

# Instructions - Parts List



1:1 RATIO

## Fast-Ball™ Pumps

307906W  
EN

For non-abrasive and non-corrosive oils and lubricants only.

180 psi (1.2 MPa, 12.4 bar) Maximum Air and Fluid Working Pressure

### Oil Pumps

#### CAUTION

These pumps are designed to pump lubricating fluids only.

#### Model No. 222051, Series E

Universal Pump

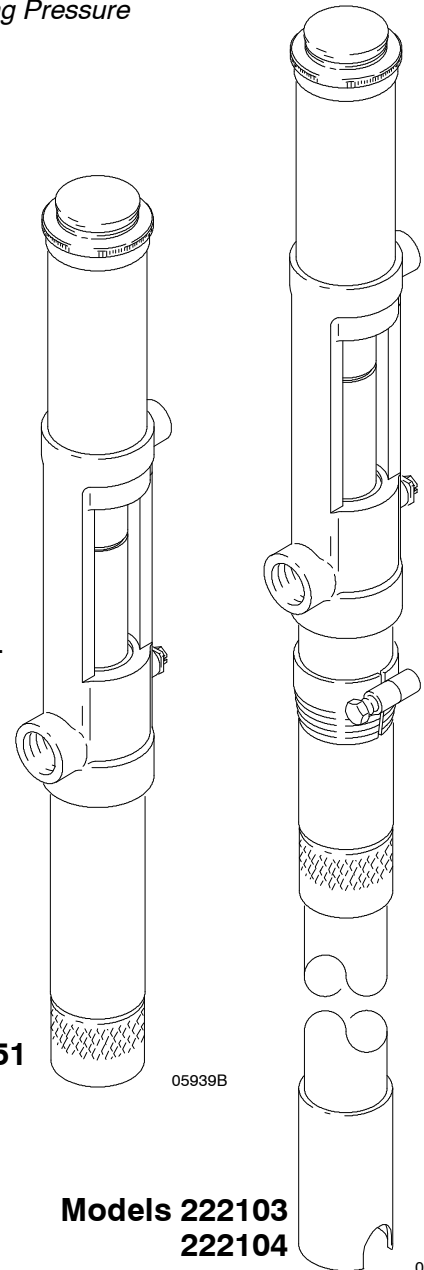
CE Model No. 222103, Series E  
55-Gallon Drum, Bung-Mount Pump

CE Model No. 222104, Series E  
275-Gallon Tank, Bung-Mount Pump



#### Important Safety instructions

Read all warnings and instructions in this manual.  
Save these instructions.  
See page 2 for **Table of Contents**.



Model 222051

05939B

Models 222103  
222104

05940B

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# Symbols

## Warning Symbol



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

## Caution Symbol



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

## WARNING



INSTRUCTIONS

### EQUIPMENT MISUSE HAZARD

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

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before you operate 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 **180 psi (1.2 MPa, 12.4 bar) maximum working pressure at 180 psi (1.2 MPa, 12.4 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.
- Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents, or fluids that contain such solvents in pressurized aluminum equipment. Such use could result in a chemical reaction, with the possibility of explosion.
- Handle hoses carefully. Do not pull on hoses to move equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 82°C (180°F) or below -40°C (-40°F).
- Do not lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

# WARNING



## SKIN INJECTION HAZARD

Fluid from the dispensing valve, leaks, or ruptured components can inject fluid into your body and cause extremely serious injury, including the need for amputation. Fluid splashed in the eyes or on the skin can also cause serious injury.

- If a fluid injection injury occurs, **get immediate surgical treatment. Do not treat as a simple cut.** Tell the doctor exactly what fluid was injected.
- Do not point the dispensing valve at anyone or at any part of the body.
- Do not put your hand or fingers over the end of the dispensing valve.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Use only extensions and no-drip tips that are designed for use with your dispensing valve.
- Do not use a low pressure flexible nozzle with this equipment.
- Follow the **Pressure Relief Procedure** on page 8 if the dispensing valve clogs before you clean, check, or service the equipment.
- Tighten all fluid connections before you operate the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn or damaged parts immediately. Do not repair high pressure couplings; you must replace the entire hose.



## TOXIC FLUID HAZARD

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

- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines.
- Always wear protective eyewear, gloves, clothing, and respirator as recommended by the fluid and solvent manufacturer.

# WARNING



## 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 and the object being lubricated. See **Grounding** on page 6.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop dispensing 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 dispensed.
- Keep the dispensing area free of debris, including solvent, rags, and gasoline.
- Do not smoke in the dispensing area.



