



INSTRUCTIONS

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

5.5 HORSEPOWER, GASOLINE-POWERED

GM5000 Airless Paint Sprayer

3000 psi (207 bar, 21 MPa) Maximum Working Pressure

Upright Cart Sprayer

Model 231-576, Series B

Basic sprayer without hose or gun.

Model 231-052

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

Lo-Boy Cart Sprayer

Model 231-577, Series B

Basic sprayer without hose or gun.

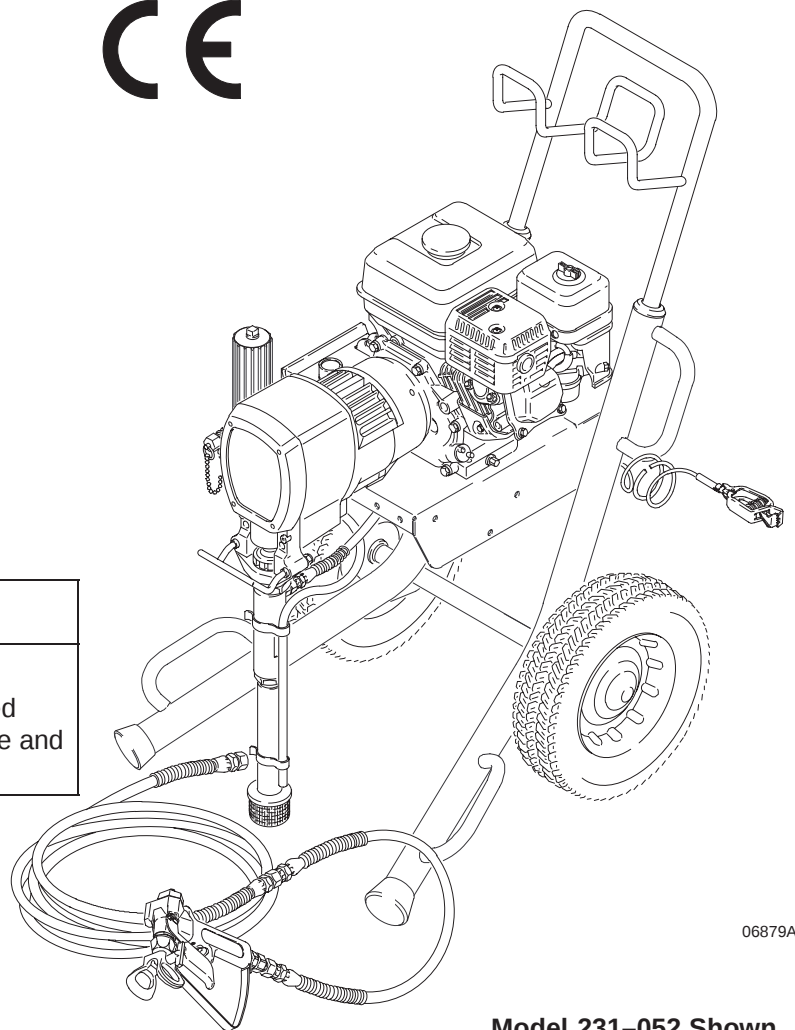
Model 231-085

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



CAUTION

Use a minimum hose length of 100 ft (30.4 m)
1/4 in. ID or 50 ft (15.2 m) 3/8 in. ID. Undersized
hose may result in poor equipment performance and
damage to the clutch or pressure control.



06879A

Model 231-052 Shown

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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 36 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 33 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			

Component Identification and Function

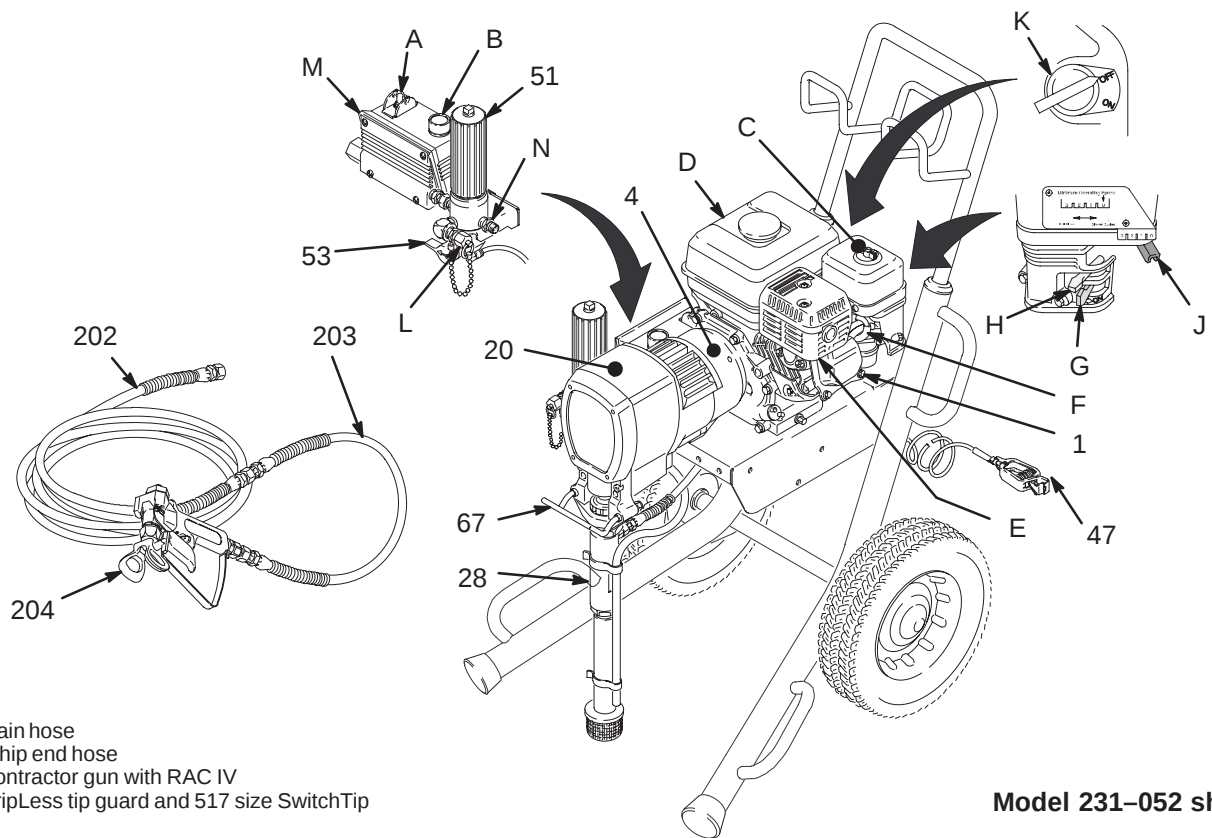


Fig. 1

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

Setup

NOTE: A 55 gallon (200 liter) suction tube kit, 208–259, is available.

⚠ 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 (207 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. Never use a wire braid hose; it is too rigid to act as a pulsation dampener.
2. Always use a minimum hose length of 100 ft (30.4 m) 1/4 in. ID or 50 ft (15.2 m) 3/8 in. ID hose.
3. Never install any shutoff device between the filter (51) and main hose (202). See Fig. 2.
4. Always use the primary filter outlet (N) for a one gun operation. Never plug this outlet.

1. Connect hose and gun. (Fig. 2)

- a. Remove the plastic cap from the 1/4 npsm(m) filter outlet nipple (N). Screw the 50 foot (15.2 m) main fluid hose (202) onto the nipple. Read the CAUTION, above.
- b. Connect the whip end hose (203) between the main fluid hose and the inlet adapter of the gun (204).
- c. DO NOT use thread sealant, and DO NOT install the spray tip yet!

2. **Two gun hookup.** Remove the cap from the secondary hose outlet (L). Connect the second outlet hoses to the sprayer as explained in Step 1, above.
3. **Fill packing nut/wetcup.** Fill the packing nut/wetcup (Y) 1/3 full with Graco Throat Seal Liquid (TSL), supplied. See Fig. 2.
4. **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 (R); 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.

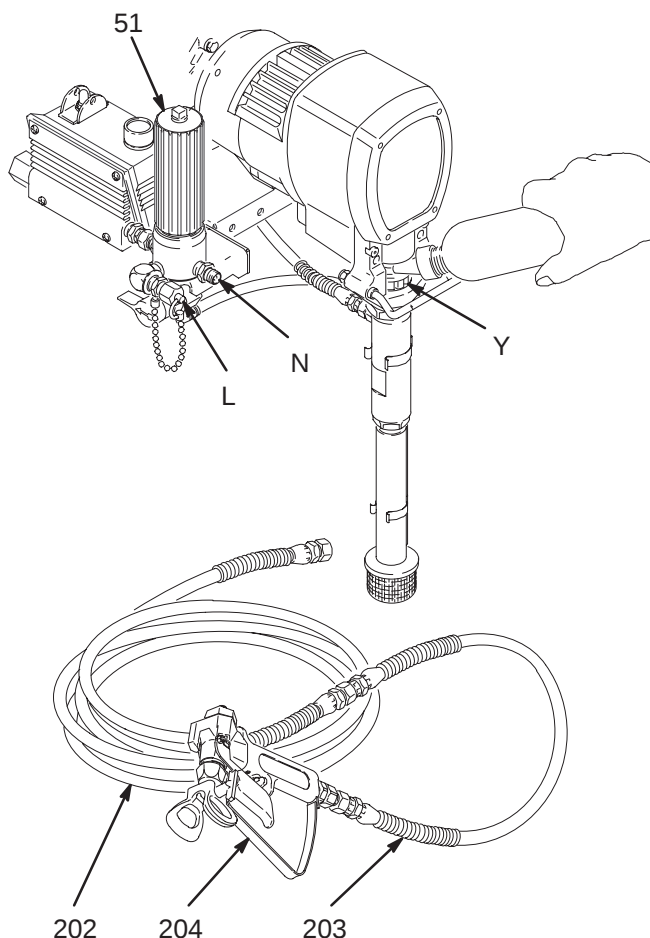


Fig. 2

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Setup

5. **Be sure your system is properly grounded before operating it.** Read and follow the warning section, FIRE OR EXPLOSION HAZARD, on page 4. Use the grounding wire and clamp (47) whenever the sprayer is used as a stationary unit.
 - c. Strain the paint through a fine nylon mesh bag (available at most paint dealers) to remove the particles that could clog the filter or spray tip. This is probably the most important step toward trouble-free spraying.
6. **Fill the gas tank.** See **Fueling**, page 8.
7. **Flush the pump** to remove the lightweight oil which was left in the pump to protect it from rust.
 - a. Before using water-base paint, flush with mineral spirits, followed by soapy water, and then flush with clean water.
 - b. Before using oil-base paint, flush with mineral spirits, only.
 - c. See Flushing on page 11 for the flushing procedure.
8. **Prepare the paint** according to the manufacturer's recommendations.
 - a. Remove any skin that may have formed.
 - b. Stir the paint to mix the pigments.
9. **Keep the sprayer upright and level** during operation and whenever it is being moved. See the last CAUTION on page 9.

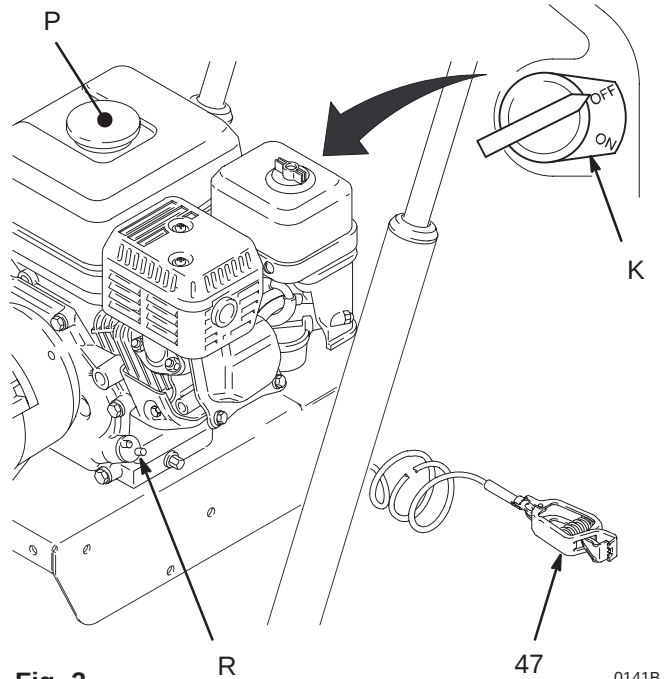


Fig. 3

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Fueling

WARNING

Gasoline is extremely flammable and explosive under certain conditions.

Always turn the engine switch (K) to off before refueling.

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. Make sure the gas fill cap (Fig. 3, P) is securely closed after refueling.

Be careful not to 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 the 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 the damage resulting from the use of gasolines containing alcohol. See the HONDA engine manual for more information.

