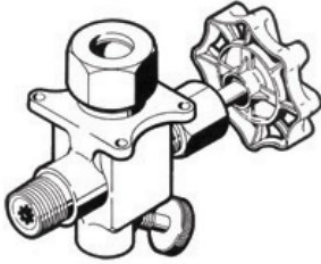


# Installation, Operation & Maintenance Instructions

Before installation these instructions must be read fully and understood

**PB500.08**

## PENBERTHY SERIES N7 GUAGECOCKS



### TABLE OF CONTENTS

Product warranty .....	1
<b>1 About the manual.....</b>	<b>2</b>
<b>2 Introduction .....</b>	<b>2</b>
2.1 Features and specifications .....	2
2.2 Design ratings at max. and min. operating temperatures .....	3
2.3 Application data .....	3
<b>3 Inspection and performance confirmation .....</b>	<b>3</b>
3.1 Receiving inspection .....	3
3.2 User's rating inspection .....	3
<b>4 Installation.....</b>	<b>4</b>
4.1 Mounting.....	4
4.2 Sight glass installation .....	4
4.3 Guard rod installation.....	4
<b>5 Operation .....</b>	<b>4</b>
5.1 Pre-operational check.....	4
5.2 Hydrostatic test.....	4
5.3 Operating.....	4
<b>6 Maintenance .....</b>	<b>5</b>
6.1 Preventative maintenance.....	5
6.2 Maintenance procedures .....	5
6.3 Removal - disassembly - reassembly .....	5
<b>7 Disposal at end of useful life .....</b>	<b>6</b>
<b>8 Telephone assistance .....</b>	<b>6</b>
<b>9 Exploded parts diagram .....</b>	<b>7</b>

### Table of figures

Table 1 - Design ratings .....	2
Table 2 - Tubular glass ratings.....	3
Figure 1 - Mounting.....	4
Figure 2 - Exploded parts diagram .....	7

### PRODUCT WARRANTY

Penberthy products as designed and manufactured to be free of defects in the 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 with freight prepaid.

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

The responsibility of Penberthy hereunder is limited to repairing or replacing the product at its expense. Penberthy shall not be liable for loss, damage or expenses related directly or indirectly 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, buildings, personnel or property, 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 made in writing and signed by the company's general manager or director of engineering.

# PENBERTHY®

# PENBERTHY SERIES N7 GAUGECKS

## INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

### 1 ABOUT THE MANUAL

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.

#### Safety instructions

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

#### WARNING

Failure to follow any instruction could possibly result in a malfunction or failure of the gaugecock resulting in leakage causing serious personal injury or property damage.

### 2 INTRODUCTION

#### 2.1 Features and specifications

Penberthy Series N7 tubular glass gaugecocks are supplied in pairs (upper and lower) and are designed to house each end of a transparent sight glass tube. This gaugecock/glass combination forms a gauge that indicates liquid level as well as liquid characteristics accurately.

Standard features of N7 gaugecocks in non steam-water applications are: a ball check shut-off to stop leakage of contained fluid in case of accidental tubular glass breakage, integral bonnet, integral drain cock and handwheel.

**Important:** Under most circumstances, Series N7 gaugecocks are not recommended without the ball check shut-off. Gaugecocks without the ball check shut-off feature will not stop leakage of contained fluid in the event of accidental tubular glass breakage. However, in circumstances where the fluid being gauged tends to surge in a rapid manner, the ball checks could tend to give a false level reading or could seat accidentally.

Series N7 gaugecocks are not suitable for steam-water applications unless they are furnished with one of the following optional features:

1. Non-automatic gaugecocks – ball checks removed from both upper and lower gaugecocks.
2. Automatic gaugecocks – vertical rising ball check and ball inspection plug in the lower gaugecock in conjunction with a steam cleaner in the lower gaugecock stem. The upper gaugecock is equipped with a horizontal ball check and a leaky ball seat formed in the body.

