

Magnetically Controlled Level Gauge

Type: ITA

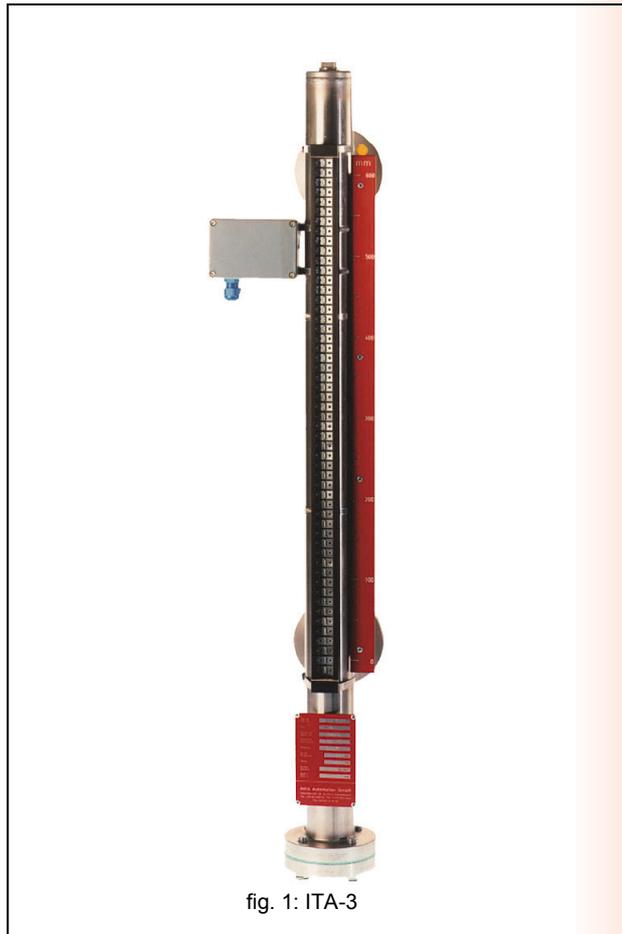


fig. 1: ITA-3

Installation and Operation Manual

01/2017



LEVEL

THE EXPERT IN LEVEL AND FLOW

Intra-Automation

Version: 01/2017

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Magnetically Controlled Level Gauge

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1. Safety instructions

In this manual you will find information for your own safety and to prevent any type of damage. The hints are marked with a danger sign described as follows:



DANGER

means, that death, personal injury or high damage to property **will** occur, if there should be taken no precaution.



WARNING

means, that death, personal injury or high damage to property **can** occur, if there should be taken no precaution.



CAUTION

with danger sign means, that only small personal injuries can occur, if there should be taken no precaution.



CAUTION

without danger sign means, that damage to property can occur, if there should be taken no precaution.



ATTENTION

highlights actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned.



NOTE

Is an important information about the product itself, the handling of the product or that part of the manual to which special attention is to be drawn.

Limited liability

We checked the content of the manual in accordance to the hardware. But we can not guarranty that there will be differences between the manual and the hardware. The manual will be checked regularly to correct the manual in the following versions.

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2. General Instructions



NOTE

For reasons of clarity the manual does not contain detailed information about all types of products and cannot take into account every conceivable case of installation, operation or maintenance.

If you require further information or should any problems occur which are not sufficiently explained in the manual, you can consult your local Intra-Automation branch to obtain the necessary information.

May we also draw your attention to the fact that the contents of the manual are not part of a previous or existing agreement, approval or legal relationship or an amendment thereof. All obligations of the Intra-Automation GmbH result from the contract of purchase which also contains the full and solely valid warranty agreement. These contractual warranty conditions are neither extended nor restricted by the contents of the manual.

The contents reflect the technical state at the time of going to print. They are subject to technical modifications in the course of further development.



WARNING

Intrinsically safe devices lose their license as soon as they are operated on circuits which do not meet the requirements of the EC test certificate.

The device may be operated with high pressure and corrosive media. Therefore serious injuries and/ or considerable material damage cannot be ruled out in the event of improper handling of the device.

The perfect and safe operation of this equipment is conditional upon proper transport, proper storage, installation and assembly as well as on careful operation and commissioning.

The equipment may only be used for the purposes specified in this instruction manual.

Exclusion of liability

All modifications to the device require the expressed approval of the manufacturer..

