

Tri-Lube[®] Heavy Duty Electric Motor Driven Grease Pump

312773A

ENG

For use in a series progressive lubrication system on construction, mining or other mobile equipment. For professional use only.

Not for use in explosive atmospheres.

Part No.: 563536

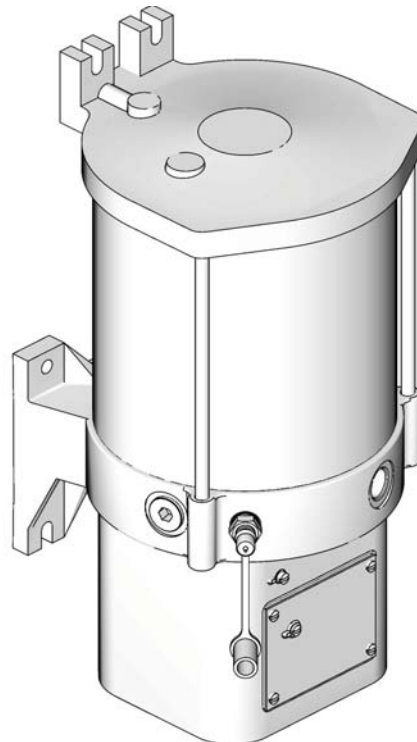
3500 psi (241 bar, 24.1 MPa) - Maximum Output Pressure

Powers from one to three fixed, displacement piston pump cartridges mounted on pump body.



Important Safety Instructions





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





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Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbol refers to procedure-specific risk. Refer back to these warnings. Additional, product-specific warnings may be found throughout the body of this manual where applicable.

 WARNING	
	<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 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>SKIN INJECTION HAZARD</p> <p>High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> • Do not point gun at anyone or at any part of the body. • Do not put your hand over the dispense outlet. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Follow Pressure Relief Procedure in this manual, when you stop dispensing and before cleaning, checking, or servicing equipment.
	<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 Data in all equipment manuals. • Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the Pressure Relief Procedure in this manual when equipment is not in use. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. • Use equipment only for its intended purpose. Call your distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.

 **WARNING**

	<p>MOVING PARTS HAZARD</p> <p>Moving parts can pinch 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 in this manual. Disconnect power or air supply.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, inhalation of toxic fumes, burns, and hearing loss. This equipment includes but is not limited to:</p> <ul style="list-style-type: none">• Protective eyewear• Clothing and respirator as recommended by the fluid and solvent manufacturer• Gloves• Hearing protection

Installation



1. Determine location to vertically mount the Tri-Lube against a bulkhead or framework supporting structure.

NOTE:

- It may be necessary to support the reservoir. Washer shims (9 and 10) are included for use on the upper two mounting bolts (FIG. 1). Make sure reservoir is not misaligned and that the tie rods are not strained.
- Do not mount the Tri-Lube in a location where it could be submerged in water.
- The Tri-Lube components are corrosion protected and gasketed where necessary and can withstand exposure to the elements and to periodic equipment wash down.

The example shown FIG. 1 is provided for reference only. Each installation is unique. It may be necessary to use additional shims or configure them in an alternate combination to provide sufficient support for the reservoir.

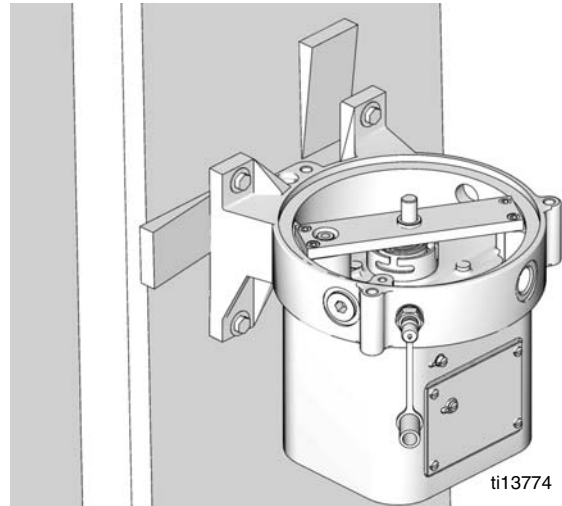


FIG. 1

2. Use 6 (six), 3/8" diameter bolts or studs and appropriate washers and nuts to mount pump. Tighten bolts securely (FIG. 2).

