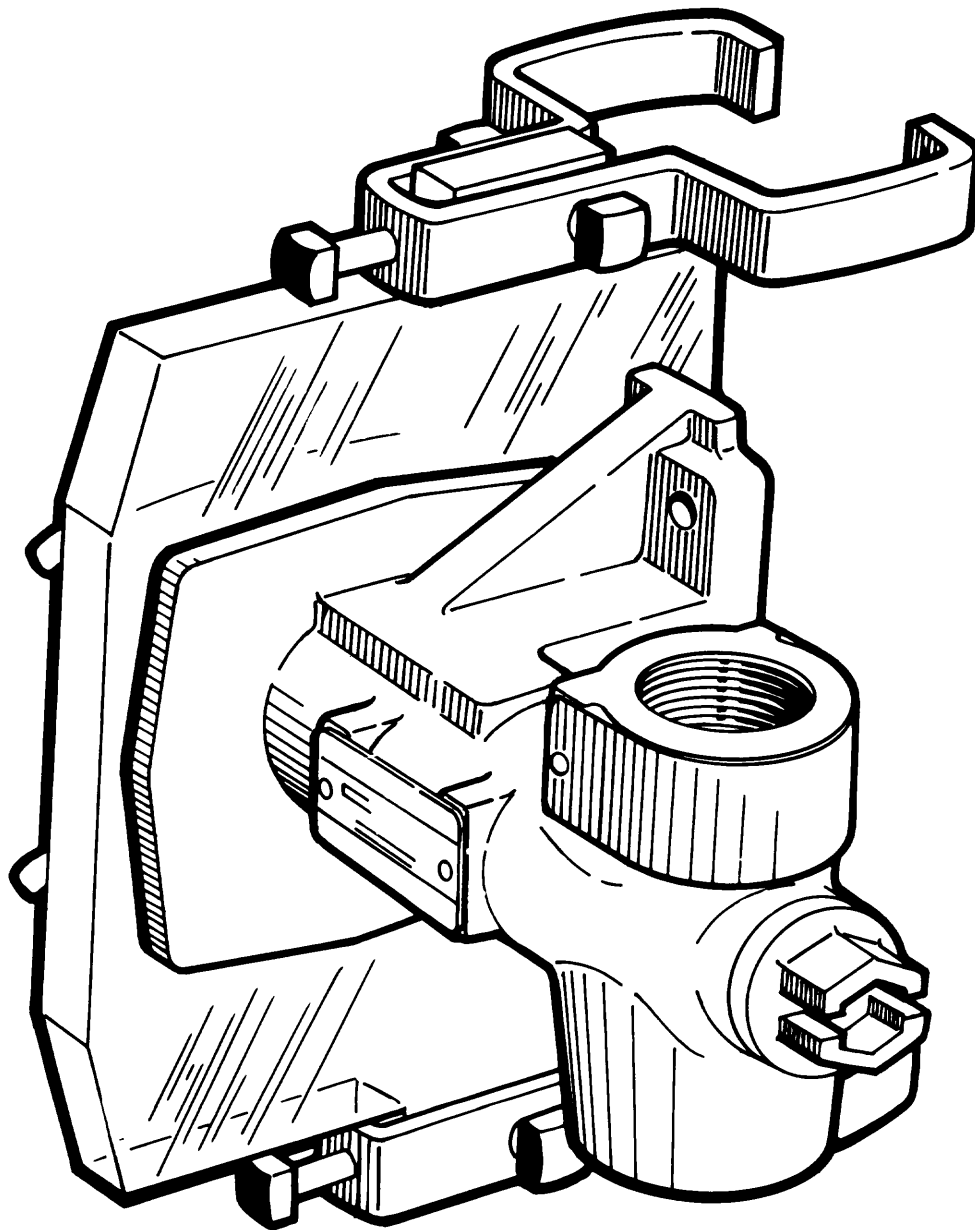


PENBERTHY®

Section 2000  
Instal. Instr. 2964  
Issued 2/94  
Replaces 6/82

# Frost Proof Illuminator



Installation / Operation / Maintenance Instructions

# PENBERTHY

## INSTALLATION / OPERATION / MAINTENANCE FOR FROST PROOF ILLUMINATORS

This manual has been prepared as an aid and guide for personnel involved in installation or maintenance. All instructions must be read and understood thoroughly before attempting any installation, operation, or maintenance. Failure to follow *any* instruction could possibly result in a malfunction of the illuminator resulting in loss of ability to read liquid level, property damage, physical injury or electrical shock to personnel.



