Instructions – Parts List

Parts

Overspray Masking Liquid System

308069 Rev.M

2700 psi (18.6 MPa, 186 bar) Maximum Working Pressure
80–90 psi (560–630 kPa, 5.6–6.3 bar) recommended regulated air inlet pressure

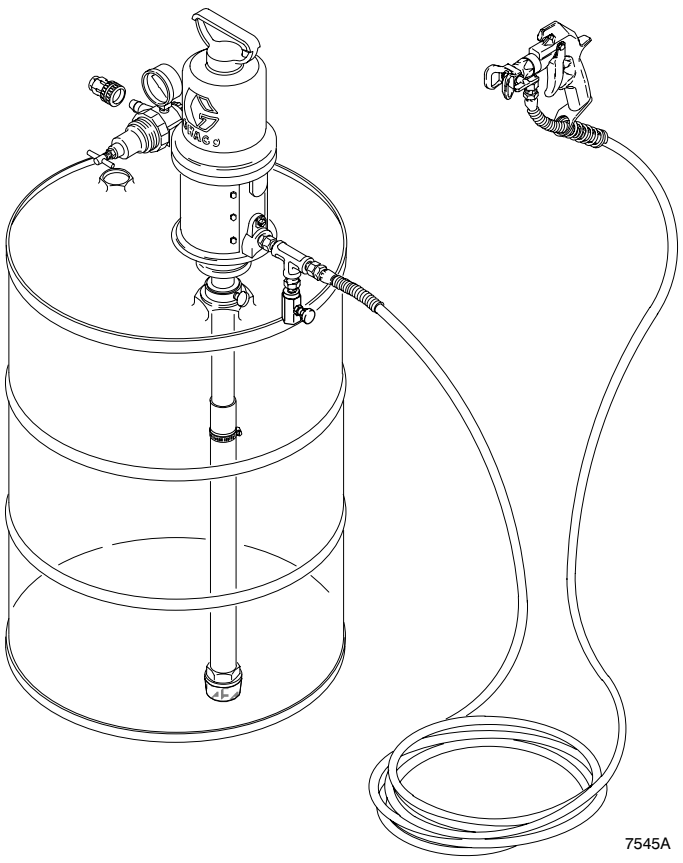
System
Model 224826
with Stainless Steel Pump*

Pump
Model 224825, Series A
Stainless Steel*

Read warnings and instructions.

⚠ CAUTION

This pump is factory tested in oil. To avoid contaminating the masking liquid or the surface being painted, flush the pump before immersing it in the masking liquid. Use water only to flush. Paint solvents will damage the seals. Follow the set-up procedure carefully, and pay special attention to the **Flushing** procedure on page 7.



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PROVEN QUALITY. LEADING TECHNOLOGY.

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440–1441

Table of Contents

Symbols

Warning Symbol

⚠ WARNING

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

Caution Symbol

⚠ CAUTION

This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the corresponding 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 operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, 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 system component. This equipment has a **2700 psi (18.6 MPa, 186 bar) maximum working 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.
- 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 82°C (180°F) or below –40°C (–40°F).
- Do not touch the heater during operation; it is very hot.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.

⚠ WARNING

INJECTION HAZARD

Spray from the gun, hose 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 gun at anyone or at any part of the body.
- Do not put your hand or fingers over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove or rag.
- Do not “blow back” fluid; this is not an air spray system.
- Always have the tip guard and the trigger guard on the gun when spraying.
- Be sure the gun trigger safety operates before spraying.
- Lock the gun trigger safety when you stop spraying.
- Follow the **Pressure Relief Procedure** on page 10 whenever you: are instructed to relieve pressure; stop spraying; clean, check, or service the equipment; and install or clean the spray tip.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.
- Use only Graco approved hoses. Do not remove any spring guard that is used to help protect the hose from rupture caused by kinks or bends near the couplings.
- Wear hearing protection when operating this equipment.

⚠ 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 sprayed. Refer to **Grounding** on page 6.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop spraying 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 sprayed.
- Keep the spray area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the spray area.
- Extinguish all open flames or pilot lights in the spray area.
- Do not smoke in the spray area.
- Do not turn on or off any light switch in the spray area while operating or if fumes are present.
- Do not operate a gasoline engine in the spray area.

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.

- 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.

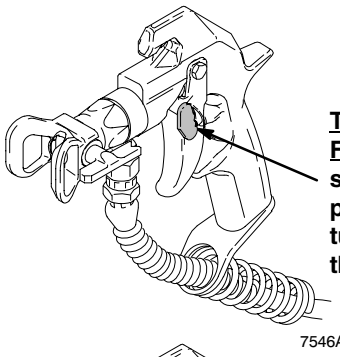
Notes

Spray Gun Safety

Learn how to use the gun's trigger safety latch before operating the system.

The high pressure, airless spray gun supplied with this system is equipped with a trigger safety latch. When set, this latch prevents the gun from being triggered accidentally. Read more about gun safety in the warning section, **FLUID INJECTION** on page 3.

Set the trigger safety latch whenever you stop spraying, even for only a minute, or if changing a tip.



TO RELEASE THE LATCH FOR THE OFF SAFE, or spraying position, gently pull up on the latch and turn it so it is parallel with the gun body.

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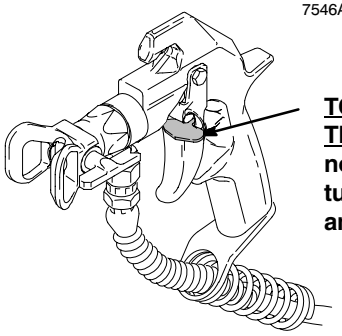

TO SET THE LATCH IN THE SAFE, or non–spraying position, turn it so it is at right angles to the gun body.

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Fig. 1

Installation

Grounding

⚠ WARNING

FIRE AND EXPLOSION HAZARD
Before operating the pump, ground the system as explained below. Also read the section **FIRE AND EXPLOSION HAZARD** on page 4.

1. Pump: use a ground wire and clamp as shown in Fig. 2. Remove the ground screw (Z) and insert through the eye of 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 ground wire to a true earth ground.
2. Fluid hoses: use only electrically conductive hoses.
3. Air compressor: follow manufacturer's recommendations.
4. Spray gun: obtain grounding through connection to a properly grounded fluid hose and pump.
5. Fluid supply container: according to local code.
6. Object being sprayed: according to local code.
7. Any pails used when flushing: use only metal, grounded pails when flushing. Make firm metal-to-metal contact between a metal part of the spray gun and a pail. Use the lowest pressure possible.

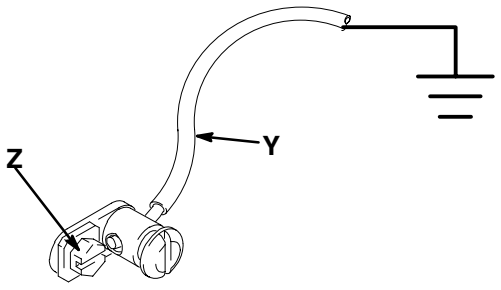


Fig. 2

Installation

Prepare for installation

You must supply the following equipment to complete the installation of this system.

1. An adjustable wrench and a screwdriver.
2. A grounding wire and clamp for the air motor.
3. The compressed air supply, with a hose that easily reaches the air regulator assembly.
4. Two 5 gallon flushing containers, one with warm soapy water, and one with cool, clean water.

⚠ CAUTION

Do not use paint solvents to flush, which will damage the pump seals.

Setup for initial flushing See Fig. 3.

5. Screw the air regulator assembly into the air inlet of the motor.
6. Remove the quick disconnect coupler from the nipple. To disconnect, pull back on the sleeve of the coupler and pull it away from the nipple. Screw the coupler onto the air line. Do not connect the air line to the pump until you are instructed to in the **Initial flushing or OPERATION** section.
7. Screw the swivel fitting of the spray hose onto the pump outlet nipple, and tighten it securely with a wrench.
8. Follow the grounding instructions in the **Grounding** section on page 6.

