

UWT Lot

Continuous level measuring system

information SLS 3000

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pricelist	P0 - P5

Subject to technical change and price change.

All dimensions in mm.

All units of this pricelist are
CE-certificated.

Of course there are other unit variations than
specified possible.

Please speak with our consulting technicians.

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information SLS 3000
introduction - function

introduction

■ The **UWT-LOT SLS 3000** 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 bulk goods
- coarse grain bulk goods

■ Features

- appropriate for nearly all kinds of bulk goods
- absolute insensitive to:
 - dielectricity and conductivity of the bulk good
 - dust in the silo
 - changes in moisture of the bulk good
 - products, that incline to stick
- no mechanical forces on the silo roof, the sensor touches the bulk good only at the surface
- very simple installation and commissioning
- high tech measurement, easy to understand
- very accurate measurement
- output 0/4-20mA
- range of measurement
 - rope version 30m (on request up to 70m possible)
 - tape version 23m, over-all-height of the silo 25m
- approval for use in hazardous areas zone 10 (dust-explosion of burnable dusts)
- micro processor controlled measurement with intelligent supervision
- internal tape cleaner for extreme difficult products (tape version)
- different sensor weights, suitable to every application
- robust diecast housing with protection class IP65

■ **UWT - LOT** level measurement systems have stood the test in several applications over a long period of years such as

- chemical industry
- building material industry
- plastic industry
- foodstuff industry

function

The **UWT - LOT SLS 3000** is mounted on the top of the silo. A sensor weight is moving down into the silo. The sensor weight is mounted at the end of a measuring rope-/tape, which is wrapped on a motor driven rope roller.

Upon impact on the bulk good, the sensor weight returns and is drawn back to its upper stop position.

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

Only the rope chamber is in contact to the inside of the silo during the 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 in

- a PLC (programmable logic controller)
- or a counter (see chapter 'transmit /display /evaluation').

0/4-20mA output:

The pulses are internal converted into an analogue current signal. The current signal can be adjusted specifically. So it is possible to get a volume-specific signal, fitting to the geometry of the silo. The current signal is renewed, when the sensor weight touches the bulk good.

The measurement starts with an external start signal (remote-control) with

- an external make contact
- or an external 24V DC signal

To start automatically at a predetermined period, an internal timer is standard.

The measurement is controlled by a microprocessor. A comparison between the distance the weight moves downwards, and the distance the weight moves upwards, is done. In case of a deviation a signal output is activated. This guarantees, that the sensor weight is almost in the upper stop position.

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information SLS 3000
technical data

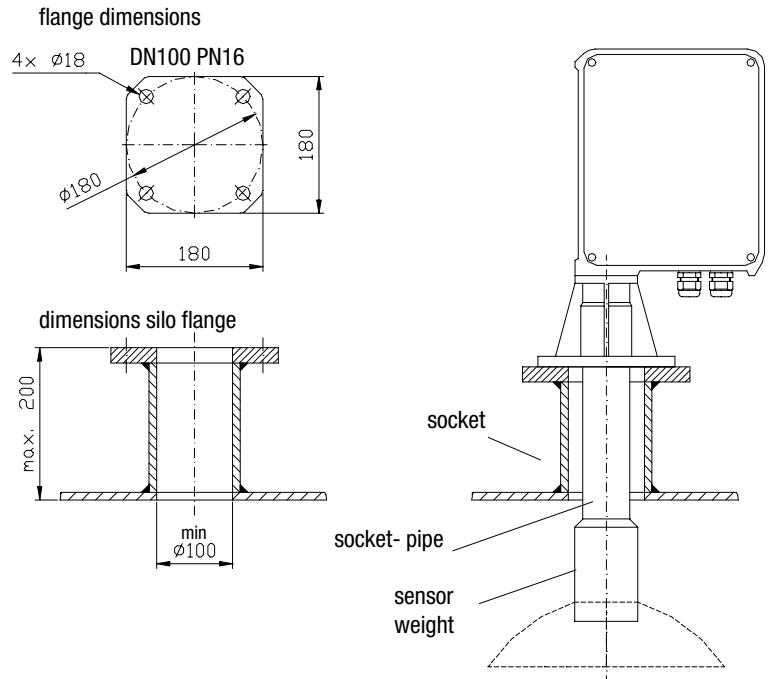
technical data

dimensions

For detailed dimensions of **UWT - Lot SLS 3000** see pricelist (page P0 - P3).

