

Hot Melt Applicator

Model VII

Part 104 385C



NORDSON CORPORATION • AMHERST, OHIO • USA

Nordson Corporation welcomes requests for information, comments and inquiries about its products.

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- A corporate commitment to deliver what was specified

* This service not available in all countries.

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<u>Country</u>	<u>Telephone</u>	<u>Facsimile</u>
Argentina	54-1-921-3058	54-1-924-3206
Australia	61-2-838-7144	61-2-838-7394
Austria	43-222-707-5521	43-222-707-5517
Belgium	32-2-720-9973	32-2-720-7371
Brazil	55-11-274-6011	55-11-632300
Canada	416-475-6730	416-475-8821
Chile	56-2-555-7190	56-2-551-7549
Colombia	57-4-266-6965	57-4-266-5716
Denmark	45-42-648-500	45-42-641-101
France	33-1-64-12-14-00	33-1-64-12-14-01
Germany	49-211-2002-0	49-211-254658
Greece	30-1-941-9058	30-1-942-7623
Hong Kong	852-4287228	852-4804685
India	91-22-6442852	91-22-6427520
Italy	39-2-9078-23-40	39-2-9078-24-85
Japan	81-3-3450-8818	81-3-3472-3301
Korea	82-2-428-1931	82-2-427-9387
Malaysia	60-3-703-7248	60-3-791-5152
Mexico	216-988-9411/4315	216-985-3710
Netherlands	31-3403-77812	31-3403-74189
New Zealand	64-9-634-0179	64-9-579-7797
Norway	47-2-656100	47-2-658858
Pakistan	92-21-568-8609/3869	92-21-568-4585
Philippines	63-2-721-1421	63-2-721-3927
Portugal	351-2-941-3874	351-2-941-3867
Puerto Rico	809-787-2474	809-780-6063
Singapore	65-459-9533	65-459-9514
Spain	34-6-3705013	34-6-3705004
Sweden	46-40-291-585	46-40-932-882
Switzerland	41-61-463-838	41-61-463-818
Taiwan	886-2-581-3172	886-2-581-3074
Thailand	66-2-5141159	66-2-2531571
Turkey	90-1-384-4085	90-1-372-1528
United Kingdom	44-84421-3171	44-84421-5358
USA: Continental	770-497-3400	770-497-3500
Alaska & Hawaii	770-497-3400	770-497-3500
Venezuela	58-2-939-111	58-2-938097

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SAFETY SUMMARY

INTRODUCTION

Here you will find safety guidelines for the use of Nordson equipment. These guidelines apply to anyone working with Nordson equipment, including operations and service personnel. They are repeated throughout this manual, along with specific warnings and cautions not included in this section. These safety guidelines cover:

- Installation.
- Equipment operation.
- Working with hot melt materials.
- Use of hot melt solvents.

Failure to follow these recommendations may result in personal injury from burns or electrocution and/or equipment and property damage.

EXPLANATION OF TERMS AND SYMBOLS

The following symbols are used in Nordson publications to alert the reader to potential physical harm or equipment damage:

WARNING:	CAUTION:
Failure to observe may cause DEATH or PERSONAL INJURY	Failure to observe can cause DAMAGE TO EQUIPMENT
 General	 General
 Electrical	
 Nozzle	
 Hot	
 Pressure	

Figure 1 - Nordson Corporation Safety Symbols

SAFETY DURING INSTALLATION

ELECTRICAL

- A protective electrical ground connection to a reliable earth ground is essential for safe operation. Without one, all accessible conductive components (including knobs and controls that appear insulated) can render an electric shock.
- A disconnect switch with lockout capability must be provided between the power source and the equipment.
- The power supply wire gauge and insulation must be sufficient to meet the temperature and power requirements.
- Only fuses of the correct type, voltage rating and current rating should be used. Refer to the Nordson equipment parts list for fuse recommendations. Using incorrect or nonrecommended fuses can present a fire hazard.

PNEUMATIC

Nordson recommends installing a lockout, three-way, manual valve in the air supply line to the filter/regulator. This valve makes it possible to relieve air pressure and lock out the pneumatic system before undertaking maintenance or repairs.

GAS-SYSTEM (Pertains to FoamMelt[®] Applicators and Nitrogen Blanket Kits Only)

Cylinders of compressed gas are under high pressure and can present significant safety hazards if handled improperly. Refer to OSHA General Industry Standards, paragraphs 1910.101, 1910.166 and 1910.167 for safety precautions that apply to the use, handling and storage of compressed air.

SAFETY DURING OPERATION

Do NOT operate Nordson equipment under the following conditions:

- At a pressure higher than the rated maximum working pressure of any component in the system.
- Near volatile or otherwise explosive gases or materials.
- Without the covers, panels and safety guards properly installed.
- At temperatures below 20° F (-6° C) or above 120° F (50° C).



- With hoses enclosed in any material that interferes with heat dissipation. This includes electrical conduit, insulation of any type or tight metal covers.
- With large areas of hoses in contact with a cold floor, cold supports or other such surfaces. Cold points along the hose restrict the flow of adhesive inside the hose and can create potential problems during operation.
- (If outdoors or in drafty areas) with the applicator guns unshielded from the wind. Rapid heat dissipation due to air movement across the guns may cause operational problems.
- With handgun trigger left unlocked while the gun is unattended.

In addition:

- Use only the metal base when attempting to lift or move this equipment. Do not use equipment covers, doors, panels or hose connectors as braces or grips.
- Never use this equipment as a ladder or stepping stool.
- Route all hoses so as to prevent damage from kinking, abrasion and other physical damage. Do not allow a hose to be installed with a bend radius of less than 6 inches (150 mm).
- Never point an applicator handgun at yourself or anyone else.

SAFETY DURING SERVICING

- Do not perform internal service or adjustment on any equipment unless another person capable of rendering first aid and resuscitation is present.
- Only qualified personnel should service Nordson equipment.
- To avoid personal injury, never touch exposed connections and components while power is ON. Dangerous voltages exist at several points in the equipment.
- Disconnect, lock out and tag external electrical power before removing protective panels or replacing electrical components.
- Remove all jewelry (rings, watches, etc.) before servicing equipment.
- If possible, stand on a rubber mat when servicing Nordson equipment. Do not work on equipment if standing water is present. Avoid working in a high-humidity atmosphere. Cover exposed terminals and work area with rubber sheeting to avoid accidental contact while the power is ON.



- Always wear safety glasses, protective gloves (Nordson P/N 902 514 or equivalent) and long-sleeved protective clothing to prevent injury from hot applicator parts, splashed hot melt adhesive and hot gun surfaces.
- To prevent serious injury from molten adhesive under pressure, always relieve system hydraulic pressure (by triggering the handgun, for example) before opening any hydraulic fitting or connection).
- Never use an open torch, drill or broach when cleaning a nozzle.
- Never continue to operate equipment with a known leak in the system.

SAFETY WHEN USING HOT MELT ADHESIVES AND SOLVENTS

HOT MELT ADHESIVES

- Use extreme care when working with molten materials. They solidify rapidly at high temperature and present a hazard. Severe burns can occur if the molten materials come in contact with the skin. Even when first solidified, they are still hot.
- Always wear protective clothing and eye protection when handling molten material or working near equipment containing hot melt adhesives under pressure.

HEATING SOLVENTS

- Do NOT use an open flame or uncontrolled heating device to heat solvents (for example, a small pan on an unregulated hot plate).

Avoid fire hazard by using only a controlled heating device to heat solvents (for example, a small deep fat fryer or thermostatically controlled hot plate).

- DO NOT USE PAINT-TYPE SOLVENTS UNDER ANY CIRCUMSTANCES! These solvents are volatile and may create a fire and/or toxic vapor hazard even at room temperature.
- Always be sure the work area is adequately ventilated. Avoid prolonged or repeated breathing of solvent vapors.



HALOGENATED HYDROCARBON SOLVENTS

Halogenated hydrocarbon solvents are dangerous when used to clean aluminum components in a pressurized fluid system. No available stabilizers prevent halogenated hydrocarbon solvents from reacting under all conditions with aluminum components in a pressurized fluid pumping system.

NEVER clean any aluminum component or flush any system using halogenated hydrocarbon solvents. Use Type R solvents or contact your solvent or hot melt supplier for a non-halogenated hydrocarbon solvent for cleaning and flushing.

Halogenated fluids include the following solvents:

Fluorocarbon Solvents:	Dichlorofluoromethane Trichlorofluoromethane
Chlorinated Solvents:	Carbon Tetrachloride Chloroform Dichloromethane Ethylene Dichloride Methylene Chloride Monochlorobenzene Monochlorotoluene Orthodichlorobenzene Perchloroethylene Trichloroethylene
Brominated Solvents:	Ethylene Dibromide Methyl Bromide Methylene Chlorobromide
Iodinated Solvents:	Ethyl Iodide Methyl Iodide N-butyl Iodide Propyl Iodide

IF MOLTEN MATERIAL COMES IN CONTACT WITH THE SKIN

- Do NOT try to remove molten material from the skin.
- Immediately immerse the affected area in cold, clean water. Keep the affected area immersed until the material has cooled.
- Do NOT try to remove the cooled material from the skin.
- Cover the affected area with a clean wet compress.
- In cases of severe burns, look for signs of shock. If shock is suspected, have patient lie down, use blankets to preserve body heat and elevate the feet several inches.
- Call a physician immediately.



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IDENTIFICATION AND USE OF NORDSON FITTINGS

There are two different types of hose adapters and pipe plugs used on Nordson equipment, one with an o-ring seal and one with a pipe-thread seal. Some Nordson H20 noncirculating automatic guns, H200 automatic guns, and Series 2000 applicators use hose fittings and pipe plugs with o-ring seals for the fluid ports. These o-ring fittings, which have straight pipe threads, are not interchangeable with the fittings which rely on tapered pipe thread (NPT) for a seal.



The use of the incorrect fitting may result in excessive leakage and possibly in serious burns, especially with low viscosity fluids.

1. Identification of Fittings Required: To determine which type of fittings should be used with any given gun or applicator, first look at the fluid ports in the manifold. The ports designed for the o-ring fittings will have a smooth machined cavity on the face of the manifold around the female threads whereas the ports designed for the pipe-thread fittings will have only female pipe threads. See Figure 1 for an illustration of the difference.
2. Selection of Correct Parts: Use Figure 1 to select the correct part.

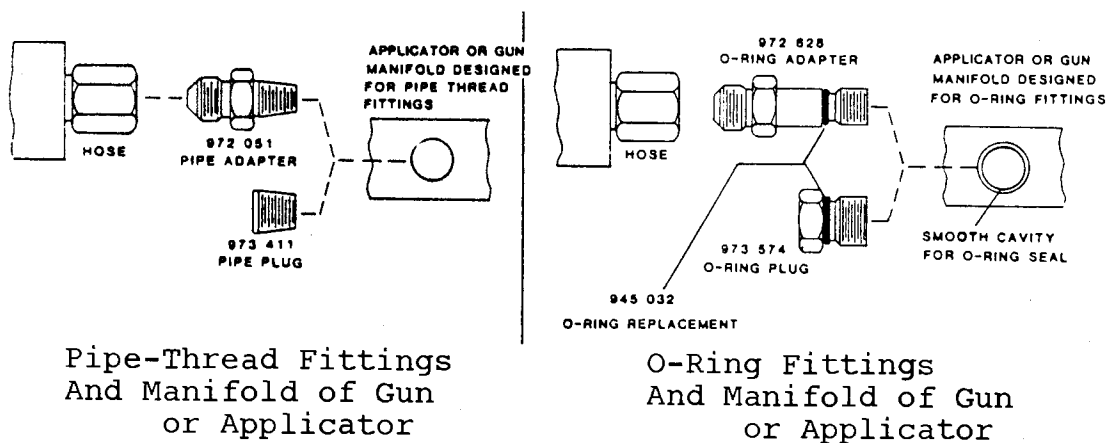


Figure 1 - Diagram of O-Ring and Pipe-Thread Fittings for H20 Noncirculating Guns, H200 Automatic Guns, and Series 2000 Applicators

3. Installation of O-Ring Fittings:
 - (a) Lubricate the fitting threads and o-ring with Never Seez (P/N 900 344), making sure first that the o-ring and threads are free of dirt and other foreign particles.

- (b) Thread the fitting by hand into the threaded port in the gun or applicator.
- (c) Tighten the fitting only enough to seat. It should seat when the body of the metal fitting contacts the manifold surface. Between 7 and 10 ft-lbs of torque is required to create an effective seal.



Any time the fitting is removed, the o-ring must be replaced. Otherwise the o-ring will not seat properly. Use only Nordson o-rings, P/N 945 032.

4. Replacement of O-Rings:

- (a) Be sure that the o-ring (Nordson P/N 945 032) and its groove are free of foreign particles.
- (b) Stretch the o-ring and carefully roll it over the threads onto the groove in the hose adapter or pipe plug. Take care not to stretch the o-ring any more than necessary.
- (c) Install fitting according to instructions in step 3.

A complete listing of Nordson fittings and their o-ring replacements, where replacements are available, is provided in the chart below:

<u>Description of Fitting and Where Used</u>		<u>Pipe-Th. Fitting</u>	<u>O-Ring Fitting</u>
Str. Conn. (Gun to Automatic Hose; Applicator to Automatic or Handgun Hose)		972 051	972 628
Pipe Plug (Extra Ports on Gun or Applicator)		973 411	973 574
90° Elbow (Gun to Automatic Hose)		972 200	274 180*
90° Elbow (Applicator to Automatic or Handgun Hose)		972 200	972 646*
45° Elbow (Gun to Automatic Hose)		972 618	274 179*
45° Elbow (Applicator to Automatic or Handgun Hose)		972 618	972 647*
Str. Conn. (FM150/170 to Hose)		-	310 281

* For instructions on installation of o-ring elbow fittings, see page 46-33-1.

Note: P/Ns 972 646 and 972 647 have an extended collar which allows them to be wrenched into the hose ports in the manifold.

An adapter which will allow guns designed for o-ring fittings to be attached to a standard 1/4 inch tapered pipe-thread fitting is available from Specials (P/N 806 724). Primarily it is used in existing installations. It may need to be insulated to prevent excessive heat loss.



SECTION I EQUIPMENT FAMILIARIZATION

INTRODUCTION

The Model VII Circulating Hot Melt Applicator, as shown in Figure 1, melts solid hot melt adhesive or other thermoplastic materials and continuously circulates the molten fluid under hydraulic pressure through electrically heated hoses and guns back to the applicator tank. Molten adhesive material is extruded onto a substrate through various size nozzles in the heated gun, depending on bead requirements.

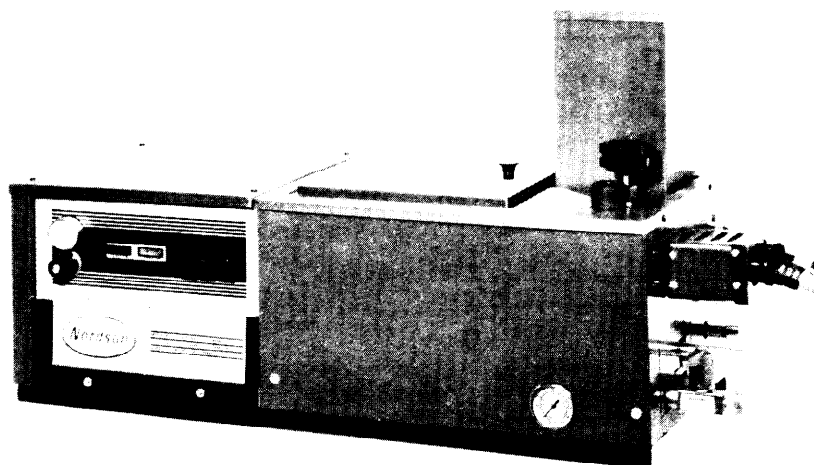


Figure 1 - Model VII Circulating Hot Melt Applicator

This service manual contains detailed information required for installation, operation, and maintenance of the Model VII hot melt applicator. The Maintenance section is subdivided into preventive maintenance procedures, troubleshooting tables, and disassembly and repair procedures. The manual also includes electrical wiring diagrams and a complete illustrated parts list to aid in maintenance and parts ordering.

SPECIFICATION SUMMARY

Pumping Medium	Hot melt adhesives and other thermoplastic materials
Melt Rate	27 lb/hr (12.2 kg/hr)
Melt Tank Capacity	20 lb (9 kg)
Pump Rate	120 lb/hr (55 kg/hr)
Operating Temperature, maximum	450°F (230°C)
Pump Ratio	16:1



Operating Air Pressure
Air Flow Rate at 60 psi/
30 strokes/minute
Unit Weight
Dimensions

10 to 80 psi (70 to 550 kPa)
2.0 cfm (57 liters/min)

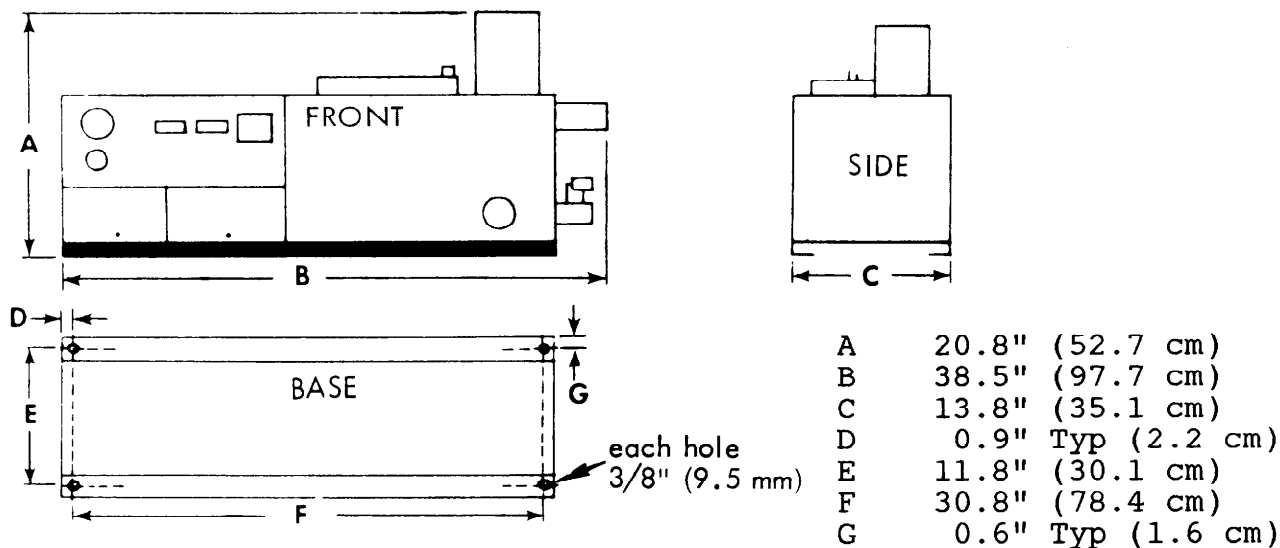
160 lb (72.6 kg)
See Figure 2.

Electrical Requirements

230 VAC, 1/3 phase, 50/60 Hz,
20 amps.

460 VAC, 1/3 phase, 50/60 Hz,
10 amps.

180/220 VAC, 1/3 phase, 50/60 Hz,
20 amps.



*Dimension B does not include filter/regulator
and solenoid valve.

Figure 2 - Model VII Dimensions

FUNCTIONAL DESCRIPTION

The Model VII hot melt applicator contains two separate sections: a heating and pumping section, and an electrical control section. The heated section consists of an air driven hydraulic piston pump, heated tank, distribution manifold with filter and circulation valve, and heated hoses. All electrical controls, indicating lights, and circuit breakers are located in the electrical control cabinet on the left side of the applicator.

Hot melt adhesive or other suitable thermoplastic material is melted in an electrically heated cast aluminum tank containing two cast-in heating elements. An adjustable temperature controller



maintains tank temperature within a range from 150° to 450°F (65° to 230°C). Overtemperature protection is provided by an automatically resetting heat limiter that interrupts electrical power to the tank heaters when tank wall temperature exceeds 465°F (240°C) and resets when wall temperature drops to 365°F (185°C). Figure 3 shows a schematic of the hydraulic section of the Model VII hot melt applicator.

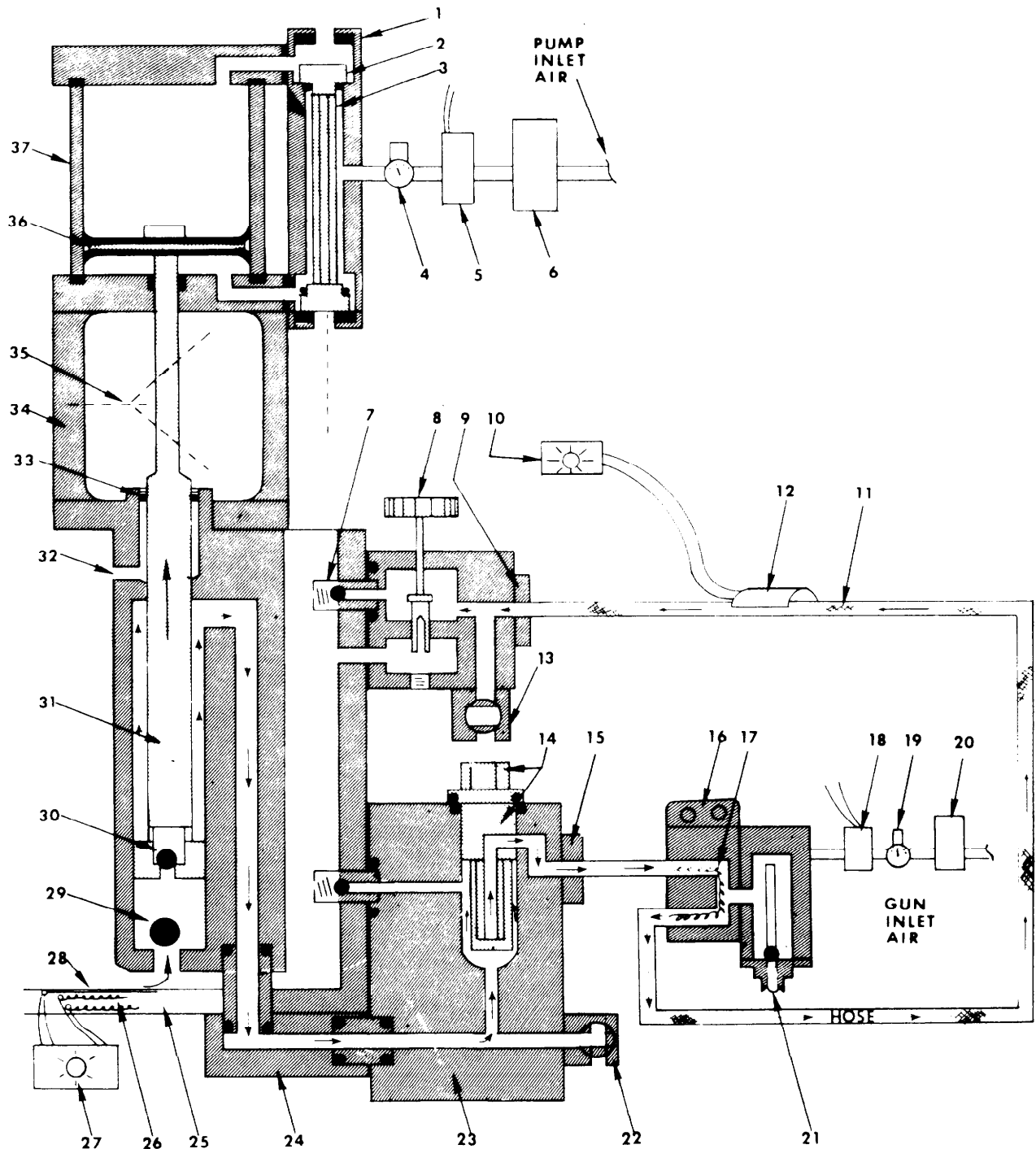


Figure 3 - Model VII System Schematic



An air-driven dual-acting hydraulic piston pump transfers molten material under pressure from the tank to the filter manifold and into heated hoses that carry hot melt adhesive material to and from the extrusion guns. The pump assembly consists of a filter/regulator, solenoid valve, air piston with four-way air control valve, and a dual-acting hydraulic pump. The air cylinder and hydraulic pump are tied together through a common shaft. A ball and seat arrangement at the bottom of the hydraulic cylinder and the relative volumes above and below the hydraulic piston cause molten material to be forced under pressure through a crossover tube into the filter manifold on both the upward and downward strokes of the air piston.

Overpressure protection is provided by a relief valve in the filter manifold and a relief valve in the circulation valve manifold that open at 1600 psi (11.0 MPa) to relieve system pressure back to the adhesive tank.

Another feature of the system is a circulation valve that adjusts the amount of material flowing back to the tank when the gun is not being triggered, or triggered at a slow rate. This feature accomplishes two things. First, it allows internal circulation of material through the system necessary to prevent the pump from stalling or the relief valve from opening when the guns are not being triggered. Second, it improves performance in both continuous and interrupted bead applications by reducing pressure fluctuations and related changes in deposition rate as guns are cycled.

FEATURE VARIATIONS

The following paragraphs describe the variations in configuration available with the Model VII hot melt applicator. Table 1 presents a summary of Nordson part numbers and feature variations of the Model VII.

MODEL VII HOT MELT APPLICATOR, 460 VAC INPUT

The 460 VAC Model VII hot melt applicator is the same as the basic 230 VAC Model VII unit, except for the front control panel and the electrical control system. Interlocked circuit breakers have been replaced in the 460 VAC Model VII with a main switch and fuses. Additionally, the tank heaters are wired in series, instead of in parallel as in the 230 VAC Model VII, to maintain the same heater watt density.

MODEL VII HOT MELT APPLICATOR, 200 VAC INPUT

The Model VII-J hot melt applicator is the same as the basic 230 VAC Model VII unit, except for the addition of a multi-tap input transformer that permits applicator use in areas where input voltages range from 180 to 220 VAC, as in Japan.



MODEL VII HOT MELT APPLICATOR w/WAX PUMP

The Model VII hot melt applicators are available with a piston pump designed for use with low temperature, low viscosity thermoplastic materials, such as wax. The pump contains extra seals in the hydraulic section to prevent leakage.

MODEL VII HOT MELT APPLICATOR w/NITROGEN BLANKET

The 230 VAC and 460 VAC Model VII hot melt applicators are also available with connections for a nitrogen gas supply to blanket the thermoplastic material in the tank with a layer of inert gas. This configuration allows the use of thermoplastics subject to rapid degradation in an air atmosphere. The Model VII-N applicators are equipped with a special pump with extra seals to prevent leakage from the pressurized tank.

TABLE 1 - FEATURE VARIATION SUMMARY

Part Number	Description
240 748	HM VII Hot Melt Applicator, 230 VAC
241 102	HM VII Hot Melt Applicator, 460 VAC
243 926	HM VII-J Hot Melt Applicator, 200 VAC
270 057	HM VII Hot Melt Applicator w/Wax Pump, 230 VAC
270 058	HM VII Hot Melt Applicator w/Wax Pump, 460 VAC
270 071	HM VII-J Hot Melt Applicator w/Wax Pump, 200 VAC
270 059	HM VII-N Hot Melt Applicator w/Nitrogen Blanket, 230 VAC
270 069	HM VII-N Hot Melt Applicator w/Nitrogen Blanket, 460 VAC



SECTION II PREPARATION FOR USE

INTRODUCTION

The Model VII hot melt applicators are shipped in a partially assembled condition in the configuration specified on the Purchase Order. Hoses and guns are shipped separately. The following paragraphs detail information necessary for proper installation of the applicator, hoses, and guns.

UNPACKING

No special instructions are necessary to unpack the Model VII applicator. Normal care should be exercised not to damage the equipment during unpacking.

INSPECTION

After unpacking, the following inspection should be performed.

1. Inspect surfaces for evidence of dents, scratches, corrosion, and other physical damage.
2. Remove the top left-hand cover and inspect for loose electrical connections and loose contaminants.
3. Inspect hose for frayed or broken connectors, rips in the outer braid, and evidence of kinking or other physical damage.
4. Inspect guns for loose mechanical and electrical connections.
5. Inspect all fasteners and mechanical connections for tightness.

INSTALLATION

GENERAL

1. Install the hot melt applicator so panels can be removed and the unit is otherwise accessible for operation.
2. Avoid unusual ambient temperature conditions, i.e., below 30°F (0°C) or above 120°F (50°C).
3. The applicator should also be protected from unusual dust conditions and severe vibration.



4. If the applicator is installed outdoors or in a drafty area, the guns must be shielded from the wind. Rapid heat dissipation due to air movement across the guns can prevent the guns from operating properly.
5. Hoses and guns in the Model VII system are electrically energized through the braid and fittings. Use protective cuffs and educate personnel to shock hazards. Do not use electrically conductive hot melt adhesive.



Hose and gun installation and air connection must precede connection of external electrical power to the hot melt applicator.

GUN INSTALLATION (H20E Automatic Gun)

1. Install the gun on the parent machine in proper alignment with the substrate.

NOTE: The gun mount should be protected from vibration and secured so that the gun will not change position relative to the substrate during operation.

2. Connect the hoses mechanically to the gun.
3. Connect a filter/regulator and solenoid valve to the gun.

NOTE: The solenoid valve should be placed as close as possible to the gun to prevent introduction of lag time between solenoid valve actuation and gun operation.



Position the solenoid valve exhaust port away from personnel access areas. Rapidly escaping air when the solenoid valve is de-energized can cause eye injuries.

4. Set the regulator to zero pressure (full counterclockwise) and connect external air supply to the filter.

NOTE: The external air supply should deliver a minimum of 50 psi (345 kPa) to the filter/regulator to ensure proper gun operation.

5. Connect solenoid valve leads to the appropriate timing device.
6. Install insulating cuffs on all hose/gun connections.



Hoses in the Model VII system are electrically heated by passing an electrical current through the braid and fillings. Failure to install insulating cuffs on all connections may result in electrical shock or equipment damage.

PUMP INSTALLATION

1. With the air motor enclosure removed, place the hydraulic pump body into the tank and insert the connecting tube into the hole in the tank bottom.
2. Slowly force the pump assembly downward until the pump mount rests on the top of the tank.



Improper installation of the pump assembly may damage the o-ring on the connecting tube causing premature failure of the o-ring and improper pump operation.

3. Position the pump assembly with air control valve toward hose end of applicator.
4. Secure the pump mount to tank using three screws and lock-washers.
5. Connect solenoid valve and filter/regulator to air control valve.
6. Plug solenoid valve electrical connector into receptacle on hose end of applicator. Tighten securely.
7. Remove panel on air motor enclosure and position enclosure over air motor. Secure enclosure with one screw on top of enclosure.
8. Position panel on air motor enclosure and secure with four screws.
9. Set regulator for zero pressure (full counterclockwise).
10. Connect external air supply to the filter/regulator.

NOTE: Input air to the Model VII applicator does not have to be lubricated.

HOSE INSTALLATION

1. Connect hoses to the one-foot hoses attached to the right side of applicator.



NOTE: The front hose is the adhesive material outlet hose to the first gun in the system. The back hose is the return hose from the last gun to circulate adhesive material back to the tank.

