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Subject to technical change and price change.

We assume no liability for typing errors.

All dimensions in mm (inches).

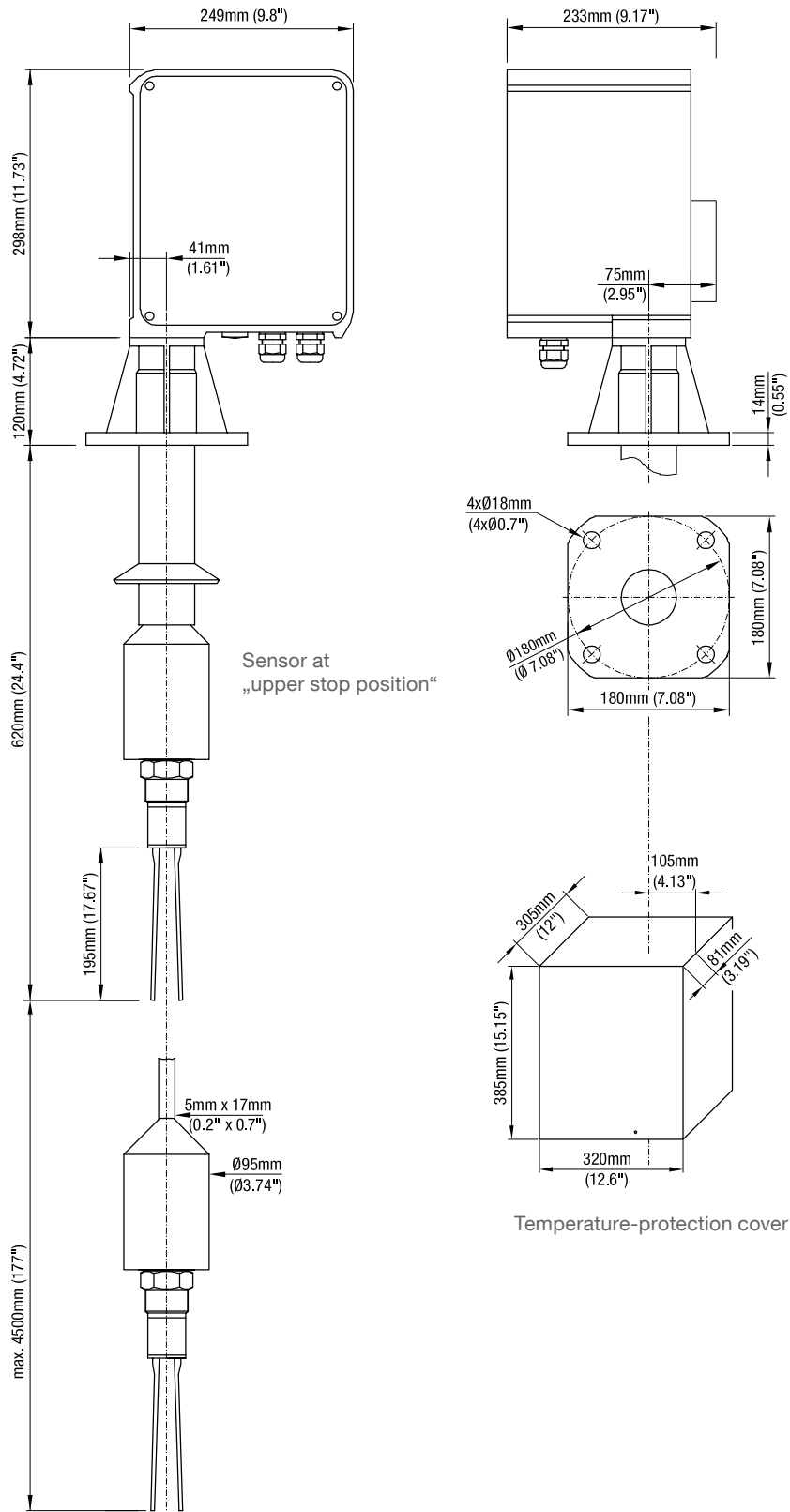
Different variations to those specified are possible.
Please contact our technical consultants.

Function / Dimensions

The unit can be used to measure the presence or absence of bulk material on a variable level. It is designed to be connected to a PLC, which is not part of the delivery.

Measurement principle:

A motor drives the sensor down to a desired level. An incremental or analogue encoder states the height of the sensor. When the bulk material reaches the sensor, an output signal is actuated.