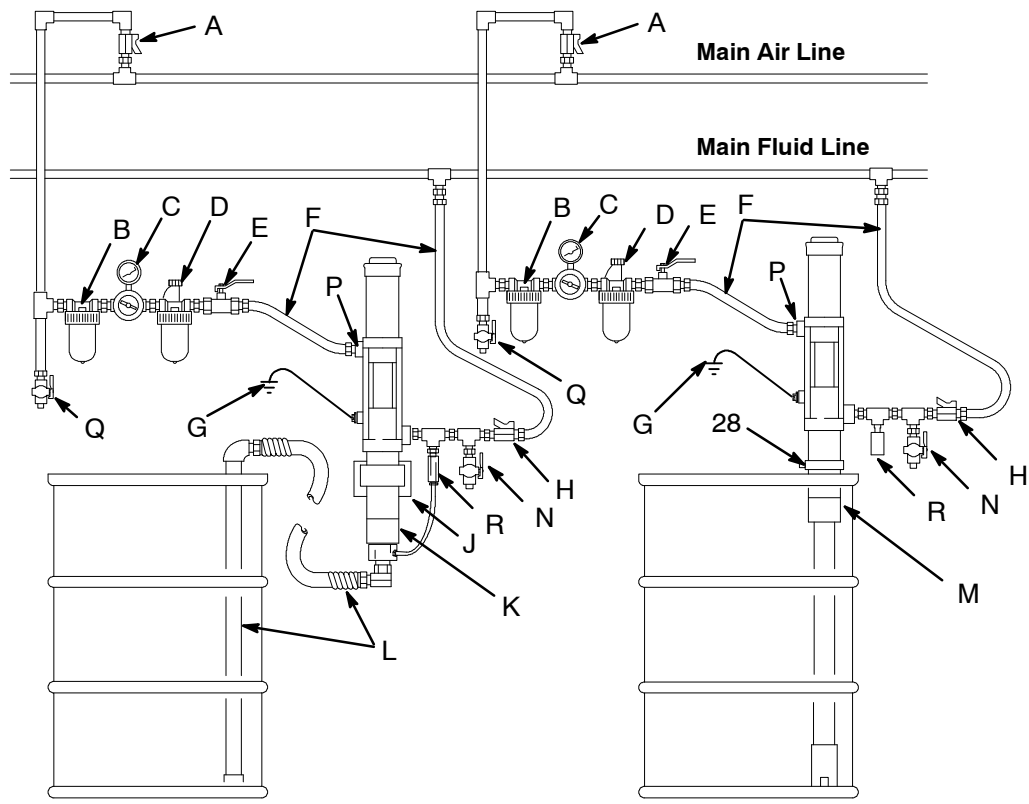
## MOVING PARTS HAZARD

Moving parts can pinch or amputate your fingers or other body parts.

- Do not cycle the pump with any parts disassembled.
- Keep clear of all moving parts when you start or operate the pump.
- Before you service the equipment, follow the **Pressure Relief Procedure** on page 8 to prevent the equipment from starting unexpectedly.

United States Government safety standards have been adopted under the Occupational Safety and Health Act. You should consult these standards--particularly the General Standards, Part 1910.

# Installation



**KEY**

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li><b>A</b> Air shutoff valve</li> <li><b>B</b> Air filter</li> <li><b>C</b> Air regulator and gauge</li> <li><b>D</b> Air motor lubricator</li> <li><b>E</b> Bleed-type master air valve (required, Part No. 110223)</li> <li><b>F</b> Air and fluid hose kits</li> <li><b>G</b> Ground wire (required, Part No. 222011)</li> <li><b>H</b> Fluid shutoff valve</li> </ul> | <ul style="list-style-type: none"> <li><b>J</b> Wall bracket</li> <li><b>K</b> Universal pump (Model 222051)</li> <li><b>L</b> Suction kit</li> <li><b>M</b> 55-gallon drum bung-mount pump (Model 222103)</li> <li><b>N</b> Fluid drain valve (required, Part No. 210658)</li> <li><b>P</b> Air inlet</li> <li><b>Q</b> Ball valve (for releasing collected moisture)</li> <li><b>R</b> Thermal relief kit (required for permanent installations, Part No. 237601)</li> <li><b>28</b> Bung adapter</li> </ul> |
|--|--|

**Fig. 1**

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Install the accessories in the order shown in the typical installation in Fig. 1. The installation shown in Fig. 1 is only a guide for selecting and installing a pump; it is not an actual system design. Contact your Graco representative for assistance in designing a system to suit your needs.

**NOTE:** Blow out all lines with compressed air before you connect the pumps.

**⚠ CAUTION**

Always mount the pump firmly to a wall bracket or a bung on a drum. Never operate the pump while it is not mounted. Such use could damage the pump and fittings.

**⚠ CAUTION**

Do not hang the air accessories directly on the air inlet (P). The fittings are not strong enough to support the accessories and may break. Provide a bracket on which to mount the accessories.

# Installation

## Grounding

Proper grounding is an essential part of maintaining a safe system.

To reduce the risk of static sparking, ground the pump. Check your local electrical code for detailed grounding instructions for your area and type of equipment. Be sure to ground all of this equipment:

- *Pump:* Use a ground wire and clamp as shown in Fig. 2.
- *Air compressor:* Follow the manufacturer's recommendations.
- *Object being dispensed to:* Follow the local code.
- *Fluid supply container:* Follow the local code.
- *To maintain grounding continuity when flushing or relieving pressure,* always hold a metal part of the dispensing valve firmly to the side of a grounded metal container, then trigger the valve.

