



**FLOAT OPERATED
LEVEL TRANSMITTERS**



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ISO - 9001-14001-45001 Certified



ATEX 2014/34/EU



Conformité Européenne



ABS - Type Approved Product



Pressure Equipment Directive
2014/68/EU



Safety Integrity Level-2

FLOAT OPERATED LEVEL TRANSMITTERS

Level Transmitters are simple and reliable sensor for continuous level indication and control of any liquid, chemically compatible with the (sensor) material, unaffected by electrical conductivity, temperature, pressure or viscosity. The float is designed for variety of liquids and its unique self-cleaning construction is well suited for even sticky or dirty environments with no float hang-ups.

FEATURES

- Continuous 'Float Type' Analog Sensor, resistive to most liquids
- Pre calibrated at factory - No Field Calibration required
- 4-20mA or 4-20mA with HART or RS-485
- High Resolution & Repeatability
- Liquid level or liquid / liquid interface detection
- Multiple alarm relays adjustable option
- Customized lengths up to 4 meters
- Intrinsically safe option available



1. REED CHAIN LEVEL TRANSMITTERS – FLX

It consists of a float & guide stem assembly in non-magnetic material to achieve undisturbed flux. A chain of closely spaced glass encapsulated reed switches & resistors are placed inside the guide tube. During rise and fall of liquid level, the float moves & actuates a series of reed switches in the chain, through a magnet system within it and develops a proportional resistance. The operation is similar to a sliding resistance potentiometer. The sensed resistance is fed to the transmitter located in the enclosure for conversion to a signal of 4-20mA.

1.1 SPECIFICATIONS

Measuring Range	² GSL - (Top ¹ DB + Bottom ¹ DB)
Span (L)	Min. 300 mm (² GSL 400 mm), Max. 3850 mm (² GSL 4000 mm)
Resolution / Accuracy	Standard ± 10 mm / 1 mm, High ± 5 mm / 0.5 mm
Installation	1. Top of the tank 2. Top mount with stilling well 3. Mounting into the external chamber 4. Mounting to MLI chamber
Enclosure	1. Weather Proof IP-67 2. Ex-Proof IP-66, Gr IIA,IIB or IIC
Conduit Connection	1. Brass Double Compression Gland 2. PG gland
Wetted Parts	Probe/Stem: SS304, SS316, SS316L, SS316 with PTFE Sleeve SS304, SS316, SS316L, PP, PVDF.
Float	$\varnothing 41$ mm, $\varnothing 45$ mm, and $\varnothing 63$ mm in SS316 and $\varnothing 46$ mm, $\varnothing 48$ mm in PP/PVDF
Process Connection	Flanged / Threaded
Output	DC 4-20mA (Isolated) or 1-5 VDC or 2-10VDC or 4-20mA with HART or RS-485
Wiring System	2 wire loop powered
Max. Temperature	120°C (For Metallic MOC)
Max. Test pressure	10Kg/cm ² (Metallic MOC)
Special feature	Intrinsically Safe, Explosion Proof IP-66 Ex ia, Gr IIA,IIB
¹ DB - Dead Band, ² GSL - Guided Stem Length	

1.2 ORDERING INFORMATION FOR MAGNETIC FLOAT OPERATED LEVEL TRANSMITTERS

SPECIFY PART NO. → FLX **1** **2** **3** **4** **5** **6**

FLX

Example: FLX **A** **A** **S1** **E** **1** **3**

1	ENCLOSURE
A	Weather Proof IP67 / Cast Al.
B	Weather Proof IP67 / Stainless Steel
C	Weather Proof IP65 / PP
D	Ex-Proof IP 66 Gr. IIA, IIB or IIC / Cast Al.
E	Ex-Proof IP 66 Gr. IIA, IIB or IIC / Stainless Steel
O	Others

2	PROCESS CONNECTION																						
	<table> <tr> <th>Flanged</th><th>Threaded</th></tr> <tr> <td>A 2" #150 ANSI SS/MS/PP</td><td>1 2" BSP SS / MS/PP</td></tr> <tr> <td>B 2½" #150 ANSI SS/MS/PP</td><td>2 3" BSP SS / MS/PP</td></tr> <tr> <td>C 3" #150 ANSI SS/MS/PP</td><td>3 Others</td></tr> <tr> <td>D 2" Table 'E' - SS/MS/PP</td><td></td></tr> <tr> <td>E 2½" Table 'E' - SS/MS/PP</td><td></td></tr> <tr> <td>F 3" Table 'E' - SS/MS/PP</td><td></td></tr> <tr> <td>G 2" Table 'D' - SS/MS/PP</td><td></td></tr> <tr> <td>H 2½" Table 'D' - SS/MS/PP</td><td></td></tr> <tr> <td>I 3" Table 'D' - SS/MS/PP</td><td></td></tr> <tr> <td>O Others</td><td></td></tr> </table>	Flanged	Threaded	A 2" #150 ANSI SS/MS/PP	1 2" BSP SS / MS/PP	B 2½" #150 ANSI SS/MS/PP	2 3" BSP SS / MS/PP	C 3" #150 ANSI SS/MS/PP	3 Others	D 2" Table 'E' - SS/MS/PP		E 2½" Table 'E' - SS/MS/PP		F 3" Table 'E' - SS/MS/PP		G 2" Table 'D' - SS/MS/PP		H 2½" Table 'D' - SS/MS/PP		I 3" Table 'D' - SS/MS/PP		O Others	
Flanged	Threaded																						
A 2" #150 ANSI SS/MS/PP	1 2" BSP SS / MS/PP																						
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C 3" #150 ANSI SS/MS/PP	3 Others																						
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I 3" Table 'D' - SS/MS/PP																							
O Others																							

