# REG-625 Service Instructions

## *I. Introduction*

REG-625 is a single stage balanced piston mechanical regulator. It is designed to maintain near constant outlet pressure of approximately 100 psig, for inlet pressure ranges from 3300 to 200 psig. Outlet pressure is preset at CAS via preload on the regulators' two Diaphragm Springs. Diaphragm reference pressure is externally source to improve droop performance. Downstream components are protected from over-pressurization by the external Pressure Relief Device (PRD) which must be operational at all times.

During End of Line testing the internal leakage (inlet to outlet) of each regulator is checked at CAS to verify a "bubble tight" seal of less than .5 cc/minute. This is accomplished via tightly controlled tolerances and extremely fine surface finishes on the regulator plunger assembly and seat assembly.

REG-625 will provide consistent leak free performance assuming reasonable care and cleanliness standards are maintained. If the regulator seat becomes contaminated with dirt or debris, internal leakage can increase greatly. If this occurs, outlet pressure will climb above its set value until the Pressure Relief Device (PRD) vents, lowering outlet pressure back to acceptable levels.

Should the need for disassembly and inspection and/or maintenance be required, the following instructions are provided to guide you through the necessary steps.

**Note:** Cycling of the PRD can occur as the result of downstream leakage caused by hoses and/or fittings that are not tightly sealed. This will occur when the system is pressurized but, not flowing. Root cause is that downstream leakage causes outlet pressure to drop significantly below prescribed levels, causing the plunger assembly to cycle open and closed momentarily. This can then produce slight over-pressurization of the outlet and hence PRD venting.

***Note:*** It is unlikely that operational issues will occur in the upper part of the Regulator (within the Spring Tower or Spring Cap). Any problems you are likely to experience will be related to contamination of the Regulator Cartridge Assembly. Servicing of the Regulator Cartridge REG-625-7-S can be accomplished ***without*** removal of the Spring Tower or Spring Cap. It is suggested that these components be left installed on the Regulator Body unless you believe that a problem has occurred directly with their operation.

## *I. Introduction Cont'd*

***Warning!*** The Spring Cap provides pre-load on the Inner and Outer Diaphragm Springs. Installed load is 550 lbs. Do not attempt to remove the Spring Tower or Spring Cap without proper tools such as an arbor press and guides for maintaining component position. Lack of proper tools and procedure can result in the catastrophic release of components, causing injury or death.

## *II. Disassembly-Cartridge*

1. Remove the Cartridge from the Regulator Body by loosening with a 1-3/4-in wrench.
2. Loosen the Cartridge Cap from the Cartridge by holding the base with a 1-3/4-in wrench and turning the Cap CCW with a 1-1/8-in wrench.
3. Once the Cap is loose, apply pressure to the tip of the Plunger Tower and finish unscrewing by hand.

   **Note**: The Cartridge Cap is preloaded via the Plunger Spring and will launch the cap and Plunger Assembly if not properly restrained during disassembly.

4. Remove Plunger Assembly and Plunger Spring.
5. Remove and discard O-rings and Backup rings from Plunger Assembly and from Cartridge.
6. Clean Cartridge, Cartridge Cap and Plunger Spring with Solvent such as Brakeleen. Dry with compressed air.

## *III. Inspection-Cartridge*

1. Clean Plunger Base and Plunger Tower with Mineral Spirits or similar non-aggressive solvent. Dry with compressed air.
2. Examine Plunger Seat and Cartridge Cap sealing surface for contamination and damage. If undamaged, proceed to Re-assembly Instructions Step 5. If Cartridge Cap sealing surface is damaged it must be replaced. If Seat is damaged proceed to Re-assembly Instructions Step 1.

## *IV. Re-assembly-Cartridge*

1. Unscrew Plunger Tower from Plunger Base using a ¼-in and 11/16-in wrench.
2. Remove damaged Seat and discard.
3. Install new Seat in Plunger Base.
4. Install and tighten Plunger Tower in Plunger Base.
5. Coat new Plunger O-rings and Backup rings with Parker Super O-Lube.
   Do not use other lubricants.
6. Install new O-ring and Back-up rings as per Figure 1.