TABLE 1 - DESIGN RATINGS

Body material	Model	Glass packing	Maximum allowable working pressure	Maximum steam pressure
Bronze	N7A	Neoprene® (Standard)	200 psig [1380 kPaG] at -20° F [-29°C] to +100° F [38°C] 165 psig [1140 kPaG] at +300°F [149°C]	125 [860 kPaG]
		Teflon® (Optional)	200 psig [1380 kPaG] at -20° F [-29°C] to +100° F [38°C] 125 psig [860 kPaG] at +400°F [204°C]	125 [860 kPaG]
Bronze	N7B	Neoprene® (Standard)	400 psig [2760 kPaG] at -20°F [-29°C] to + 100°F [38°C] 335 psig [2310 kPaG] at +300°F [149°C]	250 [1720 kPaG]
		Teflon® (Optional)	400 psig [2760 kPaG] at -20°F [-29°C] to + 100°F [38°C] 250 psig [1720 kPaG] at +400°F [204°C]	250 [1720 kPaG]
Iron	N7A	Neoprene® (Standard)	500 psig [3450 kPaG] at -20°F [-29°C] to +100°F [38°C] 375 psig [2590 kPaG] at +300°F [149°C]	350 [2410 kPaG]
		Teflon® (Optional)	500 psig [3450 kPaG] at -20°F [-29°C] to +100°F [38°C] 250 psig [1720 kPaG] at +450°F [232°C]	350 [2410 kPaG]
Iron	N7B	Neoprene® (Standard)	500 psig [3450 kPaG] at -20°F [-29°C] to +100°F [38°C] 375 psig [2590 kPaG] at +300°F [149°C]	350 [2410 kPaG]
		Teflon® (Optional)	500 psig [3450 kPaG] at -20°F [-29°C] to +100°F [38°C] 250 psig [1720 kPaG] at +450°F [232°C]	350 [2410 kPaG]
316 Stainless	N7A and	Neoprene® (Standard)	500 psig [3450 kPaG] at -20°F [-29°C] to +300°F [149°C]	350 [2410 kPaG]
Steel & Steel	N7B	Teflon® (Optional)	500 psig [3450 kPaG] at -20°F [-29°C] to +500°F [260°C]	350 [2410 kPaG]

Pressure/temperature ranges in above table are subject to the limitations of the tubular glass.  
See Table 2.

Teflon® and Neoprene® are registered trademarks of E. I. duPont de Nemours and Company.

**PENBERTHY®**

# PENBERTHY SERIES N7 GAUGECKOCKS

## INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

**TABLE 2 – TUBULAR GLASS – RATINGS 5/8" (16 mm) AND 3/4" (19 mm) OD**

Vessel tappings ctr. to ctr.		Up to 150°F (66°C)			From 150° F (66°C) thru 425°F (218°C)		
distance		High pressure	Heavy wall	Red line	High pressure	Heavy wall	Red line
Inches	[mm]	psig [kPaG]	psig [kPaG]	psig [kPaG]	psig [kPaG]	psig [kPaG]	psig [kPaG]
10	[254]	410 [2830]	600 [4140]	340 [2340]	310 [2140]	345 [2380]	275 [1900]
15	[381]	385 [2650]	600 [4140]	310 [2140]	280 [1930]	325 [2240]	265 [1830]
20	[508]	355 [2450]	600 [4140]	285 [1970]	265 [1830]	315 [2170]	260 [1790]
25	[635]	300 [2070]	580 [4000]	260 [1790]	250 [1720]	300 [2070]	250 [1720]
30	[762]	275 [1900]	550 [3790]	230 [1590]			
35	[889]	240 [1650]	500 [3450]	200 [1380]			
40	[1016]	210 [1450]	420 [2900]	180 [1240]			
45	[1143]	200 [1380]	360 [2480]	170 [1170]			
50	[1270]	180 [1240]	340 [2340]	160 [1100]			
55	[1397]	150 [1030]	N/A	140 [970]			
60	[1524]	140 [970]	N/A	120 [830]			
65	[1651]	125 [860]	N/A	100 [690]			
70	[1778]	100 [690]	N/A	90 [620]			

N/A - Not Available

### WARNING

Under no circumstances should N7 gaugecocks be used for steam-water applications unless they are equipped with one of the optional features. Use of standard N7 gaugecocks without these features can result in sudden release of pressure causing serious personal injury or property damage.

