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General Guidelines

The owner must comply exclusively with these operating instructions and the authorized use of this piece of equipment. Should problems arise that cannot be solved using these operating instructions, please contact Dixon®. We will be happy to provide further assistance.

- If any modification work is performed on the product by the owner, Dixon shall no longer be considered the manufacturer of the device. In such cases, all components must be subjected to a new certification process for any applicable certifications that the equipment holds. Unless agreed to in writing by Dixon, liability, warranties, and guarantees shall immediately be deemed null and void as soon as the owner:
 - Performs modifications/conversion work on the product.
 - Uses the product for unauthorized purposes.
 - Removes or disables safety elements.
 - Processes products whose material, form, and size do not correspond exactly to the description provided.
 - Makes alterations to the original state of the device.
- The operating instructions are regarded as part of the product.
- The operating and maintenance personnel must always be able to access the operating instructions.
- The safety instructions provided in the operating instructions must be observed.
- The operating instructions shall be valid for the entirety of the device's lifespan.
- The operating instructions must be maintained and updated as necessary.
- The operating instructions must be passed on to any subsequent owners or operators of the device.

Regulations and Safety Requirements

Regulations: Dixon combo-style pressure relief valves are used in contact with a variety of products, many of which are hazardous materials and could cause serious injury or damage if mishandled. The acceptance and transportation of products are regulated by the DOT and AAR in the U.S.A., and in Canada by CTC and Transport Canada. Regulations of other governmental bodies must be complied with for stationary and mobile applications. All personnel should be familiar with and follow these regulations. Nothing in these instructions is intended to conflict with or supersede these regulations. The information in this document was gathered from knowledgeable sources. However, Dixon makes no representations or guarantees about its accuracy or completeness and assumes no liability for this information.

Specifications are subject to change without notice.

This valve should only be installed, operated, and maintained by qualified personnel. Read these instructions carefully before proceeding. Operation of the valve must conform to all applicable specifications from TC, AAR, DOT, CFR (Parts 173.31, 174.67, etc.) and other governmental bodies, along with the operating instructions of your company.

Safety Information

The following signs may be used in this manual. To avoid serious injury and/or possible damage to equipment, pay attention to these messages. Hazards or unsafe practices could result in severe personal injury or death.



DANGER

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.



WARNING

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.



CAUTION

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

Use only replacement parts and devices recommended by the manufacturer to maintain the integrity of the equipment. Make sure the parts are correctly matched to the series, model, serial number, and revision level of the equipment.

Safety labels are placed on equipment where appropriate. Do not remove any labeling from any piece of equipment. Replace any label that is missing.

DO NOT modify any Dixon product. Non-factory modifications could create hazardous conditions and void all warranties. DO NOT attempt to use a Dixon product in any application that exceeds the product rating.

Safety Precautions

Safety Warnings and Precautions: Please carefully read each of the following warnings and cautions prior to performing any work.



WARNING: Toxic Hazard: Always use extreme caution and proper equipment when involved with hazardous materials. To avoid exposure to toxic or hazardous materials, make sure the tank car is empty and clean, and that the work area is free of hazardous chemicals before removing or installing any valve.

- Wear protective clothing and equipment suitable for withstanding the materials to which you may be exposed.
- Position yourself on the upwind side of the valve when possible.
- Work in a well-ventilated area.
- Work with a partner who can help you in the event of an emergency.
- Follow approved safety precautions for hazardous or toxic materials.
- Obtain SDS sheets for all the commodities used with the associated valve.



WARNING: Spring-Loaded Assembly: Pressure relief valves are spring-loaded assemblies with a large amount of stored potential energy in the spring. Handle with care to avoid damage to the valve stem, which could result in breakage and ejected piece parts. When assembling or disassembling the valve, DO NOT position oneself directly in front of the spring and stem. Instead, position oneself to the side away from the valve. Unexpected component failure of the valve stem or spring breakage may cause a sudden energy release that can discharge component parts a short distance in an uncontrolled manner. Personal injury may be a result.



WARNING: Valve Leakage: Improper valve-tongue seating in the flange groove, loose nuts, and damaged gaskets may result in leaks at the valve-mounting joint.



CAUTION: Groove Damage:

- Do not use a sharp tool to seat the gasket as damage may result.
- Verify that the valve tongue fits into the cover plate groove. Improper fit up could result in a leak and possible valve damage.
- To prevent tongue damage, do not install a valve having damaged sealing surfaces.

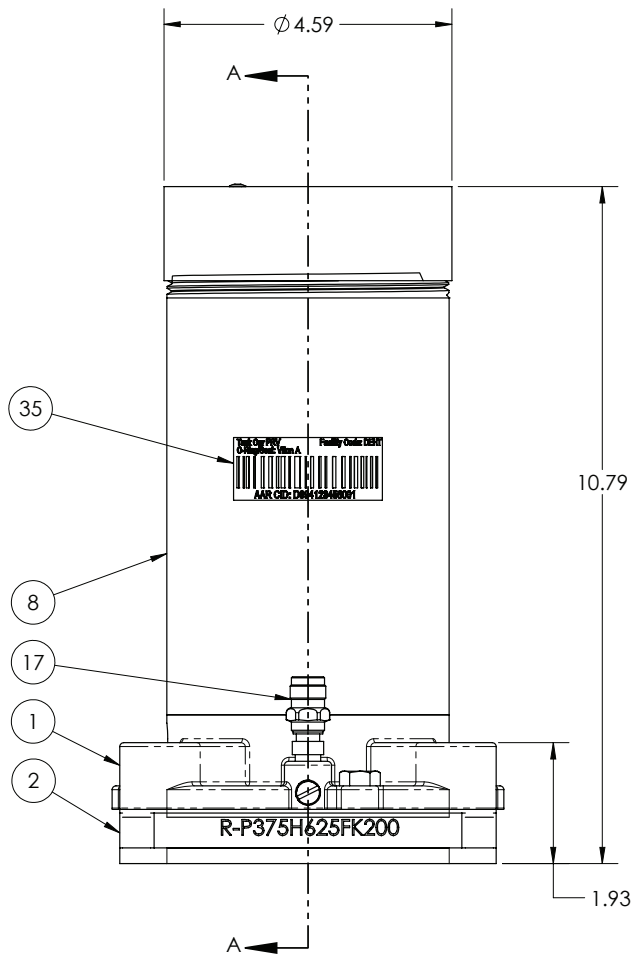
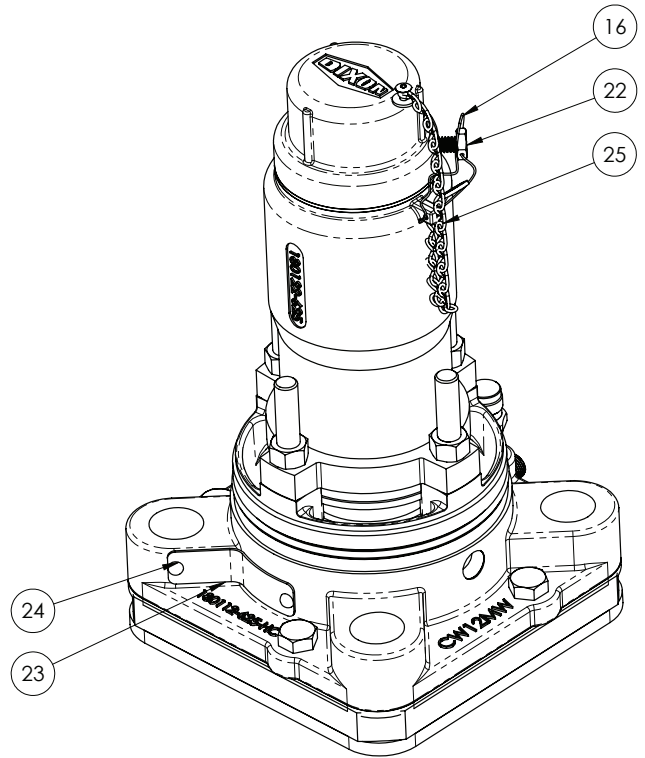
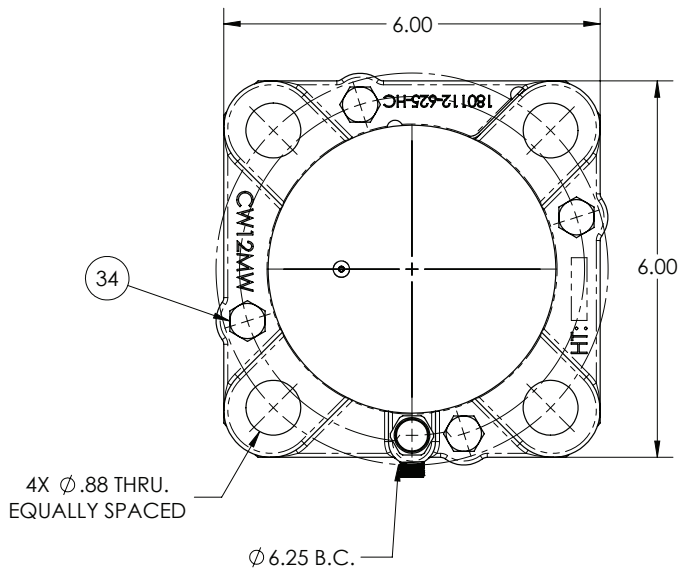


CAUTION: Incorrect Setting: Never adjust the spring compression of a valve while it is mounted on the vessel cover plate or incorrect settings may result.