**REG-625-8-S (Plunger Assembly) O-Ring Orientation**

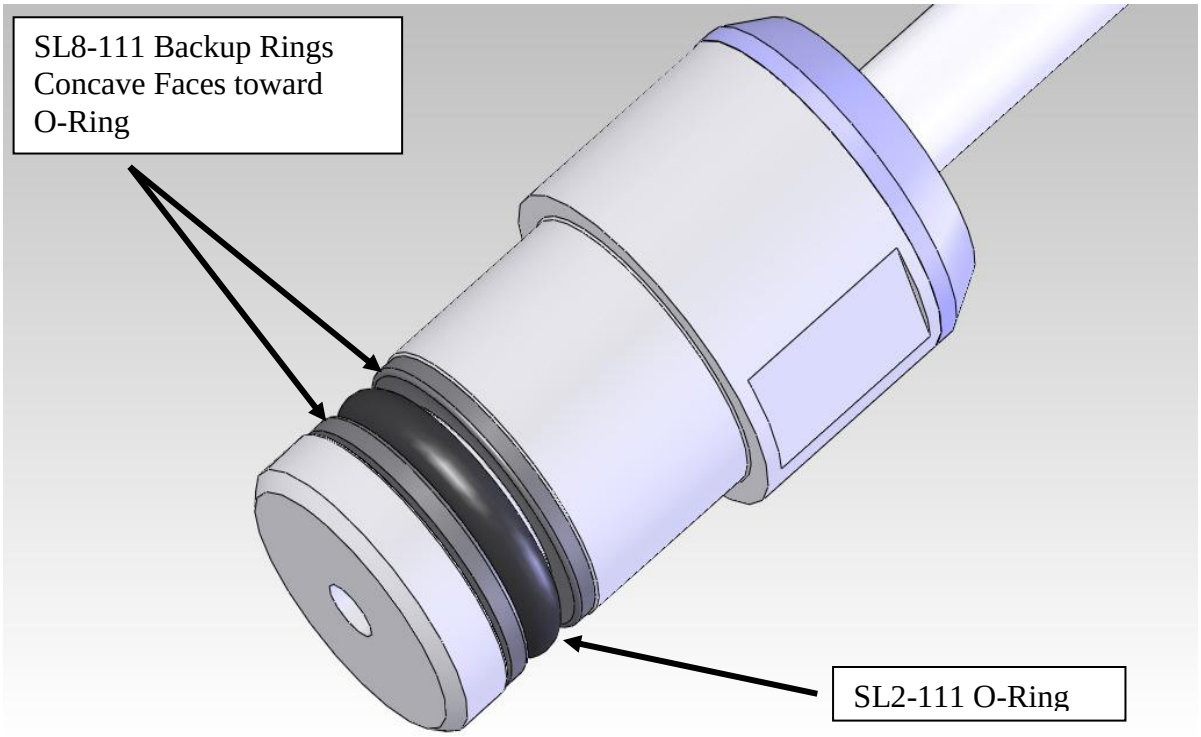



**Figure 1**

7. Coat new Cartridge O-rings with Parker Super O-Lube. Do not use other lubricants.
8. Install new O-ring and Back-up rings as per Figures 2 and 3.

