



## **PB 3000 SERIES** ELECTRO-MECHANICAL LEVEL MEASUREMENT DEVICE

# OVERVIEW AND FEATURES

## CONTINUOUS MEASUREMENT OF SOLIDS & INTERFACE

The Hycontrol PB 3000 level sensor is an electro-mechanical measuring instrument for continuous monitoring of the level or contents in tanks and silos. The unit is mounted on the top of the silo. The weight is then driven down into the silo until it makes contact with the product. When it detects the product the motor changes the winding direction and the sensor weight is driven back to the upper stop position. The measured distance is converted into a volumetric signal.

## PROCESS

- ◆ Independent of bulk material properties
- ◆ Very accurate measurement

## SERVICING

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

## APPROVALS

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

## MECHANICS

- ◆ Measurement range up to 50m (164ft)
- ◆ 1 1/2" process connection possible
- ◆ Window in lid and outside start button (optional)
- ◆ Internal tape cleaner for difficult materials

## ELECTRONICS

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

### **PB 3100**

*Rope version for solids  
Shown with process  
connection thread and  
stainless steel weight*



### **PB 3200**

*Tape version for solids  
Shown with process  
connection thread and  
stainless steel weight*



### **PB 3300**

*Rope version for  
interface measurement*



### **PB 3400**

*Tape version for  
interface measurement*



*All information in herein is subject to change. Valid from 01.04.2017 until 31.03.2018, unless otherwise agreed. All dimensions in mm (inches). 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.*

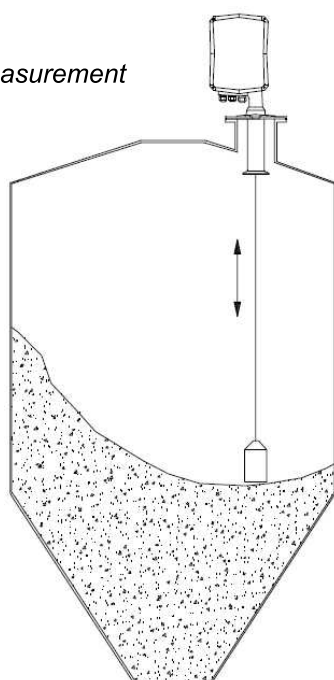
# SPECIFICATION AND APPLICATION

## SPECIFICATION

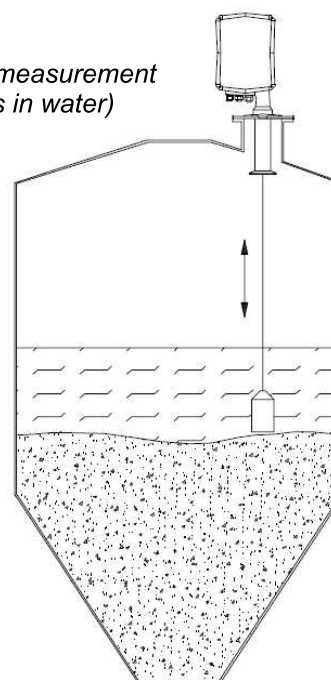
				PB 3100 / 3200 Solids	PB 3300 / 3400 Interface
<b>Process</b>	Measurement range	Rope version	30m (98.4ft)	•	•
		Tape version	40m (131ft) / 50m (164ft)	•	•
	Process temperature		80°C (176°F)	•	•
			150°C (302°F)	•	
			250°C (482°F)	•	
	Process overpressure		-0,3 .. +0,3 bar (-4.35 .. + 4.35 psi)	•	•
			-0.5 .. +1.7bar (-7.3 .. +25psi)	•	•
<b>Electronics</b>	Power supply	AC version	98 .. 253V 50-60Hz	•	•
		DC version	20-28V	•	•
	Output		0/4-20mA	•	•
			4 relays	•	•
			Modbus RTU	•	•
<b>Approvals</b>	Dust Ex		Profibus DP	•	•
			ATEX 1/2D	•	•
			FM Cl. II, III Div. 1	•	•
			TR-CU	•	•
	Ordinary		CE, FM, TR-CU	•	•

