



INSTRUCTIONS

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

First choice when quality counts.™

## 5.5 HORSEPOWER, GASOLINE POWERED

# GM 5000 Convertible Airless Paint Sprayer

*3000 psi (210 bar, 21 MPa) Maximum Working Pressure*

### Model 231-316, Series C

Basic sprayer, without hose or gun

### Model 231-330

Basic sprayer, without hose or gun, gas powered with electric motor kit

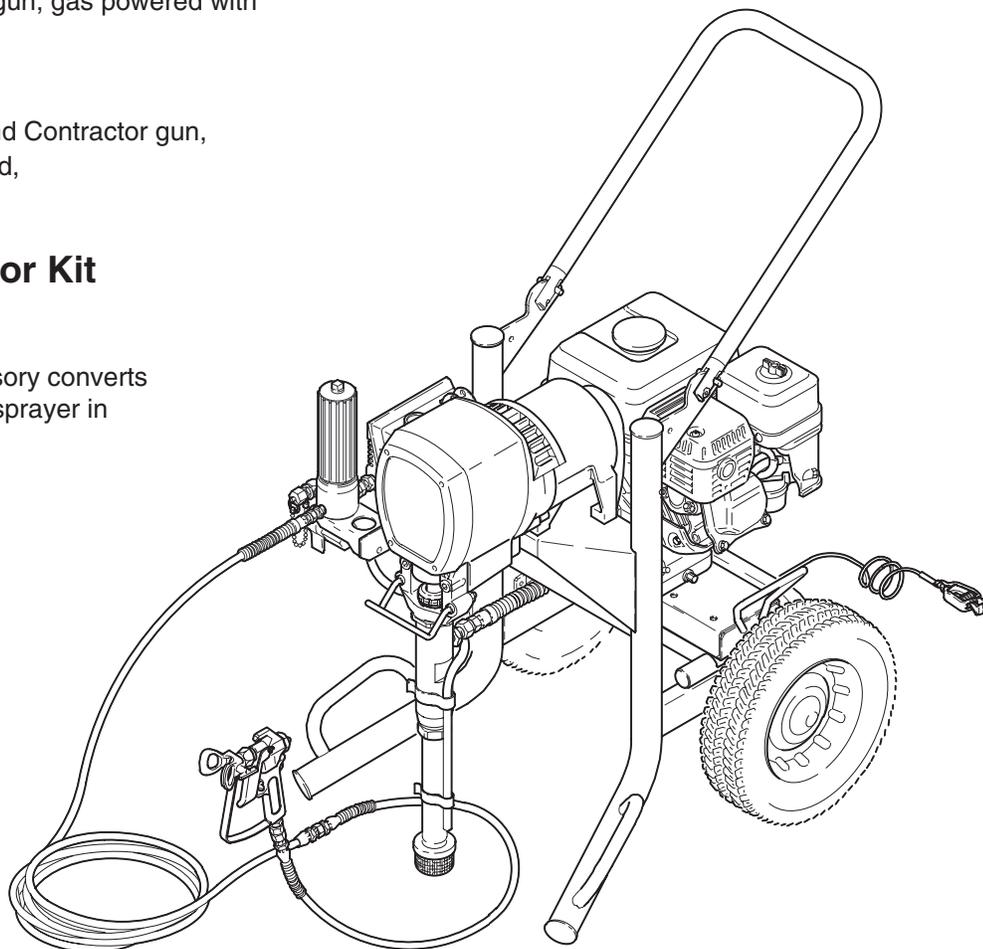
### Model 231-331

Complete sprayer, with hose and Contractor gun, RAC IV™ DripLess™ Tip Guard, and 517 size SwitchTip™

## Optional Electric Motor Kit

### Model 236-379

This 2 HP electric motor accessory converts the unit to an electric powered sprayer in just seconds.



7340A

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## Symbols

### Warning Symbol



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

### Caution Symbol



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

## ! WARNING



INSTRUCTIONS

### EQUIPMENT MISUSE HAZARD

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

- This equipment is for professional use only.
- Read all instruction manuals, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are not sure, call your distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts.
- Check equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure of the lowest rated system component. Refer to the **Technical Data** on page 31 for the maximum working pressure of this equipment.
- Use fluids and solvents 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 lift pressurized equipment.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.
- Wear hearing protection when operating this equipment.
- Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in pressurized aluminum equipment. Such use could result in a chemical reaction, with the possibility of explosion.

# WARNING



## INJECTION HAZARD

Spray from the gun, 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 may 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.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- 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 if the spray tip clogs and before cleaning, checking or servicing the equipment.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn or damaged parts immediately. Do not repair high pressure couplings; you must replace the entire hose.
- Fluid hoses must have spring guards on both ends, to help protect them from rupture caused by kinks or bends near the couplings.



## 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.



## FUEL HAZARD

The fuel used in this unit is combustible and when spilled on a hot surface can ignite and cause a fire.

- Do not fill the fuel tank while the engine is running or hot.



## EXHAUST HAZARD

The exhaust contains poisonous carbon monoxide which is colorless and odorless.

- Do not operate this equipment in a closed building.

# ! 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.



- 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.
- Disconnect all electrical 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.
- Ground the sprayer to a true earth ground with the ground wire and clamp (supplied).
- Use only electrically conductive hoses.



## MOVING PARTS HAZARD

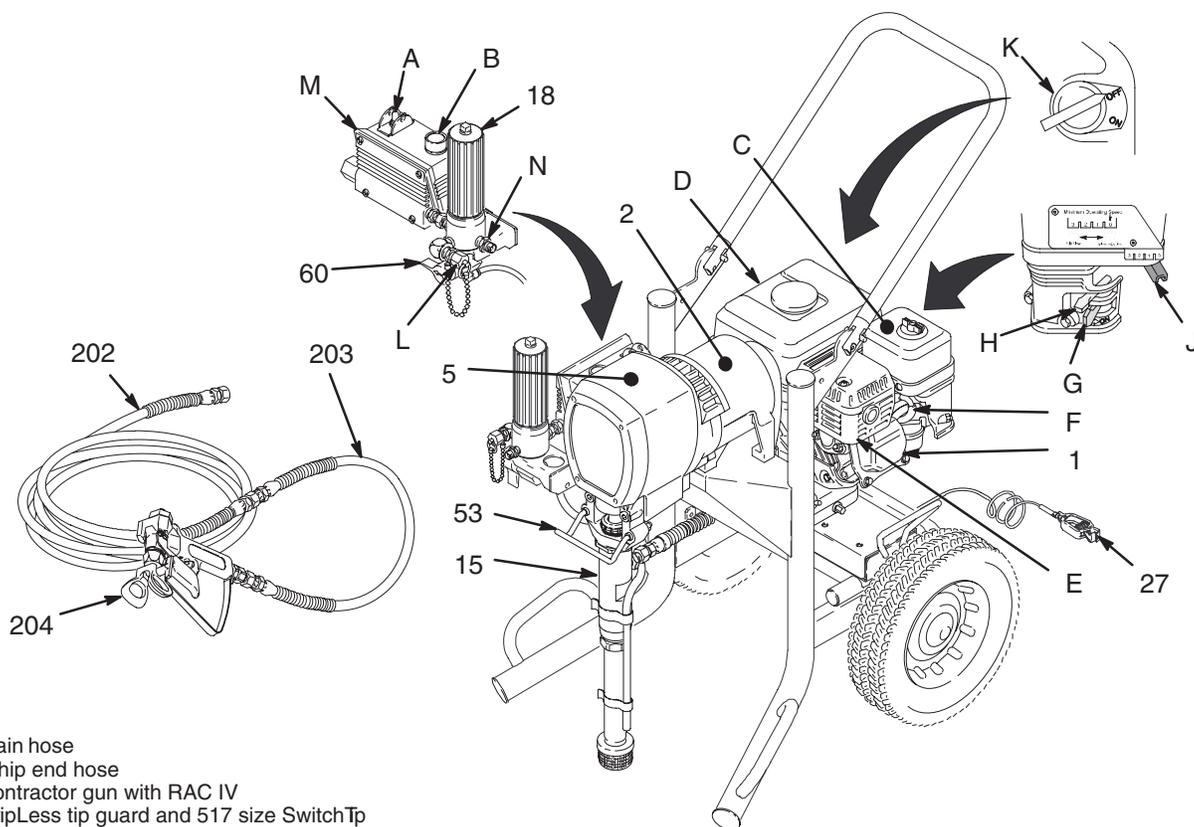
Moving parts can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 10 to prevent the equipment from starting unexpectedly.

**NOTE:** This is an example of the DANGER label on your sprayer . This label is available in other languages, free of charge. See page 31 to order.

| ! <b>DANGER</b> !  |  |  |                              |
|--|--|--|------------------------------|
|  | <b>FIRE AND EXPLOSION HAZARD</b>   |  | <b>SKIN INJECTION HAZARD</b> |
| <p>Spray painting, flushing or cleaning equipment with flammable liquids in confined areas can result in fire or explosion.</p> <p>Use outdoors or in extremely well ventilated areas. Ground equipment, hoses, containers and objects being sprayed.</p> <p>Avoid all ignition sources such as static electricity from plastic drops, 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.</p> <p>Failure to follow this warning can result in death or serious injury</p> | <p>Liquids can be injected into the body by high pressure airless spray or leaks – especially hose leaks.</p> <p>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.</p> <p>Never spray without a tip guard.</p> <p>In case of accidental skin injection, seek immediate “Surgical Treatment”.</p> <p>Failure to follow this warning can result in amputation or serious injury.</p> |  |                              |
| <b>READ AND UNDERSTAND ALL LABELS AND INSTRUCTION MANUALS BEFORE USE</b>   |  |  |                              |

# Component Identification and Function



202 Main hose  
 203 Whip end hose  
 204 Contractor gun with RAC IV  
 DripLess tip guard and 517 size SwitchTip

7203A

**Fig. 1**

|           |  |   |
|-----------|--|---|
| <b>A</b>  | Pressure Control Switch  | ON/OFF, enables/disables clutch function                            |
| <b>B</b>  | Pressure Adjusting Knob  | Controls fluid outlet pressure                                      |
| <b>C</b>  | Air Cleaner*   | Filters air entering the carburetor                                 |
| <b>D</b>  | Fuel Tank*   | Holds 0.95 gallons (3.6 liter) of 86 octane gasoline                |
| <b>E</b>  | Muffler*   | Reduces noise of internal combustion                                |
| <b>F</b>  | Spark Plug Cable*  | Routes electrical current to spark plug                             |
| <b>G</b>  | Fuel Shutoff Lever*  | On/off lever to regulate fuel flow from gasoline tank to carburetor |
| <b>H</b>  | Choke*   | Enriches air/gasoline mixture for cold starting                     |
| <b>J</b>  | Throttle*  | Adjusts engine speed for large or small orifice spray tips          |
| <b>K</b>  | Engine Switch*   | Enables/disables engine operation                                   |
| <b>L</b>  | Secondary Fluid Outlet   | Second hose and spray gun is connected here                         |
| <b>M</b>  | Pressure Control   | Controls clutch cycling to maintain fluid pressure.                 |
| <b>N</b>  | Primary Fluid Outlet   | Hose and spray gun is connected here                                |
| <b>1</b>  | Engine*  | 5.5 HP gasoline engine  |
| <b>2</b>  | Clutch Housing   | Transfers power from engine to drive assembly                       |
| <b>5</b>  | Drive Housing  | Transfers power from clutch to displacement pump                    |
| <b>15</b> | Displacement Pump  | Provides fluid to be sprayed through spray gun                      |
| <b>18</b> | Fluid Filter   | Filters fluid between source and spray gun                          |
| <b>27</b> | Grounding Clamp and Wire   | Grounds sprayer system  |
| <b>53</b> | Pail Hanger  | Provides a hanger for paint pail                                    |
| <b>60</b> | Pressure Drain Valve   | Relieves fluid pressure when open                                   |
| *         | For more detailed explanations of these controls, refer to the Honda engine manual; supplied |   |

# Setup

## ⚠ 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 *3000 psi (210 bar, 21 MPa) Maximum Working Pressure*. This is to reduce the risk of serious injury caused by static sparking, fluid injection or over-pressurization and rupture of the hose or gun.

