



**Title:** Hale Retaining Ring Replacement

**Date:** December 7, 2017

**Vehicles:** *KME Custom and Commercial*

**Problem:** Retaining ring components used by Hale may have been made from nonconforming material.

**Corrective Action:** Replace Retaining Ring on QG or P-35 and P-Series Relief Valves

**Work Instructions:** See Attachments. (Attachment A and Attachment B)

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**ATTENTION:** Mr. Chris Morrison



# ATTACHMENT A

**NOTE:** IF YOU DO NOT HAVE A QG or P-35 RELIEF VALVE ON YOUR UNIT, GO TO ATTACHMENT B.

 607 NW 27th Ave Ocala, FL 34475 Phone : (352) 629-5020 Fax : (352)-629-2902	<b>QG R.V. RETAINING RING REPLACEMENT</b>				P/N	<b>FSG-INS-00050</b>
	TYPE	QG/P35 Hale Relief Valve			PAGE	<b>1 OF 5</b>
	DEPARTMENT	OEM MECHANICAL	BY	JORGE SOTO JR	REV	<b>A</b>

## OVERVIEW

The purpose of this document is to provide step by step instructions on how to replace the retaining ring (077-0750-21-0) in various Hale Pressure Relief Valves. See Plate drawing PL404 for QG valve details, PL779 for P35 and P40 relief valves.

## TOOLS NEEDED

- Small snap ring plyers (External ring)
- Large snap ring plyers (Internal ring)
- Channel Lock Plyers (If needed)
- 7" Table Vice
- Rubber mallet (If needed)
- Flat screwdriver

## CONSUMABLES NEEDED

- GAA or NIGL2 grease

## KIT PROVIDED

- 546-00066-000

*WARNING:* Wear safety goggle while performing all procedures.

REV	DATE	BY	DESCRIPTION	Approved By
A	27OCT2017	JS2	INITIAL RELEASE	JLS

 607 NW 27th Ave Dade, FL 34473 Phone : (352) 629-9029 Fax : (352) 629-2902	QG R.V. RETAINING RING REPLACEMENT			P/N	FSG-INS-00050	
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**QG RELIEF VALVE**



Disconnect all cables and airlines and remove relief valve from the vehicle.

Perform the following bench procedure to remove and replace the selected components (see kits list). Install and test the repaired relief valve on the pump.

Take relief valve to clean stable work surface. Clean valve assembly, all gasket mating surfaces, and pump mounting bolts threads, thoroughly.

Refer to Hale Plate Drawing No. 404 for QG details, PL779 for P35 and P40 relief valves.

**DISASSEMBLY**

1. Remove snap ring (077-3930-00-0) using large snap ring pliers.



Figure 1

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2. The valve cover is now loose however it requires a special process to be removed.
  - 1) Secure the relief valve in a 7" Table vise. Ensure the check valve is clamped. Refer to Figure 2. Use care to not crush the relief valve housing in the vise.



**Figure 2**

- 2) Use the channel plyers to break loose the valve cover from the housing. See Figure 3.

Alternatively, apply low pressure air to the pressure connection to dislodge the cover.



**Figure 3**

- 3) Remove the cover by hand by twisting it and pulling outward at the same time.



**Figure 4**

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- Remove and replace the O-ring seal (040-2390-00-0). Apply recommended grease to O-ring before installation.



Figure 5

- Restrain the relief valve by bolting it to the bench or placing in a large vise. As you can see on the assembly drawing there is a spring behind the piston, so hold the piston in place. Refer to Figure 6. Remove retaining ring (077-0750-21-0) from shaft. Discard.



Figure 6

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5. Install new retaining ring (077-0750-21-0) from kit provided on poppet shaft.
  - 1) Push piston down onto the shaft until it is bottomed out.
  - 2) Install new retainer ring on shaft. Make sure the sharp corner on the snap ring is away from the piston (facing up).



