 This manual contains important warnings and information. **READ AND KEEP FOR REFERENCE.**

INSTRUCTIONS

First choice when quality counts.™

50:1 Ratio Fire-Ball® Grease Pumps

FOR LUBRICATING PRODUCTS ONLY

8400 psi (58 MPa, 580 bar) Maximum Fluid Working Pressure

140 psi (0.97 MPa, 9.7 bar) Maximum Air Working Pressure

Model No. 239877, Series B

pail length

Model No. 239887, Series B

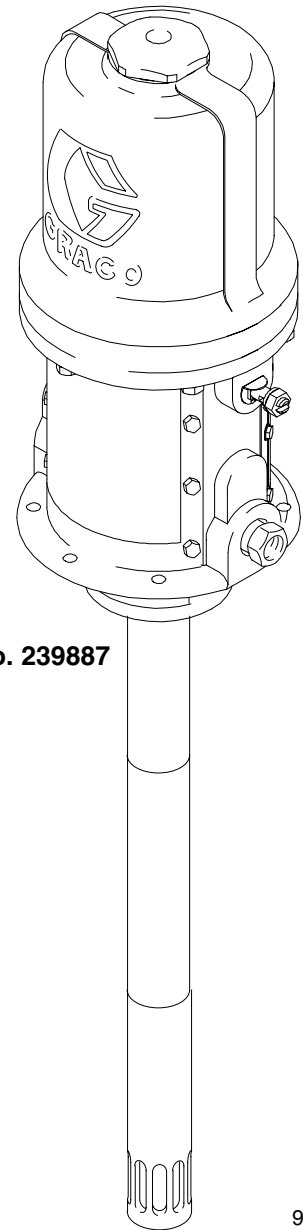
120-pound drum length

Model No. 239888, Series B

400-pound drum length

⚠ WARNING

This product is designed to be used only in pumping non-corrosive and non-abrasive lubricants and greases. Any other use can cause unsafe operating conditions and result in component rupture, fire, or explosion, which can cause serious injury, including fluid injection.



Model No. 239887 shown

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9038A

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 this equipment.
- Use the equipment only for its intended purpose. If you are not sure, call your Graco distributor.
- Do not modify this equipment.
- 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 **8400 psi (58 MPa, 580 bar) maximum working pressure at 140 psi (0.97 MPa, 9.7 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.
- 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 66°C (150°F) or below -40°C (-40°F).
- Do not move or lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

WARNING



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.

- Fluid injected into the skin might look like just a cut, but it is a serious injury. **Get immediate medical attention.**
- 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 which 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 7 if the grease fitting coupler clogs and before you clean or service this equipment.
- Tighten all fluid connections before you operate this 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 dispensed to. Refer to **Grounding** below.
- 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, such as the air motor piston, can pinch or amputate your fingers.

- Do not operate the pump with the air motor plates removed.
- Keep clear of all moving parts when you start or operate the pump.
- Before you service this equipment, follow the **Pressure Relief Procedure** on page 7 to prevent the equipment from starting unexpectedly.

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 all of this equipment:

- **Pump:** Use a ground wire and clamp as shown in Fig. 1.
- **Air and 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.*