## ⚠ CAUTION

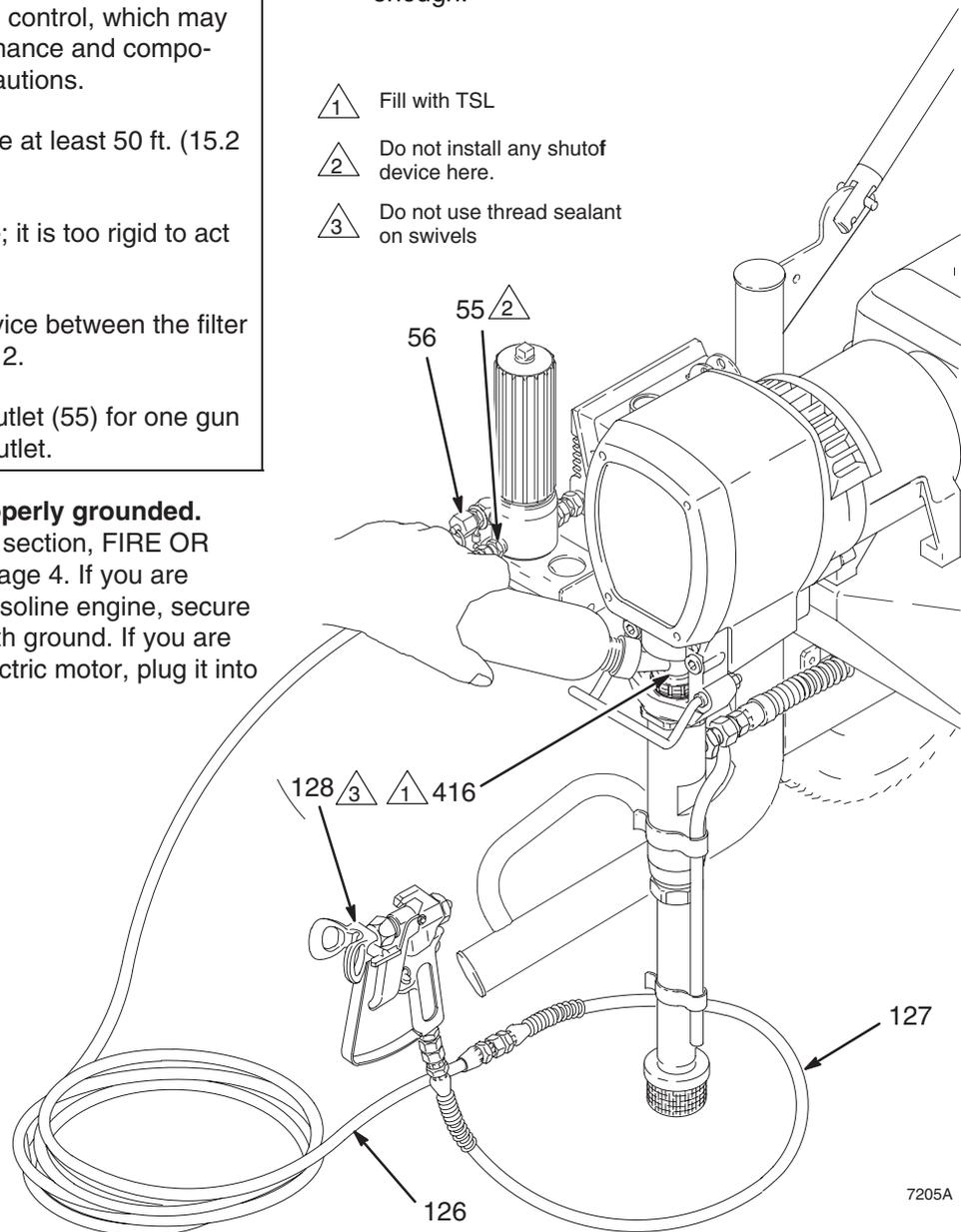
To avoid damaging the pressure control, which may result in poor equipment performance and component damage, follow these precautions.

1. Always use nylon spray hose at least 50 ft. (15.2 m) long.
2. Never use a wire braid hose; it is too rigid to act as a pulsation dampener.
3. Never install any shutoff device between the filter and the main hose. See Fig 2.
4. Always use the main filter outlet (55) for one gun operation. Never plug this outlet.

1. **Be sure your system is properly grounded.** Read and follow the warning section, FIRE OR EXPLOSION HAZARD, on page 4. If you are using the sprayer with the gasoline engine, secure the ground wire to a true earth ground. If you are using the sprayer with an electric motor, plug it into a properly grounded outlet.

2. **Connect the hose and gun.** Screw the 50 ft. (15.2 m) main fluid hose (126) onto the outlet nipple (55). Screw on the whip end hose (127). Screw on the gun (128). Do not use thread sealant on swivels, and do not install the spray tip yet! See Fig. 2.
3. **Two gun hookup.** Remove the cap (56) from the secondary hose outlet and attach an accessory hose and gun to the 1/4 npsm(m) nipple. See Fig. 2.
4. **Fill the packing nut/wetcup (416).** One full squirt of Graco Throat Seal Liquid (TSL) is usually enough.

- ⚠ 1 Fill with TSL
- ⚠ 2 Do not install any shutoff device here.
- ⚠ 3 Do not use thread sealant on swivels



7205A

Fig. 2

# Setup

5. **Check the engine oil level.** Refer to the Honda engine manual, supplied. This is a summary of the information: Remove one of the oil fill plugs (C); the oil should be almost overflowing. See Fig 3. Add oil as necessary.

Recommended lubrication oil: Use a high-quality, detergent oil, SAE 10W-40, classified “FOR SERVICE SE or SF”, for regular use and for breaking-in a new engine.

6. **Fill the gas tank.** See the **Fueling** section, below.
7. **Flush the pump** to remove the lightweight oil which was left in the pump to protect it from rust. See page NO TAG.
8. **Prepare the paint** according to the manufacturer’s recommendations. Remove any paint skin. Stir the paint to mix pigments. Strain the paint through a fine nylon mesh bag to remove particles that could clog the filter or spray tip. This is probably the most important step toward trouble-free spraying.

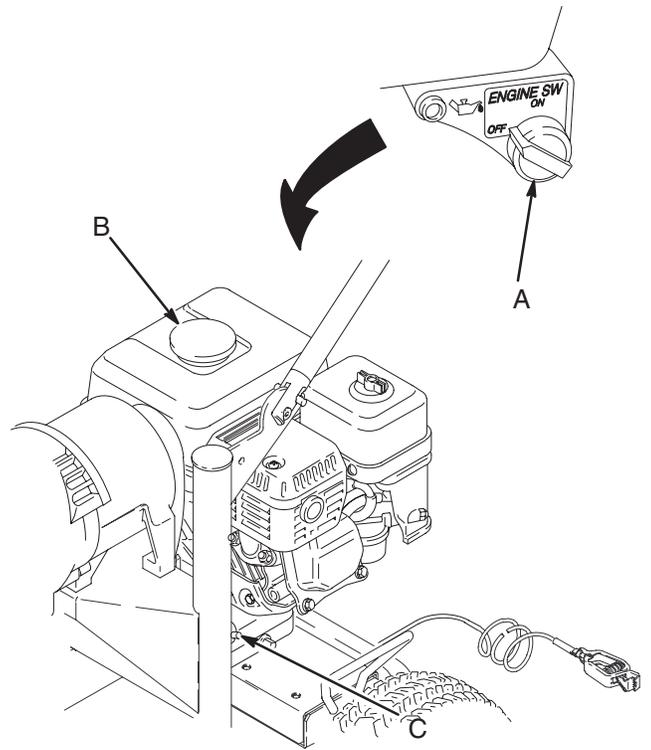


Fig. 3

7206A

# Fueling

## ⚠ WARNING

Gasoline is extremely flammable and explosive under certain conditions.

- Always shut off the engine switch (A) before refueling. See Fig 3.
- Refuel in a well-ventilated area.
- Do not smoke or allow flames or sparks in the area where the engine is refueled or where the gasoline is stored.
- Do not overfill the tank. Close the gas fill cap (B) securely after refueling. See Fig 3.
- Do not spill fuel when fueling. Fuel vapor or spilled fuel can ignite. If any fuel is spilled, make sure the area is dry before starting the engine.

1. **Fuel specifications.** Use automotive gasoline with a pump octane number  $[(R + M)/2]$  of 86 or higher, or a research octane number of 91 or higher. Unleaded fuel minimizes combustion chamber deposits.

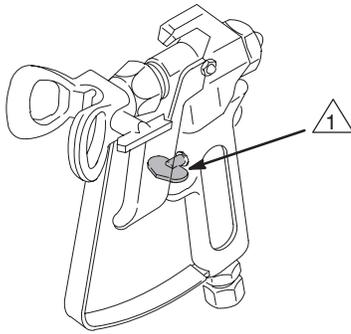
2. **Gasolines containing alcohol (gasohol).** Do not use gasohol which contains methanol, if the gasohol does not contain cosolvents and corrosion inhibitors for methanol. Even if it does contain such additives, do not use the gasohol if it contains more than 5% methanol.

**NOTE:** The Honda engine warranty does not cover damage resulting from the use of gasolines containing alcohol. See the Honda engine manual for more information.

3. **General.** Do not use oil and gasoline mixtures or contaminated gasoline. Avoid getting dirt, dust or water in the fuel tank.
4. **Tank capacity:** 0.95 gallons (3.6 liter). Always leave at least 1/2 in. at the top of the tank for expansion.
5. **Shut off the engine before refueling.**
6. **After refueling, tighten the fuel tank cap firmly.**

# Startup

1 Trigger safety latch shown engaged



0137

Fig. 4

**NOTE:** For the startup procedure, refer to Fig. 5 except where noted otherwise.

## Before you start the sprayer

1. Become familiar with how to operate the gun's trigger safety latch. See Fig. 4 and refer to your gun instruction manual.
2. Become familiar with the proper way to relieve pressure. See the **Pressure Relief Procedure** on page 10.
3. Determine if you should flush the sprayer. See **Flushing** on page NO TAG.
4. Check the gas tank level. See page 7.
5. Check the oil level. See page 7.

**NOTE:** The engine stops automatically, or will not start, if it is low on oil. If you try to start it again without adding more oil, a red light near the engine on/off switch glows as you pull the starter rope.

6. Push the spark plug cable (F) firmly onto the plug.
7. If starting a sprayer that IS NOT PRIMED, remove the spray tip.
8. If a secondary hose and gun is not installed, be sure the cap (L) is securely plugging the secondary outlet fitting.
9. Place the suction tube (50) into the material container.
10. Open the black fuel shutoff lever (G). Push it in the direction of the arrow.
11. Turn OFF the pressure control switch (A).

## CAUTION

Never try to start the engine unless fluid pressure is relieved and the pressure control switch is OFF. Trying to start the engine when it is pressurized could damage the recoil system.

## To start the engine

1. Turn the pressure adjusting knob (B) counterclockwise to the lowest pressure setting.
2. Slide the metal throttle lever (J) away from the fuel tank to the maximum position (fully left).
3. If the engine is cold, close the choke (H) by moving the gray lever.

If the engine is warm, close the choke (H) by moving the gray lever half way or not at all.

4. Turn ON the engine switch (H).

## WARNING

A rope which recoils too quickly may hit someone and cause serious bodily injury. The rope could also jam in recoil assembly.

5. Hold the frame of the sprayer with one hand and pull the starter rope rapidly and firmly. Hold the rope as you let it return. Pull and return the rope until the engine starts.
6. Open the choke (G) as soon as the engine starts, except in cold weather. In cold weather, leave the choke closed for 10 to 30 seconds before opening it to keep the engine running.
7. Disengage the gun safety latch.

## To start and prime the pump

1. Open the filter's pressure drain valve (60).
2. Turn ON the pressure control switch (A).
3. Turn the pressure control knob (B) about 1/4 turn from minimum pressure. Run the pump until fluid is flowing smoothly from the pressure drain valve, indicating the pump is fully primed.

# Startup

4. Close the pressure drain valve (60). See Fig. 5. Squeeze the trigger until fluid flows from the gun. This primes the hoses. Release the trigger. Engage the gun safety latch. See Fig. 4, page 8.

**⚠ WARNING**

**FIRE AND EXPLOSION HAZARD**

To reduce the risk of static sparking and splashing when priming, flushing or relieving pressure, always hold a metal part of the gun firmly to the side of and aimed into a grounded metal pail.



5. If you have not primed the sprayer with paint yet, move the suction tube to the paint container. Disengage the trigger safety latch. Trigger the gun into the solvent pail just until paint appears. Release the trigger and engage the trigger safety latch. Repeat for the second gun, as needed.
6. Install the spray tip (P) in the gun. See the separate tip instruction manual, 308-644, supplied.

