

INSTRUCTIONS-PARTS LIST

This manual contains **IMPORTANT WARNINGS** and **INFORMATION**
 READ AND RETAIN FOR REFERENCE



308-088
 Rev A

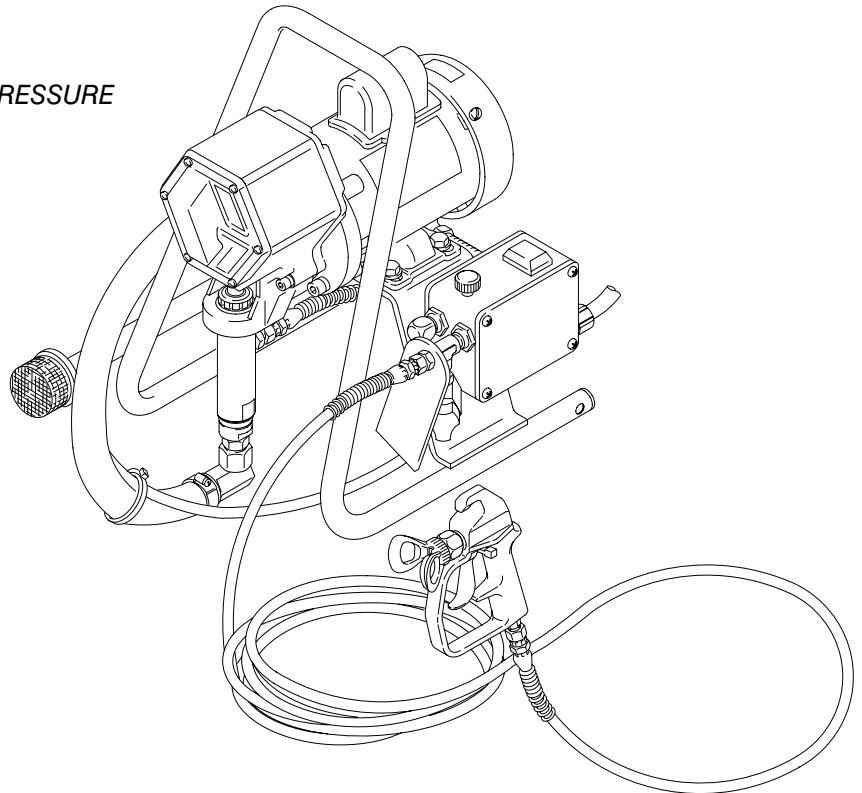
50 HZ, 220/110 V AC

EM 390® SKID PAINT SPRAYER

172 bar (2500 psi) MAXIMUM WORKING PRESSURE

Model 231-138, Series A

Includes hoses, "Black Max" gun,
 Tip Guard, and 415 size tip



CONTENTS

Warnings	2
Terms	4
Basic EM390 Components	4
Setup	4
Operation	6
Shutdown & Care	8
Flushing Guidelines	9
Application Methods	10
Troubleshooting Guide	11
Repair	13
Parts Lists and Drawings	21
Accessories	26
Technical Data	Back Cover
Warranty	Back Cover

NOTE: This is an example of the DANGER label on your sprayer.
 This label is available in other languages, free of charge.
 See page 26 to order.

! DANGER !			
	FIRE AND EXPLOSION HAZARD		SKIN INJECTION HAZARD
Spray painting, flushing or cleaning equipment with flammable liquids in confined areas can result in fire or explosion. Use outdoors or in extremely well ventilated areas. Ground equipment, hoses, containers and objects being sprayed. Avoid all ignition sources such as static electricity from plastic drop cloths, open flames such as pilot lights, hot objects such as cigarettes, arcs from connecting or disconnecting power cords or turning light switches on and off. Failure to follow this warning can result in death or serious injury.		Liquids can be injected into the body by high pressure airless spray or leaks – especially hose leaks. Keep body clear of the nozzle. Never stop leaks with any part of the body. Drain all pressure before removing parts. Avoid accidental triggering of gun by always setting safety latch when not spraying. Never spray without a tip guard. In case of accidental skin injection, seek immediate "Surgical Treatment". Failure to follow this warning can result in amputation or serious injury.	
READ AND UNDERSTAND ALL LABELS AND INSTRUCTION MANUALS BEFORE USE			

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

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SAFETY WARNINGS

**HIGH PRESSURE SPRAY CAN CAUSE SERIOUS INJURY.
FOR PROFESSIONAL USE ONLY. OBSERVE ALL WARNINGS.**

Read and understand all instruction manuals before operating the equipment.

FLUID INJECTION HAZARD

General Safety

This equipment generates very high fluid pressure. Spray from the gun, leaks or ruptured components can inject fluid through your skin and into your body, and cause extremely serious bodily injury, including the need for amputation. Also, fluid injected or splashed into the eyes or on the skin can cause serious damage.

NEVER point the spray gun at any one or at any part of the body. NEVER put your hand or fingers over the spray tip. NEVER try to “blow back” paint; this is NOT an air spray system.

ALWAYS have the tip guard in place on the spray gun when spraying.

ALWAYS follow the **PRESSURE RELIEF PROCEDURE**, below, before cleaning or removing the spray tip or servicing any system equipment.

NEVER try to stop or deflect leaks with your hand or body.

Be sure equipment safety devices are operating properly before each use.

Medical Alert—Airless Spray Wounds

If any fluid appears to penetrate your skin, get **EMERGENCY MEDICAL CARE AT ONCE. DO NOT TREAT AS A SIMPLE CUT.** Tell the doctor exactly what fluid was injected.

Note to Physician: *Injection in the skin is a traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the blood stream. Consultation with a plastic surgeon or reconstructive hand surgeon may be advisable.*

Spray Gun Safety Devices

Be sure all gun safety devices are operating properly before each use. Do not remove or modify any part of the gun; this can cause a malfunction and result in serious bodily injury.

Safety Latch

Whenever you stop spraying, even for a moment, always set the gun safety latch in the closed or “safe” position, making the gun inoperative. Failure to set the safety latch can result in accidental triggering of the gun.

Diffuser

The gun diffuser breaks up spray and reduces the risk of fluid injection when the tip is not installed. Check diffuser operation regularly. Follow the **PRESSURE RELIEF PROCEDURE**, below, then remove the spray tip. Aim the gun into a metal pail, holding the gun firmly to the pail. Using the lowest possible pressure, trigger the gun. If the fluid emitted is not diffused into an irregular stream, replace the diffuser immediately.

Tip Guard

ALWAYS have the tip guard in place on the spray gun while spraying. The tip guard alerts you to the fluid injection hazard and helps reduce, but does not prevent, the risk of accidentally placing your fingers or any part of your body close to the spray tip.

Trigger Guard

Always have the trigger guard in place on the gun when spraying to reduce the risk of accidentally triggering the gun if it is dropped or bumped.

Spray Tip Safety

Use extreme caution when cleaning or changing spray tips. If the spray tip clogs while spraying, engage the gun safety latch immediately. ALWAYS follow the **PRESSURE RELIEF PROCEDURE**, below, and then remove the spray tip to clean it.

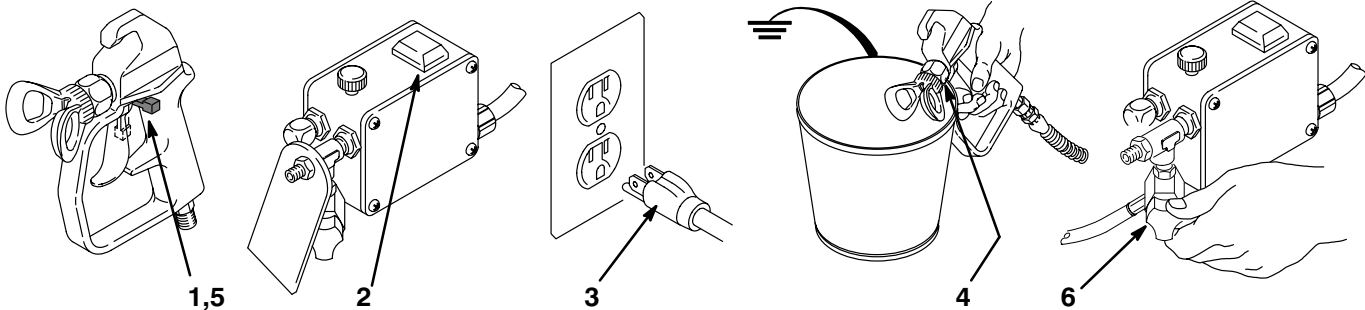
NEVER wipe off build-up around the spray tip until the pressure is fully relieved and the gun safety is engaged.

PRESSURE RELIEF PROCEDURE

To reduce the risk of serious bodily injury, including fluid injection, splashing fluid or solvent in the eyes or on the skin, or injury from moving parts or electric shock, always follow this procedure whenever you shut off the sprayer, when checking or servicing any part of the spray system, when installing, cleaning or changing spray tips, and whenever you stop spraying.

1. Engage the gun safety latch.
2. Turn the ON/OFF switch to OFF.
3. Unplug the power supply cord.
4. Disengage the gun safety latch. Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun to relieve pressure.
5. Engage the gun safety latch.
6. Open the pressure drain valve, having a container ready to catch the drainage, if a drain tube is not used. Leave the valve open until you are ready to spray again.

If you suspect that the spray tip or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, wrap a rag around the tip guard retaining nut or hose end coupling and VERY SLOWLY loosen the part to relieve pressure gradually, then loosen completely. Now clear the tip or hose.



MOVING PARTS HAZARD

Moving parts can pinch or amputate your fingers or other body parts. KEEP CLEAR of moving parts when starting or operating the sprayer. Follow the **Pressure Relief Procedure** on page 2 before checking or servicing any part of the sprayer, to prevent it from starting accidentally.

EQUIPMENT MISUSE HAZARD

General Safety

Any misuse of the spray equipment or accessories, such as overpressurizing, modifying parts, using incompatible chemicals and fluids, or using worn or damaged parts, can cause them to rupture and result in fluid injection, splashing in the eyes or on the skin, or other serious bodily injury, or fire, explosion or property damage.

NEVER alter or modify any part of this equipment; doing so could cause it to malfunction.

CHECK all spray equipment regularly and repair or replace worn or damaged parts immediately.

Always wear protective eyewear, gloves, clothing and respirator as recommended by the fluid and solvent manufacturer.

System Pressure

This sprayer can develop 172 bar (2500 psi) **MAXIMUM WORKING PRESSURE**. Be sure all spray equipment and accessories used are rated to withstand this pressure. DO NOT exceed the maximum working pressure of any component or accessory used in the system.

Fluid and Solvent Compatibility

All chemicals used in the sprayer must be chemically compatible with the wetted parts shown in the **TECHNICAL DATA** on page 28. Consult your chemical supplier to ensure compatibility.

Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in this equipment, which contains aluminum and/or zinc parts. Such use could result in a serious chemical reaction, with the possibility of explosion, which could cause death, serious bodily injury and/or substantial property damage.

FIRE OR EXPLOSION HAZARD

Static electricity is created by the flow of fluid through the pump and hose. If every part of the spray equipment is not properly grounded, sparking may occur, and the system may become hazardous. Sparking may also occur when plugging in or unplugging a power supply cord or using a gasoline engine. Sparks can ignite fumes from solvents and the fluid being sprayed, dust particles and other flammable substances, whether you are spraying indoors or outdoors, and can cause a fire or explosion and serious bodily injury and property damage. Always plug the sprayer into an outlet located at least 6 m (20 feet) away from the sprayer and the spray area. Do not plug in or unplug any power supply cords in the spray area when there is any chance of igniting fumes still in the air.

If you experience any static sparking or even a slight shock while using this equipment, **STOP SPRAYING IMMEDIATELY**. Check the entire system for proper grounding. Do not use the system again until the problem has been identified and corrected.

Grounding

To reduce the risk of static sparking, ground the sprayer and all other spray equipment used or located in the spray area. CHECK your local electrical code for detailed grounding instructions for your area and type of equipment. BE SURE to ground all of this spray equipment:

1. *Sprayer*: plug the power supply cord, or extension cord – each equipped with an undamaged, grounded plug, into a properly grounded outlet. Do not use an adapter. All extension cords must have three wires and be rated for 15 Amps.

IMPORTANT

United States Government safety standards have been adopted under the Occupational Safety and Health Act. These standards – particularly the General Standards, Part 1910, and the Construction Standards, Part 1926 – should be consulted.

HOSE SAFETY

High pressure fluid in the hoses can be very dangerous. If the hose develops a leak, split or rupture due to any kind of wear, damage or misuse, the high pressure spray emitted from it can cause a fluid injection injury or other serious bodily injury or property damage.

ALL FLUID HOSES MUST HAVE STRAIN RELIEFS ON BOTH ENDS! The strain reliefs help protect the hose from kinks or bends at or close to the coupling which can result in hose rupture.

TIGHTEN all fluid connections securely before each use. High pressure fluid can dislodge a loose coupling or allow high pressure spray to be emitted from the coupling.

NEVER use a damaged hose. Before each use, check the entire hose for cuts, leaks, abrasion, bulging cover, or damage or movement of the hose couplings. If any of these conditions exist, replace the hose immediately. DO NOT try to recouple high pressure hose or mend it with tape or any other device. A repaired hose cannot contain the high pressure fluid.

HANDLE AND ROUTE HOSES CAREFULLY. Do not pull on hoses to move equipment. Keep hoses clear of moving parts and hot surfaces of the pump. Do not use fluids or solvents which are not compatible with the inner tube and cover of the hose. DO NOT expose Graco hoses to temperatures above 82° C (180° F) or below -40° C (-40° F).