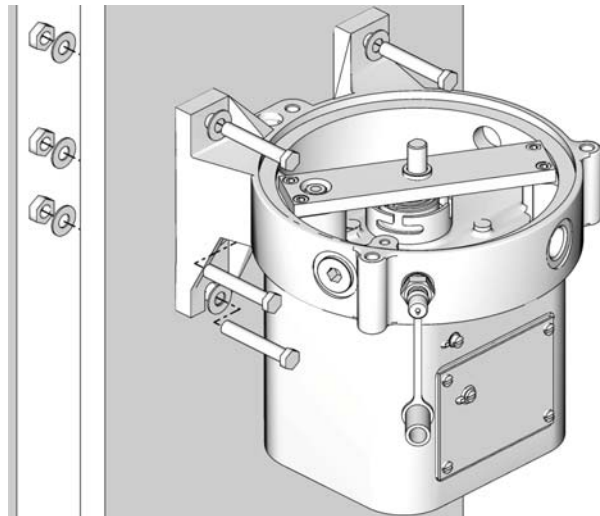


FIG. 2

Wiring

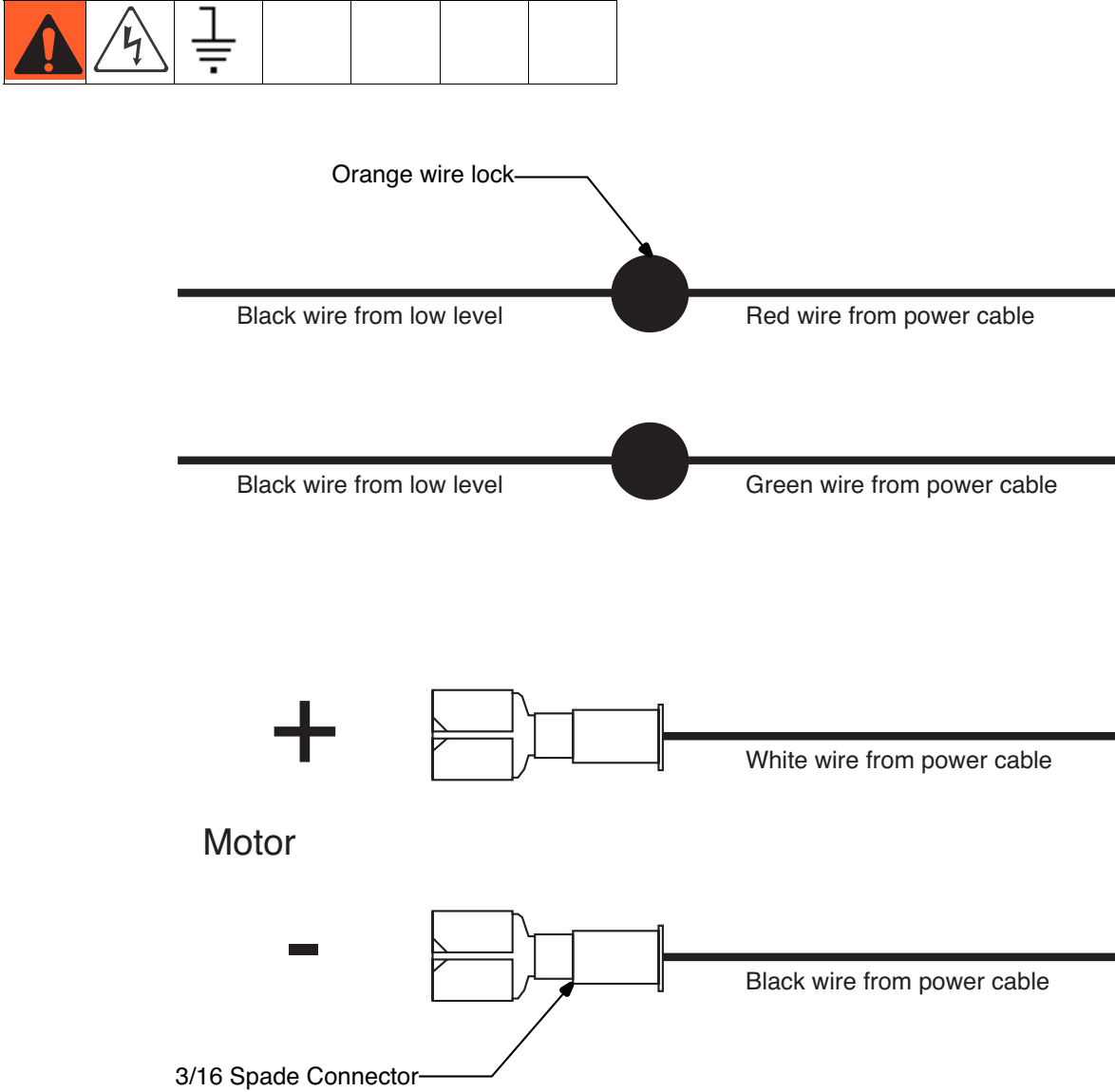


FIG. 3

Regardless of the control circuitry used, the power supplied to the Tri-Lube from the main battery supply of the machine being lubricated must come through a fused circuit.

User must supply 2 Ampere AGC style fusing hardware for 24 Volt DC applications.

- The White (+) and Black (-) wires must be connected to the main battery supply of the machine through a fused circuit.

- The Red wire supplies a signal generated by the (optional) Low Level Sensing Circuit or is not used.
- The Green wire is not used in units that contain onboard timers; on the Remote Controller version, the Green wire is connected to the ENABLE line from the controller.

Plumbing

NOTICE

Install pressure relief valves or over pressure rupture devices on each output leg to protect system circuits.

- In a series progressive lubrication system the output of each pump cartridge may be directed to the inlet port of a feeder unit or sent directly to a bearing point.
- For larger grease supply requirements, two or three pump cartridge outputs may be manifolded together and routed to the rest of the lubrication system. This will shorten pump-running time during each cycle and extend system life.
- To monitor system pressure, a pressure gauge can be added.

Low Reservoir Level Sensing (optional)

1. See Wiring information (page 5).
2. Connect Red wire to the signaling device.
3. Ground the other side of the signaling device.