## Adjust the engine speed and pump pressure

1. Disengage the trigger safety latch. Trigger the gun onto a test paper to check the spray pattern and atomization. Turn the pressure adjusting knob (B) until you get a good pattern. Then slowly lower the throttle (J) setting as far as you can without changing the spray pattern.

**⚠ CAUTION**

Always use the lowest needed fluid pressure and the lowest needed throttle setting, to increase the life of the sprayer. Higher settings cause excessive clutch cycling, premature tip wear and premature pump wear.

**⚠ CAUTION**

Close the black fuel shutoff lever (G) when transporting the sprayer to prevent fuel from flooding the engine. See Fig. 5, page 9.

Keep the sprayer upright and level when operating it and when transporting it. This prevents crankcase oil from leaking into the combustion chamber, which makes startup very difficult.

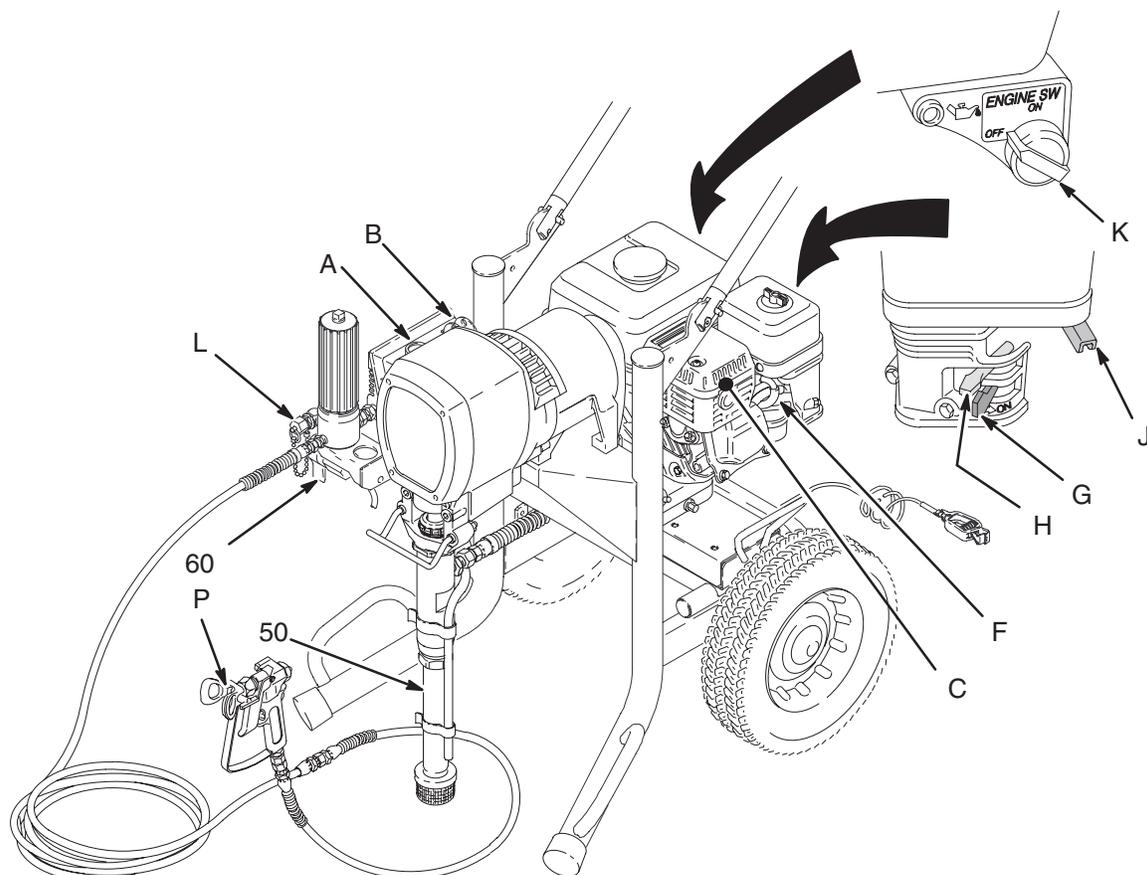


Fig. 5

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# Maintenance

## WARNING



### INJECTION HAZARD

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

## CAUTION

For detailed engine maintenance and specifications, refer to the separate engine manual, supplied.

**DAILY:** Check engine oil level and fill as necessary. See Step 5, page 7.

**DAILY:** Check the V-belt (60). Be sure it is centered on the pulleys and is not inverted. See Fig. 17, page 20. Replace it if it is worn or damaged.

**DAILY:** Check and fill the gas tank. See page 7.

**DAILY:** Check hoses for wear and damage.

**DAILY:** Check gun safety for proper operation.

**DAILY:** Check pressure drain valve for proper operation.

**After the first 20 hours of operation:** Drain the oil and refill with clean oil.

**DAILY:** Keep TSL in the packing nut to help lubricate the pump packings. One full squirt of TSL is usually enough.

**WEEKLY:** Remove the cover of the air filter (C) and clean the element. See Fig. 5, page 9. Replace the element, if necessary. If operating in an unusually dusty environment, check the filter daily and replace it, if necessary.

Replacement elements can be purchased from your local HONDA dealer.

### AFTER EACH 100 HOURS OF OPERATION:

Change the oil.

**MONTHLY:** Oil connecting rod.

**SPARK PLUG:** Use only an BPR6ES (NGK) or W20EPR-U (NIPPONDENSO) plug. Gap the plug to 0.028 to 0.031 in. (0.7 to 0.8 mm). Use a spark plug wrench when installing and removing the plug.

## WARNING



### INJECTION HAZARD

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. 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.

### Pressure Relief Procedure

1. Lock the gun trigger safety.
2. Turn the engine ON/OFF switch to OFF.
3. Move the pressure control switch to OFF.
4. Unlock the trigger safety. Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun to relieve the pressure.
5. Lock the gun trigger safety.
6. Open the pressure drain valve. Leave the valve open until you are ready to spray again.
7. Disconnect the spark plug cable.

*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, VERY SLOWLY loosen the tip guard retaining nut or hose end coupling to relieve the pressure gradually, then loosen completely. Now clear the tip or hose.*

# Flushing

## When to Flush

1. New Sprayer. This sprayer was factory tested in lightweight oil, which was left in to protect the pump parts.

*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.

2. Changing Colors. Flush with a compatible solvent such as mineral spirits or water.
3. Changing from water–base to oil–base paint. Flush with warm, soapy water, then 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.

|  |
|--|
|  <b>CAUTION</b> |
|--|

|   |
|---|
| To prevent pump corrosion, never leave water or any type of paint in the sprayer when it is not in use. Pump the water or the paint out with mineral spirits. |
|---|

5. Storage.

*Water base paint:* flush with water, then mineral spirits and leave the pump, hose and gun filled with mineral spirits. Shut off the sprayer, remove the spark plug cable, and open the pressure drain valve to relieve the pressure. Leave the drain valve open.

*Oil base paint:* flush with mineral spirits and leave the pump, hose and gun filled with mineral spirits. Shut off the sprayer, remove the spark plug cable, and open the pressure drain valve to relieve the pressure. Leave the drain valve open.

6. Startup after storage.

*Before using water–base paint,* flush out the mineral spirits with soapy water, and then with clean water.

*When using oil–based paint,* flush out the mineral spirits with the paint to be sprayed.

# Flushing

## How to Flush

### **WARNING**

#### **INJECTION HAZARD**

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



**NOTE:** “Solvent” refers to water or oil-based solvent.

1. Follow the **Pressure Relief Procedure** on page 10.
2. Unscrew the filter bowl (A) and remove the screen (B). Leave the support (C) in place. Reinstall the bowl. Clean the screen separately. See Fig 6. Also see instruction manual 307-273, supplied.
3. Close the pressure drain valve (60).
4. Put the suction tube in a grounded pail of solvent.
5. Remove the spray tip from the gun(s).

### **WARNING**

#### **FIRE AND EXPLOSION HAZARD**

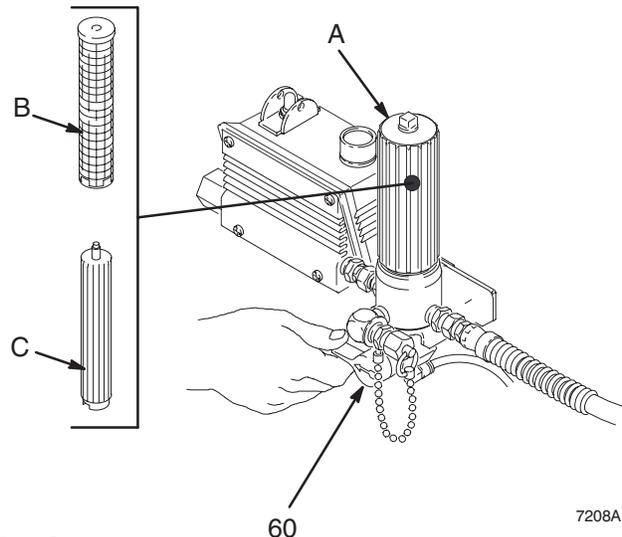
To reduce the risk of static sparking and splashing when priming, flushing or relieving pressure, always hold a metal part of the gun firmly to the side of and aimed into a grounded metal pail.



6. Follow **Startup** on page 8. Keep the gun triggered until clean solvent comes from the nozzle. Release the trigger and engage the trigger safety latch.

**NOTE:** For two guns, release the trigger safety latch on the second gun and trigger that gun until clean solvent comes from the nozzle. Flush the first gun and then the second gun at least one more time.

7. Check all fluid connections for leaks. Relieve pressure before tightening any connections. Start the sprayer. Recheck the connections for leaks.
8. Remove the suction tube from the solvent pail. Disengage the trigger safety latch. Trigger the gun to force solvent from the hose. Do not let the pump run dry for more than 30 seconds, to avoid damaging the pump packings. Relieve pressure.
9. Remove the strainer, suction tube and suction hose and clean them separately to be sure all paint sediment is removed. Dried paint can build up in these parts and later cause performance problems.
10. Unscrew the filter bowl (A) and reinstall the clean screen (B). Reinstall the bowl and hand tighten.
11. Follow **Storage or Changing colors**, on page 11. Relieve pressure.

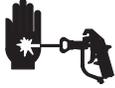


**Fig. 6**

7208A

# Troubleshooting

## WARNING



### INJECTION HAZARD

To reduce the risk of serious injury, including fluid injection or splashing in the eyes or on the skin, or injury from moving parts, always follow the **Pressure Relief Procedure Warning**, page 10, before checking, adjusting, cleaning or shutting down the sprayer. *Disconnect the spark plug!*

Check everything in the chart before disassembling the sprayer.

| PROBLEM  | CAUSE   | SOLUTION   |
|--|---|--|
| Engine/sprayer won't start                     | Engine switch not on                                | Turn on.   |
|  | Out of gas  | Replenish  |
|  | Engine oil level low                                | Try starting engine. If light on rear of engine glows, replenish oil.  |
|  | Spark plug cable disconnected or spark plug damaged | Connect cable on top of engine or replace spark plug.  |
|  | Water frozen in pressure control                    | Return pressure control to authorized Graco dealer for repair.   |
| Engine won't "pull over"                       | Oil seepage into combustion chamber                 | Remove spark plug. Pull starter rope 3 or 4 times. Clean or replace plug. Try to start. Keep sprayer upright to avoid oil seepage.   |
| Engine operates, but displacement pump doesn't | Pressure control switch turned OFF                  | Turn on.   |
|  | Pressure setting too low                            | Increase pressure.   |
|  | Displacement pump outlet filter dirty               | Clean filter.  |
|  | Tip or tip filter clogged                           | Clean tip or tip filter.   |
|  | Broken drive belt                                   | Replace belt.  |
|  | Displacement pump rod seized by dry paint           | Service pump. See page 24.   |
|  | Connecting rod worn or damaged                      | Replace. See page 15.  |
|  | Drive housing worn or damaged                       | Replace. See page 16.  |
|  | Electrical power not energizing field               | Check wiring connections. See page 19.<br><br>With pressure control switch ON and pressure turned to MAXIMUM, use a test light to check for power at black and white wires from pressure control.<br><br>Have pressure control checked by authorized Graco dealer. |
|  | Clutch worn or damaged                              | Service. See page 18.  |
| Pinion assembly worn or damaged                | Service. See page 17.                               |  |