## *IV. Re-assembly-Cartridge*

**REG-625-7-S (Cartridge Assembly) O-Ring Orientation**

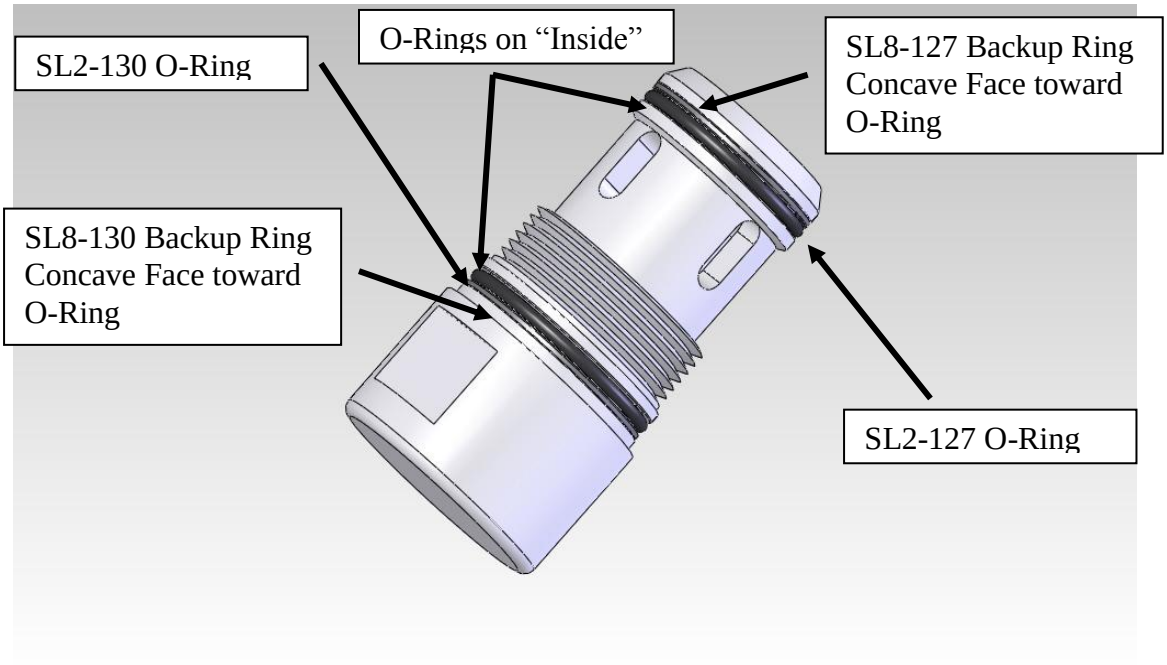



**Figure 2**

**REG-625-7-S (Cartridge Assembly) O-Ring Orientation**

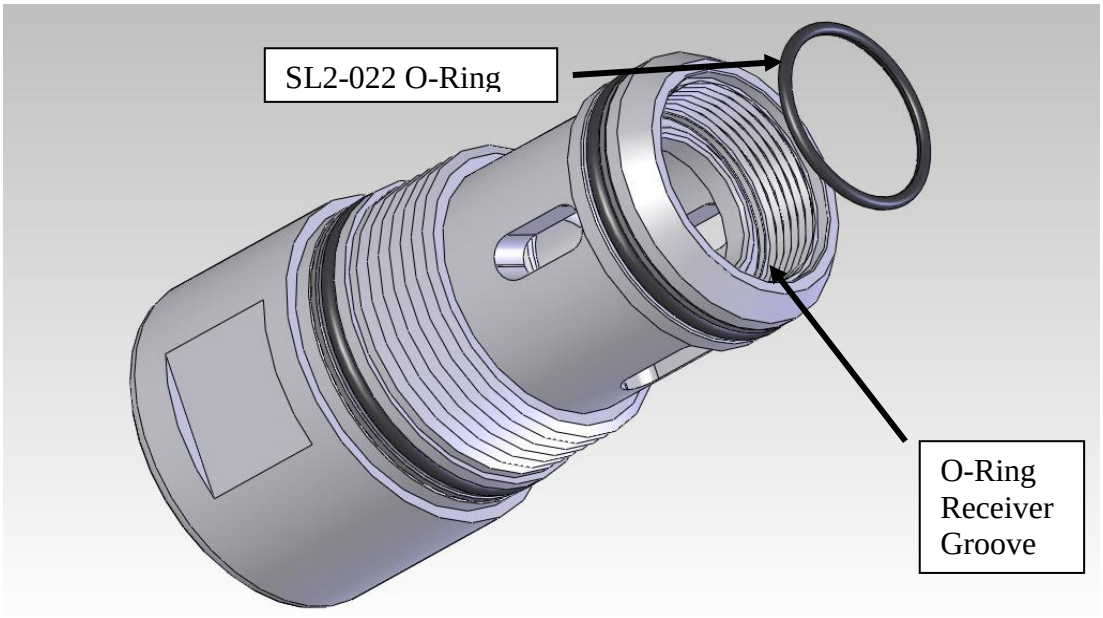



**Figure 3**

## *IV. Re-assembly-Cartridge Cont'd*

9. Install Plunger Spring in Cartridge.
10. Place Plunger Assembly in Cartridge.
11. Slip Cartridge Cap over top of Plunger Tower stem.
12. Carefully push (wiggle it as you apply pressure) Plunger Tower into Cartridge bore.

> ***Note:*** Improper installation can result in O-ring damage causing internal leakage and poor Regulator performance.

13. Thread Cartridge Cap into Cartridge Housing. Secure using 1-3/4-in and 1-1/8-in wrenches.

> **Note:** It is easy for the Cartridge to Cartridge Housing O-ring to get disturbed during this Step make sure that it is properly seated in its receiver groove in the Cartridge before securing the Cap. Improper installation can result in O-ring damage causing internal leakage and poor Regulator performance.

