ENARDO

A HMT Company

Pressure/Vacuum Relief Valve (PVRV)
Model 850/950 and Associated Configurations

INSTALLATION & MAINTENANCE MANUAL

ISO 9001 Certified Since 1997

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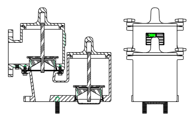
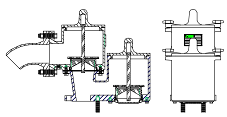
Products Covered

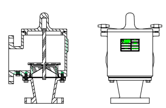
The 850/950 Pressure/Vacuum Relief Valve family consists of the following configurations which are within the scope of this document:



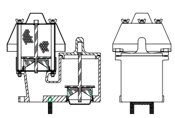
Model 850 Pressure/Vacuum Relief Valve - Pipe Away



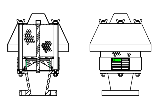
Model 850/MVC Marine Vapor Control System Pressure/Vacuum Relief Valve. This product is fitted with spark screens on the inlet and outlet ports in accordance with 33 CFR Part 154



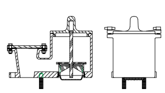
Model 851 Top Mount Pressure or Side Mount Vacuum Relief Valve - Pipe Away



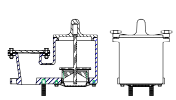
Model 950 Pressure/Vacuum Relief Valve - Vent to Atmosphere



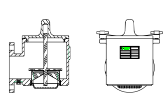
Model 951 Pressure Relief Valve - Vent to Atmosphere



Model 952 Top Mount Vacuum Relief Valve - End of Line



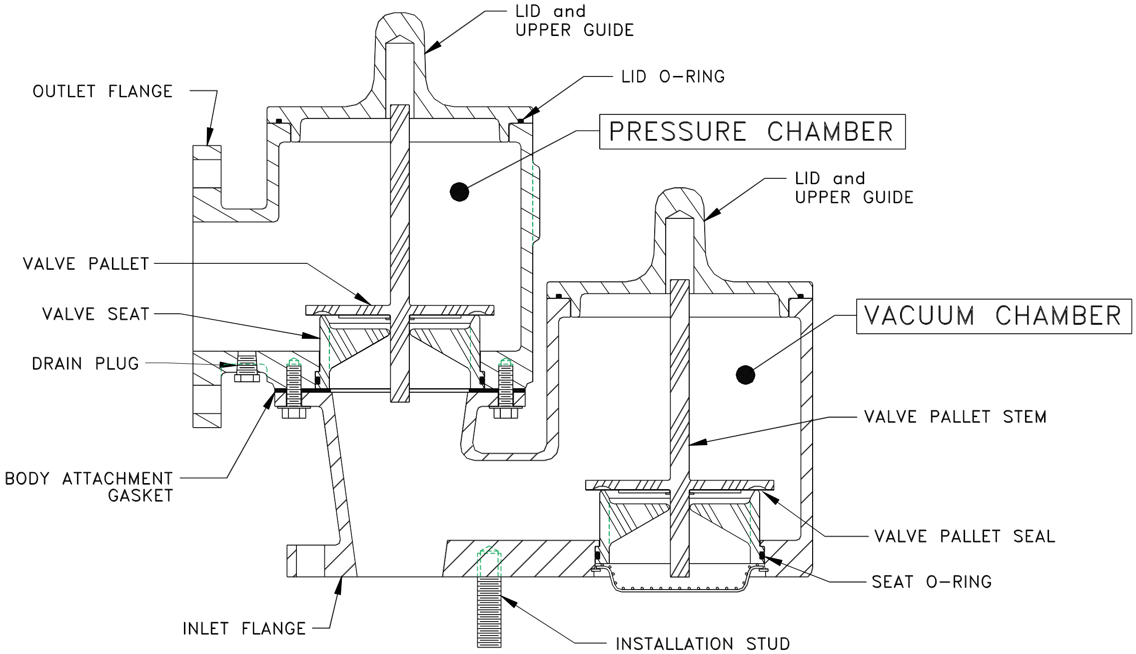
Model 952/MVC Marine Vapor Control System Vacuum Relief Valve



