

Magnetic Level Gauge - MLG

It is magnetically coupled liquid level indicator, widely used in process industry for safe indication of level as an alternative to glass level gauges. They are precisely engineered to indicate liquid level accurately, reliably and continuously.

Salient Features

- Easy to install and rugged design with minimal maintenance
- Safe for corrosive, flammable, toxic, high pressure & temperature applications
- Non-invasive indication as process liquid not in contact with indicator
- Wide choice of materials
- Variety of chamber types to suit most installations
- 360° magnetic coupling

Optional

- IP65 or hermetically sealed protected indicators
- Float failure indication for process safety
- Choice of integrating adjustable magnetic switches & transmitter with gauge
- Dual/ bifurcated chamber design for radar transmission (redundant measurement)
- Jacketing or Electrical Heat Tracing
- Insulation jacketing for high or low temperature
- NACE compliance

Process Capabilities

- Full vacuum to 250 kg/cm²
- Operating temperature: - 80 to 400 °C
- Min liquid specific gravity of 0.4 Interface level measurement for liquids with 0.2 difference of SG



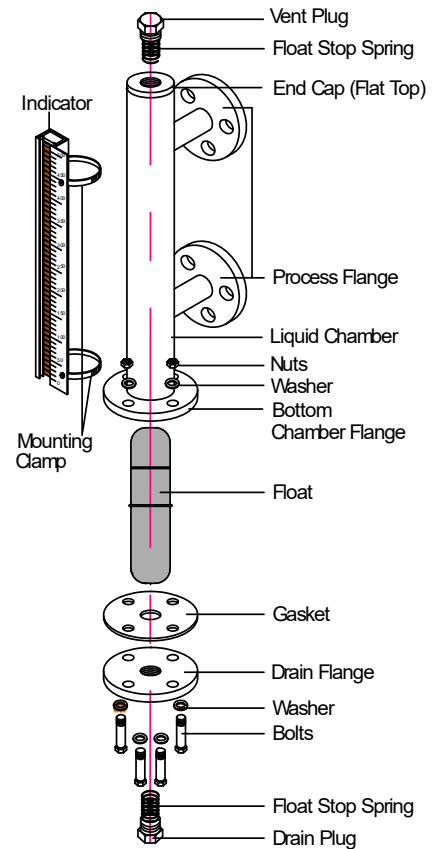
Construction & Working

It consists of a liquid chamber housing a float with an externally clamped non-invasive indicator. The liquid chamber is provided with two process connections for mounting, along with a vent at the top and a drain at the bottom. A scale runs parallel along the length of the indicator to indicate liquid level in desired unit.

The float contains a specially designed magnetic system to provide positive coupling with follower capsule or bicolor flappers fitted in the indicator. The float follows the rise & fall of liquid level and the follower capsule / bicolor flappers track the float position to provide level indication. Besides, supplementary devices like a magnetic switch and or transmitter can be clamped on the chamber to form a complete instrument package for level control & monitoring.