# Troubleshooting

| PROBLEM   | CAUSE   | SOLUTION  |
|---|---|---|
| Displacement pump output low on upstroke                    | Pump inlet screen clogged                     | Clean.  |
|   | Piston ball check not seating                 | Service piston ball check. See page 24.   |
|   | Piston packings worn or damaged               | Replace packings. See page 24.  |
|   | Sleeve gasket in displacement pump is damaged | Replace. See page 24.   |
| Displacement pump output low on down-stroke or both strokes | Pump inlet screen clogged                     | Clean.  |
|   | Piston packings worn or damaged               | Replace packings. See page 24.  |
|   | Intake valve ball check not seating properly  | Clean and service. See page 24.   |
|   | Engine RPM too low                            | Increase throttle setting. See Step 1, page 9.  |
|   | V-belt slipping                               | Replace V-belt.   |
|   | Clutch worn or damaged                        | Replace. See page 18.   |
| Paint leaks into wet-cup                                    | Loose wet-cup                                 | Tighten just enough to stop leakage.  |
|   | Throat packings worn or damaged               | Replace packings. See page 24.  |
|   | Displacement rod worn or damaged              | Replace rod. See page 24.   |
| Low fluid delivery  | Pump inlet screen clogged.                    | Clean.  |
|   | Pressure setting too low                      | Increase pressure. See Step 1, page 9.  |
|   | Engine RPM too low                            | Increase throttle setting. See Step 1, page 9.  |
|   | Dirty outlet filter, tip filter or tip        | Clean.  |
|   | Large pressure drop in hose                   | Use larger diameter hose.   |
| Spitting from gun   | Air in fluid pump or hose                     | Check for loose connections at pump intake and tighten. Then prime pump. See <b>Startup</b> , page 8.   |
|   | Tip partially clogged                         | Clear.  |
|   | Fluid supply is low or empty                  | Refill and prime the pump. See <b>Startup</b> , page 8. Check fluid supply often to prevent running the pump dry.   |
| Pump is difficult to prime                                  | Air leak                                      | Check all hose connections and tighten as needed.<br><br>Reduce RPM and cycle pump as slowly as possible during priming.                                  |
|   | Intake valve is leaking                       | Shut off pump and relieve pressure. Disassemble and clean intake valve. Be sure ball seat is not nicked or worn and that the ball seats well. Reassemble. |
|   | Worn packings                                 | Repack the pump. See page 24.   |
|   | Fluid is too thick                            | Thin fluid according to supplier's recommendations.   |

# Bearing Housing and Connecting Rod

## ⚠ WARNING



### INJECTION HAZARD

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

**NOTE:** Steps 1 to 13 refer to Fig. 7.

1. Remove the front cover and screws (7,78).
2. Remove the spring clips (49,52) and the drain hose (51). Unscrew the suction tube (50) from the pump, holding a wrench on the pump intake valve (423) to keep the pump from loosening.
3. Disconnect the hose (63) from the pump.
4. Use a screwdriver to push aside the retaining spring (13) at the top of the pump. Push the pin (12) out the rear.
5. Loosen the jam nut (14) with an adjustable wrench. Unscrew and remove the displacement pump.
6. Use a hex key wrench to remove the four screws (72) and lockwashers (73) from the bearing housing (11).
7. While pulling the connecting rod (8) with one hand, lightly tap the lower rear of the bearing housing (11) with a plastic mallet to loosen it from the drive housing (5). Pull the bearing housing and the connecting rod assembly (8,11) off the drive housing.
8. Inspect the crank (D); replace the drive housing if the crank is worn excessively.
9. Evenly lubricate the inside of the bronze bearing (A) in the bearing housing (11) and the inside of the connecting rod link (B) with high-quality motor oil. Liberally pack the roller bearing (C) in the connecting rod (8) with bearing grease.
10. Assemble the connecting rod (8) and bearing housing (11).
11. Clean the mating surfaces of the bearing housing (11) and drive housing (5).
12. Align the connecting rod (8) with the crank (D) and carefully align the locating pins (E) in the drive housing (5) with the holes in the bearing housing (11). Push the bearing housing onto the drive housing or tap it into place with a plastic mallet.

## ⚠ CAUTION

DO NOT use the bearing housing screw (73) to align or seat the bearing housing with the drive housing. These parts must be aligned using the locating pins (F), to help avoid premature bearing wear.

13. Install the screws (72) and lockwashers (73) on the bearing housing. Tighten evenly to 300 in-lb (34 N.m).
14. Refer to **Installing the Pump** on page 24 to install the pump.

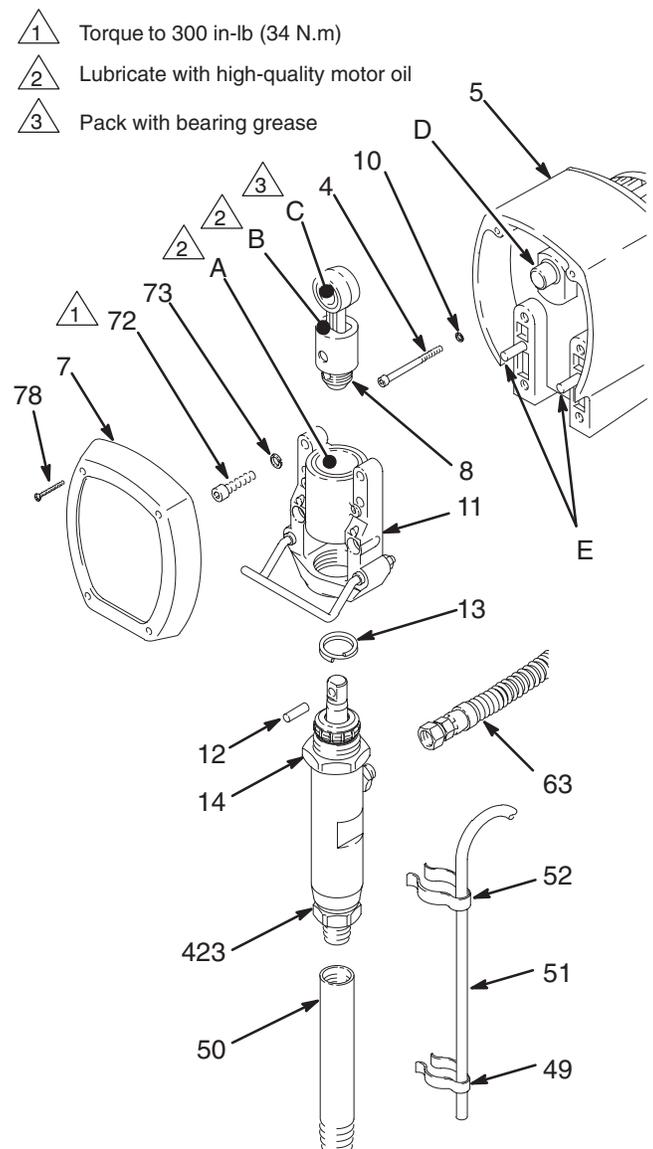


Fig. 7

02693

# Drive Housing

## ⚠ WARNING



### INJECTION HAZARD

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

## ⚠ CAUTION

Do not drop the gear cluster (16) when removing the drive housing (5). The gear cluster is easily damaged. The gear may stay engaged in the drive housing or pinion housing.

Do not lose the thrust balls (5c or 219d) located at each end of the gear cluster, or allow them to fall between the gears. The balls, which are heavily covered with grease, usually stay in the shaft recesses, but could be dislodged. If the balls are caught between the gears and not removed, they will damage the drive housing. If the balls are not in place, the bearings will wear prematurely.

**NOTE:** Refer to Fig. 8 for this procedure.

1. Remove the front cover and screws (7,78).
2. Unscrew the hose from the pump. Remove the spring clips (40,52) and the drain hose (51) from the pump.
3. Remove the four screws (72) and lockwashers (73) from the bearing housing (11).
4. Lightly tap the back of the bearing housing (11) with a plastic mallet. Pull the pump, bearing housing and connecting rod away from the drive housing as one assembly (C).
5. Remove the two drive housing screws (10) and lockwashers (4). Remove the four pinion housing screws (215) and lockwashers (214).
6. Lightly tap around the drive housing (5) to loosen it. Pull the drive housing straight off the pinion housing (219). Be prepared to support the gear cluster (16) which may also come out.
7. Apply the full 6 oz. (160 grams) of bearing grease, which is supplied with a replacement gear, to the gear cluster (16). Be sure the thrust balls (5c and 219d) are in place.
8. Place the bronze colored washer (5a) and then the silver-colored washer (5b) on the shaft protruding from the big gear of the drive housing (5). Align the gears and push the new drive housing straight onto the pinion housing and locating pins (A).
9. Starting at Step 4, work backwards to reassemble the sprayer. Or, move ahead to the next section in this manual if further service is needed.

1 Torque to 300 in-lb (34 N.m)

2 Apply a full 6 oz. (160 grams) of bearing grease (supplied with replacement gear – 16)

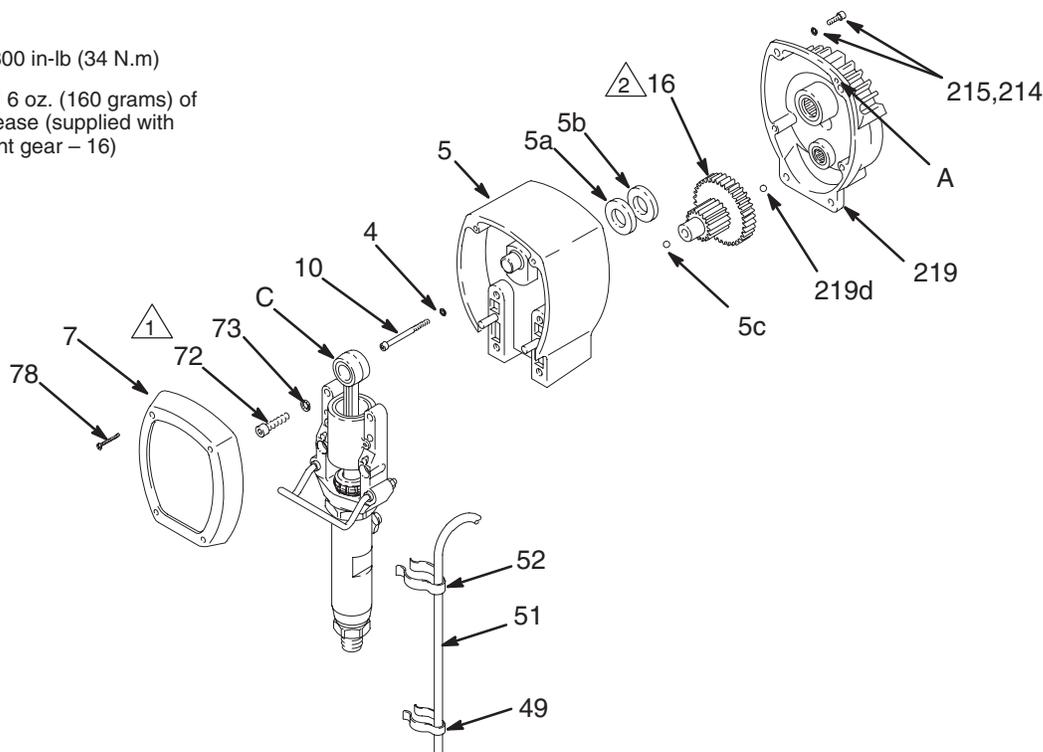


Fig. 8

02694

# Pinion

## Remove the Pinion Housing

**⚠ WARNING**

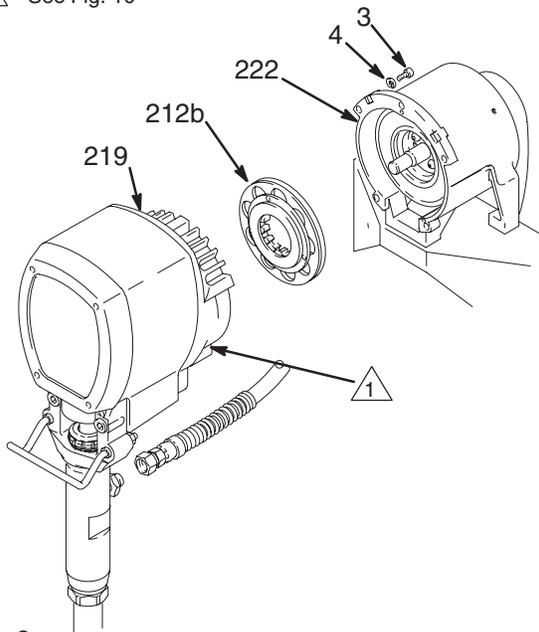
**INJECTION HAZARD**  
To reduce the risk of serious injury, whenever you are instructed to relieve pressure, follow the **Pressure Relief Procedure** on page 10.

