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Rev. R

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This manual contains important
warnings and information.
READ AND KEEP FOR REFERENCE.

INSTRUCTIONS

Husky™ 715 Air-Operated Diaphragm Pumps

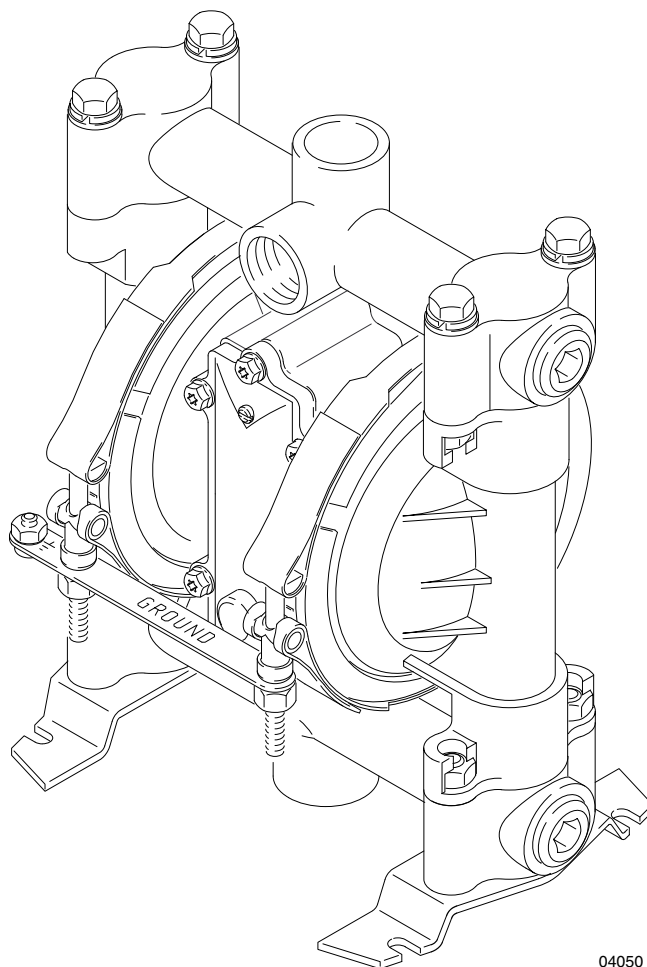
100 psi (0.7 MPa, 7 bar) Maximum Fluid Working Pressure

100 psi (0.7 MPa, 7 bar) Maximum Air Input Pressure

***Model No. D63— Aluminum Pumps, Series E**

***Model No. D64— Stainless Steel Pumps, Series E**

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



04050

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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 not sure, 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 **100 psi (0.7 MPa, 7 bar) maximum working pressure at 100 psi (0.7 MPa, 7 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 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.
- 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).
- Wear hearing protection when operating this equipment.
- Do not lift pressurized 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 9.



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 4.
- 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 pumped.
- 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 9.
- 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

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 OR EXPLOSION HAZARD** on page 3.

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:* attach a ground wire (Y) to the grounding strip (111) with the screw (121), lockwasher (122) and nut (123), as shown in Fig. 1. Connect the clamp end of the ground wire to a true earth ground. Order Part No. 222-011 Ground Wire and Clamp.

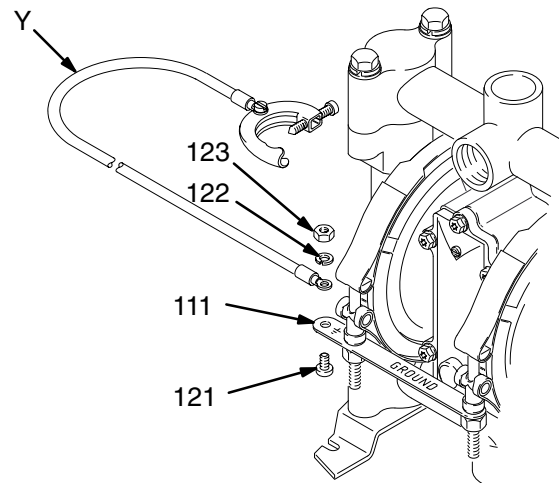


Fig. 1

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- *Air and fluid hoses:* use only electrically conductive hoses.
- *Air compressor:* follow the manufacturer's recommendations.
- *Solvent pails used when flushing:* follow your 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 your local code.

Installation

General Information

- The Typical Installations in Figs. 2 and 3 are only guides for selecting and installing system components. Contact your Graco distributor for assistance in planning a system to suit your needs.
- Always use Genuine Graco Parts and Accessories.
- Use a compatible, liquid thread sealant on all male threads. Tighten all connections firmly to avoid air or fluid leaks.
- Reference numbers and letters in parentheses refer to the callouts in the Figures and the parts lists on pages 26–30.

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 3.
2. Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.

Tightening Threaded Fasteners Before First Use

After unpacking the pump, and before using it for the first time, check and retorque all external fasteners. See the **Service** section for torque specifications. After the first day of operation, retorque the fasteners again. Although the recommended frequency for retorquing fasteners varies with pump usage, a general guideline is to retorque fasteners every two months.

Mountings

1. Be sure the mounting surface can support the weight of the pump, hoses, and accessories, as well as the stress caused during operation.
2. The Husky 715 Pump can be used in a variety of installations. See Figs. 2 and 3 for some examples.
3. Secure the pump with screws and nuts.

Pumping High Density or Abrasive Fluids

High density fluids prevent the lightweight PTFE and buna-N check valve balls from seating properly, which reduces pump performance significantly. Use stainless steel balls for such applications (see page 30). Refer to page 20 to change the balls.

Installation

ABOVE-GROUND TRANSFER INSTALLATION

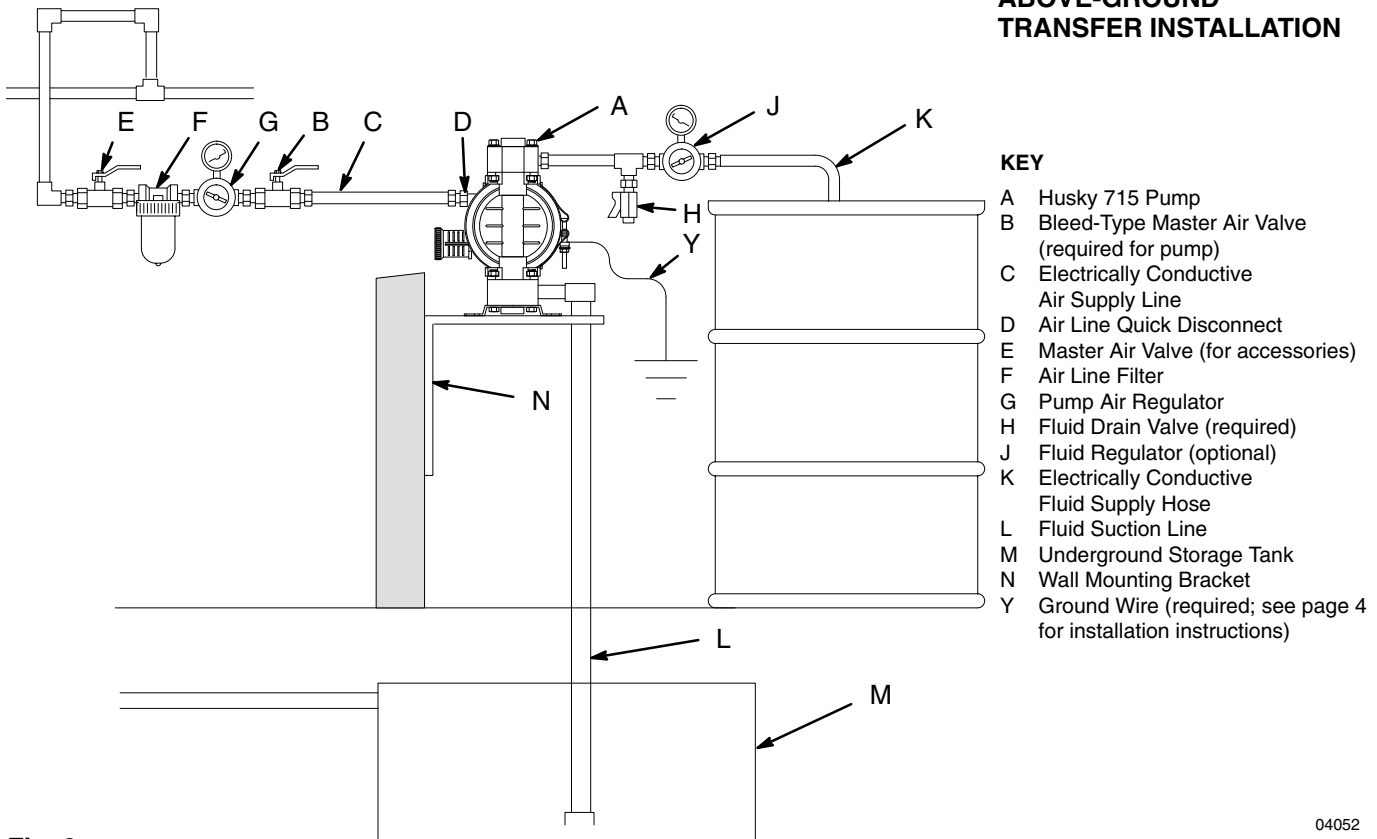
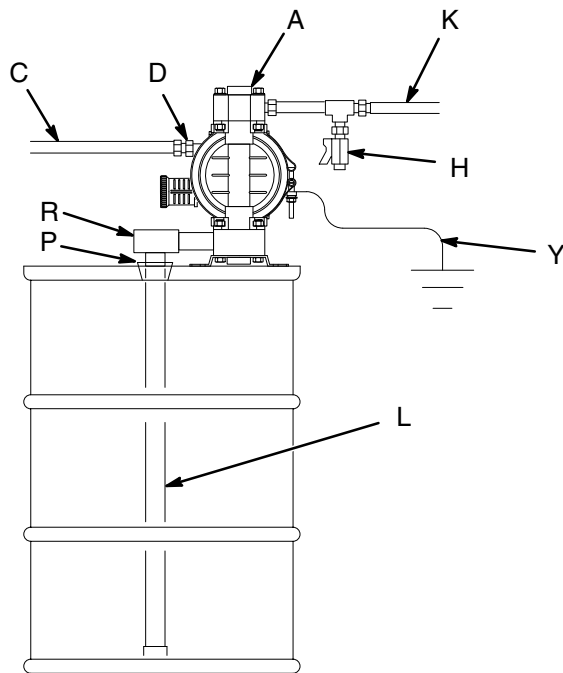


Fig. 2

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55-GALLON BUNG PUMP INSTALLATION

See Fig. 2 for air line accessories

04053

Fig. 3

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. See Fig. 2. 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.

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 9.

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. The fluid pressure can be controlled in either of two ways. To control it on the air side, install an air regulator (G). To control it on the fluid side, install a fluid regulator (J) near the pump fluid outlet (see Fig. 2).
 - 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 an electrically conductive, flexible air hose (C) between the accessories and the 1/4 npt(f) pump air inlet. Use a minimum 1/4" (6.3 mm) ID air hose. Screw an air line quick disconnect coupler (D) onto the end of the air hose (C), and screw the mating fitting into the pump air inlet snugly. Do not connect the coupler (D) to the fitting yet.

Fluid Suction Line

- Use electrically conductive fluid hoses. The pump fluid inlet is 3/4 npt(f). Screw the fluid fitting into the pump inlet snugly.
- If the 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.
- At inlet fluid pressures greater than 15 psi (100 kPa, 1.0 bar), diaphragm life will be shortened.
- See the **Technical Data** on page 33 for maximum suction lift and flow rate loss at various lift distances.

Fluid Outlet Line

WARNING

A fluid drain valve (H) is required in your system to relieve pressure in the hose if it is plugged. See Figs. 2 and 3. 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.

