Compact Dyna-Star®
Electric Pump

Provides lubricant flow and pressure to operate both single line and series progressive automatic lubrication systems. For automatic lubrication systems only. For professional use only.

Not approved for use in explosive atmospheres or hazardous (classified) locations.

3500 psi (24.1MPa, 241 bar) Maximum Working Pressure

See page 3 for model information.

Important Safety Instructions
Read all warnings and instructions in this manual and in your injector manual before using the equipment. Save these instructions.

Related Manuals
3A6932 Compact Dyna-Star Auto-Fill Shut Off Kit
3A6998 Compact Dyna-Star 35 lb (5 Gallon) Kit
3A7035 Compact Dyna-Star Pump Cable
333393 Fill Valve
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Pump Model Selection Matrix

Pump models are made up of a six-digit part number. The first two digits are fixed alpha characters, while the remaining four are chosen from the matrix below. Select an item from each column to fill in the model number for ordering.

Note: Some pump configurations are not available. Contact Graco customer service or your local Graco distributor for assistance.

<table>
<thead>
<tr>
<th>Pump Description</th>
<th>Metering System Feedback</th>
<th>Tank</th>
<th>Tank Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 12L / 35# Bucket Length, 24 VDC</td>
<td>Series Progressive, no vent valve, no pressure reporting</td>
<td>No Tank, Bare Pump</td>
<td>No Tank, Bare Pump</td>
</tr>
<tr>
<td>2 20L Tank Length, 24 VDC</td>
<td>Vent Valve, No Pressure Reporting</td>
<td>12L Steel Tank with Follower Plate</td>
<td>Low Level Switch</td>
</tr>
<tr>
<td></td>
<td>Vent Valve, Pressure Switch</td>
<td>20L Steel Tank with Follower Plate</td>
<td>Level Transducer</td>
</tr>
<tr>
<td></td>
<td>Vent Valve, Pressure Transducer</td>
<td>35# Plastic Bucket Kit</td>
<td>Auto-Fill Shut Off and Low Level Switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 L Steel Tank with no Follower Plate</td>
<td>Auto-Fill Shut Off, Level Transducer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 L Steel Tank with no Follower Plate</td>
<td></td>
</tr>
</tbody>
</table>

CD 1 2 3 4

1 2 3 4
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.

---

**WARNING**

**FIRE AND EXPLOSION HAZARD**

When flammable fluids are present in the work area, such as gasoline and windshield wiper fluid, be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:

- Use equipment only in well ventilated area.
- Eliminate all ignition sources, such as cigarettes and portable electric lamps.
- Ground all equipment in the work area.
- Keep work area free of debris, including rags and spilled or open containers of solvent and gasoline.
- Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.
- Use only grounded hoses.
- **Stop operation immediately** if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.

---

**SKIN INJECTION HAZARD**

High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**

- Do not point dispensing device at anyone or at any part of the body.
- Do not put your hand over the fluid outlet.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop dispensing and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.
### EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.
- 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 in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See in all equipment manuals. Read fluid and solvent manufacturer’s warnings. For complete information about your material, request Safety Data Sheet (SDS) from distributor or retailer.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer’s replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

### MOVING PARTS HAZARD

Moving parts can pinch, cut or amputate fingers and other body parts.
- Keep clear of moving parts.
- Do not operate equipment with protective guards or covers removed.
- Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the **Pressure Relief Procedure** and disconnect all power sources.

### 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.
Installation

Grounding

The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current.

To ground the pump: remove the ground screw (Z) located on the back of the gear box and insert it through the eye of the ring terminal (W) at end of ground wire (Y). Fasten the ground screw (Z) back onto the pump and tighten securely. Connect the other end of the ground wire (Y) to a true earth ground (Fig. 1). To order a ground and wire clamp, order Part 222011.

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.

To relieve pressure in the system, use two wrenches working in opposite directions on the pump outlet fitting to slowly loosen the fitting only until no more lubricant or air is leaking from the fitting (Fig. 2).
Fuses

**NOTICE**

Fuses (user supplied) are required on all models. To avoid equipment damage:
- Never operate the pump without a fuse installed.
- A fuse of the correct voltage and amperage must be installed in line with the power entry to the system. Graco recommends using a 10A time delay fuse.

