

PLUS
Viscount[®] I
Hydraulic Motor

308330L
EN

Used as hydraulic drive for reciprocating pumps. For professional use only.

Parts 236417, Series A, and 261466, Series A Hydraulic Motor

Parts 236418, Series C, and 253608, Series A, Hydraulic Reciprocator

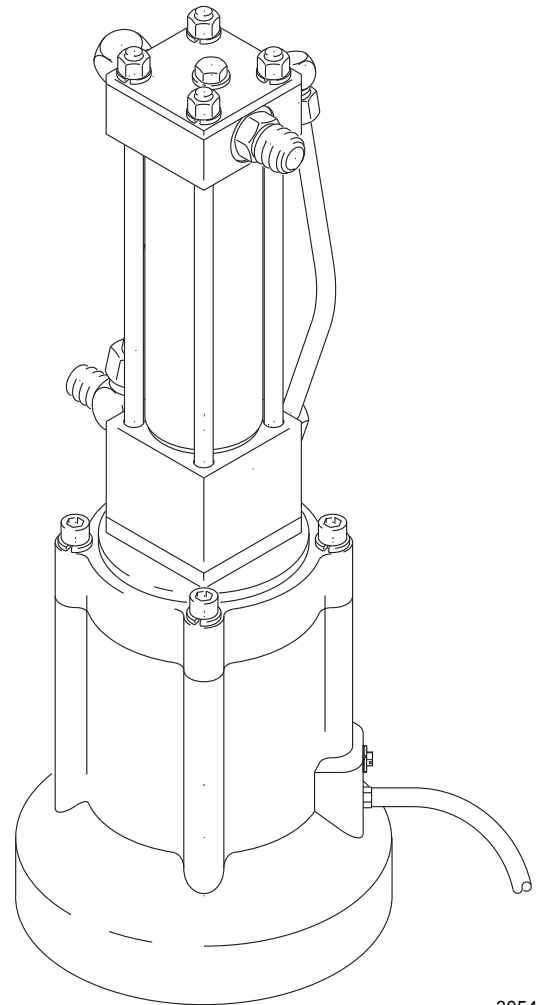
1500 psi (10 MPa, 102 bar) Maximum Hydraulic Input Pressure

See page 22 for maximum working pressures.

See also Manual 311211, High-Flo[®] Pumps



Important Safety Instructions
Read all warnings and instructions in this manual. Save these instructions.



236417 Motor Shown









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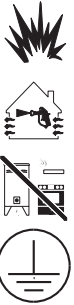


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Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.




 WARNING	
 	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> Do not operate the unit when fatigued or under the influence of drugs or alcohol. Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical Data in all equipment manuals. Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer. Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the Pressure Relief Procedure when equipment is not in use. Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. Make sure all equipment is rated and approved for the environment in which you are using it. Use equipment only for its intended purpose. Call your distributor for information. Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not kink or over bend hoses or use hoses to pull equipment. Keep children and animals away from work area. Comply with all applicable safety regulations.
  	<p>SKIN INJECTION HAZARD</p> <p>High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> Do not spray without tip guard and trigger guard installed. Engage trigger lock when not spraying. Do not point gun at anyone or at any part of the body. Do not put your hand over the spray tip. Do not stop or deflect leaks with your hand, body, glove, or rag. Follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing equipment. Tighten all fluid connections before operating the equipment. Check hoses and couplings daily. Replace worn or damaged parts immediately.
 	<p>MOVING PARTS HAZARD</p> <p>Moving parts can pinch, cut or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> Keep clear of moving parts. Do not operate equipment with protective guards or covers removed. Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure and disconnect all power sources.

WARNING

	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc). • Keep work area free of debris, including solvent, rags and gasoline. • Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present. • Ground all equipment in the work area. See Grounding instructions. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are antistatic or conductive. • Stop operation immediately if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area.
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • Read MSDSs to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear, and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer

Installation

Grounding

						
<p>The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current.</p>						

1. *Pump:* remove the ground screw (Z) and insert through the eye of the ring terminal at the end of the ground wire (Y). Fasten the ground screw onto the pump and tighten securely. Connect the other end of the wire to a true earth ground. See FIG. 1. To order a ground wire and clamp, order part number 222011.
2. *Hydraulic hoses and fluid outlet hoses:* use only electrically conductive hoses.
3. *Hydraulic power supply:* follow manufacturer's recommendations.
4. *Spray gun/dispensing valve:* obtain grounding through connection to a properly grounded fluid hose and pump.
5. *Fluid supply container:* according to local code.
6. *Object being sprayed:* according to local code.
7. *Any pails used when flushing:* use only metal, grounded pails when flushing. Make firm metal-to-metal contact between a metal part of the gun/ valve and the pail. Use the lowest possible pressure.
8. *To maintain grounding continuity when flushing or relieving pressure,* always hold a metal part of the

gun/valve firmly to the side of a metal pail, and then open the gun/valve.

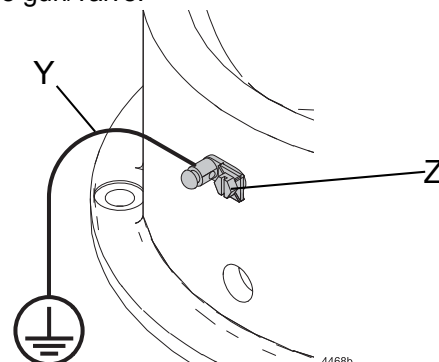


FIG. 1

General

Connect the hydraulic motor (A) to the displacement pump (B) as explained in your separate pump manual. See FIG. 2.

Mount the pump to suit the type of installation planned. Motor mounting plate kit 236714 (P) is available; contact your Graco distributor for more information.

Be sure that your power supply is equipped with a suction filter to the hydraulic pump and a system return line filter of 10 micron size.

NOTICE

Keep the hydraulic system clean

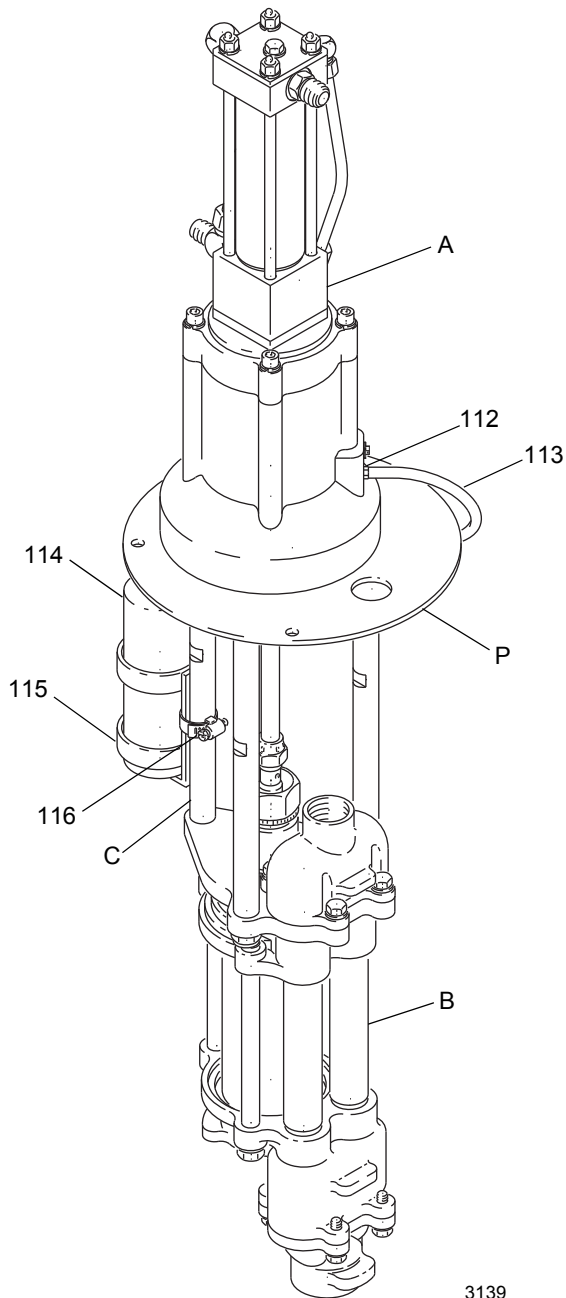
To reduce the risk of damaging the hydraulic power supply and motor, blow out all hydraulic lines with air, flush thoroughly with solvent, and then blow out with air again before connecting the lines to the hydraulic motor.

Always plug the hydraulic inlets, outlets, and lines when disconnecting them for any reason to avoid introducing dirt and other contaminants into the system.

Carefully follow the manufacturer's recommendations on reservoir and filter cleaning, and periodic changes of the hydraulic fluid. The maximum water content of the hydraulic oil is 1 percent.

