EN

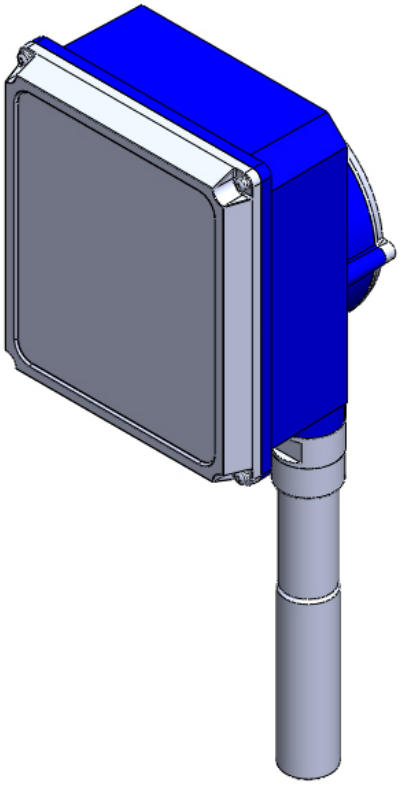
RusAutomation

ILS (E-F)

CONTINUOUS LEVEL MEASUREMENT

INSTALLATION OPERATION AND MAINTENANCE

2



Manual No. TOR.179.--.M.EN Issue: A
Latest Update: December 2011

ORIGINAL INSTRUCTIONS IN ENGLISH

TOREX®

TOREX®

All the products described in this catalogue are manufactured according to **TOREX S.p.A. Quality System procedures**. The Company's Quality System, certified according to **ISO 9001-2008** guarantees that the entire production process, from the customer's order to the after sales service, can fulfill the product quality standard.

SUMMARY

1.1 Scope of the Manual

This Manual has been prepared by the Manufacturer to provide the operating technical information for installation, operation and maintenance of the device concerned.

The Manual, which is an integral part of the device concerned, must be preserved throughout the life of the device in a known easily accessible place, available for consultation whenever required.

If the Manual is lost, damaged or becomes illegible, contact the Manufacturer for a copy specifying the serial number of the device.

If the device concerned changes ownership, the Manual has to be handed over to the new owner as part of the device supply.

The Manual is meant for specialist technical personnel appointed and authorized by the Manufacturer, owner and installer to act on the device concerned for which specific technical skills in the sector concerned are necessary (electrical, mechanical, etc.).

The illustrations may differ from the actual structure of the device concerned but do not interfere with the explanation of the operations.
In case of doubt, contact the Manufacturer for explanations.

The Manufacturer reserves the right to make changes to the Manual without the obligation to provide prior notification, except in case of modifications concerning the safety level.

The technical information included in this Instruction Manual is the property of the Manufacturer and therefore has to be considered as confidential.

It is forbidden to use the Manual for purposes other than those strictly linked to the operation and maintenance of the device concerned.

This information is provided by the Manufacturer in the original language (English) and can be translated into other languages to satisfy legislative and/or commercial requirements.

1.2 Symbols

To highlight certain parts of the text, for purposes of safety, or to indicate important information, certain symbols are used, the meaning of which is described below.

It is important to comply with and scrupulously follow the information highlighted by the symbols.

Danger - Warning

Indicates situations of serious danger which, if ignored, can be risky for the health and safety of persons.

Caution

Indicates that appropriate behaviour must be adopted to avoid posing risk for the health and safety of persons and avoid causing economic damage.

Important

Indicates particularly important technical information which must not be ignored.

List of safety and information symbols

Symbol representation	Symbol description
	**Danger sign:** indicates danger of electric shock caused by the presence of powered components inside the junction box or control panel.
	**Obligation:** read this Manual before carrying out any action on the device concerned.
	**Forbidden:** indicates that it is forbidden to lubricate or adjust moving parts.
	**Forbidden:** indicates it is forbidden to introduce hands into the device.

1.3 Glossary and terminology

Operator: person appropriately trained and authorized by the Production Manager for setting up the device concerned and carrying out routine maintenance.

Installer: organization with specialized technicians and appropriate equipment for carrying out risk-free installation and extraordinary maintenance.

Specialist technician: person responsible for and authorized by the Manufacturer, owner or installer to act on the device; must have specific technical skills depending on the sector concerned (electrical, mechanical etc.). The specialist technician, in addition to being familiar with the working of the device concerned, must be familiar with the working of the plant or equipment on which the device concerned is installed.

Routine maintenance: includes all the actions necessary to keep the device in good working conditions, to ensure greater operating durability and to keep the safety requisites constant.

Extraordinary maintenance: all the actions meant to keep the device in perfect working order.

Setting in safety conditions: all the precautions the authorized personnel must adopt before acting on the device concerned.

The precautions are listed below.

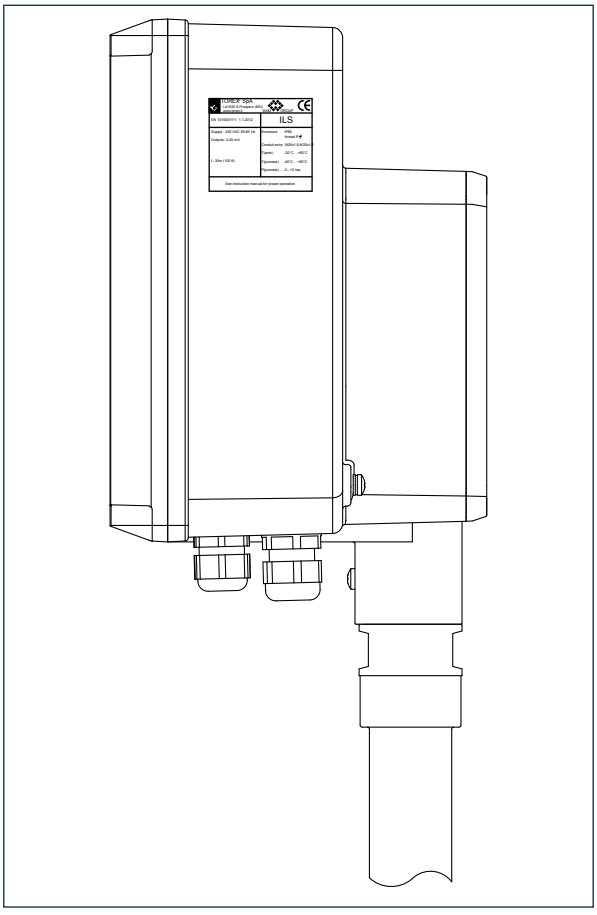
- **Ensure that the device concerned is disconnected from all the mains and appropriate devices are used to prevent these from being reconnected accidentally.**
- **Ensure that all the moving parts of the device have come to a complete stop.**
- **Ensure the temperature of the device concerned is such that it does not burn.**
- **Provide appropriate lighting in the area around the operations.**
- **Wait for the material to be handled inside the device or machine concerned to settle down completely.**

1.4 Manufacturer's data and identification of device

Important

Do not change the data on the identification plate.
Keep the ID plates clean, intact and legible as regards the data they contain.
If the ID plate is damaged or is no longer legible (even just one informative element on it) contact the Manufacturer for a new ID plate and replace it.

The ID plates shown identify the device concerned and its main components.
The plates show the reference necessary for operating safety.



TOREX® SpA① I-41030 S.Prospero (MO) www.torex.it WAM GROUP CE	
SN 1010001111 1.1.2012②	ILS③
Supply : 230 VAC 50-60 Hz④ Outputs: 4-20 mA ⑤ L: 30m (100 ft)⑥	Enclosure IP66 thread R 1½" Conduit entry M25x1.5;M20x1.5 ⑦ T(amb) -20°C ...+60°C T(process) -40°C ...+80°C P(process) : -2...+2 bar
See instruction manual for proper operation	

Identification plate of ILS

1) Manufactuer's name and address
2) Serial Number
3) Device type
4) Supply limit range
5) Output signal range
6) Rope or tape lenght
7) Application limits

1.5 Request for assistance

For all technical assistance, contact the Manufacturer's service network.
For all requests, provide the device identification data, the type of problem encountered and all other information which could be useful for identifying the problem.

1.6 Warranty

The conditions for validity and applicability of the warranty are specified in the sales contract.

1.7 Exclusion of responsibility

The device is delivered according to the specifications indicated by the Buyer in the order and the conditions valid at the time of purchase.

The Manufacturer shall not accept responsibility for safety of persons or objects and operation failure of the device if the loading/unloading operations from trucks, transport, positioning at the site, use, repairs, maintenance etc. have not been carried out in compliance with the warnings described in this Manual, and in accordance with the national legislation in force.

Likewise, the Manufacturer shall not accept any responsibility if the device concerned is used:
- improperly;
- by unauthorized persons and/or persons not sufficiently trained for installation, operation and maintenance;
- with modifications made to the original configuration without the Manufacturer's permission;
- with spare parts that are not original or are not specific for the model;
- without maintenance;
- non-pursuant to the regulatory standards and national or local legislation on the matter of occupational safety;
- non-pursuant to the recommendations in this Manual or on the warning and danger plates applied on the device.

2.1 General safety prescriptions

Read the Instruction Manual carefully and strictly follow the instructions it includes, especially those regarding safety.

Most accidents at the workplace are caused by negligence, failure to follow the most elementary safety regulations and incorrect or improper use of tools and equipment.

Accidents can be prevented and avoided by taking due care, using suitable equipment and adopting adequate preventive measures.

Apply and comply with the standards in force regarding workplace hygiene and safety.

The personnel trained for and authorized for the operations has to have the psychological/physical requisites, experience in the sector concerned and the necessary technical skills for carrying out the operations assigned to them.

All workers involved in any kind of operation must be prepared, trained and informed as regards the risks and the behaviour to be adopted.

Pay attention to the meaning of the notices applied on the device, keep these legible and respect the information indicated.

Use instruments, equipment and tools that have been approved and are intrinsically safe, and cannot alter the safety level of the operations or damage the device during installation, use and maintenance.

Modifications to the device components should not be made for any reason whatsoever, without the Manufacturer's permission.

2.2 Safety prescriptions for installation

Before starting with installation, a "Safety Plan" must be implemented to safeguard the personnel directly involved and those who carry out operations in the surrounding area.

All the laws must be strictly applied, especially those concerning workplace safety.

Before proceeding with installation operations, mark off the work area to prevent access by unauthorized persons.

The electrical connections must be made in compliance with the standards and laws in force.

The person in charge of making the electrical connections has to ensure that the required standards and laws are respected before testing.

2.3 Safety prescriptions for use and operation

Do not tamper with the device concerned by using any kind of device to obtain performances different from those designed.
All unauthorized changes can affect the health of people and the integrity of the device.

The operators have to exclusively wear protective clothing and have to be equipped with appropriate individual protection devices for carrying out the operations and as required by the safety and work accident prevention standards.

Before use, ensure that all the safety devices are installed and that they are working properly.

During operations, prevent access to the work area by unauthorized persons.

Remove all obstacles or sources of danger from the work area.

2.4 Safety prescriptions for maintenance and replacement of components

Danger - Warning

Before carrying out any operation on the device concerned, ensure it is switched off and disconnected from all mains and use suitable devices to prevent the possibility of the power sources being activated accidentally.

Maintain the device concerned in the conditions of utmost efficiency compliant with the maintenance plan provided by the Manufacturer.

Good maintenance apart from preserving the functional features and essential safety features over time, will also allow extending the working life of the device concerned and achieving the best possible performance.

Strictly follow the procedures indicated in the Manual, especially those concerning safety.

Ensure that all the safety devices are active and working properly.
Mark off the work area in such a manner as to prevent the access of unauthorized persons.

Replace the worn and damaged components exclusively with original spare parts, whose safety, reliability and interchangeability have been undoubtedly established.

Apart from invalidation of the warranty, the Manufacturer declines all responsibility for damage to objects and harm to persons deriving from the use of non-original spare parts or due to modifications made during repairs without express written authorization.

Do not dump polluting material (oil, grease, paint, plastic etc.) in the environment, but carry out waste separation disposal depending on the chemical composition of the various products in compliance with the legislation in force.

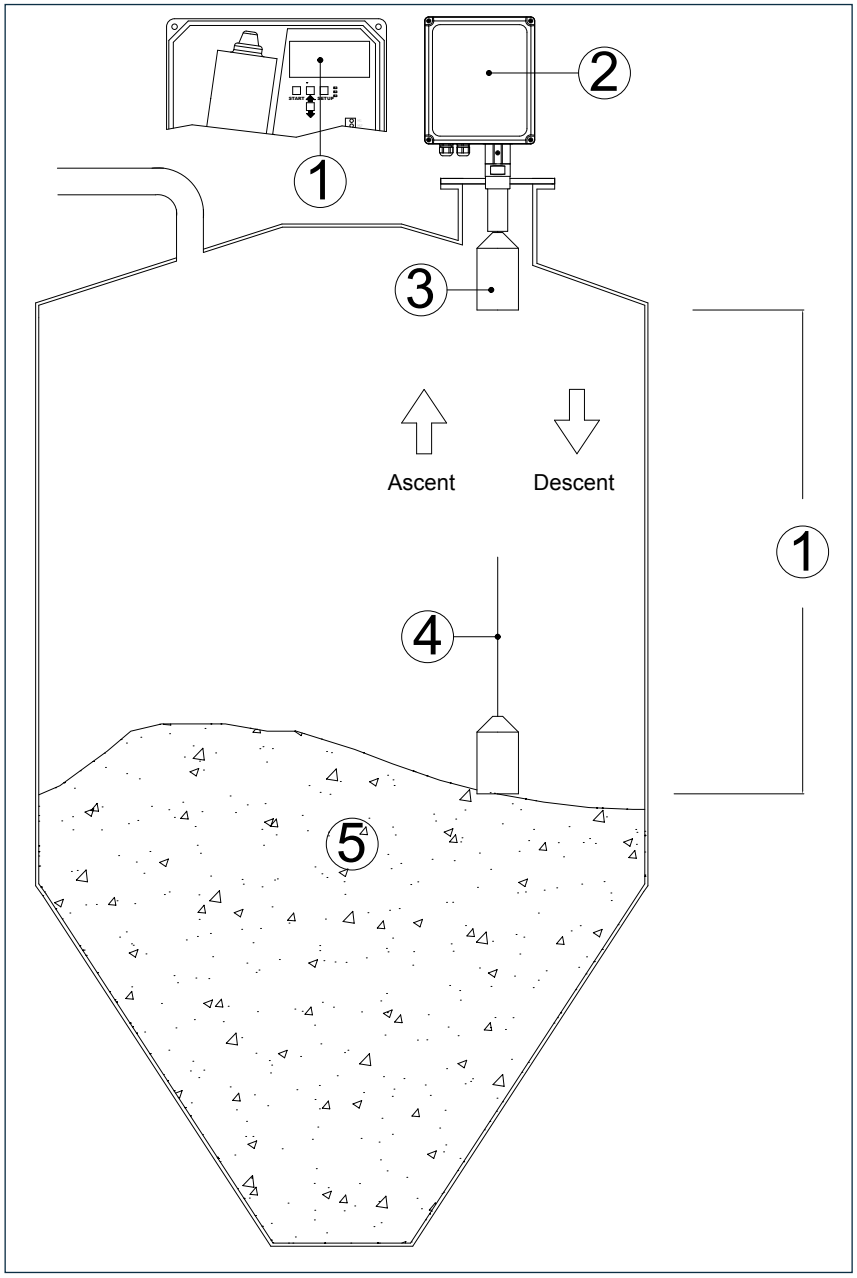
On completion of maintenance or replacement operations, before resuming production, check that no foreign bodies (rags, tools etc.) have been left inside the device concerned.

3.1 General description of the device

The ILS is an electro-mechanic level measuring instrument for the continuous measuring of level heights or level volumes in hoppers, silos or tanks.

It is used for monitoring the level in applications like:
- powders
- small grain size bulk materials
- large grain size bulk materials

3.2 Main components



1) Measured distance
2) ILS body
3) ILS sensor weight
4) Rope or tape
5) Material

3.3 Operating principles

The ILS is mounted on top of the silo. A sensor weight is lowered into the silo. The sensor weight is mounted at the end of a measuring rope/tape, which is wrapped around a motor-driven rope roller.

Upon impact on the bulk material, the sensor weight returns to its upper stop.

The unit is divided into two independent chambers (rope chamber and electronic chamber), which are sealed from each other.

Only the rope chamber is in contact with the inside of the silo during measurement. If the sensor weight is in the upper stop position, it seals the opening between the unit and the silo.

Pulses are generated during downward movement and the number of pulses can be processed directly by the PLC (programmable logic controller) or by remote display.

3.4 Noise level

The ILS level indicator does not produce any noise.

3.5 Environmental operating limits

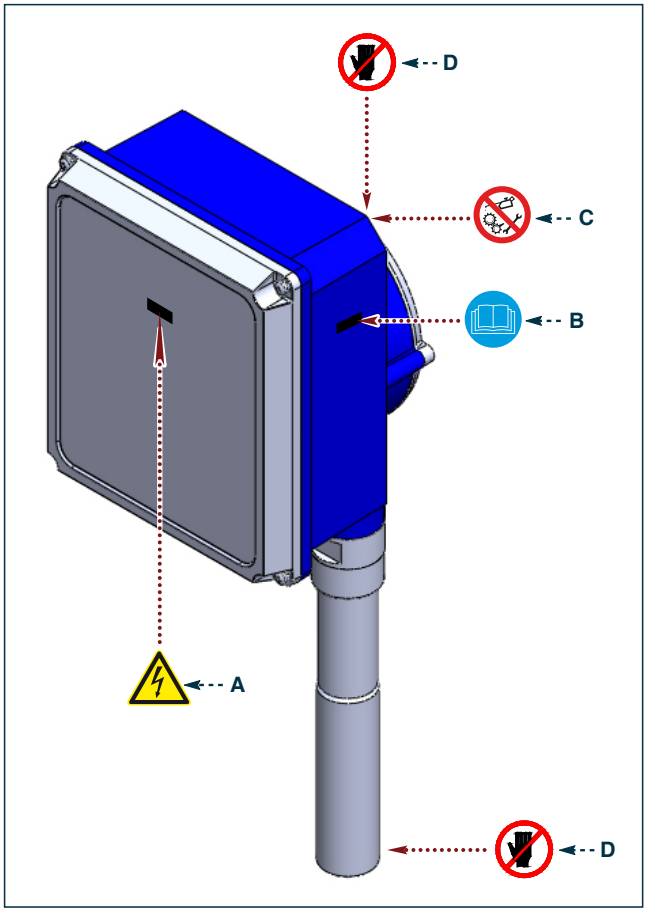
Operating conditions:

- Silo pressure: -0,2 / +0,2 bar
- Silo temperature: -40°C / +80°C
- Ambient temperature: -20°C/ +60°C
- Humidity: 0-100%
- Altitude: Max.2000 m

3.6 Safety and information signs

Danger - Warning

Respect the signs on the plates.
Ensure that the plates are readable; otherwise clean them and replace the damaged ones, placing them in their original position.



A) Danger sign: indicates danger of electric shock because of powered components inside the junction box.

B) Obligation: read this Manual before carrying out any action on the device concerned.

C) Forbidden: indicates that it is forbidden to lubricate or adjust moving parts.

D) Forbidden: indicates it is forbidden to introduce hands into the device.

3.7 Residual risks

Make the ILS connections according to the indications given in the Manual (Chap.5.3 “ELECTRICAL CONNECTIONS” Section).The ILS is supplied without power cables. During device commissioning operations, the operator must take care to connect the cables correctly, carrying out the operations in complete safety as envisaged by the standards (CEIEN 60204-1) regarding the use of electricity. The earthing con-nection must be made by the installer.