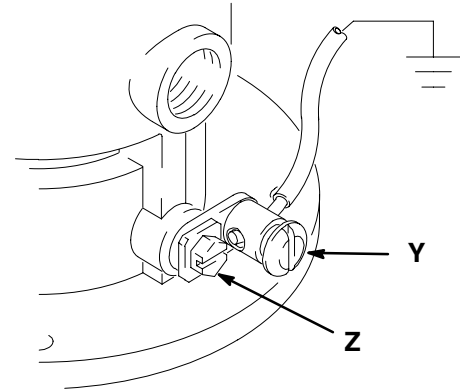


Fig. 1

T11052

For Stationary Mountings

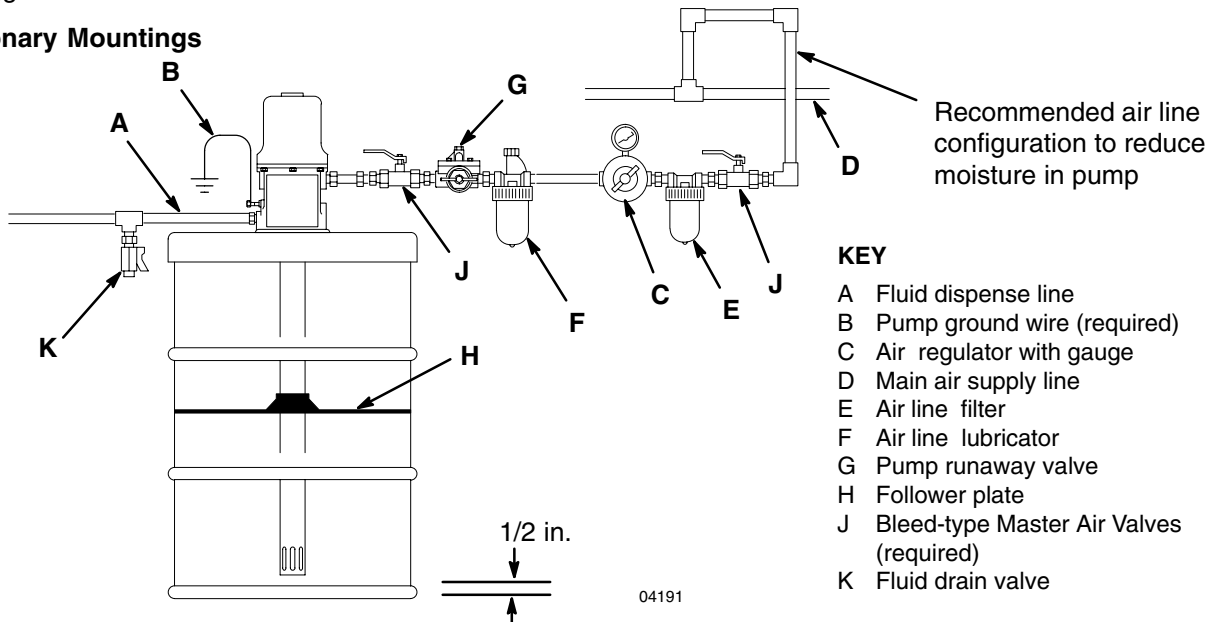


Fig. 2

Mounting

⚠ WARNING

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 concave. 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. For ease in changing drums, install a pump elevator.

Installation

Air and Fluid Line and Accessories

See Fig. 2 above.

WARNING

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 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 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). Install them 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.


NOTE: 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 (see **WARNING** at left). Order Part No. 107142.
4. Install the air regulator (C) to control pump speed and pressure (see **WARNING** at left).
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.

Operation

Pressure Relief Procedure

⚠ WARNING

 **INJECTION HAZARD**
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.

NOTE: 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.

⚠ WARNING

 **COMPONENT RUPTURE HAZARD**
The maximum working pressure of each component in the system may not be the same. To reduce the risk of overpressurizing any component in the system, be sure you know the maximum working pressure of each component. **Never** exceed the maximum working pressure of the lowest rated component in the system. Overpressurizing any component can result in rupture, fire, explosion, property damage, and serious injury.

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 x 60 = 58.2 MPa fluid output

9.7 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.

NOTE: A pump runaway valve (G) 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** at the left.

Troubleshooting

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 7.

⚠ WARNING



MOVING PARTS HAZARD

Never operate the pump with the warning plate or the identification plate removed. These plates protect your fingers from pinching or amputation by moving parts in the air motor.

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).
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 241623 is available. Parts included in the kit are marked with a dagger (†) in the parts drawing and list.

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 7.

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.

CAUTION

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

4. Use strap wrench to screw shovel tube (67) off of pump cylinder (59).
5. Use strap wrench to screw shovel (66) off of shovel rod (58).
6. Use strap wrench on pump cylinder (59) to screw it out of extension tube (64). Screw tube connector (63) out of pump cylinder. Remove bearing (61) and seal (62).

7. Screw the shovel rod (58) out of the piston (52). Remove the lower ball (56). Screw the piston out of the extension rod (57). Remove the upper ball (56), retaining washer (53), and seal (54).
8. Clean all the parts in a compatible solvent and inspect them for wear or damage. Use all the parts in the repair kit, and replace other parts as necessary.
9. Generously lubricate all the parts with light water-resistant grease and reassemble the pump.