## MEASUREMENT APPLICATIONS

*Solid measurement*



*Interface measurement  
(Solids in water)*

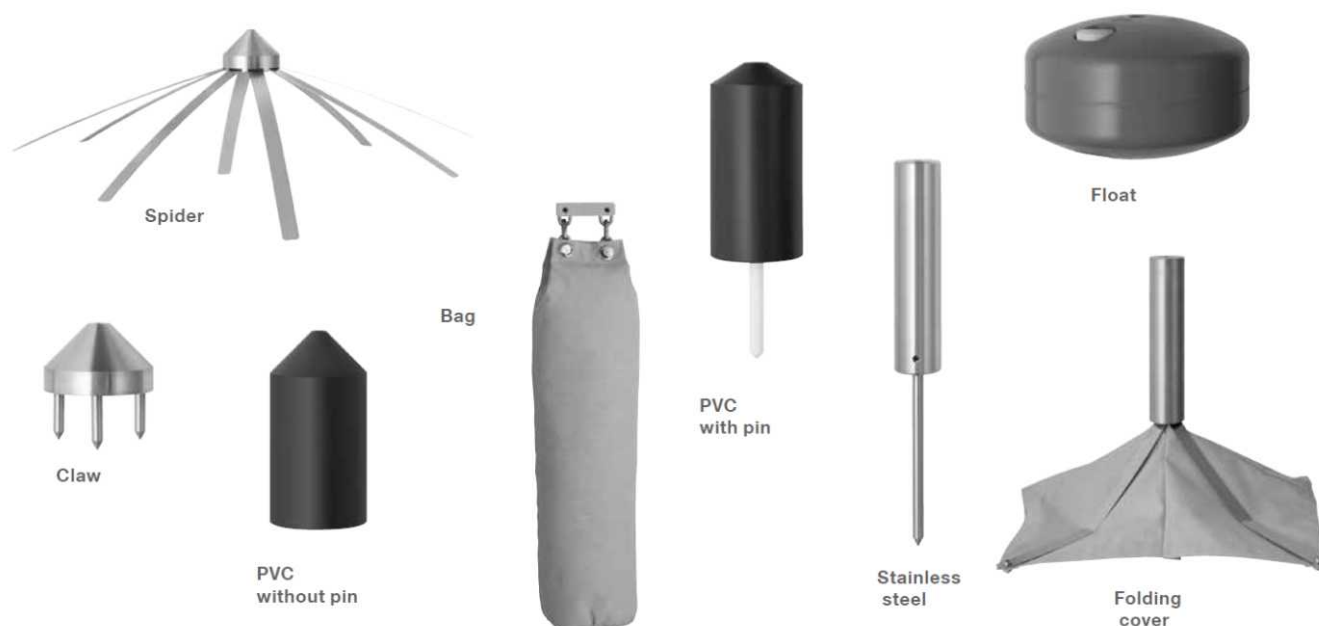


# APPLICATION - SENSOR WEIGHT GUIDE

Sensor weight	Application				Note	Fits through mounting hole				
						Thread		Flange		
	* Mat'l density g/l (lb/ft³)	Material consistence	Angle of repose	Max. process temp.		1 1/2"	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)	Large surface prevents the sensor weight from sinking into the material	•	•	•	•	•
Spider	>40 (1.4)	light powder	flat, steep	250°C (482°F)	Large 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).



## Cable entries (by default)

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

CE, ATEX,      Screwed cable gland: 2x M20x1.5 and 1x M25x1.5

TR-CU          Blindplug: 2x M20x1.5

FM              Open conduit ANSI B1.20.1: 1x NPT 3/4" and 2x NPT 1/2"

Blindplug: 2x NPT 1/2"

