Magnetic Level Meter

based on the Float Principle

MBSK

Installation and Operating Instructions

Contents

Introduction

These Installation and Operating Instructions serve as a tool for the correct installation, operation and maintenance of the device. Read the manual carefully before the device is installed and put into use. It does not include special versions or applications.

All devices are thoroughly checked for order compliance and operability before delivery. Upon receipt, please conduct a visual inspection of possible damage that may be identified as having occurred during shipment. If you discover any defect, please contact our head office in Cologne or the local sales office responsible for your area (see the telephone directory at the end of this manual or on our Web site). Apart from a description of the error, we will need the equipment type and serial number of the delivery.

Heinrichs Messtechnik shall not furnish guarantee for any repair work done without prior notice. Unless otherwise agreed on, the rejected parts must be made available to us in case a claim is made.

1 Identification

1.1 Supplier/manufacturer

Heinrichs Messtechnik GmbH
Robert-Perthel-Str. 9 · D-50739 Köln
Phone +49 (221) 49708 - 0
Fax +49 (221) 49708 - 92
Internet: http://www.heinrichs.eu
E-mail: mailto:info@heinrichs.eu

1.1 Product type

Level meter based on the float principle with magnetic measured-value transmission and local level indication.

1.2 Product name

MBSK********

1.3 Issue date

17.10.2019

1.4 Version number

19.01
File: MBSK_BA_19.01_en

2 Usage according to the intended purpose

Heinrichs Messtechnik magnetic level indicators are meters and must be treated accordingly. We assume that the customer/plant operator knows the statutory requirements, the rules for the prevention of accidents and the rules of engineering practice with respect to the installation conditions and the operation of level indicators. Special care must be taken during installation.

The level meter may be used only for indicating the liquid level of the accompanying tank. Additional controlling equipment such as magnetic switches or remote displays may be installed on the outside of the meter.

The manufacturer shall accept responsibility for the design according to the intended purpose based on customer information. The operator shall be responsible for proper installation and use.

If not otherwise agreed, the level indicator is designed for static operating conditions prevailing within the pressure/temperature ranges confirmed in the order. Dynamic use is admissible in accordance with AD-S1, Section 1.4 [Translator's Note: The AD Regulations contain the European safety requirements for the service conditions of pressure vessels.]
Operating modes in accordance with AD-S1 Section 1.5 are only admissible if the plant operator has been granted permission in writing by Heinrichs Messtechnik.

In the case of vibrations (e.g. caused by pumps or compressors) the plant operator has to provide for adequate absorption.
The plant operator shall ensure that no exothermic reactions or spontaneous formation of gaseous phases of the medium take place.

Consult the flow meter rating plate for specific flow meter approvals before installation in hazardous locations.

Before using the meter in hazardous locations, consult and follow the additional available Ex Supplement instruction.

3 Control of delivery

3.1 State of delivery

The device is partially assembled when delivered. It consists of the following elements:

1. Meter tube (float vessel)
2. Indicator device (mounted)

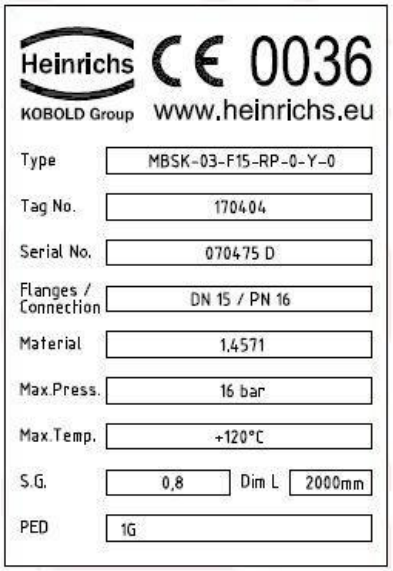
3. Float
4. Control magnet (separate)
5. Installation and Operating Instructions
6. Transmission rodding (only type MBSK.120)
7. Replacement seal for terminating flange (float-removing flange)

If a separate order was placed:

7. Contacting devices
8. Shut-off, drain and vent valves

The MBSK Level Meter Type M01, M02, M03, N03, N04, N06, N07, N10 are marked according to the following e xample

Level Meters-Type A03, A04, A07, A10 are marked with an Ex nameplate (see Ex Supplement instruction).



3.2 Checking the shipment for order compliance

Please check the shipment for order compliance **when unpacking** the device. If not otherwise agreed, the buyer shall bear the risk of transport. Any damage that occurs during transport shall be reported to the seller immediately after delivery by enclosing the respective documentation in accordance with statutory requirements.