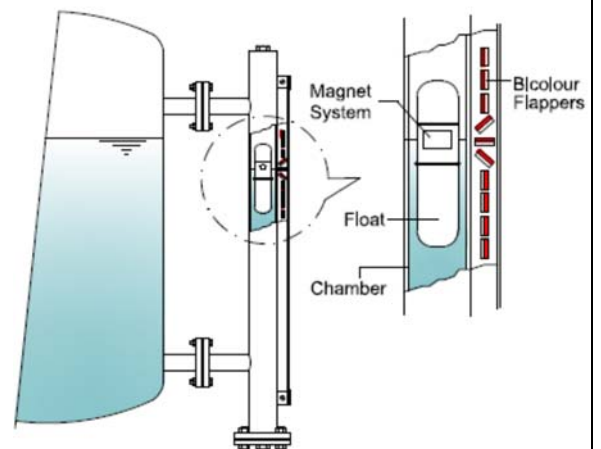
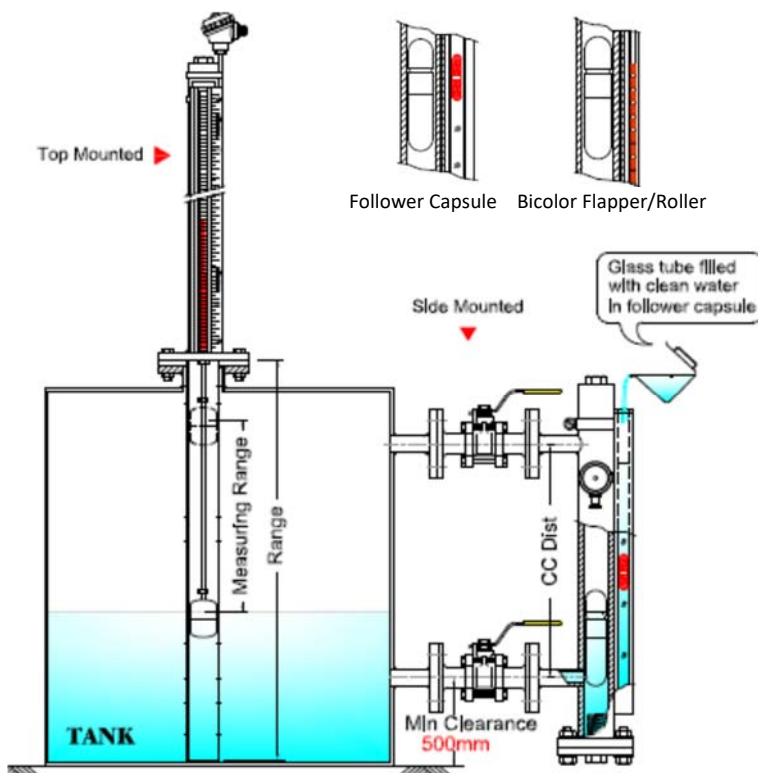
Techtrol Magnetic Level Gauges are available in following series-

- 'S' series- in SS, Hastalloy C, Inco alloy, PP, PVDF & PTFE Lined SS for corrosive applications (Standard)
- 'H' series- in SS & Alloys (High pressure)
- 'T' series – Top Mounted in SS/PP or PTFE Lined SS
- 'Z' series - Oversized chamber in SS (Flashing)
- 'D' series - Dual chamber in SS (Redundant measurement)
- 'F' series - Bifurcated chamber in SS (Redundant measurement)



Exploded View of 'S' Series

Installation



Working with Flapper Indicator

Indicator Types: It is available in follower capsule, bicolor flapper/roller indication with Al. or SS316 housing. Standard indicator is without IP protection, however IP65 and hermetically sealed indicators are available optionally.

Table 1- Indicator Types

ID No	Housing	Indication	Indicator Type	Max. Temp °C	Size (mm)	Code
1	AL	PP Capsule	Standard	150	14 dia.	MGI – APCS
2	SS316					MGI – SPCS
3	AL	PP Capsule	Hermetically Sealed	150	14 dia.	MGI – APCH
4	SS316					MGI - SPCH
5	Al	Plastic Flapper	Standard	150	14 width	MGI - APFS
6	SS316					MGI - SPFS
7	Al	Plastic Flapper	IP65	150	14 width	MGI – APFI
8	SS316					MGI – SPFI
9	Al	Plastic Flapper	Hermetically sealed	150	14 width	MGI – APFH
A	SS316					MGI - SPFH
B	SS316	SS304 Flapper	Standard	250	14 width	MGI - SNFS
C			IP65			MGI - SNFI
D			Hermetically sealed			MGI - SNFH
E	SS316	SS316 Flapper	Standard	250	14 width	MGI - SSFS
F			IP65			MGI - SSFI
G			Hermetically sealed			MGI - SSFH
H	Al	Ceramic Roller	Standard	400	22 width	MGI - ACRS
I	SS316					MGI - SCRS
J	Al	Ceramic Roller	IP65	400	22 width	MGI - ACRI
K	SS316					MGI - SCRI

