MAGNETIC LEVEL GAUGE

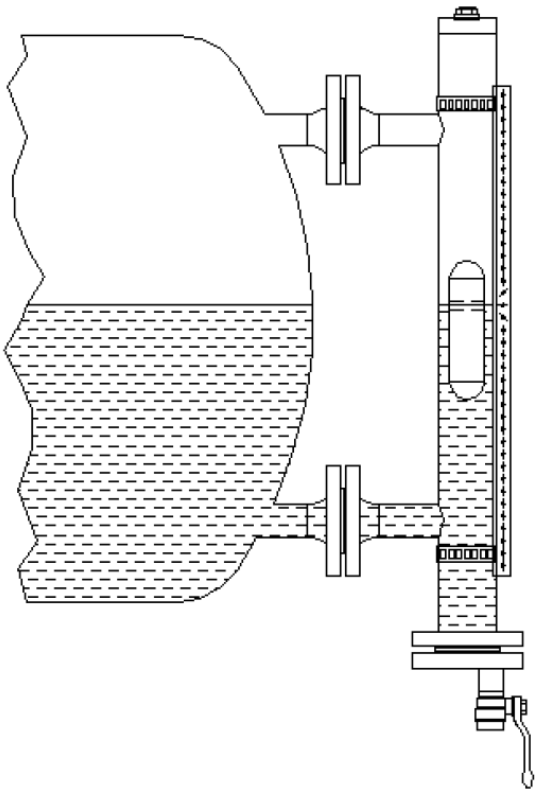
AI.LMV-16 Series

OPERETING PRINCIPLE

Magnetic level gauges work on the principle of communicating vessels, therefore the level in the measuring chamber will be the same as the level in the vessel. The measuring chamber is fitted with a float, which has a magnet inside. The float with magnet will float on the medium and the magnet in the float will turn the flaps of the indicating rail.

The float in the measuring tube is standard not pressurized and has no magnetic or mechanical guidance. This construction makes the float less dangerous than a float which is standard pressurized.
When necessary ASIT ITALIA can produce a pressurized float.

With the below mentioned process conditions it is possible to select a float which will float on the medium.
- Medium
- Density
- Working pressure
- Temperature



Each flap in the indicating rail is fitted with a permanent magnet which makes this level gauge unaffected by shocks, vibrations and high temperatures. Also moisture and / or an aggressive environment are no problem for this level gauge.

This magnetic level gauge is available with a full plastic indication rail or with stainless steel flaps in a aluminium or stainless steel 316 housing.

Because of the construction of the flaps, one side white and on the other red / orange it is possible to see the level over a greater distance or in darker places.