Qualified Personnel

Qualified personnel are persons familiar with installation, commissioning and operation of the product and who have the appropriate qualifications for their activities, such as:

- training or instruction or authorization to operate and maintain devices/ systems according to the standard of safety technology for high pressures and corrosive media.
- training or instruction according to the standards of safety engineering in the care and use of suitable safety equipment.
- training in first aid.



CAUTION

Modules which are sensitive to electrostatic charge may be destroyed by voltages which are far below the human level of perception. These voltages occur already when you touch a component or electrical connections of a module without first discharging yourself electro-statically. The damage incurred by a module as a result of an overvoltage is not usually immediately perceptible but only becomes noticeable after a long time in operation.

Trade mark

ITA is a trade mark of Intra-Automation GmbH.

3. Technical description



NOTE

To get a level measurement, the float has to be inserted into the float chamber during installation. During transport the float is packed separately to protect it from damages.

3.1 Application

The level gauge type ITA enables to measure the level of non-aggressive, aggressive or other dangerous liquids in open or closed tanks. Possible pressure ranges are PN6 up to PN320.

The accessories switches and reed chains are available for intrinsically and flame proof areas. This units are certified by an notified body in acc. to guideline 94/9/EC (see *separate manual for this accessories*).

3.1.1 Temperature range

Fluid temperature: -50°C to +400°C [-58°F to 752°F] acc. "AD Merkblätter" depending on the material.

Ambient temperature: -50°C to +200°C [-58°F to 392°F]

3.2 Design and functional principle

Directly after installation, the level gauge type ITA is ready for operation. You can determine the optional constructional details and the measuring length, pressure rating and temperature range on the tag plate.

3.2.1 Design

The design of the level gauge type ITA depends on customers requirements. So please check the constructional details by using the delivery note or the order acknowledgement.

On side of level gauge you will find the tag plate. There you are informed about the dimension of process connection, the measuring range, the pressure range and the design density.

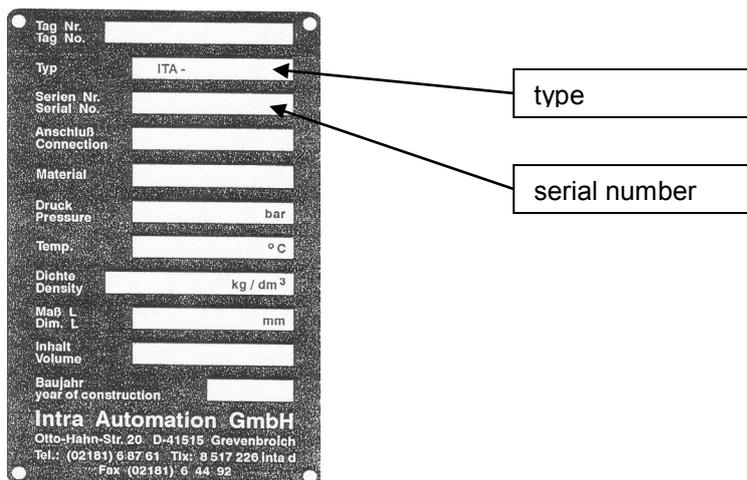


fig. 2: TAG plate

3.2.2 Mode of operation

This chapter describes how the transmitter operates and what protection and safety provisions you need to observe.

The level gauge works in accordance to the principle of communicating tubes. The changing in level inside the tank will affect directly a level-changing in the float tube of the level gauge. Inside of the level gauge there is a float containing a magnet. This magnet system was placed in the float to indicate the level of the measured liquid. Outside of the float chamber there is an indication rail installed. While the float passes the flap inside of the indication rail the magnetic bonding between the float and the flaps will turn the flaps from white to red for increasing level or just opposite for decreasing. White flap means that this area of tank is empty, red flaps indicates the liquid level.

3.2.3 Product life cycle

On appropriate use, the life cycle of a mag. level gauge type ITA is nearly unlimited.

4. System integration

4.1 System configuration

The level gauge type ITA can be used in a various types of system applications: either as stand-alone-version (without power supply) or as part of a complex system environment with the option level transmitter and/ or switches (limit switch), e.g. control system.