Prevent the sensor weight to move into the socket!

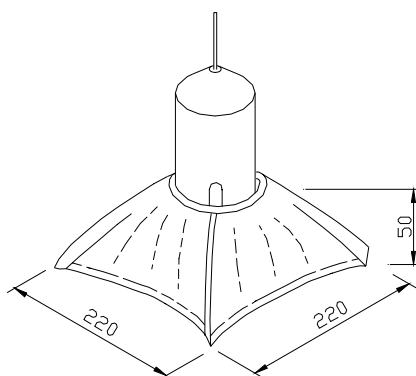
The socket-pipe avoids a collision during the upwards movement between the sensor weight and the socket-edge. Lifetime of the rope is longer due to strong shorttime-loads of the rope are avoided.



sensor weight folding cover

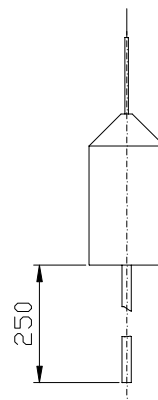
If the sensor weight is used for measuring of very light and loose bulk material, the risk, that it sinks in the filling material, is given. This can be prevented by using the folding cover which has a large surface.

The folding cover can be folded, so that it fits through the mounting socket DN100.



pin for sensor weight

The sensor weight can be equipped with a pin (Ø10mm), which prevents the sensor weight from slipping on the bulk material.



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technical data

mechanical data

housing	aluminium RAL 5010 gentian blue flange: black
enclosure	IP 65 to EN 60529
process connection	flange DN100 PN16 DIN 2633 aluminium
overall weight	approx. 17kg
measuring rope	stainless steel, Ø1 mm
measuring tape	stainless steel, 12x0.2mm
measuring range	max. 30m rope version max. 23m tape version (for max. overall height of silo 25m)
measuring speed	approx. 0.23m/s (average) (upward- and downward movement)
sensor weight	1kg rope version 1.8 kg tape version
material sensor -weight	PVC or PA or 1.4301 folding cover made of canvas
deviation of vertical mounting	max. 2° out of vertical mounting
pressure connection	quick coupling including opposite part, for hose diameter 9mm; max. operating pressure: 0.2 bar

electrical data

mains voltage	230V 50-60Hz 115V 50-60Hz both voltages +10% / -15%
installed load	max. 40VA with heating (option) additional 80W
connection terminal	max. 2.5mm ²
screwed cable gland	3x M25x1,5 (for cable diameter 9-14mm)
signal output	"counting pulse" and "reset pulse" floating relais contact max. 250V AC, 2A, 500VA floating current output 0/4 - 20mA, ±0.1mA max. load 500Ω

measuring interval	10cm/pulse (option: 1cm/pulse)
accuracy of measurement	counting pulse: 1 pulse (version with 10cm/pulse) 3 pulses (version with 1cm/pulse) current output: 1%
measuring pulse	count: 0.13s ON; 0.13 .. 0.3s OFF; reset: 0.6s
connection diagram	inside the device, datasheet
protection class	I
heating (optional)	thermostat controlled 230V, 80W; for temperatures down to -35°C or in case of condensation of water inside the housing
signal output (option)	"upper stop position" / "malfunction" floating relais contact max. 250V AC, 2A, 500VA

operating conditions

silos pressure	max. 0.3bar
temperature in silo	lower temperature: 0°C without heating -35°C with heating -20°C for zone 10/11 with heating upper temperatur: +80°C +220°C (option)
ambient temperature	lower temperature: 0°C without heating -35°C with heating -20°C for zone 10/11 with heating upper temperatur: +60°C For temperature below 0°C and in case of condensation of water inside the housing it is strongly recommended to use the heating.

