

ALUMINUM

# Husky™ Air-Operated Diaphragm Pumps

308479ZAG

EN

**1-inch (25 mm) AODD pump for fluid transfer applications.  
For professional use only.**

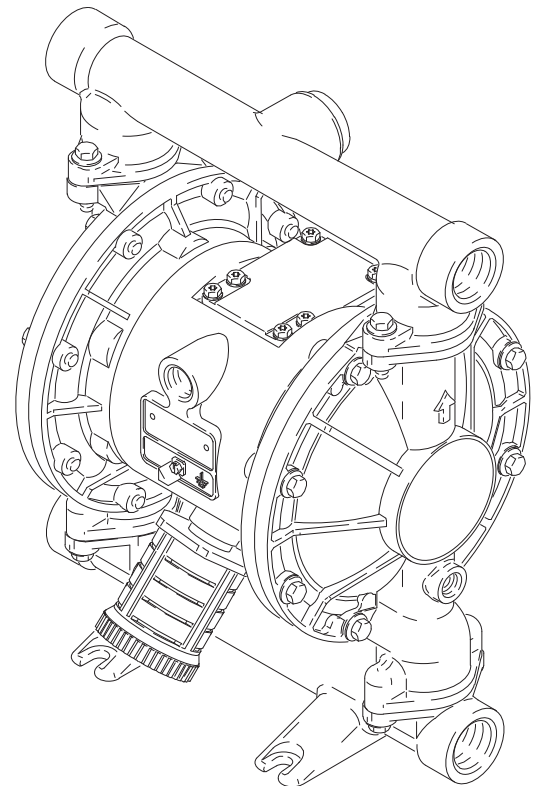
**See Models on page 2 for a list of pump models and descriptions.**

*120 psi (0.8 MPa, 8 bar) Maximum Fluid Working Pressure*  
*120 psi (0.8 MPa, 8 bar) Maximum Air Input Pressure*



#### **Important Safety Instructions**

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



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## Models

Model No.	Description
*D73_____	Aluminum Pumps

**\*NOTE:** Refer to the Pump Matrix on page 24 to determine the Model No. of your pump.

# Symbols

## Warning Symbol





This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

## Caution Symbol



This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

	
 INSTRUCTIONS	<h3>EQUIPMENT MISUSE HAZARD</h3> <p>Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury.</p> <ul style="list-style-type: none"><li>• This equipment is for professional use only.</li><li>• Read all instruction manuals, tags, and labels before operating the equipment.</li><li>• Use the equipment only for its intended purpose. If you are not sure, call your Graco distributor.</li><li>• Do not alter or modify this equipment. Use only genuine Graco parts and accessories.</li><li>• Check equipment daily. Repair or replace worn or damaged parts immediately.</li><li>• Do not exceed the maximum working pressure of the lowest rated component in your system. This equipment has a <b>120 psi (0.8 MPa, 8 bar) maximum working pressure at 120 psi (0.8 MPa, 8 bar) maximum incoming air pressure.</b></li><li>• Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the <b>Technical Data</b> section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.</li><li>• Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in pressurized aluminum equipment. Such use could result in a chemical reaction, with the possibility of explosion.</li><li>• Do not use hoses to pull equipment.</li><li>• Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 82 °C (180 °F) or below -40 °C (-40 °F).</li><li>• Do not lift pressurized equipment.</li><li>• Comply with all applicable local, state, and national fire, electrical, and safety regulations.</li></ul>

# WARNING



## TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.
- Pipe and dispose of the exhaust air safely, away from people, animals, and food handling areas. If the diaphragm fails, the fluid is exhausted along with the air. See **Air Exhaust Ventilation** on page 10.



## FIRE AND EXPLOSION HAZARD

Improper grounding, poor ventilation, open flames or sparks can cause a hazardous condition and result in a fire or explosion and serious injury.

- Ground the equipment. Refer to **Grounding** on page 5.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop pumping immediately**. Do not use the equipment until you identify and correct the problem.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvents or the fluid being sprayed.
- Pipe and dispose of the exhaust air safely, away from all sources of ignition. If the diaphragm fails, the fluid is exhausted along with the air. See **Air Exhaust Ventilation** on page 10.
- Keep the work area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the work area.
- Extinguish all open flames or pilot lights in the work area.
- Do not smoke in the work area.
- Do not turn on or off any light switch in the work area while operating or if fumes are present.
- Do not operate a gasoline engine in the work area.

# Installation

## General Information

- The Typical Installations shown in Figs. 2–4 are only guides for selecting and installing system components. Contact your Graco distributor for assistance in planning a system to suit your needs.
- Always use Genuine Graco Parts and Accessories. Refer to Product Data Sheet 305588.
- Reference numbers and letters in parentheses refer to the callouts in the figures and the parts lists on pages 26–28.

## ! WARNING



### TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

1. Read **TOXIC FLUID HAZARD** on page 4.
2. Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.

## Tightening Screws Before First Use

Before using the pump for the first time, check and retorquer all external fasteners. See **Torque Sequence**, page 29. After the first day of operation, retorquer the fasteners. Although pump use varies, a general guideline is to retorquer fasteners every two months.

## Grounding

## ! WARNING

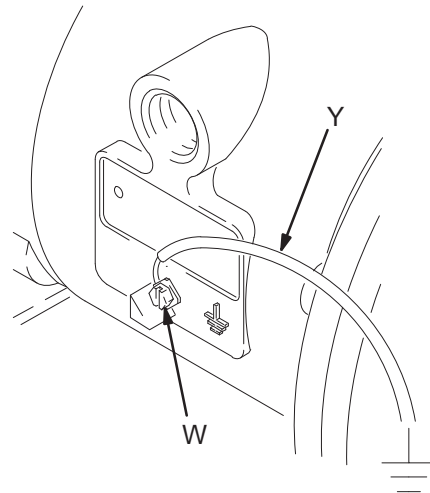


### FIRE AND EXPLOSION HAZARD

This pump must be grounded. Before operating the pump, ground the system as explained below. Also, read the section **FIRE AND EXPLOSION HAZARD**, on page 4.

To reduce the risk of static sparking, ground the pump and all other equipment used or located in the pumping area. Check your local electrical code for detailed grounding instructions for your area and type of equipment. **Ground all of this equipment.**

- *Pump:* Connect a ground wire and clamp as shown in Fig. 1. Loosen the grounding screw (W). Insert one end of a 12 ga (1.5 mm) minimum ground wire (Y) behind the grounding screw and tighten the screw securely. Connect the clamp end of the ground wire to a true earth ground. Order Part No. 222011 Ground Wire and Clamp.



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Fig. 1

- *Air and fluid hoses:* Use only grounded hoses with a maximum of 500 ft (150 m) combined hose length to ensure grounding continuity.
- *Air compressor:* Follow the manufacturer's recommendations.
- *All solvent pails used when flushing:* Follow the local code. Use only metal pails, which are conductive. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts the grounding continuity.
- *Fluid supply container:* Follow the local code.

# Installation

## Mountings

### CAUTION

The pump exhaust air may contain contaminants. Ventilate to a remote area if the contaminants could affect your fluid supply. See **Air Exhaust Ventilation** on page 10.

- Be sure the mounting surface can support the weight of the pump, hoses, and accessories, as well as the stress caused during operation.
- For all mountings, be sure the pump is bolted directly to the mounting surface.
- For ease of operation and service, mount the pump so the air valve cover (2), air inlet, and fluid inlet and outlet ports are easily accessible.
- Rubber Foot Mounting Kit 236452 is available to reduce noise and vibration during operation.

## Air Line

### WARNING

A bleed-type master air valve (B) is required in your system to relieve air trapped between this valve and the pump. Trapped air can cause the pump to cycle unexpectedly, which could result in serious injury, including splashing in the eyes or on the skin, injury from moving parts, or contamination from hazardous fluids. See Fig. 3.

1. Install the air line accessories as shown in Figs. 2–4 on pages 7 and 9. Mount these accessories on the wall or on a bracket. Be sure the air line supplying the accessories is grounded.

- a. Install an air regulator (C) and gauge to control the fluid pressure. The fluid outlet pressure will be the same as the setting of the air regulator.
- b. Locate one bleed-type master air valve (B) close to the pump and use it to relieve trapped air. See the **WARNING** above. Locate the other master air valve (E) upstream from all air line accessories and use it to isolate them during cleaning and repair.
- c. The air line filter (F) removes harmful dirt and moisture from the compressed air supply.

2. Install a grounded, flexible air hose (A) between the accessories and the 1/2 npt(f) pump air inlet (N). See Fig. 5. Use a minimum 3/8" (9.5 mm) ID air hose. Screw an air line quick disconnect coupler (D) onto the end of the air hose (A), and screw the mating fitting into the pump air inlet snugly. Do not connect the coupler (D) to the fitting until you are ready to operate the pump.

## Fluid Suction Line

1. Use grounded fluid hoses. The pump fluid inlet (R) is 1" npt(f). See Fig. 5. Screw the fluid fitting into the pump inlet securely.
2. If the fluid inlet pressure to the pump is more than 25% of the outlet working pressure, the ball check valves will not close fast enough, resulting in inefficient pump operation.
3. At inlet fluid pressures greater than 15 psi (0.1 MPa, 1 bar), diaphragm life will be shortened.
4. See the **Technical Data** on page 33 for maximum suction lift (wet and dry).

# Installation

## Fluid Outlet Line

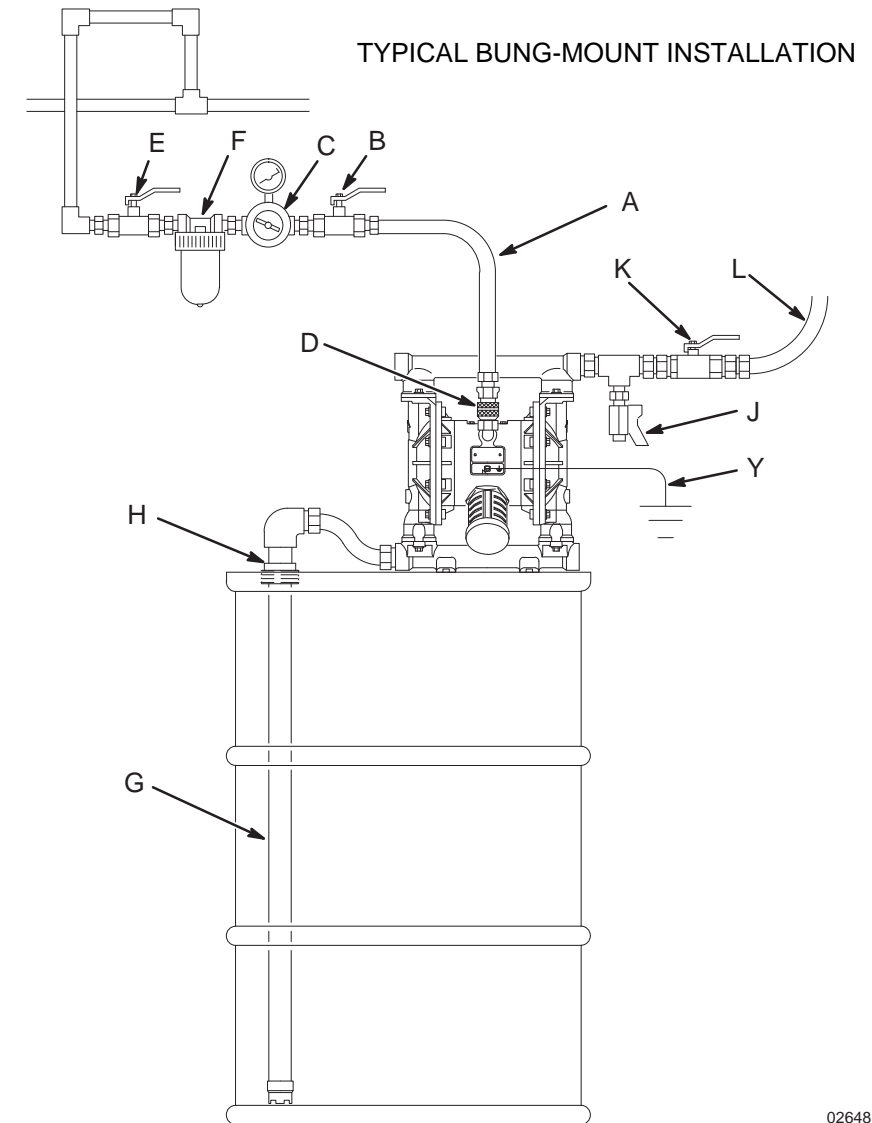
### **WARNING**

A fluid drain valve (J) is required to relieve pressure in the hose if it is plugged. The drain valve reduces the risk of serious injury, including splashing in the eyes or on the skin, or contamination from hazardous fluids when relieving pressure. Install the valve close to the pump fluid outlet. See Fig. 3.

