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## MODEL KDV SERIES "FREEZELESS" DUMP VALVE INSTALLATION AND OPERATING INSTRUCTIONS

The Kenco KDV series Dump Valve is a pneumatically controlled valve designed for fluid level control in gas scrubbers, separators and other process pressure vessels. It is available with either 1" or 2" process connections. The drain sizes available are 1/2", 3/4" and 1" depending on the model used. The valve actuation pressure range is 30-70 psi depending on the model and process pressure (see figure 2). Process pressure ratings of up to 2000 psi are available.

### •Features:

•**Ease of Maintenance**-The union nut allows the valve to be removed for service without removing the Valve Body from the pressure vessel.

•**Variety of Trim Sizes**- Several trim sizes available to accommodate different flow and pressure requirements.

•**High Performance Polyurethane Trim Seal**-The high performance polyurethane material used on the Trim Seal is more durable and longer lasting than the urethane used on competitive valves.

•**Pressure Warning Port**-If an attempt is made to remove the valve assembly from the body while the valve is under pressure, process fluid and/or gas will leak from the weep hole to provide a warning.

•**"Keyed" Housing to Valve Joint**-Valve is keyed to diaphragm housing to ensure internal retaining hardware does not twist or vibrate loose.

•**Simple Installation**-Valve is easily installed with simple hand tools in a short amount of time.

### Specifications:

**Operating Temperature:** -30 to 250°F  
(-34 to 121°C)

**Operating Process Pressure:** Up to 2000 psi, depending on model (See figure 1)

**Valve Actuation Pressure:** 30 to 70 psi depending on process pressure (see figure 2)

**Body Material:** Nickel Plated 12L14 Carbon Steel

**Wetted Materials:** Nickel Plated 12L14 Carbon Steel, 303 Stainless Steel, Buna, Polyurethane.

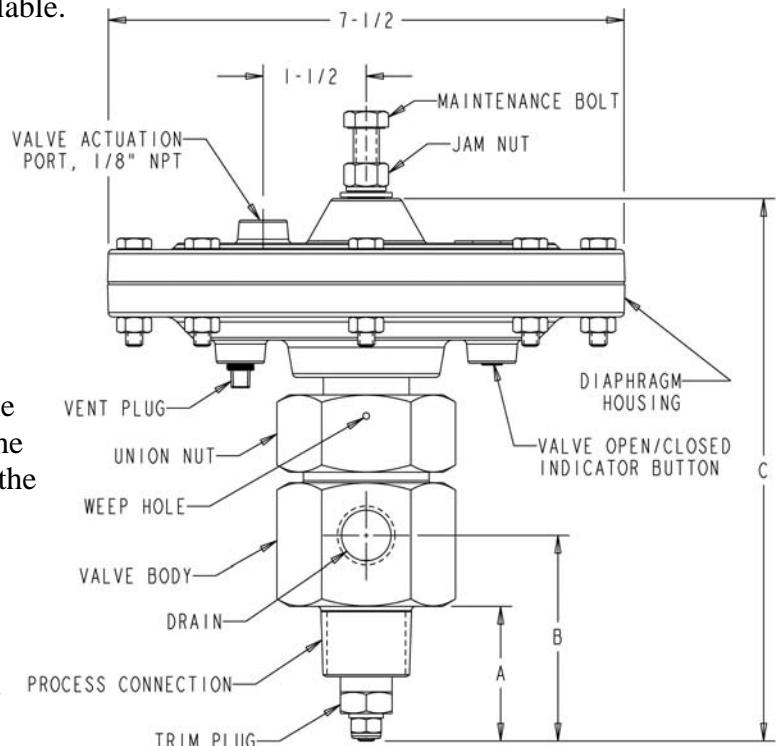


FIGURE 1: DIMENSIONS AND SPECIFICATIONS

VALVE MODEL	PROCESS CONNECTION SIZE	DRAIN SIZE	MAXIMUM PROCESS PRESSURE	TRIM SIZE	DIMENSION "A"	DIMENSION "B"	DIMENSION "C"
KDV-P18-1-05	1-11.5 NPT	1/2-14 NPT	1800 PSI	.461"	1.88"	2.88"	7.69"
KDV-P18-1-075	1-11.5 NPT	3/4-14 NPT	1800 PSI	.461"	1.88"	2.88"	7.69"
KDV-P05-2-1	2-11.5 NPT	1-11.5 NPT	500 PSI	.865"	1.92"	3.54"	8.76"
KDV-P15-2-1	2-11.5 NPT	1-11.5 NPT	1500 PSI	.589"	2.02"	3.64"	8.86"
KDV-P20-2-1	2-11.5 NPT	1-11.5 NPT	2000 PSI	.446"	2.02"	3.64"	8.86"

NOTE: ALL DIMENSIONS ARE IN INCHES.

