

# LineLazer V 250SPS and 250DC Self-Propelled Line Striper

3A3394H  
EN

**For the application of line striping materials.  
For professional use only. For outdoor use only.  
Not for use in explosive atmospheres or hazardous locations.**

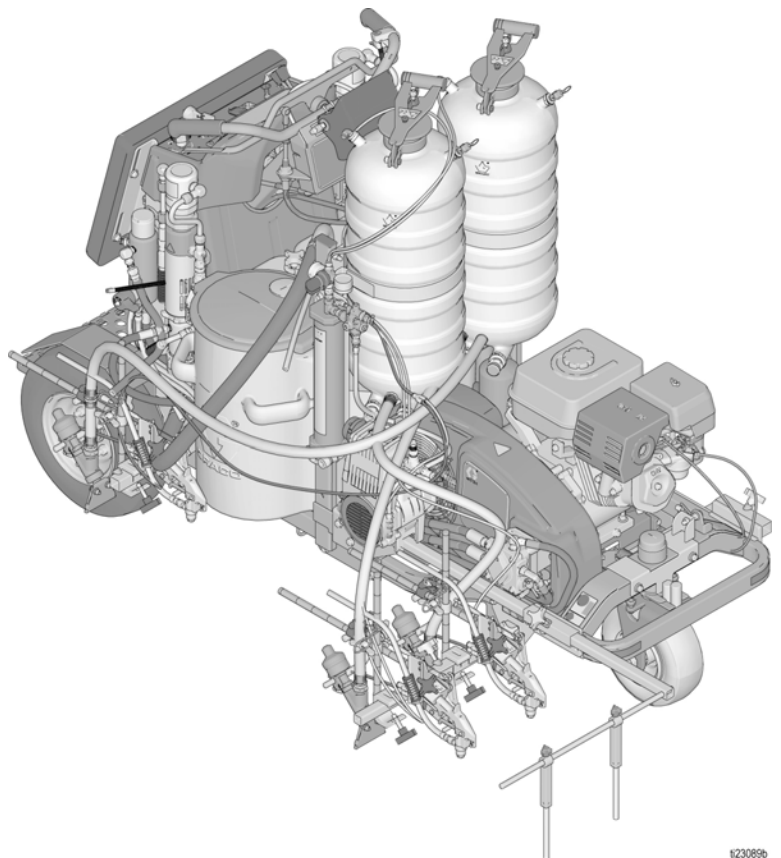
Maximum Operating Speed: 10 mph (16 kph)  
Maximum Operating Pressure: 3300 psi (22.8 MPa, 228 bar)



**IMPORTANT SAFETY INSTRUCTIONS**

Read all warnings and instructions in this manual and in related manuals.  
Be familiar with the controls and the proper usage of the equipment.  
Save these instructions.

Model	Guns	Pressurized Bead System	Description
17H471	2	No	LLV 250DC
17H472	3	No	LLV 250DC
17H473	2	Yes - 2 Tank	LLV 250DC
25P365	2	Yes - 2 Tank	LLV 250DC
17H474	3	Yes - 2 Tank	LLV 250DC
17H466	1	No	LLV 250SPS
17H467	2	No	LLV 250SPS
17H468	1	Yes - 1 Tank	LLV 250SPS
17J951	2	Yes - 1 Tank	LLV 250SPS
17H469	2	Yes - 2 Tank	LLV 250SPS



Related Manuals:	
3A3393	Operation
311254	Gun
309277	Pump
3A3428	Auto-Layout Applications Methods
332230	Pressurized Bead System (PBS)
3A6981	Steering Cable Replacement













*Use only genuine Graco replacement parts.  
The use of non-Graco replacement parts may void warranty.*

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# Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 <h1 style="margin: 0;">WARNING</h1>	
 	<p><b>TRAFFIC HAZARD</b></p> <p>Being struck by other vehicles may result in serious injury or death.</p> <ul style="list-style-type: none"> <li>• Do not operate in traffic.</li> <li>• Use appropriate traffic control in all traffic areas.</li> <li>• Follow local highway and transportation regulations for traffic control (for example: Manual on Uniform Traffic Control Devices, U.S. Department of Transportation).</li> </ul>
   	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Flammable fumes, such as solvent and paint fumes, in <b>work area</b> can ignite or explode. Paint or solvent flowing through the equipment can cause static sparking. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Use equipment only in well ventilated area.</li> <li>• Do not fill fuel tank while engine is running or hot; shut off engine and let it cool. Fuel is flammable and can ignite or explode if spilled on hot surface.</li> <li>• Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).</li> <li>• Ground all equipment in the work area. See <b>Grounding</b> instructions.</li> <li>• Never spray or flush solvent at high pressure.</li> <li>• Keep work area free of debris, including solvent, rags and gasoline.</li> <li>• Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.</li> <li>• Use only grounded hoses.</li> <li>• Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are anti-static or conductive.</li> <li>• <b>Stop operation immediately</b> if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a working fire extinguisher in the work area.</li> </ul>
    	<p><b>SKIN INJECTION HAZARD</b></p> <p>High-pressure spray is able to inject toxins into the body and cause serious bodily injury. In the event that injection occurs, <b>get immediate surgical treatment.</b></p> <ul style="list-style-type: none"> <li>• Do not aim the gun at, or spray any person or animal.</li> <li>• Keep hands and other body parts away from the discharge. For example, do not try to stop leaks with any part of the body.</li> <li>• Always use the nozzle tip guard. Do not spray without nozzle tip guard in place.</li> <li>• Use Graco nozzle tips.</li> <li>• Use caution when cleaning and changing nozzle tips. In the case where the nozzle tip clogs while spraying, follow the <b>Pressure Relief Procedure</b> for turning off the unit and relieving the pressure before removing the nozzle tip to clean.</li> <li>• Equipment maintains pressure after power is shut off. Do not leave the equipment energized or under pressure while unattended. Follow the <b>Pressure Relief Procedure</b> when the equipment is unattended or not in use, and before servicing, cleaning, or removing parts.</li> <li>• Check hoses and parts for signs of damage. Replace any damaged hoses or parts.</li> <li>• This system is capable of producing 3300 psi. Use Graco replacement parts or accessories that are rated a minimum of 3300 psi.</li> <li>• Always engage the trigger lock when not spraying. Verify the trigger lock is functioning properly.</li> <li>• Verify that all connections are secure before operating the unit.</li> <li>• Know how to stop the unit and bleed pressure quickly. Be thoroughly familiar with the controls.</li> </ul>







# WARNING

	<p><b>CARBON MONOXIDE HAZARD</b></p> <p>Exhaust contains poisonous carbon monoxide, which is colorless and odorless. Breathing carbon monoxide can cause death.</p> <ul style="list-style-type: none"> <li>Do not operate in an enclosed area.</li> </ul>
 	<p><b>EQUIPMENT MISUSE HAZARD</b></p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See <b>Technical Data</b> in all equipment manuals.</li> <li>Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheet (SDS) from distributor or retailer.</li> <li>Do not leave the work area while equipment is energized or under pressure.</li> <li>Turn off all equipment and follow the <b>Pressure Relief Procedure</b> when equipment is not in use.</li> <li>Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.</li> <li>Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.</li> <li>Make sure all equipment is rated and approved for the environment in which you are using it.</li> <li>Use equipment only for its intended purpose. Call your distributor for information.</li> <li>Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.</li> <li>Do not kink or over bend hoses or use hoses to pull equipment.</li> <li>Keep children and animals away from work area.</li> <li>Comply with all applicable safety regulations.</li> </ul>
	<p><b>PRESSURIZED ALUMINUM PARTS HAZARD</b></p> <p>Use of fluids that are incompatible with aluminum in pressurized equipment can cause serious chemical reaction and equipment rupture. Failure to follow this warning can result in death, serious injury, or property damage.</p> <ul style="list-style-type: none"> <li>Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents.</li> <li>Do not use chlorine bleach.</li> <li>Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.</li> </ul>
 	<p><b>MOVING PARTS HAZARD</b></p> <p>Moving parts can pinch, cut or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> <li>Keep clear of moving parts.</li> <li>Do not operate equipment with protective guards or covers removed.</li> <li>Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the <b>Pressure Relief Procedure</b> and disconnect all power sources.</li> </ul>
 	<p><b>ENTANGLEMENT HAZARD</b></p> <p>Rotating parts can cause serious injury.</p> <ul style="list-style-type: none"> <li>Keep clear of moving parts.</li> <li>Do not operate equipment with protective guards or covers removed.</li> <li>Do not wear loose clothing, jewelry or long hair while operating equipment.</li> <li>Equipment can start without warning. Before checking, moving, or servicing equipment, follow the <b>Pressure Relief Procedure</b> and disconnect all power sources.</li> </ul>









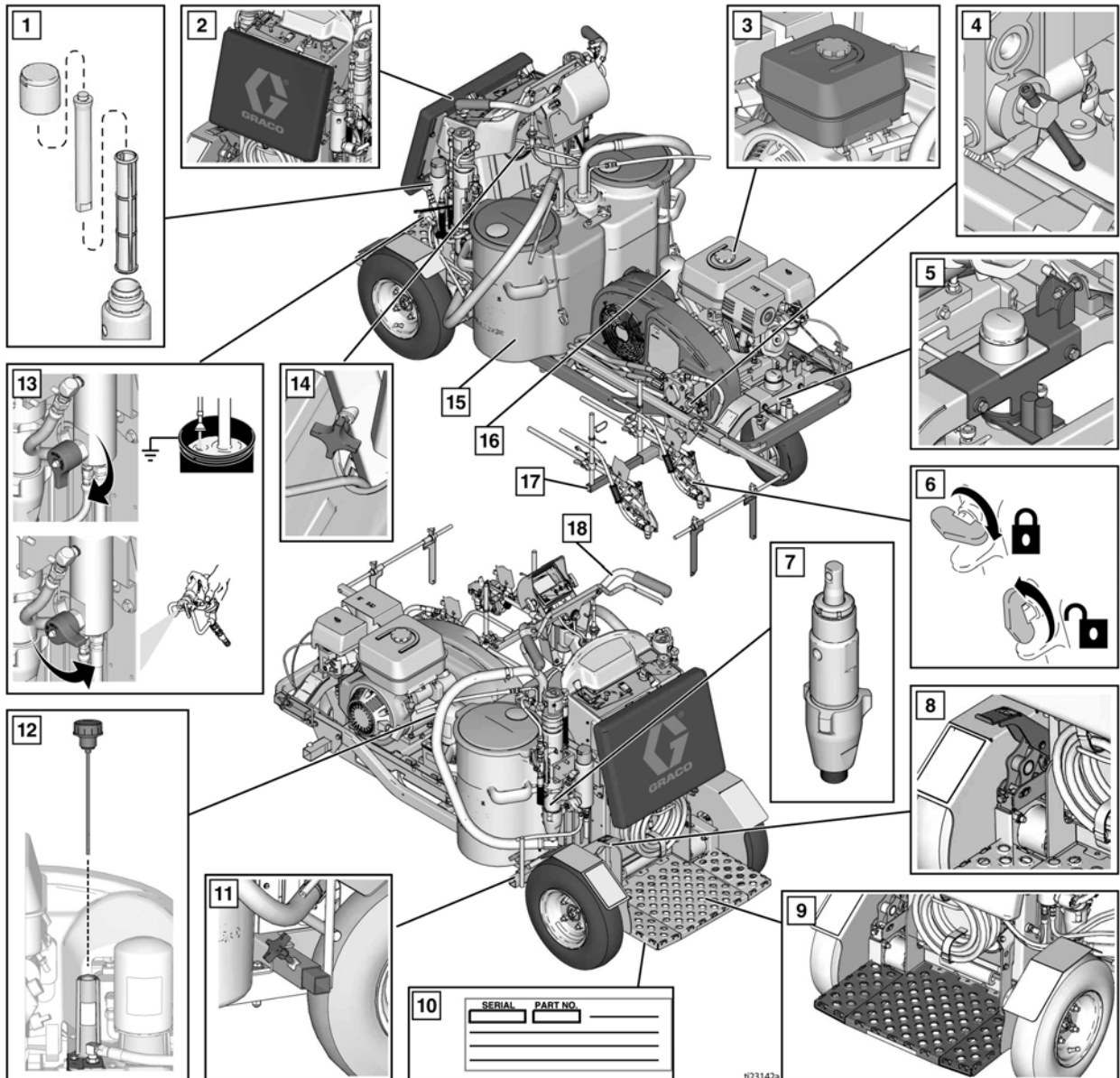
# WARNING

	<p><b>TOXIC FLUID OR FUMES HAZARD</b></p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> <li>• Read Safety Data Sheet (SDS) to know the specific hazards of the fluids you are using.</li> <li>• Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.</li> </ul>
	<p><b>BURN HAZARD</b></p> <p>Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns:</p> <ul style="list-style-type: none"> <li>• Do not touch hot fluid or equipment.</li> </ul>
	<p><b>PERSONAL PROTECTIVE EQUIPMENT</b></p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• Protective eyewear, and hearing protection.</li> <li>• Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.</li> </ul>
	<p><b>BATTERY HAZARD</b></p> <p>The battery may leak, explode, cause burns, or cause an explosion if mishandled. Contents of an open battery can cause severe irritation and/or chemical burns. If on skin, wash with soap and water. If in eyes, flush with water for at least 15 minutes and get immediate medical attention.</p> <ul style="list-style-type: none"> <li>• Only use the battery type specified for use with the equipment. See <b>Technical Data</b>.</li> <li>• Replace battery only in well-ventilated area and away from flammable or combustible materials, including paints and solvents.</li> <li>• Do not dispose of battery in fire or heat above 50°C (122°F). The battery is capable of exploding.</li> <li>• Do not throw into fire.</li> <li>• Do not expose battery to water or rain.</li> <li>• Do not disassemble, crush, or penetrate the battery.</li> <li>• Do not use or charge a battery that is cracked or damaged.</li> <li>• Follow local ordinances and/or regulations for disposal.</li> </ul>

