

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

Korean patent10-0579681

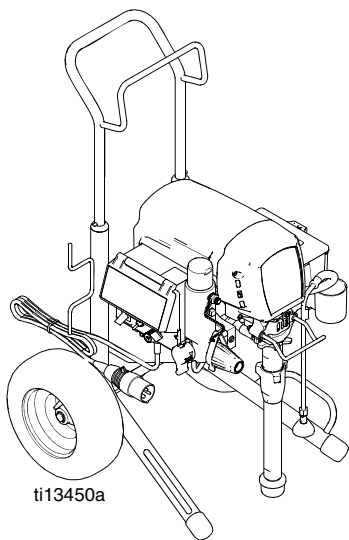
311365E rev.g

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



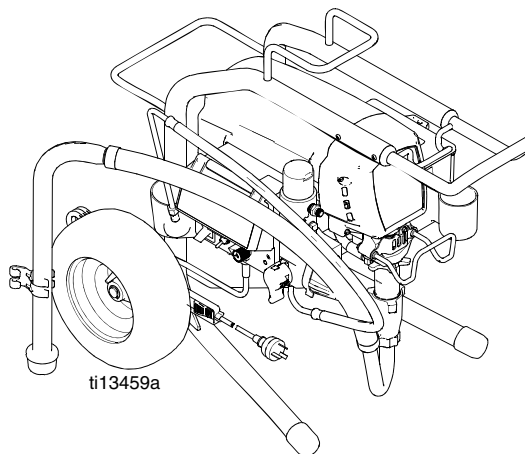
## IMPORTANT SAFETY INSTRUCTIONS

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



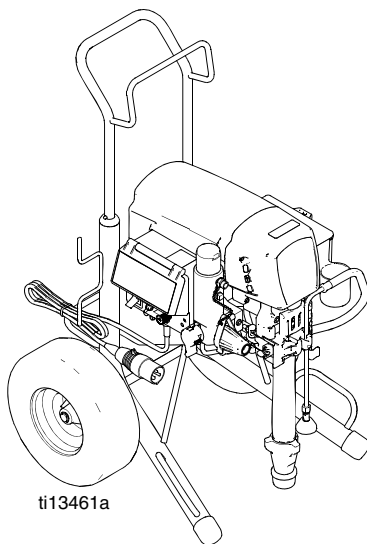
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**695/795 HI**



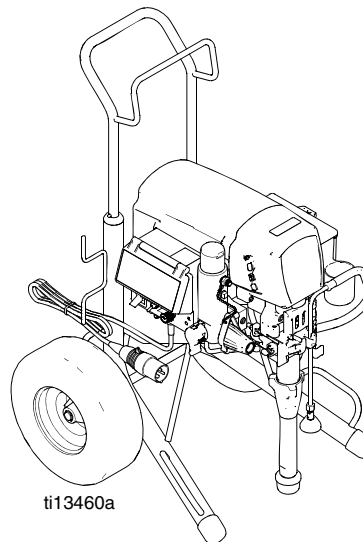
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**695/795 LOW**



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**MARK V**



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**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
				256165
	1095			249667
	Mark V			
				256166
<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
<b>240 Asia</b>	695		255138	249681
	795			249683
	1095			249684

\*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 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 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 symbol refers to procedure-specific risks. Refer back to these warnings. Additional, product-specific warnings may be found throughout the body of this manual where applicable.

## Grounding Instructions

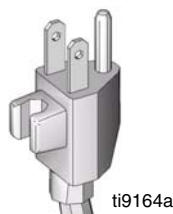
This product must be grounded. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current. This product is equipped with a cord having a grounding wire with an appropriate grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

### WARNING



#### GROUNDING

- Improper installation of the grounding plug is able to result in a risk of electric shock.
- When repair or replacement of the cord or plug is required, do not connect the grounding wire to either flat blade terminal.
- The wire with insulation having an outer surface that is green with or without yellow stripes is the grounding wire.
- Check with a qualified electrician or serviceman when the grounding instructions are not completely understood, or when in doubt as to whether the product is properly grounded.
- Do not modify the plug provided; if it does not fit the outlet, have the proper outlet installed by a qualified electrician.
- This product is for use on a nominal 120V circuit and has a grounding plug similar to the plug illustrated in the figure below.



- Only connect the product to an outlet having the same configuration as the plug.
- Do not use an adapter with this product.

#### Extension Cords:

- Use only a 3-wire extension cord that has a 3-blade grounding plug and a 3-slot receptacle that accepts the plug on the product.
- Make sure your extension cord is not damaged. If an extension cord is necessary, use 12 AWG (2.5 mm<sup>2</sup>) minimum to carry the current that the product draws.
- An undersized cord results in a drop in line voltage and loss of power and overheating.


**WARNING**







**FIRE AND EXPLOSION HAZARD**

Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:

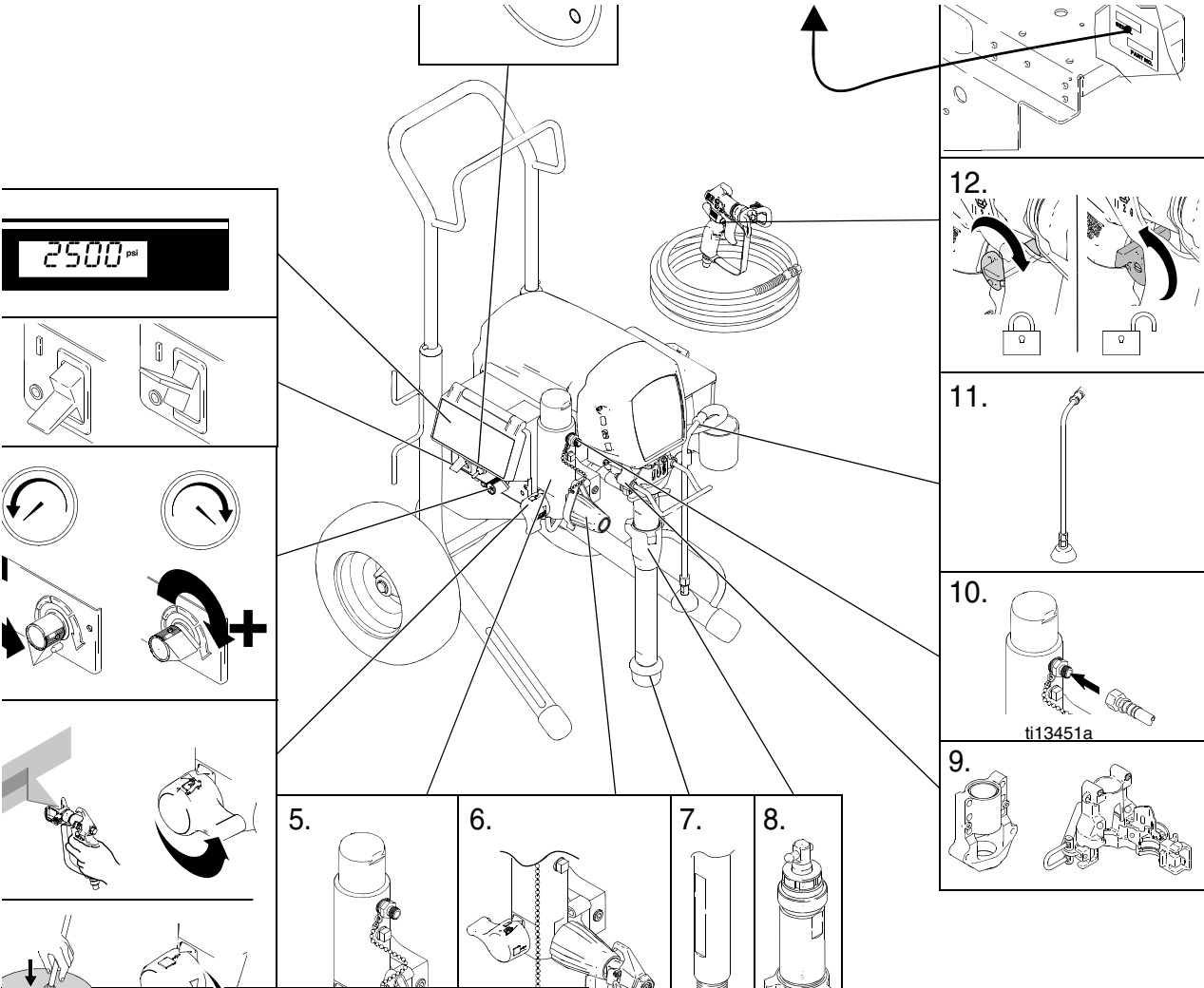
- Do not spray flammable or combustible materials near an open flame or sources of ignition such as cigarettes, motors, and electrical equipment.
- Paint or solvent flowing through the equipment is able to result in static electricity. Static electricity creates a risk of fire or explosion in the presence of paint or solvent fumes. All parts of the spray system, including the pump, hose assembly, spray gun, and objects in and around the spray area shall be properly grounded to protect against static discharge and sparks. Use Graco conductive or grounded high-pressure airless paint sprayer hoses.
- Verify that all containers and collection systems are grounded to prevent static discharge.
- Connect to a grounded outlet and use grounded extensions cords. Do not use a 3-to-2 adapter.
- Do not use a paint or a solvent containing halogenated hydrocarbons.
- Keep spray area well-ventilated. Keep a good supply of fresh air moving through the area. Keep pump assembly in a well ventilated area. Do not spray pump assembly.
- Do not smoke in the spray area.
- Do not operate light switches, engines, or similar spark producing products in the spray area.
- Keep area clean and free of paint or solvent containers, rags, and other flammable materials.
- Know the contents of the paints and solvents being sprayed. Read all Material Safety Data Sheets (MSDS) and container labels provided with the paints and solvents. Follow the paint and solvents manufacturer's safety instructions.
- Fire extinguisher equipment shall be present and working.
- Sprayer generates sparks. When flammable liquid is used in or near the sprayer or for flushing or cleaning, keep sprayer at least 20 feet (6 m) away from explosive vapors.


**SKIN INJECTION HAZARD**

- Do not aim the gun at, or spray any person or animal.
- Keep hands and other body parts away from the discharge. For example, do not try to stop leaks with any part of the body.
- Always use the nozzle tip guard. Do not spray without nozzle tip guard in place.
- Use Graco nozzle tips.
- Use caution when cleaning and changing nozzle tips. In the case where the nozzle tip clogs while spraying, follow the **Pressure Relief Procedure** for turning off the unit and relieving the pressure before removing the nozzle tip to clean.
- Do not leave the unit energized or under pressure while unattended. When the unit is not in use, turn off the unit and follow the **Pressure Relief Procedure** for turning off the unit.
- High-pressure spray is able to inject toxins into the body and cause serious bodily injury. In the event that injection occurs, **get immediate surgical treatment**.
- Check hoses and parts for signs of damage. Replace any damaged hoses or parts.
- This system is capable of producing 3300 psi. Use Graco replacement parts or accessories that are rated a minimum of 3300 psi.
- Always engage the trigger lock when not spraying. Verify the trigger lock is functioning properly.
- Verify that all connections are secure before operating the unit.
- Know how to stop the unit and bleed pressure quickly. Be thoroughly familiar with the controls.

 <b>WARNING</b>	
	<p><b>EQUIPMENT MISUSE HAZARD</b></p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Always wear appropriate gloves, eye protection, and a respirator or mask when painting.</li> <li>• Do not operate or spray near children. Keep children away from equipment at all times.</li> <li>• Do not overreach or stand on an unstable support. Keep effective footing and balance at all times.</li> <li>• Stay alert and watch what you are doing.</li> <li>• Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>• Do not kink or over-bend the hose.</li> <li>• Do not expose the hose to temperatures or to pressures in excess of those specified by Graco.</li> <li>• Do not use the hose as a strength member to pull or lift the equipment.</li> </ul>
	<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>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>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

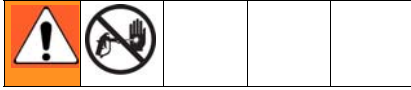


English	
1	Premium Digital Display
2	ON/OFF switch
3	Pressure control
4	Prime / Spray valve
5	Filter
6	AutoClean <sub>2</sub> <sup>™</sup>
7	Siphon tube
8	Pump
9	Bearing Housing / ProConnect <sup>™</sup>
10	Fluid Outlet
11	Drain tube
12	Trigger Lock
13	Model/serial tag
14	WatchDog <sup>™</sup> Switch (not Mark V)



# 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.

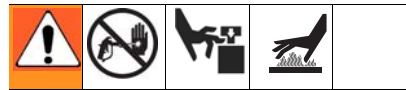
*If suspected that spray tip or hose is completely clogged, or that pressure has not been fully relieved after following steps above, VERY SLOWLY loosen tip guard retaining nut or hose end coupling to relieve pressure gradually, then loosen completely. Then clear tip or hose obstruction.*

### 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 11, for other possible solutions.

# Grounding

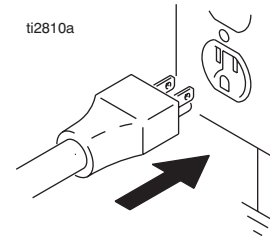


## WARNING

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.

