Repair - Parts

# Reactor A-20

311512K

EN

**For spraying or dispensing 1:1 mix ratio materials, including epoxies, and polyurethane foam. For professional use only.**

**Not approved for use in European explosive atmosphere locations.**

## 253831 Air operated, electrically heated, plural component proportioner.

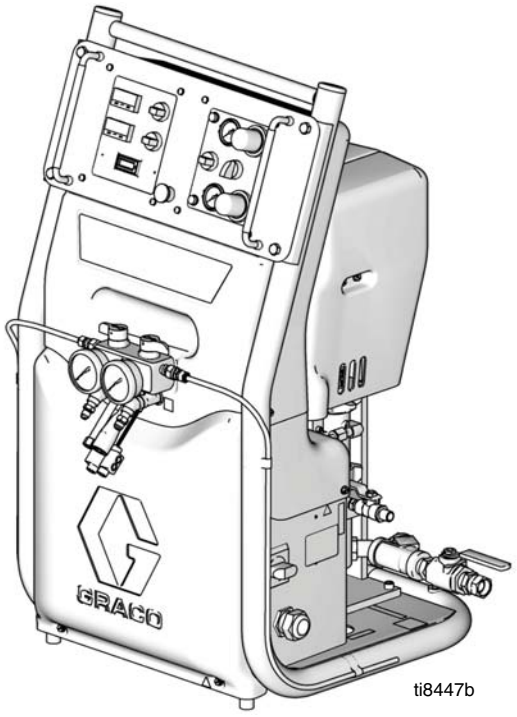
This model is field-configurable to the following supply voltages:
230 V, 1 Phase
230 V, 3 Phase
380 V, 3 Phase

*2,000 psi (14 MPa, 140 bar) Maximum Fluid Working Pressure*
*120 psi (0.84 MPa, 8.4 bar) Maximum Air Working Pressure*

**Important Safety Instructions**
Read all warnings and instructions in this manual.
Save these instructions.

US Patent No. 7822326
Russian Patent No. 2359181

**9902471**
Conforms to ANSI/UL Std. 499 Certified to CAN/CSA Std. C22.2 No. 88



ti8447b

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# Supplied Manuals

The following manuals are shipped with the Reactor™ A-20 Proportioner. Refer to these manuals for detailed equipment information.

Order Part No. 15M334 for a compact disk of Reactor manuals translated in several languages.

Manuals are also available at www.graco.com.

| Reactor A-20 Proportioner | |
|---|---|
| **Part No.** | **Description** |
| 311511 | Reactor A-20 Proportioner, Operation Manual (English) |
| **Proportioning Pump** | |
| **Part No.** | **Description** |
| 309577 | Proportioning Pump Repair-Parts Manual (English) |

# Related Manuals

The following manuals are for accessories used with the Reactor™.

Order Part No. 15M334 for a compact disk of Reactor manuals translated in several languages.

Order Part No. 15B381 for a compact disk of Fusion manual translated in several languages.

| Feed Pump Kit | |
|---|---|
| **Part No.** | **Description** |
| 309815 | Instruction-Parts Manual (English) |
| **Air Supply Kit** | |
| **Part No.** | **Description** |
| 309827 | Instruction-Parts Manual (English) for Feed Pump Air Supply Kit |
| **Circulation and Return Tube Kit** | |
| **Part No.** | **Description** |
| 309852 | Instruction-Parts Manual (English) |
| **Heated Hose** | |
| **Part No.** | **Description** |
| 309572 | Instruction-Parts Manual (English) |
| **Fusion Air Purge Spray Gun** | |
| **Part No.** | **Description** |
| 309550 | Instruction-Parts Manual (English) |
| **Fusion Mechanical Purge Spray Gun** | |
| **Part No.** | **Description** |
| 309856 | Instruction-Parts Manual (English) |
| **Circulation Hose Manifold Kit** | |
| **Part No.** | **Description** |
| 309818 | Instruction-Parts Manual (English) |

# Approvals:

INTERTEK ETL LISTED C US
**9902471**
Conforms to ANSI/UL Std. 499 Certified to CAN/CSA Std. C22.2 No. 88

# Warnings

The following general warnings are for 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



**ELECTRIC SHOCK HAZARD**

Improper grounding, setup, or usage of the system can cause electric shock.

- Turn off and disconnect power cord before servicing equipment.
- Use only grounded electrical outlets.
- Use only 3-wire extension cords.
- Ensure ground prongs are intact on sprayer and extension cords.
- Do not expose to rain. Store indoors.



**TOXIC FLUID OR FUMES HAZARD**

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read MSDS's to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
- Always wear impervious gloves when spraying or cleaning equipment.



**PERSONAL PROTECTIVE EQUIPMENT**

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:

- Protective eyewear
- Clothing and respirator as recommended by the fluid and solvent manufacturer
- Gloves
- Hearing protection




**SKIN INJECTION HAZARD**

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. **Get immediate surgical treatment.**

- Engage trigger lock when not spraying.
- Do not point gun at anyone or at any part of the body.
- Do not put your hand over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop spraying and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.

## ⚠ 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:

- Use equipment only in well ventilated area.
- Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).
- Keep work area free of debris, including solvent, rags and gasoline.
- Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.
- Ground all equipment in the work area. See **Grounding** instructions.
- Use only grounded hoses.
- Hold gun firmly to side of grounded pail when triggering into pail.
- If there is static sparking or you feel a shock, **stop operation immediately.** Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.




### THERMAL EXPANSION HAZARD

Fluids subjected to heat in confined spaces, including hoses, can create a rapid rise in pressure due to the thermal expansion. Over-pressurization can result in equipment rupture and serious injury.

- Open a valve to relieve the fluid expansion during heating.
- Replace hoses proactively at regular intervals based on your operating conditions.



### PRESSURIZED ALUMINUM PARTS HAZARD

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.



### EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- This equipment is for professional use only.
- Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the **Pressure Relief Procedure** in this manual when equipment is not in use.
- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS forms from distributor or retailer.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

## ⚠ WARNING



**MOVING PARTS HAZARD**

Moving parts can pinch or amputate fingers and other body parts.

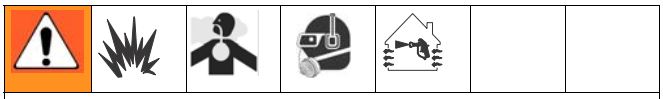
- Keep clear of moving parts.
- Do not operate equipment with protective guards or covers removed.
- Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the **Pressure Relief Procedure** in this manual. Disconnect power or air supply.



**BURN HAZARD**

Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns, do not touch hot fluid or equipment. Wait until equipment/fluid has cooled completely.

# Isocyanate Hazard



Spraying materials containing isocyanates creates potentially harmful mists, vapors, and atomized particulates.

Read material manufacturer's warnings and material MSDS to know specific hazards and precautions related to isocyanates.

Prevent inhalation of isocyanate mists, vapors, and atomized particulates by providing sufficient ventilation in the work area. If sufficient ventilation is not available, a supplied-air respirator is required for everyone in the work area.

To prevent contact with isocyanates, appropriate personal protective equipment, including chemically impermeable gloves, boots, aprons, and goggles, is also required for everyone in the work area.

# Moisture Sensitivity of Isocyanates

Isocyanates (ISO) are catalysts used in two component foam and polyurea coatings. ISO will react with moisture (such as humidity) to form small, hard, abrasive crystals, which become suspended in the fluid. Eventually a film will form on the surface and the ISO will begin to gel, increasing in viscosity. If used, this partially cured ISO will reduce performance and the life of all wetted parts.

The amount of film formation and rate of crystallization varies depending on the blend of ISO, the humidity, and the temperature.

To prevent exposing ISO to moisture:

- Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. **Never** store ISO in an open container.
- Keep the felt washers in the pump wet-cups saturated with Graco ISO pump oil, Part No. 217374. The lubricant creates a barrier between the ISO and the atmosphere.
- Use moisture-proof hoses specifically designed for ISO, such as those supplied with your system; see **Accessories**, page 25.
- Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.
- Never use solvent on one side if it has been contaminated from the other side.
- Always park pumps when you shutdown.
- Always lubricate threaded parts with Part No. 217374 ISO pump oil or grease when reassembling.

# Keep Components A and B Separate

| CAUTION |
| --- |
| To prevent cross-contamination of the equipment's wetted parts, **never** interchange component A (isocyanate) and component B (resin) parts. |

# Changing Materials

- When changing materials, flush the equipment multiple times to ensure it is thoroughly clean.
- Always clean the fluid inlet strainers after flushing; see **Fluid Inlet Filter Screen**, page 20.
- Check with your material manufacturer for chemical compatibility.
- Most materials use ISO on the A side, but some use ISO on the B side.
- Epoxies often have amines on the B (hardener) side. Polyureas often have amines on the B (resin) side.

# Before Beginning Repair

Repairing this equipment requires access to parts that may cause electric shock or other serious injury if work is not performed properly. Electrical trouble-shooting must be done by a qualified electrician. Be sure to shut off all power to equipment and lock out power at the source before repairing.

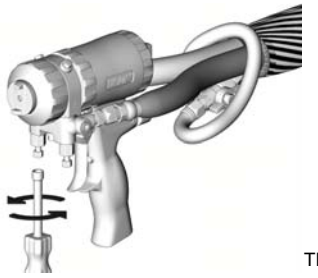
# Pressure Relief Procedure

1. Turn off feed pumps and agitator if used.
2. Turn PARK/RUN switch to PARK.
3. Trigger gun to relieve pressure.
4. Turn off air inlet valve.
5. Engage gun piston safety lock.



TI2409a

6. Verify gun fluid manifold valves A and B are closed.



TI2421a

7. Close pump inlet supply valves.

# Flushing

Flush equipment only in a well-ventilated area. Do not spray flammable fluids. Do not turn on heaters while flushing with flammable solvents.

- Flush with a compatible solvent.
- Use lowest possible pressure when flushing.
- To flush entire system, circulate through gun fluid manifold (with gun removed from manifold).
- Always leave hydraulic oil or a non-water based, non-water absorbent fluid in system. Do not use water.

Only use flush solvents that are compatible with Fluoroelastomer seals. Non-compatible solvents will damage seals and cause hazardous conditions, such as high pressure leaks and pressure switch failure.

# Troubleshooting

## Power

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| Reactor does not operate | No power | Plug in power cord |
| | | Turn Main Disconnect Switch ON |
| | Power cord not connected properly | Check connections |
| No power when disconnect switch is turned on; using 230V, 1 phase or 230V, 3 phase power | Power terminal jumper still at 380V, 3 phase position, as shipped from factory | Place jumpers in correct position; see operation manual 311511 and label inside front lower cabinet. |
| External main supply power circuit breaker trips and Reactor disconnect switch fails when switch is turned on. | Power terminal jumper was left in 230V, 1 phase position. When using 230V, 3 phase or 380V, 3 phase power | Place jumpers in correct position; see manual 311511. Replace main power disconnect switch; see page 27. |
| No temperature display lights at startup | No power | Plug in power cord |
| | | Turn Main Disconnect Switch ON |
| | Control power fuses blown | Check and replace fuses on long terminal strip |
| Reactor stops working; all lights are off except temperature displays | Red stop switch was pushed | Reset all control switches to START |

## Pumps and Pressures

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| Pump does not run up and down but green switch light is on | PARK/RUN switch in PARK position | Turn PARK/RUN switch to RUN |
| | No air supply | Air supply line not connected |
| | | Open inlet air ball valve |
| | Air pressure regulators set at 0 psi | Turn up air pressure regulators |
| Pump runs but no fluid pressure | Fluid inlet ball valves closed | Open fluid ball valves |
| Fluid pressure low or dropping | Air supply pressure low when spraying | Increase inlet air pressure |
| | | Increase air compressor size to meet flow requirements |
| | | Remove airline quick disconnects |
| | | Use 3/8 in. (0.95 cm) ID or larger air supply hose |
| | Icing in air motor quick exhausts or mufflers | Check and repair fan |
| | | Check inlet filter water separator; see page ##. Stop spraying for 5 minutes while fan melts ice. |
| Pump output low | Obstructed gun impingement ports or filters | Flush and clean gun; see gun manual |
| One pressure gauge drops when pumps are stalled on both the upstroke and the downstroke | Leaking pump throat | Repair pump; see 309577 |
| | Leak between pump and gun | Check fluid tubes, heater, and hoses |
| | Spray gun is leaking on one side | Clean and repair spray gun |
| One pressure gauge drops when pumps are stalled on the downstroke, but not the upstroke | Inlet ball check not sealing | Clean or replace; see 309577 |
| | Inlet check seat o-ring not sealing | Repair pump; see 309577 |

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| One pressure gauge drops when pumps are stalled on the upstroke, but not the downstroke | Piston check ball not sealing | Repair pump; see 309577 |
| | Piston packing not sealing | Repair pump; see 309577 |
| | Loose piston stud in pump | Repair pump; see 309577 |
| | Bad inside sleeve seal | Repair o-ring; see 309577 |
| A side rich; lack of B side | A side gauge is low | B side restriction downstream of gauge. Check gun check valve screen, mix module, or mix manifold restrictor. |
| | B side gauge is low | B side material supply problem. Check B side inlet strainer and pump intake valve. |
| B side rich; lack of A side | A side gauge is low | A side material supply problem. Check A side inlet strainer and pump intake valve. |
| | B side gauge is low | A side restriction downstream of gauge. Check gun check valve screen, mix module, or mix manifold restrictor. |
| Fluid pressures not balanced between A and B side | Fluid viscosities not equal | Sometimes normal if pressure offset is below 200 psi (14 bar) |
| | | Preheat material in drums by recirculating; see Operation manual 311511 |
| | Inlet Y-strainer screen plugged on low pressure side | Clean inlet filter screen |
| | Gun port or filter plugged on high pressure side | Clean or replace; see gun manual |
| | Pump inlet ball not seating or sticking | Clean seating; see pump manual |
| | Drum fluid outlet supply hose too small | Use 3/4 in. (1.9 cm) ID hose with short length |
| | Low side feed pump not working | Turn on or repair feed pump |
| Pump does not reverse direction | Obstruction of air motor or pumps | Check and clear obstruction |
| | Reversing switch failed | Check and service switch assembly; see page 17. |
| | Air solenoid valve failed. | Check solenoid valve, see page 17. |
| Unequal fluid pressure between UP/DOWN stroke | Air regulator pressures not set correctly. Feed pumps boost pressure on up stroke. | Adjust UP/DOWN air regulators to create equal fluid outlet pressures; see Operation manual 311511. |
| Pumps stop moving, Pump Mode Function green knob light off | Over-pressure shutdown from imbalanced pressures. Plugging one side will double the pressure. Starving one side will double the pressure on the other side. | Check for gun restriction, see Gun manual |
| | | Air pressure set too high; lower air pressure |
| | | Pump cavitating on low pressure side; check inlet and clean strainer. Check feed pump. |
| | | Heater plugged on low pressure side; see Repair, page 19. |

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| Air motor doesn't move with air pressure applied | Reversing switch failed | Inspect and repair parts; see page 33. |
| | Solenoid valve failed | Replace valve. |
| Pump movement speed is erratic | Worn air motor seals | Replace seals; see page see page 33. |
| | Worn pump seals | Replace seals; see Pump manual. |
| | Worn solenoid valve seals | Replace solenoid valve; see pages 17 and 33. |

## Hose Heat

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| Hose temperature controller display flashing "SbEr" and "H20.0" | FTS not connected. Control does not see thermocouple. | Check and connect FTS connector at each joint; see page 21. |
| Hose temperature controller display dropping with hose switch green light on | Hose power-lock connector loose | Connect hose power-lock at Reactor |
| | | Check and reconnect all connector points along hose. Use wire tie to hold together. |
| Hose heat switch green light goes out | Hose over-temperature shutdown | Repair or replace hose power controllers. See page 23. Reset hose temperature control knob to START. |
| | | Set Point 2 (SP2) deviation alarm set too low. Raise SP2 to 30 °F (17 °C) default setting. |
| Hose temperature display overshoots setpoint and/or green switch light goes out | Hose coiled up on itself too much, sends overheated fluid to FTS | Straighten out coiled hose |
| | Insulation peeled off of hose at FTS sensor inside hose causes the rest of hose to overheat. | Insulate hose up to FTS. FTS must represent bulk of heated hose. |
| Hose heat too low | Temperature setpoint too low | Check setpoint (SP1); adjust if necessary |
| | Pre-heaters too low | |
| | Fluid flow too high | Use smaller mix chamber. Decrease pressure. |
| | Hose heat not turned on long enough. More than 210 ft. connected. | Allow more time for hose heat to heat up or preheat supply drums |
| | Loose electrical connectors. Green light on Power Controller is off. | Check power and FTS connections; see page 21. |
| Either heat temperature controller display dark | Controller connector loose | Check and reconnect |
| No lights on hose power controller in lower cabinet while temperature controller 01 output light is on steady. Green switch light is on. No heat in hose. | No 4.5 to 12 Vdc signal between terminal #5(+) and #6(-) | Replace the temperature controller (143). |
| | Polarity is reversed on 4.5 to 12 Vdc | Reverse blue wires. |
| | No power to hose power controller terminals 2 and 3; 220-240 Vac | Make sure green light on hose switch is on. Make sure hose primary circuit breaker is on. |