Install the Drain Bottle

1. Push the drain hose (113) securely onto the barbed adapter (112). See FIG. 2.
2. Position the holder (115) on a pump tie rod (C) and secure with the hose clamp (116). Place the drain bottle (114) in the holder.
3. Place the drain hose (113) in the drain bottle so it hangs well down inside the bottle. Adjust the position of the holder, if necessary.



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FIG. 2

Operation

Pressure Relief Procedure



Fluid under high pressure can be injected through the skin and cause serious injury. To reduce the risk of an injury from injection, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

- are instructed to relieve the pressure,
 - stop spraying,
 - check or service any of the system equipment,
 - or install or clean the spray tips.
1. Lock the spray gun/dispensing valve safety latch.
 2. Close the supply line shutoff valve(s) first, then the return line shutoff valve(s). In a multi-pump system, do this at each pump to isolate the pumps.
 3. Unlock the gun/valve safety latch.
 4. Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun/valve to relieve pressure.
 5. Lock the gun/valve safety latch.
 6. Open the pump outlet drain valve(s), having a container ready to catch the drainage.
 7. Leave the drain valve(s) open until you are ready to spray/dispense again.

If you suspect that the tip/nozzle or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, very slowly loosen the tip guard retaining nut or hose end coupling to relieve pressure gradually, then loosen completely and clear the obstruction.

Startup

Before each use, check the hydraulic fluid level and add fluid as necessary to fill the lines.

To start the pump, turn on the hydraulic power supply. Open the return line shutoff valve **first**, then open the supply line shutoff valve.



Hydraulic Oil Temperature

If hydraulic oil becomes too hot, it can reach its flash point and cause a fire. Operating at too high an oil temperature can also cause faster motor seal wear and leakage. The recommended hydraulic oil operating temperature is 80-115°F (27-45°C). If the oil temperature approaches 130°F (54°C), shut off the motor and check the hydraulic oil supply cooling system, filters, etc. Clean or repair as needed.

Always use Graco-approved Hydraulic Oil or equivalent. Order Part No. 169236, 5 gal. (19 liter) or 207428, 1 gal. (3.8 liter). Do not substitute a lower grade oil or one with a lower flash point.

The equivalent is a premium, ISO grade 46 petroleum-based hydraulic oil containing rust and oxidation inhibitors and anti-wear agents. Before using any other type of oil in this equipment, contact your Graco distributor. **Unauthorized use of lesser grade oil or substitutes will void the warranty.**

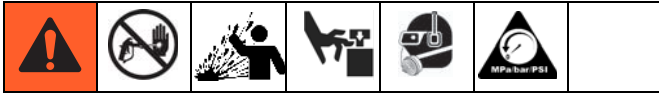
Shutdown & Care



To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure**, page 7.

Relieve the pressure. Always shut off the supply line shutoff valve **first**, and then the return line shutoff valve. This is to prevent over pressurizing the motor or its seals. When starting the hydraulic system, open the return line shutoff valve first.

Troubleshooting



1. Follow **Pressure Relief Procedure**, page 7, before checking or servicing any system equipment.
2. Check all possible problems and causes before disassembling the motor.

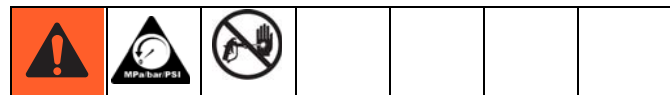
Problem	Cause	Solution
Reciprocator stops running.	Worn valve or valve balls (3); broken valve spring (18).	Repair valve. See page 13.
	Broken trip rod (17), spring (12) or retainers (11).	Replace parts. See page 13.
Poor performance or reduced efficiency.	Worn piston seals (5, 6, 7).	Replace seals. See page 13.
Oil leaking down extension rod.	Worn o-ring (117, 121, or 122) in oil deflector.	Replace o-ring. See page 9.
Oil leaking around cylinder.	Worn cylinder o-rings (2).	Replace o-rings. See page 13.
	Loose tie rods (37).	Tighten nuts (106). See page 9.
Oil leaking around inlet or return tube fittings.	Loose fittings or worn fitting o-rings.	Tighten or replace fittings (31, 34, 38). See page 13.
Excessive oil in drain bottle, or bottle needs frequent emptying.	Worn seals in bottom cylinder cap.	Replace seals (2, 15, 14 and 49). See page 13.

Service

Tools Required

- Set of allen wrenches
- Set of socket or box wrenches
- Adjustable wrench
- Torque wrench
- Spanner wrench
- O-ring pick
- 10-24 unc-2b tap
- Vise
- Shallow metal or plastic pan (approx. 12 x 20 in.)
- Repair Tool 189305
- Thread lubricant
- Lithium-base grease
- *Fresh* Loctite® 242 and 609 thread sealants and Loctite® Primer T or Perma-Loc® 115 thread sealant and Perma-Bond® Surface Conditioner I
- Chlorinated solvent

Disconnecting the Hydraulic Motor



To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 7.

1. Relieve the pressure.
2. Disconnect the hydraulic hoses and plug all hydraulic connections and hoses.

NOTICE

Keep the hydraulic system clean

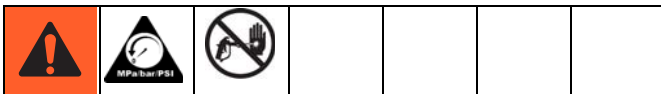
Always plug the hydraulic inlets, outlets, and lines when disconnecting them for any reason to avoid introducing dirt and other contaminants into the system.

3. Disconnect the hydraulic motor from the displacement pump as explained in your separate pump manual.
4. Pull the drain hose (113) off the barbed adapter (112).

Reconnecting the Hydraulic Motor

1. Reconnect the drain hose (113) to the barbed adapter (112).
2. Reconnect the hydraulic motor to the displacement pump as explained in your separate pump manual.
3. Unplug all hydraulic connections and hoses. Reconnect the hydraulic hoses.

Motor Disassembly



To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 7.

1. Relieve the pressure.
2. Stand the motor upright. Remove the four screws (104) and washers (105) holding the motor cap (102) to the base (103). Lift the reciprocator (101) off the base (103) and lay it in a pan. Remove the large o-ring (108) from the base (103). See FIG. 3.
3. For model 236417 only, remove the cotter pin (111) and unscrew the extension rod (110) from the reciprocator displacement rod (9). See FIG. 4.
4. Remove deflector.
 - **Model 236417**, pull the oil deflector (109) off the extension rod (110). Remove the o-ring (117) from the deflector.
 - **Model 261466**, remove the retaining o-ring and slide the deflector off the rod.
5. Unscrew the nuts (106) and washers (105) from the reciprocator tie rods (37) and pull the motor cap (102) off the reciprocator (101). Remove the o-ring (107) from the cap.

