

28:1 Lube ProTM Vertical Oil Pump

3A4033J

EN

For pumping non-corrosive and non-abrasive lubricants only. For professional use only.

Not approved for use in European explosive atmosphere locations.

Models:

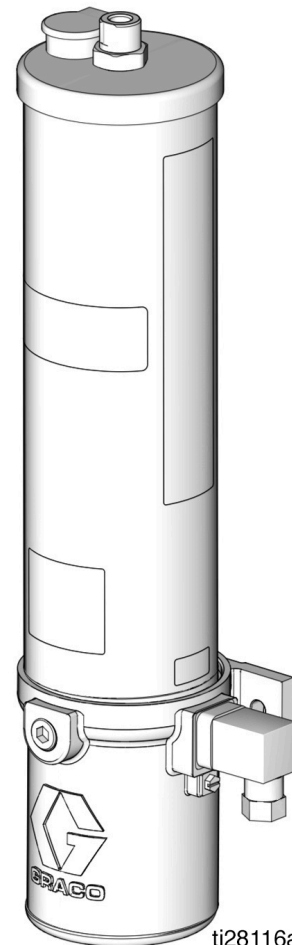
See page 2 for model information, including maximum working pressure and approvals.

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



Important Safety Instructions

Read all warnings and instructions in this manual.
Save these instructions.



Contents




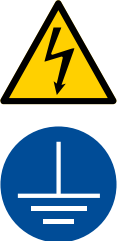

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Models

Part No.	Size	Low Level	Normally Open	Normally Closed	EU
24Z020	0.6 L				
24Z021	0.6 L	X	X		
24Z022	0.6 L	X		X	
24Z023	0.6 L				X
24Z024	0.6 L	X	X		X
24Z025	0.6 L	X		X	X
24Z026	2 L				
24Z027	2 L	X	X		
24Z028	2 L	X		X	
24Z029	2 L				X
24Z030	2 L	X	X		X
24Z050	2 L	X		X	X

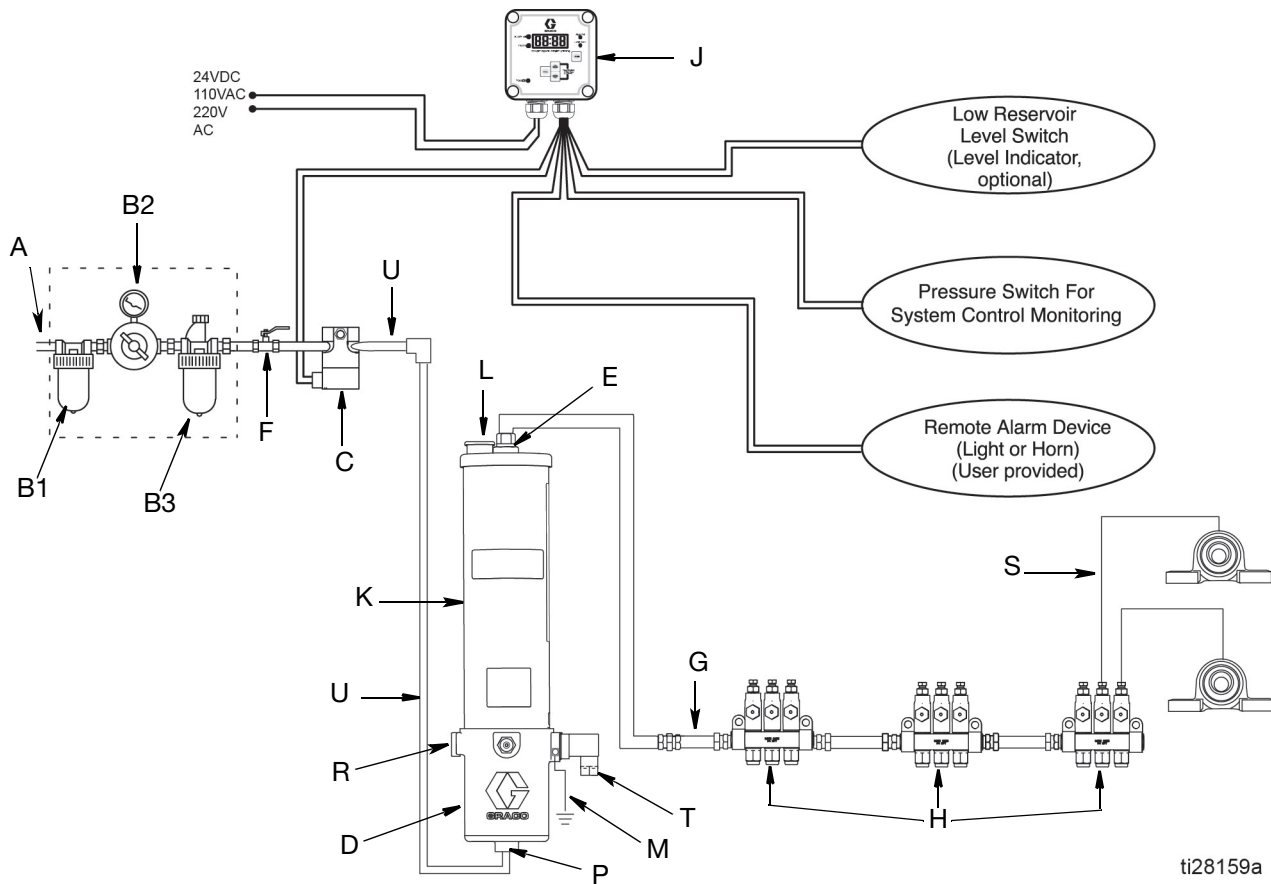
Warnings

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

 <h2 style="margin: 0;">WARNING</h2>	
	<p>SKIN INJECTION HAZARD</p> <p>High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> • Do not point dispensing device at anyone or at any part of the body. • Do not put your hand over the fluid outlet. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing equipment. • Tighten all fluid connections before operating the equipment. • Check hoses and couplings daily. Replace worn or damaged parts immediately.
	<p>PRESSURIZED EQUIPMENT HAZARD</p> <p>Over-pressurization can result in equipment rupture and serious injury.</p> <ul style="list-style-type: none"> • Do not exceed the maximum air input pressure. • Fill slowly to avoid over pressurizing reservoir. • Use tubing, hoses and other components with pressure ratings equal to or higher than the pump rating.
	<p>ELECTRIC SHOCK HAZARD</p> <p>This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> • Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment. • Connect only to grounded power source. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.
	<p>PLASTIC PARTS CLEANING SOLVENT HAZARD</p> <p>Many solvents can degrade plastic parts and cause them to fail, which could cause serious injury or property damage.</p> <ul style="list-style-type: none"> • Use only compatible water-based solvents to clean plastic structural or pressure-containing parts. • See Technical Specifications in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's Safety Data Sheets (SDSs) and recommendations.

 <h1 style="margin: 0;">WARNING</h1>	
 	<p>ELECTRIC SHOCK HAZARD</p> <p>This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> • Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment. • Connect only to grounded power source. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.
 	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical Specifications 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 SDS from distributor or retailer. • Turn off all equipment and follow the Pressure Relief Procedure when equipment is not in use. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. • Make sure all equipment is rated and approved for the environment in which you are using it. • Use equipment only for its intended purpose. Call your distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • Read SDSs to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
 	<p>MOVING PARTS HAZARD</p> <p>Moving parts can pinch, cut or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> • Keep clear of moving parts. • Do not operate equipment with protective guards or covers removed. • Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure and disconnect all power sources.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear, and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Typical Installation



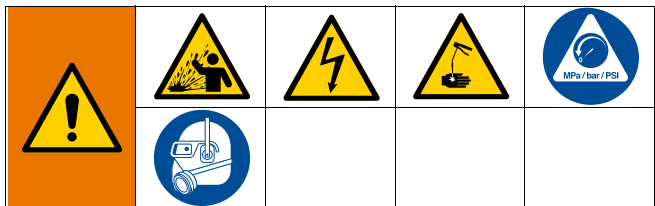
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Fig. 1: Typical Installation

Key:

- A Main Air Supply Line
- B Filter/Regulator/Lubricator Assembly
 - B1 - Air Filter
 - B2 - Air Regulator
 - B3 - Air Lubricator
- C Air solenoid valve (3-way)
- D Pump module
- E Pump outlet
- F Bleed-type master air valve (required)
- G High pressure lubricant supply lines (user supplied)
- H Injector
- I Lubricator controller
- J Pump reservoir
- K Pump reservoir fill cover
- L Ground
- M Pump air inlet - forward stroke
- N Air outlet
- O Feeder lines
- P Low level
- Q Air supply lines

Installation



Grounding



Grounding is necessary when voltages above 30 VAC or 42 VDC are used for the low level switch or an air valved is attached to the pump. Improper grounding can cause electric shock. Grounding reduces the risk of electric shock by providing an escape wire for the electric current in the event of malfunction or breakdown.

To ground the pump (FIG. 2):

1. Remove the ground screw (Z) located on the side of the pump base.
2. Insert the ground screw (Z) through the eye of the ring terminal (W) located at the end of the ground wire (Y).
3. Fasten the ground screw (Z) back onto the back of the pump and tighten the screw securely.
4. Connect the other end of the ground wire (Y) to a true earth ground.

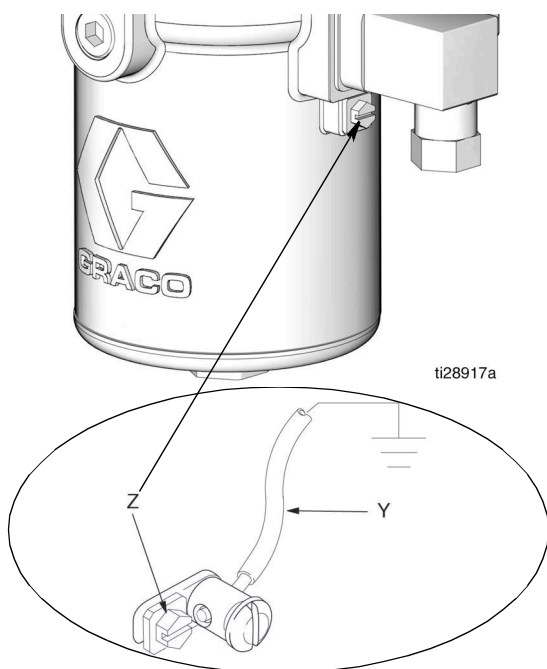


FIG. 2
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Mount the Pump



Mount the pump securely so that it cannot move around during operation. Failure to do so could result in injury or equipment damage.

Install the pump in a location that will adequately support the weight of the pump when it is filled with lubricant and also provides easy operator access to the pump air controls. The pump must be mounted in a vertical position with the reservoir up. See **Technical Specifications**, page 29 for pump weight information and the **Dimensions and Mounting Layout**, page 28.

Low Level Models Only

DIN Connector

Connection is made to PINS 1 and 3 of the DIN Field Wire-able Connector. See FIG. 3.

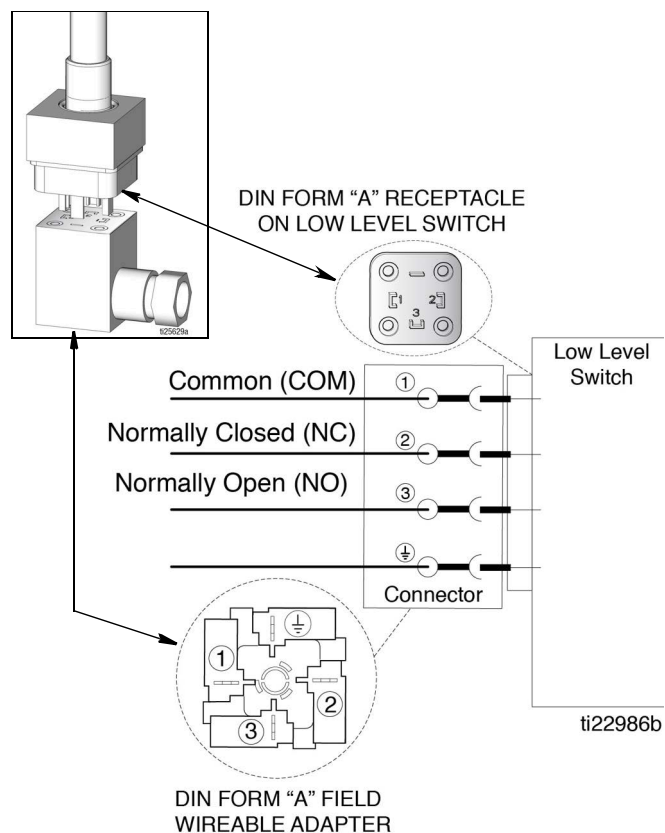






FIG. 3

Air and Fluid Line Accessories

Refer to FIG. 1, page 6, for the following instruction.

