



MBA 200

Rotating paddle indicator for bulk materials

ELECTRONIC
EQUIPMENT

ACOUSTIC

WEIGHING

ANTI-TILTING

VALVES

TEMPERATUREDETECT
A FIRE®FLOW/
RATE

DENSITY

INTERFACE

PRESSURE

LEVEL



Measuring the level of bulk better in many ways

For more than 65 years, Maihak's rotating paddle level indicators have proven to be rugged, safe and reliable. Now, Maihak has developed a new rotating paddle indicator: the MaihakMBA 200. The valued rugged construction has been improved with many attractive and functional advantages.

With the choice of MaihakMBA 200, time and costs can be optimised. The standardised components can be selected to offer differentiated solutions for the individual applications. The variations are clearly and distinctly structured in order to prevent mistakes when selecting the proper model. Also, important are the many precise details which make the MaihakMBA 200 a reliable and durable level indicator.

The MaihakMBA 200 switches as a full, demand or empty indicator of bulk products in large storage silos as well as in small containers. In drop tubes and conveyor systems, the indicator provides a quick signal to indicate a blockage in product flow. Even under difficult installation conditions, it functions reliably.

Overview

A synchronous motor slowly rotates the paddle wheel. When the bulk material reaches the paddle, the rotating motion is blocked. The counter torque is used to turn the motor mechanism against

a switch which in turn shuts off the motor. This condition is electronically transmitted via a relay switch contact. As soon as the bulk material frees the rotating paddle, the motor mechanism is returned to its operational position by means of a spring. The switch is released and the paddle begins to rotate again.

Typical Applications

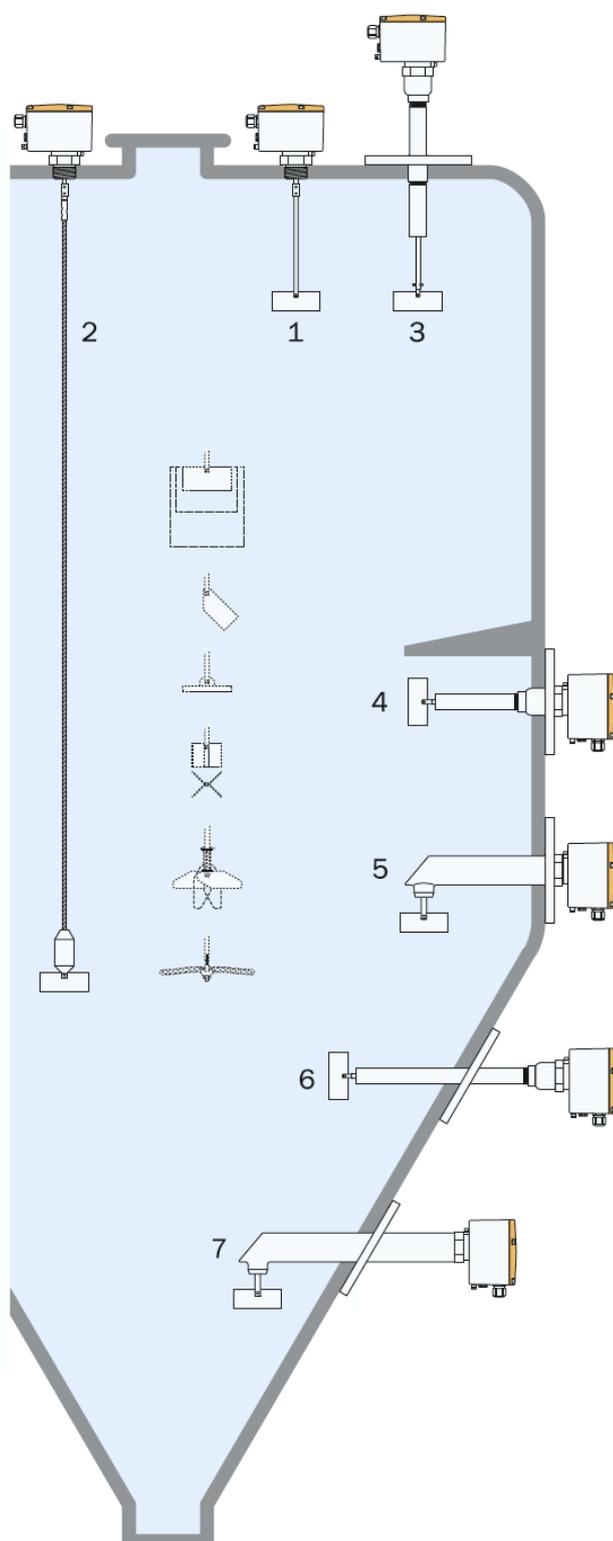
- As full, demand or empty indicator in silos or storage containers
- As a blockage indicator in drop tubes
- As a full indicator during filling operations

