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## Lion HP® Oil Pump Series

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Model 1130-024 ..... Lion HP® Bare Oil Pump, 10:1  
Model 1130-027 ..... Lion HP® Bare Oil Pump, 5:1



Thoroughly read and understand this manual before installing, operating or servicing described equipment.

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## Operation, Installation, Maintenance and Repair Guide

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## General Safety

Thoroughly read and understand this manual before installing, operating or servicing the described products.



### IMPORTANT

Because this pump can be incorporated into a pressurized systems, the following safety precautions should be observed.

Check equipment regularly and repair or replace worn and damaged parts.

Never alter or modify any parts of this pump, doing so may cause damage to pump and/or personal injury.

Under no circumstances should the dispensing valve be aimed at any person at any time. Personal injury may result.

Release pressures built up in the system before any service or repair is begun. See the pressure relief procedure on page 5.

Do not operate this pump above 150 PSI (10.3 BAR) air inlet pressure or 200 cycles per minute.

Always read and follow the fluid manufacturer's recommendations regarding the use of protective eye wear, clothing and respirators.



### DANGER

Not for use with fluids that have a flash point below 100°F (38°C). Examples: gasoline, alcohol. Sparking could result in an explosion which could result in death.



### WARNING

In the presence of explosive vapors, take action to prevent static sparking. Failure to ground the pump, piping, valves, containers, or other miscellaneous equipment can result in fire or explosion. A green grounding lug is provided on the pump.



### WARNING

If a check valve is to be installed at the end of the suction tube on 1130-024 use 4411-019. Otherwise an external pressure relief valve must be installed at the outlet of the pump.



### WARNING

WARNING: The Lion HP® 5:1 pump (1130-027) develops 750 psi (51.7 Bar) maximum working pressure and the Lion HP® 10:1 pump (1130-024) develops 1600 psi (110.3 Bar) maximum working pressure at 150 psi (10.3 Bar) maximum inlet air pressure and stall conditions. Be sure that any components or accessories used in the system are rated to withstand this pressure. To estimate fluid output pressure at stall conditions, multiply the ratio of the pump by the air pressure being used.

EXAMPLE: 10:1 Pump Ratio x 100 psi air pressure = 1000 psi fluid pressure at stall.



### WARNING

This pump contains aluminum and zinc parts. Do not use 1-1-1 Trichloroethane, methylene chloride or other halogenated hydrocarbon solvents or fluids containing such solvents in this pump. Use of these solvents/fluids may result in a violent chemical reaction, causing serious bodily injury, property damage or death. All fluids used in this pump must be chemically compatible with the wetted parts materials shown on page two (2) of this manual. Consult your chemical supplier to ensure compatibility.



### WARNING

Pressure Relief Procedure:

Follow this procedure whenever you shut off the pump, when checking or servicing any part of the system and when installing, cleaning or changing any part of the system.

- 1) Disconnect the air to the pump.
- 2) Point dispensing valve away from yourself and others.
- 3) Open dispensing valve until pressure is relieved.

## Operating Noise Level

85 DbA @ 100 psi air and 3 GPM



**NOTE:** This pump has been tested and found conforming to OSHA operating noise limits when used for intended purpose (oil or coolant dispensing, intermittent duty cycles).

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## Product Description

The 5:1 ratio Lion HP® Pump is suitable for simultaneous fluid distribution to multiple dispense points, or for pumping to distances of up to 700 feet and the 10:1 of up to 1000 feet.

The Lion HP® air motor features a precision air valve mechanism with dual valve ports for improved high speed breathing. It also contains a positive trip detent spool mechanism that eliminates stalling (blowing air) by preventing the pump from stopping between strokes. It has a simple yet durable construction with all internal parts lubricated at the factory using a life-tested synthetic grease.

The Lion HP® pumping assembly features a stainless pump rod for superior wear and corrosion resistance. The pump's exterior is constructed from aircraft grade extruded aluminum for an outstanding strength and reliability. The pump also has high quality seals and is designed for long-term durability and ease of service. The Lion HP is equipped with built-in pressure relief to protect the system from thermal expansion.

## Technical Data

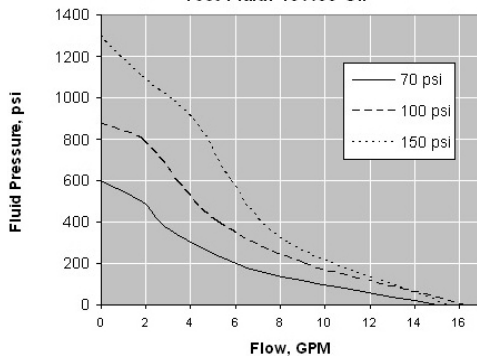
### Lion HP® 10:1 Ratio Pump

Specification Item	Value or Range
Nominal Pump Pressure Ratio	10:1
Air Motor Effective Piston Dia.	4.25 inches [107 mm]
Nominal Pump Stroke Length	3.25 inches [81.3 mm]
Air Motor Displacement	91.9 cubic inches [1.51 liters]
Pump Cycles per Gallon	28 cpg
Max. operating air pressure range	30 - 150 psi [2.75 - 10.3 Bar]
Recommended operating air pressure range	40 - 125 psi [2.75 - 8.6 Bar]
Fluid Stall Pressure @150 psi	1300 psi [90 Bar]
Relief valve cracking pressure	1450 psi [100 Bar]
Air consumption @ 100 psi air & 4 GPM	46 SCFM
Fluid suction lift	20 inches Hg.
Port size, fluid in	1" NPT(F) I.D. or 1.5" NPT(M) O.D.
Port size, fluid out	3/4" NPT(F)
Port size, supply air	1/2" NPT(F)
Wetted Parts	Carbon Steel, Buna, Aluminum, Nylon, Ultrathane, Nickel Plated Steel, SS
Compatible Fluids	Petroleum & Synthetic Oils, Gear Oil, ATF, Hyd. Fluid

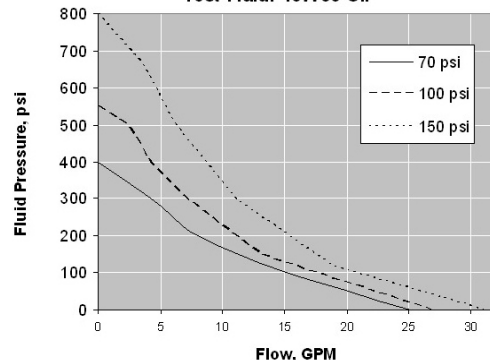
### Lion HP® 5:1 Ratio Pump

Specification Item	Value or Range
Nominal Pump Pressure Ratio	5:1
Air Motor Effective Piston Dia.	4.25 inches [107 mm]
Nominal Pump Stroke Length	3.25 inches [81.3 mm]
Air Motor Displacement	91.9 cubic inches [1.51 liters]
Pump Cycles per Gallon	14 cpg
Max. operating air pressure range	30 - 150 psi [2.06 - 10.3 Bar]
Recommended operating air pressure range	40 - 125 psi [2.75 - 8.6 Bar]
Fluid Stall Pressure @150 psi	800 psi [55 Bar]
Relief valve cracking pressure	850 psi [59 Bar]
Air consumption @ 100 psi air & 8 GPM	47 SCFM
Fluid suction lift	18 inches Hg.
Port size, fluid in	1.5" NPT(F)
Port size, fluid out	3/4" NPT(F)
Port size, supply air	1/2" NPT(F)
Wetted Parts	Carbon Steel, Buna, Bronze, Polyurethane, Nickel Plated Steel
Compatible Fluids	Petroleum & Synthetic Oils, Gear Oil, ATF, Hyd. Fluid

Pump Pressure/Flow (10:1)  
Test Fluid: 10W30 Oil



Pump Pressure/Flow (5:1)  
Test Fluid: 10W30 Oil



## Pump Installation



**WARNING:** Attach a proper ground wire to the pump grounding lug (item 52, p.10) before starting the pump.



**NOTE:** Pump performance will be degraded by air or fluid threaded connections which are not air-tight. Use Teflon™ tape or other suitable means to achieve a complete thread seal.

The Lion HP® pump may be mounted three ways: 1) using a reservoir bung fitting and Balcrank Universal Bung Adapter, model 4411-007N (model 1130-027 Lion HP 5:1 only). 2) wall mount the pump using a Wall Bracket, model 4411-001. 3) flange mounting using pumps bolt pattern.

If mounting to a reservoir bung port (model 1130-027 Lion HP 5:1 only), thread the bung adapter (4411-007N) into the bung thread on the fluid reservoir, attach a suitable suction tube or hose to the pump fluid entry port, lower the pump into the mounted bung adapter, then tighten the screws on the bung adapter. Install the 1/8" NPT x 3/8" barb in the port on the bung adapter. Slide one of the spring clamps on to each end of the included 3/8" clear tubing. Connect one end of the tubing to the barb fitting on the pressure relief valve (54) and the other end to the barb on the bung adapter. Slide the spring clamps up on both barb fittings to secure the tubing.

