

# Instructions – Parts



1:1 RATIO

## TRITON<sup>®</sup> 308 Diaphragm Pump

309303 rev.P

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

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

**Part No. 233500 Aluminum Pump, Series B, npt threads**

**Part No. 233501 Stainless Steel Pump, Series A, npt threads**

**Part No. 233776 Aluminum Pump, Series A, BSPP threads**

**Part No. 233777 Stainless Steel, Series A, BSPP threads**

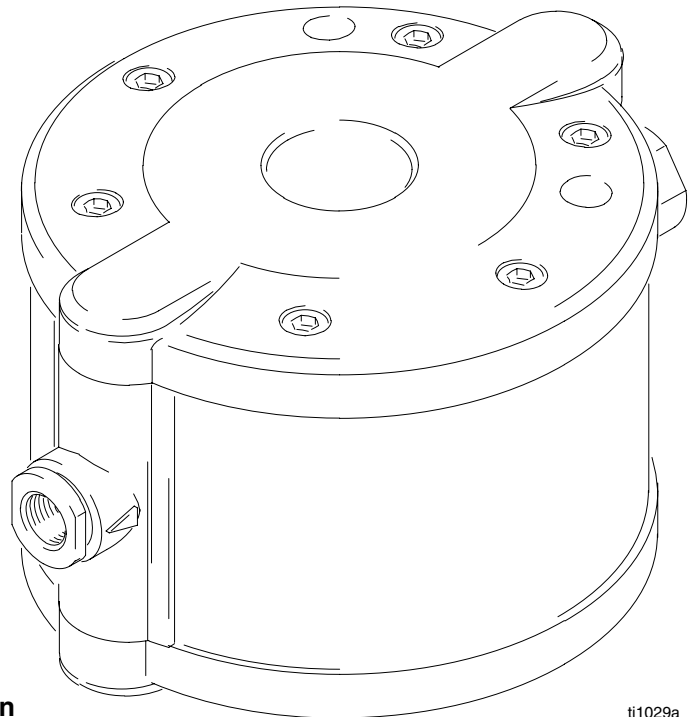
U.S. and Foreign Patents Pending



### **Important Safety Instructions.**

Read all warnings and instructions in this manual.

Save these instructions.



**Part No. 233501 Shown**

ti1029a

PROVEN QUALITY. LEADING TECHNOLOGY.

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440-1441  
Copyright 2001, Graco Inc. is registered to I.S. EN ISO 9001



# Table of Contents

Safety Warnings .....	3
Installation .....	6
Operation .....	11
Maintenance .....	12
Troubleshooting .....	12
Service	
Remove the Fluid and Side Covers .....	14
Ball Check Repair .....	16
Diaphragm Repair .....	17
Air Valve Repair .....	18
Shaft Repair .....	20
Parts .....	23
Technical Data .....	24
Dimensions .....	25
Graco Standard Warranty .....	26
Graco Information .....	26

# Symbols

## Warning Symbol



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

## Caution Symbol



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

# WARNING



INSTRUCTIONS



## EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture, malfunction, or start unexpectedly and result in a 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 **115 psi (0.8 MPa, 8 bar) maximum working pressure at 115 psi (0.8 MPa, 8 bar) maximum incoming air pressure.**
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- **Aluminum pumps only:** Never 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.
- Do not use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 180°F (82°C) or below -40°F (-40°C).
- Wear hearing protection when operating this equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

# **WARNING**



## **FIRE AND EXPLOSION HAZARD**

Improper grounding, poor air ventilation, open flames, or sparks can cause a hazardous condition and result in fire or explosion and serious injury.

- Ground the equipment. Refer to **Grounding** on page 7.
- 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.
- 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.

# WARNING



## PRESSURIZED FLUID HAZARD

Spray from the gun, hose leaks, or ruptured components can splash fluid in the eyes or on the skin and cause serious injury.

- Do not stop or deflect fluid leaks with your hand, glove, or rag.
- Follow the **Pressure Relief Procedure** on page 11 before cleaning, checking, or servicing the equipment.
- Tighten all fluid connections before each use.
- Check the hoses, tubes, and couplings daily. Replace parts immediately if worn, damaged, or loose. Permanently coupled hoses cannot be repaired.



## TOXIC FLUID HAZARD

Hazardous fluids or toxic fumes can cause a serious injury or death if splashed in the eyes or on the skin, swallowed, or inhaled.

- Know the specific hazards of the fluid you are using. Read the fluid manufacturer's warnings.
- Store hazardous fluid in an approved container. Dispose of the hazardous fluid according to all local, state, and national guidelines.
- Wear appropriate protective clothing, gloves, eyewear, and respirator.
- If the diaphragm fails, the fluid is exhausted along with the air.

# Installation

## General Information

- Fig. 2 shows a wall mounted HVLP spray application. It is only a guide 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, available from your Graco distributor. If you supply your own accessories, be sure they are adequately sized and pressure rated for your system.
- Use a compatible, liquid thread sealant on all male threads. Tighten all connections firmly to avoid air or fluid leaks.  
**NOTE:** On all npt threads, tighten to 2–3 turns past finger tight.
- Reference numbers and letters in parentheses refer to the callouts in the figures and the parts lists on pages 23–22.
- *In a spray system, ventilate the spray booth.*

## Tightening Threaded Fasteners Before First Use

See the **Service** section for torque specifications.

- After unpacking the pump, and before using it for the first time, check and retorque all external fasteners.
- After the first day of operation, retorque the fasteners.
- As a general guideline, retorque fasteners every two months.

## WARNING



### FIRE AND EXPLOSION HAZARD

To prevent hazardous concentrations of toxic and/or flammable vapors, spray only in a properly ventilated spray booth. Never operate the spray gun unless ventilation fans are operating.

Check and follow all of the national, state, and local codes regarding air exhaust velocity requirements.

## WARNING



### TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.


1. Read **TOXIC FLUID HAZARD** on page 5.
2. Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.

## Mounting the Pump

- Mount the pump in a well-ventilated area, with sufficient clearance on all sides for operator access and servicing.
- Be sure the mounting can support the weight of the pump, hoses, and accessories, as well as the stress caused during operation.
- The pump may be mounted vertically or horizontally. Be sure the pump is level in all directions.
- Wall, pail, stand, or portable cart mounting kits are available from Graco. For other mountings, be sure the pump is adequately secured. The pump has two mounting holes for 0.35 in. (9 mm) screws. See the Dimension drawing on page 25.

# Installation

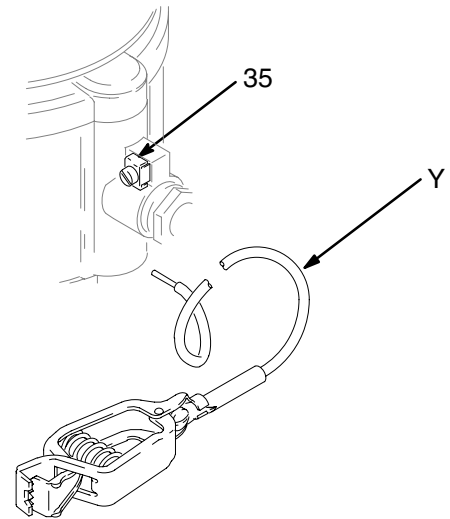
## Grounding

<b>⚠ WARNING</b>	
	<b>FIRE AND EXPLOSION HAZARD</b> This pump must be grounded. Before operating the pump, ground the system as explained below. Also read the section <b>FIRE AND EXPLOSION HAZARD</b> on page 4.