**To ground the pump,** remove the ground screw (Z) and insert through the eye of the ring terminal at end of ground wire (Y). Fasten the ground screw back onto the pump and tighten securely. Connect the other end of the wire to a true earth ground. *To order a ground wire and clamp, order Part No. 222011.*

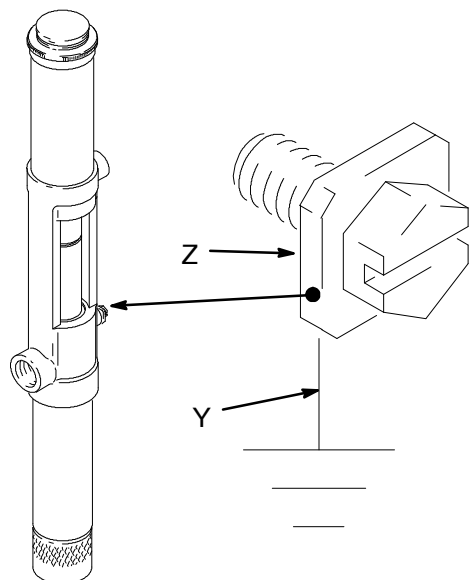


Fig. 2

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## System Accessories

### **! WARNING**

Three accessories are required in your system: bleed-type master air valve, fluid drain valve, and grounding wire. Additionally, for permanent installations, a thermal relief kit is required. These accessories help reduce the risk of serious bodily injury, including fluid injection, splashing in the eyes or on the skin, injury from moving parts if you are adjusting or repairing the pump, and explosion from static sparking.

- The bleed-type master air valve (E) relieves air trapped between it and the air motor after the air supply is shut off. Trapped air can cause the air motor to cycle unexpectedly, causing serious injury if you are adjusting or repairing the pump. As an alternative, use a quick-disconnect coupler and fitting. Install them near the pump air inlet within easy reach from the pump.
- The fluid drain valve (N) assists in relieving fluid pressure in the displacement pump, hoses, and dispensing valve. Triggering the valve to relieve pressure may not be sufficient.
- The ground wire (G) reduces the risk of static sparking.
- The thermal relief kit (R) assists in relieving pressure in the pump, hose, and dispensing valve due to heat expansion.

- *Extension Tubes:* Pump models 222103 and 222104 have extension tubes. An extension tube may be added to the Universal pump for use in submerged applications. To install, apply PTFE tape to the female threads at the top of the tube. Thread the tube tightly into the intake housing of the Universal pump. Also, install a bung adapter. *To order a standard 2-in. bung adapter, order Part No. 222308.*

- *Air and Fluid Hose Kits (F):* An 18-in. kit for wall-mounted pumps and a 6-ft. kit for drum-mounted pumps are available. Use a minimum 1/4-in. ID air supply hose between the pump air inlet and the air accessories. *To order a kit with 1/4-in. air hose, 1/4-in. swivel elbow, 3/4-in. fluid hose, and 3/4-in. swivel elbow, order one of the kits below:*

*222118 18-in. (0.4 m) hose kit for wall-mounted pumps*

*222119 6-ft (1.8 m) hose kit for drum-mounted pumps*

# Installation

- *Wall Bracket:* Use the wall bracket (J) for wall mounting the Universal pump. This wall bracket is sized to fit any Graco pump designed to use a 2-in. bung adapter. *Order Part No. 203987.*
- *Runaway Valve:* Install a pump runaway valve to shut off the air to the pump when the pump accelerates beyond the pre-adjusted setting. A pump that is in a runaway condition can be seriously damaged.

## CAUTION

Never allow the pump to run dry of the fluid being pumped. A dry pump quickly accelerates to a high speed, possibly damaging itself, and it may get very hot.

- *Air Regulator and Gauge:* Use the air regulator and gauge (C) to control air pressure and pump speed. *To order a 0 to 200 psi (0 to 1.4 MPa, 0 to 14 bar) regulated pressure range (300 psi [2.1 MPa, 21 bar] maximum), 1/4-in npt(f) air regulator and gauge, order Part No. 110147.*
- *Air Filter:* The air filter (B) removes harmful dirt and moisture from the compressed air supply. *To order a 300 psi (2.1 MPa, 21 bar), 1/4-in npt(f) air filter (20-micron element), order Part No. 110146.*
- *Air and Fluid Shutoff Valves:* Install air shutoff valves (A) and fluid shutoff valves (H) as shown to isolate the pump while you are servicing it.
- *Bleed-Type Master Air Valve:* Install a bleed-type master air valve (E) to relieve air trapped between it and the motor when the valve is closed. *To order a 300 psi (2.1 MPa, 21 bar), 1/4-in. npt(f) bleed-type master air valve, order Part No. 110223.*
- *Suction Kit:* The suction kit (L) is for use with the wall-mounted Universal pump, and it includes a drum tube and hose. *To order a suction kit, order Part No. 213099.*
- *Air Motor Lubricator:* The air motor lubricator (D) provides automatic air motor lubrication. *To order a 250 psi (1.7 MPa, 17.4 bar) 1/4-in. npt(f) air motor lubricator, order Part No. 110148.*
- *Quick-Disconnect Coupler and Nipple:* The quick-disconnect coupler and nipple (not shown) are used to quickly disconnect the air supply. Attach the coupler (*Part No. 208536*) to the pump air inlet hose, and install the nipple (*Part No. 169970*) to the pump air inlet (P).
- *Thermal Relief Kit:* Install the thermal relief kit on the dispensing valve side of the pump to assist in relieving pressure in the pump, hose, and dispensing valve due to heat expansion. *To order a 600 psi (4.2 MPa, 41 bar) Thermal Relief Kit, order Part No. 237601.*

# Operation

## Pressure Relief Procedure

### WARNING



#### PRESSURIZED FLUID HAZARD

This equipment stays pressurized until pressure is manually relieved. To reduce the risk of serious injury from moving parts, pressurized fluid, accidental spray from the valve, or splashing fluid, follow this procedure whenever you do any of the following:

- Are instructed to relieve pressure
- Stop dispensing
- Check, clean, or service any system equipment
- Install or clean dispensing devices

1. Shut off the air supply to the pump.
2. Close the bleed-type master air valve (required in your system).
3. Hold a metal part of the dispensing valve firmly to a grounded metal waste container, and trigger the valve to relieve pressure.

