

# Z-Series Chemical Pumps

3A0019V

EN

**For pumping plural component materials. For professional use only.**

**Not for use in explosive atmospheres.**

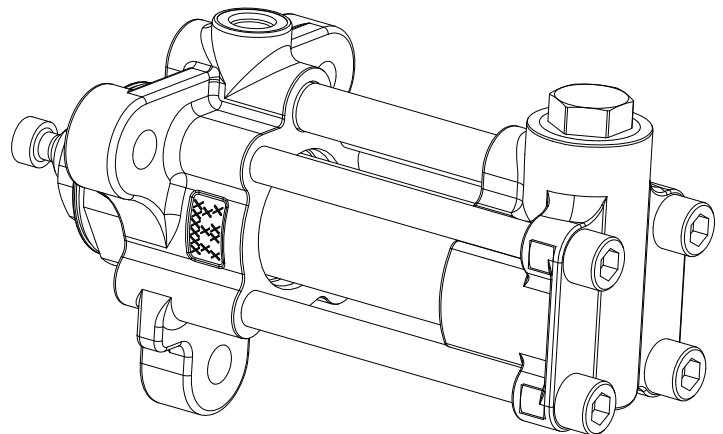
*3500 psi (24 MPa, 241 bar) Maximum Working Pressure*



### **Important Safety Instructions**

Read all warnings and instructions in this manual and all supplied manuals. Save all instructions.

See page 3 for model information.



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# Related Manuals

Manual	Description
3A0281	Z-Series Chemical Pumps Repair Kits Repair-Parts

# Models

Model	Pump Size
*L005S1	5cc
L010S1	10cc
**L010S3	10cc
L015S1	15cc
L020S1	20cc
**L020S3	20cc
L025S1	25cc
L030S1	30cc
L035S1	35cc
L040S1	40cc
L045S1	45cc
L050S1	50cc
L060S1	60cc
L065S1	65cc
L070S1	70cc
L075S1	75cc
L080S1	80cc
L086S1	86cc
L090S1	90cc
L100S1	100cc
L105S1	105cc
L120S1	120cc
L140S1	140cc
L150S1	150cc
L160S1	160cc
† L005S4	5cc
† L010S4	10cc
† L015S4	15cc
† L020S4	20cc
† L025S4	25cc
† L030S4	30cc
† L035S4	35cc
† L040S4	40cc
† L045S4	45cc
† L050S4	50cc

Model	Pump Size
† L060S4	60cc
† L065S4	65cc
† L070S4	70cc
† L075S4	75cc
† L080S4	80cc
† L086S4	86cc
† L090S4	90cc
† L100S4	100cc
† L120S4	120cc
† L140S4	140cc
† L150S4	150cc
† L160S4	160cc





\* Due to a small seal cross-section, use unfilled catalysts to achieve the best seal life results.






\*\* S3 pump models are for NVH system use only.

† S4 pump models are for use with the Electric Fixed Ration (EFR) system only.






# 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 symbol refers to procedure-specific risk. Refer back to these warnings. Additional, product-specific warnings may be found 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.</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 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>• Do not spray without tip guard and trigger guard installed.</li> <li>• Engage trigger lock when not spraying.</li> <li>• Follow <b>Pressure Relief Procedure</b> in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.</li> </ul>
	<p><b>EQUIPMENT MISUSE HAZARD</b></p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>• Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See <b>Technical Data</b> in all equipment manuals.</li> <li>• Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the <b>Pressure Relief Procedure</b> in this manual when equipment is not in use.</li> <li>• Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.</li> <li>• Do not alter or modify equipment.</li> <li>• Use equipment only for its intended purpose. Call your distributor for information.</li> <li>• Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.</li> <li>• Do not kink or over bend hoses or use hoses to pull equipment.</li> <li>• Keep children and animals away from work area.</li> <li>• Comply with all applicable safety regulations.</li> </ul>

 <b>WARNING</b>	
	<p><b>MOVING PARTS HAZARD</b></p> <p>Moving parts can pinch or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> <li>• Keep clear of moving parts.</li> <li>• Do not operate equipment with protective guards or covers removed.</li> <li>• Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the <b>Pressure Relief Procedure</b> in this manual. Disconnect power or air supply.</li> </ul>
	<p><b>TOXIC FLUID OR FUMES HAZARD</b></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"> <li>• Read MSDS's to know the specific hazards of the fluids you are using.</li> <li>• Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.</li> <li>• Always wear impervious gloves when spraying or cleaning equipment.</li> <li>• If this equipment is used with isocyanate material, see additional information on isocyanates in Isocyanate Conditions Section of this manual.</li> </ul>
	<p><b>BURN HAZARD</b></p> <p>Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns:</p> <ul style="list-style-type: none"> <li>• Do not touch hot fluid or equipment.</li> <li>• Wait until equipment/fluid has cooled completely.</li> </ul>
	<p><b>PERSONAL PROTECTIVE EQUIPMENT</b></p> <p>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, inhalation of toxic fumes, burns, and hearing loss. This equipment includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• Protective eyewear</li> <li>• Clothing and respirator as recommended by the fluid and solvent manufacturer</li> <li>• Gloves</li> <li>• Hearing protection</li> </ul>

# Isocyanate Conditions

						
<p>Spraying materials containing isocyanates creates potentially harmful mists, vapors, and atomized particulates.</p> <p>Read material manufacturer's warnings and material MSDS to know specific hazards and precautions related to isocyanates.</p> <p>Prevent inhalation of isocyanate mists, vapors, and atomized particulates by providing sufficient ventilation in the work area. If sufficient ventilation is not available, a supplied-air respirator is required for everyone in the work area.</p> <p>To prevent contact with isocyanates, appropriate personal protective equipment, including chemically impermeable gloves, boots, aprons, and goggles, is also required for everyone in the work area.</p>						

## Material Self-ignition

						
<p>Some materials may become self-igniting if applied too thickly. Read material manufacturer's warnings and material MSDS.</p>						

## Moisture Sensitivity of Isocyanates

Isocyanates (ISO) are catalysts used in two component foam and polyurea coatings. ISO will react with moisture (such as humidity) to form 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. If used, this partially cured ISO will reduce performance and the life of all wetted parts.

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

To prevent exposing ISO to moisture:

- 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 lube pump reservoir (if installed) filled with Graco Throat Seal Liquid (TSL™), Part 206995. The lubricant creates a barrier between the ISO and the atmosphere.
- Use moisture-proof hoses specifically designed for ISO, such as those supplied with your system.
- Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.
- Never use solvent on one side if it has been contaminated from the other side.
- Always lubricate threaded parts with ISO pump oil or grease when reassembling.

## Keep Components A and B Separate

<b>NOTICE</b>
<p>To prevent cross-contamination of the equipment's wetted parts, <b>never</b> interchange component A (isocyanate) and component B (resin) parts.</p>

## Foam Resins with 245 fa Blowing Agents

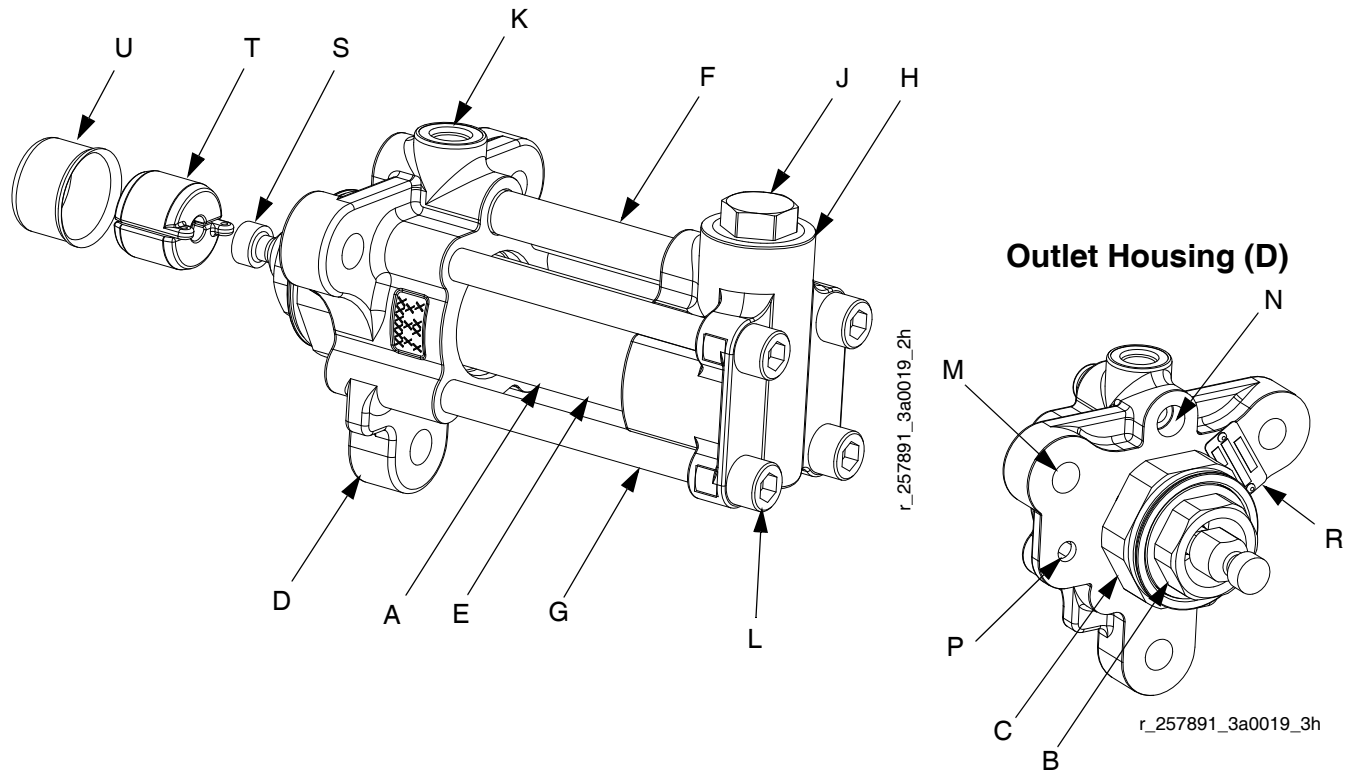
Some foam blowing agents will froth at temperatures above 90°F (33°C) when not under pressure, especially if agitated. To reduce frothing, minimize preheating in a circulation system.