5. Modular Design



WARNING

You have purchased a modular designed device. Therefore you will have the chance to replace different parts while using original spare parts. Please observe in case of replacement the notes which will be supplied with the spare parts. Please pay attention to the hints for replacements of parts in units which will be used in explosion proof areas.

5.1 Correlations

The module float is designed depending on the measured medium. Therefore you will be sure that there is not error in measuring of liquid level.



WARNING

Type of indication-rail, sealing and optional switches or transmitters has to be chosen depending on temperature of the medium. If you will not notice the medium temperature or properties of medium there will be damages possible on the system.

6. Receipt, shipment and storage

When the equipment is received, the outside packing case should be checked for any damage incurred while shipment. If the packing case is damaged, the local carrier should be notified at once regarding the liability. Remove the envelope containing the packing list. Carefully remove the equipment from the packing case and inspect for damaged or missing parts. Please check the case to be sure that all parts (e.g. accessories) will be unpacked. For transport or storage please use only the original packing case. Conditions for storage:

- Do not pile up the cases any time!
- For storage, protect the units against heat frost, humidity, dust or chemical vapour/media.
- Storage temperature: 10°C (50°F) up to 40°C (104°F)

The time of storage is unlimited, but pay attention to the guarantee confirmed in order acknowledgement.



WARNING

For transport of units with weights higher than 25 kg (55 lbs) only use suitable lifting tools. Please take care of the centre of gravity signed on the packing (without sign if the centre is in the middle of the case). During transport do not enter the dangerous area. Wear safety working clothes (shoes) only.

7. Installation



! DANGER !

DANGER

While mounting the unit user has to put on the appropriate working clothes.

1. Magnetically operated level gauges are measuring equipments to be handled in the correct way. User has to check whether all parts have been supplied and the process connections of the level gauges correspond to the tank connections. After this has been done, user can start up mounting of the level gauge to the tank flanges.
2. The float (3) has been packed separately in the same card box. Remove the service flange (5) and put the float into the stand pipe (2) with the engraving „TOP“ upwards.



ATTENTION

Avoid ferrous materials to get in contact to the float, since it has to be able to move freely. The magnetic system is exactly installed at immerse level of the float corresponding to the liquid density.

If there has to be done a pressure test, you have to remove the float from the stand pipe. This is not necessary if the test pressure will not be higher than the pressure limit marked on the float.

If the position of the indication rail (4) does not suit you, you can rotate the indication rail around the pipe. Because of the ring-magnetic-system the indication rail works in each position of the pipe. After installation of the float (3) tighten the service flange (5).



! DANGER !

DANGER

Wrong mounting may cause leakages. Only use new seals, suitable for the application (pressure, temperature, medium).

3. Adjust the magnetic flappers (4) with a magnet in the way that only the white side is visible. If the liquid raises the float turns the flappers from white to red. In case of flappers turning by 360°, please turn the indication rail by 180°.



! DANGER !

DANGER

For level gauges with drain-/ vent plugs you have to keep the screwed connection to be completely sealed and tight.

The level gauges will be delivered without any type of maximum pressure governor. This has to be realized as a part of the tank.

4. For level gauges type ITA-5 there will be no side-mounted process-connection.

7.1 Special Instructions ITA-4

1. Release split-pin (6) at lower end of guide pipe. Insert the float construction with taller part of the float to lower end of guide pipe (shorter cylinder includes magnetic system/ longer cylinder is the float).
2. Lock guide pipe with the split-pin (6). Now the gauge can be mounted to the vessel.