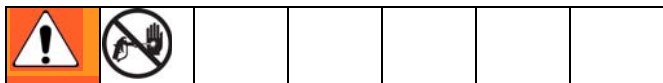
2. Do not alter ground prong or use adapter.



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 9.

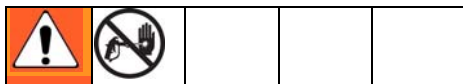
TYPE OF PROBLEM	WHAT TO CHECK If check is OK, go to next check	WHAT TO DO When check is not OK, refer to this column
E=XX is displayed	1. Fault condition exists	1. Determine fault correction from table, page 13.
False tripping of WatchDog system. EMPTY is displayed. Pump does not run.	1. Operating conditions 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 If check is OK, go to next check</b>	<b>WHAT TO DO When check is not OK, refer to this column</b>
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 30.	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.

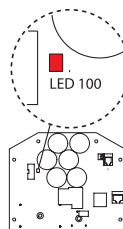
Relieve pressure; page 9.



- 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




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.


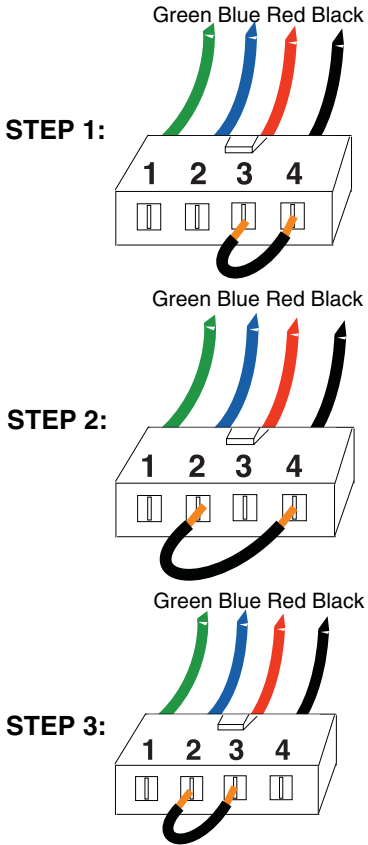



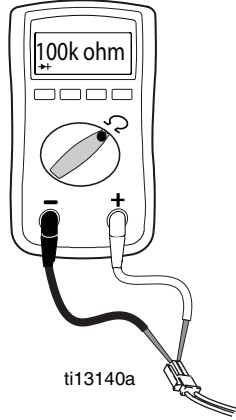
If no digital display is available, use control board status light to troubleshoot problems: Turn ON/OFF switch OFF, remove control cover and then turn power back ON. Observe status light. Blinking LED total count equals digital error code i.e., two blinks equals E=02.

TYPE OF PROBLEM	WHAT TO CHECK	HOW TO CHECK
Sprayer does not run at all	See flow chart, page 19.	
Digital display is blank		
Control board status light never lights		
Sprayer does not run at all	Check transducer or transducer connections	<ol style="list-style-type: none"> <li>1. Make sure there is no pressure in the system (see <b>Pressure Relief</b>, page 9). Check fluid path for clogs, such as clogged filter.</li> <li>2. 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>3. Set sprayer to OFF and disconnect power to sprayer.</li> <li>4. Check transducer and connections to control board.</li> <li>5. Disconnect transducer from control board socket. Check that transducer and control board contacts are clean and secure.</li> <li>6. Reconnect transducer to control board socket. Connect power, set sprayer ON and control knob 1/2 turn clockwise. If sprayer does not run properly, set sprayer to OFF and go to next step.</li> <li>7. Install new transducer. Connect power, set sprayer ON and control knob 1/2 turn clockwise. Replace control board if sprayer does not run properly.</li> </ol>
Digital display shows E=02		
Control board status light blinks 2 times repeatedly		

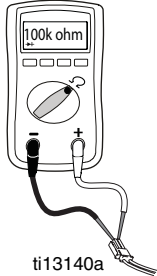
E=02

TYPE OF PROBLEM	WHAT TO CHECK	HOW TO CHECK
Sprayer does not run at all Digital display shows E=03 	Check transducer or transducer connections (control board is not detecting a pressure signal).	<ol style="list-style-type: none"> <li>1. Set sprayer to OFF and disconnect power to sprayer.</li> <li>2. Check transducer and connections to control board.</li> <li>3. Disconnect transducer from control board socket. Check to see if transducer and control board contacts are clean and secure.</li> </ol>
Control board status light blinks 3 times repeatedly		<ol style="list-style-type: none"> <li>4. Reconnect transducer to control board socket. Connect power, set sprayer ON and control knob to 1/2 turn clockwise. If sprayer does not run, set sprayer to OFF and go to next step.</li> <li>5. Connect a confirmed working transducer to control board socket.</li> <li>6. Set sprayer ON and control knob to 1/2 turn clockwise. If sprayer runs, install new transducer. Replace control board if sprayer does not run.</li> <li>7. Check transducer resistance with ohmmeter (less than 9k ohm between red and black wires and 3-6k ohm between green and yellow wires).</li> </ol>

TYPE OF PROBLEM	WHAT TO CHECK	HOW TO CHECK
Sprayer does not run at all Digital display shows E=05 	Control is commanding motor to run but motor shaft does not rotate. Possibly locked rotor condition, an open connection exists between motor and control, there is a problem with motor or control board, or motor amp draw is excessive.	<ol style="list-style-type: none"> <li>1. Remove pump and try to run sprayer. If motor runs, check for locked or frozen pump or drive train. If sprayer does not run, continue to step 2.</li> <li>2. Set sprayer to OFF and disconnect power to sprayer.</li> <li>3. Disconnect motor connector(s) from control board socket(s). Check that motor connector and control board contacts are clean and secure. If contacts are clean and secure, continue to step 4.</li> <li>4. Set sprayer to OFF and spin motor fan 1/2 turn. Restart sprayer. If sprayer runs, replace control board. If sprayer does not run, continue to step 5.</li> <li>5. <b>Perform Spin Test:</b> Test at large 4-pin motor field connector. Disconnect fluid pump from sprayer. Test motor by placing a jumper across pins 1 &amp; 2. Rotate motor fan at about 2 revolutions per second. A cogging resistance to motion should be felt at the fan. The motor should be replaced if no resistance is felt. Repeat for pin combinations 1 &amp; 3 and 2 &amp; 3. Pin 4 (the green wire) is not used in this test. If all spin test is positive, continue to step 6.</li> </ol>
Control board status light blinks 5 times repeatedly		 <p>The diagram illustrates the spin test procedure in three steps. Each step shows a 4-pin connector with wires labeled Green (Pin 1), Blue (Pin 2), Red (Pin 3), and Black (Pin 4).  <b>STEP 1:</b> A black jumper wire connects Pin 1 (Green) and Pin 2 (Blue).  <b>STEP 2:</b> A black jumper wire connects Pin 1 (Green) and Pin 3 (Red).  <b>STEP 3:</b> A black jumper wire connects Pin 2 (Blue) and Pin 3 (Red).</p>

TYPE OF PROBLEM	WHAT TO CHECK	HOW TO CHECK										
Sprayer does not run at all Digital display shows E=05 	Control is commanding motor to run but motor shaft does not rotate. Possibly locked rotor condition, an open connection exists between motor and control, there is a problem with motor or control board, or motor amp draw is excessive.	6. <b>Perform Field Short Test:</b> Test at large 4-pin motor field connector. There should not be continuity from pin 4, the ground wire, and any of the remaining 3 pins. If motor field connector tests fail, replace motor. 7. <b>Check Motor Thermal Switch:</b> Unplug thermal wires. Set meter to ohms. Meter should read the proper resistance for each model (see table below).										
Control board status light blinks 5 times repeatedly		 <p style="text-align: center;">ti13140a</p> <table border="1" data-bbox="938 993 1292 1178"> <thead> <tr> <th colspan="2">Resistance Table:</th> </tr> </thead> <tbody> <tr> <td>695</td> <td>0 ohms</td> </tr> <tr> <td>795</td> <td>2k ohms</td> </tr> <tr> <td>1095</td> <td>3.9k ohms</td> </tr> <tr> <td>MARK V</td> <td>3.9k ohms</td> </tr> </tbody> </table>	Resistance Table:		695	0 ohms	795	2k ohms	1095	3.9k ohms	MARK V	3.9k ohms
Resistance Table:												
695	0 ohms											
795	2k ohms											
1095	3.9k ohms											
MARK V	3.9k ohms											