## Changing Materials

- 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.
- Most materials use ISO on the A side, but some use ISO on the B side.
- Epoxies often have amines on the B (hardener) side. Polyureas often have amines on the B (resin) side.

# Component Identification

40cc pump shown



**FIG. 1: Component Identification**

**Key:**

- A Displacement Rod (inside main cylinder)
- B Throat Retainer
- C Throat Cartridge
- D Outlet Housing
- E Main Cylinder
- F Crossover Tube
- G Tie Bolt
- H Inlet Housing
- J Inlet Cap
- K Fluid Outlet
- L Fluid Inlet (bottom of inlet housing)
- M Pump Mounting Holes
- N Pressure Transducer Port
- P Linear Transducer Mounting Hole
- R Identification Tag
- S Rod Adapter (not on all models)
- T Pump Coupler
- U Coupler Cover

# Pressure Relief Procedure



Trapped air can cause the pump to cycle unexpectedly, which could result in serious injury from splashing or moving parts.

1. Select **Park** on Pump Control Switch if available, or turn off.
2. Turn off feed pumps.
3. Trigger gun to relieve pressure.
4. Close gun inlet valves.
5. Close fluid supply inlet valves.
6. Open all fluid drain valves in the system, having a waste container ready to catch drainage. Leave drain valve(s) open until you are ready to spray again.
7. If you suspect the spray tip or hose is clogged or that pressure has not been fully relieved after following the steps above, **VERY SLOWLY** loosen tip guard retaining nut or hose end coupling to relieve pressure gradually, then loosen completely. Clear hose or tip obstruction.

# Flushing



Flush equipment only in a well-ventilated area. Do not spray flammable fluids. Do not turn on heaters while flushing with flammable solvents.

- Flush with a fluid that is compatible with the fluid being dispensed and the equipment wetted parts.
- Flush out old fluid with new fluid, or flush out old fluid with a compatible solvent before introducing new fluid.
- Use lowest possible pressure when flushing.



# Repair



## Required Tools

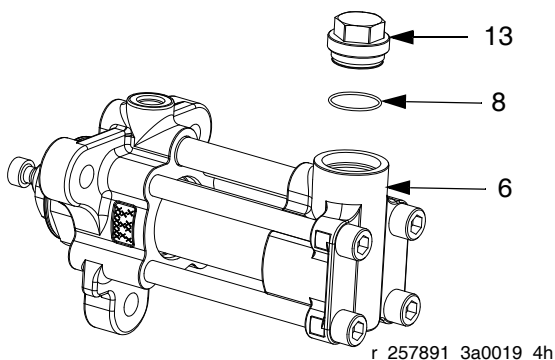
- Large vise
- Set of adjustable wrenches
- 1 in. wrench (S4 only)
- 1 1/4 in. socket (S1 only)
- 3/8 Allen wrench (S4 only)
- 1 1/4 in. wrench (S4 only)
- 1 1/8 in. Crowfoot wrench (S4 only)
- O-ring pick
- 1/2 in. bit socket
- Rubber mallet
- Torque wrench
- 2 in. and 3 in. sockets
- Anti-seize lubricant
- Removable strength thread locker

## Inlet Housing Disassembly

### S1 and S3 Models

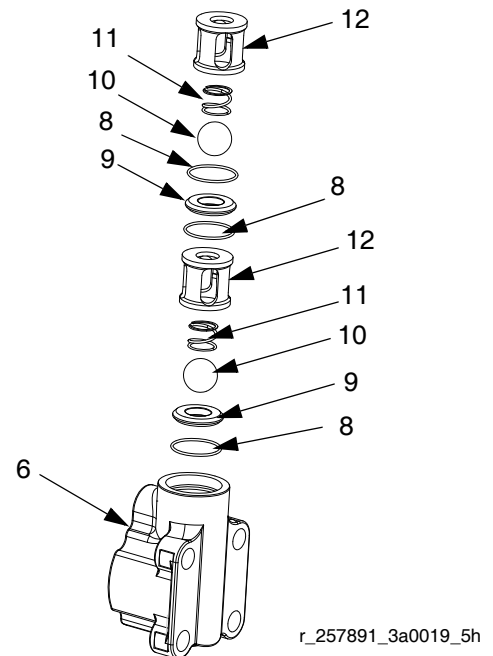
**NOTE: S1 and S3 models can be identified by the hex on the inlet cap (13).**

1. Relieve pressure and flush system. See **Pressure Relief Procedure** and **Flushing**, page 8.
2. Remove inlet hose and drain inlet housing (7).



3. Remove inlet cap (13) from inlet housing (6), and remove o-ring (8).

- a. Remove upper ball cage (12), spring (11), ball (10), o-ring (8) and seat (9).
- b. Press lower ball (10) off seat (9) from fluid inlet and drain the inlet housing (7).
- c. Remove o-ring (8), lower ball cage (12), spring (11), ball (10), seat (9), and o-ring (8).



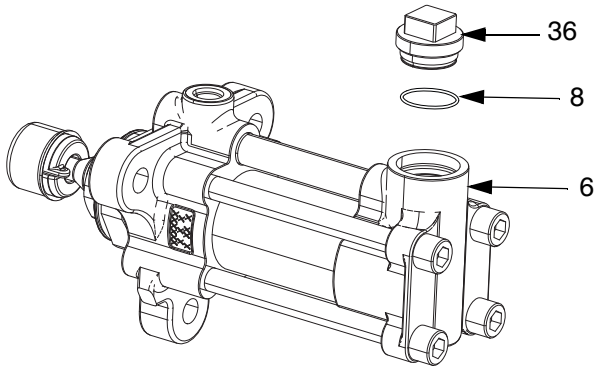
- d. Clean all parts in a compatible solvent. Lay them in order for easier reassembly. Inspect each ball and seat for nicks or scratches; replace as required.

### S4 Models

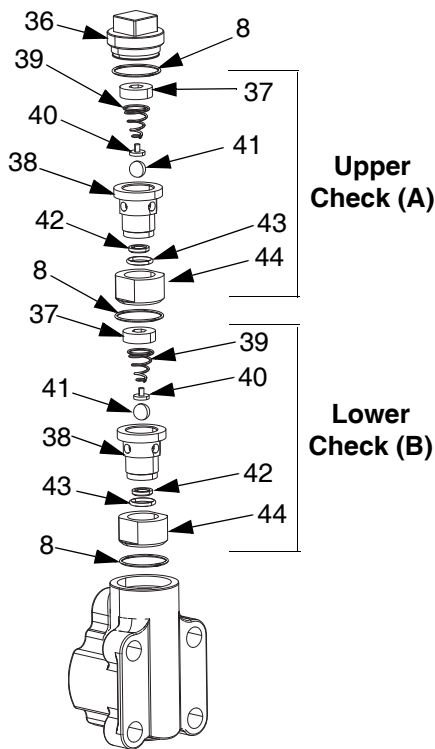
**NOTE: S4 models can be identified by the square on the inlet cap (36).**

1. Relieve pressure and flush system. See **Pressure Relief Procedure** and **Flushing**, page 8.

2. Remove inlet hose and drain inlet housing (7).



3. Remove inlet cap (36) from inlet housing (6), and remove o-ring (8).
  - a. Remove upper check (A), including the spring retainer (37), housing (38), spring (39), ball guide (40), ball (41), seat (42), o-ring (43), and seat retainer (44).
  - b. Remove lower check (B), including the spring retainer (37), housing (38), spring (39), ball guide (40), ball (41), seat (42), o-ring (43), and seat retainer (44).



- c. Clean all parts in a compatible solvent. Lay them in order for easier reassembly. Inspect each ball and seat for nicks or scratches; replace as required.
- d. It is recommended to replace both o-rings (8, 43) after cleaning.