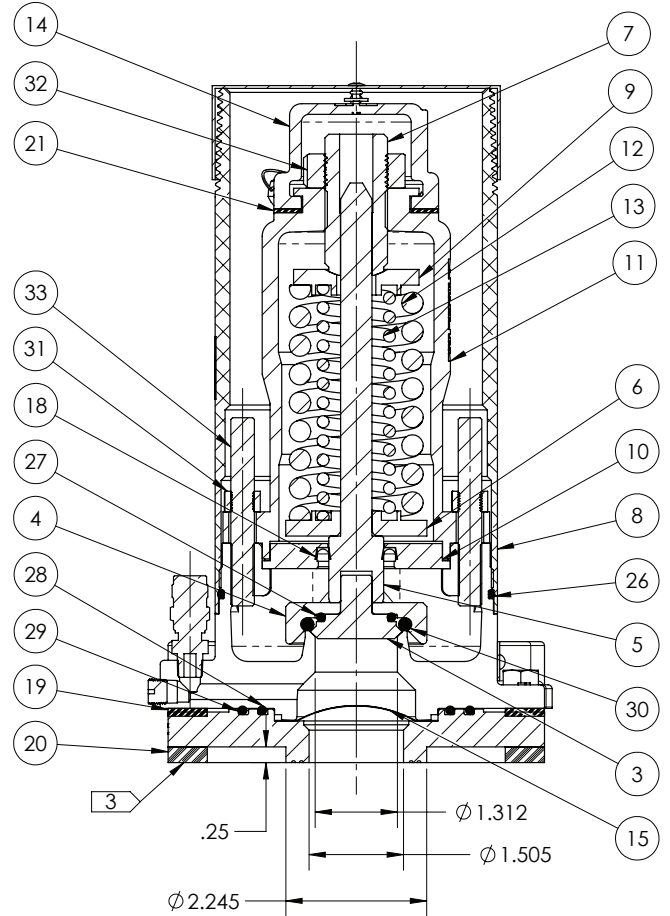


CAUTION: This is a valve containing springs under load. DO NOT attempt to disassemble or otherwise adjust the valve without first reading these instructions or injuries may result. Spring pressure must be adjusted to the minimum and a bench clamp or press used for disassembly.

Valve Introduction



VALVE COVER (ITEM 8) AND
CAP (ITEM 25) NOT SHOWN
ON THIS VIEW FOR CLARITY.



Bill of Materials

AAR Approval # PRD252108A

No.	Part #	Description	Material	Quantity
1	280013-625-HC	body	Hastelloy® C ¹	1
2	180113-625-ML	rupture disc flange	Monel® ¹	1
3	180114-625-HC	plug	Hastelloy C ¹	1
4	180115-625-HC	retainer	Hastelloy C ¹	1
5	180116-625-HC	stem	Hastelloy C ¹	1
6	180117-625-S4	guide	stainless steel	1
7	180118-625-S4	adjusting screw	stainless steel	1
8	180119-625-PV	valve cover	PVC ¹	1
9	180120-625-S4	follower	stainless steel	1
10	180121-625-ML	seal retainer	Monel ¹	1
11	180122-625-S4	top guide	stainless steel	1
12	180123-625-S7	outer spring	stainless steel	1
13	180124-625-S7	inner spring	stainless steel	1
14	180125-625-S4	cap	stainless steel	1
15	180126-625-TA	rupture disc	tantalum	1
16	180127-LD	wire seal	lead/stainless steel	1
17	180128-625-ML	purge valve	Monel	1
18	180129-625-PF	shaft seal	PTFE ¹	1
19	180130-625-VT	upper filler	FKM ¹	1
20	180131-625-VT	lower filler	FKM ¹	1
21	180132-625-FK	top gasket	FKM ¹	1
22	180133-625-S4	cap screw	stainless steel	1
23	180134-ML	nameplate	Monel	1
24	180138-S4	drive screw	stainless steel	2
25	280008-625-PE	cap/chain assembly	polyethylene/stainless steel	1
26	AS568A155VB75	O-ring, 2-155	FKM ¹	1
27	AS568A214VB75	O-ring, 2-214	FKM ¹	1
28	AS568A233VB75	O-ring, 2-233	FKM ¹	1
29	AS568A238VB75	O-ring, 2-238	FKM	1
30	AS568A324VB75	O-ring, 2-324	FKM ¹	1
31	N23824000XM400	std nut, 3/8-24	Monel ¹	4
32	N31014000T0304	jam nut	stainless steel	1
33	F13824300XK500	stud, 3/8-24	Monel ¹	4
34	F23824100X593C	hex head, 3/8-24	stainless steel	4
35	---	CID label	vinyl	1

¹ Alternate materials of construction are available as well as a flat face mounting.

Warning & Safety



Dixon® valves are designed to work safely for their intended use. Failure to know and understand the intended use or to consider the size, temperature, application, media, pressure, and manufacturers recommendations when selecting the proper valve assembly components can result in accidents and injuries, including death and serious and permanent injuries. Dixon recommends that all valve assemblies be tested in accordance with ASME and API recommendations and be inspected regularly to ensure that their use remains appropriate and that they are not damaged.

At no charge, Dixon is available to consult, train, and recommend the proper selection and application of all valves we sell. We strongly recommend that distributors and end users make use of Dixon's Testing and Recommendation Services. Contact Dixon to learn more.

Valve Installation

New valves are assembled, tested, and sealed at Dixon®. If a new valve has been left in its packaging and is less than 6 months old, it may be installed without retesting. If it is older than 6 months, it will need to be retested and qualified.

Installation Procedure and Recommended Tools

Tool	Component
1-1/4" SAE wrench	mounting stud nuts
torque wrench	mounting stud nuts
lint-free cloth	for cleaning sealing surfaces
Scotch-Brite® pad	for cleaning sealing surfaces
wire brush	for cleaning mounting stud threads

Inspect the mounting stud threads and ensure there is no damage. Inspect the cover plate and valve mounting sealing areas (e.g., tongue-and-groove or flat-faced) and ensure there are no dents or peened surfaces.

For tongue-and-groove installations:

- Inspect the groove in the cover plate. The fitment with the tongue on the valve should be very tight. Any peening of the tongue or groove edges could interfere with the proper installation of the valve. If there is damage to the groove, make any necessary corrections to meet the tolerances specified by AAR appendix E.
- Inspect the tongue of the valve (new or reconditioned) by running your fingernail around both the inner and outer edges checking for damages. The tolerances on the tongue are $\pm .003$ " so any excess material due to peening could cause the valve to not seat in the groove of the cover plate. Remove any excess material to meet the tolerances specified by the AAR.
- Install the new gasket into the groove. Ensure the gasket is seated evenly. There should be $1/16$ " of space above the gasket to allow the valve tongue to locate properly in the groove.



CAUTION: Groove Damage:

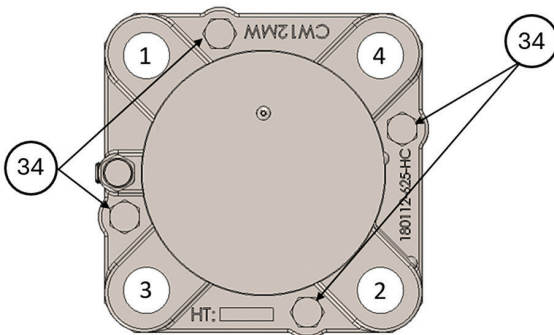
- Do not use a sharp tool to seat the gasket as damage may result.
- Verify that the valve tongue fits into the cover plate groove. Improper fit up could result in a leak and possible valve damage.
- To prevent tongue damage do not install a valve having damaged sealing surfaces.

For flat-faced flange installations:

- Ensure the underside of the valve flange and the mating area on the cover plate are defect-free and clean.

Install the mounting studs into the cover plate following your company's procedure and requirements. Use a wire brush to ensure the studs are clean and free of rust.

Mount the nuts onto the mounting studs. Using a 1-1/4" socket and torque wrench, tighten the nuts in 1/3 torque increments using the pattern shown below. Tightening torque should not exceed 200 ft-lbs.



For recommended torque values contact your gasket manufacturer.

NOTE: The four 3/8" hex head (item 34) rupture disc bolts are pre-tightened from the factory and should not require tightening. Check to ensure the bolts are tightened to 32 ft-lbs of torque.

To complete this installation process, the tank car will need to be pressurized in accordance with the tank car owner's requirements. A bubble leak test must be performed per car owner's specifications. Install wire seal (item 16) through drill head cap screw (item 22) once testing is complete.

Test all newly installed valves to conform with tank car owner specifications. No leaks should be present. Improper valve tongue seating in the groove, damaged gaskets, or loose mounting nuts may result in leaks at the cover plate mounting joint.



WARNING: Valve Leakage: Improper valve-tongue seating in the flange groove, loose nuts, and damaged gaskets may result in leaks at the valve-mounting joint.