If mounting on a wall bracket, place the pump in the wall bracket, then secure pump with hardware provided. Attach a wall mount Suction Assembly Kit to the pump, then lower the suction tube into the reservoir, adjusting height to position the end of the tube 1 to 2 inches above the reservoir bottom. The connection on the pressure relief valve (54) will need to be routed back to the reservoir or another suitable collection point using 3/8" I.D. tubing of the appropriate length. The optional model 4411-024N 2" pvc collar can be used on a standard 2" bung port to facilitate routing the pressure relief connection back to the reservoir.



**CAUTION:** Always tighten pump down securely to avoid damage to the fluid reservoir, the pump, and nearby equipment. Be sure to use only the specified bung adapter.

Provide a drop-tee fitting, 3/4" size or larger, in the nearby air supply pipeline. From that tee, install the following pump air line assembly:

- pipe bushing or adapter (to bring the line drop size to 3/4" male)
- 1/2" pipe drop to pump level
- 1/2" pipe elbow
- 1/2" air F-R-L
- 1/2" air shutoff ball valve (having an air relief vent when closed)
- 1/2" to 3/8" reducer and a 3/8" x 3 ft. air hose
- 3/8" air line coupler and nipple.

Attach the air nipple to the air inlet port of the Lion HP® pump. During assembly of the air supply line, be sure to clean out all foreign materials before making connection to the pump.

Balcrank recommends that an air line lubricator be used with turbine oil (viscosity 150-170 SSU @ 100 ° F) and set at a maximum oil feed rate of 1 drop every 2 hours of pump operation.

The pump air motor has been coated internally with a special synthetic grease at initial assembly (available as Balcrank P/N 826733) and does not require additional grease except during reassembly after a repair.



**Figure 1**  
**Installed Lion HP® Pump**

## Pump Operation



**CAUTION:** Read all limitations which apply to selection of fluids which may be pumped by this product. Do not pump a fluid which is not specified to be compatible.



**CAUTION:** Always read and follow fluid manufacturers' recommendations regarding proper use of protective eye wear, clothing and respirators.

### To Start Pump:

- 1 Immerse the pump's suction tube or fluid inlet into the fluid to be pumped.
- 2 Connect the air coupler to the pump and turn the air regulator to the minimum setting.
- 3 Direct pump outlet hose into an approved waste oil container.
- 4 Slowly adjust the air regulator until the pump is primed and running smoothly. Be sure all air has been purged from the system. The pump should prime in less than 30 seconds.
- 5 Use the air regulator to control the pump's speed and cycle rate. Always use the lowest pressure required to obtain the desired flow rate. This will increase pump and seal life.
- 6 Never allow a pump to be run dry of the fluid being pumped. A dry pump quickly speeds up, which could damage the air motor and fluid seals. If the pump suddenly speeds up, cut off the air supply as soon as possible, refill the system fluid reservoir and reprime the pump.
- 7 If the pump will be unattended for any period of time, or to shut off the system at the end of a work shift, always follow the Pressure Relief Procedure on page 5 of this manual.



## WARNING

### Pressure Relief Procedure:

Follow this procedure whenever you shut off the pump, when checking or servicing any part of the system and when installing, cleaning or changing any part of the system.

- 1) Disconnect the air to the pump.
- 2) Point dispensing valve away from yourself and others.
- 3) Open dispensing valve until pressure is relieved.



**NOTE:** The air motor is lubricated with a life-tested synthetic grease (P/N 826733) at the factory. This grease coats all parts and repels air line moisture to inhibit corrosion. It is imperative that any grease removed during maintenance be replaced afterwards. Contact your local Balcrank distributor, using the above part number, for replacement grease.

## Pump Repair / Servicing

### Pump Disassembly Procedure:

#### Figure 11

- 1 Mount the pump horizontally in a bench vise. Clamp the vise to the upper body of the pump and use elastic jaw cushions in the vise to prevent scarring the pump surface. With a socket wrench, loosen and remove the four lower 5/16" Hex Bolts [14] and Lock Washers [12]. Then remove and set aside the Bare Pump subassembly. Also remove the Lower Body [4], Muffler [17], and Diffuser Plate [16].
- 2 If the air motor subassembly will not be repaired immediately, re-attach the Lower Body [4], Muffler [7], and Diffuser Plate [16] to the Air Motor subassembly, temporarily securing them with the 5/16" Bolts [14] and Lock Washers [12], turned hand tight. Remove the assembly from the vise.
- 3 For further disassembly, use the separate procedures which follow for the Air Motor and Lower Pump subassemblies.

### Air Motor Disassembly Procedure:

#### Figure 5

- 4 If the Lower Body [4], Muffler [17], and Diffuser Plate [16] are attached to the Air Motor subassembly,

remove them now, along with the four 5/16" Hex Bolts [14] and Lock washers [12] which secure them.

**5** Mount the Air Motor horizontally in a bench vise. Clamp the vise to the Upper Body [2] of the pump and use elastic jaw cushions in the vise to prevent scarring the pump surface.

**6** Using a socket wrench, hold the 1/2" Hex Bolt [7] on the pump Cap [1]. With a second socket wrench, loosen and remove the 1/2" Hex Nut [10] and Lock washer [9] at the other end of the 1/2"-13 Bolt [7]. Repeat the procedure for the other three Bolts. Set aside all fasteners in a group.

**7** Remove the Center Insert [3] from the subassembly by sliding it carefully off the Air Piston. Remove the two O-ring Seals, [5] and [26], from their glands on the Center Insert [3]. Set these parts aside in a group.

**8** Remove the Cap [1] from the top of the Air Motor. As the Cap [1] is removed, it must be shifted sideways approximately 1 inch to allow detachment from the internal Trip Rod. After removal of the Cap, remove the O-ring Seal [5] from the gland in the Cap. Set these parts aside in a group.

**9** Remove the Air Motor Subassembly [shown in figure 4] from the Upper Body [2]. Remove toward the top of the pump, opposite the direction of the 1/2" NPT port on the Upper Body. Slide out carefully, keeping the Air Piston square with the bore of the Upper Body. Remove the Upper body from the vise and set aside.

#### Figure 4

**10** Remove the O-Ring Seal [6] from the Air Piston [18]. Using a flat blade screwdriver, remove two Detent Sleeves [29], Detent Springs [28], and Detent Balls [27]. Set all of the removed parts aside as a group.

**11** Clamp the Air Piston in a vise applied to the 6" piston diameter. Note! Use Split wooden vise blocks matched to the piston diameter to prevent scarring the piston surface!

**12** Using two open-end wrenches, loosen the Jam Nuts [25] located on top of the Intake Valve Stems [22]. Remove the Jam Nuts and the two Intake Valve Stems. It may be necessary to secure the hex cap of the Valve Stem [22] with an open end wrench while removing the second nut. Then remove the O-Ring Seals [24] from the gland of the two Valve Stems [22].

**13** Remove the Valve Trip Assembly [shown in figure 3] from the top of the Air Piston. Remove the Air Piston plus Rod Coupler, items [18] and [19], from the vise and set aside. Note! It is not necessary

to separate the joint of the Air Piston and Coupler.

#### Figure 3

**14** Secure the assembly horizontally in a bench vise, clamping the parts at the flats located on the Rod Head [33]. Applying torque to the flats of the Retainer, Spring, Threaded [34], loosen the trip rod assembly. Note! Turn wrench slowly and steadily to prevent breaking male threads on the Trip Rod [32].

**15** Remove all parts from the Trip Rod [32]. Using vise-grip pliers, clamp the Trip Rod [32] near the Rod Head [33] and loosen the remaining threaded joint. Set aside all loose parts in a group, but retain the Valve Bar parts [shown in Figure 2] for further disassembly.

#### Figure 2

**16** Using two open-end wrenches, loosen the Jam Nuts [25] located on top of the Exhaust Valve Stems [23]. Remove the Jam Nuts and the two Exhaust Valve Stems. It may be necessary to secure the hex cap of the Valve Stem [23] with an open end wrench while removing the second nut. Then remove the O-Ring Seals [24] from the gland of the two Valve Stems [23].

**17** Clamp the subassembly in a vise on the flats of the Nut [15]. Using an adjustable open-end wrench, loosen the Detent Spool [20]. Separate all parts. Set aside all items from steps 16 and 17 in a group. Disassembly of the Air Motor is now complete.

### Lower Pump Disassembly Procedure:

#### Figure 10

**1** Clamp the subassembly shown in figure 10 in a bench vise, holding the parts at the flat edge of the flange of the Fluid Adapter [38]. Using a strap wrench, apply torque to the Pump Tube [51] to loosen and remove the Pump Tube and adjacent attached parts. Set these parts aside after removal.

#### Figure 9

**2** With the Fluid Adapter [38] still clamped in the bench vise, remove the Fluid Piston [48], Pump Rod [50] and associated attached parts by sliding them out of the Adapter [38]. Use care to avoid scarring the surface finish on the o.d. of the Pump Rod. Set aside the Rod and Piston parts.

#### Figure 8



**3** Using snap ring pliers, remove the Retaining Ring [46] from the Fluid Adapter [38]. Then remove the Cup Seal [44] and Wear Band [45]. Remove the O-Ring from the lower i.d. of the Fluid Adapter [38]. Remove the Fluid Adapter from the bench vise. Set all parts aside from figure 8 as a group.

