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INSTALLATION – OPERATION and MAINTENANCE MANUAL

ITEM 0430 – ITEM 0431 BALL LEVEL INDICATOR

ITEM 0434 – ITEM 0434S FLANGED LEVEL INDICATOR

ITEM 0440 – ITEM 0441 PIPE LEVEL INDICATOR



ISTR 0430_IT

EDITION 1/2020

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1. Description

Level indicators are devices for controlling the level of filling applicable to agricultural tanker trailers, vacuum tankers and tanks in general. These are divided between float indicators and pipe indicators; in the first case the filling level indication is via the angular movement of the rod connected to the floating element (hollow ball in stainless steel or basically cylindrical float switch in expanded polyurethane), in the second case the indicator uses the principle of communicating vessels according to which a liquid contained in one or more communicating containers, in the presence of gravity, reaches the same level originating from a single equal surface.

2. Types of product

2.1 Level indicators with float ball

ITEM 0430

Level indicator completely in stainless steel. Available nominal lengths: mm 1000 - 1300 . 1500

ITEM 0431

Level indicator with external pipe in steel. Available nominal lengths: mm 1000 - 1300 . 1500

2.2 Flanged level indicators with polyurethane float

ITEM 0434

Flanged level indicator. Available nominal lengths: mm 1000 - 1300 . 1500

ITEM 0434S

Flanged level indicator with sensor. Available nominal lengths: mm 1000 - 1300 . 1500

