

# Instructions–Parts List



POLYPROPYLENE, CONDUCTIVE POLYPROPYLENE, AND PVDF

## Husky™ 2150 Air-Operated Diaphragm Pumps

308550ZAH

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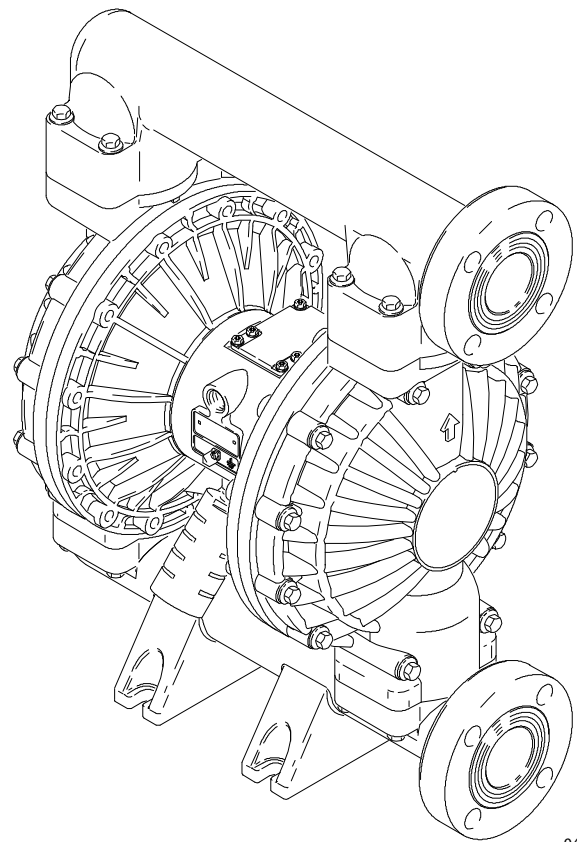
**2-inch AODD pump for fluid transfer applications. For professional use only.  
See Models on page 3 for a list of pump models, descriptions, and approvals.**

*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.  
See page 2 for table of contents.



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# Models

Model No.	Description
*DF2 _____	Polypropylene Pumps
*DG2_____	Polypropylene Pumps, Remote
*DF5 _____	PVDF Pumps
*DG5_____	PVDF Pumps, Remote
*DV2 _____	Polypropylene Plus Pumps
*DV5 _____	PVDF Plus Pumps
*DFA _____	Conductive Polypropylene Pumps†
*DGA_____	Conductive Polypropylene Pumps, Remote†
*DVA _____	Conductive Polypropylene Plus Pumps†
24B762	PVDF Plus Pump with overmolded diaphragms
24B763	Polypropylene Plus Pump with overmolded diaphragms
24B764	Polypropylene Pump with overmolded diaphragms
24B765	Polypropylene Pump with overmolded diaphragms and sst seats
24B833	PVDF Pump with overmolded diaphragms

**NOTE:** Plus models include stainless steel center sections

\* Refer to the Pump Matrix on page 27 to determine the Model No. of your pump.

† Pumps with conductive polypropylene fluid sections have the following approvals:



# 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



INSTRUCTIONS

### EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury.

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- 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.**
- 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.
- Do not use hoses to pull equipment.
- 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).
- Do not lift pressurized equipment.
- Wear hearing protection when operating this equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.



# 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 12.



## 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 7.
- **Never** use a polypropylene or PVDF pump with non-conductive flammable fluids as specified by your local fire protection code. Refer to **Grounding** on page 7 for additional information. Consult your fluid supplier to determine the conductivity or resistivity of your fluid.
- 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, dispensed, or transferred.
- 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 12.
- 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 Installation shown in **Fig. 2** 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. Be sure all accessories are adequately sized and pressure-rated to meet the system's requirements.
- Reference numbers and letters in parentheses refer to the callouts in the figures and the parts lists on pages 29- 32.
- Variations in color between the plastic components of this pump are normal. Color variation does not affect the performance of the pump.

## Tighten Screws Before First Use

Before using the pump for the first time, check and retorque all external fasteners. **See Torque Sequence**, page 33. After the first day of operation, retorque the fasteners. Although pump use varies, a general guideline is to retorque fasteners every two months.

### **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 5.
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.

# Installation

## 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 5.

*Polypropylene and PVDF are **not** conductive.* Attaching the ground wire to the grounding lug will ground only the air motor. When pumping conductive flammable fluids, **always** ground the entire fluid system by making sure the fluid has an electrical path to a true earth ground. See **Fig. 1**.

**Never** use a polypropylene or a PVDF pump with non-conductive flammable fluids as specified by your local fire protection code.

US Code (NFPA 77 Static Electricity) recommends a conductivity greater than  $50 \times 10^{-12}$  Siemens/meter (mhos/meter) over your operating temperature range to reduce the hazard of fire. Consult your fluid supplier to determine the conductivity or resistivity of your fluid. The resistivity must be less than  $2 \times 10^{12}$  ohm-centimeters.

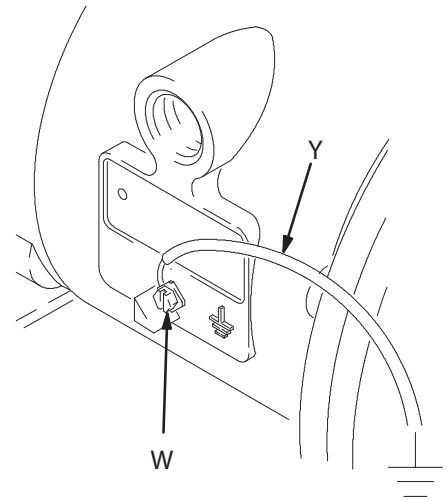
To reduce the risk of static sparking, ground the pump and all other equipment used or located in the pumping area. Check your local electrical code for detailed grounding instructions for your area and type of equipment.

### Ground all of this equipment:

- **Air Motor:** 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. 237569 Ground Wire and Clamp.

**NOTE:** When pumping conductive flammable fluids with a polypropylene or a PVDF pump, **always** ground the entire fluid system. See the **WARNING** on page 7.

- **Air and fluid hoses:** Use only electrically conductive hoses.
- **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



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**Fig. 1**

# Installation

## 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 electrically conductive.

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** at left. 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.

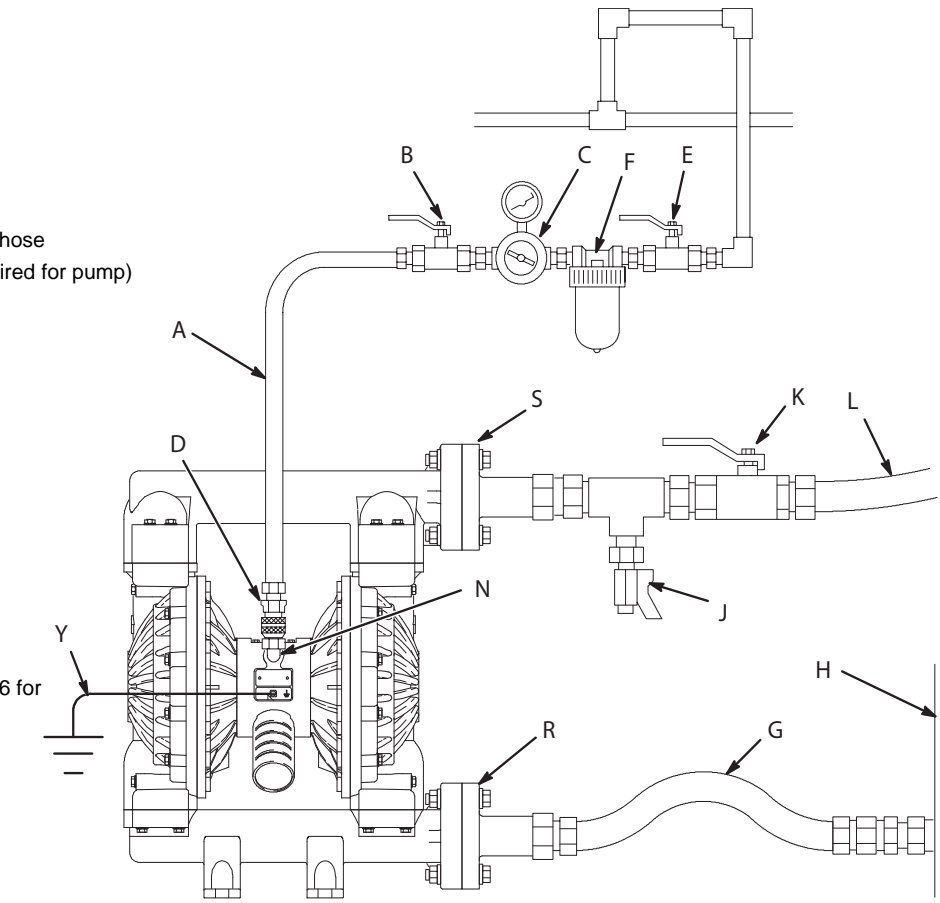
2. Install an electrically conductive, flexible air hose (A) between the accessories and the 1/2 npt(f) pump air inlet (N). See **Fig. 2**. Use a minimum 1/2" (13 mm) ID air hose.

3. Screw an air line quick disconnect coupler (D) onto the end of the air hose (A); be sure the coupler porting is large enough to not restrict the air flow, which will affect pump performance. 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.

## TYPICAL FLOOR-MOUNT INSTALLATION

### KEY FOR Fig. 2

- A Electrically conductive 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
- I Fluid hose
- N 1/2 npt(f) air inlet port
- R 2" fluid inlet flange
- S 2" fluid outlet flange
- Y Ground wire (required; see page 6 for installation instructions)



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Fig. 2



# Installation

## 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.

**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/N195265) controllers.

## 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 12

- 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.

