



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

INSTRUCTIONS

First choice when quality counts.™

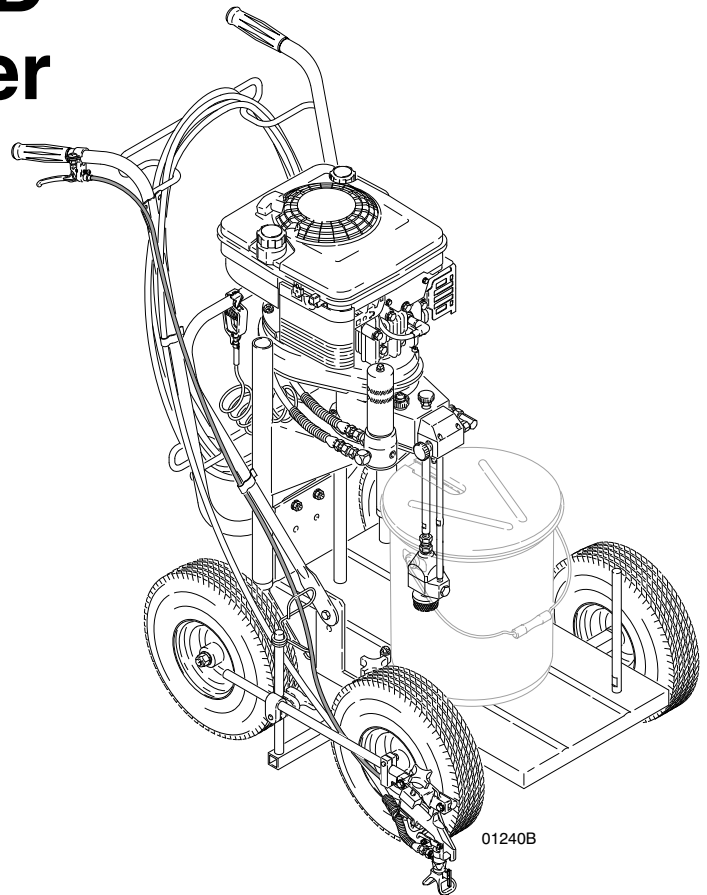
LINE LAZER™ LD Light Duty Striper

PT2501 GASOLINE-POWERED AIRLESS LINESTRIPER

3000 psi (210 bar, 21.0 MPa)
Maximum Working Pressure

Model 231-205, Series A

Includes Flex Gun, RAC IV®
DripLess™ Tip Guard,
Size LLT-315 SwitchTip™, Pail Cover
and 25 foot (7 m) hose



INDEX

Preparation	4
Setup	5
Startup	13
Spray Tip & Tip Guard	16
Spray Techniques	18
Position Gun Arm	20
Maintenance	23
Troubleshooting	26
Service	28
Parts	33
Technical Data	40
Warranty	40

NOTE: This is an example of the DANGER label on your sprayer. This label is available in other languages, free of charge. See page 39 to order.

! DANGER !			
	FIRE AND EXPLOSION HAZARD		SKIN INJECTION HAZARD
<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 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.</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>	
READ AND UNDERSTAND ALL LABELS AND INSTRUCTION MANUALS BEFORE USE			

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

©COPYRIGHT 1992, GRACO INC.

Graco Inc. is registered to I.S. EN ISO 9001

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 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.
- 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 40 for the maximum working pressure of this equipment.
- Use fluids and solvents which are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.
- Do not use hoses to pull equipment.
- Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose Graco hoses to temperatures above 82°C (180°F) or below -40°C (-40°F).
- Do not 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 5 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 dioxide 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 sprayer.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 5 to prevent the equipment from starting unexpectedly.

Preparation for Use

This is a quick overview of the steps to installing and using your new Line Lazer LD.

1. Read and be sure you understand the warnings starting on page 2 before installing or operating this sprayer. Throughout the manual, you will be instructed to follow the **Pressure Relief Procedure** which is on page 5. Don't take shortcuts – this is the only safe method to fully relieve fluid pressure in the system.
2. Unpack the sprayer and assemble it. See pages 6 to 8.
3. Check the hydraulic oil level, engine oil level and fuel the sprayer. See page 9.
4. Flush the sprayer to remove the oil left in the pump after factory testing. See page 11.
5. Review the operating and application information on pages 16 to 21.
6. Prepare the paint. See page 12.
7. Start the sprayer. See page 13.
8. Read and follow the maintenance intervals on pages 23 to 24.

Setup


General Information

NOTE: Reference numbers and letters in parentheses in the text refer to the callouts in the figures and the parts drawing.

NOTE: Always use Genuine Graco Parts and Accessories, available from your Graco distributor.

Grounding

⚠ WARNING



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

1. *Sprayer:* make sure the grounding chain (148) contacts the ground while the unit is moving. See Fig. 7. For stationary spraying, connect a ground wire and clamp (178) to a true earth ground. See Fig. 1.
2. *Fluid hoses:* use only grounded hoses with a maximum of 300 ft. (91.5 m) combined hose length to ensure grounding continuity.
3. *Spray gun:* obtain grounding through connection to a properly grounded fluid hose and sprayer.
4. *Object being sprayed:* according to local code.
5. *Fluid supply container:* follow your local code.
6. *Solvent pails used when flushing:* follow your local code. Use only metal pails, which are conductive, placed on a grounded surface. Do not place the pail on a nonconductive surface, such as paper or cardboard, which interrupts the grounding continuity.
7. *To maintain grounding continuity when flushing or relieving pressure,* hold a metal part of the spray gun firmly to the side of a grounded *metal* pail, then trigger the gun.

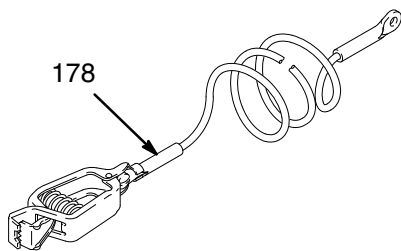



Fig. 1

Pressure Relief Procedure

⚠ WARNING



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

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

1. Engage the spray gun safety latch.
2. Turn the ON/OFF switch to OFF.
3. Flip the pressure control switch to OFF.
4. Disengage the gun safety latch. Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun to relieve pressure.
5. Engage the gun safety latch.
6. Hold the pressure relief tube firmly to the side of a grounded metal pail, and open the pressure relief valve. Leave the valve open until you are ready to spray again.
7. Disconnect the spark plug cable to prevent the system from starting unexpectedly.

*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 and relieve pressure gradually, then loosen completely. Now clear the tip or hose.*

Setup

Install the gun arm. See Fig. 2.

Loosen the knobs (131). Position the carriage bar (220) under the cart. Align the holes on the cart with those in the clamps (109) and the bar, and tighten the knobs (131) firmly. To mount the gun on the other side of the cart, see page 20.

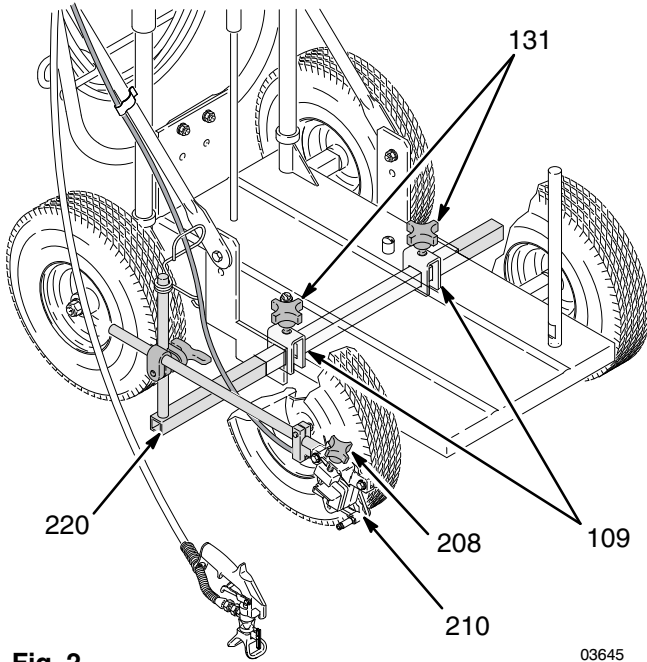


Fig. 2

03645

Mount the gun.

NOTE: If mounting the gun in a pressurized sprayer, follow the **Pressure Relief Procedure** on page 5. Then disengage the trigger cable. See page 7.

- Engage the gun trigger safety latch (B). See Fig. 3.
- Loosen the gun holder knob (208). See Fig. 4.

- Position the gun in the holder (210) so the gun trigger is resting on the remote trigger lever (A) and the end of the gun rests firmly against the back of the gun holder pin (C). See Fig. 4.

1 Gun safety latch shown engaged, or "on safe" position

2 Gun safety latch shown disengaged, or "off safe" position

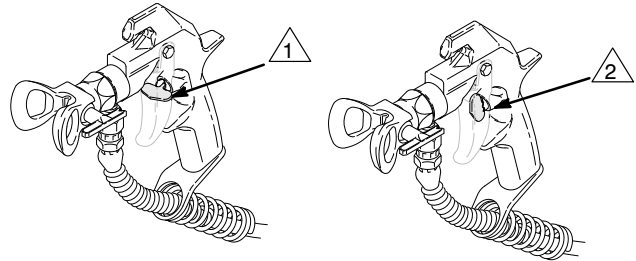
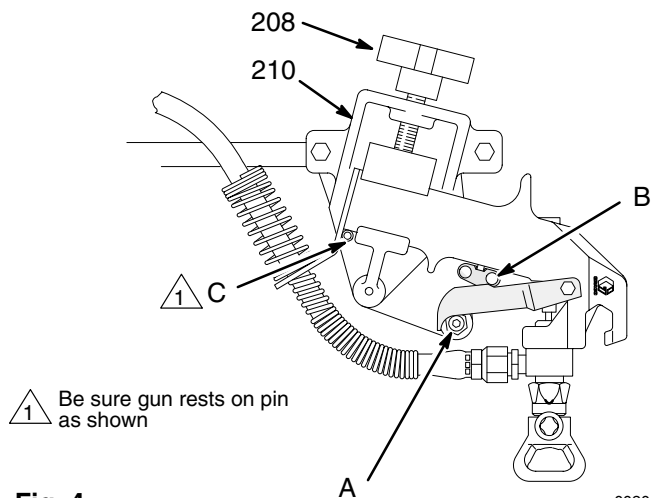


Fig. 3

03547

03548



1 Be sure gun rests on pin as shown

Fig. 4

0020

- Be sure the gun is mounted straight and then tighten the knob (208) firmly. See Fig. 4.
- Disengage the gun safety latch. Install the remote trigger cable. See page 7.

Setup

Install the trigger cable. See Fig. 5.

- a. Connect the loose end of the trigger cable (128) to the actuator lever (217) as shown in DETAIL B. Torque the screw (207) to 15 in-lb (1.7 N.m), back it off 1/16 to 1/8 turn and then tighten the jam nut (223) while holding the screw. Be sure the plate (217) moves freely.
- b. Route the trigger cable (128) to the gun as shown in Fig. 5. Install the clip (127) to hold the cable onto the frame.
- c. **To engage the trigger cable (128),** slide it into the block (205), making sure the end of the cable jacket seats firmly in the seat of the block. **The gun will trigger briefly!** See DETAIL A.

- d. **To disengage the trigger cable (128),** grasp the cable just behind the block (205). Pull the cable back about 1/2 inch (13 mm) and then up and out of the block. **The gun will trigger briefly!** See DETAIL A.

CAUTION

Keep the seat in the gun cable block (205) and the end of the cable jacket clean at all times to be sure the cable functions properly.

- 1 Be sure end jacket of cable seats here. Keep jacket and seat clean
- 2 Torque to 15 in-lb (1.7 N.m) then back off 1/16 to 1/8 turn

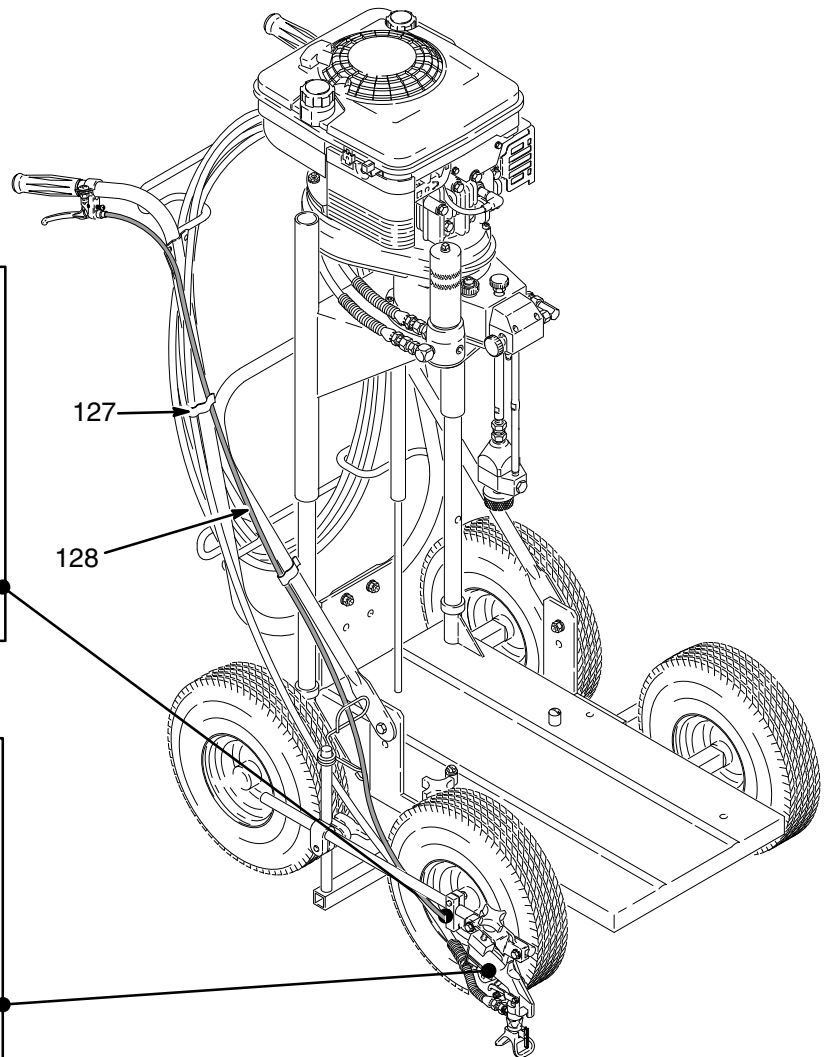
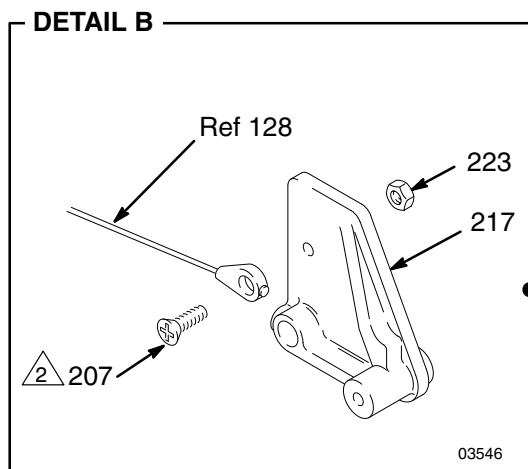
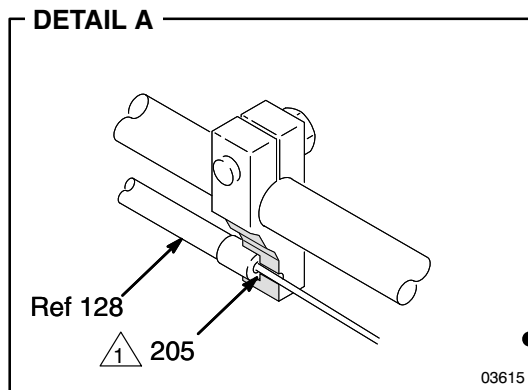


Fig. 5

03597

Setup

Adjust the trigger cable. See Fig. 6.