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

### ***Ground all of this equipment:***

- ***Pump:*** Attach a ground wire (Y) to the pump's grounding clamp (35) and secure with the screw, as shown in Fig. 1. Connect the clamp end of the ground wire to a true earth ground. Order Part No. 238909 Ground Wire and Clamp.



ti1030a

**Fig. 1**

- ***Air and fluid hoses:*** Use only electrically conductive hoses.
- ***Air compressor:*** Follow the manufacturer's recommendations.
- ***Solvent pails used when flushing:*** Follow your local code. Use only metal pails, which are conductive. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts the grounding continuity.
- ***Fluid supply container:*** Follow your local code.

# Installation

## 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.

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 two ways, either by controlling the air into the pump with the air regulator (F) or the fluid out of the pump with the fluid regulator (H).
  - b. Locate a bleed-type master air valve (B) close to the pump, to relieve trapped air. See the **WARNING** at left. Locate another air valve (E) upstream from all air line accessories, to isolate them during cleaning and repair.
  - c. Install an air line filter (D) to remove harmful contaminants such as dirt, moisture, and oil from the compressed air supply.
2. The air valve does not require lubrication.
3. Install an electrically conductive, flexible air hose (C) between the accessories and the pump air inlet (T). Use a minimum 1/4" (6.3 mm) ID air hose. Screw an air line quick disconnect coupler (V) onto the end of the air hose and screw the mating fitting into the pump air inlet snugly. Do not connect the coupler to the fitting yet.



# Installation

## Wall Mount HVLP Spray Installation Shown

### KEY

- A TRITON 308 Pump
- B Bleed-type master air valve (required for pump)
- C Air supply line
- D Air line filter
- E Air line shutoff valve
- F Pump air regulator
- G Gun air regulator (used in spray system only)
- H Fluid pressure regulator (used in spray system only)
- J Drain/circulation valve
- K Drain tube
- L Suction tube
- M Pump fluid inlet
- N Pump fluid outlet
- P Fluid hose (shown connected to gun in spray system)
- R Gun air hose (used in spray system only)
- S Spray gun (used in spray system only)
- T Pump air inlet
- U Agitator (used in spray system only)
- V Air line quick disconnect
- Y Ground wire

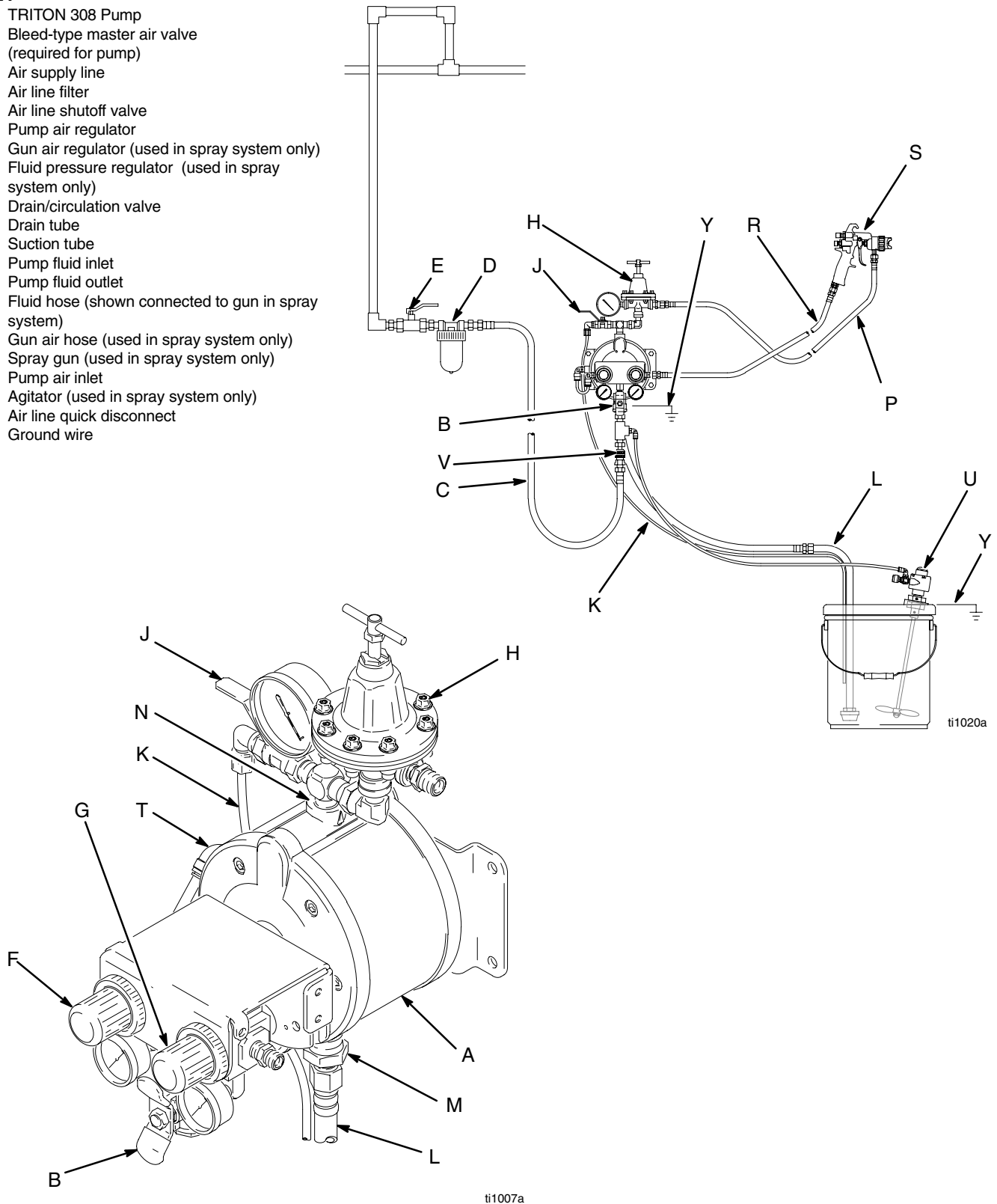


Fig. 2

# Installation

## Fluid Suction Line

- Screw the suction line (L) into the pump inlet (M) snugly. Use a compatible liquid thread sealant on connections to prevent air from getting into the fluid line.
- Do not pressure feed this pump.
- See the **Technical Data** on page 24 for maximum suction lift.
- Use an agitator (U) to prevent fluid from settling out. Part No. 245081 Agitator Kit (accessory) is available.

## Fluid Outlet Line

### **WARNING**

A fluid drain valve (J) 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. To use the valve as a circulation valve, connect a tube (K) between the valve and pail.

### **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.

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 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.

- Use electrically conductive fluid hoses (P). Screw the fluid fitting into the pump outlet (N) snugly.
- Install a fluid regulator (H) at the pump fluid outlet to control fluid pressure, if desired. See **Air Line**, step 1a, for another method of controlling pressure.
- Install a fluid drain valve (J) near the fluid outlet. See the **WARNING** at left.

## Flush the Pump Before First Use

The pump was tested in water. If the water could contaminate the fluid you are pumping, flush the pump thoroughly with a compatible solvent. Follow the steps under **Starting and Adjusting the Pump** on page 11.

# Operation

## Pressure Relief Procedure



### **WARNING**

The system remains pressurized until pressure is manually relieved. To reduce the risk of serious injury from pressurized fluid, accidental spray from the gun, or splashing of any fluid, follow this procedure whenever you

- Stop spraying
- Are instructed to relieve pressure
- Check or service any system equipment
- Install, clean, or change spray nozzles

1. Shut off the bleed-type air valve (B).
2. *In a spray system*, hold the gun (S) firmly against a grounded metal pail and trigger the gun to relieve the fluid pressure.
3. Place the drain tube (K) in a waste pail. Open the drain/circulation valve (J) to relieve any fluid pressure trapped in the system.