HAZARD	DAMAGE	CAUSE	SAFETY MEASURES	LEGAL REFERENCE	OPERATING INSTRUC-TIONS	RESIDUAL RISKS
Risk of loss of stability	Being hurt by the unit	Wrong fitting or installa-tion	Install and fix the unit upon hopper or silo according to the instructions in the Manual		Chap. 5.1, 5.2	None
Risk due to surfa-ces edges or angles	Being hurt by sharp edges		Handle the device with per-sonal protective equipments.		Chap. 2.0	None
Risks related to moving parts (mainte-nance, installa-tion)	Being hurt by internal winding system or sensor weight.	Wrong mainte-nance, access to internal parts without discon-necting electric power.	Disconnect from the mains before starting any mainte-nance operation Maintenan-ce and installation must be carried out by trained staff only. A voltage disconnec-tion device must be provided close to the unit.		Chap. 8.0	None
Electricity supply	Being hurt by electric shock	Wrong mainte-nance or instal-lation, access to internal parts without discon-necting from the mains.	All wiring must be done by trained staff only, according to national regulations and wiring diagrams.		Chap. 5.1, 5.3, 8.0.	None
Static Electricity		Presence of elec-trostatic charges upon the unit of not properly earthed.	Ground the unit through the bonding terminal.		Chap.5.3	None

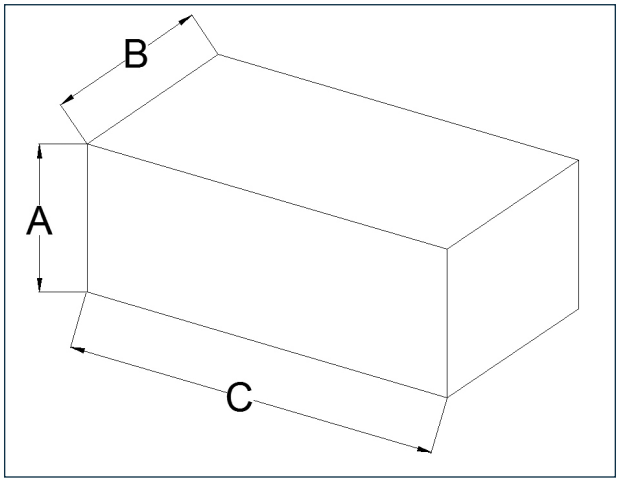
4.1 Type of packaging

The ILS level indicator are packed separately in cardboard boxes.
Depending on the quantity ordered, the boxes can be assembled on pallets wrapped and fixed with shrink film.

4.2 Unpacking

To unpack, just remove the pallet covering film (if present). The ILS level indicator inside each box is unrestrained.

4.3 Weights and dimensions



TYPE	A (mm)	B (mm)	C (mm)	WEIGHT (kg)
ILS (rope)	260	280	800	10
ILS (tape)				12

Important

The data shown in the table don not include the weight of complete packaging (pallet or other) if present.

4.4 Disposal

The installer is responsible for the disposal of the packaging materials in compliance with the laws in force regarding the matter.

4.5 Reception of goods

On receiving the goods, ensure that the type and quantity correspond to the data present on the acknowledgement of order.

Possible damage has to be immediately communicated in writing in the space provided to this purpose in the waybill.

The carrier is obliged to accept the complaint and leave the Customer a copy of the waybill.

If the supply is “free destination” a copy of the waybill and of the complaint shall be sent to the Manufacturer or to the forwarder.

If the damages are not claimed immediately on receipt of the goods, your request for compensation may not be accepted.

4.6 Lifting and unloading methods

Danger - Warning

Carry out the lifting and handling operations according to the information indicated on the device and in the Manufacturer’s Operation Manual.
The person authorized for unloading operations has to make sure all the necessary measures are adopted to ensure his or her safety and the safety of other persons directly involved.
Use means and accessories (ropes, hooks, shackles etc.) suitable for the load to be lifted.
Pay attention in the lifting phase to balance the load to avoid uncontrolled movements which could cause work injuries to persons.
Do not stack the packages as they are not sized for that purpose.
Before lifting and handling the load, read the relevant information indicated in the “Information regarding safety” Chapter.

5.1 Recommendations for installation

Prior to installation

Avoid damp and salty atmospheres as far as possible. Position the device on wooden pallets protected from unfavourable weather conditions.

Long device shutdowns after assembly

Set the device in safety status. Before starting the device, check the electrical connections and all parts the working of which may be affected by long shutdowns.

Possible reuse after long shutdowns

Avoid a damp, salty atmosphere for device storage during long shutdowns. Place the device on wooden pallets protected from unfavourable weather conditions.

Set the device in safety status. Before restarting the device, check the electrical connections and all parts the working of which may be affected by long shutdowns. Also before starting up the device, clean it thoroughly by following the instructions given on the product safety chart.

If the device operates in different conditions, or using materials different from the previous application, check to ensure this use is compatible according to the INDICATIONS FOR USE section.

Danger - Warning

The installation operations have to be carried out by a technician specialized in such activities. Provide appropriate safety measures and use suitable equipment to prevent risk of work accident to persons involved in the operations and to those nearby.

Before starting installation, define a safety plan which complies with the laws in force regarding workplace safety.

The specialist technician, authorized by the installer or owner, has to evaluate whether the area has been properly prepared and whether the necessary installation equipment is available.

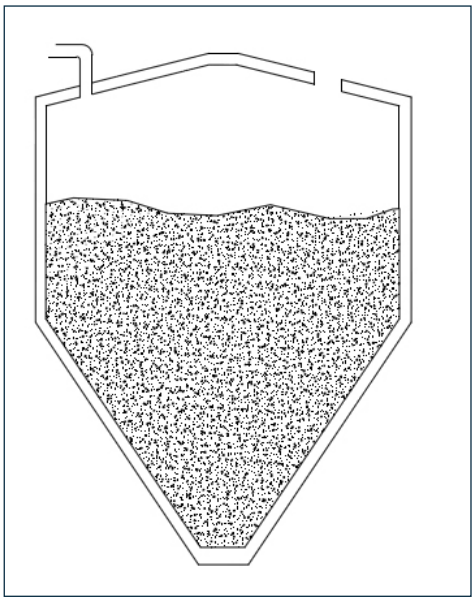
Define, on the basis of the configuration of the device concerned, the assembly method.

Clean the surfaces thoroughly.

5.2 Assembly instructions

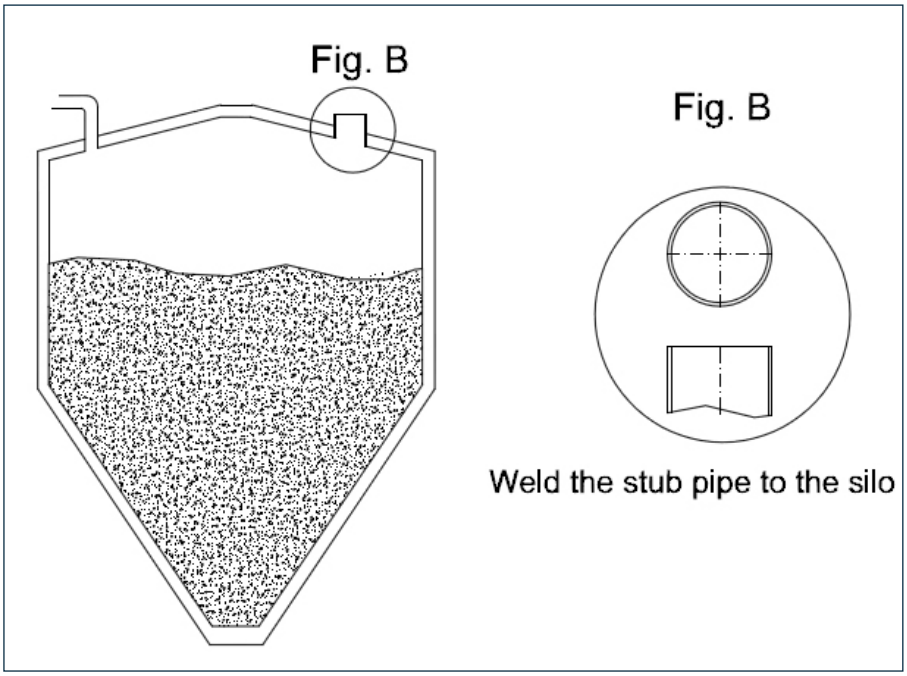
Danger - Warning

Before carrying out the operations, read the safety prescriptions and the safety recommendations for installation.



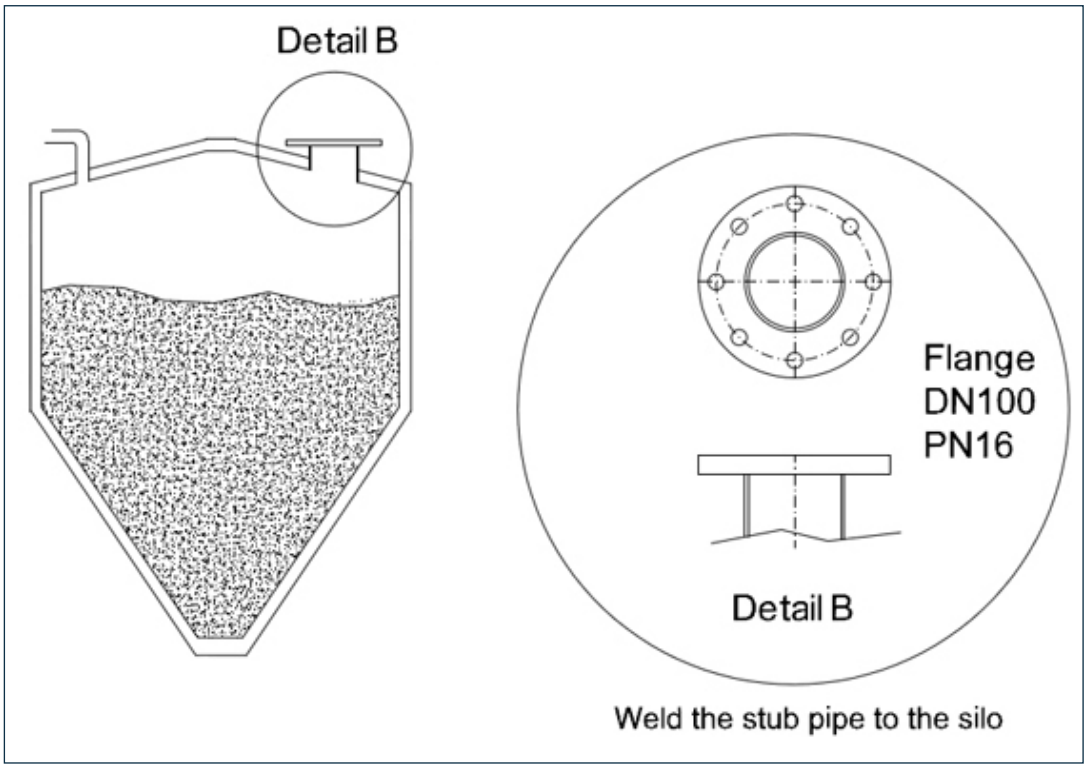
- Carry out a bore on the silo roof.
- The ILS level indicator must be fitted in vertical position on the upper part of the silo.
- Maximum possible inclination of the indicator: 2°.

Threaded version 1 ½"

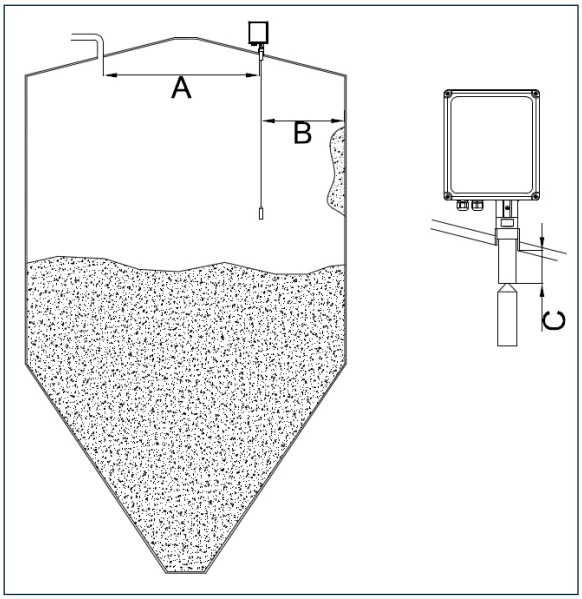


- The bore allow the welding of a stub pipe that can be welded to an internal thread 1 ½ "DIN 2999.
- Attention: weld the stub pipe to the silo in vertical position.

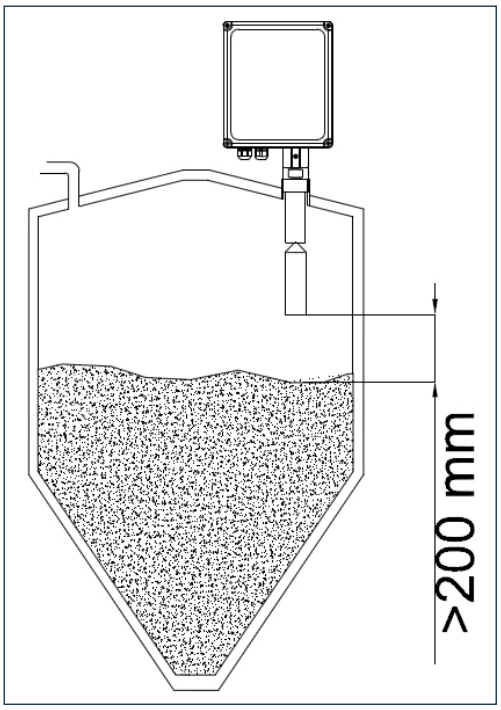
Flange version DN100 PN16



- The bore has to allow the welding of a stub pipe to the DN100 PN16 connection flange (Stub pipe not supplied by TOREX).
- Attention: weld the stub pipe to the silo in vertical position.



- The bore must be made at a distance “B” equal to about 1/3 of the distance between the silo wall and the centre, to allow a correct vertical descent of the sensor weight and in case of oscillation of the weight, prevent it from touching the material accumulated on the silo wall (if any) or accessories and masts built into the structure.
- The fitting must enter the silo at a distance “C” of at least 50 mm.
- Follow the distance “A” between the level indicator and the point at which the material enters the silo so that the flow of material while filling the silo does not interfere with the sensor weight.



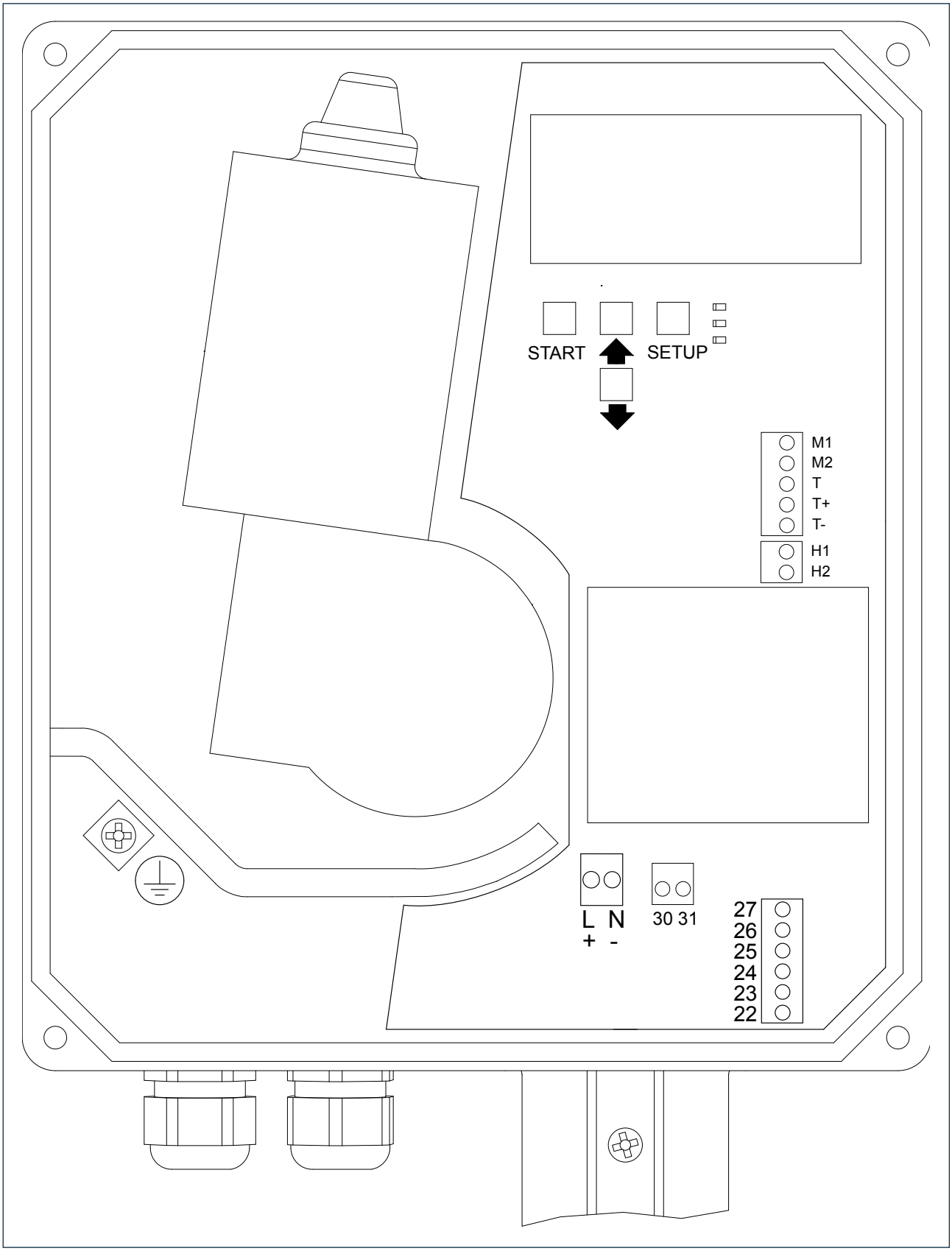
- Leave at least 200 mm of space to allow the sensor weight the minimum descent distance when the silo is full. If this distance is less, the level indicator will sent an alarm message.

5.3 Electrical connections

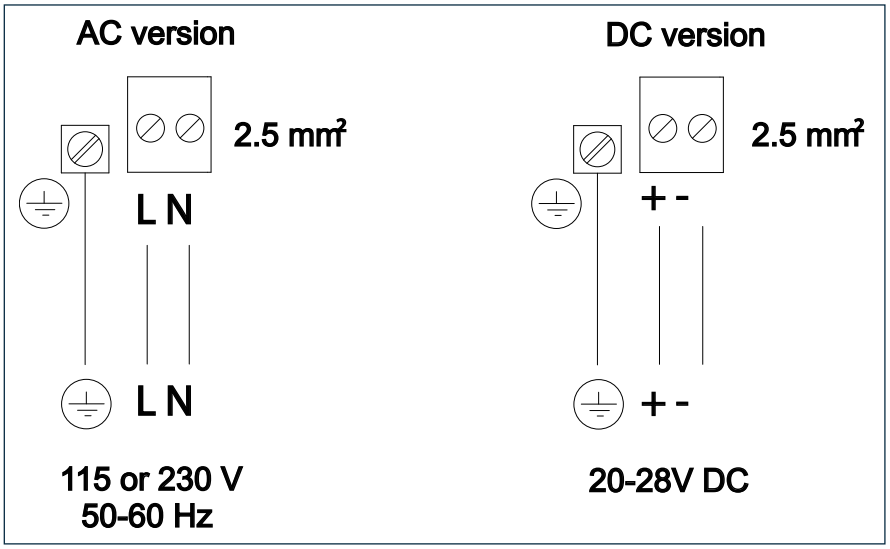
Before carrying out any action on the device, make sure it is in safe condition.

