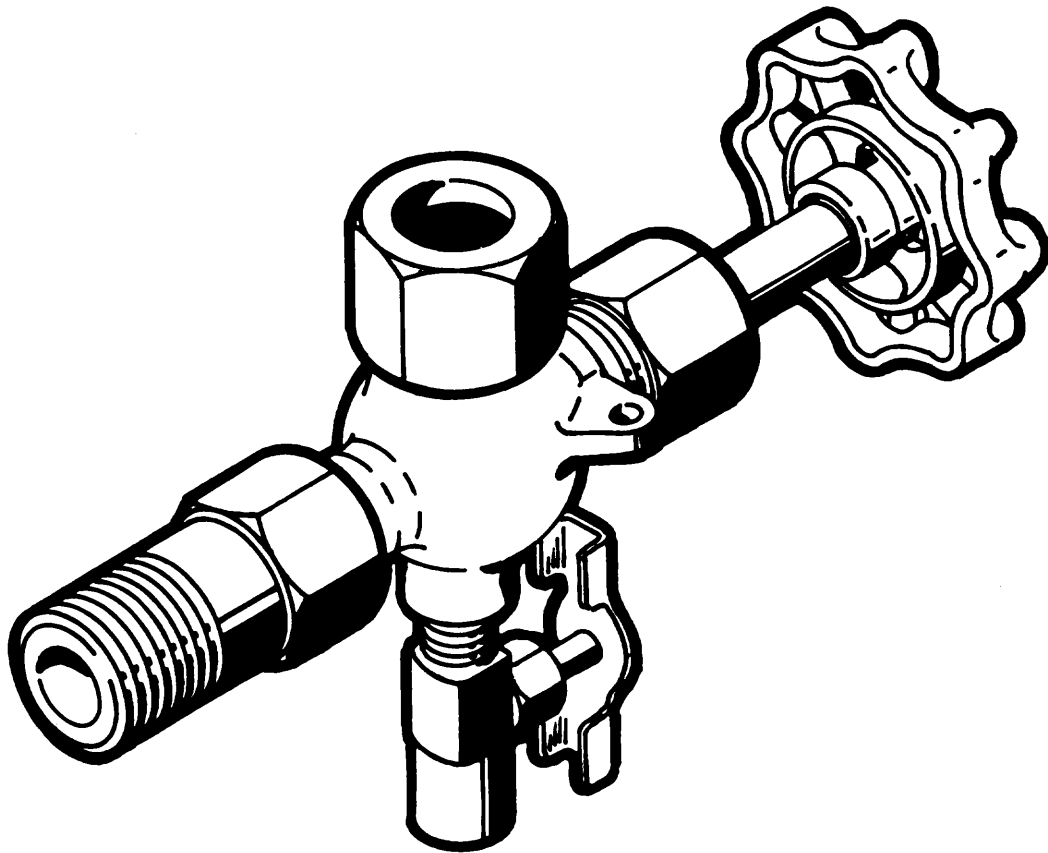


PENBERTHY®

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Gage Valves

Series N6



Installation / Operation / Maintenance Instructions

PENBERTHY

INSTALLATION / OPERATION / MAINTENANCE INSTRUCTIONS FOR SERIES N6 GAGE VALVES

This manual has been prepared as an aide 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 or failure of the gage valves, resulting in leakage, property damage, or physical injury to personnel.

CAUTION

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

WARNING

Safety glasses should be worn when installing or operating a gage valve.

I. INTRODUCTION

A. Features and Specifications

Penberthy gage valves Series N6 are supplied in pairs (upper and lower) that house each end of a transparent sight glass tube. This valve/glass combination forms a gage that accurately indicates liquid level as well as liquid characteristics.

Standard features of N6 valves in non steam-water applications are: a ball check shut-off to stop leakage of contained fluid in case of accidental gage glass breakage, integral bonnet, drain cock and handwheel.

CAUTION

Under most circumstances, Series N6 valves are not recommended without the ball check shut-off. Valves without the ball check shut-off feature will not stop leakage of contained fluid in the event of accidental tubular glass breakage. In circumstances, however, where the fluid being gaged tends to surge in a rapid manner, the ball checks could tend to give a false level reading or accidentally seat.

Series N6 valves are not suitable for steam-water applications unless they are furnished with one of the following optional features:

1. Non-automatic valves - ball checks removed from both upper and lower valves.
2. Automatic valves - vertical rising ball check and

ball inspection plug in the lower valve in conjunction with a stem cleaner in the lower valve stem. The upper valve is equipped with a horizontal ball check and a leaky ball seat formed in the body.

