

Magnetic switches (bi-stable) and transmitter (reed chain or magnetostrictive) are attached to a magnetic level gauge as supplementary devices. Provides economical & reliable solution for level control & remote monitoring without adding separate switches or transmitter on vessel.

## Salient Features

- Non-invasive level detection & measurement
- Magnetic switches adjustable over entire range
- Bi-stable switching action
- Flameproof Enclosures for Hazardous Area
- Choice of Reed Type or Magnetostrictive X'mitter
- Option of 4-20mA + HART, RS-485 O/P with X'mitter

They are clamped externally on the gauge through mounting clamp without disturbing process. It can be also retrofitted after gauge installation and may be taken out for service at any time without interruption in process.

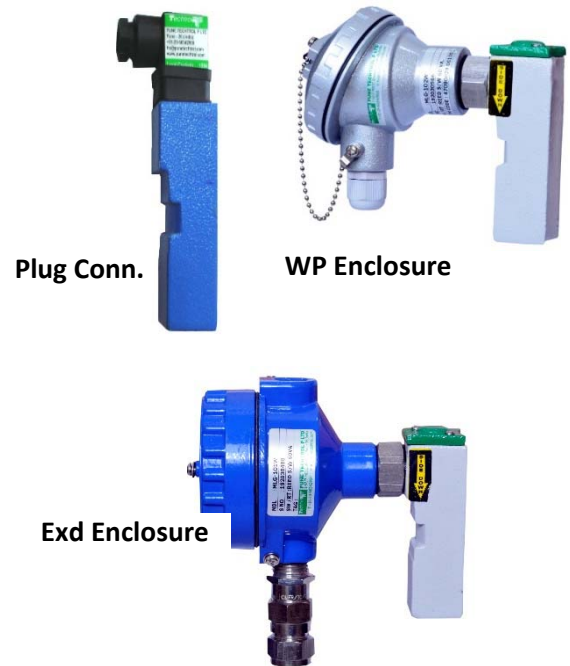
## 1. Magnetic Switches (Bi-stable)

They are mounted on the liquid chamber at required position to sense high or low level for control action. Magnetic switches are available in bi-stable switching action.

**Bi-stable switch actuation** – Reed/ Micro switch is actuated, when it comes within the magnetic field of the float, during its travel in one direction, due to change in liquid level. The switch remains actuated till float travels in same direction. Switch will de-actuate only after it again comes in magnetic field of float, while traveling in opposite direction.

Potential free output contacts of the switches can be connected directly to PLC or DCS system. However bi-stable reed switches are of low powered (60VA). Its contact rating can be enhanced by using Techtrol Controller, its relay contacts can be used to drive higher loads.