## Fluid Suction Line

1. The pump fluid inlet (R) is a 2" raised face flange. Refer to **Flange Connections** on page 10.
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 36 for maximum suction lift (wet and dry).

## Fluid Outlet 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. The pump fluid outlet (S) is a 2" raised face flange. Refer to **Flange Connections** on page 10.
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

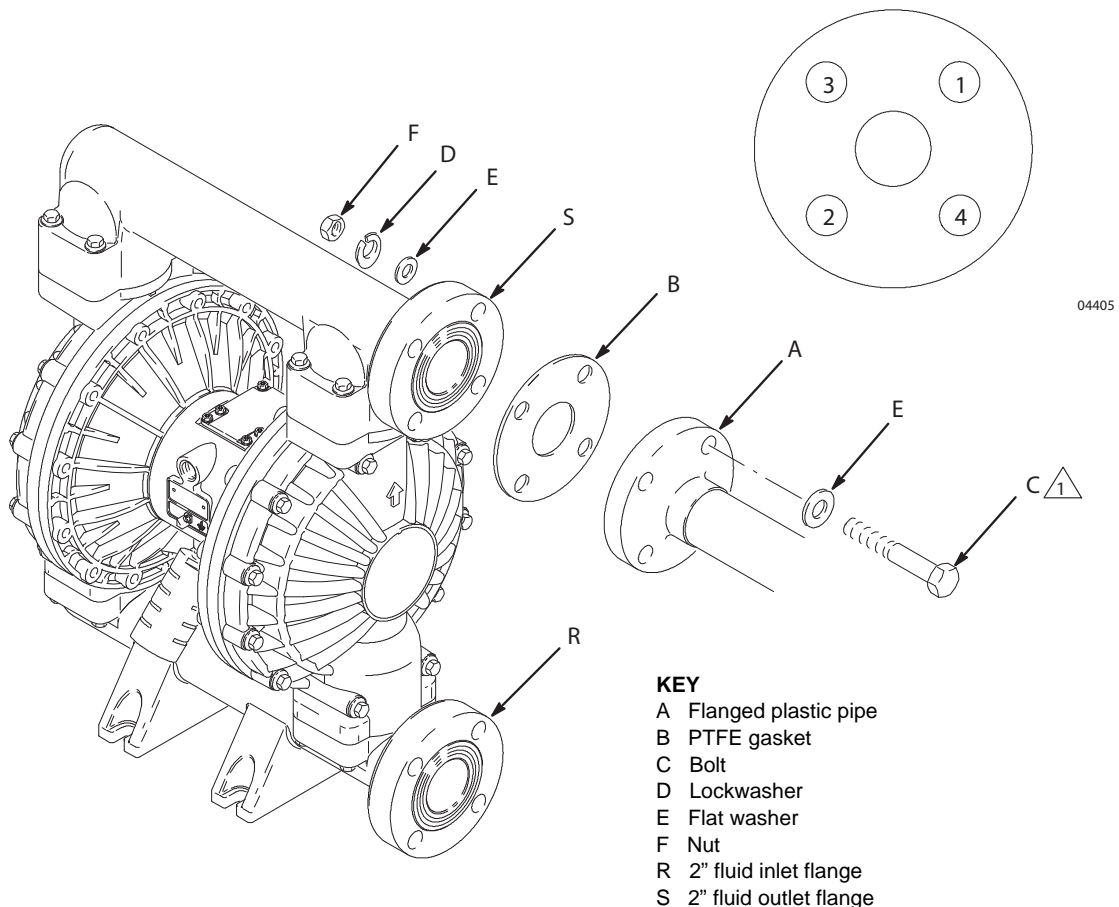
## Flange Connections


The fluid inlet and outlet ports are 2" raised face, standard 150 lb class pipe flanges. Connect 2" flanged plastic pipe to the pump as follows. You will need:

- Torque wrench
- Adjustable wrench
- 6" diameter, 1/8" thick PTFE gasket, with four 0.75" diameter holes on a 4.75" diameter bolt circle, and a 2.20" diameter center
- Four 5/8" x 3" bolts
- Four 5/8" spring lockwashers
- Eight 5/8" flat washers
- Four 5/8" nuts

1. Place a flat washer (E) on each bolt (C). Refer to **Fig. 3**.
2. Align the holes in the gasket (B) and the pipe flange (A) with the holes in the pump outlet flange (S).
3. Lubricate the threads of the four bolts. Install the bolts through the holes and secure with the washers (E), lockwashers (D), and nuts (F).
4. Hold the nuts with a wrench. Refer to the tightening sequence in Fig. 3 and torque the bolts to 20- 30 ft-lb (27- 41 N•m). **Do not over-torque.**
5. Repeat for the pump inlet flange (R).

### BOLT TIGHTENING SEQUENCE



 Lubricate threads. Torque to 20- 30 ft-lb (27- 41 N•m). Do not over-torque.

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Fig. 3


# Installation

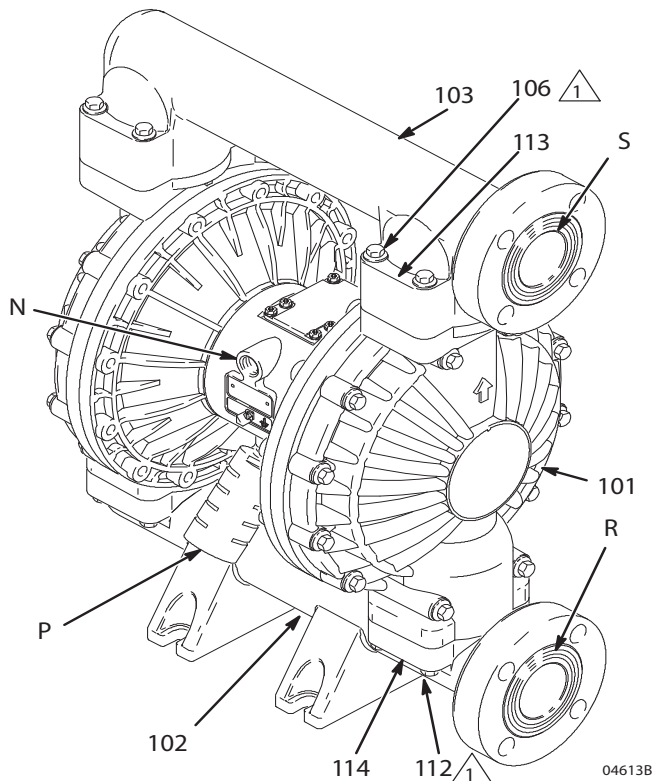
## Changing the Orientation of the Fluid Inlet and Outlet Ports

The pump is shipped with the fluid inlet (R) and outlet (S) ports facing the same direction. See **Fig. 4**. To change the orientation of the inlet and/or outlet port:

1. Remove the screws and washers (106, 112, 113 and 114) holding the inlet (102) and/or outlet (103) manifold to the covers (101).
2. Reverse the manifold and reattach. Install the screws and washers and torque to 150- 160 in- lb (17- 18 N•m). See **Torque Sequence**, page 33.

<b>KEY</b>		101	Fluid covers
N	1/2 npt(f) air inlet port	102	Fluid inlet manifold
N	1/2 npt(f) air inlet port	103	Fluid outlet manifold
P	Muffler <i>Air exhaust port is 3/4 npt(f)</i>	106	Fluid outlet manifold screws (top)
R	2" fluid inlet flange	112	Fluid inlet manifold screws (bottom)
S	2" fluid outlet flange	113	Fluid outlet manifold washer
		114	Fluid inlet manifold washer

 Torque to 150- 160 in- lb (17- 18 N•m). See **Torque Sequence**, page 31.



**Fig. 4**

## Fluid Pressure Relief Valve




### CAUTION

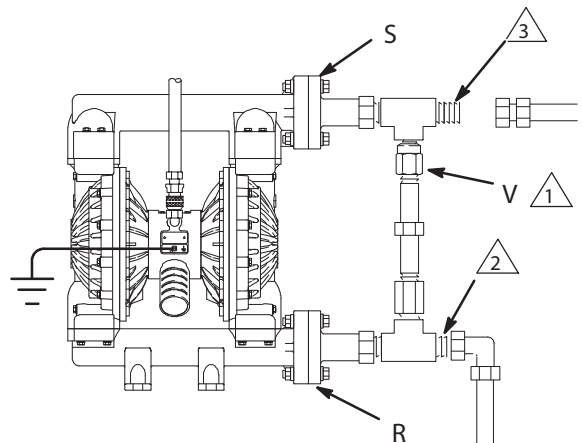
Some systems may require installation of a pressure relief valve at the pump outlet to prevent overpressurization and rupture of the pump or hose. See **Fig. 5**.

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

<b>KEY</b>	
R	2" fluid inlet flange
S	2" fluid outlet flange
V	Pressure relief valve Part No. 112119 (stainless steel)

-  Install valve between fluid inlet and outlet ports.
-  Connect fluid inlet line here.
-  Connect fluid outlet line here.



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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 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.