2.3 Pipe level indicator

ITEM 0440

Pipe level indicator DN 100. Available nominal lengths: mm 1000 - 1500 . 2000

ITEM 0441

Pipe level indicator DN 50. Available nominal lengths: mm 1000 - 1500 . 2000

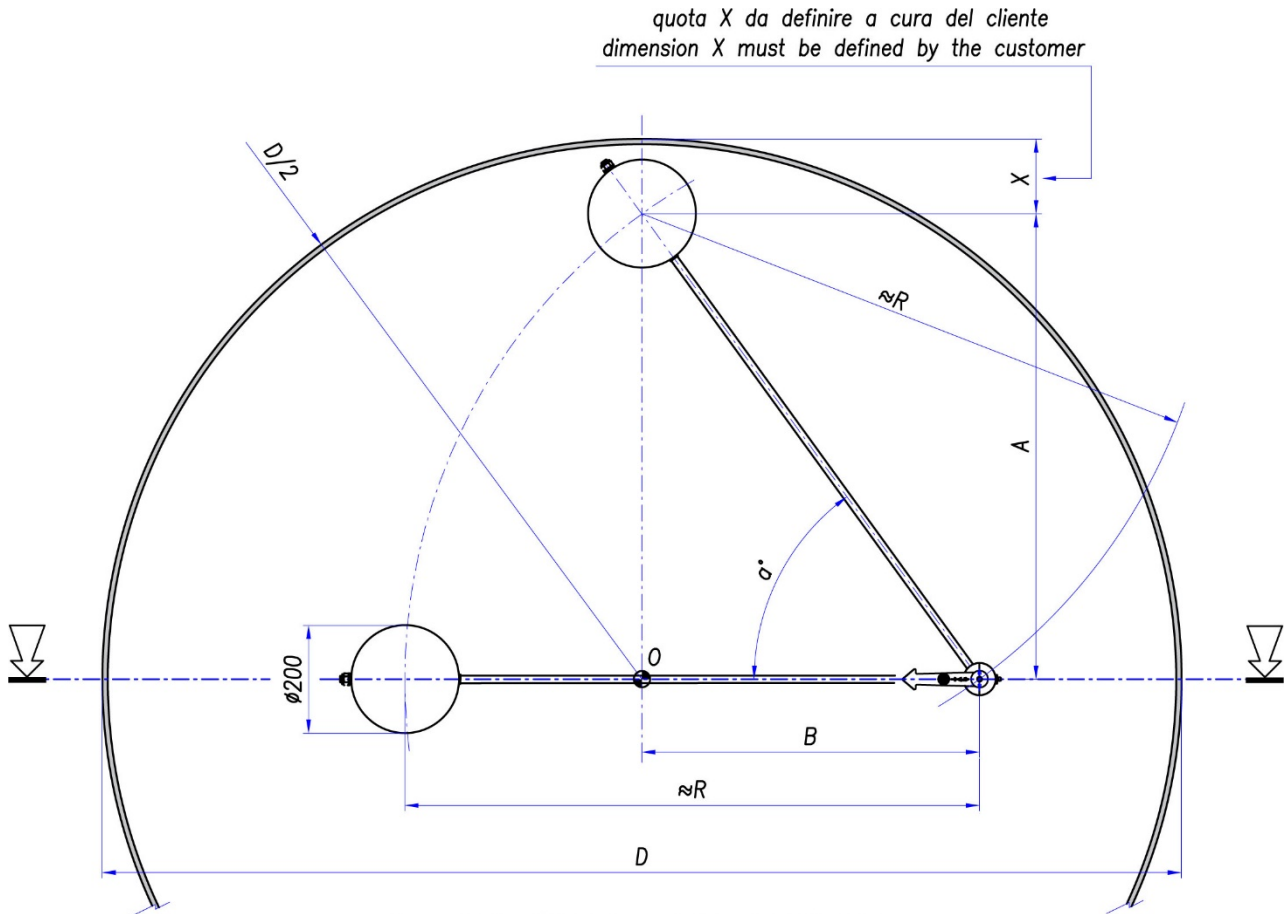
3. Convention symbols



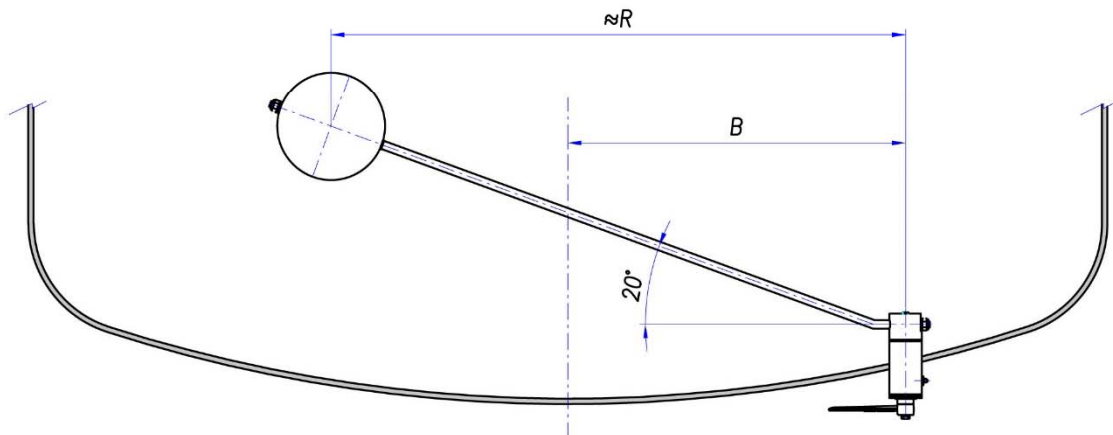
this symbol highlights information and/or instructions that are critical to the prevention of serious injury to the user and/or serious damage to the system and the environment.

4. Installation

Before installing determine the fixing point using the diagram shown below. The diagram refers to the indicator items 0430 - 0431. It is not binding and has the sole purpose of providing a general guideline for calculating the most suitable installation position.



O = CENTRO CISTERNA - CENTER OF THE TANK
D = DIAMETRO CISTERNA - DIAMETER OF THE TANK
D/2 = RAGGIO CISTERNA - RADIUS OF THE TANK



CODICE	DN	R	DIAM. CIST./TANK
ARZO_0430100200	1000	786	≈1500
ARZO_0430130200	1300	1068	≈1900
ARZO_0430150200	1500	1256	≈2300

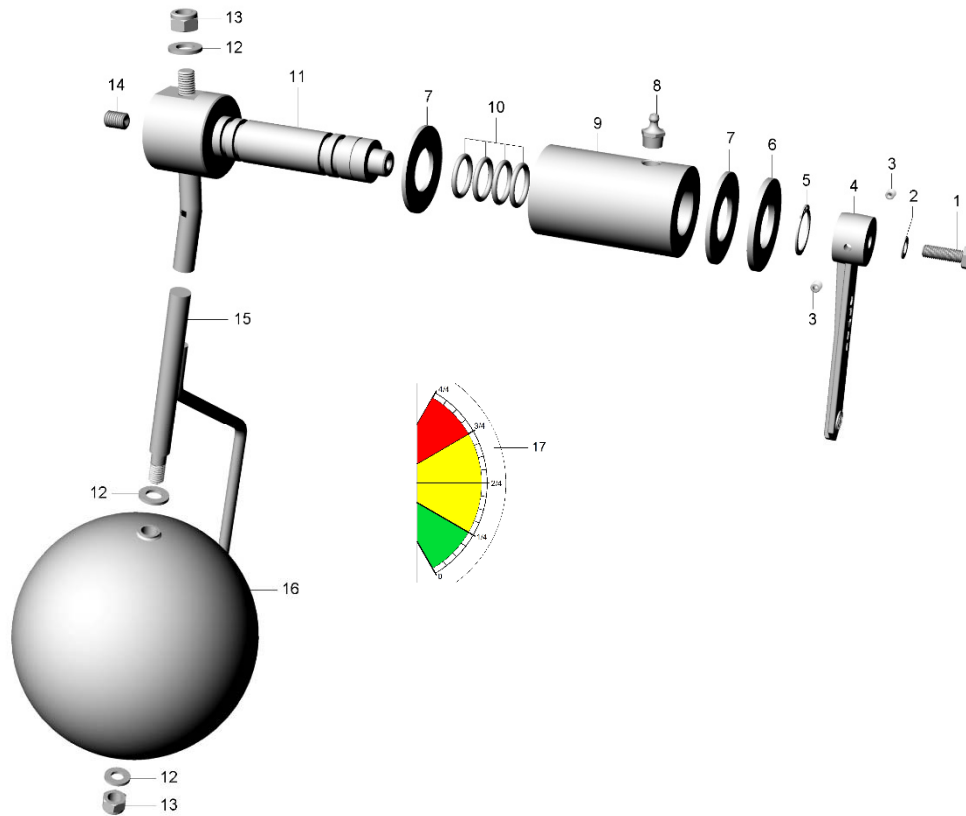
$$A = D/2 - X$$

$$B = \sqrt{R^2 - A^2}$$

$$\alpha = A/B \tan^{-1}$$

After checking the conditions of the product and the presence of all the parts, install it based on the instructions below.