Installation

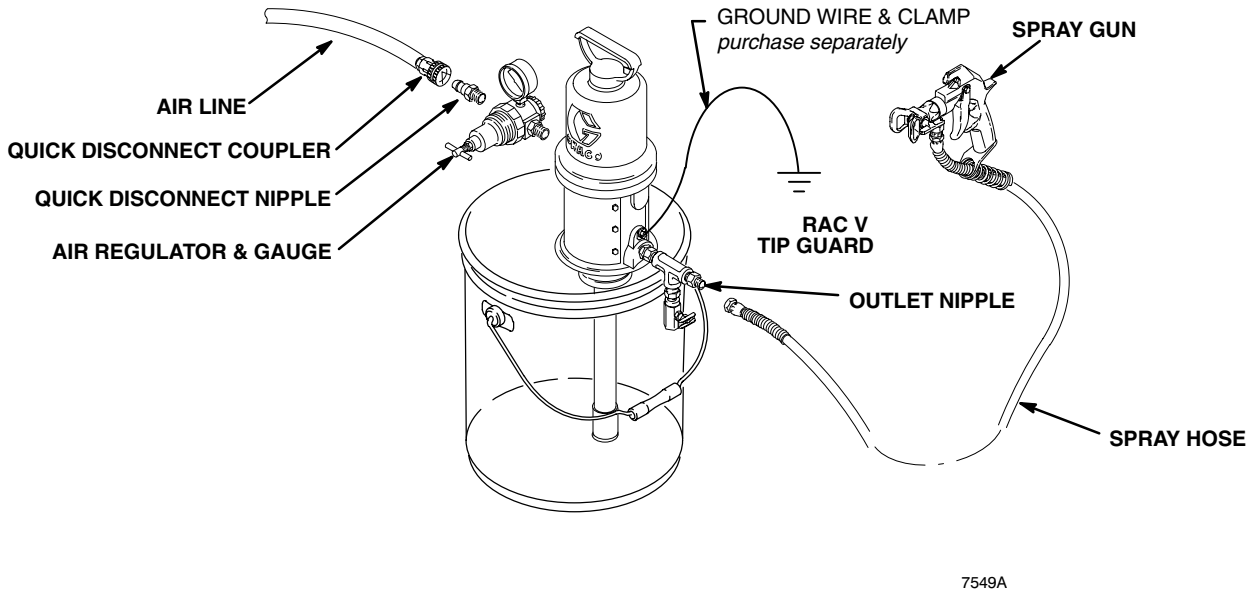


Fig. 3

Initial flushing

⚠ CAUTION

This pump is factory tested in oil. To avoid contaminating the masking liquid or the surface being painted, flush the pump before immersing it in the masking liquid.

1. Mount the pump in a 5 gallon pail of warm, soapy water.
2. Be sure there is no spray tip in the gun. See Fig. 7 if the tip needs to be removed.
3. Set the trigger safety latch. See Fig. 1.
4. Be sure the air regulator handle is turned to zero (fully left as you look at it).
5. Connect the air line to the pump.
6. Release the trigger safety latch.
7. Aim the gun into the flushing pail and squeeze the gun trigger and hold it open.
8. Slowly open the air regulator until the pump is running slowly and smoothly.
9. Using very low pressure, direct the spray from the gun back into the flushing container. Circulate the soapy water in this way for several minutes. Then release the trigger, set the trigger safety latch, and disconnect the air line to the pump.
10. Switch the pump to the clean container of water. Connect the air line, release the trigger safety latch, and repeat Step 9, above.
11. Raise the pump out of the pail. Trigger the gun to force the water from the system. DO NOT run the pump dry for more than 10 seconds to avoid damaging the pump packings.

Installation

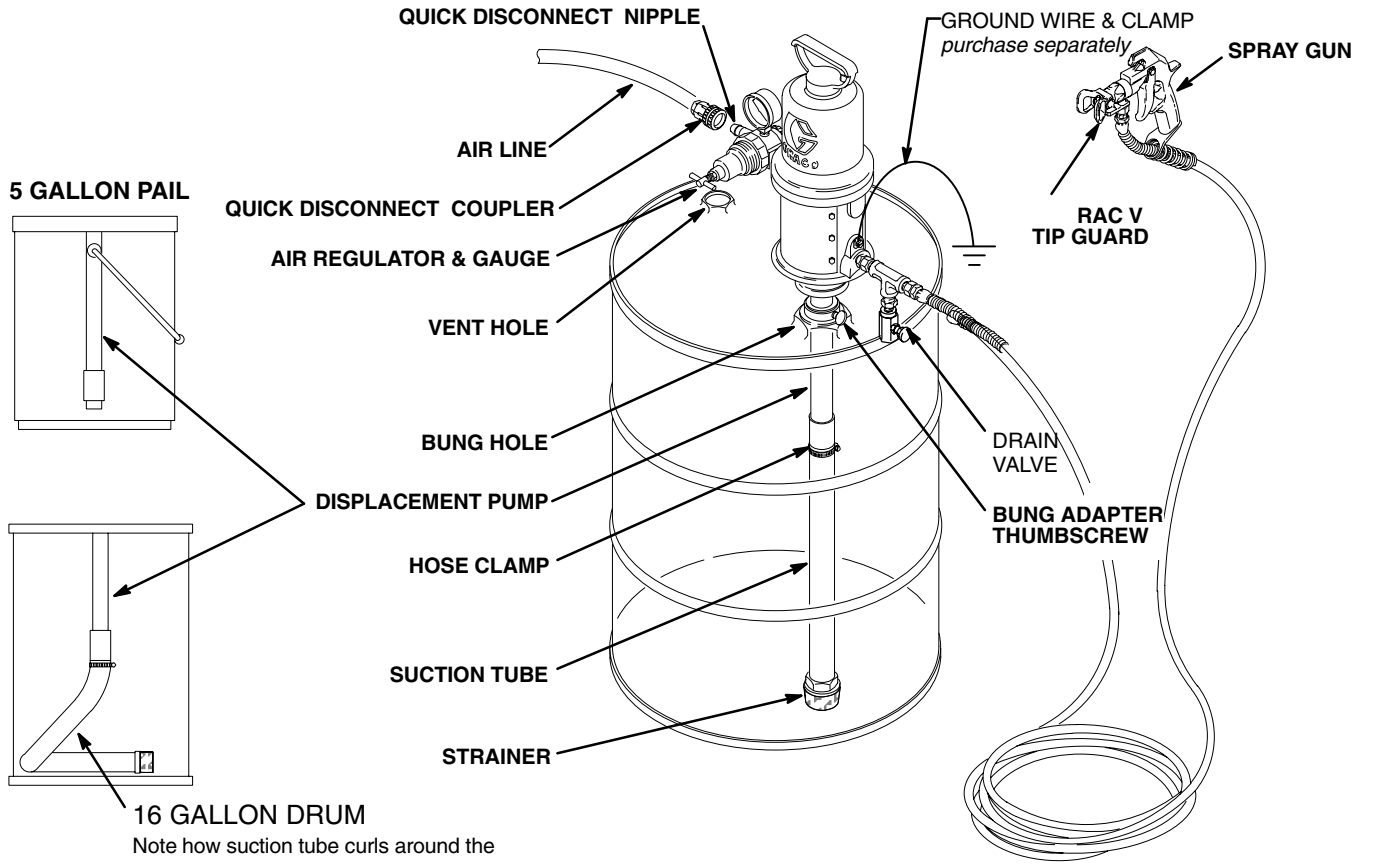


Fig. 4 7550A

Setup for operation

NOTE: Be sure the system has been thoroughly flushed.

1. Loosen the hose clamp on the suction hose. Slide the suction hose as far as possible onto the pump intake valve.
2. **Slide the clamp up and tighten its screw snugly!** A loose clamp prevents the pump from getting adequate fluid supply, which results in low fluid flow and/or spitting air from the gun.
3. Remove the bung cover from the drum and open the vent hole.
4. Loosen the thumbscrew on the bung adapter.
5. Slide the suction hose and pump through the bung hole in the drum cover. Before the final positioning of the pump, screw the bung adapter firmly into the bung hole. Now position the pump as follows.

a. For 55 gallon drums: slide the pump into the drum until you sense that the strainer is at the bottom of the drum. Tighten the thumbscrew snugly.

b. For 16 gallon drums: slide the pump into the drum and allow the suction hose to curl around the side and rest on the bottom of the drum. Tighten the thumbscrew snugly.

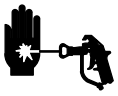
c. For 5 gallon demo pails: Remove the suction hose and strainer. Install the accessory pail cover, p/n 222058. Slide the pump into the pail until the intake valve is 1/2” off the bottom of the pail. Tighten the bung adapter thumbscrew snugly.

NOTE: Go to **Prime the system** on page 11.

Operation

Pressure Relief Procedure

⚠ WARNING



INJECTION HAZARD
Fluid under high pressure can be injected through the skin and cause serious injury. To reduce the risk of an injury from injection, splashing fluid, or moving parts, follow the **Pressure Relief Procedure** whenever you:

- are instructed to relieve the pressure,
- stop spraying,
- check or service any of the system equipment,
- or install or clean the spray tip.

1. Engage the gun's trigger safety latch.
2. Close the air regulator and disconnect the air supply hose.
3. Disengage the trigger safety latch. Hold a metal part of the gun firmly to the side of a grounded metal waste pail and trigger it to relieve the fluid pressure.
4. Engage the trigger safety latch.
5. Place a pail under the drain valve and open the drain valve to be sure all fluid pressure is relieved.

If you suspect that the tip guard or hose is clogged, or that pressure has not been fully relieved after following the steps above, very slowly loosen the tip guard retaining nut or hose end coupling to relieve pressure gradually, then loosen completely.