3. **General.** Do not use any oil and gasoline mixtures or contaminated gasoline. Avoid getting any 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

Before You Start the Sprayer

1. **See Flushing** on page 11 to determine if you should flush the sprayer.
2. **Be sure the gas tank is full.**
3. **Check the engine oil level.**

NOTE: The engine stops automatically, or will not start, if it is low on oil. Refer to the oil fill procedure in the Honda engine manual or to step 4, page 6.

4. **Be sure the spark plug cable (F) is firmly pushed onto the plug.**

Starting the Sprayer

NOTE: Refer to Fig. 1 as you start the sprayer.

1. **When starting a sprayer that IS NOT PRIMED,** remove the spray tip.
2. **If a secondary hose and gun is not installed,** be sure the cap is securely plugging the secondary outlet fitting (L).
3. **Place the suction tube into the paint, water or solvent container,** depending on whether you are flushing or are ready to spray.

4. **Open the black fuel shutoff lever (G)** by pushing it in the direction of the arrow.

CAUTION

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

5. **Turn the pressure control switch (A) to OFF.**
6. **To start the engine:**
 - a. Turn the pressure adjusting knob (B) all the way counterclockwise to the lowest pressure setting.
 - b. Slide the metal throttle lever (J) away from the fuel tank to maximum position (fully left).
 - c. If the engine is cold, close the choke (H) by moving the gray lever.
 - d. If the engine is warm, close the choke (H) by moving the gray lever only half way or not at all.
 - e. Turn the engine switch (K) to ON.

Startup

WARNING

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

- f. Hold the frame of the sprayer with one hand and pull the starter rope rapidly and firmly. Continue holding the rope as you let it return. Pull and return the rope until the engine starts.
 - g. Open the choke 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. **Unlock the gun trigger safety.**
 8. **To start the pump:**
 - a. Open the pressure drain valve (53).
 - b. Turn the pressure control switch to ON.
 - c. Turn the pressure control knob 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.
 - d. Close the pressure drain valve (53). Hold a metal part of the gun firmly against a grounded metal pail and squeeze the trigger until fluid flows from the gun.
 - e. Release the trigger. Lock the gun trigger safety.
 9. **If you have not primed the sprayer with paint yet,** move the suction tube to the paint container. Unlock the gun trigger safety. Trigger the gun into the water/solvent pail just until paint appears. Release the trigger and lock the trigger safety. Repeat for the second gun if two guns are used.

WARNING

To reduce the risk of serious injury from fluid injection, NEVER operate the spray gun with the tip guard removed.

10. **Install the spray tip in the gun.** See the separate tip instruction manual, 307–848, supplied.
11. **Adjust the engine speed and pump pressure.** Unlock the gun trigger safety. 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 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 whenever you are transporting the sprayer to prevent fuel from flooding the engine.

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.

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.

DAILY: Check the engine oil level and fill as necessary.

DAILY: Check hose for wear and damage.

DAILY: Check gun safety for proper operation.

DAILY: Check pressure drain valve for proper operation.

DAILY: Check and fill the gas tank.

AFTER THE FIRST 20 HOURS OF OPERATION

Drain the oil and refill with clean oil.

WEEKLY: Remove the cover of the air filter and clean the element. 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.

WEEKLY: Check the level of the TSL in the displacement pump packing nut. Fill the nut, if necessary. Keep TSL in the nut to help prevent fluid buildup on the piston rod and premature wear of the packings.

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.

CAUTION

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

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. See Fig. 4, A.
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.

CAUTION

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.

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: The word solvent refers to water or oil-based solvent.

1. Relieve pressure.
2. Remove the filter bowl (A) and screen (B); see instruction manual 307–273, supplied. Install the bowl and support (C), without the screen, to flush. Clean the screen separately. See Fig. 4.
3. Close the pressure drain valve (53).
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 flushing, always remove the spray tip from the gun, and hold a metal part of the gun firmly to the side of, and aimed into, a grounded metal pail.

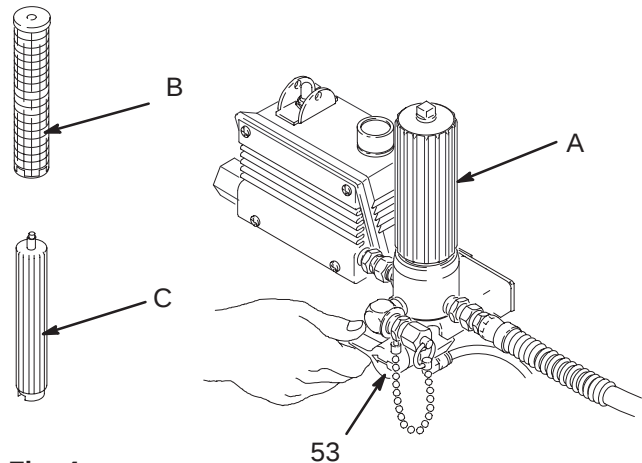
Flushing

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

NOTE: For two guns, unlock the gun trigger safety 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.

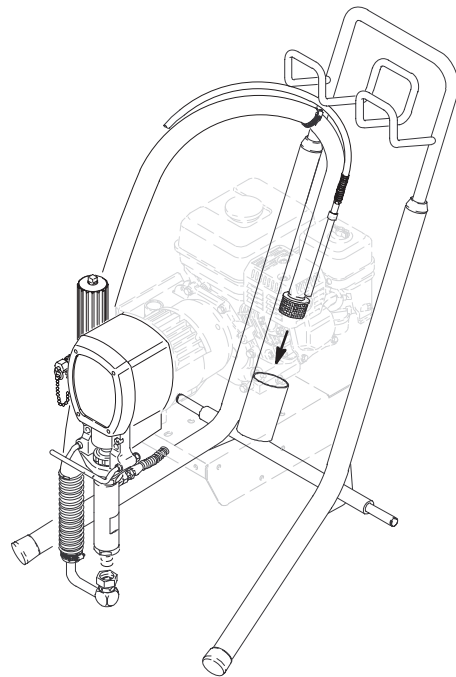
7. Check all fluid connections for leaks. Relieve the pressure before tightening any connections. Start the sprayer. Recheck the connections for leaks.
8. Remove the suction tube from the solvent pail. Unlock the gun trigger safety. Trigger the gun to force solvent from the hose. Do not let the pump run dry for more than 30 seconds, to avoid damaging the pump packings. Relieve the 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 and reinstall the clean screen. Reinstall the bowl, hand tight only.
11. Follow the preceding Storage or Changing Colors procedure. Relieve the pressure.



Suction Tube Storage

Place the suction tube in the receptacle on the cart frame as shown in Fig. 5.



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
The engine or sprayer won't start.	The engine switch is not on.	Turn on the switch.
	The engine is out of gas.	Refill the gas tank. See page 8.
	The engine oil level is low.	Try to start the engine. Replenish the oil, if necessary. See Step 4, page 6.
	The spark plug cable is disconnected or it is damaged	Reconnect the spark plug cable or replace the spark plug.
	There is frozen water in the pressure control.	Allow the sprayer to thaw completely before starting it.
The engine won't "pull over".	There is oil seeping into the combustion chamber.	Remove the spark plug. Pull the starter rope 3 or 4 times. Clean or replace the plug. Try to start the engine. Keep the sprayer upright to avoid oil seepage.
The engine operates, but the displacement pump does not operate.	The pressure control switch is turned off.	Turn on the switch.
	The pressure setting is too low.	Turn the pressure adjusting knob clockwise to increase pressure.
	The fluid filter (51) is dirty.	Clean the filter. See page 12.
	The tip or the tip filter is clogged.	Clean the tip or the tip filter. See the gun instruction manual.
	The displacement pump piston rod is stuck due to dried paint.	Repair the pump. See manual 307–806.
	The connecting rod is worn or damaged.	Replace the connecting rod. See page 15.
	The drive housing is worn or damaged.	Replace the drive housing. See page 16.
	The electrical power is not energizing the field.	Check the wiring connections. See page 23. With the pressure control switch turned on and the pressure turned to maximum, use a test light to check the power at the black and white wires from the pressure control. Have the pressure control checked by an authorized Graco dealer.
	The clutch is worn, damaged, or incorrectly positioned.	Replace the clutch. See page 20.
	The pinion assembly is worn or damaged.	Repair or replace the pinion assembly. See page 18.

PROBLEM	CAUSE	SOLUTION
The pump output is low on the upstroke.	The inlet screen (31) is clogged.	Clean the screen.
	The piston ball (25) is not seating.	Service the piston ball. See manual 307–806.
	The piston packings are worn or damaged.	Replace the packings. See manual 307–806.
	The o-ring (17) in the displacement pump is worn or damaged.	Replace the o-ring. See manual 307–806.
The pump output is low on the downstroke or on both of the strokes.	The strainer (31) is clogged.	Clean the screen.
	The piston packings are worn or damaged.	Replace the packings. See manual 307–806.
	The intake valve ball is not seating properly.	Clean the intake valve. See manual 307–806.
	The engine speed is too low.	Increase the throttle setting. See Step 11, page 9.
	The clutch is worn or damaged.	Replace the clutch. See page 20.
The paint leaks into the wetcup.	The wetcup is loose.	Tighten the wetcup just enough to stop leakage.
	The throat packings are worn or damaged.	Replace the packings. See manual 307–806.
	The displacement rod is worn or damaged.	Replace the rod. See manual 307–806.
The fluid delivery is low.	The inlet screen is clogged.	Clean the inlet screen.
	The pressure setting is too low.	Increase the pressure. See Step 11, page 9.
	The engine speed is too low.	Increase the throttle setting. See Step 11, page 9.
	The fluid filter (51), the tip filter or the tip is clogged or dirty.	Clean the filter. See page 12. Or, see the gun instruction manual.
	There is a large pressure drop in the hose with heavy materials.	Use a larger diameter hose and/or reduce the overall length of hose. Use of more than 100 ft of 1/4 in. hose significantly reduces the performance of the sprayer. Use 3/8 in. hose for optimum performance (50 ft minimum).
Fluid is spitting from the gun.	There is air in the pump or the hose.	Check and tighten all the fluid connections. Reprime the pump. See page 9.
	The tip is partially clogged.	Clear the tip. See the gun instruction manual.
	The fluid supply is low or empty.	Refill the fluid supply. Prime the pump. See page 8. Check the fluid supply often to prevent running the pump dry.
The pump is difficult to prime.	There is air in the pump or the hose.	Check and tighten all the fluid connections. Reduce the engine speed and cycle the pump as slowly as possible during priming.
	The intake valve is leaking.	Clean the intake valve. Be sure ball seat is not nicked or worn and that the ball seats well. Reassemble the valve.
	The pump packings are worn.	Replace the pump packings. See manual 307–806.
	The paint is too thick.	Thin the paint according to the supplier's recommendations.
	The engine speed is too high.	Decrease the throttle setting before priming the pump. See Step 11, page 9.

Bearing Housing & 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: The item numbers referenced are for the upright models. The lo-boy models may have different item numbers. Use the upright item number and part to find the corresponding lo-boy part and item number.

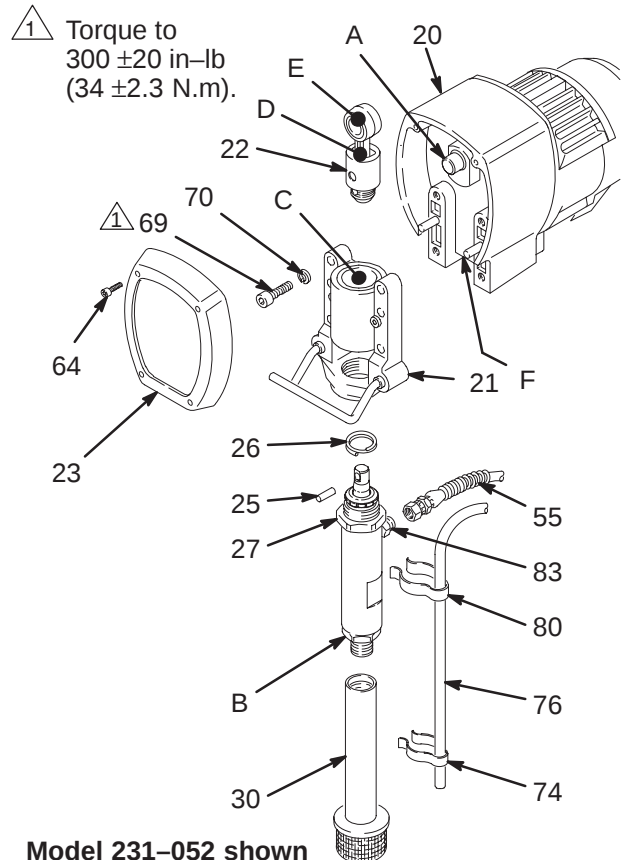
1. Relieve pressure.
2. Fig. 6. Remove the screws (64) and the front cover (23).
3. **For upright models;** remove the spring clips (80, 74) and the drain hose (76). Unscrew the suction tube (30) from the pump, holding a wrench on the pump intake valve (B) to keep the pump from loosening. **For lo-boy models;** unscrew the swivel union 50b from the pump.
4. Disconnect the pump outlet hose (55) from the displacement pump outlet nipple (83).
5. Use a screwdriver to push up the retaining spring (26) at the top of the pump. Push the pin (25) out the rear.
6. Loosen the jam nut (27) with an adjustable wrench. Unscrew and remove the displacement pump.
7. Use a hex key wrench to remove the four screws (69) and lockwashers (70) from the bearing housing (21).
8. While pulling the connecting rod (22) with one hand, lightly tap the lower rear of the bearing housing (21) with a plastic mallet to loosen it from the drive housing (20). Pull the bearing housing and the connecting rod assembly (22) off the drive housing.
9. Inspect the crank (A) for excessive wear and replace parts as needed.
10. Evenly lubricate the inside of the bronze bearing (C) in the bearing housing (21), and the inside of the connecting rod link (D), with high-quality motor oil (**do not use grease**). Liberally pack the roller bearing (E) in the connecting rod assembly (22) with bearing grease.