- The connection between the ILS indicator and the mains must be done by a specialist personnel.
- In case of improper use or in-correct installation, electrical safety can not be guaranteed.
- Before making the connection, make sure the voltage (shown on the device ID plate) matches that of the mains.
- The electrical connection must be made according to the provisions on the installation place.
- Use a fuse as shown in the wiring diagram.
- Use a residual current circuit breaker (RCCB) to protect the device from indirect contacts with hazardous voltages.
- Provide a power supply disconnecting switch the near the device.
- Install a protection device for the relay contacts.
- The device must be earthed, especially when installed in applications with pneumatic conveyors and non metallic containers.
- All the electric cables which are connected to the device must be provided with at least 250V AC and a temperature of at least 80 °C insulation.
- The cable glands must be secured tight to the cable to prevent water from entering inside the indicator. The unused cable glands must be closed.

ELECTRICAL CONNECTIONS BOARD



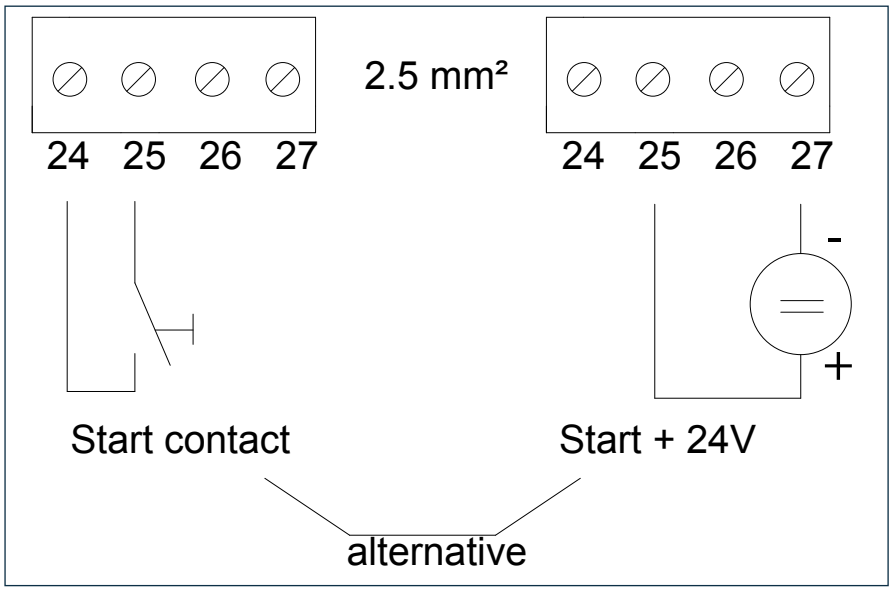
POWER SUPPLY VOLTAGE



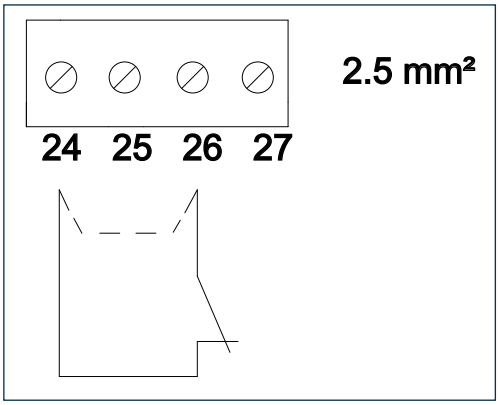
Important

Please indicate which version is needed, whether AC or DC, in order phase.

INPUT SIGNAL: STARTING MEASUREMENT

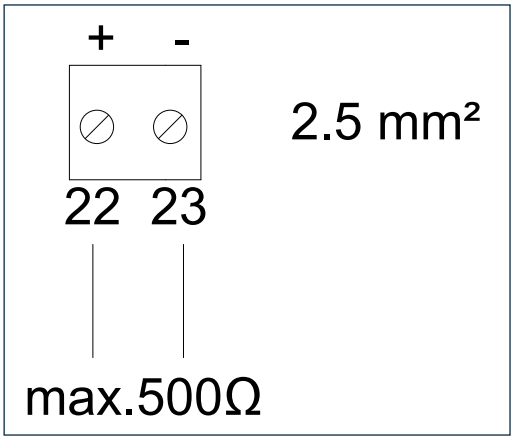


STOP MEASUREMENTS IN CASE THE CONTAINER IS FULL



Remote connection provided at factory in terminal 24 and 26.
If used, remove the connection supplied by the factory.

OUTPUT SIGNAL : ANALOGIC TYPE = 4 – 20 mA at zero potential



INPUT AND OUTPUT SIGNALS

Input signal

Starting measurements:
- Zero potential contact, terminals 24,25
- With 24 V DC voltage, terminals 25,27.
- Current consumption 25mA. Take into consideration the polarity.
- Duration of the start measurement signal: 0.7 to 5 seconds.
- To start, the contact must be closed or the 24 V signal must be present.

Stopping measurement if the container is full
- If used, connect terminals 24 and 26 to the contact of the silo filling connection, after having removed the connection provided by the factory. It is used to prevent a measurement if the silo is filled or to interrupt a measurement when filling starts.
- When the terminals 24 and 26 are open, the sensor weight returns immediately to the upper stop position. The contact must therefore be closed to enable the measurement.

Output signal

ANALOGICAL TYPE = 4 – 20 mA at zero potential - Terminals 22 (+) and 23(-).

- The current signal can be programmed to indicate the level or the volume.
- The current signal is sent when the sensor weight touches the surface of the material.
- The signal is always active and the value transmitted remains until a new measurement is carried out.

Led status

LED	STATUS
Green ON	Power supply ON
Red ON	Fault
RED flashing	Maintenance

5.4 Parameters adjustment

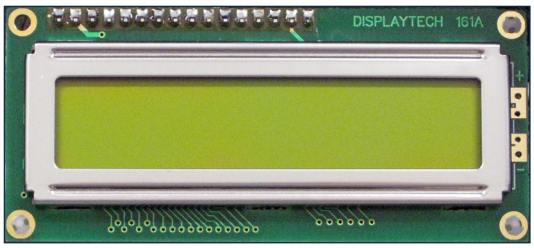
QUICK SETTING

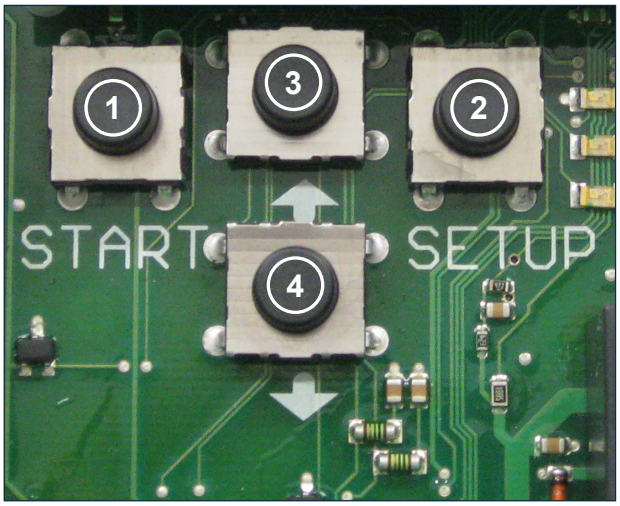
The quick setting is used for rapid and easy start-up of the system.

If the unit operates under normal conditions (Measurements Mode), pressing the SETUP button will allow entering the Quick Setting menu.

PROGRAMMING PUSHBUTTONS

DISPLAY: it displays the measurements values or the settings on two horizontal lines.





1. START button:

- It gives access to the initial MEASUREMENT MODE after a parameter setting.
- It cancels an error or maintenance message.
- It starts the measurement.

2. SETUP button :

- It gives access to next adjustment item.

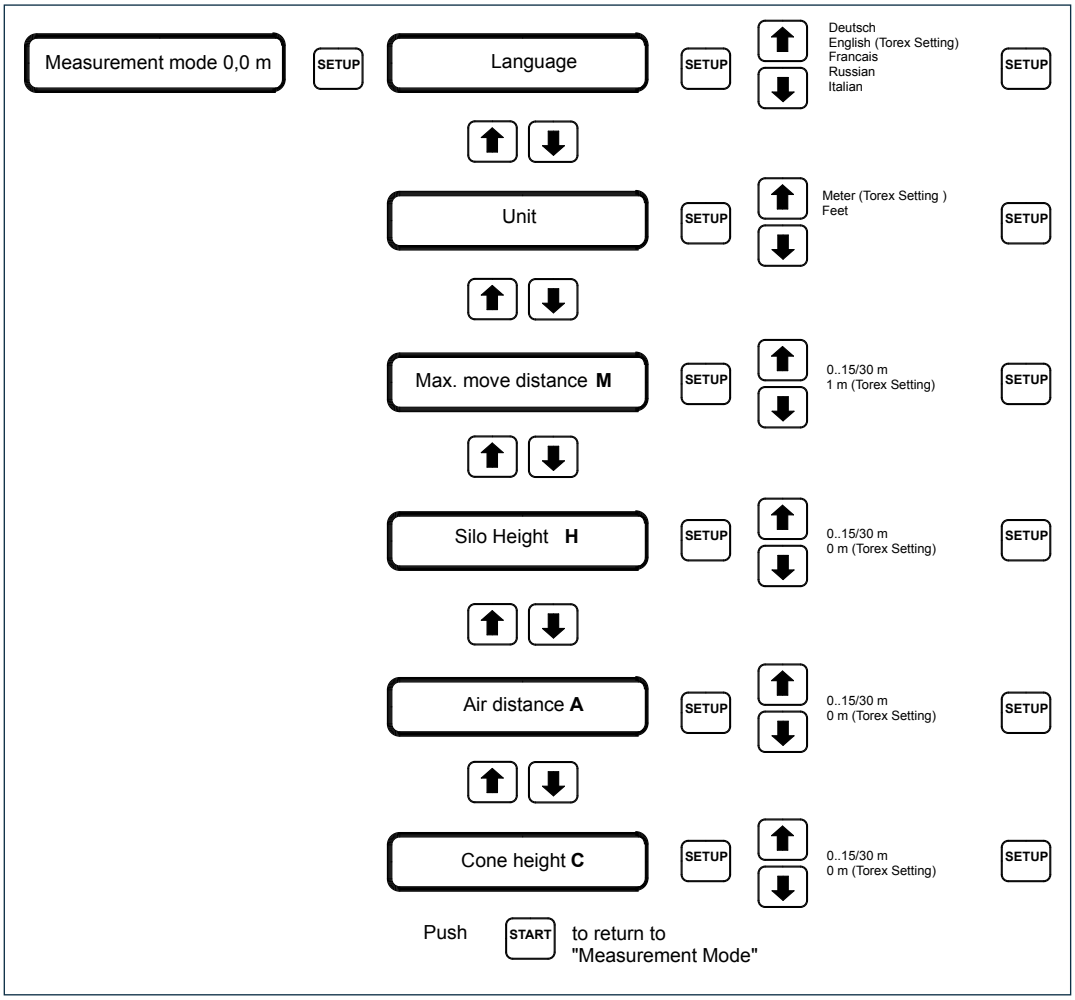
3./4. UP/DOWN button:

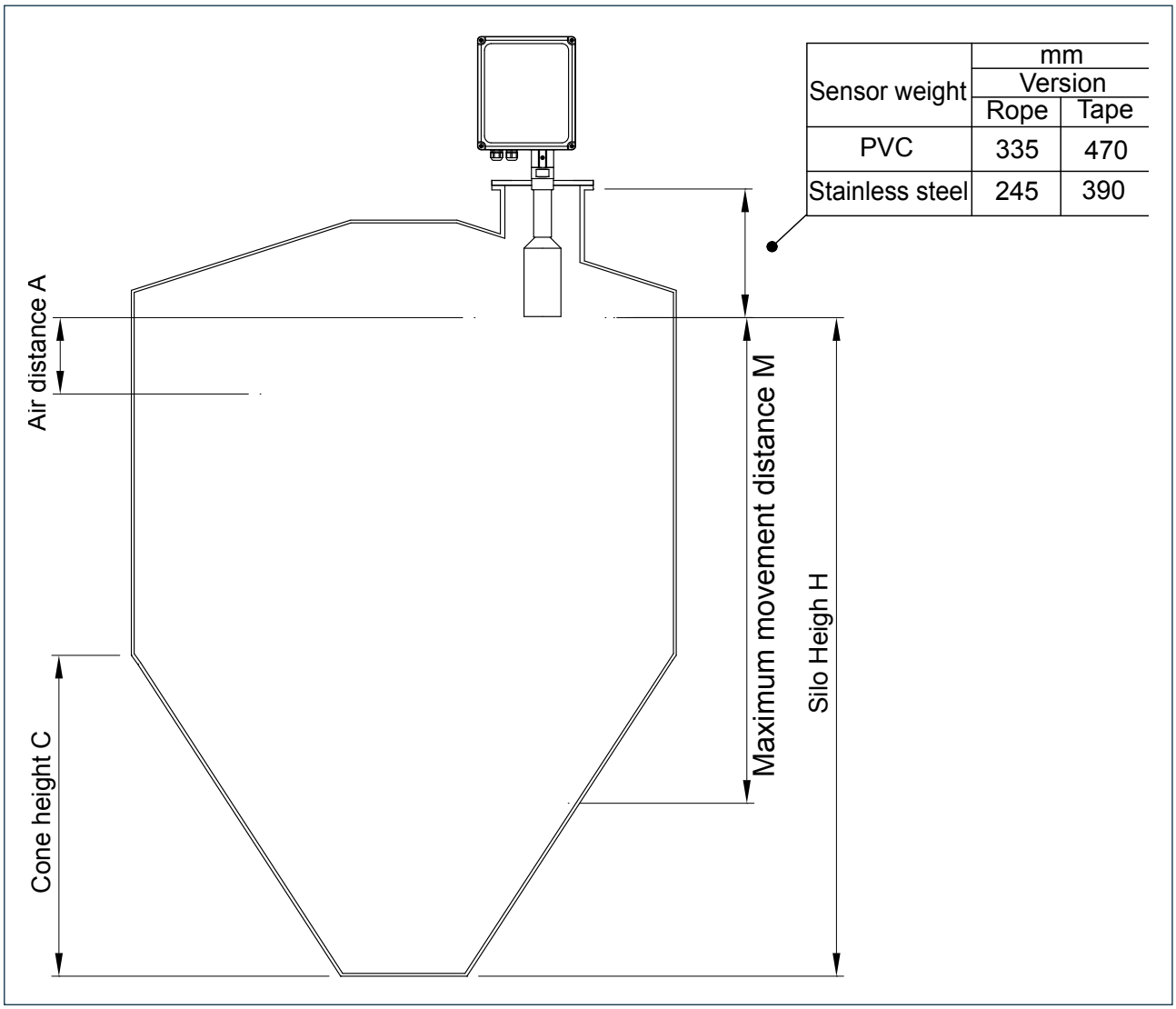
- It increases or decreases the value to be adjusted.

MESSAGES DISPLAYED DURING THE MEASUREMENT

*	The sensor weight has reached the upper stop position.
↓	The motor is moving downwards (Fast Mode).
↑	The motor is moving upwards (Fast Mode).
←	The motor is moving in Slow Mode (this message is displayed immediately after the motor starts up and just before reaching the upper stop position).
BLOCKED	Measurement interruption is active (Terminals 24 and 26 are not connected. See instructions).

QUICK SETTING MENU





Maximum movement distance M: It is the distance that prevents the sensor weight from entering the silo outlet spout.

Silo height H: Definition of the 0% level output signal.

NOTE: If the maximum movement distance M is smaller than silo height H, the value measured will always be greater than 0%.

Air distance A: Definition of the 100% level output signal.

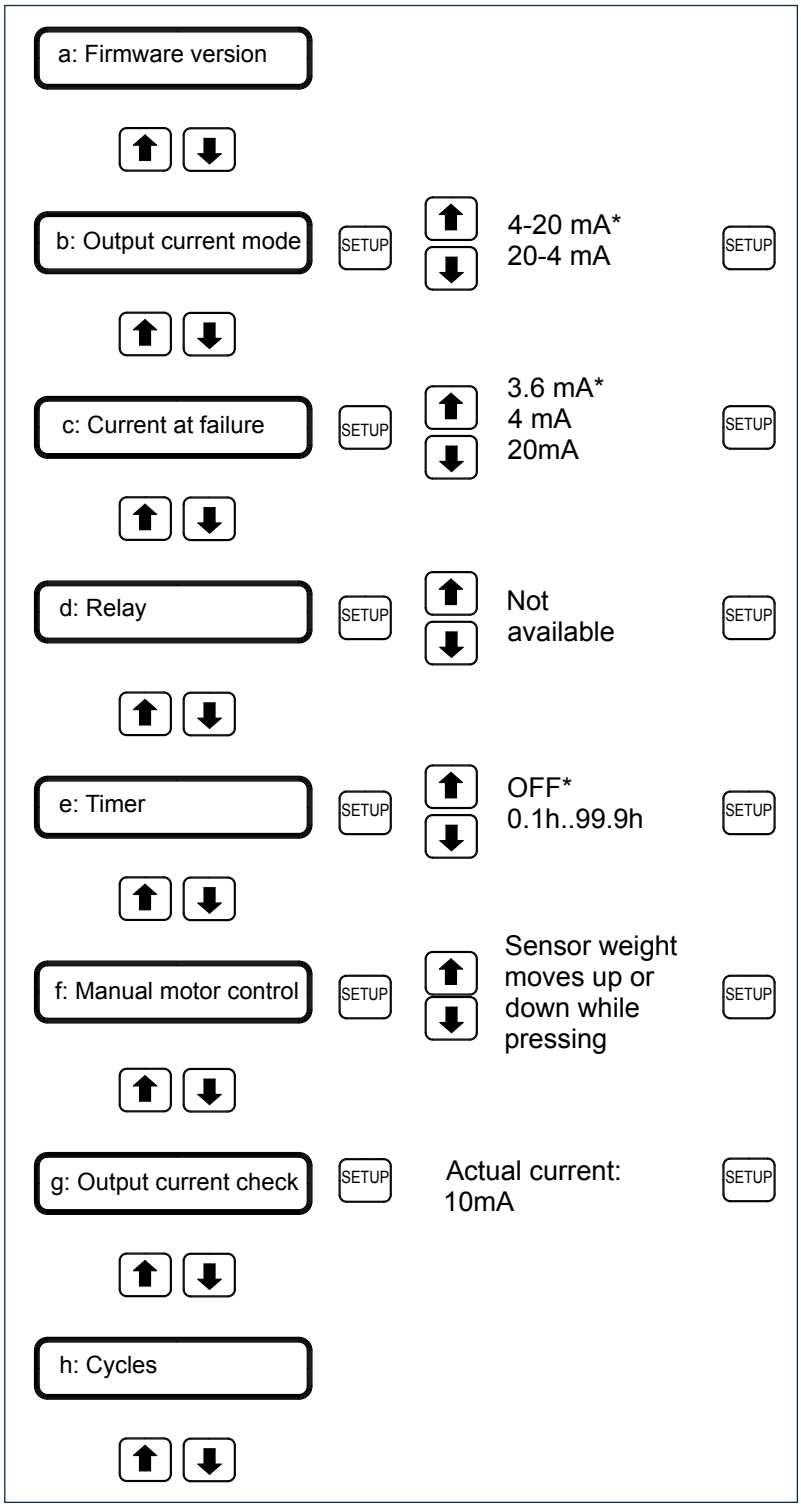
Cone height C: Adjustment of the height of the conical part C.
Enables setting of the current signal as volume.
C = 0 The current signal output refers to the level of material.
C > 0 The current signal output refers to the volume of material.