WARNING

Under no circumstances should N6 valves be used for steam-water applications unless they are equipped with one of these optional features. Use of standard N6 valves without these features, may result in sudden release of pressure, leakage of contained fluid, property damage, or physical injury to personnel.

B. Design Ratings PSIG at Maximum and Minimum Operating Temperatures

To determine the maximum allowable working pressure for a specific temperature within the design limits stated below, the user should refer to Penberthy dimension sheets, or when provided, the specifically stated design limits on a Penberthy product proposal.

C. Application Data

Note: For specific application data, within the above ranges, the user should consult the Penberthy product proposal for the specific model and size gage valve set, 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

Upon receipt of gage valve set, 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.

DESIGN RATINGS

Body Material	Glass Packing Material	Maximum Allowable Working Pressure	Maximum Steam Pressure
Bronze	Rubber (Standard)	200 PSIG at -20° F to +100° F 190 PSIG at +200° F	125
Bronze	Teflon® (Optional)	200 PSIG at -20° F to +100° F 125 PSIG at +400° F	125

Pressure/temperature ranges in above table are subject to the limitations of the tubular glass. See chart Figure 1 below.

TUBULAR GLASS - RATINGS
5/8" and 3/4" OD

Vessel Tappings Ctr. to Ctr. Distance In Inches	Up to 150° F			From 150° F Thru 400° F		
	High Pressure	Heavy Wall	Red Line	High Pressure	Heavy Wall	Red Line
	PSIG	PSIG	PSIG	PSIG	PSIG	PSIG
10	410	600	340	310	345	275
15	385	600	310	280	325	265
20	355	600	285	265	315	260
25	300	580	260	250	300	250
30	275	550	230			
35	240	500	200			
40	210	420	180			
45	200	360	170			
50	180	340	160			
55	150	N/A	140			
60	140	N/A	120			
65	125	N/A	100			
70	100	N/A	90			

N/A - Not Available

Figure 1

B. User's Rating Inspection

The user should confirm:

1. That the gage valve set model number and pressure/temperature rating 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 conditions at the installation site are within the application data shown on the Penberthy Technical Data Bulletin or product proposal referred to above.
4. That the materials of construction of the gage valves are compatible with both the contained fluid and surrounding atmosphere in the specific application.

CAUTION

If the size, model, or performance data of the gage valve set 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.

The user should refer to Penberthy dimension sheets or Penberthy product proposal to obtain dimensional information for the specific size and model gage valve set.

A. Mounting

1. Prior to actual installation, turn handwheel or lever of each valve clockwise until stem closes against seat.
2. Mount upper and lower valves to vessel using Teflon® tape, on all male tapered pipe thread connections.
3. Tighten vessel connections to a pressure tight joint making certain that sight glass connections are aligned vertically and to vessel centers as called for on application specification.

B. Sight Glass Installation

1. Turn upper valve counterclockwise (approx. 1/8 turn).
2. Loosen glass packing nut to insure there is no compressive force on glass packing.
3. Insert sight glass in upper valve sight glass connection.
4. Tighten upper valve to original position while holding sight glass in position with upward force to insure its clearing of lower sight glass connection. Check vertical alignment of valves.

5. Loosen glass packing nut on lower valve and pull glass down into lower valve sight glass connection to a positive stop.

6. Tighten upper and lower glass packing nuts.

Note: In some circumstances, it may be necessary to remove glass packing nut, glass packing gland, and glass packing, and mount them on sight glass prior to insertion of glass in upper and lower valve bodies. See Fig. 2 for proper assembly sequences.

C. Guard Rod Installation

Guard rods (two required) are assembled downward thru upper valve with swaged portion on rods at the top. Bottom of rods are positioned into respective holes in the lower valve.

IV. OPERATION

A. Pre-Operational Check

1. Assure that all installation procedures have been completed.
2. Check to determine that all connections are pressure tight.

B. Hydrostatic Test

1. Take all precautions necessary to handle the possibility of leakage during the test.
2. Hydrostatic pressure test all installations to 100 PSIG, and correct any leakage before proceeding.

C. Operating

Gage valve assemblies should be brought into service slowly. The tubular glass used in Penberthy gage valves is tempered and can stand minimal thermal shock and mechanical stress.

To avoid excessive thermal shock or mechanical stress on the tubular glass, the connecting valves should be opened slightly, and the tubular glass temperature and pressure allowed to slowly equalize with the vessel.

If the valves are furnished with ball checks, the valves must be opened all the way after the pressure and temperature have equalized to permit operation of the automatic ball check in the event of tubular glass breakage.