#### Figure 7

**4** Clamp the Foot Valve Seat [39] in a bench vise. Using a strap wrench, loosen and remove the Pump Tube [51]. Using a pointed tool, push out the Pin [41], then remove the ball [40] and O-Ring Seal [43]. Set all parts aside from figure 7 as a group.

#### Figure 6

**5** Clamp the Pump Rod [50] in a bench vise. Note! Use Split wooden vise blocks matched to the Pump Rod diameter to prevent scarring the Rod surface! Remove the Wear Band [47] and O-Ring Seal [49]. Then, using a spanner wrench, loosen and remove the Fluid Piston [48]. It is not necessary to remove check valve parts internal to the Fluid Piston. If they are damaged or malfunctioning the entire assembly must be replaced. Set all parts aside. Disassembly of the Pump Lower is now complete.

### Lower Pump Assembly Procedure:

#### Figure 6

**1** Collect the parts group shown in figure 6. Substitute rebuild kit parts in place of old items where applicable. Clamp the Pump Rod [50] in a bench vise. Note! Use Split wooden vise blocks matched to the Pump Rod diameter to prevent scarring the Rod surface! Insert the Ball [40] into the cavity of the Pump Rod [50], apply Loctite thread lock to the o.d. threads of the Fluid Piston, then screw the Fluid Piston [48] into the Pump Rod [50] Tighten using a spanner wrench, to approximately 20 ft-lb torque.

**2** Apply a film of grease to the o.d. grooves of the Fluid Piston [48]. Install the Wear Band [47] and O-Ring Seal [49]. Set this subassembly aside.

#### Figure 7

**3** Collect the parts group shown in figure 7. Substitute rebuild kit parts in place of old items where applicable. Install the O-Ring Seal [43] on the o.d. shoulder of the Foot Valve Seat [39]. Install the Ball [40] and Pin [41]. Clamp the Foot Valve Seat [39] in a bench vise. Using a strap wrench, install and tighten the Pump Tube [51] to approximately 20 ft-lb. torque. Set this subassembly aside.

#### Figure 8

**3** Collect the parts group shown in figure 8. Substitute rebuild kit parts in place of old items where applicable. Clamp the Fluid Adapter [38] in a bench vise, gripping the edges of the flange, with rod cavity horizontal. Install the O-Ring Seal [42] on the i.d. shoulder of the Fluid Adapter [38]. Install the Cup Seal [44] and Wear Band [45] in the seal cavity of the Adapter. Note! cup seal lips point down, away from the adapter flange. Using snap ring pliers, install the Retaining Ring [46] into the Fluid Adapter [38] groove.

#### Figure 9

**4** With the Fluid Adapter [38] still clamped in the bench vise, install the Fluid Piston [48], Pump Rod [50] and associated attached parts from lower pump assembly step 2, by sliding them into the Adapter [38]. Use care to avoid scarring the surface finish on the o.d. of the Pump Rod.

#### Figure 10

**5** With the Fluid Adapter [38] still clamped in the bench vise, install parts previously combined in lower pump assembly step 3. Using a strap wrench, apply torque to the Foot Valve Seat [39] and tighten to 40 ft-lb torque. Lower Pump Assembly is now complete.

### Air Motor Assembly Procedure:

#### Figure 2

**1** Collect the parts group shown in figure 2. Substitute rebuild kit parts in place of old items where applicable. Install the Valve Bar [21] on the mating diameter of the Detent Spool [20]. Clamp the 5/8" Jam Nut [15] in a bench vise on the flats of the Nut and apply Loctite 638 thread lock to the internal threads of the Jam Nut [15]. Then, Using an adjustable open-end wrench, install and tighten the Detent Spool [20]. Apply 85 in-lb torque.

**2** Install the Exhaust Valve Stems [23] into the Valve Bar [21]. Apply Loctite 638 thread lock to the internal threads of the 5/16" Jam Nuts [25] and install on the stems [23] and tighten to 70 in-lbs using two open-end wrenches. It will be necessary to secure the hex cap of the Valve Stem [23] with an open end wrench while securing the first nut. Then install the O-Ring Seals [24] into the gland of the two Valve Stems [23].

#### Figure 3

**3** Secure the Rod Head [33] in a bench vise, clamping the part across the flats. Apply Loctite

263 to the internal threads. Install the Trip Rod [32] and tighten to 40 in-lb torque. Use vise grips, applied near the Rod Head, to turn the Trip Rod.

**4** Install the following items onto the Trip Rod [32] in the sequence and orientation shown in figure 3: Spring Retainer [14, qty=3], Trip Spring [15, qty=2], assembled parts from stage 1, figure 2.

**5** Apply Loctite 263 to the internal threads of the Spring Retainer, Threaded [34]. Install the Spring Retainer, Threaded on the end of the Trip Rod [32] and tighten the entire assembly to 100 in-lbs torque.

#### Figure 4

**7** Clamp the Air Piston [18] in a vise, with clamping pressure applied to the 6" diameter on the piston. Note! Use Split wooden or elastic vise blocks matched to the piston diameter to prevent scarring the piston surface!

**8** Apply a film of grease in the center cavity of the Air Piston [18]. Insert the assembled parts from assembly stage 2 (per figure 3) into the cavity, oriented as shown in figure 4.

**9** Apply a film of grease to the seal gland and o.d. surfaces of the Intake Valves [22]. Install O-Ring Seals [24] on the Intake Valves. Then pass the valves through the ports of the Air Piston [18] and into the mating holes on the Valve Bar [21]. Secure the Valves with 5/16" Jam Nuts [25]. Tighten all Jam Nuts to 70 in-lb torque.

**10** Apply a film of grease to the 1/2" Ball [27, qty=2] and Detent Spring [28, qty=2]. Then by hand, apply upward pulling force on the Trip Rod assembly, so that the intake valves [22] are completely closed. With the Trip Rod held in that position, install the 1/2" Steel Ball [27], Detent Spring [28] and Detent Sleeve [29] in each of the two detent ports located on the Air Piston [18]. It will be necessary to unclamp and adjust position of the Air Piston during this procedure.

**11** Apply a film of grease to the o.d. seal gland on the Air Piston [18], then install the O-Ring Seal [6]. Remove the Air piston from the vise and apply a film of grease to the 6" diameter piston surface. Set aside the completed subassembly.

#### Figure 5

**12** Clamp the Upper Body in a bench vise, oriented with bore horizontal. Use elastic jaw cushions in the vise to prevent scarring the pump surface. Install the Air Motor Subassembly [shown in figure 4] into the Upper Body [2]. Install from the top of the pump, opposite the direction of the 1/2" NPT port on the Upper Body. Slide in carefully, keeping the Air Piston square with the bore of the Upper Body.

**13** Install the O-ring Seal [5] into the gland in the Cap [1]. Install the Cap [1] on the top of the Air Motor. When the Cap [1] is installed, it must be shifted sideways approximately 1 inch to allow attachment of the internal Rod Head [33, fig 2] into the slot on the Cap [1].

**14** Apply a film of grease to the seal glands on the Center Insert [3]. Install the two O-ring Seals, [5] and [26], in their glands on the Center Insert [3]. Install the Center Insert [3] on the subassembly by sliding it gently onto the Air Piston.

**15** Install the Bolts [7, qty=4] as shown in figure 5, into the holes on the subassembly. Using a socket wrench, hold the 1/2" Bolt [7] on the pump Cap [1]. With a second socket wrench, install the 1/2" Hex Nut [10, qty=4] and Lock washer [9, qty=4] at the other end of the 1/2"-13 Bolt [7] and tighten. Leave the Upper Body clamped in the bench vise.

### Final Pump Assembly Procedure:

#### Figure 11

**16** Install the Lower Body [4] in position on the Air Motor (from figure 5), with Dowel Pins on the Lower Body oriented away from the Air Motor. Install the Muffler [17] and Diffuser Plate [16] in the counterbore of the Lower Body [4].

**17** Install the Bare Pump subassembly on the Air Motor as shown in figure 11. The muffler must be loosened, Pump Rod, muffler, and diffuser plate shifted off-center 1", then moved into position and the Pump Rod locked into the coupler slot on the bottom of the Air Piston. After attachment to the Air Piston, reposition the muffler and diffuser plate then move the flange of the Fluid Adapter into tight contact with the Lower Body. Install the 5/16" Bolts [14] and Lock washers [12], then tighten to 100 in-lb torque. Pump assembly is complete.



## Troubleshooting Guide



**NOTE:** Check all other possible causes of operating problems, and apply remedial action, before disassembling pump.



**WARNING:** Before beginning pump repair, all internal pressure must be relieved. To reduce risk of personal injury, follow the Pressure Relief Procedure shown on pages 2 and 5.