## Important Laser Information for Units with Laser Option

 <b>WARNING</b>	
	<p><b>LASER LIGHT HAZARD: AVOID DIRECT EYE CONTACT</b></p> <p>Eye exposure to Class IIIa/3R levels of laser light can potentially present an eye (retinal) injury hazard, including spot blindness or other retinal injury. To avoid direct eye exposure:</p> <ul style="list-style-type: none"> <li>• Never look directly in to a laser beam or point the beam into the eyes of others, even at long distances.</li> <li>• Never shine the laser at mirror like surfaces which can cause specular reflections of the beam.</li> <li>• Always set the laser at a height and angle that prevents the beam from shining into people's eyes.</li> <li>• Immediately terminate laser emissions if personnel, animals or reflective objects approach the beam.</li> <li>• Always turn off laser when unattended.</li> <li>• Do not remove any warning labels from the laser.</li> <li>• Only properly trained laser operators are to use this product.</li> <li>• Never allow beams to be aimed toward traffic, vehicles, or heavy equipment. Even when not damaging at long distances, the high brightness of lasers can distract or disrupt vehicle operations.</li> <li>• Never point a laser at an aircraft or law enforcement personnel. This is considered a felony in most locations, with the possibility of jail time, heavy fines or both.</li> <li>• Do not disassemble laser product. Return to factory for all service procedures.</li> <li>• Laser must be turned OFF when cleaning the lens, so as not to create unwanted laser refraction.</li> </ul>
	<p><b>LASER RADIATION HAZARD</b></p> <p>Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.</p> <ul style="list-style-type: none"> <li>• Do not attempt to open or disassemble the laser housing under any circumstances. Doing so may cause exposure to potentially hazardous levels of laser radiation.</li> <li>• No serviceable parts within. Unit is factory sealed.</li> </ul>
	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Connecting directly to a generator source can create a short or sparking under certain conditions.</p> <ul style="list-style-type: none"> <li>• Only connect GL1700 to a dedicated 12 volt DC battery source.</li> </ul>

# Component Identification (LLV 250DC Shown)

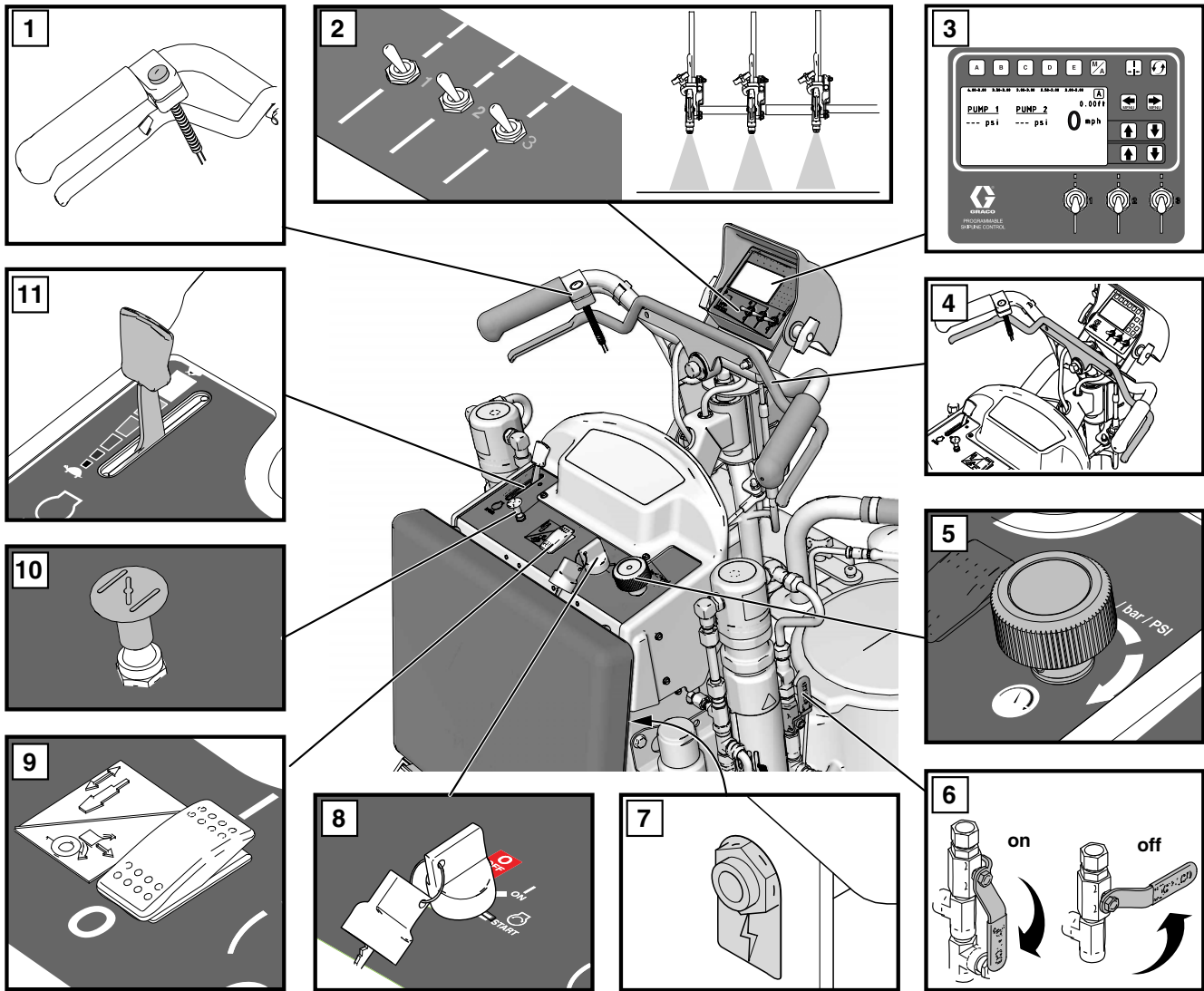


1	Paint filter, both sides
2	Adjustable pad
3	Engine fuel cap
4	Wheel motor bypass valve
5	Straight line adjuster
6	Gun trigger lock
7	Displacement pump, both sides
8	Brake
9	Operator platform

10	Serial label under operator platform
11	Rear gun arm mount, both sides
12	Hydraulic fill cap/dipstick
13	Prime/drain valve, both sides
14	Handle bar height adjustment knob
15	Two paint hoppers (15 gallon/56 liter)
16	Hydraulic oil filter
17	Front gun mount, both sides
18	Steering handle

\*LLV 250SPS has only 1 paint hopper and 1 pump.

# Component Identification (Controls)



ti23143a

1	Gun trigger control
2	Gun 1, 2, 3 selector
3	Display
4	Forward/reverse lever
5	Pressure control
6	Hydraulic pump valve, both sides

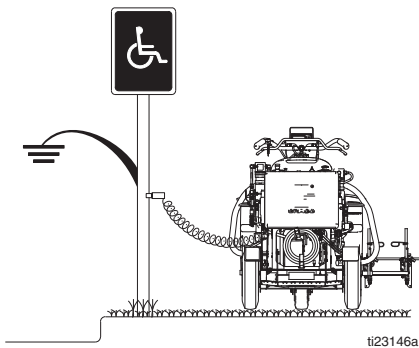
7	12V accessory jack
8	Engine key switch, OFF - ON - Start
9	Engine clutch switch
10	Engine choke
11	Engine throttle

# Grounding Procedure (For Flammable Materials Only)

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This equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current.

1. Position striper so that the tires are not on pavement.
2. Striper is shipped with a grounding clamp. Grounding clamp must attach to grounded object (e.g. metal sign post).

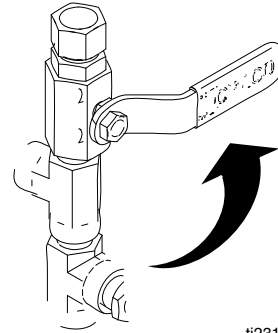


# Pressure Relief Procedure

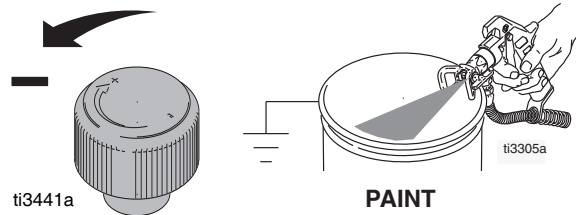

This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

1. Perform **Grounding Procedure** if using flammable materials.

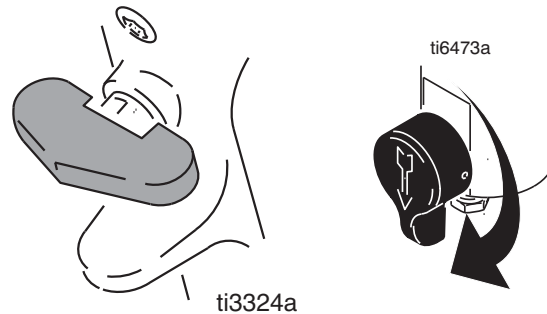
2. Set pump valve(s) to **OFF** (250SPS has one pump valve; 250DC has two pump valves). Turn engine **OFF**.



3. Turn pressure control to lowest setting. Trigger all guns to relieve pressure.



4. Engage all gun trigger locks. Turn prime valve(s) down (250SPS has one prime valve; 250DC has two prime valves).



5. If you suspect the spray tip or hose is clogged or that pressure has not been fully relieved:
  - a. **VERY SLOWLY** loosen the tip guard retaining nut or the hose end coupling to relieve pressure gradually.
  - b. Loosen the nut or coupling completely.
  - c. Clear the obstruction in the hose or tip.

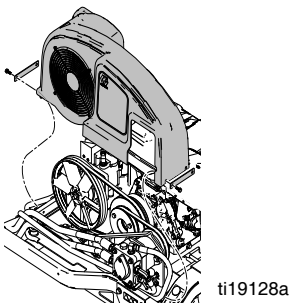


# Ground Drive Belt Replacement

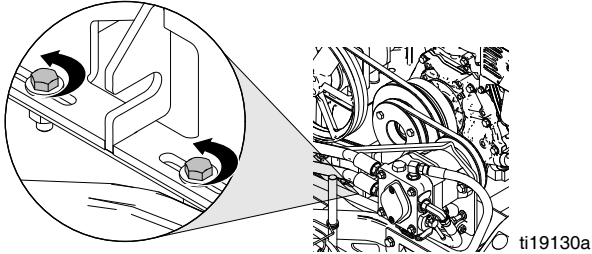
## Removal



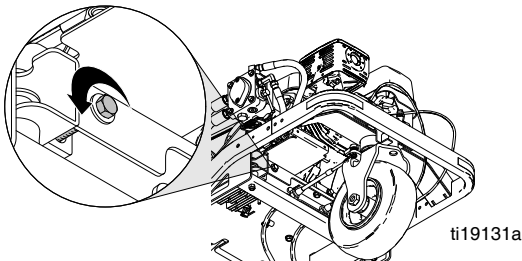
1. If equipped with a Pressurized Bead System, remove pressurized bead tanks and compressor, see Pressurized Bead System manual 332230.
2. Loosen four screws and remove belt cover.



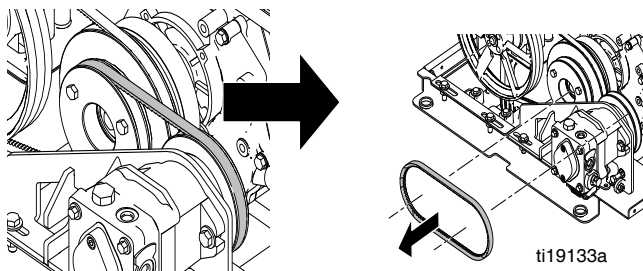
3. Loosen two hold-down bolts.