## Starting and Adjusting the Pump

1.   Read **Toxic Fluid Hazard** on page 5.

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 4.

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.

**NOTE:** Before using the pump, re-torque fluid cover screws (38) to 10 ft-lb (13.6 N•m).

5. Place the suction tube (L, if used) in the fluid to be pumped.
6. Place the fluid hose (P) in a container.
7. Close the drain/circulation valve (J).
8. Close the pump air regulator (F). 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 (F) 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.

## Pump Shutdown

### **WARNING**

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

At the end of the work shift, flush the pump and relieve pressure.

# Maintenance

## Tightening Threaded Connections

Before each use, check all hoses for wear or damage. Replace as necessary. Check that all threaded connections are tight and leak-free.

NOTE: Periodically, re-torque fluid cover screws (38) to 10 ft-lb (13.6 N•m).

## Cleaning

Clean the outside of the equipment daily, using a soft cloth and compatible solvent.

Clean the suction tube (L) and inlet strainer daily, using a compatible solvent.

Clean the air filter (D) in your main air line at least once a week.

## Storage

Before storing the pump, always flush it and relieve pressure.

## Preventive Maintenance Schedule

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

# Troubleshooting



## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

1. **Relieve the pressure** before checking or servicing the equipment.
2. Check all possible problems and causes before disassembling the pump.

PROBLEM	CAUSE	SOLUTION
Pump will not run.	Closed air line valve.	Open valve.
	Inadequate air supply, or clogged/restricted air line.	Increase air supply. Do not exceed maximum air inlet pressure.
		Open or clear air line.
		Clean air filter.
	Clogged pump, fluid line, or spray gun.	Clear, service. Flush regularly. Do not allow fluid to set up in the pump and lines.
	Stuck or damaged pump air valve.	Disassemble and clean air valve. Replace worn parts. See page 18. Use filtered air.
	Ruptured diaphragm.	Replace diaphragms. See page 17.
	Air valve plate installed incorrectly.	Align plate with center housing. See page 19.

# Troubleshooting

PROBLEM	CAUSE	SOLUTION
Pump runs sluggishly.	Worn or damaged carriage o-rings.	Service air valve. See page 18.
Pump runs erratically.	Clogged suction line or inlet strainer.	Clear.
	Sticking or leaking ball check valves.	Disassemble and clean ball checks. Replace worn parts. See page 16.
Pump runs too fast.	Exhausted fluid supply.	Refill fluid supply and prime pump.
Pump cycles at stall or fails to hold pressure at stall.	Worn ball check valves.	Disassemble and clean ball checks. Replace worn parts. See page 16.
Audible air leak.	Worn air valve cup or plate.	Service air valve. See page 18.
Air exhausting from the mounting holes.	Fluid covers are installed incorrectly.	Align mounting holes in fluid covers with holes in center housing. See page 14.
Fluid in the exhaust air.	Ruptured diaphragm.	Replace diaphragms. See page 17.
Air bubbles in fluid.	Loose suction line.	Tighten. Use a compatible liquid thread sealant on connections.
	Ruptured diaphragm.	Replace diaphragms. See page 17.
Poor finish or irregular spray pattern.	Incorrect fluid or air pressure at gun.	See gun manual; read fluid manufacturer's recommendations. Use fluid regulator.
	Fluid is too thin or too thick.	Adjust fluid viscosity; read fluid manufacturer's recommendations.
	Dirty, worn, or damaged spray gun.	Service gun.
	Fluid is settling out.	Use agitator. Order Part No. 245081 Agitator Kit.

# Service

## Remove the Fluid and Side Covers

### Tools Required

- Torque wrench
- 2.5 mm allen wrench
- 6 mm allen wrench
- Adjustable wrench

### Disassembly

#### **WARNING**

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 11.

1. **Relieve the pressure.**
2. Disconnect the hoses and ground wire.

3. Remove the pump from its mounting.

#### **CAUTION**

Be careful that the ball checks do not fall out when you remove the fluid covers (32).

4. Remove the six screws (38) and top cover (32) from the center housing (1). Remove the ball check seals (24). Remove the bottom cover and seals.

**NOTE:** Always replace the ball check seals (24) whenever the fluid covers (32) are removed. These seals are included in the four repair kits.

**NOTE:** Perform step 5 only if you are servicing the air valve or the diaphragm shaft.

5. Remove the two screws (39) and take off the side cover (31) and felt dampener (29).

# Service

## Remove the Fluid and Side Covers (continued)

### Reassembly

1. Clean all parts and inspect for wear or damage. Replace parts as needed.
2. If necessary, reinstall the felt dampener (29) and side cover (31). Torque the screws (39) to 28 in-lb (3.1 N•m).
3. Install new ball check seals (24).
4. Place the fluid covers (32) on the housing (1). Align the mounting holes (H) in the fluid covers with the holes in the housing. Install the screws (38) loosely, then torque oppositely and evenly to 10 ft-lb (13.6 N•m).
5. Reinstall the pump on its mounting.
6. Reconnect the ground wire and hoses.

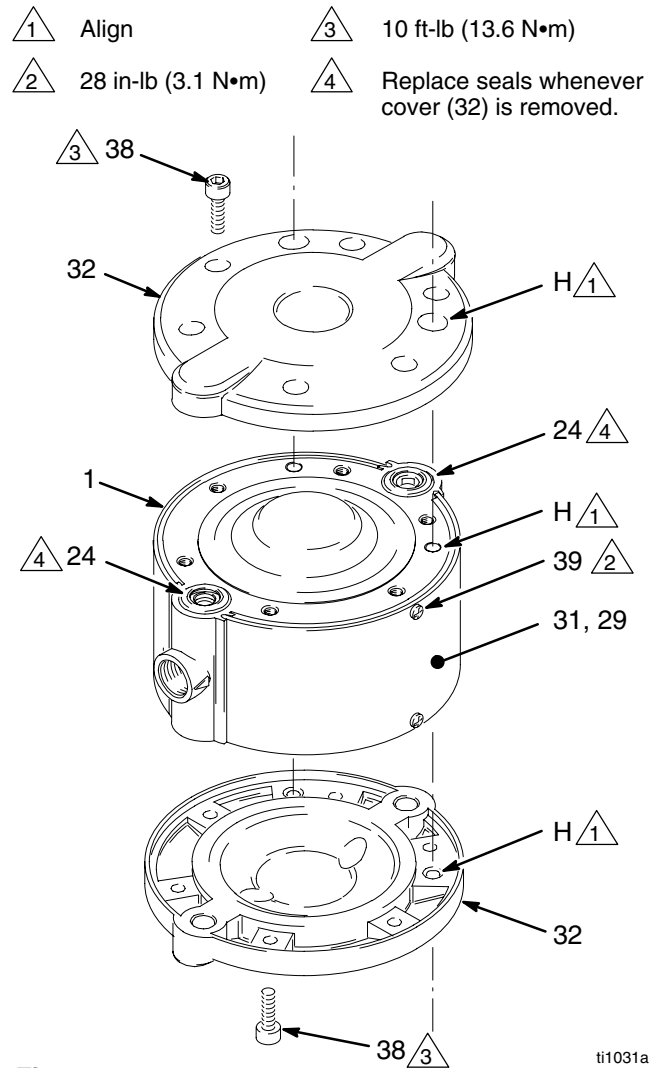


Fig. 3

ti1031a

# Service

## Ball Check Repair

## Tools Required

- O-ring pick

## Disassembly

**NOTE:** Ball Check Repair Kit 245067 is available. Parts included in the kit are marked with a double dagger, for example (21†). Use all the parts in the kit for the best results.