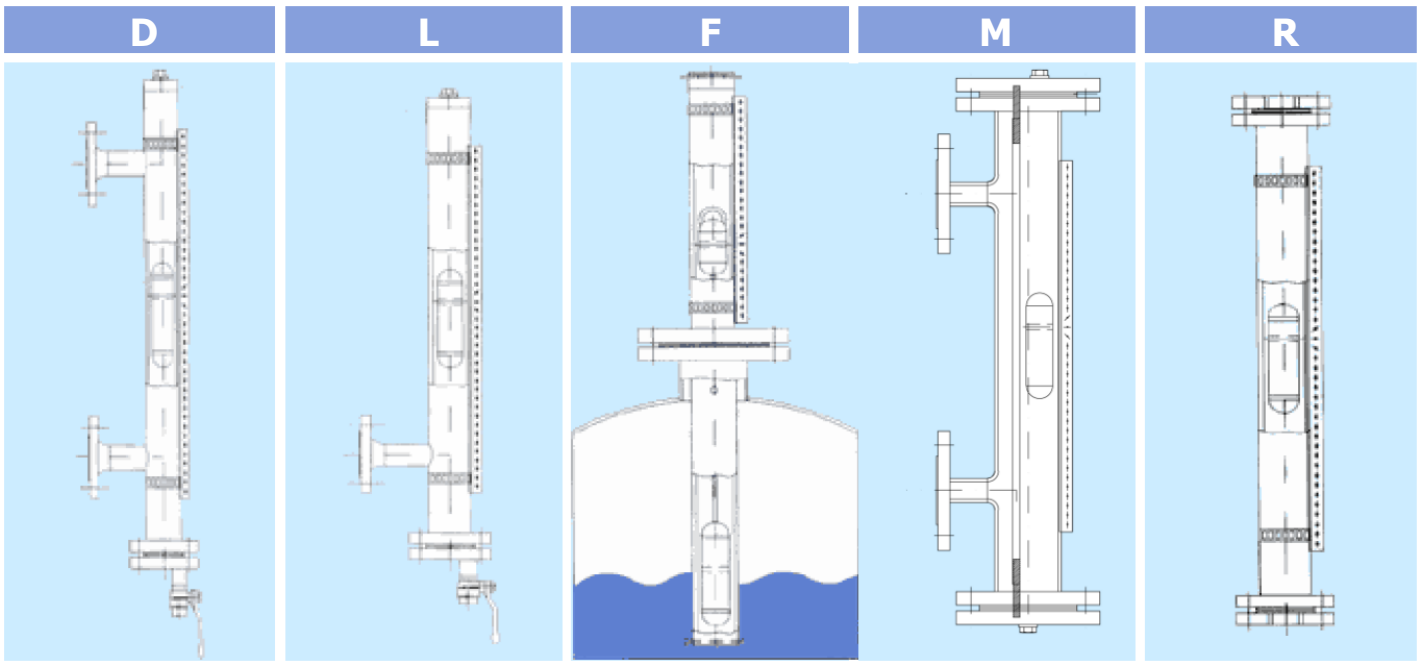
With the available "AI.LMV-16" it is possible to set the visual limits on the indicating rail on every level you require.

When the magnetic level gauge is fitted with magnetic switches it is possible to get a signal.
With more switches you can make a pump control (pump on / off) and / or create a high / low alarm.
Beside or instead of level switches a reedchain transmitter can be mounted, this reedchain has an standard output signal of 4-20 mA.

Magnetic level gauge are also suitable for interface reading. The float will sink into the medium with the lower density and will float on the medium with the higher density.

MODELS

In order to meet all the requirements there are several standard models available.



- **AI.LMV-16.D**
  With two or more process connections for mounting on the side of a vessel. This design is suitable for many different applications, for example condensate tanks, LPG tanks etc.

- **AI.LMV-16.L**
  With one process connection for mounting on the side of a vessel. This model is often used for day tanks for ships.

- **AI.LMV-16.F**
  With one process connection on the bottom, this type is suitable for mounting above a tank. This design is mostly used for storage tank below the surface.

- **AI.LMV-16.M**
  With two or more process connections for mounting on the side of a vessel. This design is specially made for evaporating applications.

- **AI.LMV-16.R**
  With two process connections at the end of the level gauge, this type is suitable for mounting between two pipelines.

Special models

Beside the above mentioned types we can manufacture special models. We can make models with a coating (lining) from E-CTFE, PFA or ETFA, models made from plastic (PVC, PP, PVDF , HDPE), Hastelloy, Monel, Titanium or 254SMO/6Mo. We also produce magnetic level gauges with (steam) jacket for heating or cooling. For further information please contact one of our technical sales engineers.

