------------------------------	---

Sensor weights

All sensor weights are delivered incl. mounting set for proper fixing to the rope/tape and excl. rope/tape

Solid measurement

sl102220	Sensor weight for rope	PVC without pin	•
sl102221	Sensor weight for rope	PVC with pin	•
sl102222	Sensor weight for rope	Stainless steel ø75 mm (ø3.0")	•
sl102228	Sensor weight for rope	Stainless steel ø42 mm (ø1.65")	•
sl102223	Sensor weight for tape	Claw	•
sl102224	Sensor weight for rope	Folding cover	•
sl102225	Sensor weight for rope	Spider	•
sl102226	Sensor weight for rope	Bag	•
sl102227	Sensor weight for rope	Float	•
sb102221	Sensor weight for tape 40 m	PVC with pin	•
sb102222	Sensor weight for tape 40 m	Stainless steel	•
sb102223	Sensor weight for tape 40 m	Claw	•
sb102224	Sensor weight for tape 40 m	Folding cover	•
sb102225	Sensor weight for tape 40 m	Spider	•
sb102226	Sensor weight for tape 40 m	Bag	•
sb102227	Sensor weight for tape 40 m	Float	•

Interface measurement

sl102230	Sensor weight for rope	PVC with metal core	•
sb102230	Sensor weight for tape	Stainless steel	•

Mounting set without sensor weights

sl100270	For rope version 80°C	•
zu108030	For tape version	•

Motor

gm102202	Motor standard version	•
gm102211	Motor brushless version	•

Electronics

pl102691	Electronics	98 .. 253 V 50 - 60 Hz	0/ 4-20 mA	Modbus	Relay counting pulse (5 cm 10 cm 1/6 ft 1/3 ft)	•
pl102690	Electronics	98 .. 253 V 50 - 60 Hz	0/ 4-20 mA	Modbus	Electr. counting pulse (1 cm 2.5 cm 1/20ft 1/10 ft)	•
pl102692	Electronics	98 .. 253 V 50 - 60 Hz	0/ 4-20 mA	Profibus DP	Relay counting pulse (5 cm 10 cm 1/6 ft 1/3 ft)	•
pl102696	Electronics	20 .. 28 V DC	0/ 4-20 mA	Modbus	Relay counting pulse (5 cm 10 cm 1/6 ft 1/3 ft)	•
pl102695	Electronics	20 .. 28 V DC	0/ 4-20 mA	Modbus	Electr. counting pulse (1 cm 2.5 cm 1/20 ft 1/10 ft)	•
pl102697	Electronics	20 .. 28 V DC	0/ 4-20 mA	Profibus DP	Relay counting pulse (5 cm 10 cm 1/6 ft 1/3 ft)	•

Required information: Rope or Tape version. Evt. further menu presettings.

Internal Heater

em100372	220 Ohms	For power supply 98 .. 253 V 50 - 60 Hz	•
em100371	8 Ohms	For power supply 20 .. 28 V DC	•

Weather protection cover

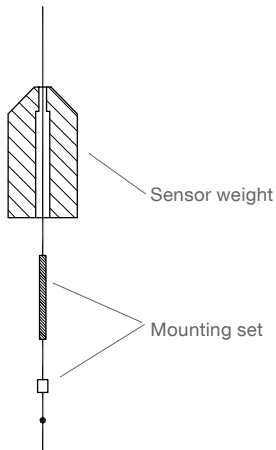
zu400215	•
-----------------	-------	---

Spare parts

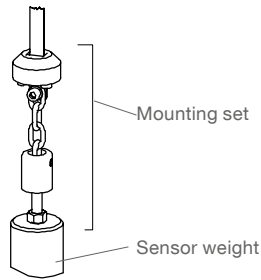
Sensor weights/ Mounting set

All sensor weights are delivered including stated parts for proper fixing to the rope/ tape

