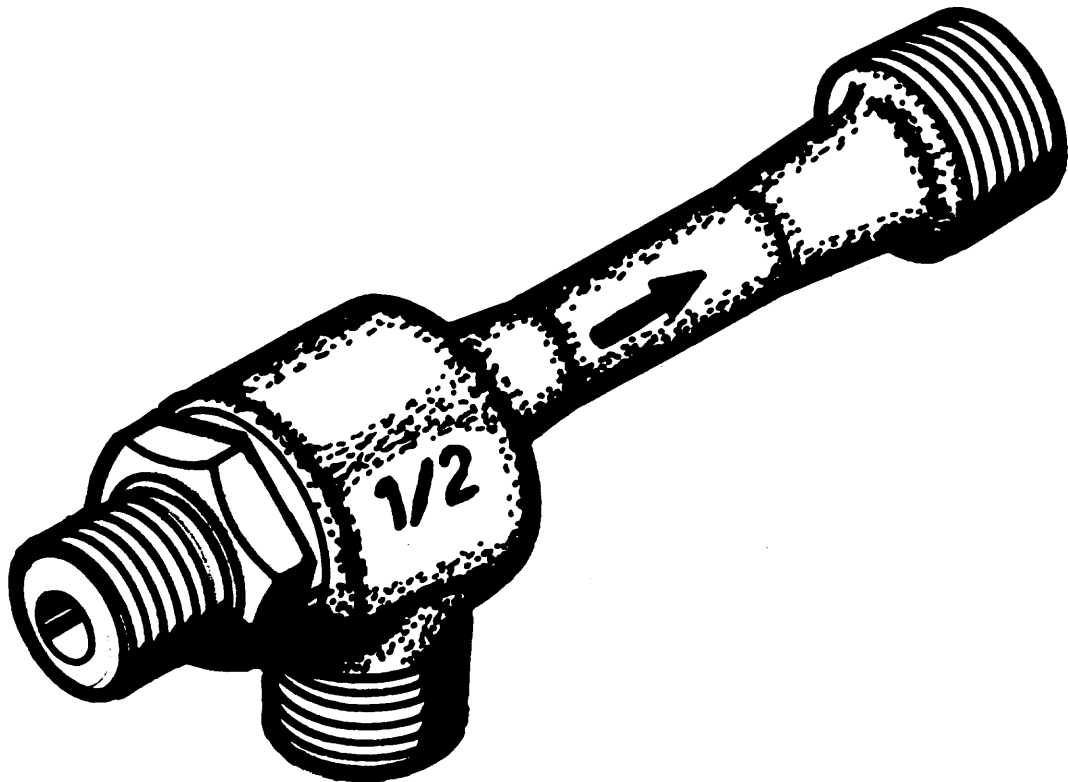


PENBERTHY®

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# Jet Pumps

Models GL, GH — *Gas Operated*



Installation / Operation / Maintenance Instructions

# PENBERTHY

## INSTALLATION / OPERATION / MAINTENANCE FOR MODELS GL & GH JET PUMPS

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 instructions could possibly result in a malfunction of the jet pump resulting in leakage of the contained fluid, property damage or physical injury to personnel.



### CAUTION



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

## I. INTRODUCTION:

### A. Features and Specifications

Penberthy gas operated jet pump models GL and GH are designed primarily for exhausting, evacuating, and priming using steam or air as the operating medium; and for pumping water using steam as the operating medium. They can also be used with other gases as the operating medium.

### B. Design Ratings at Maximum and Minimum Operating Temperatures.

MATERIAL	BODIES	NOZZLES
Iron	80 PSIG at -20°F to +150°F 50 PSIG at +350°F	200 PSIG at -20°F to +400°F
Bronze	200 PSIG at -20°F to +150°F 125 PSIG at +400°F	200 PSIG at -20°F to +400°F
316 Sts	200 PSIG at -150°F to +150°F 125 PSIG at +400°F	200 PSIG at -150°F to +400°F

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

### C. Application Data

The model GL is intended to operate between 60 and 150 PSIG steam pressure against moderate or zero discharge head. The model GH is intended to operate between 20 and 150 PSIG steam pressure against moderate to substantial discharge head.

**Note:** For specific application data within the above ranges, the user should consult the Penberthy product proposal for the specific model and size jet pump, or should request Penberthy to supply the applicable technical data bulletin.



### CAUTION



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 as a result of one or more of the following hazards: bursting of steam jet pump, discharge of live steam, objectionable noise and vibration, loosening of joints, leaks, and suction flow reversal.

## II. INSPECTION AND PERFORMANCE CONFIRMATION:

### A. Receiving Inspection

Upon receipt of jet pump, 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 jet pump size (cast on side of body) and model designation (stamped on nozzle hex flats) 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 jet pump are compatible with both the contained fluid and surrounding atmosphere in the specific application.