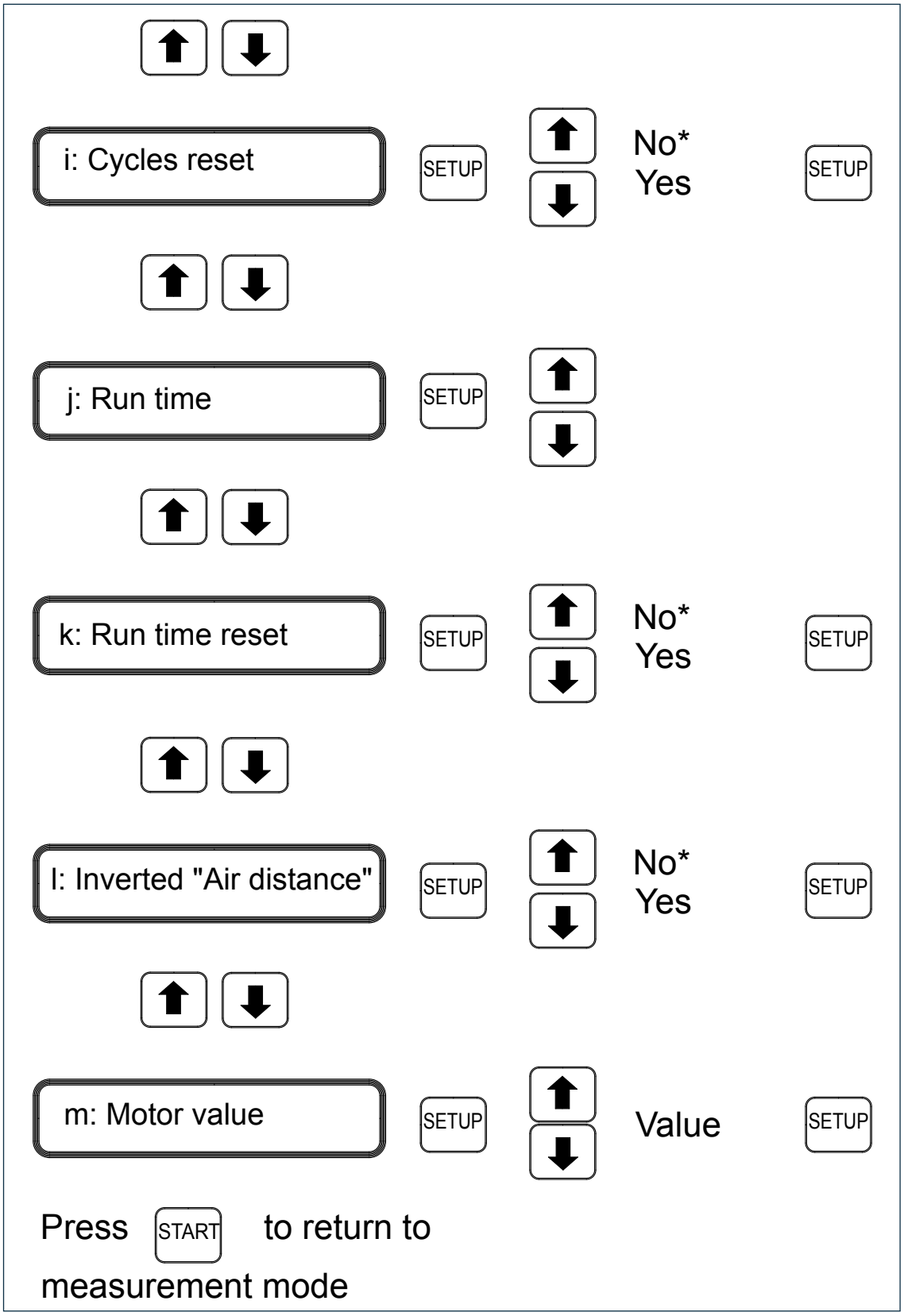
ADVANCED MENU
(Used only if necessary)

With the advanced menu it is possible to set the outputs and to display the actual status of the unit.

Enter the advanced menu:

If the unit is working under normal operation (measurement mode), press both "arrow" buttons together for approx. 2 seconds.



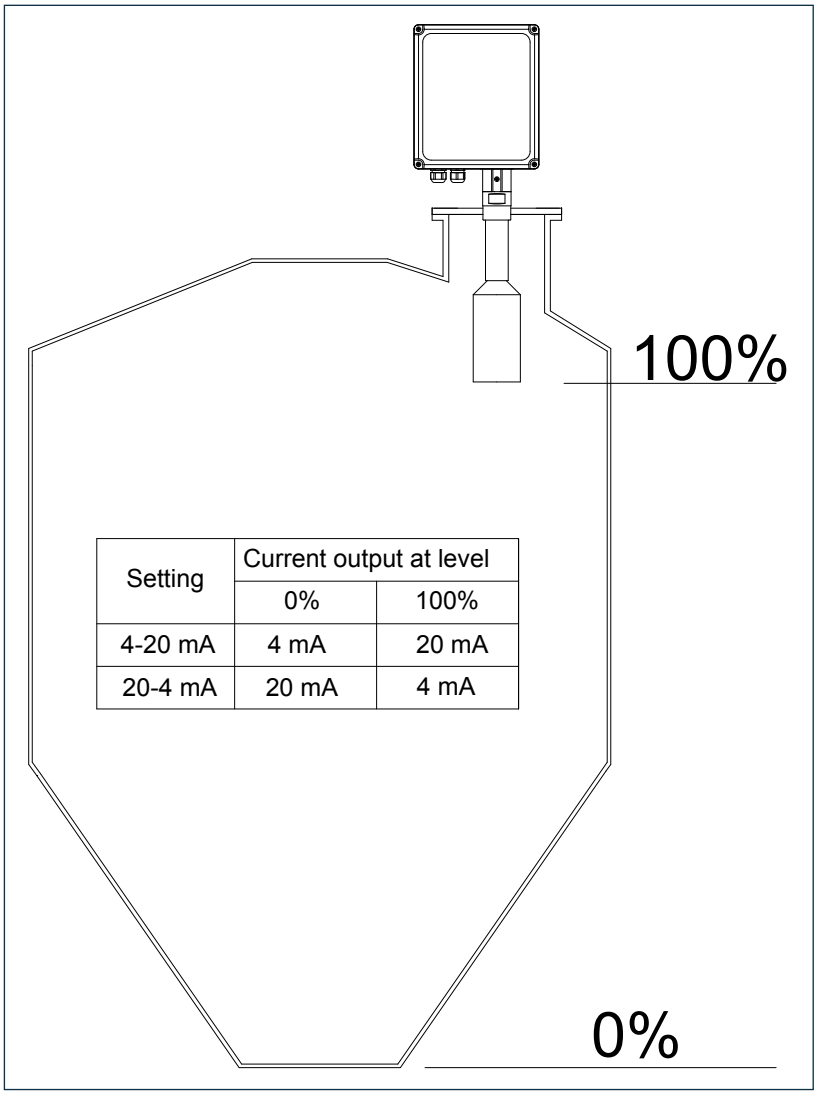


*TOREX SETTING

To reset all programmed parameters to factory setting (default values), press the buttons ARROW UP, ARROW DOWN and SETUP together for approx. 10 seconds.

a) FIRMWARE VERSION: It indicates the firmware version of the unit.

b) OUTPUT CURRENT:



Setting	Current output at level	
	0%	100%
4-20 mA	4 mA	20 mA
20-4 mA	20 mA	4 mA

c) CURRENT AT FAILURE: In case of failure the output current shows the adjustment value.

d) RELAY: Relay version not available.

e) TIMER: Automatic start measurement with timer function.

- The time interval between two measurements can be adjusted between 0.1h (6 minutes) and 99.9 hours
- The “OFF” position causes no automatic measurement start.

The TIMER is reset:

1. After the measurement is finished.

2. After a measurement has been interrupted during the silo filling (after connection of terminals 24/25).

- For automatic measurement at a predetermined time of day, it is required an external start unit connected to the terminals 24/25/27.
- To avoid wear, the unit should not be started more often than necessary.

f) MANUAL MOTOR CONTROL:

- The motor moves the sensor weight upwards while the “ARROW UP” button is beeing pushed.
- The motor moves the sensor weight downwards while the “ARROW DOWN” button is beeing pushed.

NOTE: If the sensor weight is in upper stop position or touching the bulk material surface or after the max. moving distance, the motor is automatically stopped.

Caution

Avoid that the sensor weight reaches the silo outlet position.

g) OUTPUT CURRENT CHECK:

- Enables to check, if the output current is working properly. The current output is forced to 10mA. This can be evaluated by an external connected multimeter.
- Operation current 10 mA.

h) CYCLES: It indicates how many measurement cycles have been performed up to now.

i) CYCLES RESET: it can be used after the replacement of the rope or tape.

j) OPERATION TIME: indicates (in hours) how long the motor has been running up to now

k) RESET OPERATION TIME: It can be carried out after a motor replacement.

l) INVERTED “AIR DISTANCE”: It allows setting the 100% reference of the 4-20mA output current to a level over the level of the sensor weight.

To this purpose set the value to “Yes”.

The "Air distance A", which is adjusted in the Quickset Menu (see pag. 23) is now over the level of the sensor weight.

The display in the Quickset menu indicates this with a minus as follows: Air distance: - 1.5m .

NOTE: In this case the output will never reach 100%.

m) MOTOR VALUE: Internal value to be used only in case of motor replacement (see instruction manual of motor replacement).

5.5 Maintenance error diagnosis

MAINTENANCE

Red light is bliking.

The following message is indicated on the display, but it will NOT lead to a failure and it is not indicated by the failure relais or the 4-20mA output.

MAINTENANCE CODES	DESCRIPTION	DEVICE ACTION	SOLUTION
M11	Sensor weight blocked in the “upper stop position” or block distance is too short	The unit tries to start 5 times. If the sensor weight is not released during this time, the message is shown. If after a new measure-ment start the sensor weight is released, the message will automatically disappear.	Release sensor weight. Ensure, that the min. moving distance (block distance) is >200mm (7.87“).

5.6 Inspection

Important

When installation is complete, authorized personnel must carry out a general test to ensure that the safety conditions have been completely satisfied.

6.1 Start-up

Before starting up the device, set it in safety status.

Before starting up the device, check the condition of the electric components and all parts whose working may get affected after long shutdowns.

6.2 Device shutdown at the end of the work cycle

For correct storage of the device for long shutdowns, the device must be cleaned and protected.

Avoid damp, salty environments, if possible.

Store the device protected from unfavourable weather conditions.

6.3 Reuse

During device halts, avoid damp, salty environments.

Store the device protected from unfavourable weather conditions.

Set the device in safety status before starting it up.

Before starting up the device, check the condition of the electric parts for which long shutdowns may affect working.

Before using the device carry out a complete cleaning cycle in accordance with the indications in the powder safety sheet.

If the device operates in conditions and with materials different from the previous application, check the compatibility of this use according to the indications in the INDICATIONS FOR USE section.

Danger - Warning

Before performing any maintenance operation, make sure that all the persons involved are provided with the necessary Personal safety Equipment.
Secure all the components of the device.

7.1 Cleaning the device

Clean the outside part of the device using a vacuum cleaner to prevent dispersal of dust in the environment and in the surrounding area; or use a moist cloth.

Do not use compressed air.

Wash the device, after vacuuming the dust, with a low-pressure water jet.

7.2 Cleaning the indicator

Before carrying out any operation on the device, make sure it is set in safety condition.

While removing the dust that may be present on the device, avoid its dispersal into the surrounding environment.

To ensure a safe operation for both operators and device, the user must select suitable cleaning products, depending on the type of plant, and avoid using toxic and inflammable products.

If the indicator is used with food products, non toxic detergents suitable for the type of application must be used.

The frequency of cleaning operations depends on the type of product handled and the plant.

In case of harmful, toxic products, the cleaning wastes must be conveyed into closed tanks and disposed off in accordance with the product safety sheet.

Do not point high pressure water jets directly towards the electrical components.

Every time the indicator is used with food products, it must be cleaned thoroughly.

7.3 Lifetime of the rope-tape

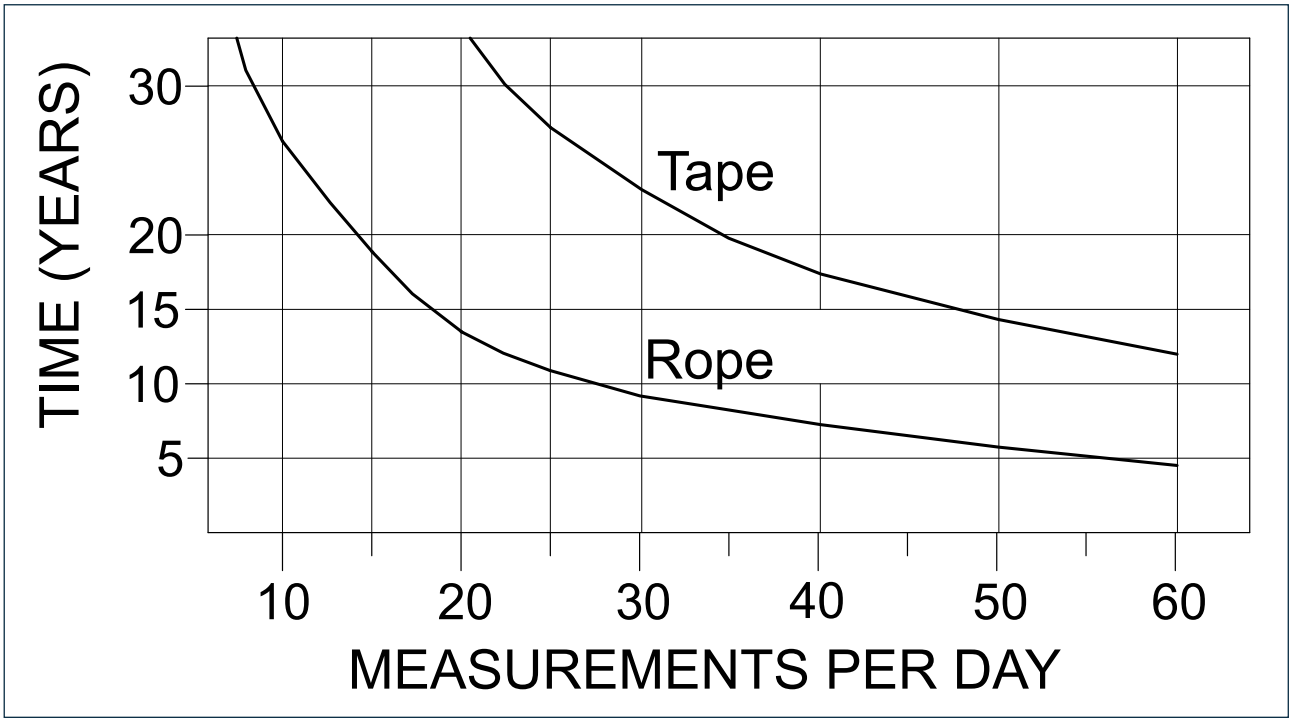
The expected lifetime (measurements cycles) of the rope/tape is:

Rope version: approx. 100000 working cycles.
Tape version: approx. 250000 working cycles.

These values refer to lifetime tests under the following conditions:

- No excessive material influence ;
- The sensor weight meets a inclinated surface, which causes the oscillation of the sensor weight during upwards movement.

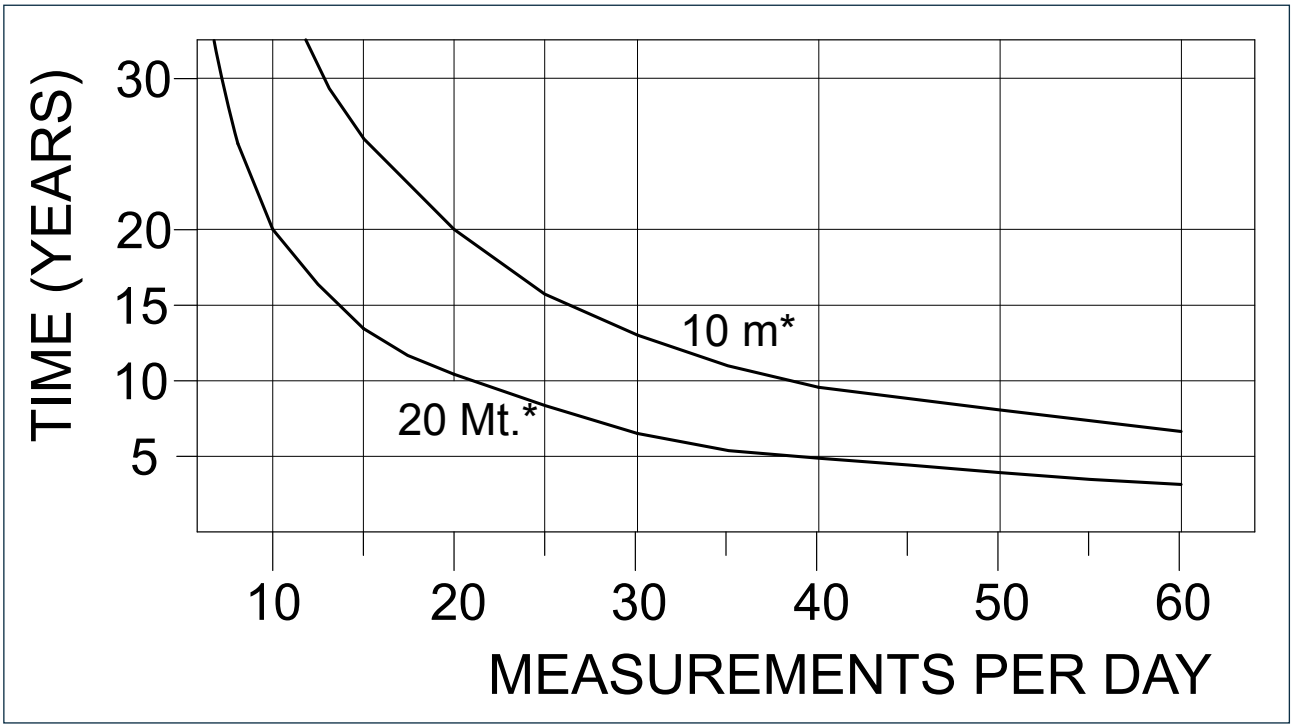
See next picture for the operating time depending on the measurement cycles per day.



For applications with adverse conditions it is recommended to change the rope/tape more frequently.

7.4 Lifetime of the electric motor

The expected lifetime (run time) for the motor is approx. 3.500 hours.
See next picture for the operating time depending on the measurement cycles per day.



* AVERAGE MEASUREMENTS DISTANCE

8.1 Safety recommendations for replacement

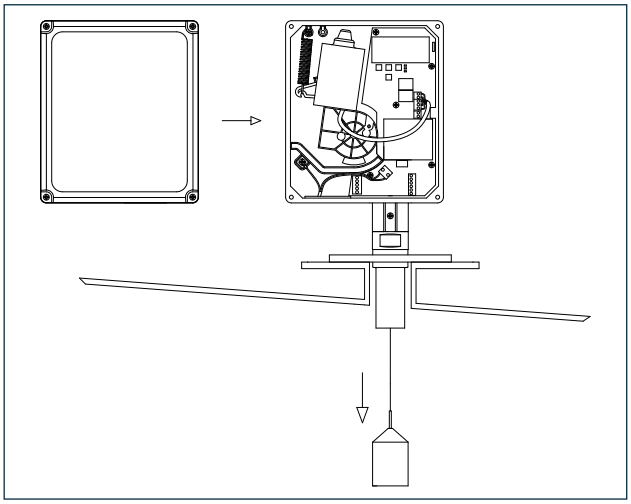
Danger - Warning

The replacement operations must be carried out by a specialist authorized technician with specific skills in the sector concerned (mechanical, electrical etc).
Before carrying out any operation, provide suitable safety measures and use the appropriate equipment to prevent risk of work injuries to persons involved in the operations and those nearby.
Activate all the safety devices envisaged and prevent access to controls which, if activated, could cause work injuries to the persons involved in the operations.

