

PredatorTM Proportioner

311327D

*For spraying polyurethane foam and polyurea coatings.
Not for use in explosive atmospheres.*

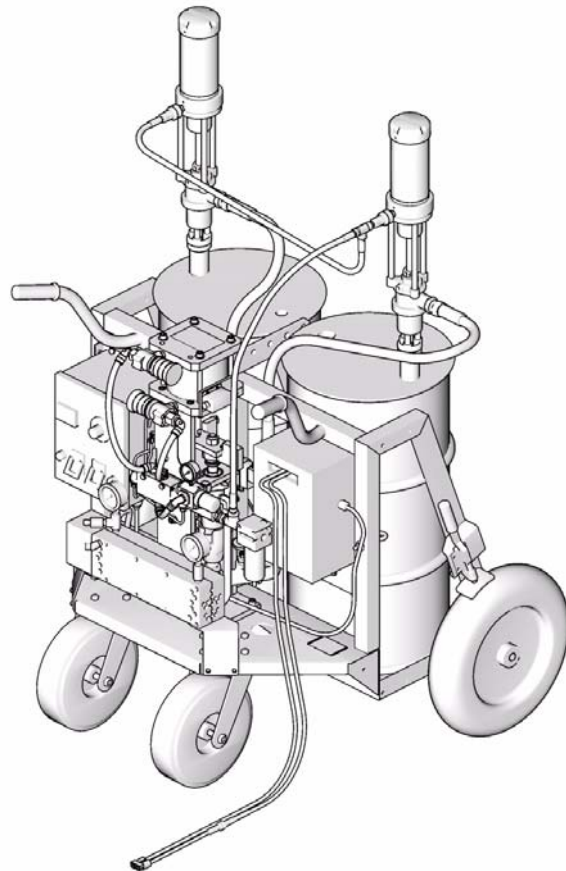
Model 288400

1600 psi (11.0 MPa, 110 bar) Maximum Working Pressure
230 V, 60 Hz; 30 Amps; 5000 Total Heater Watts



Important Safety Instructions

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



TI9514a

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Related Manuals

311326	Predator Proportioner Operation
309577	Displacement Pump Instructions and Parts



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	
	<p>ELECTRIC SHOCK HAZARD</p> <p>Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> • 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.
	<p>PERSONAL PROTECTIVE EQUIPMENT</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"> • Protective eyewear • Clothing and respirator as recommended by the fluid and solvent manufacturer • Gloves • Hearing protection
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • 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.
 	<p>SKIN INJECTION HAZARD</p> <p>High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> • 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. • Do not spray without tip guard and trigger guard installed. • Engage trigger lock when not spraying. • Follow Pressure Relief Procedure in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.

 WARNING	
	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • 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 fire extinguisher in the work area.
	<p>PRESSURIZED ALUMINUM PARTS HAZARD</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>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • 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 Graco (ASM) replacement parts only. • Do not alter or modify equipment. • Use equipment only for its intended purpose. Call your Graco 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.
	<p>MOVING PARTS HAZARD</p> <p>Moving parts can pinch or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> • 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.
	<p>BURN HAZARD</p> <p>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.</p>

Before Beginning Repair





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

Flushing

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

- Flush out fluid with new fluid, or flush out old fluid with a compatible solvent before introducing new fluid.
- Use lowest possible pressure when flushing.
- To flush entire system, circulate through gun fluid manifold (with manifold removed from gun).
- Always leave some type of fluid in system. Do not use water.

Pressure Relief Procedure

						
<p>Trapped air can cause the pump to cycle unexpectedly, which could result in serious injury from splashing or moving parts.</p>						

1. Select Park on Pump Control Switch.
2. Turn off feed pumps.
3. Trigger gun to relieve pressure.
4. Close gun inlet valves.
5. Close fluid supply inlet valves.
6. Service spray gun. See corresponding spray gun manual.

Troubleshooting

Primary Heating System



Before performing any troubleshooting procedures:

1. Relieve pressure, page 5.
2. Turn OFF red main power disconnect.
3. Allow equipment to cool.

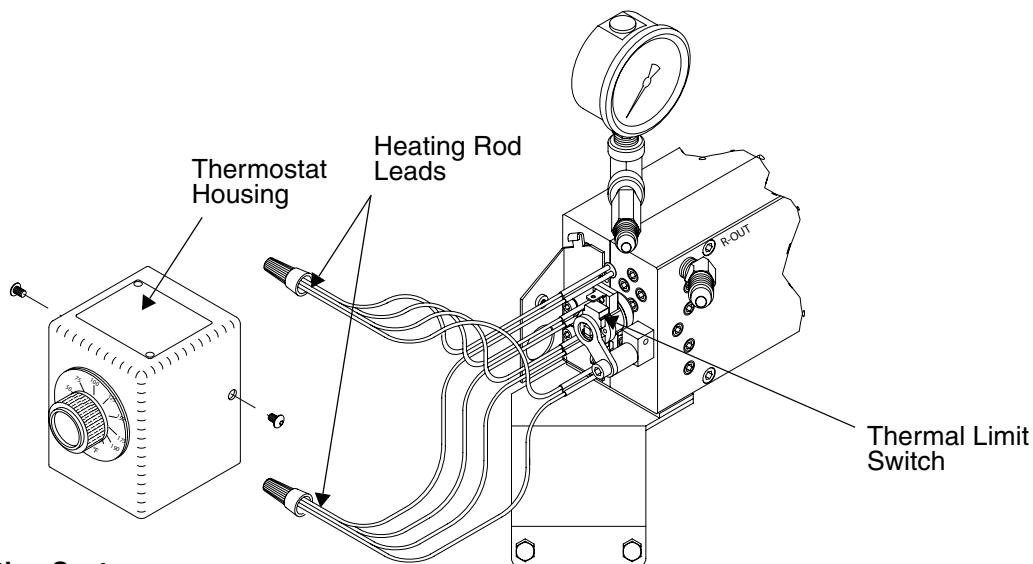


FIG. 1: Primary Heating System

(For complete **Electrical Schematic**, see page 27)

Problems

Try the recommended solutions in the order given for each problem to avoid unnecessary repairs. Also, determine that all circuit breakers, switches, and controls are properly set and wiring is correct before assuming there is a problem.

Problem	Solution
No heat, amber pilot light does not cycle on.	1
Partial heat, amber pilot light on continuously	2

Solutions

1. The **Thermostat** or **Thermal Limit Switch** is not functioning properly.
 - a. **Thermostat Check** - The amber pilot light will only be on when the temperature of the primary

heater is below the temperature setting of the thermostat. Turn the thermostat up (clockwise) to check the operation of the heater and then reset to the desired setting. If this does not solve the problem, continue to Step b.

- b. **Thermal Limit Switch.** When moving the unit, it is possible that the thermal limit switch may trip in transit. If this happens, reset the limit switch and monitor the operation of the heater to ensure the switch has not tripped as a result of a heater malfunction.

To reset the Thermal Limit Switch:

- 1b. Turn OFF the main switch and primary heater circuit breaker.
2. Turn OFF and lock out power at the source.

3. Remove the thermostat housing by removing the two mounting screws and carefully pulling the housing away from the heater.
4. Push in the red reset button on the switch.
5. If the Thermal Limit Switch does not feel as though it reset, then disconnect one lead from the Thermal Limit Switch and read continuity across the switch with an ohmmeter. If there is no continuity, the switch is defective and must be replaced.
6. If this does not solve the problem, replace the thermostat.
7. Move the thermostat housing back into place and install the two mounting screws.
8. Switch on the electrical power and monitor the operation of the primary heater to ensure it is functioning properly.
9. **Heating Rods** - The primary heater contains four 1250-watt (38.7 ohms each) heating rods wired in parallel.

To check that all rods are operational, proceed as follows:

- a. Turn OFF all switches and lock out incoming power at the source.
- b. Remove the thermostat housing by removing the two mounting screws and carefully pulling the housing away from the heater.
- c. Remove the heating rod wire nuts. Separate the heating rod leads from the wire harness and read the resistance across the four heating rods with an ohmmeter. The combined resistance should be 9.6 ohms. A higher resistance indicates that at least one of the rods is not working. If this is the case, proceed to Step d.
- d. Disconnect the heating rods and measure the resistance of each rod. Each rod should measure 38.7 ohms.
- e. Reconnect the heating rods and recheck the resistance.
- f. Move the thermostat housing back into place and install the two mounting screws.