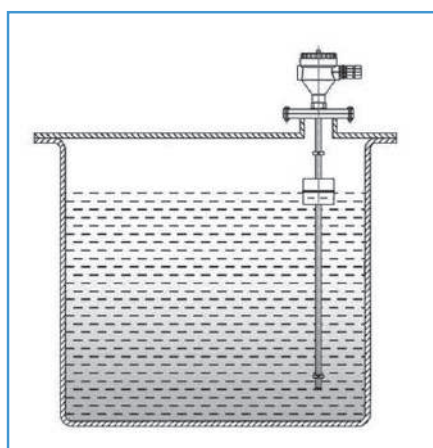
3	FLOAT		
Type	Material	Dia.	Dia. of stem
S1	SS316	41mm	12.7mm
S2	SS316	45mm	12.7mm
S3	SS316	63mm	16mm
S4	PP	46mm	16mm
S5	PVDF	48mm	16mm
S6	SS316	52mm	12.7mm
S7	Others		

4	OUTPUT
A	4-20mA (2 wire loop powered)
B	4-20mA 2 wire with HART Protocol
C	1-5 V DC
D	2-10 V DC
E	IIOT

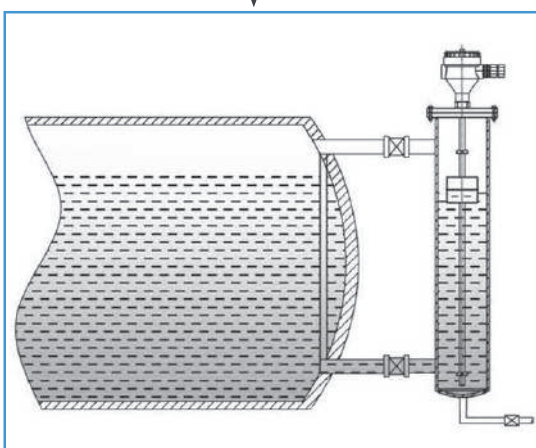
5	MOUNTING
1	Top/Internal Mount
2	Side/Chamber mount
3	Inside External Chamber
4	With Still well

6	CONFIGURATION
1	Isolated output without Process Indicator
2	Isolated output with Process Indicator
3	Foundation Fieldbus™
4	IIOT