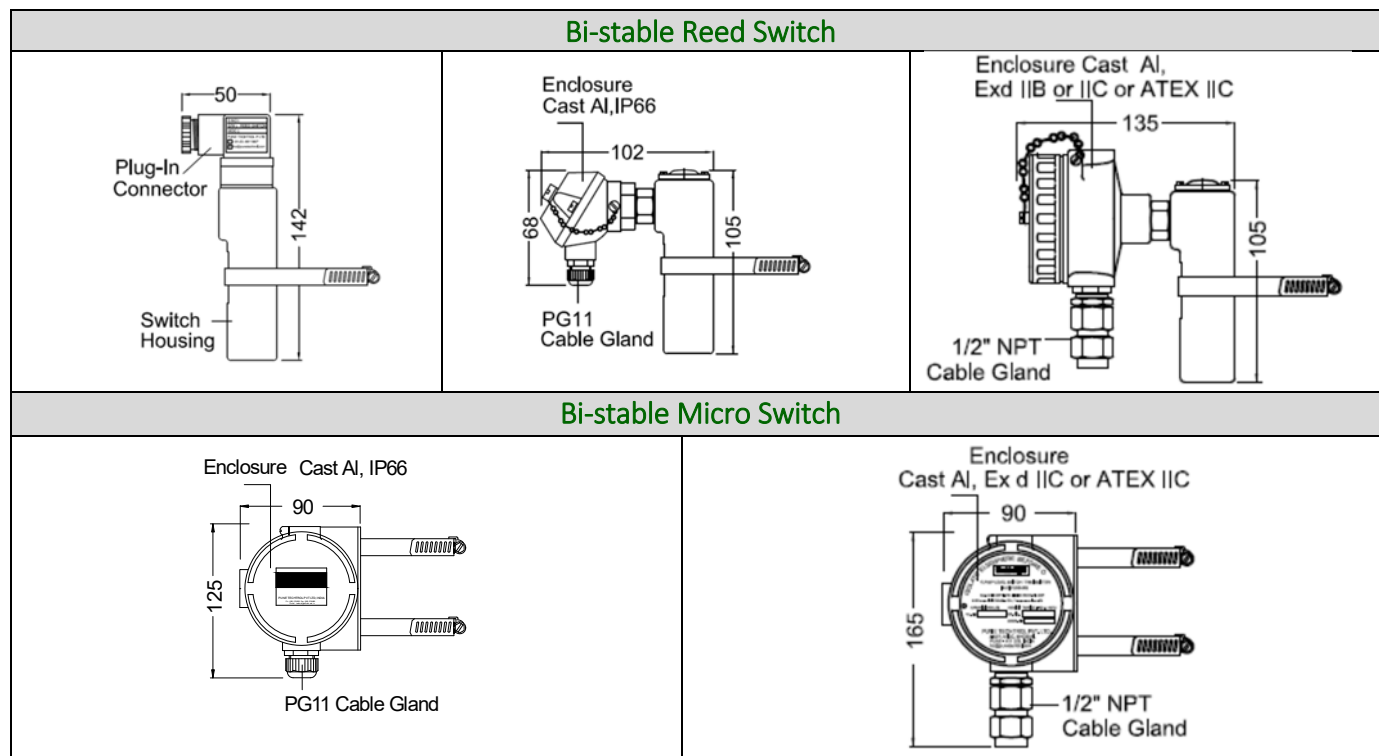
### Bi-stable – Reed Switch



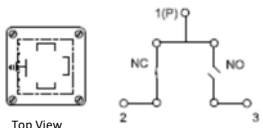

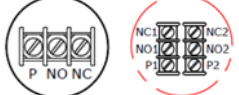
### Bi-stable – Micro Switch



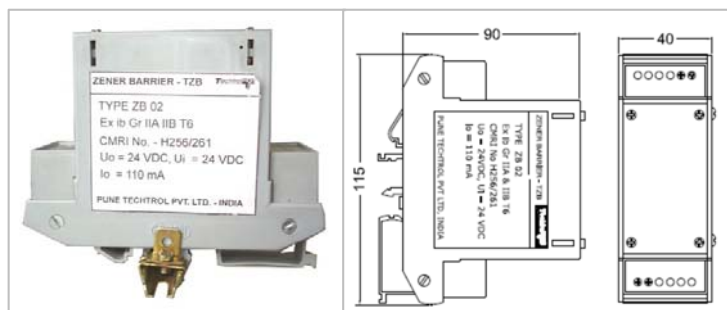
## 1.1 Schematic Diagram



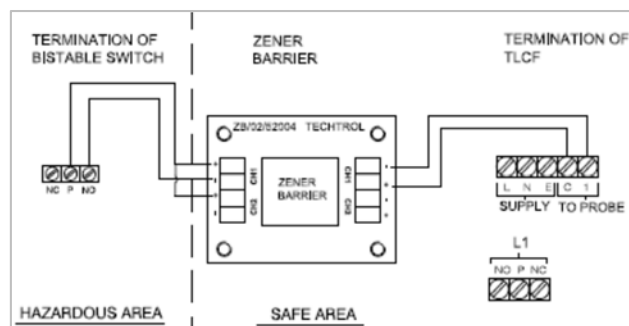
## 1.2 Specifications

Switch Action	Bi-stable		
Switch Type	Reed Switch - Hermetically sealed x 1 SPDT / 2 SPDT		Micro Switch x 1 SPDT / 2 SPDT Micro Switch in Hermetically sealed Casing x 1 SPDT / 2 SPDT
Switch Capacity	60 VA		1150 VA (5A, 230 VAC)
Max. Sw. Voltage	230 VAC/ DC		230 VAC/ DC
Max. Sw. Current	1 A		5 A
Switch Housing	Cast Al.		NA
Terminal Enclosure	DIN (Plug) Connector (1 SPDT)	Cast Al. WP IP66, Cast Al. Exd IIB or IIC, T6, IP66 Cast Al. ATEX Exd IIC, T6 IP66	Cast Al. WP IP66, Cast Al. Ex d IIC, T6, IP66 Cast Al. ATEX IIC, T6, IP66
Conduit Conn.	PG 11	PG 11, Polyamide or 1/2" NPT Double Compression, Brass, Cable Gland	
Max. Temp	200 °C	350 °C	300 °C
Intrinsically safe (Optional)	Ex ib, Gr IIB T6 with Zener barrier 24 VDC/110 mA		NA
Termination	 <p>Top View w/o socket Reed Switch -1SPDT x DIN (Plug) Conn.</p>	 <p>Reed Switch SPDT Reed Switch DPDT Cast Al Terminal Enclosure</p>	 <p>Micro Switch SPDT Micro Switch DPDT Cast Al Terminal Enclosure</p>

### 1.3 Zener Barrier



### 1.4 Termination & Wiring



Bi-stable Switch (Reed) with TLC- (M)

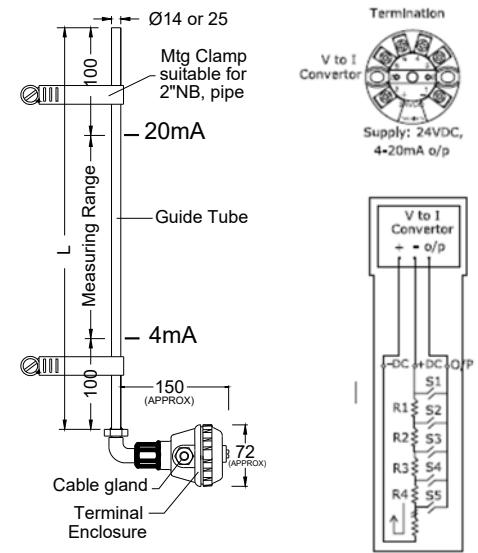
### 1.5 Magnetic Switch Model Identification

		MGS -				
<b>1. Switch Action x Type</b>						
Bi-stable x Reed Switch, Hermetically Sealed		1				
Bi-stable x Micro Switch		2				
