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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.

All units of this information are CE - certified.

Function

The unit is designed to be connected to a PLC which controls the up and down movement of the sensor and evaluates the pulses from the incremental encoder. The PLC is not part of the delivery.

1. Batch control or adjustable level detection

The unit can be used to measure the presence or absence of bulk material on a predetermined level.

The most important steps of the measurement cycle are:

- Measurement starts always from the "upper stop position".
- The motor drives the sensor down. Fast mode can be used until the sensor is close to the desired level. The incremental encoder gives pulses (1 pulse per mm sensor movement). The pulses can be evaluated by the PLC.
- When the sensor level is close to the desired level for batch control or full detection slow mode can be used to ensure accurate stop of the sensor.
- The bulk material is filled into the container.
- When the bulk material reaches the sensor, an output signal is actuated.
- The sensor must now be driven up to the „upper stop position“ for reference purposes.
- A new measurement can be started.

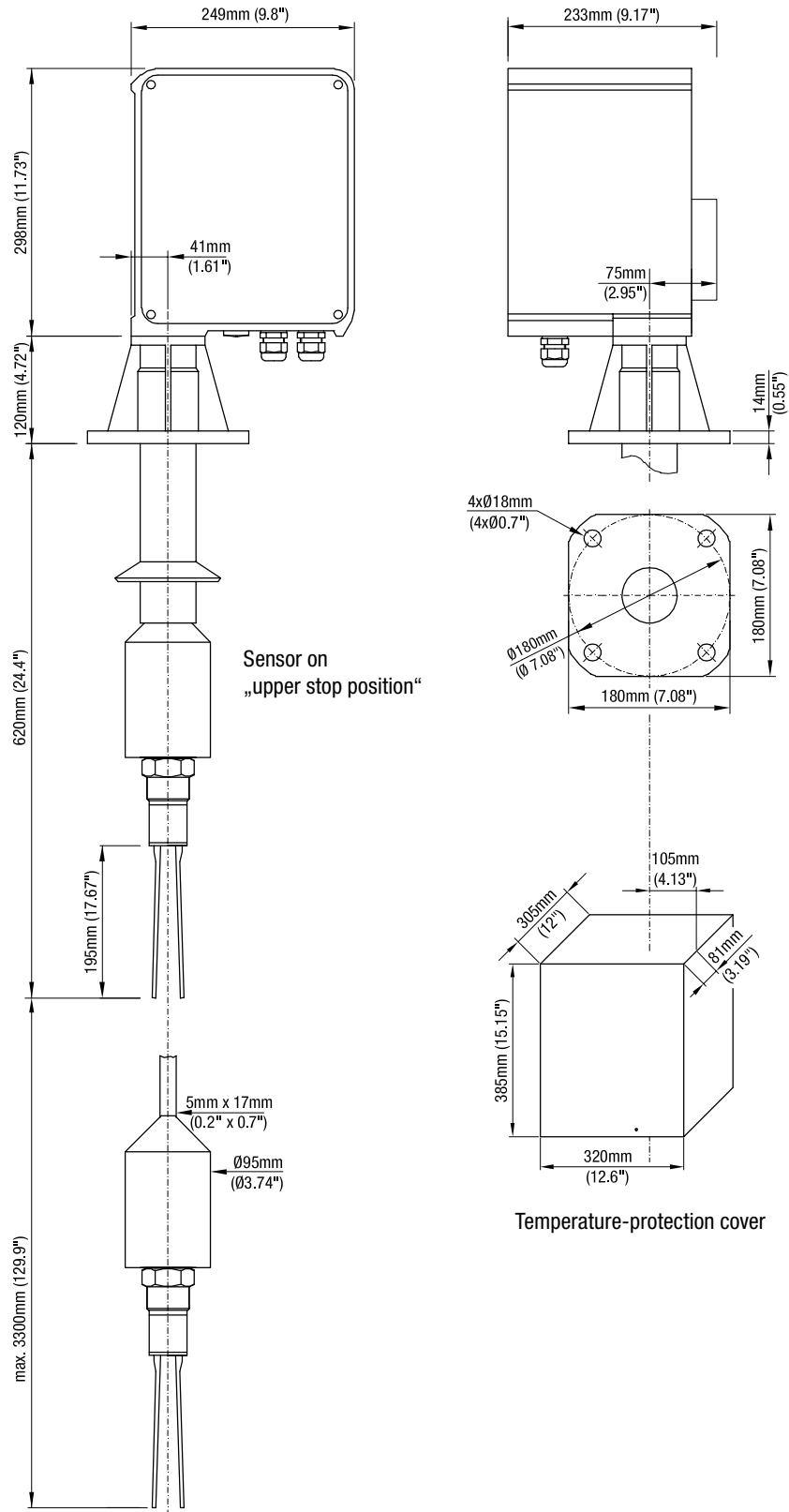
2. Level measurement

The unit can be used to measure the level of bulk material.