CAUTION: Incorrect Setting: Never adjust the spring compression of a valve while it is mounted on the vessel cover plate or incorrect settings may result.

Valve Removal

Removal Procedure and Recommended Tools

Tool	Component
1-1/4" SAE wrench	mounting stud nuts
lint-free cloth	for cleaning sealing surfaces
wire brush	for cleaning sealing surfaces

1. Remove the valve by following your company's procedure for removal and securing the opening in the cover plate.
2. Using a wire brush, clean the threads of the mounting studs removing any rust or scale. The mounting nuts should move freely on the studs. Inspect the threads for any excessive wear, corrosion, or pitting. If any are found, the parts are rejectable and should be replaced.
3. Remove and dispose of any old mounting gasket material. Use care to ensure the mounting groove is not scratched or damaged.
4. Using a lint-free cloth and an appropriate solvent, clean the mounting studs as well as the sealing surfaces on the valve and cover plate.

Valve Disassembly and Inspection

During disassembly of the valve, key components of the valve must be thoroughly inspected to ensure a properly operating valve after re-assembly. These components are listed in section 5.2 and the inspection requirements. Inspection includes looking for cracks, excessive wear, and other potential issues as described in more detail in the steps below. All O-rings, gaskets, and wire seals must be replaced during reassembly. Dixon® also recommends replacing the rupture disc, and nuts and bolts during disassembly.

Per the requirements by the AAR, all inspection, testing, and resetting of pressure relief valves must follow the procedures developed by an ANST Level III Technician and be performed by a Non-Destructive Testing (NDT) qualified operator. See AAR M-1002 appendix D "Retest and Qualification Requirements" and appendix T "Nondestructive Examination". Additionally, all maintenance activity for this valve must be performed by an AAR M-1003 certified repair facility.

NOTICE: Machining is not allowed without consent from Dixon or the car owner. Machining, grinding, welding, or other alterations to the valve seat or stem is not allowed per AAR M-1002, Paragraph A3.11.1 of the tank car specifications.

NOTICE: Repair work is limited to cleaning and polishing without consent from the valve manufacturer or car owner. See AAR M-1002, Paragraph A3.11.1 of the tank car specifications.

Valve Disassembly Recommended Tools

SAE Wrenches	Component(s)/Description	Item #
9/16"	bolts for rupture disc flange and top guide	34
1-1/2 "	adjusting screw jam nut	32
3/4"	adjusting screw	7
1/2"	purge valve	17

Other Tools, Equipment, and Supplies	Component(s)/Description	Item #
spring compression press	spring	12, 13
non-scratching tool to remove O-rings	O-rings	26, 27, 28, 29, 30
9/16" socket	rupture disc flange bolts	34
side cutters	wire seals	16
PTFE grease (Krytox® GPL204 or equivalent)*	stem	5

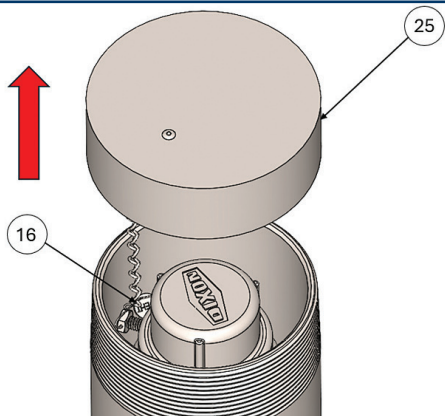
*Ensure compatibility of grease with the lading.

- Per AAR M-1002 appendix D paragraph 3.10, all wire seals and elastomers must always be replaced during servicing. Nuts and bolts must be closely inspected before any possible reuse. All valve components such as the spring follower, valve body, and top guide must be thoroughly inspected.
- Valve disassembly should only be performed by trained personnel with access to proper tools, equipment, procedures, and personal protective equipment (PPE).



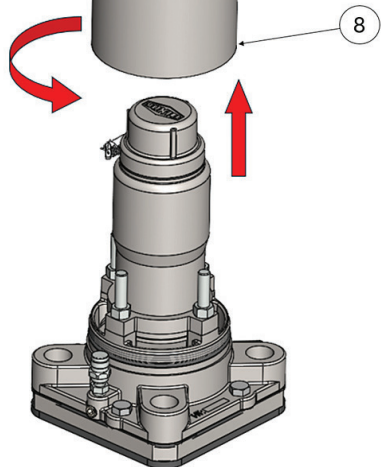
CAUTION: This is a valve containing springs under load. DO NOT attempt to disassemble or otherwise adjust the valve without first reading these instructions or injuries may result. Spring pressure must be adjusted to the minimum and a bench clamp or press used for disassembly.

1.



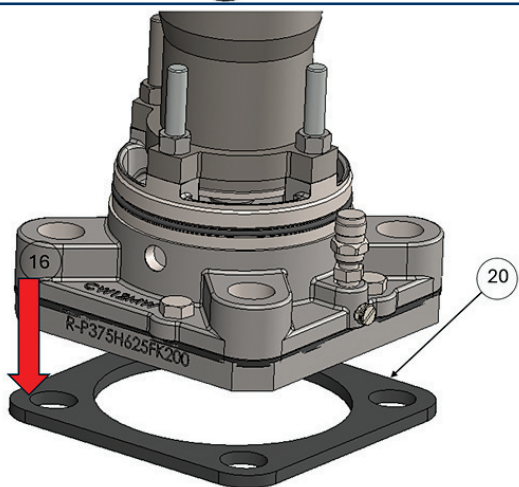
Remove the protective cap (item 25) and cut the seal wire (item 16) to release the cap chain.

2.



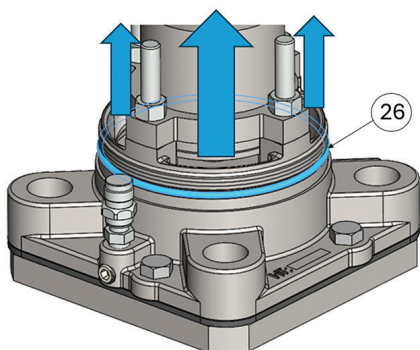
Unscrew and remove the valve cover (item 8) from around the valve.

3.



If present, remove the lower filler (item 20) and plastic protector from the base or tongue of the valve.

4.



Remove the valve cover O-ring (item 26).
The vent area of the valve body must be unobstructed by foreign matter that would hinder free flow of discharging fluid. Vent area is shown by blue arrows.

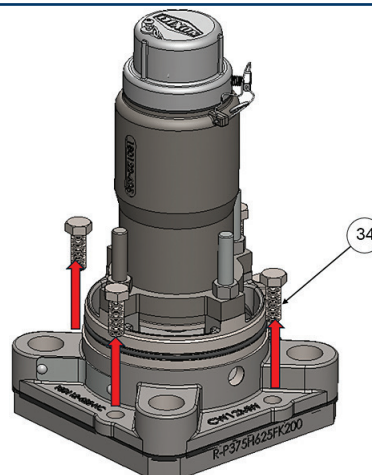
5.

Using a 9/16" socket, remove the four rupture disc flange bolts (item 34) from the valve base.

All threaded components such as bolts and nuts must be thoroughly inspected and cleaned or replaced.



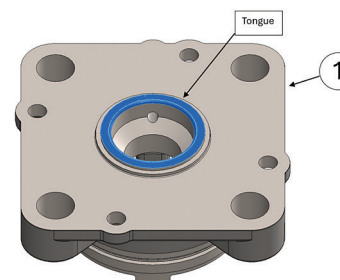
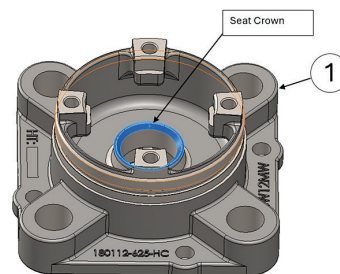
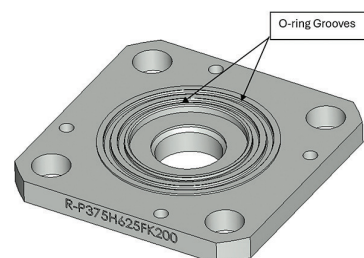
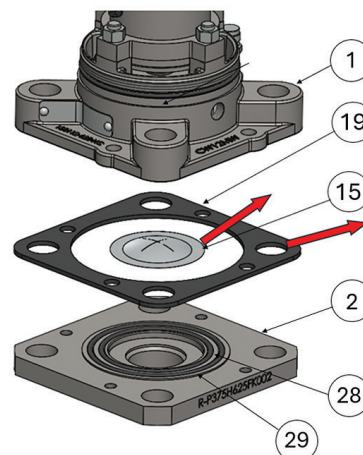
CAUTION: Handle valve body and rupture disc flange carefully after disassembly. Avoid allowing their machined surfaces to contact metal benchwork and hand tools to avoid scratching or damaging the parts.



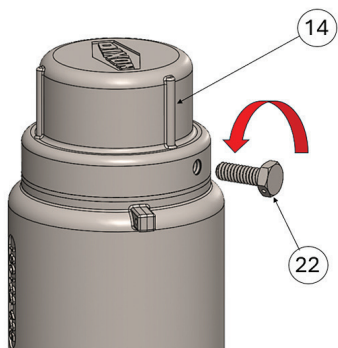
6.