- g. Switch on the electrical power and monitor the operation of the primary heater to ensure it is functioning properly.

The design of the primary heater allows it to maximize the heat transfer from the power available. However, under certain conditions, reducing the flow rate is necessary when the heater is not available to reach the required temperature.

Proportioning System



Problems

Try the recommended solutions in the order given for each problem to avoid unnecessary repairs. Also, determine that all circuit breakers, switches, and controls are properly set and wiring is correct before assuming there is a problem.

Problem	Solution
Proportioning pump does not hold pressure when installed.	1
Proportioning pump does not build pressure on the upstroke.	1,6
Pressure imbalance between pumps.	2,3,1
Cavitation in the proportioning pump.	2,3,1
Pump movement is erratic.	5,6
Failure of pump to reverse.	4,5,6

Solutions

- Leaking Ball Check Valve** - Determine which inlet ball check valve or piston ball check valve is leaking. If the pump (A or R) is losing pressure on the upstroke, check the piston ball check valve of the respective pump. If the pump is losing pressure on the downstroke, check the inlet ball check valve of the respective pump. To repair, see manual 309577.
- Pressure/Chemical Imbalance** - To troubleshoot this problem, first determine the following two points:

First - Which chemical did not exit the mixing chamber?

Determine the first point by checking the color of the material exiting the gun. Since two-component foam systems are usually a combination of light and dark material, the missing or under-proportioned material can be readily determined in most cases.

Second - Why did the chemical fail to get there?

The second point is due to a restriction in the gun or because the proportioning pump did not function properly in pumping its designed volume. This is determined by checking the chemical pressure

gauges on the unit. Focus on the pressure gauge corresponding to the missing chemical.

After determining the missing or under-proportioned material, observe the chemical pressure gauges on the problem side of the unit to see if the malfunction is due to a restriction at the gun or a lack of material produced by the pump. To prevent misinterpretation, focus on the pressure gauge corresponding to the missing chemical.

For example: Assume that the R-component is not reaching the mixing chamber. Spray off target and note the resin pressure gauge; if the resin gauge is considerably higher than the isocyanate gauge, the problem is within the gun. Refer to the gun manual to resolve the problem. If the resin gauge is considerably lower than the isocyanate gauge, see Solution 3.

- Cavitation** - Formation of a partial vacuum or void created within the pump cylinder during the fill stroke. It is actually a "short fill", since the fill chamber is not completely full of chemical when the pump reverses to start the discharge stroke. Cavitation occurs when the proportioning pump demands a greater volume of material during its fill stroke than the supply system can deliver.

The most common causes of cavitation are as follows:

- The transfer pump cannot handle the supply requirement or is malfunctioning. The Graco-Gusmer 2:1 transfer pump is recommended for use with the unit. Also recommended is a minimum of 3/4 in. diameter hose, as short as possible.
- The chemical is too viscous to pump properly. Consult your chemical supplier for the recommended material temperature required to maintain a viscosity of 250 to 1500 centipose.
- Inlet strainer screen is restricted. Service as required.
- An inlet ball check and/or seat o-ring that does not properly seal will permit some of the proportioned material to flow back towards the supply drum. When this happens, the proportioning pump will not pump the proper volume of material during the discharge stroke

and an off-ratio condition will result. This malfunction will appear almost identical to cavitation, but somewhat less severe.

4. **Pilot Valves** - Check each valve for proper operation. If either valve is defective or damaged, replace both valves.
5. **Damaged Piston Packing** - Check piston packing set for mars or scoring. Replace piston packing set if damaged.
6. **Air Motor Assembly** - Check air motor cylinder and lubricate if necessary. Also, check o-rings and seals for wear and/or damage. Replace if necessary.

Hose Heat System



Problems

To avoid unnecessary repairs, try the recommended solutions in the order given for each problem. Before assuming there is a problem, determine that all circuit breakers, switches, and controls are properly set.

Problem	Solution
Hose warm but does not reach temperature or takes too long to reach temperature.	1,2,5,6,7
Hose does not heat; Light on.	2,3,4,7
Hose Heat Circuit Breaker trips or fuse blows.	2
Hose temperature not maintained during flow.	1,2,5,6,7
Hose or hoses adjacent to the unit are warm - hoses downstream are cold.	4

Solutions


1. **Hose Length** - The hose heat system of the Predator is designed to maintain the chemical temperature developed by the primary heaters with up to 310 feet of hose. (Hose lengths greater than this require the use of an auxiliary hose heat system. Call Graco-Gusmer for details). In addition, if ambient temperature is too cold, the hose circuit may not have enough power to maintain the chemical temperature.
2. **Hose Heater Power Control** - Ensure that the power control is adjusted until the ammeter reads 15 amps (do not exceed 15 amps).
3. **Hose Heat Fuse** - With the main power OFF and locked out at the source, remove the fuse and check it for continuity or simply replace it with a new one.



Replace the fuse with one of the same rating. A substitute may damage the equipment and would create a potential source of injury to the operator.

4. **Hose Heating Element** - With the hose heat circuit breaker OFF, check to see that the Power-Lock connectors on the hoses and all electrical connections between the hoses and unit are tight. If these connections are secure and hose heat is not present, perform a systematic search for the electrical fault. To search for the electrical fault, proceed as follows:
 - a. With the hose heat circuit breaker OFF and the power control turned fully counterclockwise, starting at the gun whip, unplug the Power-Lock connectors and plug the hose troubleshooting jumper plug (included with accessory package) into the last "upstream" segment of hose.
 - b. Turn ON the hose heat circuit breaker and turn the hose heater power control (clockwise) until the ammeter reads 15 amps. If hose heat is restored, then the fault is within the gun whip.

If hose heat is not restored, turn the hose heater power control fully counterclockwise, then turn OFF the hose heat circuit breaker and the main power disconnect and proceed with the steps below:

						
<p>The hose heat transformer voltage must be set to match the hose length in use. Too much power will cause the hose heat circuit fuse to fail. Too little power will result in insufficient hose heating.</p>						

- c. Adjust the tap setting of the hose heat transformer to match the next shortest length of heated hose (see Hose Heat Power Pack on page 24).
- d. Unplug the next set of Power-Lock connectors and plug the hose jumper plug into the last "upstream" segment of hose.
- e. Restore electrical power, switch ON the hose heat circuit and adjust the hose heater power control to 15 amps.

If hose heat is restored, then the fault is within the last unplugged segment of hose.

If hose heat is not restored, turn the hose heater power control fully counterclockwise, then turn OFF the hose heat circuit breaker and the main power disconnect and repeat Steps c through e until the fault is located.



5. **Primary Heat and Hose Heat Temperature Setting** - The purpose of the hose heater is not to add heat but rather to maintain the temperature developed by the primary heater. If indications are that the hose heater is not maintaining temperature during flow, check that the primary heater and hose are set for the same temperature or reduce the output.
6. **Low Line Voltage** - The hose heat system operates at 220 Volts. Low line voltage will significantly reduce power available and the heater will not perform to its full capability at maximum hose length. A qualified electrician should determine the secondary amperage of the hose heat circuit and adjust the tap setting as required to achieve a secondary amperage of 45-50 amps.
7. **Hose Heat Transformer Tap Setting** - The transformer voltage is adjustable to accommodate between 35 ft and 310 ft of hose. Ensure that the proper tap setting is selected for the hose length in use. (See Hose Heat Power Pack on page 24).


Repair

Proportioning Pumps

When the proportioning pumps are functioning properly, it is not unusual for a trace amount of resin or isocyanate chemical to seep past the pump packing onto the pump shaft. Maintain proper packing adjustment to minimize seepage. Routinely inspect the shaft and wipe away any residue when the unit is turned off. Disassemble and clean both proportioning pumps annually. Inspect the pistons and cylinders for marks or scratches, which may cause leakage or damage to packings. As a preventative maintenance precaution, it is recommended that the piston and cylinder packings be replaced during the annual cleaning. (Refer to page 16 of the **Parts** section for reference.)