## Inlet Housing Assembly

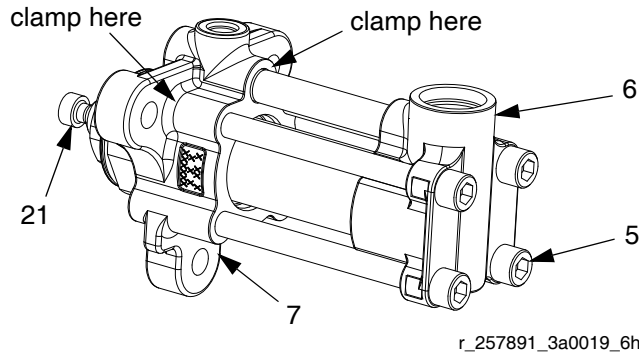
1. When installing the inlet housing components:
  - a. Apply anti-seize lubricant to the housing (38) and retainers (37, 44).
  - b. Attach the housing (38) to the seat retainer (44) and torque to 50 ft-lbs (67.5 N•m) after the seat (42) and o-ring (43) have been installed.

**NOTE:** The radius of the seat (42) must face the ball (41).

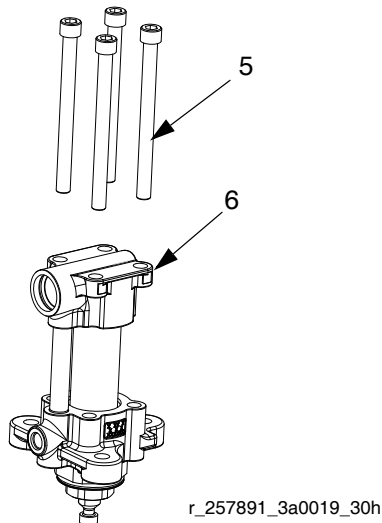
- c. Install the ball (41), ball guide (40) and spring (39) into the housing (38).
  - d. Install the spring retainer (37) cup side down into the housing (38) to trap the spring (39) until the spring retainer (37) bottoms out into the housing (38). Torque to 30 ft-lbs (41 N•m).
  - e. Install the o-ring (8) into the inlet housing (6).
  - f. Install lower check (B) into the housing (6) in the orientation shown.
  - g. Install the o-ring (8) into the housing (6).
  - h. Install upper check (A) into the housing (6) in the orientation shown.
2. Install o-ring (8) on inlet cap (13, 36) and apply anti-seize lubricant to inlet cap (13, 36) threads. Tighten inlet cap (13, 36) to 70 ft-lbs. (95 N•m).

# Pump Disassembly

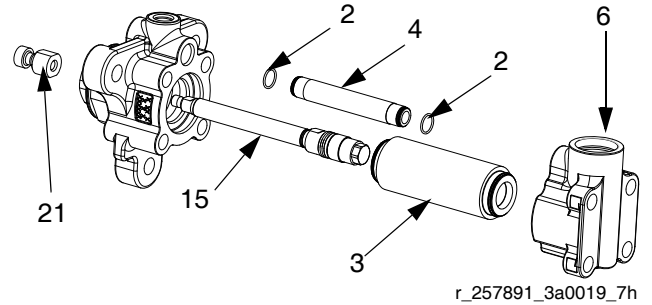
1. Relieve pressure and flush system. See **Pressure Relief Procedure and Flushing**, page 8.
2. Remove inlet hose and drain inlet housing (7).
3. Horizontally clamp pump on outlet housing (7) in vise, use 1/2 in. hex bit socket to loosen all four tie bolts (5) from inlet housing (6).



4. *For 05cc - 50cc pumps only.* Use wrench to remove rod adapter (21).
5. Remove pump assembly from vise and lay on a flat surface with towels or in catch pan.
6. Fully unthread and remove tie bolts (5).



7. Remove inlet housing (6) from main cylinder (3). Remove crossover tube (4) and o-rings (2).

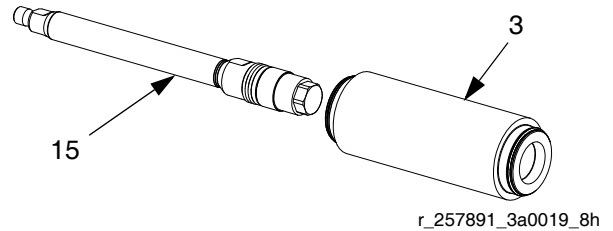


8. Pull main cylinder (3) and displacement rod (15) away from outlet housing (7).

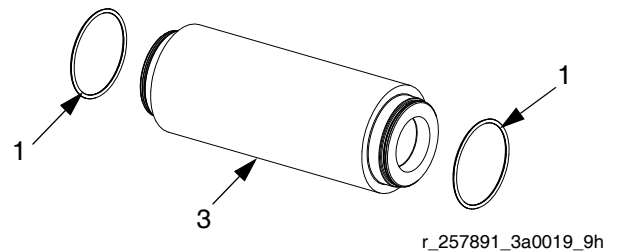
**NOTICE**

Be careful not to scratch the displacement rod (15); place it on a smooth working surface. Damage to the displacement rod will shorten pump life.

9. Remove displacement rod (15) from cylinder (3).

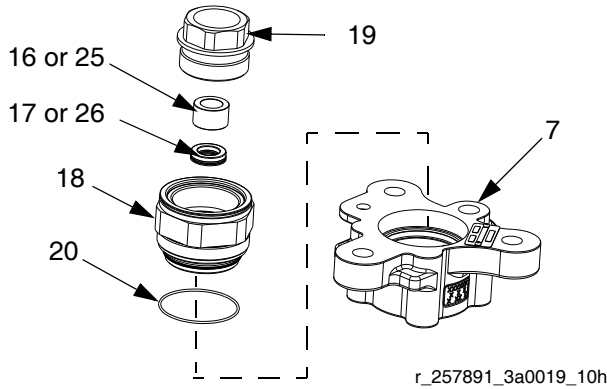


10. Remove two o-rings (1) from main cylinder (3).



11. Place outlet housing (7) in vise so throat cartridge (18) is facing up.

12. Remove throat retainer (19).



13. Use screwdriver and carefully press bearing (16 or 25) and u-cup (17 or 26) out of outlet housing (7).

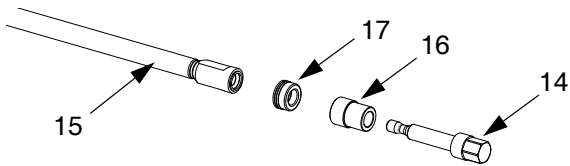
**NOTICE**

To prevent damage to seals, carefully press seals with a screwdriver.

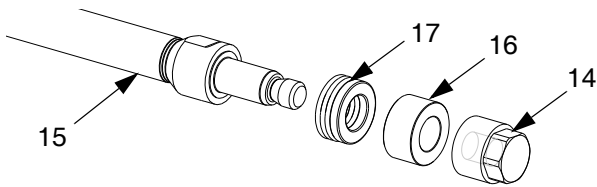
14. If o-ring (20) is leaking, remove throat cartridge (18) and o-ring (20).

15. Clamp flats on seal end of displacement rod (15) in vise. Remove piston retainer (14), bearing (16), and u-cup (17).

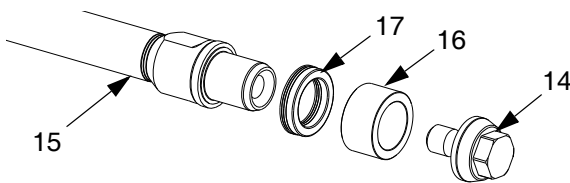
**For 5cc, 10cc, and 15cc pumps**



**For 20cc-50cc pumps**



**For 60cc-160cc pumps**



16. Thoroughly clean all metal parts in a compatible solvent.

# Pump Assembly

**NOTICE**

To prevent cross-contamination of the equipment's wetted parts, never interchange component A (isocyanate) and component B (resin) parts.

**NOTICE**

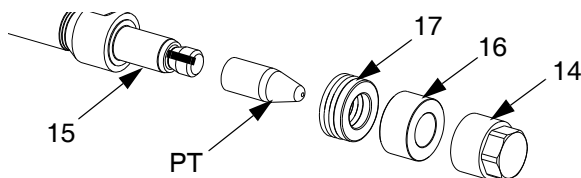
To prevent damage to seals always use piston assembly tool (PT) and rod installation tool (RT) from repair kit when assembling the piston seals and displacement rod.

**NOTE: Piston assembly tool is NOT needed for 10cc-15cc pump sizes.**

1. Install piston seal installation tool (PT) from pump repair kit on displacement rod (15). Hand tighten.
2. Apply grease to seal and bearing surface of displacement rod (15).
3. Install u-cup (17) and bearing (16). Ensure u-cup springs face displacement rod. Remove piston seal installation tool (PT).
4. For 20cc-50cc pumps: Apply one stripe of removable strength thread locker to displacement rod (15) male threads and install piston retainer (14).

**NOTICE**

Specification sheets and Graco testing indicate that anaerobic sealant requires three days to fully cure. Failure to allow three days for full cure may result in parts coming loose during operation. If faster cure time is needed, Rapid Sealant Cure Kit is available, 24N985.

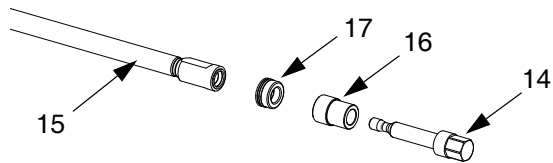


5. For 5cc, 10cc, 15cc, and 60cc-160cc pumps: Apply one stripe of removable strength thread locker to piston retainer (14) threads and assemble.