11. Assemble the connecting rod (22) and bearing housing (21).
12. Clean the mating surfaces of the bearing and drive housings.
13. Align the connecting rod with the crank (A) and carefully align the locating pins (F) in the drive housing (20) with the holes in the bearing housing (21). Push the bearing housing onto the drive housing or tap it into place with a plastic mallet.

⚠ CAUTION

DO NOT use the bearing housing screws (69) 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.

14. Install the screws (69) and lockwashers (70) on the bearing housing. Tighten evenly to 300 ± 20 in-lb (34 ± 2.3 N·m).
15. Refer to Installing the Pump on page 27.



Model 231-052 shown

Fig. 6

0149B

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.

NOTE: Refer to Fig. 7 for this procedure.

1. Relieve pressure.
2. Remove the bearing housing. Follow Steps 1 to 8 on page 15.
3. Remove the two screws (24) and lockwashers (11).
4. Remove the four screws (10) and lockwashers (11) from the pinion housing (19).
5. Lightly tap around the drive housing (20) to loosen the drive housing. Pull the drive housing straight off the pinion housing. Be prepared to support the gear cluster (18), which may also come out.

CAUTION

DO NOT drop the gear cluster (18) when removing the drive housing (20). The gear cluster is easily damaged. The gear may stay locked in the drive housing or pinion housing.

DO NOT lose the thrust balls (20c or 19d) located at each end of the gear cluster, or allow them to fall between the gears. The ball, which is heavily covered with grease, usually stays in the shaft recesses, but could be dislodged. If the balls are caught between the gears and not removed, they will seriously damage the drive housing. If the balls are not in place, the bearings will wear prematurely.

6. Liberally apply bearing grease to the gear cluster (18). A tube of grease is supplied with each replacement gear cluster. Use a full 7 ounces (200 grams) of grease. Be sure the thrust balls (20c and 19d) are in place.
7. Place the bronze colored washer (20a) and then the silver colored washer (20b) on the shaft protruding from the large shaft of the drive housing (20). Align the gears and push the new drive housing straight onto the pinion housing and locating pins (B).
8. 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.

Drive Housing

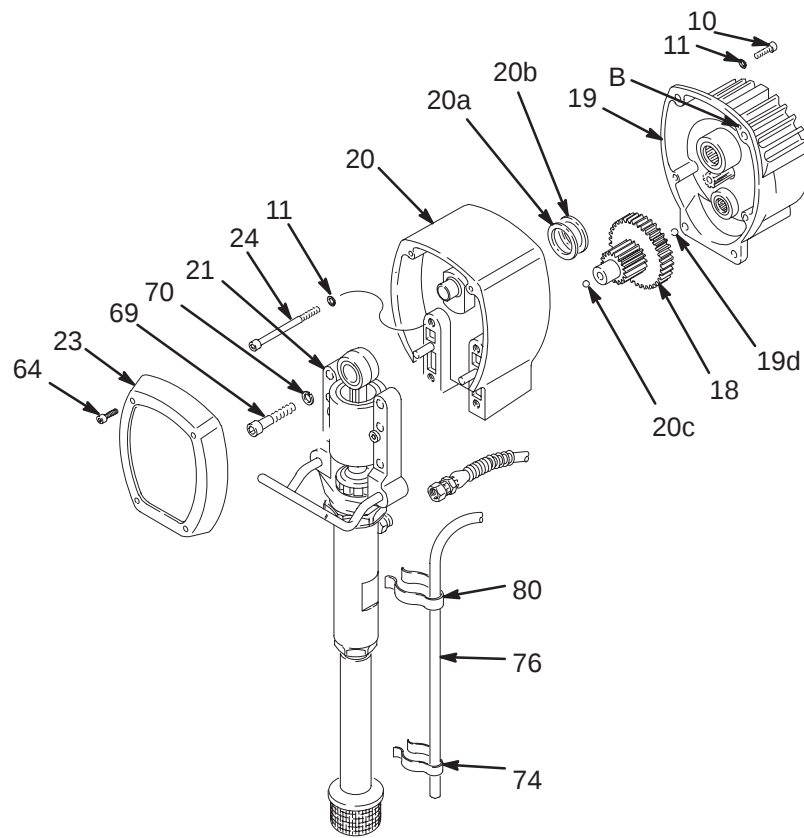


Fig. 7

0170C

Pinion, Clutch, Clamp, Field, & Engine

Disassembling these parts can start from the pinion housing, or from the clutch if no pinion service is needed.

If starting from the pinion housing, first follow Steps 3 to 5 of **DRIVE HOUSING**, on page 16, and then continue with the procedure below.

If starting from the clutch, see page 20.

Pinion

Pinion Housing Removal

WARNING



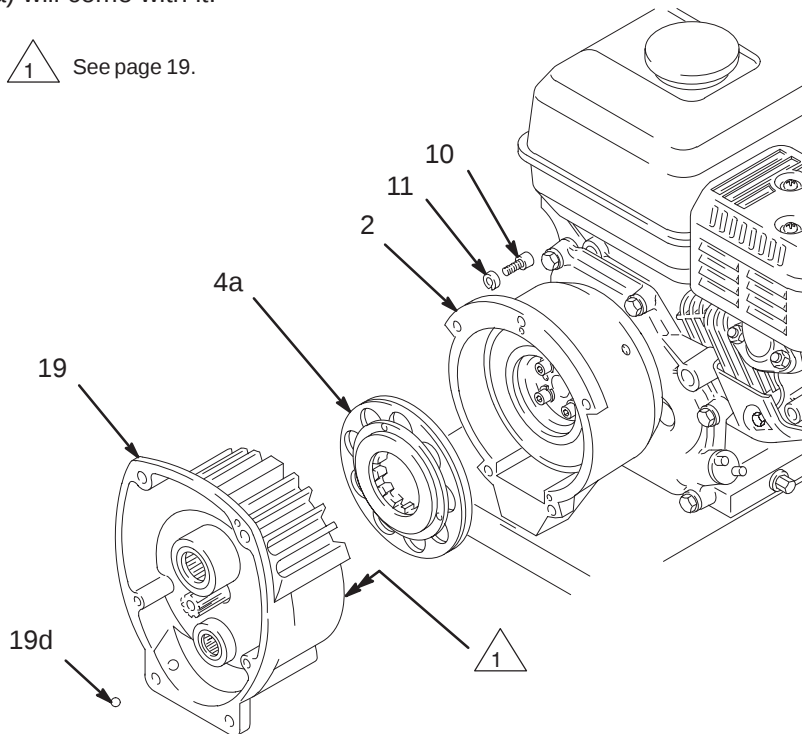
INJECTION HAZARD

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. 8 for Steps 1 to 3.

1. Relieve pressure.
2. Remove the two bottom screws (10) and lockwashers (11) first, then remove the two side screws (10) and lockwashers (11), and last remove the top screw (10) and lockwasher (11).
3. Pull the pinion housing (19) away from the clutch housing. The armature (4a) will come with it.

 See page 19.



4. Pull the armature (4a) off the hub (19j) of the pinion housing. Also see Fig. 9.

CAUTION

Do not lose the thrust ball (19d). Refer to the **CAUTION** on page 16 for more information.

NOTE: To disassemble the pinion, go to page 19. To disassemble more of the sprayer, go to page 20. To reassemble the sprayer from this point, skip ahead to **Reassembly**, page 25, step 7.

Fig. 8

0171A

Pinion Housing

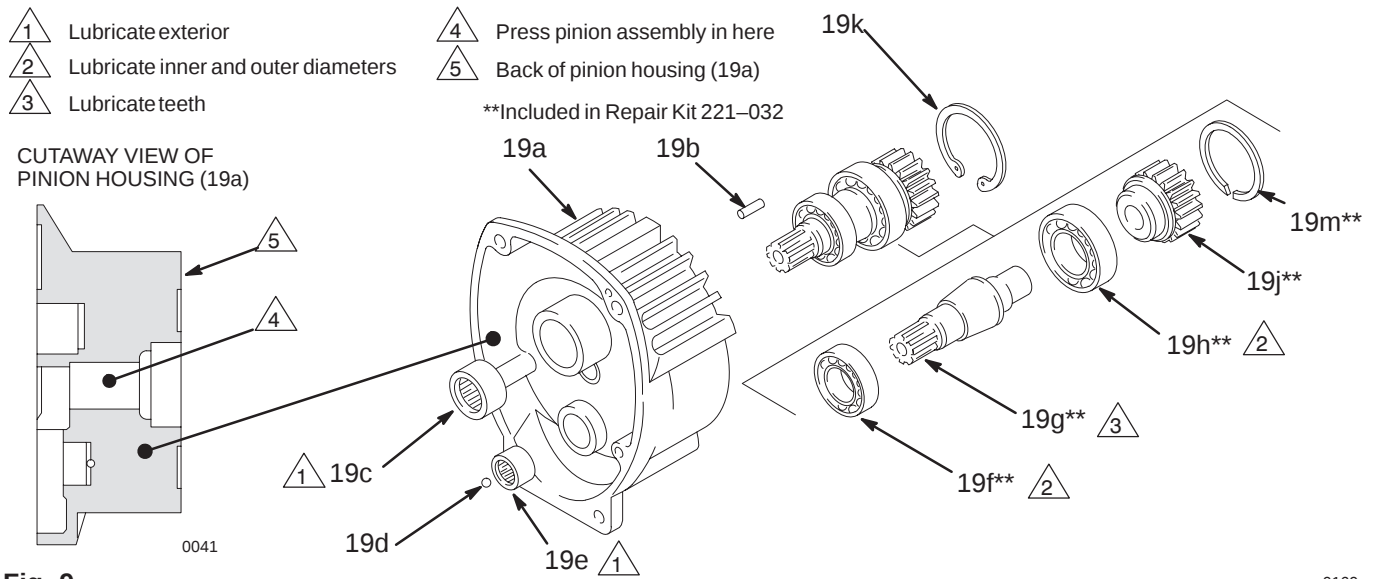


Fig. 9

0169

Repairing the Pinion

NOTE: Refer to Fig. 9 except where noted.

NOTE: A hydraulic press is required if you purchase the pinion parts individually. Otherwise, use Repair Kit No. 221-032, which includes the shaft and bearings pre-assembled and lubricated.

If using Repair Kit 221-032, follow Steps 1 to 5, below.

1. Remove the small ring (19m**) from the hub (19j) and the large ring (19k) from the bearing recess of the pinion housing (19a).
2. Push on the front of the shaft (19g**) to force the bearing and hub assembly out of the housing (19a).
3. Install the new shaft assembly into the pinion housing; push it to the shoulder of housing (19a).
4. Install the ring (19k) and then the ring (19m**).
5. Go to **Reassembly**, page 25, step 7., or continue on page 20.

Placement of steel blocks when pressing off large bearing (19h)

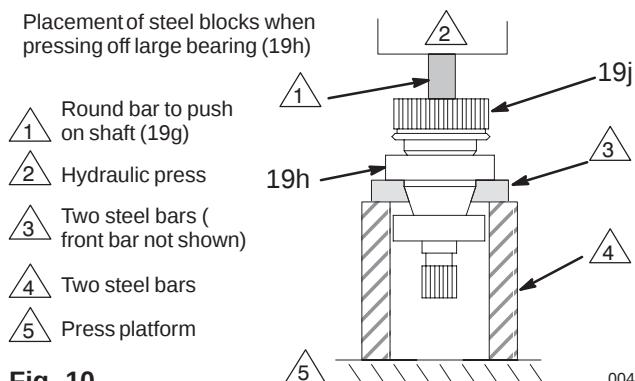


Fig. 10

0043

If purchasing parts separately, use these instructions. Disassemble as far as needed for the parts being replaced.

NOTE: The old bearings (19h and 19f) will be damaged when removed. Have extra bearings on hand if you need to remove them for any reason.

