Merkur™ Bellows Pump Assembly

For pumping isocyanates, UV coatings, and other moisture-sensitive materials. For professional use only.

Important Safety Instructions
Read all warnings and instructions in this manual. Save these instructions.

See page 7 for model information, including maximum working pressure.
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Related Manuals

<table>
<thead>
<tr>
<th>Manual</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>312793</td>
<td>Merkur Bellows Displacement Pump</td>
</tr>
<tr>
<td>312796</td>
<td>NXT™ Air Motor</td>
</tr>
<tr>
<td>312799</td>
<td>Merkur Bellows Spray Packages, AA and Airless</td>
</tr>
<tr>
<td>312798</td>
<td>Merkur Electrostatic Spray Packages</td>
</tr>
</tbody>
</table>
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, 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.

<table>
<thead>
<tr>
<th>FIRE AND EXPLOSION HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable fumes, such as solvent and paint fumes, in <strong>work area</strong> can ignite or explode. To help prevent fire and explosion:</td>
</tr>
<tr>
<td>- Use equipment only in well ventilated area.</td>
</tr>
<tr>
<td>- Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).</td>
</tr>
<tr>
<td>- Keep work area free of debris, including solvent, rags and gasoline.</td>
</tr>
<tr>
<td>- Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.</td>
</tr>
<tr>
<td>- Ground all equipment in the work area. See <strong>Grounding</strong> instructions.</td>
</tr>
<tr>
<td>- Use only grounded hoses.</td>
</tr>
<tr>
<td>- Hold gun firmly to side of grounded pail when triggering into pail.</td>
</tr>
<tr>
<td>- If there is static sparking or you feel a shock, <strong>stop operation immediately</strong>. Do not use equipment until you identify and correct the problem.</td>
</tr>
<tr>
<td>- Keep a working fire extinguisher in the work area.</td>
</tr>
</tbody>
</table>

Static charge may build up on plastic parts during cleaning and could discharge and ignite flammable vapors. To help prevent fire and explosion:

<table>
<thead>
<tr>
<th>SKIN INJECTION HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>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. <strong>Get immediate surgical treatment.</strong></td>
</tr>
<tr>
<td>- Do not spray without tip guard and trigger guard installed.</td>
</tr>
<tr>
<td>- Engage trigger lock when not spraying.</td>
</tr>
<tr>
<td>- Do not point gun at anyone or at any part of the body.</td>
</tr>
<tr>
<td>- Do not put your hand over the spray tip.</td>
</tr>
<tr>
<td>- Do not stop or deflect leaks with your hand, body, glove, or rag.</td>
</tr>
<tr>
<td>- Follow the <strong>Pressure Relief Procedure</strong> when you stop spraying and before cleaning, checking, or servicing equipment.</td>
</tr>
<tr>
<td>- Tighten all fluid connections before operating the equipment.</td>
</tr>
<tr>
<td>- Check hoses and couplings daily. Replace worn or damaged parts immediately.</td>
</tr>
</tbody>
</table>
### 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 **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer’s warnings. For complete information about your material, request MSDS from distributor or retailer.
- Do not leave the work area while equipment is energized or under pressure. 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.
- 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.

### SUCTION HAZARD
Powerful suction could cause serious injury.

- Never place hands near the pump fluid inlet when pump is operating or pressurized.

### TOXIC FLUID OR FUMES HAZARD
Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read MSDSs to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
- Always wear chemically impermeable gloves when spraying, dispensing, or cleaning equipment.

### PERSONAL PROTECTIVE EQUIPMENT
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, hearing loss, inhalation of toxic fumes, and burns. This 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.
Important Two-Component Material Information

Isocyanate Conditions

Spraying or dispensing materials containing isocyanates creates potentially harmful mists, vapors, and atomized particulates.

Read material manufacturer’s warnings and material MSDS to know specific hazards and precautions related to isocyanates.

Prevent inhalation of isocyanate mists, vapors, and atomized particulates by providing sufficient ventilation in the work area. If sufficient ventilation is not available, a supplied-air respirator is required for everyone in the work area.

To prevent contact with isocyanates, appropriate personal protective equipment, including chemically impermeable gloves, boots, aprons, and goggles, is also required for everyone in the work area.

Moisture Sensitivity of Isocyanates

Isocyanates (ISO) are catalysts used in two component coatings. ISO will react with moisture (such as humidity) to form small, hard, abrasive crystals, which become suspended in the fluid. Eventually a film will form on the surface and the ISO will begin to gel, increasing in viscosity. If used, this partially cured ISO will reduce performance and the life of all wetted parts.

NOTE: The amount of film formation and rate of crystallization varies depending on the blend of ISO, the humidity, and the temperature.

To prevent exposing ISO to moisture:
- Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. Never store ISO in an open container.
- Use moisture-proof hoses specifically designed for ISO, such as those supplied with your system.
- Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.
- Never use solvent on one side if it has been contaminated from the other side.
- Always lubricate threaded parts with ISO pump oil or grease when reassembling.