Hose Grounding Continuity

Proper hose grounding continuity is essential to maintaining a grounded spray system. Check the electrical resistance of your fluid hoses at least once a week. If your hose does not have a tag on it which specifies the maximum electrical resistance, contact the hose supplier or manufacturer for the maximum resistance limits. Use a resistance meter in the appropriate range for your hose to check the resistance. If the resistance exceeds the recommended limits, replace it immediately. An ungrounded or poorly grounded hose can make your system hazardous. Also read **FIRE OR EXPLOSION HAZARD**, below.

2. *Fluid hoses*: use only grounded hoses with a maximum of 150 m (500 feet) combined hose length to ensure grounding continuity. See **Hose Grounding Continuity** above.
3. *Spraygun*: obtain grounding through connection to a properly grounded fluid hose and sprayer.
4. *Object being sprayed*: according to local code.
5. *Fluid supply container*: according to local code.
6. *All solvent pails used when flushing*, according to local code. Use only metal pails, which are conductive. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts the grounding continuity.
7. *To maintain grounding continuity when flushing or relieving pressure*, always hold a metal part of the gun firmly to the side of a grounded metal pail, then trigger the gun.

Flushing Safety

Reduce the risk of fluid injection injury, static sparking, or splashing by following the flushing procedure given on page 9 of this manual. Follow the **PRESSURE RELIEF PROCEDURE** on page 2, and remove the spray tip before flushing. Hold a metal part of the gun firmly to the side of a grounded metal pail and use the lowest possible fluid pressure during flushing.

TERMS

NOTE: Identifies additional procedures and information.

CAUTION: Alerts user to avoid or correct conditions that could cause damage to or destruction of equipment.

WARNING: Alerts user to avoid or correct conditions that could cause bodily injury.

EM 390 COMPONENTS

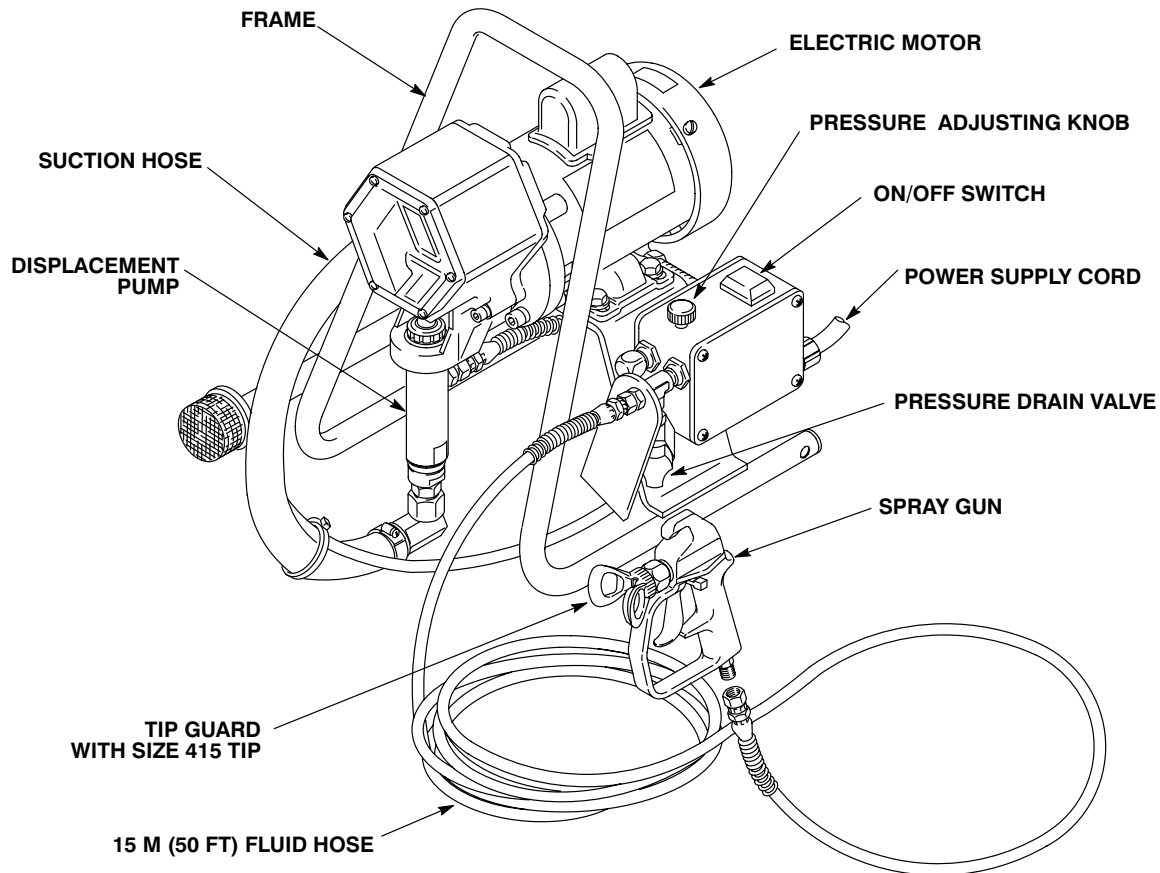


Fig 7-1

SETUP

1. **An accessory wheel kit , p/n 223-739,** is available. See page 26 to order it.
2. **Connect the hose and gun.** (See Fig 1.)
Remove the plastic plug from the outlet nipple and screw the 15.2 m (50 ft) fluid hose onto the nipple. Don't use thread sealant, and don't install the spray tip yet!

WARNING

If you are supplying your own hoses and spray gun, be sure the hoses are electrically conductive, that the gun has a tip guard, and that each part is rated for at least 172 bar (2500 psi) Working Pressure. This is to reduce the risk of serious bodily injury caused by static sparking, fluid injection or over-pressurization and rupture of the hose or gun.

CAUTION

To avoid damaging the pressure control, which may result in poor equipment performance and component damage, follow these precautions:

1. Always use grounded, flexible spray hose at least 15.2 m (50 ft) long.
2. Never use a wire braid hose as it is too rigid to act as a pulsation dampener.
3. Never install any shutoff device between the outlet of the pressure control and the main hose. See Fig 1.

SETUP

2. **Fill the packing nut/wet-cup** 1/3 full with Graco Throat Seal Liquid (TSL), supplied. See Fig 2.
3. **Check the electrical service.**
 - a. The motor is factory wired for 220 V. To rewire the motor for 110 V, unplug the sprayer, remove the cover plate of the voltage change box (located on the left side of the motor) and rewire the motor as shown in Fig 3. Also see Fig 2.
 - b. Be sure the electrical service is properly rated for your sprayer and that the outlet you use is properly grounded.
 - c. Have a licensed electrician attach an appropriate plug to the power supply cord.
 - d. Use a grounded extension cord which has 3 wires of a minimum 2.5 mm (12 gauge) size, and a maximum of 30 m (100 ft) long. Longer lengths or smaller gauges may affect sprayer performance.

WARNING

Proper grounding is essential to reduce the risk of static sparking which can cause a fire or explosion and result in serious bodily injury and property damage.

Read the warning section **FIRE OR EXPLOSION HAZARD** on page 3 of this manual and ground the sprayer as explained there.

4. **Plug in the sprayer.** Be sure the ON/OFF switch is OFF. See Fig 4. Plug the power supply cord into a grounded electrical outlet that is at least 6 m (20 ft) away from the spray area to reduce the chance of a spark igniting the spray vapors.
5. **Flush the pump** to remove the lightweight oil which was left in to protect pump parts after factory testing. See **FLUSHING GUIDELINES** on page 9.
6. **Prepare the paint** according to the manufacturer's recommendations.

Remove any skin that may have formed. Stir the paint to dissolve pigments. Strain the paint through a fine nylon mesh bag (available at most paint dealers) to remove particles that could clog the filter or spray tip. This is probably the most important step toward trouble-free spray painting.

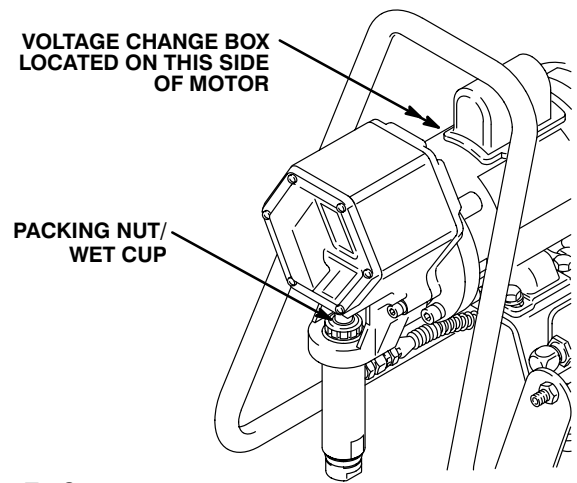


Fig 7-2

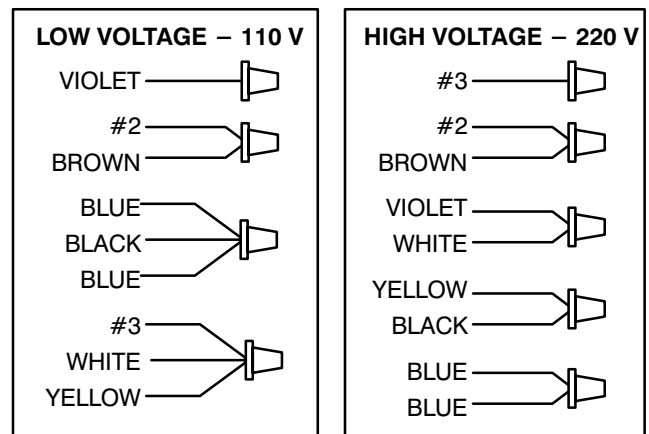


Fig 7-3

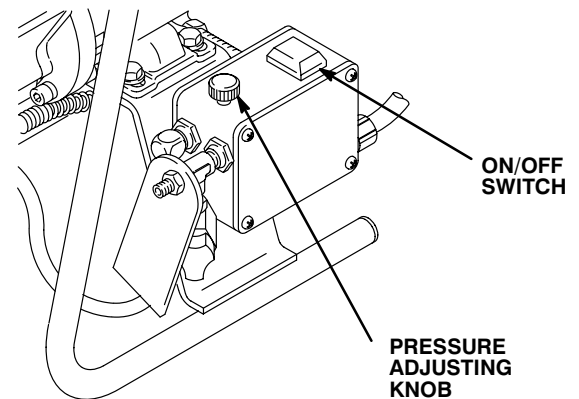


Fig 7-4

OPERATION

WARNING

To reduce the risk of serious bodily injury, including fluid injection, splashing fluid or solvent in the eyes or on the skin, or injury from moving parts or electric shock, always follow the **PRESSURE RELIEF PROCEDURE** on page 2 whenever you shut off the sprayer, when checking or servicing any part of the spray system, when installing, cleaning or changing spray tips, and whenever you stop spraying.

Startup

Use this procedure each time you start the sprayer to help ensure the sprayer is ready to operate and that you start it safely.

NOTE: Before starting the sprayer for the first time, flush it. See page 9 for **FLUSHING GUIDELINES**.

1. **Close the pressure drain valve.** See Fig 6.
2. **Don't install the spray tip yet!**
3. **Put the suction tube into the paint container.**
4. **Lower the pressure setting** by turning the pressure adjusting knob all the way counterclockwise. See Fig 6.

5. **Disengage the gun safety latch.** See Fig 6.
6. **To prime the pump,** hold a metal part of the gun firmly against and aimed into a grounded metal pail. See Fig 5. Squeeze the trigger and hold it open, turn the ON/OFF switch to ON, and slowly increase the pressure setting until the sprayer starts. Keep the gun triggered until all air is forced out of the system and the paint flows freely from the gun. Release the trigger and engage the gun safety latch.

NOTE: If the pump is hard to prime, place a container under the pressure drain valve (if a drain hose is not connected to it) and open it. When fluid comes from the valve, close it. Disengage the gun safety latch and proceed as in Step 6.

7. **Check all fluid connections for leaks.** If any leaks are found, relieve pressure before tightening the connections.