Trouble	Probable Cause	Corrective Action
Pump does not operate	Inadequate air supply pressure or restricted air line  Clogged lines, hoses, valves, etc.  Damaged air motor	Increase line size or clear air supply <sup>(1)</sup> Assure air is on and valves are open  Open; clear <sup>(1)</sup>  Service / replace air motor
Air motor is not tripping over	Air motor seals are worn/damaged	Service / replace air motor / Insure a filter is used on air inlet to pump
Air is leaking from exhaust and or seal damage, etc.	Air motor seals are worn/damaged	Service / replace air motor Insure a filter is used on air inlet to pump
Fluid is leaking from the exhaust	Fluid seal [44, fig 8] is worn/damaged	Replace fluid seal
Erratic pump operation	Air entering suction line  Pressure relief valve is stuck (Model 1130-024, 10:1 pump only)  Fluid level too low  Air motor icing cycles per minute; clean muffler [17]	Check for loose suction connections  replace fluid piston (p/n 831143)  Refill, reprime or flush  Run pump at lower pressure; run at lower
Pump runs continuously	Empty fluid supply  Blockage in pump tube or foot valve [39]  Lower ball [40] is stuck in foot valve [39]  Lower seal [49] is worn or damaged	Refill, reprime or flush  Remove pump tube, clear blockage  Replace ball and reseal foot valve  Replace
Fluid output on one stroke only or continues to operate when dispensing valve is closed	Upper ball [40] is stuck in fluid piston [48] or one or both are damaged	Replace ball and reseal
Pump operates slowly, and pump output on both strokes is low	Inadequate air supply pressure or restricted air line  Closed or clogged solenoid valve, meter, dispensing valve, etc.  Air inlet strainer/filter clogged	Increase air supply; increase air supply size  Clear <sup>(1)</sup>  Clear <sup>(1)</sup>

(1) Follow the **Pressure Relief Procedure** and disconnect the fluid line. If the pump starts when the air is turned on again, the line, etc. is clogged.

**Parts List**  
**Lion HP® 10:1 Pump**  
**1130-024**

**Service Kits**  
900020 Pump Lower Rebuild Kit  
900027 Air Motor Rebuild Kit (\*see note)  
900028 Air Motor Soft Parts Kit (\*see note)

Item	Part Number	Description	Pump Qty	Service Kit Qty		
				900020	900027	900028
1	831791	Cap	1			
2	833253	Upper Body	1			
3	831793	Center Insert	1			
4	831795	Lower Body	1			
5	830659	Seal, O-Ring, dash 258	2		2	2
6	806909	Seal, O-Ring, dash 433	1		1	1
7	833526	Bolt, 1/2-13	4			
8		No Longer Used				
9	805841	Washer, Lock, 1/2	4			
10	805813	Nut, Hex, 1/2-13	4			
11		No Longer Used				
12	805844	Washer, Lock, 5/16	4			
13		No Longer Used				
14	833527	Bolt, 5/16-18	4			
15	831366	Nut, Hex Jam, 5/8-18	1		1	
16	832228	Diffuser Plate	1			
17	832105	Muffler	1			
18	831799	Air Piston	1			
19	831913	Coupler Rod	1			
20	831660	Spool, Detent	1		1	
21	831759	Valve Bar	1		1	
22	831761	Valve Stem, Intake	2		2	
23	831762	Valve Stem, Exhaust	2		2	
24	831665	Seal, O-Ring, Polymod, dash 110	4		4	4
25	831764	Nut, Hex Jam, 5/16-18	8		8	
26	831367	Seal, O-Ring, Dash 345	1		1	1
27	813905	Ball	2		2	
28	807939	Spring	2		2	
29	831914	Sleeve, Detent	2		2	
30	831766	Spring	2		2	
31	831767	Retainer, Spring	3		3	
32	831768	Trip Rod	1		1	
33	831769	Rod Head	1		1	
34	831770	Retainer, Spring, Threaded	1		1	
35	830641	Label, Lion	1			
36	830350	Label, Warning	1			
37	832114	Lifting Eye	1			
38	831823	Fluid Adapter, Lion HP 10:1	1			
39	831993	Foot Valve Seat, Vented	1			
40	806962	Ball	2			
41	829769	Pin, Footvalve	1	1		
42	826678	Seal, O-Ring, Dash 133	1	1		
43	828359 <sup>(1)</sup>	Seal, O-Ring, Dash 136	1	1		
	826676 <sup>(2)</sup>	Seal, O-Ring, Dash 033	0	1		
44	831540	Seal, Polypak, Ultrathane	1	1		
45	831542	Wear Band	1	1		
46	831544	Snap Ring	1	1		
47	826248	Wear Band	1	1		
48	831143	Fluid Piston w/ Pressure Relief	1			
49	831638	Seal, O-Ring, Dash 325	1	1		
	827065***	Seal, Quad-Ring, Viton -325	1			
50	831667	Pump Rod	1			
51	832560	Pump Tube	1			
52	831489	Ring Terminal, Grounding (not shown)	1			
53		Not Used				
54	833064	Valve, Pressure Relief, 1400 psi	1			
55	833189	Kit, Pressure Relief Hose	1			

\*Additional parts in kit. Kit is also used for Tiger HP pumps

(1) This O-ring used on models built before 10/13/08 and after 10/13/11

(2) This O-ring used on models built between 10/13/08 and 10/13/11 - Identified in service kit by twist tie

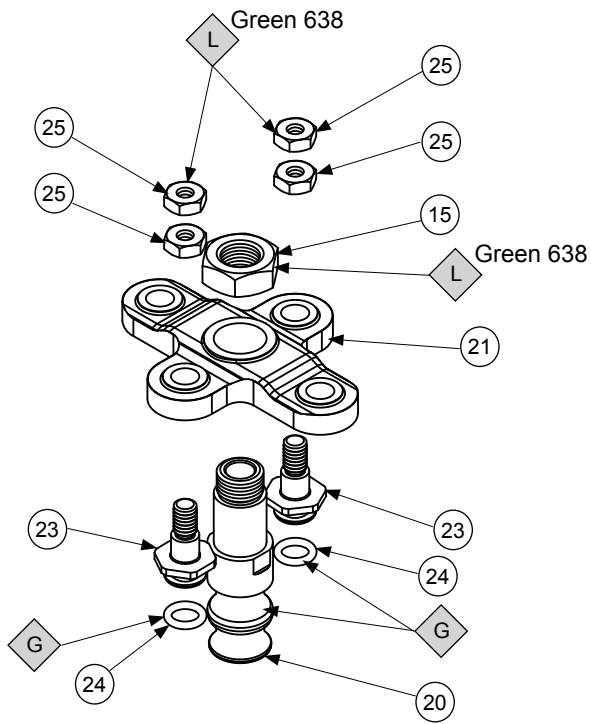
\*\*\* This Quad-Ring only used on model 1130-024V

**Parts List**  
**Lion HP® 5:1 Pump**  
**1130-027**

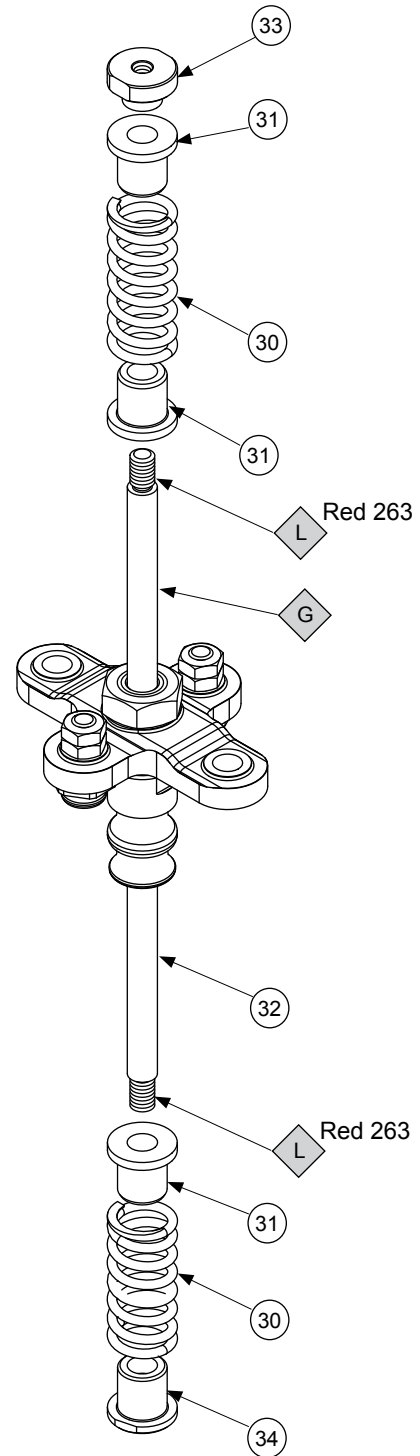
**Service Kits**  
900030 Pump Lower Rebuild Kit  
900027 Air Motor Rebuild Kit (\*see note)  
900028 Air Motor Soft Parts Kit (\*see note)

