

Instructions



# 9:1 LubePro™ Single Stroke Oil Pump

334991C

EN

**For pumping non-corrosive and non-abrasive lubricants only. For professional use only.  
Not approved for use in explosive atmospheres or hazardous locations.**

## Model No.:

*24X717 - 9:1 Oil Pump Without Low Level*

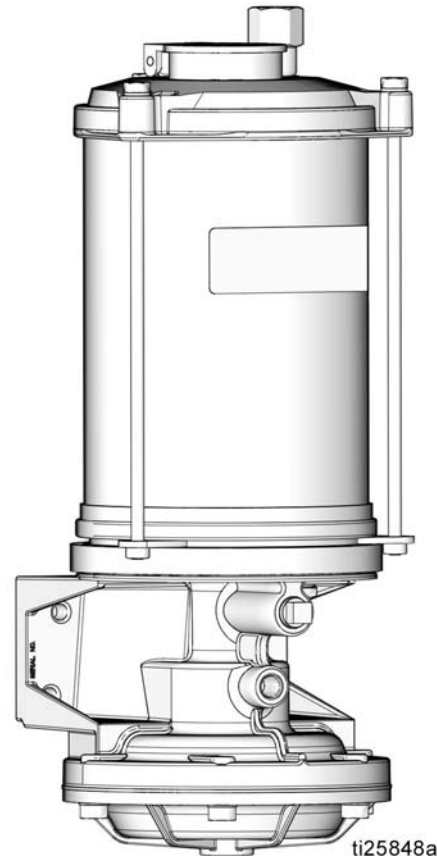
*24X694 - 9:1 Oil Pump With Low Level*

1350 psi (9.31 MPa, 93.1 bar) Maximum Working Pressure



### Important Safety Instructions










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



ti25848a







# 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.

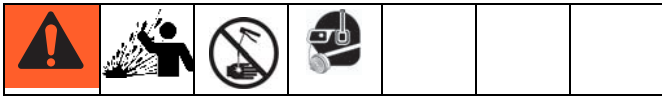
 <h2 style="margin: 0;">WARNING</h2>	
  	<p><b>SKIN INJECTION HAZARD</b></p> <p>High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. <b>Get immediate surgical treatment.</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>PLASTIC PARTS CLEANING SOLVENT HAZARD</b></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"> <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>
 	<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>