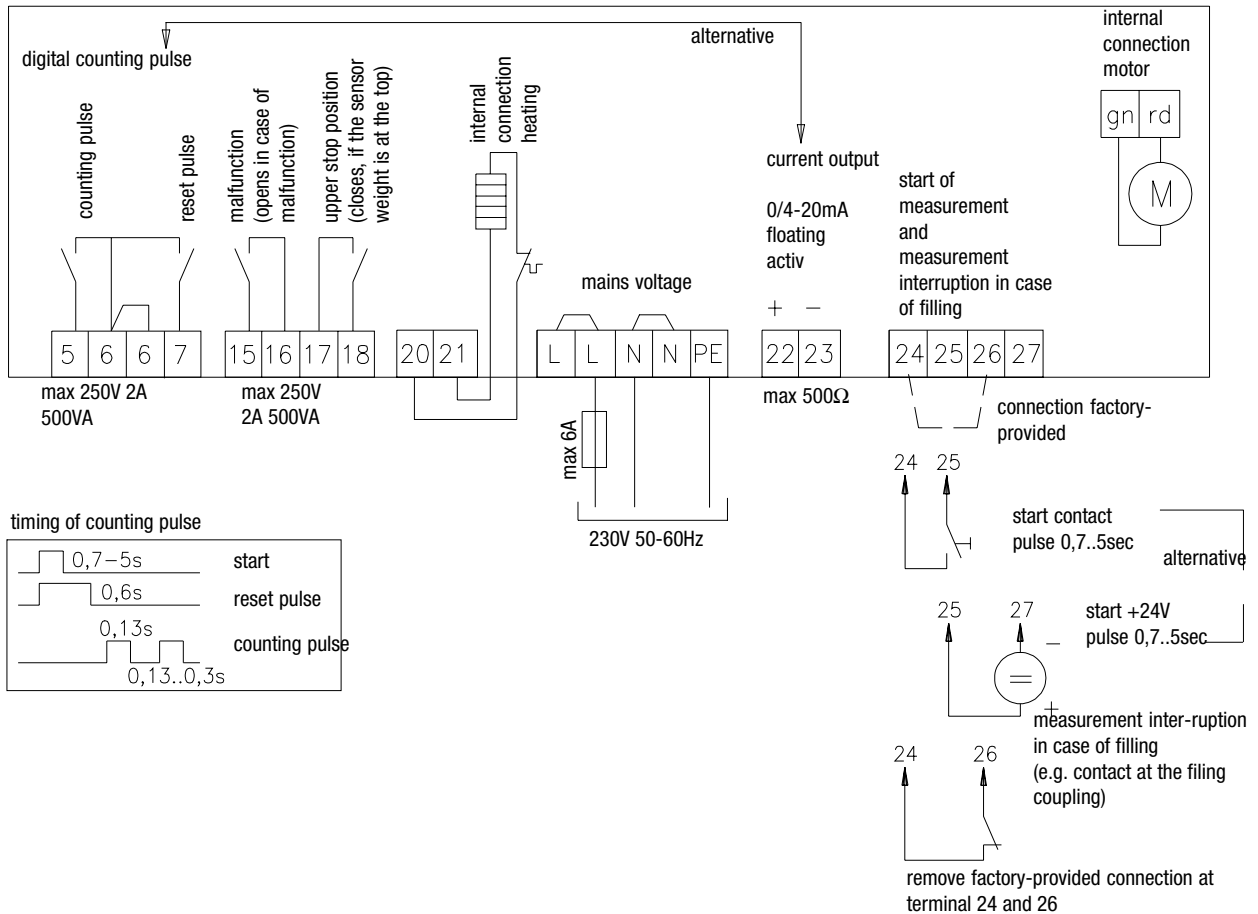
rope-/tape operating time see page G10

approvals

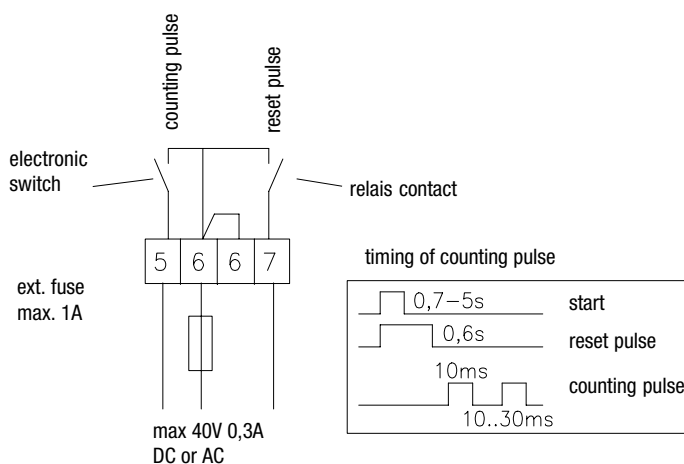
DMT/BVS (option)	zone10: inside the container zone 11: outside the container
CE	EMC EN 50081-1 EN 50082-2 electr. security EN 61010-1

information SLS 3000
electrical connection

electrical connection

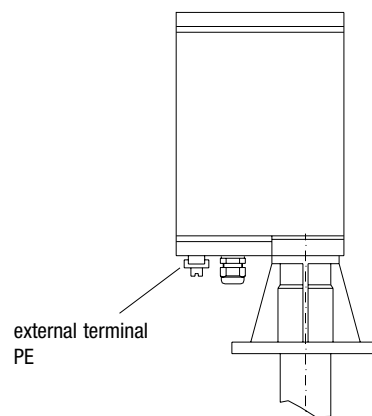


counting pulse output version 1cm pulse



electr. connection version zone 10

For application in areas zone 10, the pertinent rules and regulations (VDE 0165) must be observed.



