

## Ultra<sup>®</sup> Max II/Ultimate Mx II

Korean patent10-0579681

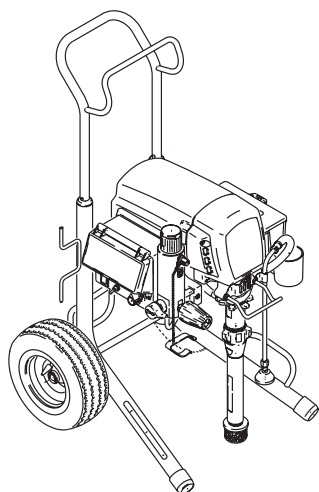
311365 rev.E

*- For Portable Airless Spraying of Architectural Coatings and Paints -*

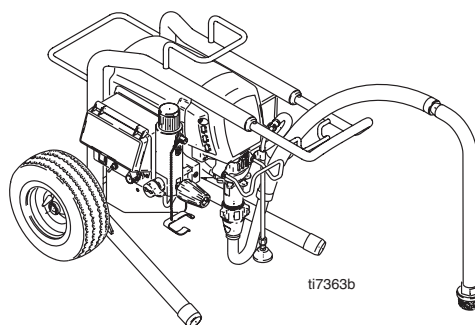


### IMPORTANT SAFETY INSTRUCTIONS.

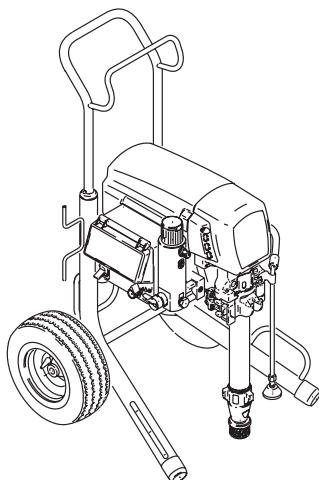
Read all warnings and instructions in this manual.  
Save these instructions.



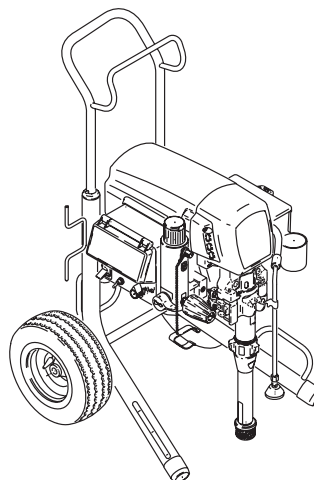
695/795 HI



695/795 LOW



MARK V



1095/1595 HI

PROVEN QUALITY. LEADING TECHNOLOGY.


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# Models





Vac	Model	Type	Lo-Boy	Hi-Boy
<b>120 North America</b>  	695	Standard	255130	249642
		Premium	255131	249644
	795	Standard	255132	249646
		Premium	255133	249648
	1095	Standard		249651
		Premium		249653
	1595	Standard		253060
		Premium		253059
	Mark V			249904
<b>120 North America</b>	1595	Standard		249658**
		Premium		249659**
	Mark V			249903**
<b>Ultimate Mx II</b>  	695	Standard	826093	826067
		Premium	826094	826069
	795	Standard		826071
		Premium		826072
	1095	Standard		826073
		Premium		826074
	1595	Standard		826082
		Premium		826081
<b>Ultimate Mx II</b>	1595	Standard		826075
		Premium		826076
<b>240 Europe</b>  	695		255134	249663
	795			249666
	1095			249667
	Mark V			249905
<b>240 Europe Multi-cord</b>  	695		255135	249668
	795			249671
	1095			249672
	Mark V*			249907
<b>110 UK</b>  	695			249673
	795			249674
	1095			249675
	Mark V			249906






\*Also for Asia and Australia;  
 \*\*Not ETL Approved  
 All models not available in all countries.

<b>Vac</b>	<b>Model</b>	<b>Type</b>	<b>Lo-Boy</b>	<b>Hi-Boy</b>
<b>240 Asia</b>	695		255138	249681
	795			249683
	1095			249684
<b>240 Australia</b> 	695		255139	249685
	795		255140	249687
	1095			249688
<b>100 Japan &amp; Taiwan</b>	695		255136	249676
	795		255137	249678
	1095			249680

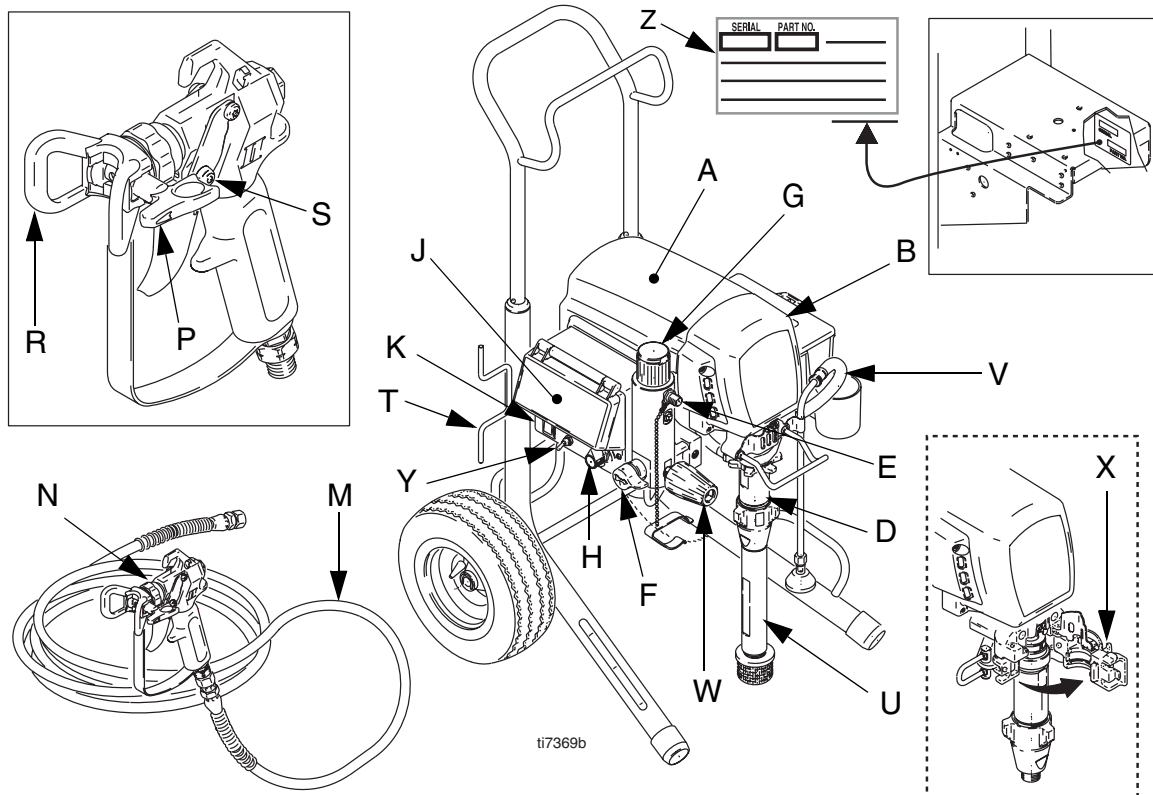
# Warnings

The following are general warnings related to the setup, use, grounding, maintenance and repair of this equipment. Additional, more specific warnings may be found throughout the body of this manual where applicable. Symbols appearing in the body of the manual refer to these general warnings. When these symbols appear throughout the manual, refer back to these pages for a description of the specific hazard.

	WARNING
	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Use equipment only in well ventilated areas.</li> <li>• Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).</li> <li>• When flammable liquid is used in or near sprayer or for flushing or cleaning, keep sprayer at least 20 feet (6 m) away from explosive vapors.</li> <li>• Keep work area free of debris, including solvent, rags and gasoline.</li> <li>• Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.</li> <li>• Ground equipment and conductive objects in work area. See <b>Grounding</b> instructions.</li> <li>• Use only conductive hoses.</li> <li>• Hold gun firmly to side of grounded pail when triggering into pail.</li> <li>• If there is static sparking or you feel a shock, <b>stop operation immediately</b>. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a fire extinguisher in the work area.</li> </ul>
	<p><b>MOVING PARTS HAZARD</b></p> <p>Moving parts can pinch 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> in this manual. Disconnect power or air supply.</li> </ul>
	<p><b>SKIN INJECTION HAZARD</b></p> <p>High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. <b>Get immediate surgical attention.</b></p> <ul style="list-style-type: none"> <li>• Do not point gun at anyone or at any part of the body.</li> <li>• Do not put your hand over the spray tip.</li> <li>• Do not stop or deflect leaks with your hand, body, glove, or rag.</li> <li>• Do not spray without tip guard and trigger guard installed.</li> <li>• Engage trigger lock when not spraying.</li> <li>• Follow <b>Pressure Relief Procedure</b> in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.</li> </ul>