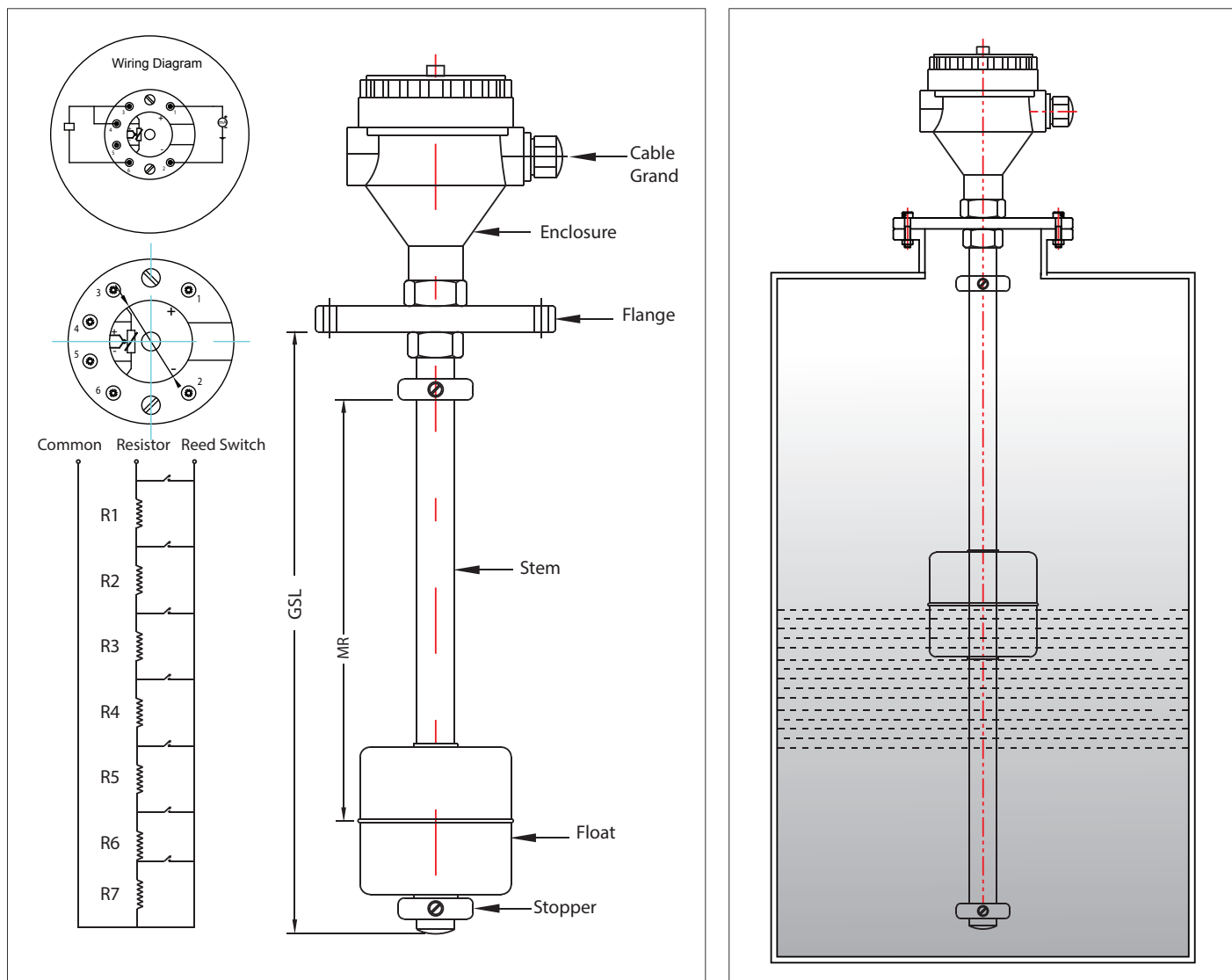
TANK MOUNTING FOR LEVEL TRANSMITTERS



EXTERNAL CHAMBER MOUNTING FOR LEVEL TRANSMITTERS



1.3 INSTALLATION OPTIONS

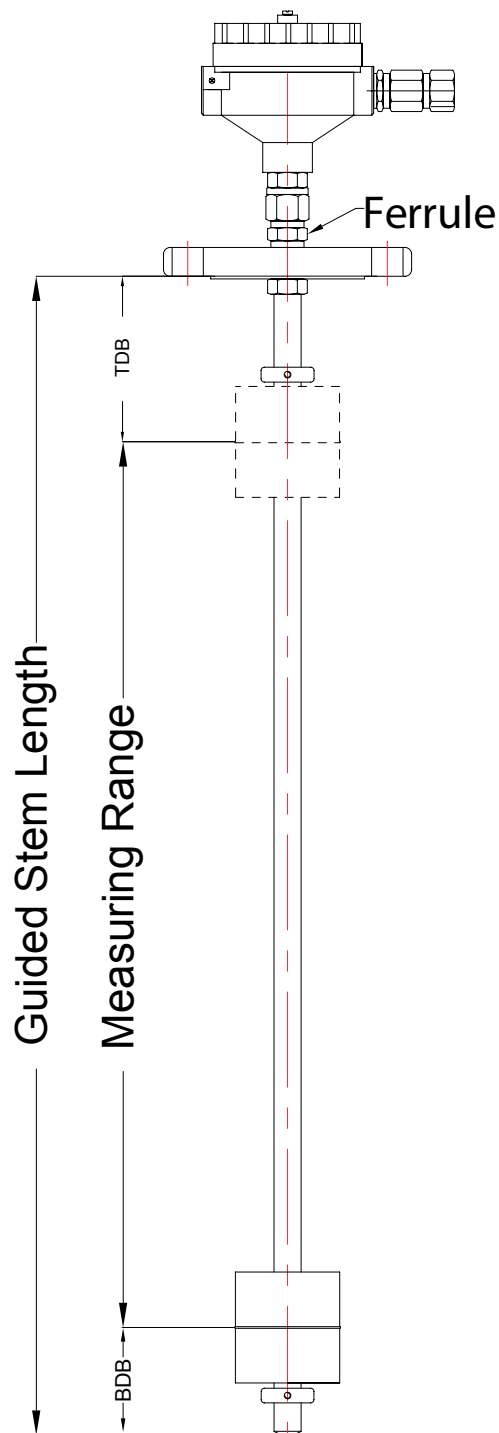


LEVEL CONTROLLER - DLC1001 (OPTION AVAILABLE ON REQUEST)