NOTES:

Torque the shovel tube (67) to the pump cylinder (59) at 45 to 55 ft-lb (61 to 75 N-m), and torque the pump cylinder (59) to the extension tube (64) at 45 to 55 ft-lb (61 to 75 N-m).

Torque the shovel rod (58) to the piston (52) at 25 to 30 ft-lb (34 to 41 N-m), and torque piston (52) to the extension rod (57) at 25 to 30 ft-lb (34 to 41 N-m).

10. If the ground wire was disconnected before servicing, be sure to reconnect it before you operate the pump.

Displacement Pump Service

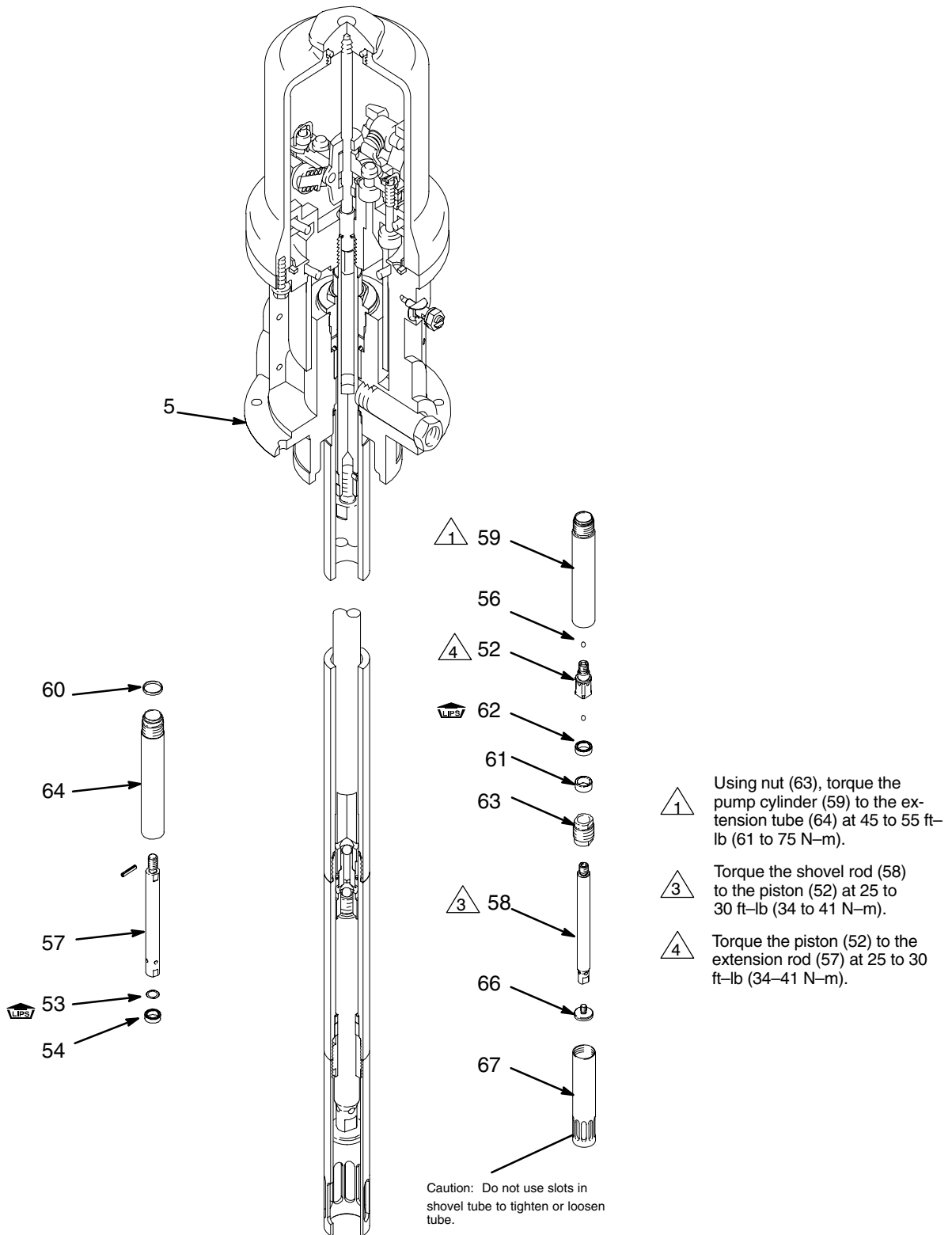


Fig. 3

Air Motor and Throat Service

- Before you start, be sure you have all necessary parts on hand. Repair Kit 206728 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 ordered. Use Padded Pliers, 207579, to grip the trip rod without damaging its surface. Use Gauge, 171818, to ensure the proper clearance between the poppets and seat of the transfer valve.