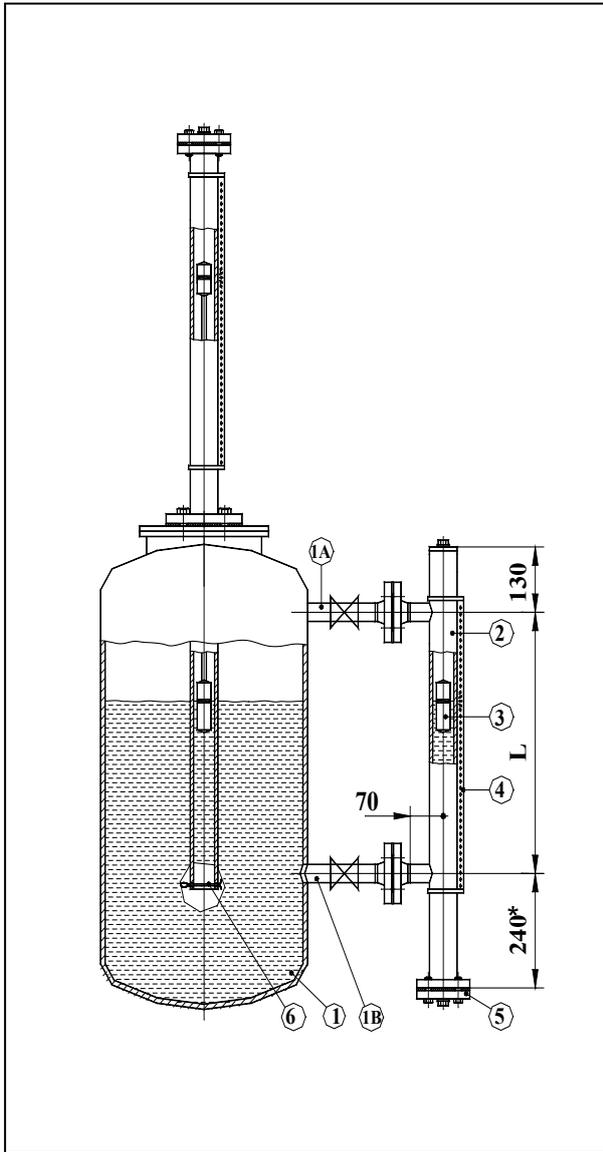
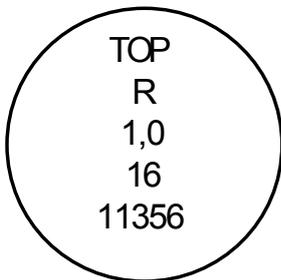


fig. 3: Types of installation

*Standard: 240 mm (this value can differ, depending on the float design!)



- TOP = Top side
- R = Type of magnetic system
- 1,0 = Specific gravity
- 16 = design pressure
- 11356 = Serial number

fig. 4: Marking on float

8. Start up

1. Close drain valve / plug and service flange.



! DANGER !

DANGER

Incorrect mounted drain plug / valve will cause leakages!

2. Open upper valve 1A (gas/steam side).



CAUTION

Prior to opening the connection valves to the vessel, there can be considerable differences in pressure between vessel and float guiding pipe. Once opening the lower valve 1B (liquid side) first, there will be a sudden rise of pressure from the lower to the upper end. This rise of pressure can take effect on the float and catapult it to the upper end of the float guide pipe. In nearly all cases, when this happens, the magnetic system in the float is damaged and it will not work anymore. Once the upper valve 1A (gas / steam side) will be opened first, the pressure raise will take place from the upper side to the lower side of the float guide pipe and the float will remain undamaged.



! DANGER !

DANGER

For aggressive or dangerous media user has to guarantee that all safety rules will be observed, so that persons or ambient will not come in contact with the medium (safety clothes, directed draining).

3. Open lower valve 1B (liquid side)
4. The liquid inside the float chamber now moves up to the same level as inside the vessel. When the float passes the wafers they rotate 180° from white to red, indicating the exact tank level.

The exact level is indicated where the flappers are in a horizontal orientation.
The level gauge now is ready for operating.



! DANGER !

DANGER

In the case of pressurized float is used, it is indicated on the TAG plate (with pressure rating of the level gauge. In addition the float is securely packed into a stainless steel pipe with an attached notification plate.



! DANGER !

DANGER

Also the data on the float has to correspond to the operating conditions.

9. Operation

Level gauges type ITA will be pressure-tested before supply (standard: 1,5*nominal pressure). Therefore Intra-Automation GmbH can guarantee that there will be no damages on pressure retaining parts.



WARNING

All screwed fittings and pressure retaining parts have to be checked regularly during operating regarding tight and sealed mounting as damage can occur when the level gauges becomes leaky!

Liquids with high temperature can heat the surface of the level gauge. The user has to take care that anybody can get in contact to this hot surface. If it is not possible by installing a protection case around the level gauge, you have to wear safety clothes in the area surround the level gauge!

If there is no maximum pressure governor for the tank, the user has to install it especially for the level gauge!

The user has to ground the level gauge separately to earth, so that no electrostatic loading on the level gauge can occur!