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electrical connection

terminal connections

The following supply lines are required:

mains supply:	3 x 1.5qmm (2.5qmm max) for N, L and PE provide preceding fuse (max. 6A)
start of measurement:	2 x 1.5qmm (2.5qmm max.)
measurement interruption in case of filling	2 x 1.5qmm (2.5qmm max.)
evaluation counting and reset pulse:	3 x 1.5qmm (2.5qmm max.)

evaluation current signal 0/4 - 20mA	2x 1.5mm ² (max. 2.5mm ²)
relais output 'upper stop position' and 'malfunction' (optional)	max. 2.5mm ²

signal description

start measuring	terminal 24 and 25 via floating make contact. or terminal 25 and 27 via 24 V DC voltage (current consumption approx. 5mA, observe the polarity) duration of starting signal: 0.7 to 5s
measurement interruption in case of filling	terminal 24 and 26 via floating opening contact. In case of opening the terminals 24 and 26, the sensor weight moves upwards immediatly. Connect here the contact of the filling coupling of the silo. This prevents the sensor weight to be buried during the filling process.
counting pulse	terminal 5 and 6 The counting pulse communicates the measured value to the evaluation device that is connected. During the downward movement of the sensor weight, this pulse will be generated every 10cm (option 1cm).
reset pulse	terminal 6 and 7 After start of measurement, a reset pulse will be given for about 0.6s. It resets the connected evaluation device (counter/ PLC, ...).

current signal output	terminal 22 (+) and 23 (-) The current signal is a measure for the level (specific adjustable). The current signal is renewed, when the sensor weight touches the bulk good. It is always actuated.
upper stop position (option)	terminal 17 and 18 This signal allows the user to determine whether the measure-ment has come to its end. In this case the sensor weight is in its upper stop position, terminals 17 and 18 are linked.
malfunction (option)	terminal 15 and 16 In case of a recognized failure (or missing mains voltage) the contact will be opened. Description of the error reports see page G9. By evaluation of the signal 'malfunction' a sensor weight that might have been torn off can be prevented from getting into the unloader of the silo. When the signal 'malfunction' is given, the device must always be checked at the spot.

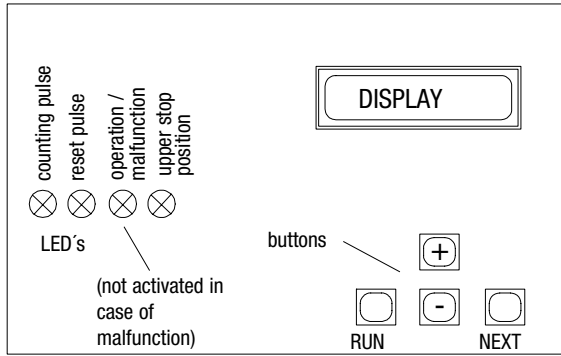
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parameter adjustment

parameter adjustment

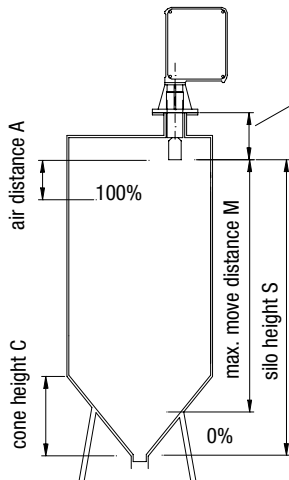


NEXT button jumps to the next adjustment item

RUN button - jumps to measurement display during parameter adjustment
- starts measurement
- cancels an error code at the display

