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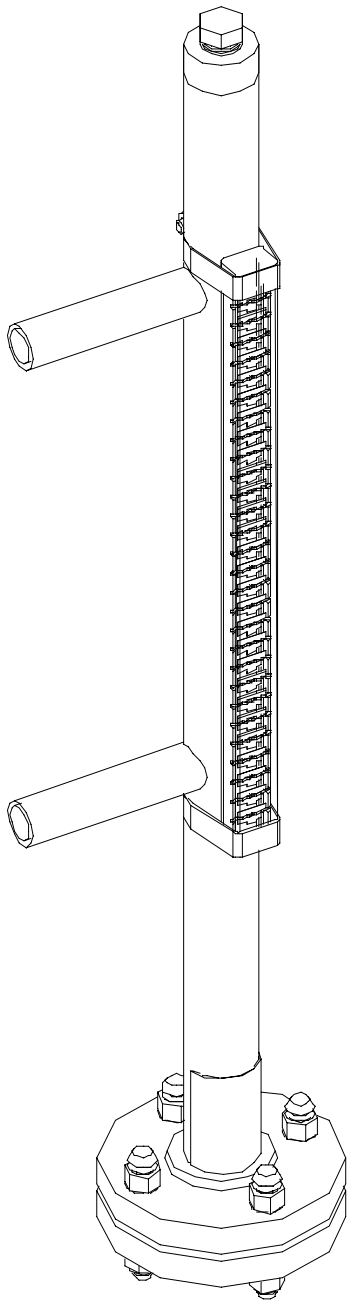
PENBERTHY®

MULTIVIEW™ Mini-Magnetic Gage



Installation/Operation/Maintenance

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PRODUCT WARRANTY

TV&C-Prophetstown warrants its Penberthy products as designed and manufactured by TV&C-Prophetstown 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. TV&C-Prophetstown 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 TV&C-Prophetstown and obtain written authorization to return the product. Thereafter, the product shall be returned to TV&C in Prophetstown, Illinois, with freight prepaid.

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

The responsibility of TV&C-Prophetstown hereunder is limited to repairing or replacing the product at its expense. TV&C-Prophetstown 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 TV&C-Prophetstown 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.

THIS IS TV&C-PROPHETSTOWN'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 TV&C-Prophetstown unless modified or made in writing and signed by the General Manager or Director of Engineering.

1.0 Introduction

The Penberthy MULTIVIEW™ Mini-Magnetic Liquid Level Gage (MMG) is designed especially for corrosive, toxic, or flammable materials that preclude the use of glass for visual indication.

1.1 Theory of Operation

The MULTIVIEW™ MMG tracks the liquid level in a process vessel or tank by means of a float (containing a magnet) in a communicating chamber. The communicating chamber is connected to the process vessel. Each float is custom sized and weighted for the specific gravity of the process media. The indicator, mounted on the outside of the communicating chamber, contains a series of flags magnetically coupled to the float. As the float rises and falls with the liquid level, the flags mirror this movement and provide visual level indication.

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™ MMG unit consists of three major sections:

Communicating Chamber
The standard chamber consists of 1" Schedule 10 pipe constructed of 304/304L STS or 316/316L STS.

Float
The float is constructed of 316L STS. It is specifically weighted for the specific gravity of the process media.

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 the liquid exists, black where vapor exists.

2.0 Specifications

2.1 General

Length:

		Overall	Vessel Centers
Side Connection	Minimum	17 15/16” [456 mm]	4-1/4” [108 mm]
	Maximum	236 5/16” [6002 mm]	222 5/8” [5655 mm]
End Connection	Minimum	17 15/16” [456 mm]	4-1/4” [108 mm]
	Maximum	236 5/16” [6002 mm]	222 5/8” [5655 mm]

Operating Temperature: (subject to indicator limitations)
MMG Flag Indicator: 175 °F [80 °C]
Standard Flag Indicator: 750 °F [399 °C]

Electronic Switches / Transmitter:
Refer to the corresponding Installation/Operation/Maintenance manual for that item.

Operating Pressure: (float limited)

Float Material	Minimum Pressure in psig [kPaG]	Maximum Pressure in psig [kPaG]
316 Stainless Steel	Full Vacuum	275 [1896]

Maximum pressure rating is based upon 100° F (38° C)

2.2 Floats

See Table #1 for Standard Floats. See Table #2 for Extended Length Floats. The magnet system is located in the upper portion of the float

STANDARD FLOATS (ANSI Classified)

NOMINAL PRESSURE RATING	FLOAT DIAMETER	MATERIAL	MINIMUM SPECIFIC GRAVITY	PRESSURE RATING PSIG [kPa G]					FLOAT TEST PRESSURE psig @ 100°F [kPa G @ 37.8° C]
				100°F [37.8° C]	300°F [149° C]	500°F [260° C]	700°F [371° C]	750°F [399° C]	
150# ANSI	1.0" [25.4 mm]	316 STS	0.70	275 [1896]	215 [1483]	170 [1172]	110 [758]	95 [655]	350 [2414]