**NOTE:** Refer to Fig. 9 for Steps 1 to 2.

1. First remove the two bottom screws (3) and lockwashers (4) from the clutch housing (222), and then remove the top three screws and lockwashers.
2. Pull the pinion housing (219) away from the clutch housing (222). The armature (212b) will come out still attached to the clutch housing. Pull the armature off the hub inside the pinion housing.

**NOTE:** To disassemble the pinion, go to **Repairing the Pinion**. To disassemble more of the sprayer, go to page 18. To reassemble the sprayer from this point, skip ahead to **Reassembly**, page 21, Steps 3 and 4.

⚠ See Fig. 10



02695

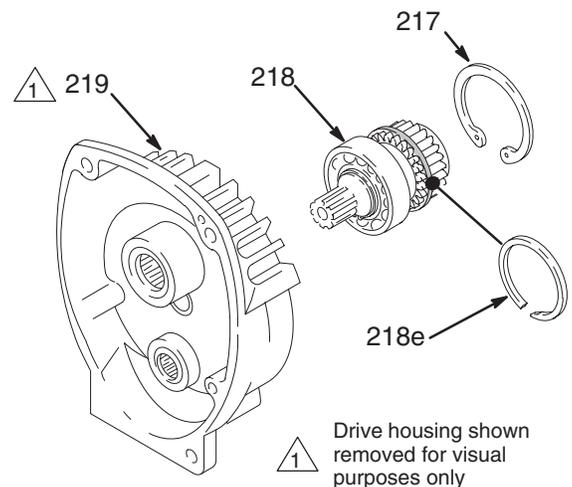
## Repairing the Pinion

**NOTE:** Repair Kit No. 236–394 includes the shaft and bearings pre-assembled and lubricated. A hydraulic press is not required. Use the repair procedure below.

**NOTE:** If purchasing the pinion parts separately, the repair must be done by a qualified technician since parts must be press fit. Refer to the parts drawing on page 28.

**NOTE:** Refer to Fig. 10 except where noted.

1. Remove the retaining ring (218e).
2. Remove the large ring (217) from the bearing recess of the pinion housing (219).
3. Pull the the pinion output shaft (218) out of the housing (219).
4. Install the new pinion output shaft (218) into the pinion housing, pushing it to the shoulder of the housing (219).
5. Install the rings (218e and 217).
6. Go to **Reassembly**, page 21, Steps 3 and 4, or continue on page 18.



02787

# Clutch

**NOTE:** The clutch assembly (212) includes the armature (212a) and rotor (212b). The armature and rotor must be replaced together so they wear evenly.

**NOTE:** If the pinion assembly (219) is not yet separated from the clutch housing (222), follow Steps 1 to 4. Otherwise, start at Step 5.

**NOTE:** Refer to Fig. 11 for this procedure.

## ⚠ WARNING

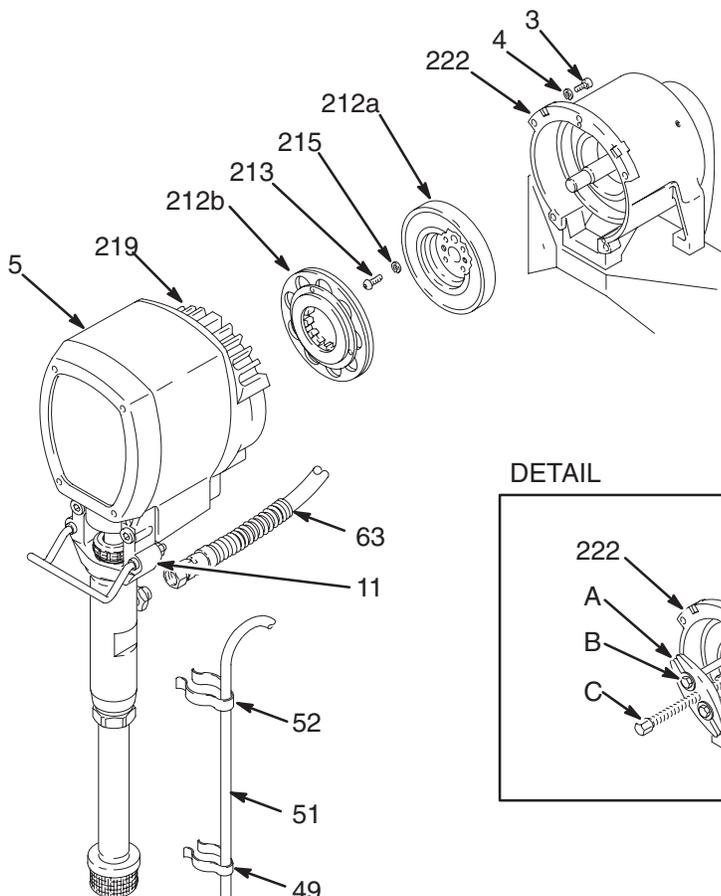


### INJECTION HAZARD

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

1. Relieve the pressure.
2. Disconnect the hose (63). Remove the spring clips (49,52) and drain hose (51).
3. Remove the bottom two screws (3) and lockwashers (4) from the clutch housing (222) and then remove the top three screws and lockwashers.

4. Tap lightly on the back of the bearing housing (11) with a plastic mallet to loosen the drive housing assembly (5) from the clutch housing (222). Pull the assembly away.
5. Remove the armature (212b) from the hub inside the pinion housing (219).
6. There are two ways to remove the rotor (212a).
  - a. Remove the four screws (213). Install two of the screws in the threaded holes in the rotor. Alternately tighten the screws until the rotor comes off.
  - b. Use a standard steering wheel puller (A) and two 1/4–22 x 3 or 4 in. long screws (B). Replace the short screws of the steering wheel puller with the longer screws (B). Turn the screws (B) into the threaded holes of the rotor. Tighten the long screw (C) until the rotor comes off. See the Detail in Fig. 11.
7. Skip ahead to **Reassembly**, page 21, Step 2, or continue on page 19.



### DETAIL

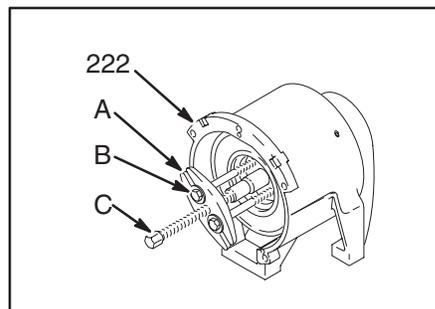


Fig. 11

02699

# Field and Wiring Harness

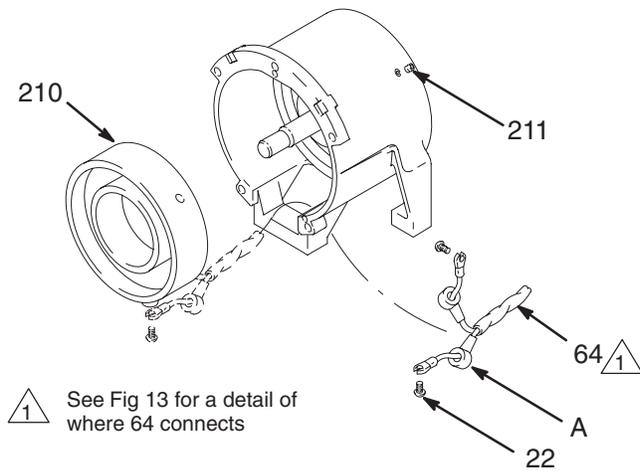


Fig. 12

02702

**NOTE:** Refer to Fig. 12.

1. Pull the plastic caps (A) off the wire screws (22) in both places on the field. Loosen the screws and release the wires (64).
2. Loosen the four setscrews (211). Pull off the field (210).
3. Skip ahead to **Reassembly**, page 21, Step 1 or continue on page 19.

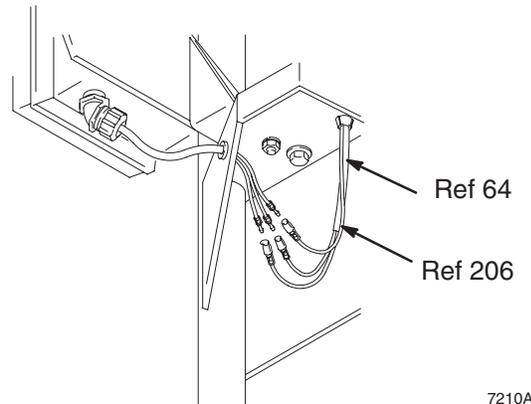


Fig. 13

7210A

# Alternator

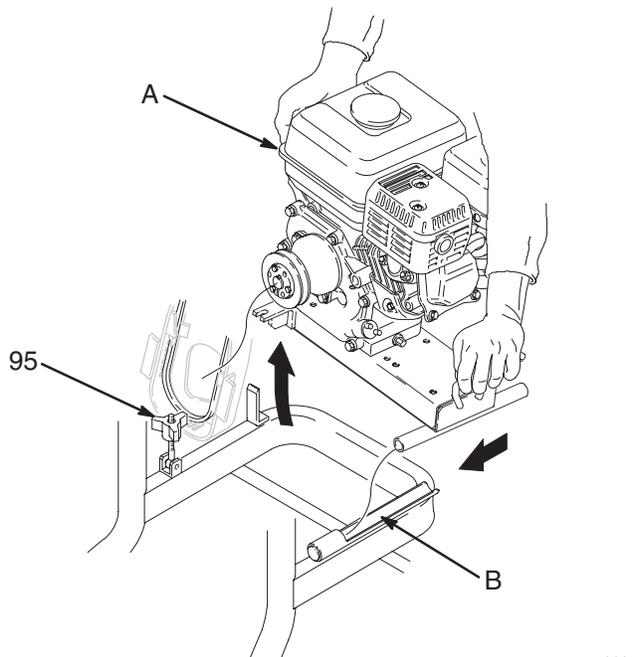


Fig. 14

7209

2. Remove the screws (43) and belt guard (35). Remove the belt (40). See Fig. 15.

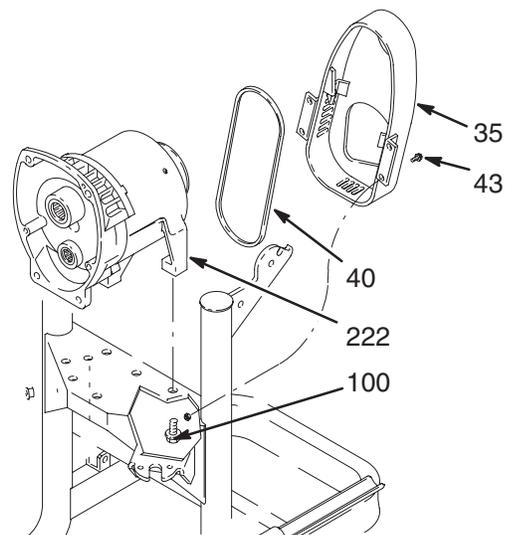


Fig. 15

## Disassembly

1. Remove the engine. Loosen the knob (95). Grasp the engine as shown in Fig. 14 and raise side A. Slide the engine out of the channel (B).