+ button increases the value to be adjusted

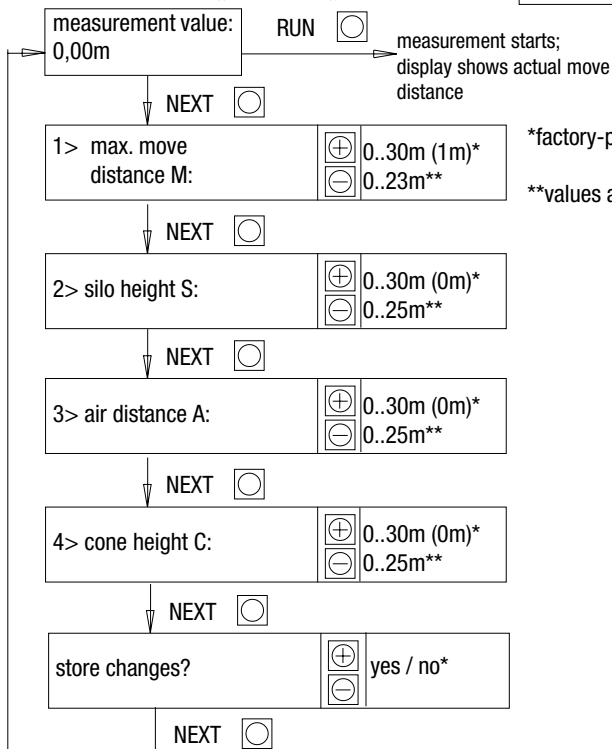
- button decreases the value to be adjusted



sensor weight	measure/ mm	
	version	rope tape
PVC	330	650
PVC zone10	700	700
PA	370	710
PA zone10	700	700
folding cover	400	740
folding cover zone10	730	730
stainless steel	250	450
spiderstainless steel	280	460

Take care, that the sensor weight can move down at least 20cm.

The max. move distance M prevents the downward movement of the sensor weight in case of empty silo.



note:

If the maximum move distance M is adjusted smaller than the silo height S, the measure value is always more than 0%.

In case of use of the digital pulse output (terminal 5/6/7, see page G4) the parameters silo height S, air distance A and cone height C have no influence on the measuring value.

Adjustment of the conical height C:

C = 0 current signal output refer to the material level
C > 0 current signal output refer to the material volume

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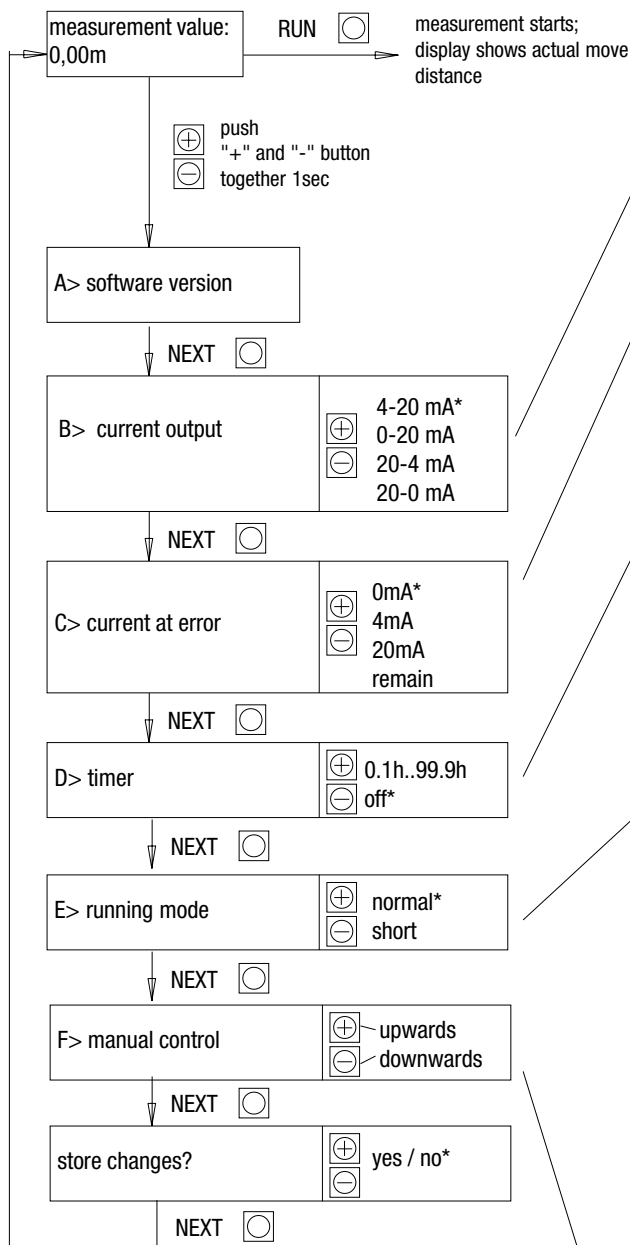


