

Operation



Husky[®] 1050A, Natural Gas Operated Diaphragm Pumps

313598H

EN

Intended for fluid transfer applications powered by sweet natural gas (less than 4 ppm hydrogen sulfide) conforms to CSA/AM ANSI LC 6. Certified to CSA STD T.I.L. No. R-14.

For professional use only.



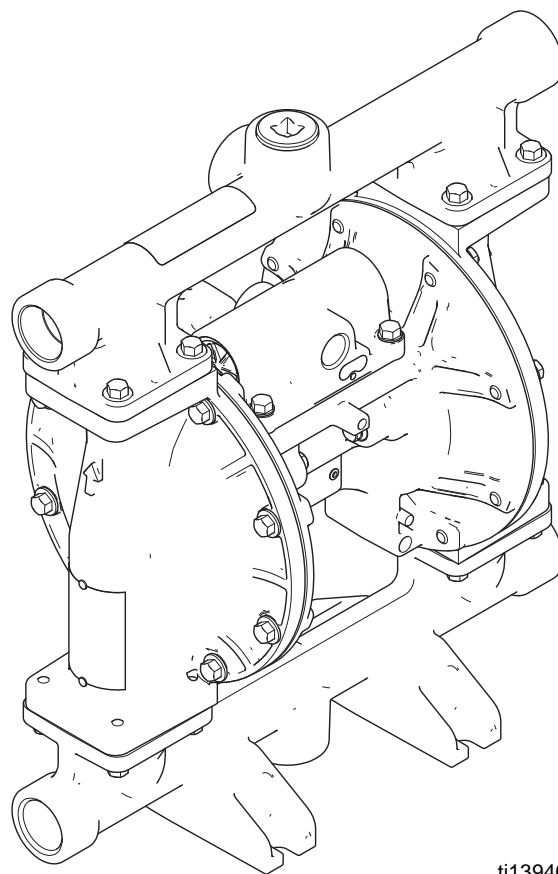
Important Safety Instructions

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

See page 4 for model information.

*120 psi (0.83 MPa, 8.3 bar) Maximum Fluid
Working Pressure*

*120 psi (0.83 MPa, 8.3 bar) Maximum Gas Input
Pressure*



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Related Manual

Manual	Description
313435	Husky 1050 Air-Operated Diaphragm Pump, Repair/Parts



To Find Your Nearest Distributor

1. Visit www.graco.com.
2. Click on **Where to Buy** and use the **Distributor Locator**.

To Specify the Configuration of a New Pump

Please call your distributor.

OR

Use the **Online Diaphragm Pump Selector Tool** at www.graco.com.

To Order Replacement Parts

Please call your distributor.

Distributor Note

1. To find part numbers for new pumps or kits, use the **Online Diaphragm Pump Selector Tool**.
2. To find part numbers for replacement parts:
 - a. Use the configuration number from the ID plate on the pump. If you only have the Graco 6-digit part number, use the selector tool to find the corresponding configuration number.
 - b. Use the Configuration Number Matrix on the next page to understand which parts are described by each digit.
 - c. **Use the Repair/Parts Manual.** Refer to the main **Parts** illustration and to the **Parts/Kits Quick Reference**. Follow the page references on these two pages for further ordering information, as needed.
3. Please call Graco Customer Service to order.



Models

Graco Part	Graco Matrix Identification Number	Maximum Working Pressure psi (MPa, bar)
647043	1050A-PAC1AA1BNBNBN—	120 (0.83, 8.3)
647047	1050A-PAC1AA1FKFKFK—	120 (0.83, 8.3)
647124	1050A-PAC1AA2BNBNBN—	120 (0.83, 8.3)
647128	1050A-PAC1AA2FKFKFK—	120 (0.83, 8.3)
647733	1050A-PAC1AA1SPSPSPPT	120 (0.83, 8.3)
647734	1050A-PAC1AA2SPSPSPPT	120 (0.83, 8.3)

Pump size and material 1050A	Drive Type	Configuration				Fluid Covers and Manifolds A1 or A2	Seats, Check Balls, and Diaphragms SP, BN or FK	Manifold O-rings —
	P	A	C	1	A			
1 inch ports, 50 gpm, Aluminum	Pneumatic	Aluminum Center Section and Air Valve	CSA Compliant	Standard	No Data Monitoring	A1 Aluminum, npt A2 Aluminum, bspt	BN Buna-N FK FKM Fluoroelastomer SP Santoprene	None

Process Fluid Compatibility

Models with Buna-N seats, balls, and diaphragms:

Good for petroleum-based fluids, water, oils, hydrocarbons and MILD chemicals (for example, mineral spirits).

Models with FKM Fluoroelastomer seats, balls, and diaphragms:

High heat resistance. Good resistance to aggressive chemicals including acids and some solvents (for example, xylene and mineral spirits), Good resistance to steam as well as animal, vegetable, and petroleum oils. Resists unleaded fuels.



Models with Santoprene seats, balls, and diaphragms:

Good abrasion and chemical resistance. OK for use with some solvents (for example, MEK, Acetone), caustic solutions, dilute acids, and alcohols. Often substituted for EPDM or EPR.



Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbol refers to procedure-specific risk. Refer back to these warnings. Additional, product-specific warnings may be found throughout the body of this manual where applicable.

 WARNING	
	<p>FIRE AND EXPLOSION HAZARD</p> <p>When flammable fluids are present in the work area, such as gasoline and windshield wiper fluid, be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as cigarettes and portable electric lamps. • Keep work area free of debris, including rags and spilled or open containers of solvent and gasoline. • Route exhaust away from all sources of ignition. If diaphragm ruptures, fluid may be exhausted with gas. See Exhaust Ventilation, page 10. • Do not plug or unplug power cords, or turn lights on or off when flammable fumes are present. • Ground all equipment in the work area. See Grounding instructions. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. • If there is static sparking or you feel a shock, stop operation immediately. Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area.





WARNING



EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.



PRESSURIZED EQUIPMENT HAZARD

Fluid from the gun/dispense valve, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.






- Follow the **Pressure Relief Procedure** when you stop spraying and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately.



PRESSURIZED ALUMINUM PARTS HAZARD

Use of fluids that are incompatible with aluminum in pressurized equipment can cause serious chemical reaction and equipment rupture. Failure to follow this warning can result in death, serious injury, or property damage.

- Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents.
- Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.

 WARNING	
	<p>PLASTIC PARTS CLEANING SOLVENT HAZARD</p> <p>Many solvents can degrade plastic parts and cause them to fail, which could cause serious injury or property damage.</p> <ul style="list-style-type: none"> • Use only compatible water-based solvents to clean plastic structural or pressure-containing parts. • See Technical Data in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's MSDS's and recommendations.
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • Read MSDS's to know the specific hazards of the fluids you are using. • Route exhaust away from work area. If diaphragm ruptures, fluid may be exhausted with gas. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	<p>BURN HAZARD</p> <p>Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns:</p> <ul style="list-style-type: none"> • Do not touch hot fluid or equipment.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear, and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer



Installation

General Information

- The Typical Installation shown in FIG. 3 is only a guide for selecting and installing system components. Contact your Graco distributor for assistance in planning a system to suit your needs.
- Installation and use must be in accordance with the American and/or Canadian National Standards for Natural Gas Operated Diaphragm Pumps (ANSI LC 6-2008, CSA TIL R-14) and must comply with all local, state, and federal codes.
- If the diaphragm ruptures, natural gas may mix with the fluid being pumped. Take appropriate precautions.

Tighten Fasteners Before Setup

Before using the pump for the first time, check and retorque all external fasteners. See **Torque Instructions**, page 16.

Mounting

<ul style="list-style-type: none"> • This pump exhausts natural gas and must be ventilated to a remote area. See Exhaust Ventilation on page 10. • Never lift a pump under pressure. If dropped, the fluid section may rupture. Always follow the Pressure Relief Procedure on page 14 before moving or lifting the pump. 						

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. Mount in an upright, horizontal position as shown in FIG. 3.
3. For all mountings, be sure the pump is bolted directly to the mounting surface.
4. For ease of operation and service, mount the pump so air valve, gas inlet, fluid inlet and fluid outlet ports are easily accessible.
5. Rubber Foot Mounting Kit 236452 is available to reduce noise and vibration during operation.

Grounding

<p>This pump must be electrically grounded using the grounding conductor provided. Improper grounding can cause hazardous operation.</p>						

The equipment must be grounded. Grounding reduces the risk of static and electric shock by providing an escape wire for the electrical current due to static build up or in the event of a short circuit.

Pump: See FIG. 1. Loosen the grounding screw (GS). Insert one end of a 12 ga. minimum ground wire (R) behind the screw and tighten the screw securely. Connect the clamp end of the ground wire to a true earth ground. A ground wire and clamp, Part 238909, is available from Graco.

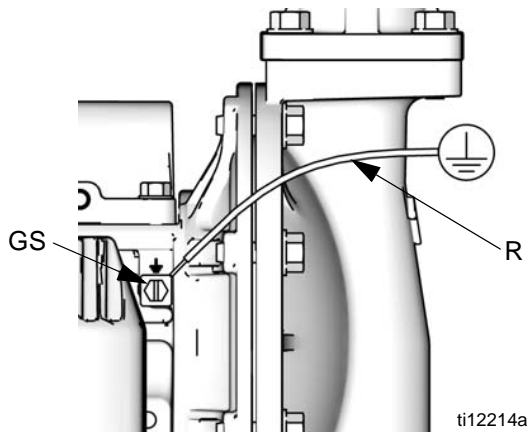


FIG. 1. Ground Screw and Wire

Gas and fluid hoses: Use only grounded hoses with a maximum of 500 ft (150 m) combined hose length to ensure grounding continuity.

Solvent pails used when flushing: Follow local code. Use only conductive metal pails, placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts grounding continuity.

Fluid supply container: follow local code.

Suction device nozzle: must be bonded to metal container from which it is suctioning by firm metal-to-metal contact to a properly grounded suction hose and pump.

Piping, valves, and fittings: use only electrically conductive materials. Bond and ground per code.

Check your system electrical continuity after the initial installation, and then set up a regular schedule for checking continuity to be sure proper grounding is maintained.

Gas Line






See FIG. 3, page 11.