⚠ CAUTION

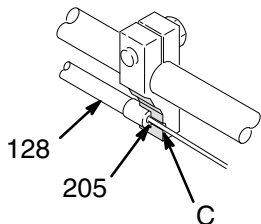
A loose cable prevents the gun from being fully triggered, which causes premature wear of the gun needle. A tight cable prevents the gun from being fully untriggered, which results in dripping and premature tip wear. Adjust the cable as needed.

NOTE: If you are adjusting the trigger cable of a sprayer that has been used, follow the **Pressure Relief Procedure** on page 5.

- The gun must be properly mounted in the holder to properly adjust the cable.
- Pull the actuator lever (217) forward and hold it. Lift up on the gun trigger (A) until there is slight resistance. Visually check to see if there is about 1/32 to 1/16 in. gap between the trigger lever (B) and where the gun trigger touches the bar.
- To adjust the tension, loosen the screw (201) in the block (205). Slide the block forward to increase the gap and backward to decrease the gap. Tighten the screw.
- Recheck the gap and continue adjusting as needed.

⚠ CAUTION

Do not allow the cable (128) to rub against the outside edges of the slot (C) in the block (205), to prevent premature wear of the cable. Rotate the block slightly to eliminate rubbing.



03615

Ground the sprayer. See Fig. 1. Proper grounding is essential to maintaining an electrically safe system. Also read and follow **FIRE OR EXPLOSION HAZARD** on page 4.

⚠ WARNING

Ground the sprayer whenever it is used indoors, either as a moving line striper or as a stationary sprayer. Floors in most factories are coated, which causes them to be poor electrical conductors. This increases the risk of hazardous static electric discharge, which can result in serious bodily injury, fire or explosion and property damage.

- Whenever you flush:** connect the ground wire to a true earth ground.
- Using as an outdoor striper:** Be sure the static chain attached to the bottom of the cart drags on the ground to help dissipate static electricity. See Fig. 7. Ground the sprayer to a true earth ground if specified by your local electrical code.
- Indoor spraying:** Ground the sprayer whenever the sprayer is used indoors. The ground wire supplied with the sprayer is not long enough to allow much operator movement. See Fig. 1. Therefore, the operator must provide a longer ground wire or provide some other method of effective electrical grounding as specified by your local electrical code.

Provide adequate ventilation when spraying indoors.

⚠ WARNING

If the Line Lazer LD is used indoors, you must vent the exhaust to the outdoors or provide **adequate** ventilation as specified by your local code. This is to reduce the risk of carbon monoxide poisoning.

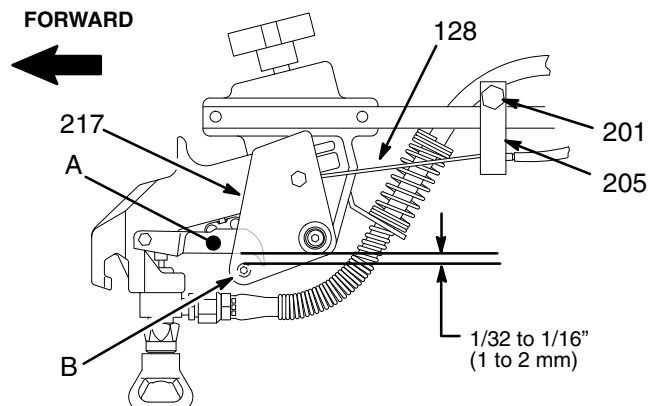


Fig. 6

03549

Setup

Check the hydraulic oil level. See Fig. 8.

Unscrew the hydraulic oil fill cap (6). The oil should be 1 in. (25 mm) from the top of the plate. Fill as necessary with lightweight hydraulic oil; use only Graco Hydraulic Oil, Part No. 218-797. Install the fill cap firmly.

NOTE: Steps 7 and 8 are summaries of the information in the Briggs & Stratton manual, supplied with the sprayer. Refer to that manual for detailed procedures and engine warranty information.

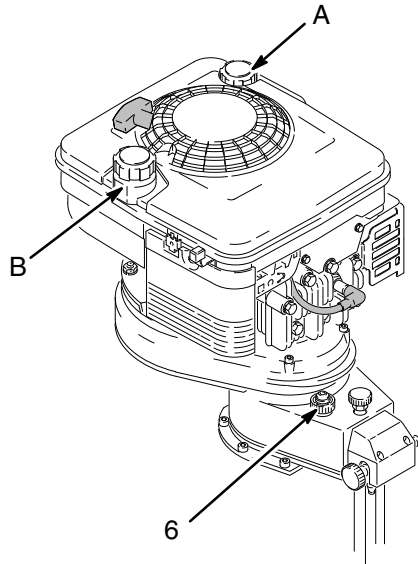


Fig. 8

01190
00191

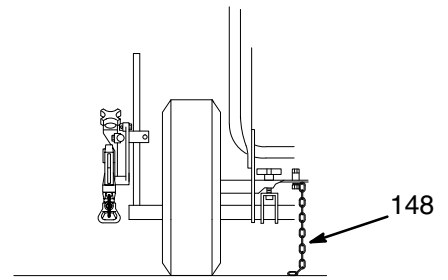
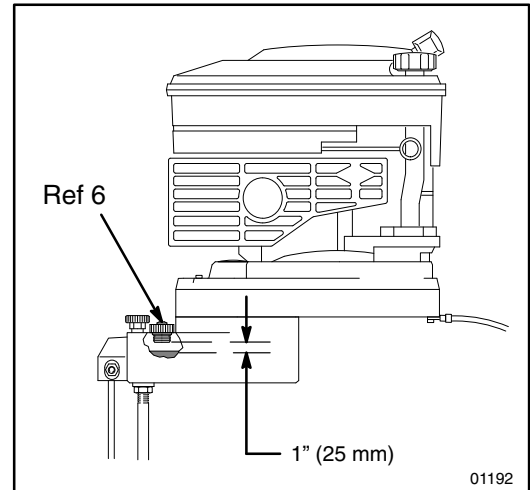


Fig. 7

01190



01192

Setup

CAUTION

When filling the hydraulic oil or engine oil or fueling the gas tank, **BE SURE** you fill through the correct port. Accidentally mixing the hydraulic oil, engine oil and/or fuel, will seriously damage the sprayer.

Check the engine oil level. See Fig. 8.

- a. Be sure the engine is level. Remove the oil fill cap/dipstick (A) and wipe the oil off with a clean cloth. Screw the dipstick firmly into place. Remove the dipstick to check the oil level.
- b. If additional oil is needed, clean around the oil fill hole. Use a high quality detergent oil classified "For Service SE, SF, SG". SAE 30 weight oil is recommended for operating conditions above 40_ F (4_ C). Use a lower weight oil in colder conditions. Multi-weight oils are not recommended. Do not mix with gasoline, and do not use additives.
- c. The crankcase capacity is about 1.25 pints (0.6 liters). Do not overfill.
- d. Install the fill cap/dipstick firmly.

Fuel the sprayer. See Fig. 8.

WARNING

Gasoline is extremely flammable and explosive under certain conditions. To reduce the risk of a fire or explosion:

1. Always shut off the engine before refueling.
2. Refuel in a well-ventilated area.
3. Do not smoke or allow flames or sparks in the area where the engine is refueled or where the gasoline is stored.
4. Do not overfill the tank. Make sure the gas cap is securely closed after refueling.
5. Fuel vapor or spilled fuel can ignite. If any fuel is spilled during refueling, make sure the area is dry before starting the engine.

- a. Use lead-free gasoline with a minimum 77 octane. Unleaded fuel minimizes combustion chamber deposits.
- b. The use of gasoline containing alcohol (gasohol) is not recommended. However, if it must be used, it must not contain more than 10% Ethanol and it must be removed from the engine during storage. Do not use gasoline containing Methanol.
- c. Do not use oil and gasoline mixtures or contaminated gasoline. Avoid getting dirt, dust or water in the fuel tank. Always place the gas cap (B) on a clean surface.
- d. Put the engine throttle lever at the STOP position before fueling.
- e. Tank capacity: 1.5 qt. (1.4 liter). Leave 1/4 in. (5 mm) at the top of the tank for gas expansion.
- f. After fueling, tighten the gas tank cap (B) firmly.

How to operate the pump lift. See Fig. 9.

To raise the pump/engine assembly above the pail level, push down lightly on handle (116), pull the ring (134) and release it as the unit starts to rise. The pin (137) will slip into a hole at the top to hold the assembly in place. To lower the assembly, pull the ring and push down on the cart handle (116) until the lift pin (137) slips into the bottom hole. See DETAIL C.

Setup

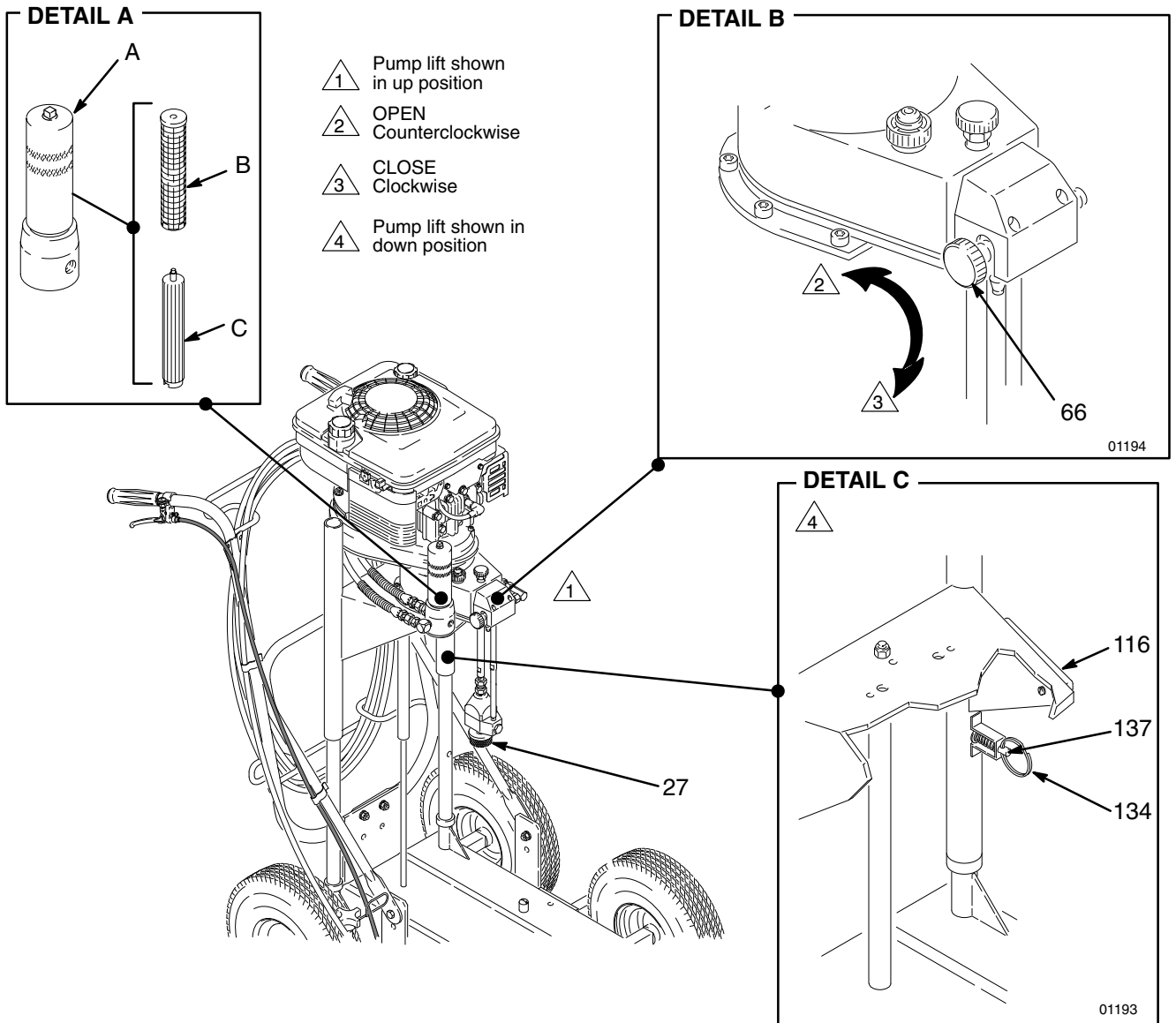


Fig. 9

Flush the sprayer. See Fig. 9.

NOTE: If you are flushing in preparation for spraying, now is a good time to practice spraying techniques and adjusting the gun position, before you add expensive paint. See pages 18 to 21.

- Follow the **Pressure Relief Procedure** on page 5.
- Remove the filter bowl (A) and screen (B); see manual 307–273. Install the bowl and support (C), without the screen, to flush it. Clean the screen separately. See DETAIL A.

- Release the trigger cable from the block – the gun will trigger briefly! See Step d., page 7. Remove the gun from the holder. See Step d., page 7. Engage the gun safety latch.
- Remove the gun's spray tip, if installed. See page 16.

⚠ WARNING

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

- Remove the pail cover.

Setup

NOTE: See pages 13 and 14, Steps 1 to 7 only to start the sprayer, when instructed to.

f. **For a new sprayer:**

- (1) Position a metal pail of mineral spirits on the cart and lower the paint pump into it.
- (2) Start the sprayer and circulate the solvent through the bypass valve (66) for two to three minutes. Close the bypass valve. See DETAIL B, Fig. 9.

g. **For a sprayer with paint in it:**

- (1) Raise the paint pump above the paint level. Start the sprayer and allow the paint to drain into the pail. Shut off the engine.
- (2) Position a metal pail of water or compatible solvent, such as mineral spirits, on the cart and lower the paint pump into it.
- (3) Start the sprayer. As soon as it starts, close the bypass valve (66). Trigger the gun into the paint pail. Watch the gun for solvent to appear, and then quickly release the gun trigger.

h. Hold a metal part of the gun firmly to the side of the metal flushing pail. See Fig. 10. Using the lowest possible pressure, trigger the gun and allow the water or solvent to circulate through the pump and gun for two or three minutes. Release the trigger and engage the trigger safety latch.

i. Open the bypass valve (66) **ONE turn counterclockwise**.

j. Turn off the engine.

k. **For a sprayer with paint in it:** Using a clean pail of water or compatible solvent and the lowest possible pressure, flush again to be sure all paint particles are removed.

l. Check all fluid connections for leaks. Relieve pressure before tightening any connections. Start the sprayer and verify that the leaks have been corrected. Shut off the engine.

m. Install the clean filter support (C) and screen (B). Install the filter bowl (A) and hand tighten. See DETAIL A, Fig. 9.

n. **For a sprayer with paint in it:**

- (1) Follow the **Pressure Relief Procedure** on page 5.
- (2) Remove the paint strainer (27) and clean it thoroughly. See Fig. 9.
- (3) Lubricate the inlet valve. See page 24.
- (4) See Storage or Changing Colors, page 24.

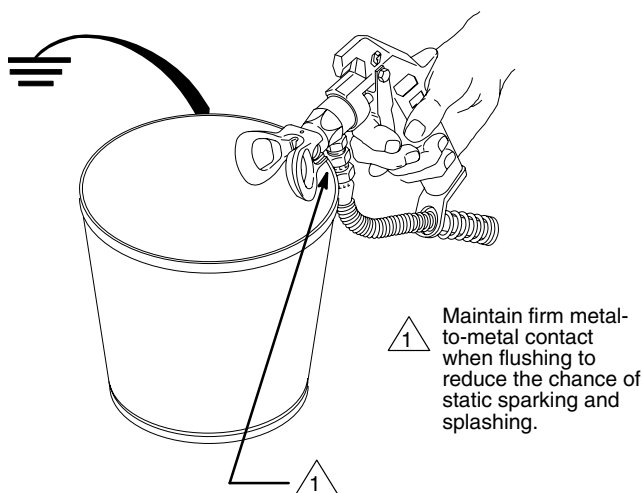


Fig. 10

0014

Prepare the paint.

This is probably the most important step toward trouble-free spraying!

- a. Prepare the paint according to the manufacturer's recommendations. Remove any skin from the top of the paint. Thin the paint as needed. Finally, strain the paint through a fine nylon mesh bag (available at most paint dealers) to remove particles that could clog the spray tip.
- b. Transfer the paint to a clean, five gallon pail, if not supplied that way.