TABLE #1

EXTENDED LENGTH FLOATS (ANSI Classified)

NOMINAL PRESSURE RATING	FLOAT DIAMETER	MATERIAL	MINIMUM SPECIFIC GRAVITY	PRESSURE RATING PSIG [kPa G]					FLOAT TEST PRESSURE psig @ 100°F [kPa G @ 37.8° C]
				100°F [37.8° C]	300°F [149° C]	500°F [260° C]	700°F [371° C]	750°F [399° C]	
150# ANSI	1.0" [25.4 mm]	316 STS	0.74	275 [1896]	215 [1483]	170 [1172]	110 [758]	95 [655]	350 [2414]

TABLE #2

3.0 Installation

3.1 Unpacking

Upon receipt of your MULTIVIEW™ MMG 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.

The float is not in the communicating chamber when shipped. Make sure that you do not throw the float away with the packing materials. The float should not be installed until the communicating chamber has been mounted to the process vessel.

To install the float, remove the bottom flange from the communicating chamber. Insert the float top first. That end of the float has been identified with a piece of removable orange tape and the word "top" etched into the float. Place the gasket over the spring on the bottom flange and reinstall.

3.2 Mounting

1.) To operate properly, the magnetic liquid level meter must be vertical.

2.) Check the vessel connections with a plumb line to verify alignment. The vessel must be free from dirt and debris to avoid malfunction of the level indicator.

3.) A minimum distance of 8" should be maintained from the centerline of the communicating chamber to the nearest source of ferromagnetic material.

4.) Special handling and installation precautions must be used with long mini magnetic level gages. This applies to any magnetic gage ten feet [three meters] or more in length. Do not attempt to handle or move with single point suspension or by both end suspension (such as two people picking up a gage by the ends). The standpipe must be supported along its entire length.

"Whipping" is highly probable unless the standpipe is supported along its entire length during handling/installation. Raising a long standpipe from the horizontal (shipping) to vertical (installation) plane will cause elastic bending unless additional support is provided.

Suggestion
Leave the standpipe supported in its shipping container until in the vertical installation plane.

Support elements
Installation should be planned to include support elements at least every six feet [two meters] to prevent vibrational whip, wind load bending, etc.

Typical damages to the visual indicators caused by mishandling

Flag style
The component parts of this indicator have close tolerances. If the standpipe is allowed to whip or bend during handling and/or installation, there is an extremely high probability that certain flags will 'hang up' (not rotate properly) thereby providing incorrect indication.

5.) It is strongly recommended that shutoff devices (valves, sliders, cocks) be installed between the vessel and the communicating chamber to allow the magnetic gage to be isolated for cleaning.

6.) Before start-up verify that the communicating chamber is free of any particles.

3.3 Indicator Alignment

To change the direction the indicator is facing, loosen the clamps holding the indicating to the communicating chamber, rotate the indicator to the position desired, and tighten the clamps. To align the indicator use the following procedure:

Flag Style

1.) Loosen the clamps holding the indicator to the communicating chamber. Move the indicator down as far as it will go.

2.) Lower the liquid level in the communicating chamber until:
   a.) Side Connection
      the liquid is at the bottom feed level.
   b.) End Connection
      the indicator stops moving. Then add liquid to the chamber until the float just becomes buoyant (the indicator will start to move upward).

3.) Move the indicator until the last visible gold flag has rotated to black. Be careful not to raise the indicator too far.

4.) Tighten the clamps.

4.0 Start-Up

1.) Check the connections between the communicating chamber and the vessel to insure proper mating.

2.) Close the drain plug (or drain cock if applicable).

3.) Open the shutoff valve at the top connection.

4.) Slowly open the shutoff valve at the bottom connection to allow for a gradual equalization of level in the communicating chamber.

5.) Check for any leaks at the connections. If none are observed, the unit is ready for use.

5.0 Periodic Maintenance

Your Penberthy Mini Magnetic Level Gage (MMG) 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.

Do not proceed with any maintenance if the mini-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.

If the process liquid is dirty or contains deposits, it is recommended to flush the instrument periodically.

To flush the communicating chamber, close the shutoff valves, open the drain plug (or drain cock), and flush. If the float requires cleaning, the bottom flange must be removed after the shutoff devices are closed.

6.0 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.	Loss of magnetic strength in the float*	Return the float to the factory to be remagnetized.
	The float is installed incorrectly	Drain the gage, remove the float and install it correctly.
Float is stationary when level changes occur.	Deposits in the process liquid have lodged between the float and the inside wall of the communicating chamber	Drain and flush the communicating chamber. Remove and clean the float.
	There is a source of ferromagnetic material within 8” of the centerline of the communicating chamber.	Remove the source of the ferromagnetic material or shield it from the magnetic gage.

*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.

