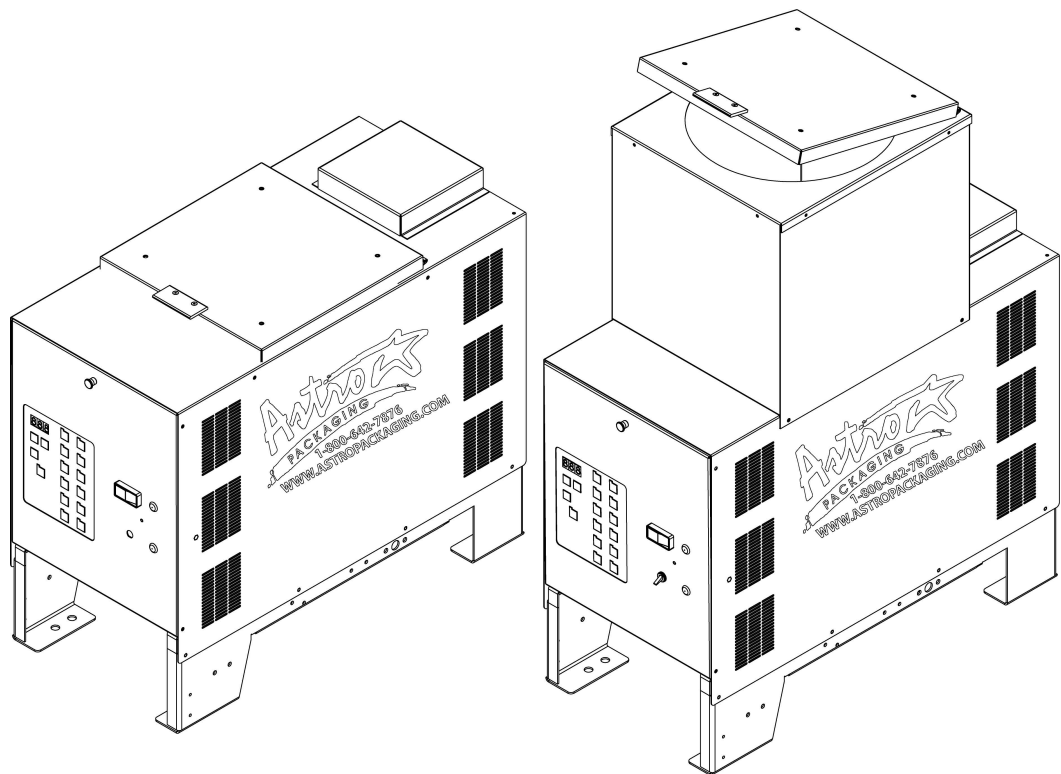




AP50/AP100 HOT MELT UNIT MANUAL

Manual Number: 19600-12 REV E

For More Information Please Contact
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SAFETY PRECAUTIONS

GENERAL CONSIDERATIONS

1. Read and follow these instructions. Failure to do this could result in severe personal injury or death.
2. Additional safety instructions and/or symbols are located throughout this manual. They serve to warn maintenance personnel and operators about potentially hazardous situations.
3. Inspect the machine for unsafe conditions daily and replace all worn or defective parts.
4. Keep work area uncluttered and well lit.
5. All covers and guards must be in place before operating this equipment.

For precautions and definitions of safety symbols, refer to Safety Chapter of the service manual.

SERVICING EQUIPMENT

1. Only trained personnel are to operate and service equipment.
2. Never service equipment while it is in motion.
3. Shut off the equipment and lock out all input power and air supply at their sources before attempting any maintenance.
4. Follow the maintenance and service instructions in the manual.

SIGNS

1. Read and obey all of the warning labels, signs and caution statements on the equipment.
2. Do not remove or deface any of the warning labels, signs, and caution statements on the equipment.
3. Replace any warning labels, signs, and caution statements which have been removed or defaced. Replacements are available.

ADDITIONAL CONSIDERATIONS

1. To ensure proper operation of the equipment, use specified electrical and/or air supply sources.
2. Do not attempt to alter the design of the equipment unless written approval is received from our factory.
3. Keep all manuals readily accessible at all times and refer to it often for the best performance from your equipment.



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Chapter 1

SAFETY PRECAUTIONS

All operators and service personnel must read and understand this manual before servicing equipment. All maintenance and service on this equipment must be performed by trained technicians.

Electrical



Dangerous voltages exist at several points in this equipment. To avoid personal injury, do not touch exposed connections and components while input power is on. Disconnect, lockout and tag external electrical power before removing protective panels.

A secure connection to a reliable earth ground is essential for safe operation.