Mounting

**LIFTING HAZARD**

This equipment is heavy. Lifting or moving heavy equipment incorrectly can cause serious injury such as muscle strain or back injuries. To avoid injury:
- Do not lift or move this equipment without assistance.
- Always use a lifting device secured to the pump when moving or installing this equipment. See Notes: page 49 for pump weight.

Securely mount and ground the unit before operation.

1. Mount the tank (K) on a sturdy, flat surface with user-provided bolts. Install so that the fill port (F) and the lubricant outlet connection (P or AC) are easily accessible after installation.

2. Connect the controller (F) (if used).

3. Connect a high pressure lubricant supply line (D) to the lubricant outlet connection (P or AC).


5. Ground the system. See Grounding instructions, page 6.

Pump

The pump provides lubricant flow and pressure to operate an automatic lubrication system.

**Series Parallel System**

The pump requires an electrical power supply and a timed signal from a lubrication controller (F). The pump provides lubricant flow and pressure to operate the injectors (E), and vents the injector system to reset the injectors.

**Series Progressive System**

The pump requires an electrical power supply and a timed signal from a lubrication controller (F). The pump provides lubrication flow and pressure to operate metering devices (AD).

Inlet and Outlet Components

**COMPONENT RUPTURE HAZARD**

The maximum working pressure of the inlet and outlet components in the system vary. Over-pressurizing an inlet or outlet can cause components to rupture, serious injury such as skin injection or injury from splashing fluid. To reduce the risk of component rupture:
- Be sure to know the maximum working pressure of each inlet and outlet component in the system.
- **Never** exceed the maximum working pressure of the inlet and outlet components.

**Vent Valve**

The vent valve (L) reduces system pressure in Series Parallel system and resets the injectors.
Pressure Relief Valve

The pump design includes a self-contained pressure relief valve (N). When needed, the valve relieves pressure back into the pump tank (K).

Motor Details

The pump (B) is driven by a 24 V DC brushless motor (1) with a built-in controller. The motor LED flashes multiple times during start up and stays on during operation. Refer to Troubleshooting, page 38 for more information.
Typical Installation: Series Parallel System

Key:
A  Lubricant output connection*
B  Pump
C  Ignition switch*
D  High-pressure lubricant supply lines*
E  Injector banks*
F  Lubrication controller*
G  Fill port
H  Overflow port
K  Tank
L  Vent Valve
NN  Bearing*

*User provided
Typical Installation: Series Progressive System

Key:
A  Lubricant output connection*
B  Pump
C  Ignition switch*
D  High-pressure lubricant supply lines*
F  Lubrication controller*
G  Fill port
H  Overflow port
K  Tank
NN  Bearing*
AD  Metering device*

*User provided
Typical Wiring: Series Parallel Systems

FIG. 6
Component Identification

Key:(Figure 6)

- **B** Pump
- **G** Fill port and cover
- **H** Overflow port
- **J** Breather
- **K** Tank
- **L** Vent valve
- **M** Motor
- **N** Pressure relief valve
- **P** Outlet (3/8 in. NPT)
- **R** Gear box
- **S** Low level switch or level transducer
- **T** Pressure switch or transducer
- **U** Lift ring
- **V** Auto-fill shut off (AFSO) (optional)
- **Y** Follower plate
- **Z** Tube-in-tube
- **AB** Plug to check venting / pressure relief
- **AC** Refill vent plug or refill pressure relief
- **AD** Outlet (1/4 in. NPT) (optional)
Setup

Fill the Tank

The fill port is used for filling and refilling the tank for pumps with or without auto-fill.

Fill the tank through the fill port (Fig. 8).

Auto-Fill Shut Off: When grease is added, the follower plate is pushed upward and closes the flow path. (Fig. 9).

Non-Auto-Fill Shut Off: When grease is added, the follower plate is pushed upward. When the tank is full, the grease will begin to flow out of the overflow port (H).

Fig. 8: Fill Port

Fig. 9: Follower Plate
**Setup**

Always fill the pump through the fill port to expel any air from the tube-in-tube (Fig. 10).

**FIG. 10**

Always use the follower plate to prime the pump for grease NLGI 1, NLGI 2, and for cold pumping applications.

Note: The auto-fill shut off requires using a follower plate.

The follower plate should not be used with oil and low viscous grease applications. The follower plate may sink in these lubricants and block the pump inlet.
Fill Pumps with an Auto-Fill Shut Off (AFSO)

Note: The remote filling station pump stalls (dead-heads) when the tank is full. If the pump does not stall (dead-head) there is a leak in the system.