NOTE: A signaling device can be an external lamp, buzzer, siren or any other eye-catching or audible alarm (supplied by the end user).

- The sensor supplies a pulsed, low level warning signal when the grease level in the reservoir tube drops below the minimum level.
- Normal pump operation continues after low level signal begins. However, if the warning is ignored for too long, the pump will eventually run out of grease entirely and begin pumping air into the system.
- The low level circuit will automatically reset when the reservoir is filled above the trip point.

Manual Run Switch (not on Remote Control Versions)

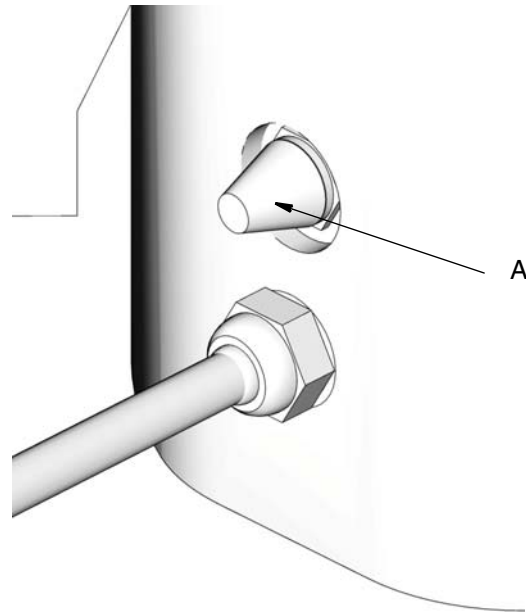







FIG. 4

- A Manual Run Switch (A) is included on units with onboard timers to assist in system testing and/or purging operations.
- The pump motor runs whenever the switch is held in either the UP or DOWN position.
- The switch has a spring return to the center OFF position.
- Switch allows jogging of the pump without removing the timer cover.

Operation

						
AUTOMATIC SYSTEM ACTIVATION HAZARD						
Unexpected activation of the system could result in serious injury, including skin injection and amputation.						
Some installation using this device have an automatic timer that activates the pump lubrication system when power is connected or when exiting the programming function. Before you install or remove the Tri-Lube Grease Pump from the system, disconnect and isolate all power supplies and relieve all pressure.						