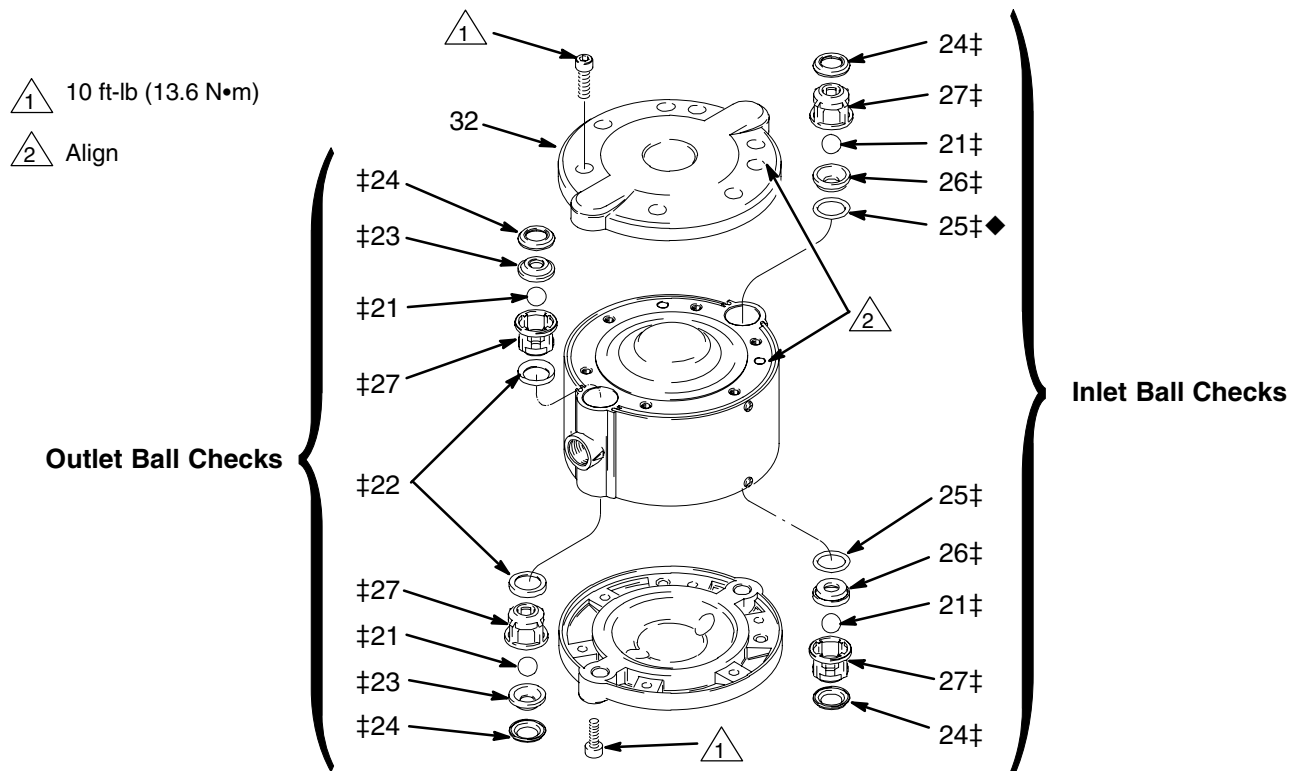
1. Remove the fluid covers. See page 14.
2. Remove the inlet and outlet ball checks. Note that the orientation of the inlet check parts is different from the outlet check parts. See Fig. 4.

**NOTE:** If the inlet seats (26) are difficult to remove, drive them out from the opposite side using a brass rod and hammer.

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

## Reassembly

1. Reinstall the inlet and outlet ball checks on one side of the pump. The inlet and outlet checks are assembled differently. Install the parts exactly as shown in Fig. 4.
2. Install one cover (32) loosely, to prevent the ball checks from falling out. See page 14.
3. Turn the pump over and install the ball checks on the opposite side, exactly as shown.
4. Reinstall the fluid covers. See page 14.



**Fig. 4**

ti1032a



# Service

## Diaphragm Repair

### Tools Required

- M8 bolt
- M8 hexnut
- Adjustable wrench, or vise

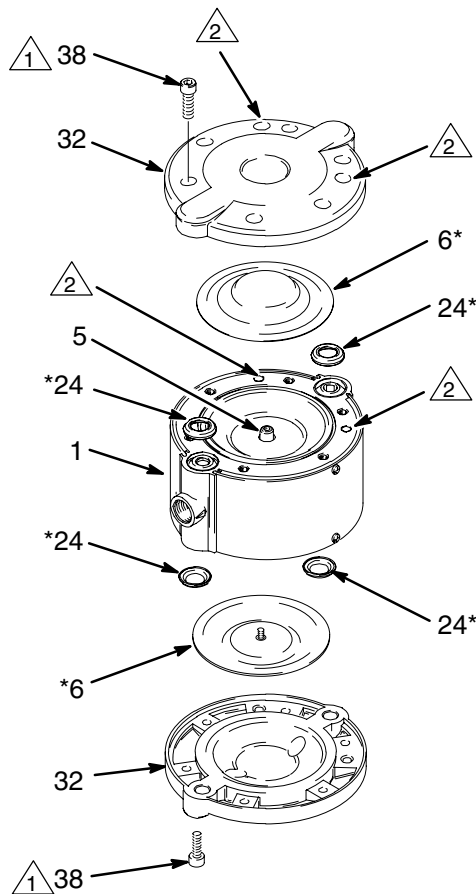
**NOTE:** Diaphragm Repair Kit 245065 is available. Parts included in the kit are marked with an asterisk, for example (6\*). Always replace both diaphragms for the best results.

1. Remove the fluid covers. See page 14.

### WARNING

Wear gloves when removing the diaphragms to reduce the risk of cuts.

2. Unscrew one diaphragm (6) from the shaft (5) by hand. See Fig. 5.




3. Thread an M8 hexnut (A) onto an M8 bolt. Screw the bolt into the shaft (5) until it bottoms out. Thread the nut down to the shaft to lock it.
4. Hold the nut with a wrench or vise to keep the shaft from turning. Unscrew the other diaphragm (6) by hand.


**NOTE:** If you cannot remove the second diaphragm, refer to **Shaft Repair Disassembly** on page 20.

### Reassembly

1. Screw the new diaphragms (6\*) into the shaft (5) handtight.
2. Replace the ball check seals (24\*) with the new seals in the kit.
3. Reinstall the fluid covers. See page 14.

 10 ft-lb (13.6 N•m)

 Align

 Use M8 bolt and nut to keep shaft from turning.

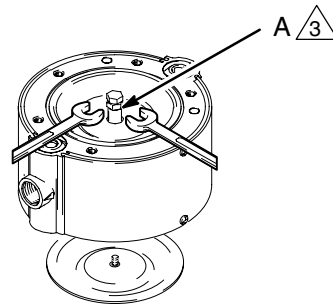


Fig. 5

ti1033a

# Service

## Air Valve Repair

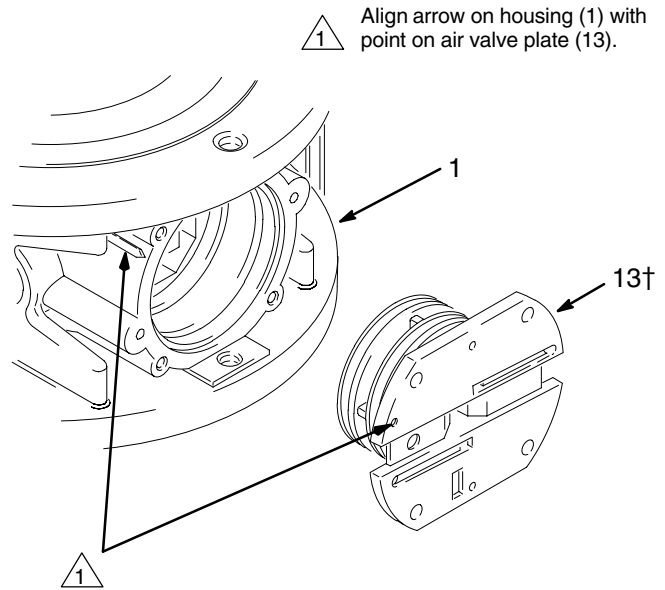
### Tools Required

- 3 mm allen wrench
- Needlenose pliers
- Retaining ring removal tool
- O-ring pick

### Disassembly

**NOTE:** Air Valve Repair Kit 245066 is available. Parts included in the kit are marked with a dagger, for example (8†). Use all the parts in the kit for the best results.