Technical data

Mechanical data

Housing:	Aluminium RAL 5010 gentian blue
Enclosure:	IP 66 to EN 60529
Process connection:	Flange similar to DN 100 PN16 Aluminium, black
Overall weight:	approx. 17kg
Material in process:	Ribbon cable: PVC, high resistance Vibrating fork: 1.4571 / 314 Vibrating fork cover: PVC
Deviation of vertical mounting:	max. 2° out of the vertical
Pressure connection:	Quick coupling including opposite part, for hose diameter 9mm; max. operation pressure: 0.2bar

Operating conditions

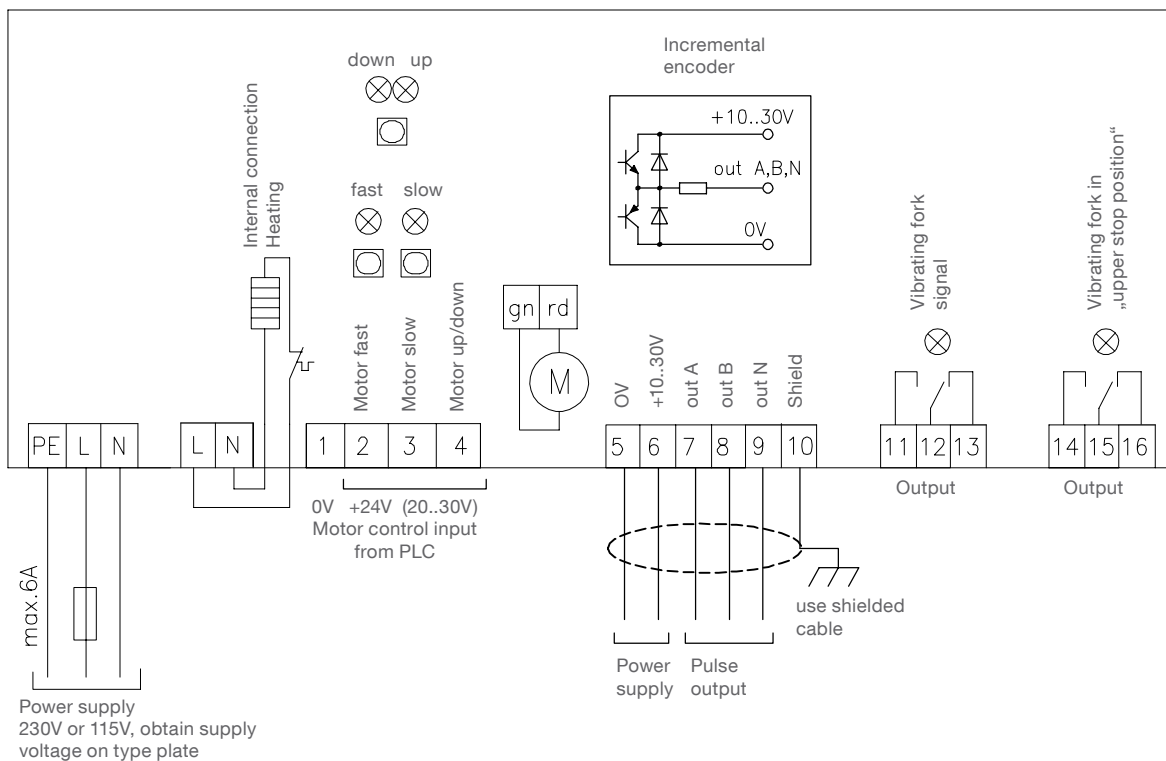
Incremental encoder:	Resolution: 1 pulse per mm sensor movement Overall accuracy of measurement ca. 5mm
Analogue 4-20mA encoder:	Resolution: 12 bit over 4500mm sensor movement Overall accuracy of measurement ca. 10mm
Accuracy of sensor:	Vibrating fork ca. 5 .. 20mm (depending on the application and the bulk material)
Measuring range:	600 .. max. 4500mm (see drawing)
Sensor speed (motor):	Motor fast (up and downwards): ca. 80-180mm/s Motor slow (downwards): ca. 20-40mm/s
Process pressure:	-0.3..+0.3 bar
Process and ambient temperature:	0°C .. 60°C -20°C .. 60°C with optional temperature-protection cover

Electrical data

Supply voltage:	230V 50-60Hz or 115V 50-60Hz both voltages +10% / -15%
Installed load:	130 VA (incl. heating)
Connection terminal:	max. 2.5mm.
Cable entry:	2 x M25 x 1.5 + 1 closing element for cable diameter 9-14 mm 3x NPT 1/2" conduit connection 3x NPT 3/4" conduit connection
Incremental encoder:	Power supply: 10-30V DC, max. 70mA Pulse output: A, B, N push-pull, max. 40mA load H-Level: > Supply voltage -2.5V L-Level: < 2.5V Cable length: max. 100m
Analogue 4-20mA encoder:	Power supply: 17-30V DC, max. 50mA 4-20mA output, active Cable length: max. 50m
Signal outputs:	„Vibrating fork signal" and "Vibrating fork in upper stop position": Floating relais contact max. 250V AC, 2A, 500VA
Control Inputs:	“Motor up”, “Motor down” and “Motor fast/slow”: Optocoupler 20-30V DC, max. 10mA each
Protection class:	I
Heating:	Included, thermostat controlled

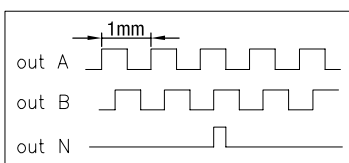
Electrical connection / Switching logic

Incremental encoder



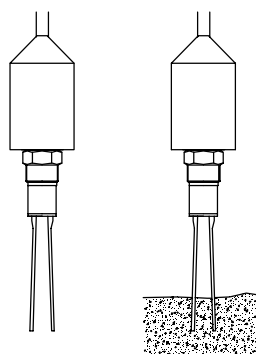
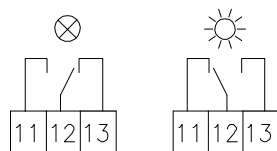
Pulse output diagram:

Shown when sensor moves upwards

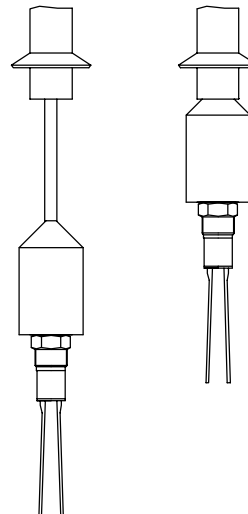
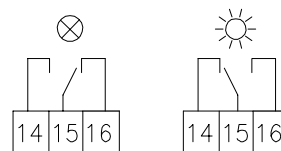


When rotation of the incremental encoder changes direction the signal of A and B is inverted.

Switching logic: Vibrating fork signal

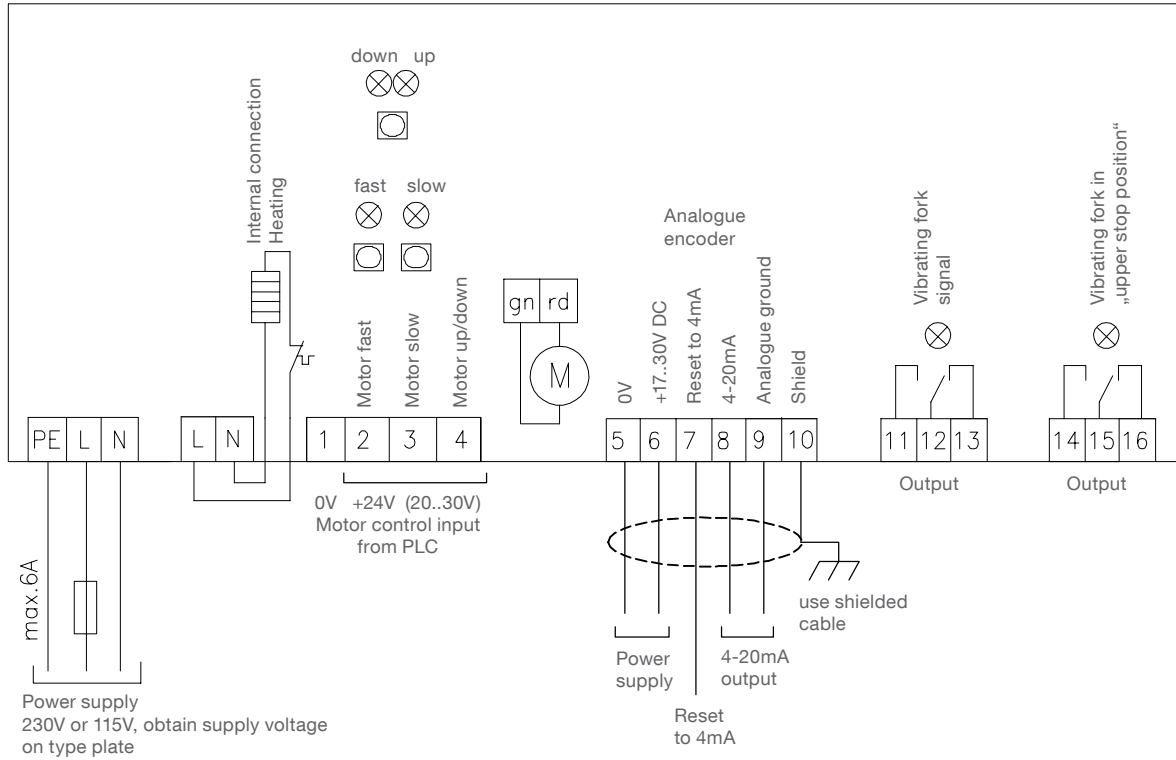


Switching logic: Vibrating fork in „upper stop position“

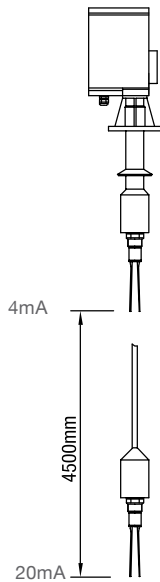


Electrical connection / Switching logic

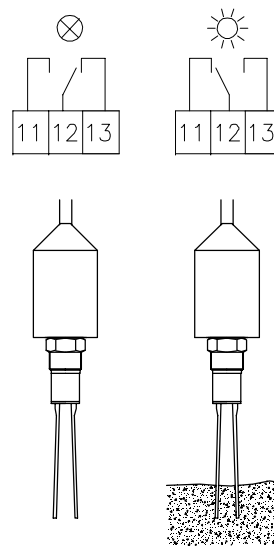
