



50:1 Mini Fire-Ball 225 Grease Pump

309966J
EN

For pumping non-corrosive and non-abrasive greases and lubricants only. For professional use only.
Not for use in explosive atmospheres.

- Model No. 246909, Series C, Pail Length
- Model No. 246780, Series C, 120-lb Drum Length
- Model No. 246781, Series C, 400-lb Drum Length
- Model No. 253361, Series C, Pail Length Without Handle

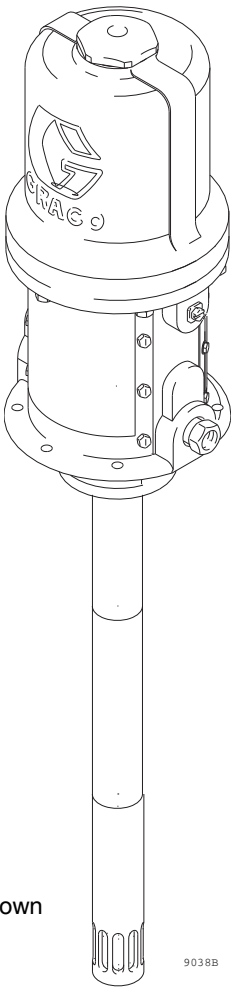
8400 psi (58 MPa, 580 bar) Maximum Working Pressure
140 psi (1.0 MPa, 10 bar) Maximum Air Working Pressure



Important Safety Instructions
Read all warnings and instructions in this manual.
Save these instructions.

Table of Contents

Warnings	2
Installation	4
Operation	6
Troubleshooting	7
Displacement Pump Service	8
Air Motor and Throat Service	11
Parts	14
Dimensional Drawings	16
Mounting Hole Layout	16
Technical Data	17
Graco Standard Warranty	18
Graco Information	18



Model No. 246780 shown

9038B

Warnings

The following general warnings are for the setup, use, grounding, maintenance, and repair of this equipment. Additional, more specific warnings may be found throughout the body of this manual where applicable. *Symbols appearing in the body of the manual refer to these general warnings. When these symbols appear throughout the manual, refer back to these pages for a description of the specific hazard.*

 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 forms from distributor or retailer. - Check equipment daily. Repair or replace worn or damaged parts immediately with genuine Graco replacement parts only. - Do not alter or modify equipment. - Use equipment only for its intended purpose. Call your Graco 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.
	SKIN INJECTION HAZARD High-pressure fluid from dispense valve, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment. - Do not point dispense valve at anyone or at any part of the body. - Do not put your hand over the end of the dispense nozzle. - Do not stop or deflect leaks with your hand, body, glove, or rag. - Follow Pressure Relief Procedure in this manual, when you stop dispensing and before cleaning, checking, or servicing equipment.
	MOVING PARTS HAZARD Moving parts can pinch or amputate fingers and other body parts. - Keep clear of moving parts. - Do not operate equipment with protective guards or covers removed. - Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure in this manual. Disconnect power or air supply.



WARNING



FIRE AND EXPLOSION HAZARD

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:

- 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.
- 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.
- Use only grounded hoses.
- 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.



TOXIC FLUID OR FUMES HAZARD

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

- Read MSDS's to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.



PERSONAL PROTECTIVE EQUIPMENT

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, inhalation of toxic fumes, burns, and hearing loss. This equipment includes but is not limited to:

- Protective eyewear
- Clothing and respirator as recommended by the fluid and solvent manufacturer
- Gloves
- Hearing protection

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.

Ground the following equipment:

- *Pump:* Use a ground wire and clamp as shown in FIG. 1.
- *Fluid hoses:* Use only electrically conductive hoses.
- *Air compressor:* Follow the manufacturer's recommendations.
- *Fluid supply container:* Follow the local code.
- *To maintain grounding continuity when flushing or relieving pressure,* always hold a metal part of the valve firmly to the side of a grounded metal pail, 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 the ground wire (Y). Fasten the ground screw back onto the pump and tighten securely. Connect the other end of the ground wire to a true earth ground. See FIG. 1. *To order a ground wire and clamp, order Part No. 222011.*

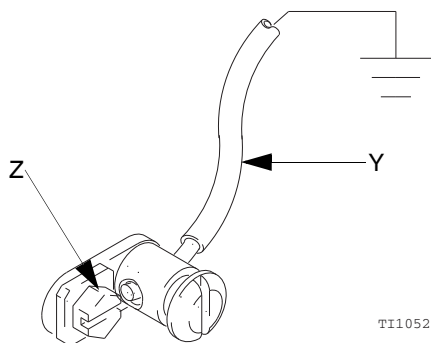


FIG. 1

Mounting



Mount the pump securely so that it cannot move around during operation. Failure to do so could result in personal injury or equipment damage.

1. Plan the mounting layout for easy operator access to the pump air controls, sufficient room to change drums and a secure mounting platform.
2. If using a follow plate (H), remove the drum cover. Scoop the material to the center of the drum to make the surface convex. Place the plate on the material. Guide the pump foot valve through the plate.
3. Mount the pump to the drum cover or other suitable mounting device.
4. Install a pump elevator for easier changing of drums,

Air and Fluid Line and Accessories

See FIG. 2.



Three accessories are **required** in your system: an air shut-off valve/air bleed device, fluid drain valve, and ground wire. These accessories help reduce the risk of serious bodily injury, including skin 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 air bleed device 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. Use a bleed-type master air valve (J), installed near the pump air inlet within easy reach from the pump.
- The fluid drain valve (K) 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 (B) reduces the risk of static sparking.

CAUTION

Do not hang the air accessories directly on the air inlet. The fittings are not strong enough to support the accessories and may cause one or more to break. Provide a bracket on which to mount the accessories.

 Install the air line accessories in the order shown in FIG. 2.