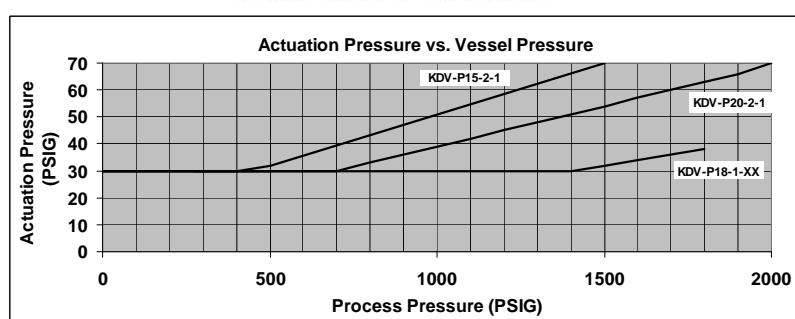


FIGURE 2

(NOTE: KDV-P05-2-1 HAS A CONSTANT ACTUATION PRESSURE OF 30 PSIG)

## **INSTALLATION OF KDV SERIES DUMP VALVE**

1. Prior to valve installation, inspect the unit for damage from shipping. Inspect the inlet (process connection) and drain to ensure no foreign material or debris is present.
2. Install valve using good piping practice. Use an appropriate pipe sealant on all NPT threads.
3. Make sure drain is facing down. Also make sure the vent plug is positioned at the bottom of the valve before tightening the union nut. If necessary, the union nut can be loosened to orient the diaphragm housing in the proper position. Be sure to tighten the union nut up firmly before putting the valve into service or leaking may result.
4. Connect the 30 to 70 psi pneumatic input signal to the valve actuation port. Always use clean, dry instrument quality air or gas.
5. To ease assembly and maintenance, plumb a union connection between the valve drain port and the condensate/drain line of the pressure vessel. Kenco also recommends a manual 2-way shut off valve installed in the process vessel at a level below the dump valve. The outlet on the manual valve should be connected to the condensate/drain line.

## **TROUBLESHOOTING**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Valve leaks when closed.	<ol style="list-style-type: none"><li>1. Debris between plug and seat.</li><li>2. Plug and/or seat worn</li><li>3. Union nut not tight enough.</li><li>4. Crush washer excessively worn.</li><li>5. Maintenance bolt is screwed in too far, pushing the trim plug off of the trim seat</li></ol>	<ol style="list-style-type: none"><li>1. Remove debris.</li><li>2. Replace trim plug and seat.</li><li>3. Tighten union nut.</li><li>4. Replace crush washer.</li><li>5. Unscrew the maintenance bolt until the trim plug is fully seated against the trim seat.</li></ol>
Valve will not open.	Pressure drop across valve too great.	<ol style="list-style-type: none"><li>1. Increase pneumatic input signal to 70 psi.</li><li>2. Make sure process pressure is not higher than KDV-Dump Valve rating.</li></ol>
Air/gas leaking from diaphragm housing.	1. Diaphragm damaged.	1. Replace diaphragm.

**WARNING!** Always make sure the process pressure is fully relieved, or zero before doing any maintenance or assembly/disassembly to the valve!

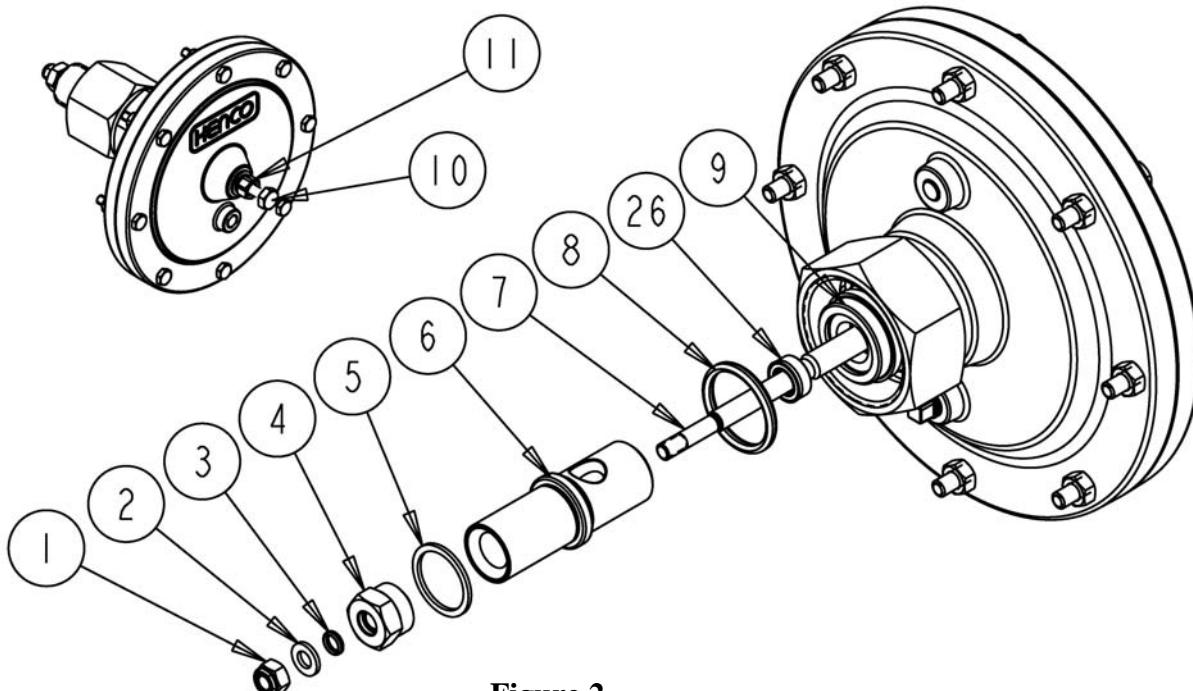
## **MAINTENANCE AND REPAIR PROCEDURES**