10. Maintenance

If the liquid contains parts of dust, which is able to disable the float to move freely inside the float chamber (2), you have to open the drain valve regular to get out all soil.

If the float chamber inside becomes coated with a deposit, you have to open top and bottom flange (depending on type of model). Take out float carefully. Now the float chamber can be cleaned.

Clean the indication rail every time with a **moist** rag.



DANGER

Before opening of drain-valve and/or dismounting of the drain-/ vent flanges the level gauge and the vessel has to be depressurized.

If liquid inside the float chamber has high temperature the user has to take care that the surface temperature gets even to ambient conditions so that there will be no chance of burning or injury.



NOTE

If you have to dismantle the indication rail due to maintenance, repair or other reasons, please mark the upper end of the rail. The flappers have a polarity of their own and will only work properly if the indication rail is mounted in the correct orientation..



NOTE

Maintenance period: As integral part of the tank, the level gauge has to be integrated in the tank maintenance cycles.

The maintenance periods are to be defined by the plant operator according to his process. Intra-Automation recommends a yearly maintenance as a minimum requirement.

11. Waste disposal



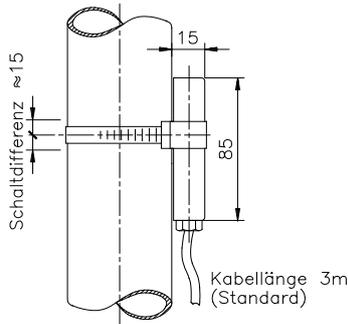
CAUTION

Local rules have to be followed.

Depending on the measured medium the user has to decontaminate the level gauge first.

12. Options

12.1 Electric alarm contacts / limit switches



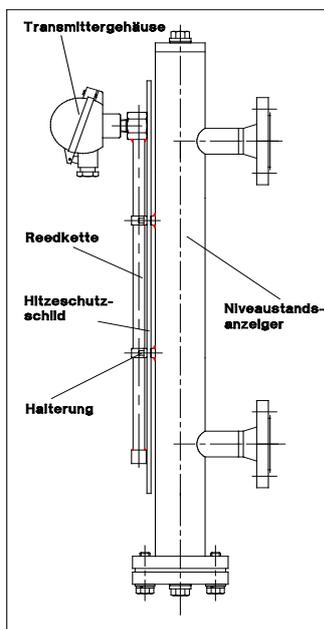
Electric alarm contacts can be mounted in any position and direction. There is a range of alarm contacts selected by temperature and electrical load.

For installation see separate operating manual for switches.

Please observe EN60079-0 and EN 60079-11!

fig. 5: Contacts

12.2 Reed Chain



The reed chain will be placed on the level gauge 90° turned from position of indication rail. The clamps for mounting are directly welded to the float chamber. For using the heat protection plate and for installing subsequent the reed chain will be fixed while using straps.

The range of the reed chain is set by factory in accordance to the distance of c/c process flanges.

For installation and operation see separate manual.

ATTENTION

The threads of the reed chain have to be re-greased with an acid-free grease latest after 2 years after supply.

fig. 6: Reed Chain

13. Overview General Types

Type	Pressure rating	Type of mounting to tank	Process connection (standard)	Material Float Pipe (standard)
ITA-3	PN16	on side	flanged	The material is indicated on the TAG-plate-
ITA-3Cryo	PN16	on side	flanged	
ITA-34	PN16	on side	flanged	
ITA-3.5	PN16	on side	flanged	
ITA3.8	PN16	on side	flanged	
ITA-4	PN16	top of tank	flanged	
ITA-5	PN16-PN320	on side	threaded	
ITA-6	PN40	on side	flanged	
ITA-6Cryo	PN40	on side	flanged	
ITA-64	PN40	on side	flanged	
ITA-6.8	PN40	on side	flanged	
ITA-7	PN64	on side	flanged	
ITA-8.1	PN6	on side	flanged	
ITA-8.2	PN6	on side	flanged	
ITA-8.3	PN6	on side	flanged	
ITA-9.1	PN6	top of tank	flanged	
ITA-9.2	PN6	top of tank	flanged	
ITA-9.3	PN6	top of tank	flanged	
ITA-10	PN100	on side	flanged	
ITA-11	PN160	on side	flanged	
ITA-12	PN250	on side	flanged	
ITA-13	PN320	on side	flanged	

14. Trouble Shooting

If the mag. level gauge is mounted to the tank acc. to the installation and operation manual, it works free of faults. In very rare cases the indication does not work properly. For these cases the below measures are to be taken.

