

# Merkur™ Bellows Displacement Pump

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EN

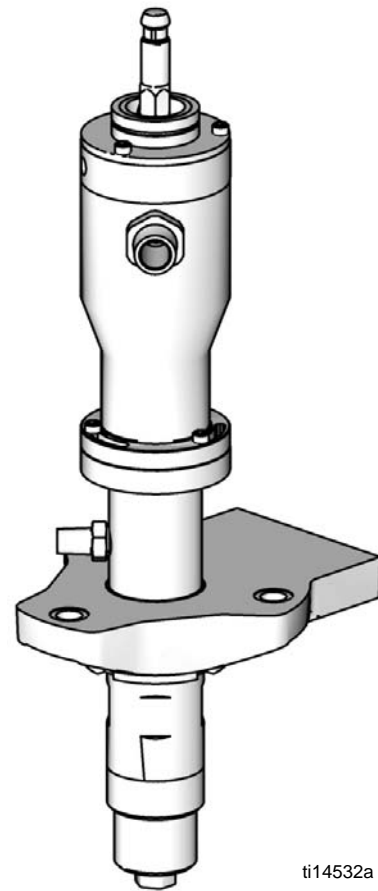
For pumping isocyanates, UV coatings, acid catalysts, and other moisture-sensitive materials. For professional use only.

See page 8 for model information, including maximum working pressures.



### Important Safety Instructions

Read all warnings and instructions in this manual. For complete warnings and instructions see your pump or package manual. Hazard symbols refer to specific procedure risks. Save these instructions.



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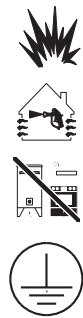

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# Related Manuals

| Manual | Description                                   |
|--------|---|
| 312795 | Merkur Bellows Pump Assembly                  |
| 312796 | NXT™ Air Motor                                |
| 312799 | Merkur Bellows Spray Packages, AA and Airless |
| 312798 | Merkur Electrostatic Spray Packages           |

# 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, 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.

|  <b>WARNING</b> |   |
|--|---|
|                 | <p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Flammable fumes, such as solvent and paint fumes, in <b>work area</b> can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Use equipment only in well ventilated area.</li> <li>• Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).</li> <li>• Keep work area free of debris, including solvent, rags and gasoline.</li> <li>• Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.</li> <li>• Ground all equipment in the work area. See <b>Grounding</b> instructions.</li> <li>• Use only grounded hoses.</li> <li>• Hold gun firmly to side of grounded pail when triggering into pail.</li> <li>• If there is static sparking or you feel a shock, <b>stop operation immediately</b>. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a working fire extinguisher in the work area.</li> </ul> |
|               | <p><b>SKIN INJECTION HAZARD</b></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. <b>Get immediate surgical treatment.</b></p> <ul style="list-style-type: none"> <li>• Do not spray without tip guard and trigger guard installed.</li> <li>• Engage trigger lock when not spraying.</li> <li>• Do not point gun at anyone or at any part of the body.</li> <li>• Do not put your hand over the spray tip.</li> <li>• Do not stop or deflect leaks with your hand, body, glove, or rag.</li> <li>• Follow the <b>Pressure Relief Procedure</b> when you stop spraying and before cleaning, checking, or servicing equipment.</li> <li>• Tighten all fluid connections before operating the equipment.</li> <li>• Check hoses and couplings daily. Replace worn or damaged parts immediately.</li> </ul>   |

# ! WARNING



## EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- 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.
- 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.



## MOVING PARTS HAZARD

Moving parts can pinch, cut or amputate fingers and other body parts.

- 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.



## SUCTION HAZARD

Powerful suction could cause serious injury.

- Never place hands near the pump fluid inlet when pump is operating or pressurized.



## TOXIC FLUID OR FUMES HAZARD

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- 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.
- Always wear chemically impermeable gloves when spraying, dispensing, or cleaning equipment.



## PERSONAL PROTECTIVE EQUIPMENT

You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

# Important Two-Component Material Information

Isocyanates (ISO) are catalysts used in two component materials.

## Isocyanate Conditions



Spraying or dispensing materials that contain isocyanates creates potentially harmful mists, vapors, and atomized particulates.

- Read and understand the fluid manufacturer's warnings and Safety Data Sheet (SDS) to know specific hazards and precautions related to isocyanates.
- Use of isocyanates involves potentially hazardous procedures. Do not spray with this equipment unless you are trained, qualified, and have read and understood the information in this manual and in the fluid manufacturer's application instructions and SDS.
- Use of incorrectly maintained or mis-adjusted equipment may result in improperly cured material. Equipment must be carefully maintained and adjusted according to instructions in the manual.
- To prevent inhalation of isocyanate mists, vapors, and atomized particulates, everyone in the work area must wear appropriate respiratory protection. Always wear a properly fitting respirator, which may include a supplied-air respirator. Ventilate the work area according to instructions in the fluid manufacturer's SDS.
- Avoid all skin contact with isocyanates. Everyone in the work area must wear chemically impermeable gloves, protective clothing and foot coverings as recommended by the fluid manufacturer and local regulatory authority. Follow all fluid manufacturer recommendations, including those regarding handling of contaminated clothing. After spraying, wash hands and face before eating or drinking.

## Material Self-ignition



Some materials may become self-igniting if applied too thick. Read material manufacturer's warnings and Safety Data Sheet (SDS).

## Keep Components A and B Separate



Cross-contamination can result in cured material in fluid lines which could cause serious injury or damage equipment. To prevent cross-contamination:

- **Never** interchange component A and component B wetted parts.
- Never use solvent on one side if it has been contaminated from the other side.

## Moisture Sensitivity of Isocyanates

Exposure to moisture (such as humidity) will cause ISO to partially cure; forming small, hard, abrasive crystals, which become suspended in the fluid. Eventually a film will form on the surface and the ISO will begin to gel, increasing in viscosity.

### NOTICE

Partially cured ISO will reduce performance and the life of all wetted parts.

- Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. **Never** store ISO in an open container.
- Keep the ISO pump wet cup or reservoir (if installed) filled with appropriate lubricant. The lubricant creates a barrier between the ISO and the atmosphere.
- Use only moisture-proof hoses compatible with ISO.
- Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.
- Always lubricate threaded parts with an appropriate lubricant when reassembling.

**NOTE:** The amount of film formation and rate of crystallization varies depending on the blend of ISO, the humidity, and the temperature.

## Changing Materials

### NOTICE

Changing the material types used in your equipment requires special attention to avoid equipment damage and downtime.

- When changing materials, flush the equipment multiple times to ensure it is thoroughly clean.
- Always clean the fluid inlet strainers after flushing.
- Check with your material manufacturer for chemical compatibility.
- When changing between epoxies and urethanes or polyureas, disassemble and clean all fluid components and change hoses. Epoxies often have amines on the B (hardener) side. Polyureas often have aminies on the A (resin) side.

# Important Acid Catalyst Information

This pump is designed for acid catalysts (“acid”) currently used in two-component, wood-finishing materials. Current acids in use (with pH levels as low as 1) are more corrosive than earlier acids. More corrosion-resistant wetted materials of construction are required, and must be used without substitution, to withstand the increased corrosive properties of these acids.

## Acid Catalyst Conditions



Acid is flammable, and spraying or dispensing acid creates potentially harmful mists, vapors, and atomized particulates. To help prevent fire and explosion and serious injury:

- Read and understand the fluid manufacturer’s warnings and Safety Data Sheet (SDS) to know specific hazards and precautions related to the acid.
- Use only genuine, manufacturer’s recommended acid-compatible parts in the catalyst system (hoses, fittings, etc). A reaction may occur between any substituted parts and the acid.
- To prevent inhalation of acid mists, vapors, and atomized particulates, everyone in the work area must wear appropriate respiratory protection. Always wear a properly fitting respirator, which may include a supplied-air respirator. Ventilate the work area according to instructions in the acid manufacturer’s SDS.
- Avoid all skin contact with acid. Everyone in the work area must wear chemically impermeable gloves, protective clothing, foot coverings, aprons, and face shields as recommended by the acid manufacturer and local regulatory authority. Follow all fluid manufacturer recommendations, including those regarding handling of contaminated clothing. Wash hands and face before eating or drinking.
- Regularly inspect equipment for potential leaks and remove spills promptly and completely to avoid direct contact or inhalation of the acid and its vapors.
- Keep acid away from heat, sparks, and open flames. Do not smoke in the work area. Eliminate all ignition sources.
- Store acid in the original container in a cool, dry, and well-ventilated area away from direct sunlight and away from other chemicals in accordance with acid manufacturer’s recommendations. To avoid corrosion of containers, do not store acid in substitute containers. Reseal the original container to prevent vapors from contaminating the storage space and surrounding facility.