Startup

⚠ CAUTION

The wallet-sized warning card provided with the gun should be kept with the operator at all times. The card contains important information on reducing the risk of a fluid injection injury, and treatment information should an injection injury occur. Additional copies of this card are available at no cost.

⚠ CAUTION

Never start the engine with the inlet valve removed, which would seriously damage the diaphragm.

1. Do not place the pump (26) in the pail yet.
2. Be sure the spark plug wire (C) is firmly connected to the spark plug. See Fig. 11.
3. Open the bypass valve (66) ONE turn **counter-clockwise**. Turn the pressure control (4) **counter-clockwise** to the lowest setting. See Fig. 11.

⚠ CAUTION

Never attempt to start the engine unless fluid pressure has been relieved **AND** the bypass valve is open. Trying to start the engine under load will damage the recoil system. If this happens, the engine must be returned to an authorized Briggs & Stratton dealer for repair.

NOTE: This engine has one control lever (B) which acts as a throttle, choke and stop lever.

4. Put the control lever in the CHOKE position for a cold startup. For restarting a warm engine, put the control lever in the FAST position. See Fig. 11.
5. Hold the sprayer frame with one hand. Grasp the starter rope (A) firmly and pull it out rapidly and smoothly. Continue holding the rope while it returns. Repeat until the engine starts. See Fig. 11.

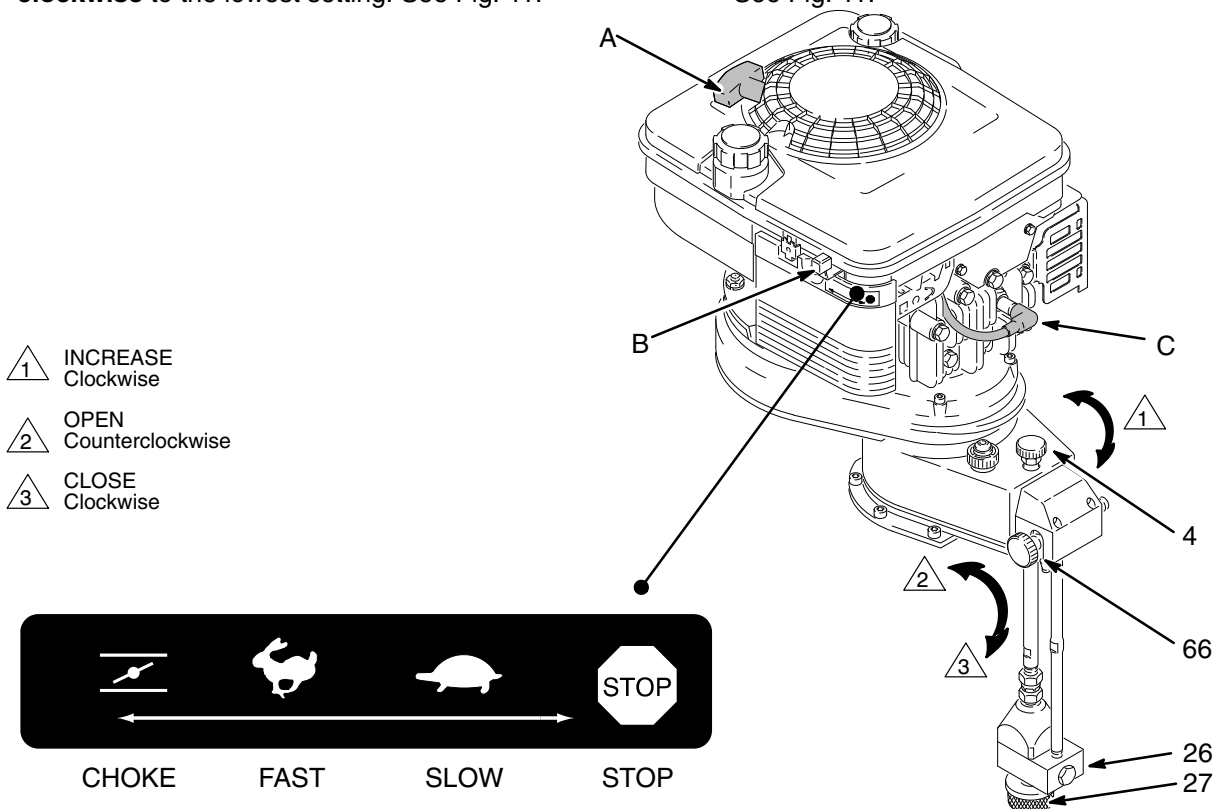


Fig. 11

01241

Startup

WARNING

Letting the rope return too fast may cause serious bodily injury if it hits someone, and the rope could jam in the recoil assembly.

6. Remove the inlet strainer (27) and place your hand over the inlet valve (26) to be sure it is drawing a vacuum. See Fig. 11.
7. If the inlet valve is not drawing a vacuum,
 - a. Turn the sprayer OFF by pushing the engine control lever to STOP.
 - b. Lightly press down on the stem (D) inside the inlet valve (26) several times with a small screwdriver. See Fig. 12.
 - c. Lower the pump into a small can of compatible solvent.
 - d. With the pressure turned up, start the sprayer . This should free any sticking parts in the pump.
 - e. Now check again for a vacuum.
 - f. Shut off the sprayer and install the inlet strainer.
8. Lower the pump into the paint pail.
9. Restart the sprayer if it was shut off. Allow the paint to circulate through the bypass valve (66) for one or two minutes to prime the pump.

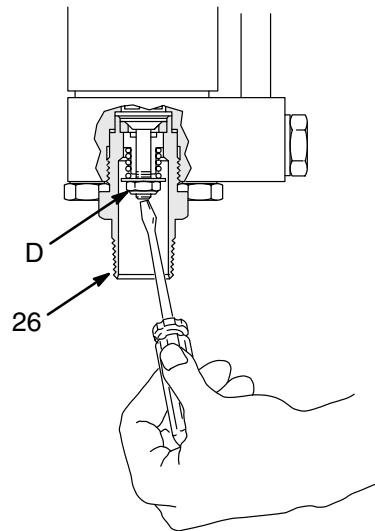


Fig. 12

0272

NOTE: If the paint does not circulate back into the pail, start and stop the engine several times to help prime the sprayer.

10. Allow the engine to warm up and then adjust the speed as needed. Turn the pressure control (4) fully **clockwise** to increase pressure. See Fig. 13.

NOTE: For normal spraying, a midpoint setting will give optimum performance and maximize pump and engine life.

11. Turn the bypass valve (66) **clockwise**, finger tight, to close it; this allows the pump to build up pressure. See Fig. 13.

Startup

12. Trigger the gun onto a piece of paper to check the spray pattern. Adjust the pressure setting to obtain the best atomization and spray pattern. **Always use the lowest pressure necessary.** Excessive pressure causes excessive overspray, premature tip wear and pump wear.

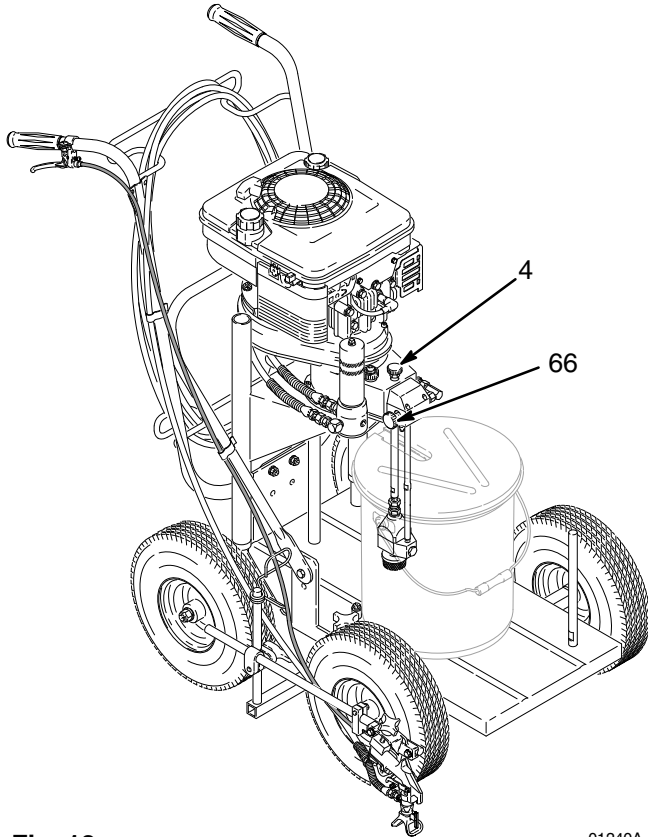


Fig. 13

01240A

NOTE: If you cannot obtain a good spray pattern or adequate atomization, your paint may be too thick. Thin the paint according to the manufacturer's recommendations until you can get good atomization.

NOTE: See pages 18 and 19 for spray techniques and how to adjust the gun arm.

13. Whenever you stop spraying and are holding the gun by hand, always set the trigger safety latch to prevent accidentally triggering the gun. If you must leave the sprayer unattended, shut it off and follow the **Pressure Relief Procedure** on page 5.

NOTE: The sprayer will not restart if it was left pressurized after shutting it off. Relieve pressure, then start it.

14. Put the cover on the pail.

15. Read and follow the maintenance intervals on pages 20 and 21.

⚠ CAUTION

Failure to properly tighten the inlet valve and screws at the specified intervals will result in oil leaking from the hydraulic system into the paint, and can cause costly damage to the sprayer.

Spray Tip and Tip Guard

⚠ WARNING

Failure to install or use the RAC IV tip guard assembly correctly may result in an undirected spray of paint into the eyes or on the skin of the operator. Be sure you:

- Use the appropriate gasket for the solvent used.
- Fully insert the SwitchTip into the guard.
- Fully tighten the guard onto the gun nozzle using a wrench.
- Turn the SwitchTip handle so it is parallel to the gun nozzle.
- When replacing a worn spray tip, always install a new gasket and seat.

Gasket selection. See Fig. 15.

⚠ WARNING

To reduce the risk of fluid splashback into the eyes or on the skin, use the appropriate gasket as specified in the following text.

- Use the black rubber gasket (E) ONLY** with latex and oil-based paints, stoddard solvents, mineral spirits, turpentine and water. When using this gasket, the SwitchTip can be removed and replaced without using tools.
- Use the red or yellow plastic gasket (D)** with the same fluids as above and with most other solvents, including lacquer thinner, trichloroethylene, MEK, acetone, brush cleaner, xylol. When using this gasket, loosen the RAC IV retaining nut to remove the SwitchTip.

Installing the SwitchTip and tip guard.

- Follow the **Pressure Relief Procedure** on page 5.
- Install a SwitchTip (G) so the flange (F) on the cylinder fits into the slots (H) at the base of the tip guard (A). See Fig. 15.
- Place the seat (C) on a pencil, curved side out, as shown in Fig. 14. Guide the seat into the retaining nut (B) and turn the seat until it straddles the cylinder of the SwitchTip (G).

- Drop in the appropriate gasket and press it down. If using the red or yellow gasket (D), be sure the flat side faces out of the retainer (A). See Fig. 15.
- Screw the tip guard snugly onto the gun, holding it in the desired position while tightening the retaining nut (B).
- NEVER use a wrench to turn the plastic tip guard (A), to avoid damaging the guard.

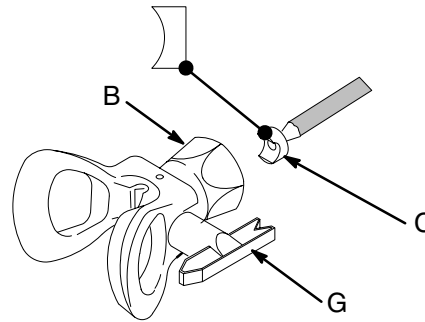


Fig. 14

0092

Operating the SwitchTip.

Be sure the SwitchTip handle is in the FULL SPRAY position before operating the gun. See Fig. 16.

⚠ WARNING

Keep clear of nozzle! High pressure fluid from leaks or spray can penetrate the skin and cause extremely serious bodily injury, including the need for amputation. The tip guard provides extra protection against injection, *but does not prevent it!* NEVER cut off the tip guard!

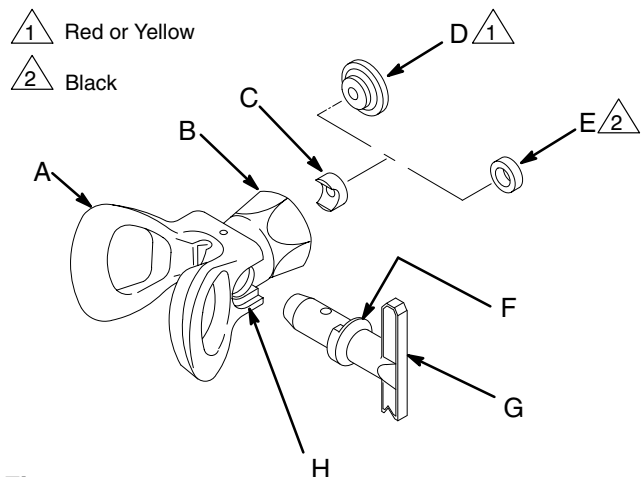


Fig. 15

Spray Tip and Tip Guard

1 SwitchTip handle shown in full spray position

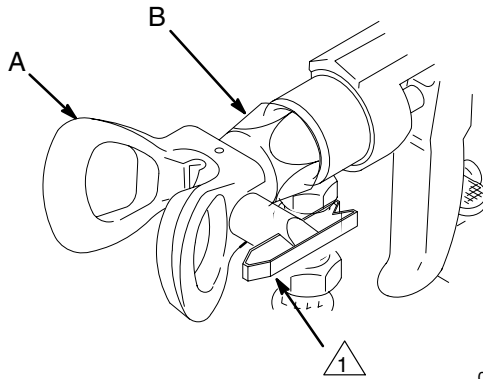


Fig. 16

0093

1 Be sure end jacket of cable seats here. Keep jacket and seat clean

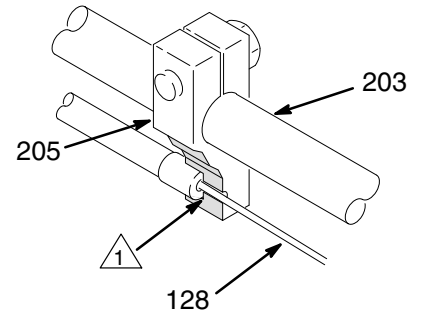


Fig. 17

03615

Clearing a clogged SwitchTip.

- Disengage the trigger cable (128). Grasp the cable just behind the block (205). Pull the cable back about 1/2 inch (13 mm) and then up and out of the block. **The gun will trigger briefly!** See Fig. 17.
- Engage the gun safety latch. See Fig. 18.
- Turn the arrow handle to the **full clean** position. See Fig. 19.
- Release the safety latch and trigger the gun. Fluid pressure should force out the clog.
- Turn the arrow handle to the **full spray** position. See Fig. 19.
- If the tip is still clogged**, follow the **Pressure Relief Procedure** on page 5 and remove the SwitchTip and clean it.
- Engage the trigger cable (128). Slide it into the block (205), making sure the end of the cable jacket seats firmly in the seat of the block. **The gun will trigger briefly!** See Fig. 17.

Maintenance.

Change the seat and gasket when the SwitchTip wears out; these parts wear at about the same rate.