3. Remove the clutch housing (222) by removing screws (100) from below the cart. See Fig. 15.

**NOTE:** This procedure is continued on page 20.

# Alternator

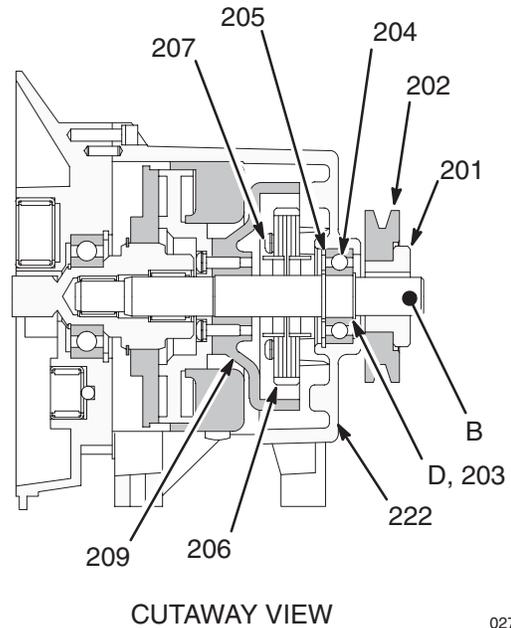
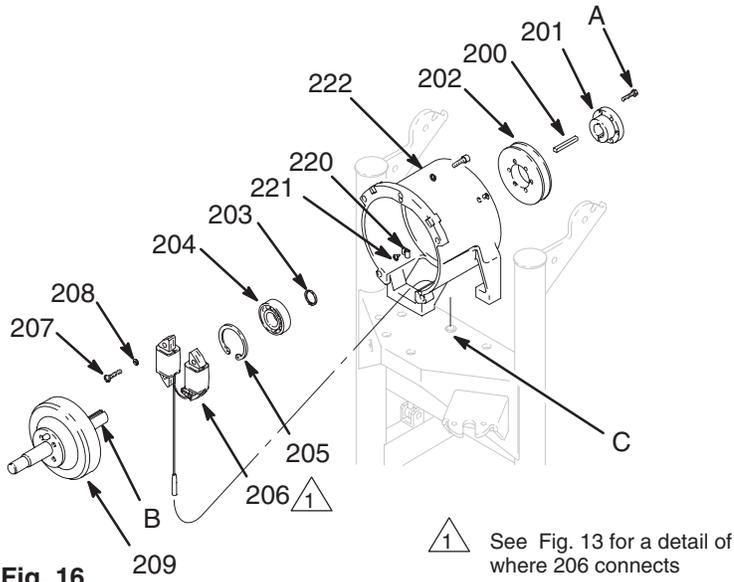


Fig. 16

02728

**NOTE:** Refer to Fig. 16 which also shows the assembly in a cutaway view.

- Remove the screws (A) from the bushing (201) and screw them into the threaded holes of the bushing. Tighten the screws until the sheave (202) separates from the bushing. Remove these parts and the key (200).

**NOTE:** If necessary, use a steering wheel puller as described in Step 6.b on page 18.

- Remove the retaining ring (203).
- Press the shaft (B) of the alternator shaft rotor (209) to free it from the clutch housing.

**NOTE:** The bearing (204) must be replaced if you remove the alternator rotor shaft (209).

- Remove the cable clamp (220) and screw (221).
- Remove the screws (207) and lockwashers (208) and the stator (206).
- Remove the retaining ring (205).
- Remove the bearing (204) from inside the clutch housing (222).

## Reassembly

- Clean all parts.
- Reassemble in the reverse order of disassembly. Route the wires of the stator (206) through the clutch housing (222) and through the hole (C) in

the mounting bracket. When pressing the shaft (209) through the bearing (204), press it until the groove D is exposed, then install the retaining ring (203).

- Mount the engine or motor (1) without the belt guard in place. Place a straight edge (E) along the surfaces of the clutch pulley (202) and engine pulley (41) as shown in Fig. 17 to be sure they are vertically aligned. Readjust the bushing screws (A) as needed to align the pulleys and recheck the alignment.

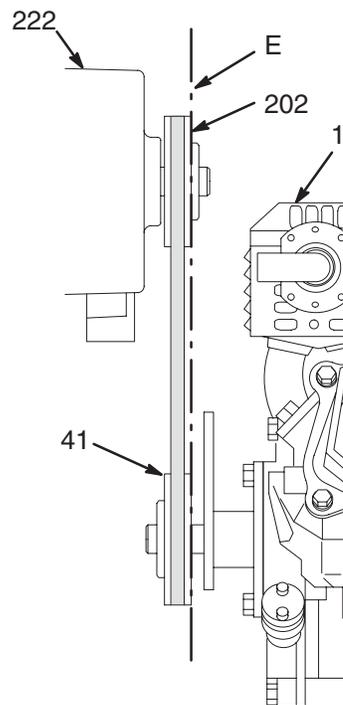


Fig. 17

02747

# Reassembly

1. Install the **field (210)** in the clutch housing (222). Working through the slot in the clutch housing, connect the wires of the harness (64) to the screws (22) in both places on the field. Pull the plastic caps (A) up and snap them over the screws. With the setscrew holes in the field and the clutch housing aligned, tighten the setscrews (211) oppositely and evenly, to 27 in-lb (3.2 N.m). See Fig. 18.

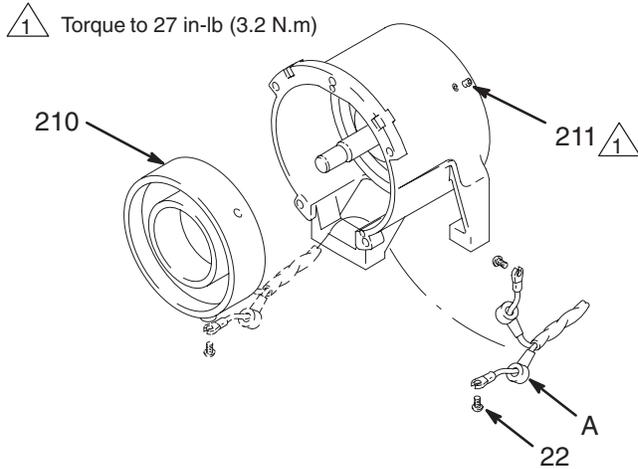


Fig. 18

02702

2. Be sure the face of the **rotor (212a)** and the field (210) is free of all oil and contaminants. Remove any burrs on the outside edge of the rotor. Install the rotor, lockwashers (215) and capscrews (213). Torque the capscrews to 7 ft-lb (9.5 N.m). See Fig. 19.

After installing the rotor (212a), pull the engine recoil rope to assure the engine turns freely, and there is no friction between the rotor (212a) and the field (6). If there is friction, loosen the setscrews (12) and reposition the field. Tighten the setscrews oppositely and evenly to 27 in-lb (3.2 N.m).

3. Be sure the face of the **armature (212b)** is clean. Assemble the armature to the hub in the pinion housing (219). A retaining ring located within the armature makes it difficult to assemble these parts. Follow this procedure for the best results. First, engage a few splines of both parts. While they are engaged, use a screwdriver to gently push the retaining ring into the armature, and finish engaging the splines. Push the armature onto the shaft until it contacts the ring. See Fig. 19.

4. Assemble the **pinion housing (219)** to the clutch housing, using the capscrews (3) and lockwashers (4). See Fig. 19.

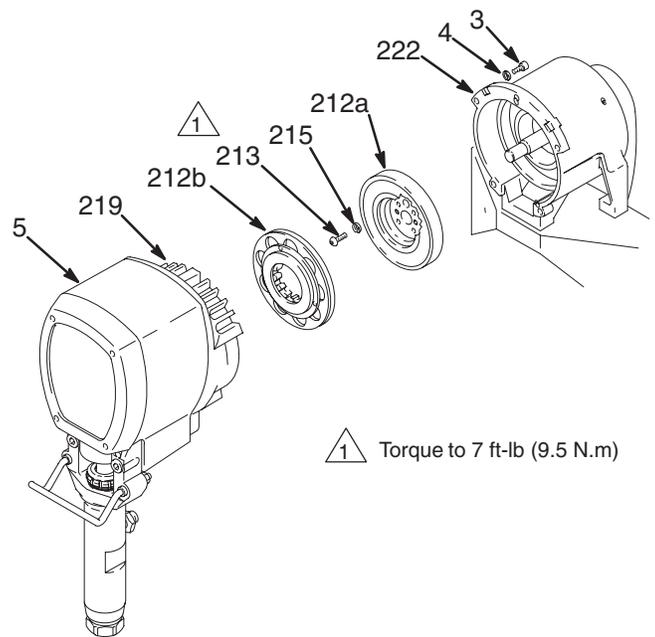


Fig. 19

02699

# Pressure Control Replacement

## ⚠ WARNING



### INJECTION HAZARD

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

1 To the pump.

2 To the filter.

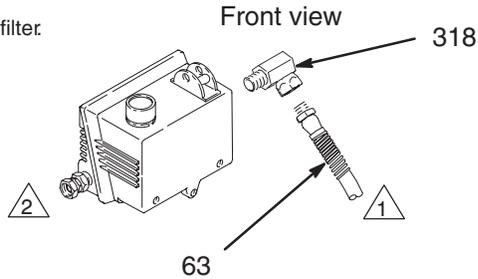


Fig. 20

06873

1. Relieve pressure.

## ⚠ CAUTION

DO NOT allow the elbow (318) to turn when removing or connecting the hose. Turning the elbow can damage the pressure control.

2. Disconnect the hose (63) while holding elbow (318) firmly. See Fig. 20.
3. Working under the cart, disconnect the wires (A). See Fig. 21.

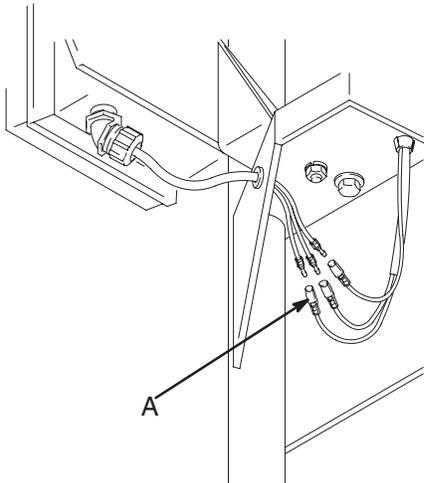


Fig. 21

7210A

4. Remove two screws (54) from filter bracket (111). See Fig. 22.
5. Disconnect the filter (18) from the pressure control (74) while holding nipple (317) firmly.
6. Remove the screws (67) and lock washers (110) from the back mounting bracket (76) and remove the pressure control (74).

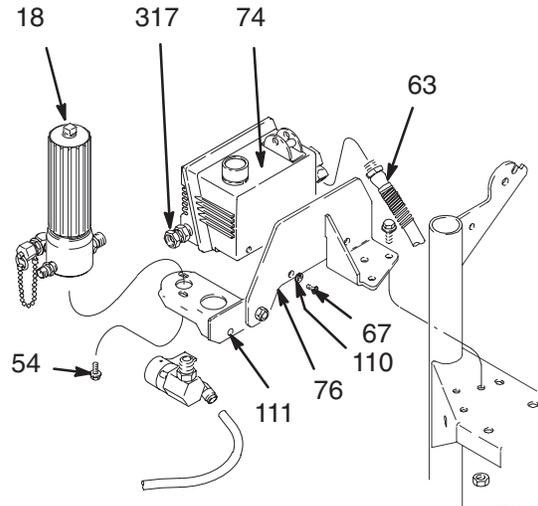


Fig. 22

7211A

# Pressure Control Replacement

7. Remove the four mounting screws and washers (302, 303, 304) from the pressure control cover (301). See Fig. 23.
8. Carefully remove the pressure control cover (301) so as not to stress the cables.
9. Disconnect the black and white wires of the pressure control cable (314) from the pressure control cover.
10. Disconnect the potentiometer cable assembly (310) from the pressure control cover.
11. Disconnect the red power lead (B) from the ON/OFF switch.
12. Loosen the ground terminal screw (317) and disconnect the ground lead (C).
13. Pull off the pressure control cover.

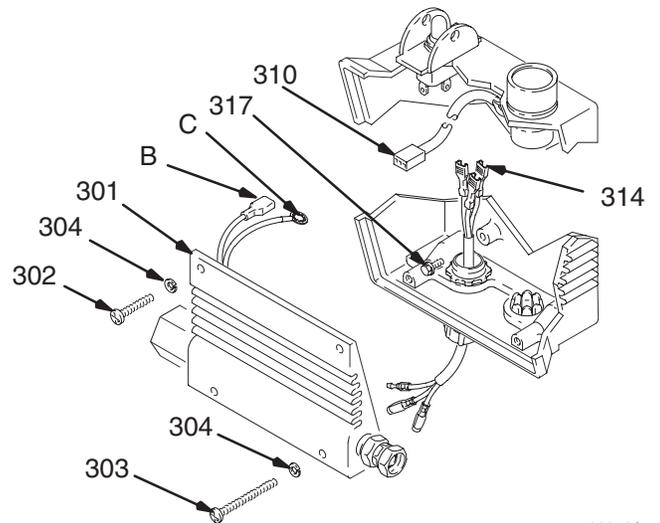


Fig. 23

06872A

## **WARNING**

Do not attempt to adjust or calibrate the pressure control. If the pressure control is faulty, replace it.

14. Reassemble in the reverse order; attach ground wire (C), power lead (B), and the black and white connectors. Attach the pressure control cover (301) with the four mounting screws and washers (302, 303, 304). Torque the mounting screws to  $22 \pm 2$  in-lb ( $2.5 \pm 0.23$  N·m).