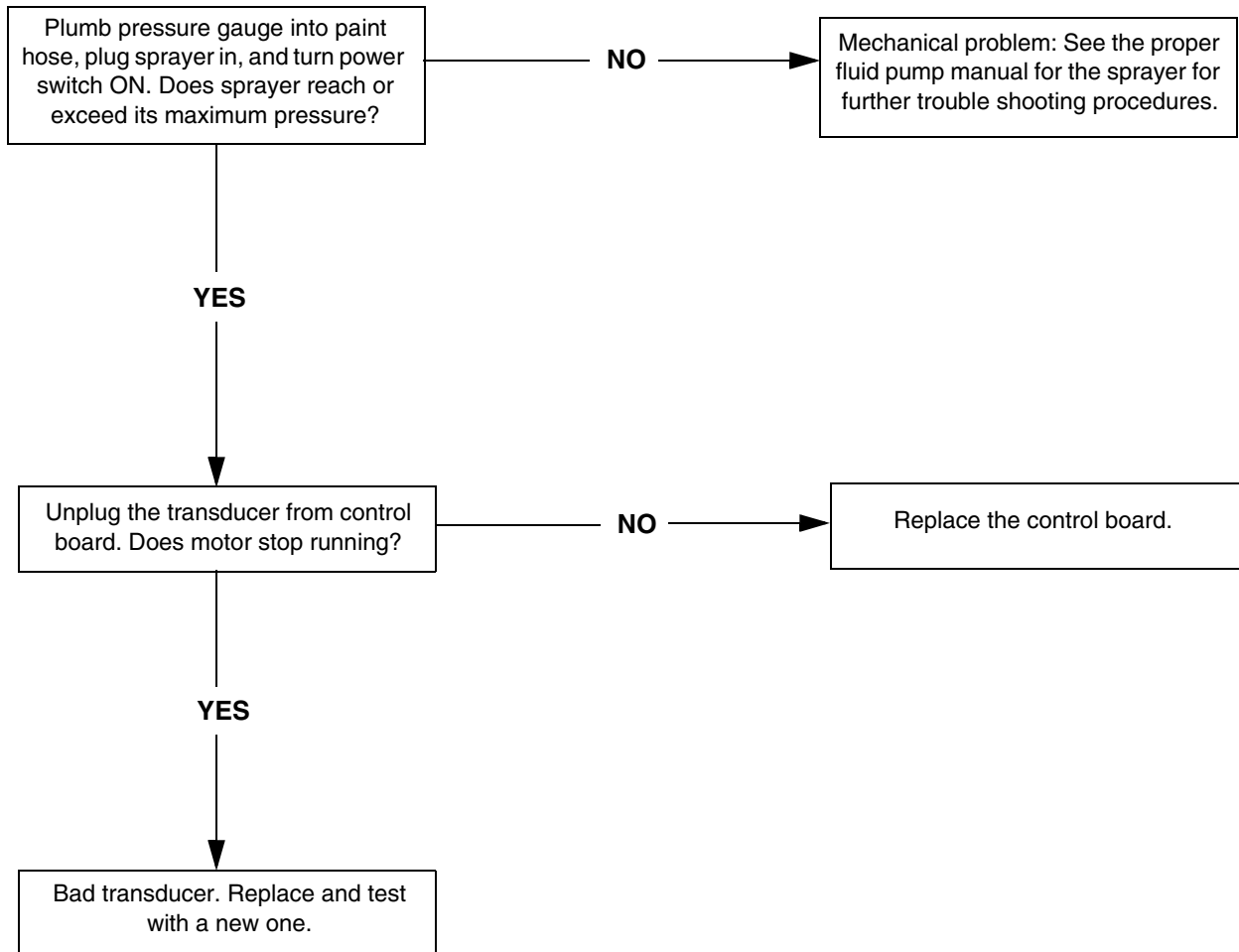


TYPE OF PROBLEM	WHAT TO CHECK	HOW TO CHECK										
<p>Sprayer does not run at all</p> <p>Digital display shows E=06</p> <p style="text-align: center; font-size: 2em;"><b>E=06</b></p> <p>Control board status light blinks 6 times repeatedly</p>	<p>Allow sprayer to cool. If sprayer runs when cool, correct cause of overheating. Keep sprayer in cooler location with good ventilation. Make sure motor air intake is not blocked. If sprayer still does not run, follow Step 1.</p>	<p><b>NOTE:</b> Motor must be cooled down for the test.</p> <ol style="list-style-type: none"> <li>1. Check thermal device connector (yellow wires) at control board.</li> <li>2. Disconnect thermal device connector from control board socket. Make sure contacts are clean and secure.</li> <li>3. Measure resistance of the thermal device. If reading is not correct, replace motor.</li> </ol> <p><b>Check Motor Thermal Switch:</b> Unplug thermal wires. Set meter to ohms. Meter should read the proper resistance for each model (see table below).</p> <div style="text-align: center;">  <p>ti13140a</p> </div> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">Resistance Table:</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">695</td> <td style="text-align: center;">0 ohms</td> </tr> <tr> <td style="text-align: center;">795</td> <td style="text-align: center;">2k ohms</td> </tr> <tr> <td style="text-align: center;">1095</td> <td style="text-align: center;">3.9k ohms</td> </tr> <tr> <td style="text-align: center;">MARK V</td> <td style="text-align: center;">3.9k ohms</td> </tr> </tbody> </table> <ol style="list-style-type: none"> <li>4. Reconnect thermal device connector to control board socket. Connect power, turn sprayer ON and control knob 1/2 turn clockwise. If sprayer does not run, replace control board.</li> </ol>	Resistance Table:		695	0 ohms	795	2k ohms	1095	3.9k ohms	MARK V	3.9k ohms
Resistance Table:												
695	0 ohms											
795	2k ohms											
1095	3.9k ohms											
MARK V	3.9k ohms											
<p>Sprayer does not run at all</p> <p>Digital display shows E=09</p> <p style="text-align: center; font-size: 2em;"><b>E=09</b></p> <p>Control board status light blinks 9 times repeatedly</p>	<p>Check the connections. Control is not receiving a motor position sensor signal</p>	<ol style="list-style-type: none"> <li>1. Turn power OFF.</li> <li>2. Disconnect motor position sensor and inspect for damage at connectors.</li> <li>3. Reconnect sensor.</li> <li>4. Turn power ON. If error continues, replace motor.</li> </ol>										
<p>Sprayer does not run at all</p> <p>Digital display shows E=10</p> <p style="text-align: center; font-size: 2em;"><b>E=10</b></p> <p>Control board status light blinks 10 times repeatedly</p>	<p>Check to see if control board is over heating.</p>	<ol style="list-style-type: none"> <li>1. Make sure motor air intake is not blocked.</li> <li>2. Make sure fan has not failed.</li> <li>3. Make sure control board is properly connected to back plate and that conductive thermal paste is used on power components.</li> <li>4. Replace control board.</li> <li>5. Replace motor.</li> </ol>										

## Sprayer Will Not Shut Off

1. **Relieve Pressure**, page 9. Leave prime valve open and power switch OFF.
2. Remove control box cover so the control board status light can be viewed if available.

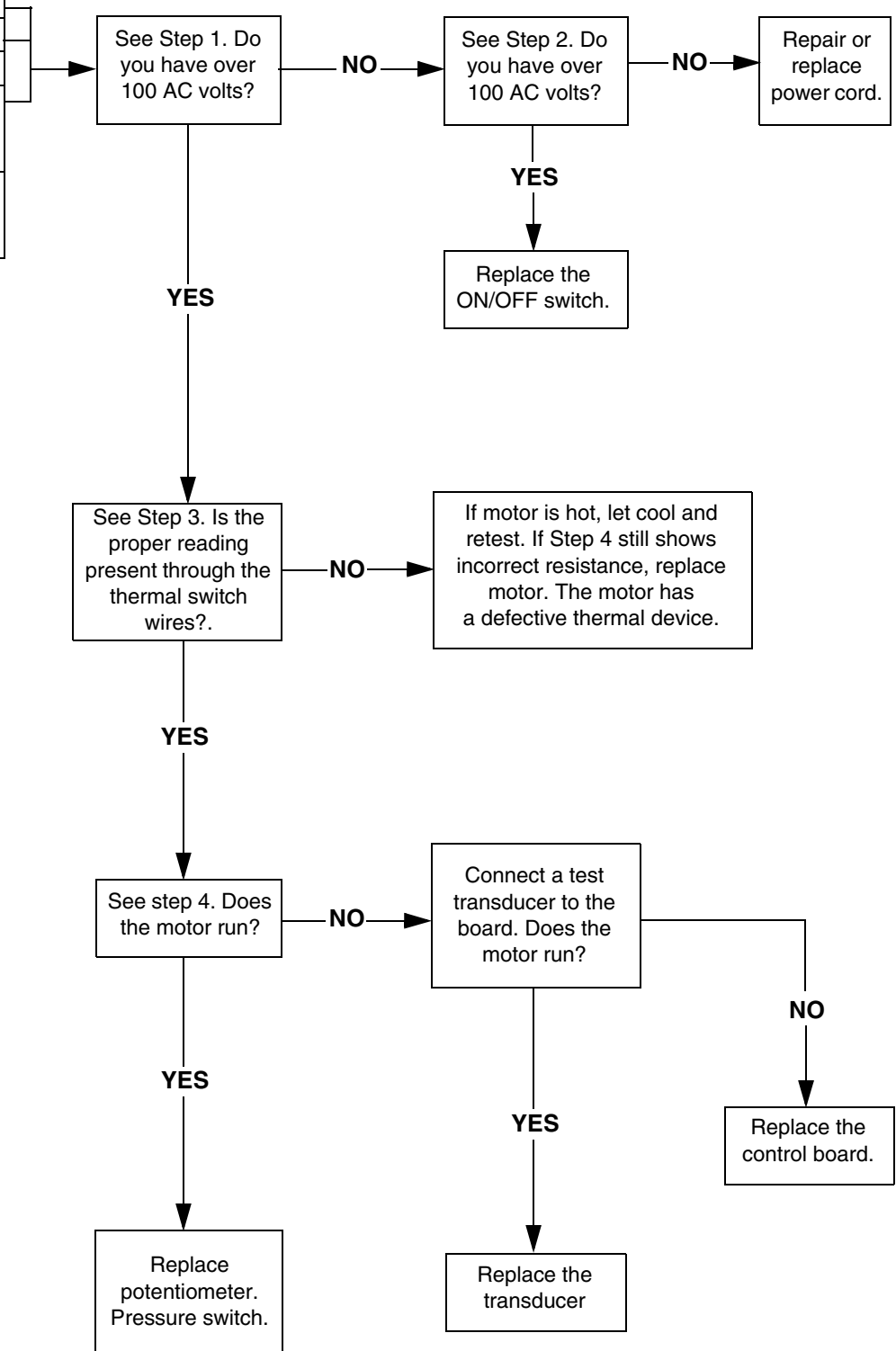
### Troubleshooting Procedure



## Sprayer Will Not Run

(See following page for steps)

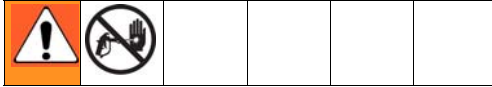
Remove control box cover. Turn sprayer ON. Observe control board status light on control board (see page 13).	
No light	
Once	Normal operation
Light on Continuously	Control board commanding motor to run
Flashing	See Error Code section for further troubleshooting



# Pressure Control Board

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

### Removal



Relieve pressure; page 9. 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 motor shroud. Disconnect and remove wiring from baffle.
11. Remove nut and screw (88) and disconnect ground wire (87). Disconnect coil connector (Y). Remove coil (81).
12. Remove top two screws (39) and control box (61).
13. Remove six screws (27), two screws (102) and control board.
14. Remove five screws (27), three screws (102) and motor control board.

### Installation

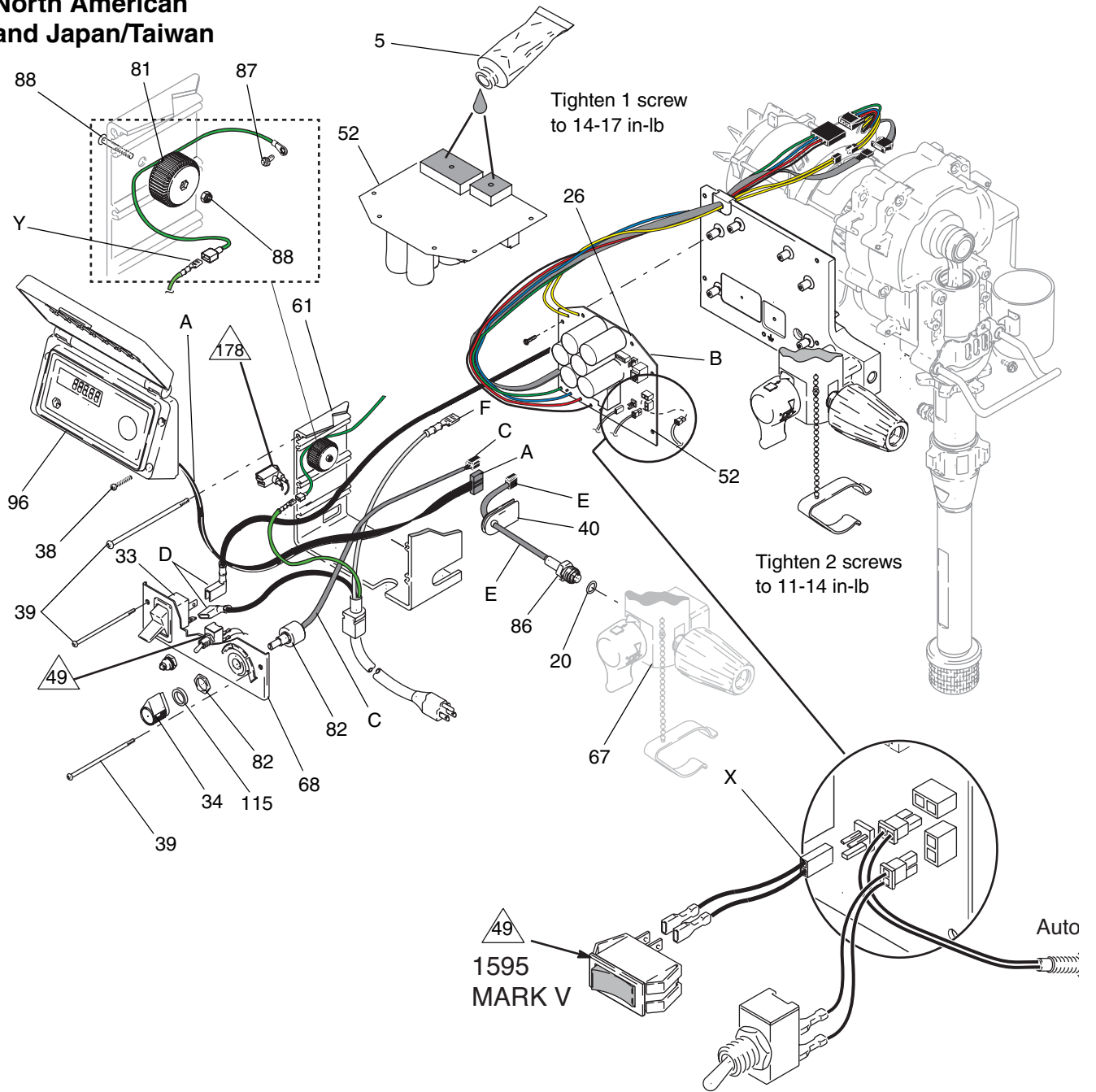
1. Apply small amount of thermal compound 15U114 or 110009 (5) to shaded component areas on rear of motor control board (52).