*If you suspect that the nozzle or hose is completely clogged, or that pressure has not been fully relieved after you have followed the steps above, do the following:* Wrap a rag around the hose end coupling and relieve pressure gradually by **very slowly** partially loosening the fitting. Then loosen completely, then clear the obstruction.

### WARNING



#### HAZARDOUS VAPORS

The air motor exhaust coming out of the muffler could contain harmful materials, such as oil, antifreeze, or some of the material being pumped.

## To Start the Pump

1. Turn the air regulator to the minimum setting.
2. Direct the outlet hose into a waste container.
3. Open the bleed-type master air valve.
4. Slowly adjust the air regulator until the pump is running smoothly and all air has been pumped out of the pump and hoses. If the pump contains solvent, be sure to pump it all into the waste container.
5. Use the air regulator to control the pump speed and cycle rate. Always use the lowest pressure needed to obtain the desired results. This results in optimum system efficiency and reduces pump wear.

## NOTES:

- The pump only takes a few strokes to prime. However, in a large system, it may take several minutes to completely prime the fluid lines.
- Never allow a pump to run dry of the fluid being pumped. A dry pump quickly speeds up and can damage itself. If it speeds up, shut off the air supply to the motor immediately. Refill the supply container, and prime the pump to eliminate air in the fluid line.
- To prevent air from being sucked into the pump and fluid lines if the supply container runs dry, use a low-level cutoff valve at the pump intake. *To order a 1 1/2-in. npt(f) thread connection low-level cutoff valve, Order Part No. 203688.*



# Troubleshooting

Problem	Cause	Solution
Pump does not run.	There is no fluid demand.	In a closed-end system the pump runs only when there is demand for fluid.
	Air supply is insufficient.	Check air supply. Increase air pressure or volume.
	Fluid outlet line or intake valve is clogged.	<b>Relieve the pressure.</b> Check and clear obstructions.
	Air motor parts are worn or damaged.	Check the piston o-rings (15a*, 15b*) and exhaust plate (15c*) for swelling. Replace if necessary. See page 10. Check the piston assembly (15). Be sure its screws are properly torqued (10 to 14 in-lb [1.3 to 1.6 N-m]) and that the assembly is hand-tightened onto the piston rod. Check the springs (8, 17) for wear or damage, and replace as needed.
Pump speeds up or runs erratically.	Material viscosity is too high.	Reduce viscosity. Reduce pump speed when running viscous materials.
	Pump throat packings, piston or piston packings, or intake valve is worn.	<b>Relieve the pressure.</b> Check and repair. See pages 10 and 11.
Pump slows down or runs erratically.	Air motor is icing.	Shut off pump and allow to warm up. Run pump at a lower air pressure.
Pump runs, but output is low on up or down stroke.	Pump piston and/or intake valve is worn.	<b>Relieve the pressure.</b> Check and repair. See pages 10 and 11.
Pump runs, but output is low on both strokes.	Air supply is insufficient.	Check air supply. Increase air pressure or volume.
	Fluid outlet line, intake valve, or dispense valve is clogged.	<b>Relieve the pressure.</b> Check and clear obstructions.

## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 8.

# Service

**NOTE:** Clean and inspect all parts for wear or damage when disassembled. Replace parts as needed. Repair Kit 247431 is available. For the best results, use all the parts in the kit. Parts included in the kit are marked with an asterisk in the text, figures, **Parts Drawing**, and **Parts List**.

## Intake Valve

See the **Parts Drawing** on page 13.

### 1. Relieve the pressure.

## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 8.

2. Unscrew the valve housing (21). Remove the o-ring (22\*), ball (23), and retainer (20).
3. Inspect the parts for wear or damage. If the ball is nicked, replace it. Apply liquid sealant to the male threads, and reassemble.

## Air Motor

See Fig. 3.

### 1. Relieve the pressure.

## WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 8.

2. Remove the air hose and fluid hoses.
3. Place the air motor base (5) in a vise.

## WARNING

To reduce the risk of injury from trapped air pressure when servicing the air motor, always remove air cap (2) from air cylinder (4) before removing air cylinder from base (5).

4. Remove the air cap (2). Gently pry the coils of the spring (17) to remove the spring. Check the spring for wear or damage, and replace as needed.
5. Use a strap wrench to unscrew the air cylinder (4) from the base (5).
6. Unscrew the air piston assembly (15) from the piston rod (10). Use pliers on the air exhaust plate (15c\*) and a wrench on the piston rod. See the **Piston Detail** in Fig. 3.

**NOTE:** Old, cured thread sealant on the piston rod threads makes it necessary that you use tools to remove the air piston assembly from the piston rod. **Do not use these tools when you screw the air piston assembly onto the piston rod.**

7. Disassemble the air piston assembly (15). See the **Piston Detail** in Fig. 3. Clean all parts, and inspect them for wear or damage. If any valve plate spacers are damaged, replace all three in order to maintain the correct clearance between the valve plates and seals.
8. Check the spring (8) for wear or damage, and replace as needed.
9. Apply sealant, such as Loctite® green, to the threads of the screws. Assemble the parts as shown in the **Piston Detail** in Fig. 3. Torque the screws to 10 to 14 in-lb (1.3 to 1.6 N-m).

