

Magnetic Level DATASHEET

JUNHO 2013

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Magnetically Controlled Liquid Level Indicator Type: ITA

ITA with Aluminium-
Indication Rail and
Switch



ITA with mA-Output Signal
and Digital Display with
Volume Linearization



ITA with Steam
Casing



ITA with Armaflex-
Insulation



Inspection / Certificate

1. Material Certificate EN 10204 2.1
2. Material Certificate EN 10204 3.1
3. Test acc. to NACE
4. Pressure Test Certificate
5. Pressure Test acc. to "AD-Merkblatt" by German TUV
6. Construction and Pressure Test as per TRD by German TUV
7. Dye Penetration Test DIN 54152
8. X-Ray Test acc. to DIN 54111 part 1
9. PMI Check
10. ATEX Certificate
11. General Approval of Construction Inspection acc. to § 19 Water Resources Law about Flammable Liquids / VbF
12. Water Level Controller Component-Check as per VdTUV/WR91-352
13. Germanischer Lloyd
14. Certification of Passivation
15. Weight Certificate

ITA,
material PVDF



Technical Catalogue

1. ISO 9001 Certificate

Certificate

Standard **ISO 9001:2008**

Certificate Registr. No. 01 100 036028

TÜV Rheinland Cert GmbH certifies:

Certificate Holder:

INTRA-AUTOMATION GmbH  elektronische Meß- und Regelinstrumente
MESS- UND REGELINSTRUMENTE

Intra-Automation GmbH
Otto-Hahn-Straße 20 • D - 41515 Grevenbroich

Scope:

Manufacturing, design and sale of measuring and control equipment

An audit was performed, Report No. 036028. Proof has been furnished that the requirements according to ISO 9001:2008 are fulfilled.

The due date for all future audits is 25-01 (dd.mm).

Validity:

The certificate is valid from 2013-02-18 until 2016-01-25.
First certification 2004

2013-03-01


TÜV Rheinland Cert GmbH
Am Grauen Stein • 51105 Köln



DGA-ZM-58-95-00

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Precisely Right.

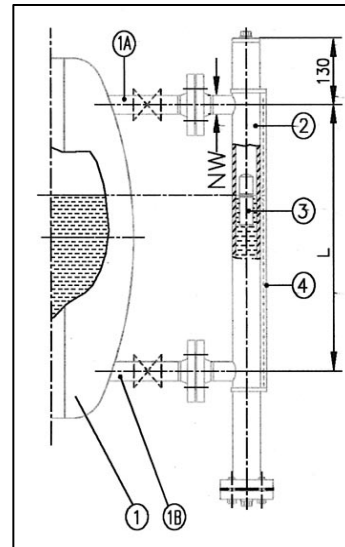
2. Functioning and General Information

2.1 Magnetically controlled liquid level gauge type ITA

The product line ITA is used wherever fluid level has to be monitored, indicated, and controlled in a reliable way, especially with corrosive, toxic and inflammable fluids with a viscosity up to max. 5000 mPa s.

The ITA level indicators offer a reliable, accident-free and maintenance-free usage, through a simple and break-resistant construction at a maximum process pressure of 320 bar and a temperature range from -50 through $400\text{ }^{\circ}\text{C}$. The fluid level is indicated directly with a separation of the measurement and indication area. The magnetic transfer of the fluid level from the tank to the indicator is continuous and vibration-resistant, even in the case of fast changing levels.

It is possible to mount the indication rail in any position on the pipe diameter. There is no corrosion of the indication system. The ITA instruments may be used in open or closed vessels. A definite level measurement without any power supply is guaranteed due to a continuous rotation of the wafers, even if a power loss in the plant occurs.



Functional Principle:

A float chamber (2) is connected (1A and 1B) to the tank (1), and following the law of communicating tubes, the level in the float chamber is equal to the level of the tank. The float (3) follows the fluid level and transmits its movements contact-free to the indication rail (4) mounted on the outside. The float has a special magnet, which rotates the wafers by 180° as it passes them. The result is a clearly defined level indication, with the level shown in a continuous red stripe strongly contrasted to the white above. At increasing levels the color of the wafer changes from white to red and vice versa.

The indication rail and the wafers are made of Makrolon so that there will never be a problem of corrosion in humid and aggressive atmosphere. Each wafer has a permanent magnet, that is why the indicator is shock proof. Moreover, as there is no turbidness because of product contamination of the UV-radiation, the readability remains unobjectable even after some years.

All models are available with electronic alarms, which can be mounted at any position during operation of the system, which renders possible an optimal definition of the min. and max. data points. The indicator can be equipped with a scale for volume or height (depending on the customer's specifications).

2.2 Level Measurement Tasks

- 1.) Indicating the fluid level
- 2.) Monitoring the level with alarm contacts
- 3.) Transferring the level using measurement value sensors (analogue signal 4...20 mA) to electronic display units
- 4.) Interface level measurement.

2.3 Advantages

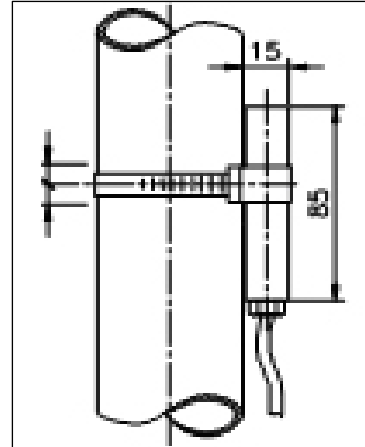
No risk of glass breakage as a result of the separation of the measurement and indicator areas. The float principle means that changes of the density in the medium have very little influence on the indication accuracy.

2.4 Switches / Alarm Contacts

Magnetic level indicators can be equipped with an arbitrary number of switch contacts. In contrast to electric float switches, switch contacts may be installed at any position of the stand pipe. Wherever additional float chambers are needed for float switches, magnetically controlled level gauges offer a considerable price benefit.

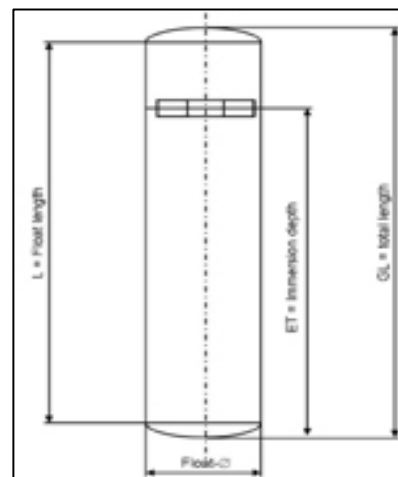
Electrical level measurement transducers which use the displacement principle must be recalibrated each time the fluid density has changed. The price of a magnetically controlled level indicator with integral electrical measurement transducer is considerably lower than level measurement transducers. The reed chain with an R/I measurement transducer can be changed without interrupting the operation. The measurement chamber is hermetically sealed – there is no contact between the fluid chamber and the reed chain.

The switches / alarm contacts are secured with pipe clips, and can be adjusted to any desired height. The connection is using 3-core cable or casing terminals. The changeover contact can be used as opener or closer. The switches are also available as explosion-proof version.



2.5 Floats

The construction of the float requires a great amount of technical knowledge. The float with its special magnet can rotate freely in the float chamber. The Intra construction avoids a guide wire and other devices. The float materials are stainless steel, 1.4571(316Ti), 1.4435 (316L) or titanium (PVC, PP, PVDF in case of the plastics level gauges). Floats without gas-pre-stressing are used from a minimum density of 0,35 kg/dm³. The maximum process pressure for sealed floats is 250 bar; at higher pressures the floats must be relieved from pressure (not to be used for condensing media). Intra-Automation mag. level gauges type ITA work up to a viscosity of 5000 mPa s.



2.6 Indication rail

The ITA level gauges can be supplied with indication rails made from 2 different materials. Makrolon indication rails are resistible to breakage. The max. permissible media temperature is 120°C, with 20°C ambient temperature and natural convection as test conditions. The rails are resistible to UV-radiation and aggressive atmospheres and are sealed against dust by two seal-caps. Aluminum indication rails can be supplied as one part rail up to a length of 6 m. The sight cover material depends on the temperature, up to 150°C the material is Makrolon and up to 400°C it is glass. The surface of the indication rail can be coated with Saekaphen if required, the standard surface is brown-anodized.

2.7 Materials

The gauge chamber and the floats are made of stainless steel (1.4571), 254SMO (1.4529), titanium, Hastelloy, PVC, PP, PVDF and PTFE. Other materials on request.

2.8 Special Versions

1. Transmitter, output signal 0...20 or 4...20 mA
2. Steam jacket, e.g. for viscous media
3. Float chamber with Armaflex®-insulation, for temperatures below zero (centigrade)
4. Scale made of Gravaloy (white plastic) or aluminium red anodized
5. Two parts versions without interruption of the indication, for measuring lengths > 5 m
6. Works report DIN 50049
7. Level indicator in Marine design (Germanischer Lloyd, Bureau Veritas, Det Norske Veritas, Lloyds Register)
8. Usage as an overfilling guard for tanks storing inflammable and non-inflammating water polluting liquids
9. ITA Cryogenic versions for refrigerants
10. ITA with lining made of PTFE
11. ITA with inside coating made of E-CTFE (Halar)

2.9 Additional Equipment

1. Anti freezing heating belt for use in the open air
2. Vent/drain valves, threaded or flanged connection
3. Measuring scale, divisions to client's specifications
4. Armaflex insulation
5. Protective hose, additional protection of the indicator against dust, dirt and moisture
6. Plastic indicator with armouring

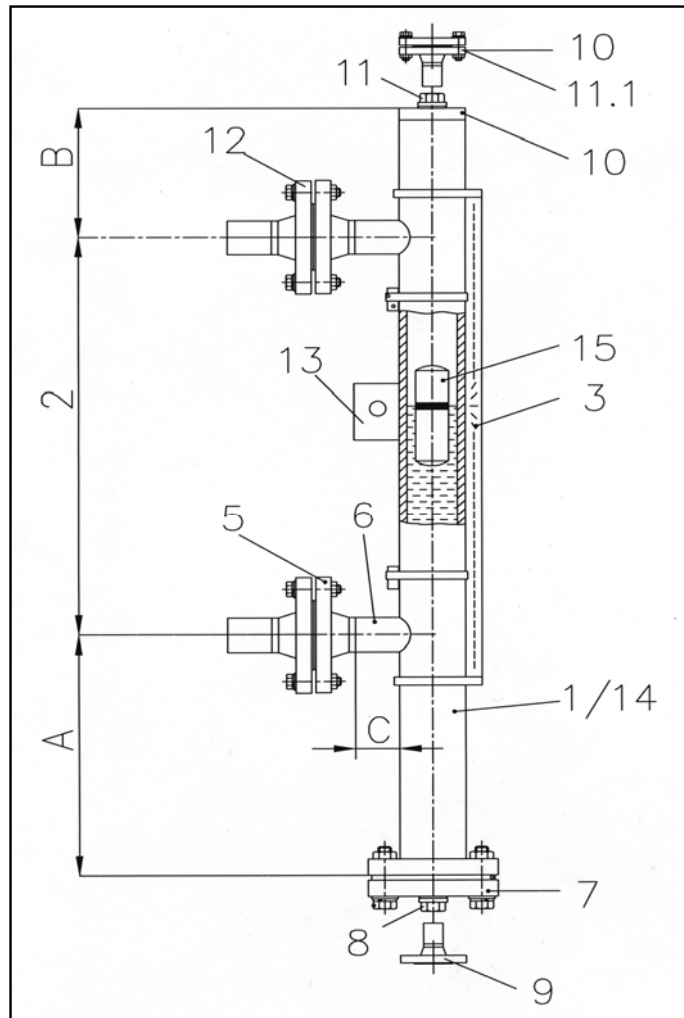
2.10 Inspection / Certificates

1. Material certificate EN 10204 2.1
2. Material certificate EN 10204 2.2
3. Material certificate EN 10204 3.1/3.2/3.3
4. Test according to NACE
5. Pressure test certificate
6. Pressure test according to "AD-Merkblatt" by the German TÜV
7. Construction and pressure test as per TRD by the TÜV
8. Dye penetration test DIN 54152
9. X-ray-test in accordance with DN 54111 part 1
10. PMI-check
11. ATEX certification
12. General approval of construction inspection in accordance with § 19 water resources law - WHG - and § 12 law about flammable liquids - VbF
13. Water level controller component check as per VdTÜV/WR91-352
14. Germanischer Lloyd
15. Certificate of Passivation
16. Weight certificate
17. PED 97/23/EG

3. Level Gauges in Details

3.1.1 ITA-3

Characteristics: PN16 / Float pipe and flange material: 1.4404



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 2 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-3

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded, 60,3 x 2 mm seamless 2" Sch10 necking connection or buttweld with T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 150#), Welding or threaded stud
Drain/Vent connections:	Plug R1/2" (for more please see order codes)
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-50...+400 °C
Operation pressure:	max. 16 bar
Operation density:	min. 0,3761 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	PTFE up to 100 °C Klingsil C4400 up to 175 °C Graphit spiral wound up to 400 °C**
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -130 mm -150 mm -210 mm -330 mm -430 mm -530 mm -630 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm -C = 40 mm

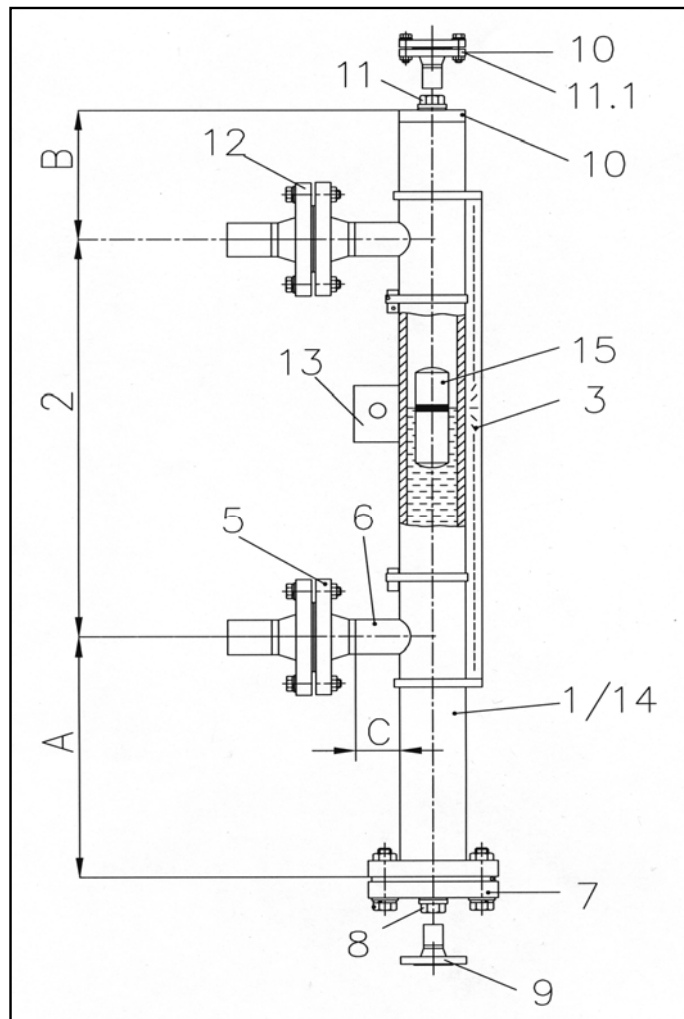
Base equipment printed in bold letters!

***for densities < 0,7374 kg/dm³ enlarge the scale A**

****only with vent- and/or drain flanges DN50 resp. 2"**

3.1.2 ITA-3.0

Characteristics: PN16 / Float pipe: 1.4404 and flanges : CS



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 2 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-3.0

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded, 60,3 x 2 mm seamless 2" Sch10 necking connection or butt weld with T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 150#), Welding or threaded stud
Drain/Vent connections:	Plug R1/2" (for more please see order codes)
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	CS
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-50...+400 °C
Operation pressure:	max. 16 bar
Operation density:	min. 0,3761 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	PTFE up to 100 °C Klingersil C4400 up to 175 °C Graphit spiral wound up to 400 °C**
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -130 mm -150 mm -210 mm -330 mm -430 mm -530 mm -630 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm -C = 40 mm

Base equipment printed in bold letters!

***for densities < 0,7374 kg/dm³ enlarge the scale A**

****only with vent- and/or drain flanges DN50 resp. 2"**

Technical specifications magnetic level gauge type ITA-3 Cryo

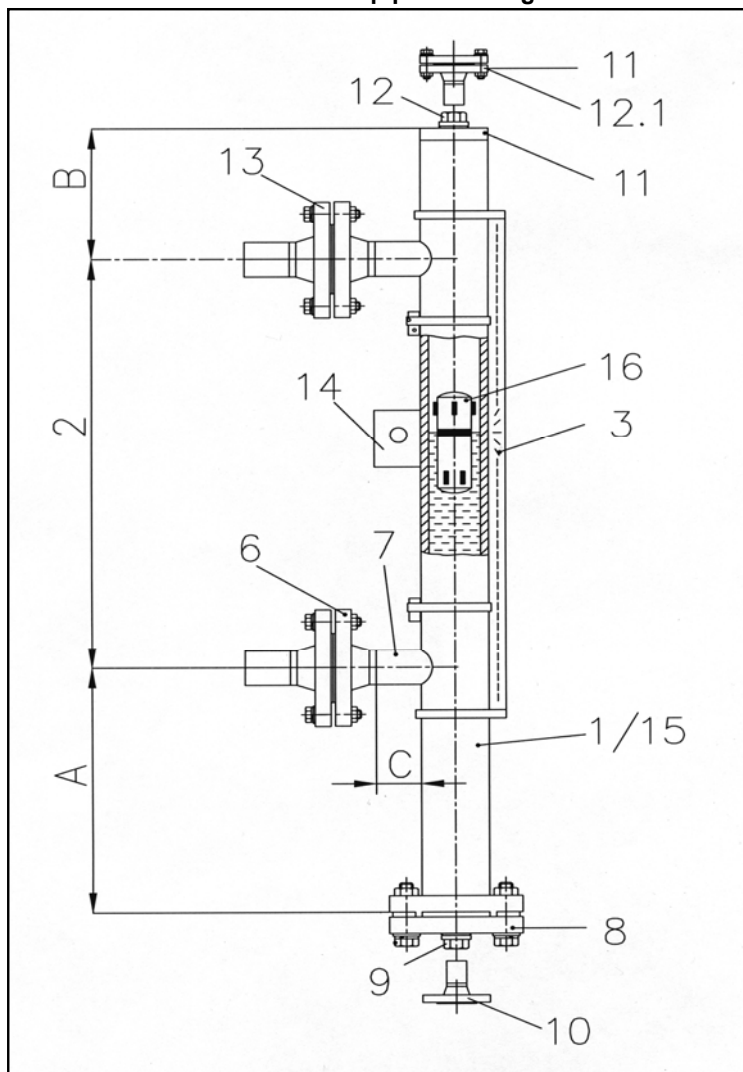
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded, necking connection or butt-welded with T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 150#), Welding or threaded stud
Drain/Vent connections:	Plug R1/2" (for more please see order codes)
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-200...+100 °C
Operation pressure:	max. 16 bar
Operation density:	min. 0,4017 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS (min. -10°C) SS or material in acc. with DIN 17280
Gasket	PTFE min -150 °C Klingersil TOP Chem 2000
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type Length: -270 mm*

Base equipment printed in bold letters!

***not for vaporizing media (e.g. ammonia)**

3.3.1 ITA-3 CR64

Characteristics: PN16 / Float pipe and flange material: 1.4404



Key:

- | | |
|--|----------------------------------|
| 1 Float pipe welded, dimensions 64 x 2 mm | 9 Drain plug |
| 2 c to c distance | 10 Additional drain flange, open |
| 3 Design (indication rail) | 11 Float pipe top end finish |
| 4 Armaflex® insulation | 12 Vent plug |
| 6 Process connection side/side | 13 Counter flanges |
| 7 Side studs welded with T pieces
for 100 % X-ray testing | 14 Additional bracket |
| 8 Float removal flange | 15 Float pipe seamless |
| | 16 Float |

Technical specifications magnetic level gauge type ITA-3 CR64

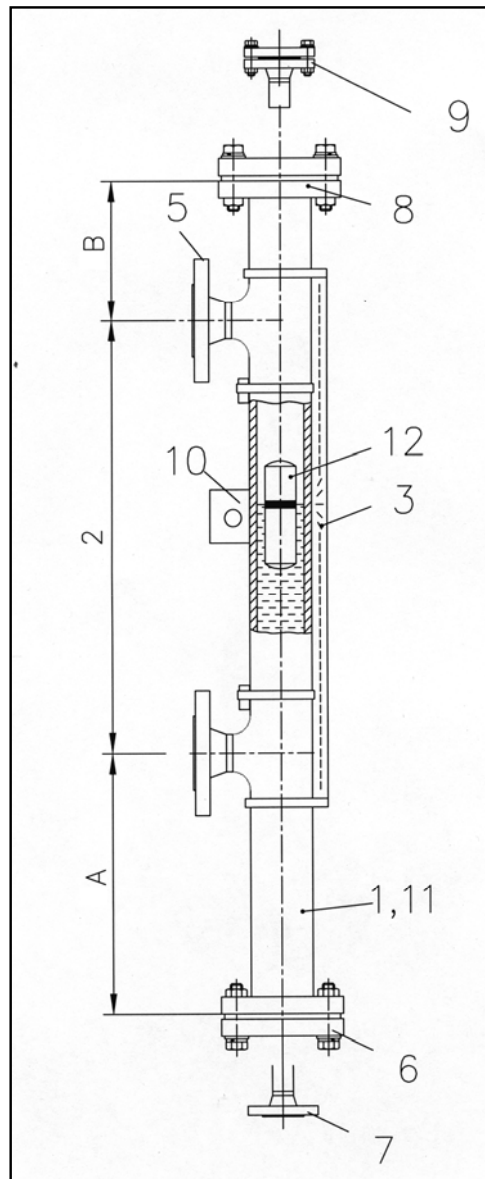
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	64 x 2 mm welded,
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 150#), Welding or threaded stud
Drain/Vent connections:	Plug G1/2" (for more please see order codes)
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-200...+100 °C
Operation pressure:	max. 16 bar
Operation density:	min. 0,4017 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS (min. -10°C) SS or material in acc. with DIN 17280
Gasket	PTFE min -150 °C Klingersil TOP Chem 2000
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type Length: -Ø50,8 x 270 mm* -Ø50,8 x 530 mm

Base equipment printed in bold letters!