Timer Programming and Motor Duty Cycle

Programming the ON/OFF duty cycle of the pump motor is achieved by one of three methods described on the following pages:

- On Board Dual Inline Pack (DIP) Switches (page 8).
- Programmable Timer (page 10)
- Remote Monitoring Controller (page 11)

Motor Duty Cycle

Regardless of what control method is used, to assure proper motor operation under varying operational and environmental conditions, the duty cycle of motor operation (motor running time vs. motor resting time) must be controlled.

- The resting (OFF) time of the system must be **at least 3 times** the running (ON) time.
- The duty cycle must be **a maximum of 25%** of the full cycle time.

For example: If **ON** time is set for 5 minutes, **OFF** time must be set to at least three times 5 minutes or 15 minutes (3 x 5 = 15).

Each full cycle is now a total of 20 minutes (5 minutes ON + 15 minutes OFF = 20 minutes).

The 5 minute ON time is 25% of the total full cycle time, 20 minutes.

On Board Dual Inline Package (DIP) Switches

Part 563544. (For the following instructions, unless otherwise specified, see FIG. 5).

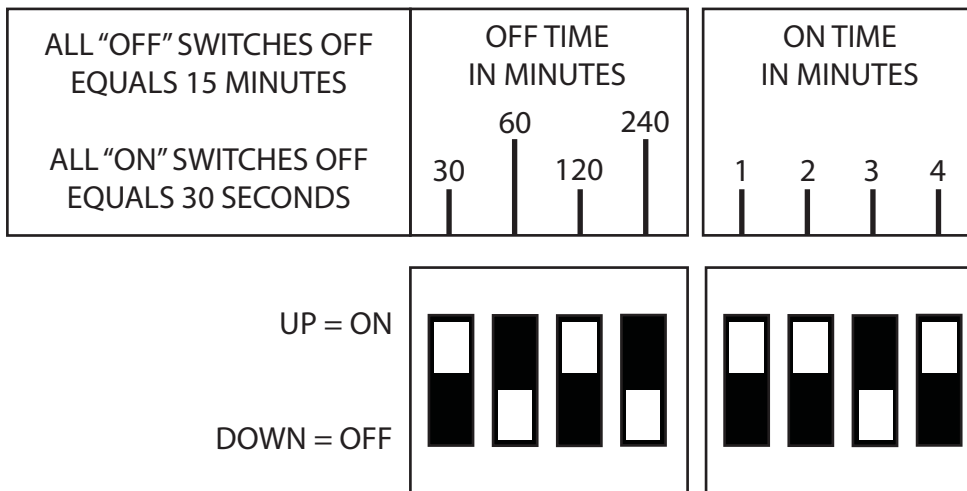


FIG. 5

The DIP (Dual Inline Package) is made up of two banks of 4 miniature switches mounted on a timer.

One bank controls the amount of time the pump motor runs (ON TIME); the other bank controls the amount of time the motor rests (OFF TIME).

Pushing a switch UP turns the pump motor ON and programs the timer to stay ON (or OFF) for the number of minutes printed on the label above the switch.

NOTE:

- The 4 switches on each bank can be turned ON and/or OFF in any combination. The ability to configure the switches in a variety of ON/OFF combinations provides a range of programmable times to control the pump's operational cycle (see DIP Time Switch Settings, Table 1, page 9).

- To provide extra timing options, a timing value has been assigned when all switches in either bank are in the OFF (down) position:
 - All Off Time switches OFF = 15 minutes;
 - All On Time switches OFF = 30 seconds.
- Each time the main power to the Tri-Lube is turned off, the timer cycle will be interrupted; when power is reconnected, a time ON condition will begin and initiate a lube cycle.

NOTICE

To assure proper motor operation, be sure to heed the maximum 25% motor duty cycle requirement, page 7.

