

# 28:1 Lube Pro™ Vertical Oil Pump

3A4033E  
EN

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

Not approved for use in European explosive atmosphere locations.

## Models:

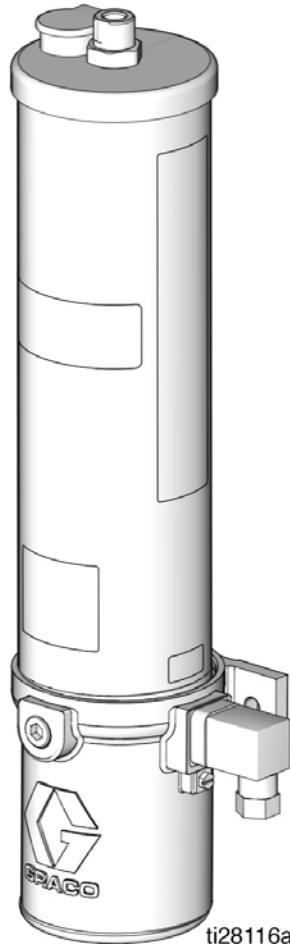
See page 2 for model information, including maximum working pressure and approvals.

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



## Important Safety Instructions

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



# 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.

 <b>WARNING</b>	
    	<p><b>SKIN INJECTION HAZARD</b></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. <b>Get immediate surgical treatment.</b></p> <ul style="list-style-type: none"> <li>• Do not point dispensing device at anyone or at any part of the body.</li> <li>• Do not put your hand over the fluid outlet.</li> <li>• Do not stop or deflect leaks with your hand, body, glove, or rag.</li> <li>• Follow the <b>Pressure Relief Procedure</b> when you stop dispensing and before cleaning, checking, or servicing equipment.</li> <li>• Tighten all fluid connections before operating the equipment.</li> <li>• Check hoses and couplings daily. Replace worn or damaged parts immediately.</li> </ul>
	<p><b>PRESSURIZED EQUIPMENT HAZARD</b></p> <p>Over-pressurization can result in equipment rupture and serious injury.</p> <ul style="list-style-type: none"> <li>• Do not exceed the maximum air input pressure.</li> <li>• Fill slowly to avoid over pressurizing reservoir.</li> <li>• Use tubing, hoses and other components with pressure ratings equal to or higher than the pump rating.</li> </ul>
 	<p><b>ELECTRIC SHOCK HAZARD</b></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"> <li>• Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment.</li> <li>• Connect only to grounded power source.</li> <li>• All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.</li> </ul>

 <b>WARNING</b>	
	<b>PLASTIC PARTS CLEANING SOLVENT HAZARD</b> <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"> <li>• Use only compatible water-based solvents to clean plastic structural or pressure-containing parts.</li> <li>• See <b>Technical Data</b> in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's Safety Data Sheets (SDSs) and recommendations.</li> </ul>
 	<b>ELECTRIC SHOCK HAZARD</b> <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"> <li>• Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment.</li> <li>• Connect only to grounded power source.</li> <li>• All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.</li> </ul>
 	<b>EQUIPMENT MISUSE HAZARD</b> <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>• 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.</li> <li>• Turn off all equipment and follow the <b>Pressure Relief Procedure</b> 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. Alterations or modifications may void agency approvals and create safety hazards.</li> <li>• Make sure all equipment is rated and approved for the environment in which you are using it.</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>TOXIC FLUID OR FUMES HAZARD</b> <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 SDSs 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> </ul>
 	<b>MOVING PARTS HAZARD</b> <p>Moving parts can pinch, cut 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> and disconnect all power sources.</li> </ul>



# WARNING



## PERSONAL PROTECTIVE EQUIPMENT

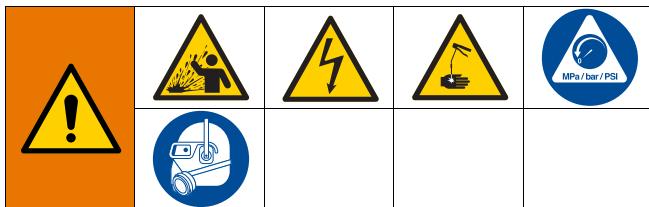
Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:

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

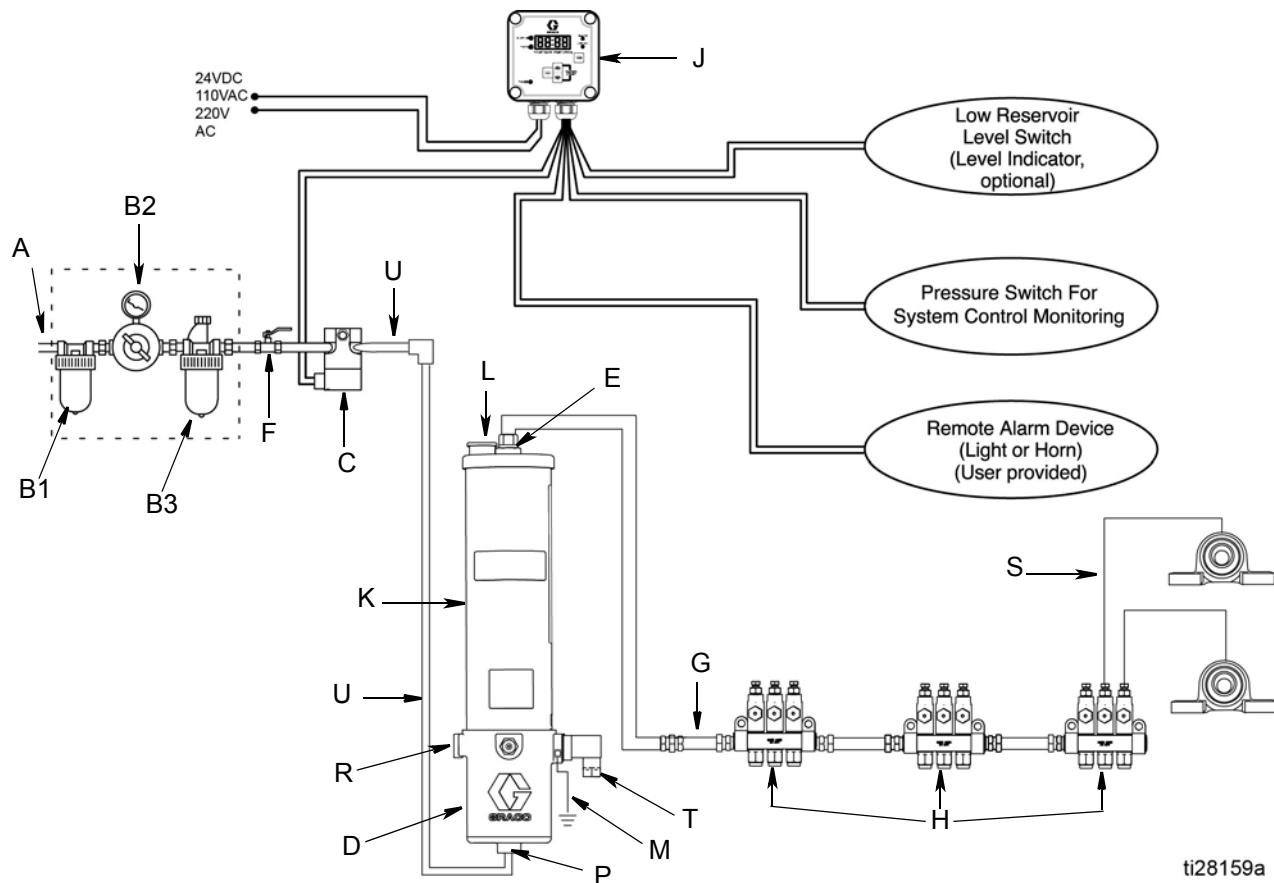
## CALIFORNIA PROPOSITION 65

This product contains a chemical known to the State of California to cause cancer, birth defects or other reproductive harm. Wash hands after handling.

# Installation



## Typical Installation



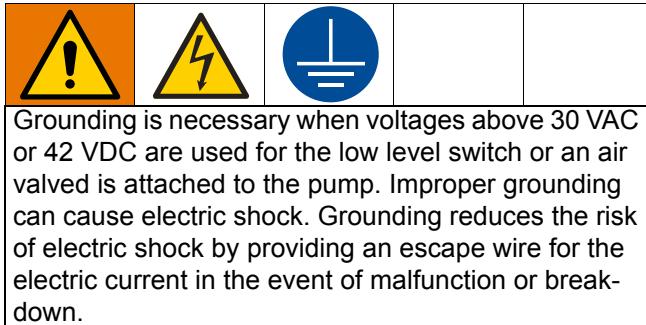
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**FIG. 1: Typical Installation**

**Key:**

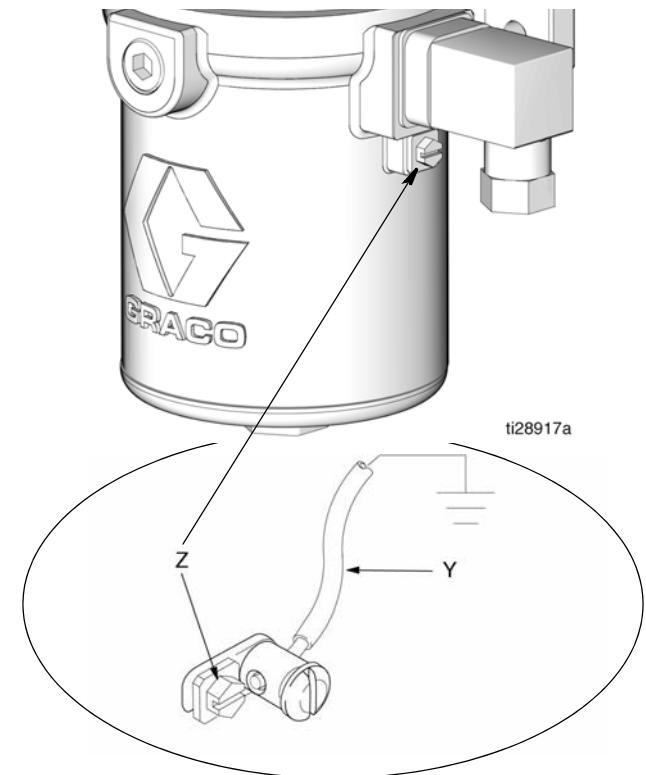
A	Main Air Supply Line	H	Injector
B	Filter/Regulator/Lubricator Assembly	J	Lubricator controller
B1	Air Filter	K	Pump reservoir
B2	Air Regulator	L	Pump reservoir fill cover
B3	Air Lubricator	M	Ground
C	Air solenoid valve (3-way)	P	Pump air inlet - forward stroke
D	Pump module	R	Air outlet
E	Pump outlet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

## Grounding



### 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.



## Mounting



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 Data, page 31 for pump weight information and the Dimensions and Mounting layout, page 30.