2. Install insulating cuffs over all hose connections using cuffs and clamps provided.



Hoses in the Model VII system are electrically heated by passing an electrical current through the braid and fittings. Failure to install insulating cuffs on all connections may result in electrical shock or equipment damage.



Observe the following precautions to prevent premature hose failure.

- a. Do not add any insulation or compress existing insulation. Do not overtighten hose cuff clamps.
- b. Avoid sharp bends and continued flexing of hoses.
- c. Do not operate hoses above 450°F (230°C).
- d. Do not place hose in conduit or confined channel that might restrict heat dissipation.
- e. Avoid dragging hose on floor or over machinery.

HOSE TRANSFORMER CONNECTION

The recommended electrical current for proper hose and gun heating is 28 amps. To provide the proper current to this circuit, the voltage supplied by the transformer to the hoses and guns must be adjusted for length of hoses and type of guns used. The following instructions detail the procedure for properly adjusting hose circuit input voltage.

1. Compute the total resistance of hoses to be attached to the Model VII by adding individual resistances of each hose, including the two one-foot hoses. Refer to Table 2 for total resistance of each hose.
2. If H20E guns are powered in series with the hoses, add 0.130 ohms resistance for each gun to the total resistance computed in step 1.



The total hose and gun circuit resistance must be at least 0.273 ohms. If total resistance is less than 0.273 ohms, more hose length must be added to the system until the total resistance is at least 0.273 ohms.



3. Compute desired input voltage to the hose and gun circuit by multiplying total hose and gun resistance by 28.
4. Referring to Figure 4, determine the terminals on the transformer that will supply an output voltage closest to the desired voltage. Use the example provided below to aid in computations.

EXAMPLE: Two H20E guns with one two-foot hose between them and two eight-foot hoses to and from the applicator.

H20E gun	0.130	0.683 x 28 = 19.12 volts
H20E gun	0.130	
1 ft hose	0.021	Voltage between terminals
1 ft hose	0.021	5 and 9 on transformer
2 ft hose	0.042	totals 19 volts
8 ft hose	0.168	
8 ft hose	0.168	
Total	0.683 ohms	

TABLE 2 - HM VII Hose Part Number and Resistance Cross Reference

Description	Old Part No.	Total Ohms Resis- tance	New Part No.	Total Ohms Resis- tance
Hose, HM VII, 1 ft (0.3 m)	846 012	0.060	271 817	0.021
Hose, HM VII, 1 ft (0.3 m) w/Sensor	240 665	0.060	271 827	0.021
Hose, HM VII, 2 ft (0.6 m)	846 024	0.120	271 818	0.042
Hose, HM VII, 3 ft (0.9 m)	846 036	0.180	271 819	0.063
Hose, HM VII, 4 ft (1.2 m)	846 048	0.240	271 820	0.084
Hose, HM VII, 5 ft (1.5 m)	846 060	0.300	271 821	0.105
Hose, HM VII, 6 ft (1.8 m)	846 072	0.360	271 822	0.126
Hose, HM VII, 8 ft (2.6 m)	846 096	0.480	271 823	0.168
Hose, HM VII, 10 ft (3.0 m)	846 120	0.600	271 824	0.210

5. Remove perforated end panel from left side of applicator by removing two 1/4-turn screws.
6. Remove cover from transformer terminal block mounted vertically on the left side of the electrical cabinet opening.
7. Connect hose circuit wires (Nos. 10 and 11) to the appropriate terminals on the transformer terminal block.

8. Reinstall transformer block cover and secure with two screws. Leave the perforated end panel off for electrical power installation.

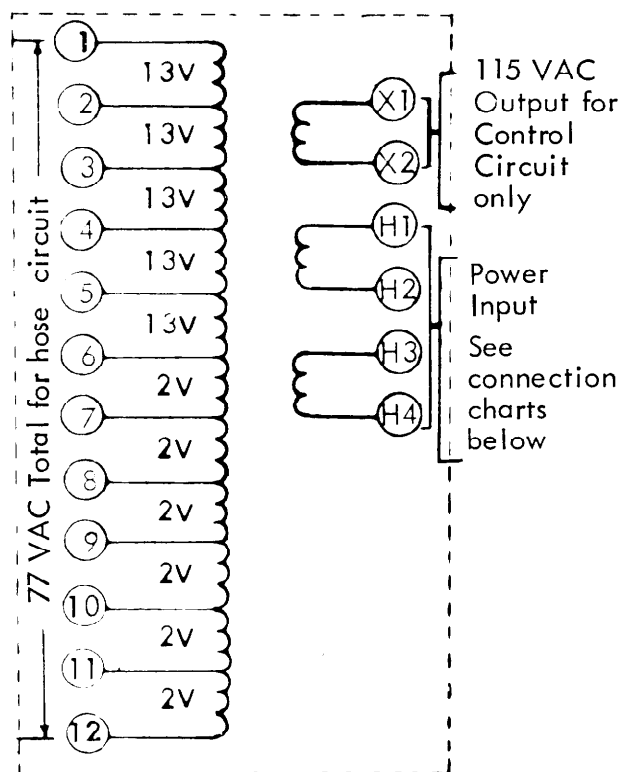


Figure 4 - Transformer Schematic

ELECTRICAL INSTALLATION

The Model VII hot melt applicator is factory wired for three-phase 230 VAC, 460 VAC, or 180/220 VAC input electrical power, depending on Purchase Order requirements. The following instructions detail the electrical power installation.



The Model VII hot melt applicator and associated guns and hoses contain energized electrical components with potentials that could be fatal. Only qualified personnel shall install this equipment electrically.



Any attempt to operate this equipment on voltages other than those for which the equipment was wired can result in serious damage to the electrical system.

1. Route a three-phase service line of the appropriate voltage through the hole and clamp provided in the base of the electrical cabinet and connect wires to terminals 1, 2, and 3 on the four-station terminal block (TB1).



NOTE: To change the applicator from three-phase to single-phase operation, disconnect wire No. 3 from TB1-3 (L3) and reconnect to TB1-1. Route a single-phase service line to the cabinet and connect to TB1-1 and TB1-2. Cover the words "3 Phase" on the information access door with a permanent label stating "Single Phase".

3. Connect the applicator to a reliable earth ground.



If more than one Model VII system is being installed in the same location, refer to Multiple Unit Installation. Failure to properly connect multiple units to the same power source will create dangerous potentials between units.

4. Install the perforated end panel and secure with two 1/4-turn screws.
5. Energize external electrical power and close the main circuit breaker (or main switch on 460 VAC applicator) and the hose circuit breaker.

NOTE: POWER ON and TANK heater lights should come on when the main circuit breaker is closed.

6. Take an amperage reading on the hoses.

NOTE: In most applications, amperage will be between 24 and 30 amps. If the amperage reading is between 24 and 30 amps, electrical installation is complete. If the amperage is below 24 amps, above 30 amps, or the circuit breaker trips when power is initiated, proceed to the appropriate following section for corrective action.

Amperage Less than 24 amps

1. Disconnect and lock out input electrical power to the applicator.



Hot melt application systems contain electrical potentials that could be fatal. The input terminal block (TB1) and the input terminals on the main circuit breaker (switch) are still electrically energized if external power is not disconnected, even though the main circuit breaker (switch) is open.

2. Remove perforated end panel by disconnecting two 1/4-turn screws.



3. Reconnect hose circuit wires (Nos. 10 and 11) to provide 1 or 2 VAC more to the hose and gun circuit.
4. Reinstall terminal board cover and perforated end panel.
5. Restore input electrical power to the applicator and close main circuit breaker (switch) and hose circuit breaker.
6. Take an amperage reading on the hoses.
7. Repeat this procedure until the amperage reading is at least 24 amps, but no greater than 30 amps.

Hose Circuit Breaker Trips or Amperage Greater than 30 amps

1. Disconnect and lock out input power to the applicator.



Hot melt application systems contain electrical potentials that could be fatal. The input terminal block (TBl) and the input terminals on the main circuit breaker (switch) are still electrically energized if external power is not disconnected, even though the main circuit breaker (switch) is open.

2. Remove perforated end panel and transformer terminal board cover.
3. Reconnect hose circuit wires (Nos. 10 and 11) to provide 1 or 2 VAC less to the hose and gun circuit.
4. Reinstall terminal board cover and perforated end panel.
5. Restore input electrical power to the applicator and close main circuit breaker (switch) and hose circuit breaker.
6. Take an amperage reading on the hoses.
7. Repeat this procedure until the amperage reading is less than 30 amps, but no less than 24 amps.



In order to prevent hose and relay damage due to excessive current, voltage must be recalculated and taps reconnected any time hose length, gun type, or number of guns in the circuit is changed.

INSTALLATION OF MULTIPLE MODEL VII UNITS



Installation of multiple Model VII hot melt applicator systems at the same location may result in hazardous voltages on the hose fittings. This condition can occur



when input electrical power connected to hose transformers are related to different phases of the same source or when two or more units are connected to the same phase, but 180 deg out of phase with each other.

In any installation involving multiple Model VII hot melt applicator systems, all hose circuit electrical input supplies must be confirmed in phase and on the same leg of the input power source. This is accomplished by measuring the voltage between a fitting on the end of the one-foot hose of any one unit and the same fitting on any other unit mounted on the same source. The voltage measured cannot exceed the difference between the transformer voltages to the hose circuits of the individual units, as in the example below.

EXAMPLE: Two Model VII systems (Systems A and B) are mounted on a single packaging machine. Input voltage to the hose circuit in System A is 30 VAC. Input voltage to the hose circuit in System B is 50 VAC. Therefore, the voltage measured between the fittings should be 20 VAC.

When a voltage measurement is made between the fittings, three possible results can occur. The results are (1) voltage equal to the difference between hose circuit voltages, (2) voltage equal to the sum of hose circuit voltages, and (3) voltage greater than the difference but less than the sum of the voltages. These results are detailed in the following paragraphs. Refer to the appropriate paragraph for corrective action.

Voltage Equal to the Difference Between Input Voltages

If the voltage measured is the difference between input voltages to the hose circuits of the individual applicators (i.e., 20 volts in the Example), the systems are in phase and properly connected. No further action is required.

Voltage Equal to the Sum of Input Voltages

If the voltage measured is the sum of input voltages to the hose circuits of the individual applicators (i.e., 80 VAC in the Example), the systems are connected to the same phase, but are 180 deg out of phase with each other. Use the following procedure to correct the problem.



Hot melt applicator systems contain electrical potentials that could be fatal. The input terminal block (TB1) and input terminals on the main circuit breaker (switch) are still electrically energized if external power is not disconnected, even though the main circuit breaker (switch) is open.



1. Disconnect and lock out input electrical power to the applicator.
2. Remove perforated end panel by turning two 1/4-turn screws counterclockwise.
3. Reverse the input service wires connected to terminals 1 and 2 on the input terminal block (TB1) on one of the applicators.
4. Reinstall the perforated end panel and secure with two 1/4-turn screws.
5. Restore input power to the applicator.
6. Recheck the voltage between the hose fittings as previously described.

NOTE: The voltage should be the difference between input voltages to the hose circuits of the individual applicators. If the voltage is not the difference, follow the procedure outlined in the following paragraph.

Voltage Greater than the Difference, But Less than the Sum of Input Voltages

If the voltage measured is greater than the difference between hose circuit voltages of the individual applicators, but less than the sum (i.e., greater than 20 VAC, but less than 80 VAC in the Example), the systems are connected across different phases. Use the following procedure to correct the problem.



Hot melt applicator systems contain electrical potentials that could be fatal. The input terminal block (TB1) and input terminals on the main circuit breaker (switch) are still electrically energized if external power is not disconnected, even though the main circuit breaker (switch) is open.

1. Disconnect and lock out input electrical power to the applicator.
2. Remove perforated end panel by turning two 1/4-turn screws counterclockwise.
3. Reverse the input service wires connected to terminals 1 and 3 on the input terminal block of one of the applicators.
4. Reinstall perforated end panel and secure with two 1/4-turn screws.



5. Restore input electrical power to the applicator.
6. Recheck the voltage between the hose fittings as previously described.

NOTE: The voltage should be the difference between input voltages to the hose circuits of the individual applicators. If the voltage is the sum of the voltages, refer back to Voltage Equal to the Sum of Input Voltages for corrective action. If the voltage remains the same, continue with this procedure.

7. Disconnect and lock out input power to the applicator.
8. Remove the perforated end panel.
9. Reverse the input service wires connected to terminals 2 and 3 on input terminal block (TB1) of one of the applicators.
10. Reinstall the perforated end panel.
11. Restore input power to the applicator.
12. Recheck the voltage between the hose fittings as previously described.

NOTE: The voltage obtained will either be the difference between the input voltages to the hose circuits or the sum of the input voltages. If the voltage equals the difference, installation is complete. If the voltage equals the sum, refer back to Voltage Equal to the Sum of Input Voltages for corrective action.



Ensure that all insulating hose cuffs are properly installed over fittings to prevent inadvertent contact by personnel or with the parent machine. Disconnect and lock out input power to the applicator until the appropriate step in Section III, Setup and Initial Operation.



SECTION III OPERATING INSTRUCTIONS

SETUP AND INITIAL OPERATION



Wear safety glasses, safety gloves (P/N 902 514), and protective clothing to prevent injury from hot applicator parts, splashed hot melt adhesive material, and hot gun surfaces.



The Model VII hot melt applicator and associated guns and hoses contain energized electrical components with potentials that could be fatal. Only qualified personnel shall operate this equipment.



Do not trigger guns with cold material in the guns. Damage may result to the ball and piston seat or module seals.

1. Check input air pressure to the pump filter/regulator at zero pressure.
2. Check filter drain valve and circulation valve drain shut.
3. Fill the adhesive tank with clean hot melt adhesive material.



Do not use electrically conductive adhesive in the Model VII.

4. Close applicator tank lid immediately to prevent introduction of contaminants into the system.
5. Set tank temperature control to the recommended temperature for the adhesive material being applied.

NOTE: Hose temperature control should remain at minimum setting until material in the tank is almost completely melted.

6. Energize input electrical power to the applicator.
7. Close main circuit breaker (switch) and hose circuit breaker.

NOTE: White POWER ON and amber TANK lights should illuminate.

8. As the adhesive in the tank starts to reach application temperature, set hose temperature controller to application temperature.



Heating an empty hose for longer than 15 minutes can cause internal damage to the hose. This can cause it to rupture when hydraulic pressure is applied.

9. Close the circulation valve by turning full clockwise.



The circulation valve should turn easily. Do not attempt to turn the valve with solidified hot melt adhesive in the system. Never use tools to turn the valve. Any such action can cause damage to the tungsten carbide stem and seat.

10. When the tank and hoses reach application temperature, open the filter drain and circulation valve drain.
11. Slowly increase input air pressure to the pump until the pump starts to stroke once every two seconds.



Trapped air in the applicator, hoses, and guns may cause spitting of air and molten adhesive as the system fills. Shield the area and personnel from splashed adhesive material.

12. Allow material to flow from both drains until the streams flow free of air and contaminants.
13. Close filter drain and circulation valve drain.
14. Remove gun nozzle and trigger gun into a waste container until the adhesive flows free of air and contaminants.
15. Reinstall nozzle.
16. Set pressure regulator on pump to zero pressure.
17. Crack open filter drain and circulation valve drain to relieve trapped hydraulic pressure in the system.
18. Remove and clean filter assembly in accordance with Section IV, Filter Cleaning.
19. Reinstall filter assembly.
20. Close filter drain and circulation valve drain.
21. Set pump pressure regulator to 30 psi (205 kPa).
22. Turn the circulation valve knob counterclockwise until the pump is stroking at a rate of 10 to 15 strokes per minute. Lock the circulation valve in position by turning lower knob full clockwise.



23. Set input air pressure to the gun to desired setting.
24. The system is ready for use.

DAILY OPERATION

DAILY STARTUP

1. Close applicator main circuit breaker (switch).
2. Check tank level and add adhesive material as necessary.
3. Adjust tank and hose temperature controllers to desired setting.
4. When the system reaches application temperature, adjust input air pressures to the pump and gun to the desired settings.

DAILY SHUTDOWN

1. Open main circuit breaker (switch) on applicator.
2. Reduce pump and gun air pressures to zero at the regulators.

ADHESIVE LOADING

Refill the adhesive tank with fresh, clean adhesive when material level in the tank drops below one-half full.

NOTE: Keeping adhesive level in the tank above one-half full eliminates the problem of starving the pump because the tank ran out of molten adhesive.

To prevent the adhesive supply from becoming contaminated, store the fresh adhesive in a closed container.



Be certain the adhesive added is clean and free of contaminants. Do not allow contaminants to enter the hot melt tank. Foreign particles may lodge in the pump causing premature failure or improper operation.



DAILY START-UP

1. Turn the applicator on. Allow the adhesive in the tank to melt.
2. Adjust the air pressure to the pump to the desired setting.

DAILY SHUTDOWN

1. Shut the applicator main switch off.
2. Reduce pump air pressure to zero.

SAFETY PRECAUTIONS

1. Do not touch the hot melt guns when in use. They are hot.
2. Reduce pump air pressure to zero and relieve hydraulic pressure by triggering the gun before removing the adhesive filter, opening filter drain, or removing a nozzle.
3. Disconnect and lock out the applicator main switch before opening the electrical enclosure.

OPERATION

Set the tank and hose temperature controller and air to the adjustments suggested by Nordson personnel and/or adhesive representative.

Tank Temperature	_____ °F
Hose Temperature	_____ °F
Pump Air Pressure	_____ psig
Gun Air Pressure	_____ psig

REMOVE THIS PAGE FROM THE SERVICE MANUAL
HANG IT NEAR YOUR APPLICATOR FOR REFERENCE.



SECTION IV MAINTENANCE

INTRODUCTION

Both preventive maintenance and corrective maintenance procedures are presented in the following paragraphs. Preventive maintenance procedures describe measures such as periodic inspections, nozzle cleaning, and material changeover. Corrective maintenance procedures describe measures such as equipment troubleshooting, removal and replacement of assemblies, and disassembly and repair of particular components of the system.



The Model VII hot melt applicator and associated hoses and guns contain energized electrical components with potentials that could be fatal. Disconnect and lock out input electrical power before attempting to perform maintenance on this equipment.



Wear safety glasses, safety gloves (P/N 902 514), and protective clothing to prevent injury from hot applicator parts, splashed hot melt adhesive material, and hot gun surfaces.



Relieve system pressure before breaking any mechanical connections (i.e., gun/hose connection, adhesive filter, etc). Open filter drain and circulation valve drain to prevent pressure buildup.



Never heat any component with a torch or other open flame. If it becomes necessary to heat components for maintenance, use an electric oven with forced air circulation or a flameless electric heat gun.



Halogenated hydrocarbon solvents are dangerous when used to clean aluminum components in a pressurized fluid system. Halogenated hydrocarbon fluids include fluorocarbon solvents, chlorinated solvents, brominated solvents, and iodinated solvents. No available stabilizers prevent halogenated hydrocarbon solvents from reacting under all conditions with aluminum components in a pressurized fluid pumping system. Never clean any aluminum component or flush any system using halogenated hydrocarbon solvents. Use Type R solvent or contact your solvent or adhesive supplier for a non-halogenated hydrocarbon solvent for cleaning and flushing.

PREVENTIVE MAINTENANCE

GENERAL MAINTENANCE

1. Keep applicator clean at all times.
2. Hot melt adhesive material supply shall be kept clean and free of contaminants. Foreign particles in the hot melt adhesive can block the filter or damage the pump.
3. Flush the system daily through the filter drain and the circulation valve drain.
4. Periodically clean regulator filters.
5. Periodically clean applicator filter assembly.
6. Periodically clean the inside of the control cabinet with an air purge.
7. Check electrical connections and terminal blocks for security.



Vibration and heating/cooling cycles may loosen terminals resulting in possible damage to electrical components or improper system operation.

8. Lubricate piston pump shaft and trip collar semiannually with lubricant (P/N 900 252).

MATERIAL CHANGE

If the old and new adhesive materials are compatible, add the new material to the tank. If the old and new materials are not compatible, flush the system using the procedures detailed in Section IV, System Cleaning. Contact your adhesive supplier for compatibilities and acceptable flushing solvents.



Never clean components or flush any system using halogenated hydrocarbon solvents.

NOZZLE CLEANING

Nozzle clogging occurs whenever a filter screen is damaged or there is charred material in the hose or gun. Char can occur when an adhesive is heated above the application temperature recommended by the adhesive manufacturer. If charring occurs, it may be necessary to replace the hose and/or gun.



The flash point of Type R solvent is 572°F (289°C). Do not heat this material above 475°F (245°C). See Section 59-1 for further details. Do not heat Type R solvent with an open flame or in an unregulated heating device (i.e., a small pan on an unregulated hot plate). A fire hazard may exist if an open flame or uncontrolled hot plate is used to heat Type R solvent. A controlled heating device (i.e., a small deep fat fryer or thermostatically controlled hot plate) shall be used to heat the solvent above the melting temperature of the hot melt adhesive material.



Wear safety glasses, safety gloves (P/N 902 514), and protective clothing to prevent injury from hot applicator parts, splashed hot melt adhesive material, or hot gun surfaces.

Use the following procedure to clean gun nozzles:

1. Heat the gun to operating temperature.
2. Reduce pump air pressure to zero at the regulator.
3. Trigger all guns to relieve trapped hydraulic pressure in the system.
4. Open the filter drain and circulation valve drain.
5. Reduce gun air pressure to zero at the regulator.



Failure to relieve system pressure before breaking any mechanical connections could result in serious burns when the nozzle is removed.

6. Remove the nozzle.
7. Place the nozzle in a container of Type R solvent and heat the solvent to the melting temperature of the adhesive material being used.



Solvents may present a toxic or fire hazard, even at room temperature. Use extreme care in selecting a cleaning solvent other than Type R solvent.



Some solvents may not be compatible with the hot melt adhesive material. Sludge formation can further compound the problem. Test the solvent with a small sample of adhesive before using the solvent in the system.

8. Clean the nozzle with a pin-type probe inserted into the nozzle in a direction opposite to the flow of material.



NOTE: See Section 43-2 for specific information on Nordson nozzle cleaning kits.



Do not use an open torch, drill, or broach to clean a nozzle. Damage may result.

NOTE: Alternate nozzle heating and cleaning techniques include heating components with a flameless heat gun and wiping with a clean cloth, submerging parts in an ultrasonic cleaner, or submerging parts in a chemical cleaner.

9. Reassemble nozzle onto gun.
10. Restore system to normal operation.

FILTER ASSEMBLY CLEANING

Clean the adhesive filter once a week, unless operating experience indicates more or less frequent cleaning is required. A complete filter assembly is recommended as a spare for faster filter changes. Hot melt system must be at operating temperature before filter is removed for cleaning.



Wear safety glasses, safety gloves (P/N 902 514), and protective clothing to prevent injury from hot applicator parts, splashed hot melt adhesive material, or hot gun surfaces.

Use the following procedure to clean the adhesive filter:

1. Heat the system to operating temperature.
2. Reduce pump pressure to zero at the regulator.
3. Momentarily trigger all guns to relieve trapped hydraulic pressure.
4. Open the filter drain over an open container.
5. Increase pump air pressure until adhesive flows steadily from the drain. Allow material to flow until it is clean and free of all contaminants.
6. Reduce pump air pressure to zero at the regulator.



Failure to relieve system pressure can result in serious burns when the filter is removed.

7. Unscrew filter assembly and remove from manifold.

8. Using Figure 5 as a guide, remove screw (A) from filter bung (B) and disassemble filter.

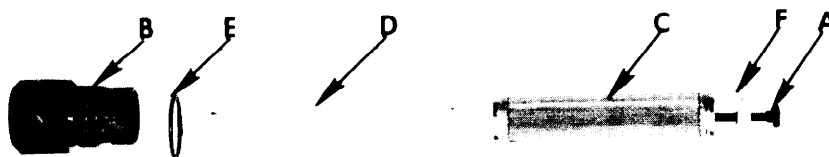


Figure 5 - Adhesive Filter Assembly



The flash point of Type R solvent is 572°F (289°C). Do not heat this material above 475°F (245°C). See Section 59-1 for further details. Do not heat Type R solvent with an open flame or in an unregulated heating device (i.e., a small pan on an unregulated hot plate). A fire hazard may exist if an open flame or unregulated hot plate is used to heat Type R solvent. A controlled heating device (i.e., a small deep fat fryer or thermostatically controlled hot plate) shall be used to heat the solvent above the melting temperature of the adhesive material.

9. Several methods for cleaning a hot melt adhesive filter screen (C) may be used, depending on the type of hot melt adhesive material used in the system, as noted below.
- a. Place the filter in a container of Nordson Type R solvent and heat above the melting temperature of the adhesive. Scrub the screen with a fine bristle brush.
 - ⊘ Some solvents may not be compatible with the hot melt adhesive material. Sludge formation can further compound the problem. Test the solvent with a small sample of adhesive before using the solvent in the system.
 - ⊘ Do not use a metal brush to clean the filter screen. Damage may result to the screen preventing proper operation of the filter.
 - b. Screens may be heated with a flameless electric heat gun and wiped clean with a dry cloth.
 - c. Use an ultrasonic cleaner filled with solvent to clean the filter components.
 - d. Use a chemical cleaner to clean the filter components.
10. Inspect the screen for damage.



NOTE: Any dents or breaks in the mesh indicate damage beyond repair. Replace with a new screen. The screen should always be smaller than the smallest nozzle orifice. See Section VI, Illustrated Parts List, for optional filter screens.

11. Slide screen (C) over core (D), as shown in Figure 5.
12. Place support on end of screen, insert screw through core, and tighten screw into filter bung.
13. Inspect o-ring for damage.

NOTE: Any indication of cuts, nicks, hardening, or other physical damage constitutes o-ring failure. Replace with P/N 941 240.

14. Screw filter assembly into manifold, finger tight only.
15. Increase input air pressure to pump and purge filter as in step 5.
16. Close filter drain.
17. Tighten filter snugly. Do not overtighten.



Ensure filter manifold is at operating temperature before the filter is tightened. Cold material on filter and/or manifold walls can cause filter screen to collapse if filter is tightened in a cold system.

SYSTEM CLEANING

The entire hot melt adhesive application system shall be flushed periodically to remove excess dirt and charred material. Use the following procedure to clean out and change adhesive material.



Wear safety glasses, safety gloves (P/N 902 514), and protective clothing to prevent injury from hot applicator parts, splashed hot melt adhesive material, and hot gun surfaces.



Relieve system pressure before breaking any mechanical connections or opening any valves by reducing pump air pressure to zero, momentarily triggering all guns, and opening filter drain.



Some solvents may not be compatible with the hot melt adhesive material. Sludge formation can further compound the problem. Test the solvent with a small sample of adhesive before using the solvent in the system.



1. With the unit at operating temperature, remove all adhesive from the system by pumping through the filter drain and/or circulation valve drain.
2. Reduce pump air pressure to zero at the regulator as draining is completed.
3. Place several pounds of fresh, uncontaminated adhesive material normally used in production into the adhesive tank.

NOTE: Type R solvent may be used in place of adhesive material. Contact the adhesive manufacturer for solvent compatibility with the adhesive used in the system.

4. When the material is molten, close the circulation valve.
5. Increase pump air pressure to 20 psi (140 kPa).
6. Open circulation valve drain and filter drain. Allow material to flow out the drains until it is clean and free of contaminants.
7. Close drain valves and open circulation valve (full counter-clockwise).
8. Allow material to circulate through the system for 15 minutes.
9. Close circulation valve and open filter drain and circulation valve drain.
10. Drain system.
11. Reduce pump air pressure to zero at the regulator as draining is complete.
12. Remove and clean adhesive filter in accordance with Section IV, Filter Assembly Cleaning.
13. Reinstall filter assembly and close drain valves.
14. Restart the system in accordance with Section III, Setup and Initial Operation.



To eliminate contamination of the adhesive by solvent that may remain in the system, melt adhesive in the tank and pump through the hoses and guns to the circulation valve drain until all the solvent is removed from the system. Solvent mixed with adhesive can cause bond failure, or odor contamination of packaged food products.

CORRECTIVE MAINTENANCE

Obvious causes of malfunction, such as broken wires and missing fasteners, are generally not considered as part of corrective maintenance. These types of incidents should be noted and eliminated during periodic cleaning and inspection, unless the failure presents an immediate hazard to personnel or to the equipment.

Tables 3 and 5 present a synopsis of the mechanical and electrical troubleshooting charts, respectively. Only typical faults and probable causes are listed. If the cause of failure is not readily apparent, refer to the appropriate troubleshooting chart for corrective action. The alphanumeric designations listed in the Reference column specify the step in the troubleshooting chart.

Tables 4 and 6 detail the mechanical and electrical troubleshooting charts, respectively, for the Model VII hot melt application systems. The tables introduce typical fault situations and the procedural steps necessary to isolate and confirm the fault. Alphanumeric designations in these tables serve to organize the tables into related groups of procedural steps. The tables then specify the corrective action to be taken based on the results of the associated procedural statement. A normal indication usually requires continuation of the fault isolation procedure or re-evaluation of the fault.

TABLE 3 - TROUBLESHOOTING CHART - MECHANICAL SUMMARY

Fault Condition	Probable Cause	Ref
AIR MOTOR NOT STROKING	Cold adhesive in tank.	A1
	Circulation valve blocked or damaged.	A2
	Cold joints in hydraulic system.	A4
	Adhesive filter blocked.	A5
	No air pressure to piston pump.	A6
	Faulty pressure regulator.	A7
	Faulty solenoid valve.	A7



TABLE 3 - TROUBLESHOOTING CHART - MECHANICAL SUMMARY
(Continued)

Fault Condition	Probable Cause	Ref
AIR MOTOR NOT STROKING (Continued)	Air cylinder leakage.	A8
	Damaged air control valve.	A9
	Air cylinder mechanical failure.	A12
	Hydraulic cylinder malfunction.	A12
NO ADHESIVE FROM GUN, AIR MOTOR STROKING	No air pressure to gun solenoid valve.	B1
	Failed pressure regulator.	B1
	Faulty solenoid valve.	B1
	Clogged nozzle.	B2
	Internal blockage or damage in gun.	B2
AIR MOTOR STROKING ERRATICALLY OR TOO FAST	Pump starved.	C1
	Circulation valve improperly set.	C2
	Pressure relief valve stuck open.	C4
	Circulation valve damaged.	C5
	Damaged air cylinder components.	C6
	Damaged hydraulic cylinder components.	C6
PUMP STROKES RAPIDLY ON UP STROKE ONLY	Failed plunger packing.	D1
MOLTEN MATERIAL PUDDLES AROUND PUMP MOUNT	Piston packing failed.	E1

TABLE 4 - TROUBLESHOOTING CHART - MECHANICAL

If the applicator is operable, flush the system before assembly. If the pump is not operable but the heating system is functional, heat the unit to application temperature and drain to ease disassembly. Otherwise, a heat gun or other flameless heating method must be used to melt solidified hot melt adhesive material on internal parts.



Before removing any panels to start disassembly, turn main circuit breaker (switch) OFF and disconnect and lock out input electrical power to prevent injury from energized electrical components.



Relieve system pressure before attempting to loosen any part of the manifold, hose, or gun system by securing air to pump, triggering all guns, and opening filter drain.



Wear safety glasses, safety gloves (P/N 902 514), and protective clothing to prevent injury from hot applicator parts, splashed hot melt adhesive material, and hot gun surfaces.



