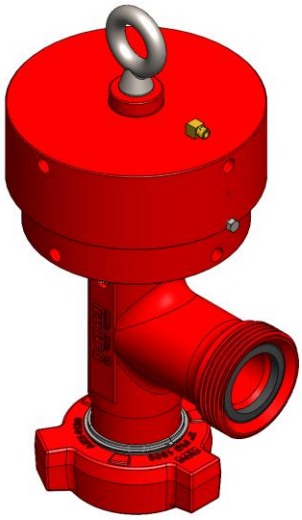
Red Deer Ironworks



3” 1502STD N2 Pressure Relief Valve Maintenance Manual

Parts Covered: PRV31502N2STD

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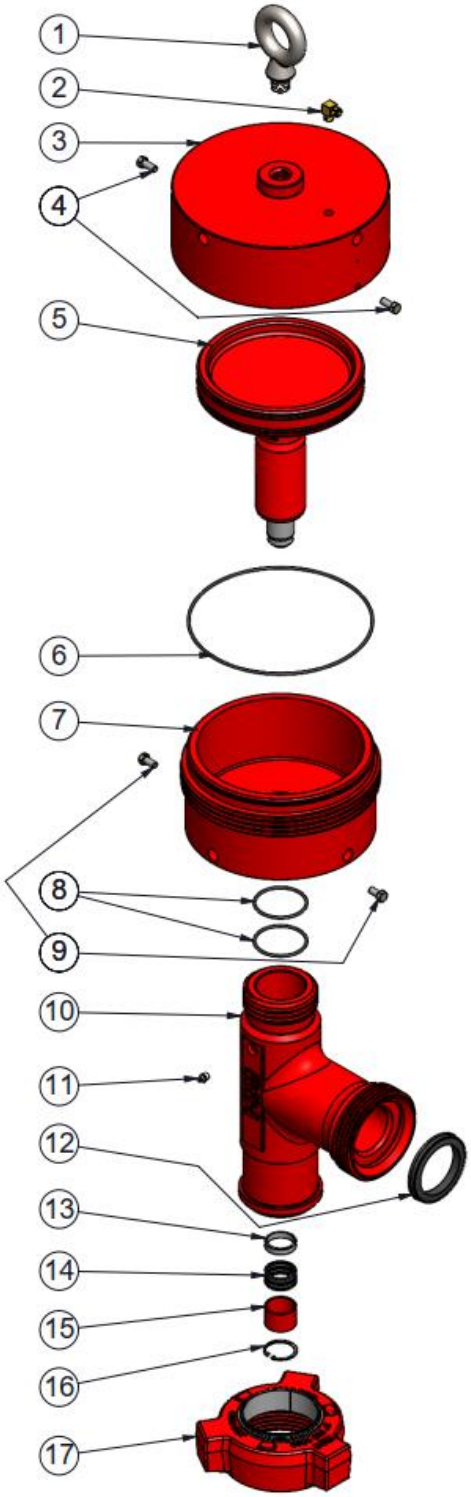
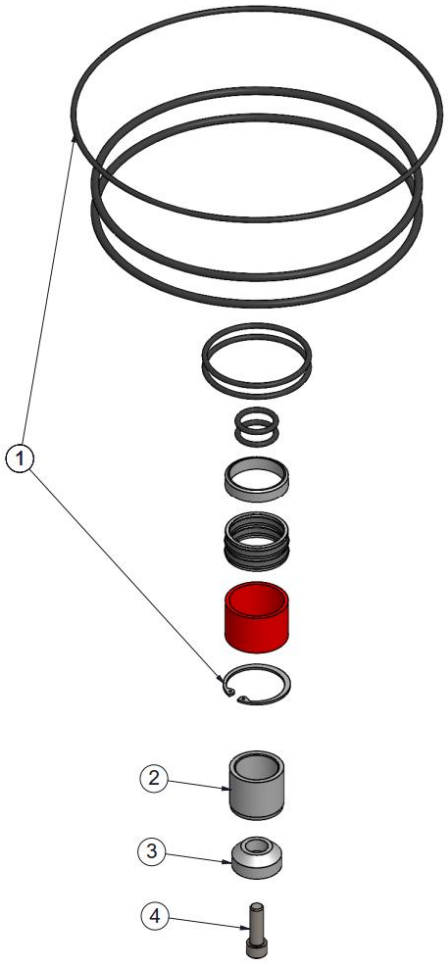
Exploded View - 3” 1502STD N2 Pressure Relief Valve