1. Remove the side cover (31) and felt dampener (29).
2. Remove the four screws (36), air valve cover (17), and gasket (16). See Fig. 7.
3. See Fig. 6. Note the orientation of the air valve plate (13). Pull the plate out of the center housing (1). Remove the three o-rings (14, 15) and the two o-rings (43) from the plate. See Fig. 7.
4. Remove the air valve cup (12) from the center housing (1).
5. Remove the retaining rings (11) and plug (9) from both sides, and slide the carriage (7) from the center housing (1). Remove the o-rings (8, 10) from the carriage and the plug.
6. Clean all parts and inspect for wear or damage. Replace parts as needed.



ti1039a

**Fig. 6**

# Service

## Air Valve Repair (continued)

### Reassembly

1. Lubricate the o-rings (8†) and install them on the carriage (7). Slide the carriage into the center housing (1) so the notch faces out, as shown in Fig. 7.
2. Lubricate each o-ring (10†) and install them on the plugs (9). Insert a plug in each side to secure the carriage (7). Install the retaining rings (11) to hold these parts in place.
3. Install the air valve cup (12†) in the notch of the carriage (7) so the open side faces out.
4. Install two o-rings (43) in the counterbore of the air motor.
5. Lubricate the large o-ring (15†) and the two small o-rings (14†) and install them on the air valve plate (13†). Align the point on the plate with the arrow on the center housing (1) as shown in Fig. 6. Install the plate in the housing.
6. Install the gasket (16†). Note the orientation.
7. Reinstall the air valve cover (17) and screws (36). Torque the screws to 28 in-lb (3.1 N•m).
8. Replace the ball check seals (24†) with the new seals in the kit.
9. Reinstall the felt dampener (29) and side cover (31). See page 14.

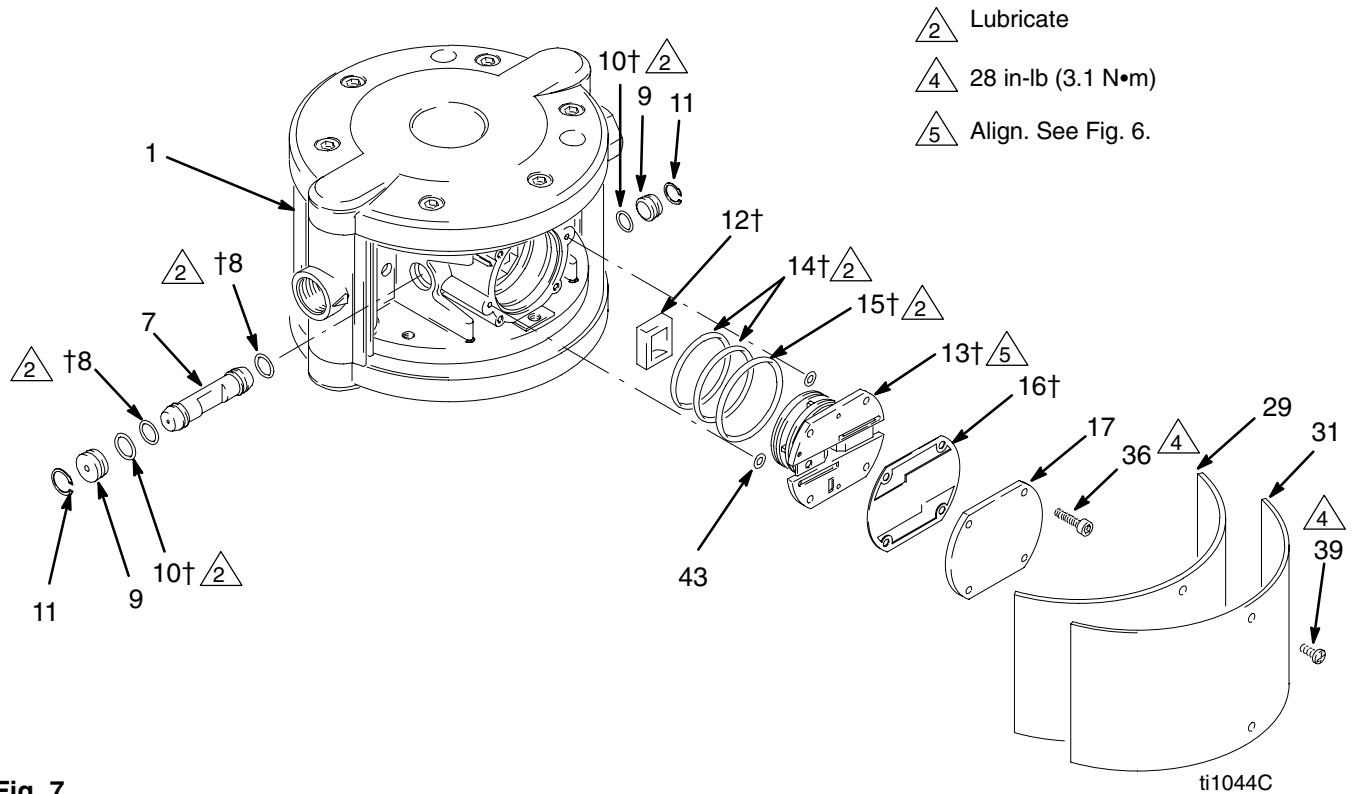


Fig. 7

# Service

## Shaft Repair

### Tools Required

- Needlenose pliers
- O-ring pick
- Retaining ring removal tool
- Vise with soft jaws

### Disassembly

**NOTE:** Shaft Repair Kit 245068 is available. Parts included in the kit are marked with a star, for example (2☆). Use all the parts in the kit for the best results.

1. Remove the fluid covers. See page 14. Remove the side cover (31) and felt dampener (29).
2. Disassemble the air valve. See page 18.
3. Remove the diaphragms (6). See page 17.
4. Remove the retaining rings (4☆) from the shaft (5). See Fig. 8.
5. Slide the shaft (5) out of the center housing (1). Remove the valve carriage (3) from the housing.
6. Remove the o-rings (2) from the shaft (5).
7. *If you could not remove one diaphragm from the shaft, place the shaft in a vise with soft jaws. Unscrew the remaining diaphragm (6) from the shaft (5) by hand.*
8. Clean all parts and inspect for wear or damage. Replace parts as needed.

### Reassembly

1. Screw one diaphragm (6) into the shaft (5☆) handtight.
2. Grease the o-rings (2☆) and install them on the shaft (5☆).
3. Place the valve carriage (3) in the center housing (1). Grease the shaft (5☆) and slide it through the center housing and valve carriage.
4. Install the retaining rings (4☆) on the shaft (5☆).
5. Screw the second diaphragm (6) into the shaft (5☆) handtight.
6. Reassemble the air valve and carriage (see page 18), using the new o-rings (8☆, 10☆, 14☆, 15☆) and gasket (16☆) included in the shaft repair kit.
7. Replace the ball check seals (24☆) with the new seals in the kit.
8. Reinstall the fluid covers. See page 14.