Never heat any component with a torch or other open flame. If a component must be heated, use an electric oven with forced air circulation or a flameless electric heat gun.



Review the Safety Summary, Section 40-1, before attempting to perform maintenance on this equipment. The Safety Summary is duplicated in the front of this service manual.

AIR MOTOR NOT STROKING

- A1. Check tank and hose temperature controllers for proper settings.

NORMAL INDICATION: Temperature in tank corresponds to temperature setting. Both controllers set at proper temperature. Proceed to next step.

ABNORMAL INDICATION: Tank temperature and/or hose temperature not properly set. Re-set to proper level. See Electrical Troubleshooting Chart if settings are correct.



TABLE 4 - TROUBLESHOOTING CHART - MECHANICAL (Continued)

- A2. Reduce air pressure to the pump to zero, crack open circulation valve drain, and then increase air pressure to pump. Check for adhesive flow.

NORMAL INDICATION: Air motor starts to stroke when valve is opened. Blockage is in the circulation valve. Remove and rebuild circulation valve. Restore system to normal operation.

ABNORMAL INDICATION: If air motor does not stroke when valve is opened, blockage is upstream of the valve. Proceed to the next step.

- A3. Reduce air pressure to the pump to zero, close circulation valve drain, open filter drain, and then increase air pressure to the pump. Check for adhesive flow from drain.

NORMAL INDICATION: Air motor starts to stroke when valve is opened. Blockage is downstream of the filter. Close filter drain and reduce air pressure to the pump to zero. Proceed to the next step.

ABNORMAL INDICATION: If the air motor does not stroke when valve is opened, blockage is upstream of the drain. Close filter drain and reduce pump air pressure to zero. Proceed to step A5.

- A4. Check for cold components and joints in hydraulic system.

NORMAL INDICATION: All components and joints in hydraulic system are hot. Disassemble gun service block and module to clear blockage.

ABNORMAL INDICATION: If a cold joint is identified, provide adequate insulation cuff on joint. See Electrical Troubleshooting Chart if hose is not heating.

- A5. Remove filter assembly and check for blocked screen by slowly increasing pump air pressure. Check for adhesive flow from manifold.



TABLE 4 - TROUBLESHOOTING CHART - MECHANICAL (Continued)

NORMAL INDICATION: Adhesive wells up out of manifold and pump strokes. Reduce air pressure to the pump to zero. Clean and reinstall filter into manifold. Restore system to normal operation.

ABNORMAL INDICATION: No adhesive flow and pump does not stroke. Problem is in the pump. Reduce air pressure to zero. Reinstall filter into manifold. Proceed to next step.

A6. Check input air supply to filter/regulator.

NORMAL INDICATION: 50 to 100 psi (345 to 690 kPa). Proceed to next step.

ABNORMAL INDICATION: Improper pressure indication. Check input air supply. Restore system to normal operation.

A7. Check pressure regulator and solenoid valve to air cylinder in the following manner:

- a. Set regulator for zero pressure by turning dial full counterclockwise.
- b. Shut off air supply to regulator.
- c. Disconnect regulator and solenoid valve from air cylinder.
- d. Restore air supply to regulator.
- e. Check main circuit breaker (switch) closed.
- f. Slowly increase air pressure at the regulator by turning dial clockwise.

NORMAL INDICATION: Gradually increasing audible noise from solenoid. Restore system to normal and proceed to step A8.

ABNORMAL INDICATION: Continue to next step if no air issues from solenoid valve when regulator is opened. Set regulator to zero and secure input air to regulator. Proceed to the next step.



TABLE 4 - TROUBLESHOOTING CHART - MECHANICAL (Continued)

- g. Remove solenoid valve from regulator.
- h. Restore input air to regulator and slowly increase air pressure out of regulator.

NORMAL INDICATION: Gradually increasing audible noise from regulator. Replace faulty solenoid valve and restore system to normal.

ABNORMAL INDICATION: Replace regulator if no air issues from regulator. Restore system to normal operation.

NOTE: Air cylinder malfunctions may be caused by seal leakage or mechanical failure. Proceed with fault isolation procedures in the following manner.

- A8. Set pump air pressure to 30 psi (205 kPa) and check air motor for leakage.

NORMAL INDICATION: No air leakage apparent. Proceed to the next step.

ABNORMAL INDICATION: Seal leakage. Use the following chart to determine failed seal. Nordson recommends that all seals be replaced when the air cylinder is disassembled for maintenance.

With Piston on Up Stroke

Air Leakage Location:

Probable Failed Seal:

- | | |
|---|----------------------------------|
| a. Around shaft inside pump mount. | U-cup pump mount |
| b. Top exhaust port (poppet open). | Lower piston cup or upper poppet |
| c. Bottom exhaust port (poppet closed). | Lower poppet seal washer |
| d. Bottom of cylinder. | Pump mount slab gasket |
| e. Between air valve and pump mount. | Lower valve gasket |



TABLE 4 - TROUBLESHOOTING CHART - MECHANICAL (Continued)

With Piston on Down StrokeAir Leakage Location:

- a. Bottom exhaust port (poppet open).
- b. Top exhaust port (poppet closed).
- c. Top of cylinder.
- d. Between air valve and cylinder head.

Probable Failed Seal:

- Upper piston cup or lower poppet
- Upper poppet seal washer
- Cylinder head slab gasket
- Upper valve gasket

A9. Visually inspect four-way air control valve actuating rod for binding or physical damage.

NORMAL INDICATION: Actuating rod is straight with no evidence of binding. Proceed to next step.

ABNORMAL INDICATION: Actuating rod is damaged or there is evidence of binding. Replace actuating rod and restore system to normal operation.

A10. Visually inspect valve shifter and trip collar for proper lubrication and evidence of binding or physical damage.

NORMAL INDICATION: Valve shifter and trip collar properly installed and lubricated. No evidence of binding or physical damage. Proceed to next step.

ABNORMAL INDICATION: Valve shifter or trip collar damaged or binding. Replace damaged parts and restore system to normal operation.

A11. Remove and disassemble four-way air control valve. Check for binding and physical damage.

NORMAL INDICATION: No binding or physical damage. Reinstall valve onto air cylinder. Proceed to next step.

ABNORMAL INDICATION: Evidence of binding or physical damage to internal valve parts. Replace damaged parts and restore system to normal operation.



TABLE 4 - TROUBLESHOOTING CHART - MECHANICAL (Continued)

NOTE: Air motor failure is usually indicated by the pump stalling in an extreme position at one end of the stroke or the other.

- A12. Check for air motor failure by manually shifting the four-way air control valve with air pressure applied to the applicator.

NORMAL INDICATION: Air motor makes one stroke and stops. Disassemble air cylinder and replace damaged or binding components. Reassemble and restore system to normal operation.

ABNORMAL INDICATION: Air motor does not stroke. Disassemble hydraulic cylinder and replace damaged or binding components. Reassemble and restore system to normal operation.

NO ADHESIVE FLOW FROM GUN, AIR MOTOR STROKING

- B1. Check input air pressure to guns at the filter/regulator and solenoid valve.

NORMAL INDICATION: 30 to 100 psi (205 to 690 kPa). Proceed to the next step.

ABNORMAL INDICATION: Refer to appropriate gun service manual for troubleshooting procedure and corrective action. The fault may be a failed regulator, solenoid valve, or gun.

- B2. Reduce air pressure to gun to zero at the regulator and remove nozzle from gun. Reset air pressure to normal setting and momentarily trigger gun. Check for adhesive flow.

NORMAL INDICATION: Material extrudes from gun with nozzle removed. Clean nozzle in accordance with Section IV, Nozzle Cleaning. Restore system to normal operation.

ABNORMAL INDICATION: Refer to appropriate gun service manual for troubleshooting procedure and corrective action.



TABLE 4 - TROUBLESHOOTING CHART - MECHANICAL (Continued)

AIR MOTOR STROKING ERRATICALLY OR TOO FAST

NOTE: Erratic stroking of the piston pump is indicated by two exhaust sounds close together followed by a pause (double stroking). This results because the piston is moving faster in one direction than the other.

C1. Check adhesive tank for proper level and sufficient melting.

NORMAL INDICATION: Adhesive in molten state and tank at least one-half full of adhesive. Proceed to the next step.

ABNORMAL INDICATION: Increase tank temperature setting and/or add fresh adhesive to tank. If tank is not heating, refer to Electrical Troubleshooting Chart for procedure and corrective action.

C2. Close circulation valve and check that pump slows noticeably.

NORMAL INDICATION: Pump stroking slows noticeably. Reset circulation valve for 10 to 15 strokes per minute.

ABNORMAL INDICATION: No change in pump stroking. Proceed to next step.

C3. Relieve system pressure by reducing pump air pressure to zero at the regulator, momentarily triggering gun to relieve trapped hydraulic pressure, and opening filter drain and circulation valve drain.

C4. Remove each pressure relief valve and check for char or foreign material on seat.

NORMAL INDICATION: Relief valves free of char and foreign material. Reinstall valves and proceed to the next step.

ABNORMAL INDICATION: Fouled seat. Disassemble and clean valve. Reinstall valve and restore system to normal operation.

C5. Remove circulation valve and check internally for char, foreign material, or physical damage.



TABLE 4 - TROUBLESHOOTING CHART - MECHANICAL (Continued)

NORMAL INDICATION: Valve is free of char and foreign material. No physical damage is apparent. Reinstall valve and proceed to next step.

ABNORMAL INDICATION: Valve is fouled with char or foreign material and is damaged. Replace damaged parts and clean valve. Restore system to normal.

C6. Remove piston pump assembly from applicator and disassemble hydraulic cylinder. Check for char or foreign material holding pressure ball off its seat. Also check for physical damage.

NORMAL INDICATION: No char or foreign particles in cylinder; no physical damage. Disassemble air cylinder and check for damage. Repair as necessary. Restore system to normal operation.

ABNORMAL INDICATION: Clean hydraulic cylinder to remove char and foreign particles. Replace damaged parts. Restore system to normal operation.

PUMP STROKES RAPIDLY ON UP STROKE ONLY (WAX PUMP ONLY)

D1. Disassemble hydraulic pump and check hydraulic plunger packing. Replace as necessary.

MOLTEN MATERIAL PUDDLES AROUND PUMP MOUNT (WAX PUMP ONLY)

E1. Disassemble hydraulic pump and check for failed piston packing. Replace as necessary.



TABLE 5 - TROUBLESHOOTING CHART - ELECTRICAL SUMMARY

Fault Condition	Probable Cause	Ref
TANK FAILS TO HEAT OR UNDERHEATS	Main fuses blown (460 VAC unit only).	A1
	Control circuit fuse blown.	A1
	Defective main circuit breaker (switch).	A4
	Improper transformer output voltage.	A6
	Tank heat limiter open.	A7
	Defective tank temperature controller.	A9
	Faulty tank control relay.	A11
	Tank heater open.	A14
TANK OVERHEATS	Defective tank heat limiter.	B3
	Tank temperature controller defective.	B4
	Tank temperature control relay contacts welded shut.	B5
HOSES AND GUNS FAIL TO HEAT	Hose temperature controller improperly set.	C1
	Main fuses blown (460 VAC unit only).	C2
	Control circuit fuse blown.	C2
	Defective main circuit breaker (switch).	C5
	Improper transformer output voltage.	C7
	Hose circuit breaker defective.	C8



TABLE 5 - TROUBLESHOOTING CHART - ELECTRICAL SUMMARY
(Continued)

Fault Condition	Probable Cause	Ref
HOSES AND GUNS FAIL TO HEAT (Continued)	Hose temperature controller defective.	C11
	Failed hose temperature sensor.	C14
	Defective hose control relay.	C17
	Defective hose.	C18
	Defective gun.	C18
HOSES AND GUNS UNDERHEATING	Improper transformer output voltage.	D2
	Transformer defective.	D3
HOSES AND GUNS OVERHEATING	Improper transformer output voltage.	E2
	Defective hose temperature sensor.	E3
	Hose temperature controller defective.	E4
	Hose temperature control relay contacts welded shut.	E4



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL

If possible, a starting condition should be established to enable determination of a fault condition. The applicator should be at normal operating temperature with the main circuit breaker (switch) and hose circuit breaker closed. Air pressure to the air motor and gun should be at normal settings.



The Model VII hot melt applicator and associated hoses and guns contain energized electrical components with potentials that could be fatal. Disconnect and lock out input electrical power to the applicator before removing any panels or attempting to perform maintenance on this equipment.



Review the Safety Summary, Section 40-1, before attempting to perform maintenance on this equipment. The Safety Summary is duplicated in the front of this manual.

TANK FAILS TO HEAT OR UNDERHEATS

- A1. Open the main circuit breaker (switch) on the applicator. Remove each of the main power fuses and the control power fuse. Check for continuity.

NORMAL INDICATION: Continuity.
Reinstall fuses and restore input power to applicator.
Proceed to the next step.

ABNORMAL INDICATION:
Open circuit. Replace defective fuse.
Reinstall fuses and restore system to normal operation.

- A2. With input power connected, measure line voltage at terminal board TB1 between terminals 1 and 2, 2 and 3, and 1 and 3.

NOTE: If single-phase operation is utilized, measure line voltage between terminals 1 and 2. Check wire No. 3 attached at terminal 1 (L1).

NORMAL INDICATION: Voltage specified on applicator front panel measured between each of the above points. Proceed to the next step.

ABNORMAL INDICATION: Unequal or no line voltage measured between terminals. Check input voltage source and restore system to normal operation.



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

- A3. Disconnect and lock out input electrical power to the applicator.



Input terminal block TB1 and input terminals on main circuit breaker (switch) are electrically energized if external power is not disconnected, even though the main circuit breaker (switch) is open.

- A4. Close main circuit breaker (switch) on applicator and check continuity from input to output terminals on main circuit breakers. Also check continuity between output wires on circuit breaker (switch).

NORMAL INDICATION: Continuity between input and output wires. Open circuit or high resistance between breakers. Proceed to the next step.

ABNORMAL INDICATION: Open circuit between input and output wires or short circuit between breakers. Replace main circuit breaker (switch) and restore system to normal.

- A5. Check for loose or broken wiring connections on all electrical components. Check all wiring for exposed wire shorting to ground or to another wire or terminal.

NORMAL INDICATION: All wiring connections tight with no broken or exposed wires. Proceed to the next step.

ABNORMAL INDICATION: Replace defective wiring and tighten loose connections. Restore system to normal operation.

- A6. Check transformer output voltage in the following manner:

- a. Remove wire at either terminal X1 or X2 on the secondary side of transformer and cover exposed wire terminal with tape.
- b. Remove wire at either terminal 1 or 12 on the transformer terminal board and cover exposed wire terminal with tape.
- c. Restore input electrical power to the applicator and close main circuit breaker (switch).



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

d. Measure the voltage between X1 and X2 on the transformer.

NORMAL INDICATION: 115 VAC. Proceed to the next step.

ABNORMAL INDICATION: No voltage. Replace transformer and restore system to normal operation.

e. Measure the voltage between terminals 1 and 12 on transformer terminal board.

NORMAL INDICATION: 77 VAC. Disconnect input electrical power and reconnect wires to transformer. Proceed to the next step.

ABNORMAL INDICATION: No voltage. Replace transformer and restore system to normal operation.

A7. Open tank front panel and check heat limiter for continuity.

NOTE: The heat limiter should open at 465°F (240°C) and reset closed at 365°F (185°C).

NORMAL INDICATION: Continuity with tank temperature below 365°F (185°C). Proceed to the next step.

ABNORMAL INDICATION: Open circuit with tank temperature below 365°F (185°C). Replace heat limiter and restore system to normal operation.

A8. Check continuity of wire No. 23 between TB2-2 and TB3-3. Check continuity of wire No. 26 between TB2-3 and TB3-4.

NORMAL INDICATION: Continuity. Proceed to the next step.

ABNORMAL INDICATION: Open circuit or resistance. Replace defective wire. Restore system to normal operation.

A9. Check continuity of tank temperature controller by connecting ohmmeter between wire No. 35 (Normally Closed



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

contact) and wire No. 36 (Common) and rotating tank temperature control knob from maximum to minimum setting.

NORMAL INDICATION: Continuity until setting reaches actual tank temperature, then open circuit to minimum setting. Proceed to the next step.

ABNORMAL INDICATION: If continuity is lost at a setting much different from actual tank temperature, replace tank temperature controller and restore system to normal operation.

- A10. Check continuity of wire No. 35 between TB2-5 and TTC.
Check continuity of wire No. 36 between TB2-3 and TTC.

NORMAL INDICATION: Continuity. Proceed to the next step.

ABNORMAL INDICATION: Open circuit or resistance. Replace defective wire. Restore system to normal operation.

- A11. Remove wire No. 24 from TB2-7 and wire No. 25 from TB2-4.
Check continuity between wires.

NORMAL INDICATION: Continuity. Tank control relay and wires are good. Proceed to step A14.

ABNORMAL INDICATION: Open circuit. Proceed to the next step.

- A12. Check continuity between wire terminals on tank control relay, between wire No. 24 end and control relay, and between wire No. 25 end and control relay.

NORMAL INDICATION: Continuity. Reconnect wires and proceed to the next step.

ABNORMAL INDICATION: Open circuit. Replace defective relay or wire. Restore system to normal operation.

- A13. Check control relay contacts by measuring continuity between wire No. 6 (wire No. 42 on 460 VAC unit) and wire No. 9 and between wire No. 7 and wire No. 8 while holding contacts manually closed.



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

NORMAL INDICATION: Continuity.
Proceed to the next step.

ABNORMAL INDICATION:
Open circuit. Replace
control relay. Restore
system to normal opera-
tion.

A14. Remove wire No. 8 or wire No. 9 from control relay and
measure resistance of tank heaters between the wires.

NORMAL INDICATION: Parallel con-
nected heaters: 20.2 to 22.9
ohms. Series connected heaters:
83.0 to 91.6 ohms. Reconnect
wires and restore system to
normal operation.

ABNORMAL INDICATION:
Parallel connected
heaters: open circuit
or 41.5 to 45.8 ohms.
Series connected heat-
ers: open circuit.
Proceed to the next
step.

A15. Remove electrical control cabinet panels, tank panels,
and components necessary to expose heater terminals on
the tank wall.

A16. Disconnect jumper(s) on heater terminals and measure
resistance between wire No. 8 and the terminal next to
it. Also measure resistance between wire No. 9 and the
terminal next to it.

NORMAL INDICATION: 41.5 to 45.8
ohms. Tank heaters are good.
Proceed to the next step.

ABNORMAL INDICATION:
Open circuit. Replace
tank and restore system
to normal operation.

A17. Check continuity of wire No. 8 from end to end, wire No.
9 from end to end, and each of the jumpers (wire No. 34)
from end to end.

NORMAL INDICATION: Continuity.
Reconnect wire to tank and to
control relay. Restore system
to normal operation.

ABNORMAL INDICATION:
Open circuit. Replace
defective wire. Re-
store system to normal
operation.



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

TANK OVERHEATS

- B1. Turn tank temperature controller knob to a lower temperature setting and observe the TANK ON indicator lamp.

NORMAL INDICATION: Amber indicator lamp should go out when setting goes below actual tank temperature. Proceed to step B5.

ABNORMAL INDICATION: Indicator lamp does not go out at any setting. Proceed to the next step.

- B2. Disconnect and lock out input electrical power to applicator.



Input terminal board TB1 and input terminals on main circuit breaker (switch) are electrically energized if external power is not disconnected, even if the main circuit breaker (switch) is open.

- B3. Check continuity of heat limiter from TB3-3 to TB3-4.

NOTE: Heat limiter opens at 465°F (240°C) and resets closed at 365°F (185°C).

NORMAL INDICATION: Continuity with tank temperature below 365°F (185°C). Proceed to the next step.

ABNORMAL INDICATION: Continuity with tank temperature above 465°F (240°C). Replace heat limiter and restore system to normal operation.

NOTE: Even though the heat limiter failed in the closed position or indicates open above 365°F (185°C), another component in the system may have failed to perform its function. Continue with the following fault isolation procedure.

- B4. Check continuity of tank temperature controller by measuring between wire No. 35 (Normally Closed contact) and wire No. 36 (Common) while rotating control knob from maximum to minimum setting.
-



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

NORMAL INDICATION: Continuity until setting reaches actual tank temperature, then open circuit to minimum setting. Proceed to the next step.

ABNORMAL INDICATION: Continuity lost at a different setting from actual tank temperature. Replace temperature controller and restore system to normal operation.

- B5. Check control relay contacts by checking continuity between wire No. 6 (wire No. 42 on 460 VAC unit) and wire No. 9 and between wire No. 7 and wire No. 8. Contactor should not be held manually closed for this test.

NORMAL INDICATION: Open circuit. Restore system to normal operation.

ABNORMAL INDICATION: Continuity across both sets of contacts. Replace control relay. Restore system to normal operation.

HOSES AND GUNS FAIL TO HEAT

- C1. Check the position of the hose temperature control knob.

NORMAL INDICATION: Setting at proper temperature for adhesive application. Proceed to the next step.

ABNORMAL INDICATION: Improper temperature setting for adhesive application. Reposition control knob to proper setting.

- C2. Open the main circuit breaker (switch) on the applicator. Remove each of the main power fuses and the control power fuse. Check for continuity.

NORMAL INDICATION: Continuity. Reinstall fuses and restore input power to applicator. Proceed to the next step.

ABNORMAL INDICATION: Open circuit. Replace defective fuse. Reinstall fuses and restore system to normal operation.



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

- C3. With input power connected, measure line voltage at terminal board TB1 between terminals 1 and 2, 2 and 3, and 1 and 3.

NOTE: If single-phase operation is utilized, measure line voltage between terminals 1 and 2. Check wire No. 3 attached at terminal 1 (L1).

NORMAL INDICATION: Voltage specified on applicator front panel measured between each of the above points. Proceed to the next step.

ABNORMAL INDICATION: Unequal or no voltage measured between terminals. Check input voltage source and restore system to normal operation.

- C4. Disconnect and lock out input electrical power to the applicator.



Input terminal block TB1 and input terminals on main circuit breaker (switch) are electrically energized if external power is not disconnected, even though the main circuit breaker (switch) is open.

- C5. Close main circuit breaker (switch) on applicator and check continuity from input to output terminals on main circuit breakers. Also check continuity between output wires on circuit breaker (switch).

NORMAL INDICATION: Continuity between input and output wires. Open circuit or resistance between breakers. Proceed to the next step.

ABNORMAL INDICATION: Open circuit between input and output wires or short circuit between breakers. Replace main circuit breaker (switch) and restore system to normal operation.

- C6. Check for loose or broken wiring connections on all electrical components. Check all wiring for exposed wire shorting to ground or to another wire or terminal.



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

NORMAL INDICATION: All wiring connections tight with no broken or exposed wires. Proceed to the next step.

ABNORMAL INDICATION: Replace defective wiring and tighten loose connections. Restore system to normal operation.

C7. Check transformer output voltage in the following manner:

- a. Remove wire at either terminal X1 or X2 on the secondary side of transformer and cover exposed wire terminal with tape.
- b. Remove wire at either terminal 1 or 12 on the transformer terminal board and cover exposed wire terminal with tape.
- c. Restore input electrical power to the applicator and close main circuit breaker (switch).
- d. Measure the voltage between X1 and X2 on the transformer.

NORMAL INDICATION: 115 VAC. Proceed to the next step.

ABNORMAL INDICATION: No voltage. Replace transformer and restore system to normal operation.

- e. Measure the voltage between terminals 1 and 12 on transformer terminal board.

NORMAL INDICATION: 77 VAC. Disconnect input electrical power and reconnect wires to transformer. Proceed to the next step.

ABNORMAL INDICATION: No voltage. Replace transformer and restore system to normal operation.

C8. Remove either wire No. 39 or wire No. 10 from hose circuit breaker and check continuity across breaker.

NORMAL INDICATION: Continuity. Reconnect wire and proceed to the next step.

ABNORMAL INDICATION: Open circuit. Replace circuit breaker and restore system to normal operation.



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

C9. Check continuity of wire No. 39 between control relay and hose circuit breaker. Check continuity of wire No. 10 between hose circuit breaker and transformer terminal board.

NORMAL INDICATION: Continuity.
Restore input electrical power to applicator and proceed to the next step.

ABNORMAL INDICATION:
Open circuit. Replace defective wire and restore system to normal operation.

C10. With input electrical power applied to the applicator, set hose temperature controller to maximum setting and note if control relay contacts close.

NORMAL INDICATION: Control relay contacts close. Proceed to step C18.

ABNORMAL INDICATION:
Control relay contacts do not close. Proceed to the next step.

C11. Check input voltage to hose temperature controller by measuring between terminals 1 and 2 (wire Nos. 17 and 18) on controller.

NORMAL INDICATION: 115 VAC. Proceed to the next step.

ABNORMAL INDICATION: No voltage. Proceed back to step C6 and check for failed transformer.

C12. Check hose temperature controller output voltage between terminals 5 and 6 (wire Nos. 27 and 28) with controller dial at maximum setting.

NORMAL INDICATION: 115 VAC. Proceed to the next step.

ABNORMAL INDICATION: No voltage. Replace hose temperature controller and restore system to normal operation.

C13. Disconnect and lock out input electrical power to the applicator.



Input terminal block TB1 and input terminals on main circuit breaker (switch) are electrically energized if external power is not disconnected, even if main circuit breaker (switch) is open.



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

C14. Remove wire No. 29 or wire No. 30 from hose temperature controller and check resistance between the wires.

NORMAL INDICATION: Hose sensor resistance from 675 ohms at 70°F (21°C) to 1500 ohms at 475°F (245°C). Reconnect wire and proceed to step C17.

ABNORMAL INDICATION: Resistance outside noted range. Proceed to the next step.

C15. Remove tank front panel and measure resistance between TB3-1 and TB3-2.

NORMAL INDICATION: Hose sensor resistance within the range specified in step C14. Proceed to the next step.

ABNORMAL INDICATION: Resistance outside range. Replace 1 ft hose w/ sensor. Restore system to normal operation.

C16. Check continuity of wire No. 29 between TB3-1 and terminal 3 on hose temperature controller. Check continuity of wire No. 30 between TB3-2 and terminal 4 on controller.

NORMAL INDICATION: Continuity. Proceed to the next step.

ABNORMAL INDICATION: Open circuit. Replace defective wire and restore system to normal.

C17. Check hose control relay in the following manner:

- a. Remove electrical cabinet rear panel and disconnect wire No. 27 from hose temperature control relay. Measure resistance between terminals on relay between wire No. 27 and wire No. 28.

NORMAL INDICATION: Approximately 100 ohms. Reconnect wire No. 27 and proceed to the next step.

ABNORMAL INDICATION: Open circuit. Replace hose control relay and restore system to normal operation.

- b. Check continuity of wire No. 27 and wire No. 28 by measuring between control relay and hose temperature controller.
-



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

NORMAL INDICATION: Continuity.
Proceed to the next step.

ABNORMAL INDICATION:
Open circuit. Replace
defective wire and re-
store system to normal.

- c. Check continuity between wire Nos. 11 and 13 and between wire Nos. 39 and 12 while holding control relay contacts manually closed.

NORMAL INDICATION: Continuity.
Proceed to the next step.

ABNORMAL INDICATION:
Open circuit. Replace
hose control relay.
Restore system to
normal operation.

- C18. Check continuity across each component in the hose/gun circuit by measuring from fitting to fitting.

NORMAL INDICATION: Hose resistance in accordance with Table 2. Gun resistance approximately 0.13 ohms. Restore system to normal operation.

ABNORMAL INDICATION:
Hose resistance valves
outside the range
specified in Table 2.
Replace defective
hose or gun. Restore
system to normal
operation.

HOSES AND GUNS UNDERHEATING

- D1. Disconnect and lock out input electrical power to applicator.



Input terminal block TB1 and input terminals on main circuit breaker (switch) are electrically energized if external power is not disconnected, even though the main circuit breaker (switch) is open.

- D2. Recalculate transformer output voltage to maintain about 25 to 28 amps in the hose and gun circuit. Check transformer terminal board for proper connection.



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

NORMAL INDICATION: Proper voltage selected. Proper terminal connections made. Proceed to the next step.

ABNORMAL INDICATION: Improper voltage selected. Reconnect hose wires on transformer terminal board to proper terminals. Restore system to normal operation.

D3. Remove wire No. 1 or wire No. 12 from transformer terminal block and cover exposed wire end with tape. Restore input electrical power to the applicator and close main circuit breaker (switch) and hose circuit breaker. Measure transformer output voltage between terminals 1 and 12 on transformer terminal board.

NORMAL INDICATION: 77 VAC. Disconnect and lock out input electrical power to applicator and reconnect wire. Restore system to normal operation.

ABNORMAL INDICATION: Less than 77 VAC. Replace transformer and restore system to normal indication.

HOSES AND GUNS OVERHEATING

E1. Disconnect and lock out input electrical power to applicator.



Input terminal block TB1 and input terminals on main circuit breaker (switch) are electrically energized if external power is not disconnected, even though the main circuit breaker (switch) is open.

E2. Recalculate transformer output voltage to maintain about 25 to 28 amps in hose and gun circuit. Check transformer terminal board for proper connections.

NORMAL INDICATION: Proper voltage selected. Proper terminal connections made. Proceed to the next step.

ABNORMAL INDICATION: Improper voltage selected. Reconnect hose wires on transformer terminal board to proper terminals. Restore system to normal operation.



TABLE 6 - TROUBLESHOOTING CHART - ELECTRICAL (Continued)

E3. Remove wire Nos. 29 and 30 from hose temperature controller. Measure resistance of hose sensor between the wire ends.

NORMAL INDICATION: Resistance values within the range specified in step C14. Reconnect wires and proceed to next step.

ABNORMAL INDICATION: Resistance values outside the range specified in C14. Replace 1 ft hose w/sensor. Restore system to normal operation.

E4. With hose temperature controller at minimum setting, check continuity between wire Nos. 11 and 13 and between wire Nos. 39 and 12. Do not hold control relay contacts closed for this test.

NORMAL INDICATION: Open circuit. Replace hose temperature controller. Restore system to normal operation.

ABNORMAL INDICATION: Continuity across both sets of contacts. Replace control relay and restore system to normal operation.

DISASSEMBLY AND REPAIR



The Model VII hot melt applicators and associated hoses and guns contain energized electrical components with potentials that could be fatal. Disconnect and lock out input electrical power to the applicator before removing any panels or attempting to perform any maintenance procedures.



Do not attempt to loosen any part of manifold, hoses, or guns until air to the applicator has been turned off and hydraulic pressure in the system has been relieved.



Wear safety glasses, safety gloves (P/N 902 514), and protective clothing to prevent injury from hot applicator parts, splashed hot melt adhesive material, and hot gun surfaces.



If the hydraulic pump is operable, flush the system before disassembly. If the pump is not operable but the heating system is functional, heat the applicator to operating temperature to ease disassembly. Otherwise, a flameless electric heat gun or other flameless heating method must be used to heat solidified hot melt adhesive material on components.



Never heat any component with a torch or other open flame. Use an electric oven with forced air circulation or a flameless electric heat gun to heat components.

