EN

Operating Instructions MBA808

Bulk Material Paddle and Level Indicator

MBA

Document Identification
Operating Instructions MBA808

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described product:	Bulk cone smoother and full indicator.
Product name:	MBA808
Hardware:	all versions

Manufacturer

MBA Instruments GmbH
Friedrich-List-Str. 3-7 · 25451 Quickborn · Germany

Warranty information

Specified product properties and technical data do not represent a warranty statement.

Contents

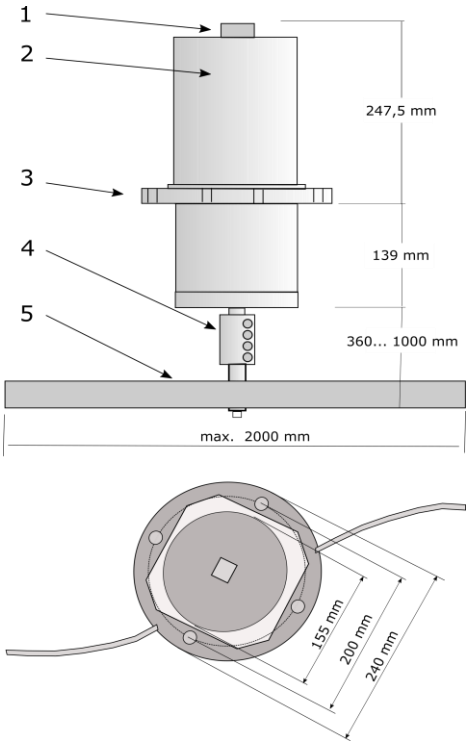
1. Operating principle

At the lower end of the shaft is a slightly curved paddle. Through the rotation of the shaft, the paddle pushes the bulk material to the outside during the filling process, thus distributing the bulk cone into the slope. As soon as the slope is filled, further filling buries the paddle until the torque of the shaft is no longer sufficient, the shaft stops and a signal switches. This means that the MBA808 has two functions:

- Smoothing of the bulk cone to optimise the usable filling volume.
- Emit a signal when the container is full.

Torque and response behaviour can be adjusted to the individual application.

1.1 External equipment components



1. Cable gland
2. Cover
3. Flange
4. Shaft fastening
5. Paddle

1.2 Intended application

MBA808 devices are robust electromechanical components for bulk material containers. They are designed to optimise the filling of a bulk material container and, as a full detector, to monitor the filling level. The application possibilities depend on the individual device model. The device versions type MBA808 are, in principle, suitable for industrial bulk materials of organic and mineral substances.

Chemically aggressive gases and liquids must not have an effect on the device. If there are doubts whether the device is suitable for the individual application: **Contact the manufacturer.**

1.2.1 Individual adjustment

The following device components are usually adjusted to the desired application at the manufacturer's works:

- Size, shape and material of the paddle
- Mounting flange
- Seal of the paddle shaft in the flange. The properties of the individual version determine the application possibilities, e.g. suitability for a certain type of bulk materials.
- Comply with the individual specifications of the supplied device.

1.2.2 Responsibility of the user

- ► *Use the device only in the manner as described in these Operating Instructions. If the device is used in another manner, the warranty and any liability claims are forfeited.*
- ► *In addition to these Operating Instructions comply with all local laws, technical rules and in-company operating instructions which apply at the operation site of the device.*
- ► *Do not remove, add or change any components on or in the device, unless this is described and specified in official information from the manufacturer.*

2. Installation

2.1 Select the installation site

Comply with the specified environmental conditions.

Place the MBA808 so that,

- the shaft hangs vertical
- the paddle can distribute the bulk material in the container when it turns;
- heavy, coarse bulk material does not hit the shaft head-on when it is filled.
- It may be necessary or advantageous to dismantle the paddle prior to assembly.

CAUTION: Open contacts inside the device.

The electrical contacts inside the device are not protected against random touch.

Switch off supply voltage and connected signal voltages externally.