Table 1, DIP Time Switch Settings

Switch Number				OFF Time* (Minutes)
30	60	120	240	
Off	Off	Off	Off	15
On	Off	Off	Off	30
Off	On	Off	Off	60
On	On	Off	Off	90
Off	Off	On	Off	120
On	Off	On	Off	150
Off	On	On	Off	180
On	On	On	Off	210
Off	Off	Off	On	240
On	Off	Off	On	270
Off	On	Off	On	300
On	On	Off	On	330
Off	Off	On	On	360
On	Off	On	On	390
Off	On	On	On	420
On	On	On	On	450

Switch Number				ON Time* (Minutes)
1	2	4	8	
Off	Off	Off	Off	30 seconds
On	Off	Off	Off	1
Off	On	Off	Off	2
On	On	Off	Off	3
Off	Off	On	Off	4
On	Off	On	Off	5
Off	On	On	Off	6
On	On	On	Off	7
Off	Off	Off	On	8
On	Off	Off	On	9
Off	On	Off	On	10
On	On	Off	On	11
Off	Off	On	On	12
On	Off	On	On	13
Off	On	On	On	14
On	On	On	On	15

**The resting (OFF) time of the system must be at least 3 times the running (ON) time.*

Programmable Timer

Part No. 563547. (For the following instructions, unless otherwise specified, see FIG. 6).

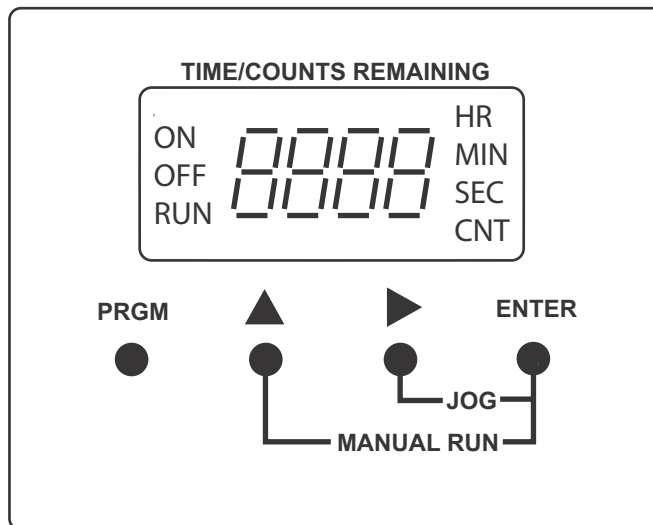


FIG. 6

The Programmable Timer has two modes of operation: DISPLAY and PROGRAM.

Display Mode

Display mode has 3 LCD status indicators: ON, OFF, and RUN.

- **ON:** indicates if the display is counting down “on time”.
- **OFF:** indicates if the display is counting down “off time”.
- **RUN:** indicates when timer is supplying power to the motor.

The **ON** and **RUN** indicators will come on together when the unit is in the DISPLAY mode and the motor is running.

Program Mode

The Program Mode indicators are used to show which counter is being adjusted when programming new ON and OFF times:

- A 4-digit display shows the remaining time left in either an ON or OFF cycle.
- Other indicators display which time increment is in operation: **CNT**, **HR**, **MIN**, or **SEC**.

- A flashing LCD character indicates the Program Mode is active.

Push Buttons

There are 4 push buttons:

PRGM: Program, alternate between setting OFF, ON, Timer DISPLAY Mode.

▲: Increase digit

▶: Select next digit

ENT: Enter (save) new setting.

Display Panel and Push Buttons

Operation

When power is supplied:

- Timer resumes cycle from wherever it was when timer was interrupted.
- Appropriate status indicator (ON/OFF/RUN) illuminates.
- Digital display counts down the remaining time for the cycle underway.
- When the display reaches 0000 the pump motor turns ON (or OFF) and the status indicator lights.

- The display counts down the remaining time until the next status change.

Changing Timer Settings

1. From the timer **DISPLAY** mode, press the **PRGM** button to change modes.
2. The **ON** status indicator flashes.
3. Press **ENT** button. The left most digit flashes.
4. To change the digit, press the ▲ (increase digit) button. Each time you press the button, the value increases by 1. When you reach 9, the value returns to zero and begins to count up again.
5. When the correct value is displayed, press the ► (select the next digit) button. This will set the displayed value and move to the next digit on the display.
6. Repeat Steps 4 and 5 to select and set values for each digit on the display.
7. When all 4 digits display the correct values, press **ENT**.
8. **SEC** flashes. Press the ▲ (increase digit) button to select **CNT**, **HR**, **MIN** or **SEC**.
9. Press **ENT** to set your choice. (The **ON** time is set.)
10. **OFF** status indicator flashes. Repeat Steps 1 - 9 to set the **OFF** time.