Bi-stable x Micro Switch in Hermetically Sealed Casing		3				
Others		0				
<b>2. Switch Contacts</b>						
1 SPDT		1				
2 SPDT (DPDT)		2				
<b>Terminal Enclosure x Conduit Connection</b>						
DIN (Plug) Connector (Bi-stable Reed Switch, 1 SDPT)			P			
Cast Al. WP IP66 x PG11 Cable Gland			J			
Cast Al. WP IP66 x ½" NPT DC Cable Gland			K			
Cast Al. Ex d IIB T6, IP66 x ½" NPT DC Cable Gland (Reed Sw)			E			
Cast Al. Ex d IIC T6, IP66 x ½" NPT DC Cable Gland			F			
Cast Al. Ex d ATEX IIC T6, IP66 x ½" NPT DC Cable Gland			S			
Others			O			
<b>3. No. of Switches</b>						
1...4				1.4		
<b>4. Intrinsic Safety Approval</b>						
Not Provided					W	
Ex ib, Gr IIB T6 with Zener barrier					P	
Others					O	
<b>5. Level Controller (Refer TLC Catalog)</b>						
Not Provided					W	
Provided					P	

## 2. Reed Chain Transmitter

Transmitter is mounted externally on the chamber through clamps such that its enclosure is oriented at bottom side of the chamber. It provides 4-20 mA current output corresponding to CC distance / range of level gauge.

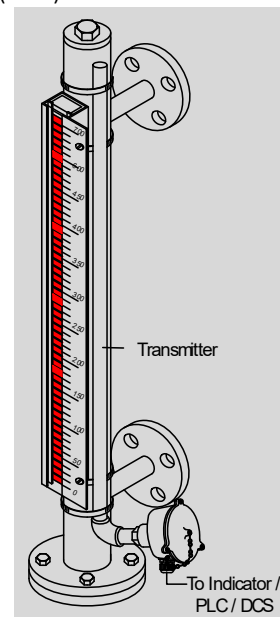
It consists of PCB strip of closely spaced reed switches and a chain of series resistors fitted inside the guide tube and a transmitter card is housed in an enclosure. The float moves inside the chamber, due to rise or fall of liquid level and actuates the reed switches according to its position and change in voltage is fed to the (v to I) transmitter card to convert it into the linear analog signal output of 4-20 mA. This output signal can be configured with Techtrol Indicator Controllers (TLIC/ TUIC/TLPI) or connected to PLC/ DCS system.



