

MBA700

Vibrating rod level sensor

Operating instructions



MBA

Operating instructions

For the purpose of safeguarding and guaranteeing the function of this device it is essential to read through these operating instructions carefully prior to assembly and commissioning!

Application

The MBA 700 serves to monitor the limit level of all types of container and silo, which are filled with powder-type or granulated bulk goods. Typical materials are plastic granulate, all types of pellets, flour, cement, clay powder and many more besides. The device is intended for use with fixed installations in industrial plants (large tools).

General instructions:

- The installation, commissioning and maintenance must be carried out by qualified specialist personnel and with consideration to the local regulations.
- The devices must be utilised exclusively in accordance with the intended uses described in these operating instructions.
- In addition to the operating instructions it is necessary to observe all local laws, technical regulations and internal company operational instructions.
- The MBA 700 is a measuring device. As with all measuring devices, the MBA 700 must be handled with care. Mechanical damage can affect the measuring results or lead to a failure of the device.
- Do not remove, add or modify parts of the device. Otherwise any guarantee provided by the manufacturer and the approval for use in areas at risk of explosion shall be voided.
- Observe the specifications regarding voltage and temperature on the type plate.

Electrical connection

- Only use connection cables that are suitable for the cable entries. The devices may only be operated with a fixed installation of the cable for the power supply and output signal.
- During operation the device head and cable entry must be closed.
- Prior to opening the housing and the electrical connection ensure that all lines are de-energised.
- In order to guarantee the devices in accordance with protection class 1 it is essential - with supply voltages $\geq 50V$ - that a protective earth conductor be connected to the housing.

Versions

- Standard configuration: Installation depth approx. 190 mm
- Welded pipe extension: Installation depths to 2.0 m
- Screwed pipe extension: Installation depths to 4.0 m
- Extension with suspension cable: Installation depths to 20.0 m

Installation

The following must always be observed when installing the MBA 700:

- The switching point is dependent on the density of the bulk goods: With heavy bulk goods such as sand it is sufficient for only the tip of the vibrating rod to be covered, in order to damp the vibrations. In contrast, with very light materials the entire vibrating rod must be covered in order that the output actuates.
- The MBA 700 must be installed such that the sensor does not protrude into the filling flow.
- In order to keep the ambient temperature of the electronics within the permissible range of a max. 70°C, the housing should be protected against direct solar radiation. If necessary erect a shade.
- If the temperature outside the container close to the container wall exceeds 70°C as a result of the high temperature of the filling material then the container wall must be insulated against the housing. Alternatively, the electronic equipment can be installed in

a separate housing or a temperature adapter may be used (special models can be supplied).

- In the event of strong container vibrations, caused for example by a vibrator, the electronic equipment should be installed in a separate housing (special models can be supplied).

Lateral installation

- The MBA 700 is suitable for lateral installation. In the case of devices with sensor extensions it may be necessary to support the extension pipe.
- With lateral installations it is recommended that the sensor be installed at an approx. 20° downward angle in order that the filling material can flow downward with ease and no deposits accumulate on the sensor.
- The sensor must be installed such that it is not reached by the filling flow of the medium and cannot be damaged in this way. However, if the installation site is reached by the flow, the sensor must be protected against damage by a suitable guard plate. This type of guard plate must always be installed if the device is to be used in the bottom section of a container as a minimum level alarm.
- The installation takes place by screwing the connection piece into the intended sleeve with the aid of a 50 mm open-ended wrench.
- The screwed connection must be sealed with conventional sealant, e.g. Teflon tape.
- With a lateral installation it is necessary to ensure that the surfaces of the vibrating rod are vertical so that the filling material can flow downward with ease and is not deposited on the vibrating rod, triggering an erroneous alarm. The vertical positioning of the vibrating rod is displayed by the two markings in the hexagon of the connection piece. These indicate – top and bottom – when the surfaces are vertical (see figure: Installation examples).