Install the air line accessories in the order shown in FIG. 1, page 6.

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



Bleed-type master air valve (F): Required in the system to relieve air trapped between it and the pump.

Air line filter (B1): Removes harmful dirt and moisture from compressed air supply.

Pump air regulator (B2): To control pump speed and outlet pressure. Locate it close to the pump.

NOTICE
<p>Do not mount the air accessories directly on the solenoid valve air inlet. The air inlet and fittings are not strong enough to support the accessories and may break. Provide a bracket on which to mount the accessories.</p>

1. Install a bleed-type master air valve (F) to relieve air trapped between it and the pump. Install the valve in a location that is easily accessible from the pump and located downstream of the air regulator.
2. Install an air line filter (B1) to remove harmful dirt and contaminants from the compressed air supply.
3. Install the air regulator (B2) to control pressure.
4. Install an air line lubricator (B3) to lubricate the air cylinder.
5. Install the (3-way) air solenoid valve (C) for control of the pump forward and return strokes.

				
<p>The maximum working pressure of each component in the system may not be the same. To reduce the risk of over-pressurizing any part of your system, know the maximum working pressure rating of each component and its connected components. Never exceed the maximum working pressure of the lowest rated components connected to a particular pump.</p>				

To use the air regulator reading to determine the fluid output pressure, multiply the ratio of the pump (28:1) by the air pressure shown on the regulator gauge or see **Table 1: Lubricant Output and Pressure - US PSI** or **Table 2: Lubricant Output and Pressure - Metric MPa (bar)**, provided on page 13.

Limit the air to the pump so that no air line or fluid line component or accessory is over pressurized.

Air Supply Lines (U)

1. Install two air supply lines (U) between the air solenoid outlets (C) and the pump (D) as shown in FIG. 1, page 6.
2. Install an air supply line (U) between the air solenoid valve inlet (C) and the Filter/Regulator/Lubricator Assembly (B) as shown in FIG. 1, page 6.

Fill Reservoir

1. Open the oil fill cap (oc) located on the top of the reservoir.

NOTE: A strainer is installed at the oil fill cap (oc) to prevent contamination of the lubricant with foreign materials (FIG. 4).

- a. Inspect the strainer before filling the reservoir.
- b. When needed, remove the strainer and clean thoroughly.
- c. If removed in Step b, install the strainer prior to adding lubricant.

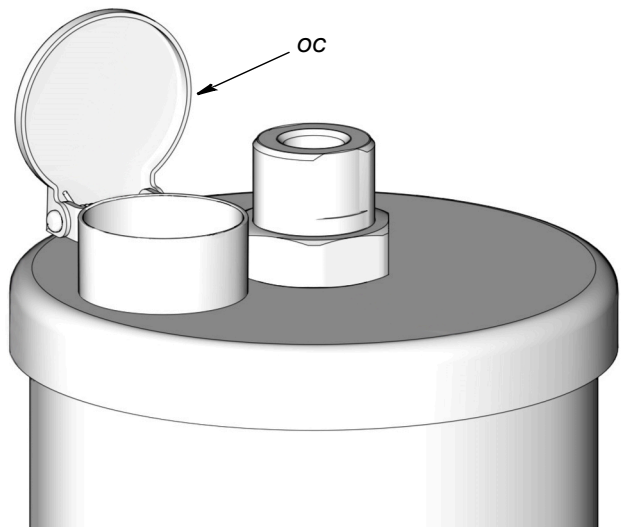


FIG. 4

2. Slowly add oil (*o*) until the reservoir is filled to capacity (FIG. 5).

NOTE: Do not fill the reservoir too quickly and overflow the reservoir capacity.

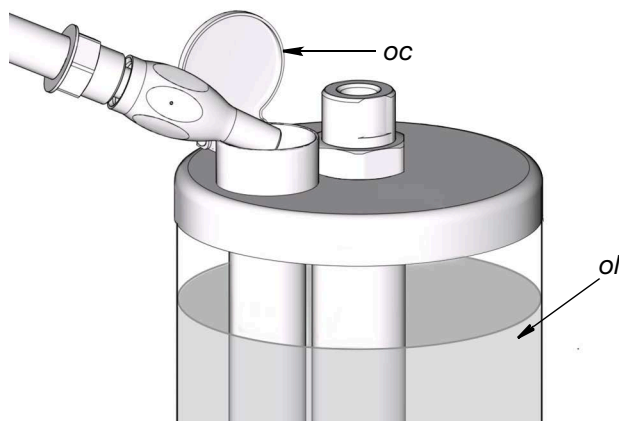


FIG. 5

3. Close the oil fill cover (*oc*) to prevent contamination and spillage (FIG. 5).

Prime

NOTE:

- Prime the pump before connecting the outlet to supply line (G).
- Before priming the pump, the reservoir must be filled with lubricant. See **Fill Reservoir**, page 8.

Run the pump until oil (*o*), free of air, comes out of the pump outlet (E). See **Operation**, page 11.

- It may take up to 20 the pump strokes to expel the air from the pump and deliver a continuous flow of oil. This depends upon the viscosity of the lubricant and temperature.
- Allow 5 seconds ON time for the forward stroke and 5 seconds OFF time for the return stroke.

Supply Lines

1. Prime the pump until oil (*o*) comes out of the pump outlet (E).
2. Connect the supply line (G) to the pump outlet (E).
3. If there are multiple pumps on the air line, close the air regulators and bleed-type master air valves to all but one the pumps. If there is only one pump, open its air regulator and bleed-type master air valve.
4. Open the master air valve from the compressor.
5. Set the air pressure to each pump at the lowest pressure needed to get the desired results. See Recommended Pressure provided in **Table 1: Lubricant Output and Pressure - US** or **Table 2: Lubricant Output and Pressure - Metric** provided on page 13.

Feeder Lines (S)

Fill each feeder line (S) with lubricant prior to connecting lines to the injector outlet.

Injectors

1. Check each injector for proper operation. The injector stem should move when lubricant is discharged.
2. Adjust the injector output if needed to ensure that the output volume discharged is sufficient.

Air Lock Procedure



Refer to FIG. 1, page 6, for the following instruction.

An air lock occurs when a bubble or pocket of air prevents the normal flow of the lubricant.

NOTICE

Running the pump dry will cause an air lock. To prevent an air lock, do not run the pump without lubricant. Always refill the pump before it is empty.

If an air lock occurs:

1. Refill the reservoir to the full level (**Fill Reservoir**, page 8).
2. Relieve pressure following the **Pressure Relief Procedure**, page 11.
3. Disconnect the lubricant supply line (G) from the pump outlet (E) (FIG. 6).
4. Open the bleed-type master air valve (F, page 6).
5. Run the pump a few strokes until oil, free of air, comes out of the pump outlet (E) (FIG. 6).
 - It may take up to 20 the pump strokes to expel the air from the pump and deliver a continuous flow of oil. This depends upon the viscosity of the lubricant and temperature.
 - Allow a minimum of 5 seconds ON time for the forward stroke and 5 seconds OFF time for the return stroke.

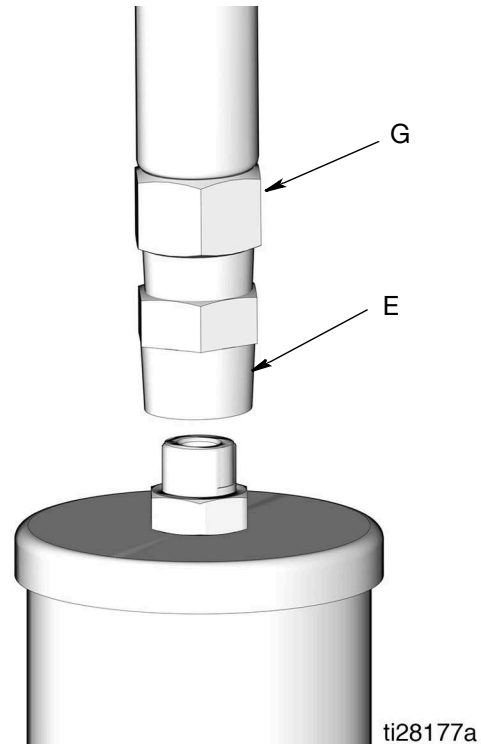


FIG. 6

6. Connect the pump outlet (E) to the lubrication line (G) (FIG. 7).

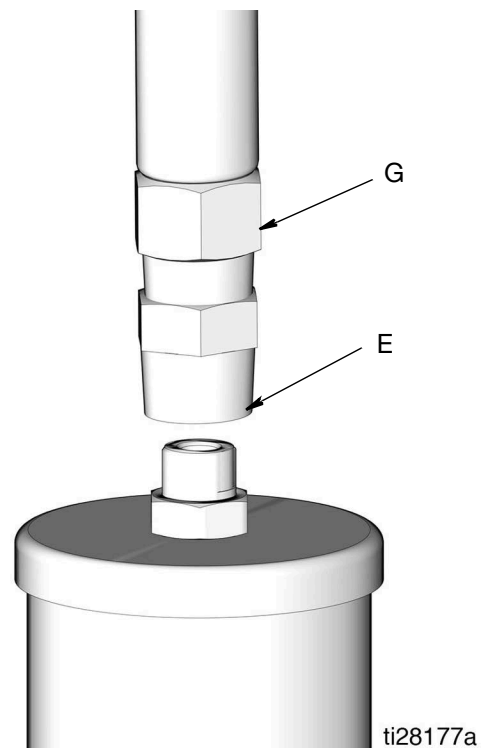


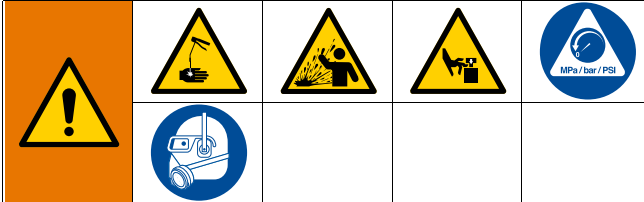
FIG. 7

Operation

Pressure Relief Procedure

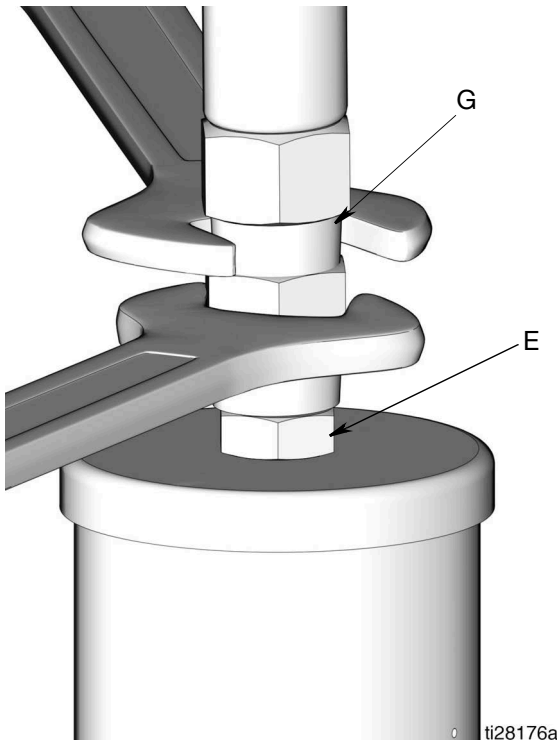


Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

1. Close the bleed-type master air valve (F, FIG. 1, page 6) (required in the system).
2. **Relieve pressure** in system using two wrenches working in opposite directions on the pump outlet (E) and lubrication line fitting (G) to **slowly loosen** the fitting until it is loose and no more lubricant or air is leaking out of the fitting (FIG. 8).