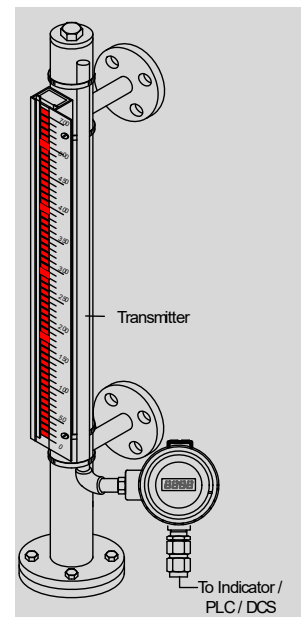
**Transmitter (Reed Type)**

### 2.1 Specifications

- Enclosure : Cast Al. WP IP66 or Cast Al. Ex d IIB or IIC, T6, IP66 or Cast Al. ATEX Ex d IIC, T6, IP66
- Cable Gland : PG 11, Nylon (WP) or 1/2" NPT DC, Brass (Exd)
- Guide tube MOC : SS316
- 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 (2wire),  
4) RS485 Modbus Protocol  
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
- Intrinsic Safety : Intrinsically safe to Ex ib Gr IIB T6
- Approval (Optional) : With Zener Barrier 24VDC/110mA
- Zener Barrier:**
- Input Supply : 24 VDC
- Output : 24 VDC / 110 mA
- Enclosure : ABS (Size: 40 x 115 x 90 D mm); DIN Rail mounting



**Reed Transmitter  
(Without Display)**

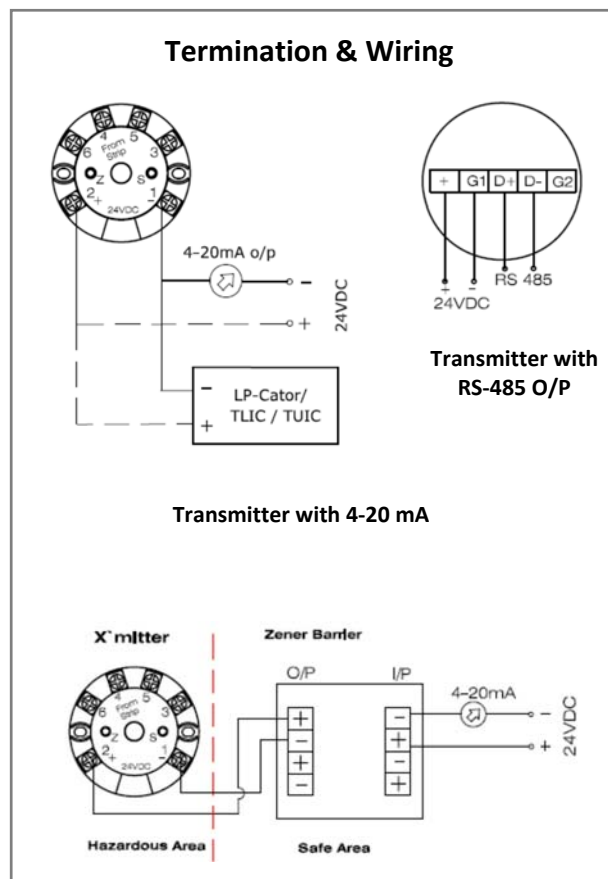


**Reed Transmitter  
With Integral Display**



### Integral Display (Optional)

- 1) Enclosure : Cast Al. WP IP65, or Ex d IIB,T6, IP65  
x ½" NPT DC cable Gland
- Indication Range: 0 to 9999
- Display : LCD
- Programming : through keypad
- Supply : 24 VDC ± 10 %
- Output : 4-20 mA
- Load : 150 Ohms @ 24 VDC
- Amb Temp : 0 to 55 °C
- 2) Enclosure : Cast Al. WP IP66 or  
Cast Al. ATEX Ex d IIC, T6, IP66 (CCOE option)
- Cable Gland : ½" NPT DC cable gland, brass
- Indication : 6 digit (Level value) (unit %)
- Display : 2 lines, 8 characters Alphanumeric LCD
- Programming : Local Operator Interface (with buttons)
- Supply : 24 VDC ± 10 %
- Output : 4-20mA with HART
- Load : 500 Ohms @ 24 VDC  
(Including HART resistance of 250 Ohms)
- Intrinsic Safety : ATEX Intrinsically safety to Ex ia IIC T4
- Approval (Option)
- Amb Temp : 0 to 55 °C