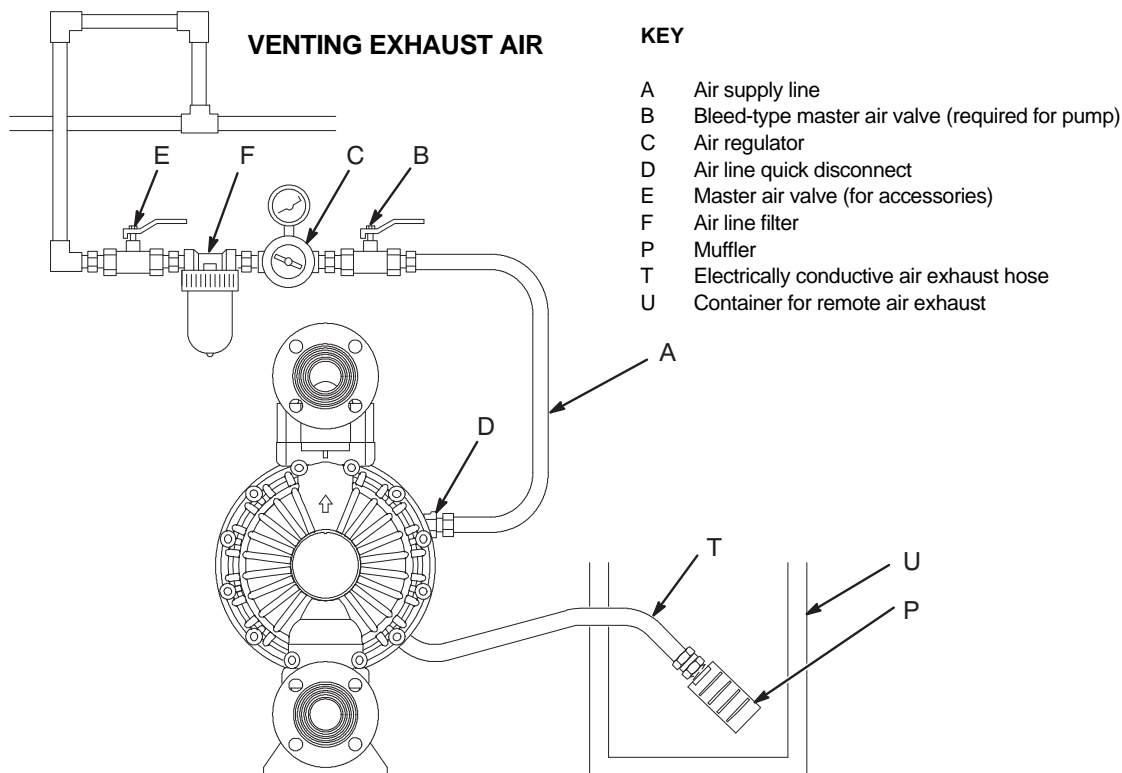
Diaphragm failure will cause the fluid being pumped to exhaust with the air. Place an appropriate container at the end of the air exhaust line to catch the fluid. See **Fig. 6**.

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

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 an electrically conductive 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. 6**.
3. Place a container (U) at the end of the air exhaust line to catch fluid in case a diaphragm ruptures.



04617

**Fig. 6**

# 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 all fluid pressure, having a container ready to catch the drainage.

## Flush the Pump Before First Use

The pump was tested in 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**

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed. Do not lift a pump under pressure. If dropped, the fluid section may rupture. Always follow the **Pressure Relief Procedure** above before lifting the pump.

1. Be sure the pump is properly grounded. Refer to **Grounding** on page 7.
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

## Operation of Remote Piloted Pumps

1. Fig. 2 and Parts Drawings. Follow preceding steps 1 through 7 of **Starting and Adjusting the Pump** on page 13.
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

### **WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 13.

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.

Flush the pump often enough to prevent the fluid you are pumping from drying or freezing in the pump and damaging it. Flush with a fluid that is compatible with the fluid you are pumping and with the wetted parts in your system. Check with your fluid manufacturer or supplier for recommended flushing fluids and flushing frequency.

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 retorque as necessary. Although pump use varies, a general guideline is to retorque fasteners every two months. See **Torque Sequence**, page 33.

## 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 13.

## 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 13.

1. Relieve the pressure before checking or servicing the equipment.
2. 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 20.
Pump will not cycle, or cycles once and stops.	Air valve is stuck or dirty.	Disassemble and clean air valve. See pages 18- 20. 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 20.
	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 20.
	Diaphragm ruptured.	Replace. See pages 21- 24.
	Restricted exhaust.	Remove restriction.
Air bubbles in fluid.	Suction line is loose.	Tighten.
	Diaphragm ruptured.	Replace. See pages 21- 24.
	Loose inlet manifold (102), damaged seal between manifold and seat (201), damaged o-rings (202).	Tighten manifold bolts (112) or replace seats (201) or o-rings (202). See page 20.
	Loose fluid side diaphragm plate (105).	Tighten or replace. See pages 21- 24.



# Troubleshooting

PROBLEM	CAUSE	SOLUTION
Fluid in exhaust air.	Diaphragm ruptured.	Replace. See pages 21- 24.
	Loose fluid side diaphragm plate (105).	Tighten or replace. See pages 21- 24.
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).	Inspect; replace. See pages 18- 20.
	Worn shaft seals (402).	Replace. See pages 21- 24.
Pump leaks air externally.	Air valve cover (2) or air valve cover screws (3) are loose.	Tighten screws. See page 18.
	Air valve gasket (4) or air cover gasket (22) is damaged.	Inspect; replace. See pages 18- 20, 25- 26.
	Air cover screws (25) are loose.	Tighten screws. See pages 25- 26.
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 and 112) 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
- Needle-nose pliers
- O-ring pick
- Lithium base grease

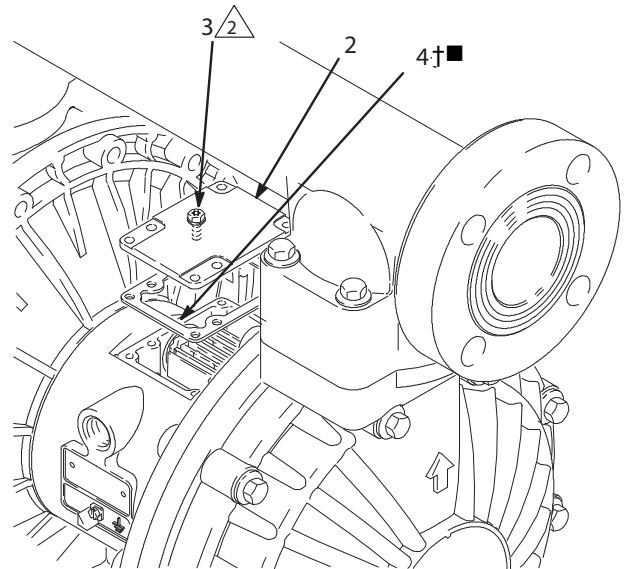
**NOTE:** Air Valve Repair Kits 236273 (aluminum center housings) and 255061 (stainless steel center housings) are available. Refer to page 28. Parts included in the kit are marked with a symbol, for example (4†■). Use all the parts in the kit for the best results.


### Disassembly

#### **WARNING**


To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 13.

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. 7**.
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. 8**.
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. 9**.
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. 10**.
6. Inspect the bearings (12, 15) in place. See **Fig. 9**. The bearings are tapered and, if damaged, must be removed from the outside. This requires disassembly of the fluid section. See page 25.
7. Clean all parts and inspect for wear or damage. Replace as needed. Reassemble as explained on page 19.




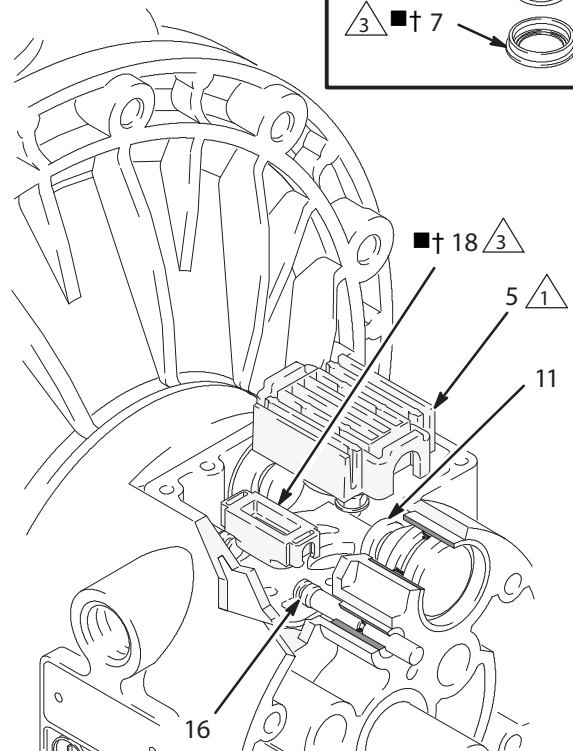
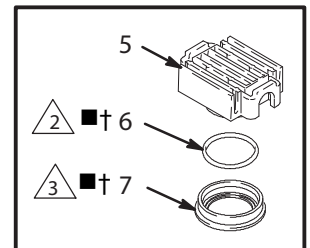
 Torque to 50- 60 in-lb (5.6- 6.8 N•m).

**Fig. 7**

 See Detail at right.

 Grease.

 Grease lower face.