***For use with vaporizing media (e.g. ammonia)**

3.4.1 ITA-3.5

**Characteristics: PN16 / Float pipe and flange material: 1.4404
(wetted parts E-CTFE-coated)**

**Key:**

- | | |
|---|------------------------|
| 1 Float pipe welded, dimensions 60,3 x 2 mm | 9 Additional bracket |
| 2 c to c distance | 10 Float pipe seamless |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Float |
| 6 Float removal flange | |
| 7 Additional drain flange, open | |
| 8 Float pipe top end finish | |

Technical specifications magnetic level gauge type ITA-3.5

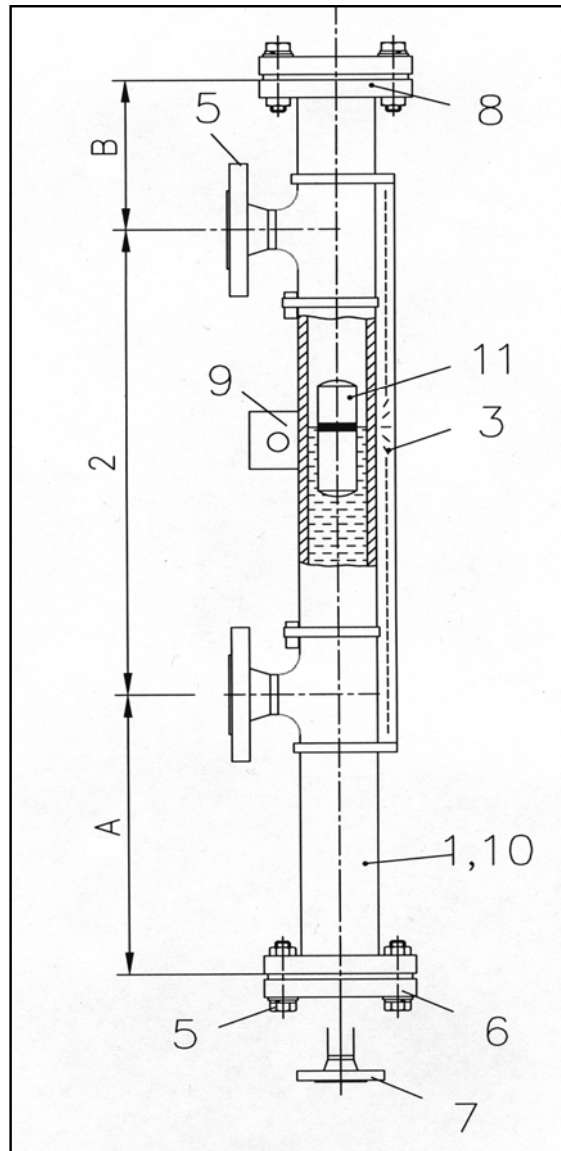
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 3100 mm (one-part, total length max. 3500 mm) > 3100 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 150#), Welding or threaded stud
Drain/Vent connections:	see order codes
Pipe material:	1.4404 (wetted parts E-CTFE coated)
Flange material:	same as pipe material
Float material:	Titanium/E-CTFE-coated
Operation temperature:	-50...+160 °C
Operation pressure:	max. 16 bar
Operation density:	min. 0,5645 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	PTFE min -150 °C Klingsil TOP Chem 2000
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type Length: -270 mm -130 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm

Base equipment printed in bold letters!

***for densities < 1,0 kg/dm³ enlarge the scale A**

3.5.1 ITA-3.8

Characteristics:
Float pipe and flange material 1.4404
wetted parts E-TFE-lined
applicable for vacuum service

**Key:**

- | | |
|---|------------------------|
| 1 Float pipe welded, dimensions 60,3 x 2 mm | 9 Additional bracket |
| 2 c to c distance | 10 Float pipe seamless |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Float |
| 6 Float removal flange | |
| 7 Additional drain flange, open | |
| 8 Float pipe top end finish | |

Technical specifications magnetic level gauge type ITA-3.8

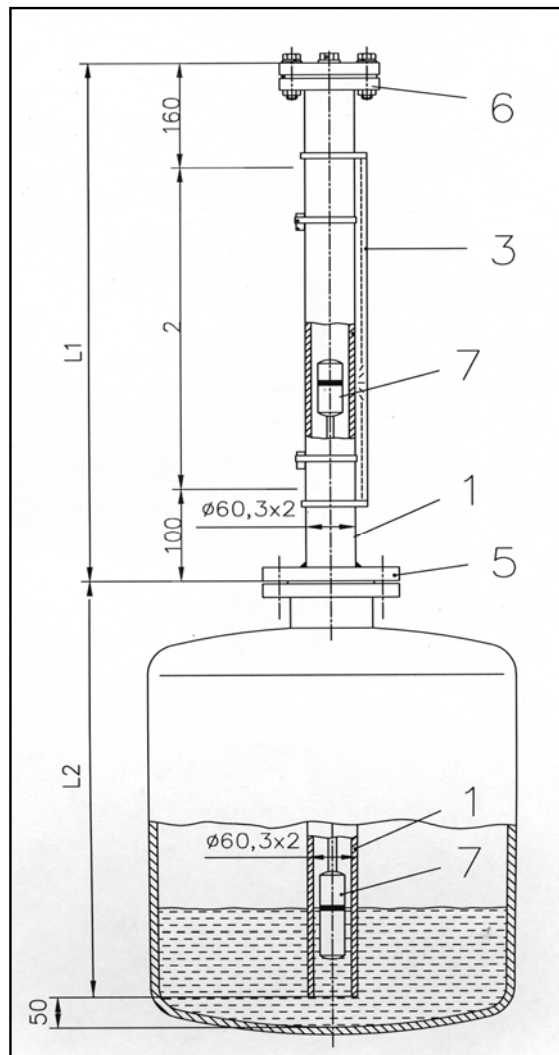
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 1700 mm (one-part, total length max. 2100 mm) > 1700 mm 2- or multipart
Pipe diameter:	64 x 2 mm welded
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 150#),
Drain/Vent connections:	see order codes
Pipe material:	1.4404 (wetted parts E-TFE lined)
Thickness of lining:	min. 3,27 mm
Flange material:	same as pipe material
Float material:	Titanium/E-TFE-coated
Operation temperature:	-50...+160 °C
Operation pressure:	max. 16 bar / vacuum resistant
Operation density:	min. 0,6873 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	PTFE up to 100 °C Klingsil-chem-200 up to 260 °C
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -150 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm

Base equipment printed in bold letters!

***for densities < 1,0 kg/dm³ enlarge the scale A**

3.6.1 ITA-4

**Characteristics: PN16 / Float pipe and flange material: 1.4404
(mounted from top of tank)**



Key:

- 1 Float pipe welded, dimensions 60,3 x 2 mm
- 2 Measuring length
- 3 Design (indication rail)
- 5 Process connection on tank
- 6 Follower magnet guide tube top side finish
- 7 Float with rod and follower magnet

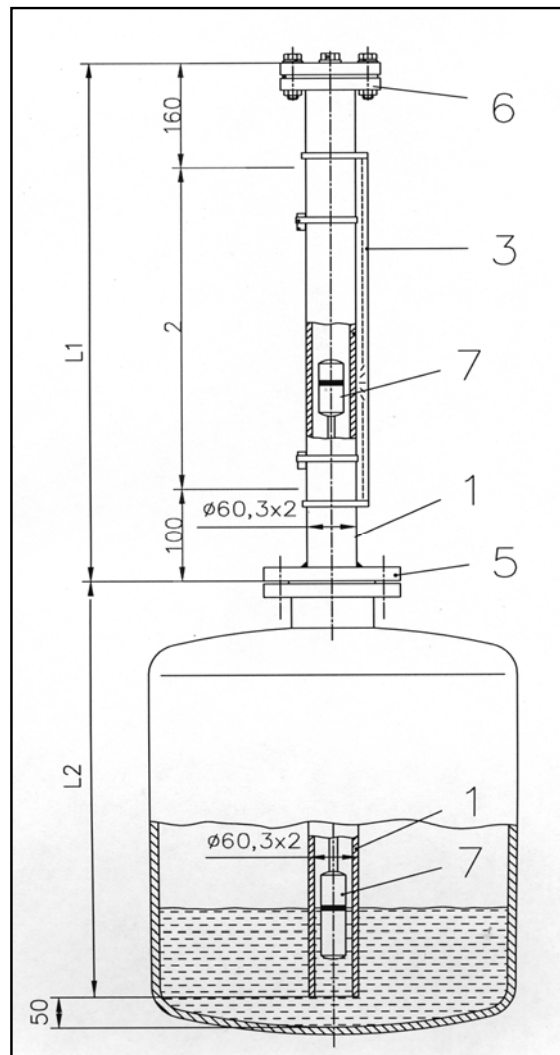
Technical specifications magnetic level gauge type ITA-4

Principle:	Communicating tubes with magnetic float
Mounting position:	Top of tank
Measuring range:	max. 2750 mm (depending on fluid's density)
Pipe diameter:	60,3 x 2 mm welded, necking connections
Process connection:	to specify: Flanges DN50 PN 16 pr 2" 150#
Drain/Vent connections:	Plug R1/2"
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-50..+400 °C
Operation pressure:	max. 16 bar
Operation density:	min. 0,68 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	PTFE up to 100 °C Klingersil C4400 up to 175 °C Graphit spiral wound up to 400 °C
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type, with rod

Base equipment printed in bold letters!

3.6.2 ITA-4.0

**Characteristics: PN16 / Float pipe: 1.4404 and flanges : CS
(mounted from top of tank)**



Key:

- 1 Float pipe welded, dimensions 60,3 x 2 mm
- 2 Measuring length
- 3 Design (indication rail)
- 5 Process connection on tank
- 6 Follower magnet guide tube top side finish
- 7 Float with rod and follower magnet

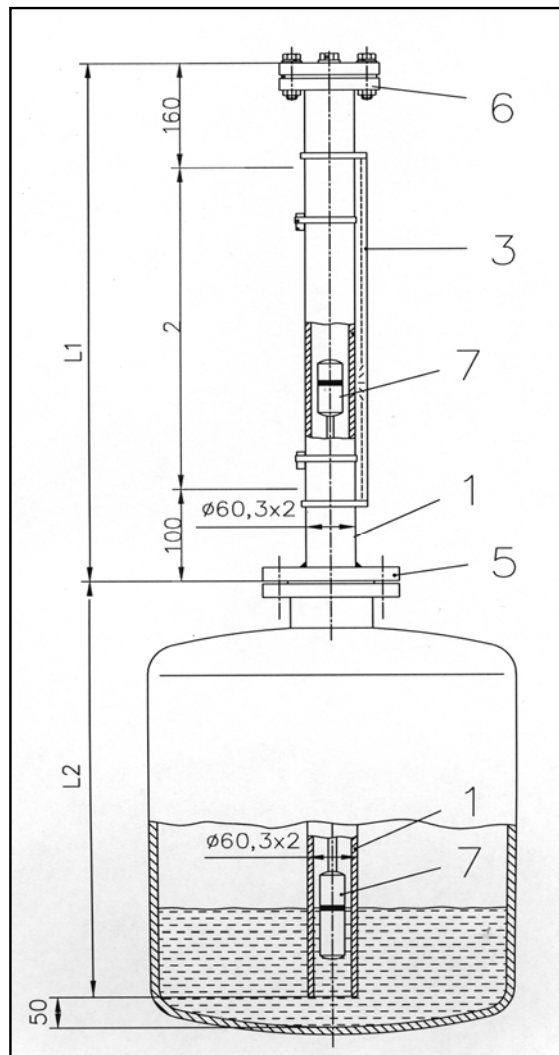
Technical specifications magnetic level gauge type ITA-4.0

Principle:	Communicating tubes with magnetic float
Mounting position:	Top of tank
Measuring range:	max. 2750 mm (depending on fluid's density)
Pipe diameter:	60,3 x 2 mm welded, necking connections
Process connection:	to specify: Flanges DN50 PN 16 pr 2" 150#
Drain/Vent connections:	Plug R1/2"
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	CS
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-50..+400 °C
Operation pressure:	max. 16 bar
Operation density:	min. 0,68 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	PTFE up to 100 °C Klingersil C4400 up to 175 °C Graphit spiral wound up to 400 °C
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type, with rod

Base equipment printed in bold letters!

3.7.1 ITA-4.1

**Characteristics: PN16 / Float pipe and flange material: 1.4404
(mounted from top of tank)**



Key:

- 1 Float pipe welded, dimensions 88,9 x 2 mm
- 2 Measuring length
- 3 Design (indication rail)
- 5 Process connection on tank
- 6 Follower magnet guide tube top side finish
- 7 Float with rod and follower magnet

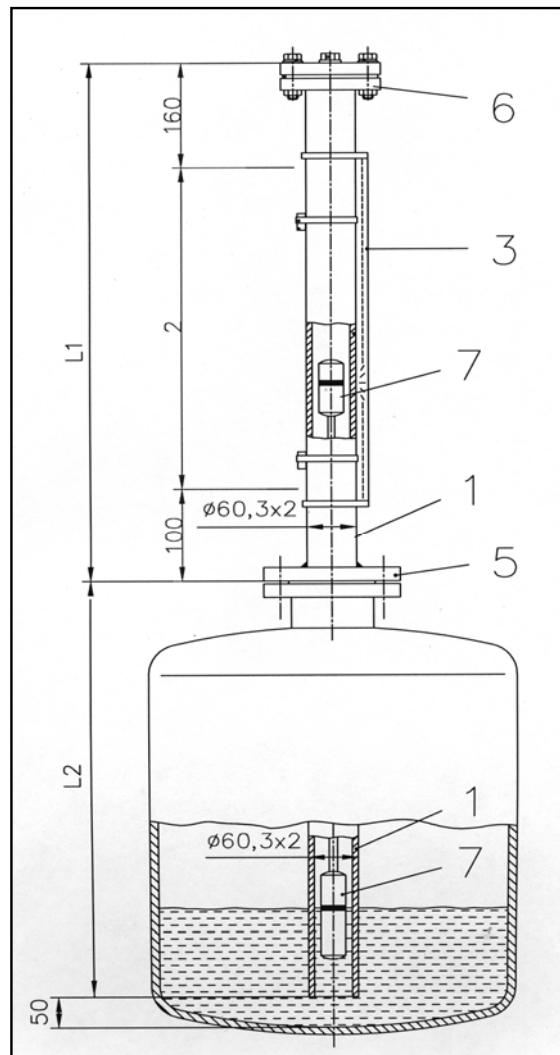
Technical specifications magnetic level gauge type ITA-4

Principle:	Communicating tubes with magnetic float
Mounting position:	Top of tank
Measuring range:	max. 2750 mm (depending on fluid's density)
Pipe diameter:	88,9 x 2 mm welded, necking connections
Process connection:	to specify: Flanges DN50 PN 16 pr 2" 150#
Drain/Vent connections:	Plug R1/2"
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-50..+400 °C
Operation pressure:	max. 16 bar
Operation density:	min. 0,35 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	PTFE up to 100 °C Klingersil C4400 up to 175 °C Graphit spiral wound up to 400 °C
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type, with rod

Base equipment printed in bold letters!

3.7.2 ITA-4.1.0

**Characteristics: PN16 / Float pipe: 1.4404 and flanges : CS
(mounted from top of tank)**



Key:

- 1 Float pipe welded, dimensions 88,9 x 2 mm
- 2 Measuring length
- 3 Design (indication rail)
- 5 Process connection on tank
- 6 Follower magnet guide tube top side finish
- 7 Float with rod and follower magnet

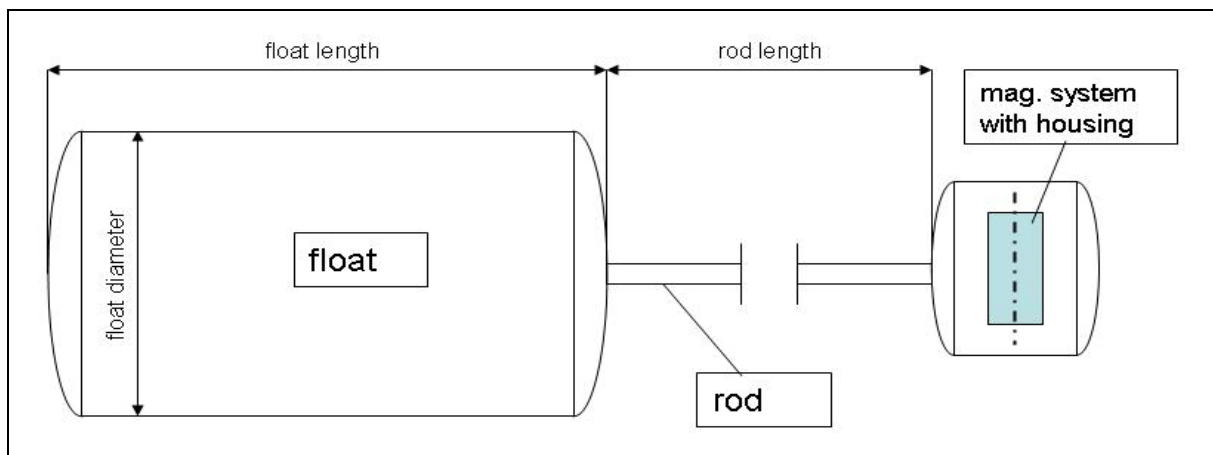
Technical specifications magnetic level gauge type ITA-4.0

Principle:	Communicating tubes with magnetic float
Mounting position:	Top of tank
Measuring range:	max. 2750 mm (depending on fluid's density)
Pipe diameter:	88,9 x 2 mm welded, necking connections
Process connection:	to specify: Flanges DN50 PN 16 pr 2" 150#
Drain/Vent connections:	Plug R1/2"
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	CS
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-50..+400 °C
Operation pressure:	max. 16 bar
Operation density:	min. 0,35 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	PTFE up to 100 °C Klingersil C4400 up to 175 °C Graphit spiral wound up to 400 °C
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type, with rod

Base equipment printed in bold letters!

Mag. Level Gauge
ITA-4.1 & ITA-4.1.0 PN16 / 150 lbs
Mounted on top of tank

Order codes for mag. Level Gauges type: ITA-4.1 & ITA-4.1.0 PN16/150 lbs

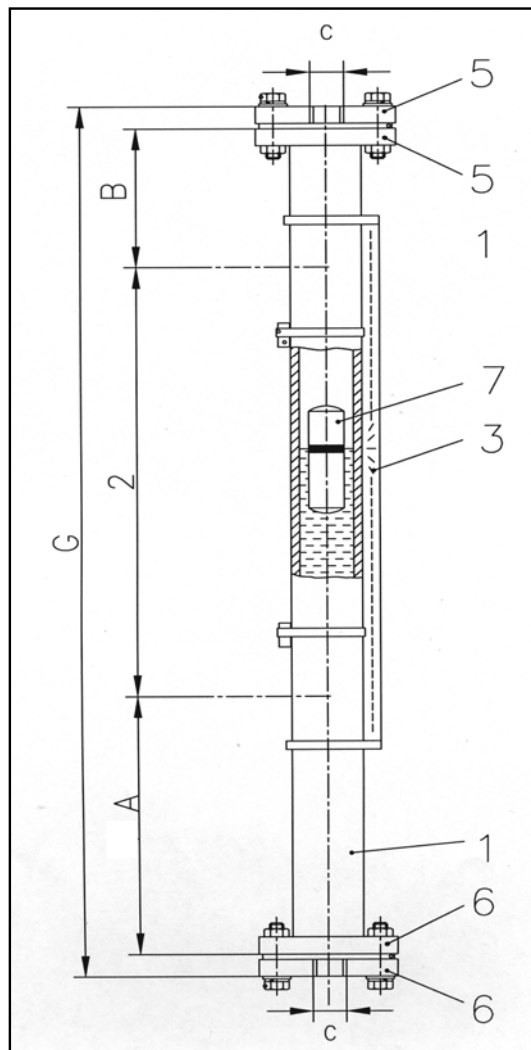


For additional accessories please refer to the chapters "Special Equipment" and "Electrical Accessories and Switches"

*The min. densities only are valid for temperature = 50 °C and rod dimensions 1000 mm (length) and 6 mm (diameter, standard).

