

# Instructions – Parts List



ALUMINUM, STAINLESS, AND DUCTILE IRON

# Husky™ 2150 Air-Operated Diaphragm Pumps

308368ZAW

EN

2-inch AODD pump for fluid transfer applications. For professional use only.

See Models on page 3 for a list of pump models and descriptions.

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

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



## Important Safety Instructions

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

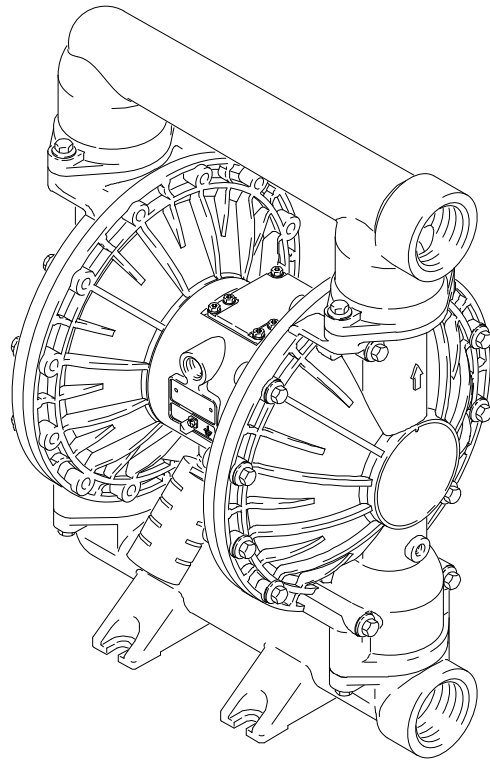


II 2 GD

Ex h IIC 66°C...135°C Gb

Ex h IIC T135°C Db

ATEX T-code rating is dependent on the temperature of the fluid being pumped. Fluid temperature is limited by the materials of the pump interior wetted parts. See **Technical Specifications** for the maximum fluid operating temperature for your specific pump model.



03940B

*Aluminum Model Shown*

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# Models

Model No.	Description
*DF3_____	Aluminum Pumps
*DG3_____	Aluminum Pumps, Remote
*DFH_____	Aluminum Extended Pump
*DGH_____	Aluminum Extended Pump, Remote
*DF4_____	Stainless Steel Pumps
*DG4_____	Stainless Steel Pumps, Remote
*DF6_____	Ductile Iron Pumps
*DG6_____	Ductile Iron Pumps, Remote
*DFC_____	Aluminum BSPT Pumps
*DGC_____	Aluminum BSPT Pumps, Remote
*DFD_____	Stainless Steel BSPT Pumps
*DGD_____	Stainless Steel BSPT Pumps, Remote
*DFF_____	Ductile Iron BSPT Pumps
*DGF_____	Ductile Iron BSPT Pumps, Remote
*DFG_____	Aluminum BSPT Extended Pump
*DGG_____	Aluminum BSPT Extended Pump, Remote
*DFP_____	Stainless Steel, center flange, vertical outlet
*DFR_____	Stainless Steel, center flange, horizontal outlet
*DV4_____	Stainless Steel Plus Pumps
*DVD_____	Stainless Steel BSPT Plus Pumps
*DVP_____	Stainless Steel, center flange, vertical outlet
*DVR_____	Stainless Steel, center flange, horizontal outlet
24B782	Aluminum Pump with overmolded diaphragms
24B783	Stainless Steel Plus Pump with overmolded diaphragms
24B801	Stainless Steel Pump with overmolded diaphragms
24G413	Aluminum BSPT with overmolded diaphragms
24J360	Aluminum Pump with overmolded diaphragms
25A018	Aluminum Pump with overmolded diaphragms, SST balls
25A149	Ductile Iron Pump with overmolded diaphragms, PTFE balls
25A150	Ductile Iron Pump with overmolded diaphragms, Geolast balls
25A151	Ductile Iron Pump with overmolded diaphragms, Santoprene balls
25C658	Stainless Steel Pump with SST Center Section, Flanged Manifold Ports (Horizontal Outlet), and overmolded diaphragms
25C659	Stainless Steel Pump with Aluminum Center Section, Flanged Manifold Ports (Horizontal Outlet), and overmolded diaphragms
25C660	Stainless Steel Pump with SST Center Section, Flanged Manifold Ports (Vertical Outlet), and overmolded diaphragms
25C661	Stainless Steel Pump with Aluminum Center Section, Flanged Manifold Ports (Vertical Outlet), and overmolded diaphragms
26C240	Same as DFC911, except SST diaphragm fluid plates

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

**NOTE:** Plus Models include stainless steel center sections.

# 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.

## WARNING



### EQUIPMENT MISUSE HAZARD

Any misuse of the equipment or accessories, such as overpressurizing, modifying parts, using incompatible chemicals and fluids, or using worn or damaged parts, can cause them to rupture and result in splashing in the eyes or on the skin, other serious injury, or fire, explosion or property damage.

- This equipment is for professional use only. Observe all warnings. Read and understand all instruction manuals, warning labels, and tags before operating the equipment.
- Never alter or modify any part of this equipment; doing so could cause it to malfunction. Use only genuine Graco parts and accessories.
- Check all equipment regularly and repair or replace worn or damaged parts immediately.
- Never exceed the recommended working pressure or the maximum air inlet pressure stated on your pump or in the **Technical Specifications** on page 36.
- Do not exceed the maximum working pressure of the lowest rated component in your system. This equipment has a **120 psi (0.8 MPa, 8 bar) maximum working pressure at 120 psi (0.8 MPa, 8 bar) maximum incoming air pressure.**
- Be sure that all fluids and solvents used are chemically compatible with the wetted parts shown in the **Technical Specifications** on page 36. Always read the manufacturer's literature before using fluid or solvent in the pump.
- Never move or lift a pump under pressure. If dropped, the fluid section may rupture. Always follow the **Pressure Relief Procedure** on page 12 before moving or lifting the pump. The pump is very heavy. If it must be moved, have two people lift the pump by grasping the outlet manifold securely.

## WARNING



### HAZARDOUS FLUIDS

Improper handling of hazardous fluids or inhaling toxic vapors can cause extremely serious injury, even death, due to splashing in the eyes, ingestion, or bodily contamination. Observe all the following precautions when handling known or potentially hazardous fluids.

- Know what fluid you are pumping and its specific hazards. Take precautions to avoid a toxic fluid spill.
- Always wear appropriate clothing and equipment, such as eye protection and breathing apparatus, to protect yourself.
- Store hazardous fluid in an appropriate, approved container. Dispose of it according to all Local, State and Federal guidelines for hazardous fluids.
- Secure the fluid outlet hose tightly into the receiving container to prevent it from coming loose and improperly draining the fluid
- 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 11.



### FIRE AND EXPLOSION HAZARD

Static electricity is created by the flow of fluid through the pump and hose. If the equipment is not properly grounded, sparking may occur. Sparks can ignite fumes from solvents and the fluid being pumped, dust particles and other flammable substances, whether you are pumping indoors or outdoors, and can cause a fire or explosion and serious injury and property damage.

- To reduce the risk of static sparking, ground the pump and all other equipment used or located in the work area. Check your local electrical code for detailed grounding instructions for your area and type of equipment. Refer to **Grounding** on page 6.
- If you experience any static sparking or even a slight shock while using this equipment, **stop pumping immediately**. Check the entire system for proper grounding. Do not use the system again until the problem has been identified and corrected.
- 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 11.
- Do not smoke in the work area. Do not operate the equipment near a source of ignition or an open flame, such as a pilot light.



### HALOGENATED HYDROCARBON HAZARD


Never use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in Aluminum Pumps. Such use could result in a serious chemical reaction, with the possibility of explosion, which could cause death, serious injury and/or substantial property damage.


Consult your fluid suppliers to ensure that the fluids used are compatible with aluminum parts.

# Installation

## General Information

- The Typical Installation shown in is only a guide for selecting and installing system components. Contact your Graco distributor or Graco Technical Assistance (see back page) for assistance in planning a system to suit your needs.
- Always use Genuine Graco Parts and Accessories.
- Reference numbers and letters in parentheses refer to the callouts in the figures and the parts lists on pages 27 to 28.

 **WARNING**

**HAZARDOUS FLUIDS**

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** on page 12 before moving or lifting the pump.

- The pump is very heavy. If it must be moved, have two people lift the pump by grasping the outlet manifold (103) securely. See FIG. 3 on page 10.

## Tightening Screws Before First Use

Before using the pump for the first time, check and retorquer all external fasteners. See **Torque Instructions**, page 32. After the first day of operation, retorquer the fasteners. Although pump use varies, a general guideline is to retorquer fasteners every two months.

## Tips to Reduce Cavitation

Cavitation in a diaphragm pump is the formation and collapse of bubbles in the pumped liquid. Frequent or excessive cavitation can cause serious damage, including pitting and early wear of fluid chambers, balls, and seats. It may result in reduced efficiency of the pump. Cavitation damage and reduced efficiency both result in increased operating costs.

Cavitation depends on the vapor pressure of the pumped liquid, the system suction pressure, and the velocity pressure. It can be reduced by changing any of these factors.

1. Reduce vapor pressure: Decrease the temperature of the pumped liquid.

2. Increase suction pressure:

- a. Lower the installed position of the pump relative to the liquid level in the supply.
- b. Reduce the friction length of the suction piping. Remember that fittings add friction length to the piping. Reduce the number of fittings to reduce the friction length.
- c. Increase the size of the suction piping.

**NOTE:** Be sure the inlet fluid pressure does not exceed 25% of the outlet working pressure.


3. Reduce liquid velocity: Slow the cyclic rate of the pump.


Pumped liquid viscosity is also very important but normally is controlled by factors that are process dependent and cannot be changed to reduce cavitation. Viscous liquids are more difficult to pump and more prone to cavitation.

Graco recommends taking all the above factors into account in system design. To maintain pump efficiency, supply only enough air pressure to the pump to achieve the required flow.

Graco distributors can supply site specific suggestions to improve pump performance and reduce operating costs.

## 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<sup>2</sup>) 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. 238909 Ground Wire and Clamp.

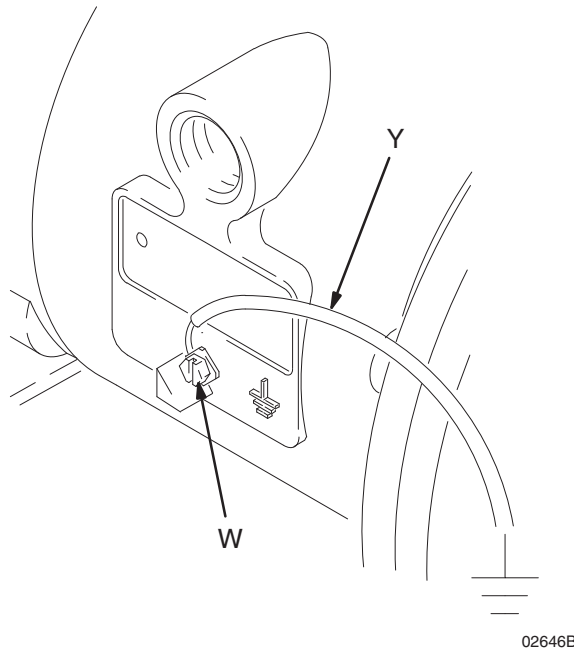


FIG. 1

- *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.

## 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 11.

- 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. 2.

1. Install the air line accessories as shown in FIG. 2. 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. 2. Use a minimum 1/2" (13 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.

## Installation of Remote Pilot Air Lines

1. Refer to Parts Drawings. Connect air line to pump as in preceding steps.
2. Connect 1/4 in. O.D. tubing to push type connectors (14) on air motor of pump.

# Installation

**NOTE:** by replacing the push type connectors, other sizes or types of fittings may be used. The new fittings will require 1/8 in. npt threads.

3. Connect remaining ends of tubes to external air signal, such as Graco's Cycleflo (P/N 195264) or Cycleflo II (P/N 195265) controllers.