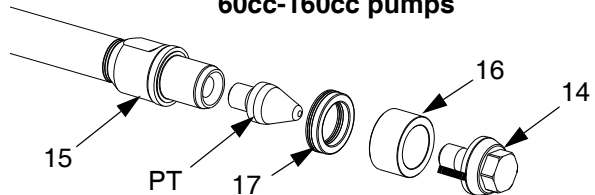
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Specification sheets and Graco testing indicate that anaerobic sealant requires three days to fully cure. Failure to allow three days for full cure may result in parts coming loose during operation. If faster cure time is needed, Rapid Sealant Cure Kit is available, 24N985.

**5cc, 10cc, and 15cc pumps**



**60cc-160cc pumps**



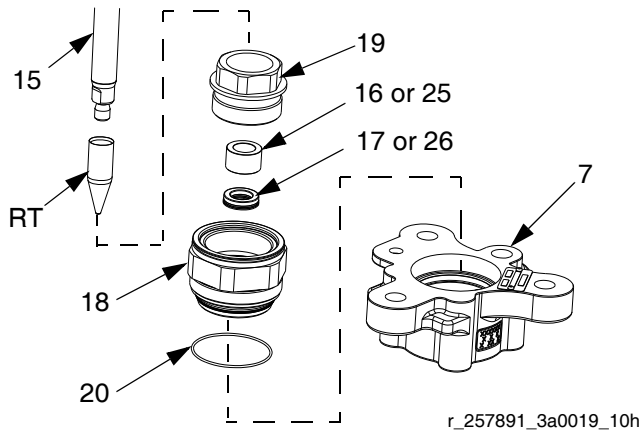
**NOTICE**

To prevent displacement rod damage, do not clamp directly onto displacement rod surface.

6. Clamp flats on seal end of displacement rod (15) in vise. See Torque Specification table for piston retainer (14) torque according to pump size.

Pump Size	Torque
5cc	38 in-lbs (3.2 ft-lbs) (4.3 N•m)
10cc	5.5 ft-lbs (7.4 N•m)
15cc	5.5 ft-lbs (7.4 N•m)
20cc	30 ft-lbs (40.6 N•m)
25cc	30 ft-lbs (40.6 N•m)
30cc	30 ft-lbs (40.6 N•m)
35cc	50 ft-lbs (67.5 N•m)
40cc	50 ft-lbs (67.5 N•m)
45cc	50 ft-lbs (67.5 N•m)
50cc	50 ft-lbs (67.5 N•m)
60cc	80 ft-lbs (108 N•m)
65cc	80 ft-lbs (108 N•m)
70cc	80 ft-lbs (108 N•m)
75cc	80 ft-lbs (108 N•m)
80cc	80 ft-lbs (108 N•m)
86cc	80 ft-lbs (108 N•m)
90cc	160 ft-lbs (216 N•m)
100cc	160 ft-lbs (216 N•m)
105cc	160 ft-lbs (216 N•m)
120cc	160 ft-lbs (216 N•m)
140cc	160 ft-lbs (216 N•m)
150cc	160 ft-lbs (216 N•m)
160cc	160 ft-lbs (216 N•m)

7. If the throat cartridge (18) was removed, install o-ring (20) on throat cartridge (18) and lubricate with grease. Apply anti-seize lubricant to throat cartridge (18) threads and install in outlet housing (7). Tighten throat cartridge (18) to 200 ft-lbs. (271 N•m).
8. Apply grease to u-cup (17 or 26) and set in throat cartridge (18); ensure u-cup springs face throat cartridge. Set bearing (16 or 25) on top of u-cup (17 or 26).



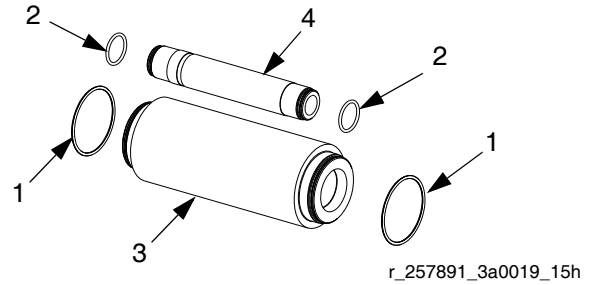
9. Apply anti-seize lubricant to throat retainer (19) threads and place on throat cartridge (18) above bearing (16 or 25).

**NOTE: Do not thread retainer (19) into throat cartridge (18).**

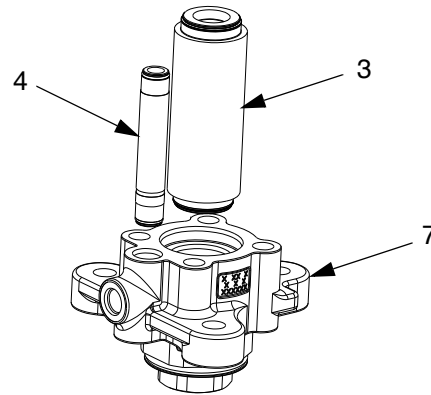
10. Install rod installation tool (RT) on displacement rod (15). Insert the displacement rod (15) through the throat retainer (19), bearing (16 or 25), and u-cup (17 or 26).

**NOTE: The displacement rod (15) guides the bearing (16 or 25) and u-cup (17 or 26) into the throat cartridge bore (18).**

11. By hand, thread throat retainer (19) into throat cartridge (18) to gradually press bearing (16 or 25) and u-cup (17 or 26) into bore.
12. When fully engaged, torque throat retainer (19) to 50 ft-lbs (67.5 N•m).
13. Remove displacement rod (15).
14. Clamp throat cartridge (18) in vise with outlet housing (7) facing up.
15. Install o-rings (1) on main cylinder (3) and o-rings (2) on crossover tube (4). Lubricate o-rings (1, 2) with grease.



16. Install main cylinder (3) and crossover tube (4) in outlet housing (7) with a rubber mallet.

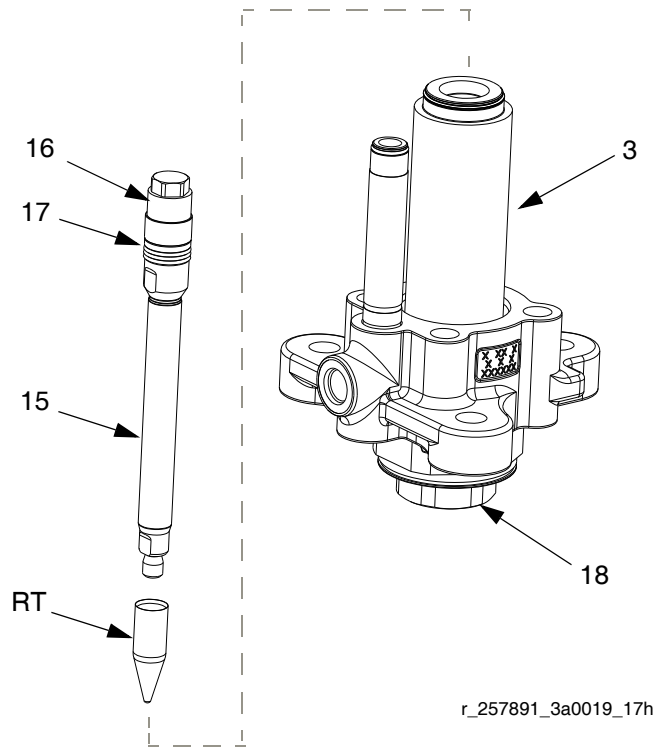


17. Lubricate piston u-cup seal (17), and bearing (16) with grease.
18. *For 60cc-160cc pumps:* Apply grease to coupler end of displacement rod (15) before installing the rod installation tool (RT).

**NOTE: The grease will hold the rod installation tool (RT) in place while assembling the displacement rod into the cylinder.**

19. Install rod installation tool (RT) on displacement rod (15).

20. Install displacement rod (15) in main cylinder (3) and throat cartridge (18). Gently tap displacement rod with a rubber mallet until piston is flush or below the surface of the main cylinder.



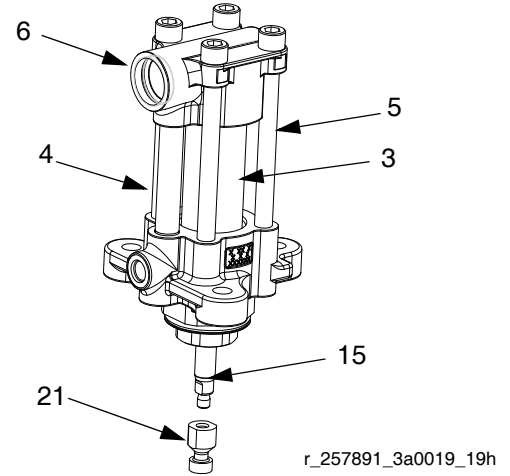
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21. Remove rod installation tool (RT).

22. Gently place inlet housing (6) on main cylinder (3) and crossover tube (4). Ensure inlet housing bores are aligned with cylinder and crossover tube. Install with a rubber mallet.

**NOTICE**

To prevent damage to o-rings, ensure inlet housing is evenly seated on main cylinder before installing tie bolts.



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23. Lubricate tie bolt (5) threads and install.