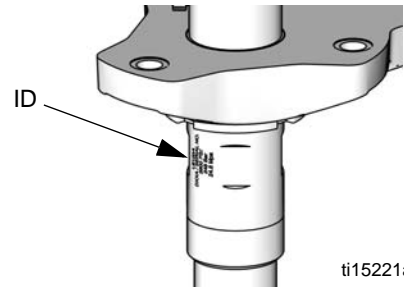
## Moisture Sensitivity of Acid Catalysts

Acid catalysts can be sensitive to atmospheric moisture and other contaminants. It is recommended the catalyst pump and valve seal areas exposed to atmosphere are flooded with ISO oil, TSL, or other compatible material to prevent acid build-up and premature seal damage and failure.

| <b>NOTICE</b>  |
|--|
| <p>Acid build-up will damage the valve seals and reduce the performance and life of the catalyst pump. To prevent exposing acid to moisture:</p> <ul style="list-style-type: none"> <li>• Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. Never store acids in an open container.</li> <li>• Keep the catalyst pump and the valve seals filled with the appropriate lubricant. The lubricant creates a barrier between the acid and the atmosphere.</li> <li>• Use only moisture-proof hoses compatible with acids.</li> <li>• Always lubricate threaded parts with an appropriate lubricant when reassembling.</li> </ul> |

# Models

Check your displacement pump's identification marking (ID) for the 6-digit part number. Use the following matrix to define the construction of your displacement pump, based on the six digits. For example, displacement pump Part No. LB100A represents a 303 stainless steel bellows style displacement pump, 100 cc, with 3 UHMWPE and 2 PTFE v-packings.



To order replacement parts, see **Parts** section starting on page 18. The digits in the matrix do not correspond to the reference numbers in the Parts drawings and lists.

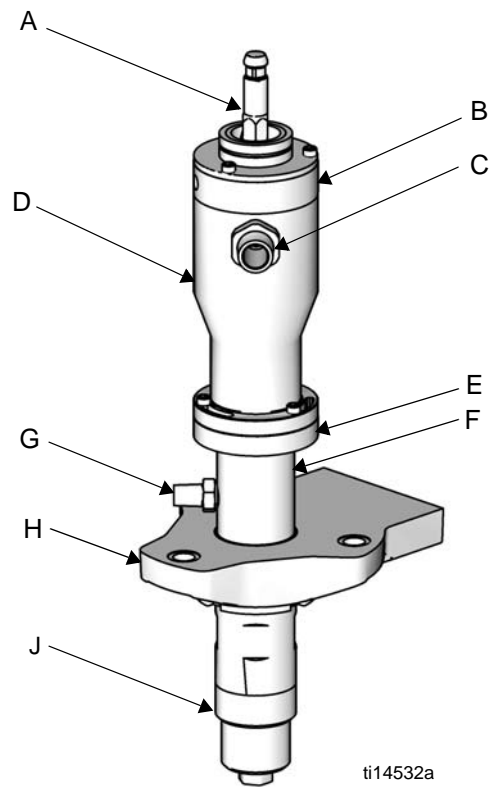
| <b>L</b>            | <b>B</b>                       |               | <b>100</b>  | <b>A</b>                            |                               |
|---------------------|--------------------------------|---------------|---|-------------------------------------|-------------------------------|
| <b>First Digit</b>  | <b>Second Digit (Material)</b> |               | <b>Third, Fourth, and Fifth Digits (Displacement Pump Volume Per Cycle in cc)</b> | <b>Sixth Digit (Packings/Seals)</b> |                               |
| <b>L</b><br>(Lower) | <b>B</b>                       | Bellows Style | <b>050</b>  | <b>A</b>                            | V-Packings (3 UHMWPE, 2 PTFE) |
|                     |                                |               | <b>100</b>  | <b>B</b>                            | U-Cup Seal                    |
|                     |                                |               | <b>150</b>  | <b>C◆</b>                           | U-Cup Seal, Acid              |

◆ The acid u-cup seal (C) is used only in model LB100C.

| <b>Part Number</b>                              | <b>Series</b> | <b>Maximum Working Pressure</b><br>psi (MPa, bar) | <b>Fluid Inlet</b> | <b>Fluid Outlet</b> |
|---|---------------|---|--------------------|---------------------|
| <b>LB050A</b><br><b>LB050B</b>                  | A             | 4500 (33.1, 310)                                  | 3/4 in. npt        | 3/8 in. npt         |
| <b>LB100A</b><br><b>LB100B</b><br><b>LB100C</b> | A             | 3600 (24.8, 248)                                  | 3/4 in. npt        | 3/8 in. npt         |
| <b>LB150A</b><br><b>LB150B</b>                  | A             | 2400 (16.5, 165)                                  | 1 in. npt          | 3/4 in. npt         |



# Component Identification



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**FIG. 1. Component Identification**

**Key:**

- A Connecting Rod
- B Top Cap
- C Pump Fluid Inlet
- D Bellows Chamber
- E Packing Nut
- F Cylinder
- G Pump Fluid Outlet
- H Pump Adapter
- J Foot Cap

# Repair

## General Information

**NOTE:** Reference numbers and letters in parentheses in the text refer to the callouts in the figures.

Always use Genuine Graco Parts and Accessories, available from your Graco distributor. If you supply your own accessories, be sure they are adequately sized and pressure rated for your system.

## Preparation



Follow all warnings and instructions in your pump manual for the following preliminary steps:

1. Flush the equipment.
2. Stop the pump close to the middle of the stroke.
3. Relieve the pressure.
4. Disconnect the air and fluid hoses and the ground wire.
5. Remove the shield.

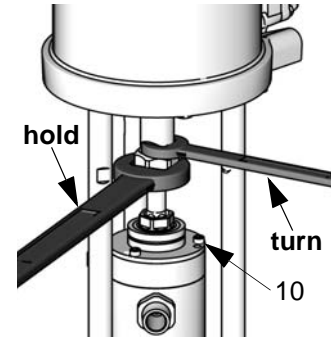
**NOTE:** If the overflow chamber (optional accessory) contains fluid, unscrew the bottle (103) and discard. See FIG. 4. If it has not been used, the bottle can remain attached to the cap.



To avoid the buildup of electrostatic charge, do not rub the plastic bottle with a dry cloth while it is attached to the pump. Remove the bottle to clean, if needed.

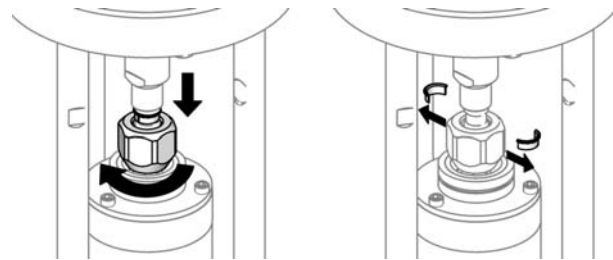
6. Use a 5 mm hex wrench to loosen the screws (10) on the top cap.

7. Hold the coupling nut with a wrench. Use another wrench to turn the motor shaft. To avoid damage to the top cap and the D-shaped seal, **do not turn the coupling nut.**



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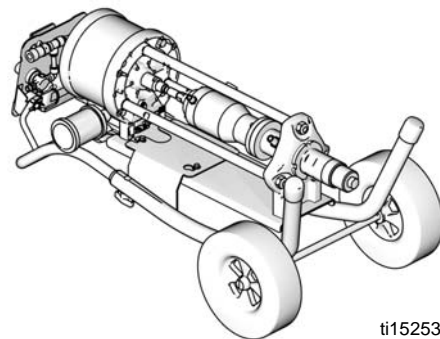
8. Lower the coupling nut and remove the coupling collars.



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**FIG. 2. Remove coupling collars.**

9. Push up the motor shaft. Remove the coupling nut.
10. **Cart Mount:** Tilt the cart onto its back to service the displacement pump.



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**FIG. 3. Tilt pump for repair.**

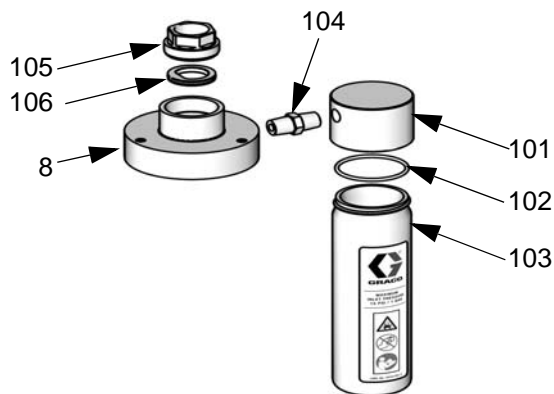
# Replace the Bellows

## Disassemble Bellows and Chamber

### NOTICE

To avoid damage to the top cap and D-shaped seal, never apply torque to the connecting rod.

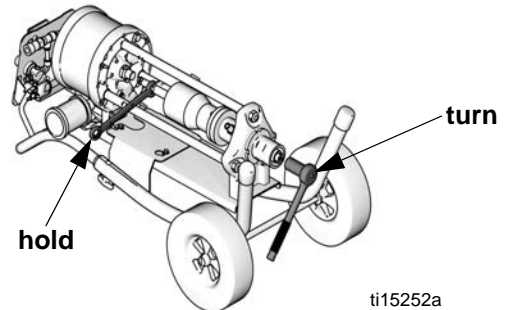
1. Follow all steps under **Preparation**, page 10.
2. Use a 5 mm hex wrench to remove the three screws (10), then remove the shield mount spacer (9) and the top cap (8). Remove and discard the bellows chamber o-ring (12).
3. Leave the overflow chamber attached to the top cap unless it needs to be replaced.
4. **If replacing overflow chamber:** Unscrew the bottle (103) if not already removed, then remove the lid (101) from the fitting (104). Discard the cup and lid. Use a socket to remove the retaining nut (105) in the top cap (8). Remove and discard the D-shaped seal (106). Leave the fitting (104) attached to the top cap (8) unless it needs to be replaced.