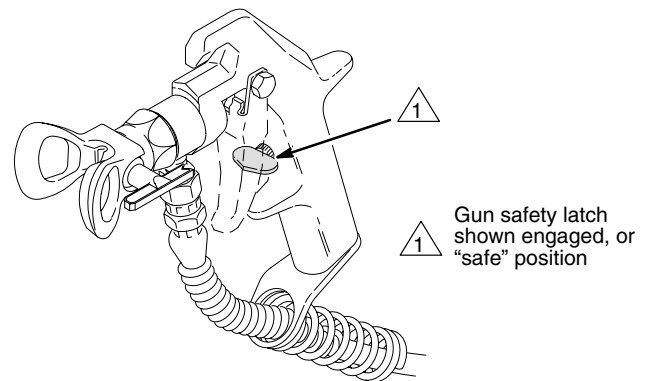


Fig. 18

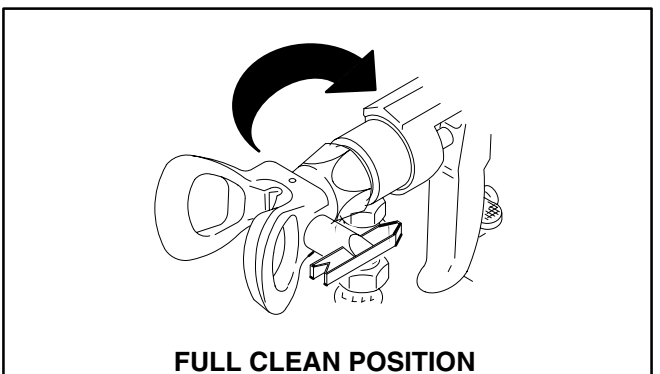
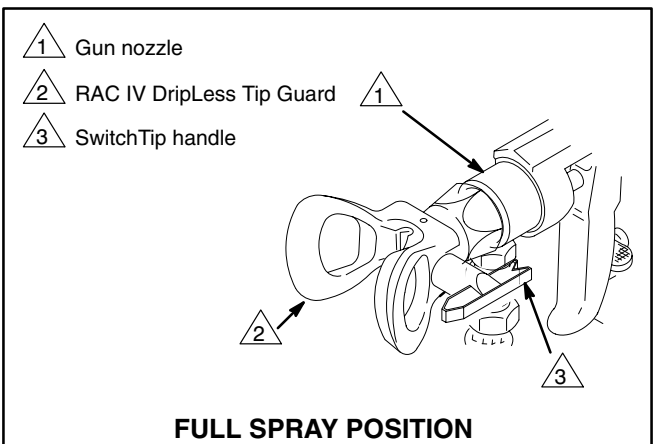


Fig. 19

0093

Spray Techniques

These spray techniques discuss how to use and adjust the features of the Line Lazer LD. You must also consider operator technique, job site conditions and weather.

Spray tip application.

Paint Type	Tip Orifice Size
Thinned alkyds	.013 – .015
Modified alkyds	.015 – .017*
Latex	.015 – .017*
Chlorinated rubber	.015 – .017*

*.017 is the maximum recommended tip size for this pump. As the tip wears, pressure may drop; change to a new tip to restore pressure.

Type of Application	Tip Size
Smooth surface, 4–6" line width	313, LLT-315, 413, 415
Bumpy surface, 4–6" line 12" line	213, 215 615
Sport court, 2" line	213
Curbs	415, 515
Stencils	413, 415
General painting	515, 517

General techniques.

- Use water rather than paint to practice spraying technique and positioning the gun.
- Keep the RAC IV Tip Guard parallel to the ground and the tip guard "wings" (A) facing the front and back of the unit as shown in Fig. 20.

⚠ WARNING

To reduce the risk of a fluid injection injury, always disengage the gun's remote trigger cable and engage the trigger safety latch before moving or adjusting the tip guards, guns or gun arms. See page 7.

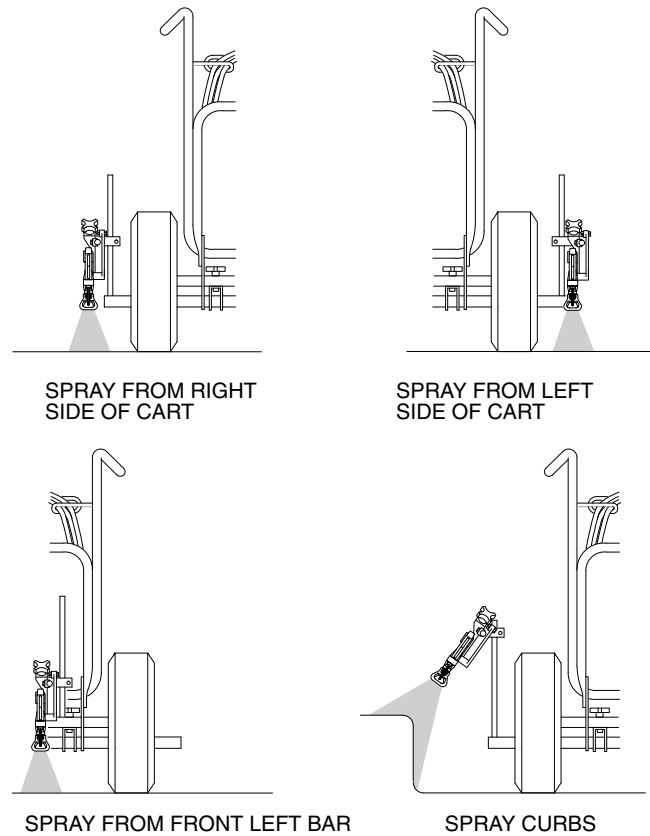


Fig. 20

01195

- Use the lowest pressure necessary for good atomization. High pressure may cause excessive paint buildup and overspray.
- Start moving the sprayer before triggering the gun to prevent a build up of paint at the beginning of the line. Release the trigger a second before stopping. Move at an even rate of speed.
- Always check your gun adjustments on cardboard or paper before starting each job. When painting curbs, paint first in an area that is less frequently seen.

Spray Techniques

- f. Many factors affect the straightness of a line, including uneven surfaces, potholes, rocks and other debris, pressure that is too high or paint that is too thin, and a clogged or worn spray tip. See pages 16 and 17 for how to clear or change a spray tip.
- g. To minimize the effect of bumps on the spray pattern, keep the gun's tip guard in line with the front wheel axis.
- h. The spray tip size and the rate at which you move the unit affect the coating thickness. Generally, the faster you move the striper, the larger the tip orifice should be. The fan width of the spray tip indicates the approximate line width.
- i. Position the gun to suit your requirements. Read through page 21.
- j. Traffic paints may be formulated for air spray, air-less spray or have no formulation description. Generally, air spray formulas are pre-thinned, and will work well in the Line Lazer LD, but there may be more overspray. Non-air spray formulas tend to deliver more lineal feet of line per gallon with less overspray, since they are less easily absorbed into the pavement.
- k. If you use fast-drying traffic paint on a hot day, float compatible solvent on top of the paint to prevent skin from forming on it.

Line width adjustment. See Fig. 21.

- a. Several factors affect line width: vertical distance of the spray tip to the spraying surface, spray tip fan pattern, paint pressure, and a worn or clogged spray tip.
- b. The typical conditions for a 4 in. wide line are: 315 size SwitchTip, the gun positioned one inch from the lowest vertical position, and just enough pressure to atomize the paint.
- c. To decrease line width, lower the gun or use a SwitchTip with a narrower pattern.
- d. To increase line width, raise the gun, or use a SwitchTip with a wider fan pattern.
- e. Disengage the gun trigger safety latch and engage the trigger cable (128). See page 7.

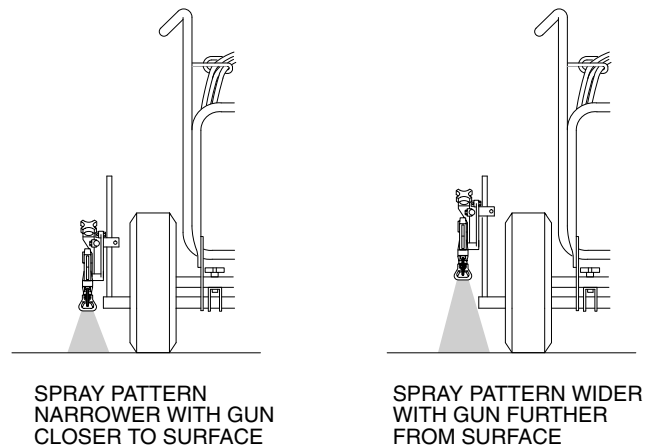


Fig. 21

01195

Positioning the Gun Arm Assembly

⚠ CAUTION

Do not kink the cable, which could prevent it from properly triggering and untriggering the gun.

- b. **Method 2:** Disengage the trigger cable (128). See page 7. Loosen the gun arm clamp (219) and swing the gun out to the side. Tighten the clamp.

To vertically position the gun. See Fig. 22.

Loosen the gun arm clamp (219) and move the gun up or down. Tighten the clamp.

To horizontally position the gun.

- a. **Method 1:** Disengage the trigger cable (128). See page 7. Loosen both knobs (131). Slide the carriage bar (220) left or right so the gun will be outside the tire path. Tighten the knobs.

NOTE: Reposition the tip guard so it is parallel to the ground and its “wings” (A) face the front and back of the sprayer. Disengage the gun trigger safety latch and engage the trigger cable.

NOTE: Use method 1 and 2 together to obtain the maximum distance of the gun from the unit, which is helpful when spraying around obstacles.

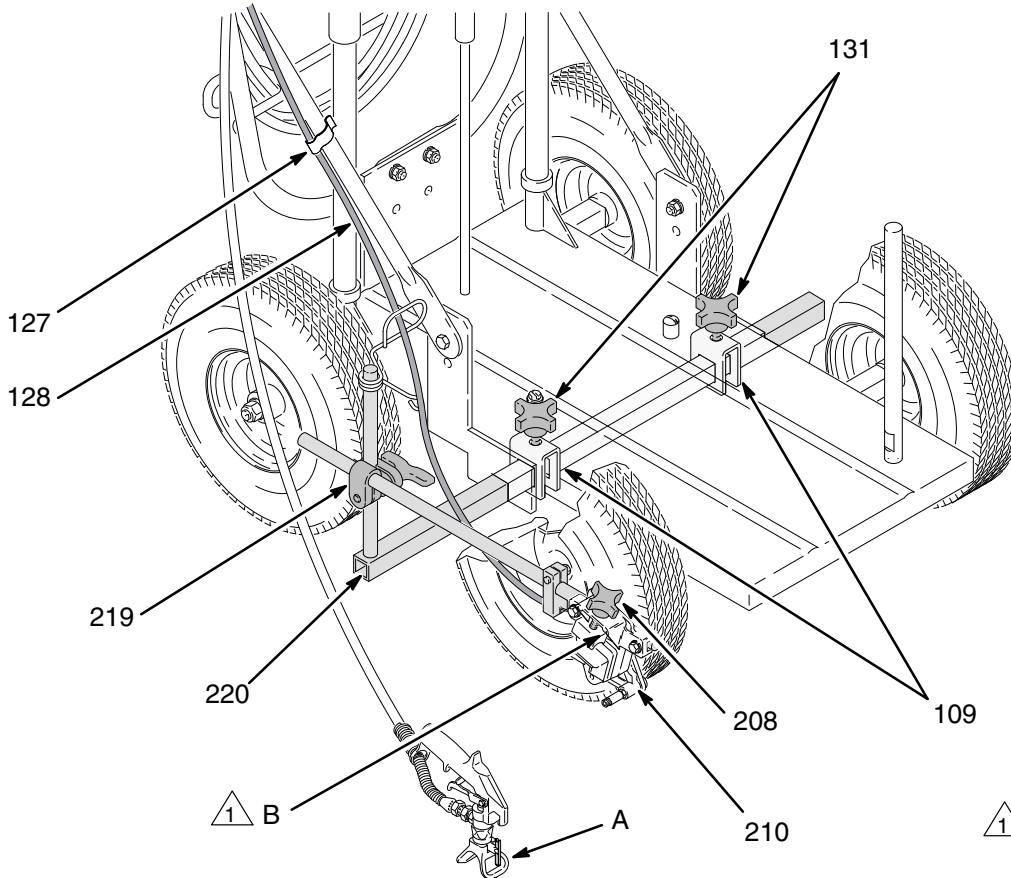


Fig. 22

03645

Positioning the Gun Arm Assembly

To mount gun on the other side of cart.

See Fig. 22.

- a. Disengage the trigger cable (128) and engage the gun trigger safety latch. See page 7.
- b. Remove the trigger cable clip (127).
- c. Loosen the gun holder knob (208) and remove the gun. Lay the gun out of the way.
- d. Loosen both knobs (131). Remove the carriage bar (220).
- e. Install the carriage bar (220) from the other side of the cart. Tighten the knobs (131). The gun arm will face back.
- f. Loosen the gun arm clamp (219) and swing the gun forward. Tighten the clamp.
- g. Install the gun. Route the hose and cable carefully to prevent kinking. Install the clip (127) so it holds the cable away from the engine.

NOTE: Reposition the tip guard so it is parallel to the ground and its “wings” (A) face the front and back of the striper.

Setup for spraying between cars or up to walls.

- a. Disengage the trigger cable (128) and engage the gun trigger safety latch. See page 7.
- b. Remove the guide (204) and slide the clamp, support arm and gun assembly off the original vertical bar (C). See Fig. 23.
- c. Reinstall the guide (204) on the original vertical bar. See Fig. 23.
- d. Slide the clamp, support arm and gun assembly on to the front gun holder bar (110). See Fig. 23.
- e. Adjust the vertical and horizontal gun position.

NOTE: Reposition the tip guard so it is parallel to the ground and its “wings” (A) face the front and back of the striper.

- f. Disengage the gun trigger safety latch and engage the trigger cable (128). See page 7.

Positioning the Gun Arm Assembly

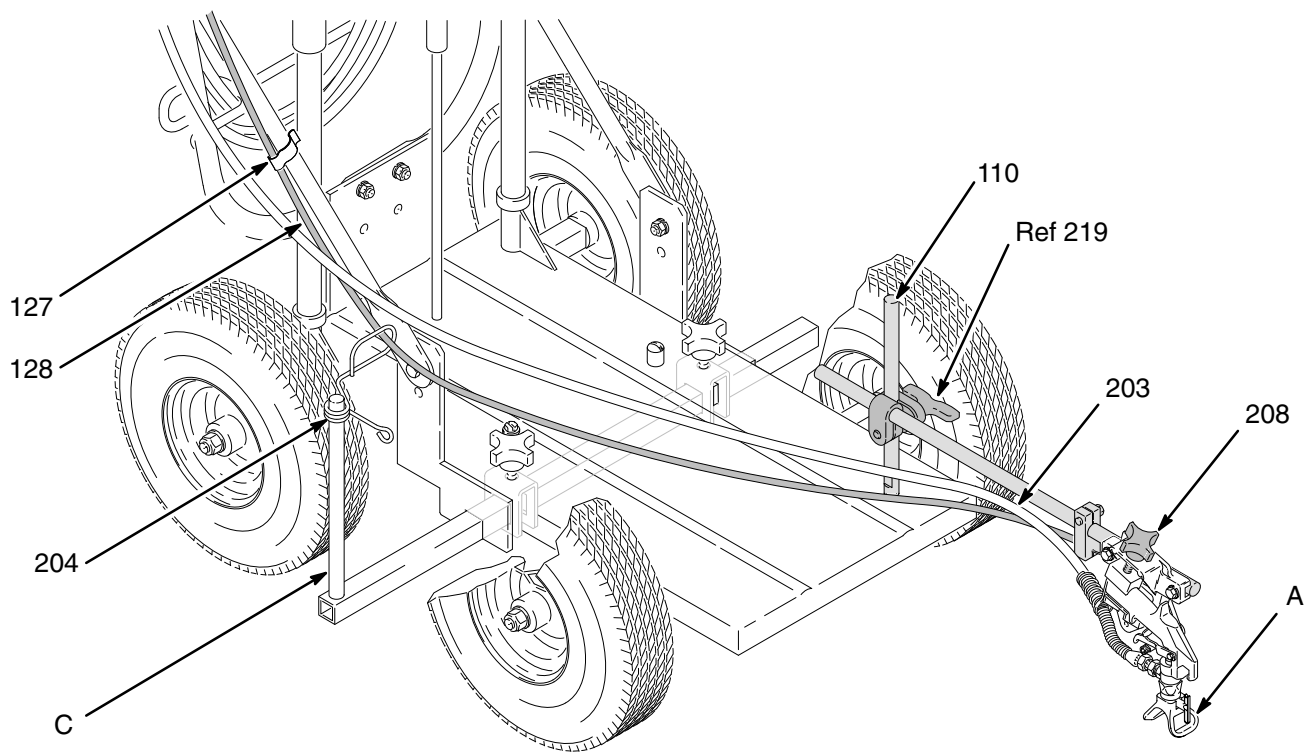


Fig. 23

03602

Setup for spraying arcs.