6. Clean and inspect all parts. Replace parts as necessary. See **Reciprocator Service**, page 13.

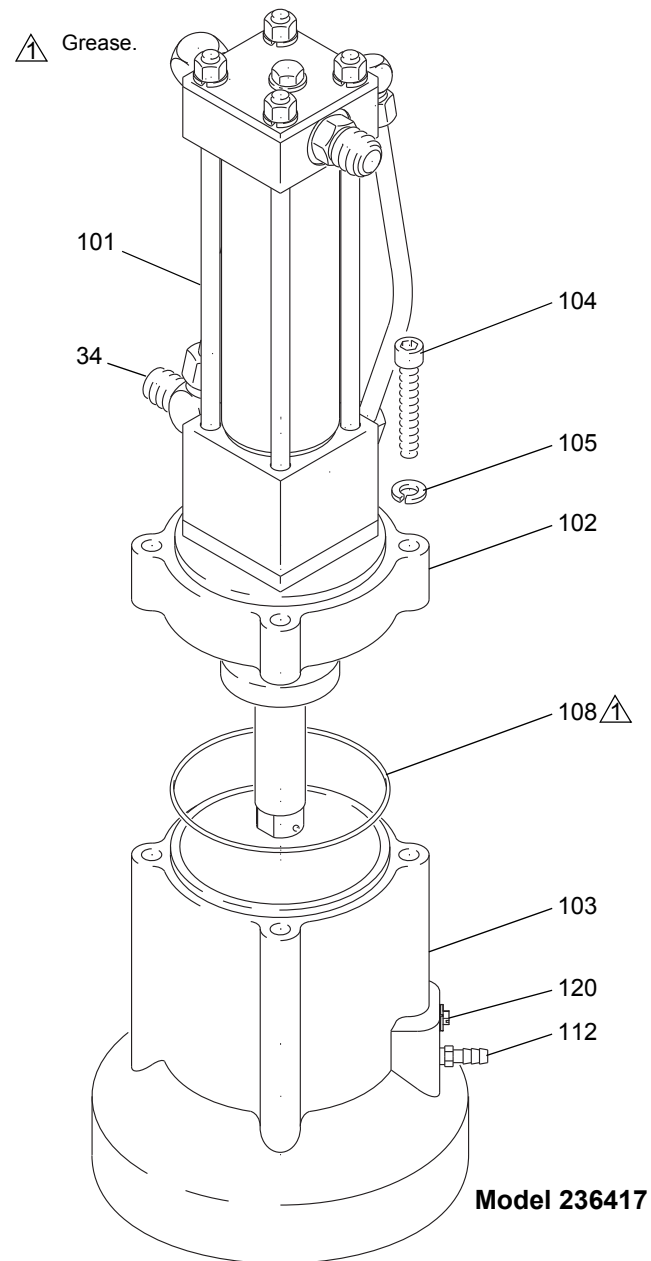


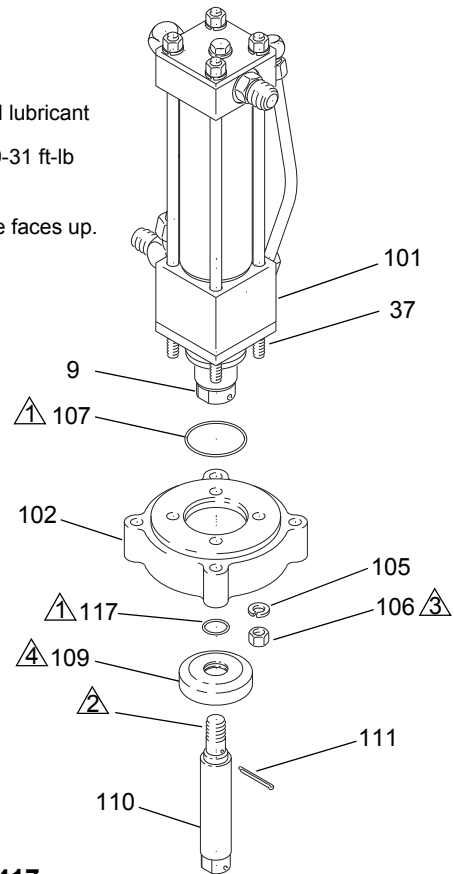
FIG. 3

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Motor Reassembly

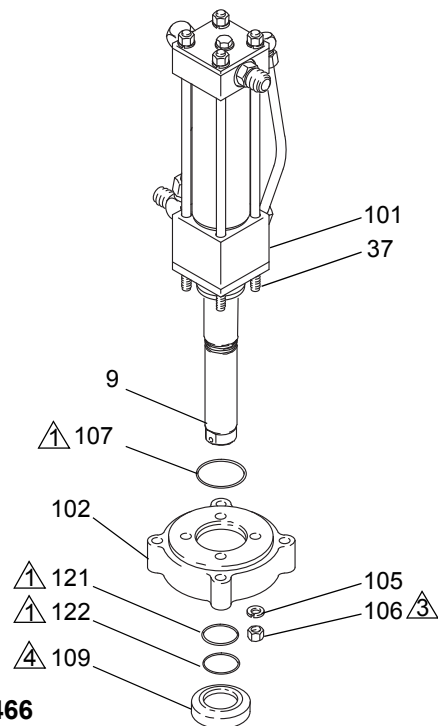
1. Grease the o-ring (107) and install it on the motor cap (102). Install the motor cap, washers (105) and nuts (106) on the reciprocator tie rods (37). Torque the nuts to 29-31 ft-lb (39-42 N•m). See FIG. 4.
2. Connect deflector.
 - **Model 236417** (see FIG. 4 and FIG. 5), grease the o-ring (117). Install it in the inner groove of the oil deflector (109). Slide the deflector onto the extension rod (110), beveled side facing up, until it seats.
 - **Model 261466** (see FIG. 4 and FIG. 6), grease the thinner o-ring (121) and install on the displacement rod (9). Slide the deflector onto the displacement rod, beveled side facing up, until it seats. Install the thicker o-ring (122).
3. For model 236417 only, apply thread lubricant to the threads of the extension rod (110) and screw it into the reciprocator displacement rod (9) until the pin holes align. Install the cotter pin (111).
4. Grease the large o-ring (108) and install it on top of the motor base (103). Set the reciprocator (101) and motor cap (102) on the motor base. Orient the reciprocator fluid inlet (34) to the grounding lug (120) as shown in FIG. 3.
5. Secure the motor cap (102) to the base (103) with four washers (105) and screws (104). Torque the screws to 29-31 (39-42 N•m).

- ① Grease.
- ② Apply thread lubricant
- ③ Torque to 29-31 ft-lb (39-42 N•m)
- ④ Beveled side faces up.



Model 236417





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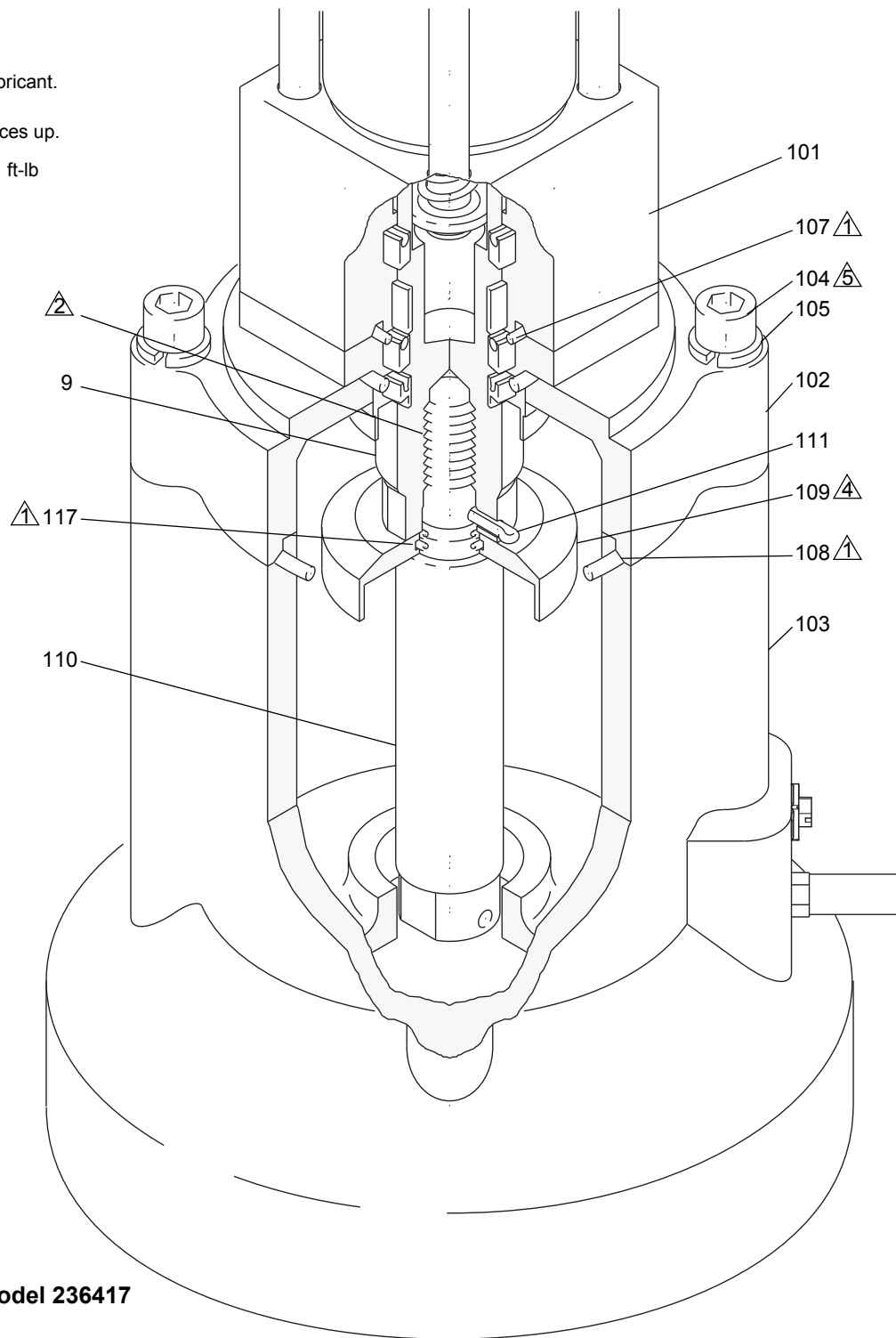


Model 261466

ti9005a

FIG. 4

-  Grease.
-  Apply thread lubricant.
-  Beveled side faces up.
-  Torque to 29-31 ft-lb (39-42 N•m)