## Low Level Models Only

### DIN Connector

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

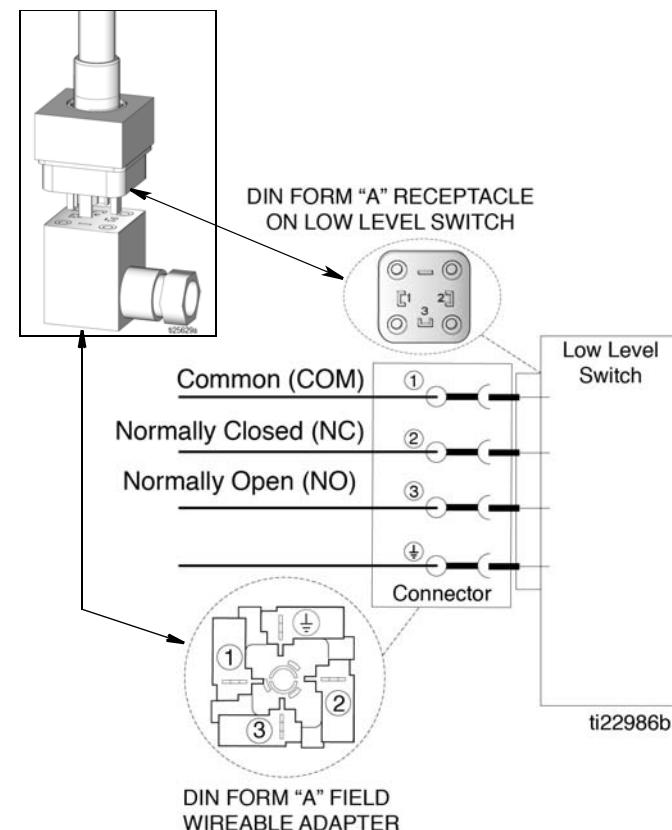


FIG. 2

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.



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

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

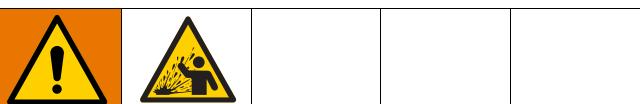
**Air line filter (B1):** removes harmful dirt and moisture from compressed air supply.

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

### NOTICE

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.

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.



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.

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 - PSI or Table 2: Lubricant Output - MPa (bar), provided on page 14.

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 the Typical Installation, 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 the Typical Installation, page 6.

## Fill Reservoir

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

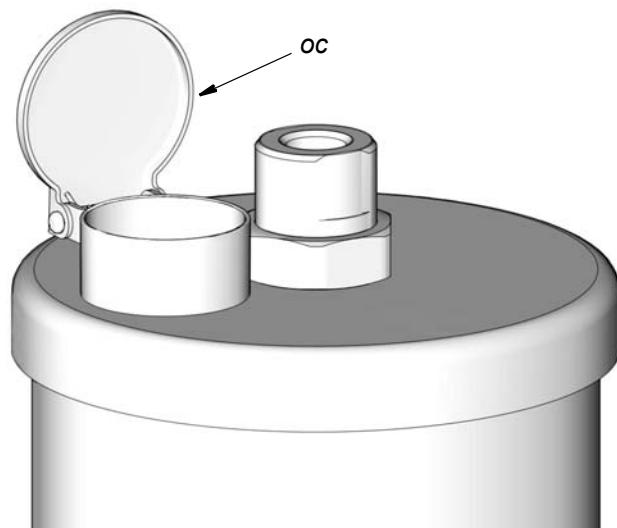


FIG. 4

- Slowly add oil (ol) until reservoir is filled to capacity (FIG. 5). Take care to not fill reservoir too quickly and overflow the reservoir capacity.

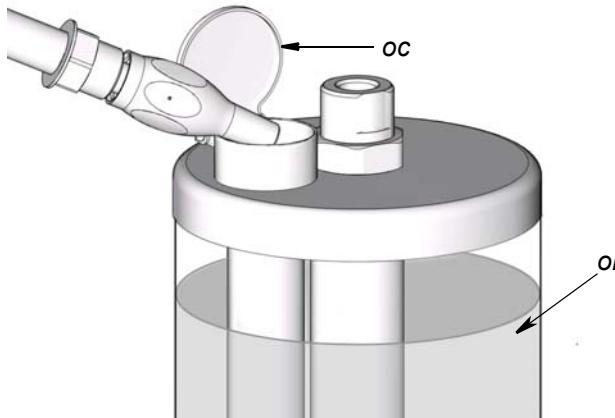


FIG. 5

- Close oil fill cover (oc) to prevent contamination and spillage (FIG. 5).

## Priming

### 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 instructions, page 8).

Run the pump until oil (ol), free of air, comes out of the pump outlet (E). See Operation, page 12.

- It may take up to 20 the pump strokes to expel the air from the pump and deliver a continuous flow of oil. This will depend on 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.

## Supply Lines

- Prime the pump until oil (ol) comes out of the pump outlet (E). Connect the supply line (G) to the pump outlet (E).
- 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.
- Open the master air valve from the compressor.
- 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 14.

## Feeder Lines (S)

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

## Injectors

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

## 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, 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. 6).

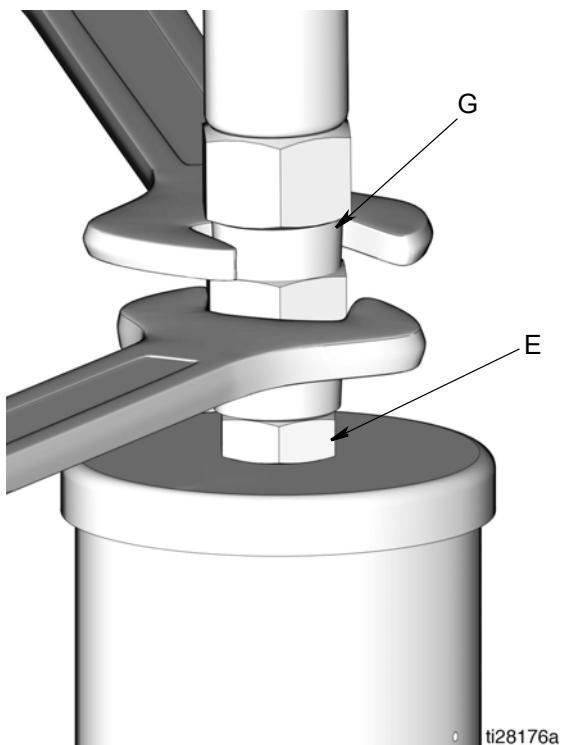


FIG. 6

## Air Lock Procedure



*The reference letters used in the following instructions, refer to the Typical Installation FIG. 1 on page 6.*

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 there is an air lock:

1. Refill the reservoir to the full level (page 8).
2. Relieve pressure. See **Pressure Relief Procedure**, page 10.
3. Disconnect the lubricant supply line (G) from the pump outlet (E) (FIG. 7).

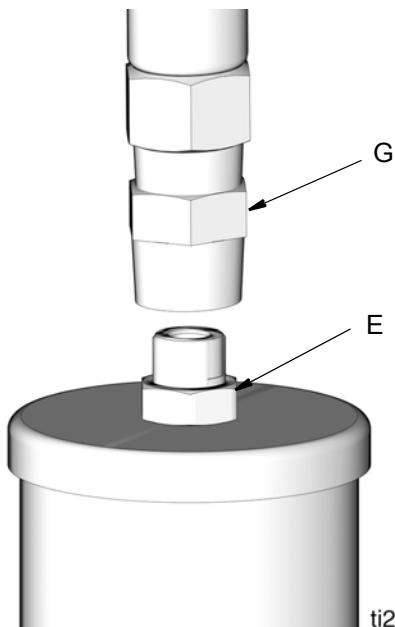


FIG. 7

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. 7).

- It may take up to 20 the pump strokes to expel the air from the pump and deliver a continuous flow of oil. This will depend on 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.