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FIG. 8

Pump

Start Up



1. Verify reservoir is filled with lubricant and system has been primed (see **Prime**, page 9).
2. Turn on the lubrication controller (J) power switch.
3. Program the lubrication controller to actuate the solenoid valve (C).

NOTE: See the lubrication controller instruction manual included with the system for these instructions.

4. Open air regulators and master air valves.

NOTE: Never allow the pump to run dry of the material being the pumped.

NOTICE

Running the pump dry will cause an air lock. To prevent an air lock, do not run the pump without lubricant. Always refill the pump before it is empty.

At the start of a the pump cycle:

- a. The air solenoid (C) supplies air to the pump air inlet (P).
- b. On the pump forward stroke, lubricant is dispensed to all the injectors.
- c. The pump is supplied with air through the air inlet (R).
- d. The pump makes a return stroke, venting the system pressure back to the pump and resetting all of the injector.

Low Level Switch

When the oil reservoir is full, the low level float (*l/f*) sits in the high, raised position as shown in FIG. 9.

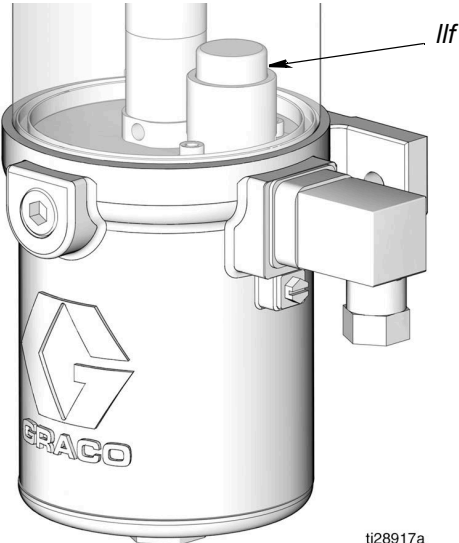


FIG. 9: Low level float in raised position

As oil is dispensed, the low level float travels down. When the oil in the reservoir reaches low level, the fully traveled down float (FIG. 10) closes the normally open low level switch and a low level signal is sent to the lubricator controller (J).

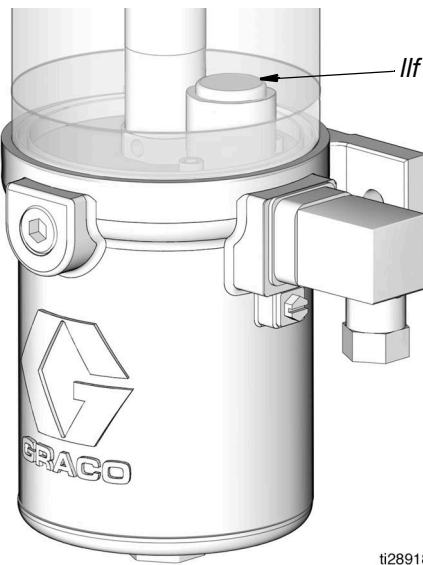


FIG. 10: Low level float in fully traveled down position

Shut Down



Refer to FIG. 1, page 6, for the following instruction.

To shut down the system:

- a. Close the bleed-type master air valve (F).
- b. Turn off electrical supply to the lubrication controller (J).

Lubrication System Sizing and Calculation Guidelines

Table 1: Lubricant Output and Pressure - US

NOTE: The lubricant output per pump stroke must be less than the amount of lubricant discharged per pump stroke.

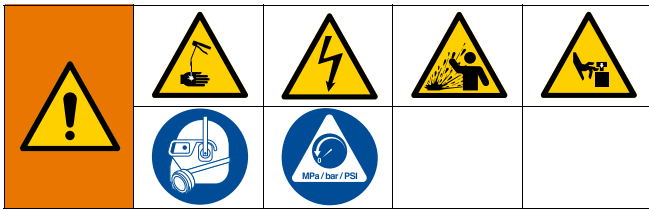
1	2	3	4	5		6		7	
Injector Type	Max Injector Output cu. in.	Injector Volume to Dispense and Charge cu. in.	Max Pump Lubricant Output / Stroke cu. in.	Maximum Pressure		Minimum Pressure		Recommended Pressure	
				Output PSI	Required Air PSI	Output PSI	Required Air PSI	Output PSI	Required Air PSI
GL-43	0.008	0.016	0.56	1000	40	750	31	850	35
GL42	0.003	0.006							

Table 2: Lubricant Output and Pressure - Metric

1	2	3	4	5		6		7	
Injector Type	Max Injector Output cc	Injector Volume to Dispense and Charge cc	Max Pump Lubricant Output / Stroke cc	Maximum Pressure		Minimum Pressure		Recommended Pressure	
				Output MPA (bar)	Required Air MPA (bar)	Output MPA (bar)	Required Air MPA (bar)	Output MPA (bar)	Required Air MPA (bar)
GL-43	0.131	0.262	9.18	6.9 (68.9)	0.27 (2.7)	5.2 (51.7)	0.21 (2.1)	5.9 (58.6)	0.24 (2.4)
GL42	0.049	0.098							

1. Total Injector Volume to Dispense and Charge
 - a. Add together the total number of injectors in the system.
 - b. From Table 1 or Table 2, find the Injector Type in the first column and the related Injector Volume to Charge in the third column. Multiply this value by the total number of injectors determined in Step a.
2. Calculate the volume of lubricant in the Pipeline (G):
 - a. Use the pipe’s inside diameter (ID) measurement to calculate the area of the pipe.
 - b. Measure the length of the pipe (G) only. Do not include the feeder lines (S) in this calculation.
 - c. Multiply the area of the pipe calculated in Step a by the length of the pipe measured in Step b.
3. Calculate line expansion and fluid compression in the pipe using the 10% Rule - multiply the volume calculated in Step 2 by 10%.
4. Calculate the Total System Volume required.
 - a. Add together the total from Step 1 and Step 3 only. Do not include Step 2.
 - b. The Total System Volume required must be less than the Pump Lubricant Output / Stroke provided in the fourth column of Table 1 or Table 2.
 - c. If the Total System Volume required is greater than the Pump Lubricant Output / Stroke provided in the fourth column of Table 1 or Table 2, split the system into two or more systems.

Repair



Seal Replacement

NOTE: For most seal replacement procedures, the pump should be completely removed from service and clamped in a vise. For only replacing the reservoir and/or reservoir seals, it is not necessary to remove the pump from the service location. The following instructions cover the complete disassembly of the pump. The pump repair may not require total pump disassembly.

Disassembly

1. Turn off the air supply and disconnect the air lines to the pump.
2. Disconnect electrical connections to the lubrication controller.
3. Follow the **Pressure Relief Procedure**, page 11.
4. Disconnect the supply line (G, page 6) from the pump outlet (E, page 6).
5. Use a hex wrench to slowly loosen and remove the drain plug (40) from the pump base and drain oil from the pump (FIG. 11).

NOTE: Removing the plug slowly prevents splashing while the oil drains from the reservoir.

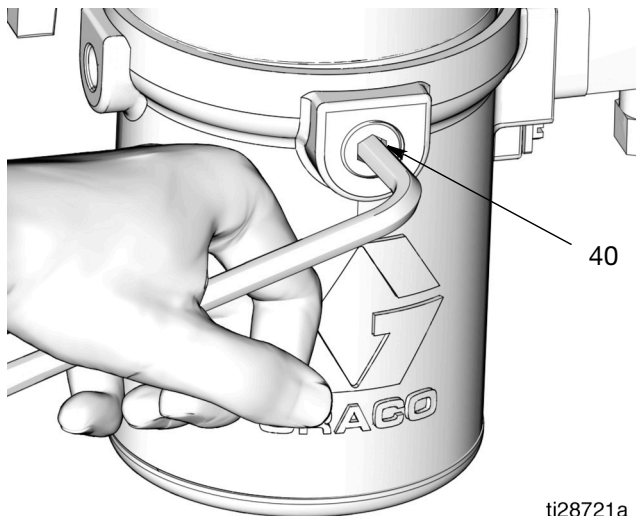


FIG. 11

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6. Collect the drained oil in a pail or waste container. Dispose of oil according to all regulations for proper disposal.
7. Replace drain plug (40).
8. Remove the mounting bolts (FIG. 12) and remove the pump from service.

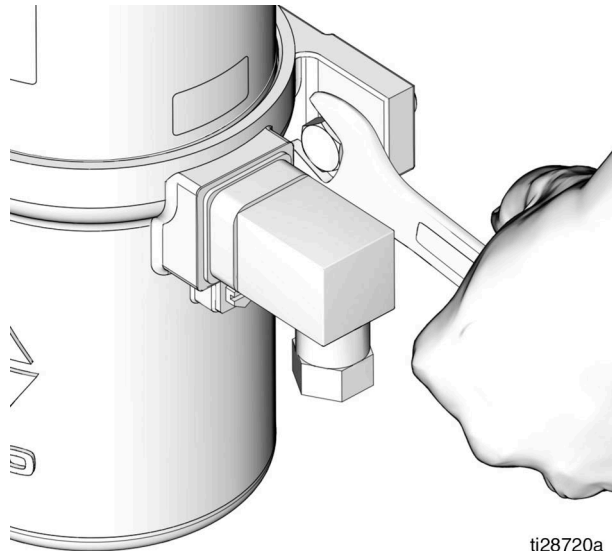


FIG. 12

9. Clamp the air motor cylinder (3) in a vise as shown in FIG. 13. Use a soft-jaw vise or place a rag in the vise jaws to protect the surface of the pump base.

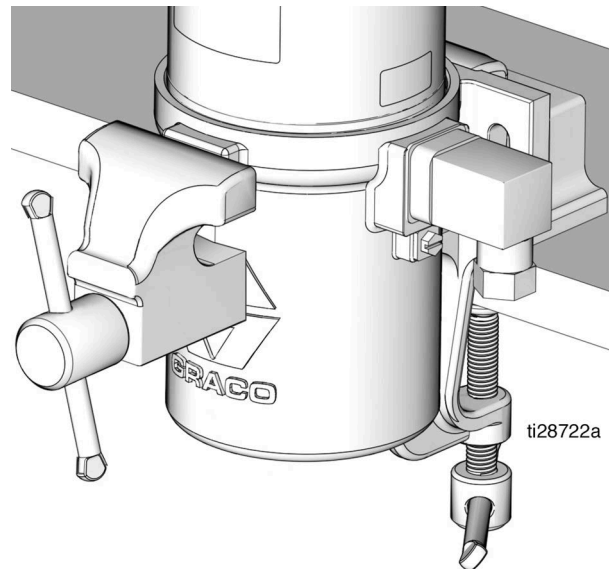


FIG. 13

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Reservoir Gaskets (10)

- 10. Use a wrench to loosen and remove the nut (17) from the reservoir cover (18) (FIG. 14).

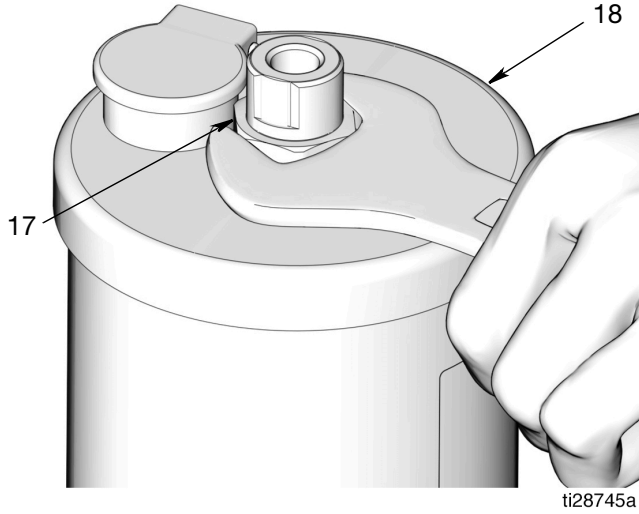


FIG. 14

- 11. Remove the cover (18) from the reservoir (11).

- 12. Remove reservoir (11) from the air motor cylinder (3) (FIG. 15). If replacing the reservoir gaskets (10), remove gaskets from the reservoir. Dispose of the gaskets according to all regulations for proper disposal.