First, please check if the level gauge has been mounted to the tank according to the instructions given by the manual. Sometime the problem can be solved simply by attaching the float.



Important!

All of the following tests and measures can only be executed while the float is dismantled.

Once you have taken the float out of the standpipe, please check the engraved information (see fig. 1) on the topside. It has to conform to the conditions of the measuring point. Also the engraved serial number has to be the same as indicated on the TAG plate (see fig. 2) of the level gauge.

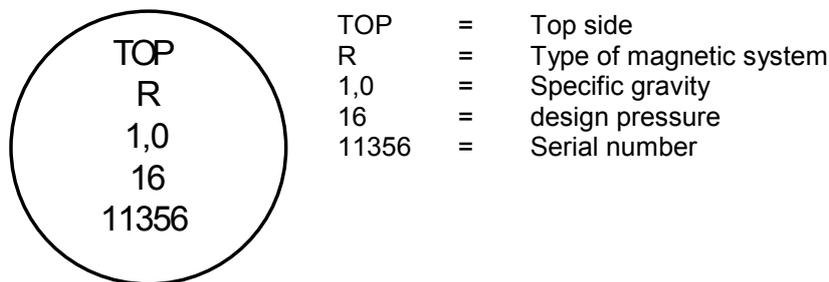


Fig. 1 Information engraved on top of the float.

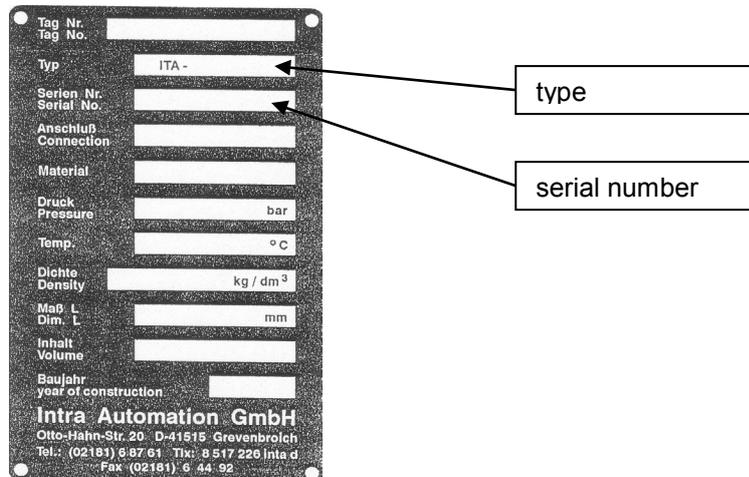
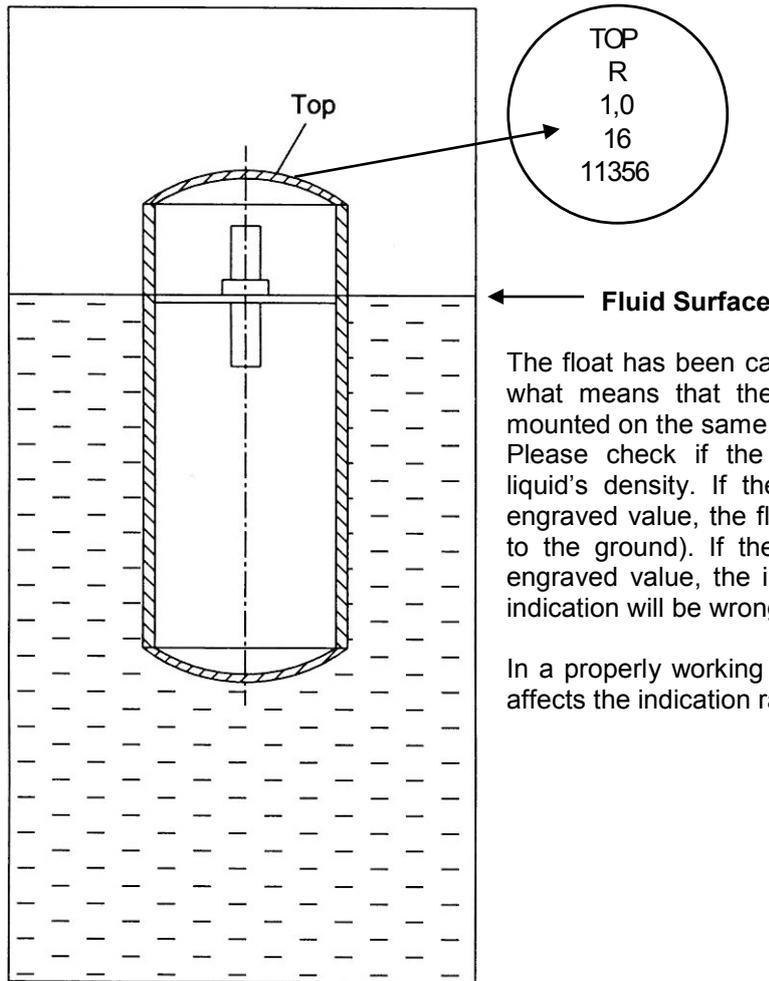