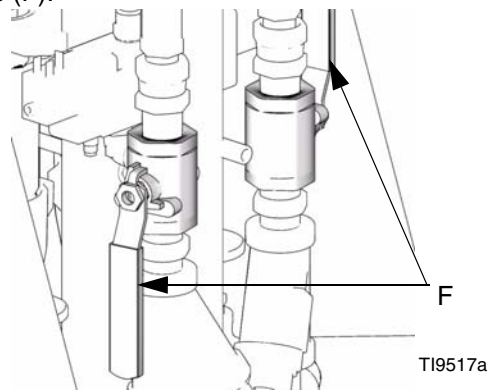
Pump Removal

						
<p>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.</p>						

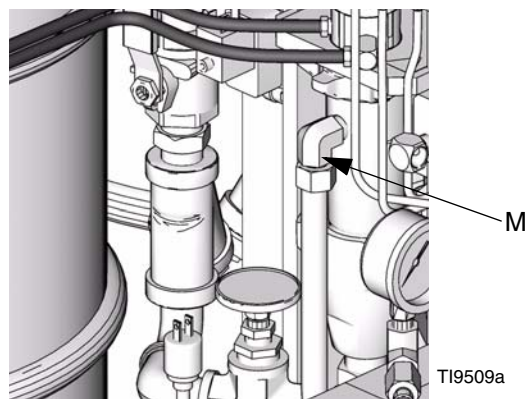
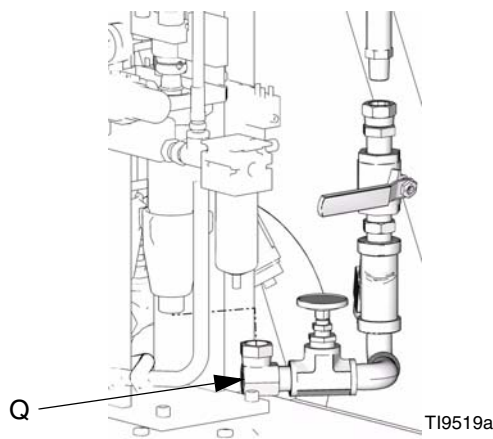
 See manual 309577 for pump repair instructions.

1. Shut off Primary Heater Switch and Hose Heater Switch.
2. Perform **Pressure Relief Procedure**, page 5.
3. Perform **Flushing**, page 5.
4. Turn Main Disconnect Switch OFF and disconnect power supply.

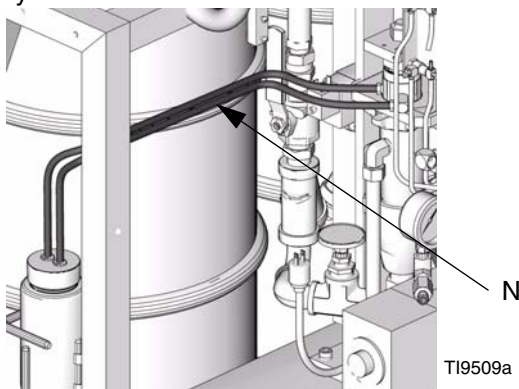
5. Shut off both feed pumps and close both inlet supply valves (F).



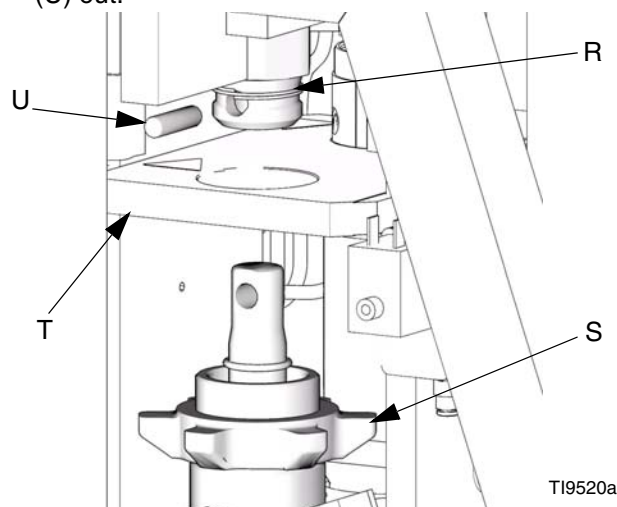
6. Shut off air supply.
7. Disconnect fitting at inlet (Q) and outlet (M).



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



9. Push retaining wire clip (R) up. Push retaining pin (U) out.

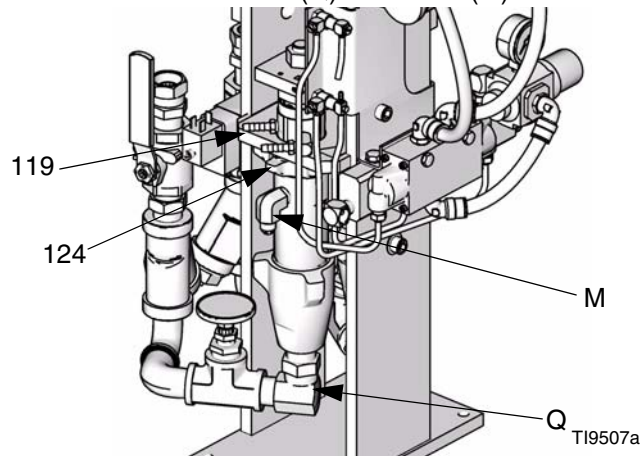


10. Loosen locknut (S) by hitting firmly with a non-sparking hammer.
11. Unscrew pump out of pump mounting plate (T).

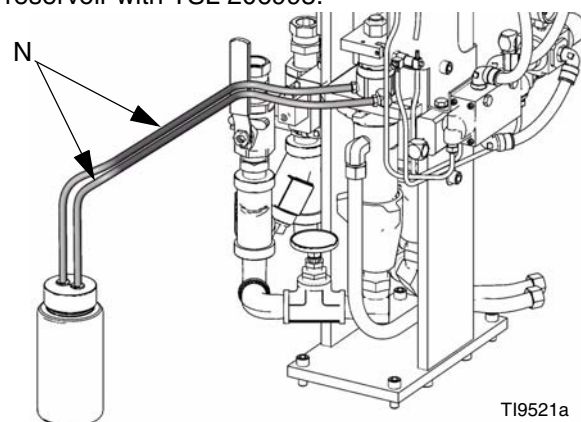
Pump Installation

1. Ensure locknut (124) is screwed on pump with flat side up. Grease pump mounting threads in mounting plate (119) with lithium grease. Screw pump into pump mounting plate 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 (137) in. Pull retaining wire down to cover pin ends.

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




4. Tighten locknut (124) 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.

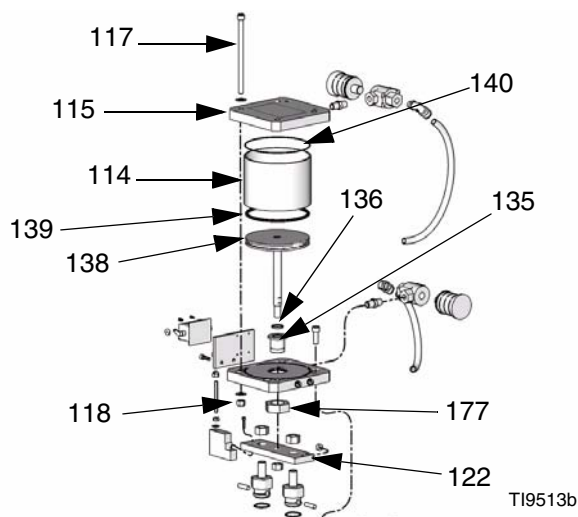
Air Motor

See **Air Motor Assembly** on page 20.

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

1. Raise retaining spring (141) and knock retaining pins (137) out of pump rod slots. Leave yoke (122) and link (121) in place.
2. Press in tube fitting ferrules and pull out tubing to disconnect air lines.

- Remove four bolts (117) to remove entire air motor assembly.