	<b>WARNING</b>
	<p><b>ELECTRIC SHOCK HAZARD</b></p> <p>Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> <li>• Turn off and disconnect power cord before servicing equipment.</li> <li>• Use only grounded electrical outlets.</li> <li>• Use only 3-wire extension cords.</li> <li>• Ensure ground prongs are intact on sprayer and extension cords.</li> <li>• Do not expose to rain. Store indoors.</li> </ul>
	<p><b>PRESSURIZED ALUMINUM PARTS HAZARD</b></p> <p>Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in pressurized aluminum equipment. Such use can cause serious chemical reaction and equipment rupture, and result in death, serious injury, and property damage.</p>
	<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 exceed the maximum working pressure or temperature rating of the lowest rated system component. Read <b>Technical Data</b> in all equipment manuals.</li> <li>• Use fluids and solvents that are compatible with equipment wetted parts. Read <b>Technical Data</b> in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.</li> <li>• Check equipment daily. Repair or replace worn or damaged parts immediately with genuine Graco replacement parts only.</li> <li>• Do not alter or modify equipment.</li> <li>• Use equipment only for its intended purpose. Call your Graco 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 overbend 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> <li>• Keep children and animals away from work area.</li> <li>• Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> </ul>
	<p><b>PERSONAL PROTECTIVE EQUIPMENT</b></p> <p>You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, inhalation of toxic fumes, burns, and hearing loss. This equipment includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• Protective eye wear</li> <li>• Clothing and respirator as recommended by the fluid and solvent manufacturer</li> <li>• Gloves</li> <li>• Hearing protection</li> </ul>

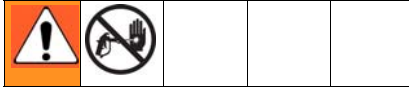
# Component Identification and Function



<b>A</b>	Motor	DC Motor, brushless, fan cooled
<b>B</b>	Drive Assembly	Transfers power from DC motor to displacement pump
<b>D</b>	Displacement Pump	Transfers fluid to be sprayed from source through spray gun
<b>E</b>	Fluid Outlet	Fluid hose is connected here
<b>F</b>	Prime/Spray Valve	Used to prime and drain sprayer (also relieves fluid outlet pressure) when open
<b>G</b>	Filter	Final filter of fluid to spray gun
<b>H</b>	Pressure Control Knob	Controls fluid outlet pressure
<b>J</b>	Premium Digital Display	Controls motor speed to maintain fluid outlet pressure at displacement pump outlet. Works with Pressure Control Knob.
<b>K</b>	ON/OFF Switch	Power switch that controls main power to sprayer
<b>M</b>	50 ft (15 m) Main Hose	1/4 in. ID, grounded, nylon hose with spring guards on both ends
<b>N</b>	Spray Gun	High pressure spray gun with gun safety latch
<b>P</b>	Spray Tip	Uses high pressure fluid to clear tip clogs without removing tip from spray gun
<b>R</b>	HandTite™ Tip Guard	Tip guard reduces risk of injection injury
<b>S</b>	Gun Safety Latch	Gun safety latch inhibits accidental triggering of spray gun. Contractor II gun shown. Refer to your gun manual to properly set your gun safety latch
<b>T</b>	Hose Rack	Holds wrapped hose for storage
<b>U</b>	Suction Tube	Transfers fluid to be sprayed from source to pump
<b>V</b>	Drain Tube	Fluid outlet used to drain and prime sprayer
<b>W</b>	AutoClean <sub>2</sub> ™	Reverse flush system
<b>X</b>	Bearing Housing / Pro Connect™	No tools pump removal and installation
<b>Y</b>	WatchDog™ Toggle Switch (not Mark V)	Pump protection system
<b>Z</b>	Model/Serial Tag	Sprayer model and serial number information

# General Repair Information

## Pressure Relief Procedure



### SKIN INJECTION HAZARD

System pressure must be manually relieved to prevent system from starting or spraying accidentally. Fluid under high pressure can be injected through skin and cause serious injury. To reduce risk of injury from injection, splashing fluid, or moving parts, follow Pressure Relief Procedure whenever you:

- are instructed to relieve pressure
  - stop spraying
  - check or service any system equipment
  - install or clean spray tip
1. Turn pressure control knob to zero.
  2. Turn ON/OFF switch to OFF.
  3. Unplug power supply cord.
  4. Hold metal part of gun firmly to grounded metal pail. Trigger gun to relieve pressure.
  5. Lock gun safety latch.
  6. Open prime valve. Leave prime valve open until ready to spray again.

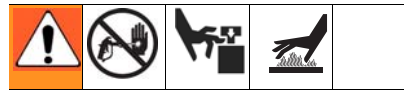
*If suspected that spray tip or hose is completely clogged, or that pressure has not been fully relieved after following steps above, VERY SLOWLY loosen tip guard retaining nut or hose end coupling to relieve pressure gradually, then loosen completely. Then clear tip or hose obstruction.*

### CAUTION

To reduce risk of pressure control malfunction:

- Use needle-nose pliers to disconnect wire. Never pull on wire, pull on connector.
- Mate wire connectors properly. Center flat blade of insulated male connector in female connector.
- Route wires carefully to avoid interference with other connections of pressure control. Do not pinch wires between cover and control box.

1. Keep all screws, nuts, washers, gaskets, and electrical fittings removed during repair procedures. These parts are not normally provided with replacement assemblies.



### ELECTRIC SHOCK HAZARD

### MOVING PARTS HAZARD

### HOT SURFACE HAZARD

To reduce risk of serious injury, including electric shock, do not touch moving or electrical parts with fingers or tools while testing repair. Shut off and unplug sprayer when inspection is complete. Install all covers, guards, gaskets, screws, washers and shroud before operating sprayer.

2. **Test repair** after problem is corrected.
3. If sprayer does not operate properly, review repair procedure to verify procedure was done correctly. If necessary, see Troubleshooting, page 10, for other possible solutions.



# Grounding

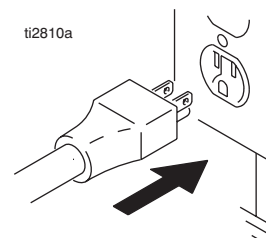


## WARNING

Improper installation or alteration of grounding plug results in risk of electric shock, fire or explosion that could cause serious injury or death.

1. Ultra Max II 695, 795 and 1095 100-200 Vac models require a 50/60 Hz, 15A circuit with a grounding receptacle. Ultra Max II 1595/Mark V 120 Vac models require a 50/60 Hz 20A circuit with a grounding receptacle; 220-240 Vac models require a 50/60 Hz, 10A circuit with a grounding receptacle.

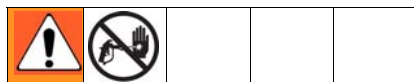
2. Do not alter ground prong or use adapter.



3. 120 Vac: A 12 AWG, 3 wires with grounding prong, 300 ft (90 m) extension cord may be used. 220-240 Vac: You may use a 3-wire, 1.0 mm (12 AWG) (minimum) extension cord up to 90 m long. Long lengths reduce sprayer performance.

# Troubleshooting

## Mechanical/Fluid Flow



Relieve pressure; page 8.

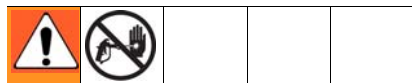
TYPE OF PROBLEM	WHAT TO CHECK If check is OK, go to next check	WHAT TO DO When check is not OK, refer to this column
E=XX is displayed	1. Fault condition exists	1. Determine fault correction from table, page 13.
False tripping of WatchDog system. EMPTY is displayed. Pump does not run.	1. Operating conditions out of WatchDog parameters. Pump output is low, see below.	1. Turn pressure down. Refer to operation manual for adjusting. Operate without WatchDog active; see operation manual.
Pump output is low	1. Spray tip worn	1. Follow Pressure Relief procedure Warning, then replace tip. See your separate gun or tip manual.
	2. Spray tip clogged	2. Relieve pressure. Check and clean spray tip.
	3. Paint supply	3. Refill and reprime pump.
	4. Intake strainer clogged	4. Remove and clean, then reinstall
	5. Intake valve ball and piston ball are not seating properly	5. Remove intake valve and clean. Check balls and seats for nicks; replace if necessary; see pump manual 310643 or 310894. Strain paint before using to remove particles that could clog pump.
	6. Suction hose connections	6. Tighten any loose connections. Check for missing or damaged seals.
	7. Fluid filter, tip filter, or tip is clogged or dirty.	7. Clean filter; see operation manual.
	8. Prime valve leaking	8. Relieve pressure. Repair prime valve.
	9. Verify pump does not continue to stroke when gun trigger is released. (Prime valve not leaking.)	9. Service pump; see pump manual 310643 or 310894.
	10. Leaking around throat packing nut which may indicate worn or damaged packings.	10. Replace packings; see pump manual. Also check piston valve seat for hardened paint or nicks and replace if necessary. Tighten packing nut/wet-cup.
	11. Pump rod damage	11. Repair pump. See pump manual 310643 or 310894.
	12. Low stall pressure	12. Turn pressure knob fully clockwise. Make sure pressure control knob is properly installed to allow full clockwise position. If problem persists, replace pressure transducer.
	13. Piston packings are worn or damaged	13. Replace packings; see pump manual 310643 or 310894.