Parts Listing - 3” 1502STD N2 Pressure Relief Valve

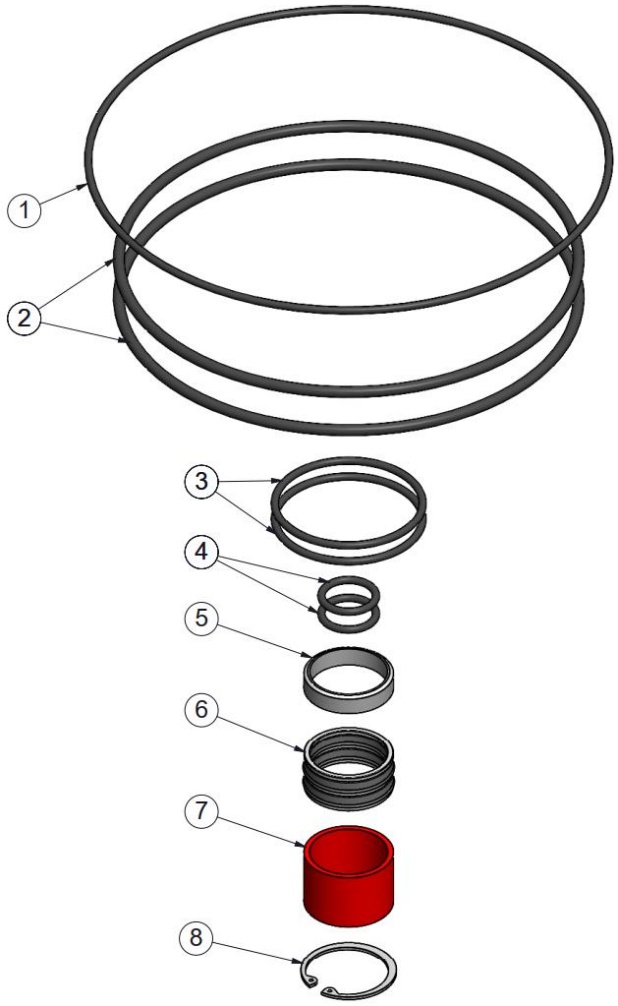
Item	Qty	Description	Part #
1	1	Eyebolt - 1-8 UNC -2B x 1.00	SH-029-P001
2	1	Brass Elbow	SH-058-P001
3	1	Nitrogen Chamber Top	PRV3N2CHAMT-P001
4	2	Hex Bolt, 3/8-16 x 7/8 x 7/8 Thrd Length	HBOLT 0.3750-16x0.875x0.875-N
5	1	Piston Assembly	PRV3N2PIST-A001
6	1	O-Ring 274	OR-N90-274
7	1	Nitrogen Chamber Bottom	PRV3N2CHAMB-P001
8	2	O-Ring 232	OR-N90-232
9	2	Hex Bolt, 3/8-16 x 3/4 x 3/4 Thrd Length	HBOLT 0.3750-16x0.75x0.75-N
10	1	Pressure Relief Valve Body	PRV31502N2STD-P001
11	1	Grease Fitting - 1/8 NPT Str.	ACGREASEFTG
12	1	Union Seal - 3in	SEAL3STD
13	1	Packing Bushing - TC	PRV3N2PBUSH-P001
14	1	Packing Kit - 2x Hytrel U-Cup & Upgraded O-Ring and 3x 0.100HT Nylon Bushing	PRV3N2CUPPACK-A001
15	1	Packing Bushing	PRV3N2PBUSH-P002
16	1	Internal Snapring - 3” PRV (5000-175)	PRV3N2ISRING-P001
17	1	Wingnut Kit – 3in Fig 1502 15,000psi Standard Service	WNKIT31502STD-A001

Major Repair Kit Parts Listing - 3” 1502STD N2 Pressure Relief Valve



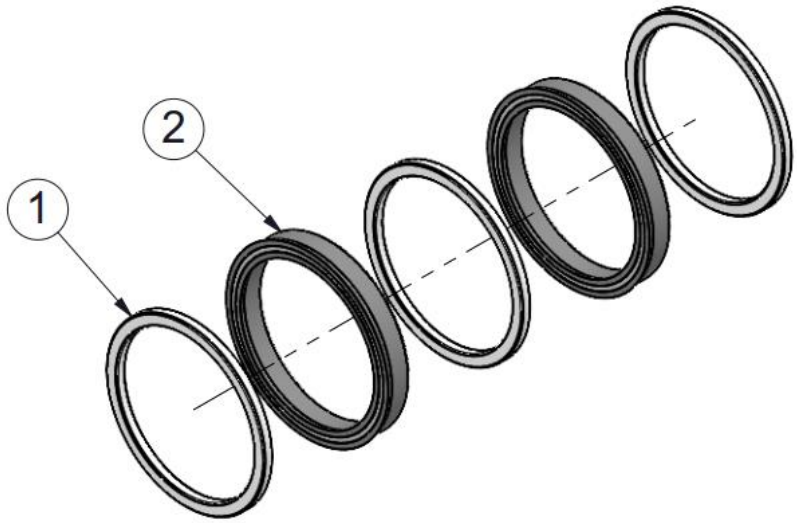
Item	Qty	Description	Part #
		Major Repair Kit	**PRVRK3N2MAJ-A001**
1	1	Pressure Relief Valve – 3in Fig 1502 Minor Repair Kit 15,000psi Standard Service	PRVRK3N2MIN-A001
2	1	Carbide Sleeve	PRV3N2TCSLV-P001
3	1	Nose Cap	PRV3N2NCAP-P001
4	1	Cap Screw, Socket Head, HEX, 3/8-16 x 1-1/4 x 1-1/4 Thrd Length	SCHS 0.375-16x1.25x1.25-N

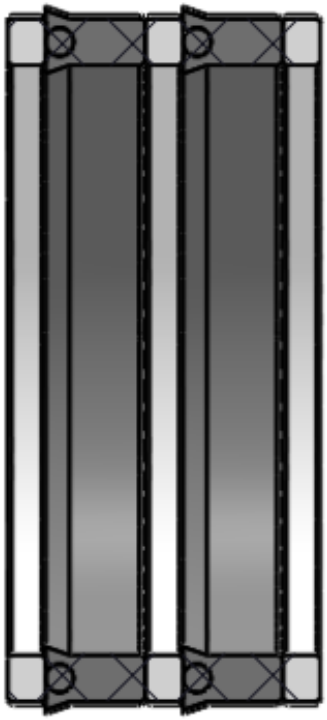
Minor Repair Kit Parts Listing - 3” 1502STD N2 Pressure Relief Valve



Item	Qty	Description	Part #
		Minor Repair Kit	**PRVRK3N2MIN-A001**
1	1	O-Ring 274	OR-N90-274
2	2	O-Ring 372	OR-N90-372
3	2	O-Ring 232	OR-N90-232
4	2	O-Ring 213	OR-N90-213
5	1	Packing Bushing - TC	PRV3N2PBUSH-P001
6	1	Packing Kit - 2x Hytrel U-Cup & Upgraded O-Ring and 3x 0.100HT Nylon Bushing	PRV3N2CUPPACK-A001
7	1	Packing Bushing	PRV3N2PBUSH-P002
8	1	Internal Snapring, 3” PRV (5000-175)	PRV3N2ISRING-P001