Bulk materials

Granulate, concrete, detergents, wood chips, fly ash, polyester, casting sand, salt, wood dust, gypsum, sludge, powder, lime, talcum, pellets, charcoal, feedstock, instant foods, PVC, soap powder, coal, sediment, barley, clinker, coal dust, marble dust, spices, quartz dust, coffee, quartz sand, cocoa, sinter chips, corn, stones, malt, dry mortar, flour, cement, milk powder, rape, rice, rye, soy, beans, soybeans, starch, wheat, sugar etc...

TF
05

Possible installations



For vertical installation

1. rigid shaft
2. flexible shaft
3. shaft in a protective tube

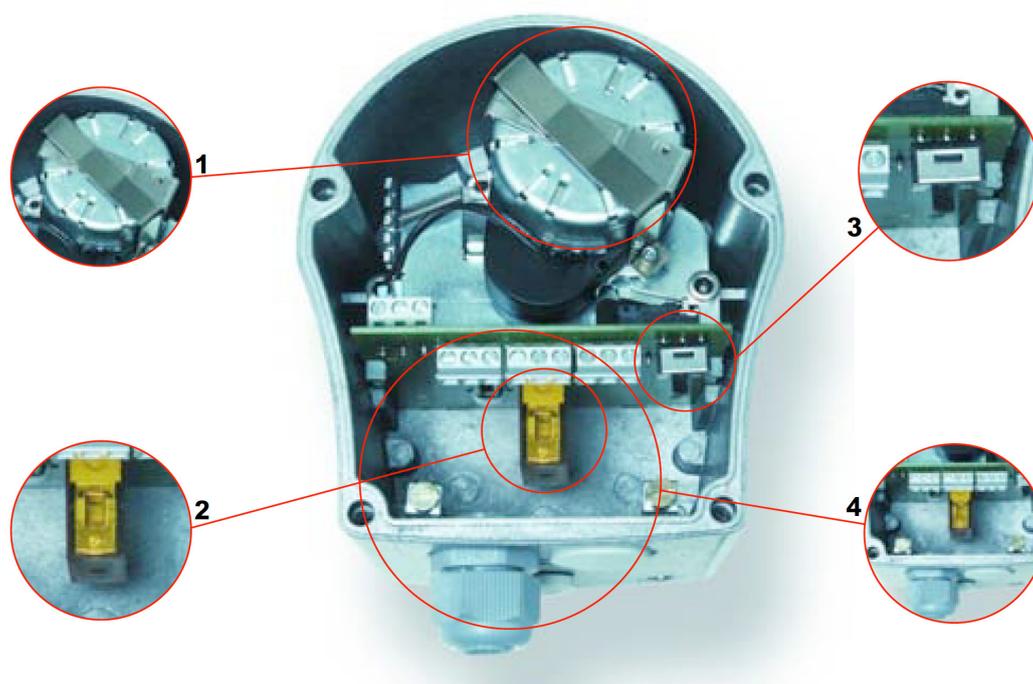
For lateral installation

4. shaft in a protective tube with bearing
5. shaft in an angled arm

For lateral installation with an angled flange

6. shaft in a protective tube with bearing
7. shaft in an angled arm

What makes the MaihakMBA 200 nine times better?