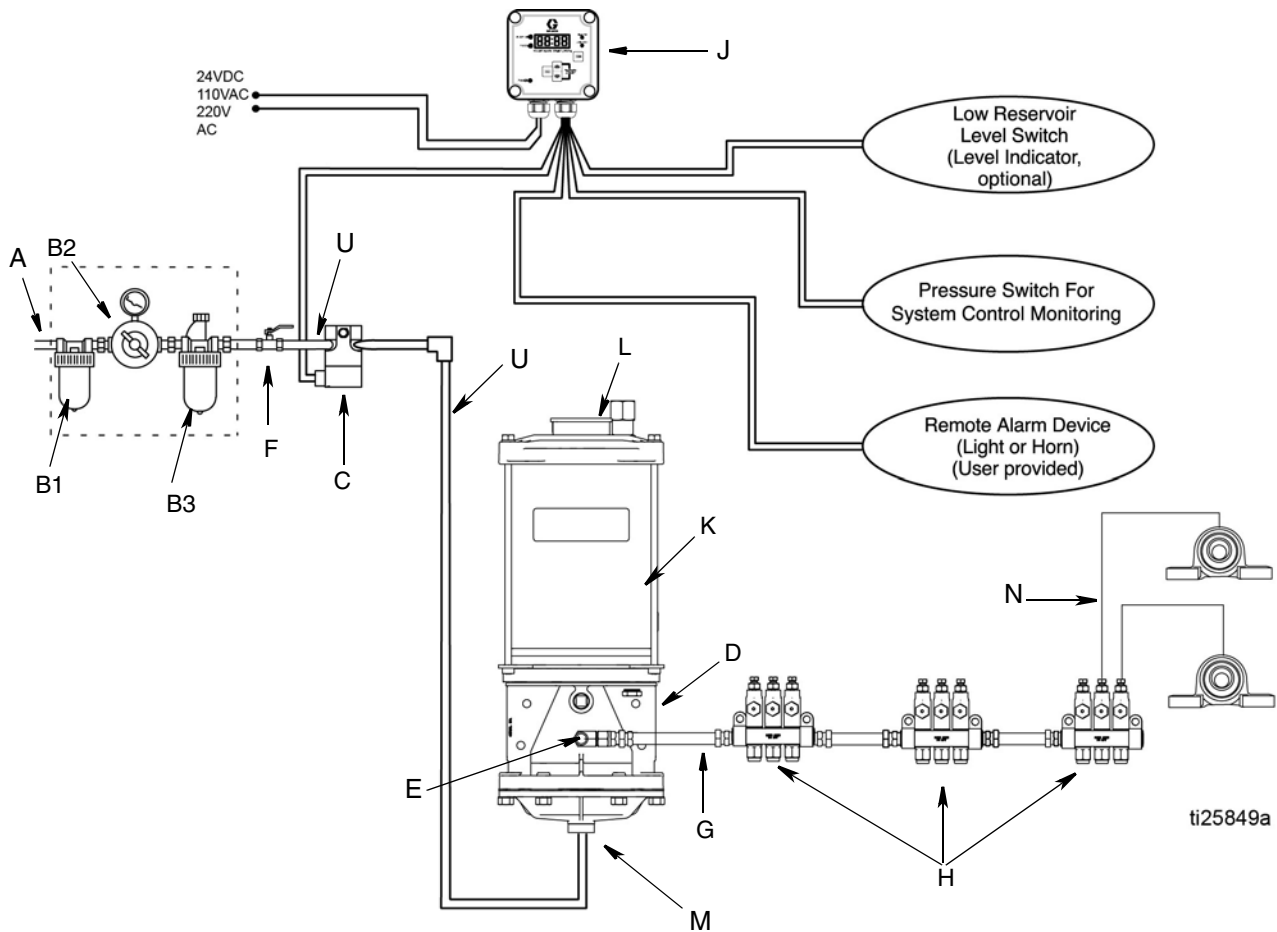
# WARNING

 	<p><b>EQUIPMENT MISUSE HAZARD</b></p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>• Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See <b>Technical Data</b> in all equipment manuals.</li> <li>• 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>
	<p><b>TOXIC FLUID OR FUMES HAZARD</b></p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> <li>• Read 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>
 	<p><b>MOVING PARTS HAZARD</b></p> <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>
	<p><b>PERSONAL PROTECTIVE EQUIPMENT</b></p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• Protective eyewear, and hearing protection.</li> <li>• Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.</li> </ul>
	<p><b>CALIFORNIA PROPOSITION 65</b></p> <p>This product contains a chemical known to the State of California to cause cancer, birth defects or other reproductive harm. Wash hands after handling.</p>

# Installation



## Typical Installation






**FIG. 1: Typical Installation**

**Key:**

- |  |                                |
|--|--------------------------------|
| A Main air supply                                      | H Injector                     |
| B Filter/Regulator/Lubricator Assembly                 | J Lubricator controller        |
| B1 - Air Filter  | K Reservoir                    |
| B2 - Air Regulator                                     | L Reservoir fill cover for oil |
| B3 - Air Lubricator                                    | M Pump air inlet               |
| C Air solenoid valve (3-way)                           | N Feeder lines                 |
| D Pump module  | U Air supply lines             |
| E Pump outlet  |                                |
| F Bleed-type master air valve (required)               |                                |
| G High pressure lubricant supply lines (user supplied) |                                |

## Mounting




						
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 pump when filled with lubricant and also provides easy operator access to the pump air controls. Pump must be mounted in a vertical position with the reservoir up. See Technical Data, page 15 for pump weight information and the Dimensions and Mounting layout, page 14.