- Disengage the trigger cable (128) and engage the gun trigger safety latch. See page 7.
- Loosen the gun arm clamp (219) and swing the arm (B) back near the rear tire. Position the arm so the tip guard aligns with the back axle of the unit. Retighten the clamp. See Fig. 22 on page 20.
- Extend the carriage bar (220) so you can see the line you are painting and avoid running over it. See Fig. 22 on page 20.
- Adjust the vertical and horizontal gun position.

NOTE: Reposition the tip guard so it is parallel to the ground and its “wings” (A) face the front and back of the unit. Disengage the gun trigger safety latch and engage the trigger cable.

- Push down on the handle bars to “slide” the front wheels, and spray the arc from the outside.

Maintenance

Care of the sprayer.

CAUTION

Thorough flushing and proper maintenance are essential to keep the sprayer working properly and avoid costly damage to the sprayer or the object being sprayed.

Diaphragm Failure: Always replace the diaphragm after every 500 hours of operation (once every 4 to 6 months). The diaphragm weakens with use. If it ruptures, hydraulic oil and paint may mix, damaging the sprayer and/or the surface of the object being sprayed may be damaged.

Follow the Maintenance Intervals outlined below.

Maintenance Intervals	
Flushing	Immediately after each use. See below and page 11.
Lubricate intake valve	Immediately after each use. See page 24.
Check engine oil	Check daily and refill as needed.
Check gas tank	Check daily and refill as needed.
Check air filter	Check daily. Remove air filter cover and clean element. Replace element as needed.
Tighten paint pump screws to 170–200 in–lb (19–23 N.m), and tighten inlet valve to 320–360 in–lb (36–41 N.m)	<ol style="list-style-type: none"> 1. After first 3 to 5 hours of operation. See page 24. 2. After next 3 to 5 hours of operation. See page 24. 3. Each 25 hours thereafter (about weekly). See page 24.
Check and/or change hydraulic oil	<ol style="list-style-type: none"> 1. Check the oil daily. See page 24. 2. Change the oil after first 20 hours of operation. See page 24. 3. Change the oil each 50 hours thereafter (about twice monthly).
Gun grease zerk (B)	Grease weekly using a grease gun. This purges pivot area of paint buildup. See Fig. 22.
Replace diaphragm	After every 500 gallons of paint sprayed (every 4 to 6 months). See page 29.
Spark plug	Replace as needed. Use a Champion RJ19LM or the equivalent.

Maintenance

1 When to flush.

NOTE: For how to flush, see page 11.

- a. **Flush a new sprayer** to remove the protective oil.

Before using water–base paint. use a compatible solvent, then warm soapy water, and then with clean water.

Before using oil–base paint. use a compatible solvent.

- b. **Changing colors.** Use a compatible solvent.
- c. **Changing from water–base to oil–base paint.** Use warm, soapy water, and then a compatible solvent, such as mineral spirits.
- d. **Changing from oil–base to water–base paint.** Use a compatible solvent, then warm, soapy water, and then clean water.
- e. **Storage.** Use mineral spirits for the final flush. Relieve pressure, but do not purge the system.
- f. **Startup after storage.**
Before using water–base paint. flush out the compatible solvent with warm soapy water, and then with clean water.

When using oil–based paint. flush out the compatible solvent with the paint to be sprayed.

Lubricate the inlet valve. See Fig. 24.

- a. Follow the **Pressure Relief Procedure** on page 5. Raise the pump. Remove the inlet screen.
- b. Press down lightly on the stem (A) of the inlet valve (26) several times with a small screwdriver.

- c. Lower the sprayer into a small can of compatible solvent. Increase the pressure control setting half way. Start the sprayer, run it for a few seconds, and then shut it off.
- d. Now tighten the paint pump screws and the inlet valve.

Tighten the paint pump screws and inlet valve. See Fig. 25.

- a. Follow the **Pressure Relief Procedure** on page 5.
- b. Torque the four hex head screws (25) on the paint pump to 170 in–lb (19–23 N.m).
- c. Torque the inlet valve (26) to 320–360 in–lb (36–41 N.m).

Check and/or change the hydraulic oil.

See Fig. 26.

- a. Follow the **Pressure Relief Procedure** on page 5.
- b. Remove the fill cap (6). The oil should be 1 in. (25 mm) from the top of the plate. If it is lower, add oil as necessary. Use only Graco lightweight hydraulic oil, part no. 218–797. Reinstall the fill cap, hand tight, if you are not going to change the oil.
- c. To change the oil, remove the engine and pump assembly and turn it over to drain the oil through the fill cap hole, or use a clean siphon assembly to drain the reservoir.

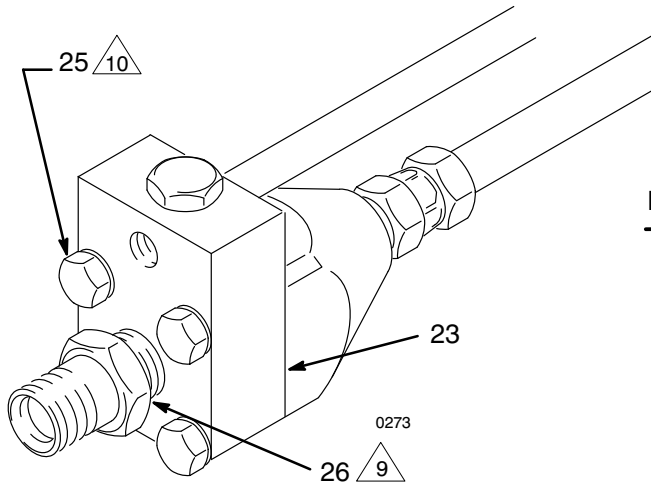
CAUTION

Whenever you remove the fill cap, be very careful not to let any dirt, paint particles, or other contaminants get into the hydraulic system. Contaminants can cause serious damage to the hydraulic system.

- d. Fill the hydraulic pump housing with 16 ounces (55 ml) of Graco lightweight hydraulic oil. Reinstall the fill cap.

Maintenance

- e. Start the sprayer. Turn the pressure control fully **counterclockwise** (no pressure). Let the sprayer run for two minutes to fill the hydraulic system. Stop and start the sprayer four times to help rid the hydraulic system of air.





-  Torque to 320–360 in-lb (36–41 N.m)
-  Torque to 170–200 in-lb (19–23 N.m)

Fig. 25

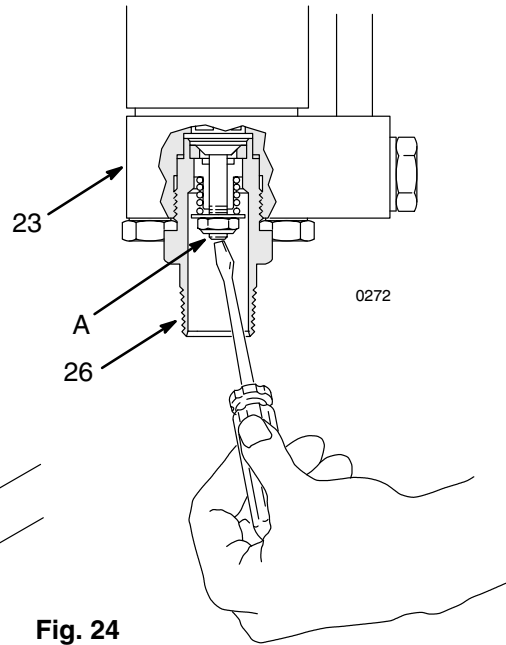


Fig. 24

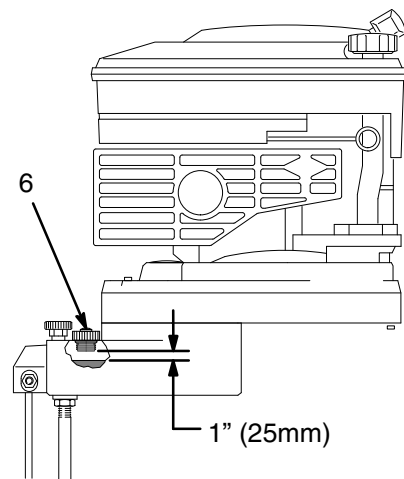


Fig. 26

03603A

Troubleshooting

WARNING

To reduce the risk of serious bodily injury, including fluid injection, always follow the **Pressure Relief Procedure Warning** on page 5 before checking or repairing any part of the spray system.

NOTES:

- Repairs, other than those for which instructions are given on page 28 to 31, should be performed by a trained and qualified repair agency. If the engine is damaged, take it to an authorized Briggs and Stratton engine dealer for repair.
- If your sprayer is not operating well, or will not operate at all, check for obvious problems first. Follow the **STARTUP** procedure exactly (see page 13). Then if the sprayer won't start, use the Troubleshooting Chart for help in identifying the possible cause.
- A damaged diaphragm is user-replaceable. A ruptured diaphragm has probably caused serious damage and must be repaired by a repair agency.
- Remember, taking the time after each use of the sprayer to thoroughly flush it and to perform all of the maintenance procedures given on page 23 and 24 will help prevent down time and costly repair bills.

Troubleshooting Chart

PROBLEM	CAUSE	SOLUTION
Poor spray pattern	Spray tip worn Paint too thick	Change tip. Thin, try larger tip.
Won't paint a straight line	Uneven tire inflation	Check all for tires. Inflate to 24 psi.
Excessive overspray	Paint too thin, or pressure too high	Reduce pressure.
Spray gun won't spray, or low output from gun, or spitting from gun	Paint supply low or empty Spray tip clogged Air in fluid pump or hose.	Refill and reprime system. See page 13. Use Reverse-A-Clean feature to clear tip clog. See page 17. Check for loose connections at pump intake and tighten. Then prime the pump. See page 13.
Engine won't start or starts hard	Out of gas ON/OFF switch turned off Choke not set properly Sprayer left pressurized when shut off Bypass valve closed Spark plug disconnected or damaged Starter rope recoil system damaged Engine worn or damaged	Refuel. See page 10. Turn switch on. Open completely or half way in warm weather; close in cold weather. Relieve pressure first, then start. Always open bypass valve before starting engine. Check; replace. Return for repair. NEVER start engine until pressure is relieved AND bypass valve is open. Return for repair.
Motor runs but sprayer won't run	Air in diaphragm housing	Bleed air. See page 30, Step 9.
Sprayer starts but won't suck paint	Paint supply empty Inlet screen clogged	Refill and prime pump. Clean

Troubleshooting

PROBLEM	CAUSE	SOLUTION
Sprayer starts but won't suck paint (continued)	<p>Inlet valve stuck or damaged</p> <p>Outlet valve stuck</p> <p>Air trapped in hydraulic system</p> <p>Hydraulic oil level low or empty</p> <p>Wrong grade of hydraulic oil or wrong fluid in hydraulic system</p> <p>Inlet valve not tight</p> <p>Damaged diaphragm</p>	<p>See page 24 or 28.</p> <p>See page 28.</p> <p>See page 30, Diaphragm, step 9.</p> <p>See page 9.</p> <p>Use only Graco approved hydraulic oil, part no. 218–797.</p> <p>Tighten; See page 24.</p> <p>Replace; See page 30.</p>
<p>Sprayer sucks paint but does not build up pressure</p> <p>Sprayer sucks paint, builds pressure, but pressure drops when gun is triggered</p>	<p>Pressure control valve not turned up</p> <p>Outlet valve stuck, dirty or has worn parts</p> <p>Hydraulic oil low</p> <p>Inlet valve leaks</p> <p>Damaged diaphragm</p> <p>Damaged bypass valve</p> <p>Damaged hydraulic system</p> <p>Damaged paint pump</p>	<p>Adjust.</p> <p>See page 28.</p> <p>See page 9.</p> <p>See page 24.</p> <p>Replace; See page 30 .</p> <p>Replace.</p> <p>Return sprayer for repair.</p> <p>Replace.</p>
	<p>No spray tip on gun</p> <p>Spray tip orifice too large for the paint or worn tip</p> <p>Inlet screen clogged</p> <p>Paint too thick</p> <p>Worn outlet valve</p> <p>Leaking bypass valve</p> <p>Worn or damaged inlet valve</p> <p>Worn or damaged pressure control valve</p>	<p>Shut off sprayer and install tip. See page 16.</p> <p>Try a smaller tip or a new tip. See page 16.</p> <p>Clean.</p> <p>Thin and/or strain.</p> <p>Replace; See page 28.</p> <p>Replace.</p> <p>See page 28.</p> <p>See page 28.</p>
Pressure fluctuations	<p>Outlet valve stuck, dirty or worn</p> <p>Leaking or dirty bypass valve</p> <p>Dirty, leaking, worn or damaged inlet valve</p> <p>Dirty pressure control knob</p> <p>Damaged diaphragm, or paint pump, or hydraulic system</p>	<p>See page 28.</p> <p>Replace.</p> <p>Replace; See page 28.</p> <p>Clean or replace; See page 28.</p> <p>Return for repair.</p>
Paint in hydraulic system	Ruptured diaphragm	Return for repair.
Hydraulic oil in paint	Ruptured diaphragm	Return for repair.

Service

Repairs, other than those for which instructions are given on pages 28 to 31, should be performed by a trained and qualified repair agency.

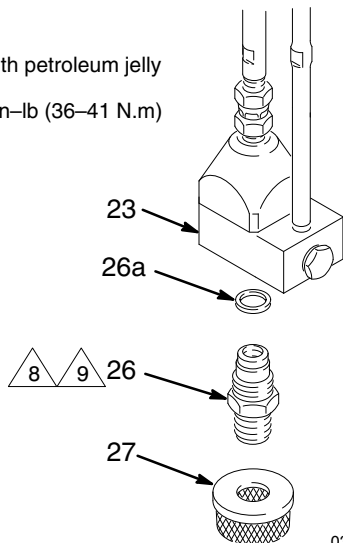
⚠ WARNING

To reduce the risk of serious injury, including fluid injection, splashing in the eyes or on the skin, or injury from moving parts, always follow the **Pressure Relief Procedure Warning** on page 5 before checking or repairing any part of the system.

Inlet Check Valve. See Fig. 27.

1. Remove the screen (27). Unscrew the inlet check valve (26).
2. Thoroughly clean the gasket (26a), inlet valve (26), and paint pump (23) threads and check for erosion. Replace any eroded parts.
3. Lubricate the inlet valve (26) threads with petroleum jelly. Install the gasket on the valve. Install the valve and torque it to 320–360 in-lb (36–41 N.m).

- 8 Lubricate threads with petroleum jelly
9 Torque to 320–360 in-lb (36–41 N.m)



03604

Fig. 27

Outlet Check Valve. See Fig. 28.

1. Unscrew the plug (31a) and housing (31e).
2. Use a pick to remove the seal (31f) from the paint pump (23). It may be hard to remove. **DO NOT LEAVE THE SEAL IN THE PAINT PUMP HOUSING.**
3. Clean the parts thoroughly, including the threads in the pump, with a compatible solvent. Check all parts for wear or damage and replace as needed.
4. Lubricate the threads of the housing (31e) and plug (31a).
5. Install a NEW seal (31f) in the pump housing.

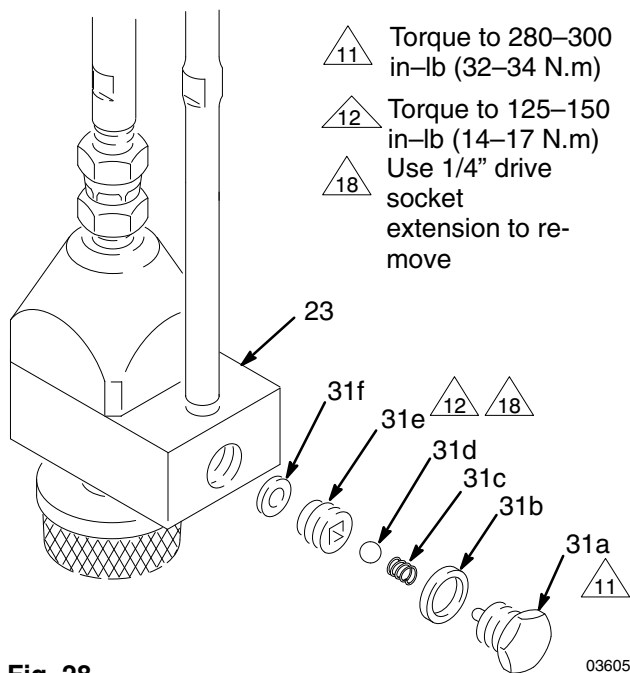
⚠ CAUTION

Be sure you do not install a new seal (31f) until the old one is removed. Having two seals in the valve will cause performance problems. Do not try to reuse the old seal as it will be deformed.