## Fluid Suction Line

1. **Use grounded, flexible fluid hoses (G).** The pump fluid inlet (R) is 2" npt(f). 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 Specifications** on page 36 for maximum suction lift (wet and dry).

## 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. 2.

1. **Use grounded, flexible fluid hoses (L).** The pump fluid outlet (S) is 2" npt(f). Screw the fluid fitting into the pump outlet securely.
2. Install a fluid drain valve (J) near the fluid outlet. See the **WARNING** above.
3. Install a shutoff valve (K) in the fluid outlet line.

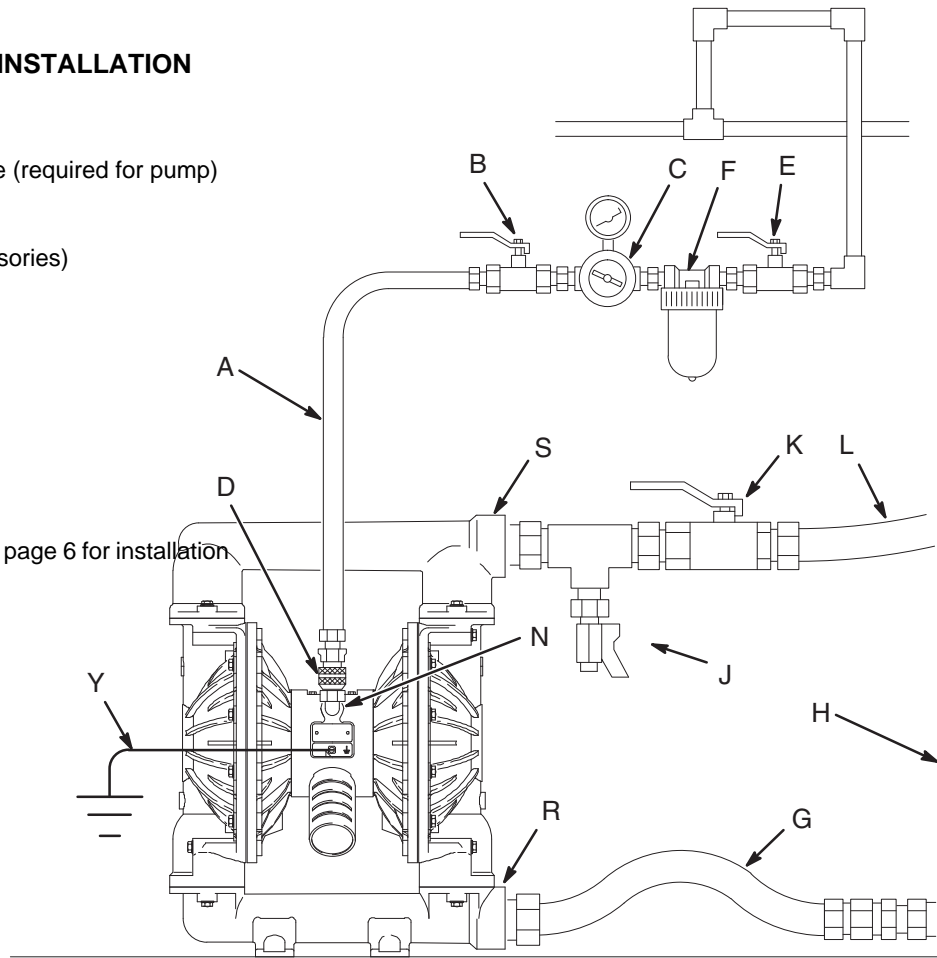


# Installation

## FLOOR-MOUNT TYPICAL INSTALLATION

### KEY

- A Air supply hose
- 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 hose
- H Fluid supply
- J Fluid drain valve (required)
- K Fluid shutoff valve
- L Fluid hose
- N 1/2 npt(f) air inlet port
- R 2 npt(f) fluid inlet port
- S 2 npt(f) fluid outlet port
- Y Ground wire (required; see page 6 for installation instructions)



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FIG. 2

# Installation

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

Remove and rotate the center manifold(s) to change the orientation of inlet or outlet port(s). Follow **Torque Instructions**, page 32.

Pumps have npt, bspt, or ANSI/DIN flange fluid ports.

### KEY

N	Air inlet port	101	Covers
P	Muffler. Air exhaust port is 3/4 npt(f).	102	Fluid inlet manifold
		103	Fluid outlet manifold
		106	Manifold and cover screws
		112	Cover screws (top and bottom)

1 Apply medium-strength (blue) thread locker to the threads. See **Torque Instructions**, page 32.

2 Apply medium-strength (blue) thread locker to the threads. See **Torque Instructions**, page 32.

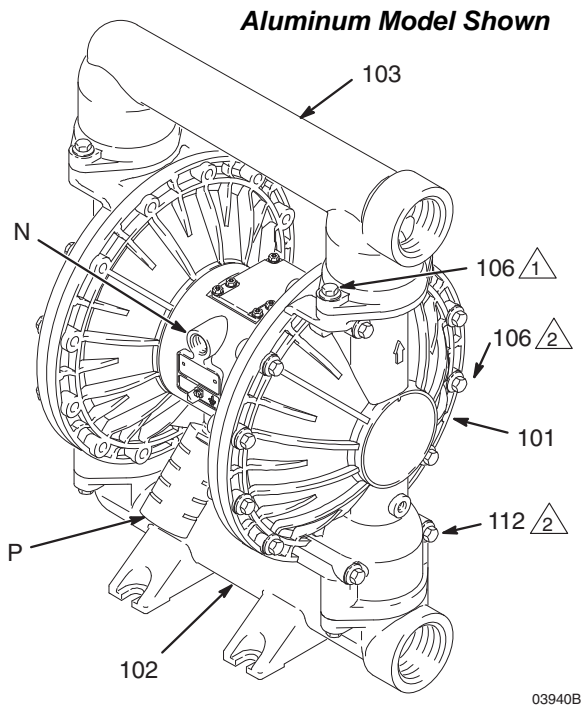


FIG. 3

## Fluid Pressure Relief Valve

### CAUTION

Some systems may require installation of a pressure relief valve at the pump outlet to prevent overpressurization and rupture of the pump or hose. See Fig. 4.

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	2 in. npt(f) fluid inlet port
S	2 in. npt(f) fluid outlet port
V	Pressure relief valve
Part No. 112119 (stainless steel)	

1 Install valve between fluid inlet and outlet ports.

2 Connect fluid inlet line here.

3 Connect fluid outlet line here.

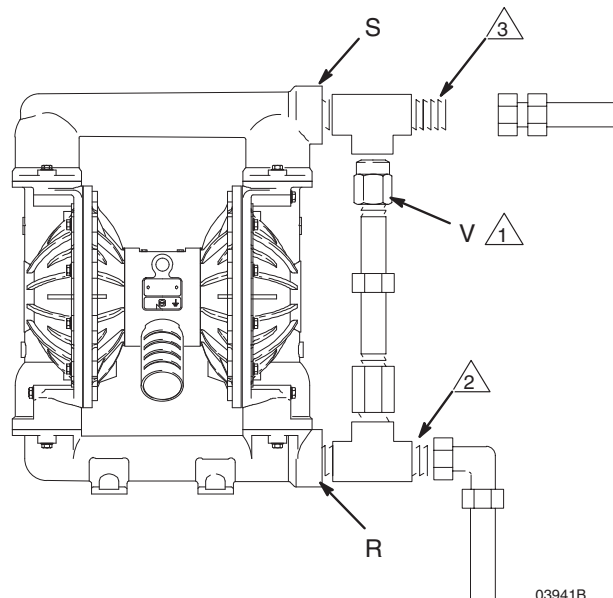


FIG. 4

# Installation

## Air Exhaust Ventilation

### **WARNING**

#### **FIRE AND EXPLOSION HAZARD; HAZARDOUS FLUIDS**

Be sure to read and follow the warnings and precautions regarding **HAZARDOUS FLUIDS**, and **FIRE AND EXPLOSION HAZARD** on page 5, 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.

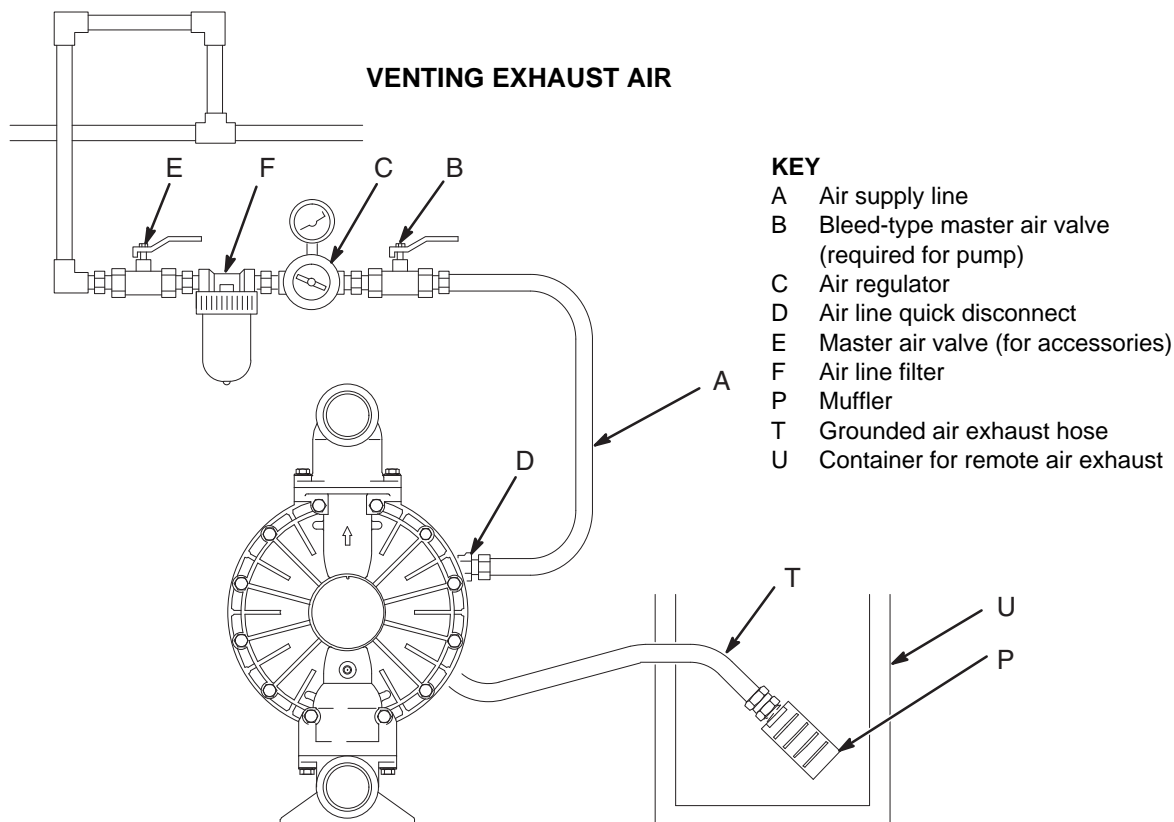
Diaphragm failure will cause the fluid being pumped to exhaust with the air. Place an appropriate container at the end of the air exhaust line to catch the fluid. See Fig. 5.

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

If the muffler (P) is installed directly to the air exhaust port, apply PTFE thread tape or anti-seize thread lubricant to the muffler threads before assembly.

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. See Fig. 5.
3. Place a container (U) at the end of the air exhaust line to catch fluid in case a diaphragm ruptures.



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FIG. 5

# Operation

## Flush the Pump Before First Use

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

## Starting and Adjusting the Pump

### **WARNING**



#### **HAZARDOUS FLUIDS**

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** at right before moving or lifting the pump.

1. Be sure the pump is properly grounded. Refer to **Grounding** on page 6.
2. Check all fittings to be sure they are tight. Be sure to use a compatible liquid thread sealant on all male threads. Tighten the fluid inlet and outlet fittings securely.
3. Place the suction tube (if used) in the fluid to be pumped.