1. Use electrically conductive fluid hoses (K). The pump fluid outlet is 3/4 npt(f). Screw the fluid fitting into the pump outlet snugly. **Do not overtighten.**
2. Install a fluid regulator (J) at the pump fluid outlet to control fluid pressure, if desired (see Fig. 2). See **Air Line**, step 1a, for another method of controlling pressure.
3. Install a fluid drain valve (H) near the fluid outlet. See the **WARNING** above.

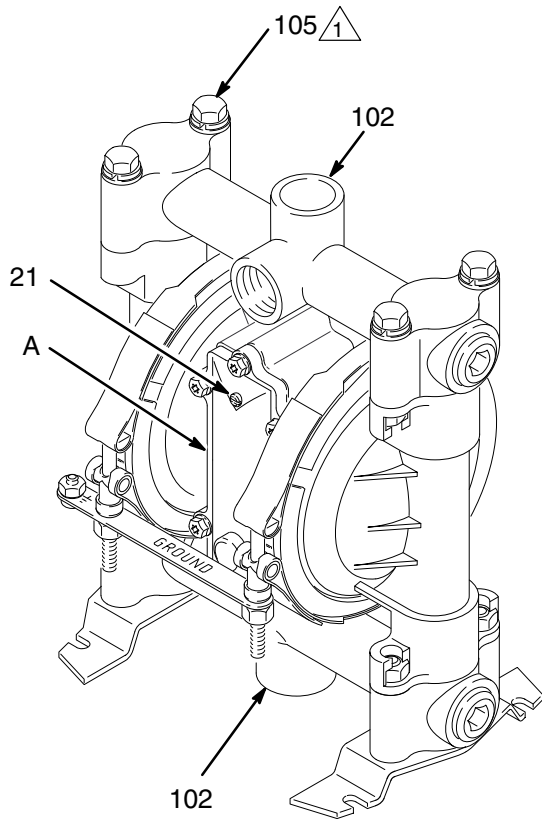
Installation

Changing the Orientation of the Fluid Inlet and Outlet Ports

You can change the direction of the fluid inlet and outlet manifolds (102), if desired. As shipped, the fluid inlet manifold points away from the air valve (A) and the fluid outlet manifold points toward the air valve. See Fig. 4.

1. Remove the bolts (105) holding the manifold (102) to the covers (101). Save the attaching hardware.
2. Turn the manifold to the desired position, and reinstall the hardware. Torque the bolts (105) to 3–6 ft-lb (4–8 N.m).

 Torque to 3–6 ft-lb (4–8 N.m).



04050

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).

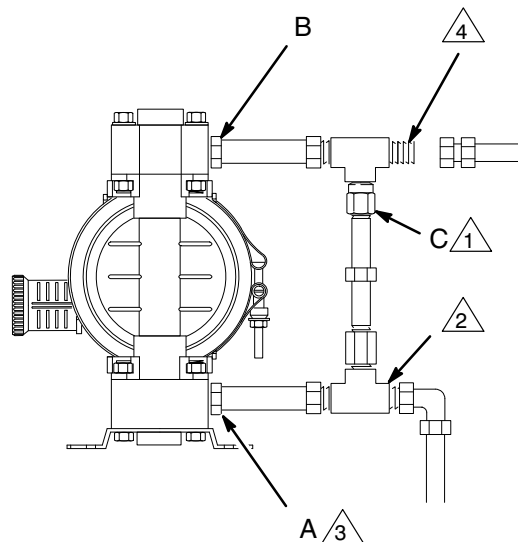
Overpressurization can also occur if the Husky pump is being used to feed fluid to a piston pump, and the intake valve of the piston pump does not close, causing fluid to back up in the outlet line.

Pressure Relief Kit 238–428 is available for use on aluminum Husky 715 pumps and may be purchased separately.

KEY

- A 3/4 npt(f) Fluid Inlet Manifold
- B 3/4 npt(f) Fluid Outlet Manifold
- C Pressure Relief Valve
- Part No. 110–134 (Aluminum)
- Part No. 112–119 (Stainless Steel)

-  Install valve between fluid inlet and outlet ports.
-  Connect fluid inlet line here.
-  Rotate fluid inlet manifold 180° (see Fig. 4).
-  Connect fluid outlet line here.



04333

Fig. 5

Installation

Air Exhaust Ventilation

WARNING



FIRE AND EXPLOSION HAZARD

Be sure to read **FIRE OR EXPLOSION HAZARD** and **TOXIC FLUID HAZARD** on page 3, 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 3/8 npt(f). Do not restrict the air exhaust port. Excessive exhaust restriction can cause erratic pump operation.

To exhaust to a remote location:

1. Remove the muffler (W) from the pump air exhaust port.
2. Install an electrically conductive air exhaust hose (X) and connect the muffler to the other end of the hose. The minimum size for the air exhaust hose is 3/8 in. (10 mm) ID. If a hose longer than 15 ft (4.57 m) is required, use a larger diameter hose. Avoid sharp bends or kinks in the hose.
3. Place a container (Z) at the end of the air exhaust line to catch fluid in case a diaphragm ruptures. See Fig. 6.

VENTING EXHAUST AIR

See Fig. 2 for accessories

All wetted and non-wetted pump parts must be compatible with the fluid being pumped.

KEY

- W Muffler
X Electrically Conductive Air Exhaust Hose
Z Container for Remote Air Exhaust

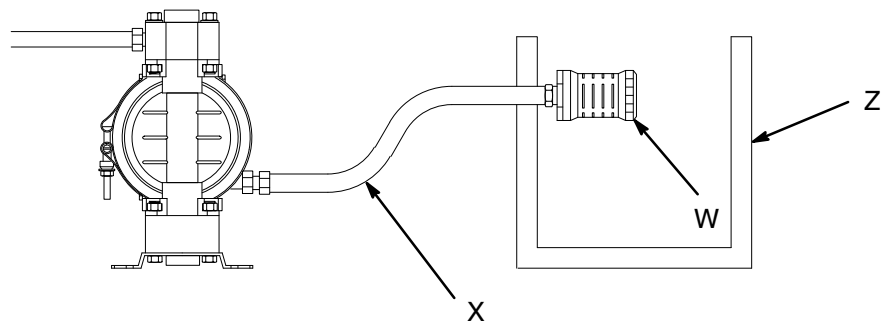


Fig. 6

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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 air, to eliminate possible contamination of the fluid you are pumping by test fluids such as water. Prior to use, 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. Read **FIRE OR EXPLOSION HAZARD** on page 3.

2. Check all fittings to be sure they are tight. Use a compatible liquid thread sealant on all male threads. Tighten the fluid inlet and outlet fittings snugly. Do not overtighten the fittings into the pump.

3. Place the suction tube (if used) in the fluid to be pumped.

NOTE: If the 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 (K) into an appropriate container.

5. Close the fluid drain valve (H).

6. With the pump air regulator (G) 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. Slowly open the air regulator (G) 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.

NOTE: If the pump does not start, turn the reset shaft (21) on the air valve (A). See Fig. 4 on page 8.

Pump Shutdown

WARNING

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

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

Maintenance

Lubrication

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

CAUTION

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

Flushing and Storage

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

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

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

Tightening Threaded Connections

Before each use, check all hoses for wear or damage and replace as necessary. Check to be sure all threaded connections are tight and leak-free.

The recommended frequency for retorquing of fasteners varies with pump usage; a general guideline is to retorquer every two months.

Tightening the Clamps

When tightening the clamps (109), apply thread lubricant to the bolts and **be sure** to torque the nuts (110) to 75–85 in-lb (8.5–9.6 N.m). See Fig. 7.

 Apply thread lube to bolts and torque nuts to 75–85 in-lb (8.5–9.6 N.m).

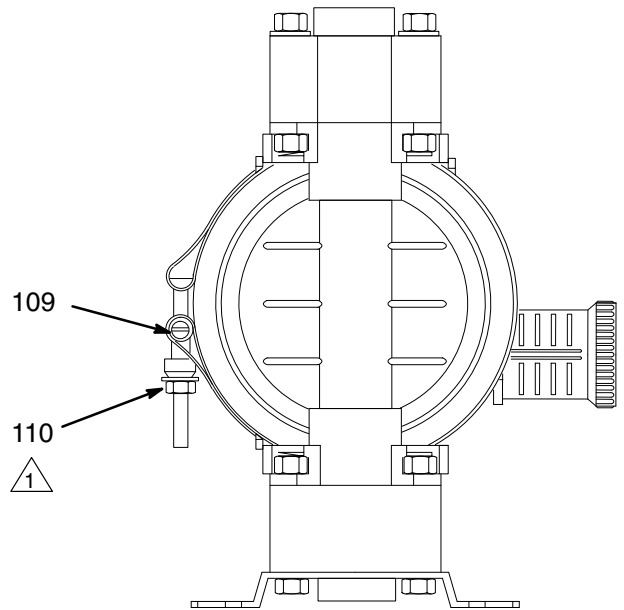


Fig. 7

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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 10.

Relieve the pressure.

Check all possible problems and causes before disassembling the pump.

PROBLEM	CAUSE	SOLUTION
Pump will not cycle, or cycles once and stops.	Air valve is stuck or dirty.	Turn reset shaft (21). Disassemble and clean air valve. See pages 17, 18. Use filtered air.
	Worn or broken detent link (22).	Replace detent link (22) and ball (8). See pages 17, 18.
	Broken or damaged springs (3, 6) and/or valve cup (5) and plate (13).	Replace. See pages 17, 18.
	Bent or broken pilot pins (26).	Replace. See pages 14, 16. When reinstalling the air valve, be sure to follow the instructions on page 16, to avoid damaging the pins.
Pump cycles at stall or fails to hold pressure at stall.	Leaky check valves or o-rings (113).	Replace. See page 20.
	Worn check balls (301) or guide (201).	Replace. See page 20.
	Check ball (301) wedged in guide (201).	Repair or replace. See page 20.
Excessive air leakage from exhaust port.	Worn air valve cup (5) or plate (13).	Replace. See pages 17, 18.
	Worn shaft seals (31‡).	Replace. See page 21.
Pump operates erratically.	Clogged suction line.	Inspect; clear.
	Loose manifolds (102).	Tighten manifold screws (105). Refer to page 20.
	Sticky or leaking check valve balls (301).	Clean or replace. See page 20.
	Diaphragm (401, 404) ruptured.	Replace. See page 21.

Troubleshooting

PROBLEM	CAUSE	SOLUTION
Air bubbles in fluid.	Suction line is loose.	Tighten.
	Diaphragm (401, 404) ruptured.	Replace. See page 21.
	Loose manifolds (102) or damaged o-rings (113).	Tighten manifold screws (105); replace o-rings (113). See page 20.
	Loose fluid side diaphragm plates (116).	Tighten screw (114). See page 21.
Fluid in exhaust air.	Diaphragm (401, 404) ruptured.	Replace. See page 21.
	Loose fluid side diaphragm plates (116).	Tighten screw (114). See page 21.
Pump exhausts air at stall.	Worn air valve cup (5) or plate (13).	Replace. See pages 17, 18.
	Worn shaft seals (31‡).	Replace. See page 21.
Pump exhausts air from clamps.	Loose clamps (109).	Tighten clamp nuts (110). See page 11.
Pump exhausts air near air valve.	Air valve screws (10) are loose.	Tighten screws. See page 14.
	Air valve o-ring (19) is damaged.	Inspect; replace. See pages 17, 18.
Pump leaks fluid from check valves.	Worn or damaged o-rings (113).	Inspect; replace. See page 20.
	Loose manifolds (102).	Tighten manifold screws (105). Refer to page 20.