- ► *Have the device installed and put into operation by experts who can carry out these tasks competently and are familiar with possible dangers. The device has neither mains switch nor mains fuse.*
- ► *Install a circuit breaker in the feed line of the supply voltage, which can be used to switch off the supply voltage.*
- ► *Install an external fuse for the supply voltage (power consumption).*

2.2 Install flange

► *Install the flange on the bulk material container.*

► *For protection class IP 65 (EN 60529): Install a suitable seal (water/dust) between flange and container.*

2.3 Attach paddle

Only necessary when paddle and shaft were delivered separately.

► *Assemble shaft and shaft end with the shaft connector (2+2 clamp screws).*

2.4 Electrical connection

2.4.1 Connection cable

► *Use a connection cable with this conductor cross-section:*

Stranded wire: max. 1.5 mm²

► *Use connection cables which are specified for an ambient temperature of at least 60 °C.*

► *Protect connection cable against heat exposure. Prevent contact with hot components (e.g. container wall). Pay attention to heat emission and heat accumulation.*

2.4.2 Connecting supply voltage

► *Connect the supply voltage to the clamps "+24 V DC" and "GND".*

Excess temperature fuse:

When the temperature in the housing exceeds 98 °C, the supply voltage is interrupted internally. The excess temperature fuse is then destroyed. The electronic card must be replaced for repair.

2.4.3 Connecting output signals

Function of the output signals

Output	Function	Output signal
OutA	Filling state status	when activated: Supply voltage or InA
OutB	Operating status	Supply voltage or InB

Reference potential of the output signals

The reference potential (–) of "OutA"/"OutB" depends on which signal voltage is selected:

– When "internal" is selected:
Reference potential = GRN.

– *When "external" is selected:* The outputs are potential-free; the signal voltage stems from "InA", resp. "InB" without galvanic connection to GND.

2.4.4 Connecting external signal voltage

Only necessary when external signal voltages are to be used for OutA/OutB.

Input	Function
InA	Signal voltage (+) for OutA
InB	Signal voltage (+) far OutB

Reference potential (–) for the signal connections in X1-GND.

► *When InA/In B are to be used: Check/Select the suitable setting.*

2.4.5 Connecting external LEDs (as required)

The MBA808 has three outputs for status LEDs. The LEDs on the electronic card function identically.

LED outputs

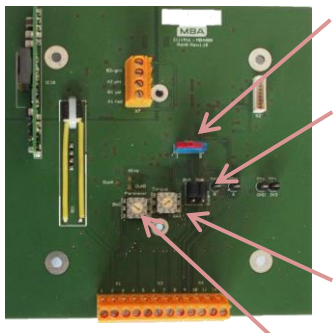
– Reference potential (–) for the LED connections in X4-GND.

LED Functions

LED	State	Meaning
Alive	off	No supply voltage
	on	Paddle rotates (Motor on)
	blinks slowly	Paddle is blocked (Motor off)
	blinks fast	Paddle is being tested (Motor on)
OutA	activated	Filling level signal[1]
OutB	activated	Ready for operation

[1] selectively "shaft blocked" or "shaft free".

2.5 Setting/Adjustment



SW1 inverting from switching signal

Jumper for external feed of switching signals:
SW4 for outA
SW5 for outB

SW3 DIP 0...9
Parameter setting for torque

SW2 DIP 0...9
Parameter setting for direction of rotation and rotation speed

2.5.1 Terminal assignment

1	GRND	Operating voltage	24V DC 1A
2	24V DC		
3	GRND		
4	24V DC		
5	GRND	Output of switching signal (A), Operating status (B), Status change (Alive) for LEDs	3V 25mA
6	Alive		
7	outB		
8	outA		
9	outB	Output for switching signal (A) and operation (B).	max. 30V DC
10	outA		
11	inB	Supply of external voltage for switching signal (inA) and the operating signal (inB)	max. 30V DC
12	inA		

2.5.2 Selecting operating mode

SW2	Speed U/min	Turning direction
0	1	right
1	3	right
2	6	right
3	10	right
4	15	right
5	1	left
6	3	left
7	6	left
8	10	left
9	15	left

State and properties of the current bulk material can change the operating behaviour.