3.8.1 ITA-5

**Characteristics: PN16 / Float pipe and flange material: 1.4404
(Process connections top/bottom)**



Key:

- 1 Float pipe welded, dimensions 60,3 x 2 mm
- 2 Distance between process connections
- 3 Design (indication rail)
- 5 Process connection top side
- 6 Process connection bottom side
- 7 Float removal flange

Technical specifications magnetic level gauge type ITA-5

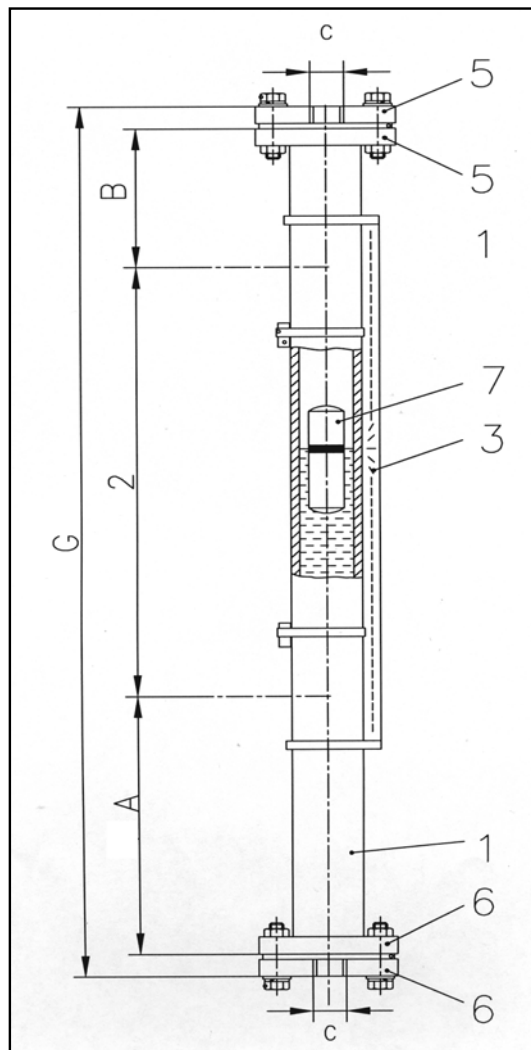
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded, 2" Sch10 60,3 x 2...8,7 mm seamless (depending on pressure rating)
Process connection:	to specify: R1/2" threaded (up to PN40) Welding or threaded stud Flanges DN15...50 (1/2"...2" 150#),
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-50..+400 °C
Operation pressure:	max. 16 bar , up to 320 bar
Operation density:	min. 0,3371 kg/dm³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	PTFE up to 100 °C Klingsil C4400 up to 175 °C Graphit spiral wound up to 400 °C**
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type or vented type (Depending on pressure rating)
Standard dimensions:	-A = 240 mm* -B = 130 mm (up to PN64) -C = R1/2" (up to PN40) 1/2"NPT (all pressure ratings)

Base equipment printed in bold letters!

*depending on the density scale A can be enlarged

3.8.2 ITA-5.0

**Characteristics: PN16 / Float pipe: 1.4404 and flanges : CS
(Process connections top/bottom)**

**Key:**

- 1 Float pipe welded, dimensions 60,3 x 2 mm
- 2 Distance between process connections
- 3 Design (indication rail)
- 5 Process connection top side
- 6 Process connection bottom side
- 7 Float removal flange

Technical specifications magnetic level gauge type ITA-5.0

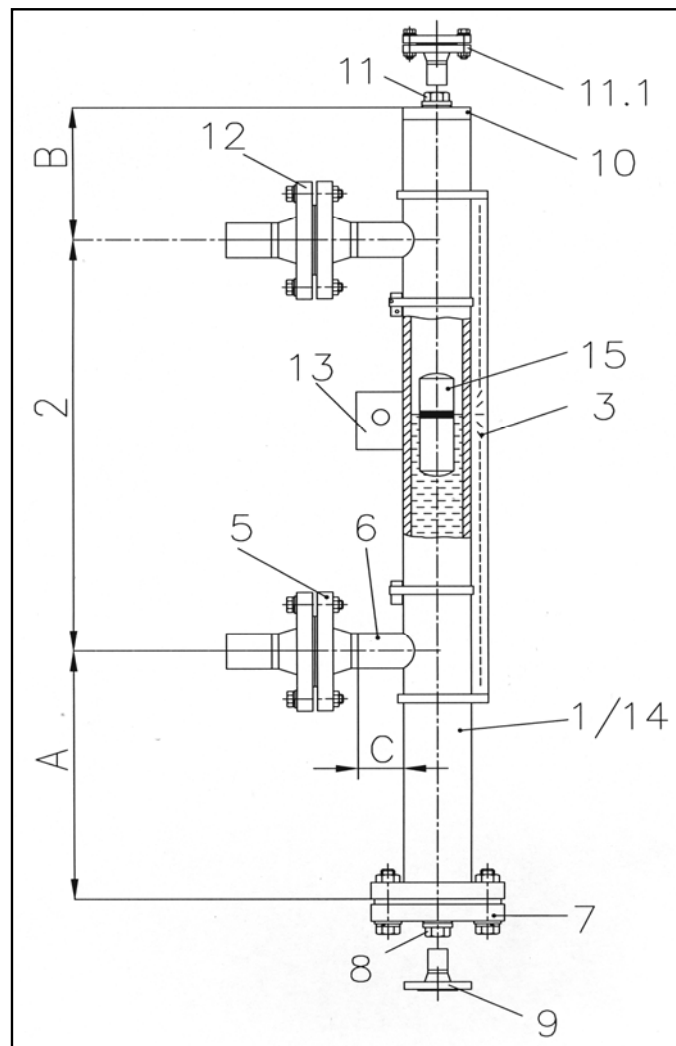
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded, 2" Sch10 60,3 x 2...8,7 mm seamless (depending on pressure rating)
Process connection:	to specify: R1/2" threaded (up to PN40) Welding or threaded stud Flanges DN15...50 (1/2"...2" 150#),
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	CS
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-50...+400 °C
Operation pressure:	max. 16 bar , up to 320 bar
Operation density:	min. 0,3371 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	PTFE up to 100 °C Klingsil C4400 up to 175 °C Graphit spiral wound up to 400 °C**
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type or vented type (Depending on pressure rating)
Standard dimensions:	-A = 240 mm* -B = 130 mm (up to PN64) -C = R1/2" (up to PN40) 1/2"NPT (all pressure ratings)

Base equipment printed in bold letters!

*depending on the density scale A can be enlarged

3.9.1 ITA-6

Characteristics: PN40 / Float pipe and flange material: 1.4404



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 2 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-6

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded, 60,3 x 2 mm seamless 2" Sch10 necking connection or butt weld with T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 300#), Welding or threaded stud
Drain/Vent connections:	Plug R1/2" (for more please see order codes)
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-50...+400 °C
Operation pressure:	max. 40 bar
Operation density:	min. 0,5723 kg/dm ³ up to 20 bar process pressure min. 0,4370 kg/dm ³ up to 40 bar process pressure
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	A193/A194 B7/2H A193/A194 B8/8M CS hot dipped galvanized SS
Gasket	PTFE up to 100 °C Klingersil C4400 up to 175 °C Graphit spiral wound up to 400 °C**
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -130 mm -150 mm -210 mm -330 mm -430 mm -530 mm -630 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm -C = 40 mm

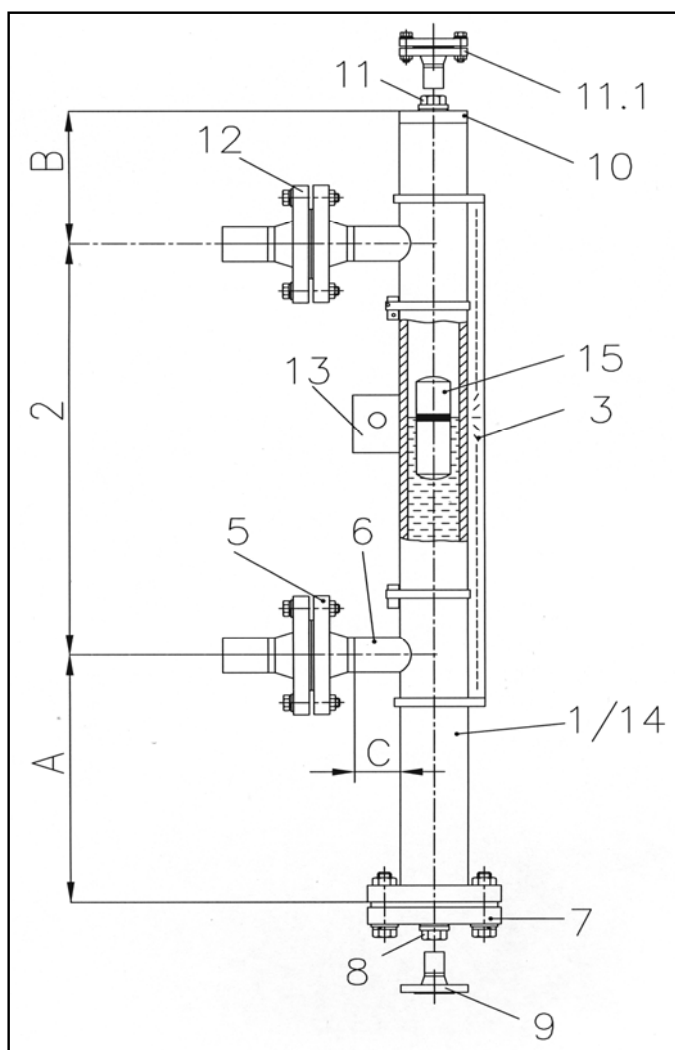
Base equipment printed in bold letters!

***for densities < 0,5723 kg/dm³ enlarge the scale A**

****only with vent- and/or drain flanges DN50 resp. 2"**

3.9.2 ITA-6.0

Characteristics: PN40 / Float pipe: 1.4404 and flanges : CS



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 2 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-6.0

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded, 60,3 x 2 mm seamless 2" Sch10 necking connection or buttweld with T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 300#), Welding or threaded stud
Drain/Vent connections:	Plug R1/2" (for more please see order codes)
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	CS
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-50..+400 °C
Operation pressure:	max. 40 bar
Operation density:	min. 0,5723 kg/dm ³ up to 20 bar process pressure min. 0,4370 kg/dm ³ up to 40 bar process pressure
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	A193/A194 B7/2H A193/A194 B8/8M CS hot dipped galvanized SS
Gasket	PTFE up to 100 °C Klingersil C4400 up to 175 °C Graphit spiral wound up to 400 °C**
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -130 mm -150 mm -210 mm -330 mm -430 mm -530 mm -630 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm -C = 40 mm

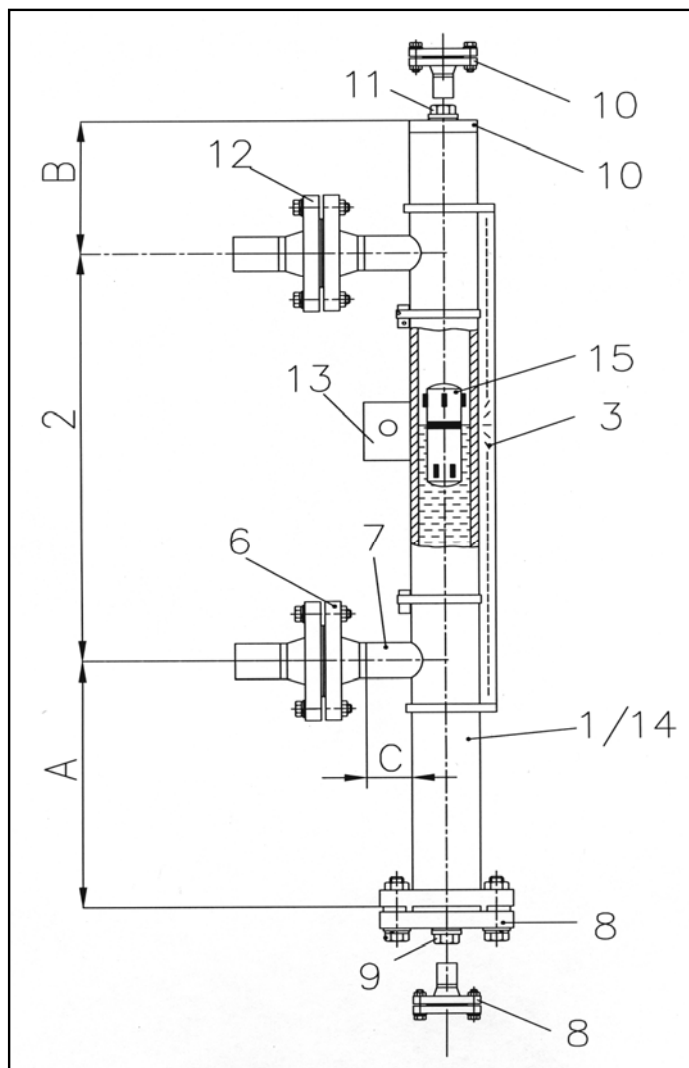
Base equipment printed in bold letters!

***for densities < 0,5723 kg/dm³ enlarge the scale A**

****only with vent- and/or drain flanges DN50 resp. 2"**

3.10.1 ITA-6 Cryo

Characteristics: PN16 / Float pipe and flange material: 1.4404



Key:

- | | |
|--|----------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 2 mm | 9 Drain plug |
| 2 c to c distance | 10 Additional drain flange, open |
| 3 Design (indication rail) | 11 Float pipe top end finish |
| 4 Armaflex® insulation | 12 Vent plug |
| 6 Process connection side/side | 13 Counter flanges |
| 7 Side studs welded with T pieces
for 100 % X-ray testing | 14 Additional bracket |
| 8 Float removal flange | 15 Float pipe seamless |
| | 16 Float |

Technical specifications magnetic level gauge type ITA-6 Cryo

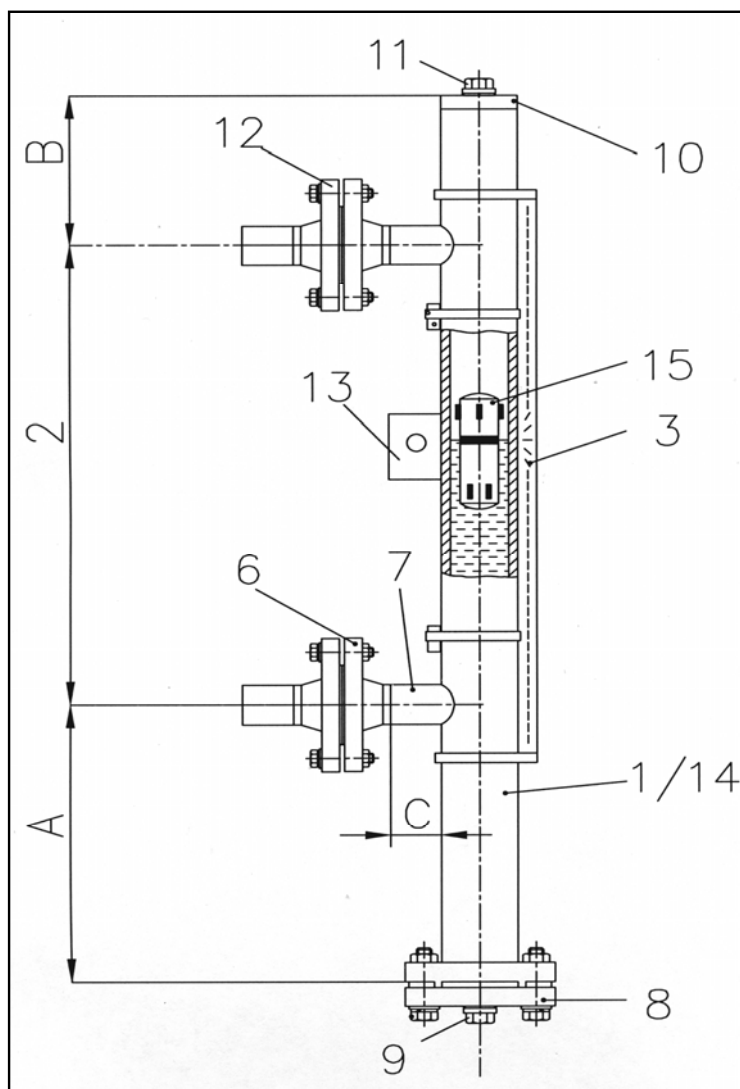
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 300#),
Drain/Vent connections:	Plug R1/2" (for more please see order codes)
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-200...+100 °C
Operation pressure:	max. 40 bar
Operation density:	min. 0,4693 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS (min. -10°C) SS or material in acc. with DIN 17280
Gasket	PTFE min -150 °C Klingersil TOP Chem 2000
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type Dimensions: - Ø50,8 x 270 mm*
Standard dimensions:	A = 240 mm* B = 130 mm C = 40 mm

Base equipment printed in bold letters!

***not for vaporizing media (e.g. ammonia)**

3.11.1 ITA-6 CR64

Characteristics: PN40 / Float pipe and flange material: 1.4404



Key:

- | | |
|--|----------------------------------|
| 1 Float pipe welded, dimensions 64 x 2 mm | 9 Drain plug |
| 2 c to c distance | 10 Additional drain flange, open |
| 3 Design (indication rail) | 11 Float pipe top end finish |
| 4 Armaflex® insulation | 12 Vent plug |
| 6 Process connection side/side | 13 Counter flanges |
| 7 Side studs welded with T pieces
for 100 % X-ray testing | 14 Additional bracket |
| 8 Float removal flange | 15 Float pipe seamless |
| | 16 Float |

Technical specifications magnetic level gauge type ITA-6 CR64

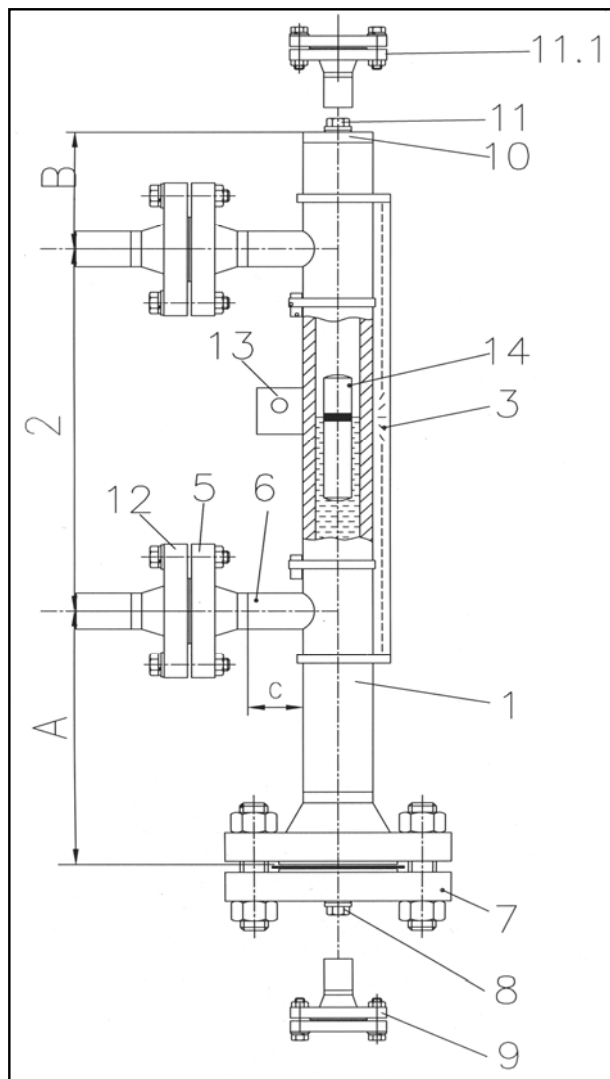
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	64 x 2 mm welded,
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 300#), Welding or threaded stud
Drain/Vent connections:	Plug G1/2" (for more please see order codes)
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	1.4404 Titan, Titan/E-CTFE-coated
Operation temperature:	-200...+100 °C
Operation pressure:	max. 40 bar
Operation density:	min. 0,4693 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS (min. -10°C) SS or material in acc. with DIN 17280
Gasket	PTFE min -150 °C Klingersil TOP Chem 2000
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type Length: -Ø50,8 x 270 mm* -Ø50,8 x 530 mm
Standard dimensions:	A = 240 mm* B = 130 mm C = 40 mm

Base equipment printed in bold letters!

***not for vaporizing media (e.g. ammonia)**

3.12.1 ITA-7

Characteristics: PN64 / Float pipe and flange material: 1.4404



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 2 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-7

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded, butt-weld connection wie T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 300#), Welding or threaded stud
Drain/Vent connections:	Plug 1/2"NPT
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	Titanium** , Titan/E-CTFE-coated
Operation temperature:	-50..+400 °C
Operation pressure:	max. 64 bar
Operation density:	min. 0,4243 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	Spiral wound, 316Ti Cam profile, 316Ti
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -330 mm -530 mm -630 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm -C = 40 mm

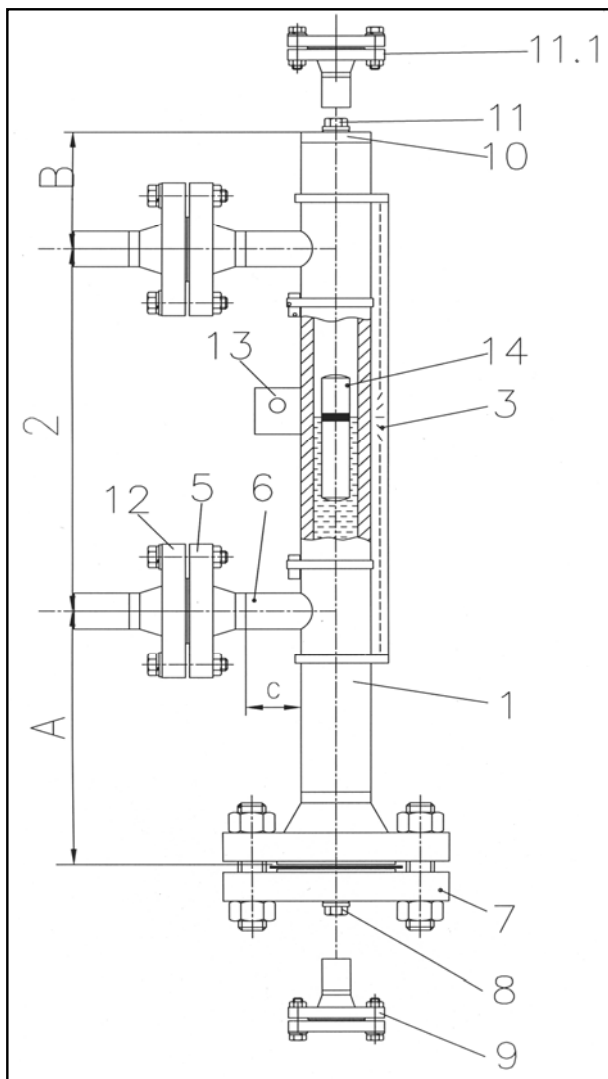
Base equipment printed in bold letters!