Analogue 4-20mA encoder



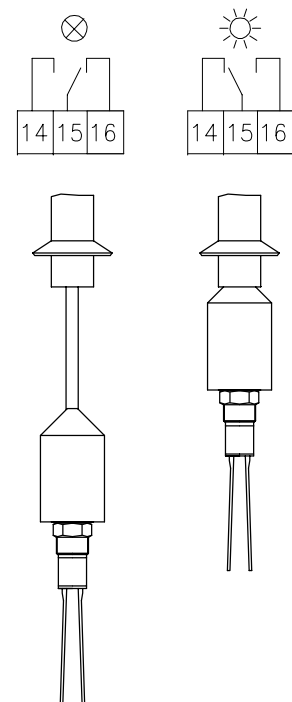
4-20mA output



Switching logic:
Vibrating fork signal

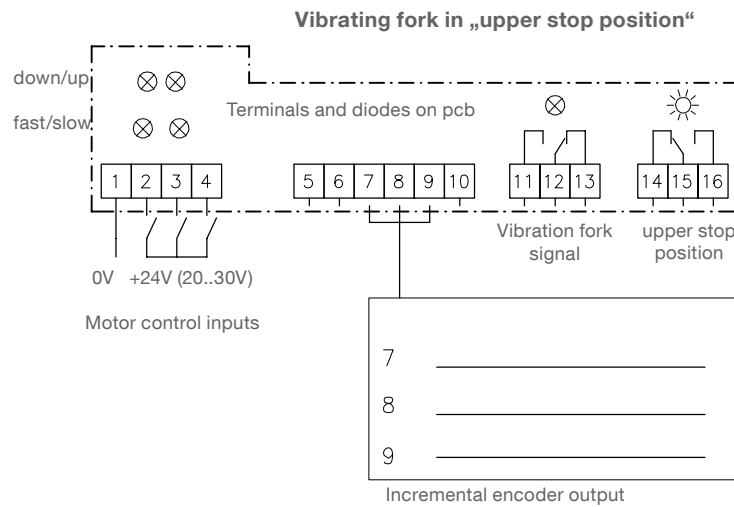
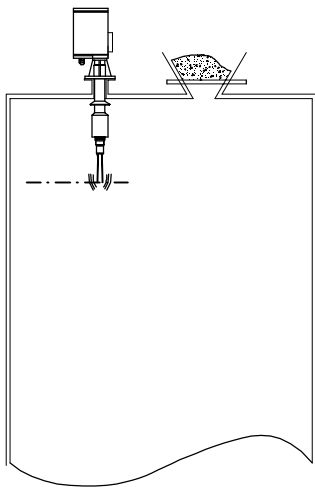


Switching logic:
Vibrating fork in
„upper stop position“

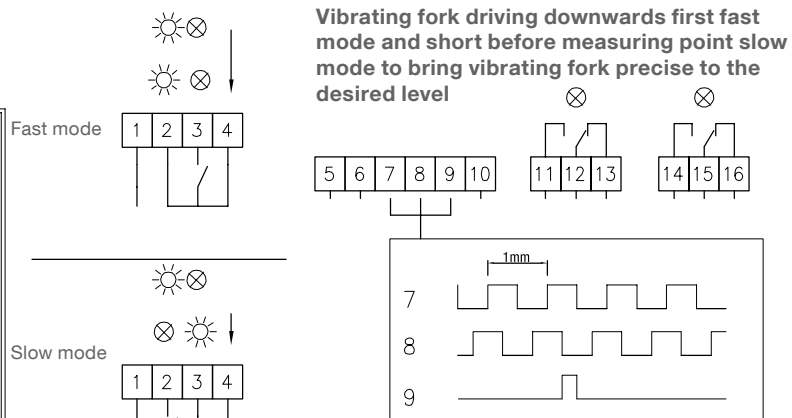
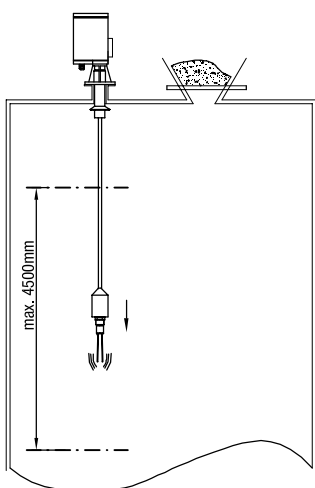


Measurement procedure - Incremental encoder

1.

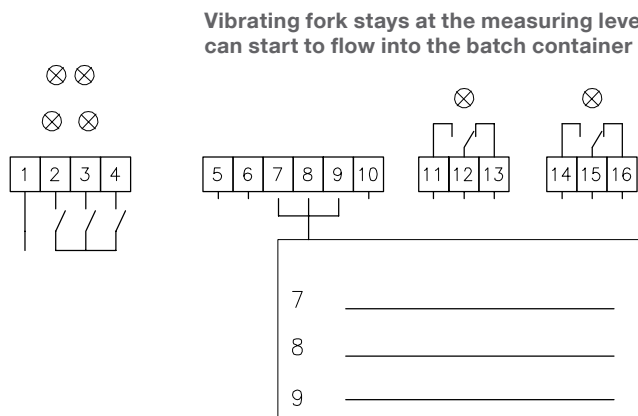
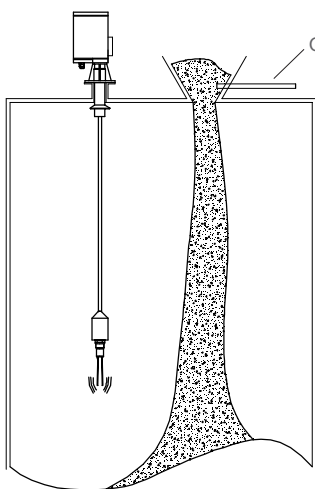


2.