NOTE: After the **OFF** time programming is complete and the ENT button has been pressed (Step 9), the timer will return to the operating **DISPLAY** mode.

11. Do a Manual Run (below) to make sure the new values are active.

NOTICE
To assure proper motor operation, be sure to heed the maximum 25% motor duty cycle requirement, page 7.

Manual Run Cycle

A manual run cycle may be initiated from the normal Display Mode by pressing the ► (select the next digit) and **ENT** (Enter) button.

Remote Monitoring Controller

Part No. 563545 (24 Volt).

Refer to the Wiring Section of this instruction manual, page 5 and Programming Instructions supplied with the Remote Monitoring Controller, or contact your Graco distributor.

Filling the Reservoir

NOTICE

Do not allow reservoir to run totally dry. Entrapment of a slug of air around the pump cartridges) can adversely affect the time it takes to prime the pump. To avoid this, if an air operated "barrel pump" is used to supply grease for refills, slow the delivery rate by backing air pressure to 35 psi (2.4 bar, .24 MPa) max.

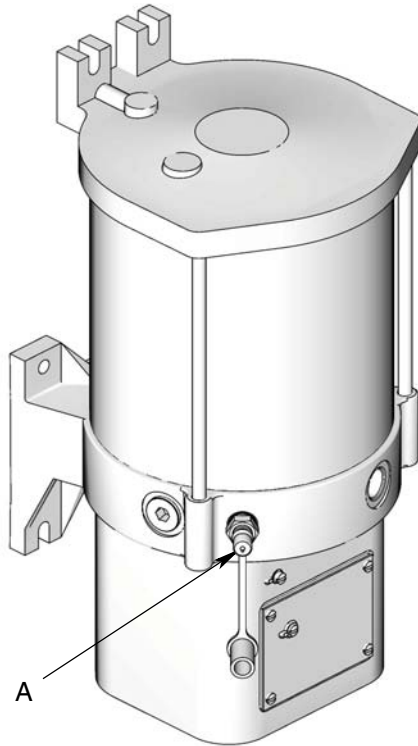


FIG. 7

- Fill reservoir with clean grease through fitting at the base of the reservoir (A).
- Do not attempt to fill from the top.
- To avoid plugging the vent tube that runs down the back of the reservoir, parallel to the tie rods, do not overfill.
- Maintain at least an inch or more of air space at the top of the reservoir.

Adding or Replacing Pump Cartridges

Piston pump cartridges can be added or replaced in the field without disturbing the main unit mounting. Use HD Cartridge Kit 563538.