# PB 3000 - ORDER CODES (SOLIDS)

pos. 1		<b>Basic type</b>
	C	<b>PB 3100</b> Rope version
	D	<b>PB 3200</b> Tape version
pos. 2		<b>Certificate</b>
	0	CE (1)
	W	ATEX II 1/2 D
	M	FM general purpose
	N	FM Class II, III Div.1 Group E-G
pos. 3	E	TR-CU Ex ta/tb IIIC T! Da/Db X
		<b>Process temperature</b>
	A	max. + 80°C (176°F)
	S	max. +150°C (302°F)
pos. 4	T	max. +250°C (482°F)
		<b>Power supply</b>
	1	98 .. 253V 50-60Hz
pos. 5	3	20 .. 28V DC
		<b>Signal output</b>
	B	0/4-20mA Modbus Electronic counting pulse (1cm 2.5cm 1/20ft 1/10ft)
	D	0/4-20mA Modbus Relay counting pulse (5cm 10cm 1/6ft 1/3ft)
pos. 6	E	0/4-20mA Profibus DP Relay counting pulse (5cm 10cm 1/6ft 1/3ft)
		<b>Process connection</b>
	A	Thread R1½" tapered DIN 2999
	B	Thread NPT1½" tapered ANSI B1.20.1
	C	Thread NPT 3" tapered ANSI B1.20.1
	X	Flange DN100 PN16 (EN1092-1) and flange 4" 150lbs ANSI B16.5 (unit is fitting to this flange)
pos. 7	Y	Flange 2" and flange 3" 150lbs ANSI B16.5 (unit is fitting to this flange)
		<b>Motor for high measurement frequency (1)</b>
	1	Standard
pos. 8	2	Brushless motor (2)
		<b>Sensor weight (3,4)</b>
	Y	Without
	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

## ORDER CODE

<b>PB 3..00</b>								
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 4

(5) Including mounting set for sensor weight (see page 14: Sensor weights) xxxxxxXXX

# PB 3000 - OPTIONS (SOLIDS)

pos. 11	X	<b>Guarantee extension to 5 years</b> Wear and tear parts rope/tape and standard motor pos. 7 1 not included
pos. 21		<b>Weather protection cover</b> For Ex only approved for Zone 22 or Division 2
pos. 23		<b>Measurement range 50m</b> Available with tape version pos.1 D, not with sensor weight pos.8 G,H
pos. 25		<b>Window in lid and external start button</b>
pos. 26		<b>Internal heater</b> 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	A B	<b>Length of socket pipe</b> 500mm (19.7") 1000mm (39.4")
pos. 28		<b>Compressed air connector</b> Quick coupling including counterpart for hose diameter 9mm (0,35")
pos. 29		<b>Increased corrosion resistance</b> 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		<b>Increased process overpressure</b> -0.5 to 1.7bar (-7.3 to 25psi) (for CE and ATEX, Pos.2 0,W) -0.5 to 1.1bar (-7.3 to 16psi) (for FM general purpose, pos.2 M)
pos. 31	0 A	<b>Cable entry</b> Selection of the following options only necessary, if a deviation from the default cable gland / conduit is required: 0 Screwed cable gland 1x M25x1,5 + 2x M20x1,5 + blindplug 2x M20x1,5 A Conduit 1x NPT 3/4"+ 1x NPT 1/2" + blindplug 1x NPT 3/4"+ 1x NPT 1/2"
pos. 33		<b>Preset fieldbus address (Modbus)</b> Enables easy commissioning with Level Monitoring System. Preset from address = "1" to "amount of ordered units". Address label on enclosure. Termination resistor set on unit with highest address.

# PB 3000 - ORDER CODES (INTERFACE)

pos. 1		<b>Basic type</b>
	E	<b>PB 3300</b> Rope version (30m) incl. sensor weight (for applications with soft/muddy or compact material surface)
	F	<b>PB 3400</b> Tape version (40m) incl. sensor weight (for applications with compact material surface)
pos. 2		<b>Certificate</b>
	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		<b>Power supply</b>
	1	98 .. 253V 50-60Hz
	3	20 .. 28V DC
pos. 5		<b>Signal output</b>
	B	0/4-20mA Modbus Electronic counting pulse (1cm 2.5cm 1/20ft 1/10ft)
	D	0/4-20mA Modbus Relay counting pulse (5cm 10cm 1/6ft 1/3ft)
	E	0/4-20mA Profibus DP Relay counting pulse (5cm 10cm 1/6ft 1/3ft)
pos. 6		<b>Process connection</b>
	X	Flange DN100 PN16 (EN1092-1) and flange 4" 150lbs ANSI B16.5 (unit is fitted to this flange)
pos. 7		<b>Motor for high measurement frequency</b>
	1	Standard
	2	Brushless motor (2)

## ORDER CODE

<b>PB 3..00</b>			<b>A</b>			<b>X</b>		<b>1</b>
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