AIR OPERATED PISTON PUMP DISASSEMBLY

Air Motor Disassembly (Figure 20)

1. Disconnect and lock out input electrical power to the applicator.
2. Set air motor air pressure regulator for zero pressure (full counterclockwise).
3. Crack open filter drain to relieve trapped hydraulic pressure.
4. Remove air motor enclosure back panel by removing four screws.
5. Remove air motor enclosure from pump assembly by removing one screw on top of enclosure.
6. Disengage solenoid valve electrical connector from hose end of applicator.
7. Remove solenoid valve and filter/regulator from air motor control valve (7).
8. Remove three screws and lockwashers anchoring pump mount to tank top.
9. Pull pump assembly straight up and out of tank to disengage connecting tube from crossover manifold.
10. Remove four-way air control valve (7) from air motor by removing four screws (6) and lockwashers (3).
11. Remove four screws (2) and lockwashers (3) from air cylinder head (1). Remove cylinder (33) and cylinder head (1) from pump assembly.



12. Check slab gaskets for damage.

NOTE: Any evidence of cuts, hardening, or other physical damage constitutes gasket damage beyond repair. Replace gaskets with Nordson P/N 940 420.

13. Hold piston shaft (21) with a wrench and remove retaining nut (26) and washer (27) from air motor piston.
14. Remove both piston cup washers (25), piston seal washer (24), and piston cups (23) from piston shaft. Inspect seals and washers for damage. Replace as necessary.
15. Remove two outer set screws (9) in air valve trip collar (8).

NOTE: These two screws do not secure the collar to the shaft, but instead are used to lock the inner set screws beneath them.
16. Loosen 3rd and 4th set screws (9) until collar slides freely along piston shaft.

Hydraulic Pump Disassembly (Figure 20)

1. Using the spanner wrench supplied with the unit, loosen special retaining nut (19) anchoring hydraulic pump body (10) to pump mount (20).
2. Unscrew retaining nut (19) and tab lockwasher. Slide nut and lockwasher away from pump mount.
3. Pull pump body away from pump mount to remove entire hydraulic pump section.
4. Remove air valve trip collar (8), retaining nut, and tab lockwasher from piston shaft as the shaft is withdrawn from the pump mount.
5. Inspect U-cup seal (22) in upper face of pump mount. Replace if damaged.
6. Remove siphon ball seat (15) from pump body (10).

 Avoid scratching hydraulic pump plunger (21) and inside of hydraulic pump body during disassembly and reassembly of hydraulic pump. Surface scratches on these parts may cause excessive leakage and premature pump failure.
7. Hold hydraulic pump body and push threaded end (air motor) of hydraulic pump plunger (21) toward siphon ball seat (15) until pressure ball seat (12) appears.

8. Pull pressure ball assembly and hydraulic plunger away from pump body.
9. Unscrew pressure ball seat from hydraulic plunger.
10. Refer to Figure 6 and the following instructions to remove hydraulic scraper retaining ring (17) from pump body.

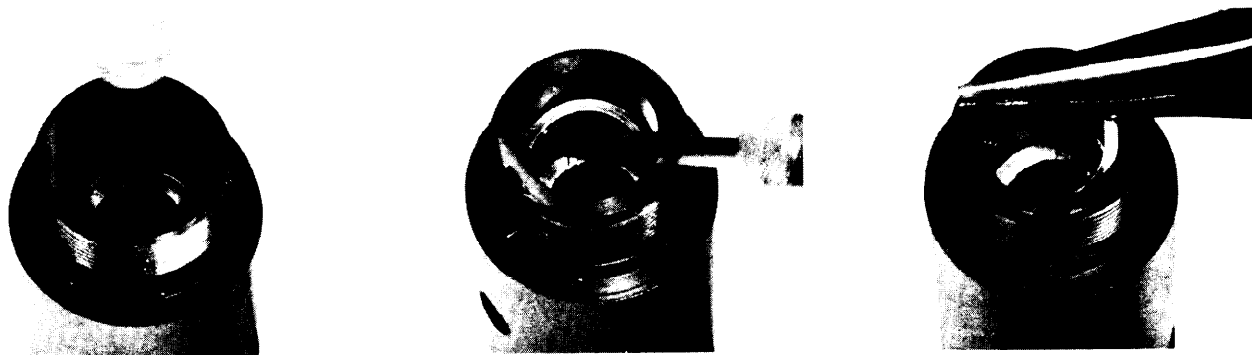


Figure 6 - Scraper and Retaining Ring Removal

- a. Pry end of retaining ring out of ring groove with a small screwdriver or other pointed tool.
- b. Work retaining ring out of ring groove until it can be grasped with needle-nose pliers.
- c. Spiral retaining ring out of pump body.

NOTE: Retaining ring may be damaged during removal. Replace with a new retaining ring during reassembly.

11. Heat the pump body around the hydraulic scraper to soften hot melt adhesive material.
12. Remove the scraper (16) from pump body.
13. Clean all components of the hydraulic section in a container of Type R solvent heated to the melting temperature of the adhesive material. Wipe components with a dry cloth.

Air Control Valve Disassembly (Figure 22)

1. Remove four screws (5) holding each poppet seat (4) to the control valve body (10). This frees the detent (3) and spacers (2).



2. Hold the shifter link (6) and unscrew the detent pin (7) to free the upper poppet.
3. Pull the shifter link out of the valve body.
4. Holding the spool valve (9) with an adjustable wrench, unscrew the shifter link to free the lower poppet.
5. Inspect the poppets and poppet seats. Replace as necessary.

NOTE: If the poppet seat washer is worn and needs to be replaced, replace the entire poppet seat assembly.

Valve Shifter Disassembly

1. Remove two screws to disconnect valve shifter from pump mount.
2. Remove two screws and washers to disconnect control arm bracket from control arm. Push the control arm away from bracket to relieve spring pressure.
3. Slide pin out of bracket to remove spring.

NOTE: Pin stops against a shoulder on the outside wall of the control arm bracket. Slide the pin out the hole on the inside wall of bracket.

4. When reassembling valve shifter, ensure spring loops are bottomed in pin sleeve grooves.

AIR OPERATED PISTON PUMP REASSEMBLY (Figure 20)

1. Insert scraper (16) with flat surface away from body into the air motor end of pump body (20).



The scraper ring may be damaged if all hot melt adhesive material is not removed from scraper cavity and retaining ring groove in the pump body.

2. Install the scraper retaining ring into the pump mount using Figure 7 and the following instructions.

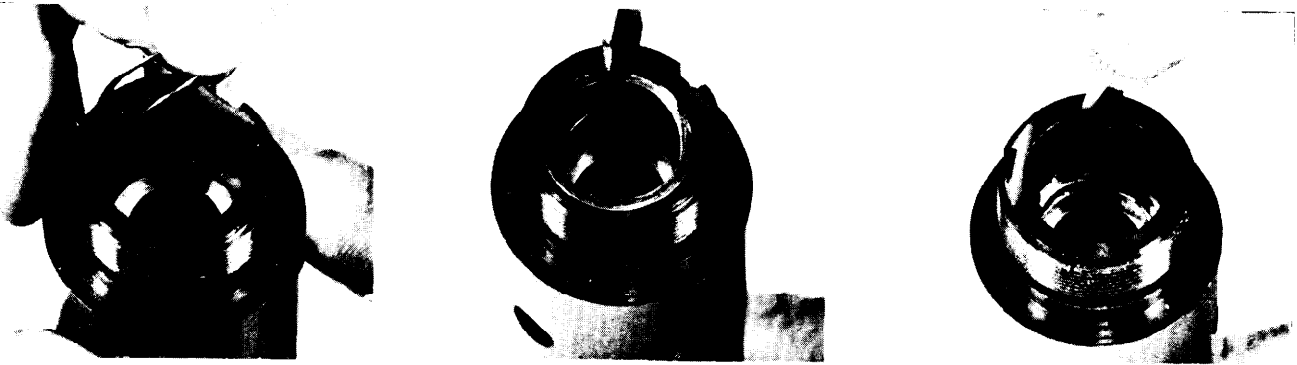


Figure 7 - Scraper and Retaining Ring Reassembly

- a. Separate the coils of retaining ring and insert one end of ring over the top of the pump mount.
- b. Keeping the coils separated, force the ring over the lip of the pump mount. Spiral the ring into the pump mount using a screwdriver until the entire ring is inside the pump mount.
- c. Carefully work the retaining ring into the ring groove.

NOTE: An audible snap indicates the last ring has entered the groove and the retaining ring is installed properly.

3. Place threaded end of pump body (10) into pump mount (20) and secure with locknut (19) and tab lockwasher (18).
4. Install lower slab gasket (34) and U-cup seal (22) into pump mount grooves.
5. Screw pressure ball seat (12) onto hydraulic plunger (21).
6. Insert air motor end of hydraulic plunger into pump body and into the bottom hole of pump mount.
7. Place trip collar (8) over threaded end of hydraulic plunger. Push plunger out through the hole in the top of pump mount.
8. Tighten set screws (9) in trip collar into groove on hydraulic plunger shaft. Secure set screws with second set of set screws.



To prevent slippage and possible damage to trip collar or shaft, ensure inner set screws bottom in shaft groove.



9. Assemble valve shifter (30) to pump mount.
10. Lubricate the valve shifter and trip collar with lubricant (P/N 900 252).
11. Pull air motor plunger as far out of pump mount as possible.
12. Place piston washer (25) over threads.
13. Place one piston cup seal (23) over washer with curved edge toward washer.
14. Place piston seal washer (24) over cup seal.
15. Slide cylinder (33) over the partly assembled piston and seat cylinder onto slab gasket in pump mount. Raise air piston to top of cylinder.
16. Place second piston cup seal (23) on top of seal washer with curved edge away from washer.
17. Place second piston washer (24) over cup seal and secure piston assembly with locknut (26) and washer (27).
18. Place slab gasket (34) into cylinder head (1) groove.
19. Secure cylinder head and cylinder to pump mount using four screws (2) and lockwashers (3).
20. Position control valve gaskets (5) onto air cylinder and pump mount.
21. Secure air control valve (7) to pump mount and air cylinder head with four screws (6) and lockwashers (3).
22. Refer to Section II, Pump Installation, for additional assembly instructions.

HYDRAULIC PRESSURE RELIEF VALVE REPLACEMENT

The Model VII hot melt applicator is equipped with two pressure relief valves to relieve excessive hydraulic pressure that may build up in the hose and gun section of the system. One valve screws into the filter manifold and the other into the circulation valve manifold. Both valves relieve into the hot melt adhesive tank.



Wear safety glasses, safety gloves (P/N 902 514), and protective clothing to prevent injury from hot applicator parts, splashed hot melt adhesive material, and hot gun surfaces.



Remove system pressure before breaking any mechanical connections by securing air to the air motor, momentarily triggering guns, and opening filter and circulation valve drains.

Circulation Valve Manifold Relief Valve Replacement

1. Heat the applicator to operating temperature and drain the adhesive tank to a level below the deflector plate.
2. Remove deflector plate from tank by removing one screw.
3. Remove relief valve.
4. Reinstall new relief valve. Coat threads with teflon paste (P/N 900 236).
5. Position deflector plate over relief valve and secure with one screw.
6. Restore the applicator system to normal operation.

Filter Manifold Relief Valve Replacement

1. Heat the applicator to operating temperature and drain the adhesive tank to a level below the relief valve.
2. Secure air to pump filter/regulator.
3. Momentarily trigger all guns to relieve trapped hydraulic pressure in the system.
4. Open filter manifold drain and circulation valve manifold drain.
5. Remove air motor enclosure back cover by loosening four screws.
6. Remove air motor enclosure by removing one screw on top of enclosure.
7. Unplug solenoid valve electrical connector.
8. Disconnect and lock out input electrical power to the applicator.



The Model VII hot melt applicator contains energized electrical components with potentials that could be fatal. Disconnect and lock out input electrical power to the applicator before removing any panels.



9. Remove three screws and lockwashers from pump mount.
10. Lift pump assembly straight up and out of adhesive tank.
11. Remove circulation valve from manifold.
12. Remove tank front and back panels by turning two 1/4-turn screws counterclockwise.
13. Remove tank lid by removing three screws and lockwashers.
14. Remove tank cover by removing two screws on cover end and six screws and lockwashers from top of unit.
15. Remove both drain valve handles.
16. Remove cover plate over drain valves by removing two screws.
17. Loosen three nuts on bottom of hose end panel.
18. Slide hose end panel away from applicator far enough along hoses to expose manifolds and tank end.



Exercise extreme care not to damage insulating cuffs on hoses. Damaged cuffs could allow personnel or equipment to come in contact with the electrically energized fittings when power is restored to the applicator.

19. Remove filter manifold from tank by removing three screws.

NOTE: The filter manifold connects to the crossover manifold through a hydraulic connector that plugs into both manifolds. The connector may or may not separate with the filter manifold.

20. Unscrew the relief valve from the back of the filter manifold.
21. Screw a new relief valve into filter manifold. Use teflon paste (P/N 900 236) on threads.
22. Check o-ring for damage. Replace if necessary.

NOTE: Nicks, cuts, hardening, or other physical damage to the o-ring constitutes damage beyond repair.

23. Align hydraulic connector in crossover manifold and relief valve with hole in tank. Push filter manifold until it seats onto tank wall.



24. Secure the filter manifold to tank using three screws. Use teflon paste (P/N 900 236) on threads.
25. Slide hose end panel onto applicator base and tighten three nuts on bottom of panel.
26. Reinstall cover plate over drain valves and secure to hose end panel with two screws.
27. Reinstall both drain valve handles.
28. Reposition tank cover on unit and secure with six screws and lockwashers on top of panel and two screws on hose end panel.
29. Position tank lid on cover and secure with three screws and lockwashers.
30. Reinstall tank front and back covers and secure with 1/4-turn screws.
31. Reinstall circulation valve into manifold. Use teflon paste (P/N 900 236) on threads.
32. Inspect o-ring on pump assembly connecting tube for damage. Replace if necessary.

NOTE: Nicks, cuts, hardening, or other physical damage to the o-ring constitutes damage beyond repair.

33. Place the pump assembly into tank and insert connecting tube into hole in tank bottom.
34. Slowly force the pump downward until the pump mount rests on top of tank.



Improper installation of pump assembly may damage the o-ring on connecting tube causing improper pump operation and premature failure.

35. Secure the pump mount to tank using three screws and lockwashers.
36. Plug in and tighten solenoid valve electrical connector.
37. Position air motor enclosure over pump assembly and secure with one screw on top of enclosure.
38. Position air motor enclosure back panel onto enclosure and secure with four screws.
39. Close filter manifold drain and circulation valve manifold drain.



40. Restore system to normal operation in accordance with Section III, Setup and Initial Operation.

TANK TEMPERATURE CONTROLLER REPLACEMENT

The Model VII tank temperature controller is not designed for field repair or recalibration. Malfunction requires replacement of the entire temperature controller. Use the following procedure to replace the tank temperature controller.



The Model VII hot melt applicator and associated hoses and guns contain energized electrical components with potentials that could be fatal. Disconnect and lock out input electrical power before opening any panels or attempting any maintenance on this equipment.

1. Disconnect and lock out input electrical power to the applicator.
2. Remove electrical cabinet top cover and tank front panel.
3. Remove three screws and lockwashers on tank sensor cover plate.
4. Open front hinged panel on electrical cabinet and pull knob off tank temperature control.
5. Remove two screws on controller front.
6. Lift temperature controller out of electrical cabinet. Route sensor bulb through tank inner panel wall.
7. Route new controller sensor bulb through tank inner panel wall to tank.



Exercise care not to pinch or kink sensor bulb or tubing. A pinched or kinked sensor tube or bulb will result in erroneous temperature control or complete failure of the temperature controller.

8. Position new temperature controller behind front panel and secure with two screws.
9. Position sensor bulb in tank groove and secure with cover plate and three screws and lockwashers.
10. Push knob onto temperature controller.
11. Reinstall tank front panel and electrical cabinet cover.
12. Restore system to normal operation.

**HOSE TEMPERATURE CONTROLLER REPLACEMENT**

The Model VII hose temperature controller is not designed for field repair or recalibration. Malfunction of the controller requires replacement of the entire temperature controller. Use the following procedure to replace the hose temperature controller.

1. Open the applicator main circuit breaker (switch).
2. Open the front hinged panel on electrical cabinet.
3. Grasp the hose temperature controller and pull straight outward.
4. Plug in a new controller and press firmly until the controller seats against the control cabinet socket.
5. Close applicator main circuit breaker (switch) and restore system to normal operation.

SECTION V

DIAGRAMS AND TABLES

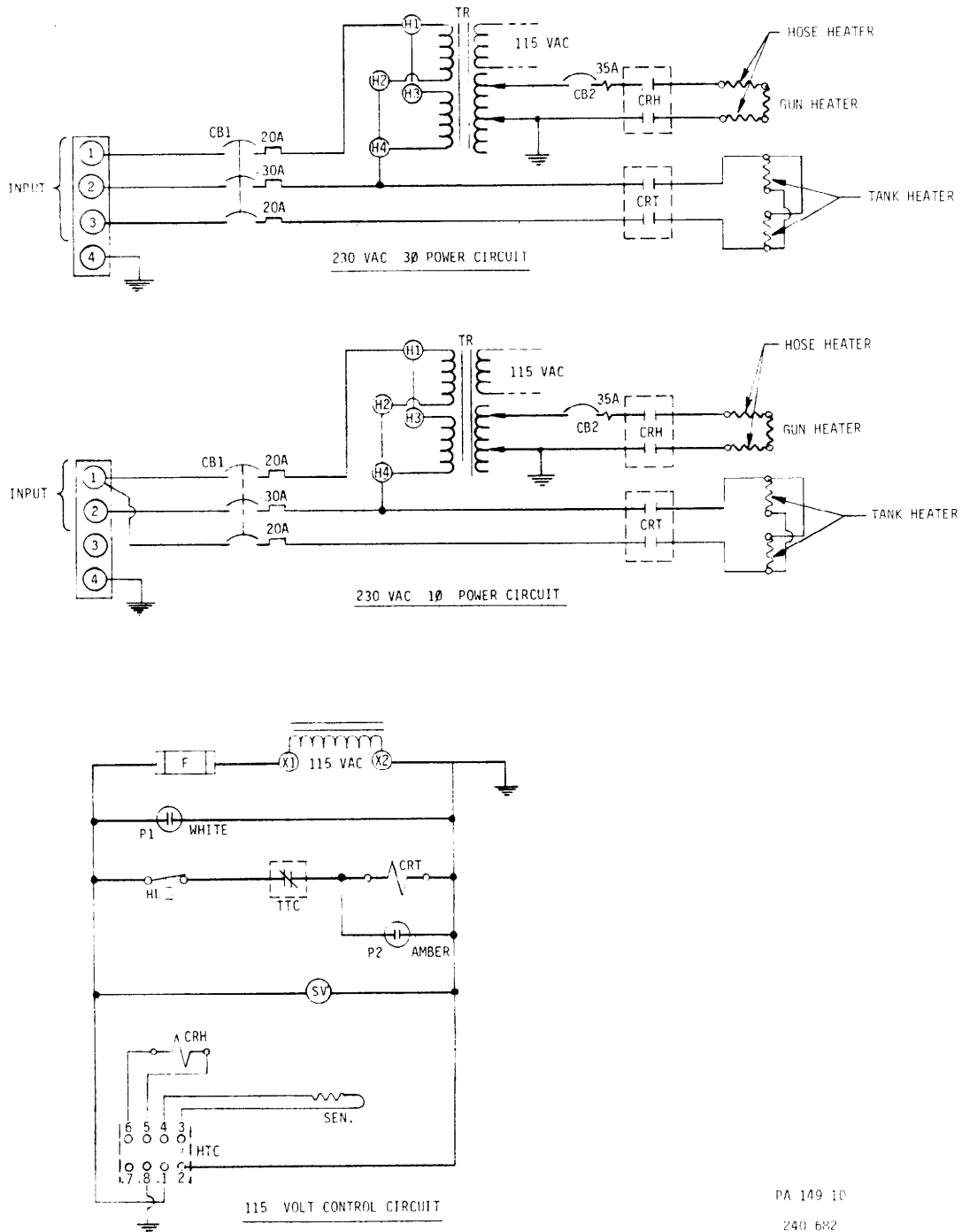


Figure 8 - 230 VAC Electrical Schematic, HM VII Applicator

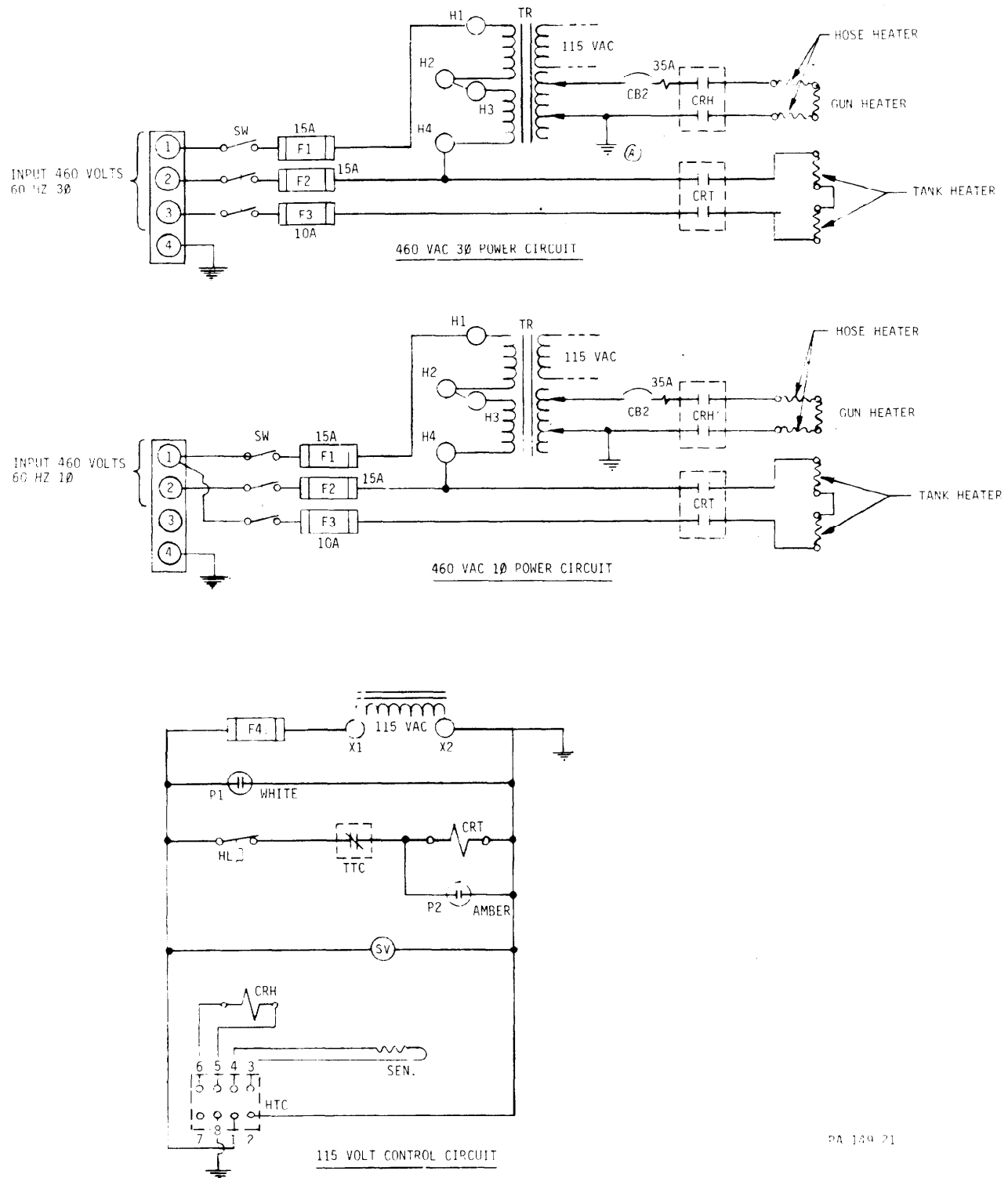
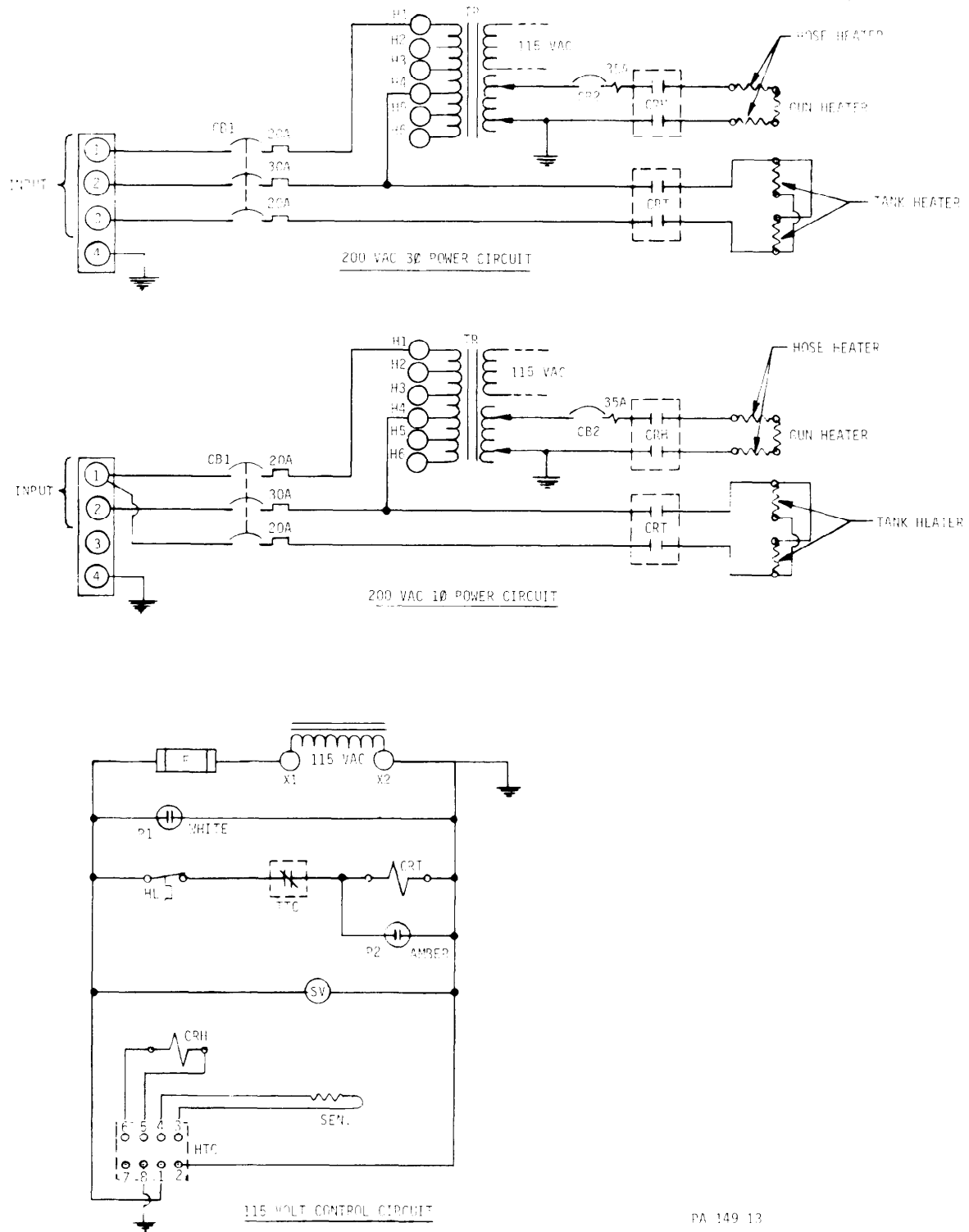


Figure 9 - 460 VAC Electrical Schematic, HM VII Applicator



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Figure 10 - 200 VAC Electrical Schematic, HM VII Applicator