THE ADVANTAGES

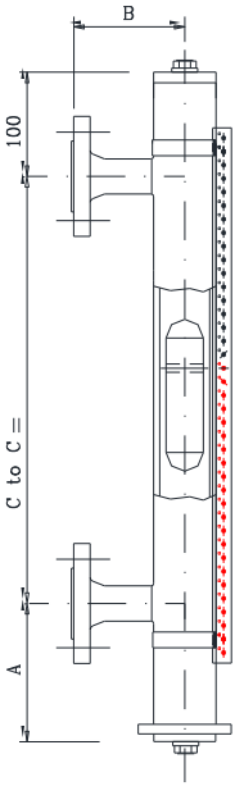
- Standard unpressurised floatsystem
- Float without mechanical or magnetic guide rails
- Fully corrosion resistant system
- Competitive prices
- Short delivery times
- Measurement is unaffected by pressure, vacuum, temperature, foam and viscosity
- Minimum sensitivity to density variations
- Permanent indication without external power supply
- Low temperature version is fitted with ice free indication strip
- LRS and BV approval for vessels
- Unique free view indication rail in plastic, Aluminium or full SS 316
- Fully adjustable switches
- Scale / ruler available in cm, mm, % or litres
- Back lighting is unnecessary
- Eccentric drain cannot blocked by the float
- Safe, environmentally friendly and maintenance-free construction
- Broken float indication rail is possible
- Special designs according to client wishes are possible
- You are doing business directly with the manufacturer, reducing transfer mistakes
- For most types all our weldings are fully penetrated.

CONTENTS

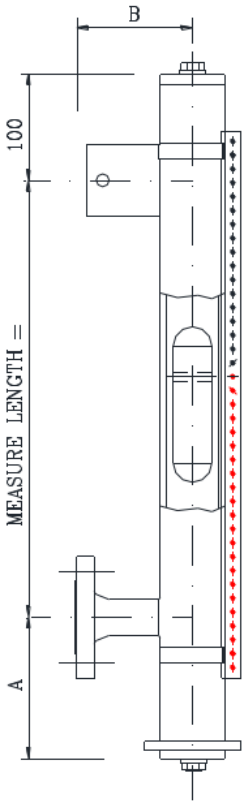
1. AI.LMV-16.D / AI.LMV-16.L

1.1 Max. pressure 10 bar, 70 lbs

Model: D-10 / D-70 e L-10 / L-70
Material: Stainless steel 316L (1.4404)
Pipe: 60.3 x 2 mm
Pressure: Max. 10 bar / 70 lbs
Temperature: Max. 160 °C
C. to C.: Max. 5500 mm (for longer C. to C. see pointer D-16)
Indication rail: Polycarbonate (max. temp. 105 °C, temporary 120 °C)
Aluminium with SS316 flaps
Stainless steel 316
Process connection: DIN DN 15 – DN 32 / PN 16 B = 75 mm
ANSI ½" – 1¼" 150# RF B = 85 mm
Weld or thread (Male / Female) ½"-1" B = 70 mm
DN 40-DN 50 and ANSI 1.1/2"-2"on 1"pipe B = 130 mm
Drain: ¼", ½" or ¾" plug BSP or NPT
¼", ½" or ¾" ballvalve
None
Drain gasket: EPDM, NBR, FPM
Vent: ¼", ½" or ¾" plug or valve, BSP or NPT
G 2" stop
None
Float: From density min. 380 kg/m3
Drain length: Density min. 920 kg/m3 A = 200 mm (*)
Density min. 830 kg/m3 A = 235 mm (*)
Density min. 720 kg/m3 A = 285 mm (*)
Density min. 660 kg/m3 A = 340 mm (*)
Extra support: C. to C. > 3 meter for offshore
C. to C. > 4 meter for onshore
Pointers: High & Low in stainless steel
Marking: Tag plate acc. to standard layout
PED marking till cat. III std.
Special: Electrical tracing
(*) special (shorter) drain length available on request.