Specifications

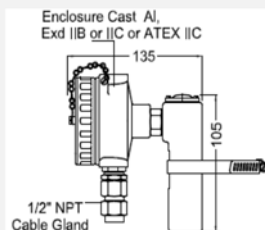
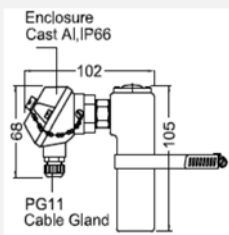
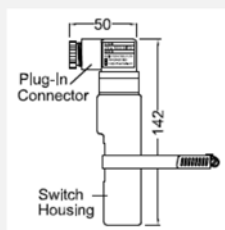
Series	S			H	T
Chamber MOC	SS304/316/316L, Hastalloy C, Incoalloy	PP , PVDF	PTFE lined SS304/316	SS304/316/316L	SS304/316/316L,PP PTFE lined SS304/316
Range (mm)	0.3 to 3 mtr (Capsule) 0.3 to 5 mtr Flapper/ Roller Indicator	0.3 to 3 mtr Capsule Indicator; 0.3 to 4 mtr Flapper/ Roller		0.3 to 3 mtr	0.5 to 3mtr
Chamber Size	2”NB, Sch 10 – Std. 2”NB, Sch 80 (SS)- Option	2” (63Ø)	2”NB sch 10 (ptfe lining SS304/316)	2.5”NB, Sch 80	1-½”NB Sch 40 (SS); 1-½”(PP); 2”NB (ptfe lined SS)
Chamber Types	Flat Top-Flanged Bottom Flanged Top- Flanged Bottom		Flanged Top- Flanged Bottom	Dish end Top – Flanged Bottom	Flat Top
Float Size	Ø 50, (Ø45 with Sch 80 chamber)		Ø 45	Ø 55	Ø75 (SS/ptfe lined); Ø73(PP)

Series	S			H	T
Float MOC	Std-SS316; Options-SS316L/ Ti, Hastalloy C, Incoalloy	PP, PVDF	Std -PVDF Option-SS316 ECTFE ctd.	Titanium	SS316/316L,Ti, PP, ECTEFE ctd SS316
Liquid SG	≥ 0.8 (upto 0.4 SG optional)	≥ 0.8 (Low SG upto 0.7 optional)		≥ 0.8 (Low SG up to 0.4 optional)	≥ 0.8 (Low SG upto 0.7 option)
Interface Level	0.2 diff bet ⁿ upper & lower Liq. SG	NA	NA	0.2 diff bet ⁿ upper & lower Liq. SG	NA
Indicator	(Follower Capsule /flapper/roller); Refer table 1			Flapper / Roller Refer table-1	(Capsule/flapper /roller) Refer table1
Scale	Aluminum in mm, cm, inch, % ; Optional in SS304 or SS316 MOC (Scale width - 30 mm)				
Float Failure Indication (FFI)	Provided with Flapper/roller (Optional); FFI in red, blue or yellow with SS flapper available on request				NA
Process Conn. Size x Type	¾", 1" Screwed (M/F), SW, Weld Stub; ¾", 1", 1-1/2" 2" 2-1/2" 3" NB Flange ASME 150#, 300# (DIN/BS) or Triclover Ferrule (SS)			1", 1-1/2", 2" Flanged	4" Flanged
Pr. Flange Face	RF, SWRF, FF, RTJ, WNRF, WNRTJ, SWRTJ	FF	RF	RF, SWRF, WNRF RTJ, WNRTJ, SWRTJ	RF or FF
Pr. Conn. Orientation/Mtg	Side-side, Side-top, Side-bottom Top -bottom mtg.	Side-side mtg.		Side-Side mtg.	Top mtg.
Shut Off Valves (Optional)	¾" x Ball, Globe Valve	Flanged Ball Valve		Flanged ball/ Globe Valve	NA
Vent/ Drain Size	½", ¾" NPT; 3/4' SW ½" (Flg) , ¾" 1" (Flg./ FBV)	½" BSP	½" BSP	½' NPT, ¾" NPT/ SW, ¾'/1" (Flg)	½"NPT or BSP (PP)
Vent/Drain Type	Plug, Ball Valve, Flange, Dual Flanges		Plug, Flanged Ball Valve	Plug, Globe/ Gate Valve of Flange	Plug , Ball Valve
	Globe/ Gate Valve	Flanged Ball Valve			
Gasket	CNAF, PTFE, SS304/ 316 spiral wound graphite	PTFE	PTFE	SS304/316 spiral wound graphite	CNAF, PTFE, SS304/ 316 spiral wound graphite
Bolts x Nuts for Chamber Flange	Standard -SS304 x SS304; Options- A193 Gr. B7 x A194 Gr. 2H A193 Gr. B8 x A194 Gr. 8 (SS304) A193 B8M x A194 Gr 8M (SS316)			A193,GrB7 x A194 Gr.2H	Std- SS304 x SS304, Options- A193 Gr. B7 x A194 Gr. 2H; A193 Gr. B8 x A194 Gr. 8; A193 B8M x A194 Gr 8M
Max Temp	-10 to 400 °C (-40°C on request)	-10 to 70°C (PP) 100°C (PVDF)	-10 to 120°C	-10 to 400°C	-10 to 250°C (SS), 70°C (PP), 100 °C (PTFE lining SS)

