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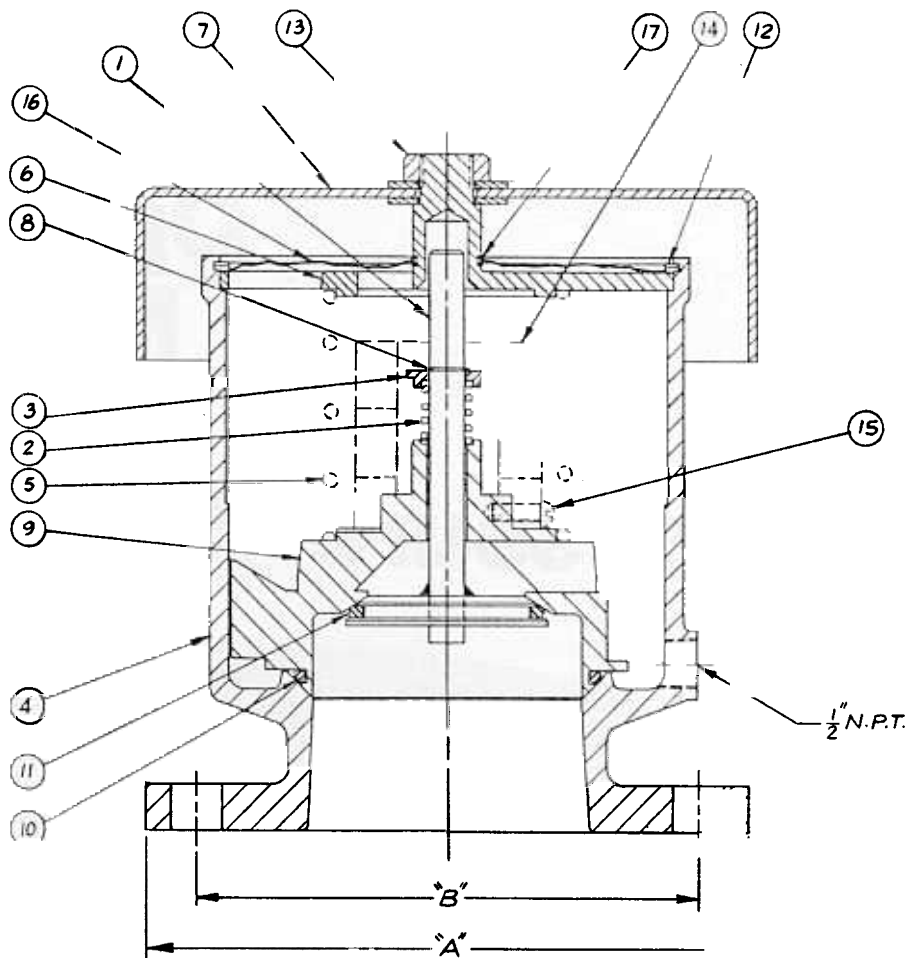
# Installation, Operation and Maintenance of Midland Pressure-Vacuum Valves



MIDLAND MFG. CORP. - SKOKIE, ILL.  
3 1/2" A-825 SERIAL  
PRESS. OZ. VAC. OZ.  
UCCG 182 817/1137



ITEM NO.	PART NAME
	POPPET
2	VACUUM SPRING
3	SPRING SEAT
4	BODY
5	PRESSURE SPRING
6	FOLLOWER
8	VACUUM CLIP
9	VACUUM HOUSING
10	PRESSURE SEAL
11	VACUUM SEAL
12	FOLLOWER CLIP
14	WEIGHT
15	WEIGHT BOLTS
16	FIRE SCREEN
17	SCREEN CLIP



### CAUTION—IMPORTANT SAFEGUARDS

Midland valves are used in connection with a variety of products, most of which are hazardous materials and could cause serious injury or damage.

Always use extreme caution and proper equipment when involved with hazardous materials.

This valve should only be handled by qualified personnel.

Read all of these instructions carefully before proceeding.

**SAVE THESE INSTRUCTIONS**

## Installation

### CAUTION:

1. All Midland pressure-vacuum valves (abbreviated PVV) are either screwed on a male pipe thread, or flanged mounted on a nozzle. For either type of mounting, when removing a PVV, put a soft rubber plug in the opening of the mounting.
2. Wire brush the nipple's threads so there are clean threads for at least 1" beyond the normal hand engagement. If there is a nozzle flange, wire brush the gasket surface clean. Dents, score marks, and corroded metal may have to be filed smooth to insure that a tight gasket seal can be achieved.
3. Put PTFE tape, or pipe compound, on the male thread.

Contact your supervising engineer for specifying a suitable oil or grease to apply to the gasket surface of the nozzle flange.