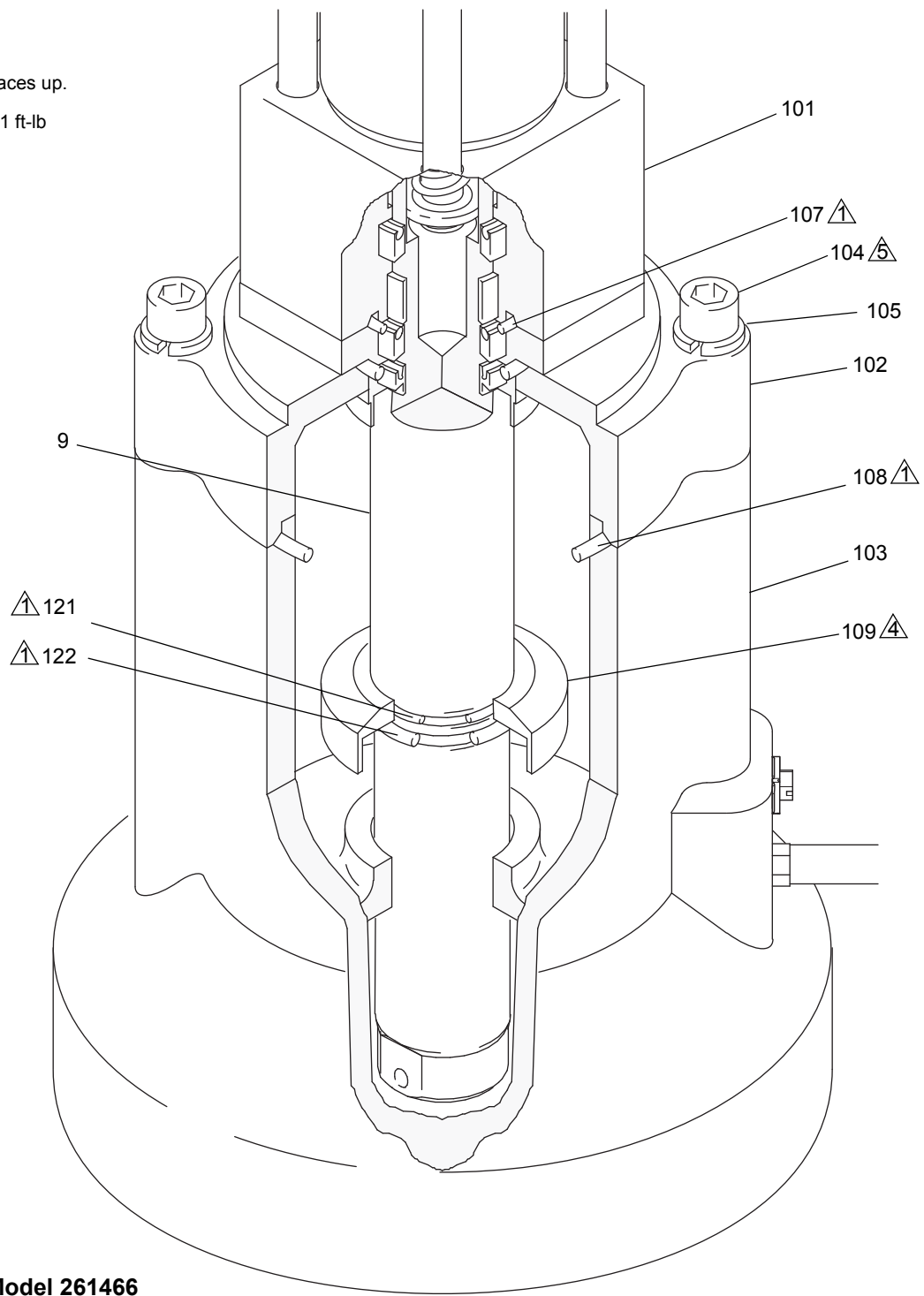


Model 236417

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FIG. 5

- ▲ Grease.
- ▲ Beveled side faces up.
- ▲ Torque to 29-31 ft-lb (39-42 N•m)



Model 261466

ti9006a

FIG. 6

Reciprocator Service

Disassembly

NOTE: Repair Kit 236698 is available. For the best results, use all the parts in the kit. Kit parts are marked with an asterisk, for example (2*).

NOTE: When disassembling, lay out all parts in sequence, to make reassembly easier. Clean and inspect all parts for wear or damage before reassembling. Replace as necessary.

1. Remove the reciprocator from the motor base. See **Motor Disassembly**, page 9. Lay it on its side in a pan.
2. Un-thread the tie rods (37) from the retainer (36) and pull them out through the top of the reciprocator. It should not be necessary to remove the four nuts (27) and lock washers (28).
3. Unscrew the four fluid tube nuts (N) and remove the tubes (32, 39). See FIG. 7. Allow excess oil to drain from the reciprocator, then plug the fluid fittings.

NOTICE

Keep the hydraulic system clean

Always plug the hydraulic inlets, outlets, and lines when disconnecting them for any reason to avoid introducing dirt and other contaminants into the system.

4. Pull the top cylinder cap (1), cylinder (33), and displacement rod (9) together off the bottom cylinder cap (35). Remove the o-ring (2) from the bottom cap.
5. Grasp the top cap (1) and pull the cylinder (33) off. Slide the cylinder off the displacement rod (9). Be careful not to damage the rod. Remove the o-ring (2) from the top cap.
6. Lay the top cap (1) and displacement rod (9) on a table. Place a clean rag around the yoke (4) to prevent the detent balls (3) from popping out. Push the yoke (4) sideways off the valve sleeve (19) while holding the balls (3) and spring (18) with the rag, then carefully remove the balls and spring.
7. Inspect the valve sleeve (19), valve stop (25), and spool (S) for damage. If any of these parts requires replacement, unscrew the two screws (26) holding

the stop (25) to the spool (S). Remove the stop and slide the sleeve (19) off the spool. If the spool is damaged, replace the top cap (1).

NOTE: If any of these parts are being reused, thoroughly clean any adhesive residue from the screws and female threads of the spool. Use a surface cleaner such as chlorinated solvent on the threads and blow dry with compressed air. If necessary, use a 10-24 unc-2b tap to remove adhesive from the female threads.

8. Remove the cap screw (23), sealing washer (22) and o-ring (24) from the cap plate (29). Lift off the cap plate and remove the o-ring (20).
9. Hold the flats of the displacement rod (9) in a vise and use a spanner wrench in the pin holes of the piston (16) to screw it off the rod. Remove the trip rod (17) from the displacement rod.

NOTICE

Be careful not to scratch the outside of the displacement rod.

10. Unscrew the nut (48) and remove the retainers (11) and spring (12) from the trip rod (17).
11. Slide the piston (16) off the trip rod (17). Remove the bearing (5), seal (6), and o-rings (7 and 8) from the piston.
12. Inspect the yoke (4) and trip rod (17) for damage. If either part requires replacement, slide the yoke into Repair Tool 189305 and set the tool in a vise. See FIG. 8. Use a wrench on the flats of the trip rod and unscrew the rod from the yoke.
13. Pull the housing retainer (36) away from the bottom cylinder cap (35).
14. Remove the block packings (14 and 49), wiper (15), bearing (13), and o-ring (2) from the housing retainer and bottom cylinder cap.