## Displacement Pump

See Fig. 3, and see the **Parts Drawing** on page 13.

## WARNING

Do not cycle the pump with any parts disassembled. See the **Moving Parts Hazard** on page 4.

1. Use a strap wrench on the fluid cylinder (24) to unscrew it from the motor base (5). Pull down on the piston rod (10) until you have access to the fluid piston assembly (19).
2. Stand the fluid piston assembly (19) in a vise, and remove the piston rod (10).
3. Unscrew the fluid piston (19) from the piston rod (10), and be careful not to drop the ball (18). Remove the piston rod the rest of the way from the base.
4. Remove the shaft seal (16\*), wiper ring (11\*), and the gasket (9\*) from the top of the motor base (5).
5. Reach inside the opening of the air motor base (5) to remove the o-ring (26\*). Carefully remove the wiper ring (11\*) and the seal (12\*) from the motor base.
6. Carefully inspect the smooth inner surface of the fluid cylinder (24) for scoring or irregular surfaces. Such damage causes premature packing wear and leaking, so replace the part if needed.
7. Lubricate and install the new shaft seal (16\*), wiper ring (11\*), and gasket (9\*), seal (12\*), wiper ring (11\*), and o-ring (26\*) into the base.
8. Lubricate the new seal (19b\*), and install it on the fluid piston (19c).
9. Install washer (19a) onto fluid piston (19c).

# Service

10. Place the ball (18) on the fluid piston (19c).
11. Apply thread sealant to the threads of the fluid piston (19), screw the fluid piston onto the piston rod (10), and torque to 23 ft-lb (31.2 N•m).
12. Install the air motor rod assembly by inserting it up through the base from the bottom.
13. Install the spring (8) and the washer (7) on top of the piston rod (10).
14. Apply sealant to the threads of the piston rod (10). Carefully hand tighten the air piston assembly (15) onto the piston rod until it is secure. **Do not tighten with tools.**
15. Lubricate the outside of the air piston assembly (15). Install the spring (17) into the cap (2). Lubricate the gasket (6\*), and install it in the cap. Install the cap on the cylinder (4).
16. Assemble the cylinder (4) onto the base (5). Screw the cylinder and base together hand tight.
17. Screw the intake valve housing (21) of the assembled intake valve assembly onto the fluid cylinder (24).
18. Heavily lubricate the top inside diameter of the fluid cylinder (24) and the outside threads. Carefully guide the fluid piston assembly into the fluid cylinder. Push the fluid cylinder up, and screw it into the pump base. Use a pipe wrench on the knurled part of the intake valve housing (21) to tighten the fluid cylinder and the intake valve.