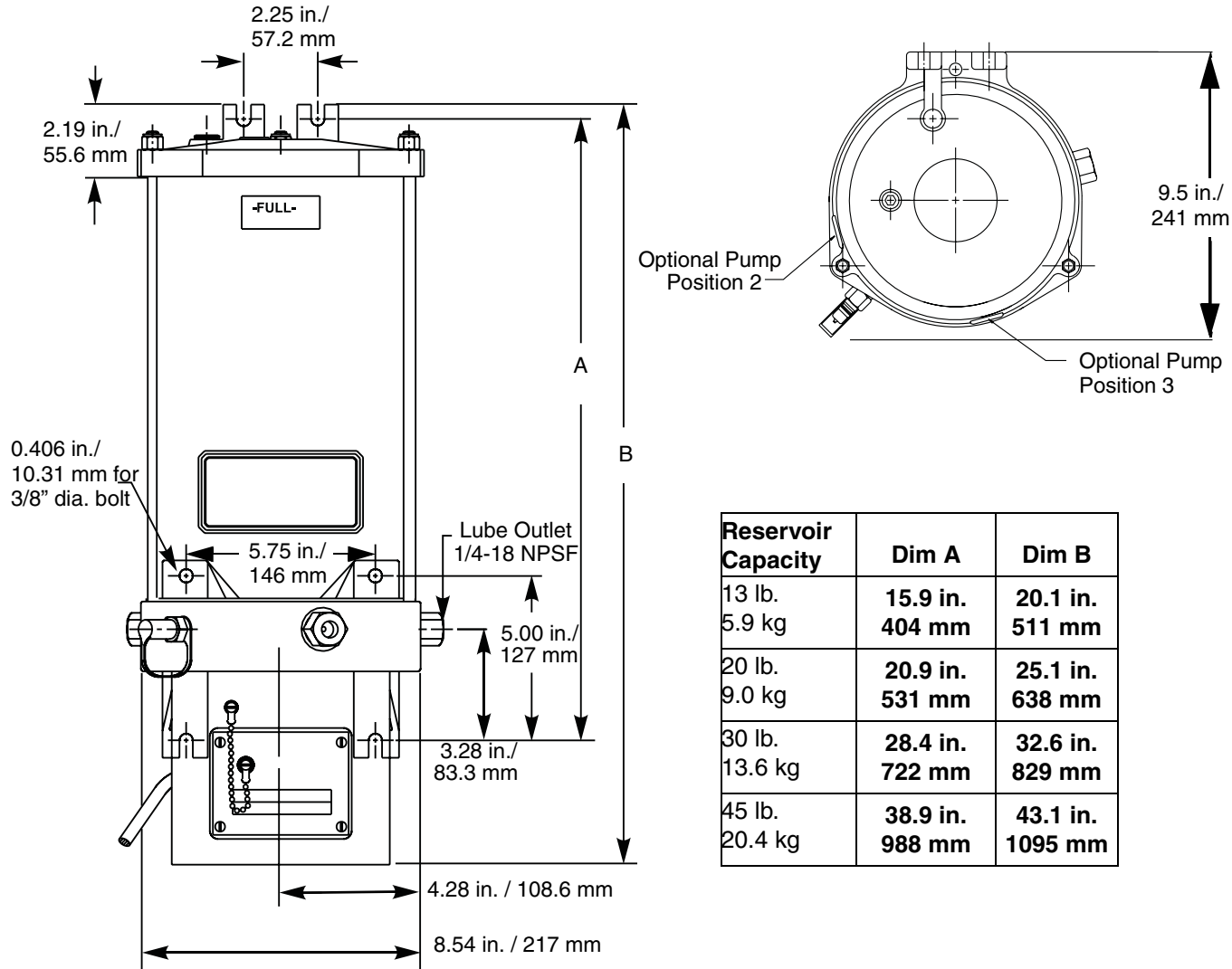
NOTICE

To avoid severe internal damage to the drive line or new cartridge, follow the instructions provided with the HD Cartridge Kit 563538 **exactly** as written.