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**FIG. 4. Overflow chamber**

5. Use a socket to remove the foot cap (42). Remove and discard the o-ring (41).
6. Hold the hex on the connecting rod (14) with a 19 mm (3/4 in.) wrench. Brace against tie rod or bench so it cannot turn. Use a socket to loosen the piston/rod assembly.



**FIG. 5. Hold connecting rod steady.**

7. See FIG. 6. Pull the connecting rod (14) and bellows (7) out of the top of the bellows chamber (1). Leave the bellows chamber (1) attached to the packing nut.
8. Remove the bellows bushing (6) and the damaged bellows (7).
9. Remove the snap bushing (3). Remove and discard the o-rings (4, 5).

## Reassemble Bellows and Chamber

1. Slide the bellows bushing (6) and new bellows (7) on the connecting rod (14).
2. Install new o-rings (4 and 5) into snap bushing. Grease and install snap bushing (3) on end of bellows and snap into place.
3. Put the bellows o-ring (12) loosely around the bellows (7). Push the connecting rod (14), with fully assembled bellows (7) into the bellows chamber (1). Hand tighten the connecting rod.
4. Hold the hex on the connecting rod (14) and use a torque wrench to turn the piston (45). Torque to 74-86 ft-lb (100-117 N•m).
5. Make sure the o-ring (12) is against the top of the bellows. Push the connecting rod (14) and bellows (7) snugly into the bellows chamber (1).
6. Set top cap (8) on the connecting rod (14). Do not tighten.
7. **If Replacing Overflow Chamber:** Order Kit 24E298. (See page 25.) Install the new D-shaped

seal (106) on the connecting rod (14). Hold connecting rod with 19 mm (3/4 in.) wrench. Install and tighten the retaining nut (105). Torque to 100-120 in-lb (11-14 N•m). **Do not overtighten.**

8. Install a new foot cap o-ring (41). Grease and install the foot cap (42). Torque to 54-66 ft-lb (73-89 N•m).
9. Push up on the motor shaft. Slide on the coupling nut (55). Install the coupling collars (56).
10. Hold connecting rod with 19 mm (3/4 in.) wrench. Install and tighten the coupling nut. Torque to 75-80 ft-lb (138-146 N•m).
11. **If Replacing Overflow Chamber:** Insert the o-ring (102) into the lid (101). Tighten the new bottle (103) with lid (101) attached, to the fitting (104).
12. Turn connecting rod (14) to align holes in top cap (8) with holes on bellows chamber (1) so the D-flat in the top cap faces the front of the pump. Reattach the top cap (8) and shield mount spacer (9). Torque screws (10) to 100-120 in-lb (11-14 N•m).

- △1 Apply grease.
- △2 Apply thread lubricant.
- △3 Torque to 100-120 in-lb (11-14 N•m).
- △4 Torque to 54-66 ft-lb (73-89 N•m).
- △5 Torque to 74-86 ft-lb (100-117 N•m).

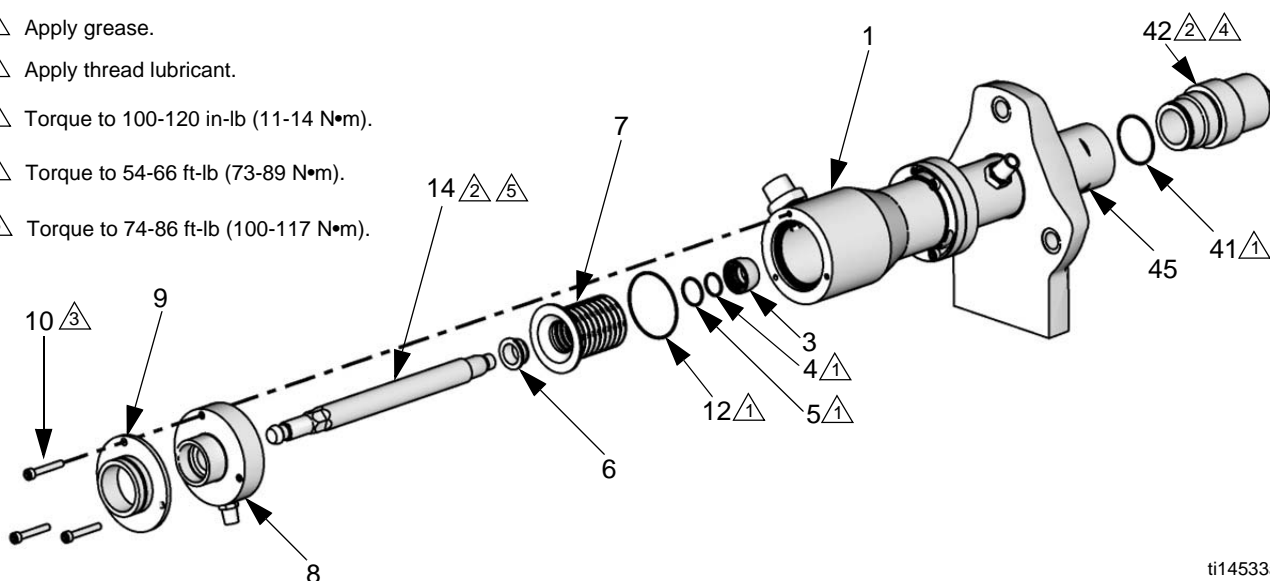


FIG. 6. Replace bellows.

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# Complete Pump Repair

## Disassembly

- Follow all steps under **Preparation**, page 10.
- Use a socket to remove the foot cap (42). Remove and discard the o-ring (41).
- Use a 5 mm hex wrench to loosen the three screws (10) on the top cap. Lift the air motor shaft to remove the top cap (8) and the shield mount spacer (9) from the bellows chamber.
- Hold the hex on the connecting rod (14) with a 19 mm (3/4 in.) wrench so it cannot turn. Use a socket to loosen the piston/rod assembly. See FIG. 5.
- Pull the piston/rod assembly out of the bottom of the cylinder (27).
- V-Packing Models:** Remove the piston packings (37, 39), glands (38, 40), and spring (35). See FIG. 14, page 16.
- U-Cup Models:** Remove the bearing (52), u-cup (53), and washer (54). See FIG. 13, page 15.
- Models with overflow chamber:** If overflow chamber needs to be replaced, see **Replace the Bellows**, page 11. If overflow chamber is fine, leave it attached to the top cap.
- Remove the connecting rod (14) and bellows (7).
- Use a 5 mm allen wrench to remove the three screws (17) and washers (18), then remove the bellows chamber (1). Remove and discard the bellows chamber o-ring (12).
- Use a 54 mm (2 1/8 in.) socket wrench to remove the packing nut (20).
- V-Packing Models:** Remove the glands (23, 26), throat packings (24, 25), and spring (22). See FIG. 10, page 14.
- U-Cup Models:** Use an o-ring pick or pliers to remove the spring clip (51), the u-cup (50), and the bearing (49). FIG. 11, page 15.
- Remove and discard the packing nut top o-ring (2) and bottom o-ring (21).
- Put the hex of the piston rod (31) in a vise. Use a 1/2 in. hex wrench to remove the flow-through nut (44) from the bottom of the piston (45).
- Remove the o-ring (32) and seat (46). Remove from vise and tip out the check ball (47).

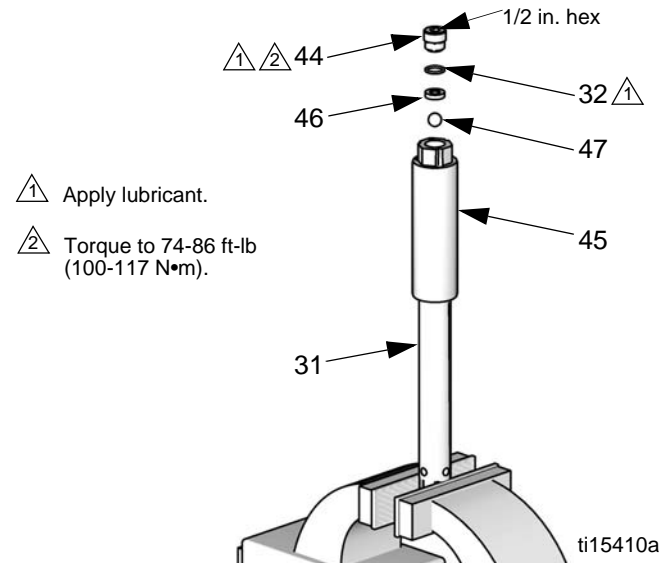
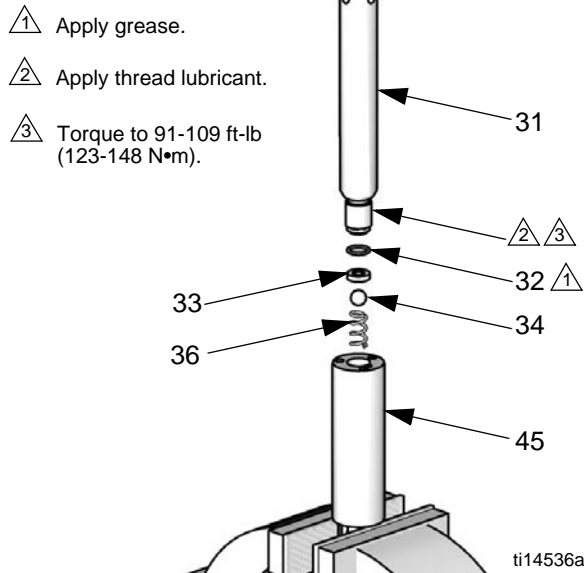


FIG. 7. Outlet check.

