Instructions

Air-Operated Diaphragm Pumps

For fluid transfer applications. For professional use only. Only models marked with (*) are approved for use in European explosive atmosphere locations.

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

ACETAL*, POLYPROPYLENE, AND PVDF

**Husky™ 515**

Model No. D 5 1 ___ Acetal NPT Pumps
Model No. D 5 2 ___ Polypropylene Pumps
Model No. D 5 5 ___ PVDF NPT Pumps
Model No. D 5 A ___ Acetal BSPT Pumps
Model No. D 5 B ___ Polypropylene BSPT Pumps
Model No. D 5 E ___ PVDF BSPT Pumps
Model No. D 9 1 ___ Acetal NPT Pumps
Model No. D 9 A ___ Acetal BSPT Pumps

For Additional Models, see Table of Contents

ALUMINUM* AND STAINLESS STEEL*

**Husky™ 716**

Model No. D 4 D ___ Stainless Steel BSPT Pumps, Remote
Model No. D 5 3 ___ Aluminum NPT Pumps
Model No. D 5 4 ___ Stainless Steel NPT Pumps
Model No. D 5 C ___ Aluminum BSPT Pumps
Model No. D 5 D ___ Stainless Steel BSPT Pumps
Model No. D 9 4 ___ Stainless Steel NPT Pumps
Model No. D 9 D ___ Stainless Steel BSPT Pumps

For Additional Models, see Table of Contents

*These models are certified:

II 2 GD
Ex h IIC 66°C...135°C Gb
Ex h IIC T135°C Db

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

Important Safety Instructions

Read all warnings and instructions in this manual.
Save these instructions.
Refer to the Pump Matrix on page 25 to determine the model number of your pump.
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Symbols

Warning Symbol

⚠️ WARNING

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

Caution Symbol

⚠️ CAUTION

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

⚠️ WARNING

EQUIPMENT MISUSE HAZARD

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 that 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.
- 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.
- Do not kink or overbend hoses or use hoses to pull equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.
- Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in pressurized aluminum equipment. Such use could result in a chemical reaction, with the possibility of explosion.
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.
- Do not lift a pump under pressure. If dropped, the fluid section may rupture. Always follow the Pressure Relief Procedure on page 10 before lifting the pump.
- 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. Read Air Exhaust Ventilation on page 6.
- Never use an acetal pump to pump acids. Take precautions to avoid acid or acid fumes from contacting the pump housing exterior. Stainless steel parts will be damaged by exposure to acid spills and fumes.

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 8.
- 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 8 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 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. Read Air Exhaust Ventilation on page 6.
- 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.
- Keep a fire extinguisher in the work area.
Installation

General Information

- The Typical Installations in Fig. 2 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.

Tightening Threaded Fasteners Before First Use

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

Mountings

- These pumps can be used in a variety of installations. Be sure the mounting surface can support the weight of the pump, hoses, and accessories, as well as the stress caused during operation.
- Fig. 2 shows some installation examples. On all installations, mount the pump using screws and nuts.
- Prolonged exposure to UV radiation will degrade natural polypropylene components of the pumps. To prevent potential injury or equipment damage, do not expose pump or the plastic components to direct sunlight for prolonged periods.

Toxic Fluid Hazard

Use fluids and solvents that 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.

Pumping High-Density Fluids

High density fluids may prevent the lighter non-metallic check valve balls from seating properly, which reduces pump performance significantly. Stainless steel balls should be used for such applications.

Split Manifolds

Plastic Split Manifold Kits are available to enable you to pump two fluids simultaneously or to mix two fluids in the pump. To order a Split Manifold Kit, use the Part No. from the list below:

- 241240 polypropylene; split inlet
- 241241 acetal; split inlet
- 241242 PVDF; split inlet
- 241243 polypropylene; split outlet
- 241244 acetal; split outlet
- 241245 PVDF; split outlet

Safe Operating Temperatures

Minimum (all pumps): 40°F (4°C)  
Maximum  
Acetal: 180°F (82°C)  
Polypropylene: 150°F (66°C)  
Aluminum, stainless steel, PVDF: 225°F (107°C)  
These temperatures are based upon mechanical stress only and may be significantly altered by pumping certain chemicals. Consult engineering guides for chemical compatibilities and temperature limits, or contact your Graco distributor.
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. Read Air Exhaust Ventilation on page 6.

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. Read 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 in. (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.

**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.

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 (16) on underside of pump.

**NOTE:** if using a conductive (acetal) pump, use conductive hoses. If using a non-conductive pump, ground the fluid system. Read Grounding on page 8. The fluid inlet port is 1/2 in. or 3/4 in.

3. Connect remaining ends of tubes to external air signal, such as Graco's Cycleflo (P/N 195264) or Cycleflo II (P/N195265) controllers.

**FLUID SUCTION LINE**

- If using a conductive (acetal) pump, use conductive hoses. If using a non-conductive pump, ground the fluid system. Read Grounding on page 8. The fluid inlet port is 1/2 in. or 3/4 in.

- At inlet fluid pressures greater than 15 psi (0.1 MPa, 1 bar), diaphragm life will be shortened.

**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 Fig. 2. 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 1/2 in. or 3/4 in. 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. Read the WARNING above.
**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. 1.

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.

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

**Air Exhaust Ventilation**

![CAUTION]

Read TOXIC FLUID HAZARD on page 3.

Read FIRE AND EXPLOSION HAZARD on page 3.

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. 2.

The air exhaust port is 3/8 npt(f). Do not restrict the air exhaust port. Excessive exhaust restriction can cause erratic pump operation.

See Venting Exhaust Air in Fig. 2. Exhaust to a remote location as follows:
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. 2.
Installation

ABOVE-GROUND TRANSFER INSTALLATION

KEY
A  Pump
B  Bleed-type master air valve (required for pump)
C  Electrically conductive air supply line
D  Air line quick disconnect
E  Master air valve (for accessories)
F  Air line filter
G  Pump air regulator
H  Fluid drain valve (required)
J  Fluid regulator (optional)
K  Electrically conductive fluid supply hose
L  Fluid suction line
M  Underground storage tank
N  Wall mounting bracket
Y  Ground wire (required; see page 8 for installation instructions)

55-GALLON BUNG PUMP INSTALLATION

KEY
A  Pump
C  Electrically conductive air supply line
D  Air line quick disconnect
H  Fluid drain valve (required)
K  Electrically conductive fluid supply hose
L  Fluid suction line
Y  Ground wire (required; see page 8 for installation instructions)

AIR SPRAY INSTALLATION

KEY
A  Pump
C  Electrically conductive air line to pump
E  Gun air line shutoff valve
F  Air line filter
G  Gun air regulator
H  Fluid drain valve (required)
K  Electrically conductive fluid supply hose
P  Circulating valve
R  Electrically conductive air line to gun
S  Air spray gun
T  Electrically conductive fluid return line
U  5-gallon pail
V  Agitator
Y  Ground wire (required; see page 8 for installation instructions)

VENTING EXHAUST AIR

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

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

Fig. 2
**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 3.