Service

Tools Required

- Torque wrench
- Phillips screwdriver
- O-ring pick
- 1/8" EZY-OUT bearing extractor
- Rubber mallet

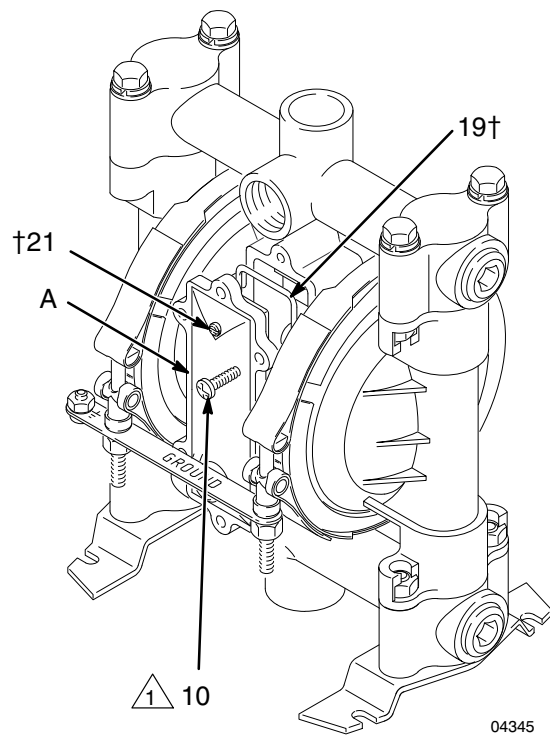
Replacing the Air Valve

NOTE: Air Valve Kit 239–952 is available. Parts included in the kit are marked with a symbol, for example (2†). A tube of general purpose grease (25†) is supplied in the kit. Install the kit as follows.

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

1. Relieve the pressure.
2. Unscrew the six mounting screws (10) and remove the air valve (A) from the pump. See Fig. 8.



- 1  Torque oppositely and evenly to 20–25 in-lb (2.3–2.8 N.m).
- 2  Apply grease (25†).

GREASE APPLICATION

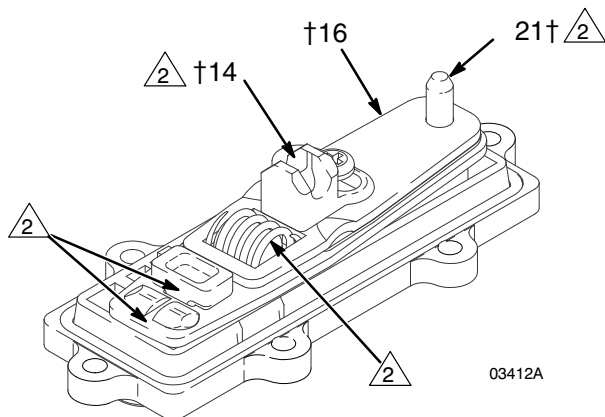


Fig. 8

Service

3. Refer to Fig. 9. Use an o-ring pick to remove the bearings (9 and 24).
4. Remove the two screws (23) holding the valve plate (13) to the pump. Use an o-ring pick to remove the valve plate and seal (12). Clean and inspect the parts. Replace any worn ones.
5. If the pilot pins (26) are accessible from the inside of the pump housing (1), pull them out. If not accessible, disassemble the fluid section as explained on page 21.

NOTE: Inspect the pilot pin o-rings (28) and bearings (27) in place. Removal will destroy the bearings and is not required unless they are damaged. To service the bearings, first perform steps 2–5 on page 21.

6. Use a 1/8 in. EZY-OUT to remove the bearings (27) from the housing (1). See Fig. 17 on page 21 for an illustration of how to use an EZY-OUT. Remove the o-rings (28). Clean and inspect the parts. Replace any worn ones.

NOTE: If the pilot pin o-rings (28) and bearings (27) were not removed, go to step 8.

7. Grease the o-rings (28) and install them in the bearings (27). Press the bearings and o-rings in place so the bearings are flush with the surface of the housing (1). See Fig. 9.
8. Grease the pilot pins (26) and install them from the inside of the housing (1).
9. Install the seal (12) in the pump housing (1). Install the valve plate (13) and secure with the two screws (23). (The heads of the screws overlap the top and bottom edges of the plate to hold it in place.) Torque the screws to 5–7 in-lb (0.6–0.8 N.m).

10. Apply grease (25†) to the bearings (9† and 24). Install the bearing (9†) in the pump housing (1). Install the other bearing (24).
11. Make certain the o-ring (19†) is in place on the air valve (A). See Fig. 8.
12. Apply grease (25†) where shown in Fig. 8.

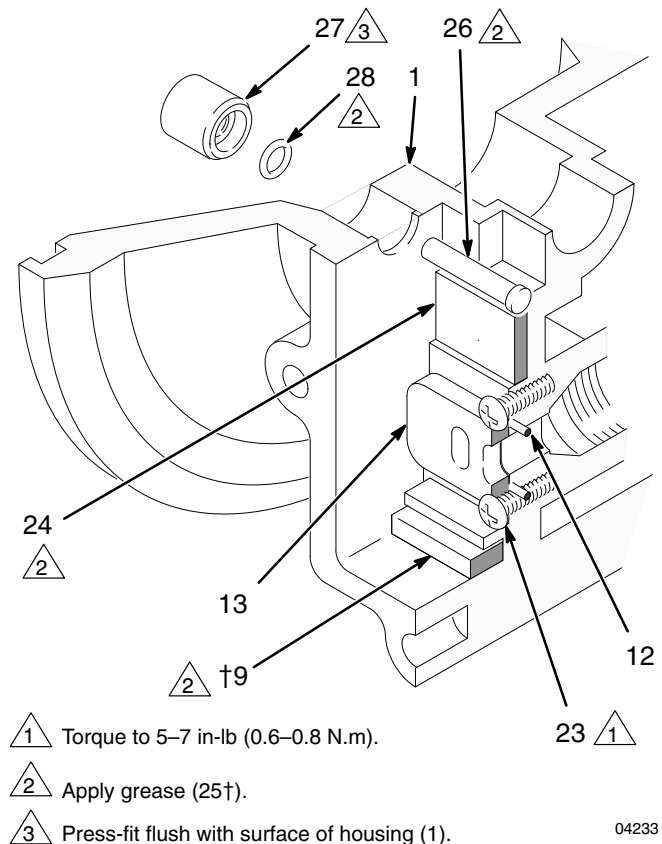


Fig. 9

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Service

⚠ CAUTION

If you are replacing the diaphragms, you must reinstall the air valve before installing the diaphragms, as the diaphragms will force the pilot pins into the air valve area.

The pilot pins (26) must give clearance for the actuator link (16†), to prevent damage to the pins. Follow steps 13–15 carefully.

13. Check if either of the two pilot pins (26) are protruding out into the air valve cavity. Push them back in as far as possible.
14. If one of the pins is still protruding, make sure the air valve is shifted **away from** that pin's side of the cavity. To shift the valve, push down on the detent link (22) and slide it to the other side with your fingers (see Fig. 11).
15. Align the air valve assembly (A) so the reset shaft (21) is at the top and the valve is angled away from a protruding pilot pin (26), then slip it into position. See Fig. 10. **Do not force the air valve down onto the pin.** If the pin is interfering with the actuator link (16), make sure the valve is shifted away from the pin (see step 14), then reposition the valve.

16. Install the six screws (10) and torque oppositely and evenly to 20–25 in-lb (2.3–2.8 N.m). See Fig. 8.

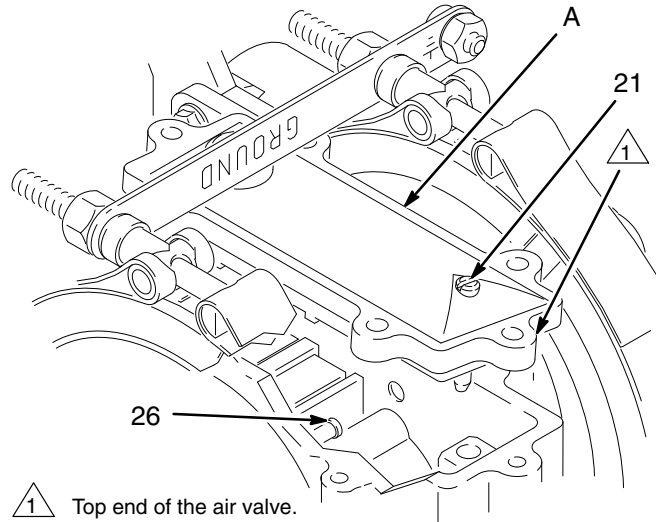


Fig. 10

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NOTE: This example shows how to shift the air valve when a pilot pin (26) is protruding as shown in Fig. 10. If the pin on the other side of the air valve is protruding, the valve should be shifted in the reverse of this example.

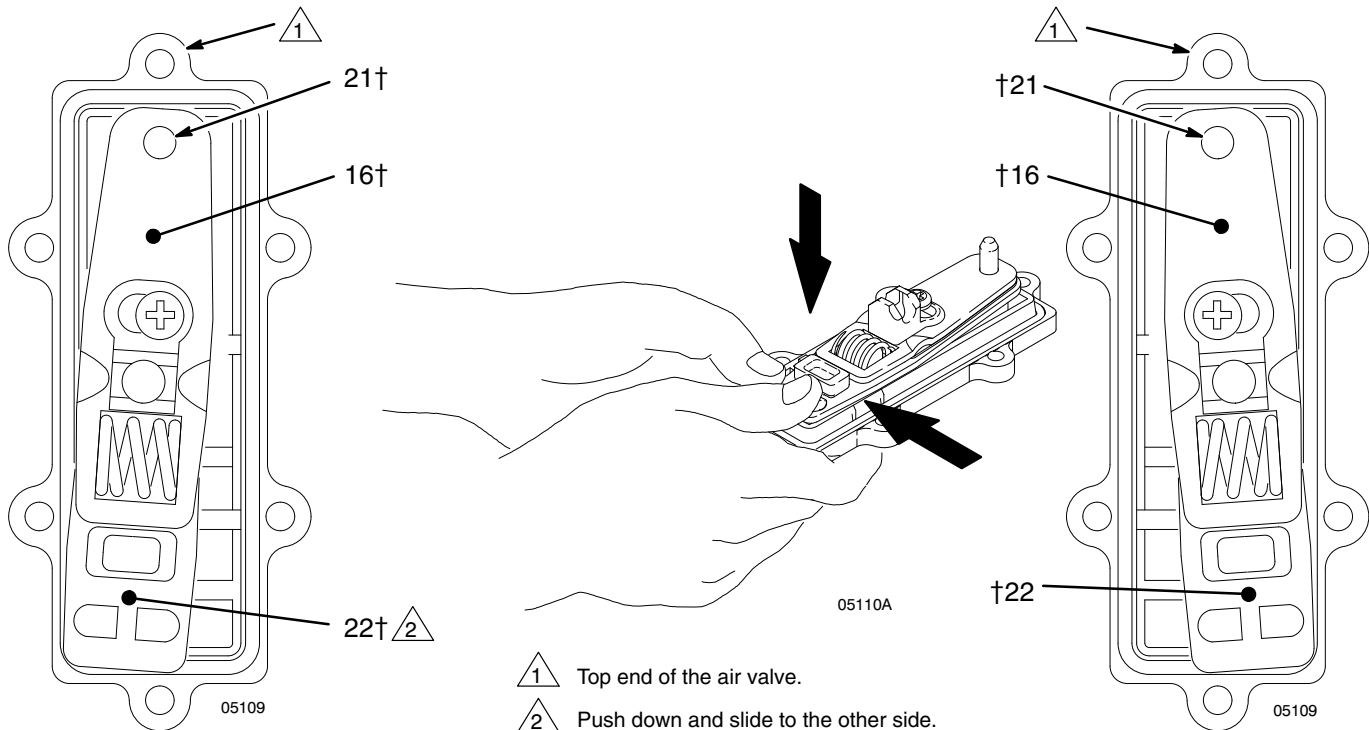


Fig. 11

Service

Tools Required

- Torque wrench
- Phillips screwdriver
- O-ring pick
- Rubber mallet

Repairing the Air Valve

Disassembly

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

1. **Relieve the pressure.**

2. Remove the air valve (A) from the pump (see page 14).
3. Remove the screw (15) and shift saddle (14). See Fig. 12.
4. Disassemble the link assembly, consisting of the actuator link (16), spacer (17), detent link (22), spring (3), stop (4), and valve cup (5).
5. Remove the detent ball (8) and spring (6). The detent collar (7) is a press-fit and should not need removal; if it does require replacement, you should also replace the cover (2).
6. Remove the reset shaft (21), o-ring (20) and washer (18).
7. Clean all parts and inspect for wear or damage. Replace as needed. See **Reassembly**, page 18.