### 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)

# PB 3000 - OPTIONS (INTERFACE)

pos. 11	X	<b>Guarantee extension to 5 years</b> Wear and tear parts rope/tape and standard motor pos. 7 1 not included
pos. 21		<b>Weather protection cover</b> For Ex only approved for Zone 22 or Division 2
pos. 25		<b>Window in lid and external start button</b>
pos. 27		<b>Length of socket pipe</b>
	A	500mm (19.7")
	B	1000mm (39.4")
pos. 28		<b>Compressed air connector</b> Quick coupling including counterpart for hose diameter 9mm (0,35")
pos. 29		<b>Increased corrosion resistance</b> All metal parts on process side coated, rope with plastic coating, use of stainless steel bearings. Available with rope version (pos.1 E)
pos. 30		<b>Increased process overpressure</b> -0.5 to 1.7bar (-7.3 to 25psi) (for CE, pos.2 0) -0.5 to 1.1bar (-7.3 to 16psi) (for FM general purpose, pos.2 M)
pos. 31		<b>Cable entry</b> Selection of the following options only necessary, if a deviation from the default cable gland / conduit is required:
	0	Screwed cable gland 1x M25x1,5 + 2x M20x1,5 + blindplug 2x M20x1,5
	A	Conduit 1x NPT 3/4" + 1x NPT 1/2" + blindplug 1x NPT 3/4" + 1x NPT 1/2"
pos. 33		<b>Preset fieldbus address (Modbus)</b> Enables easy commissioning with Level Monitoring System. Preset from address = "1" to "amount of ordered units". Address label on enclosure. Termination resistor set on unit with highest address.

## ACCESSORIES

### Mounting Kit

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

Material	Bolts	Washers	Nuts
stainless steel / A2	4 pieces M16x60	8 pieces	4 pieces

### Flange sealings

Sealings for mounting the unit on a flange.

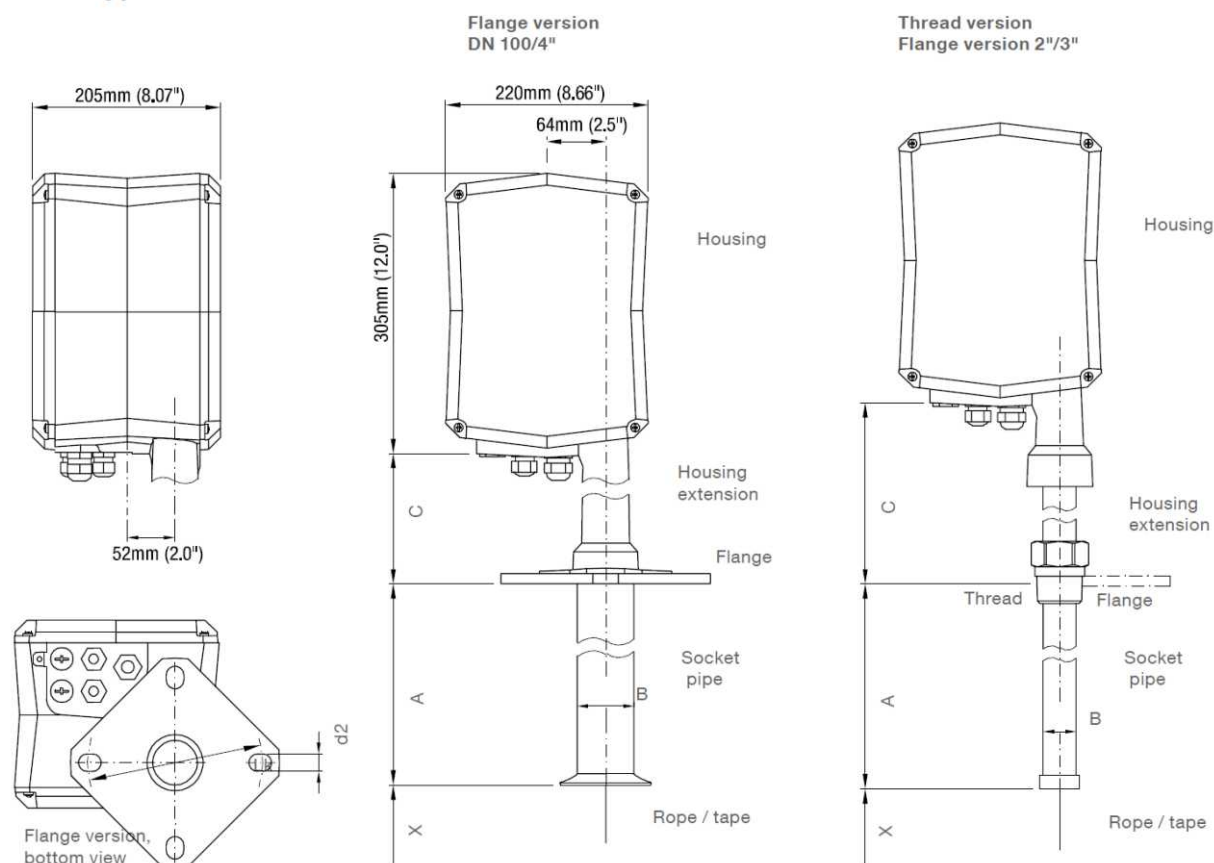
Material: neoprene (85°C), temperature resistive plastic AFM30 (250°C)