## CAUTION

Do not grip the shaft with tools that can scratch or damage the shaft, such as wrenches or pliers.

# Service

## Shaft Repair (continued)

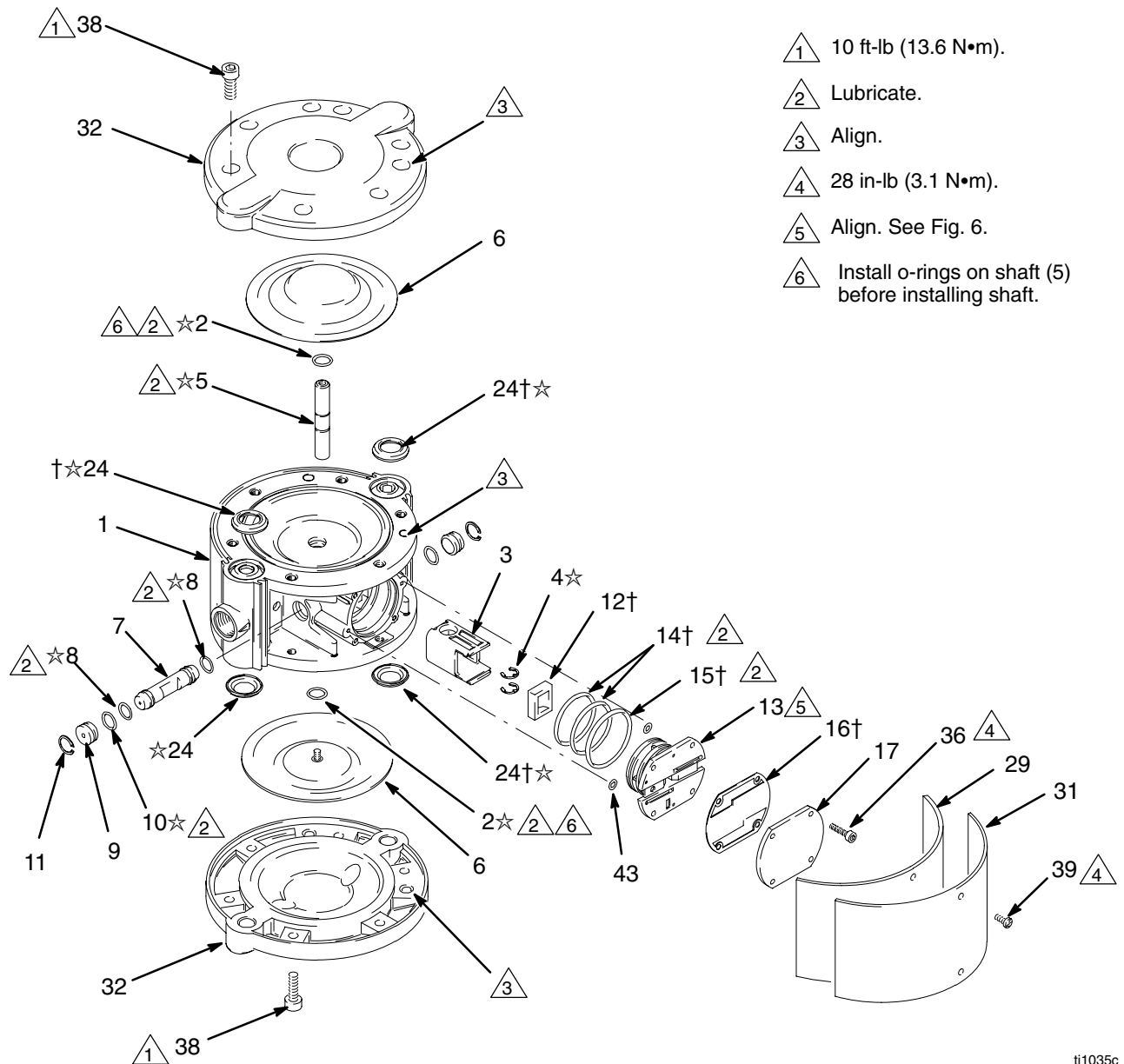


Fig. 8

ti1035c

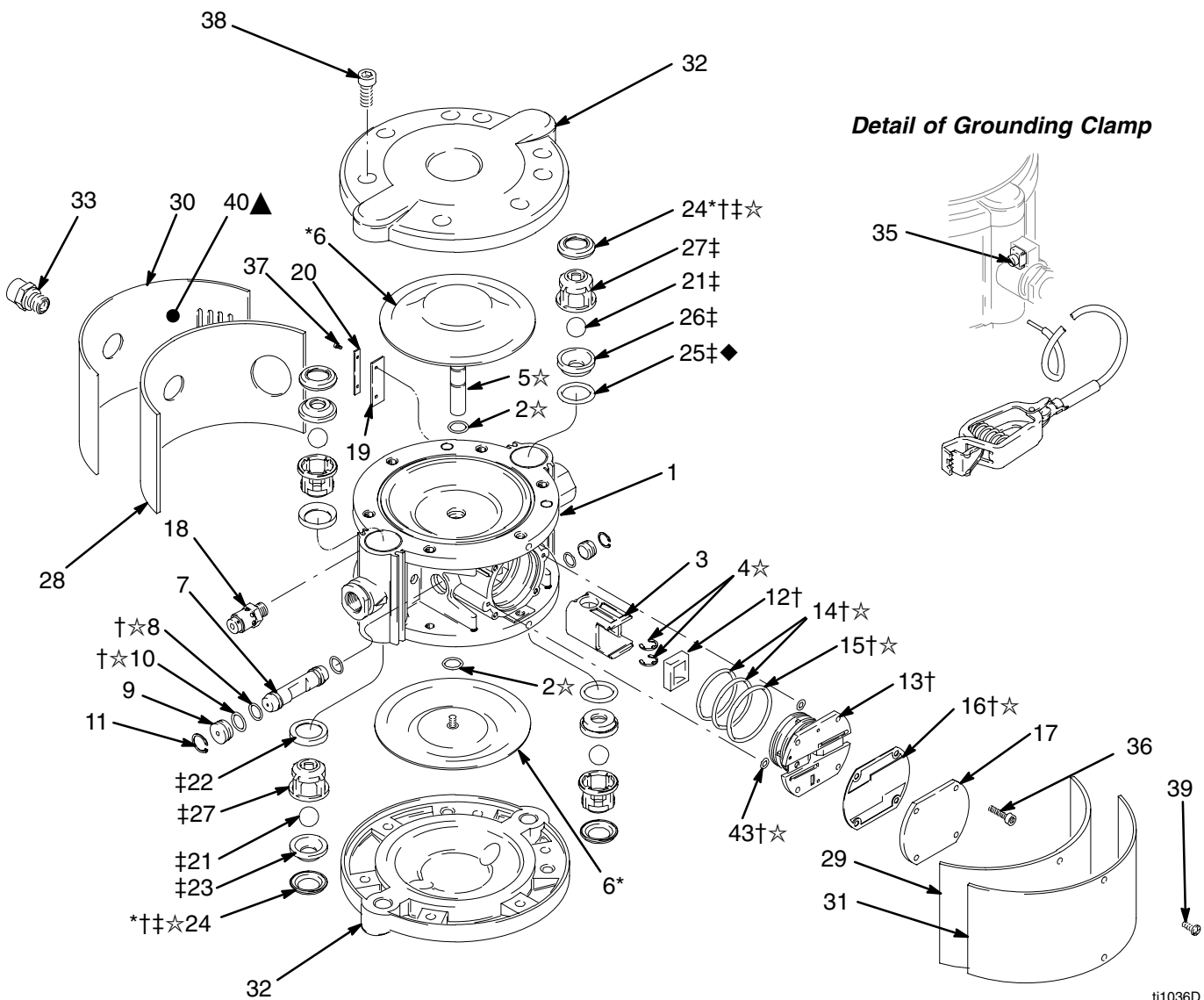
# Parts

Part No. 233500 Aluminum Pump, Series B, npt threads

Part No. 233501 Stainless Steel Pump, Series A, npt threads (Shown)