- Remove lock nut (118) from piston rod (138) and remove pump yoke (122).
- Remove four lock nuts (118), washers (116), and tie-rod bolts (117).
- Lift top plate (115) and remove from air cylinder (114).
- Push piston rod assembly out of air cylinder and replace piston o-ring (139) and lubricate.
- Remove nut (177). Replace bottom plate bearing (135), u-cup seal (136), and lubricate. Ensure the open end of the u-cup seal faces up.
- Replace top and bottom o-rings (140) in plates. Use lubricant to hold in place.
- Assemble in reverse order.
- Torque tie rod bolts in small increments evenly to 17-22 in-lbs (3*4 Nm).

Primary Heater

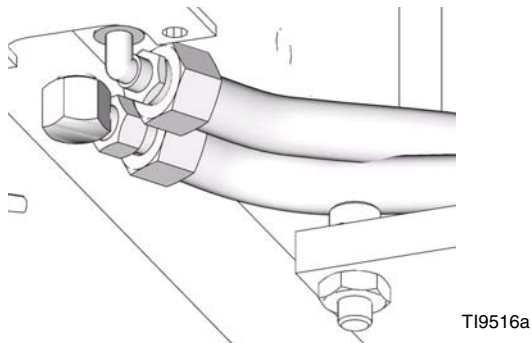
Read Warnings on page 3. Wait for heater to cool before repairing.						

- Turn Main Disconnect Switch OFF.
- Perform **Pressure Relief Procedure**, page 5.
- Wait for heater to cool.

- Perform **Flushing**, page 5.

Removal

- Disconnect two fluid lines at bottom of heater.
- Disconnect upper fluid hose from fittings.
- Remove two side screws from thermostat cover.



- Disconnect two main power leads from wire harness.
- Remove four screws underneath heater. Retain four thermal barrier spacers for later installation.
- Pull heater assembly out and remove from unit.

Service

See **Parts** on page 16 for servicing.

Installation

Reconnect and install primary heater in reverse order of removal steps.

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 Predator Proportioner Operation manual (311326).



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**, page 5.
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 out of strainer. Clean or replace. See **Accessories**, page 15, for alternate mesh size.
6. Thoroughly clean screen gasket and material inside strainer.
7. Position scree on should 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.

Change lubricant as follows:

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

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

Accessories

260652 Predator Material Supply Kit

Pumps, hoses, and mounting hardware to supply fluids to unit.

246483 Air Supply Kit

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

255057 Air Motor Seal Kit

Includes piston rod seal and bearing. Also includes piston and cylinder o-rings.

TSL (Throat Seal Liquid)

Part Description

206995 1 qt. (1 liter) bottle
206996 1 gal. (3.8 liter) container

Heated Hoses

Hoses are available in 50 ft (15.2 m) and 25 ft (7.6 m) lengths with a 1/4 in. (6 mm), 3/8 in. (10 mm), or 1/2 in. (13 mm) diameter. Hoses are also available maximum fluid pressures of 2000 psi (14 MPa, 140 bar) or 3500 psi (24 MPa, 241 bar). See manual 309572.

Heated Whip Hoses

Hoses are available in 10 ft (3 m) length with a 1/4 in. (6 mm) or 3/8 in. (10 mm) diameter. Hoses are also available maximum fluid pressures of 2000 psi (14 MPa, 140 bar) or 3500 psi (24 MPa, 241 bar). See manual 309572.

Fusion Spray Gun

Air purge gun available in round or flat spray pattern; see manual 309550. Mechanical purge gun available in round or flat spray pattern; see manual 309856.

Y-Strainer Screen

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

Part Description

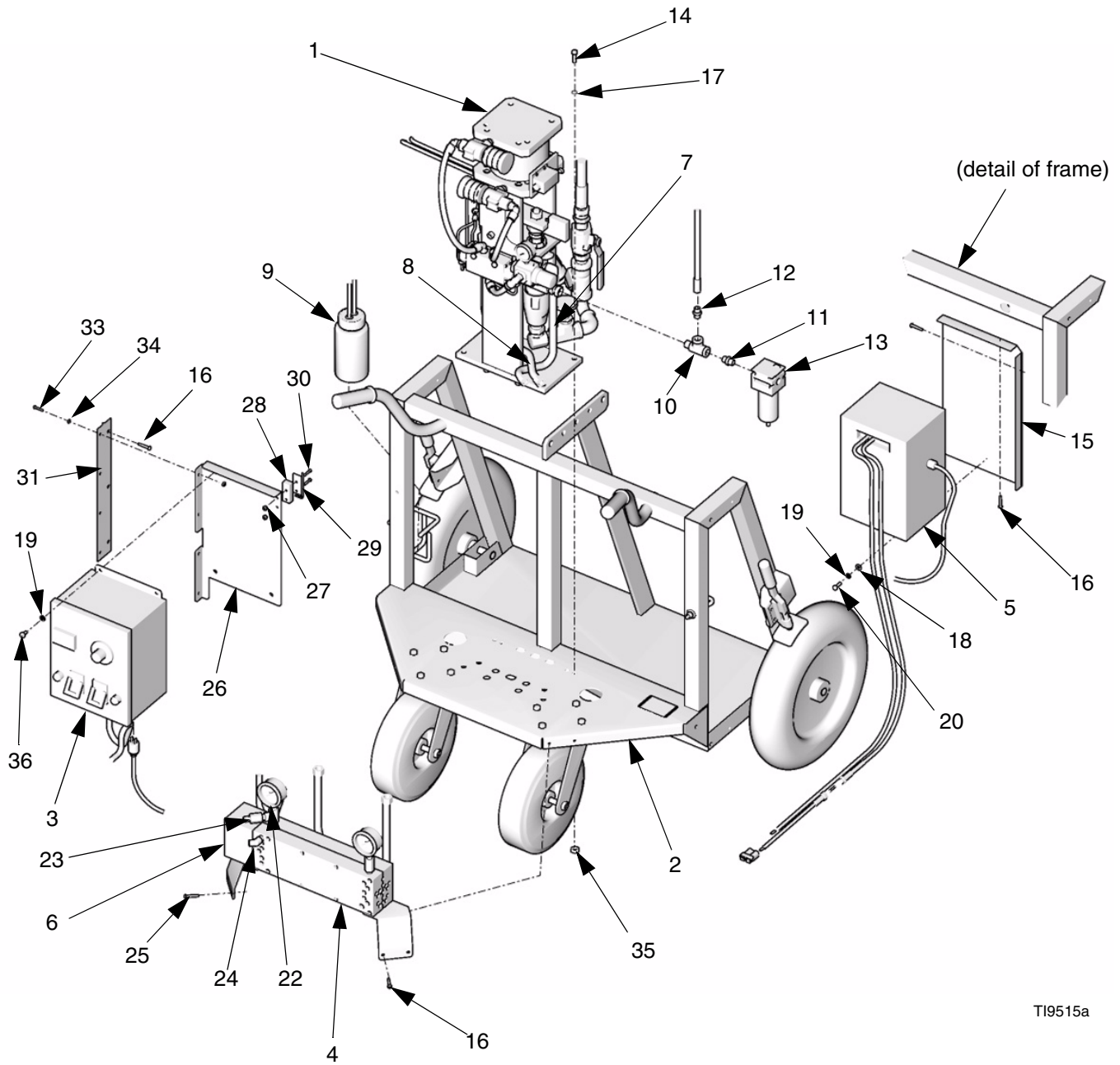
180199 20 mesh; as shipped
255082 80 mesh (2 pack)
255083 80 mesh (10 pack)

Recommended Spare Parts

Keep the following spare parts on hand to reduce downtime.