### **PREVENTATIVE MAINTENANCE**

1. Inspect Trim Plug and Trim Seat for wear every 6 months.
2. Inspect Diaphragm, Thrust Plate and Trim Shaft for wear or damage once a year.

## TRIM SEAL REPAIR PROCEDURE

1. Make sure all the pressure is off of the pressure vessel and the condensate is drained to a level below the valve inlet. Also ensure the pressure is off the pneumatic input signal.
2. Disconnect the pneumatic input signal.
3. With a wrench on the union nut and a back-up wrench on the valve body, break the union nut loose.
4. While removing the union nut, make note of the weep hole. If at any time, pressure is escaping through the weep hole, STOP! Tighten the union nut and check the vessel shut down and depressurizing procedures to make sure no pressure is on the valve. NEVER remove the valve while pressure of any kind, no matter how low, is present in the vessel.
5. With the union nut removed, slide the valve assembly out of the valve body.

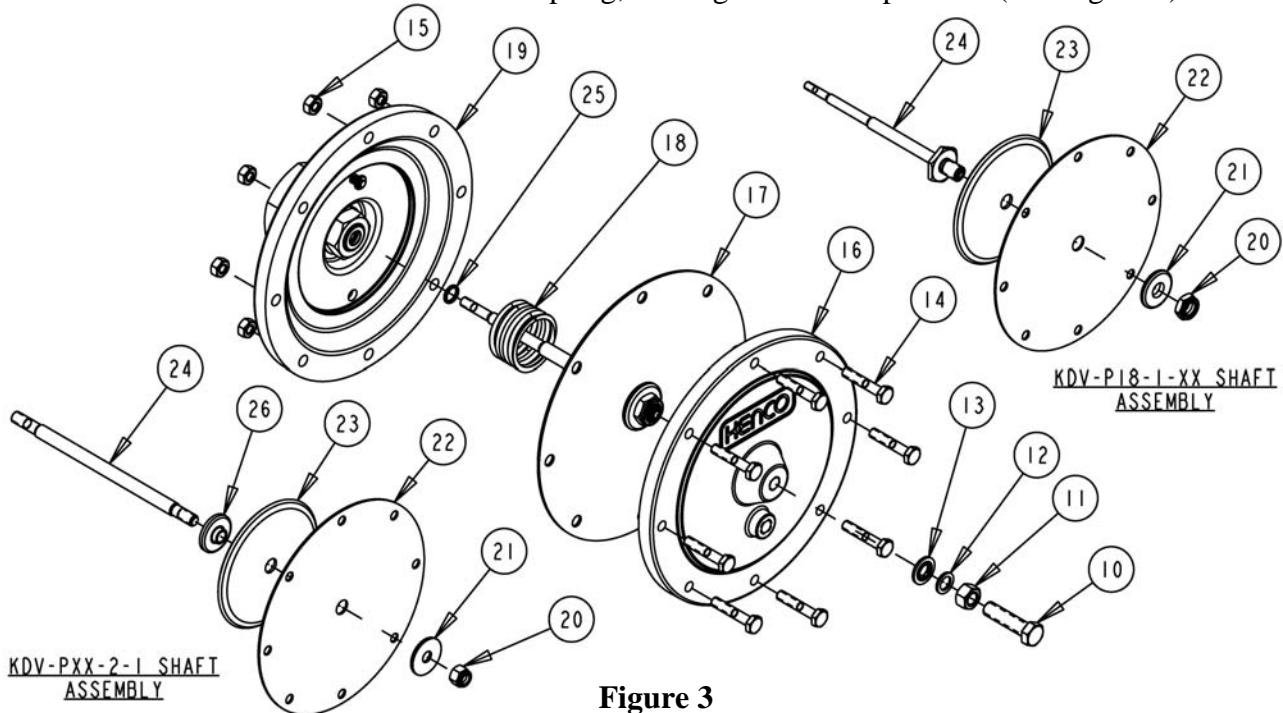


**Figure 2**

6. Loosen the jam nut (#11) and spin it all the way to the top of the maintenance bolt (#10). (See Figure 2)
7. Screw the maintenance bolt (#10) in until it bottoms and lightly snug. DO NOT OVER TIGHTEN. This will take the spring load off of the trim plug, allowing for its removal.
8. With a wrench backing up the trim plug (#4) break the lock nut (#1) loose. Once the lock nut is loose, backing up the trim plug is no longer necessary. The maintenance bolt and diaphragm assembly will provide the resistance needed to remove to locknut.
9. With the locknut removed, remove the washer (#2), o-ring (3), trim plug (#4), crush washer (#5) and trim seat (#6). Also remove the o-ring (#8) from the spud (#9) under the union nut. (Note: if fluid was leaking from weep hole, then replace packing (#26)).
10. Replace all of the parts in the reverse order they were removed. Lubricate the O-rings (and the packing if replaced) with Parker O-ring lubricant or equivalent.
11. When installing the new locknut (#1) on the trim shaft (#7) screw it on until it just contacts the trim plug (#4). Then, using a wrench to back up the trim plug (#4) tighten up the locknut (#1).
12. Loosen the maintenance bolt (#10) until the trim plug (#4) is firmly in contact with the trim seat (#6). Back the maintenance bolt up another couple of turns to make sure it does not come in contact with the trim shaft during normal operation.
13. Spin the jam nut (#11) down against the housing and tighten. The KDV Dump Valve is ready for operation.

## DIAPHRAGM AND TRIM SHAFT REPLACEMENT

1. Remove the trim plug and seat following steps 1 through 9 under Trim Seal Repair Procedure.