Separate the rupture disc flange (item 2) from the valve body (item 1). Remove the rupture disc (item 15) and upper filler (item 19). Examine the upper filler (item 19). If excessively worn, discard the upper filler.

- Examine the rupture disc (item 15) for nicks, damage, corrosion, or signs of stretching. If any defects are observed, discard the rupture disc. Dixon® recommends replacing the rupture disc at disassembly.
- Remove and discard the two O-rings (items 28 & 29) from the rupture disc flange (item 2).
- Examine the rupture disc flange (item 2) sealing surfaces. Look very carefully at the top surface of the rupture disc flange that holds the disc. Clean both O-ring grooves using 400 grit emery cloth (minimum) then wipe clean using a lint-free cloth and a suitable solvent. Repair is limited to cleaning only. If any nicks, gouges, or surface imperfections are found, the part must be replaced. No machining, grinding, welding, or other modifications are allowed except by the manufacturer. (See AAR M-1002 Appendix A Paragraph 3.11.1).
- Examine the tongue on the underside of the rupture disc flange (item 2). Inspect the tongue of the rupture disc flange by running your fingernail around both the inner and outer edges checking for damages. The tolerances on the tongue are $\pm .003$ " so any excess material due to peening could cause the valve to not seat in the groove of the cover plate. If there is damage to the tongue, make any necessary corrections to meet the tolerances specified in AAR M-1002 Appendix E.
- Examine the valve body (item 1) sealing surfaces. This is the crown of seat. Clean seat of the valve body using 400 grit emery cloth (minimum) then wipe clean using a lint-free cloth and a suitable solvent. Run your fingernail across the sealing surfaces to detect any flaws. Repair is limited to cleaning only. If any nicks, gouges, or surface imperfections are found, the part must be replaced. No machining, grinding, welding, or other modifications are allowed except by the manufacturer. (See AAR M-1002 Appendix A Paragraph 3.11.1).
- Examine the tongue on the underside of the valve body flange carefully. Clean the tongue of the valve body using 400 grit emery cloth (minimum) then wipe clean using a lint-free cloth and a suitable solvent. Run your fingernail around both the inner and outer edges checking for damage. Repair is limited to cleaning only. If any nicks, gouges, peening, or other damage is found, the part must be replaced. No machining, grinding, welding, or other modifications are allowed except by the manufacturer. (See AAR M-1002 Appendix A Paragraph 3.11.1).



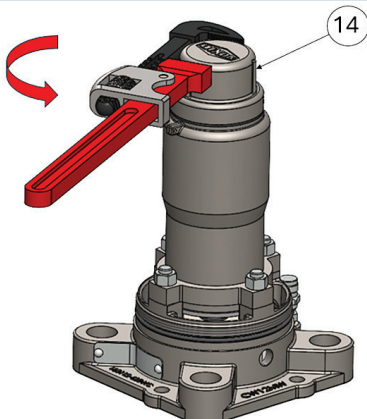
7.



Cut the set screw seal wire (item 16) and loosen the set screw (item 22) securing the cap (item 14). If the set screw seal is cut or absent, the valve may have been tampered with. Notify the valve owner.

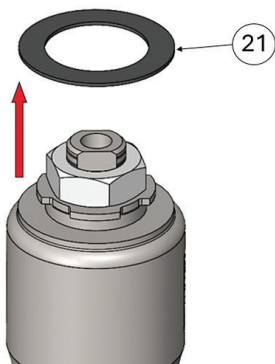
All threaded components such as bolts and nuts must be thoroughly inspected and cleaned or replaced. Inspect the threads for any sign of excessive wear, corrosion, pitting, or other defects. If any are found the part is rejected and must be replaced.

8.



Use a pipe wrench and unscrew the cap (item 14) as shown at left. Remove the cap.

9.

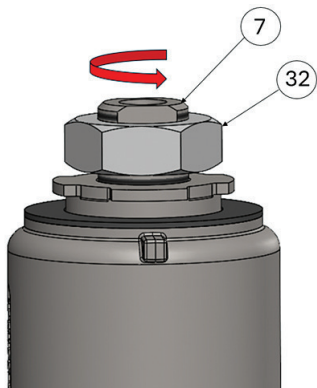


Remove the top gasket (item 21).



WARNING: To avoid personal injury or product damage, the following steps must be performed by certified and trained personnel only.

10.



Loosen the jam nut (item 32) one turn counterclockwise. Loosen the adjusting screw (item 7) until it can be easily rotated (is at minimum adjustment limit).

11.

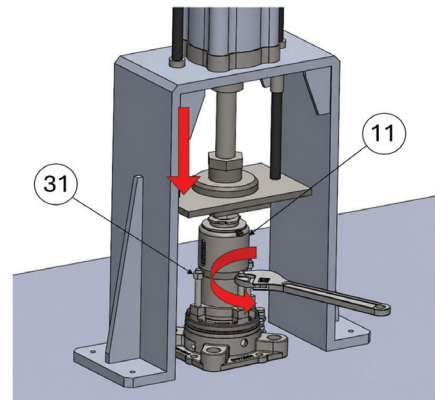
Place the valve assembly into a press with a locking bench clamp or cylinder and apply pressure to the adjusting screw (item 7) while clamped, remove the four stud nuts (item 31) securing the top guide (item 11) to the valve body (item 1).



CAUTION: When clamping the valve, place a hard rubber pad under the valve body (item 1) to prevent damage to the sealing surface on the underside of the valve body.

All threaded components such as bolts and nuts must be thoroughly inspected and cleaned or replaced. Inspect the threads for any sign of excessive wear, corrosion, pitting or other defects. If any are found the part is rejected and must be replaced.

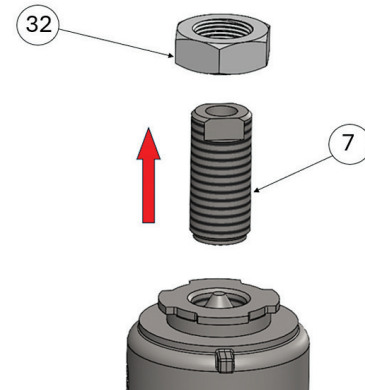
Slowly release the press piston to slowly relieve the spring compression. (Located inside the guide (item 11)), allow the spring to fully expand. Once the spring is no longer compressed, lift the top guide (item 11) off the valve body (item 1).



12.

Remove the adjusting screw (item 7) and jam nut (item 32) from the top guide (item 11).

Adjusting screw and jam nut (item 32) threads – the threads of the adjusting screw should be clean and lightly lubricated. Inspect the threads for any sign of excessive wear, corrosion, pitting, or other defects. If any are found the part is rejected and must be replaced.



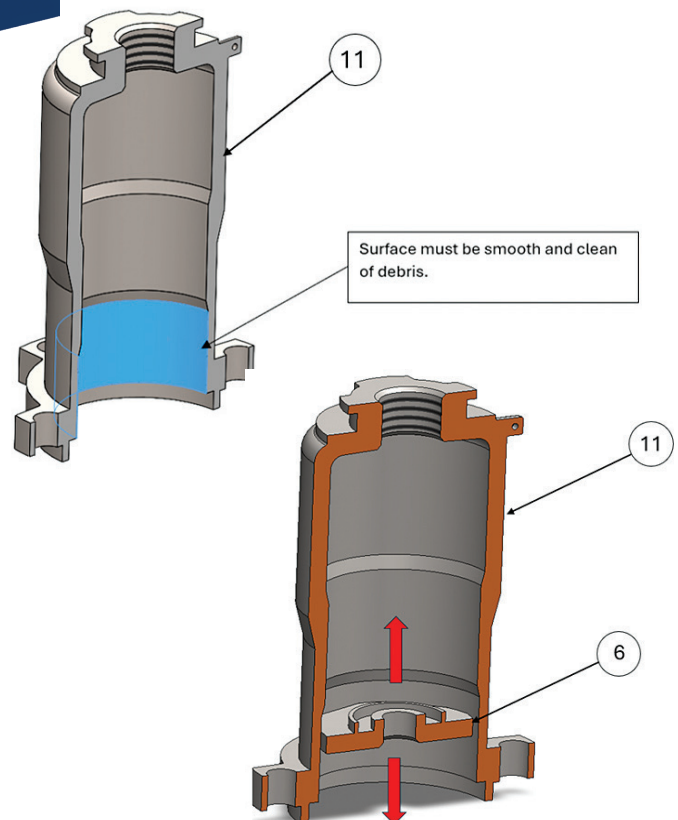
13.

Remove the top guide (item 11) from the valve assembly. Inspect the top guide – the top guide protects the internal components and provides a guide for the springs. There should be no paint on the inside of the top guide (item 11). Examine the inner surfaces and look for dents or gouges. Run your fingernail across the sealing surfaces to detect any flaws. Repair any damage or remove any corrosion by lightly sanding the inside surface of the top guide (item 11) to allow free movement of the guide (item 6).