Disassembly

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 7.

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 screw it out of 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) out of 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, 207579, 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 screw the nut off 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.

WARNING

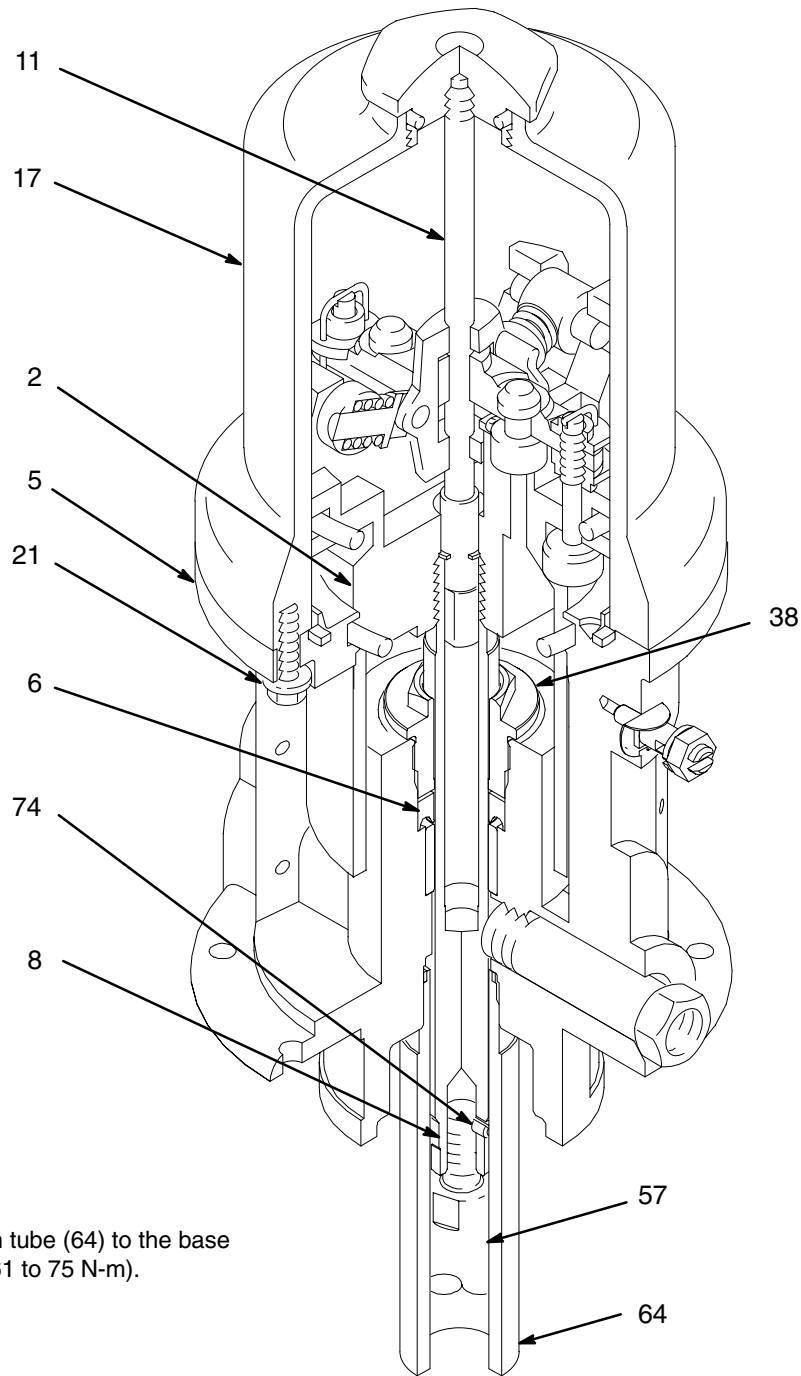
To reduce the risk of pinching or amputating your fingers, **always** keep fingers clear of the toggle assemblies (L). See Fig. 5.