**Fig. 8**

04900

# Service

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

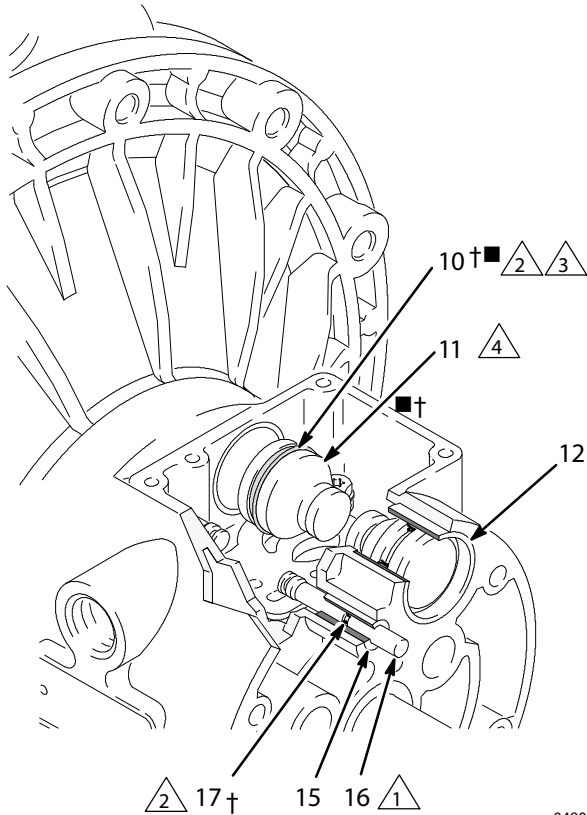


Fig. 9

## Reassembly

1. If you removed the bearings (12, 15), install new ones as explained on page 25. 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. 10.
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. 10.
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. 9.

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. 9.

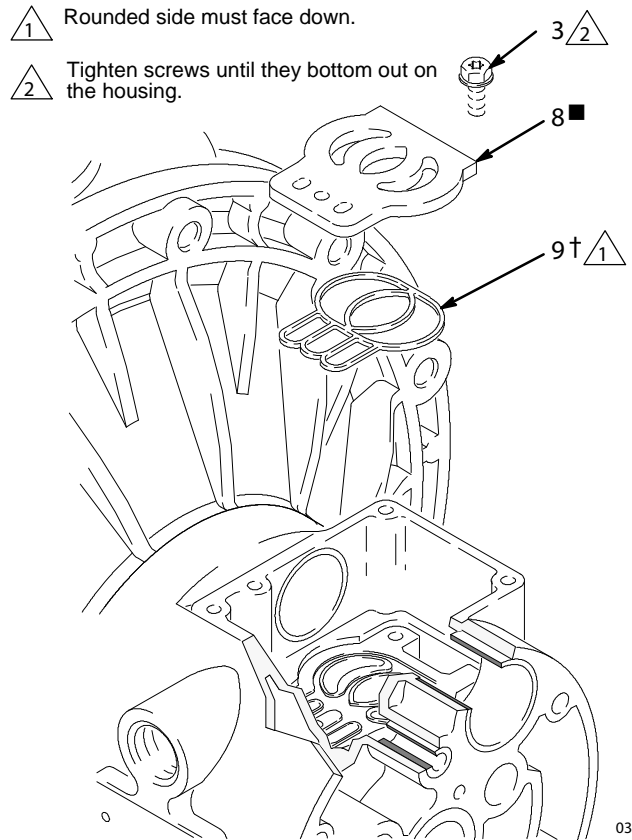


Fig. 10

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. 9.
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. 8.
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. 8.
9. Install the valve carriage (5) so its tabs slip into the grooves on the narrow end of the actuator pistons (11). See Fig. 8.
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. 7.

# 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 28 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.

### WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 13.




1. **Relieve the pressure.** Disconnect all hoses.
2. Remove the pump from its mounting.
3. Using a 10 mm socket wrench, remove the eight bolts (106), and four washers (113), holding the outlet manifold (103) to the fluid covers (101). See **Fig. 11**.
4. Remove the seats (201), balls (301), and o-rings (202) from the manifold.

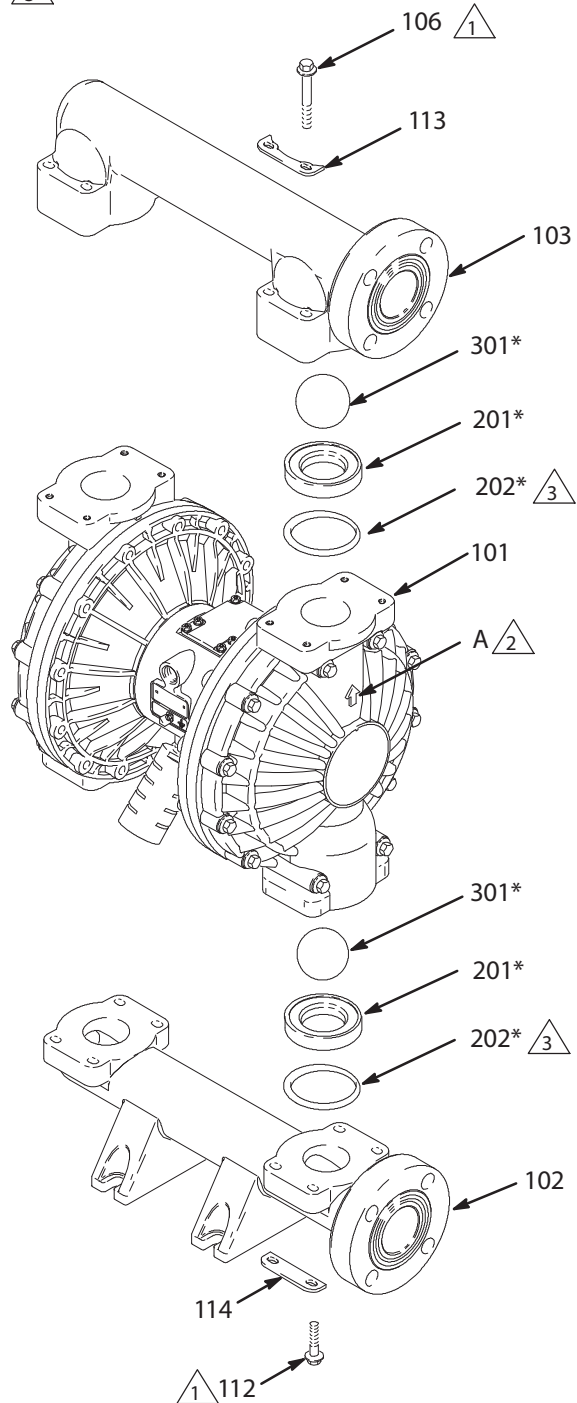
**NOTE:** Some models do not use o-rings (202).

5. Turn the pump over and remove the bolts (112), washers (114), and 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. 11**. 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).

-  Torque to 150- 160 in- lb (17- 18 N•m). See **Torque Sequence**, page 33.
-  Arrow (A) must point toward outlet manifold (103).
-  Not used on some models.



**Fig. 11**

04619C

# Service

## Diaphragm Repair

### Tools Required

- Torque wrench
- 13 mm socket wrench
- Adjustable wrench
- 19 mm open- end wrench
- O-ring pick
- Lithium-base grease

### Disassembly

**NOTE:** A Fluid Section Repair Kit is available. Refer to page 28 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 13.

1. **Relieve the pressure.**
2. Remove the manifolds and disassemble the ball check valves as explained on page 20.
3. Using 13 mm socket wrenches, remove the screws (107 and 108) holding the fluid covers (101) to the air covers (23). Pull the fluid covers (101) off the pump. See **Fig. 12**.

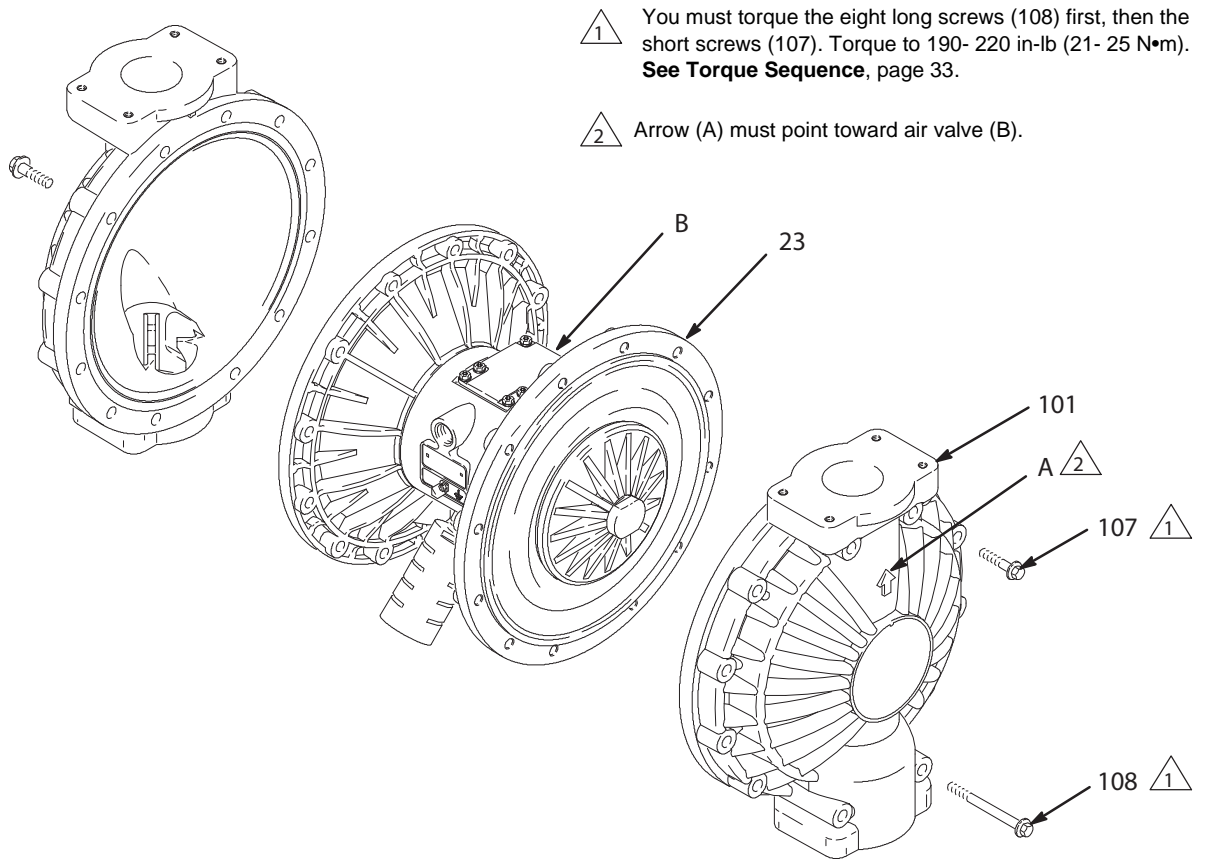


Fig. 12

04620B

# Service

4. Unscrew one outer plate (105) from the diaphragm shaft (24). Remove one diaphragm (401), and the inner plate (104). See **Fig. 13**.