The function is as follows:

- Measurement starts always from the "upper stop position".
- The motor drives the sensor down. Fast or slow mode can be used depending on the desired accuracy. The Incremental encoder gives pulses (1 pulse per mm sensor movement). The pulses can be evaluated by the PLC.
- When the sensor reaches material level, the motor is automatically stopped and an output signal is actuated.
- The sensor must now be driven up to the „upper stop position“ for reference purposes .
- A new measurement can be started.

Dimensions



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

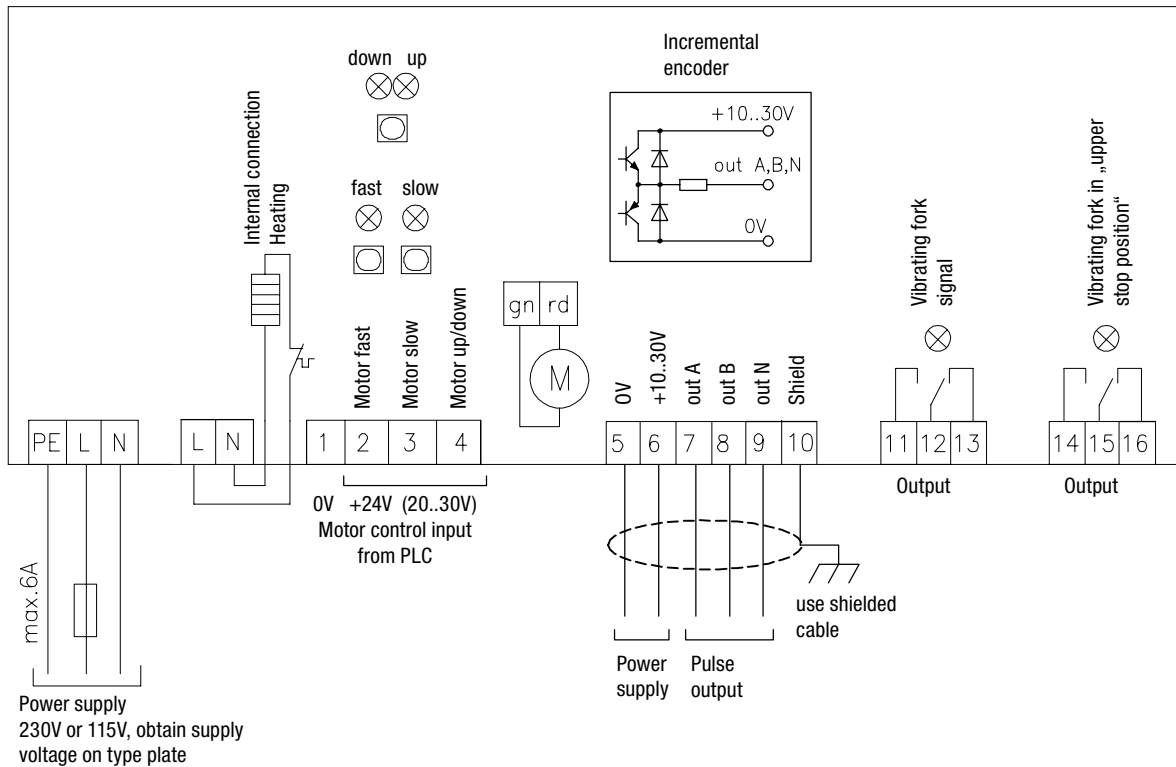
Operating conditions

Incremental encoder:	resolution: 1 pulse per mm sensor movement allover accuracy of measurement ca. 5mm
Accuracy of sensor:	vibrating fork ca. 5 .. 20mm (depending on the application and the bulk material)
Measuring range:	600 .. max. 3800mm (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

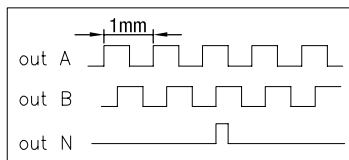
Mains voltage:	230V 50-60Hz or 115V 50-60Hz both voltages +10% / -15%
Installed load:	130 VA (with heating)
Connection terminal:	max. 2.5mm.
Cable entry:	2 x M25 x 1.5 + 1 closing element for cable diameter 9-14 mm 3x NPT 1/2" conduit connection 3x NPT 3/4" conduit connection
Incremental encoder:	power 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
Signal outputs:	„Vibrating fork signal », « Vibrating fork in upper stop position“: floating relais contact max. 250V AC, 2A, 500VA
Control Inputs:	“motor up”, “motor down”, “motor fast/slow”: optocoupler 20-30V DC, max. 10mA each
Protection class:	I
Heating:	included, thermostat controlled