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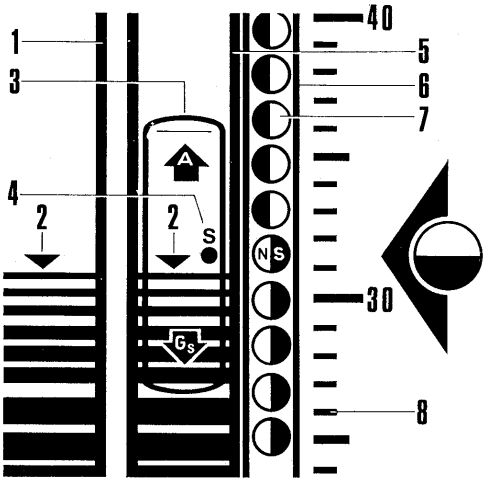
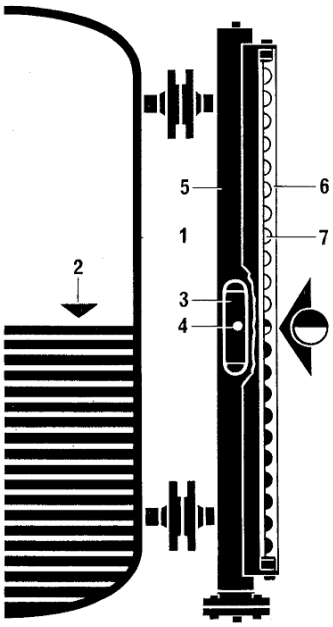
4 Operational mode and system design

A pressure-resistant or pressure-relieved float (3) is installed in the pressure-resistant meter tube (5); the tube is mounted on the tank (1) as a communicating vessel. Due to the buoyant force "A", the float follows the liquid level (2) in the tank or the housing tube. The height of the float serves as the measure for the liquid level. This height will be transmitted safely to the red and white indicator balls with the encapsulated tracking magnet (7); these balls can be rotated horizontally in the indicator tube (6), via the magnetic tracking system (4) encapsulated in the float. The magnet poles in the float are designed so that the tracking magnets (7) will couple safely even if the float rotates or the liquid level changes rapidly.
The column of the indicator balls that has turned to "red" is the measure for the liquid level in the tank and can be read on a large scale (8) in centimeters and decimeters.



A = buoyant force
Gs = weight of the float



4.1 Technical characteristics

Simple, robust and maintenance-free design to ensure a high degree of operational safety.

Ball indicator Version:
Large scale made of plastics mounted on a stainless steel U profile with centimeter and decimeter scaling. For medium temperatures > 150°C and < 40°C, the scale will be made of stainless steel.

For medium temperatures up to 80°C the indicator tube is made of Perspex. For higher temperatures the indicator tube is made of Borosilicate glass..

Version with Magnetic roller indication:
Versions with or without indicator scale.

For operation temperatures -40°C …120° Roller material Polypropylene and display glass Persprex. For higher temperatures Roller Material Ceramic and display glass Borosilicate .

Due to the free-floating float, the measuring system is largely insensitive to dirt.
The viscosity oft he measured medium is limited to max. 200 mm²/s.

5 Mounting the device

In general, national conditions and provisions must be followed.
The device must be vertically mounted on the tank to avoid faulty measurements.

For cleaning purposes and in order to control the float, it is helpful to install appropriate shut-off valves between the tank and the level meter, which must be secured against unintentional closing.

There must be sufficient distance between the housing tube and the magnets, magnetic fields and ferrite parts such as steel tubes or brackets/supports in order to avoid mutual influences on the magnetic tracking system.

5.1 Installation, setup and operating personnel

Only trained specialists authorized by the system operator may carry out the installation, electrical installations, start-up, maintenance and operation. They must read and understand the operating manual and follow its instructions.

5.2 Checks to be carried out before installing the device

The center-to-center distances of the level meter connections are carried out at the manufacturer's site with a tolerance of ±1 mm up to 2000 mm (length) and additionally ±2 mm. The customer must check the **connection dimensions** of the tank **before installing** the device. Special care must be taken to ensure that the connecting flanges are rectangularly welded onto the tank. Stress on the meter tube must be avoided.

To install a separate delivered float pay attention to Chapter 5.3

The meter tube can now be mounted directly on the tank or on the shut-off valves. The flange bolts must be tightened crosswise using a torque wrench, applying the prescribed torque evenly. For maximum torques, see the table in Section 5.3.

5.2.1 Safety information for the installation

The level meter should be lifted smoothly in axial direction using a textile hoop. Please protect the indicator tube or other elements (e.g. switches or remote displays).