### 2.2 Design ratings at maximum and minimum operating temperatures

To determine the maximum allowable working pressure for a specific temperature within the design limits stated in Table 1, the user must refer to applicable technical data sheets, or when provided, the specifically stated design limits on a product proposal.

### 2.3 Application data

**Note:** For specific application data, within the above ranges, consult the product proposal for the specific model and size gaugecock set, or request the supply of the applicable technical data sheet.

### WARNING

Never exceed these design ratings or application data limits. Exceeding design ratings or application data limits can cause serious personal injury or property damage

## 3 INSPECTION & PERFORMANCE CONFIRMATION

### 3.1 Receiving inspection

Upon receipt of a gaugecock set, 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.

### 3.2 User's rating inspection

The user is to confirm:

1. That the gaugecock set model number and pressure/temperature rating stamped on nameplate (163) conform 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 applicable technical data sheet or product proposal referred to above.
4. That the materials of construction of the gaugecocks are compatible with both the contained fluid and surrounding atmosphere in the specific application.

**Important:** If the size, model or performance data of the gaugecock set as received does not conform with any of the criteria above, do not proceed with installation. Contact an authorized Penberthy distributor for direction.

**PENBERTHY®**

# PENBERTHY SERIES N7 GAUGECKOCKS

## INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

### 4 INSTALLATION

Use only qualified, experienced personnel who are familiar with this equipment and thoroughly understand all the instructions in this manual for the installation of this equipment. Refer to relevant technical data sheets or product proposal to obtain dimensional information for the specific size and model of gaugecock set.

#### 4.1 Mounting

1. Prior to actual installation, turn handwheel or lever of each gaugecock clockwise until the stem closes against the seat.
2. Mount upper and lower gaugecocks to vessel using PTFE tape, or equivalent, on all male pipe thread connections as shown in Figure 1.
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 the application specification.

#### 4.2 Sight glass installation

1. Turn upper gaugecock counterclockwise (approx.  $\frac{1}{8}$  turn).
2. Loosen glass packing nut to insure there is no compressive force on glass packing.
3. Insert sight glass up into upper gaugecock sight glass connection.
4. Tighten upper gaugecock to its original position while holding sight glass with upward force to insure its clearing of lower sight glass connection. Check vertical alignment of gaugecocks.
5. Loosen glass packing nut on lower gaugecock and pull glass down into lower 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 retainer and glass packing, and mount them on sight glass prior to insertion of glass into upper and lower gaugecock bodies. See Figure 2 for proper assembly sequence.

#### 4.3 Guard rod installation

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

### 5 OPERATION

#### 5.1 Pre-operational check

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

#### 5.2 Hydrostatic test

1. Take all precautions necessary to handle the possibility of leakage.
2. Hydrostatic pressure test installation to at least 100 psig (690 kPaG) or gauge limit and correct any leakage before proceeding.

#### 5.3 Operating

##### WARNING

*Gaugecock assemblies should be brought into service slowly to avoid excessive shock or stress on the tubular glass. Rapid pressurization of a gaugecock assembly can cause glass breakage with resulting sudden release of pressure causing serious personal injury or property damage.*

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

If the gaugecocks are furnished with ball checks, the gaugecocks 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 gauge failure.

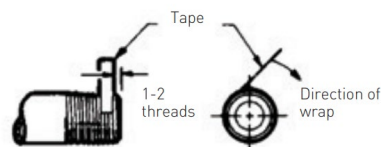


FIGURE 1

# PENBERTHY®

# PENBERTHY SERIES N7 GAUGECKOCS

## INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

### 6 MAINTENANCE

Use only qualified, experienced personnel who are familiar with this equipment and understand all the instructions in this manual for all maintenance thoroughly. During system shut down, the gaugecocks should be left open to permit the gauge to lose pressure and cool with the rest of the system. Failure to leave the gaugecocks open during system shut down will trap high pressure fluid in the gauge.