4. Loosen tension bolt to bring two pulleys closer together to create slack in the belt.

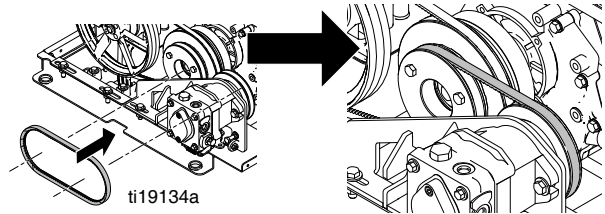


5. Remove belt.

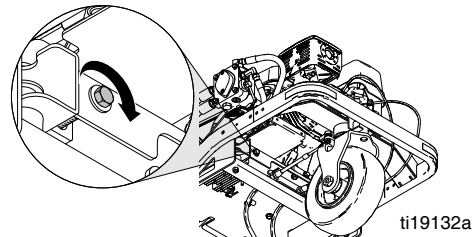


## Installation

1. Install belt onto pulleys.



2. Tighten tensioning bolt to move two pulleys apart and tighten belt to proper tension (see table).



Ground Drive Belt Tension Recommendations		
New Belt	Tension	53 +/- 2 Lbf (236 +/- 9 N)
	Frequency	167 +/- 3 Hz
Used Belt	Tension	45 +/- 2 Lbf (200 +/- 9 N)
	Frequency	155 +/- 3 Hz

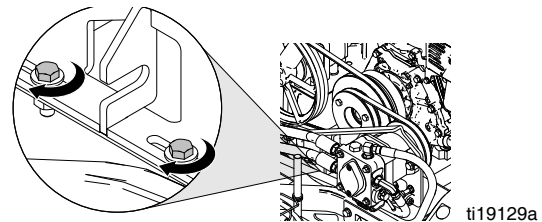
Gates Sonic Tension Meter

Settings: M = MASS = 85 g/m

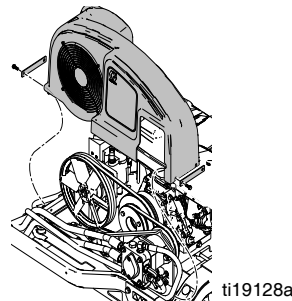
W = # of belts = 1

S = Span = 157 mm

3. Install mounting plate and tighten two hold-down bolts.



4. Replace belt cover and tighten four screws.



5. If equipped with a Pressurized Bead System, install pressurized bead tanks and compressor, see Pressurized Bead System manual 332230.



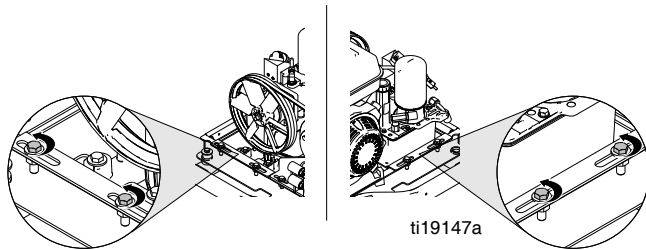
# Oil Reservoir Belt Replacement



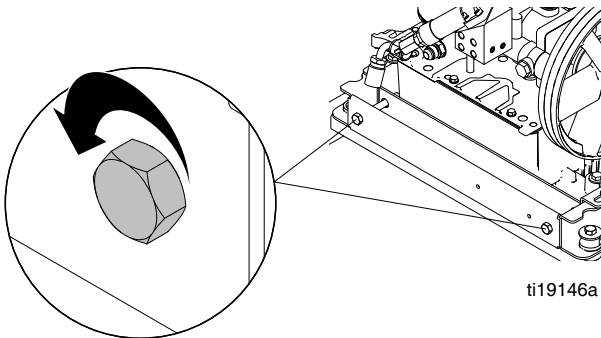
## Removal

**NOTE:** Ground drive belt must be removed before oil reservoir belt can be replaced, see **Ground Drive Belt Replacement**, page 10.

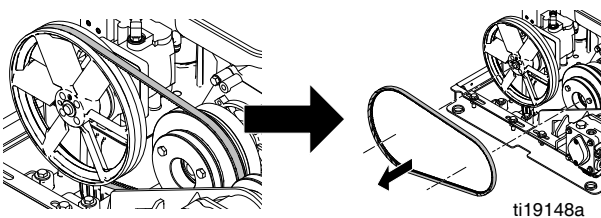
1. Loosen four hold-down bolts.



2. Loosen two adjustment bolts to bring pulleys closer together to create slack in the belt.

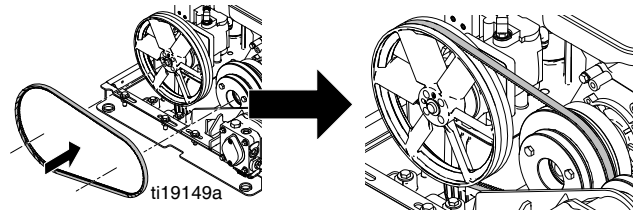


3. Remove belt.

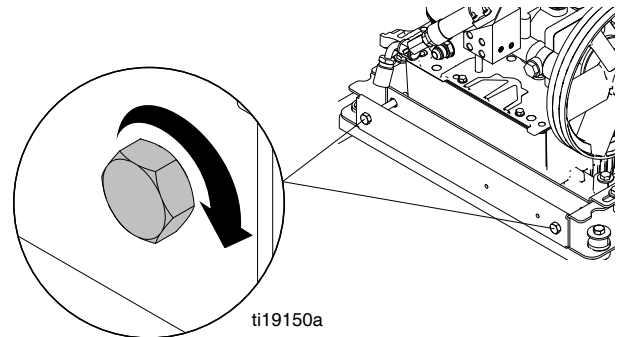


## Installation

1. Replace belt.



2. Tighten two adjustment bolts evenly and maintain belt alignment. Tighten belt to proper tension (see table).



Oil Reservoir Belt Tension Recommendations		
New Belt	Tension	55 +/- 2 Lbf (245 +/- 9 N)
	Frequency	114 +/- 2 Hz
Used Belt	Tension	48 +/- 2 Lbf (214 +/- 9 N)
	Frequency	106 +/- 2 Hz

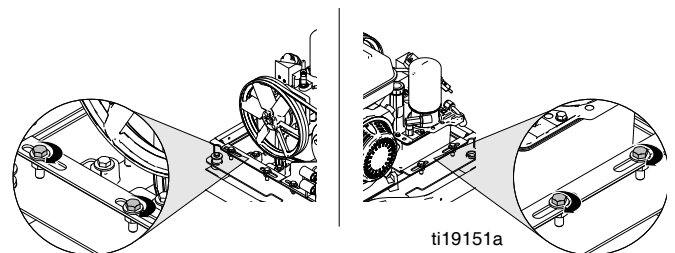
Gates Sonic Tension Meter

Settings: M = MASS = 85 g/m

W = # of belts = 1

S = Span = 236 mm

3. Tighten four hold-down bolts.



4. Install **Ground Drive Belt** and tighten to proper tension, see **Ground Drive Belt Replacement**, page 10.

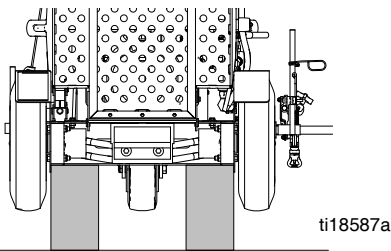
# Hydraulic System Purging



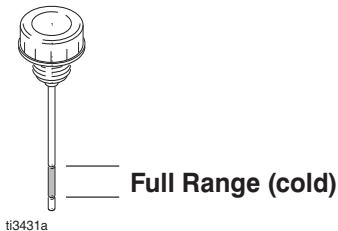
This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

Follow this procedure after replacing any hydraulic component other than the hydraulic gun manifold which is self-purging.

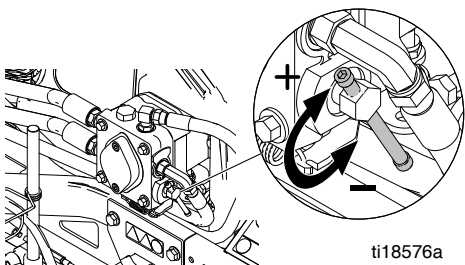
1. Perform **Pressure Relief Procedure**, page 9.
2. Set LineStriper on blocks so wheels are off ground.



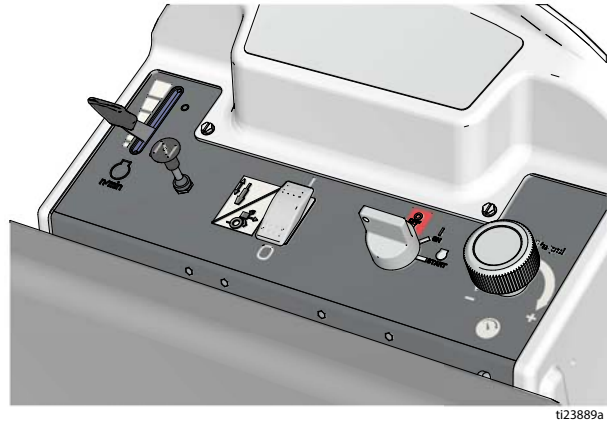
3. Fill oil reservoir to "Full" range.



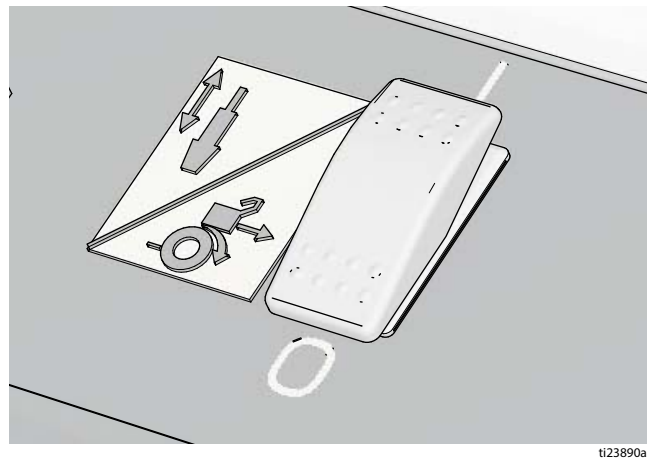
4. Make sure drive wheel release is closed (+).



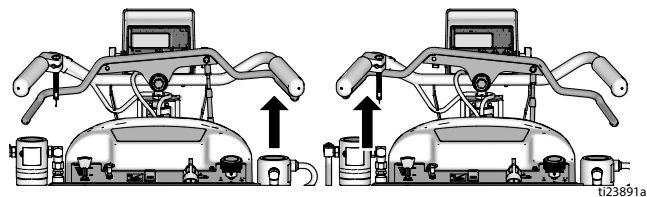
5. Start engine and run at low speed.



6. Turn on the Main Power Switch to engage clutch.

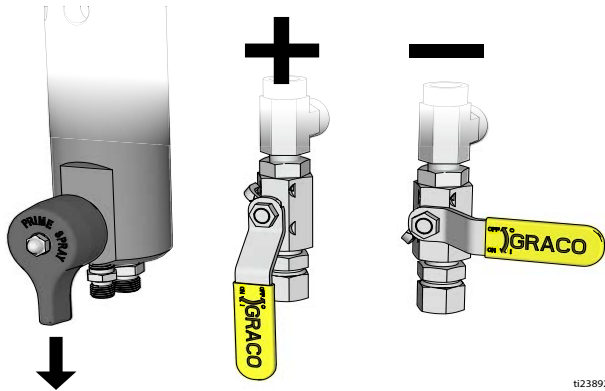


7. Slowly pull forward/reverse control lever in forward and reverse directions 10 times.

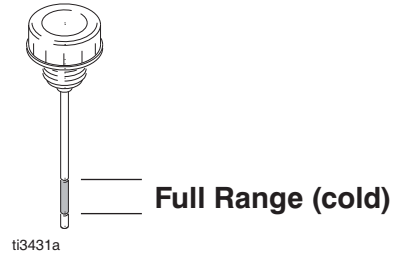


**NOTE:** Both rear wheels should turn in the correct direction. If one wheel is not turning, carefully restrain the spinning wheel to purge out the wheel that is not turning.

- Turn the prime valve down and open the hydraulic pump valve. Allow the paint pump to stroke 10 times and then close the hydraulic pump valve.



- Repeat step 8 for the other pump.
- The hydraulic gun manifold is self-purging.
- Use the key switch to turn engine off. Check oil level. Top off to "Full" range.



# Ground Drive Pump Replacement



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

## Removal

1. Perform **Pressure Relief Procedure**, page 9.
2. Remove ground drive belt, see **Ground Drive Belt Replacement**, page 10.
3. Use allen wrench to remove two set screws (71) from pulley (64).
4. Slide pulley (64) off shaft and save key (60).

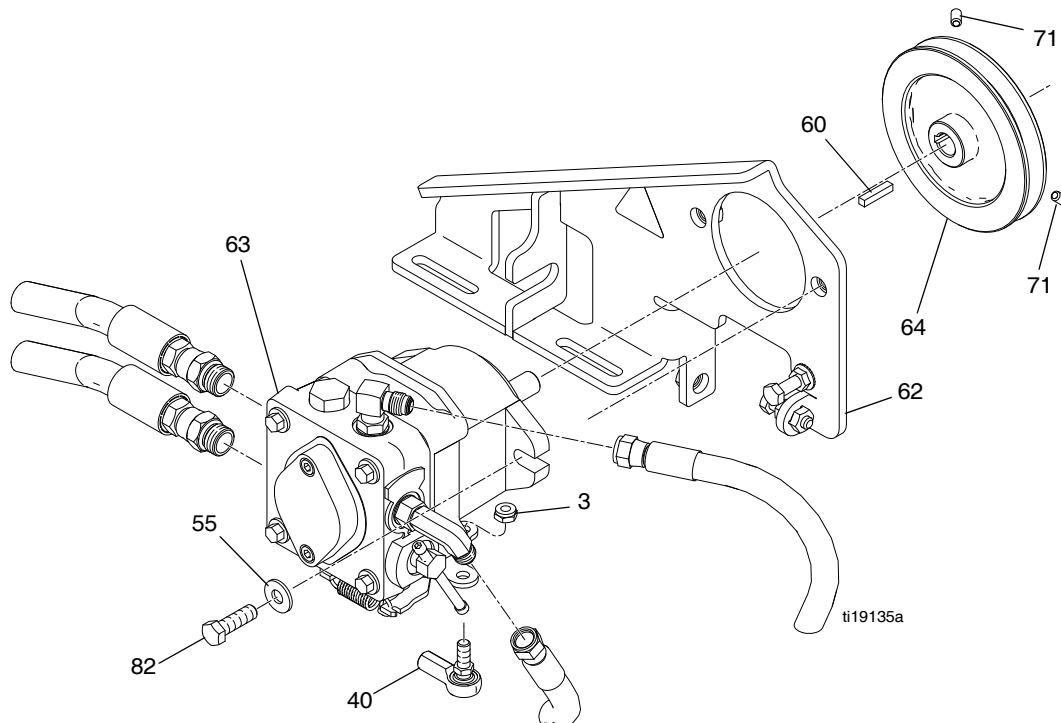
5. Disconnect all fittings and hoses from pump (63).