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.

During system shut down, the gage valves should be left open to permit the gage to lose pressure and cool with the rest of the system.

Failure to leave the valves open during system shut down will trap high pressure fluid in the gage.



CAUTION



Do not proceed with any maintenance unless the gage has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature, and has been drained or purged of all fluids.

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

A. Preventative Maintenance

The user must create maintenance schedules, safety manuals and inspection details for each specific installation of a gage valve set.

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

1. Valves, for signs of leakage around stem area.
2. Valves, for signs of internal stem leak.
3. Valves, for signs of leakage around stuffing box connection.
4. Valves, for signs of internal or external corrosion.

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

B. Maintenance Procedures

1. Stem packing leakage can often be stopped by tightening the stem packing nut. If leak persists, the stem packing should be replaced by following steps a thru f of Disassembly and a thru f of Reassembly instructions.

2. Signs of an internal stem leak is an indication of a worn or damaged stem or seat.

a. To replace stem, follow Disassembly steps a thru f and Reassembly steps a thru f.

b. To renew seat surface, follow Disassembly steps a thru f. Renew seat by using a fine lapping compound and a mandrel with the same size, shape, and seat angle as the stem. Flush valve body clean, and reassemble by following steps a thru f of Reassembly.

Note: Series N6 valves have an integral seat. Valve body must be replaced when seat becomes worn or damaged beyond repair.

3. Signs of leakage around the stuffing box indicates worn out glass packing or improper compression of glass packing. To replace glass packing, follow Disassembly steps a, b and g thru l and Reassembly steps a, b and g thru m. In the event of improper packing compression, leakage can be stopped by tightening gage coupling nut.

4. Signs of internal or external corrosion could be an indication of a misapplication. An investigation should immediately be carried out as to the cause of the problem. It is the user's responsibility to choose a material of construction compatible with both the contained fluid and surrounding atmosphere in the specific application.

5. For broken sight glass replacement, follow Disassembly steps a, b and g thru l and Reassembly steps a, b and g thru m.



CAUTION



New glass packing must be used when replacing glass.

C. Removal - Disassembly - Reassembly



CAUTION



Do not proceed with the disassembly of a gage valve unless the gage valve has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature, and has been drained or purged of all fluids.

1. Disassembly

- a. Close upper and lower valves.
- b. Open drain cock and allow valves to drain.
- c. Remove handwheel screw, nameplate, and handwheel or lever from stem.
- d. Loosen and remove stem packing nut.
- e. Remove stem by turning counterclockwise, along with stem packing, and stem packing retainer.
- f. Slip the stem packing, and stem packing retainer off the stem.
- g. Remove guard rods if present.
- h. Loosen glass packing nuts on both upper and lower valves.
- i. Slide sight glass upward into upper valve until bottom of tubular glass clears the stuffing box connection on the lower valve.
- j. While holding tubular glass in this upward position, rotate upper valve counterclockwise (approx. 1/8 turn) to allow clearance to remove sight glass from upper valve.]
- k. Remove sight glass from upper valve.
- l. Remove glass packing nuts, glass packing glands, and glass packing from both upper and lower valves.

2. Reassembly

- a. Refer to exploded view Figure 2.

- b. Prepare for installation of new packing by cleaning all packing chambers and glands of upper and lower valves.

- c. Slip packing retainer on stem and install new packing.

- d. Thread stem assembly into valve by turning clockwise until stem seats and then back off one turn.

- e. Assemble stem packing nut and tighten in place.

- f. Assemble handwheel or lever, nameplate, and handwheel screw on stem and tighten securely in place.

- g. Replace glass packing nut, glass packing gland, and new glass packing on each end of tubular glass.

- h. With upper valve turned 1/8 turn counterclockwise from vertical insert one end of sight glass into stuffing box connection in upper valve, to sufficient depth to insure clearance of lower valve glass packing nut.

- i. Tighten upper valve to original position holding sight glass in place with upward force to insure its clearing lower sight glass connection. Check vertical alignment of valves.

- j. Slide sight glass down into lower valve sight glass connection to a positive stop.

- k. Tighten glass packing nuts.

- l. Close both valves by turning handwheel or lever clockwise until stem seats.

- m. Replace guard rods.

3. Refer to Section IV for operation of gage valve when returned to service.

RECOMMENDED SPARE PARTS

REF. NO.	ITEM	MIN. QTY.
18	Retainer, Stem Packing	2
25	Packing, Stem	2
26	Nut, Stem Packing	1
34	Packing, Glass	2
35	Retainer, Glass Packing	2
37	Nut, Glass Packing	1
48	Glass	1

RECOMMENDED MAXIMUM QUANTITIES SHOULD PROVIDE SPARE PARTS FOR 10% OF THE VALVES IN SERVICE.