Part	Description
245971	PUMP, resin (B) side
246421	KIT, repair, pump, resin (B), 245971
246831	PUMP, iso (A) side
15C851	KIT, repair, pump, iso (A), 246831
246963	KIT, wet cup for pump 246831
206995	FLUID, TSL, 1 qt
101078	STRAINER, Y, 20 mesh
180199	FILTER, y-strainer, 20 mesh
114228	ELEMENT, air filter, 5 micron
255057	KIT, seal, air motor
108636	MUFFLER, 2 pack

Parts



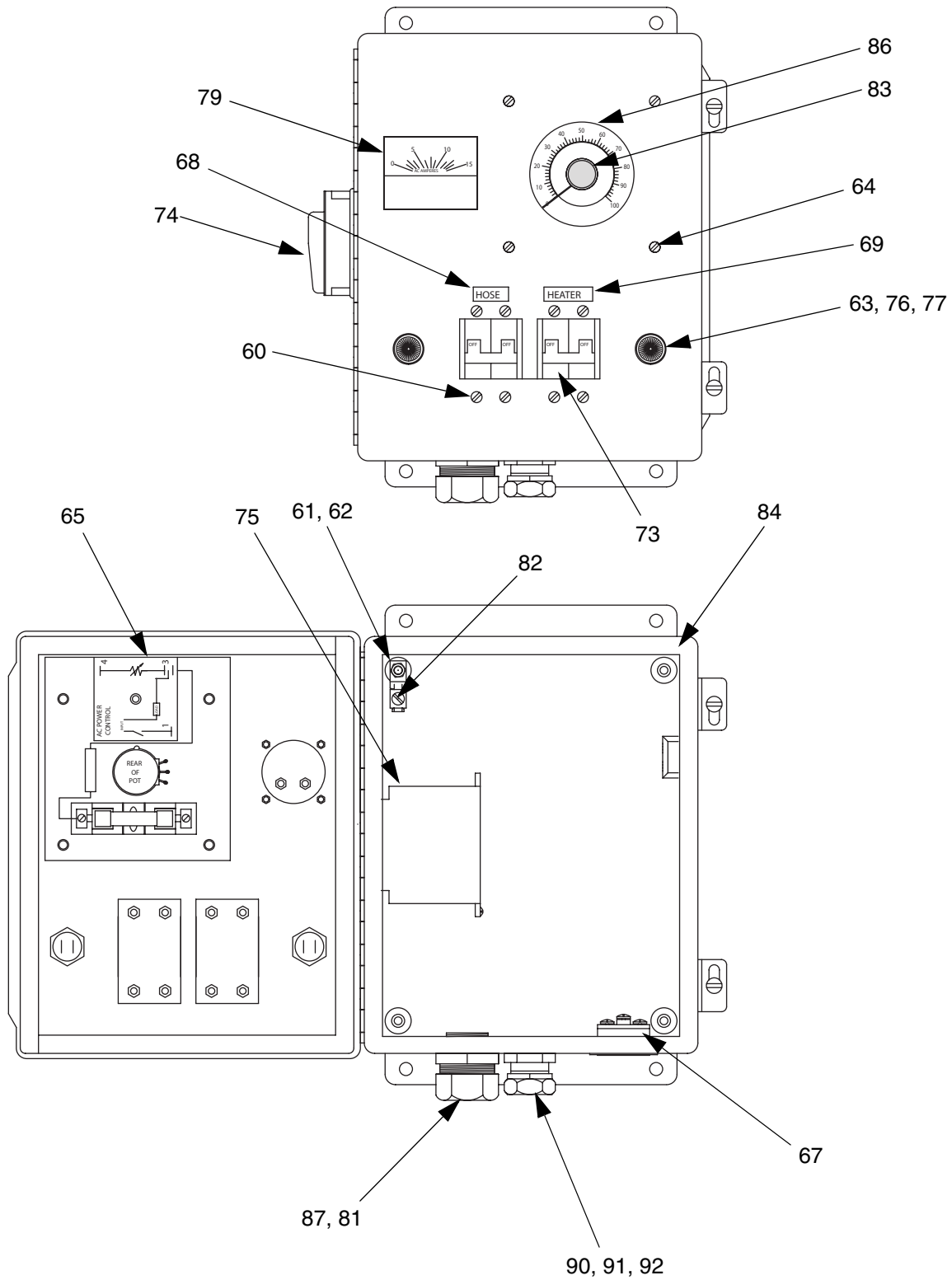
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Parts - Main Assembly

Ref.	Part	Description	Qty.	Ref.	Part	Description	Qty.
1	256508	PUMP, air motor, kit	1	22	296171	GAUGE, pressure, 0-3000 psi	2
2	297647	CART, mobile	1	23	297637	CAP PLUG, 1/2 in. JIC	1
3	297519	CONSOLE, electrical	1	24	297638	CAP PLUG, 9/16 in. JIC	1
4	297528	HEATER, primary	1	25	297639	SCREW, cap, button head	2
5	297652	POWER SUPPLY, 70 V	1	26	297508	PLATE, control	1
6	297485	THERMOSTAT	1	27	C19158	SCREW, mach, slotted round hd	2
7	15J759	HOSE, pump, 14.5 in.	1	28	297547	SHIM	1
8	15J760	HOSE, pump, iso	1	29	297642	HINGE, spring, left	1
9	246995	BOTTLE, assy	1	30	109466	NUT, lock, hex	2
10	803088	FITTING, tee, street	1	31	297548	HINGE	1
11	297436	FITTING, straight, nipple, hex	1	32	C19293	NUT, hex, machine	4
12	297591	FITTING, straight, nipple	1	33	297640	SCREW, cap, button head	4
13	297452	FILTER, air	1	34	100718	WASHER	4
14	100004	SCREW, cap, hex hd	4	35	100340	NUT	4
15	297509	PLATE, transformer	1	36	100333	SCREW, cap, hex hd	4
16	297582	SCREW, hex washer	11	52	309577	MANUAL, instruction	1
17	106115	WASHER, lock (hi-collar)	4				
18	100086	WASHER, plain	1				
19	100016	WASHER, lock	5				
20	100022	SCREW, cap, hex hd	1				
21*	297546	LABEL, thermal switch	2				

* Not shown.