**NOTE:** Oil will spill out of hoses. Have rags and waste pail nearby.

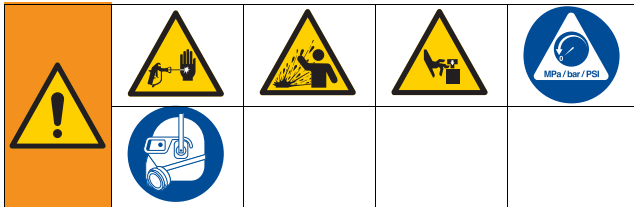
6. Remove nut (3) and disconnect tie rod (40) underneath pump (63).
7. Remove two mounting bolts (82) and washers (55) to remove pump (63) from bracket.

## Installation

1. Insert pump (63) into bracket (62) and install two mounting bolts (82) and washers (55).
2. Install tie rod (40) with nut (3) to lever underneath pump (63).
3. Connect all fittings and hoses to pump (63).
4. Install key (60) onto pump shaft and slide pulley (64) onto shaft.
5. Align pulley to outer clutch groove and tighten two set screws (71).
6. Install ground drive belt and tighten to proper tension, see **Ground Drive Belt Replacement**, page 10.
7. Purge Hydraulic System see, **Hydraulic System Purging**, page 12.



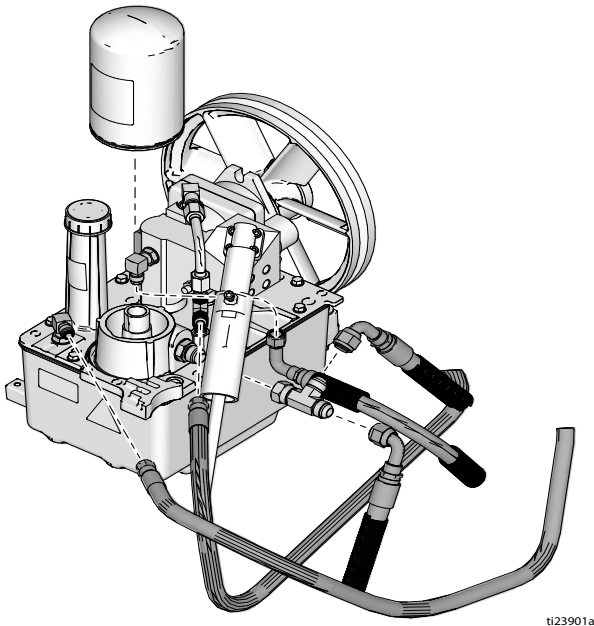
# Oil Reservoir Pump Replacement



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

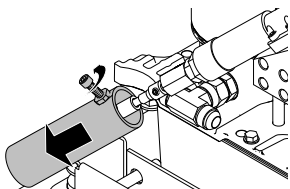
## Removal

1. Perform **Pressure Relief Procedure**, page 9.
2. Remove belt cover, see **Oil Reservoir Belt Replacement**, page 11.
3. Remove oil filter and disconnect five hydraulic hoses from oil reservoir.



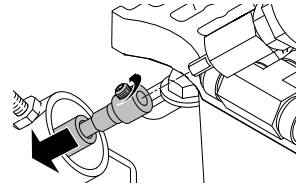
ti23901a

4. Loosen nut and slide cable sleeve down to gain access to the two cable set screws.



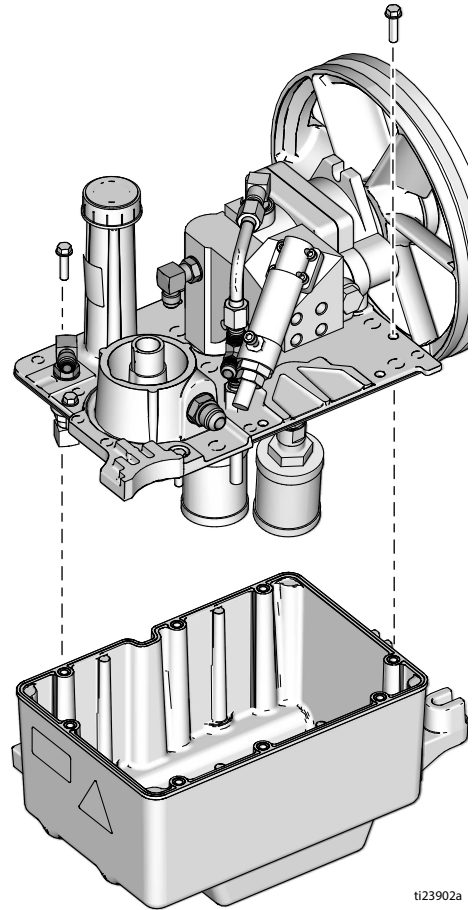
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5. Loosen two set screws and cable.



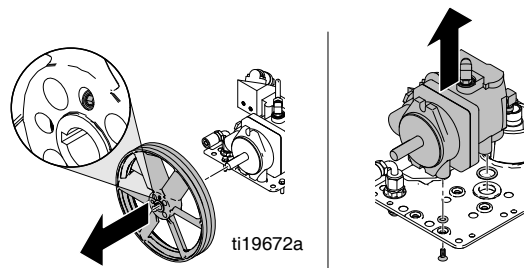
ti19142a

6. Remove eight screws and oil reservoir cover with pump.



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7. Remove pulley from pump. Remove four screws and pump from reservoir cover.

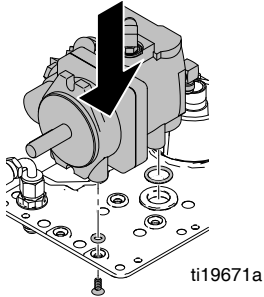


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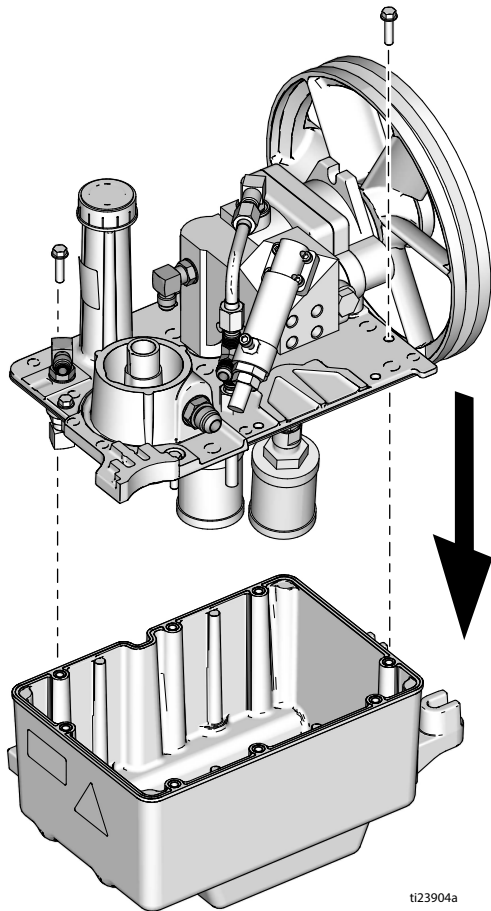


## Installation

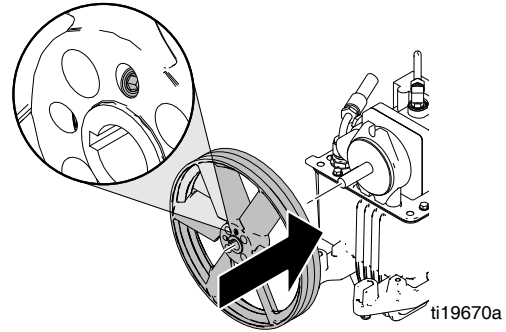
1. Install pump onto oil reservoir cover with four screws. Make sure the five o-rings are in place.



2. If hydraulic oil is contaminated in reservoir, drain reservoir and remove contamination. Install oil reservoir cover with eight screws to the oil reservoir base.



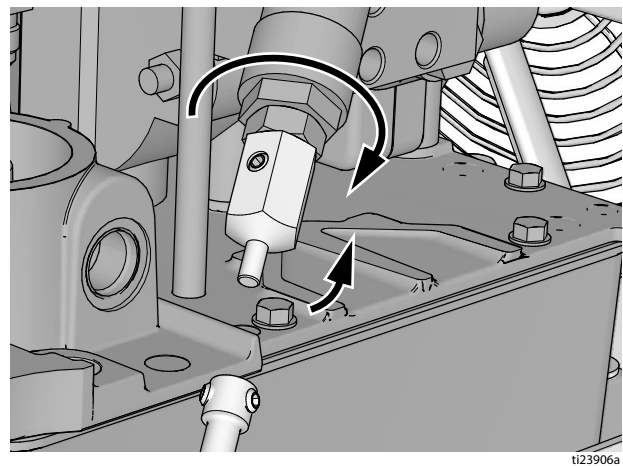
3. Install pulley on pump shaft and maintain belt alignment to inner groove of the clutch pulley. Tighten two pulley screws.



4. Turn pressure control knob clockwise until seated.

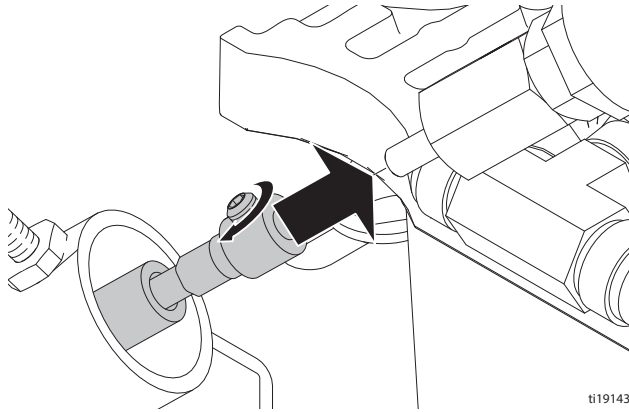


5. Turn hydraulic pump pressure control clockwise until seated then counterclockwise 1/6 turn.



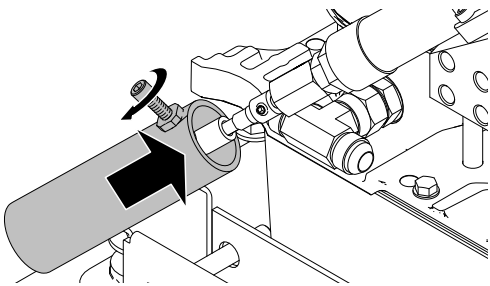


6. Install cable and tighten two set screws.



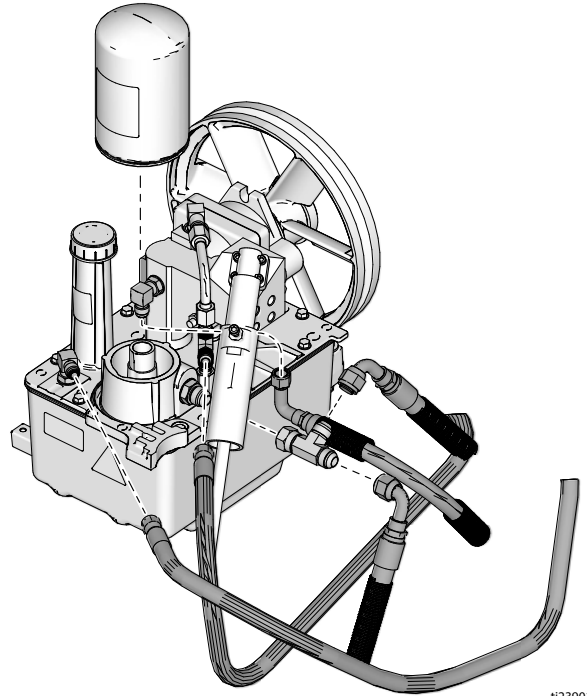
ti19143b

7. Slide cable sleeve up and tighten screw.



ti19145a

8. Connect five hydraulic hoses to fittings on oil reservoir. Replace oil filter.



ti23901a

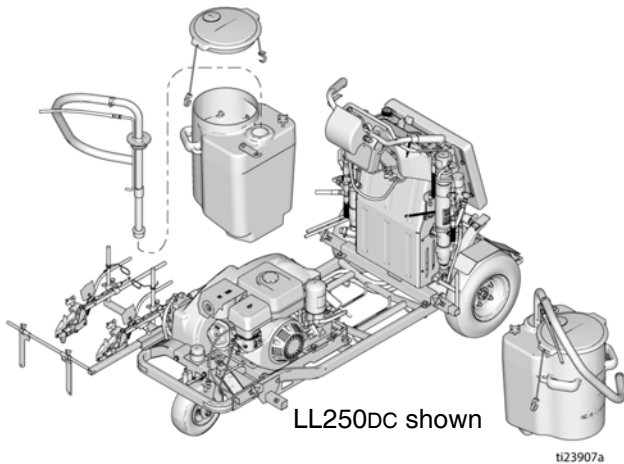
9. Install and tension belts, see **Oil Reservoir Belt Replacement**, page 11 and **Ground Drive Belt Replacement**, page 10.
10. Fill reservoir and purge hydraulic system, see **Hydraulic System Purging**, page 12.