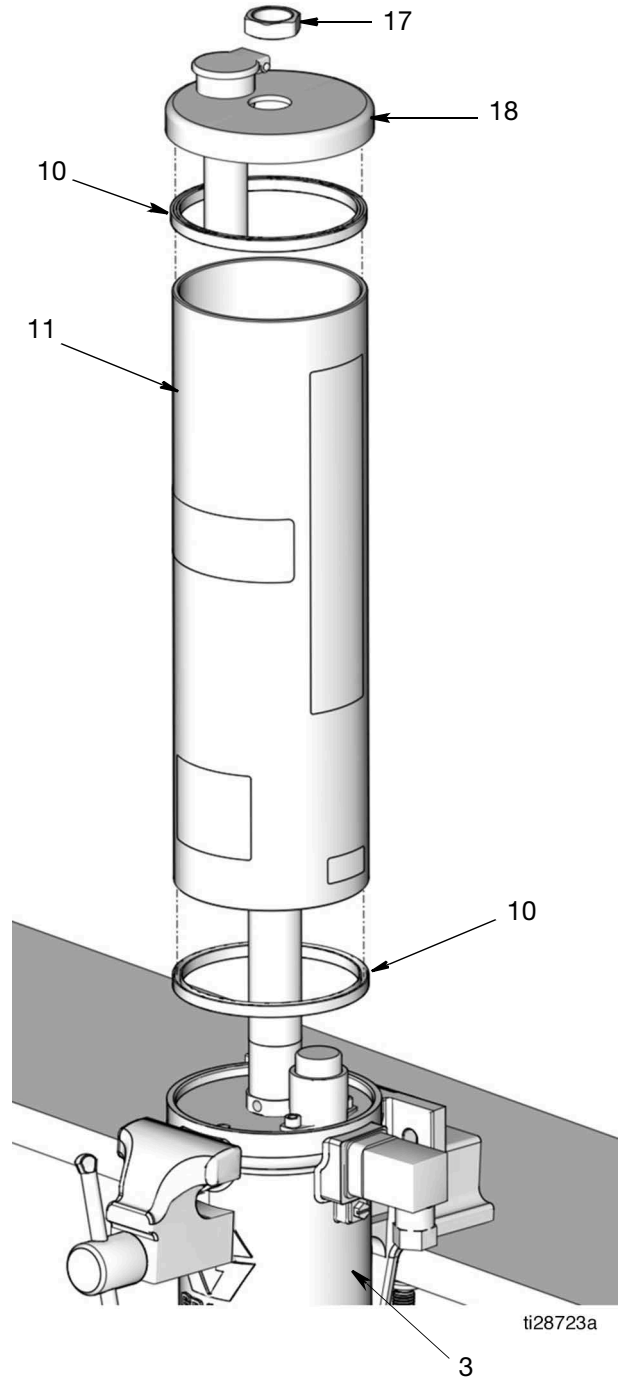


FIG. 15

Outlet Tube O-Ring (13) and Pump Cylinder O-Ring (9).

13. Securely hold the nut (3a), located on the bottom of the pump cylinder (12), in place with a wrench. Secure a second wrench on the flats of the outlet tube (14). Turn the outlet tube counter-clockwise to loosen and remove it from the pump cylinder (12) (FIG. 16).

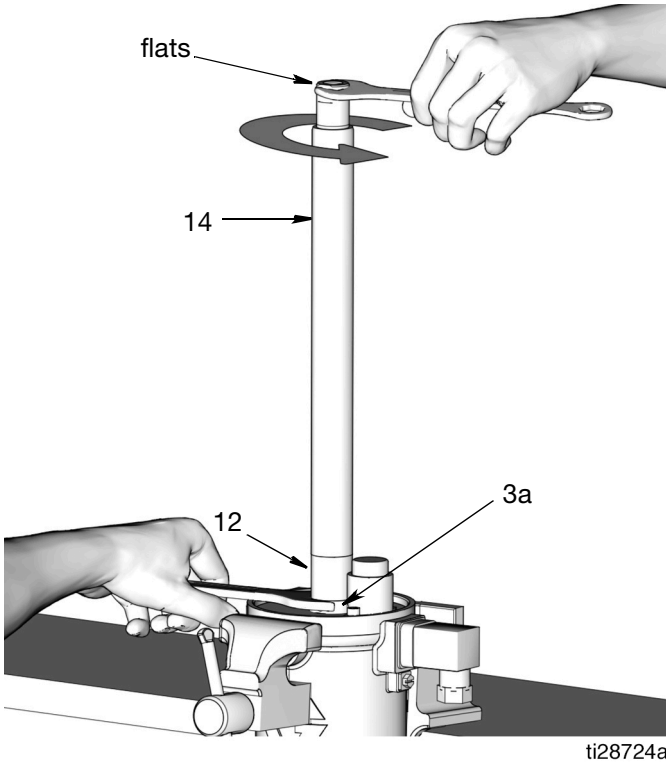


FIG. 16

14. Loosen the nut (3a) and remove the pump cylinder (12) from the air motor cylinder (3) (FIG. 17).

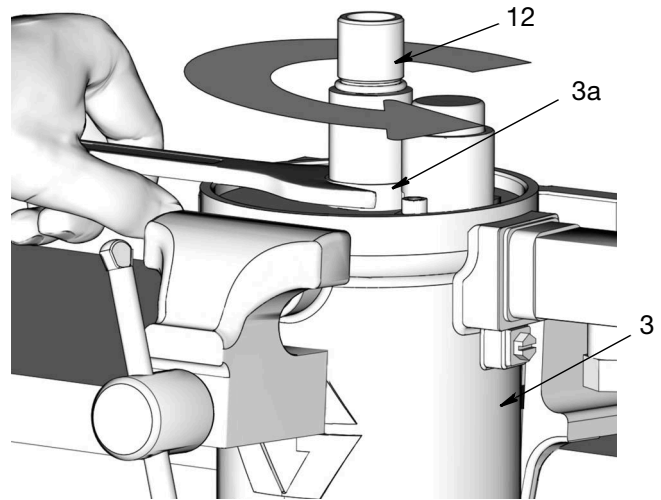


FIG. 17

15. Remove the o-ring (13) from the outlet tube (14). Remove the o-ring (9) from the pump cylinder (12). Dispose of the o-rings according to all regulations for proper disposal (FIG. 18).

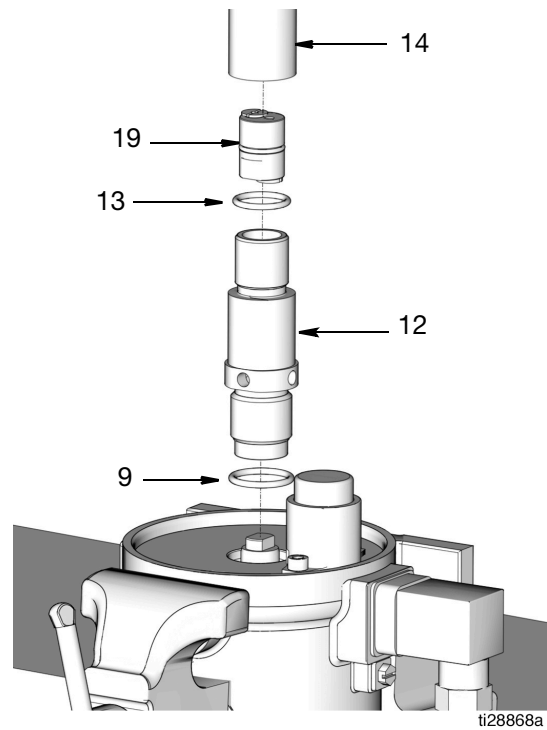


FIG. 18

Pump Piston Subassembly (33).

16. Secure a wrench on the flats of piston rod (34). Use a second wrench to remove the lock nut (31) and star washer (32) from top of the piston (FIG. 19).
17. Remove the lock nut and star washer. Keep these parts for reassembly.

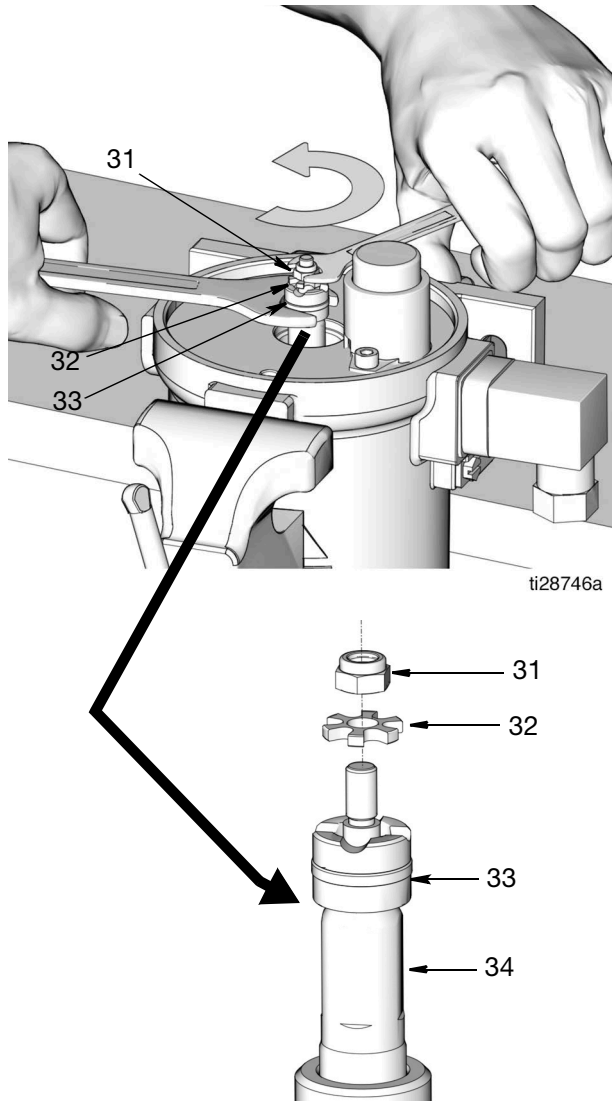


FIG. 19

18. Examine the piston assembly (33) for scratches and other wear and damage. If damaged, replace the pump piston assembly (33).
19. Reposition the air motor cylinder in vise to access the bottom of the air motor cylinder (FIG. 20).

20. Secure a wrench on the cover nut (1a). Turn it counter-clockwise loosen and remove the cover (1) from bottom or air motor cylinder. (FIG. 20).

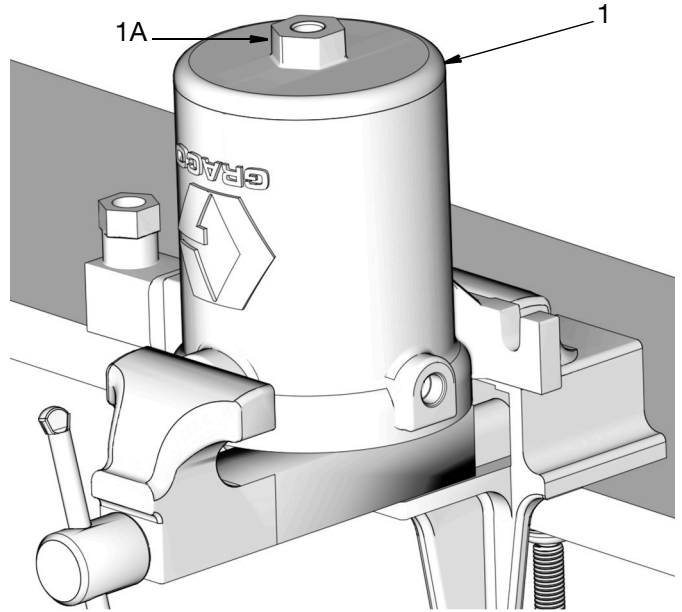


FIG. 20

NOTE: There is a spring (6) inside the air motor cylinder (3) under the piston (5). Hold hand on the cover (1) for resistance and hold it down while loosening the cover screws (1a) (FIG. 21).