1. Remove the small ring (19m) from the hub (19j).
2. Remove the snap ring (19k) from the bearing recess of the pinion housing (19a).
3. Push on the front of the shaft (19g) to force the bearing (19h) and hub (19j) assembly out of the housing.
4. **Using a hydraulic press**, place pieces of steel bar stock on the inner race of the large bearing (19h) and press the shaft through the hub and bearing. Then turn over the shaft and press out the small bearing (19f). See Fig. 10.
5. Apply lubricant to the parts as shown in Fig. 9.
6. Press fit the following parts: Large bearing (19h) to the large shoulder of the shaft (19g). Small bearing (19f) to the shoulder of the shaft (19g). Hub (19j) onto the shaft (19g) all the way to the large bearing (19h).
7. Install the shaft assembly, pushing it to the shoulder of the housing (19a).
8. Install the snap ring (19k). Install the small ring (19m).
9. Go to **Reassembly**, page 25, step 7., or continue on page 20.

Clutch

⚠ 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: The clutch assembly (4) includes the armature (4a) and rotor (4b). The armature and rotor must be replaced together so they wear evenly.

NOTE: If the pinion assembly (19) is not yet separated from the clutch housing (2), follow Steps 1 to 4. Otherwise, start at Step 5.

NOTE: Refer to Fig. 11 for this procedure.

1. Relieve pressure.
2. Disconnect the hose (55) from the displacement pump. Remove the spring clips and drain hose (76) from the displacement pump.
3. Remove the two bottom screws (10) and lockwashers (11) first, then remove the two side screws (10) and lockwashers (11), and last remove the top screw (10) and lockwasher (11).
4. Tap lightly on the back of the bearing housing (21) with a plastic mallet to loosen the assembly (D) from the clutch housing. Pull the assembly away.
5. The armature (4a) was removed with the pinion housing. Remove the armature from the pinion hub.
6. There are two procedures to remove the rotor (4b).
 - a. Remove the four socket head capscrews (16) and lockwashers (11). Install two of the screws in the threaded holes (E) in the rotor. Alternately tighten the screws until the rotor comes off. See Fig. 11. If the rotor is difficult to remove, use procedure b.
 - b. You can use a standard steering wheel puller (A). However, two 1/4-22- x 3 or 4 in. long screws (B) are also needed. Replace the short screws of the steering wheel puller with the longer screws (B). Turn the screws (B) into the threaded holes (E) of the rotor (4b). Tighten the capscrew (C) of the tool until the rotor comes off. See the Detail in Fig. 11.
7. Skip ahead to **Reassembly**, page 25, step 6., or continue on the next page.

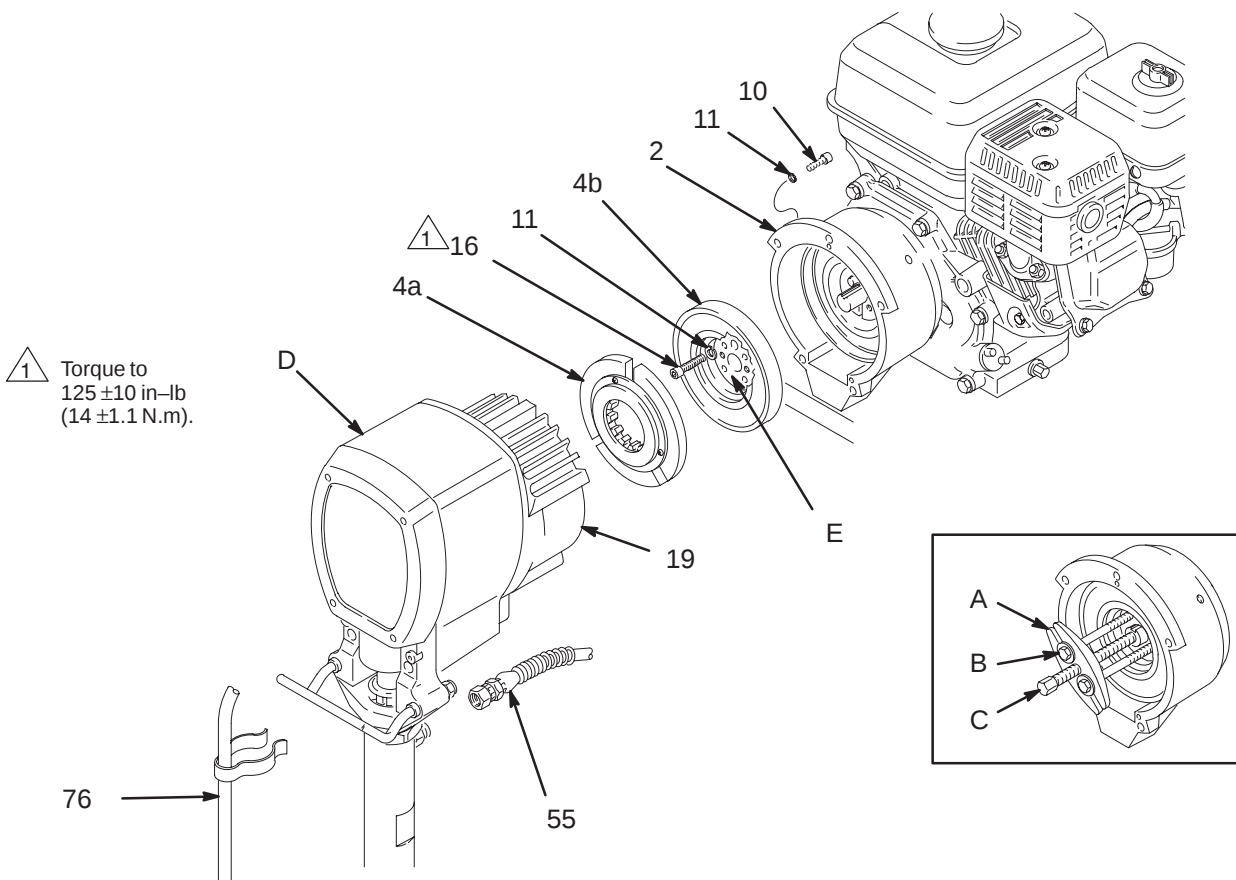


Fig. 11

0152A

Field & Wiring Harness

NOTE: Refer to Fig. 12.

1. Loosen the four setscrews (12) holding the field (6) to the clutch housing (2).
2. Pull off the field.
3. Pull the plastic caps (B) off the wire screws (17) in both places on the field. Loosen the screws and release the wires (32).
4. Skip ahead to **Reassembly**, page 24, step 4. or continue on page 21.

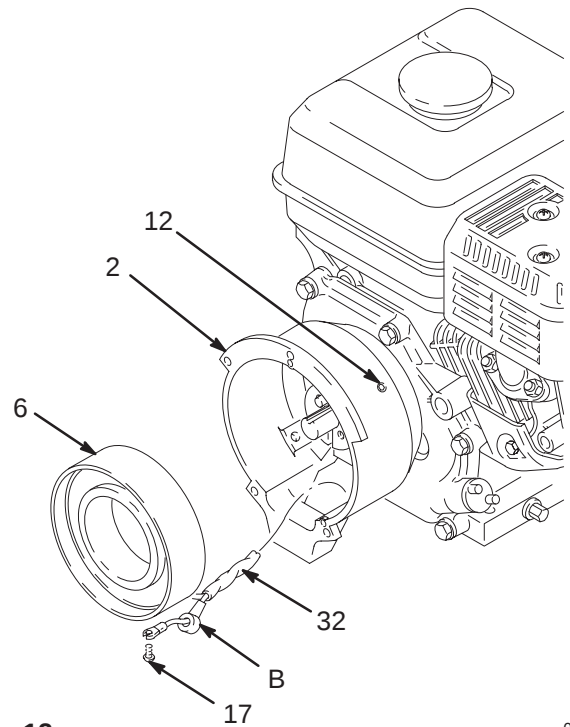


Fig. 12

03479

Clamp

NOTE: A standard steering wheel puller and two 1/4–28 x 3 or 4 in. long screws are required to remove the clamp.

NOTE: Refer to Fig. 13.

1. Loosen the two screws (16) on the clamp (3), working through the slot at the bottom of the clutch housing (2).
2. Install two screws (B) of the tool (A) in two of the threaded holes in the clamp (3). Tighten the screw (C) until the clamp comes off.
3. Skip ahead to **Reassembly**, page 24, step 3., or continue to the right.

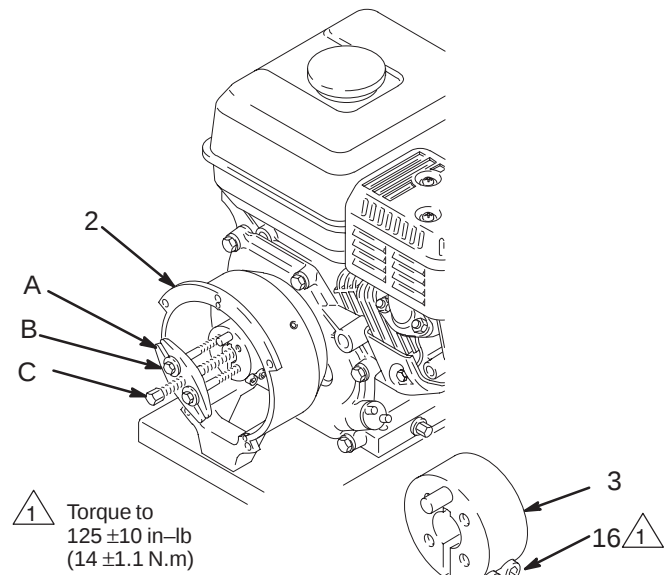


Fig. 13

03480

Clutch Housing

NOTE: Refer to Fig. 14.

1. Remove the four capscrews (8) and lockwashers (9) which hold the clutch housing (2) to the engine.
2. Remove the capscrew (15) from beneath the mounting plate (D).
3. Remove the engine key (13).
4. Pull off the clutch housing (2).
5. Skip ahead to **Reassembly**, page 24, step 1.

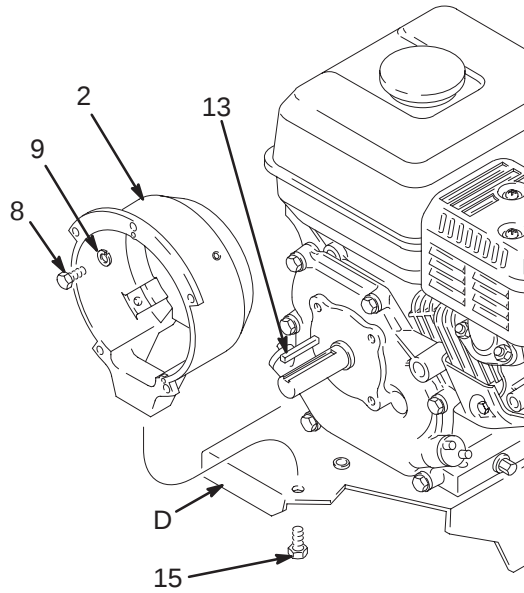


Fig. 14

03481A

Engine

1. Remove the **Pinion Housing, Clutch, Field and Wiring Harness, Clamp** and **Clutch Housing**, as instructed on pages 18 and 20 through 22.
2. See Fig. 15 and 16. Disconnect the red wire (D) from the engine lead (B). Disconnect the black and white wires from the field. Loosen the clamp (61). Pull the wires carefully through the grommets (60) before removing the engine. Remove the two locknuts (84) and then pull the screws (14) out of the base of the engine.
3. Lift the engine carefully and place it on a work bench.
4. Skip ahead to **Reassembly**, page 24, step 1.

NOTE: All service to the engine must be performed by an authorized HONDA dealer.

