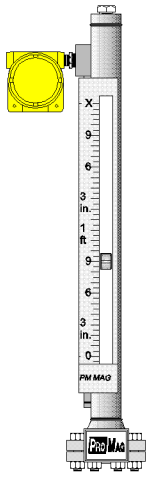
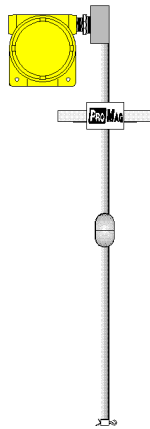


MST-x27 PM-2000

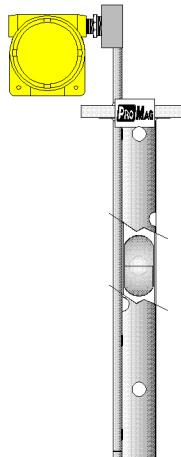
MAGNETOSTRICTIVE LIQUID LEVEL TRANSMITTER



MST-C27



MST-I27



MST-S27

ProMag LTD

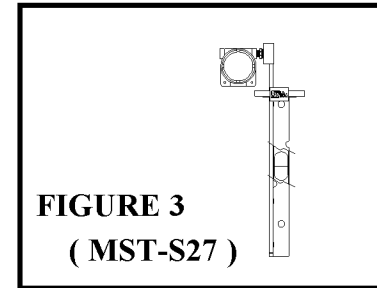
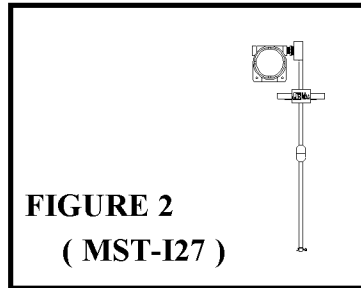
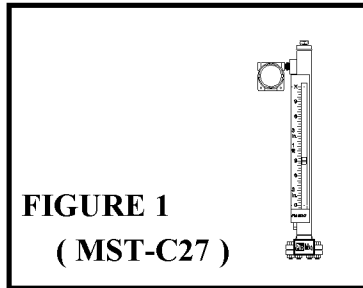
BULLETIN 1011

DESCRIPTION

The MST-C27, MST-I27, and MST-S27 are Liquid Level sensing devices designed to measure tank levels, and to re-transmit outputs to remote locations. They consist of a Magnetostrictive Primary Sensing Element mounted in a protective tube, and an Electronic Transmitter that is mounted at one end of the assembly.

These Instruments measure liquid levels in vessels by the means stated below using one of the following three configurations.

1. **MST-C27:** This unit is integrally mounted with a PROMAG PM-26. The PM-26 is a device used to measure vessel liquid levels. See PM-26 brochure for detailed description of its operation. Basically the PM-26 contains a float that is monitoring the vessel's liquid level. This float has a magnet internally mounted, which sets up a magnetic field around its perimeter. It is this magnetic field that the MST senses and in turn transmits a 4 to 20 mA signal relative to the float's position in the chamber. See Figure 1 below.
2. **MST-I27:** This configuration uses the same principle as in the #1 design above, but the float has a hole through its center, and goes around the sensing tube. This device is inserted into the vessel instead of being mounted to a PM26 chamber external to the vessel. See Figure 2 below.
3. **MST-S27:** Design #3 incorporates part of both designs #1 and #2 above. The float is in a guide tube lateral to the sensing tube as in design #1, but is inserted into the vessel as in design # 2. See figure 3 below.



FEATURES / BENEFITS

- * 2 Wire Loop powered Design
- * Unique Magnetic coupling / no contact with process fluids
- * Ease of mounting and adjustments
- * Relatively unaffected by specific gravity changes of the measured fluid
- * Accommodates tanks of any size, shape, or type
- * Compact design / ease of handling and calibration
- * Interface Level capability
- * High Accuracy, Repeatability, Linearity
- * Temperature Measurement Capability

APPLICATIONS

Butane	Acids	Tank Trucks	Total Level
Propane	Chlorine	Constant Volume Chambers	Interface Level
Oil	Water		Total and Interface Level
Solvents	Stationary Vessels		

See PM-26 Brochure for more detailed list of applications and uses.

OPERATION

The MST, Magnetostrictive Liquid Level Transmitter works by mechanically exciting a primary sensing element made of magnetostrictive material. Excitation is accomplished by means of a specially developed electro-mechanical actuator. The excitation shock wave travels down the primary sensing element at a constant rate of speed independent of outside influences. The interaction of this moving shock wave with the magnetic field of the float will cause a Return Signal Voltage (RSV) to be induced on the sensing element. This RSV is sensed by the PM-2000 Transmitter, and the resulting time delay is linearly proportional to the distance of the electro-mechanical actuator to the position of the float.