1- It's all in the motor

A rugged AC motor is built into every MaihakMBA 200 – high performance and steadfast. For versions designed for DC power supply, a built-in inverter is included to correct the supply to the motor. And, if the paddle is stopped, the motor is automatically switched off – there's no energy consumption and no load when the unit is at standstill.

2- Gold contacts – high quality for low signals

Important parameters for switch contacts are highest voltage and highest current. But even low signals need to be safely switched as well. Therefore, each MaihakMBA 200 signal relay is built with goldplated switch contacts. This means that the MaihakMBA 200 can be used reliably with digital control instruments, e.g. with PLCs.

3 - Safety-orientated switching – faults are safely detected

Each MaihakMBA 200 can be easily set to work as an empty or full indicator. Depending on the set-up, the unit will read "full" or "empty" in the event of a power failure. An example: For operation as a full indicator, the MaihakMBA 200 will immediately signal "full" if the power cable is cut or power supply fails: This safety function prohibits overfilling of the silo.

4 - More room for the connection cable: quicker and safer cable installation

There's more space inside of the enclosure and a clear arrangement of the connecting terminals – that makes for easy and safe electrical connection, even for especially difficult installation locations.

5- Plug-in Instrument head: easy replacement

The instrument head can be separated from the process connection for repair or replacement. The mounting connection on the silo is thereby not effected; the silo remains closed. The instrument head is just as easy to remount again.

6 - Delayed switching: Safety switching, the relays don't flutter

In the MaihakMBA 220 and 230 a switch on/off delay can be set. This prevents giving out a faulty signal when the product is dropping or swirling around the paddle. The switch signal will only be given when the vessel is really "full" or "empty", always correct.

7 - Action monitoring: greater safety through self-monitoring

As a safety option, the models MaihakMBA 220 and 230 can be equipped with a monitoring logic for the shaft rotation: When the shaft stops due to a malfunction of the indicator not due to the product, a fault signal is given. The opposite condition is also indicated as a fault. In this way the MaihakMBA 200 is continuously monitoring it's internal function.

8 - Stainless bearings – reliable function after a long standstill

As long as the product covers the paddle, the MaihakMBA 200 remains shut off. This condition can exist for a long time – e.g. with demand or empty indicators. Even after month-long standstills, the shaft must immediately rotate as soon as the paddle has been freed. Therefore, each MaihakMBA 200 is equipped with high quality, corrosion-resistant, stainless steel ball bearings. What's more: the instrument versions made for high temperature include a hybrid bearing with ceramic balls or a special PTFE sealing.

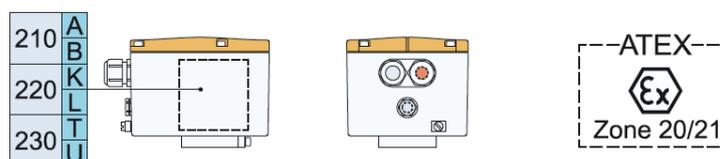
9 - A new generation made easy

If one of the older style MBA bin level indicators needs to be replaced, this can be easily done with the new MaihakMBA 200. Power supply, process connection, process temperature and pressure – everything can be configured to fit the existing installation.