6. Install the housing (31e) and torque to 125–150 in-lb (14–17 N.m).

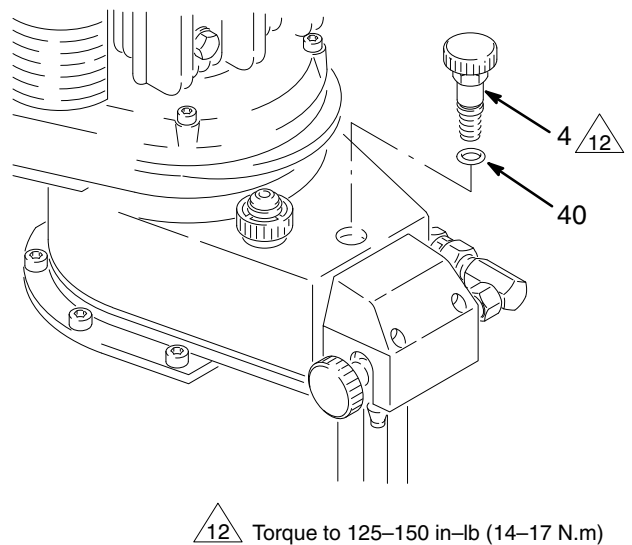
Service

- The last coil on one end of the spring is turned in. Place this end over the stud in the plug (31a). Install the ball (31d), washer (31b) and plug. Torque the plug to 280–300 in–lb (32–34 N.m).



Pressure Control. See Fig. 29.

- When removing the pressure control (4) to check or clean it, always replace the seal (40). When replacing the pressure control, torque the new control (4) to 125–150 in–lb (14–17 N.m).



Diaphragm. See Fig. 30.

- Remove the inlet strainer (27). Remove the four paint pump screws (25) and lockwashers (24).
- Remove the screws (35) and shield (3).
- Remove the screw (36) and lockwasher (37) from the bracket (38).
- Pull the paint pump assembly away from the hydraulic housing (20) and remove the diaphragm (21).

CAUTION

Never start the engine with the inlet valve (26) removed, as it will severely damage the diaphragm.

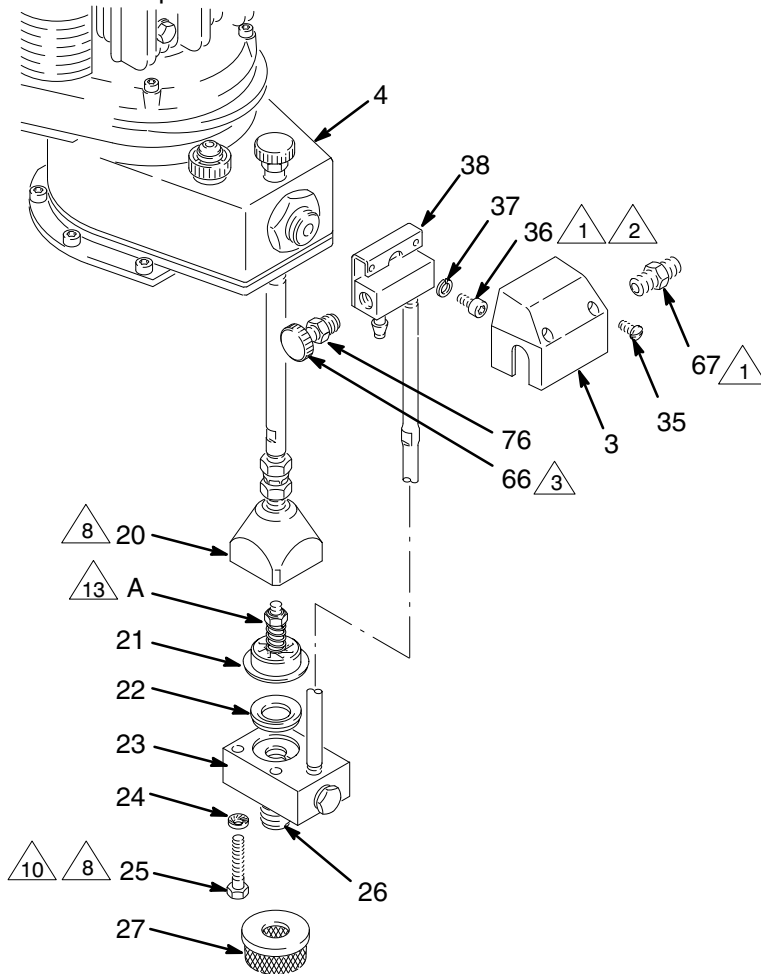
Service

⚠ CAUTION

Be careful not to get any dirt or paint on the new diaphragm or the hydraulic housing. Contaminants in the hydraulic system can cause the sprayer to malfunction and result in costly damage to the sprayer.

DO NOT TAMPER with the nut (A). The nut is factory set to hold the spring to a specific dimension.

5. Check the insert (22) for wear or damage and replace it if needed. Clean the top of the paint pump and the hydraulic housing thoroughly.
6. Install the new diaphragm assembly (21), lubricate the internal threads of the housing (20), and reassemble the parts.



- 1 Apply thread sealant
- 2 Torque to 40–45 ft–lb (54–61 N.m)
- 3 Torque to 100–110 in–lb (11.5–12.5 N.m)
- 8 Lubricate threads
- 10 Torque to 170–200 in–lb (19–23 N.m)
- 13 DO NOT alter position of nut

7. Lubricate the screws (25) and then install and torque them to 170–200 in–lb (19–23 N.m).

⚠ CAUTION

Whenever you remove the paint pump screws, torque them as instructed above, and then retorque them after 3 to 5 hours of operation.

8. Check the hydraulic oil level and add Graco-approved oil as necessary until the level is 1 in. (25 mm) from the top of the plate. See Fig. 8.
9. Turn the pressure control fully **counterclockwise** (no pressure). Start the sprayer and run it for two minutes to fill the hydraulic system. Increase the pressure to maximum. Stop and start the sprayer four times to help rid the hydraulic system of air.

Fig. 30

03607

Service

Drive Belt

1. Follow the **Pressure Relief Procedure** on page 5.
2. Remove the shield (75): remove the six screws (74) and lockwashers (56). See Fig. 31.
3. Remove the engine (18): reach inside the drive housing and remove the capscrews (two of 14, one of 97), along with the lockwashers (93) and nuts (92) on the engine flange. See Fig. 31.

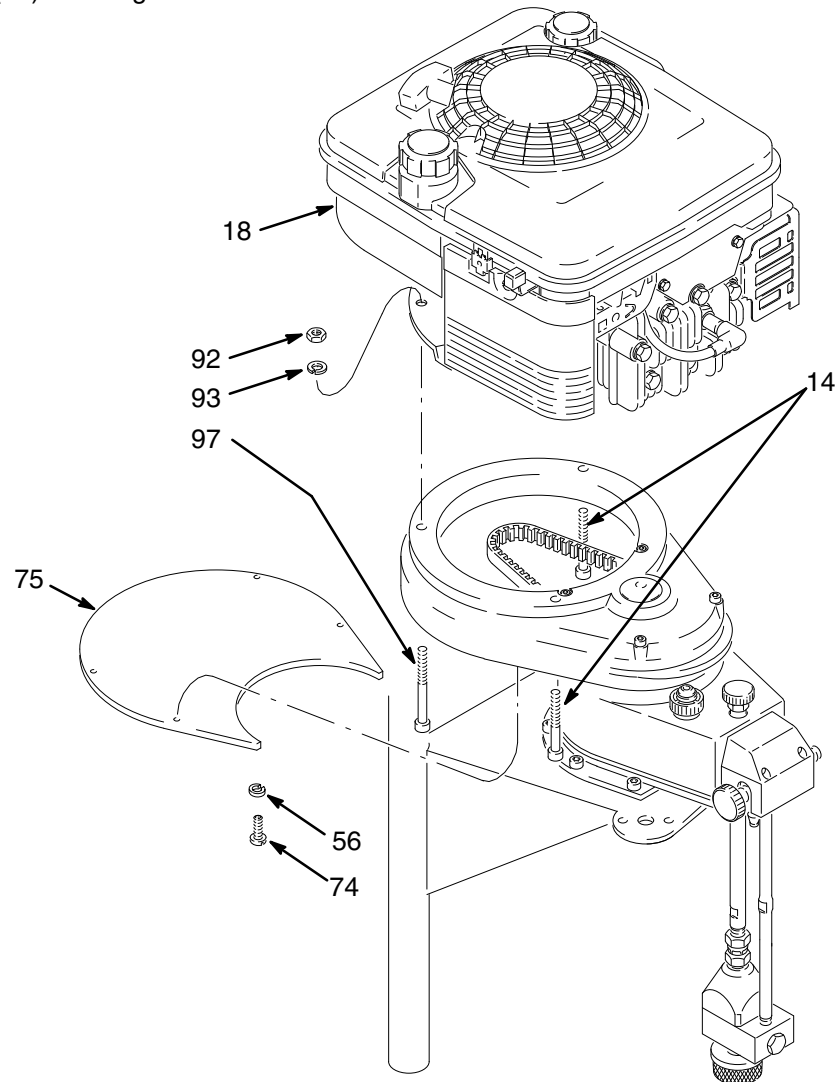


Fig. 31

03608A

4. Remove the six capscrews (150), lockwashers (121) and nuts (151) holding the pump assembly to the cart lift bracket (107). See Fig. 32.

Service

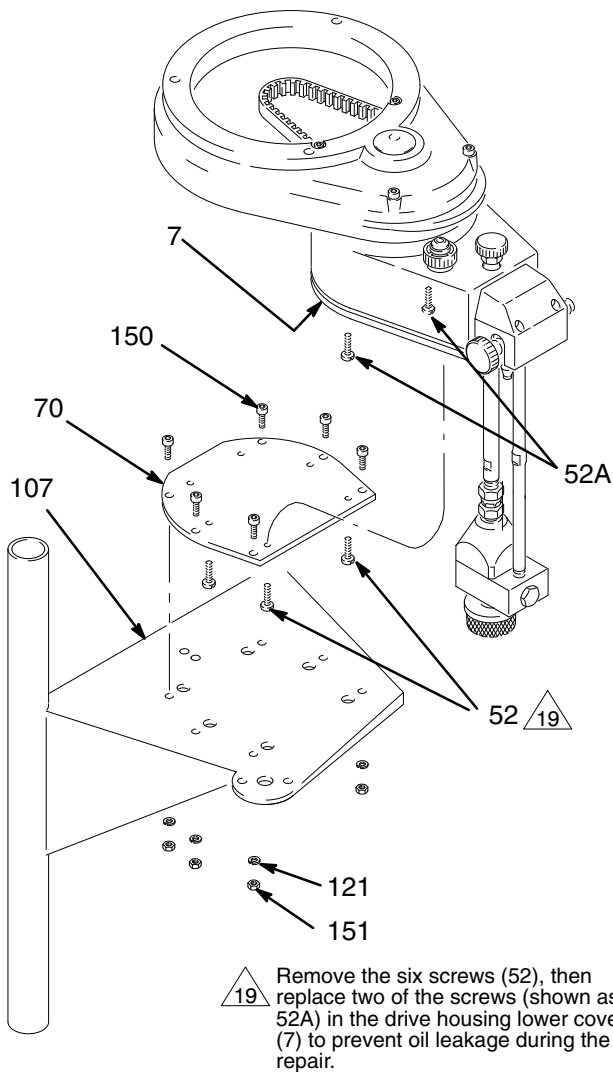


Fig. 32

03609

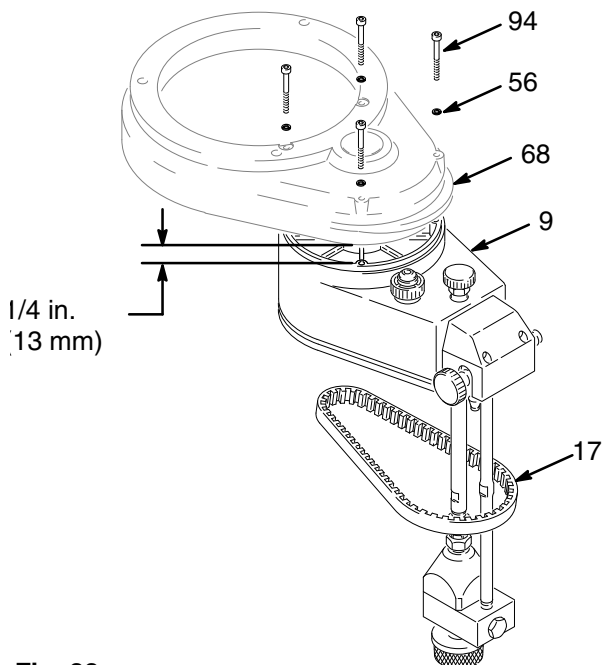


Fig. 33

03610

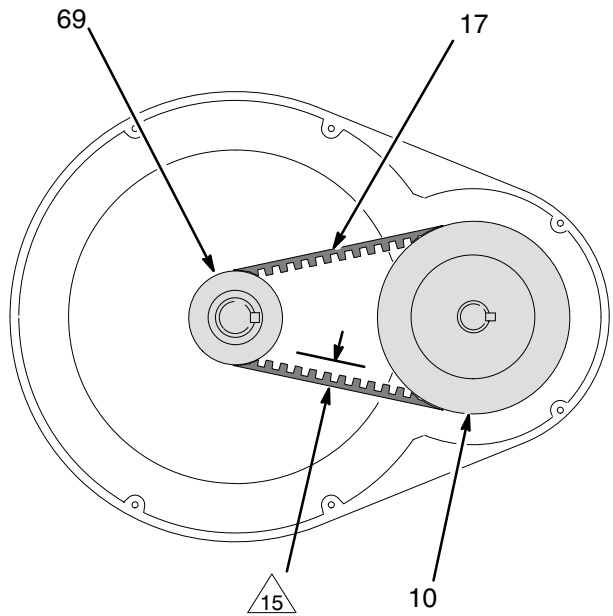
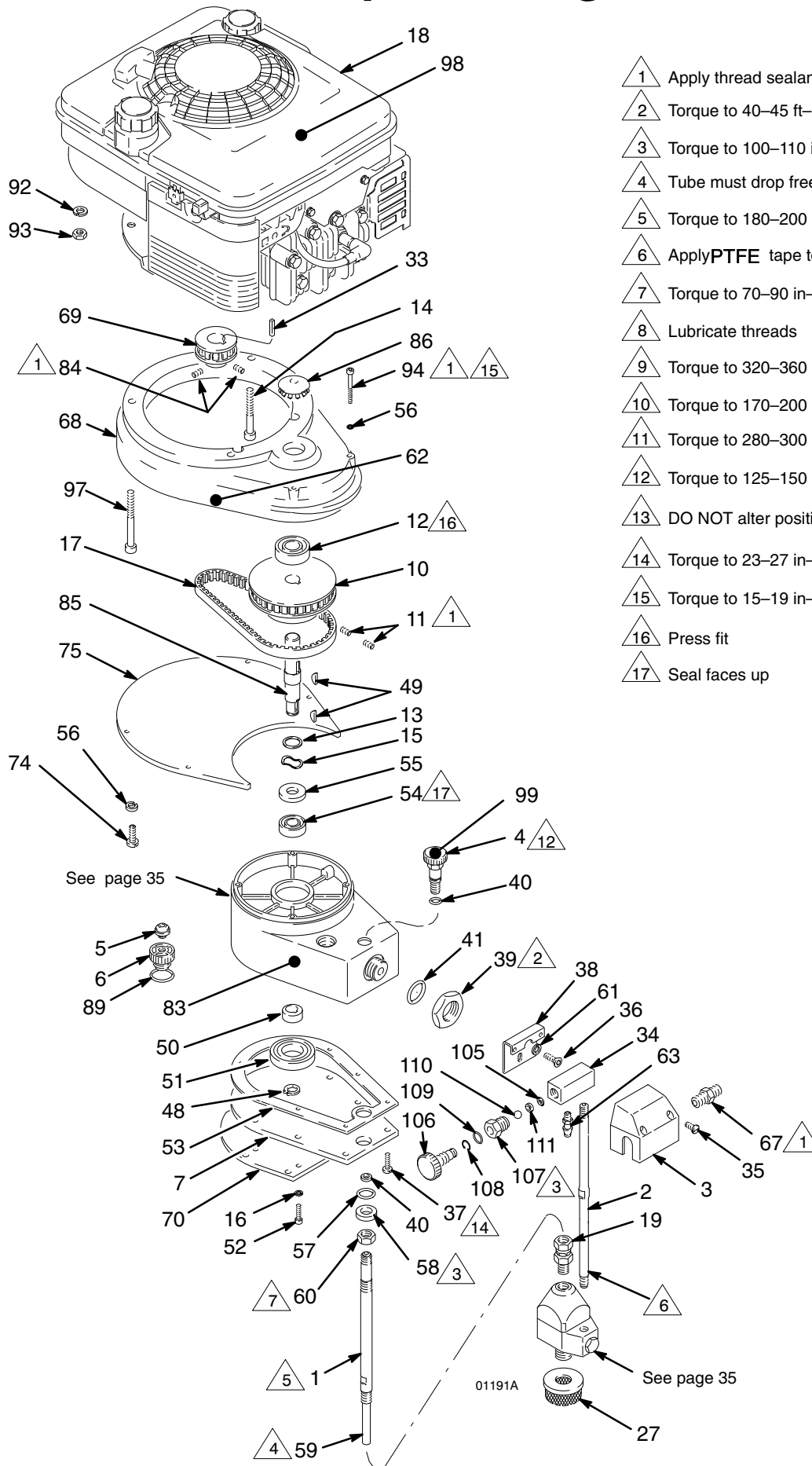