## Air and Fluid Line Accessories

Refer to Fig. 1, page 4, for the following instructions.

**NOTE:** Install the air line accessories in the order shown in FIG. 1, page 4.

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

**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 (9:1) 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 11.

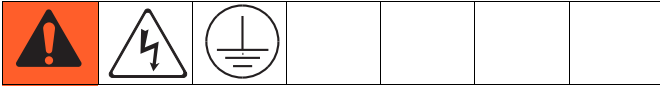
Limit the air to the pump so that no air line or fluid line component or accessory is over pressurized.

## Air Supply Lines (U)

1. Install two air supply lines (U) between the air solenoid valve outlets (C) and the pump (D) as shown in the Typical Installation, page 4.
2. Install an air supply line (U) between air solenoid valve inlet (C) and the Filter/Regulator/Lubricator Assembly (B) as shown in the Typical Installation, page 4.

## Low Level Switch

Model 24X694 only.



Low level oil pumps are equipped with a low level switch assembly (*lls*) (FIG. 2). The low level switch leads (*sl*) require connection to a control monitor or a remote alarm. The low level switch assembly must be grounded and wiring must comply with all local electrical codes and regulations.

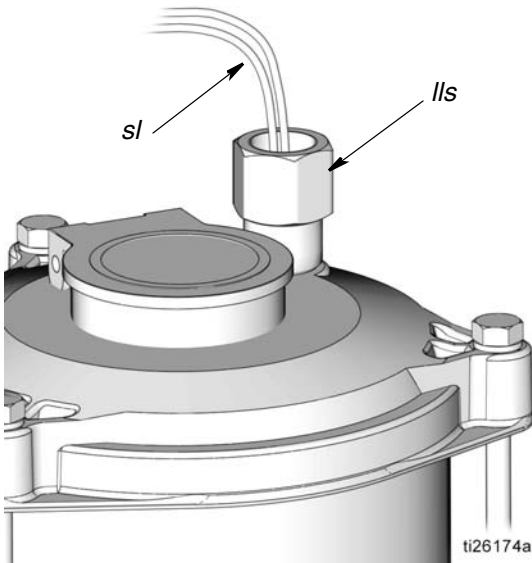


FIG. 2

### Low Level Switch Operation

A signal is sent to the system control monitor or a remote alarm device when the oil level in the reservoir is low.

When there is a sufficient level of oil (*ol*) in the reservoir the float (*fl*) will be submerged and hang freely in the oil as shown in FIG. 3.

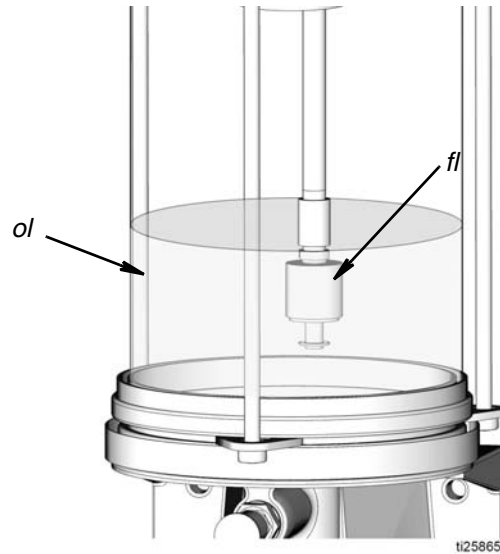


FIG. 3

When the oil (*ol*) level in the reservoir is low, the float (*fl*) will drop to the low level position as shown in FIG. 4. A signal will be sent to the system control monitor or a remote alarm device.