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parameter adjustment

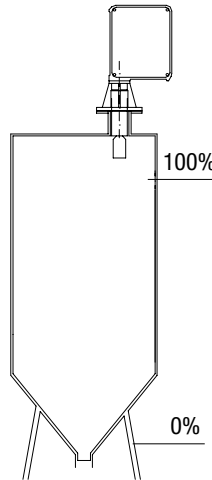
advanced parameter adjustment

(only necessary in case of need)

Following parameters can be adjusted in case of need.



*factory-provided



adjustment	current output at level	
	0%	100%
4-20 mA	4mA	20mA
0-20 mA	0mA	20mA
20-4 mA	20mA	4mA
20-0 mA	20mA	0mA

In case of malfunction the current jumps to the adjusted value.

timer

Automatic start of measurement with timer function.

Timing interval between two measurements can be adjusted.

The timer will be started:

- if the sensor weight is in the upper stop position after a measurement.
- after external measurement start at terminal 24/25/27
- after linking of the terminals 24/26 (measurement interrupt in case of filling)

Position "off" causes no automatic measurement start.

To get automatic measurement starts at a predetermined time of day, an external start unit at the terminals 24/25/27 is necessary.

To avoid needless wear, the unit should not be started more than necessary.

running mode

adjustment "normal"

The sensor weight moves back to the upper stop position after every measurement.

adjustment "short"

(only possible in case of use of the 0/4-20mA output)

The sensor weight stops, after it has touched the material, one meter over the material level. This reduces the wear and the measurement time. Every 20 measurements the sensor weight moves back to the upper stop position to adjust the measurement value. Then it moves back to the position it was before.

ATTENTION at running mode "short"

To avoid the burying of the sensor weight during the filling of the silo, the function "measurement interrupt in case of filling" (terminals 24/26, see page G4) must be used. Before the filling starts, the sensor weight must be in the upper stop position.

manual control

push "+" button: The motor moves the sensor weight upwards as long as the button is pushed.

push "-" button: The motor moves the sensor weight downwards as long as the button is pushed.

Caution: Avoid, that the sensor weight reaches the outlet position of the silo.

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safety items - mounting



commissioning

Warning:

In the case of inexpert handling or handling malpractice, the safety of the device cannot be guaranteed.

1. Connect the unit with mains voltage, evaluation units and starting units (see page G4).
2. Compare mains voltage and frequency with the specifications on the type plate.
3. Connect the unit to the mains voltage. The sensor weight must now move in the position 'upper stop position' (if not already happened).
4. Adjust the parameters (see page G6 and G7).
5. The unit is now ready for work. Measurements can be started.

safety items

- All parts with dangerous electric tension are protected, after the lid has been opened. Switch off mains voltage, before any parts of the unit are removed.
- Mains voltage circuit must be protected with a fuse (max. 6A).
- In the case of a defect, the distribution voltage must auto-matically be cut off by a FI protective switch, so as to protect the user of the device from indirect contact with dangerous electric tensions.
- For terminal connection of the device, the local regulations or VDE 0100 (Regulations of German electrotechnical Engineers) must be observed.
- For application in areas zone 10, the pertinent rules and regulations (VDE 0165) must be observed.
- In the case of inexpert handling or handling malpractice, the electric safety of the device cannot be guaranteed.
- Isolating mains voltage to signal output: 3kV~
- Provide protection for relay contacts to protect the device against spikes with inductive loads.

mounting

The unit is mounted vertically with the flange on the silo. Avoid the sensor weight to graze the socket (this causes wear of the rope).

The mounting position must be chosen carefully:

- cornices that might fall down may damage the sensor weight or the rope. Observe proper distance from silo wall
- filling of the silo might cover the sensor weight with material (prevent measuring during filling or observe proper distance to infeed)
- upward and downward movement of the sensor weight must not be obstructed, even if the weight oscillates; observe proper distance to stanchions and built-in fittings