# Displacement Pump

## ⚠ WARNING



### INJECTION HAZARD

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

### Removing the pump. (See Fig. 24.)

1. Relieve pressure.
2. Flush the pump. See page NO TAG.
3. Remove the hose (55). Remove the two spring clips (74, 80) and drain hose (76).
4. Push the retaining spring (26) up. Push the pin (25) out the rear.
5. Loosen the locknut (27). Unscrew the pump.

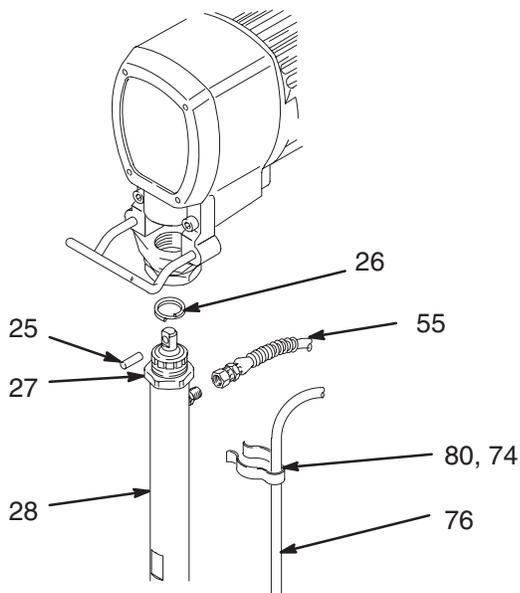


Fig. 24

7179A

### Repairing the pump.

See manual 307–806 for displacement pump repair.

### Installing the pump. (See Fig. 25.)

1. Screw the pump about 3/4 of the way into the bearing housing (21). Hold the pin (25) up to the pin hole on the connecting rod (22) and continue screwing in the pump until the pin slides easily into the hole.
2. Back off the pump until the top threads of the pump cylinder are flush with the face of the bearing housing and the outlet nipple faces back.
3. Push the retaining spring (26) into the groove all the way around the connecting rod. Tighten the locknut (27) to  $90 \pm 5$  ft-lb ( $122 \pm 6.8$  N·m) using a wrench and a light hammer.
4. Connect the pump outlet hose. Install the suction tube parts. Install the spring clips and drain hose.

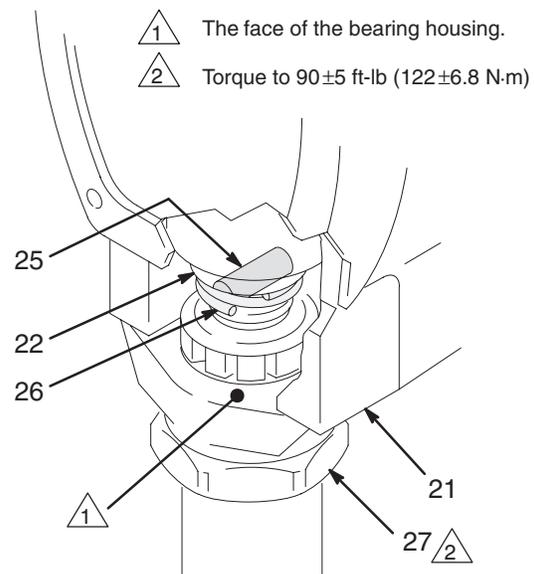


Fig. 25

0031



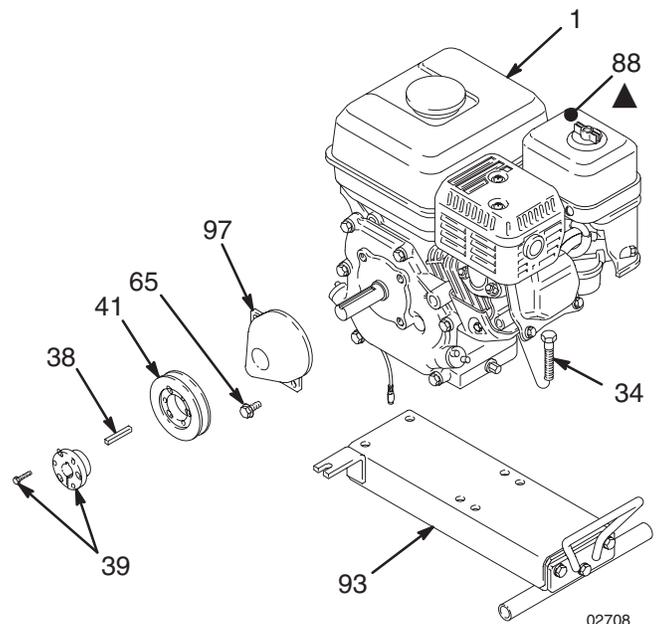


# Parts – Basic Sprayer

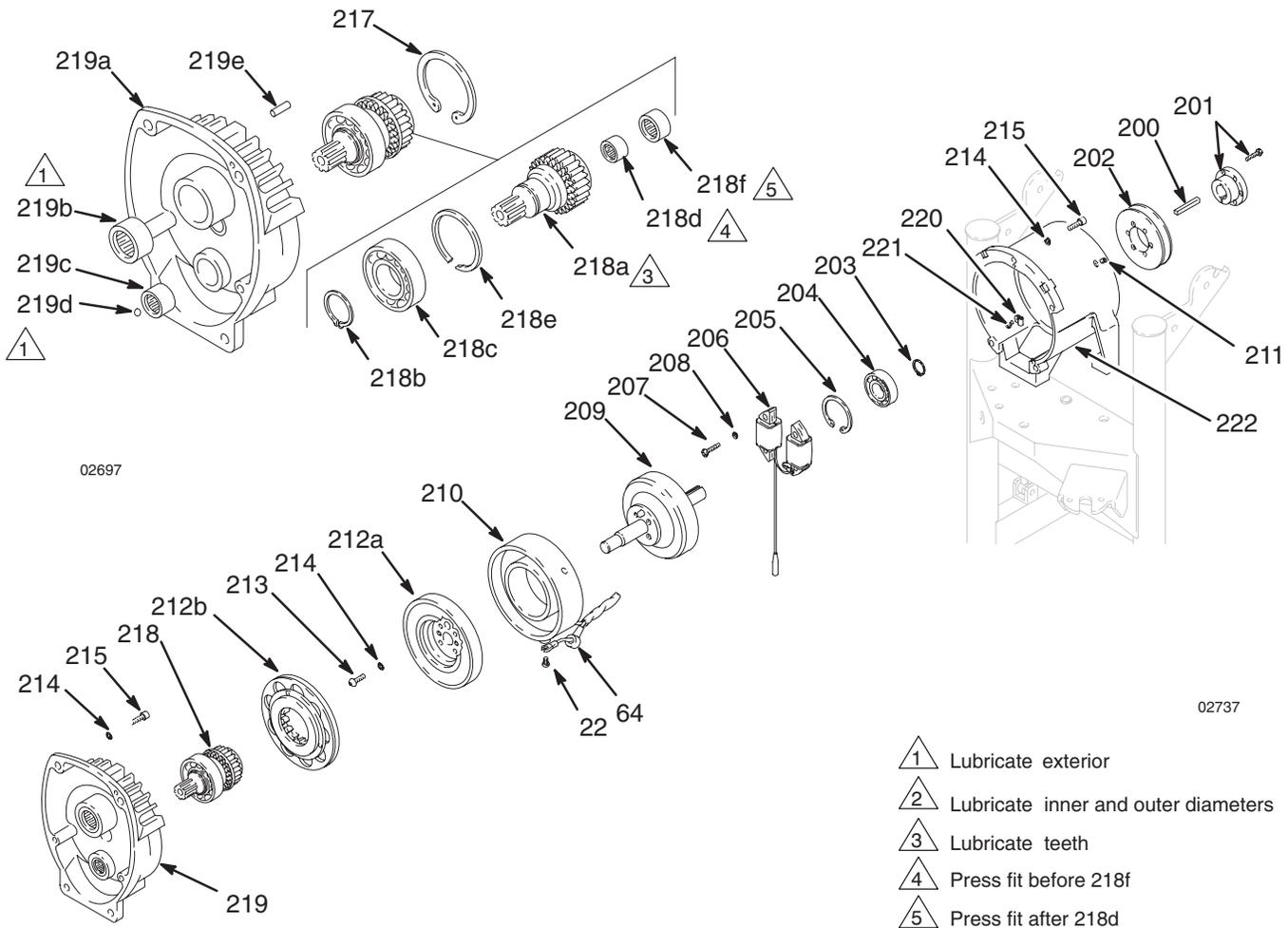
## Model 231–316, Series A

| Ref. No. | Part No. | Description   | Qty. | Ref. No. | Part No. | Description                              | Qty. |
|----------|----------|---|------|----------|----------|--|------|
| 1        | 802–264  | ENGINE, 5.5 HP  | 1    | 64       | 220–980  | HARNESS, wiring, Shown on page 28        | 1    |
| 2        | 241–299  | CLUTCH HOUSING ALTERNATOR<br>See separate parts list on page 28         | 1    | 65       | 108–842  | SCREW, cap, flange, 5/16–24 x 3/4"       | 4    |
| 3        | 100–644  | CAPSCREW, socket head, 1/4–20 x 3/4"                                    | 9    | 66       | 112–386  | PIN                                      | 1    |
| 4        | 105–510  | LOCKWASHER, spring, 1/4"  | 11   | 67       | 101–344  | SCREW, cap, 10–24 x 1/2"                 | 3    |
| 5        | 241–291  | DRIVE HOUSING KIT<br>Includes replaceable items 5a to 5d                | 1    | 71       | 290–375  | LABEL, identification, control, top      | 1    |
| 5a       | 106–227  | . WASHER, bronze colored  | 1    | 72       | 110–141  | CAPSCREW, 3/8–16 x 1–1/2"                | 4    |
| 5b       | 183–209  | . WASHER, silver colored  | 1    | 73       | 106–115  | LOCKWASHER, spring, 3/8"                 | 4    |
| 5c       | 100–069  | . BALL  | 1    | 74       | 239–662  | PRESSURE CONTROL<br>See parts on page 30 | 1    |
| 5d       | 110–293  | . TUBE OF GREASE  | 1    | 76       | 192–225  | PRESSURE CONTROL BRACKET                 | 1    |
| 6▲       | 185–953  | LABEL, Danger   | 1    | 77       | 290–436  | IDENTIFICATION LABEL, front cover        | 1    |
| 7        | 188–423  | COVER, housing  | 1    | 78       | 108–850  | SCREW, No. 8–32 x 1–1/4"                 | 4    |
| 8        | 220–640  | CONNECTING ROD KIT  | 1    | 88▲      | 181–867  | LABEL, Warning                           | 1    |
| 10       | 108–849  | CAPSCREW, sckt hd, 1/4–20 x 3"  | 2    | 89       | 187–147  | STRAINER                                 | 1    |
| 11       | 220–639  | BEARING HOUSING   | 1    | 90       | 239–521  | CART                                     | 1    |
| 12       | 183–210  | PIN, straight, 3/8 x 1/8"   | 1    | 91       | 206–994  | THROAT SEAL LIQUID,<br>8 oz (0.27 liter) | 1    |
| 13       | 183–169  | SPRING, retaining   | 1    | 93       | 236–529  | MOUNTING BASE                            | 1    |
| 14       | 189–969  | NUT, hex, 1 13/16–16  | 1    | 94       | 236–388  | EYE BOLT                                 | 1    |
| 15       | 220–872  | PUMP See parts in manual 307–806  | 1    | 95       | 112–392  | KNOB                                     | 1    |
| 16       | 220–919  | GEAR REDUCER  | 1    | 96       | 236–402  | CART HANDLE                              | 1    |
| 17       | 109–099  | BUSHING, snap   | 2    | 97       | 236–376  | ENGINE GUARD                             | 1    |
| 18       | 239–286  | FLUID FILTER;<br>See manual 307–273 for other parts                     | 1    | 100      | 112–395  | SCREW, 3/8–16 x 3/4"                     | 3    |
| 21       | 112–583  | PLUG  | 4    | 102▲     | 177–144  | LABEL, Warning                           | 1    |
| 22       | 108–860  | SCREW, No. 8–32 x 1/4"<br>Shown on page 28                              | 2    | 104      | 189–679  | LABEL, caution (not shown)               | 1    |
| 25       | 112–798  | SCREW, thread forming   | 1    | 105      | 112–756  | SCREW, cap, socket hd                    | 3    |
| 27       | 237–686  | GROUNDING CLAMP & WIRE  | 1    | 106      | 110–838  | LOCKNUT, w/nylon insert, 5/16–18         | 4    |
| 28       | 102–556  | RIVET, blind (not shown)  | 2    | 110      | 100–214  | WASHER, lock                             | 3    |
| 29       | 187–112  | PLATE, designation (not shown)  | 1    | 111      | 237–831  | BRACKET, filter                          | 1    |
| 30       | 179–811  | WHEEL, semi–pneumatic   | 2    | 118      | 113–983  | RING, retaining, external                | 1    |
| 31       | 154–636  | WASHER, 5/8"  | 2    | 112      | 290–437  | LABEL, identification, control, bottom   | 1    |
| 32       | 101–242  | RING, retaining   | 2    | 119      | 112–818  | SCREW, cap, hex, hd, flange              | 1    |
| 33       | 104–811  | HUBCAP  | 2    |          |          |  |      |
| 34       | 110–837  | FLANGE SCREW, hex hd,<br>5/16–18 x 1–1/2"                               | 4    |          |          |  |      |
| 35       | 236–378  | BELT GUARD  | 1    |          |          |  |      |
| 37       | 108–859  | SCREW, 5/16–18 x 3/8" shld, 1/2" thd                                    | 2    |          |          |  |      |
| 38       | 183–401  | KEY, parallel, 3/16" sq x 7/8"  | 1    |          |          |  |      |
| 39       | 109–581  | BUSHING   | 1    |          |          |  |      |
| 40       | 109–582  | BELT, 3V  | 1    |          |          |  |      |
| 41       | 109–580  | SHEAVE  | 1    |          |          |  |      |
| 43       | 112–161  | FLANGE SCREW, 1/4–20 x 1/2"   | 4    |          |          |  |      |
| 44       | 110–963  | FLANGE SCREW, hex hd,<br>5/16–18 x 3/4"                                 | 3    |          |          |  |      |
| 46       | 112–746  | NUT, retainer   | 2    |          |          |  |      |
| 47       | 183–461  | NIPPLE, 3/8–18 npsm x 1/4–18 npt  | 1    |          |          |  |      |
| 49       | 181–102  | CLIP, spring  | 1    |          |          |  |      |
| 50       | 183–423  | TUBE, intake  | 1    |          |          |  |      |
| 51       | 186–495  | TUBE, bypass  | 1    |          |          |  |      |
| 52       | 186–490  | CLIP, spring  | 1    |          |          |  |      |
| 53       | 189–918  | HANGER, pail  | 1    |          |          |  |      |
| 54       | 110–997  | SCREW, flange hex hd, 1/4–20 x 5/8"                                     | 2    |          |          |  |      |
| 60       | 237–677  | PRESSURE DRAIN VALVE  | 1    |          |          |  |      |
| 63       | 222–516  | FLUID HOSE, 3/8" ID, 3/8" npt<br>couplings, 2.5 ft. long, spring guards | 1    |          |          |  |      |