AI.LMV-16.D

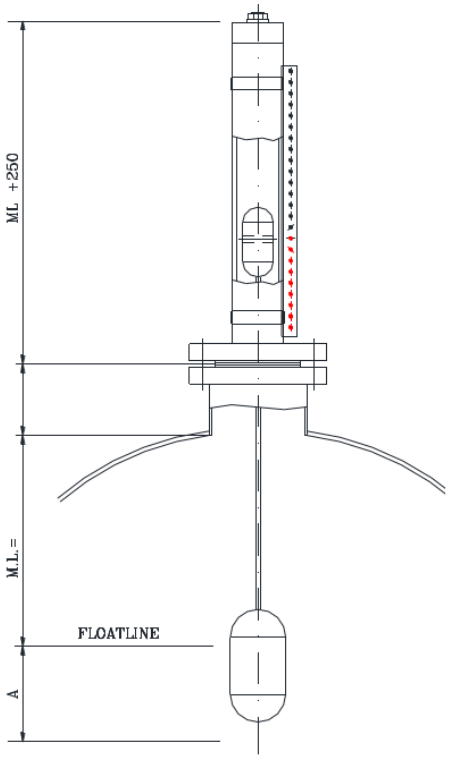


AI.LMV-16.L

2. AI.LMV-16.F (mounting on top of a vessel)

2.1 Without stillingwell

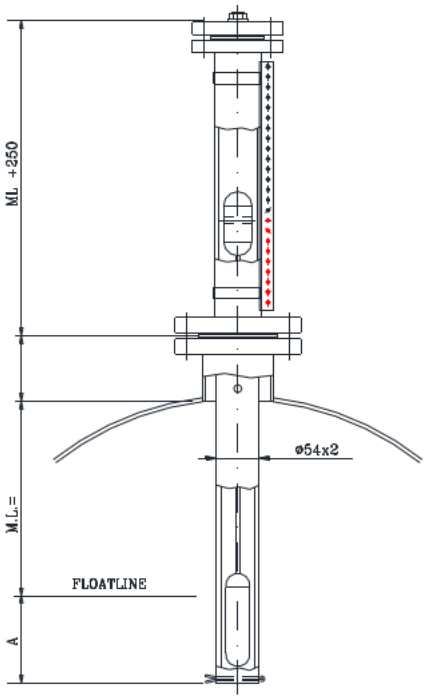
Model: F-00A / F-00B
Material: Stainless steel 316L (1.4404), others on request
Pipe: 60.3 x 2 mm (above tank)
Stilling well: Without
Pressure: Max. 60 bar (depending on type)
Temperature: Max. 350 °C
Measuring lenght: Max. 5500 mm
Indication rail: Polycarbonate (max. temp. 105 °C, temporary 120 °C)
Aluminium with SS316 flaps
Stainless steel 316
Process connection: DIN DN 50-DN 150 / PN 40
ANSI 2" – 6" 150# RF
ANSI 2" – 6" 300# RF
ANSI 2" – 6" 600# RF
Vent: ½", ¾" plug BSP or NPT, flange or valve
Float F-00A: Float OD 52 mm
From density min. 480 kg/m3
Density depending on measuring length,
by measuring length 1000 mm for std. floats:
Density min. 1210 kg/m3 A = 115 mm
Density min. 1030 kg/m3 A = 185 mm
Density min. 810 kg/m3 A = 205 mm
Density min. 670 kg/m3 A = 255 mm
Float F-00A: Float OD 67 or 72 mm
From density min. 380 kg/m3
Density depending on measuring length,
by measuring length 1000 mm for floats (OD 72 mm):
Density min. 970 kg/m3 A = 100 mm
Density min. 690 kg/m3 A = 150 mm
Density min. 570 kg/m3 A = 200 mm
Density min. 500 kg/m3 A = 250 mm
Pointers: High & Low in stainless steel
Marking: Tag plate acc. to standard layout in stainless steel