*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.

**NOTE:** PTFE models include a PTFE diaphragm (403) in addition to the backup diaphragm (401).

5. 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 outer plate (105) 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.

6. 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 25.
7. 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.
8. Clean all parts and inspect for wear or damage. Replace parts as needed.

## Reassembly - Standard Diaphragms

1. Grease the shaft u-cup packings (402\*) and install them so the lips face out of the housing (1). See **Fig. 13**.
2. Grease the length and ends of the diaphragm shaft (24) and slide it through the housing (1).
3. Assemble the inner diaphragm plates (104), diaphragms (401\*), PTFE diaphragms (403\*, if present), and outer diaphragm plates (105) exactly as shown in **Fig. 13**. These parts **must** be assembled correctly.
4. Apply medium-strength (blue) Loctite® or equivalent to the threads of the fluid-side plates (105). Hold one of the outer plates (105) with a wrench, and torque the other outer plate to 20 to 25 ft-lb (27 to 34 N•m) at 100 rpm maximum. **Do not over-torque**.
5. 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 (107 and 108), handtight. Install the longer screws (108) in the top and bottom holes of the covers. See **Fig. 12**.
6. First, torque the longer screws (108) oppositely and evenly to 190- 220 in-lb (21- 25 N•m), using a 13 mm socket wrench. Then torque the shorter screws (107). See **Torque Sequence**, page 33.
7. Reassemble the ball check valves and manifolds as explained on page 20

# Service

## Reassembly - Overmolded Diaphragms

### **WARNING**

To reduce the risk of serious injury, including amputation, do not put your fingers or hand between the air cover and the diaphragm.

1. Lubricate and install the shaft u- cup packings (402\*) so the lips face **out** of the housing (1). See **Fig. 13**.
2. 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) Loctite or equivalent 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). Insert the shaft/diaphragm assembly into one side of the pump. Align the fluid cover (101) and the center housing (1) so the arrow (A) faces the same direction as the air valve. Secure the cover with the screws (107 and 108), handtight.
4. Torque the longer screws (108) oppositely and evenly to 190- 220 in- lb (21- 25 N•m), using a 13mm socket wrench. Then torque the shorter screws (107). See **Torque Sequence**, page 33.
5. Assemble the other diaphragm assembly to the shaft as explained in step 2. This diaphragm will be lifted off the air cover at this point.
6. Supply the pump with low pressure air (less than 7 psi [0.05 MPa, 0.5 bar]). The diaphragm will very slowly pull onto the air cover. Find the pressure that keeps the diaphragm close enough to secure with the screws, but does not let it contact the pilot pin.

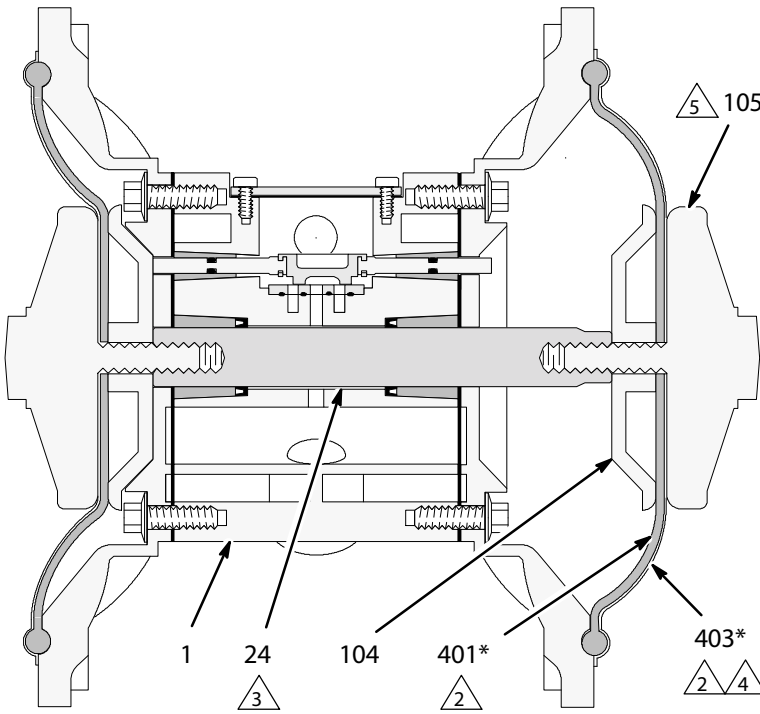
**NOTE:** Do not deform the diaphragm manually. The diaphragm needs uniform pressure to deform properly for maximum life.

7. Align the fluid cover (101) and the center housing (1) so the arrow (A) faces the same direction as the air valve. Secure the cover with two of the longer screws (108), handtight.

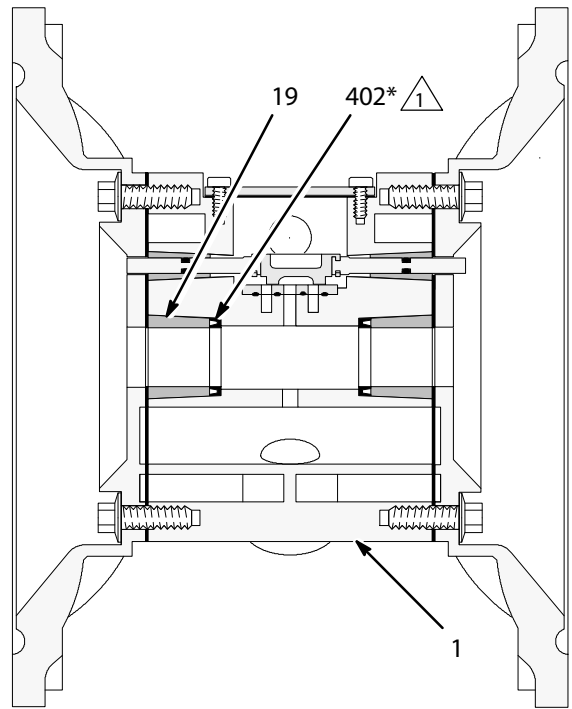
**NOTE:** If the diaphragm contacts the pilot pin and is forced away from the air cover, try Step 5 again. If necessary, return to Step 3.

8. Torque the longer screws (108) oppositely and evenly to 190- 220 in- lb (21- 25 N•m), using a 13mm socket wrench. Then torque the shorter screws (107). See **Torque Sequence**, page 33.
9. Reassemble the ball check valves and manifolds as explained on page 20.

# Service



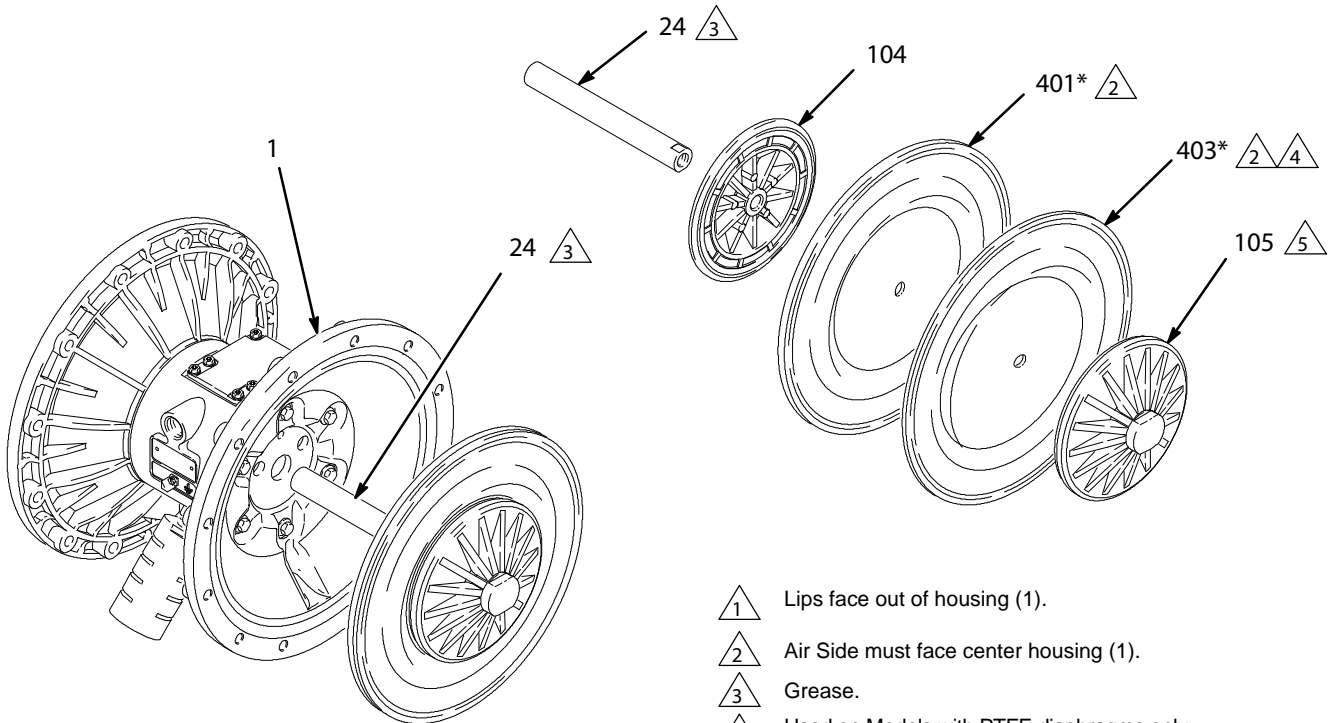
04708



03982

**Cutaway View, with Diaphragms in Place**

**Cutaway View, with Diaphragms Removed**



- △ 1 Lips face out of housing (1).
- △ 2 Air Side must face center housing (1).
- △ 3 Grease.
- △ 4 Used on Models with PTFE diaphragms only.
- △ 5 Apply medium-strength (blue) Loctite or equivalent. Torque to 20 to 25 ft-lb (27 to 34 N•m) at 100 rpm maximum.