NOTE: ALL PARTS SHOWN ARE INCLUDED IN AIR VALVE KIT 239-952.

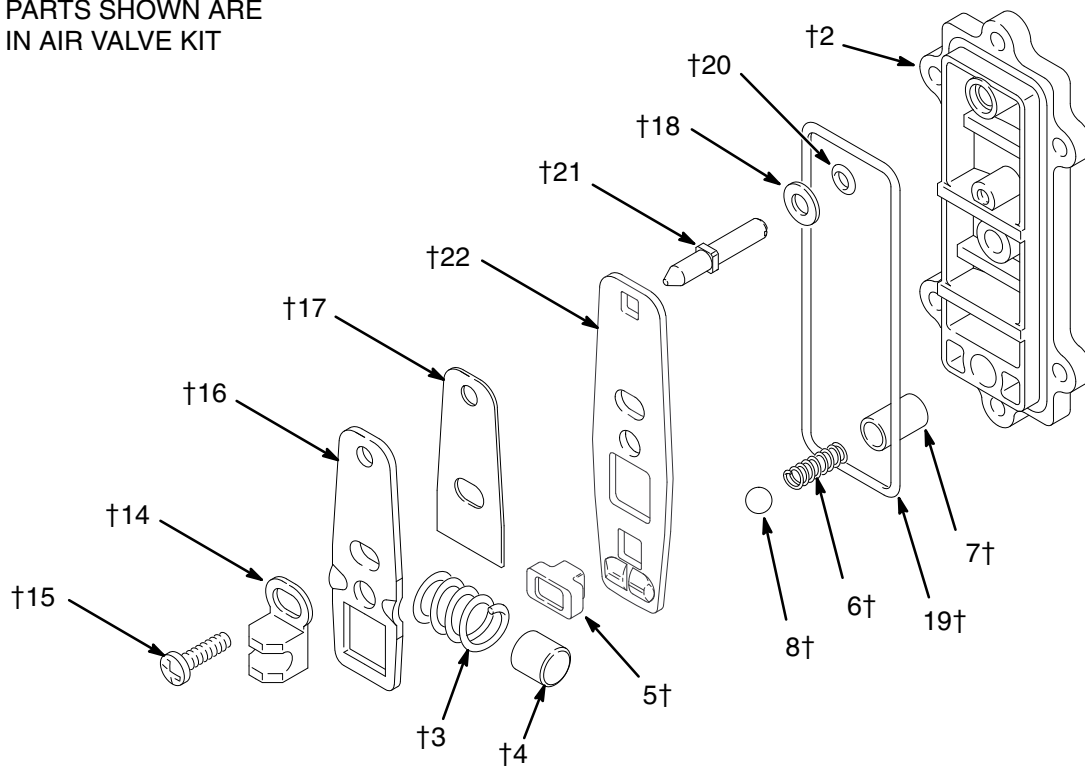


Fig. 12

01431A

Service

Reassembly

1. If the detent collar (7) was removed, carefully install a new collar in a new cover (2). Using a rubber mallet, carefully press fit the detent collar (7) into the cover (2). See Fig. 13.
2. Grease the detent spring (6) and place it in the collar (7). Grease the ball (8) and set it on the spring.
3. Grease the o-ring (20) and install it in the hole (H) in the cover (2). See Fig. 13. Slide the washer (18) onto the blunt end of the reset shaft (21). Insert the shaft through the cover (2) until it seats.

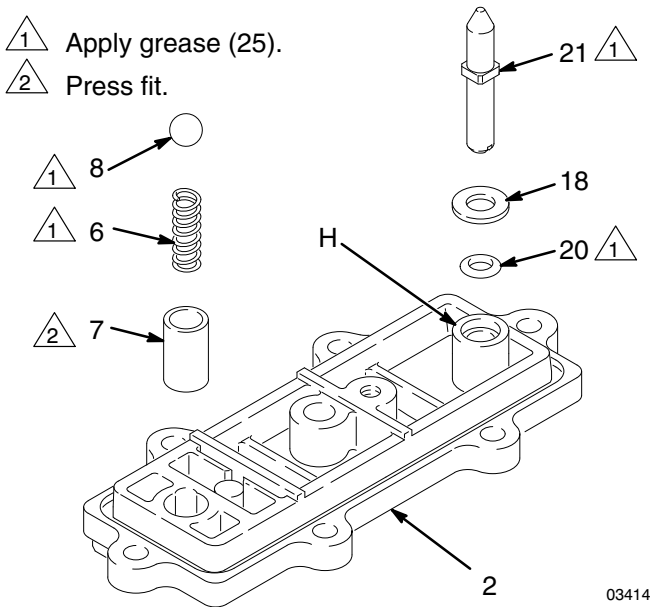


Fig. 13

5. Grease the detent link (22) and link spacer (17). Assemble the detent link, link spacer, and actuator link (16) as shown in Fig. 14. The raised bumps on the links (16 and 22) must face up.
6. Squeeze the spring (3) and install it and the stop (4) in the link assembly. The spring tension will hold all these parts together. Grease the valve cup (5) and install it in the link assembly as shown.
7. Install the link assembly onto the air valve cover (2) so the pointed end of the reset shaft (21) fits through the holes in the links and the square part of the shaft engages the square hole in the detent link (22). Make certain the bumps on the detent link (22) engage the detent ball (8).

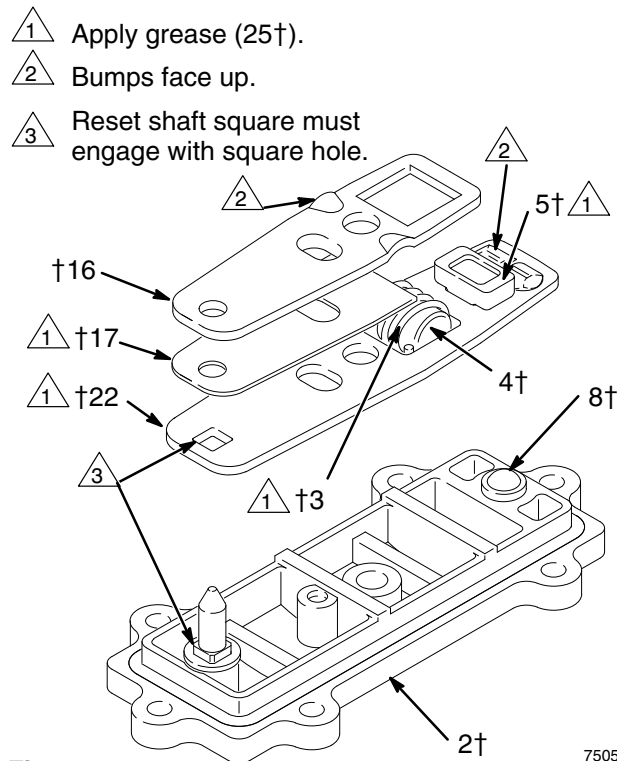


Fig. 14

4. Grease the spring (3). Place the link stop (4) inside the spring. See Fig. 14.

Service

8. Grease the inside surfaces of the shift saddle (14) and install it as shown in Fig. 15. Hold the link assembly firmly in place and install the screw (15). Torque to 7 to 9 in-lb (0.8 to 1.0 N.m). Install the o-ring (19) on the cover (2).
9. Reinstall the air valve as explained on page 16.

- 1 Apply grease (25†).
- 2 Torque to 7 to 9 in-lb (0.8 to 1.0 N.m).

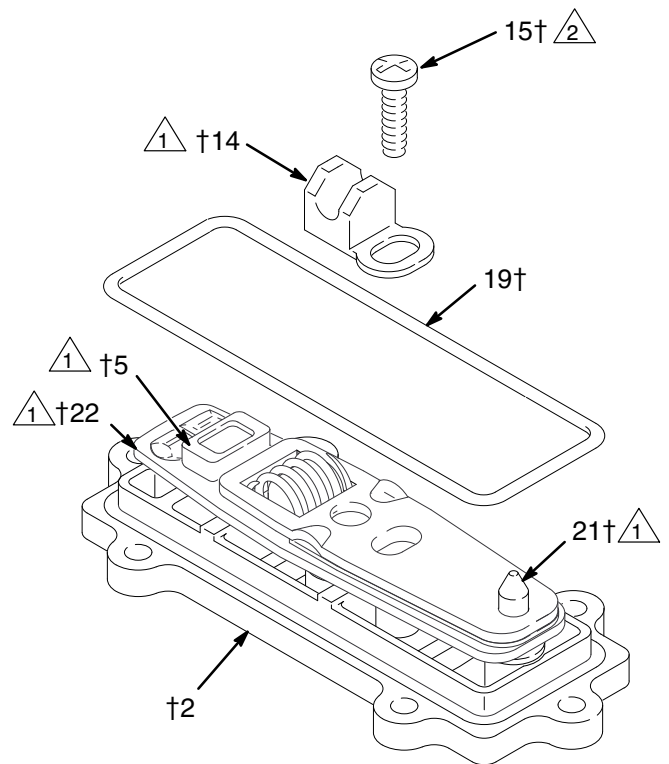


Fig. 15

7506A

Service

Tools Required

- Torque wrench
- 9/16" socket wrench
- O-ring pick

Ball Check Valves

NOTE: A Fluid Section Repair Kit is available. See page 25 for the correct kit. Parts included in the kit are marked with an asterisk, for example (301*). Use all the parts in the kit for the best results. Always replace the o-rings (113) with new ones whenever they are removed for any reason.

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

1. **Relieve the pressure.** Disconnect all hoses.
2. Remove the pump from its mounting.
3. Unscrew the four bolts (105), washers (107), and nuts (106) holding the top manifold (102) to the covers (101). Lift the manifold off the pump. See Fig. 16.
4. Remove the outer o-ring (113), ball stop (202), ball (301), ball guide (201), and inner o-ring (113) from each of the covers (101).
5. Turn the pump over. Remove the bolts (105), nuts (106), feet (108), and bottom manifold (102).
6. Remove the outer o-ring (113), ball guide (201), ball (301), ball stop (202), and inner o-ring (113) from each of the covers (101).
7. Clean all parts. Inspect parts and replace worn or damaged ones.
8. Reassemble. Follow all notes in Fig. 16. Be sure the ball checks are assembled **exactly** as shown.