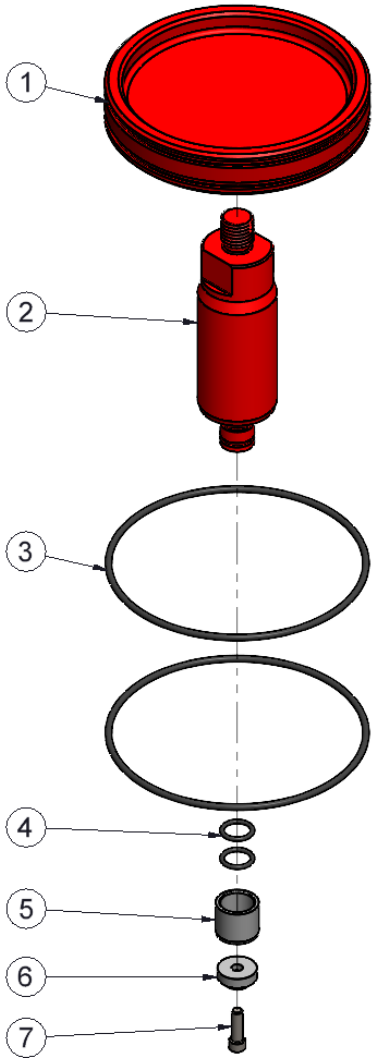
Packing Kit Part Listing - 3” 1502STD N2 Pressure Relief Valve





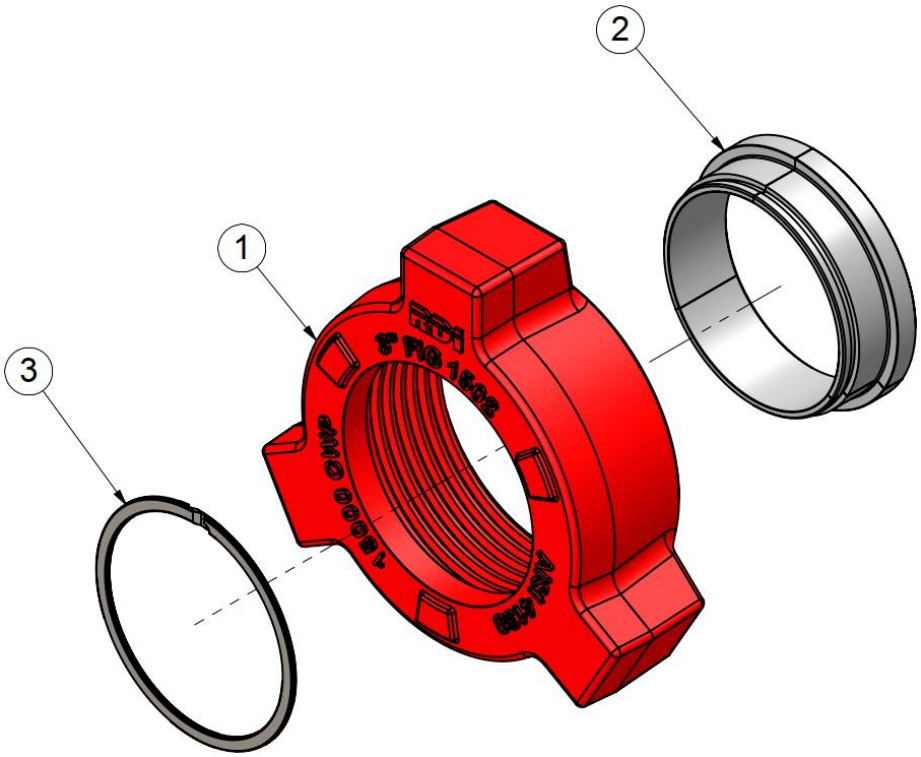
Item	Qty	Description	Part #
		Packing Kit – 2x Hytrel U-Cup & Upgraded O-Ring and 3x 0.100HT Nylon Bushing	**PRV3N2CUPPACK-A001**
14.1	1	Spacer	PRV3N2CUPPACK-P002
14.2	1	U-Cup & Upgraded O-Ring	PRV3N2CUPPACK-P001

Piston Assembly Parts Listing - 3” 1502STD N2 Pressure Relief Valve



Item	Qty	Description	Part #
		Piston Assembly	**PRV3N2PIST-A001**
5.1	1	Piston	PRV3N2PIST-P001
5.2	1	Piston Shaft	PRV3N2PISTSHFT-P001
5.3	2	O-Ring 372	OR-N90-372
5.4	2	O-Ring 213	OR-N90-213
5.5	1	Carbide Sleeve	PRV3N2TCSLV-P001
5.6	1	Nose Cap	PRV3N2NCAP-P001
5.7	1	Cap Screw, Socket Head, HEX, 3/8-16 x 1-1/4 x 1-1/4 Thrd Length	SHCS 0.375-16x1.25x1.25-N

Wingnut Kit Parts Listing - 3” 1502STD N2 Pressure Relief Valve



Item	Qty	Description	Part #
		Wingnut Kit	**WNKIT31502STD-A001**
17.1	1	Wingnut Body	WN315DETSTD-P001
17.2	1	Segment Set (3)	SEG31502-P001
17.3	1	Spiral Retaining Ring WST 450	SNAPRINGWST450

Assembly Procedure

It is important that the workstation is clean and free of any contaminants such as metal shavings, dirt, etc. Do not sand or de-burr any items while at the assembly workstation.

Note: RDI-6430 (assembly grease), Jet Lube High Arctic Low Temperature Grease (low temp grease), O-ring silicone grease and Anti-Seize Compound are used in this procedure. Use of grease other than listed in this manual is not recommended as it may adversely affect the performance and functionality of the Valve.