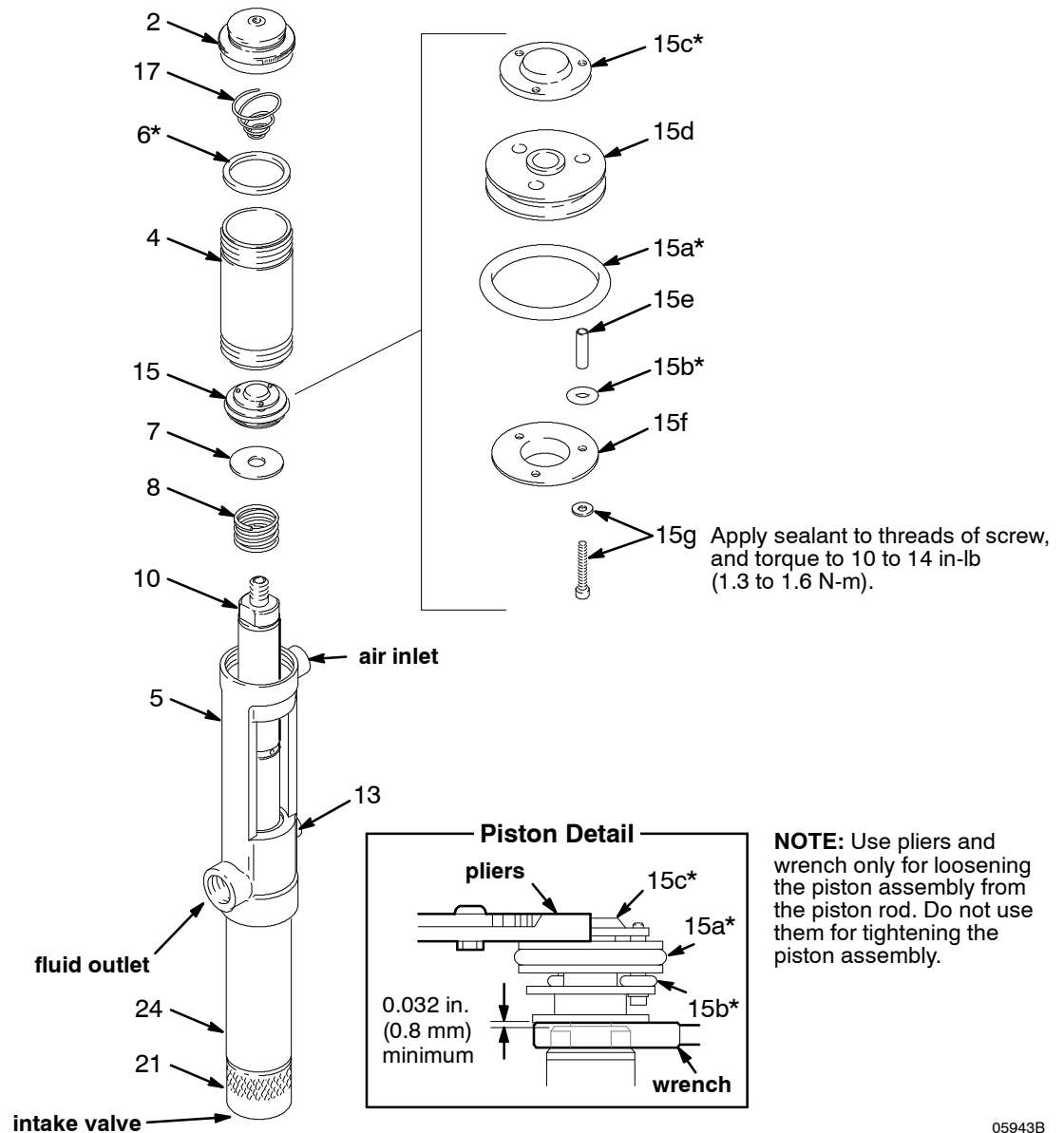


Fig. 3

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# Parts List

## Model 222051, Series E Universal Pump

Includes items 1 through 27

## Model 222103, Series E 55-Gallon Drum Bung-Mount Pump

Includes items 1 through 26  
and 28 through 31,

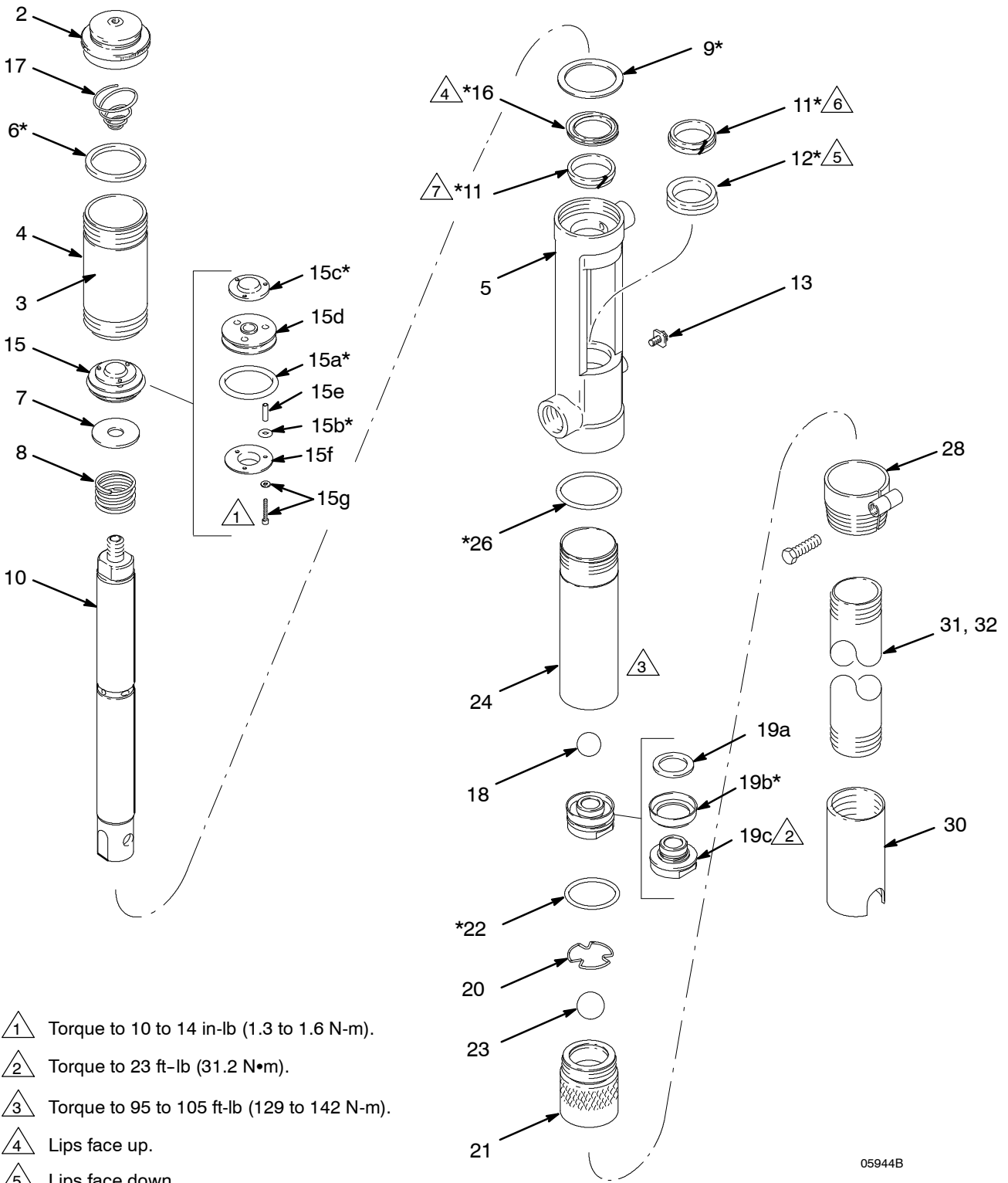
## Model 222104, Series E 275-Gallon Tank Bung-Mount Pump