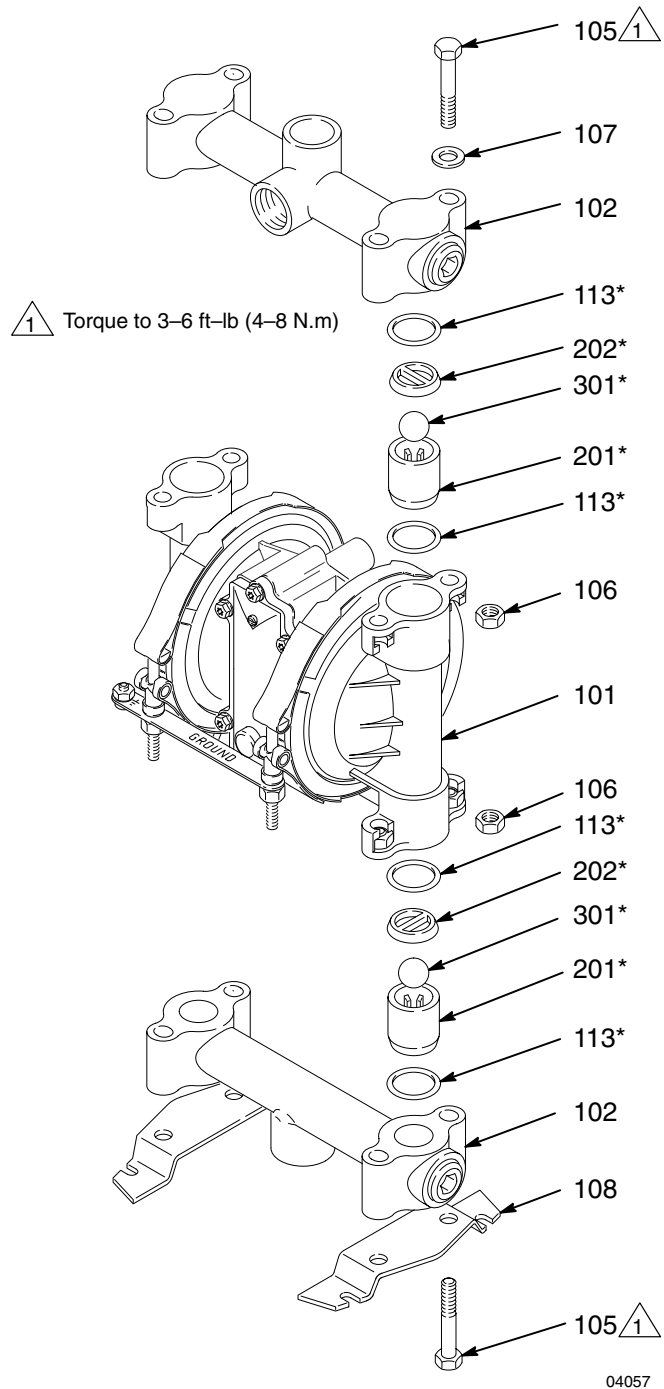


Fig. 16

Service

Tools Required

- Torque wrench
- Set of socket wrenches
- Phillips screwdriver
- O-ring pick
- 13/32" EZY-OUT bearing extractor
- Rubber mallet
- Lithium base grease
- Vise with soft jaws

Diaphragm Repair

Disassembly

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

NOTE: In Step 6, use a 13/32 in. EZY-OUT (B) screw extractor to remove the bearings (31‡). Other removal methods may damage the pump housing (1).

NOTE: Inspect the pilot pin o-rings (28) and bearings (27) in place. Removal will destroy the bearings and is not required unless they are damaged. To service the bearings, see step 6 on page 15.

NOTE: A Diaphragm Shaft Kit is available. See page 26. Parts included in the kit are marked with a double dagger, for example (29‡). Use all parts in the kit.

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

1. **Relieve the pressure.**
2. Remove the manifolds (102) from the covers (101). Keep the attaching hardware. See page 20.
3. Using a 7/16" socket wrench, remove the clamp nuts (110) and the grounding strip (111). See Fig. 19. Slip the clamps over the housing (1). Pull the covers (101) off the housing, then remove the clamps.

4. Using 7/16 in. socket wrenches, hold one diaphragm shaft screw (114) while unscrewing the opposite screw. Remove the screw and o-ring (115). Disassemble the diaphragm assembly.
5. Pull the other diaphragm and the shaft out of the pump housing (1). Clamp the shaft in a vise with soft jaws (or grip the flats with a wrench) and disassemble the remaining diaphragm assembly.

NOTE: In Step 6, use a 13/32 in. EZY-OUT (B) screw extractor to remove the shaft bearings (402). Other removal methods may damage the pump housing (1). *Do not remove undamaged bearings.*

6. Inspect the shaft (29) for wear or scratches. If it is damaged, check the shaft bearings (31‡) in place. Replace parts as needed. To remove the bearings, place a 13/32 EZY-OUT (B) in a vise (C). Position the pump housing (1) over the EZY-OUT (see Fig. 17). Turn the housing in the direction shown by the arrows to remove the bearing.
7. Hook the shaft seals (30‡) with an o-ring pick and pull them out of the housing (1).

NOTE: Inspect the pilot pin o-rings (28) and bearings (27) in place. Removal will destroy the bearings and is not required unless they are damaged. To service the bearings, see step 6 on page 15.

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

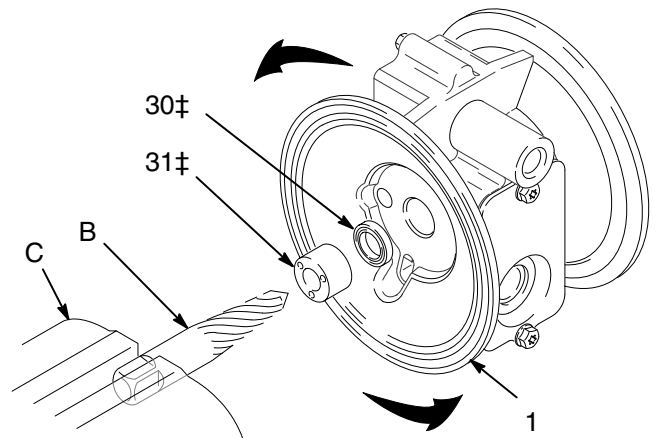


Fig. 17

04030

Service

Reassembly

⚠ CAUTION

If you have removed the air valve, you **must** reinstall it before reinstalling the diaphragms. See page 14.

- Grease the shaft seals (30‡) and install them in the housing (1). Using a rubber mallet, carefully drive the bearings (31‡) flush into the housing so the holes face out. See Fig. 18.
- Grease the diaphragm shaft (29‡) and slide it into the housing (1).
- Assemble the air side diaphragm plates (116**), diaphragms (401*), PTFE diaphragms (404*, if present), fluid side diaphragm plates (118**), o-rings (*115**), and screws (114**) *exactly* as shown in Fig. 18. Apply medium-strength (blue) Loctite® or equivalent to the fluid side diaphragm plate screw (114) heads, and torque the screws to 75–85 in-lb (8.5–9.6 N.m) at 100 rpm maximum. These parts **must** be assembled correctly.
- Install the clamps (109) in the reverse order of step 3 on page 21. The clamp bolts should be on the air valve side of the housing, and pointing down toward the bottom of the pump.
- Place the covers (101) on the pump housing (1). Position the clamps (109) and install the grounding strip (111) on the clamp bolts. Apply thread lubricant to the bolts. Torque the clamp nuts (110) to 75–85 in-lb (8.5–9.6 N.m). See Fig. 19.
- Position the top manifold (102) as desired and install on the covers (101) with the screws (105), washers (107) and nuts (106). Repeat for the bottom manifold, using the screws (105), feet (108), and nuts (106). Torque the screws to 3–6 ft-lb (4–8 N.m).

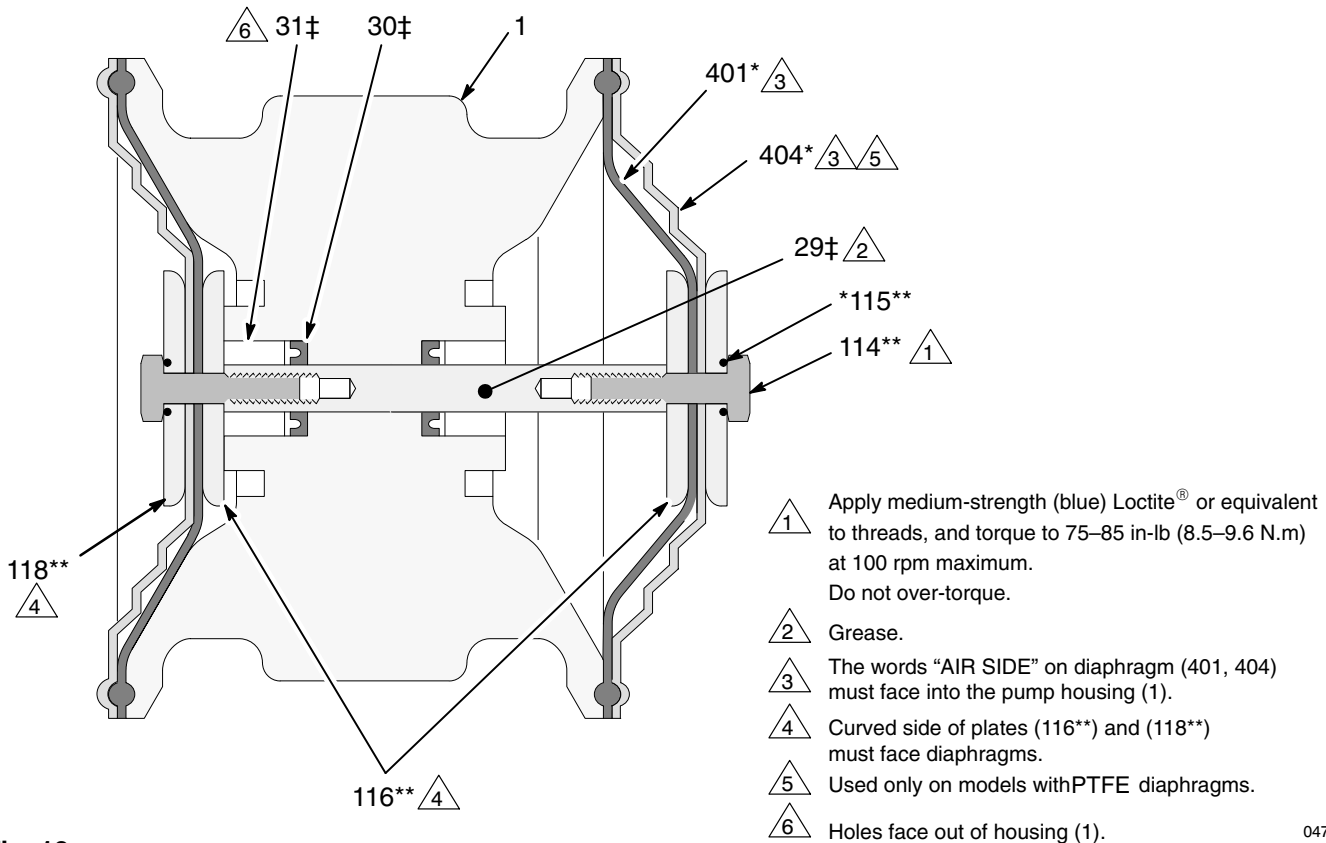
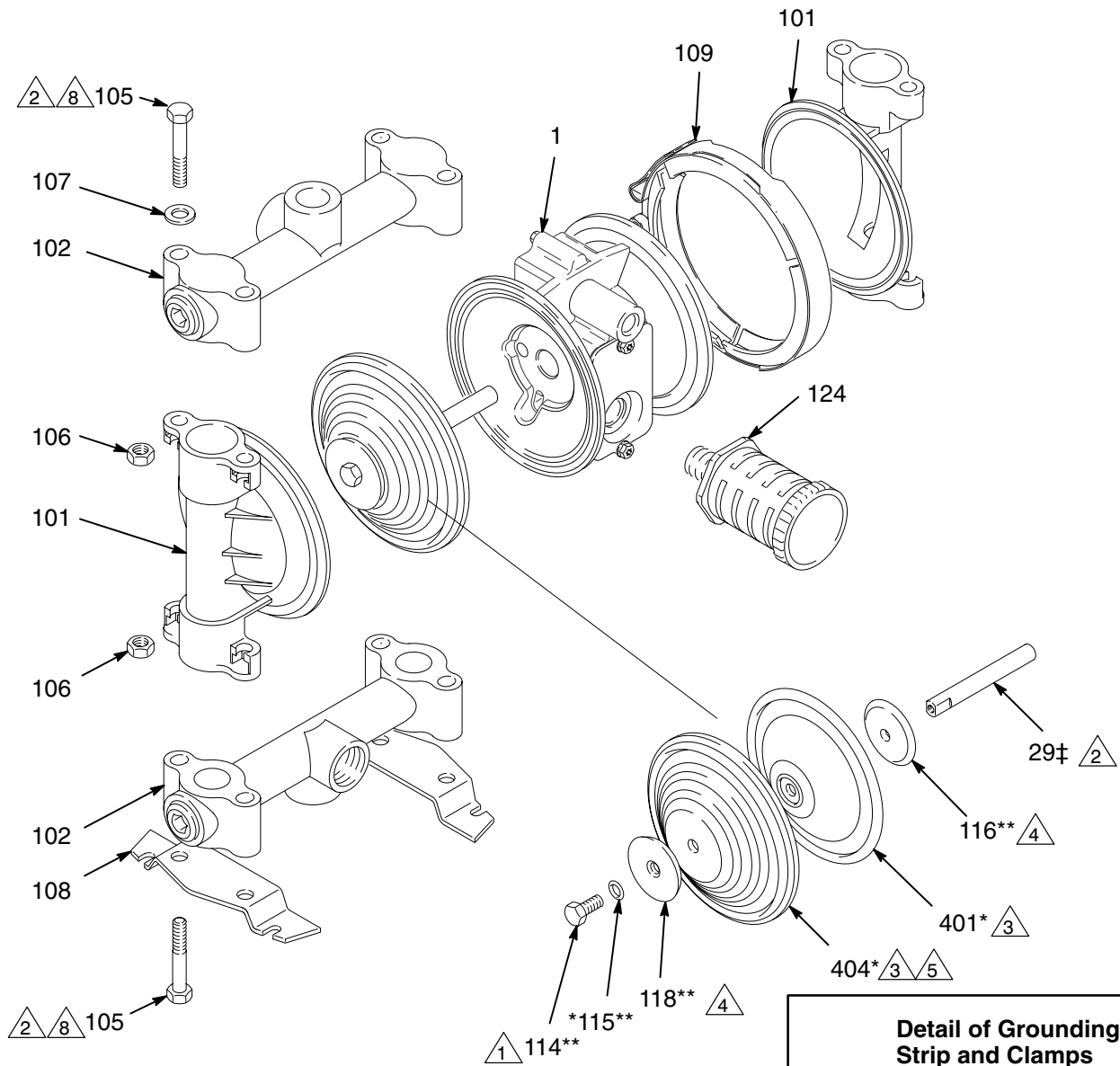