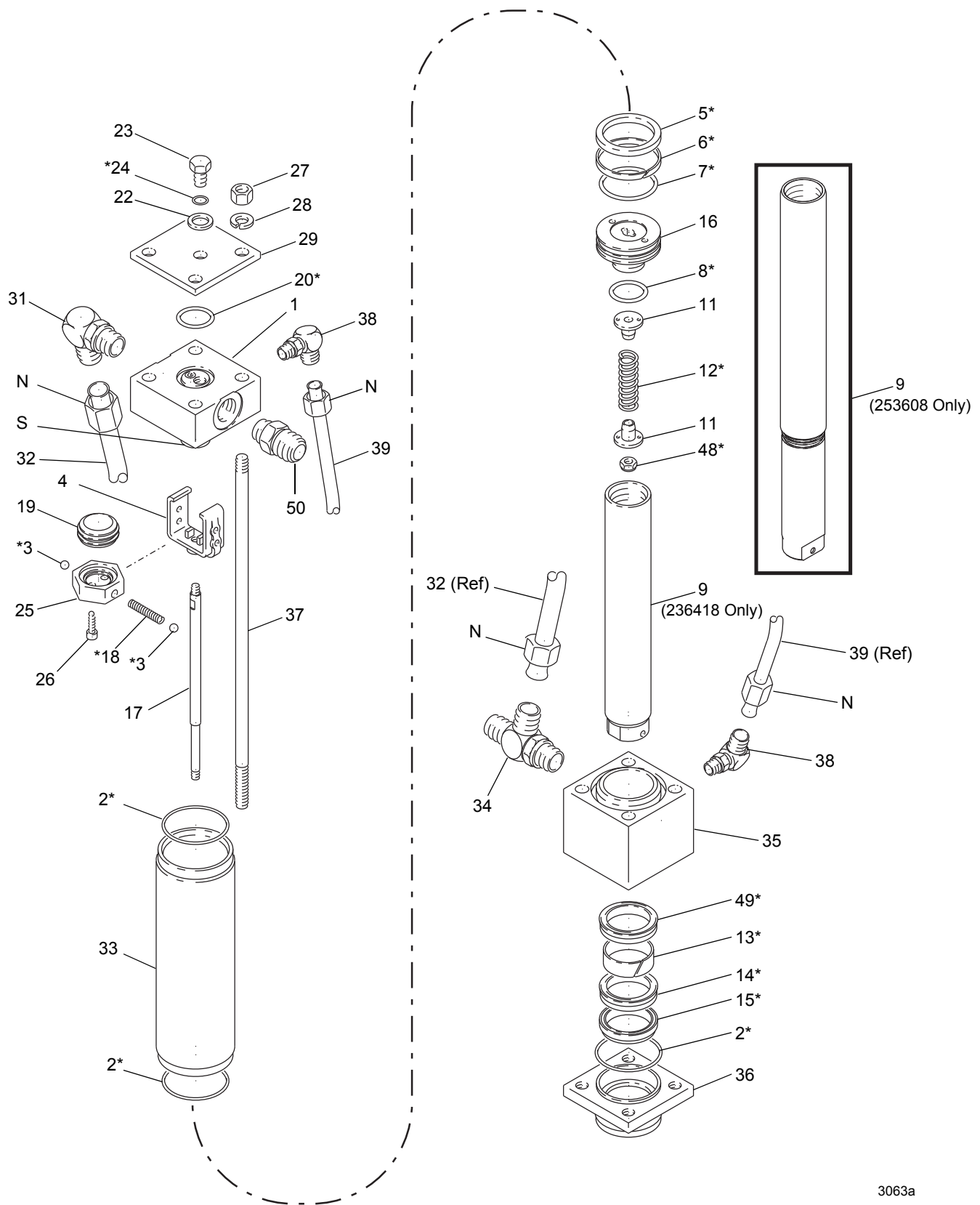


FIG. 7

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Reassembly Part 236418

1. Install the block packing (14*) and wiper (15*) in the housing retainer (36). *The spring of the block packing and the lips of the wiper must face up.* Install the o-ring (2*) on the top surface of the retainer. See FIG. 8.
2. Install the bearing (13*) and block packing (49*) in the bottom cylinder cap (35). *The lips of the block packing must face up.*
3. Reassemble the housing retainer (36) and the bottom cylinder cap (35).

NOTE: Thread sealant and primer are required. See **Tools Required** on page 8 for specifications. Loctite® 609 is used only in step 4 below. Use Loctite® 242 thread sealant and Loctite® Primer T or Perma-Loc® 115 in all other steps as required.

4. To reassemble the yoke (4) and trip rod (17), clean the threads with primer or chlorinated solvent and let dry for 3 to 4 minutes. Apply Loctite® 609 thread sealant to the female threads of the yoke. Slide the yoke into Repair Tool 189305 and place the tool in a vise. Using a wrench on the flats of the trip rod, screw the rod into the yoke. Torque to 96-100 in-lb (10.8-11.2 N•m).
5. Install the bearing (5*), o-ring (7*), and seal (6*) on the piston (16). Install the second o-ring (8*) on the underside of the piston. Slide the piston onto the trip rod (17) so the wide end of the piston faces the yoke (4).
6. Install the retainers (11) and spring (12*) on the trip rod (17). Screw the nut (48*) onto the rod until it runs out of thread, so that it bottoms out on the shoulder of the rod. See the Detail in FIG. 8.
7. Hold the flats of the displacement rod (9) in a vise. Slide the trip rod (17) into the displacement rod. Use a spanner wrench in the pin holes of the piston (16) to screw it into the displacement rod. Torque to 30-40 ft-lb (41-54 N•m).
8. Install the o-ring (20*) in the top cylinder cap (1), then install the cap plate (29), o-ring (24*), sealing washer (22), and cap screw (23).
9. To reassemble the valve sleeve (19) and valve stop (25), slide the sleeve (19) onto the valve spool (S). (Either side of the sleeve can face up.) Apply primer to the threads of the screws (26) and let dry for 3 to 4 minutes. Apply 1 or 2 drops of thread sealant to

the female threads of the spool (S). Install the stop (25) and torque the screws (26) to 42-45 in-lb (4.7-5.1 N•m).

10. To assemble the valve mechanism, use Repair Tool 189305 as follows:
 - a. Slide the yoke (4) into the repair tool, as shown in the Detail in FIG. 8. Align the upper detent holes (H) of the yoke with the center line of the tool.
 - b. Insert the spring (18*) and one ball (3*) into the valve stop (25). Tilt the valve stop and start guiding it into the tool, making sure the ball is sliding into the rounded slot in the tool.
 - c. Place the second ball (3*) at the other end of the spring (18*) and push it in with your thumb while rotating the valve stop (25) until the spring is horizontal and the balls are in place. Continue holding this assembly together.
 - d. Align the curved ends of the yoke with the valve sleeve groove, then press the assemblies firmly together. Make sure the balls snap into the upper detent holes (H) of the yoke (4), and the curved ends of the yoke engage the valve sleeve (19) groove. To remove the tool, slide it over the trip rod (17).
11. Place the bottom cylinder cap (35) in a vise. Install the o-ring (2*) in the cap. Set the cylinder (33) on the bottom cap.
12. Install the o-ring (2*) in the top cylinder cap (1). Make sure the hydraulic fittings (31, 34, and 38) are oriented as shown in FIG. 7, then slide the displacement rod (9) and piston (16) into the cylinder (33) until it seats in the top cap.

NOTICE

When inserting the piston into the cylinder, carefully guide the piston seal (6*) and bearing (5*) to prevent damage to these parts.

13. Install the tie rods (37). If the nuts and washers were removed, screw them onto the ends with short threads. Torque the nuts (27) to 28-30 ft-lb (38-41 N•m).
14. Remove the plugs from the fluid fittings (31, 34 and 38). Install the tubes (32, 39) and tighten the four fluid tube nuts (N).
15. Reinstall the reciprocator on the motor base. See **Motor Reassembly**, page 10.

Reassembly Part 253608

1. Install the o-ring (20*) in the top cylinder cap (1), then install the cap plate (29), o-ring (24*), sealing washer (22), and cap screw (23).

NOTE: Thread sealant and primer are required. See **Tools Required** on page 8 for specifications. Loctite® 609 is used only in step 6 below. Use Loctite® 242 thread sealant and Loctite® Primer T or Perma-Loc® 115 in all other steps as required.

2. To reassemble the valve sleeve (19) and valve stop (25), slide the sleeve (19) onto the valve spool (S). (Either side of the sleeve can face up.) Apply primer to the threads of the screws (26) and let dry for 3 to 4 minutes. Apply 1 or 2 drops of thread sealant to the female threads of the spool (S). Install the stop (25) and torque the screws (26) to 42-45 in-lbs (4.7-5.1 N•m). Install the o-ring (2*) in the top cylinder cap (1).
3. Install the block packing (14*) and wiper (15*) in the housing retainer (36). The spring of the block packing and the lips of the wiper must face up. Install the o-ring (2*) on the top surface of the retainer. See FIG. 8.
4. Install the bearing (13*) and block packing (49*) in the bottom cylinder cap (35). The lips of the block packing must face up.
5. Reassemble the housing retainer (36) and the bottom cylinder cap (35).
6. To reassemble the yoke (4) and trip rod (17), clean the threads with primer or chlorinated solvent and let dry for 3 to 4 minutes. Apply Loctite® 609 thread sealant to the female threads of the yoke. Slide the yoke into Repair Tool 189305 and place the tool in a vise. Using a wrench on the flats of the trip rod, screw the rod into the yoke. Torque to 96-100 in-lbs (10.8-11.2 N•m).
7. Install the o-ring (7*), and seal (6*) on the piston (16). Install the second o-ring (8*) on the underside of the piston. Slide the piston onto the trip rod (17) so the wide end of the piston faces the yoke (4).
8. Install the retainers (11) and spring (12*) on the trip rod (17). Screw the nut (48*) onto the rod until it runs out of thread, so that it bottoms out on the shoulder of the rod. See the Detail in FIG. 8.
9. Slide the displacement rod (9) into the bottom of the cylinder cap (35), first passing through the housing retainer (36) so that the o-ring grooves on the displacement rod do not pass through the block packing (14*).

10. Place the bottom cylinder cap (35) in a vise. Slide the trip rod (17) into the displacement rod. Use a spanner wrench in the pin holes of the piston (16) to screw it into the displacement rod. Torque to 30-40 ft-lbs (41-54 N•m).
11. Install the o-ring (2*) in the bottom cylinder cap. Install the bearing (5*) on the piston (16). Slide the cylinder (33) over the displacement rod (9) and piston (16) until it seals on the bottom cap.

NOTICE

When inserting the piston into the cylinder, carefully guide the piston seal (6*) and bearing (5*) to prevent damage to these parts.