1.4 FLOAT LEVEL TRANSMITTER WITH FERRULE

Ferrule type is used in applications where in the measuring range is not fixed or if the vessel / tank dimensions are not clearly known. Ferrule enables us to adjust the measuring range to the desired level ($\pm 300\text{mm}$)



1.5 FLOAT LEVEL TRANSMITTER INSTALLED IN A CHAMBER

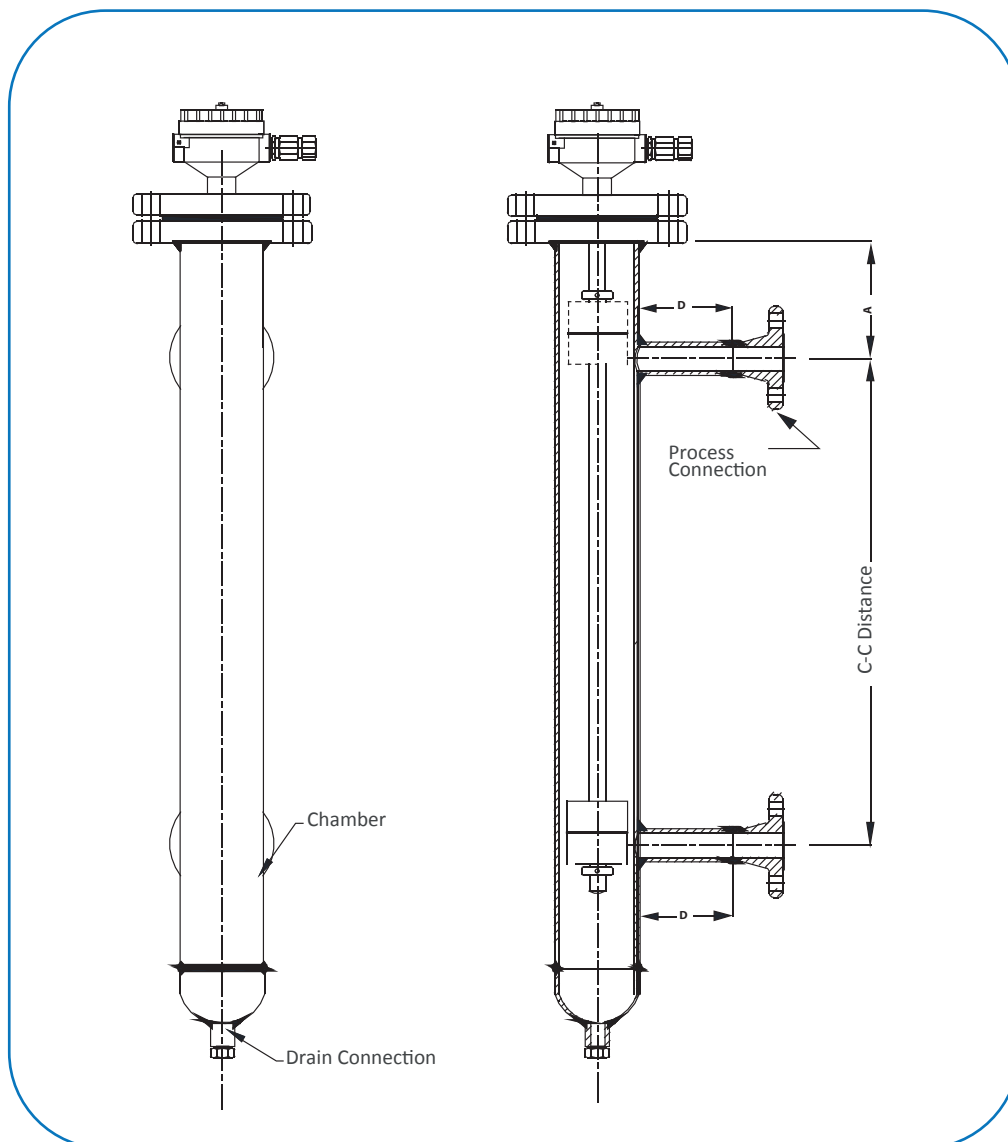
Wherever it is not possible or desirable to install Float Level Transmitter directly onto the vessel, switches can be installed in an External Chamber. This arrangement gives smooth level control irrespective of turbulence in the process vessel and prevents accidental damages to the switch during shutdown or maintenance of the vessel. Chambers are used in applications which require isolations of process, High Pressure / High Temperature applications, Corrosive applications, Onshore / Offshore installations.

Main function of these chambers are:

- Level Measurement
- Interface Measurement between two liquids.

FEATURES

- Available for Low Pressure and High Pressure applications.
- Wide range of material of construction to suit different environmental conditions.
- Wide range of end connection types / sizes to choose from.
- A variety of chamber mounting arrangements provided to suit existing nozzles.