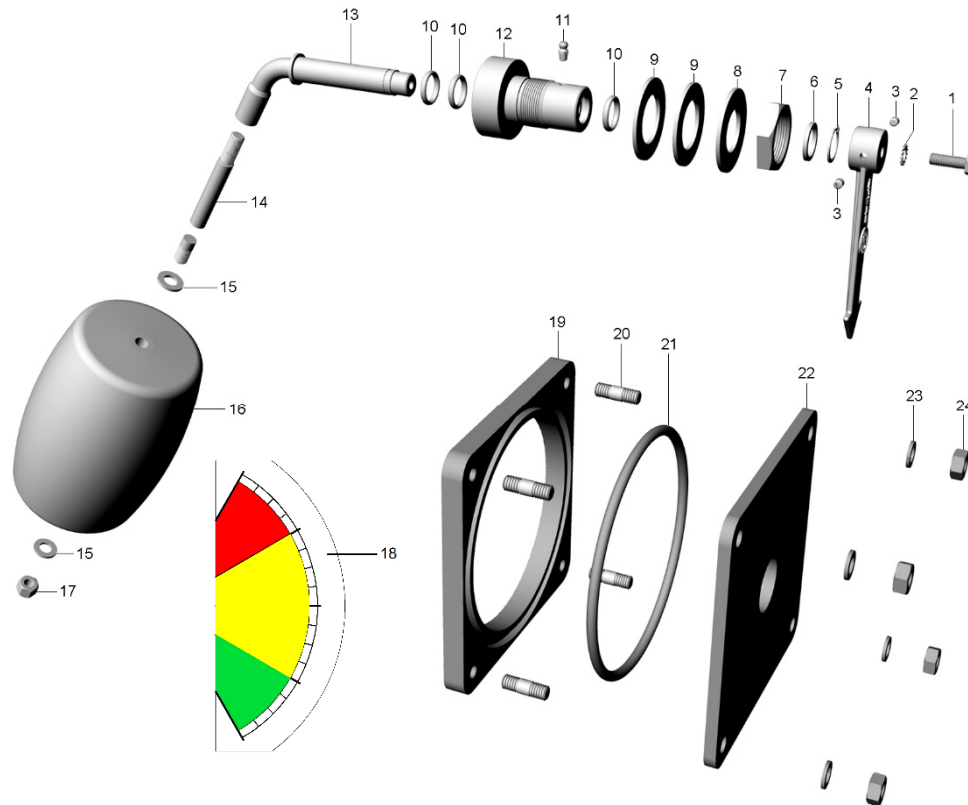
Items 0430 – 0431



The indicator is supplied assembled.

1. Remove the indicator lever (4) by loosening the M6 grub screw (3) and the M8x16 SHC screw (1)
2. Unscrew the greaser (8)
3. Remove the snap ring (5) on the shaft (11) and then remove the Ø60 stainless steel washer (6) and the Ø60 washer in Teflon (7).
4. Pull the external pipe (9) from the shaft (11)
5. Position the external pipe (9) in the hole drilled on the tank (or on the flange that will be fixed to the tank), being careful to keep the part with the threaded hole outside. The pipe welding position (more or less protrusion) may be variable based on the tank shape and the specific application needs. Weld all along the external pipe circumference (9) to the tank
- ⚠ The welding must be performed by qualified personnel equipped with adequate personal protection equipment (gloves, goggles, safety shoes, etc.)
6. Position the greaser (8) and screw it on the external pipe using a low strength threadlocker, if necessary.
7. From the inside of the tank insert the shaft (11) (with relative rod mounted) in the external pipe (9)
8. Position the Ø60 white washer (7) and Ø60 stainless steel washer (6) on the shaft (11) and lock it all by inserting the snap ring (5) in its seat.
9. Reposition the indicator lever (4), adjust its position based on the tank minimum and maximum filling points and then lock it into position by completely screwing down the set screw (1) with the relative washer (2) and anti-rotation grub screws (3)
10. Apply the graduated level (17) to the tank in the adequate position