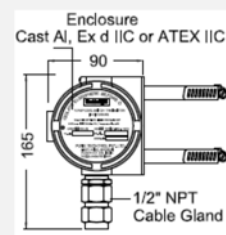
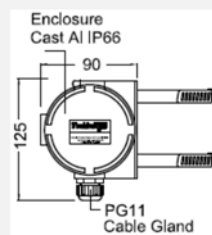
Series	S		H	T
Max Test Pressure	10 kg/cm ² , upto 60 kg/cm ² (option)	3 kg/cm ²	upto 250 kg/cm ²	3 kg/cm ² (High Pr. 10 kg/cm ² on req.)
Perforated Stillwell	NA	NA	NA	3" NB pipe with 4" NB Flg x CS, SS304/316, PP, PVDF MOCs
Special Features	1) Jacketing for Heating / Cooling 2) Electrical Heat Tracing with Insulation Jacket, 3) Insulation Jacket for high or low temperature			
Approval	ATEX (non- electrical) available with SS MOC; Max Temp - 350°C; Max Pressure - upto 200 kg/cm ² ATEX as per Ex h IIC T6... T1 Ga as per 2014/68/EU (Non- Electrical)			

Supplementary Devices (refer separate datasheet for detail specifications)

1. Magnetic Switches		Bi-stable Reed Switch	Bi-stable Micro Switch
	Switch Contacts	60 VA (1 SPDT or 2 SPDT)	1150 VA (5A, 230 VAC) x 1 SPDT or 2 SPDT)
	Terminal Enclosure	Plug (DIN) Connector; Cast Al, WP IP66, Cast Al. Exd IIB or IIC,T6, IP66 or ATEX IIC T6, IP66	Cast Al, WP IP66, Cast Al. Exd IIC or ATEX IIC T6, IP66
	Intrinsic Safety	Ex ib, Gr IIB T6 with Zener barrier available optionally	NA



Bi-stable Reed Switch



Bi-stable Micro Switch

2. Transmitter

2.1 Reed Chain Type Transmitter

Enclosure : Cast Al. WP IP66 or
Cast Al. Ex d IIB or IIC,T6, IP66
Cast Al. ATEX Ex d IIC,T6, IP66

Cable Gland: PG 11, Polyamide or 1/2" NPT DC, Brass

Resolution : ±12 mm (Standard), ± 6 mm (High)

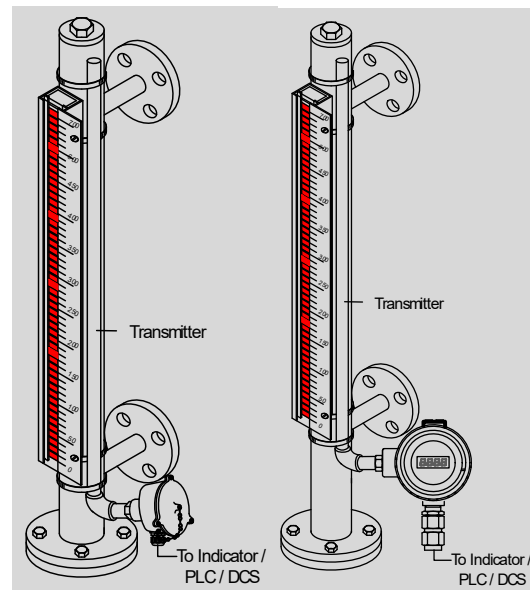
Supply : 24 VDC ± 10%

Output : 1) 4-20mA (2 wire), 2) 1- 5VDC (3 wire),
3) 4-20mA with HART (2 wire),
4) RS-485 Modbus;
Baud Rate: 9600, 19200,38400;
Slave ID: 1 to 7; Data 0 to 4095

Max. Load : 400 Ohms (with current o/p)

Max. Temp : 150 °C Standard, (High Temp 250°C)