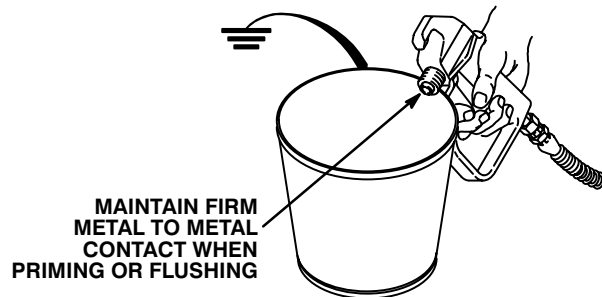


Fig 7-5

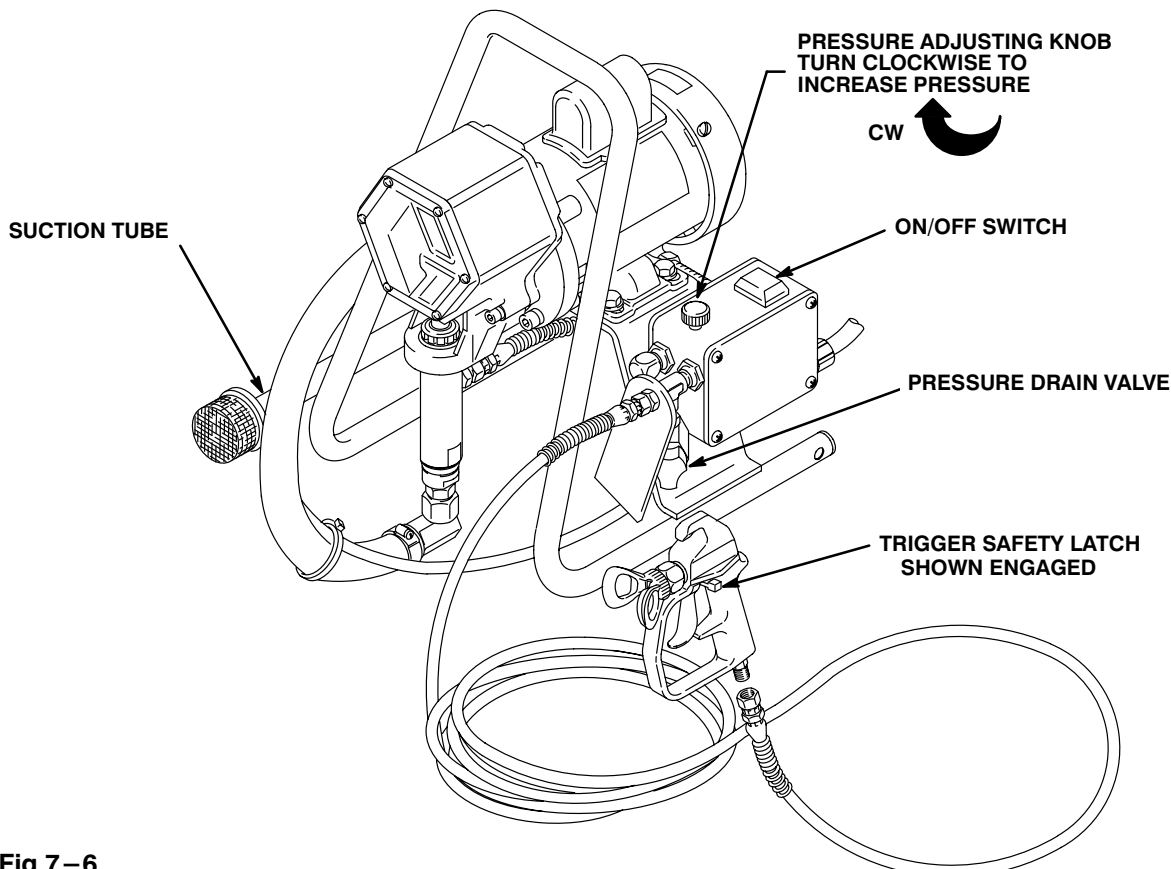


Fig 7-6

8. **Install the spray tip and tip guard.** Be sure the gun safety latch is engaged. See *Fig 7*. Install the spray tip. Refer to the instructions supplied with the tip guard.

9. **Adjust the spray pattern**
 - a. Increase the pressure just until spray from the gun is completely atomized. To avoid excessive overspray and fogging, and to decrease tip wear and extend the life of the sprayer, always use the lowest possible pressure needed for good atomization.
 - b. If more coverage is needed, use a larger tip rather than increasing the pressure.
 - c. To adjust the direction of the spray pattern, engage the gun safety latch and loosen the retaining nut. Position the tip guard horizontally for a horizontal pattern or vertically for a vertical pattern. Then tighten the retaining nut.

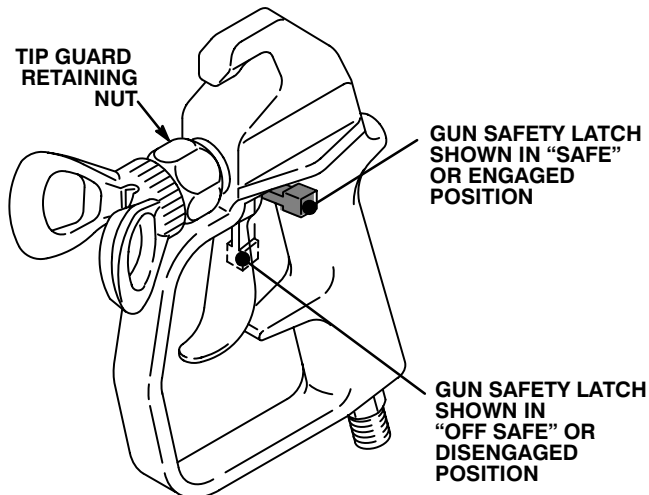


Fig 7-7

Cleaning a Clogged Tip

WARNING

To reduce the risk of serious bodily injury from fluid injection;

NEVER operate the spray gun with the tip guard removed.

DO NOT hold your hand, body, or a rag in front of the spray tip when cleaning or checking a clogged tip. Always point the gun toward the ground or into a pail when checking to see if the tip is clear.

DO NOT try to "blow back" paint; this is NOT an air spray sprayer.

1. Clean the front of the tip frequently during the day's operation. Follow the **Pressure Relief Procedure Warning** on page 2. Use a solvent-soaked brush to clean the tip.

2. If the spray tip clogs while spraying, engage the gun safety latch. See *Fig 7*. Shut off the sprayer. Open the pressure drain valve to relieve pressure. SLOWLY loosen the tip guard retaining nut and allow any remaining pressure to be released gradually. Remove the spray tip and clean it. Refer to instruction manual 306-686, supplied, for the cleaning instructions.

SHUTDOWN AND CARE

1. **Check the packing nut/wet-cup daily.** Relieve pressure. Keep the wet-cup 1/3 full of TSL to help prevent fluid buildup on the piston rod and premature wear of packings. See Fig 8. Tighten the packing nut just enough to stop leakage. Over tightening the packing nut may cause binding and excessive packing wear. Use a round punch or brass rod and light hammer to adjust the nut. Use a round punch or brass rod and light hammer to adjust the nut.

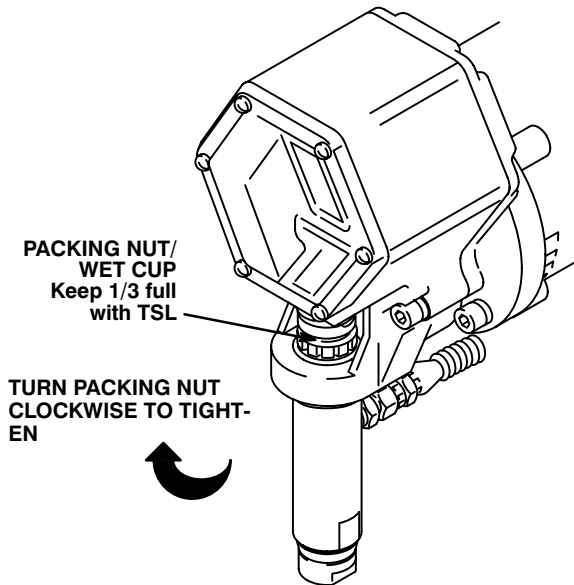


Fig 7-8

3. **Lubricate the bearing housing** after every 100 hours of operation. Remove the drive housing cover. Fill the bearing housing cavity with SAE non-detergent oil. See Fig 9.

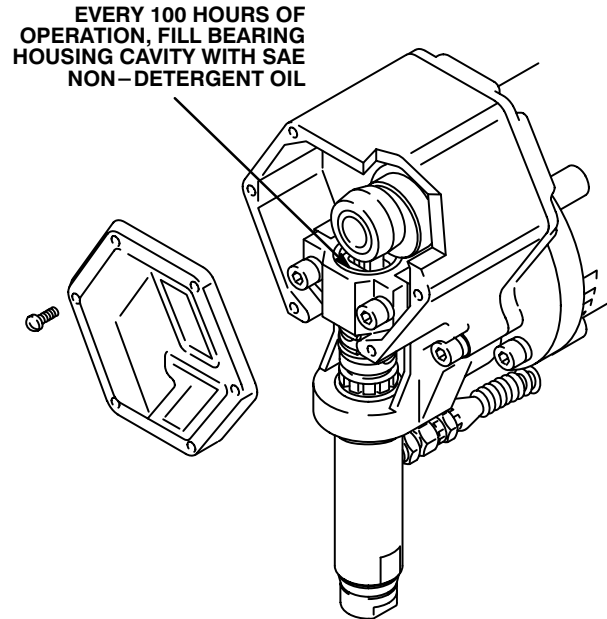


Fig 7-9

2. **Flush the sprayer at the end of each work day** and fill it with mineral spirits. Proper flushing helps prevent performance problems and costly equipment damage. See **FLUSHING GUIDELINES** on page 9.

CAUTION

Never leave water or any paint in the sprayer overnight to prevent pump corrosion and to prevent the fluid from freezing or setting up in the pump, pressure control, or hoses. Fluid which is allowed to freeze or set up in the sprayer or other accessories can cause loss of pressure, stalling or serious equipment damage.

Always eliminate water or water-base fluid from the spray system by using mineral spirits for the final flush. Then relieve pressure and leave the mineral spirits in the sprayer.

4. For very short shutoff periods, leave the suction tube in the paint, follow the **Pressure Relief Procedure Warning** on page 2, and clean the spray tip.
5. Coil the hose and lay it on top of the sprayer when storing it, even for overnight, to help protect the hose from kinking, abrasion, coupling damage, etc.

WARNING

See the warning section **HOSE SAFETY** on page 3 for information on the hazard of using damaged hoses.

FLUSHING GUIDELINES

When To Flush

CAUTION

NEVER leave water in the sprayer if there is the slightest chance it could freeze. Flush out the water with mineral spirits. Water frozen in the pressure control tube prevents the sprayer from being started and causes serious damage to the pressure control.

1. **New Sprayer.** Flush out the test oil.
Before using water-base paint, flush with mineral spirits, followed by a soapy water flush, and then a clean water flush.
Before using oil-base paint, flush with mineral spirits, only.
2. **Changing Colors.** Flush with a compatible solvent such as mineral spirits or water.

How To Flush

1. Relieve pressure. See page 11.
2. Close the pressure drain valve. See Fig 10.

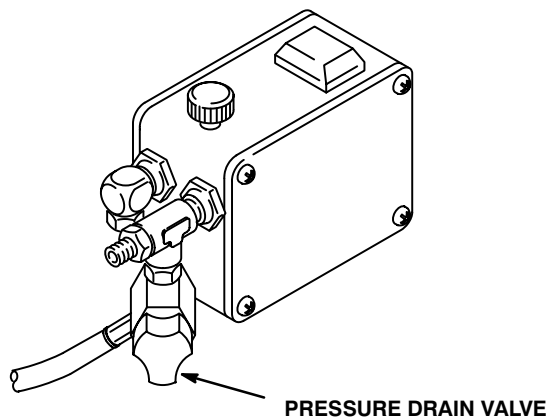


Fig 7-10

3. Pour one-half gallon (2 liters) of compatible solvent into a grounded metal pail. Put the suction tube in the pail.
4. Remove the spray tip and tip guard, if installed, and clean separately.
5. Turn the pressure adjusting knob all the way counterclockwise to the lowest setting.

WARNING

To reduce the risk of static sparking and splashing when flushing, always remove the spray tip from the gun, and hold a metal part of the gun firmly to the side of a grounded metal pail. See Fig 11.

6. Disengage the gun safety latch. Hold a metal part of the gun firmly against and aimed into a grounded metal pail. Start the sprayer, trigger the gun, and slowly turn the pressure adjusting knob clockwise just until the pump starts. Keep the gun triggered until clean solvent comes from the nozzle. Release the trigger and engage the gun safety latch.

3. **Changing from water-base to oil-base paint.** Flush with warm, soapy water, and then flush with mineral spirits.
4. **Changing from oil-base to water-base paint.** Flush with mineral spirits, followed by warm, soapy water, and then a clean water flush.
5. **Storage.** Flush, leave the pump, hose and gun filled with mineral spirits. Shut off the sprayer and open the pressure drain valve to relieve pressure.
Water-base paint: Flush with water, and then mineral spirits.
Oil-base paint: Flush with mineral spirits.
6. **Startup after storage.**
Before using water-base paint, flush with soapy water, and then with clean water.
When using oil-based paint, with the paint to be sprayed.

NOTE: If the pump is hard to prime, open the pressure drain valve. When fluid comes from the drain tube, close the valve. Repeat Step 6.

7. Check all fluid connections for leaks. Relieve pressure before tightening the connections. Start the sprayer.
8. Remove the suction tube from the pail. Disengage the gun safety latch. Trigger the gun to force solvent from the hose. Do not run the pump dry for more than 30 seconds to avoid damaging the pump packings! Relieve pressure.
9. Leave the pressure drain valve open until you use the sprayer again.
10. If you flushed with mineral spirits and are going to use a water-base paint, flush with soapy water followed by a clean water flush. Relieve pressure.
11. Remove the suction tube and hose and clean them separately. Flushing alone is not sufficient to remove paint buildup.

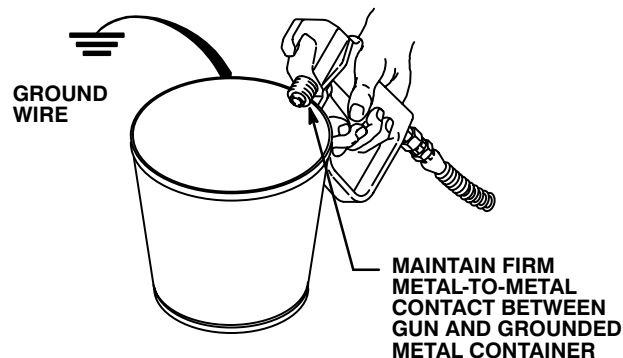


Fig 7-11

APPLICATION METHODS

Hold the gun perpendicular to the surface. Keep the gun at an even 300–356 mm (12 to 14 in.) from the surface you are spraying. See Fig 12.

Begin moving the gun horizontally at a steady rate. Start the spray stroke off the target surface and pull the trigger as the gun is moving. Then, while the gun is still moving, and as you approach the other edge of the surface, release the trigger. This method avoids excess paint build-up at the end of each stroke.