#### WARNING

Do not proceed with any maintenance unless the gaugecock has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature and has been drained or purged of all fluids. Failure to do so can cause serious personal injury or property damage.

#### 6.1 Preventative maintenance

Create maintenance schedules, safety manuals and inspection details for each specific installation of a gaugecock set.

For maintenance purposes on all installations, check gaugecocks regularly for signs of:

1. leakage around stem area.
2. an internal stem leak.
3. leakage around stuffing box connections.
4. internal or external corrosion.

Upon evaluation of your own operating experience, determine an appropriate maintenance schedule necessary for the specific application. Realistic maintenance schedules can only be determined with full knowledge of the services and application situation involved.

#### 6.2 Maintenance procedures

1. Stem packing leakage can often be stopped by tightening the stem packing nut. If leakage persists, the stem packing should be replaced by following steps 'a' through 'f' of Disassembly and steps 'a' through 'f' of Reassembly.
2. Signs of internal stem leak is an indication of a worn or damaged stem or seat.
  - A. To replace stem, follow Disassembly steps 'a' through 'f' and Reassembly steps 'a' through 'f'.
  - B. To renew seat surface, follow Disassembly steps 'a' through 'f'. Renew seat by using a fine lapping compound and a mandrel with the same size, shape and seat angle as the stem. Flush gaugecock body clean and reassemble by following steps 'a' through 'f' of Reassembly.

**Note:** Series N7 gaugecocks have an integral seat. Gaugecock 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' through 'l' and Reassembly steps 'a', 'b' and 'g' through 'n'. In the event of improper packing compression, leakage can be stopped by tightening glass packing nut.
4. It is the user's responsibility to choose a material of construction compatible with both the contained fluid and surrounding atmosphere in the user's specific application. If internal or external corrosion are present, an investigation must be carried out immediately by the user as to the cause of the problem, including consulting with an authorized Penberthy distributor.
5. For broken sight glass replacement, follow Disassembly steps 'a', 'b' and 'g' through 'l', and Reassembly steps 'a', 'b' and 'g' through 'n'.

**Important:** New glass packing must be used when replacing glass.

#### 6.3 Removal - Disassembly – Reassembly WARNING

*Do not proceed with the disassembly of a gaugecock unless the gaugecock has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature and has been drained or purged of all fluids. Failure to comply can cause serious personal injury or property damage.*

1. Disassembly
  - a. Close upper and lower gaugecocks.
  - b. Open drain cock and allow gaugecocks 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 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 gaugecocks.
  - i. Slide sight glass upward into upper gaugecock until bottom of tubular glass clears the stuffing box connection on the lower gaugecock.
  - j. While holding tubular glass in this upward position, rotate upper gaugecock counterclockwise (approx. 1/8 turn) to allow clearance to remove sight glass from upper gaugecock.
  - k. Remove sight glass from upper gaugecock.
  - l. Remove glass packing nuts, glass packing glands, glass packing and glass packing retainers from both upper and lower gaugecocks.

**PENBERTHY®**

# PENBERTHY SERIES N7 GAUGECKS

## INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

---

### 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 gaugecocks.
- c. Slip stem packing retainer (18) on stem (17) and install new stem packing (25).
- d. Thread stem assembly into gaugecock by turning clockwise until stem seats and then back off one turn.
- e. Assemble stem packing nut (26) and tighten in place.
- f. Assemble handwheel (28) or lever (261), nameplate (163) and handwheel screw (100) on stem and tighten securely into place.
- g. Replace glass packing nut (37), glass packing gland (36), new glass packing (34) and glass packing retainers (35) on each end of tubular glass (48).
- h. Insert glass packing retainer (35A) into stuffing box of lower gaugecock.
- i. With upper gaugecock turned  $\frac{1}{8}$  turn counterclockwise from vertical, insert one end of sight glass into stuffing box connection in upper gaugecock to sufficient depth to insure clearance of lower glass packing nut.
- j. Tighten upper gaugecock to original position while holding sight glass in place with upward force to insure its clearing lower sight glass connection. Check vertical alignment of gaugecocks.
- k. Slide sight glass down into lower gaugecock sight glass connection to a positive stop.
- l. Tighten glass packing nuts.
- m. Close both gaugecocks by turning handwheel or lever clockwise until stem seats.
- n. Replace guard rods (40).