The plant operator must ensure that suitable sealing dimensions and materials are selected. The torque to be applied must correspond to the standard values for pipe works. The stress-free mounting of the meter must be ensured.

The connectors of the meter are designed to bear the weight of the device and the internal pressure in a static condition. If additional loads are to be expected, we recommend using suspensions or similar elements.

In general, we recommend the installation of shut-off valves. First, the dust seals must be removed from the openings of the valves and the level meter.

The customer must ensure by using the appropriate measures that rocking motions and/or vibrations (for an open-air installation the wind must be taken into account) will not be transferred to the device. If the customer feels that clamps/brackets/supports are necessary, the experts at Heinrichs Messtechnik should be contacted. Any measures carried out by the customer must not impair the functionality of the level meter. Magnetizable parts must not be used on or close to the meter!

5.3 Installing the float

Since the float material is thin-walled, it must be treated with appropriate care.

MBSK for lateral installation

In general, the float is introduced into the device from the bottom. Installation from above might be necessary in special cases. This must be specified in the order.

MBSK for the installation on the tank

Before installation, the float will be screwed to the transmission rodding of the magnetic tracking system and introduced into the housing tube from the bottom or from above (depending on the local situation).

Please observe the float marking: "**top**." The plant operator must ensure that the float data (marking) at least corresponds to the conditions of use.

The float must be clean (foreign bodies attracted by the magnetic system must be removed).

After checking the sealing (please replace if necessary), the terminating flange must be re-attached (please observe Table 1).

Table 1 Tightening torques

Type	Dimension	Torque in Nm
MBSK process connection	M 12	50 Nm
„	M 16	75 Nm
„	M 20	110 Nm
„	M 24	150 Nm
Plug	G ½, ½“ NPT	80 Nm
„	G 5/8	100 Nm
„	G ¾, ¾“ NPT	120 Nm

5.4 Pressure and leak test

In general, the information on the type plate is relevant for all tests and applications.

5.4.1 Strength test

A pressure test is carried out for each device at the factory. If another strength test (system pressure test) should be necessary at the customer's site, the float must be removed.

The test pressure must not exceed **1.5 times** the nominal pressure stated on the type plate.

5.5 Installation of contacting devices

Electrical contacting devices are mounted opposite the indicator unit; they are offset by 90° and fastened using the supplied bracket. Please note:

- Mount the correct contact for maximum or minimum alarm at the correct position.
- Initialize the contacting device.

For further information on mounting the switches, see the Installation and Operating Instructions for the selected switch type.

5.5.1 Safety information regarding the use of electrical equipment

6 Start-up

The float swims on the liquid flowing into the meter tube. The magnetic system turns the indicator balls so that their red half will be visible. After the liquid levels in the tank and the housing tube have been balanced, the red balls indicate the current liquid level.

If the level meter was equipped with shut-off valves according to our recommendation, proceed as follows:

- Close the drain and vent valves.
- **Slowly open** the **shut-off valve** at the **upper** connector of the meter (gas or steam).
- **Slowly open** the **shut-off valve** at the **lower** connector of the meter (liquid).

This order must be observed carefully to avoid damaging the float.

6.1 Maintenance, inspection, repair and cleaning

The parts used for maintenance must be the spare parts recommended by Heinrichs Messtechnik. Any repair work planned by the plant operator must be coordinated with Heinrichs Messtechnik in writing. Otherwise, Heinrichs Messtechnik provides no warranty and does not accept any responsibility.

In general, the device requires no maintenance. If concentrations of sludge and suspended matter are anticipated in the lower indicator standpipe, the plant operator must have the standpipe cleaned within fixed intervals in order to ensure proper function of the float.

The plant operator must ensure that the necessary inspection work is carried out within the required intervals

6.2 Complying with boundary design conditions

The boundary design conditions based on the buyer's order must be met throughout the entire operating period.
When changing the medium, the plant operator must determine whether the material of the device and the sealings will still be suitable.

6.2.1 Safety measures for maintenance work

Before starting any maintenance work, the pressure must have been compensated completely. The respective safety and environmental regulations must be observed.

7 Additional equipment

Additional electrical sensors (limit transducers and/or continuous remote displays) may be mounted on the outside of the indicator unit. When using the level meters in hazardous areas, they must have their own EC Type Examination Certificate. For further information on the installation and adjustment of the device, see the Operating Instructions of the corresponding sensor.

8 CE mark

The measuring system meets, as far as applicable, the requirements of der EU-Guidelines 2014/68/EU (for pressure device equipment) and the Ex-Guideline 2014/34/EU.
Heinrichs Messtechnik is declaring the conformity to these guidelines by placing the identifying CE marks.