AI.LMV-16.F-00

2.2 With stilling well pipe ∅ 54 or 60.3

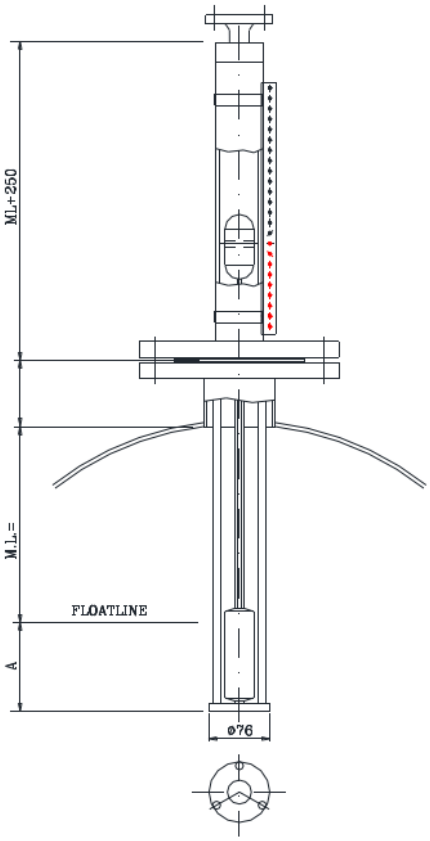
Model: F-01 / F-01A
Material: Stainless steel 316L (1.4404), others on request
Pipe: 60.3 x 2 mm (above tank)
Stilling well: pipe 54 or 60.3
Pressure: Max. 60 bar (depending on type)
Temperature: Max. 350 °C
Measuring lenght: Max. 5500 mm
Indication rail: Polycarbonate (max. temp. 105 °C, temporary 120 °C)
Aluminium with SS316 flaps
Stainless steel 316
Process connection: DIN DN 50-DN 150 / PN 40
ANSI 2" – 6" 150# RF
ANSI 2" – 6" 300# RF
ANSI 2" – 6" 600# RF
Vent: ½", ¾" plug BSP or NPT, flange or valve
Float F-01: Stilling well pipe OD 60.3, float OD 52
From density min. 480 kg/m3
Density depending on measuring length,
by measuring length 1000 mm for std. floats:
Density min. 1160 kg/m3 A = 150 mm
Density min. 1030 kg/m3 A = 185 mm
Density min. 810 kg/m3 A = 205 mm
Density min. 670 kg/m3 A = 255 mm
Float F-01A: Stilling well pipe OD 54, float OD 47
From density min. 600 kg/m3
Density depending on measuring length,
by measuring length 1000 mm for std. floats:
Density min. 1050 kg/m3 A = 150 mm
Density min. 910 kg/m3 A = 200 mm
Density min. 800 kg/m3 A = 250 mm
Density min. 730 kg/m3 A = 300 mm
Pointers: High & Low in stainless steel
Marking: Tag plate acc. to standard layout in stainless steel