1. Install a regulator (C) and gauge to control the fluid pressure. Locate it close to the pump.
2. Locate a bleed-type master gas valve (B, required in your system) close to the pump and use it to relieve trapped natural gas. Be sure the valve is easily accessible from the pump and located downstream from the regulator.

Trapped gas can cause the pump to cycle unexpectedly, which could result in serious injury from splashing.						

3. Locate another bleed-type master valve (E) upstream from all natural gas line accessories and use it to isolate them during cleaning and repair.
4. A filter (F) removes harmful dirt and moisture from the compressed gas supply.
5. Install a grounded, flexible gas hose between the accessories and the 1/2 in. npt(f) pump inlet (D). See FIG. 3. Use a minimum 1/2 in. (13 mm) ID hose.

Exhaust Ventilation

						
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Be sure to read and follow the **TOXIC FLUID OR FUMES HAZARD** warning, page 7, and **FIRE AND EXPLOSION HAZARD** warning, page 5, before operating this pump. You must vent the exhaust to a safe location, such as away from people, animals, food handling areas, and all sources of ignition. Vent in accordance with local codes, or in the absence of local codes, an industry or nationally recognized code having jurisdiction over the specific installation.

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

1. Remove the muffler (T) from the pump gas exhaust port.
2. Install a grounded exhaust hose (U) and connect the muffler (T) to the other end of the hose. The minimum size for the exhaust hose is 3/4 in. (19 mm) ID. If a hose longer than 15 ft (4.57 m) is required, use a larger diameter hose. Avoid sharp bends or kinks in the hose.
3. Place a container at the end of the exhaust line to catch fluid in case a diaphragm ruptures. Locate the container away from all sources of ignition, including pilot lights and waste materials. If the diaphragm ruptures, the fluid being pumped will exhaust with the natural gas.

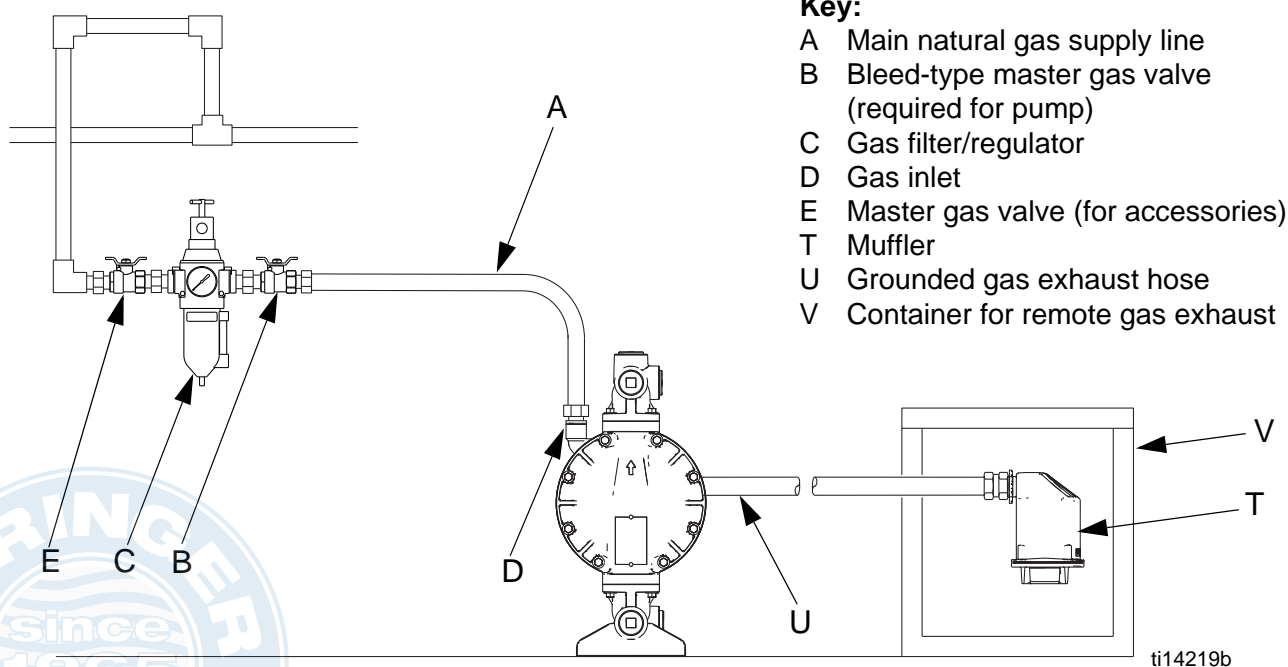
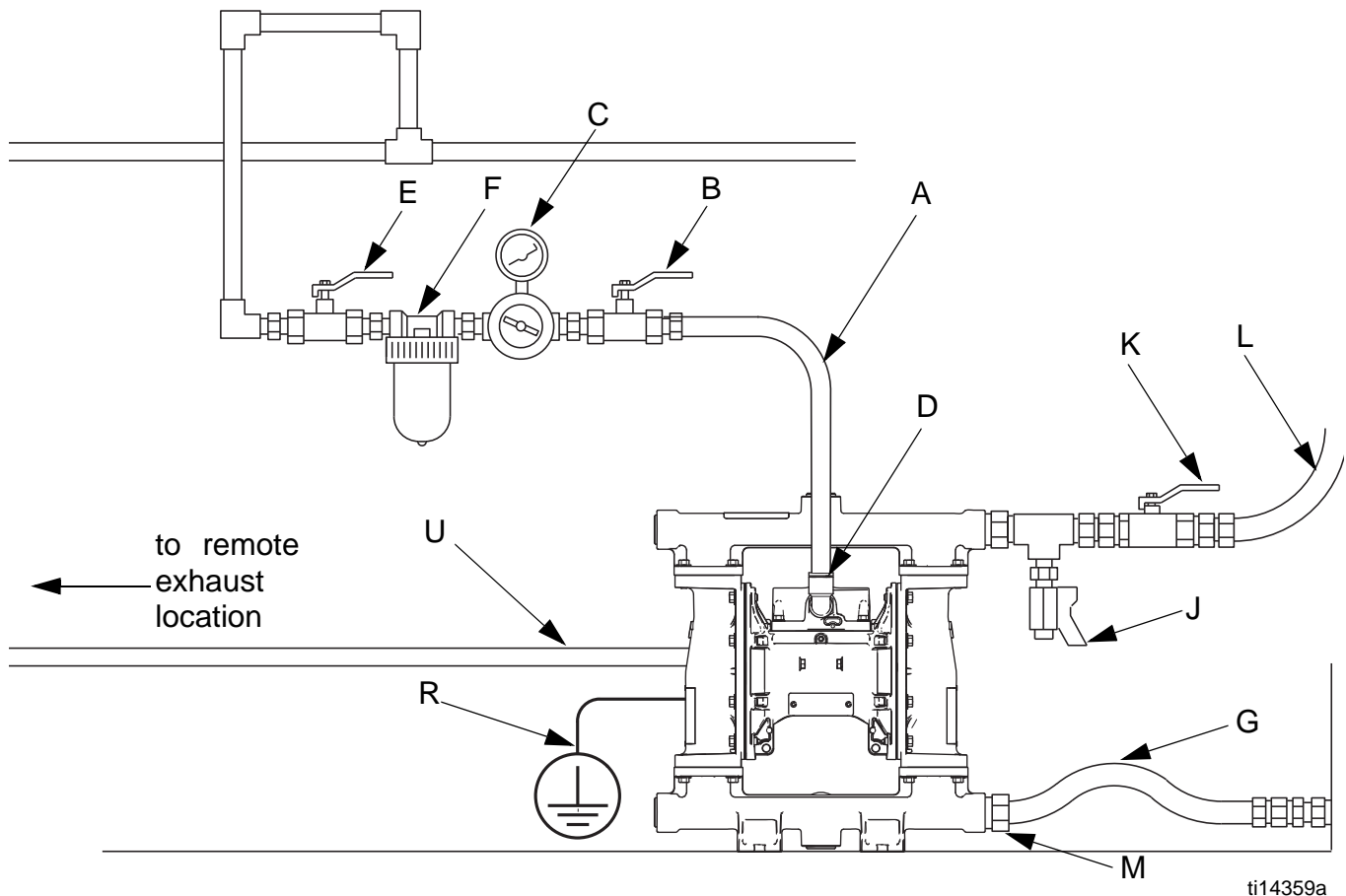