Electrical Console



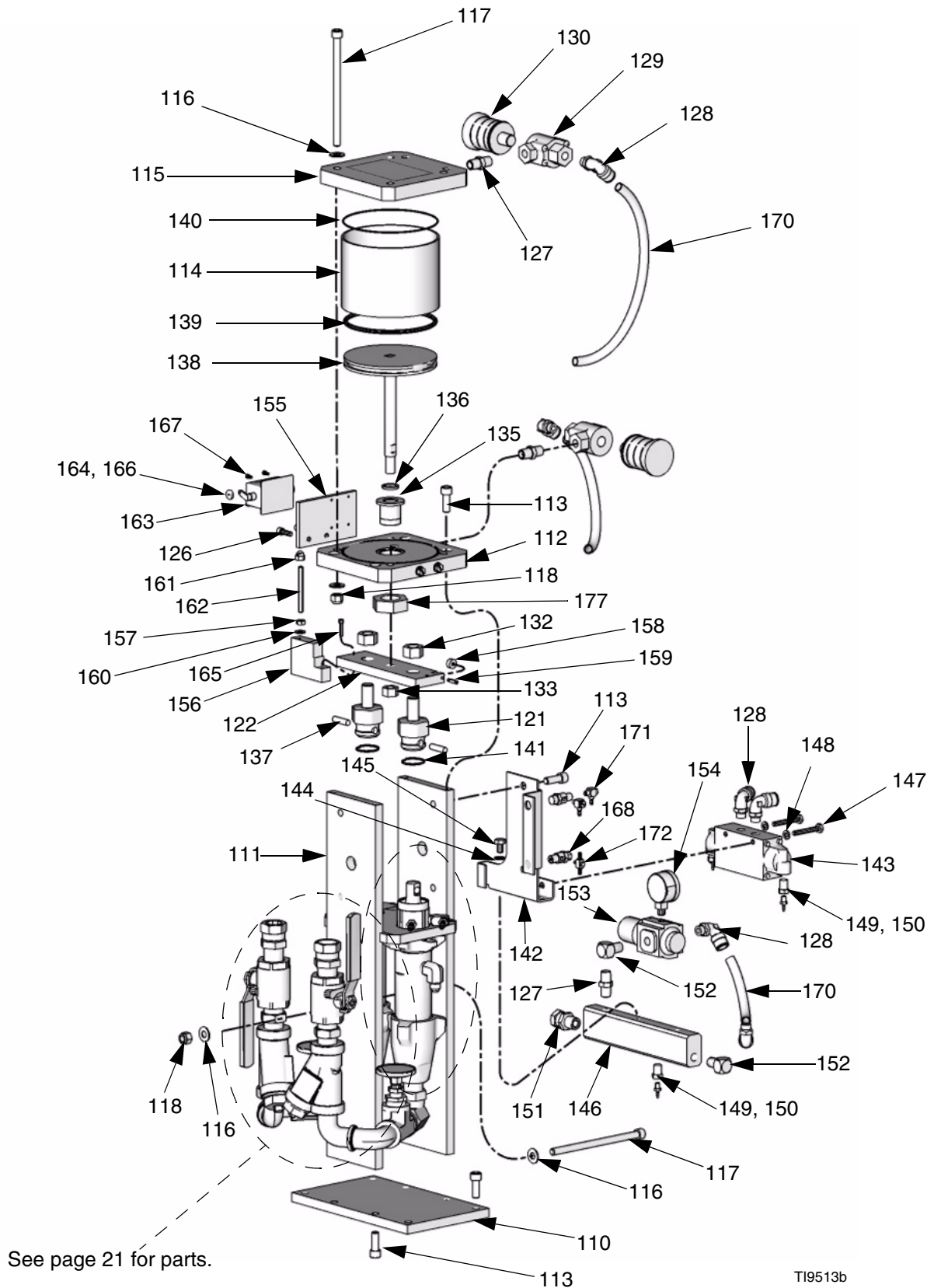
Parts - Electrical Console

Ref.	Part	Description	Qty.	Ref.	Part	Description	Qty.
60	297621	SCREW, machine, button head	8	76	297628	LIGHT, bulb	2
61	100518	SCREW, mach, pnhd	2	77	297629	LIGHT, base	2
62	103181	WASHER, lock ext	6	79	297631	AMMETER, 0-15 amp	1
63	297623	LENS, amber	2	81	297633	FITTING, strain relief	1
64	297624	SCREW, machine, round head	4	82	297634	TERMINAL, LUG, #10	1
65	297622	CONTROL, phase	1	83	297635	KNOB	1
66	100072	NUT, hex mscr	2	84	297522	CONSOLE, electrical	1
67	297625	SOCKET, hose	1	85*▲	297524	LABEL, warning, 7 amps	1
68	297520	LABEL, hose	1	86	297523	LABEL, indicator	1
69	297521	LABEL, heater	1	87	295269	NUT, lock, hubble	1
70▲	297513	LABEL, caution	1	90	297570	CONNECTOR, straight	1
73	297626	CIRCUIT BRKR, 25 amp	2	91	297571	NUT, lock	1
74	295210	SWITCH, operator handle	1	92	297572	RING, sealing	1
75	297627	SWITCH, disconnect	1	103*	196222	LABEL, ID	1

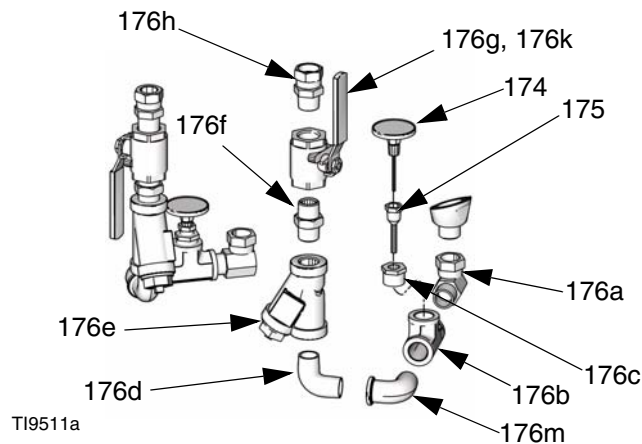
* Not shown.