A disconnection switch with lockout capability must be provided in the line ahead of the unit. Wiring used to supply electrical power should be installed by a qualified electrician.

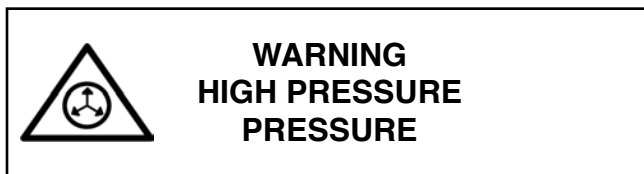
High Temperatures



Severe burns can occur if unprotected skin comes in contact with molten adhesive or hot application system parts.

Safety glasses, gloves, and long-sleeved clothing must be worn whenever working with or around adhesive application systems.

High Pressure

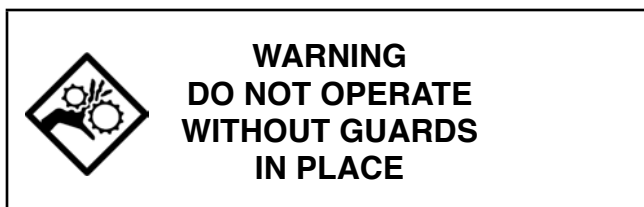


To avoid personal injury, do not operate the equipment without all covers, panels, and safety guards properly installed.

To prevent serious injury from molten adhesive under pressure when servicing the equipment,

disengage the pumps and relieve the adhesive under pressure (e.g. trigger the heads, hand-held applicators, and/or other application devices into a waste container) before opening any hydraulic fittings can connections.

Protective Covers



Keep all guards in place!

To avoid personal injury, do not operate the application system without all covers, panels, and safety guards properly installed.

Eye Protection & Protective Clothing



It is very important that you PROTECT YOUR EYES when working around hot melt adhesive equipment !

Wear glasses with side shields which conform to ANSI Z87.1 or EN166

Failure to wear safety glasses could result in severe eye injury.

It is important to protect yourself from potential burns when working around hot melt adhesive equipment.

Always wear steel reinforced safety shoes.

Wear protective gloves and long-sleeved, protective clothing to prevent burns that could result from contact with hot material or hot components.

Safe Installation and Operation

To avoid possible failure of hoses, make sure all hoses are routed to avoid kinking, tight radius turns (8" or less) and abrasive contact. Hot-melt hoses should not have prolonged contact with heat-absorbing surfaces such as cold floors or metal troughs. These heat-absorbing surfaces can alter adhesive flow and cause incorrect calibration. Hoses should never be covered with materials that prevent heat dissipation, such as insulation or sheathing.

Read this manual before applying electrical power to the equipment. Equipment may be damaged by incorrect electrical connections.

Do not use adhesive that is dirty or that may be chemically contaminated. Doing so can cause system clogging and pump damage.

When adhesive hand-held applicators or other movable applicators are used, never point them at yourself or at any other person. Never leave a hand-held applicator's in use.

Do not operate the tank or other system components without adhesive for more than 15 minutes if the temperature is 150 degrees C (300 degrees F) or more. To do so will cause charring of the residual adhesive.

Never activate the heads, hand-held applicators and/or other application devices until adhesive's temperature is within the operating range. Severe damage could result to internal parts and seals.

Treatment for Burns From Hot Melt Adhesives

Burns caused by hot melt adhesives must be treated at a burn center.

Care should be used when working with hot melt adhesives in the molten state. Because they rapidly solidify, they present a unique hazards.

Even when first solidified, they are still hot and can cause severe burns. When working near a hot melt application system, always wear safety gloves, safety glasses and long-sleeved, protective clothing.

Always have first-aid information and supplies available.

Call physician and/or an emergency medical technician immediately.

Service

Refer all servicing to qualified personnel only.

Explosion/Fire Hazard

Never operate this unit in an explosive environment.

Use cleaning compounds recommended by Astro Packaging. Flash points of cleaning compounds vary according to their composition, so consult with your supplier to determine the maximum heating temperatures and safety precautions.

Lockout/Tag-out

Follow OSHA 1910.147 (Lockout/Tag-out Regulation) for equipment's lockout procedures and other important lockout/tag-out guidelines.

Be familiar with all lockout sources on the equipment.

Even after the equipment has been locked out, there may be stored energy in the application system, particularly capacitors within the panel box. To ensure that all stored energy is relieved, wait at least one minute before servicing electrical capacitors.

In This Manual

WARNINGS and CAUTIONS are found throughout the manual.

WARNINGS mean that failure to observe the specific instructions may cause injury to personnel.