Part No. 233776 Aluminum Pump, Series A, BSPP threads

Part No. 233777 Stainless Steel Pump, Series A, BSPP threads



ti1036D

# Parts

**Part No. 233500 Aluminum Pump, Series B, npt threads**

**Part No. 233501 Stainless Steel Pump, Series A, npt threads**

**Part No. 233776 Aluminum Pump, Series A, BSPP threads**

**Part No. 233777 Stainless Steel Pump, Series A, BSPP threads**

**NOTE:** Purchase items 36–39 locally.

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	15J732	HOUSING, center; for Part No. 233500; aluminum	1	30	197672	COVER, air inlet side	1
	198894	HOUSING, center; for Part No. 233501; stainless steel	1	31	197673	COVER, side	1
	198892	HOUSING, center; for Part No. 233776; aluminum	1	32	197674	COVER, housing; for Part Nos. 233500 and 233776; aluminum	2
	197679	HOUSING, center; for Part No. 233777; stainless steel	1		197680	COVER, housing; for Part Nos. 233501 and 233777; stainless steel	2
2☆	197644	O-RING, shaft, diaphragm	2	33	198832	FITTING, air inlet; for Part Nos. 233500 and 233501	1
3	197645	CARRIAGE, valve	1		198831	FITTING, air inlet; for Part Nos. 233776 and 233777	1
4☆	197646	RING, retaining, shaft	2	35	116343	CLAMP, grounding; M5 x 10	1
5☆	197647	SHAFT, diaphragm	1	36	116474	SCREW, cap, socket-hd; M4 x 20	4
6*	197648	DIAPHRAGM; PTFE composite	2	37	116475	SCREW, cap, socket-hd; M4 x 12	2
7	197649	CARRIAGE	1	38	117367	SCREW, cap, socket-hd; M8 x 18; for Part Nos. 233500 and 233776	12
8†☆	197650	O-RING, carriage	2		15D128	SCREW, same as above; for Part Nos. 233501 and 233777	12
9	197651	PLUG, carriage	2	39	116595	SCREW, button-hd; M4 x 12	2
10†☆	197652	O-RING, plug	2	40▲	188621	LABEL, warning	1
11	197653	RING, retaining, carriage	2	43†☆	157628	O-RING	2
12†	197654	CUP, valve, air	1	* These parts are only available by purchasing Dia- phragm Repair Kit 245065.			
13†	197655	PLATE, valve, air	1	† These parts are only available by purchasing Air Valve Repair Kit 245066.			
14†☆	197656	O-RING, valve, air	2	‡ These parts are only available by purchasing Ball Check Repair Kit 245067.			
15†☆	197657	O-RING, valve, air	1	☆ These parts are only available by purchasing Shaft Repair Kit 245068.			
16†☆	197658	GASKET, valve, air	1	▲ Replacement Danger and Warning labels, tags and cards are available at no cost.			
17	197659	COVER, valve, air	1	◆ This part available in 10–pack kit 15D564 or in Ball Check Repair kit 245067			
18	197660	VALVE, safety, air	1				
19	197661	PLATE, dampener; neoprene	1				
20	197662	DAMPENER; steel	1				
21‡	197663	BALL; acetal	4				
22‡	197664	SEAL, valve, outlet; acetal	2				
23‡	197665	SEAT, valve, outlet; stainless steel	2				
24*†‡☆	197666	SEAL, ball check; nylon	4				
25‡◆	197667	O-RING, valve, inlet; fluoroelas- tomer	2				
26‡	197668	SEAT, valve, inlet; stainless steel	2				
27‡	197669	GUIDE, ball; acetal	4				
28	197670	DAMPENER, felt, air inlet side	1				
29	197671	DAMPENER, felt, side	1				

# Technical Data

Category	Data
Maximum fluid working pressure	115 psi (0.8 MPa, 8.0 bar)
Air pressure operating range	12 to 115 psi (.08 to 0.8 MPa, 0.8 to 8.0 bar)
Ratio	1:1
Maximum free flow delivery	8.5 gal./min (32 l/min)
Operating fluid temperature range	50 to 176° C (10 to 80° C)
Maximum suction lift	16 ft (4.8 m) dry; 22 ft (6.5 m) wet
Weight	Part Nos. 233500, 233776: 9 lb (4 kg) Part Nos. 233501, 233777: 14 lb (6.4 kg)
Wetted parts	Part Nos. 233500, 233776: Aluminum, Stainless Steel, Acetal, Nylon, PTFE, fluoroelastomer Part Nos. 233501, 233777: Stainless Steel, Acetal, Nylon, PTFE, fluoroelastomer

## Sound Pressure Levels in dB(A)\* (measured at 1 m from unit)

Input Air Pressures	Sound Pressure
40 psi (0.28 MPa, 2.8 bar)	69.1
60 psi (0.42 MPa, 4.2 bar)	72.1

## Sound Power Levels in dB(A)\* (tested in accordance with ISO 3744)

Input Air Pressures	Sound Power
40 psi (0.28 MPa, 2.8 bar)	80.8
60 psi (0.42 MPa, 4.2 bar)	83.7

## Performance Chart

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

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

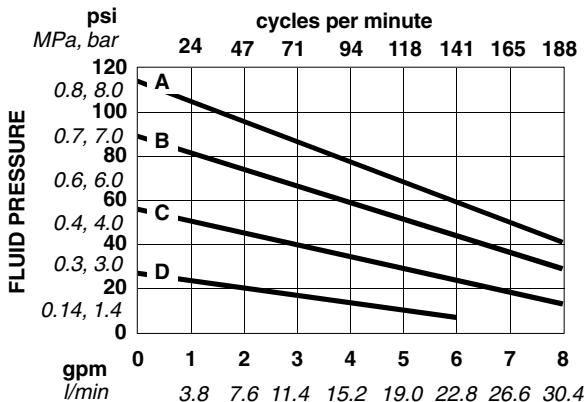
**To find Pump Air Consumption** (l/min or scfm) at a specific fluid flow (lpm/gpm) and air pressure (psi/MPa/bar):

1. Locate desired flow along bottom of chart.
2. Read vertical line up to intersection with selected air consumption curve (dashes). Follow left to scale to read air consumption.