- △ 1 To the field
- △ 2 To the engine

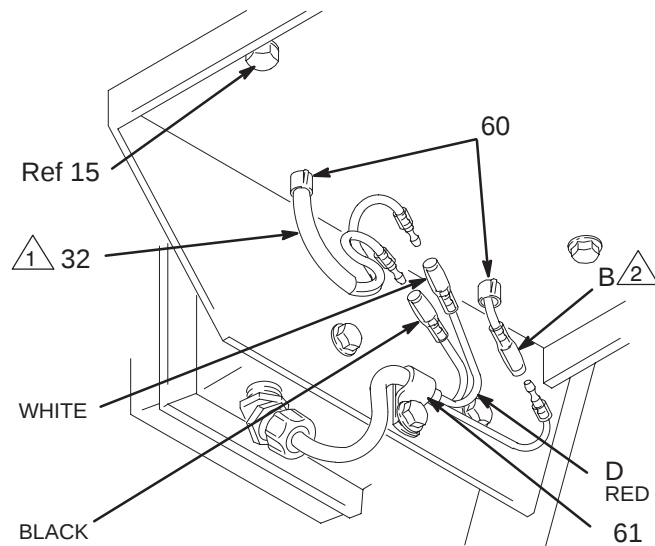


Fig. 15

03478B

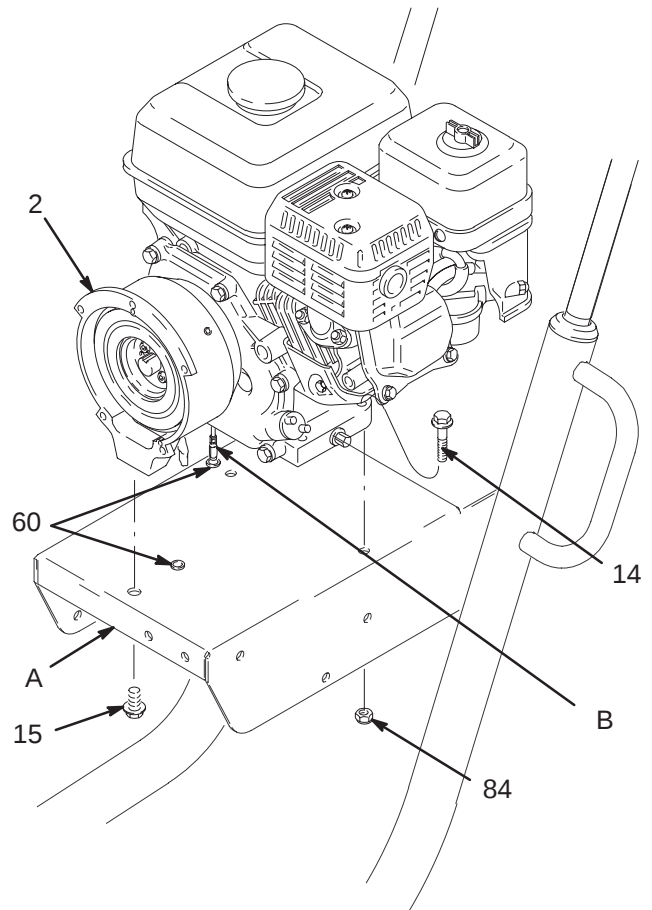


Fig. 16

0153B

Reassembly

1. Install the **clutch housing (2)**, capscrews (8) and lockwashers (9) on the engine. See Fig. 17.
Torque the screws (8) to 200 ± 10 in-lb (23 ± 1.1 N·m)
2. Install the engine shaft **key (13)**. See Fig. 17.
3. Press the **clamp (3)** onto the engine shaft (A).
Maintain the 1.99 ± 0.01 in. (50.55 ± 0.25 mm) dimension shown in Fig. 18.

To check the dimension, place a rigid, straight steel bar (B) across the face of the clutch housing (2). Use an accurate measuring device to measure the distance between the bar and the face of the clamp. Adjust the clamp as necessary. Torque the two screws (16) to 125 ± 10 in-lb (14 ± 1.1 N·m).

4. Connect the wires of the wire harness (32) to the screws (17) in both places on the field (wires can be attached to either connection). Pull the plastic caps (C) up and snap them over the screws. Install the **field (6)** in the clutch housing (2). Work the wire harness through the slot in the clutch housing. With the setscrew holes in the field and the clutch housing (2) aligned, tighten the setscrews (12) oppositely and evenly, to 27 ± 3 in-lb (3 ± 0.33 N·m). See Fig. 17.

-  Torque the screws oppositely and evenly to 27 ± 3 in-lb (3 ± 0.33 N·m)
-  Slot

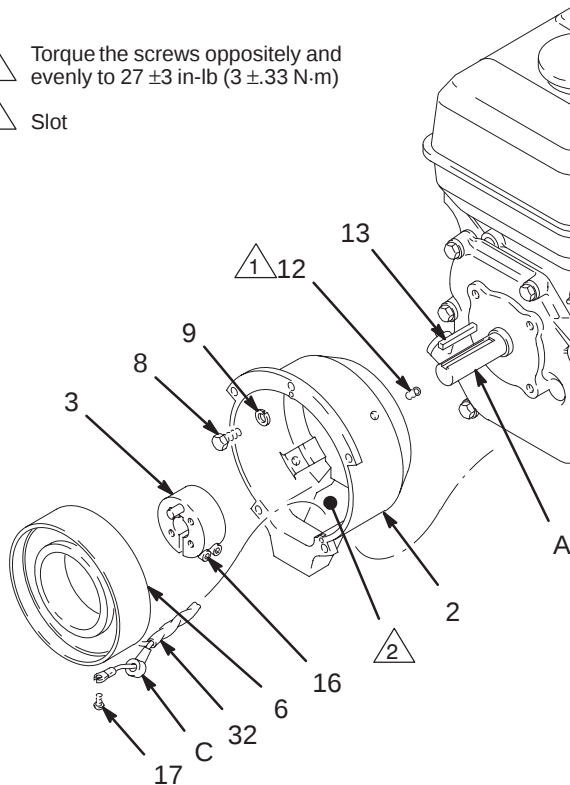


Fig. 17

03482

-  The face of the housing
-  1.99 ± 0.01 in. (50.55 ± 0.25 mm)
-  Torque to 125 ± 10 in-lb (14 ± 1.1 N·m)

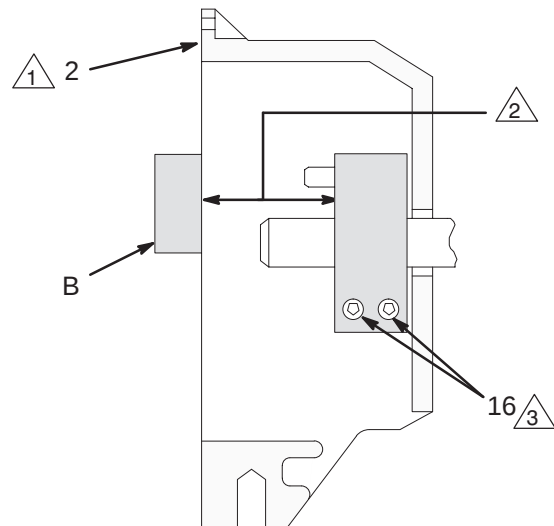


Fig. 18

03483

5. Place the **engine (1)** assembly on the cart. Align the mounting holes. Carefully guide the engine wire (D) and wiring harness (32) from the field, through the appropriate grommets (60) in the mounting plate (E). Install the flange screws (14) and locknuts (84). Torque to 15 ft-lb (20.4 N·m). Install the capscrew (15) from under the engine mounting plate to the clutch housing (2). Connect the engine wire (D) to the red wire, and connect the black and white wires as shown in the Detail drawing in Fig. 19.

Reassembly

6. Be sure the face of the **rotor (4b)** and the field are free of all oil and contaminants. Remove any burrs on the outside edge of the rotor. Install the rotor, lockwashers (11) and capscrews (16). Torque the capscrews to 125 ± 10 in-lb (14 ± 1.1 N-m). See Fig. 19.

After installing the **rotor (4b)**, check the clearance between the outside diameter of the rotor and the inside diameter of the field. The clearance must be at least 0.010 in. (0.25 mm) all the way around. Use shim stock or feeler gauge. If necessary, loosen the setscrews (12) and reposition the field. Tighten the setscrews evenly to 27 ± 3 in-lb (3 ± 33 N-m).

7. Be sure the face of the **armature (4a)** is clean. Assemble the armature to the shaft in the pinion housing (19). A retaining ring located within the armature makes it difficult to assemble these parts. Follow this procedure for the best results. First, lock a few splines of both parts. While they are locked, 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 (19m). See Fig. 19.
8. Assemble the **pinion housing (19)** to the clutch housing, using the capscrews (10) and lockwashers (11). See Fig. 19.

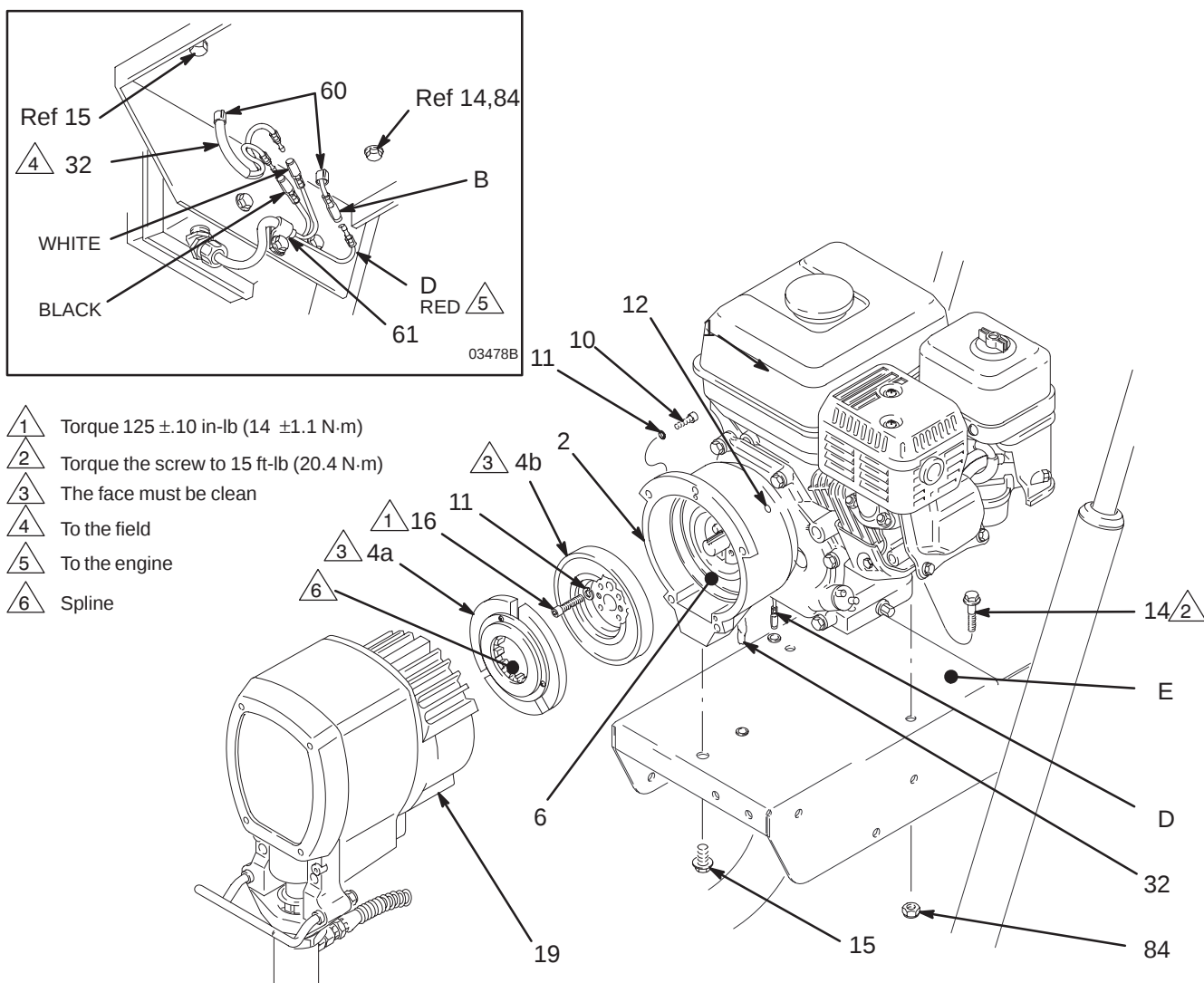


Fig. 19

0157B

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. Relieve pressure.
2. Disconnect both hoses at the pressure control while holding the fitting or elbow (A) firmly. See the **CAUTION**, below. Note the original location of each hose to be sure you reassemble them correctly at the end of this procedure. See Fig. 20.

CAUTION

Do not allow the elbow (A) to turn when removing or connecting the hoses. Turning the fitting or elbow can shift the calibration of the pressure control.

3. Remove the four mounting screws and washers (302, 303, 304) from the pressure control cover (301). See Fig. 21.
4. Carefully remove the pressure control cover (301) so as not to stress the cables.
5. Disconnect the black and white wires of the pressure control cable (314) from the pressure control cover.
6. Disconnect the potentiometer cable assembly (310) from the pressure control cover.
7. Disconnect the red power lead (B) from the ON/OFF switch.
8. Loosen the ground terminal screw (317) and disconnect the ground lead (C).
9. Pull off the pressure control cover.