### CAUTION



Penberthy does not have any control over the manner in which its frost proof illuminator is handled, installed, or used, and Penberthy cannot and does not warrant or guarantee that a frost proof illuminator is suitable or compatible with the user's specific application.



### WARNING



Safety glasses should be worn when installing a frost proof illuminator.

#### I. INTRODUCTION:

##### A. Features and Specifications

Penberthy frost proof illuminators are designed to provide uniform light distribution over the entire visible length of a transparent style liquid level gage which is otherwise equipped with a frost proof extension.



### CAUTION



Penberthy frost proof illuminators must be used in conjunction with frost proof extensions as shown in Figure 1 below. Frost proof extension kits are not included with frost proof illuminators, but must be separately ordered from Penberthy. Failure to provide a frost proof extension kit with a frost proof illuminator will allow the build up of frost in viewing window with resulting loss of ability to read liquid level.

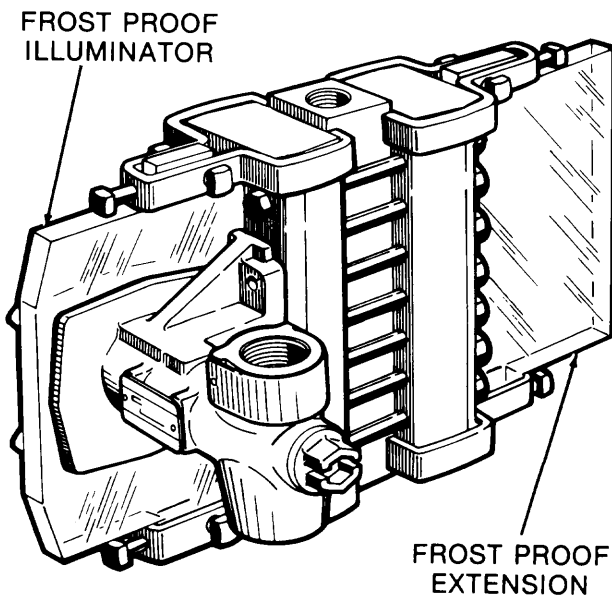


Figure 1

Penberthy frost proof illuminators are provided with an aluminum bulb housing to contain bulb and provide housing for electrical connections.

#### B. Design Ratings

Penberthy frost proof illuminators are available in single section units (SIF), double section units (DIF), and in combinations of (SIF) and (DIF) for three or more section gages. The standard frost proof illuminator rating is 58 watt at 115 VAC. The optional frost proof illuminator rating is 58 watt at 230 VAC. Both units are listed by Underwriter's Laboratories for electrical fixtures in hazardous locations Class 1, Groups B, C, and D.

#### C. Application Data

**Note:** For specific application data within the design limits stated above, the user should refer to Penberthy product proposal, or should request Penberthy to supply the applicable technical data bulletin.



### WARNING



Under no circumstances should these design ratings or application data be exceeded. Exceeding design ratings or application data may cause property damage or physical injury to personnel.

#### II. INSPECTION AND PERFORMANCE CONFIRMATION:

##### A. Receiving Inspection

**Caution:** Exercise care in handling illuminator parts to avoid scratching, denting, or otherwise damaging the polished edge of the reflector (120). Any marks on the polished edge, as well as dirt, paint, or tape, will result in a reduction of light output.

Upon receipt of frost proof illuminator, check all components carefully for damage incurred in shipping. If damage is evident or suspected, do not attempt installation. Notify carrier immediately and request damage inspection.