7.0 Telephone Assistance

If you are having difficulty with your MULTIVIEWTM Mini Magnetic Liquid Level Gage, notify your local Penberthy representative, or call the factory direct (815) 537-2311 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**
- **Float Part #**
- **Name of the company from whom you purchased the meter**
- **Invoice # and Date**
- **Process Material**
- **Specific Gravity**
- **Operating Temperature**
- **Operating Pressure**
- **Brief description of the problem**

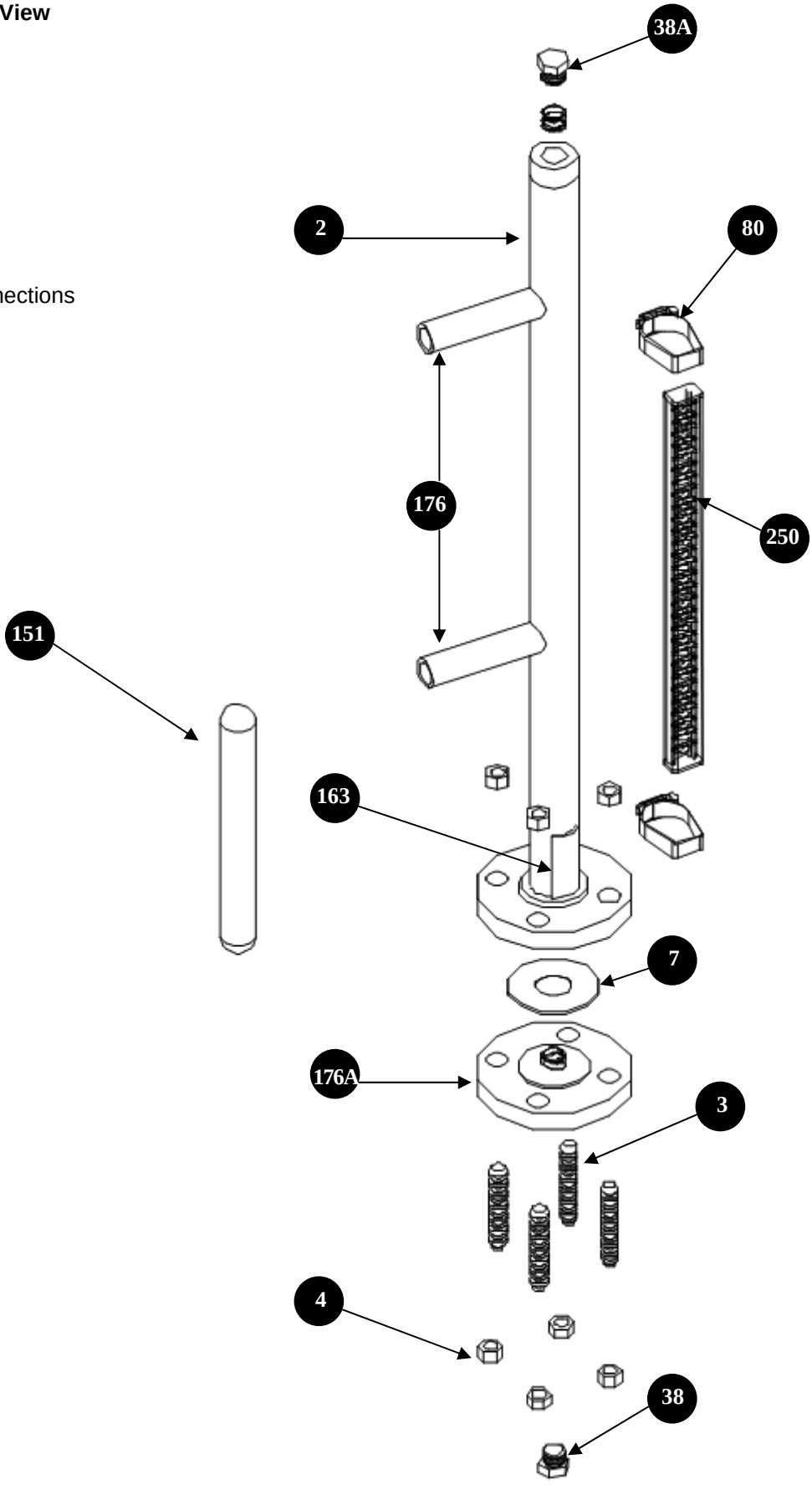
If attempts to solve your problem fail, you may be requested to return your instrument to the factory for intensive testing. You must obtain a Return Authorization (R. A.) number from TV&C-Prophetstown prior to returning your unit. Failure to do so will result in the unit being returned to you, without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

8.0 Exploded Parts View

2	Chamber
3	Stud
4	Nut
7	Gasket
38	Plug
38A	Plug
80	Clamp
151	Float
163	Nameplate
176	Vessel Connections
176A	Flange
250	Indicator



tyco/Flow Control/ Tyco Valves & Controls
Penberthy

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