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| Hose power controller in lower cabinet illuminates green light, but amber light not on. Temperature controller 01 output light is on steady. No heat in hose. | Opening in hose circuit | Disconnect main hose plug. Check for only 0.4 - 6 ohm resistance through hose circuit. Make sure all hose connections are secure. |
| | Hose secondary circuit breaker open | Check hose secondary breaker. Check for continuity across breaker. Check current sensor for 18 ohms; see page 24. |
| Hose power controller in lower cabinet illuminates green light, but amber light not on when temperature controller 01 output light is on steady. High heat in hose. Causing temperature overshoot. | Current sensor doughnut not connected | Check hose power controller connections 15 and 16. |
| | Hose cable not running through current sensor doughnut | Check hose cable and reroute if needed. Check sensor for 18 ohms. |
| | Hose power controller needs replacement | Contact Graco Technical Assistance. |
| Low heat in hose. Hose power controller in lower cabinet illuminates green light, but amber light not on. Temperature controller 01 output light is on steady. | More than 210 ft (64 m) of heated hose on machine (prevents hose from reaching 45 amps) | Running at full voltage. Orange light only comes on when power controller is at 45 amp current limit. Remove any length of hose over 210 ft. |

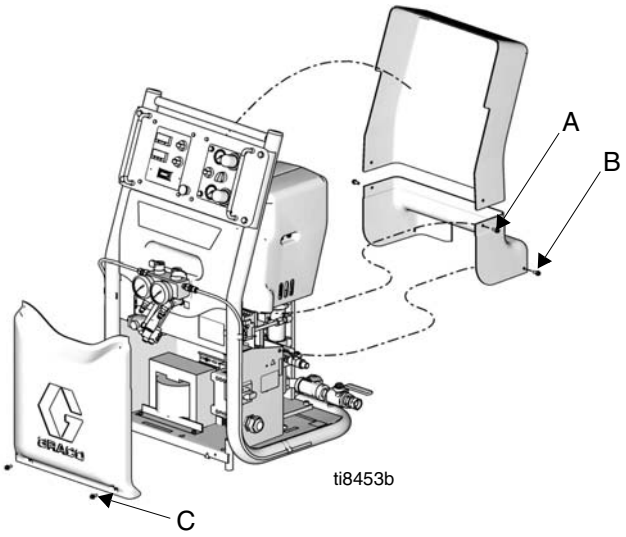
## Primary Heater

| | | |
|---|---|---|
| Primary heat temperature controller green switch light goes out | Primary heater 230°F (110 °C) over-temperature switch tripped. | Reset heater switch to START after cooling. |
| | Solid state relay failed closed. | Replace solid state relay 165 SSR. |
| Primary heat display low; power ON | Temperature setpoint too low | Check setpoint (SP1) and adjust if necessary. |
| | Fluid flow too high | Use smaller mix chamber; decrease pressure. |
| | Heating element burned out | Check heater element resistance; see page 18. |
| | Heating element fuse blown | Determine high current cause; replace fuse; see page 18. |
| | Fluid too cold for flow rate | Recirculate fluid in supply drum; see Operation manual 311511. |
| No Primary heat. Temperature controller output light is on. Green switch light is on. Solid state relay indicator light is on. | Contactor relay failed (190 CR) | Check for line voltage across contactor. Replace contactor. |
| | Circuit breaker tripped (110 CB) | Reset circuit breaker; investigate cause. |
| | Solid state relay failed (165 SSR) | Check for line voltage across relay. |
| Primary heat temperature controller displays “SbEr” | Open thermocouple | Check Thermocouple connection. Check thermocouple resistance; replace. |

# Repair

Unless otherwise noted, all repair procedures must be completed with incoming power switched OFF and locked out at the source. Any electrical repair or troubleshooting required beyond the scope of this manual must be performed by a qualified electrician. Shut off air inlet ball valve and shut off all air supply pressure.

## Shroud Removal




### Rear Upper Half

1. Remove two screws (A) on sides of shroud.
2. Lift shroud up over three pins holding it in place at top of Reactor.
3. Lift shroud completely off and remove from Reactor.

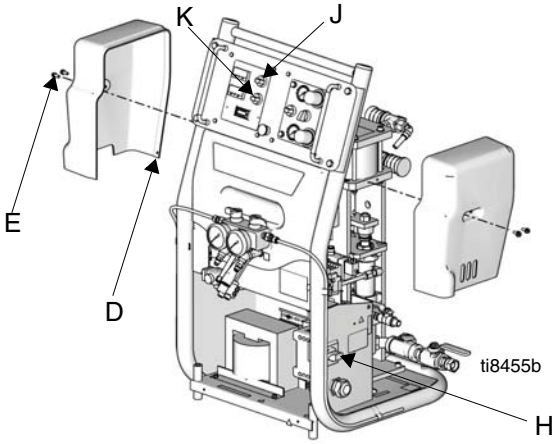
### Rear Lower Half

1. Remove two screws (B) from lower half of shroud.
2. Pull lower half of shroud up and off to remove from Reactor.

### Lower Front Cover

1. Remove two bolts (C) at bottom of front cover.
2. Pull cover down and out to remove from Reactor.

### Air Motor Cover




1. Pull out and remove pin (D) holding two shroud halves together.
2. Remove two screws (E) on each side of shroud.
3. Remove fan wires if required.

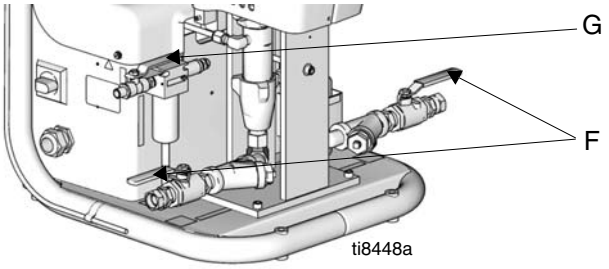
## Pump Removal

Air motor shaft, yoke, pump rod and connecting rod move during operation. Moving parts can cause serious injury such as pinching or amputation. Keep hands and fingers away from connecting rod during operation.

See manual 309577 for pump repair instructions.

1. Shut off Primary Heater Switch and Hose Heater Switch.
2. Perform **Pressure Relief Procedure**; see page 8.
3. Perform **Flushing Procedure**; see page 8.
4. Turn Main Disconnect Switch OFF (H) and disconnect power supply.

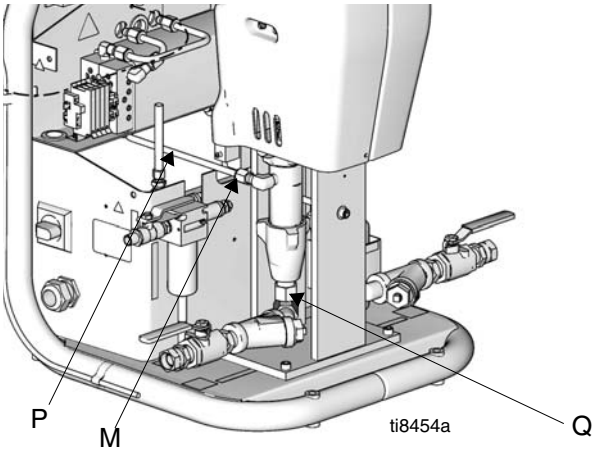
5. Shut off both feed pumps and close both inlet supply valves (F).



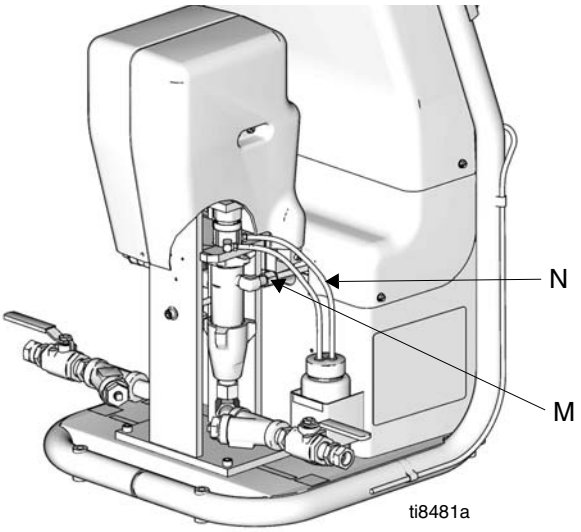

6. Shut off inlet air ball valve (G).

7. Remove air motor cover on side to be repaired; see page 13.

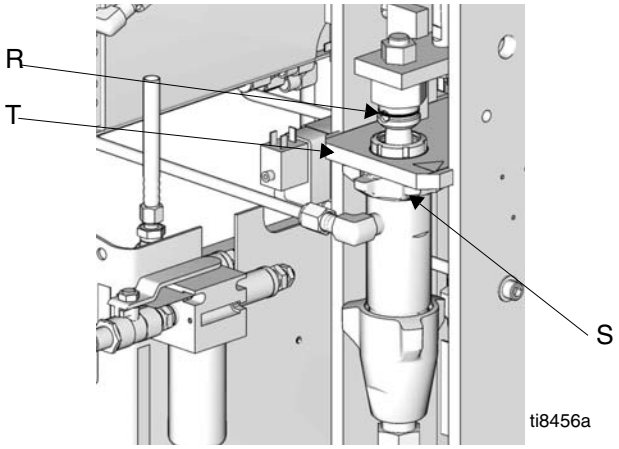
8. Disconnect fittings at inlet (Q) and outlet (M). Also disconnect steel outlet tube (P) from heater inlet.




9. Disconnect tubes (N) from Iso Lube Pump on A side only.




10. Push retaining wire clip (R) up. Push retaining pin out.




11. Loosen locknut (S) by hitting firmly with a non-sparking hammer.

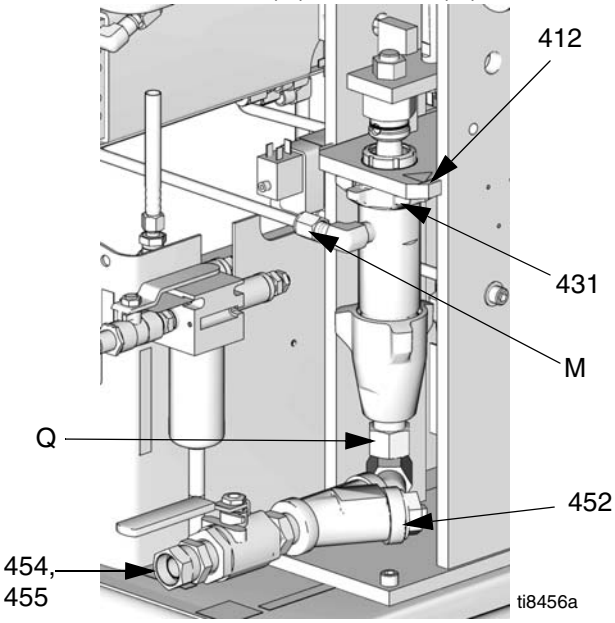
12. Unscrew pump out of pump mounting plate (T).

# Pump Installation

1. Ensure locknut (431) is screwed on pump with flat side up. Grease pump mounting threads in plate (412) with lithium grease. Screw pump into pump mounting plate (401) until top of pump thread is above mounting plate 1/2 to 1 1/2 threads above flush.

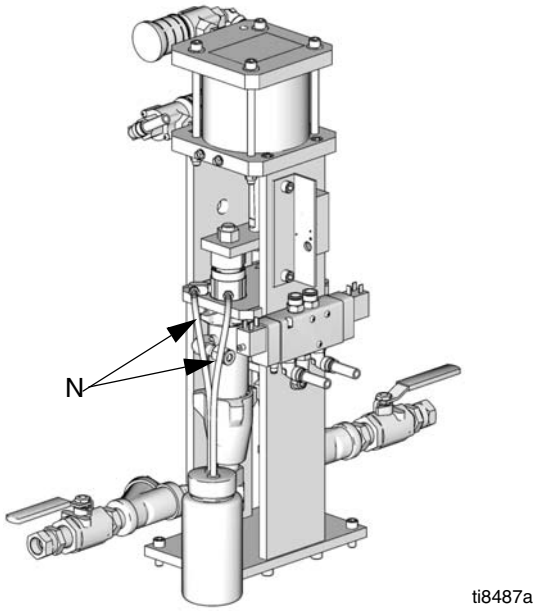
2. Align pump rod hole with link hole. Push retaining pin (436) in. Pull retaining wire down to cover pin ends.

3. Reconnect fluid inlet (Q) and outlet (M).




4. Tighten locknut (431) by hitting firmly with a non-sparking hammer.

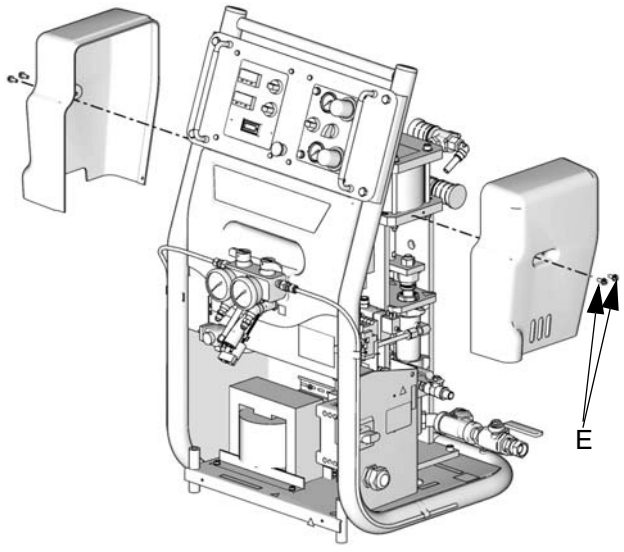
5. For Iso A pump only: reconnect two tubing lines (N) from ISO Pump Lube reservoir. Flush and refill reservoir with TSL 206995.




6. Refill Resin B pump wet cup with TSL 206995.

7. Reconnect fan wires if they were disconnected.

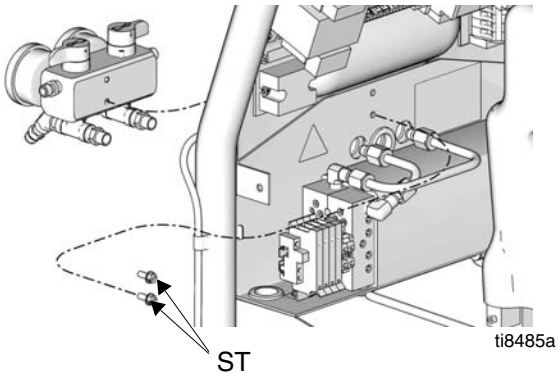
8. Reinstall air motor cover and tighten two screws (E).



# Recirculation / Over Pressure Relief Block

Valves can be serviced with the block on the machine (see page 33 for parts view). For thorough cleaning, remove the block assembly as follows.

1. Remove both rear shrouds and lower front shroud; see page 13.
2. Disconnect two fluid tubes connected to back of recirculation block.
3. Loosen and remove two screws (ST) in back of recirculation block.

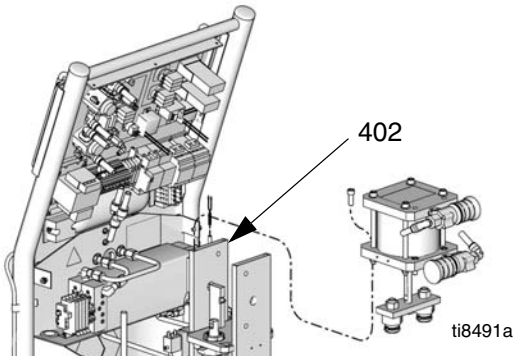



4. See **Relief Manifold**, page 31. Clean and inspect all parts for damage. Ensure that the seat (8a) and gasket (8b) are positioned inside each valve cartridge (8).
5. Apply PTFE pipe sealant to all tapered pipe threads before reassembling.
6. Reassemble in reverse order, following all notes.

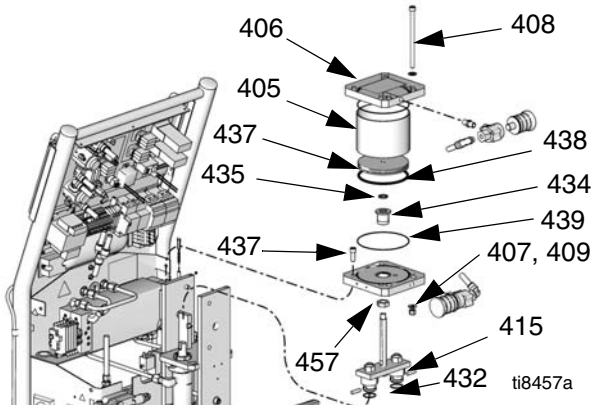
# Air Motor

See **A-20 Air Motor Pump Assembly** on page 33.