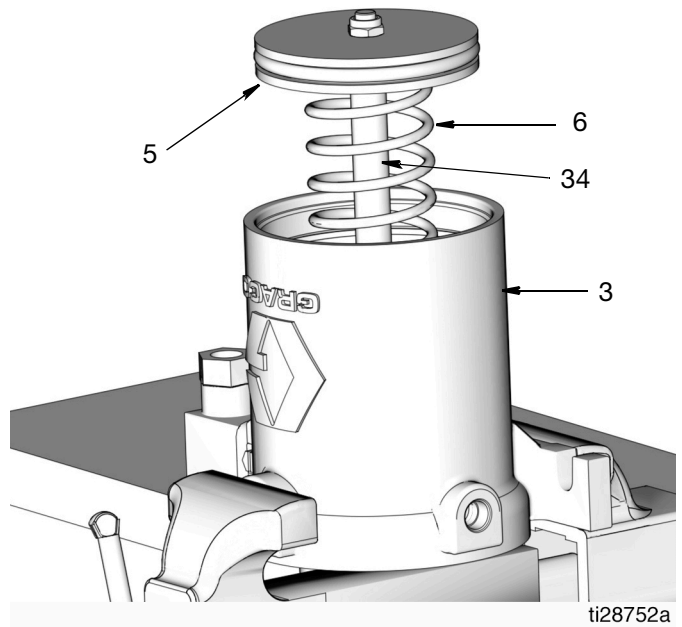


FIG. 21

21. Remove the cover (1), the cover o-ring (2) and the spring (6). Dispose of the o-ring according to all regulations for proper disposal (FIG. 22).

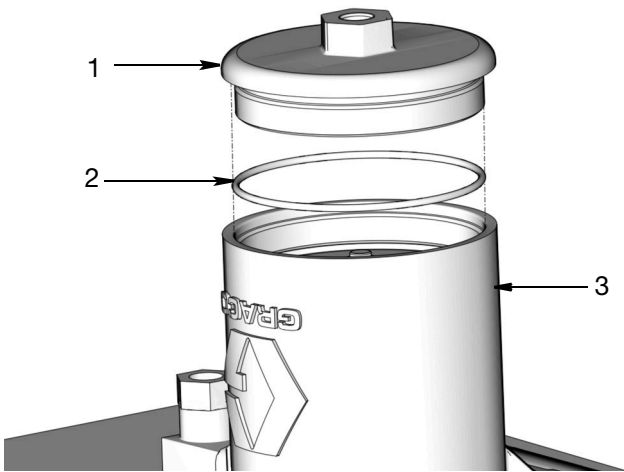


FIG. 22

Piston Rod O-Ring (36) and Piston Seal (4)

22. Remove the piston rod (34), the piston (5), and the spring (6) from the air motor cylinder (3) (see FIG. 21, page 17).
23. Separate the piston rod (34) and the piston (5) using two wrenches, working in opposite directions. Secure one wrench to flats of piston rod and the second wrench to loosen the nut (37) (FIG. 23).

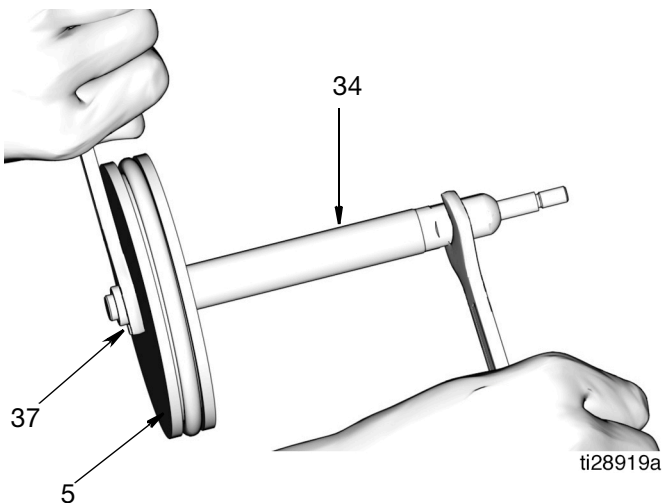


FIG. 23

24. Remove the o-ring (4) from the piston (5) (FIG. 24).

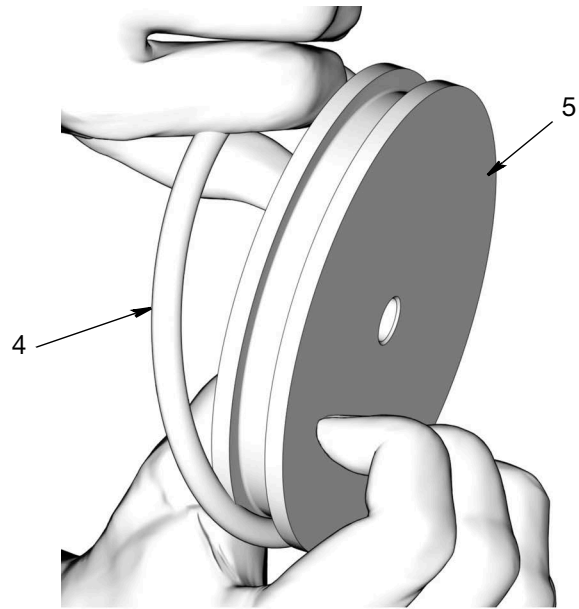


FIG. 24

25. Dispose of the piston seal (4), the o-ring (34a) and the nut (37) according to all regulations for proper disposal.
26. Use a pick to remove the o-ring (34a) from the piston rod (34) (FIG. 25).

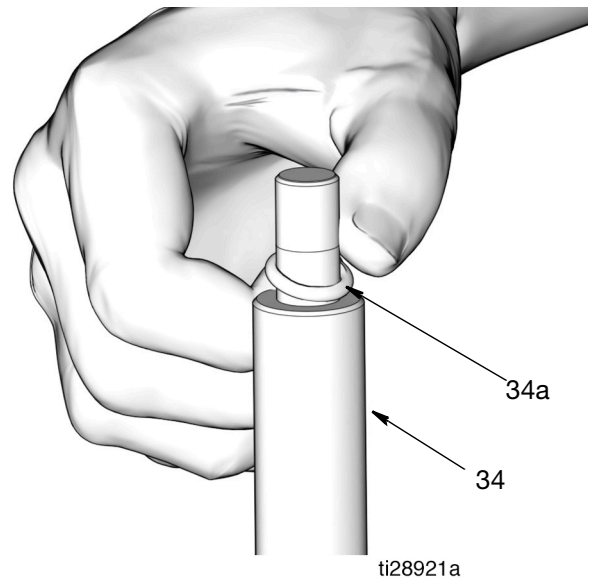


FIG. 25

27. Use a pick to remove the bushing (35) and u-cup seal (36) (FIG. 26).

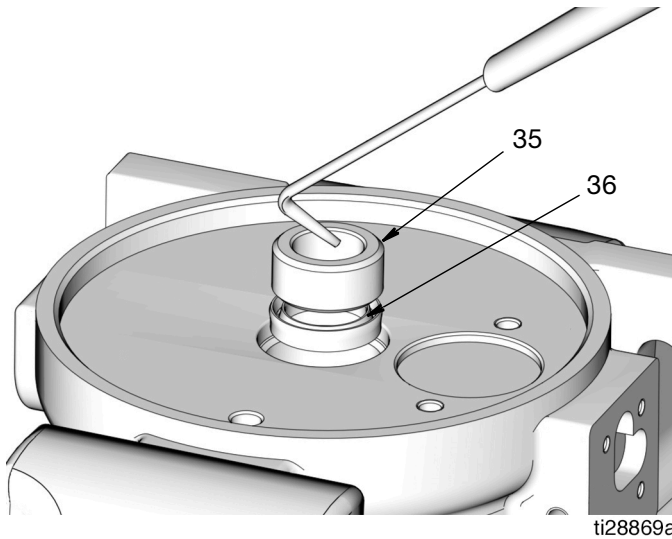


FIG. 26

28. Use a smooth, long brass or aluminum rod, free of sharp edges and burrs, to push the check valve assembly (19) out of the outlet tube (14) (FIG. 27).

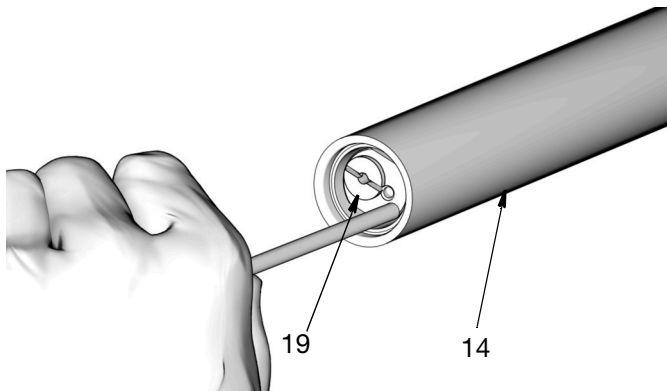


FIG. 27

29. Dispose of the check valve assembly (19) according to all regulations for proper disposal.

Reassembly

Use all of the new parts included in the repair / service kit even if the old parts do not appear to be worn or damaged and dispose of the old parts according to all regulations for proper disposal.

1. Install u-cup seal (36) with lips facing up, and bushing (35) in air cylinder (3) (FIG. 28).

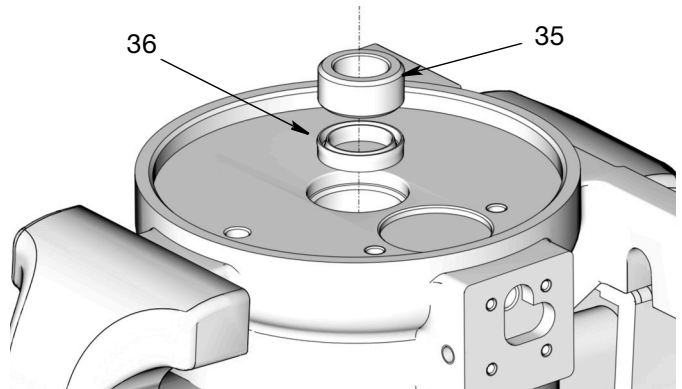


FIG. 28

Check Valve Assembly (19)

2. Coat the new check valve assembly (19) with a thin layer of grease.
3. Use a smooth, long brass or aluminum rod, free of sharp edges and burrs, to push the check valve assembly (19) into place in the outlet tube (14) (FIG. 29).

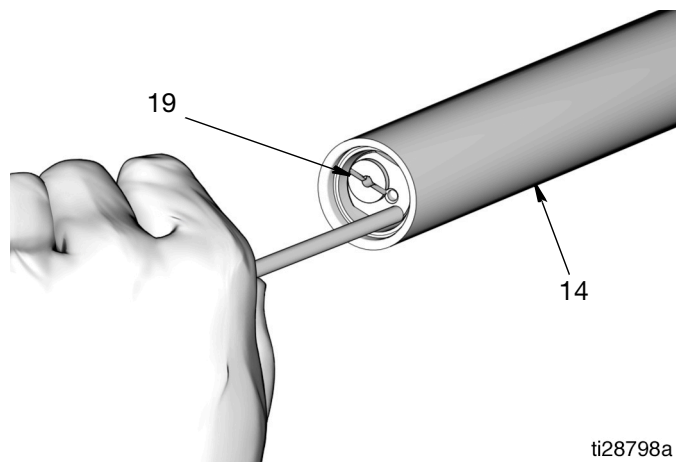


FIG. 29

Piston Rod-O-Ring (34a) and Piston Seal (4)

NOTE: Do not clamp the piston rod (34) in vise.

4. Use a clean cloth to wipe down the piston rod (34) and the piston (5) to remove any dirt or contaminants. Inspect surfaces for any scratches or damage. Replace damaged parts.
5. Apply a thin layer of grease to the o-ring (34a). Install the o-ring over the grooves of the piston rod (34) (FIG. 30).

NOTE: If needed, a pick can be used to seat the o-ring over the grooves of the piston rod (13).