Selection aid

Electronic selection

Instrument model	MaihakMBA 210	MaihakMBA 220	MaihakMBA 230
Control	electromechanical	micro-controller	micro-controller
Power supply	230 V 50/60 Hz	24 V AC/DC	42, 115, 230 V AC
Safety-orientated switching	yes	yes	yes
On/off switching delay	no	yes	yes
Action monitoring	no	optional	optional



Selection of the connecting parts - Extension shaft

Type	Installation ¹⁾	Application ¹⁾	Material	Max. immersion depth	Max temperature	
Control	vertical from the top	full indicator	stainless steel	1000 mm	800 °C ²⁾	A
Power supply	vertical from the top	full, demand or empty indicator	stainless steel	15000 mm	350 °C ²⁾	D, E
Safety-orientated switching	vertical from the top	full, demand or empty indicator	stainless steel or steel	4000 mm	800 °C ²⁾	B, C
On/off switching delay	horizontal, lateral (also with angled flange)	full, demand or empty indicator	stainless steel or steel	1000 mm	350 °C ³⁾	H, I
Action monitoring	horizontal, lateral (also with angled flange)	full, demand or empty indicator	stainless steel or steel	600 mm	350 °C ³⁾	K, L

¹⁾ Recommended installation and application. In individual cases, special versions may be possible.

²⁾ Maximum temperature with stst connecting parts and DTR bearings

³⁾ Maximum temperature with stst connecting parts and hybrid ball bearings, DHY

Tips for selection of the connecting parts



Rigid shafts

Rigid shafts are suitable for use in applications where the shaft is not subject to any great lateral stress. Short shafts can (as opposed to the table above) also be used for lateral, horizontal or angled installations as long as the bulk products doesn't bend the shaft.

Immersion depth 100 / 150 / 200 ... 1000 mm
Stainless steel

A



Shafts in protective tube with bearing

Shafts protective tubes with a bearing are used for horizontal or angled lateral installations. The bearing centers and supports the shaft inside of the protective tube and seals the tube against dust ingress.

Immersion depth 160 / 200 / 250 / 300 ... 650 mm
Steel
Stainless steel

H
I



Flexible shafts

The flexible shaft consists of an 8 or 12 mm rugged steel cord. The advantage of a flexible shaft: There is no continuous bending via lateral stress through movement in the bulk product or when the bulk material hits the steel cord and the paddle wheel. If the silo is empty, the steel cord is tightened with a tightening weight.

Immersion depth 300 / 400 / 500 ... 15000 mm
Ø 8 mm stainless steel with pressed thimble
(recommended up to 3000 mm)
Ø 12 mm stainless steel with rolled-in thimble
(recommended from 3000 mm)

D
E



Shaft

The shaft in an angled arm are protected with a very rugged steel tube. The paddle is mounted at a 90° angle down and therefore is best designed for horizontal or lateral installations. The angled arm can also be installed in flowing product e.g. as a tailback (jam) indicator.

Immersion depth 85 / 250 / 300 / 350 ... 650 mm
Steel
Stainless steel

K
L



Shafts in protective tube

Shafts mounted in protective tubes (without a bearing) are used for vertical installations from the top. The protective tube offers additional protection from lateral forces or impacts from bulk material. Also, pulling forces which occur through friction of the product when the silo is emptied are diverted by the protective tube.

Immersion depth 300 / 400 / 500 ... 4000 mm
Steel
Stainless steel

B
C

Paddle selection and Technical data

Paddle selection

Version	Application		Material
Rectangular 98 x 40 mm	rugged, standard paddle used for most applications		A
Rectangular 98 x 98 mm 200 x 100 mm	paddle with a larger surface, reacts more sensitively. This is used for fine, low density powders or light bulk products		B, C
One-sided paddle	allows the shaft together with the paddle to be inserted into a 1 1/2" process connection.		D
Folded paddle	allows the shaft together with the paddle to be inserted into a 1 1/2" process connection. The folded paddle has a larger surface area than the one sided paddle and is therefore more sensitive.		K
Toggle paddle	for heavy bulk materials e.g. stones		N
Cord paddle	for coarse wood chips, also as an empty indicator		T
Rubber paddle	for special applications (not shown)		G
Cross paddle	for quick reaction times in fine powders (not shown)		R
Special paddle	other paddle types are available on request		