The PM-2000 4/20mA Loop Powered Transmitter serves the purpose of:

- 1) Generating the pulses for the electro-mechanical actuator.
- 2) Sensing of the RSV.
- 3) Measuring the time delay of the return pulse.
- 4) Conversion of the resulting time delay into a usable 4/20 mA signal. This resulting 4/20 mA output of the PM-2000 is calibrated to the desired liquid level range.

The MST-25/PM-2000 can also be provided with an optional temperature sensing device.

MST-(x)27 MAGNETOSTRICTIVE LEVEL TRANSMITTER

MST PART NUMBER SELECTION

MODEL TYPE

MST-C27 / PM-2000 CHAMBER MOUNTED
 MST-I27 / PM-2000 INTERNAL TANK MOUNTING (See Note 1)
 MST-S27 / PM-2000 INTERNAL / SIDE STILLING WELL (See Note 1)

MOUNTING

C - CHAMBER F - FLANGE H - HEX PLUG

SENSING ELEMENT TUBE MATERIAL

4S - 304 SS FB - FIBERGLASS - (See Note 3)
 6S - 316 SS 4T - TFE COATED 304SS
 6LS - 316 LSS FOR SLIP RESISTANCE
 M - MONEL 4H - HALAR COATED 304 SS
 HC - HASTELLOY C

FLANGE / PLUG MATERIAL

4S 6S 6LS M HC F 4T 4H CS
 (X - NO FLANGE or PLUG)

FLANGE / PLUG SIZE

1 - 1"	6 - 6"
15 - 1 1/2"	8 - 8"
2 - 2"	10 - 10"
25 - 2 1/2"	X - No Flange or Plug
3 - 3"	
4 - 4"	

PRESS. RATING

A - 150 #
B - 300 #
C - 600 #
F - Plug (3000#)

PM-2000 TRANSMITTER POSITION

T - TOP MOUNT B - BOTTOM MOUNT

OPTIONS

X - NONE
 P - INSULATION PAD (Style C) when blanket is not used on PM-26.

POWER

DC - 24 VDC CUSTOMER SUPPLIED POWER
PROMAG SUPPLIED POWER
 AC1 - 110 VAC REMOTE
 AC2 - 220 VAC REMOTE
 (See Note 2)

TEMPERATURE OUTPUT / RANGE

X - No Temperature Output
 N - Narrow Range -50/51 C (-122/123 F)
 W - Wide Range -100/104 C (-212/219 F)

MEASURE RANGE

SPECIFY IN INCHES

INACTIVE LENGTH

SPECIFY IN INCHES
 (See Note 1 and Figure 6)
 "X" for C Style unit

OVERALL LENGTH

SPECIFY IN INCHES
 (See Note 1 and Figure 6)
 "X" for C Style unit

MST C 27 PM-2000 C 4S X X T X DC X 100 X X

SPECIFICATIONS

- * OUTPUT 4/20 mA Loop Powered
- * OUTPUT SIGNAL LOADING 800 Ohms at 30 VDC
- * ACCURACY +/- .25% of Span
- * LINEARITY The greater of .01% Span or .035 "
- * PRIMARY ELEMENT REPEAT-ABILITY +/- 1/5" SS +/- 1/16" Teflon (PM-26 Dependent)
- * POWER 24 VDC / 30 VDC Max
- * HOUSING STD: NEMA 7X Copper Free Epoxy Coated Aluminum NEMA 4 Available
- * PRIMARY SENSING ELEMENT Magnetostrictive
- * MEASURING INCREMENT Continuous Analog
- * PROCESS OPERATING TEMPERATURE
 - MST-I27, and MST-S27 200 Deg F Max
 - MST-C27 Max 800 ° F when an INSULATION PAD or BLANKET is used between the MST and FLOAT CHAMBER.
- * PM-2000 Operating Temp -40 - 150 ° F
- * MST SENSING TUBE 304SS Standard for "C" Style See Selection for Internal units

HAZARDOUS LOCATIONS

Suitable for :
 CL I GROUPS B, C, D
 CL II GROUPS E, F, G
 CL III NEMA 4

NOTES:

1. For the MST-I27 and MST-S27, exact tank dimensions will be required. See "I" and "S" style Internal Mounting and Dimensions (page 3)
2. DC Customer Supplied 24 VDC Power.
 AC1 110 VAC to 24 VDC power supply remotely mounted from PM-2000 Transmitter.
 AC2 220 VAC to 24 VDC power supply remotely mounted from PM-2000 Transmitter.

When the AC1, and AC2 Power Supply's are supplied as an integral part of other PROMAG device's , they should be shown in the part #. All of the above Power Supply's can power the loop as well as the MST Transmitter.