1. Install a pump runaway valve (G) to shut off the air to the pump if the pump accelerates beyond the pre-adjusted setting. A pump that runs too fast can be seriously damaged.
2. Install an air line lubricator (F) for automatic air motor lubrication.
3. Install a bleed-type master air valve (J) to relieve air trapped between the valve and the motor. Order Part No. 107142.
4. Install an air regulator (C) to control pump speed and pressure.
5. Install an air line filter (E) to remove harmful dirt and contaminants from your compressed air supply.
6. Install a second bleed-type master air valve (J) upstream from all other accessories, to isolate the accessories for servicing.

Typical Installation for Stationary Mountings

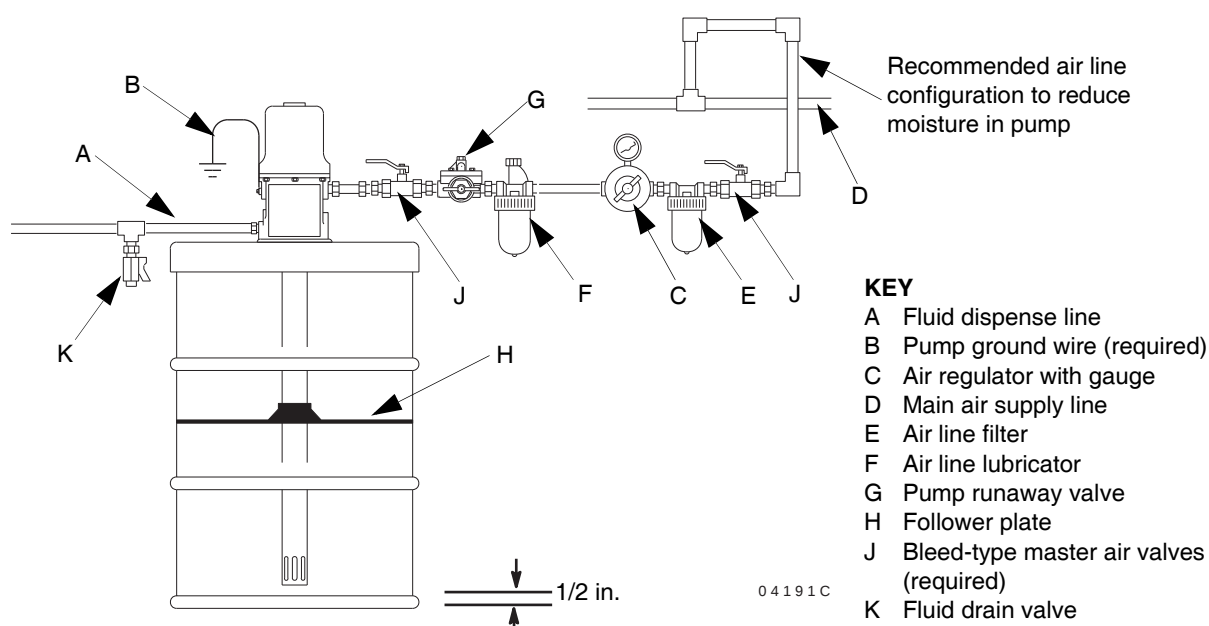
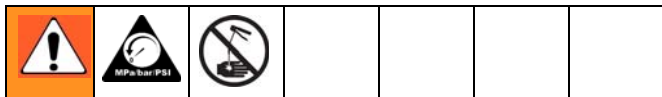


FIG. 2

Operation

Pressure Relief Procedure



The equipment stays pressurized until pressure is manually relieved. To reduce the risk of serious injury from pressurized fluid, fluid from the valve, or splashing fluid, follow this procedure whenever you:

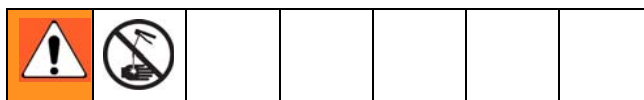
- are instructed to relieve pressure
 - stop dispensing
 - check, clean, or service any system equipment
 - install or clean dispensing devices.
1. Close the pump air regulator and the bleed-type master air valve (required in your system).
 2. Hold a metal part of the dispensing valve firmly to a grounded metal waste container and trigger the valve to relieve the fluid pressure.

Startup

1. If there are multiple pumps on the air line, close the air regulators and bleed-type master air valves to all but one pump. If there is only one pump, close its air regulator and bleed-type master air valve.
2. Open the master air valve from the compressor.
3. Open the dispensing valve into a grounded metal waste container, making firm metal-to-metal contact between the container and valve. Open the bleed-type master air valve and open the pump air regulator slowly, just until the pump is running. When the pump is primed and all air has been pushed out of the lines, close the dispense valve.
4. If you have more than one pump, repeat this procedure for each pump.

 When the pump is primed, and with sufficient air supplied, the pump starts when the dispensing valve is opened and shuts off when it is closed.

5. Set the air pressure to each pump at the lowest pressure needed to get the desired results.



 The pump has a rated ratio of 50:1. However, it is capable of reaching stall pressures equal to 60 times the air input pressure. Calculate the fluid output pressure using the air regulator reading. Multiply the air pressure shown on the regulator gauge by 60. For example:

140 psi air x 60 = 8400 psi fluid output
 (0.97 MPa air = 58.2 MPa fluid output
 99.7 bar air x 60 = 582 bar fluid output

Regulate air to the pump so that no air line or fluid line component or accessory is overpressurized.