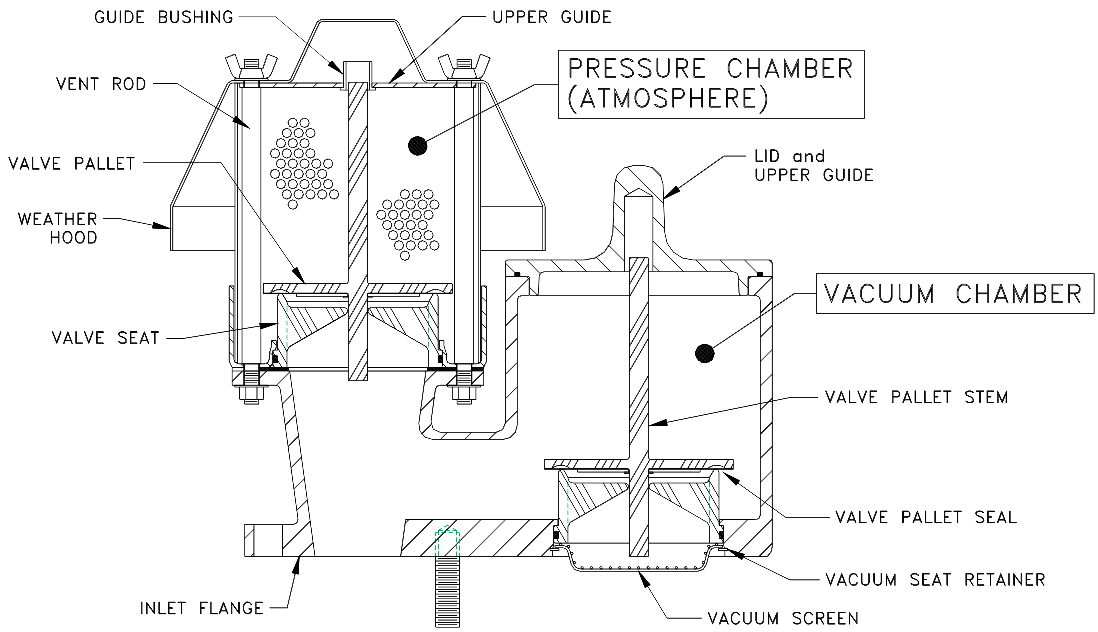
Model 953 Side Mount Vacuum Relief Valve

Common Valve Configurations

Model 850 Pipe Away



Model 950 Vent to Atmosphere



Product Identification and Marking

Nameplate

A nameplate will be attached to the valve, and will contain the following information:

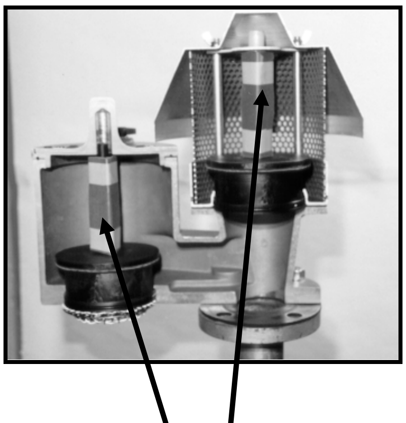
- Model Number – Ex. VALVE, 950- 8-10X
- Conn. Flange Size and Rating – Ex. 4”
- Serial Number
- Tag Number (Optional)
- Notified Body Number – Ex. 0575
- Year – Ex. 08
- Cert. No. – Ex. 19407
- Pressure
    - Setting – Ex. Z4.0
    - Flow Rate SCFH (Air) – Ex. 00000
- Vacuum
    - Setting – Ex. Z0.5
    - Flow Rate SCFH (Air) – Ex. 00000

Placing the Valve in Service

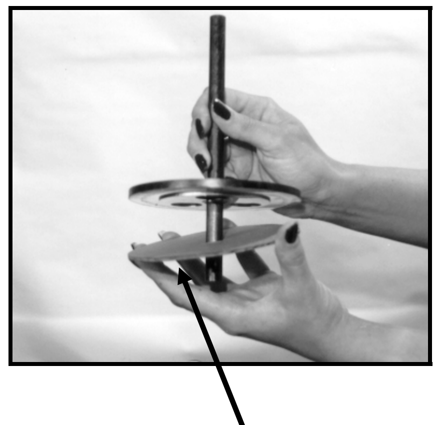
Warning: Make sure line is free of hazardous vapors before installing or servicing the valve.