<b>TYPE OF PROBLEM</b>	<b>WHAT TO CHECK</b> If check is OK, go to next check	<b>WHAT TO DO</b> When check is not OK, refer to this column
Pump output is low	14. O-ring in pump is worn or damaged	14. Replace o-ring; see pump manual 310643 or 310894.
	15. Intake valve ball is packed with material	15. Clean intake valve; see pump manual 310643 or 310894.
	16. Pressure setting is too low	16. Increase pressure; see pump manual 310643 or 310894.
	17. Large pressure drop in hose with heavy materials	17. Use larger diameter hose and/or reduce overall length of hose. Use of more than 100 ft of 1/4 in. hose significantly reduces performance of sprayer. Use 3/8 in. hose for optimum performance (50 ft minimum).
Motor runs but pump does not stroke	1. Displacement pump pin (32) damaged or missing; see pump manual 310643 or 310894.	1. Replace pump pin if missing. Be sure retainer spring (31) is fully in groove all around connecting rod; see pump manual 310643 or 310894.
	2. Connecting rod assembly (43) damaged; see pump manual 310643 or 310894.	2. Replace connecting rod assembly; see pump manual 310643 or 310894.
	3. Gears or drive housing damaged, page 26.	3. Inspect drive housing assembly and gears for damage and replace if necessary; see pump manual 310643 or 310894.
Excessive paint leakage into throat packing nut	1. Throat packing nut is loose	1. Remove throat packing nut spacer. Tighten throat packing nut just enough to stop leakage.
	2. Throat packings are worn or damaged	2. Replace packings; see pump manual 310643 or 310894.
	3. Displacement rod is worn or damaged	3. Replace rod; see pump manual 310643 or 310894.
Fluid is spitting from gun	1. Air in pump or hose	1. Check and tighten all fluid connections. Reduce engine speed and cycle pump as slowly as possible during priming.
	2. Tip is partially clogged	2. Clear tip; see tip guard manual 309640.
	3. Fluid supply is low or empty	3. Refill fluid supply. Prime pump; see pump manual 310643 or 310894. Check fluid supply often to prevent running pump dry.
Pump is difficult to prime	1. Air in pump or hose	1. Check and tighten all fluid connections. Reduce engine speed and cycle pump as slowly as possible during priming.
	2. Intake valve is leaking	2. Clean intake valve. Be sure ball seat is not nicked or worn and that ball seats well. Reassemble valve.
	3. Pump packings are worn	3. Replace pump packings; see pump manual 310643 or 310894.
	4. Paint is too thick	4. Thin the paint according to the supplier's recommendations.
No display, sprayer operates	1. Display is damaged or has bad connection	1. Check connections. Replace display.

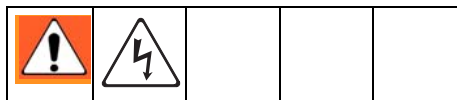
## Electrical

Symptom: Sprayer does not run or stops running.

Relieve pressure; page 8.

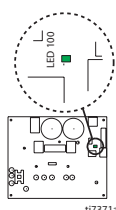


- Plug sprayer into correct voltage, grounded outlet
- Set power switch OFF for 30 seconds and then ON again. This ensures sprayer is in normal run mode.
- Turn pressure control knob clockwise 1/2 turn
- View digital display



### WARNING

To avoid electrical shock or moving parts hazards when covers are removed for troubleshooting, wait 30 seconds after unplugging power cord for stored electricity to dissipate. Keep clear of electrical and moving parts during troubleshooting procedures.









If no digital display is available, use control board status light to troubleshoot problems: Turn ON/OFF switch OFF, remove control cover and then turn power back ON. Observe status light.







Blinking LED total count equals digital error code i.e., two blinks equals E=02.

DIGITAL DISPLAY	SPRAYER OPERATION	INDICATION	WHAT TO DO
Blank	Sprayer may be pressurized	No power to control board	<ol style="list-style-type: none"> <li>1. Verify required voltage is present.</li> <li>2. Check wiring connections to control board.</li> <li>3. Perform continuity check on power cord and switch. Replace power cord or switch as needed.</li> <li>4. If steps 1 - 3 are ok, replace control board.</li> </ol>
 ti6314a	Sprayer may be pressurized	Pressure less than 200 psi (14 bar, 1.4 MPa)	<ol style="list-style-type: none"> <li>1. Make sure prime valve is open and there is no pressure in the system.</li> <li>2. Turn pressure control knob clockwise.</li> <li>3. Check potentiometer connection to control board.</li> <li>4. Check pressure control knob alignment to potentiometer shaft. Turn shaft fully clockwise and attach knob in full ON position.</li> <li>5. Unplug potentiometer. Short out center pin of control board potentiometer connector to each outer pin (one at a time). If sprayer runs, replace potentiometer, page 22.</li> <li>6. Check transducer connection.</li> <li>7. Disconnect and reconnect transducer plug to ensure good connection with control board socket. Check that transducer contacts are clean.</li> <li>8. Open prime valve. Connect a known good transducer in place of the sprayer transducer. Set sprayer ON. Replace transducer if sprayer runs. Replace control board if sprayer does not run.</li> </ol>

## Electrical

DIGITAL DISPLAY	SPRAYER OPERATION	INDICATION	WHAT TO DO
	Displays high pressure when prime valve is open and there is no pressure in sprayer.	Improper pressure signal to control	Open prime valve. Connect a known good transducer in place of the sprayer transducer. Set sprayer ON. Replace transducer if sprayer runs. Replace control board if sprayer does not run.
	Sprayer Stops	Control board is receiving excessive pressure signal from transducer. Transducer may be damaged or fluid flow path may be clogged.	<ol style="list-style-type: none"> <li>1. Check fluid path for clogs, such as a clogged filter.</li> <li>2. Open prime valve and gun if running AutoClean.</li> <li>3. Use airless paint spray hose with no metal braid, 1/4 in. x 50 ft minimum. Smaller hose or metal braid hose may result in high-[pressure spikes.</li> <li>4. Replace transducer if fluid path is not clogged and proper hose is used.</li> </ol>
	Sprayer Stops	Transducer or transducer connection error	<ol style="list-style-type: none"> <li>1. Check transducer connection.</li> <li>2. Disconnect and reconnect transducer plug to ensure good connection with control board socket. Check that transducer contacts are ok.</li> <li>3. Open prime valve. Connect a known good transducer in place of the sprayer transducer. Set sprayer ON. Replace transducer if sprayer runs. Replace control board if sprayer does not run.</li> </ol>
	Sprayer Stops	Possible locked pump or drive. May be motor connection or wiring error.	<ol style="list-style-type: none"> <li>1. Check motor wiring connections.</li> <li>2. Check for locked or frozen pump drive train.</li> <li>3. If all motor wiring connections are OK and pump/drive train are not locked up, spin motor fan 1/4 turn. Restart sprayer. If sprayer runs, replace control board. If not, replace motor.</li> </ol>
	Sprayer Stops	Motor is too hot or motor/terminal device connection may be bad	<ol style="list-style-type: none"> <li>1. Check all wire connections from motor to control board.</li> <li>2. If connections are all ok, allow sprayer to cool. If sprayer runs when cool, correct cause of overheating. Keep sprayer in cooler location with good ventilation. Make sure motor air intake is not blocked.</li> </ol>
	Sprayer Stops	Exceeded 2000 psi during timed flush cycle	<p>This error only occurs in flush timer mode.</p> <ol style="list-style-type: none"> <li>1. Make sure prime valve and gun are open.</li> <li>2. Make sure no flow obstructions or clogged filter.</li> </ol>

## Electrical

DIGITAL DISPLAY	SPRAYER OPERATION	INDICATION	WHAT TO DO
 ti7461a	Sprayer Stops	Motor sensor failure	Make sure motor sensor (resolver) is connected to the control board and check wiring for damage.
 ti7462a	Sprayer Stops	High control board temperature	<ol style="list-style-type: none"> <li>1. Make sure the motor air intake is not blocked.</li> <li>2. Make sure control board is properly connected to the back plate and that the conductive thermal paste is used on the power components. See page 16.</li> </ol>
 ti7463a	Sprayer Stops	Excessive motor speed	Check for damaged gears or disconnected pump.
 ti7464a	Sprayer Stops	High current	<ol style="list-style-type: none"> <li>1. Check for locked or frozen pump or drive train.</li> <li>2. Check for possible short circuits in wiring.</li> <li>3. Check pressure output and replace transducer if pressure is excessive.</li> </ol>
 ti7465a	Sprayer will not start	Model not selected	Control board identity resistors must be properly clipped to identify model type; see parts manual 311362, 311363, or 311364.
 ti6342a	Sprayer Stops	EMPTY on digital display indicates a loss of paint to the pump or a severe loss in pressure	<ol style="list-style-type: none"> <li>1. Check for empty paint condition, clogged inlet strainer, failed pump or severe leak. Turn pressure control knob to zero to restart sprayer.</li> <li>2. WatchDog (W-DOG) feature can be deactivated. Set WatchDog switch to OFF.</li> </ol>

\*Error codes also appear on control board as a blinking green LED. LED is an alternate to digital messages.

1. Remove two screws (71) and swing down cover (130).
2. Start motor. Blink count is the same as error code (E=0X).

After a fault, follow these steps to restart sprayer.

1. Correct fault condition.
2. Turn sprayer OFF.
3. Turn sprayer ON.

# Notes

# Pressure Control Board

## 100 - 120 Vac North American and Japan/Taiwan Motor Control Board

### Removal



Relieve pressure; page 8. Wait 5 minutes before servicing.

1. Remove four screws (38) and cover (96).
2. Disconnect display connector (A) from motor control board.
3. Remove bottom two screws (39) and allow control panel (68) to hang down freely.
4. Disconnect control board power lead(s) (D) from ON/OFF switch (33) and motor control board (52).
5. Disconnect potentiometer connector (C) from motor control board.
6. Disconnect WatchDog (49) switch connector (X) from motor control board.
7. Disconnect 15/20A switch (178) (1595 model only).
8. Disconnect transducer connector (E) from motor control board.
9. Disconnect motor connectors (F, G, and H) from motor control board.
10. Remove nut and screw (88) and disconnect ground wire (87). Disconnect coil connector (Y). Remove coil (81).
11. Remove top two screws (39) and control box (61).
12. Remove five screws (27), three screws (102) and motor control board.