Item	Part Number	Description	Pump Qty	Service Kit Qty		
				900030	900027	900028
1	831791	Cap	1			
2	833253	Upper Body	1			
3	831793	Center Insert	1			
4	831795	Lower Body	1			
5	830659	Seal, O-Ring, dash 258	2		2	2
6	806909	Seal, O-Ring, dash 433	1		1	1
7	833526	Bolt, 1/2-13	4			
8		No Longer Used				
9	805841	Washer, Lock, 1/2	4			
10	805813	Nut, Hex, 1/2-13	4			
11		No Longer Used				
12	805844	Washer, Lock, 5/16	4			
13		No Longer Used				
14	833527	Bolt, 5/16-18	4			
15	831366	Nut, Hex Jam, 5/8-18	1		1	
16	832109	Diffuser Plate	1			
17	832105	Muffler	1			
18	831799	Air Piston	1			
19	831913	Coupler Rod	1			
20	831660	Spool, Detent	1		1	
21	831759	Valve Bar	1		1	
22	831761	Valve Stem, Intake	2		2	
23	831762	Valve Stem, Exhaust	2		2	
24	831665	Seal, O-Ring, Polymod, dash 110	4		4	4
25	831764	Nut, Hex Jam, 5/16-18	8		8	
26	831367	Seal, O-Ring, Dash 345	1		1	1
27	813905	Ball	2		2	
28	807939	Spring	2		2	
29	831914	Sleeve, Detent	2		2	
30	831766	Spring	2		2	
31	831767	Retainer, Spring	3		3	
32	831768	Trip Rod	1		1	
33	831769	Rod Head	1		1	
34	831770	Retainer, Spring, Threaded	1		1	
35	830641	Label, Lion	1			
36	830350	Label, Warning	1			
37	832114	Lifting Eye	1			
38	822367	Fluid Adapter, Lion HP 5:1	1			
39	827929	Foot Valve	1			
40	806962	Ball	2			
41	827931	Pin, Footvalve	2		2	
42	822372	Seal, O-Ring, Dash 146	1		1	
43	808691	Ball	1			
44	828945	Seal	1		1	
45	831134	Adapter Plate	1			
46	823101	Screw, 1/4-28 x 5/8	6			
47	827928	Wear Band	1		1	
48	827925	Fluid Piston	1			
49	827927	Seal, Quad-Ring, Viton, Dash 331	1		1	
50	831135	Pump Rod	1			
51	822375	Pump Tube	1			
52	831489	Ring Terminal, Grounding (not shown)	1			
53	822402	Spring	1		1	
54	833052	Valve, Pressure Relief, 850 psi	1			
55	833189	Kit, Pressure Relief Hose	1			

\*Additional parts in kit. Kit is also used for Tiger HP pumps



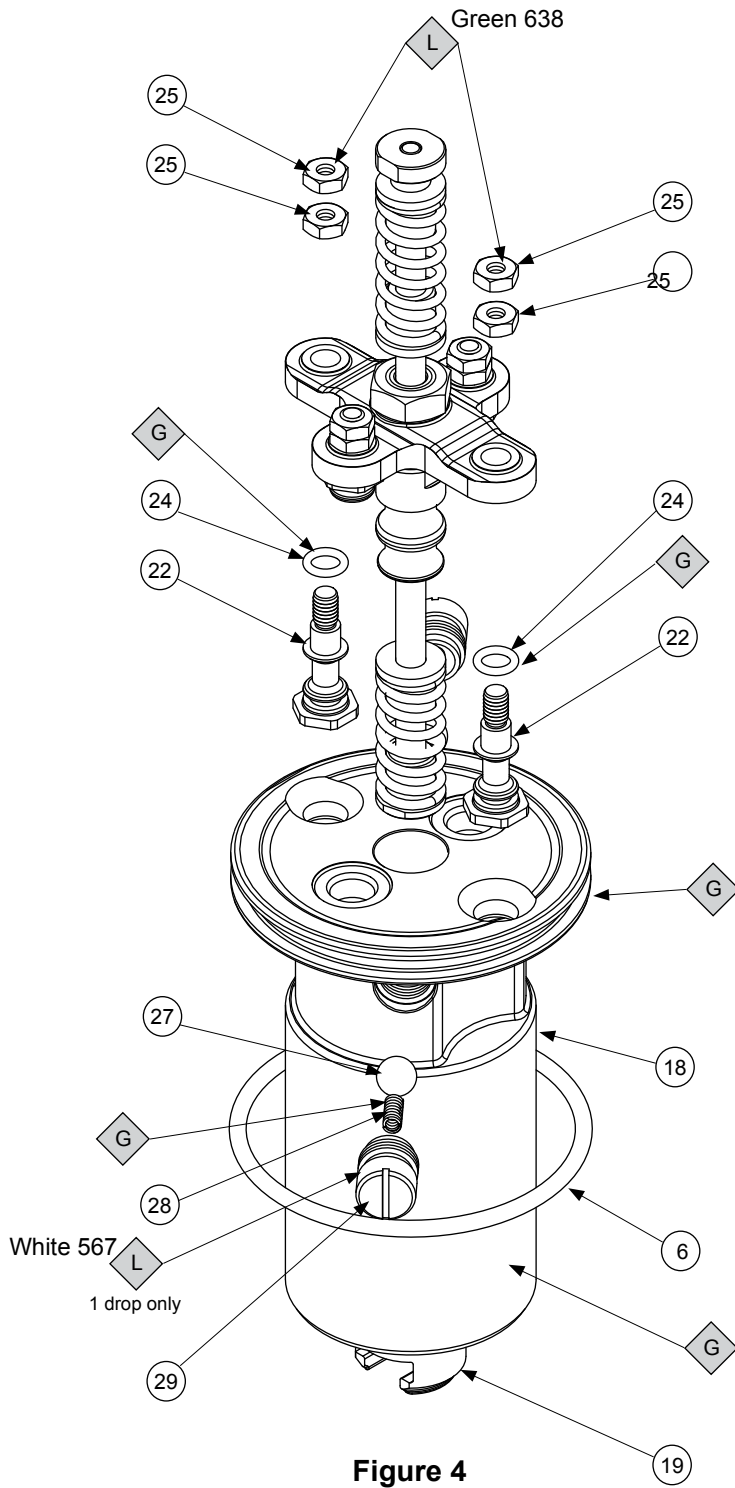
**Figure 2**  
**Head Assembly**  
**Assembly Stage 1**



**Figure 3**  
**Head Assembly**  
**Assembly Stage 2**

**Exploded Views**  
**Lion HP® Pump**  
**Air Motor**

- (25) - Item number, see page 10
- G - Grease application point, see detail in written procedure
- L - Loctite application point, see detail in written procedure

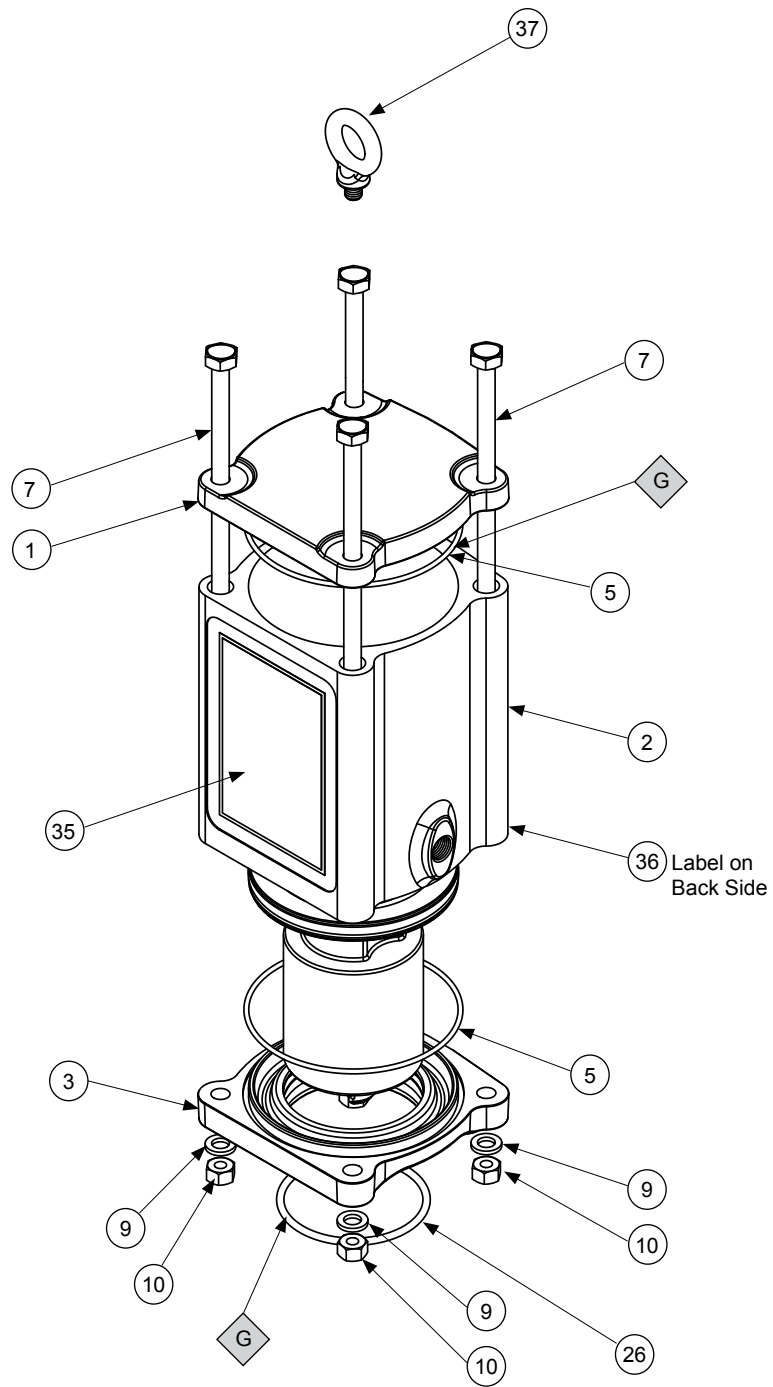


**Figure 4**  
**Head Assembly**  
**Assembly Stage 3**

**Exploded Views**  
**Lion HP® Pump**  
**Air Motor**

- 25 - Item number, see page 10
- Grease application point, see detail in written procedure
- Loctite application point, see detail in written procedure