##### B. User's Rating Inspection

The user should confirm:

1. That the frost proof illuminator size, rating and model number stamped on nameplate (163) conforms to the description on the user's purchase order.
2. That the operating conditions described in the purchase order agree with the actual operating conditions at the installation site.
3. That the actual operating condition at the installation site are within the application data shown on the Penberthy Technical Data Bulletin or product proposal above.
4. That the materials of construction of the frost proof illuminator are compatible with the surrounding atmosphere in the specific application.



## CAUTION



If the size, model or design rating of the frost proof illuminator as received does not conform with any of the criteria above, do not proceed with installation. Contact an authorized Penberthy distributor for direction on what to do.

### III. INSTALLATION:

Installation should only be undertaken by qualified experienced personnel who are familiar with this equipment and have read and understood all the instructions in this manual.



## CAUTION



Do not proceed with installation of a frost proof illuminator to a liquid level gage unless:

- a. The gage has been permanently mounted and tested per the Installation/Operation/Maintenance Instructions included with the gage.
- b. The gage has been allowed to reach ambient temperature, and has been drained or purged of all fluids.

The user should refer to Penberthy product proposal to obtain dimensional information for the specific size and model frost proof illuminator.

#### A. Inspection and Cleaning of Gage Glass

Penberthy recommends that prior to installation of a frost proof illuminator to a gage, that the gage glass be cleaned and inspected per instructions as follows:

1. Clean glass within vision slot using a non-abrasive household cleaner. *DO NOT* use a wire brush, metal scraper, or any device which could scratch glass.
2. Inspect the surface of the glass for any signs of clouding, etching, scratching or deeper physical damage such as bruises, checks, or corrosion that extends through the outer surface of the glass into the interior. Shining a light at approximately a 45° angle will aid in detecting some of these conditions, which will glisten more brightly than the surrounding glass when reflecting light.

#### B. Optional Use of a Clear Silicone Rubber Sealant

Penberthy recommends the use of a clear silicone rubber sealant applied around the exterior of the reflector where the reflector and the gage glass come in contact. The sealant, when applied according to these instructions, will form a barrier against moisture.

Frost proof illuminator applications where a clear silicone rubber sealant is not used may be subject to partial or total loss of visibility due to freezing of moisture between gage glass and reflector.

#### C. Familiarization

Study all the parts and compare them to the exploded view in Figure 2. Notice that the reflector is not symmetrical. The reflector face with rounded corners is made to fit into vision slot in gage cover.

#### D. Installation of Unit to Gage

1. When using the silicone rubber sealant, Penberthy recommends that the user follow all direc-

tions on the rubber sealant package. Attach the nozzle and prepare for application by cutting the tip at the 1/4 mark.

2. Insert end bolt into bracket and thread nut a few turns for both upper and lower brackets.
3. While holding the reflector in place to gage, slip brackets over ends and hand tighten end bolts to hold the reflector in place.
4. Insert thru bolts into brackets and hole in reflector. Attach nuts and hand tighten.
5. Apply a 1/4" wide bead of the clear silicone rubber sealant completely around the reflector where the reflector and the gage glass come in contact, making sure there are no gaps.
6. Wrench tighten end bolts one turn beyond hand tight.
7. Wrench tighten thru bolts.

### E. Electrical Installation

Do not proceed with electrical installation unless:

- a. The illuminator has been mounted to the gage according to all instructions above under Section III Installation, and is grounded.
- b. The electrical installation can be performed by a qualified electrician and comply with applicable codes (refer to National Electrical Code NEPA-70 current edition).
- c. The conduit is run in such a manner that it is not supported by or does not serve as a support for the gage or the illuminator.



## WARNING



Failure to follow any of the above instructions may result in damage to frost proof illuminator or gage glass breakage with resulting property damage, physical injury, or electrical shock to personnel.

### IV. OPERATION:

#### A. Pre-Operational Check

1. Assure that all installation procedures have been completed.
2. Assure that frost proof illuminator has sufficient light output over the entire visible length of the liquid level gage.

#### B. Operating



## CAUTION



Liquid level gage assemblies must be brought into service slowly to avoid excessive stress on gage glass caused by hydraulic shock, thermal shock, or mechanical loads. The connecting valves must first be opened slightly, and the gage pressure and temperature allowed to equalize with the vessel. The connecting valves should then be opened all the way.