Air Motor Seal Repair Kit 255057 is available to change all air motor seals.




1. Press in tube fitting ferrules and pull out tubing to disconnect air lines.
2. Raise retaining spring (444) and knock retaining pins (436) out of both pump connection links (414). Leave yoke (415) and link (414) in place.
3. Remove four bolts (404) to remove entire air motor assembly.

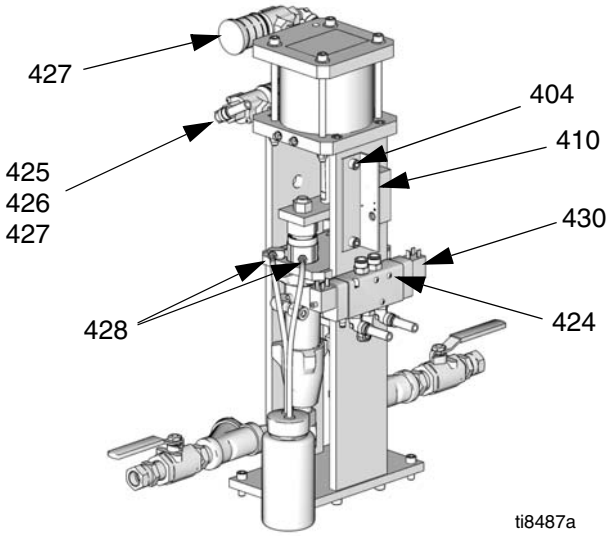



4. Remove lock nut (432) from piston rod (437) and remove pump yoke (415).
5. Remove four lock nuts (409), washers (407), and tie-rod bolts (408).
6. Remove top plate (406) from air cylinder (405).
7. Push piston assembly out of the air cylinder and replace piston o-ring (438) and lubricate. Inspect air cylinder (405) for wear or damage.
8. Remove nut (457). Replace bottom plate bearing (434), u-cup seal (435), and lubricate. U-cup seal open end faces up.
9. Replace top and bottom o-rings (439) in the plates. Use lubricant to hold in place.
10. Assemble in reverse order.

11. Torque tie rod bolts in small increments evenly to 17-22 in/lbs (3•4 Nm).

## Reversing Switch

1. Remove single screw and remove cover from reversing switch (410).
2. Inspect parts for damage or wear; replace switch assembly if necessary.
3. Disconnect wire from terminal block (follow wire back to where it connects to terminal block and disconnect).
4. Remove two screws (404) from mounting bracket.
5. Reassemble in reverse order.




## Solenoid Valve Replacement

See **A-20 Air Motor Pump Assembly**, page 33.

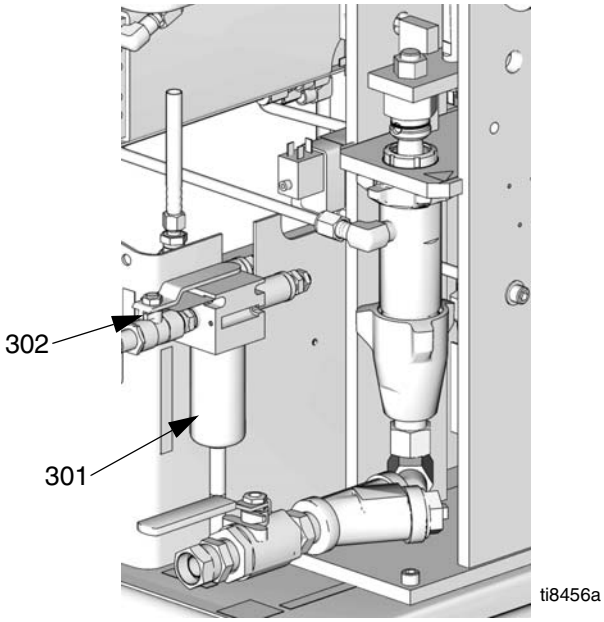
1. Disconnect all tubing attached to air control solenoid valve (430). To disconnect, push end sleeve in and pull tube. Mark each tube according to its corresponding fitting.
2. Loosen self-contained plug retaining screw on each end and remove electronic plug.
3. Remove three screws (424) on air control solenoid valve.
4. Replace fittings (425, 426, 428) and muffler (427) onto new valve.
5. Reattach mounting screws and plug retaining screws.
6. Reconnect all tubing lines.

## Air Inlet Filter / Water Separator (Auto Drain)

### Air Filter Element Removal

See **Air Inlet**, page 31.

1. Close air inlet valve (302) on filter (301).
2. Hold in metal spring clip and twist black cover counterclockwise to remove.




3. Unscrew clear drain cover by hand.
4. Unscrew black filter element retainer to remove element.
5. Inspect filter element. Clean or replace.

### Air Filter Element Installation

1. Insert cleaned or replacement filter (114228).
2. Hand-screw filter retainer into place.
3. Hand-screw clear drain cover until tight.
4. Reposition black cover and turn. Make sure it “snaps” back into place.

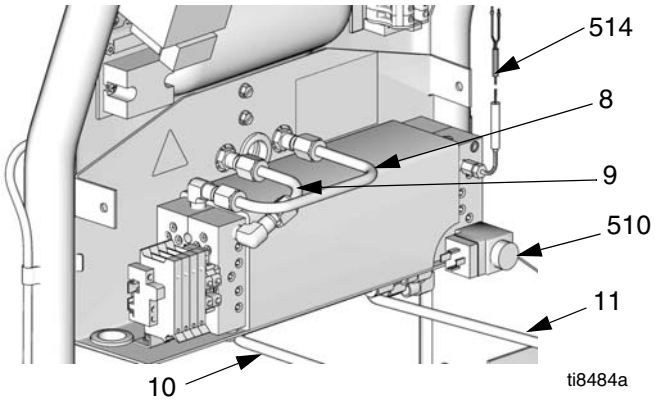
# Primary Heater

Read **Warnings** on page 4. Wait for heater to cool before repairing.

1. Turn Main disconnect Switch OFF.
2. Perform **Pressure Relief Procedure**; see page 8.
3. Wait for heater to cool.
4. Perform **Flushing** procedure; see page 8.
5. Remove both rear shrouds and lower front shroud; see page 13.

## Removal

1. Disconnect two fluid lines (10, 11) at bottom of heater.
2. Disconnect two upper fluid lines (8, 9) at the connection to the recirculation manifold. Leave tubing assemblies connected to heater.




3. Follow brown thermocouple wire (514) up to hose heat temperature control and disconnect. See **Wiring** on page 36.
4. Disconnect over pressure switches. (510)
   a. Loosen retaining screw.
   b. Unplug connector front and back.
5. Disconnect two main power leads from wire harness at heater assembly terminal blocks.
6. Disconnect two wires from over temperature switch.
7. Remove back screw holding wiring bracket to heater shelf. Retain screw.
8. Remove four screws (37) underneath heater. Retain four thermal barrier spacers (22) for later installation.
9. Pull heater assembly out and remove from unit.

## Service

See parts breakdown on page 35 for servicing.

## Installation

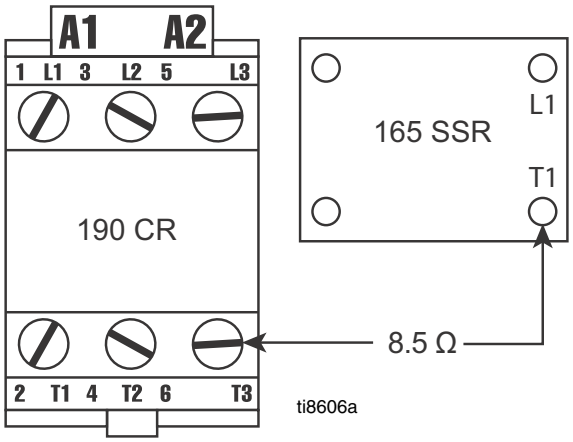
Reconnect and install in reverse order.

# Heating Elements

The primary heater contains four 1500-watt (30-36 ohms each) heating elements wired in parallel. To check if the elements are functional, perform the following steps:

1. Turn OFF and lock out incoming power at source.
2. Allow heater to cool.
3. Remove two rear shrouds; see page 13.
4. Measure the resistance of all four heating elements wired in parallel together at the heater contactor.

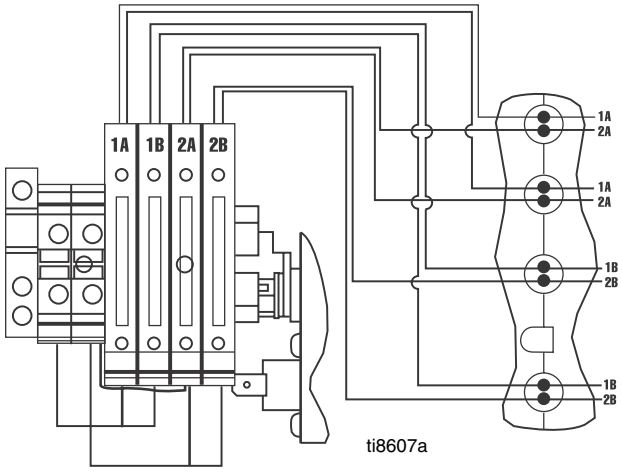
   When measured at points T1 on 165 SSR and T3 on 190 CR (see figure below), ohms reading should be 8.5. If ohm reading is above 10 ohms, see step 5.




5. Check each fuse in fuse holder. Swing open fuse holder by pulling on tab. Test each fuse for electrical continuity from end to end. Replace if open resistance is measured. If fuses are good, see step 6.
6. Measure resistance of two heating elements wired in parallel with fuse holders open.

   Resistance between 1A and 2A to be 17 ohms. Resistance between 1B and 2B to be 17 ohms.

   If resistance is higher than 25 ohms, determine which heating element is failed open. Disconnect each heating element wire from fuse holder and measure resistance.




7. Each heating element resistance reading should be 34 ohms.

# Fluid Inlet Filter Screen



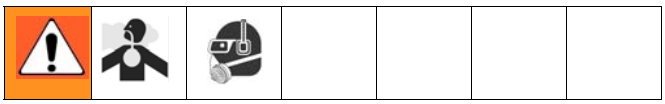
A Y-line filter screen before each proportioning pump traps solid matter to ensure proper operation of ball check valves in pump base. Inspect and clean both screens. See Reactor A-20 Operation manual (311511).

Regularly clean isocyanate pump screen during start-up procedure. This minimizes moisture contamination problems by immediately flushing out any isocyanate residue at start of dispensing operation.

Remove and clean filter screens as follows:

1. Follow **Pressure Relief Procedure** on page 8.
2. Place a rag beneath filter base to catch drain-off of chemical when removing screen plug.
3. Loosen screen plug just enough to allow material to drain out onto rag.
4. Unthread screen plug and remove it.
5. Pull screen straight out of strainer. Clean or replace. See **Accessories**, page 25, for alternate mesh size.
6. Thoroughly clean screen gasket and material inside strainer.
7. Position screen on shoulder of plug and screw securely back into strainer.
8. Reconnect transfer pump air supply and open material inlet supply valve. Ensure there are no leaks and wipe equipment clean.

# Isocyanate Pump Lubricant



Check pump lubricant daily. Change lubricant before it becomes a gel or when its color darkens. The time interval between changes due to gel formation will depend on environmental conditions.

To change lubricant, use the following steps.

1. Lift lubricant reservoir out of bracket and remove reservoir from cap.
2. Flush reservoir thoroughly and fill 3/4 full with TSL Throat Seal Lubricant 206995.
3. Thread reservoir back onto cap assembly and return it to the bracket.

The lubrication system is now ready from operation. No priming is required.

# Fluid Temperature Sensor (FTS)

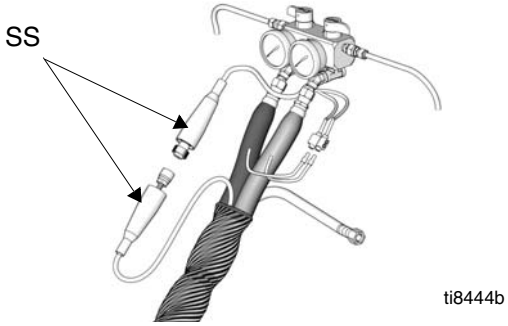
Check FTS operation by connecting directly to Reactor.

An alternating hose controller display of SbEr and H20.00 indicates a loss of signal from the FTS. Two conditions must be satisfied for proper FTS operation:

- The sensor must be functional
- The signal must travel uninterrupted from the sensor to the control unit

## FTS Cable Test

1. Disconnect FTS cable (SS) at Reactor.




2. Test with ohmmeter between pins of cable connector.

| Pins | Result |
|---|---|
| 1 to 2 | Approximately 35 ohms per 50 ft (15.2 m) of hose, plus approximately 10 ohms for FTS |
| 1 to 3 | Infinity |

3. If cable fails test, retest at FTS.

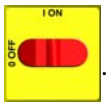
## FTS Test

1. Turn Main Disconnect Switch OFF. Disconnect power supply cord.
2. **Relieve pressure**; see page 8.
3. Remove tape and protective covering from FTS. Disconnect hose cable. Test with ohmmeter between pins of cable connector.

| Pins | Result |
|---|---|
| 1 to 2 | Approximately 35 ohms per 50 ft (15.2 m) of hose, plus approximately 10 ohms for FTS |
| 1 to 3 | Infinity |
| 3 to FTS ground screw | 0 ohms |
| 1 to FTS component A fitting (ISO) | Infinity |

4. If FTS fails test, replace FTS.

## Test/Removal

1. Turn main power OFF 

. Disconnect power supply.
2. Relieve pressure, page 8.
3. Remove tape and protective covering from FTS. Test with ohmmeter between pins of cable connector (4).

| Pins | Result |
|---|---|
| 1 to 2 | approximately 10 ohms |
| 1 to 3 | infinity |
| 3 to FTS groundscrew | 0 ohms |
| 1 to FTS component A fitting (ISO) | infinity |

4. If FTS fails any test, replace FTS.
5. Disconnect FTS from whip hose (6A).
6. Remove ground wire (K) from ground screw on underside of FTS.
7. Disconnect FTS (5a) from hose (1).
8. Remove FTS probe (H) from A (ISO) side of hose.

## Installation

The Fluid Temperature Sensor (FTS) is supplied. Install FTS between main hose and whip hose. See Heated Hose manual 309572 for instructions.

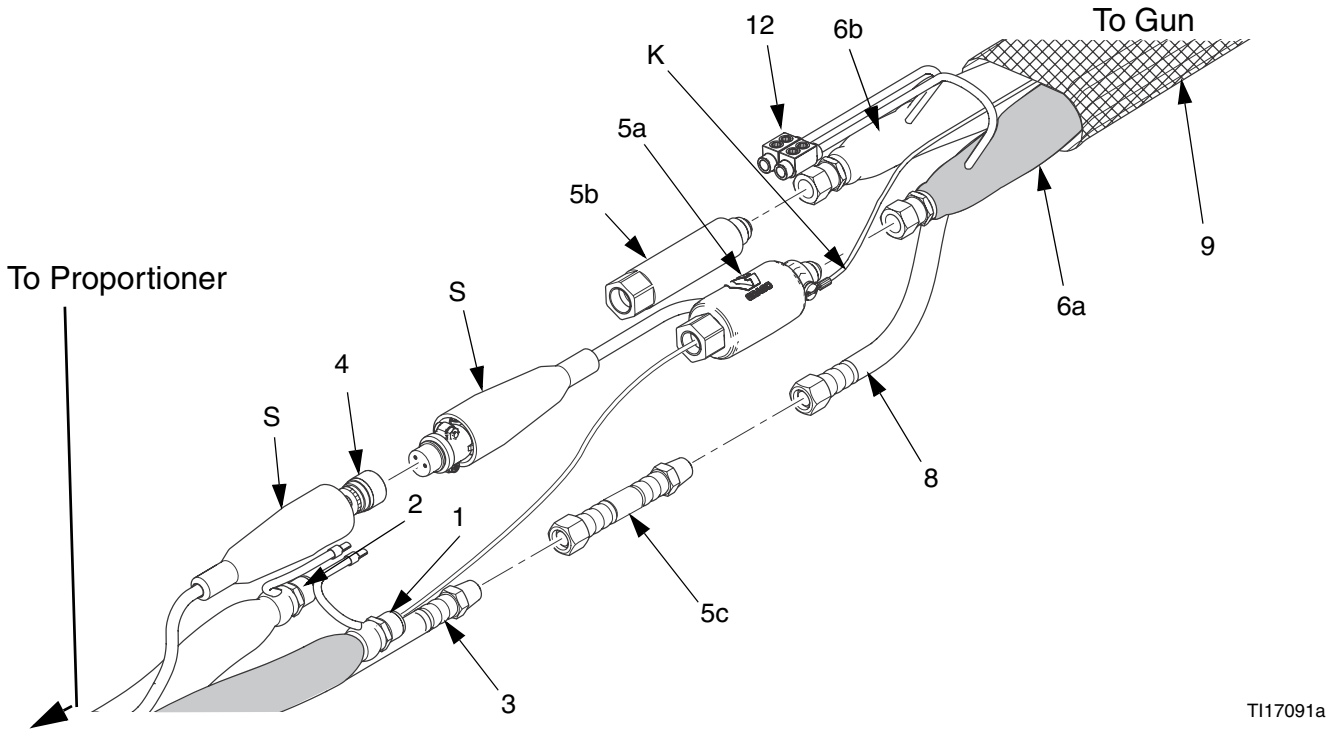



**FIG. 1: Fluid Temperature Sensor and Heated Hoses**

# Replacing Control Components

## Hose Power Controller / Circuit Breaker / Relays

Hose Heat Power Controller and Hose Transformer Secondary Circuit Breaker are DIN rail-mounted in the lower cabinet. Unsnap them from the DIN to replace them. See **Electrical Control Panel**, page 29.