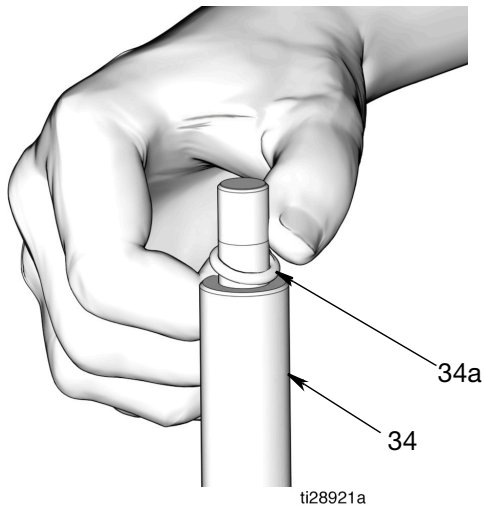


FIG. 30

6. Push the piston (5) over end of the piston rod (34) until seated on the rod (FIG. 31).

NOTE: A pop sound occurs when placed correctly.

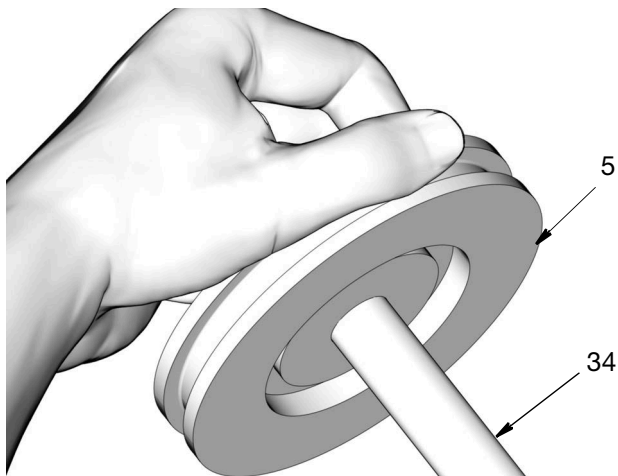


FIG. 31

7. Install the nut (37) over the end of the piston rod (34). Use two wrenches, working in opposite directions to tighten the nut. Secure one open end wrench to flats of piston rod and use the second wrench to tighten the nut. Torque nut to 13 to 15 ft. lbs (17.6 to 20.3 N.m) (FIG. 32).

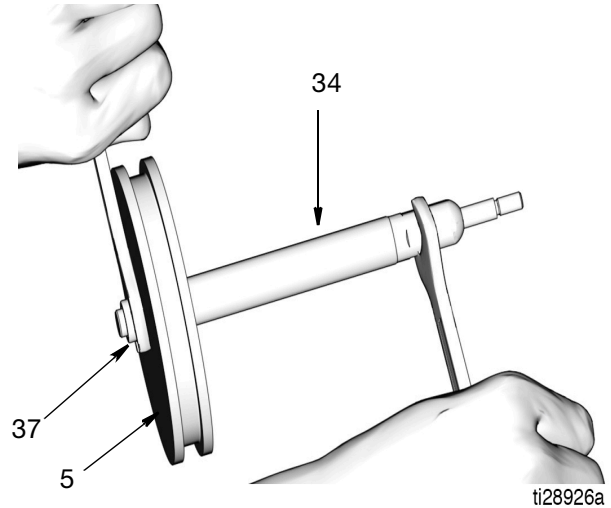


FIG. 32

8. Apply a thin layer of grease to the piston seal (4). Install the seal around the piston (5) as shown in FIG. 33.

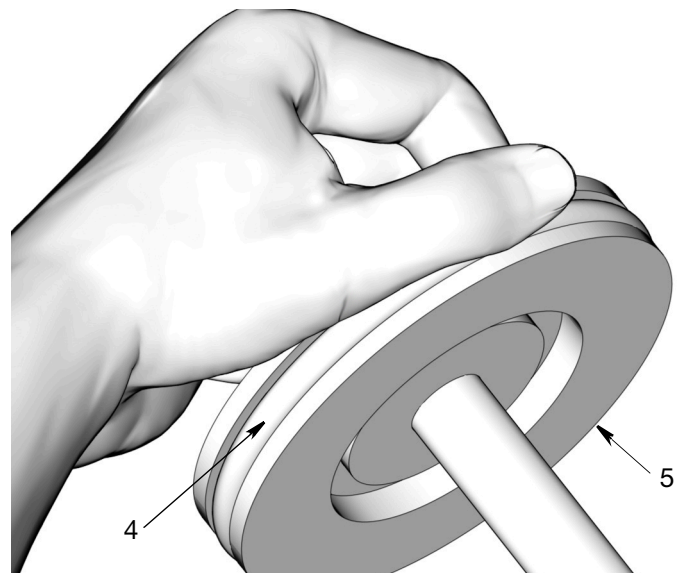


FIG. 33

9. Install the spring (6) over the piston rod (34) and install spring and piston rod into the air cylinder (3) (FIG. 34).

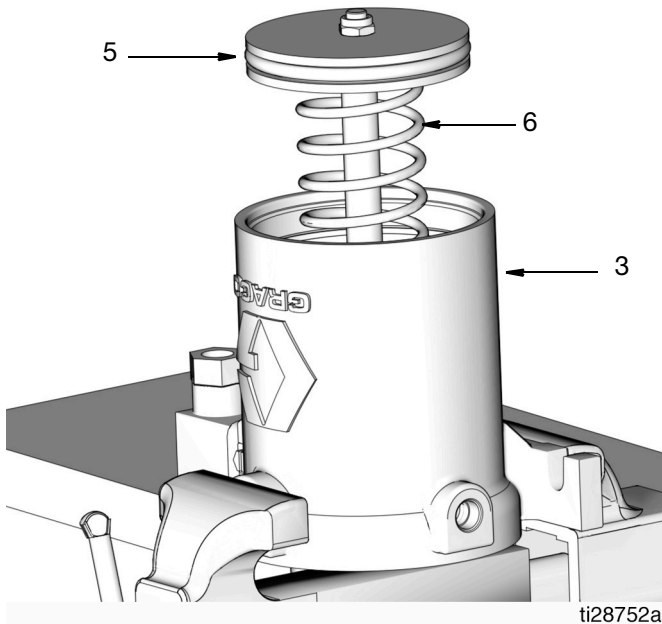


FIG. 34

10. Apply a thin layer of grease to the cover o-ring (2). Install the o-ring to cover (1) (FIG. 35).
11. Install the cover in bottom of air motor cylinder (3). Push on the top of the cover to seat it and compress the spring. Use a wrench on the nut (1a) to turn and tighten the cover securely, then torque to 28 to 32 ft. lbs. (37.9 to 43.4 N.m) (FIG. 35).

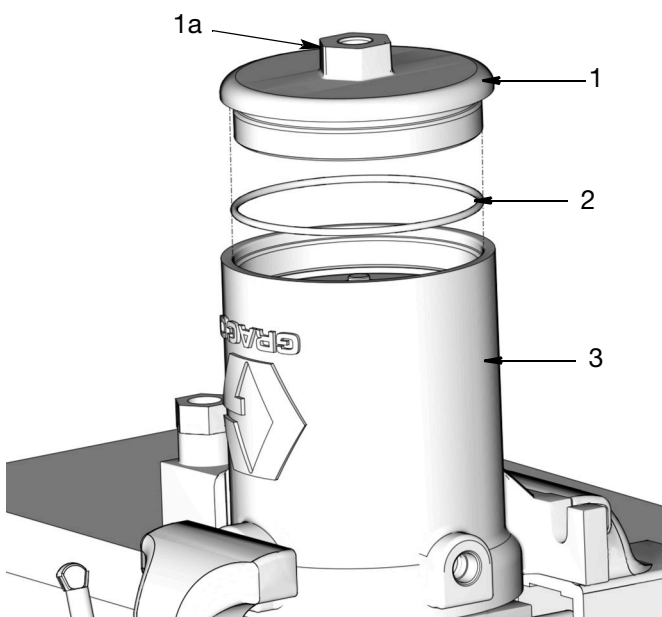


FIG. 35

12. Reposition the air motor cylinder in vise to access the top of the air motor cylinder as shown in FIG. 36.

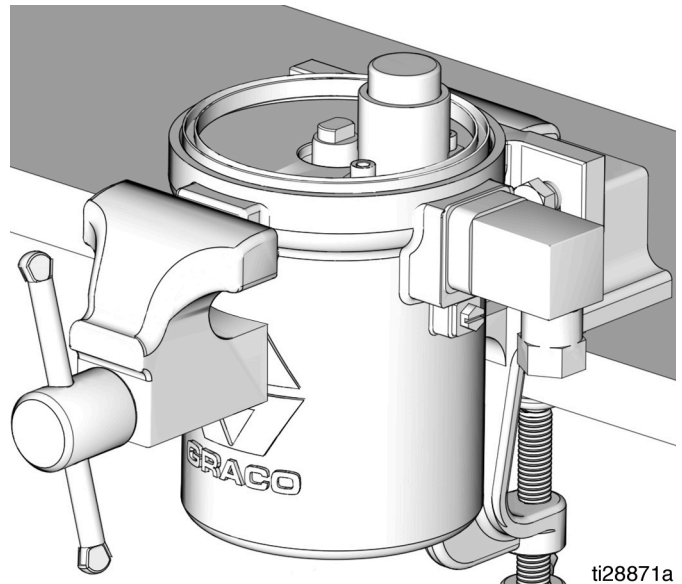


FIG. 36

Pump Piston Subassembly (33)

13. Apply a thin layer of grease to the piston seal (33). Install the piston seal over the piston rod (34).
14. Install the star washer (32) and the lock nut (31) on the piston rod (34), as shown in FIG. 37.

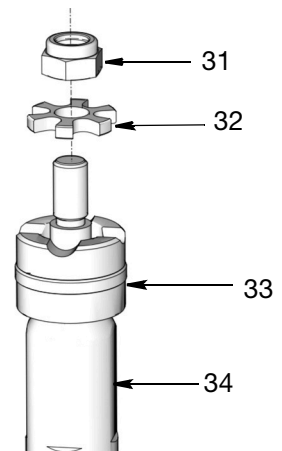


FIG. 37

15. Use a wrench to tighten the lock nut (31).

Outlet Tube O-ring (13) and Pump Cylinder O-ring (9)

16. Apply a thin layer of grease to the outlet tube o-ring (13) and the pump cylinder o-ring (9) and install the o-rings on the outlet tube (14) and the pump cylinder (12) (FIG. 38).

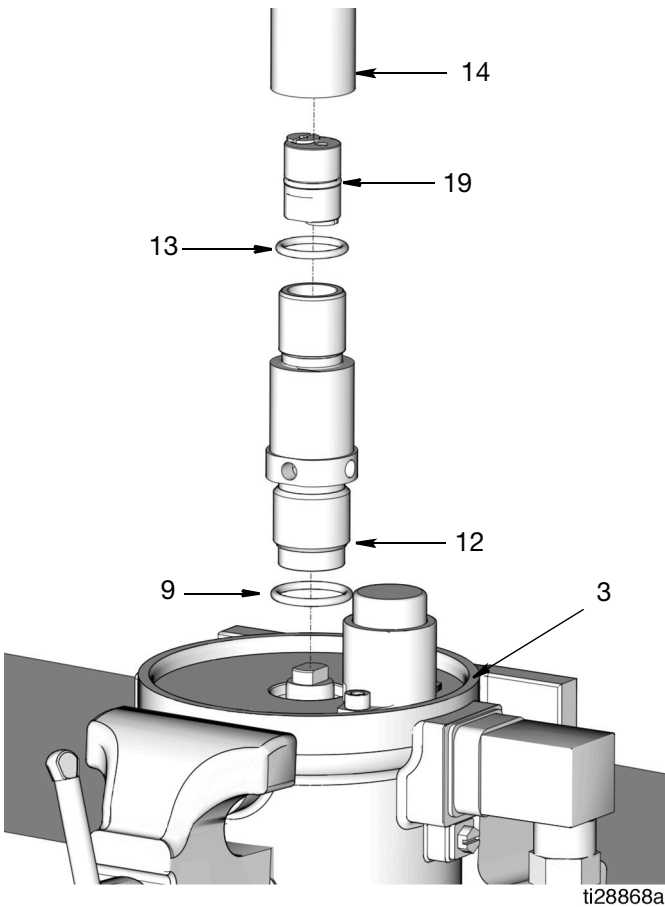


FIG. 38

17. Install the pump cylinder (12) in air motor cylinder (3). Use a wrench to tighten nut (3a) securely. Torque to 28 to 32 ft. lbs. (37.9 to 43.4 N.m).