6. Never allow the pump to run dry of the material being pumped.

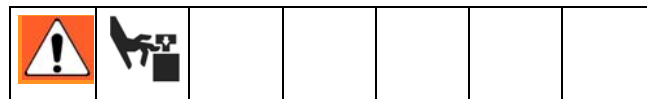
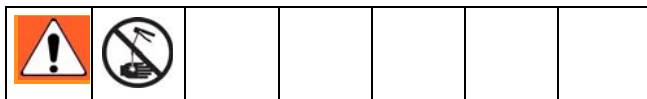
CAUTION

A dry pump will quickly accelerate to a high speed, possibly damaging itself. If your pump accelerates quickly, or is running too fast, stop it immediately and check the material supply. If the supply container is empty and air has been pumped into the lines, prime the pump and lines with material, or flush it and leave it filled with a compatible solvent. Be sure to eliminate all air from the material lines.

 A pump runaway valve can be installed on the air line to automatically shut off the pump if it starts to run too fast.

7. Read and follow the instructions supplied with each component in your system.
8. To shut off the system, always follow the **Pressure Relief Procedure**.

Troubleshooting



 Relieve pressure before you check or service any system equipment.

Problem	Cause	Solution
Pump fails to operate	Inadequate air supply pressure or restricted air lines	Increase air supply and/or clear restriction.
	Closed or clogged pump valves	Open and/or clean.
	Clogged fluid line, hose, valve, or other accessory	Relieve pressure. Clear obstruction.
	Damaged air motor	Assess damage, and service air motor.
	Exhausted fluid supply	Refill and reprime or flush.
Continuous air exhaust	Worn or damaged air motor gasket or seal	Assess wear or damage, and service air motor.
Erratic pump operation	Exhausted fluid supply	Refill and reprime or flush.
	Worn pump seals	Replace.
	Damaged shovel tube	Replace.
	Damaged check seat	Replace pump piston or shovel rod (or other damaged part).
Errataic or accelerated pump speed	Exhausted fluid supply	Refill and reprime of flush.
	Fluid too heavy for pump priming	Use inductor or follow plate.
	Held open or worn piston valve or seal	Clear valve; replace seal.
	Held open or worn intake valve or seal.	Clear valve; replace seal.
Pump operates, but output low on up stroke	Worn piston seal	Replace.
	Damaged upper check seat	Replace pump piston.
Pump operates, but output low on down stroke	Worn fluid intake seal	Replace.
	Damaged lower check seat	Replace shovel rod.
Pump operates, but output low on both strokes	Inadequate air supply pressure or restricted air lines	Increase air supply and/or clear restriction.
	Closed or clogged pump valves	Open and/or clean.
	Exhausted fluid supply	Refill fluid supply, and reprime pump.
	Clogged fluid line, hose, valve, or other accessory	Relieve pressure. Clear obstruction.
	Worn seals	Replace.
Grease leaking from muffler plates	Worn throat seal	Replace.

Displacement Pump Service

- Be sure you have all necessary parts on hand before you start. If using a repair kit, use all the parts in the kit for the best results.
- Displacement Pump Repair Kit 246920 is available. Parts included in the kit are marked with a dagger (†) in the parts drawing and list.



Disassembly

1. Flush pump.
2. **Relieve pressure, (page 6).**
3. Disconnect hoses and remove pump from its mounting. Clamp the air motor base (5) in a vise.

CAUTION

To avoid damaging the shovel tube, do not use slots in the tube to tighten or loosen tube.

4. Use strap wrench to remove shovel tube (67).
5. Unscrew shovel (66) from priming rod (58).
6. Unscrew seal retainer (63) from pump cylinder (59). Remove o-ring (61) from seal retainer. Inspect all parts for damage.
7. Use a strap wrench to remove pump cylinder (59) from the extension tube (64). Remove intake seal (62) from pump cylinder. Remove gasket seal (60) from pump cylinder. Inspect all parts for damage.
8. Use a small punch to drive pin (53) out of connecting rod (57) and piston (52) connection. Unless priming rod (58) is damaged, leave the pin connecting the piston (52) and priming rod (58) assembled.
9. Unscrew piston/priming rod assembly from the connecting rod (57). Slide piston seal (54) off piston and inspect for damage.

10. Check to make sure there is endplay at pinned connections.

When there is *endplay* at the pinned connection, you should be able to slightly move from side-to-side, the connecting rod (57) pinned to the displacement rod (8) and the piston (52) pinned to the priming rod (58).

If these connections seem too rigid:

- remove the pin
- adjust hole alignment by 1/2 turn in the direction that aligns the thru holes as close as possible, axis-to-axis (FIG. 3). Improper alignment take the self-aligning feature out of the design, which could result in damage to the pump.