***for densities < 0,4243 kg/dm³ enlarge the scale A**

****not for use for hydrogen or alcohol-compounds**

3.12.2 ITA-7.0

Characteristics: PN64 / Float pipe: 1.4404 and flanges : CS



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 2 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-7.0

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 2 mm welded, butt-weld connection wie T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 300#), Welding or threaded stud
Drain/Vent connections:	Plug 1/2"NPT
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	CS
Float material:	Titanium** , Titan/E-CTFE-coated
Operation temperature:	-50...+400 °C
Operation pressure:	max. 64 bar
Operation density:	min. 0,4243 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	Spiral wound, 316Ti Cam profile, 316Ti
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -330 mm -530 mm -630 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm -C = 40 mm

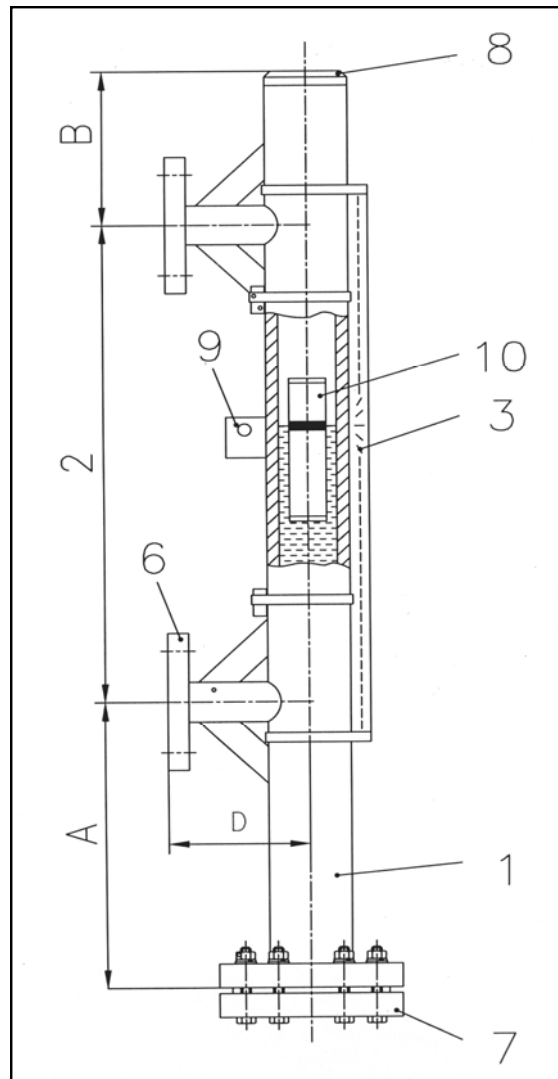
Base equipment printed in bold letters!

***for densities < 0,4243 kg/dm³ enlarge the scale A**

****not for use for hydrogen or alcohol-compounds**

3.13.1 ITA-8.1 [PVC]

Characteristics: PN6 / Material: PVC



Key:

- 1 Float pipe PVC, dimensions 63 x 47 mm
- 2 c to c distance
- 3 Design (indication rail)
- 6 Process connection side/side
- 7 Drain plug
- 8 Float pipe top end finish
- 9 Mounting link
- 10 Float

Technical specifications magnetic level gauge type ITA-8.1

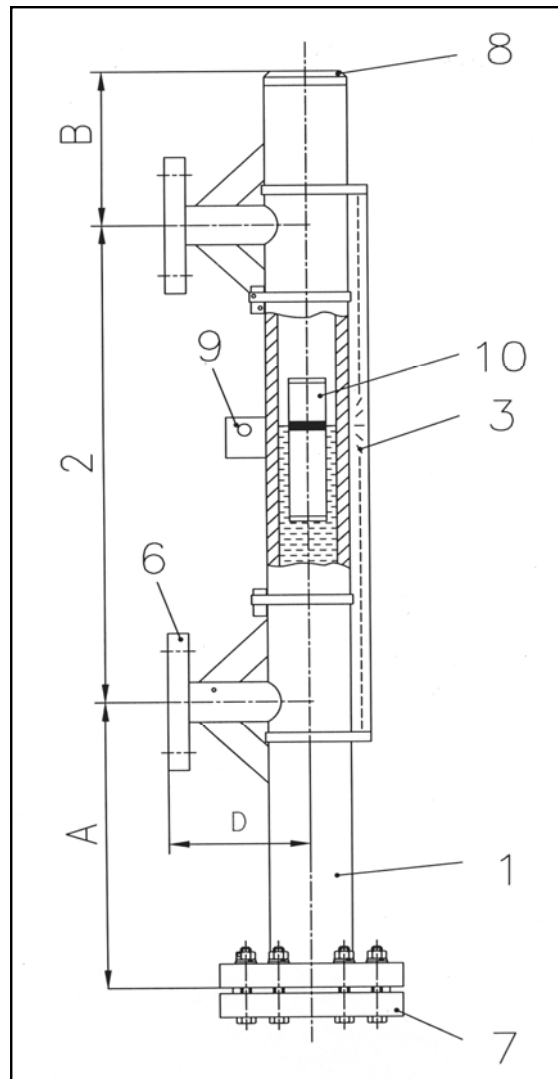
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	63 x 4,7 mm
Process connection:	to specify: Flanges DN15...50 (1/2"...2")
Drain/Vent connections:	Plug R1/2" (for more please see order codes)
Pipe material:	PVC
Flange material:	same as pipe material
Float material:	PVC
Operation temperature:	-30...+60 °C
Operation pressure:	max. 6 bar
Operation density:	min. 0,75 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	SS
Gasket	Viton
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type Length: - 255 mm - 135 mm
Standard dimensions:	A = 240 mm* B = 130 mm C = 110 mm

Base equipment printed in bold letters!

***for densities < 0,75 kg/dm³ enlarge scale A**

3.14.1 ITA-8.2 [PP]

Characteristics: PN6 / Material: PP



Key:

- 1 Float pipe PP, dimensions 63 x 47 mm
- 2 c to c distance
- 3 Design (indication rail)
- 6 Process connection side/side
- 7 Drain plug
- 8 Float pipe top end finish
- 9 Mounting link
- 10 Float

Technical specifications magnetic level gauge type ITA-8.2

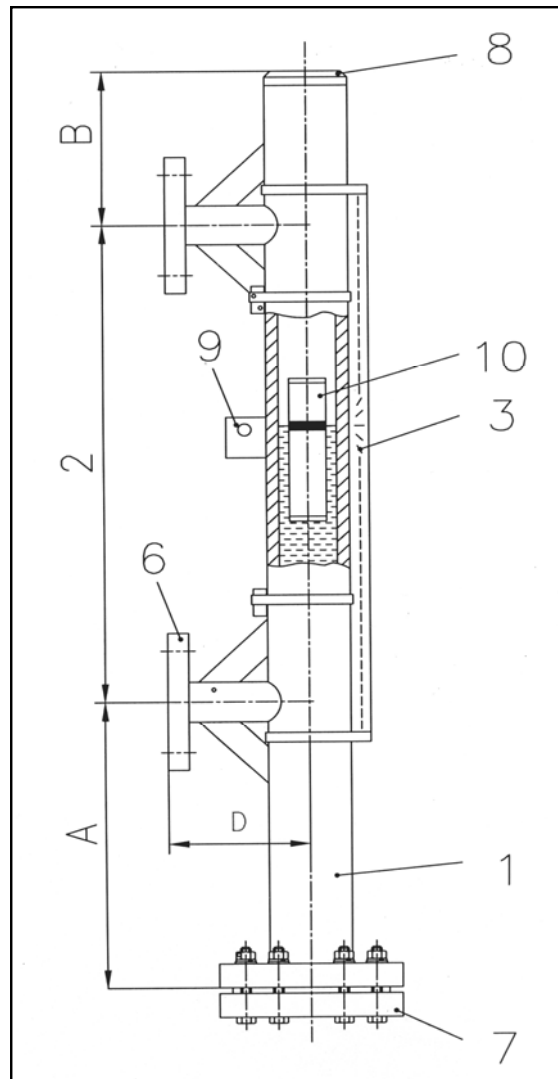
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	63 x 4,7 mm
Process connection:	to specify: Flanges DN15...50 (1/2"...2")
Drain/Vent connections:	Plug R1/2" (for more please see order codes)
Pipe material:	PP
Flange material:	same as pipe material
Float material:	PP
Operation temperature:	-30...+80 °C
Operation pressure:	max. 6 bar
Operation density:	min. 0,65 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	SS
Gasket	Viton
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type Length: - 255 mm - 135 mm
Standard dimensions:	A = 240 mm* B = 130 mm C = 110 mm

Base equipment printed in bold letters!

***for densities < 0,65 kg/dm³ enlarge scale A**

3.15.1 ITA-8.3 [PVDF]

Characteristics: PN6 / Material: PVDF



Key:

- 1 Float pipe PVDF, dimensions 63 x 47 mm
- 2 c to c distance
- 3 Design (indication rail)
- 6 Process connection side/side
- 7 Drain plug
- 8 Float pipe top end finish
- 9 Mounting link
- 10 Float

Technical specifications magnetic level gauge type ITA-8.3

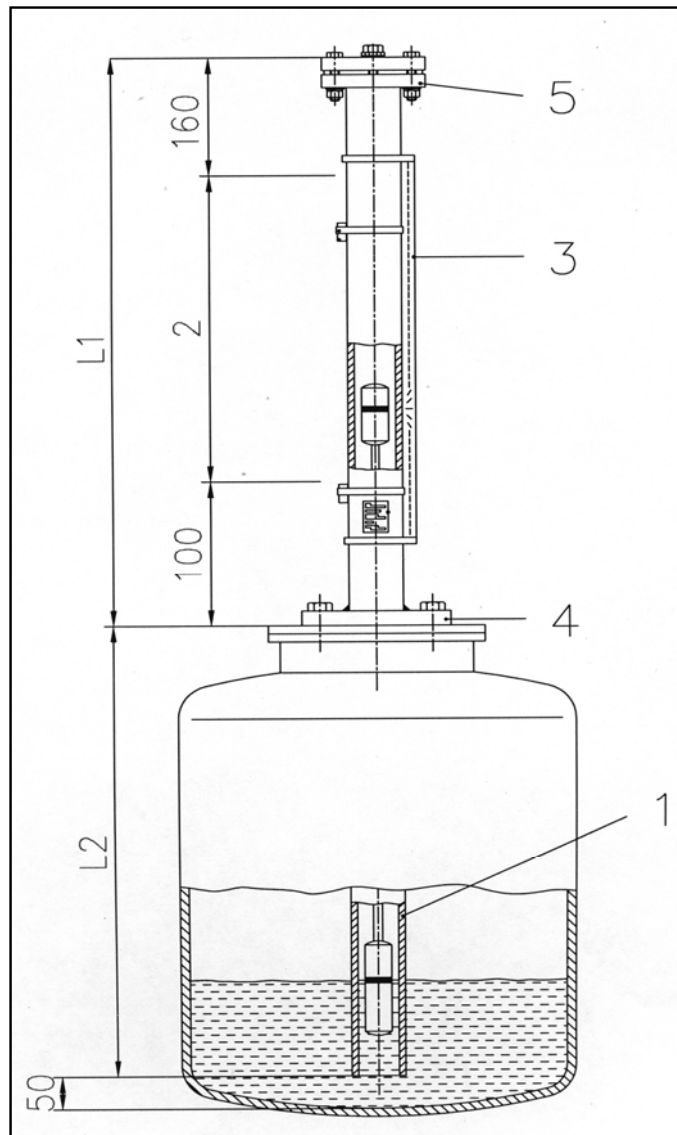
Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	63 x 4,7 mm
Process connection:	to specify: Flanges DN15...50 (1/2"...2")
Drain/Vent connections:	Plug R1/2" (for more please see order codes)
Pipe material:	PVDF
Flange material:	same as pipe material
Float material:	PVDF
Operation temperature:	-40..+120 °C
Operation pressure:	max. 6 bar
Operation density:	min. 0,85 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	SS
Gasket	Viton
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type Length: - 255 mm - 135 mm
Standard dimensions:	A = 240 mm* B = 130 mm C = 110 mm

Base equipment printed in bold letters!

***for densities < 0,85 kg/dm³ enlarge scale A**

3.16.1 ITA-9.1 [PVC]

**Characteristics: PN6 / Material: PVC
(mounted from top of tank)**

**Key:**

- 1 Float pipe PVC, dimensions 63 x 4,7 mm
- 2 Measuring length
- 3 Design (indication rail)
- 4 Process connection on tank
- 5 Follower magnet guide tube topside finish

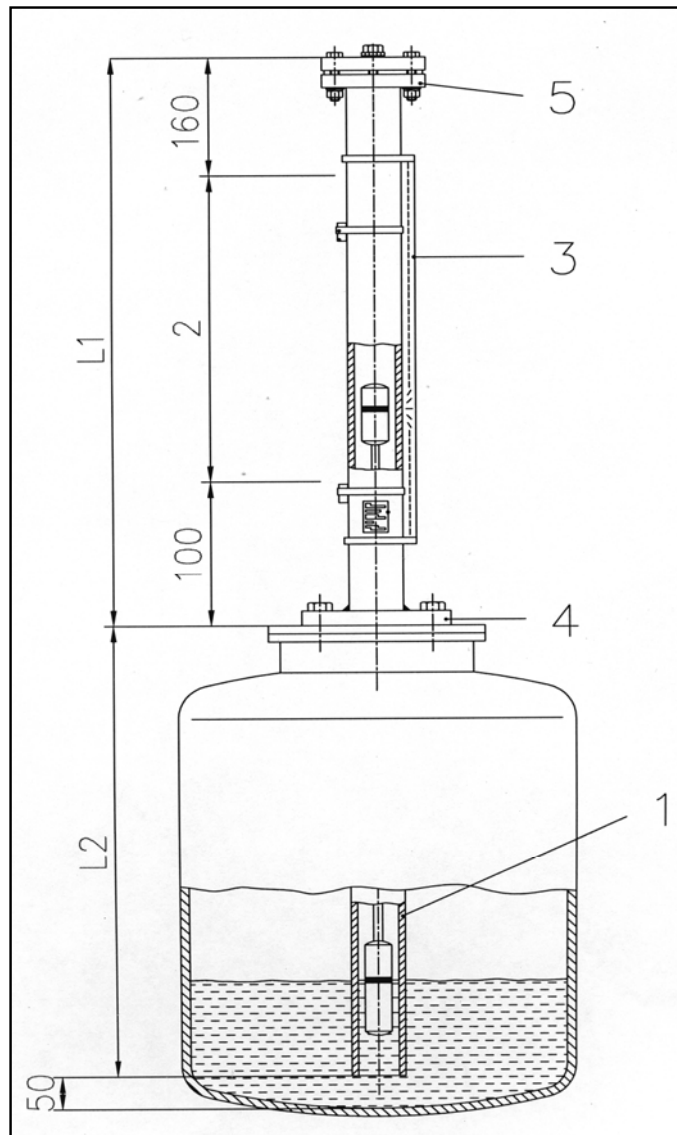
Technical specifications magnetic level gauge type ITA-9.1

Principle:	Communicating tubes with magnetic float
Mounting position:	top of tank
Measuring range:	max. 2500 mm
Pipe diameter:	63 x 4,7 mm
Process connection:	Flanged DN 80 (3") Flanged DN100...DN150 (4"...6")
Drain/Vent connections:	Flanged DN32 PN6
Pipe material:	PVC
Flange material:	same as pipe material
Float material:	PVC
Operation temperature:	-30...+50 °C
Operation pressure:	max. 6 bar
Operation density:	min. 0,7 kg/dm ³ (depending on the measuring length)
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	SS
Gasket	Viton
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type, with rod Length: - 250 mm - (special sizes available)

Base equipment printed in bold letters!

3.17.1 ITA-9.2 [PP]

**Characteristics: PN6 / Material: PP
(mounted from top of tank)**

**Key:**

- 1 Float pipe PP, dimensions 63 x 3,6 mm
- 2 Measuring length
- 3 Design (indication rail)
- 4 Process connection on tank
- 5 Follower magnet guide tube topside finish

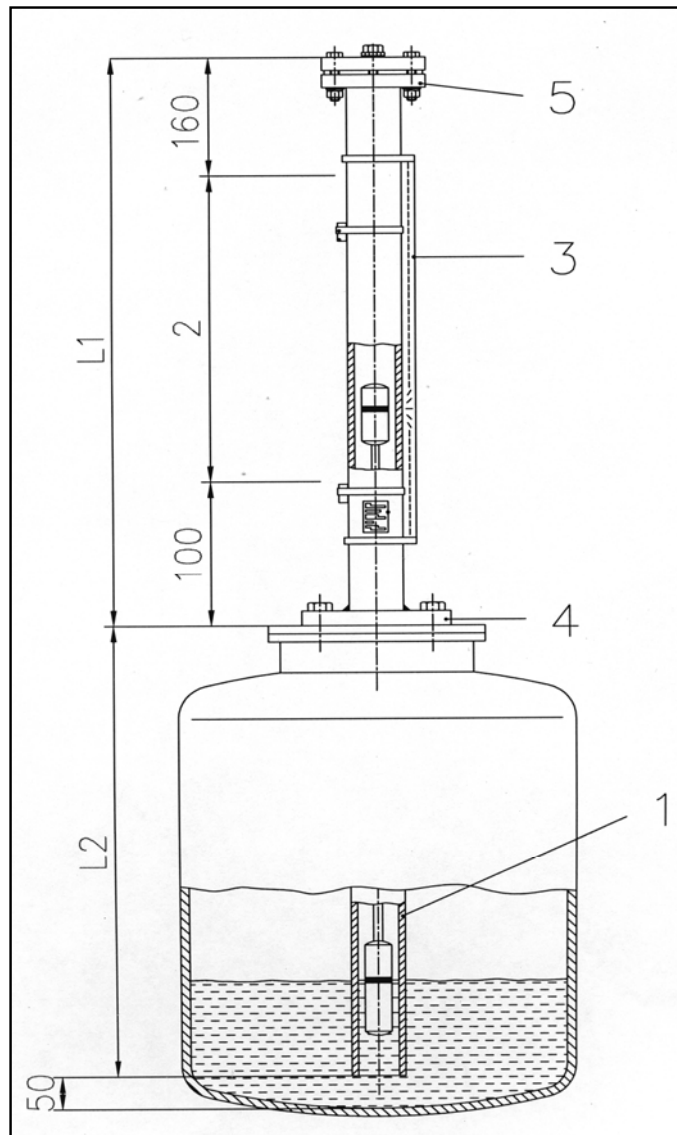
Technical specifications magnetic level gauge type ITA-9.2

Principle:	Communicating tubes with magnetic float
Mounting position:	top of tank
Measuring range:	max. 2500 mm
Pipe diameter:	63 x 3,6 mm
Process connection:	Flanged DN 80 (3") Flanged DN100...DN150 (4"...6")
Drain/Vent connections:	Flanged DN32 PN6
Pipe material:	PP
Flange material:	same as pipe material
Float material:	PP
Operation temperature:	-10...+80 °C
Operation pressure:	max. 6 bar
Operation density:	min. 0,7 kg/dm ³ (depending on the measuring length)
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	SS
Gasket	Viton
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type, with rod Length: - 250 mm - (special sizes available)

Base equipment printed in bold letters!