**NOTICE**

Never allow the pump to run dry of the fluid being pumped to avoid pump damage.

**NOTICE**

If the refilling pump runs dry it pumps air into the pump and may cause damage. Always make sure that there is enough lubricant in the refilling pump station.

**Key:**

- AA Remote fill station pump*
- BB Remote fill station tank*
- CC Filter*
- DD Pressure relief line*
- EE Fill valve* [Graco Part No. 77X542]
- FF Fill valve pressure relief knob* [Part of Fill Valve 77X542]
- GG Refilling line*
- HH Instruction label* [Included with Fill Valve 77X542]
- JJ Supply hose*
- K Tank
- V Auto-Fill Shut Off
- V1 Auto-Fill Shut Off valve pin
- Y Follower plate

*User supplied
The auto-fill shut off (V) is used to refill the grease tank (K) in an automatic lubrication system. When the grease level in the tank is full, the auto-fill shut off automatically ends the filling operation.

Always fill the tank (K) to full during refilling.

As grease is added to the tank (K), the follower plate (Y) is pushed to the top of the tank (K) and pushes up the valve pin (V1) which closes the inlet fluid path. Pin (V2) pops up when the tank is full (Fig. 12).

![Fig. 12](image)

When the fluid refilling path closes, the refilling line (GG) pressurizes and brings the remote fill station pump (AA) to a pressurized stall condition.

Note: The operator must monitor the system during filling of the tank to prevent any accidental fluid overflow.

**Refill the Tank: Pumps with an Auto-fill Shut Off (AFSO)**

1. Pull and hold the fill valve pressure relief knob (FF) long enough to relieve line pressure between the fill valve (EE) and the auto-fill shut off valve (V).

2. Verify the auto-fill shut off pin (V2) is down, indicating it is reset (Fig. 13).

3. Remove the dust cover (DC) from the fill coupler (FC) on the fill valve (EE) (Fig. 14).

![Fig. 13](image)

![Fig. 14](image)
4. Connect the supply hose (JJ) between the remote fill station pump (AA) and fill coupler (FC) port marked with an “I” (Fig. 14).

5. Start the remote fill station pump (AA).

6. When the tank (K) is filled:
   - The remote fill station pump (AA) stalls (dead-heads),
   - the auto-fill shut off pin (v2) pops up as shown in Fig. 15,
   - The pressure gauge needle rises to the fill pump’s set pressure.

Note: If the pump does not stall (dead-head) there is a leak in the system.

7. Turn off the remote fill station pump (AA).

8. Pull and hold the fill valve pressure relief knob (FF) long enough to relieve line pressure between fill valve (EE) and Auto-fill Shut Off Valve (V) and between remote fill station pump (AA) and fill valve (EE).

Note: The length of time it takes to vent the pressure varies depending on the system design and installation. In some installations it may be necessary to repeat Step 8 to ensure pressure is relieved.

9. Disconnect the supply hose (JJ) from the fill coupler (FC) (Fig. 14).

10. Replace the dust cover (DC) over the fill coupler (FC).

**NOTICE**

To prevent damage to the unit:
- Check breather (J) vent for proper operation before filling the tank (K).
- Do not fill tank (K) beyond the overflow port (H).
- Do not use the breather (J) as a port to fill the tank.

**FIG. 15**
Fill Pumps Without an Auto-fill Shut Off (AFSO)

Key:
- AA Remote fill station pump
- BB Remote fill station tank
- CC Filter
- DC Dust cap
- G Fill port
- JJ Supply hose
- H Overflow port
- Y Follower plate

*User supplied

**Refill the Tank: Pumps without an Auto-fill Shut Off**

Do not insert your finger into the overflow port while filling a tank equipped with a follower plate. Injury or amputation could result.

**COMPONENT RUPTURE HAZARD**

The maximum working pressure of each component in the system may not be the same. To reduce the risk of overpressurizing any component in the system, know the maximum working pressure of each component. Never exceed the maximum working pressure of the lowest rated component in the system. Overpressurizing can result in rupture, and serious injury from skin injection or splashing fluids.

Regulate pressure to the pump so that no fluid line, component or accessory is over pressurized.
1. Connect the lubricant supply hose (JJ) from the remote filling station pump (AA) to the fill port (G) (Fig. 17).