The acetal Husky 515 pump contains stainless steel fibers, which makes the wetted parts conductive. Attaching the ground wire to the grounding screw (106) grounds the wetted parts. See grounding screw on page 25.

The metal Husky 716 pumps have a grounding strip connecting the vee clamps (109). Attach a ground wire to the grounding strip with the screw, lockwasher, and nut as shown in the Grounding Detail on page 27.

The polypropylene and PVDF Husky 515 pumps are not conductive.

When pumping conductive flammable fluids, always ground the entire fluid system by making sure the fluid system has an electrical path to a true earth ground (see Fig. 3). Never use a polypropylene or 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 x 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 x 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.

**WARNING**

**GROUNDING A PUMP**

**KEY**
- A Pump
- H Fluid drain valve (required)
- S Dispense valve
- T Fluid drain line
- Y Fluid section grounding via grounding strip or grounding screw (required for metal and acetal pumps)
- Z Container ground wire (required)

**GROUNDING A PUMP**

**KEY**
- A Pump
- H Fluid drain valve (required)
- S Dispense valve
- T Fluid drain line
- Y Fluid section grounding via grounding strip or grounding screw (required for metal and acetal pumps)
- Z Container ground wire (required)

Hose must be conductive.

Dispense valve nozzle must be in contact with container.

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US Code (NFPA 77 Static Electricity) recommends a conductivity greater than 50 x 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 x 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.

**NOTE:** When pumping conductive flammable fluids with a polypropylene or PVDF pump, always ground the fluid system. See the WARNING above. Fig. 3 shows a recommended method of grounding flammable fluid containers during filling.
Installation

Changing the Orientation of the Fluid Inlet and Outlet Ports (Husky 515)

You can change the orientation of the fluid inlet and outlet ports by repositioning the manifolds. For Husky 515, see Fig. 4. For Husky 716, see Fig. 5.

1. Relieve the pressure. See Pressure Relief Procedure on page 11.

2. Remove the four manifold nuts (109) or bolts (105).

3. Turn the manifold to the desired position, reinstall the nuts or bolts, and torque to 80 to 90 in-lb (9 to 10 NSm). See Torque Sequence, page 32.

NOTE: Make sure all manifold o-rings are positioned correctly before you fasten the manifold. Manifold o-rings (139) are shown in Fig. 8 and Fig. 9.

NOTE: Pumps with duckbill check valves are shipped with the inlet manifold on top and the outlet manifold on the bottom. See page 14 for details.

Torque to 80 to 90 in-lb (9 to 10 NSm). See Torque Sequence, page 32.
Install Reed Switch

1. Shut off air to pump and remove valve cover (A).

2. Remove lower carriage and replace with new carriage assembly (2), so magnet faces end of valve chamber.

3. Replace valve cover. Torque to 80 to 100 in-lb (9.0 to 13.6 N•m).

4. Screw reed switch (1) into one of two holes on underside of air motor until it bottoms out.

5. Attach the reed switch cable (1) to the system monitoring counts.

   NOTE: The following steps will require that the pump is operated with the targeted fluid, and at the minimum operational speed, so that the reed switch counting is properly calibrated.

6. Set the inlet air pressure to a minimum of 40 psi (2.76 bar). Observe that the air motor is functioning. If it is not, increase the pressure until it does begin to operate.

7. While monitoring the reed switch output at the monitoring location, slowly turn the reed switch counter-clockwise until a consistent pulse output is observed.

8. Mark a vertical line on the threads of the reed switch and a corresponding alignment mark on the body of the air motor.

9. While monitoring the pulse output, slowly turn the reed switch counter-clockwise until breaks in the pulses are observed. Make a mark on the air motor where the line on the threads of the reed switch is located.

10. Rotate the reed switch clockwise until the line on the threads is halfway between the two marks on the air motor.

11. Tighten the lock nut on the reed switch against the air motor. Do not overtighten.
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, 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, and have a container ready to catch the drainage.

Flush Pump Before First Use
The pump was tested with water. Prior to first use, flush the pump thoroughly with a compatible solvent.

Reactor feed pumps, part numbers 246484, 246485, and 257447, were tested with lightweight oil, which is left in the fluid passages. To avoid contaminating your fluid with oil, flush the pump with a compatible solvent before using the equipment. Follow the steps under Starting and Adjusting Pump.

Starting and Adjusting Pump

1. Read TOXIC FLUID HAZARD on page 3.
2. If lifting the pump, follow the Pressure Relief Procedure above.
3. Be sure the pump is properly grounded. Read FIRE AND EXPLOSION HAZARD on page 3.
4. 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.
5. Place the suction tube (if used) in the fluid to be pumped.

**NOTE:** If the inlet fluid 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.

6. Place the end of the fluid hose (K) into an appropriate container.
7. Close the fluid drain valve (H).
8. With the pump air regulator (G) closed, open all bleed-type master air valves (B, E).
9. 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.
Operation of Remote Piloted Pumps

1. Fig. 2 and Parts Drawings. Follow preceding steps 1 through 8 of Starting and Adjusting Pump.

2. Open air regulator (G).

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pump may cycle once before the external signal is applied. Injury is possible. If pump cycles, wait until end before proceeding.</td>
</tr>
</tbody>
</table>

3. Pump will operate when air pressure is alternately applied to push type connectors (16).

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

Pump Shutdown

At the end of the work shift, relieve the pressure as described in Pressure Relief Procedure on page 11.
Maintenance

Lubrication
The air valve is lubricated at the factory to operate without additional lubrication. If you want to provide additional lubrication, remove the hose from the pump air inlet and add two drops of machine oil to the air inlet every 500 hours of operation or every month.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

Flush and Storage
Flush the pump 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 you store it for any length of time.

| ! | Read Pressure Relief Procedure on page 11. |

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 32.

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

Read Pressure Relief Procedure on page 11, and relieve the pressure before you check or service the equipment. Check all possible problems and causes before disassembling the pump.