Electrical connection / Switching logic



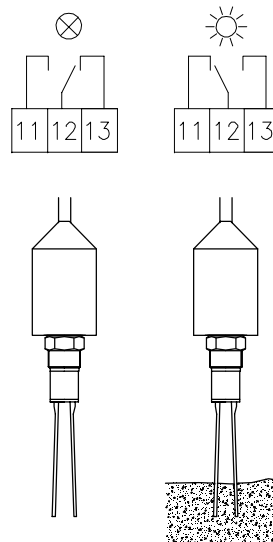
Pulse output diagram:

Shown when sensor moves upwards

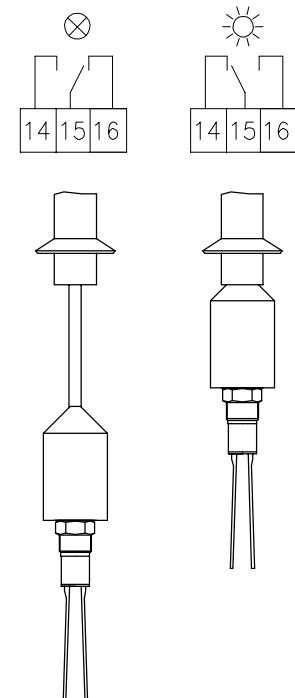


When rotation of the incremental encoder changes direction the signal of A and B is inverted.