### WARNING



If the size, model or performance data of the jet pump as received does not conform with any of the criteria above, do not proceed with installation. Contact an authorized Penberthy distributor for direction on how to proceed.

## III. INSTALLATION:

**Note:** The user should refer to Penberthy dimension sheets or Penberthy product proposal to obtain dimensional information for the specific size and model jet pump.

**A.** Check the exploded view Figure 3 for the location of operating, suction, and discharge connections to insure correct hook up.

### B. Effect of Related Piping and Precautions

1. Penberthy gas operated jet pump models GL and GH can be installed and operated in any position.
2. Jet pumps should be installed with pipe and fittings which provide minimum resistance to fluid flow. Pipe line friction losses must always be a consideration when estimating jet pump performance.
3. It is recommended that provisions be made for pressure gage connections near the inlet, suction, and discharge connections of the jet pump. If operating difficulties are encountered at any time, it may become necessary to install pressure gages in order to identify the problem.
4. Steam must not have over 20° F of superheat, or performance will differ from that published on Penberthy Technical Data Bulletin or product proposal referred to above.
5. When pumping liquids, suction piping should be sized so that the velocity of the liquid does not exceed 4 feet per second. This is almost always automatically obtained when the suction line is the same pipe size as the suction connection.

6. Install a valve in the suction line if it is desirable to:
  - a. Prevent contamination of the suction fluid by the motive fluid at start up.
  - b. Prime a centrifugal pump.
  - c. Throttle the suction throw.
7. When a gas operated jet pump is used to lift liquids by suction or vacuum, the jet pump should be located as close to the level of the liquid as practical. However, any liquid entrained into the jet pump, *other than water when using steam as the operating medium*, will cause the jet pump to stop pumping, resulting in a possible suction flow reversal.
8. Discharge piping should be sized as short as possible and with the least number of turns and restrictions. Discharge piping friction losses must always be considered when estimating jet pump performance. Increase discharge line pipe size if necessary to minimize loss.
9. Do not impose system piping loads on a jet pump. The unit is *not* designed to be a load bearing fitting.
10. All piping should be clean and free of foreign materials which could clog the jet pump.

#### IV. OPERATION:

##### A. Pre-Operational Check

1. Assure that all installation procedures have been completed.
2. Assure that any restrictions in the discharge line have been removed.
3. Assure that any discharge line valves are fully open.
4. Assure that suction line valve, if installed, is fully closed.

##### B. Operating

1. Open the operating gas valve quickly.
2. Open the suction line valve, if any.
3. Regulate the discharge pressure as desired, to a value within capability published on Penberthy Technical Data Bulletin or product proposal referred to above.
4. For pump priming applications, when evacuation is completed, close the suction valve and immediately start the centrifugal pump. Then shut off the operating gas valve to the jet pump.

#### V. MAINTENANCE:

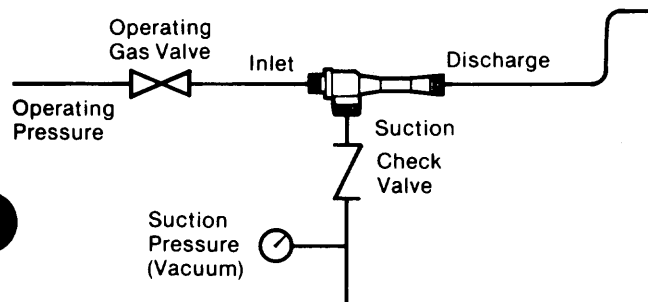


Figure 1 — Typical Installation Schematic  
Gas Operated Pumping Gases

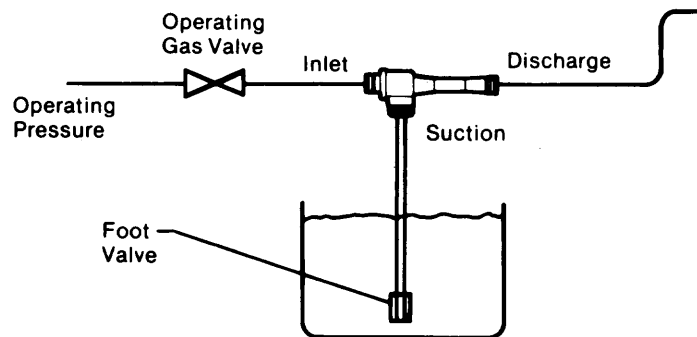


Figure 2 — Typical Installation Schematic  
Steam Operated Pumping Water

#### WARNING



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 unless the jet pump has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature, and has been drained or purged of all fluids.

##### A. Preventative Maintenance

The following items should be regularly monitored for purposes of maintenance.