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump will not cycle, or cycles once and stops.</td>
<td>Air valve is stuck or dirty.</td>
<td>Use filtered air.</td>
</tr>
<tr>
<td>Pump cycles at stall or fails to hold pressure at stall.</td>
<td>Leaky check valves or o-rings.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>Worn check balls or duckbill valves or guides.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>Check ball wedged in guide.</td>
<td>Repair or replace.</td>
</tr>
<tr>
<td></td>
<td>Worn diaphragm shaft seals.</td>
<td>Replace.</td>
</tr>
<tr>
<td>Pump operates erratically.</td>
<td>Clogged suction line.</td>
<td>Inspect; clear.</td>
</tr>
<tr>
<td></td>
<td>Sticky or leaking check valve balls.</td>
<td>Clean or replace.</td>
</tr>
<tr>
<td></td>
<td>Diaphragm ruptured.</td>
<td>Replace.</td>
</tr>
<tr>
<td>Air bubbles in fluid.</td>
<td>Suction line is loose.</td>
<td>Tighten.</td>
</tr>
<tr>
<td></td>
<td>Diaphragm ruptured.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>Loose manifolds or damaged manifold o-rings.</td>
<td>Tighten manifold bolts or nuts; replace o-rings.</td>
</tr>
<tr>
<td></td>
<td>Loose fluid side diaphragm plates.</td>
<td>Tighten.</td>
</tr>
<tr>
<td>Fluid in exhaust air.</td>
<td>Diaphragm ruptured.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>Loose fluid side diaphragm plates.</td>
<td>Tighten.</td>
</tr>
<tr>
<td></td>
<td>Worn diaphragm shaft seals.</td>
<td>Replace.</td>
</tr>
<tr>
<td>Pump exhausts air from clamps (metal pumps).</td>
<td>Loose clamps.</td>
<td>Tighten clamp nuts.</td>
</tr>
<tr>
<td></td>
<td>Air valve o-ring is damaged.</td>
<td>Inspect; replace.</td>
</tr>
<tr>
<td>Pump leaks fluid from check valves.</td>
<td>Worn or damaged check valve o-rings.</td>
<td>Inspect; replace.</td>
</tr>
<tr>
<td>Reed switch electrical signal output erratic or inconsistent</td>
<td>Switch moved</td>
<td>Re-install reed switch. See page 10.</td>
</tr>
<tr>
<td></td>
<td>Running speed of pump less than reed switch calibration speed.</td>
<td>Reset reed switch calibration with pump running at or below minimum operation speed. See page 10.</td>
</tr>
<tr>
<td></td>
<td>Slow changeover or pump inlet pressure too low.</td>
<td>Increase pump inlet pressure to a minimum of 40 psi.</td>
</tr>
</tbody>
</table>
Service

Air Valve (Husky 515 and Husky 716 pumps without reed switch)

NOTE: Air Valve Repair Kit 241657 is available. Parts included in the kit are marked with a dagger (†) in Fig. 6 and in the Parts Drawings and Lists. A tube of general purpose grease 111920 is supplied in the kit. Service the air valve as follows. See Fig. 6.

- Relieve the pressure. See Pressure Relief Procedure on page 11.

1. Remove the cover (10) and the o-ring (4).
2. Remove the carriage plungers (7), carriages (8), carriage pins (9), and valve plate (14) from the center housing (11).
3. Clean all the parts, and inspect them for wear or damage.
4. Grease the lapped surface of the valve plate (14), and install the valve plate with the lapped surface facing up.
5. Grease the bores of the center housing (11), install the u-cup packings (2) on the carriage plungers (7), and slide the carriage plungers into the carriage plunger bores. See the following important installation notes:
   - When you install each u-cup packing (2) on each carriage plunger (7), make sure the lips of the u-cup packing face toward the clip end (the smaller end) of the carriage plunger.
   - When you slide the carriage plungers (7) into the bores, slide them in with the clip ends (the smaller ends) facing toward the center of the center housing (11).
6. Grease the carriage pins (9), and slide the carriage pins into the carriage pin bores.
7. Install the carriages (8). Make sure the carriages engage the clip ends of the carriage plungers (7) and carriage pins (9).
8. Grease the o-ring (4), and seat it in the groove around the cover opening of the center housing (11).
9. Screw the cover (10) into the center housing.

NOTE: Center housing (11) is shown separated from the air covers, but it is not necessary to remove the air covers for this service. Leave the center housing and air covers assembled for this service.

† Included in Air Valve Repair Kit 241657

- Torque to 80 to 100 in-lb (9.0 to 13.6 N-m).
- Apply grease.
- Apply grease to lapped face.
- Apply grease to bores of center housing (11) before installing.
- Seal lips face clip end (the smaller end) of carriage plunger (7).
- Install with the clip ends (the smaller ends) facing toward center of center housing (11).

Fig. 6
Air Valve (Husky 515 and Husky 716 pumps with reed switch)

NOTE: Air Valve Repair Kit 25C469 is available. Parts included in the kit are marked with a dagger (†) in Fig. 7 and in the Parts Drawings and Lists. A tube of general purpose grease 111920 is supplied in the kit. Service the air valve as follows. See Fig. 7.

Relieve the pressure. See Pressure Relief Procedure on page 11.

1. Remove the cover (10) and the o-ring (4).

2. Remove the carriage plungers (7), carriages (8, 8a), carriage pins (9), and valve plate (14) from the center housing (11).

3. Clean all the parts, and inspect them for wear or damage.

NOTE: If you are installing the new Air Valve Repair Kit 25C469, use all the parts in the kit.

4. Grease the lapped surface of the valve plate (14), and install the valve plate with the lapped surface facing up.

5. Grease the bores of the center housing (11), install the u-cup packings (2) on the carriage plungers (7), and slide the carriage plungers into the carriage plunger bores. See the following important installation notes:

NOTES:
- When you install each u-cup packing (2) on each carriage plunger (7), make sure the lips of the u-cup packing face toward the clip end (the smaller end) of the carriage plunger.
- When you slide the carriage plungers (7) into the bores, slide them in with the clip ends (the smaller ends) facing toward the center of the center housing (11).

6. Grease the carriage pins (9), and slide the carriage pins into the carriage pin bores.

7. Install the carriages (8, 8a). Make sure the carriages engage the clip ends of the carriage plungers (7) and carriage pins (9).

8. Grease the o-ring (4), and seat it in the groove around the cover opening of the center housing (11).

9. Screw the cover (10) into the center housing, and torque the cover to 80 to 100 in-lb (9.0 to 13.6 N-m).

NOTE: Center housing (11) is shown separated from the air covers, but it is not necessary to remove the air covers for this service. Leave the center housing and air covers assembled for this service.

† Included in Air Valve Repair Kit 25C469

⚠️ Torque to 80 to 100 in-lb (9.0 to 13.6 N-m).
⚠️ Apply grease.
⚠️ Apply grease to lapped face.
⚠️ Apply grease to bores of center housing (11) before installing.
⚠️ Seal lips face clip end (the smaller end) of carriage plunger (7).
⚠️ Install with the clip ends (the smaller ends) facing toward center of center housing (11).