Switching logic: Vibrating fork signal

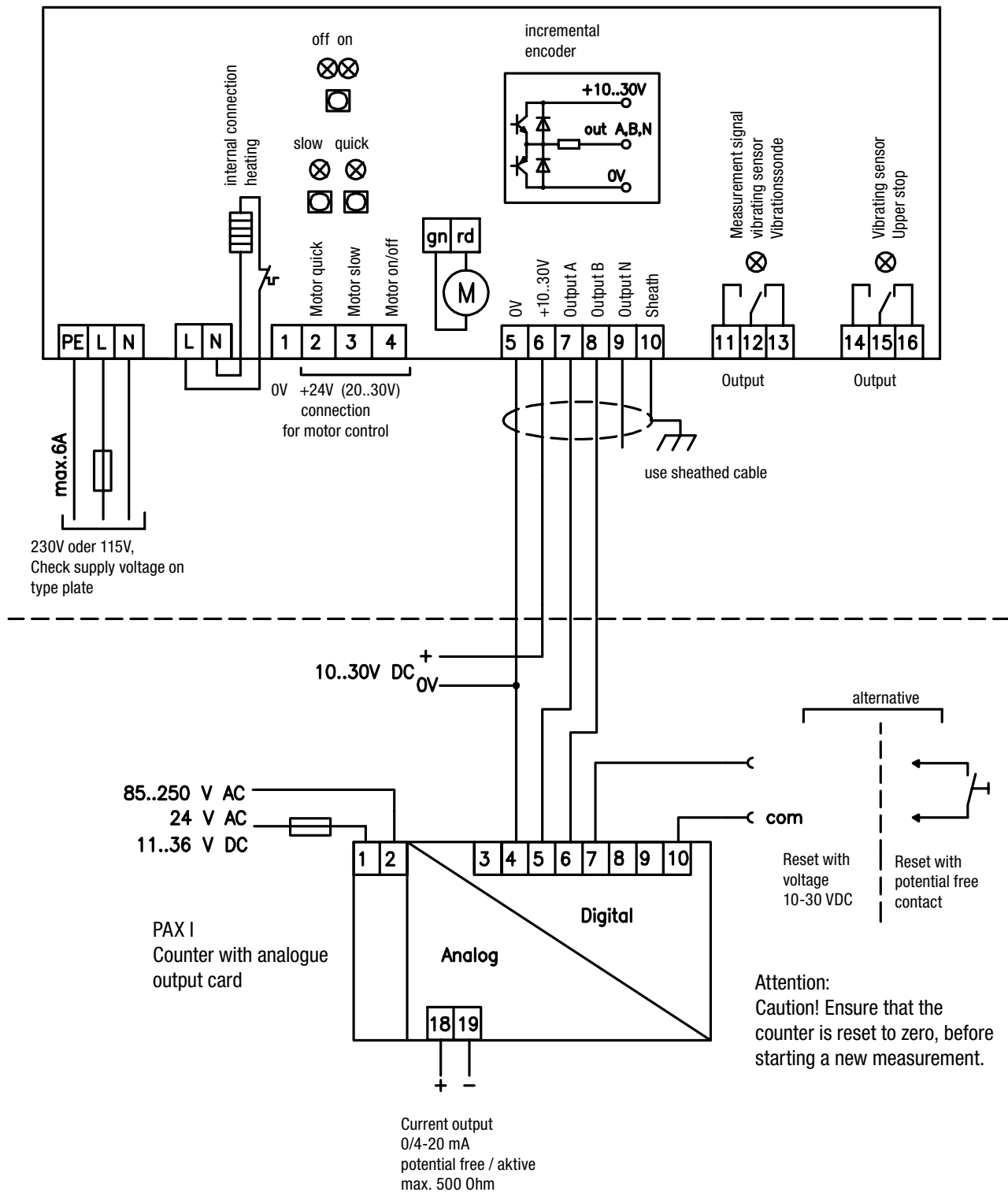


Switching logic: Vibrating fork in „upper stop position“



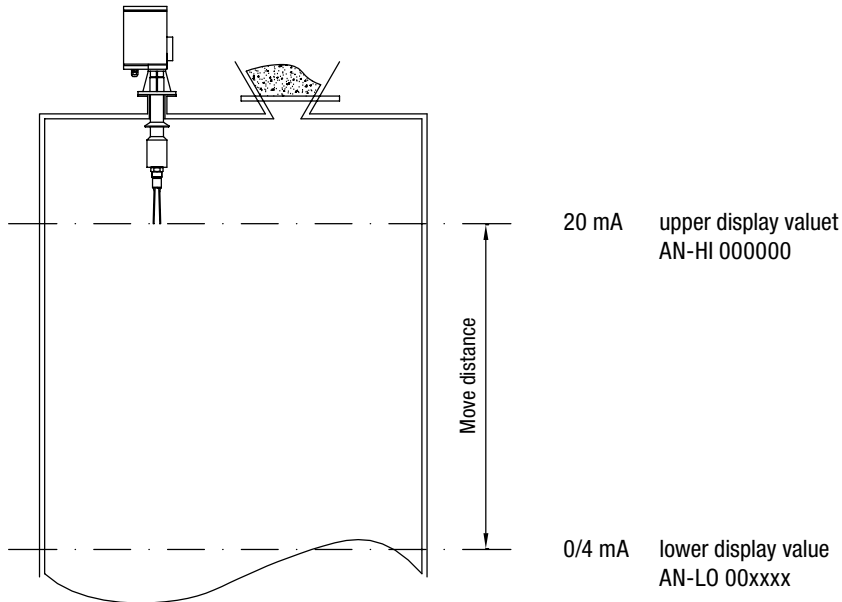
Electrical connection for the pulse converter PAX I

Evaluation 0/4- 20 mA with pulse convertor PAX I



Programming the pulse convertor PAX I

Programming the counter PAX I



1. Programming with either 0-20 mA or 4-20 mA (preset to 4-20 mA)

Keys	Display
Press PAR to start programming	Pro
F1 (press 8 times)	Change from Pro to 8-ANA
PAR	Type 4-20
To change to 0-20 mA press F2	change to type 0-20
Press F1 to return to 4-20 mA	
To save press PAR first and then DSP	actual measurement value

2. Move distance - value of current output

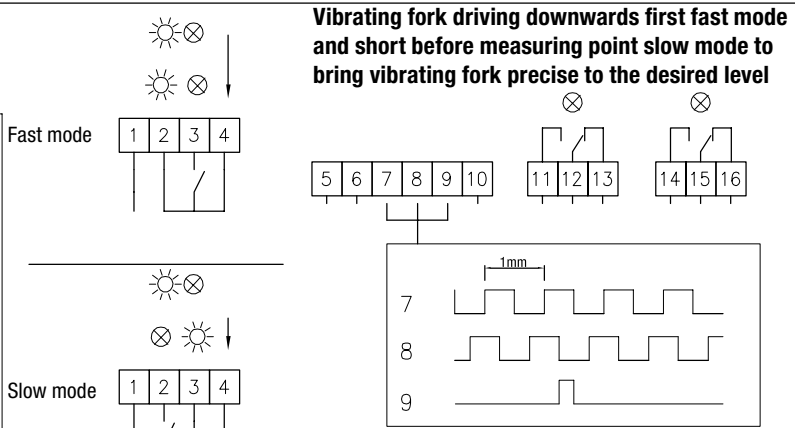
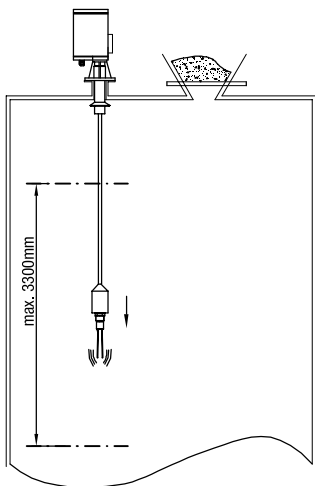
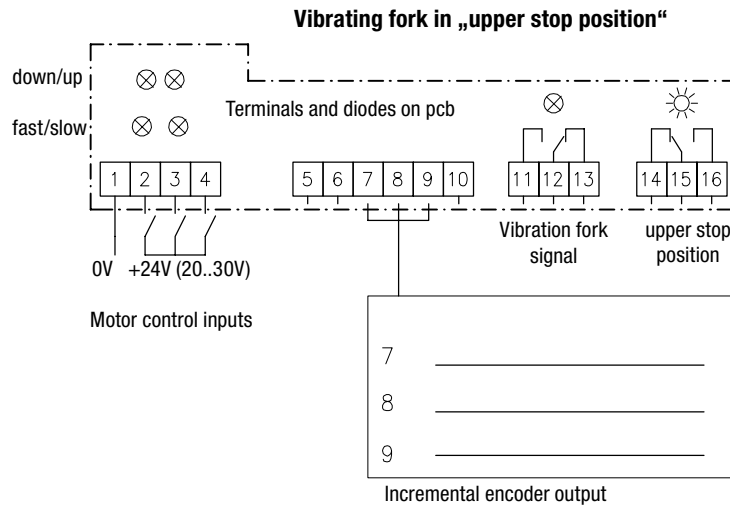
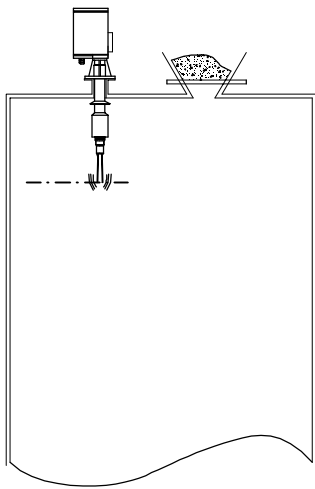
Upper display value AN-HI: Set to 000000 (This value must not be changed)
 0 Impulse = 20 mA