4. Be sure the NPT female thread or the flange face of the PVV you are going to mount on the tank, has been prepared for installation as recommended above for the mating surfaces (in paragraph #2 and #3).
5. If the PVV is to be screwed on to a nipple, start the threaded application slowly, making sure the PVV is not canted at an angle. After the PVV is hand tight, take a wrench, and by gripping on the surface at the bottom of the valve, tighten the PVV to insure there is no pressure leakage.

6. For the flange mounted PVV s put a suitable gasket between the two mating surfaces. Use clean and lubricated nuts and bolts. Tighten the bolts alternately— 1 and 3, then 2 and 4. Overtightening on one side will cock the PVV and cause a flange leak to develop. In the absence of an approved standard of your company, on clean and lubricated  $\frac{5}{8}$ -11 bolts, torquing from 50 to 100 foot pounds should be adequate.
7. After the PVV is installed, inspect for leaks. Follow your company procedures in this testing. If you do not have a procedure to use, it will be necessary to introduce pressure into the tank, apply soap suds to the PVV mounting on the tank and check for leaks.

## Operation

**Note:** When used on ship board pressure vessels, Midland's PVV conforms to U.S.C.G. requirements.

### WARNING:

1. These valves are either spring loaded, or weight loaded to respond automatically to changes in positive and negative internal tank pressures.
2. Since these valves operate at very low pressures, they can discharge product without warning. Therefore one must wear suitable protective clothing when in the general area of the PVV s.
3. There are no pressure adjustments on the valves. The opening pressures for both positive and negative pressures are pre-set at the factory. Due to the likely release of harmful product vapors, do not attempt to maintain or reset the valves when mounted on a tank.
4. Some PVV s are designed to permit manual opening of the positive and negative pressure components.
5. All Midland PVV s have metal to metal seats and resilient seals to provide bubble tight closure. If they leak, maintenance is required but should only be attempted where there is no danger of harmful vapors.

## Inspection and Maintenance

### WARNING:

1. Except for these PVV s with external manual operating handles (to verify that the components are free to operate), it is advisable to do all inspection of PVV after they have been demounted from the tanks. When demounting valves, be prepared for a product discharge through the valve or in the opening in the mounting. Take all necessary protective measures.
2. Since all operating parts of the PVV s are contained inside the body housing (P/N 4), it will be necessary to disassemble the valves to inspect them or do maintenance work on them. To take the valves apart, do the following.

### Disassembly

- a. Put a large blade screwdriver in the slot at the top of the follower (P/N 6) and unscrew the top lock nut (P/N 13). Then lift off the weather cover (P/N 7) and the washers.
- b. For most valves, there will be a compressed spring below the follower. If the positive pressure setting is more than 1 psi, put the PVV in an arbor press to keep the follower from flying out as the follower clip is removed. For those valves with settings of 1 psi or less, keeping one hand pressing down on the follower as the clip is removed should keep the follower under control. Don't stand over the valve as the follower is being removed. Take a small blade screwdriver and bend inwardly the tapered end of the follower clip, while you restrain the follower.
- c. After the clip has been removed, let the follower slowly be pushed up by the compressed spring, until the spring is no longer compressed. It is then safe to take out the follower with the fire screen (P/N 16) still attached.
- d. Reach inside the valve and lift the inner assembly out by pulling straight up on the hex part of the poppet

(P/N 1). There is very little clearance between the fins on the vacuum housing (P/N 9) and the ID of the body. Therefore, this assembly will bind if it isn't lifted out directly upward.

- e. With a retainer ring pliers (with a  $\frac{1}{32}$  anvil), spread the vacuum clip and pull straight upward. This will allow the vacuum spring (P/N 2) to expand to its free height. The spring seat (P/N 3) and the spring can be removed from the top side, and the poppet (P/N 1) will be free to go down through the guide in the vacuum housing, and be removed.
- f. The pressure and vacuum seals are not O rings, but have the cross sectional shape of a clover leaf. Using the rounded end of a 6" scale, carefully work it under the pressure seals to remove them. Do not gouge the side of the groove as you insert the blunt end of the scale, as a score mark may serve as a leak path around the seals.

### Individual Part Inspection

3. All the operating parts of the valve should be inspected. The poppet stem is a hex. It should rotate freely in the follower and the vacuum housing. The corners of the hex should be free of burrs. The hex should not be bowed. Put it on a table, with the poppet head extended beyond the table's edge. Then turn the stem hex progressively over and sight between the table top and hex for evidence of bowing.
4. The vacuum housing should also be free to rotate without binding inside the lower part of the body that is machined to centrally locate the vacuum housing.
5. The valve's mounting, either the female thread or the face of the flange, must be cleaned, free of nicks, gouges, etc.
6. The pressure seal grooves in the poppet head and in the vacuum housing should be cleaned of any foreign materials. There cannot be any nicks, burrs, gouges or score marks that could permit leakage around the pressure seals.