14. Coat threads of Stem assembly with Krytox or similar Oxygen compatible lubricant.
15. Reinstall Cartridge in Regulator Body using 1-3/4-in wrench.

## *V. Disassembly-Upper*

> ***Warning!*** The Spring Cap provides pre-load on the Inner and Outer Diaphragm Springs. Installed load is 550 lbs. Do not attempt to remove the Spring Tower or Spring Cap without proper tools such as an arbor press and guides for maintaining component position. Lack of proper tools and procedure can result in the catastrophic release of components, causing injury or death.

1. Remove two oppositely located (180 degrees apart) 10-24-in cap screws that retain the Spring Tower Cap to the Spring Tower.
2. Replace screws with 6-in long pieces of 10-24 threaded rod.
3. Place Regulator in an arbor press.

   **Note:** Press must have at least 4-in of upward travel from top of Spring Tower Cap to allow spring pressure to be fully released.

4. Lightly load top of Regulator with press.
5. Remove remaining 10-24 Cap Screws.
6. Slowly remove load from top of Regulator.
7. Remove Spring Tower Cap and Springs.

## *V. Disassembly-Upper Continued*

8. Remove 5/16-in Cap Screws that hold Spring Tower to Regulator Body.
9. Remove Spring Tower, Diaphragm and Diaphragm Backing Plates.

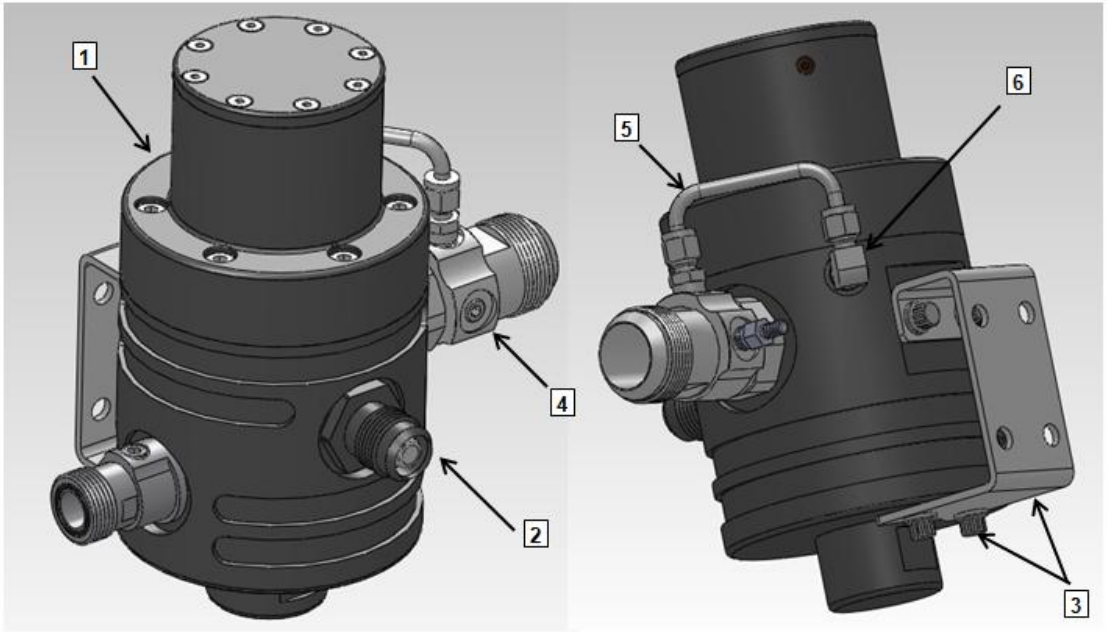
## *VI. Inspection-Upper*

1. Clean Diaphragm, Diaphragm Backing Plates, Spring Tower and Regulator using mineral spirits or a similar non-aggressive solvent.
2. Inspect Diaphragm, Diaphragm Backing Plates and Diaphragm Sleeves in Spring Tower and Regulator Body for damage. Replace components as necessary.

## *VII. Re-assembly-Upper*

1. Place lower Diaphragm Backing Plate in Regulator Body.
2. Place Diaphragm on Regulator Body.
3. Place upper Diaphragm Backing Plate on top of Diaphragm.
4. Place Spring Tower on top of Diaphragm. Radially located Diaphragm, upper Diaphragm Backing Plate and Spring Tower.
5. Secure Spring Tower to Regulator Body using 5/16-in Cap Screws.
6. Insert inner and outer pre-load springs in Spring Tower
7. Radially Locate Spring Tower Cap on Spring Tower using 10-24 guide studs.
8. Compress Springs using arbor press until Spring Cap is fully seated on Spring Tower.
9. Secure Cap with six 10-24 Cap Screws.
10. Remove guide studs.
11. Install remaining two 10-24 Cap Screws.