Fig 1 - 1/2 Turn Too Deep

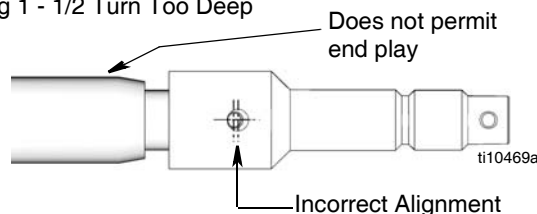


Fig 2 - 1/2 Turn Too Shallow

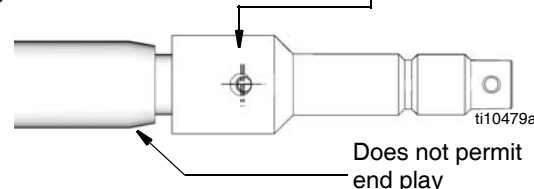


Fig 3 - Correct

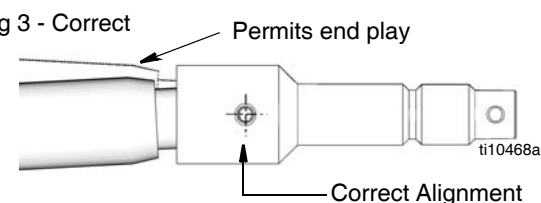


FIG. 3

11. Clean all parts in a compatible solvent and inspect them for wear or damage.

Reassembly

1. Slide piston seal (54) on piston/priming rod (58) assembly.
2. Screw priming rod (58) assembly onto connecting rod (57). Align the thru holes as close as possible, axis-to-axis (FIG. 3). See *endplay* Note included in Step 10, Pump Disassembly instructions (page 8) for additional assembly instructions.
3. Generously lubricate all parts of the shaft assembly with a light, water resistant grease.
4. Replace the gasket seal (60) on the pump cylinder (59). Screw the pump cylinder onto the extension tube (64).
5. Slide the intake seal (62) onto the priming rod (58) flat side down.
6. Replace the o-ring (61) on the seal retainer (63). Slide the seal retainer over the priming rod (58) and screw into the pump cylinder. Using the seal retainer torque the entire cylinder assembly to 44-55 ft-lbs (61-75 N.m).
7. Screw the shovel (66) on the priming rod (58). Screw the shovel tube (67) on the seal retainer (63).
8. If the ground wire was disconnected before servicing, be sure to reconnect it before you operate the pump.

1 Using nut (63), torque the pump cylinder (59) to the extension tube (64) at 45-55 ft-lb (61-75 N•m).

2 Lubricate.

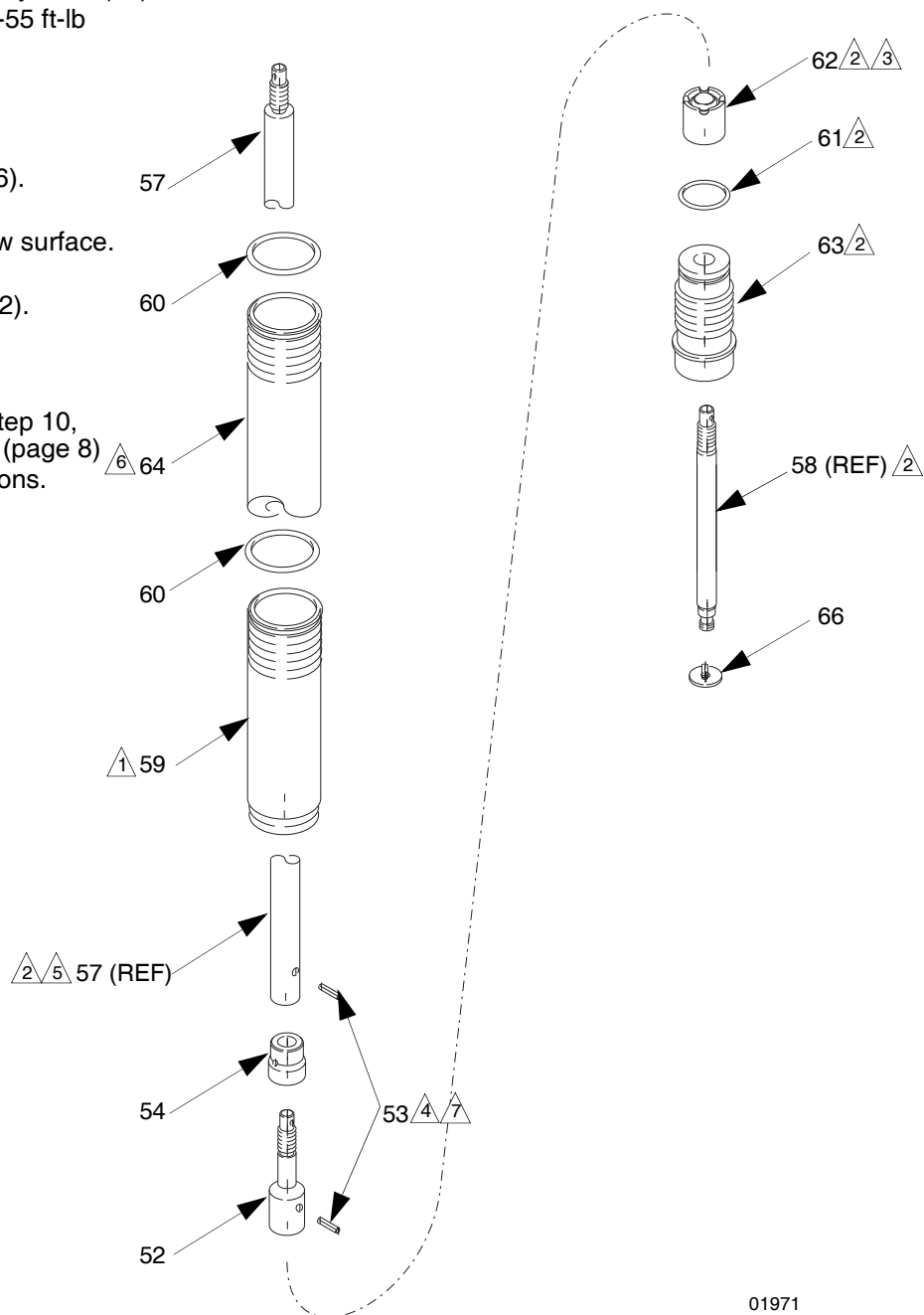
3 Flat side must face retainer (106).

4 Assemble pin (53) flush or below surface.

5 Large bevel must face piston (52).

6 Lubricate inside diameter.

7 See *endplay* Note included in Step 10, Pump Disassembly instructions (page 8) for additional assembly instructions.



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FIG. 4

Air Motor and Throat Service

- Before you start, be sure you have all necessary parts on hand. Repair Kit 246919 is available for the motor. Use all the parts in the kit for the best results. Parts included in the kit are marked with an asterisk (*) in the parts drawing and list.
- Two accessory tools should be used. Order Padded Pliers, 248198, to grip the trip rod without damaging its surface. Use Gauge, 15E796 (included in kit), to ensure the proper clearance between the poppets and seat of the transfer valve.