Fig. 18

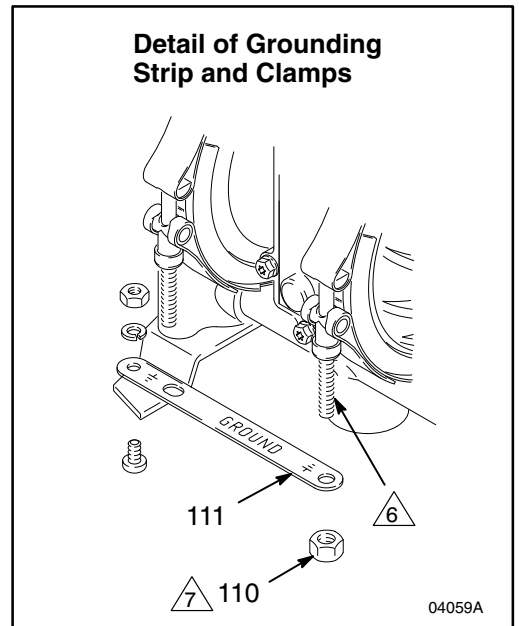
04796

Service



04058

- 1 Apply medium-strength (blue) Loctite® or equivalent to threads, and torque to 75–85 in-lb (8.5–9.6 N.m) at 100 rpm maximum. Do not over-torque.
- 2 Grease.
- 3 The words “AIR SIDE” on diaphragm (401, 404) must face into the pump housing (1).
- 4 Curved side of plates (116**) and (118**) must face diaphragms.
- 5 Used only on models with PTFE diaphragms.
- 6 Apply thread lubricant.
- 7 Torque to 75–85 in-lb (8.5–9.6 N.m).
- 8 Torque to 3–6 ft-lb (4–8 N.m).



04059A

Fig. 19

Pump Matrix

Husky 715 Aluminum and Stainless Steel Pumps, Series E

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 715 aluminum air motor, aluminum fluid section, acetal seats, PTFE balls, and PTFE diaphragms is Model **D 6 3 – 2 1 1**. To order replacement parts, refer to the part lists on pages 26–30. *The digits in the matrix **do not** correspond to the ref. nos. in the parts drawing and lists.*

Diaphragm Pump	Air Motor	Fluid Section	–	Guides	Balls	Diaphragms
D (for all pumps)	6 (Husky 715; aluminum)	1 (acetal; see manual 308–444)	–	1 (not used)	1 (PTFE®)	1 (PTFE®)
		2 (polypropylene; see manual 308–444)	–	2 (acetal)	2 (not used)	2 (not used)
		3 (aluminum)	–	3 (316 sst)	3 (316 sst)	3 (not used)
		4 (sst)	–	4 (not used)	4 (not used)	4 (not used)
		A (acetal BSPT) see manual 308–444	–	5 (not used)	5 (Hytrel®)	5 (Hytrel®)
		B (polypropylene BSPT) see manual 308–444	–	6 (not used)	6 (Santoprene®)	6 (Santoprene®)
		C (aluminum BSPT)	–	7 (not used)	7 (buna-N)	7 (buna-N)
		D (sst BSPT)	–	8 (not used)	8 (Viton®)	8 (Viton®)
			–	9 (polypropylene)	9 (not used)	9 (not used)
			–	A (not used)	A (not used)	A (not used)
			–	B (not used)	B (not used)	B (not used)

Repair Kit Matrix

For Husky 715 Aluminum and Stainless Steel Pumps, Series E

Repair Kits may be ordered separately. To repair the air valve, order **Part No. 239–952** (see page 26). Parts included in the Air Valve Repair Kit are marked with a symbol in the parts list, for example (2†).

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 **5**. 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 acetal seats, PTFE balls, and PTFE diaphragms, order Repair Kit **D 0 5 – 2 1 1**. If you only need to repair certain parts (for example, the diaphragms), use the 0 (null) digits for the seats and balls, and order Repair Kit **D 0 5 – 0 0 1**. *The digits in the matrix **do not** correspond to the ref. nos. in the parts drawing and lists on pages 26–30.*

Diaphragm Pump	Null	O-rings	–	Guides	Balls	Diaphragms
D (for all pumps)	0 (for all pumps)	5 (PTFE®)	–	0 (null)	0 (null)	0 (null)
			–	1 (not used)	1 (PTFE®)	1 (PTFE®)
			–	2 (acetal)	2 (not used)	2 (not used)
			–	3 (316 sst)	3 (316 sst)	3 (not used)
			–	4 (not used)	4 (not used)	4 (not used)
			–	5 (not used)	5 (Hytrel®)	5 (Hytrel®)
			–	6 (not used)	6 (Santoprene®)	6 (Santoprene®)
			–	7 (not used)	7 (buna-N)	7 (buna-N)
			–	8 (not used)	8 (Viton®)	8 (Viton®)
			–	9 (polypropylene)	9 (not used)	9 (not used)
			–	A (not used)	A (not used)	A (not used)
			–	B (not used)	B (not used)	B (not used)

Parts

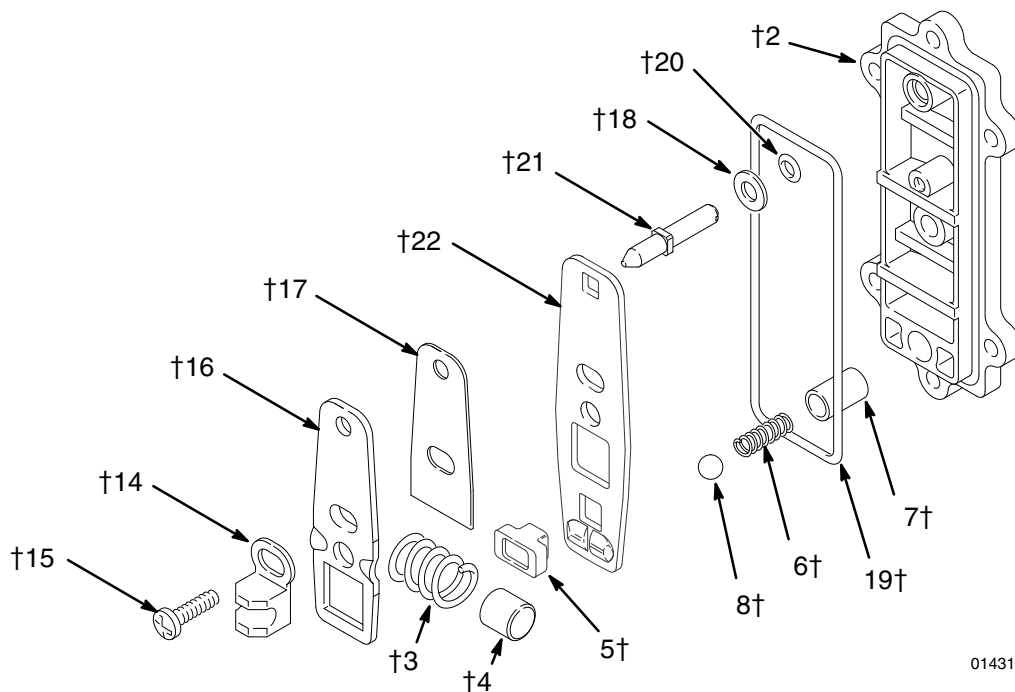
Air Motor Parts List (Matrix Column 2)

Digit	Ref. No.	Part No.	Description	Qty
6	1	189-531	HOUSING, center; aluminum; see page 27	1
	2†	187-706	COVER, air valve; polypropylene	1
	3†	187-722	SPRING; sst	1
	4†	187-853	STOP, link; acetal	1
	5†	192-675	CUP, valve; acetal	1
	6†	187-728	SPRING; sst	1
	7†	187-730	COLLAR, detent; sst	1
	8†	111-629	BALL, detent; carbide	1
	9†	187-726	BEARING, link; acetal; see page 27	1
	10	112-545	SCREW, thread-forming; M5 x 0.8; 16 mm long; see page 27	6
	12	187-719	SEAL, plate, valve; buna-N; see page 27	1
	13	187-720	PLATE, valve; sst; see page 27	1
	14†	187-718	SADDLE, shift; acetal	1
	15†	111-630	SCREW, thread-forming; 10-14 size; 0.75 in. (19 mm) long	1
	16†	187-724	LINK, actuator; sst	1

Digit	Ref. No.	Part No.	Description	Qty
6	17†	188-175	SPACER, link; acetal	1
	18†	111-750	WASHER, plain; sst	1
	19†	111-624	O-RING; buna-N	1
	20†	111-625	O-RING; buna-N	1
	21†	187-727	SHAFT, reset; sst	1
	22†	192-526	LINK, detent; sst	1
	23	112-546	SCREW, machine; 4-40; 3/8" (10 mm) long; see page 27	2
	24	190-244	BEARING, link, lower; see page 27	1
	25†	111-920	GREASE, general purpose; 0.375 oz. (10.5 g); not shown	1
	26	188-849	PIN, pilot; see page 27	2
	27	188-850	BEARING, pin; see page 27	2
	28	157-628	O-RING; buna-N; see page 27	2
	29‡	191-780	SHAFT, diaphragm; sst; see page 27	1
	30‡	113-704	PACKING, o-ring; Viton	2
	31‡	191-779	BEARING, acetal	2

† These parts are included in Air Valve Kit 239-952, which may be purchased separately. The kit is shown below.