Lower display value AN-LO: Can be set to 00xxxx
 xxxx Impulse = Move distance in mm, which will give a current of 0/4 mA.

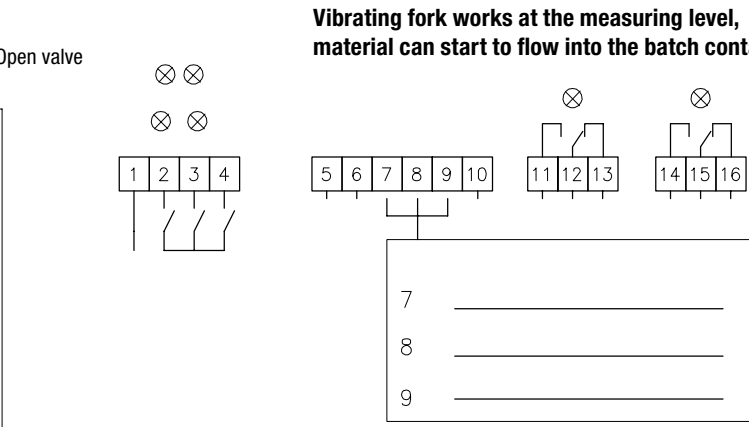
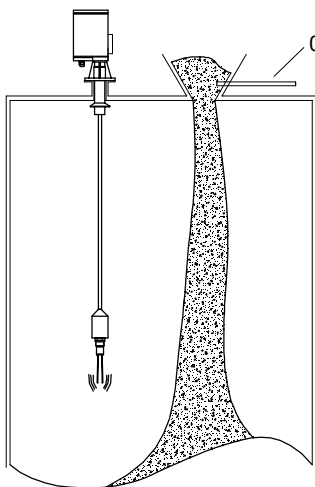
The lower display value can be set as follows:

Keys	Display
Press PAR to activate	Pro
F1 (press 8 times)	Change from Pro to 8-AnA
PAR (press 3 times)	Change from AN-LO to 001000
Use F1 or F2 to set the desired run length	
To save press PAR first and then DSP	

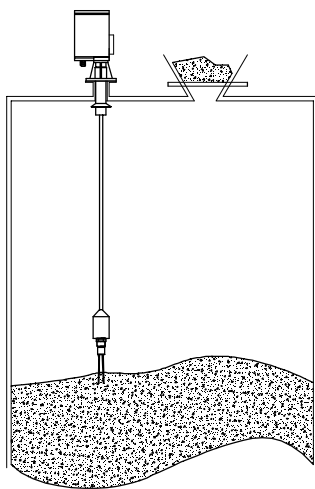
Batch control or adjustable level detection