Suitable for flanges	Max. temp.
DN100 PN16 / 4"	+85°C (185°F)
DN100 PN16 / 4"	+250°C (482°F)
2" / 3" 150lbs	+85°C (185°F)
2" / 3" 150lbs	+250°C (482°F)



# DIMENSIONS AND MATERIALS

## Basic type



## Dimensions

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

A = Length of socket pipe

200mm (7.9")  
Optional 500mm (19.7") / 1000mm (39.4")

B = Diameter of socket pipe

Rope version with  
Flange DN100 / 4"

ø60mm (2.36")

All other versions

ø40mm (1.57")

C = Housing extension

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

Rope

ø1,0mm (0.04")

Tape

12x0.2mm (0.47x0.008")

## Flanges

fitting to: DN100 PN16 / 4" 150lbs	Lk = ø180-190.5mm (7.1-7.5") slot d2 = ø19mm (0.75")
fitting to: 2" / 3" 150lbs	Lk = ø120.7-152.4mm (4.75-6.0") slot d2 = ø19mm (0.75")

## 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 DN 100/4", 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.

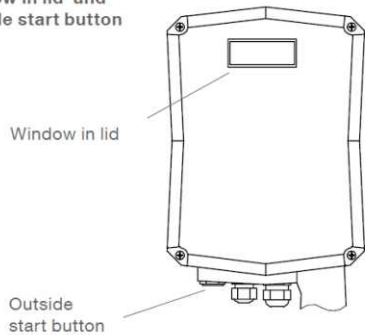
The rope is plastic coated with PA.

The internal bearings are made of stainless steel.

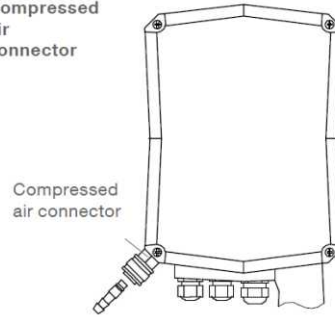
# DIMENSIONS AND MATERIALS

## Options and Accessories

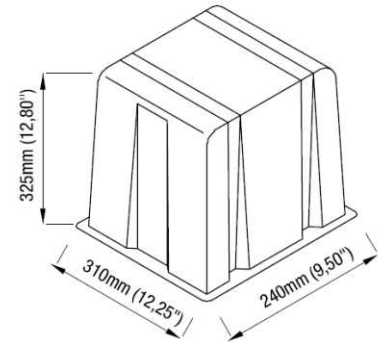
Pos. 25  
Window in lid and  
outside start button



Pos. 28  
Compressed  
air  
connector



Pos. 21  
Weather protection cover

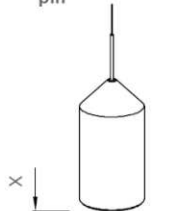


## Sensor weights

### Solids measurement: Rope version

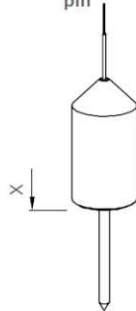
All weights ca. 1,0kg (2.2lbs)

PVC without  
pin



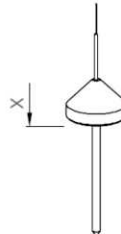
Ø81mm (3.2")  
X = 137mm (5.4")  
Material: PVC