Operation

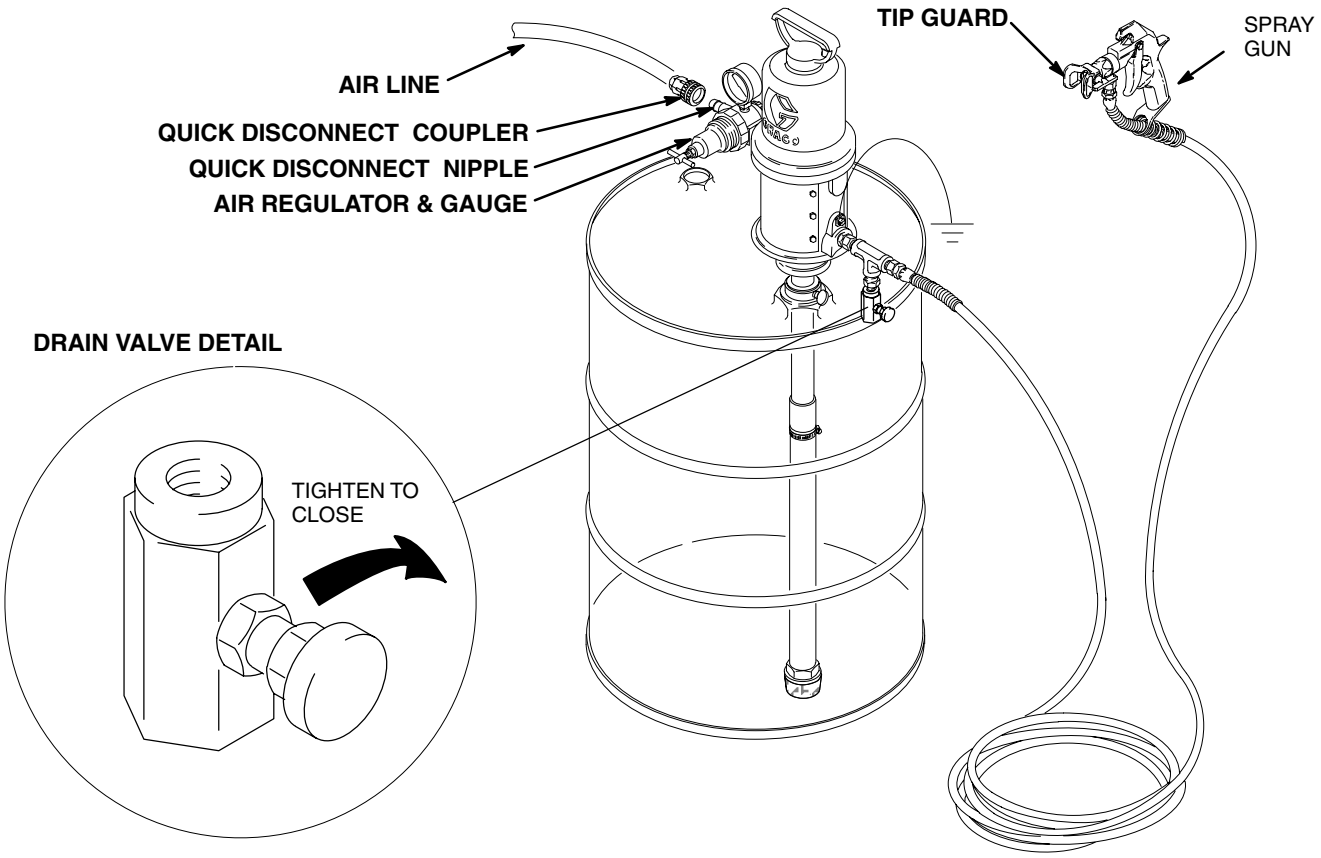


Fig. 5

Prime the system

1. Set the trigger safety latch. See Fig. 1.
2. Remove the spray tip from the gun, if it is installed. See **Changing spray tips** on page 13.
3. Be sure the air regulator handle is turned to zero (fully left as you look at it).
4. Connect the air line to the pump.
5. Release the trigger safety latch.
6. Hold a metal part of the gun firmly against and aimed into a grounded metal pail. See Fig. 6. Squeeze the gun trigger and hold it open.

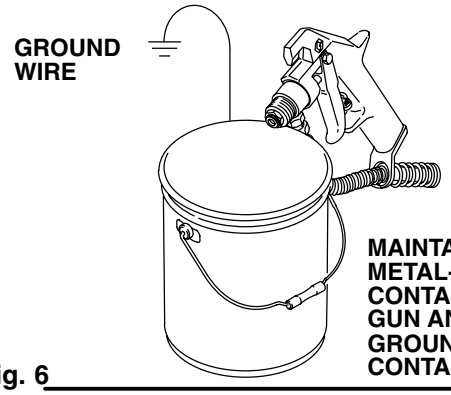


Fig. 6

7. Slowly open the air regulator until the pump is running slowly and smoothly.
8. Dispense about 1 pint of masking liquid to be sure all air is pushed out of the system and the liquid flows freely.
9. Release the trigger and set the trigger safety latch. See Fig. 1.
10. Check all fluid connections for leaks; relieve pressure before tightening connections.

Select a tip

Two tips are provided with the gun. The size is marked on the cylinder handle. The size 621 tip comes installed in the tip guard. Each tip comes with a square ring and a seal. Refer to **Changing spray tips** and Fig. 7.

11. Use the 211 size tip for narrow surfaces such as door jambs.
12. Use the 621 size tip for wide or large surfaces.

Operation

Installing the spray tip

1. Be sure the trigger safety latch is engaged.

2. Install the tip cylinder. Hold the cylinder with the arrow handle straight up. Push the cylinder into the tip guard so the flange on the cylinder fits into the slots at the base of the tip guard. See Fig 7. Then turn the arrow handle in the direction of the tip guard, which is the spraying position. See Fig. 8.

If the tip guard was removed from the gun and you are are reinstalling it:

3. Be sure the seal and square ring are in place as shown in Fig. 7. If not, place the seal on the end of a pencil with the curved side out. Guide the seal into the retaining nut and turn it until it straddles the cylinder. Drop in the square ring and press it down.

4. Screw the retaining nut snugly onto the gun, holding the tip guard in the desired direction while tightening the nut. See Step 4 of **Adjusting the spray pattern and spraying pressure** on page 14 for more information on adjusting the direction of the spray pattern.

⚠ CAUTION

To avoid damaging the tip guard:

- Never use a wrench to turn the plastic tip guard, which causes internal damage.
- Never hang the gun by the tip guard.

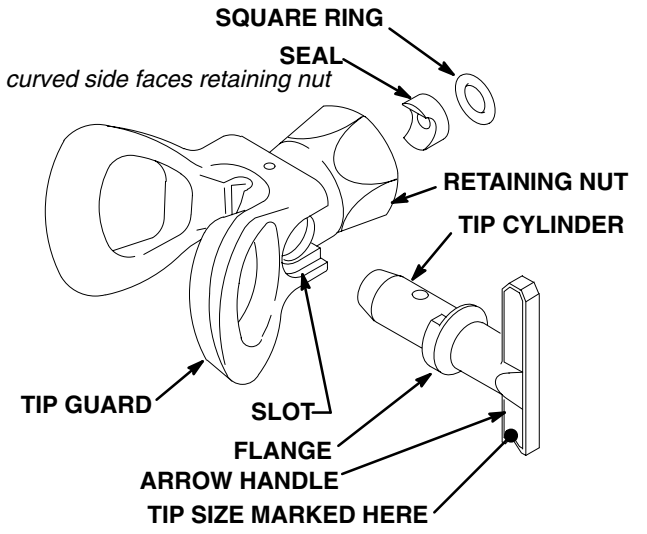


Fig. 7

Operation

Changing spray tips

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

Relieve the pressure. Rotate the arrow handle until it is straight up. Pull out the tip. Install the new tip and rotate it to the spraying position.

Clearing a clogged spray tip

⚠ WARNING

To reduce the risk of serious injury from fluid injection, use extreme caution when cleaning or changing spray tips. If the spray tip clogs while spraying, set the trigger safety latch immediately, then follow the procedure in Steps 1–5 at right.

Never wipe off buildup around the spray tip until pressure is fully relieved and the trigger safety latch is set.

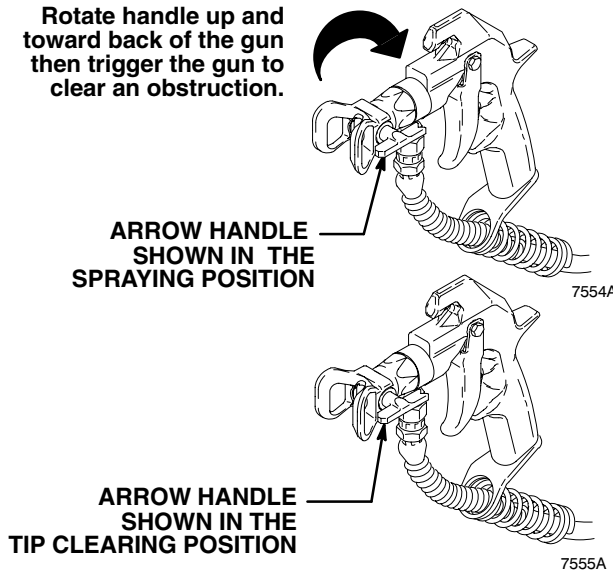


Fig. 8

1. If the spray tip clogs, release the gun trigger, and set the trigger safety latch.
2. Turn the arrow handle up and back toward the gun body. See Fig. 8. Release the trigger safety latch. Trigger the gun into a pail. This usually forces out the obstruction. Set the trigger safety latch again. Return the arrow handle to the spraying position.
3. Release the trigger safety latch and resume spraying.
4. If the tip is still clogged, close the air regulator, disconnect the air line, try triggering the gun into a pail, and open the drain valve.
5. Remove the spray tip and clean it. Refer to manual 307848, supplied.