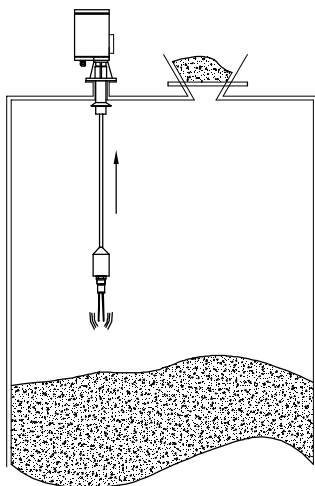
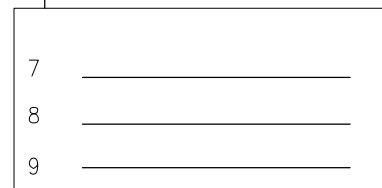
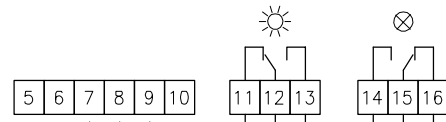
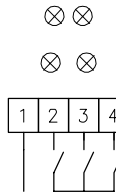
ATTENTION: To avoid damaging the unit while driving downwards, ensure that the vibrating fork stops at max. 3300 mm.



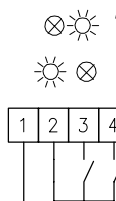
Batch control or adjustable level detection



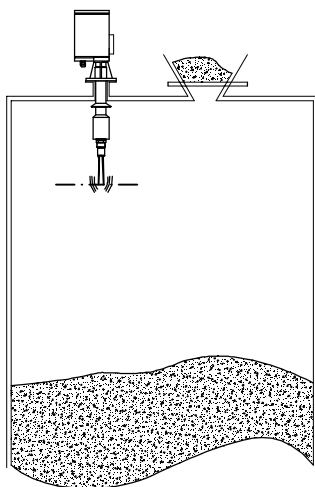
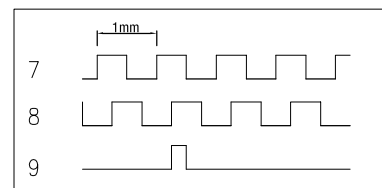
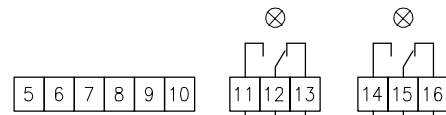
Vibrating fork detecting material



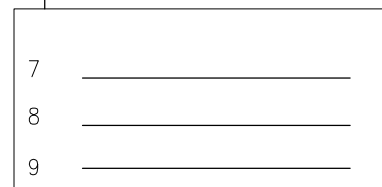
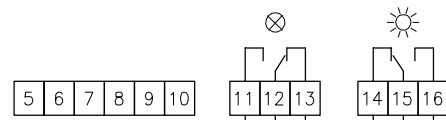
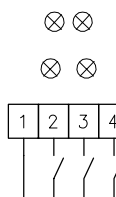
Fast mode