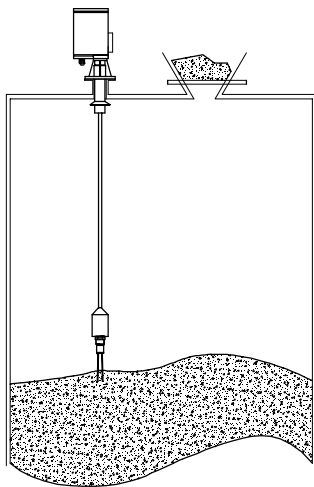
ATTENTION: To avoid damaging the unit while driving downwards, ensure that the vibrating fork stops at max. 4500 mm.

3.

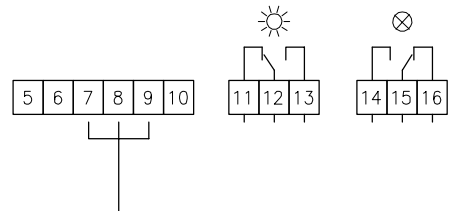
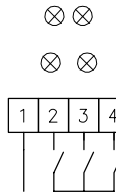


Measurement procedure - Incremental encoder

4.

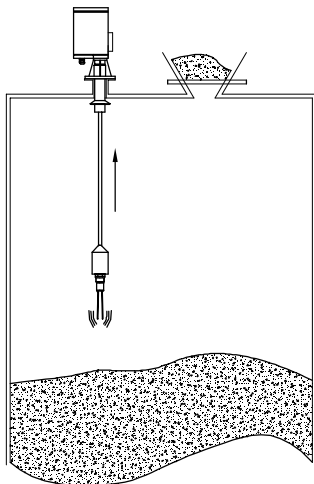


Vibrating fork detecting material

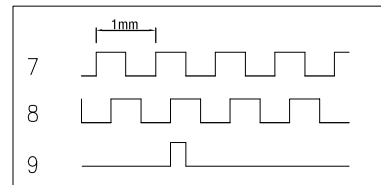
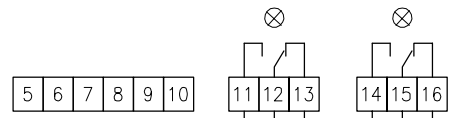
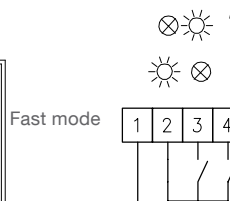


7	_____
8	_____
9	_____

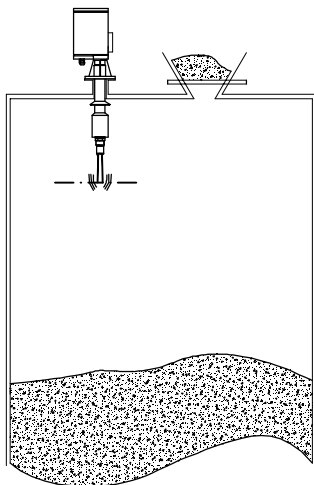
5.



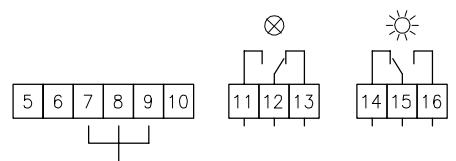
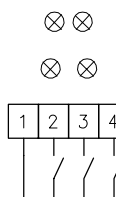
Vibrating fork goes back up after completing the measurement



6.