Amb. Temp : 0 to 60 °C



Reed Transmitter (Without Display)

Reed Transmitter With Integral Display

Intrinsic Safety: Intrinsically safe to Ex ib Gr IIB T6 available with Zener Barrier

Integral Display (Optional)

Enclosure	Cast Al WP IP65, Cast Al. Ex d IIB, T6, IP65 x ½" NPT DC Cable Gland	Cast Al. WP IP66, Cast Al. ATEX Exd IIC,T6, IP66 (CCOE optional) x ½" NPT DC Cable Gland
Indication	0 to 9999 on LCD display	5 digit on LCD Display (unit %),
Programming	through keypad	Local Operator Interface (with 2 buttons)
Supply	24 VDC ±10%	24 VDC ±10%
Output	4-20 mA (2 wire)	4-20mA with HART (2 wire)
Load	150 Ohms @ 24 VDC	500 Ohms @ 24 VDC (Including HART Resister =250Ω)
Amb. Temp	0 to 55 °C	0 to 55 °C
Intrinsic Safety (optional)	NA	ATEX Intrinsically safety to Ex ia IIC T6

2.2 Magnetostrictive Transmitter

Range : 500 to 5000 mm
 Indication : 5 digit, LCD display
 Programming : 3 Buttons
 Supply : 24 VDC ± 10%
 Output : 4-20 mA or 4-20mA + HART (2 wire)
 Accuracy : ± 1 mm
 Enclosure : Cast Al. WP IP66
 Conduit Conn.: M20 x 1.5 Cable Entry
 Max Temp : 150 °C



Techtrol Display Instruments

For local or remote indication
LP- Cator : Loop Powered Indicator for local indication of liquid level
TLIC : Techtrol Level Indicator Controller for remote indication on 7 segment LEDs & control thru relay output (microcontroller based programmable)
TUIC : Techtrol Universal Indicator Controller for remote level & volume indication on LCD and control thru relay output (microcontroller based, programmable)

- Note: 1. Magnetic Level Gauge in 'Z', 'D' & 'F' series is available on request.**
2. For more details about supplementary devices (magnetic switch & transmitter), refer its datasheet.

Typical Services

- Oil (Lube, Diesel); Water, Steam Condensate, Brine, Liquid Sulphur, Interface Liquids; Acids & Alkalis, 98% H2SO4, Spent Acid, Refined Petrochemicals-Propane, Butane, Gasoline, Ethylene etc.
- Solvents-Acetone, Phenol Toluene, Xylene, Naphtha, IPA, Alcohol, Gas Condensate, Heat Transfer Fluids-Downtherm, Therminol, Thermic Fluid, Glycol, Refrigerants, Alcohols, Ammonia

Model Identification

MLG -																						
1. Series																						
'S' Series (Standard)	S																					
'H' Series (High Temp/Pressure)	H																					
'T' Series (Top Mounted)	T																					
'Z' Series (Oversized Chamber)	Z																					
'D' Series (Dual Chamber- Redundant Measurement)	D																					
'F' Series (Bifurcated Chamber - Redundant Measurement)	F																					
2. Chamber MOC																						
SS304	N																					
SS316	S																					
SS316L	L																					
PTFE lined SS304 (corrosive applications; S, T series)	T																					
PTFE lined SS316 (corrosive applications; S, T series)	F																					
Hastalloy C (S series)	H																					
Inco Alloy (S series)	I																					
PP (corrosive applications; S, T series)	P																					
PVDF (corrosive applications; S series)	V																					
Others	O																					
3. Chamber Types x Process Conn. Orientation (Mtg)																						
Flat top, flanged bottom x Side-Side Mtg.	A																					
Dish end top, flanged bottom x Side -Side Mtg. (H Series)	B																					
Flanged top, flanged bottom x Side-Side Mtg.	C																					
Flat top, flanged bottom x Side-Top Mtg.	D																					
Flat top, flanged bottom x Side-Bottom Mtg.	E																					
Flat top, flanged bottom x Top-Bottom Mtg.	F																					
Flat top x Top Mtg. (T series)	G																					
Others	O																					
4. Float MOC																						
SS316	S																					
SS316L	L																					
SS316 with ECTFE coating (S, T series)	C																					
PP (S, T Series)	P																					
PVDF (S Series)	V																					
Titanium	T																					
Hastalloy C	H																					
Others	O																					
5. Process Connection Size																						
¾"	1																					
1"	2																					
1-1/2" (Flange conn.)	3																					
2" (Flange conn.)	4																					
2-1/2" (Flange conn.)	5																					
3" (Flange conn.)	6																					
4" (Flange conn; T series)	7																					
Others	O																					
6. Process Connection Type																						
ASME Flange 150#	A																					
ASME Flange 300#	B																					
ASME Flange 600#	C																					
ASME Flange 900#	D																					