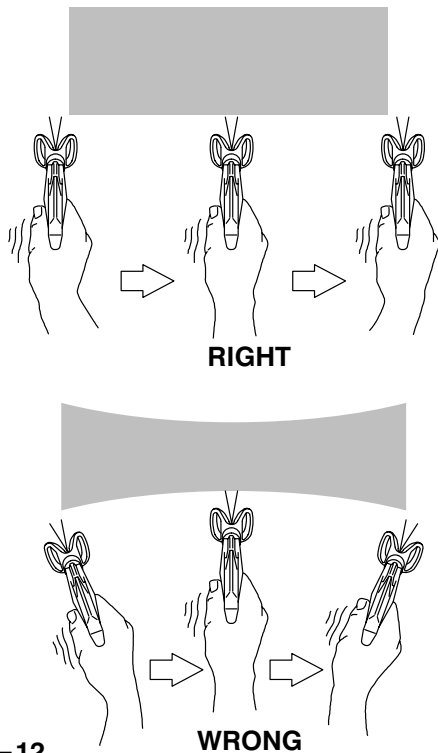


Fig 7–12

Move the gun at a speed that provides a full, wet coating to be applied without runs or sags. Lap each stroke 50% over the previous stroke to produce a uniform paint thickness. Spray in a uniform pattern from right to left and then left to right for a professional finish. See Fig 13.

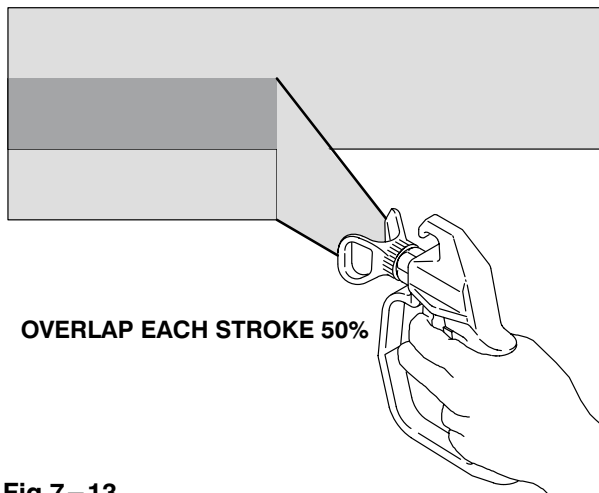


Fig 7–13

The best way to control the rate of coverage is with the gun tip size. A small tip orifice applies less paint. A larger tip orifice applies more paint. The width of the pattern depends on the fan pattern of the tip you choose.

Do not try to increase coverage by increasing the fluid pressure! Use the lowest pressure needed for good results. This prolongs the life of your sprayer and reduces paint lost by overspray.

For interior corners aim the gun toward the center of the corner to be sprayed. By dividing the spray pattern this way, the edges on both sides are sprayed evenly. See Fig 14.

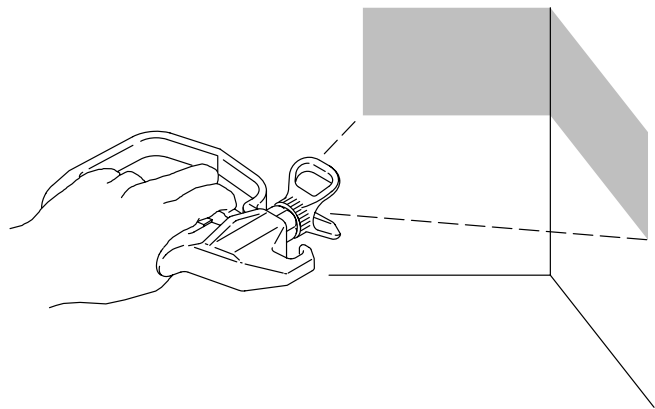


Fig 7–14

If there is a wind, angle the spray pattern into the wind to minimize drifting. Paint from the ground to the roof.

Shrubs. Tie back shrubs with rope and stakes. Cover them with a dropcloth as the painter approaches the area. Remove the dropcloth as soon as the area is painted to prevent damage.

Concrete walks. If the walkways will be walked on, cover them with a canvas dropcloth to avoid slipping. Otherwise a plastic cloth can be used.

Electrical outlets and lamps. Protect electrical outlets with masking tape. Cover lamps with plastic bags secured with masking tape.

Nearby objects. Move portable objects upwind of the surface to be sprayed. If there is a nearby home, make a protective barrier by hanging plastic drop cloths between two long poles.

TROUBLESHOOTING GUIDE

WARNING

Pressure Relief Procedure

To reduce the risk of serious bodily injury, including fluid injection, splashing in the eyes or on the skin, or injury from moving parts, always follow this procedure when you shut off the sprayer, when checking, adjusting or cleaning the system, and when changing spray tips.

- 1 Engage the gun safety latch.
- 2 Turn the ON/OFF switch OFF.
- 3 Unplug the power supply cord.

- 4 Disengage the gun safety latch. Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun.
- 5 Engage the gun safety latch.
- 6 Open the fluid pressure drain valve and leave it open until you start the sprayer again.

*If you suspect the hose or spray tip is completely clogged or that pressure is not fully relieved after following the steps above, **VERY SLOWLY** loosen the tip guard retaining nut or hose end coupling to relieve pressure gradually. Now clear the tip or hose.*

Check everything in the chart before disassembling the sprayer.

PROBLEM	CAUSE	SOLUTION
Electric motor won't run	Power cord or extension cord unplugged, or damaged, or building circuit breaker or fuse has tripped.	Check, reset or replace.
	Motor overload switch ¹ has opened.	Unplug power supply cord, relieve pressure, allow motor to cool, decrease pressure.
	Pressure setting is too low.	Increase pressure.
	Pressure control frozen or damaged by overpressurization.	Try to thaw ² , or replace pressure control.
Electric motor stops while spraying	Power cord or extension cord unplugged, or damaged, or building circuit or fuse is blown.	Check, reset or replace.
	Motor overload switch ¹ has opened.	Unplug the power supply cord, relieve pressure, allow motor to cool, decrease pressure.
	Pressure setting is too low.	Increase pressure.
	Spray tip is plugged.	Remove and clean.
	Wrong type of extension cord.	Use maximum 15 m (50 ft), 3 wires, 2.5 mm (12 gauge) minimum gauge, grounded extension cord.
Electric motor runs, but low paint output or no paint output, OR pump is not stroking See the PROBLEM , "Not enough paint pressure", on page 12, also	Piston ball check not seating.	Service the pump. See page 18.
	Piston packings are worn or damaged.	Replace the piston. See page 18.
	Intake valve ball check not seating.	Service the pump. See page 18.
	Pump is frozen.	Thaw ²
	Pressure control frozen or damaged by overpressurization ³ .	Try to thaw ² , or replace pressure control.
	Drive assembly damaged.	Replace the drive housing. See page 14.
	Displacement pump worn or damaged.	Replace the displacement pump. See page 18.
	Sprayer is not primed.	Prime the sprayer. See page 6.
Electric motor labors when starting, and trips building circuit breaker, fuse or motor overload switch	Start switch has failed.	Replace the start switch. See page 16.
	Motor capacitor has failed.	Replace the capacitor. See page 16.
	Motor is incorrectly wired for voltage being used.	Verify wiring. See page 5.

PROBLEM	CAUSE	SOLUTION
Paint leaks into wet-cup	Throat packings are worn or damaged.	Replace the packings. See page 18.
Excessive surging from spray gun	Spray tip is plugged.	Disassemble and clean.
	Spray tip too big or worn.	Change the spray tip.
	Paint too viscous.	Thin the paint.
	Wrong type hose.	Use minimum 15 m (50 ft) grounded, flexible hose (wire braid hose is unacceptable).
Not enough paint pressure	Pressure setting too low.	Increase the pressure.
	Spray tip too big or worn.	Change the spray tip.
	Pressure control frozen ² or damaged by overpressurization ³ .	Try to thaw ² , or replace the pressure control.
	Displacement pump worn or damaged.	Replace the displacement pump. See page 18.
Tails or fingers in spray pattern	Pressure setting too low.	Increase the pressure.
	Spray tip too big or worn.	Change the spray tip.
	Fluid supply is low or empty.	Refill and prime the pump. Check fluid supply often to prevent running the pump dry.
	Paint too viscous.	Thin the paint.
	Wrong type hose.	Use minimum 15 m (50 ft), grounded, flexible hose (wire braid hose is unacceptable).
Paint runs or sags	Spray tip too big or worn.	Change the spray tip.
Spitting from gun	Air in fluid pump or hose.	Check for loose connections at pump intake and tighten. Then prime the pump.
	Spray tip is partially clogged.	Clear the tip. See page 7.
	Fluid supply is low or empty.	Refill and prime the pump. Check fluid supply often to prevent running the pump dry.
Static sparking from the gun	Spray or work being sprayed is not properly grounded.	Correct problem before continuing. Follow the warning section, FIRE OR EXPLOSION HAZARD on page 3.

¹ The electric motor has an over-temperature switch which automatically resets upon cooling. If it opens and the electric motor shuts itself off, unplug the power supply cord and let the sprayer cool for 30 to 60 minutes. Always use the lowest pressure setting needed when spraying.

² Freezing results from failure to replace the water-base paint or flushing water with mineral spirits, and usually causes permanent damage to the pressure control.

³ Over-pressurization results from (1) using less than 15 m (50 ft) of flexible spray hose, (2) from using a wire braid spray hose, (3) from adding a shutoff device between the pump outlet and the spray gun, or (4) from attaching a spray hose to the pressure drain valve.

CONNECTING ROD and BEARING

WARNING

To reduce the risk of serious bodily injury, including fluid injection; splashing in the eyes; injury from moving parts or electric shock, always follow the **Pressure Relief Procedure Warning** on page 11 before continuing.

NOTE: See Fig 15.

- 1 Remove pump as described on page 18.
- 2 Remove the screws (1) and the cover (2). Remove the screws (51) and slide the connecting rod and bearing assembly (A) off the crankshaft (B).
- 3 Use a screwdriver to push the retaining spring (65) up and remove the pin (63) from the coupling (64). Remove the coupling from the connecting rod.
- 4 Pull the connecting rod (54) out of the bearing (66). Wipe off these parts; do not use solvent. Inspect the surfaces of the bearing and connecting rod link for wear or damage. If either part needs replacing, replace both. When installing the rod and bearing, coat the surfaces with SAE 10 non-detergent motor oil.
- 5 Clean and inspect the crankshaft. Wipe it clean with a rag; do not use solvent. If the crankshaft (B) is badly worn, replace the drive assembly (8) as described on page 14.
- 6 Clean and inspect the connecting rod needle bearing (C). Repack the bearing with industrial grade, heavy duty, extreme-pressure lithium soap grease.

NOTE: After every 100 hours of operation, or whenever servicing the pump (whichever comes first), fill the cavity (D) in the connecting rod (54) with SAE 10 non-detergent motor oil.

- 7 Assemble the new rod and bearing, being sure to push the spring (65) down in place over the pin (63) ends, and install the remaining parts in the reverse order.