Disassembly



1. Flush the pump.
2. Relieve the pressure before you proceed.
3. Disconnect the hoses, remove the pump from its mounting, and clamp the air motor base (5) in a vise.
4. Use a strap wrench or pipe wrench on the extension tube (64) to unscrew it from the base (5). See Fig. 4.
5. Pull the extension rod (57) down as far as it will go, exposing the displacement rod (8).
6. Use a hammer and punch to remove the roll pin (74) from the displacement rod (8), and unscrew the extension rod (57) from the displacement rod.

CAUTION

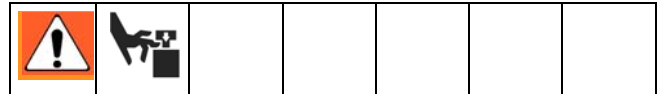
In step 7, do not damage the plated surface of the trip rod (11). A damaged trip rod could cause erratic air motor operation. Use the special padded pliers (248198) to grasp the rod.

7. Manually push on the displacement rod (8) to move the air motor piston (2) up as far as it will go. Unscrew the cylinder cap nut (29a or 29b). Pull the nut up. Grip the trip rod (11) with padded pliers, and unscrew the nut from the rod. See Fig. 4.

8. Remove the six screws (21) that hold the cylinder (17) to the base. Carefully pull the cylinder straight up off the piston (2).

CAUTION

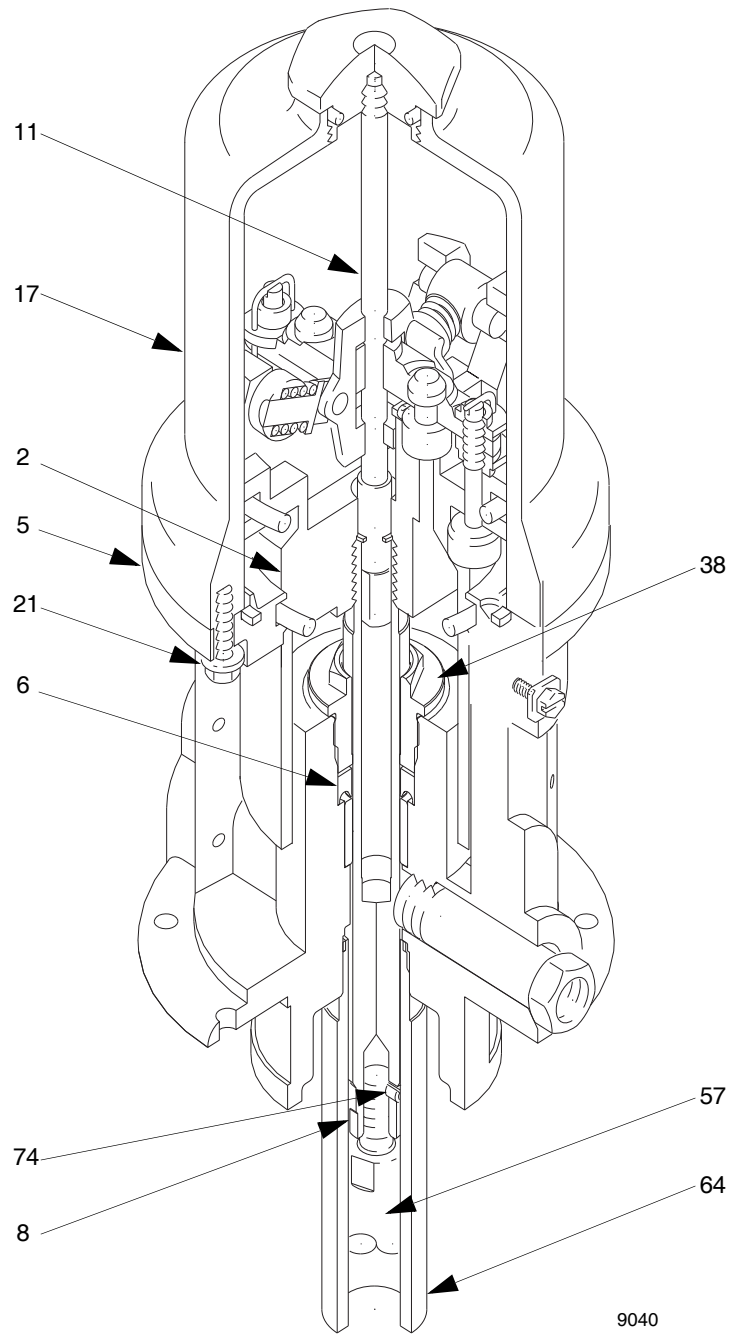
To avoid damaging the cylinder wall, lift the cylinder straight up off of the piston. Never tilt the cylinder while you are removing it.



9. Use a screwdriver to push down on the trip rod yoke (22). Always keeping fingers clear of the toggle assemblies (L), snap the toggles down. Straighten the lockwires (31) and remove them from the adjusting nuts (30) of the transfer valves. Remove the top nuts. Unscrew the stems (1) from the grommets (12) and bottom nuts. Squeeze orange poppets (1) firmly to check for cracks. See Fig. 5.
10. Grip the toggle rockers (26) with a pliers. Compress the springs (27), and swing the toggle assembly (L) up and away from the piston lugs (M), and remove the parts. Check to see that the valve actuator (13) is supported by the spring clips (14), but slides easily into them. See Fig. 5.
11. Remove the trip rod yoke (22), actuator (13), and trip rod (11). Check the exhaust valve poppets (16) for cracks.

 To remove cracked exhaust valve poppets (16), stretch them out, and cut them with a sharp knife.

12. Remove one of the air motor plates (18 or 20). Pull the piston (2) up out of the base (5). Remove the throat packing nut (38) and throat seal (6).



Torque extension tube (64) to the base (5)
at 45 to 55 ft-lb (61 to 75 N•m).

