PENBERTHY®

Section 3000
Instal. Instr. 3962
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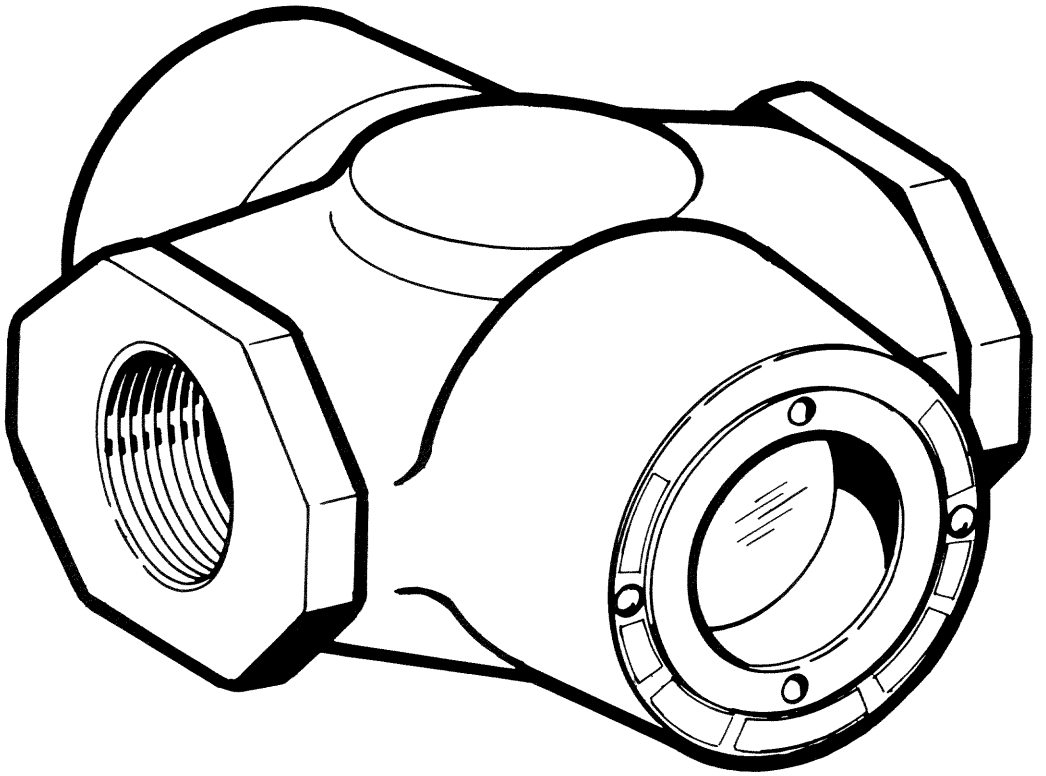
Replaces New

Sight Flow Indicators

Threaded Window



Installation/Operation/Maintenance Instructions

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PRODUCT WARRANTY

Penberthy Inc., warrants its products as designed and manufactured by Penberthy to be free of defects in material and workmanship for a period of one year after the date of installation or eighteen months after the date of manufacture, whichever is earliest. Penberthy 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 Penberthy and obtain written authorization to return the product. Thereafter, the product shall be returned to Penberthy 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 Penberthy factory, or if it has been subjected to misuse, neglect or accident.

Penberthy's responsibility hereunder is limited to repairing or replacing the product at its expense. Penberthy 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 Penberthy 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 PENBERTHY'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 Penberthy unless modified or made in writing and signed by the President or a Vice President of Penberthy.

1.0 About the Manual

This manual has been prepared as an aid and guide for personnel involved in installation and maintenance. All instructions must be read and understood thoroughly before attempting any installation, operation or maintenance.

WARNING

Failure to follow instructions could result in a malfunction or breakage of the indicator, resulting in fluid escaping from the unit and fragmenting glass. Always wear safety glasses when installing, servicing or operating a sight flow indicator. Failure to follow precautions can result in personal injury and property damage.

2.0 Introduction

Penberthy Inc.'s Threaded Window Sight Flow Indicators have been designed to enhance the visibility of process media as they pass by the glass window. The glass window assists the operations manager by creating a window to the fluid process volumes, directions, and reactions without interrupting the process flow. The process flow stream can be monitored in many orientations with a variety of indication devices. Penberthy's models are available in a variety of materials and sizes.