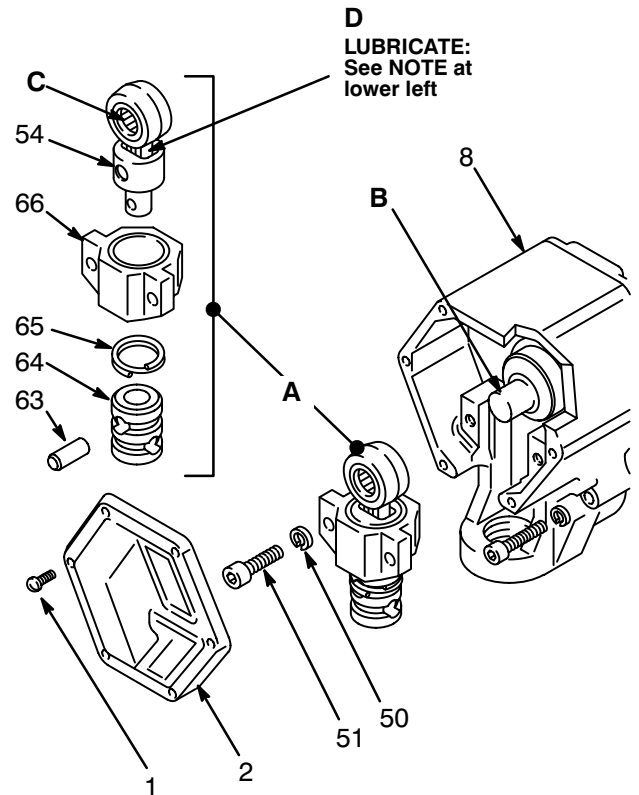


Fig 7-15

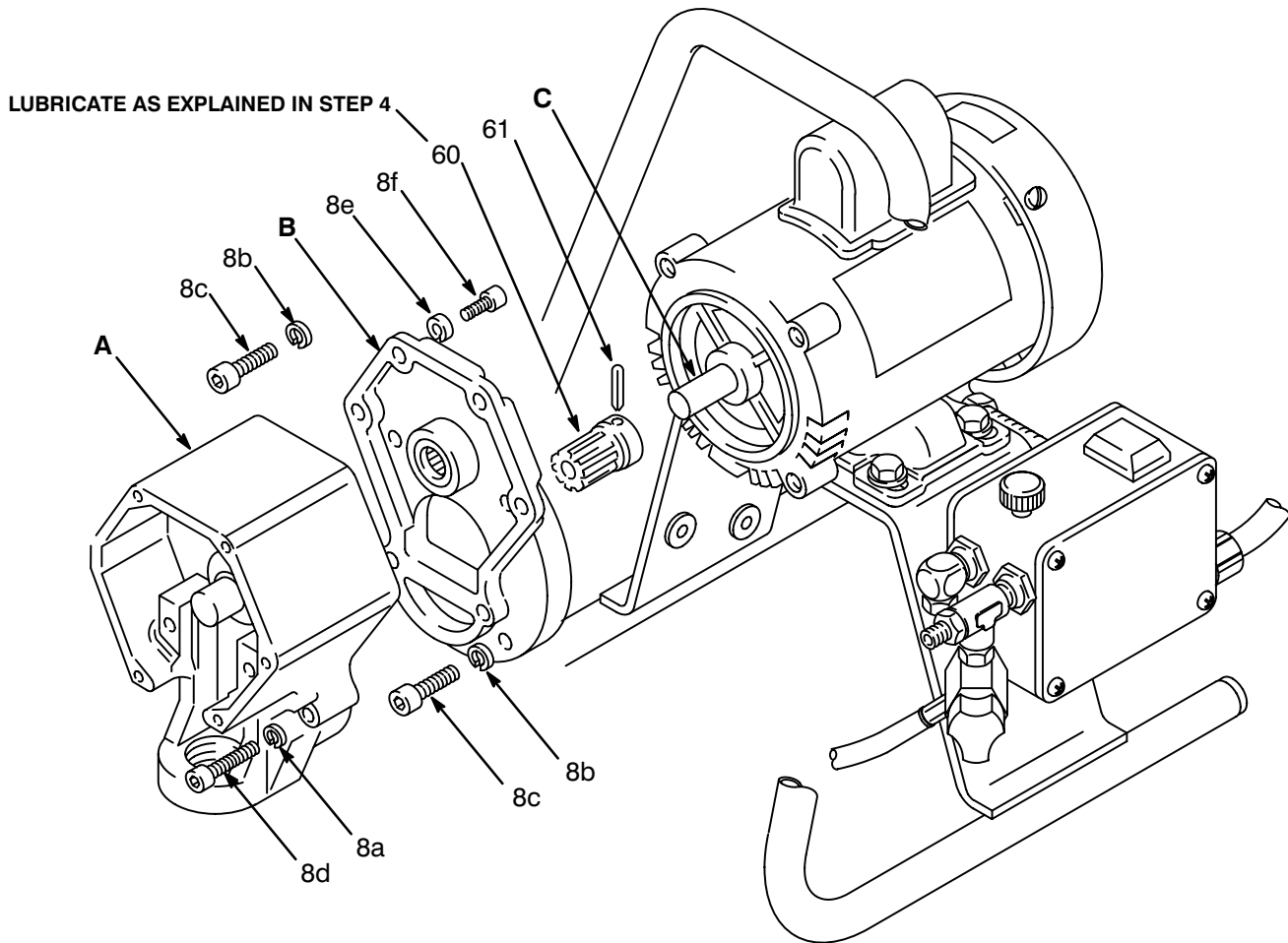


Fig 7-16

WARNING

To reduce the risk of serious bodily injury, including fluid injection; splashing in the eyes; injury from moving parts or electric shock, always follow the **Pressure Relief Procedure Warning** on page 11 before continuing.

- 1 Remove the pump. See page 18. Remove the connecting rod and bearing. See page 13.

NOTE: See Fig 16 for this procedure.

- 2 Remove the screws (8d) from the front of the drive housing (A). Remove the screws (8f) from the top rear of the motor housing (B). Pull the drive housing (A) off the motor housing (B).

- 3 Remove the screws (8c) from the front of the motor housing (B). Pull the motor housing off the motor.

- 4 Clean and inspect the gear (60). Replace the gear if it is worn or damaged. To remove the gear, drive out the pin (61) and pull the gear off the motor shaft (C). Before reassembling the gear, apply molybdenum disulfide spray lubricant to it, allow it to dry, then apply industrial grade, heavy duty, extreme-pressure lithium soap grease.

- 5 Install the new drive assembly in the reverse order of removal.

REMOVING and REPLACING ELECTRIC MOTOR

WARNING

To reduce the risk of serious bodily injury, including fluid injection; splashing in the eyes; injury from moving parts or electric shock, always follow the **Pressure Relief Procedure Warning** on page 11 before continuing.

- 1 Disconnect the hose (26) at the displacement pump. See page 18.
- 2 Remove the drive assembly. See page 14. You can leave the pump, connecting rod and bearing assembled to the drive assembly.
- 3 Drive out the pin (61) and remove the gear (60). Remove the screws (3) and cover (17) from the pressure control (18). See Fig 17.

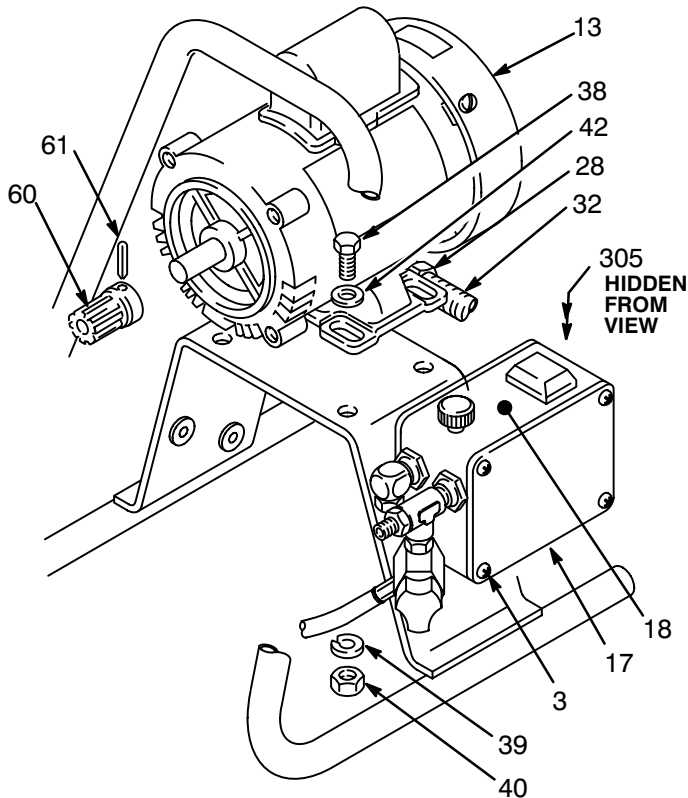
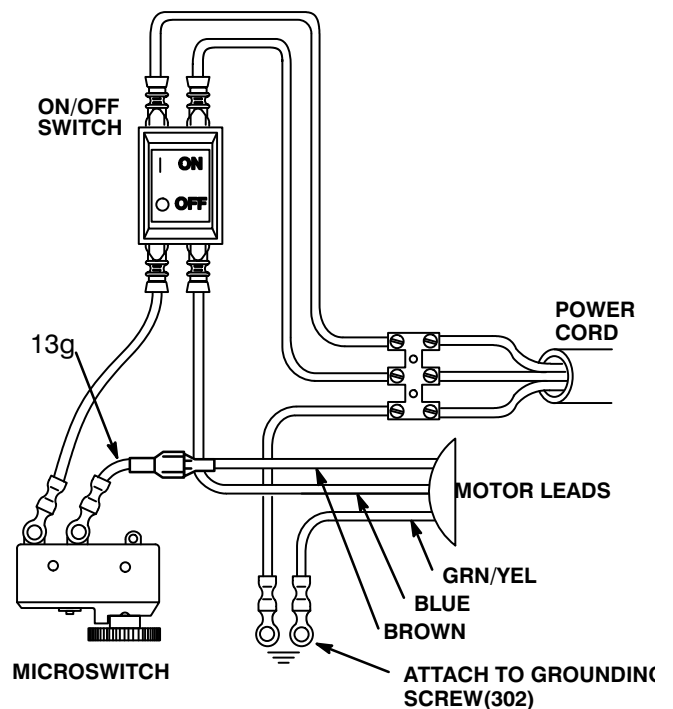


Fig 7-17

- 4 Disconnect the green and yellow motor lead from the grounding screw, the brown motor lead from the top of the microswitch and the blue lead from the on/off switch. See Fig 18.
- 5 Unscrew the connector (28 and 305) nuts on both ends of the conduit (32). Remove the screws (38), washers (42), nuts (40) and lockwashers (39). See Fig 17. Remove the motor from the frame while carefully guiding the wires through the connector (305) in control box. Remove the conduit (32) from the wires.
- 6 Loosen the locknut and unscrew the connector (28) from the motor, being careful to avoid twisting the wires. Install the new motor in the reverse order.

NOTE: The replacement motor includes a harness adapter (13g). Connect it between the brown motor lead and the microswitch. See Fig 18.



WIRING DIAGRAM

Fig 7-18

START SWITCH

WARNING

To reduce the risk of serious bodily injury, including fluid injection; splashing in the eyes; injury from moving parts or electric shock, always follow the **Pressure Relief Procedure Warning** on page 11 before continuing.

- 1 Be sure the sprayer is unplugged.
- 2 Remove the cover on the voltage change box. See *Fig 19*. Disconnect the terminals, taking note of their locations. Remove the two screws holding the start switch, and remove the start switch.
- 3 Reassemble in the reverse order. To verify the wiring, refer to *Fig 3*, page 5.

CAPACITOR

WARNING

To reduce the risk of serious bodily injury, including fluid injection; splashing in the eyes; injury from moving parts or electric shock, always follow the **Pressure Relief Procedure Warning** on page 11 before continuing.

- 1 Remove the two screws and the cover of capacitor (13d). See *Fig 19*.
- 2 Remove the flag connectors from the old capacitor. Connect the flag connectors of the new capacitor and replace the cover.

NOTE: The replacement capacitor includes a new resistor, installed.

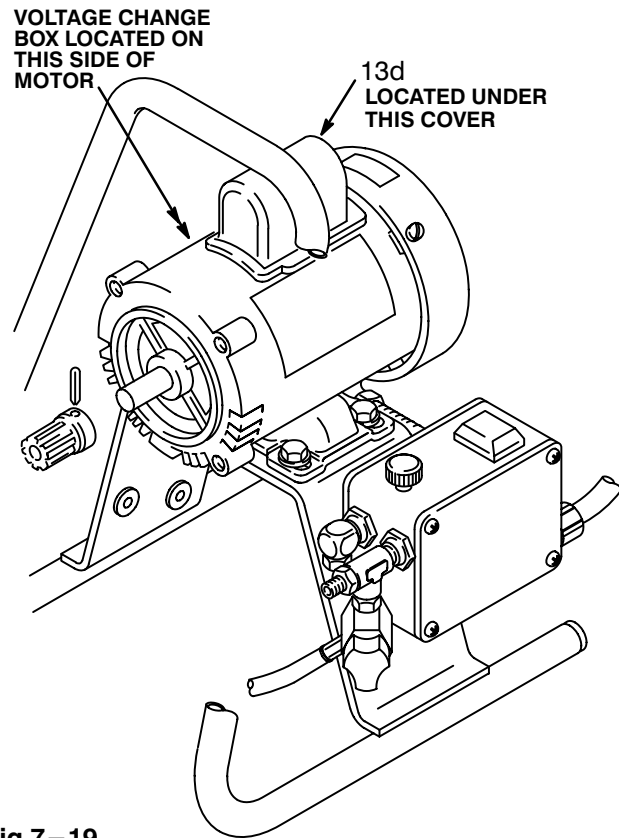


Fig 7-19

PRESSURE CONTROL

WARNING

To reduce the risk of serious bodily injury, including fluid injection; splashing in the eyes; injury from moving parts or electric shock, always follow the **Pressure Relief Procedure Warning** on page 11 before continuing.

NOTE: Refer to Fig 20 except where noted otherwise.

- 1 Disconnect the hose (26) from the pressure control nipple (30).
- 2 Remove the screws (3) and cover (17) from the pressure control (18).
- 3 Disconnect the motor leads. See Fig 21.
- 4 At the pressure control, unscrew the nut on the conduit connector (305).
- 5 Remove the screws (68) and pull the pressure control away from the frame, carefully guiding the motor leads through the connector (305).

CAUTION

Use extreme caution when removing the tee (11) or any other fitting from the pressure control. Any twisting or jarring of the pressure control fitting could alter the factory setting of the control or permanently damage the control.

- 6 Remove the tee (11), nipple (30) and drain valve (35,36) from the old pressure control.
Hold the nut (A) firmly at the pressure control with a wrench and rotate the tee 90° counterclockwise to move the drain valve away from the sprayer. This provides clearance to remove the drain valve from the tee. Remove the tee (11) and nipple assembly. Install these parts in the new pressure control in the reverse order.
- 7 Remove the mounting bracket (52) and install it on the new pressure control.
- 8 Replace the pressure control in the reverse order of disassembly.

NOTE: The harness adapter (13g) is used only with a replacement motor. See Fig 21.

CAUTION

Failure to observe the following may cause poor performance or excessive pressure and permanent damage to the pressure control:

1. Always use nylon spray hose at 15.2 m (50 ft) minimum length.
2. Never use a wire braid spray hose.
3. Never attach a spray hose to the pressure drain valve.
4. Never add any type of shutoff device between the pump outlet and the spray gun.
5. Never allow flushing water or water base paint to freeze in the system.