PVC with  
pin

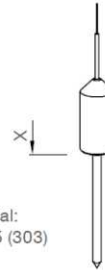


Ø81mm (3.2")  
X = 137mm (5.4")  
Pin: 130mm (5.1")  
Material: PVC (pin POM)

Stainless steel



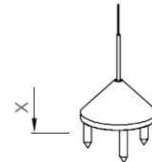
Version with  
Flange DN100 / 4"  
Ø75mm (3.0")  
X = 25mm (1.0")  
Pin: 130mm (5.1")



Material:  
1.4305 (303)

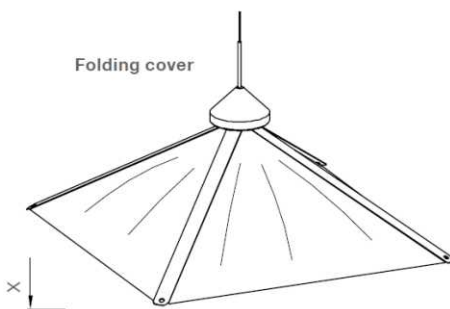
All other versions  
Ø42mm (Ø 1.65")  
X = 81mm (3.19")  
Pin: 130mm (5.1")

Claw



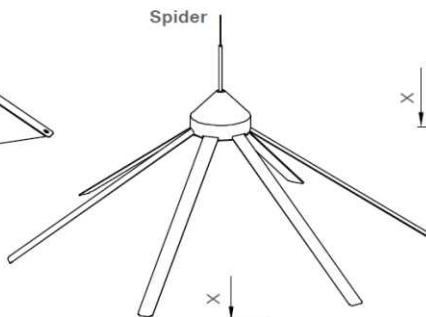
Ø95 (3.7")  
X = 71mm (2.80")  
Material: 1.4305 (303)

Folding cover



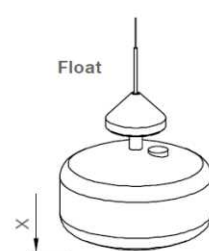
380x380mm (15x15")  
X = 150mm (5.9")  
Material: 1.4310 (301)/1.4305 (303)  
PA canvas

Spider



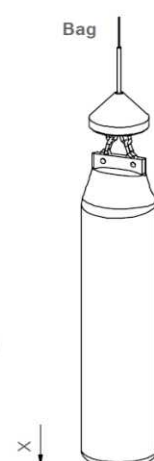
Ø600mm (23.6")  
X = 160mm (6.3")  
Material: 1.4301 (304)/1.4305 (303)  
1.4310 (301)