FIG. 2. Vent exhaust gas



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FIG. 3. Typical Installation**Key:**

- A Main natural gas supply line
- B Bleed-type master gas valve (required)
- C Gas regulator
- D Gas inlet
- E Master gas valve (for accessories)
- F Gas line filter
- G Fluid suction line
- J Fluid drain valve (required)
- K Fluid shutoff valve
- L Fluid line
- M Fluid inlet
- R Ground wire (required; see page 8 for installation instructions)
- U Grounded gas exhaust hose

Fluid Supply Line

See FIG. 3.

1. Use grounded fluid supply lines (G). See **Grounding**, page 8.
2. If the fluid inlet pressure to the pump is more than 25% of the outlet working pressure, the ball check valves will not close fast enough, resulting in inefficient pump operation.
3. At inlet fluid pressures greater than 15 psi (0.1 MPa, 1 bar), diaphragm life will be shortened.
4. For maximum suction lift (wet and dry), see **Technical Data** on page 19.

Fluid Outlet Line

See FIG. 3.

1. Use grounded fluid hoses (L). The pump fluid outlet is 1 in. npt(f). Screw the fluid fitting into the pump outlet securely.
2. A fluid drain valve (J) is required in your system to relieve pressure in the hose and dispense valve. Install the valve close to the pump fluid outlet.
3. Install a shutoff valve (K) in the fluid outlet line.

Fluid Inlet and Outlet Ports

NOTE: Remove and reverse the manifold(s) to change the orientation of inlet or outlet port(s). Follow the **Torque Instructions** on page 16.

The fluid inlet and outlet manifolds each have four 1 in. npt(f) or bspt threaded ports. Close off the unused ports, using the supplied plugs.



Fluid Pressure Relief Valve



Some systems may require installation of a pressure relief valve at the pump outlet to prevent overpressurization and rupture of the pump or hose. Relief pressure is between 150 and 180 psi (1.03 MPa-1.24 MPa, 10.3-12.4 bar).