1. Use grounded fluid hoses (L). The pump fluid outlet (S) is 1" npt(f). See Fig. 5. Screw the fluid fitting into the pump outlet securely.
2. Install a fluid drain valve (J) near the fluid outlet. See the **WARNING** above, and Figs. 2–4 on pages 7 to 9.
3. Install a shutoff valve (K) in the fluid outlet line.

#### KEY FOR FIG. 2

- A Air supply line
- B Bleed-type master air valve (required for pump)
- C Air regulator
- D Air line quick disconnect
- E Master air valve (for accessories)
- F Air line filter
- G Fluid suction line
- H Bung adapter
- J Fluid drain valve (required)
- K Fluid shutoff valve
- L Fluid line
- Y Ground wire (required; see page 5 for installation instructions)



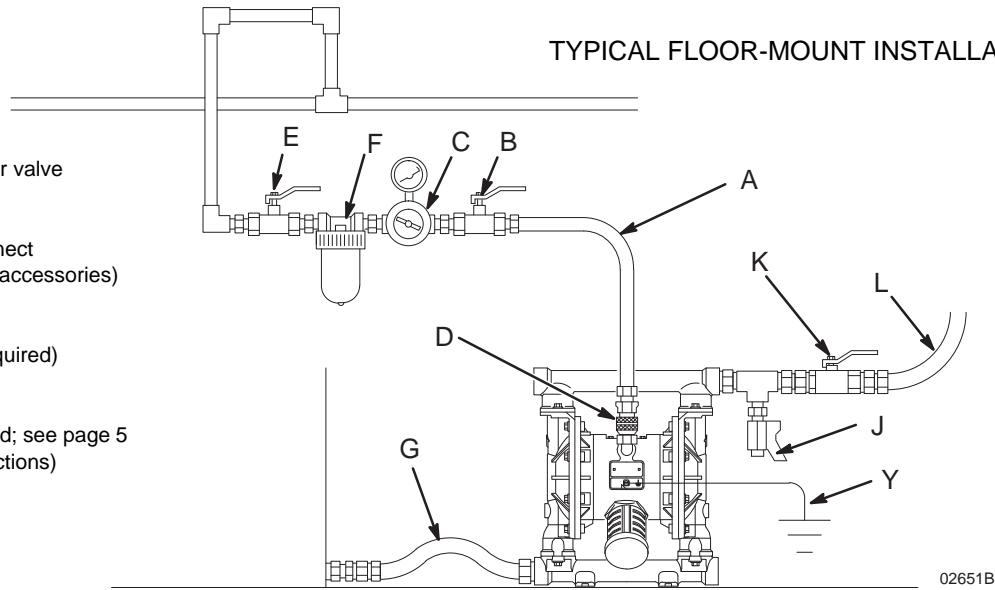
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Fig. 2

# TYPICAL FLOOR-MOUNT INSTALLATION

## KEY FOR FIG. 3

- A Air supply line
- B Bleed-type master air valve (required for pump)
- C Air regulator
- D Air line quick disconnect
- E Master air valve (for accessories)
- F Air line filter
- G Fluid suction line
- J Fluid drain valve (required)
- K Fluid shutoff valve
- L Fluid line
- Y Ground wire (required; see page 5 for installation instructions)



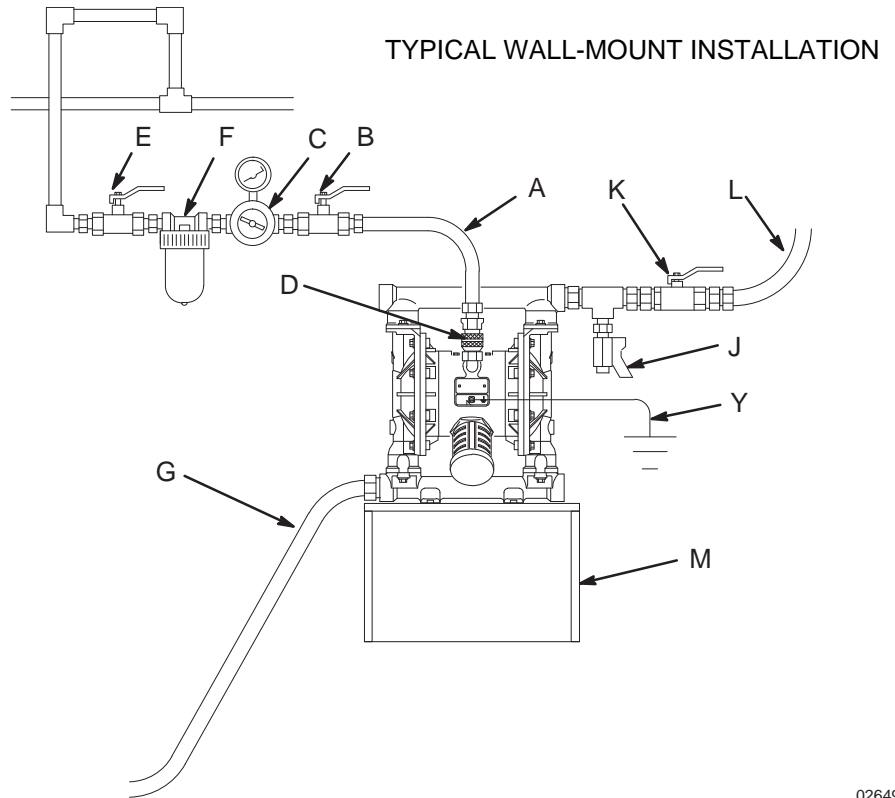
**Fig. 3**



# Installation

## KEY FOR FIG. 4

- A Air supply line
- B Bleed-type master air valve (required for pump)
- C Air regulator
- D Air line quick disconnect
- E Master air valve (for accessories)
- F Air line filter
- G Fluid suction line
- J Fluid drain valve (required)
- K Fluid shutoff valve
- L Fluid line
- M Wall mounting bracket
- Y Ground wire (required; see page 5 for installation instructions)



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Fig. 4

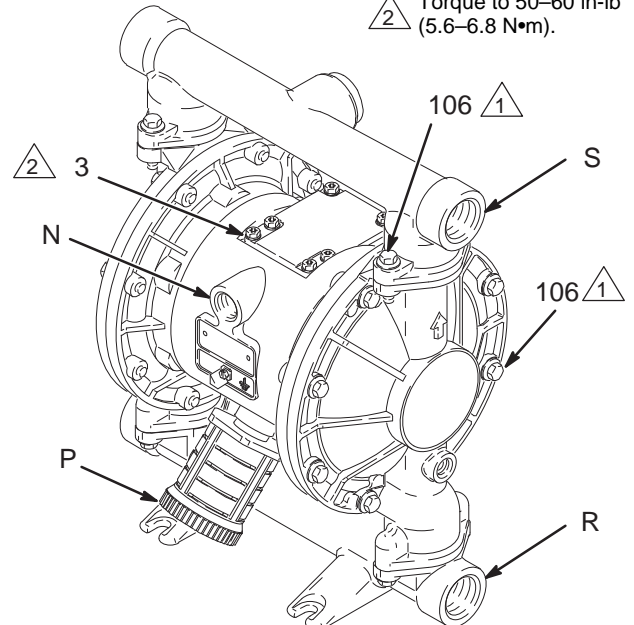
## Changing the Orientation of the Fluid Inlet and Outlet Ports

The fluid inlet and outlet manifolds have threaded ports on both ends. The pump is shipped with a plug installed in one end of each manifold, and the opposite end open. See Fig. 5. To change the orientation of the inlet and/or outlet port, remove the plug from one end of a manifold and install it in the opposite end.

### KEY

- N 1/2 npt(f) air inlet port
- P Muffler. Air exhaust port is 3/4 npt(f)
- R 1 npt(f) fluid inlet port
- S 1 npt(f) fluid outlet port
- 106 Manifold and cover screws
- 3 Air valve screws

- 1 Apply medium-strength (blue) Loctite® or equivalent to the threads, and torque to 120–150 in-lb (14–17 N•m). See **Torque Sequence**, page 29.
- 2 Torque to 50–60 in-lb (5.6–6.8 N•m).



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Fig. 5

# Installation

## Air Exhaust Ventilation

### WARNING



#### FIRE AND EXPLOSION HAZARD

Be sure to read and follow the warnings and precautions regarding **TOXIC FLUID HAZARD**, and **FIRE OR EXPLOSION HAZARD** on page 4, before operating this pump.

Be sure the system is properly ventilated for your type of installation. You must vent the exhaust to a safe place, away from people, animals, food handling areas, and all sources of ignition when pumping flammable or hazardous fluids.

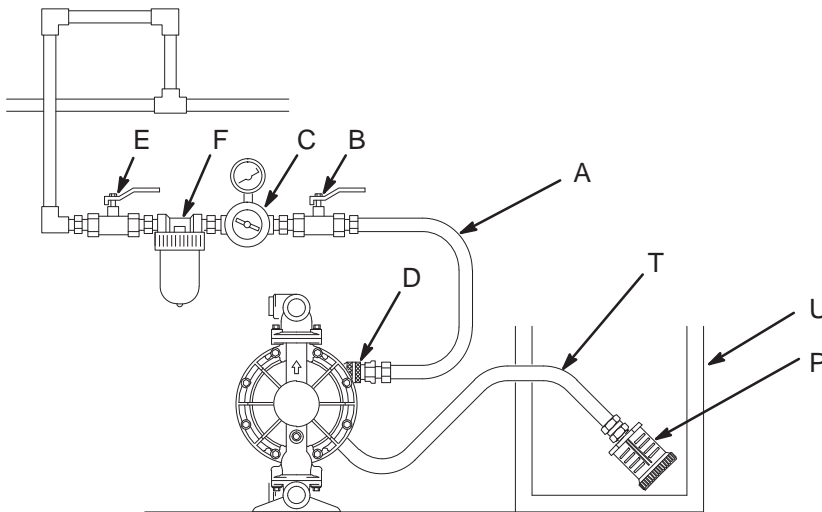
Diaphragm failure will cause the fluid being pumped to exhaust with the air. Place an appropriate container at the end of the air exhaust line to catch the fluid. See Fig. 6.