04621 B

**Fig. 13**



# 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 13.




1. **Relieve the pressure.**
  2. Remove the manifolds and disassemble the ball check valves as explained on page 20.
  3. Remove the fluid covers and diaphragm assemblies as explained on page 21.
- NOTE:** If you are removing only the diaphragm shaft bearing (19), skip step 23.
4. Disassemble the air valve as explained on page 18.
  5. Using a 10 mm socket wrench, remove the screws (25) holding the air covers (23) to the center housing (1). See **Fig. 14**.
  6. Remove the air cover gaskets (22). Always replace the gaskets with new ones.

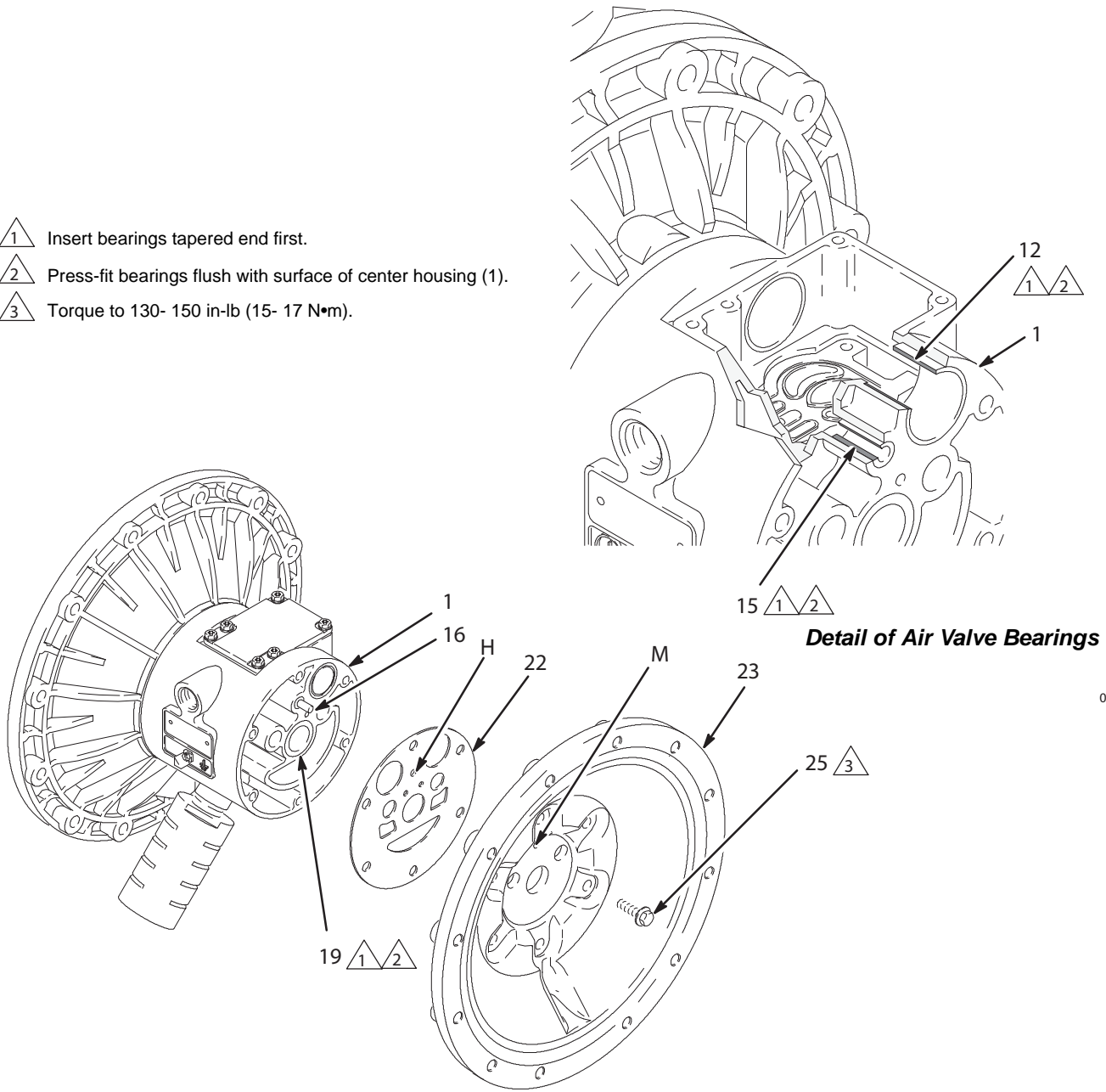
7. Use a bearing puller to remove the diaphragm shaft bearings (19), air valve bearings (12) or pilot pin bearings (15). Do not remove undamaged bearings.
8. If you removed the diaphragm shaft bearings (19), reach into the center housing (1) with an o-ring pick and hook the u-cup packings (402), then pull them out of the housing. Inspect the packings. See **Fig. 13**.

### 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 18.
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. 14**. 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 22.
7. Reassemble the ball check valves and manifolds as explained on page 20.

# Service

- 1  Insert bearings tapered end first.
- 2  Press-fit bearings flush with surface of center housing (1).
- 3  Torque to 130- 150 in-lb (15- 17 N•m).



03951

03952B

Fig. 14

# Pump Matrix

## Husky 2150 Polypropylene, Conductive Polypropylene, and PVDF 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 a Husky 2150 aluminum air motor, polypropylene fluid section, polypropylene seats, PTFE balls, and PTFE diaphragms is Model **DF2911**. To order replacement parts, refer to the part lists on pages 29- 31. *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
D (for all pumps)	F aluminum (standard)	1 (not used)	1 (not used)	1 (PTFE)	1 (PTFE)
24B762*	G aluminum (remote)	2 (polypropylene)	2 (not used)	2 (Acetal)	2 (not used)
24B763*	V SST (standard)	3 (aluminum; see manual 308368)	3 (316 SST)	3 (not used)	3 (not used)
24B764*		4 (SST; see manual 308368)	4 (17- 4 PH SST)	4 (440C SST)	4 (not used)
24B765*		5 (PVDF)	5 (TPE)	5 (TPE)	5 (TPE)
24B833*		A (Conductive Polypropylene)	6 (Santoprene)	6 (Santoprene)	6 (Santoprene)
		7 (Buna- N)	7 (Buna- N)	7 (Buna- N)	
		8 (Fluoroelastomer)	8 (Fluoroelastomer)	8 (Fluoroelastomer)	
		9 (polypropylene)			
		A (PVDF)			
		G (Geolast®)	G (Geolast®)	G (Geolast®)	G (Geolast®)

### 246452 Stainless Steel Air Motor Conversion Kit

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

### \* 24B762 PVDF Plus Pump

This pump is the same as Model DV5A11 except for the serial plate and parts listed in the chart at right.

### \* 24B763 Polypropylene Plus Pump

This pump is the same as Model DV2911 except for the serial plate and parts listed in the chart at right.

### \* 24B764 Polypropylene Pump

This pump is the same as Model DF2911 except for the serial plate and parts listed in the chart below.

### \* 24B765 Polypropylene Pump

This pump is the same as Model DF2311 except for the serial plate and parts listed in the chart below.

### \* 24B833 PVDF Pump

This pump is the same as Model DF5A11 except for the serial plate and parts listed in the chart below.