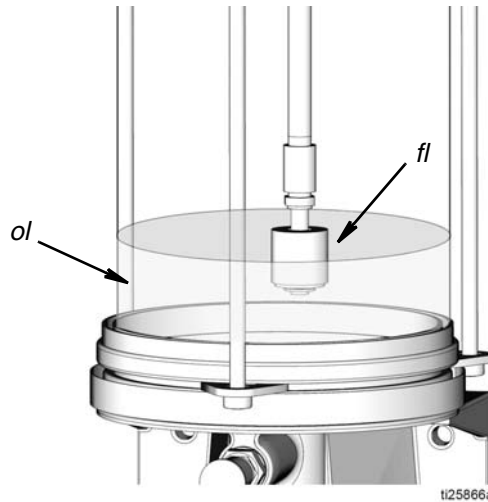


FIG. 4

## Fill Reservoir

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

**NOTE:** A strainer (*st*) is installed at the oil fill cap (*oc*) to prevent contamination of the lubricant with foreign materials (FIG. 5).

- a. Inspect strainer (*st*) before filling reservoir.
- b. When needed, remove strainer (*st*) and clean it thoroughly.
- c. Replace strainer (*st*) prior to adding lubricant.

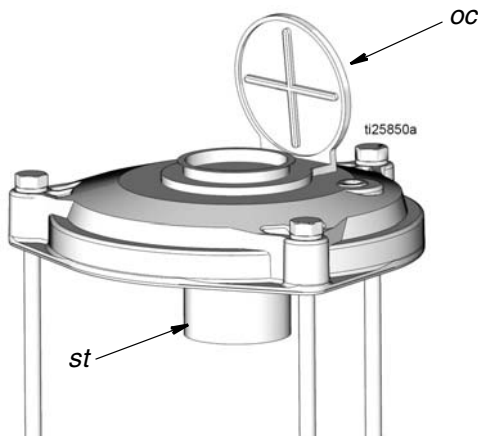


FIG. 5

2. Slowly add oil (*ol*) until reservoir is filled to capacity (FIG. 6). Take care to not fill reservoir too quickly and overflow the reservoir capacity.

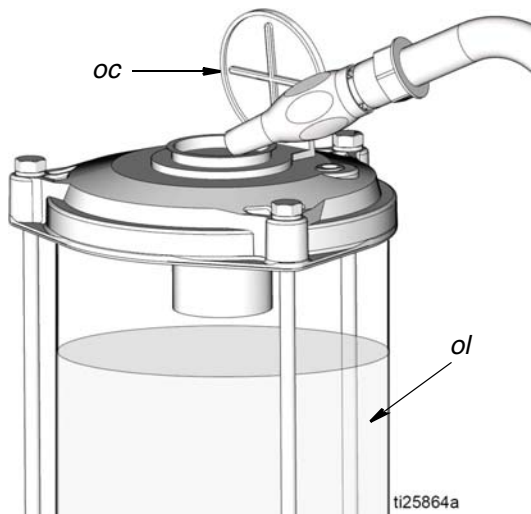


FIG. 6

3. Close oil fill cover (*oc*) to prevent contamination and spillage (FIG. 6).

## Priming

**NOTE:**

- Prime pump before connecting the outlet to supply line (G).
- Before priming the pump, the reservoir must be filled to the full level with oil (see Fill Reservoir instructions, page 6).

Run the pump until oil (*ol*), free of air, comes out of the pump outlet (E). See Operation, page 9.

## Supply Lines (G)

1. If there are multiple pumps on the air line, close the air regulators and bleed-type master air valves to all but one pump. If there is only one pump, open its air regulator and bleed-type master air valve.
2. Open the master air valve from the compressor.
3. 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 Table - PSI** or **Table 2: Lubricant Output Table - MPa (bar)** provided on page 11.

## Feeder Lines (N)

Fill each feeder line 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.