The air exhaust port is 3/4 npt(f). Do not restrict the air exhaust port. Excessive exhaust restriction can cause erratic pump operation.

To provide a remote exhaust:

1. Remove the muffler (P) from the pump air exhaust port.
2. Install a grounded air exhaust hose (T) and connect the muffler (P) to the other end of the hose. The minimum size for the air exhaust hose is 3/4 in. (19 mm) ID. If a hose longer than 15 ft (4.57 m) is required, use a larger diameter hose. Avoid sharp bends or kinks in the hose.
3. Place a container (U) at the end of the air exhaust line to catch fluid in case a diaphragm ruptures. See Fig. 6.

## VENTING EXHAUST AIR



### KEY

- A Air supply line
- B Bleed-type master air valve (required for pump)
- C Air regulator
- D Air line quick disconnect
- E Master air valve (for accessories)
- F Air line filter
- P Muffler
- T Grounded air exhaust hose
- U Container for remote air exhaust

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Fig. 6

# Installation

## Fluid Pressure Relief Kit

### CAUTION




Pressure Relief Kit 238428 (V) is available for Aluminum Pumps, to prevent overpressurization and rupture of the pump or hose. See Fig. 7. The kit includes instructions.

Thermal expansion of fluid in the outlet line can cause overpressurization. This can occur when using long fluid lines exposed to sunlight or ambient heat, or when pumping from a cool to a warm area (for example, from an underground tank).

Overpressurization can also occur if the Husky pump is being used to feed fluid to a piston pump, and the intake valve of the piston pump does not close, causing fluid to back up in the outlet line.

#### KEY

- R 1 npt(f) optional fluid inlet port
- S 1 npt(f) optional fluid outlet port
- V Pressure relief kit

-  1 Install kit between fluid inlet and outlet manifolds.
-  2 Connect fluid inlet line here.
-  3 Connect fluid outlet line here.

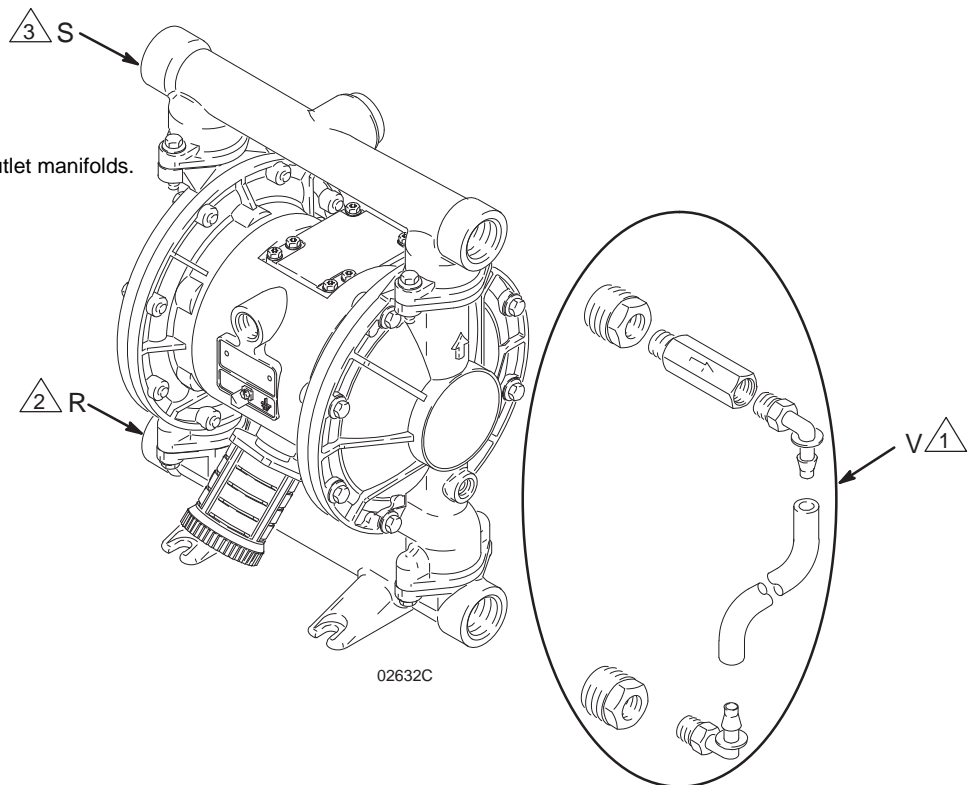


Fig. 7

# Operation

## Pressure Relief Procedure

### WARNING

#### PRESSURIZED EQUIPMENT HAZARD

The equipment stays pressurized until pressure is manually relieved. To reduce the risk of serious injury from pressurized fluid, accidental spray from the gun or splashing fluid, follow this procedure whenever you

- Are instructed to relieve pressure
- Stop pumping
- Check, clean or service any system equipment
- Install or clean fluid nozzles

1. Shut off the air to the pump.
2. Open the dispensing valve, if used.
3. Open the fluid drain valve to relieve fluid pressure, having a container ready to catch the drainage.

## Flush the Pump Before First Use

The pump was tested with water. If water could contaminate the fluid you are pumping, flush the pump thoroughly with a compatible solvent. Follow the steps under **Starting and Adjusting the Pump**.

## Starting and Adjusting the Pump

### WARNING

#### TOXIC FLUID HAZARD



To reduce the risk of serious injury, splashing in the eyes or on the skin, and toxic fluid spills, **never** move or lift a pump under pressure. If dropped, the fluid section may rupture. Always follow the **Pressure Relief Procedure Warning** above before lifting the pump.

1. Be sure the pump is properly grounded. Refer to **Grounding** on page 5.
2. Check fittings to be sure they are tight. Use a compatible liquid thread sealant on male threads. Tighten fluid inlet and outlet fittings securely.
3. Place the suction tube (if used) in fluid to be pumped.

**NOTE:** If fluid inlet pressure to the pump is more than 25% of outlet working pressure, the ball check valves will not close fast enough, resulting in inefficient pump operation.

4. Place the end of fluid hose (L) into an appropriate container.
5. Close the fluid drain valve (J).
6. Back out the air regulator (C) knob, and open all bleed-type master air valves (B, E).
7. If the fluid hose has a dispensing device, hold it open while continuing with the following step.
8. Slowly increase air pressure with the air regulator (C) until the pump starts to cycle. Allow the pump to cycle slowly until all air is pushed out of the lines and the pump is primed.

*If you are flushing, run the pump long enough to thoroughly clean the pump and hoses. Close the air regulator. Remove the suction tube from the solvent and place it in the fluid to be pumped.*

## Pump Shutdown

### WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** at left.

At the end of the work shift, relieve the pressure.

# Maintenance

## Lubrication

The air valve is designed to operate unlubricated, however if lubrication is desired, every 500 hours of operation (or monthly) remove the hose from the pump air inlet and add two drops of machine oil to the air inlet.



### CAUTION

Do not over-lubricate the pump. Oil is exhausted through the muffler, which could contaminate your fluid supply or other equipment. Excessive lubrication can also cause the pump to malfunction.

## Flushing and Storage



### WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 12.

Flush the pump often enough to prevent the fluid you are pumping from drying or freezing in the pump and damaging it. Use a compatible solvent.

Always flush the pump and relieve the pressure before storing it for any length of time.

## Tightening Threaded Connections

Before each use, check all hoses for wear or damage, and replace as necessary. Check to be sure all threaded connections are tight and leak-free. Check fasteners. Tighten or retorquing as necessary. Although pump use varies, a general guideline is to retorquing fasteners every two months. See **Torque Sequence**, page 29.

## Preventive Maintenance Schedule

Establish a preventive maintenance schedule, based on the pump's service history. This is especially important for prevention of spills or leakage due to diaphragm failure.

# Troubleshooting



## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 12.

- Relieve the pressure before checking or servicing the equipment.
- Check all possible problems and causes before disassembling the pump.

PROBLEM	CAUSE	SOLUTION
Pump cycles at stall or fails to hold pressure at stall.	Worn check valve balls (301), seats (201) or o-rings (202).	Replace. See page 18.
Pump will not cycle, or cycles once and stops.	Air valve is stuck or dirty.	Disassemble and clean air valve. See page 16. Use filtered air.
	Check valve ball (301) severely worn and wedged in seat (201) or manifold (102 or 103).	Replace ball and seat. See page 18.
	Check valve ball (301) is wedged into seat (201), due to overpressurization.	Install Pressure Relief Valve (see page 11).
	Dispensing valve clogged.	Relieve pressure and clear valve.
Pump operates erratically.	Clogged suction line.	Inspect; clear.
	Sticky or leaking balls (301).	Clean or replace. See page 18.
	Diaphragm ruptured.	Replace. See page 19.
	Restricted exhaust.	Remove restriction.
Air bubbles in fluid.	Suction line is loose.	Tighten.
	Diaphragm ruptured.	Replace. See page 19.
	Loose inlet manifold (102), damaged seal between manifold and seat (201), damaged o-rings (202).	Tighten manifold bolts (106) or replace seats (201) or o-rings (202). See page 18.
	Loose diaphragm shaft bolt (107).	Tighten or replace (page 19).
	Damaged o-ring (108).	Replace. See page 19.

# Troubleshooting

PROBLEM	CAUSE	SOLUTION
Fluid in exhaust air.	Diaphragm ruptured.	Replace. See page 19.
	Loose diaphragm shaft bolt (107).	Tighten or replace (page 19).
	Damaged o-ring (108).	Replace. See page 19.
Pump exhausts excessive air at stall.	Worn air valve block (7†), o-ring (6†), plate (8†), pilot block (18), u-cups (10), or pilot pin o-rings (17†).	Repair or replace. See page 16.
	Worn shaft seals (402).	Replace. See page 19.
Pump leaks air externally.	Air valve cover (2) or air valve cover screws (3) are loose.	Tighten screws. See page 16.
	Air valve gasket (4) or air cover gasket (22) is damaged.	Inspect; replace. See page 16.
	Air cover screws (25) are loose.	Tighten screws.
Pump leaks fluid externally from ball check valves.	Loose manifolds (102, 103), damaged seal between manifold and seat (201), damaged o-rings (202).	Tighten manifold bolts (106) or replace seats (201) or o-rings (202). See page 18.

# Service

## Repairing the Air Valve

### Tools Required

- Torque wrench
- Torx (T20) screwdriver or 7 mm (9/32") socket wrench
- Needle-nose pliers
- O-ring pick
- Lithium base grease

**NOTE:** Air Valve Repair Kit 236273 is available. Parts included in the kit are marked with a symbol, for example (4†). Use all the parts in the kit for the best results.

### Disassembly



## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 12.