FIG. 5

Reassembly

1. Clean all the parts carefully in a compatible solvent, and inspect for wear or damage. Use all the repair kit parts during reassembly, and replace other parts as necessary.
2. Check the polished surfaces of the piston (2), displacement rod (8), and cylinder (17) wall for scratches or wear. A scored rod causes premature throat seal wear and leaking.
3. Lubricate all parts with a light, water-resistant grease.
4. Install the new throat seal (6), **lips facing down**. Screw the packing nut (38) into the base (5).
5. Slide the displacement rod (8) down through the throat, and lower the piston (2) into the base (5). Be sure the o-rings (9, 10, and 24) are in place. See Fig. 4.
6. Pull the exhaust valve poppets (16) into the valve actuator (13), and clip off the top part shown with dotted lines in Fig. 5.
7. Install the air intake grommets (12), and reassemble the valve mechanism. Before you install the lock-wires (31) in the adjusting nuts (30), use the special gauge, 15E796, to adjust the transfer valve so there is $0.105 \pm .010$ in. clearance between the poppets (1) and the seat when it is open. See Fig. 5. Snap the toggles (25) to the up position. This is essential for reliable air motor performance.
8. Reassemble the air motor, and assemble to the displacement pump. Torque the extension tube (64) to base (5) at 45 to 55 ft-lb (61 to 75 N•m). Before you install the air motor plate, tighten the throat packing nut (38) snugly; do not overtighten it.
9. Before you remount the pump, connect an air hose, and run the pump slowly, at about 40 psi (276 kPa, 2.8 bar), to ensure that it operates smoothly.
10. Reconnect the ground wire before regular operation of the pump.

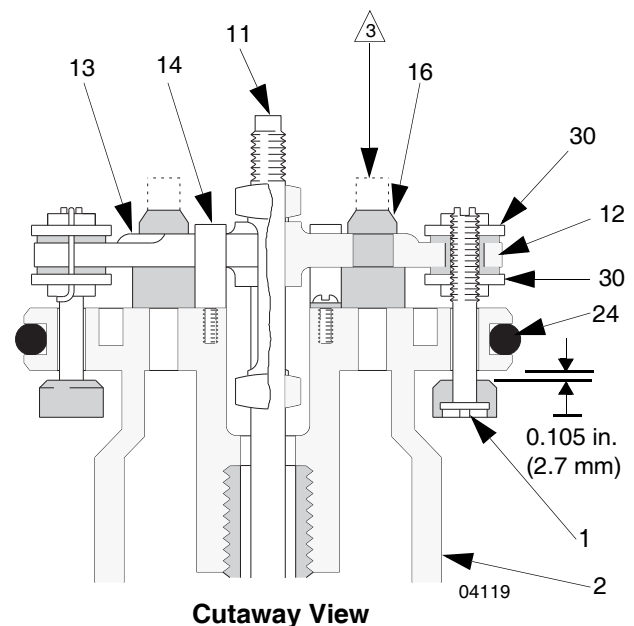
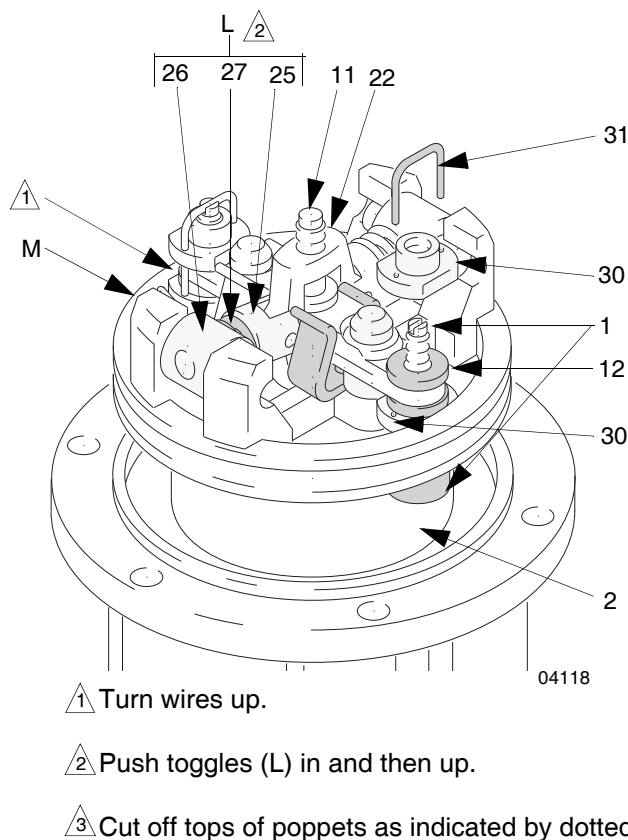