9 Standards and directives, certificates and approvals

Certified to DIN-EN 9001
Production in accordance with AD guidelines and HPO approval (TRB200/TRD201)
TÜV approval for welding requirements in accordance with DIN-EN 729-2

Directive 2014/68/EU (Pressure Equipment Directive)
AD 2000 Regulations

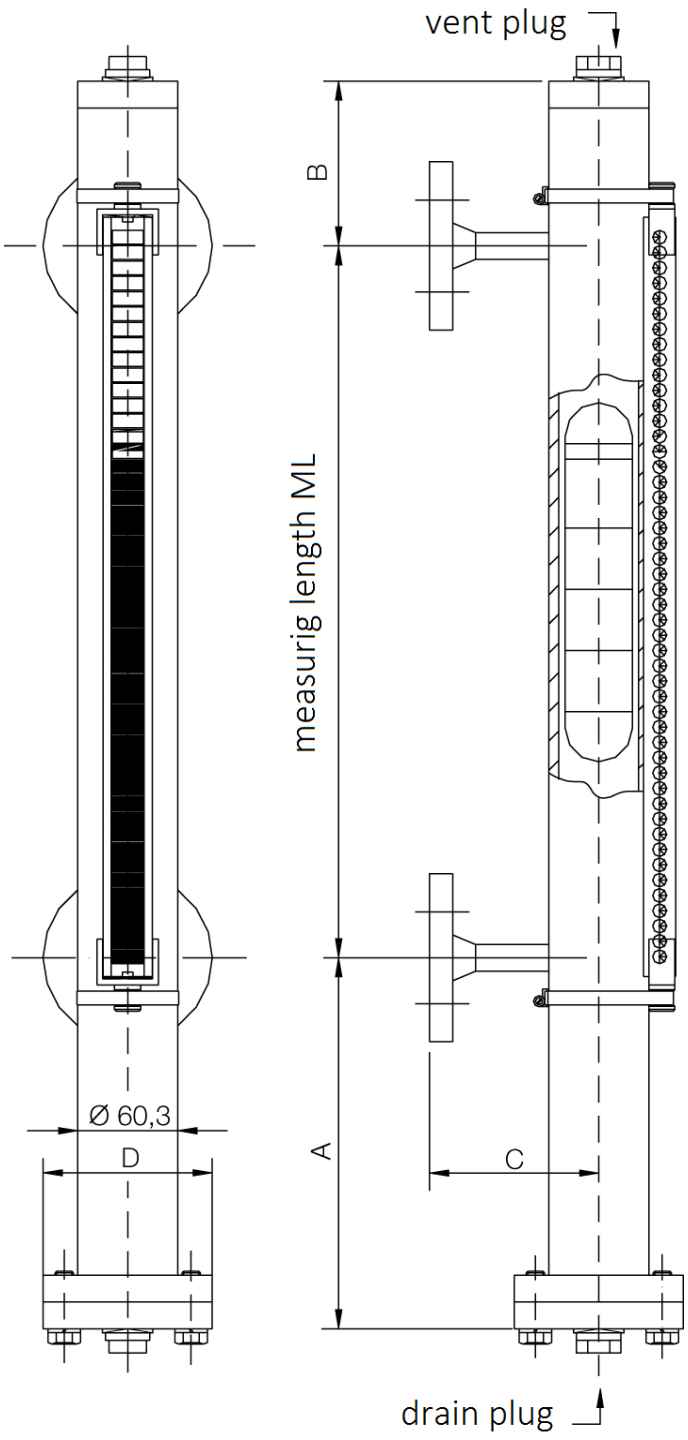
Hazardous area version (see rating plate for applicability):
Directive 2014/34/EU (Equipment and Protective Systems for Use in Potentially Explosive Atmospheres)
EN 13463-1 (Non-electrical equipment for potentially explosive atmospheres – Basic methods and requirements)
EN 13463-5 (Non-electrical equipment for potentially explosive atmospheres – Protection by constructional safety)

10 Returning devices for repair and service

Note: In accordance with the applicable German waste disposal legislation, the owner/client is responsible for the disposal of special waste and hazardous materials. Consequently, all devices sent to us for repair must be free of any hazardous materials. This also applies to possible hollow spaces and fissures in the devices. If repair is necessary, confirm the above-mentioned item in writing **(please use the form in Section 14)**.

If hazardous materials remain in or on the device after it has been returned, Heinrichs Messtechnik shall be authorized to remove them at the client's expense without further inquiry.

11 MBSK*** dimension drawing (standard version)



N10 and A10 cannot delivered with drain plug and or vent plug.