### Installation

1. Apply small amount of thermal compound 110009 (5) to shaded component areas on rear of motor control board (52).

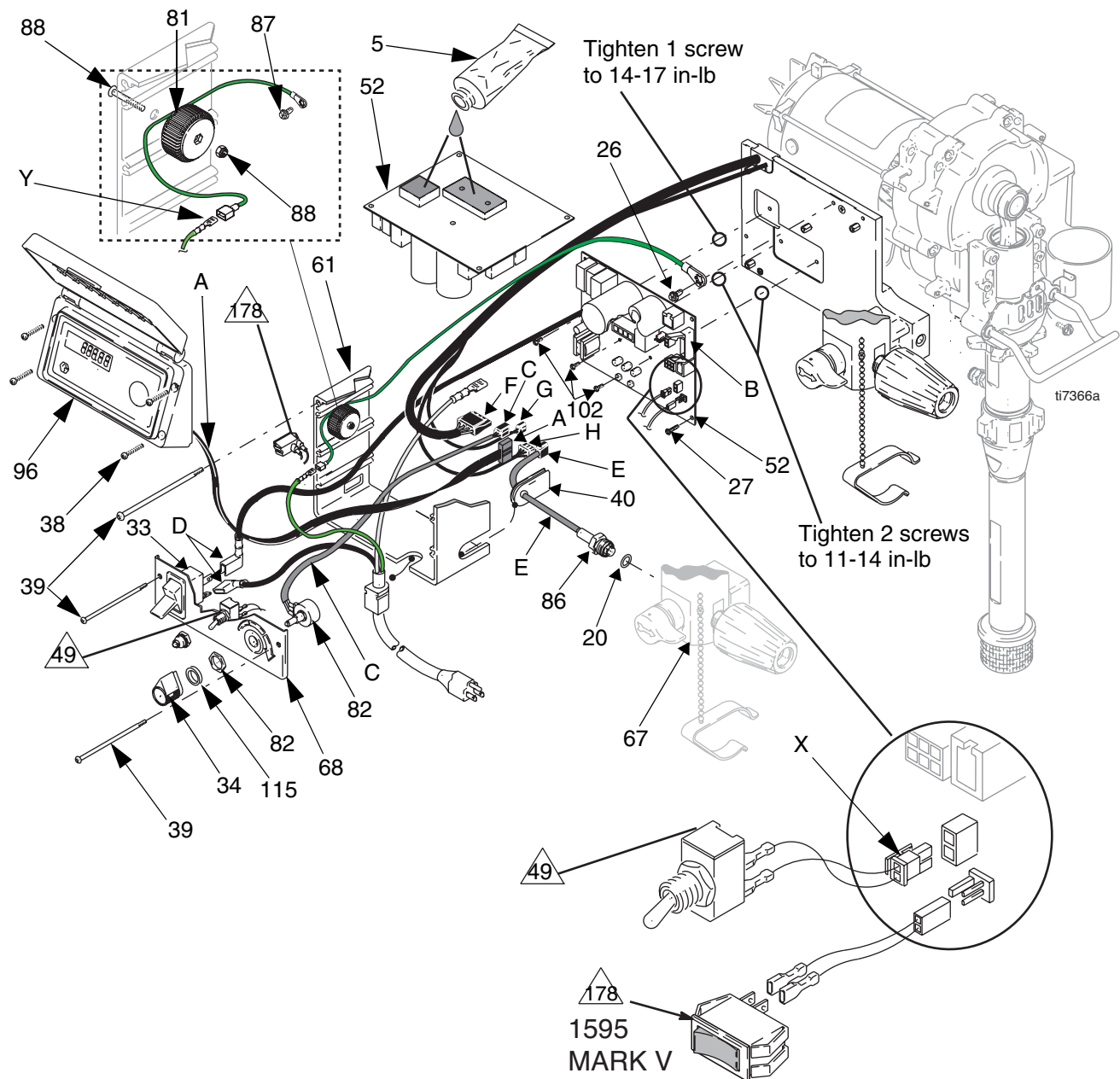
#### CAUTION

To reduce risk of motor control board failure, do not overtighten screws (102) which can damage the electric components.

2. Install motor control board (52) with five screws (27). Torque to 9-11 in-lb (1.02 - 1.24 N•m). Install and torque three screws (102) to values in illustration.
3. Connect motor connectors, (F, G and H) to motor control board.
4. Install control box (61) with top two screws (39).
5. Install coil (81) and tighten screw and nut (88). Tighten ground wire screw (87) and coil connector (Y).
6. Connect transducer connector (E) to motor control board.
7. Connect 15/20A switch (178) (1595 model only).
8. Connect motor control board power lead(s) (D) to ON/OFF switch (33).
9. Connect WatchDog (49) switch connector (X) to motor control board.
10. Connect potentiometer connector (C) to motor control board.
11. Install control panel (68) with two screws (39).
12. Connect display connector (A) to motor control board.
13. Install cover (96) with four screws (38).

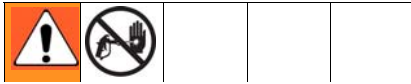


**100 - 120 Vac**  
**North American**  
**and Japan/Taiwan**



## 240 Vac Motor Control Board

### Removal



Relieve pressure; page 8. Wait 5 minutes before servicing.

1. Remove all four screws (38) and cover (96).
2. Disconnect display connector (A) from motor control board (52).
3. Remove bottom two screws (39). disconnect potentiometer connector (C) from motor control board (52). Disconnect power cord connectors (D) and filter board connectors (J) from ON/OFF switch (33) and remove control panel (68).
4. Disconnect WatchDog switch connector (X) from motor control board.
5. Disconnect motor control board power connectors (K) from filter board (146).
6. Remove top two screws (39) and control box (61).
7. Disconnect transducer connector (E) from motor control board.
8. Disconnect motor connectors (F, G and H) from motor control board.
9. Remove five screws (27), three screws (102) and motor control board.

### Installation

1. Apply a small amount of thermal compound 110009 (5) to shaded areas on rear of motor control board (52).

#### CAUTION

To reduce risk of motor control board failure, do not overtighten screws (102) which can damage the electric components.

2. Install motor control board (52) with five screws (27). torque to 9-11 in-lb (1.02 - 1.24 N•m). Install and torque three screws (102) to values in illustration on page 19.
3. Connect motor connectors (F, G and H) to motor control board.
4. Connect transducer connector (E) to motor control board.
5. Connect motor control board power connectors (K) to filter board (146).
6. Install control box (61) with top two screws (39).
7. Connect filter board power connectors (J) and power cord connectors (D) to ON/OFF switch (33).
8. Connect potentiometer connector (C) to motor control board.
9. Connect WatchDog switch (X) to motor control board.
10. Install control panel (68) with two screws (39).
11. Connect display connector (A) to motor control board (52).
12. Install cover (96) with four screws (38).

## Removal

- ## Installation

1. Install filter board (146) with four screws (163).
2. Connect motor control board power connectors (K) to filter board (146).
3. Connect filter board power connectors (J) to top two terminals of ON/OFF switch (33) and power cord connectors (D) to bottom two terminals of ON/OFF switch.
4. Connect potentiometer connector (C) to motor control board (52).
5. Connect WatchDog switch (X) to motor control board.
6. Install control panel (68) with two screws (39).
7. Connect display connector (A) to motor control board (52).
8. Install cover (96) with four screws (38).

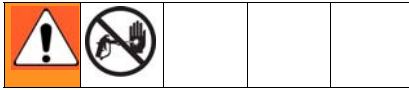
This diagram illustrates the assembly of the engine control system. Key components and their assembly instructions are as follows:

- 5**: A cable or hose is shown being connected to the main assembly.
- 52**: A bracket or plate is shown being attached to the main assembly.
- Tighten 1 screw to 14-17 in-lb (1.58-1.92 N•m)**: This instruction applies to the screw labeled **26**.
- Tighten 2 screws 11-14 in-lb (1.24-1.58 N•m)**: This instruction applies to the screws labeled **102** and **27**.
- 96**: A digital display unit is shown being connected to the main assembly.
- 38**, **39**, **34**, **115**, **82**, **68**, **80**, **20**, **67**, **X**: Various other components and connectors are shown being attached to the main assembly.
- 107367a**: A specific part number is indicated for a component on the right side of the diagram.

## 110 Vac U.K. Motor Control Board

### Removal

Relieve pressure; page 8.



Wait 5 minutes before servicing.

1. Remove four screws (38) and cover (96).
2. Disconnect display connector (A) from motor control board (52).
3. Disconnect display connector (A) from motor control board (52).
4. Remove bottom two screws (39). Disconnect potentiometer connector (C) from motor control board (52). Disconnect filter board connector (J) and power cord connector (D) from ON/OFF switch (33). Remove control panel (68).
5. Disconnect WatchDog switch connector (X) from motor control board.
6. Disconnect motor control board power connectors (K) from filter board (146).

Disconnect filter connector (L) from power cord connector (L).

7. Remove four screws (163) from filter board (146).

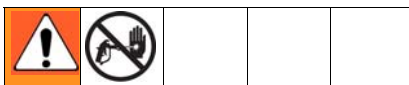
### Installation

1. Connect motor control board power connectors (K) to filter board (146). Connect filter connector (L) to power cord connector (L).
2. Install filter board (146) with four screws (163).
3. Connect filter board power connector (J) and power cord connector (D) to ON/OFF switch (33).
4. Connect potentiometer connector (C) to motor control board (52).
5. Connect WatchDog switch (X) to motor control board.
6. Install control panel (68) with two screws (39).

## 110 Vac U.K. Filter Board

### Removal

Relieve pressure; page 8.



Wait 5 minutes before servicing.