- Put the hex of the piston (45) in a vise, then use a 23 mm socket to remove the piston rod (31).
- Remove the piston o-ring (32) and seat (33). Remove from vise and tip out the check ball (34) and spring (36).

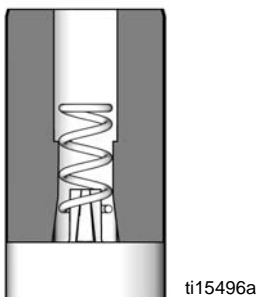


**FIG. 8. Piston check.**

- If the bellows is damaged, see **Replace the Bellows**, page 11. If not, leave the bellows attached to the connecting rod.

**Reassembly**

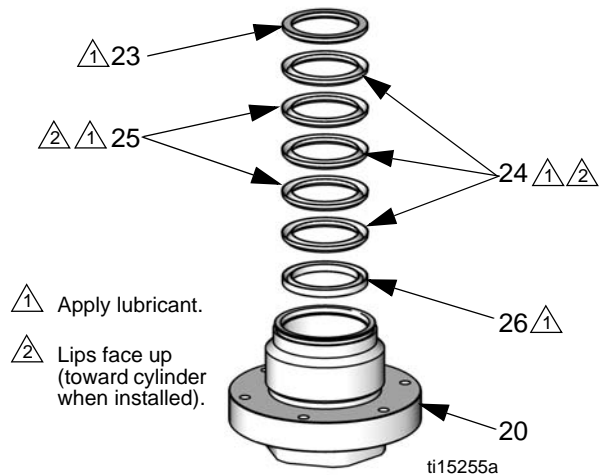
- Clamp the hex of the piston (45) in a vise. Install new spring (36) on the ball stop.



**FIG. 9. Ball stop spring**

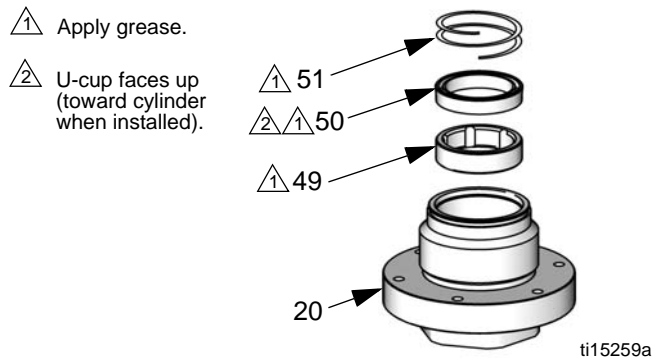
- Install check ball (34) and seat (33) in the top of the piston. Grease and install new o-ring (32).
- With hex of piston (45) still in vise, apply thread lubricant and then use a socket to reattach the displacement rod (31). Torque to 91-109 ft-lb (123-148 N•m).
- Clamp the hex of piston rod in vise. Install new check ball (47) and seat (46) in the bottom of the piston. Grease and install new o-ring (32).
- Grease and reinstall the flow-through nut (44). Torque to 74-86 ft-lb (100-117 N•m).
- Place the packing nut (20) upside down on the bench so packings will align properly.

**V-Packing Models:** Lubricate and install the female gland (26), new v-packings, 24, 25) and the male gland (23) in the packing nut. **Lips must face up, so they will face toward the cylinder when the packing nut is installed.** Push packings all the way in.



**FIG. 10. Throat v-packings**

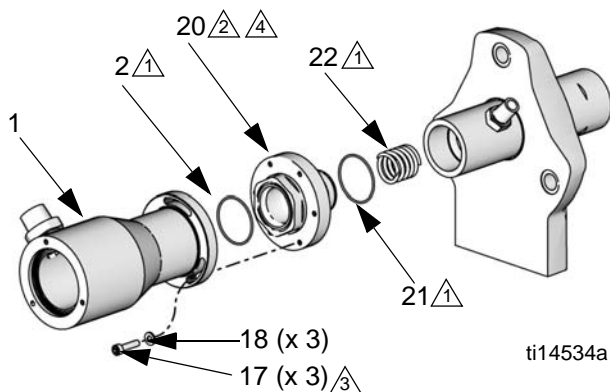
**U-Cup Models:** Lubricate and install the bearing (49), the u-cup packing (50), and the spring clip (51). **U-cup must face up, so it will face toward the cylinder when the packing nut is installed.**



**FIG. 11. U-Cup throat seal**

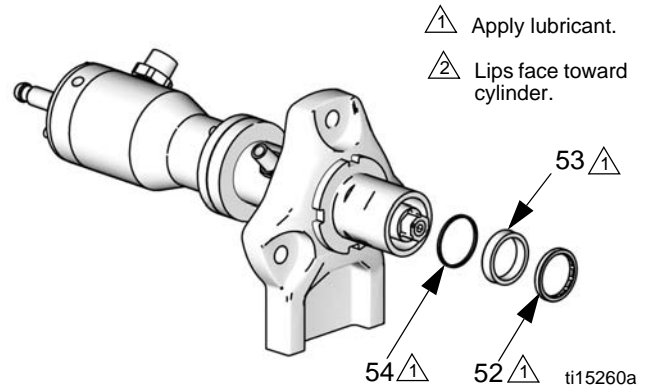
7. Install the top o-ring (2) and the bottom o-ring (21) on the packing nut (20).
8. **V-Packing Models:** Install the spring (22) in the top of the cylinder (27).
9. Grease and reattach the packing nut (20). Torque to 54-66 ft-lb (73-89 N•m).
10. Use screws (17) and washers (18) to reattach the bellows chamber (1). Align the screws so the inlet fitting does not interfere with the tie rods. Torque screws (17) to 100-120 in-lb (11-14 N•m).

- 1 Apply grease.
- 2 Apply thread lubricant.
- 3 Torque to 100-120 in-lb (11-14 N•m).
- 4 Torque to 54-66 ft-lb (73-89 N•m).

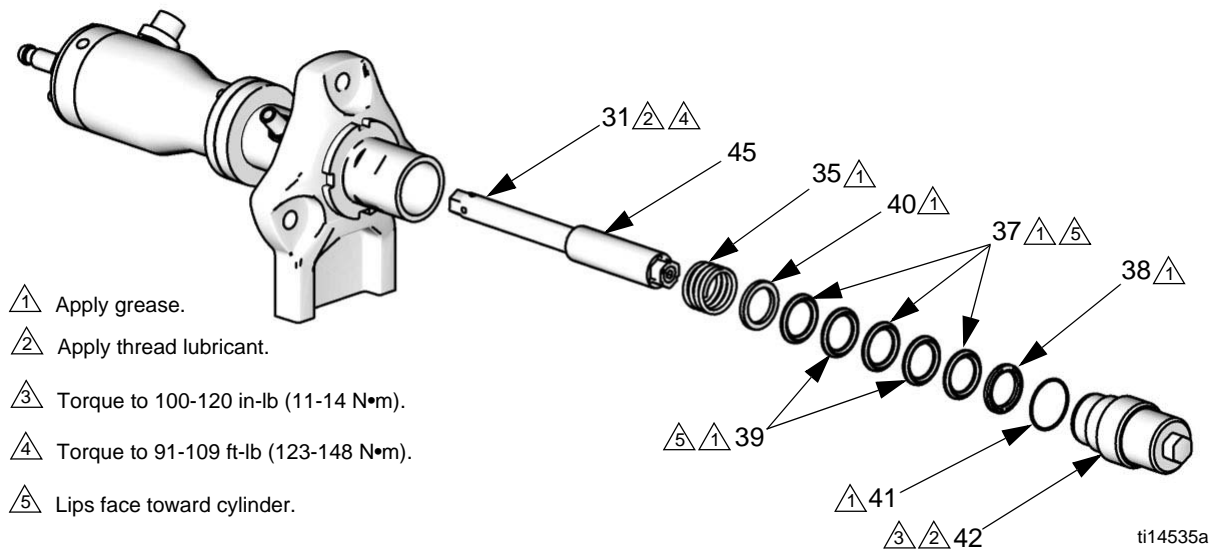


**FIG. 12. Bellows chamber and packing nut.**

11. **V-Packing Models:** Install new piston spring (35). Lubricate and install male gland (40), new piston packings (37, 39), and female gland (38) on the displacement rod (31). **Lips must face toward the cylinder.**
12. **U-Cup Models:** Lubricate and install the washer (54), u-cup (53), and bearing (52). **U-cup must face toward the cylinder.**



**FIG. 13. U-Cup piston seal**



**FIG. 14. Piston v-packings**

13. Grease the outside of the displacement rod shaft and the piston, near the hexes. Push the rod and the piston into the cylinder (27).
14. **If Replacing Bellows:** Follow steps 1 and 2 under **Reassemble Bellows and Chamber**, page 12, to put new bellows on connecting rod.
15. See FIG. 6, page 12. Put the bellows o-ring (12) loosely around the bellows (7). Push the connecting rod (14), with fully assembled bellows (7) into the bellows chamber (1). Hand tighten the connecting rod.
16. Hold the hex on the connecting rod (14) and use a torque wrench to turn the piston (45). Torque to 74-86 ft-lb (100-117 N•m).
17. Set top cap (8) on the connecting rod (14). Do not tighten.
18. **If Replacing Overflow Chamber:** Order Kit 24E298. (See page 25.) Install the new D-shaped seal (106) on the connecting rod (14). Hold connecting rod with 19 mm (3/4 in.) wrench. Install and tighten the retaining nut (105). Torque to 100-120 in-lb (11-14 N•m). **Do not overtighten.**
19. Install a new foot cap o-ring (41). Grease and install the foot cap (42). Torque to 54-66 ft-lb (73-89 N•m).