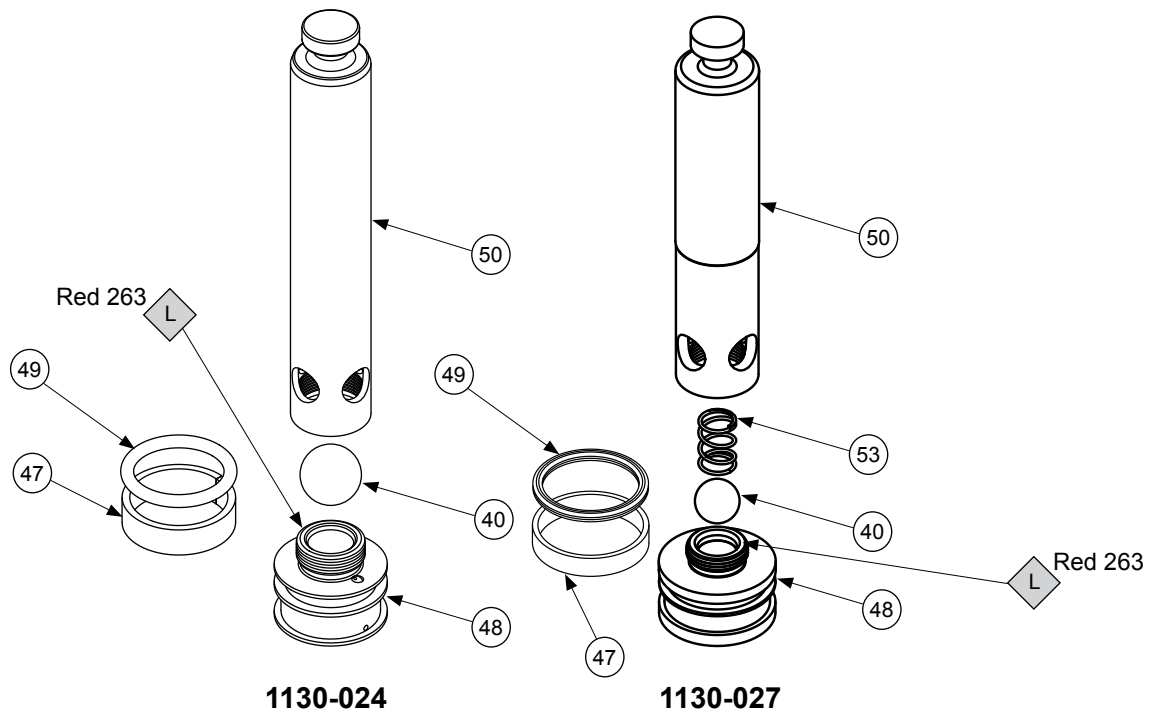




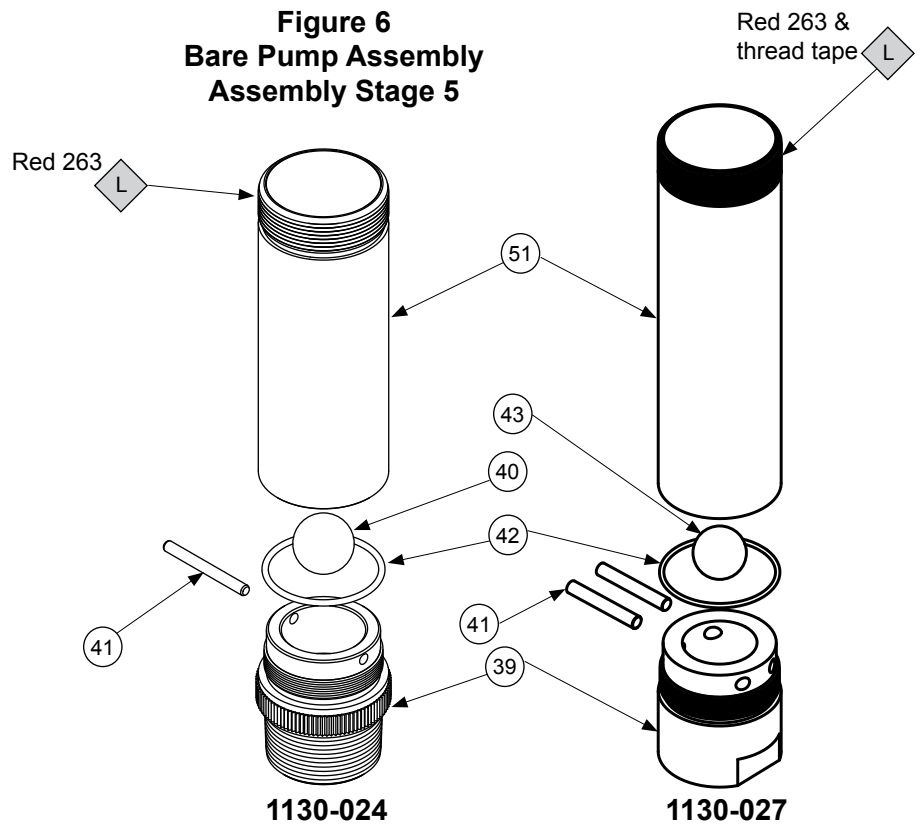
**Exploded Views**  
**Lion HP® Pump**  
**Air Motor**

- 25 - Item number, see page 10
- G - Grease application point, see detail in written procedure
- L - Loctite application point, see detail in written procedure

**Figure 5**  
**Head Assembly**  
**Assembly Stage 4**



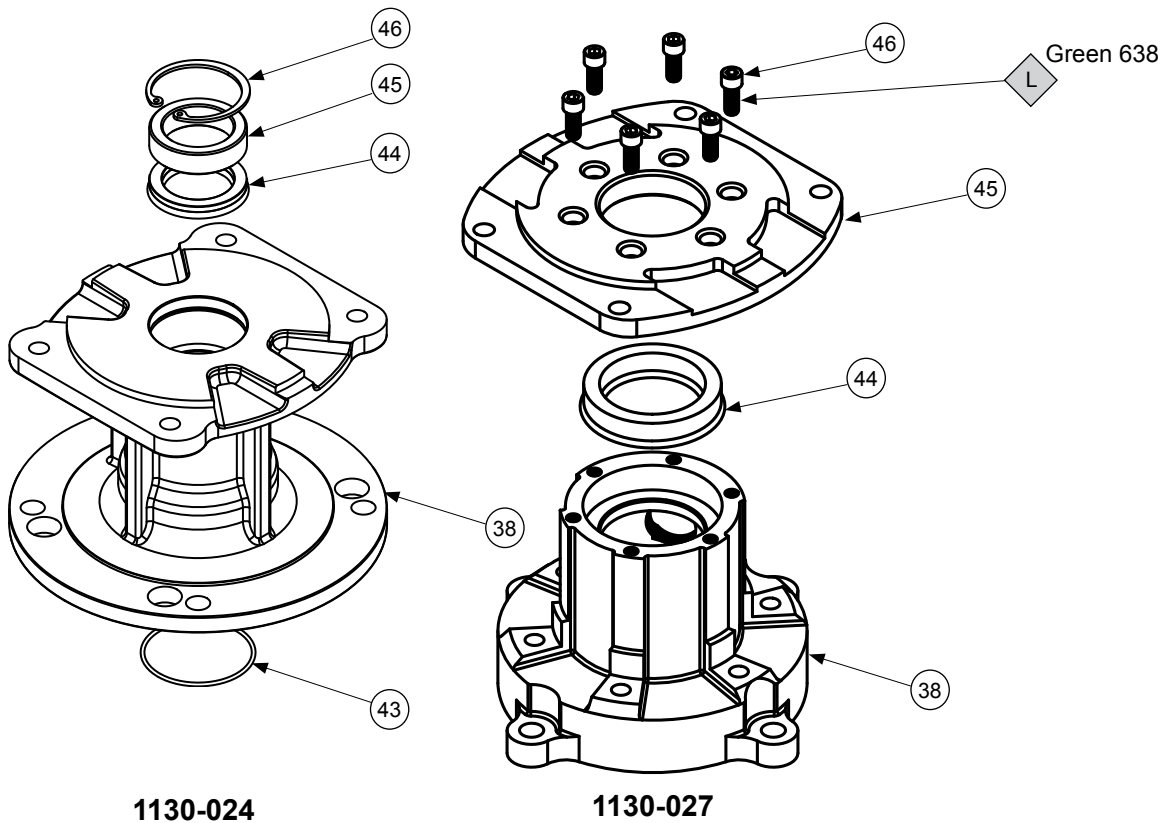
**Figure 6**  
**Bare Pump Assembly**  
**Assembly Stage 5**