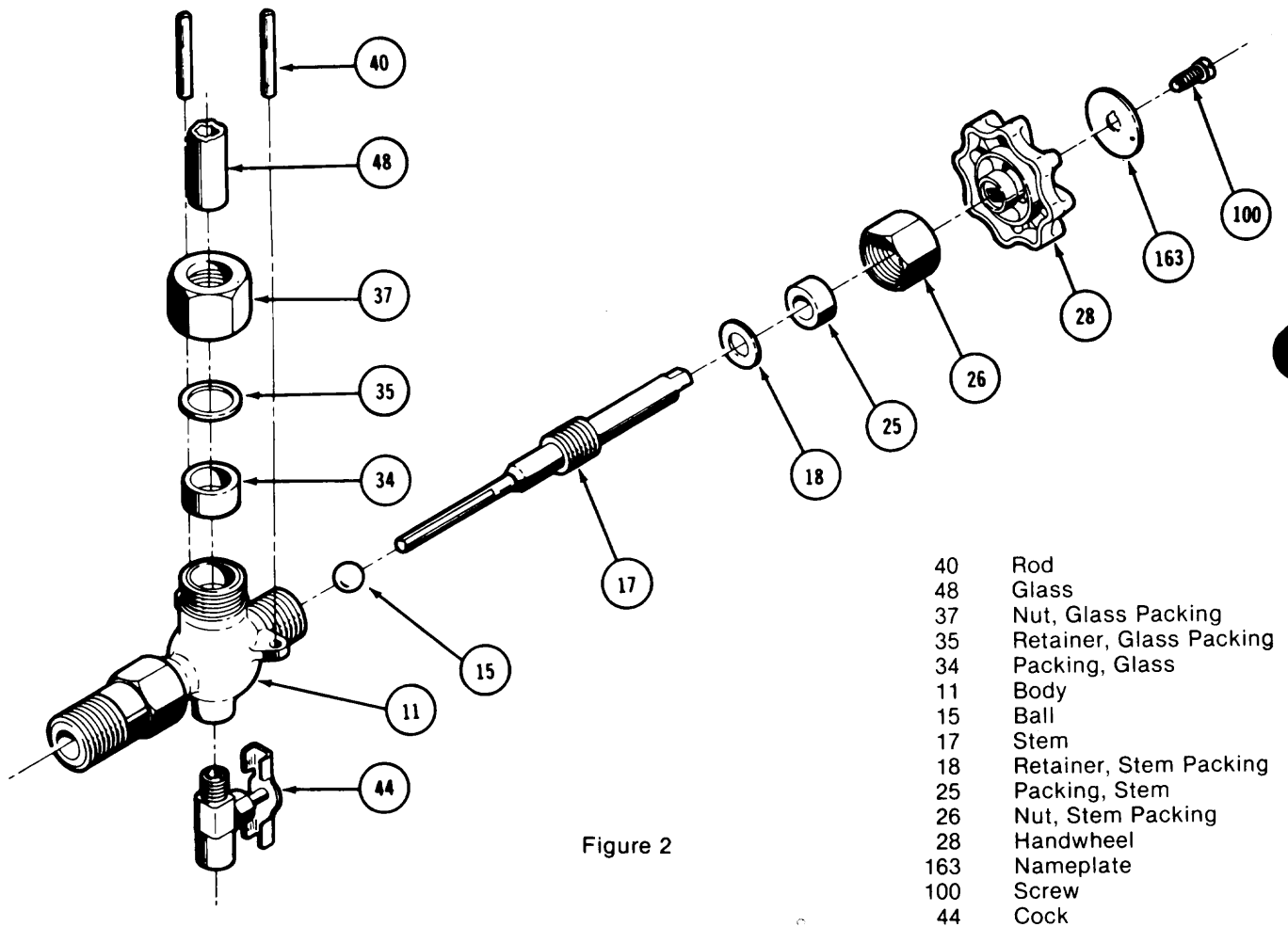


Figure 2

- 40 Rod
- 48 Glass
- 37 Nut, Glass Packing
- 35 Retainer, Glass Packing
- 34 Packing, Glass
- 11 Body
- 15 Ball
- 17 Stem
- 18 Retainer, Stem Packing
- 25 Packing, Stem
- 26 Nut, Stem Packing
- 28 Handwheel
- 163 Nameplate
- 100 Screw
- 44 Cock

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