3.18.1 ITA-9.3 [PVDF]

**Characteristics: PN6 / Material: PVDF
(mounted from top of tank)**

**Key:**

- 1 Float pipe PVDF, dimensions 63 x 3 mm
- 2 Measuring length
- 3 Design (indication rail)
- 4 Process connection on tank
- 5 Follower magnet guide tube topside finish

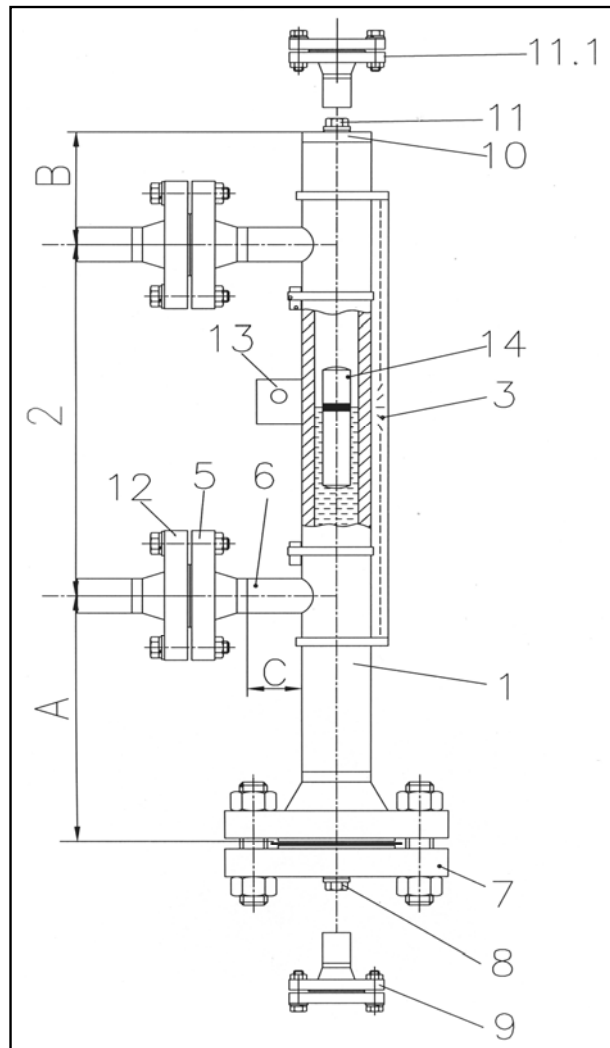
Technical specifications magnetic level gauge type ITA-9.3

Principle:	Communicating tubes with magnetic float
Mounting position:	top of tank
Measuring range:	max. 2500 mm
Pipe diameter:	63 x 3 mm
Process connection:	Flanged DN 80 (3") Flanged DN100...DN150 (4"...6")
Drain/Vent connections:	Flanged DN32 PN6
Pipe material:	PVDF
Flange material:	same as pipe material
Float material:	PVDF
Operation temperature:	-40...+120 °C
Operation pressure:	max. 6 bar
Operation density:	min. 0,7 kg/dm ³ (depending on the measuring length)
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	SS
Gasket	Viton
Indication rail:	Aluminium 1.4301
Float types:	Cylindrical, sealed type, with rod Length: - 250 mm - (special sizes available)

Base equipment printed in bold letters!

3.19.1 ITA-10

Characteristics: PN100 / Float pipe and flange material: 1.4404



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 3,2 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-10

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 3,2 mm seamless, butt-weld connection wie T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 600#), Welding or threaded stud
Drain/Vent connections:	Plug 1/2"NPT
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	Titanium*** , Titan/E-CTFE-coated
Operation temperature:	-50...+400 °C
Operation pressure:	max. 100 bar
Operation density:	min. 0,4632 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	Spiral wound, 316Ti Cam profile, 316Ti
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -330 mm -430 mm -530 mm -630 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm** -C = 70 mm

Base equipment printed in bold letters!

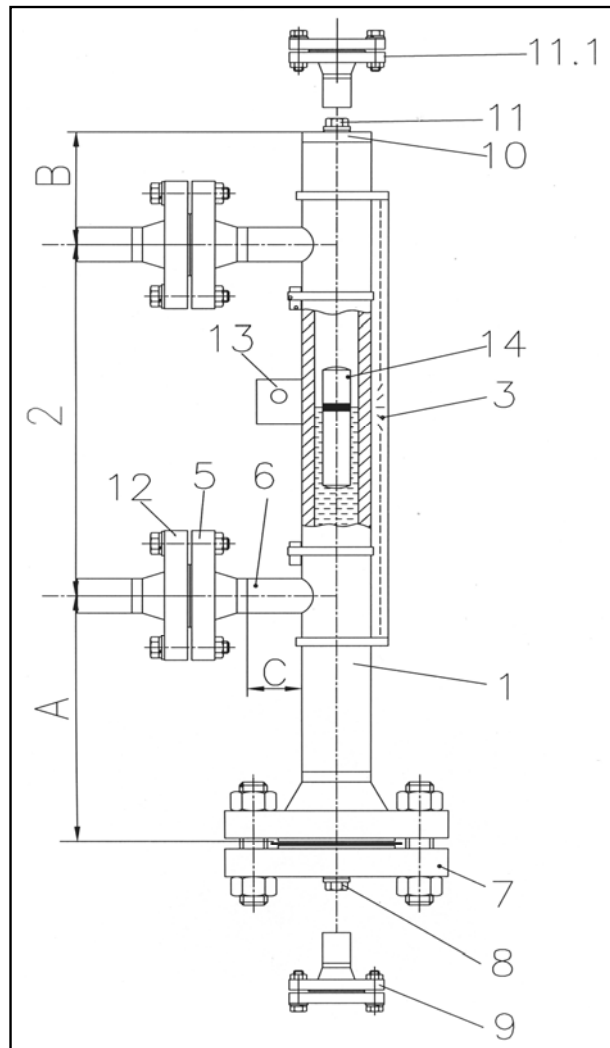
***for densities < 0,4243 kg/dm³ enlarge the scale A**

**** for end cap B=170 mm for WN**

****not for use for hydrogen or alcohol-compounds**

3.19.2 ITA-10.0

Characteristics: PN100 / Float pipe: 1.4404 and flanges : CS



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 3,2 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

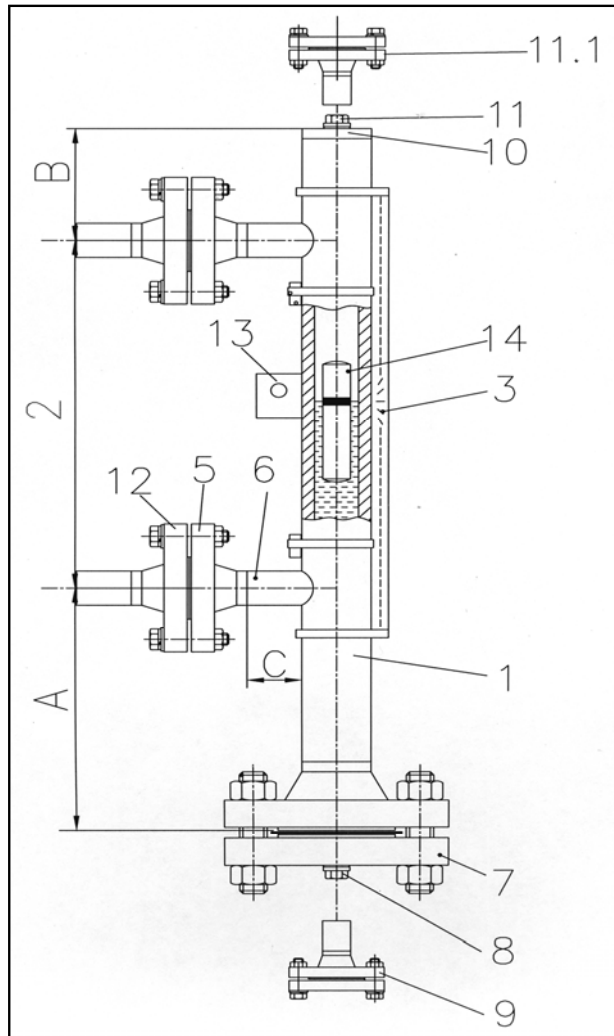
Technical specifications magnetic level gauge type ITA-10.0

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 3,2 mm seamless, butt-weld connection wie T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 600#), Welding or threaded stud
Drain/Vent connections:	Plug 1/2"NPT
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	CS
Float material:	Titanium***, Titan/E-CTFE-coated
Operation temperature:	-50...+400 °C
Operation pressure:	max. 100 bar
Operation density:	min. 0,4632 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	Spiral wound, 316Ti Cam profile, 316Ti
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -330 mm -430 mm -530 mm -630 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm** -C = 70 mm

Base equipment printed in bold letters!***for densities < 0,4243 kg/dm³ enlarge the scale A****** for end cap B=170 mm for WN******not for use for hydrogen or alcohol-compounds**

3.20.1 ITA-11

Characteristics: PN160 / Float pipe and flange material: 1.4404



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 3,91 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-11

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 3,91 mm seamless, 60,3 x 3,6 mm seamless welding stud or butt-weld connection wie T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2" ...2" 1500#), Welding or threaded stud
Drain/Vent connections:	Plug 1/2"NPT
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	316Ti (1.4571); Titanium***
Operation temperature:	-50...+400 °C
Operation pressure:	max. 160 bar
Operation density:	min. 0,6008 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	Spiral wound, 316Ti Cam profile, 316Ti
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -330 mm -430 mm -530 mm
Standard dimensions:	- A = 240 mm* - B = 130 mm** - C = 70 mm

Base equipment printed in bold letters!

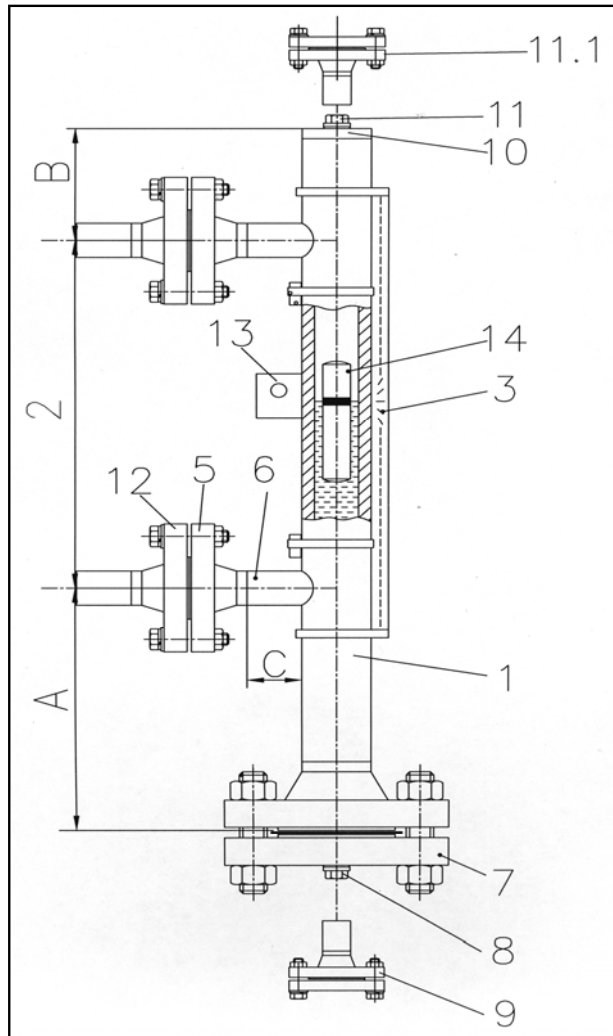
***for densities < 0,4243 kg/dm³ enlarge the scale A**

**** for end cap B=170 mm for WN**

****not for use for hydrogen or alcohol-compounds**

3.20.2 ITA-11.0

Characteristics: PN160 / Float pipe: 1.4404 and flanges : CS



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 3,91 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-11.0

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 3,91 mm seamless, 60,3 x 3,6 mm seamless welding stud or butt-weld connection wie T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2" ...2" 1500#), Welding or threaded stud
Drain/Vent connections:	Plug 1/2"NPT
Pipe material:	1.4404; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	CS
Float material:	316Ti (1.4571); Titanium***
Operation temperature:	-50...+400 °C
Operation pressure:	max. 160 bar
Operation density:	min. 0,6008 kg/dm ³
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	Spiral wound, 316Ti Cam profile, 316Ti
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type Length: -270 mm -330 mm -430 mm -530 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm** -C = 70 mm

Base equipment printed in bold letters!

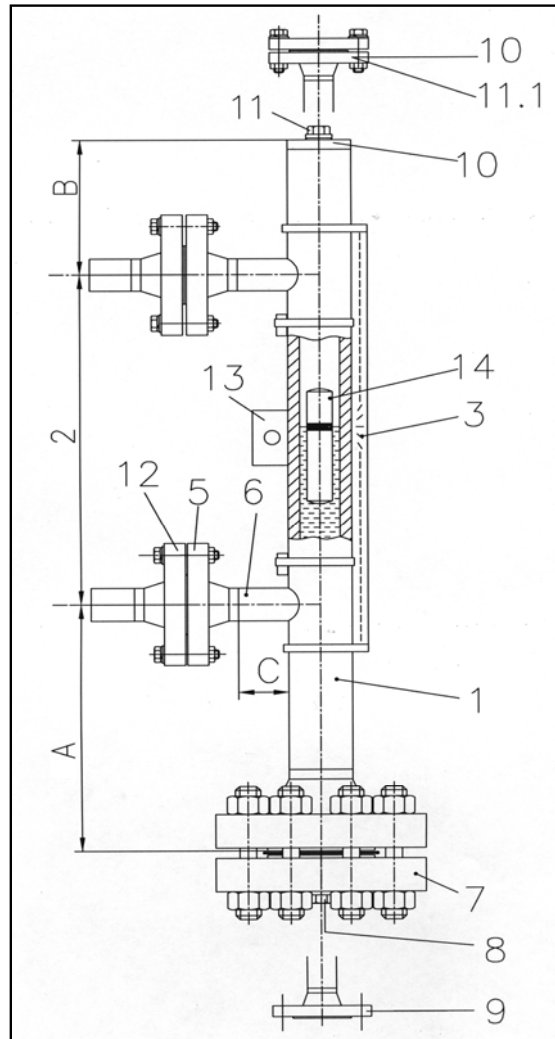
***for densities < 0,4243 kg/dm³ enlarge the scale A**

**** for end cap B=170 mm for WN**

****not for use for hydrogen or alcohol-compounds**

3.21.1 ITA-12

Characteristics: PN250 / Float pipe and flange material: 1.4404



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 5,54 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-12

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 5,54 mm seamless, welding stud or butt-weld connection wie T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 1500#), Welding or threaded stud
Drain/Vent connections:	Plug 1/2"NPT
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	316Ti (1.4571) ; Titanium***
Operation temperature:	-50...+400 °C
Operation pressure:	max. 250 bar
Operation density:	min. 0,57 kg/dm ³ (vented float) min. 0,828 kg/dm ³ (sealed float)
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	Spiral wound, 316Ti Cam profile, 316Ti
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type (Titanium) Length: -270 mm -330 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm** -C = 100 mm

Base equipment printed in bold letters!

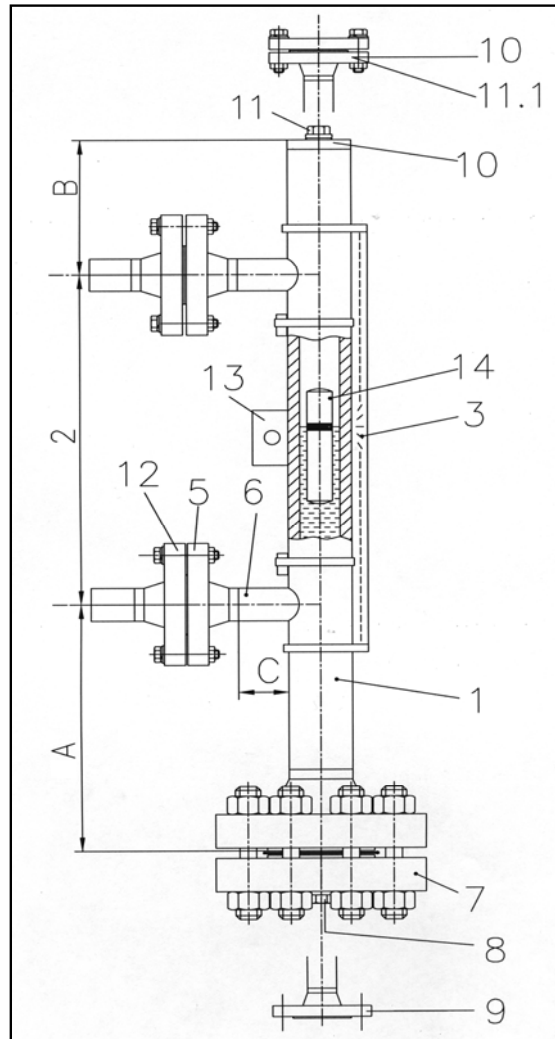
***for densities < 0,57 kg/dm³ enlarge the scale A**

**** for end cap B=170 mm for WN**

****not for use for hydrogen or alcohol-compounds**

3.21.2 ITA-12.0

Characteristics: PN250 / Float pipe: 1.4404 and flanges : CS



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 5,54 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-12.0

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 5,54 mm seamless, welding stud or butt-weld connection wie T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 1500#), Welding or threaded stud
Drain/Vent connections:	Plug 1/2"NPT
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	CS
Float material:	316Ti (1.4571) ; Titanium***
Operation temperature:	-50...+400 °C
Operation pressure:	max. 250 bar
Operation density:	min. 0,57 kg/dm ³ (vented float) min. 0,828 kg/dm ³ (sealed float)
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	Spiral wound, 316Ti Cam profile, 316Ti
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type (Titanium) Length: -270 mm -330 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm** -C = 100 mm

Base equipment printed in bold letters!

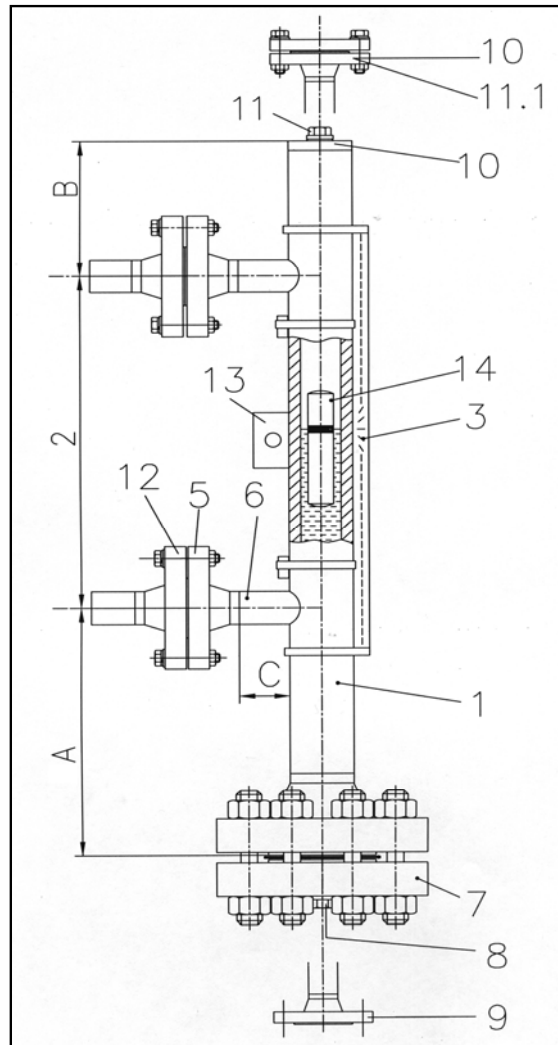
***for densities < 0,57 kg/dm³ enlarge the scale A**

**** for end cap B=170 mm for WN**

****not for use for hydrogen or alcohol-compounds**

3.22.1 ITA-13

Characteristics: PN320 / Float pipe and flange material: 1.4404



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 8,7 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-13

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 8,7 mm seamless, welding stud or butt-weld connection wie T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 2500#), Welding or threaded stud
Drain/Vent connections:	Plug 1/2"NPT
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	same as pipe material
Float material:	Titanium***
Operation temperature:	-50...+400 °C
Operation pressure:	max. 320 bar
Operation density:	min. 0,5032 kg/dm ³ (vented float) min. 0,7582 kg/dm ³ (sealed float)
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	Spiral wound, 316Ti Cam profile, 316Ti
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type (Titanium) Length: -270 mm -330 mm -430 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm** -C = 100 mm

Base equipment printed in bold letters!

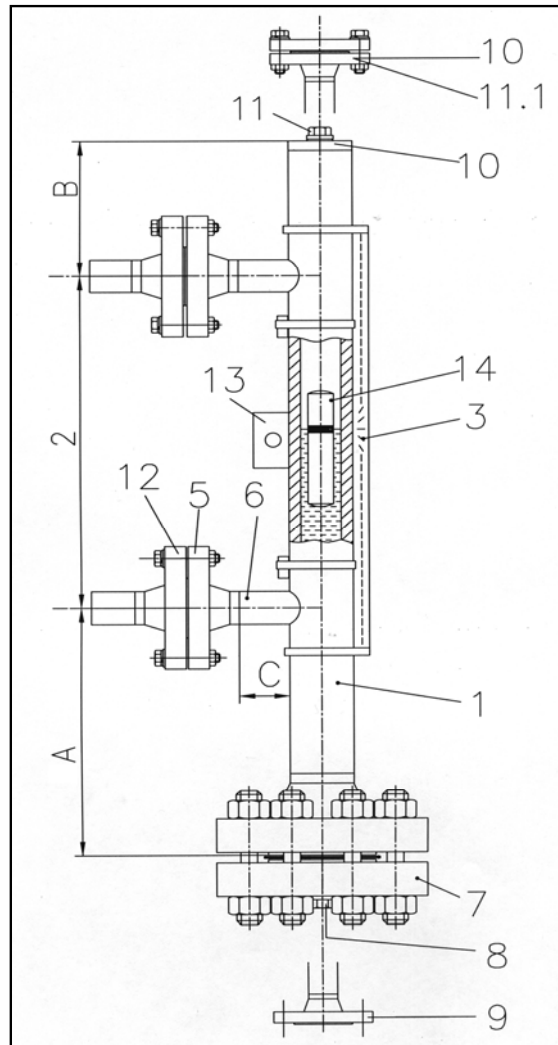
*depending on density enlarge the scale A

** for end cap B=170 mm for WN

**not for use for hydrogen or alcohol-compounds

3.22.2 ITA-13.0

Characteristics: PN320 / Float pipe: 1.4404 and flanges : CS



Key:

- | | |
|--|---------------------------------|
| 1 Float pipe welded, dimensions 60,3 x 8,7 mm | 9 Additional drain flange, open |
| 2 c to c distance | 10 Float pipe top end finish |
| 3 Design (indication rail) | 11 Vent plug |
| 5 Process connection side/side | 12 Counter flanges |
| 6 Side studs welded with T pieces
for 100 % X-ray testing | 13 Additional bracket |
| 7 Float removal flange | 14 Float pipe seamless |
| 8 Drain plug | 15 Float |

Technical specifications magnetic level gauge type ITA-13.0

Principle:	Communicating tubes with magnetic float
Mounting position:	vertical
Measuring range:	max. 5000 mm (one-part) > 5000 mm 2- or multipart
Pipe diameter:	60,3 x 8,7 mm seamless, welding stud or butt-weld connection wie T-pieces
Process connection:	to specify: Flanges DN15...50 (1/2"...2" 2500#), Welding or threaded stud
Drain/Vent connections:	Plug 1/2"NPT
Pipe material:	1.4404 ; 1.4435; 1.4539; Hastelloy C4 (2.4610); Inconel 625 (2.4856); Inconel 825 (2.4858); Titan (3.7035) (other materials on request)
Flange material:	CS
Float material:	Titanium***
Operation temperature:	-50...+400 °C
Operation pressure:	max. 320 bar
Operation density:	min. 0,5032 kg/dm ³ (vented float) min. 0,7582 kg/dm ³ (sealed float)
Viscosity:	max. 5000 mPa s
Bolts & Nuts:	CS SS
Gasket	Spiral wound, 316Ti Cam profile, 316Ti
Indication rail:	Makrolon up to 120 °C Aluminium up to 400 °C 1.4301 up to 400 °C
Float types:	Cylindrical, sealed type (Titanium) Length: -270 mm -330 mm -430 mm
Standard dimensions:	-A = 240 mm* -B = 130 mm** -C = 100 mm

Base equipment printed in bold letters!