#### CAUTION

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

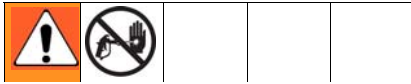
2. Install five screws (27), three screws (102) and motor control board.
3. Install motor control board (52) with five screws (27). Torque to 9-11 in-lb (1.02 - 1.24 N•m). Install and torque three screws (102) to values in illustration.
4. Connect motor connectors, (F, G and H) to motor control board.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

100 - 120 Vac  
North American  
and Japan/Taiwan



## 240 Vac Motor Control Board

### Removal



Relieve pressure; page 9. 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 motor shroud disconnect and remove wiring from baffle.
10. Remove five screws (27), three screws (102) and motor control board.
11. Remove six screws (27), two screws (102) and control board.

### Installation

1. Apply a small amount of thermal compound 15U114 or 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 six screws (27), two screws (102) and control board.
3. 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 23.
4. Connect motor connectors (F, G and H) to motor control board.
5. Reconnect wiring and install onto baffle. Install motor shroud.
6. Connect transducer connector (E) to motor control board.
7. Connect motor control board power connectors (K) to filter board (146).
8. Install control box (61) with top two screws (39).
9. Connect filter board power connectors (J) and power cord connectors (D) to ON/OFF switch (33).
10. Connect potentiometer connector (C) to motor control board.
11. Connect WatchDog switch (X) to motor control board.
12. Install control panel (68) with two screws (39).
13. Connect display connector (A) to motor control board (52).
14. Install cover (96) with four screws (38).

## 240 Vac Filter Board



Relieve pressure; page 9.

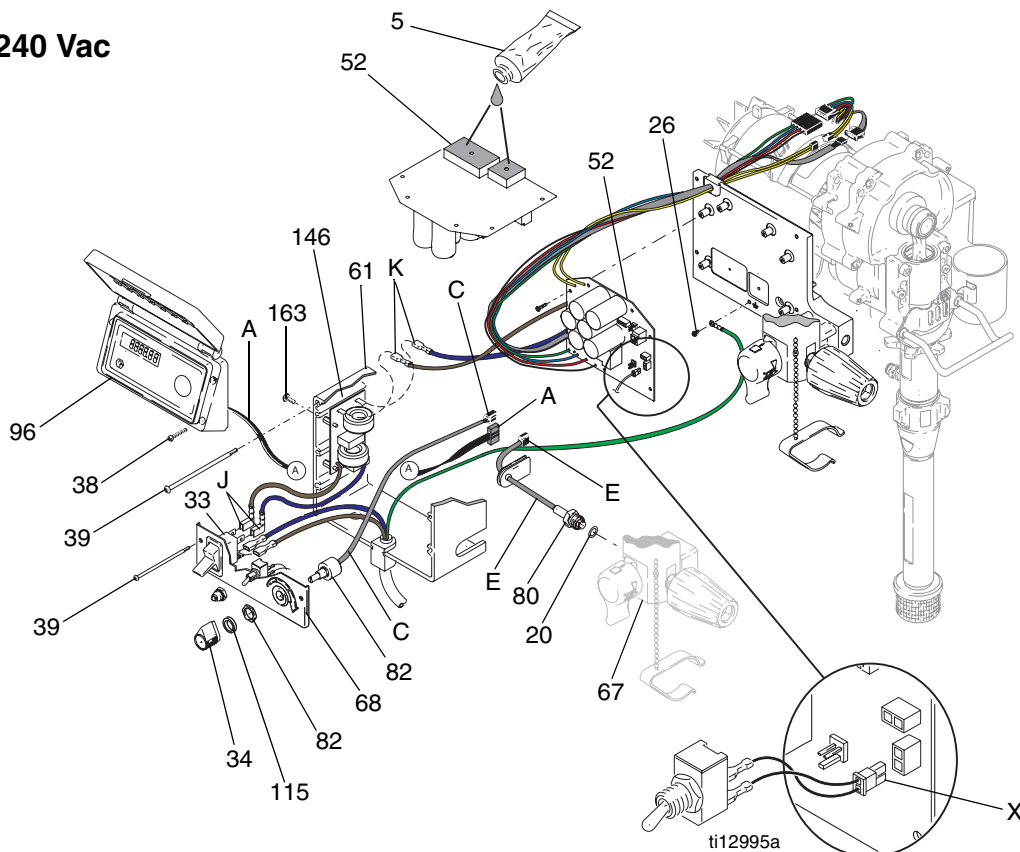
### Removal

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

### 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).

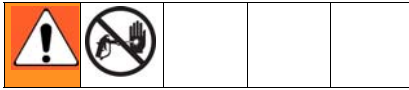
### 240 Vac



## 110 Vac U.K. Motor Control Board

### Removal

Relieve pressure; page 9.



Relieve pressure; page 9. 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 motor shroud. Disconnect and remove wiring from baffle.
11. Remove nut and screw (88) and disconnect ground wire (87). Disconnect coil connector (Y). Remove coil (81).
12. Remove top two screws (39) and control box (61).
13. Remove six screws (27), two screws (102) and control board.
14. Remove five screws (27), three screws (102) and motor control board.

### Installation

1. Apply small amount of thermal compound 15U114 or 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 five screws (27), three screws (102) and motor control board.
3. 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.
4. Connect motor connectors, (F, G and H) to motor control board.
5. Reconnect and install wiring in baffle. Install motor shroud.
6. Install control box (61) with top two screws (39).
7. Install coil (81) and tighten screw and nut (88). Tighten ground wire screw (87) and coil connector (Y).
8. Connect transducer connector (E) to motor control board.
9. Connect 15/20A switch (178) (1595 model only).
10. Connect motor control board power lead(s) (D) to ON/OFF switch (33).
11. Connect WatchDog (49) switch connector (X) to motor control board.
12. Connect potentiometer connector (C) to motor control board.
13. Install control panel (68) with two screws (39).
14. Connect display connector (A) to motor control board.
15. Install cover (96) with four screws (38).



## 110 Vac U.K. Filter Board

### Removal

Relieve pressure; page 9.



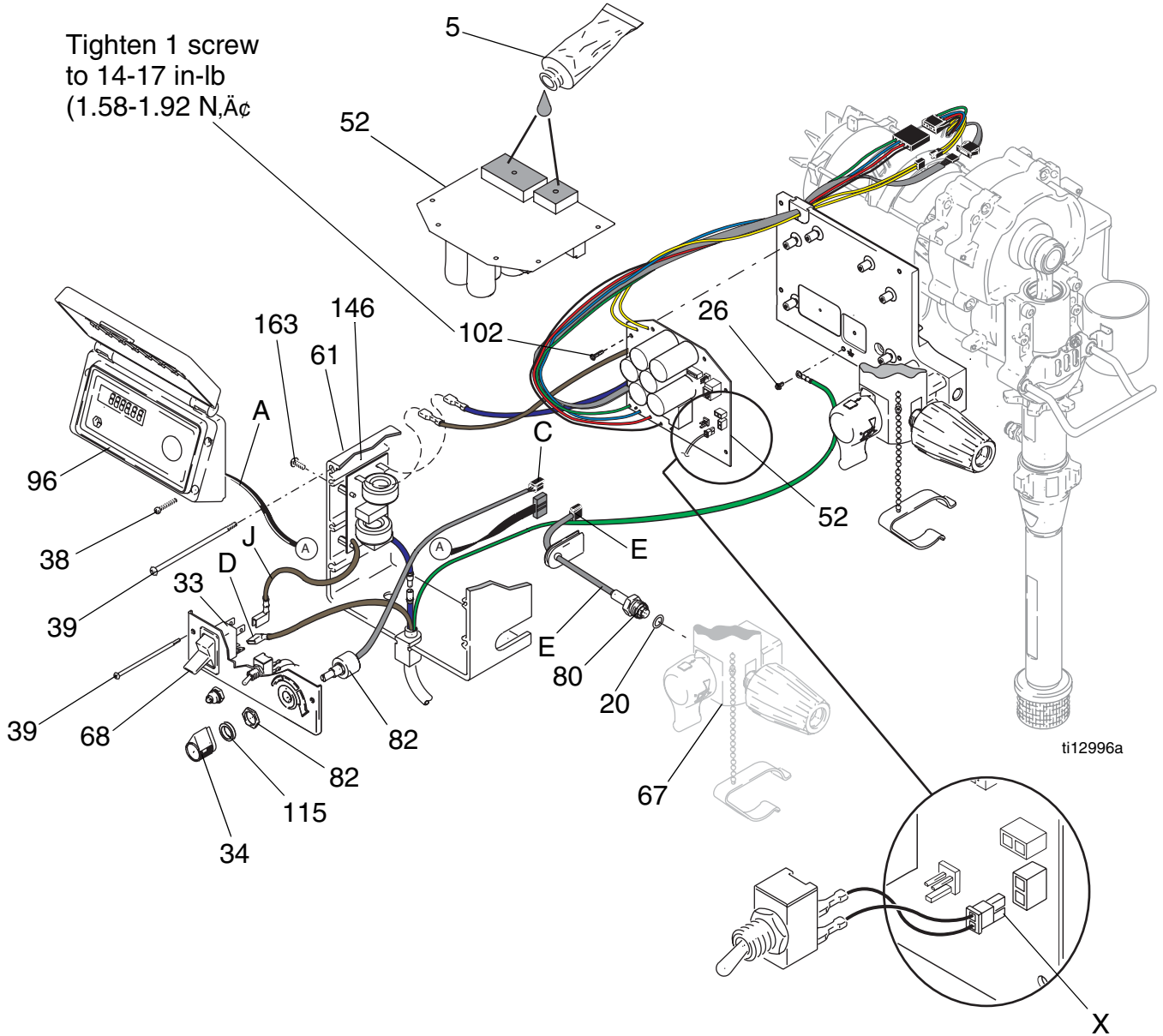
Wait 5 minutes before servicing.

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). 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).
5. Install control panel (68) with two screws (39).
6. Connect display connector (A) to motor control board (52).
7. Install cover (96) with four screws (38).

110 Vac U.K.



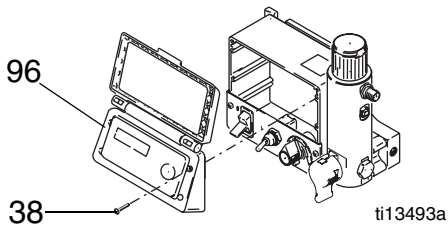
## Pressure Adjust Potentiometer

### Removal

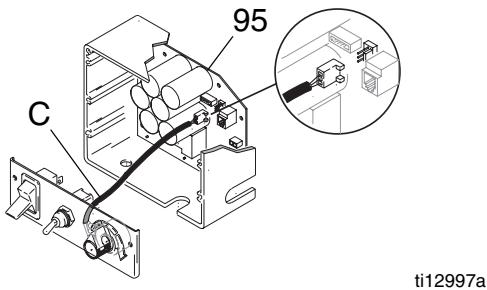


Relieve pressure; page 9. Wait 5 minutes before servicing.

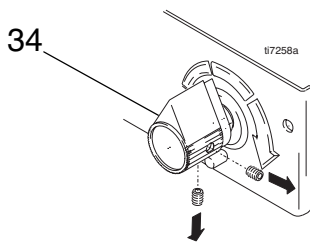
1. Remove four screws (38) and cover (96).



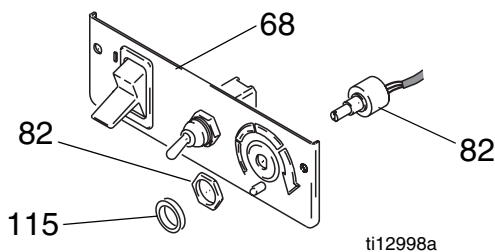
2. Disconnect potentiometer connector (C) from motor control board (95).