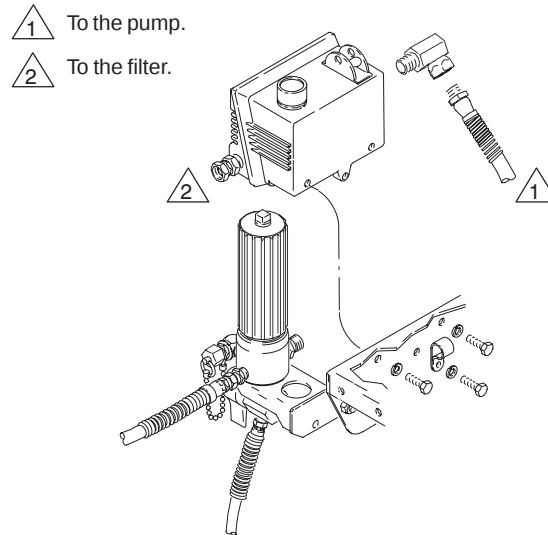


Fig. 20

06873

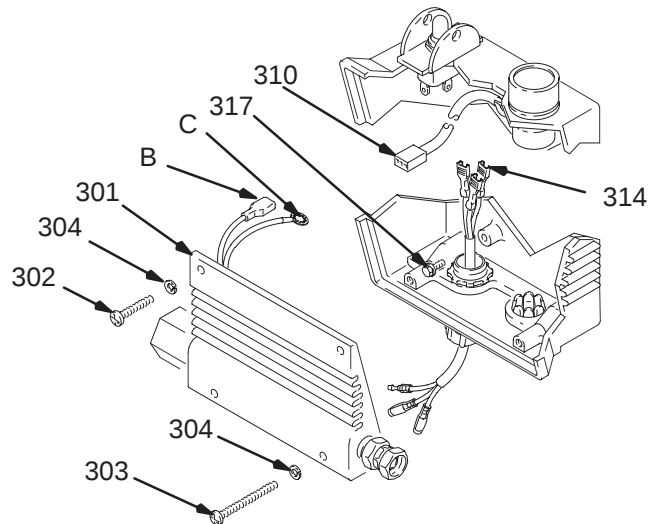


Fig. 21

06872A

WARNING

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

10. 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 ± 2 in-lb (2.5 ± 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. 22.)

1. Relieve pressure.
 2. Flush the pump. See page 11
 3. For upright models: Hold the intake valve (B) with a wrench and unscrew the suction tube (30). Remove the hose (55). Remove the spring clips (74, 80) and drain hose (76).
- For lo-boy models: Hold the intake valve (B) with a wrench and unscrew the swivel union (50b). Remove the hose (55).
4. Push the retaining spring (26) up. Push the pin (25) out the rear.
 5. Loosen the locknut (27). Unscrew the pump.

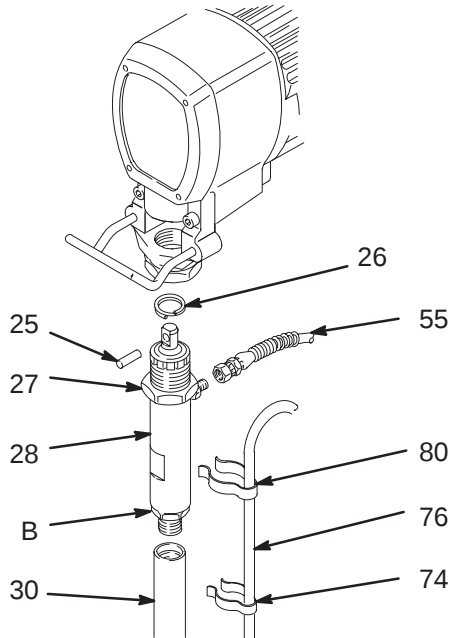


Fig. 22

Model 231-052 Shown

0477A

Repairing the pump.

See manual 307-806 for displacement pump repair.

Installing the pump. (See Fig. 23.)

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 ± 5 ft-lb (122 ± 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.

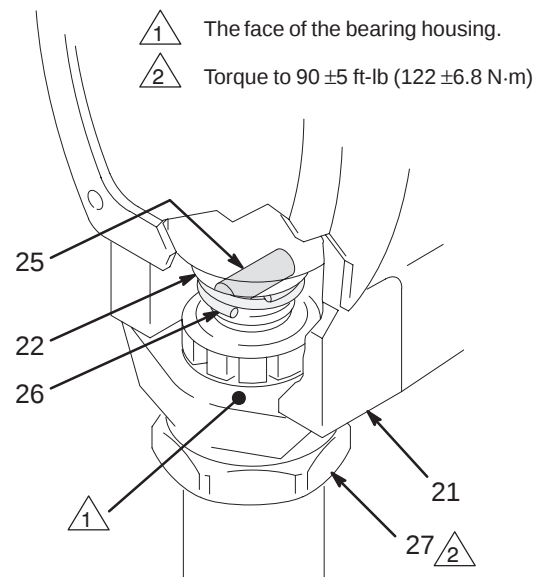


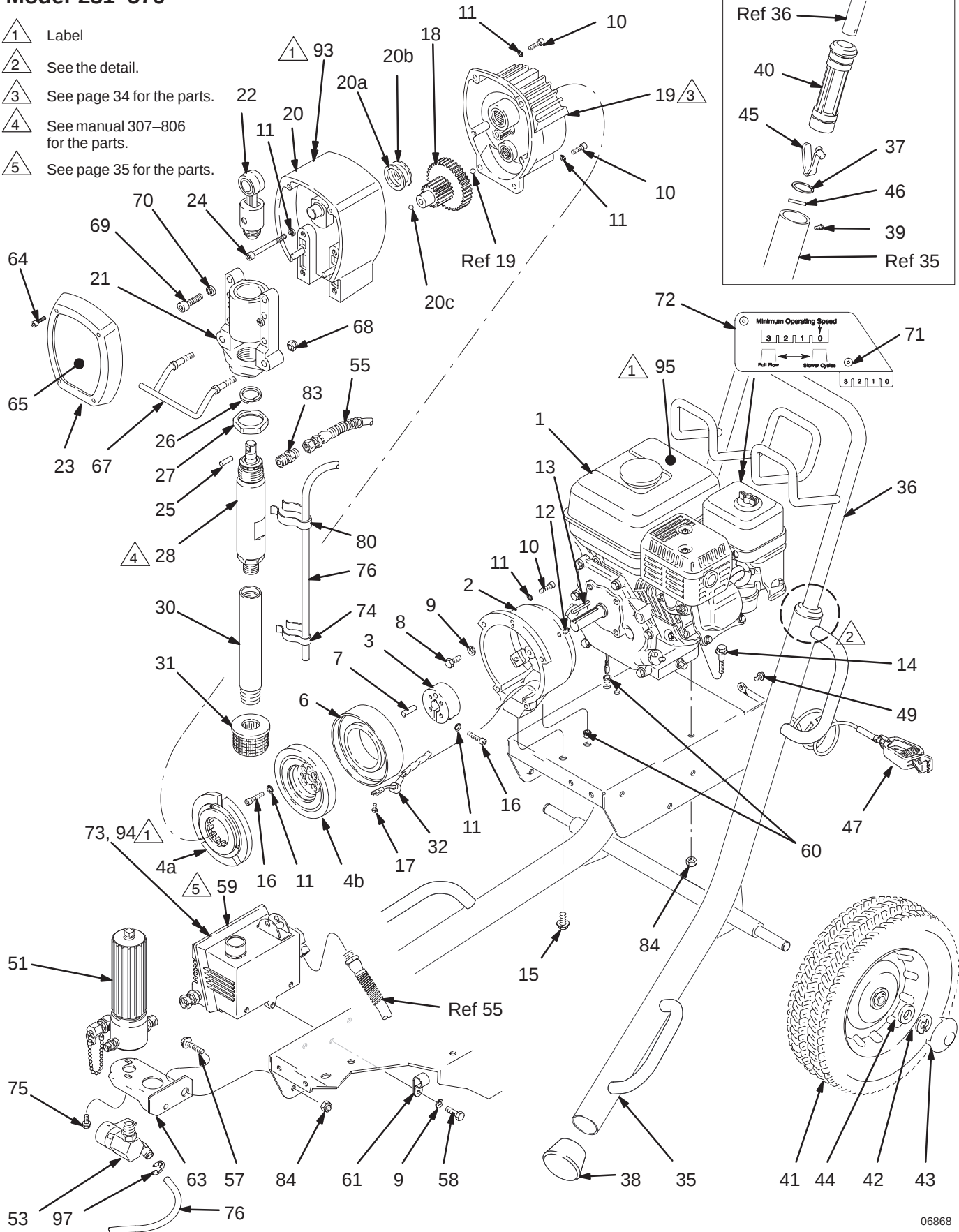
Fig. 23

0031

Parts Drawing – Upright Cart Sprayer

Model 231-576

- 1 Label
- 2 See the detail.
- 3 See page 34 for the parts.
- 4 See manual 307-806 for the parts.
- 5 See page 35 for the parts.