Material Self-ignition

Some materials may become self-igniting if applied too thickly. Read material manufacturer’s warnings and material MSDS.

Changing Materials

- When changing materials, flush the equipment multiple times to ensure it is thoroughly clean.
- Always clean the fluid inlet strainers after flushing.
- Check with your material manufacturer for chemical compatibility.
- Most materials use ISO on the A side, but some use ISO on the B side.

Keep Components A and B Separate

Cross-contamination can result in cured material in fluid lines which could cause serious injury or damage equipment. To prevent cross-contamination of the equipment’s wetted parts, never interchange component A (isocyanate) and component B (resin) parts.
Models

Check your pump’s identification marking (ID) for the 6-digit part number. Use the following matrix to define the construction of your pump, based on the six digits. For example, pump Part No. B05FA0 represents a 5 to 1 ratio, 150 cc pump, with no DataTrak, a low noise exhaust, and v-packings.

To order replacement parts, see Parts section starting on page 22. The digits in the matrix do not correspond to the reference numbers in the Parts drawings and lists.

<table>
<thead>
<tr>
<th>B (Bellows style)</th>
<th>First Digit</th>
<th>Second and Third Digit (Ratio)</th>
<th>Fourth Digit (Displacement Pump Volume Per Cycle)</th>
<th>Fifth Digit (Smarts/Exhaust)</th>
<th>Sixth Digit (Packings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>05</td>
<td>B</td>
<td>50 cc</td>
<td>A</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>D</td>
<td>100 cc</td>
<td>B</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>F</td>
<td>150 cc</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>23</td>
<td></td>
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<td>24</td>
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<tr>
<td></td>
<td>35</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

* Cycle refers to combination of one upstroke and one downstroke.
## Pump Data

<table>
<thead>
<tr>
<th>Model, Series</th>
<th>Air Motor</th>
<th>Displacement Pump</th>
<th>Maximum Fluid Working Pressure psi (MPa, bar)</th>
<th>Flow Rate at 60 cpm gpm (lpm)</th>
<th>Fluid Inlet</th>
<th>Fluid Outlet</th>
<th>Air Inlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>B05FA0, Series A</td>
<td>M04LN0</td>
<td>LB150A</td>
<td>500 (3.4, 34)</td>
<td>2.4 (9.0)</td>
<td>1 in. npt</td>
<td>3/4 in. npt</td>
<td>1/4 in. npt</td>
</tr>
<tr>
<td>B05FB0, Series A</td>
<td>M04LT0</td>
<td>LB150B</td>
<td>1200 (8.3, 83)</td>
<td>1.6 (6.0)</td>
<td>3/4 in. npt</td>
<td>3/8 in. npt</td>
<td>1/2 in. npt</td>
</tr>
<tr>
<td>B05FA1, Series A</td>
<td>M04LN0</td>
<td>LB100A</td>
<td>1500 (10.3, 103)</td>
<td>0.8 (3.0)</td>
<td>3/4 in. npt</td>
<td>3/8 in. npt</td>
<td>1/4 in. npt</td>
</tr>
<tr>
<td>B12DA0, Series A</td>
<td>M07LN0</td>
<td>LB100B</td>
<td>1500 (10.3, 103)</td>
<td>2.4 (9.0)</td>
<td>1 in. npt</td>
<td>3/4 in. npt</td>
<td>1/2 in. npt</td>
</tr>
<tr>
<td>B12DB0, Series A</td>
<td>M07LT0</td>
<td>LB050A</td>
<td>2300 (15.9, 159)</td>
<td>1.6 (6.0)</td>
<td>3/4 in. npt</td>
<td>3/8 in. npt</td>
<td>1/2 in. npt</td>
</tr>
<tr>
<td>B12DA1, Series A</td>
<td>M07LN0</td>
<td>LB050B</td>
<td>2400 (16.5, 165)</td>
<td>2.4 (9.0)</td>
<td>1 in. npt</td>
<td>3/4 in. npt</td>
<td>1/2 in. npt</td>
</tr>
<tr>
<td>B12DB1, Series A</td>
<td>M07LT0</td>
<td>LB050A</td>
<td>2500 (17.2, 172)</td>
<td>0.8 (3.0)</td>
<td>3/4 in. npt</td>
<td>3/8 in. npt</td>
<td>1/2 in. npt</td>
</tr>
<tr>
<td>B15BA0, Series A</td>
<td>M04LN0</td>
<td>LB150A</td>
<td>2500 (17.2, 172)</td>
<td>1.6 (6.0)</td>
<td>3/4 in. npt</td>
<td>3/8 in. npt</td>
<td>1/2 in. npt</td>
</tr>
<tr>
<td>B15BB0, Series A</td>
<td>M04LT0</td>
<td>LB100A</td>
<td>3500 (24.1, 241)</td>
<td>1.6 (6.0)</td>
<td>3/4 in. npt</td>
<td>3/8 in. npt</td>
<td>1/2 in. npt</td>
</tr>
<tr>
<td>B15BA1, Series A</td>
<td>M04LN0</td>
<td>LB100B</td>
<td>3500 (24.1, 241)</td>
<td>1.6 (6.0)</td>
<td>3/4 in. npt</td>
<td>3/8 in. npt</td>
<td>1/2 in. npt</td>
</tr>
<tr>
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<td>M04LT0</td>
<td>LB100A</td>
<td>3500 (24.1, 241)</td>
<td>1.6 (6.0)</td>
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<td>M12LN0</td>
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<td>M12LT0</td>
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</tr>
</tbody>
</table>