1. Clean and inspect all parts for any damage (i.e. dents, scratches, sharp edges and burrs), particularly on the sealing areas and threads prior to assembly. Tools needed include: needle-nose pliers, adjustable wrench, pipe wrench, rubber mallet, 5/16” drive Allen Key, belt straps, 3/8” wrench, 1-3/4” max OD breaker bar, 7/16” socket wrench, 3/4" max OD bars

2. Apply **Thread Coat/Protector Spray** on all male and female ends of the **Pressure Relief Valve (PRV) Body (#10).**

3. Insert the **Union Seal (#12)** into the groove at the top female end of the **PRV Body.**

4. Install the **Spiral Retaining Ring (#17.3)** onto the male end of the **PRV Body**

   Refer to **Wingnut Kit Parts Listing**.

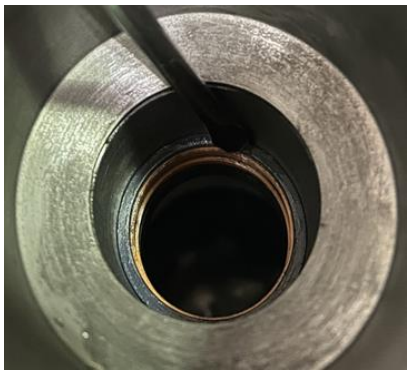
5. Slide the **Wingnut Body (#17.1)** onto the male end up against the **PRV Body** and **Spiral Retaining Ring.**

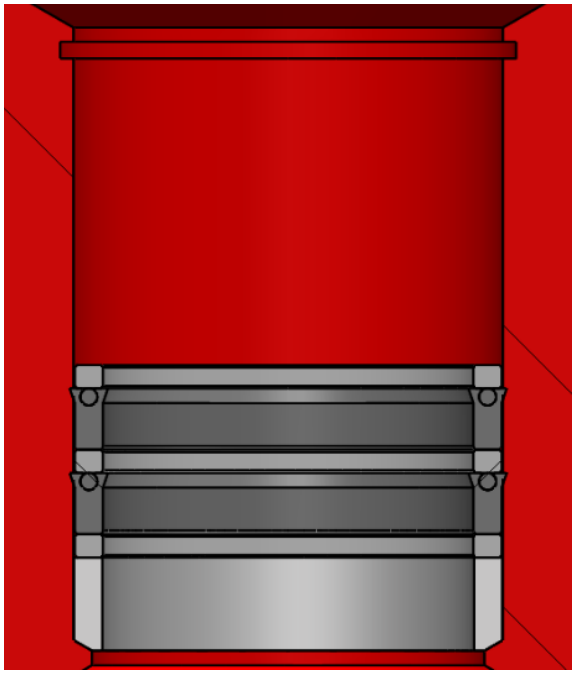
6. Place the **Segment Set (3) (#17.2)** around the male end and pull the **Wingnut Body** over the **Segments** to hold them in place. Pry the **Spiral Retaining Ring** around into the groove of the **Segments** to secure the **Wingnut.**

7. Coat **Packing Bushing - TC (#13)** with **assembly grease**. Install the **Packing Bushing - TC** with the bevel side down into the male end of the **PRV Body** and push until full contact is made with inside surface. See cross-section view for proper orientation of **Packing Bushing - TC** when male end of the **PRV Body** is facing up.

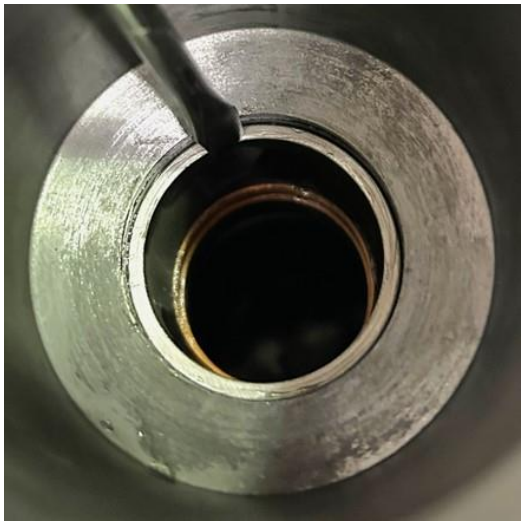
8. Coat all components of the **Packing Kit (#14)** with **assembly grease** then install all components as one unit into the male end of the **PRV Body.** Ensure the cup side of **U-Cup & Upgraded O-Ring (#14.2)** is closest to the male end of the **PRV Body.** Ensure the **Packing Kit** is pushed down until it makes full contact with the internal surface of the male end. See cross-section view for proper orientation of **Packing Kit** when male end of the **PRV Body** is facing up.

   Refer to **Packing Kit Parts Listing** for proper orientation.



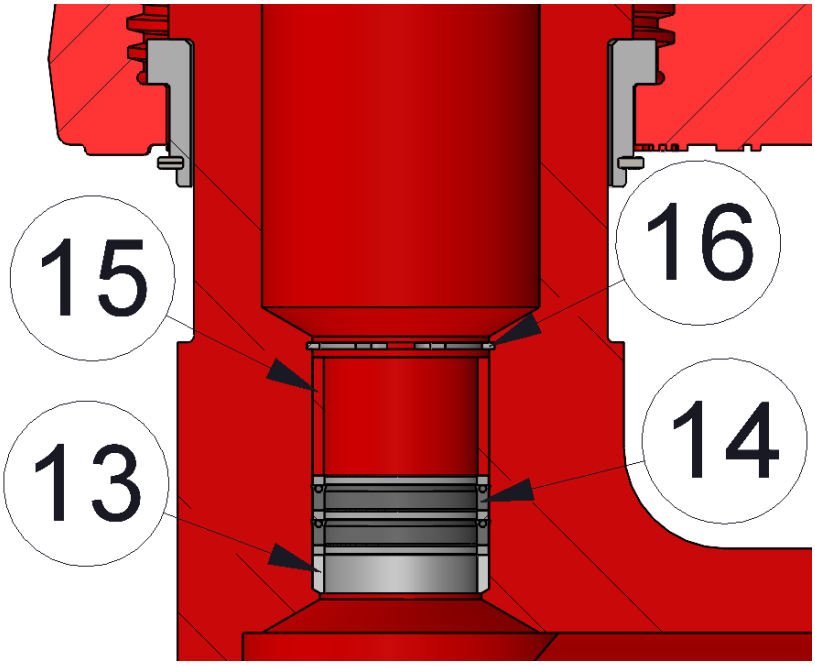


9. Coat **Packing Bushing (#15)** with **assembly grease**. Install **Packing Bushing** into male end of the **PRV Body** and push down until full contact with internal surface is made.