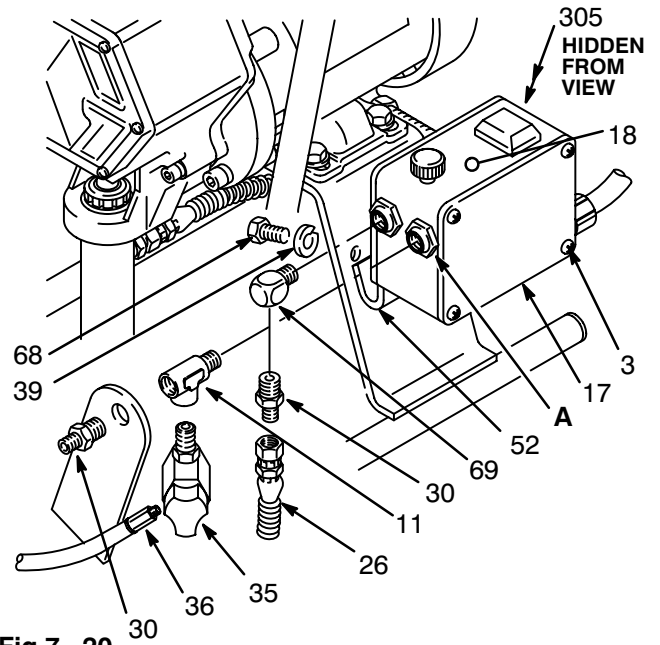


Fig 7-20

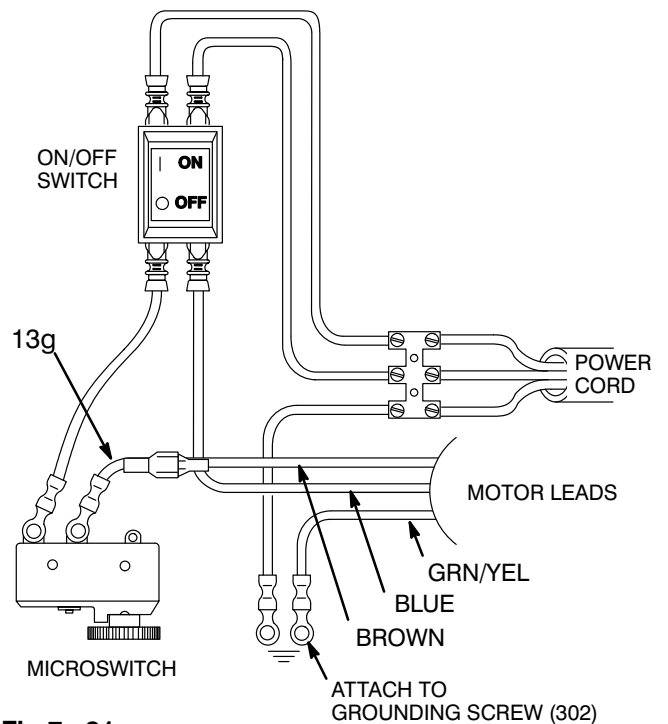


Fig 7-21

WARNING

To reduce the risk of serious bodily injury, including fluid injection; splashing in the eyes; injury from moving parts or electric shock, follow the **Pressure Relief Procedure Warning** on page 11 before continuing.

Removing the Pump. See Fig 22.

- 1 Flush the sprayer. Relieve pressure.
- 2 Remove the swivel (81) and the nipple (71).
- 3 Unscrew the pump outlet hose (26).
- 4 Use a screwdriver to push the retaining spring (65) aside, and then push out the pin (63).
- 5 Loosen the locknut (31) and unscrew the pump (29). See **Disassembly** to the right.

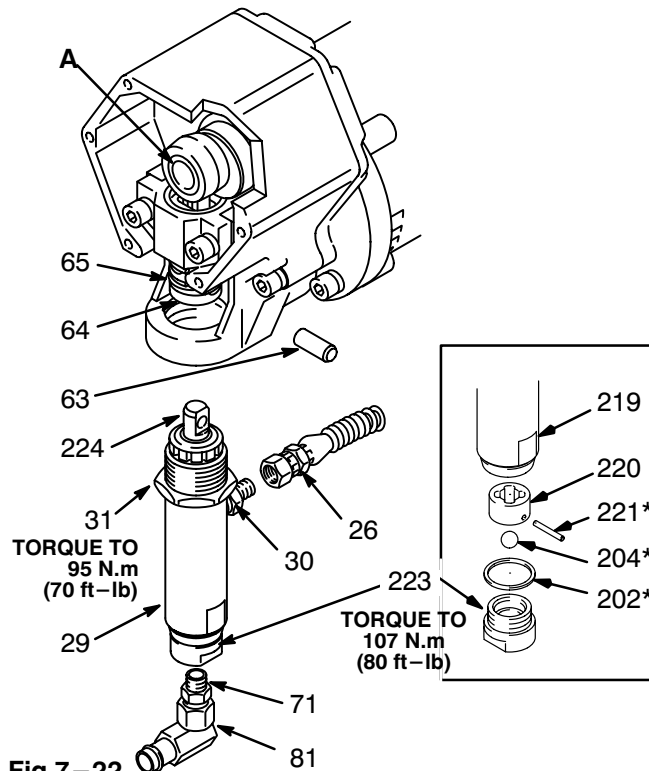


Fig 7-22

Reinstalling the Pump. See Fig 22.

- 1 Rotate the crankshaft (A) so the pump coupling (64) is in its lowest position. (Rotate the fan blades at the rear of the motor with a screwdriver to rotate the crankshaft.) The pump piston rod (224) should protrude about 25 mm (1 in.) above the pump cylinder. Screw the pump into the pump coupling (64) until the pin holes are aligned. Insert the pin (63). Position the spring (65) so it covers the ends of the pin. Screw the pump into the drive housing (8) until it stops at the locknut (31). Unscrew the pump just until the nipple (30) faces straight back.

WARNING

Be sure the retaining spring (65) is firmly and completely in the groove of the connecting rod to prevent the pin (63) from working loose due to vibration. See Fig 22.

If the pin works loose, it or other parts could break off due to the force of the pumping action. These parts could be projected through the air and result in serious bodily injury or property damage, including damage to the pump, connecting rod or bearing housing.

- 2 Torque the locknut (31) to 95 N.m (70 ft-lb).
- 3 Reassemble the remaining parts, in the reverse order of removal.

Disassembly

- 1 Remove and disassemble the intake valve (223). If no further service is needed, reassemble the valve, using a new gasket (202*). Torque to 107 N.m (80 ft-lb). See Fig 22.
- 2 Remove the packing nut (216) and plug (205). See Fig 25.
- 3 Tap the piston rod (224) down with a plastic mallet. Pull the rod out of the bottom of the cylinder (219). See Fig 25.
- 4 Remove the packings and glands from the throat of the cylinder (219). See Fig 25.
- 5 Clamp the flats of the piston rod (224) in a vise. Unscrew the retaining nut (211). Unscrew the piston valve (222) from the rod (224). Remove all parts from the piston. See Fig 23.

Reassembly Notes

- A. Packing Repair Kit 222-587 is available. Parts included in the kit are marked with an asterisk (*) in the text and drawings.
- B. Clean all parts thoroughly. Check the outside of the piston rod (224) and the inside of the cylinder (219) for scoring or scratches, which prevent the packings from sealing properly. Replace all worn parts.
- C. Alternate polyethylene and leather packings as shown in Fig 25. Notice that:
 - the lips of the throat V-packings face down;
 - the lips of the piston V-packings face up;
 - the lips of the U-cup seal (203*) face down.
 Incorrect installation damages the packings and results in pump leakage.
- D. Coat the piston rod and the inside of the cylinder with lightweight oil, and soak the packings in the oil, before reassembling.

Reassembly Procedure

- Stack the backup washer (214*), U-cup seal (203*) *lips down*, and female gland (215*), alternate the polyethylene and leather v-packings (212*, 206*) *lips up*, and stack the male gland (210*) onto the piston valve (222). See Fig 25.
- Tighten the packing retaining nut (211) onto the piston valve (222) and torque to 0.34 – 0.35 N.m (3 – 4 in-lb). See Fig 23.

NOTE: NOTE THE ALIGNMENT of the piston (222) to the nut (211). Maintain this alignment throughout Steps 2, 3 and 4.

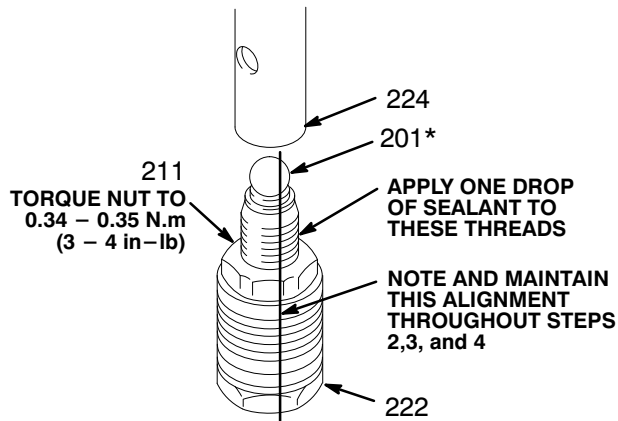


Fig 7-23

- Apply 1 drop only of sealant, supplied with the repair kit, to the piston valve threads. Place the small ball (201*) on the valve. See Fig 23. Hand tighten the valve into the rod (224) just until the nut contacts the rod. Place the flats of the displacement rod in a vise.

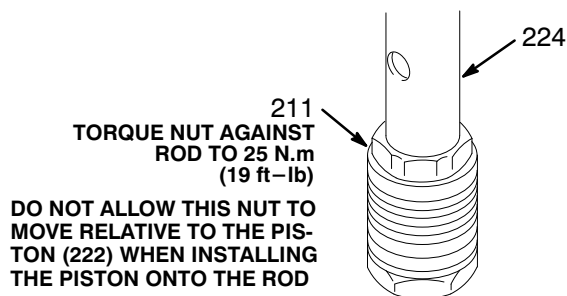


Fig 7-24

- Torque the nut (211) against the rod (224) to 25 N.m (19 ft-lb). Use two wrenches to maintain the alignment as mentioned in the **NOTE**. See Fig 24.
- One at a time stack these parts into the top of the cylinder (219): the male gland (208*), alternate the polyethylene and leather v-packings (213*, 207*) *lips down*, and the female gland (209*). See Fig 25.

- Loosely install the packing nut (216) and plug (205). See Fig 25.
- Insert the oiled piston rod (224) into the bottom of the cylinder (219). Refer to Fig 25.
- Assemble the intake valve. Use a new gasket (202*). Screw the valve into the cylinder and tighten to 107 N.m (80 ft-lb). See Fig 25.
- Screw down the cylinder locknut (31) until it is finger tight at the bottom of the external cylinder threads. See Fig 22.
- Install the displacement pump on the sprayer. See page 18.