At a glance, the Threaded Window Sight Flow Indicators allow for monitoring of:

- liquid interfaces - change in level or evidence of liquid in the viewing area
- foam interfaces - change in level or evidence of foam in the viewing area
- fluid movement - change in direction or volume
- color - change in tint or hue
- clarity - change in opacity, brightness or purity

2.1 System Description

The Penberthy Threaded Window Sight Flow Indicator consists of four basic components. Each component may vary slightly, depending on the desired physical and mechanical properties for the indicator. Use the exploded parts view in Section 10 as additional reference material.

Body - the threaded style connector ends provide rigid, in-line attachment capability for the Threaded Window Sight Flow Indicator. In addition, the body provides a flat, machined cavity in which the retaining ring compresses the cushion and glass.

Glass - the glass disk is installed between the gaskets and cushions to provide a window for observation of the media passing through the body.

Gaskets - the gaskets are compressed by the covers to tightly seal the gap between the glass and the body and to prevent leaking. Neoprene gaskets are standard with all materials except 316 STS which are Teflon®.

Covers - the covers provide a machined surface in which the glass and cushion are protectively seated. The threaded cover provides an effective means of "screw" compressing the glass between the cushion, gasket and body on either side of the sight flow indicator.

3.0 Available Models

Penberthy offers five, standard Threaded Window Sight Flow Indicator models. Standard materials of construction are ductile iron, bronze, carbon steel and 316 STS. Threaded Window Sight Flow Indicators are divided into the following models:

Model	Description
STW	Plain SFI with NPT Connection
STWF	SFI with Flapper Indicator and NPT Connection
STWR	SFI with Rotator Indicator and NPT Connection
STWD	SFI with Drip Tube Indicator and NPT Connection
STWG	SFI with Gaseous Indicator and NPT Connection

TABLE 1

Covers are available in brass and 316 stainless steel. Spanner wrenches for retaining cover removal, installation, and torquing are available from Penberthy.

3.1 Indicator Pressure and Temperature Specifications

⚠ WARNING ⚠

Exceeding the design ratings or application's data limits can cause the glass to break, the unit to leak or sudden release of pressure. Do not exceed the design ratings for each particular unit. Failure to keep operations below design ratings may result in serious personal injury and property damage.

Maximum Design Ratings for Units with Tempered Glass

Body Material	Temp Rating	Gasket Material						
		Teflon®	Asbestos	Grafoil®	Viton®	Kel-F®	Neoprene	Buna N
Iron	-20°F to 150°F	175	175	175	175	175	175	175
	at 250°F							150
	at 300°F						140	
	at 350°F	125	125	125	125	125		
Bronze	-20°F to 150°F	225	225	225	225	225	225	225
	at 250°F							205
	at 300°F						190	
	at 400°F	150	150	150	150	150		
Carbon Steel	-20°F to 100°F	285	285	285	285	285	285	285
	at 250°F							245
	at 300°F						230	
	at 400°F				200	200		
	at 500°F	170	170	170				
316 STS	-20°F to 100°F				275			
	-65°F to 100°F						275	275
	-120°F to 100°F	275						
	-150°F to 100°F		275					
	-300°F to 100°F			275		275		
	at 250°F							230
	at 300°F						215	
	at 400°F				195	195		
	at 500°F	170	170	170				

TABLE 2

4.0 Assembly

Upon receipt of a Penberthy sight flow indicator, check all components carefully for damage which may have been incurred during shipping. **IMPORTANT: If damage is evident or suspected, do not attempt installation. Notify your carrier immediately and request a damage inspection.**

Penberthy's standard Threaded Window Sight Flow Indicator unit is comprised of (1) body, (2) gaskets, (2) cushions, (2) glass disks, (2) covers, and (1) identification nameplate.

Confirm that the information on the identification nameplate conforms to the size, model, and performance data on the purchase order and the actual operating conditions at the installation sight.

4.1 Assembling Indicators

Refer to the exploded view in Section 10 for component identification assistance and position.

1) Carefully remove the glass disks from the shipping package, examine the glass to ensure that it is free of scratches and other imperfections, and place in a safe area.
2) Clean any material from gasket and cushion seating cavity.
3) Place body on a clean flat surface and place gasket in one side.
4) Apply Volara band around circumference of glass viewer without touching the flat glass surface with fingers.
5) Place glass on top of the gasket on the body.
6) Place cushion on top of the glass and thread the cover clockwise until it is finger tight.
7) Turn assembly over and repeat steps 2 through 6.
8) Using a spanner wrench, hand torque covers to the values in tables below:

Unit Ratings and Torque Values

Gasket Material		Viton, Buna N, Butyl, Neoprene, EPR	
Unit Rating and Torque Value (ft·lbs)		150 PSIG Torque (ft·lbs)	150 ANSI Torque (ft·lbs)
Unit Size	1/4", 3/8"	3 to 4	5 to 6
	1/2", 3/4"	6 to 7	10 to 12
	1"	7 to 8	13 to 15
	1 1/4", 1 1/2"	16 to 18	29 to 33
	2"	23 to 27	44 to 48

TABLE 3

Unit Ratings and Torque Values

Gasket Material		Teflon®, Asbestos, Kel-F®, Grafoil®, Durabala®, Nobestos, Garlock®, Gylon®	
Unit Rating and Torque Value (ft·lbs)		150 PSIG Torque (ft·lbs)	150 ANSI Torque (ft·lbs)
Unit Size	1/4", 3/8"	7 to 8	8 to 9
	1/2", 3/4"	15 to 17	16 to 18
	1"	20 to 24	22 to 26
	1 1/4", 1 1/2"	35 to 39	44 to 48
	2"	53 to 57	65 to 69

TABLE 4

⚠ WARNING ⚠

Torquing under pressure increases the likelihood of glass breakage and contents spraying out of the indicator, than if sight flow were de-pressurized. A sight flow indicator in service must be freed of all pressure or vacuum, allowed to reach ambient temperature and drained or purged of all fluids before re-torquing. Failure to follow this procedure could result in serious personal injury and property damage.

5.0 Installation

⚠ CAUTION ⚠

Only qualified, experienced personnel who are familiar with sight flow indicator equipment and thoroughly understand the implications of the tables and all the instructions should assemble the sight flow indicator. Failure to read and comply to the following instructions could result in personal injury or property damage.

INSPECTION:

1) Examine the glass to see that it is free of scratches, chips or other imperfections.
2) Ensure that the connections and inside of the sight flow have been cleaned and are free of any foreign material.

LOCATION PRECAUTIONS:

DO NOT impose system piping loads on the Threaded Window Sight Flow Indicator. The sight flow indicator is not designed to be a load bearing component. Piping must be supported and aligned with the sight flow indicator end connections to reduce the possibility of load or torsional stresses.

Locate the Threaded Window Sight Flow Indicator:

1) where it can be easily seen;
2) away from areas where objects may be dropped, thrown or generally allowed to contact the glass;
3) so that it is protected from dust, grit or other objects that could damage the glass;
4) so it is protected from external thermal shock, such as a high temperature application being exposed to a cold air blast or cold water wash.

COVER TORQUE CHECK:

Cover torque is vital to the proper operation of a Threaded Window Sight Flow Indicator. Torque values should be checked after initial installation, and periodically thereafter, to ensure that the unit is in compliance with the torque values described in Section 4.1.

Failure to inspect, locate and check the sight flow indicator as described above within the Inspection, Loading Precautions, and Cover Torque Sections could result in serious personal injury and property damage.

6.0 Operation

Before initializing sight flow operation, check that all installation procedures have been completed. Use only qualified, experienced personnel who are familiar with sight flow indicator equipment and thoroughly understand the implications of the tables and all the instructions. Check that the covers have been torqued to their proper limits as stated in Section 4. Check that all connections are pressure tight and the glass is clean and free of any damage.

Sight flow indicator installations should be brought into service slowly to avoid excessive shock or stress on the glass. Rapid pressurization of a sight flow indicator can cause glass breakage/fragmentation and fluid leakage. Hydrostatically pressure test the Threaded Window Sight Flow Indicator to at least 50 psig and correct any leakage to help avoid personal or property damage.

7.0 Maintenance

Use only qualified, experienced personnel who are familiar with sight flow indicator equipment and thoroughly understand the implications of the tables and all the instructions.

Torquing under pressure increases the likelihood of glass breakage and contents spraying out of the indicator, than if sight flow were de-pressurized. A sight flow indicator in service must be freed of all pressure or vacuum, allowed to reach ambient temperature and drained or purged of all fluids before re-torquing. Failure to follow this procedure could result in serious personal injury and property damage.

Create a maintenance schedule for each specific installation of a Threaded Window Sight Flow Indicator. On all inspections, regularly check the following items:

1) glass for cleanliness and signs of damage or wear,
2) sight flow indicator for signs of leakage at gaskets or connections,
3) sight flow indicator for signs of internal or external corrosion, and
4) cover torque values (see Section 4).