Item 0434

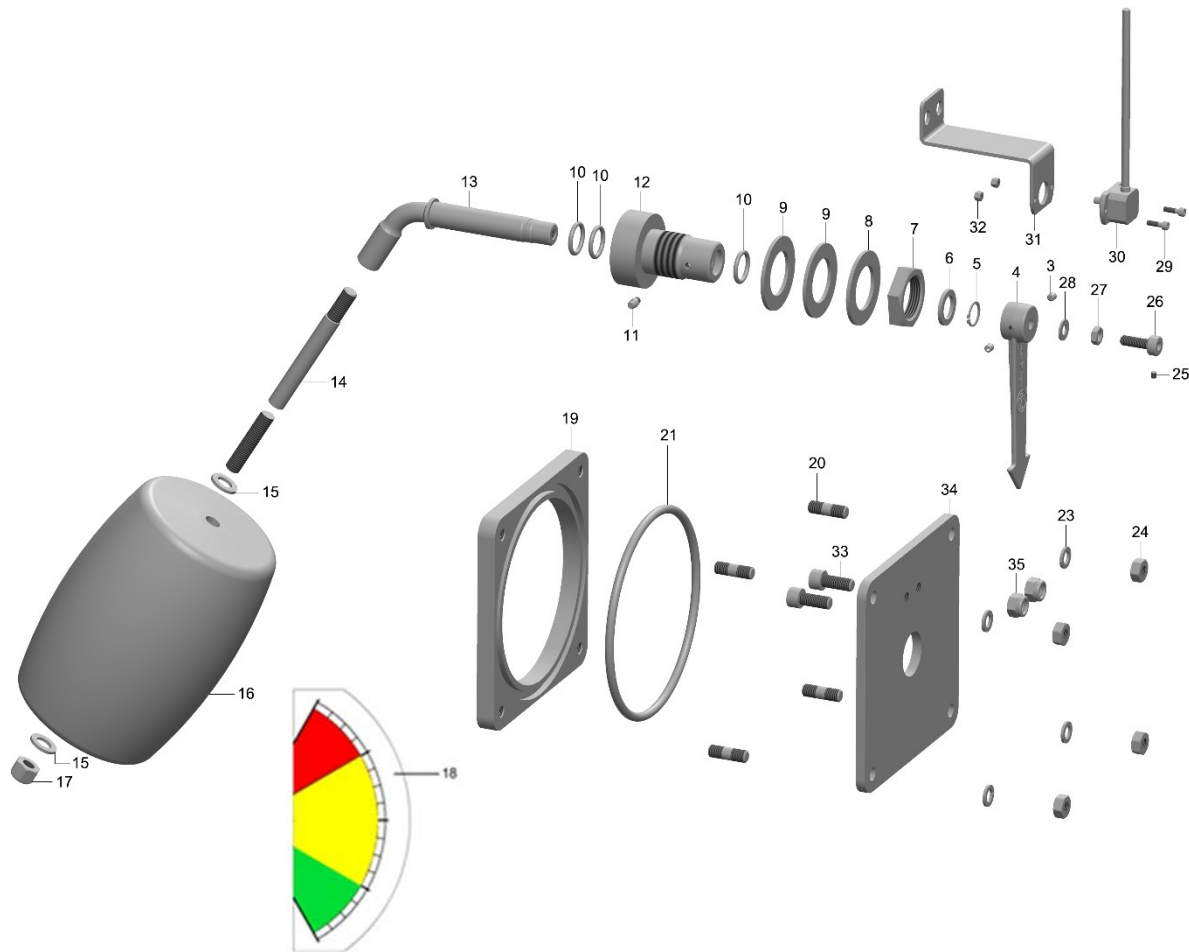


The level indicator is delivered pre-assembled, flange and counterflange are delivered aside.

For the installation it is necessary to keep to the following procedure:

1. Weld the threaded flange (19) all along its perimeter to the tank and ensure that the o-ring seat remains on the exterior side.
2. After the coating with zinc of the threaded flange (19) we advise to overhaul the threaded holes M10 and to remove excessive zinc deposits from the o-ring seat.
3. Screw the four stud bolts (20) to the threaded flange and seal them with a threadlocker
4. Insert the sealing o-ring (21) in the seat present on the threaded flange (19).
5. Remove the pointer (4) by loosening the grub screws M6 (3) and the screw T.C.E.I. M8x16 (1).
6. Remove the greaser (11), unfasten the ring M36x2 (7) and then remove the inox washer \varnothing 60 (8) and one of the two gaskets \varnothing 60 (9).
7. Place the gasket (9) in rabbet on the sleeve (12) and insert the on the sleeve itself the joining flange (22) previously coated with zinc.
8. Insert the gasket \varnothing 60 (9) on the sleeve (12) and put it on the plane of the joining flange (22).
9. Insert the inox washer \varnothing 60 (8) and screw with strength the threaded ring M36x2 (7) to sleeve (12) again. During this phase it is necessary to hold the sleeve still (12) by using a key mm 30 on the two flat sides present on the sleeve itself and to screw the ring (7) with key mm 46 until you reach a stable fixing of the parts.
10. Place the greaser (11) and screw it on the sleeve (12) using, if necessary, a weak threadlocker sealer.
11. Insert the indicator through the whole of the threaded flange(19) and place the flange (22) in rabbet on the threaded flange (19).
12. Place the washers (23) and screw the four nuts M10 (24) until you reach a stable fixing.
13. Re-place the pointer (4), adjust the position according to the maximum and minimum filling points of the tank and then block it by screwing tight the block screw (1) with the relative washer (2) and the anti-rotation grub screws (3).
14. Stick the graduated level (18) on the tank in the adequate position.

Item 0434S



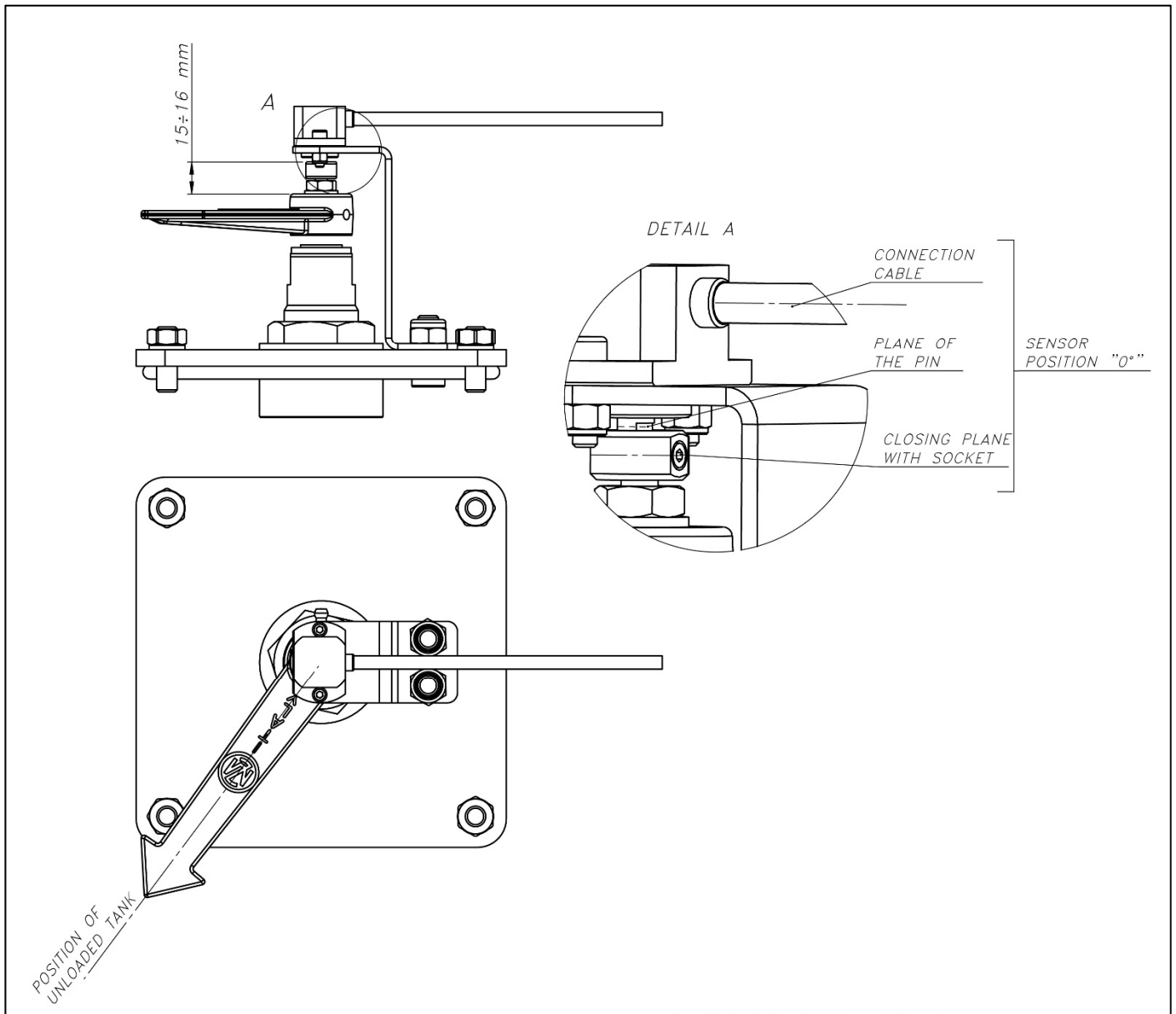
The level indicator is delivered pre-assembled, flange and counterflange are delivered aside. For the installation it is necessary to keep to the following procedure:

1. Weld the threaded flange (19) all along its perimeter to the tank and ensure that the o-ring seat remains on the exterior side.
2. After the coating with zinc of the threaded flange (19) we advise to overhaul the threaded holes M10 and to remove excessive zinc deposits from the o-ring seat.
3. Screw the four stud bolts (20) to the threaded flange and seal them with a threadlocker
4. Insert the sealing o-ring (21) in the seat present on the threaded flange (19).
5. Remove the special screw M8 (26), with the nut (27) and the washer (28)
6. Remove the greaser (11), unfasten the ring M36x2 (7) and then remove the inox washer \varnothing 60 (8) and one of the two gaskets \varnothing 60 (9).
7. Place the gasket (9) in rabbet on the sleeve (12) and insert the on the sleeve itself the joining flange (34) previously coated with zinc.
8. Insert the gasket \varnothing 60 (9) on the sleeve (12) and put it on the plane of the joining flange (34).
9. Insert the inox washer \varnothing 60 (8) and screw with strength the threaded ring M36x2 (7) to sleeve (12) again. During this phase it is necessary to hold the sleeve still (12) by using a key mm 30 on the two flat sides present on the sleeve itself and to screw the ring (7) with key mm 46 until you reach a stable fixing of the parts.
10. Place the greaser (11) and screw it on the sleeve (12) using, if necessary, a weak threadlocker sealer.
11. Insert the indicator through the whole of the threaded flange(19) and place the flange (34) in rabbet on the threaded flange (19).
12. Place the washers (23) and screw the four nuts M10 (24) until you reach a stable fixing.
13. Place the arrow pointer (4), adjust its position taking into account the points of maximum and minimum filling degree of the tank and then block its position by screwing the special screw M8 (26) onto the lock nut (27), the washer (28) and the anti-rotation sockets (3); during this phase make sure that the closing

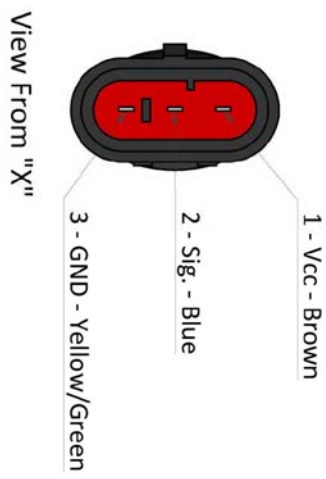
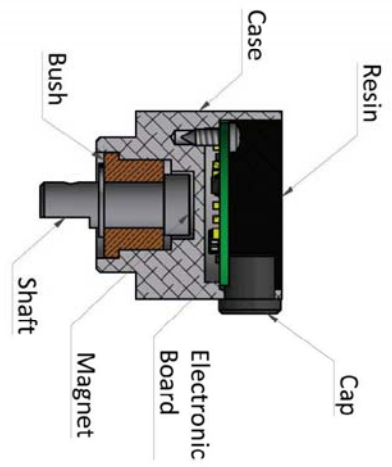
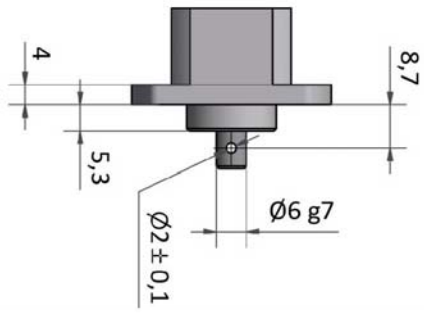
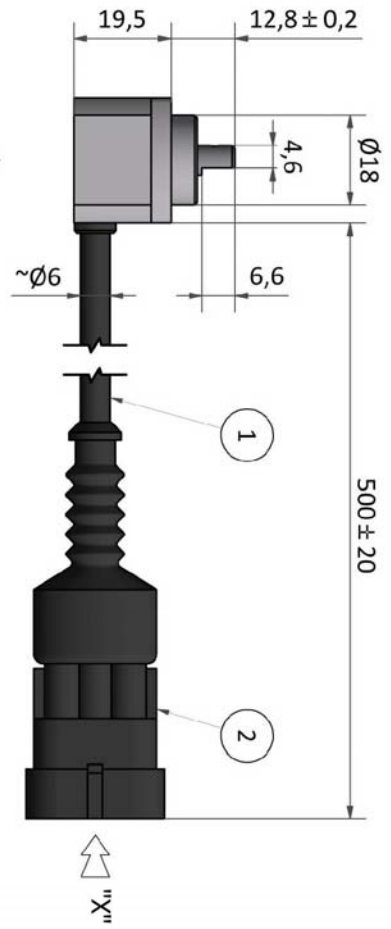
plane of the screw M8 (26) is in direction of the screws (33), the distance between the screw head (26) and the arrow pointer must be between 15 and 16 mm (see picture 1). Use a threadlocker glue of weak intensity.