2. MLX SERIES - MAGNETOSTRICTIVE LEVEL TRANSMITTER

This high-precision and robust level transmitter is designed to provide continuous gauging of liquid media levels in tanks. The measuring principle used by the magnetic float level transmitter exploits the physical effect of magnetostriction and is largely unaffected by temperature. Magnetostriction is particularly ideal where level measurements are required to be extremely accurate, e.g. in the Petrochemical / Oil and Gas industry. The level sensor outputs measuring signals in the range of 4-20mA. Available in lengths 200-4000mm, it is compatible with a variety of tank dimensions.

It also comes in the following versions: The explosion-proof version of the level sensor can be installed in potentially explosive atmospheres in which electrical equipment of category 1 (zone 0) or category 1/2 (zone 0/1) are required. Operating on the digital HART protocol, the HART level sensor is able to output the position of the first, second or both floats.



2.1 SPECIAL FEATURES

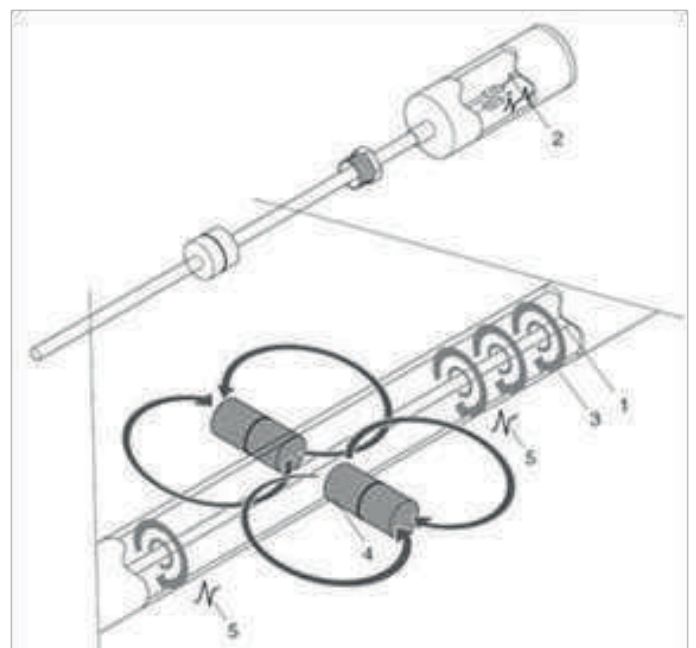
- 0.1mm or 1mm resolution
- Insertion length maximum 15m
- Rigid or flexible guide tube
- Plastic coated version for chemicals
- 4-20mA and HART output
- Graphical display
- 99-point linearization table
- Measurement optimisation
- Volume measurement
- Ex version
- SIL2 & IEC Certified

2.2 APPLICATIONS

- Sensor for continuous level measurement of liquids in bypass level indicators.
- Chemical, petrochemical, off shore industries
- Shipbuilding, machine building
- Power generating equipment, power plants
- Pharmaceutical, food, water treatment, environmental engineering industries

2.3 OPERATING PRINCIPLE

Inside the probe tube there is a rigid wire made of magnetostrictive material. The sensor circuitry emits pulses of current through the wire, generating a circular magnetic field. The level transmitter is a magnet, which is integrated into the float. Its magnetic field magnetizes the wire axially. Since the two magnetic fields are superimposed, around the float magnet a torsion wave is generated which runs in both directions along the wire. One wave runs directly to the probe head while the other is reflected at the bottom of the probe tube. The time is measured between emission of the current pulse and arrival of the wave at the probe head. The position of the float is determined on the basis of the transit times.