6. Connect the pump outlet (E) to the lubrication line (G) (FIG. 8).

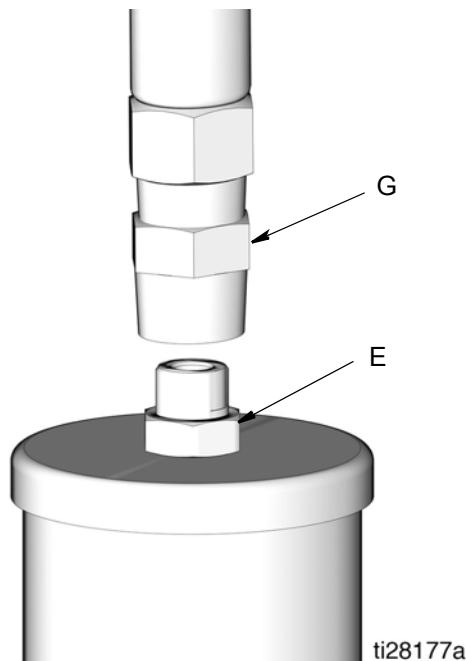


FIG. 8

# Operation

## Pump

### Start Up



1. Verify reservoir is filled with lubricant and system has been Primed (see Prime System, 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 (llf) sits in the high, raised position as shown in FIG. 9.

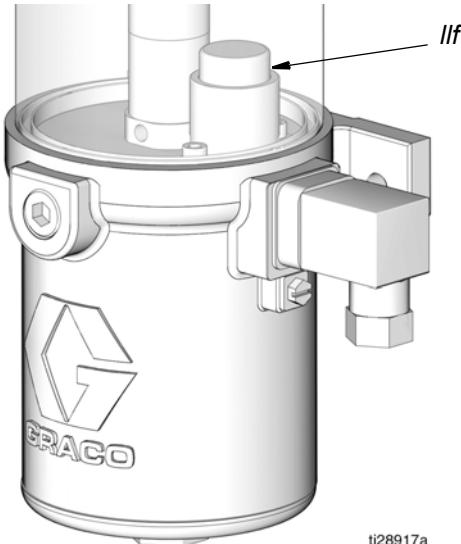


FIG. 9: Low level float in raised position

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

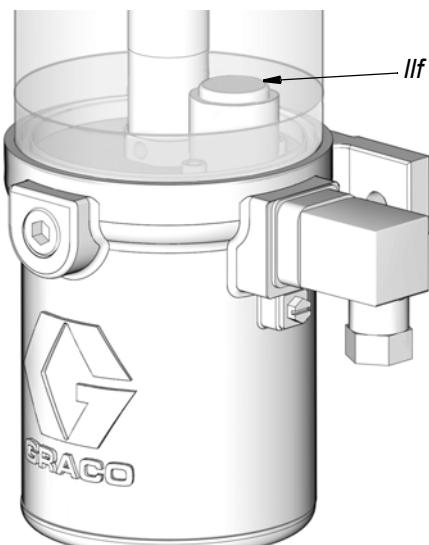


FIG. 10: Low level float in fully traveled down position

## Shut Down



To shut down the system:

- a. Close the bleed-type master air valve (F, page 6).
- b. Turn off electrical supply to the lubrication controller (J, page 6).

## 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							

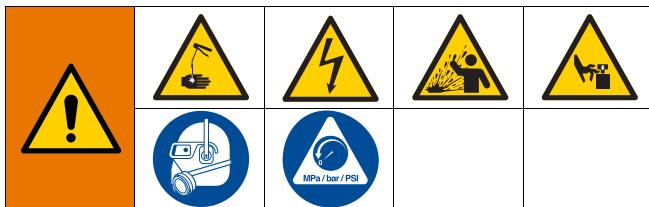
1. Total Injector Volume to Dispense and Charge
  - a. Add together the total number of injectors in the system.
  - b. From Table 1 or Table 2 above, find your Injector Type in the first column and the related Injector Volume to Charge in the third column. Multiply this value by the total number of injectors determined in Step a (above).
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.
  - a. 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.

# Troubleshooting



Problem	Cause	Solution
The pump is not operating. No lubricant flow.	No air	<ol style="list-style-type: none"> <li>1. Adjust air pressure/supply.</li> <li>2. Open bleed-type master air valve (F) (page 6).</li> </ol>
	No lubricant in reservoir	Fill the reservoir.
	Losing prime	<ol style="list-style-type: none"> <li>1. Remove trapped air (see Air Lock, page 10).</li> <li>2. Prime the pump (Priming, page 9).</li> </ol>
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"> <li>1. Check piping for leaks. If a leak is detected, repair or replace piping.</li> <li>2. Check injectors for leaks. If a leak is detected, repair or replace injector.</li> <li>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 14.</li> </ol>
	Pump seals are bad	Replace seals (17K553). See Parts, page 29.

# Repair



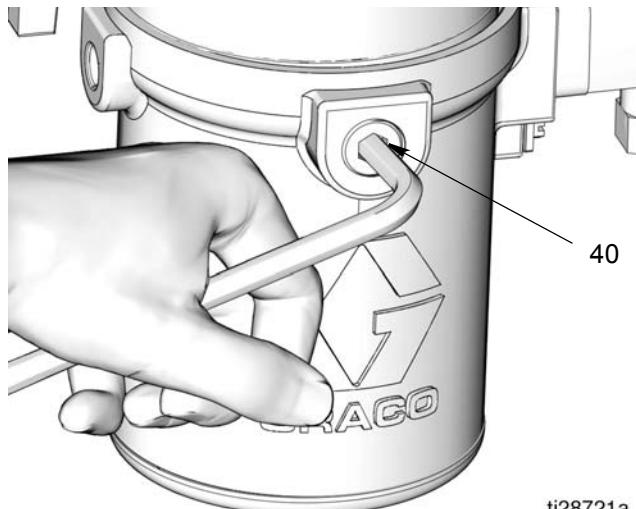
## Seal Replacement

**NOTE:** For most seal replacement procedures, the pump should be completely removed from service and clamped in a vise. If you are only replacing the reservoir and/or reservoir seals, you do not have to remove the pump from its service location. The following instructions cover the complete disassembly of the pump. Your pump repair may not require total pump disassembly.

### Disassembly

1. Turn off air supply and disconnect air lines to the pump.
2. Disconnect electrical connections to lubrication controller.
3. Relieve pressure (page 10).
4. Disconnect supply line (G, page 6) from the pump outlet (E, page 6).
5. Use a hex wrench to slowly loosen and remove drain plug (40) from the pump base and drain oil from the pump (FIG. 11).

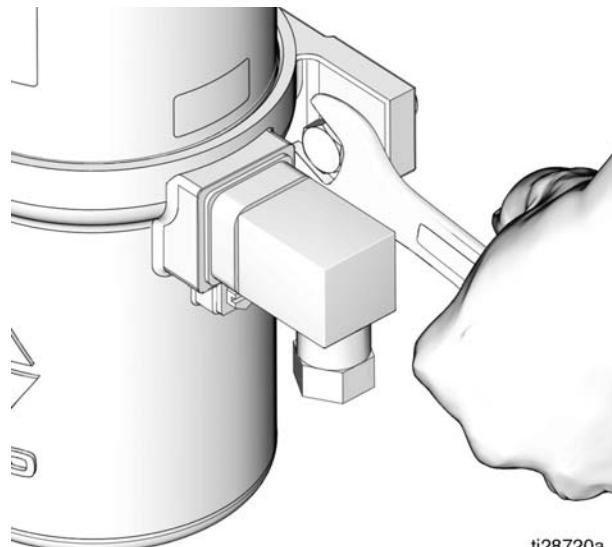
**NOTE:** Removing the plug slowly will help prevent splashing while the oil drains from the reservoir.



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FIG. 11

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



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FIG. 12

8. 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.