NOTE: Continue with **Adjust the spray pattern and spraying pressure** on page 14.

Operation

Adjusting the spray pattern and spraying pressure. See Fig. 9.

NOTE: If the system is not primed, follow the procedure on page 11.

1. Set up a large piece of paper or cardboard to spray on for testing the spray pattern.

2. Release the trigger safety latch.

3. Aim the gun at the cardboard and trigger it briefly. Check the spray pattern. Adjust the air pressure just until spray from the gun is completely atomized. 3M recommends 80 to 90 psi air pressure at the air inlet gauge for the best results.

4. To adjust the direction of the spray pattern, set the trigger safety latch and loosen the tip guard retaining nut. See Fig. 7. Position the tip guard horizontally for a horizontal pattern or vertically for a vertical pattern. Retighten the retaining nut.

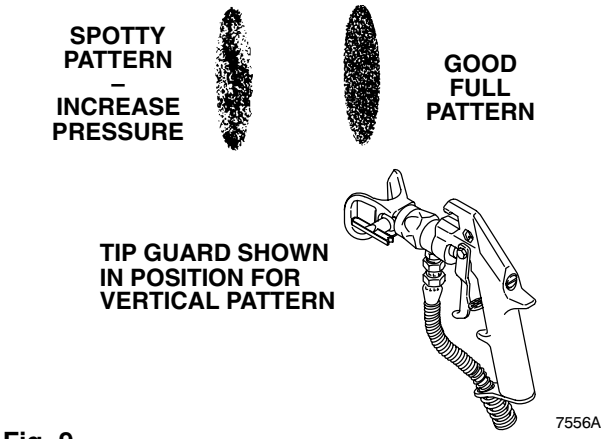


Fig. 9

Practice spraying

Read the spray techniques in Steps 1–5, below and Figs. 10 and 11, and follow 3M's recommendations on application of the masking liquid.

1. Begin triggering and moving gun just before first edge of target surface. See Fig. 10.

2. Keep gun moving horizontally or vertically at a steady rate.

3. Release trigger just as you approach other edge of target surface, but keep gun moving until it has passed the edge.

4. Hold the gun perpendicular (at right angles) to the target surface. Hold the gun an even 12 to 14" from the target surface. See Fig. 11.

5. Lap each stroke 50% over the previous stroke to produce a uniform material thickness.

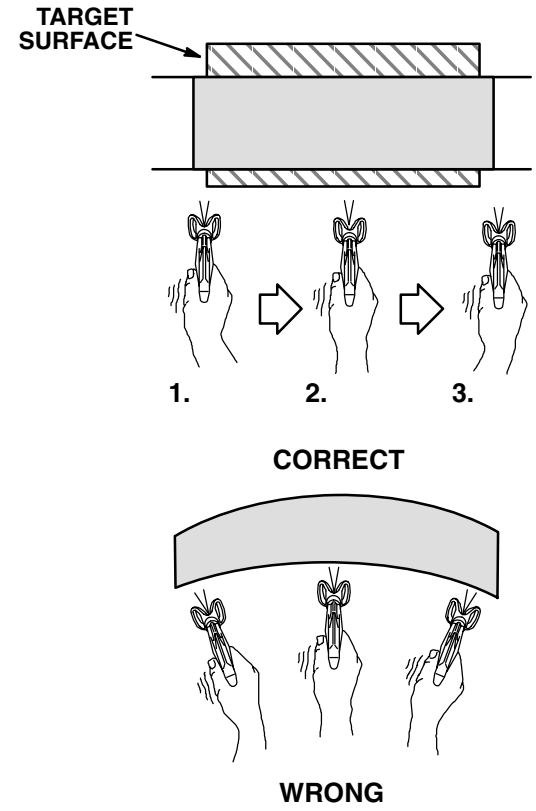


Fig. 10

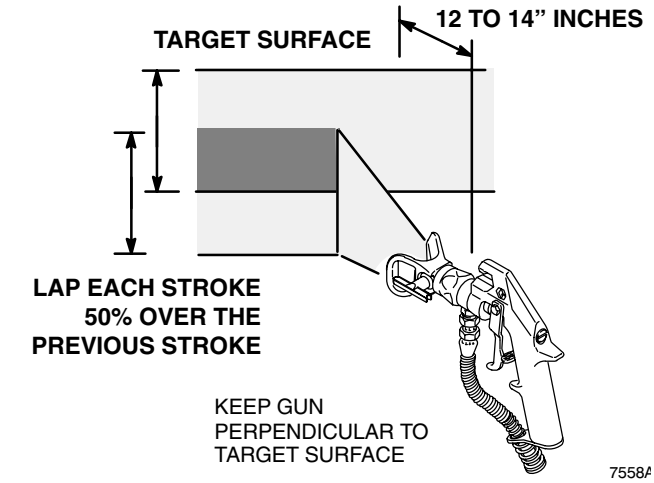


Fig. 11

Maintenance

General care

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

1. Keep the pump and hose fully primed with the masking liquid when it is not in use. This is done by **relieving the pressure**.

2. Do not allow the supply container to be completely emptied. If that happens, the pump will start to run too fast and it could be damaged. If the pump starts to run too fast, disconnect the air line immediately. Prime the system with the masking liquid (see page 11) or flush it as instructed in **Weekly flushing**.

3. Lubricate the air motor daily. Disconnect the regulator, place about 15 drops of light machine oil in the pump air inlet, reconnect the regulator and turn on the air supply to blow oil into the motor.

4. If fluid drips steadily from the air motor weep port, or the pump requires more than 35 psi (240 MPa 2.4 bar) air pressure to cycle when the gun is triggered, adjust the packing nut. See **Packing nut adjustment** on page 16.

Weekly flushing

⚠ WARNING

Thorough flushing is required at the end of each work week and before using a system that has been stored. Flushing keeps a system free of dried or aging material, such as discolored or jellied material.

Equipment needed:
4 gallons warm water: use empty 3M container
5 gallon bucket for water
Cloth rags

1. Turn the air regulator handle to zero (fully left as you look at it). Disconnect the air hose.

2. Remove the spray tip from the gun. See Fig. 7.

3. Pour 4 gallons of warm water into the empty 3M container.

4. Move the pump to the flushing container.

5. Connect the air line to the pump.

6. Release the trigger safety latch.

7. Aim the gun into the flushing pail and squeeze the gun trigger and hold it open.

8. Slowly open the air regulator until the pump is running slowly and smoothly.

9. Using very low pressure, direct the spray from the gun back into the flushing container. Circulate the water in this way for several minutes. Then release the trigger, set the trigger safety latch, and disconnect the air line to the pump.

10. Raise the pump out of the pail. Trigger the gun to force the water from the system. DO NOT run the pump dry for more than 10 seconds to avoid damaging the pump packings.

11. Wash the exterior of the pump and all components with a water and cloth. Scrub any dirty areas and threads to remove residue.

12. Dry the pump and all components with a clean, dry cloth.

NOTE: If you plan to use the pump again soon, prime it with masking material.

If you plan to store the pump, continue as follows.

3. Flushing before storage

1. Flush as in Steps 1 to 11, above, but use warm, soapy water.

2. Move the pump to a container of mineral spirits.

⚠ CAUTION

Do not use paint solvents to flush, which will damage the pump seals.

3. Trigger the gun into the flushing container. When mineral spirits appear at the gun, release the trigger and set the trigger safety latch. Remove the pump.

4. Release the trigger safety latch. Trigger the gun to force the mineral spirits from the system. DO NOT run the pump dry for more than 10 seconds to avoid pump packing damage.

5. Disconnect the hose and gun and store the pump.

Maintenance

Pump packing nut adjustment

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

⚠ WARNING

Keep your hand and fingers away from the piston when it is moving. As the piston moves into the pump base it can amputate fingers or break tools caught between the moving parts. Note the pinch point shown in Fig. 12. Be sure all air and fluid pressure is fully relieved before adjusting the piston or packing nut to reduce the risk of amputation.

NOTE: Perform this adjustment if: (a) material drips steadily from the air motor weep hole, which indicates the packings are too loose, or (b) the pump requires more than 35 psi (244 kPa, 2.4 bar) air pressure to cycle when the gun is triggered, which indicates the packings are too tight.

1. **Relieve the pressure**.