9. Use a screwdriver to push down on the trip rod yoke (22), and snap the toggles down. Remove the lockwires (31) from the adjusting nuts (30) of the transfer valves. Screw the top nuts off. Screw the stems (1a) out of the grommets (12) and bottom nuts. Take the valve poppets (1b) off the stems and squeeze them 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.

NOTE: 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).

Air Motor and Throat Service



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

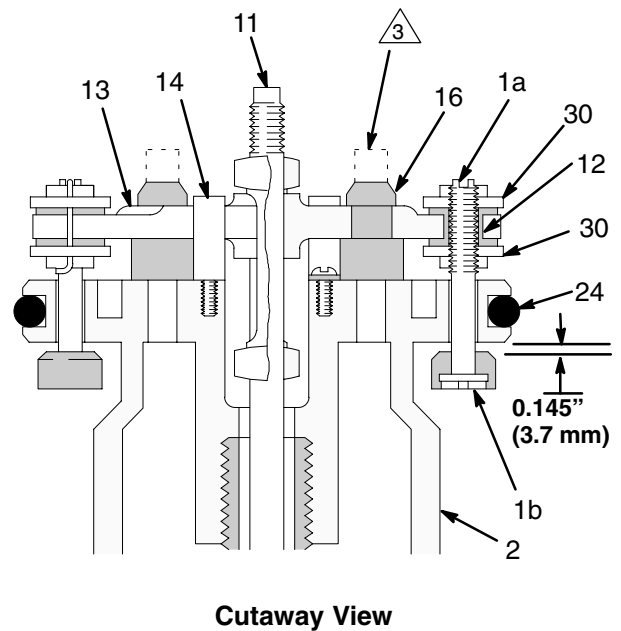
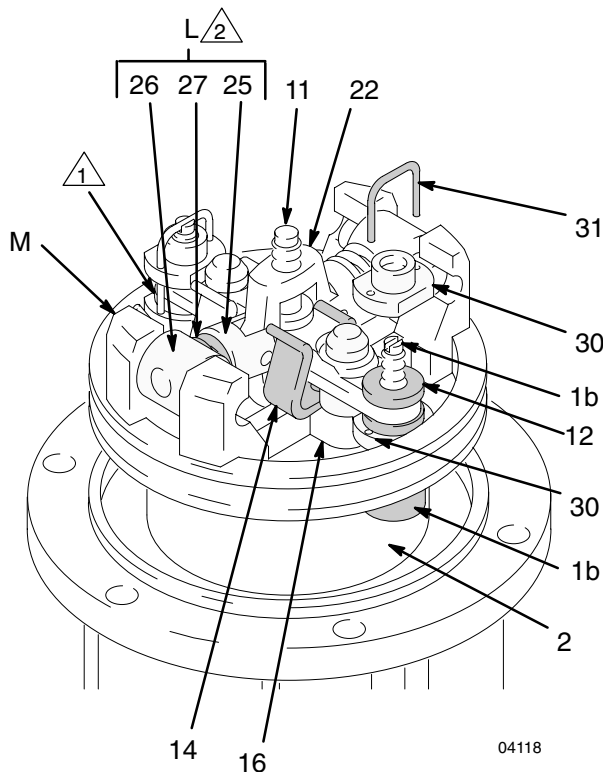
Fig. 4

9040A

Air Motor and Throat Service

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 transfer valve grommets (12), and reassemble the valve mechanism. Before you install the lockwires (31) in the adjusting nuts (30), use the special gauge, 171818, to adjust the transfer valve so there is 0.145 in. (3.7 mm) clearance between the poppets (1b) and the seat when it is open. See Fig. 5. Snap the toggles (25) to the up position.
8. Reassemble the air motor, and assemble to the displacement pump. Torque the extension tube (64) to 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 see that it operates smoothly.
10. Reconnect the ground wire before regular operation of the pump.



- 1 Turn wires up.
- 2 Push toggles (L) in and then up.
- 3 Cut off tops of poppets as indicated by dotted lines.