![Diagram of lubrication setup]

**FIG. 17**

**NOTICE**

To prevent damage to the unit:

- Check breather (J) vent for proper operation before filling the tank (K).
- Do not fill tank (K) beyond the overflow port (H).
- Do not use the breather (J) as a port to fill the tank.

2. Slowly turn on the supply lubricant until the level of lubricant reaches the overflow port (H). When the tank (K) is full (or overfilled) grease will flow out of the overflow port (H).

Note: For pump tanks (K) with a follower plate (Y), fill the tank until the follower plate reaches the overflow port (H) and grease flows out.
Operation


The unit must be securely mounted and grounded before operation.

Priming the System

1. After the tank (K) is completely filled, remove the high pressure lubricant supply line (D) from the outlet.
2. Connect power to the pump (B).
3. Start the pump (B) and run until all of the air has been expelled and fluid flow is continuous (Fig. 18).
4. Reconnect the high pressure lubricant supply line (D) to the outlet.

Pump Operation Overview

Series Parallel System

1. At the start of the cycle, the lubrication controller (F) initiates a signal that closes the vent valve (L) and starts the pump (B).
2. The pump (B) builds pressure in the supply lines (D) until all the injectors (E) actuate. Then the pressure switch (T) sends a signal to the lubrication controller (F) to end the cycle.
3. The lubrication controller (F) terminates the signal to the pump (B) and power to the vent valve (L).
4. The vent valve (L) opens.
5. Pressure is relieved in the supply lines (D), back into the tank (K), and resets all of the injectors (E).

Series Progressive System

1. At the start of the cycle, the lubrication controller (F) initiates a signal to start the pump (B).
2. The pump (B) supplies lubricant and pressure to the metering devices (AD). When the metering devices are active, they carry lubricant to the lube points.
3. Continuous lubrication is provided during pump operation.
4. To control lubrication based upon number of cycles, a cycle switch can be added to the metering devices.

Shutdown

For normal shut down, disconnect power to the lubricator controller (F) and to the pump.
Level Monitoring

Low Level Switch

The low level switch (S) (Fig. 19) indicates a fault when the follower plate (Y) reaches the factory set distance from the bottom of the tank. The fault activates when the remaining grease level is approximately 10 percent.

NOTICE

The pump (B) should not be run without grease because air will be introduced into the system and could cause damage.

<table>
<thead>
<tr>
<th>Output type:</th>
<th>1 switching output, PNP NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage:</td>
<td>10 - 30 VDC</td>
</tr>
<tr>
<td>Current:</td>
<td>200mA</td>
</tr>
<tr>
<td>Connection type:</td>
<td>M12x1, 4-pin</td>
</tr>
</tbody>
</table>

**Connector on Housing**

<table>
<thead>
<tr>
<th>Pin-out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  + Uᵢₜ</td>
</tr>
<tr>
<td>2  Teach Input</td>
</tr>
<tr>
<td>3  - Uᵢₜ</td>
</tr>
<tr>
<td>4  Switch Input</td>
</tr>
</tbody>
</table>

**Example Wiring Diagram**

```
  1  + Uᵢₜ Brown
  2  Teach Input White
  4  Switch Input Black
  3  - Uᵢₜ Blue
```

Fig. 19

Fig. 20
Level Transducer

The level transducer (S) (Fig. 21) is used for continuous level monitoring. It indicates a fault when the follower plate (Y) reaches the factory set distance from the bottom of the tank. The fault activates when the remaining grease level is approximately 10 percent.

NOTICE

The pump (B) should not be run without grease, or air will be introduced into the system and could cause damage.

**Output type:** 1 analog output 0 - 10V  
**Operating voltage:** 10 - 30 VDC  
**Current:** 200mA  
**Connection type:** M12x1, 4 pin

**Light Indicator**

<table>
<thead>
<tr>
<th>State</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Green</td>
</tr>
<tr>
<td>Low-Level</td>
<td>Yellow</td>
</tr>
<tr>
<td>Error</td>
<td>Red</td>
</tr>
</tbody>
</table>

**Connector on Housing**

<table>
<thead>
<tr>
<th>Pin-out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 + U0  Brown</td>
</tr>
<tr>
<td>2 Teach Input White</td>
</tr>
<tr>
<td>3 - U0 Blue</td>
</tr>
<tr>
<td>4 Analog Output Black</td>
</tr>
</tbody>
</table>

**Example Wiring Diagram**

![Wiring Diagram](chart.png)
Pressure Switch

The pressure switch (T) is factory set to 3000 psi (20.7 MPa, 207 bar) (Fig. 22).