2. Remove the six screws (24) using a 1/4” nut driver. Remove the muffler plate (20). See Fig. 13.

3. Check to see that the air motor piston is at the top of the stroke. If it is not, **first read the warning above. Then, while keeping your fingers away from moving parts,** apply very low pressure air to the air inlet to move the piston up. Close the air regulator and disconnect the air supply hose. Refer to Fig. 12.

4. Use a 1/4” diameter rod to tighten the packing nut. First loosen the nut, then tighten snugly, and finally tighten 1/4 turn more. See Fig. 14.

5. Replace the muffler cover, and the six screws. See Fig. 13.

6. Reconnect the air line. After the pump is started, it should run at 20 psi (1.5 bar) with no load. Startup may require additional air pressure.

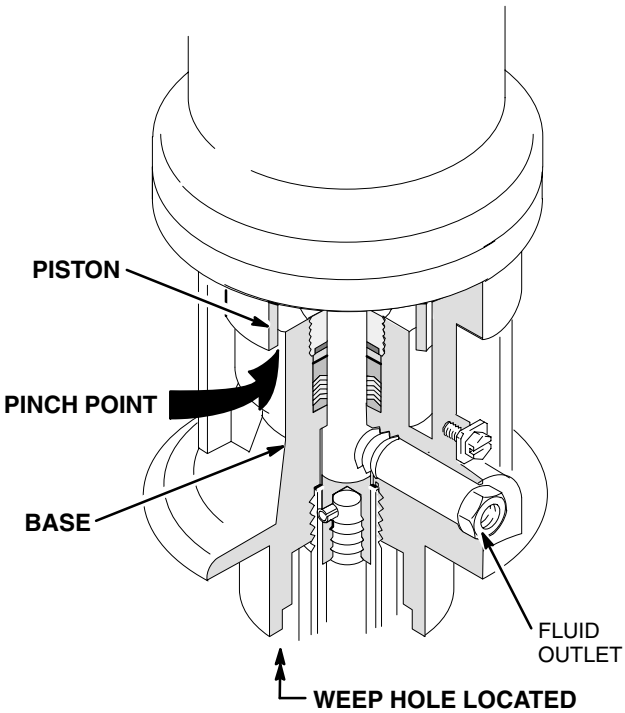


Fig. 12

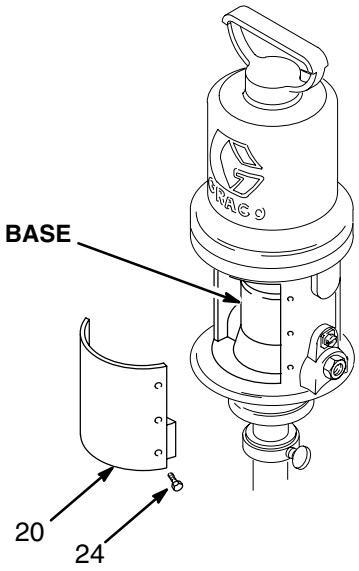


Fig. 13

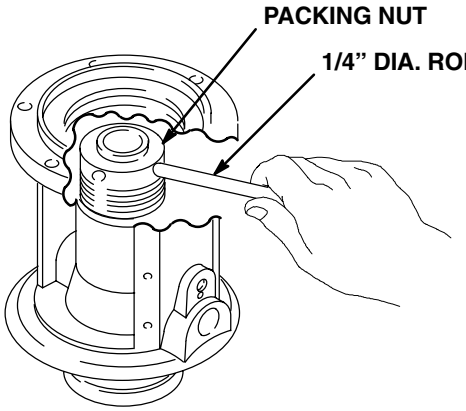


Fig. 14

Notes

Troubleshooting

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

⚠ WARNING

Never operate the pump with the warning plate (20) or the identification plate (40) removed. These plates protect your fingers from pinching or amputation by moving parts in the air motor.

NOTE: Check all other possible problems and solutions before disassembling the pump.

PROBLEM	CAUSE	SOLUTION
Pump fails to operate	Low air supply pressure or restricted air lines	Increase air supply; clear*
	Closed valves	Open
	Clogged fluid lines, hoses, valves, etc.	Clear*
	Damaged air motor	Service air motor
	Empty fluid supply container	Refill and reprime, or flush
Continuous air exhaust	Worn or damaged air motor gasket, packing, seal, etc.	Service air motor
Erratic pump operation	Empty fluid supply container	Refill and reprime, or flush
	Held open or worn intake valve or piston packings	Clear; service
Pump operates, but output is low on the up stroke	Held open or worn piston or packings	Clear; service
Pump operates, but output is low on the down stroke	Held open or worn intake valve	Clear; service
Pump operates, but output is low on both strokes	Low air supply pressure or restricted air lines	Increase air supply; clear*
	Closed valves	Open
	Empty fluid supply container	Refill and reprime, or flush
	Clogged fluid lines, hoses, valves, etc.	Clear*
	Packing nut too tight	Loosen
	Loose packing nut or worn packings	Tighten; replace

Troubleshooting

PROBLEM	CAUSE	SOLUTION
Material drips steadily from weep port in motor base	Throat packing nut loose	Tighten packing nut
	Throat packing worn	Replace packings
Pump chattering	Packing nut too tight	Loosen packing nut
	Packing worn/material dried on I.D. of packing	Inspect/replace packings
	Material dried on rod	Clean or replace rod
Pump fails to prime	No material	Fill or replace container
	Air leak between intake valve and suction tube (55 gal. unit only)	Tighten or replace clamp or hose
	Material or other contamination on ball seats	Inspect and clean
	Intake ball stuck	Inspect, clean or replace
	Inlet strainer plugged	Clean strainer

** **Relieve the pressure.** Disconnect the fluid hose. If the pump starts when the air is turned on again, the hose or gun is clogged.*

Notes

Service

Before you start:

1. Have all necessary parts on hand. Always replace the glands and bearing when replacing the packings. Use all the parts in the repair kits for the best results
2. **Air Motor Repair Kit 206728.** Parts included in this kit are marked with two asterisks, (i.e., 36**), in the text and drawings.
3. **Displacement Pump Repair Kit 235136.** Parts included in the kit are marked with one asterisk, (i.e., 6*), in the text and drawings.
4. Always use **Padded pliers, p/n 207579** to grip the trip rod without damaging its surface. Use **Gauge, p/n 171818** ensure the proper clearance between the poppets and seat of the transfer valve.

Air Motor & Throat Disassembly

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

1. Flush the pump and **relieve the pressure**.
2. Disconnect the hoses, remove the pump from its mounting, and clamp the air motor base in a vise.
3. Use a strap wrench on the riser tube (12) to screw it out of the air motor base (55).
4. Pull the connecting rod (10) down as far as it will go.
5. Use a hammer and punch to remove the roll pin (4). Unscrew the connecting rod (10). See Fig. 15.

⚠ CAUTION

Do not damage the plated surface of the trip rod (54). Damaging the surface of the trip rod can result in erratic air motor operation. Use the special padded pliers, 207579, to grasp the rod.

6. Manually push up on the piston rod (41) to move the piston assembly (59) up as far as it will go. Unscrew the cap nut (47). Pull the nut up. Grip the trip rod (54) with padded pliers and screw the nut off the rod. See Fig. 15.

⚠ CAUTION

To avoid damaging the cylinder wall, lift the cylinder straight up off of the piston. Never tilt the cylinder as it is being removed.

7. Remove the six screws (25). See Fig. 15. Pull the cylinder straight up off the piston (59).
8. Use a screwdriver to push down on the trip rod yoke (28) and snap the toggles down. See Fig. 16.
9. Remove the lockwires (34**) from the adjusting nuts (33**) of the transfer valves. Screw the top nuts off. Screw the stems (45**) out of the grommets (32**) and the bottom nuts (30). Take the valve poppets (52**) off the stems and squeeze them firmly to check for cracks. See Fig. 16.

⚠ WARNING

To reduce the risk of pinching or amputating your fingers, always keep fingers clear of the toggle assemblies (N).

10. Grip the pivot pins (30) with pliers. Compress the springs (31) and swing the toggle assembly (N) up and away from the piston lugs (L). Remove the parts. Check to see that the valve actuator (35) is supported by the spring clips (58), but slides easily into them. See Fig. 16.
11. Remove the trip rod yoke (28), actuator (35) and trip rod (54). See Fig. 16. Check the exhaust valve poppets (53**) for cracks. To remove the exhaust valve poppets (53**), stretch them out and cut with a sharp knife.
12. Remove one muffler plate (20 or 40). Pull the piston (59) up out of the base. Remove the throat packing nut (42) and packings. See Fig. 15.

Service

Reassembly

1. Clean all the parts in a compatible solvent and inspect for wear or damage. Check the polished surfaces of the piston, piston rod and cylinder wall for scratches or wear. A scored rod will cause premature packing wear and leaking. Use all the repair kit parts and replace other parts as necessary.
2. Lubricate all parts with a light, waterproof grease.
3. One at a time, install these parts in the base (55): the gland (49*), alternately install three reinforced packings (48*) and two nitrile packings (72*) *with lips facing down*, bearing (50*), backup washer (43), flat packing (44*), and loosely screw in the packing nut (42). Be sure the o–rings (38 & 39**) are in place. See Fig. 15.