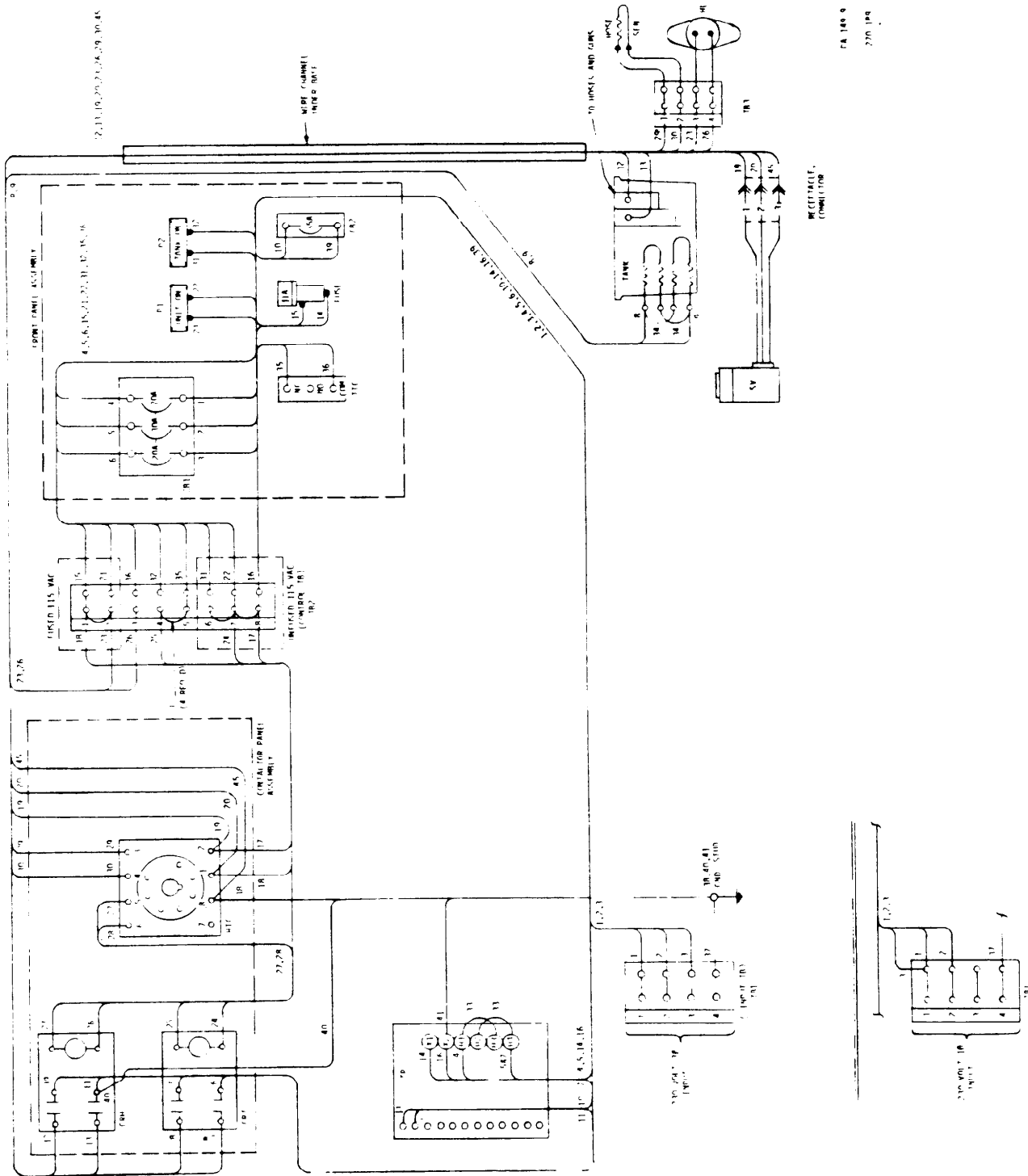


Figure 11 - 230 VAC Wiring Diagram, HM VII Applicator

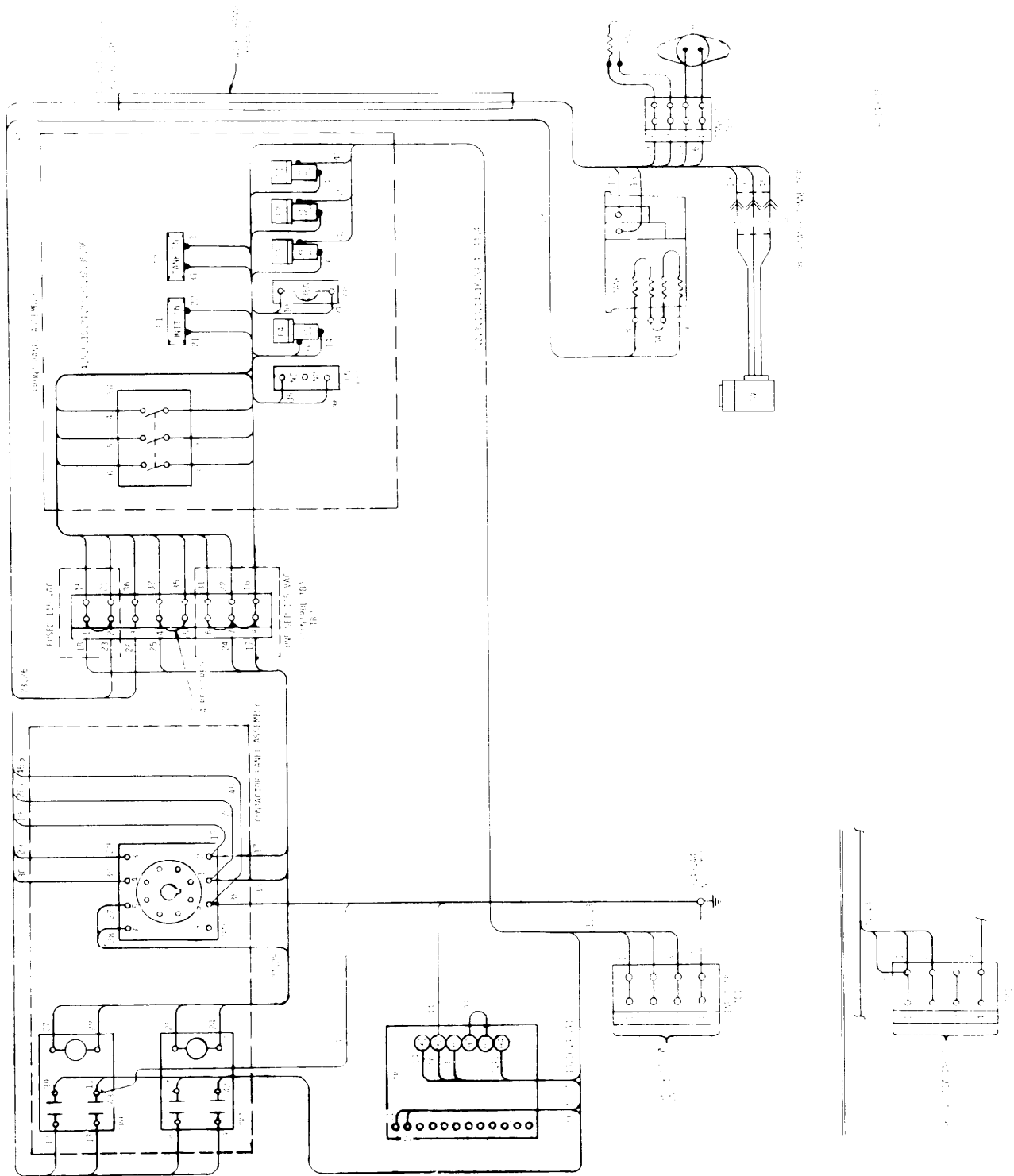


Figure 12 - 460 VAC Wiring Diagram, HM VII Applicator

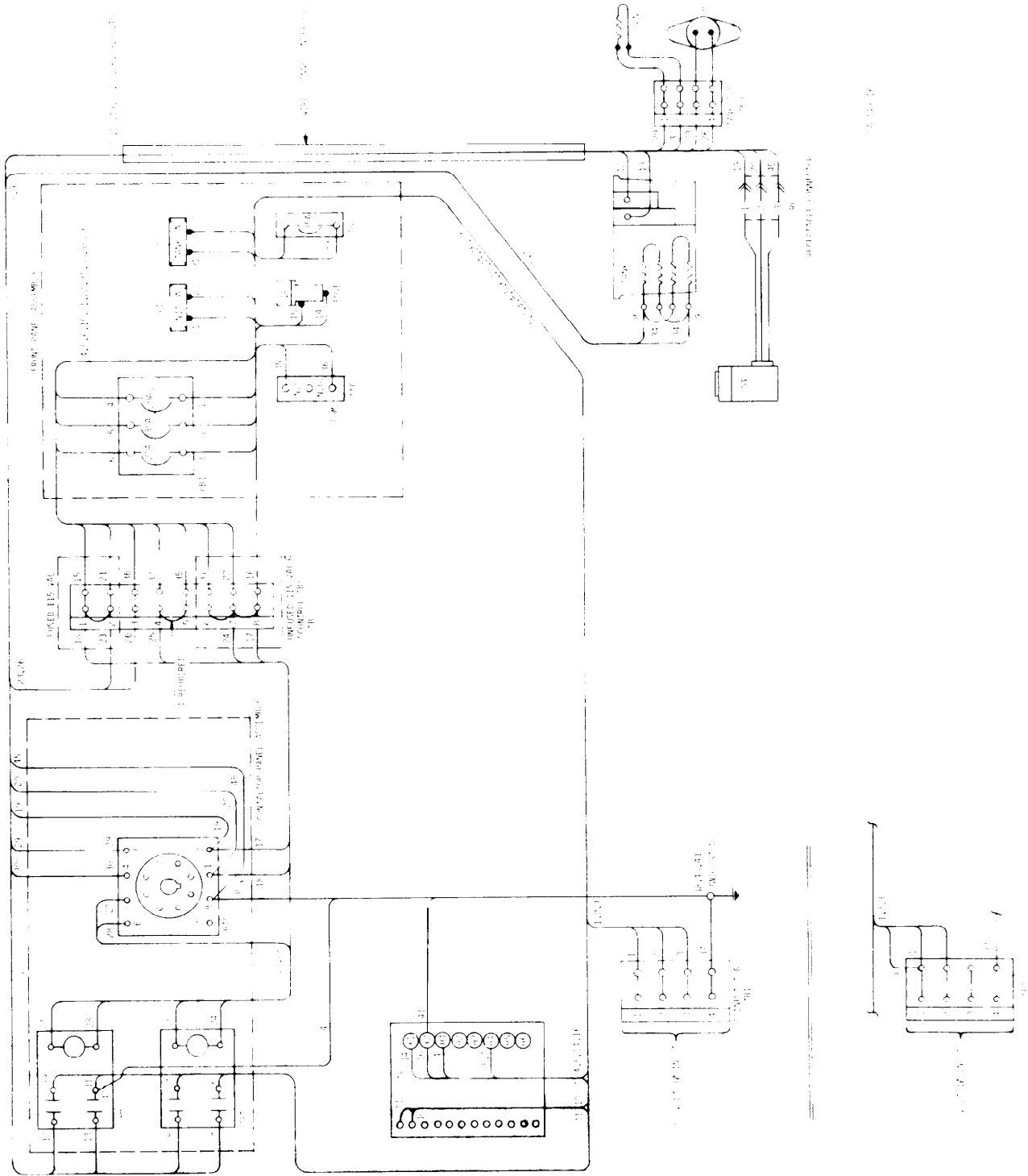


Figure 13 - 200 VAC wiring Diagram, HM VII Applicator

TABLE 7 - DEFINITION OF ELECTRICAL SYMBOLS

Symbol	Part No.	Description
CB1	270 826	Circuit Breaker, 200/230 VAC
SW	937 140	Main Switch, 460 VAC
FUSE	939 016	Fuse, 1 amp
	939 047	Fuse, 10 amp
	939 019	Fuse, 15 amp
	933 053	Post, Fuse
P1	939 525	Light, White Indicator
P2	939 524	Light, Amber Indicator
SEN	240 665	Hose w/Sensor, 1 ft
HL	240 713	Tank Heat Limiter
TR	240 597	Transformer, 230/460 VAC
	243 921	Transformer, 200 VAC
CRH	937 289	Hose Control Relay
CRT	937 036	Tank Control Relay
HTC	240 567	Controller, Hose Temperature
TTC	240 537	Controller, Tank Temperature
SV	901 081	Valve, Solenoid
TB1	933 044	Terminal Board, 4-Station
TB2	933 074	Terminal Board, 8-Station
TB3	933 130	Terminal Board, 12-Station
CB2	937 131	Circuit Breaker, 35 amps
J	933 128	Jumper, Terminal Board
RC	939 214	Receptacle/Connector



SECTION VI ILLUSTRATED PARTS LIST

INTRODUCTION

The Illustrated Parts List details and illustrates the assemblies and components of the Model VII hot melt applicator described in Section I of this manual. For ease of understanding, Figure 15 is provided as a composite of Figures 16 through 19 to show relative position.

COLUMN IDENTIFICATION

FIGURE ITEM COLUMN

The Figure Item column indicates the callout number for the part in the associated figure. A dash in this column denotes that no callout has been made for the part.

PART NUMBER COLUMN

The Part Number column indicates the Nordson part number for the physical part or assembly. A dash in this column indicates a nonsaleable part or a nonsaleable subassembly of a saleable assembly.

DESCRIPTION COLUMN

The Description column presents a written description of the part or assembly. Nomenclature, dimensional information, and material information appear in this column.

REQUIRED COLUMN

The Required column specifies the quantity of the part required per unit or assembly. A dash in this column indicates that no specific quantity is required. The term "Ref." in this column indicates the part or assembly has been included for reference only.

PHOTO NOT AVAILABLE

Figure 14 - Model VII Hot Melt Applicator

Parts List

Item No.	Part No.	Description	Req'd
-	240 748	Applicator, HM VII, 230 VAC	Ref
-	270 057	Applicator, HM VII w/Wax Pump, 230 VAC	Ref
-	241 102	Applicator, HM VII, 460 VAC	Ref
-	270 058	Applicator, HM VII w/Wax Pump, 460 VAC	Ref
-	243 926	Applicator, HM VII-J, 200 VAC	Ref
-	270 071	Applicator, HM VII-J w/Wax Pump, 200 VAC	Ref
1	-	• Assembly, Heating and Control, HM VII	1
2	244 404	• Pump w/ Enclosure	1
2	270 119	• Wax Pump w/ Enclosure	1
-	271 485	• Plate, Information	1
-	985 101	• Rivet, Pop	2
-	241 116	• Kit, Installation, 200/230 VAC Applicators	1
-	273 634	•• Cuff, Insulating	2
-	972 054	•• Connector, Male	2
-	983 150	•• Lockwasher, Split, 0.31 in.	3
-	981 312	•• Screw, Hex Head, 5/16-18 x 1.12 in.	3
-	939 004	•• Tie, Cable	4
-	243 030	•• Tag, Warning, Hot	2

PARTS LIST (Continued)

Item No.	Part No.	Description	Req'd
-	939 016	°° Fuse, 1 amp	1
-	272 753	° Kit, Installation, 460 VAC Applicator	1
-	273 634	°° Cuff, Insulation	2
-	972 054	°° Connector, Male	2
-	939 004	°° Tie, Cable	4
-	983 150	°° Lockwasher, Split, 0.31 in.	3
-	981 312	°° Screw, Hex Head, 5/16-18 x 1.12 in.	3
-	243 030	°° Plate, Warning, Hot	2
-	939 016	°° Fuse, 1 amp	1
-	939 047	°° Fuse, 10 amp	1
-	939 019	°° Fuse, 15 amp	2

TABLE 8 - APPLICATOR DESCRIPTION

Part No.	Voltage (VAC)	Electrical Schematic	Wiring Diagram	Installation Kit	Pump
240 748	230	Fig. 8	Fig. 11	241 116	244 405
270 057	230	Fig. 8	Fig. 11	241 116	270 116
241 102	460	Fig. 9	Fig. 12	272 753	244 405
270 058	460	Fig. 9	Fig. 12	272 753	270 116
243 926	180/220	Fig. 10	Fig. 13	241 116	244 405
270 071	180/220	Fig. 10	Fig. 13	241 116	270 116

TABLE 9 - MODEL VII SERVICE PARTS LIST

Part No.	Description	Qty
240 825	Tube, Hydraulic Connector	1
240 826	Manifold, Crossover	1
240 827	Plunger, Hydraulic	1
270 073	Door w/Information Plate	1



TABLE 9 - MODEL VII SERVICE PARTS LIST (Continued)

Part No.	Description	Qty
240 289	Tube, Crossover	1
240 830	Panel, Front Tank	1
240 831	Base, Model VII	1
240 833	Controller, Tank Temperature	1
240 835	Bung, Filter	1
241 372	Valve, Circulation	1
241 371	Manifold, Filter	1
240 838	Ball and Seat, Pressure	1
240 839	Ball and Seat, Siphon	1
240 840	Body, Hydraulic Pump	1
240 841	Kit, Seal, HM VII Pump (Use with 240 828 Air Valve)	1
240 540	• Cup, Piston, Air Motor	2
503 656	• Gasket, Valve	4
503 658	• Washer, Seat, Poppet	2
503 731	• Poppet	2
940 125	• O-ring, Viton, 0.38 x 0.50 in.	2
940 141	• O-ring, Viton, 0.50 x 0.62 in.	2
940 420	• O-ring, Viton, 3.25 x 0.38 in.	2
952 130	• Cup, U, Viton	1
954 020	• Ring, Backup, Single, 0.50 x 0.62 in.	1
240 842	Kit, Seal, Heating and Control, HM VII	1
152 695	• Sleeve, Sealing	2
152 697	• Sleeve, Support	2
940 141	• O-ring, Viton, 0.50 x 0.62 in.	4
940 161	• O-ring, Viton, 0.62 x 0.75 in.	1
940 191	• O-ring, Viton, 0.81 x 0.94 in.	3
954 020	• Ring, Backup, Single, 0.50 x 0.62 in.	5
241 114	Kit, Detent	1
503 735	• Detent	1
503 736	• Pin, Detent	1
503 737	• Spacer	2
981 156	• Screw, Fillister Head, 8-32 x 1.25 in.	2
240 832	Kit, Grounding Screw	1
240 674	• Tag, Ground	1
981 156	• Screw, Pan Head, 10-32 x 1.00 in.	1
983 021	• Washer, Flat, 0.21 x 0.41 in.	1
983 120	• Lockwasher, Split, No. 10	3
984 129	• Nut, Hex, 10-32	3
240 913	Tag, Warning	1
240 914	Tag, Warning	1
240 834	Kit, Circuit Breaker, Handle Tie	1
240 656	• Pin, Breaker Handle	1
240 657	• Spacer, Breaker Handle	2
986 001	• Ring, Retaining, External, 0.12 in.	2



TABLE 9 - MODEL VII SERVICE PARTS LIST (Continued)

Part No.	Description	Qty
241 766	Stem w/Guide	1
241 491	Kit, Circulation Valve and Filter	1
940 191	• O-Ring, Viton, 0.81 x 0.94 in.	2
984 020	• Ring, Backup, Single, 0.50 x 0.62 in.	4
981 120	• Screw, Pan Head, 6-32 x 0.25 in.	2
981 083	• Screw, Pan Head, 8-32 x 0.25 in.	2
981 219	• Screw, Socket Head, 1/4-28 x 1.25 in.	4
983 150	• Lockwasher, Split, 0.31 in.	7
244 244	Valve, 4-Way Air Control, HM VII	1
244 246	Kit, Detent	1
243 512	• Detent	1
243 519	• Pin, Detent	1
468 001	• Blank, Pin	1
900 424	• Compound, Thread Locking	-
503 737	• Spacer	2
981 052	• Screw w/Lock Patch, 8-32 x 0.62 in.	2
270 040	Kit, Seal, Pump (Use with 244 244 Air Valve)	1
240 540	• Cup, Piston, Air Motor	2
503 656	• Gasket, Valve	4
940 141	• O-ring, Viton, 0.50 x 0.62 in.	2
940 420	• O-ring, Viton, 3.25 x 3.38 in.	2
952 130	• Cup U, Viton	1
954 020	• Ring, Backup, Single, 0.50 x 0.62 in.	1

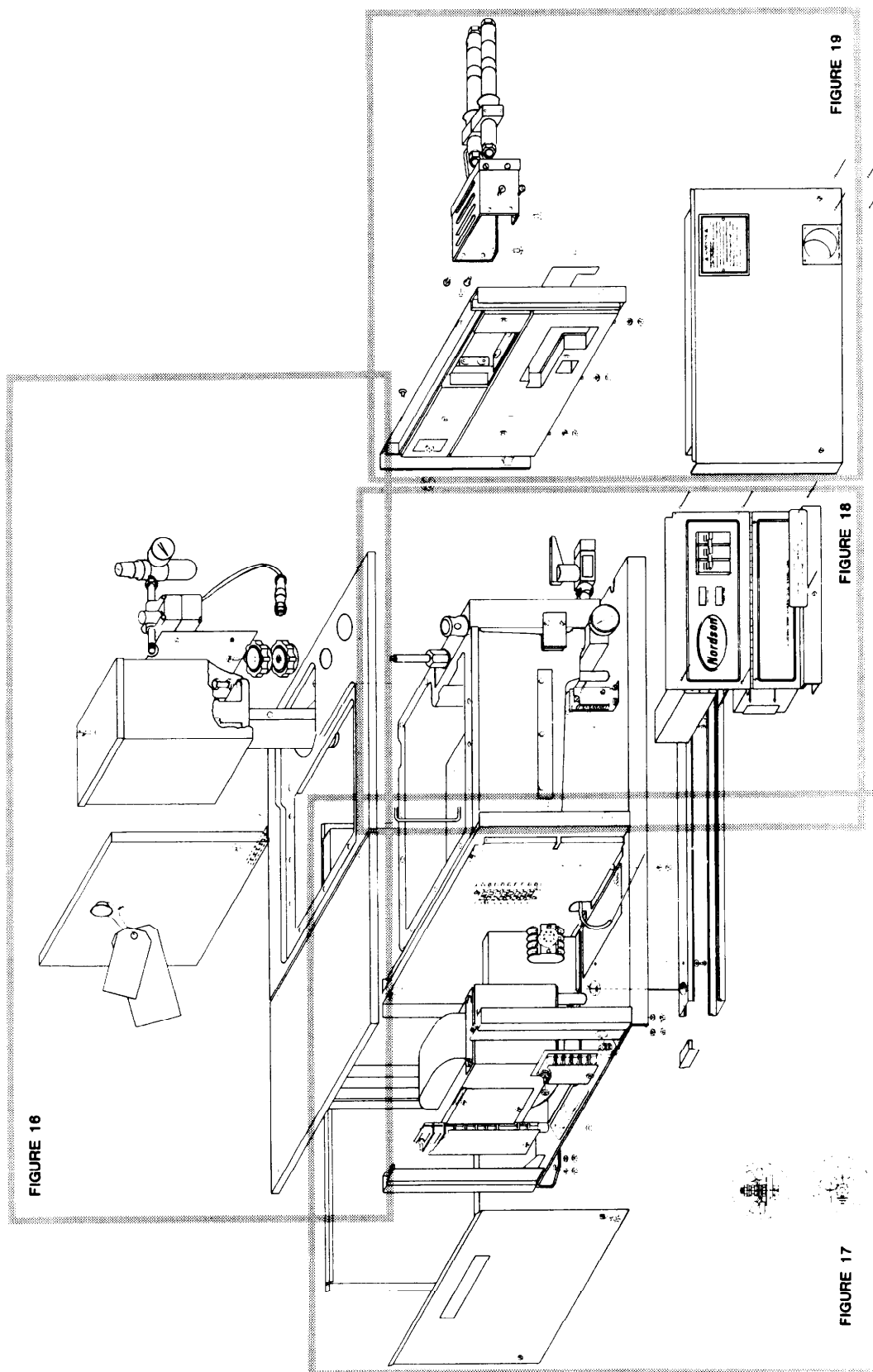
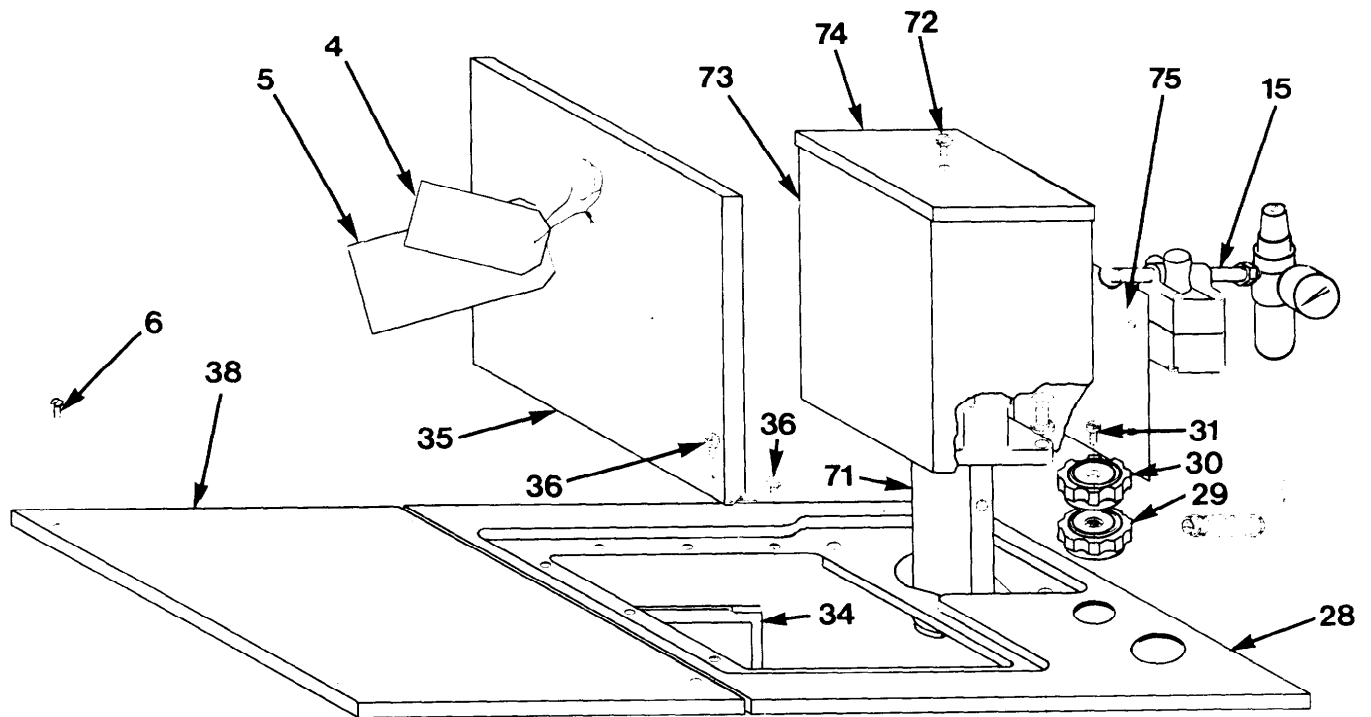


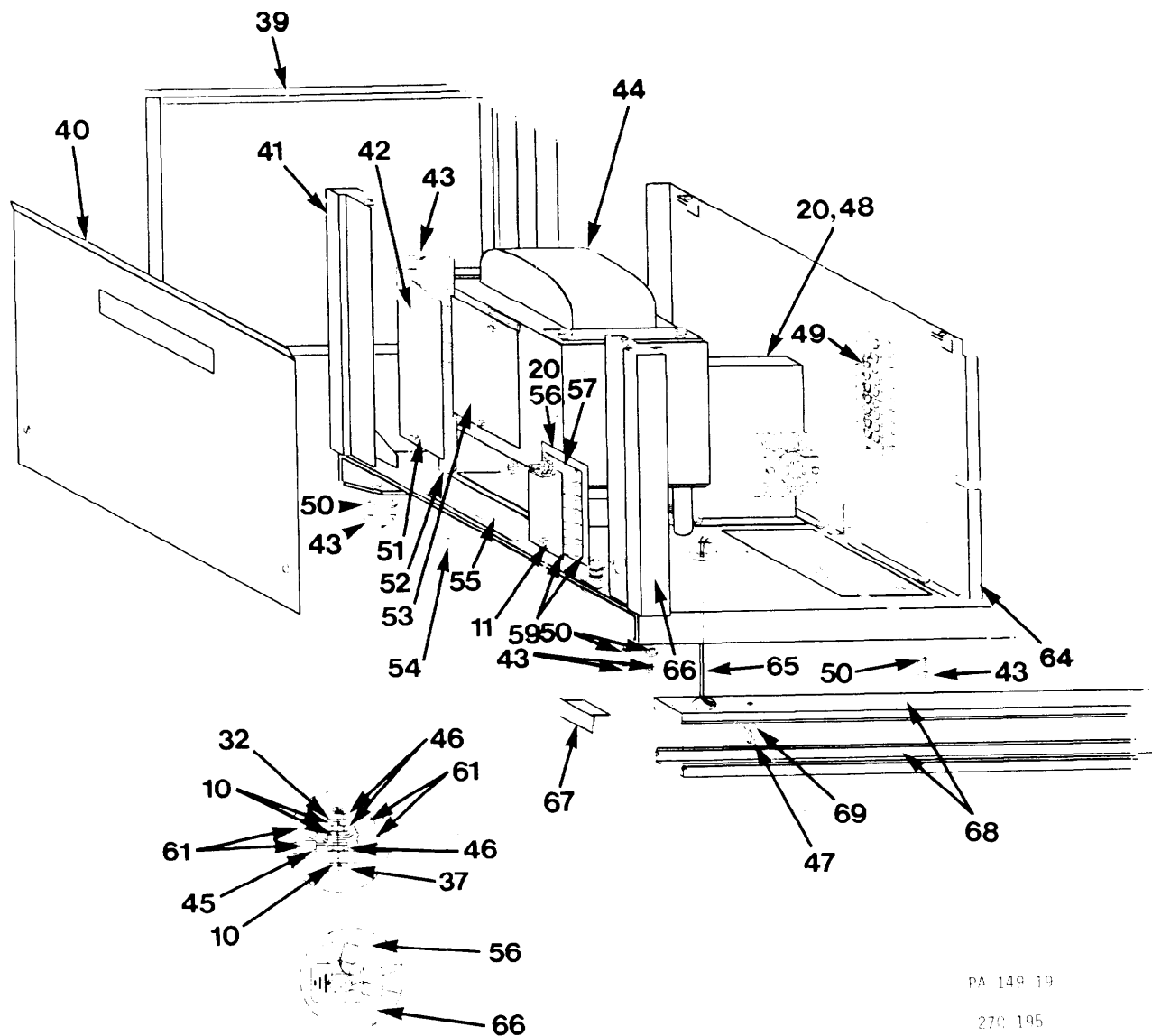
Figure 15 - Model VII Heating and Control Assembly



PA 149 20

270 195

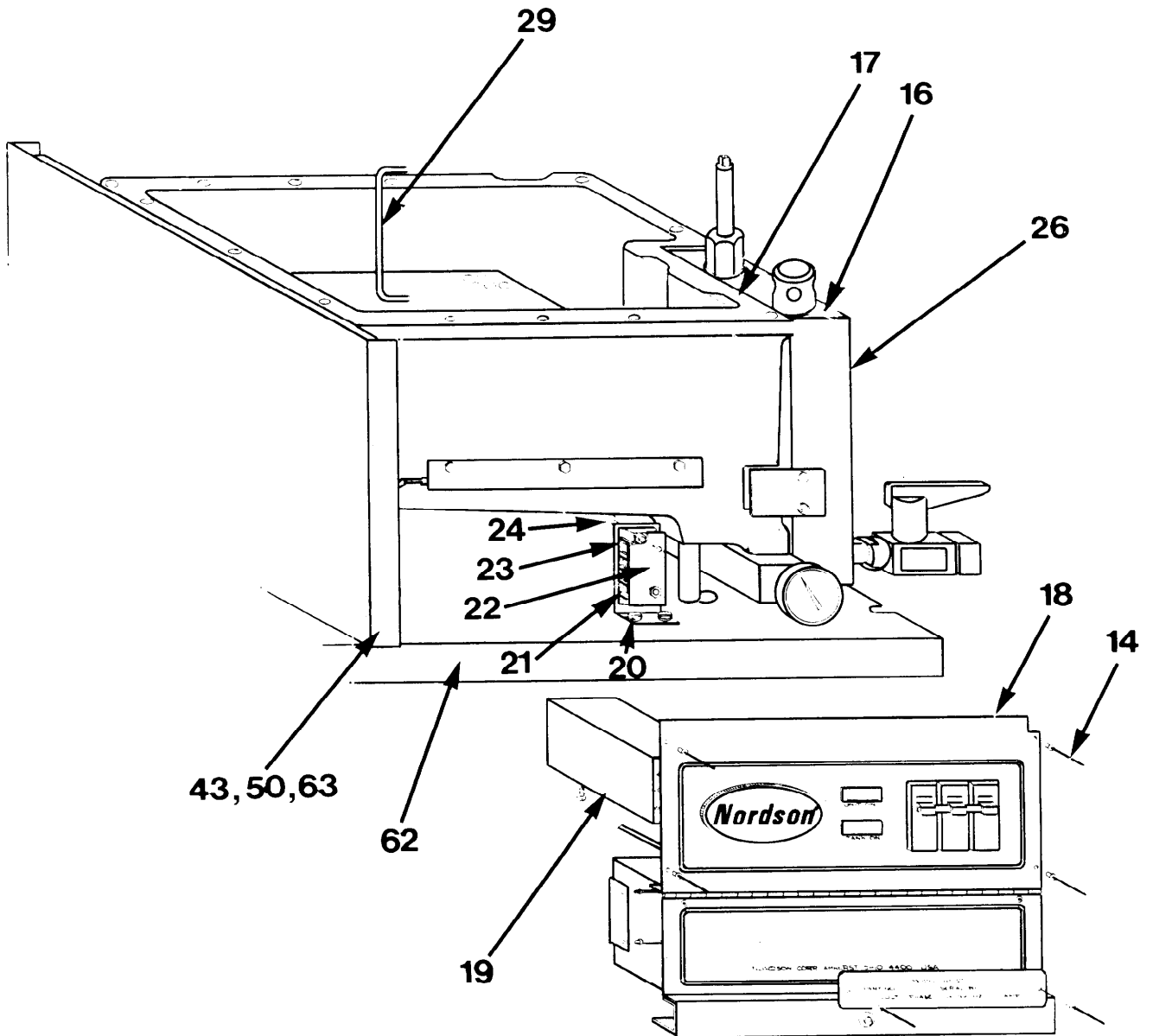
Figure 16 - Model VII Applicator Cover Section