### V. MAINTENANCE:

Maintenance should only be undertaken by qualified experienced personnel who are familiar with this equipment and have read and understood all the instructions in this manual.



## CAUTION



Do not proceed with any maintenance on frost proof illuminator unless:

- a. The liquid level gage to which the frost proof illuminator is mounted has been relieved of all pressure or vacuum, has been allowed to reach

ambient temperature, and has been drained or purged of all fluids.

b. Electrical power has been turned off.

### A. Preventative Maintenance

The user must create maintenance schedules, safety manuals, and inspection details for each specific installation of a frost proof illuminator.

On all installations, the following items should be regularly evaluated by the user for purposes of maintenance.

1. Reflector, for signs of dirt build up, breakage or scratches.
2. Mounting brackets or cover wing nuts, for signs of loosening.
3. Build up of frost between glass and reflector.

The user must determine upon evaluation of his or her own operating experience an appropriate maintenance schedule necessary for his or her own application. Realistic maintenance schedules can only be determined with full knowledge of the services and application situation involved.

### B. Maintenance Procedures

1. Access to maintenance item.

Maintenance Item	Follow Steps Below	
	Disassembly V.C.1	Re-Assembly V.C.2
Glass Lens Cleaning	1 a thru c	2 d thru f
Bulb Replacement	1 a thru d	2 c thru f
Reflector Cleaning	1 e thru k	2 a thru f
Illuminator to Gage	1 e thru k	2 g

#### 2. Cleaning

a. Reflector. Wash with a non-abrasive soap or detergent and water using a soft, grit-free cloth or sponge. When cleaning grease and oil from reflector, use only hexane, kerosene, or aliphatic naphtha (no aromatic content) and a soft, grit-free cloth. **DO NOT** use solvents such as acetone, benzene, carbon tetrachloride, dry cleaning fluid, or lacquer thinners since they will attack the surface of the reflector. After surface has been cleaned and rinsed of all foreign particles, it may be dried with a clean, soft, damp chamois or cloth.

**CAUTION**  
Do not use hard, rough cloths on edge of reflector because they will scratch the polished surface. The scratches will result in reduced light output of the frost proof illuminator.

b. Lens. Wash with a commercial glass cleaner. **DO NOT** use a wire brush, metal scraper, or any other device which might scratch the glass.

### C. Removal — Disassembly — Reassembly

## CAUTION

Do not proceed with the disassembly of frost proof illuminator unless:

a. The liquid level gage to which the frost proof illuminator is mounted has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature, and has been drained or purged of all fluids.

b. Electric power has been turned off.

#### 1. Disassembly

- a. Hold illuminator firmly, loosen and remove wing nuts, and washers.
- b. Slide cover off studs.
- c. Carefully remove glass lens.
- d. Unscrew and remove lamp.
- e. Remove conduit fittings and disconnect wires.
- f. Remove nuts.
- g. Remove bracket thru bolts.
- h. Loosen bracket end bolts and remove brackets while holding reflector to keep it from falling.
- i. Remove illuminator and reflector intact.
- j. Remove sealant, if any, from vision slot by pulling out with bare hands or with the aid of a wood scraper.

## CAUTION

**DO NOT** use a wire brush, metal scraper, or any device which could scratch the gage glass within the vision slot.

k. Remove sealant, if any, from reflector by peeling off with bare hands. **DO NOT** use any scraping or abrasive device. Clean reflector per Section V. B. 2. above.

#### 2. Reassembly

- a. Slide reflector on studs.
  - b. Replace nuts and tighten.
  - c. Replace bulb.
  - d. Replace glass lens.
  - e. Replace cover by sliding into position on studs making certain that lip on the cover slips inside the lens to provide proper location of lens.
  - f. Replace washers and wing nuts and tighten finger tight.
  - g. Assemble frost proof illuminator to gage per Section III Paragraph D above.
3. Refer to Section IV operation when returning to service.