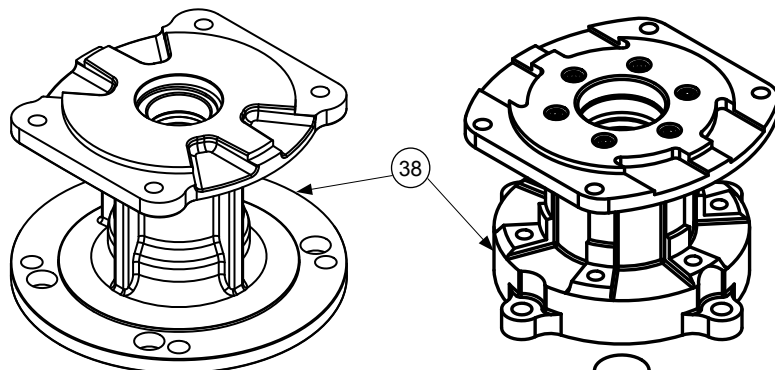
**Figure 7**  
**Bare Pump Assembly**  
**Assembly Stage 6**

**Exploded Views**  
**Lion HP® Pump**  
**Lower Assembly**

- (25) - Item number, see page 10
- G - Grease application point, see detail in written procedure
- L - Loctite application point, see detail in written procedure

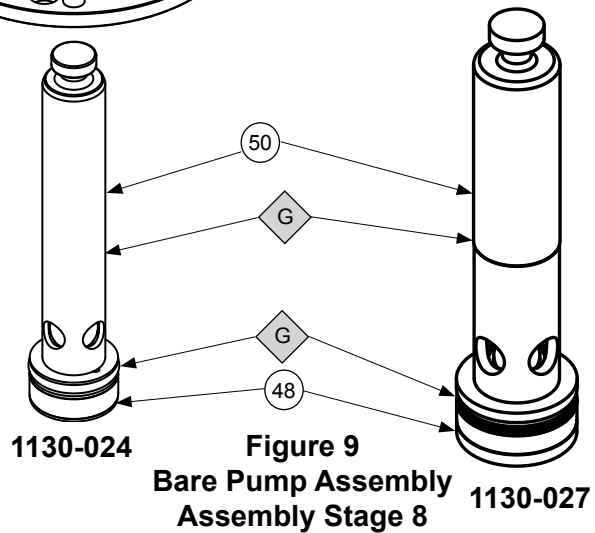


**Figure 8**  
**Bare Pump Assembly**  
**Assembly Stage 7**

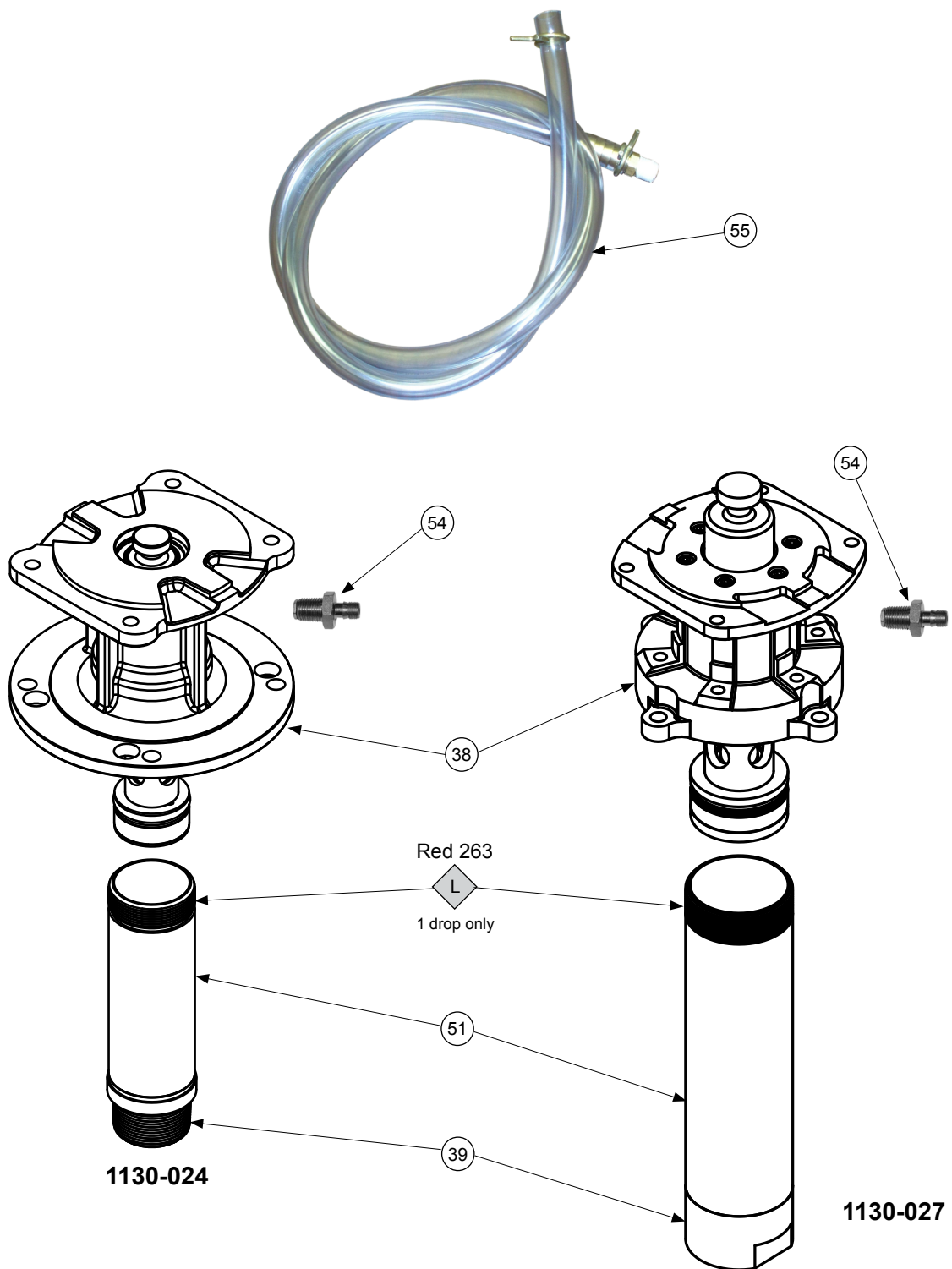


**Exploded Views**  
**Lion HP® Pump**  
**Lower Assembly**

- (25) - Item number, see page 10
- G - Grease application point, see detail in written procedure
- L - Loctite application point, see detail in written procedure



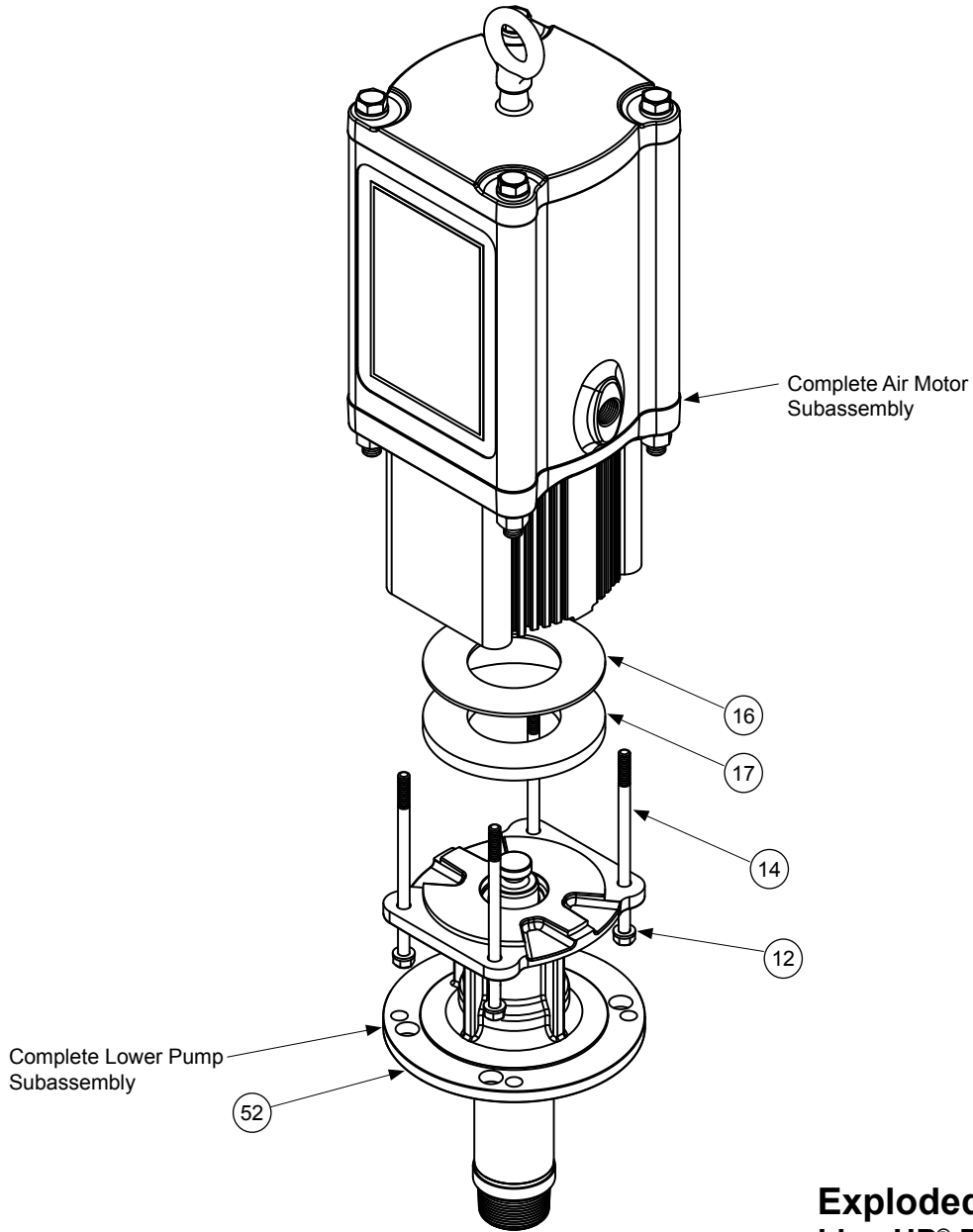
**Figure 9**  
**Bare Pump Assembly**  
**Assembly Stage 8**