2. Remove the maintenance bolt (#10), nut (#11), flat washer (#12) and seal washer (#13). This will take most of the load off of the valve spring, making the next step easier. (See Figure 3)



**Figure 3**

3. Make an alignment mark on the housing halves (#16, #19) and remove the eight  $\frac{1}{4}$  " nuts (#15) and bolts (#14). The valve spring (#18) will probably force the 2 housing halves apart, but if not, gently pry the halves apart with a flat tip screwdriver. Take care not to gouge the sealing surface of the housings.
4. With the two halves apart, remove the old diaphragm assembly (#17).
5. If the valve is a 2" model, slide the washer (#26) on the shaft. Make sure the flat side of the washer sits on the shoulder of the shaft and that the proper end of the shaft is selected.
6. Install the new thrust plate (#23) with the edge of the rolled lip facing the body side of the housing (#19). Use the old assembly for reference if necessary. Also install the diaphragm (#22), washer (#21) and nut (#20). If the valve is a 2" model, the washer (#21) will have a counter bore on one side. This counter bore must face the diaphragm (#22). Failure to orient this washer properly will result in leakage and early valve failure. This only applies to the 2" KDV's.
7. Use a 1-1/8" wrench to back up the hex end of the trim shaft (#24) and tighten the nut (#20) to 220 in lbs (1"KDV) or 180 in lbs (2" KDV) or until it slightly compresses the surface of the diaphragm (#22).
8. Remove the o-ring (#25) and insert the new o-ring into the groove in the spud (#9 in figure 2). Use plenty of o-ring lubricant.
9. Smear a thin coat of O-ring lube on the shaft (#24) near the end with the hex. This will help lubricate the o-ring and packing and will improve the life of these seals.
10. Insert the shaft into the spud on the housing (#19). If the valve is a 2" valve, the shaft will have a fairly sharp edge on the shoulder the trim plug (#4 figure 3) bolts up against. Use care when inserting the shaft. The shaft should be gently rotated while applying some pressure to push it past the O-ring (#25). If caution is not used here, the O-ring (#25) and or packing (#26 figure 2) could be damaged.
11. It is easiest to install the packing (#26 figure 2) after the diaphragm assembly is completed. Simply lube the packing thoroughly and work it gently over the trim shaft. Make sure it is oriented properly. The narrow end will sit in the bottom of the groove and the wide end should face the trim plug. Warning! If this seal is put in backwards, the valve will leak fluid and/or gas out of the weep hole. Use the trim seat (#6 Figure 2) to fully seat the packing in the groove.
12. Assemble the rest of the valve following steps 10 through 13 under Trim Seal Repair Procedure.