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

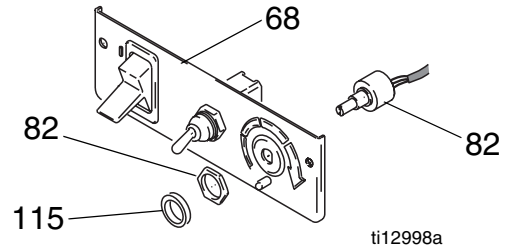


4. Remove gasket (115), nut and potentiometer (82) from control panel (68).

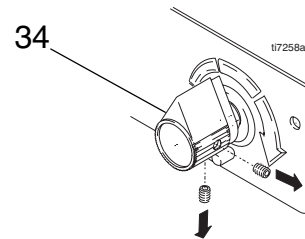


### Installation

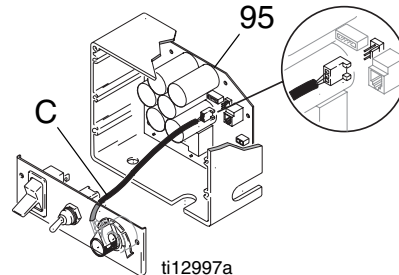
1. Install gasket (115), nut and potentiometer (82) on control panel (68). Torque nut to 30-35 in-lb (3.38 - 3.95 N•m).



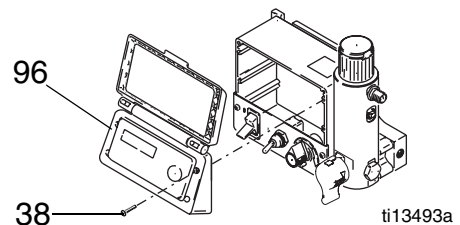
2. Install pressure control knob (34): Check pressure control knob alignment to potentiometer shaft. Turn shaft fully clockwise and attach knob in full ON position with a hex wrench.



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



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



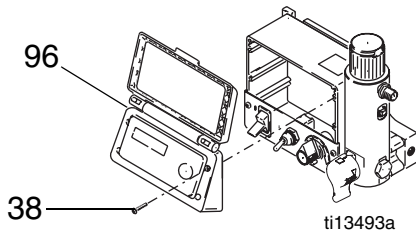
## Pressure Control Transducer

### Removal

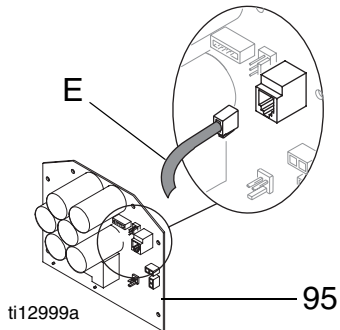


Relieve pressure; page 9. Wait 5 minutes before servicing.

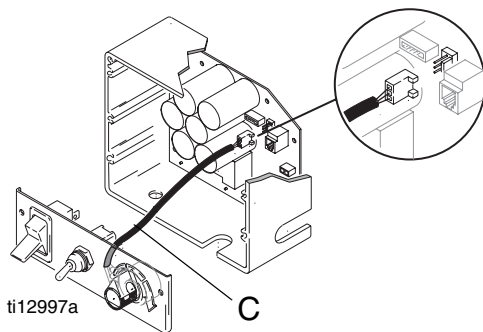
1. Remove four screws (38) and cover (96).



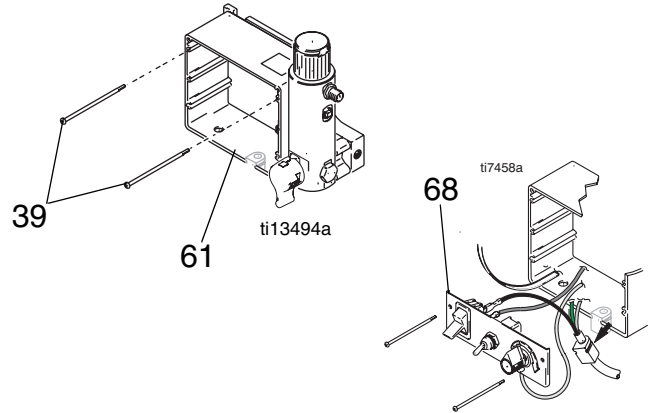
2. Disconnect transducer connector (E) from motor control board (95).



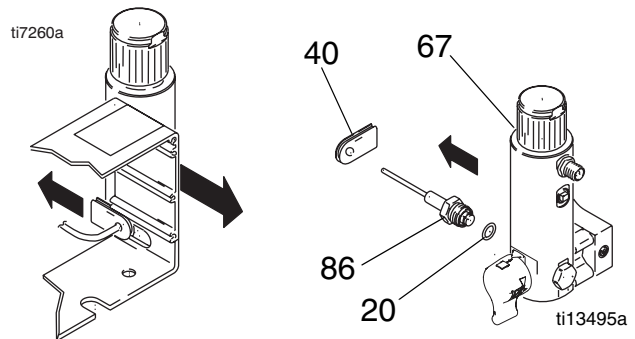
3. Disconnect potentiometer connector (C) from motor control board.



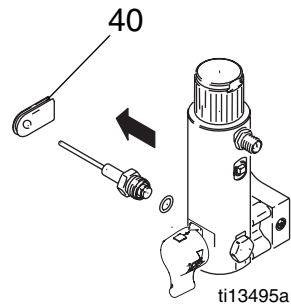
4. Remove four screws (39) and control box (61). Allow control panel (68) to hang down freely.



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

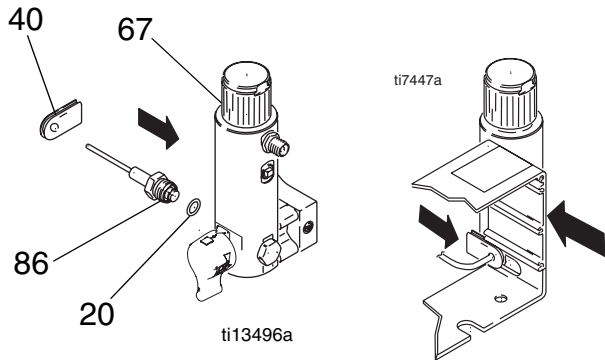


6. Remove grommet (40) from transducer and save for reuse.

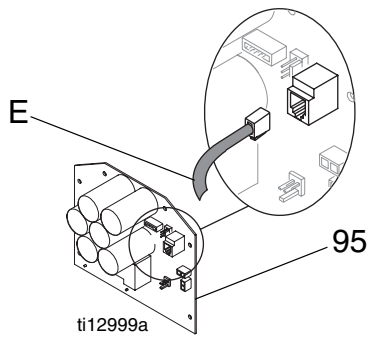


## Installation

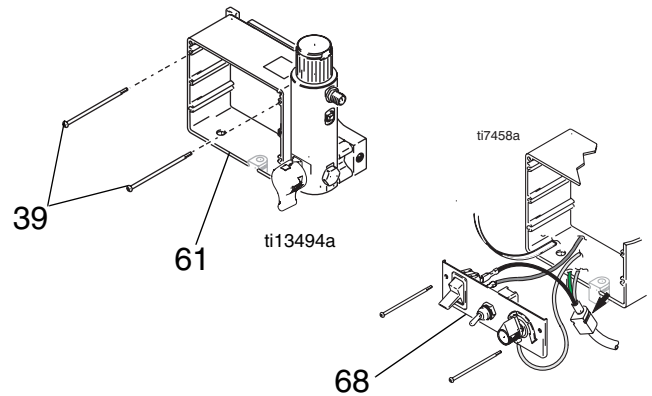
1. Install o-ring (20) and transducer (86) in filter base (67). Torque to 35-45 ft-lb (47-61 N•m). Install grommet onto transducer (86) and transducer into control box.



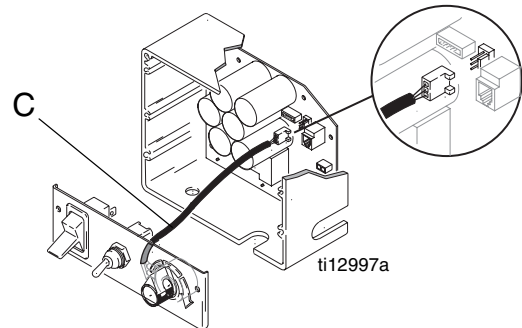
2. Connect transducer connector (E) to motor control board (95).



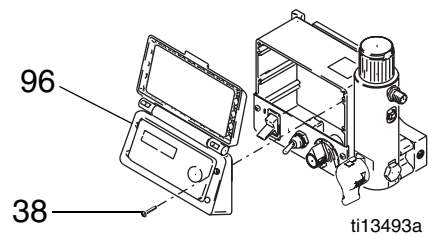
3. Install control box (61) and control panel (68) with four screws (39).



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



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

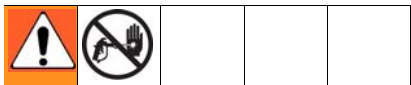


# Drive and Bearing Housing Replacement

## 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



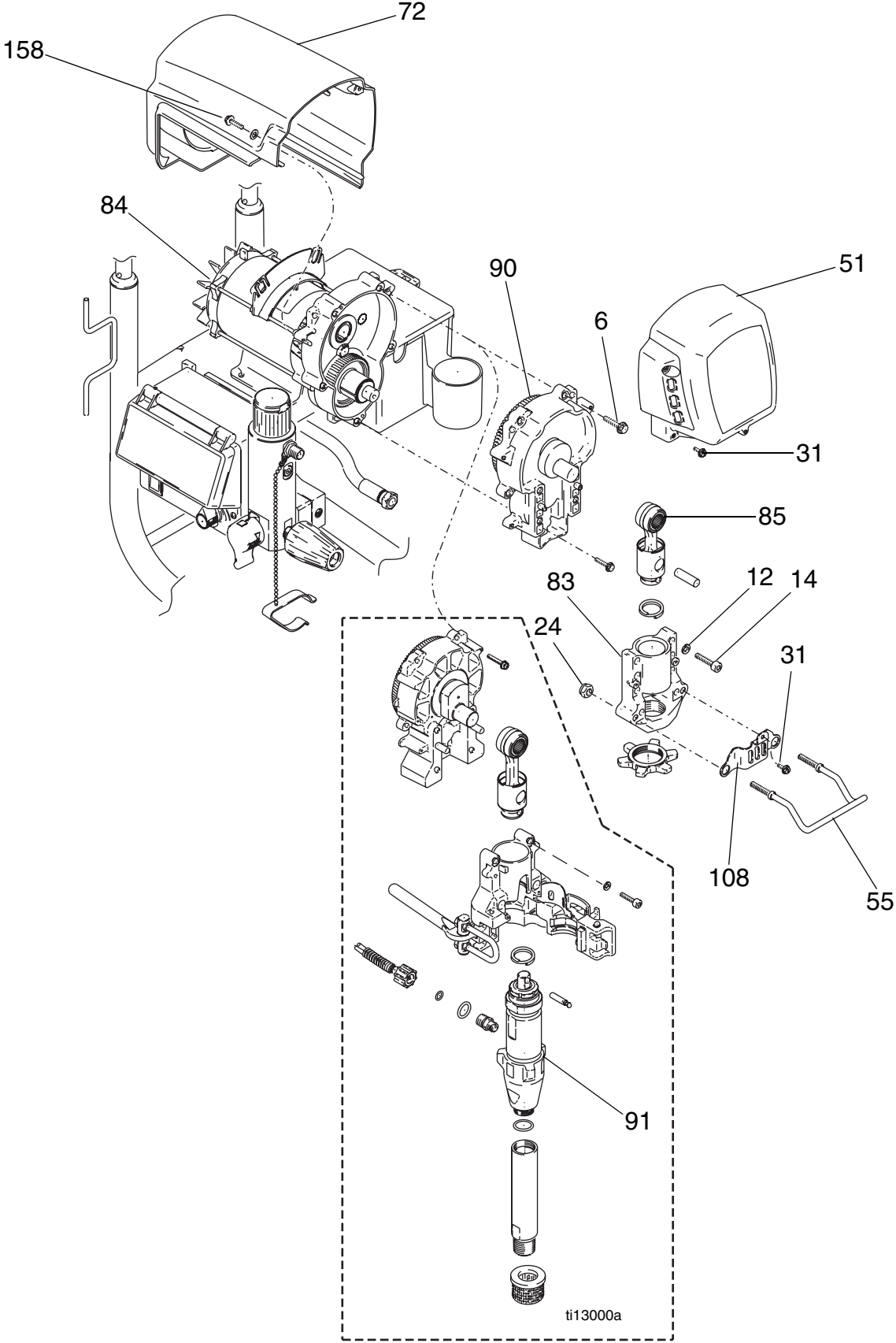
Relieve pressure; page 9.