Fig. 5

Parts Drawing

Model No. 239877, Series B, pail length

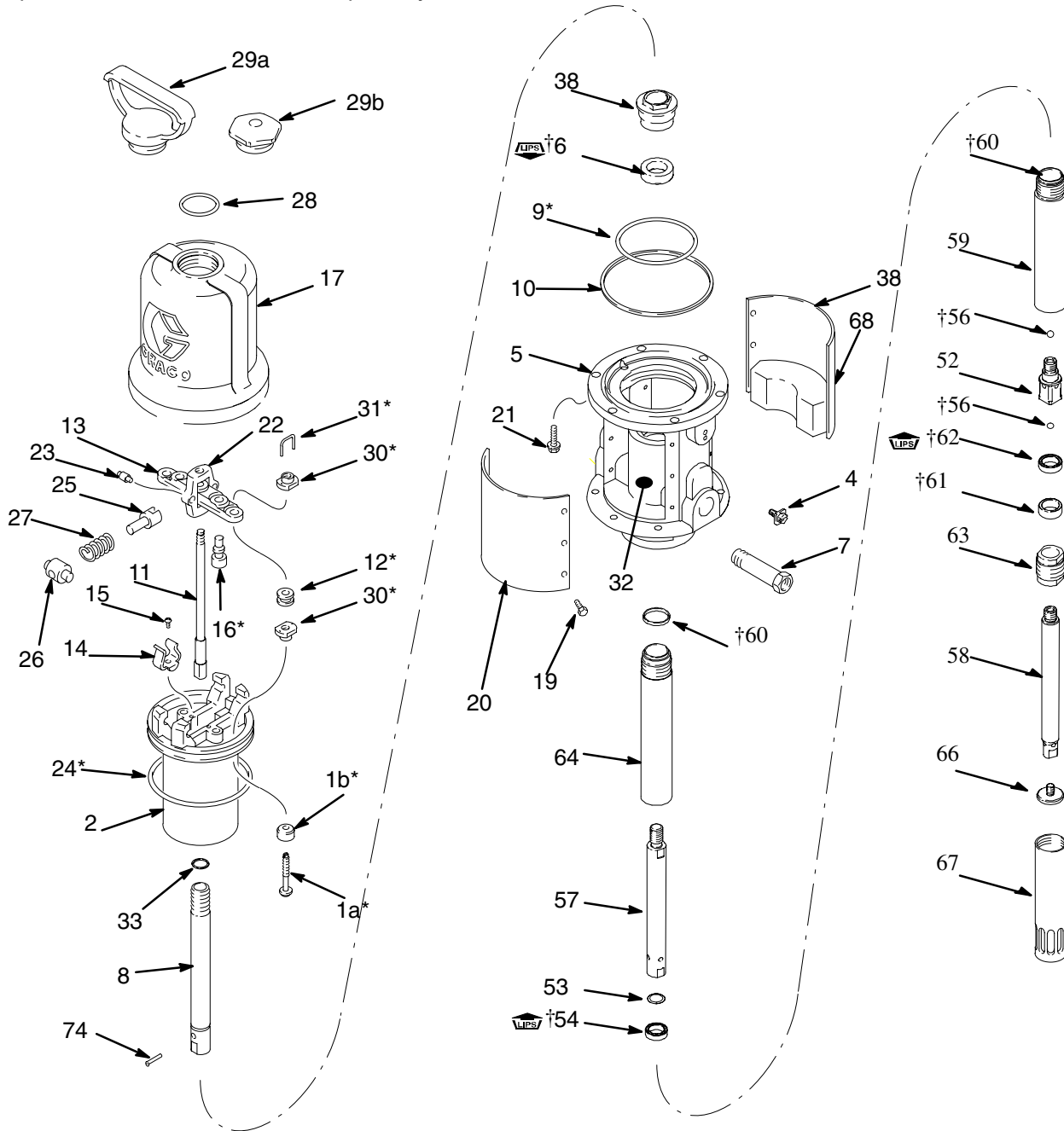
Model No. 239887, Series B, 120-pound drum length

Model No. 239888, Series B, 400-pound drum length

Air Motor Includes item 1 to 39

* The replacements for these parts are available in Repair Kit 206728. Purchase kit separately.