**NOTE:** 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.

4. Place the end of the fluid hose (L) into an appropriate container.
5. Close the fluid drain valve (J). See FIG. 2.
6. With the pump air regulator (C) closed, 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 open 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.

## Operation of Remote Piloted Pumps

1. Fig. 2 and Parts Drawings. Follow preceding steps 1 through 7 of **Starting and Adjusting the Pump**.
2. Open air regulator (C).

### **WARNING**

The pump may cycle once before the external signal is applied. Injury is possible. If pump cycles, wait until end before proceeding.

3. Pump will operate when air pressure is alternately applied and relieved to push type connectors (14).

**NOTE:** Leaving air pressure applied to the air motor for extended periods when the pump is not running may shorten the diaphragm life. Using a 3-way solenoid valve to automatically relieve the pressure on the air motor when the metering cycle is complete prevents this from occurring.

## Pump Shutdown

At the end of the work shift and before checking, adjusting, cleaning or repairing the system, follow the **Pressure Relief Procedure** below.

## Pressure Relief Procedure

### **WARNING**

To reduce the risk of serious injury, including splashing fluid in the eyes or on the skin, follow this procedure when this manual instructs you to relieve pressure, when you shut off the pump, and before checking, adjusting, cleaning, moving, or repairing any system equipment.

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

# 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

Flush the pump often enough to prevent the fluid you are pumping from drying or freezing in the pump and damaging it. Always flush the pump and follow the **Pressure Relief Procedure Warning** on page 12 before storing it for any length of time. Use a compatible solvent.

## 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 retorque as necessary. Although pump use varies, a general guideline is to retorque fasteners every two months. See **Torque Instructions** on page 32.

## 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, including splashing fluid in the eyes or on the skin, follow the **Pressure Relief Procedure** on page 12 when this manual instructs you to relieve pressure, when you shut off the pump, and before checking, adjusting, cleaning, moving, or repairing any system equipment.

**NOTE: 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 pages 15 to 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 10).
	Dispensing valve clogged.	Relieve pressure and clear valve.
Pump operates erratically.	Clogged suction line.	Inspect; clear.
	Sticky or leaking check valve balls (301).	Clean or replace. See page 18.
	Diaphragm ruptured.	Replace. See pages 19 to 21.
	Restricted exhaust.	Remove restriction.
Air bubbles in fluid.	Suction line is loose.	Tighten.
	Diaphragm ruptured.	Replace. See pages 19 to 21.
	Loose inlet manifold (102), damaged seal between manifold and seat (201), or 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. See pages 19 to 21.
	Damaged o-ring (108).	Replace. See pages 19 to 21.
Fluid in exhaust air.	Diaphragm ruptured.	Replace. See pages 19 to 21.
	Loose diaphragm shaft bolt (107).	Tighten or replace. See pages 19 to 21.
	Damaged o-ring (108).	Replace. See pages 19 to 21.
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 pages 15 to 16.
	Worn shaft seals (402).	Replace. See pages 19 to 21.
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 pages 15 to 16, 22 to 23.
	Air cover screws (3) are loose.	Tighten screws. See pages 22 to 23.
Pump leaks fluid externally from ball check valves.	Loose manifolds (102, 103), damaged seal between manifold and seat (201), or damaged o-rings (202).	Tighten manifold bolts (106) or replace seats (201) or o-rings (202). See page 18.

# Service

## Repairing the Air Valve

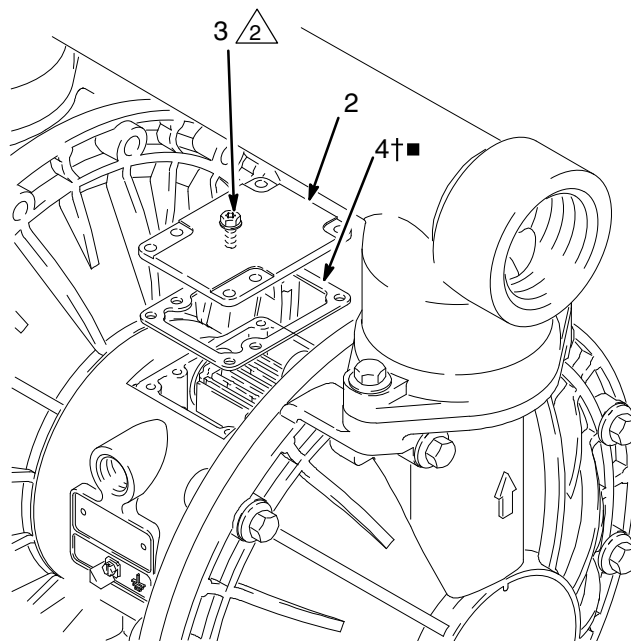
### Tools Required

- Torque wrench
- Torx (T20) screwdriver or 7 mm (9/32") socket wrench
- Needle-nose pliers
- O-ring pick
- Lithium base grease, part no. 111920 (Lubriplate 630AA or equivalent)

**NOTE:** Air Valve Repair Kits 236273 (aluminum center housings) and 255061 (stainless steel center housings) are available. Refer to page 27. 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

1. Follow the **Pressure Relief Procedure Warning** on page 12.
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. 6.
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. 7.
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 pilot pins. See Fig. 8.
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, on aluminum center housing models only, remove the seal (9). See Fig. 9.
6. Inspect the bearings (12, 15) in place. See Fig. 8. The bearings are tapered and, if damaged, must be removed from the outside. This requires disassembly of the fluid section. See page 22.
7. Clean all parts and inspect for wear or damage. Replace as needed. Reassemble as explained on page 16.



△ Torque to 50 to 60 in-lb (5.6 to 6.8 N•m).

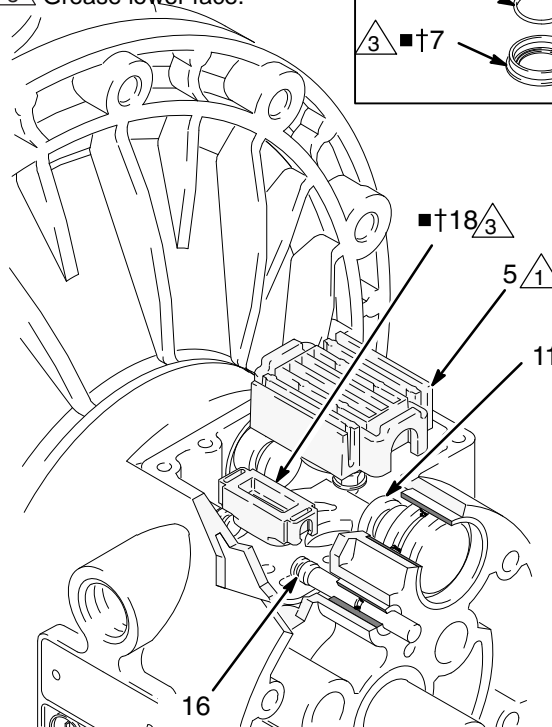
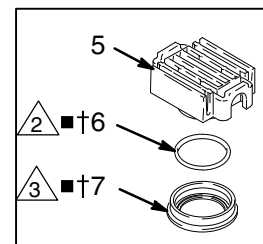
03944

FIG. 6

△ See Detail at right.

△ Grease

△ Grease lower face.



03945

FIG. 7

# Service

- ▲ 1 Insert narrow end first.
- ▲ 2 Grease
- ▲ 3 Install with lips facing narrow end of piston (11).
- ▲ 4 Insert wide end first.

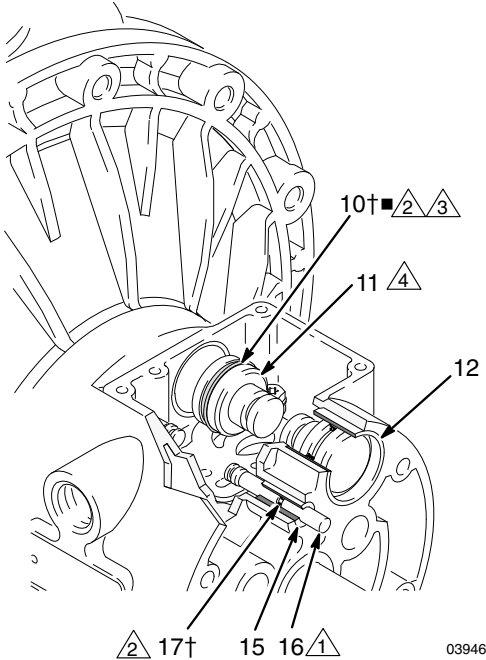


FIG. 8

- ▲ 1 Rounded side must face down (aluminum center housing models only).
- ▲ 2 Tighten screws until they bottom out on the housing.

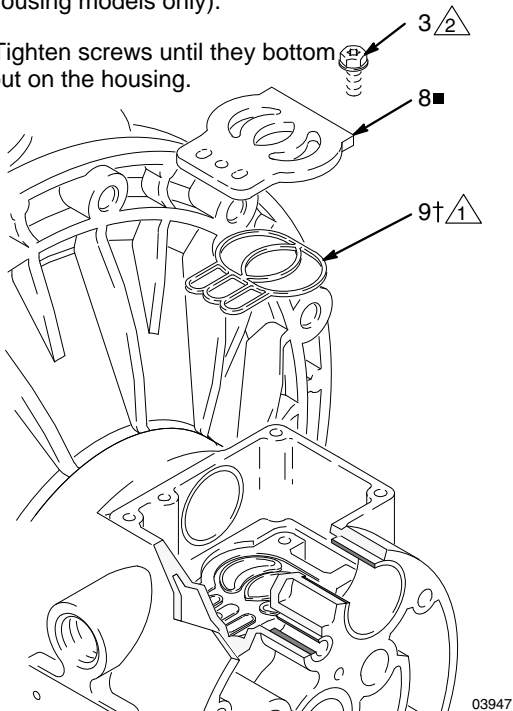


FIG. 9

## Reassembly

1. If you removed the bearings (12, 15), install new ones as explained on page 22. Reassemble the fluid section.
2. On aluminum center housing models, 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. 9.
3. Install the valve plate (8■) in the cavity. On aluminum center housing models, 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. 9.
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. 8.
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. 8.
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. 8.
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. 7.
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. 7.
9. Install the valve carriage (5) so its tabs slip into the grooves on the narrow end of the actuator pistons (11). See FIG. 7.
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 to 60 in-lb (5.6 to 6.8 N•m). See FIG. 6.





# 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 26 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.

**NOTE:** (Extension Version) To ensure proper sealing of extension (115), always replace o-rings (116) when replacing the balls.

1. Follow the **Pressure Relief Procedure Warning** on page 12. 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. 10.
4. Remove the seats (201), balls (301), and o-rings (202) from the manifold.

**NOTE:** Some models do not use o-rings (202).

5. Turn the pump over and remove the inlet manifold (102). Remove the seats (201), balls (301), and o-rings (202) 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. 10. Be sure the ball checks 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) thread locker to the threads. Torque to 120 to 150 in-lb (14 to 17 N•m) on aluminum pumps. Torque to 190-220 in-lb (22-25 N•m) on ductile iron and stainless steel pumps. See **Torque Instructions** on page 32.

▲2 Arrow (A) must point toward outlet manifold (103).

▲3 Not used on some models.

▲4 Beveled seating surface must face ball (301).

▲a Used on stainless steel model only.