20. Push up on the motor shaft. Slide on the coupling nut (55). Install the coupling collars (56).
21. Hold air motor shaft. Install and tighten the coupling nut. Torque to 75-80 ft-lb (138-146 N•m).
22. **If Replacing Overflow Chamber:** Insert the o-ring (102) into the lid (101). Tighten the new bottle (103) with lid (101) attached, to the fitting (104).
23. Turn connecting rod (14) to align holes in top cap (8) with holes on bellows chamber (1). Reattach the top cap (8) and shield mount spacer (9). Torque screws (10) to 100-120 in-lb (11-14 N•m).

**NOTE:** The overflow chamber fits best if the D flat is aligned to the front of the pump.

### Inlet or Outlet Fitting Repair

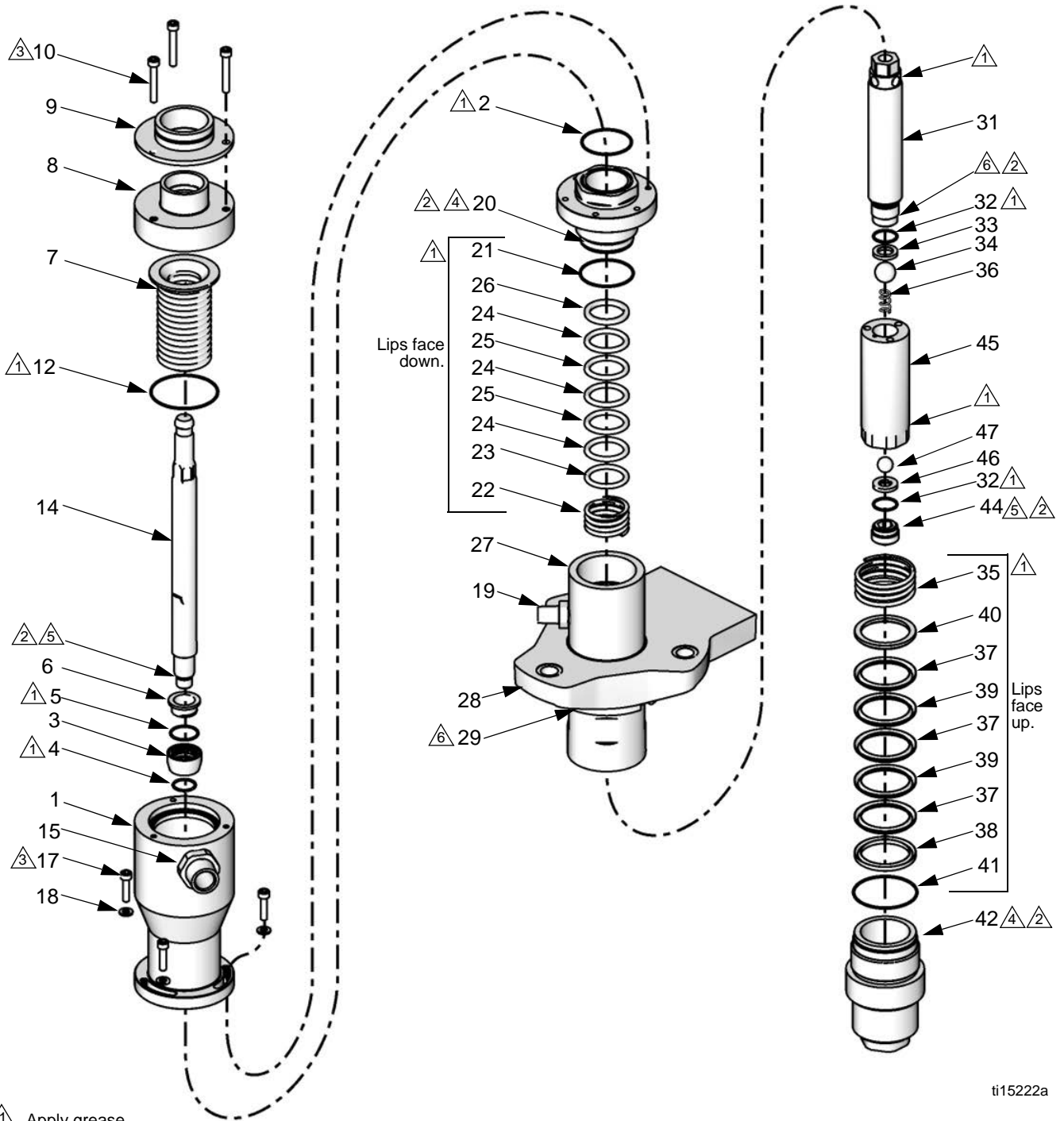
Remove and replace the inlet or outlet fitting only if damaged. Replace one or both o-rings if a leak or seepage is present and every time a fitting is removed. To reassemble, grease the o-ring and apply high-strength thread locker to the fitting. Torque to 54-66 ft-lb (73-89 N•m).





# Parts

## Models with V-Packings



ti15222a

① Apply grease.

② Apply thread lubricant.

④ Torque to 54-66 ft-lb (73-89 N•m).

⑥ Torque to 91-109 ft-lb (123-148 N•m).

③ Torque to 100-120 in-lb (11-14 N•m).

⑤ Torque to 74-86 ft-lb (100-117 N•m).