TECHNICAL DATA

Type	Rigid probe version	Flexible probe version	Plastic coated rigid probe version	Mini version with rigid probe
Measured process value	Liquid level, distance, volume			
Nominal length (L)	0.5m...4.5m (1.5...14.5ft)	2m...15m (6.5...50ft)	0.5m...3m (1.5...10ft)	0, 5m...1,5m (1.5...4.5ft)
Material of the tube	1.4571(316Ti) stainless steel		PFA coated St. Steel	1.4571stainless steel
Max.medium pressure (1)	2.5MPa (25barg/363psig)	1.6MPa (16barg/232psig)	0.3MPa (3barg/43.5psig)	1MPa (10barg/145psig)
Medium temperature	-40°C ...+90°C (-40°F...194°F), see temperature diagram			
Standard float diameter / Material (2)	Ø53.5x60mm (2x2.35") Cylindrical/ 1.4404(316L)	Ø96mm (4") ball /1.4435(316L)	Ø76x87mm (3x3.45") Cylindrical/ PVDF/PP	Ø28x28mm (1x1.15") Cylindrical 1.4404(316l)
Medium density	Depends on the applied float			
Material of wetted parts	Stainless steel:1.4571,1.4404(316Ti,316L)		PFA, PVDF, PP	St.steel: 1.4571, 1.4404
Ambient temperature	-40°C...+70°C (-40°F...+158°F), plastic housing:-25°C...+70°C (-13°F...+158°F), With display: -25°C... + 70°C (-13°F... + 158°F), Ex type: see temperature diagram			
Output	Analogue	4-20mA (limit values: 3.9... 20.5mA)		
	Digital	4-20mA+HART		
	Display	SAP-300 graphic display		
Damping time	Adjustable 0s...99s			
Error indication	22mA or 3.8mA or holding			
Output load	$R_t = (U_t - 12.5V) / 0.02A$, U_T = power supply voltage			
Power supply	12.5V – 36VDC			
Electrical protection	Class III			
Ingress protection	IP67			
Process connection	As per order code			
Electric connection	2xM 20x1.5 plastic cable glands for 6...12mm (0.25...0.5inch) cable + 2xNPT½" internal thread for cable protective pipe terminal block for 0.5...1.5 mm² (AWG20...AWG15)			
Housing	Wire cross section Ex type: see "Special data for Ex certified models" table Paint coated Aluminum or Plastic (PBT)			
Mass	1.7kg (3.75lb) + m. probe: 0.6kg/m (0.41lb/ft.)	2.9kg (6.4lb) + m. probe: 0.3kg/m (0.2lb/ft.) + Counter weight 3.5kg (7.7lb)	1.7kg (3.75lb) + m. probe: 0.6kg/m (0.4lb/ft.)	1.7kg (3.75lb) + m. probe: 0.7kg/m (0.45lb/ft.)

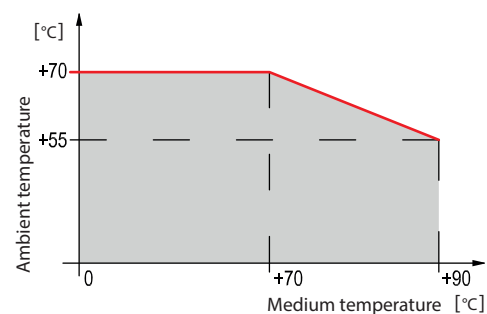
1. Depends on selected float, with sliding sleeve connection the maximal pressure is 0.3MPa (3barg/43.5psig)
2. Requested float type should be specified when placing an order

SPECIAL DATA FOR EX CERTIFIED MODELS

Protection type		ia	d	d ia
Ex marking	ATEX	II 1G Exia IIB T6..T5 0.5...15m	II2G Exd IIB T6.. T5 0.5...10m	II1/2G Exd ia IIB T6.. T5 0.5... 10m
	IEC Ex (3)	Ex d ia IIB T6 Ga	Exd IIB T6 Gb	Exia IIB T6 Ga
Ex power supply and limit data		U _{imax} =30V I _{imax} =140mA	P _{imax} =1W Ci<15nF	Li<200µH
Cable gland		Brass Nickel plated M 20x1.5 Exdap proved cable gland	Brass Nickel plated M 20x1.5 cable gland	
Cable outer diameter		Ø7...13mm (0.275...0.55in)	Ø9...11mm (0.35...0.45in)	

TEMPERATURE PARAMETERS

Type	Temp. Class	Max. Ambient temp.	Max. medium temp.
Rigid probe	T6	70°C (158°F)	80°C (176°F)
Rigid or flexible probe With Plastic coating			
Flexible probe	T5	55°C (131°F)	70°C (158°F)
Rigid or flexible probe With plastic coating			