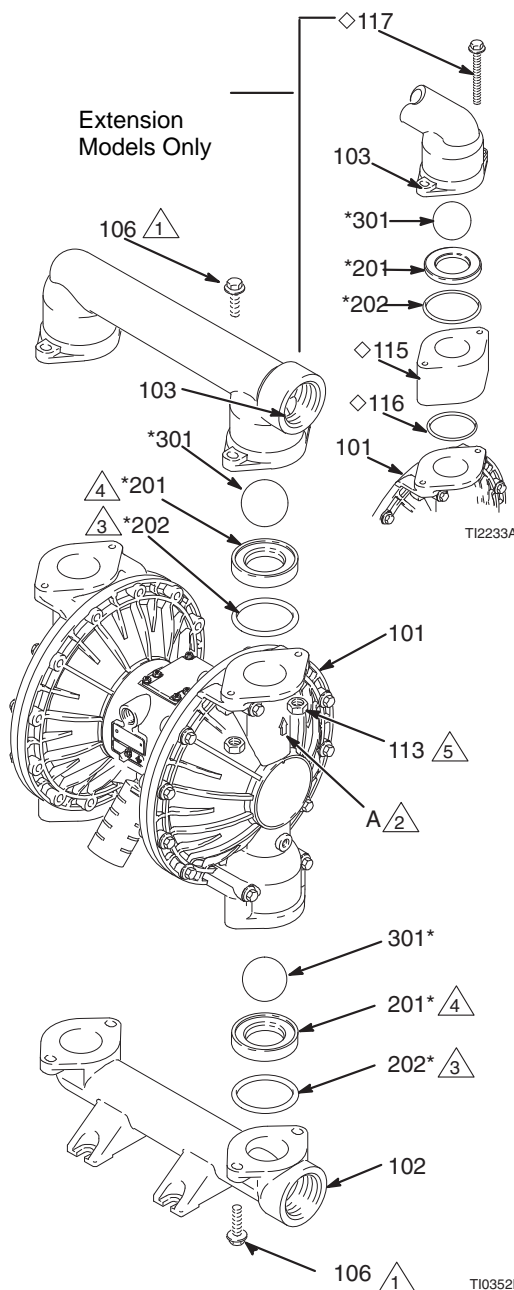


FIG. 10

# Service

## Diaphragm Repair

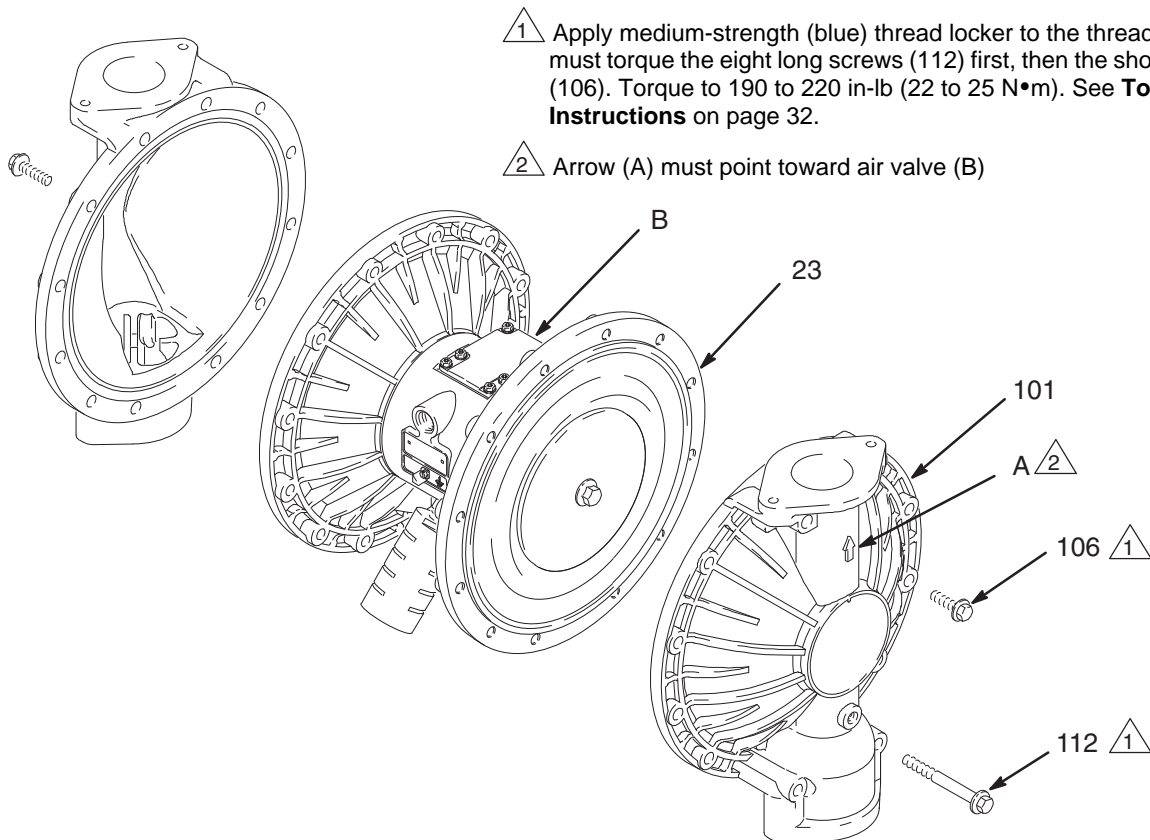
### Tools Required

- Torque wrench
- 10 mm socket wrench
- 13 mm socket wrench
- 15 mm socket wrench (aluminum models) or 1" socket wrench (stainless steel models)
- 19 mm open-end wrench
- O-ring pick
- Lithium-base grease, part no. 111920 (Lubriplate 630AA or equivalent)

### Disassembly

**NOTE:** A Fluid Section Repair Kit is available. Refer to page 26 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.

1. Follow the **Pressure Relief Procedure Warning** on page 12.
2. Remove the manifolds and disassemble the ball check valves as explained on page 16.
3. Using 10 and 13 mm socket wrenches, remove the screws (106 and 112) holding the fluid covers (101) to the air covers (23). Pull the fluid covers (101) off the pump. See FIG. 11.



03949B

FIG. 11

# Service

4. Loosen but do not remove the diaphragm shaft bolts (107), using a 15 mm socket wrench (1" on stainless steel models) on both bolts. *NOTE: This step does not apply to pumps with overmolded diaphragms.*
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. 12.

*For overmolded diaphragms:* Grip both diaphragms securely around the outer edge and rotate counterclockwise. One diaphragm assembly will come free and the other will remain attached to the shaft. Remove the freed diaphragm and air side plate.

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.

*For overmolded diaphragms:* 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 diaphragm and air side plate from the shaft.

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.

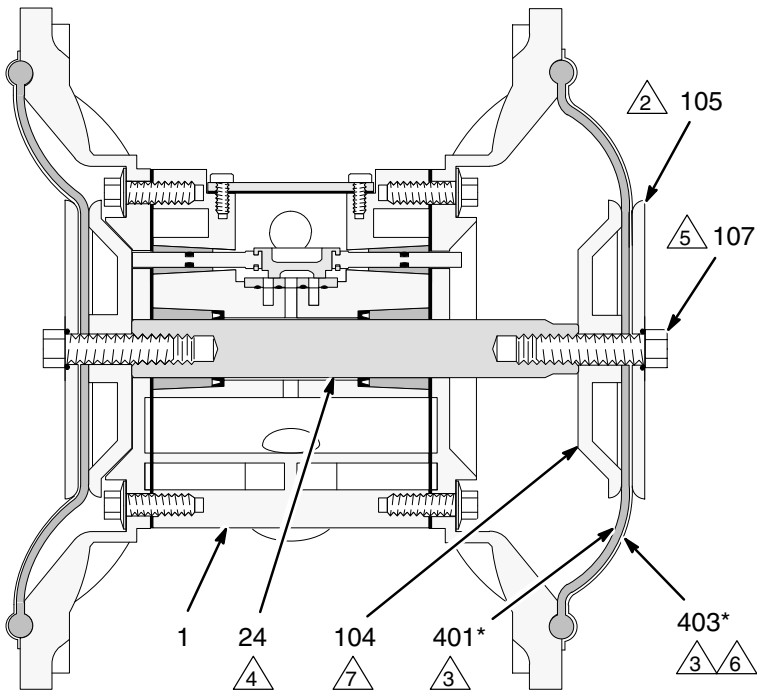
## Reassembly

1. Install the shaft u-cup packings (402\*) so the lips face **out** of the housing (1). Lubricate the packings. See FIG. 12.
2. Install the diaphragm assembly on one end of the shaft (24) as follows. *For pumps with overmolded diaphragms, go directly to step g.*
  - 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 in, toward 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 recessed side faces the diaphragm (401).
- f. Apply medium-strength (blue) thread locker to the bolt (107) threads. Screw the bolt into the shaft (24) hand tight.
- g. *For overmolded diaphragms:* Assemble the air side plate (104) onto the diaphragm (403). The wide, radiused side of the plate must face the diaphragm. Apply medium-strength (blue) thread locker to the threads of the diaphragm assembly. Screw the assembly into the shaft (24) hand tight.

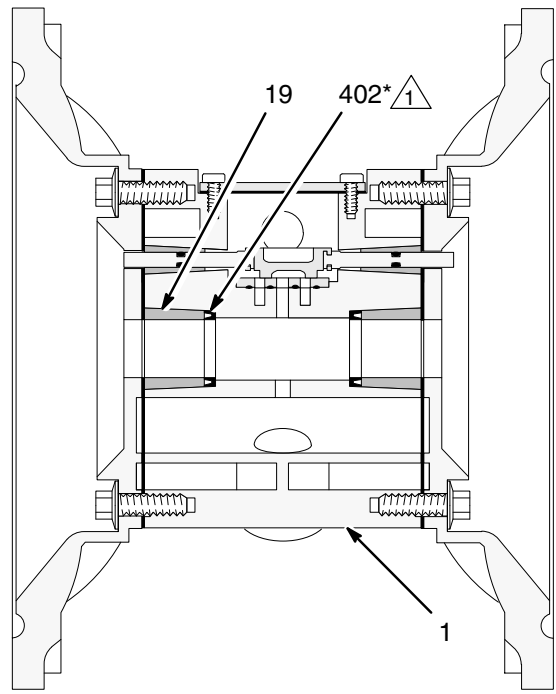
3. Grease the length and ends of the diaphragm shaft (24), and slide it through the housing (1).
4. Assemble the other diaphragm assembly to the shaft as explained in step 2.
5. Hold one shaft bolt (107) with a wrench and torque the other bolt to 20 to 25 ft-lb (27 to 34 N•m) at 100 rpm maximum. *NOTE: This step does not apply to pumps with overmolded diaphragms.*
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). Secure the covers with the screws (106 and 112), handtight. Install the longer screws (112) in the top and bottom holes of the covers. See FIG. 11.
7. First, torque the longer screws (112) oppositely and evenly to 190 to 220 in-lb (22 to 25 N•m), using a 13 mm socket wrench. Then torque the shorter screws (106), using a 10 mm socket wrench. See **Torque Instructions** on page 32.
8. Reassemble the ball check valves and manifolds as explained on page 18.