1. Relieve the pressure.
2. With a Torx (T20) screwdriver or 7 mm (9/32") socket wrench, remove the six screws (3), air valve cover (2), and gasket (4). See Fig. 8.
3. Move the valve carriage (5) to the center position and pull it out of the cavity. Remove the valve block (7†) and o-ring (6†) from the carriage. Using a needle-nose pliers, pull the pilot block (18) straight up and out of the cavity. See Fig. 9.
4. Pull the two actuator pistons (11) out of the bearings (12). Remove the u-cup packings (10) from the pistons. Pull the pilot pins (16) out of the bearings (15). Remove the o-rings (17) from the push pins. See Fig. 10.
5. Inspect the valve plate (8) in place. If damaged, use a Torx (T20) screwdriver or 7 mm (9/32") socket wrench to remove the three screws (3). Remove the valve plate (8) and seal (9). See Fig. 11.
6. Inspect the bearings (12, 15) in place. See Fig. 10. The bearings are tapered and, if damaged, must be removed from the outside. This requires disassembly of the fluid section. See page 19.
7. Clean all parts and inspect for wear or damage. Replace as needed.

### Reassembly

1. *If you replaced the bearings (12, 15),* reinstall as explained on page 22. Reassemble the fluid section.
2. Install the valve plate seal (9†) into the groove at the bottom of the valve cavity. The rounded side of the seal **must face down** into the groove. See Fig. 11.
3. Install the valve plate (8) in the cavity. The plate is reversible, so either side can face up. Install the three screws (3), using a Torx (T20) screwdriver or 7 mm (9/32") socket wrench. Tighten until the screws bottom out on the housing. See Fig. 11.
4. Install an o-ring (17†) on each pilot pin (16). Grease the pins and o-rings. Insert the pins into the bearings (15), **narrow** end first. See Fig. 10.
5. Install a u-cup packing (10†) on each actuator piston (11), so the lips of the packings face the **narrow** end of the pistons. See Fig. 10.
6. Lubricate the u-cup packings (10†) and actuator pistons (11). Insert the actuator pistons in the bearings (12), **wide** end first. Leave the narrow end of the pistons exposed. See Fig. 10.
7. Grease the lower face of the pilot block (18†) and install so its tabs snap into the grooves on the ends of the pilot pins (16). See Fig. 9.
8. Grease the o-ring (6†) and install it in the valve block (7†). Push the block onto the valve carriage (5). Grease the lower face of the valve block. See Fig. 9.
9. Install the valve carriage (5) so its tabs slip into the grooves on the narrow end of the actuator pistons (11). See Fig. 9.
10. Align the valve gasket (4†) and cover (2) with the six holes in the center housing (1). Secure with six screws (3), using a Torx (T20) screwdriver or 7 mm (9/32") socket wrench. Torque to 50–60 in-lb (5.6–6.8 N•m). See Fig. 8.



# Service

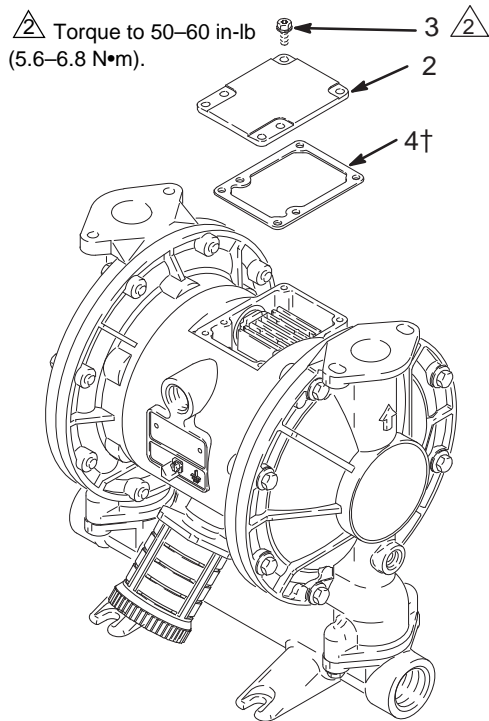


Fig. 8

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- ⚠ Insert narrow end first.
- ⚠ Grease.
- ⚠ Install with lips facing narrow end of piston (11).
- ⚠ Insert wide end first.

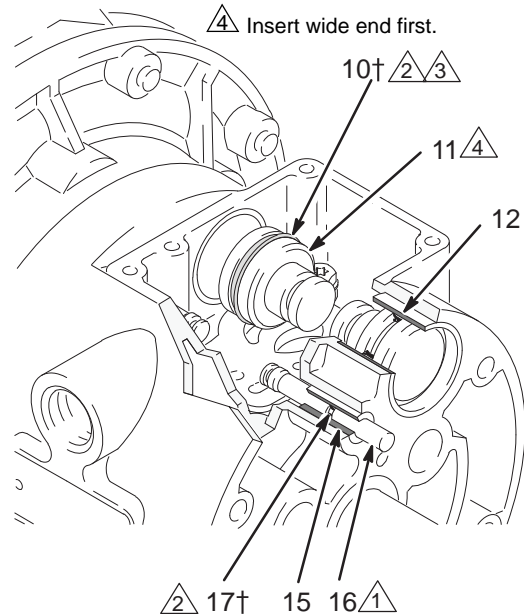


Fig. 10

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- ⚠ See Detail at right.
- ⚠ Grease.
- ⚠ Grease lower face.

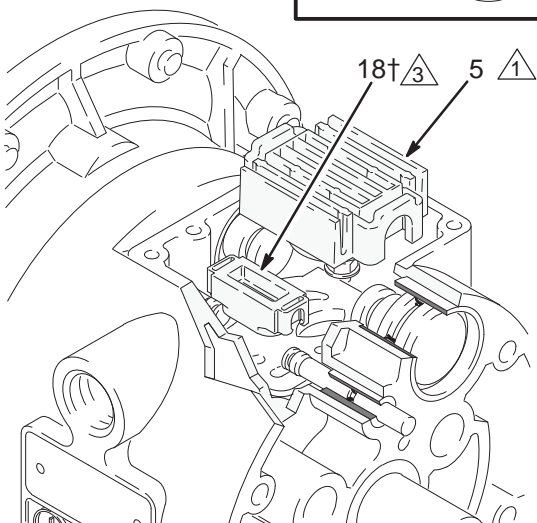
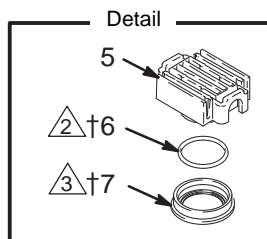


Fig. 9

02642

- ⚠ Rounded side must face down.
- ⚠ Tighten screws until they bottom out on the housing.

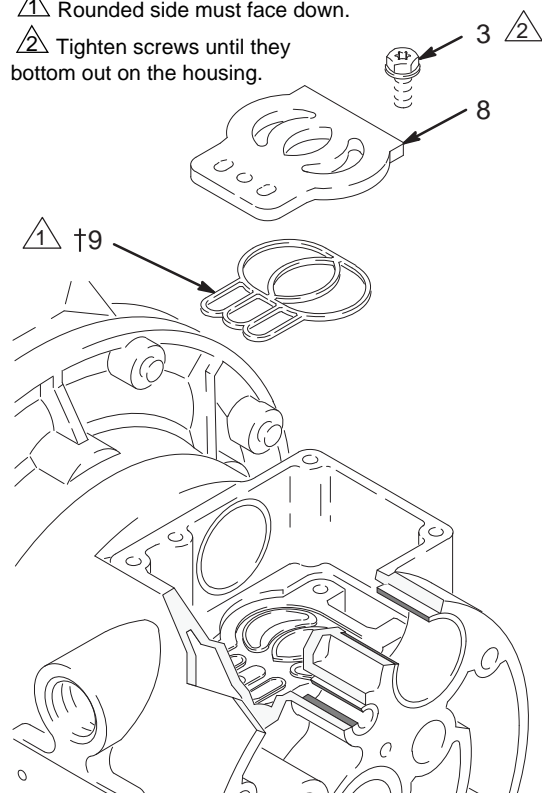


Fig. 11

02645

# Service

## Ball Check Valve Repair

### Tools Required

- Torque wrench
- 10 mm socket wrench
- O-ring pick

### Disassembly

**NOTE:** A Fluid Section Repair Kit is available. Refer to page 25 to order the correct kit for your pump. Parts included in the kit are marked with an asterisk, for example (201\*). Use all the parts in the kit for the best results.

**NOTE:** To ensure proper seating of the balls (301), always replace the seats (201) when replacing the balls. Also, on some models, replace the o-rings (202).





## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 12.

1. Relieve the pressure. Disconnect all hoses.
2. Remove the pump from its mounting.
3. Using a 10 mm socket wrench, remove the four bolts (106) holding the outlet manifold (103) to the fluid covers (101). See Fig. 12.
4. Remove the o-rings (202, *not used on some models*), seats (201), and balls (301) from the manifold (103).
5. Turn the pump over and remove the inlet manifold (102). Remove the o-rings (202, *not used on some models*), seats (201), and balls (301) from the fluid covers (101).

### Reassembly

1. Clean all parts and inspect for wear or damage. Replace parts as needed.
2. Reassemble in the reverse order, following all notes in Fig. 12. Be sure the ball checks and manifolds are assembled **exactly** as shown. The arrows (A) on the fluid covers (101) must point toward the outlet manifold (103).

- 1  Apply medium-strength (blue) Loctite or equivalent to the threads, and torque to 120–150 in-lb (14–17 N•m). See **Torque Sequence**, page 29.
- 2  Arrow (A) must point toward outlet manifold (103).
- 3  Beveled seating surface must face the ball (301).
- 4  Not used on some models.

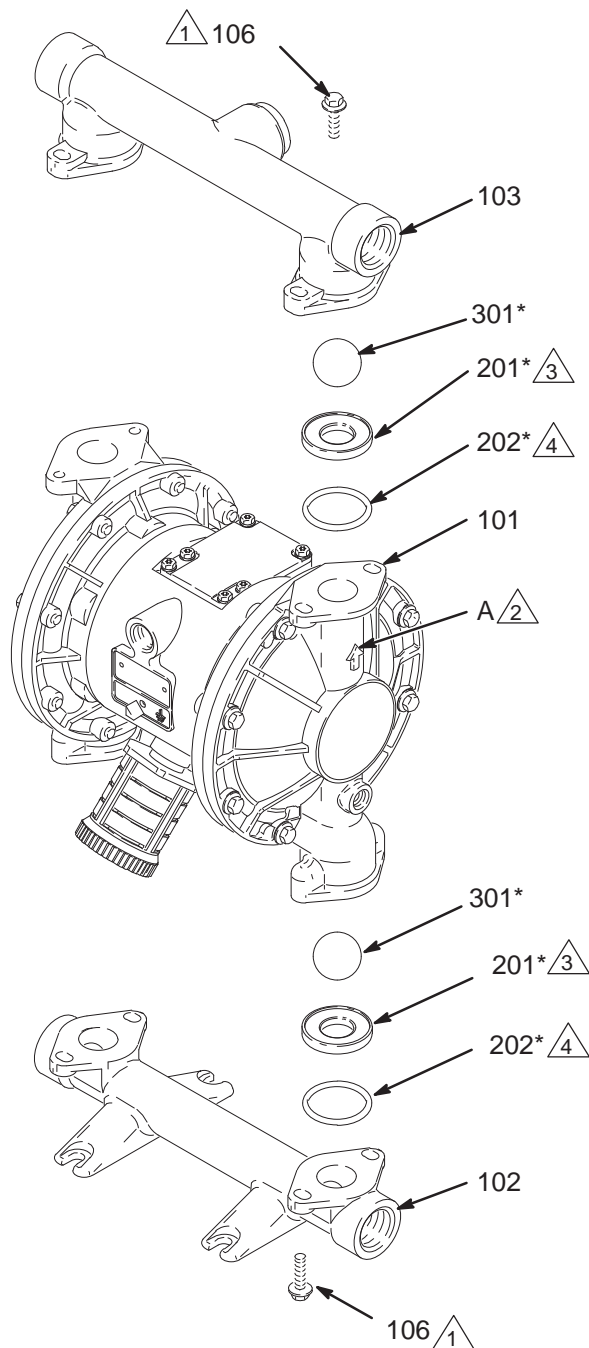


Fig. 12

02647C

# Service

## Diaphragm Repair

### Tools Required

- Torque wrench
- 10 mm socket wrench
- 15 mm socket wrench
- 19 mm open-end wrench
- O-ring pick
- Lithium-base grease

### Disassembly

**NOTE:** A Fluid Section Repair Kit is available. Refer to page 25 to order the correct kit for your pump. Parts included in the kit are marked with an asterisk, for example (401\*). Use all the parts in the kit for the best results.

## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 12.

1. Relieve the pressure. Disconnect all hoses.
2. Remove the manifolds and disassemble the ball check valves as explained on page 18.
3. Using a 10 mm socket wrench, remove the screws (106) holding the fluid covers (101) to the air covers (23). Pull the fluid covers (101) off the pump. See Fig. 13.

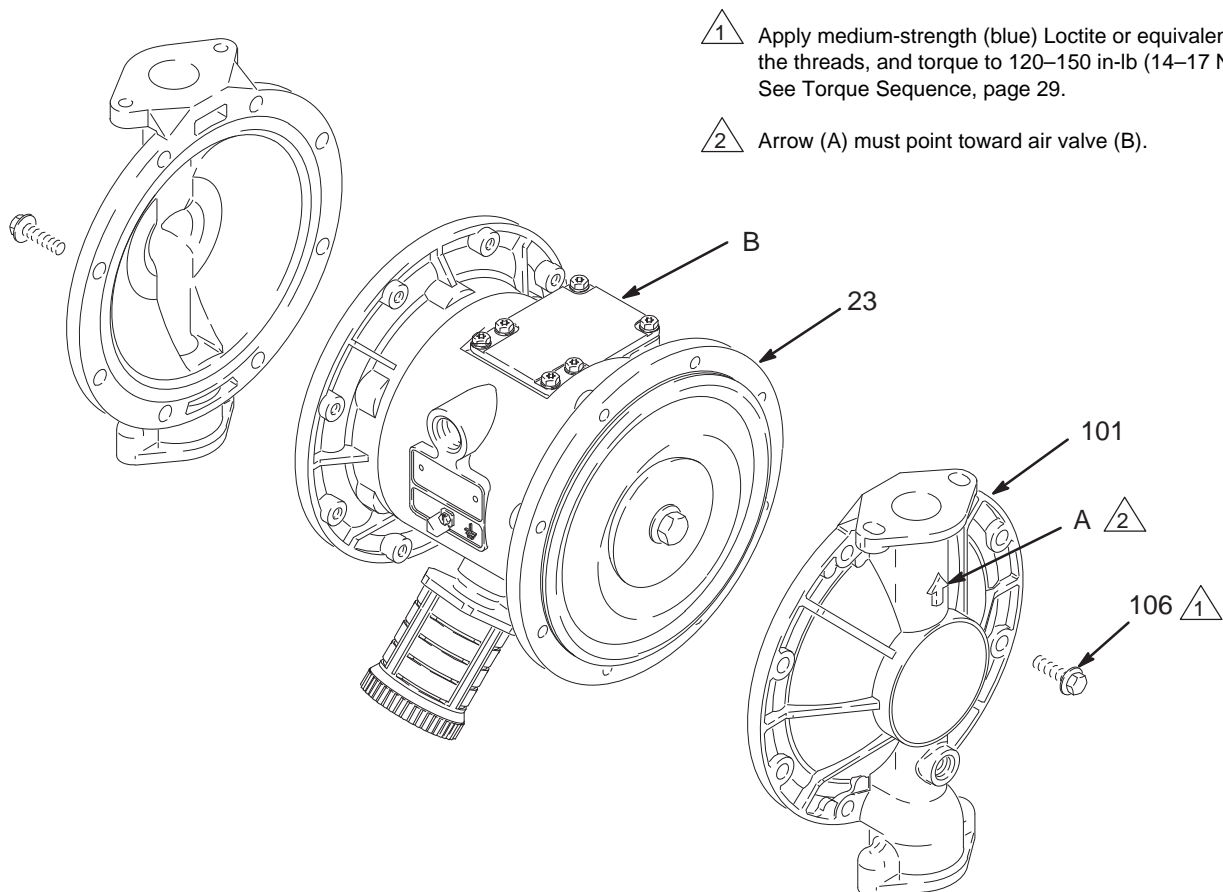


Fig. 13

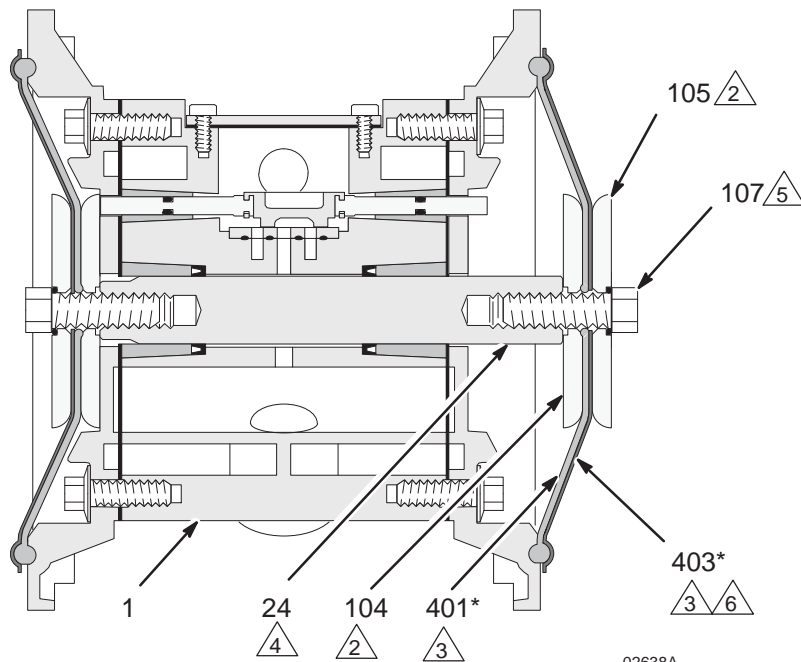
# Service

4. Loosen but do not remove the diaphragm shaft bolts (107), using a 15 mm socket wrench on both bolts.
5. Unscrew one bolt from the diaphragm shaft (24) and remove the o-ring (108), fluid side diaphragm plate (105), PTFE diaphragm (403, *used on PTFE models only*), diaphragm (401), and air side diaphragm plate (104). See Fig. 14.
6. Pull the other diaphragm assembly and the diaphragm shaft (24) out of the center housing (1). Hold the shaft flats with a 19 mm open-end wrench, and remove the bolt (107) from the shaft. Disassemble the remaining diaphragm assembly.
7. Inspect the diaphragm shaft (24) for wear or scratches. If it is damaged, inspect the bearings (19) in place. If the bearings are damaged, refer to page 22.
8. Reach into the center housing (1) with an o-ring pick and hook the u-cup packings (402), then pull them out of the housing. This can be done with the bearings (19) in place.
9. Clean all parts and inspect for wear or damage. Replace parts as needed.
3. Grease the length and ends of the diaphragm shaft (24), and slide it through the housing (1).
4. Assemble the other diaphragm assembly to the shaft as explained in step 2.
5. Hold one shaft bolt (107) with a wrench and torque the other bolt to 20–25 ft-lb (27–34 N•m) at 100 rpm maximum.
6. Align the fluid covers (101) and the center housing (1) so the arrows (A) on the covers face the same direction as the air valve (B). Apply medium-strength (blue) Loctite® or equivalent to the threads of the screws (106). Secure the covers with the screws handtight. See Fig. 13. Using a 10 mm socket wrench, torque the screws oppositely and evenly to 120–150 in-lb (14–17 N•m). See **Torque Sequence**, page 29.
7. Reassemble the ball check valves and manifolds as explained on page 18.

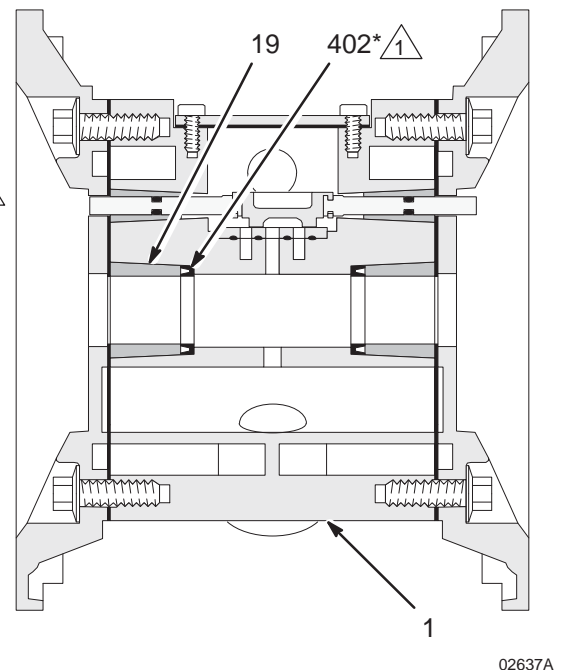
## Reassembly – Standard Diaphragms

1. Install the shaft u-cup packings (402\*) so the lips face **out** of the housing (1). Lubricate the packings. See Fig. 14.
2. Install the diaphragm assembly on one end of the shaft (24) as follows.
  - a. Install the o-ring (108\*) on the shaft bolt (107).
  - b. Install the fluid side diaphragm plate (105) on the bolt so the rounded side faces the diaphragm (401).
  - c. *On PTFE models only*, install the PTFE diaphragm (403\*). Make certain the side marked AIR SIDE faces the center housing (1).
  - d. Install the diaphragm (401\*) on the bolt. Make certain the side marked AIR SIDE faces the center housing (1).
  - e. Install the air side diaphragm plate (104) so the rounded side faces the diaphragm (401). This plate is used on all models, and is stamped with its part number.
  - f. Apply medium-strength (blue) Loctite® or equivalent to the bolt (107) threads. Screw the bolt into the shaft (24) hand tight.