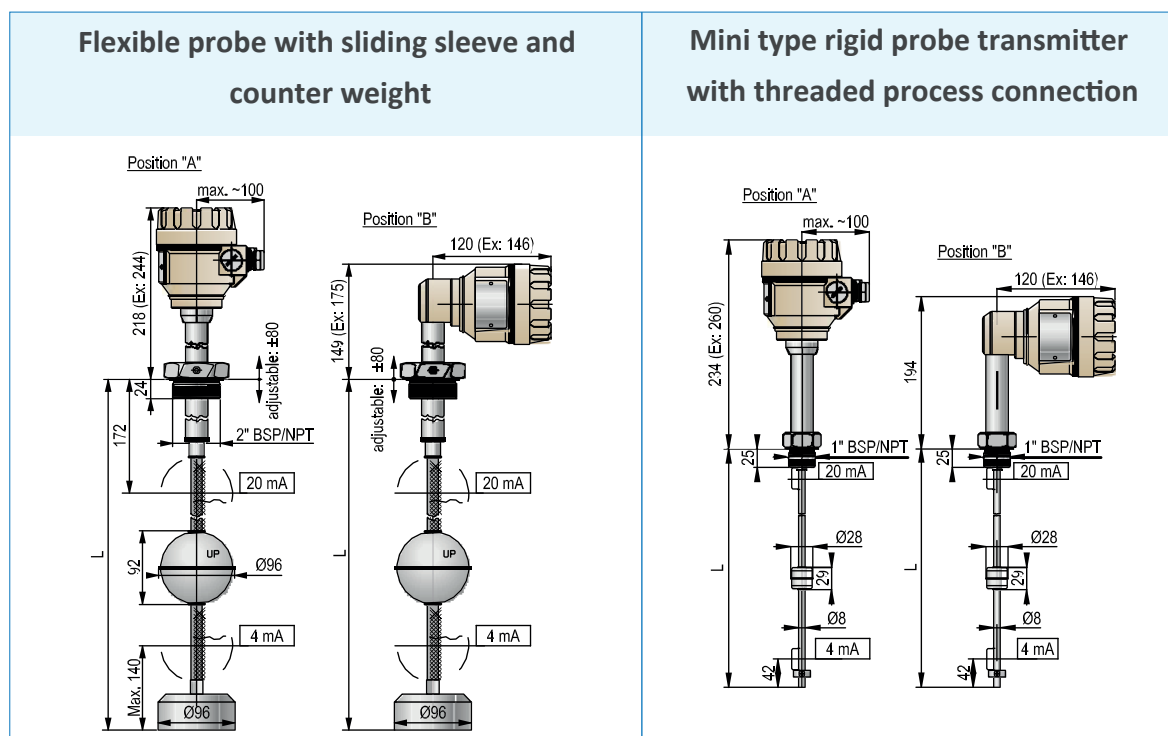


LOWER TEMPERATURE LIMIT

Type		Protection type		
		Ia	d	dia
Transmitter		−40°C (-40°F)		
Transmitter with display	ATEX	−25°C (-13 °F)	−20°C (-4°F)	
	IEC	−25°C (-13°F)		

DIMENSIONS

Rigid probe with threaded process connection	Rigid probe without process connection (1,2)	Rigid probe with plastic coating without process connection(1)



FLOATS

Type	MBA-505-2M-800-00(1)	MBA-505-2M-200-00(1)	MBK-530-2M-400-00(2)	MBA-505-2M-900-00(2)	MGU-505-2M-200-00(2)	MGU-505-1M-200-00(2)	4w34bs-16yyyyy(3)
Dimensions							
Medium density(min.)	0.55kg/dm3 (550oz/ft3)	0.8kg/dm3 (800oz/ft3)	0.55kg/dm3 (550oz/ft3)	0.4kg/dm3 (400oz/ft3)	0.7kg/dm3 (700oz/ft3)	0.4kg/dm3 (400oz/ft3)	0.8kg/dm3 (800oz/ft3)
Material	Titanium	1.4404 (316L)	1.4435 (316L)	1.4401 (316)	PVDF	PP	1.4404 (316L)
Medium pressure	2.5MPa (25barg/363psig)				0.6MPa (6barg/ 87psig)	0.3MPa (3barg/ 43.5psig)	1Mpa (10barg/ 145psig)

2.4 ORDERING INFORMATION FOR MAGNETOSTRICTIVE LEVEL TRANSMITTERS

SPECIFY PART NO. → MLX

1	2	3	4	5
---	---	---	---	---

 MLX

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 Example: MLX

B	C	20	5	2
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1	TYPE
T	Transmitter
B	Transmitter + display ⁽²⁾
E	Transmitter with plastic coated probe
G	Transmitter + display with plastic Coated probe ⁽²⁾
M	Transmitter mini ⁽⁶⁾
C	Transmitter mini + display ⁽⁶⁾

2	PROBE TYPE/ PROCESS CONNECTION
A	Rigid / 1" BSP
C	Rigid / 2" BSP
D	Rigid / 1" NPT
G	Rigid / 2" NPT
U	Rigid / w / o process conn. ⁽⁴⁾
L	Rigid / w / o process conn. & float
K	Flexible / 2" BSP
N	Flexible / 2" NPT
O	Other (Flanged- Specify Size)

3	CODE	PROBE LENGTH	CODE
0	0m	0.0m	0
1	1m	0.1m	1
2	2m	0.2m	2
•	•	•	•
•	•	•	•
•	•	•	•
9	9m	0.9m	9
A	10m		
B	11m		
C	12m		
D	13m		
E	14m		
F	15m		

4	HOUSING
5	Aluminium
6	Plastic ⁽³⁾

5	OUTPUT/RESOLUTION
1	4-20mA / 0.1mm
2	4-20mA / 1mm
3	4-20mA + HART / 0.1mm
4	4-20mA + HART / 1mm
5	4-20mA / 0.1mm / Exia
6	4-20mA / 1mm / Exia
7	4-20mA + HART / 0.1mm / Exia
8	4-20mA + HART / 1mm / Exia
A	4-20mA / 0.1mm / Exd ⁽⁵⁾
B	4-20mA + HART / 0.1mm / Exd ⁽⁵⁾
C	4-20mA / 0.1mm / Exd + Exia ⁽⁵⁾
D	4-20mA + HART / 0.1mm / Exd + Exia ⁽⁵⁾