Thermal expansion of fluid in the outlet line can cause overpressurization. Thermal expansion 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 also can occur if the Husky pump is 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.

FIG. 4 shows Fluid Pressure Relief Kit 238428 for aluminum pumps.

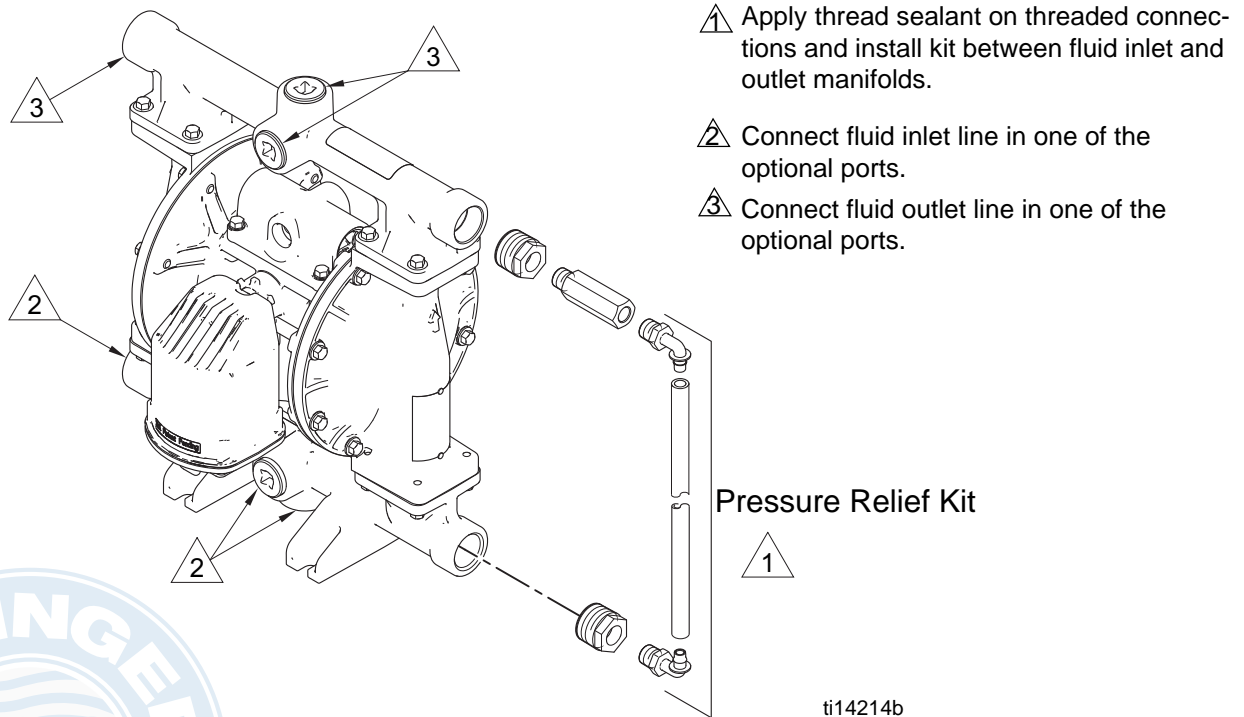
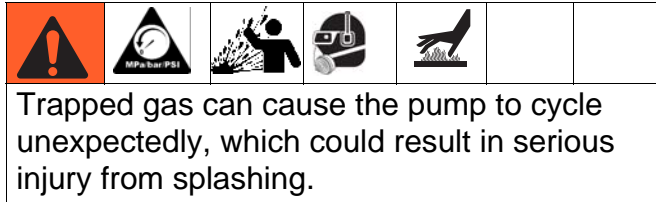


FIG. 4. Optional Fluid Pressure Relief Kit 238428

Operation

Pressure Relief Procedure



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

Flush the Pump Before First Use

The pump was tested in water. If water could contaminate the fluid you are pumping, flush the pump thoroughly with a compatible solvent. See **Flushing and Storage**, page 15.

Tighten Fasteners Before Setup

Before using the pump for the first time, check and retorque all external fasteners. See **Torque Instructions**, page 16. After the first day of operation, retorque the fasteners.

Starting and Adjusting the Pump

1. Be sure the pump is properly grounded. Refer to **Grounding** on page 8.
2. Check fittings to be sure they are tight. Use a compatible liquid thread sealant on male threads. Tighten fluid inlet and outlet fittings securely.
3. Place the suction tube (if used) in fluid to be pumped.

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

4. Place the end of the fluid hose into an appropriate container.
5. Close the fluid drain valve.
6. Back out the regulator knob, and open the bleed-type master gas valves.
7. If the fluid hose has a dispensing device, hold it open.
8. Slowly increase gas pressure with the regulator 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.

NOTE: Use lowest possible gas pressure to prime, just enough to cycle the pump. If the pump does not prime as expected, turn gas pressure **DOWN**.

NOTICE

When replacing Husky 1040s: The Husky 1050 operates more efficiently than did the 1040. **Reduce** gas inlet pressure by approximately **20 percent** to maintain an equivalent fluid output.