‡ These parts are included in Diaphragm Shaft Kit 230-016, which may be purchased separately.



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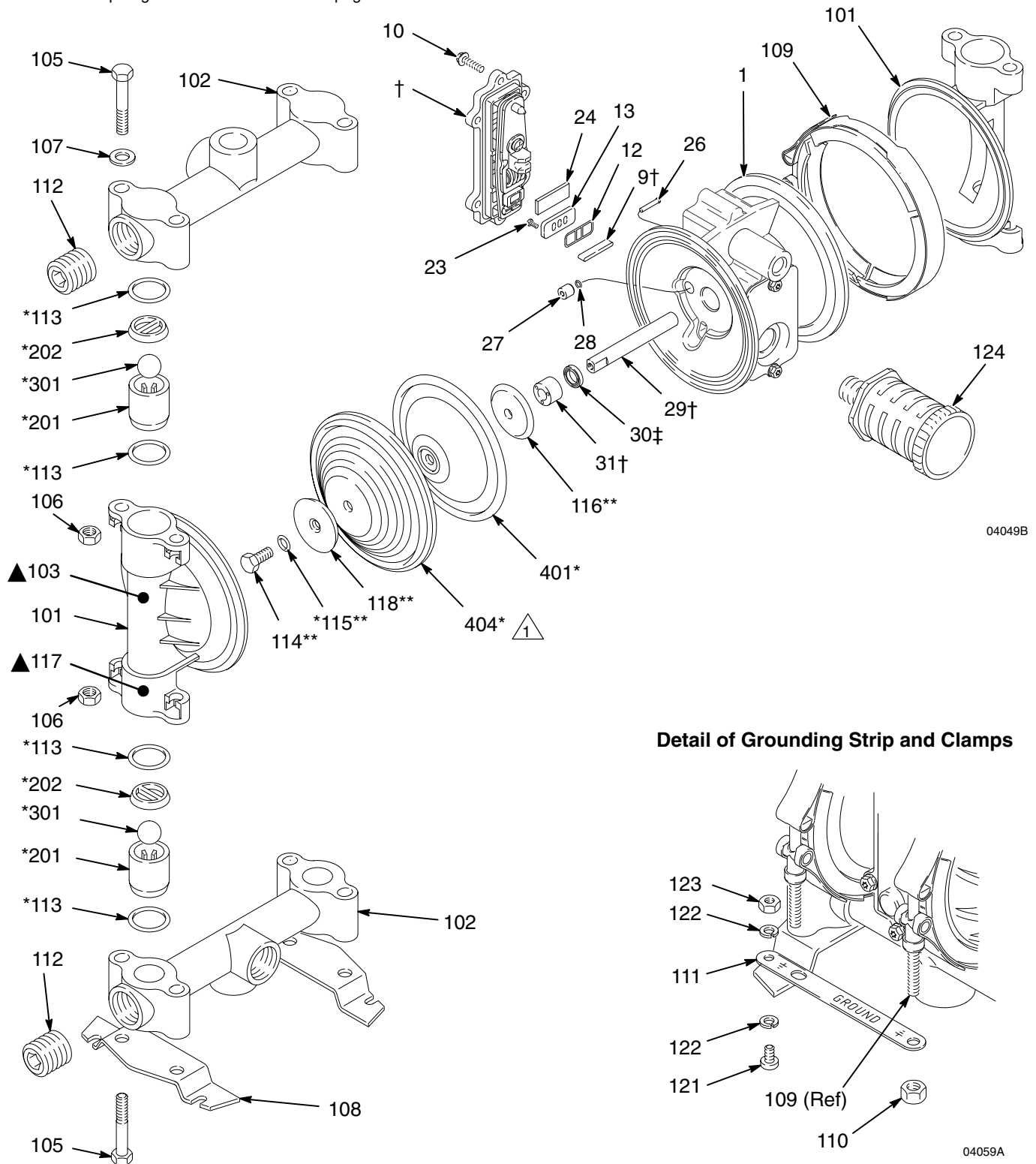
Parts

† Part of Air Valve Kit 239-952. See page 26.

‡ Part of Diaphragm Shaft Kit 239-016. See page 26.

** Part of Diaphragm Plate Kit 239-141. See page 28.

1 Used only on models with PTFE diaphragms.



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Parts

Fluid Section Parts Lists (Matrix Column 3)

Digit	Ref. No.	Part No.	Description	Qty
3	101	185-622	COVER, fluid; aluminum	2
	102	185-624	MANIFOLD; aluminum	2
	103▲	189-220	LABEL, warning	1
	105	112-912	SCREW; 3/8-16; 2.25" (57.2 mm) long	8
	106	112-913	NUT, hex; 3/8-16; sst	8
	107	112-914	WASHER, flat; 3/8"; sst	4
	108	186-207	FEET	2
	109	189-540	CLAMP	2
	110	112-499	NUT, clamp; 1/4-28	2
	111	191-079	STRIP, grounding	1
	112	102-726	PLUG; steel	2
	113*	110-636	O-RING; PTFE®	8
	114**	113-747	SCREW; 1/4-20; 1" (25.4 mm) long	2
	*115**	110-004	O-RING; PTFE	2
	116**	191-741	PLATE, diaphragm; sst	2
	117▲	186-205	LABEL, warning	1
	118**	191-837	PLATE, diaphragm, fluid side; sst	2
	121	102-790	SCREW; 10-24; 0.31 in. (8 mm) long	1
	122	100-718	LOCKWASHER, internal tooth; no. 10	1
	123	100-179	NUT, hex; 10-24	1
	124	108-636	MUFFLER	1

Digit	Ref. No.	Part No.	Description	Qty
4	101	187-241	COVER, fluid; stainless steel	2
	102	187-244	MANIFOLD; stainless steel	2
	103▲	189-220	LABEL, warning	1
	105	112-912	SCREW; 3/8-16; 2.25" (57.2 mm) long	8
	106	112-913	NUT, hex; 3/8-16; sst	8
	107	112-914	WASHER, flat; 3/8"; sst	4
	108	186-207	FEET	2
	109	189-540	CLAMP	2
	110	112-499	NUT, clamp; 1/4-28	2
	111	191-079	STRIP, grounding	1
	112	111-384	PLUG; sst	2
	113*	110-636	O-RING; PTFE®	8
	114**	113-747	SCREW; 1/4-20; 1" (25.4 mm) long	2
	*115**	110-004	O-RING; PTFE	2
	116**	191-741	PLATE, diaphragm; sst	2
	118**	191-837	PLATE, diaphragm, fluid side; sst	2
	121	102-790	SCREW; 10-24; 0.31 in. (8 mm) long	1
	122	100-718	LOCKWASHER, internal tooth; no. 10	1
	123	100-179	NUT, hex; 10-24	1
	124	108-636	MUFFLER	1

continued

* These parts are included in the Fluid Section Repair Kit, which may be purchased separately. See page 25 to determine the correct kit for your pump.

** These parts are included in the Diaphragm Plate Kit 239-141, which may be purchased separately.

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

Parts

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

Digit	Ref. No.	Part No.	Description	Qty
C	101	185-622	COVER, fluid; aluminum	2
	102	192-061	MANIFOLD; aluminum; BSPT	2
	103▲	189-220	LABEL, warning	1
	105	112-912	SCREW; 3/8-16; 2.25" (57.2 mm) long	8
	106	112-913	NUT, hex; 3/8-16; sst	8
	107	112-914	WASHER, flat; 3/8"; sst	4
	108	186-207	FEET	2
	109	189-540	CLAMP	2
	110	112-499	NUT, clamp; 1/4-28	2
	111	191-079	STRIP, grounding	1
	112	102-726	PLUG; steel	2
	113*	110-636	O-RING; PTFE®	8
	114**	113-747	SCREW; 1/4-20; 1" (25.4 mm) long	2
	*115**	110-004	O-RING; PTFE	2
	116**	191-741	PLATE, diaphragm; sst	2
	117▲	186-205	LABEL, warning	1
	118**	191-837	PLATE, diaphragm, fluid side; sst	2
	121	102-790	SCREW; 10-24; 0.31 in. (8 mm) long	1
	122	100-718	LOCKWASHER, internal tooth; no. 10	1
	123	100-179	NUT, hex; 10-24	1
	124	108-636	MUFFLER	1

Digit	Ref. No.	Part No.	Description	Qty
D	101	187-241	COVER, fluid; stainless steel	2
	102	192-060	MANIFOLD; stainless steel; BSPT	2
	103▲	189-220	LABEL, warning	1
	105	112-912	SCREW; 3/8-16; 2.25" (57.2 mm) long	8
	106	112-913	NUT, hex; 3/8-16; sst	8
	107	112-914	WASHER, flat; 3/8"; sst	4
	108	186-207	FEET	2
	109	189-540	CLAMP	2
	110	112-499	NUT, clamp; 1/4-28	2
	111	191-079	STRIP, grounding	1
	112	111-384	PLUG; sst	2
	113*	110-636	O-RING; PTFE®	8
	114**	113-747	SCREW; 1/4-20; 1" (25.4 mm) long	2
	*115**	110-004	O-RING; PTFE	2
	116**	191-741	PLATE, diaphragm; sst	2
	118**	191-837	PLATE, diaphragm, fluid side; sst	2
	121	102-790	SCREW; 10-24; 0.31 in. (8 mm) long	1
	122	100-718	LOCKWASHER, internal tooth; no. 10	1
	123	100-179	NUT, hex; 10-24	1
	124	108-636	MUFFLER	1

* These parts are included in the Fluid Section Repair Kit, which may be purchased separately. See page 25 to determine the correct kit for your pump.

** These parts are included in the Diaphragm Plate Kit 239-141, which may be purchased separately.

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

Parts

Guide Parts Lists (Matrix Column 4)

Digit	Ref. No.	Part No.	Description	Qty
2	201*	186-691	GUIDE; acetal	4
	202*	186-692	STOP; acetal	4
3	201*	187-242	GUIDE; 316 stainless steel	4
	202*	187-243	STOP; 316 stainless steel	4
9	201*	186-776	GUIDE; polypropylene	4
	202*	186-777	STOP; polypropylene	4

Ball Parts Lists (Matrix Column 5)

Digit	Ref. No.	Part No.	Description	Qty
1	301*	108-639	BALL; PTFE	4
3	301*	103-462	BALL; 316 stainless steel	4
5	301*	112-945	BALL; Hytrel	4
6	301*	112-946	BALL; Santoprene	4
7	301*	108-944	BALL; buna-N	4
8	301*	112-959	BALL; Viton	4

Diaphragm Parts Lists (Matrix Column 6)

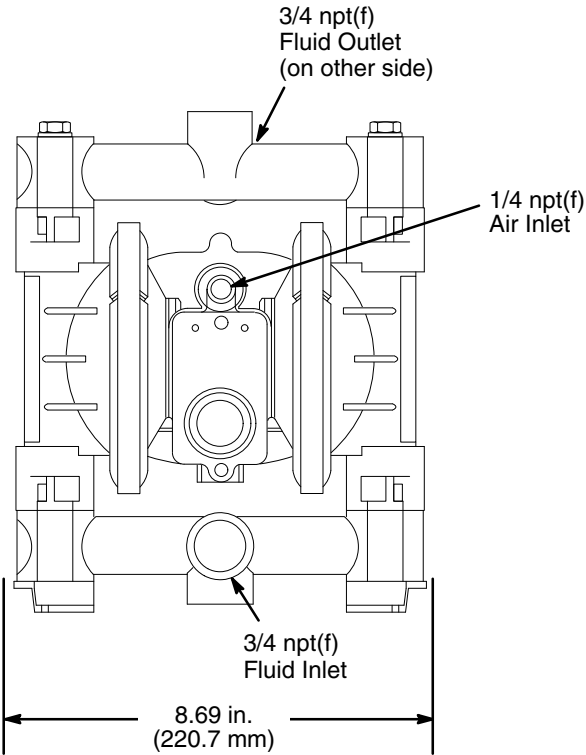
Digit	Ref. No.	Part No.	Description	Qty
1	401*	183-542	DIAPHRAGM, backup; polyurethane	2
	404*	108-839	DIAPHRAGM; PTFE	2
5	401*	189-537	DIAPHRAGM; Hytrel	2
6	401*	189-536	DIAPHRAGM; Santoprene	2
7	401*	190-148	DIAPHRAGM; buna-N	2
8	401*	190-149	DIAPHRAGM; Viton	2

* These parts are included in the Fluid Section Repair Kit, which may be purchased separately. See page 25.