## Models with V-Packings

**NOTE:** Many parts are available in one or more Service/Repair kits. See page 24.

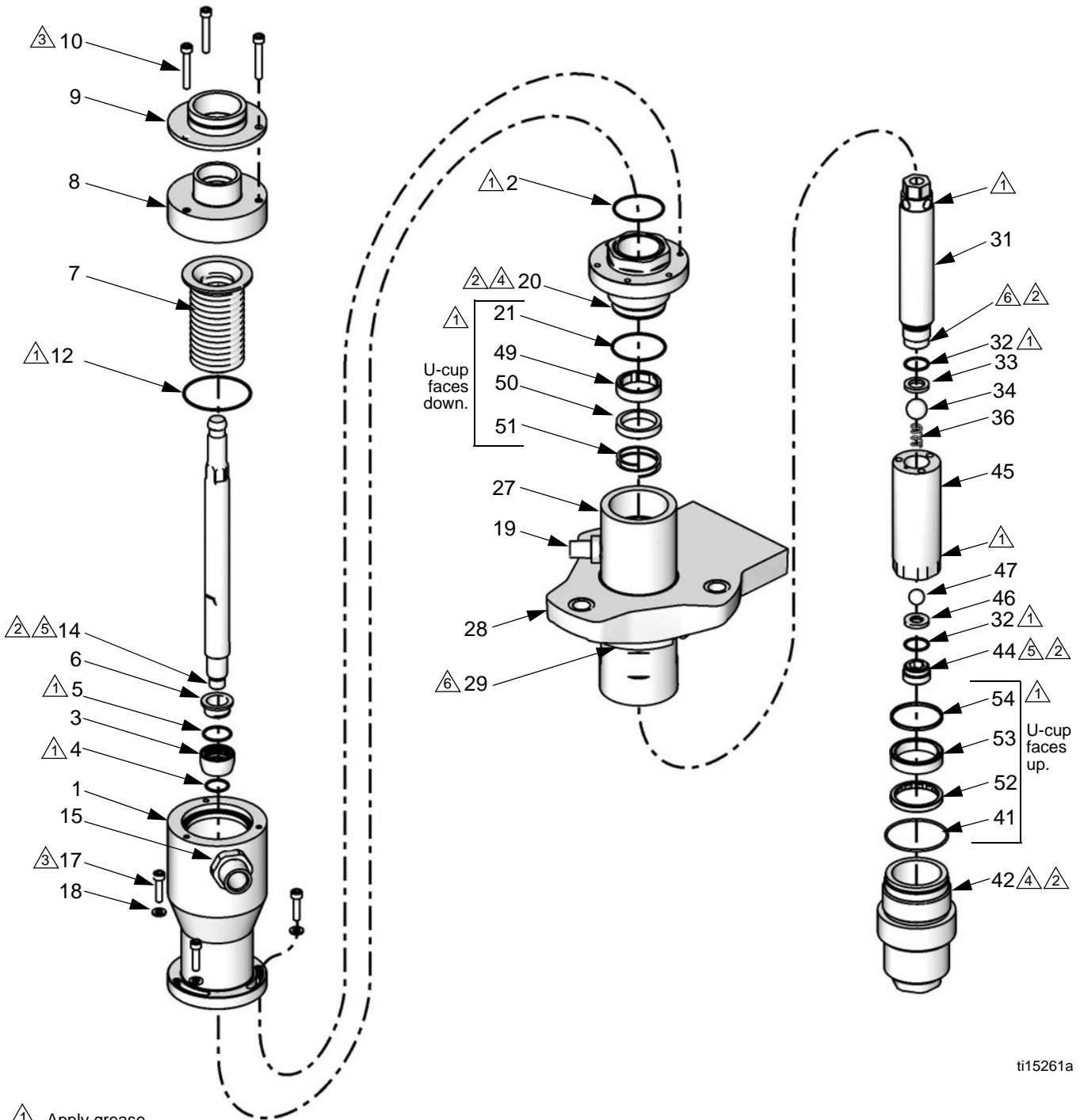
| Ref | Description   | Part                       | Qty |
|-----|---|----------------------------|-----|
| 1   | BELLOWS CHAMBER KIT (includes 2, 12, 15, 17, 18, 21, 32, and 41)<br>LB050A<br>LB100A and LB150A                       | 24E758<br>24E759           | 1   |
| 2   | O-RING, packing nut, top  | 113082                     | 1   |
| 3   | BUSHING, snap   | -----                      | 1   |
| 4   | O-RING, snap bushing  | 110135                     | 1   |
| 5   | O-RING, snap bushing  | C20182                     | 1   |
| 6   | BUSHING, bellows  | -----                      | 1   |
| 7   | BELLOWS KIT (includes 2, 4, 5, 12, 21, 32, and 41)<br>LB050A<br>LB100A and LB150A                                     | 24A267<br>24E764           | 1   |
| 8   | TOP CAP KIT (includes 9, 10, and 12)  | 24A271                     | 1   |
| 9   | SPACER, shield mount  | -----                      | 1   |
| 10  | SCREW, M6 x 40; see <i>Hardware Kit, page 24</i>  | 117030                     | 3   |
| 12  | O-RING, bellows chamber   | 116377                     | 1   |
| 14  | CONNECTING ROD KIT (includes 4, 5, 12, 32, and 41)  | 24E762                     | 1   |
| 15  | INLET FITTING KIT<br>LB050A and LB100A,<br>3/4-14 npt x 1 3/16-16 un<br>LB150A<br>1-11.5 npt x 1 3/16-16 un           | 24A842<br>24E711           | 1   |
| 17  | SCREW, bellows chamber, M6 x 25,<br>see <i>Hardware Kit, page 24</i>  | 117029                     | 3   |
| 18  | WASHER, bellows chamber;<br>see <i>Hardware Kit, page 24</i>  | 117018                     | 3   |
| 19  | OUTLET FITTING KIT (includes 48)<br>LB050A and LB100A,<br>3/8-18 npt x 3/4-16 un<br>LB150A, 3/4-14 npt x 1 3/16-16 un | 24A840<br>24A842           | 1   |
| 20  | PACKING NUT KIT (includes 2, 12, 21, 32, and 41)<br>LB050A<br>LB100A<br>LB150A  | 24F837<br>24F223<br>24F224 | 1   |
| 21  | O-RING, packing nut, bottom<br>LB050A<br>LB100A<br>LB150A   | 107078<br>104537<br>110492 | 1   |
| 22  | SPRING  | -----                      | 1   |
| 23  | GLAND, male   | -----                      | 1   |
| 24  | V-PACKING, UHMWPE   | -----                      | 3   |
| 25  | V-PACKING, PTFE   | -----                      | 2   |
| 26  | GLAND, female   | -----                      | 1   |

| Ref | Description   | Part                       | Qty |
|-----|---|----------------------------|-----|
| 27  | CYLINDER KIT (includes 2, 12, 19, 21, 32, 41, and 48)<br>LB050A<br>LB100A<br>LB150A | 24A828<br>24A829<br>24A830 | 1   |
| 28  | ADAPTER, pump   | -----                      | 1   |
| 29  | JAM NUT<br>LB050A<br>LB100A<br>LB150A   | 24A635<br>24A637<br>24A639 | 1   |
| 31  | DISPLACEMENT ROD KIT (includes 2, 12, 21, 32, and 41)<br>LB050A<br>LB100A<br>LB150A | 24F492<br>24F296<br>24F295 | 1   |
| 32  | O-RING, piston  | -----                      | 2   |
| 33  | SEAT, tungsten carbide  | -----                      | 1   |
| 34  | CHECK BALL, stainless steel<br>LB050A<br>LB100A and LB150A                          | 101947<br>107203           | 1   |
| 35  | SPRING  | -----                      | 1   |
| 36  | SPRING, ball stop   | -----                      | 1   |
| 37  | V-PACKING, UHMWPE   | -----                      | 3   |
| 38  | GLAND, female   | -----                      | 1   |
| 39  | V-PACKING, PTFE   | -----                      | 2   |
| 40  | GLAND, male   | -----                      | 1   |
| 41  | O-RING, foot cap  | -----                      | 1   |
| 42  | FOOT CAP KIT (includes 41)<br>LB050A<br>LB100A<br>LB150A                            | 24A831<br>24A832<br>24A833 | 1   |
| 44  | FLOW-THROUGH NUT  | -----                      | 1   |
| 45  | PISTON KIT (includes 2, 12, 21, 32, and 41)<br>LB050A<br>LB100A<br>LB150A           | 24F488<br>24F489<br>24F490 | 1   |
| 46  | SEAT, tungsten carbide  | -----                      | 1   |
| 47  | CHECK BALL, stainless steel<br>LB050A<br>LB100A and LB150A                          | 101947<br>101859           | 1   |
| 48  | O-RING, outlet fitting, not shown   | -----                      | 1   |
| 55  | NUT, coupling   | 15T311                     | 1   |
| 56  | COLLARS, coupling; see <i>page 24 for pack of 10</i>                                | 184128                     | 2   |

**NOTE:** Replacement Danger and Warning labels, tags, and cards are available at no cost.

--- Parts not sold separately. See pages 24-25 for available kits.

**Models with U-Cup Packings (Non-acid)**



ti15261a

△1 Apply grease.

△2 Apply thread lubricant.

△4 Torque to 54-66 ft-lb (73-89 N•m).

△6 Torque to 91-109 ft-lb (123-148 N•m).

△3 Torque to 100-120 in-lb (11-14 N•m).

△5 Torque to 74-86 ft-lb (100-117 N•m).