### Hose Heat Power Controller

Place flat blade screwdriver under controller and pry spring-loaded release tab above fan and against back wall. Pivot bottom of unit towards front.

### Circuit Breakers and Power Contactor Relays

Pry tab on bottom down. Pivot bottom relays towards front.

### Digital Temperature Controller

1. Carefully pry tabs away on back sides of case and pull black wire connector off of controller.
2. Squeeze in side tabs on black retainer clip.
3. Pull clip off of controller.
4. Push controller out towards front.

### Rotating Panel Switches

1. Push down thumb tab on back of switch assembly.
2. Pull contact block assembly straight back.
3. Use a small blade to unclip contact blocks and light blocks.
4. Unscrew round nut on back of knobs to remove.

### Counter

1. Pry tabs of retaining clip away from top and bottom of counter body.
2. Push counter out from back towards front.

### Red Stop Switch

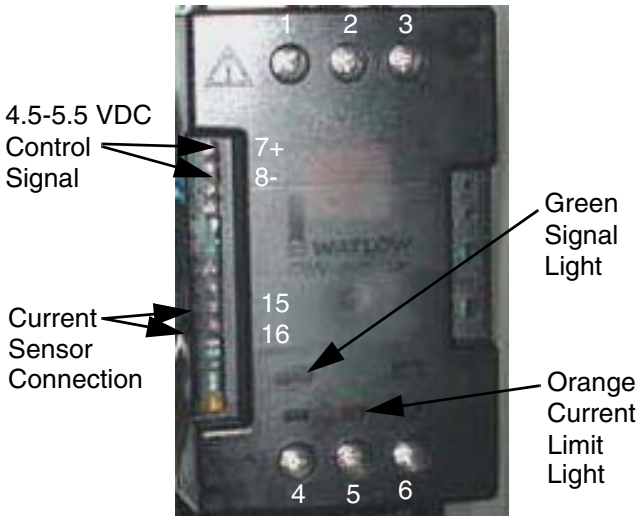
1. Remove yellow locking tab on back of switch.
2. Rotate metal tab counterclockwise.
3. Pull contact block straight back and off.
4. Unscrew round nut on back of knob to remove.

### Checking Heated Hose Power Controller

The controller, next to the hose transformer in the lower compartment, requires four conditions to be met for proper function:

- 210 - 240 Vac to power the controller
- 4.5 - 5.5 Vdc to operate the control circuit
- a complete electrical circuit through the hose heaters, transformer secondary, and secondary circuit breaker.
- transformer secondary current sensor connected with hose cable running through sensor doughnut.

If these four conditions are met, one green and one orange status lights are illuminated. This only happens if the hose temperature controller output light is on. If the temperature controller light is flickering on less than 50%, the orange light may not be illuminated. No more than 210 ft of hose on the machine.




5.

### Hose Heat Manual Mode

If the hose temperature controller does not see the Fluid Temperature Sensor (FTS), it will shut off the hose heat and give a flashing error alternating between:

SbEr = Sensor break error
H20.0 = Heat output 20%

The hose can be manually heated by turning the hose back on with the hose switch and green light. The up/down arrows can be used to adjust the default 20% power output.

There is no monitoring or alarm in manual mode. You must monitor the temperature by inserting a probe thermometer inside the hose insulation against the hose. The thermometer will read 10-20 °F less than actual fluid temperature. Repair the temperature sensor or cable as soon as possible to avoid damaging the heated hose.



Do not allow hose to overheat during manual control. Hose temperature, as indicated by a properly installed hose thermometer, must not exceed 170 °F (76 °C). Closely monitor hose temperature to avoid personal injury or damage to property.

### Checking Heated Hose Current Sensor

The hose current sensor is a small “D” shaped black plastic coil with two small wires coming to terminals (15, 16) of the Hose Power Controller. The “D” coil itself has one of the large wires from the hose transformer secondary running through it.

1. Disconnect either wire at connection 15 or 16.
2. Connect ohm meter to the disconnected wire and to the connected wire at terminal.
3. Resistance across the sensor should read approximately 18 ohms on the meter.

## Air Motor Up / Down / Pressure Regulators / Gauges

### Regulators

Unscrew block nut on front of panel. Push regulator out to the back.

### Gauges

1. Remove air fitting.
2. Remove brass nut and clamp.
3. Push gauge out to front.

## Control Panel Wiring

Every wire has a component number followed by a dash and a number, which indicates the terminal location. Refer to schematic and labels on back of panel.

# Accessories

## Feed Pump Kits

Pumps, hoses, and mounting hardware to supply fluids to Reactor. Includes 246483 Air Supply Kit. See 309815.

## 246483 Air Supply Kit

Hoses and fittings to supply air to feed pumps, agitator, and gun air hose. Included in feed pump kits. See 309827

## 246978 Circulation Kit

Return hoses and fittings to make circulation system. Includes two 246477 Return Tube Kits. See 309852.

## 246477 Return Tube Kit

Desiccant dryer, return tube, and fittings for one drum. Two included in 246978 Circulation Kit. See 309852.

## 255057 Air Motor Seal Kit

Includes piston rod seal and bearing, piston and cylinder o-rings.

## TSL (Throat Seal Liquid)

206995 1 qt (1 liter) bottle

206996 1 gal. (3.8 liter) container

## Heated Hoses

50 ft (15.2 m) and 25 ft (7.6 m) lengths, 1/4 in. (6 mm), 3/8 in. (10 mm), or 1/2 in. (13 mm) diameter, 2000 psi (14 MPa, 140 bar) or 3500 psi (24 MPa, 241 bar). See 309572.

## Heated Whip Hoses

10 ft (3 m) whip hose, 1/4 in. (6 mm) or 3/8 in. (10 mm) diameter, 2000 psi (14 MPa, 140 bar) or 3500 psi (24 MPa, 241 bar). See 309572.

## Fusion Spray Gun

Air Purge Gun available in round or flat pattern. See 309550. Mechanical Purge Gun available in round or flat pattern. See manual 309856.

## Y-Strainer Screen

Replacement strainer screen for fluid Y-strainer; 20 mesh.

| Part | Description |
|---|---|
| 180199 | 20 mesh; as shipped |
| 255082 | 80 mesh (2 pack) |
| 255083 | 80 mesh (10 pack) |

## 114228 Air Filter Element

Replacement air filter element; 5 micron.

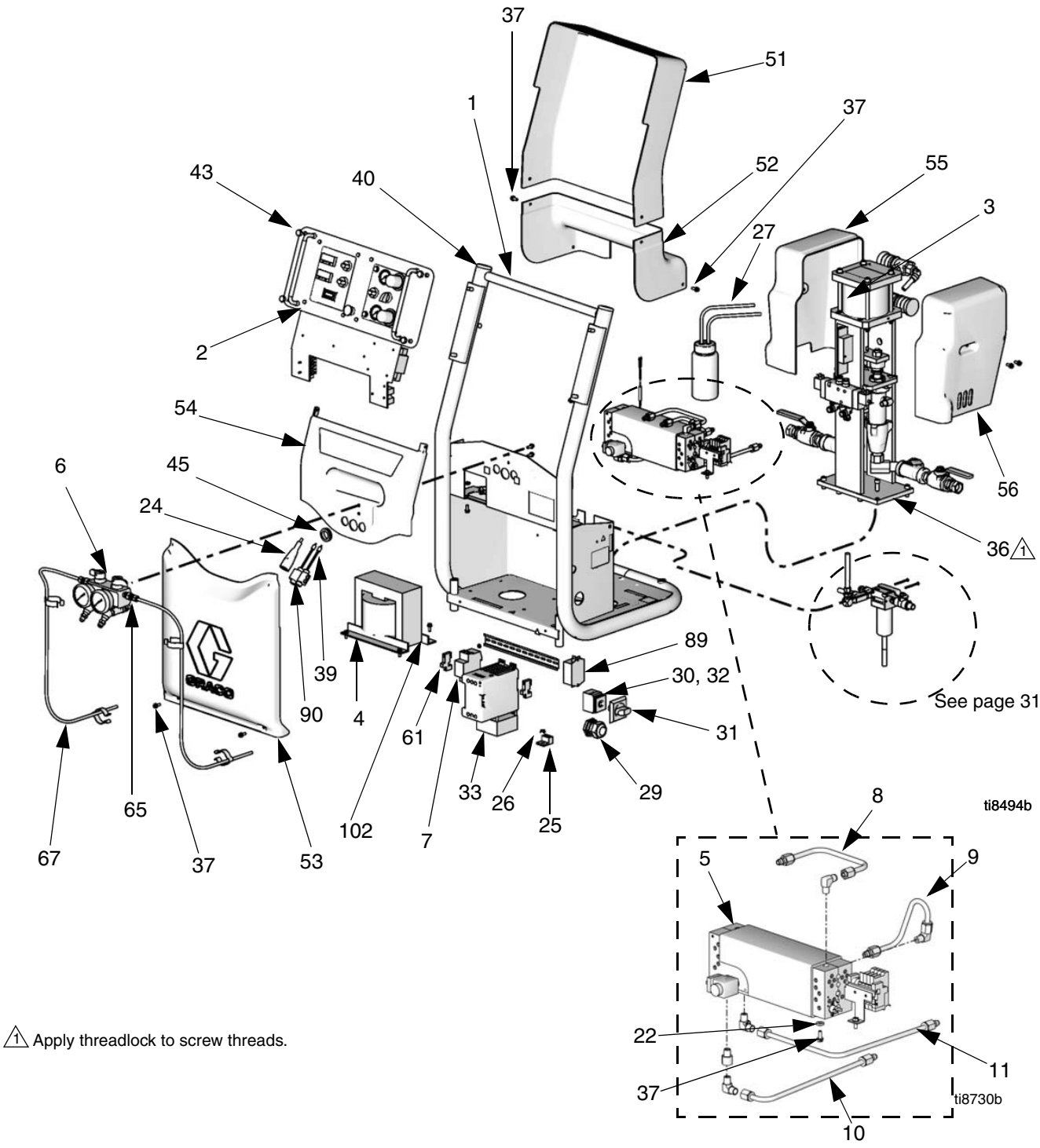
# Recommended Spare Parts

Keep the following spare parts on hand to reduce downtime.

| Part No. | Description |
|---|---|
| 245971 | Pump, Resin (B) side |
| 246421 | Resin (B) Pump Repair Kit for 245971 pump |
| 246831 | Pump, ISO (A) side |
| 15C851 | ISO (A) Pump Repair Kit for 246831 pump |
| 246963 | Wet Cup Kit for 246831 pump |
| 206995 | TSL bottle, 1 qt (1 liter) |
| 101078 | Y-Strainer; includes 180199 element |
| 180199 | Element, Y-Strainer, 20 mesh |
| 114228 | Element, air filter, 5 micron |
| 255057 | Kit, Air Motor Seal |
| 108636 | Muffler (qty 2) |
| 239914 | Valve, recirc/spray; includes seat and gasket |
| 120624 | Fuse, heating element (qty 4) |
| 260938 | Heating element (qty 4) |
| 116225 | Fuse, control power (qty 3) |

# Parts

## Reactor A-20




1 Apply threadlock to screw threads.

**FIG. 2: Reactor A-20**

## Reactor A-20

| Ref. | Part | Description | Qty. |
|---|---|---|---|
| 1 | | CART, assy. | 1 |
| 2 | | PANEL, control, electrical; see page 29 | 1 |
| 3 | | PUMP, air motor; see page 33 | 1 |
| 4 | 15J349 | TRANSFORMER, 2790VA, 230/62 | 1 |
| 5 | | HEATER, 6000W, primary; see page 35 | 1 |
| 6 | | MANIFOLD, relief; see page 31 | 1 |
| 7 | 120579 | CIRCUIT BREAKER, 50 amp | 1 |
| 8 | 15U357 | TUBE, fluid, A (outlet), A-20 | 1 |
| 9 | 15U359 | TUBE, fluid, B (outlet), A-20 | 1 |
| 10 | 15U356 | TUBE, fluid, A (inlet), A-20 | 1 |
| 11 | 15U358 | TUBE, fluid, B (inlet), A-20 | 1 |
| 22 | 167002 | INSULATOR, heat | 4 |
| 23 | 120550 | FITTING, tube, union Y, 1/2 OD | 1 |
| 24 | 15B380 | CABLE, FTS | 1 |
| 25 | 117666 | TERMINAL, ground | 1 |
| 26 | 115942 | NUT, hex, flange head, 1/4-20; see manual 309911 | 1 |
| 27 | 246995 | BOTTLE, assembly, complete | 1 |
| 29 | 117682 | BUSHING, strain relief, PG29 | 1 |
| 30★ | 123970 | SWITCH, disconnect, 40A | 1 |
| 31★ | 123971 | KNOB, disconnect, operator | 1 |
| 32 | 123972 | SWITCH, fourth pole | 1 |
| 33 | 120387 | CONTROL, hose power, 240V | 1 |
| 35❄ | 114128 | FITTING, elbow, male, swivel | 4 |
| 36 | C19837 | SCREW, cap, socket hd, 3/8-16 x 1 | 4 |
| 37 | 108296 | SCREW, hex washer hd, 1/4-20 | 16 |
| 39 | 15J224 | WIRE, high current to hose | 1 |
| 40 | 112125 | PLUG, tube | 2 |
| 41❄ | 114151 | FITTING, elbow, male, swivel | 4 |
| 42❄ | 100451 | COUPLING | 2 |
| 43 | 117623 | NUT, cap (3/8-16) | 4 |
| 45 | 114269 | GROMMET, rubber | 1 |
| 46❄ | 113505 | NUT, keps, hex hd, 10/24 | 3 |
| 47†▲ | 15G280 | LABEL, warning | 1 |
| 51 | 253894 | COVER, controls, rear | 1 |
| 52 | 253893 | COVER, elect, rear | 1 |
| 53 | 253891 | COVER, elect, front | 1 |
| 54 | 253892 | COVER, controls, front | 1 |
| 55 | 253895 | COVER, motor, left | 1 |
| 56 | 253896 | COVER, motor, right | 1 |
| 57† | 120302 | CASTER, friction post, 3 in. wheel | 4 |
| 61 | 112446 | BLOCK, clamp end | 2 |
| 62❄ | 116513 | REGULATOR, air | 2 |
| 63†❄ | 116514 | NUT, regulator mnt | 2 |
| 64❄ | 116257 | GAUGE, pressure | 2 |
| 65 | 205447 | COUPLING, hose | 2 |
| 66 | 054826 | TUBE, plastic, PTFE, 6 ft | 1 |
| 67 | 186494 | CLIP, spring | 4 |
| 71†▲ | 189930 | LABEL, caution, electric | 1 |
| 72† | 172953 | LABEL, ground | 1 |
| 74† | 261669 | SENSOR, fluid temperature | 1 |
| 78†▲ | 189285 | LABEL, caution, hot | 1 |
| 89 | 120616 | FILTER, electrical | 1 |
| 90 | 261821 | CONNECTOR, wire | 1 |
| 102 | 113796 | SCREW, flanged | 4 |

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

*† Not shown.*

❄ *See* ***Electrical Control Panel****, page 29.*

★ ***Required for all A-D series models.*** *Included in Knob Repair Kit 258921 (purchase separately).*

