



# PENBERTHY MULTIVIEW™ TOP MOUNT MAGNETIC GAGE INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

Before installation these instructions must be read fully and understood

## TABLE OF CONTENTS

Product warranty .....	1
1 Introduction .....	1
1.1 Theory of operation .....	1
1.2 System description .....	1
2 Specifications .....	2
2.1 General .....	2
2.2 Floats .....	2
3 Installation .....	2
3.1 Unpacking .....	2
3.2 Assembly .....	2
3.3 Installation .....	3
3.4 Indicator alignment .....	3
4 Start-up .....	3
5 Periodic maintenance .....	3
6 Troubleshooting .....	4
7 Telephone assistance .....	4

*This is Emerson's sole warranty and in lieu of all other warranties, expressed or implied which are hereby excluded, including in particular all warranties of merchantability or fitness for a particular purpose.*

This document and the warranty contained herein may not be modified and no other warranty, expressed or implied, shall be made by or on behalf of Emerson unless made in writing and signed by the company's general manager or director of engineering.

## 1 INTRODUCTION

The Penberthy Multiview™ top mount magnetic gage (TMMG) is designed for applications requiring visual indication but with the only access being a single manway in the top of the vessel.

## Indicator

The indicator consists of a series of magnetically interlocked flags. The flags are black on one side and gold colored on the other. As the float rises the flags rotate 180°, changing from black to gold. Gold denotes where liquid exists, black where it does not.

## PRODUCT WARRANTY

Emerson warrants its Penberthy products as designed and manufactured to be free of defects in material and workmanship for a period of one year after the date of installation or eighteen months after date of manufacture, whichever is earliest. Emerson will, at its option, replace or repair any products which fail during the warranty period due to defective material or workmanship.

Prior to submitting any claim for warranty service, the owner must submit proof of purchase to Emerson and obtain written authorization to return the product. Thereafter, the product shall be returned to Emerson, with freight prepaid.

This warranty shall not apply if the product has been disassembled, tampered with, repaired or altered outside of the Emerson factory, or if it has been subjected to misuse, neglect or accident.

Emerson's responsibility hereunder is limited to repairing or replacing the product at its expense. Emerson shall not be liable for loss, damage or expenses directly or indirectly related to the installation or use of its products or from any other cause or for consequential damages. It is expressly understood that Emerson is not responsible for damage or injury caused to other products, building, property or persons, by reason of the installation or use of its products.

### 1.1 Theory of operation

The Multiview™ TMMG tracks the liquid level in a process vessel or tank by means of a float located in the vessel. The float is connected to a tube. At the opposite end of the tube is a magnet. The magnet is contained in the standpipe mounted to the vessel connection. As the float level changes, so does the position of the magnet. The level change is visually conveyed to the operator via the indicator mounted to the standpipe.

Point level control and remote continuous level measurement are also available. This is achieved by attaching electronic switches and/or a 4-20 mA level transmitter to the exterior of the communicating chamber.

### 1.2 System description

The Penberthy Multiview™ TMMG unit consists of three major sections:

#### Standpipe chamber

The standard chamber consists of 1" Schedule 10 pipe constructed of 304/304L STS, 316/316L STS, Alloy 20, Monel or Hastelloy-C. Other chamber materials such as Inconel 625 and Titanium may also be used.

#### Float

The float is constructed of 316L STS, Titanium, Alloy-20, Monel, Hastelloy-C or Inconel 625.

# PENBERTHY MULTIVIEW™ TOP MOUNT MAGNETIC GAGE

## INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

### 2 SPECIFICATIONS

#### 2.1 General

**Indication length:** Standard range: 24" to 140"

**Operating temperature:** (subject to indicator limitations)  
Standard flag indicator, hermetically sealed flag indicator, or follower indicator 750°F [399°C]

**Electronic switches/transmitter:**

Refer to the corresponding Installation, Operation and Maintenance manual for these items.

**Operating pressure:** (float limited)

Float material	Minimum pressure in psig (kPaG)	Maximum pressure in psig (kPaG)
316 Stainless steel	Full vacuum	720 (4965)
Titanium	Full vacuum	600 (4138)
Monel	Full vacuum	600 (4138)
Alloy-20	Full vacuum	600 (4138)
Hastelloy-C	Full vacuum	750 (5172)

Maximum pressure rating is based on 100°F [38°C]

#### 2.2 FLOATS

Float diameter in inches (mm)	Float minimum specific gravity	
	Minimum specific gravity	
3.5 (89)	0.50	
4.5 (114)	0.32	
6 (152)	0.21	
8 (203)	0.20	
10 (254)	0.15	

### 3 INSTALLATION

#### 3.1 Unpacking

Upon receipt of your Multiview™ TMMG unit, check all components carefully for damage incurred in shipping. If damage is evident or suspected, do not attempt installation. Notify the carrier immediately and request a damage inspection. Check each item against the packing list.

#### 3.2 Assembly

Each TMMG unit comprises several separate pieces. Some assembly of these pieces will be required on site.

1. Standpipe
2. Float tube guide
3. Float tube
4. Float
5. Float guide system (optional)

Your TMMG is shipped with the float tube installed in the standpipe and the float tube guide attached. Cardboard has been placed inside the standpipe to minimize movement and damage of the float tube during shipment.

Upon receipt of the TMMG:

1. The float tube guide should be removed. It is simply threaded onto the standpipe.

2. Remove the float tube and magnet from the standpipe along with the cardboard.
3. Check the jam nut on the magnet end of the tube to insure it is tight.
4. Insert the float tube through the float tube guide. Be sure to maintain the proper orientation.
5. Install the float tube and magnet back in the standpipe.
6. Completely thread the float tube guide to the standpipe. Tighten the setscrew.