ASME Flange 1500#	E																		
DIN Flange PN 10	F																		
DIN Flange PN 40	G																		
DIN Flange PN 60	H																		
DIN Flange PN100	I																		
BS 10 T 'D'	J																		
NPT (M) Screwed 3000#	K																		
BSP (M) Screwed 3000#	L																		
BSP (F) Screwed 3000#	M																		
Weld Stub	N																		
Socket Weld 3000# (<i>Chamber Type A,B,C,D,E & F</i>) <i>Metallic</i>	P																		
Triclover Ferrule (<i>Chamber Type C</i>) <i>Metallic</i>	Q																		
Others	O																		
<i>(Note: 'S' series in PP, PVDF & PTFE lined SS, 'H' & 'T' series with flanged conn. only)</i>																			
7. Process Flange Face																			
Not Applicable (<i>Screwed, SW & TC connection</i>)	W																		
FF (<i>PP & PVDF MOC</i>)	A																		
RF	B																		
WNRF	C																		
SWRF	D																		
RTJ	E																		
WNRTJ	F																		
SWRTJ	G																		
Others	O																		
8. Shut Off (Isolation) Valves																			
Without (<i>Z, D, F & T series</i>)	W																		
¾" Screwed Ball Valve (<i>'S' Series Metallic</i>)	1																		
¾" Screwed Globe Valve Screwed (<i>'S' Series Metallic</i>)	2																		
Flanged Ball Valve (<i>'H' series, 'S' series with PP, PVDF & PTFE lining SS MOC</i>)	3																		
Flanged Globe Valve (<i>'H' series</i>)	4																		
Others	O																		
9. Vent Size and Type																			
Sizes		Type																	
Not Applicable (<i>Chamber Type F & D</i>)	W	Not Applicable (<i>Chamber Type F & D</i>)	W																
½" BSP (<i>PP, PVDF & PTFE lining SS MOC</i>)	1	Plug	A																
½" NPT	2	Ball Valve (<i>Screwed/SW</i>)	B																
¾" NPT	3	Ball Valve Flanged	C																
¾" SW (<i>Valve</i>)	4	Globe Valve (<i>Screwed/SW</i>)	D																
½" NB ASME (<i>Flange</i>)	5	Globe Valve Flanged	E																
¾" NB ASME (<i>Flange/FBV</i>)	6	Gate Valve (<i>Screwed/SW</i>)	F																
1" NB ASME (<i>Flange/FBV</i>)	7	Gate Valve Flanged	G						X	X									
Others	O	FF Flange*	H																
		RF Flange*	I'																
		WNRF Flange*	J																
		SWRF Flange*	K																
		WNRTJ Flange*	L																
		SWRTJ Flange*	M																
<i>Note : FBV=Flanged Ball Valve</i>		Dual Flange* (<i>RF/FF Flange with Blind Flange</i>) (<i>FF for PP & PVDF MOC</i>)	N																
		Others	O																
*Flange rating as per the rating of process connection.																			
10. Drain Size and Type																			