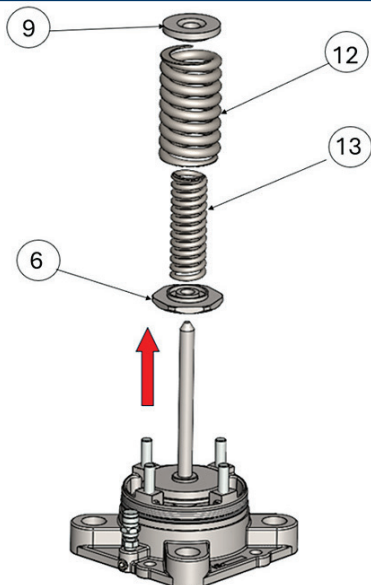
Remove the guide (guide for spring item 6). Inspect the guide (item 6) – this part has guides on its outer edges. Move it up and down the length of the top guide as indicated below. The outer edges of the guide (item 6) should be smooth and free of nicks or gouges. Repair any damage or remove any corrosion by lightly sanding the surface to allow free movement of the guide (item 6).



WARNING: If the spring guide binds in the top guide bore, the valve may stick in the open position or be prevented from opening. Always ensure free travel of the spring guide before reassembling the valve.



14.



Remove the follower (item 9), outer spring (item 12), and inner spring (item 13).

Test the springs by pressing the spring to the specified test height for 2 minutes. Remove from the press and then measure the spring free height. If free height is less than the minimum indicated in table below, replace the spring.



WARNING: Coil springs that have taken a "set," resulting in an undersized free height, will not allow the valve to open fully.



WARNING: Defects in coil springs, such as cracks and corrosion pits, can act as stress concentrators. Failure to detect these defects can result in coil spring breakage and uncontrolled valve venting. Additionally, the spring should not be bowed more than 1/4" when assembled in the valve. Bowing in excess of this amount could cause the springs to rub against each other and/or the inside wall of the guide tube and adversely affect the start to discharge or flowing performance. If any of the above defects are observed the spring must be replaced.



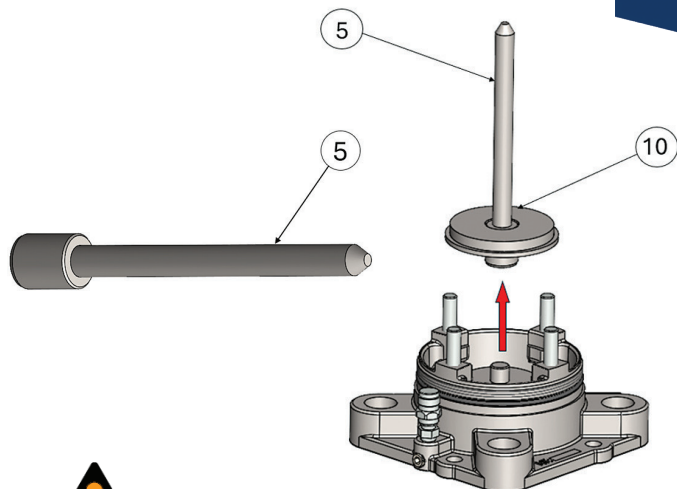
CAUTION: The springs (item 12 and item 13) are highly stressed parts of the assembly. The exterior surface must be free of cracks and corrosion pitting. Magnetic particle or dye-penetrant inspection (performed by certified personnel) can be used to evaluate the exterior surfaces and ensure that they are free of cracks and corrosion pits. If any excessive wear over 0.030" of the area is measured, the spring is rejectable and must be replaced.



CAUTION: Insufficient valve travel: Test the springs by placing them in a press and compressing them the specified test height for two minutes. Remove from the press and then measure the free height of the spring. If free height is less than the minimum indicated in the table below the spring must be replaced. Coil springs that have taken a "set" and now have an undersized free height, may not allow the valve to open fully. Additionally, the spring should not be bowed more than 1/4" when assembled in the valve. Bowing in excess of this amount could cause the spring to rub against the inside wall of the guide tube and adversely affect the start to discharge or flowing performance. If any of the above defects are observed the spring must be replaced.

Spring Part#	Wire Size (REF)	Test Height	Minimum Free Height
180123-625-S4	0.343"	3.38"	4.85"
180124-625-S4	0.192"		

15.



Lift the stem (item 5) and seal retainer (item 10) out of the assembly.

Examine the valve stem (item 5) – inspect the stem for nicks, gouges, corrosion, or pitting. If any is found, it is cause for rejection, as it may indicate more severe corrosion or the start of more difficult-to-detect cracking. Clean the stem with 400 grit emery cloth (minimum) and then wipe it clean using a lint-free cloth and suitable solvent.

The valve stem must be straight with total run out less than 0.010" (maximum). If the measurements are greater than the allowable maximum, the part must be replaced.



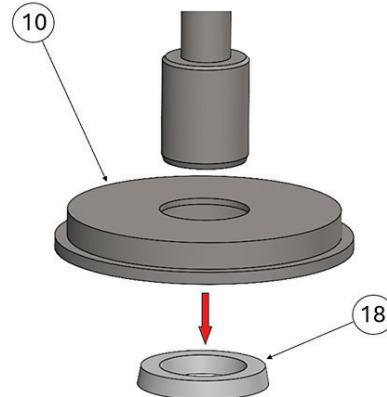
WARNING: Valve-stem straightening: Straightening of the stem by bending it in a press may result in the buildup of uneven stresses in the stem, which may result in valve malfunction.



WARNING: Valve-stem failure: Cracks and corrosion of pressure relief valve stems can result in stem failure and uncontrolled venting.

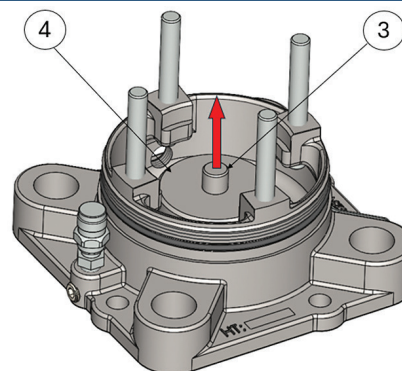
16.

Remove the shaft seal (item 18) from the seal retainer (item 10). Discard the shaft seal (item 18).



17.

Remove the retainer (item 4).



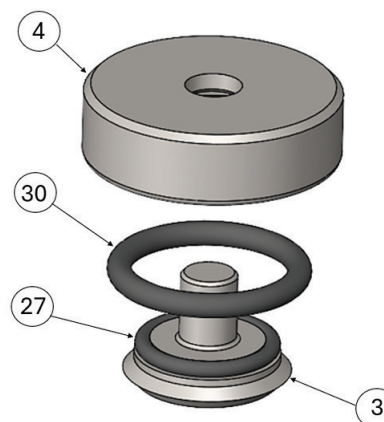
18.

Remove the plug (item 3) from the retainer (item 4). Remove and discard the two O-rings (item 27 and 30) from the retainer (item 4).



CAUTION: Remove the O-rings (item 27 and 30) from the retainer using only a non-scratching tool to prevent damage to O-ring grooves.

Inspect the retainer (item 4) groove and plug (item 3) O-ring sealing surfaces. Clean these surfaces using 400 grit emery cloth (minimum) then wipe clean using a lint-free cloth and a suitable solvent. Run your fingernail across the sealing surfaces to detect any flaws. Repair is limited to cleaning only. If any nicks, gouges, or surface imperfections are found, the part must be replaced. No machining, grinding, welding, or other modifications are allowed except by the manufacturer. (See AAR M-1002 Appendix A Paragraph 3.11.1).



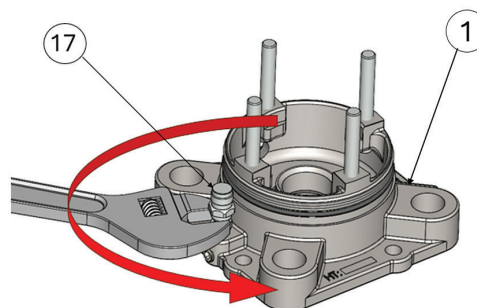
19.

Unscrew and remove the purge valve (item 17) from the valve body (item 1).

Inspect the threads and operation of the purge valve (item 17). Clean the threads. Check that the valve easily opens and closes. If the threads show any sign of excessive wear, corrosion, pitting, or other defects or if the purge valve does not operate smoothly, the purge valve must be rejected and replaced.

Examine the rupture disc for nicks, damage, or any signs of stretching. Replace the disc if any defects are observed.

O-rings – these must be replaced at the time of the periodic valve retest and when the valve is disassembled.



CAUTION: O-rings develop micro cracks, can swell or shrink, and become harder or softer with age and chemical exposure. An O-ring that fits loosely in the cap, or can only be pushed into the O-ring retainer with difficulty, is quite likely not the correct size.



CAUTION: If any parts appear defective, it is recommended they be replaced, or consult with Dixon® for recommended repair techniques when applicable.

