

Installation and Operation Manual

DVU Series Dump Valves

Model: DVU150, DVU175, DVU2105, DVU2115 and DVU2120

Please read the following information before installing. Visually inspect product for shipping damage at receiving. It is your responsibility to have a qualified person install this unit and make sure it conforms to local codes. The training, qualification and experience required is for work around pressure vessels, natural gas, possibly sour gas or any substance to be found in the vessel.



Before installation of this product:

- Disconnect all electrical power to the machine
- Ensure the machine cannot operate during installation
- Follow safety warnings of the machine manufacturer
- Read and follow all installation instructions

Specifications

Operating Temperature: -30° F to 250° F (-34.4° C to +121° C)

Valve Operating Pressure: See How to Order

Maximum Working Pressure:

DVU150/175 (STD & SS): 1800 psi (12.4 MPa) [124 bar]

DVU2105: 500 psi (3.44 MPa) [34 bar]

DVU2115: 1500 psi (10.3 MPa) [103 bar]

DVU2120: 2000 psi (13.8 MPa) [138 bar]

Shipping Weights:

DVU150 and DVU175: 9 lbs. (4 kg)

DVU150SS and DVU175SS: 9 lbs. (4 kg)

DVU2105, DVU2115, DVU2120: 14 lbs. (6.4 kg)

Shipping Dimensions: 8 x 8 x 12 in. (203 x 203 x 305 mm)

Wetted Parts

Standard Models:

Body/Union Nut: 12L14 carbon steel, electroless nickel-plated

Stem: ANSI 303 SS

Stuffing Box: ANSI 303 SS

Seat: ANSI 303 SS

Plug/Seal: ANSI 303 SS / 95 durometer urethane

Stainless Steel Models:

Body/Union Nut: ANSI 316 SS

Stem: ANSI 316 SS

Stuffing Box: ANSI 316 SS

Seat: ANSI 316 SS

Plug/Seal: ANSI 316 SS / 95 durometer urethane

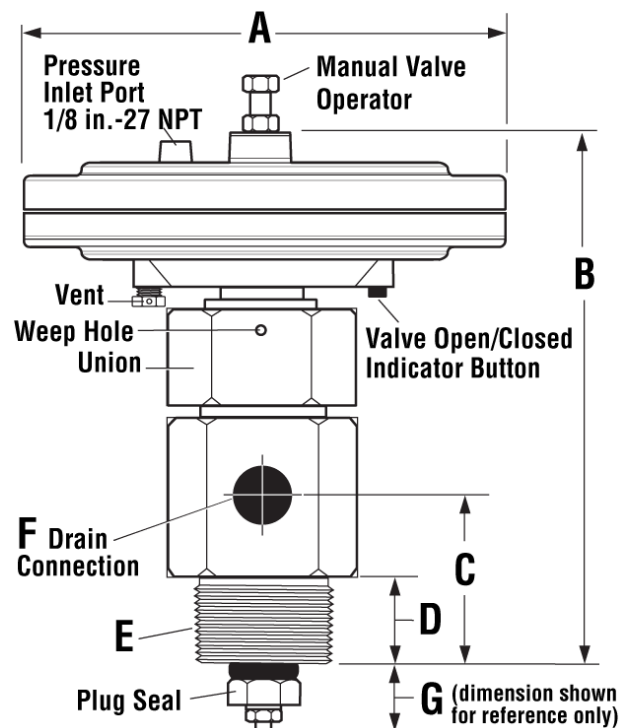
Models

Model DVU	Inlet	Outlet	Trim Size inches (mm)	Working Max. Press.
2120	2 NPT	1 NPT	0.500 (12.7)	2000 psi
2115			0.571 (14.5)	1500 psi
2105			0.791 (20.09)	500 psi
175	1 NPT	3/4 NPT	0.359 (9)	1800 psi
175SS		1/2 NPT		
150				
150SS				

Description

The DVU Series models are pneumatically controlled dump valves. The valves open and close automatically by pneumatic control from a FW Murphy LS200NDVOR or similar level controller and dump valve operator. Diaphragm actuated, the DVU series dump valves operate at 30–70 psi (207–483 kPa) [2.07–4.83 bar] and up to 2000 psi (13.8 MPa) [138 bar] vessel pressure (depending on model). A key benefit of this design is the hex union that provides the ability to replace the seat without removing the valve from piping.

Dimensions (All Models)



Model DVU	A	B	C	D	E	F	G
2120	7.50 (191)	8.0 (203)	2.75 (70)	1.0 (25)	2-11.5 NPT	1-11.5 NPT	0.81 (20.57)
2115							
2105							
175	7.50 (191)	6.75 (171)	2.0 (51)	1.0 (25)	1-11.5 NPT	3/4"-14 NPT	0.73 (19)
150						1/2"-14 NPT	

NOTE: Dimensions are in inches and (mm)

Typical Installation on Gas Compressors and Basic Operation

The Murphy Gas Compressor Scrubber Level System (SLS)

The system provides for liquid control in gas scrubber applications, by dumping liquids to drain and protecting compressors with high liquid level switch. Wetted metal parts are made to survive constant use in corrosive environments.