PA 149 19

270 195

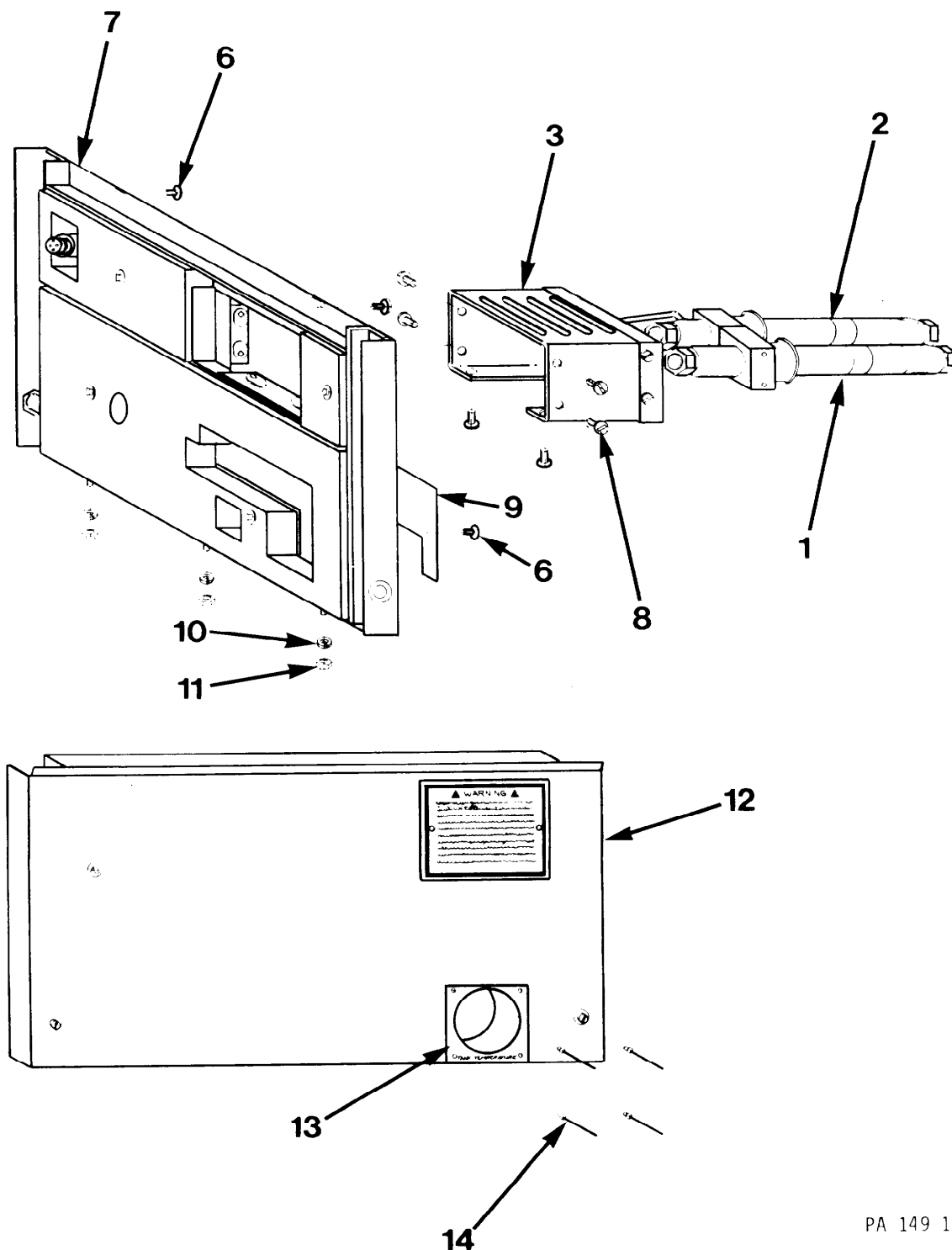
Figure 17 - Model VII Applicator Electrical Cabinet



PA 149 18

270 195

Figure 18 - Model VII Applicator Hydraulic Section



PA 149 17

270 195

Figure 19 - Model VII Applicator Adhesive Output Section



PARTS LIST FOR FIGURES 15 THROUGH 19

Item No.	Part No.	Description	Req'd
-	-	Assembly, Heating and Control, HM VII	Ref
1	271 828	• Hose w/Retainer, 1 ft	1
2	271 827	• Hose w/Sensor, 1 ft	1
3	240 644	• Support, Hose	1
4	600 168	• Tag, Inspection	1
5	-	• Tag, Warning	1
6	981 055	• Screw, Pan Head, 8-32 x 0.25 in.	8
7	270 168	• Panel, Outside Tank	1
-	-	•• Panel, Outside	1
-	240 697	•• Insulation, Top Left	1
-	240 698	•• Insulation, Lower	1
-	270 171	•• Insulation, Top Right	1
-	981 856	•• Nut, 1/4-Turn	2
-	981 855	•• Receptacle, 1/4-Turn	2
-	-	•• Receptacle, Electrical Connector	1
-	981 014	•• Screw, Pan Head, 4-40 x 0.25 in.	4
-	984 104	•• Nut, Hex, 4-40	4
8	981 160	• Screw, Pan Head, 10-32 x 0.50 in.	6
9	240 701	• Cover, Drain Valve	1
10	983 120	• Lockwasher, Split, No. 10	6
11	984 120	• Nut, Hex, 10-32	9
12	-	• Panel, Front Tank	1
-	240 638	•• Insulation	1
-	981 857	•• Stud	2
-	981 858	•• Washer, Special	2
-	985 101	•• Rivet, Pop	2
13	-	• Plate, Tank Temperature	1
14	985 101	• Rivet, Pop	12
15	270 172	• Solenoid Valve and Filter/Regulator, 1/8-NPT	1
-	901 741	•• Filter/Regulator w/Gauge, 1/8-NPT	1
-	270 173	•• Valve, Solenoid, 115 VAC, 1/8-NPT	1
-	973 000	•• Nipple, Pipe, 1/8-NPT Close	1
-	973 002	•• Nipple, Pipe, 1/8-NPT x 1.50 in.	1
-	973 372	•• Bushing, Reducer, 1/4-NPT x 1/8-NPT	1



PARTS LIST (Continued)

Item No.	Part No.	Description	Req'd
-	900 236	•• Paste, Teflon	-
16	241 175	• Gasket, Manifold	1
17	241 174	• Gasket, Tank	1
18	-	• Panel, Front Control (200/230 VAC Units Only)	1
-	270 175	•• Panel, Control	1
-	270 826	•• Breaker, Circuit, 20-30-20 amp	1
-	240 659	•• Bracket Breaker	1
-	981 161	•• Screw, Pan Head, 10-32 x 0.38 in.	2
-	-	•• Hinge, Access Door	1
-	981 005	•• Screw, Round Head, 5-40 x 0.44 in.	3
-	984 100	•• Nut, Hex, 5-40	3
-	981 855	•• Receptacle, 1/4-Turn	1
-	981 856	•• Nut, 1/4-Turn	1
-	981 020	•• Screw, Pan Head, 6-32 x 0.25 in.	4
-	983 100	•• Lockwasher, No. 6	4
-	240 537	•• Controller, Tank Temperature	1
-	933 053	•• Post, Fuse	1
-	939 016	•• Fuse, 1 amp	1
-	985 101	•• Rivet, Pop	4
-	981 857	•• Stud, 1/4-Turn	1
-	981 858	•• Washer, 1/4-Turn	1
-	-	•• Door, Access	1
-	901 586	•• Knob	1
-	240 719	•• Harness, Wire	1
-	931 014	••• Wire, 18 GA, Black	9.0 ft
-	931 072	••• Wire, 14 GA, White w/Orange	6.7 ft
-	931 133	••• Wire, 10 GA, Natural w/Brown	13.0 ft
-	933 054	••• Terminal, Ring Tongue	4
-	933 071	••• Terminal, Ring Tongue	8
-	933 126	••• Terminal, Spade	2
-	933 129	••• Terminal, Ring Tongue	10
-	933 210	••• Terminal, Spring Spade	1
-	-	••• Marker, Wire	-
-	939 110	••• Strap, Cable	17
-	939 525	•• Light, Indicator, White	1
-	939 524	•• Light, Indicator, Amber	1
-	136 418	•• Nameplate, Oval	1
-	984 529	•• Nut, Speed	3
-	937 131	•• Breaker, Circuit, 35 amp	1
-	939 110	•• Strap, Cable	2



PARTS LIST (Continued)

Item No.	Part No.	Description	Req'd.
-	931 084	•• Tubing, Insulation	2.0 ft
-	241 032	•• Cover, Panel	1
18	-	• Panel, Front Control (460 VAC Unit Only)	1
-	270 175	•• Panel, Front	1
-	241 121	•• Harness, Control Panel Wiring	1
-	931 133	••• Wire, 10 GA, Natural w/Brown	6.9 ft
-	933 071	••• Terminal, Ring Tongue	8
-	931 072	••• Wire, 14 GA, White w/Orange	12.2 ft
-	931 014	••• Wire, 18 GA, Black	9.0 ft
-	939 110	••• Strap, Cable	20
-	-	••• Marker, Wire	-
-	933 129	••• Terminal, Ring Tongue	6
-	933 054	••• Terminal, Ring Tongue	8
-	933 126	••• Terminal, Spade	6
-	241 121	•• Mounting w/Switch	1
-	981 031	••• Screw, Flat Head, 6-32 x 0.38 in.	2
-	241 030	••• Mounting, Switch	1
-	937 140	••• Switch, 460 VAC	1
-	241 031	•• Cover, Switch	1
-	981 161	•• Screw, Pan Head, 10-32 x 0.38 in.	2
-	981 020	•• Screw, Pan Head, 6-32 x 0.25 in.	4
-	983 100	•• Lockwasher, Split, No. 6	4
-	240 537	•• Controller, Tank Temperature	1
-	933 053	•• Post, Fuse	1
-	939 016	•• Fuse, 1 amp	1
-	985 101	•• Rivet, Pop	4
-	901 586	•• Knob	1
-	984 529	•• Nut, Speed	3
-	981 084	•• Tubing, Insulation	2.0 ft
-	-	•• Door, Access	1
-	981 857	•• Stud, 1/4-Turn	1
-	981 858	•• Washer, 1/4-Turn	1
-	136 418	•• Nameplate, Oval	1
-	-	•• Hinge, Access Door	1
-	981 005	•• Screw, Round Head, 5-40 x 0.44 in.	3
-	984 100	•• Nut, Hex, 5-40	3
-	981 074	•• Screw, Round Head, 8-32 x 0.50 in.	6
-	939 525	•• Light, Indicating, White	1



PARTS LIST (Continued)

Item No.	Part No.	Description	Req'd
-	939 524	•• Light, Indicating, Amber	1
-	939 110	•• Strap, Cable	2
-	937 131	•• Breaker, Circuit, 35 amp	1
-	981 855	•• Receptacle, 1/4-Turn	1
-	981 856	•• Nut, 1/4-Turn	1
-	984 111	•• Nut, Hex, 8-32	6
-	939 047	•• Fuse, 10 amp	1
-	939 019	•• Fuse, 15 amp	2
-	933 133	•• Post, Fuse	3
19	240 567	• Controller, Hose Temperature	1
20	981 149	• Screw, Round Head, 10-32 x 0.38 in.	7
21	933 130	• Block, Terminal, High Temperature	1
22	240 667	• Cover, High Temperature Terminal Block	1
23	240 669	• Bracket, Terminal Block	1
24	981 028	• Screw, Fillister Head, 6-32 x 0.75 in.	2
25	984 101	• Nut, Hex, 6-32	4
26	-	• Assembly, Tank, HM VII (See Figure 23)	1
27	240 600	• Screen, Tank	1
28	270 194	• Cover, Tank	1
29	240 480	• Knob, Lock, Circulation Valve	1
30	136 477	• Knob, Adjustment, Circulation Valve	1
31	981 115	• Screw, Oval Head, 10-32 x 0.50 in.	1
32	983 021	• Washer, Flat, No. 10, Brass	1
33	939 110	• Strap, Cable	4
34	240 640	• Panel, Rear Tank	1
-	-	•• Panel, Rear	1
-	240 643	•• Insulation, Rear	1
-	981 857	•• Stud, 1/4-Turn	2
-	981 858	•• Washer, 1/4-Turn	2
35	240 675	• Lid, Loading	1
-	-	•• Lid, Loading	1
-	-	•• Hinge, Loading Lid	1
-	243 328	•• Guard, Hand	1
-	901 582	•• Knob	1
-	981 082	•• Screw, Pan Head, 8-32 x 1.25 in.	1
-	983 110	•• Lockwasher, External, No. 8	1



PARTS LIST (Continued)

Item No.	Part No.	Description	Req'd
-	985 101	•• Rivet, Pop	6
36	981 200	• Screw, Fillister Head, 1/4-20 x 0.50 in.	9
37	981 156	• Screw, Pan Head, 10-32 x 1.00 in., Brass	1
38	240 592	• Cover, Control Cabinet	1
39	240 585	• Panel, Rear Control	1
-	-	•• Panel, Rear	1
-	981 857	•• Stud, 1/4-Turn	2
-	981 858	•• Washer, 1/4-Turn	2
40	240 588	• Panel, Outside Tank	1
-	-	•• Panel, Outside	1
-	600 085	•• Tag, Warning	1
-	981 857	•• Stud, 1/4-Turn	2
-	981 858	•• Washer, 1/4-Turn	2
-	985 101	•• Rivet, Pop	2
41	240 574	• Support, Rear Cabinet	1
-	981 855	•• Receptacle, 1/4-Turn	2
-	981 856	•• Nut, 1/4-Turn	2
42	933 122	• Cover, Transformer Terminal Block	1
43	984 111	• Nut, Hex, 8-32	14
44	240 597	• Transformer (230/460 VAC Only)	1
44	243 921	• Transformer (200 VAC Only)	1
45	240 674	• Tag, Ground	1
46	984 129	• Nut, Hex, 10-32, Brass	3
47	981 066	• Screw, Round Head, 8-32 x 0.25 in.	2
48	-	• Panel, Control Mounting	1
-	270 179	•• Panel, Mounting	1
-	240 717	•• Harness, Control Mount Wiring	1
-	931 014	••• Wire, 18 GA, Black	5.2 ft
-	931 084	••• Sleeving, Insulation	0.3 ft
-	933 071	••• Terminal, Ring Tongue	12
-	-	••• Marker, Wire	-
-	939 110	••• Strap, Cable	2
-	937 036	•• Contactor	2
-	981 149	•• Screw, Round Head, 10-32 x 0.38 in.	4
-	933 099	•• Plug, Octal	1
-	981 027	•• Screw, Fillister Head, 6-32 x 1.25 in.	2
49	933 128	• Jumper, Terminal Block	4
50	983 111	• Lockwasher, Split, No. 8	10



PARTS LIST (Continued)

Item No.	Part No.	Description	Req'd
51	984 509	• Nut, Round w/Slot, 8-32	4
52	240 668	• Spacer, Leg	4
53	933 124	• Cover, Transformer Terminal Block (230/460 VAC Units Only)	1
53	933 185	• Cover, Transformer Terminal Block (200 VAC Units Only)	1
54	984 126	• Nut, Hex, 12-24	4
55	-	• Tag, Warning, Electrical Shock	1
56	240 670	• Bracket, Terminal	1
57	933 044	• Terminal Block, 4-Station	1
58	939 004	• Cable, Tie	2
59	933 046	• Strip, Marker, 4-Station	2
60	939 045	• Bushing, Nylon	2
61	-	• Wire Group (230 VAC Unit Only)	1
-	931 072	•• Wire, 14 GA, White w/Orange	1.2 ft
-	931 129	•• Wire, 10 GA, Green w/Yellow	2.8 ft
-	931 149	•• Wire, 18 GA, Green w/Yellow	1.0 ft
-	933 054	•• Terminal, Ring Tongue	8
-	933 071	•• Terminal, Ring Tongue	2
-	933 129	•• Terminal, Ring Tongue	2
-	-	•• Marker, Wire	-
61	-	• Wire Group (460 VAC Unit Only)	1
-	931 014	•• Wire, 18 GA, Black	4.7 ft
-	931 072	•• Wire, 14 GA, White w/Orange	0.7 ft
-	931 129	•• Wire, 10 GA, Green w/Yellow	2.8 ft
-	931 149	•• Wire, 18 GA, Green w/Yellow	1.5 ft
-	-	•• Marker, Wire	-
-	933 054	•• Terminal, Ring Tongue	6
-	933 071	•• Terminal, Ring Tongue	6
-	933 129	•• Terminal, Ring Tongue	3
-	933 162	•• Terminal, Pushon	4
61	-	• Wire Group (200 VAC Unit Only)	1
-	931 014	•• Wire, 18 GA, Black	4.7 ft
-	931 072	•• Wire, 14 GA, White w/Orange	0.7 ft
-	931 129	•• Wire, 10 GA, Green w/Yellow	2.8 ft
-	931 149	•• Wire, 18 GA, Green w/Yellow	1.0 ft
-	-	•• Marker, Wire	-
-	933 054	•• Terminal, Ring Tongue	4
-	933 071	•• Terminal, Ring Tongue	6
-	933 129	•• Terminal, Ring Tongue	6
-	933 162	•• Terminal, Pushon	4
62	-	• Base, HM VII (See Service Parts List)	1
63	270 181	• Panel, Inside Tank	1
-	-	•• Panel, Inside	1



PARTS LIST (Continued)

Item No.	Part No.	Description	Req'd
-	270 184	•• Insulation, Inside	1
-	985 101	•• Rivet, Pop	2
-	-	•• Insulation, Terminal	1
-	981 856	•• Nut, 1/4-Turn	2
-	981 855	•• Receptacle, 1/4-Turn	2
64	270 185	• Panel, Inside Control	1
-	-	•• Panel, Inside	1
-	933 074	•• Block, Terminal, 8-Station	1
-	933 075	•• Marker, Insulation, 8-Station	1
-	981 060	•• Screw, Pan Head, 8-32 x 0.50 in.	2
-	981 856	•• Nut, 1/4-Turn	1
-	881 855	•• Receptacle, 1/4-Turn	1
65	270 188	• Harness, Main Wiring	1
-	931 072	•• Wire, 14 GA, White w/Orange	2.6 ft
-	931 084	•• Tubing, Fiberglass	1.2 ft
-	931 131	•• Wire, 18 GA, Green	3.6 ft
-	931 132	•• Wire, 18 GA, Black	19.8 ft
-	931 133	•• Wire, 10 GA, Natural w/Brown	8.6 ft
-	-	•• Marker, Wire	-
-	933 006	•• Terminal, Ring Tongue	4
-	933 054	•• Terminal, Ring Tongue	4
-	933 071	•• Terminal, Ring Tongue	7
-	933 129	•• Terminal, Ring Tongue	3
-	933 283	•• Terminal, Ring Tongue	1
-	-	•• Socket, Electrical Connector	3
-	939 110	•• Strap, Cable	5
66	240 594	• Support, Front Cabinet	1
67	900 769	• Fitting, Wire Molded End	2
68	136 139	• Conduit, Base	1
69	983 011	• Washer, No. 8	2
70	-	• Tag, Los Angeles Approved (Not Applicable to 200 VAC Unit)	1
-	244 404	• Pump, Air Operated, w/Enclosure	1
-	270 119	• Wax Pump, Air Operated, w/Enclosure	1
71	244 405	•• Pump, Air Operated (w/244 404)	1
71	270 116	•• Wax Pump, Air Operated (w/270 119)	1
72	981 160	•• Screw, Pan Head, 10-32 x 0.50 in.	1
73	270 125	•• Enclosure, Air Motor	1
74	240 591	•• Cover, Enclosure	1
75	244 408	•• Plate, Enclosure	1

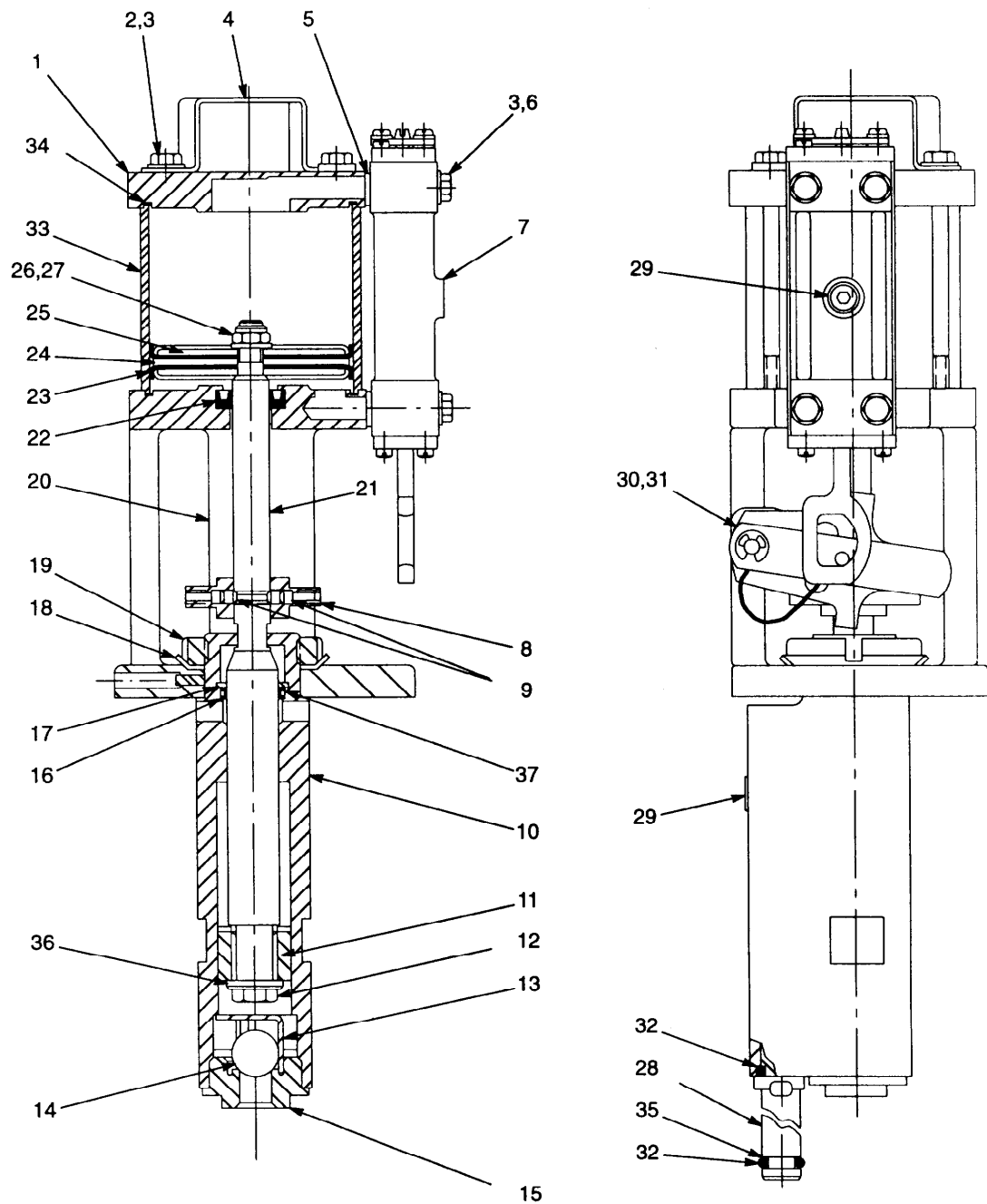


Figure 20 - HM VII Piston Pump

4104002

PARTS LIST FOR FIGURE 20

Item No.	Part No.	Description	Req'd
-	244 405	Pump, Hydraulic, Air Operated Piston, HM VII/IX	Ref
1	243 111	◦Head, Cylinder	1
2	981 235	◦Screw, Cap, Hex Head, 1/4-20 x 4.00 in.	4
3	983 140	◦Lockwasher, Split, 0.25 in.	8
4	243 529	◦Bracket, Enclosure	1
5	503 656	◦Gasket, Valve	2
6	981 222	◦Screw, Cap, Hex Head, 1/4-20 x 1.50 in.	4
7	-	◦Valve, 4-Way Air Control (See Figure 22)	1
8	240 530	◦Collar, Trip	1
9	981 101	◦Screw, Socket Set, 10-32 x 0.187 in.	4
10	240 531	◦Body, Hydraulic Pump	1
11	276 716	◦Piston, HM VII	1
12	981 411	◦Screw, Cap, Hex Head, 3/8-24 x 0.75 in.	1
13	240 533	◦Cage, Ball, Siphon	1
14	900 023	◦Ball, 440 Stainless Steel, 0.75 in.	1
15	240 534	◦Seat, Siphon Ball	1
16	288 122	◦Seal, Pump, High Volume	1
17	986 711	◦Retaining Ring, Internal, No. 106, Spiral	1
18	983 184	◦Lockwasher, Bearing	1
19	984 545	◦Locknut, Bearing	1
20	243 109	◦Mounting, Pump	1
21	276 718*	◦Plunger	1
22	952 130	◦U-cup, Viton	1
23	240 540	◦Piston Cup, Air Motor	2
24	240 541	◦Disc, Piston Seal	1
25	240 542	◦Washer, Piston Cup	2
26	984 153	◦Locknut, Hex, 3/8-16 UNC 2B	1
27	983 061	◦Washer, Flat, 0.406 x 0.812 x 0.065 in.	1
28	-**	◦Tube, Crossover	1
29	973 402	◦Plug, Pipe, Socket, Flush, 1/8 NPTF	1
30	-	◦Snapper Assembly	1
-	276 645	◦◦U-spring, Snapper	1
-	276 647	◦◦Snapper, Weldment, Control Arm	1
-	986 320	◦◦Retaining Ring, External, No. 25, E-ring	1
-	276 648	◦◦Mount Assembly, Snapper	1
31	981 814	◦Screw, Shoulder, 1/4-20	2
32	940 141	◦O-ring, Viton, 0.500 x 0.625 x 0.063 in.	2



PARTS LIST (Continued)

Item No.	Part No.	Description	Req'd
33	240 543	◦Cylinder, Air	1
34	940 420	◦O-ring, Viton, 3.250 x 3.375 x 0.063 in.	2
35	954 020	◦Back-up Ring, Single, 1/2 X 5/8	1
36	276 717	◦Washer, 1.00 x 0.38 x 0.10 in.	1
37	288 121	◦Washer, 1.045 x 0.819 in.	1

* Plunger Assembly service kit (P/N 276 827) available for normal applications and service kit (P/N 276 828) available for wax pumps.

** Crossover Tube service kit (P/N 240 829) available, which contains items 28, 32, and 35.

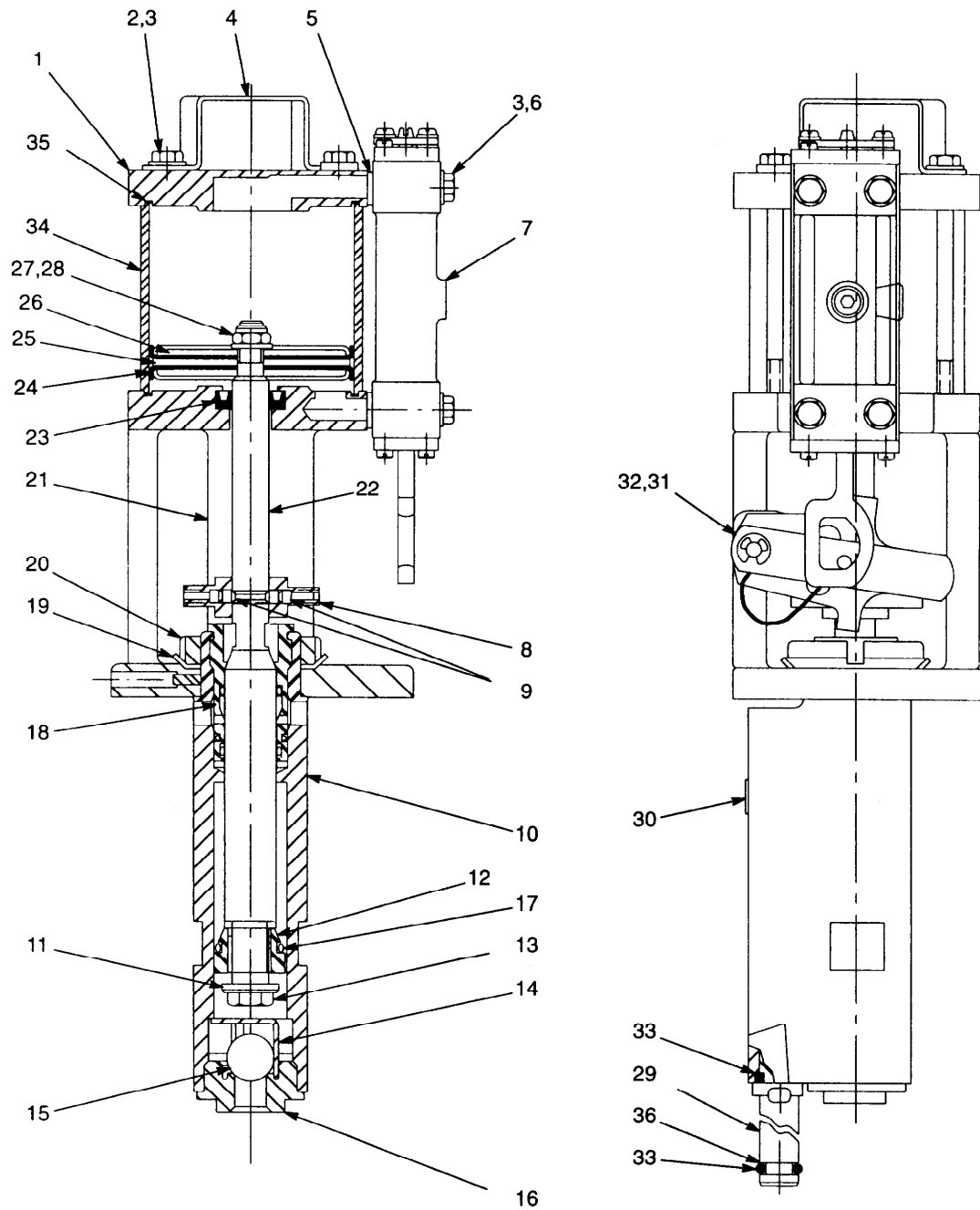


Figure 21 - HM VII Piston Pump w/Packings

4104003

PARTS LIST FOR FIGURE 21

Item No.	Part No.	Description	Req'd
-	270 116	Pump With Packings, Hydraulic, Air Operated, HM VII	Ref
1	243 111	◦Head, Cylinder	1
2	981 235	◦Screw, Cap, Hex Head, 1/4-20 x 4.00 in.	4
3	983 140	◦Lockwasher, Split, 0.25 in.	8
4	243 529	◦Bracket, Enclosure	1
5	503 656	◦Gasket, Valve	2
6	981 222	◦Screw, Cap, Hex Head, 1/4-20 x 1.50 in.	4
7	-	◦Valve, 4-Way Air Control (See Figure 22)	1
8	240 530	◦Collar, Trip	1
9	981 101	◦Screw, Socket Set, 10-32 x 0.187 in.	4
10	244 455	◦Body, Hydraulic Pump	1
11	276 717	◦Washer, 1.00 x 0.38 x 0.10 in.	1
12	276 789	◦Piston, HM IX	1
13	981 411	◦Screw, Cap, Hex Head, 3/8-24 x 0.75 in.	1
14	240 533	◦Cage, Ball, Siphon	1
15	900 023	◦Ball, 440 Stainless Steel, 0.75 in.	1
16	240 534	◦Seat, Siphon Ball	1
17	244 450	◦Seal, Packing	1
18	244 453	◦Body, Gland, With Packings	1
19	983 184	◦Lockwasher, Bearing	1
20	984 545	◦Locknut, Bearing	1
21	243 109	◦Mounting, Pump	1
22	276 718*	◦Plunger	1
23	952 130	◦U-cup, Viton	1
24	240 540	◦Piston Cup, Air Motor	2
25	240 541	◦Disc, Piston Seal	1
26	240 542	◦Washer, Piston Cup	2
27	984 153	◦Locknut, Hex, 3/8-16 UNC 2B	1
28	983 061	◦Washer, Flat, 0.406 x 0.812 x 0.065 in.	1
29	-**	◦Tube, Crossover	1
30	973 402	◦Plug, Pipe, Socket, Flush, 1/8 NPTF	1
31	-	◦Snapper Assembly	1
-	276 645	◦◦U-spring, Snapper	1
-	276 647	◦◦Snapper, Weldment, Control Arm	1
-	986 320	◦◦Retaining Ring, External, No. 25, E-ring	1
-	276 648	◦◦Mount Assembly, Snapper	1
32	981 814	◦Screw, Shoulder, 1/4-20	2

PARTS LIST (Continued)

Item No.	Part No.	Description	Req'd
33	940 141	◦O-ring, Viton, 0.500 x 0.625 x 0.063 in.	2
34	240 543	◦Cylinder, Air	1
35	940 420	◦O-ring, Viton, 3.250 x 3.375 x 0.063 in.	2
36	954 020	◦Back-up Ring, Single, .500 x .625 in.	1

* Plunger Assembly service kit (P/N 276 827) available for normal applications and service kit (P/N 276 828) available for wax pumps.