312795J
Component Identification

FIG. 1. Component Identification

Key:
A  Air Motor
B  Coupler Shield
C  Connecting Rod
D  Tie Rod
E  Fluid Inlet
F  Bellows Chamber
G  Fluid Outlet
H  Ground Wire
J  Coupling Nut
K  Coupling Collar
L  Packing Nut
M  Pump Adapter
N  Jam Nut
P  Cylinder
R  Foot Cap
Installation

General Information

NOTE: Reference numbers and letters in parentheses in the text refer to the callouts in the figures and the parts drawing.

NOTE: Always use Genuine Graco Parts and Accessories, available from your Graco distributor. If you supply your own accessories, be sure they are adequately sized and pressure-rated for your system.

Fig. 2 and Fig. 3 are only guides for selecting and installing system components and accessories. Contact your Graco distributor for assistance in designing a system to suit your particular needs.

Prepare the Operator

All persons who operate the equipment must be trained in the operation of all system components as well as the proper handling of all fluids. All operators must thoroughly read all instruction manuals, tags, and labels before operating the equipment.

⚠️ Use alternate mounting holes (on bracket, not visible) to mount air controls vertically.

Fig. 2: Typical Wall-Mount Installation
Prepare the Site

Ensure that you have an adequate compressed air supply.

Bring a compressed air supply line from the air compressor to the pump location. Be sure all air hoses are properly sized and pressure-rated for your system. Use only electrically conductive hoses.

Keep the site clear of any obstacles or debris that could interfere with the operator's movement.

Have a grounded, metal pail available for use when flushing the system.

Fig. 3: Typical Cart-Mount Installation

Key:
A  Air Shutoff Valve
B  Air Filter (optional accessory)
C  Gun Air Pressure Gauge
D  Gun Air Pressure Regulator
E  Bleed Type Master Air Valve
F  DataTrak
G  Pump Air Pressure Gauge
H  Pump Air Pressure Regulator
J  Solenoid Release Button
  (not visible)
K  Gun Swivel
L  Air-Assisted Spray Gun
M  Gun Fluid Supply Hose
N  Gun Air Supply Hose
P  Fluid Filter
R  Pump Fluid Outlet
S  Grounding Wire
T  Pump Fluid Inlet
U  Suction Hose
V  Fluid Drain Valve
Grounding

The equipment must be grounded. Grounding reduces the risk of static and electric shock by providing an escape wire for the electrical current due to static build up or in the event of a short circuit.

Pump: See Fig. 4. Verify that the ground screw (GS) is attached and tightened securely to the air motor. Connect the other end of the ground wire (S) to a true earth ground.

Air and fluid hoses: Static electricity may build up when fluids flow through pumps, hoses, and sprayers. At least one hose must be electrically conductive, with a maximum of 500 ft. (150 m) combined hose length to ensure grounding continuity. Check electrical resistance of hose. If total resistance to ground exceeds 25 megohms, replace hose immediately.

Air compressor: follow manufacturer’s recommendations.

Spray gun / Dispense valve: Ground the spray gun through connection to a Graco-approved grounded fluid hose.

Fluid supply container: follow local code.

Object being sprayed: follow local code.

Solvent pails used when flushing: follow local code. Use only conductive metal pails, placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts grounding continuity.

To maintain grounding continuity when flushing or relieving pressure: hold metal part of the spray gun/dispense valve firmly to the side of a grounded metal pail, then trigger the gun/valve.

Mount the Pump

Mount the pump directly to the wall (order Wall Mounting Kit, page 24) or to a Graco cart (order Cart Mounting Kit 24E879). Pump dimensions are shown on page 30.

Wall-Mounted Pumps

1. Be sure the wall can support the weight of the pump, bracket, hoses and accessories, as well as the stress caused during operation.

2. Position the wall bracket about 1.2-1.5 m (4-5 ft) above the floor. For ease of operation and service, make sure the pump air inlet, fluid inlet, and fluid outlet ports are easily accessible.

3. Using the wall bracket as a template, drill 10 mm (0.4 in.) mounting holes in the wall. Wall mounting dimensions are shown on page 31.