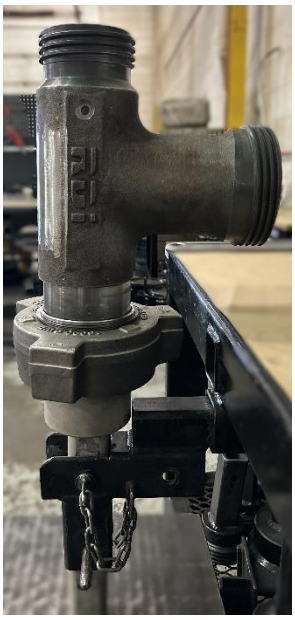


10. Insert **Internal Snapring (#16)** into the groove in the male end of the **PRV Body**. Check that the **Internal Snapring** can still rotate when installed in the groove to ensure proper installation.

The **Packing Bushing – TC (#13)**, **Packing Kit (#14)**, **Packing Bushing (#15)**, and **Internal Snapring (#16)** should now be installed in the male end of the **PRV Body** as shown in the cross-section view to the right.



11. Mount the **PRV Body** on a bench receiver and flip so the **PRV Body** is upright.

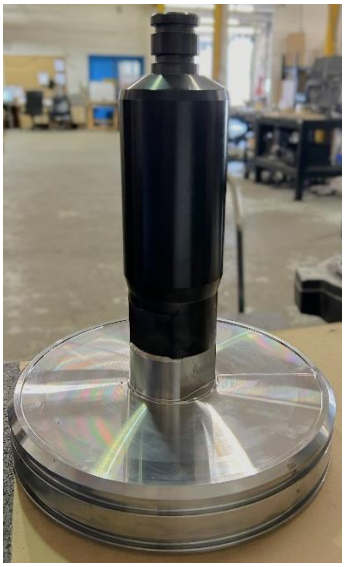


12. Coat each **O-Ring 232 (#8)** with **O-ring silicone grease** and install each into the grooves in the female end opposite the male end of the **PRV Body.**

13. Apply a liberal amount of **anti-seize compound** on the threads of the **Piston Shaft (#5.2).**

Refer to **Piston Assembly Parts Listing**.

14. Thread **Piston Shaft** into **Piston (#5.1)**. Attach a crescent wrench onto the flats of the **Piston Shaft** and to the **Piston** to brace. Tighten **Piston Shaft** until snug.

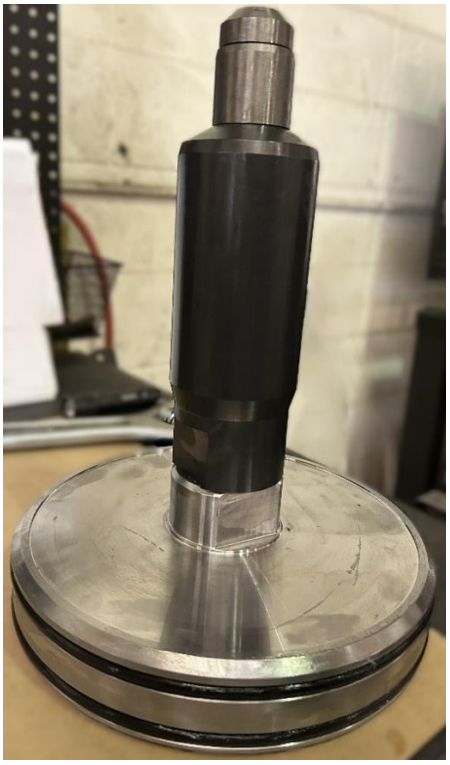


15. Coat each **O-Ring 213 (#5.4)** with **O-ring silicone grease** and install into the grooves on the **Piston Shaft.**

16. Coat **Carbide Sleeve (#5.5)** with **assembly grease** and install with the bevel side up. Install **Carbide Sleeve** overtop of each **O-Ring 213** on the **Piston Shaft.** Use a rubber mallet to ensure sleeve is fully over the end of the **Piston Shaft.**

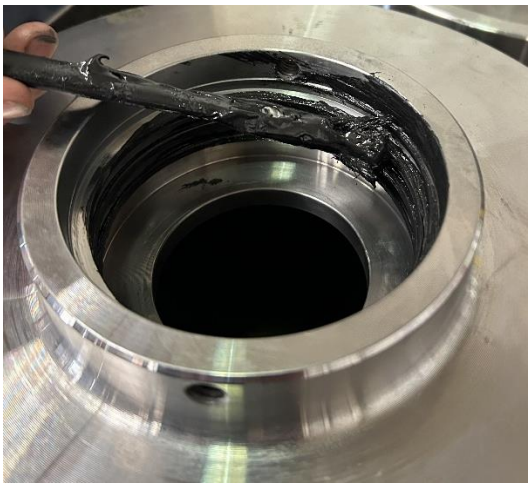
17. Coat **Nose Cap (#5.6)** with **assembly grease** and place on the **Piston Shaft.** Apply **anti-seize compound** to the threads of the **Cap Screw (#5.7)**, then thread the **Cap Screw** into the **Nose Cap** and **Piston Shaft** to join them together. Tighten the **Cap Screw** with an Allen Key until snug.