Float



Ø190mm (7.5")  
X = 175mm (6.9")  
Material: Float PP,  
Cone: aluminium

Bag

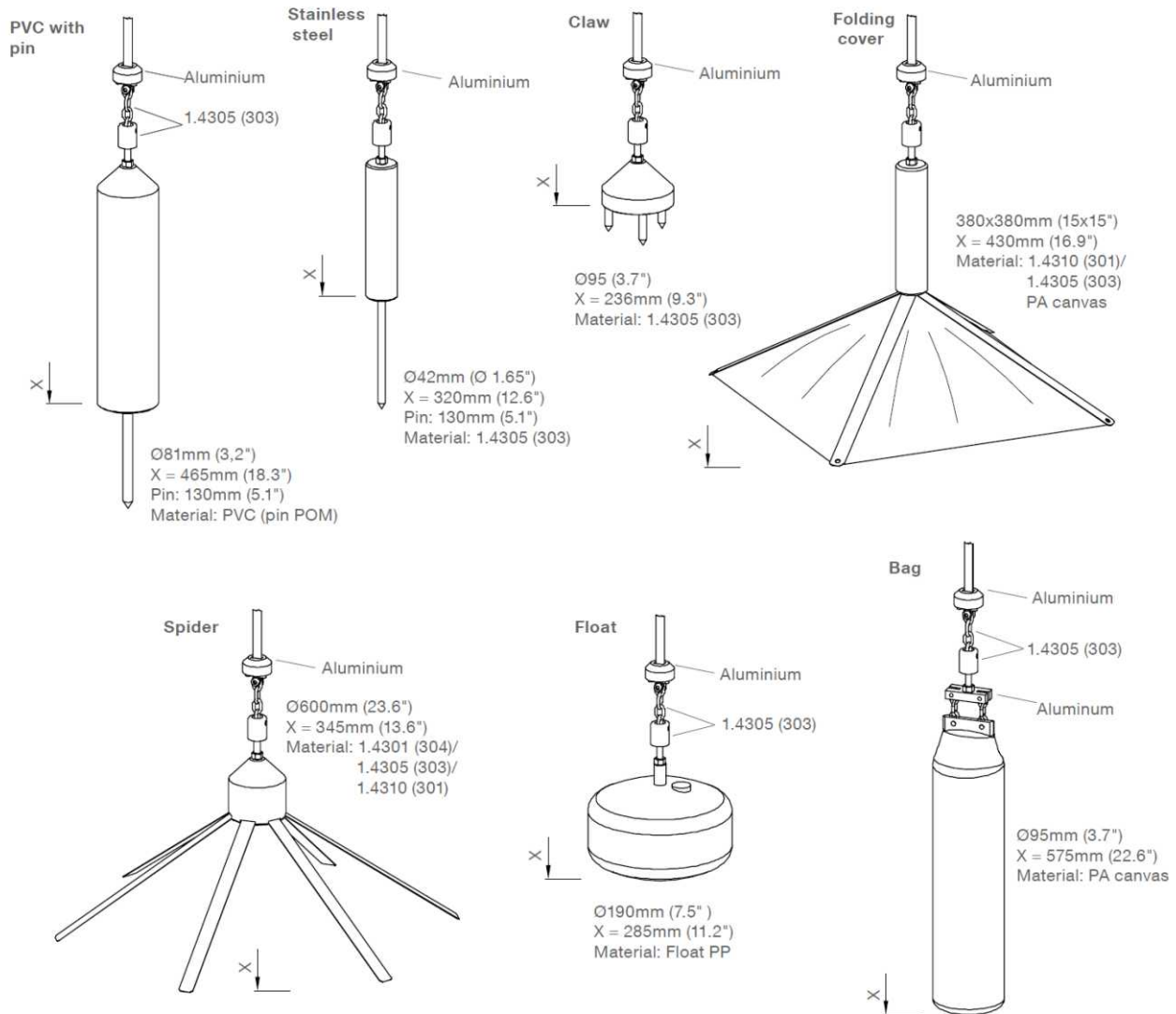


Ø95mm (3.7")  
X = 460mm (18.1")  
Material: PA canvas,  
Chain: 1.4305 (303)  
Cone: aluminium

# DIMENSIONS AND MATERIALS

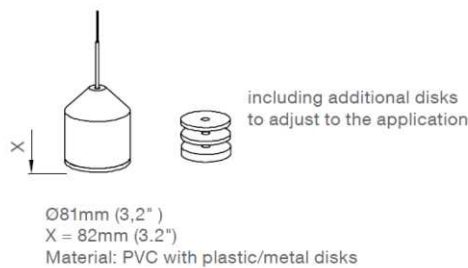
## Solids measurement: Tape version

All weights ca. 2.1kg (4.6lbs)



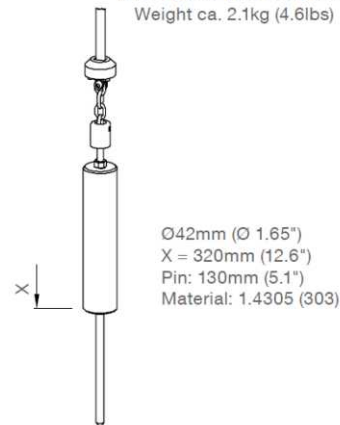
## Interface measurement: Rope version

Weight ca. 1.0kg (2.2lbs)



## Interface measurement: Tape version

Weight ca. 2.1kg (4.6lbs)



*For spare parts information, please contact a Hycontrol representative*



# HYCONTROL - THE COMPLETE LEVEL SOLUTION

**Hycontrol** has been at the forefront of level control and measurement technology for over thirty-five years, providing effective solutions for diverse applications across a wide range of industries ranging from quarrying to food; from nuclear power to chemical; and from animal feed to waste recycling. From our manufacturing base in Redditch, Worcestershire, we have been trusted to oversee thousands of applications across the UK and around the world.