Vibrating fork has reached the „upper stop position“

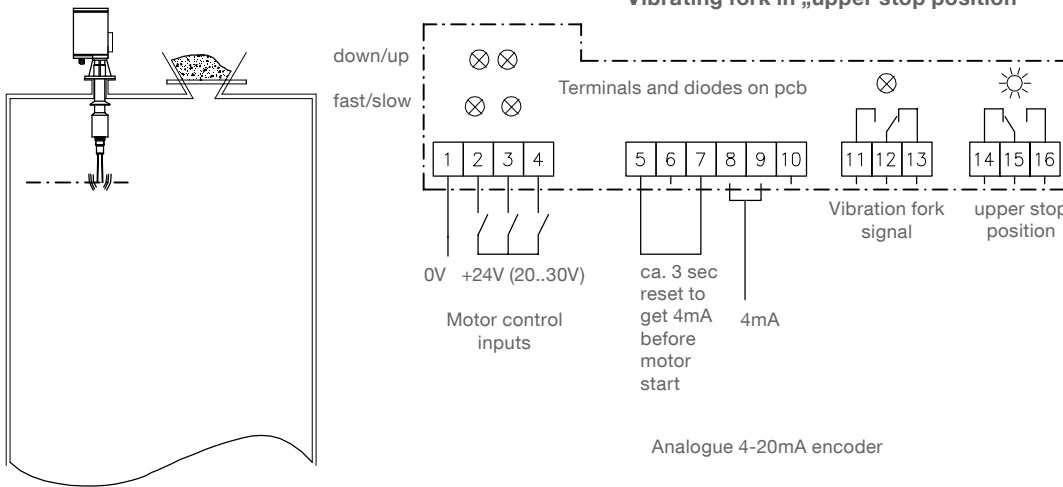


7	_____
8	_____
9	_____

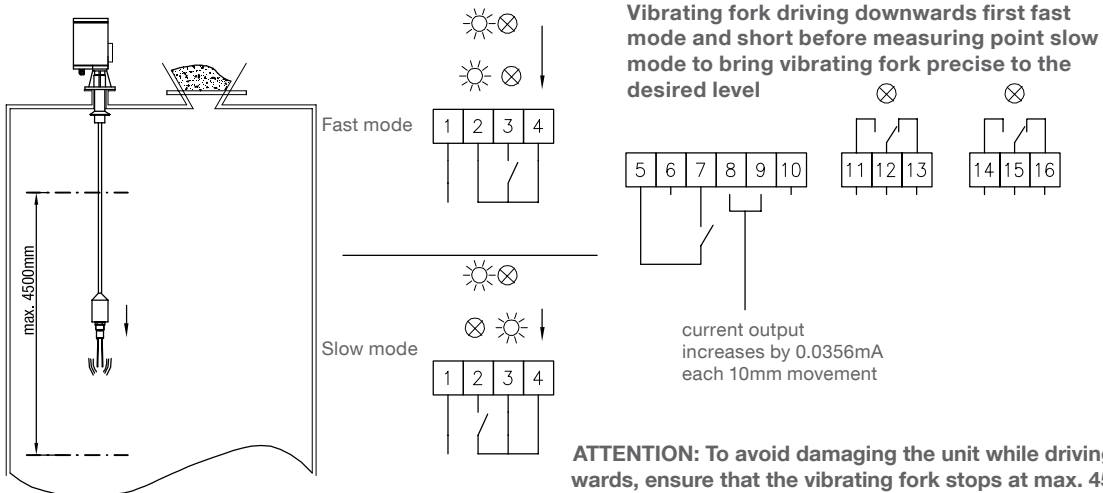
ATTENTION: Before starting next measurement, ensure that PLC counter is set to zero for reference

Measurement procedure - Analogue 4-20mA encoder

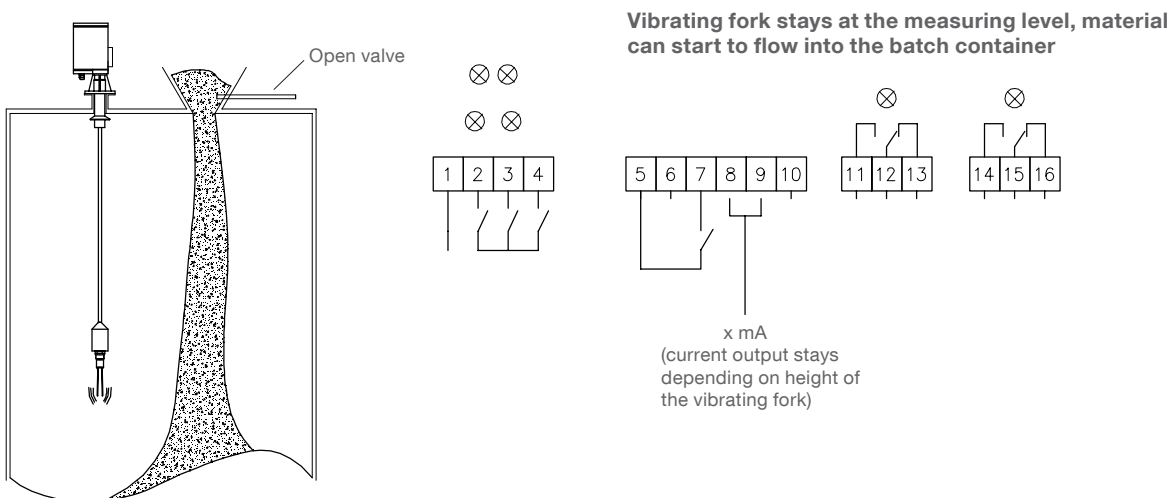
1.



2.

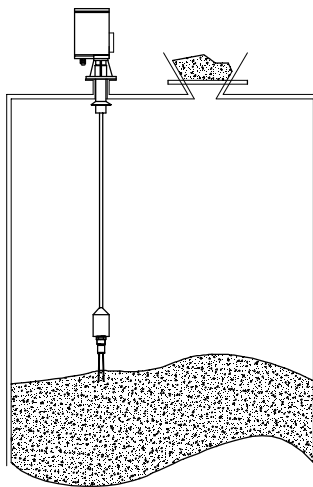


3.