fig. 2: TAG plate



The float has been calibrated to the given density of liquid, what means that the magnetic system inside exactly is mounted on the same level as the liquid surface (see fig. 3). Please check if the engraved density conforms to the liquid's density. If the existing density is lower than the engraved value, the float may sink deeper into the fluid (or to the ground). If the existing density is higher than the engraved value, the immersion depth will be less and the indication will be wrong.

In a properly working float the effective magnetic field only affects the indication rail at the point of liquid level.

fig. 3 Properly working float.



Important!

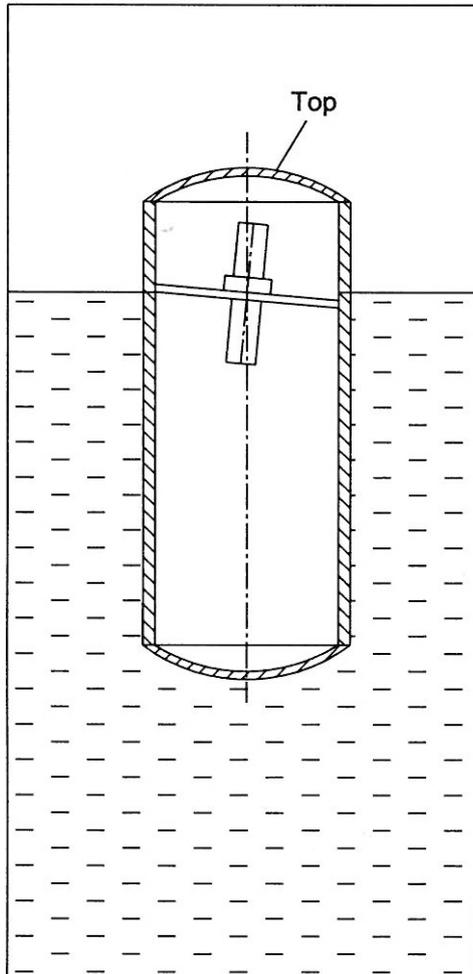
The engraved side where TOP is indicated has to be mounted upwards into the standpipe. Otherwise the magnetic system will be placed below the fluid surface and will emerge a false indication.

Now move the float from outside along the indication rail. The flappers inside the rail should flap one after another. If the flappers do not turn from one side to the other (red to silver or silver to red), the mag. system in the float has been damaged. This may have occurred on transport or once the float dropped to earth while mounting.



Important!

All floats made by Intra-Automation GmbH are tested for their function before they leave our factory. No claims for defective floats can be accepted due to this..



← Fluid surface

Once the magnetic system in the float has been damaged (see fig. 4), the magnetic field has another direction and cannot affect the indication rail at the right place in the right way. In some cases the flappers are effected twice und turn by 360° what means as a result that they show the same side they have shown before the float passed by.

In this case the only solution is to buy a spare float. Please contact Intra-Automation GmbH. Once you indicate the serial number of the float, it is no problem to build a new float on the same data.

fig. 4 Float with defective mag. system.

Optionally, a reed chain can be attached to your level gauge. If it has been ordered with the level gauge, it has been pre-mounted in our factory and must not be calibrated anymore. The reed-chain function has been tested before despatch.