8.2 Replacement of the sensor weight

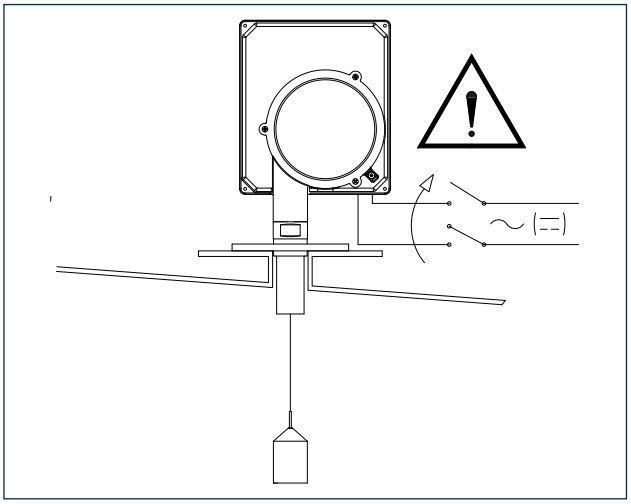
1)

Unroll 2 meter of cable with manual setting



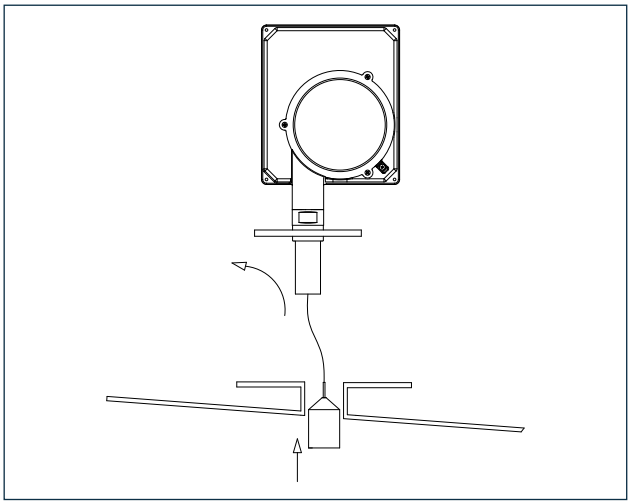
2)

Remove the power supply

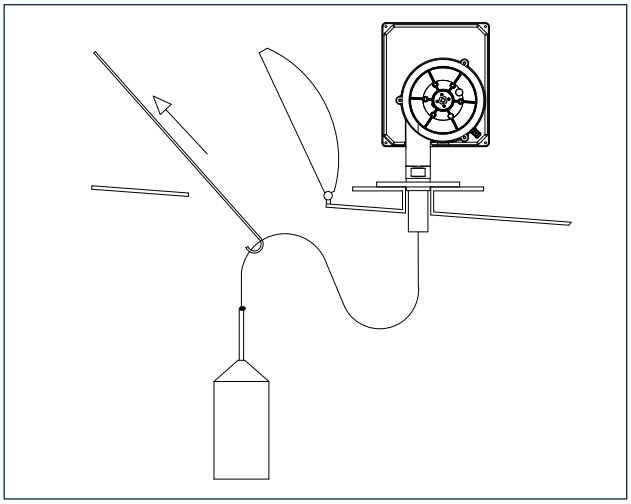


3)

Old and new sensor weights fit through the opening

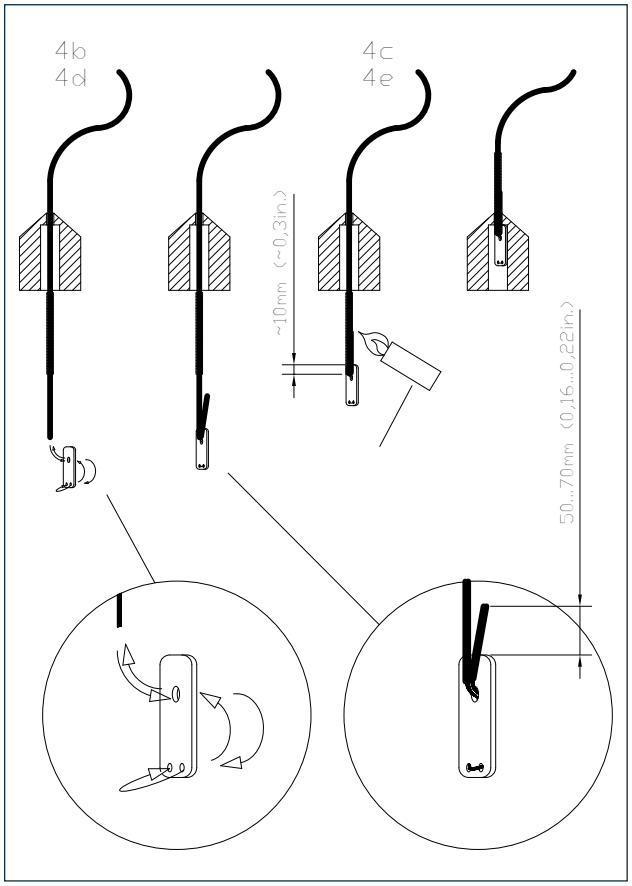


Old and/or new sensor weights do not fit through opening

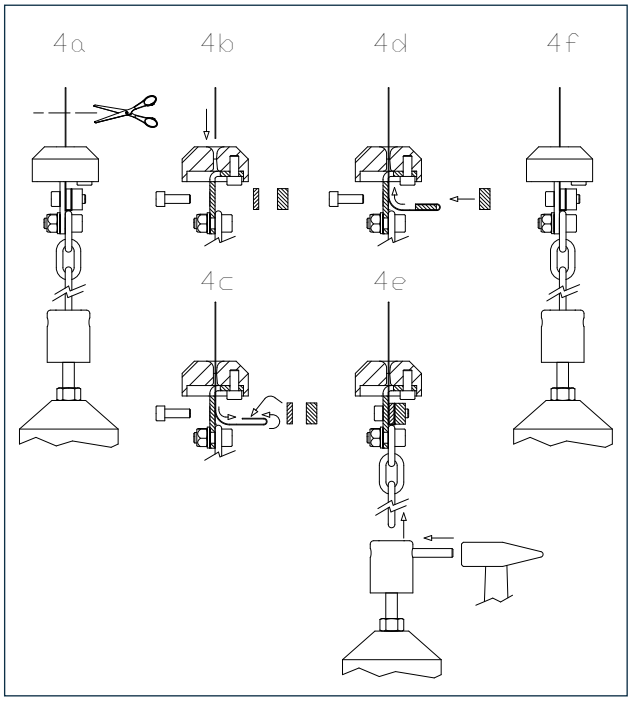


4)

Rope version



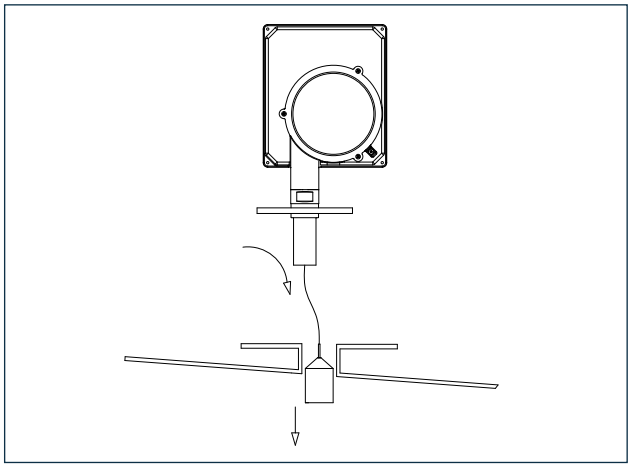
Tape version



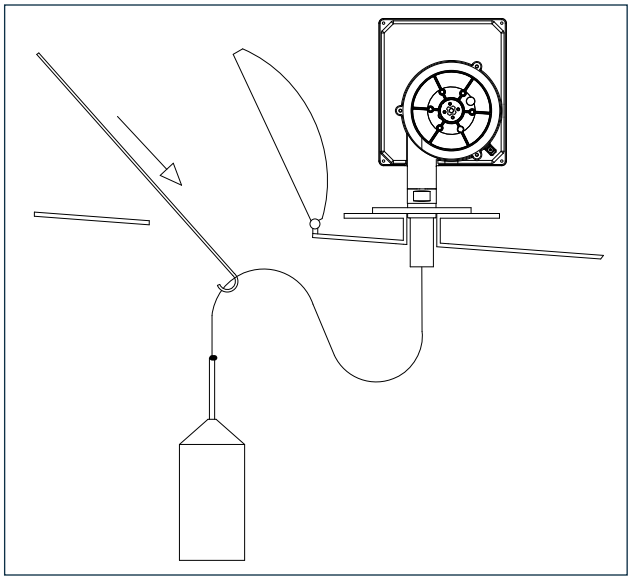
If tape and tape mounting are in good condition, start with 4e

5)

Old and new sensor weights fit through the opening



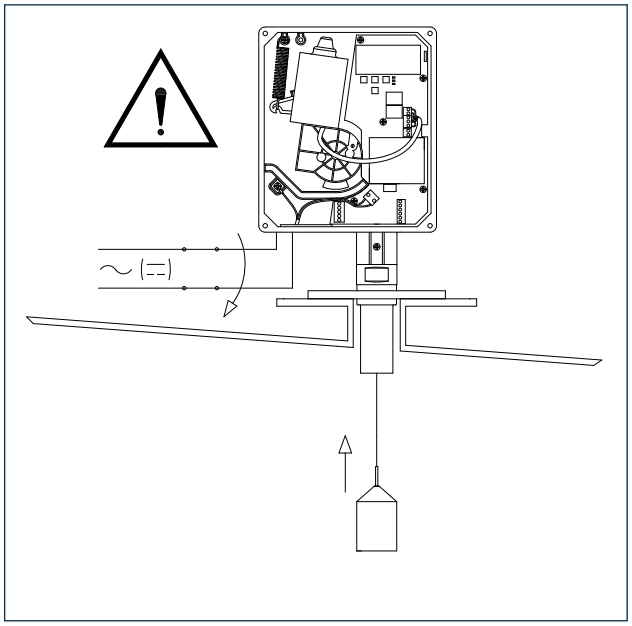
Old and/or new sensor weights do not fit through the opening



Do NOT throw the sensor weight into the silo. It may cause damages!

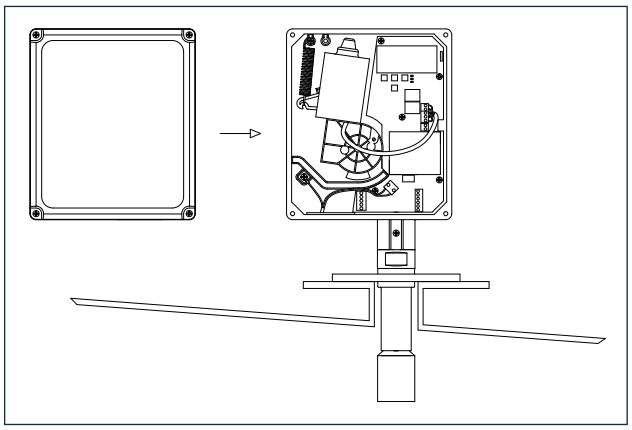
6)

Switch on the power supply → Sensor weight drives to upper end position



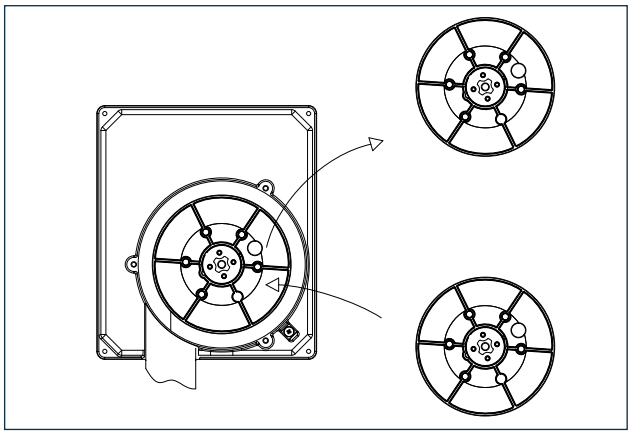
7)

Sensor weight must be in upper stop position before the silo is filled



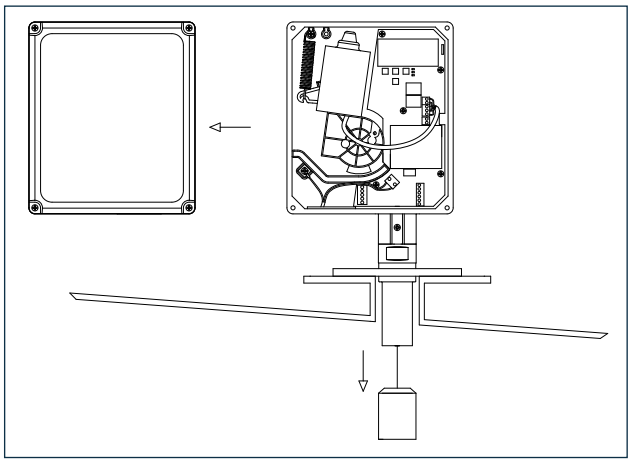
8.3 Replacement of the rope or tape

For the replacement of the rope or tape see 1 to 14



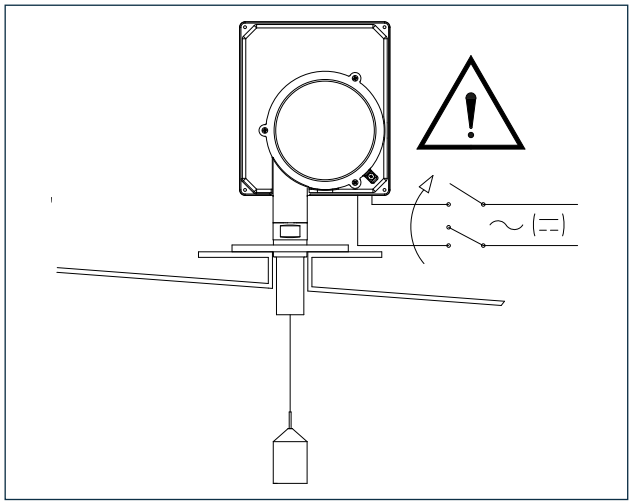
1)

See chapter regarding the replacement of the sensor weight



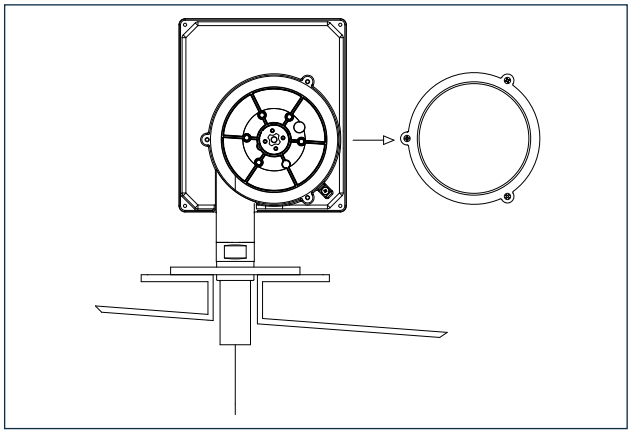
2)

See chapter regarding the replacement of the sensor weight



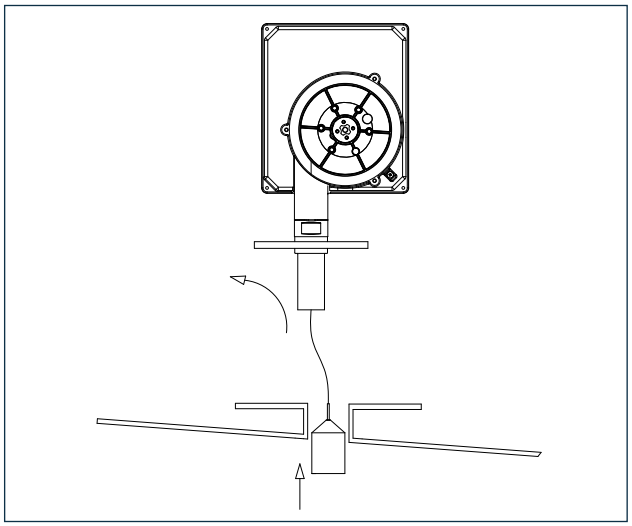
3)

See chapter regarding the replacement of the sensor weight

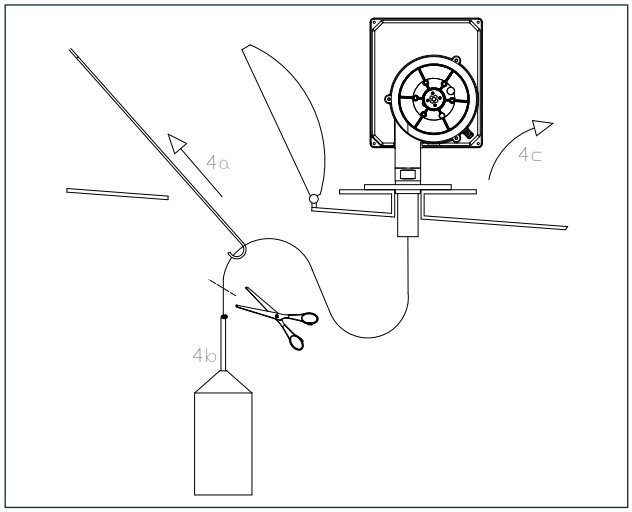


4)

Old and new sensor weights fit through the opening

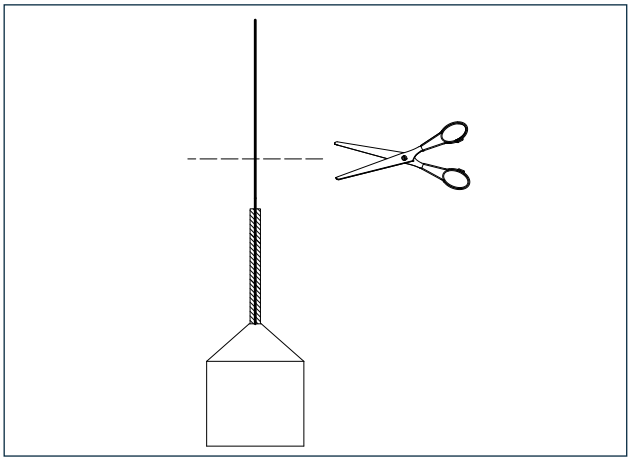


Old and/or new sensor weights do not fit through the opening

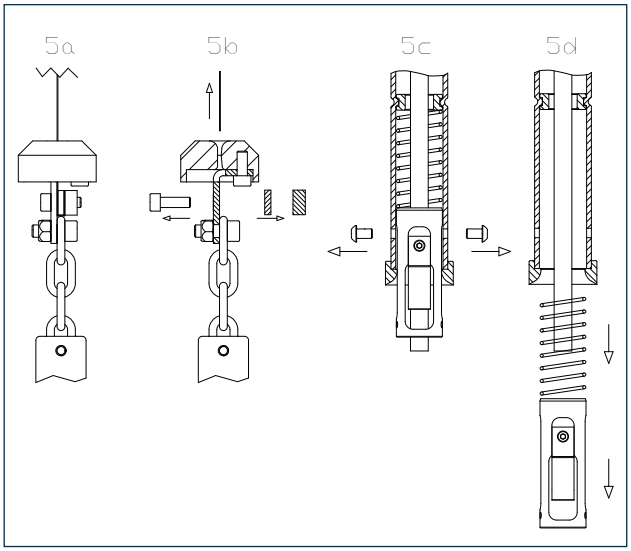


5)