CAUTIONS mean that failure to observe the specific instructions may damage the equipment.

Chapter 2

DESCRIPTION AND SPECIFICATIONS

Description

The Astro Packaging AP50/AP100 adhesive supply unit (ASU) is a computer-controlled hot-melt supply unit designed on metric standards. Its easy-to-use, all-icon control panel is internationally operator friendly. The AP50/AP100 is available for either 240V/400V service.

The AP50/100 uses a microprocessor temperature control to closely control the temperature of hot-melt adhesive for up to six hoses and six heads. Temperature set points are operator-selected for up to thirteen zones and the system automatically provides warnings and alarms for operator errors and system malfunctions.

The system provides accurate, proportionate temperature control for the tank, hoses, and applicators. Sequential start-up delays may be programmed for turn-on of the hoses and heads. A “standby” temperature may be programmed so that the temperature zones can be maintained at a lower temperature when the ASU is not in active use, enabling rapid return to normal operation.

The temperature control can interlock the parent machine with preselected adhesive temperatures so that production automatically begins when adhesive temperatures are correct for the application. All system temperature values can easily and quickly be programmed.

With these flexible temperature programming features, the system increases adhesive life by eliminating prolonged high adhesive temperatures. It reduces energy consumption and brings the system up to normal operating temperatures in the shortest possible time.

The standard AP50/AP100 ASU uses a brushless AC motor to drive a positive displacement gear pump. This gear pump has an easily adjustable flow control. The pressure can be adjusted from 75 PSI to a maximum of 900 PSI.

The ASU’s Teflon-coated tank accepts adhesive in all popular forms, including pellets, slugs and blocks. The ASU can accommodate air-actuated automatic applicators (heads), electric applicators, hand-held applicators and/or special applicators. Options available include pressure gauge, a 40-mesh outlet filter, and RS-232 interface.

Specifications

Environmental:

Storage/shipping temperature.....-40°C to 70°C (-40°F to 158°F)

Ambient service temperature.....-7°C to 50°C (20°F to 122°F)

Noise Emission.....<60 dbA (at 1 meter)

Physical:

Dimensions dimensional layouts on following pages

Number of heads/hoses up to 6 heads/hoses

Number of tank temperature zones 1

Number of pumps 1

Gear pump pressure range of..... 75 PSI to 900 PSI

Enclosure..... styled, durable metal and high temp plastic, dust and splatter resistant

Hose connections..... Electrical:12-pin

Mechanical: wrench-secured fluid fittings (#06 37° SAE)

Tank Capacity 22.5 kg/50 lbs.

..... 45.5 kg/100 lbs.

Tank Construction welded aluminum, TFE Teflon coated

Filtration pre and post pump filters

Weight, empty 72.6 kg/ 160 lbs.

..... 86.18 kg/ 190 lbs.

Adhesive formaccepts most forms (no water-based adhesives)

Electrical:

Supply voltage240/400 VAC/ 3PH + N 60 Hz (Y, "WYE")

.....240 VAC/ 3PH 60 Hz (Δ, "DELTA")

Power Consumption, system maximum9600 watts

Power Consumption, tank.....2400 Watts

Tank Heater Typereplaceable cartridge style

Temperature control.....micro-controller

Temperature sensorsNi120 standard

Electrical connectors.....durable, latching connectors, Nordson-style

Maximum current available for each hose/head combination5 amps

Performance:

Adhesive temperature control range40°C to 218°C (100°F to 425°F)
Adhesive temperature control accuracy $\pm 1^{\circ}\text{C}$ ($\pm 1^{\circ}\text{F}$)
Over-temperature cutoff for all zones 232°C (450°F)
Over-temperature cutoff for tank thermostat 224°C (435°F)
Adhesive Viscosity500 to 50,000 centipoise
Warm-up time, full tankapproximately 0.5 hour
Adhesive delivery rate, open line2.91 lbs/min
Adhesive melt rate (depends on adhesives used) 50 lbs/hr
..... 65 lbs/hr
Adhesive pressure up to 68 bar (1000 PSI) maximum
Maximum pump speed170 rpm