9. If you are flushing, run the pump long enough to thoroughly clean the pump and hoses.
10. Close the dispensing valve, if used.
11. Close the bleed-type master gas valves.

Pump Shutdown

At the end of the work shift and before you check, adjust, clean or repair the system, follow the **Pressure Relief Procedure** on page 14.

Maintenance

Maintenance Schedule

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

Lubrication

The pump is lubricated at the factory. It is designed to require no further lubrication for the life of the pump.

Tighten Threaded Connections

Before each use, check all hoses for wear or damage and replace as necessary. Check to be sure all threaded connections are tight and leak-free. Check fasteners. Tighten or retorque as necessary. Although pump use varies, a general guideline is to retorque fasteners every two months. See **Torque Instructions**, page 16.

Flushing and Storage



- Flush before fluid can dry in the equipment, at the end of the day, before storing, and before repairing equipment.
- Flush at the lowest pressure possible. Check connectors for leaks and tighten as necessary.
- Flush with a fluid that is compatible with the fluid being dispensed and the equipment wetted parts.

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.



Torque Instructions

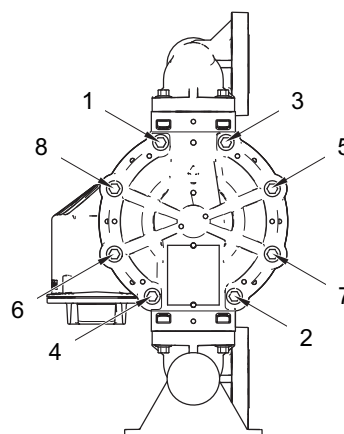
NOTE: Fluid cover and manifold fasteners have a thread-locking adhesive patch applied to the threads. If this patch is excessively worn, the fasteners may loosen during operation. Replace screws with new ones or apply medium-strength (blue) Loctite or equivalent to the threads.

If fluid cover or manifold fasteners have been loosened, it is important to torque them using the following procedure to improve sealing.

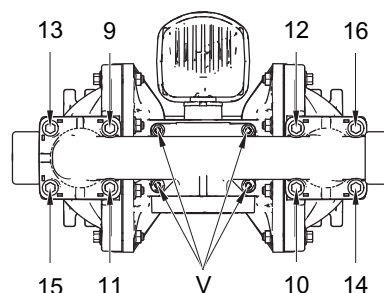
NOTE: Always completely torque fluid covers before torquing manifolds.

Start all fluid cover screws a few turns. Then turn down each screw just until head contacts cover. Then turn each screw by 1/2 turn or less working in a crisscross pattern until each screw is torqued to 100 in-lb (11.3 N•m). Repeat for manifolds. See FIG. 5.

Retorque the air valve fasteners (V) in a crisscross pattern, to 80 in-lb (9.0 N•m).



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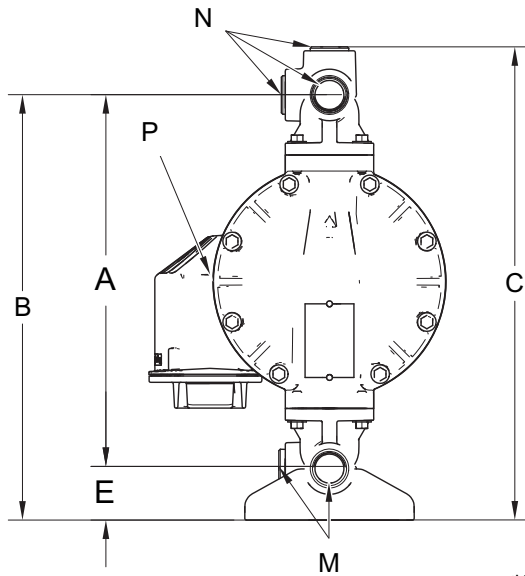
FIG. 5. Torque sequence

Repair and Parts

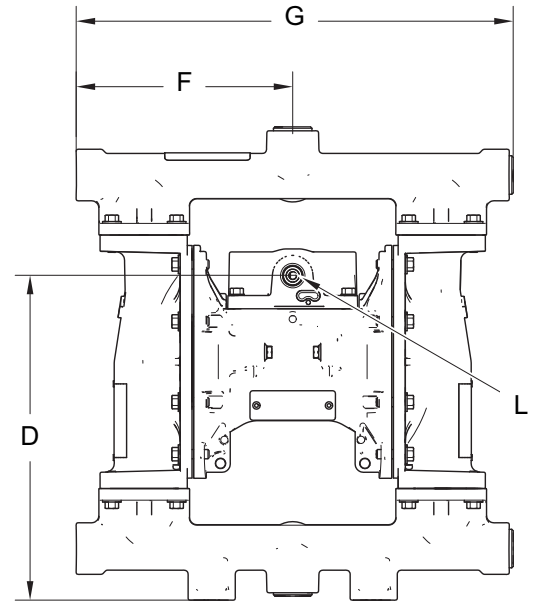
See manual 313435, which can be found on your Husky 1050 Manuals disk or at www.graco.com.