1. Remove four screws (38) and cover (96).
2. Disconnect display connector (A) from motor control board (52).
3. Remove bottom two screws (39). Disconnect potentiometer connector (C) from motor control board (52). Disconnect filter board connector (J) and power cord connector (D) from ON/OFF switch (33). Remove control panel (68).
4. Disconnect motor board control power connectors (K) from filter board (146).
5. Install control panel (68) with two screws

Disconnect filter connector (L) from power cord connector (L).

5. Remove four screws (163) from filter board (146).

### Installation

1. Connect motor control board power connectors (K) to filter board (146). Connect filter connector (L) to power cord connector (L).
2. Install filter board (146) with four screws (163).
3. Connect filter board power connector (J) and power cord connector (D) to ON/OFF switch (33).
4. Connect potentiometer connector (C) to motor control board (52).

[illegible]

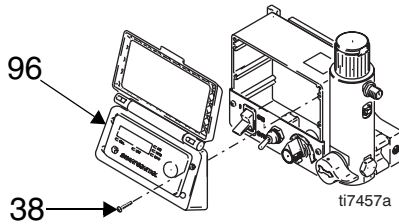
# Pressure Adjust Potentiometer

## Removal

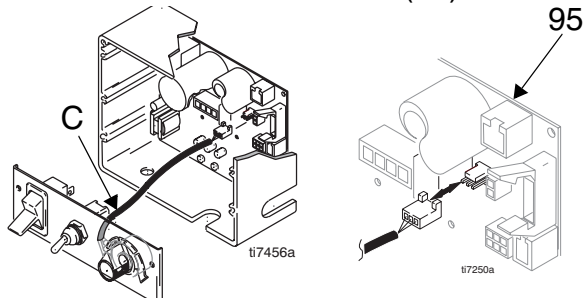


Relieve pressure; page 8. Wait 5 minutes before servicing.

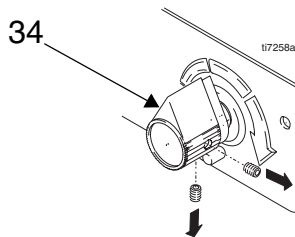
1. Remove four screws (38) and cover (96).



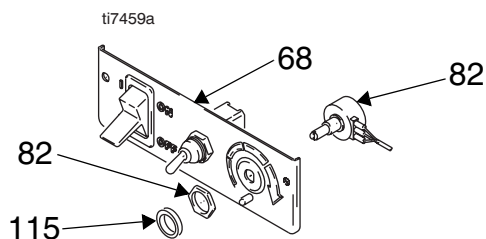
2. Disconnect potentiometer connector (C) from motor control board (95).



3. Remove pressure control knob (34) with a hex wrench.

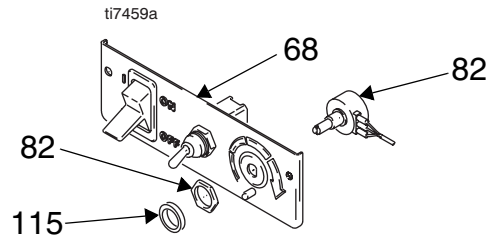


4. Remove gasket (115), nut and potentiometer (82) from control panel (68).

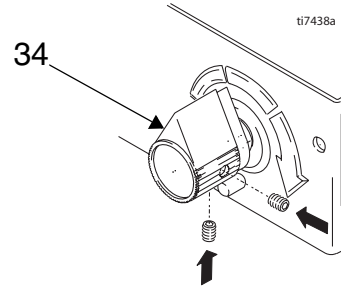


## Installation

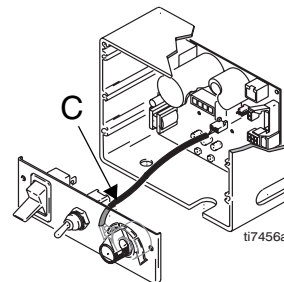
1. Install gasket (115), nut and potentiometer (82) on control panel (68). Torque nut to 30-35 in-lb (3.38 - 3.95 N•m).



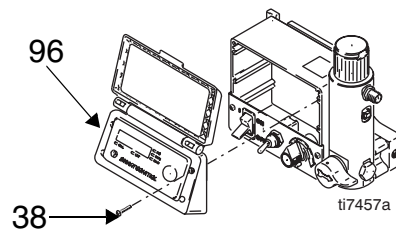
2. Install pressure control knob (34): Check pressure control knob alignment to potentiometer shaft. Turn shaft fully clockwise and attach knob in full ON position with a hex wrench.



3. Connect potentiometer connector (C) to motor control board.



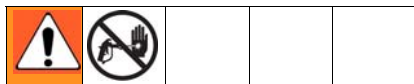
4. Install cover (96) with four screws (38).





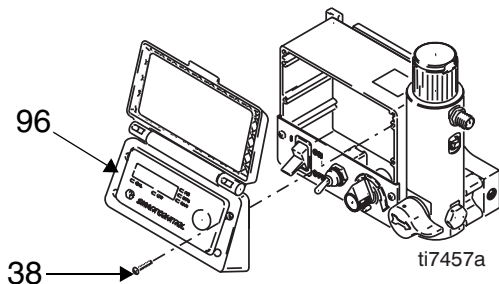
## Pressure Control Transducer

### Removal

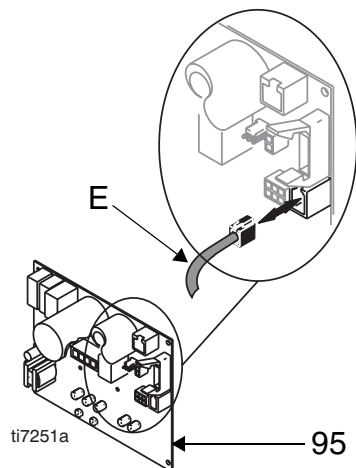


Relieve pressure; page 8. Wait 5 minutes before servicing.

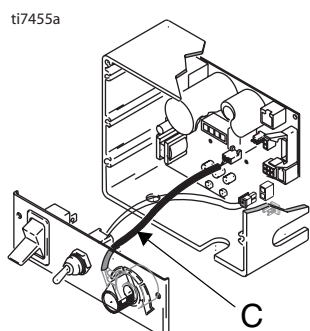
1. Remove four screws (38) and cover (96).



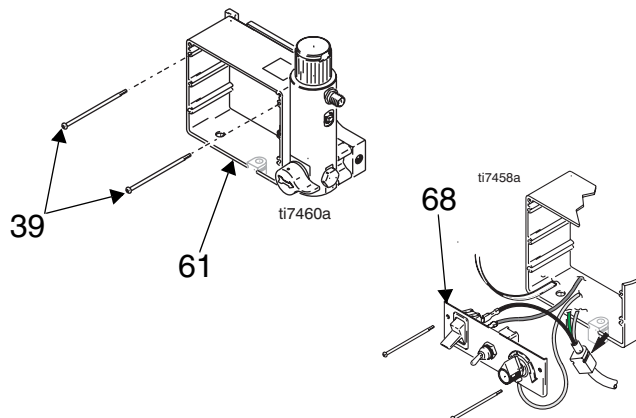
2. Disconnect transducer connector (E) from motor control board (95).



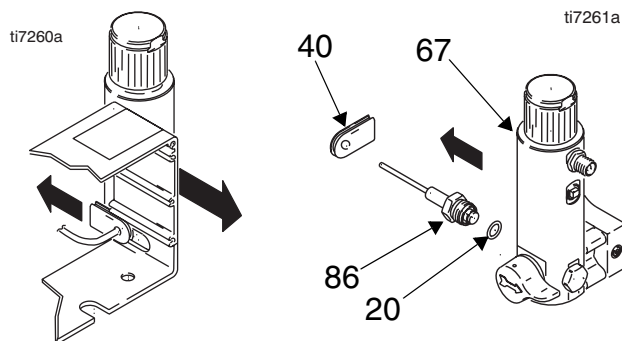
3. Disconnect potentiometer connector (C) from motor control board.



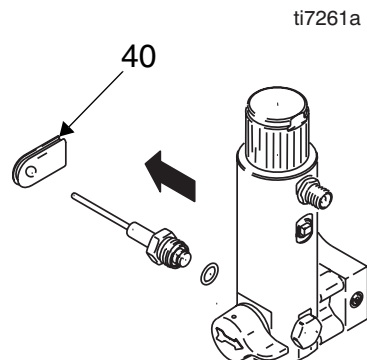
4. Remove four screws (39) and control box (61). Allow control panel (68) to hang down freely.



