

Ekorex – Consult, spol. s r.o. Company ID No.: 47451394	User's Manual MAREG liquid level sensor	NKO0802/MIH
Na Lužci 657 Lázně Bohdaneč	Type MIH-XX.XX.XX	

User's manual approved on behalf of the manufacturer:	Date, stamp, signature
Petr Kohoutek - Company Director	01/08/2002

This manual contains instructions, guidelines and pictures necessary for putting this device in operation and use, and for safe assembly, disassembly, maintenance, installation and adjustment.

This user's manual is supplied with each device.

Contents:

- 1. DESCRIPTION OF FUNCTIONALITY AND USE**
- 2. DESCRIPTION**
- 3. OPERATING CONDITIONS**
- 4. TECHNICAL SPECIFICATIONS**
- 5. OTHER INFORMATION**
- 6. STORAGE, DELIVERY AND SHIPPING**
- 7. INSTALLATION AND MECHANICAL ADJUSTMENTS, START UP**
- 8. ELECTRICAL ADJUSTMENTS, SERVICE AND REPAIRS**
- 9. TABLE OF AVAILABLE MODELS**
- 10. QUALITY GUARANTEE**

1. Functionality and use

1.1 Functionality

The Mareg "MIH" type level sensors consist of a head, pipe, and float. The pipe is hermetically sealed in order to make sure that the inner space is separated from the liquid. The float moves freely on the pipe. The inner space of the device is closed with a screw-on lid equipped with a rubber o-ring. Magnetic level sensors are placed inside the pipe (7,10, and 20 mm apart), and they gradually connect or disconnect resistors in line. Based on the level of the liquid the float moves on the pipe. The float uses magnetic field and sensor to indicate the liquid level. The input signal is processed with an electric current converter to current between 4 and 20 mA. Single float may be used for basic measurements. As a default, the stopper has been set by the manufacturer a split second behind the time when the relay switches on. Number of sensors, placement as well as the level of output signal may be selected in the device order form. On the device questionnaire form it is necessary to specify the location of individual measuring locations and the direction from which the float will calculate and control the liquid level.

1.2 Product use

The Mareg product types MIH may be used for various measuring applications and step liquid level controlling procedures, offering up to four different levels. Based on the product type, you may use the device to control and measure liquids such as water, flammable liquids, acids, aggressive substances etc. High electric protection class (IP 65) allows the device to be used in harsh weather conditions. Based on a special agreement, the device may be fitted with a special sensor Pt100 and with a linear converter providing output between 4 and 20 mA.

If required, you may use a model with a separate guiding/measuring pipe, which may be installed in the reservoir. The result evaluation head with terminals may be placed at a separate location, where the operating personnel may inspect the level of the liquid and control the activity of the device, etc. (cable is used to connect both parts).

Thanks to the high protection level, the sensors are resistant to environmental changes in terms of humidity and are still able to perform measurements with high accuracy. Sensors do not remember statuses. When the float moves to a different level, the sensor goes back to its original mode. If you use a combined regulation device with limited components control, keep in mind that sensors are very sensitive and are able to measurable levels with high precision and repeatability. After the probe of the reed relay switches on - when the float moves away from the previously measured liquid level, the probe is (due to the influence of magnetic field interruption) at least 50 mm away from its original position (based on the float type). Similarly, when the probe moves downwards, it is approximately (again due to the influence of magnetic field) 20 mm away from the previous level (based on the float type). Therefore, it is necessary to account for this type of hysteresis during installation of sensors as well as during the actual measurement process.

2. Description

The sensor is fitted with the following basic components:

Each device is composed of a head, float and measuring tubes. The basic types of the device are in the form of a stainless steel guide tube and a float. The tube forms together with the flanges a "continuous vessel and the level of the measured medium is captured by a float with built-in magnets. The magnetic field affects the external components that allow measurement, fluid level control. The inside of the device is closed by a flange. The unit can be connected to the BVC and the optical display. The head of the built-in BVC is an aluminum casting to which a stainless steel tube is mechanically fastened. The tube is welded and the inner space is separated from the measured medium. Magnetic level sensors are located in the BVC tube. The float moves freely according to the level of the float, indicating the state of the surface by means of the magnetic field and the sensor.