**Figure 7**

6. Reinstall valve cover (044-0123-00-0).
  - 1) Use a rubber mallet to evenly push down on the cover until the top snap ring groove is fully exposed.
7. Reinstall the retaining ring (077-3930-00-0).  
 Note: All circlips (also called snap rings) should be installed with the sharp edge in the direction of thrust support. If you examine the circlip closely you can determine which side has the sharp edge by rubbing the edges with your finger. The edge of one side will feel sharp and the other side will be rounded.
8. Test Relief Valve.
  - 1) Refer to the plate drawing for instructions on setting pressure as well as light installation and other maintenance procedure which are recommended to be done at this time.

# ATTACHMENT B

**NOTE: IF YOU DO NOT HAVE A P-SERIES RELIEF VALVE ON YOUR UNIT, NO FURTHER ACTION IS REQUIRED.**

 607 NW 27th Ave Ocala, FL 34475 Phone : (352) 629-5020 Fax : (352) 629-2902	P-SERIES R.V. RETAINING RING REPLACEMENT			P/N	FSG-INS-00051
	TYPE	P-SERIES Hale Relief Valve		PAGE	1 OF 5
	DEPARTMENT	OEM MECHANICAL	BY	JORGE SOTO JR	REV

## OVERVIEW

The purpose of this document is to provide step by step instructions on how to replace the retaining ring (077-0750-21-0) in various Hale Pressure Relief Valves. See Drawings PL1165 for P30's.

## TOOLS NEEDED

- Small snap ring plyers (External ring)
- Rubber mallet
- Flat screwdriver
- 5/8" Wrench

## CONSUMABLES NEEDED

- GAA or NIGL2 grease
- Loctite 243 (Included in Kit)
- Cable Ties

## KIT PROVIDED

- 546-00066-001

**WARNING:** Wear appropriate PPE such as safety goggle while performing all procedures.

Notes: If the Hale Pressure Relief Valve is equipped with a sensing switch and bracket assembly, refer to Hale publication 101-0850-56-0 for instructions to remove and replace the bracket, flasher, and switch assembly portion of the relief valve.

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A	27OCT2017	JS2	INITIAL RELEASE	JLS

 807 NW 27th Ave Ocala, FL 34675 Phone : (352) 520-5000 Fax : (352) 520-2900	P-SERIES R. V. RETAINING RING REPLACEMENT				P/N	FSG-INS-00051
	TYPE	P-SERIES Hale Relief Valve			PAGE	2 OF 5
	DEPARTMENT	OEM MECHANICAL	BY	JORGE SOTO JR	REV	A

**P SERIES RELIEF VALVE**



Perform the following bench procedure to remove and replace the selected components (see kits list). Install and test the repaired relief valve on the pump.

Take relief valve to clean stable work surface. Clean valve assembly, all gasket mating surfaces, and pump mounting bolts threads, thoroughly.

**DISASSEMBLY**

- 1) If so equipped, remove switch assembly.

**WARNING: REMOVING THE SNAP RING WITHOUT RESTRAINING THE SPRING POSES A HAZARD. USE THE CABLE TIES OR SPRING COMPRESSOR TO SAFELY RESTRAIN AND RELEASE THE SPRING WHILE REMOVING/REPLACING THE SNAP RING. FAILURE TO RESTRAIN THE SPRING OR RELEASE ITS STORED ENERGY SLOWLY MAY RESULT IN SERIOUS INJURY.**

- 1) Using 5/8-inch socket and ratchet (set CCW), loosen two [2] 7/16 –14 x 1-1/2 inch long switch to PG30 (or PG30 cover) bolts.
- 1) Note/match mark switch assembly orientation to P Series body assembly.
- 2) Remove bolts.
- 3) Remove switch assembly.



 607 NW 27th Ave Ocala, FL 34476 Phone : (352) 629-0020 Fax : (352) 629-2002	P-SERIES R. V. RETAINING RING REPLACEMENT			P/N	FSG-INS-00051
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2. Tension on the spring must be reduced before removing the snap ring (077-0620-44-0). Cable ties are recommended to be used to tie down the lower 4 strands of the spring. Note that a flat screwdriver may need to be used to get the cable tie under the spring. See Figure 1.



**Figure 1**

1) While 2 cable ties may be sufficient for holding the spring compressed, the use of 3 or 4 cable ties spread out evenly will provide more stability to the compression as the ties can move around the spring.