18. Install the outlet tube (14) on the pump cylinder (12). Securely hold the nut (3a) [located on the bottom of the pump cylinder (12)] in place with a wrench. Secure a second wrench on the flats of the outlet tube (14). Turn the outlet tube clockwise to tighten it to the pump cylinder (12) (FIG. 39). Torque to 28 to 32 ft. lbs. (37.9 to 43.4 N.m).

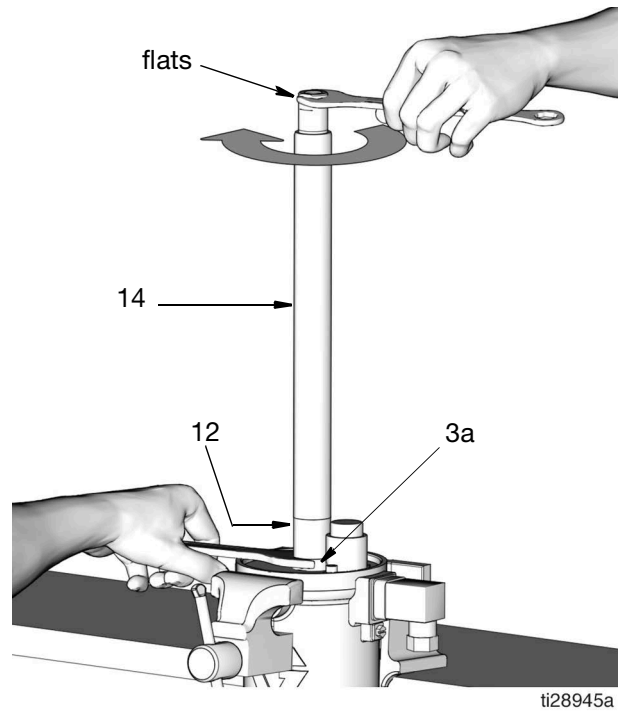
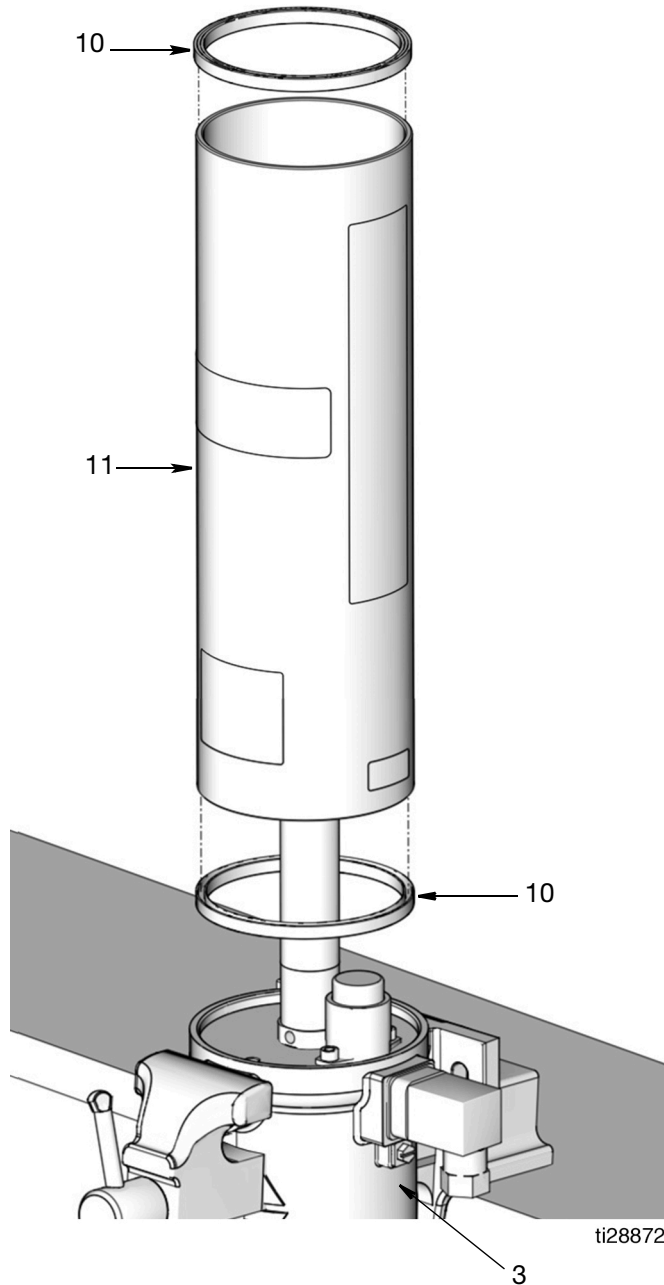


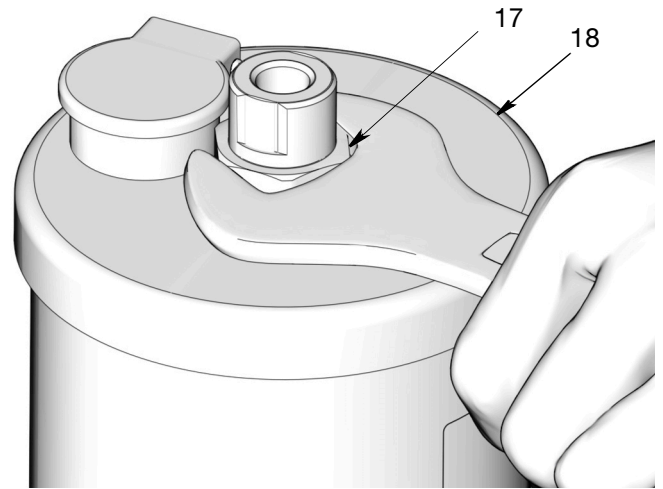
FIG. 39

Reservoir Gaskets (10)

19. Install the reservoir gaskets (10) to the top and the bottom of the reservoir (11) as shown in FIG. 40.
20. Install the reservoir (11) into the air motor cylinder (3) (FIG. 40).

**FIG. 40**

21. Install the cover (18) on the reservoir (11). Torque nut (17) to 45 - 55 in. lbs. (5.1 to 6.2 N.m) (FIG. 41).

**FIG. 41**

22. Remove the pump assembly from vise and reinstall the pump in the service location. See Installation Instructions beginning on page 6.

Recycling and Disposal

End of Product Life

At the end of the product's useful life, dismantle and recycle it in a responsible manner.

- Perform the **Pressure Relief Procedure**, page 11.
- Drain and dispose of fluids according to applicable regulations. Refer to the material manufacturer's Safety Data Sheet.
- Remove motors, batteries, circuit boards, LCDs (liquid crystal displays), and other electronic components. Recycle according to applicable regulations.
- Do not dispose of batteries or electronic components with household or commercial waste.



- Deliver remaining product to a recycling facility.

Troubleshooting

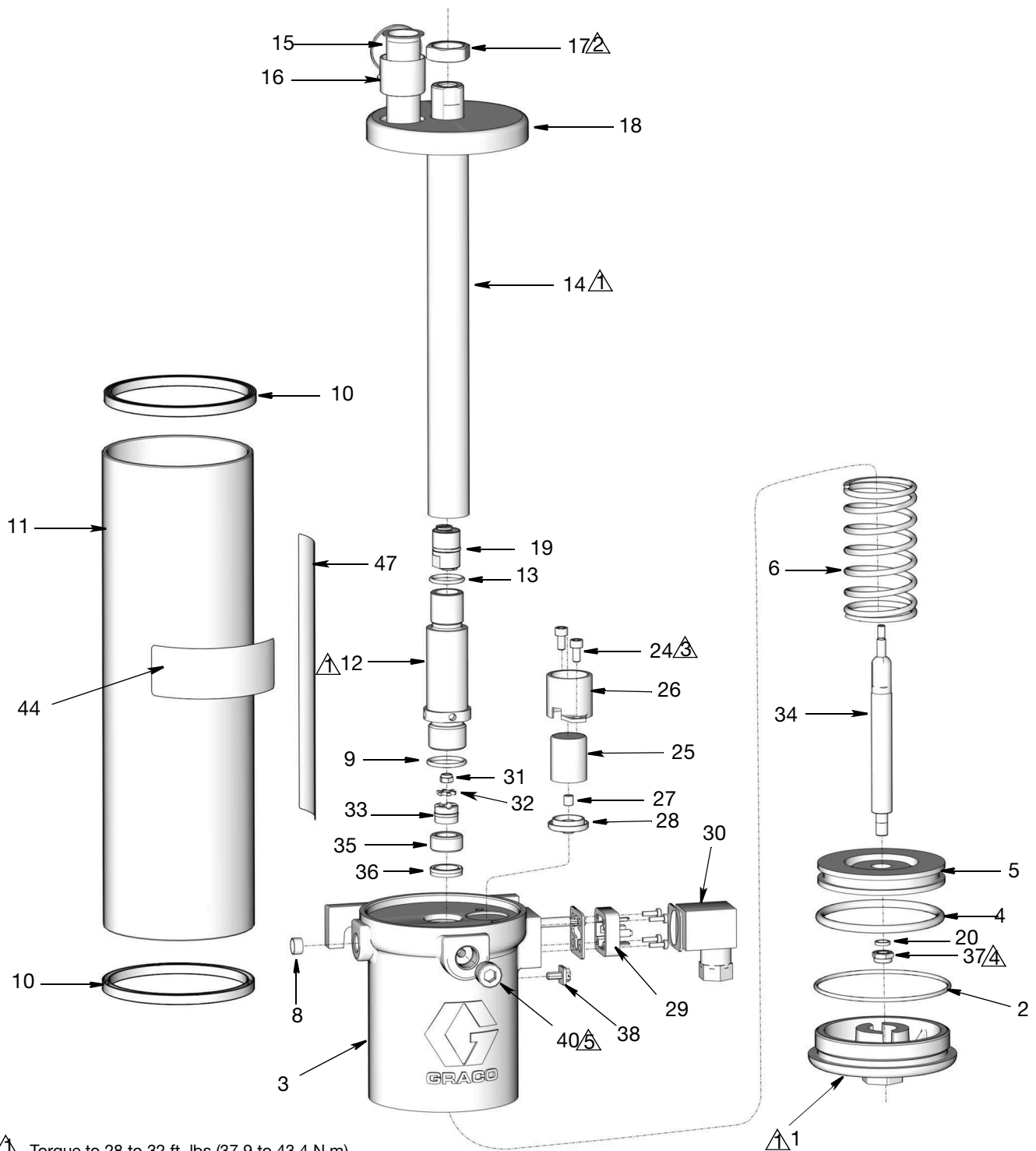


Follow **Pressure Relief Procedure**, page 11, before checking or repairing the pump.

Check all possible problems and causes before disassembling the pump.

Problem	Cause	Solution
The pump is not operating. No lubricant flow.	No air	<ol style="list-style-type: none"> 1. Adjust the air pressure/supply. 2. Open the bleed-type master air valve (F) (page 6).
	No lubricant in the reservoir	Fill the reservoir.
	Losing prime	<ol style="list-style-type: none"> 1. Remove trapped air (see Air Lock, page 10). 2. Prime the pump (Priming, page 9).
Injectors not cycling or only some of the injectors are operating	No lubricant flow	See Pump is not operating. No lubricant flow in Troubleshooting table.
	Low pressure or no pressure	<ol style="list-style-type: none"> 1. Check piping for leaks. If a leak is detected, repair or replace piping. 2. Check injectors for leaks. If a leak is detected, repair or replace injector. 3. If the total system volume is greater than the Pump Lubricant Output provided in Table 1 or Table 2, split the system into two or more systems. Refer to Lubrication System Sizing and Calibration Guide, page 13.
	Pump seals are bad	Replace seals (17K553). See Parts, page 27.