2.5.3 Adjusting Failsafe Mode

– The behaviour of the output signal OutA can be changed by the switch position SW1 on I or II.

SW1	Fail-safe Mode
I	Signal arrives when the paddle blocks
II	Signal arrives when the paddle rotates

2.5.4 Adjusting the sensitivity of the level indication

SW3	Switching torque
0	8 Nm
1	11 Nm
2	13 Nm
3	15 Nm
4	16 Nm
5	17 Nm
6	18 Nm
7	19 Nm
8	20 Nm
9	21 Nm

► *Select a small switching torque for light, smooth bulk materials. Select a larger switching torque for heavy, rough bulk materials.*

► *If an empirical value is missing: Determine the suitable setting during the first commissioning.*

2.5.5 Selecting signal voltage

SW4	Output of OutA (when activated)
Internal	Supply voltage
External	Signal voltage of InA

SW5	Output of OutB (when activated)
Internal	Supply voltage
External	Signal voltage of InB

When “external” is selected, the outputs “OutA”/”OutB” are potential-free.

2.6 Closing the housing

► *Before closing the device cover, make sure that there are no foreign bodies in the device head (e.g. cable residues).*

► *Make a visual check of the seal of the device cover. If necessary, clean, resp. replace.*

► *Put on device cover and screw down.*

► *Close the cable entry so that it is dust-tight and water-tight.*

3. Commissioning

3.1 Switching on

Keep the housing closed during operation. Otherwise the specified protection class is not guaranteed.

3.2 Function test during first commissioning

3.2.1 Testing functionality

After the first commissioning, check the reporting function:

– Let paddles rotate freely → Check status of “OutA“”.

– Stop paddle by hand → Check status of

– “OutA”.

The status of “OutA” depends on whether “Full indicator” or “Empty indicator” is set.

3.2.2 Check release through bulk material

1 Fill the bulk material container carefully and observe
- whether the bulk material is initially distributed by the paddle;
- whether the rotation stops when the bulk material finally covers the paddle fully.

2 Empty the bulk material container until the paddle is uncovered again.
- Check whether the paddle turns again after a few seconds.

When the function is not correct:
- Vary the sensitivity.
- *If that does not help:* Change the paddle (size, shape). Then repeat the test and re-adjust the switching sensitivity.

When the bulk material was changed:
- Conduct this test/adjustment again.

4. Maintenance

4.1 Recommended maintenance work

► *Clean moved external parts*: *Roughly clean deposits on paddle and paddle shaft with a scraper and/or brush. Do not use force. Note: Do not damage the seal of the paddle shaft in the flange. Do not permit any bristles to get between paddle shaft and seal.*

► *Inspect wear (recommended in particular for abrasive bulk materials). Inspect all components which reach into the bulk material container. Carefully check connection parts (screws, etc.) Replace damaged and doubtful components.*

4.2 Preventive function test

When the reporting function is triggered only rarely:
- *Inform the connected stations that a test will be carried out.*
- *Stop paddle by hand, resp. allow paddle to rotate freely and check the triggering of the reporting function.*

4.3 Safety instructions for opening

WARNING: Health hazard

► *Before opening the housing head: Switch off the power supply and connected signal voltages at an external point. (Note: The level indicator is then inoperative.)*

► *Open the housing only when it is assured that no danger can be incurred by this. Coarse contamination of the internal area can affect the function.*

► *Protect the internal area of the device head against contamination.*

5. Technical data

IMPORTANT: Information on the type plate prevails. Check the individual type plate.

5.1.1 Electrical data

Supply voltage:	24 V DC ± 10 %
Power consumption:	7A

5.1.2 Environmental conditions

Environmental temperature outside the container:	–15 … +60 °C
Permissible temperature in the container:	–30 … +80 °C
Pressure in the container:	–50 … +300 kPa

5.2 Materials used

5.2.1 Materials in contact with the filling material

Flange, shaft, paddle:	Stainless steel
Seals:	NBR

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