# Electrical Control Panel

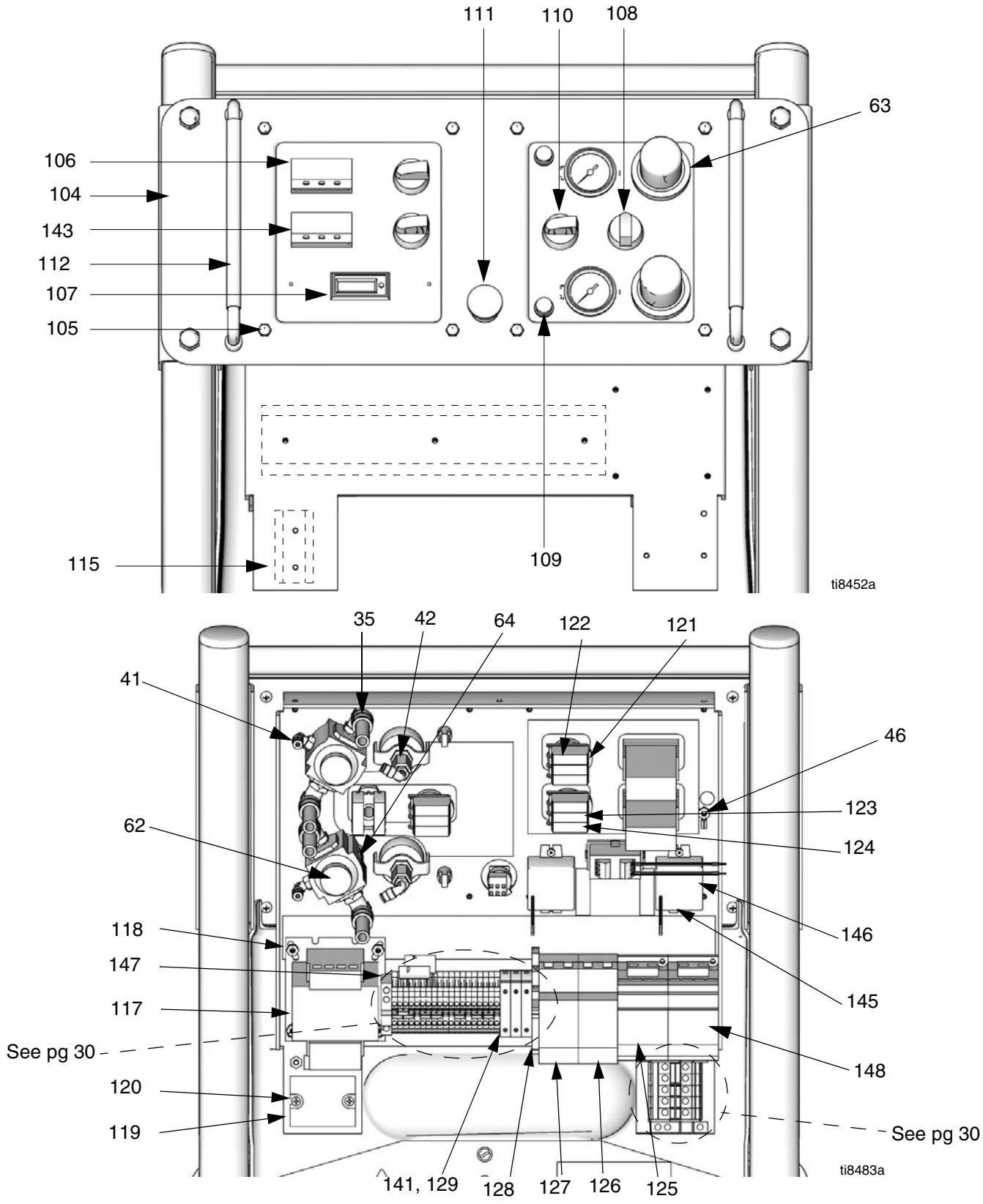
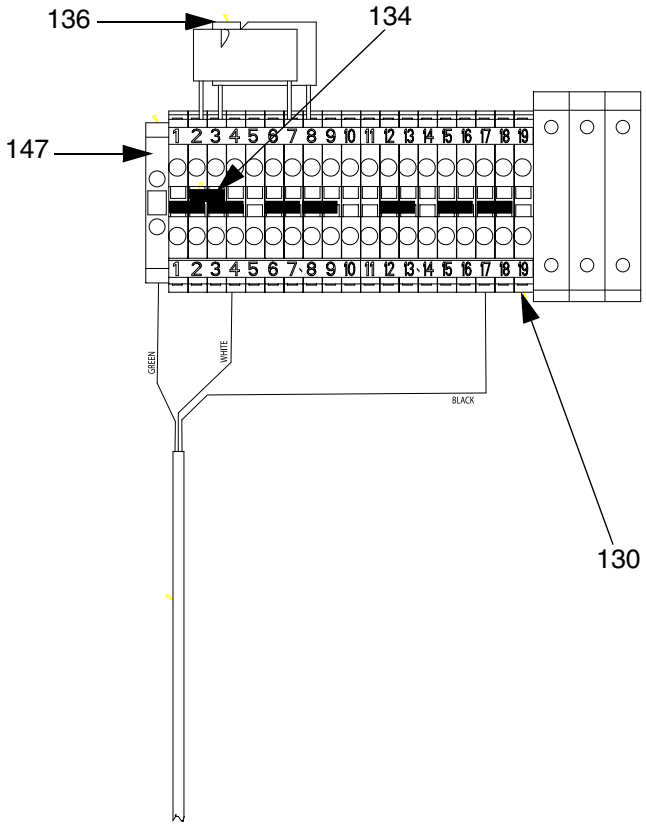


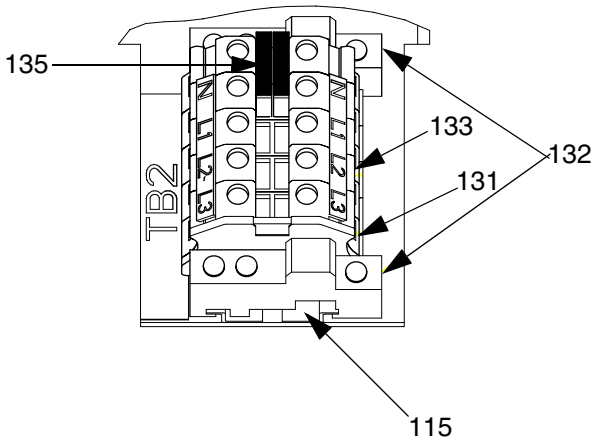

**FIG. 3: Electrical Control Panel**

# Electrical Control Panel

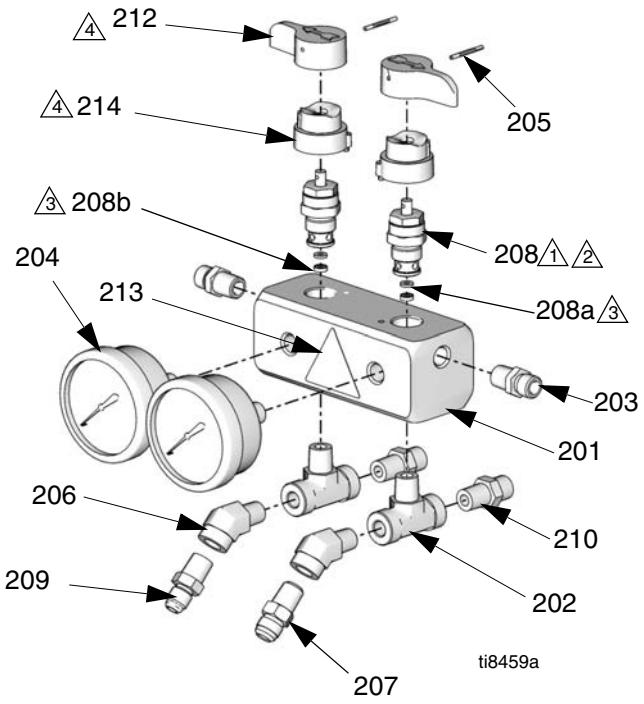
| Ref. | Part | Description | Qty. |
|---|---|---|---|
| 104 | 15B291 | PLATE, display | 1 |
| 105 | 117523 | NUT, cap (#10) | 8 |
| 106 | 15J591 | CONTROLLER, temp, heater (w/software) | 1 |
| 107 | 296825 | COUNTER, digital | 1 |
| 108 | 120497 | SWITCH, selector, two position | 1 |
| 109 | 120526 | LIGHT, indicator, 120 volt | 2 |
| 110 | 120492 | SWITCH, three position, lighted | 3 |
| 111 | 117500 | SWITCH, e-stop | 1 |
| 112 | 117499 | HANDLE, large | 2 |
| 115 | | RAIL, mounting, 3 in. | 1 |
| 117 | 120482 | TRANSFORMER | 1 |
| 118 | 113505 | NUT, keps, hex hd, 10-24 | 8 |
| 119 | 120479 | RELAY, SSR, heater | 1 |
| 120 | 103196 | SCREW, mach pan hd, 8-32 | 4 |
| 121 | 120493 | LATCH, mounting | 4 |
| 122 | 120495 | BLOCK, switch, N.C., red | 4 |
| 123 | 120496 | BASE, light, LED | 3 |
| 124 | 120494 | BLOCK, switch, N.O., green | 4 |
| 125 | 120498 | RELAY, contactor, hose | 2 |
| 126 | 295351 | CIRCUIT BREAKER, 16A, 2P | 1 |
| 127 | 295355 | CIRCUIT BREAKER, 32A, 2P | 1 |
| 128 | 120489 | RELAY, pump circuit | 1 |
| 129 | 514556 | HOLDER, fuse term. block (5x20 mm) | 3 |
| 130 | 120491 | BLOCK, terminal | 19 |
| 131 | 120490 | COVER, end | 1 |
| 132 | 112446 | BLOCK, clamp end | 3 |
| 133 | 120570 | BLOCK, terminal | 5 |
| 134 | 120485 | BRIDGE, plug-in, (jumper) | 8 |
| 135 | 120573 | BRIDGE, plug-in, (jumper) | 2 |
| 136 | 295472 | CAPACITOR | 2 |
| 141 | 116225 | FUSE, bussmann, gdc-1a (5x20 mm) | 3 |
| 143 | 15J590 | CONTROLLER, temp, hose (w/software) | 1 |
| 145 | 102794 | NUT, hex, 4-40 | 4 |
| 146 | 120582 | FILTER, noise, SSR | 2 |
| 147 | 112443 | BLOCK, terminal ground | 1 |
| 148 | 120656 | RELAY, contactor, heater | 1 |




Electrical Control Panel - Detail



# Relief Manifold




1 Apply sealant and torque to 250 in-lbs (28 N•m)

2 Use blue thread lock on valve cartridge threads into manifold

3 Part of item 208

4 Apply lubricant to mating surfaces

5 Apply pipe sealant to all NPT threads

**FIG. 4: Relief Manifold**

| Ref. | Part | Description | Qty. |
|---|---|---|---|
| 201 | 15F870 | MANIFOLD, recirculation | 1 |
| 202 | 108638 | FITTING, pipe, tee | 2 |
| 203 | 162453 | FITTING, (1/4 npsm x 1/4 npt) | 2 |
| 204 | 113641 | GAUGE, pressure, fluid, SST | 2 |
| 205 | 111600 | PIN, grooved | 2 |
| 206 | 119789 | FITTING, elbow, street, 45 deg, | 2 |
| 207 | 116704 | ADAPTER, 3/8 JIC x 1/4 npt | 1 |
| 208 | 239913 | VALVE, drain; includes 208a, 208b | 2 |
| 208a | | SEAT | 2 |
| 208b | | GASKET | 2 |
| 209 | 119998 | ADAPTER, 5/16 JIC x 1/4 npt | 1 |
| 210 | 116702 | FITTING, union, 1/4 npt x 3/8 JIC | 2 |
| 212 | 187625 | HANDLE, valve, drain | 2 |
| 213 | 189285 | LABEL, caution | 1 |
| 214 | 224807 | BASE, valve | 2 |

# Air Inlet

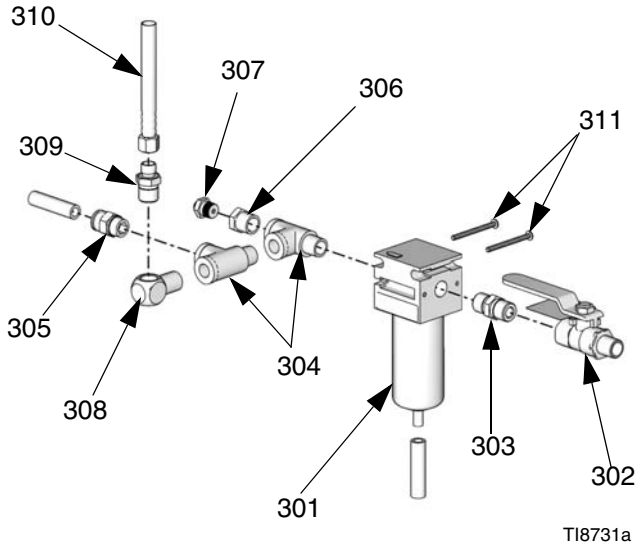



**FIG. 5: Air Inlet**

| Ref. | Part | Description | Qty. |
|---|---|---|---|
| 301 | 24K977 | FILTER, air, 3/8 (auto drain) | 1 |
| 302 | 113333 | VALVE, ball, vented, 0.375 | 1 |
| 303 | 156849 | PIPE, nipple | 1 |
| 304 | 803088 | FITTING, tee, street | 2 |
| 305 | 114129 | FITTING, connector, male | 1 |
| 306 | 100176 | BUSHING, hex | 1 |
| 307 | 15D916 | FITTING, straight 5/32 to 1/4 npt | 1 |
| 308 | 155699 | FITTING, elbow, street | 1 |
| 309 | 164672 | ADAPTER | 1 |
| 310 | 15B772 | HOSE, air, 18 in. | 1 |
| 311 | | SCREW, pan head, 8-32 x 2 in. | 2 |