1. Loosen fasteners on top of the valve and remove the lid, hood or guide.

2. Remove valve pallets from the unit. Separate the protective cardboard coverings from the pallet stems and seals, being careful not to damage the pallet seal surface. See typical illustration below. Please note that all product configurations use similar packing methods.



Remove cardboard from pallet stems

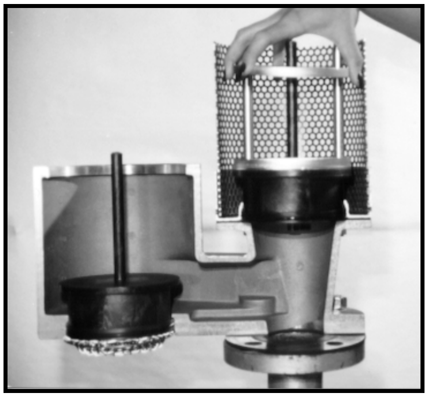


Remove cardboard from pallet seals

3. Reinsert uncovered valve pallets back into the unit. Make sure the lower stem on the pallet is centered into the valve seat. If the pallet appears to be off center to the valve chamber, or if there is difficulty positioning the lid or guide, carefully inspect the pallet to ensure it is inserted properly.

4. Remove any protective flange covers.

5. Reinstall pressure and/or vacuum pallet assemblies into their respective openings. Setting weights (if required) should be installed by engaging the hole in the weight on the appropriate pallet assembly stem.



   5.1. The weights are marked with their pressure equivalents and are shipped outside of the valve chamber. Verify that the appropriate weights are being installed to provide the specified pressure and/or vacuum setting. Refer to the nameplate data to verify the specified factory settings.

   5.2. To adjust valve settings higher than minimum, use the weights to increase the pressure setting. Weights are packed separately within the unit shipping package and are labeled "PRESSURE" and/or "VACUUM". If weights are shipped with the unit, they should be installed onto the pallets in the valve chamber in which they are labeled. Gently slide the weights onto the pallet stem and down on top of the valve pallet.

> For more detail on using weights to adjust the pallet setting, read the section titled <u>Adjustments</u>.

6. Replace the covers and/or hood. Note: Make sure that the pallet assembly stem positively engages the stem guide hole in the hood or cover. Each pallet assembly must be free to move upwards, with the pallet stem traveling into the stem guide.

7. Replace wing nuts or nuts and tighten to secure covers/hoods in position.

8. Attach the valve to the appropriate mating flange using appropriate flange gasket which is compatible with process conditions (customer provided). To insure proper function, the valve must be installed to a level surface no grater than 1° off horizontal so the pallet will move vertically. Units that are tilted during usage may suffer premature damage or wear.

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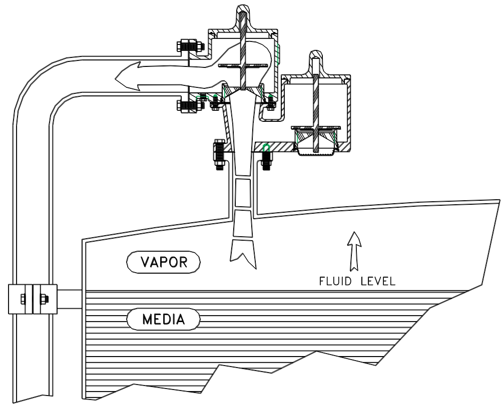
Valve Operation