12. To assemble the valve mechanism, use Repair Tool 189305 as follows:
 - a. Slide the yoke (4) into the repair tool, as shown in the Detail in FIG. 8. Align the upper detent holes (H) of the yoke with the center line of the tool.
 - b. Insert the spring (18*) and one ball (3*) into the valve stop (25). Tilt the valve stop and start guiding it into the tool, making sure the ball is sliding into the rounded slot in the tool.
 - c. Place the second ball (3*) at the other end of the spring (18*) and push it in with your thumb while rotating the valve stop (25) until the spring is horizontal and the balls are in place. Continue holding this assembly together.
 - d. Align the curved ends of the yoke with the valve sleeve groove, then press the assemblies firmly together. Make sure the balls snap into the upper detent holes (H) of the yoke (4), and the curved ends of the yoke engage the valve sleeve (19) groove. To remove the tool, slide it over the trip rod (17).
13. Make sure the hydraulic fittings (31, 34, and 38) are oriented as shown in FIG. 7 install the top cylinder cap (1) until it seats on the cylinder (33).
14. Install the tie rods (37). If the nuts and washers were removed, screw them onto the ends with short threads. Torque the nuts (27) to 28-30 ft-lbs (38-41 N•m).
15. Remove the plugs from the fluid fittings (31, 34 and 38). Install the tubes (32, 39) and tighten the four fluid tube nuts (N).
16. Reinstall the reciprocator on the motor base. See **Motor Reassembly**, page 10.

- ⚠ Spring faces up.
- ⚠ Lips face up.
- ⚠ Apply thread sealant to female threads
- ⚠ Torque to 96-100 in-lb (10.8-11.2 N•m)
- ⚠ Wide end faces yoke (4).
- ⚠ Apply primer to threads and let dry 3 to 4 minutes
- ⚠ Apply 1-2 drops of thread sealant to female threads
- ⚠ Torque to 42-45 in-lb (4.7-5.1 N•m)
- ⚠ Torque to 30-40 ft-lb (41-54 N•m)
- ⚠ Torque to 28-30 ft-lb (38-41 N•m)

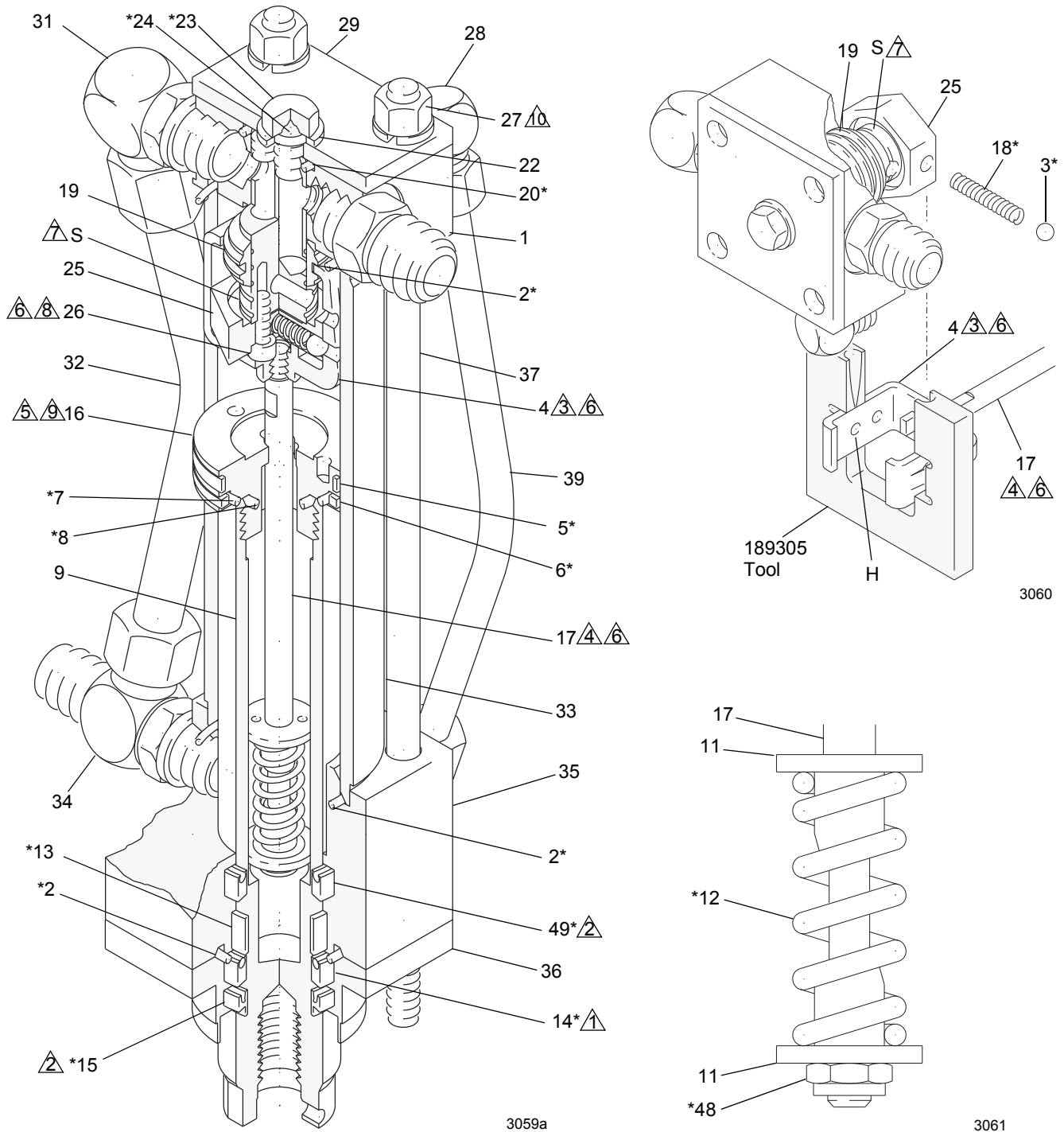
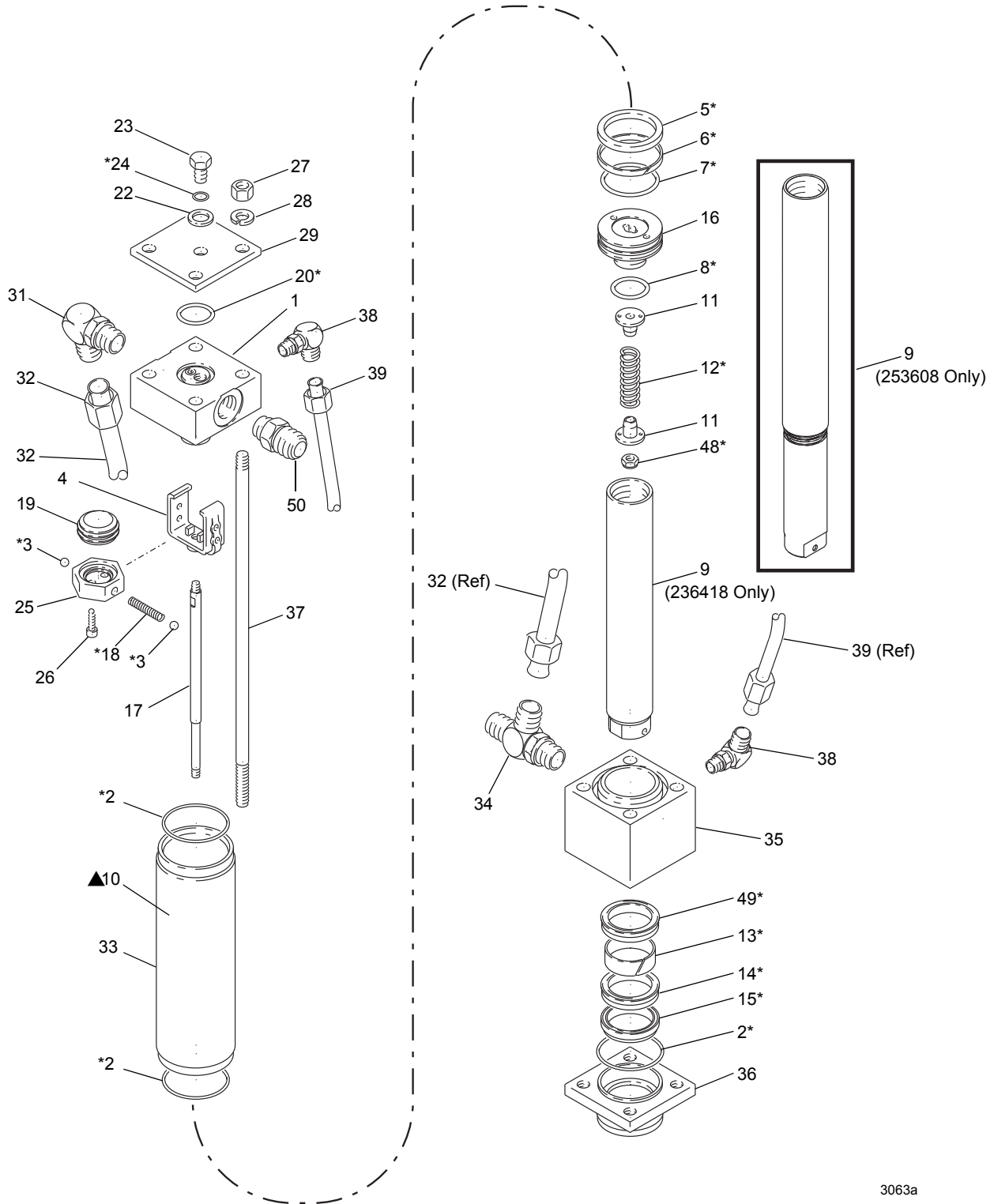