Fig. 34

03611

5. Remove the four screws (94) and lockwashers (56) holding the lower drive housing (9) and upper drive housing (68) together. See Fig. 33.
6. Remove the six capscrews (52) holding the mounting plate (70) to the drive housing lower cover (7). See Fig. 32.
7. Carefully remove the plate (70) and replace two of the capscrews (52) to prevent the oil gasket (53) from breaking loose and leaking oil. See Fig. 32.
8. Separate the drive housing (9) and shield (68) as far as they will go without forcing them, which is about 1/4 in. (13 mm). See Fig. 33.
9. Slide the belt (17) out of the slot created between the upper and lower drive housings (9 & 68). Pull the belt over the lower housing (9) and then over the pump assembly. See Fig. 33.
10. Install the new belt (17) in the reverse order of disassembly. Before mounting the engine, check the belt deflection as in Step 11.
11. Halfway between both pulleys (69 & 10), press the belt toward the center with one finger. It should deflect 1/16 to 1/8 in. (2 to 3 mm). To adjust the belt, loosen the three screws (2 of 14 and 1 of 94) and move the engine forward to loosen the belt and back to tighten it. See Fig. 34.

Parts – Pump and Engine Assembly



- △ 1 Apply thread sealant
- △ 2 Torque to 40–45 ft-lb (54–61 N.m)
- △ 3 Torque to 100–110 in-lb (11.5–12.5 N.m)
- △ 4 Tube must drop freely into tube (2)
- △ 5 Torque to 180–200 in-lb (20–23 N.m)
- △ 6 Apply PTFE tape to top and bottom threads
- △ 7 Torque to 70–90 in-lb (8–10 N.m)
- △ 8 Lubricate threads
- △ 9 Torque to 320–360 in-lb (36–41 N.m)
- △ 10 Torque to 170–200 in-lb (19–23 N.m)
- △ 11 Torque to 280–300 in-lb (32–34 N.m)
- △ 12 Torque to 125–150 in-lb (14–17 N.m)
- △ 13 DO NOT alter position of nut
- △ 14 Torque to 23–27 in-lb (2.6–3 N.m)
- △ 15 Torque to 15–19 in-lb (1.7–2.2 N.m)
- △ 16 Press fit
- △ 17 Seal faces up

Parts – Pump and Engine Assembly

Model 235–032, Series B

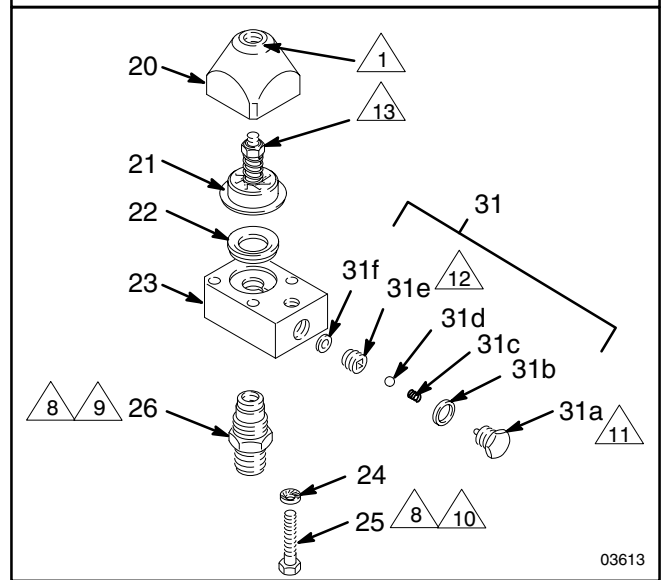
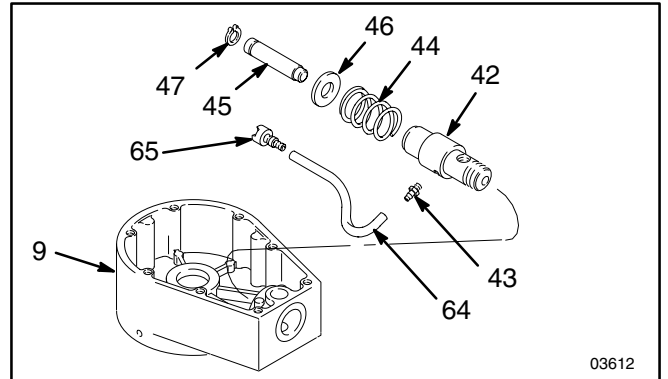
REF NO.	PART NO.	DESCRIPTION	QTY	REF NO.	PART NO.	DESCRIPTION	QTY
1	180–462	PIPE, pump, 5 gallon size	1	39	183–839	NUT, hex, M25 x 1.0	1
2	181–789	ROD, displacement	1	40	180–447	SEAL	2
3	181–816	SHIELD	1	41	103–255	O-RING, cylinder	1
4	218–728	PRESSURE CONTROL	1	42	183–840	CYLINDER, pump	1
5	108–152	VALVE, plug, fill	1	43	108–153	FITTING, hose, barbed	1
6	180–983	PLUG, fill	1	44	107–511	SPRING, compression	1
7	275–706	COVER, drive housing	1	45	180–479	PISTON 1	
9	181–801	HOUSING, drive	1	46	180–480	WASHER, spring	1
10	111–825	PULLEY, drive	1	47	107–517	RING, retaining, external	1
11	101–962	SETSCREW, sch, 1/4–20 x 3/8"	4	48	107–524	RING, retaining, external	1
12	108–469	BEARING, ball	1	49	107–513	KEY, woodruff	2
13	181–817	WASHER, 11/16"	1	50	180–449	ECCENTRIC, shaft	1
14	100–657	CAPSCREW, hex hd, 5/16–18 x 2"	2	51	107–516	BEARING	1
15	108–600	WASHER, wave	1	52	111–820	CAPSCREW, sch, 10–24 x 3/4"	6
16	100–020	LOCKWASHER, 3/16"	6	53	181–886	GASKET, housing	1
17	108–464	DRIVE BELT	1	54	107–518	BEARING, ball	1
18	111–718	ENGINE	1	55	107–519	SEAL, shaft	1
19	156–823	UNION, 1/4 npt(m) x 1/4 npt swivel	1	56	100–079	LOCKWASHER, No. 8	8
20	180–406	HOUSING, diaphragm	1	57	108–165	PACKING, o-ring, Buna–N	1
21	218–727	DIAPHRAGM	1	58	181–032	SEAL, tube	1
22	187–185	GUIDE, diaphragm	1	59	180–466	ROD, displacement, 5 gallon	1
23	187–920	HOUSING, pump	1	60	108–151	NUT, hex, 9/16" thread	1
24	109–042	WASHER, spring, rib	4	61	108–053	CAPSCREW, hex head, M4 x 0.7 x 10	1
25	107–514	CAPSCREW, hex head, M8 x 1.25	4	62	187–902	LABEL, identification	2
26	218–726	INLET VALVE	1	63	108–154	FITTING, hose, barbed	1
27	108–143	STRAINER 1		64	180–996	TUBE, filter	1
31	236–954	OUTLET CHECK VALVE ASSY.		65	180–998	FILTER, hydraulic oil	1
		Includes items 31a to 31f	1	67	191–872	ADAPTER, 1/8 npt to 1/4 npsm	1
31a	218–505	. PLUG, ball stop	1	68	187–901	HOUSING, drive	1
31b	180–454	. WASHER	1	69	111–720	PULLEY, drive	1
31c	112–619	. SPRING, compression	1	70	187–924	PLATE, mount	1
31d	112–618	. BALL, ceramic	1	74	100–258	SCREW, 8–32 x 3/8"	4
31e	218–968	. HOUSING, seat, valve	1	75	187–925	COVER, shield	1
31f	180–455	. SEAL, washer	1	81▲	179–761	TAG, warning <i>not shown</i>	1
33	168–372	KEY, straight	1	83▲	187–947	LABEL, Danger, Fire & Explosion	1
34	187–952	HOUSING, pressure control	1	84	108–484	SETSCREW, sch, 10–32 x 1/4"	2
35	105–335	SCREW, M4 x 0.7 x 10	2	85	181–761	SHAFT, engine	1
36	108–482	SCREW, flat sch, M6 X 1	1	86	108–533	PLUG, button	1
37	108–042	SCREW, M4 x 14.0	2	89	108–284	O-RING	1
38	181–768	BRACKET, shroud	1				

Parts – Pump and Engine Assembly

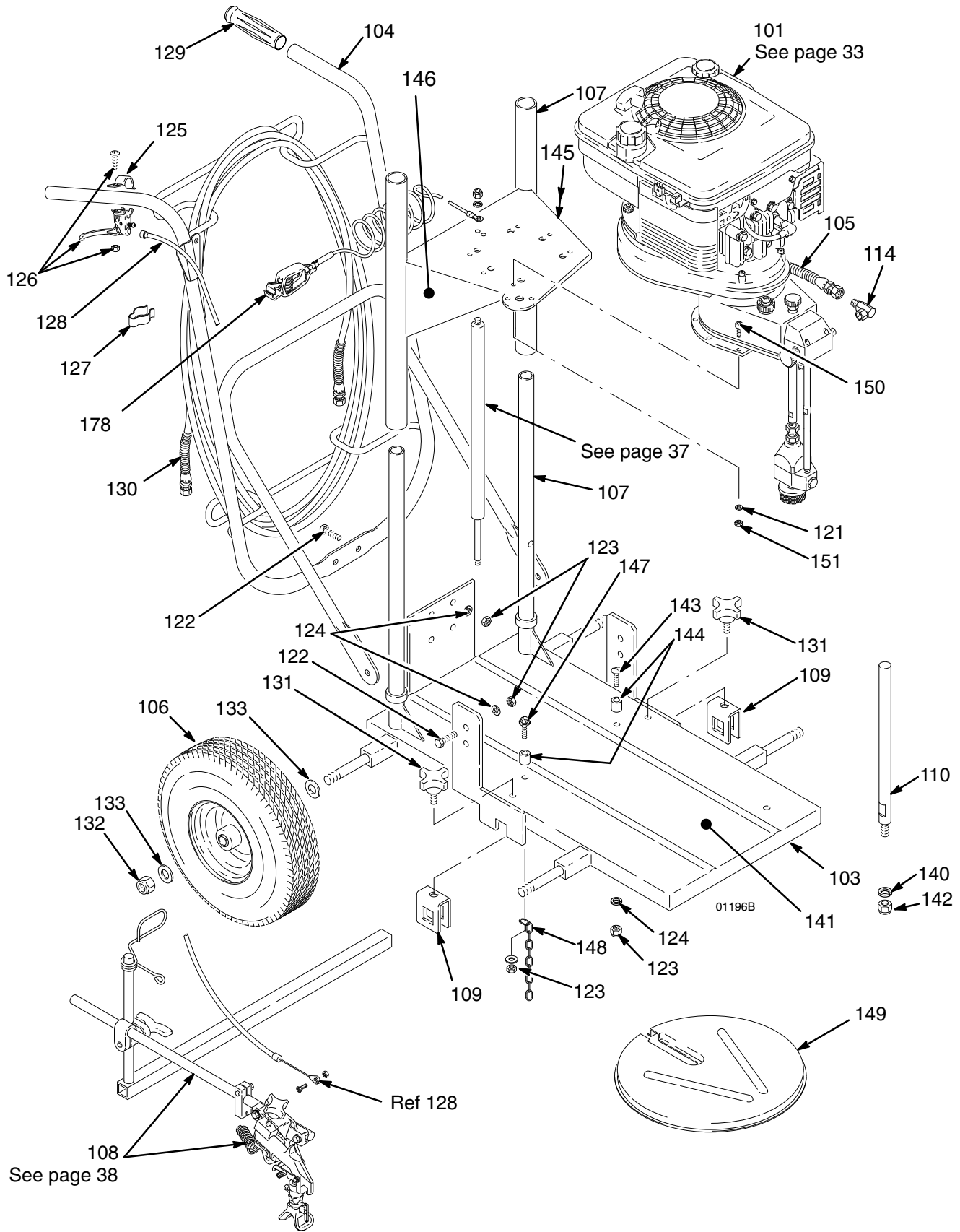
Model 235–032, Series B (Cont'd)

REF NO.	PART NO.	DESCRIPTION	QTY
90	218-933	SPRING SET; <i>includes 2 replacement springs (not shown) same as 31c</i>	1
92	100-188	NUT, heavy hex, 5/16-18 unc-2a	3
93	100-214	LOCKWASHER, spring, 5/16"	3
94	111-821	CAPSCREW, sch, 8-32 x 1-3/4"	4
97	111-822	CAPSCREW, sch, 5/16-18 x 3"	1
98	181-867	BRACKET, lever, release	1
99	181-000	LABEL, pressure control	1
105	187-060	GASKET	1
106	187-057	KNOB, control	1
107	187-953	NUT, seat	1
108	111-317	RING, retaining	1
109	168-110	O-RING	1
110	107-536	BALL	1
111	183-548	SEAT, ball	1