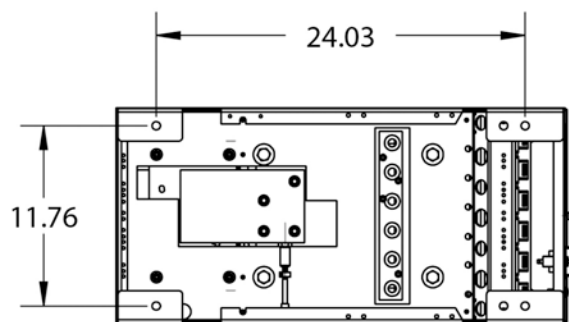
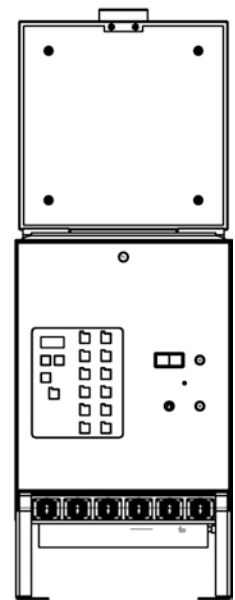
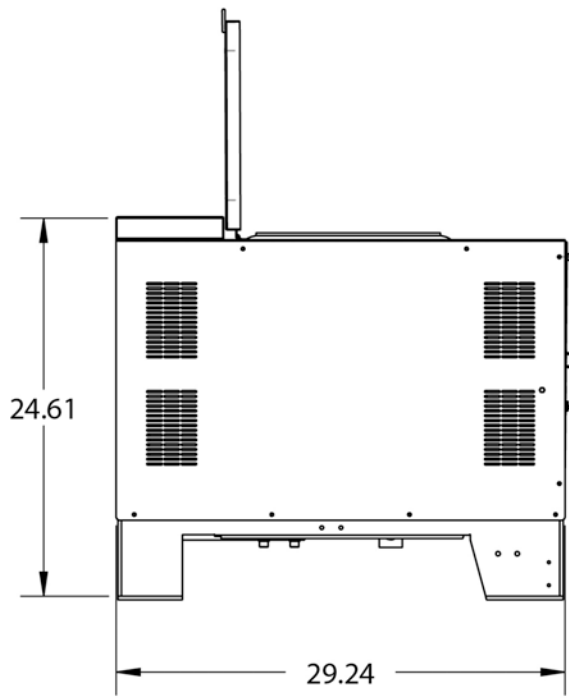
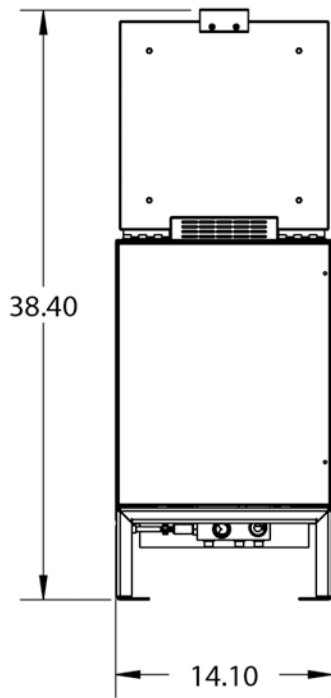
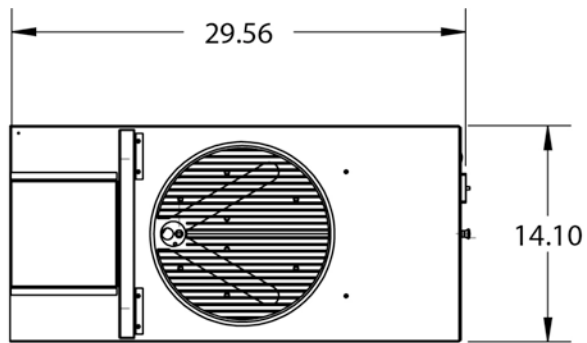
Temperature Controller:

Controller Board1 board, modular construction
Display typelife-long, bright LED
Temperature control zones 13
Fusesall fuses are size 5 mm x 20 mm
hose/ applicator head: 6.3 amp fast open
transformer: 1 amp, fast
tank: 15 amp fast