† The replacements for these parts are available in Repair Kit 241623. Purchase kit separately.



Parts List

Model No. 239877, Series B, pail length
Model No. 239887, Series B, 120-pound drum length
Model No. 239888, Series B, 400-pound drum length

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
A	238756	AIR MOTOR ASSEMBLY <i>Model 239877</i>		52	196184	PISTON	1
		(includes items 1 to 39)	1	53	196185	RETAINER, piston seal	1
	239886	AIR MOTOR ASSEMBLY <i>Models 239887 and 239888</i>		54†	114171	SEAL, piston	1
		(includes items 1 to 39)	1	56†	100065	BALL	2
1*	236079	.VALVE, poppet (includes items 1a and 1b)	2	57	192685	ROD, extension <i>Model 239877</i>	1
1a	160896	.STEM, valve	1		192684	ROD, extension <i>Model 239887</i>	1
1b	170708	.POPPET, valve; urethane	1		192535	ROD, extension <i>Model 239888</i>	1
2	160614	.PISTON, air motor	1	58	192540	ROD, shovel	1
4	116343	.SCREW, grounding	1	59	192538	CYLINDER, pump	1
5	241826	.BASE	1	60†	192533	SEAL, gasket	2
6†	114179	.SEAL, throat	1	61†	192534	BEARING, shovel rod	1
7	162718	.ADAPTER; 3/8 npt(m) x 1/4 npt(f)	1	62†	114178	SEAL, shovel rod	1
8	192541	.ROD, displacement	1	63	192531	CONNECTOR, tube	1
9*	160625	.O-RING, buna-N	1	64	192682	TUBE, extension <i>Model 239877</i>	1
10	160624	.O-RING, buna-N	1		193760	TUBE, extension <i>Model 239887</i>	1
11	203965	.ROD, trip	1		193758	TUBE, extension <i>Model 239888</i>	1
12*	158367	.GROMMET, rubber, air intake	2	66	192660	SHOVEL	1
13	172867	.ACTUATOR, valve	1	67	192539	TUBE, shovel	1
14	172866	.CLIP, spring	2	68	185220	PLATE, serial	1
15	102975	.SCREW, rd hd mach; no. 6-32 x 0.25" (6.3 mm)	2	74	112154	PIN, spring, straight	1
16*	170709	.POPPET, valve; urethane	2				
17	160613	.CYLINDER, air motor	1				
18	222499	.PLATE, identification; <i>with muffler</i>	1				
19	100078	.SCREW, hex head; no. 8-32 x 0.38 in. (10 mm) long.	12				
20	222501	.PLATE, warning; <i>with muffler</i>	1				
21	101578	.SCREW, hex head; no. 8-32 x 0.38 in. (10 mm) long	6				
22	158360	.YOKE, rod, trip	1				
23	158362	.PIN, toggle	2				
24*	160621	.O-RING, nitrile rubber	1				
25	160623	.ARM, toggle	2				
26	158364	.ROCKER, toggle	2				
27	167585	.SPRING, helical compression	2				
28	156698	.O-RING; buna-N	1				
29a	164704	.HANDLE NUT, cylinder, cap <i>Model 239877</i>	1				
29b	161435	.NUT, cylinder, cap <i>Models 239887 and 239888</i>	1				
30*	160261	.NUT, adjusting	4				
31*	160618	.LOCKWIRE, transfer valve	2				
32	180233	.LABEL, warning	2				
33	160932	.GASKET; copper	1				
38	192537	.NUT, packing	1				

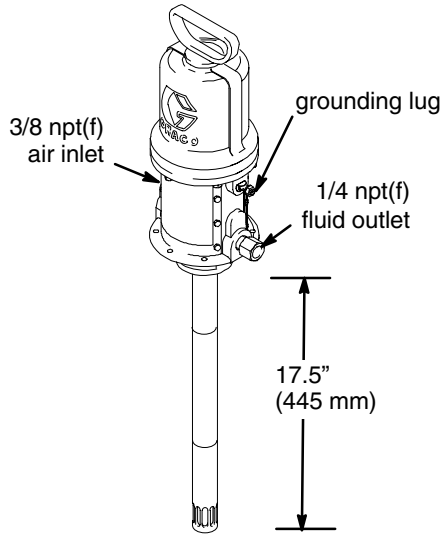
* The replacements for these parts are available in Repair Kit 206728. Purchase the kit separately.