7.1 Maintenance Procedures

GLASS should be given regular and careful attention. Keep glass clean using a commercial glass cleaner and a soft cloth. Inspect the surface of the glass for any clouding, etching or scratching or physical damage such as bruises, checks or corrosion. Glass that is damaged is weakened and may break under pressure. Shining a light at approximately a 45° angle will aid in detecting some of these conditions. Typical damaged areas will glisten more brightly than the surrounding glass because the light is reflected.

Detection of any damage, problem areas or surface wear is sufficient evidence to take the sight flow indicator out of service. DO NOT proceed with operation of the sight flow indicator until the glass has been replaced with a glass replacement kit following the assembly instructions in Section 4.

GASKET LEAKS must be repaired immediately. DO NOT proceed with operation of a sight flow indicator until gaskets have been replaced by following the assembly instructions in Section 4.

CONNECTION LEAKS at a threaded connection should be corrected by tightening the NPT connection, or by taking the sight flow indicator out of service and wrapping the connection threads with Teflon® tape on all male pipe threads.

CORROSION may occur if the user has selected an improper material for the Threaded Window Sight Flow Indicator application. It is the responsibility of the user to choose a material of construction compatible with both the contained fluid and the surrounding environment. If internal or external corrosion are present, an investigation must immediately be performed by the user. It may be necessary to contact an authorized Penberthy distributor to better determine the origin of the corrosion.

7.2 Troubleshooting

Problem:	glass becomes etched or clouded in service
Cause:	fluid being handled is not compatible with the glass
Solution:	replace the glass

Problem:	glass continually breaks in service
Cause:	warped body as a result of mechanical or thermal stresses
Solution:	reduce the stress and replace sight flow indicator

8.0 Removal/Disassembly/Reassembly

WARNING

DO NOT remove sight flow indicator while it is under pressure. A pressurized sight flow indicator fragments the glass and sprays contents in a more violent manner than if it were de-pressurized. A sight flow indicator in service must be freed of all pressure or vacuum, allowed to reach ambient temperature and drained or purged of all fluids before re-torquing. Failure to follow this procedure could result in serious personal injury and property damage.

8.1 Disassembly

Threaded Window Sight Flow Indicators should be disassembled by placing the sight flow indicator on a clean, level table surface. Ensure that the unit is stable and secure, hold the sight flow indicator firmly, and loosen the covers with a spanner wrench. Remove the cushions, glass and gaskets from the indicator using the appropriate safety precautions. Once a sight flow indicator has been disassembled, all glass must be disposed of because of wear; and, all gaskets must be disposed of since they are permanently deformed by compression during service.

WARNING

DO NOT under any circumstances reuse glass or gasketing items previously in service, since they can cause leaks or high stress points resulting in glass breakage and serious personal and property damage.

Glass that is broken or damaged in any way is dangerous and should be disposed of in a safe manner determined by the user.

8.2 Reassembly

To prepare for installation of new glass, clean the gasket seating surfaces on the body and cushion seating surface of cover. This should be done using a soft metal scraper (preferably brass) to remove all burrs, rust and remnants of the previous gasket or cushion. Exercise extreme care to avoid gouging or scarring gasket seating surfaces. Failure to prepare the gasket surfaces will result in leaks and/or glass breakage.

Before installation, inspect the replacement glass for imperfections. During inspection, and during any subsequent handling of the glass, keep the glass from contacting other surfaces. Bumping or sliding of glass against other surfaces can result in glass breaking, scratching or chipping. Install the new glass disks by following the procedure in Section 4.

9.0 Telephone Assistance

Telephone Assistance & Equipment Return

If you are having difficulty with your Threaded Window Sight Flow Indicator, notify your local Penberthy distributor, or call the factory direct (815) 537-2311 and ask for the sight flow indicator product manager. To help us to assist you more effectively, please have as much of the following information as possible when you call:

- Model #
- Name of the company from whom you purchased the Threaded Window Sight Flow Indicator
- Invoice # and Date
- Process Media
- Operating Temperature
- Operating Pressure
- Brief description of the problem
- Troubleshooting procedures that failed