18. Coat each **O-Ring 372 (#5.3)** with **O-ring silicone grease** and install into the grooves of the **Piston**.



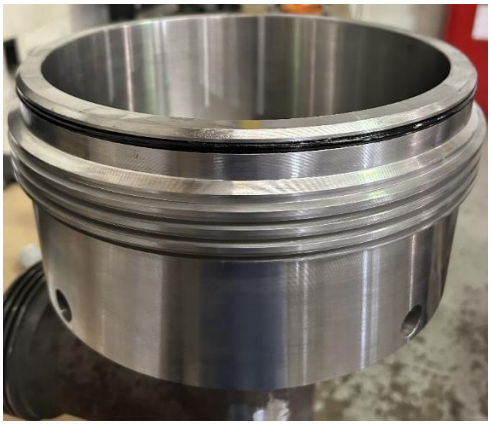
19. Apply a liberal amount of **anti-seize compound** on the 2” female threads opposite the male end of the **PRV Body.**

20. Apply a liberal amount of **anti-seize compound** to the internal threads of the **Nitrogen Chamber Bottom (#7).**

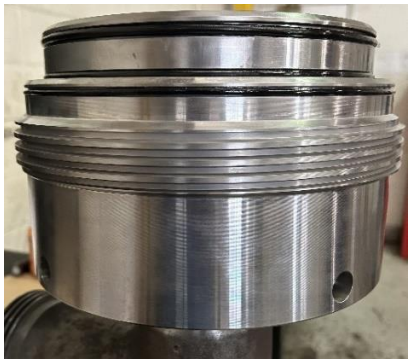


21. Thread the **Nitrogen Chamber Bottom** onto the 2” female thread end opposite the male end of the **PRV Body** until snug.

22. Coat **O-Ring 274 (#6)** with **O-ring silicone grease** and install into the groove of the **Nitrogen Chamber Bottom.** Apply a thin film of **assembly grease** to the outer body of the **Piston Shaft**, the outer diameter of the **Piston**, and the inside surface of the **Nitrogen Chamber Bottom.**



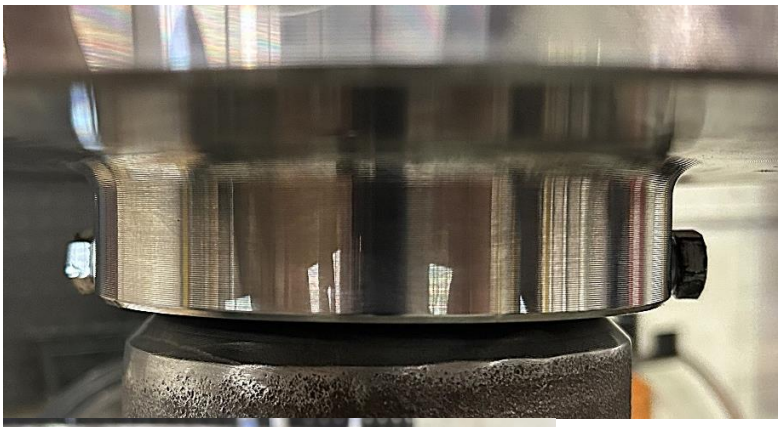
23. Set **Piston Assembly (#5)** in the **Nitrogen Chamber Bottom.**



24. Use belt straps to fully install the **Piston Assembly** into the **Nitrogen Chamber Bottom.** A block can be placed on the top of the **Piston Assembly** to help install it. Wrap the straps fully around the full assembly, with the straps wrapping around the top of the **Piston Assembly** and block and braced against a strong support on the bottom. Keep hands clear of straps.

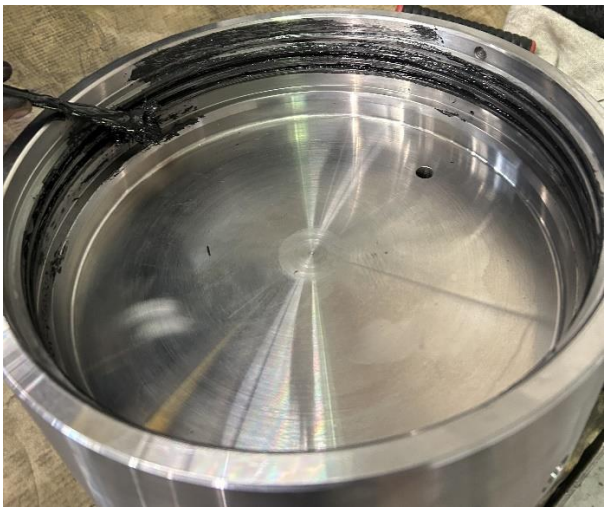
25. Tighten belt straps until the top of the **Piston Assembly** is significantly below the top face of the **Nitrogen Chamber Bottom.**

26. Apply **anti-seize compound** to threads of both (2) **Hex Bolt, 3/8-16 x 3/4 x 3/4 Thrd Length (#9)** and install into **Nitrogen Chamber Bottom.** Fully tighten.



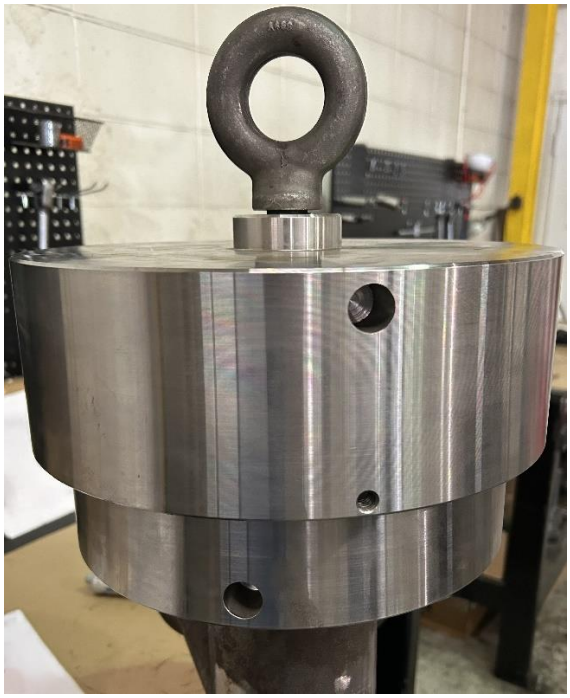
27. Apply **anti-seize compound** to external threads on **Nitrogen Chamber Bottom.**