Filter/Regulator & MURPHYGAGE®

"Instrument Quality Air/Gas Supply"

Pneumatic Level Control

Float actuated level snap-acting switch controls pneumatic pressure to open and close dump valve.

LS200NDVOR: Dump Valve Operator, pressure regulator, and pressure indicating MURPHYGAGE®.

High Level Shutdown Switch

Stainless steel float actuated level switches to alarm and/or shutdown the equipment.

LS200: 2" NPT pipe connection; Rated 2000 psi (13.7MPa) [137bar]; Class I, Division 1. SPDT snap-switch standard. DPDT Optional.

All Stainless Steel available.

Control Panel

Pneumatic Dump Valves

See DVU-01069B for more details.
Two piece union design with manual valve operator allows soft plug and hard seat to be replaced without disassembling outlet piping or scrubber pipe connection. Diaphragm actuated valves operate on 30-70 psi (207-483 kPa; 2-5 bar).

As condensate rises in the scrubber, the float on the pneumatic level control rises and trips its pneumatic valve. The valve opens, allowing pressure to enter the dump valve pilot chamber. Once the pressure enters the pilot chamber it forces the diaphragm and valve stem forward, thus opening the valve seat (valve open/closed indicator button pops out) and releasing condensate through the valve stem and out the drain. As the condensate level drops, the pneumatic level control valve closes to shut off the pressure to the dump valve, causing it to close.

If for any reason the condensate continues to rise beyond normal dump levels, the high level shut-down switch operates the alarm and/or shuts down the equipment.

The filter/regulator and the Murphygage® instrument help keep the control pressure clean and dry. They also allow the operator to adjust pressure to recommended levels.

Note: Always use clean, dry, instrument-quality gas.

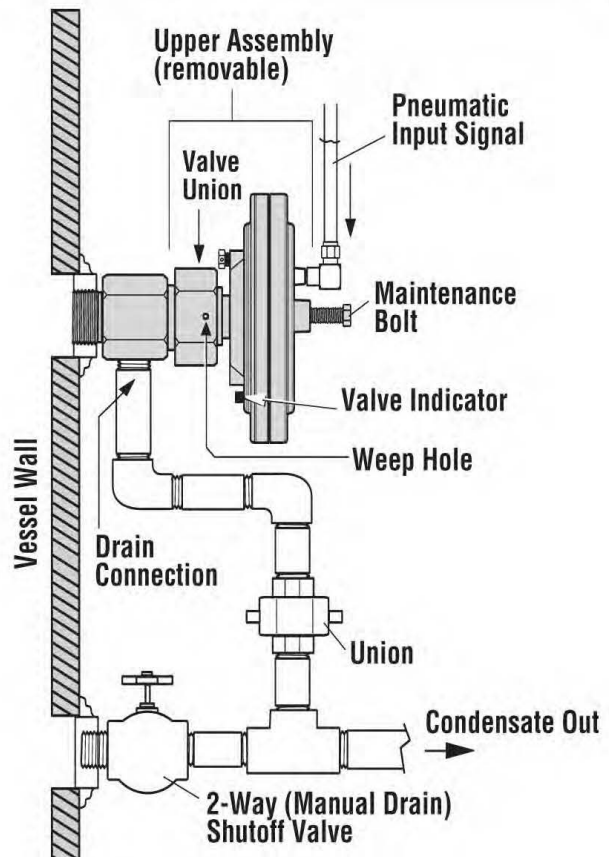
Typical Dump Valve Installation

CAUTION: Always use non-sparking tools when gas is known to be present.

Direct Mounting Method to Tank Wall

1. Install the valve so the drain connection is on the bottom. Use pipe thread sealant on all the connections.
2. Be sure the unit is screwed tight and does not leak.
3. Install the piping for the pneumatic input signal into the 1/8 NPY threaded connection of the pressure inlet port (on top of the diaphragm housing of the DVU).
4. Install a union between the DVU drain connection and the condensate out line. Use pipe thread sealant on all the connections.

Description	Sealant Specification
NPT threads	Pipe Sealant

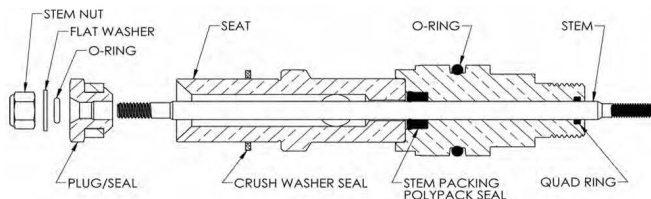


Repair Procedure

CAUTION: Use extreme care to ensure any residual or full pressure is relieved from all parts of the system to be serviced.