** Crossover Tube service kit (P/N 240 829) available, which contains items 29, 33, and 36.

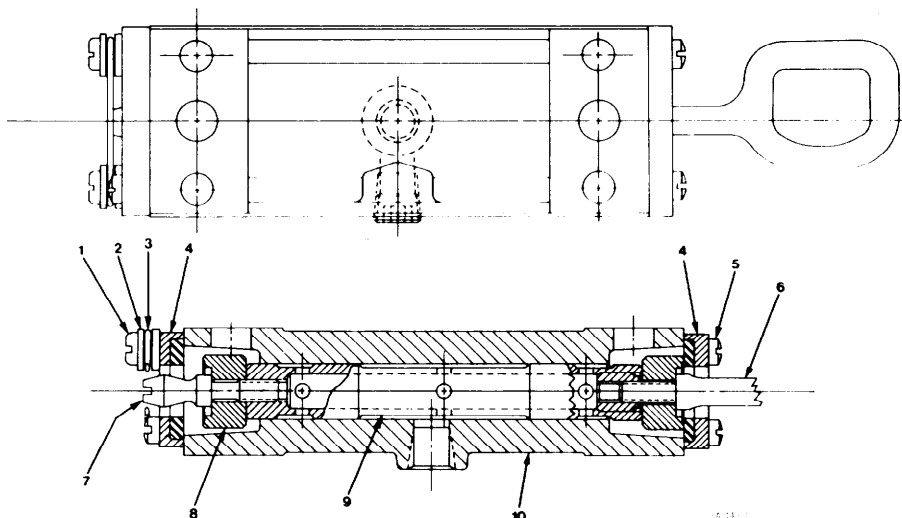


Figure 22 - 4-Way Air Control Valve

PARTS LIST

Item No.	Part No.	Description	Req'd
-	244 244	Kit, Service, 4-Way Air Valve	Ref
-	503 656	° Gasket, Valve	4
-	-	° Valve, 4-Way Air Control	1
1	981 052	°° Screw, 8-32 x 0.62 in., w/Lock Patch	2
2	503 737	°° Spacer	2
3	243 512	°° Detent	1
4	243 511	°° Seat, Poppet	2
5	981 053	°° Screw, 8-32 x 0.50 in., w/Lock Patch	6
6	243 515	°° Link, Shifter	1
7	243 519	°° Pin, Detent	1
8	270 042	°° Poppet	2
9	270 044	°° Spool	1
10	271 360	°° Body, Air Control Valve	1
11	973 402	Plug, Pipe, 1/8-NPTF (ship with item)	1

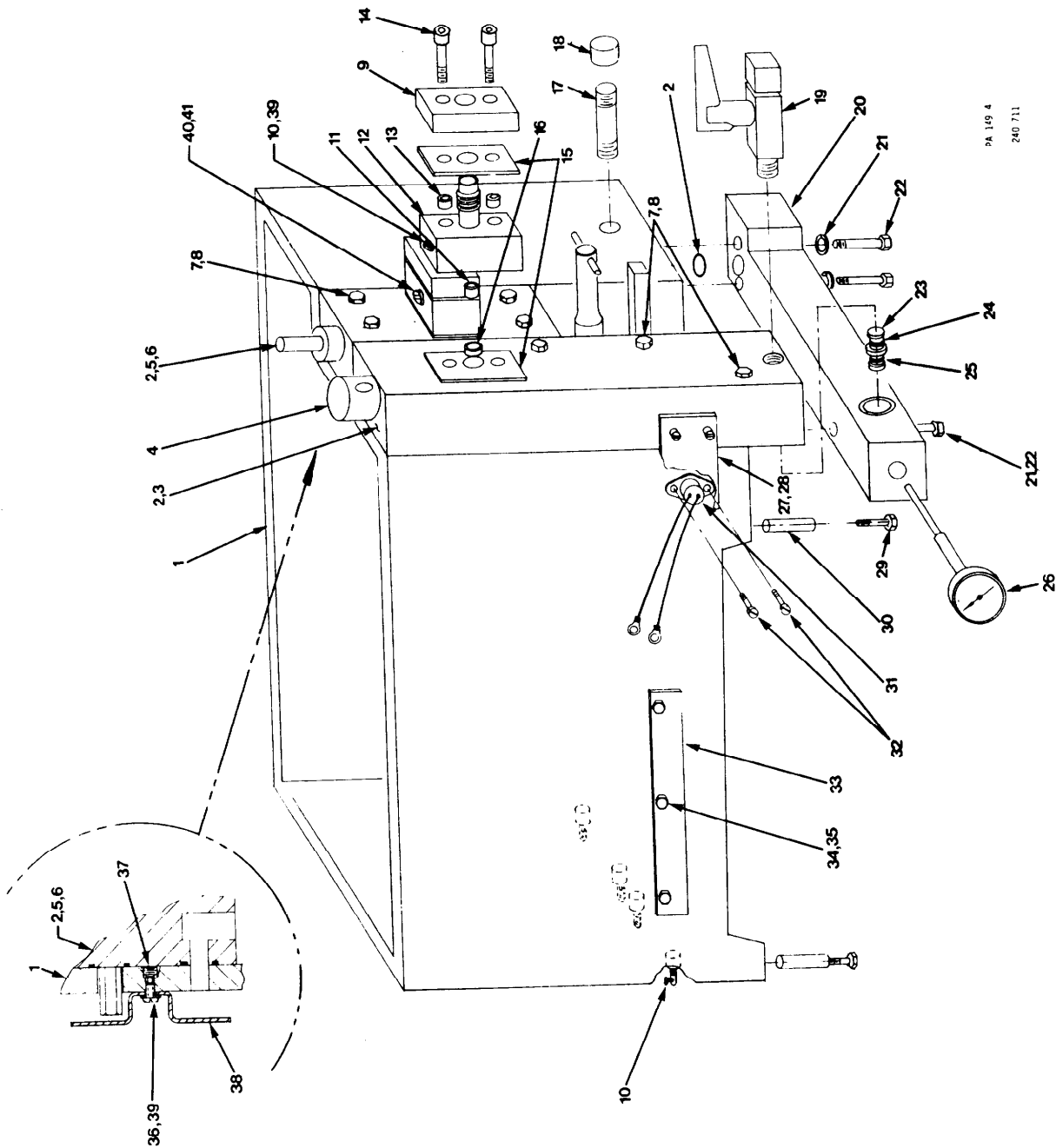


Figure 23 - HM VII Tank Assembly

PARTS LIST FOR FIGURE 23

Item No.	Part No.	Description	Req'd
-	-	Assembly, Tank, HM VII	Ref
1	240 484	° Tank, HM VII	1
2	940 191	° O-ring, Viton, 0.81 x 0.94 in.	3
3	241 370	° Manifold, Filter	1
-	241 371	°° Manifold	1
-	973 402	°° Plug, Pipe, 1/8-NPT	2
-	750 165	°° Valve, Pressure Relief (See Figure 25)	1
4	240 677	° Filter (See Figure 24)	1
5	-	° Valve Assembly, Circulation (See Figure 25)	1
6	940 161	° O-ring, Viton, 0.62 x 0.75 in.	1
7	241 364	° Screw, Hex Head, 5/16-18 x 3.00 in.	7
8	983 150	° Lockwasher, 0.31 in.	7
9	240 468	° Holder, Hose Fitting	2
10	981 090	° Screw, Pan Head, 8-32 x 0.19 in.	5
11	152 695	° Sleeve, Sealing	2
12	241 363	° Fitting, Hose	2
13	152 691	° Sleeve, Insulating	4
14	981 219	° Screw, Socket Head, 1/4-28 x 1.25 in.	4
15	240 464	° Insulator, Hose Fitting	4
16	152 697	° Sleeve, Support	2
17	973 028	° Nipple, Pipe, 1/4-NPT x 4.00 in.	1
18	973 960	° Cap, Pipe, 1/4-NPT	1
19	240 703	° Valve, Tank Drain (See Figure 27)	1
20	240 826	° Manifold, Crossover	1
21	983 140	° Lockwasher, Split, 0.25 in.	3
22	240 466	° Screw, Hex Head, 1/4-20 x 1.75 in.	3
23	240 456	° Tube, Hydraulic Connector	1
24	954 020	° Ring, Backup, Single, 0.50 x 0.62 in.	2
25	940 141	° O-ring, Viton, 0.50 x 0.62 in.	2
26	901 205	° Thermometer, 150° to 500°F (65° to 290°C)	1
27	240 667	° Cover, High Temperature Terminal Block	1
28	981 020	° Screw, Pan Head, 6-32 x 0.25 in.	2
29	981 337	° Screw, Hex Head, 5/16-18 x 2.50 in.	4

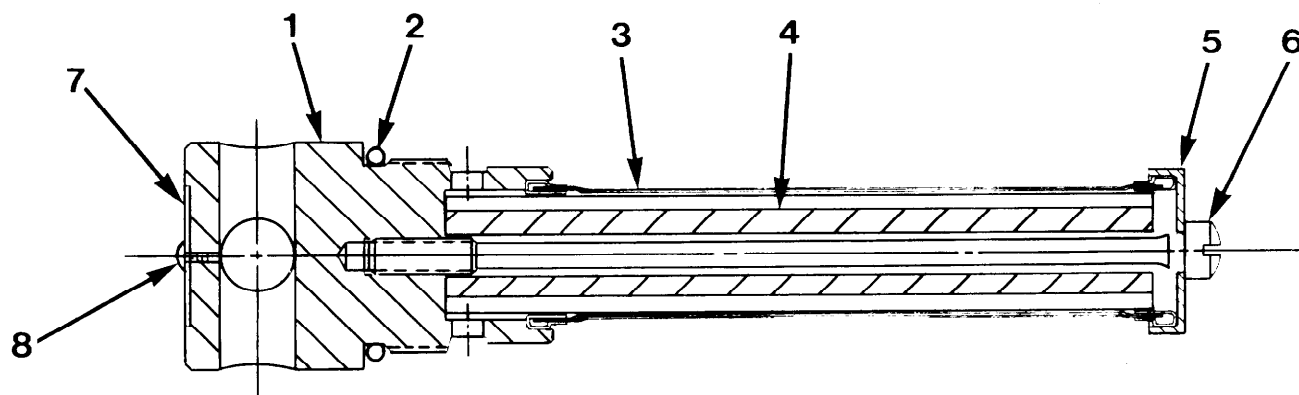


PARTS LIST (Continued)

Item No.	Part No.	Description	Req'd
30	240 668	• Spacer, Leg	4
31	240 713	• Heat Limiter, Tank	1
-	933 006	•• Terminal, Ring Tongue	2
32	981 000	• Screw, Fillister Head, 5-40 x 0.25 in.	2
33	240 471	• Cover, Sensing Bulb	1
34	981 130	• Screw, Hex Head, 10-32 x 0.50 in.	3
35	983 120	• Lockwasher, Split, No. 10	3
36	981 064	• Screw, Pan Head, 8-32 x 0.38 in.	1
37	973 403	• Plug, Pipe, 1/16-NPTF	1
38	240 712	• Deflector, Hot Melt Adhesive	1
39	983 110	• Lockwasher, No. 8	2
40	981 020	• Screw, Pan Head, 6-32 x 0.25 in.	1
41	983 100	• Lockwasher, No. 6	1
-	900 236	• Paste, Teflon	-

TABLE 10 - OPTIONAL FILTER SCREENS

Part No.	Description
161 104	Screen, Filter, 0.004 in. mesh
161 106	Screen, Filter, 0.006 in. mesh
161 109	Screen, Filter, 0.009 in. mesh
161 112	Screen, Filter, 0.012 in. mesh
161 115	Screen, Filter, 0.015 in. mesh
161 120	Screen, Filter, 0.020 in. mesh



PA 149 3

240 677

Figure 24 - Filter Assembly

PARTS LIST

Item No.	Part No.	Description	Req'd
-	240 677	Filter Assembly, HM VII	Ref
1	-	• Bung, Filter (See Service Parts List)	1
2	941 240	• O-ring, Viton, 1.25 x 1.44 in.	1
3	161 106*	• Screen, Filter, 0.006 in. mesh	1
4	240 457	• Core, Filter	1
5	240 459	• Support, Filter	1
6	240 458	• Screw, Hex Head, 1/4-20 x 5.50 in.	1
7	240 749	• Tag, Filter Warning	1
8	981 905	• Screw, Drive, 2-56 x 0.19 in.	1

* 0.006 in. filter screen shipped with filter assembly unless specified otherwise on Purchase Order. See Table 10 for optional filter screen sizes and part numbers.

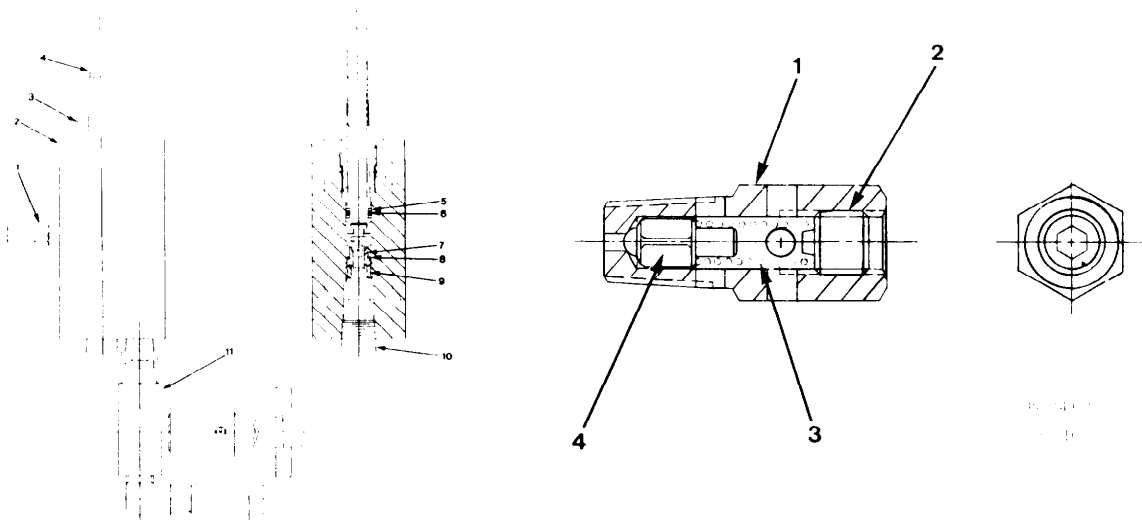


Figure 25 - Circulation Valve Assembly, HM VII

PARTS LIST

Item No.	Part No.	Description	Req'd
1	241 372	Kit, Valve, Circulation,	Ref
2	-	° Manifold, Circulation Valve	1
3	241 764	° Guide, Stem	1
4	241 765	° Stem, Circulation Valve	1
5	954 014	° Ring, Backup, 0.44 x 0.62 in.	2
6	941 112	° O-ring, Viton, 0.44 x 0.62 in.	1
7	750 030	° Seat and Stem, Circulation Valve	1
8	750 027	° Washer, Seal	1
9	981 700	° Screw, Lock, 5/8-18	1
10	973 431	° Plug, Pipe, 1/2-NPT	1
11	241 365*	Valve, Ball, Drain (See Figure 26)	1

*Used with circulation valve P/N 241 367.

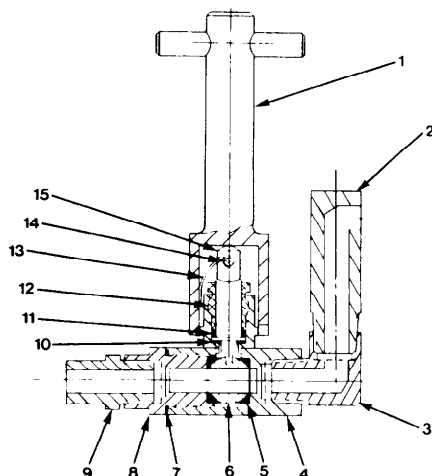
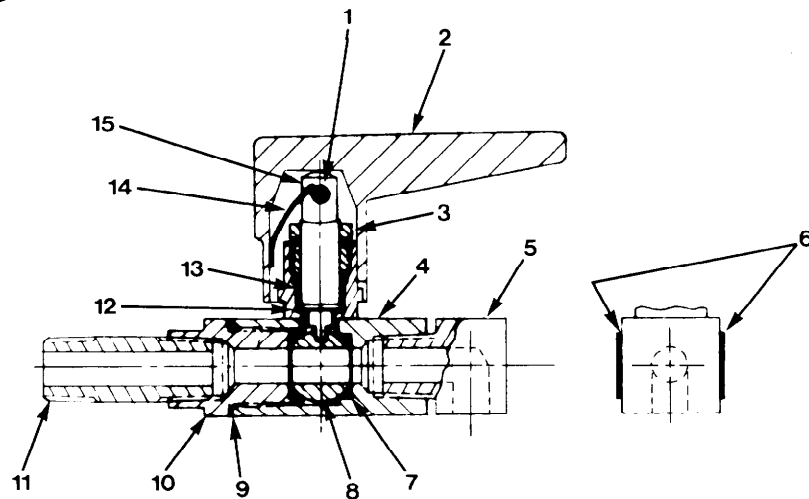


Figure 26 - Drain Ball Valve

PARTS LIST

Item No.	Part No.	Description	Req'd
-	241 365	Valve, Ball, Drain, HM VII	Ref
1	240 707	° Handle, Drain Valve	1
2	240 706	° Fitting, Drain	1
3	973 177	° Elbow, Street, Pipe, 3/8-NPT	1
4	750 041	° Housing, Valve	1
5	750 059	° Seal, Valve	2
6	750 135	° Ball	1
7	-	° Seal, Body	1
8	750 056	° Cap, Body	1
9	973 057	° Nipple, Pipe, 3/8-NPT x 1.32 in.	1
10	750 047	° Washer, Thrust	1
11	750 046	° Packing, Stem	1
12	750 045	° Nut, Stem Gland	1
13	750 048	° Spring, Flat	1
14	750 050	° Screw, Cross	1
15	750 044	° Stem	1



PA 149 E

240 703

Figure 27 - Tank Drain Ball Valve

PARTS LIST

Item No.	Part No.	Description	Req'd
-	240 703	Valve, Ball, Tank Drain, HM VII	Ref
1	750 050	• Screw, Cross	1
2	750 113	• Handle	1
3	750 045	• Nut, Stem Gland	1
4	750 041	• Housing, Valve	1
5	750 111	• Fitting, Elbow	1
6	600 174	• Plate, Warning	2
7	750 059	• Seat, Ball	2
8	750 135	• Ball	1
9	-	• Seal, Body	1
10	750 056	• Cap, Body	1
11	973 067	• Nipple, Pipe, 3/8-NPTF x 2.00 in.	1
12	750 047	• Washer, Thrust	1
13	750 046	• Packing Stem	1
14	750 048	• Spring, Flat	1
15	750 044	• Stem	1



TABLE 11 - RECOMMENDED SPARE PARTS LIST

Part No.	Description	Qty
<u>PUMP ASSEMBLY</u>		
244 244	Valve, 4-Way Air Control	1
240 354	Shifter, Valve	1
986 711	Ring, Retaining	2
240 535	Scraper, Hydraulic (244 405 Pump Only)	1
244 453	Body, Gland w/Packings (270 116 Pump Only)	1
940 223	O-ring, Viton, 1.00 x 1.12 in. (270 116 Pump Only)	2
244 451	Seal, Packing, Plunger (270 116 Pump Only)	1
240 839	Ball and Seat, Siphon	1
240 838	Ball and Seat, Pressure	1
270 040	Seal Kit, Pump	1
<u>TANK AND MANIFOLD</u>		
750 165	Valve, Pressure Relief, Hydraulic	2
240 713	Heat Limiter, Tank	1
240 677	Filter Assembly	1
161 106	Screen, Filter	1
240 842	Kit, Seal, Heating and Control	1
750 058	Kit, Packing, 3/8-in. Ball Valve	2
<u>ELECTRICAL</u>		
240 665	Hose w/Sensor, 1ft	1
939 524	Light, Indicating, Amber	1
939 525	Light, Indicating, White	1
270 826	Circuit Breaker, 20-30-20 amp (200/230 VAC Units Only)	1
937 140	Switch, Main (460 VAC Unit Only)	1
937 131	Circuit Breaker, 35 amp	1
939 016	Fuse, 1 amp	1
939 047	Fuse, 10 amp (460 VAC Unit Only)	1
939 019	Fuse, 15 amp (460 VAC Unit Only)	2
240 833	Controller, Tank Temperature	1
240 567	Controller, Hose Temperature	1
<u>MISCELLANEOUS</u>		
270 755	Solvent, Type R, 1 gal. (3.8 liter)	1
900 252	Lubricant, 1 oz Tube	1
900 236	Paste, Teflon	-

GENERAL INFORMATION

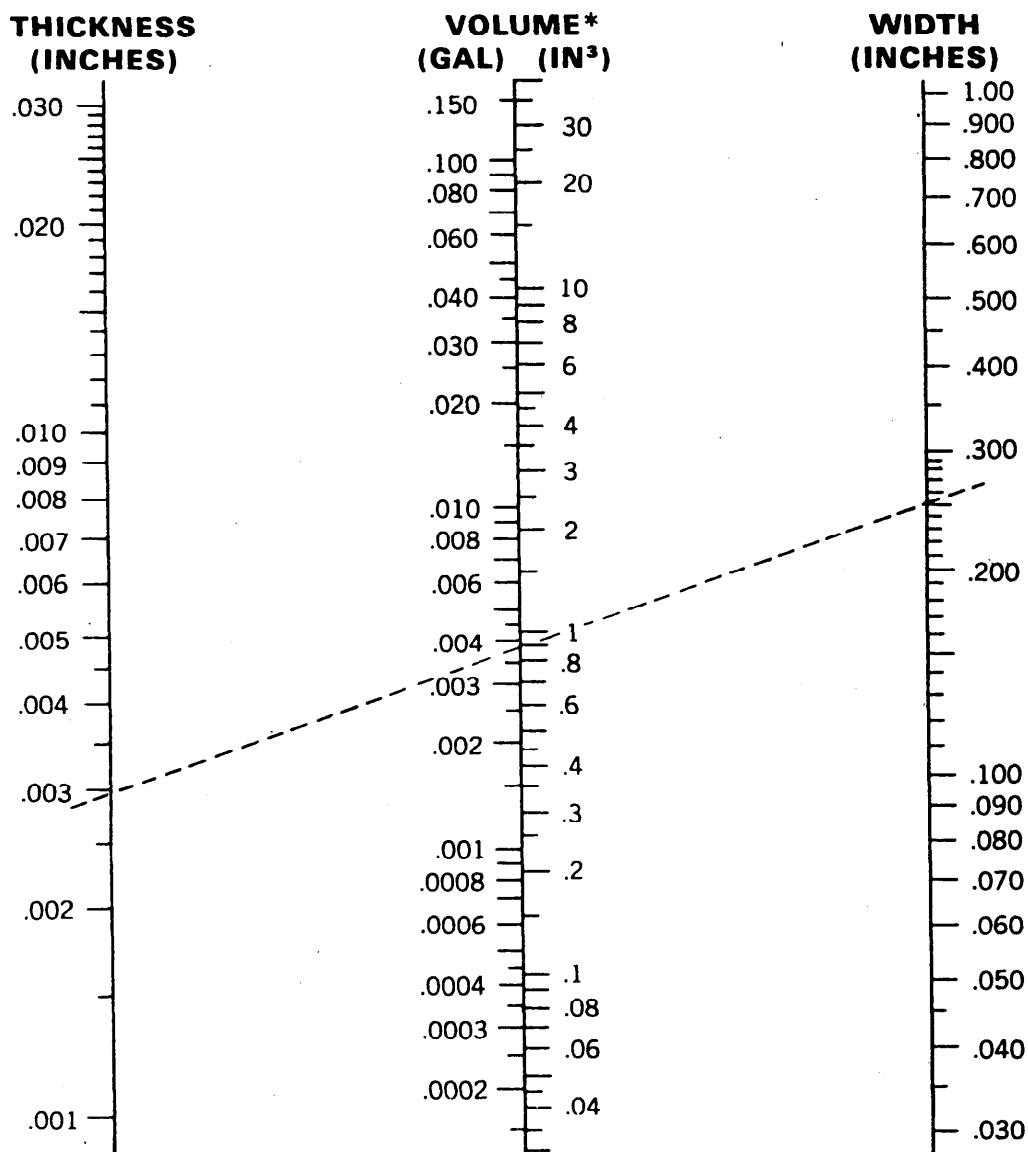


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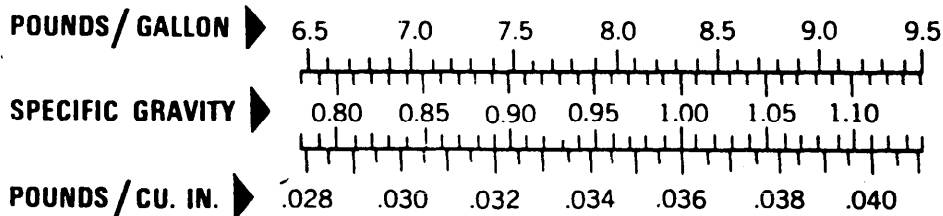
NOMOGRAPH FOR HOT MELT BEADS

MATERIAL REQUIRED PER 100 FEET



* NOMOGRAPH BASED ON FLAT BEADS ■

* BEADS WITH A ROUNDED TOP SURFACE ▲ REQUIRE APPROXIMATELY $\frac{2}{3}$ THE VOLUME SHOWN



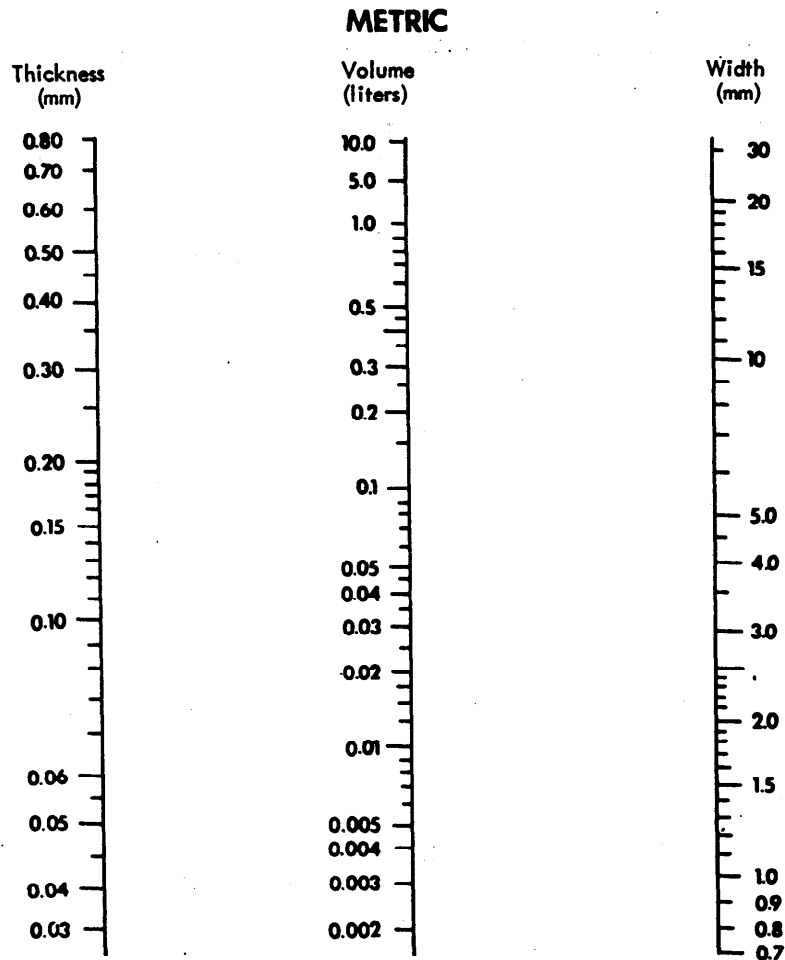
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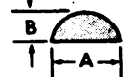
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NOMOGRAPH FOR HOT MELT BEADS



Material required per 100 meters

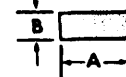
Rounded Bead



F = 0.66

$$\text{Volume in liters} = \frac{A \times B \times F}{10}$$

Flat Bead



F = 1.0

$$\text{Weight in Kilograms} = \frac{A \times B \times F}{10} \times \text{Specific Gravity}$$

EXAMPLE:

For a flat bead, 0.3 mm x 5.0 mm, with specific gravity of 0.9:

$$\text{Volume} = \frac{0.3 \times 5.0 \times 1.0}{10} = .15 \text{ liters/100 M}$$