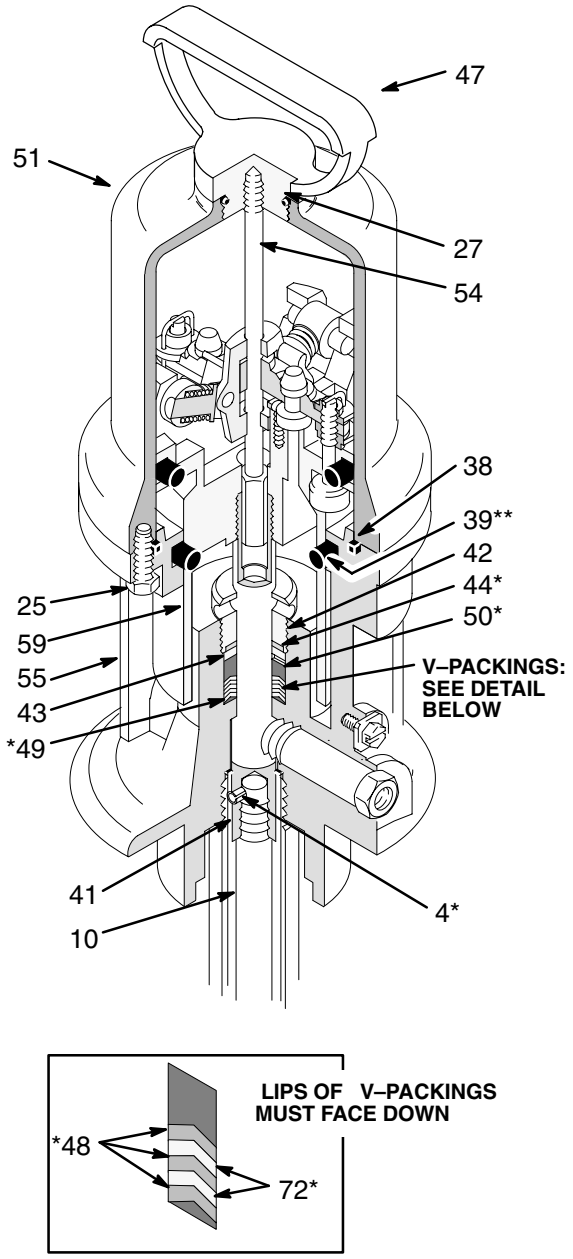


Fig. 15

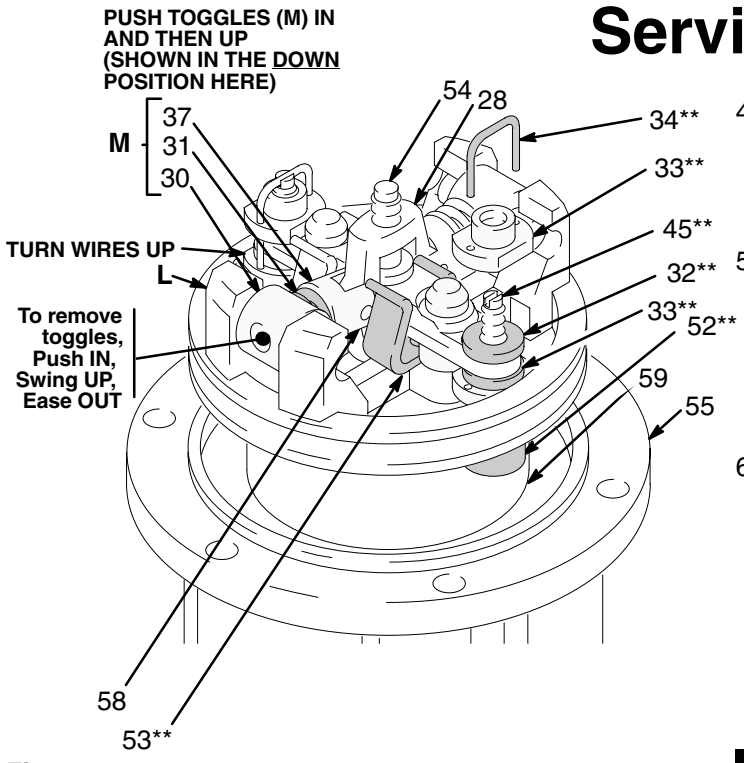


Fig. 16

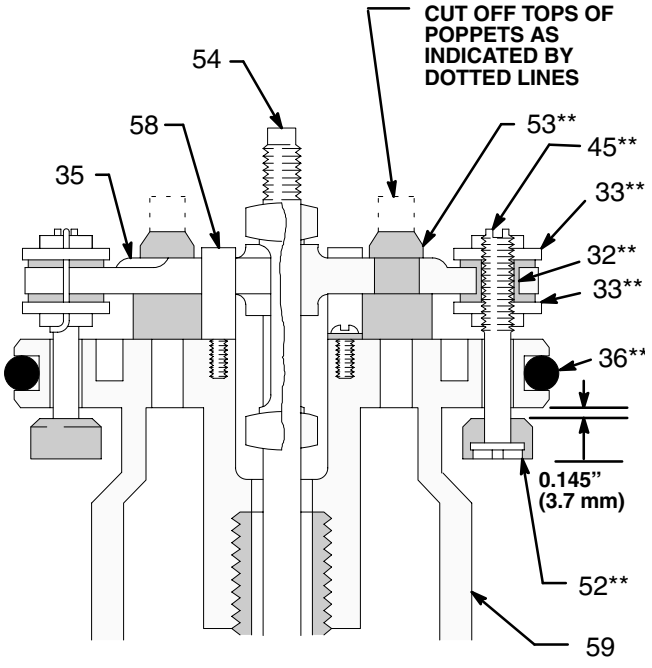
4. Install the poppets (52**) on the valve stems (45**). Pull the exhaust valve poppets (53**) into the valve actuator (35) and clip off the top part shown with dotted lines. See Fig. 17.

5. Install the grommets (32**) in the valve actuator (35). Install the trip rod (54) in the piston (59). Place the trip rod yoke (28) and valve actuator (35) on the trip rod. Be sure the o–ring (36*) is in place and that the valve actuator is supported by the spring clips (58), and then reassemble the valve mechanism. See Fig. 16.

6. Install the bottom adjusting nuts (33**) on the valve stems (45**) and screw the stems into the grommets (32**). Screw the top nuts (33**) on the stems. Tighten the nuts (33) just enough to slightly compress the grommet (32). Before installing the lockwires (34**) in the adjusting nuts, use the special gauge 171–818 to adjust the transfer valve so there is 0.145 in. (3.7 mm) clearance between the poppets (52**) and the seat when it is open. See Fig. 17.

⚠ WARNING

To reduce the risk of pinching or amputating your fingers, always keep your fingers clear of the toggle assemblies.



CUTAWAY VIEW

Fig. 17

7. Install the springs (31) and pivot pins (30) on the toggle arms (37). Snap the toggles to the up position. Refer to Fig. 16.

8. Carefully lower the cylinder (51) over the piston (59) and onto the base (55). Secure with the six screws (25).

9. Manually push on the piston rod (41) to move the piston (59) up as far as it will go. Grip the trip rod (54) with padded pliers and screw the cylinder cap nut (47) onto the trip rod. Pull the piston rod (41) to move the piston downward. Be sure the o–ring (27) is in place at the top of the cylinder (51), and then screw the cap nut into the cylinder.

10. Screw the connecting rod (10) into the piston rod (41) and secure with the pin (4*). Screw the riser tube (12) into the base (55).

11. Install the muffler plates (20,40). Tighten the throat packing nut (42) just until snug.

12. Connect an air hose and run the pump slowly [about 30 psi (2.1 bar)] to see that it operates smoothly.

13. Remount the pump and reconnect the ground wire.

Displacement Pump Service

Before you start:

1. Have all necessary parts on hand. Whenever you replace the packings, also replace the glands and bearing. If you are using a repair kit, use all the parts for the best results.
2. **Displacement Pump Repair Kit 235–136** includes repair parts for the pump throat and piston. Parts included in the kit are marked with one asterisk, for example (6*), in the text and drawings.
3. To replace the throat packings, which are included in Repair Kit 206–924, refer to the **Air Motor and Throat Disassembly** on page 21.

Displacement Pump Disassembly

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 10.

1. Flush the pump and **relieve the pressure** before proceeding.
2. Disconnect the hoses, remove the pump from its mounting, and clamp the air motor base in a vise.
3. Unscrew the intake valve body (22) from the riser tube (12). See Fig. 18. Disassemble the intake valve.
4. Clean and inspect the parts for wear or damage, and replace parts as needed. Unless further service is needed, reassemble and reinstall the intake valve, using liquid sealant on the male threads. See Fig. 18.
5. Use a strap wrench on the riser tube (12) to screw it out of the air motor base (55). Carefully inspect the smooth inner surface of the cylinder for scoring or irregular surfaces. Such damage causes premature packing wear and leaking, so replace the part if damaged.
6. Unscrew the piston body (13) from the piston coupling (14). Remove the ball (2*), seat (19*), gasket (6*), bearing (18*), packing (17*), and seal (16). Do not remove the press–fit brass bearing (15*). See Fig. 18.