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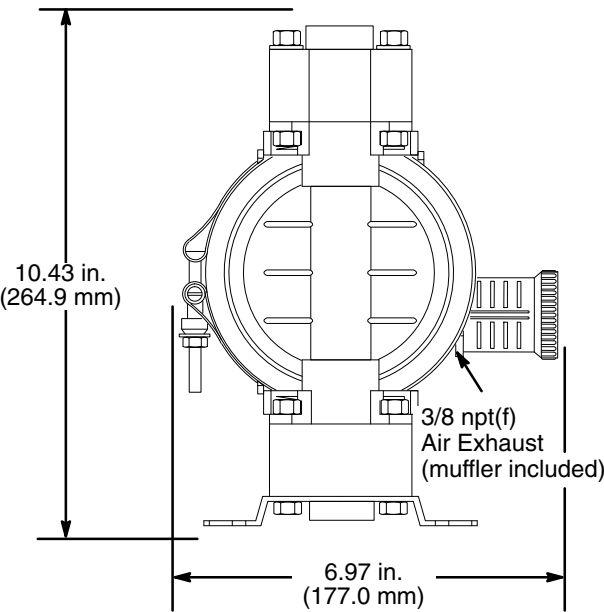
Dimensions

FRONT VIEW



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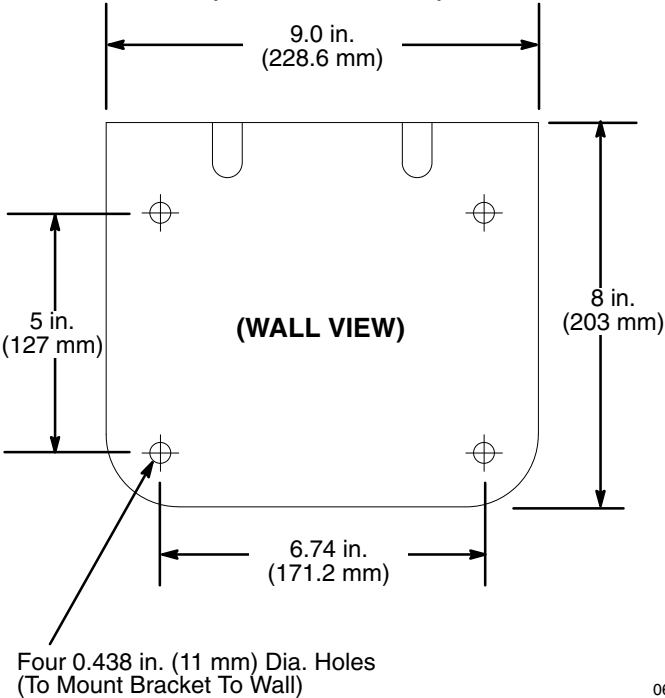
SIDE VIEW



04056

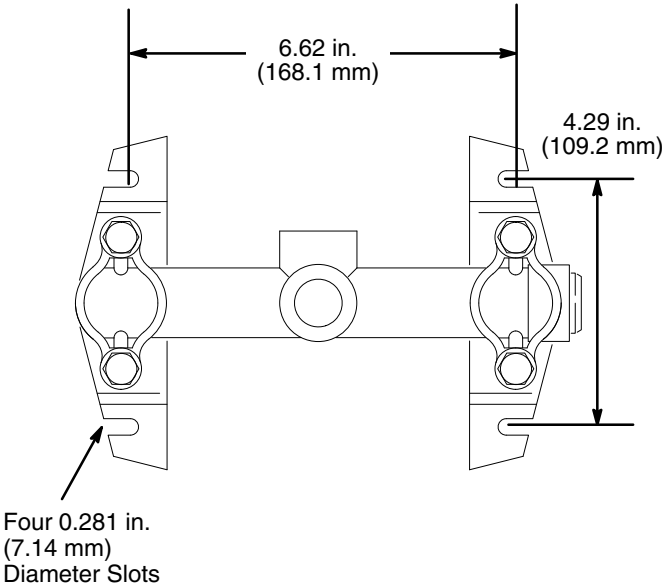
Mounting Hole Layouts

**WALL BRACKET 221-167
(Viewed from Wall)**



0654

HUSKY 715 PUMP (BOTTOM VIEW)



04769

Technical Data

Maximum Fluid Working Pressure . . . 100 psi (0.7 MPa, 7 bar)
 Air Pressure Operating Range 25–100 psi
 (0.18–0.7 MPa, 1.8–7 bar)
 Maximum Air Consumption 19 scfm
 Maximum Free Flow Delivery 16 gpm (60 l/min)
 Maximum Pump Speed 200 cpm
 Gallons (Liters) per cycle 0.08 (0.3)
 Maximum Suction Lift (water) 16 ft (4.8 m) dry,
 25 ft (7.6 m) wet
 Maximum Size Pumpable Solids 3/32 in. (2.5 mm)
 Sound power level 85 dBa
 Air Inlet Size 1/4 npt(f)
 Fluid Inlet Size. 3/4 npt(f)
 Fluid Outlet Size. 3/4 npt(f)

Wetted Parts Vary by Model. See pages 26–30.
 Non-wetted External Parts . . . Aluminum, 303 Stainless Steel
 Polyester (labels), Polyethylene, Zinc-Plating
 Weight *Aluminum Pumps:* 11 lb (5.0 kg)
 *Stainless Steel Pumps:* 20 lb (9.1 kg)

* Sound power level measured per ISO standard 9614–2.

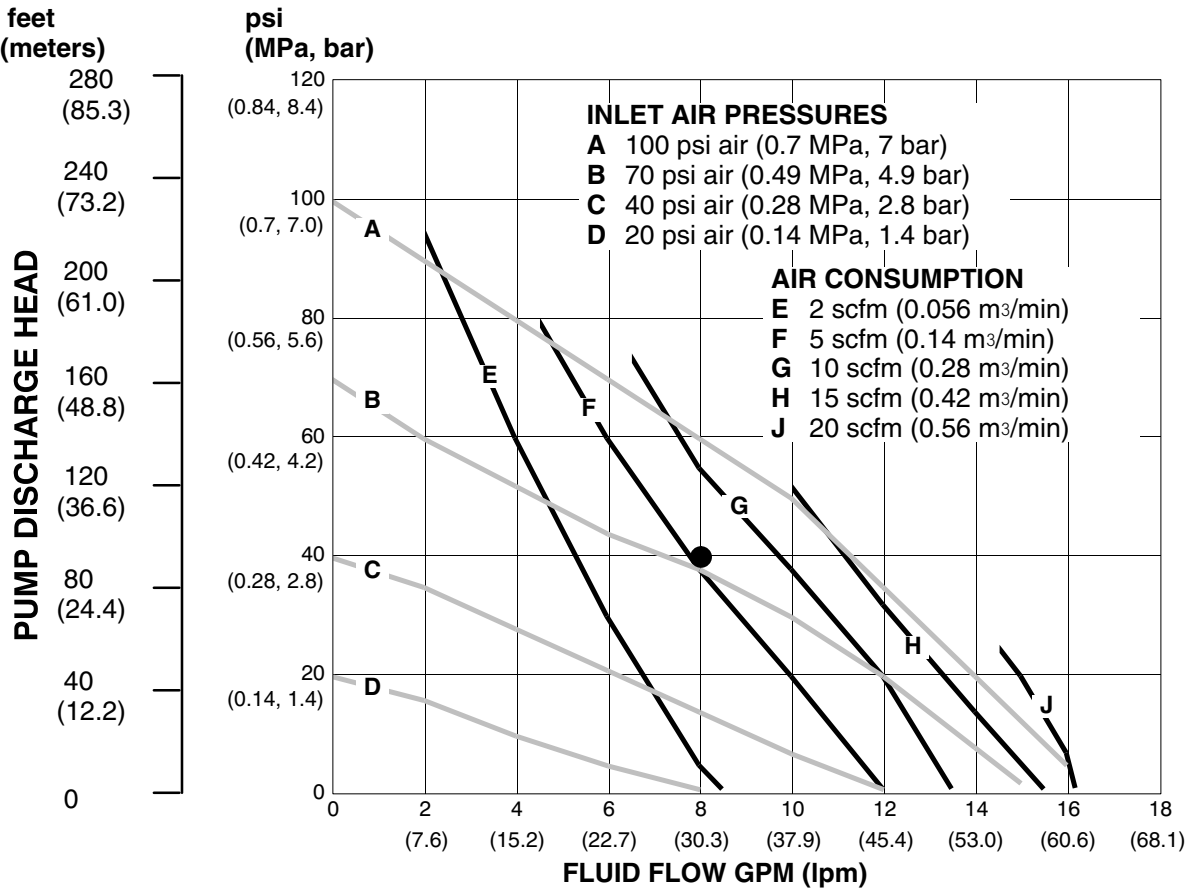
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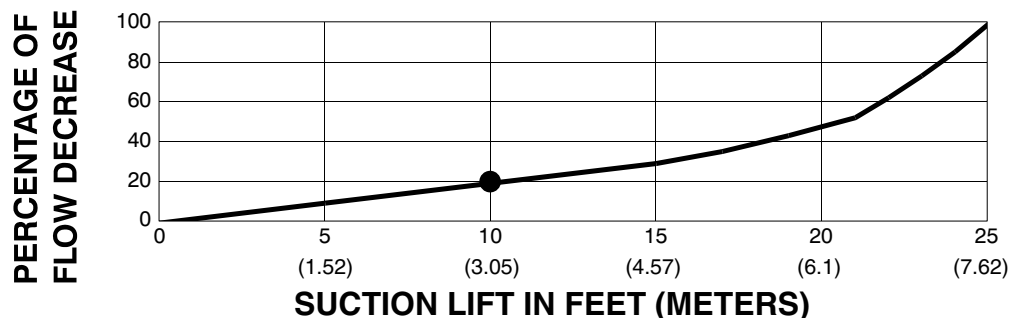
Example of Finding Pump Air Consumption and Air Pressure at a Specific Fluid Delivery and Discharge Head:

To supply 8 gpm (30.3 liters) fluid flow (horizontal scale) at 40 psi (0.28 MPa, 2.8 bar) discharge head pressure (vertical scale) requires 5 scfm (0.14 m³/min) air consumption at 70 psi (0.49 MPa, 4.9 bar) air pressure.



PUMPING RATE DECREASE AT DIFFERENT SUCTION LIFTS

EXAMPLE: At a suction lift of 10 ft (3.05 m), the pump flow rate will be decreased by 20 percent.



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Manual Change Summary

This manual went from Rev. P to Rev. R to make the following changes:

- BSPT threaded manifolds (Ref. No. 102) are added to **Pump Matrix** on page 24 and **Fluid Section Parts List** on page 29.
- Ground screw (Ref. No. 121) is changed from Part No. 100–264 to 102–790, and the quantity of the grounding lockwasher (Ref. No. 122) is changed from 2 to 1. See the **Fluid Section Parts List** on pages 28 and 29.
- Ceramic balls are deleted from the matrices and the **Ball Parts List** on page 30.
- Retorquing instructions for threaded fasteners and connections are added on pages 5 and 11.

Graco Standard Warranty

Graco warrants all equipment manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

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

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

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