To check the function of the reed chain, please open the transmitter housing of the device and connect a Multimeter to the blue and black connection cables. Now move the float alongside the reed chain, from the Zero point to the Full-Scale point (see fig. 5).

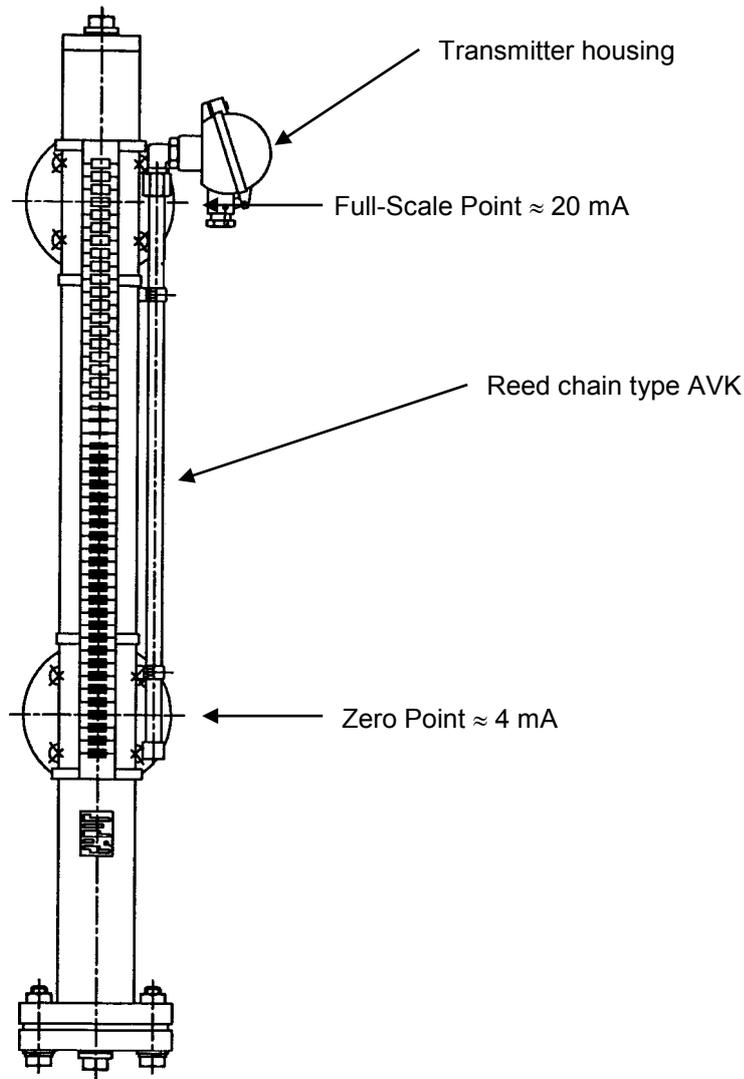


fig. 5: ITA with reed chain

The transmitter output is a linear function of the fill level, so the indicated Ohmic signal should rise continuously while moving the magnetic system from the Zero Point to the Full-Scale Point. If the transmitter is turned on, the mA-Signal should also continuously rise from 4 to 20 mA (in steps of 5, 10 or 20 mm, dependent on the ordered measurement resolution). Please see fig 6 and 7.



fig. 6: Ohmic signal at Zero Point



fig. 7: Ohmic signal at Full Scale

If the Signal is not rising (resp. falling) continuously, the reed chain has to be returned to the manufacturer for inspection. Please do not return any systems to Intra-Automation GmbH without prior agreement with us!

If the Zero Point is not equal to the Zero Point of the ITA mag. level gauge (lowest point of the measuring length, please carefully loosen the clamps of the reed chain and push it into the right position. After that, please tighten the fixing clamps again.

Besides the products covered by this brochure, Intra-Automation GmbH also manufactures other high-quality and high precision instruments for industrial measurement tasks. For more information, please contact us (contact details on the backside of this brochure).

Flow measurement



Itabar®-Flow Sensor



IntraSonic IS210 Ultrasonic Flow Meter

Level measurement



ITA-mag. Level Gauge



MAGLINK Level Indicator

Other Measurement Tasks:



DigiFlow Flow and Level Computers



IntraCon Digital Controllers



IntraDigit Digital Indicators / Meters



INTRA-AUTOMATION



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