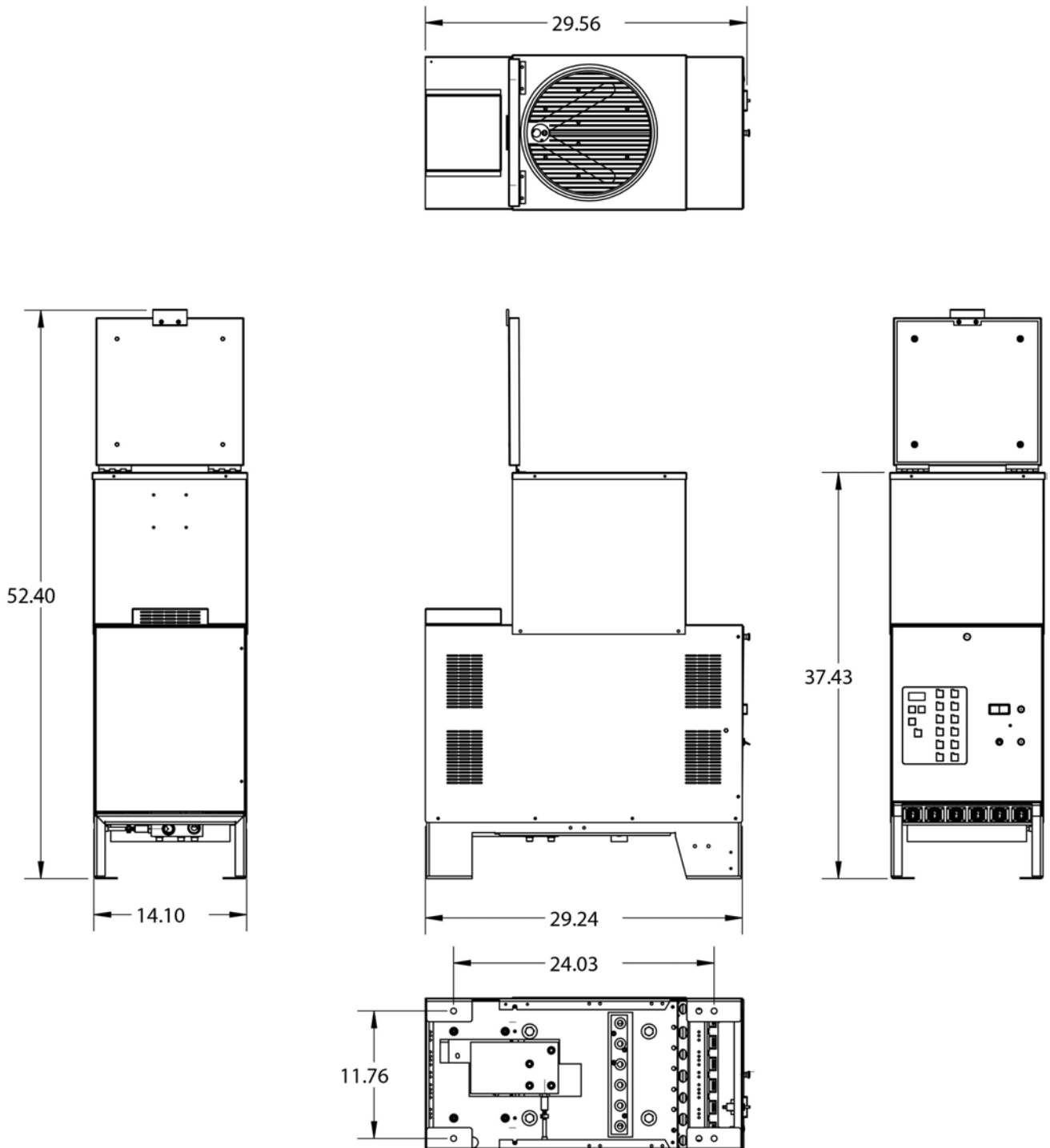
Other:

Operator interfacedigital display with simplified, all-icon keypad
RS232 interfaceoption
Temperature standbyyes
High & low temperature toleranceyes
Ready interlock contactyes
Sensor open alarmyes

Dimensions - AP50



Dimensions - AP100



Chapter 3

INSTALLATION & START-UP

Mounting the AP50/AP100 ASU

The AP500/100 ASU can be mounted on most flat surfaces, on either an open or a solid frame (as shown below). The main electrical power and the serial communication connections come in from below the unit and connect under the keypad. Access to the underside of the ASU may be necessary and an “open” frame mount is generally best.