24. Torque tie bolts (5) in star pattern to 10 ft-lbs (13.5 N•m). Then torque again in star pattern to 50 ft-lbs (67.5 N•m). Finally torque again in star pattern to the pump size specific torque.

Pump Size	Torque
5cc-86cc	120 ft-lbs (163 N•m)
90cc-160cc	200 ft-lbs (271 N•m)

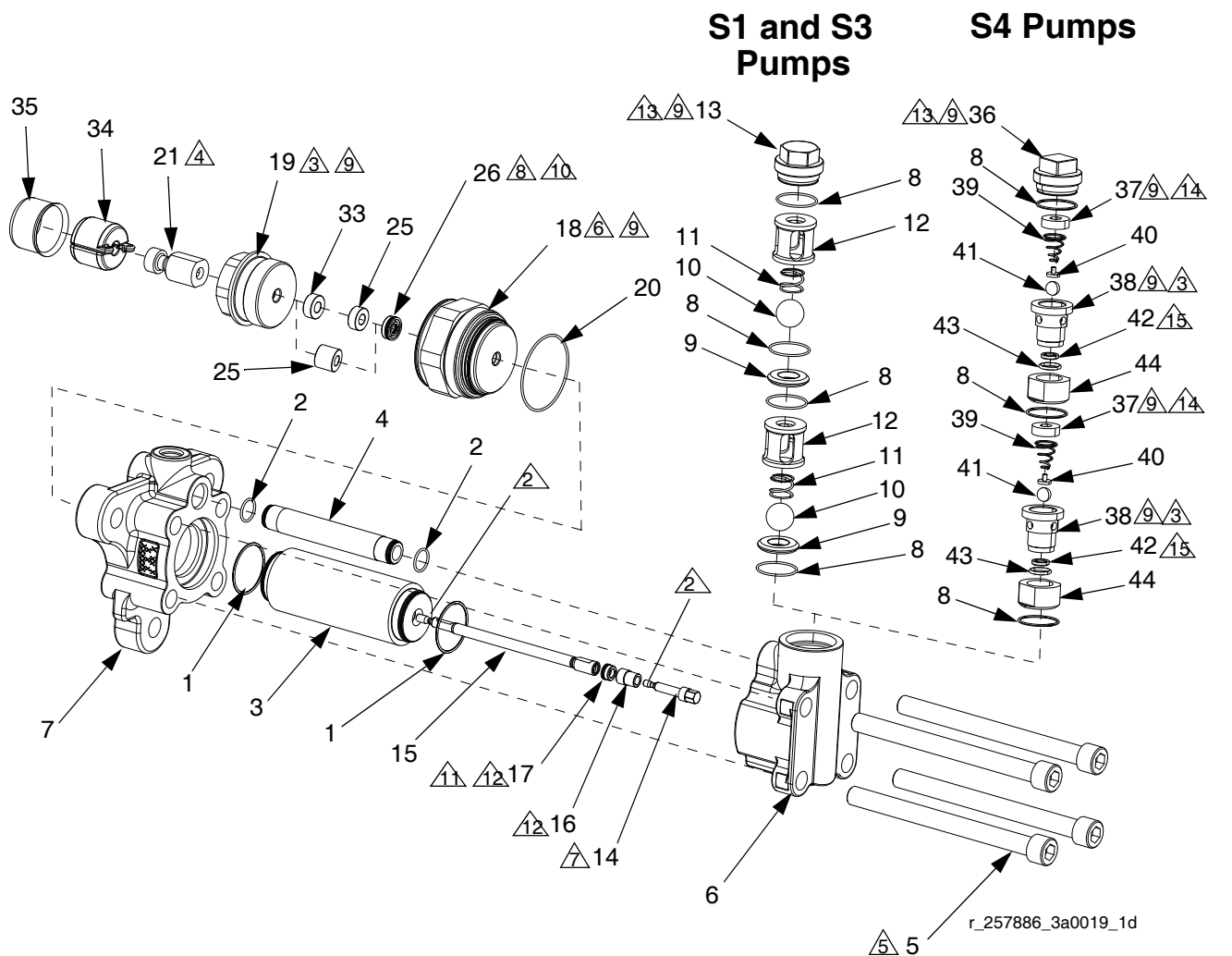
25. Ensure the inlet housing is evenly seated onto the main cylinder (3) and crossover tube (4).

26. *For 10cc-50cc pumps only:* Clean rod adapter (21) threads with a wire brush and apply removable strength thread locker to displacement rod (15) threads. Install rod adapter (21) on displacement rod (15). See Torque Specification table for rod adapter (21) torque according to pump size.

Pump Size	Torque
5cc	38 in-lbs (3.2 ft-lbs) (4.3 N•m)
10cc	8.5 ft-lbs (11.5 N•m)
15cc	8.5 ft-lbs (11.5 N•m)
20cc	30 ft-lbs (40.6 N•m)
25cc	30 ft-lbs (40.6 N•m)
30cc	30 ft-lbs (40.6 N•m)
35cc	45 ft-lbs (60.75 N•m)
40cc	45 ft-lbs (60.75 N•m)
45cc	45 ft-lbs (60.75 N•m)
50cc	45 ft-lbs (60.75 N•m)

# Parts

## 5cc, 10cc, and 15cc Pumps



1. Lubricate seals, o-rings, lead-in's and moving parts with grease.

2. Apply one stripe of removable strength anaerobic sealant on threads.

### NOTICE

Specification sheets and Graco testing indicate that anaerobic sealant requires three days to fully cure. Failure to allow three days for full cure may result in parts coming loose during operation. If faster cure time is needed, Rapid Sealant Cure Kit is available, 24N985.

3. Torque to 50-ft-lbs (67.5 N•m).

4. Assemble and torque after displacement rod (15) is assembled through throat retainer (19). See table on page 15 for torque specification.

5. Torque tie bolts (5) in star pattern to 10 ft-lbs (13.5 N•m). Then torque again in star pattern to 50 ft-lbs (67.5 N•m). Finally torque again in star pattern to 120 ft-lbs (163 N•m).

6. Torque to 200 ft-lbs. (271 N•m).

7. See table on page 13 for torque specification.

8. Must be pressed straight into housing.

9. Apply anti-seize lubricant to threads.

10. Ensure u-cup (26) springs face throat cartridge (18).

11. Ensure u-cup (17) springs face displacement rod (15).

12. Fully assemble u-cup (17) and bearing (16) onto displacement rod (15) before tightening piston retainer (14).

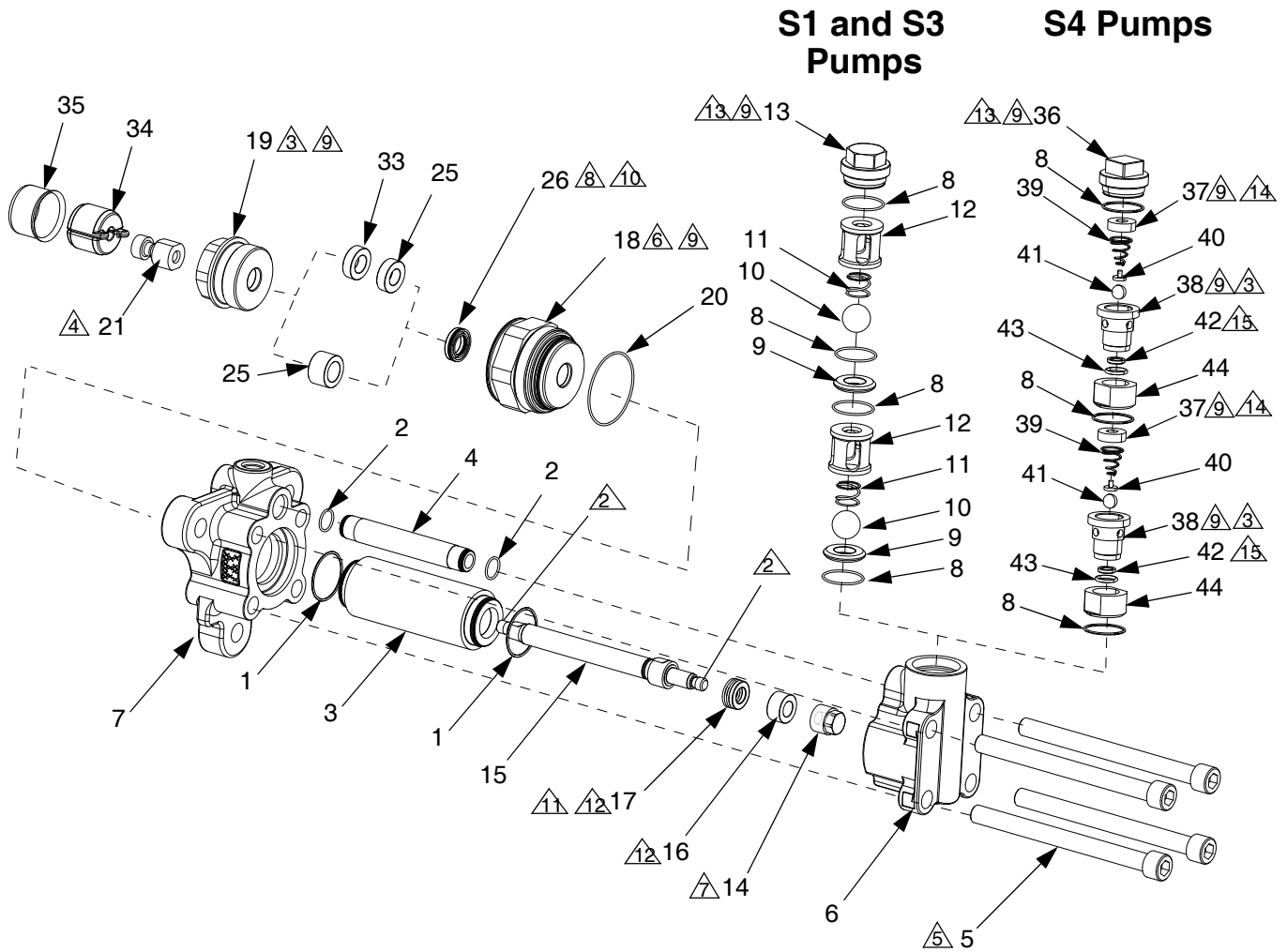
13. Torque to 70 ft-lbs. (95 N•m).