Ref. No.	Part No.	Description	Qty
104	15H811	PLATE, air side; alum.	2
105	-- -- --	not used	0
401	15G746	DIAPHRAGM, HD, overmolded; PTFE/EPDM	2

# Repair Kit Matrix

## For Husky 2150 Polypropylene, Conductive Polypropylene, and PVDF 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 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 **G**. 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 **DOG 911**. 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 **DOG 001**. *The digits in the matrix do not correspond to the ref. nos. in the parts drawing and lists on pages 29- 31.*

Diaphragm Pump	Null	Fluid Section Material	--	Seats	Balls	Diaphragms
D (for all pumps)	0 (for all pumps)	G (Plastic)	--	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)		
			--	A (PVDF)		
--	G (Geolast®)	G (Geolast®)	G (Geolast®)			

**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.

**Part No. 24F399:** Husky 2150 PTFE/Santoprene Backer Diaphragm Repair Kit, for plastic pumps.

# Parts

## Air Motor Parts List (Matrix Column 2)

Digit	Ref. No.	Part No.	Description	Qty
F	1	188838	HOUSING, center; aluminum	1
	2	188854	COVER, air valve; aluminum	1
	3	116344	SCREW, mach, hex flange hd; M5 x 0.8; 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 1.25; 25 mm (1 in.)	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	15A735	COVER, air valve; stainless steel	1
	8■	15H178	PLATE, air valve; stainless steel	1
	9	----	----	----
	23	15A742	COVER, air; stainless steel	

# Parts

## Fluid Section Parts List (Matrix Column 3)

Digit	Ref. No.	Part No.	Description	Qty
2	101	189793	COVER, fluid; polypropylene	2
	102	189787	MANIFOLD, inlet; polypropylene	1
	103	189790	MANIFOLD, outlet; polypropylene	1
	104	189298	PLATE, air side; aluminum	2
	105	189796	PLATE, fluid side; polypropylene	2
	106	112560	SCREW; M8x 1.25; 70 mm (2.76 in.); sst	8
	107	112368	SCREW; M10x 1.50; 60 mm (2.36 in.); sst	16
	108	114181	SCREW; M10x 1.50; 110 mm (4.33 in.); sst	8
	110▲	188621	LABEL, warning	1
	111	102656	MUFFLER	1
	112	112559	SCREW; M8x 1.25; 40 mm (1.57 in.); sst	8
		113	15J379	WASHER, manifold; outlet
	114	15J380	WASHER, manifold; inlet	4

5	101	189795	COVER, fluid; PVDF	2
	102	189789	MANIFOLD, inlet; PVDF	1
	103	189792	MANIFOLD, outlet; PVDF	1
	104	189298	PLATE, air side; aluminum	2
	105	189798	PLATE, fluid side; PVDF	2
	106	112560	SCREW; M8x 1.25; 70 mm (2.76 in.); sst	8
	107	112368	SCREW; M10x 1.50; 60 mm (2.36 in.); sst	16
	108	114181	SCREW; M10x 1.50; 110 mm (4.33 in.); sst	8
	110▲	188621	LABEL, warning	1
	111	102656	MUFFLER	1
	112	112559	SCREW; M8x 1.25; 40 mm (1.57 in.); sst	8
		113	15J379	WASHER, manifold; outlet
	114	15J380	WASHER, manifold; inlet	4
A	101	120969	COVER, fluid; conductive polypropylene	2
	102	120970	MANIFOLD, inlet; conductive polypropylene	1
	103	120971	MANIFOLD, outlet; conductive polypropylene	1
	104	189298	PLATE, air side; aluminum	2
	105	189796	PLATE, fluid side; polypropylene	2
	106	112560	SCREW; M8x 1.25; 70 mm (2.76 in.); sst	8
	107	112368	SCREW; M10x 1.50; 60 mm (2.36 in.); sst	16
	108	114181	SCREW; M10x 1.50; 110 mm (4.33 in.); sst	8
	110▲	188621	LABEL, warning	1
	111	102656	MUFFLER	1
	112	112559	SCREW; M8x 1.25; 40 mm (1.57 in.); sst	8
		113	15J379	WASHER, manifold; outlet
	114	15J380	WASHER, manifold; inlet	4

# 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; 17-4 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
A	201*	189745	SEAT; PVDF	4
	202*	112358	O-RING; PTFE	4
G	201*	194215	SEAT; Geolast	4
	202*	112358	O-RING; PTFE	4

## Diaphragm Parts List (Matrix Column 6)

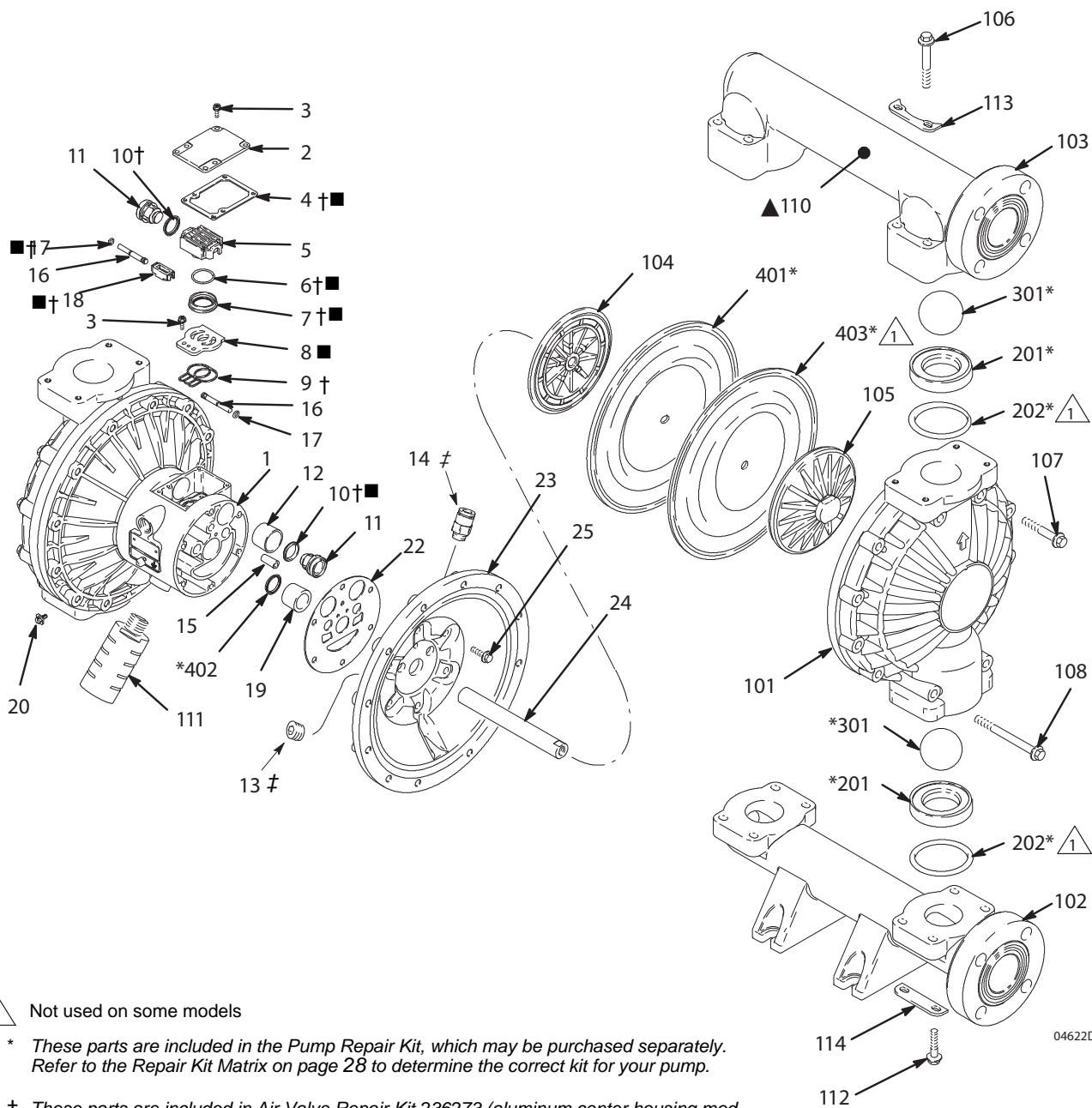
Digit	Ref. No.	Part No.	Description	Qty
1	401*	not sold separately	DIAPHRAGM, backup; polychloroprene (CR)	2
	402*	112181	PACKING, u-cup; nitrile	2
	403*	15K313	DIAPHRAGM; PTFE	2
5	401*	189295	DIAPHRAGM; TPE	2
	402*	112181	PACKING, u-cup; nitrile	2
6	401*	189296	DIAPHRAGM; Santoprene	2
	402*	112181	PACKING, 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

\* These parts are included in the pump repair kit, purchased separately. See Repair Kit Matrix on page 28 to determine the correct kit for your pump.

## 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 stainless steel	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

# Parts



Not used on some models

\* These parts are included in the Pump Repair Kit, which may be purchased separately. Refer to the Repair Kit Matrix on page 28 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 ----

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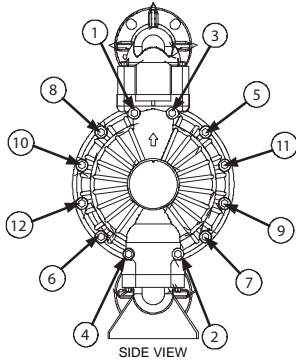


# Torque Sequence

Always follow torque sequence when instructed to torque fasteners.

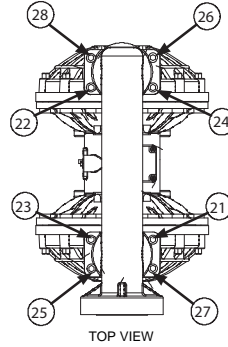
## 1. Left/Right Fluid Covers

Torque bolts to 190- 220 in- lb (21- 25 N•m)



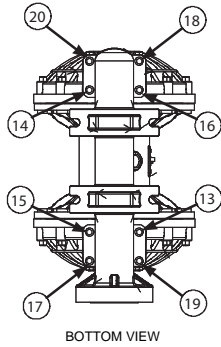
## 3. Outlet Manifold

Torque bolts to 150- 160 in- lb (17- 18 N•m)