Fig. 7
Service

Ball or Duckbill Check Valves

NOTE: Fluid Section Repair Kit D05XXX is available. See page 25 to order the correct kit for your pump. Parts included in the kit are marked with a double dagger (‡) in Fig. 8 and Fig. 9 and in the Parts Drawings and Lists. General purpose grease 111920 and Adhesive 113500 are supplied in the kit.

Relieve the pressure. See Pressure Relief Procedure on page 11.

1. Remove the top and bottom manifolds (102, 103).

2. Remove all parts shown with a dagger (†) in Fig. 8 and Fig. 9.

3. Clean all parts, and replace worn or damaged parts.

4. Reassemble the pump.

NOTE: Torque the manifold nuts (109) or bolts (105) to 80 to 90 in-lb (9 to 10 NSm). See Torque Sequence, page 32.

Inlet and Outlet for Pumps with Duckbill Check Valves

Pumps with duckbill check valves are shipped with the inlet manifold on top and the outlet manifold on the bottom. To make the inlet manifold on the bottom and the outlet manifold on the top, rotate each of the four duckbill assemblies vertically 180° as shown below.
Husky 515

⚠️ Torque to 80 to 90 in-lb (9 to 10 N-m). See Torque Sequence, page 32.

Fig. 8

Husky 716

⚠️ Torque to 80 to 90 in-lb (9 to 10 N-m). See Torque Sequence, page 32.

Fig. 9
Service

Diaphragms (Husky 515)

NOTE: Fluid Section Repair Kit D05XXX is available. See page 25 to order the correct kit for your pump. Parts included in the kit are marked with a double dagger (‡) in Fig. 10 and in the Parts Drawings and Lists. General purpose grease 111920 and Adhesive 113500 are supplied in the kit. Service the diaphragms as follows. See Fig. 10.

Disassembly

1. Remove manifolds (102 and 103) and fluid covers (101).

NOTE: Make sure all the check valve parts stay in place. See Fig. 8.

2. Remove one of the fluid-side diaphragm plates (105) (whichever one comes loose first when you use a wrench on the hex of each), and pull the diaphragm shaft out of the center housing (11).

Overmolded Diaphragms: The air cover bolts may make it difficult to remove the overmolded diaphragms on the 515 pump. Use a flat surface that fits within the bolt pattern to apply pressure on one of the diaphragms to shift the diaphragm shaft to one side. Apply pressure until the other diaphragm is separated from the air cover. Rotate the separated diaphragm counterclockwise until the diaphragm assembly comes free. Pull the second diaphragm assembly and the diaphragm shaft (15) out of the center housing (11).

3. Use a wrench on the flats of the diaphragm shaft (15) to remove the other fluid-side diaphragm plate (105) from the diaphragm shaft.

Overmolded Diaphragms: Use a wrench on the flats of the diaphragm shaft (15) to remove the second diaphragm.

4. Remove the screws (106), remove the left (114) and right (113) air covers, and remove all old gasket (12) material from the ends of the center housing (11) and the surfaces of the air covers.

5. Remove the diaphragm shaft u-cups (416) and pilot pin o-rings (1).

6. Inspect all parts for wear or damage, and replace as necessary.

Reassembly

1. Insert a diaphragm shaft u-cup (416) and a pilot pin o-ring (1) into the bores of the center housing (11).

NOTE: Make sure the lips of the u-cup face out of the center housing.

2. Line up the holes in the gasket (12) with the holes in the end of the center housing (11), and use six screws (106) to fasten an air cover (113 or 114) to the end of the center housing (11). Torque the screws to 35 to 45 in-lb (4.0 to 5.1 N-m).

3. Position the exhaust cover (13) and o-ring (4) on the center housing (11).

4. Repeat steps 1 and 2 for the other end of the center housing and the remaining air cover.

5. Apply medium-strength (blue) thread locker to the threads of the fluid-side diaphragm plate (105). Install on one end of the diaphragm shaft (15) the following parts (see proper order in Fig. 10): air-side diaphragm plate (6), backup diaphragm (402, used only on models with PTFE diaphragms), diaphragm (401), and fluid-side diaphragm plate (105).

NOTE: The words "AIR SIDE" on the diaphragm (401), the backup diaphragm (402, used only on models with PTFE diaphragms) and the flat side of the air-side diaphragm plate (6) must face toward the diaphragm shaft (15).

Overmolded Diaphragms: Assemble the air-side plate (6) onto the diaphragm (401). The words AIR SIDE on the air-side plate must face away from the diaphragm. Apply medium-strength (blue) thread locking adhesive to the threads of the diaphragm assembly. Screw the assembly into the diaphragm shaft (15) hand tight.

6. Put grease on the diaphragm shaft (15), and carefully (do not damage the shaft u-cups) run the diaphragm shaft (15) through the center housing (11) bore.
7. Repeat step 5 for the other end of the diaphragm shaft (15), and torque the fluid-side diaphragm plates (105) to 80 to 90 in-lb (9 to 10 N-m) at 100 rpm maximum.

Overmolded Diaphragms: The air cover bolts may make it difficult to assemble the overmolded diaphragms on the 515 pump. Two people are needed. Use a flat surface that fits within the bolt pattern to apply pressure on the diaphragm that has already been assembled. Apply pressure until the diaphragm shaft sticks out of the other end of the center housing far enough to attach the second diaphragm assembly. Screw the assembly into the shaft (15) hand tight.

8. Install the muffler (3).

9. Make sure all the check valve parts are in place.

10. See Fig. 8.

11. Reinstall the fluid covers (101) and manifolds (102 and 103), and torque the fluid cover and manifold nuts (109) to 80 to 90 in-lb (9 to 10 N-m). See Torque Sequence, page 32.
Diaphragms (Husky 515)

Service

HD Overmolded Diaphragm

† Included in Fluid Section Repair Kit D05XXX

⚠️ Install with lips facing out of center housing (11).

⚠️ Torque to 35 to 45 in-lb (4.0 to 5.1 N-m).

⚠️ Apply grease.

⚠️ The words “AIR SIDE” on diaphragms (and on backup diaphragms required on PTFE models) must face toward diaphragm shaft (15).

⚠️ Flat side of air-side diaphragm plate must face toward diaphragm shaft (15).

⚠️ Apply medium-strength (blue) thread locker to threads, and torque to 80 to 90 in-lb (9 to 10 N-m) at 100 rpm maximum.

⚠️ Torque to 80 to 90 in-lb (9 to 10 N-m). See Torque Sequence, page 32.

Fig. 10
Service

Diaphragms (Husky 716)

NOTE: Fluid Section Repair Kit D05XXX is available. See page 25 to order the correct kit for your pump. Parts included in the kit are marked with a double dagger (‡) in Fig. 11 and in the Parts Drawings and Lists. General purpose grease 111920 and Adhesive 113500 are supplied in the kit. Service the diaphragms as follows. See Fig. 11.