06868

06868B

Parts List – Upright Cart Sprayer

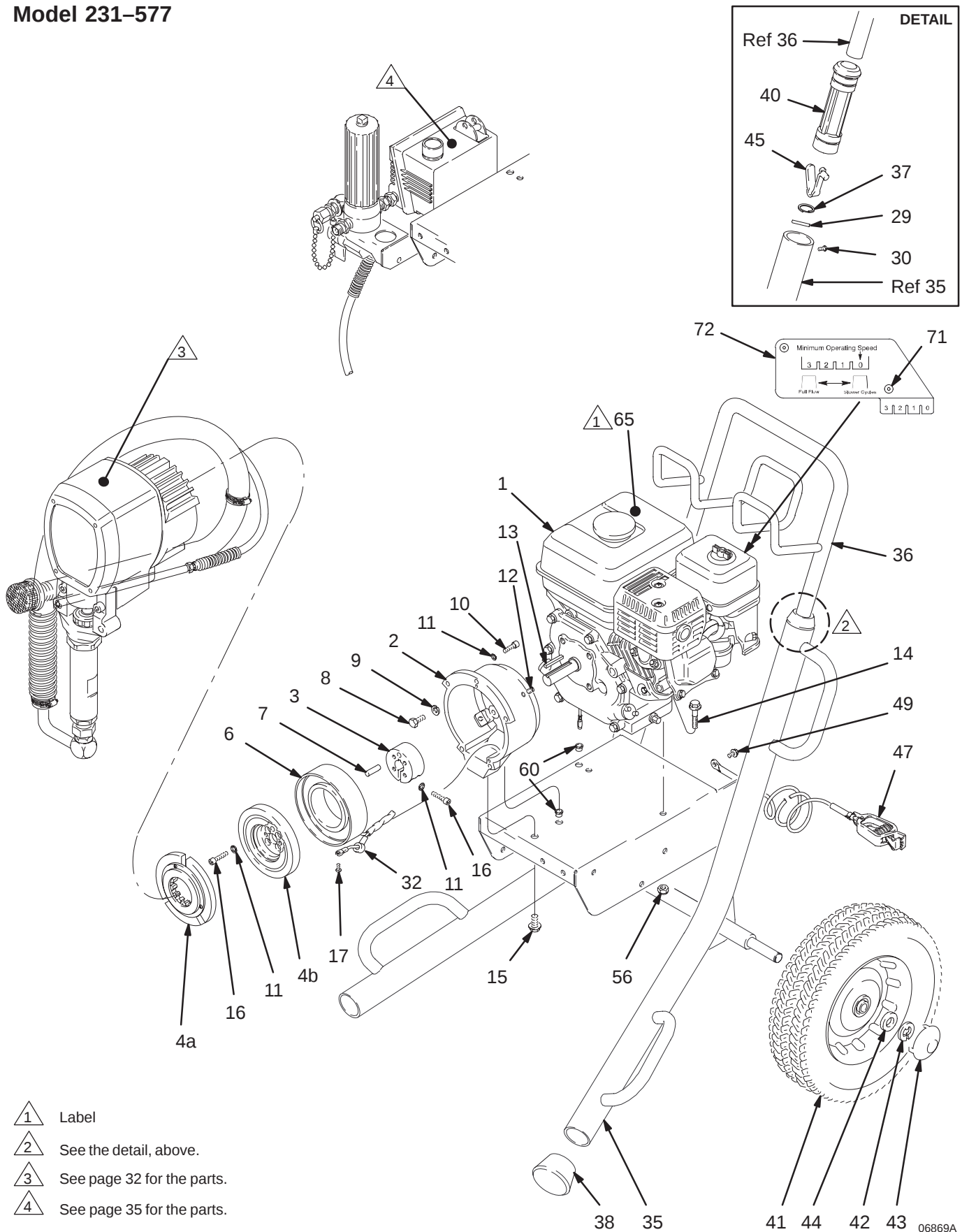
Model 231–576

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
1	108–802	ENGINE	1	40	187–604	SLEEVE	2
2	183–397	CLUTCH HOUSING	1	41	179–811	WHEEL, semi–pneumatic	2
3	183–517	CLAMP, mounting, rotor	1	42	101–242	RING, retaining	2
4	236–568	CLUTCH ASSEMBLY includes items 4a and 4b	1	43	104–811	HUBCAP	2
4a		.ARMATURE	1	44	154–636	WASHER, 5/8 in.	2
4b		.ROTOR	1	45	112–827	BUTTON, snap	2
6	183–400	FIELD	1	46	108–068	PIN, spring, straight, 3/16 x 1–1/4 in.	2
7	108–800	PIN, dowel, spring, 5/16 x 1 in.	1	47	237–686	GROUNDING CLAMP & WIRE	1
8	108–842	CAPSCREW, hex head, 5/16–24 x 3/4 in.	4	49	112–798	SCREW, hex washer head, No. 8 x 3/8 in.	1
9	100–214	LOCKWASHER, 5/16 in.	7	51	239–286	FLUID FILTER ASSEMBLY See 307–273 for parts	1
10	100–644	CAPSCREW, socket head, 1/4–20 x 3/4 in.	9	53	237–677	VALVE, pressure drain	1
11	105–510	LOCKWASHER, spring, 1/4 in.	17	55	222–516	HOSE, 3/8 in. ID, 29 in. (737 mm), cpld 3/8–18 npt(m) x 3/8 npsm; spring guard both ends	1
12	108–801	SETSCREW, 1/4–20	4				
13	183–401	KEY, parallel, 3/16 in. sq x 7/8 in.	1				
14	110–837	SCREW, flange, hex head, 5/16–18 x 1–1/2 in.	2	57	112–818	CAPSCREW, hex hd, flanged, 5/16–18 x 3/4 in.	1
15	113–802	SCREW, flange, hex head, 3/8–16 x 5/8 in.	1	58	101–344	CAPSCREW, hex hd, 5/16–18 x 7/8 in.	3
16	108–803	CAPSCREW, socket head, 1/4–28 x 1 in.	6	59	239–266	CONTROL, pressure See page 35 for parts	1
17	108–860	SCREW, mach, bdgd, 8–32 x 1/4 in.	2	60	109–099	BUSHING, snap	2
18	220–919	GEAR REDUCER	1	61	108–868	CLAMP, wire	1
19	241–286	PINION HOUSING ASSEMBLY See parts on page 34	1	63	237–831	BRACKET, filter	1
20	241–291	DRIVE HOUSING Includes items 20a to 20d	1	64	108–850	SCREW, filh, 8–32 x 1–1/4 in.	4
20a	106–227	.WASHER, bronze	1	65	290–367	LABEL, identification	1
20b	183–209	.WASHER, silver	1	67	189–918	HANGER, pail	1
20c	100–069	.BALL, sst	1	68	112–746	LOCKNUT, 5/16–18	2
20d	110–293	.TUBE, grease	1	69	110–141	CAPSCREW, socket head, 3/8–16 x 1–1/2 in.	4
21	220–639	BEARING HOUSING	1	70	106–115	LOCKWASHER, spring, 3/8 in.	4
22	220–640	CONNECTING ROD	1	71	113–084	RIVET, blind	2
23	183–168	COVER, HOUSING	1	72	192–014	PLATE, indicator	1
24	108–849	CAPSCREW, socket head, 1/4–20 x 3 in.	2	73	290–375	LABEL, identification, control, top	1
25	183–210	PIN, straight, 3/8 x 1/8 in.	1	74	181–102	CLIP, spring	1
26	183–169	SPRING, retaining	1	75	110–997	SCREW, flange, hex head, 1/4–20 x 5/8 in.	2
27	189–969	NUT, retaining, 1–13/16 –16	1	76	191–889	TUBE, bypass	1
28	220–872	DISPLACEMENT PUMP See manual 307–806 for parts	1	80	186–490	CLIP, spring	1
30	183–423	TUBE, intake	1	82	206–994	THROAT SEAL LIQUID, 8 ounce (0.27 liter); not shown	1
31	181–072	STRAINER	1	83	183–461	NIPPLE, 3/8–18 npsm(m) x 1/4 npt(m)	1
32	220–980	HARNESS, wiring	1	84	110–838	LOCKNUT, heavy hex, 5/16–18	3
35	239–051	CART FRAME	1	92	220–980	HARNESS, wiring	1
36	238–187	CART HANDLE & HOSE RACK	1	93▲	185–953	LABEL, Danger	1
37	183–350	WASHER, plain	2	94	290–368	LABEL, identification, control, bottom	1
38	112–125	CAP, tube	2	95▲	181–867	LABEL, Warning	1
39	108–795	SCREW, mach, pan head, 10–32 x 5/16 in.	4	97	113–983	RING, retaining	1

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

Parts Drawing – Lo-Boy Sprayer

Model 231-577



06869A

Parts List – Lo-Boy Sprayer

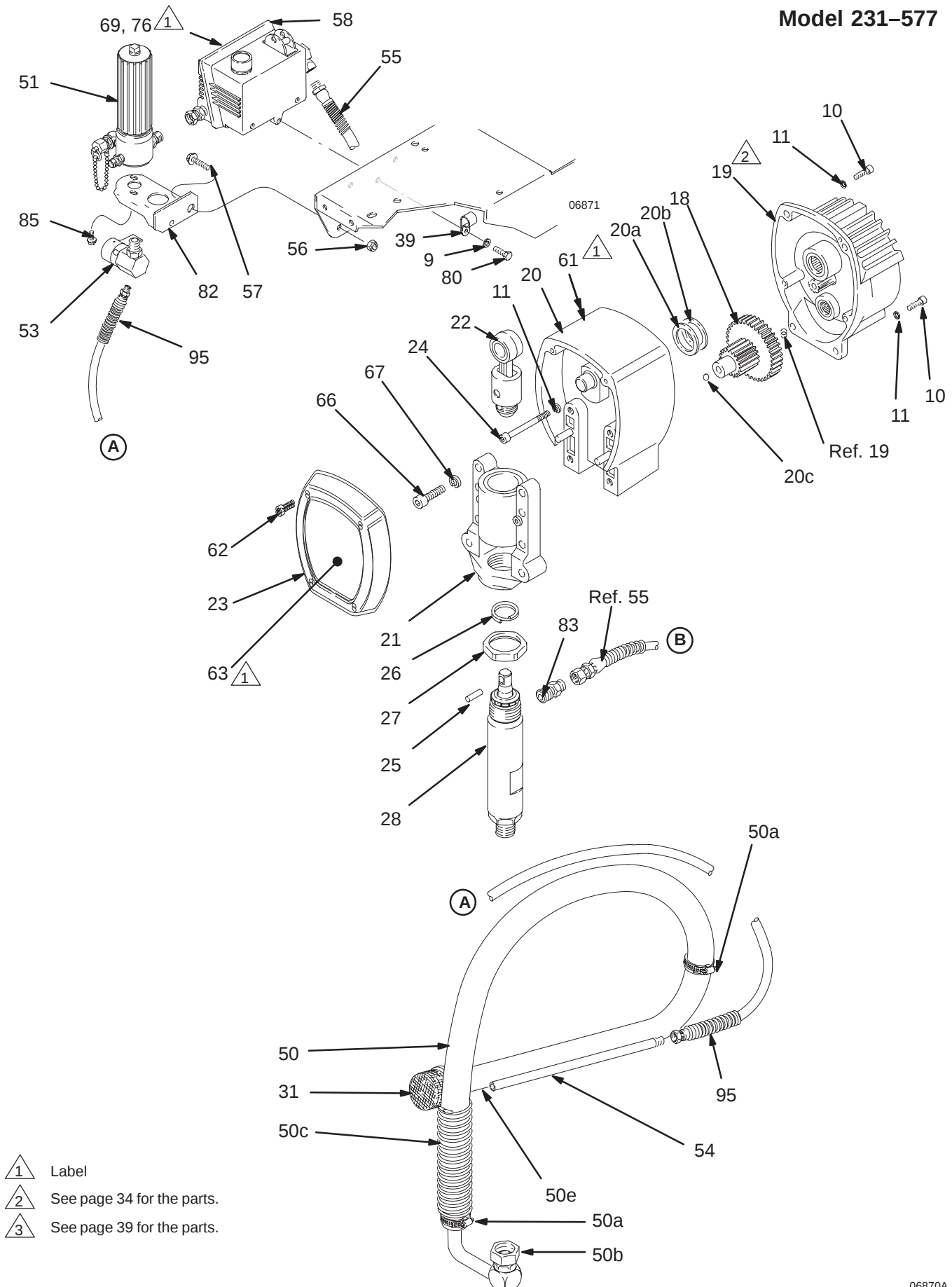
Ref No.	Part No.	Description	Qty*	Ref No.	Part No.	Description	Qty*
1	108-802	ENGINE	1	30	108-795	SCREW, mach, pan head,	
2	183-397	CLUTCH HOUSING	1			10-32 x 5/16 in.	4
3	183-517	CLAMP, mounting, rotor	1	32	220-980	HARNESS, wiring	1
4	236-568	CLUTCH ASSEMBLY		35	239-055	CART FRAME	1
		includes items 4a and 4b	1	36	238-187	CART HANDLE & HOSE RACK	1
4a		.ARMATURE	1	37	183-350	WASHER, plain	2
4b		.ROTOR	1	38	112-125	CAP, tube	2
6	183-400	FIELD	1	40	191-084	SLEEVE	2
7	108-800	PIN, dowel, spring, 5/16 x 1 in.	1	41	179-811	WHEEL, semi-pneumatic	2
8	108-842	CAPSCREW, hex head, 5/16-24		42	101-242	RING, retaining	2
		x 3/4 in.	4	43	104-811	HUBCAP	2
9	100-214	LOCKWASHER, 5/16 in.	7	44	154-636	WASHER, 5/8 in.	2
10	100-644	CAPSCREW, socket head, 1/4-20		45	112-827	BUTTON, snap	2
		x 3/4 in.	9	47	237-686	GROUNDING CLAMP & WIRE	1
11	105-510	LOCKWASHER, spring, 1/4 in.	17	49	112-798	SCREW, hex hd, thread forming,	
12	108-801	SETSCREW, 1/4-20	4			1/4-20 x 3/8 in.	1
13	183-401	KEY, parallel, 3/16 in. sq x 7/8 in.	1	56	110-838	LOCKNUT, heavy hex, 5/16-18	3
14	110-837	SCREW, flange, hex head, 5/16-18		60	109-099	BUSHING, snap	2
		x 1-1/2 in.	2	65▲	181-867	LABEL, Warning	1
15	113-802	SCREW, flange, hex head,		71	113-084	RIVET, blind	2
		3/8-16 x 5/8 in.	1	72	192-014	PLATE, indicator	1
16	108-803	CAPSCREW, socket head,					
		1/4-28 x 1 in.	6				
17	108-860	SCREW, mach, bdgh,					
		8-32 x 1/4 in.	2				
29	108-068	PIN, spring, straight,					
		3/16 x 1-1/4 in.	2				

* Qty refers to total quantity on Lo-Boy sprayer.

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

Parts Drawing – Lo-Boy Sprayer

Model 231–577



06870A

Parts List – Lo-Boy Sprayer

Ref No.	Part No.	Description	Qty*	Ref No.	Part No.	Description	Qty*
9	100-214	LOCKWASHER, 5/16 in.	7	61▲	185-953	LABEL, Danger	1
10	100-644	CAPSCREW, socket head, 1/4-20 x 3/4 in.	9	62	108-850	SCREW, filh, 10-24 x 2 in.	4
11	105-510	LOCKWASHER, spring, 1/4 in.	17	63	290-367	LABEL, identification	1
16	108-803	CAPSCREW, socket head, 1/4-28 x 1 in.	6	66	110-141	CAPSCREW, socket head, 3/8-16 x 1-1/2 in.	4
18	220-919	GEAR REDUCER	1	67	106-115	LOCKWASHER, spring, 3/8 in.	4
19	241-286	PINION HOUSING ASSEMBLY	1	69	290-375	LABEL, identification, control, top	1
20	241-291	DRIVE HOUSING	1	76	290-368	LABEL, identification, control, bottom	1
20a	106-227	.WASHER, bronze	1	78	206-994	THROAT SEAL LIQUID, 8 ounce (0.27 liter); not shown	1
20b	183-209	.WASHER, silver	1	80	101-344	CAPSCREW, hex hd, 5/16-18 x 7/8 in.	5
20c	100-069	.BALL, sst	1	82	237-831	BRACKET, filter	1
20d	110-293	.TUBE, grease	1	83	183-461	NIPPLE, 3/8-18 npsm(m) x 1/4 npt(m)	1
21	220-639	BEARING HOUSING	1	85	110-997	FLANGE SCREW, hex head, 1/4-20 x 5/8 in.	2
22	220-640	CONNECTING ROD	1	95	190-963	HOSE, drain	1
23	183-168	COVER, HOUSING	1				
24	108-849	CAPSCREW, socket head, 1/4-20 x 3 in.	2				
25	183-210	PIN, straight, 3/8 x 1-1/8 in.	1				
26	183-169	SPRING, retaining	1				
27	189-969	NUT, retaining, 1-13/16 -16	1				
28	220-872	DISPLACEMENT PUMP	1				
		See manual 307-806 for parts	1				
31	181-072	STRAINER	1				
39	108-868	CLAMP, wire	1				
50	239-059	KIT, tube, suction, 20 gallon	1				
		Includes 50a through 50e	1				
50a†	101-818	CLAMP, hose	2				
50b†	110-194	UNION, swivel, 180°	1				
50c†	176-450	GUARD, hose	1				
50d†	185-381	HOSE, nylon	1				
50e†	170-957	TUBE, suction	1				
51	239-286	FLUID FILTER ASSEMBLY	1				
		See 307-273 for parts	1				
53	239-267	DRAIN VALVE	1				
54	192-013	TUBE, drain	1				
55	222-516	HOSE, 3/8 in. ID, 29 in. (737 mm), cpld 3/8-18 npt(m) x 3/8 npsm; spring guard both ends	1				
56	110-838	LOCKNUT, heavy hex, 5/16-18	3				
57	112-818	CAPSCREW, hex head, flanged, 5/16-18 x 3/4 in.	1				
58	239-266	CONTROL, pressure	1				
		See page 35 for parts	1				

* Qty refers to total quantity on Lo-Boy sprayer.