4. Attach the bracket to the wall. Use 9 mm (3/8 in.) screws that are long enough to keep the pump from vibrating during operation.

NOTE: Be sure the pump is level.

Cart-Mounted Pumps

Kit 24E885 is available if you plan to bolt your cart to the floor. It includes two spacers that keep the legs stable. Bolts not included.

Air and Fluid Hoses

Be sure all air hoses (N) and fluid hoses (M) are properly sized and pressure rated for your system. See Fig. 3. Use only electrically conductive fluid hoses.
Accessories
Install the following accessories in the order shown in Fig. 2 or Fig. 3, using adapters as necessary.

Air Line
- **Bleed-type master air valve (E):** required in your system to relieve air trapped between it and the air motor and gun when the valve is closed. Do not block access to the valve.

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

- **Air line filter (B):** removes harmful dirt and moisture from compressed air supply.
- **Air shutoff valve (A):** isolates air line accessories for servicing. Locate upstream from all other air line accessories.
- **Gun air regulator (D):** controls air pressure to the air-assisted spray gun.

Fluid Line
- **Fluid filter (P):** with a 60 mesh (250 micron) stainless steel element to filter particles from the fluid as it leaves the pump.
- **Fluid drain valve (V):** required in your system, to relieve fluid pressure in the hose and gun.
- **Gun or valve (L):** dispenses the fluid. The gun shown in Fig. 3 is an air-assisted spray gun for light to medium viscosity fluids.
- **Fluid line swivel (K):** for easier gun movement.
- **Suction kit (U):** enables the pump to draw fluid from a container.

Be sure the valve is easily accessible from the pump and located downstream from the air regulator.

- **Pump air regulator (H):** controls pump speed and outlet pressure. Locate it close to the pump.
Operation

Pressure Relief Procedure

1. Lock the gun trigger.
2. Close the bleed-type master air valve.
3. Unlock the gun trigger.
4. Hold a metal part of the gun firmly to a grounded metal pail. Trigger the gun to relieve pressure.
5. Lock the gun trigger.
6. Open all fluid drain valves in the system, having a waste container ready to catch drainage. Leave drain valve(s) open until you are ready to spray again.
7. If you suspect that pressure has not been fully relieved after following the steps above, check the following:
   a. The spray tip may be completely clogged. Very slowly loosen the air cap retaining ring to relieve pressure in the cavity between the ball/seat shutoff and the plugged tip. Clear the tip orifice.
   b. The gun fluid filter or the fluid hose may be completely clogged. Very slowly loosen the hose end coupling at the gun and relieve pressure gradually. Then loosen completely to clear the obstruction.
   c. After following the steps above, if the spray tip or hose still seems completely clogged, very slowly loosen the tip guard retaining nut or hose end coupling and relieve pressure gradually, then loosen completely. With tip removed, trigger gun into waste container.

Flush the Pump Before First Use

The pump is tested with lightweight oil, which is left in to protect the pump parts. If the fluid you are using may be contaminated by the oil, flush it out with a compatible solvent. See Flushing, page 16.

Trigger Lock

Always engage the trigger lock when you stop spraying to prevent the gun from being triggered accidentally by hand or if dropped or bumped.

FIG. 5. Gun Trigger Lock
Prime and Adjust the Pump

1. Lock gun trigger. Remove tip guard and spray tip from gun. Refer to gun manual.

2. Close gun air regulator (D) and pump air regulator (H) by turning knobs counterclockwise reducing pressure to zero. Close bleed-type air valve (E). Also verify that all drain valves are closed.

3. Check that all fittings throughout system are tightened securely.

4. Position pail close to pump. Do not stretch suction hose tight; let it hang to assist fluid flow into pump.

5. Hold metal part of gun (L) firmly to side of grounded metal pail, unlock trigger, and hold trigger open.

6. Open bleed-type air valve (E). Slowly open the pump air regulator (H) until the pump starts.

7. Cycle pump slowly until all air is pushed out and the pump and hoses are fully primed.

8. Release the gun trigger and engage the trigger lock. Pump should stall against pressure.

9. In a direct supply system, with the pump and lines primed, and with adequate air pressure and volume supplied, the pump will start and stop as the gun/valve is opened and closed.

10. In a circulating system, the pump runs continuously and speeds up or slows down as the system demands until the air supply is shut off.

11. Use the air regulator to control the pump speed and the fluid pressure. Always use the lowest air pressure necessary to get the desired results. Higher pressures cause premature tip/nozzle and pump wear.

Noticed:
The maximum fluid inlet pressure is 15 psi (0.1 MPa, 1.0 bar). Damage to the bellows may occur if you exceed this pressure. Do not use another pump or checking device to supply the bellows pump.