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



# Parts – Clutch Housing Alternator



- △ 1 Lubricate exterior
- △ 2 Lubricate inner and outer diameters
- △ 3 Lubricate teeth
- △ 4 Press fit before 218f
- △ 5 Press fit after 218d

**Ref No. 2**  
**Part No. 241–299**  
**CLUTCH HOUSING ALTERNATOR KIT**  
 Includes items 200 to 222

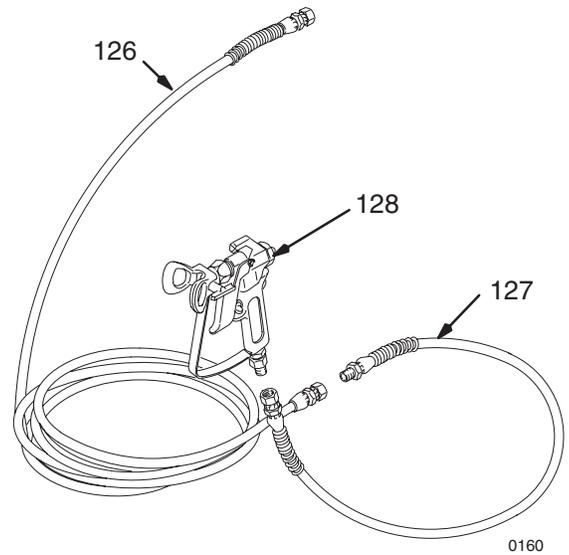
| Ref. No. | Part No. | Description                    | Qty. | Ref. No. | Part No. | Description  | Qty. |
|----------|----------|--------------------------------|------|----------|----------|--|------|
| 200      | 183–401  | KEY                            | 1    | 218      | 236–394  | PINION OUTPUT SHAFT KIT<br>Includes replaceable items 218a to 218f | 1    |
| 201      | 109–581  | BUSHING                        | 1    | 218a     | 188–812  | . PINION OUTPUT SHAFT  | 1    |
| 202      | 109–580  | SHEAVE                         | 1    | 218b     | 112–141  | . RETAINING RING   | 1    |
| 203      | 112–132  | RETAINING RING, 0.693"         | 1    | 218c     | 108–798  | . BALL BEARING   | 1    |
| 204      | 112–126  | BALL BEARING                   | 1    | 218d     | 112–139  | . NEEDLE BEARING, small  | 1    |
| 205      | 112–128  | RETAINING RING, 2.054"         | 1    | 218e     | 108–796  | . RETAINING RING   | 1    |
| 206      | 236–396  | GENERATOR STATOR               | 1    | 218f     | 112–140  | . NEEDLE BEARING, large  | 1    |
| 207      | 112–143  | SCREW, pan head, 10–24 x 1"    | 4    | 219      | 241–290  | PINION HOUSING KIT<br>Includes replaceable items 219a to 219e      | 1    |
| 208      | 100–020  | LOCKWASHER                     | 4    | 219a     | 194–313  | . PINION HOUSING   | 1    |
| 209      | 236–395  | ALTERNATOR SHAFT ROTOR         | 1    | 219b     | 108–692  | . NEEDLE BEARING, large  | 1    |
| 210      | 188–425  | FIELD                          | 1    | 219c     | 107–088  | . NEEDLE BEARING, small  | 1    |
| 211      | 108–801  | SETSCREW, 1/4–20 x .31"        | 4    | 219d     | 100–069  | . BALL   | 1    |
| 212      | 221–031  | CLUTCH, includes 212a and 212b | 1    | 219e     | 105–489  | . PIN  | 1    |
| 212a     |          | . ROTOR                        | 1    | 220      | 112–145  | CABLE CLAMP  | 1    |
| 212b     |          | . ARMATURE                     | 1    | 221      | 112–144  | SCREW, pan head, 8–32 x 1/4"                                       | 1    |
| 213      | 112–142  | CAPSCREW, 1/4–28 x 3/4"        | 4    | 222      | 188–791  | CLUTCH HOUSING   | 1    |
| 214      | 105–510  | LOCKWASHER, spring, 1/4"       | 9    |          |          |  |      |
| 215      | 100–644  | CAPSCREW, 1/4–20 x 3/4"        | 5    |          |          |  |      |
| 217      | 108–799  | RETAINING RING                 | 1    |          |          |  |      |

# Parts – Complete Sprayer

## Model 231–331

Includes items 125 to 128

| Ref. No. | Part No. | Description   | Qty. |
|----------|----------|---|------|
| 125      | 231–316  | CONVERTIBLE GM5000 Basic Sprayer<br>See parts list on page 27   | 1    |
| 126      | 238–361  | HOSE, grounded, nylon; 1/4" ID;<br>cpld 1/4 npsm(fbe); 50 ft (15 m);<br>spring guards both ends                     | 1    |
| 127      | 238–358  | HOSE, grounded, nylon; 3/16" ID;<br>cpld 1/4 npsm(m) x 1/4 npsm(f) swivel;<br>3 ft (0.9 m); spring guards both ends | 1    |
| 128      | 220–955  | "CONTRACTOR" SPRAY GUN<br>Includes RAC IV™ DripLess™ Tip Guard<br>and 517-size SwitchTip™<br>See 307–614 for parts  | 1    |



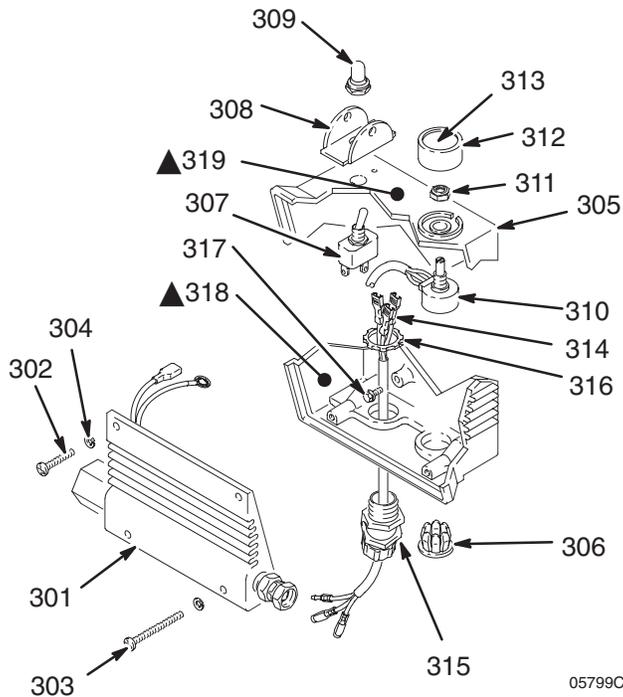
# Parts – Pressure Control

## Basic Pressure Control for the GM5000 Convertible Sprayer

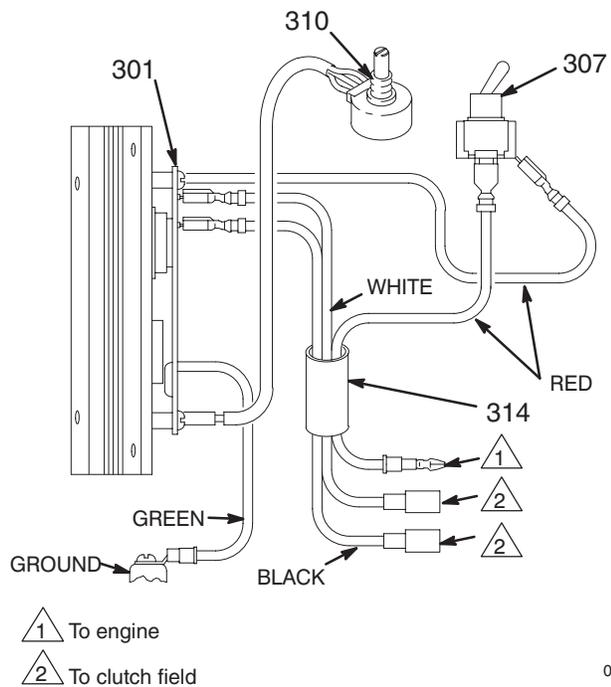
| Ref No. | Part No. | Description                        | Qty | Ref No. | Part No. | Description                      | Qty |
|---------|----------|------------------------------------|-----|---------|----------|----------------------------------|-----|
| 301     | 239-519  | ENGINE CONTROL BOARD               | 1   | 312     | 112-373  | KNOB                             | 1   |
| 302     | 107-251  | SCREW, panhead, 10-24 x 1 in.      | 2   | 313     | 185-565  | LABEL                            | 1   |
| 303     | 112-610  | SCREW, panhead, 10-24 x 2 in.      | 2   | 314     | 237-674  | CONDUCTOR                        | 1   |
| 304     | 100-020  | LOCKWASHER, No. 10                 | 4   | 315     | 109-078  | CONNECTOR                        | 1   |
| 305     | 189-095  | HOUSING, 1                         | 1   | 316     | 112-376  | LOCKNUT                          | 1   |
| 306     | 112-614  | PLUG                               | 1   | 317     | 100-078  | SCREW, hex head, 8-24 x .375 in. | 1   |
| 307     | 111-930  | TOGGLE SWITCH                      | 1   | 318▲    | 189-286  | LABEL, warning                   | 1   |
| 308     | 107-255  | GUARD                              | 1   | 319▲    | 189-246  | LABEL, warning                   | 1   |
| 309     | 105-659  | BOOT                               | 1   |         |          |                                  |     |
| 310     | 236-352  | POTENTIOMETER, pressure adjustment | 1   |         |          |                                  |     |
| 311     | 112-382  | NUT, shaft, sealing                | 1   |         |          |                                  |     |

▲ Replacement Danger and Warning labels, tags, and cards are available free.

## Parts Drawing – Pressure Control



## Wiring Schematic – Pressure Control





# Graco Warranty

Graco warrants all equipment listed in this manual which is manufactured by Graco 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. 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 a 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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