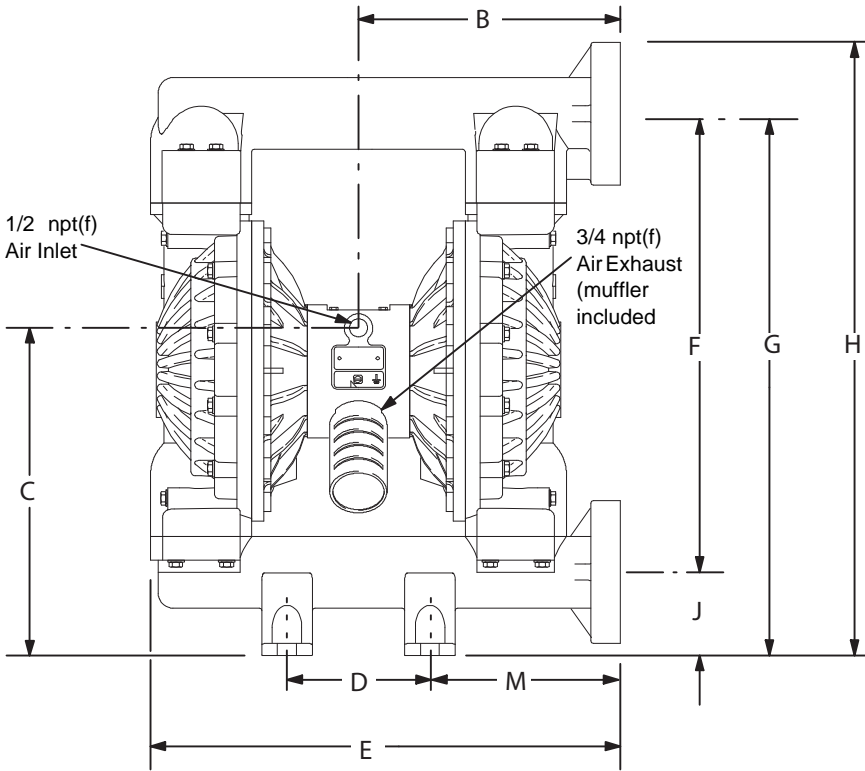
## 2. Inlet Manifold

Torque bolts to 150- 160 in- lb (17- 18 N•m)

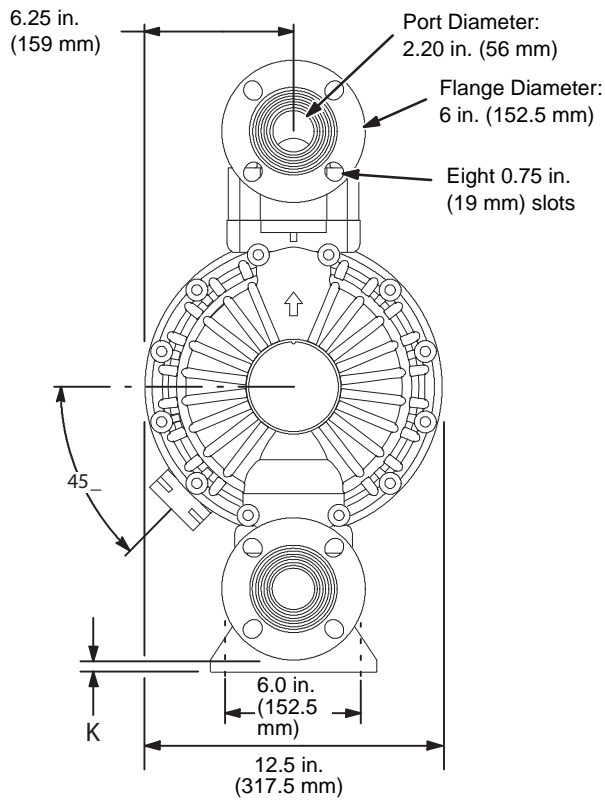


# Dimensions

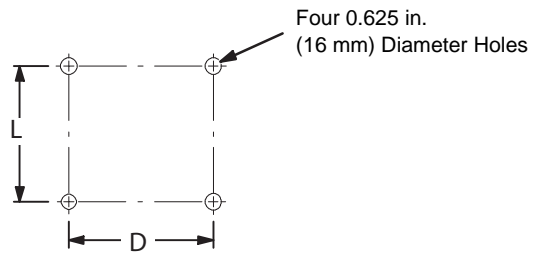
**FRONT VIEW**



**SIDE VIEW**



**PUMP MOUNTING HOLE PATTERN**



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.

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# Dimensions

Dimension	SST Center Polypropylene or Conductive Polypropylene Cover		SST Center PVDF Cover		Aluminum Center Polypropylene or Conductive Polypropylene Cover		Aluminum Center PVDF Cover	
	in.	mm	in.	mm	in.	mm	in.	mm
<b>B</b>	11.0	280	11.0	280	11.0	280	11.0	280
<b>C</b>	13.7	349	13.6	345	13.7	349	13.6	345
<b>D</b>	6.0	152	6.0	152	6.0	152	6.0	152
<b>E</b>	19.7	501	19.6	499	19.7	501	19.6	499
<b>F</b>	19.2	487	19.1	484	19.2	487	19.1	484
<b>G</b>	22.7	576	22.6	573	22.7	576	22.6	573
<b>H</b>	25.7	652	25.6	649	25.7	652	25.6	649
<b>J</b>	3.5	89	3.5	89	3.5	89	3.5	89
<b>K</b>	0.5	13	0.5	13	0.5	13	0.5	13
<b>L</b>	6.0	152	6.0	152	6.0	152	6.0	152
<b>M</b>	8.0	203	8.0	203	8.0	203	8.0	203

# Technical Data

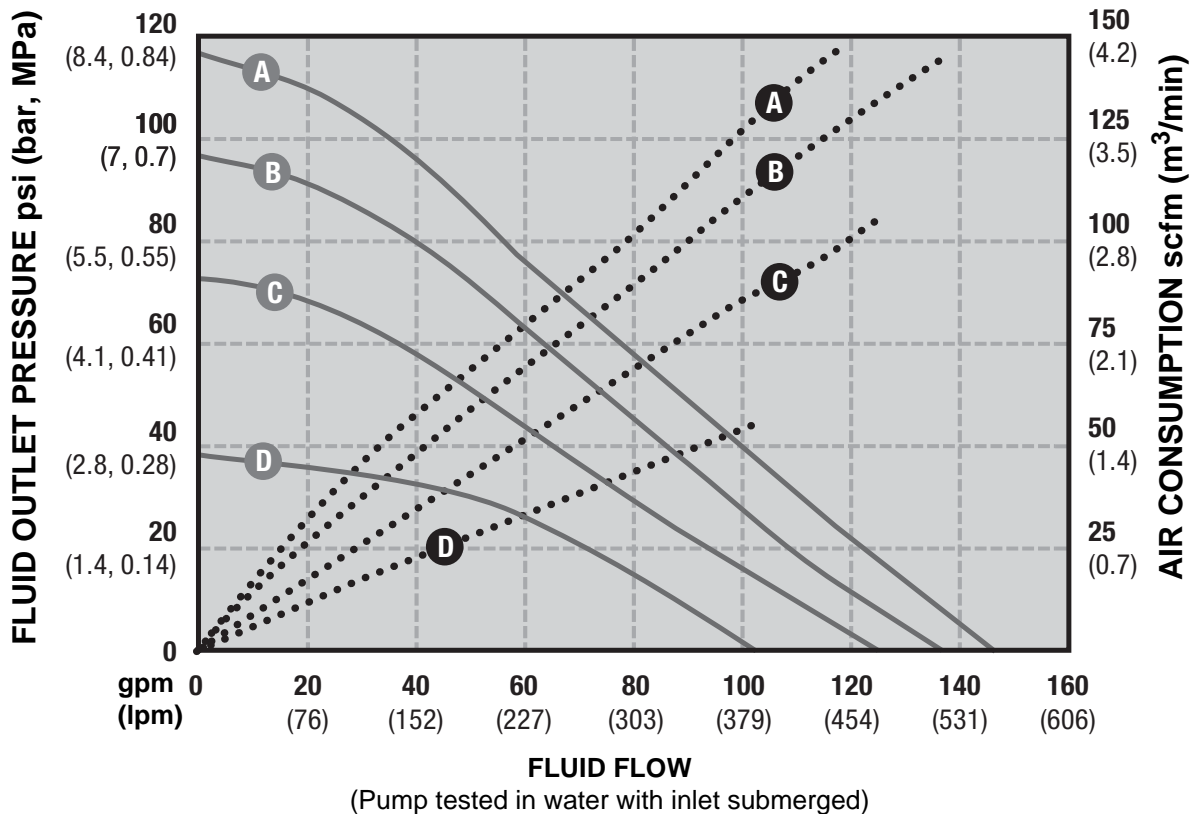
Maximum fluid working pressure	120 psi (0.8 MPa, 8 bar)
Air pressure operating range	20- 120 psi (0.14- 0.8 MPa, 1.4- 8 bar)
Maximum air consumption	175 scfm
Air consumption at 70 psi/60 gpm	60 scfm (see chart)
Maximum free-flow delivery	150 gpm (568 l/min)
Maximum pump speed	145 cpm
Gallons (Liters) 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 and 50 cpm	90 dBa
* Sound power level	103 dBa
* Noise level at 70 psi and 50 cpm	85 dBa
Maximum operating temperature	150°F (65.5°C)
Air inlet size	1/2 npt(f)
Fluid inlet size	2" Raised Face Flange
Fluid outlet size	2" Raised Face Flange
Wetted parts	Vary by Model. See pages 29- 31
Non-wetted external parts	aluminum, 302 and 316 stainless steel, polyester (labels)
Weight	
Polypropylene pumps with Aluminum center section	49 lb (22 kg)
Conductive Polypropylene pumps with Aluminum center section	53 lb (24 kg)
PVDF pumps with Aluminum center section	68 lb (31 kg)
Polypropylene pumps with stainless steel center section	71 lb (32 kg)
Conductive Polypropylene pumps with stainless steel center section	75 lb (34 kg)
PVDF pumps with stainless steel center section	90 lb (41 kg)

*Geolast<sup>®</sup> and Santoprene<sup>®</sup> are registered trademarks of the Monsanto Co.*

*Loctite<sup>®</sup> 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 9216.*

# 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.

# 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.

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Original instructions. This manual contains English. MM 308550

**Graco Headquarters:** Minneapolis

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