# Service



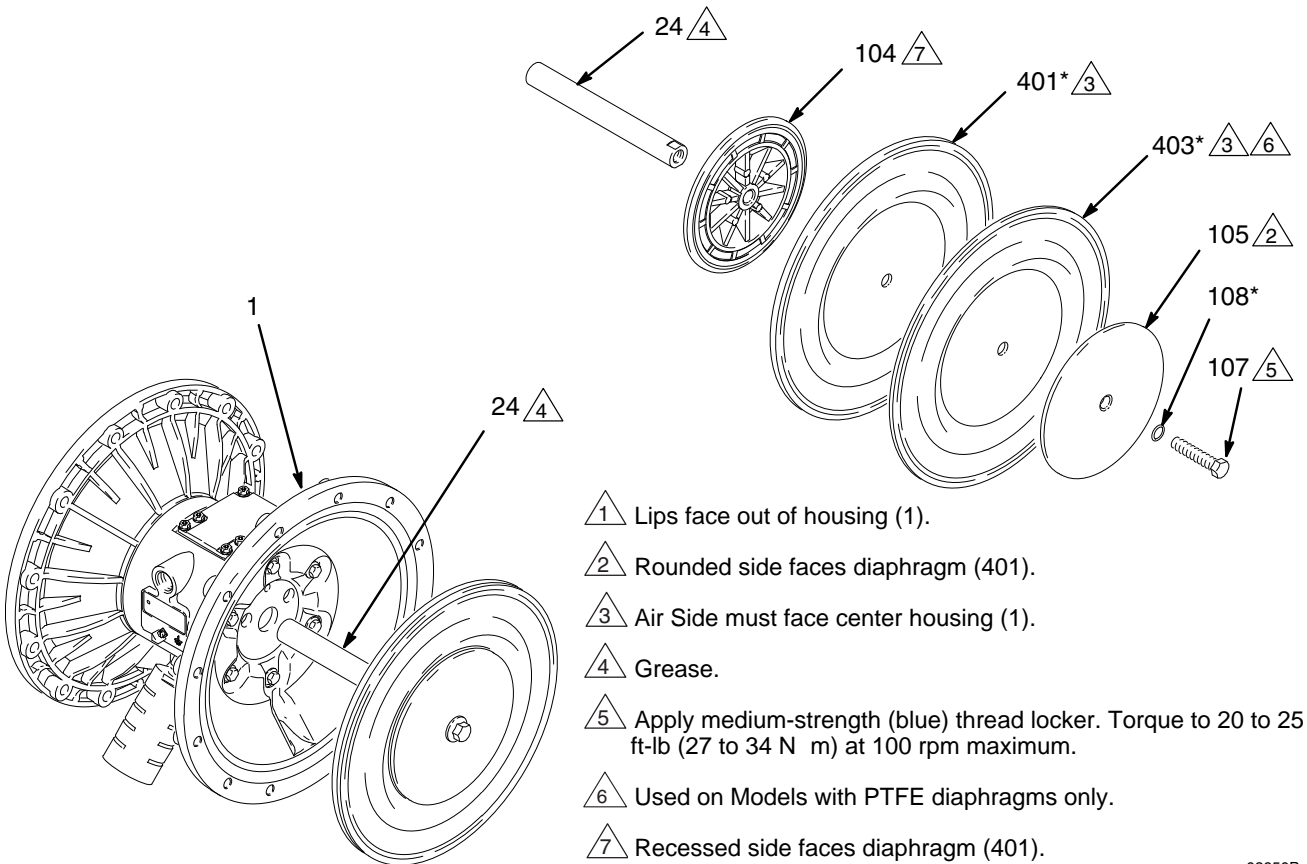
03981A

**Cutaway View, with Diaphragms in Place**



03982A

**Cutaway View, with Diaphragms Removed**



- ▲ 1 Lips face out of housing (1).
- ▲ 2 Rounded side faces diaphragm (401).
- ▲ 3 Air Side must face center housing (1).
- ▲ 4 Grease.
- ▲ 5 Apply medium-strength (blue) thread locker. Torque to 20 to 25 ft-lb (27 to 34 N·m) at 100 rpm maximum.
- ▲ 6 Used on Models with PTFE diaphragms only.
- ▲ 7 Recessed side faces diaphragm (401).

03950B

**FIG. 12**

# 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.

1. Follow the **Pressure Relief Procedure Warning** on page 12.
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 15.
5. Using a 10 mm socket wrench, remove the screws (25) holding the air covers (23) to the center housing (1). See FIG. 13.
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. 12.

### Reassembly

1. If removed, install the shaft u-cup packings (402\*) so the lips face **out** of the housing (1).
2. The bearings (19, 12, and 15) 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. See FIG. 13. Using a 10 mm socket wrench, torque the screws oppositely and evenly to 120 to 150 in-lb (14 to 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) thread locker to the threads. Torque to 120 to 150 in-lb (14 to 17 N•m).

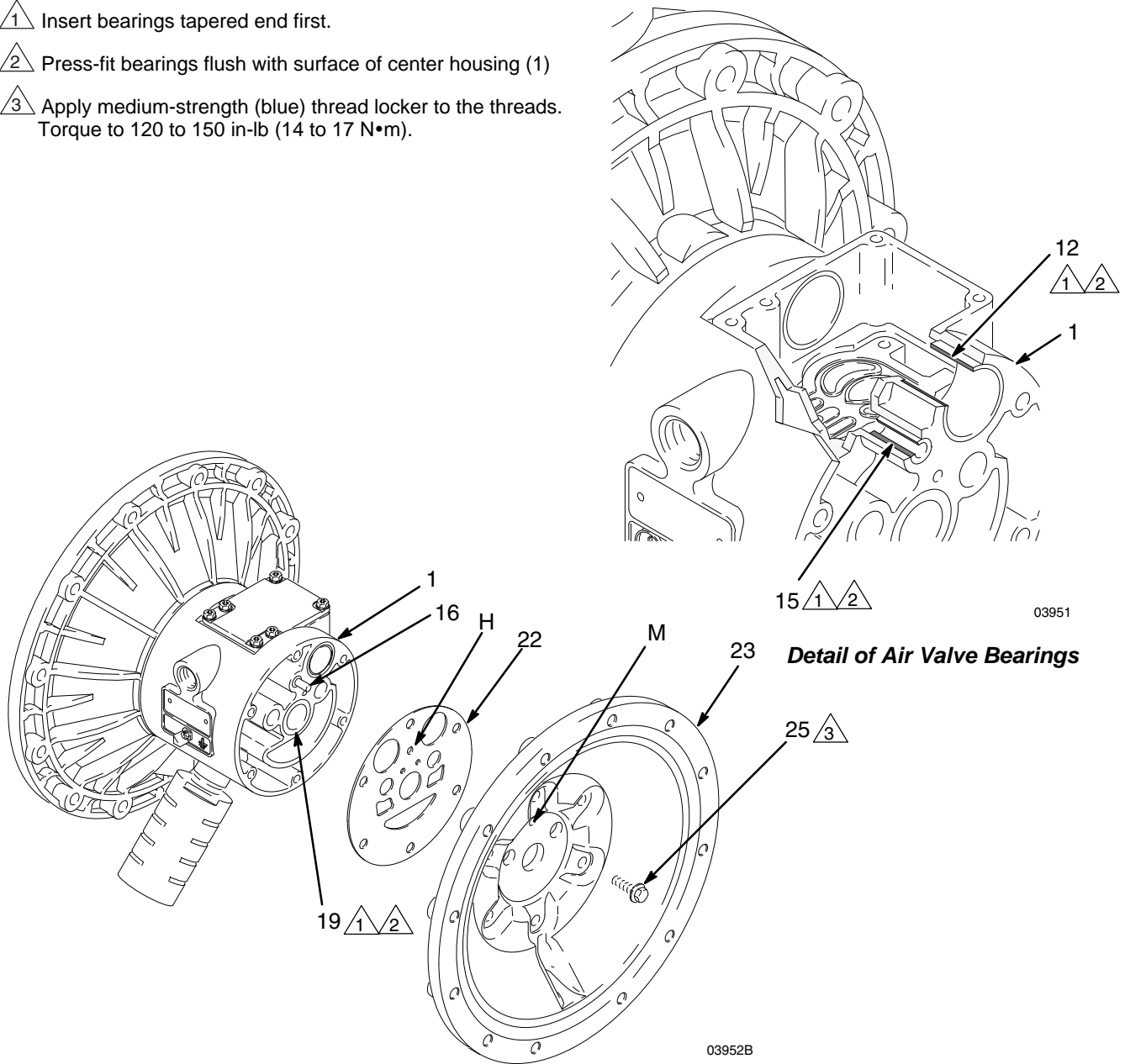


FIG. 13

# Pump Matrix

## Husky 2150 Aluminum, Stainless Steel, and Ductile Iron 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 and fluid section, polypropylene seats, PTFE balls, and PTFE diaphragms is Model No. **D F 3 9 1 1**. To order replacement parts, refer to the part lists on pages 27 and 28. *The digits in the matrix **do not** correspond to the ref. nos. in the parts drawing and lists on pages 27 and 28.*

Diaphragm Pump	Air Motor	Fluid Section	-	Seats	Balls	Diaphragms
25C658	sst	sst	-	sst	PTFE	PTFE/EPDM Overmolded
25C659	aluminum	sst	-	sst	PTFE	
25C660	sst	sst	-	sst	PTFE	
25C661	aluminum	sst	-	sst	PTFE	
D (for all pumps)	F aluminum (standard)	1 (not used)	-	1 (not used)	1 (PTFE)	1 (PTFE)
24B782*	G aluminum (remote)	2 (not used)	-	2 (not used)	2 (acetal)	2 (not used)
24B783*	V SST (standard)	3 (aluminum)	-	3 (316 sst)	3 (not used)	3 (not used)
24B801*		4 (sst)	-	4 (17-4 PH sst)	4 (440C sst)	4 (not used)
24G413*		5 (not used)	-	5 (TPE)	5 (TPE)	5 (TPE)
26C240*		6 (ductile iron)	-	6 (Santoprene®)	6 (Santoprene®)	6 (Santoprene®)
		C (aluminum BSPT)	-	7 (Buna-N)	7 (Buna-N)	7 (Buna-N)
		D (sst BSPT)	-	8 (Fluoroelastomer)	8 (Fluoroelastomer)	8 (Fluoroelastomer)
		F (ductile iron BSPT)	-	9 (Polypropylene)		
		G (aluminum BSPT extended)	-	G (Geolast®)	G (Geolast®)	G (Geolast®)
		H (aluminum extended)			H (neoprene/sst)	N (polychloroprene)
	P (sst manifold center-ported flange, vert. outlet)					
	R (sst manifold center-ported flange, horiz. output)					

### 246452 Stainless Steel Air Motor Conversion Kit

Use kit 246452 and refer to manual 309643 (included in kit) to convert from aluminum air motor to stainless steel air motor.



**\* 24B782 Aluminum Pump**

This pump is the same as Model DF3311 except for the serial plate and parts listed in the chart at right.

**\* 24J360 Aluminum Pump**

This pump is the same as Model DF3321 except for the serial plate and parts listed in the chart at right.

**\* 24B783 Stainless Steel Plus Pump**

This pump is the same as Model DV4311 except for the serial plate and parts listed in the chart at right.

**\* 24B801 Stainless Steel Pump**

This pump is the same as Model DF4311 except for the serial plate and parts listed in the chart at right.

**\* 24G413 Aluminum pump**

This pump is the same as Model DFC311 except for the serial plate and parts listed in the chart at right.

**\* 25A018 Aluminum pump**

This pump is the same as Model DF3341 except for the serial plate and parts listed in the chart at right.

**\* 25A149 Ductile Iron pump**

This pump is the same as Model DF6311 except for the serial plate and parts listed in the chart below.

**\* 25A150 Ductile Iron pump**

This pump is the same as Model DF63G1 except for the serial plate and parts listed in the chart below.

**\* 25A151 Ductile Iron pump**

This pump is the same as Model DF6361 except for the serial plate and parts listed in the chart below.

**\* 25C658 Stainless Steel Pump**

This pump is the same as Model DVR315 except for the serial plate and parts listed in the chart below.

**\* 25C659 Stainless Steel Pump**

This pump is the same as Model DFR315 except for the serial plate and parts listed in the chart below.

**\* 25C660 Stainless Steel Pump**

This pump is the same as Model DVP315 except for the serial plate and parts listed in the chart below.

**\* 25C661 Stainless Steel Pump**

This pump is the same as Model DVP315 except for the serial plate and parts listed in the chart below.

**\* 26C240 Aluminum Pump**

This pump is the same as Model DFC911 except that the fluid side diaphragm plates are SST.

Ref. No.	Part No.	Description	Qty
104	15H811	PLATE, air side; alum.	2
105	---	not used	0
107	---	not used	0
108	---	not used	0
401	253628	DIAPHRAGM, HD, overmolded; PTFE/EPDM	2

# Repair Kit Matrix

## For Husky 2150 Aluminum and Stainless Steel Pumps, Series A

Repair Kits may be ordered separately. To repair the air valve, order **Part No. 236273** for aluminum center housing models, or **Part No. 255061** for stainless steel housing models (see page 27). Parts included in the Air Valve Repair Kit are marked with a symbol in the parts list, for example (4†\*).