# Hydraulic Gun Manifold Replacement



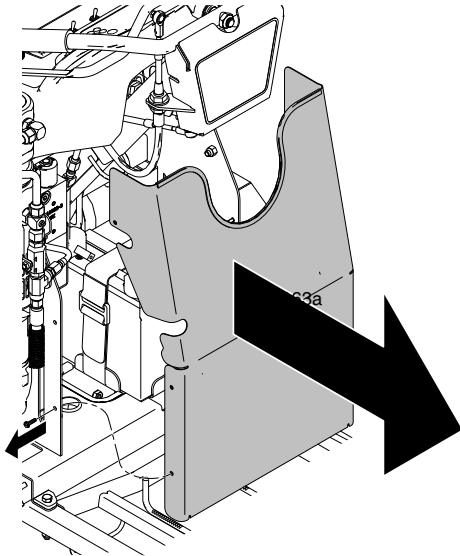
## Removal

1. Remove tank lid(s) and siphon tube(s).

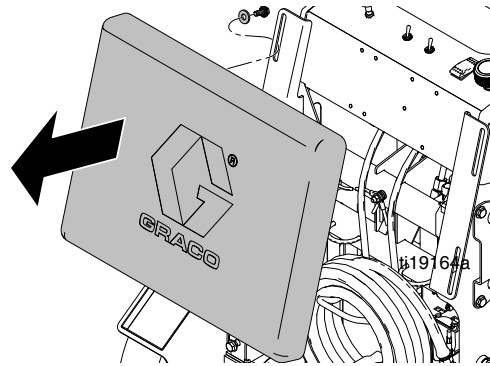


2. Remove tank(s) from unit.

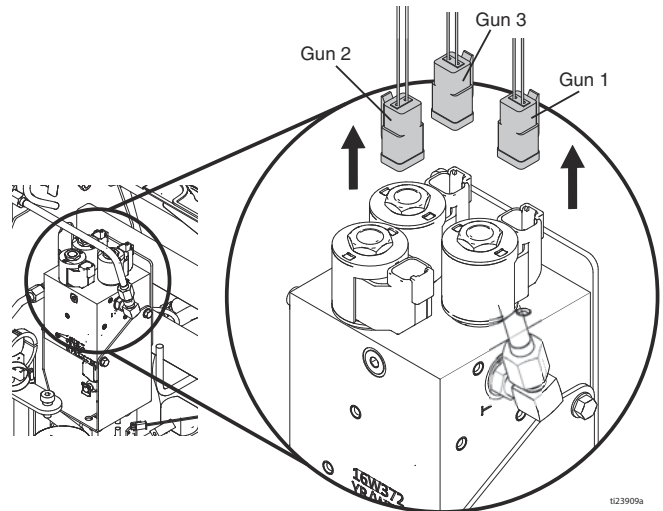
3. Remove six screws and then remove front shield from unit.



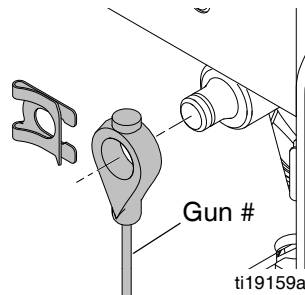
4. Remove four screws and pad.



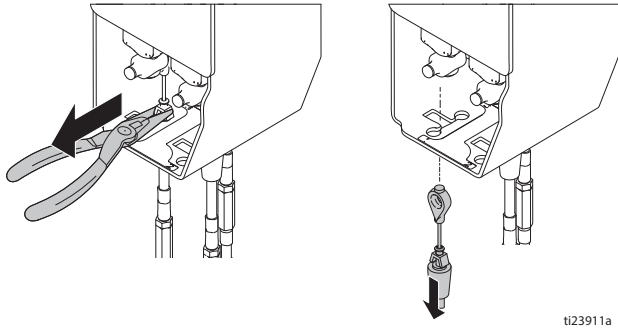
5. Label wire harnesses **GUN 1**, **GUN 2**, and **GUN 3**. Disconnect three wire harnesses from solenoids.



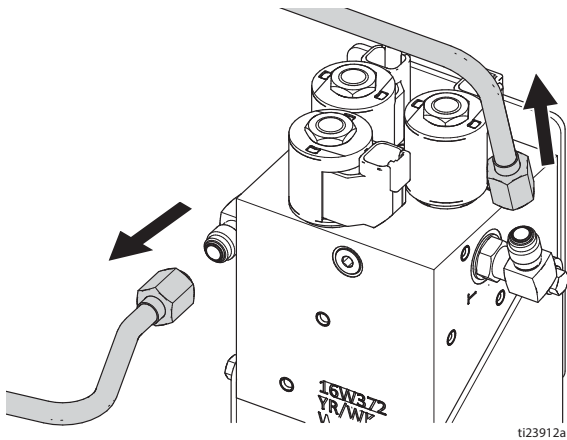
6. Label gun cables **GUN 1**, **GUN 2**, and **GUN 3**. Disconnect gun cables from actuators.



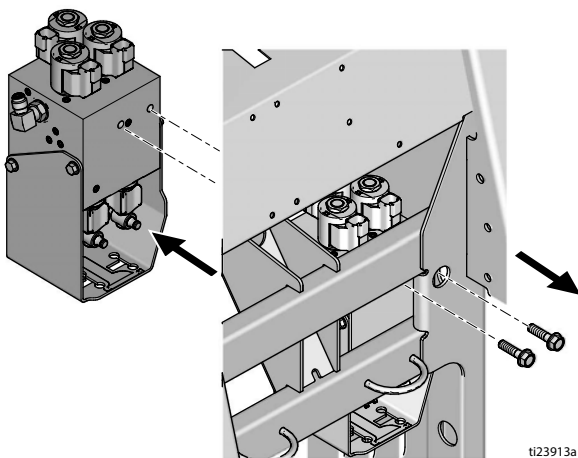
7. Use a needle-nose pliers to remove gun cables from bracket.



8. Use wrench to disconnect manifold tubes by the paint pump. **NOTE:** Oil will spill. Use a rag to contain the oil.

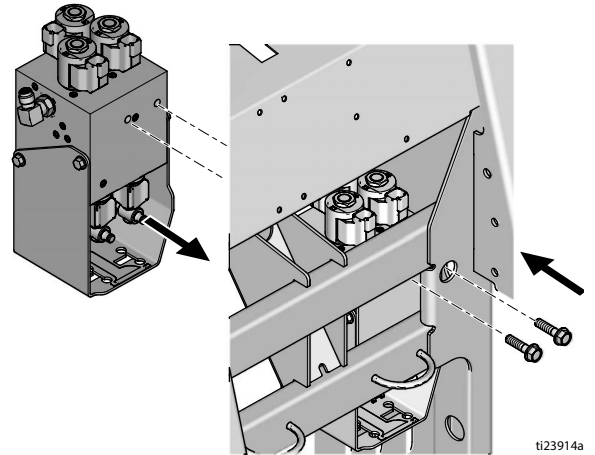


9. Disconnect manifold tubes at manifold.
10. Remove two mounting bolts and slide hydraulic manifold down and out from unit.

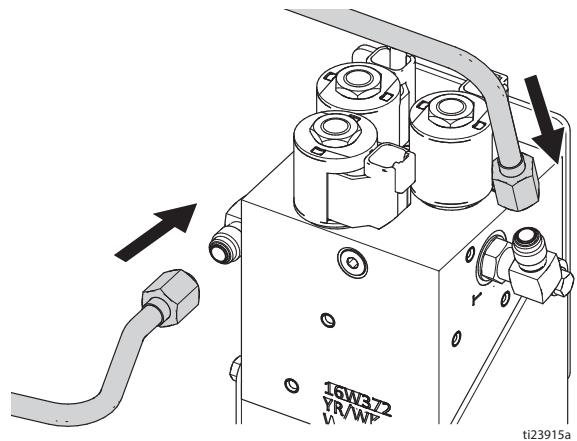


## Installation

1. Slide hydraulic manifold in and up into unit. Install and tighten two mounting bolts.

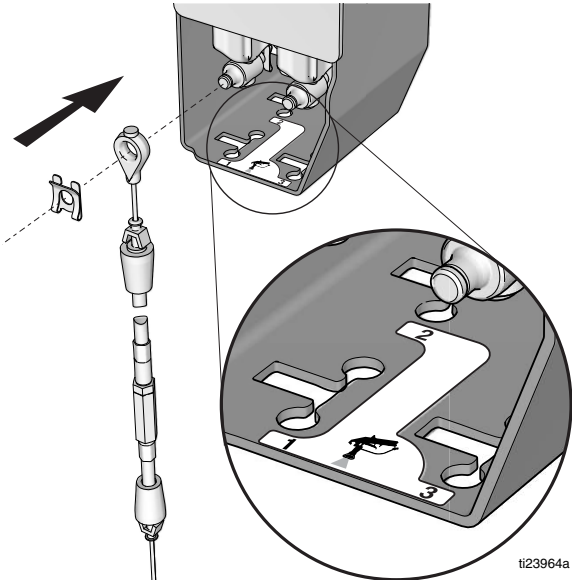


2. Loosely install manifold tubes to manifold.
3. Loosely install manifold tubes by the paint pump. Tighten four nuts.

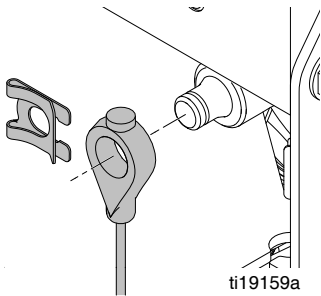


## Hydraulic Gun Manifold Replacement

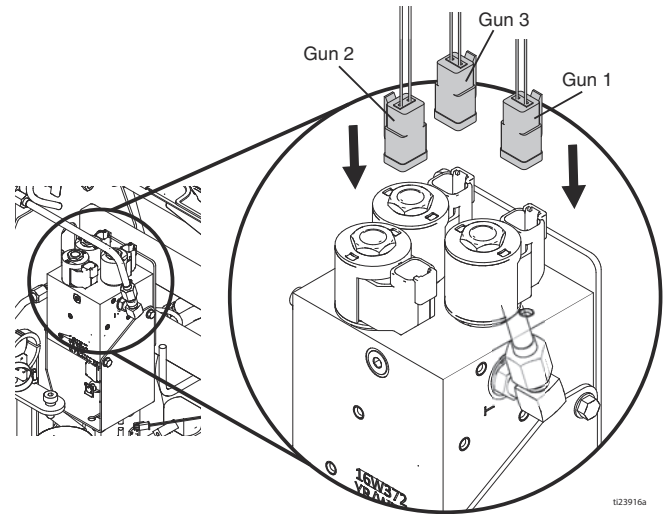
4. Observe label on bracket. Push labeled gun cables into manifold brackets.



5. Connect gun cables to actuators.



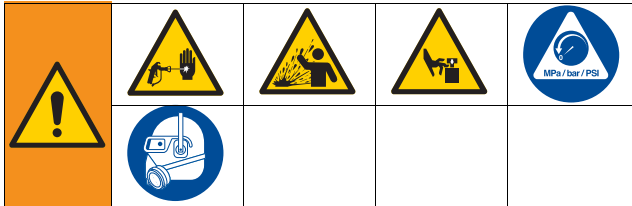
6. Connect three wire harnesses to solenoids.



7. Install pad and tighten four screws.
8. Install front shield to unit and tighten six screws.
9. Install tank(s), lid(s) and insert siphon tube(s) into tank(s).