28. Apply **anti-seize compound** to internal threads of **Nitrogen Chamber Top (#3).**



29. Apply **anti-seize compound** to threads of **Eyebolt (#1).** Thread **Eyebolt** into **Nitrogen Chamber Top.**

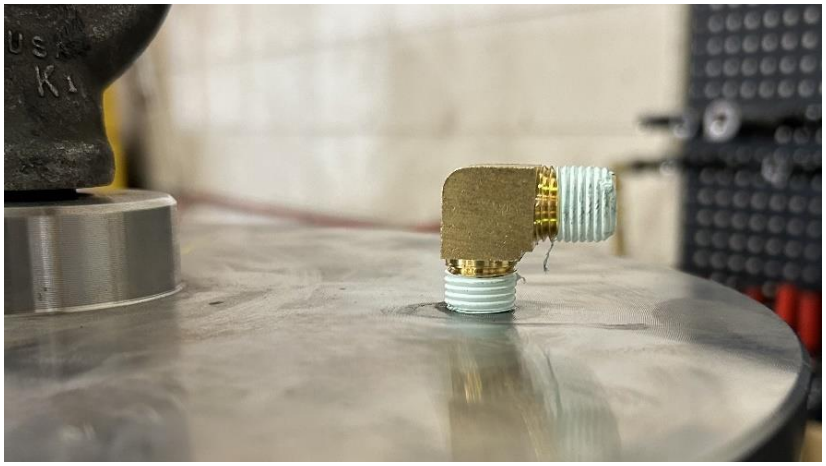
30. Thread **Nitrogen Chamber Top** onto **Nitrogen Chamber Bottom.** Place a bar through the **Eyebolt.** Use the bar to tighten the **Nitrogen Chamber Top** as snug as possible.



31. Apply **anti-seize compound** to threads of both (2) **Hex Bolt, 3/8-16 x 7/8 x 7/8 Thrd Length (#4)** and install into **Nitrogen Chamber Top.**

32. Apply **anti-seize compound** to threads of the **Grease Fitting (#11)** and thread into the **PRV Body.**

33. Wrap **Brass Elbow (#2)** with 4 wraps of Teflon tape. Thread **Brass Elbow** into top of **Nitrogen Chamber Top.** Add **low temp grease** to the **Grease Fitting.**



Note: After the valve has been greased, the hydro test of the valve is conducted. The Nitrogen pressure is set after the valve has been hydro tested. Regrease the valve after the hydro test using 2 to 3 pumps of **low temp grease**. See Operation Manual OM-06 N2 PRV Operation Manual for information on how to set Nitrogen pressure.

Maintenance Schedule

Once the N2 Pressure Relief Valve is installed in operation, it may be subjected to harsh conditions such as sand, rocks and chemicals which may cause pitting and washing in the body that will affect the performance of the valve. To ensure proper reliable operation, RDI recommends the following maintenance schedule for service.

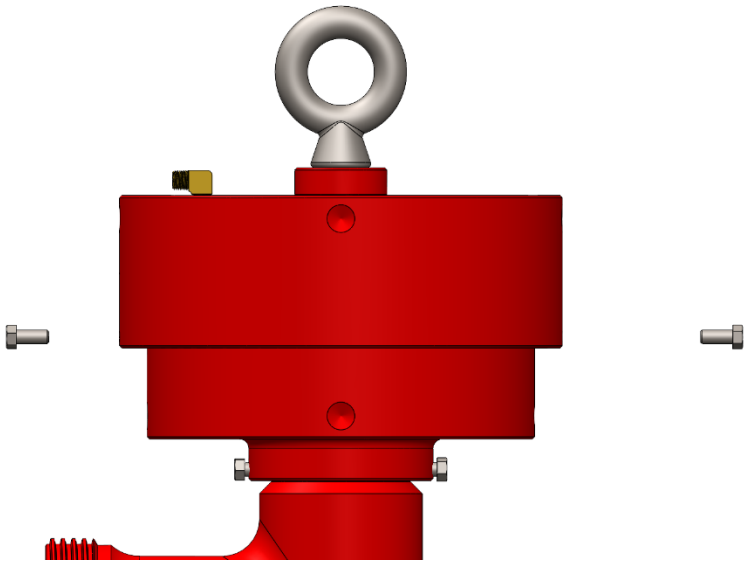
Under normal pressure operation, the valve is recommended to be serviced at the following intervals:

- At least every three (3) months.
- After every frac job or every 25 stages.
- After every overpressure event while in operation.
- An annual inspection whether the valve has been used or not.

Tear-Down Procedure

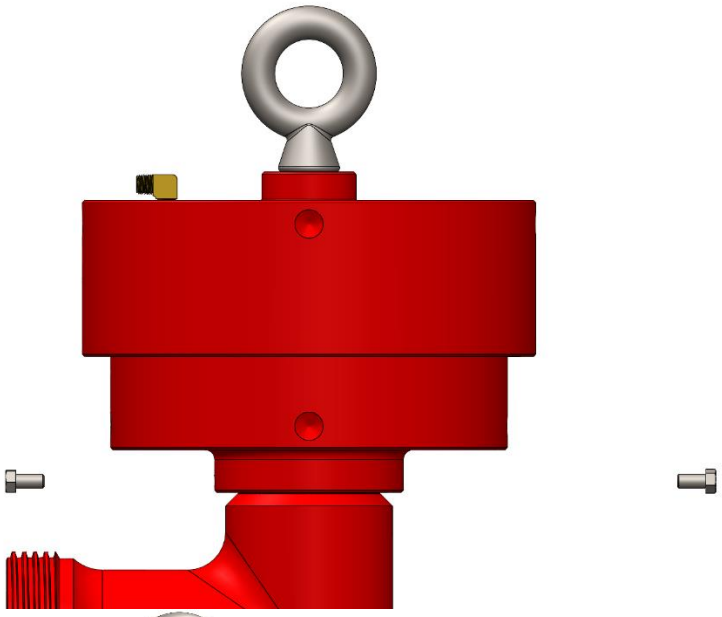
Refer to the following steps to remove the **Piston Assembly** from the **Nitrogen Chamber Bottom.**

1. Remove both (2) **Hex Bolt, 3/8-16 x 7/8 x 7/8 Thrd Length (#4)** from the **Nitrogen Chamber Top**.
2. Loosen the **Nitrogen Chamber Top** until hand loose.