To repair the seats, balls, and diaphragms, select the six digits which describe your pump from the following matrix, working from left to right. The first digit is always **D**, and the second digit is always **0** (zero). The remaining four 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, you need to order Repair Kit **D 0 F 9 1 1**. The digits in the matrix **do not** correspond to the ref. nos. in the parts drawing and lists on pages 28 - 30.

Diaphragm Pump	Null	Shaft O-Ring	-	Seats	Balls	Diaphragms
D (for all pumps)	0 (for all pumps)	F (PTFE)	-	0 (null)	0 (null)	0 (null)
			-	1 (not used)	1 (PTFE)	1 (PTFE)
			-	2 (not used)	2 (acetal)	2 (not used)
			-	3 (316 sst)	3 (not used)	3 (not used)
			-	4 (17-4 PH sst)	4 (440C sst)	4 (not used)
			-	5 (TPE)	5 (TPE)	5 (TPE)
			-	6 (Santoprene®)	6 (Santoprene®)	6 (Santoprene®)
			-	7 (Buna-N)	7 (Buna-N)	7 (Buna-N)
			-	8 (Fluoroelastomer)	8 (Fluoroelastomer)	8 (Fluoroelastomer)
			-	9 (Polypropylene)		B (2-piece, PTFE with Santoprene® backer)
			-	G (Geolast®)	G (Geolast®)	G (Geolast®)
					H (neoprene/sst)	N (polychloroprene)

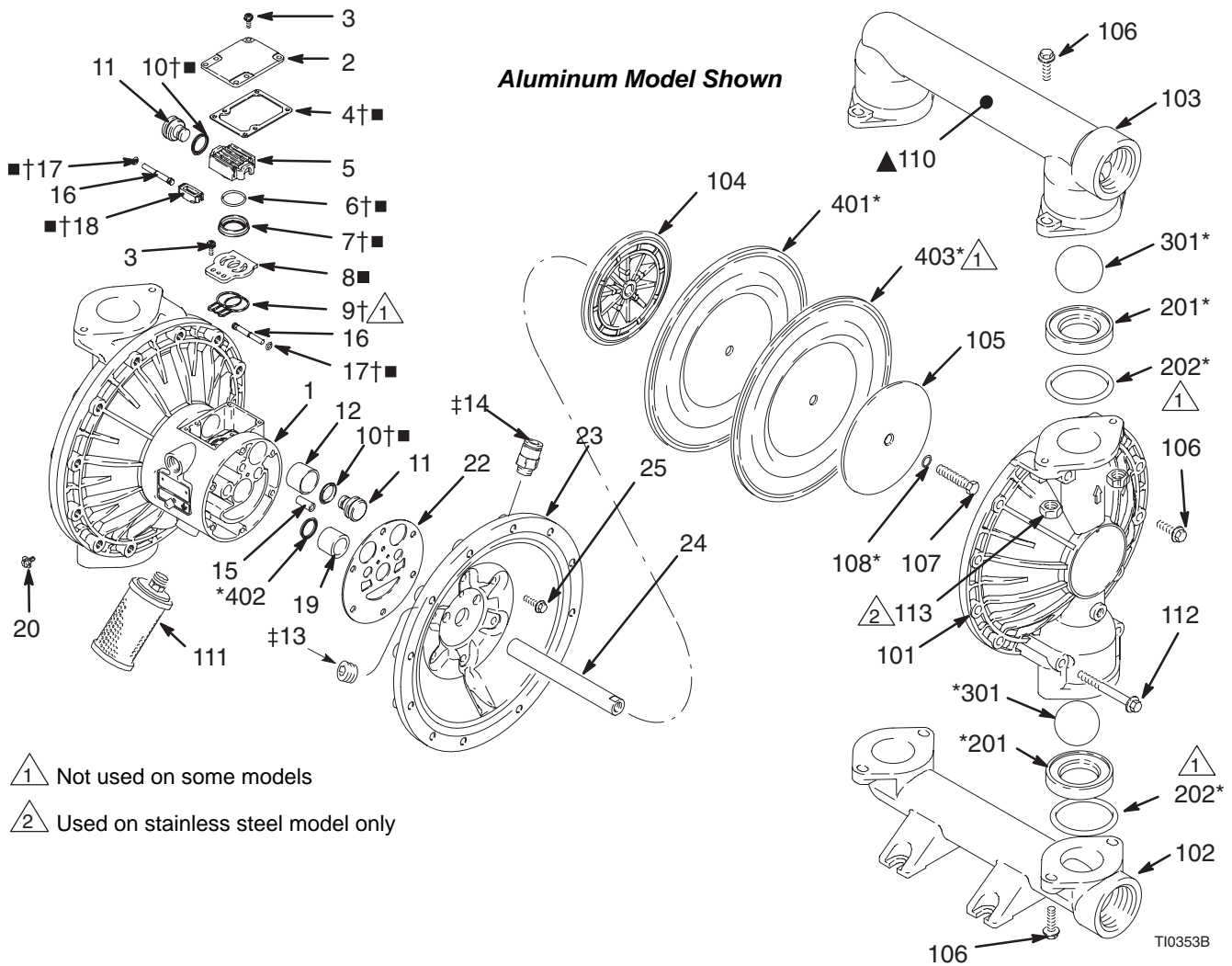
**Part No. 253628:** Husky 2150 HD Overmolded PTFE/EPDM Diaphragm Repair Kit.

**Part No. 289226:** Husky 2150 HD Overmolded PTFE/EPDM Diaphragm Repair Kit, with new air side diaphragm plates.

## Extension Conversion Kit

To convert an existing 2150 Aluminum pump to an extended version, use conversion kit 234019. This kit is for 2 in (50.8 mm) npt or bspt ported aluminum pumps only. It extends the outlet manifold to match the inlet to outlet distance of a Wilden or ARO aluminum pump.

# Parts



- ▲ 1 Not used on some models
- ▲ 2 Used on stainless steel model only

\* These parts are included in the Pump Repair Kit, which may be purchased separately. Refer to the **Repair Kit Matrix** on page 26 to determine the correct kit for your pump.

† These parts are included in Air Valve Repair Kit 236273 (aluminum center housing models), which may be purchased separately.

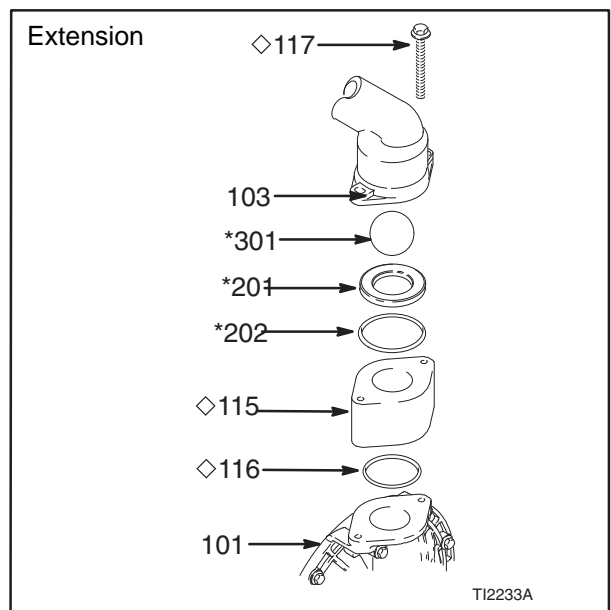
■ These parts are included in Air Valve Repair Kit 255061 (stainless steel center housing models), which may be purchased separately..

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

‡ These parts are unique to remote piloted air motor,

DG \_\_\_\_\_

◇ These parts are used on extension version only. Ref. No. 106 is qty. 20 on extension version.



# Parts

## Air Motor Parts List (Matrix Column 2)

Digit	Ref. No.	Part No.	Description	Qty
F	1	188838	HOUSING, center;	1
	2	188854	COVER, air valve; alum.	1
	3	116344	SCREW, mach, hex flange hd; M5x0.8;12 mm (0.47 in.)	9
	4†■	188618	GASKET, cover; foam	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
	13‡	104765	PLUG, pipe; headless	2
	14‡	115671	FITTING, connector; male	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	189300	COVER, air; aluminum	2
	24	189304	SHAFT, diaphragm; sst	1
	25	115643	SCREW; M8x .25; 25 mm	12

Digit	Ref. No.	Part No.	Description	Qty
G	Same as F with the following exceptions			
	1	195921	HOUSING, center; remote, aluminum	1
	23	195919	COVER, air; remote	2
V	Same as F with the following exceptions			
	1	15K009	HOUSING, center; stainless steel	1
	2	15K696	COVER, air valve; stainless steel	1
	8■	15H178	PLATE, air valve; stainless steel	1
	9	-	-	-
	23	15A742	COVER, air; stainless steel	2

# Parts

## Fluid Section Parts List (Matrix Column 3)

Digit	Ref. No.	Part No.	Description	Qty
3	101	15A612	COVER, fluid; aluminum	2
	102	189302	MANIFOLD, inlet; aluminum	1
	103	15A613	MANIFOLD, outlet; aluminum	1
	104	189298	PLATE, air side; aluminum	2
	105	262025	PLATE, fluid side; carbon steel	2
	106	115644	SCREW; M10 x 1.18; 30 mm	24 or 20Z
	107	189410	BOLT; M12 x 1.75; 55 mm (2.17 in.); 316 stainless steel	2
	108*	104319	O-RING; PTFE	2
	110▲	188621	LABEL, warning	1
	111	102656	MUFFLER	1
	112	115645	SCREW; M10 x 1.50; 90 mm (3.54 in.); carbon steel	8
	115◇	15B131	EXTENSION, 2150	2
	116◇	106260	PACKING, o-ring; PTFE M10x1.5;90mm	2
	117◇	112417	SCREW, mach, hex	4

Digit	Ref. No.	Part No.	Description	Qty
4	101	194279	COVER, fluid; 316 stainless steel	2
	102	194280	MANIFOLD, inlet; 316 stainless steel	1
	103	194281	MANIFOLD, outlet; 316 stainless steel	1
	104	189298	PLATE, air side; aluminum	2
	105	189299	PLATE, fluid side; 316 stainless steel	2
	106	112416	SCREW; M10 x 1.38; 35 mm	24
	107	189410	BOLT; M12 x 1.75; 55 mm (2.17 in.); 316 stainless steel	2
	108*	104319	O-RING; PTFE	2
	110▲	188621	LABEL, warning	1
	111	102656	MUFFLER	1
	112	112543	SCREW; M10 x 1.50; 110 mm (4.33 in.); stainless steel	8
	113	114862	NUT; M10	8
	6	101	191541	COVER, fluid; ductile iron
102		191542	MANIFOLD, inlet; ductile iron	1
103		191543	MANIFOLD, outlet; ductile iron	1
104		189298	PLATE, air side; aluminum	2
105		262025	PLATE, fluid side; carbon steel	2
106		112416	SCREW; M10 x 1.38; 35 mm	24
107		189410	BOLT; M12 x 1.75; 55 mm (2.17 in.); 316 stainless steel	2
108*		104319	O-RING; PTFE	2
110▲		188621	LABEL, warning	1
111		102656	MUFFLER	1
112		112543	SCREW; M10 x 1.50; 110 mm (4.33 in.); stainless steel	8