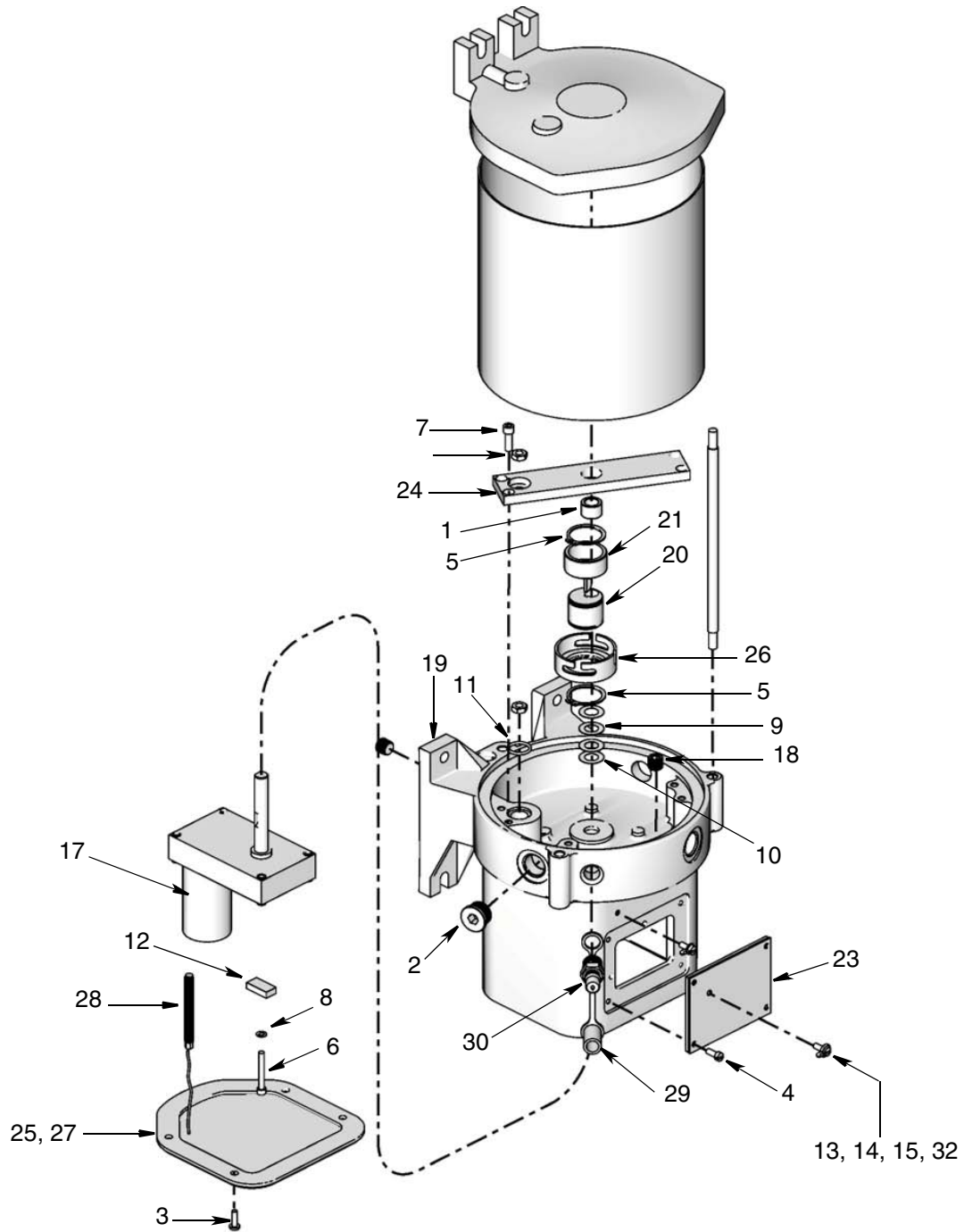
Technical Data

Pump Cartridge Maximum Output Pressure	3500 psi (241 bar, 24.1 MPa)
Operating Temperature	-20° to 140°F (-29° to 60°C)
Motor Voltage24VDC: requires 2 Amp, slow-blow fuse (user supplied)
Weight (empty)	40 lbs (18.2 kg)
Lubricants	NLGI Grade #2 grease (at temperatures below freezing, progressively lower viscosity (fluid) grade greases required.
Reservoir, wetted parts	1/4 in. thick Acrylic

Dimensions



Parts



Part No/Description

Ref.	Part No.	Description	Qty.
1	556368	KEY, #5, USA, Woodruff	1
2	556424	PLUG, pipe, 7/8-14 SAE MG	2
3	556465	SCREW, #10-32	4
4	109032	SCREW	6
5	555556	RING, retainer	2
6	555585	SCREW, 10-32 x 1.50	4
7	556512	SCREW, 1/4-28 x .75	4
8	555635	WASHER, #10, internal tooth lock	6
9	556535	WASHER, shim, .010	3
10	556536	WASHER, shim, .015	2
11	555657	O-RING, 115 buna-70, Duro	1
12	556602	SEAL, lip, .50 ID, 1.12 OD, .25 W	1
13	556758	SEAL, washer, #10 (not shown)	1
14	556762	CHAIN, bead, bulk, .333 (not shown)	1
15	555763	COUPLING, bead, chain	2
16	555776	BAG, desiccant, 1-oz (not shown)	1
17	557277	MOTOR, 24 VDC	1
18	557391	PLUG, dryseal, 1/4 NPTF	2
19	557783	BODY, pump	1
20	561044	CAN	1
21	557784	RING, wear	1
23	557786	COVER, hatch, timer	1
24	563540	BAR, ricer assembly	1
25	557788	GASKET, set	1
26	561050	RING, slotted pull back	1
27	557790	COVER	1
28	563546	SWITCH	1
29	557875	CAP, dust	1
30	557880	STUD, fill	1
32	C19293	NUT, hex	1

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.

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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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Graco Information

TO PLACE AN ORDER, contact your Graco distributor or call to identify the nearest distributor.

Phone: 612-623-6928 or **Toll Free:** 1-800-533-9655, **Fax:** 612-378-3590

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