NOTE: If the pressure–fit brass bearing (15*) needs to be replaced, clamp it in a vise and drive the piston body (13) out with a plastic hammer. The new bearing **must** be started onto the piston body squarely.

7. Clean and inspect the parts and replace any that are worn or damaged. Be sure to check the copper gasket (46) in the motor base (55). Lubricate the parts with a light waterproof grease.
8. Install the seal (16*), packing (17*), bearing (18*), gasket (6*), seat (19*) and ball (2*) on the piston body (13). The check ball seat (19*) may be reversed, if needed, to provide a new seat. Screw the piston body (13) into the piston coupling (14).
9. Screw the riser tube (12) into the air motor base (55).
10. Reinstall the ball (3*), gasket (7), ball stop (21) and other gasket (7) in the intake valve housing (22). Screw the housing onto the riser tube (12).
11. Be sure the ground wire is connected before regular operation of the pump.

Displacement Pump Service

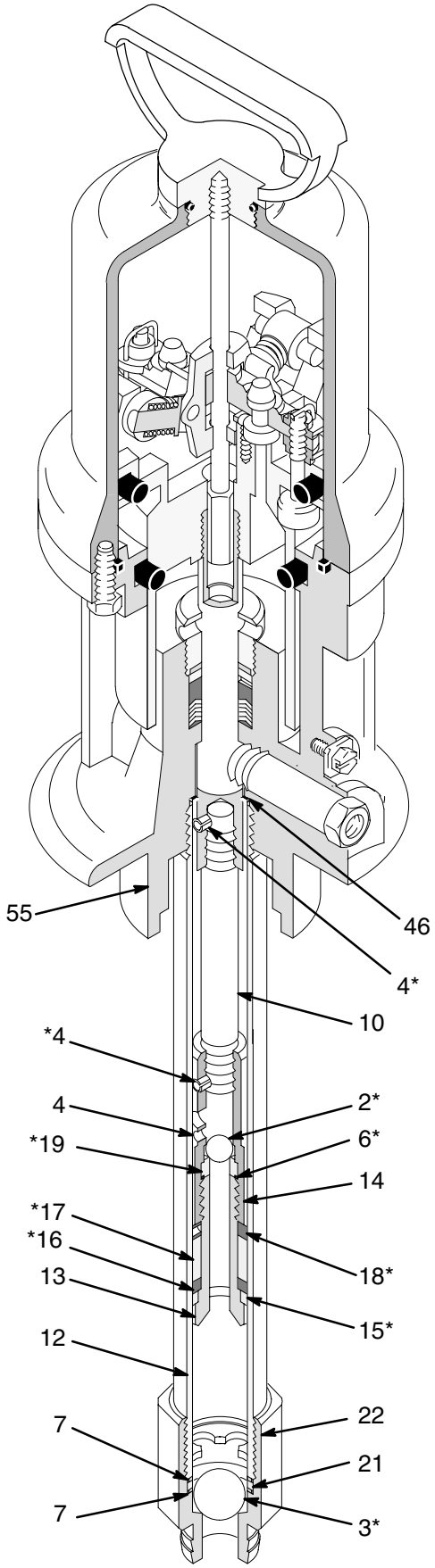


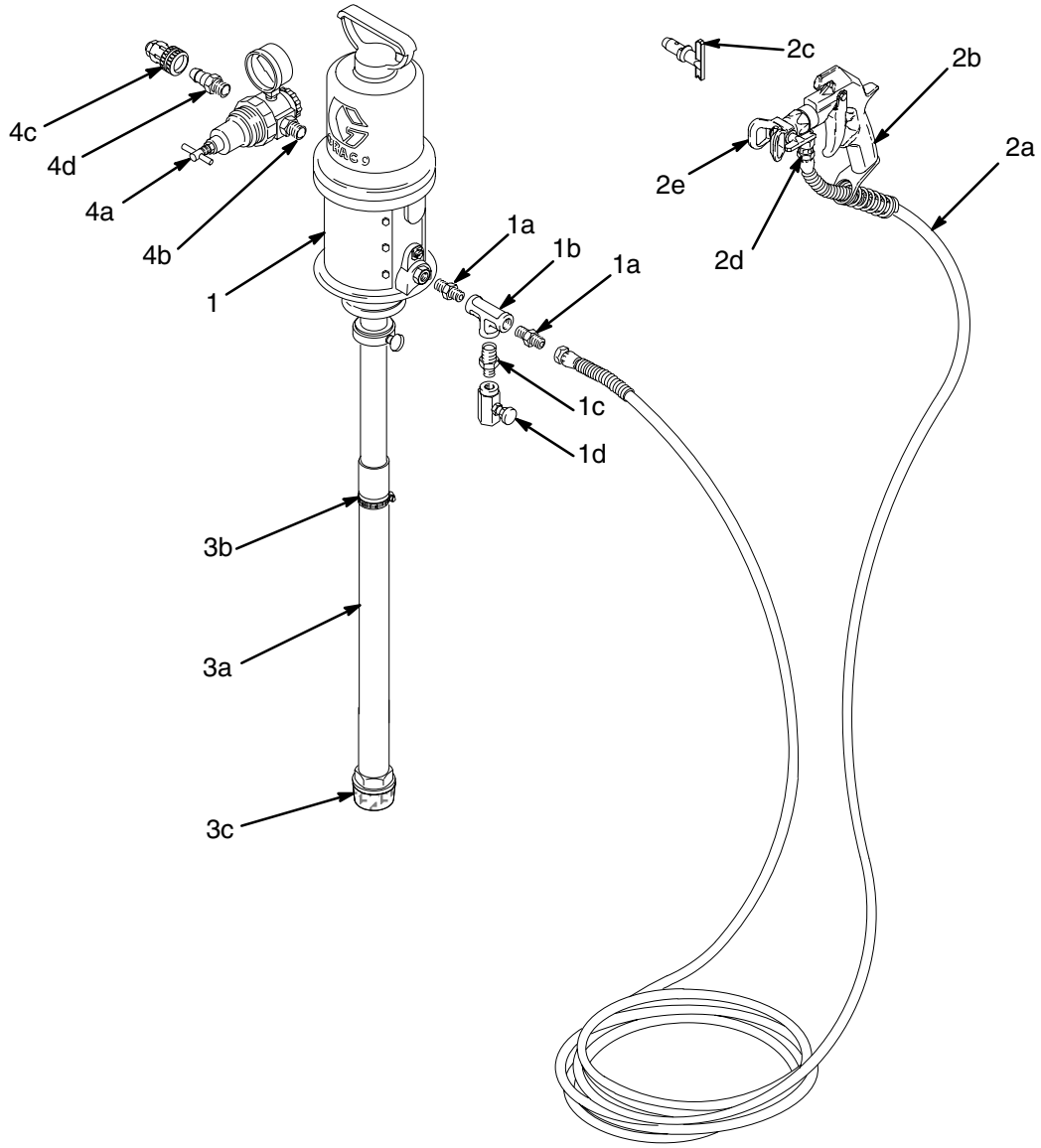
Fig. 18

Notes

Parts

Model 224826
Stainless Steel System
(See Technical Data for additional wetted parts.)
Includes items 1 to 4

REF NO.	PART NO.	DESCRIPTION	QTY
1	224825	15:1 FIRE–BALL® 300 PUMP *See pages 28 and 29 for parts* *Includes items 1a to 1d*	1
1a	166421	. NIPPLE, 1/4 npt	2
1b	104984	. TEE, 1/4 npt(f)	1
1c	111521	. DRAIN VALVE	1
1d	111643	. NIPPLE, 1/4 x 1/8 npt	1
2	224023	SPRAY GUN & HOSE ASSEMBLY *Includes items 2a to 2e*	1
2a	223540	. SPRAY HOSE, 25 ft (7 m), cpld 1/4 npsm (fbe), spring guards both ends	1
2b	248157	. SPRAY GUN *See manual 309741 for parts*	1
2c	286211	. SPRAY TIP, Size 211	1
2d	286621	. SPRAY TIP, Size 621 *installed in tip guard*	1
2e	243161	. TIP GUARD, RAC V	1
3	224022	SUCTION HOSE *Includes items 3a to 3c*	1
3a	110979	. HOSE, suction	1
3b	110980	. HOSE CLAMP	1
3c	187147	. STRAINER	1
4	224024	AIR REGULATOR ASSEMBLY *Includes items 4a to 4d*	1
4a	109075	. AIR REGULATOR *See manual 308167 for parts*	1
4b	156849	. NIPPLE	1
4c	208536	. COUPLER, quick disconnect	1
4d	169971	. NIPPLE, quick disconnect	1