Replacing the Plug and Seat

1. Close the pressure block valves (suction and discharge valves) on the inlet and outlet of the skid. Lock them closed if possible.
2. Open the blowdown valve to remove pressure from the unit. Lock the blowdown valve open if possible.
3. After taking all possible precautions to ensure there is no pressure in the vessel, (If the condensate line is pressurized, it must also be blocked and locked.) open the manual drain valve so it bleeds into the vessel so it can also be bled down. Disconnect the pneumatic input signal connection after ensuring it also has been depressurized. **See illustrations on page 2.**
4. Using the back-up wrench on the valve body, with a quick breaking action, loosen the union nut on the valve. There is a weep hole in the nut. If at any time (while loosening and taking off the nut) pressure is escaping through the weep hole, immediately stop loosening the nut. Retighten the nut and check the preceding procedures to ensure the pressure is bled off the vessel. Never remove the assembly if pressure is coming through the weep hole. **See illustrations on page 2.**
5. With the upper assembly removed from the vessel, the plug and/or seat can be replaced. Loosen the 9/16 in. jam nut on the maintenance bolt on top of the diaphragm cover. Spin the nut up against the head of the bolt. Tighten the bolt to extend the shaft and plug. Do not overtighten.
6. Using the back-up wrench on the plug, remove the stem nut on the shaft under the plug. Once the stem nut is broken loose, the 9/16 in. head maintenance bolt and top assembly will keep the stem from turning. The plug turns freely on the stem once loose. The plug and the stem can now be removed. All soft seals should be replaced. Refer to How to Order.
7. If the diaphragm or stem need to be replaced, do steps a-k in the procedure Replacing the Stem or Diaphragm. Otherwise proceed with steps 8-11.
8. Install the seat and plug. Place the O-ring on the stem followed by the washer and stem nut.
9. Tighten the stem nut. Loosen the 9/16 in. head maintenance bolt by at least one turn past the point where it is no longer in contact with the stem. Tighten head maintenance bolt.
10. Replace the crush washer and the O-ring hidden by the union nut. **NOTE:** If pressure or fluid comes out the weep hole of the union nut, either the O-ring under the union nut is leaking or the packing could be leaking though the internal weep hole above that O-ring.
11. The assembly is ready to be reinstalled. Check for relative position of the pneumatic input signal connections before tightening the union nut. See Torque Specification table.



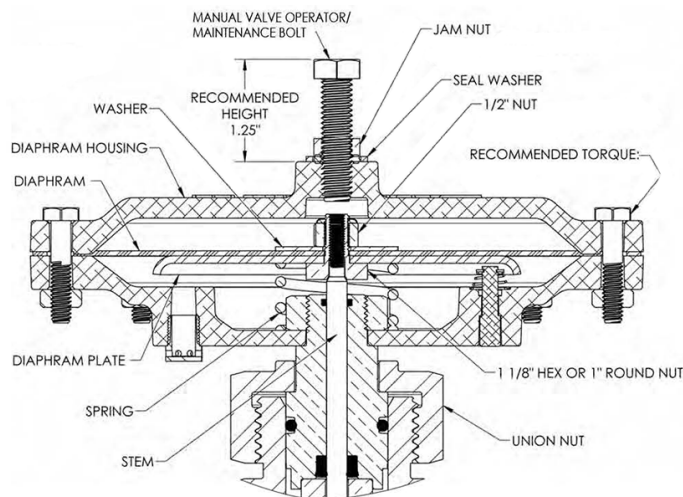
Torque Specification

Description	Foot Pounds
Jam Nut	20 ft-lb. (27 Nm)
1/2 in. Nut	11 ft-lb. (15 Nm)
Diaphragm Bolt/Nut (8)	80 in-lb. (9 Nm)
Union Nut DVU 150/175	260 ft-lb. (353 Nm)
Union Nut DVU 2105/2115/2120	350 ft-lb. (475 Nm)

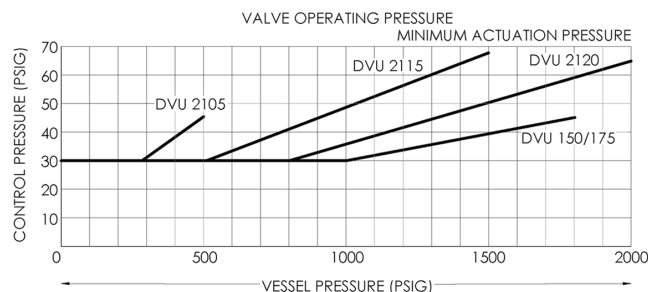
Replacing the Stem and/or Diaphragm

Only do the following steps if the diaphragm or stem need to be replaced and after completing steps 1-7 in the procedure Replacing the Plug and Seat.