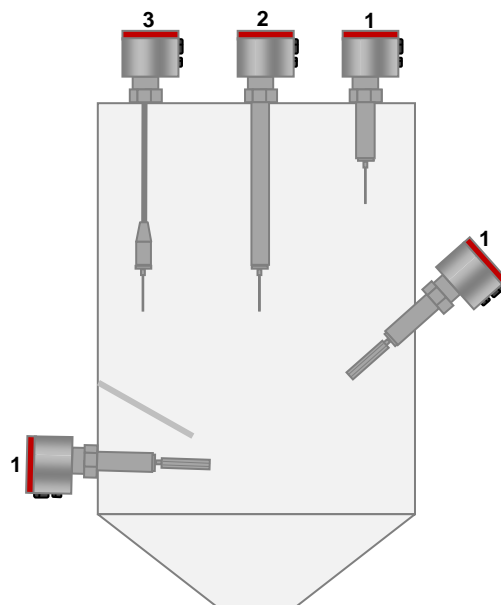
ATTENTION: Do not turn by the housing!

Vertical installation

A vertical installation is possible with all versions of the MBA 700 and takes place as described with the lateral installation. The version with cable extension can only be installed vertically.

Installation examples:

1. Short immersion depth
2. Pipe extension
3. Cable extension



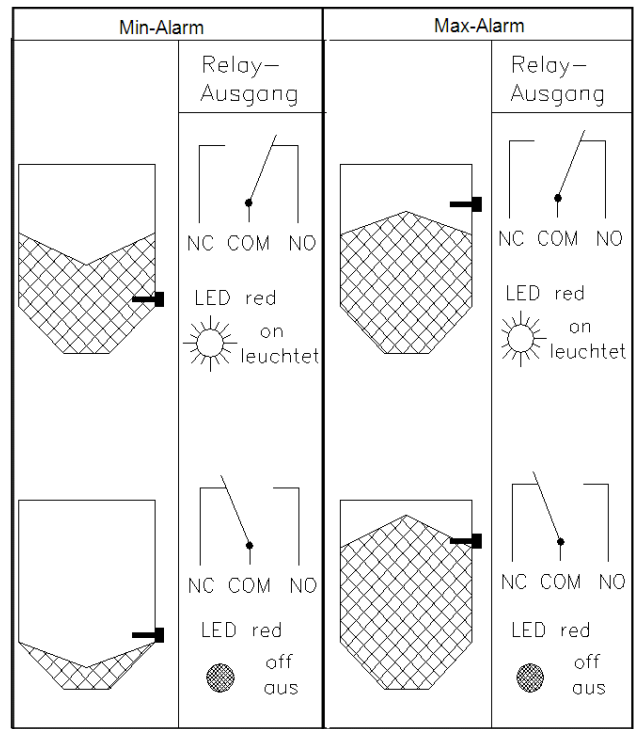
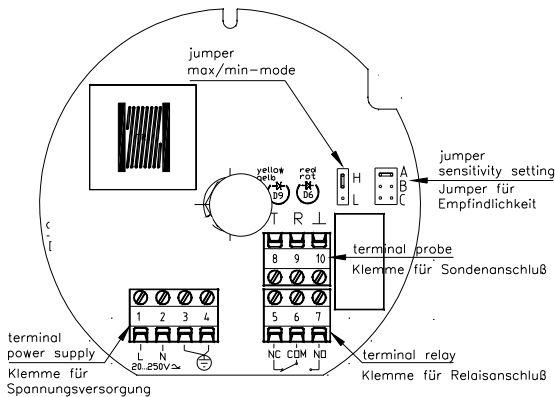
Electrical connection

Multi-voltage electronics with relay output

Terminal for power supply:	1 = L	Terminal for relay:	5 = NC
	2 = N		6 = COM
	3 = Protective earth conductor		7 = NO
	4 = Protective earth conductor		

The max. possible cable cross-section for the supply voltage and relay is 1.5 mm². The connection between the sensor and electronics is established with the three silicone-insulated braids of the sensor as follows:

Terminal for sensor: 8 = T (red), 9 = R (yellow), 10 = ⊥ (black)



Settings

Safety switching MAX / MIN (H / L):

Maximum alarm: Jumper in position FH:

The output goes into alarm status (relay dropped out, position NC, red LED off, green LED on) as soon as the filling material covers the vibrating rod.

Minimum alarm: Jumper in position FL:

The output goes into alarm status (relay dropped out, position NC, red LED off, green LED on) as soon as the filling material is no longer covering the vibrating rod.

With a failure of the supply voltage to the device the relay will also drop out and the LED is off with both versions in this case.

Sensitivity settings:

Setting with jumper:

Position A: For light bulk goods with material densities of up to 20 g/l, maximum sensitivity setting.