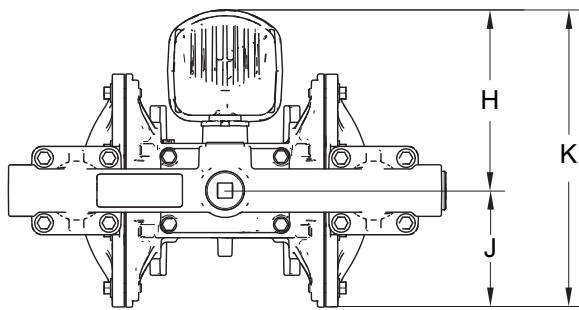
Dimensions



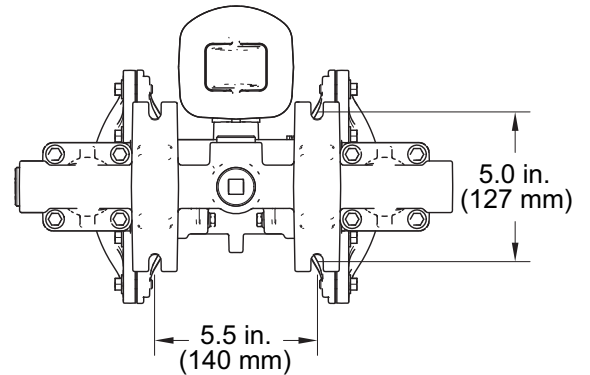
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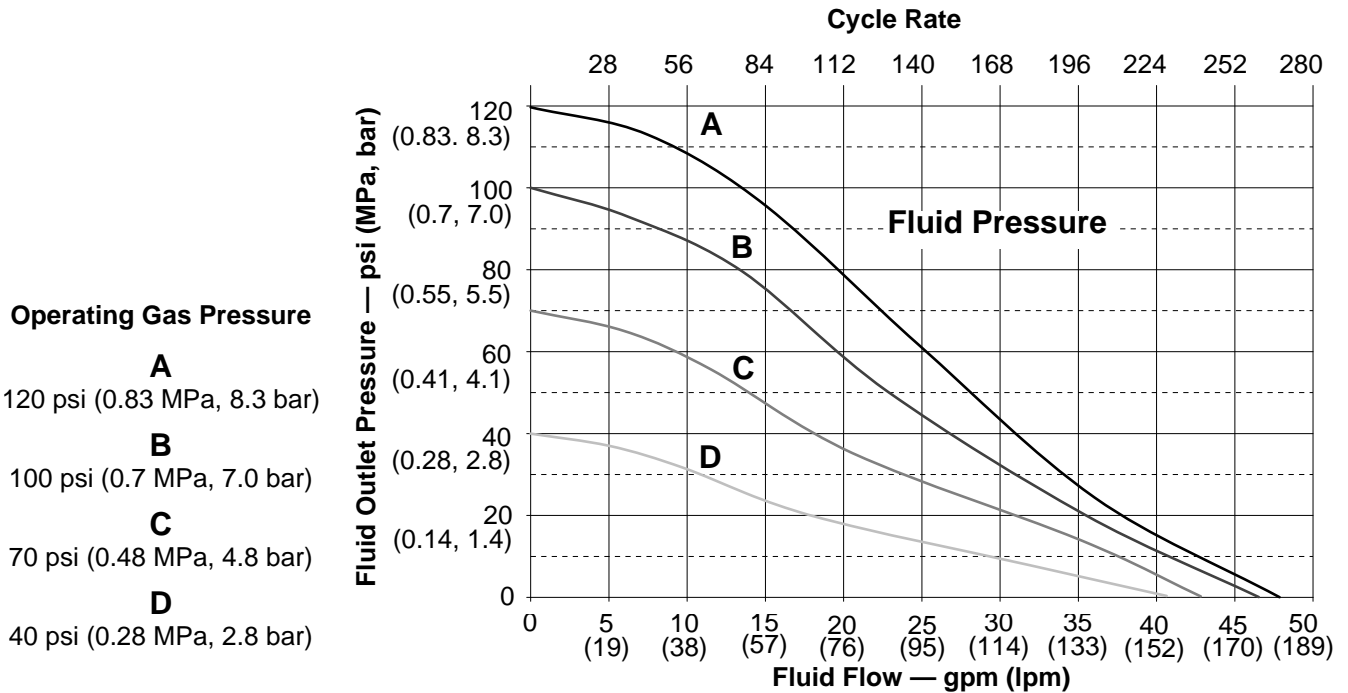
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- A** 12.7 in. (323 mm)
- B** 14.4 in. (366 mm)
- C** 15.9 in. (404 mm)
- D** 10.9 in. (277 mm)
- E** 1.8 in. (46 mm)
- F** 7.3 in. (185 mm)
- G** 14.7 in. (373 mm)
- H** 6.2 in. (158 mm)
- J** 3.9 in. (99 mm)

- K** 10.2 in. (258 mm)
- L** 1/2 npt(f) gas inlet
- M** 1 in. npt(f) or 1 in. bspt fluid inlet ports (4)
- N** 1 in. npt(f) or 1 in. bspt fluid outlet ports (4)
- P** 3/4 npt(f) gas exhaust port