# A-20 Air Motor Pump Assembly

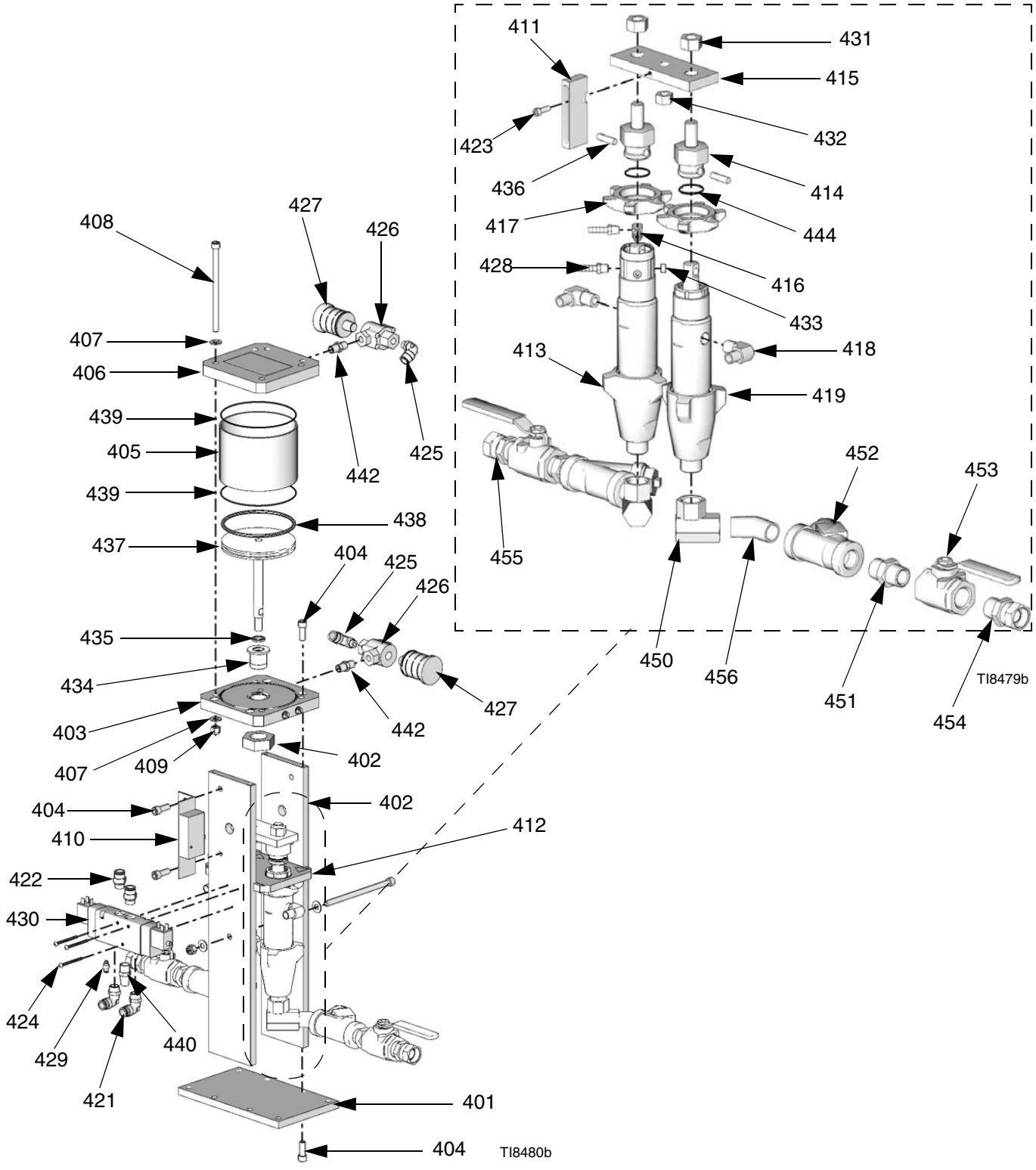



**FIG. 6: A-20 Air Motor Pump Assembly**

## A-20 Air Motor Pump Assembly

| Ref. | Part | Description | Qty. |
|---|---|---|---|
| 401 | 15J138 | PLATE, base, pump | 1 |
| 402 | 15J131 | PLATE, side | 2 |
| 403 | 15J587 | PLATE, cylinder, air, bottom | 1 |
| 404 | C19837 | SCREW, cap, socket hd, 3/8-16 x 1 | 10 |
| 405 | 297411 | CYLINDER, air | 1 |
| 406 | 15J586 | PLATE, cylinder, air, top | 1 |
| 407 | 101971 | WASHER, thrust, 3/8 | 10 |
| 408 | 120557 | SCREW, cap, socket hd | 5 |
| 409 | 101566 | NUT, lock | 5 |
| 410 | 296111 | SWITCH, reversing | 1 |
| 410a† | 295476 | SWTICH, micro | 1 |
| 410b† | 297276 | SHAFT, pivot | 1 |
| 410c† | 297280 | LEVER, roller, assy. | 1 |
| 410d† | 297318 | WASHER, fiber | 1 |
| 410e† | 295418 | SPRING | 1 |
| 411 | 15J134 | ACTUATOR, switch | 1 |
| 412 | 15J133 | PLATE, mounting, pump | 1 |
| 413 | 246831 | PUMP, displacement, w/lube, 0.552 | 1 |
| 414★ | 15J132 | LINK, connecting | 2 |
| 415★ | 15J135 | PLATE, yoke, pump | 1 |
| 416★ | 191892 | FITTING, elbow, street, 90 deg | 1 |
| 417★ | 193031 | NUT, retaining | 2 |
| 418★ | 556766 | FITTING, elbow, 3/8 npt x 3/8 JIC | 2 |
| 419★ | 245971 | PUMP, resin | 1 |
| 421 | 114114 | FITTING, elbow, male, swivel | 2 |
| 422 | 114129 | FITTING, connector, male | 2 |
| 423 | 112166 | SCREW, cap, sch, 1/4-20 x 3/4 | 1 |
| 424 | | SCREW, pan head, phillips, 8-32 x 2 | 3 |
| 425 | 114128 | FITTING, elbow, male, swivel | 2 |
| 426 | 297439 | VALVE, quick exhaust | 2 |
| 427 | 108636 | MUFFLER | 2 |
| 428 | 116746 | FITTING, barbed, plated | 2 |
| 429 | 111328 | CONNECTOR, male | 1 |
| 430 | 120522 | VALVE, control, air | 1 |
| 431 | 120553 | NUT, center lock, 5/8-18 | 2 |
| 432 | 120552 | NUT, center lock, 1/2-20 | 1 |
| 433 | 104765 | PLUG, pipe headless | 2 |
| 434 | 15J149 | BUSHING, rod, air motor | 1 |
| 435 | 120554 | SEAL, u-cup, bevel lip | 1 |
| 436 | 183210 | PIN, str, hdls | 2 |
| 437 | 297372 | PISTON, air, w/ rod | 1 |
| 438 | 296113 | O-RING, #350, buna-n | 1 |
| 439 | 296112 | O-RING, #049, buna-n | 2 |
| 440 | 120551 | MUFFLER, bronze, sintered | 1 |
| 442 | 156971 | FITTING, nipple, short | 2 |
| 444 | 183169 | SPRING, retaining | 2 |
| 450 | 160327 | FITTING, union, adapter, 90 deg | 2 |
| 451 | C20487 | FITTING, nipple, hex | 2 |
| 452 | 101078 | STRAINER, Y | 2 |
| 452a† | 180199 | SCREEN, 20 mesh | 1 |
| 453 | 109077 | VALVE, ball, 3/4 npt | 2 |
| 454 | 296178 | FITTING, union, swivel, 3/4 mpt x 1/2 fpt | 1 |
| 455 | 157785 | FITTING, swivel | 1 |
| 456 | 113445 | FITTING, elbow, 45 deg, 3/4 npt(m) | 2 |
| 457 | 121601 | NUT, acetal, 1 1/8-12 | 1 |

*† Not shown.*

★ *See manual 309577.*

# Primary 6000W Heater

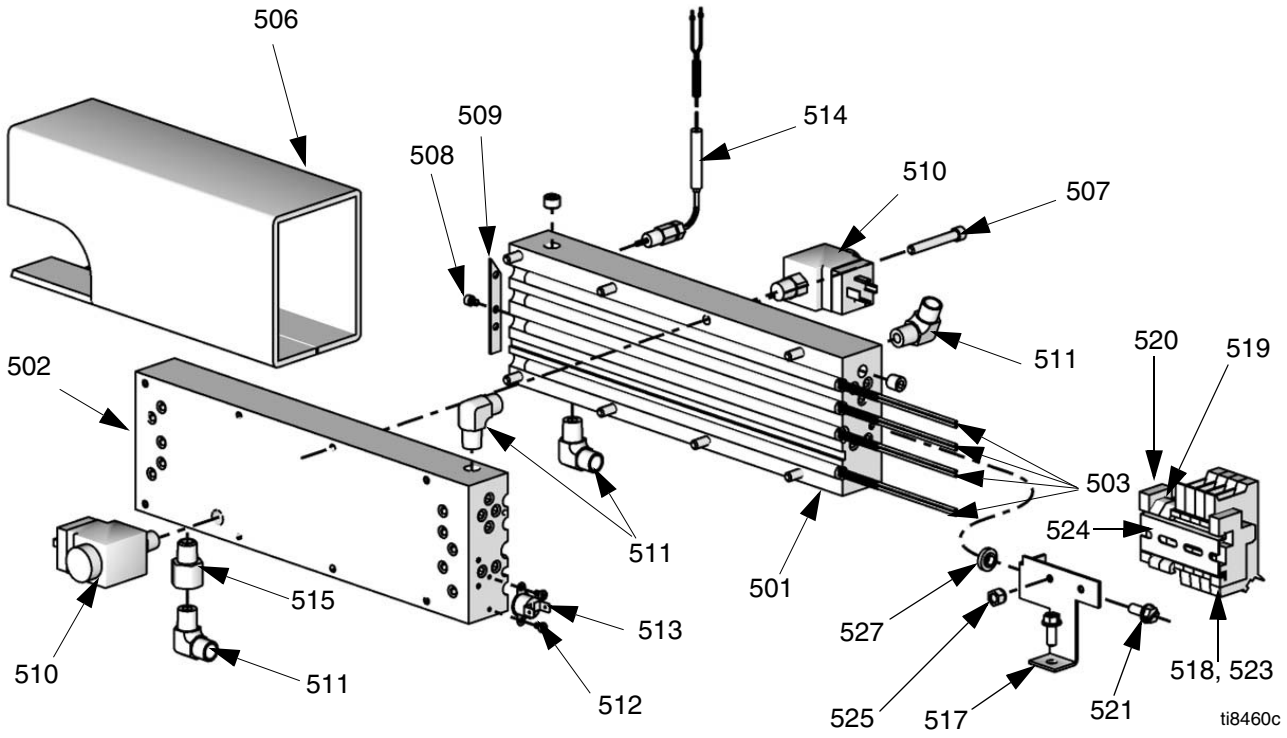



**FIG. 7: Primary 6000W Heater**

| Ref. | Part | Description | Qty. |
|---|---|---|---|
| 501 | 288352 | HEATER, B, kit | 1 |
| 502 | 288353 | HEATER, A, kit | 1 |
| 503 | 260938 | ELEMENT, heating 1500 watt | 4 |
| 506 | 15H960 | INSULATOR, heater | 1 |
| 507 | 297258 | SCREW, cap, socket head | 8 |
| 508 | 295732 | SCREW, cap, sh, 8-32 x 1/4 lg | 1 |
| 509 | 297529 | STOP | 1 |
| 510 | 296821 | SWITCH, pressure, 2200 psi | 2 |
| 511 | 556765 | FITTING, elbow, 1/4 npt x 3/8 JIC | 4 |
| 512 | 103854 | SCREW, mach, bdgh, 6-32 | 2 |
| 513 | 15B137 | SWITCH, over temperature | 1 |
| 514 | 117484 | SENSOR, thermocouple | 1 |
| 515 | 113336 | ADAPTER, 1/4 nptm, 1/4 nptf | 1 |
| 517 | 15J583 | BRACKET, mounting, fuse | 1 |
| 518 | 120621 | FUSE, block | 4 |
| 519 | 120570 | BLOCK, terminal | 2 |
| 520 | 112446 | BLOCK, clamp end | 1 |
| 521 | 108296 | SCREW, mach, hex, washer hd, 1/4-20 | 1 |
| 523 | 120624 | FUSE, electrical, MDA-20, 1/4 x 1 1/4 | 4 |
| 524 | 295261 | RAIL, mounting | 2 |
| 525 | 113505 | NUT, keps, hex hd, 10-24 | 2 |
| 527 | 110533 | WASHER, flat, nylon, 1/4 | 1 |