Disassembly

Relieve the pressure. See Pressure Relief Procedure on page 11.

1. Remove the manifolds (102) and fluid covers (101).

NOTE: Make sure all the check valve parts stay in place. See Fig. 9.

2. Remove the grounding strip from the vee clamps (109), and remove the vee clamps.

3. Remove one of the fluid-side diaphragm plates (133) (whichever one comes loose first when you use a wrench on the hex of each), and pull the diaphragm shaft out of the center housing (11).

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 diaphragm shaft (15). Remove the freed diaphragm and the air side plate (6). Pull the other diaphragm assembly and the diaphragm shaft (15) out of the center housing (11).

4. Use a wrench on the flats of the diaphragm shaft (15) to remove the other fluid-side diaphragm plate (133) from the diaphragm shaft.

Overmolded Diaphragms: Use a wrench on the flats of the diaphragm shaft (15) to remove the second diaphragm from the diaphragm shaft.

5. Remove the screws (141) and air covers (136), and remove all old gasket (12) material from the ends of the center housing (11) and the surfaces of the air covers.

6. Remove the diaphragm shaft u-cups (416) and pilot pin o-rings (1).

7. Inspect all parts for wear or damage, and replace as necessary.

Reassembly

1. Insert a diaphragm shaft u-cup (416) and a pilot pin o-ring (1) into the end of the diaphragm shaft bore of the center housing (11).

NOTE: Make sure the lips of the u-cup face out of the center housing.

2. Line up the holes in the gasket (12) with the holes in the end of the center housing (11), and use six screws (141) to fasten an air cover (136) to the end of the center housing (11). Torque the screws to 35 to 45 in-lb (4.0 to 5.1 N-m).

3. Position the exhaust cover (13) and o-ring (4) on the center housing (11).

4. Repeat steps 1 and 2 for the other end of the center housing and the remaining air cover.

5. Apply medium-strength (blue) thread locker to the threads of the screws (140). Install on one end of the diaphragm shaft (15) the following parts (see proper order in Fig. 11): air-side diaphragm plate (6), backup diaphragm (402, used only on models with PTFE diaphragms), diaphragm (401), fluid-side diaphragm plate (133), o-ring (115), and screw (140).

NOTE: The words “AIR SIDE” on the diaphragm (401), the backup diaphragm (402, used only on models with PTFE diaphragms), and the flat side of the air-side diaphragm plate (6) must face toward the diaphragm shaft (15).

Overmolded Diaphragms: Assemble the air-side plate (6) onto the diaphragm (401). The words AIR SIDE on the air side plate must face away from the diaphragm. Apply medium-strength (blue) thread locking adhesive to the threads of the diaphragm assembly. Screw the assembly into the diaphragm shaft (15) hand tight.

6. Put grease on the diaphragm shaft (15), and carefully (do not damage the shaft u-cups) run the diaphragm shaft (15) through the center housing (11) bore.

7. Repeat step 5 for the other end of the diaphragm shaft (15), and torque the diaphragm shaft screws (140) to 80 to 90 in-lb (9 to 10 N-m) at 100 rpm maximum.
Overmolded Diaphragms: Repeat Step 5 for the other end of the diaphragm shaft (15).

8. Install the muffler (3).

NOTE: When you install the vee clamps in step 9, orient the center housing (11) so the air inlet is approximately 45° above horizontal and the muffler (3) is approximately horizontal.

9. Apply thin, even film of grease to inside of vee clamp (109).

10. Position the fluid covers (101), install the vee clamps (109) around the fluid and air covers, install the grounding strip on the vee clamps, and torque the vee clamp nuts to 80 to 90 in-lb (9 to 10 N-m). See Torque Sequence, page 32.

11. Make sure all the check valve parts are in place. See Fig. 9.

12. Install the manifolds (102), and torque the manifold bolts (105) to 80 to 90 in-lb (9 to 10 N-m). See Torque Sequence, page 32.
Install with lips facing out of center housing (11).
\[\text{HD Overmolded Diaphragm}\]

Torque to 35 to 45 in-lb (4.0 to 5.1 N-m).

Apply grease.

The words "AIR SIDE" on diaphragms (and on backup diaphragms used on PTFE models) must face toward diaphragm shaft (15).

Flat side of the air-side diaphragm plate must face toward diaphragm shaft (15).

Apply medium-strength (blue) thread locker to threads, and torque to 80 to 90 in-lb (9 to 10 N-m) at 100 rpm maximum.

Torque to 80 to 90 in-lb (9 to 10 N-m). See Torque Sequence, page 32.
Husky 515 and Husky 716 Pump Matrix

Your Model No. is marked on the pump's serial plate. To determine a pump Model No. from the following matrix, select the six digits that describe the pump, working from left to right. The first digit is always D, designating Husky diaphragm pumps. The remaining five digits define the air motor type and the materials of construction. For example, a pump with a standard air motor, acetal fluid section, acetal seats, PTFE balls, and PTFE diaphragms is Model D 5 1 2 1 1. The same model with EN 10204 Type 3.1 certification would be D51211C31.

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
<th>Column 5</th>
<th>Column 6</th>
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<td>Fluid Section</td>
<td>Guides</td>
<td>Balls</td>
<td>Diaphragms</td>
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<td>E (PVDF) Husky 515, BSPT</td>
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NOTE: The following models have ports that open downward. See page 26.
- Husky 515: 241564, 241565, 246484, 253344, 26C092
- Husky 716: 243305, 243306, 243307, 246485

Husky 515 and Husky 716 Repair Kits

NOTE: Order Repair Kits separately.
To order the Air Valve Repair Kit, order Part No. 241657.
To order the Fluid Section Repair Kit, order Part No. D05 _ _ _ . For the last three digits, use the last three digits of your pump Model No.
The guides in Part No. D _ _3 _ _ pumps are powdered 316 stainless steel. Machined 316 stainless steel guides are available separately in a kit, Part No. 24F846.
Part No. 24N320: Husky 515/716 HD Overmolded PTFE/EPDM Diaphragm Repair Kit
Part No. 24N321: Husky 515/716 HD overmolded PTFE/EPDM Diaphragm Repair Kit, with new air side diaphragm plates.

NOTE: The following models have Heavy Duty Overmolded PTFE/EPDM Diaphragms. See page 26.
- Husky 515: 24N093-24N098
- Husky 716: 24N257-24N262
## Additional Husky 515 and Husky 716 Pumps

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### Pumps with Overmolded Diaphragms

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† Mounting feet (186207) ordered separately.

### Table of Parts

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26 308981
Husky 515 and Husky 716 Common Parts

See the Pump Matrix on page 25 for an explanation of the Matrix Column and the Digit.