The dimensions of other versions will be provided on request!

MBSK-M01 (PN6)-M02 (PN167150 lbs)-M03 (PN40/300 lbs), max. 200°C

Typ	Dimensions [mm]				Distance A [mm] for Density of measured Medium [kg/m³] ≥					
	Ø	B	C	D	800	1000				
M01	40	45	*	80	290	185				
M02	40	45	*	80	290	185				
M03	40	45	*	80	290	185				

*depending of the process connections
Max. measuring range: 3000 mm
O-Ring (lower flange: NBR 70 (-20 … +120°C), PTFE (-20 … +120°C), FPM (-15… +200°C), Silicon (-60… +200°C),
other material on request

Maximum permissible pressure

Typ	-10…+50°C	< 100°C	< 150°C	< 200°C
M01	5,6 bar	5,1 bar	4,7 bar	4,4 bar
M02	14,9 bar	13,5 bar	12,5 bar	11,7 bar
M03	37,3 bar	33,8 bar	31,3 bar	29,3 bar

MBSK-N03 (PN16/150 lbs)-N04 (PN40/300 lbs)-N07 (PN63/600 lbs), N10(PN100/1500 lbs), max. 400°C
MBSK-A03 (PN16/150 lbs)-A04 (PN40/300 lbs)-A07 (PN63/600 lbs), A10(PN100/1500 lbs), max. 400°C

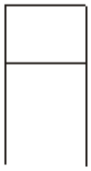
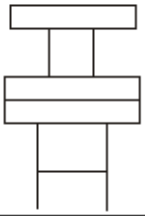
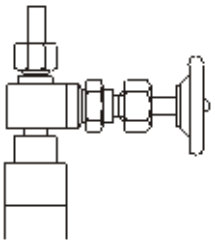
Typ	Dimensions [mm]				Distance A [mm] for Density of measured Medium [kg/m³] ≥					
	Ø	B	C	D	540	600	700	800	900	1000
N03	60,3	130	110	115	320	320	320	320	320	210
N04	60,3	130	110	115	410	410	320	320	320	210
N07	60,3	130	150	180	410	410	320	320	320	210
N10	60,3	130	150	195	-	700*	410**	320	320	210

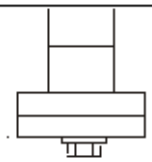
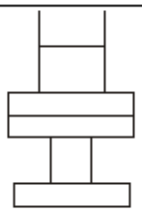
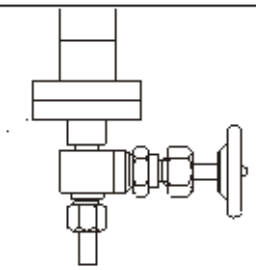
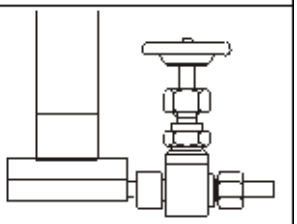
*800 mm for meters with temperature shielding **450mm for meters with temperature shielding
Shorter lower part © on request
Up to 6000 mm length one piece, longer meters 2 parts or several parts.
Lower part flange sealing N03,N04,N07,A03,A04,A07: ≤ 120°C material PTFE, > 120°C material Klinger SIL
Lower part flange sealing N10,A10: Graphite with inlet

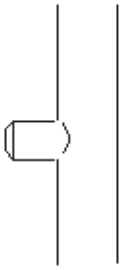
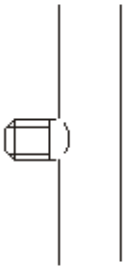
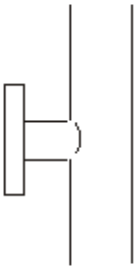
12 Float

The float is a. closed construction
The float is normally separated delivered
Additional float materials or float weights on request

13 Variants

Vent			
			
Cap	Screw plug ½“NPT	Flange connector	Valve

Drain			
			
Drain plug ½“NPT	Flange connector	Valve	Lateral valve

Flange connector		
		
Weld-on connector	Screw connector	Flange

14 Decontamination certificate for device cleaning

Company: ..... City: .....

Department: ..... Name: .....

Tel. No.: .....

This level meter

type MBSK .....

was operated using the measured medium.....

Since this measured medium is dangerous in water/poisonous/corrosive/flammable,

we have

- checked that all hollow spaces of the device are free of these materials*
- neutralized and flushed all hollow spaces of the device*

*cross out what is not applicable.

We hereby confirm that in resending the device no danger to persons or the environment is posed by the residual measured substance.

Date: ..... Signature: .....

Stamp

15 Sales representatives

Internet: http://www.heinrichs-eu

16 Notes