Rope version

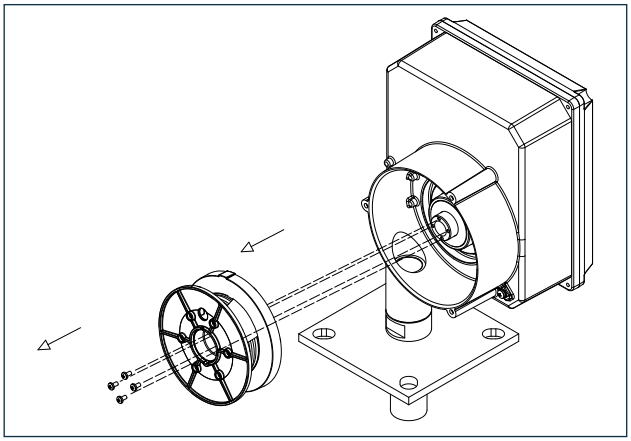


Tape version



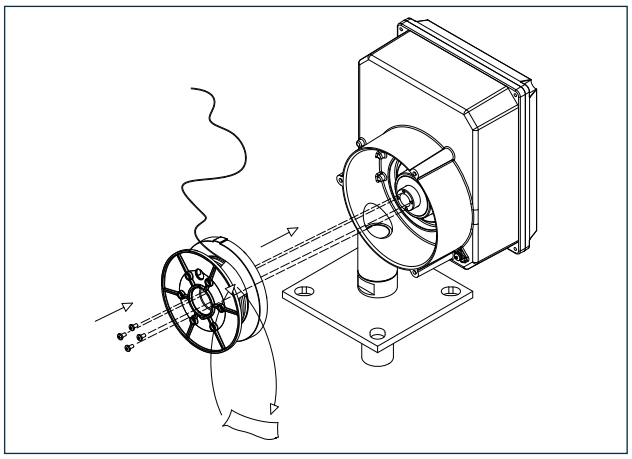
6)

Remove the pulley from its housing



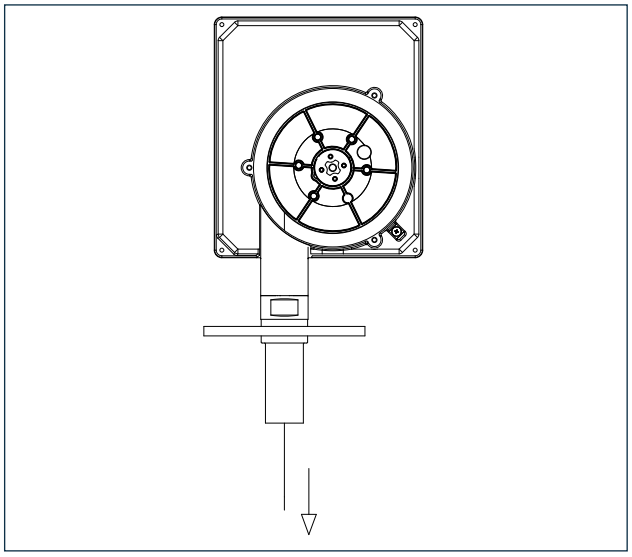
7)

Unroll 2 m rope or tape and fix the pulley



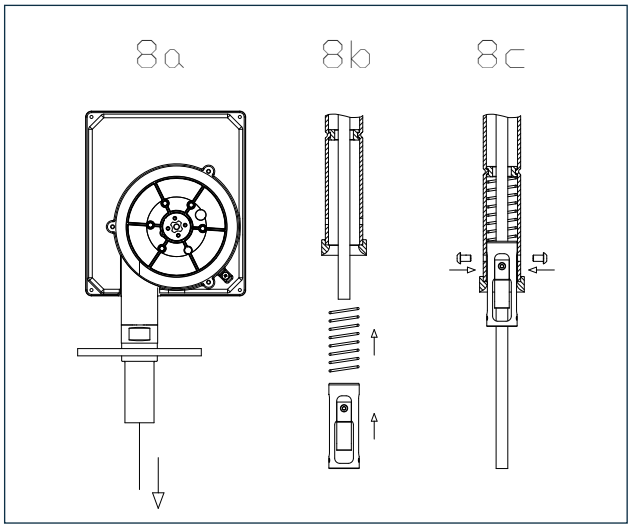
8)

Rope version



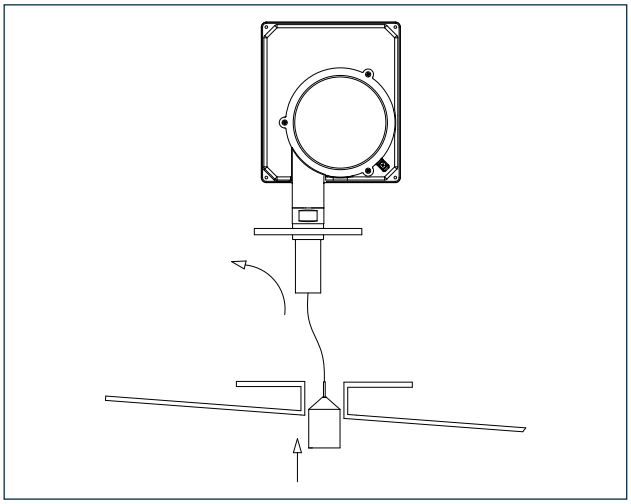
8)

Tape version



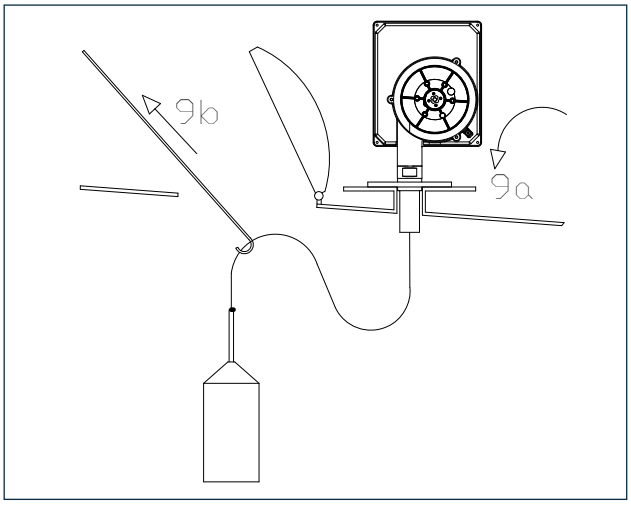
9)

The sensor weights fit through the opening



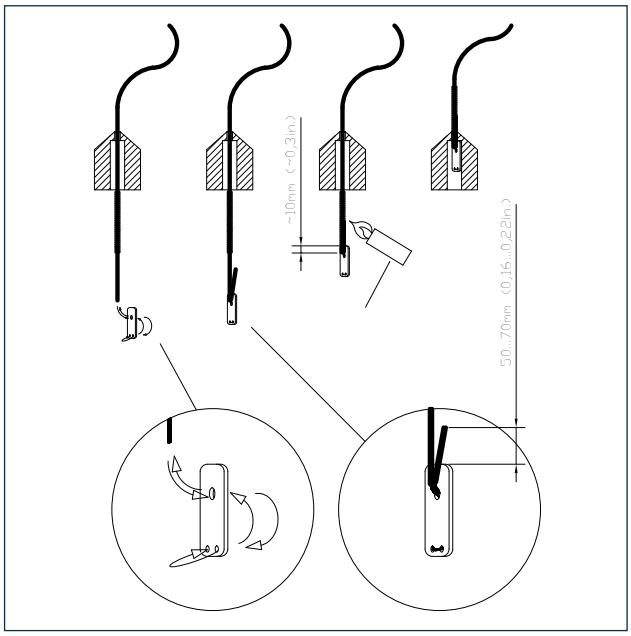
9)

The sensor weights do not fit through the opening



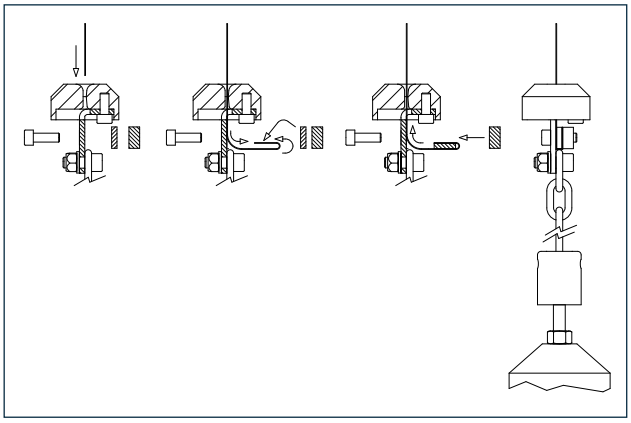
10)

Rope version



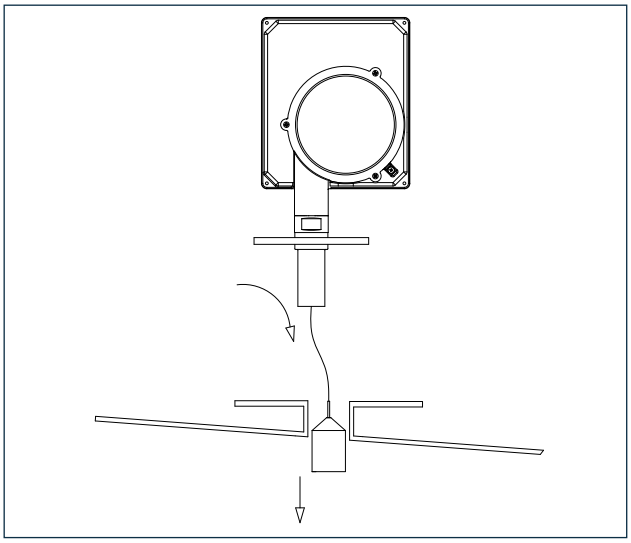
10)

Tape version



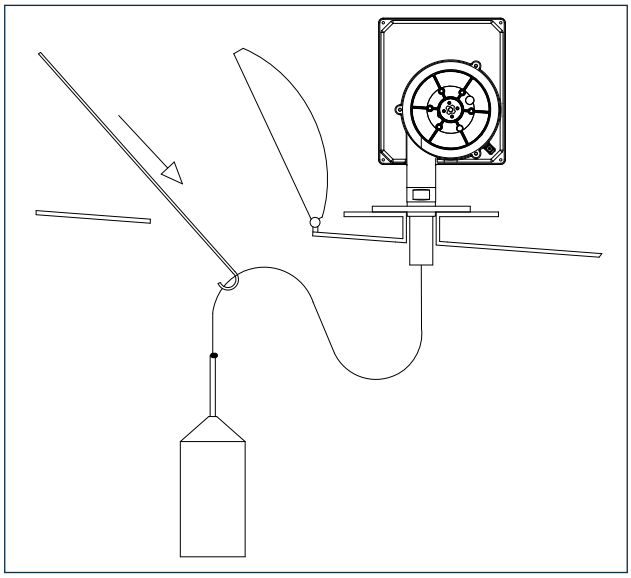
11)

The sensor weights fit through the opening



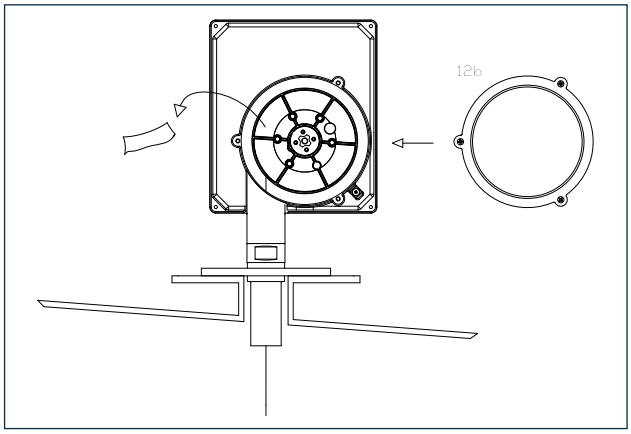
11)

The sensor weights do not fit through the opening



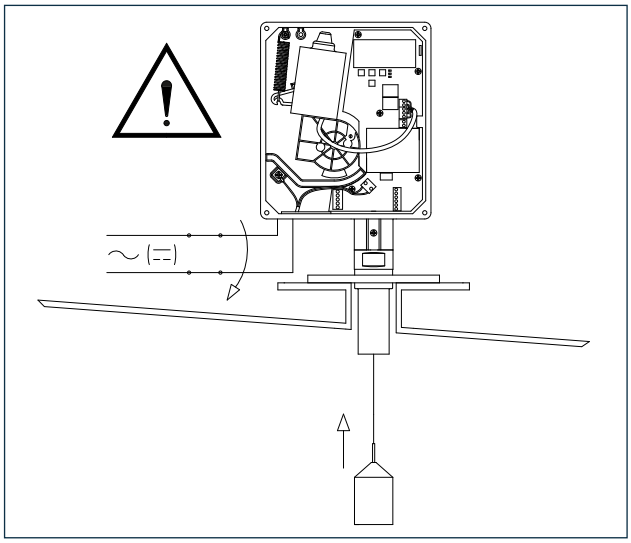
12)

Remove the adhesive tape



13)

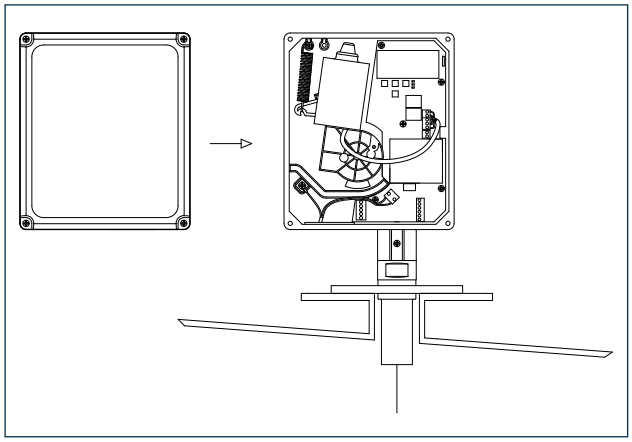
Switch on power supply → The sensor weight drives to upper end position



14)

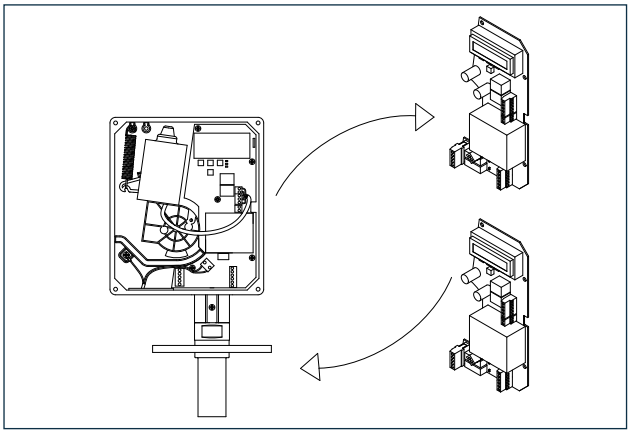
Refer to the instructions inside the lid and in the manual to reset the maintenance counter.

The sensor weight must be in upper stop position before the silo is filled.



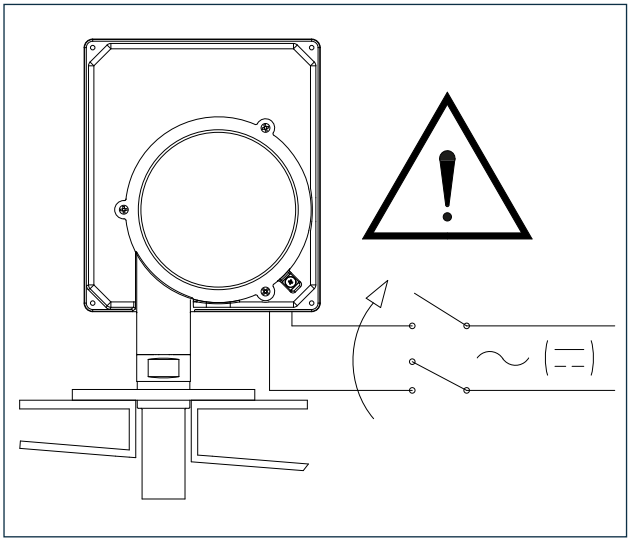
8.4 Replacement of the electronic board

For the replacement of the electronic board, see 1-7



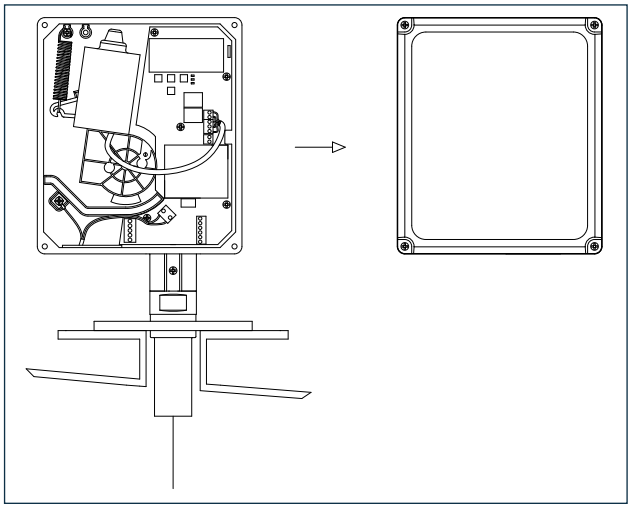
1)

Switch off the power supply

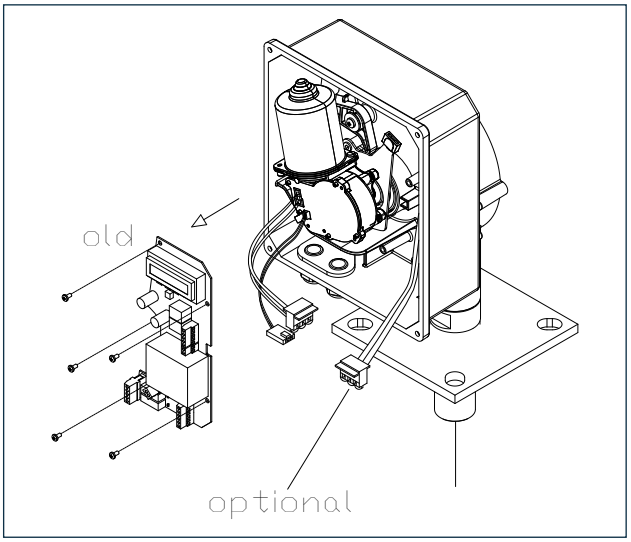


2)