† The replacements for these parts are available in Repair Kit 241623. Purchase the kit separately.

Note: two accessory tools are required for air motor and throat service: Padded Pliers, 207579 and Gauge, 171818.

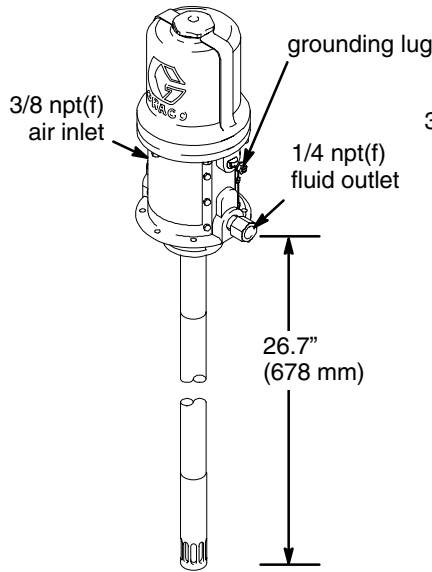
Dimensional Drawings

Model 239877
pail length



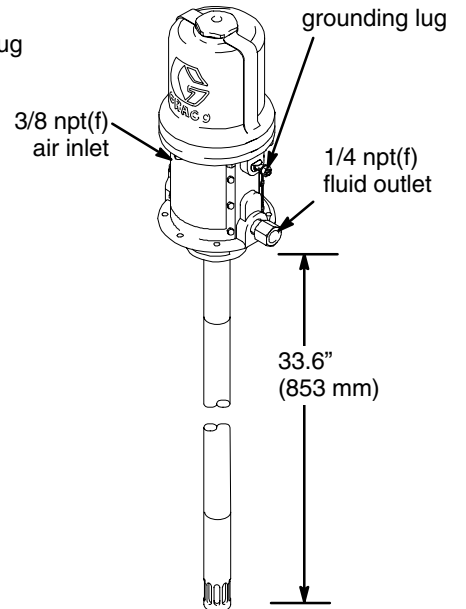
Overall length:
31" (788 mm)

Model 239887
120 lb drum size



Overall length:
38.4" (975 mm)

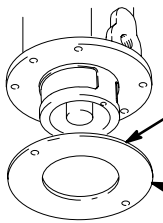
Model 239888
400 lb drum size



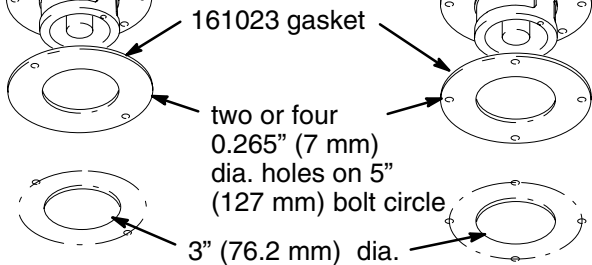
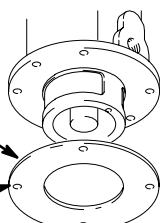
Overall length:
45.4" (1153 mm) 9039A

Mounting Hole Layout

2-Hole Mounting Pattern



4-Hole Mounting Pattern



04127

Technical Data

Maximum working pressure	8400 (58 MPa, 580 bar)
Fluid pressure ratio	50:1
Air operating range	30 to 140 psi (0.3 to 0.97 MPa, 3 to 9.7 bar)
Air consumption	22.8 cfm (0.638 m ³ /min) at 0.25 gpm (0.95 liter/min), at 100 psi (0.7 MPa, 7 bar)
Gallons (liters) per pump cycle	0.003 (0.0109)
Maximum recommended pump speed	76 cycles/min 0.22 gpm (0.82 liter/min)
Wetted parts	steel, brass, aluminum, Delrin®, nitrile rubber, polyurethane
Sound pressure level (measured at 1 meter from unit)	77.8 dB(A)
Sound power level (tested in accordance with ISO 9614-2)	85.6 dB(A)
Approximate weight	22 lb (10 Kg)

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To order parts contact Florida Equipment Service

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