1. Remove screw (31), two nuts (24), pail hanger (55) and pump rod cover (108).
2. Remove pump (91); see **Displacement Pump Replacement**, page 34 (695/795) page 36 (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 34 (695/795) page 36 (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 9.

1. Remove pump (91); see **Displacement Pump Replacement**, page 34 (695/795) page 36 (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.

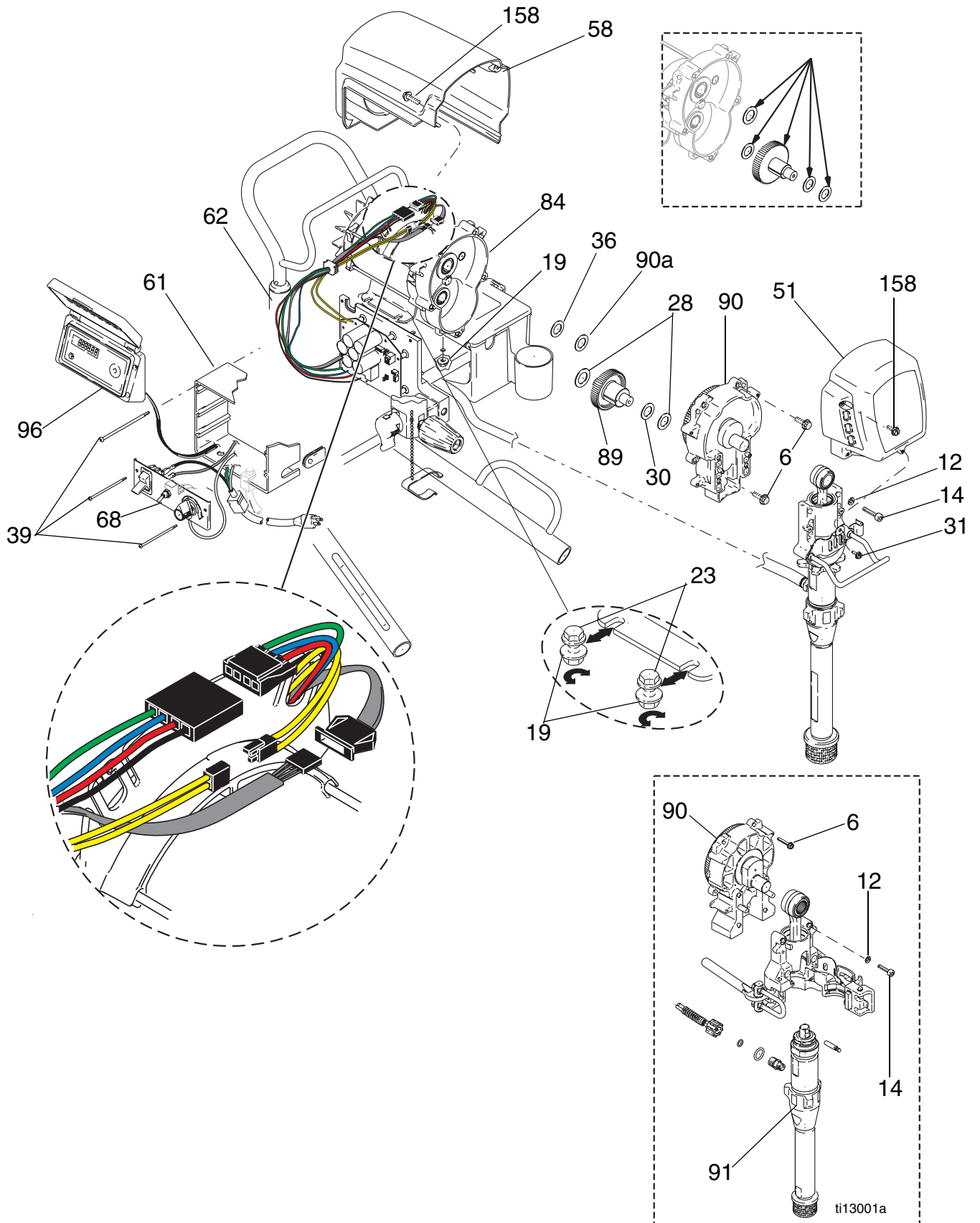
2. Remove drive housing (90); see **Drive Housing Replacement**, page 30.
3. Remove shroud (58).
4. Remove four screws (38) and control cover (96).
5. Remove bottom two screws (39) and allow control panel (68) to hang down freely.
6. Disconnect all three motor connectors from motor control board (52).
7. Disconnect motor leads.
8. Remove top two screws (39) and control housing (61).
9. Remove strain relief (29) from motor wires and power bar plate (69).
10. Remove motor wires from baffle 278075 and remove baffle.

11. Remove two screws (23) and nuts (19) on side opposite control.
12. 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. Install baffle and connect motor wires.
4. Tighten all four screws (23) and nuts (19). torque nuts to 115-135 in-lb (13-15 N•m).
5. Install strain relief (29) onto motor wires and into power bar plate (69).
6. Install control housing (61) with top two screws (39).
7. Connect motor leads.
8. Connect all three motor connectors to motor control board (52).
9. Install control panel (68) with two screws (39).
10. Install control cover (96) with four screws (38).
11. Install drive housing (90); see **Drive Housing Replacement**, page 30.
12. Install pump (91); see **Displacement Pump Replacement**, page 34 (695/795) page 36 (1095/1595/Mark V).





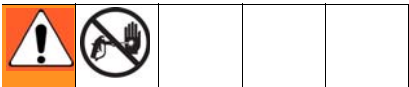
# Displacement Pump Replacement for 695/795

See pump manual 310643 or 310894 for pump repair instructions.

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

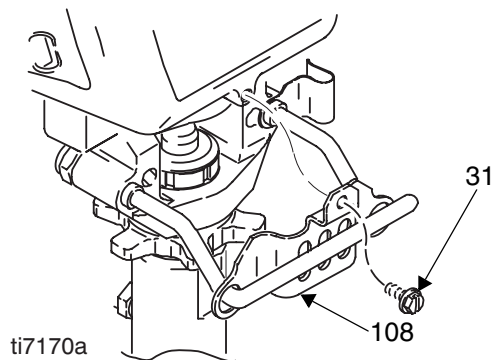
## Removal

1. Flush pump.



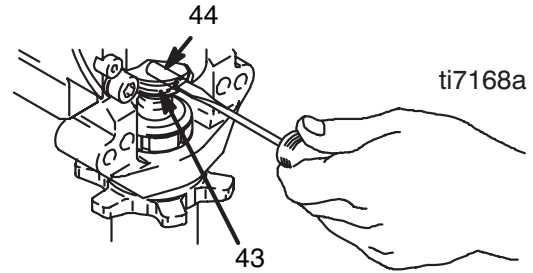
Relieve pressure; page 9.

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

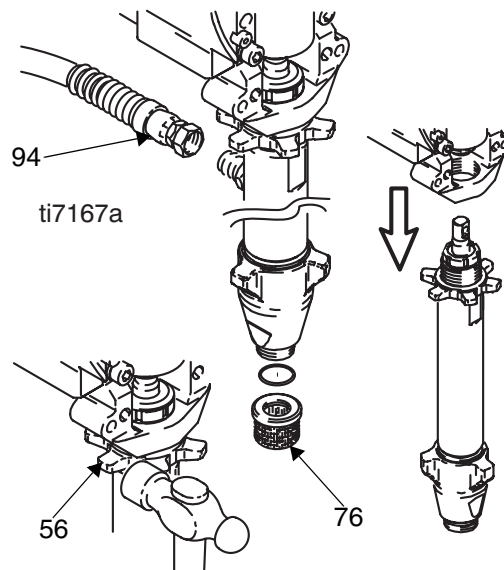


3. Cycle pump in JOG mode until pump pin (44) is in position to be removed. Turn power switch OFF and unplug power cord.

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



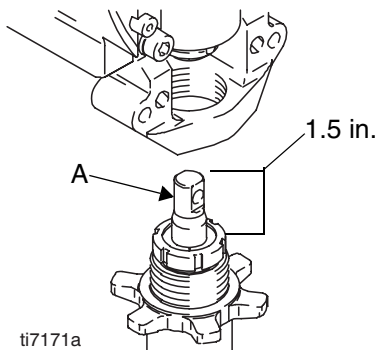
### WARNING

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.

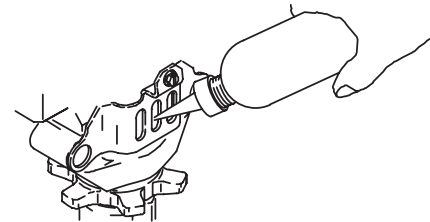
### CAUTION

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.



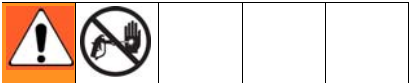
2. Install pump pin (44). Verify retaining spring (43) is in groove of connecting rod (85).
3. Push pump up until pump threads engage.
4. Screw in pump until threads are flush with drive housing opening. Align pump outlet to back.
5. Install washers, o-rings and suction tube (76) and hose (94).
6. Screw 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  $75 \pm 5$  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

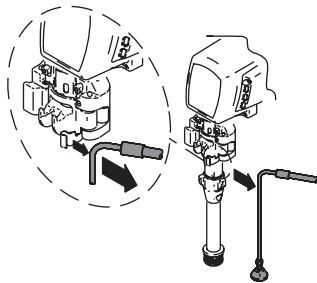
1. Flush pump.
2. Stop pump with piston rod in its lowest position.



Read Skin Injection Hazard; page 5.

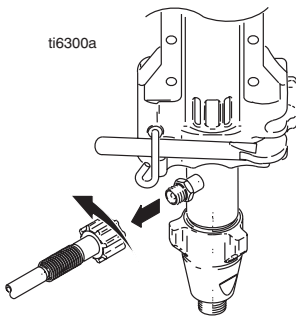
3. Do Pressure Relief, page 9.
4. Separate drain hose from sprayer.

ti7326a



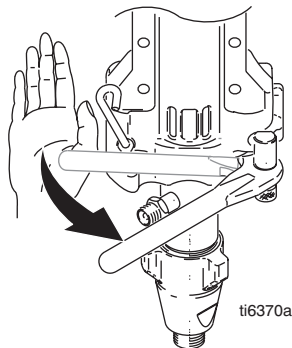
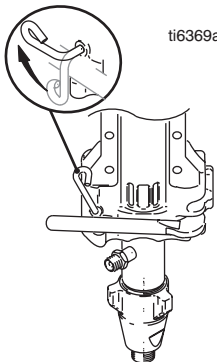
5. Disconnect paint hose from pump.

ti6300a



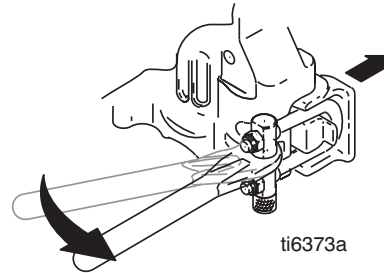
6. Raise latch lock. Push latch open.

ti6369a



ti6370a

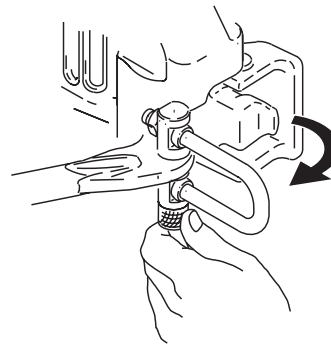
7. Ratchet open pump door.
  - a. Ratchet pump door forward.



ti6373a

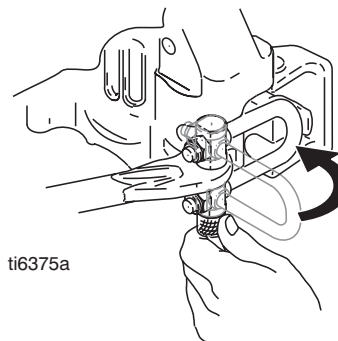
- b. Twist latch u-bolt out of pump door recess.
  - c. Place u-bolt on pump door outer edge.
  - d. If pump door is stuck, do steps e, f, and 8, otherwise go to step 9.
  - e. Twist latch u-bolt back from pump door outer edge.

ti6374a

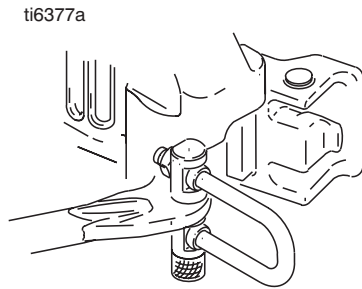


- f. Place u-bolt on pump door protrusion.