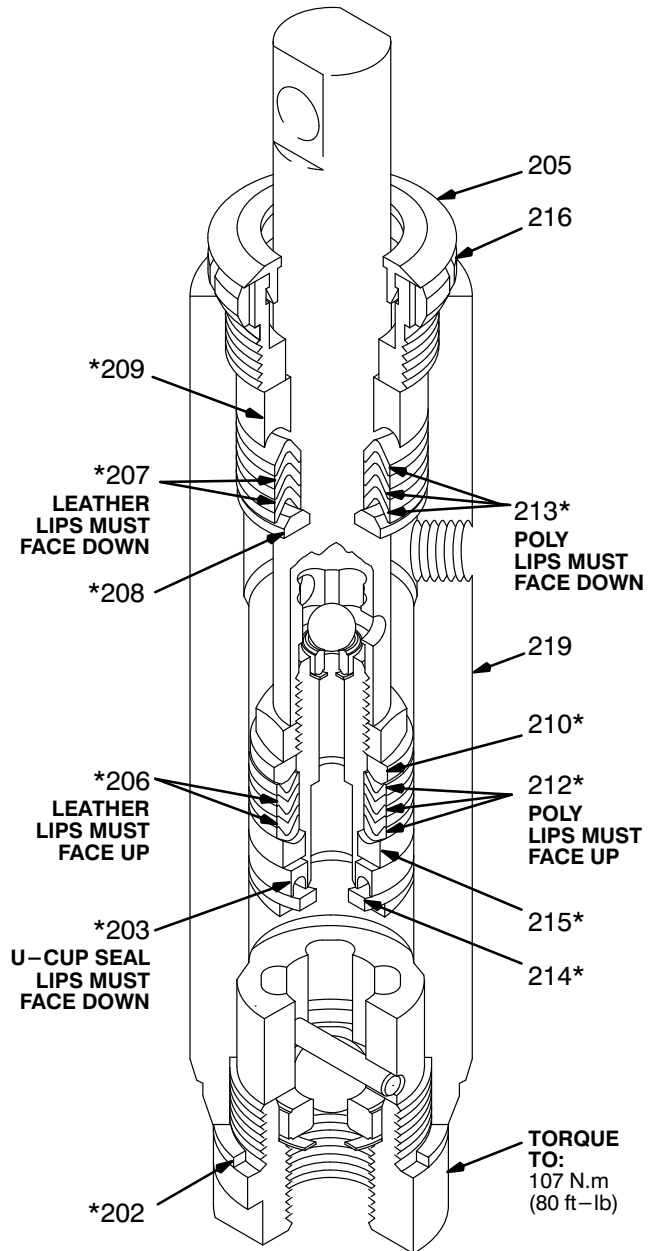


Fig 7-25

PARTS LIST & DRAWING

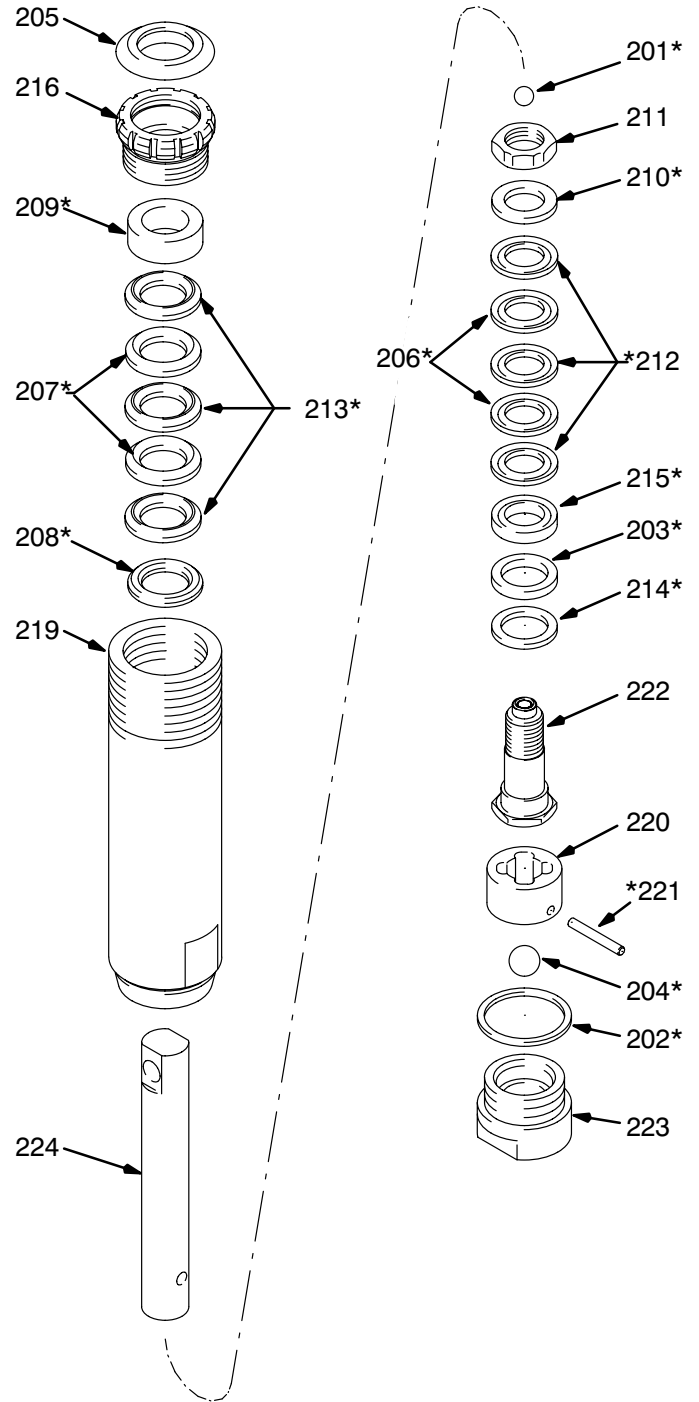
Model 218–215, Series A

Sleeved Displacement Pump

Includes items 201 to 224

REF NO.	PART NO.	DESCRIPTION	QTY
201	105-444*	BALL	1
202	176-761*	GASKET, brass	1
203	105-522*	SEAL, u-cup, polyurethane	1
204	105-445*	BALL, sst	1
205	180-656	PLUG	1
206	176-749*	V-PACKING, leather	2
207	176-755*	V-PACKING, leather	2
208	176-754*	GLAND, male	1
209	176-757*	GLAND, female	1
210	176-750*	GLAND, male	1
211	176-751	NUT, hex, retaining	1
212	176-882*	V-PACKING, polyethylene	3
213	176-997*	V-PACKING, polyethylene	3
214	180-161*	WASHER, backup	1
215	180-073*	GLAND, female	1
216	176-758	NUT, packing	1
219	177-929	CYLINDER	1
220	176-760	GUIDE, ball	1
221	176-759*	PIN, ball stop	1
222	218-197	VALVE, piston	1
223	215-455	VALVE, intake	1
224	181-879	ROD, piston	1

***Supplied in Repair Kit 222–587**
(must purchase separately)



PARTS LIST

Model 231 – 138, Series A, Basic Sprayer

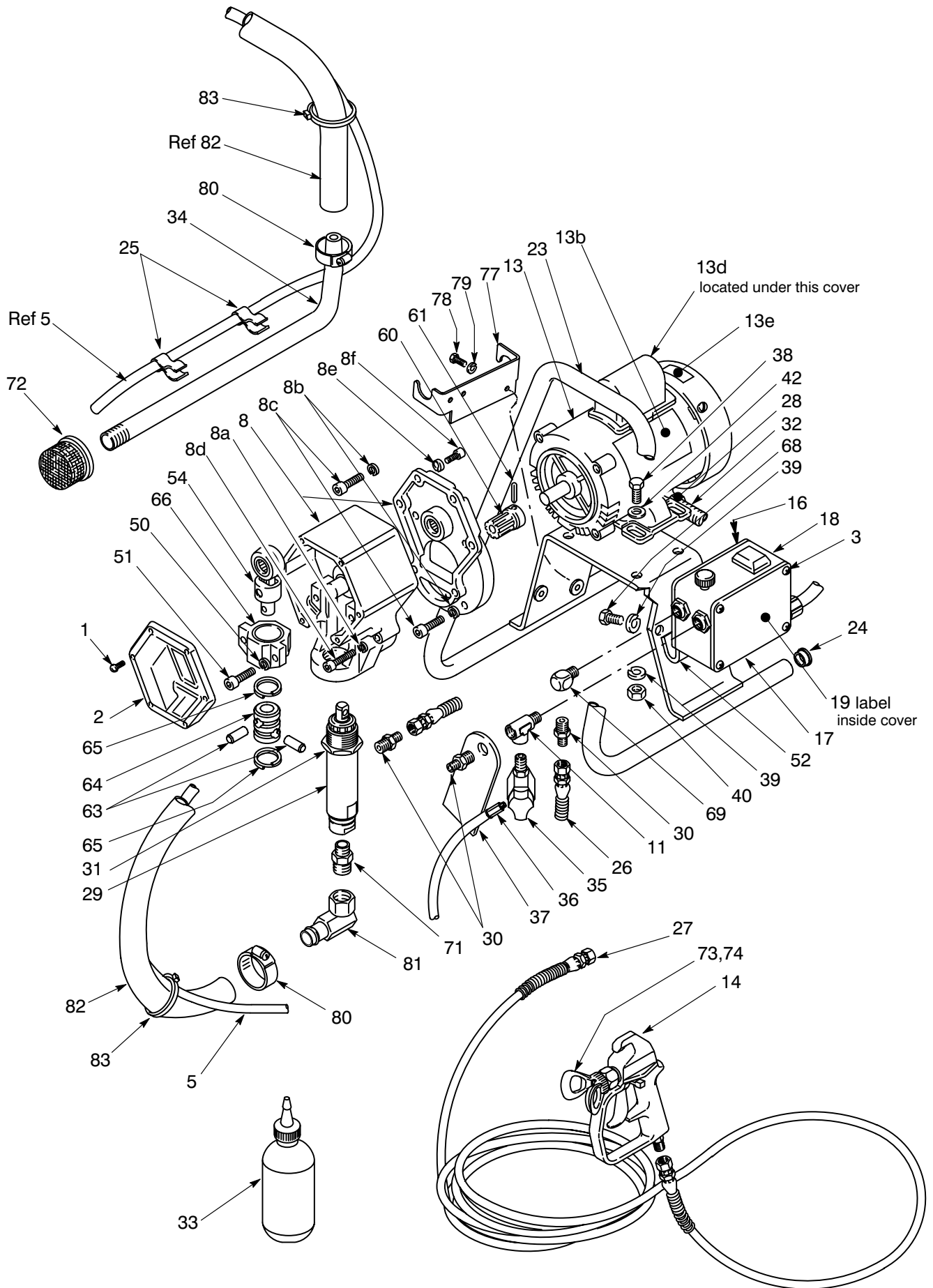
Includes items 1 to 83 as listed below

REF NO.	PART NO.	DESCRIPTION	QTY	REF NO.	PART NO.	DESCRIPTION	QTY
1	107-156	SCREW, mach, pan hd, 6-32 x 5/8"	6	29	218-215	DISPLACEMENT PUMP	
2	181-062	COVER, drive housing	1			<i>see parts on page 23</i>	1
3	110-037	SCREW, mach, pan hd, 10-24 x 1/2"	4	30	162-453	NIPPLE, 1/4 npsm x 1/4 npt	3
5	183-281	DRAIN TUBE	1	31	176-762	NUT, hex, 1 1/2-18	1
8	224-308	DRIVE ASSEMBLY		32	065-099	CONDUIT, electrical	102 mm
		<i>includes replacement items 8a – 8f</i>	1	33	206-994	THROAT SEAL LIQUID,	
8a	104-008	.LOCKWASHER, spring, 5/16"	2			8 oz <i>not shown</i>	1
8b	106-115	.LOCKWASHER, spring, 3/8"	4	34	170-113	TUBE, suction	1
8c	100-659	.CAPSCREW, soc hd, 3/8-16 x 1"	4	35	221-077	PRESSURE DRAIN VALVE	1
8d	100-657	.CAPSCREW, soc hd, 5/16-18 x 2"	2	36	108-982	CONNECTOR, tube, 1/8 npt (m) x	
8e	105-510	.LOCKWASHER, spring, 1/4"	4			3/8" dia. tube	1
8f	100-644	.CAPSCREW, soc hd, 1/4-20 x 3/4"	4	37	178-034†	TAG, WARNING	1
11	106-228	TEE, street, 1/4 npt (m x f x f)	1	38	100-057	CAPSCREW, hex hd, 5/16-18 x 3/4"	4
13	224-307	MOTOR, electric, dual voltage, 0.75 HP		39	100-214	LOCKWASHER, spring, 5/16"	6
		<i>includes replaceable items 13a-13g</i>	1	40	100-188	NUT, heavy, hex, 5/16-18	4
13a	102-799	.TERMINAL, wire, ring <i>see page 24</i>	1	42	107-194	WASHER, flat, 5/16"	4
13b	185-954†	.LABEL, DANGER	1	50	104-008	LOCKWASHER, spring, 5/16"	2
13c	107-263	.TERMINAL, wire, female, slip-on		51	105-509	CAPSCREW, soc hd, 5/16-18 x 7/8"	2
		<i>see page 24</i>	1	52	186-369	BRACKET, mounting, pres. control	1
13d	106-077*	.CAPACITOR, motor, includes resistor	1	54	215-904	CONNECTING ROD	1
13e	181-118†	.LABEL	1	60	177-670	GEAR, pinion	1
13f	110-938*	.START SWITCH		61	105-680	PIN, spring, straight, .167" dia. x 1.0"	1
		<i>not shown: inside motor</i>	1	63	176-818	PIN, str, hdls, .3125" dia. x 1.023"	2
13g	224-306	.ADAPTER, harness		64	176-824	COUPLING, pump	1
		<i>used only with replacement motor</i>	1	65	176-817	SPRING, retaining, 1.040" ID	2
14	222-002	"Black Max" SPRAY GUN		66	215-903	BEARING HOUSING	1
		<i>See manual 307-821 for parts.</i>	1	68	100-001	CAPSCREW, hex hd, 5/16-18 x 5/8"	2
16	106-075	SCREW, mach, oval hd, 10-24 x 1/2"	4	69	100-840	ELBOW, street, 1/4 npt (f x m)	1
17	183-998	COVER, pressure control	1	71	183-285	NIPPLE	1
18	222-227	PRESSURE CONTROL ASSEMBLY		72	181-073	STRAINER	1
		<i>see parts on page 24</i>	1	73	220-251	TIP GUARD	1
19	177-762†	LABEL, WARNING	1	74	163-415	SPRAY TIP, Size 415	
23	223-740	FRAME, sprayer	1			<i>See manual 306-686</i>	1
24	105-521	PLUG, tubing	2	77	187-028	TUBE HOLDER	1
25	178-342	SPRING CLIP	2	78	104-966	SCREW, M6 x 1.0 x 16	2
26	223-748	HOSE, nylon, 1/4" ID, cpld 1/4 npsm(fbe), 22" (559 mm), spring guard full length	1	79	108-050	LOCKWASHER, M6	2
			1	80	103-927	HOSE CLAMP	2
27	223-541	HOSE, nylon, 1/4" ID, cpld 1/4 npsm(fbe), 50 ft (15 m) long, spring guards both ends	1	81	221-020	SWIVEL UNION, 90°	1
			1	82	176-920	SUCTION HOSE	1
28	102-932	CONNECTOR, conduit, 90°, 1/2 npt x 1/2 conduit	1	83	103-473	TIE STRAP	2

*Recommended spare parts. Keep on hand to reduce downtime.

†Extra warning labels are available at no charge.