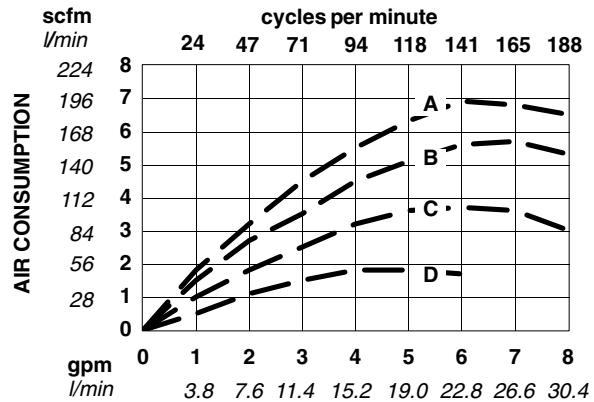
- A** 115 psi (0.8 MPa, 8 bar) air pressure  
**B** 90 psi (0.6 MPa, 6 bar) air pressure  
**C** 60 psi (0.4 MPa, 4 bar) air pressure  
**D** 30 psi (0.2 MPa, 2 bar) air pressure

## Test Fluid: No. 10 Weight Oil

### Fluid Outlet Pressure

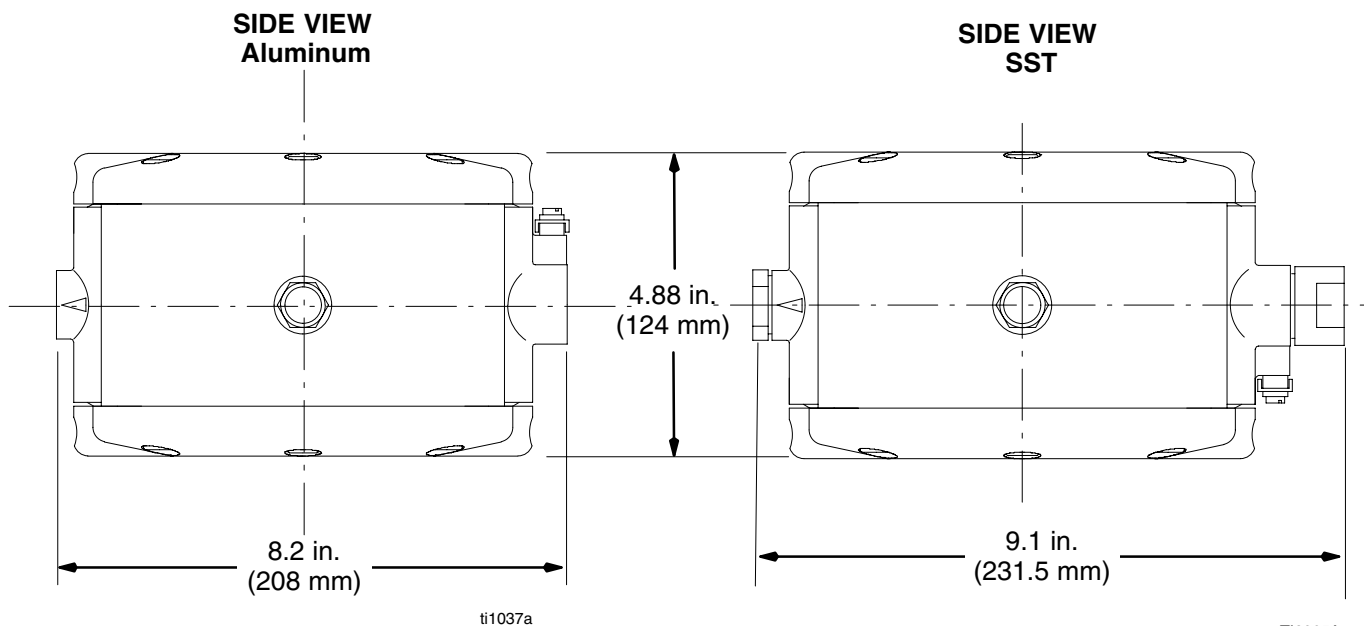
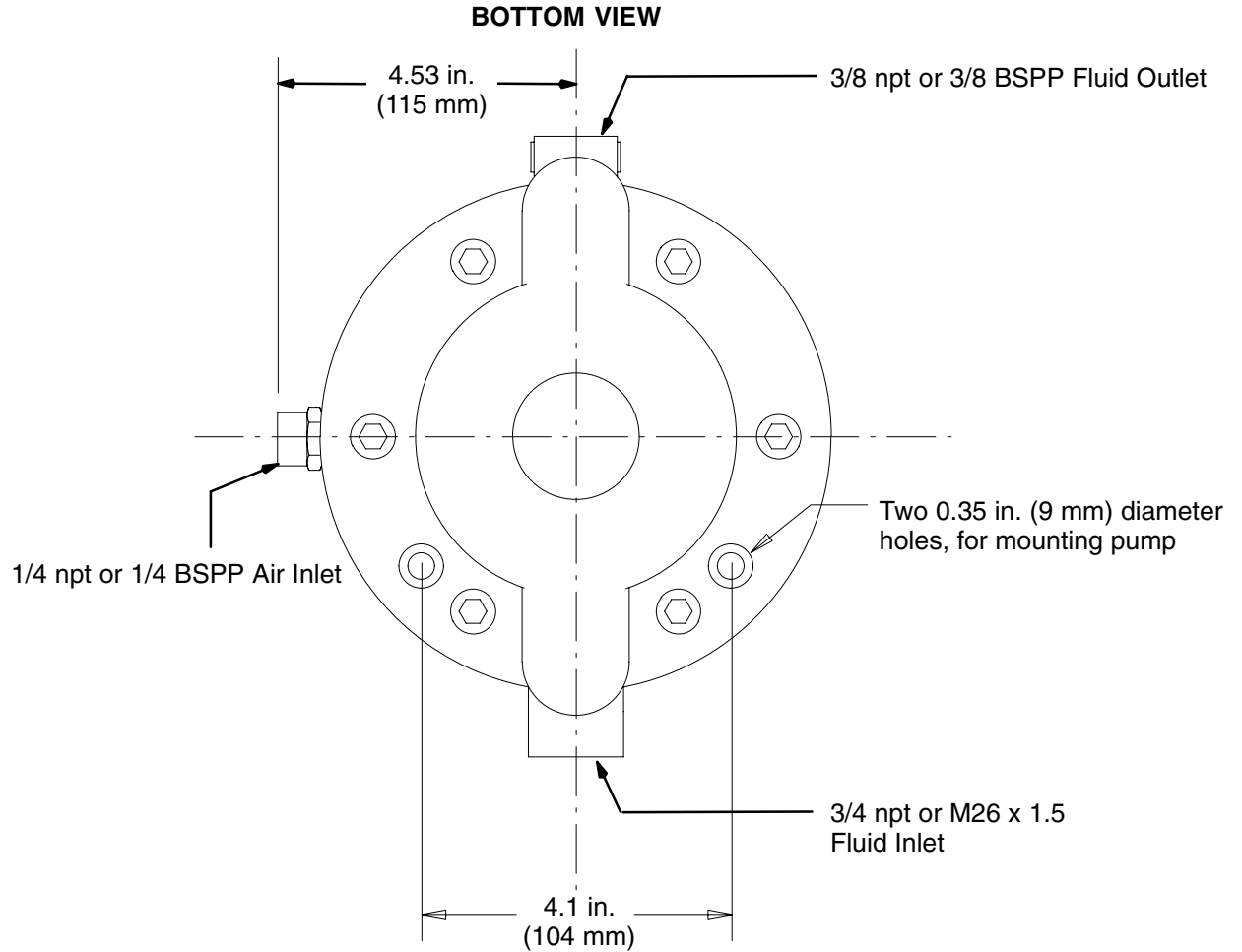


### Air Consumption





# Dimensions



# Graco Standard Warranty

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

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

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

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

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

Graco makes no warranty, and disclaims all implied warranties of merchantability and fitness for a particular purpose in connection with accessories, equipment, materials or components sold but not manufactured by Graco. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

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**

The parties acknowledge that they have required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présente document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

# Graco Information

**TO PLACE AN ORDER**, contact your Graco distributor, or call one of these numbers to identify the distributor closest to you:

**1-800-328-0211 Toll Free**

**612-623-6921**

**612-378-3505 Fax**

*All written and visual data contained in this document reflects the latest product information available at the time of publication.  
Graco reserves the right to make changes at any time without notice.*

This manual contains English. MM 309303

**Graco Headquarters:** Minneapolis

**International Offices:** Belgium, China, Japan, Korea

**GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440-1441**

**[www.graco.com](http://www.graco.com)**

309303 02/2001, Revised 5/2007