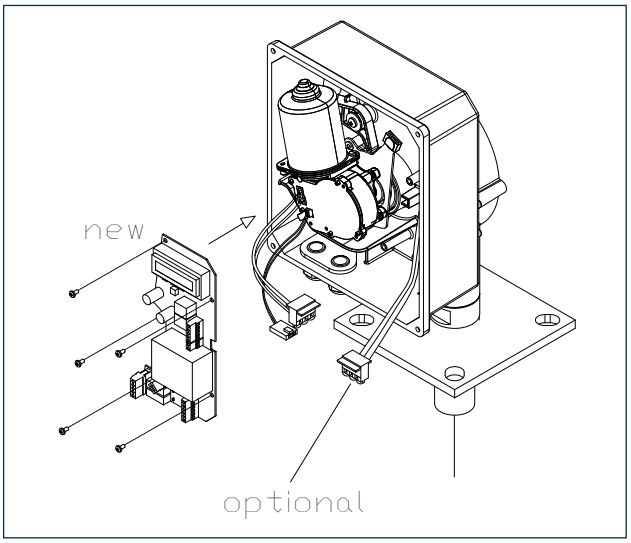
Disconnect all cables from the electronic board



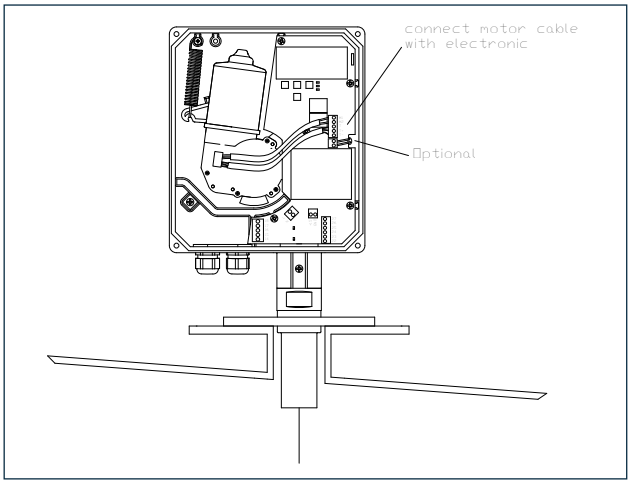
3)


old
optional

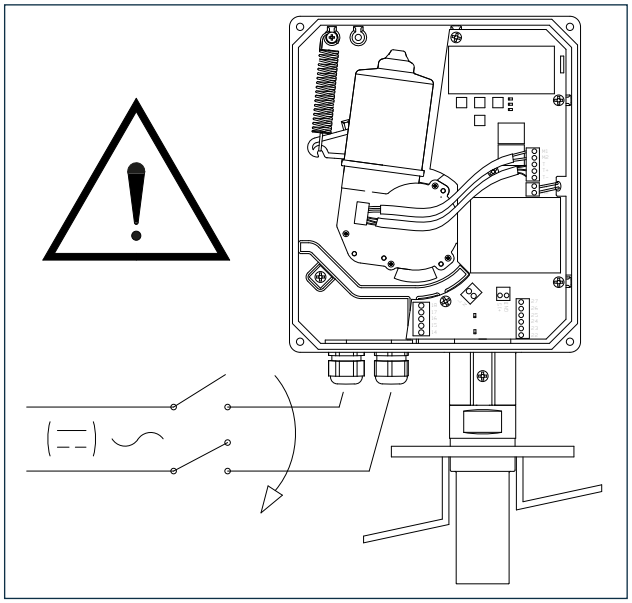
4)


new
optional

5)

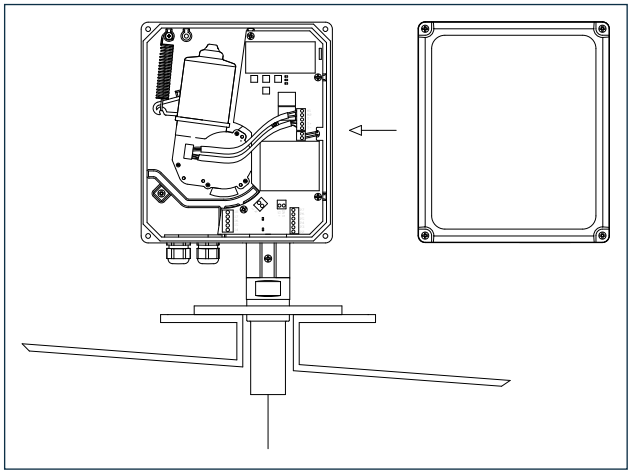

connect motor cable
with electronic
Optional

6)



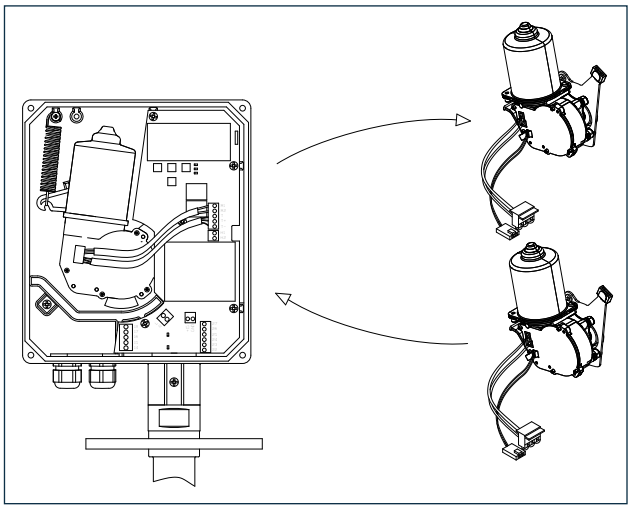
7)

The sensor weight must be in upper stop position before the silo is filled.



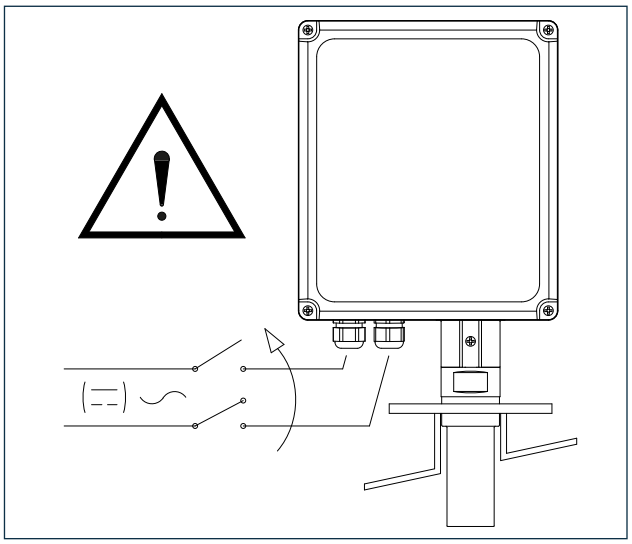
8.5 Replacing the motor

For the replacement of the motor, see 1-10

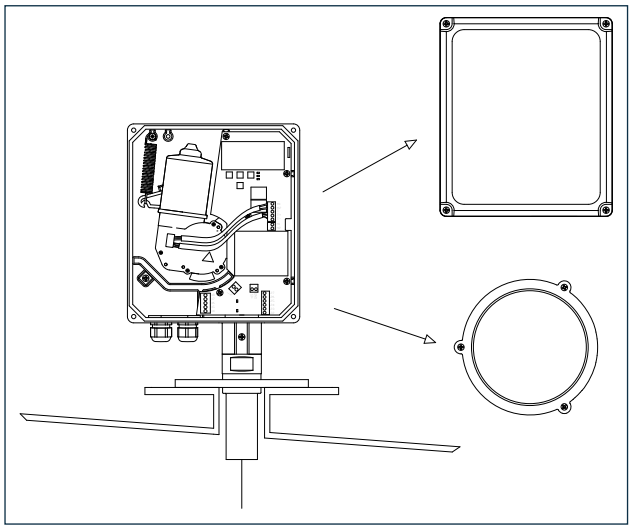


1)

Switch off the power supply

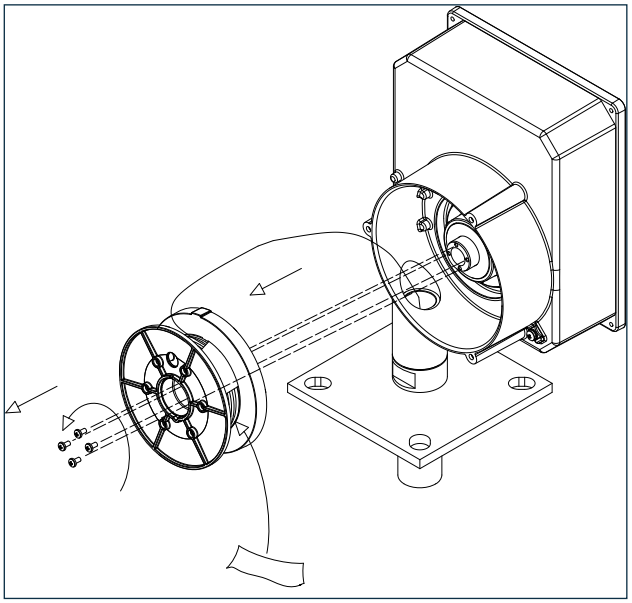


2)

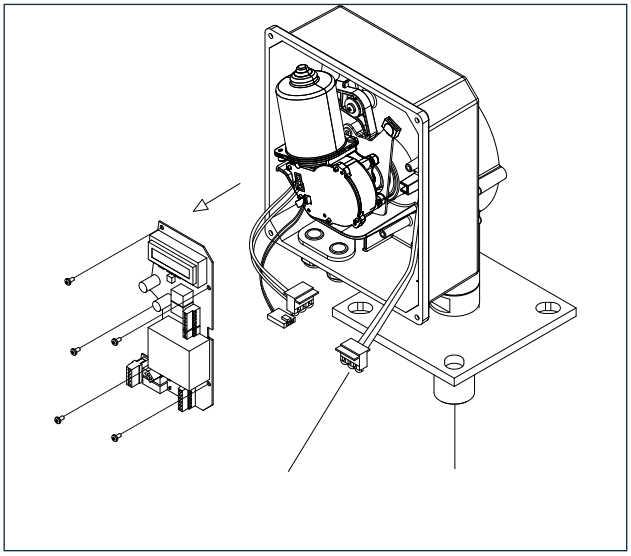


3)

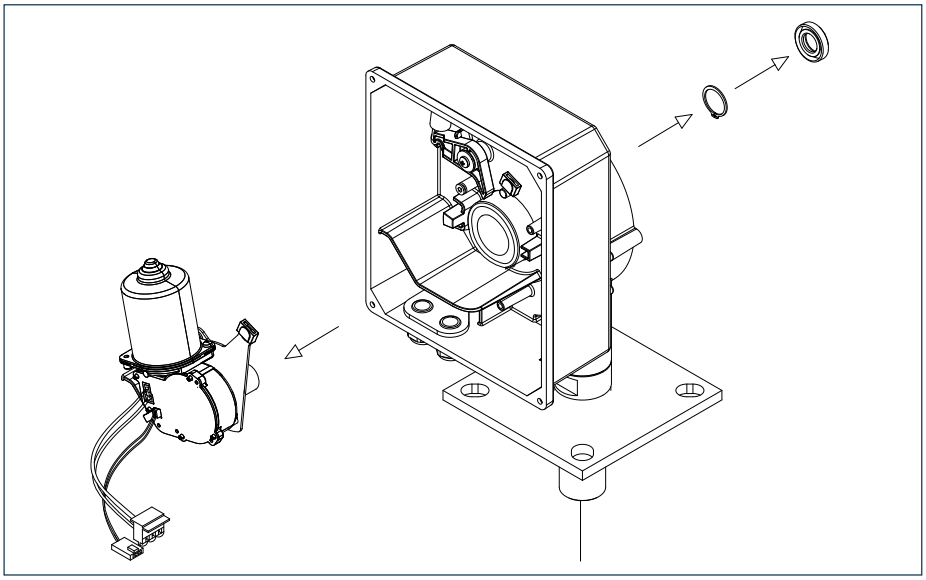
Fix the roller to avoid further unrolling



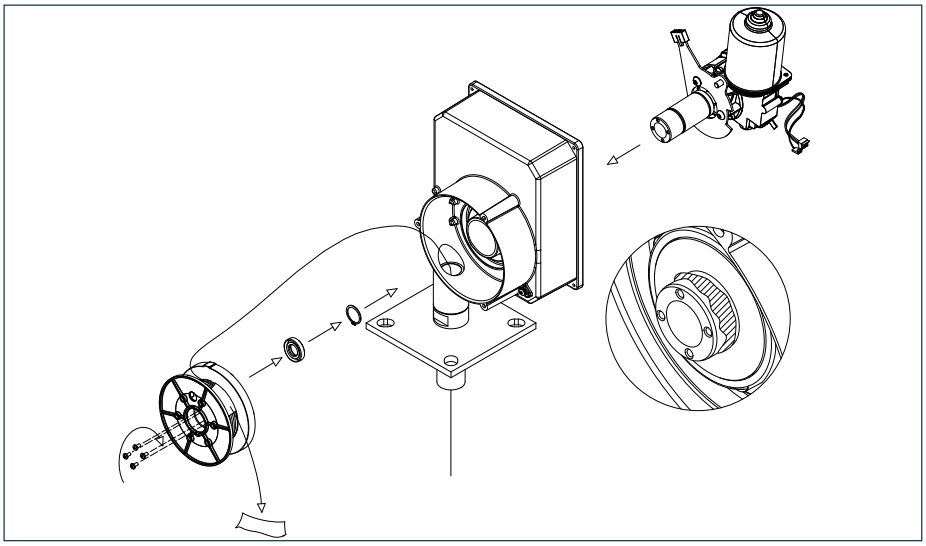
4)



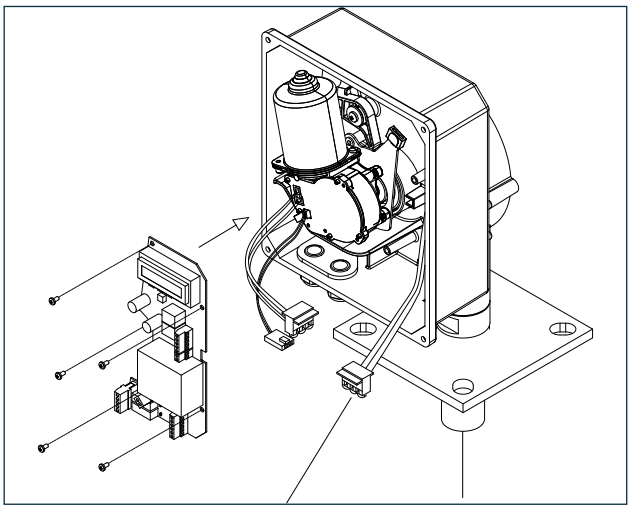
5)



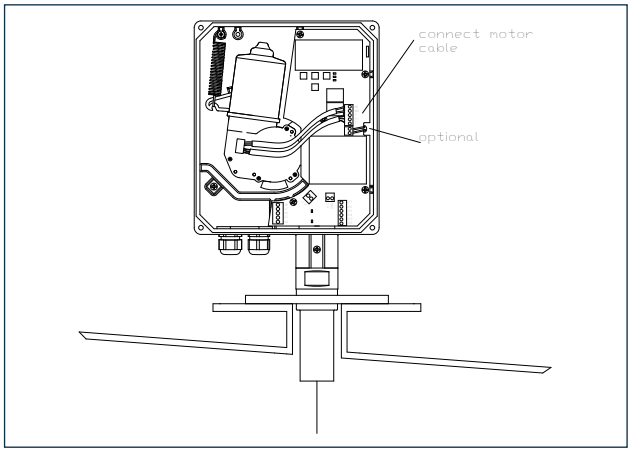
6)



7)

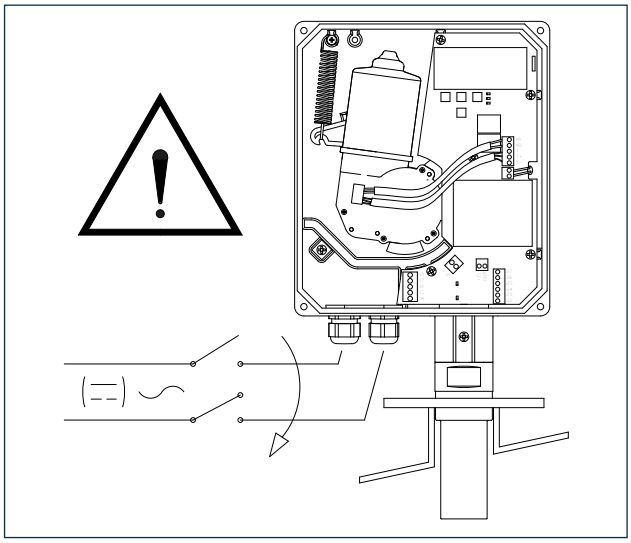


8)



9)

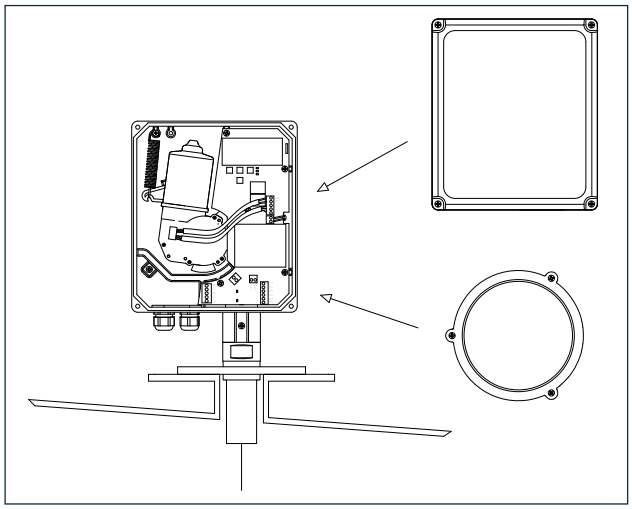
Switch on power supply.



10)

Refer to the instructions inside the lid and in the manual to reset the maintenance counter.

The sensor weight must be in upper stop position before the silo is filled.



8.6 Returning the device

When returning the device use the original packaging if it has been preserved, place the device in a small container, to protect it as best as possible from impact during transport. In any event, make sure there is no residue material inside the device.

8.7 Demolition and disposal

Demolition of the device must be entrusted to personnel specialized in these activities and equipped with adequate skills.

Dismantle the components of the device concerned; if necessary contact the Manufacturer for further information.

The components dismantled have to be separated on the basis of the nature of the materials of which they consist, in compliance with the laws on the matter of “differential collection and disposal of wastes”.

With reference to the WEEE Directives, electrical and electronic components, marked with a special symbol, have to be disposed off in authorized collection centres meant for the purpose.

Unauthorized disposal of “Waste Electrical and Electronic Equipment” (WEEE) is punishable with fines governed by the laws concerning the matter.

9.1 Trouble-shooting

Minor problems can be solved without consulting a specialist.

The following Table contains a list of the most common problems, the possible causes and possible remedies.

For particularly difficult actions which are not mentioned in the Table, contact the Manufacturer's Customer Service Department.

Danger - Warning

Before carrying out any operation "set the device concerned in safety" (see "Glossary and terminology"), operate according to the indications on the "Operation and Maintenance Manual" and in accordance with and in compliance with the standards in force as regards health and safety.

FAILURE CODE	DESCRIPTION	INDICATION	PERFORMANCE OF THE DEVICE	SOLUTION
F10	a) Rope/tape too short or rope jammed in the rope roller. b) Motor or electronic board faulty.	Motor does not rotate when it is actuated.	If possible, the sensor weight will be moved up to the "Upper stop position".	a) Check rope/tape. b) Check motor connection. Replace the motor or the electronic board.
F11	Sensor weight is covered with material or jammed.	Difference of distance between down and up movement too big.	The motor moves 4 seconds upwards, then waits 10 seconds. Then the motor moves shortly downwards and then upwards again. If the sensor weight is still jammed, this cycle is repeated 5 times. Then the cycle goes on with a delay time of one hour.	Release the sensor weight. Make sure the sensor weight can move freely.
F12	Rope/tape broken.	Motor is running but the upper stop position is not reached.	Motor moves upwards. If after a certain time the upper stop position is not reached, the motor stops.	Repair the tape/rope. Verify if the rope/tape maintenance was properly done. Check if the sensor weight is covered with material.
F13	Spring broken	Motor moves downwards and upper stop position is sensed.	Motor stop	Check internal spring.
F15	Not enough current available from DC power supply (DC version only).	Supply voltage drops during function.	Sensor weight is moved to the upper stop position	Enable enough supply current according to the technical data specification.
F16	Service interval: rope/ tape	The amount of measurement cycles is 90% of the rope/ tape lifetime.	Sensor weight is moved to the upper stop position	Change rope or tape roller (do not just cut the rope or tape*).
F17	Service interval: motor	The actual run time is 90% of the motor lifetime.	The measurement cannot be restarted.	Change the motor.