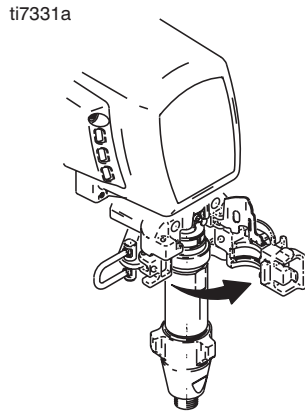
ti6375a



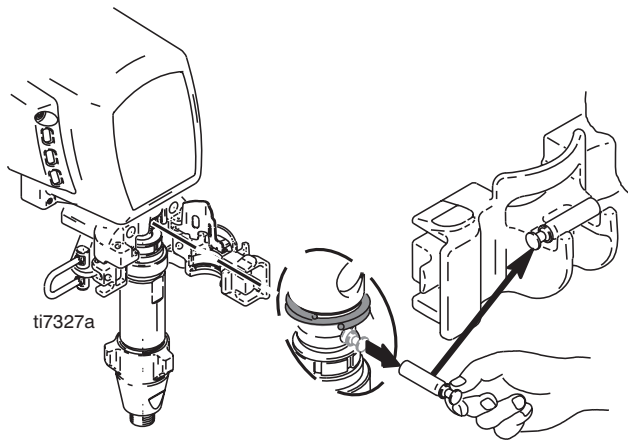
8. Ratchet pump door forward.



9. Open pump door.

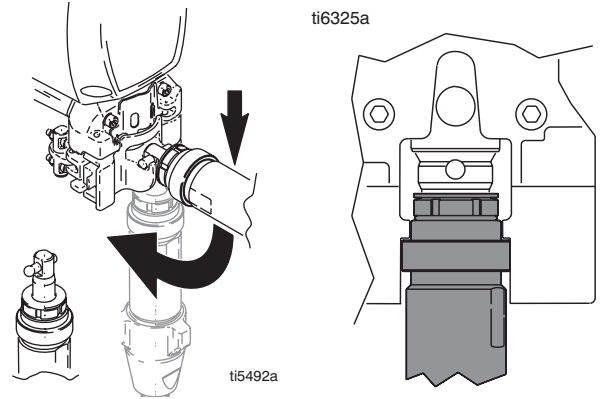


10. Pull out pump pin and place in pin holder.

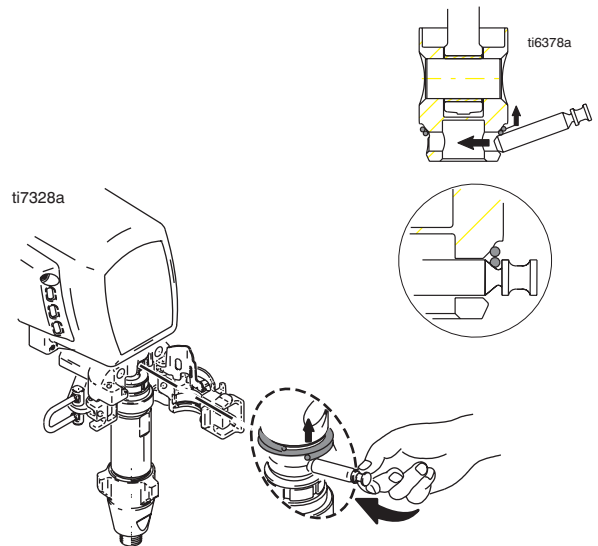


## Installation

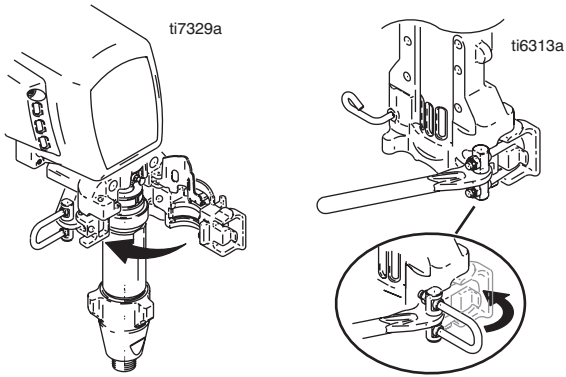
1. Adjust piston rod with pin holder to pull out piston rod. Tap piston rod on hard surface to push in piston rod.
2. Push pump collar flush with bearing housing ledge to be able to close pump door.



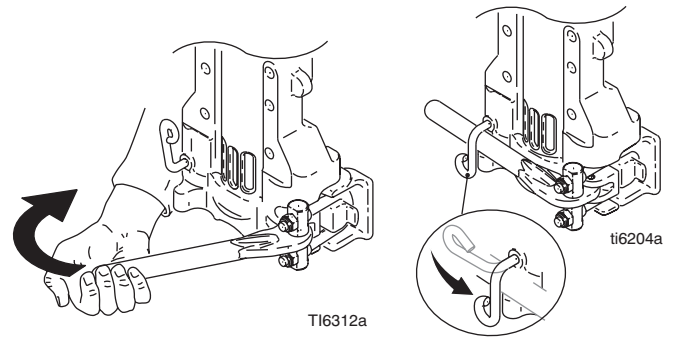
3. Slide pump into connecting rod. Push pump pin until it is fully retained.  
Note: Pin will snap into position.



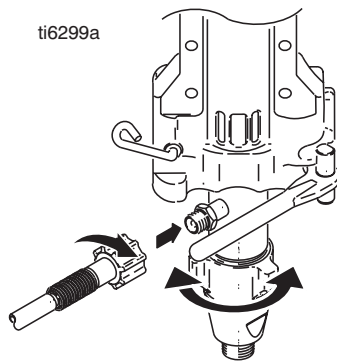
4. Close pump door and rotate latch into position. Do not tighten latch.



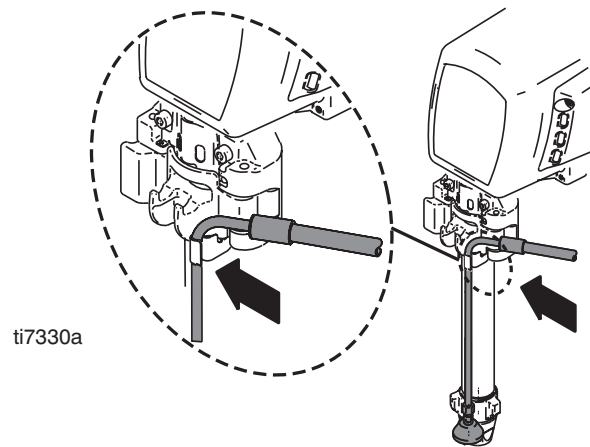
6. Tighten latch and rotate latch lock into locked position.



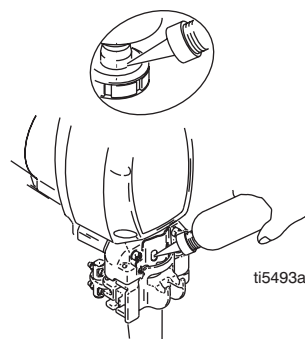
5. Rotate pump to align with paint hose. Connect paint hose and hand tighten to 70 in-lb.