AI.LMV-16.F-01A

2.3 With 3- rods ∅ 76 or ∅ 104

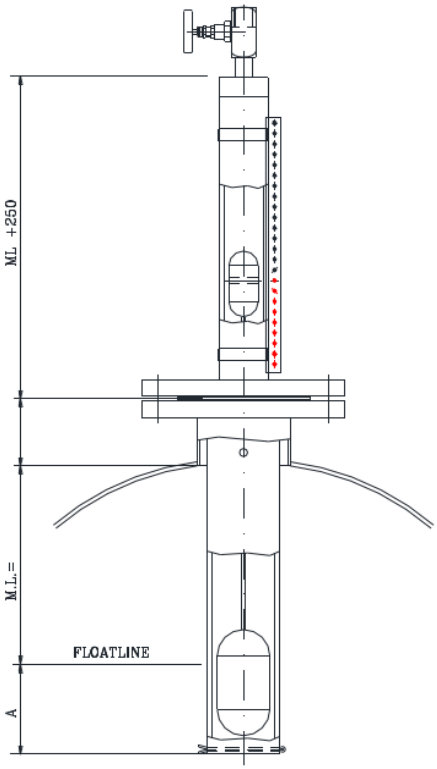
Model: F-02 / F-04
Material: Stainless steel 316L (1.4404), others on request
Pipe: 60.3 x 2 mm (above tank)
Stilling well: 3- rods ∅ 76 or ∅ 104
Pressure: Max. 60 bar (depending on type)
Temperature: Max. 350 °C
Measuring lenght: Max. 5500 mm
Indication rail: Polycarbonate (max. temp. 105 °C, temporary 120 °C)
Aluminium with SS316 flaps
Stainless steel 316
Process connection: DIN DN 80-DN 150 / PN 40
ANSI 2" – 6" 150# RF
ANSI 2" – 6" 300# RF
ANSI 2" – 6" 600# RF
Vent: ½", ¾" plug BSP or NPT, flange or valve
Float F-02: 3- rods ∅ 76, float OD 52 mm
From density min. 480 kg/m3
Density depending on measuring length,
by measuring length 1000 mm for std. floats:
Density min. 1160 kg/m3 A = 150 mm
Density min. 1030 kg/m3 A = 185 mm
Density min. 810 kg/m3 A = 205 mm
Density min. 670 kg/m3 A = 255 mm
Float F-04: 3- rods ∅ 104, float OD 72mm
From density min. 380 kg/m3
Density depending on measuring length,
by measuring length 1000 mm for std. floats:
Density min. 970 kg/m3 A = 100 mm
Density min. 690 kg/m3 A = 150 mm
Density min. 570 kg/m3 A = 200 mm
Density min. 500 kg/m3 A = 250 mm
Pointers: High & Low in stainless steel
Marking: Tag plate acc. to standard layout in stainless steel



AI.LMV-16.F-02

2.4 With stilling well pipe ∅ 76.1 or 88.9

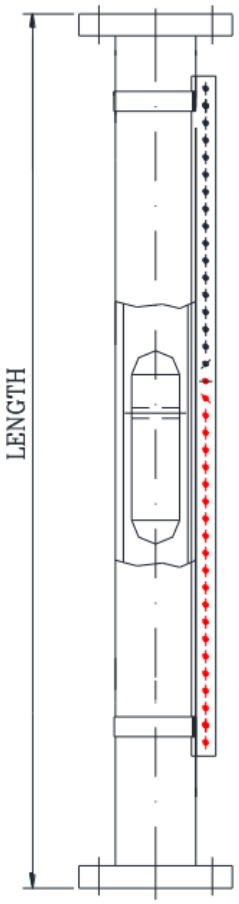
Model: F-03A / F-03B
Material: Stainless steel 316L (1.4404), others on request
Pipe: 60.3 x 2 mm (above tank)
Stilling well: Pipe 76.1 or 88.9
Pressure: Max. 20 bar (depending on type)
Temperature: Max. 350 °C
Measuring lenght: Max. 5500 mm
Indication rail: Polycarbonate (max. temp. 105 °C, temporary 120 °C)
Aluminium with SS316 flaps
Stainless steel 316
Process connection: DIN DN 80-DN 150 / PN 40
ANSI 2" – 6" 150# RF
ANSI 2" – 6" 300# RF
ANSI 2" – 6" 600# RF
Vent: ½", ¾" plug BSP or NPT, flange or valve
Float F-03A: Pipe 76.1, float OD 67 mm
From density min. 470 kg/m3
Density depending on measuring length,
by measuring length 1000 mm for std. floats:
Density min. 1050 kg/m3 A = 100 mm
Density min. 760 kg/m3 A = 150 mm
Density min. 630 kg/m3 A = 200 mm
Density min. 560 kg/m3 A = 250 mm
Float F-03B: Pipe 88.9, float OD 72
From density min. 380 kg/m3
Density depending on measuring length,
by measuring length 1000 mm for std. floats:
Density min. 970 kg/m3 A = 100 mm
Density min. 690 kg/m3 A = 150 mm
Density min. 570 kg/m3 A = 200 mm
Density min. 500 kg/m3 A = 250 mm
Pointers: High & Low in stainless steel
Marking: Tag plate acc. to standard layout in stainless steel