# Air Tubing Connections

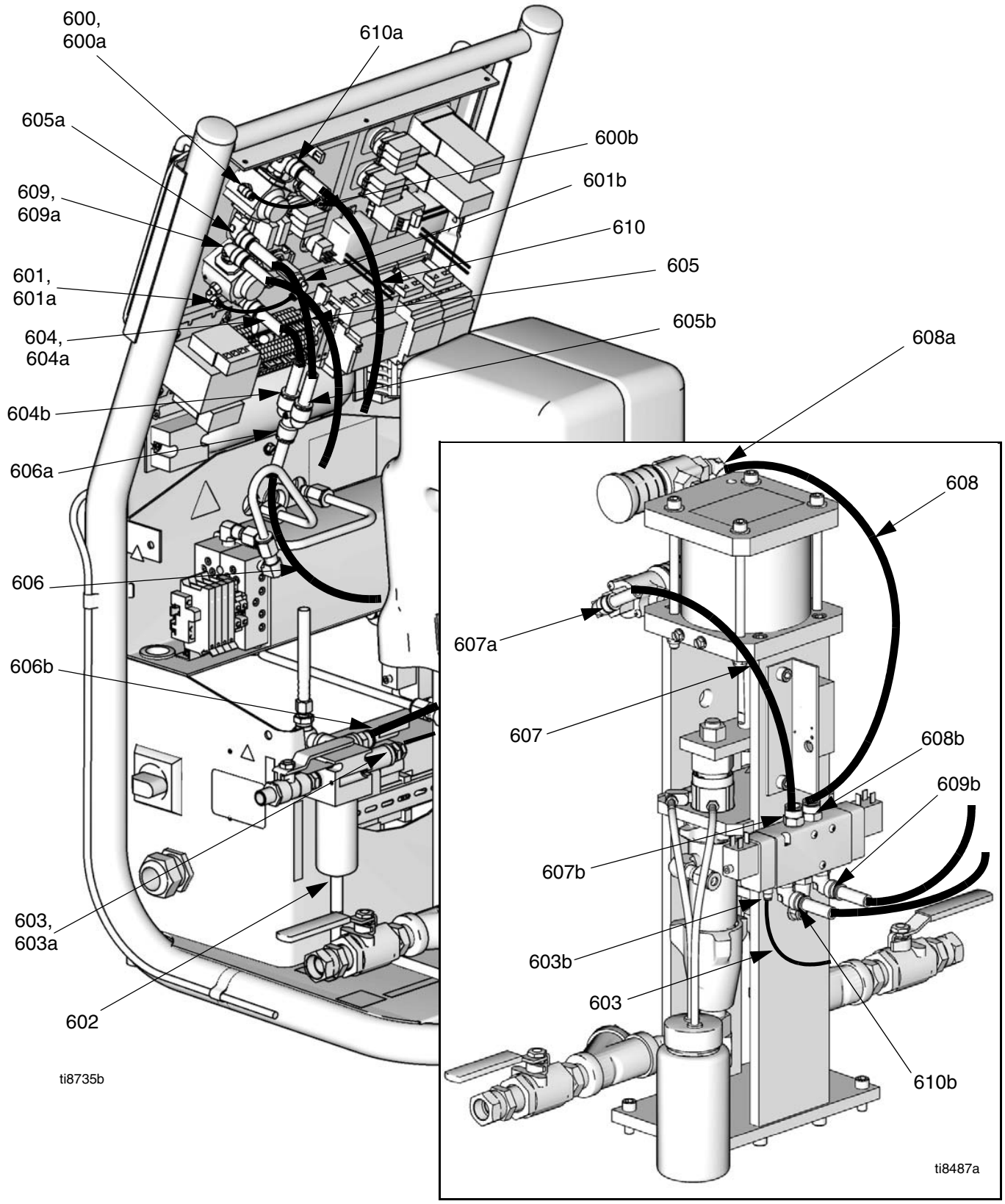



**FIG. 8: Air Tubing Connections**

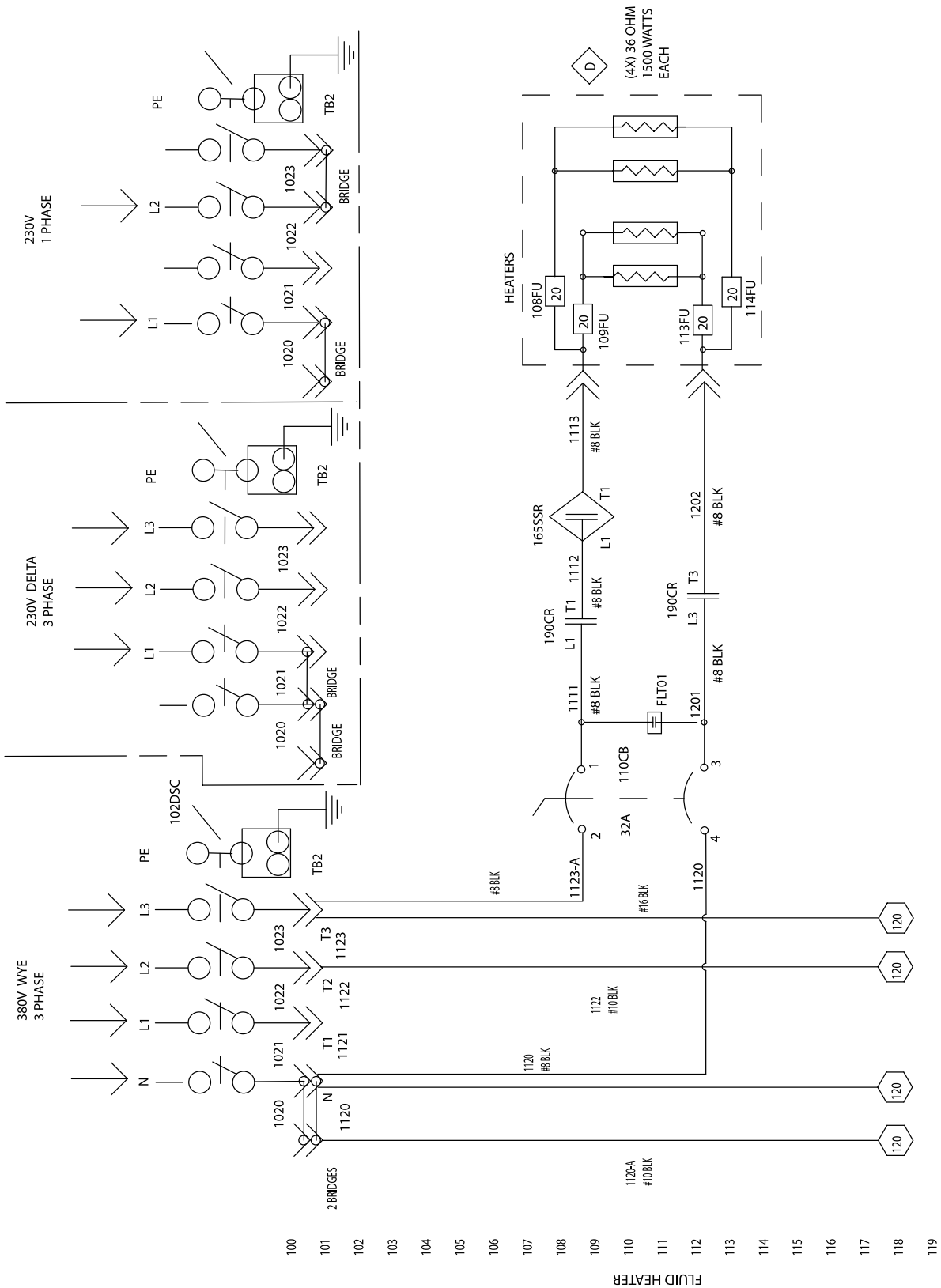
## Air Tubing Connections

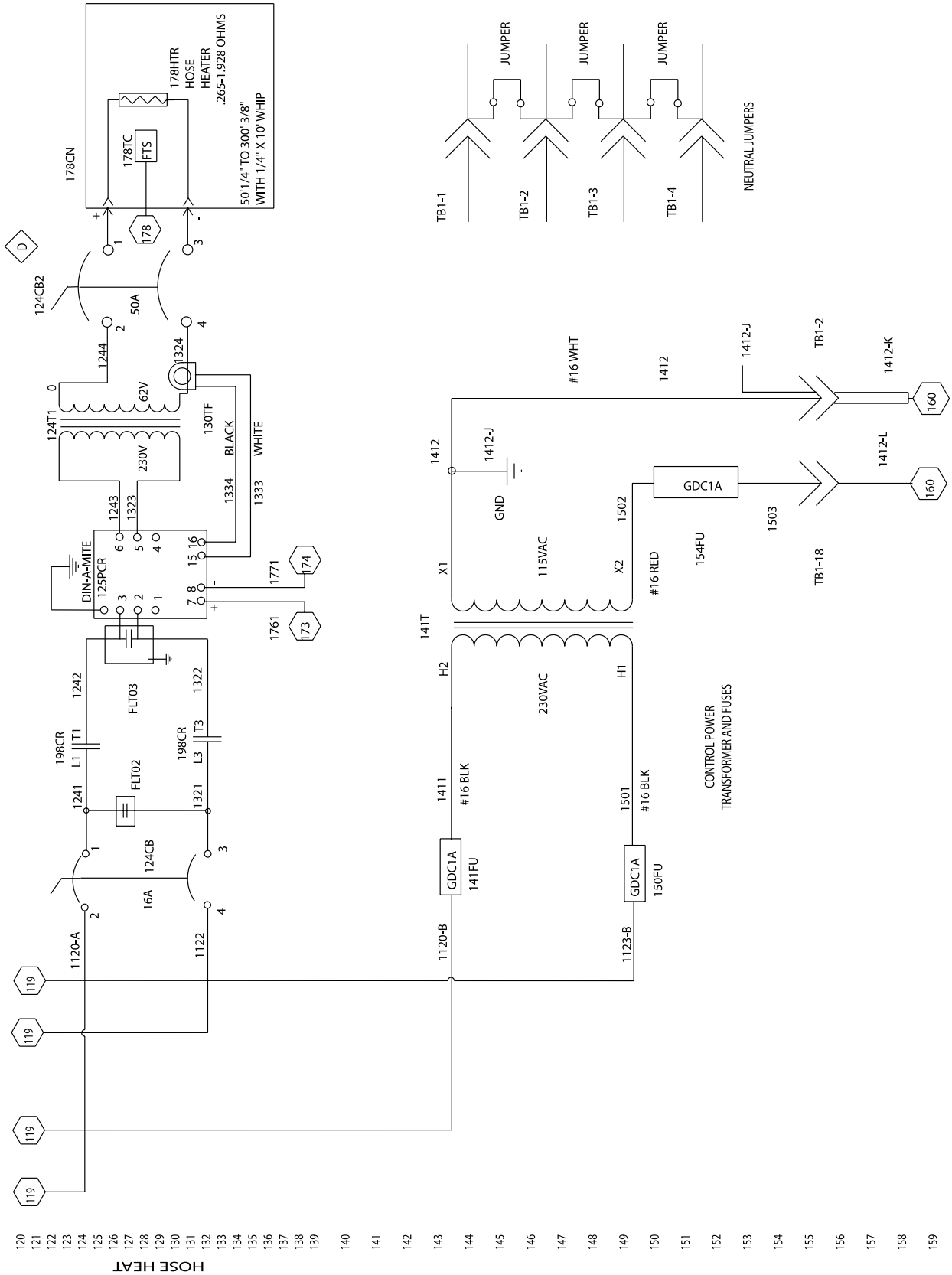
| Item | Ref. | Length in. (mm) | Connection | |
|---|---|---|---|---|
| | | | From | To |
| Y | 600 | 4.5 (114.3) | 600a | 600b |
| Y | 601 | 4.5 (114.3) | 601a | 601b |
| X | 602 | 5.0 (127) | 602a | 602b |
| Y | 603 | 7.5 (190.5) | 603a | 603b |
| X | 604 | 9.0 (228.6) | 604a | 604b |
| X | 605 | 12.0 (304.8) | 605a | 605b |
| X | 606 | 19.0 (482.6) | 606a | 606b |
| X | 607 | 14.5 (368.3) | 607a | 607b |
| X | 608 | 18.5 (469.9) | 608a | 608b |
| X | 609 | 29.0 (736.6) | 609a | 609b |
| X | 610 | 35.0 (889) | 610a | 610b |

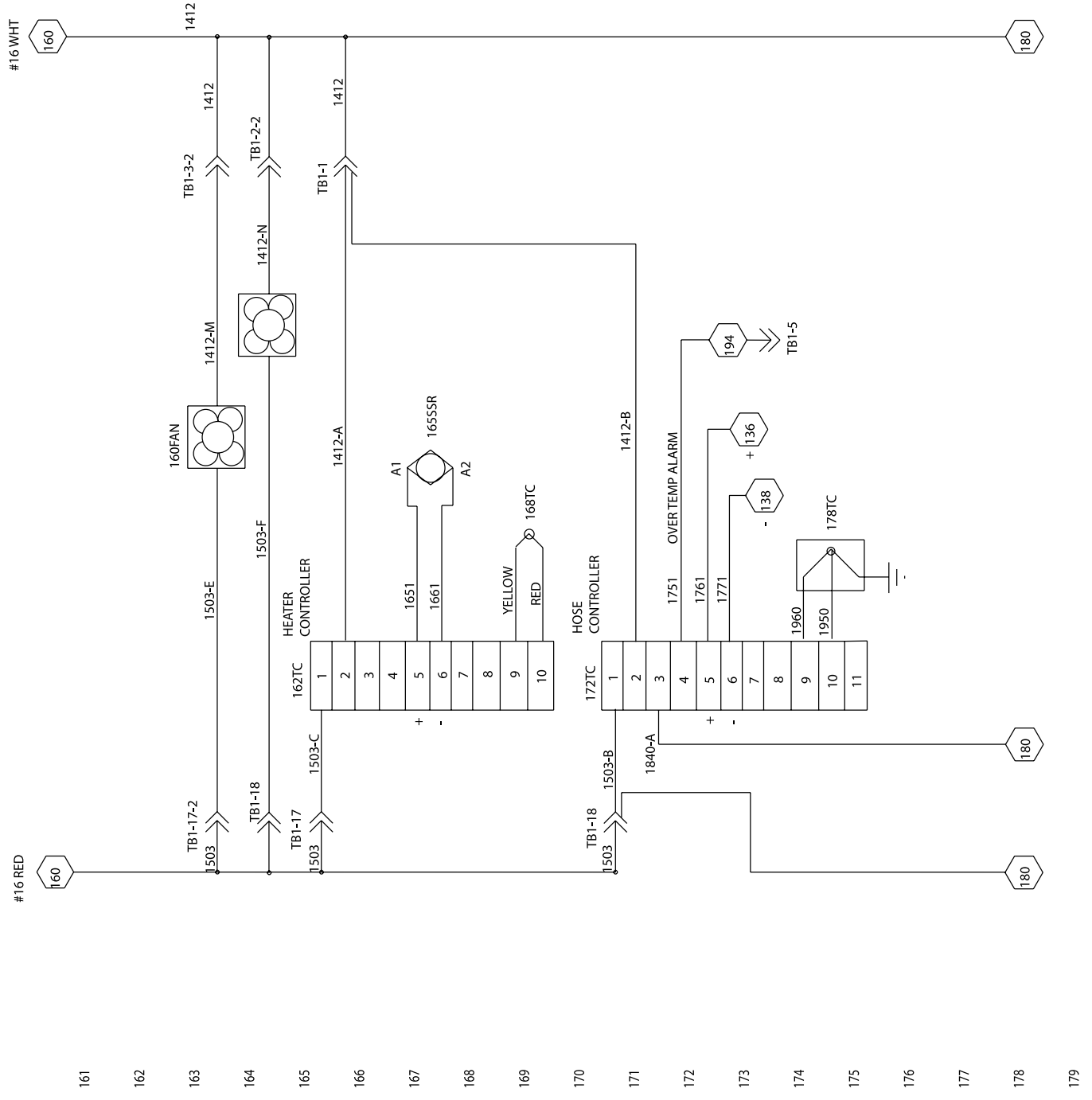
X = TUBE, 1/2 in. OD, polyurethane

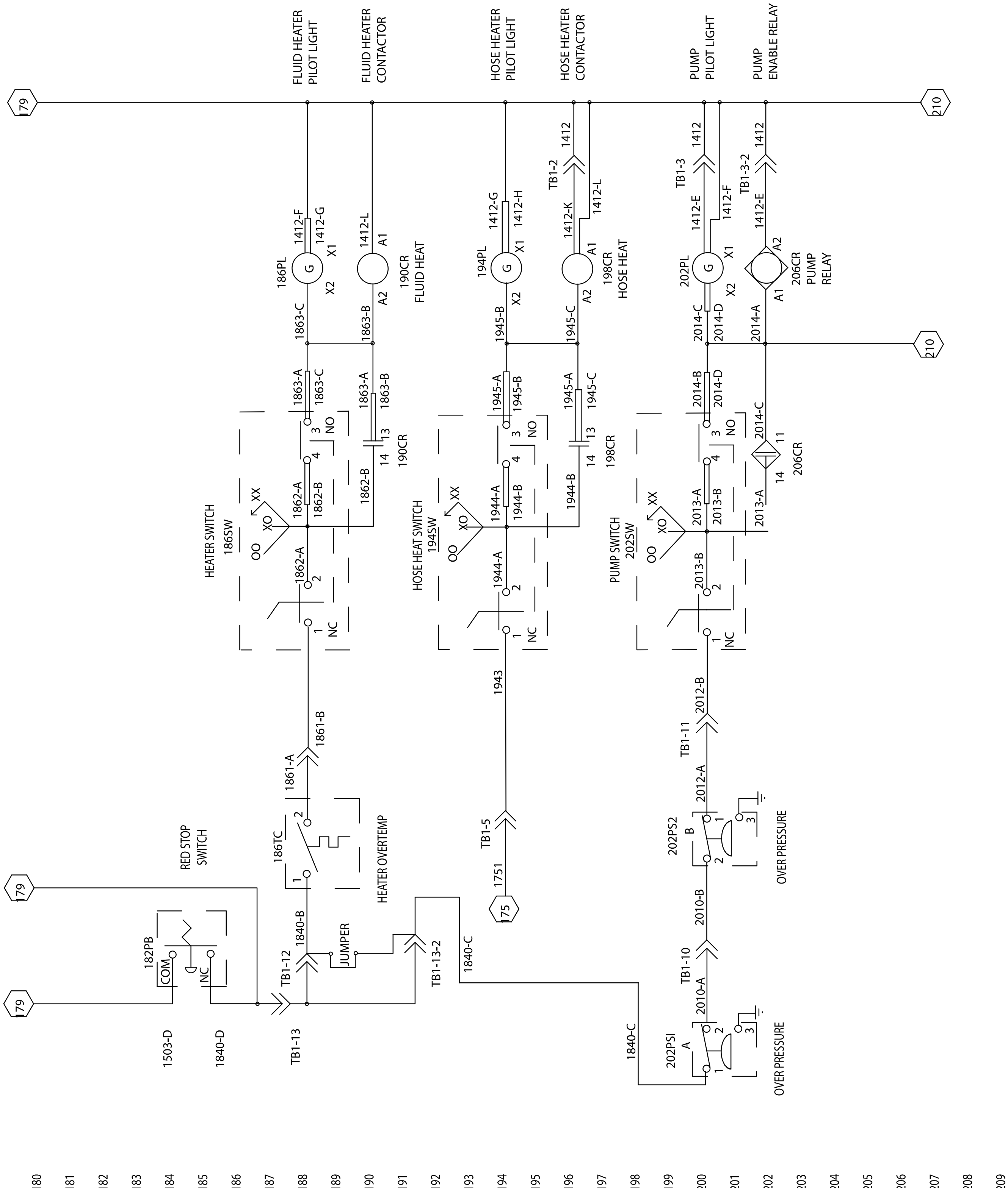
Y = TUBE, 5/32 in. OD, polyethylene

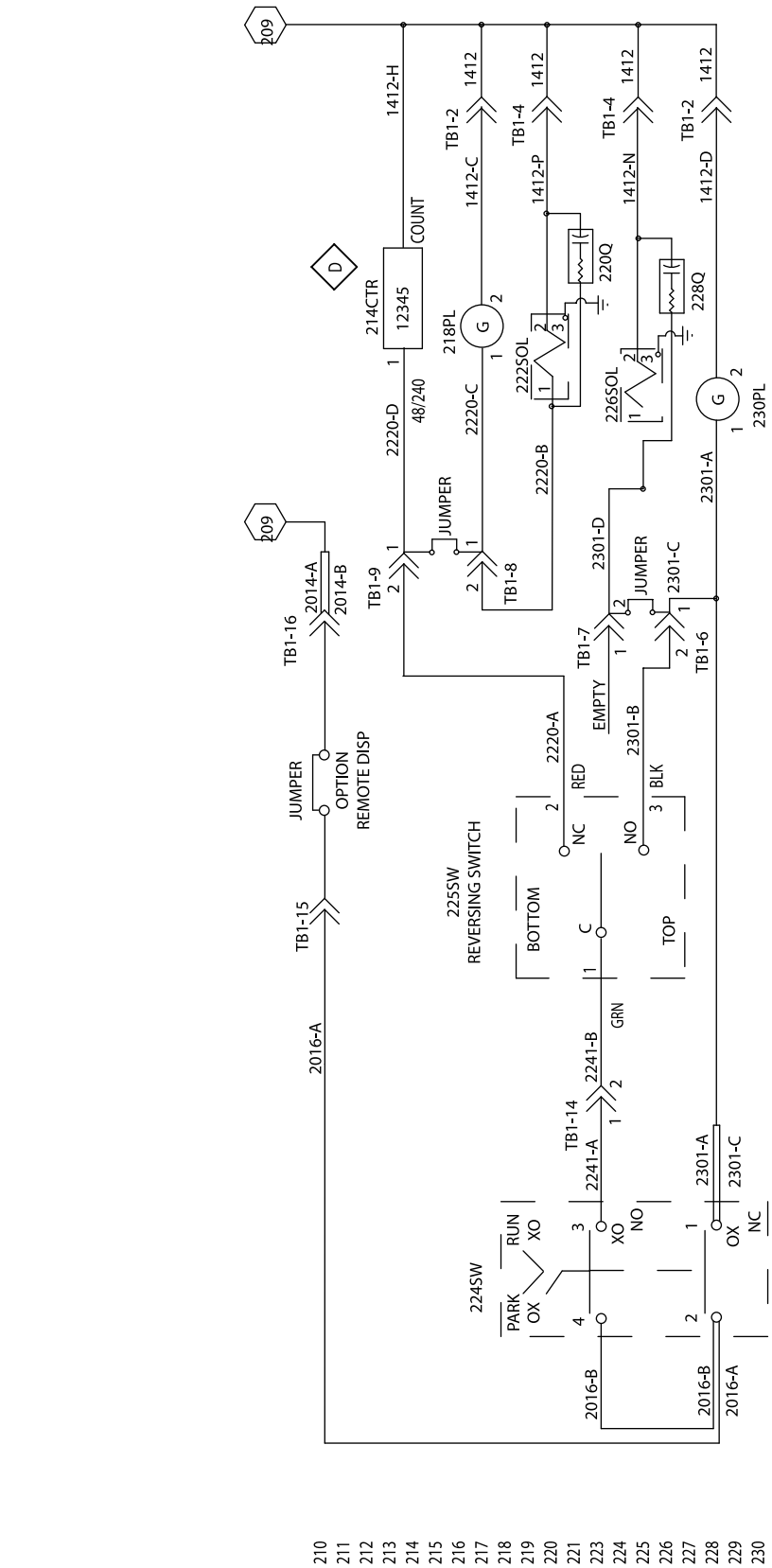
# Reactor A-20 Wiring Schematic




178CN
178HTR
HOSE
HEATER
.265-1.928 OHMS
50'1/4" TO 300' 3/8"
WITH 1/4" X 10' WHIP
178TC
FTS
178
124CB2
50A
124T1
62V
230V
130TF
BLACK
WHITE
1334
1333
1324
1244
1243
1323
DIN-A-MITE
125PCR
1771
1761
174
173
198CR
FLT03
FLT02
124CB
16A
1120-A
1122
119
1120-B
GDC1A
141FU
1411
#16 BLK
141T
H2
H1
230VAC
1501
150FU
1123-B
CONTROL POWER
TRANSFORMER AND FUSES
1412
1412-J
GND
X1
115VAC
X2
1502
#16 RED
154FU
GDC1A
1503
TB1-18
#16 WHT
1412-J
TB1-2
1412-K
160
1412-L
TB1-1
TB1-2
TB1-3
TB1-4
JUMPER
NEUTRAL JUMPERS
HOSE HEAT