***depending on density enlarge the scale A**

**** for end cap B=170 mm for WN**

****not for use for hydrogen or alcohol-compounds**

4. Equipment

4.1 ITA-3 Cryo

If Armaflex is used for insulation ($t=9$ mm) the material for the indication rail will be aluminium. As standard for the level gauge in Cryo-design we use a float chamber $\square 60,3 \times 2$ mm with a float from titanium ($\square 50,8 \times 240$ mm length) down to a liquid density of $0,6 \text{ kg/dm}^3$.

For temperatures below -40°C the Armaflex insulation is double ply, the upper layer only up to the indication rail.

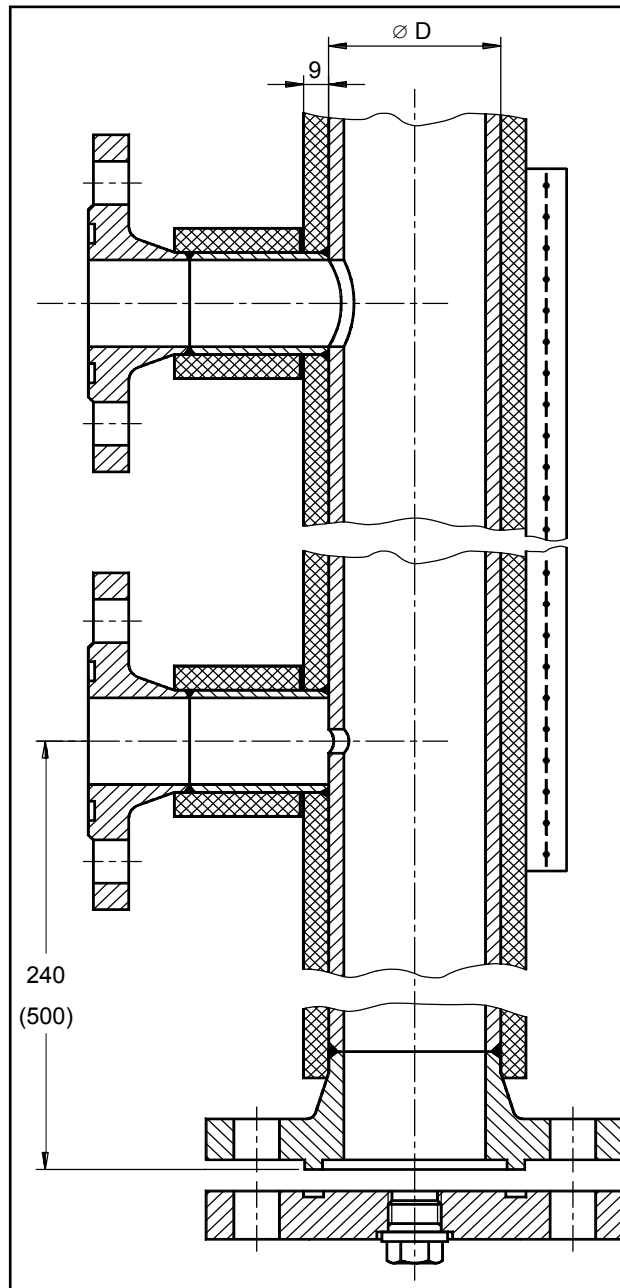
The customer should also insulate the process flanges.

For vaporizing media (for example ammonia) we recommend to use floats with 4 distance sleeves (In this case the floats are smaller than standard floats). This construction prevents catapulting the float upwards (this would cause switch failures) if gas evolution appears.

For temperatures down to -20°C we are using a float chamber $\square 60,3 \times 2$ mm and a titanium float $\square 45 \times 400$ mm, for temperatures below -20°C we are using a float chamber $\square 64 \times 2$ mm and a titanium float $\square 50,8 \times 500$ mm.

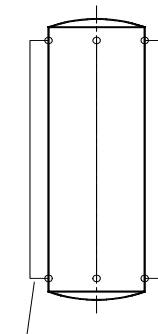
In every case we use flanges DN50 as drain connections (weld neck and blind flanges with groove and tongue). When the dimension of the float chamber is $\square 64 \times 2$ mm, it is necessary to modify the weld neck flange.

On request by the customer we make use of small hole (throttling part) to transmit the liquid level to the float chamber. It stabilizes



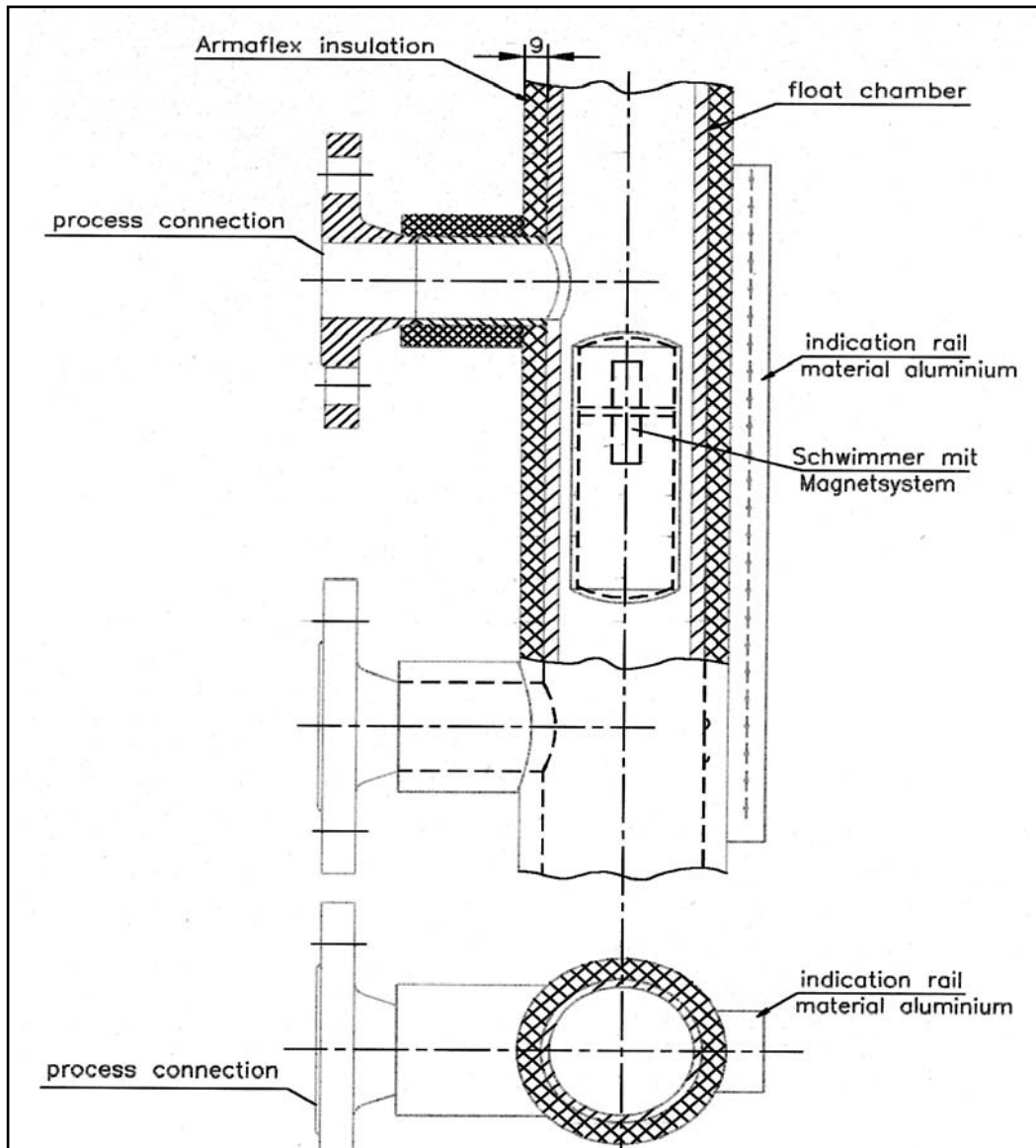
throttling part dependence on the temperature:

- Ø 4 mm for T -20°C
- Ø 2 mm for T $< -20^\circ\text{C}$



distance sleeve

4.2 Armaflex®-Insulation



4.3 Heat insulation

Isolation and sealing material:

made of e-glassyarns

Technical data:

Composition in %:	: 53 % SiO ₂ , 16 % CaO, 13 % Al ₂ O ₃ , 7 % B ₂ O ₃ , 4 % MgO, 1 % Na ₂ + K ₂ O
Portion organic substance	: < 1 % (combust at first heating-up)
Density (g/cm ³)	: 2,5
Temperature resistance	: 500°C/550°C
Degree of moisture	: 1%
Annealing loss	: 0,6%
Shrinking	: 500°C = 0 %
Resistance against	: Oil, grease, water, temporary steam and numerous organic acids/solvents. Good resistance against sudden heat waves. Good thermal electrical and acoustical insulation resistance: Toxicologically harmless No handling obligations

4.4 Technical data Switches

1. General table

Switch	1690	1690ATEX	LMS-A	LMS-A-EEExd	MS09K	MS10 EEExd
Part-no.	641.6502.380LI	610.045N1001	----	----	----	----
Housing	synthetic	synthetic	Al Si 12	Al Si 12	synthetic	Aluminium
Contact Function	bistable change-over contact	bistable change-over contact	bistable change-over contact**	bistable change-over contact	break-or make-contact, change-over contact	break-or make-contact, change-over contact
Dimensions	20x15x80	20x15x80	65x65x40	Ø138x80	110x75x50	120x120x110
Breaking on rupturing capacity	230 VAC	230 VAC	12..250 VAC	220 VAC	250 VAC	250 VAC
	0,8 A	0,4 A	1,5 A	1,5 A	10 A	10 A
	60 VA	30 VA	80 VA	80 VA	----	----
Protective System	IP65	IP65	IP65 DIN 40050	IP65 DIN 40050	IP65 DIN 40050	IP65 DIN 40050
Option	IP67 DIN40050	IP67 DIN40050	----	----	----	----
Switch-hysteresis	15 mm	15 mm	8...12 mm	8...12 mm	----	----
Medium temperature	max. 130 °C	max. 130 °C	max. 200 °C*	max. 200 °C	max. 100 °C	max. 200 °C
EEEx-protection	----	EEEx m II CT6	----	EEEx d II CT6	----	EEEx d II CT6
Connection	----	----	PG7,5	4 connection (3/4" NPT)	PG11	3/4" NPT

Electric connection with 3-channel plug and earth.

For all switches the international standard EN 60529 is valid.

*Type LMS-A in heat protection version can stand a max. temp. of 400 °C

**available with gold contact

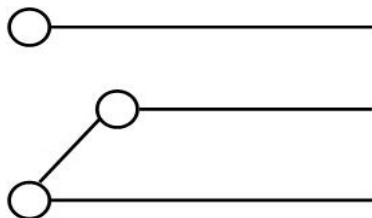
2. NI Ex NJ switch

Inherent safety EEx-switch, on request with define error message.

Contact-transmitter	Supply voltage:	8 V DC
	Max temperature:	60 °C
	Cable connection at housing:	PG11
Section switch appliance	Supply voltage:	220 V + 15 % (45...60 Hz)
	Power consumption:	appr. 1,5 V
	Open circuit voltage:	8 V DC
	Allowed charge:	4 A/250 V/250 VA
	Allowed temperature:	-20...+60°C

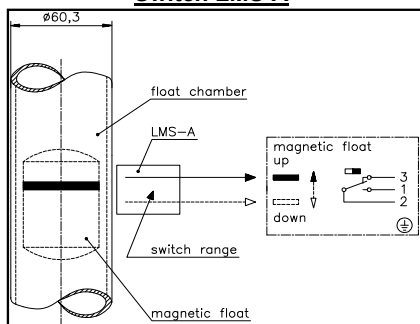
3. Switch diagrams

Types: 1690, 1690ATEX, LMS-A, LMS-A-EEExd, MS09K and MS10 EEExd:

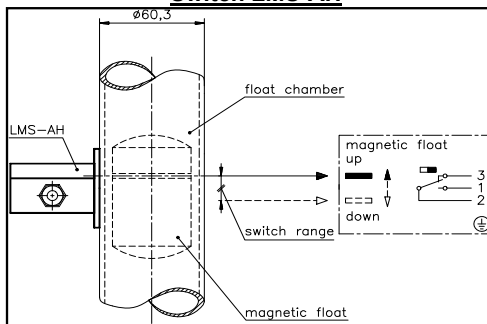


bistable change-over contact

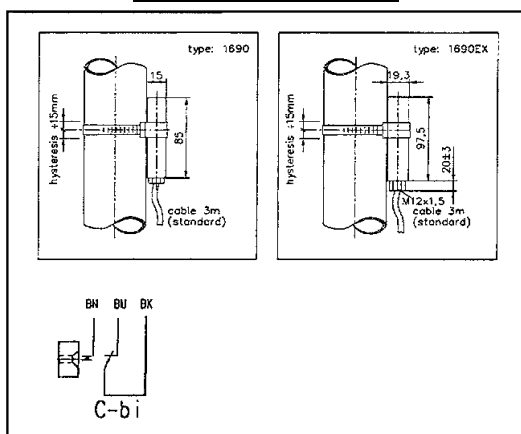
Switch LMS-A



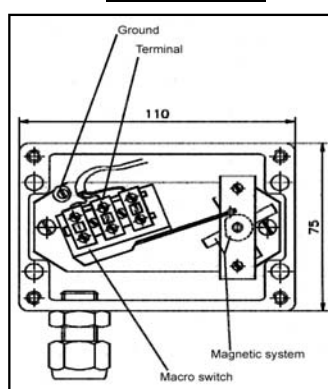
Switch LMS-AH



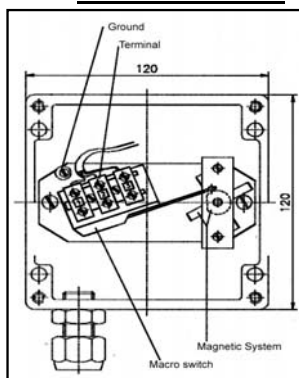
Switch 1690 / 1690ATEX



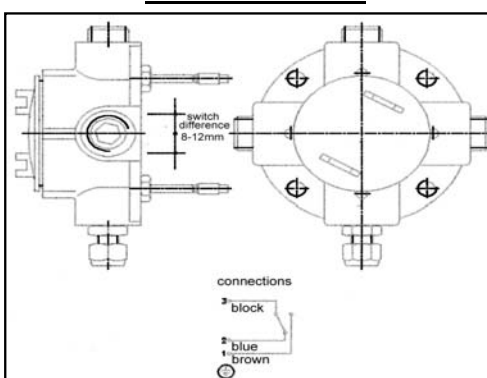
Switch MS09K



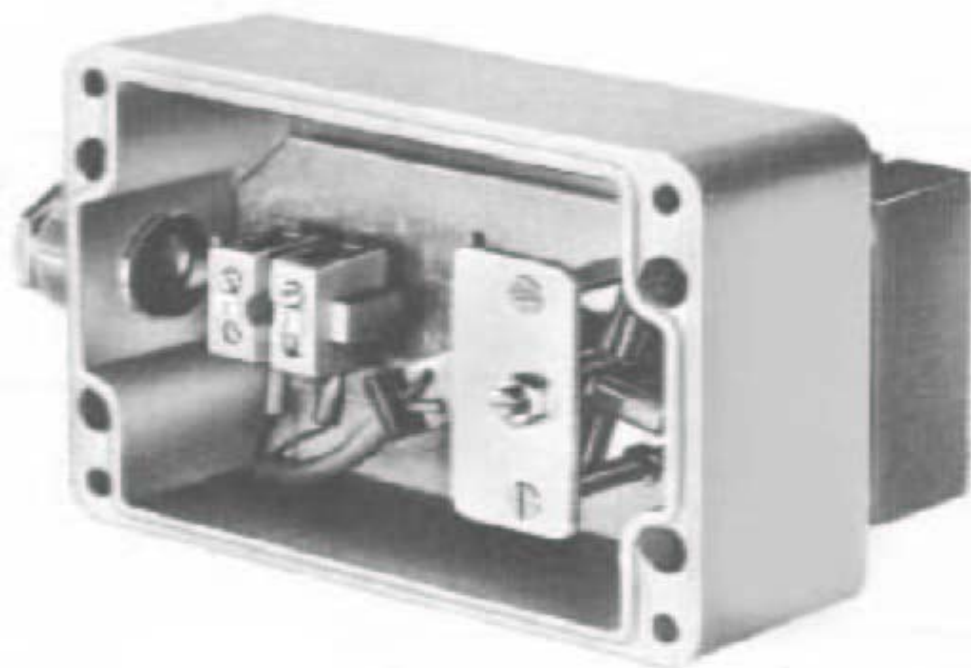
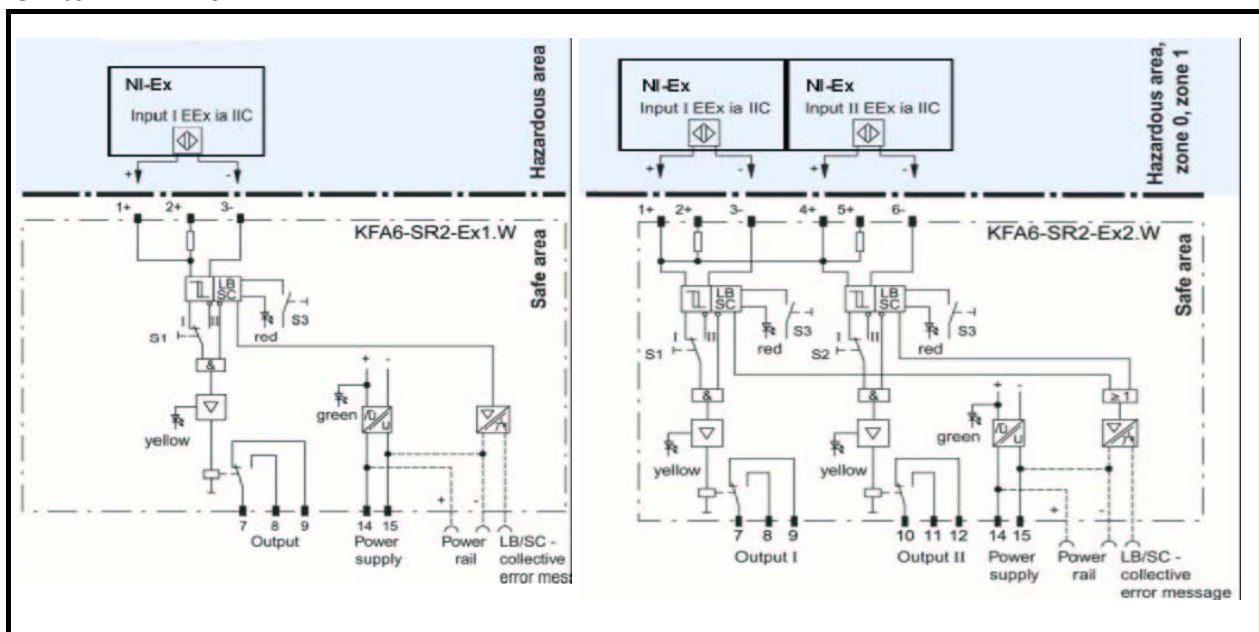
Switch MS10 EExd



Switch LMS-A-EExd



Switch Ni Ex NJ



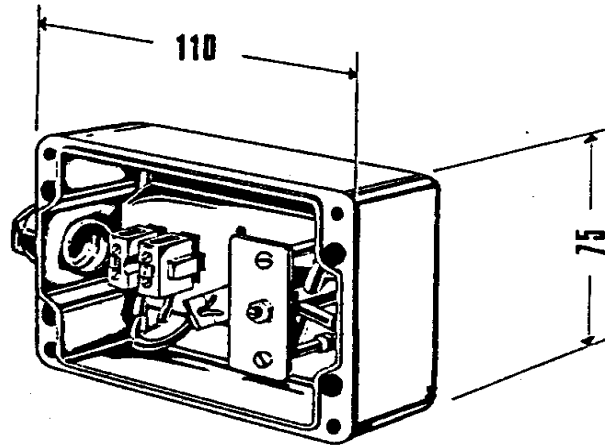
Switch NI-Ex-NJ

4.5 Contact NJ-EX

The contact NJ-EX is an inductive contact NJ 1.5-6.5 N, kontex system, protective system EEx ia IIC T6.