3. Refer to Section 4 'Installation' and Section 5 'Operation of gaugecock' when returning to service.

### 7 DISPOSAL AT END OF USEFUL LIFE

---

Penberthy Series N7 gaugecocks are used in a variety of fluid applications. By following the appropriate federal and industry regulations, the user must determine the extent of preparation and treatment the N7 gaugecocks must incur before their disposal. A Material Safety Data Sheet (MSDS) may be required before disposal services accept certain components. Metal, glass and polymers should be recycled whenever possible. Refer to order and applicable technical data sheets for materials of construction.

### 8 TELEPHONE ASSISTANCE

If you are having difficulty with your Series N7 gaugecocks, contact your local Penberthy distributor. You may also contact the factory direct at (956) 430-2500 and ask for an applications specialist. So that we may assist you more effectively, please have as much of the following information available as possible when you call:

- Model #
- Name of the company from whom you purchased the N7 gaugecocks
- Invoice # and date
- Process conditions (pressure, flow rates, tank shape, etc)
- A brief description of the problem
- Troubleshooting procedures that failed

If attempts to solve your problem fail, you may request to return your N7 gaugecocks 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 without being tested, freight collect. To obtain an R.A. number, the following information (in addition to that above) is needed:

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

There is a minimum charge for evaluation of non-warranty units. You will be contacted before any repairs are initiated should the cost exceed the minimum charge. If you return a unit under warranty, but it is not defective, the minimum charge will apply.

**PENBERTHY®**

PENBERTHY SERIES N7 GAUGE COCKS  
INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

9 EXPLODED PARTS DIAGRAM

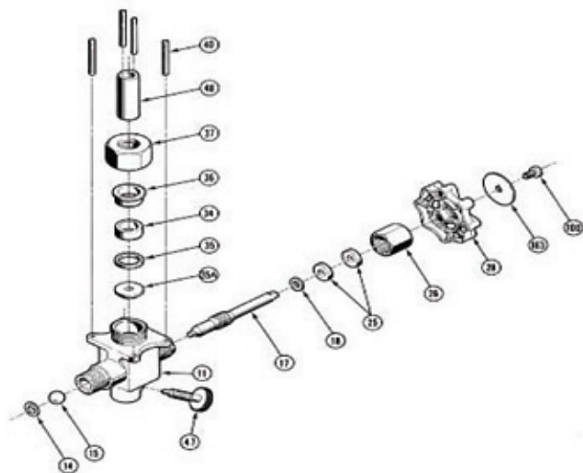


FIGURE 2

PARTS LIST

Ref #	Item
11	Body
14	Retainer, ball
15	Ball
17	Stem
18	Retainer, stem packing
25	Packing, stem
26	Nut, stem packing
28	Handwheel
34	Packing, glass
35	Retainer, glass packing
35A	Retainer, glass packing
36	Gland, glass packing
37	Nut, glass packing
40	Rod
47	Stem, drain
48	Glass
100	Screw
163	Nameplate
261	Lever

RECOMMENDED SPARE PARTS

Ref. no.	Item	Min. qty.
18	Retainer, stem packing	2
25	Packing, stem	4
26	Nut, stem packing	1
34	Packing, glass	2
35	Retainer, glass packing	2
35A	Retainer, glass packing	1
37	Nut, glass packing	1
48	Glass	1

**Note:** Part No. 35A Retainer, glass packing, on lower gagecock only.

Recommended maximum quantities should provide spare parts for 10% of the gagecocks in service.