Valve Reassembly and Requalification

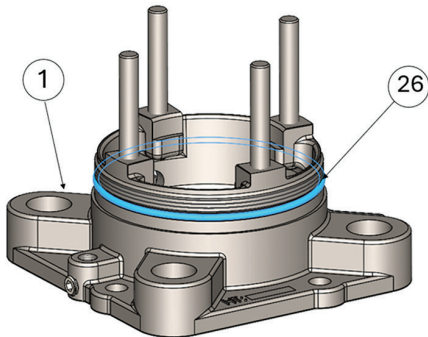
SAE Wrenches	Component(s)/Description	Item #	Torque (ft-lb)
9/16"	nuts for top guide	31	---
1-1/2"	jam nut for spring adjustment	32	---
3/4"	spring adjustment screw	7	---

Other Tools, Equipment, and Supplies	Component(s)/Description	Item #	Torque (ft-lb)
spring compression press	springs	12 and 13	--
torque wrench	torque fasteners to specification	---	32-85
9/16" socket	torquing rupture disc flange bolts	34	32
1-1/2 socket or crowsfoot	torquing jam nut for spring adjustment	32	85
9/16" crowsfoot	torquing top guide nuts	31	32
adjustable wrench	adjusting screw	7	---
PTFE grease (Krytox® GPL204 or equivalent)	adjusting screw and fasteners.	---	--



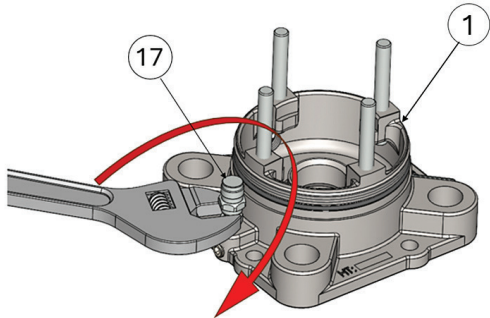
CAUTION: Handle the valve body carefully and ensure the rupture disc sealing face is protected during assembly.

1.



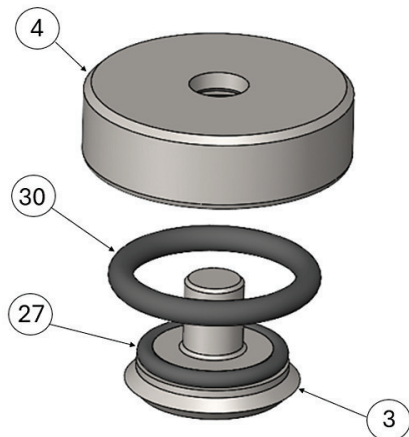
Place valve body (item 1) onto a work bench and install the valve cover O-ring (item 26).

2.



Install the purge valve (item 17). Use Teflon® tape and/or a fluid compatible thread sealant.

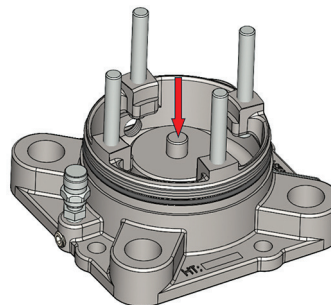
3.



Install O-ring (item 30) into the groove on the retainer (item 4). Place O-ring (item 27) around the plug (item 3). New O-rings must be installed. Install the plug (item 3) into the retainer (item 4).

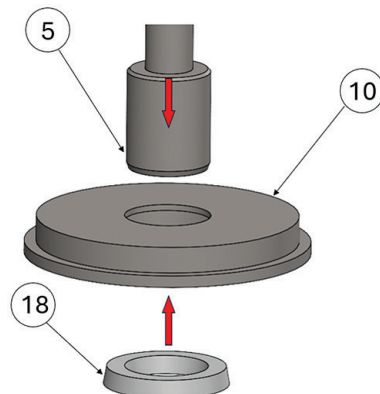
4.

Install the retainer and plug into the valve body.



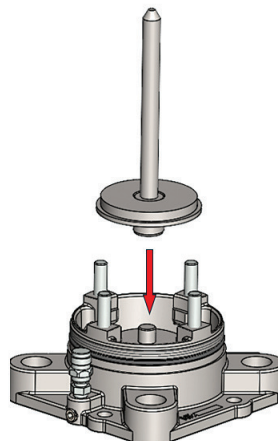
5.

Install the shaft seal (item 18) into the seal retainer (item 10). Install the stem (item 5) into the seal retainer in the direction shown after the shaft seal has been seated properly.



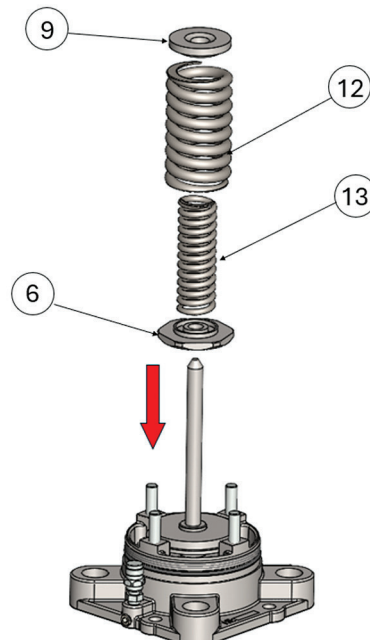
6.

Install the stem and seal retainer assembly into the valve body.

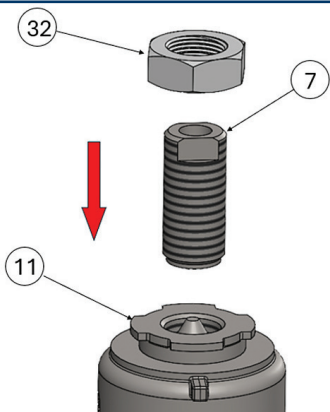


7.

Install the guide (item 6), inner and outer spring (item 12 and 13), and the spring follower (Item 9).

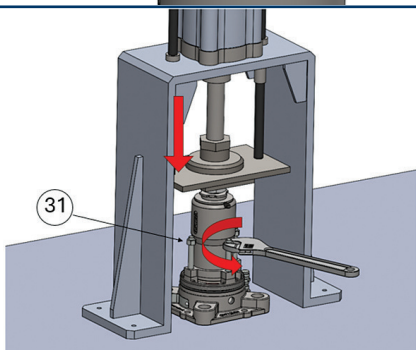


8.



Install adjusting screw (item 7) and jam nut (item 32) into the top guide (item 11). Do not tighten jam nut. Thread the adjusting screw so that about 0.86" is above the top surface of the top guide.

9.

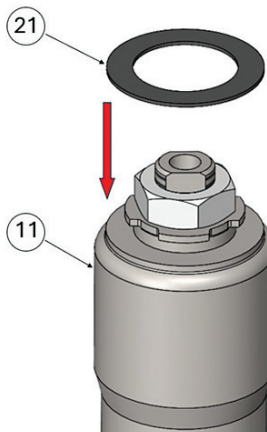


Install the top guide assembly using a bench clamp to tighten all four stud nuts (item 31). Torque to 32 ft-lbs.



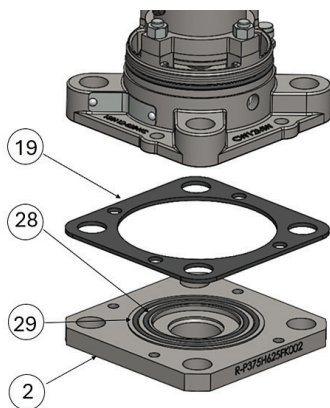
CAUTION: When clamping the valve, place a hard rubber pad under the valve body to prevent damage to the sealing surface on the underside of the valve body.

10.



Install the top gasket (item 21) on top of the top guide (item 11).

11./12.



Next, pressure test and perform the valve adjustment procedure. Do not install the rupture disc flange (item 2). Refer to start-to-discharge and vapor tight test process to set the valve start-to-discharge and vapor tight pressure before proceeding with the assembly procedure of the valve.

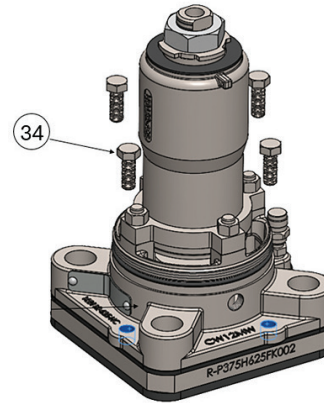
Once the start-to-discharge and vapor tight test process is complete, install both O-rings (item 28 and 29) onto the rupture disc flange (item 2). Install the upper filler gasket (item 19) and carefully install the valve body assembly.



CAUTION: Do not install rupture disc until the vapor and start-to-discharge pressures have been set.

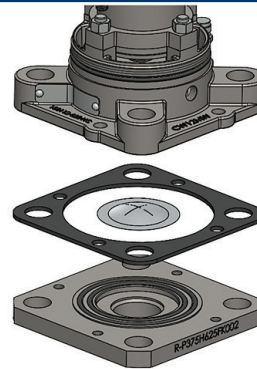
13.

Install the four hex head bolts (item 34) and torque to 32 ft-lbs.



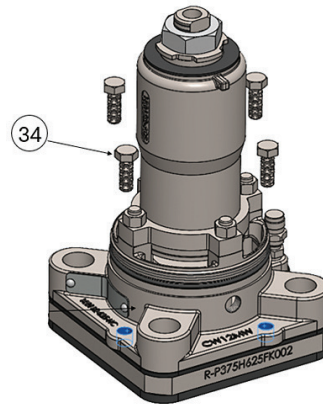
14.