Function:

Actuation is provided by the magnet installed in the float. The follow magnet system of the contact maker moves the switching disk, which serves for releasing the contact between two small inductances of the slotted initiator and thereby varies the attenuation of the resonant circuit.



Technical data:

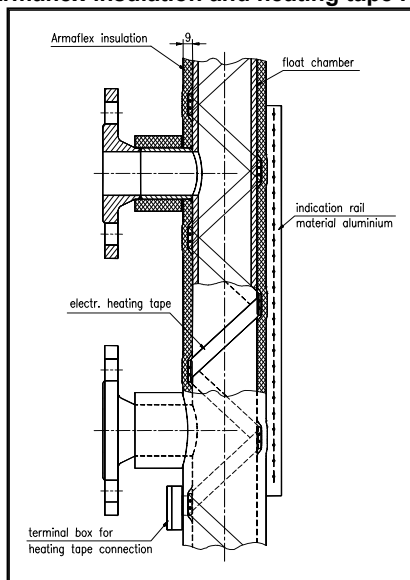
Electrical connection:	8 V DC
Temp./ambient temp.	60 °C
Cable connections:	M20x1,5

Switch relay:

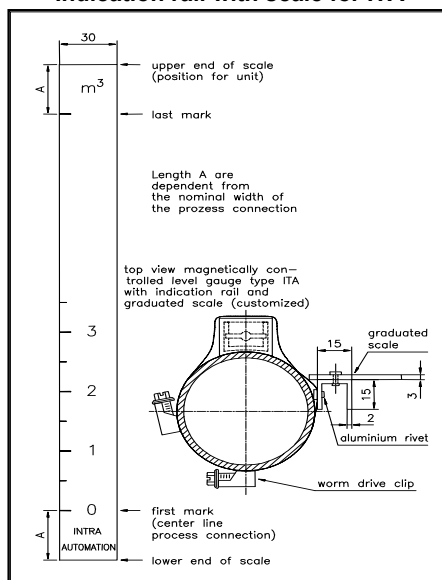
KFA6-SR2-Ex1.W:	for 1 inductive contact EEx ia IIC
KFA6-SR2-Ex2.W:	for 2 inductive contacts EEx ia IIC

4.6 Indication rails

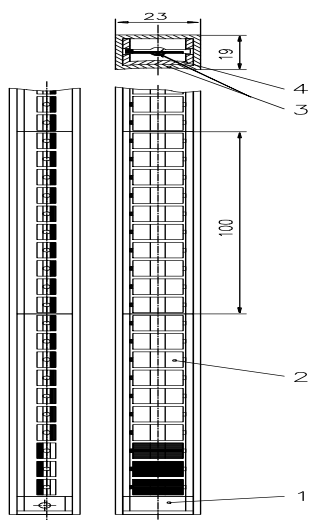
Armaflex-insulation and heating tape ITA



Indication rail with scale for ITA

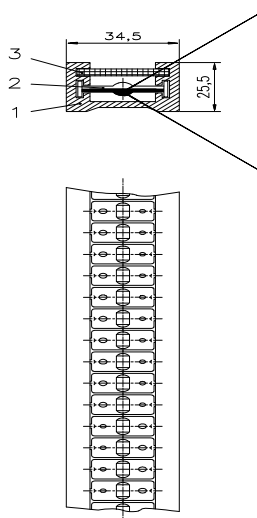


Makrolon



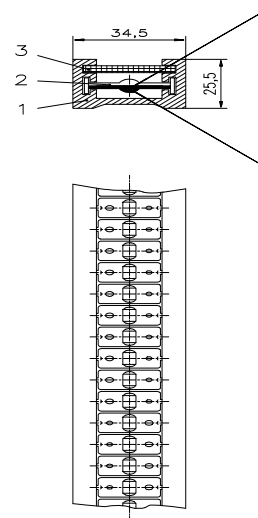
1. Sealing cap
2. Indication lamina with magnet
3. Rectangular profile
4. U-profile

Indication rails: Aluminium



1. U-profile
2. Indication lamina with magnet
3. Transparent covering
4. Hermetically sealed

316SS



1. U-profile
2. Indication lamina with magnet
3. Transparent covering
4. Hermetically sealed

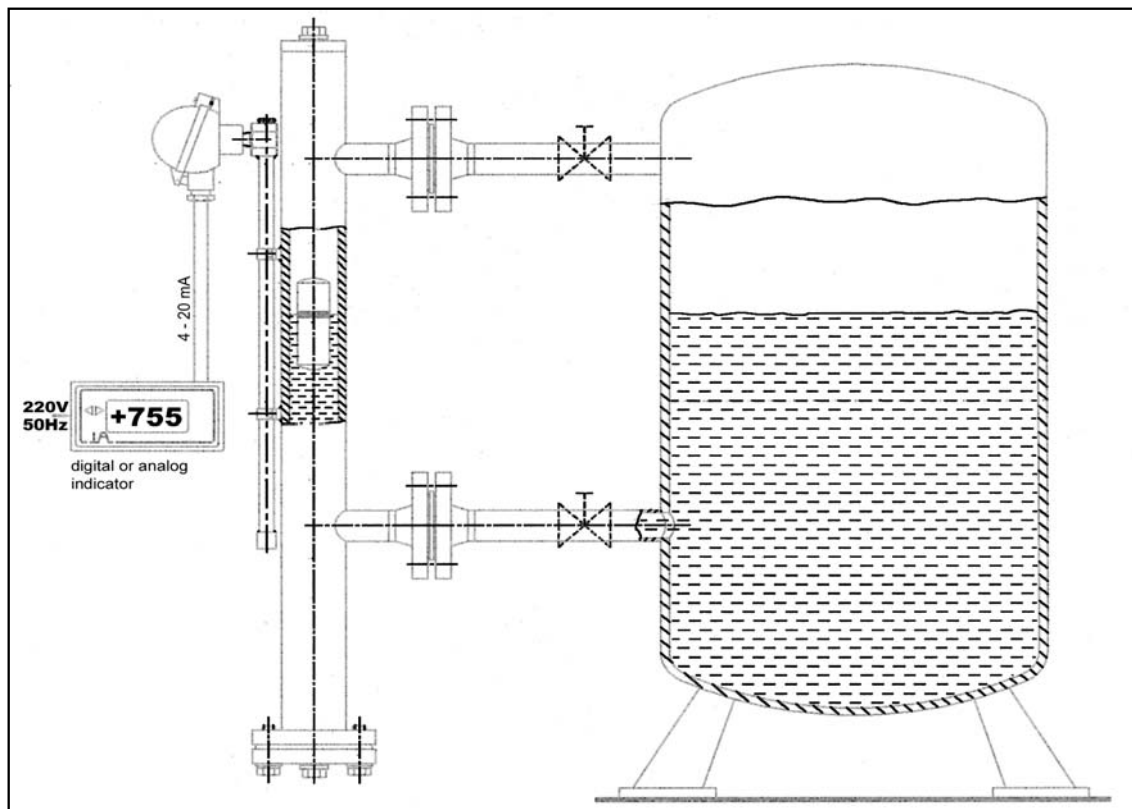
4.7 Reed-Chain

Electrical level measurement transducers which use the displacement principle have to be recalibrated each time the fluid density is changed.

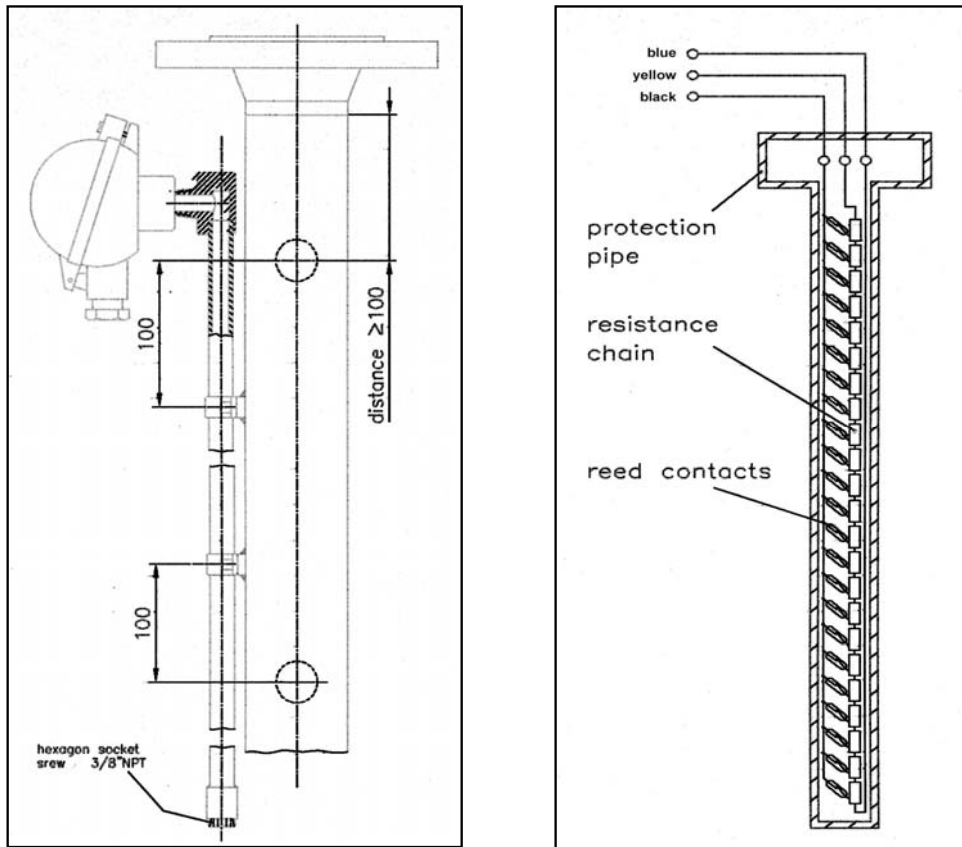
The price of a magnetically controlled level indicator with integral electrical measurement transducer is considerably lower than level measurement transducers.

The reed chain with an R/I-measurement transducer can be changed without interrupting operation. The measurement chamber is hermetically sealed - there is no contact between the fluid chamber and the reed chain.

With the microprocessor-controlled level indicator unit type 520, the level can be displayed directly in any arbitrary physical measurement unit. The indicator has a curve calculator with which non-linear tank contents can be displayed directly in cubic meters.



4.8 Niveau-source



Measuring principle:

The resistance chain with the reed contacts are built in a pipe made of material 316SS. This so-called "Reed-chain" is mounted on the float chamber with tube clamps. According to the movement of the float, the float magnet closes one reed contact which produces a voltage (or resistance) proportional to the height of the liquid in the tank. You get a near-analogous output signal, with a resolution of about 10 mm.

The resistance chain receives its power supply from the transmitter. The 4...20 mA transmitter output signal can be transferred to an indicator or can be used to drive alarm contacts. In the case of an error the output signal becomes higher than 22 mA.

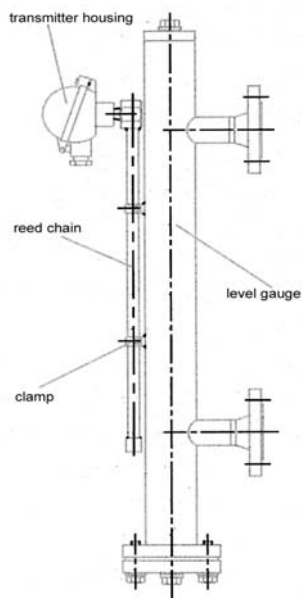
Connection:

As a standard, the reed chain is supplied with a transmitter that is installed inside the housing-head, 2-wire connection to the transmitter is only required.

4.9 Reed-contact

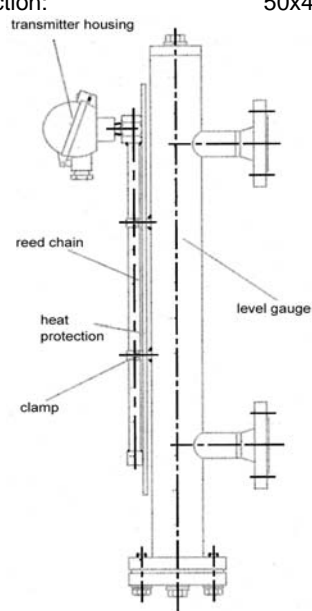
Standard-reed chain

Max. medium temperature: 150 °C
 Protection pipe: Ø 14 mm
 Material: 316Ti
 Housing: IP65

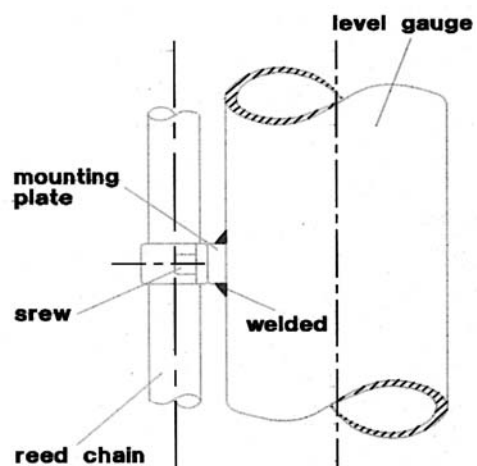


Reed chain for higher temperature

Max. medium temperature: 400 °C
 Protection pipe: Ø 14 mm
 Material: 316Ti
 Housing: IP65
 Heat protection: 50x4 mm

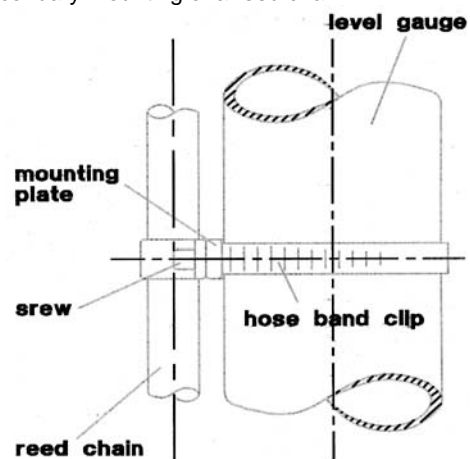


Clamp (standard)



Clamp (special)

Will be needed by Armaflex insulation and secondary mounting of a reed chain.

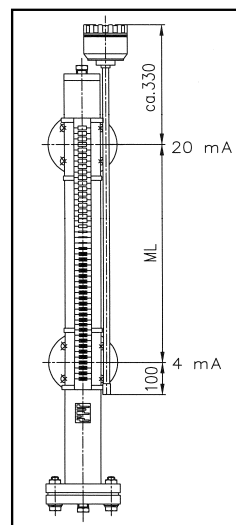


4.10 Magnetostrictive level transmitter

M-500 / M-600

Magnetostrictive transmitter for mounting to a level gauge type ITA.

M-500/M-600 series working on the magnetostrictive principle is high accuracy transmitter for affordable price. The float inside the level gauge type ITA moves along the magnetostrictive wire. A pulse generated by the electronics travels along the wire. When the pulse reaches the float's magnetic field, a twist develops in the wire. Reflected from the torsion point, the pulse creates an acoustic wave that travels back along the wire. The 4...20 mA output from the transmitter is proportional to the level.



Technical data:

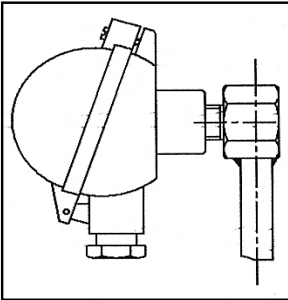
Type:	rigid version	flexible version
principle/design	magnetostrictive 2- wire transmitter	
measured process values	level, interface level	
sensor length	0,5...4,5 m	2...10 m
materials	sensor: 316Ti (1.4571), housing: Aluminium, powder paint coated or plastic (PTB)	
max. pressure	depends on the level gauge type ITA	
temperature	medium: max. 90 °C (+400 °C for high-temperature-version) ambient: -40 °C...+70 °C	
linearity with dry calibration	± 1 mm	
resolution	0,1 mm or 1 mm (order-dependent)	
temperature coefficient	0,04 mm/°C	
measuring range	min. 200 mm	
medium density	depends on the level gauge type ITA	
outputs	analogue: 4...20 or 20...4 mA serial: HART interface /min. loop resistance: 250 Ohm display: 6 digits (7 mm characters) icons, units and bargraph	
damping	0...60 s, programmable	
error indication	3,8 mA or 22 mA	
output load	$R_t = (U_s - 12,5V) / 0,02A$; U_s = voltage of power supply	
power supply	12,5...36 V DC	
ATEX approval	Ex II 1 G EEx ia IIB T6...T5 Ex II 2G EEx d IIV T6...T5 Ex II 1/2G EEx d ia IIB T6...T5	
intrinsically safe area	Ex II	
protection	electric: class III ingress: IP67	
electrical connection	cable gland PG16 or M20x1,5 cable diameter: 8...15 mm, wire cross section: max. 1,5 mm ²	
weight:	1,7 kg + sensor (sensor = 0,6 kg/m)	2,9 kg + sensor (sensor=0,3 kg/m)

Temperature classification for Ex-Application:

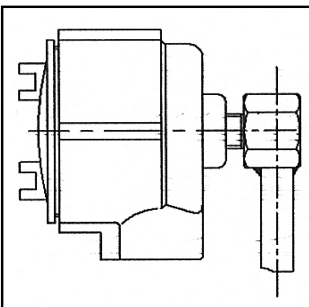
Temperature class	ambient temperature	process temperature
T6	-25...+70 °C	max. 400 °C, because no wetted parts
T5	-25...+59 °C	
T4	-25...+45 °C	

4.11 Transmitters

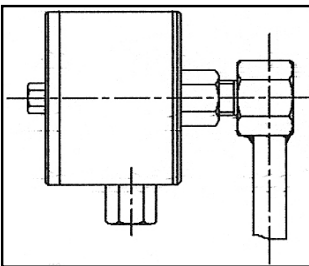
Available housings



Standard-transmitter-housing
 ♦ material: aluminium
 ♦ PG 16 entry

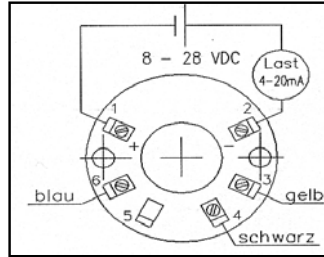


EExd-transmitter-housing
 ♦ material: aluminium epoxy coated
 ♦ 1/2" NPT cable entry

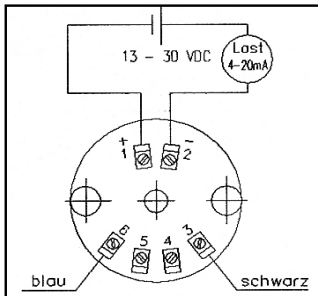


Stainless steel transmitter housing
 ♦ material: 316Ti
 ♦ M20x1,5 entry

Available transmitters



Type: INT5333B
 ♦ EEx ia IIC T5/T6
 ♦ output: 4...20 mA
 ♦ power supply: 2...36 V DC
 ♦ linearity: $\pm 1\%$



Type: TMT182
 ♦ EEx ia IIC T4
 ♦ output: 4...20 mA (Hart-protocol)
 ♦ power supply: 13...30 V DC
 ♦ linearity:
 400 Ω -area $\pm 0,04\%$
 4000 Ω -area $\pm 0,5\%$
 ♦ input: 5...400 Ω /50...4000 Ω

Other types of transmitters on request!

Transmitter type INT5333**INT5333
2-wire
programmable transmitter****2-WIRE PROGRAMMABLE TRANSMITTER
INT-5333**

- ◆ RTD or Ohm input
- ◆ High measurement accuracy
- ◆ 3-wire connection
- ◆ programmable sensor error value
- ◆ for DIN form B sensor head mounting

Application:

- Linearized temperature measurement with Pt100...Pt1000 or Ni100...Ni1000 sensor
- Conversion of linear resistance variation to a standard analogue current signal, for instance from valves or Ohmic level sensors.

Technical characteristics:

- within a few seconds the user can program the INT5333 to measure temperatures with all RTD ranges defined by the standards.
- The RTD and resistance inputs have cable compensation for 2- and 3-wire connection.

Mounting/Installation:

- For DIN form B sensor head or DIN rail mounting with a special fitting.

Order information:

Type	Version	
INT5333	Standard:	:A
	EEx:	:B
	FM and EEx:	:C

Electrical specifications:**Specification range:**

-40...+85 °C

Common specifications:

Supply voltage, DC

Standard, INT5333A 8...35 V

EEx and FM, INT5333B and C 8...28 V DC

Internal consumption 35 mW...0,8 W

Voltage drop 8 V DC

Warm-up time 5 min.