PARTS DRAWING – SPRAYER

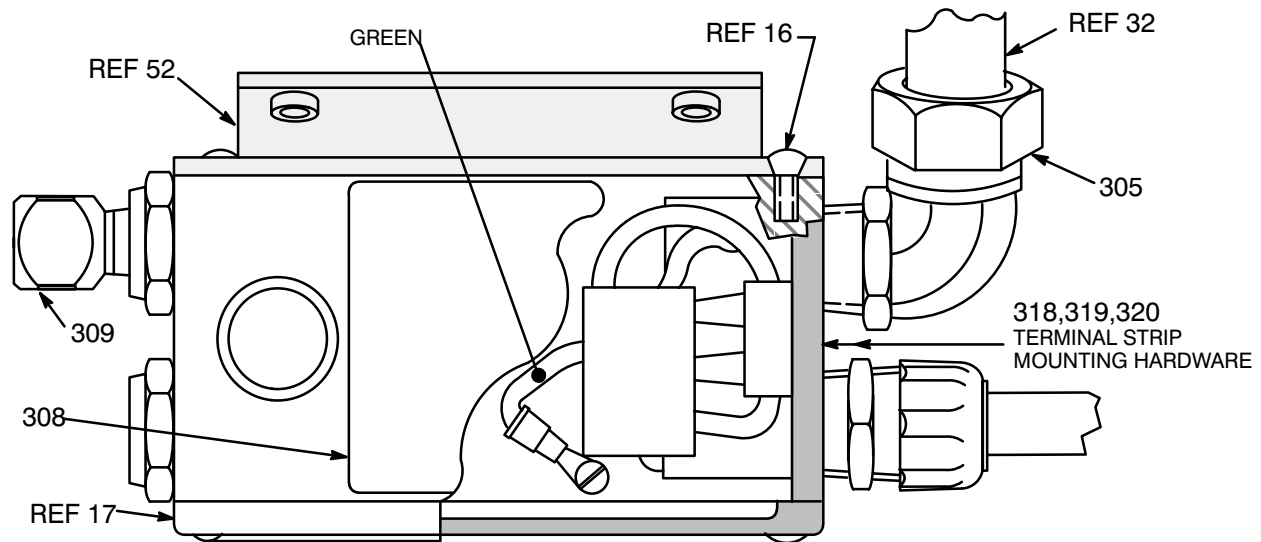


PARTS LIST & DRAWING – PRESSURE CONTROL

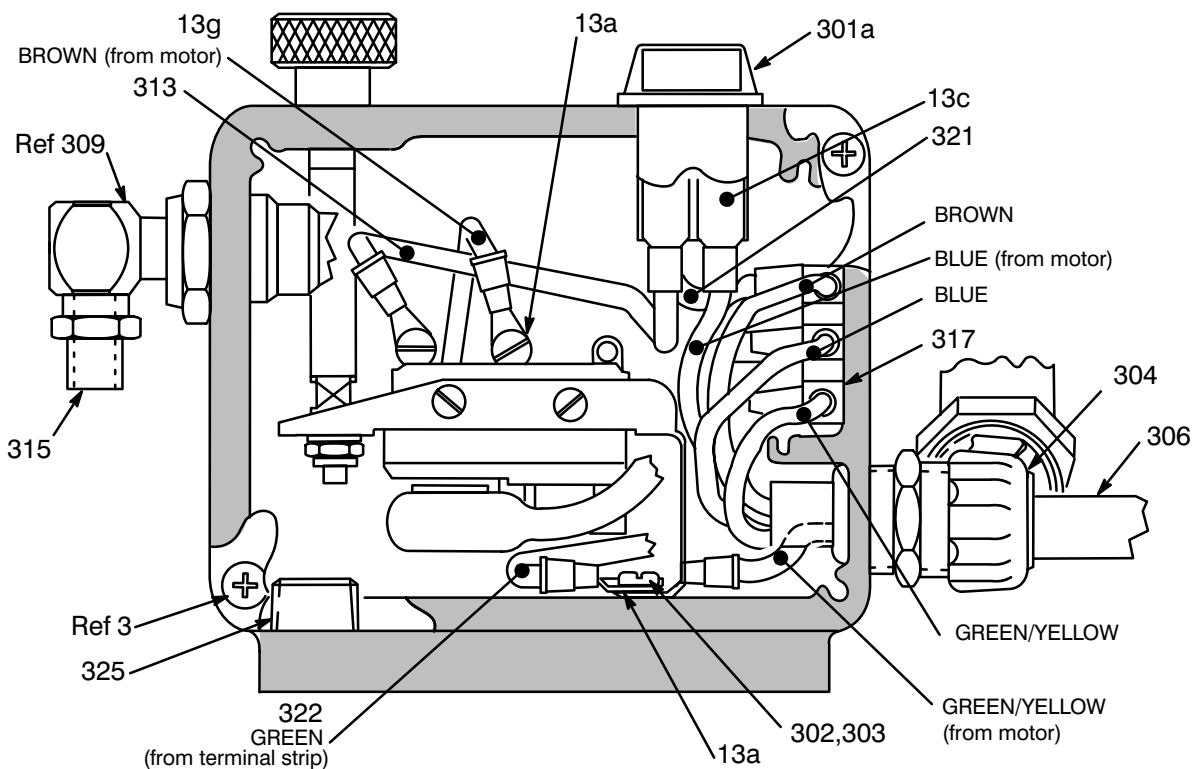
Model 222–227

REF NO.	PART NO.	DESCRIPTION	QTY	REF NO.	PART NO.	DESCRIPTION	QTY
301	222–196	BARE PRESSURE CONTROL Includes replaceable item 301a	1	312	218–372	CONDUCTOR, with terminal	1
301a	109–191	.SWITCH, on/off	1	313	215–861	CONDUCTOR, with terminals	1
302	100–035	SCREW, mach, pan head, 8–32 x 5/16"	1	315	162–453	NIPPLE, 1/4 npsm x 1/4 npt	1
303	157–021	LOCKWASHER, internal, No. 8	1	317	107–436	TERMINAL STRIP	1
304	108–295	RELIEF, strain, cord	1	318	107–438	SCREW, mach, flh, No. 5–40 x 7/8"	2
305	102–932	CONNECTOR, conduit, 90°	1	319	101–792	LOCKWASHER, No. 5, external	2
306	183–963	CORD, supply, power	1	320	100–975	NUT, hex, No. 5–40	2
308	183–960	LABEL, CAUTION	1	321	218–371	CONDUCTOR, with terminal	1
309	100–840	ELBOW, street, 1/4 npt	1	322	222–195	CONDUCTOR, with terminal	1
				325	101–754	PLUG, pipe, 3/8 npt x .48"	1

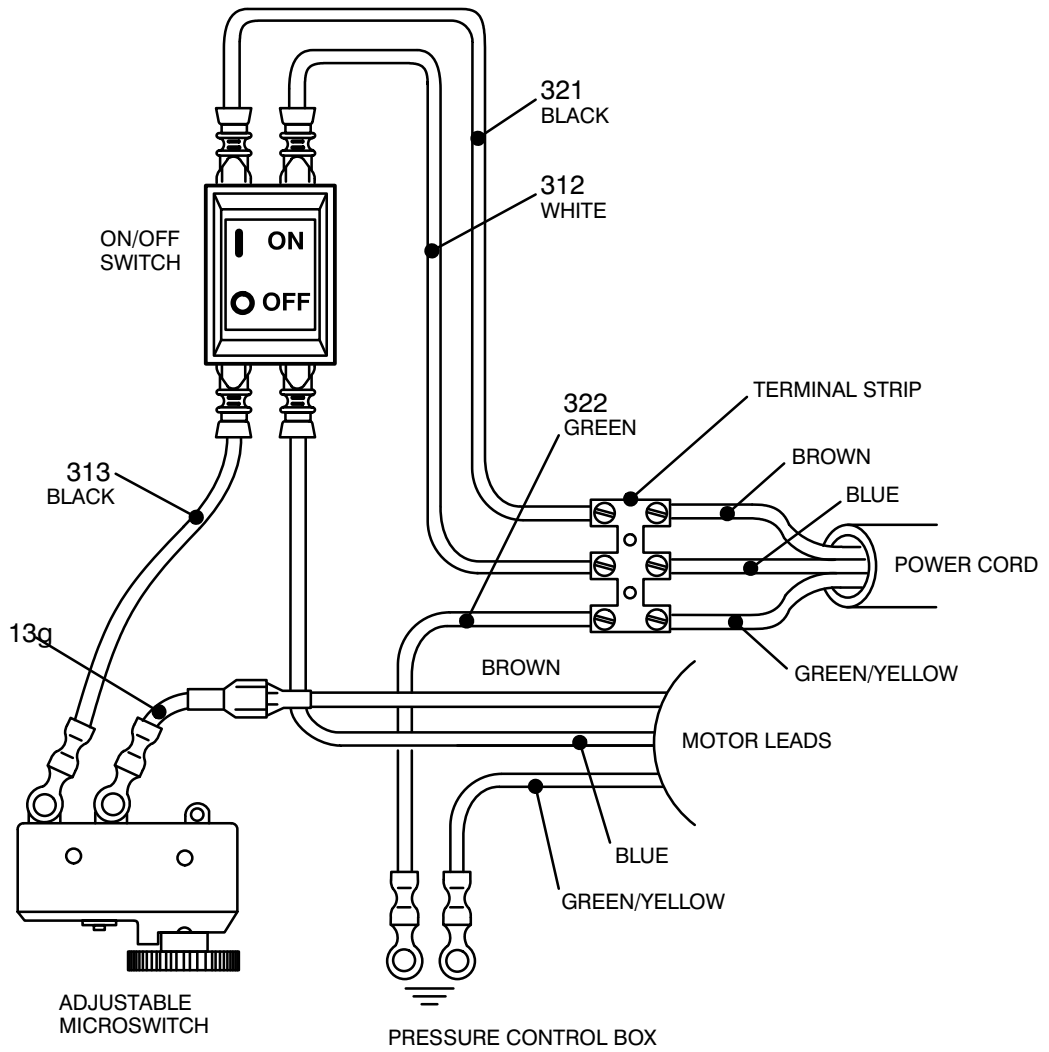
TOP VIEW



FRONT VIEW



WIRING DIAGRAM



ACCESSORIES

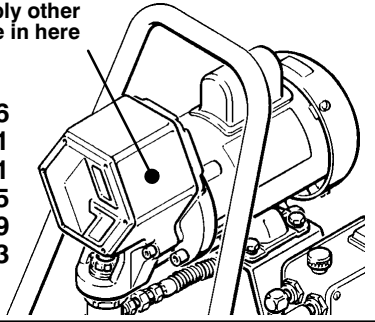
MUST BE PURCHASED SEPARATELY

DANGER LABELS

The English language DANGER label shown on page 1 is also on your sprayer. If you have painters who do not read English, order one of the following labels to apply to your sprayer. The drawing below shows the best placement of these labels for good visibility. Order the labels directly from your Graco distributor, free of charge.

Apply other
language in here

French	185-956
Spanish	185-961
German	186-041
Greek	186-045
Korean	186-049
English	185-953



222-587 DISPLACEMENT PUMP REPAIR

See contents on page 21. Repair instructions are included with the kit.

THROAT SEAL LIQUID

Non-evaporating liquid for the wet-cup. Helps prevent buildup of paint on the rod and throat packings, to reduce premature wear.

206-994 8 oz.

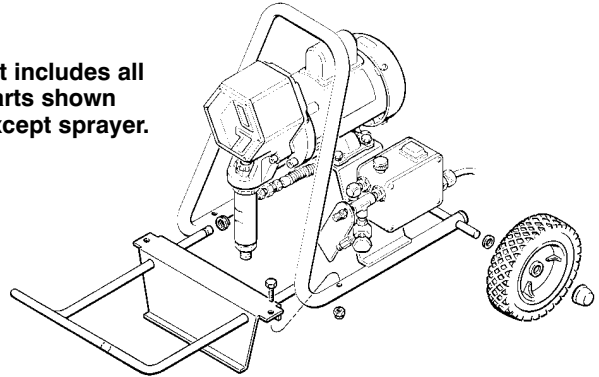
206-995 1 quart

206-996 1 gallon

223-739 WHEEL KIT

Converts the sprayer mounting frame to a portable cart.

Kit includes all
parts shown
except sprayer.



TECHNICAL DATA

Power requirements	50 HzAc, 220V/110V, 1 phase, fused for 7.5 amp/15 amp
Electric motor	750 W (0.50 HP), 50 Cycle, 1425 RPM with thermal overload protection and automatic reset switch
Max. recommended speed (continuous)	305 Cycles/min
Recommended operating range	172 bar (2500 psi)
Max. delivery (continuous duty)	1.25 liter/min (0.33 GPM)
Wetted parts	Aluminum, Delrin®, Nylon, Rubber—impregnated Leather, Stainless Steel, Teflon®, Polyurethane, Tungsten Carbide, Zinc—plated steel

Delrin® and Teflon® are registered trademarks of the DuPont Company.

DIMENSIONS

Height	483 mm (19 in.)
Length	584 mm (23 in.)
Width	406 mm (16 in.)
Weight	27 Kg (60 lb)

THE GRACO WARRANTY AND DISCLAIMERS

WARRANTY

Graco warrants all equipment manufactured by it and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. As purchaser's sole remedy for breach of this warranty, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment proven 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, 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 with Graco equipment of 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 claim. 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.

DISCLAIMERS AND LIMITATIONS

THE TERMS OF THIS WARRANTY CONSTITUTE PURCHASER'S SOLE AND EXCLUSIVE REMEDY AND ARE IN LIEU OF ANY OTHER WARRANTIES (EXPRESS OR IMPLIED), INCLUDING WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY NON-CONTRACTUAL LIABILITIES, INCLUDING PRODUCT LIABILITIES, BASED ON NEGLIGENCE OR STRICT LIABILITY. EVERY FORM OF LIABILITY FOR DIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR LOSS IS EXPRESSLY EXCLUDED AND DENIED. IN NO CASE SHALL GRACO'S LIABILITY EXCEED THE AMOUNT OF THE PURCHASE PRICE. ANY ACTION FOR BREACH OF WARRANTY MUST BE BROUGHT WITHIN TWO (2) YEARS OF THE DATE OF SALE.

EQUIPMENT NOT COVERED BY GRACO WARRANTY

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO ACCESSORIES, EQUIPMENT, MATERIALS, OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motor, switches, hose, etc.) are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

Factory Branches: Atlanta, Chicago, Dallas, Detroit, Los Angeles, West Caldwell (N.J.)
Subsidiary and Affiliate Companies: Canada, England, Switzerland, France, Germany, Hong Kong, Japan

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