Measuring tube of the instrument

The basic part of the instrument consists of a guiding tube, which together with the flanges forms a continuous vessel. The float moves in the tube and monitors the level of the measured medium. The magnets are built in the float.

The head of the built-in BVC component is normally manufactured in two basic sizes with the designation BLH080060 and BLH100130. BLH100130 head is a powerful screw cap casting. The head has an IP 66 rating. A BLH080060 is a standard cover (Al - casting with seal and lid) with IP 65 protection. The device also includes a 4 to 20 mA electronic output converter for measuring the proportional output from the decade resistance. For the control and output of the limit levels, it is possible to use the output from the converter as well in stepwise mA.

The device may also include passive components such as a Pt100 sensor, a linearized Pt100 output transducer, and possibly other components as agreed with the customer (optional version).

3. Operational conditions

3.1 Operational conditions

3.11 The design of the device provides safe use and operation in environments specified in ČSN EN 3303 00 :

- a) Cold environments
- b) Hot environments
- c) zone 0 (pipe and float) zone 1, zone 2 /for certain device types - connection head/
- e) dusty environments
- f) wet environments

3.12 Protection (based on type)

IP65 /IP66

3.13 Atmospheric pressure around the device head

86 to 106 kPa

3.14 Measured liquid/media:

Density 0.55 to 4 (xx) kg.m⁻³

3.15 Operating overpressure at the measuring point

- Stainless steel version maximum 1.6 MPa
 - Testing overpressure max. 2.2 MPa
- If the float is not designed for this type of pressure, it is necessary to place it outside of the reservoir during testing
- 3.16 Ambient temperature
- The measured medium temperature -30 °C to +350 °C
- Temperature at the measuring location -30 °C to +100 °C
- Designed to be used in explosive environments
- 3.17 Working position horizontal
- 3.18 Special design – working position is perpendicular to the head in bottom position
- 3.19 Type of operation permanent

4. Technical specifications

- 4.1 Measuring range - stainless steel design max. 5,800 mm
- 4.2 Insensibility + 7, 10 20 mm
- 4.3 Power supply 12-28V /DC (4 to 20 mA)
- Maximum switching voltage max. 40 V AC/DC/100 mA
- (combined device, each terminal)
- 4.4 Basic error ± 2 mm
- 4.5 Additional errors 0.01 % /1°C
- 4.6 Insulation resistance 10¹⁰ Ohms
- 4.7 Switching speed 0.2 ms
- b) Life Expectancy
- 5 V DC, 10 mA 5 x 10⁷
- 10 V DC, 100 mA 10⁷
- 50 V AC 5 x 10⁷

Note: – when evaluating output signal, repeated inaccuracies may be compensated for by the control system.

5. Other information

- 5.1 Type of operation permanent
- 5.3 Device label
- 5.31 Manufacturer label (located on the cast head):
 - a) manufacturer identification, including address
 - b) Device type MIH-XX.XX.XX
 - c) year of manufacture for example 2002
 - d) serial number Serial No.
 - e) manufacturer specifications – country of origin – Made in Czech republic
- c) General label (located on the rear lid or on the machine side):
 - a) manufacturer reference number Technical documentation file No. - NK00802/ MIH (valid User's manual)
 - d) Label necessary due to safety reasons Temperature range - T4
 - e) The general label may feature other necessary information - for example, a wiring diagram, information about built-in components, etc.

6. Storage, delivery and shipping

- 6.1 Storage
 - The device may be stored in temperature range from -20 °C to +40 °C, with maximum relative humidity of the surrounding air 75 %.
- 6.2 Delivery

The device is delivered with the following documentation: NKO0802 / MIH User's manual including applicable annexes or with additional documentation if agreed between the manufacturer and customer.

6.3 Transport and storage

Products are delivered in packaging which provides sufficient stability and protection against mechanical and temperature variations.

The device is shipped as follows:

After assembly and final inspection, the float is attached to the guiding pipe.

The device is shipped in a packaging unit fitted with a label specifying the manufacturer and the customer.

6.4 Recycling

Each device may be separated based on individual material types and as required by Waste management regulations SM - 15 and therefore, it can be safely stored or disposed of.