5. Remove grommet (40) from control box then remove transducer (86) and o-ring (20) from filter base (67).

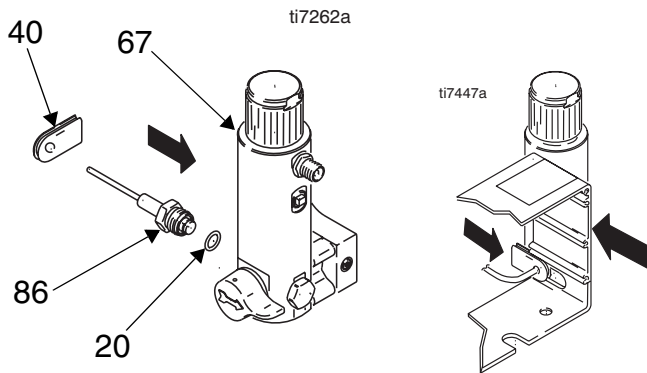


6. Remove grommet (40) from transducer and save for reuse.

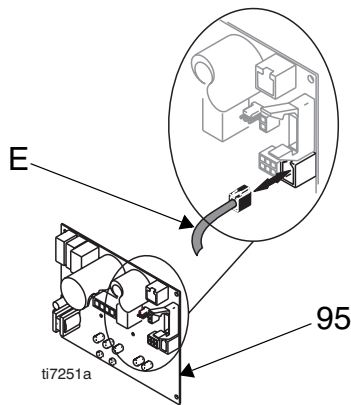


## Installation

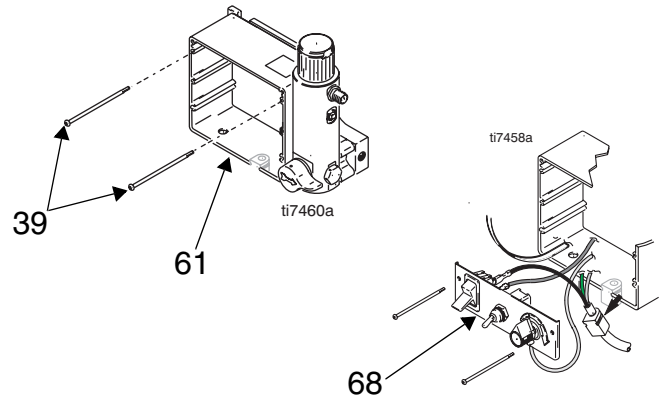
1. Install o-ring (20) and transducer (86) in filter base (67). Torque to 35-45 ft-lb (47-61 N•m). Install grommet onto transducer (86) and transducer into control box.



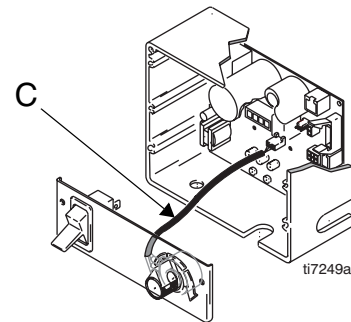
2. Connect transducer connector (E) to motor control board (95).



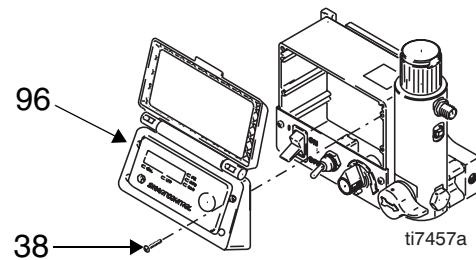
3. Install control box (61) and control panel (68) with four screws (39).



4. Connect potentiometer connector (C) to motor control board.



5. Install cover (96) with four screws (38).





# Notes

# Drive and Bearing Housing Replacement

## CAUTION

Do not drop gear cluster (89) when removing drive housing (90). Gear cluster may stay engaged in motor front end bell or drive housing.

## Disassembly



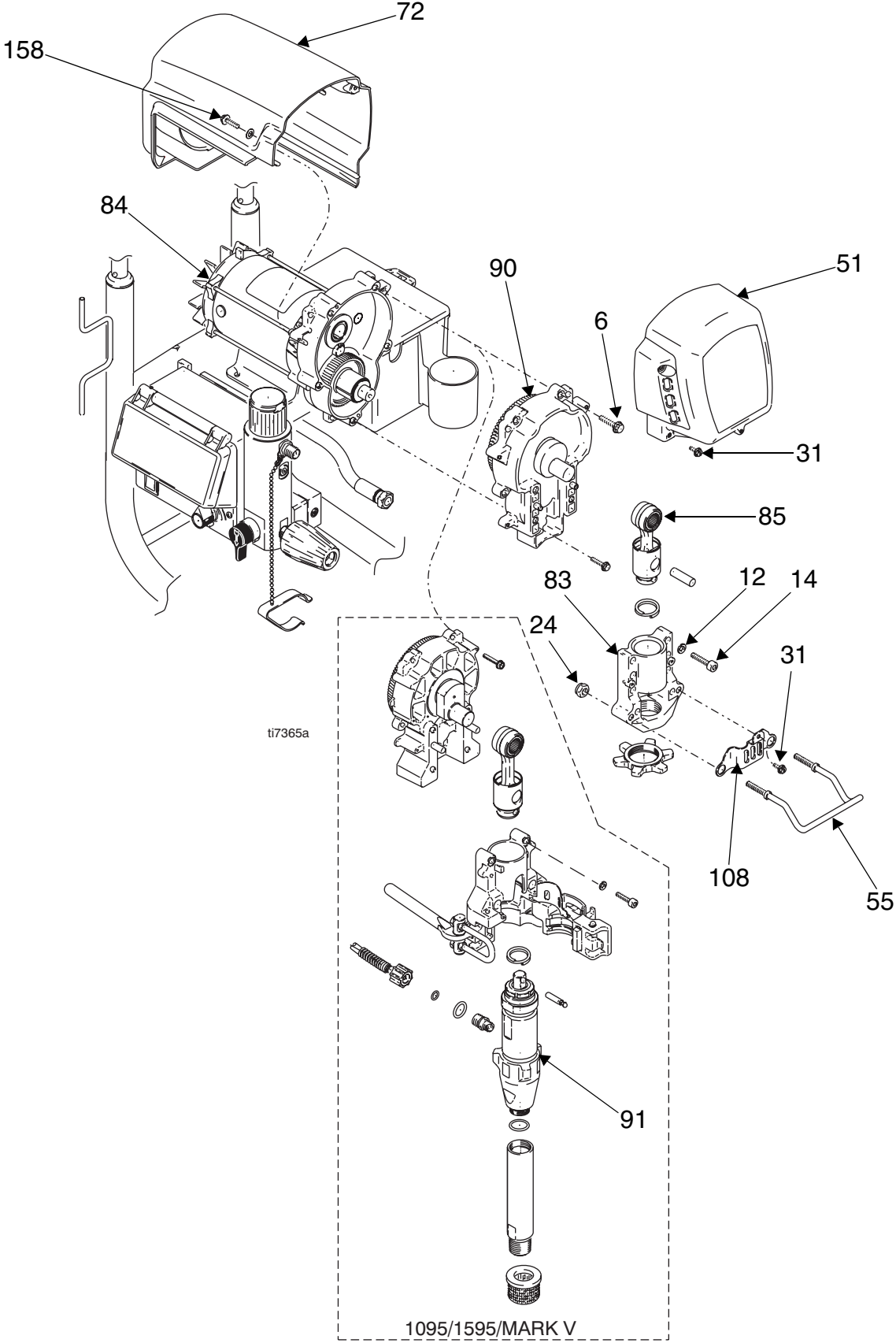
Relieve pressure; page 8.

1. Remove screw (31), two nuts (24), pail hanger (55) and pump rod cover (108).
2. Remove pump (91); see **Displacement Pump Replacement**, page 30 (695/795) page 32 (1095/1595/Mark V).
3. Remove two screws (158) and shroud (72).
4. Remove four screws (31) and front cover (51).
5. Remove four screws (14) and washers (12) to remove bearing housing (83) and connecting rod (85).
6. Remove five screws (6) and pull drive housing (90) off motor (84).

## Assembly

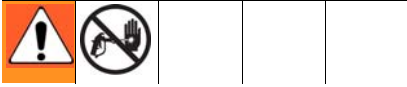
Make sure gear (89) and thrust washers (28, 30, 90a, 36; see page 29) are in place. Brush grease onto gear teeth.

1. Push drive housing (90) onto motor (84) and install with five screws (6). Torque to 190-210 in-lb (21-23 N•m).
2. Install bearing housing (83) with four screws (14) and washers (12). Torque to 25-30 ft-lb (34-40 N•m).
3. Install front cover (51) with four screws (31).
4. Install shroud (72) with two screws (158).
5. Install pump (91); see **Displacement Pump Replacement**, page 30 (695/795) page 32 (1095/1595/Mark V).
6. Install pump rod cover (108) and pail hanger (55) with screw (31) and two nuts (24).



# Motor Replacement

## Removal



Relieve pressure; page 8.