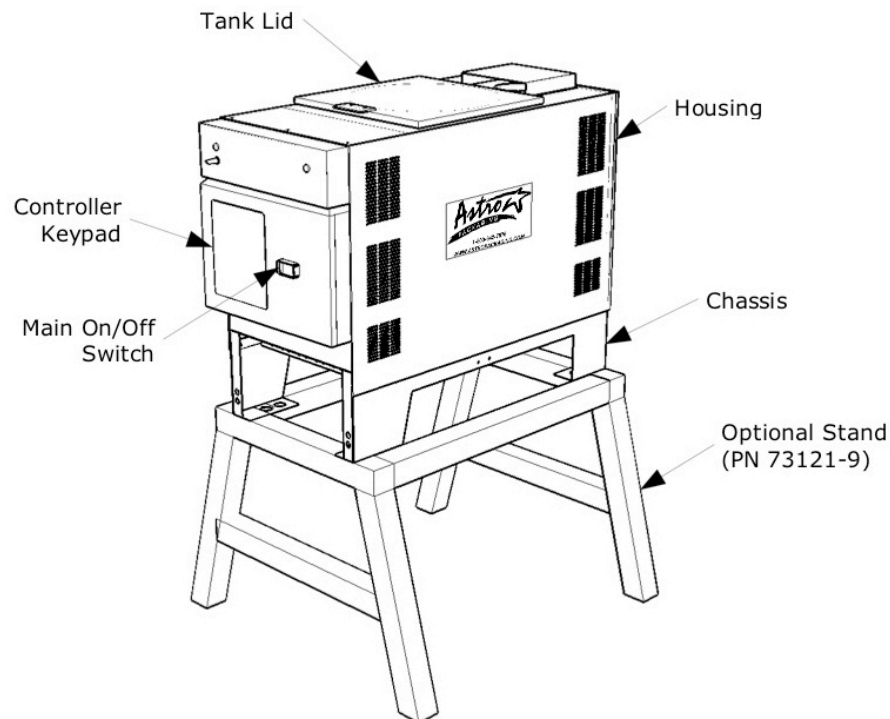
For installation dimensions, see illustration on page 2-4.

Lifting the ASU



WARNING

The unit must be lifted by two persons, using proper lifting technique, one person at either end. Securely hold it under its base plate. No belts or hooks should be used. Never allow anyone to stand on the ASU.



Installation

NOTE: Re-read Chapter 1 "Safety Precautions" before performing any installation procedures. All installation procedures must be performed by qualified, trained technicians.

After the AP50/AP100 ASU has been properly mounted, the following general sequence should be followed for installation:

1. Make sure that incoming line power to the ASU and the unit's main power switch are turned OFF.



DANGER HIGH VOLTAGE

A lockable power disconnect switch with overload protection must be provided by the customer as part of the ASU installation. The disconnect must isolate the ASU from its power source.



DANGER HIGH VOLTAGE

Disconnect and lockout input power to the application system before starting any installation procedures. Make sure there is no electrical power on the leads you will be connecting.

2. Your power supply should be rated for 30 Amp service and should include an earth ground conductor.



CAUTION: Grounding conductors never carry electrical current. The use of a neutral conducting wire as earth ground is incorrect and may cause damage to the controller.

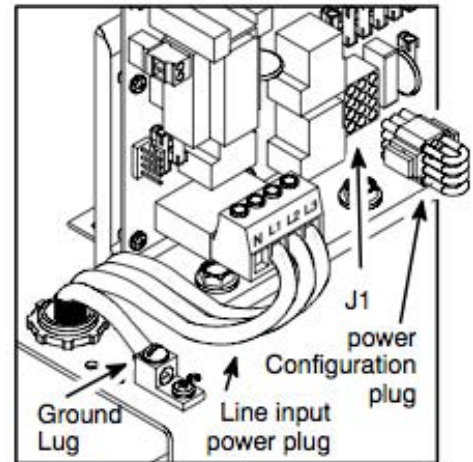
3. Make two connections to the printed circuit board: Loosen the 3 button head screws on the top. Front door will open forward.

- a. Select proper power configuration plug for your system (two plugs are shipped with the unit. You must install one of these):



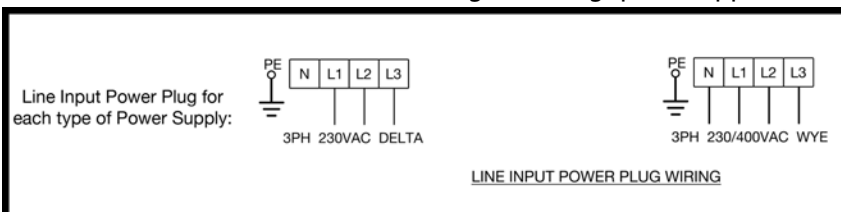
CAUTION: Using the incorrect power configuration plug may cause serious damage to the unit.

for 230 VAC, 3PH, Delta = use PN 112542
white plug with violet wire
for 230/400 VAC, 3PH, WYE = use PN 112543
white plug with yellow wire



- b. Insert proper power configuration plug into socket J1 at bottom, center of control printed circuit board located within the control enclosure (see illustration of PCB in Chapter 7 for location).

- c. Wire main power into Line Input Power Plug and the ground lug. Main power connections & the ground lug are at the bottom, left of the PCB (X1). Conduit fitting or cable grip not supplied.



4. The adhesive hoses are connected under the unit. You must make both an electrical and an adhesive flow connection. The electrical hose connections are at the six numbered rectangular receptacles on the front end panel.