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

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<tr>
<th>Digit</th>
<th>Ref. No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Qty.</th>
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</thead>
<tbody>
<tr>
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<td>1†</td>
<td>114866</td>
<td>PACKING, o-ring</td>
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<td>2†</td>
<td>108808</td>
<td>PACKING, u-cup</td>
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<td>112933</td>
<td>MUZZLER</td>
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<tr>
<td></td>
<td>4†</td>
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</tr>
<tr>
<td></td>
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<td>195025</td>
<td>PLATE, diaphragm, air side</td>
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</tr>
<tr>
<td></td>
<td>7†</td>
<td>15Y825</td>
<td>PLUNGER, carriage</td>
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<tr>
<td></td>
<td>8†</td>
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<td>CARRIAGE</td>
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<tr>
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<td>9†</td>
<td>192596</td>
<td>PIN, carriage</td>
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<td></td>
<td>10</td>
<td>192597</td>
<td>COVER, valve chamber</td>
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<td>11</td>
<td>192602</td>
<td>HOUSING, center</td>
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<td>11*</td>
<td>194380</td>
<td>HOUSING, center, includes Ref 16 &amp; 17</td>
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<td>194247</td>
<td>COVER, exhaust</td>
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<td>194269</td>
<td>PLATE, valve</td>
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<td>PACKING, u-cup</td>
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<td>MUZZLER</td>
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<td>PACKING, o-ring</td>
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<tr>
<td></td>
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<td>195025</td>
<td>PLATE, diaphragm, air side</td>
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<td>7†</td>
<td>15Y825</td>
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<td></td>
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<td>192597</td>
<td>COVER, valve chamber</td>
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<td>HOUSING, center</td>
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<tr>
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<td>192765</td>
<td>GASKET</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>194247</td>
<td>COVER, exhaust</td>
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<td></td>
<td>14†</td>
<td>194269</td>
<td>PLATE, valve</td>
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<td></td>
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</tbody>
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† Included in Air Valve Repair Kit 241657 (column 2 = 4 or 5) or 25C469 (column 2 = 9)
‡ Included in Fluid Section Repair Kit D05XXX
* These parts are unique to the remote operated air motor.
† Included in Proximity Sensor Accessory Kit 241405

### Guide Parts List (Matrix Column 4)

<table>
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<tbody>
<tr>
<td>2</td>
<td>201†</td>
<td>186691</td>
<td>GUIDE; acetal</td>
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<td>186692</td>
<td>STOP; acetal</td>
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</tr>
<tr>
<td>3</td>
<td>201†</td>
<td>187242</td>
<td>GUIDE; sst</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>202†</td>
<td>187243</td>
<td>STOP; sst</td>
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<td>201†</td>
<td>186776</td>
<td>GUIDE; polypropylene</td>
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<td>202†</td>
<td>186777</td>
<td>STOP; polypropylene</td>
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</tr>
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<td>A</td>
<td>201†</td>
<td>17U169</td>
<td>GUIDE; PVDF</td>
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<td>202†</td>
<td>17U170</td>
<td>STOP; PVDF</td>
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<td>201†</td>
<td>192138</td>
<td>SPACER</td>
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<td>202†</td>
<td>192137</td>
<td>VALVE, duckbill</td>
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### Ball Parts List (Matrix Column 5)

<table>
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<th>Digit</th>
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<th>Part No.</th>
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<tbody>
<tr>
<td>1</td>
<td>301‡</td>
<td>108639</td>
<td>BALL; PTFE</td>
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</tr>
<tr>
<td>3</td>
<td>301‡</td>
<td>103462</td>
<td>BALL; sst</td>
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</tr>
<tr>
<td>5</td>
<td>301‡</td>
<td>112945</td>
<td>BALL; TPE</td>
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<tr>
<td>6</td>
<td>301‡</td>
<td>112946</td>
<td>BALL; Santoprene®</td>
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<tr>
<td>7</td>
<td>301‡</td>
<td>108944</td>
<td>BALL; buna-N</td>
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<tr>
<td>8</td>
<td>301‡</td>
<td>112959</td>
<td>BALL; fluoroelastomer</td>
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### Diaphragm Parts List (Matrix Column 6)

<table>
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<th>Digit</th>
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<th>Part No.</th>
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</thead>
<tbody>
<tr>
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<td>416‡</td>
<td>108808</td>
<td>PACKING, u-cup</td>
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</tr>
<tr>
<td></td>
<td>401‡</td>
<td>108839</td>
<td>DIAPHRAGM; PTFE</td>
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</tr>
<tr>
<td></td>
<td>402‡</td>
<td>183542</td>
<td>DIAPHRAGM, backup; polyurethane</td>
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<tr>
<td>5</td>
<td>416‡</td>
<td>108808</td>
<td>PACKING, u-cup</td>
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<td>401‡</td>
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<td>DIAPHRAGM; TPE</td>
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<td>108808</td>
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</tr>
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<tr>
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<td>416‡</td>
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<td>8</td>
<td>416‡</td>
<td>108808</td>
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<td>401‡</td>
<td>190149</td>
<td>DIAPHRAGM; fluoroelastómer</td>
<td>2</td>
</tr>
</tbody>
</table>
† Included in Air Valve Repair Kit 241657 or 25C469
‡ Included in Fluid Section Repair Kit D05XXX
* These parts are unique to the remote operated air motor.

106 grounding screw (acetal pump only)
# Husky 515 Fluid Section Parts List

See the Pump Matrix on page 25 for an explanation of the Matrix Column and the Digit.

See page 27 for Air Motor Parts List (Matrix Column 2)

## Husky 515 Fluid Section Parts List (Matrix Column 3)

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Acetal Pumps</th>
<th>Polypropylene Pumps</th>
<th>PVDF Pumps</th>
</tr>
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<tbody>
<tr>
<td>Qty.</td>
<td>Qty.</td>
<td>Qty.</td>
<td>Qty.</td>
</tr>
<tr>
<td>Part No.</td>
<td>Description</td>
<td>Qty.</td>
<td>Part No.</td>
</tr>
<tr>
<td>101</td>
<td>192559</td>
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<tr>
<td>102</td>
<td>192571</td>
<td>MANIFOLD, inlet; acetal; NPT</td>
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</tr>
<tr>
<td>102</td>
<td>192576</td>
<td>MANIFOLD, inlet; acetal; BSPT</td>
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</tr>
<tr>
<td>102*</td>
<td>241558</td>
<td>MANIFOLD, inlet; open downspout; acetal; NPT</td>
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</tr>
<tr>
<td>103</td>
<td>192562</td>
<td>MANIFOLD, outlet; acetal; NPT</td>
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</tr>
<tr>
<td>103</td>
<td>192567</td>
<td>MANIFOLD, outlet; acetal; BSPT</td>
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</tr>
<tr>
<td>103</td>
<td>124847</td>
<td>MANIFOLD, inlet; polypropylene; BSPP</td>
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<tr>
<td>104</td>
<td>194362</td>
<td>PLUG; acetal; 3/4 NPT</td>
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<tr>
<td>104</td>
<td>194368</td>
<td>PLUG; acetal; 3/4 BSPT</td>
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<td>105</td>
<td>187711</td>
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<tr>
<td>106</td>
<td>114882</td>
<td>SCREW, torx</td>
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<td>109</td>
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<td>NUT, hex, large flng</td>
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<td>194365</td>
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<tr>
<td>139‡</td>
<td>114849</td>
<td>PACKING, o-ring; encapsulated</td>
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</table>