### 2.3 Magnetostrictive Transmitter

- Range : 500 to 5000 mm
- Indication : 5 digit, LCD display
- Programming : through 3 Buttons
- Supply : 24 VDC ± 10%
- Output : 4-20 mA or 4-20mA + HART (2 wire)
- Accuracy : ± 1 mm
- Enclosure : Cast Al. WP IP66 x M20 cable gland
- 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 level indication on seven segment LEDs and control through relay output (microcontroller based, programmable)
- TUIC : Techtrol Universal Indicator Controller for remote level & volume indication on LCD and control through relay output (microcontroller based, programmable)

## 2.4 Transmitter Model Identification

MGT-						
<b>1. Transmitter Type</b>						
Reed Chain Type	R					
Magnetostrictive Type	M					
Others	O					
<b>2. Enclosure x Conduit Connection</b>						
Cast Al. WP IP66 x PG11 Cable Gland	J					
Cast Al. WP IP66 x ½" NPT DC Cable Gland	K					
Cast Al. Ex d Gr IIB, T6, IP66 x ½" NPT DC Cable Gland	E					
Cast Al. Ex d Gr IIC, T6, IP66 x ½" NPT DC Cable Gland	F					
Cast Al. ATEX Ex d IIC, T6, IP66 x ½" NPT DC Cable Gland	S					
Cast Al. WP IP65 x ½" NPT DC Gland ( <i>Integral Display, 4-20mA o/p</i> )	I					
Cast Al. Ex d Gr IIB, T6, IP65 x ½" NPT DC Cable Gland ( <i>Integral Display, 4-20mA o/p</i> )	H					
Others	O					
<b>3. Resolution</b>						
± 12 mm ( <i>Standard</i> )		S				
± 6 mm ( <i>High Resolution</i> )		H				
± 1 mm ( <i>Magnetostrictive</i> )		M				
Others		O				
<b>4. Output</b>						
4-20 mA ( <i>2 wire</i> )			1			
4-20 mA with HART ( <i>2 wire</i> )			2			
1-5 VDC			3			
RS-485 MODBUS RTU Serial Communication ( <i>IP66 encl only</i> )			4			
Others			O			
<b>5. Intrinsic Safety Approval</b>						
Without				W		
Ex ib IIB T6 <i>with Zener Barrier (with 4-20mA O/P)</i>				S		
ATEX Ex ia IIC T6 ( <i>with 4-20mA+ HART O/P</i> )				A		
Others				O		
<b>6. Display Type</b>						
Without					W	
With Integral Display ( <i>Magnetostrictive; Refer Table1 below for Reed Transmitter</i> )					I	
Loop Powered Indicator (LP-Cator)					L	
Level Indicator Controller (TLIC)					I	
Universal Indicator Controller (TUIC)					U	
Others					O	

**Table 1**– Combination of Reed Transmitter Output x Integral Display x Intrinsically Safe x Enclosure Types

Enclosure →	I	J/K/L	E/H	F	S
Combinations↓	IP65	IP66	Ex d IIB	Ex d IIC	ATEX IIC
4-20 mA	-	Provided	Provided	Provided	Provided
4-20mA + HART	-	Provided	Provided	Provided	Provided
4-20mA + Intrinsic Safety	-	Provided	Provided	-	-
4-20mA + HART + Intrinsic Safety	-	Provided	-	-	Provided
4-20mA + Integral Display	Provided	-	Provided	-	-
4-20mA + HART + Integral Display	-	Provided	-	-	Provided
4-20mA + Intrinsic Safety + Integral Display	-	Provided	-	-	Provided
4-20mA + HART + Intrinsic Safety + Integral Display	-	Provided	-	-	Provided

## Ordering Information:

Model no., Optg. Temperature of Magnetic Level Gauge and CC/CF/FF distance/measuring range of Magnetic Level Gauge (for transmitter)