Options

Action monitoring	electronic monitoring of the bin level indicator. Signals a fault when a mechanical break occurs between the motor and the paddle shaft. The fault signal is safety switched.	L
Electrical internal heating	permits operation even at outdoor temperatures as low as -30°C	H
Display lamp	the lamp is integrated in the enclosure for the display of "full" or "empty"	A
Variable height adjustment	permits the change of limit level at which a full signal is given. This can be adjusted/altered.	V
Membrane	for climatic exchange between the ambient and enclosure. This prevents condensation inside of the enclosure. Also as a safety balance for pressurized instruments.	M
Quickly rotating motor	higher motor speed (5 RPM) shortens the reaction time of the bin level indicator e.g. during rapid filling	B,L,U

Technical Data

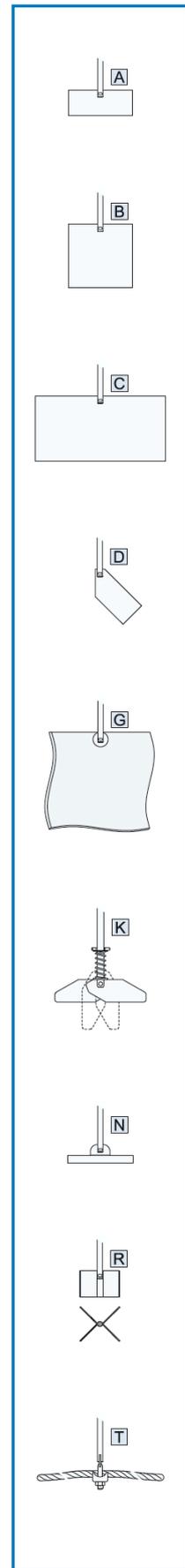
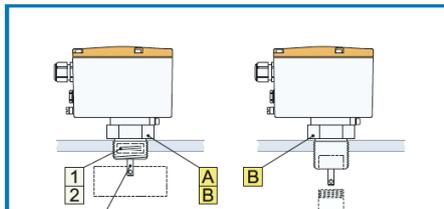
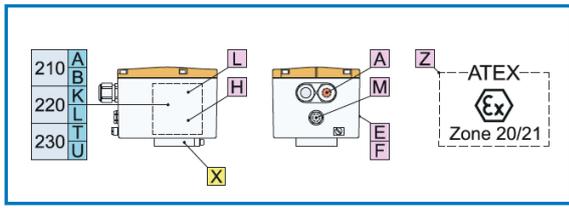
Instrument model	MaihakMBA 210	MaihakMBA 220	MaihakMBA 230
Power supply	230 V, 50 / 60 Hz	24 V AC / DC	42, 115, 230 V, 50/60 Hz
Power consumption	3 VA	3 VA	3 VA
Micro-controller	no.	yes	yes
Safety-orientated switching	yes	yes	yes
On/Off switching delay	no	yes	yes
Action monitoring	no	option	option
Switch contacts	one isolated change over contact		
Enclosure protection	IP 65		
Material	cast aluminium (optional anodized or painted)		
Ambient temperature	-15 ... +60 °C (with heating -30 ... +60 °C)		
Ex dust certification: Zone 20 in the vessel Zone 21 outside of the vessel	TÜV 03 ATEX 2275 X, Guidelines 94/9/EG II 1/2 D IP65 T98 °C or II 1/2 D IP65 T200 °C / T98 °C or II 1/2 D IP65 T350 °C / T98 °C		