NOTICE: Never allow the pump to run dry of the fluid being pumped. A dry pump quickly accelerates to a high speed, possibly damaging itself. If your pump accelerates quickly, or is running too fast, stop it immediately and check the fluid supply. If the supply container is empty and air has been pumped into the lines, refill the container and prime the pump and the lines with fluid, or flush and leave it filled with a compatible solvent. Be sure to eliminate all air from the fluid system.

Shutdown and Care of the Pump

For a brief shutdown, relieve the pressure, page 14. For a longer shutdown, or overnight, always flush the pump, page 16, and relieve the pressure, page 14.

NOTE: If the overflow chamber (optional accessory) contains fluid, unscrew the bottle (103) and discard. If it has not been used, the bottle can remain attached to the cap.

To avoid the buildup of static charge, do not rub the plastic bottle with a dry cloth while it is attached to the pump. Remove the bottle to clean, if needed.
Maintenance

Preventive Maintenance Schedule

The operating conditions of your particular system determine how often maintenance is required. Establish a preventive maintenance schedule by recording when and what kind of maintenance is needed, and then determine a regular schedule for checking your system.

Tighten Threaded Connections

Before each use, check all hoses for wear or damage. Replace as necessary. Check that all threaded connections are tight and leak-free.

Flushing

Read all Warnings. Follow all Grounding instructions. See page 12.

Flush the pump:

- Before first use
- When changing colors or fluids
- Before repairing equipment
- Before fluid dries or settles out in a dormant pump (check the pot life of catalyzed fluids)
- At the end of the day
- Before storing the pump.

Flush at the lowest pressure possible. Flush with a fluid that is compatible with the fluid you are pumping and with the wetted parts in your system. Check with your fluid manufacturer or supplier for recommended flushing fluids and flushing frequency.

1. Follow Pressure Relief Procedure, page 14.

2. Remove tip guard and spray tip from gun. Refer to separate gun manual.
# Troubleshooting

**NOTE:** Check all possible problems and causes before disassembling the pump.

**Relieve the pressure**, page 14, before checking or servicing the equipment.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump output low on both strokes.</td>
<td>Restricted air supply lines.</td>
<td>Clear any obstructions; be sure all shut off valves are open; increase pressure, but do not exceed maximum working pressure.</td>
</tr>
<tr>
<td></td>
<td>Exhausted fluid supply.</td>
<td>Refill and reprime pump.</td>
</tr>
<tr>
<td></td>
<td>Clogged fluid outlet line, valves, etc.</td>
<td>Clear.</td>
</tr>
<tr>
<td></td>
<td>Worn piston u-cup or v-packings.</td>
<td>Replace. See Bellows Displacement Pump manual.*</td>
</tr>
<tr>
<td>Pump output low on only one stroke.</td>
<td>Held open or worn ball check valves.</td>
<td>Check and repair. See Bellows Displacement Pump manual.*</td>
</tr>
<tr>
<td></td>
<td>Worn piston u-cup or v-packings.</td>
<td>Replace. See Bellows Displacement Pump manual.*</td>
</tr>
<tr>
<td>No output.</td>
<td>Improperly installed ball check valves.</td>
<td>Check and repair. See Bellows Displacement Pump manual.*</td>
</tr>
<tr>
<td>Pump operates erratically.</td>
<td>Exhausted fluid supply.</td>
<td>Refill and reprime pump.</td>
</tr>
<tr>
<td></td>
<td>Held open or worn ball check valves.</td>
<td>Check and repair. See Bellows Displacement Pump manual.*</td>
</tr>
<tr>
<td></td>
<td>Clogged suction tube or filter</td>
<td>Clear part(s).</td>
</tr>
<tr>
<td></td>
<td>Worn piston u-cup or v-packings.</td>
<td>Replace. See Bellows Displacement Pump manual.*</td>
</tr>
<tr>
<td></td>
<td>Damaged bellows.</td>
<td>Replace. See Bellows Displacement Pump manual.*</td>
</tr>
<tr>
<td>Material visible in the overflow chamber (if equipped) or weeping from port in packing nut.</td>
<td>Damaged bellows.</td>
<td>Replace. See Bellows Displacement Pump manual.*</td>
</tr>
<tr>
<td>Pump will not operate.</td>
<td>Restricted air supply lines.</td>
<td>Clear any obstructions; be sure all shut off valves are open; increase pressure, but do not exceed maximum working pressure.</td>
</tr>
<tr>
<td></td>
<td>Exhausted fluid supply.</td>
<td>Refill and reprime pump.</td>
</tr>
<tr>
<td></td>
<td>Clogged fluid outlet line, valves, etc.</td>
<td>Clear.</td>
</tr>
<tr>
<td></td>
<td>Damaged air motor.</td>
<td>See NXT Air Motor manual.*</td>
</tr>
<tr>
<td></td>
<td>Runaway solenoid has tripped.</td>
<td>Retract solenoid. NXT Air Motor manual.*</td>
</tr>
</tbody>
</table>

*See Related Manuals, page 2, for manual numbers.*
Repair

General Information

• Reference numbers and letters in parentheses in the text refer to the callouts in the figures and the parts drawing.
• Always use Genuine Graco Parts and Accessories, available from your Graco distributor. If you supply your own accessories, be sure they are adequately sized and pressure rated for your system.