1. Remove pump (91); see **Displacement Pump Replacement**, page 30 (695/795) page 32 (1095/1595/Mark V).

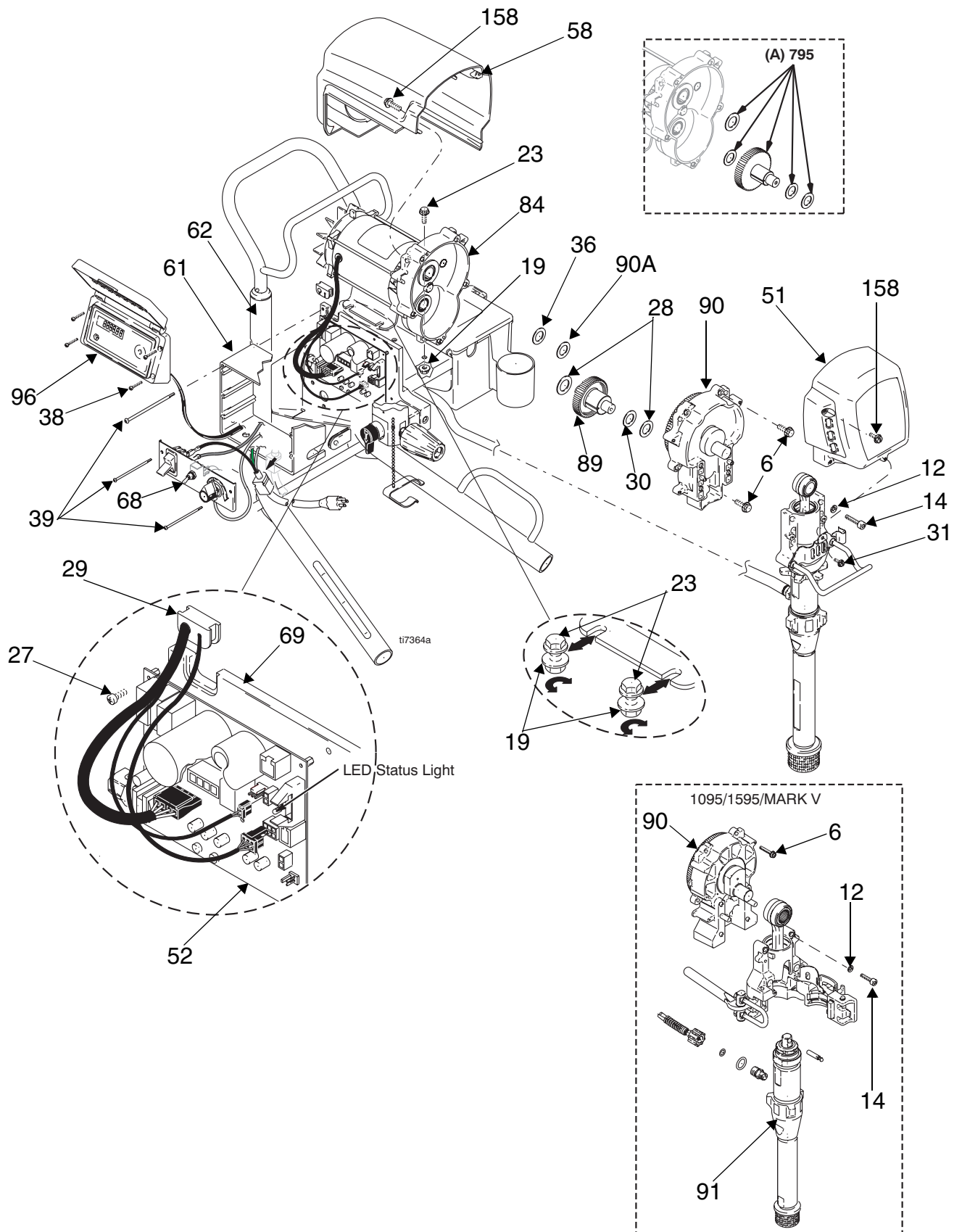
### CAUTION

Do not drop gear cluster (89) when removing drive housing (90). Gear cluster may stay engaged in motor front end bell or drive housing.

2. Remove drive housing (90); see **Drive Housing Replacement**, page 26.
3. Remove four screws (38) and control cover (96).
4. Remove bottom two screws (39) and allow control panel (68) to hang down freely.
5. Disconnect all three motor connectors from motor control board (52).
6. Remove top two screws (39) and control housing (61).
7. Remove strain relief (29) from motor wires and power bar plate (69).
8. Remove two screws (23) and nuts (19) on side opposite control.
9. Loosen two nuts (19) on side near control and remove motor (84) from cart frame (62).

## Installation

1. Slide new motor (84) under two screws (23) in cart frame (62) near control.
2. Install two screws (23) and nuts (19) on motor side opposite control.
3. Tighten all four screws (23) and nuts (19). torque nuts to 115-135 in-lb (13-15 N•m).
4. Install strain relief (29) onto motor wires and into power bar plate (69).
5. Install control housing (61) with top two screws (39).
6. Connect all three motor connectors to motor control board (52).
7. Install control panel (68) with two screws (39).
8. Install control cover (96) with four screws (38).
9. Install drive housing (90); see **Drive Housing Replacement**, page 26.
10. Install pump (91); see **Displacement Pump Replacement**, page 30 (695/795) page 32 (1095/1595/Mark V).



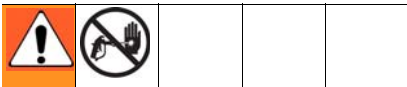
# Displacement Pump Replacement for 695/795

See pump manual 310643 or 310894 for pump repair instructions.

See manual 311362, 311363, or 311364 for applicable sprayer part number references.

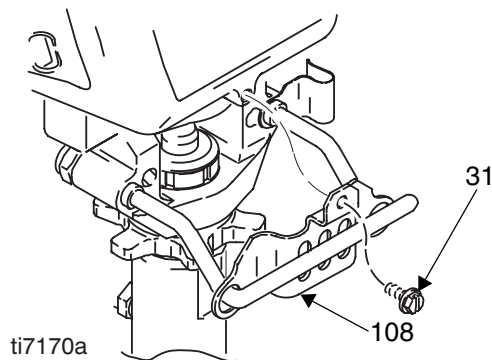
## Removal

1. Flush pump.



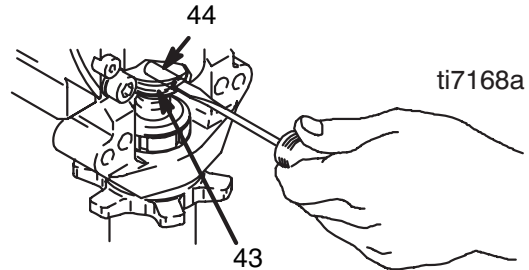
Relieve pressure; page 8.

2. Remove screw (31) and slide pump rod shield (108) forward.

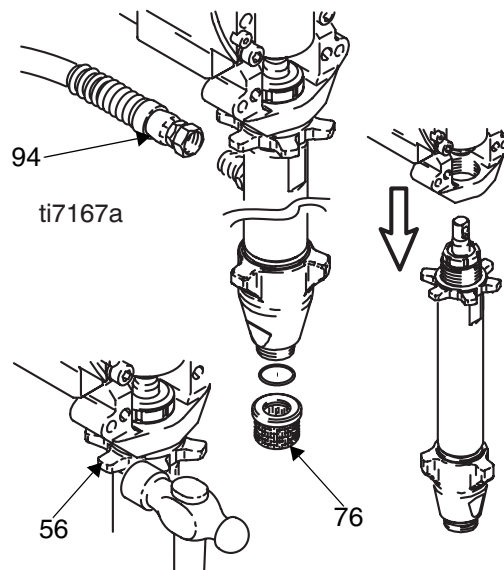


3. Cycle pump in JOG mode until pump pin (44) is in position to be removed. Turn power switch OFF and unplug power cord.

Push up retaining ring (43) and push pump pin out.



4. Remove suction tube (76), hose (94) and any washers and o-rings.
5. Loosen pump jam nut (56). Unscrew pump.



## Installation



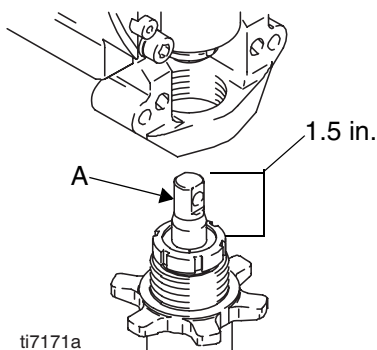
### WARNING

If pump pin works loose, parts could break off due to force of pumping action. Parts could project through the air and result in serious injury or property damage.

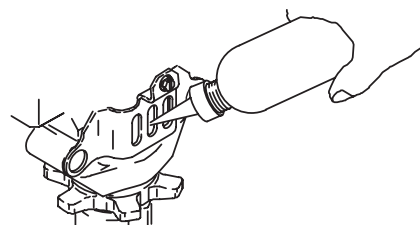
### CAUTION

If the pump jam nut loosens during operation, the threads of the drive housing will be damaged.

1. Extend pump piston rod 1.5 in. Apply grease to top of pump rod at (A) or inside connecting rod.



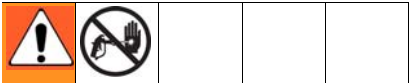
2. Install pump pin (44). Verify retaining spring (43) is in groove of connecting rod (85).
3. Push pump up until pump threads engage.
4. Screw in pump until threads are flush with drive housing opening. Align pump outlet to back.
5. Install washers, o-rings and suction tube (76) and hose (94).
6. Screw jam nut (56) up onto pump until nut stops. Tighten jam nut by hand, then tap 1/8 to 1/4 turn with a 20 oz (maximum) hammer to approximately 75± 5 ft-lb (102 N•m).
7. Install pump rod shield (108) with screw (31).
8. Fill packing nut with Graco TSL until fluid flows onto top of seal.



# Displacement Pump Replacement 1095/1595/Mark V

## Removal

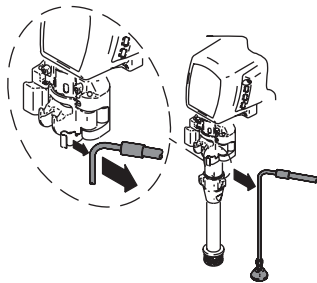
1. Flush pump.
2. Stop pump with piston rod in its lowest position.



Read Skin Injection Hazard; page 5.