FIG. 8

Parts

236418 Viscount® I Reciprocator, Series C

253608 Viscount® I Reciprocator, Series A



3063a

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	236594	TOP CAP ASSEMBLY	1	26	104092	SCREW, cap, socket hd; 10-24 unrc-3a; 0.625 (16 mm) long	2
2*	106274	O-RING; buna-N	3	27	106292	NUT, hex; 3/8-24 unf-2b	4
3*	100069	BALL; carbon steel	2	28	100133	WASHER, lock; 3/8 in. size	4
4	189077	YOKE, valve	1	29	178181	PLATE, cap	1
5*	178207	BEARING, piston; bronze-filled PTFE	1	31	106470	ELBOW, 90°; 3/4-16 unf-2a; fits 1/2 in. (13 mm) diameter tube	1
6*	178226	SEAL, piston; glass-filled PTFE	1	32	236419	TUBE, inlet; w/3/4-16 unf-2b fittings	1
7*	108014	O-RING; buna-N	1	33	178229	CYLINDER	1
8*	105765	O-RING; buna-N	1	34	107197	TEE; 3/4-16 unf-2a	1
9	189070	ROD, displacement, 236418 only	1	35	189073	CAP, cylinder, bottom	1
	15H840	ROD, displacement, 253608 only	1	36	189074	RETAINER, housing	1
10▲	179885	LABEL, warning	1	37	189075	ROD, tie	4
11	189069	RETAINER, spring	2	38	110792	ELBOW, 90°; 7/16-20 unf-2a x 9/16-18 unf-2a; fits 3/8 in. (10 mm) diameter tube	2
12*	178189	SPRING, compression	1	39	236420	TUBE, drain; w/9/16-18 unf-2b fittings	1
13*	112342	BEARING, rod; bronze-filled PTFE	1	48*	114231	NUT, hex, locking; w/nylon insert; 10-32 unf-3b	1
14*	112340	PACKING, block; nitrile rubber	1	49*	112561	PACKING, block; urethane	1
15*	112341	WIPER, rod; nitrile rubber	1	50	107195	ADAPTER, straight thread, 37° flare; 3/4-16 unf-2a x 7/8-14 unf-2a	1
16	192656	PISTON	1				
17	18A423	ROD, trip	1				
18*	108437	SPRING, compression	1				
19	189072	SLEEVE, valve	1				
20*	104093	O-RING; buna-N	1				
22	178179	WASHER, sealing	1				
23	106276	SCREW, cap, hex hd; 3/8-4 unf-a 0.625 (16 mm) long	1				
24*	155685	O-RING; buna-N	1				
25	192654	STOP, valve	1				

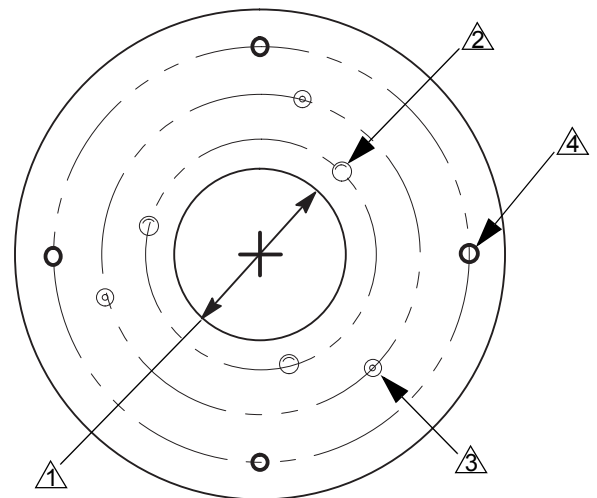
* These parts are included in Repair Kit 236698, which may be purchased separately.

▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.

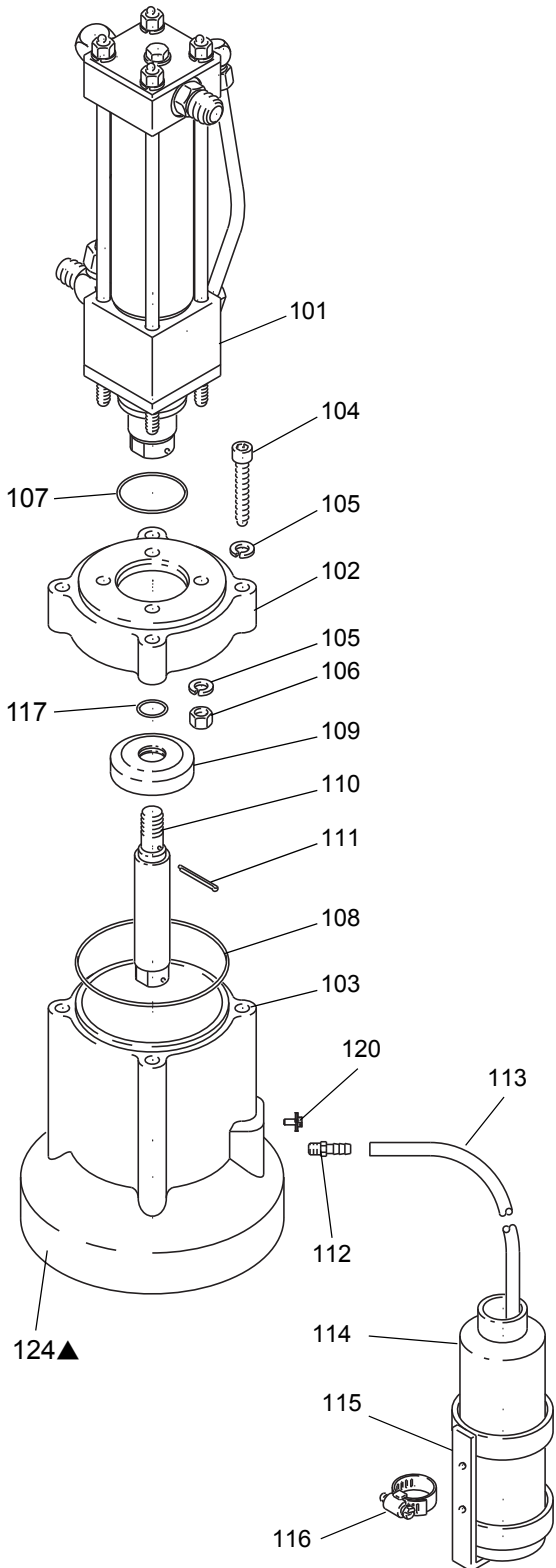
Mounting Hole Layout

3 Tie Rod Mounting

- ▲ 2.62" (67 mm) Dia. Cutout
- ▲ Three 1/2- 3 unc (2b) holes on a 3.5" (89 mm) dia bolt circle.
- ▲ Three 0.45" (11.5 mm) countersunk holes with M10 x 1.5 threaded holes on a 4.92" (125 mm) bolt circle.
- ▲ Four 5/16-18 unc (2b) threaded holes on a 6.4" (163 mm) dia bolt circle for adapter plate mounting holes.