Sizes	Type																																				
Not Applicable (<i>Chamber Type F & E</i>)	W	Not Applicable (<i>Chamber Type F & E</i>)	W																																		
½" BSP (<i>PP, PVDF & PTFE lining SS MOC</i>)	1	Plug	A																																		
½" NPT	2	Ball Valve (<i>Screwed/SW</i>)	B																																		
¾" NPT	3	Ball Valve Flanged	C																																		
¾" SW (<i>Valve</i>)	4	Globe Valve (<i>Screwed/SW</i>)	D	X	X																																
½" NB ASME (<i>Flange</i>)	5	Globe Valve Flanged	E																																		
¾" NB ASME (<i>Flange/FBV</i>)	6	Gate Valve (<i>Screwed/SW</i>)	F																																		
1" NB ASME (<i>Flange/FBV</i>)	7	Gate Valve Flanged	G																																		
Others	O	FF Flange*	H																																		
		RF Flange*	I																																		
		WNRF Flange*	J																																		
		SWRF Flange*	K																																		
		WNRTJ Flange*	L																																		
		SWRTJ Flange*	M																																		
Note : <i>FBV=Flanged Ball Valve</i>		Dual Flange* (<i>RF/FF Flange with Blind Flange</i>) (<i>FF for PP & PVDF MOC</i>)	N																																		
		Others	O																																		
*Flange rating as per the rating of process connection																																					
11. Gasket																																					
CNAF																					C																
PTFE (<i>PP, PVDF & PTFE lined SS MOC</i>)`																					T																
SS304 spiral wound graphite																					N																
SS316 spiral wound graphite																					S																
Others																					O																
12. Indicator Model																																					
MGI-APCS	: A	MGI-SNFS	: K																																		
MGI-SPCS	: B	MGI-SNFI	: L																																		
MGI-APCH	: C	MGI-SNFIH	: M																																		
MGI-SPCH	: D	MGI-SSFS	: N																																		
MGI-APFS	: E	MGI-SSFI	: P																																		
MGI-SPFS	: F	MGI-SSFIH	: Q																																		
MGI-APFI	: G	MGI-ACRS	: R																																		
MGI-SPFI	: H	MGI-SCRS	: S																																		
MGI-APFH	: I	MGI-ACRI	: T																																		
MGI-SPFH	: J	MGI-SCRI	: U																																		
		Others	: O																																		
																		A																			
																		.																			
																		U																			
																		.																			
																		O																			
13. Float Failure Indication																																					
Not provided																					W																
Provided (flapper/roller indication in red as failure indication)																					R																
Provided (flapper/roller indication in blue as failure indication)																					B																
Others																					O																
14. Calibrated Scale																																					
Aluminum Scale in mm (<i>LC= 10 mm</i>)																					A																
Aluminum Scale in cm (<i>LC= 1 cm</i>)																					B																
Aluminum Scale in Inch (<i>LC= 0.5"</i>)																					C																
Aluminum Scale in % (<i>LC= 1 %</i>)																					D																
SS304 Scale in mm (<i>LC= 10 mm</i>)																					E																
SS304 Scale in cm (<i>LC= 1 cm</i>)																					F																
SS304 Scale in Inch (<i>LC= 0.5"</i>)																					G																
SS304 Scale in % (<i>LC= 1%</i>)																					H																

Refer Table 1 on page 3

SS316 Scale in mm (LC= 10 mm)	I			
SS316 Scale in cm (LC= 1 cm)	J			
SS316 Scale in Inch (LC= 0.5")	K			
SS316 Scale in % (LC= 1 %)	L			
Others	O			
15. Special Features				
Without		W		
Jacketing for Heating/ Cooling		J		
Electrical heat tracing with Insulation Jacketing		H		
Insulation Jacketing for High/ Low Temperature		I		
Others		O		
16. Accessories				
Without		W		
Counter Flange with Nuts, Bolts & Gasket		F		
CS Perforated Stillwell + Nuts & Bolts ('T' series)		C		
SS304 Perforated Stillwell + Nuts & Bolts ('T' series)		N		
SS316 Perforated Stillwell + Nuts & Bolts ('T' series)		S		
PP Perforated Stillwell + Nuts & Bolts ('T' series)		P		
PVDF perforated Stillwell + Nuts & Bolts ('T' series)		V		
Others		O		
17. Approval				
Without		W		
ATEX (Non- Electrical)		A		
18. Supplementary Devices				
Without			W	
Magnetic Switch (Refer separate datasheet of Supplementary devices for MLG)			S	
Transmitter (Refer separate datasheet of Supplementary devices for MLG)			T	
Magnetic Switch and Transmitter			C	
Others			O	

Ordering Information:

- 1) Model no. of level gauge x Liquid & its sp. gr, Operating Temperature & Pressure and CC/CF/FF distance/ measuring range.
- 2) Model no. of magnetic switch if required (Refer data sheet of Supplementary Devices for MLG)
- 3) Model no. offered type transmitter if required (Refer data sheet of Supplementary Devices for MLG)