Position B: Standard setting, suitable for almost all materials.

Position C: For medium-heavy to heavy materials, which tend to form a build-up easily. With the sensitivity of the devices low in position C it is not possible for very light media to be detected in this position!

Functional description

The vibrating rod of the MBA 700 is stimulated by the electronics to vibrate at its resonance frequency of approx. 290 Hz. If the vibrating rod is covered by bulk goods then the vibration is damped. The electronic equipment registers this damping and activates a binary output signal. If the vibrating rod is once again released by a drop in the fill level then it starts to vibrate once more and the output signal is deactivated.

Technical data

- Housing:** Aluminium die cast, protection class IP65
One (optionally 2) cable entry M20x1.5 for cable diameters of 6 to 12 mm
- Sensor:** Stainless steel 1.4301 / AISI 304
Resonance frequency 290 Hz
- Process connection:** Thread 1 1/2" DIN2999 (BSPT) or 1 1/2" NPT
- Time delay:** 1 second after vibrations stop
2 to 5 seconds from the start of vibrations
- Display:** LED on electronic insert (optionally visible externally)
- Density of bulk goods:** min. 20 g/litre
in special configuration up to min. 10g/l
- Tensile strength of cable:** max. 200 kg (with cable extension)
- Pressure in container:** max. 10 bar
- Safety:** Protection class I, overvoltage category III, degree of contamination 2, max. height 2000m

Electronics

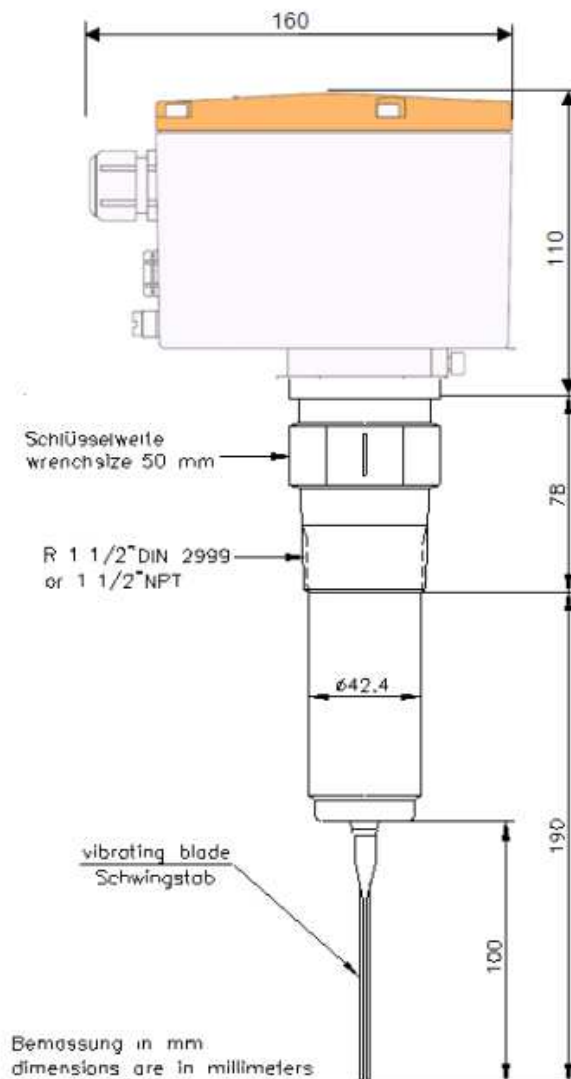
Multi-voltage electronics with relay output

- Supply voltage:** 20 ...250V AC/DC
- Relay output:** One (optionally 2) potential-free changeover
max. AC: 250V, 8A, 2000VA, cos φ = 1
max. DC: 8A at 24V, 1.5A at 48V
min. DC: 24V / 100mA
- Power consumption:** ≤3VA

Permissible temperatures:

	Standard sensor
Process temp.	-40...+80°C
Ambient temp. housing	-40...+70°C

MBA700 – dimensional drawing



Document Information

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Product described

Product name: MBA 700

Hardware: All versions

Manufacturer

MBA Instruments GmbH

Friedrich-List-Str. 5 · 25451 Quickborn · Germany

Information guarantee

Quoted product characteristics and technical data do not constitute guaranteed declarations.

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Subject to change