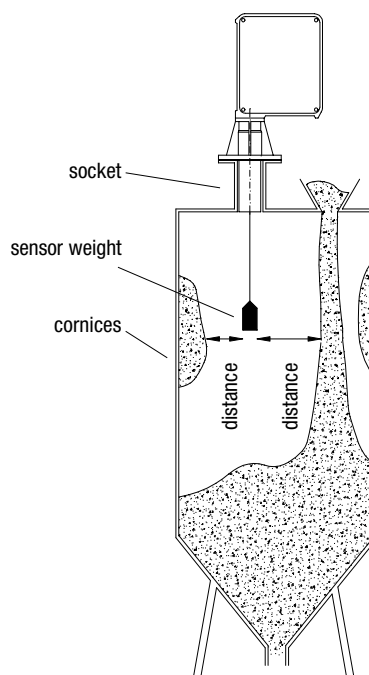
The electrical connections are made in accordance with the connection diagram. Make sure, that the cable in the screwed cable gland is seated tightly without fail.

Close both lids of the housing, to prevent entrance of water into the housing.

When the unit is used in the open, we recommend to use the weather-protection-cover. It protects the unit against moisture, heat and cold.

In case of temperatures lower than 0°C or expecting condense water inside the housing, a heating (option) is strongly recommended.

There must be at least 20cm space for the sensor weight to move down in case of a full silo. Pay attention to the lower cutting edge of the sensor weight in case of 'upper stop position' (measure see page G7).



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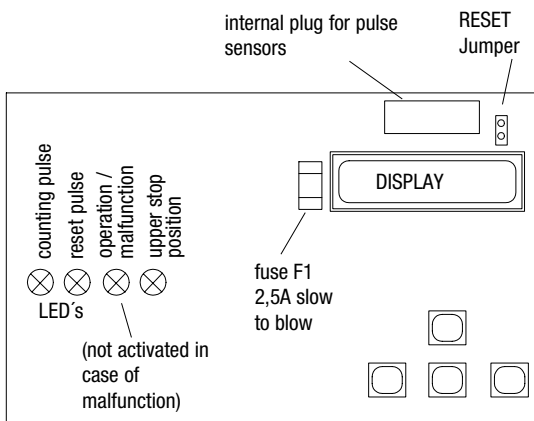
error codes



Switch off the mains voltage and take care, that it is not switched on again, before you start any repair at the device.

error code	possible reason	behaviour of the device	remedy
error code 2	Internal pulse sensors are not identified from the software.	The motor stops. When the pulse sensors can be identified again, the sensor weight moves to the upper stop position.	Connect the internal plug for the pulse sensors.
error code 3	Rope/ tape break. Motor blocked or defect.	The motor stops. This code is displayed in the following case: error code 4 happens; the motor tries to move the sensor weight upwards; after 4 minutes the upper stop position is not reached;	Repair the rope-/tape break (see page G11/G12). Look for the reason of motor blocking.
error code 4	No pulses come from the return pulley. Return pulley moves too heavy.	The motor moves the sensor weight upwards, until it reaches the upper stop position.	Repair the heavy movement of the return pulley.
error code 6	Sensor weight buried or jammed.	The motor moves 2 seconds upwards, then it waits for 10 seconds. After that the motor moves shortly downwards and then upwards again. If the sensor weight is still jammed, this cycle repeats 5 times. After that the delay time will be increased to one hour.	Release the sensor weight. Take care, that the sensor weight might move without obstacle.
error code 7	Mains voltage too low.		Take care for the right mains voltage.
error code 8	Sensor weight blocked in 'upper stop position' or move distance sensor weight <20cm.	The unit tries 5 times to start. If the sensor weight is not able to release, the error code is set.	Release sensor weight. Increase the min. move distance to >20cm.
error code 9	service interval	see chapter 'service interval' page G10	

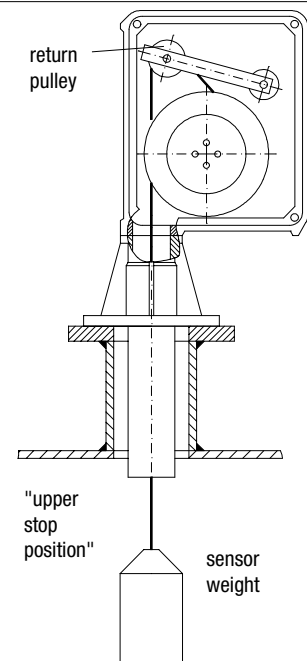
By pushing the "RUN" button, an error code shown on the display can be canceled.



Control of the measurement

The device compares the distance of downwards movement of the sensor weight (until it reaches the surface of the bulk good) with the distance of upwards movement, until it reaches the upper stop position. In case, that the values are different, this is an indication for a buried or jammed sensor weight.