**Figure 10**  
**Bare Pump Assembly**  
**Assembly Stage 9**

**Exploded Views**  
**Lion HP® Pump**  
**Lower Assembly**

- 25 - Item number, see page 10
- G - Grease application point, see detail in written procedure
- L - Loctite application point, see detail in written procedure



**Figure 11**  
**Final Pump Assembly**  
**Assembly Stage 10**

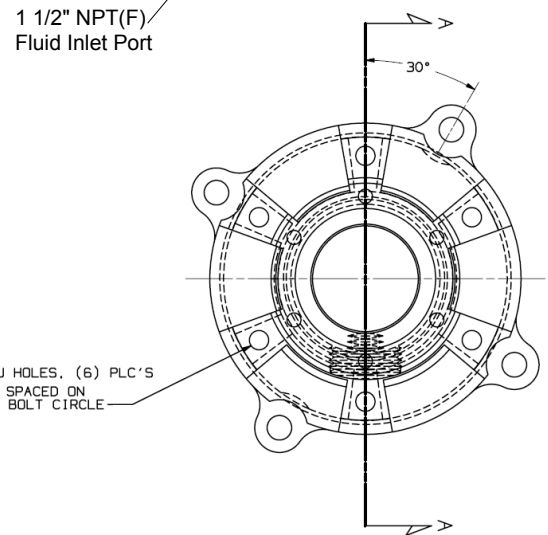
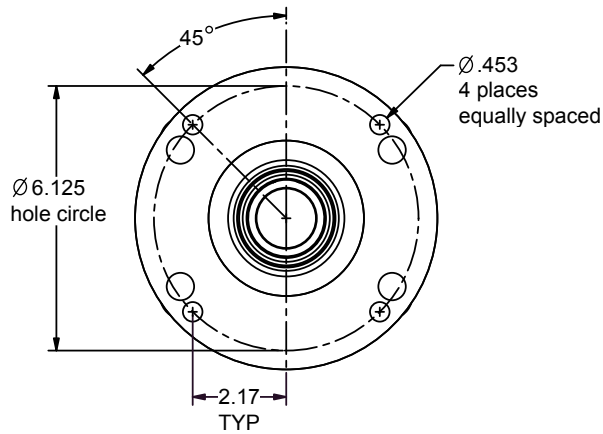
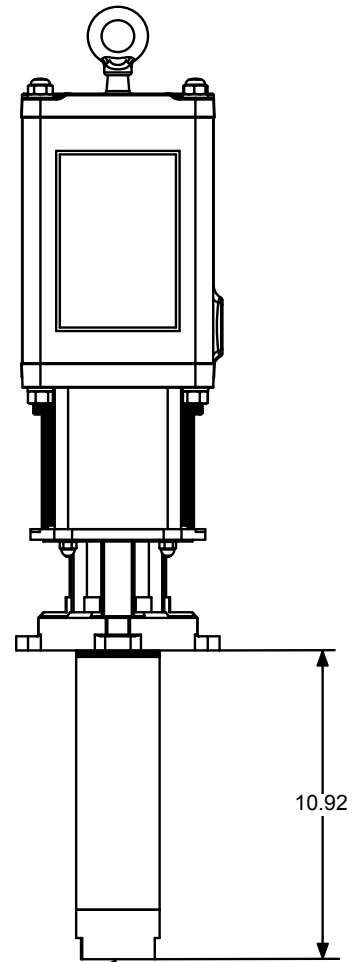
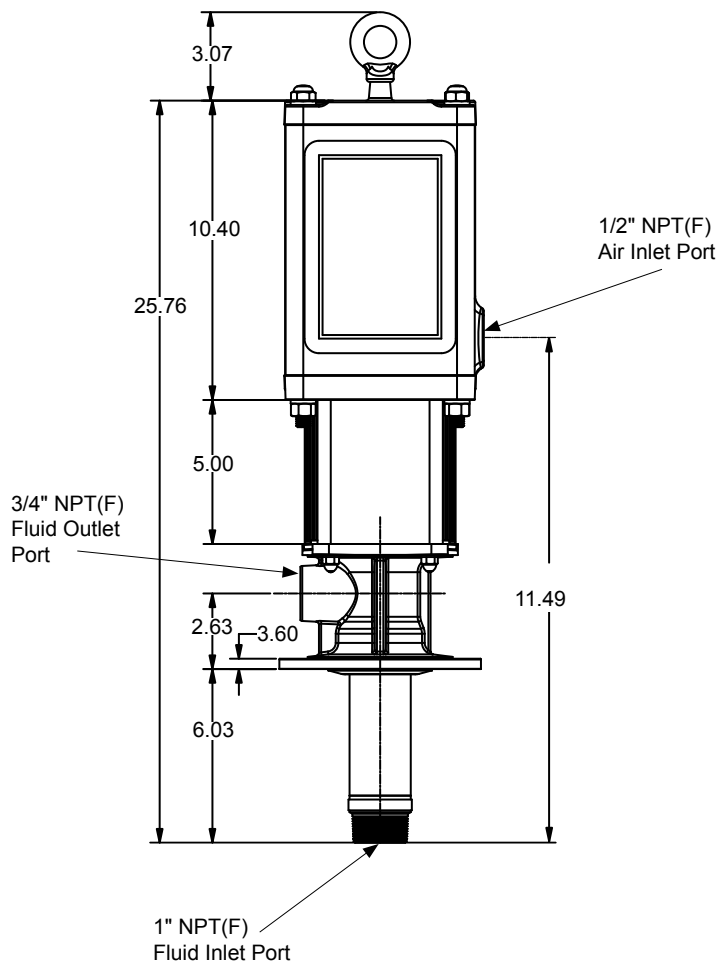
**Exploded Views**  
**Lion HP® Pump**  
**Complete Pump**

- |      |  |
|------|--|
| (25) | - Item number, see page 10                                   |
| G    | - Grease application point, see detail in written procedure  |
| L    | - Loctite application point, see detail in written procedure |



**Lion HP® 10:1  
Model 1130-024**

**Lion HP® 5:1  
Model 1130-027**



**Figure 12  
Complete Pump  
Dimensions & Features**

**Lion HP® Pump  
Complete Pump**

# Accessories

**4411-007N\***  
Universal Bung Adapter



\*Only for use with model 1130-027  
Lion HP 5:1

**4411-024N**  
2" PVC collar for fill port



**For Warranty Information Visit:  
[www.balcrank.com](http://www.balcrank.com)**

**Balcrank® Corporation**  
Weaverville, NC 28787  
800-747-5300  
800-763-0840 Fax  
[www.balcrank.com](http://www.balcrank.com)

Service Bulletin SB 1073  
Rev. N 12/15

## Revision Log:

Rev. A - 5/06 - New Release  
Rev. B - 6/06 - changed item 6  
Rev. C - 9/06 - added 5:1  
Rev. D - 8/07 - updated part number, Item 16  
Rev. E - 12/08 - added note about kits 900027 & 900028 on pages 10 & 11 and updated warranty statement  
Rev. F - Added tech data for 5:1 pump on pages 3 and 19  
Rev. G - Updated item numbers 2 (pages 9 & 10) 43 & 51 (page 10)  
Rev. H - Removed item 8 (no longer used) from pgs 10,11 & 14. Updated warranty information  
Rev. I - Updated technical data  
Rev. J - Added part numbers for new pressure relief and accessories  
Rev. K - Corrected part number for Lion HP 5:1 Lower rebuild kit pg. 11  
Rev. L - Changed part number for item 43 (model 1130-024)  
Rev. M - Corrected fluid stall pressures [Bar] in Technical Data on page 3  
Rev. N - Updated part numbers for items 7, 14, & removed items 11 & 13 (per ECN 16111)