At Hycontrol, we pride ourselves on providing a 'complete solution' service to our UK customers. We provide a turnkey solution for level equipment requirements, with the experience and skill to design, manufacture, install and maintain bespoke measurement and control systems that are crafted to suit the particular needs of each individual customer.

We understand the consequences of inaccurate or unreliable level systems, and therefore each Hycontrol installation is tailored precisely to match your application. Our goal is simple: to provide the best-engineered solution - *without compromise*.

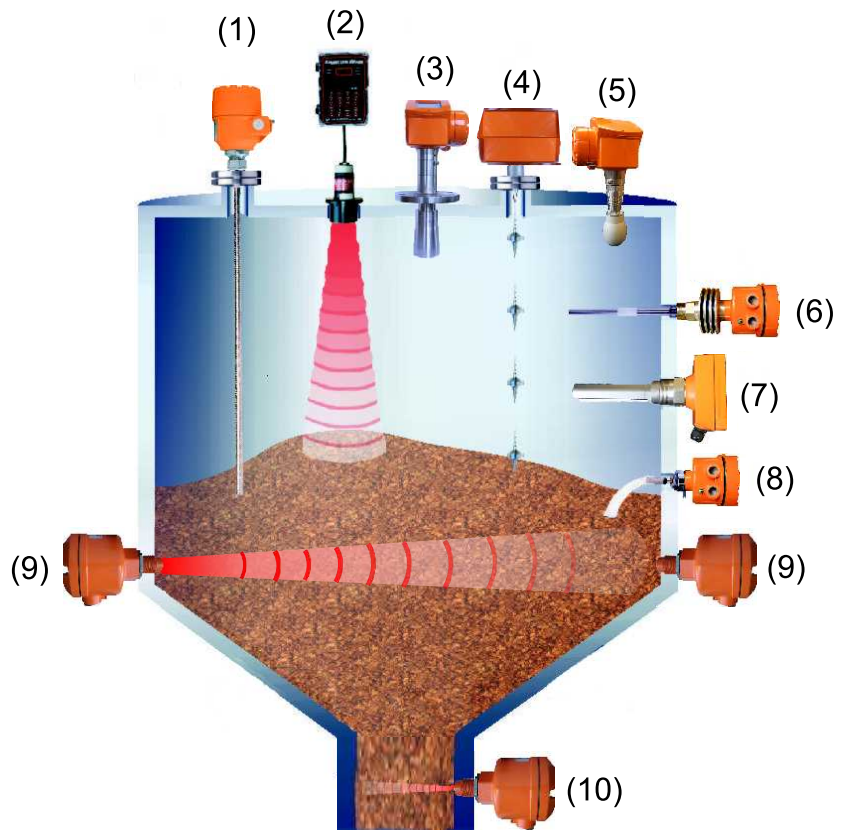
With one of the widest ranges of level measurement technologies on the market including award-winning silo pressure safety systems and a patented range of foam detection and control equipment, backed up by a team of highly experienced engineers and technicians, Hycontrol is a leading force in the manufacture and supply of advanced level solutions.



# HYCONTROL LEVEL TECHNOLOGIES

## Product Range For Solids:

- (1) TDR Radar for Solids
- (2) 2-Wire Ultrasonic Transmitter
- (3) FMCW 2-Wire Radar (Horn)
- (4) Continuous Servo Level Indicator
- (5) FMCW 2-Wire Radar (Drop)
- (6) Capacitance Level Switch
- (7) Vibrating Probe Level Switch
- (8) Rotating Paddle Level switch
- (9) Microwave Level Switch
- (10) Doppler Flow Switch



## Product Range For Liquids:

- (1) Bypass Level Indicator with Radar
- (2) TDR Radar for Liquids
- (3) 2-Wire Ultrasonic Transmitter
- (4) FMCW 2-Wire Radar (Horn)
- (5) Magnetic Float Switches
- (6) FMCW 2-Wire Radar (Corrosion-Proof)
- (7) Capacitance Level Switch
- (8) RF Admittance Level Switch
- (9) Side Mounting 316 SS Float Switch
- (10) Tuning Fork Level Switch
- (11) Tuning Fork Level Switch
- (12) Ultrasonic Through Wall
- (13) Mini Magnetic Float Level Switch