* Inlet manifolds with downspouts are used on pump models 241564, 241565, 246484, 253344, and 26C092 only.
Husky 716 Parts Drawing

† Included in Air Valve Repair Kit 241657
‡ Included in Fluid Section Repair Kit D05XXX
* These parts are unique to the remote operated air motor.
## Husky 716 Fluid Section Parts List

See the Pump Matrix on page 25 for an explanation of the Matrix Column and the Digit.
See page 27 for Air Motor Parts List (Matrix Column 2)

**Husky 716 Fluid Section Parts List (Matrix Column 3)**

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Aluminum Pumps</th>
<th>Stainless Steel (sst) Pumps</th>
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</thead>
<tbody>
<tr>
<td>Digit: 3 (NPT)</td>
<td>Digit: C (BSPT)</td>
<td>Digit: 4 (NPT)</td>
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<tr>
<td>Part No.</td>
<td>Description</td>
<td>Qty.</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>101</td>
<td>185622</td>
<td>COVER, fluid; aluminum</td>
</tr>
<tr>
<td>102*</td>
<td>185624</td>
<td>MANIFOLD; aluminum; NPT</td>
</tr>
<tr>
<td>102*</td>
<td>192061</td>
<td>MANIFOLD; aluminum; BSPT</td>
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<tr>
<td>102*</td>
<td>190246</td>
<td>MANIFOLD; aluminum; NPT</td>
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<td>103</td>
<td>189220</td>
<td>LABEL, warning</td>
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<tr>
<td>105</td>
<td>112912</td>
<td>SCREW; 3/8-16; 2.25 in. (57.2 mm)</td>
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<tr>
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<td>112913</td>
<td>NUT, hex; 3/8-16; sst</td>
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<td>112914</td>
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<td>108</td>
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<td>189540</td>
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<td>112499</td>
<td>NUT, clamp; 1/4-28</td>
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<td>191079</td>
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<td>115t</td>
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<td>121</td>
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<td>SCREW; 10-24; 0.31 in. (8 mm)</td>
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<td>100179</td>
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</tbody>
</table>

† Included in Fluid Section Repair Kit D05XXX

* Pump model numbers 243305, 243306, 243307, and 246485 have one 190246 inlet manifold and one 185624 outlet manifold.
Torque Sequence

Always follow torque sequence when instructed to torque fasteners.

Husky 515

1. Left/Right Fluid Covers
   Torque bolts to 80-90 in-lb (9-10 N•m)

![SIDE VIEW]

2. Inlet Manifold
   Torque bolts to 80-90 in-lb (9-10 N•m)

![BOTTOM VIEW]

3. Outlet Manifold
   Torque bolts to 80-90 in-lb (9-10 N•m)

![TOP VIEW]

Husky 716

1. Left/Right Fluid Covers
   Torque bolts to 80-90 in-lb (9-10 N•m)

![FRONT VIEW]

2. Inlet Manifold
   Torque bolts to 80-90 in-lb (9-10 N•m)

![BOTTOM VIEW]

3. Outlet Manifold
   Torque bolts to 80-90 in-lb (9-10 N•m)

![TOP VIEW]
Husky 515 Technical Data

Maximum fluid working pressure ................................................. 100 psi (0.7 MPa, 7 bar)
Air pressure operating range ..................................................... 30 to 100 psi (0.2 to 0.7 MPa, 2.1 to 7 bar)

Operating Temperature Range*
  Minimum (all pumps) ................................................................. 40°F (4°C)
  Maximum
    Acetal: ................................................................................. 180°F (82°C)
    Polypropylene: ................................................................. 150°F (66°C)
    Aluminum, stainless steel, PVDF: ........................................ 225°F (107°C)

Flooded volume ........................................................................... 0.115 gal. (0.435 liters)

Maximum air consumption ............................................................ 28 scfm (0.672 cubic meters/min.)
Maximum free flow delivery (1/2 in. ports) .................................... 15 gpm (57 l/min)
Maximum pump speed ................................................................. 400 cpm

Gallons (Liters) per cycle ............................................................... 0.04 (0.15)
Maximum suction lift (water w/buna balls) .................................... 15 ft (4.5 m) dry,
                                                                      25 ft (7.6 m) wet

Maximum size pumpable solids ..................................................... 3/32 in. (2.5 mm)

Sound power level (measured per ISO standard 9614-2)
  At 70 psig (0.48 MPa, 4.8 bar) at 50 cycles per minute .................. 77 dBA
  At 100 psig (0.7 MPa, 7 bar) at maximum cycles per minute ............... 95 dBA

Sound pressure level (measured 1 meter from pump)
  At 70 psig (0.48 MPa, 4.8 bar) at 50 cycles per minute .................. 67 dBA
  At 100 psig (0.7 MPa, 7 bar) at maximum cycles per minute ............... 85 dBA

Air inlet size .................................................................................... 1/4 npt(f)
Air exhaust port size ...................................................................... 3/8 npt(f)
Fluid inlet size .............................................................................. 1/2 and 3/4 in. npt(f) or bspt(f)
Fluid outlet size ............................................................................ 1/2 and 3/4 in. npt(f) or bspt(f)

Wetted parts (in addition to ball, seat, and diaphragm materials, which vary by pump)
  Polypropylene pumps .............................................................. polypropylene, PTFE
  Acetal pumps ........................................................................... groundable acetal, PTFE
  PVDF pumps ............................................................................. PVDF, PTFE

Non-wetted external parts .............................................................. polypropylene, stainless steel, polyester and aluminum (labels),
                                                                      nickel-plated brass

Weight (approximate)
  Polypropylene pumps ............................................................... 6.5 lb (2.9 kg)
  Acetal pumps ............................................................................ 7.8 lb (3.5 kg)
  PVDF pumps ............................................................................. 8.5 lb (3.9 kg)

*These temperatures are based on mechanical stress only and may be altered significantly by pumping certain chemicals. Consult engineering guides for chemical compatibilities and temperature limits, or contact your Graco distributor.