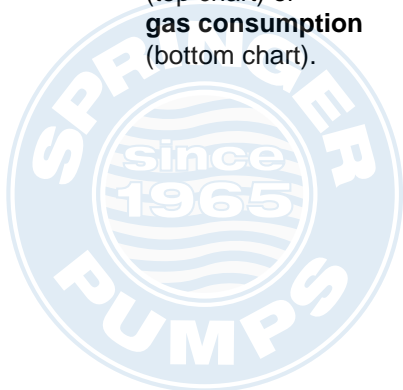
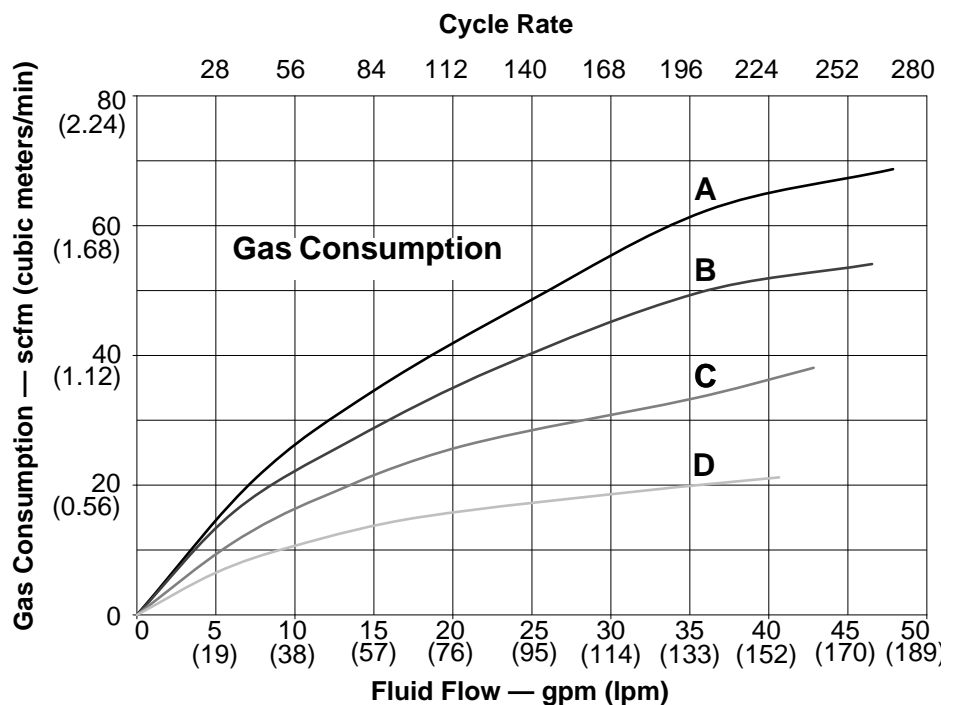
Performance Chart

Test Conditions: Pump tested in water with inlet submerged.



How to Read the Charts

1. Locate fluid flow rate along bottom of chart.
2. Follow vertical line up to intersection with selected operating gas pressure curve.
3. Follow left to scale to read **fluid outlet pressure** (top chart) or **gas consumption** (bottom chart).



Technical Data

Maximum fluid working pressure	120 psi (0.83 MPa, 8.3 bar)
Gas pressure operating range	20-120 psi (0.14-0.83 MPa, 1.4-8.3 bar)
Fluid displacement per cycle	0.17 gal. (0.64 liters)
Gas consumption at 70 psi (0.48 MPa, 4.8 bar), 20 gpm (76 lpm)	25 scfm
Maximum values with water as media under sub- merged inlet conditions at ambient temperature:	
Maximum gas consumption	64 scfm
Maximum free-flow delivery	49 gpm (189 lpm)
Maximum pump speed	275 cpm
Maximum suction lift (varies widely based on ball/seat selection and wear, operating speed, material properties, and other variables)	16 ft (4.9 m) dry, 29 ft (8.8 m) wet
Maximum size pumpable solids	1/8 in. (3.2 mm)
Sound Power*	
at 70 psi (0.48 MPa, 4.8 bar) and 50 cpm	78 dBa
at 100 psi (0.7 MPa, 7.0 bar) and full flow	90 dBa
Sound Pressure**	
at 70 psi (0.48 MPa, 4.8 bar) and 50 cpm	84 dBa
at 100 psi (0.7 MPa, 7.0 bar) and full flow	96 dBa
Operating temperature range	32° to 125°F (0° to 52°C)
Gas inlet size	1/2 npt(f)
Fluid inlet size	1 in. npt(f) or 1 in. bspt
Fluid outlet size	1 in. npt(f) or 1 in. bspt
Weight	23 lb. (10.5 kg)
Wetted parts	aluminum and buna-n or fkm fluoroelastomer or San- toprene, depending on pump selection
Non-wetted external parts	aluminum, coated carbon steel

* Sound power measured per ISO-9614-2.

** Sound pressure was tested 3.28 ft (1 m) from equipment.

All trademarks mentioned in this manual are the property of their respective owners.



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

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

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

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

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within six (6) years of the date of sale.

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In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

FOR GRACO CANADA CUSTOMERS

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Graco Information

For the latest information about Graco products, visit www.graco.com.

TO PLACE AN ORDER, contact your Graco distributor or call to identify the nearest distributor.

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

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Original instructions. This manual contains English. MM 313598

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Revised 09/2016

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