## 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 4) (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. 7).

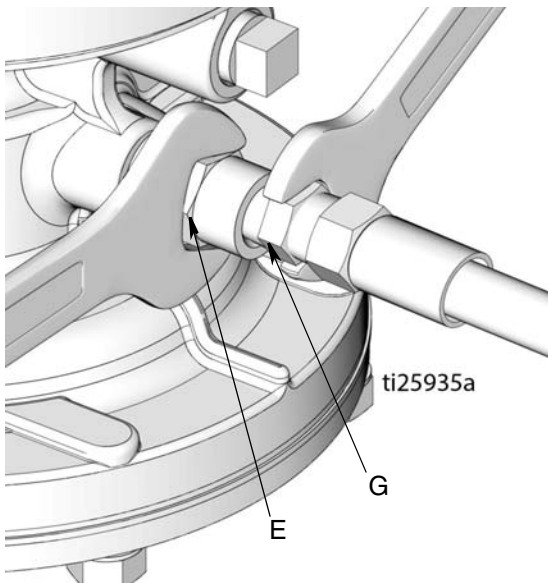


FIG. 7



# Operation

## Start Up



1. Verify reservoir is filled with lubricant and system has been Primed (see Prime System, page 7).
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.

### 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.

## Pump Operation

At the start of a pump cycle:

- a. The air solenoid (C) supplies air to the pump air inlet (M).
- b. On the pump forward stroke, lubricant is dispensed to all the injectors.
- c. The air solenoid valve (C) cuts off the air supply to the pump.
- d. The pump makes a return stroke, venting the system pressure back to the pump and resetting all the injectors.

## Shut Down



To shut down the system:

- a. Close the bleed-type master air valve (F, page 4).
- b. Turn off electrical supply to the lubrication controller (J, page 4).