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7. Whenever the valves are disassembled, new pressure seals should be installed. Replacement seals of whatever material that is required by the nature of the lading, must be obtained from Midland.
8. Before reassembly begins, all parts should be steam cleaned. All parts should be lightly oiled or greased. The supervising engineer should be contacted to get recommendations for suitable cleaning and lubricating materials.
9. Put a new vacuum seal in the poppet head by stretching it slightly to fit it into the groove. Using the rounded end of a 6" scale, carefully work the seal into place all around. Do not get the seal twisted. With one finger acting as a pivot point on the hex stub that sticks through the poppet head, rotate the shank end of the poppet stem. Sight across the edge of the pressure seal as you turn the stem. If the pressure seal is properly positioned, no waviness will be apparent as the stem is rotated. Any unevenness can be remedied by reapplying the rounded end of the 6" scale to the edge of the seal that is protruding.
10. Similarly, install the pressure seal in the vacuum housing groove. To verify that the seal is in position all the way around, put the poppet stem through the housing. Clamp the hex stem horizontally in a vise, and rotate and inspect the pressure seal's position as outlined above.
11. Reassemble the valve in inverse order to the disassembly procedure.

### Testing

There are no adjustments in the pressure setting of the PVV s since most valves are set at very low pressures which conventional gaging cannot accurately measure. However, the pressure tightness of the valve can be verified.

1. Take off the weather cover.
2. Put a 1/2" pipe plug in threaded drain hole.
3. Mount the valve on a test chamber that is threaded or flanged to mate with the valve.
4. Use a retard type gage, or a mercury manometer.
5. Fill the valve with water up to the fire screen.
6. Slowly increase the pressure in the test chamber.
7. Shine a flash light down into the valve.
8. If the valve is tight, initially there should be no leaks through either the positive or negative pressure closures.
9. Increase the test chamber pressure until the valve opens and note this pressure. Then, slowly bleed off the pressure in the test chamber.
10. The bubbling should stop before the test chamber has lost all of its pressure.
11. Without elaborate test fixturing, it is not feasible to verify the negative pressure setting. If it is necessary to establish the negative and positive valve settings, call Midland.

### Post Test Procedures

1. After the testing has been completed, relieve the pressure in the test chamber.
2. Remove the pipe plug from the side drain hole. Drain all the water from the inside of the valve. Demount it from the test stand.
3. Turn the valve upside down to let any trapped water drain out.
4. Wipe dry the valve's outside and put the weather cover back on.
5. Cover the mounting surface, if threaded, with a protective plastic pipe cover, or a flange protector, if the valve is flange mounted.
6. Store in a dry place until ready to use.

## NOTICE

The Midland PVV are used in a variety of products, most of which are hazardous materials. The acceptance and transportation of the products are regulated by the DOT and AAR in the U.S.A., and in Canada by the CTC and Transport Canada, as well as other governmental bodies, particularly when used in stationary applications. All personnel should be familiar with and follow these regulations. Nothing in this pamphlet is intended to conflict with or supersede these regulations.

Assembly drawings of Midland PVV are available at no charge, and will be mailed upon request. Address any questions concerning valve maintenance or usage to the Engineering Dept., Midland Manufacturing Corp.

The information contained herein is thought to be reliable. It was gathered from knowledgeable sources, but Midland Manufacturing Corp. makes no representations or guarantees about its accuracy or completeness and assumes no liability for this information.

### Warranty:

Midland warrants the products of its own manufacture to be free of defects in material and workmanship, under normal use and proper operation, for a period of thirty (30) days from date of shipment from Midland's plant. Furnished materials and accessories purchased from other manufacturers are warranted only by and to the extent of those manufacturers' warranties, if any.

MIDLAND MAKES NO WARRANTY OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, OTHER THAN AS SPECIFICALLY STATED HERE. MIDLAND MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR USE.

Midland's obligation under this warranty is strictly limited, at its option, to 1) repair or replacement at its factory of a like quantity of product; 2) refunding to purchaser money paid to Midland for its product; or 3) issuance of written authorization for the Purchaser to repair or replace, at costs comparable to Midland's normal manufacturing costs, those parts proven defective, provided that Purchaser has given to Midland immediate notice upon discovery of such defect. Merchandise claimed to be defective shall not be returned without first obtaining Midland's written consent. The undertaking of repair or replacement by the Purchaser, or its agents, without Midland's written consent, shall void Midland's warranty and relieve Midland of all responsibility. Under no circumstances shall Midland be liable for any direct, incidental, consequential or other damages of any kind in connection with the installation, operation, maintenance, repair, inspection or other use of any product purchased from it.



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