(1) The order codes for Ex version should end in "Ex"

(2) The position of the display (A or B) should be specified in the order

(3) Not available in Ex version

(4) Threaded sliding sleeve should be ordered separately

(5) Insertion length max.10m

(6) Insertion length max.1.5m

(7) For certified level measurement for custody transfer only the HART output with 0.1mm resolution version including local display unit can be ordered

2.5 ORDERING INFORMATION FOR MAGNETOSTRICTIVE LEVEL TRANSMITTERS - SIL 2 & IEC Certified

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
L	P	R																			
A			B	C	D	E	F	G	H	I	J	K	L	M	N		O				P

A	SENSOR MODEL
	L P R Level Transmitter

B	OUTPUT
M	Modbus
D	DDA
U	USTDII Replacement
1	1 Loop with HART
2	2 Loop with HART
5	1 Loop with HART and SIL2
7	2 Loop with HART and SIL2 (Loop 1 only)

C	HOUSING TYPE
A	NEMA housing w/cable
B	NEMA housing w/terminal
C	NEMA housing w/connector
D	Single cavity with display
E	Dual cavity with display
F	SS Single cavity w/display

D	ELECTRONICS MOUNTING
1	Standard

E	SENSOR PIPE
B	5/8" OD pipe

F	MATERIALS OF CONSTRUCTION (WETTED PARTS)
1	316L stainless steel
3	Nickel Alloy C-276
A	FEP

G	PROCESS CONNECTION TYPE
1	NPT adjustable
2	BSPP adjustable
6	150 lb welded RF flange
7	300 lb welded RF flange
8	600 lb welded RF flange
A	PN16, DIN 2572 welded flange
B	PN40, DIN 2572 welded flange
C	PN64, DIN 2572 welded flange
D	PN100, DIN 2572 welded flange

H	PROCESS CONNECTION SIZE
A	¾ in. NPT Or BSP only
D	2 in. (DN50)
E	DN65
F	3 in. (DN80)
G	4 in. (DN100)
H	5 in. (DN125)
J	6 in. (DN150)
X	None

I	NUMBER OF DT'S (DIGITAL THERMOMETER)
0	None
1	One DT
5	5 DTs (Modbus or DDA)
K	Twelve DTs (Modbus only)
M	Sixteen DTs (Modbus only)

J	DT PLACEMENT
F	Evenly spaced per API
C	Custom
X	None

K	NOTIFIED BODY
C	CEC (FMC)
E	ATEX
F	NEC (FM)
I	IEC
X	None
B	INMETRO
N	NEPSI
P	CCOE
T	CML/ TIIS
K	KC

* Note: Contact factory for other materials

2.5 ORDERING INFORMATION FOR MAGNETOSTRICTIVE LEVEL TRANSMITTERS - SIL 2 & IEC Certified

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L	P	R													
A			B	C	D	E	F	G	H	I	J	K	L	M	N

17	18	19	20	21	22
O					P

L	PROTECTION METHOD
I	Intrinsically safe
F	Explosion Proof/ Flame Proof ¹
X	No approval

¹ Only with Housing Type D, E, or L

M	GAS GROUP
A	Group A (not available with "C=CEC(FMC)" Notified body and "F - flame-proof / explosion-proof" protection method
B	Group B
C	Group C
D	Group D
3	Group C (Intrinsically safe only)
4	Group B + H ₂ (explosion proof / flame proof only)
X	None

N	UNIT OF MEASURE
M	Metric -Millimeters
U	US Customary-inches

O	LENGTH
X X X X X	Rigid sensor pipe 305...7620mm (code as 00305 to 7620)
X X X X X	Rigid sensor pipe 12...300mm (code as 01200 to 30000)

P	SPECIAL
S	Standard Product

HQ and Manufacturing - 1

SHRIDHAN Automation Pvt. Ltd.
#B-54, KSSIDC Industrial Estate,
Kumbalgodu, Mysore Road,
Bangalore-560074. India.
Ph no - +91-80-2843 7847 / 7848
Email - info@shridhan.com

Manufacturing - 2

SHRIDHAN Automation Pvt. Ltd.
#D-13 KIADB Industrial Area,
Kumbalgodu, Mysore Road,
Bangalore-560074. India.

Manufacturing - 3

SHRIDHAN Automation Pvt. Ltd.
#D-18, KIADB Industrial Area,
Kumbalgodu, Mysore Road,
Bangalore-560074. India.

Middle East

ORBIT Automation FZE
#Z3-38, II Floor, PO Box - 122828,
SAIF Zone, Sharjah, UAE.
A 100% Subsidiary of
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Ph No : +971 6 5792662
Email - me@shridhan.com

Europe

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5051 DT, Goirle,
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Ph No: +31 13 304 00 01
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