Parts



1 Torque to 28 to 32 ft. lbs (37.9 to 43.4 N.m)

2 Torque to 45 to 55 in. lbs (5.1 to 6.2 N.m)

3 Torque to 25 to 30 in. lbs (2.8 to 3.4 N.m)

4 Torque to 155 to 165 in. lbs (17.5 to 18.6 N.m)

5 Torque to 12 to 15 ft. lbs (16.3 to 20.3 N.m)

Parts

Ref	Part No	Description	Qty
1	17J825	COVER, air motor	1
2★	17J826	SEAL, o-ring	1
3	17J828	CYLINDER, air motor, low level, models 24Z021, 24Z022, 24Z024, 24Z025, 24Z027, 24Z028, 24Z030, 24Z050	1
	17J829	CYLINDER, air motor, models 24Z020, 24Z023, 24Z026, 24Z029	1
4	17J830	SEAL, o-ring	1
5	17J839	PISTON, air motor	1
6	17J833	SPRING, comp., wire	1
8	U10013	SCREEN, brass, regulator	1
9★	118563	PACKING, o-ring	1
10†❖	557332	GASKET, reservoir	2
11	557348†	RESERVOIR, plastic, 4 lb (2.0 L), models 24Z026 - 24Z030, 24Z050	1
	17J836❖	RESERVOIR, plastic, 1 lb (0.6 L), models 24Z020 - 24Z025	1
12	17J853	CYLINDER, pump	1
13★	110926	PACKING, o-ring	1
14	17K564	TUBE, lube outlet, 4 lb (2 L), 24Z026 - 24Z030, 24Z050	1
	17L565	TUBE, lube outlet, 1 lb (0.6 L), models 24Z020 - 24Z025	1
15	17J842	FILTER, oil inlet	1
16	17J843	FILLER, oil	1
17	17J844	NUT, 7/8-14unf- 2b	1
18	17J845	COVER, reservoir	1
19	24Z278	HOUSING, check valve	1
20★	118892	O-ring	1
24**	115266	SCREW, cap, socket head, models 24Z021, 24Z022, 24Z024, 24Z025, 24Z027, 24Z028, 24Z030, 24Z050	3
25**	17K548	FLOAT, magnet holder, models 24Z021, 24Z022, 24Z024, 24Z025, 24Z027, 24Z028, 24Z030, 24Z050	1
26**	17K549	GUIDE, float, models 24Z021, 24Z022, 24Z024, 24Z025, 24Z027, 24Z028, 24Z030, 24Z050	1

Ref	Part No	Description	Qty
27**	15K550	MAGNET, 6.35 mm diameter; 6.35 mm tall, models 24Z021, 24Z022, 24Z024, 24Z025, 24Z027, 24Z028, 24Z030, 24Z050	1
28**	17K551	PLUG, magnet, holder, models 24Z021, 24Z022, 24Z024, 24Z025, 24Z027, 24Z028, 24Z030, 24Z050	1
29	17C668*	CABLE, low level, switch, NO, models 24Z021, 24Z024, 24Z027, 24Z030	1
	128741*	CABLE, reed switch to DIN, NC, models 24Z022, 24Z025, 24Z028, 24Z050	1
30**	125520	CONNECTOR, DIN form A, 4 pin, 24Z021, 24Z022, 24Z024, 24Z025, 24Z027, 24Z028, 24Z030, 24Z050	1
31★	105332	NUT, lock	1
32★	17K200	WASHER	1
33★	17K553	PUMP PISTON, subassembly	
34	17J835	ROD, displacement	1
35★	17J852	BUSHING	1
36★	17J834	SEAL, u-cup	1
37★	16C022	NUT, hex	1
38	116343	SCREW, ground	1
40	101754	PLUG, pipe, 3/8 NPTF	1
44†❖	129070	LABEL, branding	1
47▲†	17C560	LABEL, safety, warning, pressure	1
54	128338	ADAPTER, NPT to BSPP, models 24Z023 - 24Z025, 24Z029, 24Z030, 24Z050	2

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

★ Parts included in seal Kit 24Z210

† Parts included in Reservoir Kit 24Z208

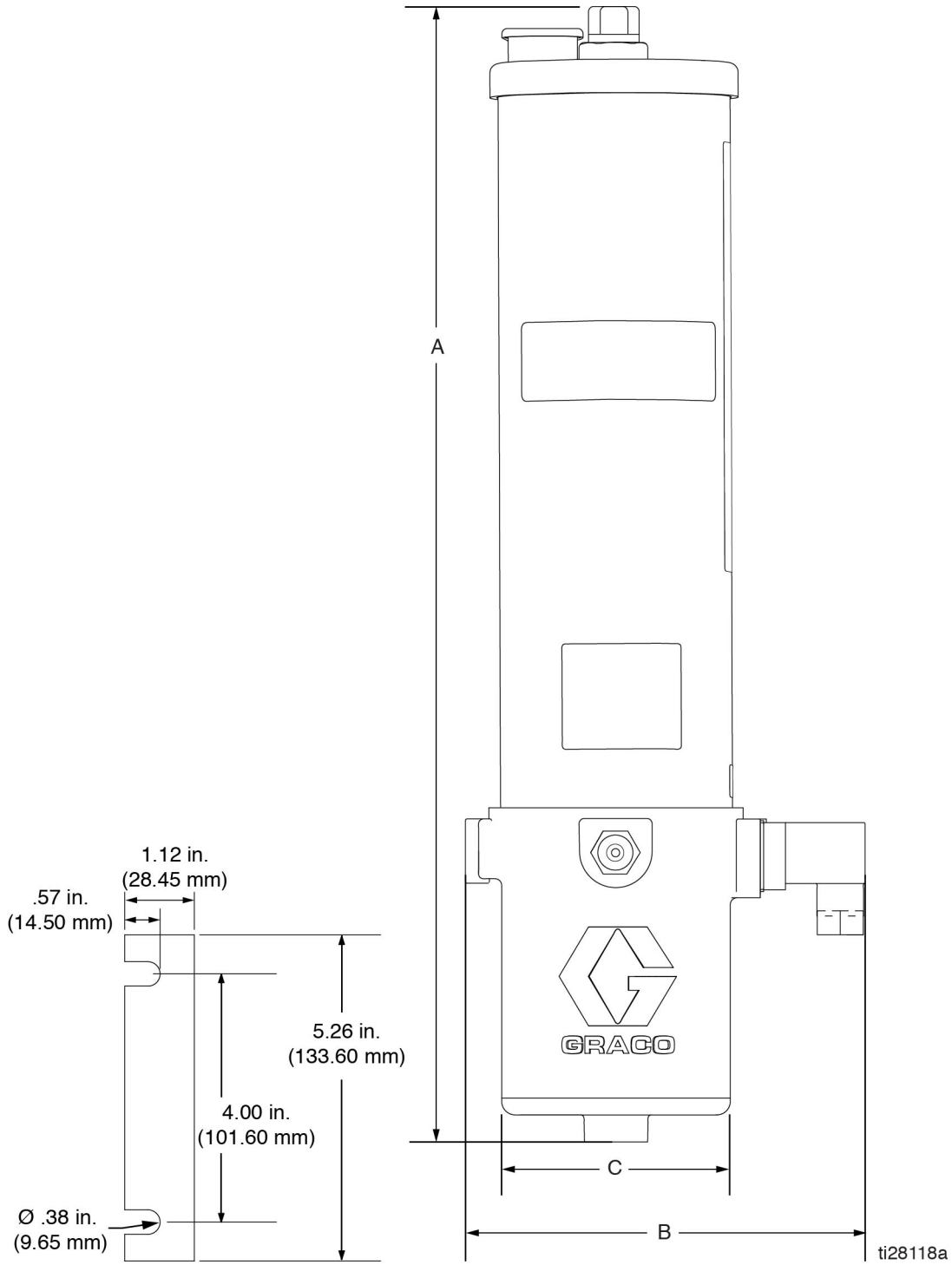
❖ Parts included in Reservoir Kit 24Z209

* Parts included in Kit 24Z212

* Parts included in Kit 24Z213

Dimensions and Mounting Layout

See Dimensions Tables, page 29



Dimensions: US - inches (See Dimensions and Layout drawing, page 28)

Models	A	B	C
24Z020, 24Z023	12.53 ± 0.11	5.25 ± 0.11	5.1 ± 0.11
24Z021, 24Z022, 24Z024, 24Z025		6.8 ± 0.11	
24Z026, 24Z029	19.83 ± 0.11	5.25 ± 0.11	
24Z027, 24Z028, 24Z030, 24Z050		6.8 ± 0.11	

Dimensions: Metric - mm (See Dimensions and Layout drawing, page 28)

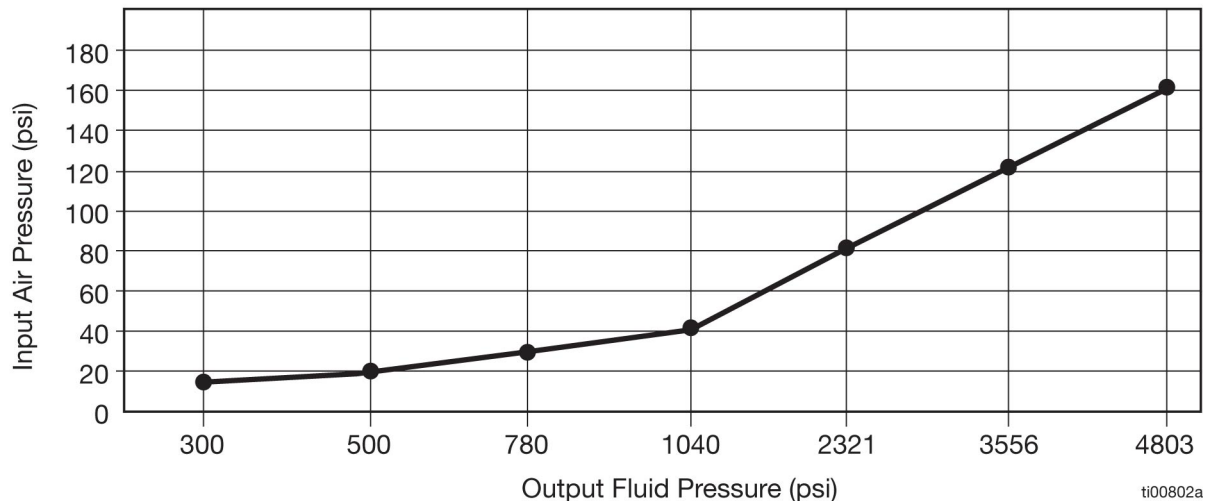
Models	A	B	C
24Z020, 24Z023	318.3 ± 3.0	133.5 ± 3.0	129.0 ± 3.0
24Z021, 24Z022, 24Z024, 24Z025		172.9 ± 3.0	
24Z026, 24Z029	503.8 ± 3.0	133.5 ± 3.0	
24Z027, 24Z028, 24Z030, 24Z050		172.9 ± 3.0	

Technical Specifications

LubePro Vertical Oil Pump		
	US	Metric
Maximum fluid working pressure	3500 psi	24 MPa, 241 bar
Fluid	Minimum 40cSt	
Pressure ratio	28:1	
Pump output	0.56 cu. inch/stroke	
Reservoir capacity	0.6 L (30 cu ni.) or 2 L (120 cu. in.)	
Maximum air inlet pressure	125 psi	0.86 MPa, 8.62 bar
Minimum air inlet pressure	15 psi	0.10 MPa, 1.03 bar
Air inlet size	1/4 in. NPT(F)	
Fluid outlet size	1/4 in. NPT(F)	
Filling	Top cover with strainer	
Wetted Parts	Pump: zinc plated steel, casting aluminum ZL101, magnet, plastic POM Reservoir: polycarbonate Seals: Buna-N (nitrile), PTFE, PEEK	
Approximate weight	10.58 lbs	4.8 kg
Operating temperature	14°F to 149°F	-10°C to 65°C
Low Level		
Maximum switching current	0.5 Amps	
Voltage	12-240 DC/AC	
IP ratings	IP65 when plugged and screwed down	
Cable diameter	0.315 to 0.394 inches	8 to 10 mm
Wire size	20 to 16 AWG	0.5 to 1.5 mm ²


Input Air Pressure (psi)	15	20	30	40	80	120	160
Output Fluid Pressure (psi)	300	500	780	1040	2321	3656	4803

**Vertical Oil Pump Pressure Curve
Tested with ISO 46 Hyd Oil**



ti00802a

California Proposition 65

 **WARNING:** This product can expose you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65warnings.ca.gov.

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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.

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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.

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Original instructions. This manual contains English. MM 3A4033

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