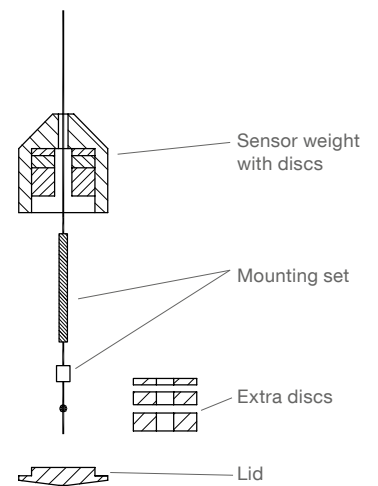
Solids measurement: rope version



Solids measurement: tape version Interface measurement: tape version

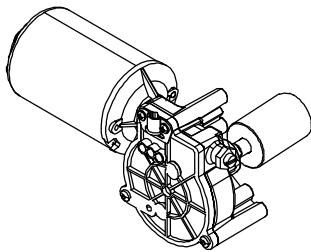


Interface measurement: rope version

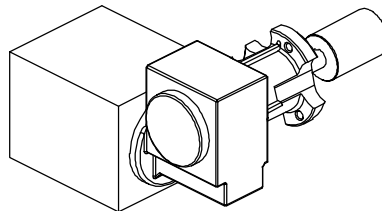


Motor

Standard

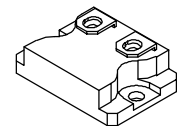


Brushless motor



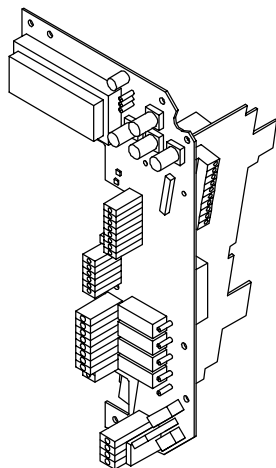
Delivery including: cable, plug, sealing, mounting tools

Heater

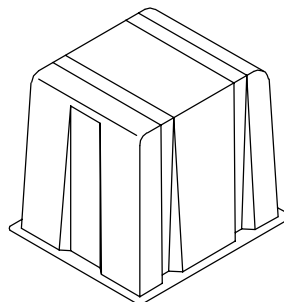


Delivery including cable and plug

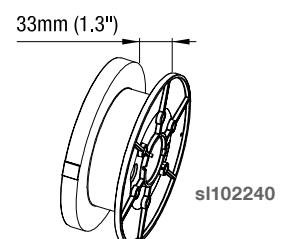
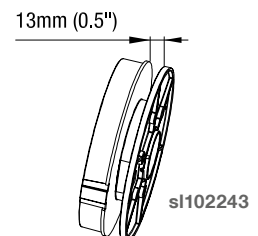
Electronics