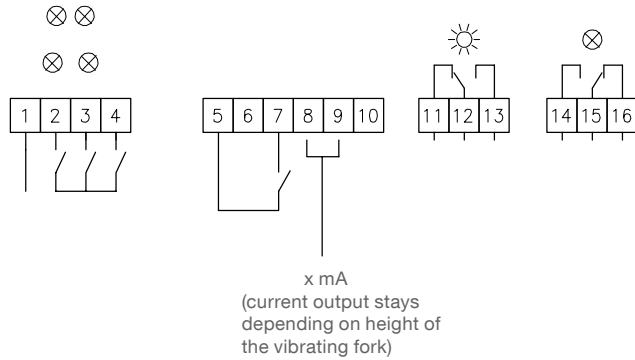


Measurement procedure - Analogue 4-20mA encoder

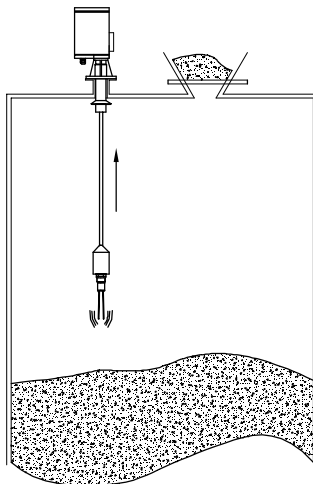
4.



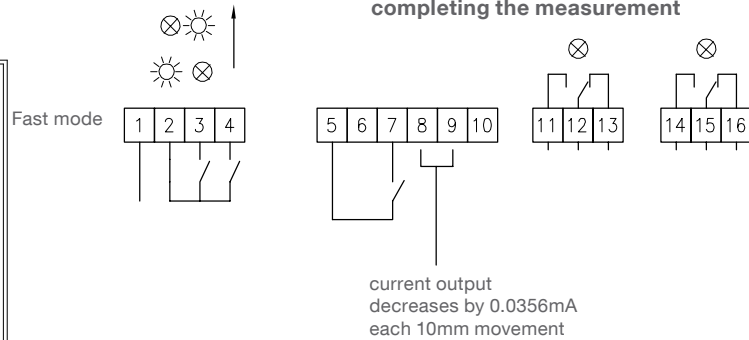
Vibrating fork detecting material



5.

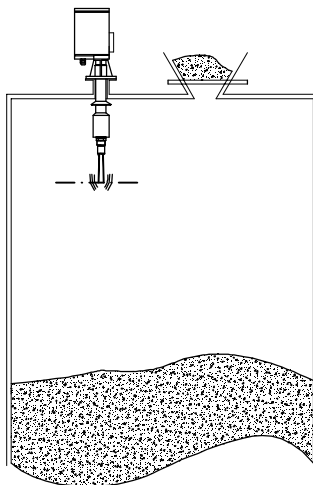


Vibrating fork goes back up after completing the measurement

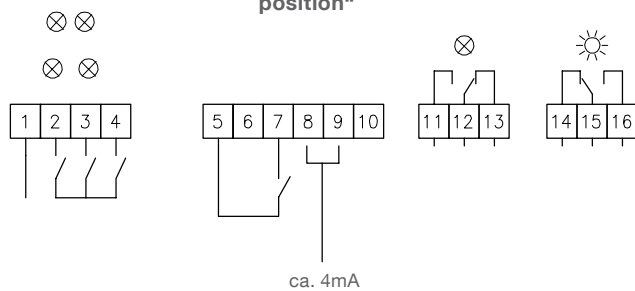


current output decreases by 0.0356mA each 10mm movement

6.



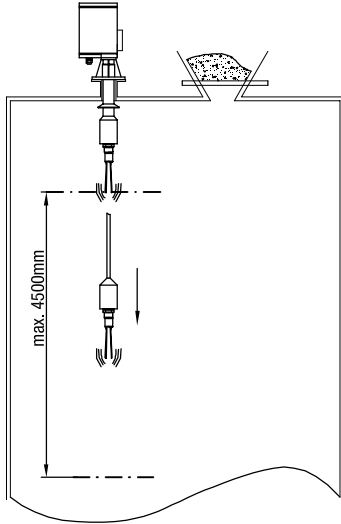
Vibrating fork has reached the „upper stop position“



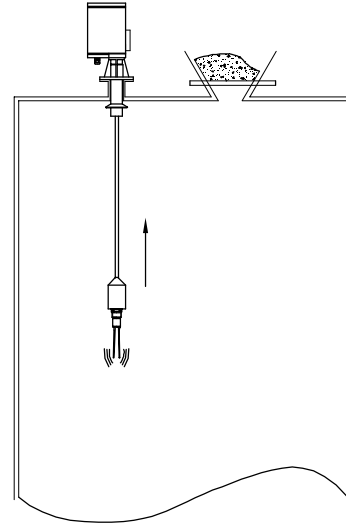
ca. 4mA

Manual motor operation

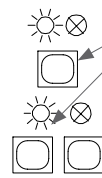
Vibrating fork driving downwards while pushing the buttons