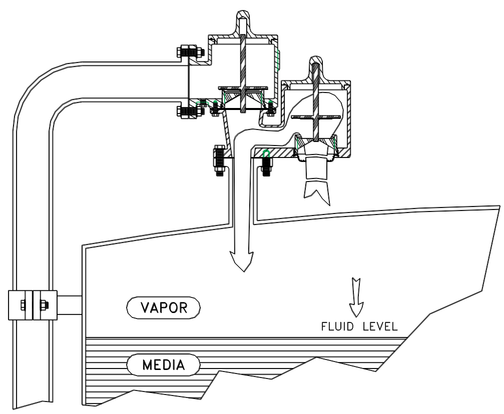
The Enardo PVRV maintains a tight seal until system pressure, or vacuum, exceeds the set pressure of the valve. Set pressure is determined by stacking a series of weights onto the valve pallet unless the pressure and vacuum set points have been specified for the minimum settings. When over-pressure occurs the weighted pallet lifts, breaking the seal between the seat and pallet. This allows vapors to pass through the valve orifice and relieve pressure buildup. The valve reseals upon relief and remains sealed.

It is important to know that relieving vapors near the set pressure in a continuous manner may cause the pallet to flutter, or oscillate, inside the valve chamber. This is common to products of this type. Operating the valve with flutter, or oscillation, may cause premature valve damage or wear over time. Enardo PVRV flow charts and sizing program results designate the "flutter zone" to assist with correct valve sizing. Contact Enardo with any questions or additional assistance.

Pressure Flow



Vacuum Flow



Adjustments

The Enardo PVRV can achieve various pressure and vacuum settings in units of ounces (oz.) or inches of water column (in.). Standard Enardo valve pallets installed alone reach minimum settings of ½ oz. or 1 in. The pallets are calibrated by the seal support located on the bottom side of the pallet. The pallet's setting of ½ oz. or 1 in. is etched into the support. When a valve requires a setting higher than the ½ oz. or 1 in. standard pallet setting, weights must be used to increase the pallet's ability to achieve the required setting. Enardo weights also come in units of ounces (oz.) or inches of water column (in.). The individual setting of each weight is either etched or imprinted into the weight. Enardo offers several different sizes of PVRVs. To ensure that the right weight is placed on the right pallet, keep in mind that the weights and pallets that go together will have the same outside diameter. Standard Enardo weights allow the user to stack in increments of ½ oz. or ½ in.

Your Enardo PVRV shipment will include prepackaged weight kits to use to achieve the proper settings for the valve you ordered. The package labeled "PRESSURE" goes on the pallet in the pressure chamber. The package labeled "VACUUM" goes on the pallet in the vacuum chamber. All of the weights in these packages should be installed. If one or neither of these packages is included with your order, then they are not needed.

A common question is, "What if my pressure and vacuum weights get mixed together?" If this happens, the weights need to be sorted and reorganized.

When installing weights for the Enardo PVRV, find the required settings for the valve located on the tag attached to the unit. Then add weights to the pallet that will give you the required setting. For example, if you have a valve pallet that requires a setting of 6 oz., you will need to add weights totaling an additional 5-1/2 oz.; the pallet alone achieves 1/2 oz. setting. Therefore, the weights to be added must total the remaining balance of the required setting, which in this example is 5-1/2 oz.

Valve Maintenance

Warning:

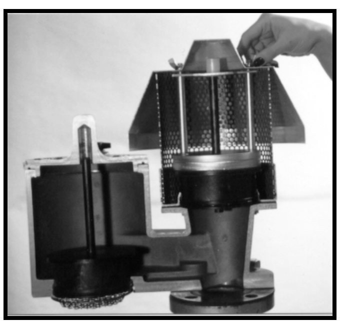
Make sure line is free of hazardous vapors before installing or servicing the valve. The use of non-sparking tools is necessary if flammable vapors are present.

Observe all applicable safety requirements. Only qualified and trained personnel should perform maintenance functions in hazardous locations.

Valves should be removed from the location having a potentially explosive atmosphere and taken to a safe location for repair and maintenance.