Pressure Transducer

The pressure transducer (T) is used for continuous pressure monitoring.

<table>
<thead>
<tr>
<th>Output type</th>
<th>Analog 1-5V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>8 - 32V</td>
</tr>
<tr>
<td>Connection type</td>
<td>Packard Metri-Pack 150 Series</td>
</tr>
<tr>
<td>Pressure range</td>
<td>0-5000 psi</td>
</tr>
</tbody>
</table>

**Fig. 22**

When the pressure in the system reaches 3000 psi, the pressure switch (T) closes.

<table>
<thead>
<tr>
<th>Output type</th>
<th>1 Switching output NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>24VDC</td>
</tr>
<tr>
<td>Current</td>
<td>5A</td>
</tr>
<tr>
<td>Connection type</td>
<td>Packard Metri-Pack 150 Series</td>
</tr>
<tr>
<td>Preset pressure</td>
<td>3000 psi</td>
</tr>
</tbody>
</table>

**Fig. 23**
Disassemble

1. Relieve pressure, following the Pressure Relief Procedure, page 6.
2. Disconnect the power to the system.
3. Loosen and remove the four bolts (3) holding the motor (1) to the pump, then remove the motor (1) and the o-ring (2) (Fig. 24).
4. Loosen and remove the four bolts and four washers holding the pump to the tank (41) with a 5 mm Allen wrench (Fig. 25).
5. Pull the pump out of the tank (41).
6. Remove the pressure relief valve cartridge (5) (Fig. 26).
7. Remove the two bolts (6) and two nuts (not shown) from the protection cover (8) (Fig. 27).
8. Remove the protection cover (8).
9. Loosen the retaining nut (9) with a tube wrench (Fig. 28).

10. Pull up on the lower section to separate from the gear head (4) (Fig. 29).

11. Remove the tube-in-tube (10) with a pipe wrench. Verify the o-ring (11) is on the tube-in-tube (10) (Fig. 30).

12. Push on the end of the pump rod (27) to gain access to the cross-hole located at the end of the shovel rod (Fig. 31 and Fig. 32).
13. Place an Allen wrench or similar tool through the slot of the shovel tube (13) and into the exposed cross-hole to keep the shovel rod (17) steady (Fig. 32).

14. Loosen and remove the shovel piston (12) with a 10 mm socket wrench (Fig. 32).

15. Place the pump tube into a vise, protected by a cloth, and tighten to steady the pump lower tube (23) (Fig. 33).

16. Loosen the shovel tube (13) using a pipe wrench and remove it from the pump lower tube (23) (Fig. 33).

17. Remove the two back up rings (14) and the o-ring (15) from the shovel tube (13) (Fig. 33).

18. Loosen and remove the pump lower tube (23) with a pipe wrench and remove the o-ring (24) from the pump lower tube (23) (Fig. 34).

19. Remove the shuttle valve (16) (Fig. 35).

20. Remove the spacer (18) (Fig. 35).
21. Remove the piston bushing (19) (Fig. 36).

22. Remove the two (2) backup rings (20) and the o-ring (21) from the piston bushing (19) (Fig. 36).

23. Remove the shovel rod (17) from the pump piston (25) (Fig. 37).

24. Remove the pump piston (25) from the pump rod (27).

Note: Remove the ball (22) from the pump piston (25) (Fig. 38 and Fig. 39).
25. Loosen and remove the extension tube (26) from the top housing. Remove two backup rings (14) and the o-ring (15) (Fig. 40).

26. Pull out the pump rod (Fig. 41).

27. Remove the retaining nut (9) located on the upper housing (Fig. 42).

28. Remove the outer o-ring (28) from the retaining nut (Fig. 43).

29. Remove the throat screw (29) to get to the inner o-ring (30) (Fig. 43).

30. Remove the bronze washer (31) from the pump housing (Fig. 43).

31. Remove the throat seal (32) (u-cup) (Fig. 43).
32. Remove the check valve and o-ring (37) (Fig. 44).
Reassemble

1. Place throat seal (32) (u-cup) into the pump housing, lips downward (Fig. 45).

2. Place the bronze washer (31) on top of the throat seal (32) (u-cup) (Fig. 45).

3. Replace the inner o-ring (30) from the retaining nut (9) with a new o-ring and grease lightly. (Fig. 46).

4. Replace the outer o-ring (28) from the retaining nut (9) with a new o-ring and grease lightly (Fig. 46).

5. Place the throat screw (29) into the retaining nut (9) using an Allen wrench and tighten (torque 16 ft-lb/21.7 N·m)

6. Grease the o-ring (28) and place the retaining nut (9) into the pump housing and tighten slightly (Fig. 48).
7. Apply a light coating of grease to the pump rod (27) and push it into the pump housing through the hole in the retaining nut (9) (Fig. 49).