Communications interface Loop Link 5905

Signal/noise ratio min. 60 dB

Response time (programmable) 0,33...60 s

Signal dynamics, input 19 bit

Signal dynamics, output 19 bit

Calibration temperature 20...28 °C

Accuracy, the greater of general and basic values:

General values

Input type:	Absolute accuracy	Temperature coefficient
all	$\leq \pm 0,1$ % of span	$\leq \pm 0,1$ % of span / °C

Basic values

Input type:	Basic accuracy	Temperature coefficient
RTD	$\leq \pm 0,3$ °C	$\leq \pm 0,01$ °C / °C
Lin. R.	$\leq \pm 0,2$ Ω	$\leq \pm 20$ Ω / °C

EMC immunity influence $\leq \pm 0,5$ % of spanEffect of supply voltage $\leq \pm 0,005$ % of span / V DC

Vibration: IEC 68-2-6 Test FC

Lloyd's specification no. 1 4 g / 3...100 Hz

Max. wire size 1 x 1,5 mm²

Humidity < 95 % RH (non-cond.)

Dimensions Ø44 x 20,2 mm

Tightness (enclosure/terminal) IP68/IP00

Weight: 50 g

Electrical specifications, input:

RTD-type	min. value	max. value	min. span
Pt100	-200 °C	+850 °C	25 °C
Ni100	-60 °C	250 °C	25 °C
Lin.R.	0 Ω	10000 Ω	30 Ω

RTD and linear resistance input:

Max. offset	50 % of selected max. value
Cable resistance per wire (max.)	10 Ω
Sensor current	> 0,2 mA < 0,4 mA
Effect of sensor cable resistance (3-wire)	< 0,002 Ω/Ω
Sensor error detection	Yes

Output:**Current output:**

Signal range	4...20 mA
Min signal range	16 mA
Updating time	135 ms
Load resistance	$\leq (V_{\text{supply}} - 8)/0,023$ [Ω]
Load stability	< $\pm 0,01$ % of span / 100 Ω

Sensor error detection:

Programmable	3,5...23 mA
NAMUR NE 43 upscale	23 mA
NAMUR NE 43 downscale	3,5 mA

Ex data:

U_i	28 V DC
I_i	120 mA DC
P_i	0,84 W
L_i	≤ 10 μH
C_i	≤ 1 nF

EEx approval CENELEC:

DEMKO 03	ATEX 13705X
ATEX	0539 Ex II 1 GEExia IIC T1...T6
max. amb. temperature for T1...T4	85 $^{\circ}\text{C}$
max. amb. temperature for T5 and T6	60 $^{\circ}\text{C}$
Applicable in zone:	0, 1 or 2
FM	IS, Cl.I, Div.1 Gp.A-D
Entity, FM control drawing no.	5300Q502

Observed authority requirements:**Standard:**

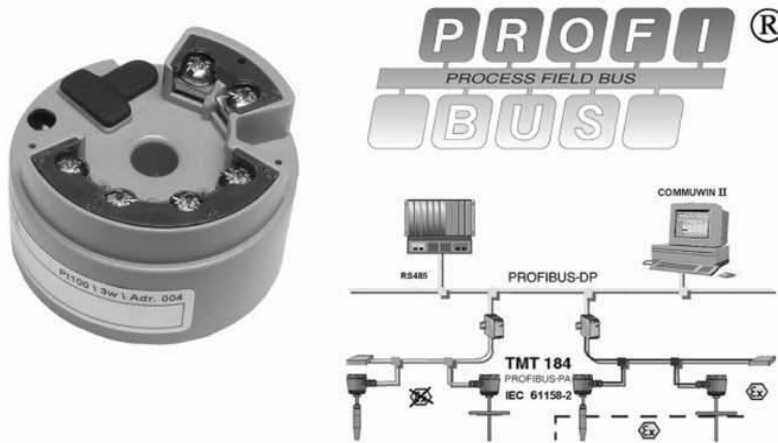
EMC 89/339/EEC	
Emission	EN50081-1, EN50081-2
Immunity	EN50082-2, EN50082-1
ATEX 94/9/EC	EN50014 and EN50020
FM class number	3600, 3610

Of span: of the presently selected range

Transmitter type TMT84 (Profibus)

Resistance transmitter Type: TMT84

Head transmitter with Profibus-PA® interface. Supply and digital communication using PROFIBUS-PA®, for installation in a form B sensor head.



Features and benefits:

- Universally programmable for various input signals using PROFIBUS-PA®.
- DIP switch for address setting (as option)
- High accuracy in the total ambient temperature range
- EMC to NAMUR NE 21, CE
- Certification:
 - ATEX
 - FM
 - CSA
- PROFIBUS-PA profile V3.0
- Galvanic isolation
- Customer specific address setting or expanded setup (see questionnaire page)

Application areas:

- Applied in a PROFIBUS-PA® environment, the process industry fieldbus, an open standard to EN50170 and IEC 61158-2
- Temperature head transmitter with PROFIBUS-PA® protocol for converting various input signals into a digital output signal
- Input:
 - Resistance thermometer (RTD)
 - Thermocouple (TC)
 - Resistance transmitter (Ω)
 - Voltage transmitter (mV)
- Swift and easy operation, visualization and maintenance using a PC direct from the control panel, e.g. using the COMMUN II operation software.

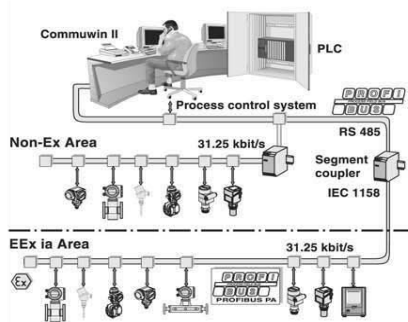
Operation and system construction

Measurement principle

Electronic measurement and conversion of input signals in industrial temperature measurement.

Measurement system

The TMT184 temperature head transmitter is a 2-wire transmitter with measurement inputs for resistance thermometers and resistance transmitters in 2-, 3- or 4-wire connection, thermocouples and voltage transmitters. Applications are in the measurement and control areas for process monitoring. The TMT184 setup is done using the PROFIBUS-PA®



PROFIBUS-PA® is an open field bus standard in accordance with EN50170 and IEC61158-2, which has been specifically designed to handle the requirements of the process industry. In the simplest case a complete measurement circuit consists of a TMT184 fitted into a temperature sensor, a segment coupler, a PROFIBUS-PA® connection resistance, a PLC or a PC with an operating software.

The maximum number of transmitters that can be connected per bus segment is determined by the transmitter consumption, the maximum power of the segment coupler as well as the required bus length.

Normally:

- max. 9 TMT184 in an EEx ia explosion hazardous area per bus segment.
- max. 32 TMT184 in a non-explosion hazardous area per bus segment.

More detailed information for detailed project planning can be found in the operating manual.

Input values

Measurement value: Temperature (temperature linear), resistance and voltage

Measurement range: Dependent on the sensor connection and input signal the transmitter evaluates a number of different measurement ranges.

Type of input:

Resistance thermometer (RTD)	Type	Measurement ranges	Min. measurement range
	Pt100	-200...850 °C (-328...1562 °F)	10 K
	Pt500	-200...250 °C (-328...482 °F)	10 K
	Pt1000 acc.to IEC 751	-200...250 °C (-328...482 °F)	10 K
	Ni100	-60...250 °C (-78...482 °F)	10 K
	Ni500	-60...150 °C (-78...302 °F)	10 K
	Ni1000 acc.to DIN43760	-60...150 °C (-78...302 °F)	10 K
-Connection type: 2-, 3- or 4-wire connection cable resistance compensation possible in the 2-wire system (0...30 Ω) -Sensor cable resistance: max. 11 Ω per cable -Sensor current: ≤ 0.2 mA			
Resistance transmitter	Resistance (Ω)	10...400 Ω 10...2000 Ω	10 Ω 100 Ω
Thermocouples (TC)	B(PtRh30-PtRh6)	0...1820°C (32...3308 °F)	500 K
	C(W5Re-W26Re) ^I	0...2320°C (32...4208 °F)	500 K
	D(W3Re-W25Re) ^I	0...2495°C (32...4523 °F)	500 K
	E(NiCr-CuNi)	-270...1000°C (-454...1832 °F)	50 K
	J(Fe-CuNi)	-210...1200°C (-346...2192 °F)	50 K
	K(NiCr-Ni)	-270...1372°C (-454...2500 °F)	50 K
	L(Fe-CuNi) ^{II}	-200...900°C (-328...1652 °F)	50 K
	N(NiCr-Si-NiSi)	-270...1300°C (-454...2372 °F)	50 K
	R(PtRh13-Pt)	-50...1768°C (-58...3214 °F)	500 K
	S(PtRh10-Pt)	-50...1768°C (-58...3214 °F)	500 K
	T(Cu-CuNi)	-270...400°C (-454...752 °F)	50 K
	U(Cu-CuNi) ^{II}	-200...600°C (-328...1112 °F)	50 K
	MoRe5-MoRe41 ^{III}	0...2000°C (32...3632 °F)	500 K
	-Cold junction: internal (Pt100)		
	-Cold junction accuracy: ± 1 K		
Voltage transmitters (mV)	Millivolt transmitter (mV)	-10...75 mV	5 mV

I: according to ASTM E 988
II: according to DIN 43710

Output values**Output signal**

Physical data transmission (Physical layer type):
 Fieldbus interface in acc. to IEC 61158-2.

Failure signal

Status message acc. to the PROFIBUS-PA® profile V3.0 specification.

Galvanic isolation

2 kV AC

Filter

Digital filter 1st degree 0...60 s

Current consumption

10 mA \pm 1 mA

Error current

0 mA

Switch on delay

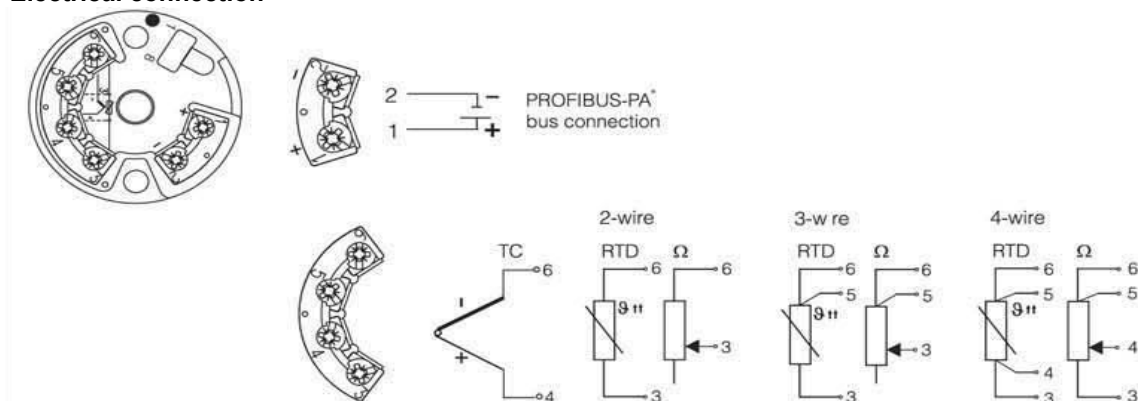
- 10 s

Data transmission speed

31,25 kBit/s, voltage mode

Signal code

Manchester II

Auxiliary energy**Electrical connection**

Head transmitter terminal layout

Power supply

Ub = 9...30 V DC non Ex area, polarity protected

Ub = 9...15 V DC Ex area, polarity protected

Accuracy**Response time:** 1 s**Reference conditions:** Calibration temperature: +23 °C ± 5 K**Maximum measured error:**

	Type:	Measurement accuracy
Resistance Thermometer (RTD)	Pt100, Ni100	0,15 K
	Pt500, Ni500	0,5 K
	Pt1000, Ni1000	0,3 K
Thermocouple (TC)	K, J, T, E, L, U	typ. 0,5 K
	N, C, D	typ. 1,0 K
	S, V, R, MoRe5-MoRe41	typ. 2,0 K

Resistance Transmitter (Ω)**Voltage Transmitter (mV)**

Meas. accuracy:	Measurement range
± 0,1 Ω or 0,08 %	10...400 Ω
± 0,15 Ω or 0,12 %	20...2000 Ω
20 μV or 0,08 %	-10...75 mV

Influence of ambient temperature (temperature drift):

Resistance thermometer:

$$T_d = \pm(15\text{ppm/K} \cdot \text{max.meas.range} + 50\text{ppm/K} \cdot \text{preset meas.range}) \cdot \Delta\delta$$

Thermocouple

$$T_d = \pm(15\text{ppm/K} \cdot \text{max.meas.range} + 50\text{ppm/K} \cdot \text{preset meas.range}) \cdot \Delta\delta$$

 $\Delta\delta$ = Deviation to the ambient temperature according to the reference condition.**Long term stability:**

≤ 0,1 K/year or ≤ 0,05 %/year

Influence of reference junction:

Pt100 DIN IEC 751 Cl. B (internal reference junction for thermocouples)

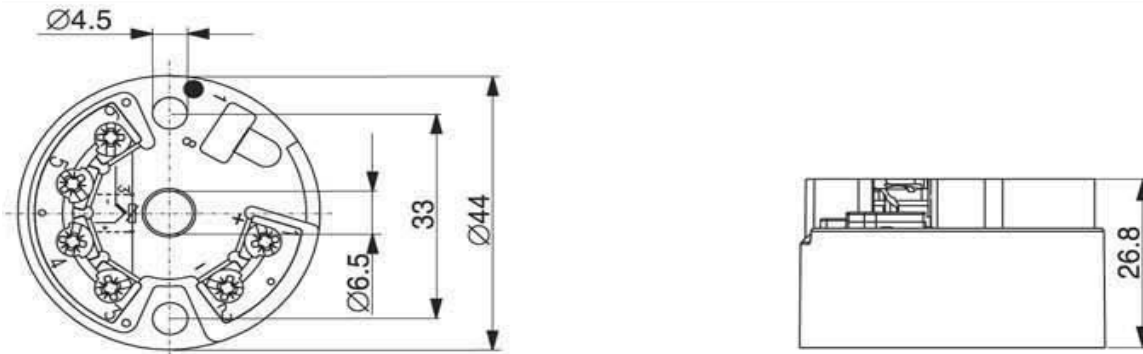
Application conditions (installation conditions)**Installation hints:**

- installation angle: no limitations

- installation area:

connection head acc. to DIN 43729 Form B; field housing TAF 10

Application conditions (ambient conditions)**Ambient temperature:** -40...+85 °C (for hazardous area see Ex-certificate)**Storage temperature:** -40...+100 °C**Climate class:** acc. to EN 60654-1, Class C**Condensation:** allowable**Ingress protection:** IP00, IP66 installed**Shock and vibration resistance:** 4g/2...150 Hz acc. to IEC 60068-2-6**Electromagnetic compatibility (EMC):** Interference immunity and interference emission acc. to EN 61326-1 (IEC 1326) and NAMUR NE 21

Mechanical construction**Dimensions:**

Head transmitter (dimensions in mm)

Weight: approx. 40 g
Material: - housing: PC
- potting: PUR

Terminals: cable up to max. 1,75 mm² (secure screws)

Display and operating system**Remote operation**

Operation via PROFIBUS-PA® using a suitable configuration or operating software.

Certification**Ex-certification**

Details regarding the availability of the Ex-versions (ATEX, FM, CSA etc.) can be obtained from your local sales organization. All relevant data for hazardous area protection can be found in separate Ex-documentation, which can be requested separately.

CE marking

The measurement system complies with the legal requirements laid out within the EU regulations.

5. Special Constructions

5.1 ITA-T1S Continuous level sensing element

Technical Information / ITA-T1S special features

- Simple and rugged design
- reliable performance in liquids with densities of $\geq 0,5 \text{ kg/dm}^3$
- short mounting depth $\geq 300 \text{ mm}$ (11.81"), therefore suitable for small vessels.
- indicating length up to 3000 mm (118")
- resistant to pressures of $\leq 40 \text{ bar}$ (580 psi g) and temperatures of $\leq 300^\circ\text{F}$ (266 $^\circ\text{F}$)
- housing: cast aluminium or stainless steel in IP65, equivalent to NEMA 4 and NEMA 4X enclosure
- wide variety of material combinations
- various plastic coatings available for all wetted parts
- 4...20 mA or Hart protocol 4...20 mA output via the signal amplifier

Introduction

Intra-Automation does not limit you with the standard designs catalogued here. Our experienced engineering staff, with extensive research and development capabilities, will customize liquid level indicators to meet your specific requirements. Modifications regarding the variety of mountings, exotic materials and float configurations provide compatibility for most liquid media, various tank temperatures and pressures, as well as liquids with a broad range of specific gravities.

Operation

The ITA-T1S Liquid Level Transmitters, vertically mounted in the tank and cable connected (3-wire) to a remote receiver, operates on the float principle.

A float guided on a non-magnetic tube follows the level of the liquid surface, thereby actuating the reed switches located inside the tube by means of a built-in magnet system. The reed switches shunt over parts of a resistor string.

The magnet system operates the reed switches according to the position of the float and thus causes the Ω resistance of the resistor string to change as a function for liquid level.

A current 4...20 mA is then obtained as an output signal together with the INT5333; INT5333ATEX; TMT182 signal conditioner. The float travel distance can be limited by stops fitted to the guide tube.

Monitoring

Combined with DigiFlow 520 these transmitters form a complete liquid level monitoring system. Used as a separate system with a process control system, Intra transmitters can interface with programmable controllers and other industrial microprocessors.



Fig 1: ITA-T1S with Eexd housing and tank mounting flange

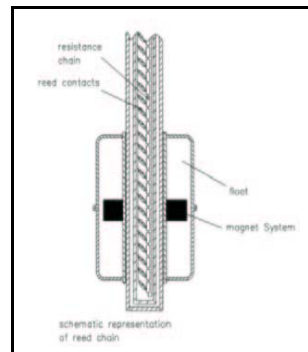


Fig 2 diagrammatic view of reed switches



Fig 3 DigiFlow 520

Interface Measuring

Very often dissimilar liquids resides in a tank. Most tank gauging methods are limited in these cases and only indicate the level of the uppermost surface. But, with using Intra-Automation level sensing elements, you can easily monitor the interface between liquids. By adjusting the specific gravity of the magnet float, Intra can adapt the transmitter to monitor the interface of a broad range of media. This principle applies to oil and water, slurries, acid, bilge and other dissimilar liquids.

In conjunction with DigiFlow 520 tank level, ITA-T1S will help assure that only the "correct" liquid is taken from a tank, or introduced into a process system.

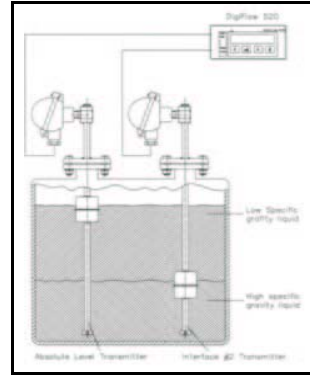


Fig 4 Interface level measurement

Technical data

Level Transmitter

overall length

measurement accuracy

ambient temperature

- aluminium housing
- stainless steel housing

tank product

- temperature
- min. density
- max. allowable op. pressure

protection category DIN 40050/IEC144

terminals

cable entry

- aluminium housing
- stainless steel housing

current output connection

- screw connection acc. ISO
- screw connection acc. ANSI/NEMA
- flanges acc. DIN
- flanges acc. ANSI

materials

housing

- standard
- special
- explosion proof

flange

thread

guide tube

float

ITA-T1S

0,3...6 m (0.98...19.69 ft)

± 5, 10 or 20 mm (± 0.2", 0.39" or 0.79")

-40...+60 °C (-40...+140 °F)

-40...+60 °C (-40...+140 °F)

-10...+100 °C (-14...+212 °F)

0,5 kg/dm³ (32.21 lbs/ft³)

40 bar (580 psi g)

IP65 (NEMA 4, NEMA 4X)

PG16 (optional M20x1.5)

PG13,5 (optional M20x1.5)

other entries on request

R 1/2"

1/2" NPT

DN50, DN100, PN16 and PN40

2", 4" class 150 lbs/RF or 300 lbs/RF

other connections on request

cast aluminium (option: with epoxy finish)

stainless steel

cast aluminium with epoxy finish

carbon steel, stainless steel, (optional Halar-coated),

PP, PVC, PVDF

stainless steel

carbon steel, stainless steel, (optional Halar-coated),

PP, PVC, PVDF

see "float type"

Float type

type ¹⁾	shape	dimensions in mm (inches)	material	min. density kg/dm ³ (lbs/ft ³)	max. op. Pressure in bar (psi g) @ 20 °C (38 °F)	max. liquid temperature in °C (°F)
A	spherical	Ø 52 (2.05)	1.4571 (316Ti)	0,7 (43.70)	40 (580)	-40...+100 (-40...+266)
B	spherical	Ø 80 (3.15)	3.7035 (Titanium)	0,6 (37.46)	17 (247)	-40...+100 (-40...+266)
C	cylindrical	Ø 80x35 (3.15x1.38)	1.4571 (316Ti)	0,5 (31.21)	13 (189)	-40...+100 (-40...+266)
D	cylindrical	Ø 44x52	1.4571 (316Ti)	0,8 (49.94)	25 (362)	-40...+100 (-40...+266)
E	cylindrical	Ø 32x34	Buna N	0,55	10 (150)	0...+82 (-18...+180)
F	cylindrical	Ø 32x34	Intox	0,5	100 (1450)	-40...+100 (-40...+266)

1) other types on request



Transmitter

Type	Output in mA	Supply voltage in VDC	Current in mA	Operating temperature in °C (°F)	Min./max. resistance in Ohm	Approval
INT5333	4...20	8...28	4...20	-20...+85 (-4...+185)	50 6000	non
TMT182	4...20	10...30	4...20	-40...+85	0...400 0...2000	EEx ia C FM IS CSA IS
TMT184	Profibus	10...35	Profibus	-40...+85	10...400 10...2000	EEx ia CII ATEX FM CSA



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