# Troubleshooting



Problem	Cause	Solution
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 4).</li> </ol>
	No lubricant in reservoir	Fill the reservoir.
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 11.</li> </ol>

## 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 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	1.5	1000	111	750	83	850	94
GL-42	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 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	24.6	6.9 (68.9)	0.76 (7.60)	5.2 (51.7)	0.58 (5.8)	5.9 (58.6)	0.65 (6.5)
GL-42	0.049	0.098							

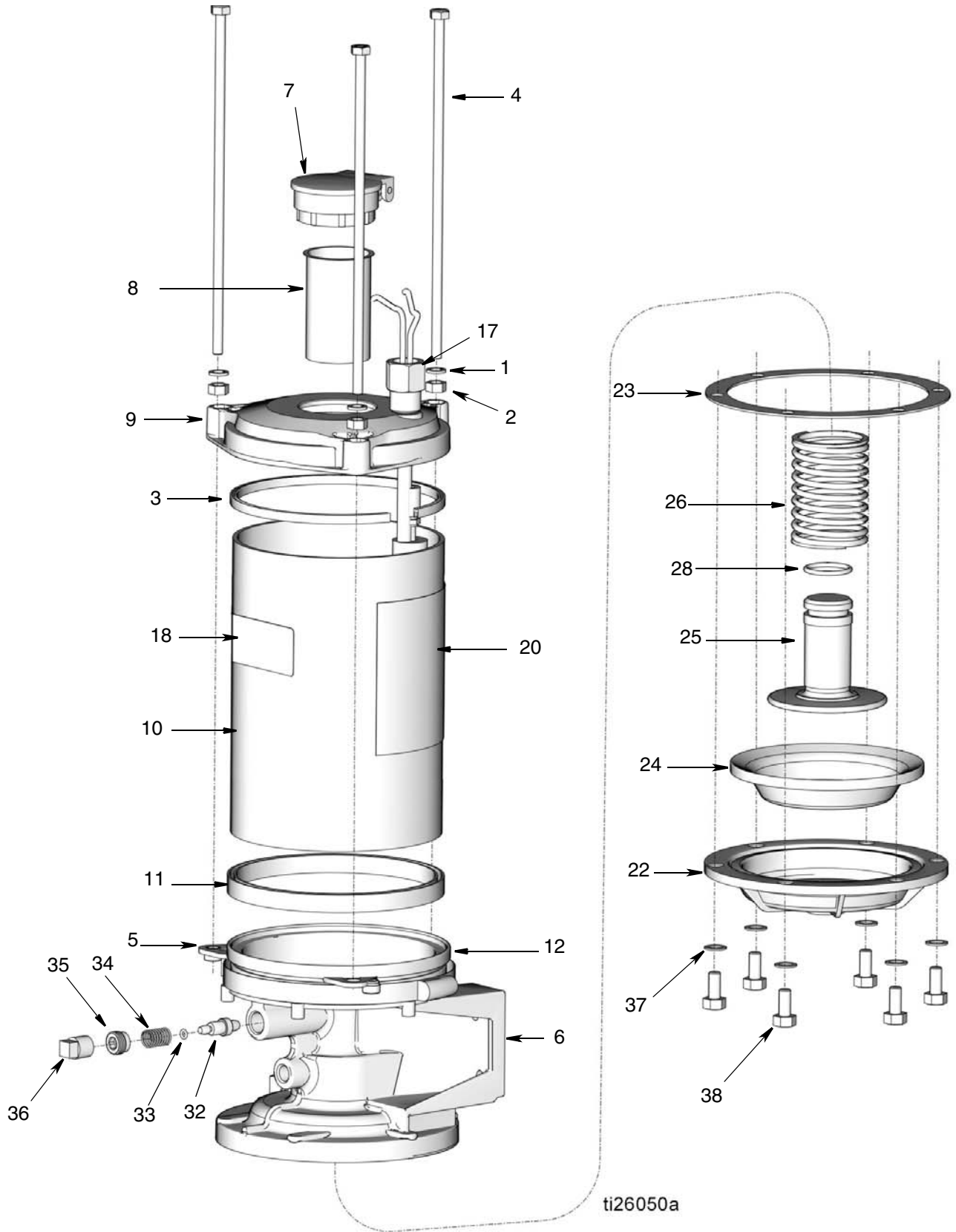
1. Total Injector Volume to Dispense and Charge
  - a. Add together the total number of injectors in the system.
  - b. From Table 1 or Table 2 above, find your Injector Type in the first column and the related Injector Volume to Charge in the third column. Multiply this value by the total number of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