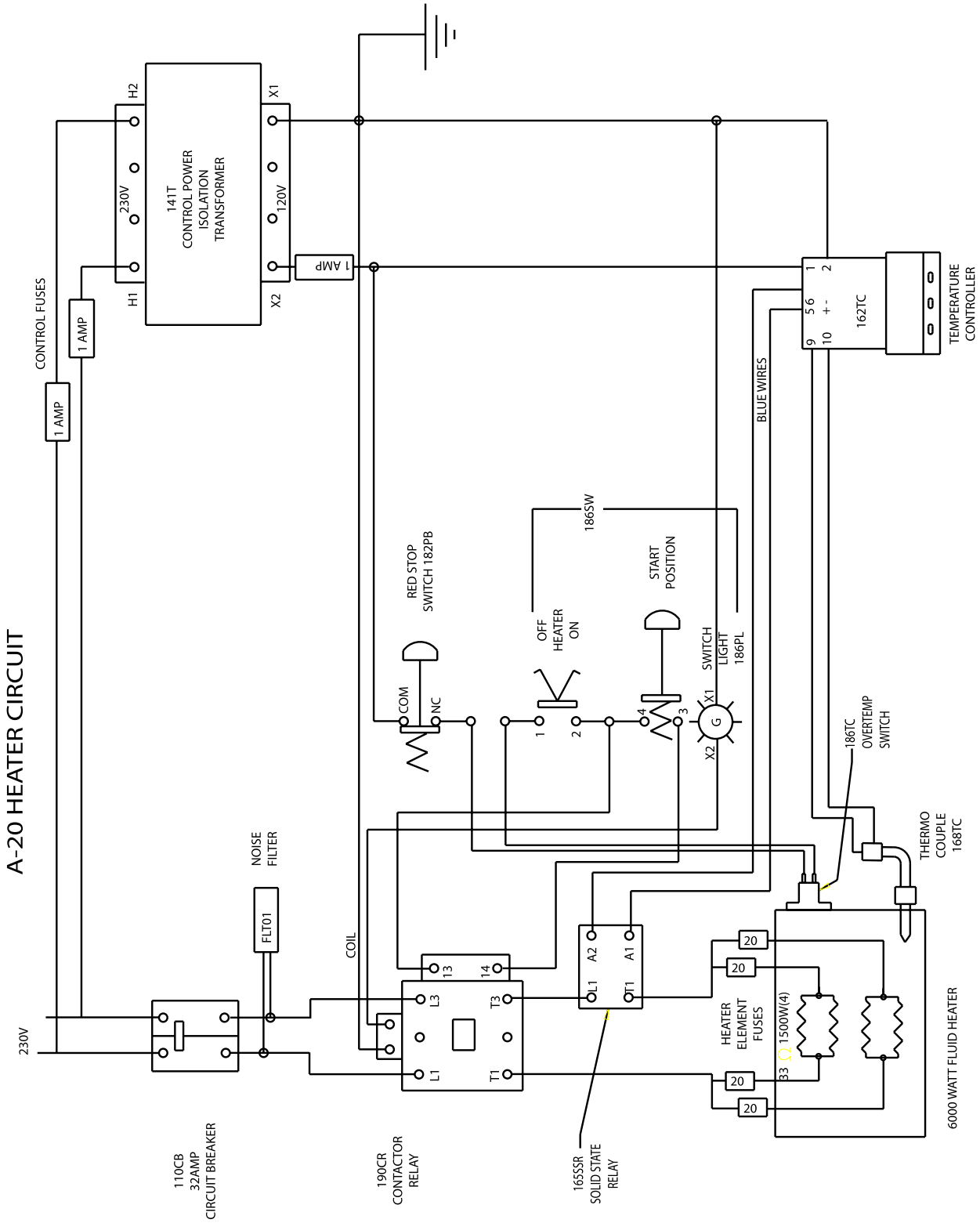

#16 WHT
160
1412
180
TB1-3-2
TB1-2-2
TB1-1
1412-N
1412-M
160FAN
1412-A
1412-B
A1
165SSR
A2
194
TB1-5
+ 136
- 138
OVER TEMP ALARM
HEATER CONTROLLER
HOSE CONTROLLER
162TC
172TC
168TC
178TC
YELLOW
RED
1651
1661
1751
1761
1771
1960
1950
1503-E
1503-F
1503-C
1503-B
1840-A
TB1-17-2
TB1-18
TB1-17
TB1-18
1503
#16 RED
160
180
161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179


FLUID HEATER PILOT LIGHT
FLUID HEATER CONTACTOR
HOSE HEATER PILOT LIGHT
HOSE HEATER CONTACTOR
PUMP PILOT LIGHT
PUMP ENABLE RELAY
190CR FLUID HEAT
198CR HOSE HEAT
206CR PUMP RELAY
HEATER SWITCH 186SW
HOSE HEAT SWITCH 194SW
PUMP SWITCH 202SW
RED STOP SWITCH
HEATER OVERTEMP
OVER PRESSURE
OVER PRESSURE

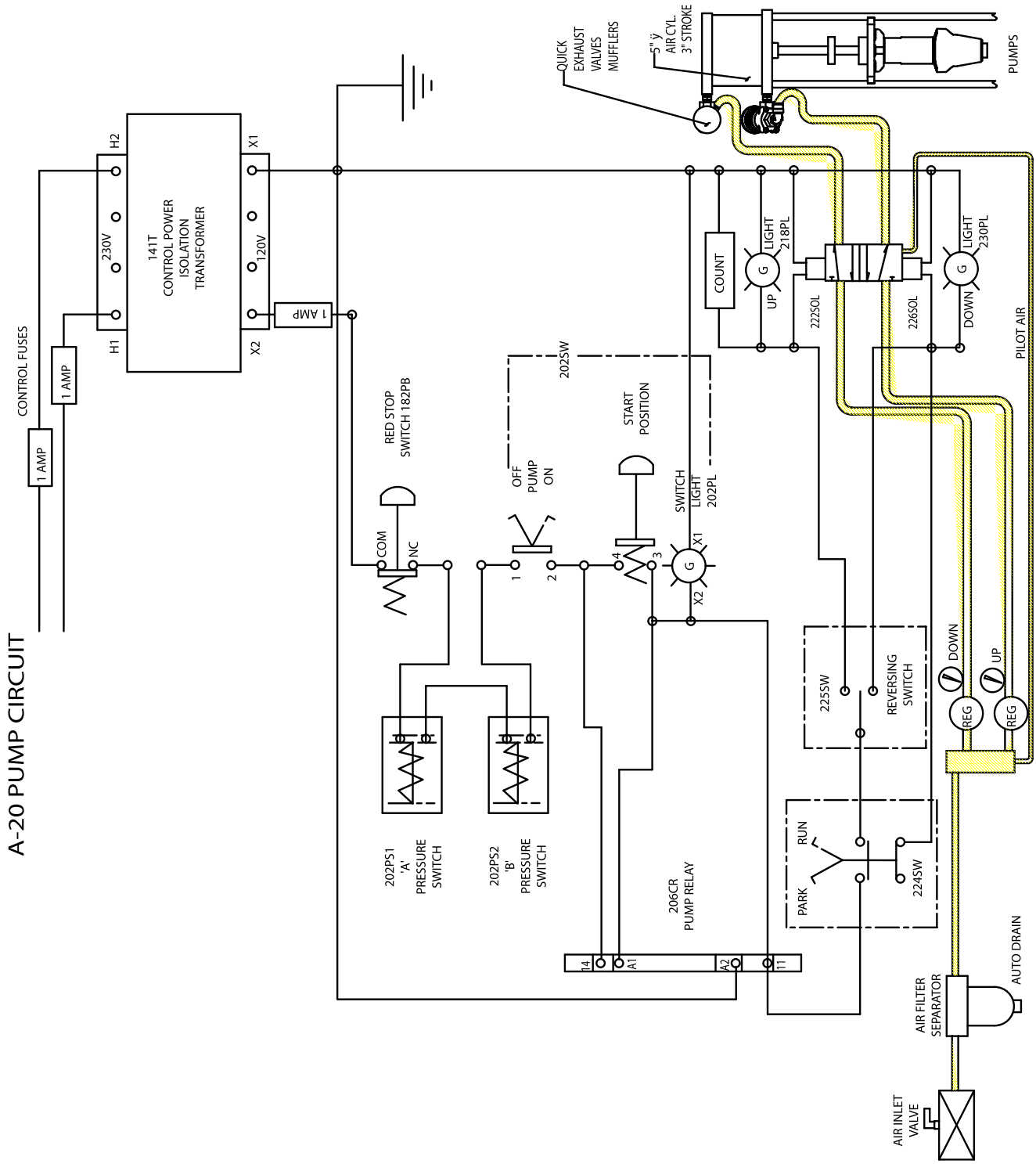

209
1412-H
1412
TB1-2
1412-C
COUNT
214CTR
12345
D
218PL
G
2220-D
48/240
2220-C
JUMPER
TB1-9
TB1-8
2220-B
222SOL
220Q
1412-P
TB1-4
1412
209
TB1-16
2014-A
2014-B
JUMPER
OPTION
REMOTE DISP
TB1-15
2016-A
2220-A
RED
NC
NO
BLK
2301-B
EMPTY
TB1-7
2301-D
JUMPER
2301-C
TB1-6
2301-A
226SOL
228Q
1412-N
1412-D
230PL
225SW
REVERSING SWITCH
BOTTOM
TOP
C
GRN
2241-B
TB1-14
2241-A
224SW
PARK
RUN
OX
XO
2016-B
2301-A
2301-C
NC

# Wiring Diagrams

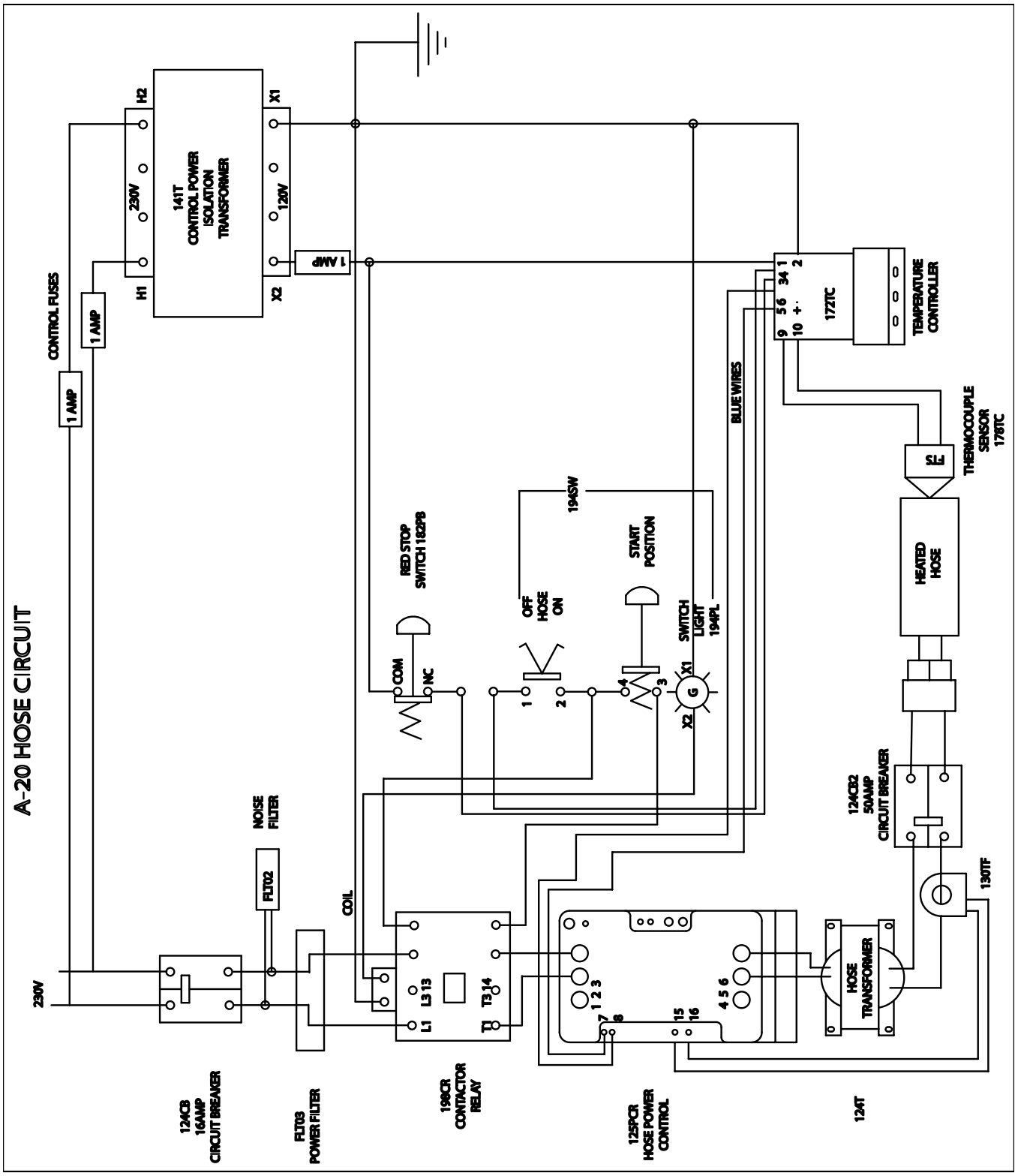
## Heater Circuit



# Pump Circuit



# Hose Circuit



# Technical Data

| Category | Data |
|---|---|
| Maximum Fluid Working Pressure | 2000 psi (14 MPa, 140 bar) |
| Maximum Air Working Pressure | 120 psi (0.84 MPa, 8.4 bar) |
| Machine Maximum Power with hose | 9000 Watts |
| Voltage Requirement (50/60 Hz)<br>(230 V Nominal: 195-253 VAC)<br>(380 V Nominal: 338-457 VAC) | 230 V, 1 Phase<br>230 V, 3 Phase (Delta)<br>380 V, 3 Phase (WYE 220 V Nominal to Neutral) |
| Amperage Requirement (Full Load Peak)* | 40 amps @ 230 V, 1 Phase<br>32 amps @ 230 V, 3 Phase<br>18.5 amps @ 380 V, 3 Phase |
| Maximum Heater Fluid Temperature | 190 °F (88 °C) |
| Maximum Hose Fluid Temperature | 180 °F (82 °C) |
| Maximum Ambient Temperature | 120 °F (49 °C) |
| Maximum Output | 20 lb/min. (9.0 kg/min.) |
| Output Per Cycle (A and B) | 0.028 gal/cycle (0.105 ltr/cycle) |
| Overpressure Relief Shutdown | 2250 psi (15.5 MPa, 155 bar) |
| Over Temperature Shutdown (Primary Heater) | 230 °F (110 °C) |
| Heater Power | 6000 Watts |
| Hose Power | 2790 Watts |
| Sound Pressure | 86.3 dB(A) at 2000 psi (14 MPa, 140 bar), 0.5 gpm (1.9 lpm) |
| Sound Power, per ISO 9614-2 | 91.6 dB(A) at 2000 psi (14 MPa, 140 bar), 0.5 gpm (1.9 lpm) |
| Viscosity Range | 250-1500 centipoise |
| Maximum Fluid Inlet Pressure | 400 psi (2.7 MPa, 27 bar) |
| Fluid Inlet/Strainer Filter | 20 mesh standard (optional - 60/40 mesh) |
| Air inlet Filter Mesh | 5 Micron |
| Component B (Resin) Inlet | 3/4 npt(f) swivel |
| Component A (Isocyanate) Inlet | 1/2 npt(f) swivel |
| Recirculation/Block Hose Connections | Iso (A) side: -5 JIC (m); Resin (B) side: -6 JIC (m) |
| Maximum Heated Hose Length | 310 ft. (95 m) 210 ft of 3/8 ID @ 12 watts/ft, 310 ft @ 9 watts/ft |
| Height | 39.5 in. (1003.3 cm) |
| Width | 27.2 in. (690.9 cm) |
| Depth | 25.0 in. (635 cm) |
| Weight | 250 lb (117.6 kg) |
| Wetted Parts | Carbon steel, stainless steel, chrome, aluminum, Fluoroelastomer, PTFE, nylon |
| Certification | CE ** |

*Full load amps with all devices operating at maximum capabilities with 210 ft (64.1 m) of hose.

** When a surge transient is applied to the power lines of the unit, heat to the hose may be interrupted and require the hose heat switch to be manually cycled.

# 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.

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# Graco Information

For the latest information about Graco products, visit www.graco.com.

***TO PLACE AN ORDER,*** contact your Graco distributor or call to identify the nearest distributor.
**Phone:** 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

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**Graco Headquarters:** Minneapolis
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