9.2 Check-list in case of fault

If you have been unable to solve the problem on the device even after having carried out the operations suggested in paragraph “Trouble-shooting” please contact the plant technician/installer/or the Manufacturer.

If technical assistance is required, in addition to the device data, the plant technician/installer or Manufacturer will also need information concerning the plant in which the device is installed, its installation and its working, for better identification of the problem that has occurred.

Obviously many of the checking operations which are requested have already been performed in the various steps during installation, testing and start-up of the device concerned.

Danger - Warning

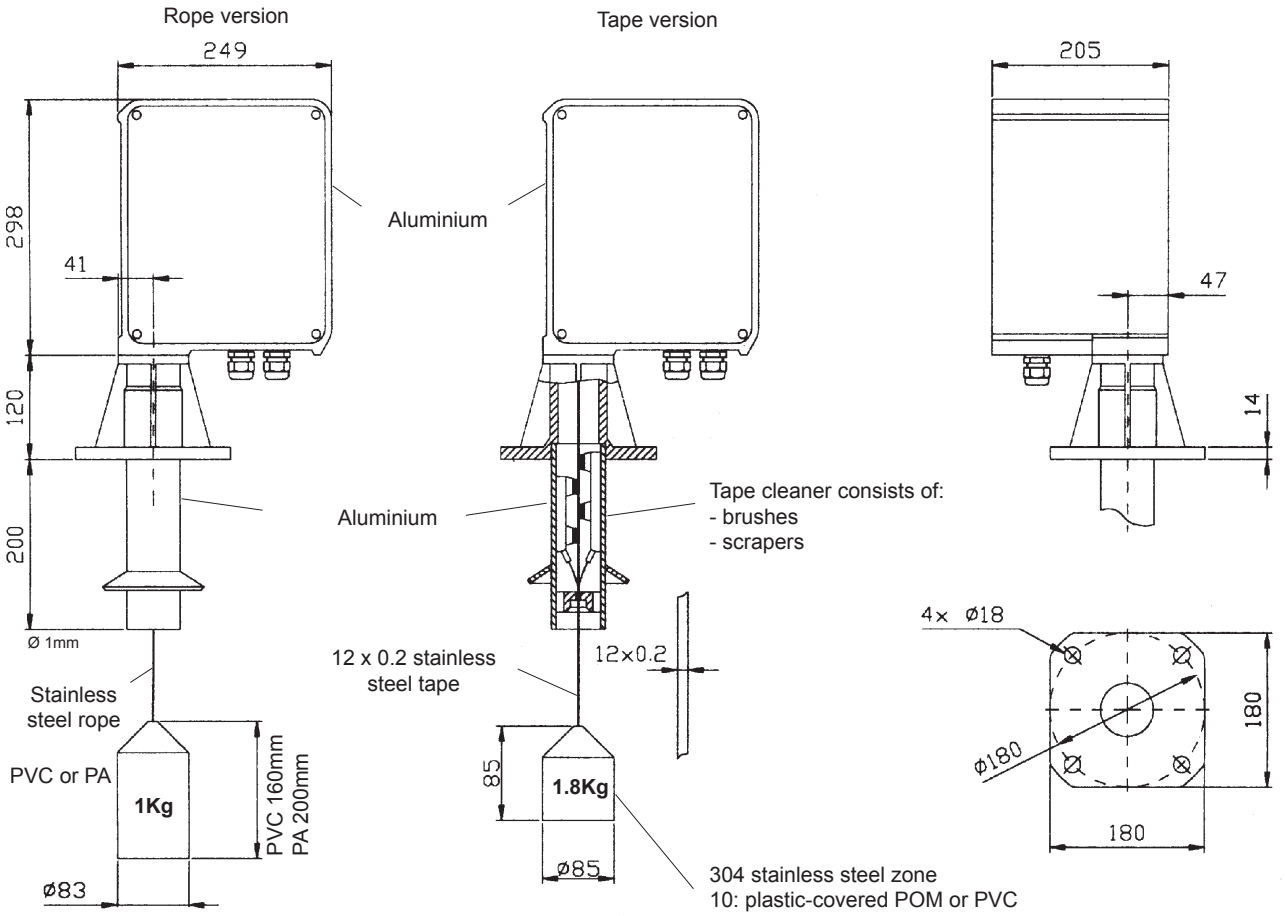
Before carrying out any operation “set the device concerned in safety” (see “Glossary and terminology”), operate according to the indications on the “Operation and Maintenance Manual” and in accordance with and in compliance with the standards in force as regards health and safety.

By pushing the START and SETUP button together for 2 seconds, the failure message shown on the display can be reset.

Caution

Resetting F16 or F17 without changing the rope/tape respective the motor will cause material damage due to the breaking of the rope/tape.
Before removing the rope/tape roller, disassemble the indicator from the silo to avoid that the sensor weight falls into the silo.

10.1 Dimensions



10.2 Weights

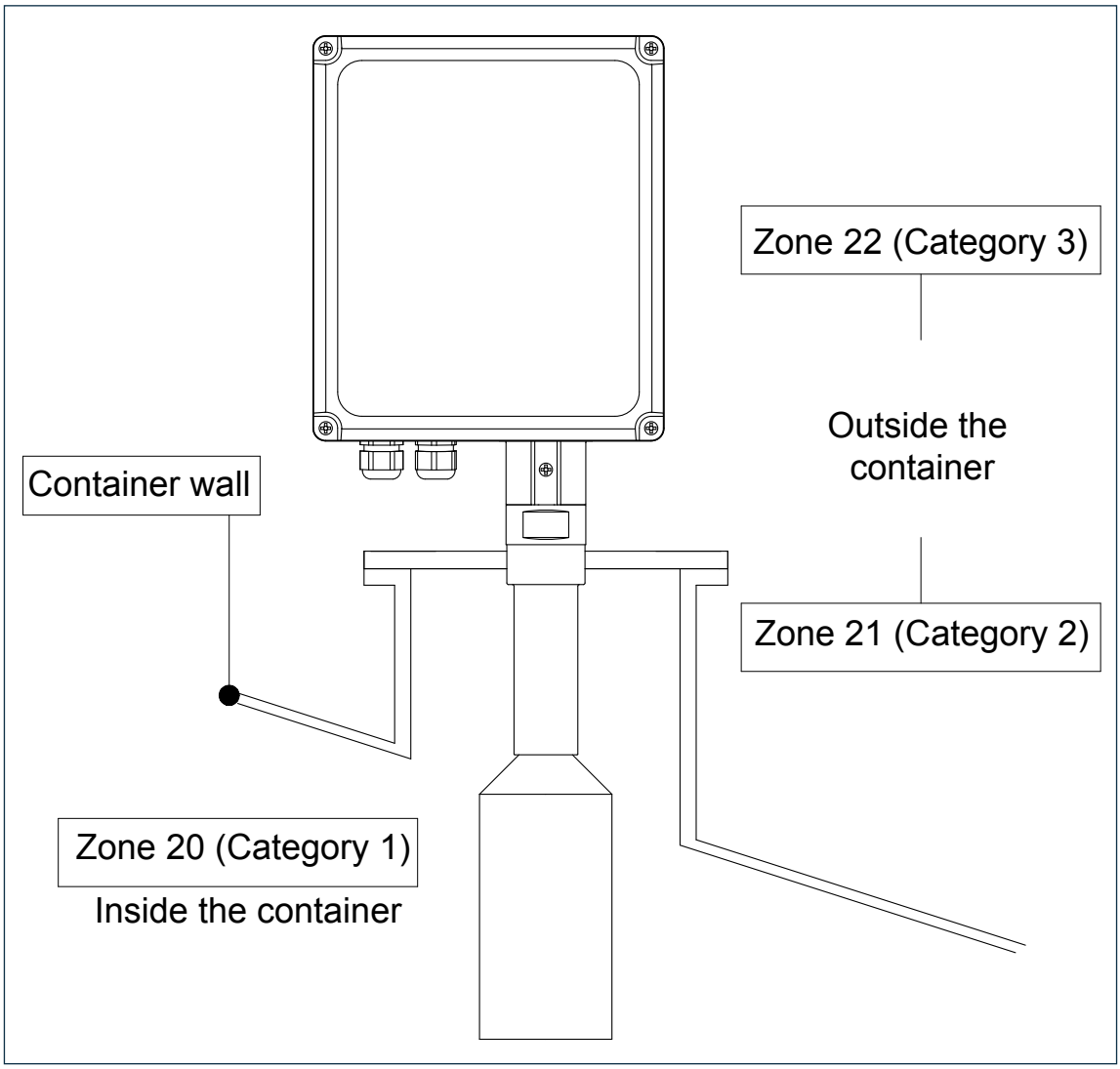
VERSION	D	LK		X	WEIGHT
Thread	1½" DIN 2999			The length of the sensor weight part in upper stop position depends on the sensor weight type.	With thread: 9 Kg
Flange	19 mm	180 mm	190.6 mm		With flange: 11 Kg

10.3 Instructions for use in hazardous areas (dust explosion) according to ATEX STD

Zone classification

The approval according to ATEX (directive 94/9/CE) for the hazardous areas (dust explosion) category 1/2D (zone 20/21) determinates the following classification:

Device category 94/9/EG	To be used in zone
1D	20-21-22
2D	21-22
3D*	22



MARKING

Devices with ATEX approval have special markings on the identification plate.

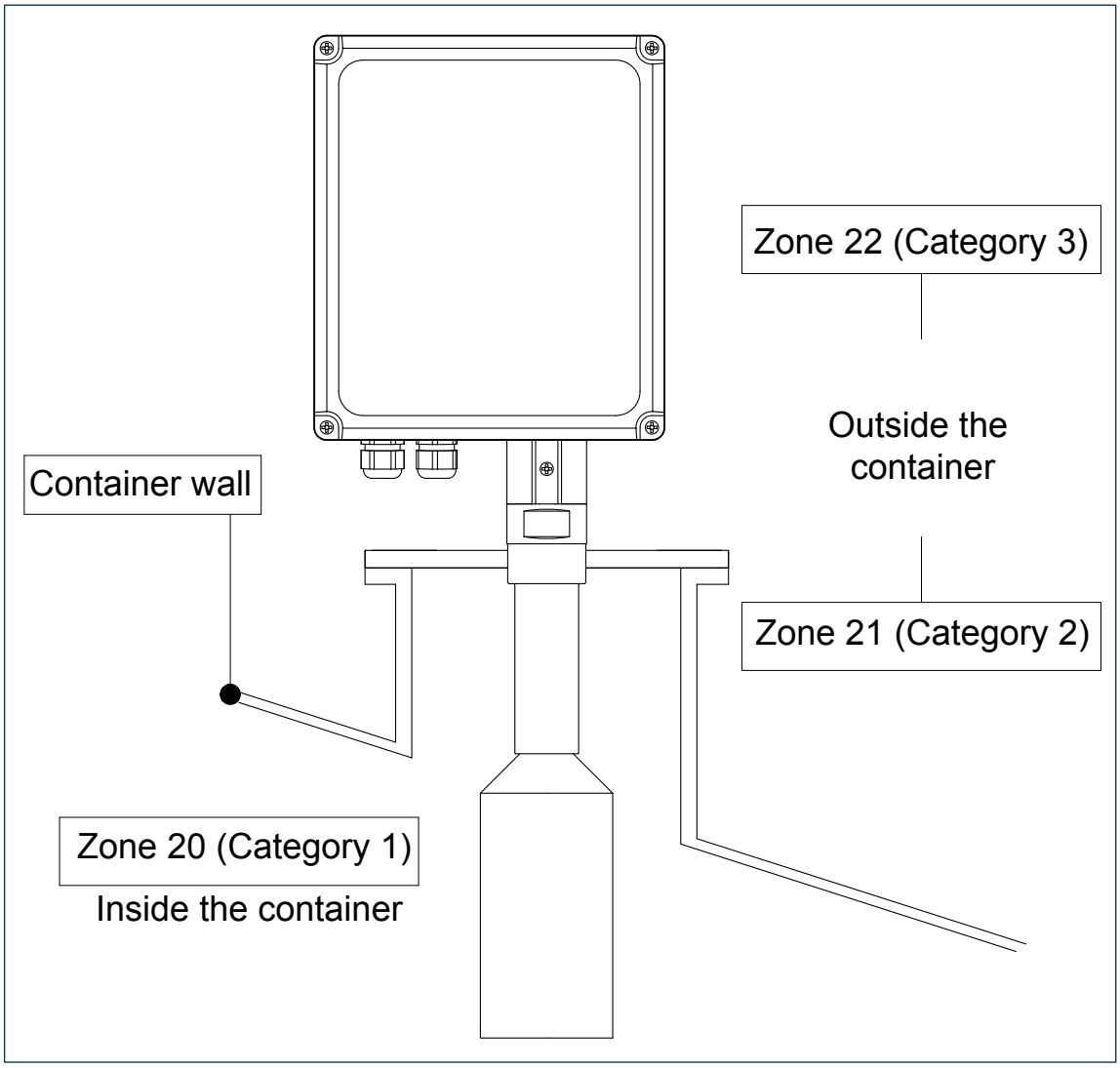
ELECTRICAL CONNECTION

Power supply: "Take into consideration the informations related to the voltage present on the identification plate"

Unused cable glands must be blocked by a docking element.

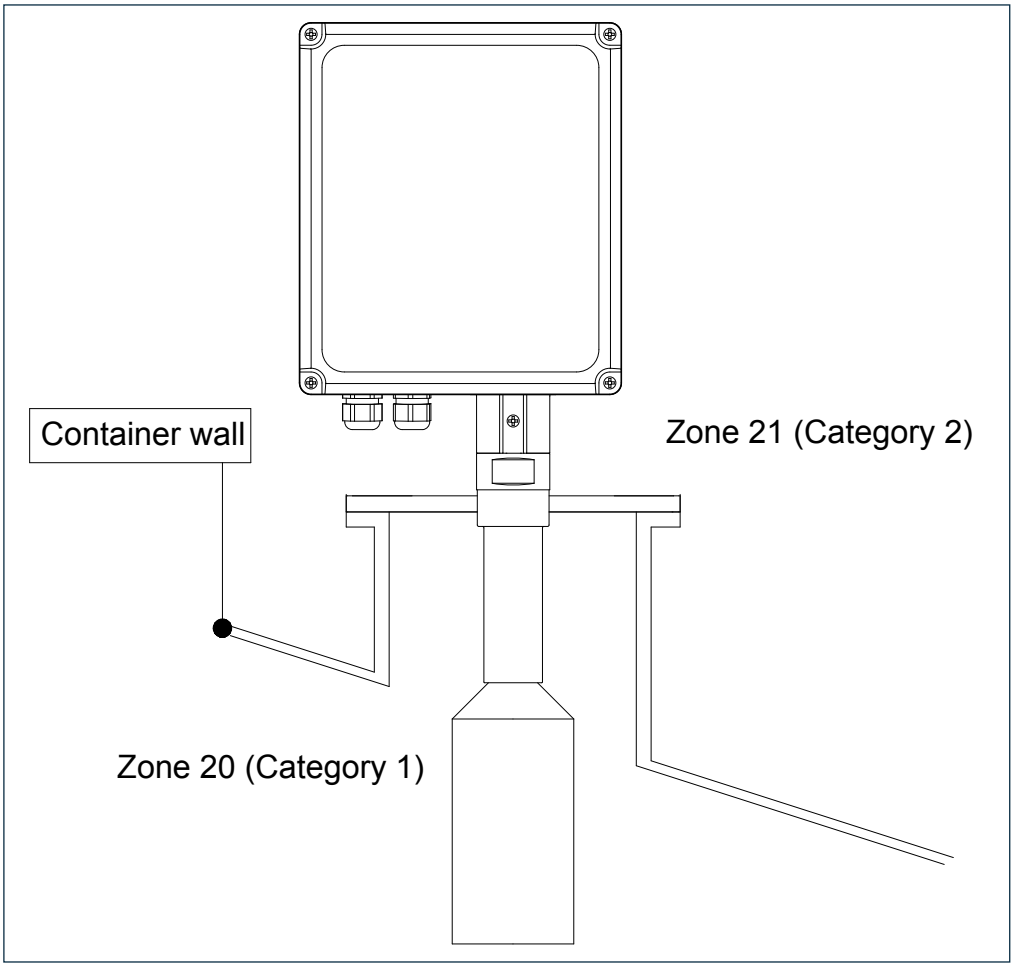
Operating conditions

Pressure information:
The device construction allows an over-pressure operation up to +0.2bar. This pressure values represents the results of the tests carried out. The definition of the ATEX is only valid for a silo-over-pressure between -0.2...+0.1 bar.
The ATEX approval shall not be considered valid for values different than the ones indicated.



MAXIMUM SURFACE TEMPERATURE

The following information shows the maximum surface temperature at the warmest part of the unit that may be reached in the case of malfunction (according to ATEX definition).



Max. surface temperature	Max. ambient temperature	Max operation temperature
130°C	60°C	80°C

SAFETY INSTRUCTIONS FOR HAZARDOUS AREAS

For devices used in Zones 20/21 hazardous areas (dust explosion) there shall be followed all valid regulations in force regarding installation.

- **The repair of devices with ATEX approval must be carried out only by the manufacturer.**
- **For devices used in Zones 20/21 hazardous areas (dust explosion) there shall be followed all valid regulations in force regarding installation.**
- **There must be followed all requirements of the Standard EN 50281-1-1-2 (e.g. regarding dust deposits and temperatures).**
- **Operate only with the lid closed.**
- **Switch off the supply voltage before opening the device.**
- **Before opening the lid check that there are no dust deposits or whirls.**

A1 Declaration of Incorporation

The manufacturer:

TOREX S.p.A.

located in

Via Canaletto ,139/A - 41030 (Mo) - Italy

under its own responsibility declares that:

the continuous level indicators type ILS

comply with the essential safety requirements of the following Directives:

Directive 2006/95/EC[1]
Low voltage Directive

Applied standards for evaluation of the unit:
DIN EN 61010-1 (Safety requirements for electrical equipment for measurement, control and laboratory use)
EN 60529 (IEC 529) (Degrees of protection provided by enclosures)

2004/108/CE[2]
Electromagnetic compatibility

Applied standards for evaluation of the unit:
EN 61326 (EMC requirements, electrical equipment for measurement, control and laboratory use)

The signing company is committed to provide, in response to a reasoned request by national authorities, relevant information on products covered by this declaration, without prejudice to the rights of intellectual property of the manufacturer. The information will be transmitted directly to the national authorities having requested.

Via Canaletto, 139/A - 41030 – S.Prospero (Mo) - Italy, 9/01/2012

The person authorized to provide the technical documentation:
Nino Ratti

The legal representative:
Nino Ratti

[1] ***Directive 2006/95/EC*** *of the European Parliament and the Council of 12 December 2006 on the approximation of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits*

[2] ***Directive 2004/108/EC*** *of the European Parliament and the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility.*