14. Position the bracket (31) on the flange (34) with the sensor (30) pre-assembled and screw the nuts M10 (35), insert the pin of the sensor in the hole of the special screw (26); the plane of the pin of the sensor must be directed to the connection cable of the sensor. Securely tighten the nuts M10 (35) and the socket M4 (25). Use a threadlocker glue of weak intensity on non-self-locking threads (see picture 1)
15. Stick the graduated level (18) on the tank in the adequate position.

ORIENTATION OF THE SENSOR: the sensor has an angular range of 360°, its point "0" (the point where it shows 0°) is detected when the plane of the pin is directed to the connection cable of the sensor. It is advisable to have the sensor in proximity of the position "0" when the arrow pointer is in position of unloaded tank as described for the assembling phase.

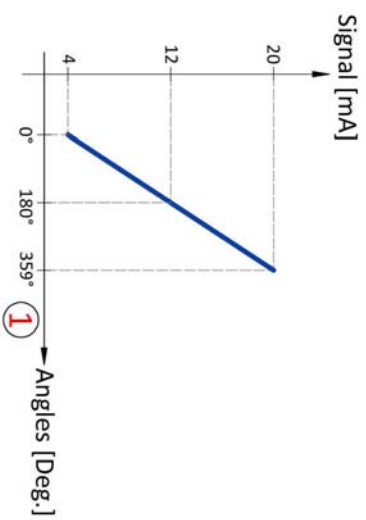


■ Angular Sensor

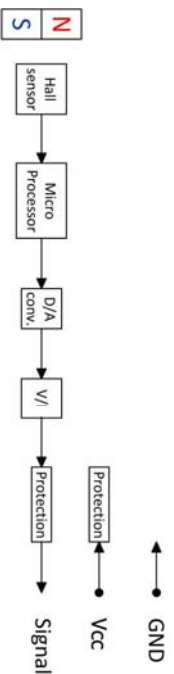


Ref.	Description	Operating Temperature
1	Cable HT 105°C	-25 / +105
2	Tyco SuperSeal 1.5 Series 3 Pins Connector	-40 / +125

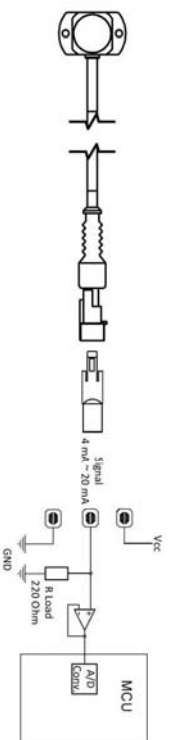
Output Signal 1



Functional Scheme



Typical Application



Technical Specifications 1

Specific	Value
Power Supply (Vcc)	Min 10V - Max 30V
EMC Compatibility	BCI - Class "A" - 100mA; 1~400 MHz
Resolution	< 0.1°
Reverse Polarity Protection	-30V For 1h
Overvoltage Protection	36V For 1h
Output Short Circuit Protection	To Ground For 5' To VDC For 5'
Max Load Recommended Output	< 250 Ohm@ Vin=10V ; < 820 Ohm@ Vin=24V ; < 1250 Ohm@ Vin=30V
Supply Current (No Load)	30 mA Max
Signal Output	1 Linear 4 mA @ 0° + 20 mA @ 359°
Dielectric Rigidity	750V@50Hz For 60s
ESD Protection	±8kV Contact, ±15 kV Air
Insulation Resistance	1000 MOhm@500V
Temperature Operating Voltage	30V@105°C For 1h
Linearity	< ±1 %
Operating Temperature	-40° C ++105° C
Storage Temperature	-40° C ++115° C
Degree Of Protection	IP 67
Vibrations Resistance - Sine	(5±12.87) Hz@dis ±15mm (12.87±200) Hz@dis s±15mm@5g, 1 Octave/min, 20 Sweep Cycles
Vibrations Resistance - Random	f=10Hz@PSD=1.44 g ² /Hz ; f=100Hz@PSD=3.85 g ² /Hz ; f=1000Hz@PSD=3.85 g ² /Hz ; f=2000Hz@PSD=0.96 g ² /Hz ; 3 Axis - 24h For Axis
Body Material	Aluminium With Antioxidant Treatment
Shaft Material	Stainless Steel

Item 0440

The pipe level indicator item 0440 is supplied completely assembled. Installation simply requires fixing it by welding the flanged sleeve to the tank.