Remove the four rupture disc flange bolts and ensure the rupture disc area is clean of any debris. Install the rupture disc, ensure the "TOP" mark on the rupture disc is facing the top of the valve.



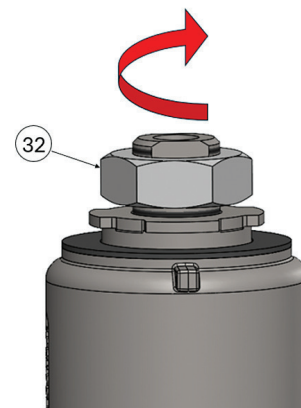
15.

Re-install the four hex head bolts (item 34) on the rupture disc flange and torque to 32 ft-lbs.

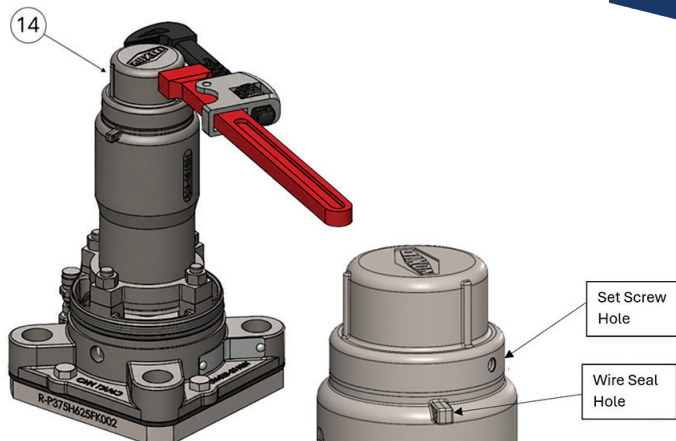


16.

Tighten the lock nut (item 32) on the top guide to 85 ft-lbs.

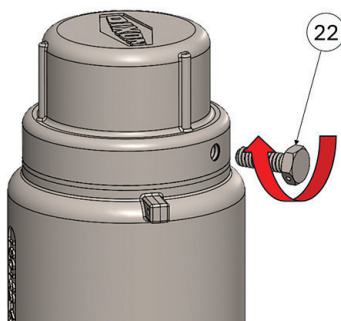


17.



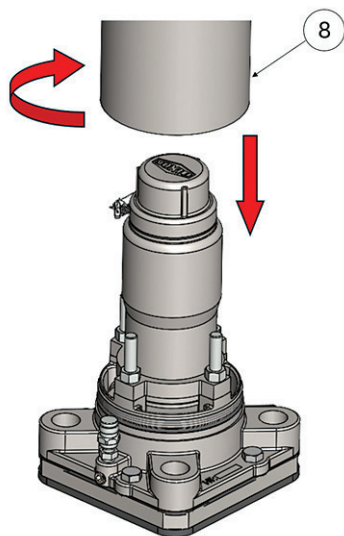
Install the cap (item 14).
Ensure the set screw hole and the wire seal hole are oriented as shown at left.

18.



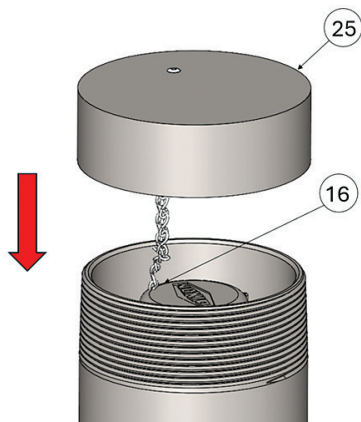
Install the set screw (item 22).

19.



Install the valve cover (item 8) and thread until it bottoms out on the valve body. Ensure O-ring is not pushed off by valve cover.

20.



Get cap/chain assembly (item 25) close enough to the valve body to secure the chain with a wire and lead seal (item 16). Then install the cap/chain assembly.

Start-to-Discharge and Vapor Tight Test Process



CAUTION: Safety protection: Always wear appropriate personal protective equipment (PPE) when conducting this procedure. This includes but is not limited to safety glasses or face shield. And protective clothing. Valve testing involves high velocity air and water flow that can cause injury.

Refer to AAR publication "Regulations for Tank Cars". Appendix A applies specifically to valves. This section prescribes the start-to-discharge (STD) and vapor-tight pressures (VTP) and their tolerances. A "popping pressure" is not specified. STD is defined as a continuous leak pressure in contrast to the start-to-leak pressure which is defined as the first bubble leak.

Vapor-tight is defined as the pressure at which no bubbles are detected after the valve has opened/relieved. Dixon® recommends that no bubbles be observed for at least two minutes at vapor-tight.

Valve Pressure Testing Procedure

Pressure Relief Valve testing procedures must comply and meet the requirements specified in M-1002 C-III Appendix D 4.0 Pressure Relief and Hydrostatic Testing. Your company's test procedure(s) must be developed by an ANST Level III Technician and be performed by a Non-Destructive Testing (NDT) qualified operator. See AAR Appendix T "Nondestructive Examination". The pressure gauge must meet the requirements per AAR M-1002 Appendix D 4.2 Test Gauge Standards and must be date-tagged. Additionally, all maintenance activity for this valve must be performed by an AAR M-1003 certified repair facility.

Follow your company's requirements for safety and personal protection equipment (PPE).

1.

1. Install the valve on the test fixture and alternately tighten all the mounting nuts. Next seal the drain channels in the side of the valve body with plumbers' putty or a similar material.
2. Fill the valve body with water to allow bubble detection at the valve seat. Take a position that allows observation of both the valve seat as well as the pressure gauge.
3. Slowly increase the test air pressure until the valve start-to-discharge (STD) is reached. Note, the initial opening of the valve may be slightly higher than listed in the table below and not indicative of the actual STD because the O-ring may have been partially stuck to the valve seat. Actuate the valve 2-3 times by increasing and relieving pressure to ensure there is no O-ring stiction.



CAUTION: Do not look directly into the valve as water and other debris may discharge upwards.

4. Observe the STD pressure and then slowly bleed pressure and observe the VTP.

STD Settings $\pm$ 3% (PSIG)	VTP Settings Minimum (PSIG)
351	300

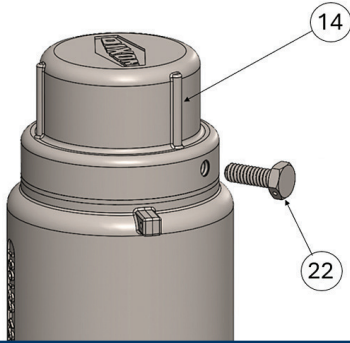
5. Repeat this procedure to ensure consistent valve performance. Both the STD and VTP should be consistent. Note that the actual STD for a valve with good condition sealing surface and new O-rings should exhibit a VTP well above the VTP settings in the table above. Typical VTP can be up to 95% of the STD. If both STD and VTP are consistent and in tolerance, record both values.

If the STD and VTP results are not consistent, follow the Valve-Setting Adjustment Procedure.

Valve-Setting Adjustment Procedure

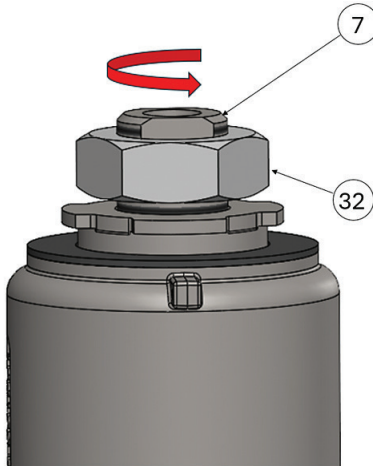
If your company has an approved test procedure, follow it. If not, the following procedure provides essential guidelines regarding pressure testing.

1.



Remove the wire seal from the top guide (item 11) and set screw (item 22). Remove the cap (item 14) to expose the jam nut (item 32) and adjustment screw (item 7). Note, if you are continuing from the Valve Reassembly and Requalification procedure, the cap has already been removed.

2.



Using a wrench loosen the locknut (item 32) from the adjustment nut (item 7).

Loosen the spring adjustment screw (item 7) two turns (counterclockwise).

Tighten the jam nut (item 32) to lock the setting. Make sure that the spring adjustment screw does not rotate when tightening the jam nut (item 32).

Retest the valve STD and determine how much pressure change occurred when the Adjusting Screw was loosened two turns. Using the change in pressure divided by the linear distance change of the Adjustment Screw, this should provide a rate of pressure change vs Adjustment Screw travel to help find the proper Adjustment Screw setting to achieve the desired STD. Re-compress the valve spring and alter the Adjustment Screw (item 7) to achieve the midpoint in the STD tolerance range.