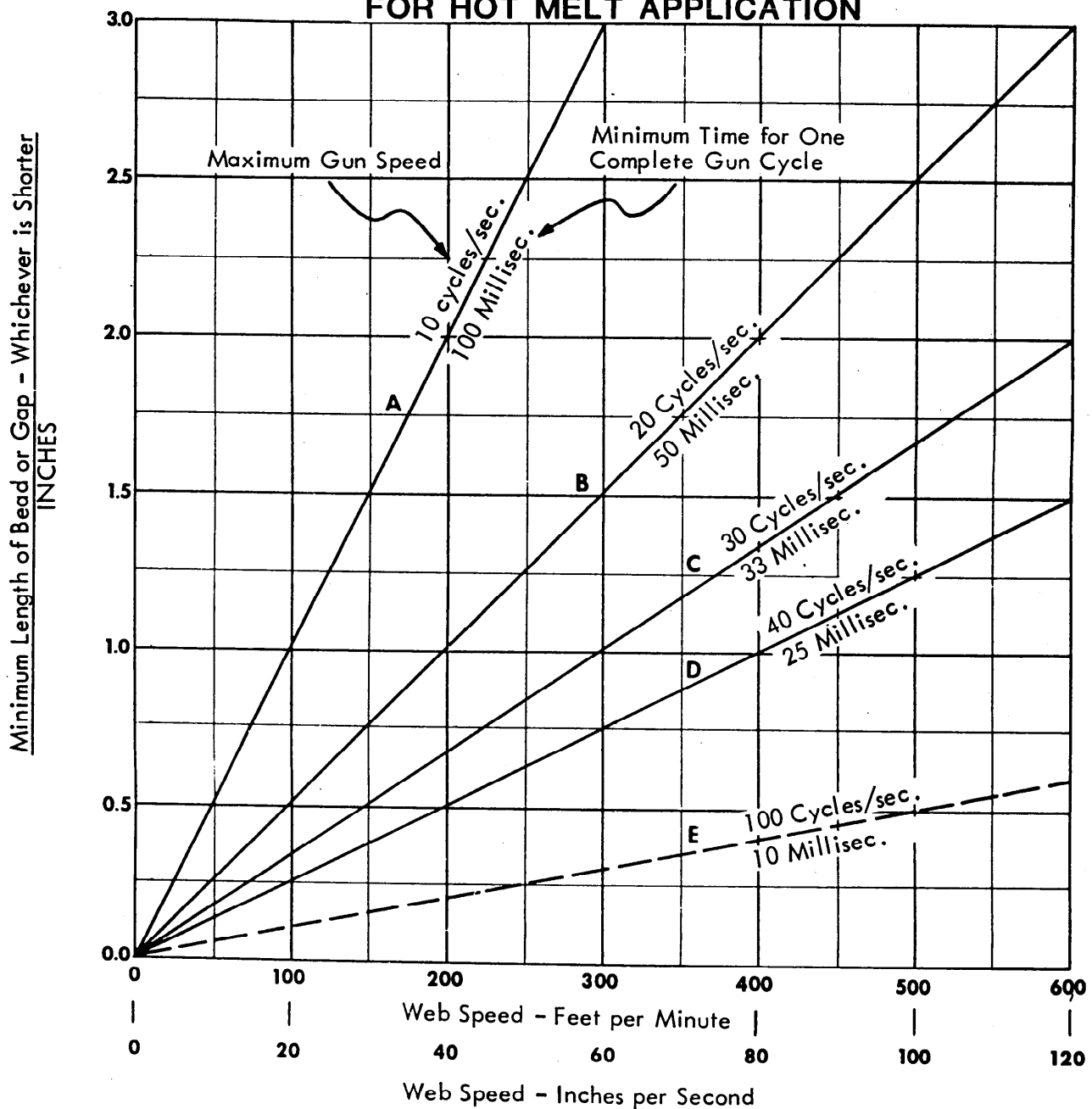
$$\text{Weight} = \frac{0.3 \times 5.0 \times 1.0 \times 0.9}{10} = 0.135 \text{ Grams/100 M}$$



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MINIMUM BEAD LENGTH CHART FOR HOT MELT APPLICATION



NOTE: One Gun Cycle = One Bead + One Gap



Minimum Gun Cycle Length = 2 Times the Minimum Length shown at Left Side of chart

Curve B - #152 670 Nordson Automatic Gun with Pneumatic Operation
Curve A, C, D and E - Specific information not available

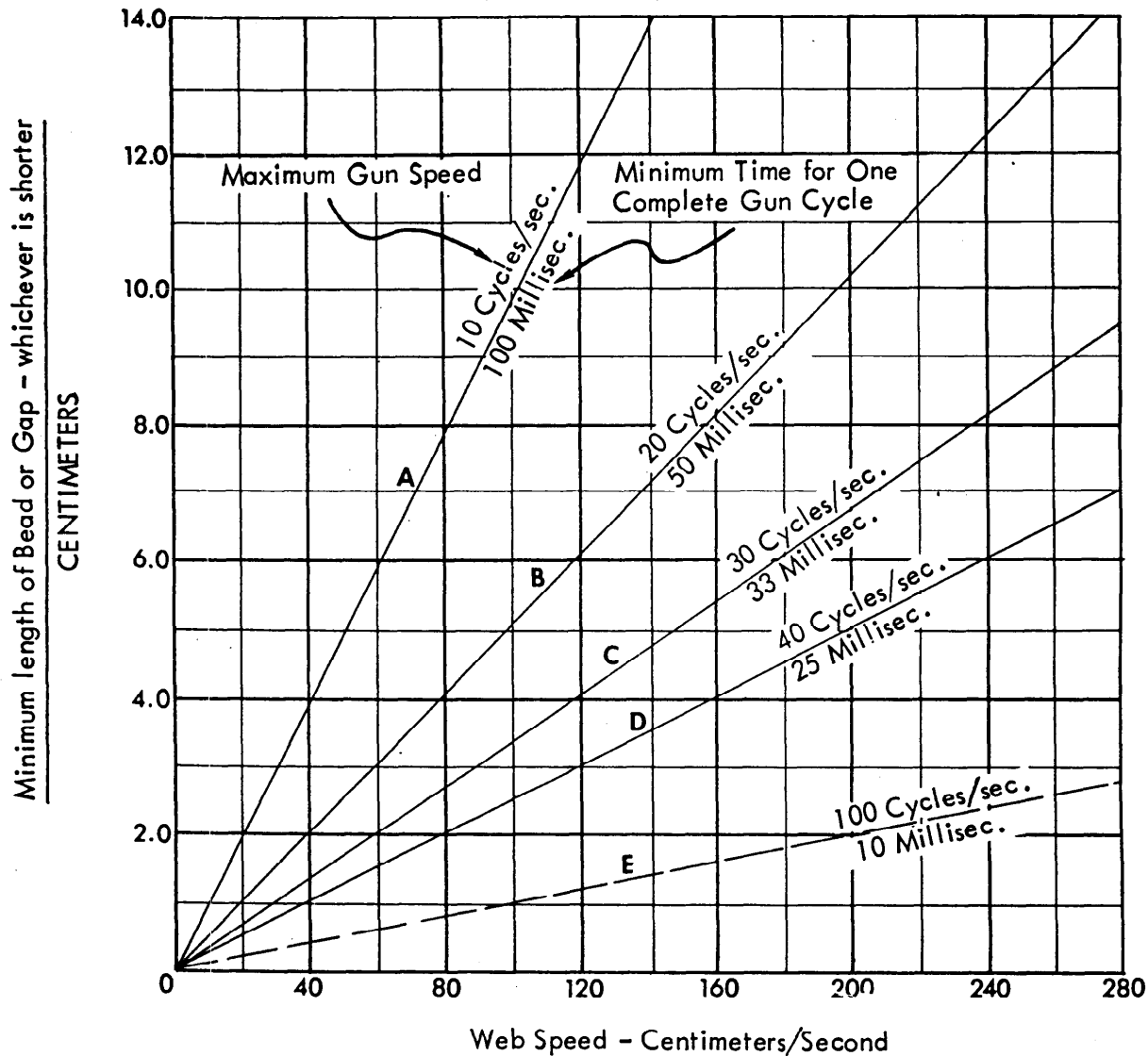
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MINIMUM BEAD LENGTH CHART FOR HOT MELT APPLICATION



NOTE: One Gun Cycle = One Bead + One Gap



Minimum Gun Cycle Length = 2 Times the Minimum Length shown at left side of chart.

Curve B -- #152 670 Nordson Automatic Gun with Pneumatic Operation

Curve A, C, D, and E - Specific information not available.

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HOT MELT

FAULTS AND TROUBLESHOOTING CHART

The photographs below represent samples of bead faults commonly encountered in the application of hot melt adhesives. Troubleshooting procedures are outlined on the pages that follow.

Cold Bead

Possible Causes:

- A. Adhesive colder than recommended application temperature.



- B. Ambient temperature in the application area below normal.



Example: Ice cream plant
(cold draft blowing on nozzle)

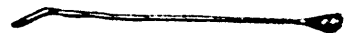


- C. A stream of air directed at guns and nozzles (radiation and convection) will cool the nozzle, gun, and adhesive.
- D. Gun thermostat not of the proper temperature rating for the material in use.
- E. The nozzle too far from the substrate.

Excess Amount in Triggering

Possible Causes:

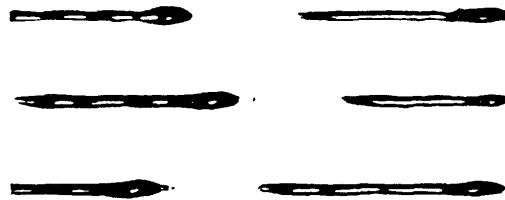
- A. Insufficient air pressure to the gun.
- B. Insufficient air pressure to the pump.
- C. The nozzle too far from the substrate.
- D. Partially plugged nozzle.



Stringing

Possible Causes:

- A. Adhesive too viscous.
- B. Cold adhesive.
- C. Lack of an air-piloted relief valve between solenoid and gun.
- D. Old adhesive (beyond recommended pot life).

Excessive Amount of Cut-off

Possible Causes:

- A. Insufficient air pressure to the pump.
- B. Cold adhesive.
- C. Insufficient air pressure to the gun.

Concentric Circles

Possible Causes:

- A. Material too hot.
- B. Material low in viscosity.
- C. High speed application (fast gun cycling).





HOT MELT TROUBLESHOOTING CHART

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
 Do not attempt to loosen any part of manifold, hose, or gun system until air to the unit has been turned off and pressure has been relieved from hot melt system by triggering the guns.	
 Use safety goggles, safety gloves (P/N 902 514), and protective clothing to prevent injury from splashed hot material or hot parts.	
<u>ADHESIVE BOUNCES OR SPLASHES FROM SUBSTRATE</u>	
A1. Check adhesive temperature settings of applicator, hose and gun.	
NORMAL INDICATION: Adhesive temperature settings normal.	Normal Indication: Proceed to step A2.
	Abnormal Indication: Adhesive temperature too high. Reduce temperature.
A2. Check air pressure to applicator.	
NORMAL INDICATION: Air pressure to applicator within normal limits.	Normal Indication: Proceed to step A3.
	Abnormal Indication: Applicator air pressure too high. Reduce air motor air pressure at the regulator.
A3. Check adhesive viscosity.	
NORMAL INDICATION: Adhesive viscosity within normal limits.	Normal Indication: None.



HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
	Abnormal Indication: Adhesive viscosity too low. Adjust one or more of the following parameters as necessary: 1. Reduce air motor air pressure. 2. Reduce application temperature. 3. Use lower flow-rated nozzle. 4. Use a higher viscosity adhesive.
<u>ADHESIVE CHARRING IN TANK</u>	
B1. Check tank temperature.	
NORMAL INDICATION: Tank temperature within normal limits.	Normal Indication: Proceed to step B2. Abnormal Indication: Tank temperature too high. Reduce tank temperature.
B2. Check tank temperature controller in accordance with applicator service manual.	
NORMAL INDICATION: Tank temperature controller functioning properly.	Normal Indication: Proceed to step B3. Abnormal Indication: Faulty temperature controller. Repair or replace controller.
B3. Check adhesive level in tank.	
NORMAL INDICATION: Tank full of adhesive.	Normal Indication: Proceed to step B4.



HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
	Abnormal Indication: Adhesive level low. Keep tank full.
B4. Hot melt adhesive may be oxidizing in tank.	
NORMAL INDICATION: No oxidation in tank adhesive.	Normal Indication: None.
	Abnormal Indication: Hot melt adhesive oxidizing in tank. Keep tank lid closed. In extreme cases, change adhesive or use nitrogen gas blanket applicator.
<u>ADHESIVE FUMING OR SMOKING</u>	
C1. Check tank temperature setting.	
NORMAL INDICATION: Proper tank temperature setting.	Normal Indication: Proceed to step C2.
	Abnormal Indication: Tank temperature too high. Reduce temperature.
C2. Adhesive may be unstable (chars easily).	
NORMAL INDICATION: No char.	Normal Indication: None
	Abnormal Indication: Unstable adhesive. Use one or more of the following steps to reduce charring:
	1. Keep tank lid closed.
	2. Use a more stable adhesive.
	3. Use nitrogen gas blanket applicator.



HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
<u>ADHESIVE JELLING</u>	
D1. Check temperature settings of applicator and hose.	
NORMAL INDICATION: Temperature settings in proper positions.	Normal Indication: Proceed to step D2.
	Abnormal Indication: Overheating. Drain and flush system in accordance with applicator service manual. Reduce temperature.
D2. Check compatibility by mixing adhesives in separate container.	
NORMAL INDICATION: Compatible mixture.	Normal Indication: Proceed to step D3.
	Abnormal Indication: Incompatible mixing. Drain and flush system in accordance with applicator service manual.
D3. Adhesive may be unstable.	Use a more stable adhesive.
<u>ADHESIVE NOT PENETRATING SUBSTRATE</u>	
E1. Check adhesive temperature.	
NORMAL INDICATION: Adhesive temperature within normal limits.	Normal Indication: Proceed to step E2.
	Abnormal Indication: Low adhesive temperature. Increase temperature slightly.



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HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
E2. Check substrate surface.	
NORMAL INDICATION: No coating on substrate.	Normal Indication: Check with adhesive representative for a compatible adhesive. Abnormal Indication: Coated substrate. Increase temperature slightly. If adhesive still does not penetrate, check with adhesive representative for compatible adhesive.
	NOTE: Flush and drain system in accordance with applicator service manual before changing adhesive.
E3. Check to see that adequate amount of adhesive is being applied to substrate.	
NORMAL INDICATION: Adequate amount of adhesive being applied to substrate.	Normal Indication: Contact adhesive representative for a compatible adhesive. Abnormal Indication: Insufficient adhesive. Use one or more of the following steps to increase adhesive flow: 1. Use higher flow-rated nozzle. 2. Increase temperature slightly. 3. Increase applicator air pressure.



HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
4. Change adhesive to another compatible adhesive with lower viscosity.	
<u>ADHESIVE STRINGING</u>	
F1. Check gun position relative to substrate in accordance with 43-1.	
NORMAL INDICATION: Proper height above substrate.	Normal Indication: Proceed to step F2.
	Abnormal Indication: Gun too far from substrate. Move closer to substrate.
F2. Check adhesive temperature and viscosity.	
NORMAL INDICATION: Adhesive temperature and viscosity within normal limits.	Normal Indication: Proceed to step F3.
	Abnormal Indication: Cold adhesive too viscous. Increase adhesive temperature slightly. Use lower viscosity adhesive.
F3. Check adhesive shelf-life.	
NORMAL INDICATION: Adhesive shelf-life recommended by adhesive manufacturer.	Normal Indication: Proceed to step F4.
	Abnormal Indication: Drain and flush old adhesive. Add new adhesive to tank.



HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
F4. Check for cold air blowing on gun and/or low ambient temperature. NORMAL INDICATION: Normal ambient temperature with little air movement around gun.	Normal Indication: Check with adhesive manufacturer. Abnormal Indication: Cold air blowing on gun and/or low ambient temperature. Use one or more of the following steps to correct the problem: 1. Protect gun from air movement. 2. Increase adhesive temperature slightly. 3. Preheat substrate. 4. Heat ambient air.
<u>AIR IN ADHESIVE</u>	
G1. Check adhesive tank full of molten adhesive. NORMAL INDICATION: Adhesive tank full of molten adhesive.	Normal Indication: Proceed to step G2. Abnormal Indication: Adhesive melt tank empty. Refill tank and operate guns until bubble disappears.
G2. Check viscosity of adhesive. NORMAL INDICATION: Adhesive viscosity within normal limits.	Normal Indication: See MOISTURE BUBBLES IN ADHESIVE BEAD ON SUBSTRATE.



HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
<u>DEPOSIT FROM NOZZLES UNEVEN IN MULTI-GUN INSTALLATION</u>	Abnormal Indication: Increase adhesive temperature slightly or use a lower viscosity adhesive material.
H1. Check for clogged nozzles in accordance with gun service manual.	
NORMAL INDICATION: Adhesive flows freely through nozzle.	Normal Indication: Proceed to step H2.
	Abnormal Indication: Clogged nozzles. Clean nozzles in accordance with gun service manual.
H2. Check pressure drop across guns and nozzles.	
NORMAL INDICATION: Approximately equal pressure drop across all guns.	Normal Indication: None.
	Abnormal Indication: Unequal pressure drop across guns. Use one or more of the following steps to correct the problem:
	1. Increase applicator air pressure.
	2. Increase applicator temperature slightly.
	3. Flush and clean guns and nozzles.
	4. Use different flow-rated nozzle or guns.



HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
5. Use flow-control valves in the lines.	
<u>GUN DROOLING</u>	
11. Check gun needle and seat for wear and/or char.	
NORMAL INDICATION: Gun needle and seat clean with no indication of wear.	Normal Indication: Proceed to step 12. Abnormal Indication: Clean and/or replace worn parts in accordance with gun service manual.
12. Check trigger adjustment in accordance with gun service manual.	
NORMAL INDICATION: Trigger adjustment within normal limits.	Normal Indication: None. Abnormal Indicator: Adjust trigger in accordance with gun service manual.
<u>MOISTURE BUBBLES IN ADHESIVE BEAD ON SUBSTRATE</u>	
J1. Apply adhesive to dry substrate and check for moisture bubbles.	
NORMAL INDICATION: No bubbles on dry substrate.	Normal Indication: Dry substrate prior to application of adhesive. Pre-heat substrate as necessary. Abnormal Indication: See AIR IN ADHESIVE.



HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
<u>CARTON POP-OPEN AFTER LEAVING COMPRESSION SECTION</u>	
K1. Check adhesive not cooling fast enough (too long an open time).	
NORMAL INDICATION: Proper open time.	Normal Indication: Proceed to step K3.
	Abnormal Indication: Proceed to step K2 if open time is too short. Use one or more of the following steps if open time is too long:
	1. Decrease air pressure to air motor to decrease bead size. 2. Reduce adhesive temperature slightly. 3. Reduce line speed through compression. 4. Move guns further from substrate. 5. Increase distance from deposition to compression. 6. Increase compression length. 7. Cool substrate. 8. Use lower flow-rated nozzle. 9. Change bead pattern from constant to intermittent.



HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
K2. Check adhesive cooling too fast (too short an open time).	10. Use adhesive with shorter open time. See adhesive manufacturer.
NORMAL INDICATION: Proper open time.	Normal Indication: Proceed to step K3.
	Abnormal Indication: Use one or more of the following steps to correct the problem:
	1. Increase air pressure to air motor to increase bead size.
	2. Increase adhesive temperature slightly.
	3. Move guns closer to substrate.
	4. Shorter distance from deposition to compression.
	5. Heat substrate.
	6. Use higher flow-rated nozzle.
	7. Change bead pattern from intermittent to constant or increase bead length.
	8. Protect deposit and/or gun from cold or moving air.



HOT MELT TROUBLESHOOTING CHART (CONTINUED)

SYMPTOM/PROCEDURE	CORRECTIVE ACTION
K3. Check for sheared adhesive deposit.	9. Use longer open time adhesive. See adhesive manufacturer.
NORMAL INDICATION: Adhesive deposit not sheared.	Normal Indication: None Abnormal Indication: Sheared adhesive deposit. Ensure substrate is not twisted, jogged, or otherwise subjected to adverse movement in the compression section. See adhesive manufacturer if compression section is smooth.

Hot Melt Hose

45-0-0



NORDSON CORPORATION • AMHERST, OHIO • USA



HOT MELT HOSES -

Our instruction manuals clearly state that hot melt hoses are not to be placed inside of conduit but do not state a reason why.

Hot melt hoses should not be placed inside of any closed cover where heat cannot be dissipated from them. This includes electrical conduit, insulation of any type or tight metal covers. Complete failure of the hose can result if the hose is insulated beyond the insulation that is included with the hose.

If the thermocouple section is exposed to a lower temperature it will call for heat even though the extra insulated section is at, or above correct operating temperature. This will raise the temperature of the extra insulated section above the teflon melting point. For this reason, customers should be cautioned against enclosing the hot melt hoses in any way that will cause overheating of the hose, and failure.

ADDITIONAL CAUTION:

Hot melt hoses should not be secured so that the hose has a large area of surface contact with a cold floor, cold steel, angle iron or other cold material. This may act as a heat sink reducing the temperature of the hose at that point and restrict the adhesive flow which could cause application problems.

NOTE: If a hot melt hose is to be used in an application where the hose is suspended by an overhead tool balancer or similar device it is recommended that a hose support be used to minimize damage to the hose.

The hot melt hose should be supported so that the minimum bend radius is no less than 6 inches, and so the weight of the hose will not compress the internal teflon tubing.

The hose support should neither act as a heat sink nor restrict the hose heat dissipation.

10/78 - Revised Information.

Nordson Automatic Hot Melt Hoses

45-3-0



NORDSON CORPORATION • AMHERST, OHIO • USA



MODEL VII AUTOMATIC HOT MELT HOSE

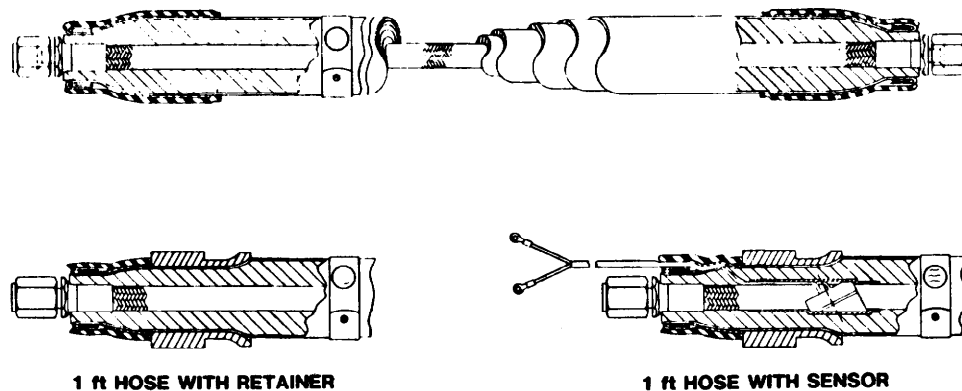


Figure 1 - Model VII Automatic Hot Melt Hose

The automatic hose for use with the Model VII applicator and the H20E automatic extrusion gun is an aircraft-type hydraulic hose constructed with a teflon innertube reinforced with a stainless steel wire braid. Heat is generated in the hose by passing a current through the wire braid and fittings. The Model VII hose assemblies without sensors are constructed using the standard aircraft teflon hose covered with a silicone rubber tube, then covered with an EPDM cover. The hose with sensor has two wraps of silicone rubber tape covered by an EPDM tube. The hose is covered with a nylon braid for abrasion resistance.

Temperature within the hose is monitored by a resistance temperature detector (RTD) inside the hose and controlled by an adjustable temperature control in the applicator electrical cabinet.

Figure 2 details the insulating cuff configuration. This cuff must be installed over each fitting connection to retain heat generated in the hose and to prevent inadvertent electrical shock.

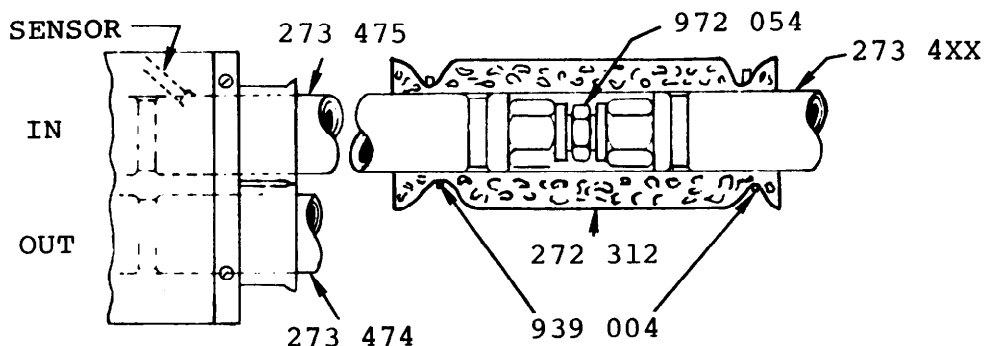


Figure 2 - Model VII Hose Insulating Cuff



PARTS LIST

Part No.	Description	Req'd
846 012	Hose Assembly, Model VII 1 ft (0.3 m)	Ref
846 024	Hose Assembly, Model VII 2 ft (0.6 m)	Ref
846 036	Hose Assembly, Model VII 3 ft (0.9 m)	Ref
846 048	Hose Assembly, Model VII 4 ft (1.2 m)	Ref
846 060	Hose Assembly, Model VII 5 ft (1.5 m)	Ref
846 072	Hose Assembly, Model VII 6 ft (1.8 m)	Ref
846 096	Hose Assembly, Model VII 8 ft (2.4 m)	Ref
842 120	Hose Assembly, Model VII 10 ft (3.1 m)	Ref
240 665	Hose Assembly w/Sensor, Model VII 1 ft (0.3 m)	Ref
271 272	Cuff, Insulation, Hose to Gun	1
272 312	Cuff, Insulation, Hose to Hose	1
939 004	Tie, Cable	2
972 054	Connector, Male, Hose	1

COLD RESISTANCE

Part No.	Hose Length ft (m)	Cold Resistance (ohms)
846 012	1 (0.3)	0.061 to 0.053
846 024	2 (0.6)	0.121 to 0.107
846 036	3 (0.9)	0.181 to 0.161
846 048	4 (1.2)	0.242 to 0.214
846 060	5 (1.5)	0.303 to 0.267
846 072	6 (1.8)	0.364 to 0.321
846 096	8 (2.4)	0.485 to 0.427
846 120	10 (3.1)	0.485 to 0.427
240 665	1 (0.3)	0.061 to 0.053



Packaging and Assembly Division
Atlanta, Georgia

TECHNICAL PUBLICATION 45-3-19/20

REPLACEMENT PART NUMBERS

Old Hose Part No.	Hose Length ft (m)	New Hose Part No.
271 817	1 (0.3)	846 012
271 818	2 (0.6)	846 024
271 819	3 (0.9)	846 036
271 820	4 (1.2)	846 048
271 821	5 (1.5)	846 060
271 822	6 (1.8)	846 072
271 823	8 (2.4)	846 096
271 824	10 (3.1)	846 120
271 827	1 (0.3)	240 665

Miscellaneous Technical Data

Hot Melt



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Nordson Corporation welcomes requests for information, comments and inquiries about its products.

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NORDSON TYPE R CLEANING SOLVENT



The flash point of Type R solvent is 550°F (288°C). Do not heat this material above 475°F (246°C). Do not heat Type R solvent with an open flame or in an uncontrolled heating device (for example, a small pan or unregulated hot plate). A fire hazard may exist if an open flame or uncontrolled hot plate is used to heat Type R solvent. A controlled heating device (such as a small deep fat fryer or thermostatically controlled hot plate) should be used to heat the solvent above the melting point of the adhesive.

PHYSICAL PROPERTIES

Flash Point:	550°F (288°C)
Freeze Point:	32°F (0°C)
Vapor (Odor):	None
Color:	Clear
Viscosity:	5,600 CPS @ 77°F (25°C)
Pounds/Gallon (kilograms/liter):	9 (1)
Molecular Weight:	3,300
	Non-irritating to skin
	Non-toxic

Type R solvent meets the requirements of the following FDA regulations:

175.105
175.300
175.380
175.390
176.170
176.180
177.1010
177.1210

USDA approved for use in food processing plants for cleaning hot melt adhesive applying equipment as long as there is no direct contact with the food.



Do not take internally. Keep out of reach of children.

USAGE



Type R solvent may not be compatible with all adhesives. Before using Type R solvent with an adhesive for the first time, test for compatibility using the procedure described below.

NOTE: For ease of pouring, store Type R solvent at room temperature 70°F (21°C). Do not store Type R solvent at temperatures over 150°F (65°C).



USAGE, (Continued)

To clean parts exposed to hot melt, nozzles, and filters, soak the parts in heated Type R solvent at a temperature somewhat above the normal adhesive application temperature, but less than 475°F (245°C).



When cleaning the AD-24 drop-in cartridge with Type R solvent, do not submerge the entire cartridge in the solvent. Be certain the pneumatic section (top) of the cartridge is not inserted in the molten solvent. The mixture of Type R solvent and molten adhesive will cause the pneumatic section to seize.

If a question concerning the compatibility of Type R solvent and a specific adhesive arises, consult the adhesive supplier or use the following test:

1. Heat the mixture slightly above the application temperature.
2. Note changes in the mixture:
 - a. Discoloration.
 - b. Increase in viscosity.
 - c. Gelling.
 - d. Separation of any ingredients in the mixture.
 - e. Sharp drop in viscosity.



Do not use Type R solvent when flushing equipment using Polyamide, Surlyn, Polyester or certain other high performance hot melt materials. A gelled contaminant may form which will cause nozzle plugging and charring in the various heated components.



Before using a cleanout material other than Nordson Type R solvent, check to be sure the material meets these specifications:

1. Non-toxic and non-sensitizing.
2. Does not produce toxic vapors when heated.
3. Flash point at least 50°F (28°C) above intended use temperature.
4. Non-corrosive.

Refer to the specific Nordson applicator service manual for additional information regarding the use of Type R solvent.

Part No.	Description
270 755	Solvent, Type R, 1 Gallon (3.8 Liters)
270 756	Solvent, Type R, 5 Gallon (18.9 Liters)
270 757	Solvent, Type R, 55 Gallon (208.2 Liters)



VOLTAGE AND FREQUENCY RATING

Proper input voltage to an electrical product is important. Excessively high voltage can cause failure of the product and excessively low voltage is likely to result in poor performance.

Nominal voltage of electric power varies from one utility system to another and the voltage on any one system can vary by as much as 10 per cent from the nominal value, being low during peak load periods and high during light loads (such as lunch time).

Nordson products are designed to operate satisfactorily on the following voltage ranges:

Range	Nameplate Rating
115 to 125	120
230 to 250	240
365 to 395	380
460 to 500	480

Products sold in Europe must be designed to operate on 220 Volts rather than 240 Volts, because of European standards. Thus, all Nordson products sold in Europe are designed to operate anywhere in the range of 220 to 250 volts. A nameplate rating of 230 volts automatically implies "Suitable for 230 V plus or minus 5 per cent or from 218.5 V to 241.5 V."

Products designed essentially for the U.S. market may be shipped to Europe with 240 volt ratings, but in all cases these products will operate on 220 volts.

Frequency rating is important on motors and transformers, but not on heaters. An induction motor runs 5/6 as fast on 50 Hz (50 cycles per second) as on 60 Hz. Further, if the motor is rated only for 60 Hz it may overheat on 50 Hz. Both motors and transformers run hotter at lower frequencies and must be designed to withstand the higher temperature.

Products designed for operation at either of two frequencies will be marked as 50/60 Hz or something similar. Products designed to operate at only one frequency will be marked 50 Hz or 60 Hz.