# Parts

## Fluid Section Parts List (Matrix Column 3)

Digit	Ref. No.	Part No.	Description	Qty
C	101	15A612	COVER, fluid; aluminum	2
	102	192086	MANIFOLD, inlet; aluminum; BSPT	1
	103	15A614	MANIFOLD, outlet; aluminum; BSPT	1
	104	189298	PLATE, air side; aluminum	2
	105	262025 189299	PLATE, fluid side; carbon steel SST	2
	106	115644	SCREW; M10 x 1.18; 30 mm	24
	107	189410	BOLT; M12 x 1.75; 55 mm (2.17 in.); 316 stainless steel	2
	108*	104319	O-RING; PTFE	2
	110▲	188621	LABEL, warning	1
	111	102656	MUFFLER	1
	112	115645	SCREW; M10 x 1.50; 90 mm (3.54 in.); carbon steel	8
	D	101	194279	COVER, fluid; 316 stainless steel
102		195576	MANIFOLD, inlet; 316 stainless steel; BSPT	1
103		195577	MANIFOLD, outlet; 316 stainless steel; BSPT	1
104		189298	PLATE, air side; aluminum	2
105		189299	PLATE, fluid side; 316 stainless steel	2
106		112416	SCREW; M10 x 1.38; 35 mm	24
107		189410	BOLT; M12 x 1.75; 55 mm (2.17 in.); 316 stainless steel	2
108*		104319	O-RING; PTFE	2
110▲		188621	LABEL, warning	1
111		102656	MUFFLER	1
112		112543	SCREW; M10 x 1.50; 110 mm (4.33 in.); stainless steel	8
113		114862	NUT; M10	8

Digit	Ref. No.	Part No.	Description	Qty
F	101	191541	COVER, fluid; ductile iron	2
	102	192088	MANIFOLD, inlet; ductile iron; BSPT	1
	103	192089	MANIFOLD, outlet; ductile iron; BSPT	1
	104	189298	PLATE, air side; aluminum	2
	105	262025	PLATE, fluid side; carbon steel	2
	106	112416	SCREW; M10 x 1.38; 35 mm	24
P, R	101	194279	COVER, fluid	2
	102	17N102	MANIFOLD, inlet, flange	1
	103	17N103 17N153	MANIFOLD, outlet, flange horizontal vertical	1
	104	189298	PLATE, air side	2
	105	189299	PLATE, fluid	2
	106	112416	SCREW	24
	107	189410	BOLT	2
	108	104319	O-RING	2
	110	188621	LABEL	1
	111	102656	MUFFLER	1
	112	112543	SCREW	8
	113	114862	NUT	8

# Parts

## Seat Parts List (Matrix Column 4)

Digit	Ref. No.	Part No.	Description	Qty
3	201*	189288	SEAT; 316 stainless steel	4
	202*	112358	O-RING; PTFE	4
4	201*	189289	SEAT; 174 stainless steel	4
	202*	112358	O-RING; PTFE	4
5	201*	189292	SEAT; TPE	4
	202	None	Not Used	0
6	201*	189290	SEAT; Santoprene®	4
	202*	112358	O-RING; PTFE	4
7	201*	15B267	SEAT; Buna-N	4
	202	None	Not used	0
8	201*	15B265	SEAT; Fluoroelastomer	4
	202	None	Not used	0
9	201*	189291	SEAT; polypropylene	4
	202*	112358	O-RING; PTFE	4
G	201*	194215	SEAT; Geolast®	4
	202*	112358	O-RING; PTFE	4

## Ball Parts List (Matrix Column 5)

Digit	Ref. No.	Part No.	Description	Qty
1	301*	112359	BALL; PTFE	4
2	301*	112363	BALL; acetal	4
4	301*	112360	BALL; 440C SS	4
5	301*	112745	BALL; TPE	4
6	301*	112361	BALL; Santoprene®	4
7	301*	15B492	BALL; Buna-N	4
8	301*	15B491	BALL; Fluoroelastomer	4
G	301*	114753	BALL; Geolast®	4
H	301*	15H834	BALL; neoprene/sst	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*	15K313	DIAPHRAGM; PTFE	2
5	401*	189295	DIAPHRAGM; TPE	2
	402*	112181	PACKING, u-cup; nitrile	2
6	401*	189296	DIAPHRAGM; Santoprene®	2
	402*	112181	PACKING, u-cup; nitrile	2
7	401*	15B313	DIAPHRAGM; Buna-N	2
	402*	112181	PACKING, u-cup; nitrile	2
8	401*	15B502	DIAPHRAGM; Fluoroelastomer	2
	402*	112181	PACKING, u-cup; nitrile	2
G	401*	194216	DIAPHRAGM; Geolast®	2
	402*	112181	PACKING, u-cup; nitrile	2
N	401*	15K245	DIAPHRAGM; polychloroprene	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 26 to determine the correct kit for your pump.

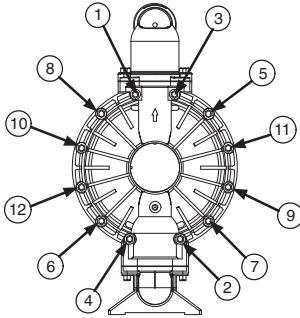
# Torque Instructions

## Aluminum Pumps

Model Numbers DF3\_\_\_, DG3\_\_\_, DFH\_\_\_, DGH\_\_\_, DFC\_\_\_, DGC\_\_\_, DFG\_\_\_, DGG\_\_\_

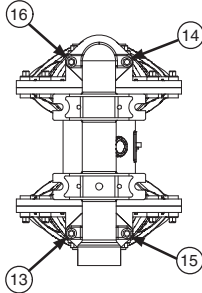
Always follow torque sequence when instructed to torque fasteners.

1. Left/Right Fluid Covers  
Torque bolts to 190-220 in-lb (22-25 N•m)



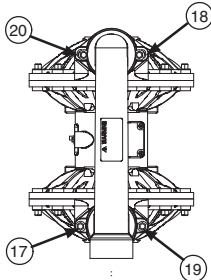
SIDE VIEW

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



BOTTOM VIEW

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



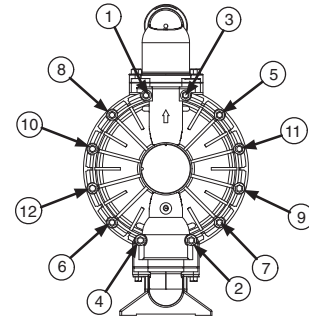
TOP VIEW

## Ductile Iron and Stainless Steel Pumps

Model Numbers DF4\_\_\_, DG4\_\_\_, DF6\_\_\_, DG6\_\_\_, DFD\_\_\_, DGD\_\_\_, DFF\_\_\_, DGF\_\_\_, DV4\_\_\_, DVD\_\_\_, DVP\_\_\_, DVR\_\_\_

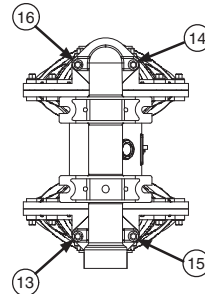
Always follow torque sequence when instructed to torque fasteners.