FIG. 6

Parts

Model No. 246909, Series C, Pail Length

Model No. 246780, Series C, 120-pound Drum Length

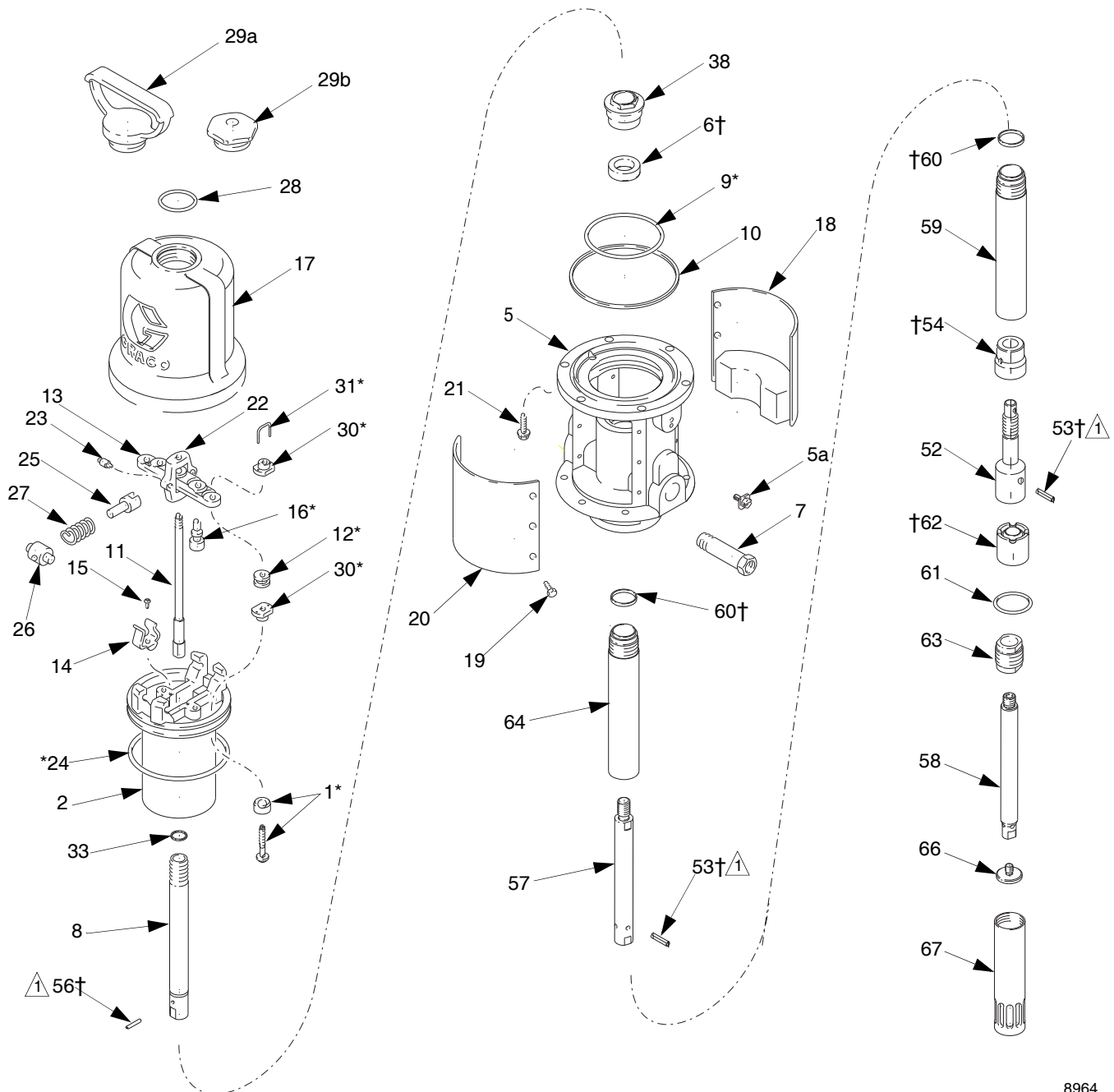
Model No. 246781, Series C, 400-pound drum length

Model No. 253361, Series C, Pail Length without Handle

* Replacements for these parts are available in Repair Kit 246919 which may be purchased separately.

† Replacements for these parts are available in Repair Kit 246920 which may be purchased separately.

⚠ See *endplay* Note included in Step 10, Pump Disassembly instructions (page 8) for additional assembly instructions.



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Air Motor

Ref. No	Part No.	Description	Qty
1*	248211	VALVE, poppet	2
2	15W205	PISTON, air motor	1
5	253999	BASE, air motor (includes 5a)	1
5a	116343	SCREW, grounding	1
6†	118355	SEAL, throat, polyurethane	1
7	162718	ADAPTER	1
8	15C527	ROD, displacement	1
9*	113347	O-RING, buna-N	1
10	118109	O-RING, buna-N	1
11	15C279	ROD, trip	1
12*	118107	GROMMET, rubber, air intake	2
13	15C249	ACTUATOR, valve	1
14	15C248	CLIP, spring	2
15	118718	SCREW, round head machine	2
16*	15C267	POPPET, valve, urethane	2
17	15C274	CYLINDER, air motor	1
18	246782	PLATE, identification; with muffler	1
19	100078	SCREW, hex head	12
20▲	246783	PLATE, warning; with muffler	1
21	101578	SCREW, hex head	6
22	15C245	YOKE, rod, trip	1
23	15C275	PIN, toggle	2
24*	118108	O-RING, nitrile rubber	1
25	15C277	ARM, toggle	2
26	15C276	ROCKER, toggle	2
27	118111	SPRING, helical compression	2
28	156698	O-RING, buna-N	1
29a	15F691	HANDLE NUT, cylinder cap (Model 246909)	1
29b	15C278	NUT, cylinder cap (Models 253361, 246780 and 246781)	1
30*	15C246	NUT, adjusting	4
31*	15C247	LOCKWIRE, transfer valve	2
33	15C266	GASKET, copper	1
38	15C530	NUT, packing	1

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

* Replacements for these parts are available in Repair Kit 246919 which may be purchased separately



Two accessory tools are required for air motor and throat service: padded pliers 248198 and gauge 15E796 (included in repair kit 246919) to ensure gap is set correctly

Pump

Ref. No	Part No.	Description	Qty
52	15G098	PISTON	1
53†	119956	PIN, straight	2
54†	15G116	SEAL, piston	1
56†	112154	PIN, straight, slotted	1
57	15C758	ROD, extension (Model 246909 and 253361)	1
	15C541	ROD, extension (Model 246780)	1
	15C542	ROD, extension (Model 246781)	1
58	15F296	ROD, shovel	1
59	15C537	CYLINDER, pump	1
60†	192533	SEAL, gasket	2
61	119955	O-RING	1
62†	15G096	SEAL, shovel rod	1
63	15F169	CONNECTOR, tube	1
64	192682	TUBE, extension (Model 246909 and 253361)	1
	193760	TUBE, extension (Model 246780)	1
	193758	TUBE, extension (Model 246781)	1
66	192660	SHOVEL	1
67	17A265	TUBE, shovel	1