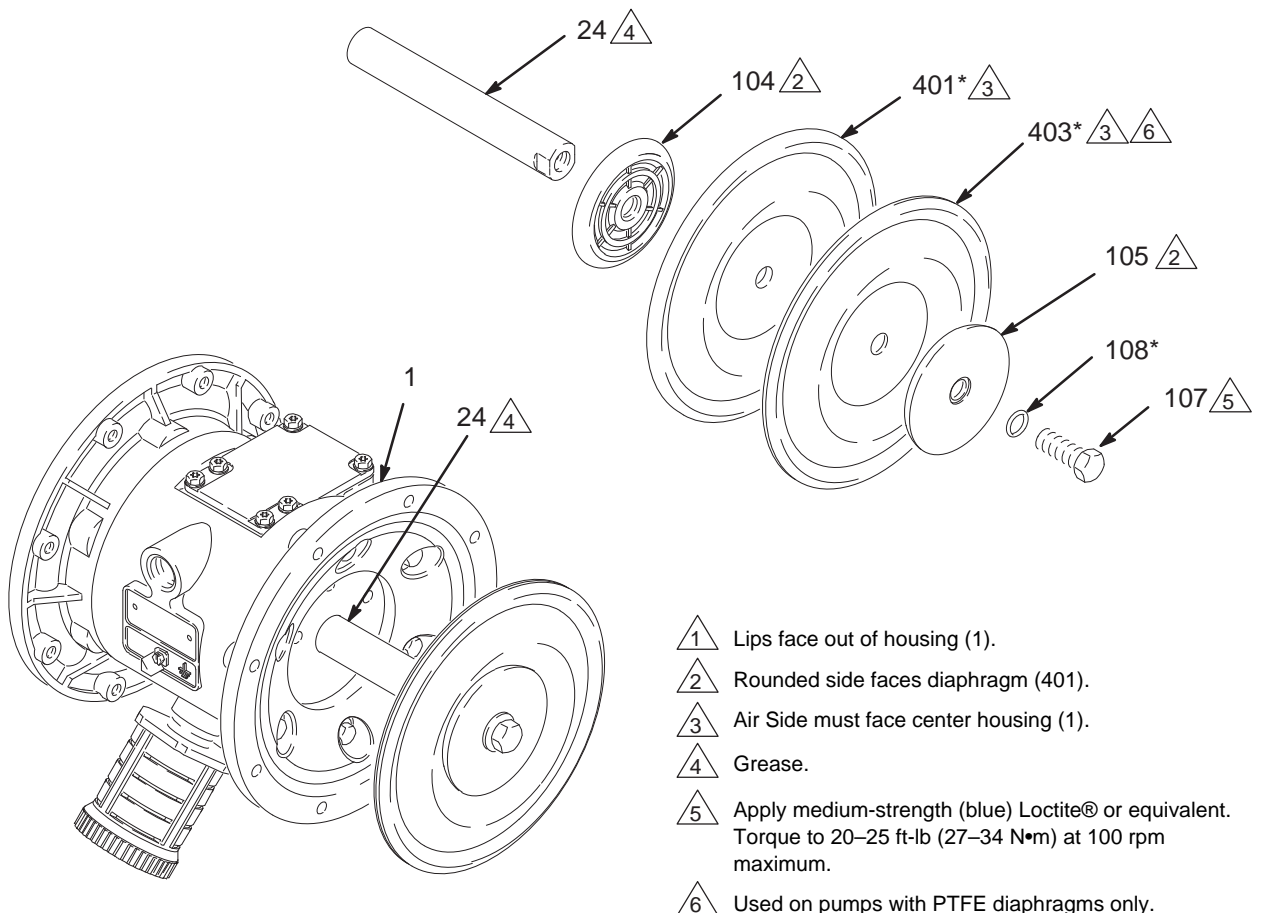
# Service



**Cutaway View, with Diaphragms in Place**



**Cutaway View, with Diaphragms Removed**



**Fig. 14**

02636B

# Service

## Bearing and Air Gasket Removal

### Tools Required

- Torque wrench
- 10 mm socket wrench
- Bearing puller
- O-ring pick
- Press, or block and mallet

### Disassembly

**NOTE:** Do not remove undamaged bearings.

## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 12.

1. Relieve the pressure.
2. Remove the manifolds and disassemble the ball check valves as explained on page 18.
3. Remove the fluid covers and diaphragm assemblies as explained on page 19.

**NOTE:** If you are removing only the diaphragm shaft bearing (19), skip step 4.

4. Disassemble the air valve as explained on page 16.
5. Using a 10 mm socket wrench, remove the screws (25) holding the air covers (23) to the center housing (1). See Fig. 15.
6. Remove the air cover gaskets (22). Always replace the gaskets with new ones.

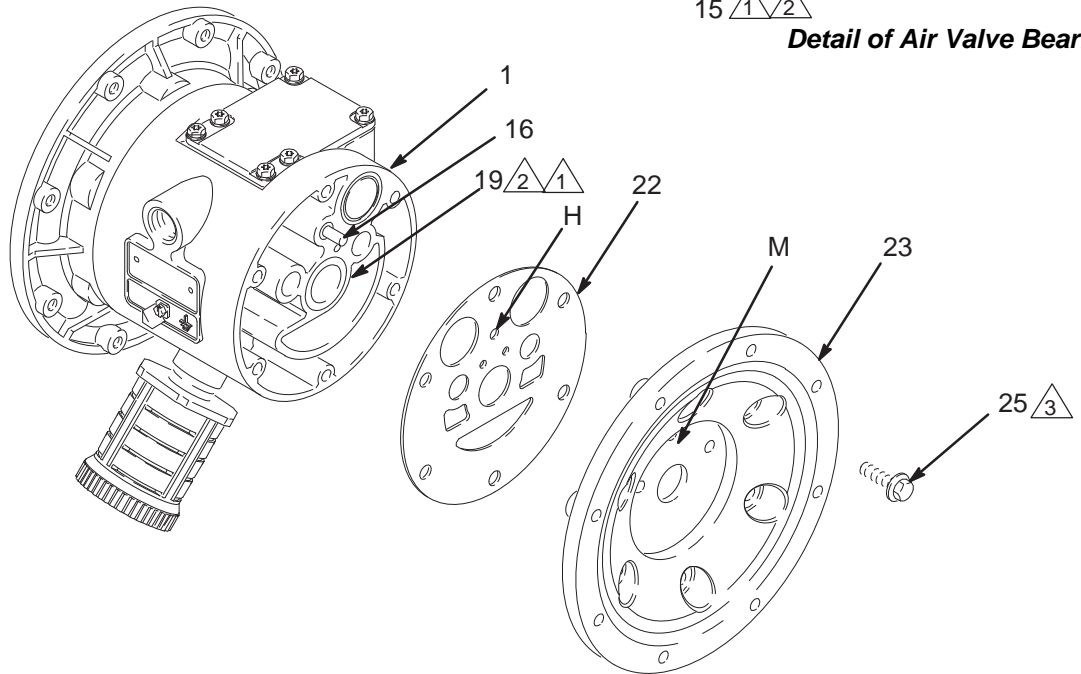
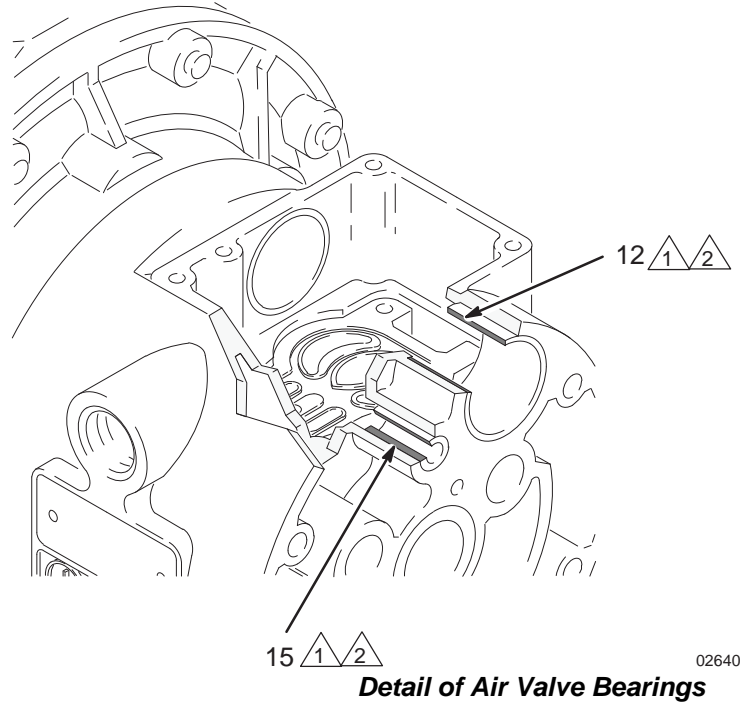
7. Use a bearing puller to remove the diaphragm shaft bearings (19), air valve bearings (12) or pilot pin bearings (15). Do not remove undamaged bearings.
8. If you removed the diaphragm shaft bearings (19) reach into the center housing (1) with an o-ring pick and hook the u-cup packings (402), then pull them out of the housing. Inspect the packings. See Fig. 14.

### Reassembly

1. If removed, install the shaft u-cup packings (402\*) so the lips face **out** of the housing (1).
2. The bearings (12, 15, and 19) are tapered and can only be installed one way. Insert the bearings into the center housing (1), **tapered end first**. Using a press or a block and rubber mallet, press-fit the bearing so it is flush with the surface of the center housing.
3. Reassemble the air valve as explained on page 16.
4. Align the new air cover gasket (22) so the pilot pin (16) protruding from the center housing (1) fits through the proper hole (H) in the gasket.
5. Align the air cover (23) so the pilot pin (16) fits in the middle hole (M) of the three small holes near the center of the cover. Install the screws (25), handtight. Apply medium-strength (blue) Loctite or equivalent to the threads of the screws (25). See Fig. 15. Using a 10 mm socket wrench, torque the screws oppositely and evenly to 130–150 in-lb (15–17 N•m).
6. Install the diaphragm assemblies and fluid covers as explained on page 19.
7. Reassemble the ball check valves and manifolds as explained on page 18.

# Service

- 1 Insert bearings tapered end first.
- 2 Press-fit bearings flush with surface of center housing (1).
- 3 Apply medium-strength (blue) Loctite® or equivalent. Torque to 130–150 in-lb (15–17 N•m).



**Fig. 15**

# Pump Matrix

## Husky 1040 Aluminum Pumps, Series A

Your Model No. is marked on the pump's serial plate. To determine the Model No. of your pump from the following matrix, select the six digits which describe your pump, working from left to right. The first digit is always **D**, designating Husky diaphragm pumps. The remaining five digits define the materials of construction. For example, a pump with an aluminum air motor, aluminum fluid section, polypropylene seats, PTFE balls, and PTFE diaphragms is Model **D 7 3 9 1 1**. To order replacement parts, refer to the part lists on pages 26–28. *The digits in the matrix **do not** correspond to the ref. nos. in the parts drawing and lists.*

Diaphragm Pump	Air Motor	Fluid Section	Seats	Balls	Diaphragms
<b>D</b> (for all pumps)	<b>7</b> Aluminum	<b>3</b> aluminum	<b>3</b> (316 sst)	<b>1</b> (PTFE)	<b>1</b> (PTFE)
			<b>5</b> (TPE)	<b>2</b> (acetal)	<b>5</b> (TPE)
			<b>6</b> (Santoprene®)	<b>6</b> (Santoprene®)	<b>6</b> (Santoprene®)
			<b>9</b> (polypropylene)	<b>G</b> (Geolast®)	<b>G</b> (Geolast®)
			<b>G</b> (Geolast®)		



# Repair Kit Matrix

## For Husky 1040 Aluminum Pumps, Series A

Repair Kits may be ordered separately. To repair the air valve, order **Part No. 236273**. Parts included in the Air Valve Repair Kit are marked with a symbol in the parts list, for example (4†).