## Models with U-Cup Packings (Non-acid)

**NOTE:** Many parts are available in one or more Service/Repair kits. See page 24.

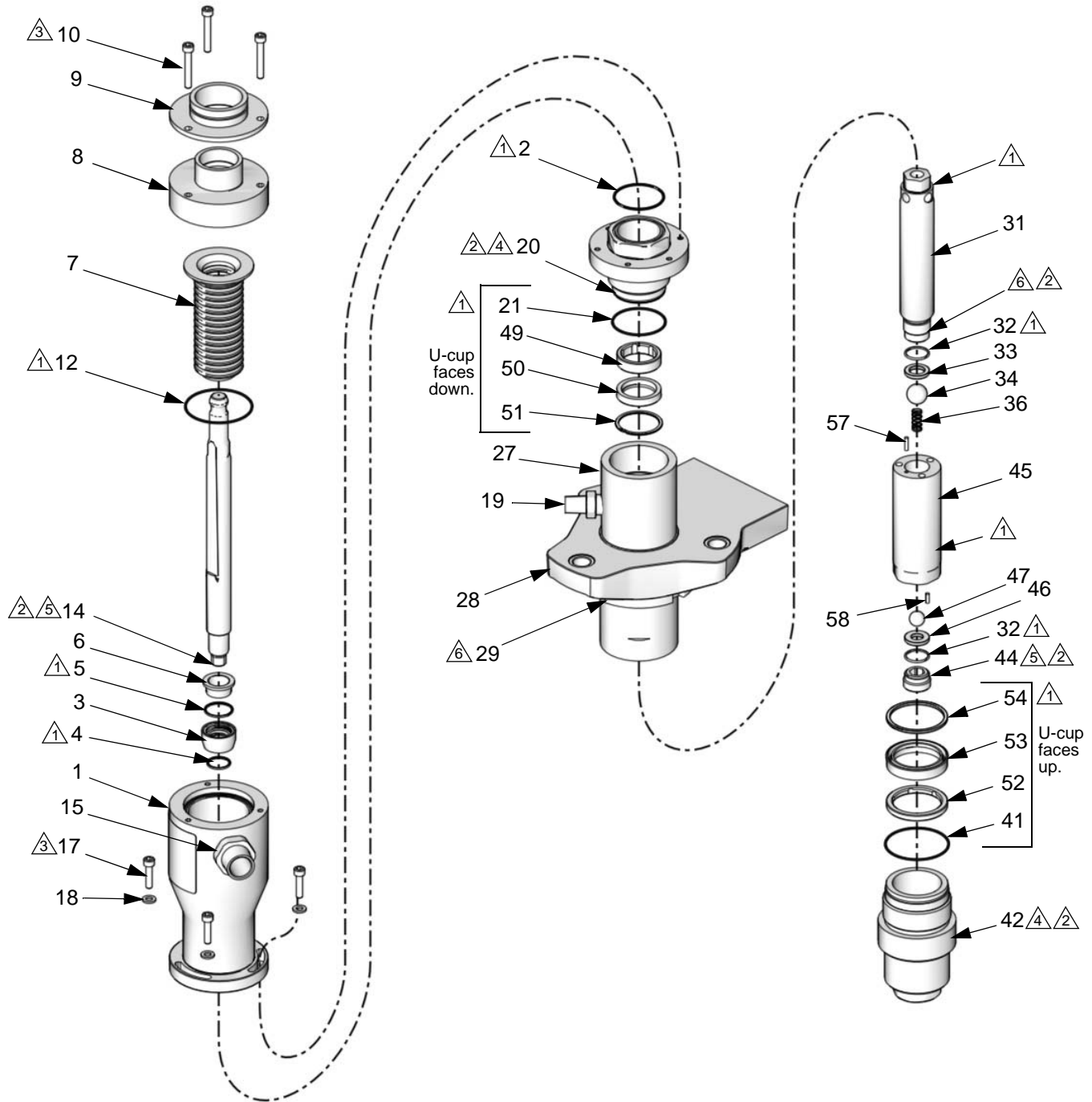
| Ref. | Description   | Part Number                | Qty |
|------|---|----------------------------|-----|
| 1    | BELLOWS CHAMBER KIT (includes 2, 12, 15, 17, 18, 21, 32, and 41)<br>LB050B<br>LB100B and LB150B                       | 24E758<br>24E759           | 1   |
| 2    | O-RING, packing nut, top  | 113082                     | 1   |
| 3    | BUSHING, snap   | -----                      | 1   |
| 4    | O-RING, snap bushing  | 110135                     | 1   |
| 5    | O-RING, snap bushing  | C20182                     | 1   |
| 6    | BUSHING, bellows  | -----                      | 1   |
| 7    | BELLOWS KIT (includes 2, 4, 5, 12, 21, 32, and 41)<br>LB050B<br>LB100B and LB150B                                     | 24A267<br>24E764           | 1   |
| 8    | TOP CAP KIT (includes 9, 10, and 12)  | 24A271                     | 1   |
| 9    | SPACER, shield mount  | -----                      | 1   |
| 10   | SCREW, M6 x 40; see <i>Hardware Kit, page 24</i>  | 117030                     | 3   |
| 12   | O-RING, bellows chamber   | 116377                     | 1   |
| 14   | CONNECTING ROD KIT (includes 4, 5, 12, 32, and 41)  | 24E762                     | 1   |
| 15   | INLET FITTING KIT<br>LB050B and LB100B,<br>3/4-14 npt x 1 3/16-16 un<br>LB150B, 1-11.5 npt x 1 3/16-16 un             | 24A842<br>24E711           | 1   |
| 17   | SCREW, bellows chamber, M6 x 25, see <i>Hardware Kit, page 24</i>   | 117029                     | 3   |
| 18   | WASHER, bellows chamber; see <i>Hardware Kit, page 24</i>   | 117018                     | 3   |
| 19   | OUTLET FITTING KIT (includes 48)<br>LB050B and LB100B,<br>3/8-18 npt x 3/4-16 un<br>LB150B, 3/4-14 npt x 1 3/16-16 un | 24A840<br>24A842           | 1   |
| 20   | PACKING NUT KIT (includes 2, 12, 21, 32, and 41)<br>LB050B<br>LB100B<br>LB150B  | 24F837<br>24F223<br>24F224 | 1   |
| 21   | O-RING, packing nut, bottom<br>LB050B<br>LB100B<br>LB150B   | 107078<br>104537<br>110492 | 1   |
| 27   | CYLINDER KIT (includes 2, 12, 19, 21, 32, 41, and 48)<br>LB050B<br>LB100B<br>LB150B                                   | 24A828<br>24A829<br>24A830 | 1   |
| 28   | ADAPTER, pump   | -----                      | 1   |

| Ref. | Description   | Part Number                | Qty |
|------|---|----------------------------|-----|
| 29   | JAM NUT<br>LB050B<br>LB100B<br>LB150B   | 24A635<br>24A637<br>24A639 | 1   |
| 31   | DISPLACEMENT ROD KIT (includes 2, 12, 21, 32, and 41)<br>LB050B<br>LB100B<br>LB150B | 24F492<br>24F296<br>24F295 | 1   |
| 32   | O-RING, piston  | -----                      | 2   |
| 33   | SEAT, tungsten carbide  | -----                      | 1   |
| 34   | CHECK BALL, stainless steel   | 107203                     | 1   |
| 36   | SPRING, ball stop   | -----                      | 1   |
| 41   | O-RING, foot cap  | 106259                     | 1   |
| 42   | FOOT CAP KIT (includes 41)<br>LB050B<br>LB100B<br>LB150B                            | 24A831<br>24A832<br>24A833 | 1   |
| 44   | FLOW-THROUGH NUT  | -----                      | 1   |
| 45   | PISTON KIT (includes 2, 12, 21, 32, and 41)<br>LB050B<br>LB100B<br>LB150B           | 24F488<br>24F489<br>24F490 | 1   |
| 46   | SEAT, tungsten carbide  | -----                      | 1   |
| 47   | CHECK BALL, stainless steel   | 101859                     | 1   |
| 48   | O-RING, outlet fitting, not shown   | -----                      | 1   |
| 49   | BEARING, throat   | -----                      | 1   |
| 50   | U-CUP Packing, throat   | -----                      | 1   |
| 51   | SPRING CLIP, throat   | -----                      | 1   |
| 52   | BEARING, piston   | -----                      | 1   |
| 53   | U-CUP Packing, piston   | -----                      | 1   |
| 54   | WASHER, piston  | -----                      | 1   |
| 55   | NUT, coupling   | 15T311                     | 1   |
| 56   | COLLARS, coupling; see <i>page 24 for pack of 10</i>                                | 184128                     | 2   |

**NOTE:** Replacement Danger and Warning labels, tags, and cards are available at no cost.

--- Parts not sold separately. See pages 24-25 for available kits.

**Model LB100C with U-Cup Packings (Acid)**



ti29675a

△1 Apply grease.

△2 Apply thread lubricant.

△4 Torque to 54-66 ft-lb (73-89 N•m).

△6 Torque to 91-109 ft-lb (123-148 N•m).

△3 Torque to 100-120 in-lb (11-14 N•m).

△5 Torque to 74-86 ft-lb (100-117 N•m).

## Model LB100C with U-Cup Packings (Acid)

**NOTE:** Many parts are available in one or more Service/Repair kits. See page 24.

| Ref. | Description   | Part Number | Qty |
|------|---|-------------|-----|
| 1    | BELLOWS CHAMBER, 316 sst  | 17M106      | 1   |
| 2†   | O-RING, packing nut, top  | 113082      | 1   |
| 3†   | BUSHING, snap, 316 sst  | -----       | 1   |
| 4†   | O-RING, snap bushing  | 110135      | 1   |
| 5†   | O-RING, snap bushing  | C20182      | 1   |
| 6†   | BUSHING, bellows, 316 sst   | -----       | 1   |
| 7†   | BELLOWS KIT (includes 2, 4, 5, 12, 21, 32, and 41)                | 24J851      | 1   |
| 8    | TOP CAP KIT (includes 9, 10, and 12)                              | 24A271      | 1   |
| 9    | SPACER, shield mount  | -----       | 1   |
| 10   | SCREW, M6 x 40; see <i>Hardware Kit, page 24</i>                  | 117030      | 3   |
| 12†  | O-RING, bellows chamber   | 116377      | 1   |
| 14   | CONNECTING ROD KIT (includes 4, 5, 12, 32, and 41)                | 24E762      | 1   |
| 15†  | INLET FITTING KIT, 3/4-14 npt x 1 3/16-16 un                      | 24A842      | 1   |
| 17   | SCREW, bellows chamber, M6 x 25, see <i>Hardware Kit, page 24</i> | 117029      | 3   |
| 18   | WASHER, bellows chamber; see <i>Hardware Kit, page 24</i>         | 117018      | 3   |
| 19   | OUTLET FITTING KIT, 3/8-18 npt x 3/4-16 un (includes 48)          | 24A840      | 1   |
| 20   | PACKING NUT   | 17M093      | 1   |
| 21†  | O-RING, packing nut, bottom                                       | -----       | 1   |
| 27   | CYLINDER  | 17M089      | 1   |
| 28   | ADAPTER, pump   | -----       | 1   |

| Ref. | Description  | Part Number | Qty |
|------|--|-------------|-----|
| 29   | JAM NUT  | 24A637      | 1   |
| 31   | DISPLACEMENT ROD KIT                                 | 24F296      | 1   |
| 32†  | O-RING, piston                                       | -----       | 2   |
| 33†  | SEAT, 17-4 sst                                       | -----       | 1   |
| 34†  | CHECK BALL, stainless steel                          | -----       | 1   |
| 36†  | SPRING, ball stop                                    | -----       | 1   |
| 41†  | O-RING, foot cap                                     | 106259      | 1   |
| 42   | FOOT CAP (includes 41)                               | 24A832      | 1   |
| 44†  | FLOW-THROUGH NUT                                     | -----       | 1   |
| 45   | PISTON   | 17M092      | 1   |
| 46†  | SEAT, 17-4 sst                                       | -----       | 1   |
| 47†  | CHECK BALL, stainless steel                          | 103462      | 1   |
| 48†  | O-RING, outlet fitting, not shown                    | -----       | 1   |
| 49†  | BEARING, throat                                      | -----       | 1   |
| 50†  | U-CUP Packing, throat                                | -----       | 1   |
| 51†  | RETAINING RING, spiral, 316 sst                      | -----       | 1   |
| 52†  | BEARING, piston                                      | -----       | 1   |
| 53†  | U-CUP Packing, piston                                | -----       | 1   |
| 54†  | WASHER, piston, 316 sst                              | -----       | 1   |
| 55   | NUT, coupling  | 15T311      | 1   |
| 56   | COLLARS, coupling; see <i>page 24 for pack of 10</i> | 184128      | 2   |
| 57   | PELLET, nylon, 0.516 in. (13 mm)                     | 160742      | 1   |
| 58   | PELLET, nylon, 0.375 in. (9.5 mm)                    | 15V998      | 1   |

**NOTE:** Replacement Danger and Warning labels, tags, and cards are available at no cost.

--- Parts not sold separately. See pages 24-25 for available kits.