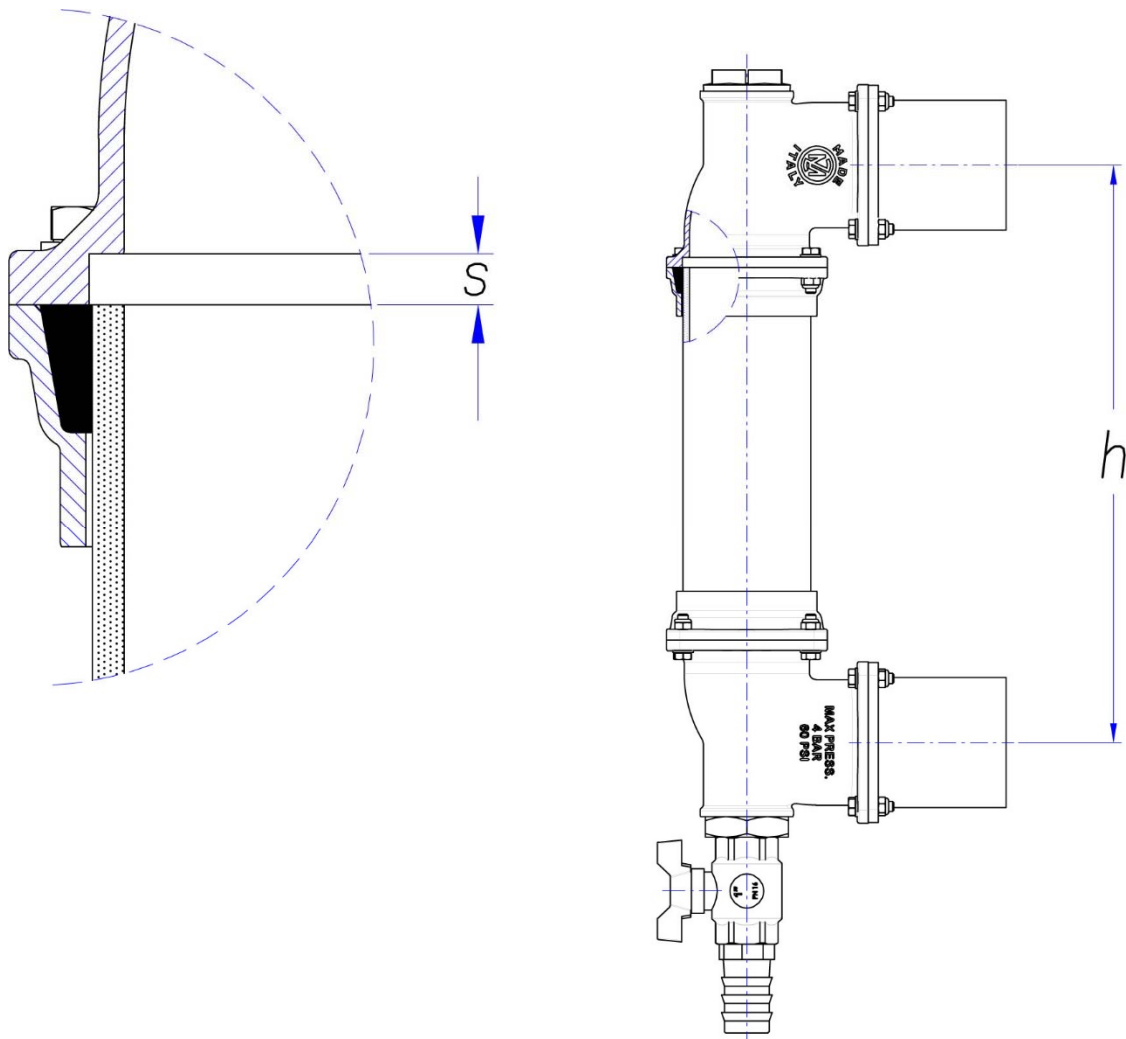
In this phase it is indispensable to comply with the nominal fixing height “h”, i.e. the vertical distance between the horizontal axes of the two sleeves.

Compliance with distance “h” is important to:

1. prevent compression of the ends of the pipe which could cause cracking
2. ensure the space (s)* necessary to allow linear dilatation of the pipe due to changes in temperature.

If the installer wants to change the nominal fixing height “h” by “xx” mm, he must shorten the transparent pipe by the same “x” mm.

* the indicated S space is the sum of the upper space + lower space



As a general rule, the length L of the transparent pipe must comply with the following dimensions:

$$L = h - 152$$

For example, an indicator with centre-to-centre distance $h = 1500$ mm should have a pipe length $L = 1348$ mm

$$L = 1500 - 152 = 1348$$

Item 0441

Item 0441 is supplied with the transparent pipe and discharge valve disassembled. Compared to item 0440, installation of item 0441 is relatively more complex because the sleeves are not flanged but threaded instead.

The procedure below needs to be followed for the installation:

1. Weld the threaded sleeves (5) to the tank being careful to comply with the nominal height "h", the horizontality of the axis of the sleeves, the protrusion (A) of the threaded end of the sleeve from the tank. Compliance with distance "h" is important to:
 - prevent compression of the ends of the pipe which could cause cracking
 - ensure the space (s)* necessary to allow linear dilatation of the pipe due to changes in temperature.If the installer wants to change the nominal fixing height "h" by "xx" mm, he must shorten the transparent pipe by the same "x" mm.

* the indicated S space is the sum of the upper space + lower space

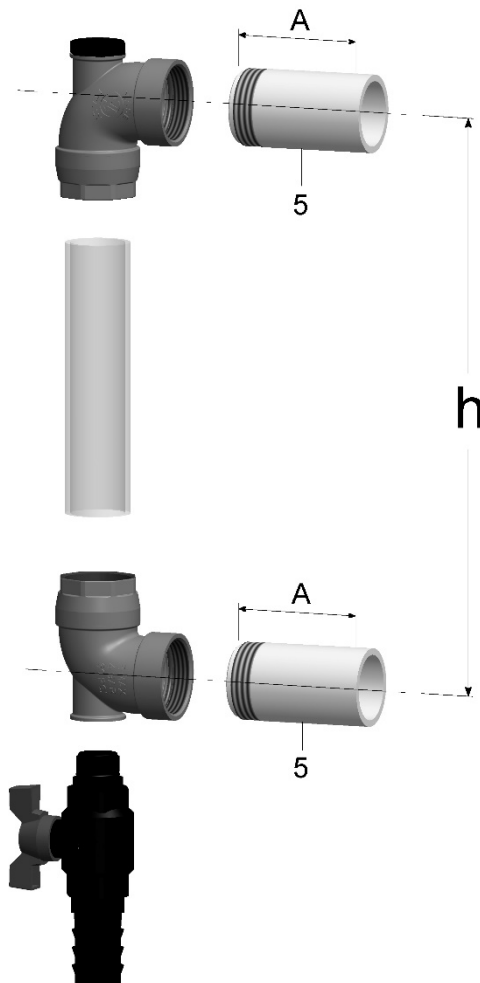
As a general rule, the length L of the transparent pipe must comply with the following dimensions:

$$L = h - 92$$

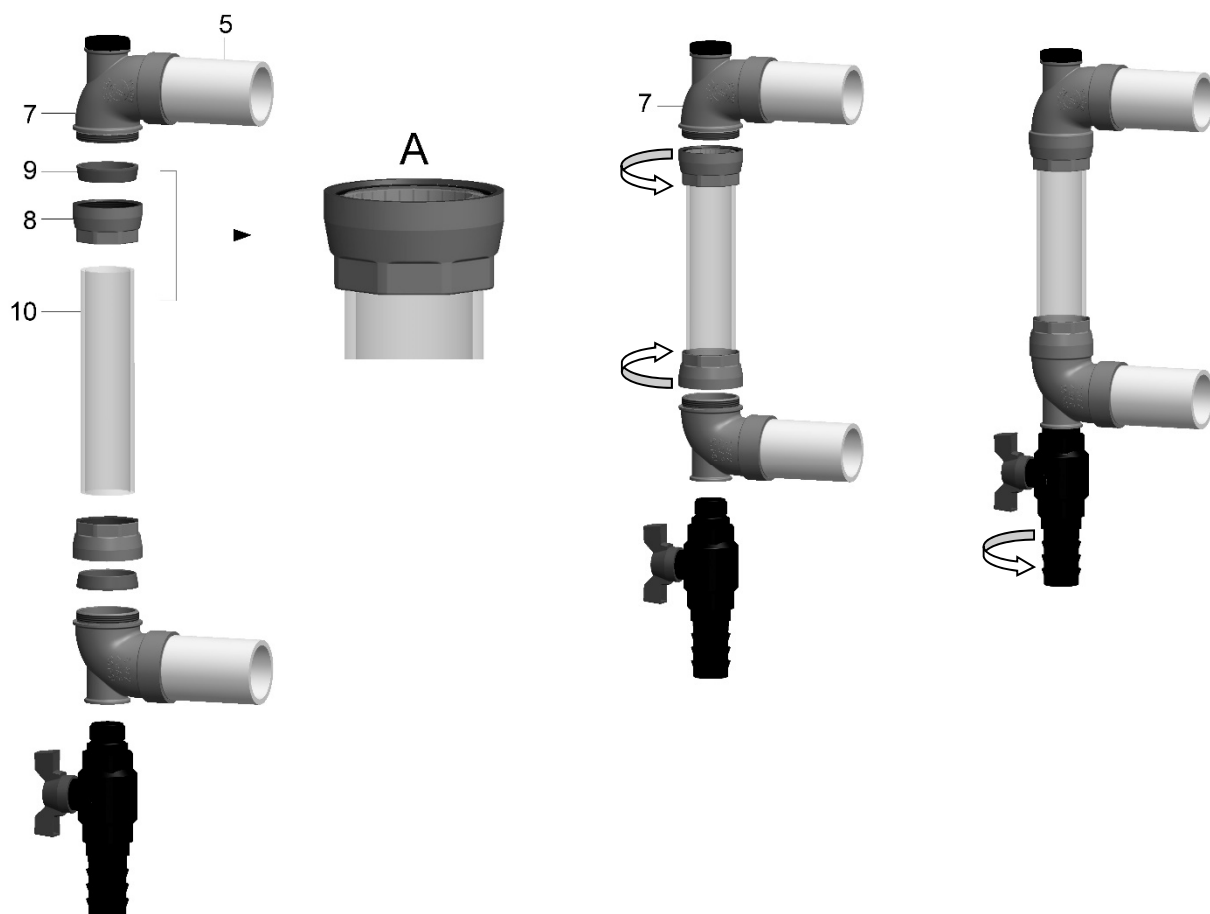
For example, an indicator with centre-to-centre distance $h = 1500$ mm should have a pipe length $L = 1408$ mm

$$L = 1500 - 92 = 1408$$

2. After galvanising / painting operations it is advisable to accurately clean the sleeve threading by removing excessive deposits of zinc or paint.



3. Insert the o-ring in the upper body (7) screw the body (7) to the upper sleeve (5). Repeat the operation for the lower sleeve.
4. Lubricate the seal (9) and insert it in the lower body (8), insert the pipe (10) in the lower body (8) by aligning it as indicated in detail A. Repeat the operation for the opposite end of the pipe.
5. Put the lower pipe-body assembly next to the upper body (7); screw body (8) to body (7)
6. Repeat the operation for the opposite side of the pipe. Slightly bend the pipe in the central area if necessary to make the assembly easier.
7. Assemble the discharge valve and start the indicator.



5. Maintenance

The indicators need just a few simple maintenance operations that can be performed by qualified personnel equipped with the necessary personal protection equipment.

For float indicators:

- Periodically make sure there are no leaks between the rotating parts (shaft/sleeve)
- Periodically check (more or less every 6 months) the conditions of the polyurethane float (item 0434 - 0434S)
- Periodically grease the shaft using the greaser located on the sleeve. Lithium NLGI 1 grease is recommended.

The sight glass on pipe indicators needs to be cleaned periodically. This operation can be done easily by inserting a brush (not metallic) for pipes with telescopic or extendible handle through the cap located in the upper part of the indicator. Do not use aggressive chemical products to clean the pipe; only use light detergents or soapy water with a temperature not over 60°C.

6. Storage

If stored prior to long-term installation or long-term storage it is recommended to keep the indicators in their original boxes in a cool (max 40°C), ventilated place, away from direct sunlight and other sources of heat and humidity.

7. Disposal

No special precautions are necessary for disposing of the product. After cleaning just separate any recyclable materials (metal parts, plastic parts) from those to be disposed of as special waste (P.T.F.E. gaskets, rubber parts, etc.) according to local laws.