Process conditions

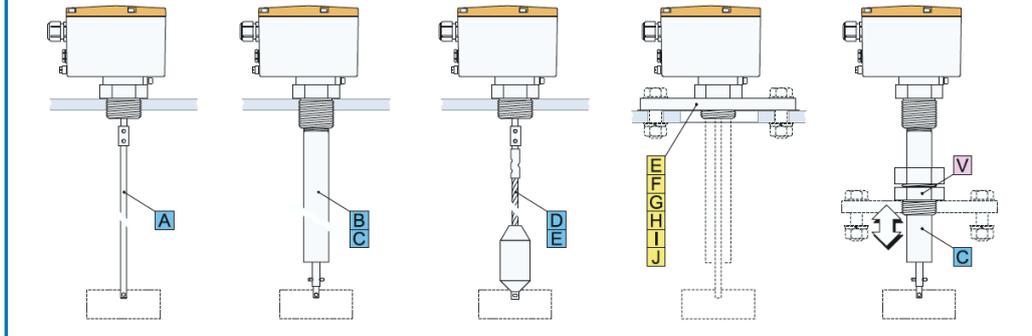
Process temperature (*)	up to max. 80 °C (standard) up to max. 800 °C (not with Ex dust version)	1, 2, 3, 5, 8
Process pressure (*)	up to 3 bar (standard) up to max. 10 bar (not with Ex dust version)	N, H
Process connection Steel or stainless steel	G 1 1/2" thread Flange DN100 PN6 / DN100 PN16 / DN125 PN6 / DN125 PN16	A, B, E, F, G, H, I, J, K, L, M, N, P
Bearings / Seals	Stainless steel bearings, rust-free steel, gas and dust tight. DTR-bearing for additional protection against abrasive products.	1, 2, 3

(*) Instrument for higher temperatures and pressures are limited in their variations

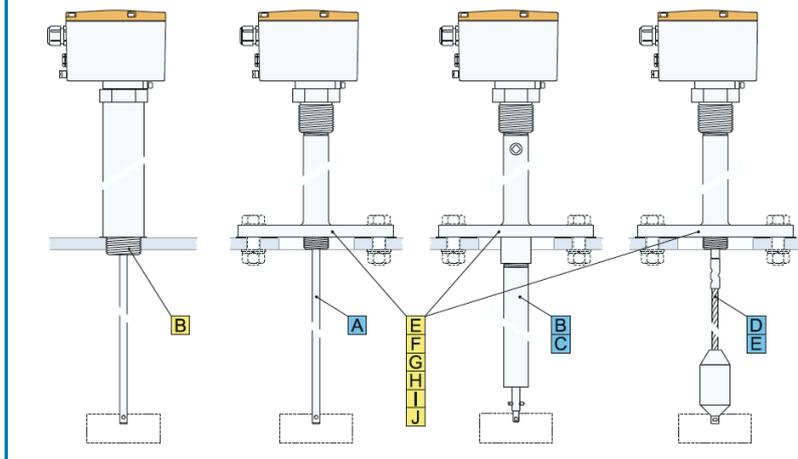
Versions and Product Selection



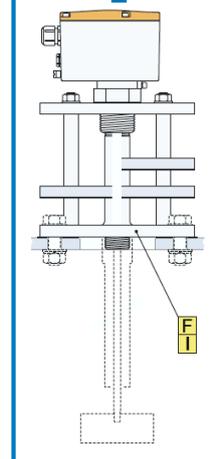
1 80 °C



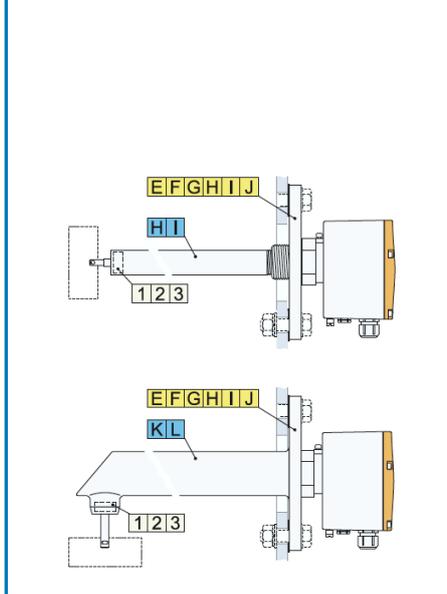
2 200 °C



5 500 °C 8 800 °C



1 80 °C



2 200 °C 3 350 °C