# Service Documentation
# REG-625




| | |
|---|---|
| 1 | REG-625-S Regulator Assembly |
| 2 | PRD-625-S Pressure Relief Device |
| 3 | BRKT-REG-625-S Bracket and Fasteners |
| 4 | FIT-CSMB-20SAE-S |
| 5 | HSE-.25-2.7-R SS Tube |
| 6 | FIT-SS-400-2-4-R Fitting |

| DATE | Revision | Description | Comments |
|---|---|---|---|
| 2/29/2016 | A | Production Release | |
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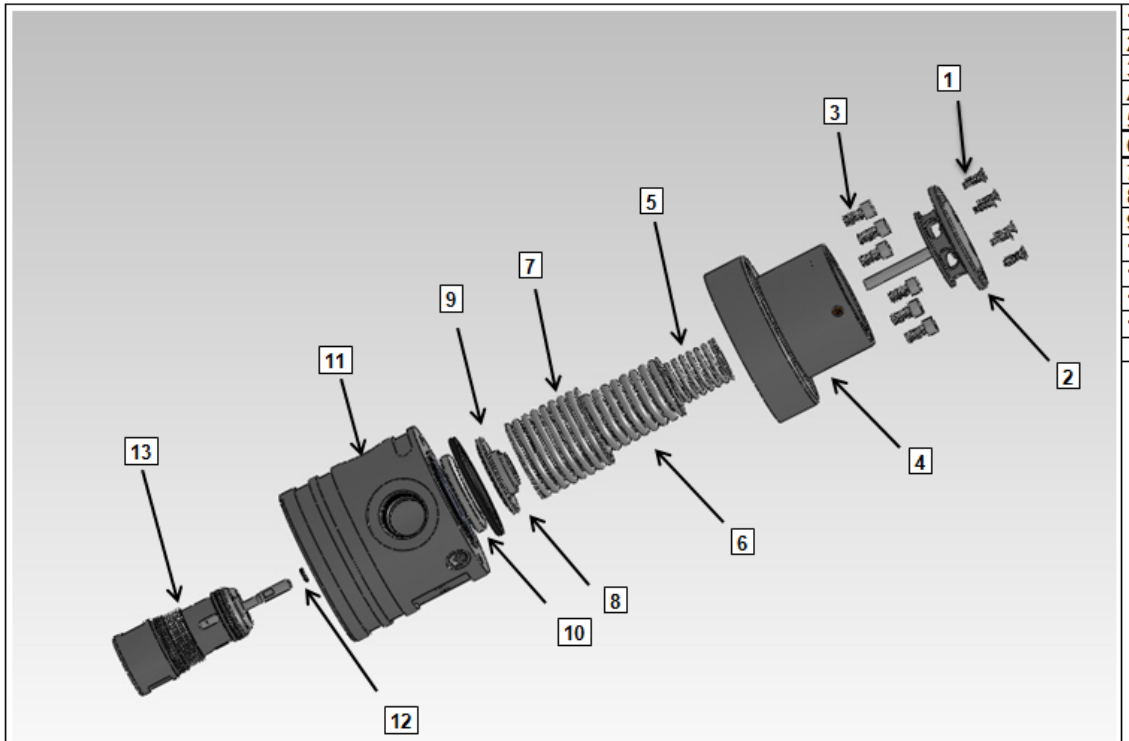
***Serviceable Components***

# Service Documentation
# REG-625-S




| | |
|---|---|
| 1 | FST-10-24-.5FHCS-R Flat Head Cap Screw |
| 2 | REG-625-3-S Spring Tower Cap |
| 3 | FST-.31-18-1.5CS-R Cap Screw |
| 4 | REG-625-2-S Spring Tower |
| 5 | REG-625-11-R Preload Spring (Center) |
| 6 | REG-625-9-R Preload Spring (Inner) |
| 7 | REG-625-10-R Preload Spring (Outer) |
| 8 | REG-625-4-R Spring Tower Diaphragm Backing Plate |
| 9 | REG-625-R Diaphragm |
| 10 | REG-625-6-R Body Diaphragm Backing Plate |
| 11 | REG-625-1-S Regulator Body |
| 12 | SL-2-011 O-Ring *** |
| 13 | REG-625-7-S Regulator Cartridge |