7. Attach drain hose to sprayer.

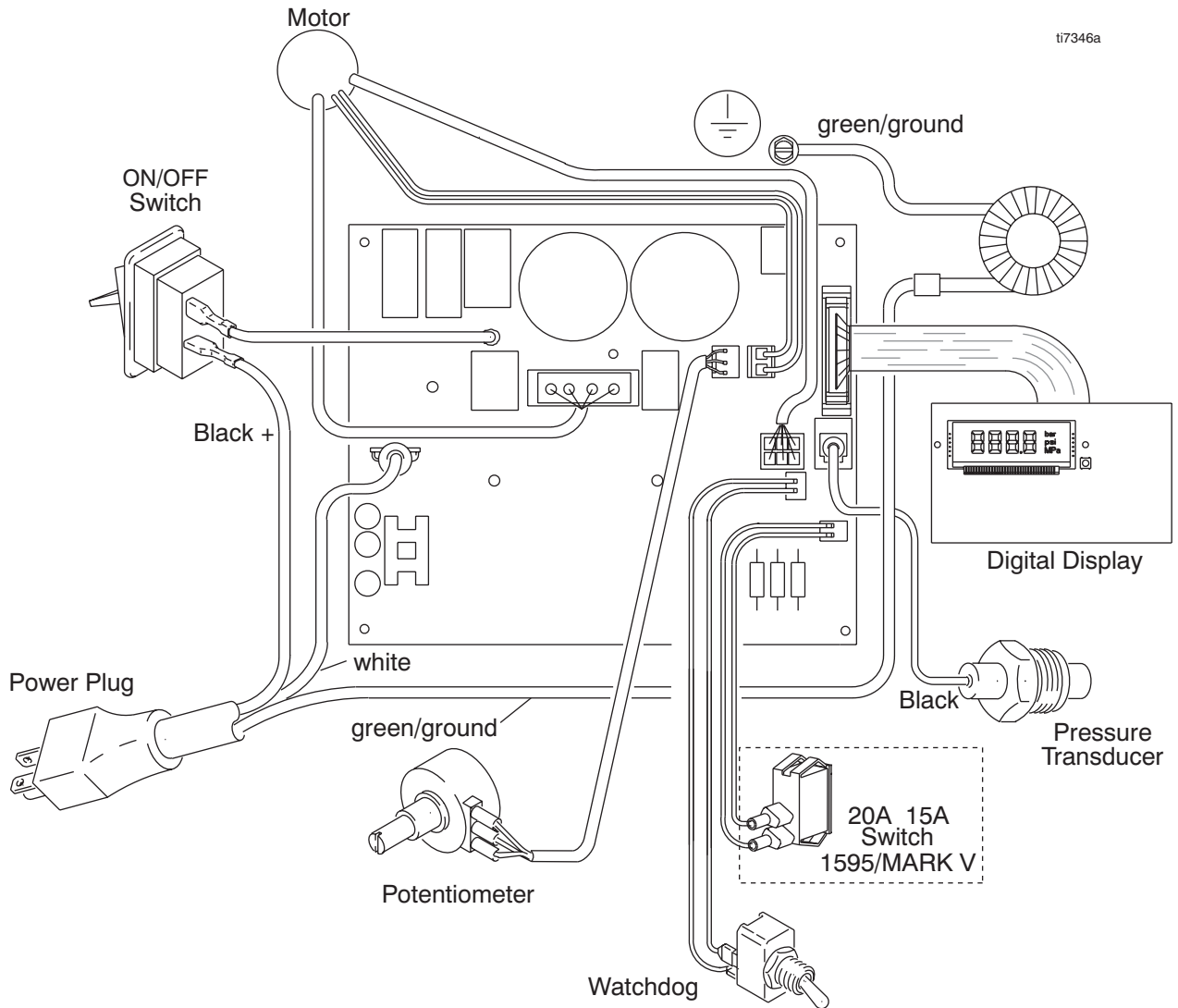


8. Fill pump with Graco TSL until fluid flows onto top of seal.



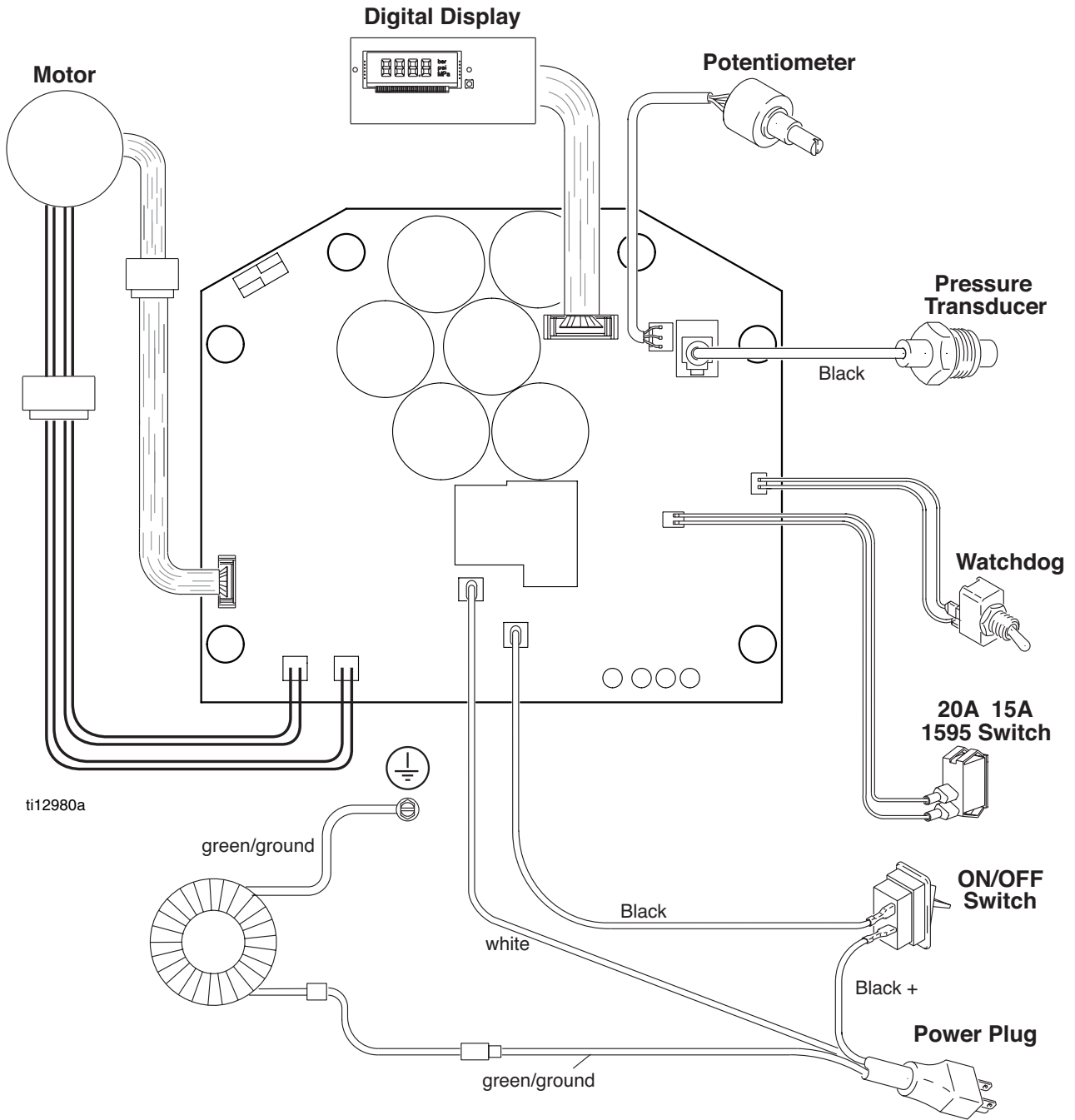
# Wiring Diagram

695/795 Lo-Boy Series A; 695 Hi-Boy Series A - C;  
795 Hi-Boy Series A, B; 1095/1595/Mark V Series A



# Wiring Diagram

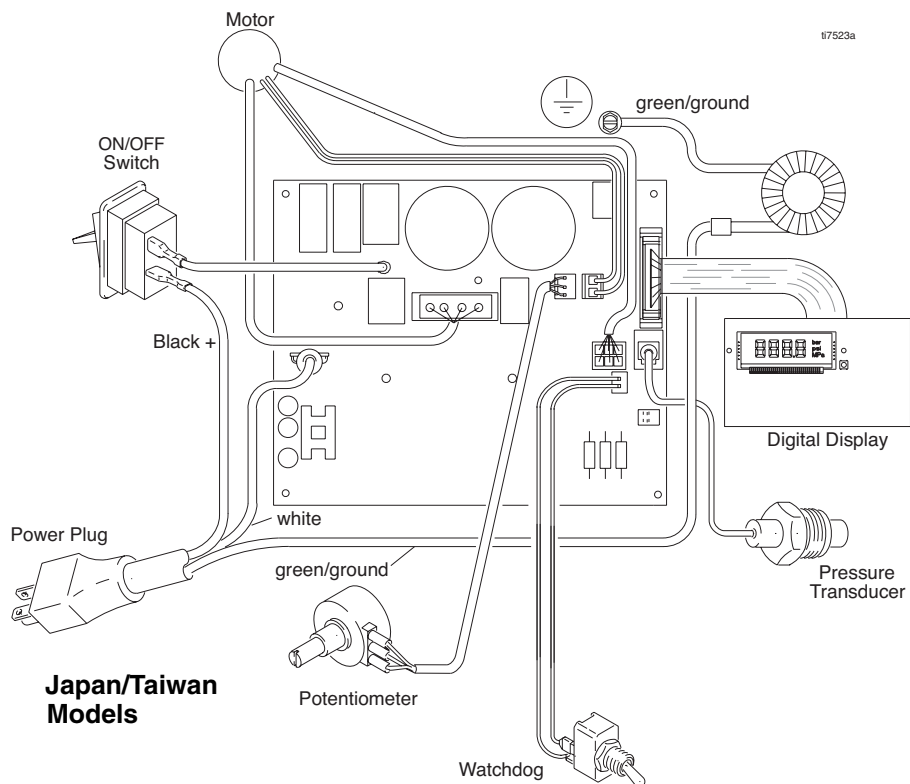
695/795 Lo-Boy Series A; 695 Hi-Boy Series A - C;  
795 Hi-Boy Series A, B; 1095/1595/Mark V Series A



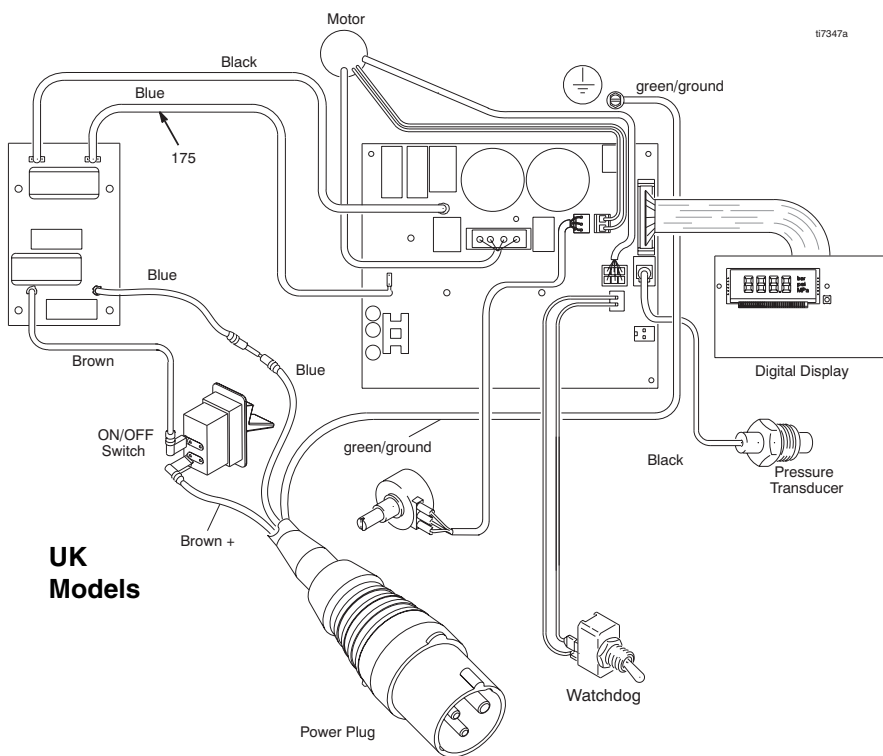


# Wiring Diagram

**UltraMax II: 695/795 Lo-Boy Series A; 695 Hi-Boy Series A - C;  
795 Hi-Boy Series A, B; 1095/Mark V Series A  
(Models with only TWO large capacitors on control board)**



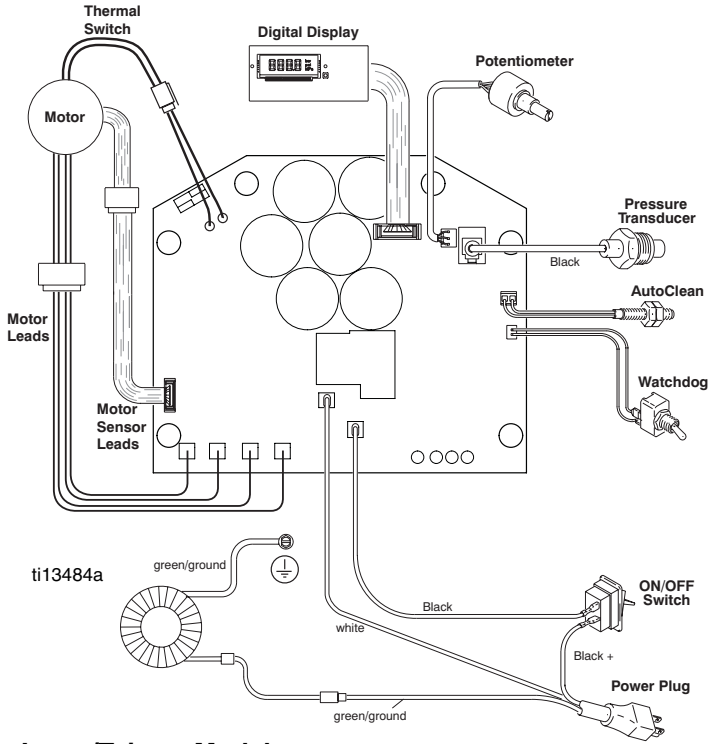
**Japan/Taiwan  
Models**



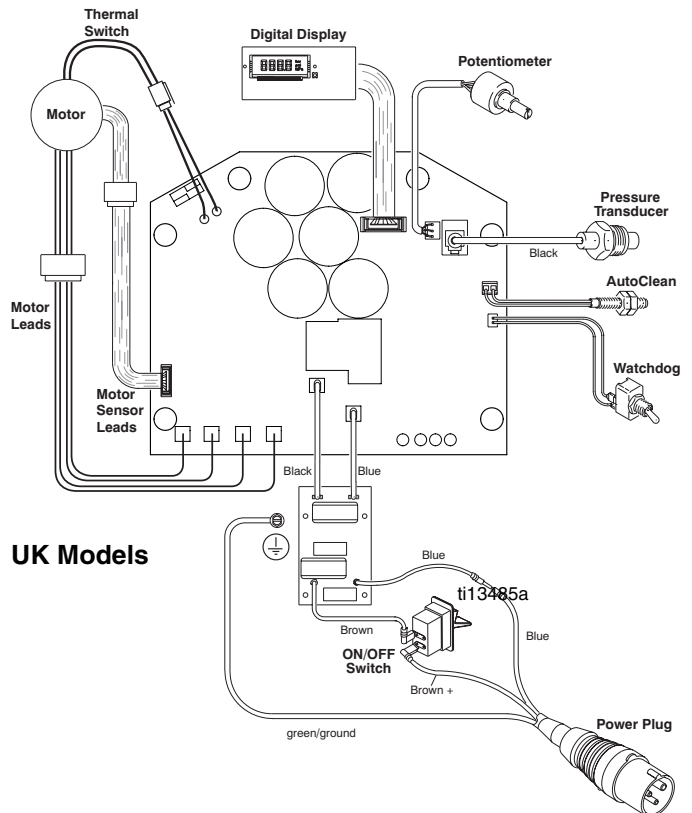
**UK  
Models**

# Wiring Diagram

UltraMax II: 695/795 Lo-Boy Series B; 695 Hi-Boy Series D;  
795 Hi-Boy Series C, 1095/Mark V Series B  
(Models with SIX large capacitors on control board)



## Japan/Taiwan Models



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