Preparation

1. Flush the pump, if possible, page 16.
2. Stop the pump close to the middle of the stroke.
4. Disconnect the air and fluid hoses and the ground wire.
5. Remove the shield.

NOTE: If the overflow chamber (optional accessory) contains fluid, unscrew the bottle (103) and discard. If it has not been used, the bottle can remain attached to the cap.

To avoid the buildup of electrostatic charge, do not rub the plastic bottle with a dry cloth while it is attached to the pump. Remove the bottle to clean, if needed.

Disconnect the Pump

NOTE: Follow these instructions to remove the entire pump from the wall or cart bracket. For wall-mounted packages, you may prefer to remove the entire pump, even if only the air motor requires repair.

1. Follow all steps under Preparation, page 18.
2. Loosen the four mounting nuts. Use two people to lift the entire pump up and out from the mounting plate. Place it on a work bench.

Disconnect the Displacement Pump

1. Follow all steps under Preparation, page 18.
2. Loosen the screws on the top cap.
3. Hold the coupling nut (7) with a wrench. Use another wrench to turn the motor shaft. To avoid damage to the bellows top cap and the D-shaped seal, do not turn the coupling nut.
4. Lower the coupling nut (7) and remove the coupling collars (5).

FIG. 7. Loosen the coupling nut.

FIG. 8. Remove coupling collars.
5. Push up the motor shaft. Remove the coupling nut (7).

6. Use a socket to remove the tie rod nuts (4).

7. Use a socket to remove the bottom two mounting screws.

8. Carefully remove the displacement pump, with the pump adapter attached.

9. Clamp the adapter plate in a vise to service the displacement pump.

10. See your displacement pump manual for service and parts information.

Disconnect the Air Motor

1. Follow all steps under Preparation, page 18.

2. Loosen the screws on the top cap.

3. Hold the coupling nut (7) with a wrench. Use another wrench to turn the motor shaft. To avoid damage to the bellows top cap and the D-shaped seal, do not turn the coupling nut. See Fig. 7.

4. Lower the coupling nut (7) and remove the coupling collars (5). See Fig. 8.

5. Push up the motor shaft. Remove the coupling nut (7).

6. Use a socket to remove the tie rod nuts (4).

7. Use a socket to remove the top two mounting screws.

8. Lift up on the air motor to remove it. The tie rods (3) will remain attached.

NOTE: For cart mount pumps, remove the two screws on the arms and tip back or remove the air control panel for easier removal of the air motor.

9. Use a socket on the flats of the tie rods (3) to remove them from the bottom cover of the air motor.

NOTE: See your air motor manual for service and parts information.
Reconnect the Air Motor

1. Screw the tie rods (3) into the bottom cover of the air motor. Torque to 50-55 ft-lb (68-75 N•m).

2. As needed for the larger air motors, use two people to reattach. Align the tie rods (3) with the holes in the pump adapter. Carefully lower the air motor into place.

3. Attach the tie rod nuts (4) and torque to 50-60 ft-lb (68-81 N•m).

4. Tighten the mounting screws.

5. Hold the motor shaft up with one hand. With your other hand, put the coupling nut (7) on the displacement rod.

6. Put the coupling collars (5) into the coupling nut (7) so large flanges point upward.

7. Gently let the motor shaft drop onto the displacement rod. Torque the coupling nut (7) to 75-80 ft-lb (138-146 N•m).

8. Connect the air and fluid hoses, the ground wire, and the shield.

Reconnect the Displacement Pump

1. Align the straight edge of the pump adapter with the back of the air motor. Slide the pump adapter onto the tie rods (3).

2. Attach the tie rod nuts (4) and torque to 50-60 ft-lb (68-81 N•m).

3. Tighten the mounting screws.

4. Hold the motor shaft up with one hand. With your other hand, put the coupling nut (7) on the displacement rod.

5. Put the coupling collars (5) into the coupling nut (7) so large flanges point upward.

6. Gently let the motor shaft drop onto the displacement rod. Torque the coupling nut (7), see Table 1.

7. Connect the air and fluid hoses, the ground wire, and the shield.

<table>
<thead>
<tr>
<th>Motor</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>M04xxx</td>
<td>50-55 ft-lb (68-75 N•m)</td>
</tr>
<tr>
<td>M07xxx - M34xxx</td>
<td>75-80 ft-lb (102-108 N•m)</td>
</tr>
</tbody>
</table>

Reconnect the Pump

NOTE: If the entire pump has been removed and is now reassembled, follow these directions:

1. Use two people to lift the pump into place. Slide it in and down onto the mounting plate.

2. Tighten the mounting screws.

3. Connect the air and fluid hoses, the ground wire, and the shield.
Torque to 50-55 ft-lb (68-75 N•m).  
Torque to 50-60 ft-lb (68-81 N•m).  
Torque to 75-80 ft-lb (138-146 N•m).  
M04xxx air motors only; counterbore end faces motor.
### Parts That Vary by Model

#### Part No./Description

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>See Table</td>
<td>DISPLACEMENT PUMP, see manual 312793 for parts</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>See Table</td>
<td>MOTOR, see manual 312796 for parts</td>
<td>1</td>
</tr>
<tr>
<td>3*</td>
<td>15U691</td>
<td>TIE ROD</td>
<td>3</td>
</tr>
<tr>
<td>4*</td>
<td>15U606</td>
<td>NUT, tie rod</td>
<td>3</td>
</tr>
<tr>
<td>5*</td>
<td>184128</td>
<td>COLLAR, coupling; see page 24 for package of 10</td>
<td>2</td>
</tr>
<tr>
<td>6*</td>
<td>See Table</td>
<td>ADAPTER, used with air motor M04xxx</td>
<td>1</td>
</tr>
<tr>
<td>7*</td>
<td>15T311</td>
<td>NUT, coupling</td>
<td>1</td>
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<tr>
<td>8*</td>
<td>24A640</td>
<td>SHIELD, coupler</td>
<td>Set of 2</td>
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<td>9</td>
<td>238909</td>
<td>WIRE, grounding assembly</td>
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<td>10</td>
<td>24E992</td>
<td>LIFT RING, with o-ring</td>
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<td>11▲</td>
<td>290079</td>
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<td>12▲</td>
<td>15W718</td>
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<td>13▲</td>
<td>15W719</td>
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</table>

----- Not sold separately.

* Included in Connecting Kit. See page 24 to order the correct kit for your pump.

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

### Model Information

<table>
<thead>
<tr>
<th>Model</th>
<th>Displacement Pump (1)</th>
<th>Motor (2)</th>
<th>Motor Piston Diam. (in.)</th>
<th>Adapter (6)</th>
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<tbody>
<tr>
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<td>LB150A</td>
<td>M04LN0</td>
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<td>15M675</td>
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<td>B05FB0</td>
<td></td>
<td>M04LT0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B05FA1</td>
<td>LB150B</td>
<td>M04LN0</td>
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<td></td>
</tr>
<tr>
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<td>M04LT0</td>
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<tr>
<td>B12DA0</td>
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<td>M07LN0</td>
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<tr>
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<td></td>
<td>M07LT0</td>
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<td></td>
</tr>
<tr>
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<td>M07LN0</td>
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<tr>
<td>B12DB1</td>
<td></td>
<td>M07LT0</td>
<td></td>
<td></td>
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<tr>
<td>B15BA0</td>
<td>LB050A</td>
<td>M04LN0</td>
<td>3.5</td>
<td>15M675</td>
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<tr>
<td>B15BB0</td>
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<td>M04LT0</td>
<td></td>
<td></td>
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<tr>
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<td>LB050B</td>
<td>M04LN0</td>
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<tr>
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<td>M04LT0</td>
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<td>6.0</td>
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<td>M12LT0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B15FA1</td>
<td>LB150B</td>
<td>M12LN0</td>
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<tr>
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<td>M12LN0</td>
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<td>B23DB0</td>
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<td>LB150B</td>
<td>M18LN0</td>
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<td>LB100A</td>
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<td>M18LT0</td>
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</tbody>
</table>
Repair Kits

NOTE: For displacement pump repair kits, see manual 312793. For air motor repair kits, see manual 312796.

Wall Mounting Kits
Includes bracket and hardware.

<table>
<thead>
<tr>
<th>Kit</th>
<th>Air Motor on Pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>24E880</td>
<td>M04xxx</td>
</tr>
<tr>
<td>24E881</td>
<td>M07xxx</td>
</tr>
<tr>
<td>24E882</td>
<td>M12xxx or M18xxx</td>
</tr>
</tbody>
</table>

Cart Mounting Kit 24E879
Includes cart, bracket, and hardware.

Accessories

Overflow Chamber Kit 24E298
Kit includes overflow cup with cap, seals and necessary hardware. Parts not sold separately.