AI.LMV-16.F-03

3. AI.LMV-16.R (mounting between two pipes)

Model: R-40 / R-150 / R-300
Material: Stainless steel 316L (1.4404)
Pipe: 60.3 x 2 mm or 60.3 x 2.77 mm
Pressure: Max. 40 bar / 150 or 300 lbs
Temperature: Max. 400 °C
Measuring lenght: Max. 5500 mm in 1 piece, longer out more pieces
Indication rail: Polycarbonate (max. temp. 105 °C, temporary 120 °C)
Aluminium with SS316 flaps
Stainless steel 316
Process connection: DIN DN 80-DN 150 / PN 40
ANSI ½" – 2" 150 - 300# RF
Thread (Male / Female) ½" – 1" BSP or NPT
Float: From density min. 380 kg/m3
Extra support: C. to C. > 3 meter for offshore
C. to C. > 4 meter for onshore
Pointers: High & Low in stainless steel
Marking: Tag plate acc. to standard layout in stainless steel
PED marking till cat. III std.
Special: Insulation, steamjacket, spring, electric tracing



AI.LMV-16.R

4. AVAILABLE FLOATS

All the magnetic level gauges are fitted with a float. This float is standard in stainless steel, but the float is also available in Titanium, Hastelloy, PVC-C, PVC-U, PP, PVDF, PE etc. The float must have enough buoyancy and the magnet must be fitted at the right position inside the float. So it is always important to select a float which is suitable for the process conditions.

In order to select the correct float the following process conditions are necessary.
- Medium
- Density
- Working pressure
- Operating temperature

The lowest density, for which we can supply a float is 380 kg/m3 but this is depending on the before mentioned process conditions.
When a fluid is very aggressive we can also coat the float with a suitable lining.
When we have a choice between an open float or a pressurised float we prefer the pressurized float. Because the open float will eventually sink, condensate will build up inside the open float. For example our pressurized floats are suitable for 208 bar at 375°C with a density of 650 kg/m3.

The float inside a magnetic level gauge can be fitted with a torriodal (360°) magnet or a magnetic bar. All our floats are fitted standard with a torriodalmagnet, because a float with a magnetic bar can loose there guidance/ indication rail by rapid movement inside the level gauge. As a result the magnetic level gauge will not work properly for a while. Torriodalmagnets are not affected by rapid movements of the float and can move freely inside the level gauge. This is also why you can place a level switch at all the sides you want.

5. TYPE APPROVAL

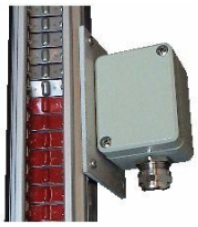
Logo	Description	Country
RINA	RINA Naval, Ships buildings Certificate n. ELE141120CS Rif. Doc. N. 05.2203 rev.0	International

6. SWITCHES

When you mount a magnetic switch on the level gauge it is possible to get a signal. With more switches you can make a pump control (pump on / off) and / or obtain a high / low alarm.

We can supply general purpose switches, switches for hazardous areas, or switches suitable for marine applications.

6.1 GENERAL PURPOSE LEVEL SWITCHES

Type	HLS-15	LMS-Ha2	HLS-Ha1
Function	SPDT	SPDT	SPDT
System	Reed switch bi-stabile	Reed switch bi-stabile	Micro switch
Max. rating	2,5A / 60W / 60VA	0,8A / 60W / 40VA	5A / 100W / 100VA
Voltage	10 – 230 V	10 – 230 V	10 – 230 V
Temp. rating	-25 … +95°C	-40… + 180°C	-50 … +350°C
Lifetime	1 x 10^9	1x 10^8	1 x 10^6
Enclosure	IP 66 / 67 and IP 68	IP 65	IP 67
Connection	5 meter cable PVC	M16 cable gland	M16 cable gland
Dimensions	65 x 25 x 15 mm	100 x 75 x 40 mm	95 x 65 x 54 mm
Material	Engineered Resin	Aluminium housing	AlSi housing
Options			M20 cable gland
			SS 316 housing
			2x SPDT
			