The hose adhesive ports are located to the at the bottom of the unit. There are six ports (fittings) for the use of up to six hoses. They may be routed out the front, back or down from the unit.

When making hose connections, follow the number guide label on the ASU above the hose socket; i e. when using one hose make your hookup to electrical connection #1 and adhesive port #1. When using two heads/ hoses, connect hose/ head #1 to electrical connection #1 and adhesive port #1, then hookup hose/ head #2 to electrical connection #2 and adhesive port #2. In a similar manner, connect the remainder of your hose(s)/ head(s).

Route hoses so that there is at least an eight-inch radius at any bend. Do not hang hoses without proper support. Do not crimp, clamp, squeeze or tie hoses. Refer to the hose and applicator manuals for further details on these items.

Adding Adhesive

	WARNING HOT ADHESIVE Do not overfill the melt tank since adhesive generally expands as it melts and a full tank may overflow.
---	---



CAUTION: Using adhesive with viscosity over 50,000 centipoise may cause the pump to stall.

The adhesive level should be maintained at 13 mm to 100 mm (1/2" to 4") from the top of the tank. Where applications demand a high output volume of adhesive, add small amounts of adhesive frequently. ADDING LARGE AMOUNTS OF ADHESIVE TO AN ALMOST EMPTY TANK WILL LOWER THE TEMPERATURE OF THE ADHESIVE IN THE TANK AND MAY CAUSE THE ASU TO FALL BELOW ITS READY SET-POINT.

Changing the Adhesive Formula

If a different adhesive formulation from the one being currently used is needed, the system will have to be flushed if the two formulations are incompatible. See Chapter 6 of this manual for the proper flushing procedure. When in doubt about adhesive compatibility, flush your system.

Wattage Availability Chart

ASU Voltage	Max. System Wattage	Hopper Wattage	Wattage Available for All Hoses and Heads
240/400 VAC(Y) or 240 VAC (Delta)	9600 @ 240VAC 3PH Power	2400 @ 240VAC	7200 @ 240VAC

Notes:

1. Assume 33 Watts per foot of hose, #6 hose at 240VAC.
2. Assume 100 Watts per inch of head width, at 240VAC.
3. The power available for any one hose/head combination is 1200 Watts at 240VAC.
4. AT REDUCED VOLTAGE, LESS WATTAGE IS AVAILABLE. FOR EXAMPLE: 240V EQUIPMENT OPERATED ON 200 VOLTS, WILL DEVELOP WATTAGE 31% LOWER THAN THE WATTAGE AVAILABLE AT 240 VOLTS.

Typical Start-Up and Shut Down of the AP50/AP100 Application System

Start-Up Procedures

1. Fill the ASU's tank with clean hot-melt adhesive as described on page 3-3. Close the tank lid immediately to prevent contaminants from falling in. (Cover your bulk supply of adhesive to prevent contaminants also.)
2. At the control panel, turn ON the Main Power Switch. The controller will perform its initial calibration cycle. The display will read "CAL". Each of the 13 temperature zone's LEDs will flash as a lamp test.
3. Program your adhesive set-points (see instructions on page 5-2) or use the factory settings listed below. Allow adequate time (approximately 20-30 min.) for the adhesive to melt and the temperatures of the temperature zones to stabilize. *Note:* When the ASU leaves Astro Packaging, it is programmed with the following factory settings (unless special factory settings were requested):
 - Tank: 177°C (350°F)
 - Hose: 177°C (350°F)
 - Applicator: 177°C (350°F)
 - Sequential Startup: OFF
4. Once the ASU has reached temperature, the ASU will begin to pump adhesive.
NOTE: A DELAY MAY BE PROGRAMMED AT CONTROLLER
5. Adjust the flow control with the provided 1/4" Allen wrench to desired pressure.