**If your TMMG utilizes a Penberthy float guide system see steps 7 and 8. If not, go to step 9. Penberthy recommends that either our guide system or a stilling well be utilized to prevent damage to the float tube.**

7. Attach your float guide system by threading it to the float tube guide until it will no longer turn. Tighten the setscrew.
8. Insure that the float tube extends out of the standpipe and into the float guide system.
9. Attach your float to the float tube via the threaded stud on top of the float. A jam nut has been provided to tighten this connection.

Your TMMG is now ready to be installed in your vessel.

# PENBERTHY MULTIVIEW™ TOP MOUNT MAGNETIC GAGE

## INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

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### 3.3 Installation

1. A minimum distance of 8" should be maintained from the centerline of the standpipe to the nearest source of ferromagnetic material.
2. Support the float and float tube. Damage to either of these components will adversely affect the performance of your TMMG.
3. Carefully insert the float, float tube and float guide system (if present) through the vessel connection flange.
4. Align the bolt pattern in the TMMG flange with the vessel flange.
5. Connect the two flanges together using standard piping procedures.

Minimum vessel opening requirements	
Float diameter (mm)	Min. flange connection
3.5" (89)	4"
4.5" (114)	6"
6" (152)	6"
8" (203)	8"
10" (254)	10"

Minimum connection sizes assume the use of a Schedule 10 stilling well equal to the flange size. If a higher schedule or the Penberthy guide system is used, the minimum connection must be increased by one pipe size.

### 3.4 Indicator alignment

To change the direction the indicator is facing, loosen the clamps holding the indicator to the communicating chamber, rotate the indicator to the position desired, and tighten the clamps. This procedure should only be done when the vessel is empty or the indicator is currently registering a '0' level indication. To align the indicator use the following procedure:

#### Follower style

1. Loosen the clamps holding the indicator to the communicating chamber. Move the indicator down as far as it will go.
2. Move the indicator so that the center line on the magnetic follower is aligned with 'zero' on the calibrated scale. If you do not have a scale the bottom of the follower should just touch the cushion in the bottom of the hermetically-sealed tube.
3. Tighten the clamps.

#### Flag style

1. Loosen the clamps holding the indicator to the communicating chamber. Move the indicator down as far as it will go.
2. Move the indicator until the last visible gold flag has rotated to black. This will be the third flag from the bottom (two flags are hidden behind the nameplate). Be careful not to raise the indicator too far.
3. Tighten the clamps.

### 4 START-UP

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1. Check the connections between the communicating chamber and the vessel to insure proper mating.
2. Check for any leaks at the connections. If none are observed, the unit is ready for use.

### 5 PERIODIC MAINTENANCE

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Your Penberthy top mount magnetic gage (TMMG) is designed to give you years of reliable service. However, equipment failure can occur. Sound maintenance practices require periodic inspection of the gage to ensure it is in good working order.

The end user must determine the appropriate maintenance schedule based upon his or her experience for the specific application. Realistic maintenance schedules can only be determined with full knowledge of the services and applications involved.

#### WARNING

*Do not proceed with any maintenance if the magnetic gage is still at operating pressure or temperature. Relieve the unit of pressure or vacuum, allow it to reach ambient temperature, and purge or drain it of all fluids. Failure to do so could result in personal injury or property damage.*

# PENBERTHY MULTIVIEW™ TOP MOUNT MAGNETIC GAGE

## INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

### 6 TROUBLESHOOTING

Problem	Cause	Solution
Loss of indication. Even though there is liquid in the vessel and the float is moving freely, the indicator fails to register a level.	<ol style="list-style-type: none"> <li>1. Loss of magnetic strength.*</li> <li>2. If it is a follower style indicator you may be experiencing volatile level changes or high levels of vibration.</li> </ol>	<ol style="list-style-type: none"> <li>1. Return the magnet to the factory to be remagnetized. Replace the magnet.</li> <li>2. Change to a flag style indicator. Due to its design it will not decouple from the float.</li> </ol>
Float is stationary when level changes occur.	<ol style="list-style-type: none"> <li>1. There is a source of ferromagnetic material within 8" of the centerline of the standpipe.</li> <li>2. If a stilling well is being used to protect the float and float guide tube, deposits in the process liquid may have become lodged between the float and stilling well.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove the source of the ferromagnetic material or shield it from the magnetic gage.</li> <li>2. Remove the TMMG from the vessel, clean the float assembly and the inside wall of the stilling well.</li> </ol>

\* All magnets will lose strength over time. The rate of loss is normally very gradual and will vary with the application. Higher operating temperatures and excessive vibration can increase the rate of loss.

### 7 TELEPHONE ASSISTANCE

If you are having difficulty with your top mount magnetic gage, notify your local Penberthy distributor, or call the factory direct (956) 430-2500 and ask for an applications engineer.

To help us to assist you more effectively, please have as much of the following information as possible when you call:

- Standpipe part number
- Float part number
- Name of the company from whom you purchased the meter
- Invoice number and date
- Process material
- Specific gravity
- Operating temperature
- Operating pressure
- Brief description of the problem

If attempts to solve your problem fail, you may be requested to return your instrument to the factory for intensive testing. You must obtain a return authorization (R. A.) number from Emerson prior to returning your unit. Failure to do so will result in the unit being returned to you, without being tested, freight collect.

To obtain a R. A. number gather the following additional information:

- Reason for return
- Person to contact at your company
- 'Ship-to' address

We recommend that you return the entire unit for testing. There will be a minimum charge applied for evaluation of non-warranty units. You will be contacted before we repair the unit if there will be any additional charges in excess of the minimum. If you return a unit that is covered by the warranty, but is not defective, the minimum charge will apply.