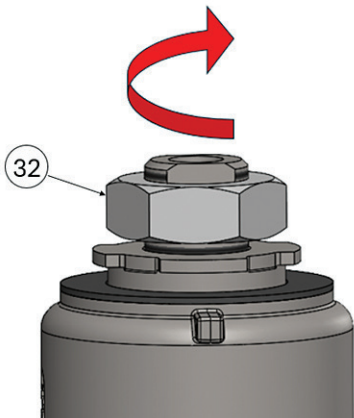


CAUTION: Since all nickel bearing stainless steels are susceptible to galling, wrenching the adjustment nut without first relieving the spring load will frequently result in thread damage. Inspect the threads for any excessive wear, corrosion, pitting, or other defects. If any defects are found the part is rejectable and must be replaced.

Retest the valve.

If the results are erratic, troubleshooting is more complex. Consult your supervisor or a Dixon® representative.

3.

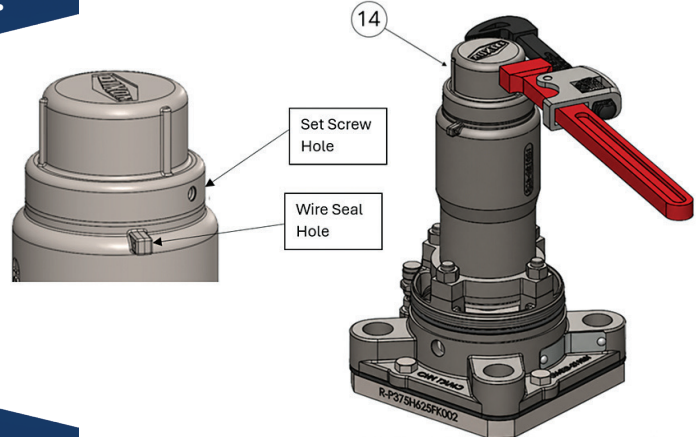


When the test results are acceptable, tighten the jam nut (item 32) to 85 ft-lbs.

4.

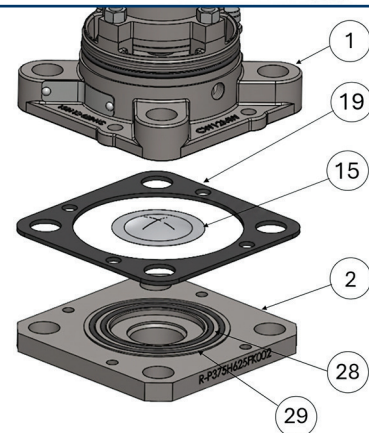
Reinstall the valve cap, tighten the set screw, and install a new wire seal through the cap set screw hole. Reinstall the valve cover and the protective cap.

Ensure the set screw hole and the wire seal hole are oriented as shown at right.



5.

Install the two O-rings (items 28 and 29) in the rupture disc flange (item 2). Install the upper filler (item 19) and the rupture disc (item 15) as shown making sure the disc and mounting flange are in serviceable condition as specified in valve disassembly and inspection section, step 6 (see page 9). Install the rupture disc flange bolts and torque to 32 ft-lbs in a star pattern. Record the serial number of the rupture disc.



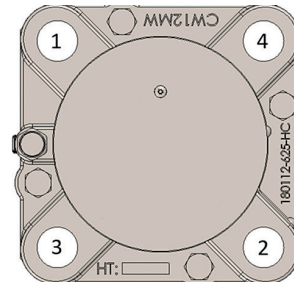
CAUTION: Rupture discs are made of very thin metallic sheets. Handle the disc only by their edges as to not dent them.



WARNING: Cocking the rupture disc flange will cause the body-to-disc flange joint to leak.

6.

Install the assembled combination valve on the test stand and bolt in place. Screw the mounting stud nuts down evenly using the pattern shown.



7.

If there is a purge valve (item 17), open the purge valve. This is necessary to equalize pressure in the test stand to 50% of the disc burst pressure.



WARNING: DO NOT permit the pressure to exceed 60% of the disc rating or the disc may be damaged or distorted. If the disc is rated at **375 PSI**, do not allow pressure to exceed **225 PSI**.

Using a soap and water solution (e.g. Snoop) squirt the solution over the purge valve (item 17) outlet and around the circumference of the flange joint. A bubble may form initially.

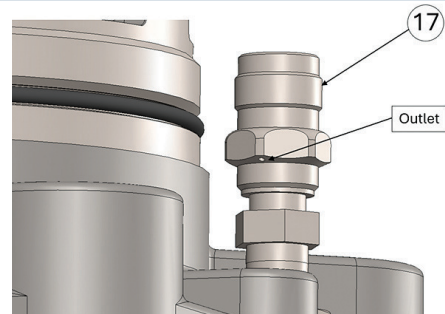
This is most likely from the disc slightly deforming upwards and displacing air in the chamber above it. After two minutes, if there is no change in the size of the soap bubble, slowly vent the pressure from the test stand and unmount the valve.

If the soap bubble on the purge valve continues to grow or has a continuous stream of bubbles, a pressure leak through the disc is indicated. Vent the pressure from the test stand, unmount the valve, and unscrew the bolts securing the rupture disc flange.

Inspect the disc crown for a crack or pinhole leak where the crown meets the flat part of the disc. Hold the disc up to a light to detect defects. Also look at the flat flange radial seating surface for creases or small bumps that could be leak paths. Since the disc is the most fragile part of the assembly, imperfections in any of the parts may be most easily seen in the disc. Also, inspect the disc flange and mating surface on the underside of the valve body for any imperfection.

If there is any imperfection in the disc, it cannot be used. Replace it. If there is no visible cause for the leak, consult with your supervisor or with a Dixon® representative.

Close the purge valve.



Post Test Procedure and Final Check Before Reinstallation

1. After testing the valve, close the pressure inlet valve to the test chamber, and vent the pressure in the test stand. Remove putty and drain water. Then remove the valve from the test fixture.
2. Wipe or blow away any remaining soap suds and water used in the testing.
3. Install a plastic protector over the Valve Body Tongue to prevent tongue damage.



WARNING: Tongue Damage: A damaged valve tongue may prevent proper sealing to the tank-car cover plate and may result in leakage of the tank contents.

4. If applying a preservative or paint to the exterior surfaces of the valve, be sure to mask the nameplate so that it will be readable afterward.



CAUTION: Mounting interface: DO NOT apply preservatives or paint the sealing surfaces of the valve. This could impede proper sealing resulting in leaks. Permanently attach a metal tag to the valve body with repair/test date, repair facility identification, and technician ID.

5. Store the valve in a clean, dry place until ready to use.

Routine Maintenance

It is essential to establish a periodic retesting and preventative program for pressure relief valves. The DOT and AAR have set forth a retesting interval that should be considered the maximum length of time between tests. If your company's experience indicates a shorter interval is advisable, a program with more frequent retesting should be implemented.

Per AAR M-1002 Appendix D Paragraph 3.10, all wire seals and elastomers must always be replaced during servicing

Emergency Response for Leaking Valve

Emergency response is the temporary remediation to a valve observed to be releasing product in an unintended manner. It is possible to replace the O-Rings on an internal style pressure relief valve installed on a pressurized tank car. Leak repair is a temporary measure, once the car is unloaded and pressure is relieved, the valve should be removed for a complete inspection and repair, and qualification to the car owner's standard qualification and maintenance program. Leak repairs are unscheduled and not part of regular maintenance. This manual is not intended to provide all the information necessary to complete emergency maintenance. Personnel must be specifically trained and qualified in hazmat procedures before attempting to service a leaking valve.

Limited Warranty

DIXON VALVE AND COUPLING COMPANY, LLC (herein called "Dixon") warrants the products described herein and manufactured by Dixon to be free from defects in material and workmanship for a period of one (1) year from date of shipment by Dixon under normal use and service. Its sole obligation under this warranty being limited to repairing or replacing, as hereinafter provided, at its option any product found to Dixon's satisfaction to be defective upon examination by it, provided that such product shall be returned for inspection to Dixon's factory within three (3) months after discovery of the defect. The repair or replacement of defective products will be made without charge for parts or labor. This warranty shall not apply to: (a) parts or products not manufactured by Dixon, the warranty of such items being limited to the actual warranty extended to Dixon by its supplier; (b) any product that has been subject to abuse, negligence, accident, or misapplication; (c) any product altered or repaired by others than Dixon; and (d) to normal maintenance services and the replacement of service items (such as washers, gaskets, and lubricants) made in connection with such services. To the extent permitted by law, this limited warranty shall extend only to the buyer and any other person reasonably expected to use or consume the goods who is injured in person by any breach of the warranty. No action may be brought against Dixon for an alleged breach of warranty unless such action is instituted within one (1) year from the date the cause of action accrues. This limited warranty shall be construed and enforced to the fullest extent allowable by applicable law.

Other than the obligation of Dixon set forth herein, Dixon disclaims all warranties, express or implied, including but not limited to any implied warranties of merchantability or fitness for a particular purpose, and any other obligation or liability. The foregoing constitutes Dixon's sole obligation with respect to damages, whether direct, incidental or consequential, resulting from the use or performance of the product.

Some products and sizes may be discontinued when stock is depleted or may require a minimum quantity for ordering.

The Right Connection®

Dixon®

1 Dixon Square
Chestertown, MD 21620
Phone: 877-963-4966
Fax: 800-283-4966
Email: sales@dixonvalve.com
dixonvalve.com

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