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

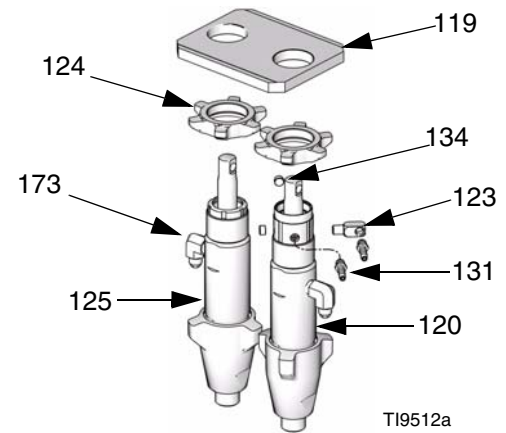
Air Motor Assembly



Air Motor Assembly

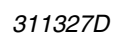


TI9511a



TI9512a

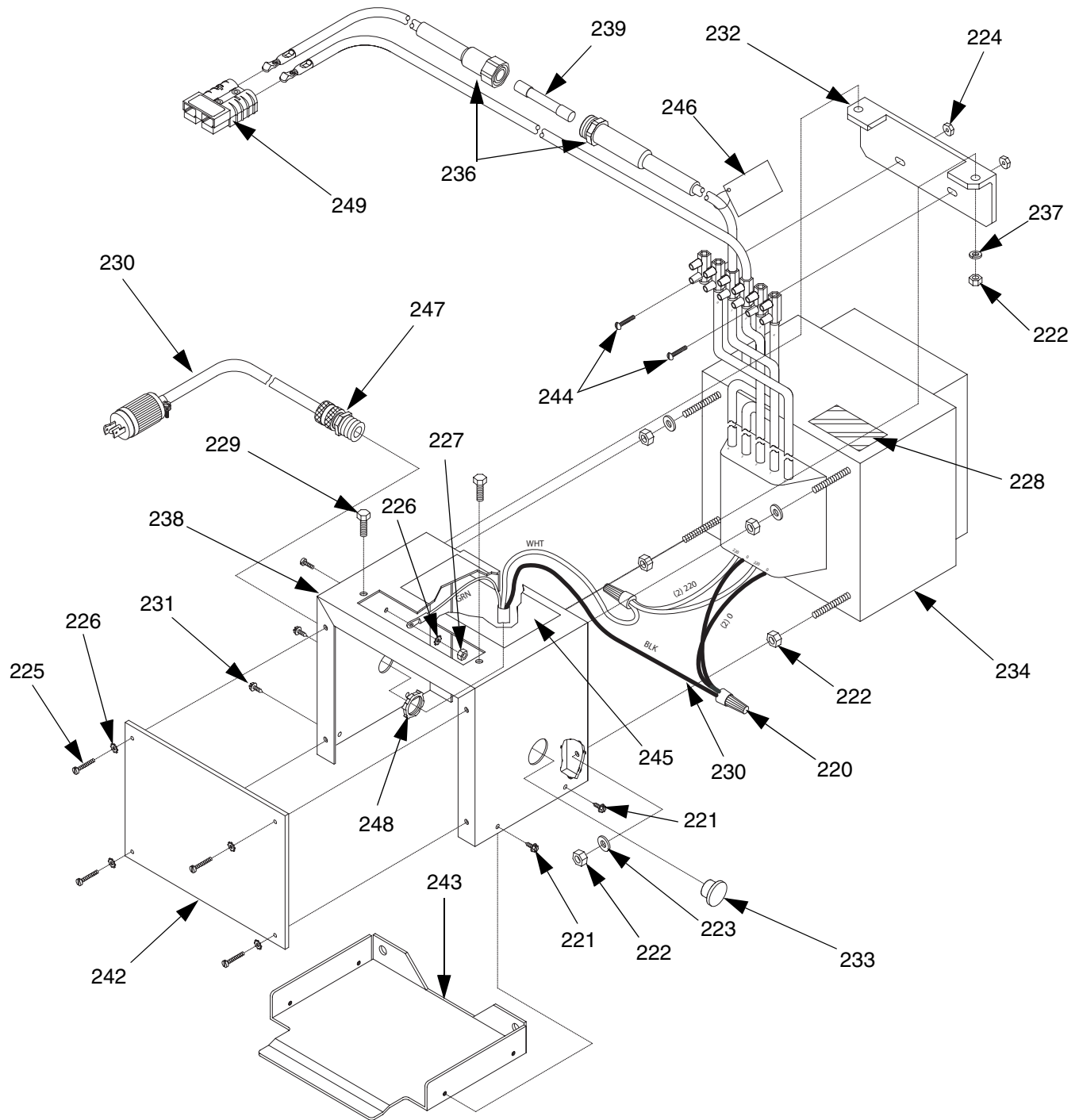
Ref.	Part	Description	Qty.	Ref.	Part	Description	Qty.
110	15J138	PLATE, base, pump	1	150	297429	FITTING, straight	5
111	15J131	PLATE, side	2	151	155665	UNION, adapter	1
112	15J587	PLATE, cylinder, air, bottom	1	152	100840	FITTING, elbow, street	1
113	C19837	SCREW, cap, socket hd	10	153	116513	REGULATOR, air	1
114	297411	CYLINDER, air	1	154	111598	GAUGE, pressure, air	1
115	15J586	PLATE, cylinder, air, top	1	155	297549	PLATE, counter	1
116	101971	WASHER, thrust	8	156	297551	BRACKET, yoke	1
117	120557	SCREW, cap, socket head	5	157	100015	NUT, hex mscr (not shown)	2
118	101566	NUT, lock	5	158	297371	ROLLER	1
119	15J133	PLATE, mounting, cylinder	1	159	297383	STUD, operating	1
120	246831	PUMP, displacement, w/lube, 0.552	1	160	100086	WASHER, plain	1
121	15J132	LINK, connecting	2	161	100029	NUT, cap, hex	1
122	15J684	PLATE, yoke, pump	1	162	297584	STUD, threaded	1
123	191892	FITTING, elbow, street, 90 deg	1	163	297585	COUNTER, mechanical	1
124	193031	NUT, retaining	2	164	297552	WHEEL, counter	1
125	245971	PUMP	1	165	295709	SCREW, cap, socket head	1
126	112166	SCREW, cap, sch	2	166	295695	SCREW, cap, buttoned	1
127	156971	FITTING, nipple, short	3	167	295203	SCREW, cap, 6-32 x 1/4, bh	4
128	114128	FITTING, elbow, male, swivel	6	168	297440	VALVE, pilot	2
129	297439	VALVE, quick exhaust	2	169	297442	TUBE	3
130	108636	MUFFLER	2	170	054760	TUBE, polyurethane, rnd, black	3
131	116746	FITTING, barbed, plated	2	171	297370	CONNECTOR, tube, air	3
132	120553	NUT, center lock, 5/8-18	2	172	297430	FITTING, tee	1
133	120552	NUT, center lock, 1/2-20	1	173	261840	FITTING, elbow, male	1
134	104765	PLUG, pipe headless	2	174	102124	THERMOMETER, dial	2
135	15J149	BUSHING, rod, air motor	1	175	15D757	HOUSING, thermometer, viscon hp	2
136	120554	SEAL, u-cup, bevel lip	1	176	288356	KIT, fluid inlet, pair	1
137	183210	PIN, str, hdls	2	176a		FITTING, union, adapter, 90 deg	2
138	297372	PISTON, air, w/ rod	1	176b		TEE, pipe 3	2
139	296113	O-RING, #350,buna-n	1	176c		BUSHING, pipe	2
140	296112	O-RING, #049,buna-n	2	176d		FITTING, elbow, pipe, male	2
141	183169	SPRING, retaining	2	176e		STRAINER, y	2
142	15J614	BRACKET, mounting, control	1	176f		FITTING, nipple, hex	2
143	297389	VALVE, pilot	1	176g		VALVE, ball, 3/4 npt	2
144	109468	SCREW, cap, hex hd	2	176h		FITTING, union, 3/4 mpt x 1/2 fpt	1
145	100186	WASHER, lock, internal tooth	2	176k		FITTING, swivel	1
146	297527	MANIFOLD, air	1	176m		ELBOW, 90 deg	2
147	102313	SCREW, cap, hex, 1/4	2	177	121601	NUT, acetal, 1 1/8-12	1
148	100016	WASHER, lock	2				
149	297438	FITTING, adapter	3				



Primary Heater Assembly

Ref.	Part	Description	Qty.
180	297529	STOP	1
181	297530	ELEMENT, heating	4
182	295731	NUT, wire	2
183	297245	FITTING, elbow, 90, st, 1/4 x 1/4	1
184	297586	FITTING, straight, nipple	1
185	297531	SPRING, leaf	1
186	295662	PLUG, pipe	42
187	295732	SCREW, cap, sh, 8-32 x 1/4lg	2
188	596936	SCREW, cap socket hd 1/4-20 x1.5	1
189	297532	PLATE, heat transfer	1
190	297533	BRACKET, mounting, cover	1
191	297423	FITTING, elbow, 45	1
192	295225	PLUG, pipe, flush	2
193	157021	WASHER, lock, int	2
194	297587	FITTING, elbow, 90	1
195	112166	SCREW, cap, sch	4
196	116504	FITTING, tee, run	1
197	297328	THERMOSTAT, 195 deg, n.c.	1
198	297258	SCREW, cap, socket head	8
199	297588	FITTING, straight, nipple	1
200	297534	BUSHING	1
201	297589	SPRING, wave	1
202	297535	BRACKET, mounting, switch	1
203	297538	INSULATOR, thermo	2
204	297540	BRACKET, heater, left	1
205	297539	BRACKET, heater, right	1
206	15J584	HEATER, R, half	1
207	15J585	HEATER, A, half	1
208	297545	BRACKET, thermo	1
209	295269	NUT, lock, hubble	2
210	100903	SCREW, mach, rdh	2

Hose Heat Power Pack



Hose Heat Power Pack (Power Supply)

Ref. Part	Description	Qty.	Ref. Part	Description	Qty.
220	295731 NUT, wire	3	237	100016 WASHER, lock	2
221	295732 SCREW, cap, sh, 8-32 x 1/4lg	4	238▲	189930 LABEL, caution	1
222	100015 NUT, hex mscr	8	239	297599 HARNESS, wire, hose, heater	1
223	100086 WASHER, plain	2	240	297600 CONNECTOR, hose	1
224	100284 NUT, hex mscr	2	241	311438 MANUAL, instructions	1
225	100518 SCREW, mach, pnhd	5	242	297515 COVER, front	1
226	103181 WASHER, lock ext	5	243	297516 COVER, bottom	1
227	100072 NUT, hex mscr	1	244	C19158 SCREW, mach, slotted round hd	2
228▲	297513 LABEL, caution	1	245	297649 LABEL, transformer, 70V	1
229	100333 SCREW, cap, hex hd	2	246	297648 LABEL, setting, power pack	1
230	297511 CABLE, power	1	247	295268 BUSHING, hubble	1
231	297512 BOX, cover, transformer	1	248	295269 NUT, LOCK, hubble	1
232	297650 BRACKET, mounting, block, terminal	1	249	117789 CONNECTOR, hose, elect	1
233	297596 PLUG	1	▲ Replacement Danger and Warning labels, tags, and card are available at no cost.		
234	297658 TRANSFORMER, 220/70V	1	* Not shown.		
235	297598 BLOCK, terminal, 6 position	1			
236*	297330 FUSE, 50A SC-50 bussman	2			