3. MST-I27 / PM-2000 only.



Typical 4-20 mA Application Wiring and Adjustment Location

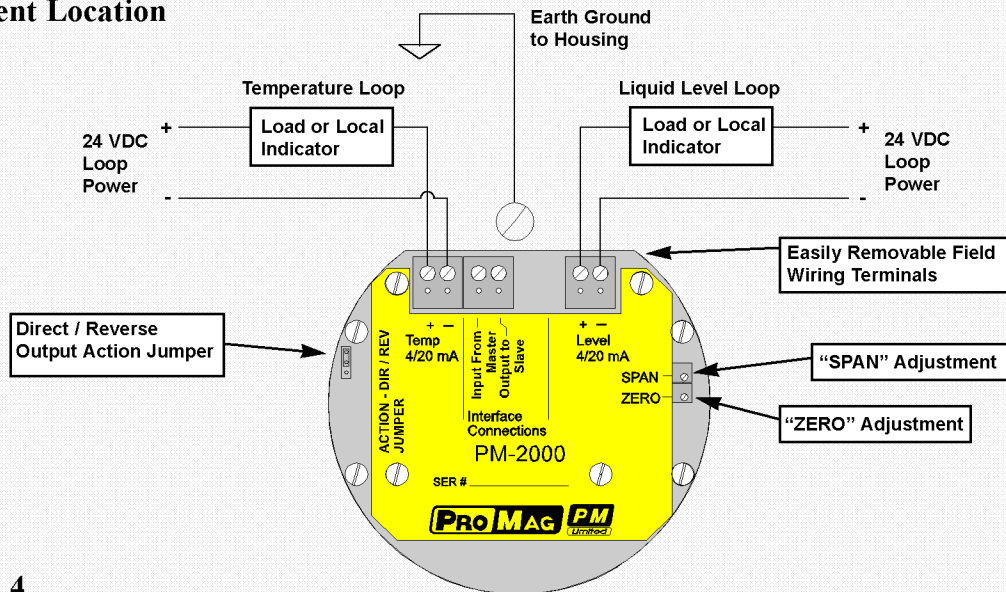


FIGURE 4

MST-C27 / PM-2000 PM-26 Chamber Mounting

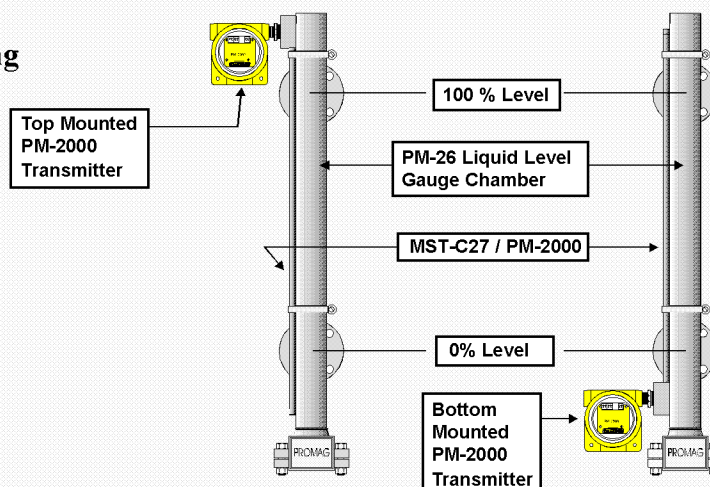
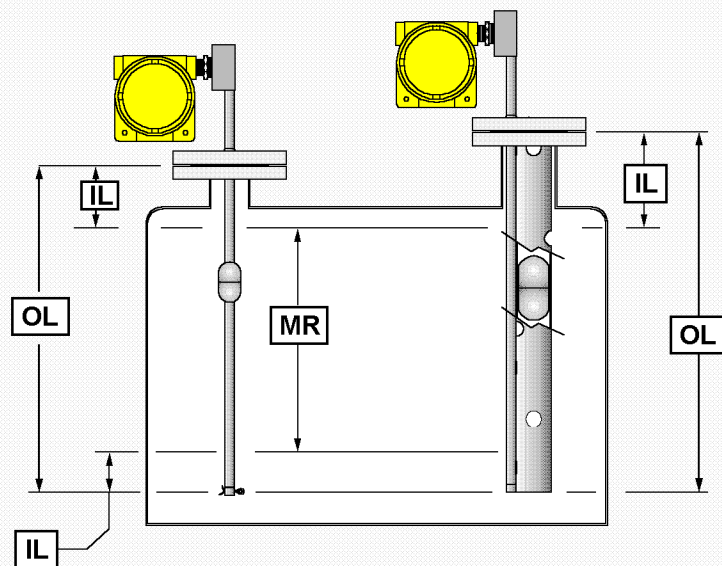


FIGURE 5

MST-I27 / PM-2000 and MST-S27 / PM-2000 Internal Mounting and Dimensions



OL = OVERALL LENGTH
 IL = INACTIVE LENGTH
 MR = MEASURING RANGE

Inactive Length Depends on the following conditions.

- 1) Float Design.
- 2) Process Conditions.
- 3) Nozzle Diameter and Height.

NOTE:
 A 4" minimum inactive length is required at both the top and bottom of the sensing tube.

FIGURE 6

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