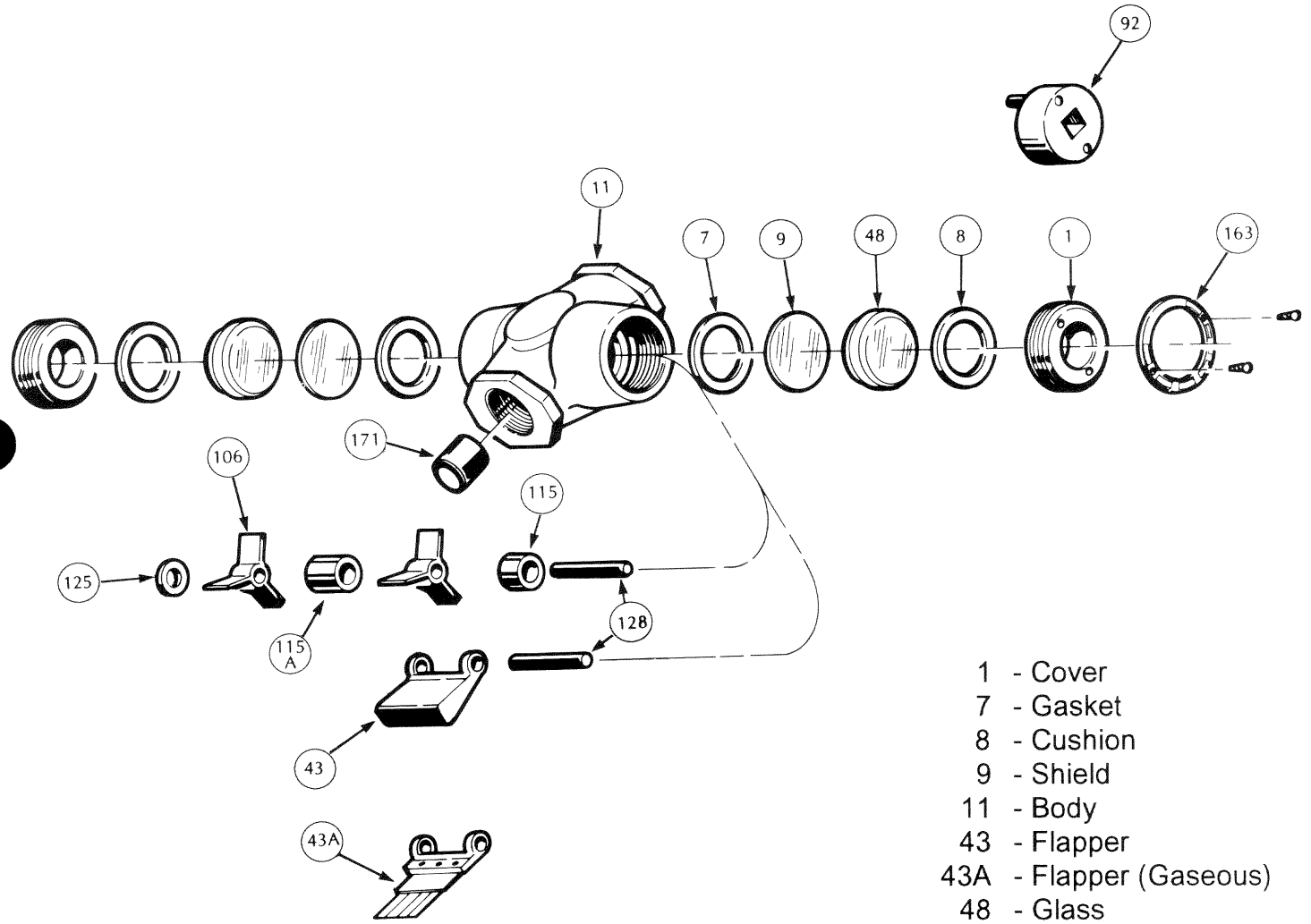
If attempts to solve your problem fail, you may be requested to return your sight flow to the factory for intensive testing. You must obtain a Return Authorization (R. A.) number from Penberthy before returning anything. Failure to do so will result in the unit being returned to you freight collect without being tested. To obtain a R. A. #, the following information (in addition to that above) is needed:

- Reason for Return
- Person to contact at your company
- "Ship-To" address

We recommend that you return the entire unit for testing. There is a minimum charge of $50.00 for evaluation of non-warranty units. You will be contacted before we repair the unit if there will be any additional charges. If you return a unit that is covered by the warranty, but is not defective, the minimum charge will apply.

10.0 Exploded Parts View

Recommended Spare Parts		
REF #	ITEM	QTY
7	Gasket	2
48	Glass	2



1 - Cover
7 - Gasket
8 - Cushion
9 - Shield
11 - Body
43 - Flapper
43A - Flapper (Gaseous)
48 - Glass
92 - Spanner Wrench
106 - Rotator
115 - Spacer
115A - Spacer
125 - Washer
128 - Pin
163 - Nameplate
171 - Drip Tube
331 - Band

NOTES

NOTES

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