† Parts included in Acid Kit 26A234.

# Repair Kits

| Kit Description  | LB050A<br>LB050B | LB100A<br>LB100B | LB150A<br>LB150B | LB100C<br>(acid) |
|--|------------------|------------------|------------------|------------------|
| <b>O-Ring Kit</b> - Includes o-rings (2, 4, 5, 12, 16, 21, 32, 41, and 48)   | 24E713           | 24E714           | 24E715           | 24E714           |
| <b>V-Packing Seal Kit</b><br>Includes: springs (22, 35), glands (23, 26, 38, 40), v-packings (24, 25, 37, 39), and o-rings (2, 12, 21, 32, and 41)   | 24A655           | 24A656           | 24A657           |                  |
| <b>U-Cup Seal Kit</b><br>Includes: throat u-cup (50), bearing (49), and spring clip (51); piston u-cup (53), bearing (52), and washer (54). Also includes o-rings (2, 12, 21, 32, and 41)  | 24E716           | 24E631           | 24E632           |                  |
| <b>Bushing Kit</b><br>Includes: bellows bushing (6), snap bushing (3), and o-rings (2, 4, 5, 12, 16, 21, 32, and 41)   | 24A268           | 24E766           | 24E766           |                  |
| <b>440 Stainless Steel Check Ball Kit</b><br>Includes: Check balls (34, 47), ball stop spring (36), and o-rings (2, 12, 21, 32, and 41).   | 24A661           | 24A662           | 24A662           |                  |
| <b>Tungsten Carbide Seats and 440 Stainless Steel Balls Repair Kit</b><br>Includes seats (33, 46), check balls (34, 47), flow-through nut (44), and o-rings (2, 12, 21, 32, and 41)  | 24A787           | 24A788           | 24A788           |                  |
| <b>Displacement Rod/Connecting Rod/Piston Kit</b><br>Includes: displacement rod (31), piston (45), nylon extrusions (not in parts list), connecting rod (14), bellows (7), snap bushing (3), bellows bushing (6), seats (33, 46), check balls (34, 47), spring (36); flow-through nut (44); coupling nut (55), coupling collars (56), and o-rings (2, 4, 5, 12, 21, 32, and 41)  | 24A649           | 24A650           | 24A651           |                  |
| <b>Displacement Rod Kit</b><br>Includes: displacement rod (31) and o-rings (2, 12, 21, 32, and 41)   | 24F296           | 24F296           | 24F296           | 24F296           |
| <b>Piston Kits</b><br>Includes: piston (45), nylon extrusions (not in parts list), and o-rings (2, 12, 21, 32, and 41)   | 24F488           | 24F489           | 24F490           |                  |
| <b>Hardware Kit</b><br>Includes: three top cap screws (10); three bellows chamber screws (17) and three washers (18)   | 24E712           | 24E712           | 24E712           | 24E712           |
| <b>Coupling Collars Kit</b> - Includes: 10-pack of coupling collars  | 24A619           | 24A619           | 24A619           | 24A619           |
| <b>Acid 100cc Bellows U-Cup Kit</b><br>Includes: check ball (47), ball stop spring (36), U-cup packings (50 and 53), throat bearing (49), piston bearing (52), bellows (7), flow-through nut (44), seat (33), check ball (34), seat (46), snap bushing (3), piston washer (54), spiral retaining ring (51), bellows bushing (6), nylon extrusions, inlet and outlet fitting o-rings (see 15 and 48), and o-rings (2, 4, 5, 12, 21, 32, and 41) |                  |                  |                  | 26A234           |



## Optional Kits

| Kit Description  | LB050A<br>LB050B | LB100A<br>LB100B | LB150A<br>LB150B | LB100C<br>(acid) |
|--|------------------|------------------|------------------|------------------|
| <b>Reinforced PTFE V-Packing Kit*</b><br>Reinforced PTFE throat packings and glands, reinforced PTFE piston packings and glands, o-rings, and springs        | 24J858           | 24J859           | 24J860           |                  |
| <b>PTFE Bellows Kit*</b><br>Includes PTFE bellows and o-rings  | 24J850           | 24J851           | 24J851           | 24J851           |
| <b>316 Stainless Steel Check Ball Kit**</b><br>Includes: Check balls (34, 47), ball stop spring (36), and o-rings (2, 12, 21, 32 and 41).                    | 24T257           | 24T258           | 24T258           | 24T258           |
| <b>316 Stainless Steel Seat and Ball Kit**</b><br>Includes: Seats (33, 46), check balls (34, 47), flow-through nut (44) and o-rings (2, 12, 21, 32, and 41). | 24A800           | 24A801           | 24A801           |                  |

\* Use with materials that cause chemical compatibility concerns with UHMWPE, such as acid catalyst materials.

\*\* Replaces standard kits for high corrosive applications.

## Accessories

### Overflow Chamber Kit 24E298

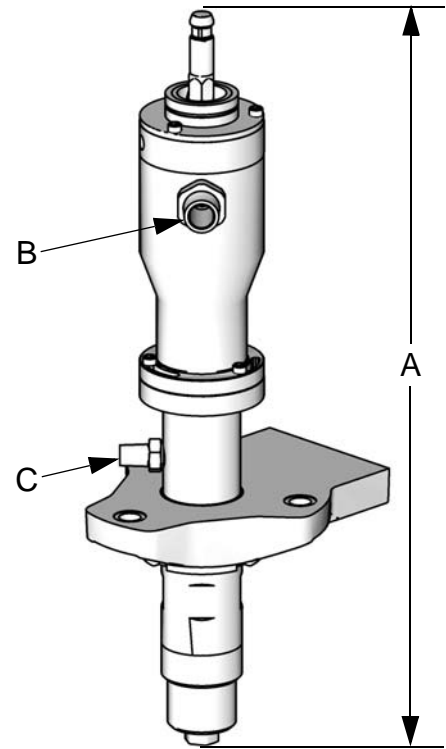
| Ref. | Description             | Qty. |
|------|-------------------------|------|
| 101  | LID                     | 1    |
| 102  | O-RING                  | 1    |
| 103  | BOTTLE                  | 1    |
| 104  | FITTING, 2 x 1/4-18 npt | 1    |
| 105  | NUT, retaining          | 1    |
| 106  | D-SHAPED SEAL, bellows  | 1    |

# Dimensions

## Displacement Pump Dimensions

| Displacement Pump                 | A<br>(Height*)<br>in. (mm) | B<br>(Inlet Size)<br>in. npt | C<br>(Outlet Size)<br>in. npt | Weight<br>lbs (kg) |
|-----------------------------------|----------------------------|------------------------------|-------------------------------|--------------------|
| <b>LB050A, LB050B</b>             | 23.6 (599)                 | 3/4 in.                      | 3/8 in.                       | 26 (11)            |
| <b>LB100A, LB100B,<br/>LB100C</b> | 23.6 (599)                 | 3/4 in.                      | 3/8 in.                       | 30 (13)            |
| <b>LB150A, LB150B</b>             | 23.6 (599)                 | 1 in.                        | 3/4 in.                       | 34 (15)            |

\* Height measured at midstroke.



ti14532a

# Technical Data

|  |  |
|--|--|
| Maximum fluid working pressure                   |  |
| LB050A and LB050B . . . . .                      | 4500 psi (33.1 MPa, 310 bar)                             |
| LB100A, LB100B and LB100C . . . . .              | 3600 psi (24.8 MPa, 248 bar)                             |
| LB150A and LB150B . . . . .                      | 2400 psi (16.5 MPa, 165 bar)                             |
| Maximum fluid inlet pressure . . . . .           | 15 psi (0.1 MPa, 1.0 bar)                                |
| Maximum fluid temperature . . . . .              | 160°F (71°C)   |
| Ambient temperature range . . . . .              | 35°–120°F (2°–49°C)                                      |
| Stroke length . . . . .                          | 2.5 in.  |
| Wetted parts . . . . .                           | PEEK, PTFE, stainless steel, tungsten carbide,<br>UHMWPE |
| Wetted materials on acid model (LB100C). . . . . | 316 SST, 17-4 SST, Peek, PTFE, UHMWPE                    |

# Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

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**Phone:** 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

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