14. Torque to 30 ft-lbs. (41 N•m).

15. The seat radius (42) must face the ball (41).



20cc, 25cc, 30cc, 35cc, 40cc, 45cc, and 50cc Pumps



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- 1. Lubricate seals, o-rings, lead-in's and moving parts with grease.
- Apply one stripe of removable strength anaerobic sealant on threads.

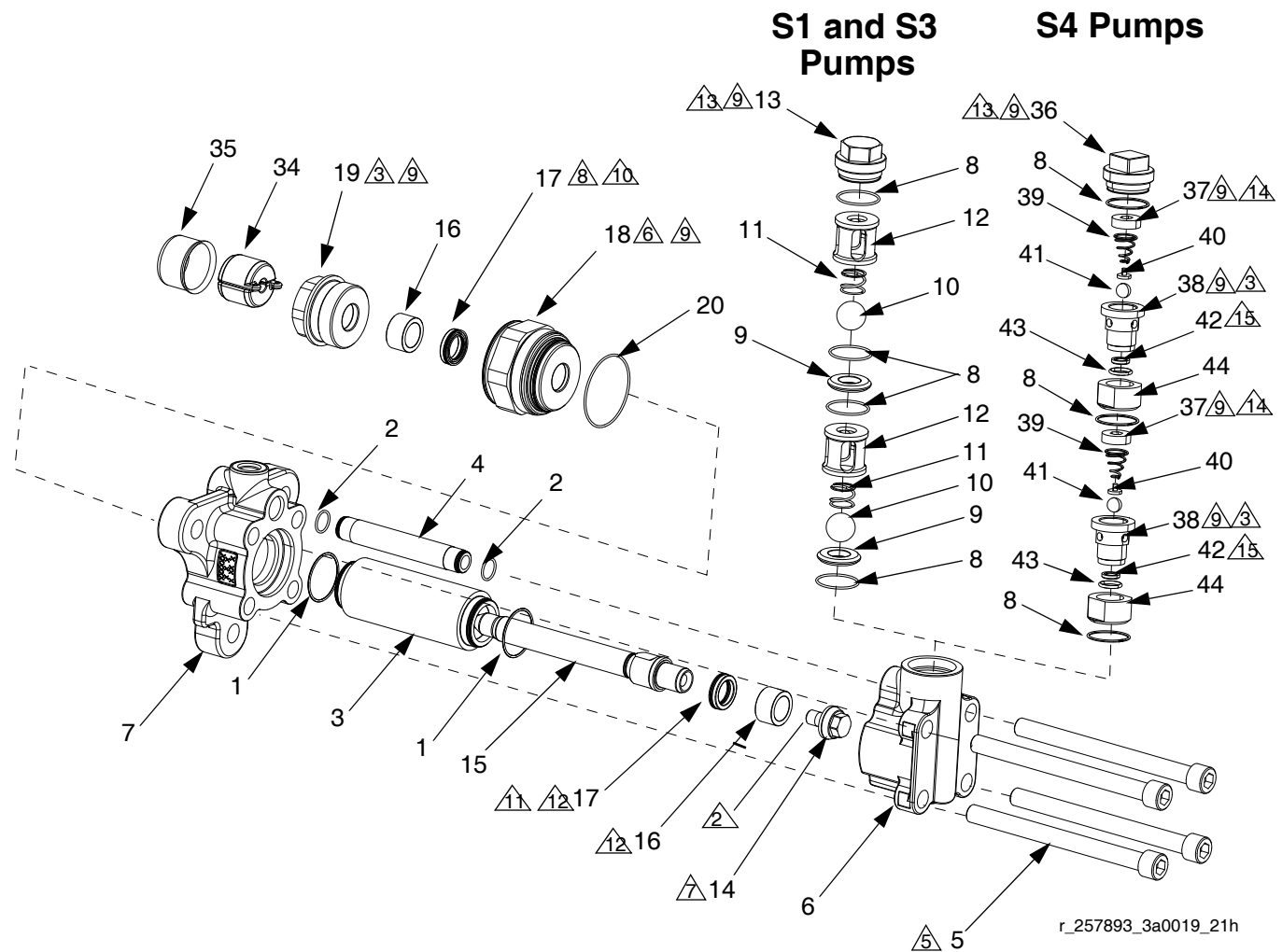
**NOTICE**

Specification sheets and Graco testing indicate that anaerobic sealant requires three days to fully cure. Failure to allow three days for full cure may result in parts coming loose during operation. If faster cure time is needed, Rapid Sealant Cure Kit is available, 24N985.

- Torque to 50-ft-lbs (67.5 N•m).
- Assemble and torque after displacement rod (15) is assembled through throat retainer (19). See table on page 15 for torque specification.
- Torque tie bolts (5) in star pattern to 10 ft-lbs (13.5 N•m). Then torque again in star pattern to 50 ft-lbs (67.5 N•m). Finally torque again in star pattern to 120 ft-lbs (163 N•m).

- Torque to 200 ft-lbs. (271 N•m).
- See table on page 13 for torque specification.
- Must be pressed straight into housing.
- Apply anti-seize lubricant to threads.
- Ensure u-cup (26) springs face throat cartridge (18).
- Ensure u-cup (17) springs face displacement rod (15).
- Fully assemble u-cup (17) and bearing (16) onto displacement rod (15) before tightening piston retainer (14).
- Torque to 70 ft-lbs. (95 N•m).
- Torque to 30 ft-lbs. (41 N•m).
- The seat radius (42) must face the ball (41).

60cc, 65cc, 70cc, 75cc, 80cc, 86cc, 90cc, 100cc, 105cc, 120cc, 140cc, 150cc, and 160cc Pumps



r\_257893\_3a0019\_21h

- 1. Lubricate seals, o-rings, lead-in's and moving parts with grease.
- 2 Apply one stripe of removable strength anaerobic sealant on threads.

**NOTICE**

Specification sheets and Graco testing indicate that anaerobic sealant requires three days to fully cure. Failure to allow three days for full cure may result in parts coming loose during operation. If faster cure time is needed, Rapid Sealant Cure Kit is available, 24N985.

- 3 Torque to 50-ft-lbs (67.5 N•m).
- 5 Torque tie bolts (5) in star pattern to 10 ft-lbs (13.5 N•m). Then torque again in star pattern to 50 ft-lbs (67.5 N•m). Finally torque again in star pattern to 120 ft-lbs (163 N•m).

- 6 Torque to 200 ft-lbs. (271 N•m).
- 7 See table on page 13 for torque specification.
- 8 Must be pressed straight into housing.
- 9 Apply anti-seize lubricant to threads.
- 10 Ensure u-cup (26) springs face throat cartridge (18).
- 11 Ensure u-cup (17) springs face displacement rod (15).
- 12 Fully assemble u-cup (17) and bearing (16) onto displacement rod (15) before tightening piston retainer (14).
- 13 Torque to 70 ft-lbs. (95 N•m).
- 14 Torque to 30 ft-lbs. (41 N•m).
- 15 The seat radius (42) must face the ball (41).