**NOTE:** The hydraulic gun manifold is self-purging.

# Paint Pump Replacement



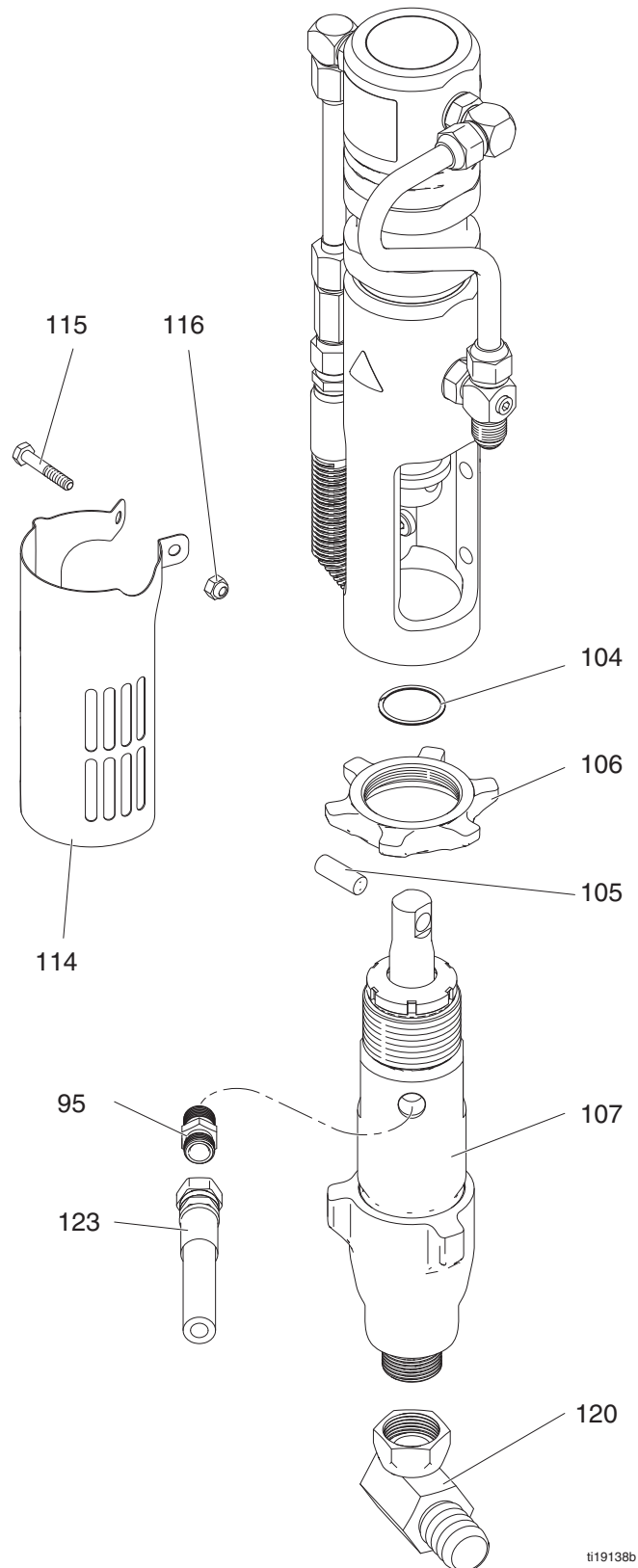
This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

## Removal

1. Perform **Pressure Relief Procedure**, page 9.
2. Disconnect suction tube (120).
3. Disconnect hose (123) and fitting (95) from paint pump (107). Note orientation of fitting (95) for installation.
4. Remove screw (115), nut (116) and pump guard (114).
5. Use hammer to loosen pump jam nut (106).
6. Slide down retainer (104) and remove pin (105).
7. Unscrew and remove paint pump (107).

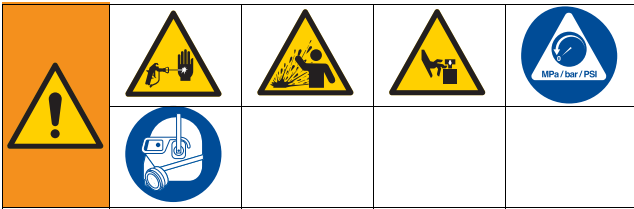
## Installation

1. Extend pump rod out of pump (107).
2. Insert pump rod into hydraulic motor rod and install pin (105) and retainer (104).
3. Thread pump (107) into hydraulic motor housing until pump bottoms out. Unscrew pump one full turn and orient pump outlet as noted in **Removal** step 3.
4. Use hammer to tighten pump jam nut (106).
5. Install guard (114) with screw (115) and nut (116).
6. Install fitting (95) and connect hose (123).
7. Connect suction tube (120).



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# Hydraulic Motor Replacement



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing the equipment.

## Removal

1. Perform **Pressure Relief Procedure**, page 9.
2. Remove paint pump, see **Paint Pump Replacement**, page 21.
3. Disconnect fitting (108) above ball valve (109).  
**NOTE:** Oil will spill out of hoses. Have rags and waste pail nearby.
4. Disconnect hose (74) for pump 1 or tube (98) for pump 2.
5. Disconnect pump counter (112) with 2 screws (113).

**NOTICE**  
Use a screwdriver to lift pump piston up to gain access to mounting bolts and avoid contact with piston. Contact with pump mounting bolts can scratch and damage the pump piston.

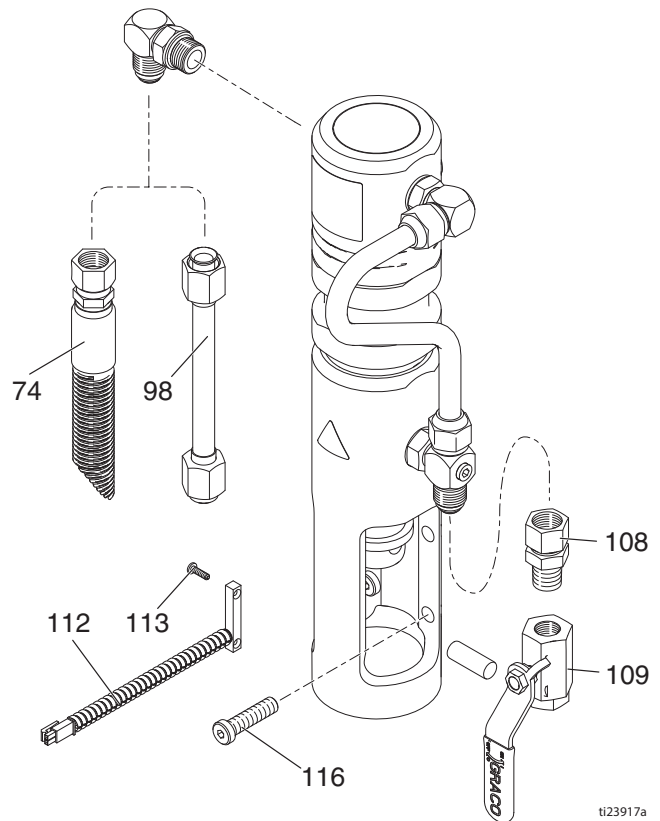
6. Remove four mounting bolts (116) from hydraulic motor and remove motor from sprayer.

## Installation

1. Install hydraulic motor with four mounting bolts (116).

**NOTICE**  
Use a screwdriver to lift pump piston up to gain access to mounting bolts and avoid contact with piston. Contact with pump mounting bolts can scratch and damage the pump piston.

2. Install pump counter (112) with two screws (113).
3. Connect hose (74) or tube (98) to fitting.
4. Connect fitting (108) above ball valve (109).
5. Install paint pump, see **Paint Pump Replacement**, page 21.
6. Purge hydraulic system, see **Hydraulic System Purging**, page 12.



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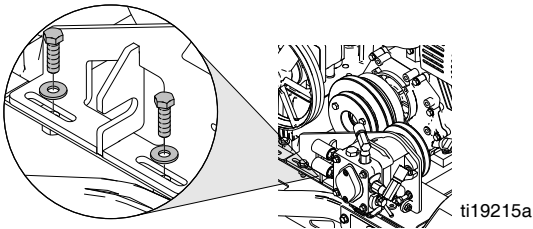


# Clutch Replacement

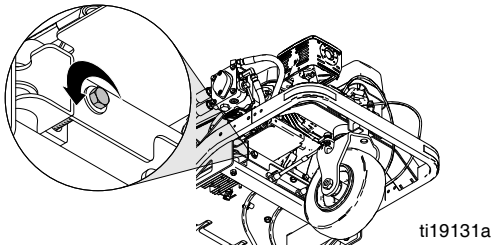


## Removal

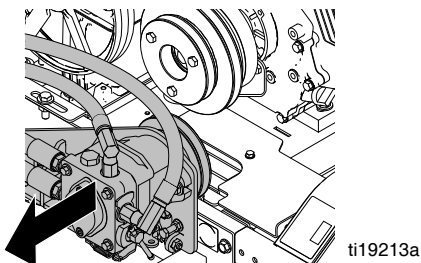
1. Remove ground drive belt, page **Ground Drive Belt Replacement**, page 10.
2. Remove oil reservoir belt, see **Oil Reservoir Belt Replacement**, page 11.
3. Remove two hold-down bolts for the ground drive pump bracket.



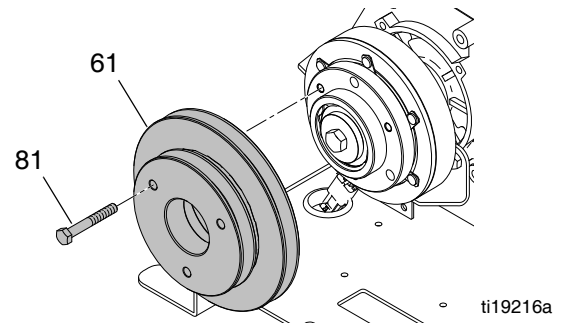
4. Unscrew tensioning bolt from the ground drive pump bracket.



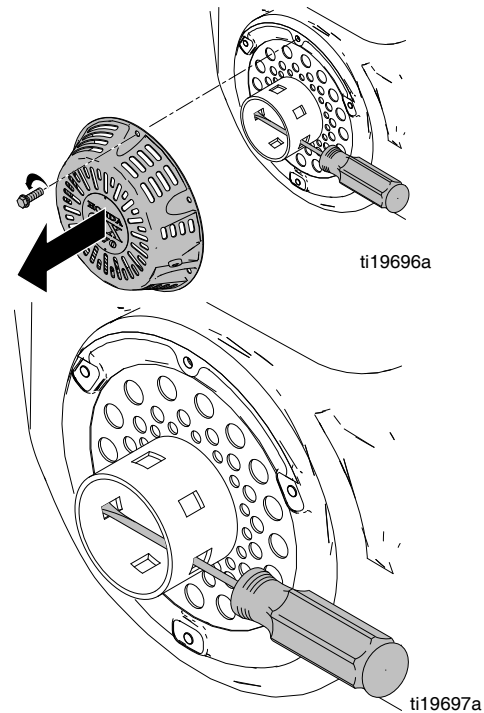
5. Move ground drive pump assembly aside.



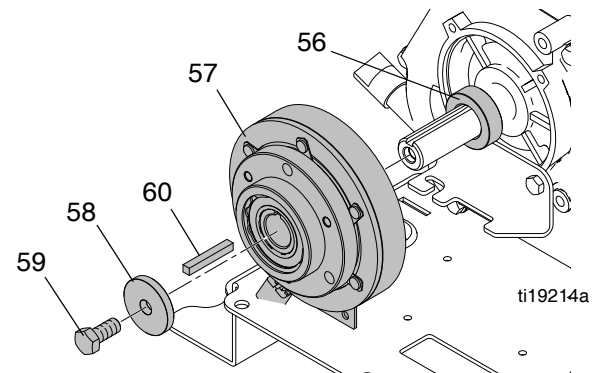
6. Remove three bolts (81) and pulley (61).



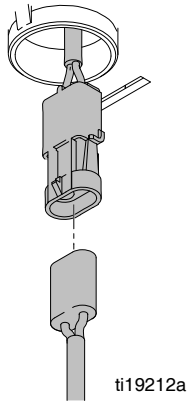
7. Remove engine recoil starter and place a screwdriver through the recoil starter cup.



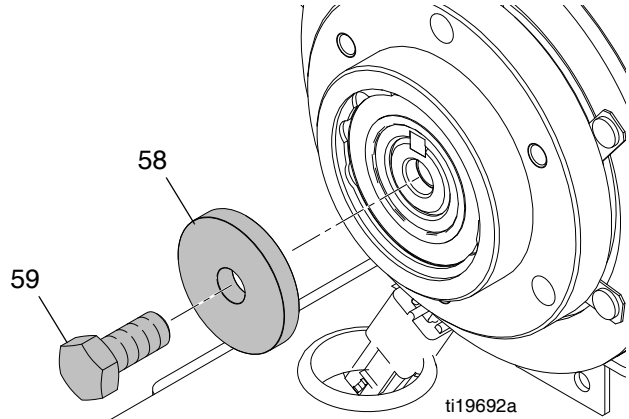
8. Remove center bolt (59) and remove clutch (57).



9. Disconnect clutch connector to main wire harness.

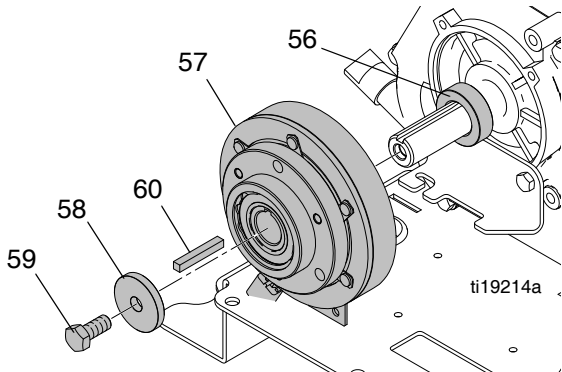


3. Install heavy washer (58) and bolt (59) onto crankshaft. Torque bolt to 45 +/- 5 ft-lb (61 +/- 7 N•m). Use screwdriver in recoil starter cup to hold crankshaft.

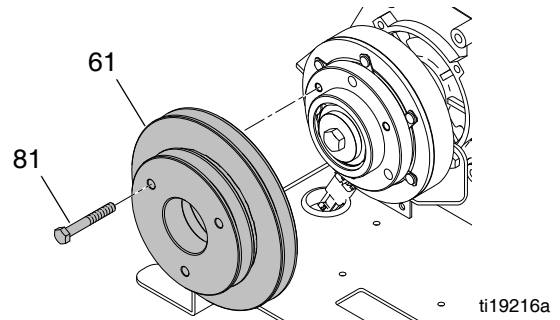


## Installation

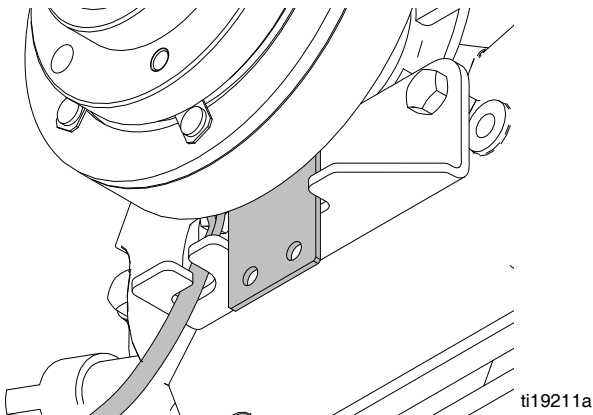
1. Install spacer (56) and key (60) onto crankshaft. Slide clutch (57) onto crankshaft.