Vibrating fork goes back up after completing the measurement

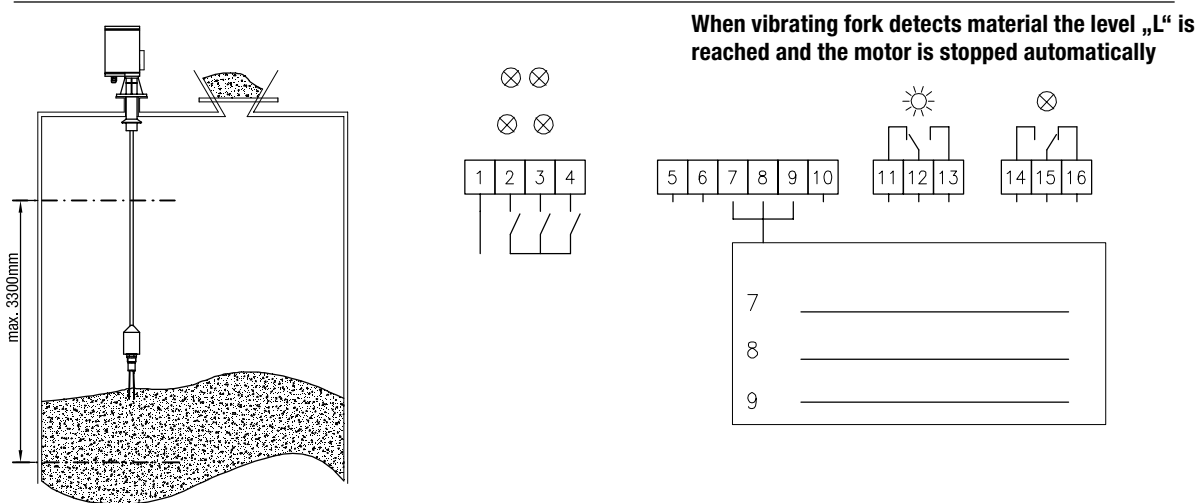
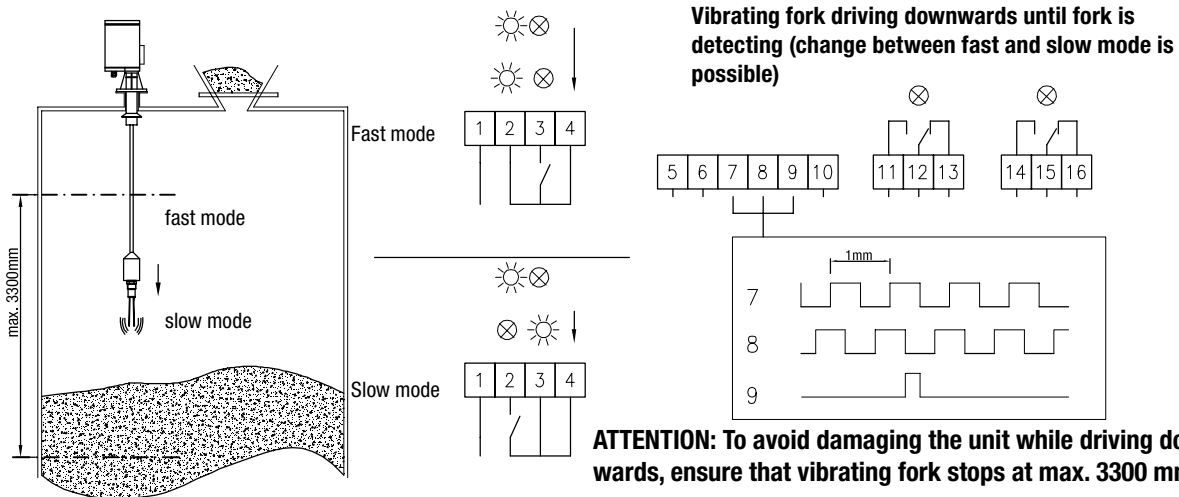
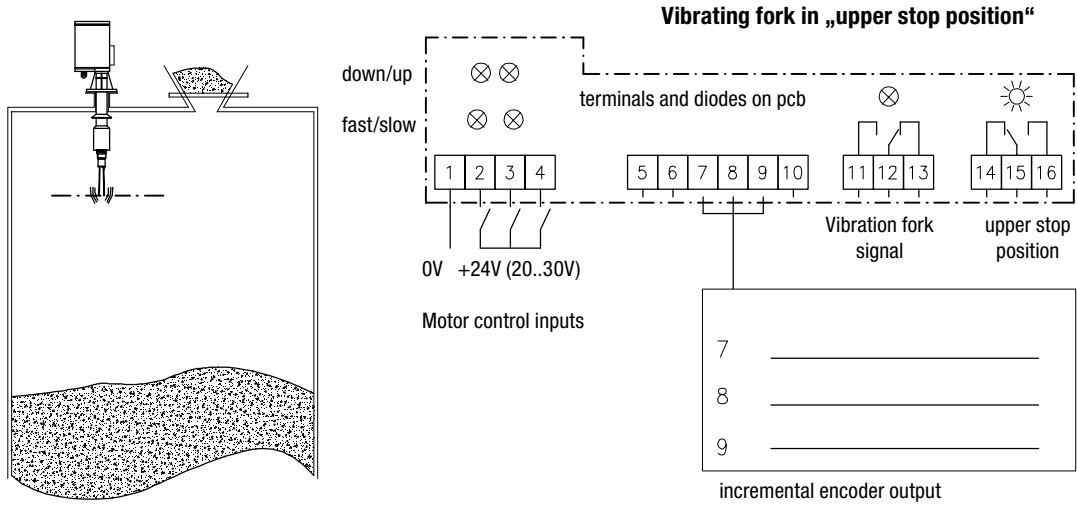


Vibrating fork has reached the „upper stop position“

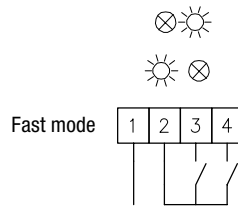
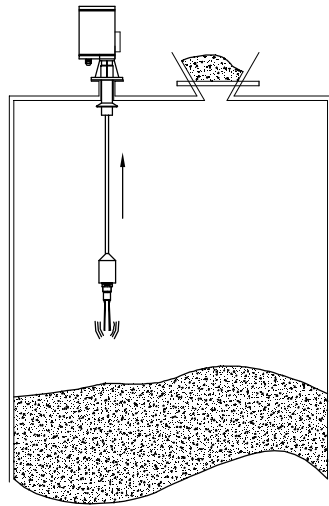


ATTENTION: Before starting next measurement, ensure that PLC counter is set to zero for reference