† Replacements for these parts are available in Repair Kit 246920 which may be purchased separately

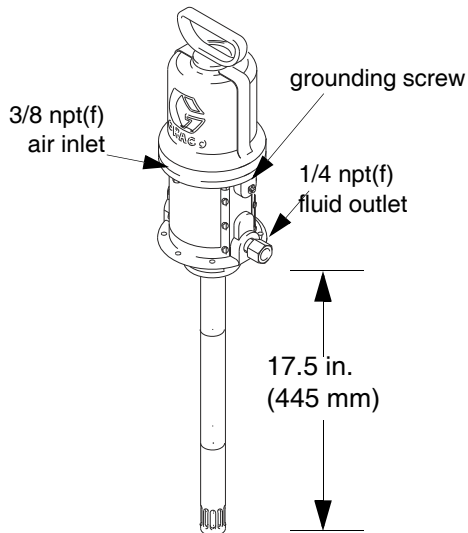
Dimensional Drawings

Model 246909

pail length

Model 253361

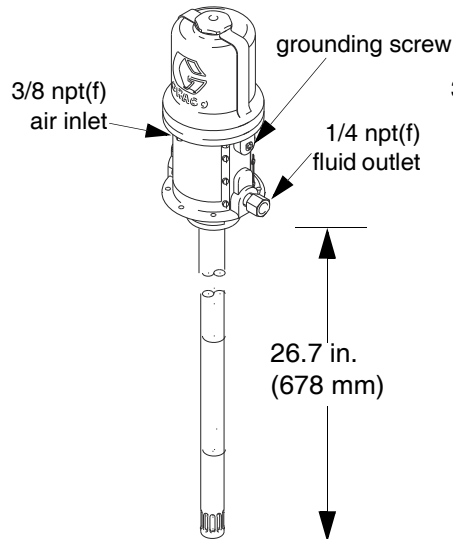
pail length without handle



Overall length:
30.2 in (768 mm)

Model 246780

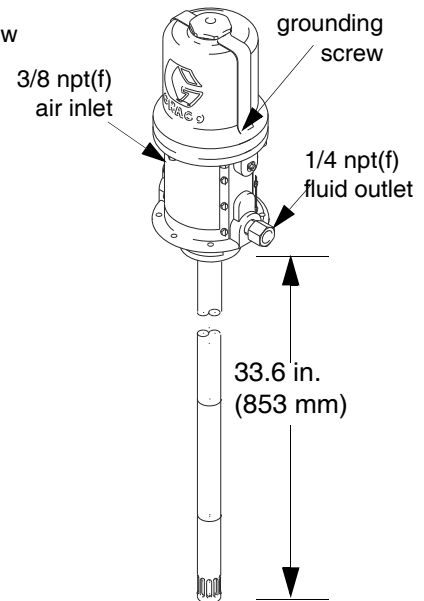
120 lb drum size



Overall length:
37.6 in (955 mm)

Model 246781

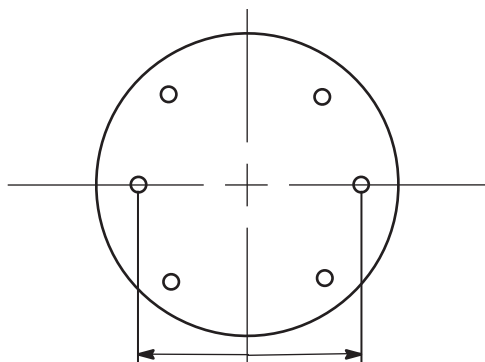
400 lb drum size



Overall length:
44.5 in (1130 mm)

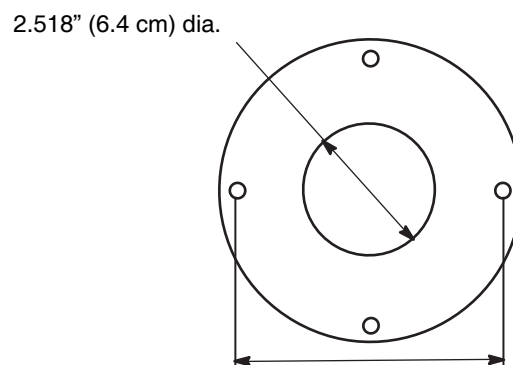
Mounting Hole Layout

Pump Base



4.250" (10.8 cm) bolt circle
0.281" (7.1 mm) diameter clearance holes

Order gasket 15R881 for sealed tank/drum mounting.



4.250" (10.8 cm) bolt circle
0.266" (6.7 mm) diameter clearance holes

Technical Data

Maximum fluid working pressure	8400 psi (58 MPa, 580 bar)
Maximum air inlet pressure	140 psi (1.0 MPa, 10 bar)
Ratio	50:1
Pump cycles per lb (.45 kg)	130
Maximum recommended pump speed	100 cycles/min
Recommended pump speed for continuous operation.	60 cycles/min
Maximum delivery	.56 lb/min (.25 kg/min) at 60 cycles/min
Stroke length	2.0 in. (50.8 mm)
Maximum pump operating temperature	130°F (54°C)
Air inlet size	3/8 npt(f)
Fluid outlet size	1/4 npt(f)
Wetted parts	carbon steel; zinc plating; brass; polyurethane; ultra-high molecular weight polyethylene; Buna-N
Sound pressure level (measured 1 meter from unit)	77.8 dB(A) @ 140 psi, 100 cpm
Sound power level (tested in accordance with ISO 9614-2	85.6 dB(A) @ 140 psi, 100 cpm
Approximate weight	15 lb (6.8 kg)

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Phone: 612-623-6928 **or Toll Free:** 1-800-533-9655, **Fax:** 612-378-3590

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Original instructions. This manual contains English. MM 309966

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