*** Sold in Seal Kit P/N REG-625-SL-R

| DATE | Revision | Description | Comments |
|---|---|---|---|
| 2/29/2016 | A | Production Release | |
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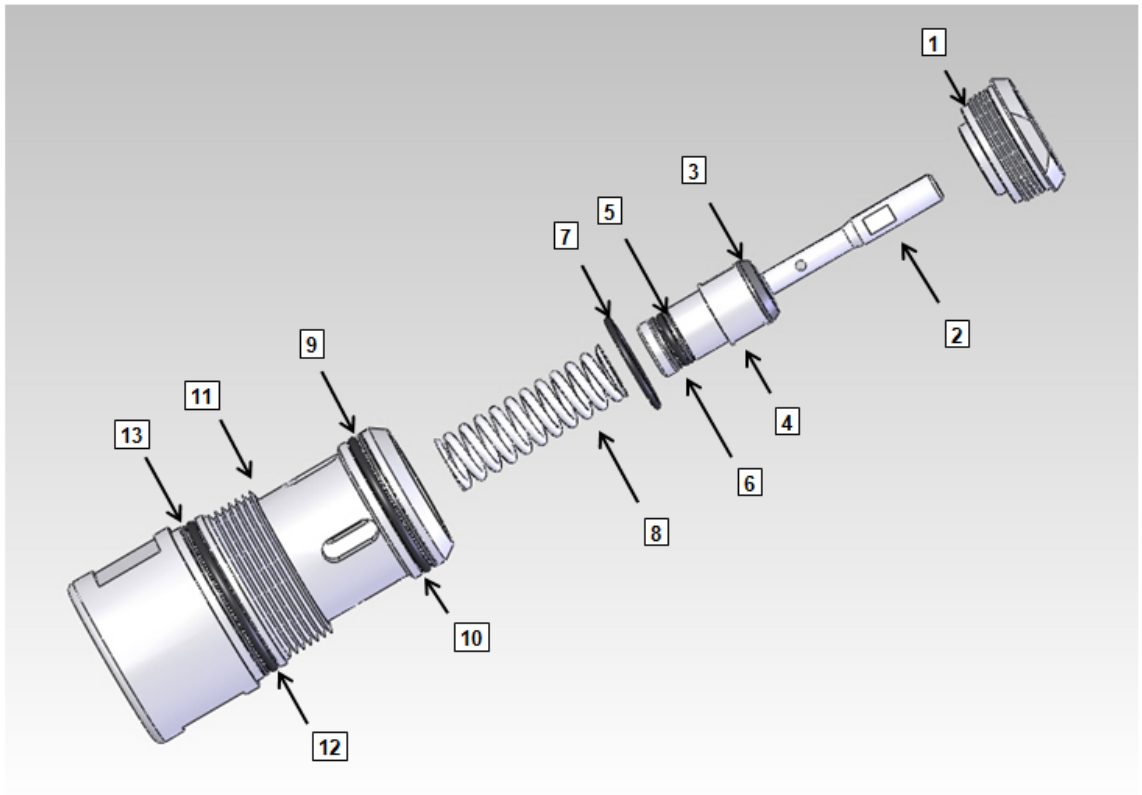
***Serviceable Components***

# Service Documentation
# REG-625-7-S




| | |
|---|---|
| 1 | REG-625-7B-R Cartridge Cap* |
| 2 | REG-625-8A-R Plunger Tower ** |
| 3 | REG-625-8B-R |
| 4 | REG-625-8-R Plunger Base ** |
| 5 | SL-8-111-R Backup Ring *** |
| 6 | SL-2-111 O-Ring *** |
| 7 | SL2-022 O-Ring *** |
| 8 | REG-625-7C-R Spring |
| 9 | SL-8-127 Backup Ring *** |
| 10 | SL-2-127 O-Ring *** |
| 11 | REG-625-7A-S Cartridge |
| 12 | SL-2-130 O-Ring *** |
| 13 | SL-8-130 O-Ring *** |

* Not Sold Separately.
** Sold as Assembly P/N REG-625-7-S
*** Sold in Seal Kit P/N REG-625-SL-R

| DATE | Revision | Description | Comments |
|---|---|---|---|
| 2/29/2016 | A | Production Release | |
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***Serviceable Components***