Furthermore, the pulses generated from the return pulley during the measurement, are supervised. In case of missing or too irregular pulses, this indicates that the return pulley moves too heavy, or that the motor is blocked.



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maintenance/service interval

maintenance

The **UWT- LOT SLS 3000** measuring device features a high degree of functional reliability and it requires virtually no maintenance during normal operation.

Yet the regular observance is recommended:

Open the lid to the rope-/tape chamber.

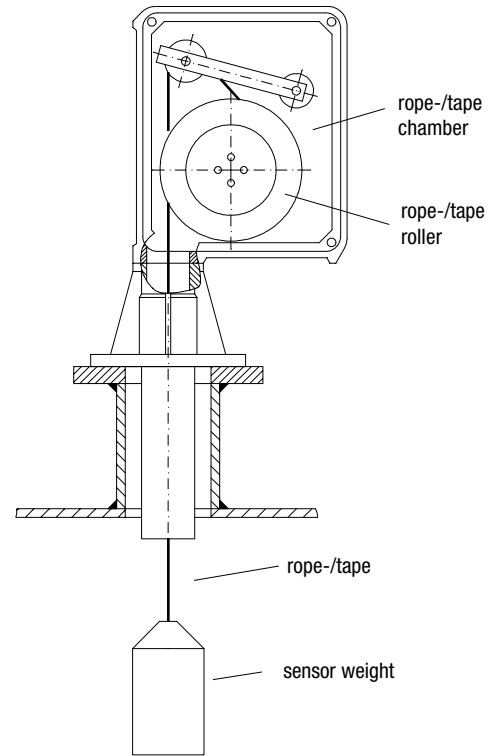
Remove any excess material in the rope-/tape chamber.

Visual inspection of the rope-/tape as to rubbed-off parts or damage.

Close the lid to the rope-/tape chamber tight.

If the rope-/tape is rubbed-off or damaged, it must be changed (perhaps shortened). Available spare parts are:

- single rope
- rope-/tape roller complete (with 30m rope or 23m tape)
- mounting set for sensor weight
- sensor weights



service interval

(error code 9)

Error code 9 is created automatically after following number of measurements:

rope version: 30 000
tape version: 40 000

To guarantee furthermore a faultless work, it is strongly recommended to change the rope/tape (see page G11 or G12).

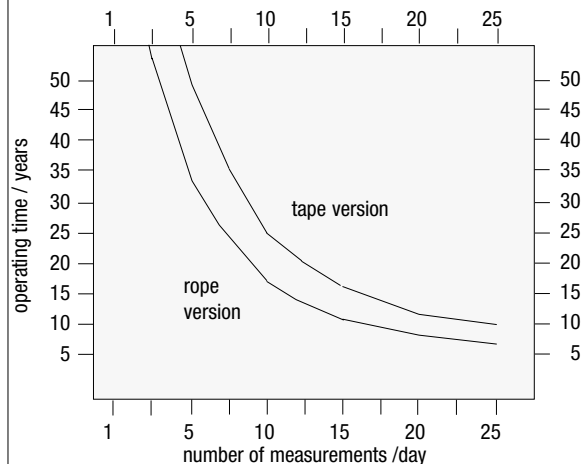
Canceling the error message by pushing the 'RUN'-button. The next message will appear after further 30 000 (40 000) measurements,

Rope-/tape operating time

	Number of measurements
rope version	approx. 60 000
tape version	approx. 90 000

These values refer to longtime tests without influence of material. The sensor weight meets an incline surface, so that an oscillating movement of the sensor weight is caused.

Due to these values, following operating times are caused:



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rope change

NOTE:

Only the manufacturer is allowed to repair units with approval BVS / DMT dust Ex zone 10/11

rope change

Switch off power supply, make sure that power cannot be accidentally restored/switched back on.

Screw the device off the mounting socket.

Open the lid to the rope chamber.

Remove the rope roller (4 screws).

Wind up a new rope or mount a new cable roller (observe the direction of winding), leave about 1.5 m of rope unwound.

Mount the sensor weight in accordance to the drawing.

Lead sensor weight into the socket, mount the device at the flange again.

Check the leading of the rope inside the rope chamber.
Close the lid to the rope chamber tight.

Switch on power supply. The sensor weight moves automatically in the "upper stop position".

The device is now ready for work. Measurements can be started.

A new software adjustment is not necessary.