Includes items 1 through 26,  
28 through 30, and 32

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1		AIR MOTOR <i>(includes items 2 through 17)</i>	1	16*	121010	SEAL, shaft	1
2	168825	CAP, air motor	1	17	157630	SPRING, compression, cap	1
3	185218	LABEL, identification	1	18	100279	BALL, steel 0.88" (22.2 mm) dia	1
4	185528	CYLINDER, air	1	19a	116153	WASHER	1
5	183520	BASE, air motor	1	19b*	116152	CUP, piston	1
6*	162989	GASKET	1	19c	196802	PISTON, fluid	1
7	157872	WASHER, valve	1	20	157182	RETAINER, ball	1
8	157633	SPRING, compression, piston	1	21	183009	HOUSING, intake valve	1
9*	158109	GASKET	1	22*	156633	O-RING, nitrile rubber	1
10	191389	PISTON ROD	1	23	101190	BALL, steel; 1" (25 mm) dia	1
11*	185428	RING, wiper	2	24	196803	CYLINDER, fluid	1
12*	110247	SEAL	1	26*	156641	O-RING, buna-N	1
13	116343	SCREW, ground	1	28	222308	BUNG ADAPTER	1
15	24J679	KIT, air valve <i>(includes items 15a through 15g)</i>	1	30	110127	SPACER, foot	1
15a*	108357	.O-RING	1	31	191130	TUBE, extension, 55-gal drum	1
15b*	108358	.O-RING	3	32	191131	TUBE, extension, 275-gal tank	1
15c*	162729	.PLATE, air exhaust valve	1				
15d	189210	PISTON	1				
15e	181485	SPACER, valve plate	1				
15f	181487	PLATE, valve	1				
15g	220884	SCREW / GASKET assy	1				

\* Included in Repair Kit 247431

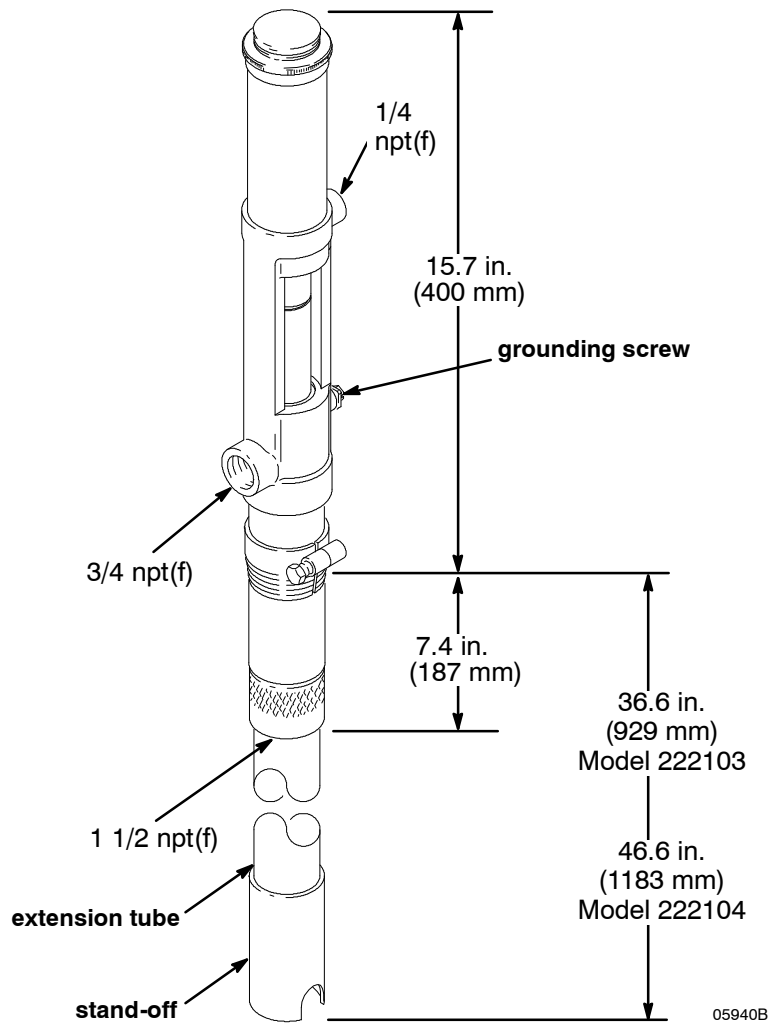
# Parts Drawing



- △1 Torque to 10 to 14 in-lb (1.3 to 1.6 N-m).
- △2 Torque to 23 ft-lb (31.2 N•m).
- △3 Torque to 95 to 105 ft-lb (129 to 142 N-m).
- △4 Lips face up.
- △5 Lips face down.
- △6 Smaller OD up.
- △7 Smaller OD down.