![Fig. 49]

8. Replace the two back-up rings (14) and o-ring (15) with new back-up rings and o-ring and grease lightly (Fig. 50).

9. Place the extension tube (26) over the pump rod and tighten to pump housing (torque 40 ft-lb/54.2 N·m) (Fig. 50).

![Fig. 50]

10. Place the ball (22) back into the pump piston (25) (Fig. 51).

![Fig. 51]

11. Apply medium strength thread locking compound on the threads of the pump rod (27).
12. Place the pump piston (25) on the end of the pump rod (27) and tighten using wrenches (torque 10 ft-lb/13.6 Nm) (Fig. 52 and Fig. 53).

13. Replace the two back-up rings (20) and o-ring (21) with new back-up rings and o-ring and grease lightly (Fig. 54).

14. Place the piston busing (19) into the pump lower tube (23) until seated (Fig. 54).

15. Place the shovel rod (17) into the pump piston (25) groove (Fig. 55).
16. Replace and lightly grease the o-ring (24) on the lower pump tube (23) (Fig. 56).

17. Slide the pump lower tube (23) over the pump rod (27) and connect to the extension tube (26) (torque 40 ft-lb/54.2 N•m) (Fig. 56).

18. Place the spacer (18) into the pump lower tube (23) until seated (Fig. 57).

19. Attach the shuttle valve (16) to the shovel rod (17), with the notch upward (Fig. 57).

20. Replace the two shovel tube (13) back-up rings (14) and the o-ring (15) and grease lightly (Fig. 58).

21. Place the shovel tube (13) into the pump lower tube (23) and tighten (torque 40 ft-lb/54.2 N•m) (Fig. 58).

22. Push pump rod (27) down to move the shovel rod (17) down to access the cross-hole (Fig. 59).

23. Place an Allen wrench or similar tool through the slot of the shovel tube (13) and into the exposed cross-hole to keep the shovel rod (17) steady (Fig. 59).

24. Tighten the shovel piston (12) with a 10 mm socket wrench (torque 3-4 ft-lb/4.1-5.4 N•m) (Fig. 59).
25. Replace the o-ring (11) and grease lightly (Fig. 60).

26. Slide the tube-in-tube (10) over the assembly and up to the pump housing. Tighten the flange (torque 40 ft-lb/54.2 N•m) (Fig. 60 and Fig. 61).

27. Fit the pump assembly into the gear head (4). The retaining nut (9) can be loosened to increase the gap. Line up the pump rod (27) with the cut out and slide into place (Fig. 62).

Note: Leave the retaining nut loose (9).

28. Place two bolts (6) into the pump assembly to hold the gear head and pump assembly in place and tighten slightly the two nuts (7) (Fig. 63).
29. Tighten the retaining nut (9) with a wrench (torque 30 ft-lb/40.1 N\cdot m) to secure (Fig. 64).

30. Remove the two bolts (6) and two nuts (7) (Fig. 65).

31. Place the protection cover (8) in place and secure with bolts (6) and nuts (7) (not shown) (Fig. 66).

32. Place the o-ring (2) and attach the motor (1) to the pump using the four bolts (3) (torque 11 ft-lb/14.9 N\cdot m) (Fig. 67).
33. Place the o-ring onto the check valve, and then place into the pump outlet and tighten (torque 16 ft-lb/21.7 N·m) (Fig. 68).

There is air located between the pump tube and the tube-in-tube. Remove this air by filling it with grease to prime the pump. If this is not done, the pump may lose priming during operation.

34. Connect the refill pump to the fill coupler (Fig. 69).
35. Run the refill pump until grease comes out of the bottom of the tube-in-tube (Fig. 70).