3. Hold down the spring with your hands to allow the washer (097-0990-00-0) not to be pressed up on the snap ring. Make sure to hold the washer too as it will spring up if not held in place. Using a small straight blade screwdriver, pry retainer (E-clip) off of poppet shaft.

4. Remove PG30 cover.

- 1) Remove snap ring (077-0620-44-0) and discard.
- 2) Remove washer (097-0990-00-0).
- 3) Remove spring (042-0020-00-0). Do not cut cable ties.
- 4) Remove the 4 screws (018-1812-25-0) and washers using 5/8" wrench.
- 5) Remove PG30 valve cover (044-0321-01-0). (If required tap cover with non-marring hammer to break gasket.)

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- Remove the gasket and discard. Clean the mounting surface and piston shaft. Refer to Figure 2.

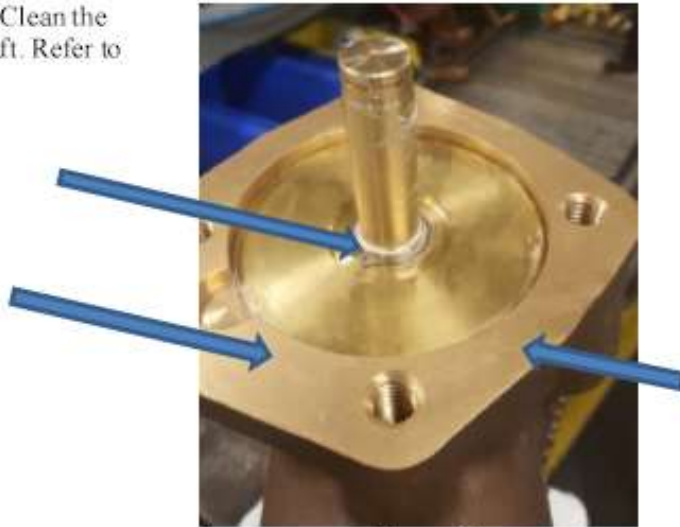


Figure 2

- Remove the old snap ring and replace with new (077-0750-21-0) retaining ring included in the kit. Apply GAA or NIGL2 grease to mounting face of the valve body. See Figure 2.
- Apply lubrication to the lower half of the shaft. See Figure 3.

- Replace the cover gasket (046-6250-00-0). Ensure the notch on the body aligns with the notch on the gasket.



Figure 3

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	TYPE	<b>P-SERIES Hale Relief Valve</b>		PAGE	<b>5 OF 5</b>
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9. Remove and install a new quad ring (040-1149-00-0) on inner bore of valve cover (044-0321-01-0). Make sure the quad ring is not twisted in the groove.
  
10. Note: If switch was removed, only bolt in [2] bolts per this step.  
 Reinstall the cover and hardware. Ensure the notch on the body aligns with the notch on the cover. Install cleaned bolts and washers. Apply Loctite 243 threadlocker to bolt threads.

11. Install PG30 spring as follows.
  - 1) Place large side of spring in recess in cover.
  - 2) Center spring and place washer (097-0990-00-0) on poppet shaft.
  - 3) Holding down on spring and washer as shown in figure 2, install new E-clip (077-0620-44-0) on shaft (077-0620-44-0). Pliers can be used to easily seat the ring. Figure 6.
  - 4) Do not release the spring until the e-clip is fully seated.
  - 5) Cut cable ties.



**Figure 4**

12. If so equipped, install switch assembly. (Otherwise this step does not apply).
  - 1) Align switch assembly as noted/match marked.
  - 2) Install remaining two [2] cover bolts as described in step 10.
  
13. Using 5/8-inch socket and torque wrench (set CW), torque four [4] 7/16 –14 x 1-1/2 inch long PG30 cover bolts to 29 lb-ft. If so equipped, adjust switch so the relief valve lamp is off.
  
14. Test Relief Valve.
  - 1) Refer to the plate drawing for instructions on setting pressure as well as light installation and other maintenance procedure which are recommended to be done at this time.