236417 Viscount® I Hydraulic Motor, Series A

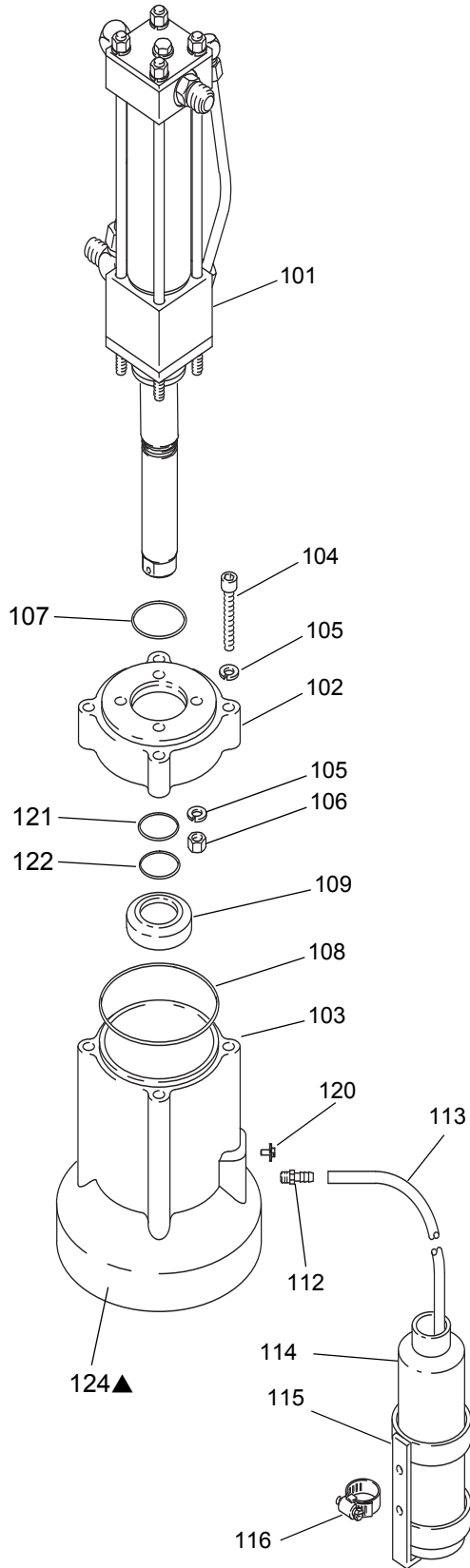


Ref No.	Part No.	Description	Qty
101	236418	RECIPROCATOR, hydraulic, See page 18 for parts.	1
102	189079	CAP, motor	1
103	189068	BASE, motor	1
104	112339	SCREW, cap, socket hd; 3/8-24 unf-3a; 2.25 in. (57.2 mm)	4
105	100133	WASHER, lock; 3/8 in. size	8
106	106292	NUT, hex; 3/8-24 unf-2b	4
107	106274	O-RING; buna-N	1
108	112343	O-RING; buna-N	1
109	189080	DEFLECTOR, oil	1
110	189081	ROD, extension	1
111	100103	PIN, cotter	1
112	103875	ADAPTER, barbed; 1/8 npt(m); fits 0.25 in. (6.3 mm) ID hose	1
113		HOSE, drain; PVC; 0.25 in. (6.3 mm) ID; purchase locally 6 ft	
114	112279	BOTTLE, drain	1
115	236272	HOLDER, drain bottle	1
116	103927	CLAMP, hose	1
117	112030	O-RING	1
120	116343	LUG, grounding	1
124▲	187959	LABEL, warning	1

▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.

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261466 Viscount® I Hydraulic Motor, Series A



Ref No.	Part No.	Description	Qty
101	253608	RECIPROCATOR, hydraulic, See page 18 for parts.	1
102	189079	CAP, motor	1
103	189068	BASE, motor	1
104	112339	SCREW, cap, socket hd; 3/8-24 unf-3a; 2.25 in. (57.2 mm)	4
105	100133	WASHER, lock; 3/8 in. size	8
106	106292	NUT, hex; 3/8-24 unf-2b	4
107	106274	O-RING; buna-N	1
108	112343	O-RING; buna-N	1
109	15K222	DEFLECTOR, oil	1
112	103875	ADAPTER, barbed; 1/8 npt(m); fits 0.25 in. (6.3 mm) ID hose	1
113		HOSE, drain; PVC; 0.25 in. (6.3 mm) ID; purchase locally 6 ft	
114	112279	BOTTLE, drain	1
115	236272	HOLDER, drain bottle	1
116	103927	CLAMP, hose	1
120	116343	LUG, grounding	1
121	118381	O-RING, packing	1
122	15K234	O-RING, packing	1
124▲	187959	LABEL, warning	1

▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.

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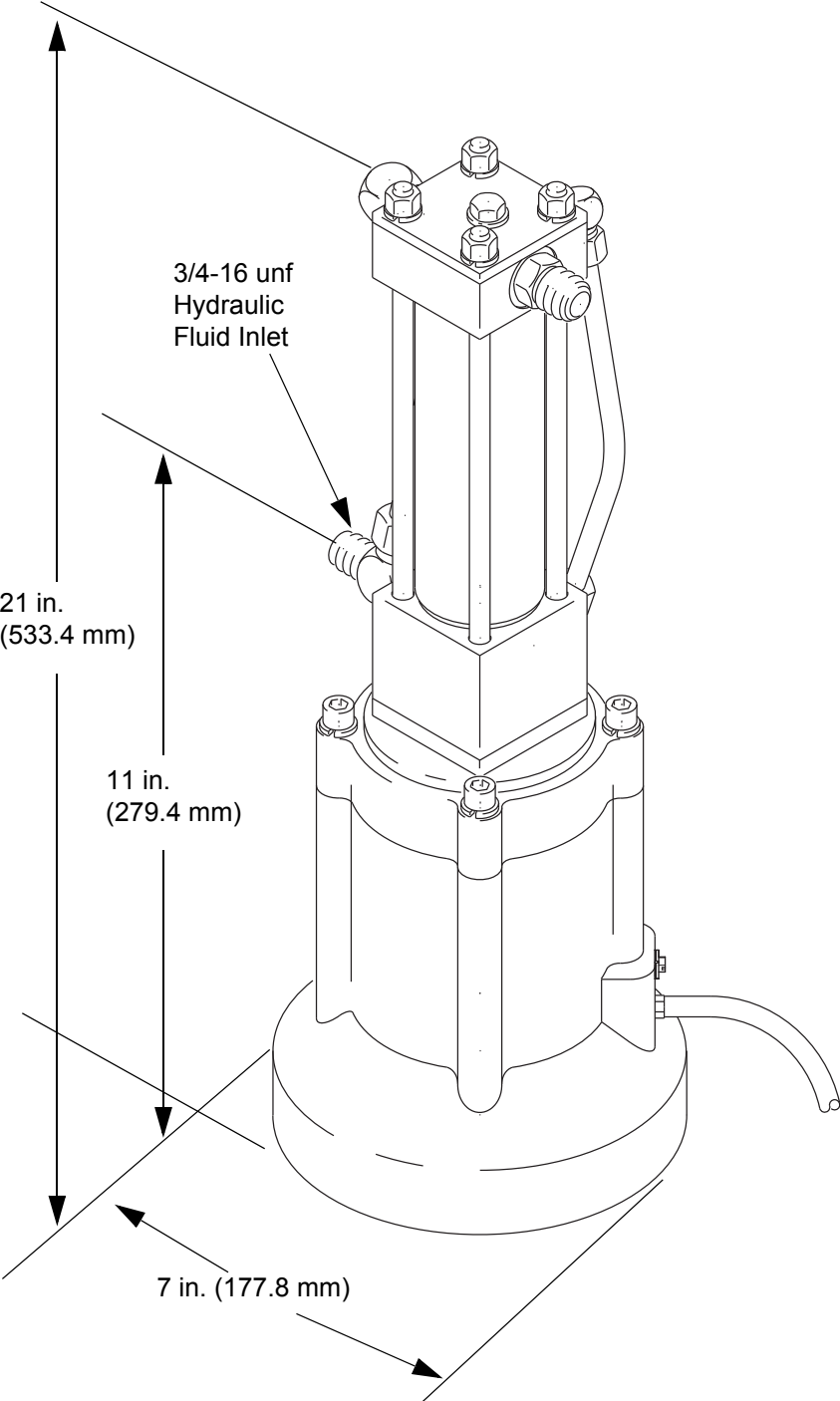
Technical Data

	US	Metric
Maximum hydraulic fluid input pressure	1500 psi	10.5 MPa, 105 bar
Maximum hydraulic fluid input volume	3 gpm	11.3 liter/min
Fluid consumption rate	6.5 ounces per cycle (1 gallon per 19.5 cycles)	0.195 liter per cycle
Maximum water content of hydraulic fluid	1 percent	
Maximum hydraulic fluid temperature	130°F	54°C
Effective piston area	1.48 in ²	9.55 cm ²
Piston rod diameter	1-3/8 in.	34.9 mm
Stroke	4 in.	101.6 mm
Thrust at 1500 psi (10.5 MPa, 105 bar)	2200 lb (9875 N)	
Weight with base	28 lb (124.6 N)	
Notes		
<i>Loctite® is a registered trademark of the Loctite Corporation. Perma-Loc® and Perma-Bond® are registered trademarks of Perma-Loc Company.</i>		

Sound Data

Hydraulic Pressure	dBa at 20 cycles/minute	dBa at 30 cycles/minute	dBa at 60 cycles/minute
500 psi (35 bar)	76.1	77.9	79.5
1000 psi (70 bar)	78.0	78.6	80.5
1500 psi (105 bar)	78.7	80.9	83.0

Dimensions



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