6.2 INTRINSIC SAFE LEVEL SWITCHES (EX i)

Type	HLS-25*i*	HLS-Ha1E
Function	SPDT	SPDT
System	Reed switch bi-stabile	Micro switch
Max. rating	250mA / 1.3W	0,5A / 1.3W
Voltage	10 – 30 V	10 – 30 V
Temp. rating	-40 … +100°C	-50 … +350°C
Lifetime	1 x 10^9	1 x 10^6
Enclosure	IP 66 / 67 and IP 68	IP 67
Connection	5 meter cable PVC	M20 cable gland (blue)
Dimensions	80 x 25 x 20 mm	95 x 65 x 54 mm
Material	SS 316 housing	AlSi housing
Approval	II 1 GD Exia IIC T6 Ga II 1 GD Exia IIIC T85°C IP66/67 Da	Ex i "simple apparatus"
Options		M16 cable gland (blue)
		SS 316 housing
		Gold contacts
		2x SPDT
		

6.3 INTRINSIC SAFE LEVEL SWITCHES (EX d)

Type	HLS-25*d*	HLS-HaD
Function	SPDT	SPDT
System	Reed switch bi-stabile	Micro switch
Max. rating	24VDC / 2.5A / 60W 230VAC / 250 mA / 60W	5A / 100W / 100VA
Voltage	10 – 30 V	10 – 230 V
Temp. rating	-25 … +100°C	-50 … + 350°C
Temp. amb.	-20 … +70°C	-40 … + 60°C
Lifetime	1 x 10^9	1 x 10^6
Enclosure	IP 66 / 67 and IP 68	IP 66 / IP 68
Connection	5 meter cable PVC	¾" NPT or M20x1,5 max 1,5 mm^2
Dimensions	80 x 25 x 20 mm	130 x 130 x 90 mm
Material	SS 316 housing	Aluminium housing
Approval	II 2 GD Exd IIC T6 Gb II 2 GD Ex tb IIIC T85°C Db	II 2 G Ex db IIC T5..T1 Gb II 2 D Ex tb IIIC T100°C..T350°C Db
Options		SS 316 Housing
		2x SPDT
		Gold contacts
		

7. REEDCHAIN FOR AN ANALOG OUTPUT SIGNAL

By using a reedchain it is possible to become a 4-20 mA signal. The reedchain is standard mounted on the complete length of the magnetic level gauge.

Design	Standard	Ex i	Ex d
Transmitter	"SMART" type	"SMART" type	"SMART" type
Approval		II 1G Ex ia II C T4..T6	II 2G Ex db IIC T5..T1 Gb II 2D Ex tb T100°C..T350°C
Supply	8 – 35 VDC	8 – 30 VDC	8 – 30 VDC
Temperature	-50 … +350°C	-50 … +350°C	-50 … +350°C
Accuracy	± 5 mm	± 5 mm	± 5 mm
Material pipe	SS 316 L	SS 316 L	SS 316 L
Max. length	5,5 meter	5,5 meter	5,5 meter
Material housing	Aluminium or SS	Aluminium or SS	Aluminium or SS316
Enclosure	IP 67	IP 67	IP 66 / 67 and IP 68
Connection	M16 x 1,5	M20 x 1,5	¾" NPT, M20x1.5
Output	4 – 20 mA / 2 wire	4 – 20 mA / 2 wire	4 – 20 mA / 2 wire
Action	Reversible std. D.A.	Reversible std. D.A.	Reversible std. D.A.
Options	High accuracy (± 2.5 or ± 1 mm)		
	M16x1,5; M20x1,5; ½" NPT; ¾" NPT connections		
	Enclosure IP 68		
	HART		
	PROFIBUS		
	FIELDBUS		
	SS 316 housing		
	Housing with LCD display (also optical)		
	Output signal (Ohm or V)		

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