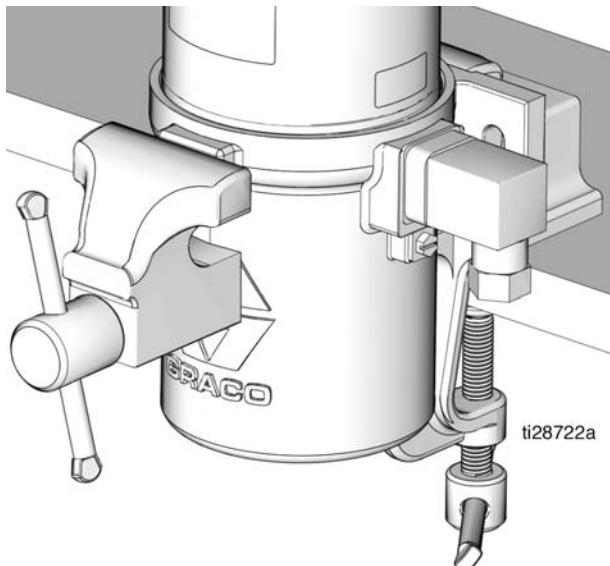


FIG. 13

**9. Reservoir Gaskets (10)**

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

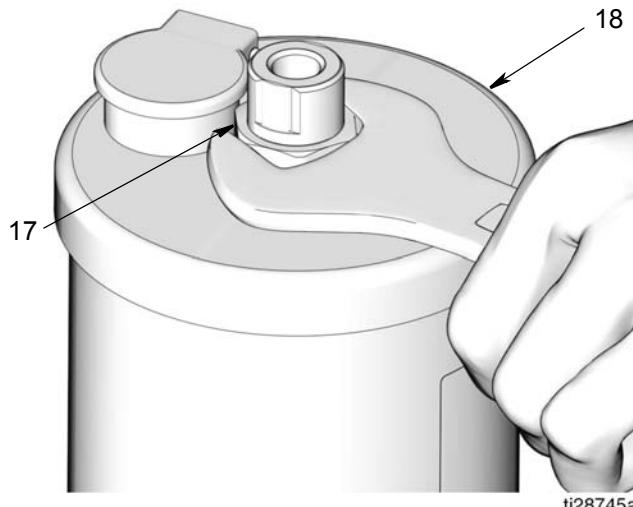


FIG. 14

10. Remove cover (18) from reservoir (11).

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

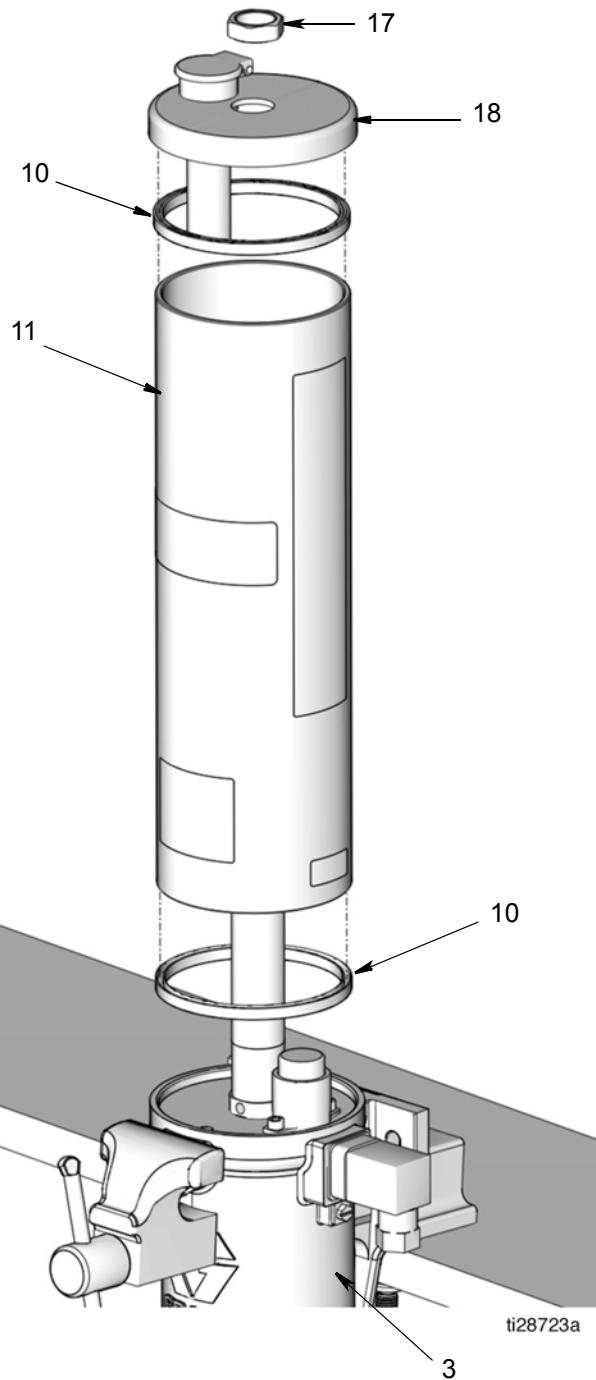
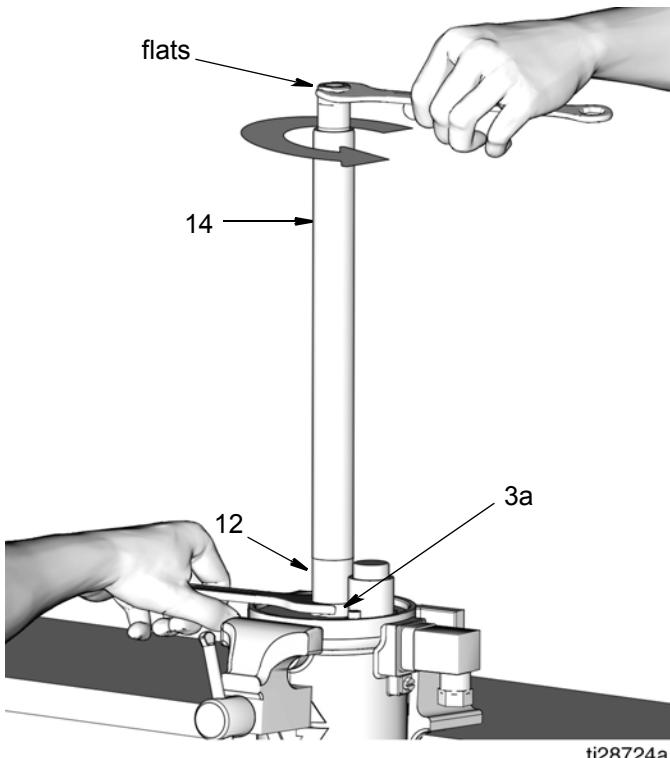


FIG. 15

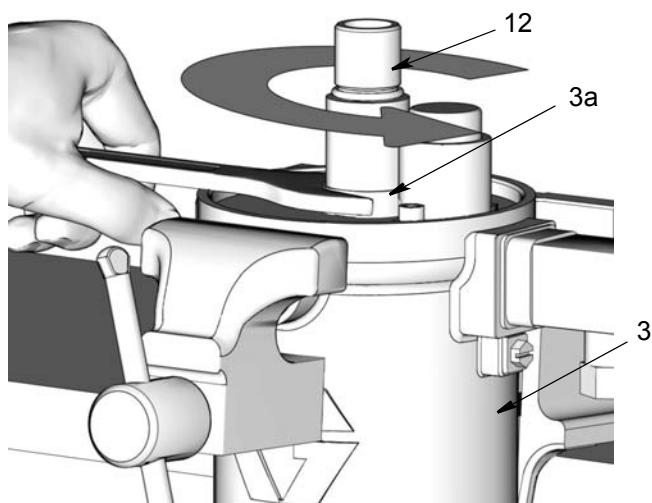
## 12. Outlet Tube O-Ring (13) and Pump Cylinder O-Ring (9)

Securely hold 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 outlet tube counter-clockwise to loosen and remove it from the pump cylinder (12) (FIG. 16).



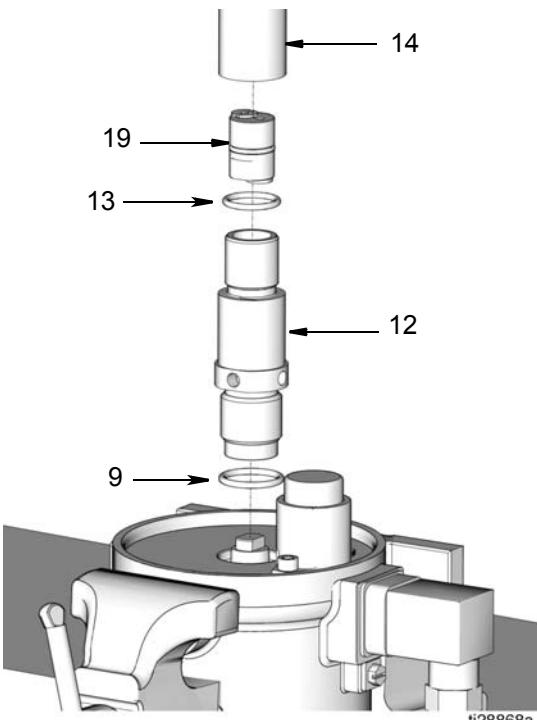
**FIG. 16**

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



**FIG. 17**

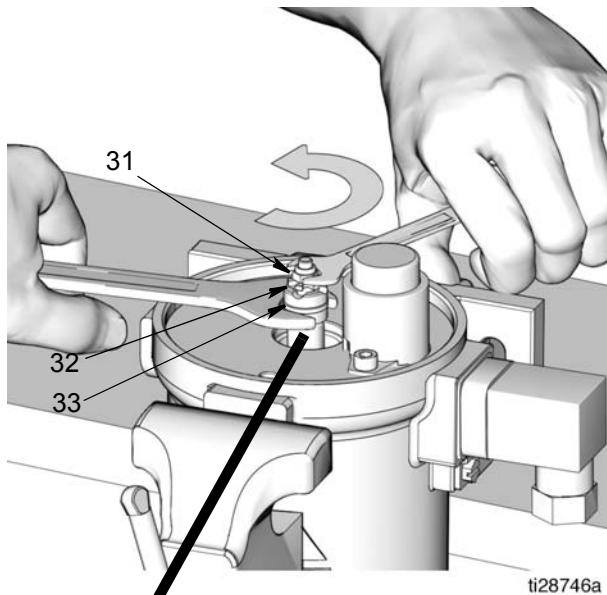
14. Remove o-ring (13) from outlet tube (14). Remove o-ring (9) from pump cylinder (12). Dispose of o-rings according to all regulations for proper disposal (FIG. 18).