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



Parts – Sprayer Assembly

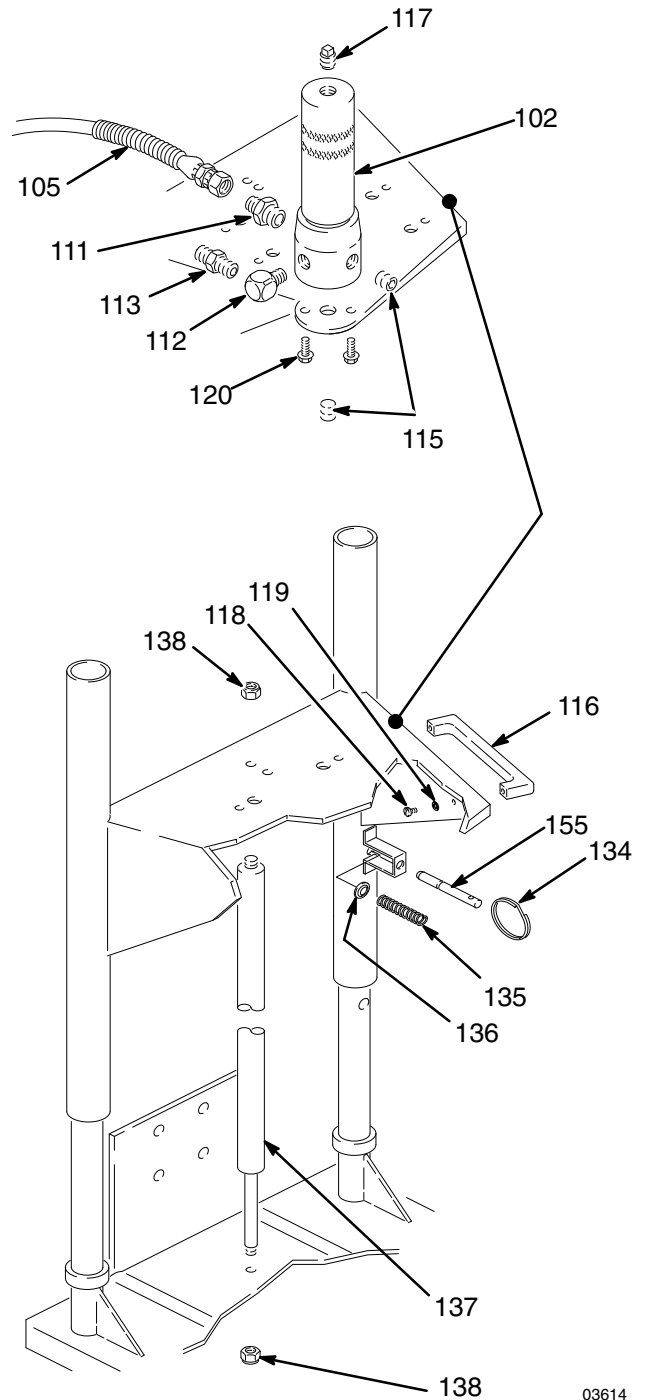


Parts – Sprayer Assembly

Model 231–205, Series A

REF NO.	PART NO.	DESCRIPTION	QTY
101	235-032	PUMP, 1/4 GPM	1
102	218-029	FLUID FILTER, <i>see 307-273 for parts</i>	1
103	235-031	CART	1
104	224-021	HANDLE	1
105	235-493	HOSE, nylon, 1/4" ID, 28" long, cpld 1/4 npsm(f), spring guards both ends	1
106	111-719	WHEEL	4
107	235-030	BRACKET, lift	1
108	235-033	GUN KIT	1
109	224-136	CLAMP	2
110	187-926	BAR, gun holder	1
111	164-672	ADAPTER, 3/8-18 npt x 1/4-18 npsm	1
112	100-840	ELBOW, street, 1/4-18 npt(f) x 1/4-18 npt (m)	1
113	162-453	NIPPLE, hex, 1/4 npsm x 1/4 npt, 1-3/16"	1
114	155-541	UNION, swivel, 90°, 1/4 npt(m) x 1/4 nps (f) swivel	1
115	100-509	PLUG, pipe, soc hd, 1/4 npt	2
116	103-250	HANDLE	1
117	100-040	PLUG, 3/8 npt	1
118	100-264	SCREW, pnh, 10-24 x 5/16"	2
119	100-020	LOCKWASHER, 3/16"	3
120	110-997	SCREW, washer/hex hd, 5/16"	2
121	100-016	LOCKWASHER, 1/4"	7
122	100-004	CAPSCREW, hex hd, 3/8-16 x 1-1/4"	4
123	100-307	NUT, hex, 3/8"	5
124	100-731	WASHER, 3/8"	5
125	186-787	BRACKET, release lever	1
126	111-197	LEVER, release	1
127	108-495	CLAMP, cable	3
128	111-721	CABLE	1
129	108-063	GRIP, handle	2
130	238-360	HOSE, nylon, 1/4" ID, cpld 1/4 npsm, spring guards both ends, 7.1 m (25')	1
131	108-471	KNOB	2
132	101-712	LOCKNUT, 5/8"	4
133	111-841	WASHER, flat, 5/8"	8
134	108-061	RING	1
135	111-727	SPRING, compression	1
136	111-728	RING, snap	1
137	111-722	SPRING, gas	1
138	104-541	LOCKNUT, nylon insert, M8 x 1.25	2
140	100-276	LOCKWASHER, 3/8"	1
141	187-944	LABEL, identification	1
142	101-566	LOCKNUT, 3/8-16 w/nylon insert	1
143	111-193	CAPSCREW, flangehd, 3/8-16 x 1-1/4"	1
144	181-868	SPACER	2
145▲	187-922	LABEL, Warning, injection	1
146▲	187-923	LABEL, Warning, Injection	1
147	111-194	CAPSCREW, flangehd, 3/8-16 x 2"	1
148	188-126	GROUND CHAIN, heavy, 17-5/8" long	1
149	181-869	COVER, pail	1
150	100-644	CAPSCREW, 1/4-20 x 3/4"	6
151	100-015	NUT, hex, 1/4-20	6
155	187-945	PIN, quick release	1
178	237-686	GROUNDING CLAMP ASSY	1

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

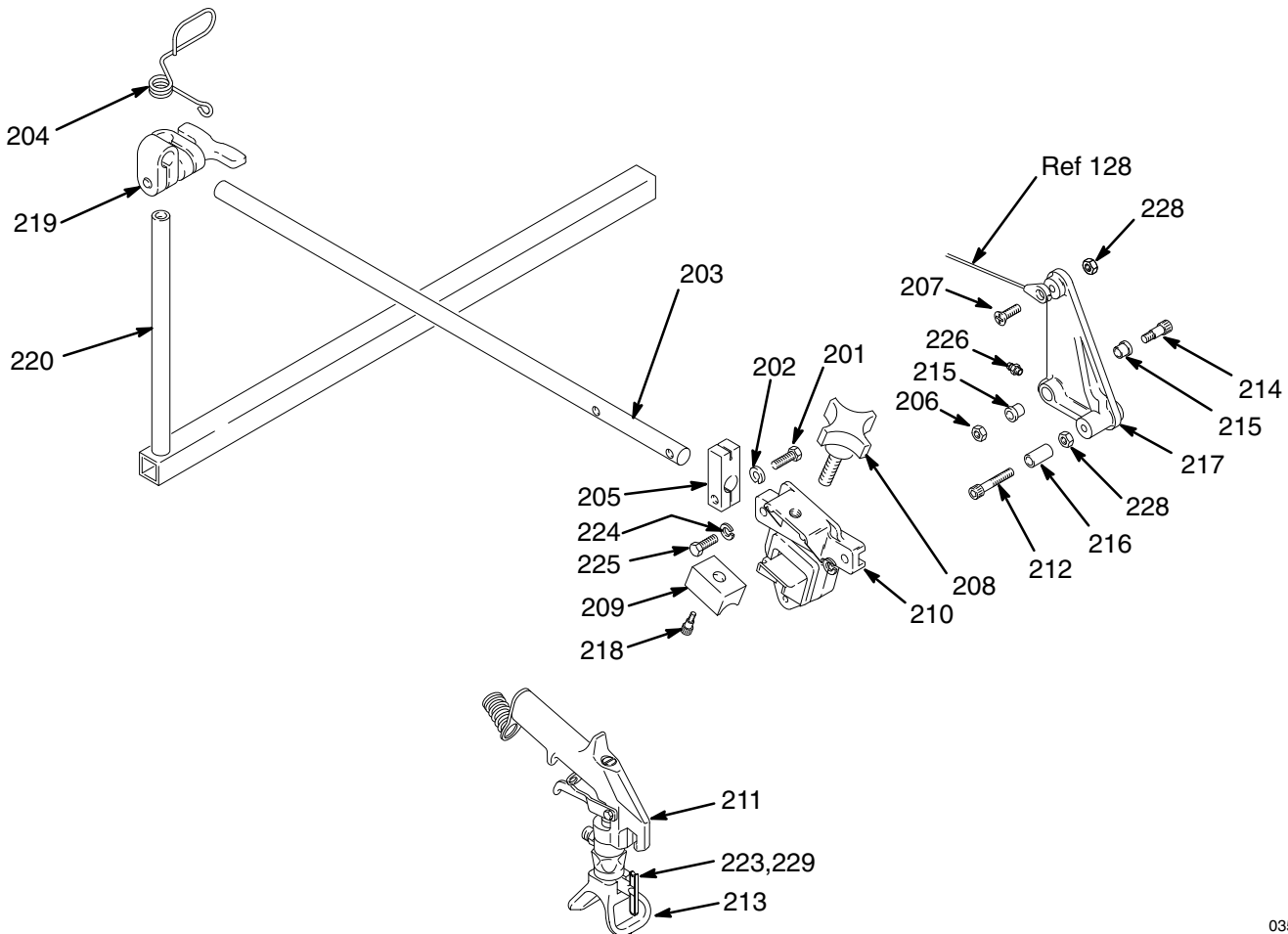


03614

Parts – Gun Mounting

Model 235–033, Gun Kit

REF NO.	PART NO.	DESCRIPTION	QTY	REF NO.	PART NO.	DESCRIPTION	QTY
201	100–101	CAPSCREW, hex hd, 3/8–16 x 1"	1	213	220–422	RAC IV DripLess TIP GUARD	1
202	100–133	LOCKWASHER, 3/8"	1	214	111–045	SCREW, shoulder, sch, 5/16 x 1"	1
203	181–734	ARM, support	1	215	111–016	BEARING, flanged	2
204	188–135	GUIDE, cable	1	216	108–535	BEARING, sleeve	1
205	186–699	BLOCK, mounting cable	1	217	186–747	LEVER, actuator	1
206	100–015	NUT, hex, 1/4–20	1	218	108–483	SCREW, shoulder, 1/4 x 3/8"	1
207	111–230	SCREW, flhd, 1/4–20 x 1"	1	219	114–029	CLAMP, gun arm	1
208	181–818	KNOB	1	220	224–096	BAR, carriage	1
209	181–795	JAW, clamp	1	223	LLT–315	LineLazerTip, Size 315	1
210	18 8–452	HOLDER, gun	1	224	100–021	CAPSCREW, hex hd, 1/4–20 x 1"	2
211	235–457	FLEX GUN <i>See manual 308–235 for parts</i>	1	225	100–016	LOCKWASHER, 1/4"	2
212	107–445	CAPSCREW, sch, 1/4–20 x 1–1/2"	1	226	100–846	FITTING, lubrication	1
				228	101–345	NUT, hex, jam, 1/4–20	2
				229	221–415	SwitchTip, Size 415	1



03545

Manual Change Summary

Changes have been incorporated to reflect various production improvements.

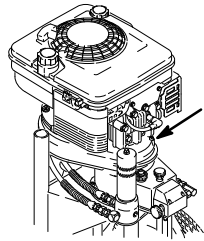
Accessories

DANGER LABELS

The English language DANGER label shown on page 1 is on your sprayer. If you have painters who do not read English, order from the following labels and apply to your sprayer. The drawing below indicates the best label placement for good visibility.

Order the labels directly from Graco, free of charge. Toll Free: 1-800-367-4023

French	185-956
Spanish	185-961
German	186-041
Greek	186-045
Korean	186-049
English	187-947



Apply other language DANGER labels here

Technical Data

Engine	Briggs & Stratton, 4 HP, single cylinder, air cooled	Weight	175 lb (79 kg)
Spark Plug	Champion RJ19LM or equivalent	Dimension	
Pressure Operating Range ..	0–3000 psi (0–210 bar)	Height	39.5 in. (1003 mm)
Maximum Fluid Delivery	0.28 GPM (1.1 liter/min)	Width	without gun bar: 26 in. (660 mm) with gun bar: 31 in. (787 mm)
Fluid Outlet Size	1/4 npsm(m)	Length	45 in. (1143 mm)
Wetted Parts	Stainless steel, Zinc-plated steel, Carbide, Nylon, Delrin®		

Graco Phone Number

TO PLACE AN ORDER, contact your Graco distributor, or call this number to identify the distributor closest to you:
1-800-367-4023 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.

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.

FOR GRACO CANADA CUSTOMERS

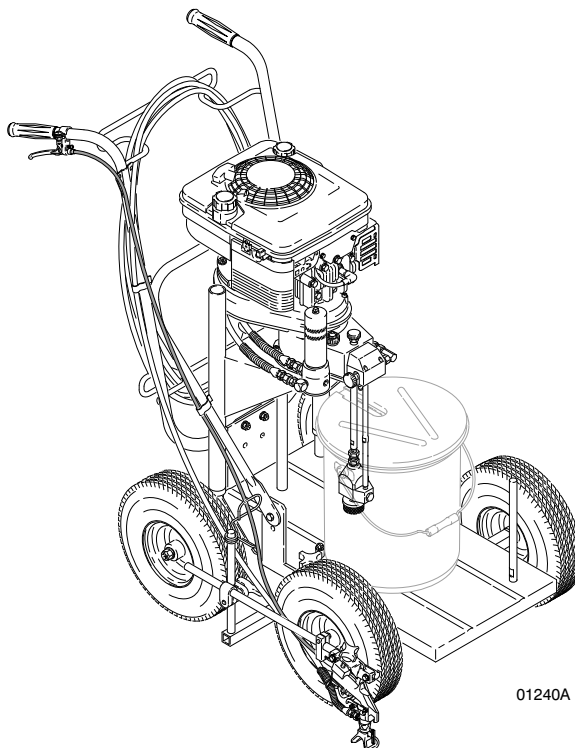
The parties acknowledge that they have required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présente document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

*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

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

PRINTED IN U.S.A. 308-203 March 1993, Revised April 1997



Model 231-205
Includes Flex Gun, RAC IV® DripLess™ tip guard,
size 315 SwitchTip™, pail cover, and 25 ft (7 m) hose

Technical Data

Maximum Working Pressure 3000 psi (210 bar)
Engine 4 HP, Briggs & Stratton
Spark Plug Champion RJ19LM or equivalent
Fuel Tank Capacity 1.5 quart (1.4 liter)
Cycles/Gallon (liter) 200 (53)
Delivery 0.28 gpm (1.1 lpm)
Tip Size one gun to 0.017 tip
with latex at 2000 psi (138 bar)
Fluid Inlet 3/4 npt(m)
Inlet Paint Strainer 16 mesh (1190 micron)
stainless steel screen, reusable
Fluid Outlet Size 1/4 npsm(m)
Fluid Filter zinc-plated carbon steel,
stainless steel
60 mesh (250 micron) reusable SST screen
Spray Hose Requirements grounded,
50 ft (15 m) minimum, non-wire braid,
spring guards on both ends
Pump Material zinc-plated carbon steel, stainless
steel, tungsten carbide, nylon, Delrin®

Application

Sprays finishes from stains to heavier architectural coatings. **Do not** use with solvents such as methylene chloride or other HHCs.

Dimensions

Height 39.5 in. (1003 mm)
Length 45 in. (1143 mm)
Width 31 in. (787 mm)
Weight 175 lb (79 kg)



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

©COPYRIGHT 1995, GRACO INC.
PRINTED IN U.S.A. 3Z8-203 August 1995

**TO PLACE AN ORDER, call
1-800-367-4023 Toll Free**

**FOR TECHNICAL ASSISTANCE, call
1-800-543-0339 Toll Free**

Supplement to instruction manual 308-203.

Line Lazer LD™

⚠ WARNING



INJECTION HAZARD

This form is only a quick reference to the features and frequently ordered parts of this sprayer. To reduce the risk of serious injury, including fluid injection, while operating or repairing this sprayer, follow the warnings and instructions in manual 308-203.

Model 231-205, Series A

Ref No.	Part No.	Description
1	235-032	Pump Assembly (includes items 2 to 20)
2	111-718	Engine
3	108-469	Bearing
4	108-464	Drive Belt
5	180-449	Eccentric
6	107-516	Bearing
7	180-447	Seal
8	108-165	O-ring
9	181-032	Tube Seal
10	107-519	Shaft Seal
11	107-518	Bearing
12	221-131	Pressure Control
13	103-255	O-ring
14	218-904	Bypass Valve
15	108-143	Strainer
16	180-406	Diaphragm Housing
17	218-727	Diaphragm
18	187-185	Diaphragm Guide
19	187-920	Pump Housing
20	218-726	Inlet Valve
21	236-954	Outlet Check Valve
21a	218-505	. Plug
21b	180-454	. Washer
21c	112-679	. Spring
21d	112-618	. Ball
21e	218-968	. Valve Seat Housing
21f	180-455	. Seal
22	218-029	Fluid Filter
23	111-197	Release Lever
24	186-787	Release Lever Bracket
25	111-721	Cable
26	224-021	Handle
27	235-030	Lift Bracket
28	▲ 187-923	Warning Label

▲ Extra warning labels are available for free.