36. Put the pump back into the tank (41) through the cover and the gasket (Fig. 71).

37. Place the four bolts and four washers into place and tighten with a 5 mm Allen wrench (torque 16 ft-lb/21.7 Nm) (Fig. 71).

38. Place the pressure relief valve cartridge (5) and tighten (torque 8 ft-lb/10.8 Nm) (Fig. 72).

39. Reconnect the power to the system.
Troubleshooting

1. Follow **Pressure Relief Procedure**, page 6, before checking or repairing the pump.

2. Check all possible problems and causes before disassembling the pump.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
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<tr>
<td>Pump is not powering ON. The red LED on the motor is not ON.</td>
<td>Wiring is incorrect Polarity is wrong Loose wire(s)</td>
<td>Check and verify that the wire connections are tight. Check and correct polarity.</td>
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<td>Fuse is: Wrong amperage Not in place or missing Faulty</td>
<td>Check the fuse rating and replace with new or correct amperage fuse.</td>
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<td>The lubrication controller is in OFF mode.</td>
<td>Set the lubrication controller to the correct lube cycle.</td>
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<tr>
<td>Problem</td>
<td>Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
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<tr>
<td>Pump in not powering ON. The red LED on the motor is blinking.</td>
<td>2 blinks indicate: over current pump is jammed</td>
<td>Remove the pump and repair with new pump element parts.</td>
</tr>
<tr>
<td></td>
<td>2 blinks indicate: over current pump is jammed</td>
<td>Replace the grease if it is too thick or the ambient temperature is too cold to pump the grease.</td>
</tr>
<tr>
<td></td>
<td>The grease is too thick or the ambient temperature is too cold to pump.</td>
<td>Replace grease with correct temperature rated grease.</td>
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<td>3 blinks indicate the motor is losing the signal.</td>
<td>Verify that the wire connections are tight.</td>
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<td>4 blinks indicate low voltage.</td>
<td>Check voltage and correct as needed.</td>
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<td>5 blinks indicate high voltage.</td>
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<td>6 blinks indicate an over temperature motor windings.</td>
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<td>Remove the pump and repair with new pump element parts, if the pump is jammed,</td>
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<td>Replace grease with correct temperature rated grease.</td>
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<td>Replace grease with correct temperature rated grease.</td>
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<tr>
<td>The Pump is cycling, but there is no lubricant output from the outlet</td>
<td>The lubricant level in the tank is too low.</td>
<td>Refill the tank.</td>
</tr>
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</table>
The Pump is cycling, but there is no lubricant output from the outlet. The Pump lost priming/pump is cavitating.

- **Tank was not refilled through the fill port. Air in the tube-in-tube was pushed into the grease tank.**
  - Connect the refill pump to the fill port and fill tank to remove any air.
- **Grease inside of the tank is not moving to the pump shovel tube.**
  - Install follower plate to help distribute grease during pump operation.
- **Follower plate is not moving and is stuck inside of the tank.**
  - Inspect and replace follower plate, if necessary.
- **Follower plate is sunk into the tank.**
  - The grease viscosity is too low. Remove the follower plate.
- **The pump element parts are worn or damaged.**
  - Replace with new pump element parts.

Pump is cycling, there is output of fluid at the outlet, but pump pressure is not building.

- **Pump element parts are worn or damaged.**
  - Replace with new pump element parts.
- **Vent valve is not energized in the series parallel system.**
  - Check the wiring and correct.
- **Vent valve is energized but not closing (leaky vent valve).**
  - Open the inspection plug (AB), page 12, to confirm that the vent valve is not closing (leaky). Replace the vent valve.
- **Pressure relief is leaky.**
  - Open the inspection plug (AB), page 12, to confirm pressure relief is leaky. Replace pressure relief valve.
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<th>Ref.</th>
<th>Part No.</th>
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<th>Part No.</th>
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## Parts

### Replacement safety labels, tags, and cards are available at no cost.

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### Related Kits

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- Also included with 41, 58, 59
- Also included with 41
- Also included with 58, 59
- Also included with 41, 59
Dimensions: Pump with Tank

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<tr>
<td>C</td>
<td>11.48</td>
<td>291.6</td>
<td>11.48</td>
</tr>
<tr>
<td>D</td>
<td>13.9</td>
<td>353.1</td>
<td>13.9</td>
</tr>
</tbody>
</table>