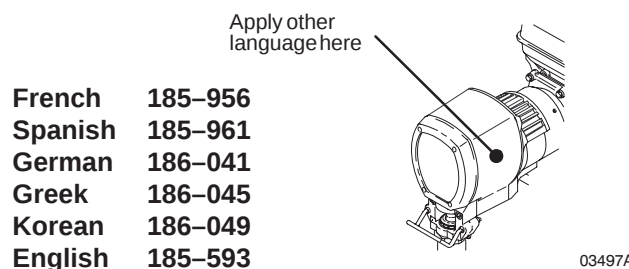
▲ Replacement Danger and Warning labels, tags, and cards are available free.

† Included in Suction Hose Kit 239-059

DANGER LABELS

The English language DANGER label shown on page 4 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 Graco, free of charge. Toll Free: 1-800-328-0211



Accessories

Sleeve Removal Tool 224-788

Required to remove the displacement pump sleeve.

Displacement Pump Repair Kit 220-877

Packing repair kit.

55 Gallon (200 Liter) Suction Tube Kit 208-259

For use with 55 gallon (200 liter) barrels.

5 Gallon (19 Liter) Suction Tube Kit 208-920

For use with 5 gallon (19 liter) buckets.

Heavy Duty 5 Gallon (19 Liter) Suction Tube Kit 223-934

For use with 5 gallon (19 liter) buckets.

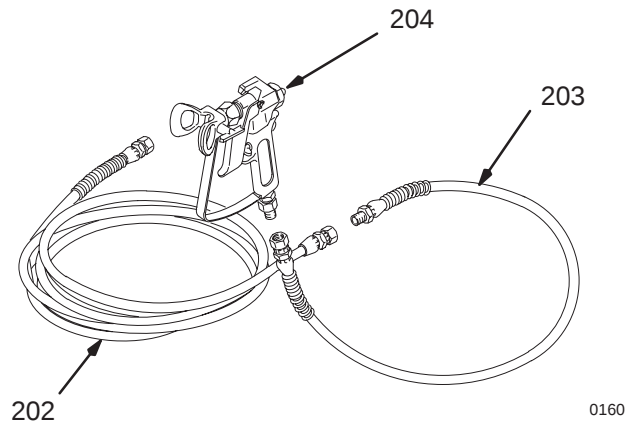
Parts List & Drawing – Complete Sprayers

Models 231–052 and 231–085

GM5000 Airless Paint Sprayer

Includes items 201 to 204

Ref No.	Part No.	Description	Qty
201	231–576	GM5000 Upright Sprayer See parts list on page 29	1
	231–577	GM5000 Lo-Boy Sprayer See parts list on pages 31 and 33	1
202	238–361	HOSE, grounded, nylon; 1/4 in. ID; cpld 1/4 npsm(fbe); 50 foot (15 m); spring guards both ends	1
203	238–358	HOSE, grounded, nylon; 3/16 in. ID; cpld 1/4 npsm(m) x 1/4 npsm(f) swivel; 3 foot (0.9 m); spring guards both ends	1
204	220–955	CONTRACTOR SPRAY GUN Includes RAC IV™ DripLess™ Tip Guard and 517–size SwitchTip™ See 307–614 for parts	1



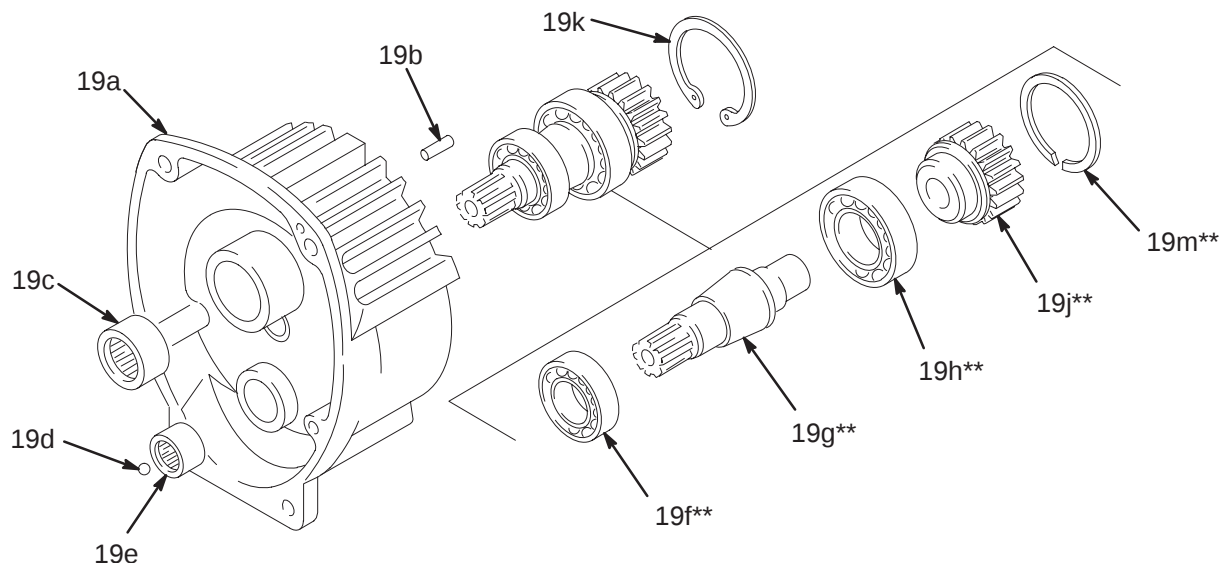
Parts List & Drawing – Pinion Assembly

Ref No. 19

Pinion Housing Assembly 241–286

Includes items 19a to 19m

Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
19a	194–311	.PINION HOUSING	1	19h**	108–798	.BALL BEARING, large	1
19b	105–489	.PIN	2	19j**	183–396	.HUB, armature	1
19c	108–692	.BEARING	1	19k	108–799	.RETAINING RING, large	1
19d	100–069	.BALL, sst	1	19m**	108–796	.RETAINING RING small	1
19e	107–088	.BEARING	1	**Included in Repair Kit No. 221–032.			
19f**	108–797	.BEARING, ball, small	1				
19g**	183–395	.PINION SHAFT	1				



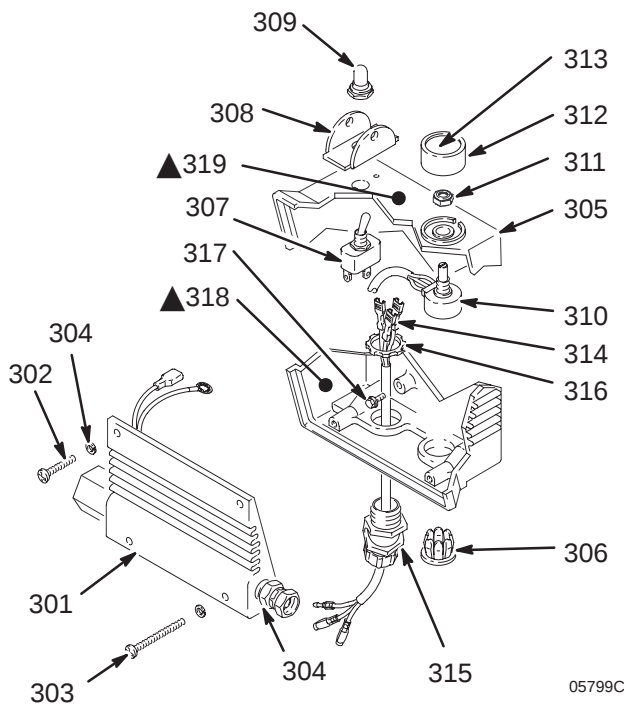
Parts List – Pressure Control

Basic Pressure Control for the GM5000 Sprayers

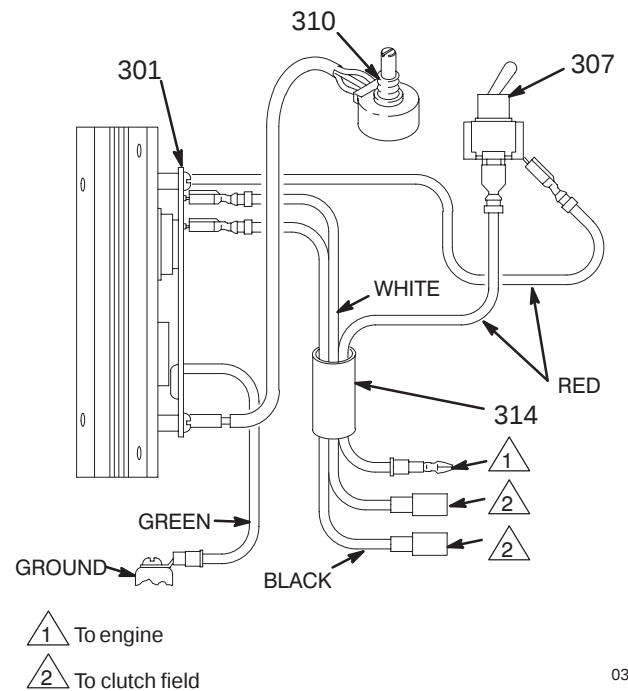
Ref No.	Part No.	Description	Qty	Ref No.	Part No.	Description	Qty
301	239-056	ENGINE CONTROL BOARD	1	312	112-373	KNOB	1
302	107-251	SCREW, panhead, 10-24 x 1 in.	2	313	185-565	LABEL	1
303	112-610	SCREW, panhead, 10-24 x 2 in.	2	314	237-674	CONDUCTOR	1
304	100-020	LOCKWASHER, No. 10	4	315	109-078	CONNECTOR	1
305	189-095	HOUSING,	1	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	108-358	SEAL	1				

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

Parts Drawing – Pressure Control



Wiring Schematic – Pressure Control



Dimensions

Model 231-576

Weight (dry, without packaging)	135 lb (61 kg)
Height	31.6 in. (803 mm)
Length	30.5 in. (775 mm)
Width	22.5 in. (572 mm)

Model 231-577

Weight (dry, without packaging)	135 lb (61 kg)
Height	31.6 in. (803 mm)
Length	30.5 in. (775 mm)
Width	22.5 in. (572 mm)

Technical Data

Engine 5.5 horsepower, Honda
Maximum working pressure 3000 psi (210 bar, 21 MPa)
Noise Level
Sound power 105 dBa
per ISO 3744
Sound pressure 96 dBa
measured at 3.1 feet (1 m)
Cycles/gallon (liter) 104 (27.5)
Maximum delivery 1.25 gpm (4.7 liter/min)
Fuel tank capacity 0.95 gallons (3.6 liter)
Maximum tip size 1 gun with 0.035 in. tip
2 guns with 0.025 in. tip
3 guns with 0.019 in. tip

Inlet paint strainer 16 mesh (1190 micron)
stainless steel screen, reusable
Outlet paint filter 60 mesh (250 micron)
stainless steel screen, reusable
Pump inlet size 3/4 in. npt (m)
Fluid outlet size 1/4 npsm from fluid filter
Wetted parts
Displacement Pump stainless steel, carbon steel,
polyurethane, UHMW polyethylene,
Delrin®, leather
Filter aluminum, carbon steel, stainless steel

NOTE: Delrin® is a trademark of the DuPont Company.

Graco Phone Number

TO PLACE AN ORDER, contact your Graco distributor, or call this number to identify the distributor closest to you:
1-800-690-2894 Toll Free

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 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.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motors, gas engines, 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.

LIMITATION OF LIABILITY

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

ADDITIONAL WARRANTY COVERAGE

Graco does provide extended warranty and wear warranty for products described in the "Graco Contractor Equipment Warranty Program".

*All written and visual data contained in this document reflects the latest product information available at the time of publication.
Graco reserves the right to make changes at any time without notice.*

Sales Offices: Minneapolis, Detroit, Los Angeles
Foreign Offices: Belgium, Canada, England, Korea, France, Germany, Hong Kong, Japan

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