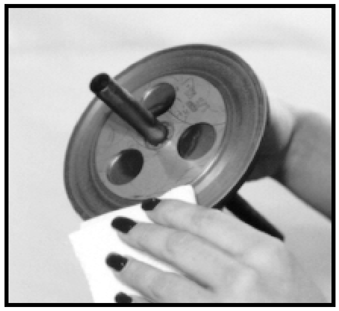
Below is a list of instructions recommended for preventative maintenance for the Enardo PVRV:

1. Loosen fasteners on top of the valve and remove the lid, hood or guide.

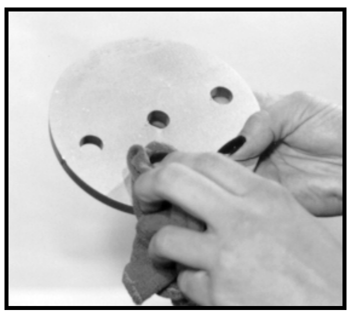


2. Remove any valve pallets and weights from the unit. Keep in mind that these will be reinstalled, so keep track of the chamber from which they were removed.

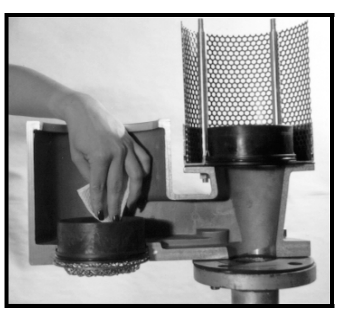
3. Inspect the pallets for any damage or buildup that may affect its sealing characteristics or its ability to move properly inside the valve. If necessary, gently clean the pallet and seal with a suitable solvent and nonabrasive cloth.



4. Clear away any buildup that may be on the weights or on the housing.



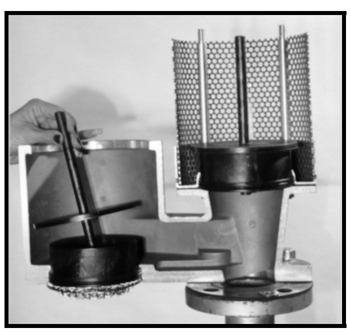
5. Inspect the valve seats installed in the unit. The sealing surfaces should be smooth and free of nicks or buildup. Check the guides for anything that may keep the valve pallet from moving properly inside the valve. If necessary, gently clean the seats with a suitable solvent and nonabrasive cloth.



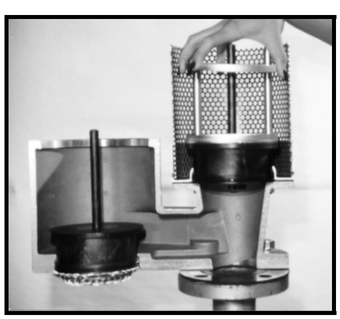
6. If your valve has a lid, clean any buildup that may exist in or around the guide hole located in the center of the part.

7. If your valve is fitted with a screen of some type, clear away any blockage that may impede proper flow.

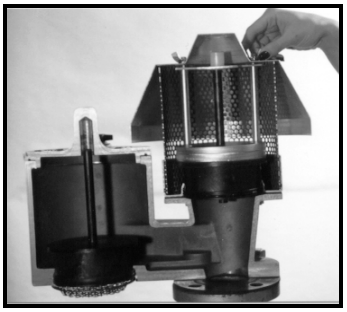
8. Reinstall valve pallets and weights into their proper chambers. Make sure the lower stem on the pallet is centered into the valve seat. If the pallet appears to be off center to the valve chamber, or if there is difficulty positioning the lid or guide, the pallet may be inserted improperly.