Pneumatic Schematic

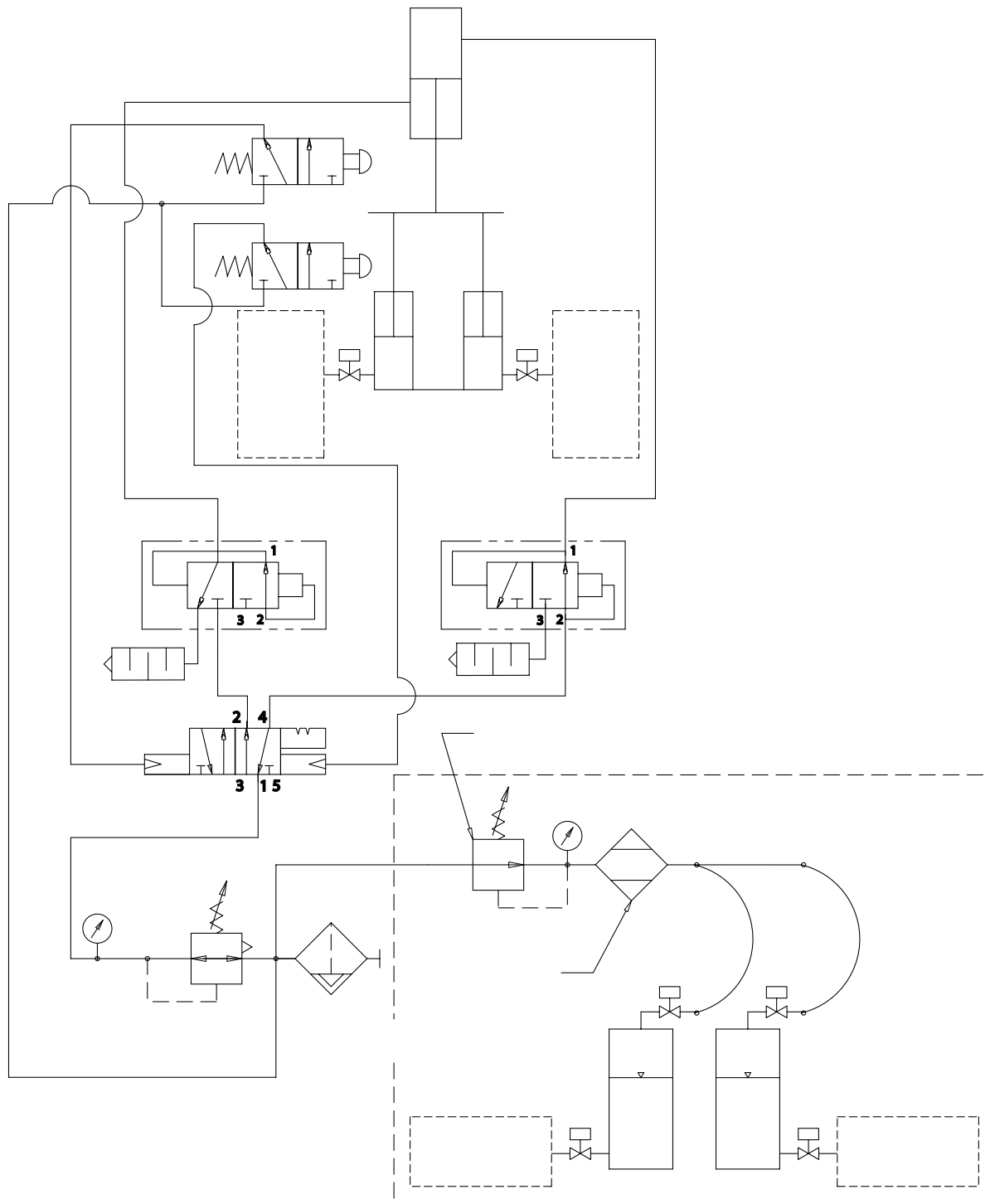


FIG. 2: Pneumatic Schematic

Electrical Schematic

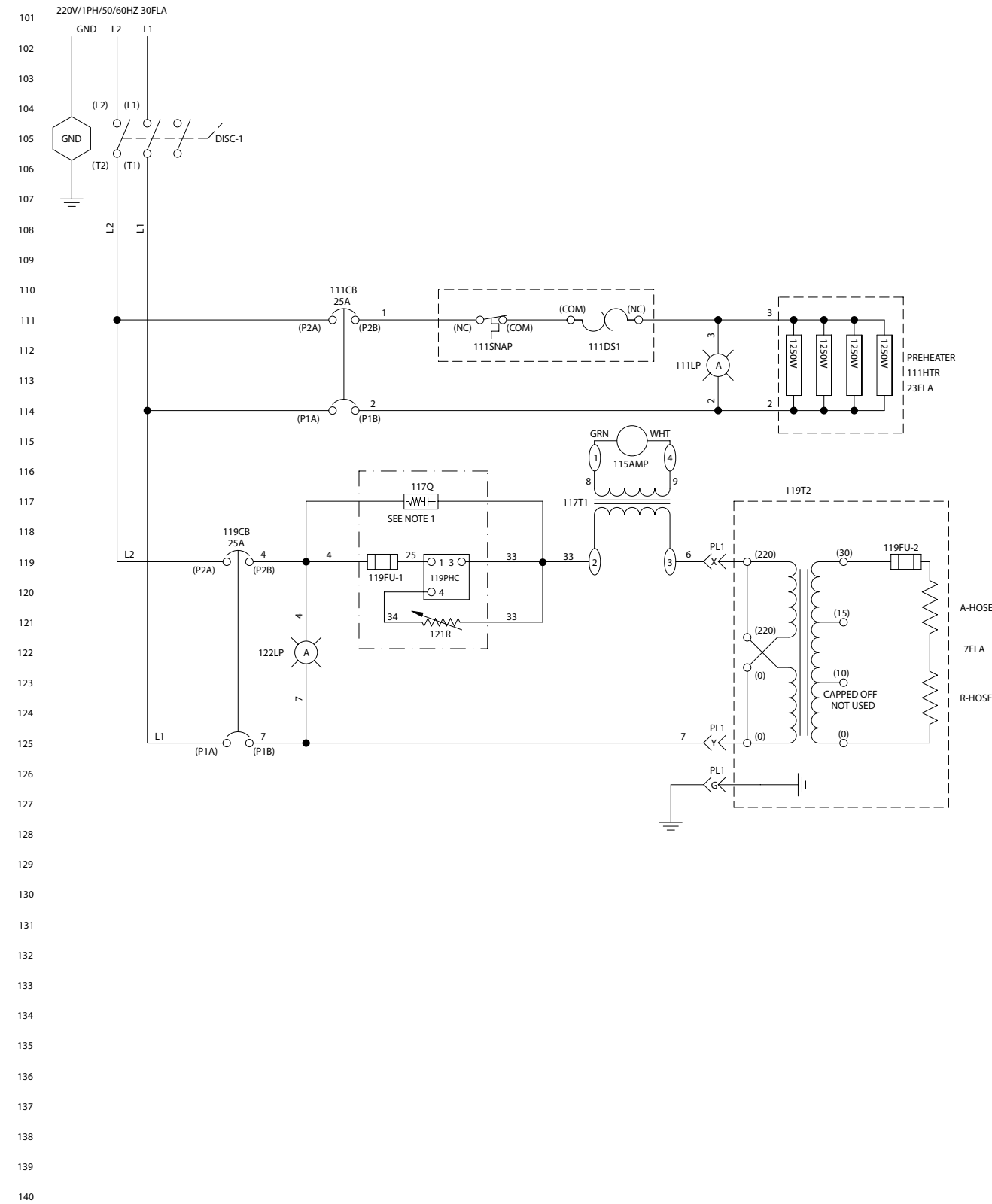


FIG. 3: Electrical Schematic



Handwriting practice lines consisting of multiple sets of three horizontal lines (top, middle, and bottom lines) for letter formation.

Technical Data

Maximum working pressure	1600 psi (11.0 MPa, 110 bar)
Maximum fluid temperature	190°F (88°C)
Maximum output (may vary due to operating conditions)	16 lb/min (7.25 kg/min)
Viscosity range	250-1500 centipoise
Maximum material inlet pressure	400 psi (2.7 MPa, 27 bar)
Voltage requirement +/- 10%	230V, 60 Hz
Amperage requirement	30 Amps
Total heater watts	5000 W
Inlet filter size	80 mesh standard (optional - 60/40 mesh)
Component B (resin) inlet	3/4 npt(f)
Component A (isocyanate) inlet	1/2 npt(f)
Maximum heated hose length	310 ft. (95 m)
Height	50 in. (127 cm)
Width	41 in. (104 cm)
Depth	28 in. (71 cm)
Weight	225 lbs. (102 kg)
Wetted parts	Carbon steel, stainless steel, chrome, aluminum, Fluoroelastomer, PTFE, nylon

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Graco Headquarters: Minneapolis
International Offices: Belgium, China, Japan, Korea

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

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