Santoprene® is a registered trademark of the Monsanto Company.
Husky 515 Dimensions

* Pumps with duckbill check valves are shipped with the inlet manifold on top and the outlet manifold on the bottom. To make the inlet manifold on the bottom and the outlet manifold on the top, rotate each of the four duckbill assemblies vertically 180° as shown below.

NOTE: Bottom port open on 241564, 241565 and 246484 only.

PUMP MOUNTING HOLE PATTERN

Four 0.30 in. (7.6 mm) Diameter Slots
Husky 716 Technical Data

Maximum fluid working pressure .................................................. 100 psi (0.7 MPa, 7 bar)
Air pressure operating range ......................................................... 30 to 100 psi (0.2 to 0.7 MPa, 2.1 to 7 bar)

Operating Temperature Range*
<table>
<thead>
<tr>
<th>Minimum (all pumps)</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetal:</td>
<td>180°F (82°C)</td>
</tr>
<tr>
<td>Polypropylene:</td>
<td>150°F (66°C)</td>
</tr>
<tr>
<td>Aluminum, stainless steel, PVDF:</td>
<td>225°F (107°C)</td>
</tr>
</tbody>
</table>

Flooded volume ................................................................. 0.142 gal. (0.538 liters)

Maximum air consumption ......................................................... 28 scfm (0.672 cubic meters/min.)
Maximum free flow delivery .......................................................... 16 gpm (61 l/min)
Maximum pump speed .................................................................. 400 cpm
Gallons (Liters) per cycle ........................................................... 0.04(0.15)
Maximum suction lift (water w/buna balls) ..................................... 15 ft (4.5 m) dry,
........................................................................ 25 ft (7.6 m) wet

Maximum size pumpable solids ...................................................... 3/32 in. (2.5 mm)

Sound power level (measured per ISO standard 9614-2)
At 70 psig (0.48 MPa, 4.8 bar) at 50 cycles per minute ....................... 77 dBA
At 100 psig (0.7 MPa, 7 bar) at maximum cycles per minute ................ 95 dBA

Sound pressure level (measured 1 meter from pump)
At 70 psig (0.48 MPa, 4.8 bar) at 50 cycles per minute ....................... 67 dBA
At 100 psig (0.7 MPa, 7 bar) at maximum cycles per minute ................ 85 dBA

Air inlet size .............................................................................. 1/4 npt(f)
Air exhaust port size .................................................................... 3/8 npt(f)
Fluid inlet size ............................................................................ 3/4 npt(f), bspt(f) or bspp(f)
Fluid outlet size ........................................................................... 3/4 npt(f), bspt(f) or bspp(f)

Wetted parts (in addition to ball, seat, and diaphragm materials, which vary by pump)
Aluminum pumps ................................................................. aluminum, stainless steel, PTFE, zinc-plated steel
Stainless steel pumps ............................................................... 316 stainless steel, PTFE

Non-wetted external parts .......................................................... polypropylene, stainless steel, polyester (labels),
nickel-plated brass, epoxy-coated steel (feet)

Weight (approximate)
Aluminum pumps ................................................................. 8.5 lb (3.9 kg)
Stainless steel pumps .............................................................. 18 lb (8.2 kg)

*These temperatures are based on mechanical stress only and may be altered significantly by pumping certain chemicals. Consult engineering guides for chemical compatibilities and temperature limits, or contact your Graco distributor.

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Reed Switch Technical Data

Contact Ratings

State ........................................... Normally open
Voltage ........................................... 200 VDC Max
Current .......................................... 500 mA Max Switching
.................................................. 800 mA Max Carry
Power ........................................... 10 W Max
Resistance ...................................... 100 mΩ Max Initial
Ambient Temperature .......................... -40°C to 105°C (-40°F to 221°F)

Ex Ratings

Classification ................................. “simple apparatus” in accordance with UL/EN/IEC 60079-11, clause 5.7

Class I, Div 1, Group A, B, C, D T4
-40°C ≤ T_a ≤ 60°C

 exigible

Ex ia IIC T4 Ga
-40°C ≤ T_a ≤ 60°C

Parameters ....................................

U_i = 45 V
I_i = 500 mA
P_i = 1.2 W
C_i = 251 pF
L_i = 1.01 μH
Husky 716 Dimensions

* Pumps with duckbill check valves are shipped with the inlet manifold on top and the outlet manifold on the bottom. To make the inlet manifold on the bottom and the outlet manifold on the top, rotate each of the four duckbill assemblies vertically 180° as shown below.

1/4 npt(f) 
Air Inlet

4.44 in. 
(112.8 mm)

4.25 in. 
(108.0 mm)

3/4 npt(f), bspt(f) or bspp(f)

7.80 in. 
(198.1 mm)

7.37 in. 
(187.2 mm)

10.43 in. 
(264.9 mm)

9.18 in. 
(233.2 mm)

6.62 in. 
(168.1 mm)

1.38 in. 
(35.1 mm)

3/4 npt(f) or bspt(f) 
Fluid Inlets *

3/4 npt(f) or bspt(f) 
Fluid Outlets *

2.76 in. 
(62.5 mm)

3/4 npt(f) or bspt(f) 
Fluid Outlets *

NOTE: Bottom port open on 243305, 243306, 243307 and 246485 only.

PUMP MOUNTING HOLE PATTERN

Four 0.28 in. 
(7.1 mm) 
Diameter Slots

4.29 in. 
(109.0 mm)

6.62 in. 
(168.1 mm)

6.04 in. 
(153.4 mm)

4.29 in. 
(109.0 mm)

3/4 npt(f) or bspt(f) 
Fluid Inlets *

3/4 npt(f) or bspt(f) 
Fluid Inlets *
Husky 515 and 716 Performance Charts

Fluid Outlet Pressure

Test Conditions: Pump tested in water with inlet submerged.

Fluid Pressure Curves
A at 100 psi (0.7 MPa, 7 bar) air pressure
B at 70 psi (0.48 MPa, 4.8 bar) air pressure
C at 40 psi (0.28 MPa, 2.8 bar) air pressure

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

1. Locate fluid flow rate along bottom of chart.
2. Follow vertical line up to intersection with selected fluid outlet pressure curve.
3. Follow left to scale to read fluid outlet pressure.
Husky 515 and 716 Performance Charts
Air Consumption

Test Conditions: Pump tested in water with inlet submerged.

Air Consumption Curves
A at 100 psi (0.7 MPa, 7 bar) air pressure
B at 70 psi (0.48 MPa, 4.8 bar) air pressure
C at 40 psi (0.28 MPa, 2.8 bar) air pressure

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

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

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

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

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

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For patent information, see www.graco.com/patents.

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

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