7. Installation / disassembly, mechanical adjustments and startup

7.1. Assembly, startup, operation and use, service

Installation of limiting devices is done by the manufacturer or by other companies authorized by the manufacturer to do so. Due to the simplicity of the device, other professional companies may also perform the installation.

7.2 In general, the device does not require any operations or maintenance. However, the manufacturer recommends to perform inspection of the device and its configuration settings after 2 or 5 years of operation. This shall depend on operational conditions - aggressive environment, vibration etc.. The device is not equipped with its own fuse or switch.

7.3 Repairs are done by the manufacturer. The device is removed and subjected to applicable inspection and setting.

7.4 The manufacturer reserves its right to change technical parameters at any time.

7.5 Service and installation is done by the manufacturer or by a company authorized by the manufacturer to do so. The list of servicing companies as well as installation or maintenance could be agreed directly at the company headquarters.

8. Electrical adjustments, service and repairs

1.1 Installation and adjustment of electrical components is rather simple, and it is done by the manufacturer or by other companies authorized by the manufacturer to do so. Due to the simplicity of the device, other professional companies may also perform the installation. The switching level has been preconfigured based on parameters specified in the order form.

1.2 The manufacturer reserves its right to change technical parameters at any time

1.3 Service and installation is done by the manufacturer or by a company authorized by the manufacturer to do so. The list of servicing companies as well as installation or maintenance could be agreed directly at the company headquarters.

1.31 Regular inspection and maintenance (approximately after one year of operation)

In general, we inspect whether the readout on the visual display, the output signal and measured values match (for example, measured by the measuring pipe).

8.42 Basic maintenance (approximately after 5 years of operation)

We inspect whether the status of the measured medium and the output signal matches values measured by the measuring pipe. Based on the recommended service life and based on conditions where the device operates, we select the proper maintenance.

8.43 Midterm device repair (approximately after 7 years of operation)

Midterm repairs are completed by the manufacturer. The device is removed and all components are inspected. Screws and screw couplings are lubricated, switches are replaced, seals and transmitting device are inspected. All seals are replaced.

8.44 Service life and maintenance (based on individual needs and spring service life)

Based on the environment where the device operates (humidity, acid vapours, gases, sudden weather changes, or changes in the surrounding environment, vibrations, spring life service, etc.), we will recommend the basic maintenance interval. If the device is used in harsh environment, with recommend at least one midterm service per year (applies to the above specified environments). If the device is used very often, the maintenance interval is based on the maximum life expectancy of relevant switches.

8.45 Complete repair/rebuild and device component update, etc.

We recommend complete repair / rebuild and update of device components (possible thanks to modular design of the device) completed at the manufacturer's facility since the operation could be completed during one day and the device delivered back to the customer (depending on the status of the device and on the scope of its repair).

8.46 Installation of the device is done by the manufacturer or by other companies authorized by the manufacturer to do so. Repairs are done exclusively by the manufacturer.

Should the customer attempt repairs, he may lose warranty and the manufacturer will not guarantee safe operation.

8.5 The manufacturer reserves its right to change technical parameters at any time

8.6 Service and installation is done by the manufacturer or by a company authorized by the manufacturer to do so. The list of servicing companies as well as installation or maintenance could be agreed directly at the company headquarters.

Quality warranty

9.1 The manufacturer guarantees the device for 24 months, as required by the Commercial Code (Par. 429 et seq.). Defects occurred during the warranty period due to clearly defective material or workmanship will be repaired for free, provided that the device is sent back to the manufacturer in its original or suitable packaging. If the repair is done at the customer facility, the manufacturer will charge for the travel cost and repair time according to valid price list of the manufacturer.

9.2 The warranty does not cover defects caused by unauthorized tempering with the device, by failure to comply with the technical and operational requirements specified by the manufacturer, by forced mechanical damage and incorrect installation procedures. Further, the warranty does not cover defects due to incorrect installation process done by unauthorized installation company.

9.3 The manufacturer reserves its right to change the product design or to make changes in the product documentation. Any modifications will be attached in a form of an Annex to the applicable product documentation.

Manufacturer address: Ekorex-Consult, spol. s r.o.
Na Lužci 657
533 41 Lázně Bohdaneč

Phone: +420 466 921 179

E-mail: ekorex@ekorex.cz