**FIG. 18**

### 15. Pump Piston Subassembly (33)

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



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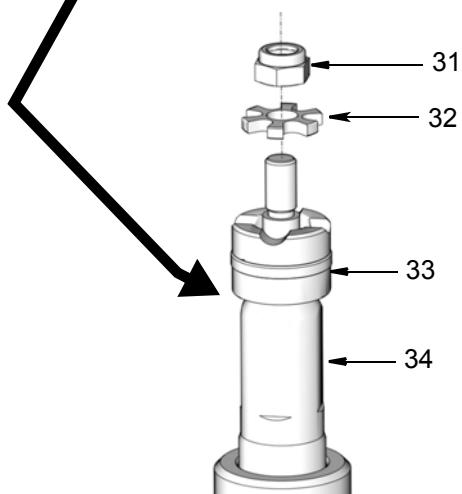
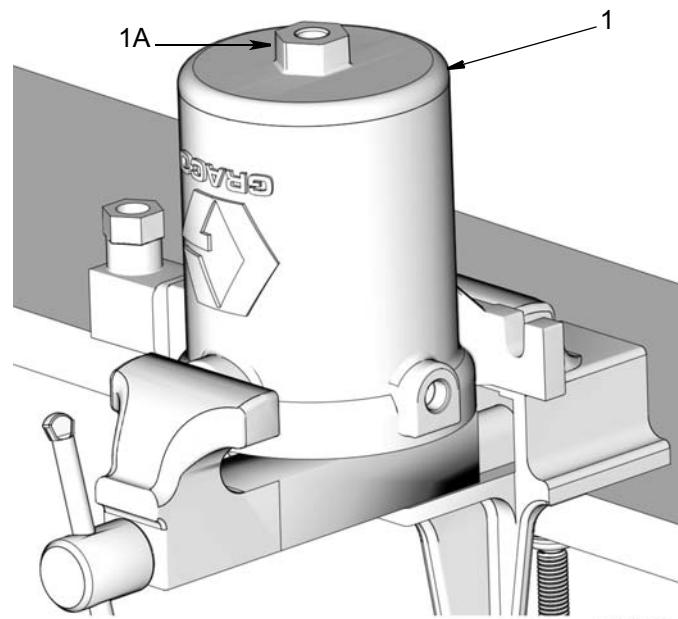


FIG. 19

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

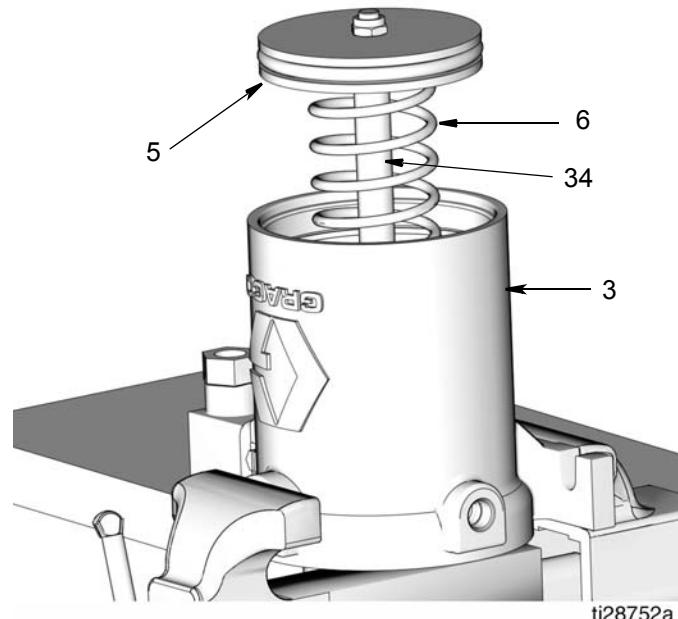


ti28747a

FIG. 20

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

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



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FIG. 21

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

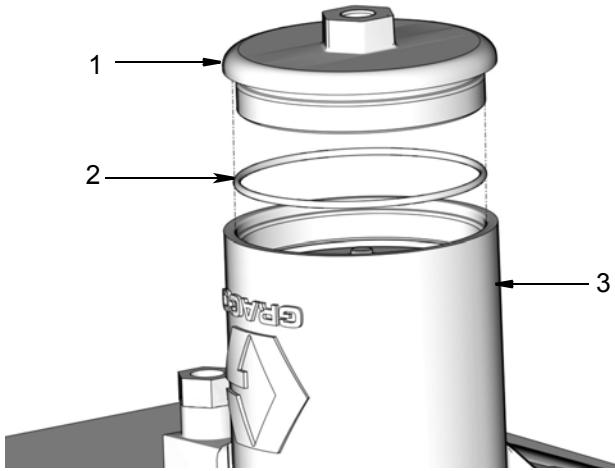


FIG. 22

**20. Piston Rod O-Ring (36) and Piston Seal (4)**

- Remove piston rod (34) and piston (5) and spring (6) from air motor cylinder (3) (FIG. 21).
- Separate piston rod (34) and 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).

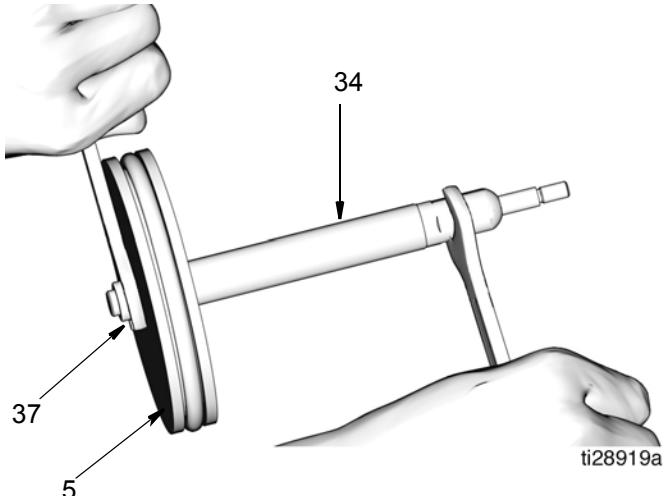


FIG. 23

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

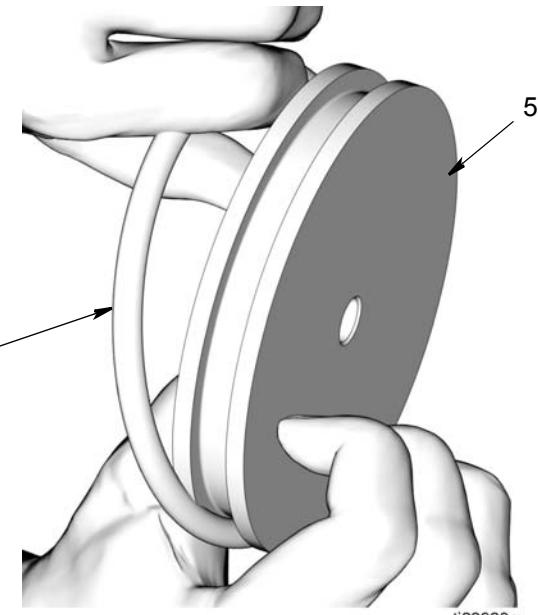


FIG. 24

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

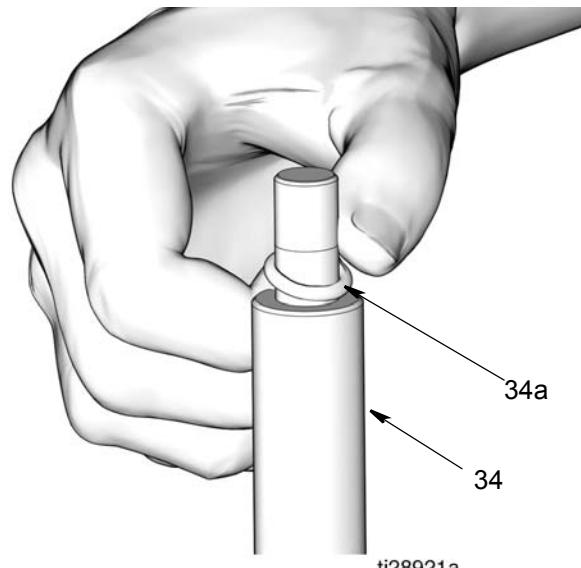
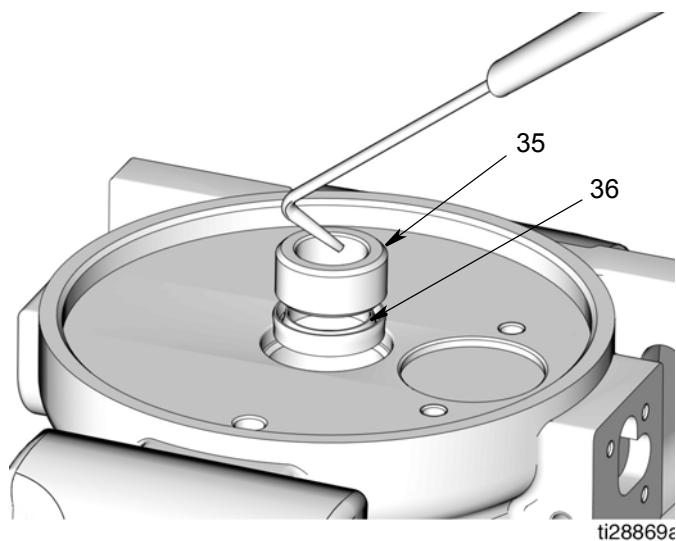


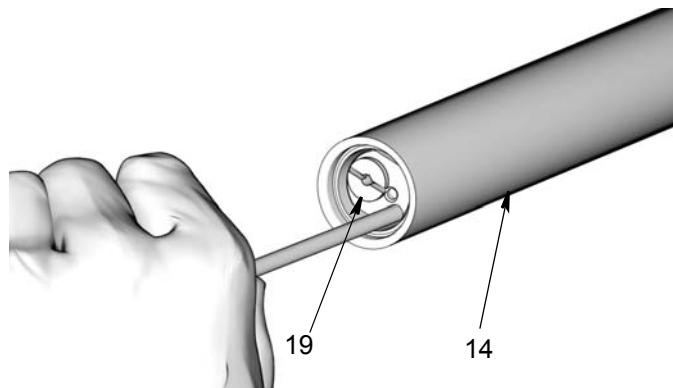
FIG. 25

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



**FIG. 26**

23. 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**

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

## Reassembly

Use all new part included in the repair / service kit even if the old parts do not appear to be worn or damaged and dispose of 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).