To repair your pump, select the six digits which describe your pump from the following matrix, working from left to right. The first digit is always **D**, the second digit is always **0** (zero), and the third is always **7**. The remaining three digits define the materials of construction. Parts included in the kit are marked with an asterisk in the parts list, for example (201\*). For example, if your pump has polypropylene seats, PTFE balls, and PTFE diaphragms, order Repair Kit **D 0 7 9 1 1**. If you only need to repair certain parts (for example, the diaphragms), use the 0 (null) digits for the seats and balls, and order Repair Kit **D 0 7 0 0 1**. *The digits in the matrix **do not** correspond to the ref. nos. in the parts drawing and lists on pages 26–28.*

Diaphragm Pump	Null	Shaft O-ring	Seats	Balls	Diaphragms
<b>D</b> (for all pumps)	<b>0</b> (for all pumps)	<b>7</b> (PTFE)	<b>0</b> (null)	<b>0</b> (null)	<b>0</b> (null)
			<b>3</b> (316 sst)	<b>1</b> (PTFE)	<b>1</b> (PTFE)
			<b>5</b> (TPE)	<b>2</b> (acetal)	<b>5</b> (TPE)
			<b>6</b> (Santoprene®)	<b>6</b> (Santoprene®)	<b>6</b> (Santoprene®)
			<b>9</b> (polypropylene)	<b>G</b> (Geolast®)	<b>G</b> (Geolast®)
			<b>G</b> (Geolast®)		

# Parts

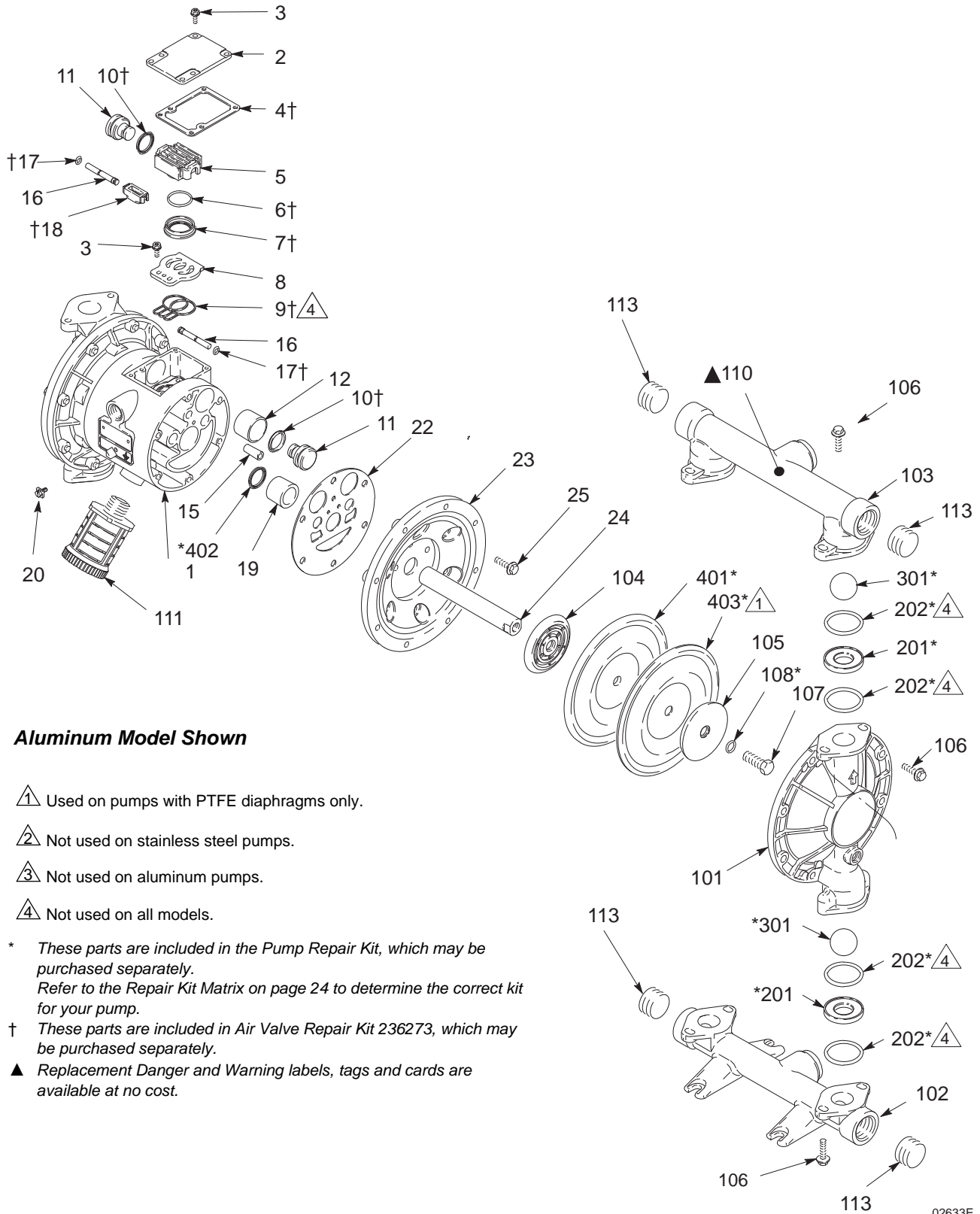
**Air Motor Parts List (Matrix Column 2)**

Digit	Ref. No.	Part No.	Description	Qty
7	1	188838	HOUSING, center; aluminum	1
	2	188854	COVER, air valve; alum.	1
	3	116344	SCREW, mach, hex flange hd; M5 x 0.8; 12 mm (0.47 in.)	9
	4†	188618	GASKET, molded Santoprene	1
	5	188855	CARRIAGE; aluminum	1
	6†	108730	O-RING; nitrile	1
	7†	188616	BLOCK, air valve; acetal	1
	8	188615	PLATE, air valve; sst	1
	9†	188617	SEAL, valve plate; buna-N	1
	10†	112181	PACKING, u-cup; nitrile	2
	11	188612	PISTON, actuator; acetal	2
	12	188613	BEARING, piston; acetal	2
	15	188611	BEARING, pin; acetal	2
	16	188610	PIN, pilot; stainless steel	2
	17†	157628	O-RING; buna-N	2
	18†	188614	BLOCK, pilot; acetal	1
	19	188609	BEARING, shaft; acetal	2
	20	116343	SCREW, grounding	1
	22	188603	GASKET, air cover; foam	2
	23	188839	COVER, air; aluminum	2
	24	188608	SHAFT, diaphragm; sst	1
	25	115643	SCREW; M8 x 1.25; 25 mm (1 in.)	12

**Fluid Section Parts List (Matrix Column 3)**

Digit	Ref. No.	Part No.	Description	Qty.
3	101	188840	COVER, fluid; aluminum	2
	102	188841	MANIFOLD, inlet; aluminum	1
	103	188842	MANIFOLD, outlet; aluminum	1
	104	188607	PLATE, air side; alum.	2
	105	188607	PLATE, fluid side; aluminum	2
	106	115643	SCREW; M8 x 1.25; 25 mm (1 in.)	24
	107	189044	BOLT; M12 x 1.75; 35 mm (1.38 in.); sst	2
	108*	104319	O-RING; PTFE	2
	110 ▲	188970	LABEL, warning	1
	111	112182	MUFFLER	1
	113	121497	PLUG: 1" npt; cst	4
	114	None	Not Used	0

# Parts



02633E

### Seat Parts List (Matrix Column 4)

Digit	Ref. No.	Part No.	Description	Qty
3	201*	188707	SEAT; 316 stainless steel	4
	202*	109205	O-RING; PTFE	8
5	201*	188711	SEAT; TPE	4
	202	None	Not Used	0
6	201*	191595	SEAT; Santoprene	4
	202*	109205	O-RING; PTFE	8
9	201*	189722	SEAT; polypropylene	4
	202*	109205	O-RING; PTFE	8
G	201*	194211	SEAT; Geolast	4
	202*	109205	O-RING; PTFE	8

### Ball Parts List (Matrix Column 5)

Digit	Ref. No.	Part No.	Description	Qty
1	301*	112088	BALL; PTFE	4
2	301*	112254	BALL; acetal	4
6	301*	112092	BALL; Santoprene	4
G	301*	114751	BALL; Geolast®	4

### Diaphragm Parts List (Matrix Column 6)

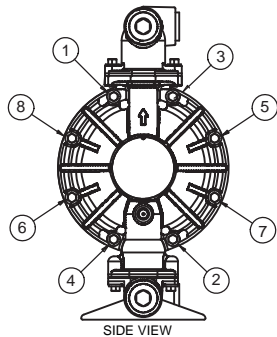
Digit	Ref. No.	Part No.	Description	Qty
1	401*	Not sold separately	DIAPHRAGM, backup; polychloroprene (CR)	2
	402*	112181	PACKING, u-cup; nitrile	2
	403*	188605	DIAPHRAGM; PTFE	2
5	401*	188606	DIAPHRAGM; TPE	2
	402*	112181	PACKING, u-cup; nitrile	2
6	401*	188857	DIAPHRAGM; Santoprene	2
	402*	112181	PACKING, u-cup; nitrile	2
G	401*	194212	DIAPHRAGM; Geolast®	2
	402*	112181	PACKING, u-cup; nitrile	2

\* These parts are included in the pump repair kit, purchased separately. See Repair Kit Matrix on page 25 to determine the correct kit for your pump.

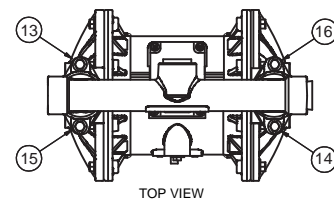
# Torque Sequence

Always follow torque sequence when instructed to torque fasteners.

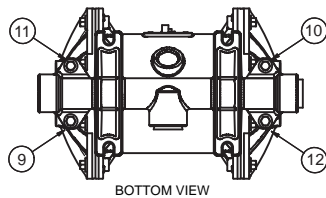
1. Left/Right Fluid Cover  
Torque Bolts to 120–150 in-lb (14–17 N•m)