1. Left/Right Fluid Covers  
Torque bolts to 190-220 in-lb (22-25 N•m)



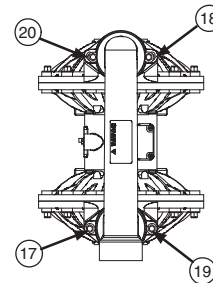
SIDE VIEW

2. Inlet Manifold  
Torque bolts to 190-220 in-lb (22-25 N•m)



BOTTOM VIEW

3. Outlet Manifold  
Torque bolts to 190-220 in-lb (22-25 N•m)

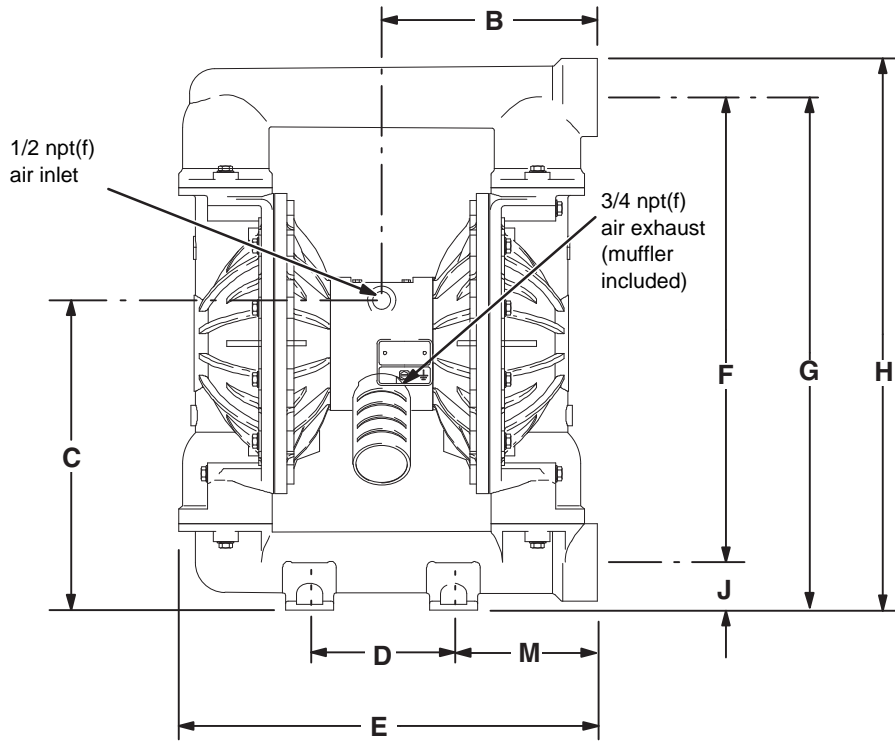


TOP VIEW

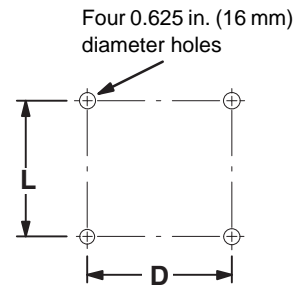


# Dimensions

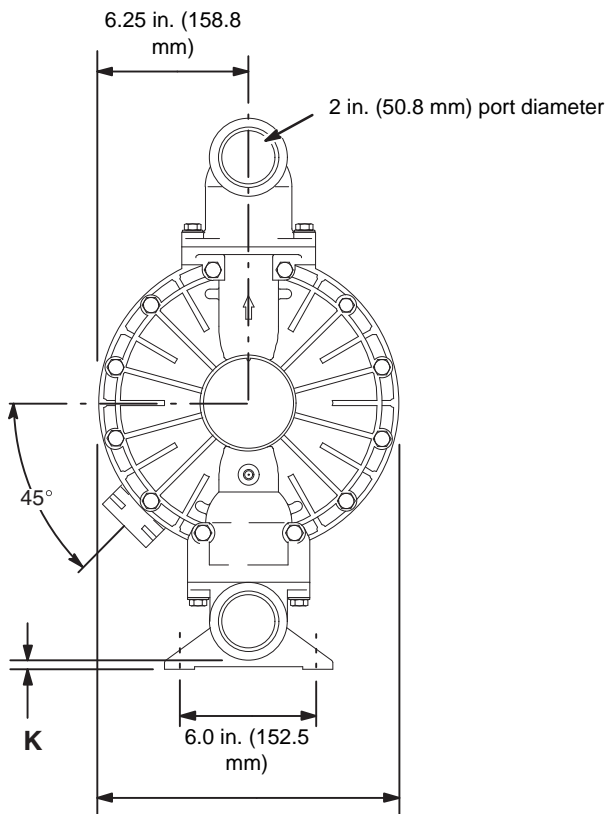
**FRONT VIEW**



**PUMP MOUNTING HOLE PATTERN**



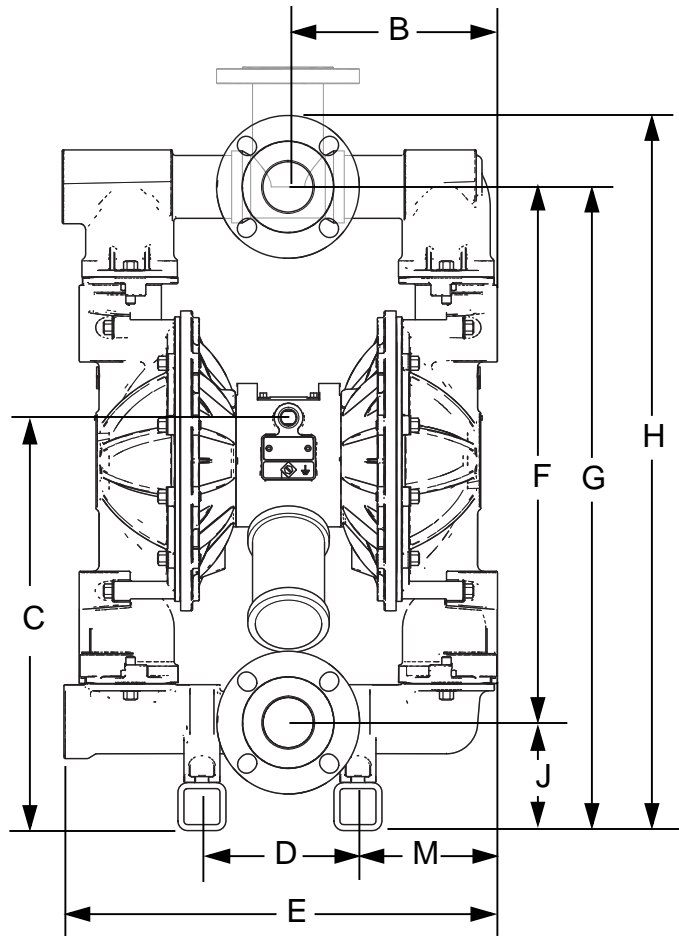
**SIDE VIEW**



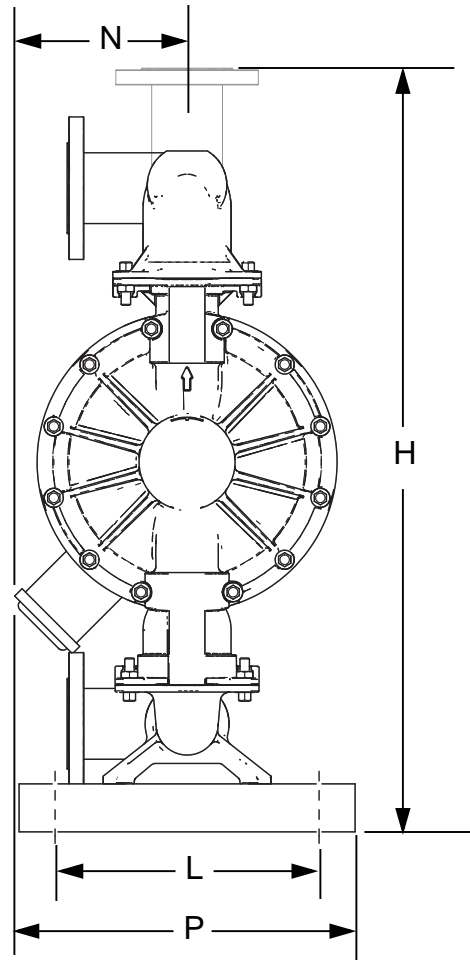
Dimensions B, C, F, G, H, and M can vary by up to 1/4 in. (6.3 mm) depending on the seat and diaphragm material fitted in the pump.

7440B

# Pump with Stainless Steel Flanged Manifold Ports



**FRONT VIEW**



**SIDE VIEW**

Dimensions B, C, F, G, H, and M can vary by up to 1/4 in. (6.3 mm) depending on the seat and diaphragm material fitted in the pump.

# Dimensions

Dimension	Aluminum Center Aluminum Cover		Aluminum Center Aluminum Cover Extended Pump*		Aluminum Center SST Cover		Aluminum OR SST Center SST Cover Flanged Manifold Ports		Aluminum Center Cast Iron Cover		SST Center Aluminum Cover		SST Center SST Cover		SST Center Cast Iron Cover	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
B	9.0	229	9.1	231	9.4	238	8.7	221	9.7	245	9.0	229	9.4	238	9.7	245
C	12.9	328	12.9	328	15.2	385	17.2	437	12.9	327	12.9	328	15.2	385	12.9	327
D	6.0	152	6.0	152	6.5	165	6.5	165	6.0	152	6.0	152	6.5	165	6.0	152
E	17.5	443	17.4	442	18.1	459	18.1	459	18.5	469	17.5	443	18.1	459	18.5	469
F	19.9	506	22.9	581	22.3	565	22.3	565	19.3	491	19.9	506	22.3	565	19.3	491
G	21.9	557	24.9	632	24.9	631	26.8	681	21.3	542	21.9	557	24.8	629	21.3	542
H†	23.6	598	26.5	673	26.3	668	29.8/31.8	757/808	22.8	578	23.6	598	26.3	668	22.8	578
J	2.0	51	2.0	51	2.5	64	4.5	114	2.0	51	2.0	51	2.5	64	2.0	51
K	0.4	10	0.4	10	0.9	24	---	---	0.6	14	0.4	10	0.9	24	0.6	14
L	6.0	152	6.0	152	6.0	152	11.0	279	6.0	152	6.0	152	6.0	152	6.0	152
M	6.0	152	6.0	152	5.8	146	5.8	147	7.0	178	6.0	152	5.8	146	7.0	178
N	---	---	---	---	---	---	7.2	183	---	---	---	---	---	---	---	---
P	---	---	---	---	---	---	14.3	363	---	---	---	---	---	---	---	---

\*Aluminum extended pump matches the inlet to outlet dimensions of Wilden and Aro aluminum pumps. This will help for ease of installation during upgrades.

†Dimension H for flanged port manifolds represent both the horizontal and vertical outlet manifold port dimensions.

# Technical Specifications

Maximum fluid working pressure .....	120 psi (0.8 MPa, 8 bar)
Air pressure operating range .....	20 to 120 psi (0.14 to 0.8 MPa, 1.4 to 8 bar)
Maximum air consumption .....	175 scfm
Air consumption at 70 psi (0.48 MPa, 4.8 bar)/60 gpm .....	60 scfm (see chart)
Maximum free-flow delivery.....	150 gpm (568 l/min)
Maximum pump speed .....	145 cpm
Gallons (Liters) per cycle.....	1.03 (3.90)
Maximum suction lift.....	18 ft (5.48 m) wet or dry
Maximum size pumpable solids.....	1/4 in. (6.3 mm)
* Maximum noise level at 100 psi (0.7 MPa, 7 bar) 50 cpm .....	90 dBA
* Sound power level.....	103 dBA
* Noise level at 70 psi (0.48 MPa, 4.8 bar) and 50 cpm .....	85 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.....	2" npt(f)
Fluid outlet size.....	2" npt(f)
Wetted parts .....	Vary by Model. See pages 22 to 26
Non-wetted external parts .....	aluminum, 302 and 316 stainless steel, polyester (labels)
<b>Weight</b>	
Aluminum pumps.....	58 lb (26.3 kg)
Stainless steel pumps with aluminum center section .....	111 lb (50.3 kg)
Stainless steel pumps with aluminum center section and flanged port manifolds.....	139 lb (63.0 kg)
Ductile Iron pumps with stainless steel center section .....	130 lb (59.0 kg)
Stainless steel pumps with stainless steel center section .....	134 lb (61.0 kg)
Stainless steel pumps with stainless steel center section and flanged port manifolds.....	162 lb (73.5 kg)

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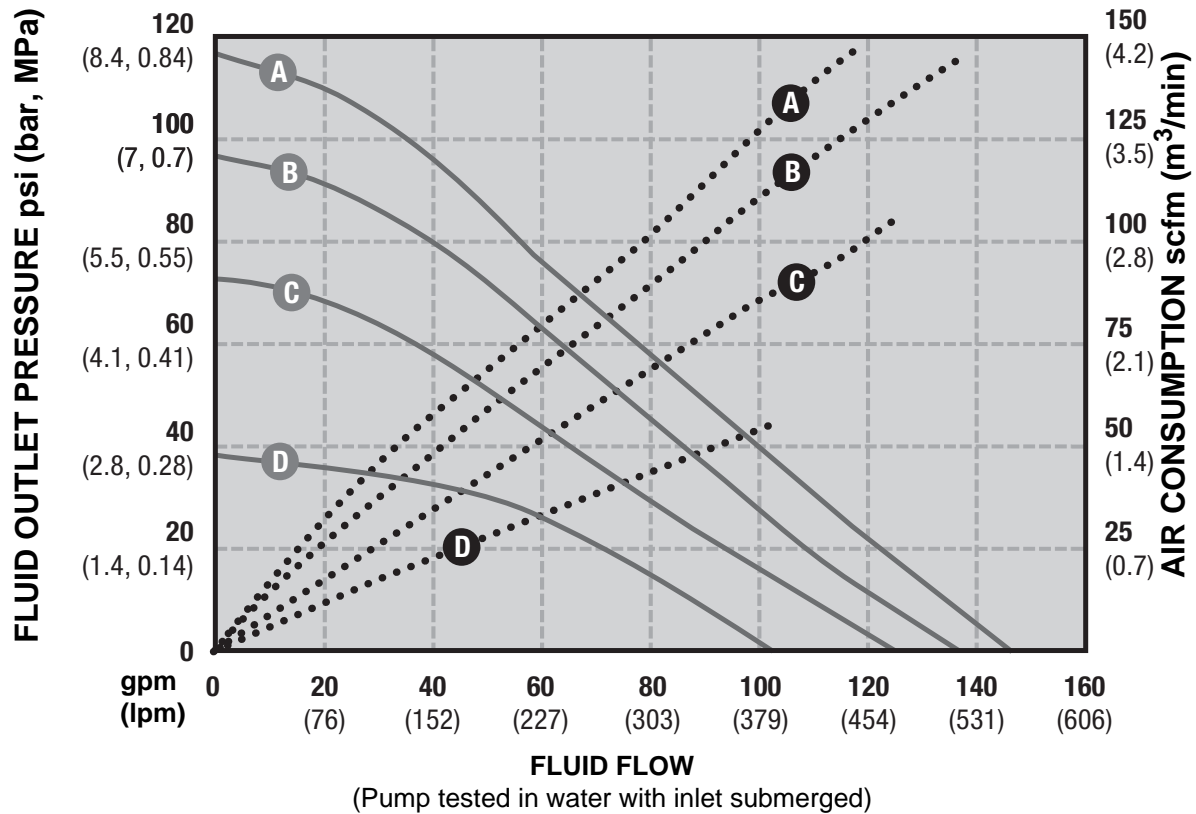
\* Noise levels measured with the pump mounted on the floor, using Rubber Foot Kit 236452. Sound power measured per ISO Standard 9216.

## Fluid Temperature Range

<b>⚠ CAUTION</b>
Temperature limits are based on mechanical stress only. Certain chemicals will further limit the fluid temperature range. Stay within the temperature range of the most-restricted wetted component. Operating at a fluid temperature that is too high or too low for the components of your pump may cause equipment damage.

Diaphragm/Ball/Seat Material	Fluid Temperature Range	
	Fahrenheit	Celsius
Acetal	10 to 180	-12 to 82
Buna-N	10 to 180	-12 to 82
FKM Fluoroelastomer	-40 to 275	-40 to 135
Geolast	-40 to 150	-40 to 66
Polypropylene	32 to 150	0 to 66
PTFE	40 to 180	4 to 82
Santoprene	-40 to 180	-40 to 82
TPE	-20 to 150	-40 to 82
Polychloroprene	0 to 180	-18 to 82

# Performance Chart



## AIR PRESSURE

A 120 psi air (8.4 bar, 0.84 MPa)

B 100 psi air (7 bar, 0.7 MPa)

C 70 psi air (4.8 bar, 0.48 MPa)

D 40 psi air (2.8 bar, 0.28 MPa)

— — — AIR CONSUMPTION

————— FLUID PRESSURE

**To find Fluid Outlet Pressure** (psi/bar/MPa) at a specific fluid flow (gpm/lpm) and operating air pressure (psi/bar/MPa):

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

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

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

## California Proposition 65

### CALIFORNIA RESIDENTS

**⚠ WARNING:** Cancer and reproductive harm – [www.P65warnings.ca.gov](http://www.P65warnings.ca.gov).

# 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 twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

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

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

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

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

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

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

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

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Original instructions. This manual contains English. MM 308368

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