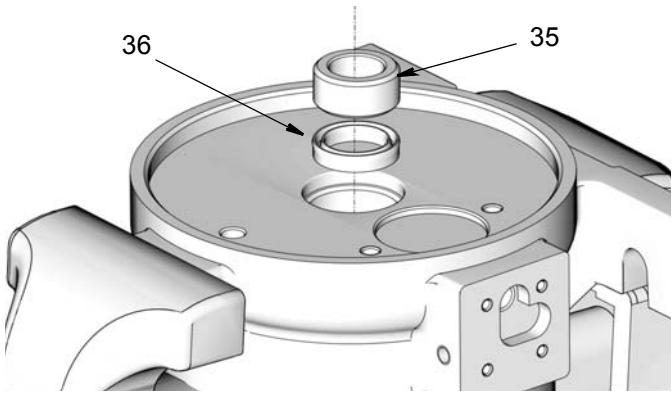


FIG. 28

2. Check Valve Assembly (19)

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).

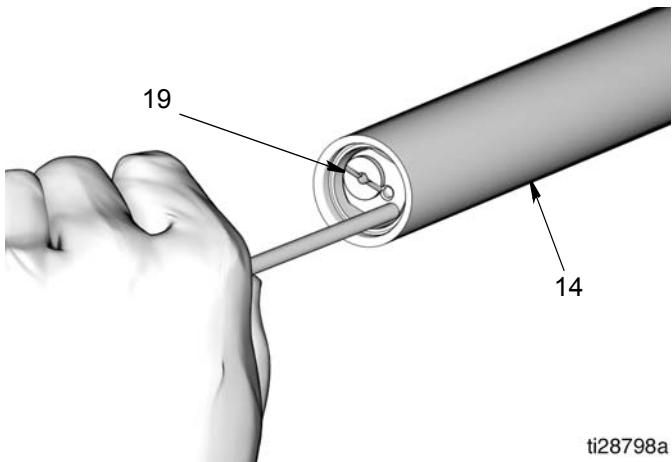


FIG. 29

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

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

Use a clean cloth to wipe down the piston rod (34) and piston (5) and remove any dirt or contaminants. Inspect surfaces for any scratches or damage. Replace damaged parts.

5. Apply a thin layer of grease to o-ring (34a). Install o-ring over the grooves of piston rod (34) (FIG. 30).

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

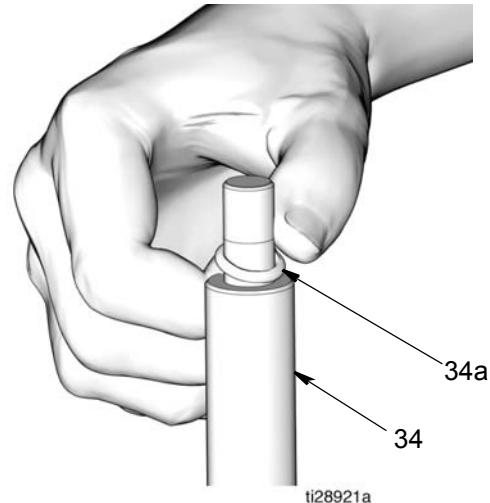


FIG. 30

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

**NOTE:** You should hear a pop sound when it is in place correctly.

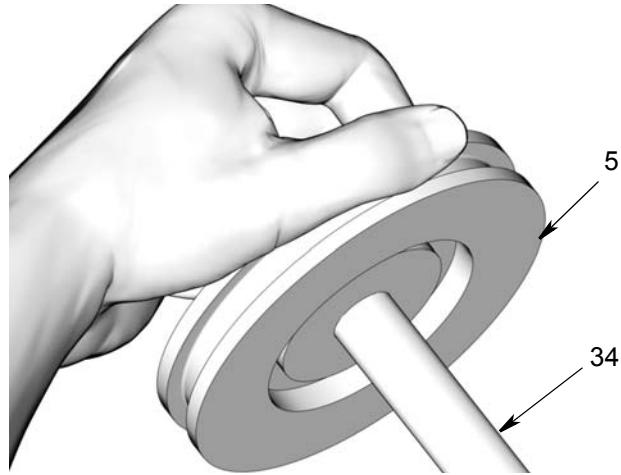


FIG. 31

7. Install 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 as shown in FIG. 31. Torque nut to 13 to 15 ft. lbs (17.6 to 20.3 N.m).

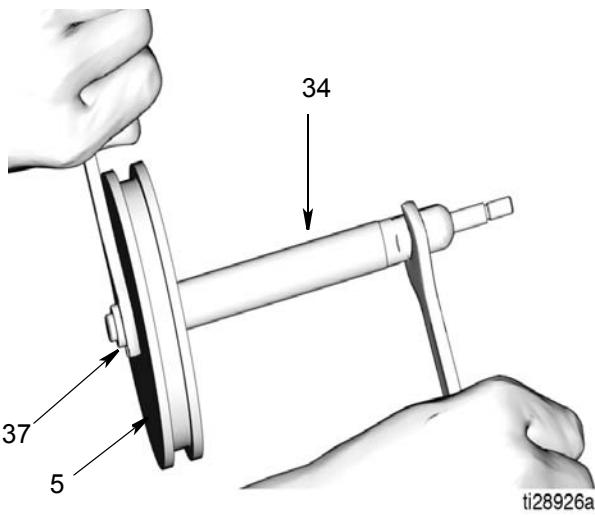


FIG. 32

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

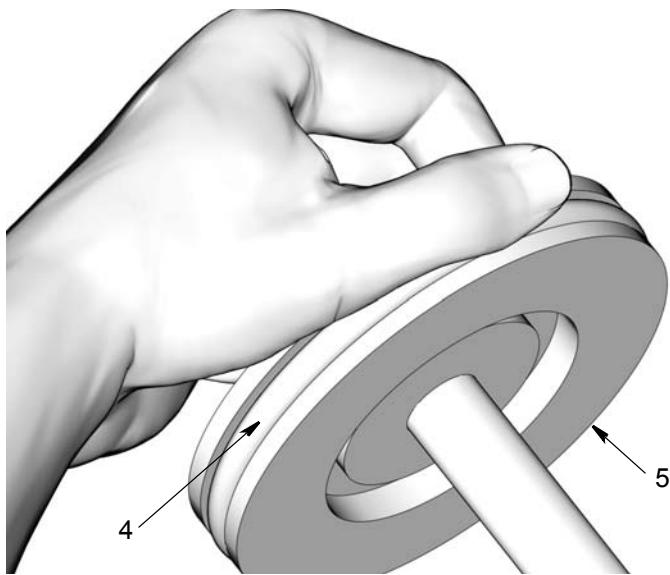


FIG. 33

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

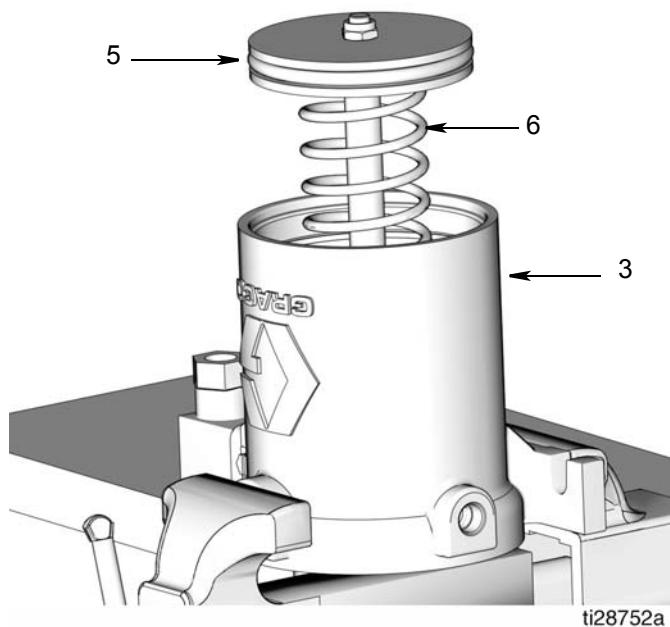


FIG. 34

10. Apply a thin layer of grease to the cover o-ring (2). Install o-ring to cover (1) (FIG. 35).

11. Install cover in bottom of air motor cylinder (3). Apply pressure with your hand to help seat the cover and compress the spring. Use a wrench on 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.