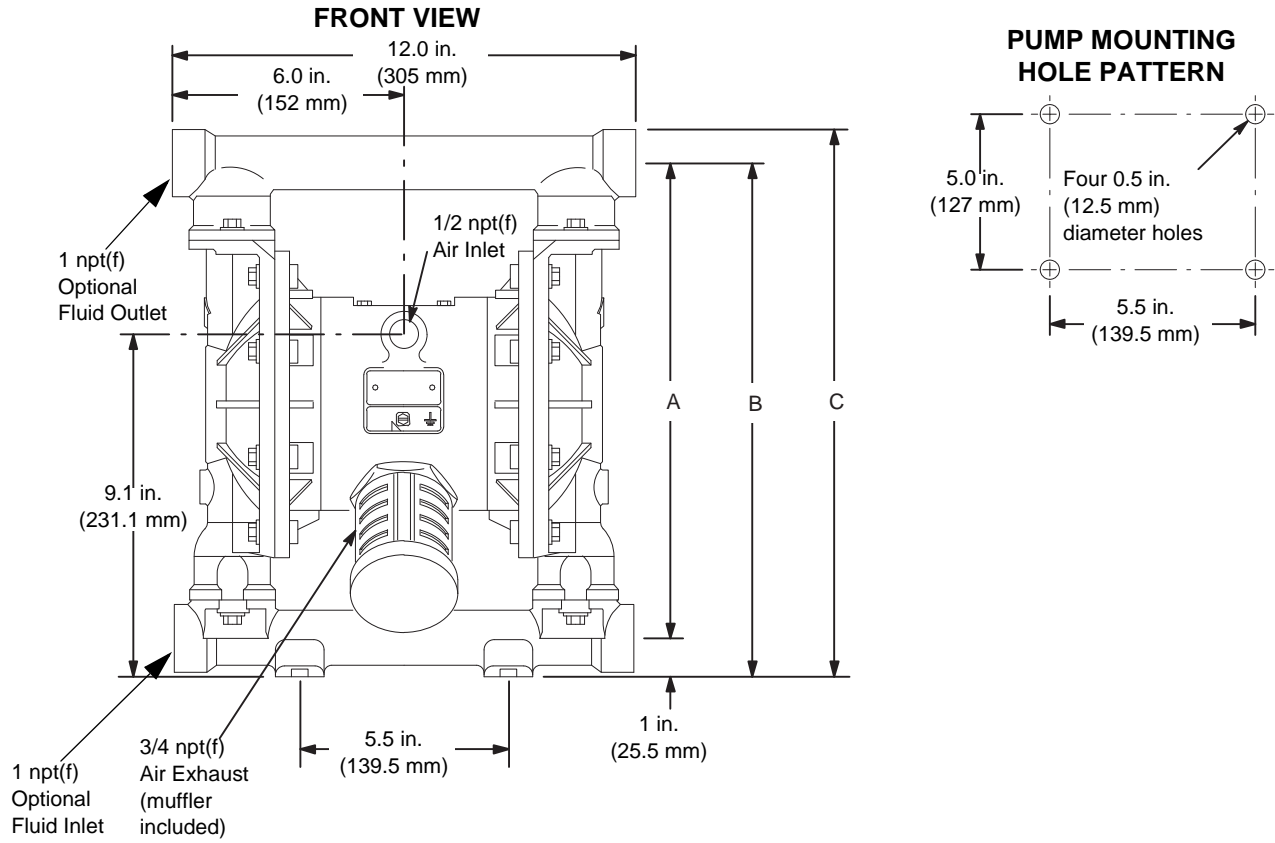
3. Outlet Manifold  
Torque Bolts to 120–150 in-lb (14–17 N•m)



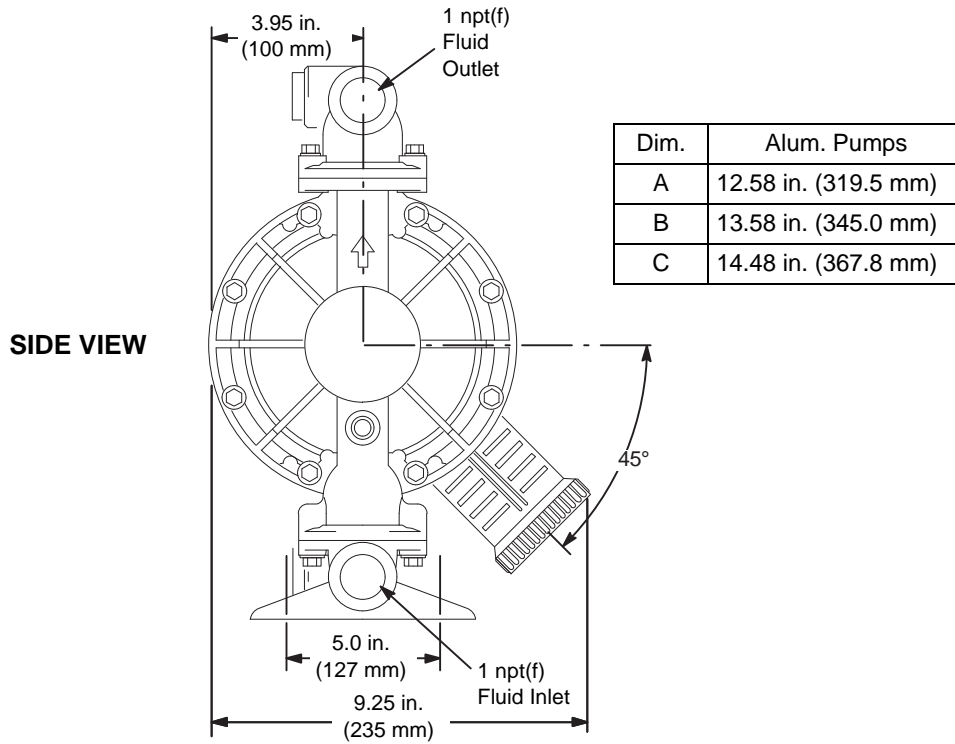
2. Inlet Manifold  
Torque Bolts to 120–150 in-lb (14–17 N•m)



# Dimensional Drawings



7437A



# Performance Chart

**Test Conditions:** The pump had PTFE 2-piece diaphragms and was tested in water with inlet submerged.

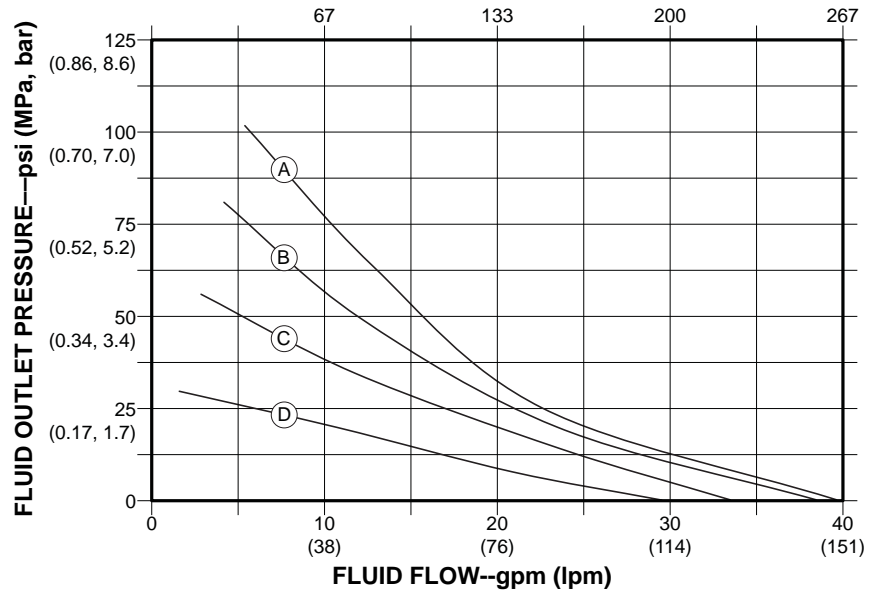
## Fluid Pressure Curves

- A** at 120 psi (0.83 MPa, 8.3 bar) operating air pressure
- B** at 100 psi (0.7 MPa, 7 bar) operating air pressure
- C** at 70 psi (0.48 MPa, 4.8 bar) operating air pressure
- D** at 40 psi (0.28 MPa, 2.8 bar) operating air pressure

### To find Fluid Outlet Pressure

(psi/MPa/bar) at a specific fluid flow (gpm/lpm) and operating air pressure (psi/MPa/bar):

1. Locate fluid flow rate along bottom of chart.
2. Follow vertical line up to intersection with selected operating air pressure curve.
3. Follow left to scale to read fluid outlet pressure.

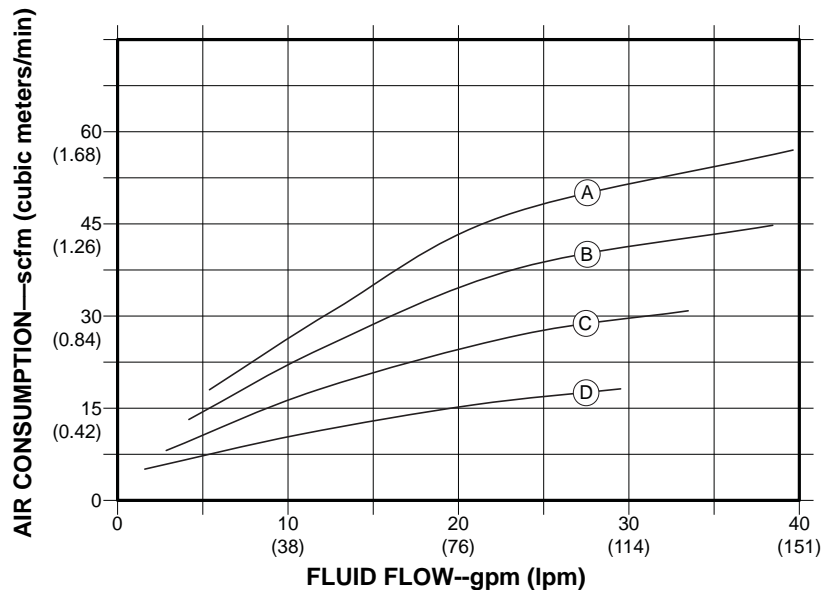


## Air Consumption Curves

- A** at 120 psi (0.83 MPa, 8.3 bar) operating air pressure
- B** at 100 psi (0.7 MPa, 7 bar) operating air pressure
- C** at 70 psi (0.48 MPa, 4.8 bar) operating air pressure
- D** at 40 psi (0.28 MPa, 2.8 bar) operating air pressure

**To find Pump Air Consumption** (scfm or m<sup>3</sup>/min) at a specific fluid flow (gpm/lpm) and operating air pressure (psi/MPa/bar):

1. Locate fluid flow rate along bottom of chart.
2. Read vertical line up to intersection with selected operating air pressure curve.
3. Follow left to scale to read air consumption.



## Notes

[illegible]



# Technical Data

Maximum fluid working pressure	120 psi (0.8 MPa, 8 bar)
Air pressure operating range	20–120 psi (0.14–0.8 MPa, 1.4–8 bar)
Maximum air consumption	60 scfm
Air consumption at 70 psi/20 gpm	20 scfm (see chart)
Maximum free-flow delivery	42 gpm (159 l/min)
Maximum pump speed	276 cpm
Gallons (Liters) per cycle	0.15 (0.57)
Maximum suction lift	18 ft (5.48 m) wet or dry
Maximum size pumpable solids	1/8 in. (3.2 mm)
* Maximum Noise Level at 100 psi, full flow	89 dBA
* Sound Power Level	100 dBA
* Noise Level at 70 psi and 50 cpm	78 dBA
Maximum operating temperature	150 °F (65.5 °C); 200 °F (93.3 °C) for models with PTFE diaphragms
Air inlet size	1/2 npt(f)
Fluid inlet size	1" npt(f)
Fluid outlet size	1" npt(f)
Wetted parts	Vary by Model. See pages 26–28.
Non-wetted external parts	aluminum, 302, 316 stainless steel, polyester (labels)
Weight	
Aluminum pumps	18 lb (8.2 kg)

*Geolast® and Santoprene® are registered trademarks of the Monsanto Co.*

*Loctite® is a registered trademark of the Loctite Corporation.*

\* Noise levels measured with the pump mounted on the floor, using Rubber Foot Kit 236452. Sound power measured per ISO Standard 9614–1.

# Graco Standard Husky Pump 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 five years 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 six (6) 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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For patent information, see [www.graco.com/patents](http://www.graco.com/patents).

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**Phone:** +1 612-623-6921 or **Toll Free:** 1-800-328-0211 **Fax:** +1 612-378-3505

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Original instructions. This manual contains English. MM 308479

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