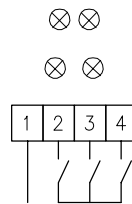
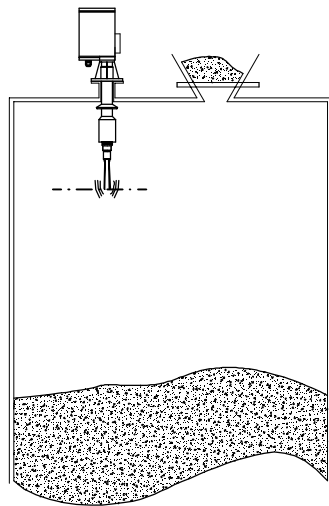
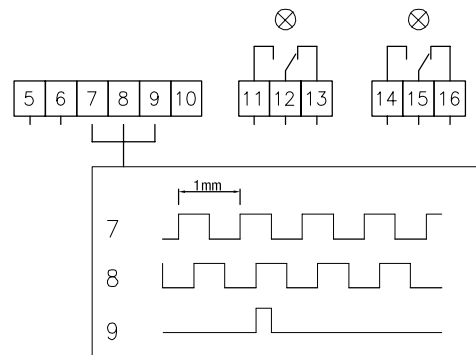
Continuous level measurement



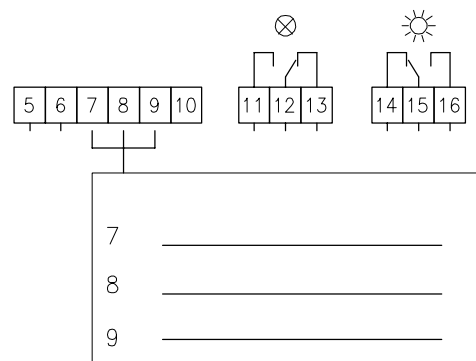
Continuous level measurement



Vibrating fork driving upwards after finishing the measurement



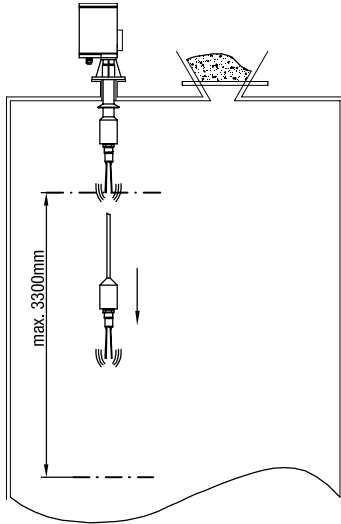
Vibrating fork reached the „upper stop position“



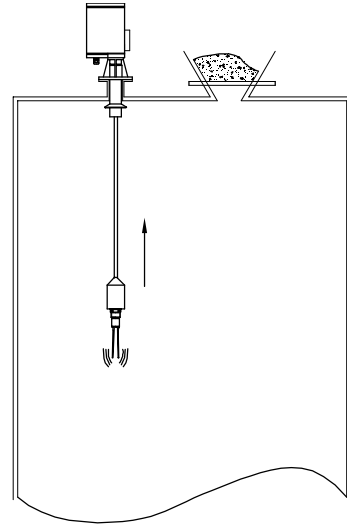
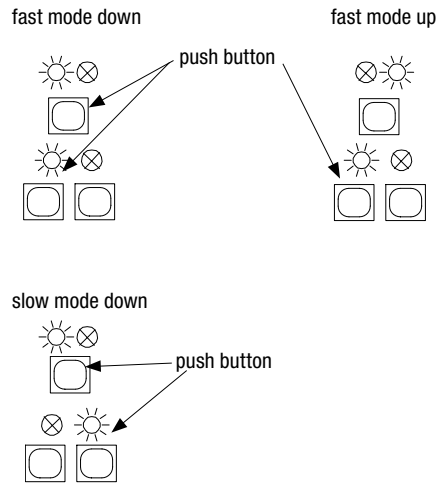
ATTENTION: Before starting next measurement, ensure that PLC counter is set to zero for new reference

Manual motor operation

**Vibrating fork driving downwards
while pushing the buttons**



**Vibrating fork driving upwards
while pushing the button**



Safety instructions / Commissioning / 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 mains voltage (max. 6A).
- Provide protection for relay contacts and output transistors to protect the device against spikes with inductive loads.
- Compare the mains voltage applied with the specifications given on the name plate before switching the device on.
- Make sure that max. 8mm of the pigtails 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.

Commissioning

Warning:

In 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 steering units (see page G5).
2. Cable conduit fittings, which are not used, must be locked with a closing element.
3. Compare mains voltage and frequency with the on the type plate.
4. Switch mains voltage and PLC on.
5. Test the function of the unit, the PLC and the measurement functions. Ensure that the point level switch cannot be driven more than 3300mm downwards (to avoid damage of the unit).
6. The unit is now ready for work. Measurements can be started.

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 G3).