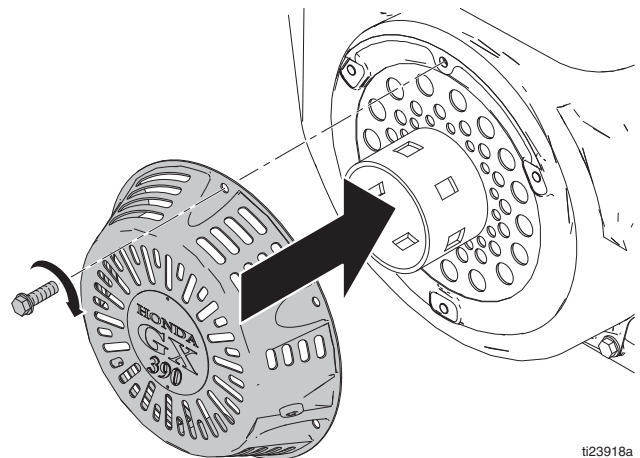
4. Install pulley (61) and torque three screws (81) to 10 ft-lb (13 N•m).



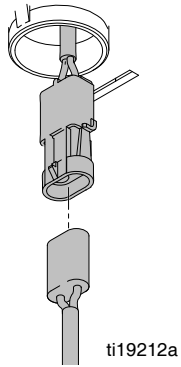
2. Align clutch and wire in bracket.



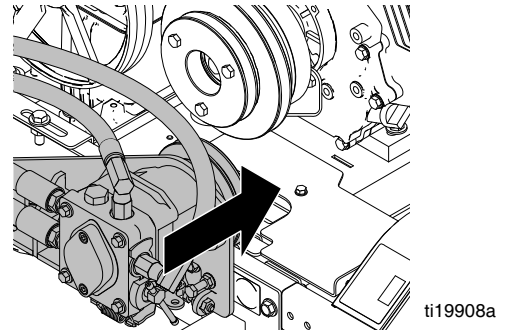
5. Install recoil starter onto engine.



6. Connect clutch to wire harness.



7. Install ground drive pump assembly with tensioning and two hold-down bolts.



8. Install and tension belts, see **Oil Reservoir Belt Replacement**, page 11 and **Ground Drive Belt Replacement**, page 10.

# Engine Replacement



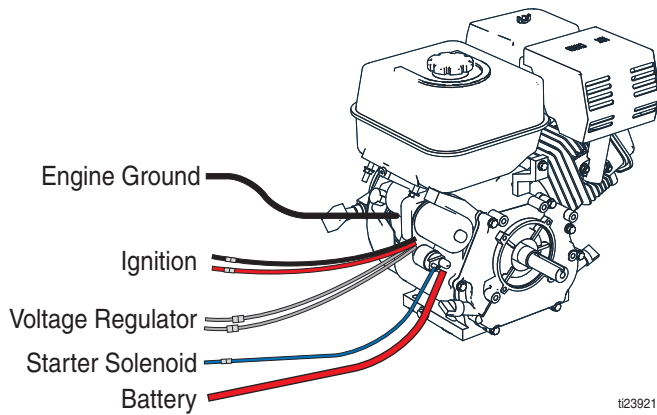
## Removal

1. Remove clutch, see **Clutch Replacement**, page 23.

### NOTICE

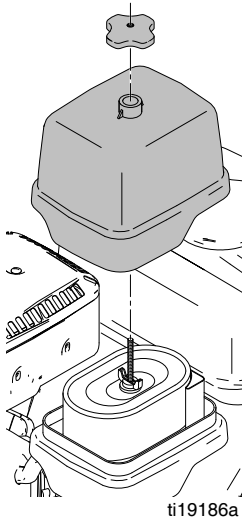
To reduce the risk of battery damage and shorts, always disconnect **NEGATIVE** (black wire) first.

2. Disconnect two negative (black) battery wires at battery. Negative battery post is located above platform on the left side.
3. Disconnect seven wires from engine.



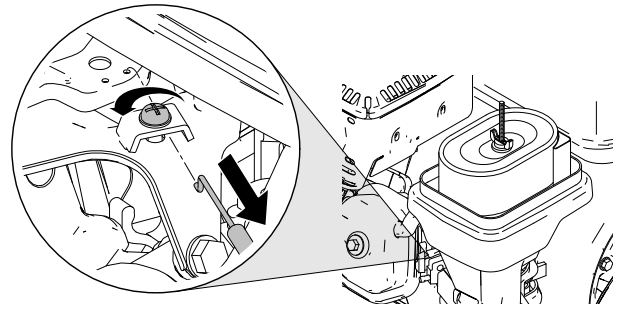
ti23921

4. Remove air filter cover, element and base.



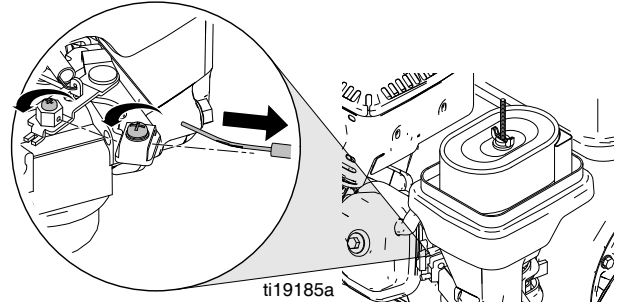
ti19186a

5. Disconnect throttle cable.



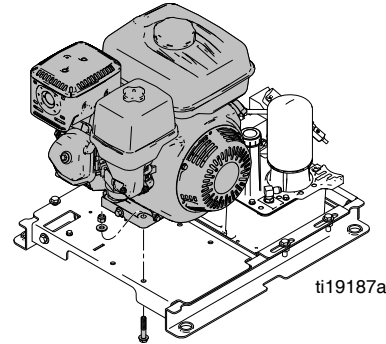
ti19183a

6. Disconnect choke cable.



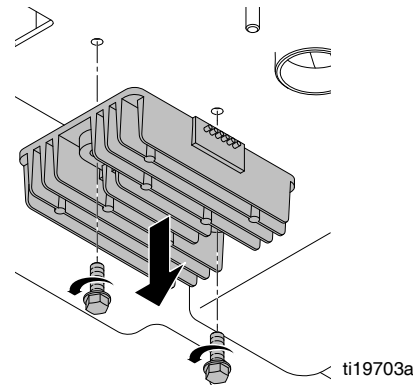
ti19185a

7. Remove four mounting bolts from engine.



ti19187a

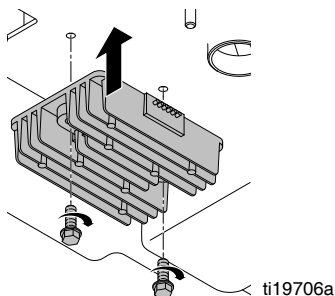
8. Remove engine. **NOTE:** Engine voltage regulator is located below engine mounting plate. Remove two screws and disconnect wires.



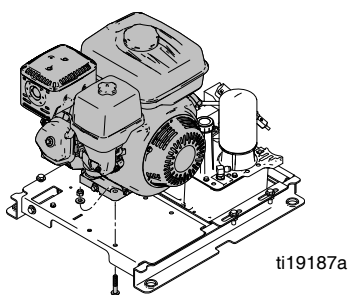
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## Installation

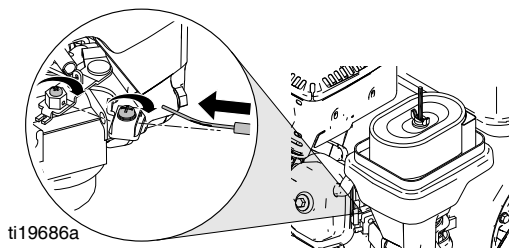
1. Install engine voltage regulator below engine mounting plate with two screws. Connect regulator to wire harness.



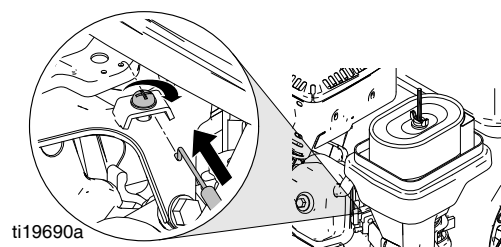
2. Install engine and tighten four mounting bolts and nuts.



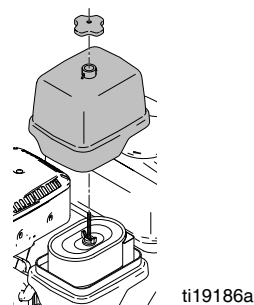
3. Install choke cable:
  - a. Make sure choke knob is pressed down.
  - b. Insert choke cable wire into hex-shaped pivot.
  - c. Insert cable sheathing under cable clamp and tighten screw.
  - d. Tighten screw on hex-shaped pivot.
  - e. Verify proper operation of engine choke.



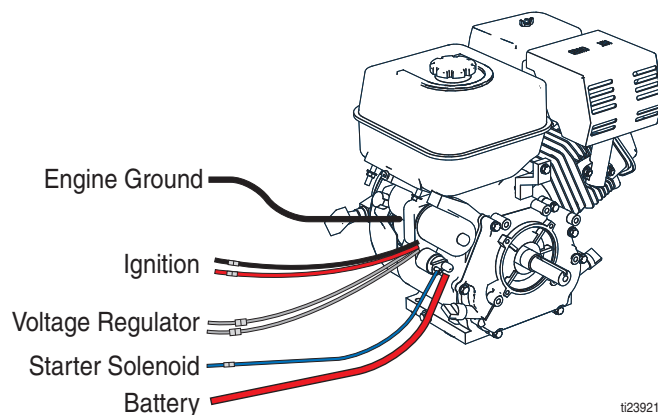
4. Install throttle cable.
  - a. Place speed lever to high speed.
  - b. Insert "Z" bend wire into hole furthest from pivot.
  - c. Place cable sheathing under clamp and pull cable against high speed stop screw.
  - d. Tighten screw on cable clamp.
  - e. Verify proper operation of speed lever.



5. Install air filter base, element and cover.

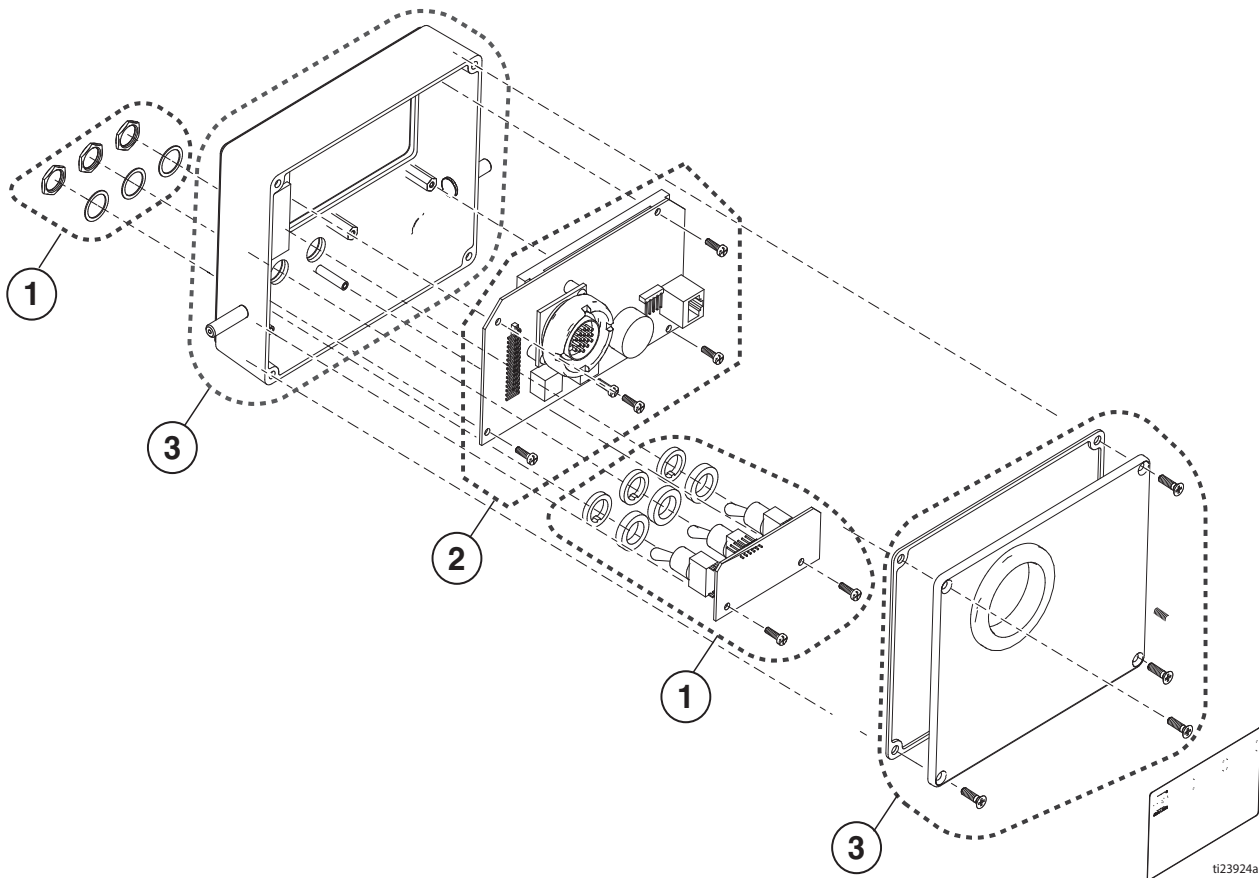


6. Connect seven wires to engine.



7. Install clutch, see **Clutch Replacement**, page 23.
8. Connect two negative (black) wires at battery.
9. Add gas and oil to engine (see Operation manual).
10. Start engine and verify high speed of 3600 rpm.