![Overflow Chamber Kit Diagram]

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Description</th>
<th>Qty.</th>
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</thead>
<tbody>
<tr>
<td>101</td>
<td>LID</td>
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</tr>
<tr>
<td>102</td>
<td>O-RING</td>
<td>1</td>
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<tr>
<td>103</td>
<td>BOTTLE</td>
<td>1</td>
</tr>
<tr>
<td>104</td>
<td>FITTING, 2 x 1/4-18 npt</td>
<td>1</td>
</tr>
<tr>
<td>105</td>
<td>NUT, retaining</td>
<td>1</td>
</tr>
<tr>
<td>106</td>
<td>D-SHAPED SEAL, bellows</td>
<td>1</td>
</tr>
</tbody>
</table>
Performance Charts

Model B05Fxx
5:1 Ratio, 150cc/cycle

Model B12Dxx
12:1 Ratio, 100cc/cycle

Fluid Flow gpm (lpm) tested in No. 10 weight oil

Air Flow scfm (m³/min)

KEY

A = 100 psi (0.7 MPa, 7 bar)
B = 70 psi (0.5 MPa, 5 bar)
C = 40 psi (0.3 MPa, 3 bar)
= fluid flow
= air consumption
Model B15Fxx
15:1 Ratio, 150cc/cycle

Cycles per Minute

Fluid Outlet Pressure psi (MPa, bar)

Air Flow scfm (m³/min)

Fluid Flow gpm (lpm) tested in No. 10 weight oil

KEY

A = 100 psi (0.7 MPa, 7 bar)
B = 70 psi (0.5 MPa, 5 bar)
C = 40 psi (0.3 MPa, 3 bar)

= fluid flow
= air consumption

Model B15Bxx
15:1 Ratio, 50cc/cycle

Cycles per Minute

Fluid Outlet Pressure psi (MPa, bar)

Air Flow scfm (m³/min)

Fluid Flow gpm (lpm) tested in No. 10 weight oil

A = 100 psi (0.7 MPa, 7 bar)
B = 70 psi (0.5 MPa, 5 bar)
C = 40 psi (0.3 MPa, 3 bar)

= fluid flow
= air consumption
Model B23Dxx
23:1 Ratio, 100 cc/cycle

Fluid Flow gpm (lpm) tested in No. 10 weight oil

Fluid Outlet Pressure psi (MPa, bar)

Air Flow scfm (m³/min)

KEY
A = 100 psi (0.7 MPa, 7 bar)
B = 70 psi (0.5 MPa, 5 bar)
C = 40 psi (0.3 MPa, 3 bar)
= fluid flow
= air consumption

Model B24Fxx
24:1 Ratio, 150cc/cycle

Fluid Flow gpm (lpm) tested in No. 10 weight oil
Model B25Bxx
25:1 Ratio, 50 cc/cycle

Cycles per Minute

Fluid Outlet Pressure psi (MPa, bar)

Air Flow scfm (m³/min)

Fluid Flow gpm (lpm) tested in No. 10 weight oil

A = 100 psi (0.7 MPa, 7 bar)
B = 70 psi (0.5 MPa, 5 bar)
C = 40 psi (0.3 MPa, 3 bar)

= fluid flow
- = air consumption

Model B35Dxx
35:1 Ratio, 100 cc/cycle

Cycles per Minute

Fluid Outlet Pressure psi (MPa, bar)

Air Flow scfm (m³/min)

Fluid Flow gpm (lpm) tested in No. 10 weight oil

A = 100 psi (0.7 MPa, 7 bar)
B = 70 psi (0.5 MPa, 5 bar)
C = 40 psi (0.3 MPa, 3 bar)

= fluid flow
- = air consumption
## Pump Dimensions

<table>
<thead>
<tr>
<th>Pump Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Weight</th>
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<tbody>
<tr>
<td>B05FAX</td>
<td>33 (838)</td>
<td>6.9 (175)</td>
<td>5.8 (147)</td>
<td>9.7 (246)</td>
<td>35 (888)</td>
<td>57 (25)</td>
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<tr>
<td>B05FBX</td>
<td>58 (26)</td>
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<tr>
<td>B12DAX</td>
<td>33.5 (851)</td>
<td>6.9 (175)</td>
<td>10.8 (274)</td>
<td>9.7 (246)</td>
<td>35 (888)</td>
<td>63 (28)</td>
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<tr>
<td>B12DBX</td>
<td>64 (29)</td>
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Wall Bracket Mounting Dimensions

Technical Data

- Maximum fluid working pressure: See Pump Data, page 7.
- Maximum fluid inlet pressure: 15 psi (0.1 MPa, 1.0 bar)
- Maximum air inlet pressure: 100 psi (0.7 MPa, 7 bar)
- Minimum air inlet pressure: 10 psi (0.07 MPa, 0.7 bar)
- Fluid flow at 60 cycles per minute: See Pump Data, page 7.
- Maximum fluid temperature: 160°F (71°C)
- Ambient temperature range: 35°–120°F (2°–49°C)
- Stroke length: 2.5 in. (63.5 mm)
- Sound data: See Technical Data in NXT Air Motor manual.*
- Wetted parts: PEEK, PTFE, stainless steel, tungsten carbide, UHMWPE

* See Related Manuals, page 2, for manual number.
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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For patent information, see www.graco.com/patents.

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