# Parts

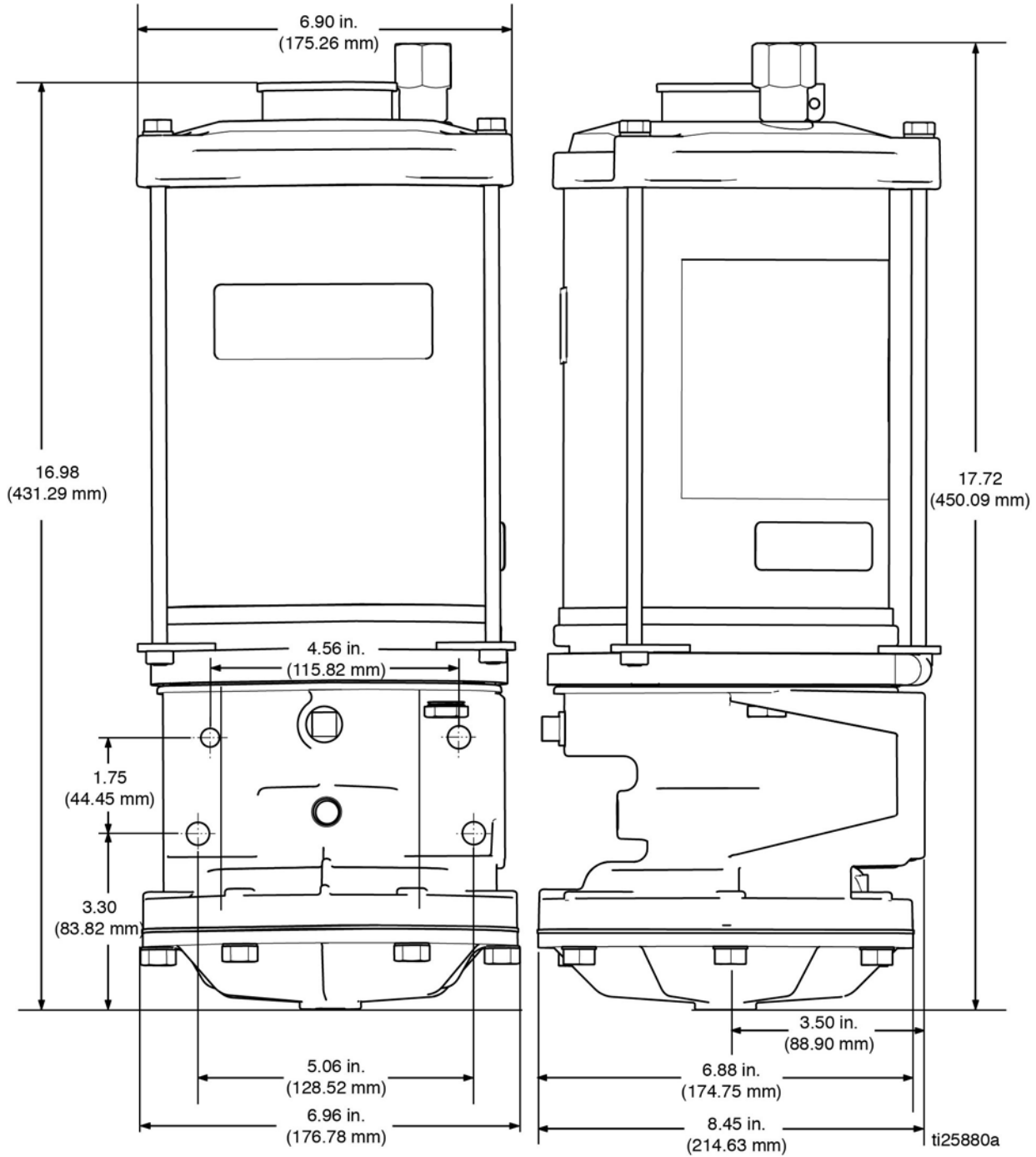
Ref	Part No.	Description	Qty
1		WASHER, lock	3
2	557965	SPACER	3
3	557333	GASKET	1
4		ROD, tie	3
5	557046	CLAMP, tie rod	3
6		PUMP, housing	1
7	557797	CAP, fill	1
8	557799	SCREEN, filter	1
9	571273	CAP	1
10		TUBE, reservoir	1
11	557334	GASKET, reservoir	1
12	557878	STRAP, reservoir	1
17	557391	PLUG, dry seal 1/4 NPTF (not shown, model 24X717 only)	1
	563014	SWITCH, low level (model 24X694)	1
18	128200	LABEL, branding	1
20▲	17C560	LABEL, safety, warning	1

Ref	Part No.	Description	Qty
22	571271	COVER	1
23		GASKET, cover	1
24		DIAPHRAGM	1
25	557881	PISTON, lube	1
26		SPRING, piston	1
28		O-RING	1
32		PISTON, check valve outlet	1
33		O-RING	1
34		SPRING, check valve	1
35		RETAINER, check valve	1
36		PLUG, 3/8 hex head	1
37		WASHER, flat sst 3/8 inch	6
38		SCREW, HEX hd cap, 3/8 inch	6

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



# Dimensions and Mounting



# Technical Data

<b>9:1 Single Stroke Oil Pump</b>		
	<b>US</b>	<b>Metric</b>
Maximum fluid working pressure	1350 psi	9.31 MPa, 93.1 bar
Pressure ratio	9:1	
Pump output	1.5 cu. inch/stroke	
Reservoir capacity	216 cu. in.; 0.93 gallon (3.54 Liters)	
Maximum air inlet pressure	150 psi	1.03 MPa, 10.3 bar
Air inlet size	1/4 in.-18 NPSF	
Fluid outlet size	1/4 in.-18 NPT	
Wetted Parts	Reservoir: polycarbonate Seals: Buna-N (nitrile)	
Approximate weight	9.17 lbs	4.17 kg
Low level switch	24-120 DC/AC; Maximum Watts: 10; Normally open, SPST	

# Graco Standard Warranty

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

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

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

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

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

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

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

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

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Original instructions. This manual contains English. MM 334991

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