# Touch-Pad Display



## NOTICE

To avoid electrostatic-discharge (ESD) always use wrist strap 112190 when servicing the touch-pad display.

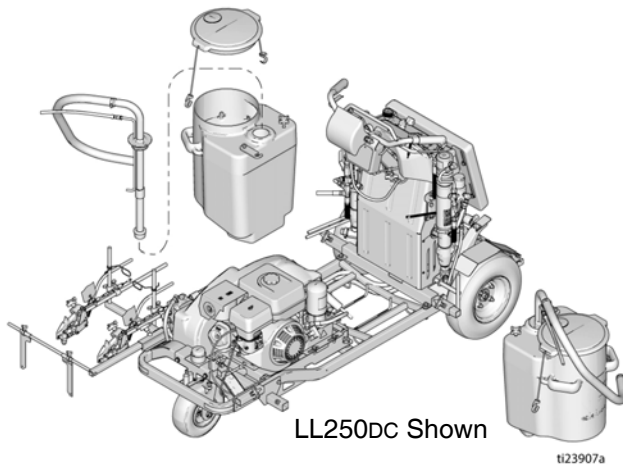
1. Toggle switch kit.
  - a. Torque screws to 3-5 in-lb (0.34-0.56 N•m)
  - b. Torque nuts to 3-5 in-lb (0.34-0.56 N•m)
2. Display kit. Remove protective film from display face.
  - a. Torque screws to 3-5 in-lb (0.34-0.56 N•m)
3. Membrane switch kit.
  - a. Torque screws to 1-2 in-lb (0.11-0.23 N•m)



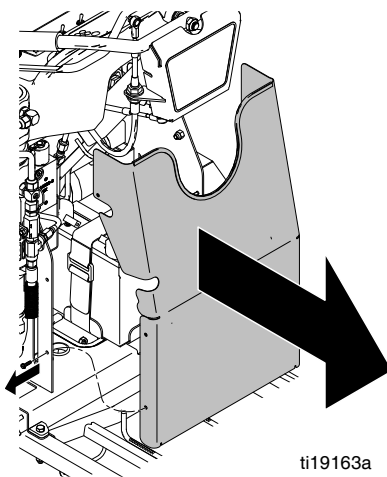
# Control Board Replacement

## Removal

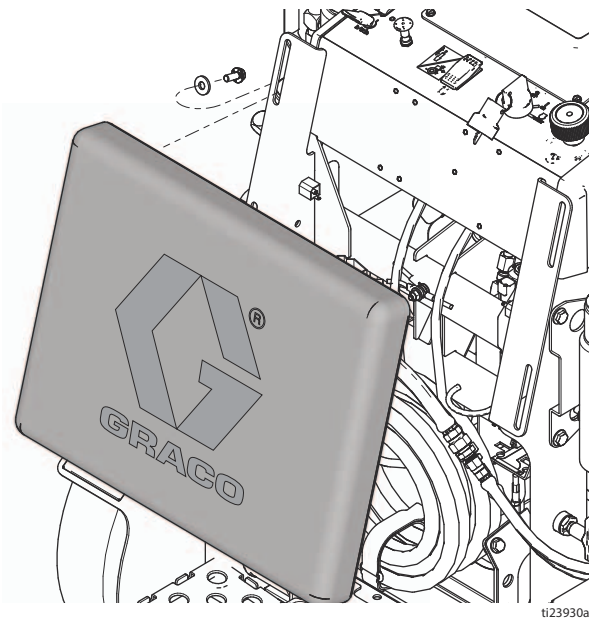
1. To disconnect power remove fuse, see **Fuse Replacement**, page 33.
2. Remove siphon tube(s) and lid(s).



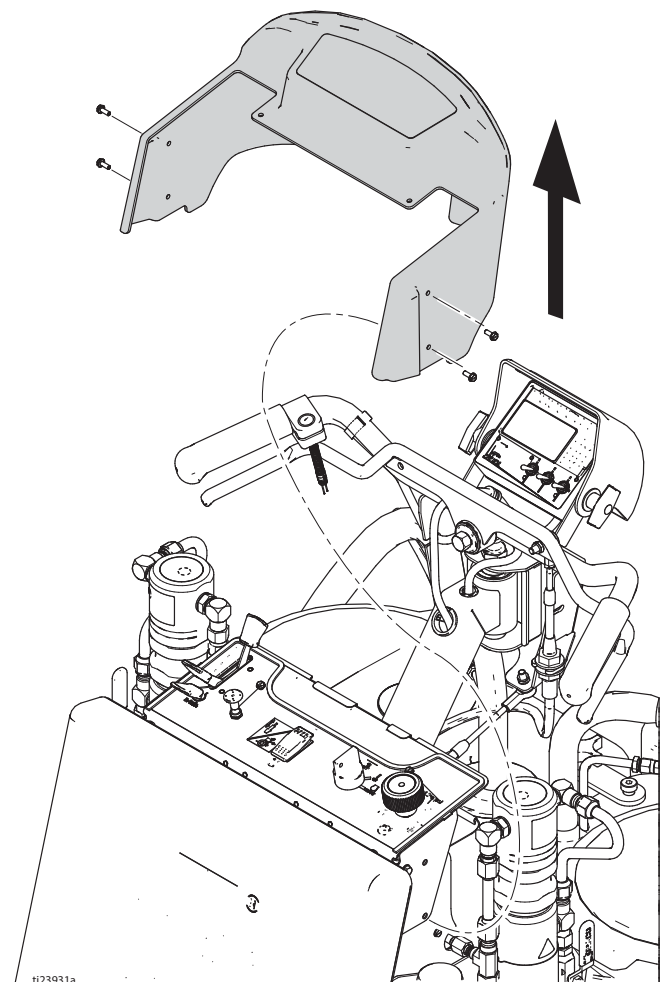
3. Remove tank(s) from unit.
4. Remove six screws and then remove front shield from unit.



5. Remove four screws and remove pad.

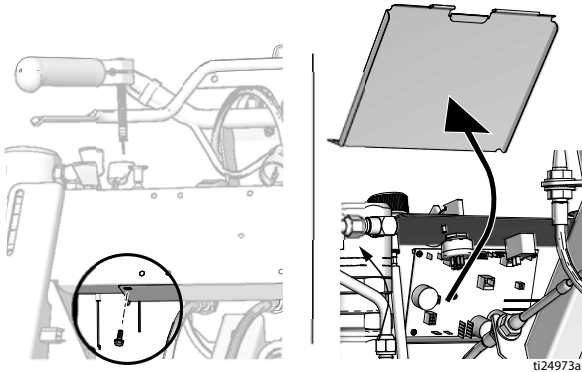


6. Remove six screws and control shroud.

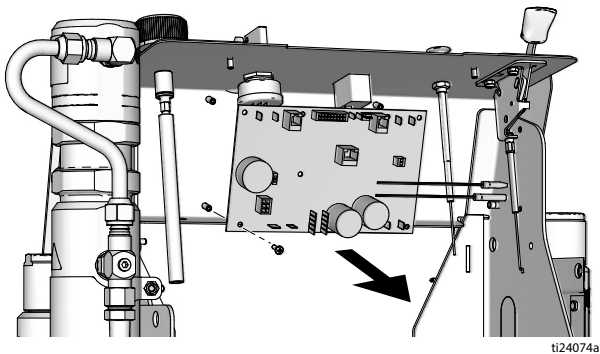


## Control Board Replacement

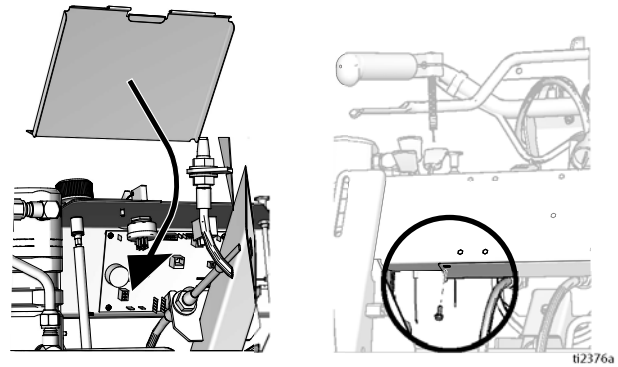
7. Remove two screws and splash shield.



8. Disconnect all wires from control board.
9. Remove eight control board mounting screws and then remove control board.



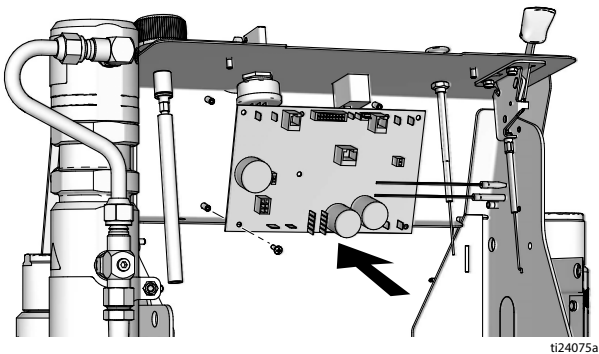
3. Connect all wires to control board. See, **Notes**, page 49. Pump number 1 is on the left when you stand in the operator position.
4. Bundle and secure wires with a cable tie just inboard of the choke cable.
5. Bundle and secure wires with a cable tie just out-board of the key switch.
6. Install fuse, see **Fuse Replacement**, page 33. Check control, switches and display.
7. Install splash shield with two screws.



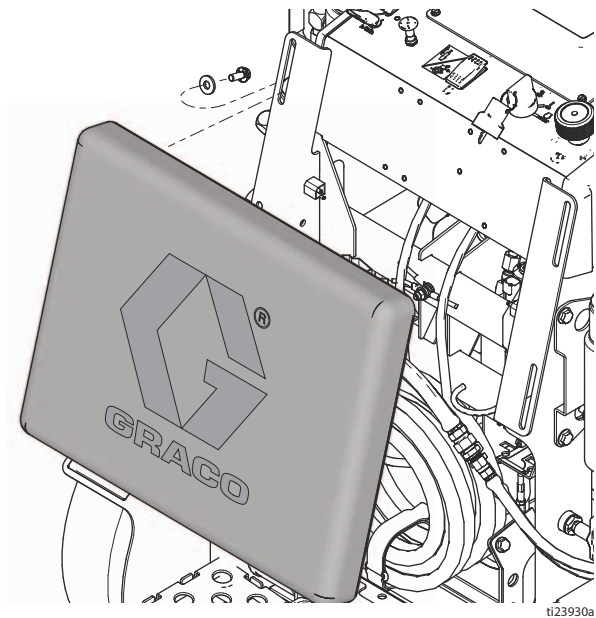
8. Install control shroud with six screws. See **Removal** step 6.
9. Install pad and tighten four screws.

## Installation

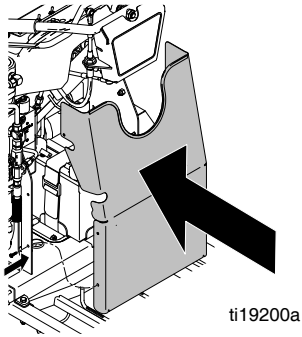
1. Install control board with eight mounting screws.



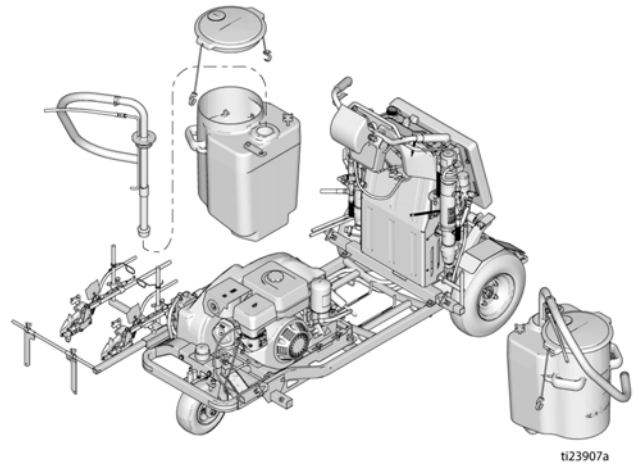
2. Before connecting wires to control board, make sure that all wires are routed above the two steering cables.



10. Install front shield and tighten six screws.



11. Install tank(s), lid(s) and siphon tube(s).



12. If control board was replaced select language, units, and calibrate distance sensor (see Operation manual).