RECOMMENDED SPARE PARTS

REF. NO.	ITEM	QTY.
113	LAMP	1
118	LENS	1
181	HOUSING	1
7	GASKET	1
164	PLATE	1
120	REFLECTOR	1
1	COVER	1

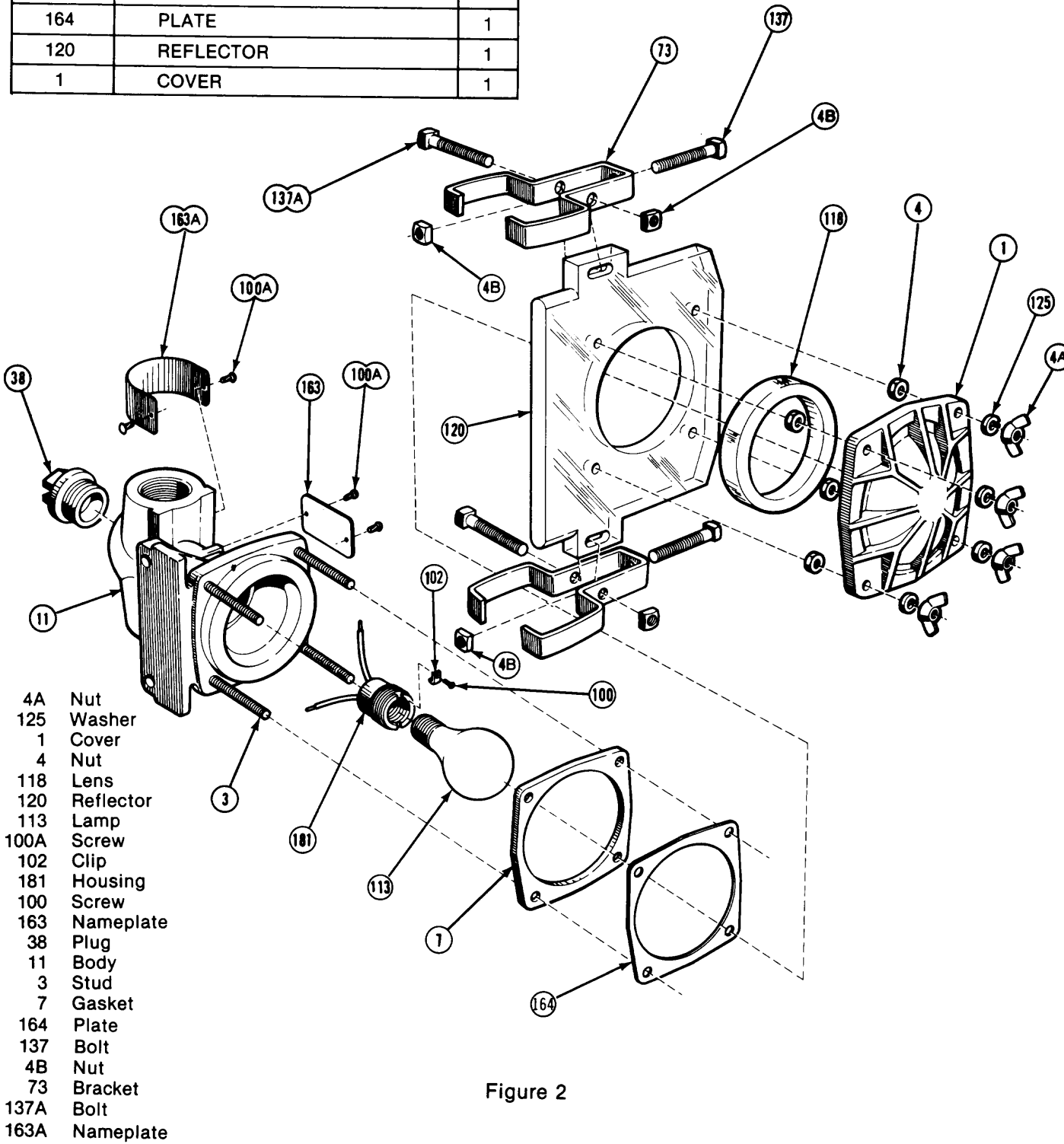


Figure 2

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