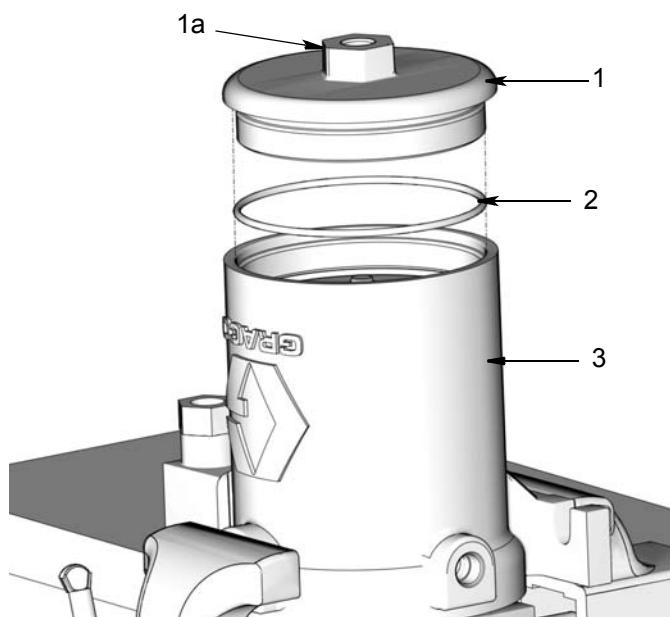


FIG. 35

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

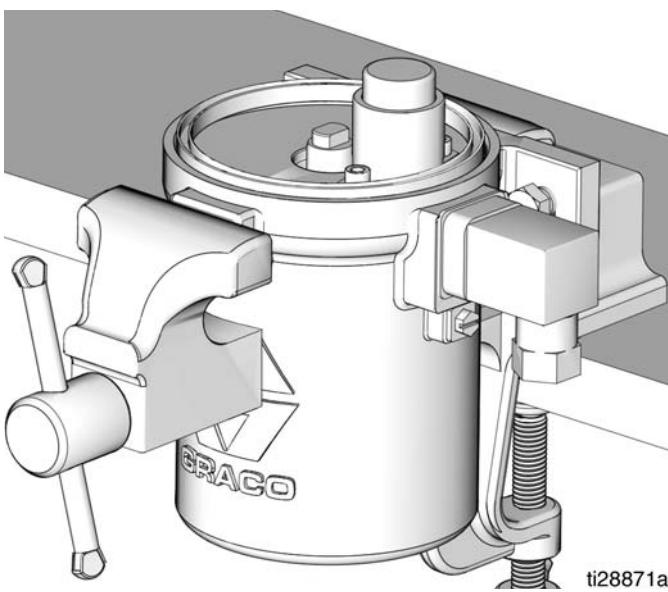


FIG. 36

**13. Pump Piston Subassembly (33).**

Apply a thin layer of grease to piston seal (33).  
Install piston seal over piston rod (34).

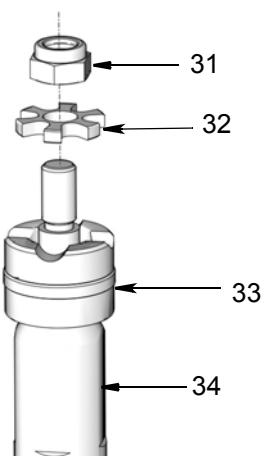


FIG. 37

14. Install star washer (32) and lock nut (31) on piston rod (34) as shown in FIG. 37.

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

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

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

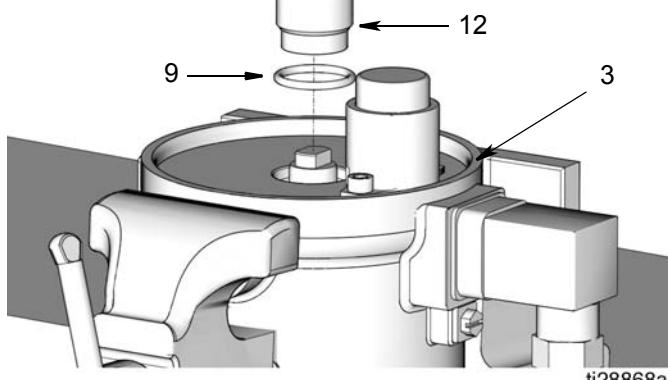
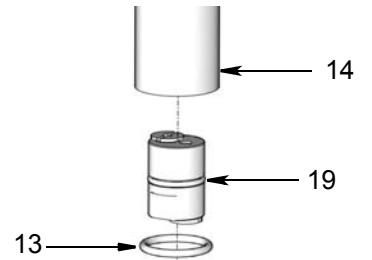
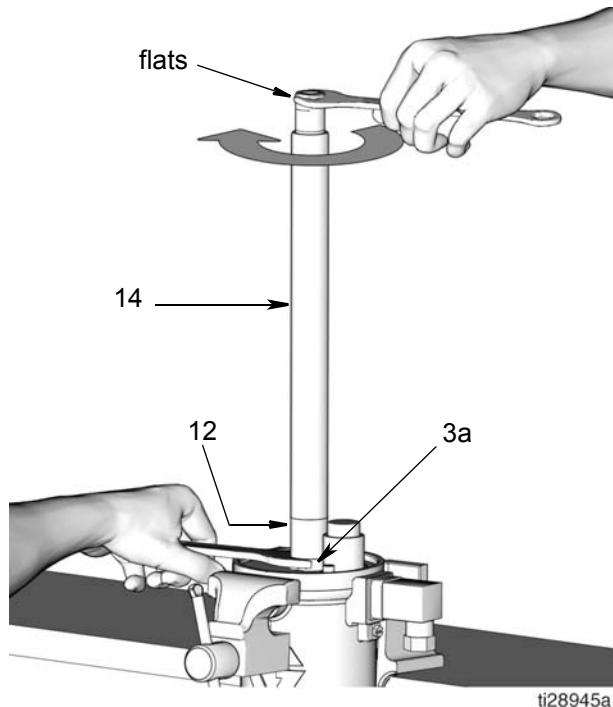


FIG. 38

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

18. Install outlet tube (14) on pump cylinder (12).

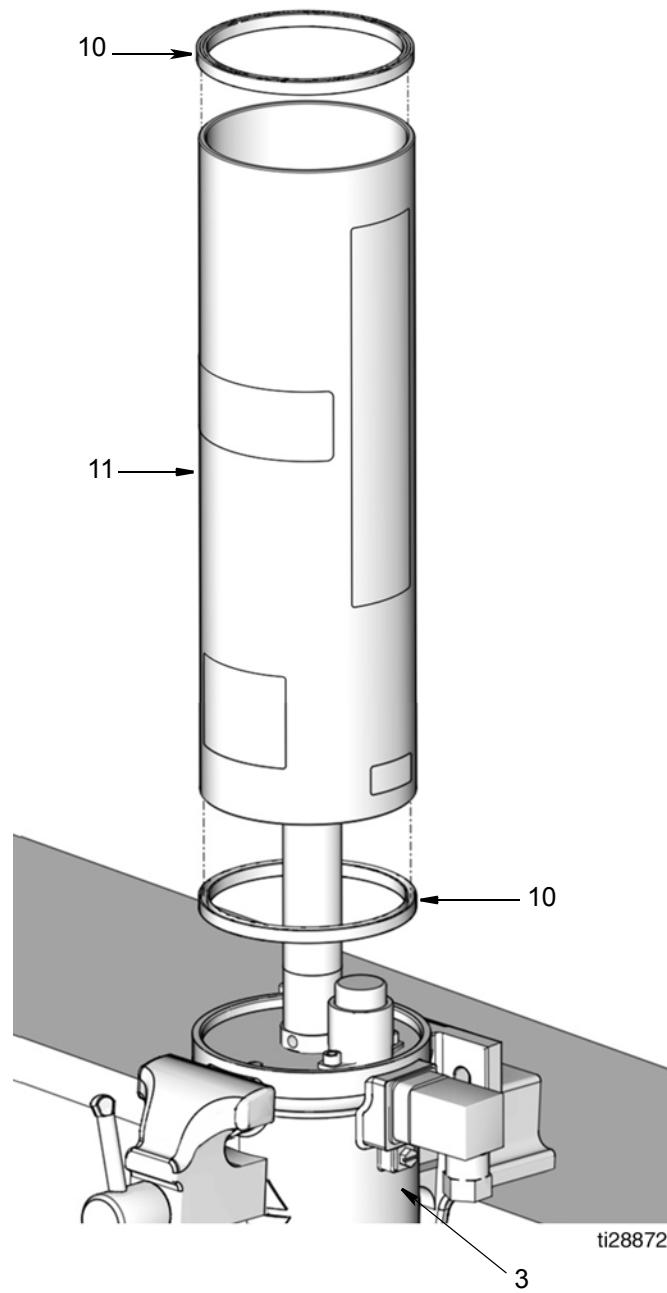
Securely hold nut (3a) [located on the bottom of the pump cylinder (12)] in place with a wrench. Secure a second wrench on the flats of the outlet tube (14). Turn outlet tube clockwise to tighten it to the pump cylinder (12) (FIG. 39). Torque to 28 to 32 ft. lbs. (37.9 to 43.4 N.m).



**FIG. 39**

19. **Reservoir Gaskets (10)**

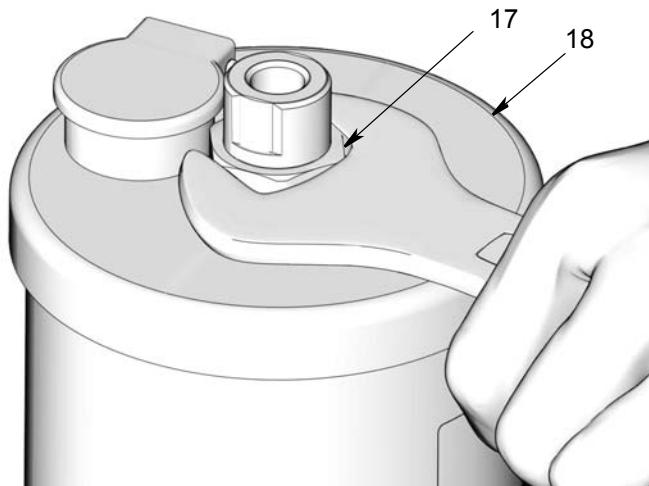
Install reservoir gaskets (10) to top and bottom of reservoir (11) as shown in FIG. 40.