6 x Ø 0.433 inches on Ø 10.616 bolt circle
## Dimensions: Stand Alone Pump

### Top View

<table>
<thead>
<tr>
<th>Ref</th>
<th>12 Liter inches</th>
<th>12 Liter mm</th>
<th>20 Liter inches</th>
<th>20 Liter mm</th>
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<tbody>
<tr>
<td>A</td>
<td>13.92</td>
<td>353.57</td>
<td>19.89</td>
<td>505.21</td>
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<tr>
<td>B</td>
<td>10.1</td>
<td>256.54</td>
<td>10.1</td>
<td>256.54</td>
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<tr>
<td>C</td>
<td>9.8</td>
<td>248.92</td>
<td>9.8</td>
<td>248.92</td>
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<tr>
<td>D</td>
<td>1.5</td>
<td>38.1</td>
<td>1.5</td>
<td>38.1</td>
</tr>
<tr>
<td>M</td>
<td>0.8</td>
<td>20.32</td>
<td>0.8</td>
<td>20.32</td>
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</tbody>
</table>
Dimensions: Stand Alone Pump

Top View

Bottom View

<table>
<thead>
<tr>
<th>Ref</th>
<th>12 Liter/20 Liter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>inches</td>
</tr>
<tr>
<td>E</td>
<td>7.63</td>
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<tr>
<td>F</td>
<td>2.54</td>
</tr>
<tr>
<td>G</td>
<td>3.26</td>
</tr>
<tr>
<td>H</td>
<td>6.79</td>
</tr>
<tr>
<td>K</td>
<td>10.18</td>
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Mounting Dimensions: Stand Alone Pump
Technical Specifications

<table>
<thead>
<tr>
<th>Compact Dyna-Star Electric Pump</th>
<th>US</th>
<th>Metric</th>
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</thead>
<tbody>
<tr>
<td>Maximum Working Pressure</td>
<td>3500 psi</td>
<td>24.1 MPa, 241 bar</td>
</tr>
<tr>
<td>Pressure switch factory set:</td>
<td>3000 psi</td>
<td>20.7 MPa, 207 bar</td>
</tr>
<tr>
<td>Pressure relief valve factory set:</td>
<td>4000 psi</td>
<td>27.6 MPa, 276 bar</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40° F to 149° F</td>
<td>-40° C to 65° C</td>
</tr>
<tr>
<td>IP Rating</td>
<td>IP69K</td>
<td></td>
</tr>
</tbody>
</table>

**Electrical Requirements**

| Voltage                          | 24 VDC                           |
| Input Voltage Range              | 18-30 VDC                        |
| Maximum Current                  | 10 A                              |
| Peak Operating Current           | 15 A                              |
| Peak Power                       | 188 Watts                         |
| Maximum Delivery*                | 4.5 in³/min                       |
| Grease Tank Capacity (Graco Supplied) | 12 or 20 Liters               |

**Inlet/Outlet Size**

| Tank Fill Port                  | Quick Coupler                    |
| Overflow Port                   | 1/2 in. npt                      |
| Fluid Outlet                    | 3/8 in. npt                      |

**Materials of Construction**

- Pump: steel, buna-N, acetal, lubricane, polyurethane, brass, polyethylene
- Tank: steel, buna-N, rubber, aluminum

**Weight - Without Grease in the Tank**

| 12 Liter | 66 lb | 29.9 kg          |
| 20 Liter | 73 lb | 33.1 kg          |

**Weight - Pump Only**

| 12 Liter | 27 lb | 12.2 kg          |
| 20 Liter | 30 lb | 13.6 kg          |

**Low Level Switch/Low Level Transducer**

- Operating Voltage: 0 - 30 VDC
- Output Type: 1 Switching output, PNP NO
  1 Analog output 0 - 10V (low level transducer)
- Connection Type: M12X1, 4-pin

**Pressure Switch/Pressure Transducer**

- Operating Voltage: 24 VDC
- Output Type: 1 Switching output, NO
  1 Analog output 1 - 5V (pressure transducer)
- Connection Type: Packard Metri-Pack 150 Series

*Output of the pump depends upon the fluid being used, the output pressure, the ambient temperature, and other environmental factors.*
California Proposition 65

⚠️ WARNING: This product can expose you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65warnings.ca.gov.
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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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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For patent information, see www.graco.com/patents.
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Phone: 612-623-6928 or Toll Free: 1-800-533-9655, Fax: 612-378-3590