Weather protection cover

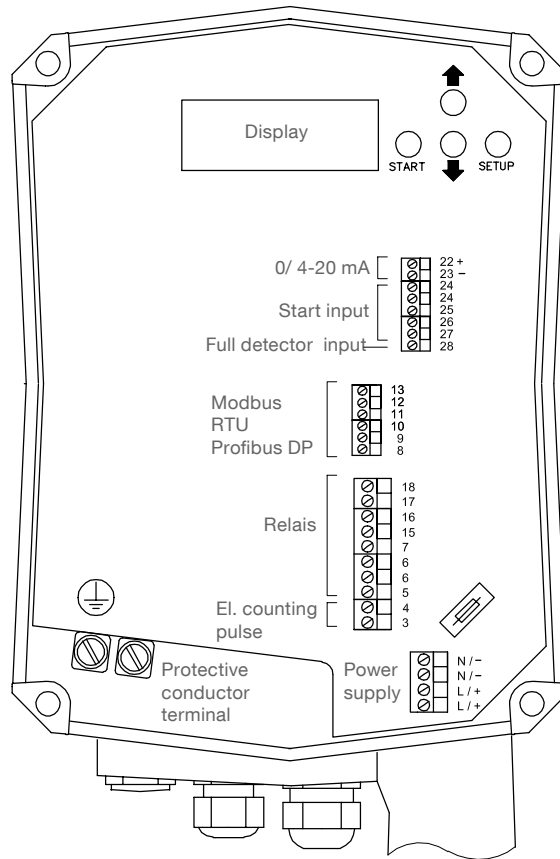


Rope roller



Electrical installation

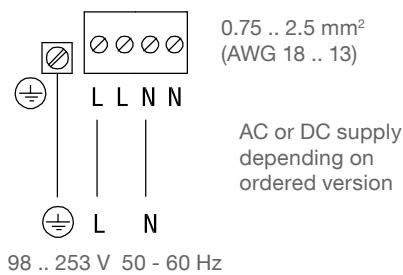
Terminal location



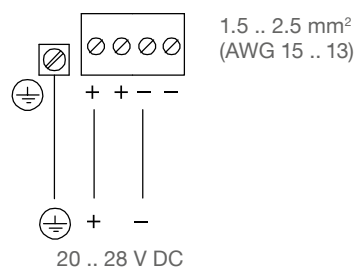
Power supply and Signal input/ output

Power supply

AC version

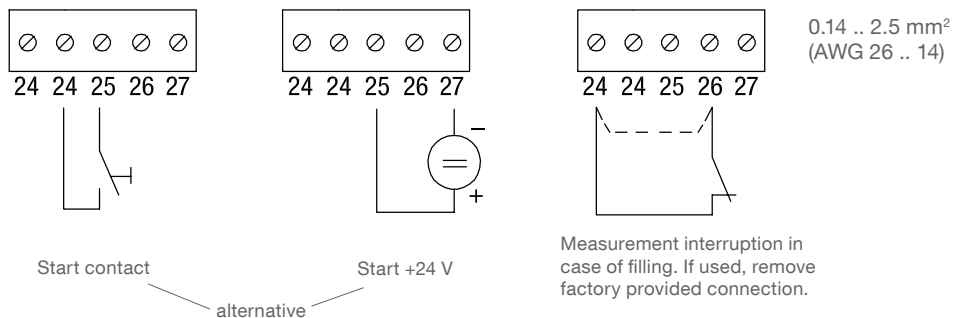


DC version



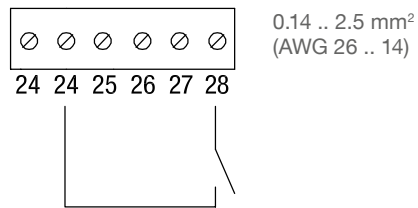
Signal input:

Start of measurement

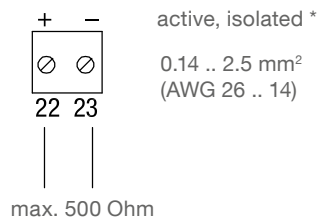


Electrical installation

Signal input:
Full detector

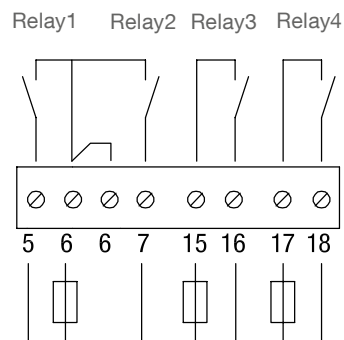


Signal output:
0/4-20 mA



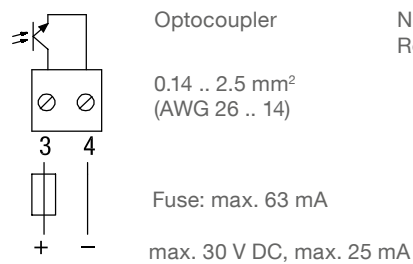
*** CAUTION:**
 If connecting to a PLC with isolated (floating) 4-20 mA input, the "-" line must be connected to ground of the PLC. See user manual of the PLC.

Signal output:
Relay



Fuse: max. 2 A, fast or slow, HBC, 250 V
 max. 250 V AC, 2 A, 500 VA, non inductive

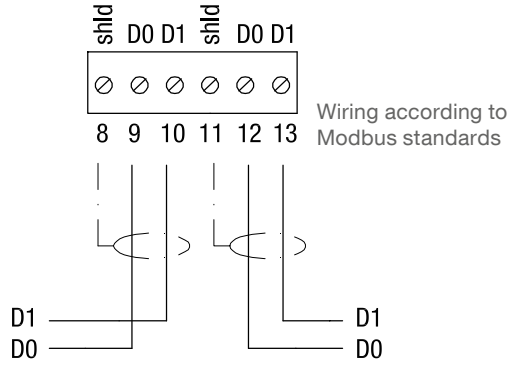
Signal output:
Electronic counting pulse



Note:
 Reset pulse is done with Relay 2

Electrical installation

Modbus network



Profibus DP network