**FIG. 40**

20. Install reservoir (11) in the air motor cylinder (3) (FIG. 40).

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

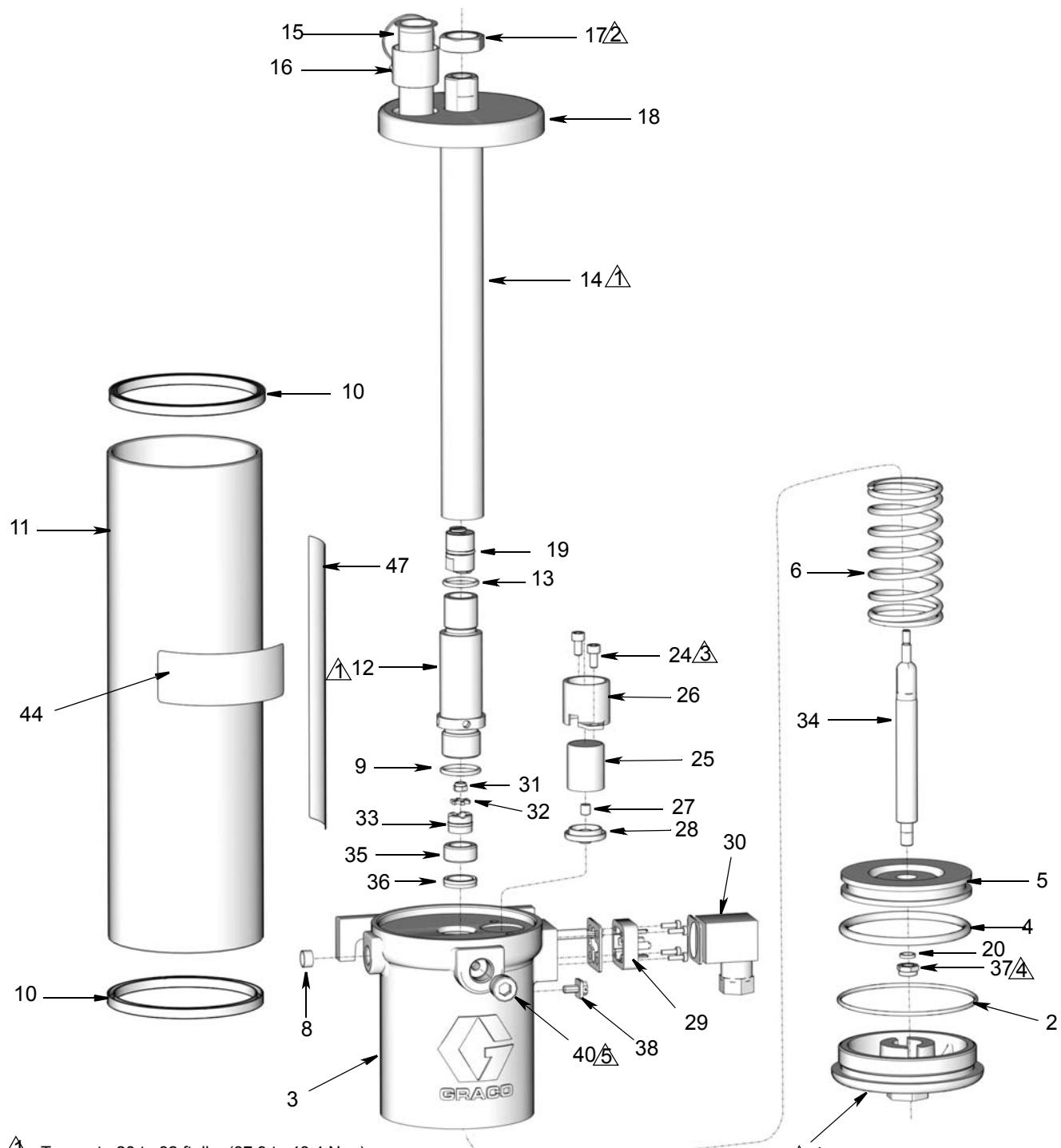


**FIG. 41**

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

## Notes

# Parts



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

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

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

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

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

# Parts

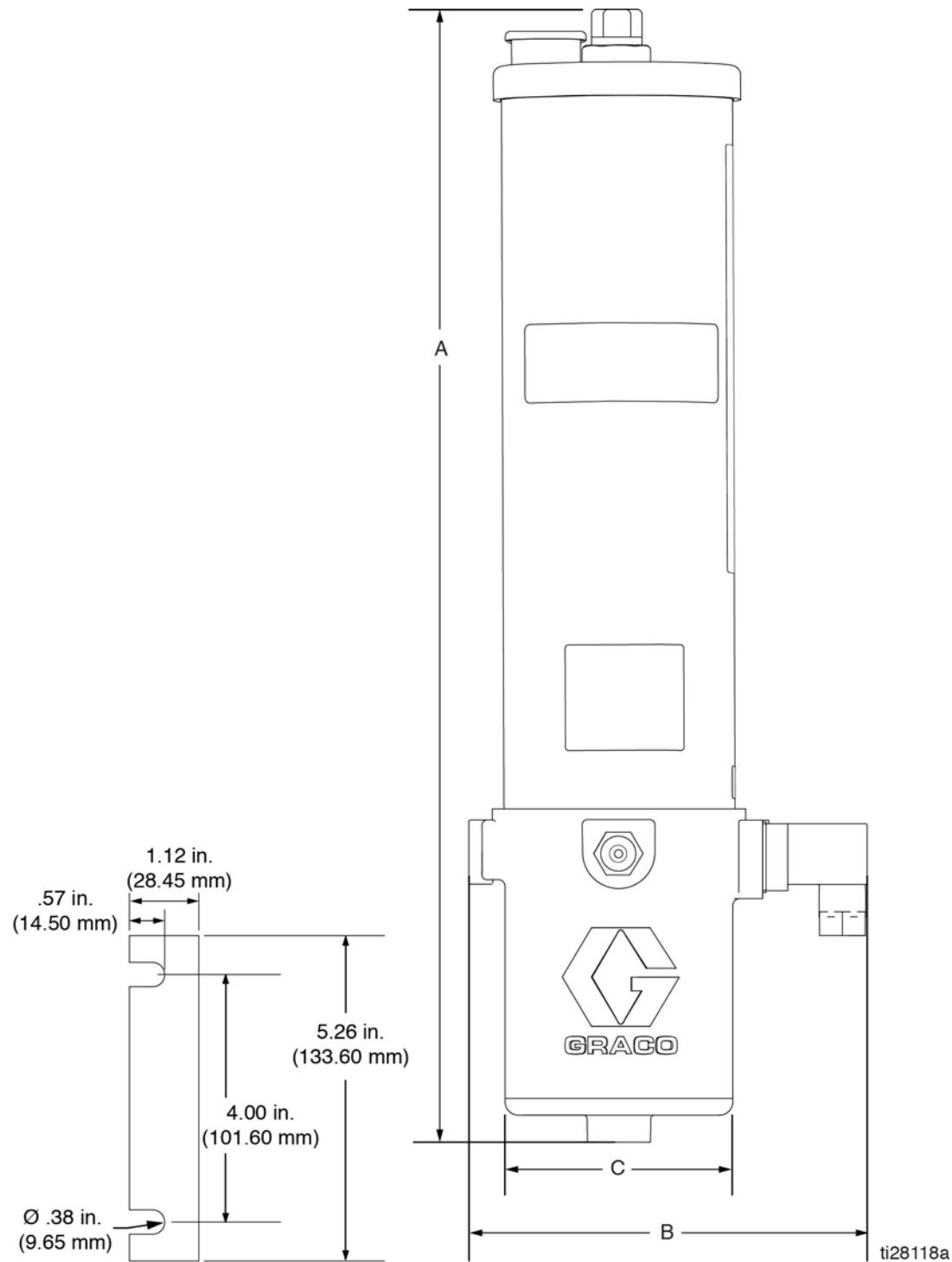
Ref	Part No	Description	Qty
1	17J825	COVER, air motor	1
2	17J826	SEAL, o-ring	1
3	17J828	CYLINDER, air motor, low level, models 24Z021, 24Z022, 24Z024, 24Z025, 24Z027, 24Z028, 24Z030, 24Z050	1
	17J829	CYLINDER, air motor, models 24Z020, 24Z023, 24Z026, 24Z029	1
4	17J830	SEAL, o-ring	1
5	17J839	PISTON, 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

Ref	Part No	Description	Qty
26	17K549	GUIDE, float, models 24Z021, 24Z022, 24Z024, 24Z025, 24Z027, 24Z028, 24Z030, 24Z050	1
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.

# Dimensions and Mounting Layout

See Dimensions Tables, page 31



# Technical Data

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	40 psi	0.28 MPa, 2.76 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 <sup>2</sup>

Dimensions: US - inches (See Dimensions and Layout drawing, page 30)

Models	A	B	C
24Z020, 24Z023	12.53 $\pm$ 0.11	5.25 $\pm$ 0.11	5.1 $\pm$ 0.11
24Z021, 24Z022, 24Z024, 24Z025		6.8 $\pm$ 0.11	
24Z026, 24Z029	19.83 $\pm$ 0.11	5.25 $\pm$ 0.11	129.0 $\pm$ 3.0
24Z027, 24Z028, 24Z030, 24Z050		6.8 $\pm$ 0.11	

Dimensions: Metric - mm (See Dimensions and Layout drawing, page 30)

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

# 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.

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Original instructions. This manual contains English. MM 3A4033

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