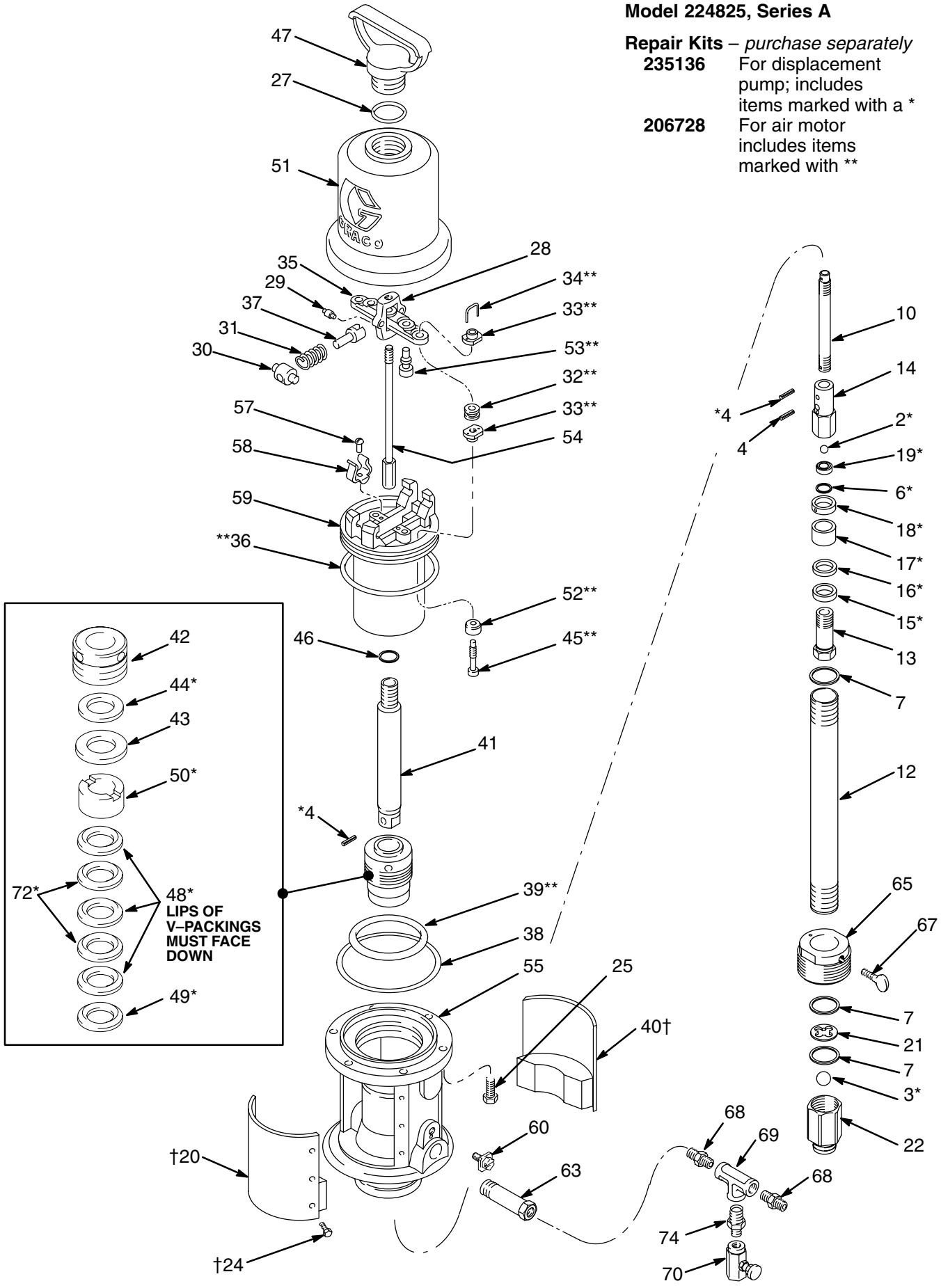


Parts

Model 224825, Series A

Repair Kits – *purchase separately*

235136	For displacement pump; includes items marked with a *
206728	For air motor includes items marked with **



Parts

Model 224825, Series A
15:1 Fire–Ball 300 Pump, Stainless Steel
(See Technical Data for additional wetted parts.)
Includes items 2–74

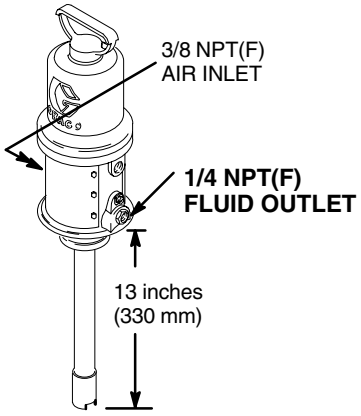
REF NO.	PART NO.	DESCRIPTION	QTY
2	103075*	BALL, sst, 0.44" (11.2 mm) dia.	1
3	101859*	BALL, sst, 0.75" (19 mm) dia.	1
4	101871*	PIN, roll, 0.12" (3.2 mm) dia., 0.75" (19 mm) long	3
6	150451*	GASKET, copper	1
7	150694	GASKET, copper	3
10	187743	ROD, connecting, 5–1/4" (133 mm) long	1
12	187746	TUBE, riser, 11–11/16" (297 mm) long	1
13	187745	BODY, piston	1
14	187744	COUPLING, piston	1
15	160941*	BEARING, press fit, brass	1
16	160942*	SEAL, piston; PTFE	1
17	160943*	PACKING, block, nitrile rubber	1
18	160944*	BEARING, piston, brass	1
19	187753*	SEAT, piston, reversible	1
20	234578†	PLATE, warning (with muffler)	1
21	187748	STOP, ball	1
22	187747	HOUSING, intake valve	1
23	224824	AIR MOTOR ASSEMBLY, Series A *includes items 20 and 24–63*	1
24	100078†	. SCREW, hex washer hd, mach, 8–32 x 3/8"	12
25	101578	. CAPSCREW, hex hd Nylock, 5/16–18 x 7/8"	6
27	156698	. O–RING, nitrile rubber	1
28	158360	. YOKE, rod, trip	1
29	158362	. PIN, toggle	2
30	158364	. PIN, pivot	2
31	167585	. SPRING, helical compression	2
32	158367**	. GROMMET; rubber	2
33	160261**	. NUT, adjusting	4
34	160618**	. WIRE, lock	2
35	172867	. ACTUATOR, valve	1
36	160621**	. O–RING, nitrile rubber	1
37	160623	. ARM, toggle	2
38	160624	. O–RING, nitrile rubber	1
39	160625**	. O–RING, nitrile rubber	1
40	234577†	. PLATE, identification, with muffler	1
41	187749	. ROD, piston	1
42	187756	. NUT, packing	1
43	187757	. WASHER, backup	1
44	160644*	. PACKING, flat leather	1
45	160896**	. STEM, valve	2
46	160932	. GASKET, copper	1
47	164704	. NUT, cylinder cap	1
48	111688*	. V–PACKING, reinforced nitrile	3
49	187755*	. GLAND, male	1
50	187856*	. BEARING, throat	1
51	160613	. CYLINDER, air motor	1
52	170708**	. POPPET, valve, urethane	2
53	170709**	. POPPET, valve, urethane	2
54	203965	. ROD, trip	1
55	224823	. BASE, air motor	1
57	102975	. SCREW, rd hd mach, 6–32 x 1/4"	2
58	172866	. CLIP, spring	2
59	160614	. PISTON, air motor	1
60	116343	. SCREW, ground	1
63	187752	. ADAPTER, 3/8 npt (m) x 1/4 npt(f)	1
65	187754	BUNG ADAPTER	1
67	100220	THUMBSCREW	1
68	166421	NIPPLE, 1/4 npt	2
69	103696	TEE, 1/4 npt(f)	1
70	111521	DRAIN VALVE	1
72	111642	V–PACKING, nitrile rubber	2
74	111643	NIPPLE, 1/4 x 1/8 npt	1

*** Parts included in Displacement Pump Repair Kit 235136**
**** Parts included in Air Motor Repair Kit 206728**
† Parts included in Muffler Repair Kit 222559

Technical Data

Category	Data
Maximum working pressure	2700 psi (18.6 MPa, 186 bar)
Fluid pressure ratio	15:1
Air operating range	40–180 psi (0.3–1.2 MPa, 3–12 bar)
Air motor effective diameter	3 in. (76 mm)
Stroke	3 in. (76 mm)
Air consumption	17 cfm/gallon pumped at 100 psi (0.476 m^3/liter at 0.7 MPa, 7 bar)' up to 30 cfm with pump operated at 180 psi and 66 cycles/min. (up to 0.84 m^3/min with pump operated at 1.2 MPa, 12 bar and 66 cycles/min.)
Pump cycles per gallon (liter)	90
Delivery	0.66 gallons/minute (3 liters/minute)
Maximum recommended pump speed	66 cycles/min; (0.7 gpm [32 liter/min])
Recommended speed for optimum pump life	15 to 25 cycles/min.
Wetted parts	Stainless Steel, Aluminum, Nitrile Rubber, PTFE, Brass, Copper, Leather

Dimensions



Notes

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 . 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.

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