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# Dimensional Drawing



## Technical Data

Maximum working pressure ..... 180 psi  
(1.2 MPa, 12.4 bar)

Fluid pressure ratio ..... 1:1

Air pressure range ..... 40 to 180 psi  
(0.28 to 1.2 MPa, 2.8 to 12.4 bar)

Air consumption ..... Approximately 1.5 cfm  
(0.042 m<sup>3</sup>/min)  
at 1 gpm (3.8 lpm) at 100 psi  
(0.7 MPa, 7 bar) air pressure

Sound data\*  
Sound pressure level ..... 74.9 dB(A)  
Sound power level ..... 83.5 dB(A)

Effective piston area ..... 1.48 sq in. (9.55 sq cm)

Piston rod diameter ..... 1.375 in. (34.9 mm)

Stroke length ..... 4 in. (101 mm)

Wetted parts ..... carbon steel, aluminum, urethane,  
UHMWPE

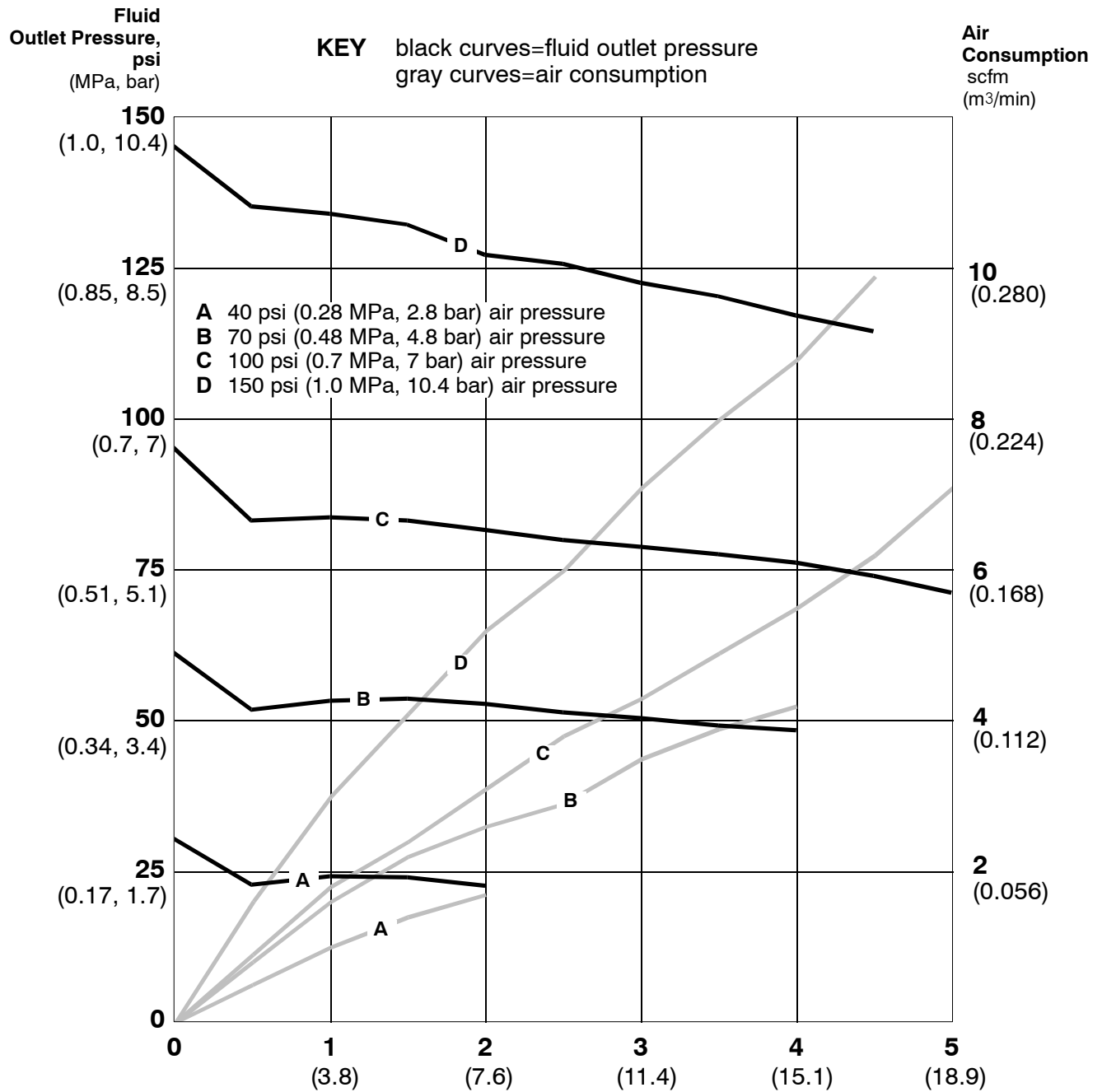
Approximate weight  
Model 222051 ..... 8 lb (3.6 kg)  
Model 222103 ..... 13 lb (5.9 kg)  
Model 222104 ..... 14 lb (6.4 kg)

Maximum temperature ..... 180°F (82°C)

\* Sound measurements were taken at 100 psi air  
(0.7 MPa, 7 bar) inlet pressure at 40 cycles per  
minute per ISO Standard 3744.

Loctite® is a registered trademark of Loctite  
Corporation.

# Performance Curves



Test Fluid: No. 10 weight oil at 75° F (23.9° C)

**To find fluid outlet pressure** at a specific fluid flow and operating air pressure:

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

**To find pump air consumption** at a specific fluid flow and air pressure:

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

# 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 the following numbers to identify the distributor closest to you:

**1-800-533-9655 Toll Free**

**612-623-6928**

**612-378-3590 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 307906  
For patent information: [www.graco.com/patents](http://www.graco.com/patents)

**Graco Headquarters:** Minneapolis  
**International Offices:** Belgium, Korea, China, Japan

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

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