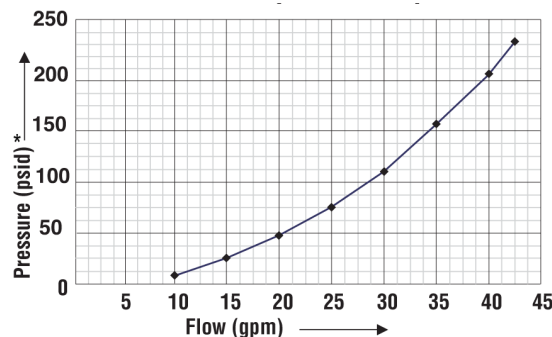
- a. Loosen the 9/16 in. head maintenance bolt allowing the diaphragm spring to relax and the stem to retract. Make alignment marks on the top and bottom halves of the diaphragm assembly for alignment during reassembly.
- b. Remove the eight 7/16 in. bolts/nuts holding the diaphragm housing together.
- c. Using a straight edge screwdriver, gently separate the two halves of the diaphragm housing and remove the top or outside portion.
- d. Lift the diaphragm and support plate far enough for the 1-1/8 in. hex or 1 in. round nut on the bottom of the diaphragm assembly to be accessible to a wrench and not have the spring interfere. If it is desired to replace the packing and or stem, pull the stem all the way out. The packing can easily be removed by using a small screwdriver to pry the packing out. The new packing can be simply pressed in, making sure the orientation of the packing installed is the same as orientation of the packing removed. The packing is wider toward the plug end. You will have to use the seat to hold the packing in place when re-inserting the stem.
- e. With the 1-1/8 in. hex or 1 in. round nut held by a wrench, use a wrench to loosen and remove the 1/2 in. nut on top of the diaphragm. The diaphragm, plate and stem can now be removed and replaced.
- f. With the new diaphragm in place and the 1/2 in. nut tightened, place the assembly with the diaphragm down on a clean and smooth sturdy surface.
- g. Have the seat, plug, washers and stem nut handy (if any of these are to be replaced use the old parts for this procedure). Press down evenly and smoothly on the bottom of the diaphragm assembly to cause stem to come up. Place the set and plug in place. Then push the bottom of the diaphragm assembly down far enough to install the washers and stem nut on the stem. Tighten the stem nut enough to hold against the diaphragm spring.
- h. Align the diaphragm holes to the bolt holes (bottom half of the housing). Install the upper diaphragm housing using the alignment marks from removal. Install the eight 7/16 in. bolts and nuts. Tighten the bolts evenly using an X-pattern until all eight bolts are evenly tight. See Torque Specification table.
- i. Using the 9/16 in. head maintenance bolt, tighten, pushing the stem out until the 9/16 in. bolt stops. Do Not Overtighten.
- j. Remove the stem nut holding the plug.
- k. If old parts were used, prepare to install the new parts now. Follow steps 8-11 in the procedure Replacing the Plug and Seat.



Control Pressure vs. Working Pressure



Pressure vs. Flow (DVU-150/175)



How to Order

Part Number	Model and Description	Notes
Use Model Number	DVU2120	
	DVU2115	
	DVU2105	
	DVU175	
	DVU175SS	
	DVU150	
	DVU150SS	
55000272	DVU2120 Seal Kit	Service Parts
55000273	DVU2120 Diaphragm Kit	
55000271	DVU2115 Seal Kit	
55000273	DVU2115 Diaphragm Kit	
55000270	DVU2105 Seal Kit	
55000273	DVU2105 Diaphragm Kit	
55000230	DVU150/175 Seal Kit	
55000231	DVU150/175 Diaphragm Kit	
55000255	DVU150/175 End Seal Kit	
55000262	DVU150SS/175SS Seal Kit	
55000231	DVU150SS/175SS Diaphragm Kit	
55000263	DVU150ss/175SS End Seal Kit	

The DVU Series Valve is included in the following Scrubber Levels Systems.

(Includes LS200, LS200NDVOR and DVU valve)

SLS2120: Includes DVU2120 valve

SLS2115: Includes DVU2115 valve

SLS2105: Includes DVU2105 valve

SLS175: Includes DVU175 valve

SLS150: Includes DVU150 valve

-LR: Less regulator option

(Includes MLS-020, LS200NDVOR and DVU valve)

MSLS2120: Includes DVU2120 valve

MSLS175: Includes DVU175 valve

MSLS150: Includes DVU150 valve

-LR: Less regulator option

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