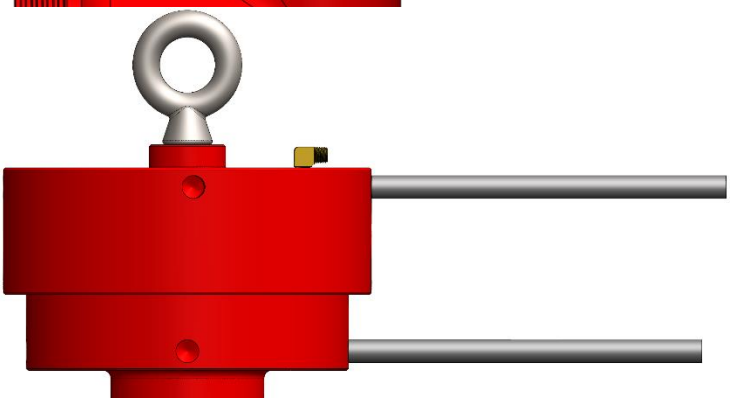


3. Remove both (2) **Hex Bolt, 3/8-16 x 3/4 x 3/4 Thrd Length (#9)** from the **Nitrogen Chamber Bottom**.

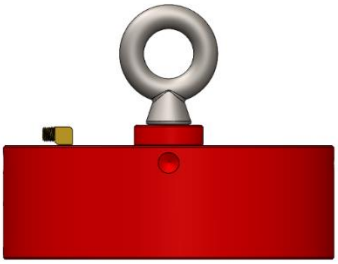
4. Fully loosen the **Nitrogen Chamber Bottom** from the **PRV Body**. Use the eyebolt to lift the **Nitrogen Chamber Top** a small amount. This will allow the **Piston Shaft** to move and easily detach from the **PRV Body**.



5. Insert a 3/4” bar into one of the holes along the circumference of the **Nitrogen Chamber Top.** Next, insert a 3/4" bar into one of the holes along the circumference of the **Nitrogen Chamber Bottom.** Apply gradual force in opposite directions to the top and bottom bars until the **Nitrogen Chamber Top** is loosened and can be removed.

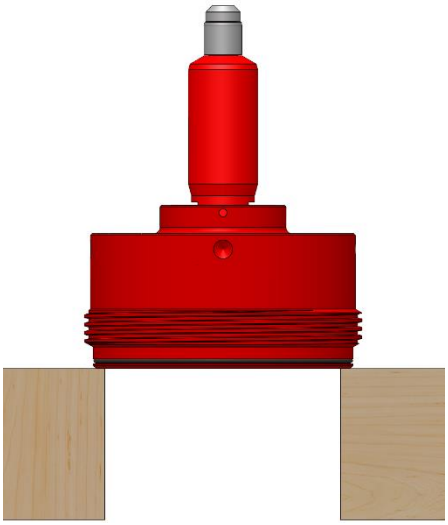


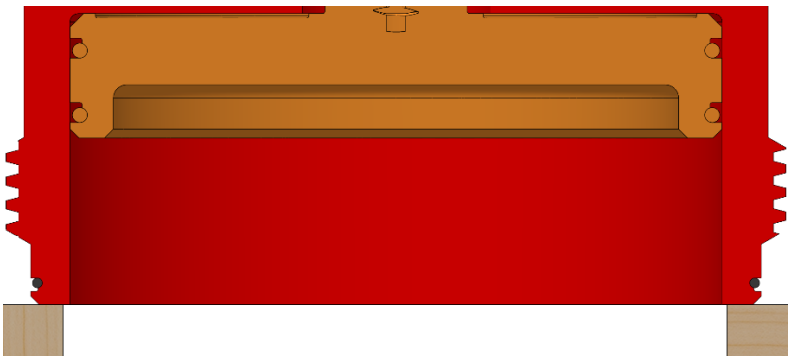
Remove the **Nitrogen Chamber Top** gently from the **Nitrogen Chamber Bottom**.



6. Remove the **Nitrogen Chamber Bottom** from the **PRV Body**. Note that removing the **Nitrogen Chamber Bottom** will also remove the **Piston Assembly**.

7. Flip the **Nitrogen Chamber Bottom** and the **Piston Assembly** upside down and place on blocks. Ensure that only the rim of the **Nitrogen Chamber Bottom** is supported by the blocks. This will allow the **Piston Assembly** to be removed.





8. Apply force to the **Nose Cap** of the **Piston Assembly**. Apply a gradual pushing force down on the **Piston Assembly** until it has been fully pushed out of the **Nitrogen Chamber Bottom**.

   Note: Do **NOT** hit or strike the **Piston Assembly** with a blunt object as this could damage the **Piston Assembly**.

Once the **Piston Assembly** has been removed from the **Nitrogen Chamber Bottom**, the steps in the Assembly Procedure can be followed to tear-down the Valve.

Thoroughly degrease and clean all parts that are disassembled. Check for any damage, replace as necessary with RDI Repair Kit only.

WARNING: Only qualified Service Technicians should perform the Tear-Down, Assembly and Relieving Pressure Setting procedures.

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Valves · Flowline · Manifolds
Recertification

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