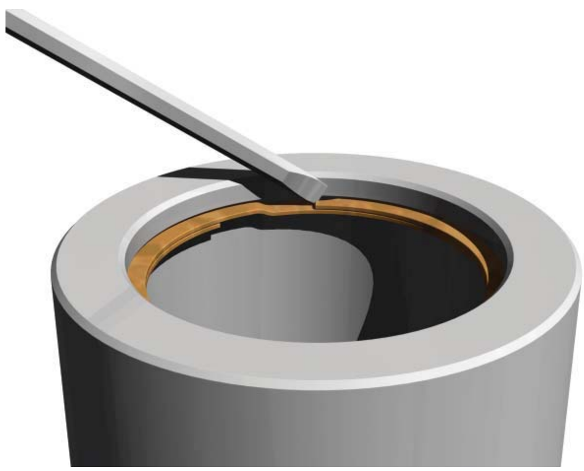
9. Reinstall weights onto their appropriate valve pallets.



10. Replace any lid, hood or guide that was previously removed and fasten securely. When tightening down lids, make sure the o-ring in each lid has full contact with the sealing surface.



11. Seat Removal: (see common valve configuration drawings shown on page 4). The valve seats are installed in machined bores in both the upper body (pressure) and in the lower body (vacuum) and are fitted with o-ring seals. The upper body seat may be removed by removing the upper body casting (Model 850) or the Vent Hood assembly (Model 950). The seat may be removed from the bore at this time. The lower seat (vacuum) is retained by a Spirolox retaining ring. This ring may be removed with a flat-bladed screwdriver as shown below.



12. Seat Replacement: The seats are installed in the reverse order of removal. Make sure the bores are clean and that the o-ring seals are not damaged. A light lubricant lubricate may be used to facilitate installation if necessary.

Valve Repair

Warning:
Make sure line is free of hazardous vapors before installing or servicing the valve. Observe all applicable safety requirements. Only qualified and trained personnel should perform maintenance functions in hazardous locations. All replacement parts must be provided by Enardo.

The valve should be removed from the tank before attempting any repairs beyond pallet assembly and weight maintenance as described above.

Most repairs will consist of replacing pallet seals, lid gaskets and in some cases, the body gaskets. The seats are also replaceable if the need arises. These repairs are relatively simple and can normally be handled by plant maintenance personnel using common hand tools.

Most valve maintenance can be performed by the customer or by a valve repair facility. These include:

Part	Replacement
Pallet Seals:	Simple replacement. Provided with gasket repair kit along with other gaskets. The pallet seals are fragile and should be handled carefully to avoid damage. They must never be folded or creased. Never use abrasive cleaners on a pallet seal.
Pallet Assemblies:	Drop-in replacement. Requires removal of lid and replacement of gasket. Again, care must be taken not to damage the seals.
Body Gaskets:	Requires disassembly. Provided with gasket repair kit
Seats	Requires gasket to be replaced as well.
Weights	Requires removal of lid and replacement of O-ring on Model 850 Pipe-Away valves. The customer must be careful to install the proper weights in the right location.

In most cases, it is not necessary to return the valves to the factory. If the valve needs to be tested and certified at a specified pressure and/or vacuum, it should be returned to the factory or else sent to a qualified valve repair facility that is capable of performing the necessary tests in accordance with API Bulletin 2521 recommendations.

Contact Enardo with any questions or additional assistance you may need for repairing your valve.

PRODUCT LIMITED WARRANTY

WARRANTY - Enardo warrants, to the extent stated herein, all products manufactured by it are free from original defects in workmanship or material for a period of twelve (12) months. Seller at its option will repair or replace any products returned to the factory in Tulsa, Oklahoma, transportation charges prepaid. Upon inspection, seller shall determine any defect in material and/or workmanship. There are no further warranties either express or implied in connection with the design, sale, merchantability or use of the items of sale and/or services. The rights and remedies of buyer hereunder

(i) Are exclusive and in substitution for and buyer hereby waives, all other warranties, guaranties, obligations, liabilities, rights and remedies, express or implied, arising by law or otherwise, including, but not limited to, the implied warranty of merchantability, any implied warranty of fitness and any obligation or liability of seller arising from tort or for loss of use, revenue or profit, or for incidental or consequential damages, and

(ii) Shall not be modified except by written agreement, date even herewith or subsequent hereto, signed on behalf of buyer and Enardo by the respective duly authorized representatives.

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