## Pump Parts

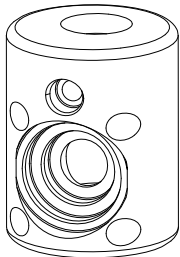
Ref.	Part	Description	Qty	
1	✓✱✱◆✱	O-RING, cylinder	2	✓ See Cylinder O-ring Kits, page 20, for kit number.
2	✓✱✱◆✱	O-RING, crossover tube	2	✱ See Cylinder Kits, page 20, for kit number.
3	✱	CYLINDER, pump	1	✱ See Crossover Tube Kits, page 20, for kit number.
4	✱	TUBE, crossover, pump	1	★ See Throat Cartridge Kits, page 20, for kit number.
5	258790	BOLT, tie	4	✱ See Throat Retainer Kits, page 20, for kit number.
6	258792	HOUSING, inlet	1	** See Piston Retainer Kits, page 20, for kit number.
7	258791	HOUSING, outlet	1	◆ See Seal Kits, page 21, for kit number.
8	◆†#•	O-RING, inlet	4	✱ See Displacement Rod Kits, page 23, for kit number.
	258775	KIT, package of 4	-	‡ See Throat Spacer Kits, page 23, for kit number.
	258776	KIT, package of 16	-	† Included in Kit 258783.
9	†	SEAT, carbide	2	❖ Clip coupler cable before installing on to proportioner pumpline.
10	†	BALL, sst	2	# Parts included in Kit 25B124.
11	258784	SPRING, ball check	2	• Included fully assembled in Kit 25B123.
12	258785	HOUSING, ball cage	2	\$ Included in all S1 and S3 models.
13	258787	CAP, inlet valve	1	& Included in all S4 models.
14	**✱	RETAINER, piston	1	
15	✱	ROD, displacement	1	
16	◆✱	BEARING, piston	1(2)	
17	◆✱	SEAL, piston	1(2)	
18	★	CARTRIDGE, throat	1	
19	✱	RETAINER, throat	1	
20	★✱	O-RING, throat cartridge	1	
21	✱	(see ADAPTER, rod	1	
	Table 1)			
25	◆✱	BEARING, throat	1	
26	◆✱	SEAL, throat	1	
28		PLATE, identification	1	
29		SCREW, drive	2	
33	‡	SPACER, throat; 10cc-30cc only	1	
34	❖	247167 COUPLER, pump; 05cc-80cc	1	
		244819 COUPLER, pump; 100cc-160cc	1	
35	\$	197340 COVER, coupler	1	
	&	124078 CLAMP, spring	1	
36	•	17E794 CAP, inlet valve	1	
37	•	17Y222 RETAINER, spring	2	
38	•	17Y345 HOUSING, check valve	2	
39	#•	131767 SPRING, conical	2	
40	•	17Y400 GUIDE, ball	2	
41	#•	BALL	2	
42	#•	SEAT, carbide	2	
43	#•	O-RING	2	
44	•	17E786 RETAINER, seat	2	

**Table 1: Various Kits**

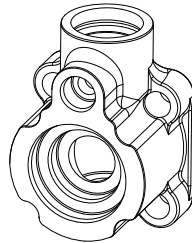
Pump Model	Pump Size	Adapter	✓ Cylinder O-ring Kit	✿ Cylinder Kit	✕ Crossover Tube		★ Throat Cartridge Kit	✕ Throat Retainer Kit	** Piston Retainer Kit
					Bar Stock Inlet*	Cast inlet*			
L005S1 / L005S4	5cc	25P039	258774	262557	258789	24E557	262558	262559	262560
L010S1 / L010S4	10cc	258966		258925			258928	258927	258926
L010S3	10cc	24U649		24U651			24U647	258927	24U645
L015S1 / L015S4	15cc	258966		258931			258934	258933	258932
L020S1 / L020S4	20cc	258967		258937			258940	258939	258938
L020S3	20cc	24U650		24U652			24U648	258939	258938
L025S1 / L025S4	25cc	258967		258943			258946	258945	258944
L030S1 / L030S4	30cc	258967		258949			258952	258951	258950
L035S1 / L035S4	35cc	258786		24R310			24R316	24R314	24R312
L040S1 / L040S4	40cc	258786		258795			258798	258797	258796
L045S1 / L045S4	45cc	258786		24R311			24R317	24R315	24R313
L050S1 / L050S4	50cc	258786		258801			258804	258803	258802
L060S1 / L060S4	60cc	Not included		258807			258810	258809	258808
L065S1 / L065S4	65cc		24H998	24J007	24J010	24J012			
L070S1 / L070S4	70cc		25C252	25C254	25C255	25C256			
L075S1 / L075S4	75cc		24N821	24N819	24N818	24N822			
L080S1 / L080S4	80cc		258813	258816	258815	258814			
L086S1 / L086S4	86cc		24H999	24J008	24J011	24J013			
L090S1 / L090S4	90cc		258773	24T165	24T175	24T171	24T168		
L100S1 / L100S4	100cc			258819	258822	258821	258820		
L105S1	105cc			24R011	24R014	24R013	24R012		
L120S1 / L120S4	120cc			258825	258828	258827	258826		
L140S1 / L140S4	140cc			24T166	24T176	24T172	24T169		
L150S1 / L150S4	150cc			24T167	24T177	24T173	24T170		
L160S1 / L160S4	160cc			258831	258834	258833	258832		

\* See figure below for inlet types:

*Bar Stock Inlet*

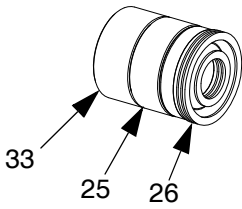


*Cast Inlet*

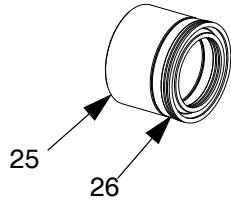


### Seal Kits

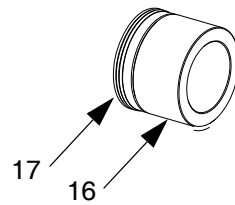
**5cc-30cc Throat Seals**  
(excluding L010S3,  
L020S3)



**35cc-160cc Throat Seals**  
(also includes L010S3,  
L020S3)



**Piston Seals**



**Table 2: Seal Kits**

Pump Model	Pump Size	Seal Kit	Reference Number and Quantity Included in Kit						
			1	2	8	16	17	25	26
L005S1 / L005S4	5cc	262561	2	2	4	1	1	1	1
L010S1 / L010S4	10cc	258923	2	2	4	1	1	1	1
L010S3	10cc	24U653	2	2	4	1	1	1	1
L015S1 / L015S4	15cc	258929	2	2	4	1	1	1	1
L020S1 / L020S4	20cc	258935	2	2	4	1	1	1	1
L020S3	20cc	24U654	2	2	4	1	1	1	1
L025S1 / L025S4	25cc	258941	2	2	4	1	1	1	1
L030S1 / L030S4	30cc	258947	2	2	4	1	1	1	1
L035S1 / L035S4	35cc	24R306	2	2	4	1	1	1	1
L040S1 / L040S4	40cc	258793	2	2	4	1	1	1	1
L045S1 / L045S4	45cc	24R307	2	2	4	1	1	1	1
L050S1 / L050S4	50cc	258799	2	2	4	1	1	1	1
L060S1 / L060S4	60cc	258805	2	2	4	2	2		
L065S1 / L065S4	65cc	24J002	2	2	4	2	2		
L070S1 / L070S4	70cc	25C253	2	2	4	2	2		
L075S1 / L075S4	75cc	24N820	2	2	4	2	2		
L080S1 / L080S4	80cc	258811	2	2	4	2	2		
L086S1 / L086S4	86cc	24J003	2	2	4	2	2		
L090S1 / L090S4	90cc	24T162	2	2	4	2	2		
L100S1 / L100S4	100cc	258817	2	2	4	2	2		
L105S1	105cc	24R009	2	2	4	2	2		
L120S1 / L120S4	120cc	258823	2	2	4	2	2		
L140S1 / L140S4	140cc	24T163	2	2	4	2	2		
L150S1 / L150S4	150cc	24T164	2	2	4	2	2		
L160S1 / L160S4	160cc	258829	2	2	4	2	2		

## Displacement Rod Kits

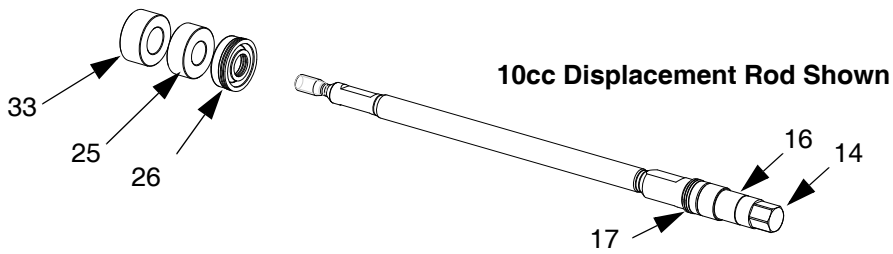
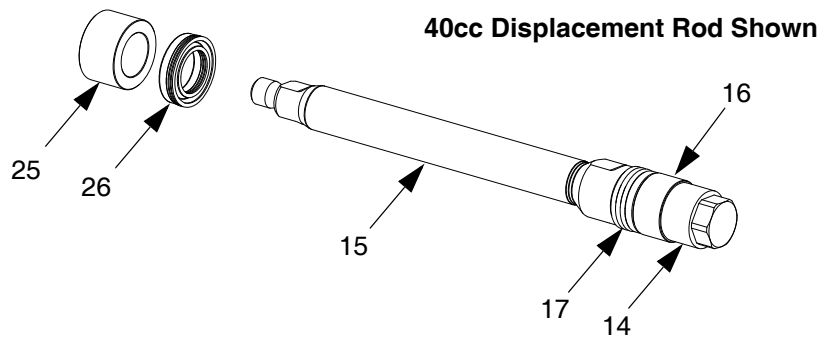
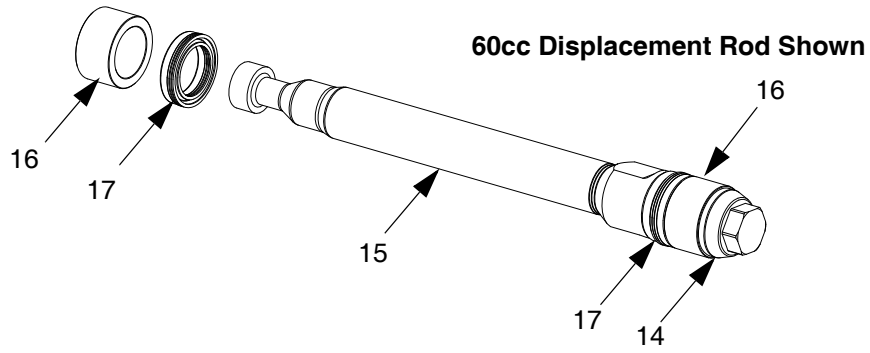