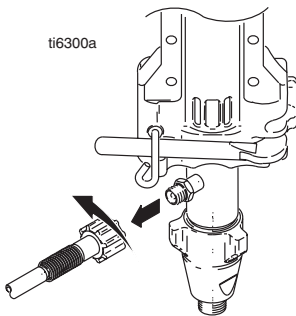
3. Do Pressure Relief, page 8.
4. Separate drain hose from sprayer.

ti7326a



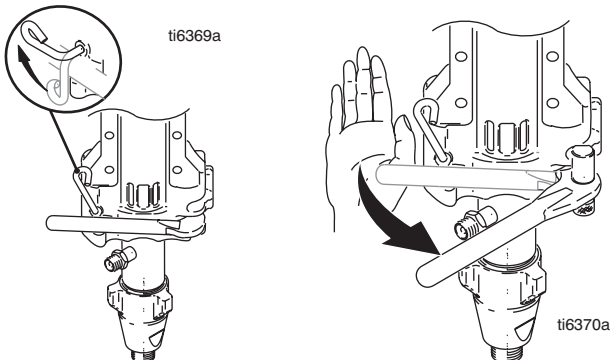
5. Disconnect paint hose from pump.

ti6300a

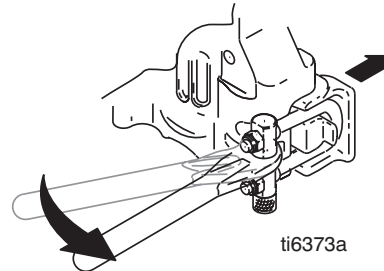


6. Raise latch lock. Push latch open.

ti6369a



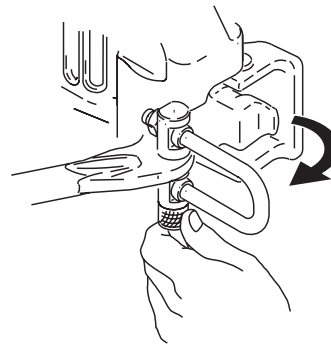
7. Ratchet open pump door.
  - a. Ratchet pump door forward.



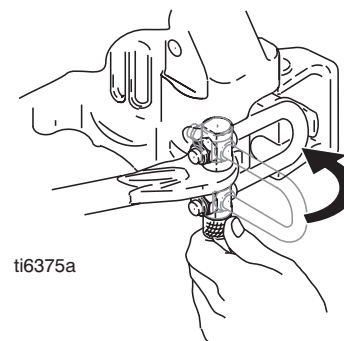
ti6373a

- b. Twist latch u-bolt out of pump door recess.
- c. Place u-bolt on pump door outer edge.
- d. If pump door is stuck, do steps e, f, and 8, otherwise go to step 9.
- e. Twist latch u-bolt back from pump door outer edge.

ti6374a



- f. Place u-bolt on pump door protrusion.

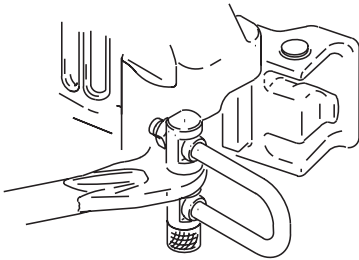


ti6375a



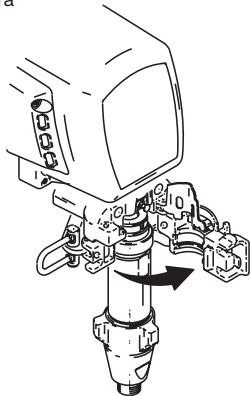
8. Ratchet pump door forward.

ti6377a

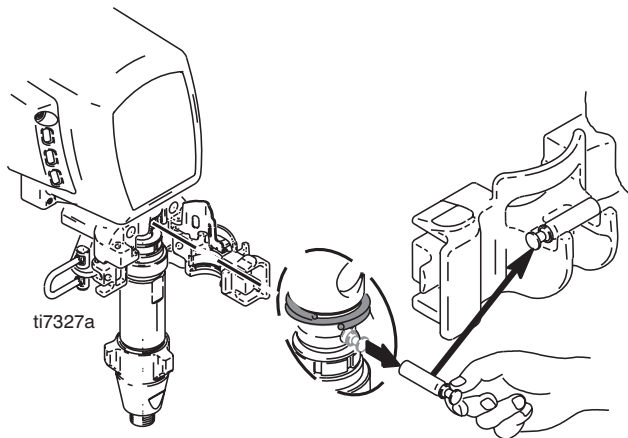


9. Open pump door.

ti7331a



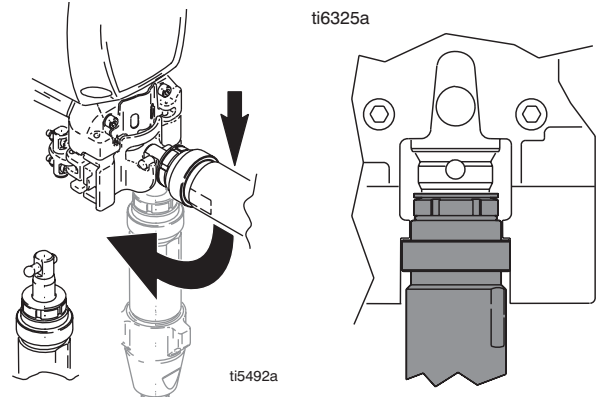
10. Pull out pump pin and place in pin holder.



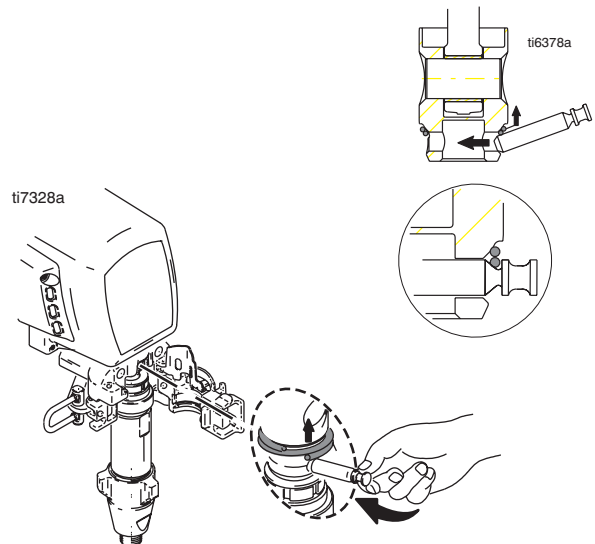
4. Close pump door and rotate latch into

## Installation

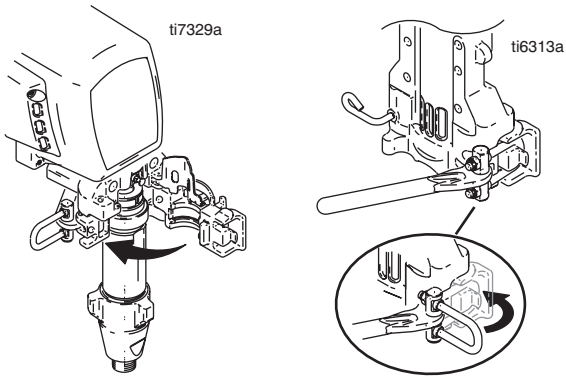
1. Adjust piston rod with pin holder to pull out piston rod. Tap piston rod on hard surface to push in piston rod.
2. Push pump collar flush with bearing housing ledge to be able to close pump door.



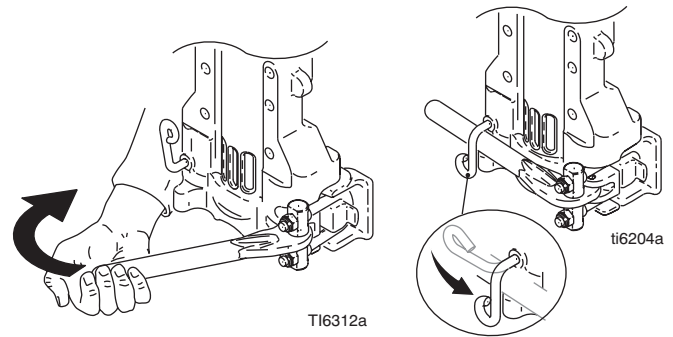
3. Slide pump into connecting rod. Push pump pin until it is fully retained.  
Note: Pin will snap into position.



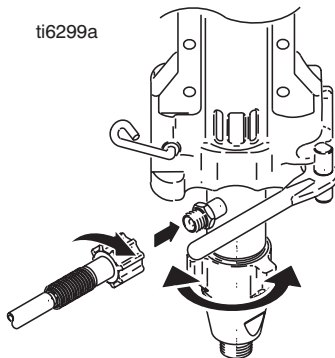
position. Do not tighten latch.



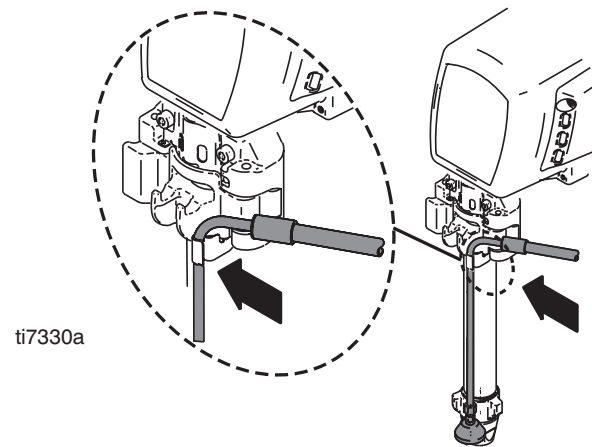
6. Tighten latch and rotate latch lock into locked position.



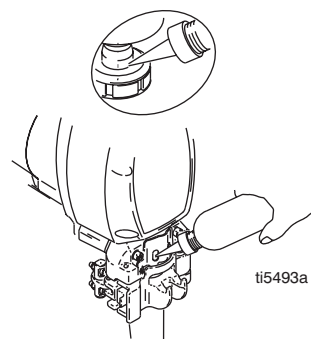
5. Rotate pump to align with paint hose. Connect paint hose and hand tighten to 70 in-lb.



7. Attach drain hose to sprayer.



8. Fill pump with Graco TSL until fluid flows onto top of seal.



# Notes

# Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale 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.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

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, 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.

**TO PLACE AN ORDER OR FOR SERVICE**, contact your Graco distributor, or call **1-800-690-2894** to identify the nearest distributor.

This manual contains: English

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