1. Jet pump units for corrosion or debris build up.
2. Piping and fittings for corrosion or debris build up.
3. All connections for tightness.
4. Units for wear.
5. Strainers for debris build up.

The user must determine upon evaluation of his own application and the factors stated above an appropriate maintenance schedule most suitable for his specific application.

## B. Troubleshooting

### Problem

The suction flow is less than expected.

### Cause

Suction piping is too restrictive.

Discharge pressure is too high.

Operating fluid pressure is lower than required.

Suction liquid is at much higher than ambient temperature.

Suction piping leaks.

### Cure

Remove restriction

Remove restriction

Increase pressure.

Lower temperature or size larger jet pump.

Tighten fittings.

## C. Disassembly—Reassembly



## CAUTION



Do not proceed with the removal of jet pump from connecting piping unless the jet pump has been relieved of all pressure or vacuum, has been allowed to reach ambient temperature, and has been drained or purged of all fluids.

The jet pump Models GL and GH are made up of two parts (see Figure 3), a nozzle (61) and a body (11) which are held together by a straight right hand mechanical thread.

To disassemble the unit, first attach a short piece of pipe to the suction connection as a handle. Then grip the nozzle flats and rotate in a counterclockwise direction.

When ready to reassemble the unit, be sure the seal face of the nozzle and body are free of foreign material and raised metal due to nicks. A non-hardening pipe seal compound may be applied to the threads to further promote sealing. Thread the body back on to the nozzle turning in a clockwise direction.

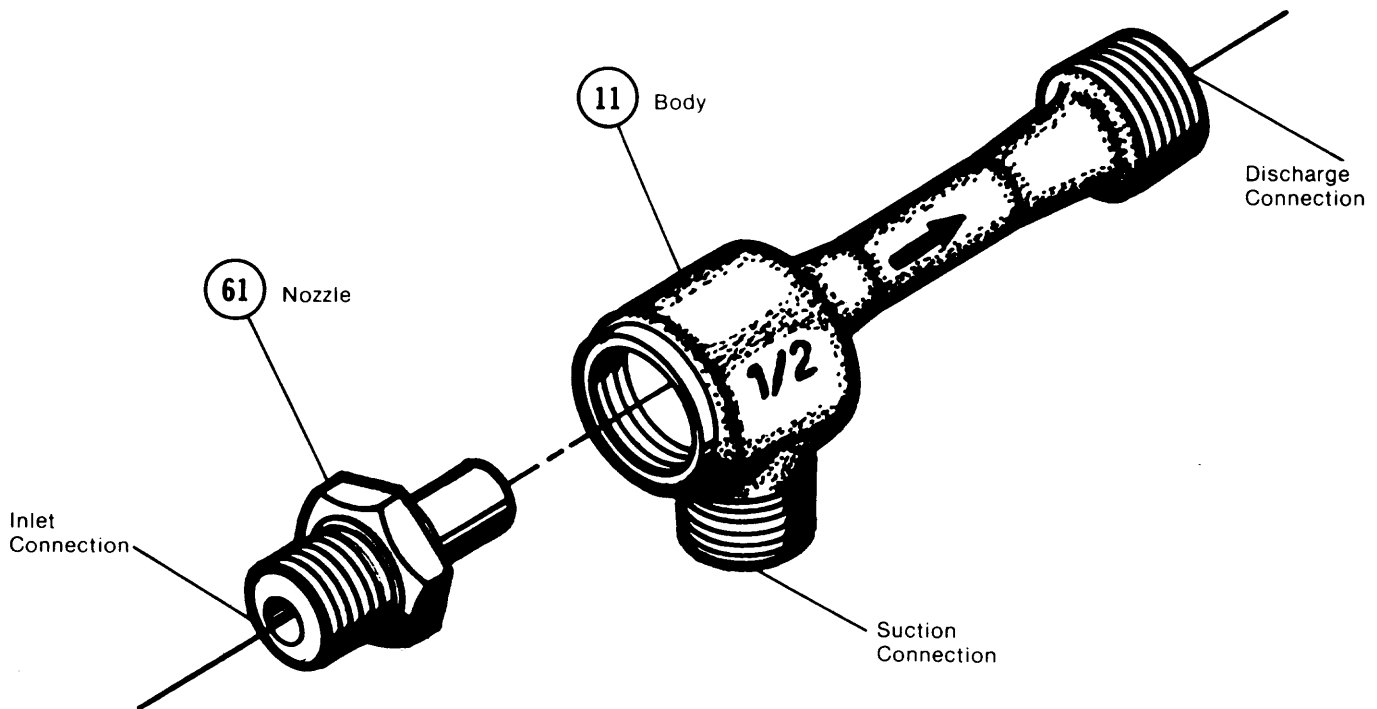


Figure 3

## PENBERTHY

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