Vibrating fork driving upwards while pushing the button

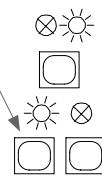


fast mode down

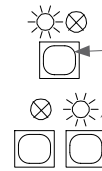


push button

fast mode up



slow mode down



push button

Safety instructions / Mounting

Safety instructions

- Installation, maintenance and commissioning may be accomplished only by qualified technical personnel.
- The respectively valid installation instructions must be observed.
- For terminal connection of the device, the local regulations or VDE0100 (Regulations of German electrotechnical Engineers) must be observed.
- Use a fuse for the supply voltage (max. 6A).
- Provide protection for relay contacts and output transistors to protect the device against spikes with inductive loads.
- Compare the supply voltage applied with the specifications given on the name plate before switching the device on.
- Make sure that max. 8mm of the pigtailed are bared (danger of contact with live parts).
- Make sure that the boots for protecting cable terminations are not longer than 8mm (danger of contact with live parts).
- Make sure that the screwed cable gland safely seals the cable and that it is tight (danger of water intrusion).
- A voltage-disconnecting switch must be provided near the device.
- In the case of a defect, the distribution voltage must automatically be cut off by a RCCB protection switch so as to protect the user of the device from indirect contact with dangerous electric tensions.
- In the case of inexpert handling or handling malpractice, the electric safety of the device cannot be guaranteed.
- Switch off the supply voltage before opening the device.
- Before opening the lid take care, that no dust deposits or whirlings are present.

Mounting

The unit is mounted vertically with the flange on the silo. Avoid the point level switch to graze the socket (this causes wear of the cable).

The mounting position must be chosen carefully:

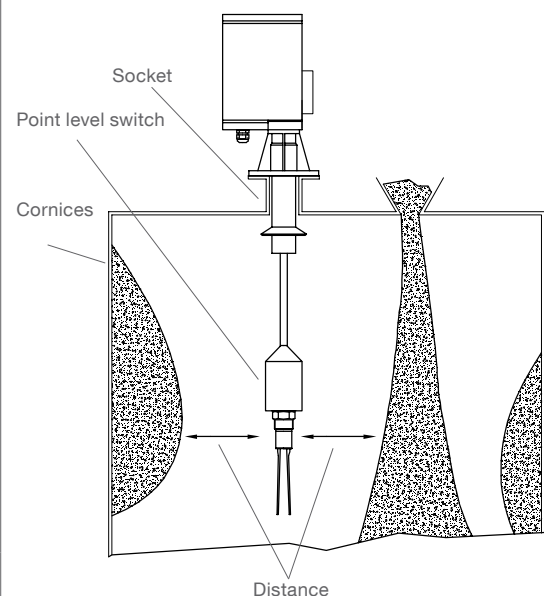
- cornices that might fall down may damage the point level switch or the rope. Observe proper distance from silo wall.
- filling of the silo might cover the point level switch with material (prevent measuring during filling or observe proper distance to infeed).
- upward and downward movement of the point level switch must not be obstructed, even if the point level switch 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 temperature protection cover. It protects the unit against moisture, heat and cold. If the ambient temperature can drop to less than 0°C the use of a temperature-protection-cover is obligatory.

Take care that the sensor never drives through the socket into the „upper stop position“ to avoid damage to the unit (see relevant dimensions page G2).



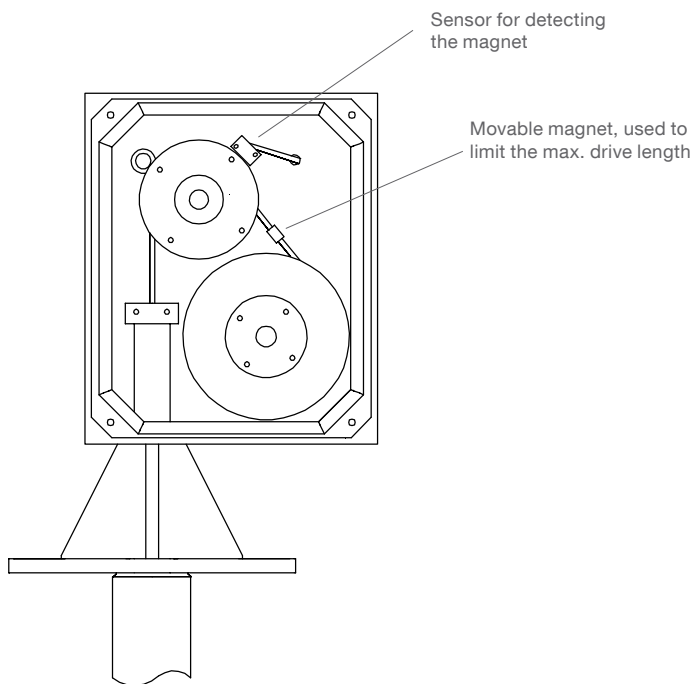
Commissioning

Commissioning

Warning:

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

1. Connect the unit with supply voltage and evaluation units
2. Cable conduit fittings, which are not used, must be locked with a closing element.
3. Compare supply voltage and frequency with the type plate.
4. Switch on supply voltage and PLC.
5. Setting the max. drive length



The movable magnet avoids, that the probe may drive too far and causes the unit to be damaged. When the magnet reaches the sensor, the motor stops driving downwards. Remove the magnet and drive the probe to the max. required length by using the manual motor operation (see page G11) . Then fix the magnet close to the sensor. It must be ensured, that the probe moves max. 4500mm downwards.

6. Test the function of the unit, the PLC and the measurement functions.
7. The unit is now ready for work. Measurements can be started.