Table 3: Displacement Rod Kits

Pump Model	Pump Size	Displacement Rod Kit	Reference Number and Quantity Included in Kit									
			1	2	14	15	16	17	20	21	25	26
L005S1 / L005S4	5cc	262562	2	2	1	1	1	1	1	1	1	1
L010S1 / L010S4	10cc	258924	2	2	1	1	1	1	1	1	1	1
L010S3	10cc	24U655	2	2	1	1	1	1	1	1	1	1
L015S1 / L015S4	15cc	258930	2	2	1	1	1	1	1	1	1	1
L020S1 / L020S4	20cc	258936	2	2	1	1	1	1	1	1	1	1
L020S3	20cc	24U656	2	2	1	1	1	1	1	1	1	1
L025S1 / L025S4	25cc	258942	2	2	1	1	1	1	1	1	1	1
L030S1 / L030S4	30cc	258948	2	2	1	1	1	1	1	1	1	1
L035S1 / L035S4	35cc	24R308	2	2	1	1	1	1	1	1	1	1
L040S1 / L040S4	40cc	258794	2	2	1	1	1	1	1	1	1	1
L045S1 / L045S4	45cc	24R309	2	2	1	1	1	1	1	1	1	1
L050S1 / L050S4	50cc	258800	2	2	1	1	1	1	1	1	1	1
L060S1 / L060S4	60cc	258806	2	2	1	1	2	2	1			
L065S1 / L065S4	65cc	24J004	2	2	1	1	2	2	1			
L070S1 / L070S4	70cc	25C251	2	2	1	1	2	2	1			
L075S1 / L075S4	75cc	24N823	2	2	1	1	2	2	1			
L080S1 / L080S4	80cc	258812	2	2	1	1	2	2	1			
L086S1 / L086S4	86cc	24J005	2	2	1	1	2	2	1			
L090S1 / L090S4	90cc	24T158	2	2	1	1	2	2	1			
L100S1 / L100S4	100cc	258818	2	2	1	1	2	2	1			
L105S1	105cc	24R010	2	2	1	1	2	2	1			
L120S1 / L120S4	120cc	258824	2	2	1	1	2	2	1			
L140S1 / L140S4	140cc	24T159	2	2	1	1	2	2	1			
L150S1 / L150S4	150cc	24T160	2	2	1	1	2	2	1			
L160S1 / L160S4	160cc	258830	2	2	1	1	2	2	1			

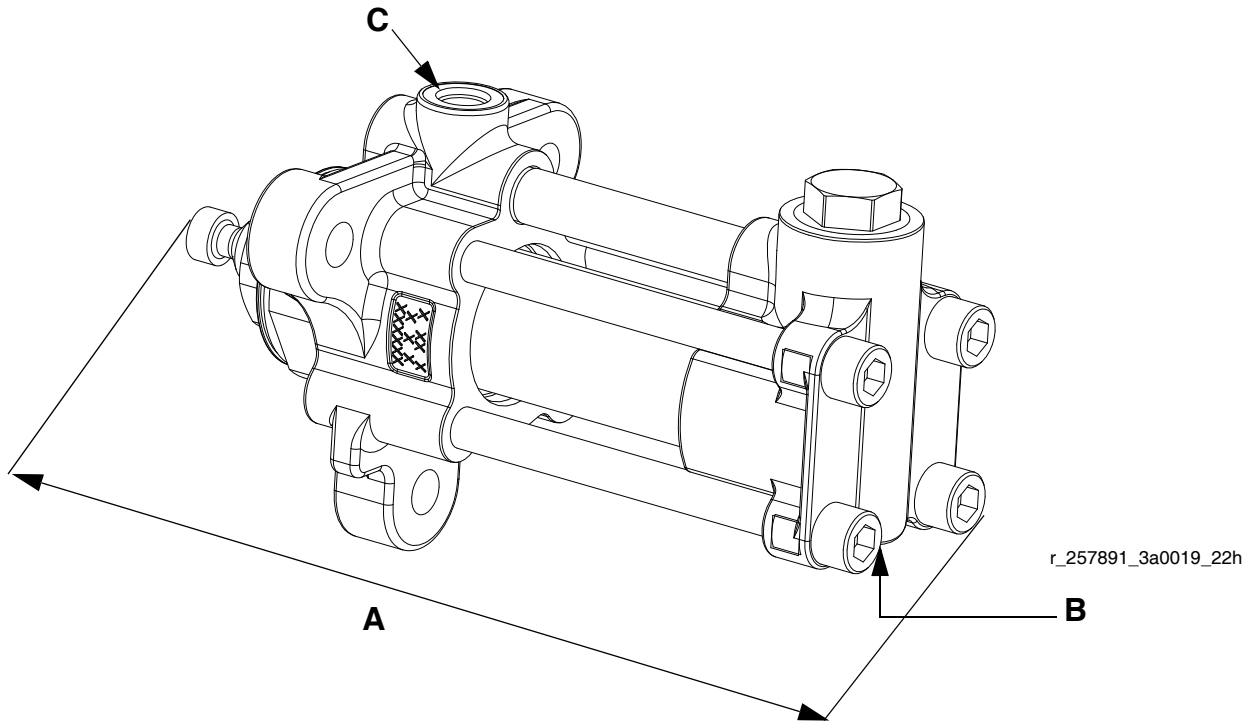
Table 4: Throat Spacer Kits

Pump Model	Pump Size	Throat Spacer Kit
L005S1 / L005S4	5cc	16E364
L010S1 / L010S4	10cc	16D188
L010S3	10cc	(Not included)
L015S1 / L015S4	15cc	16D189

Pump Model	Pump Size	Throat Spacer Kit
L020S1 / L020S4	20cc	16D190
L020S3	20cc	(Not included)
L025S1 / L025S4	25cc	16D191
L030S1 / L030S4	30cc	16D192

## Dimensions

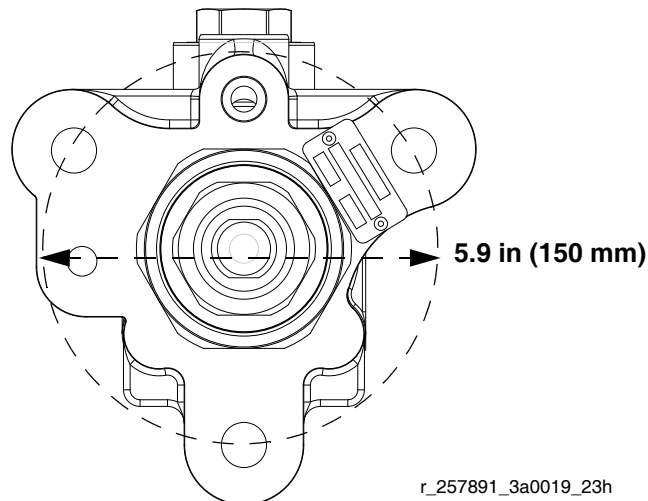
All pump sizes have the same dimensions.



<b>A</b> <b>(Length)</b> in. (mm)	<b>B</b> <b>(Inlet)</b> in. npt (f)	<b>C</b> <b>(Outlet)</b> SAE (f)
13.36 (339.34)	3/4-14	3/4-16

## Outlet Housing Mounting Hole Layout

All pumps have the same outlet housing mounting hole layout.





# Technical Data

Maximum working pressure . . . . .	3500 psi (24MPa, 241 bar)
Maximum operating temperature . . . . .	180° F (82° C)
Maximum cycle rate . . . . .	65 cycles per minute
Minimum feed pressure at inlet . . . . .	50 psi (0.35 MPa, 3.5 bar)
Weight . . . . .	30 lbs (13.6 kg)
Wetted parts . . . . .	SST, tungsten carbide, acetal, PTFE, UHMWPE, silicon nitride (S4 pumps only)

# 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.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

**GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO.** These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

## **FOR GRACO CANADA CUSTOMERS**

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# Graco Information

## Sealant and Adhesive Dispensing Equipment

For the latest information about Graco products, visit [www.graco.com](http://www.graco.com).

For patent information, see [www.graco.com/patents](http://www.graco.com/patents).

**TO PLACE AN ORDER**, contact your Graco distributor, go to [www.graco.com](http://www.graco.com), or call to identify the nearest distributor.

**If calling from the USA:** 1-800-746-1334

**If calling from outside the USA:** 0-1-330-966-3000

*All written and visual data contained in this document reflects the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.*

Original instructions. This manual contains English. MM 3A0019

**Graco Headquarters:** Minneapolis

**International Offices:** Belgium, China, Japan, Korea

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