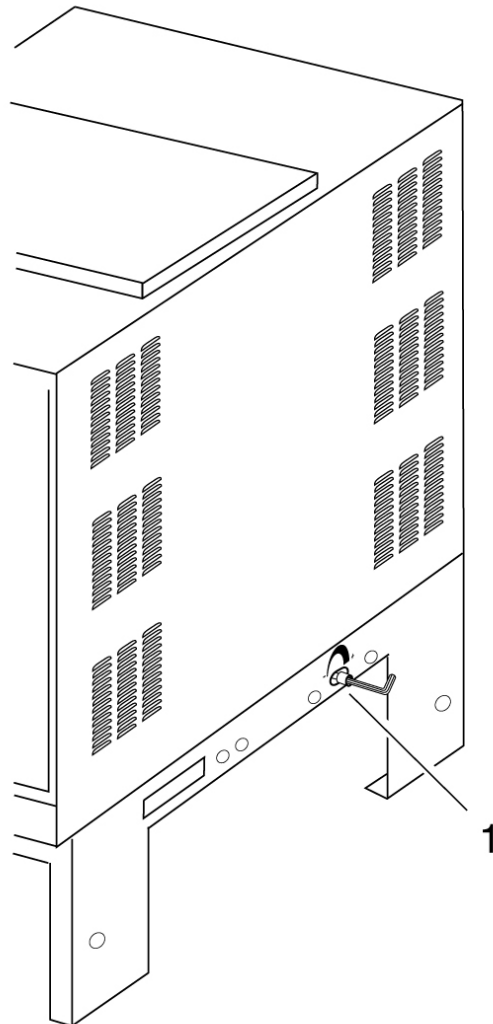
Shut Down Procedures

1. Turn OFF the Main Power Switch

Adjusting the Flow Control Valve

The flow control valve (1) is an adjustable pressure-regulating device mounted to the pump underneath the melt unit chassis. It is adjusted from the lower right side of the melt unit, using 1/4-inch hex key supplied with the unit.

Turning the flow control in (clockwise) will increase pressure. Turning the flow control (out) counter clockwise will reduce the pressure. It is recommended that you use a larger tip at the gun and run the lowest pump pressure possible.



CAUTION: For maximum performance and motor life, do not allow pump motor to stall. Prolonged stall conditions will cause motor to go into thermal overload.

Storage and Disposal of the AP50/AP100 Application System

Temporary Storage of the Unit

1. Flush the adhesive application system with flushing fluid (PN RB-5), following the instructions detailed in Chapter 6 of this manual.
2. Clean or replace both the output filter and the tank, following instructions detailed in Chapter 6.
3. Shut OFF all pressure and power sources.
4. Remove all residual adhesive and wipe components clean.
5. Remove all power supply cables.
6. Pack the unit in a corrosion-proof manner.
7. Store the unit in such a way that it is protected from damage.

Disposal of the Unit

1. Shut OFF all pressure and power sources.
2. Remove all residual adhesive.
3. Remove all adhesive supply hoses and all power supply cables.
4. Dismantle all components and sort into mechanical and electrical components.
5. Arrange for all components to be recycled.

Chapter 4

TEMPERATURE CONTROLLER SET-UP

Temperature Control Functions in General

The AP50/AP100 temperature controller provides accurate temperature control for the hopper, hoses and applicators. Set-points are programmed at the user-friendly, all-icon keypad. The controller will display an error message any time an open or shorted sensor condition occurs.

Defining Temperature Control Terms

Adhesive Temperature Control Range

The temperature limits within which the ASU, hoses and applicators may be programmed and maintained.

Alarm Signal

The controller provides an alarm signal if any zone has a critical situation. This signal is available on a dry contact located at connector X10 on the Control printed circuit board.

CPU Module

The central processing unit (CPU) of the microprocessor temperature control.

Temperature Controller

The built-in control system that controls, monitors and displays all system temperature values of the adhesive application system.

Control PCB

The printed circuit board (PCB) of the ASU. It provides control signals to, and monitoring signals from, the tank, hoses and applicators. It features lighted LEDs to indicate that heater power is ON. The ASU's fuses and power configuration plug are located on this board.

Keypad Locking

The controller's keypad may be locked (or unlocked) to restrict (or allow) further programming.

Mechanical High-Temperature Protection

A mechanical, redundant thermostat located on the tank that will turn off the system above safe temperatures

RTD Sensors

The system uses 120-ohm Nickel resistance temperature detector (RTD) sensors for all temperature controls.

Ready Signal

The controller provides a ready signal if all temperature zones are within a programmable tolerance and the system is ready for production. This signal is available on a dry contact at connector X11 on the Control printed circuit board. The ready signal also controls pump operation.

RS232 Remote I/O Interface

Bi-directional data transfer to a remote computer is available for the controller via the RS232 option. The ASU's RS232 serial port connection allows remote interface up to 50 meters from the AP50/AP100 controller.

Sequential Startup

This feature allows the temperature zones to come on in sequence (tank followed by hoses and heads). When activated, and the ASU is turned ON from a cold start, the tank heats first. When the tank is within its set-point tolerances, the hoses and heads begin to heat.

Set-point

A programmable temperature that has been selected for tank, hoses and applicators.

Set-point Limitation

This is a universal maximum temperature for all zones (218°C [425°F]). The programmer cannot program a temperature set-point higher than the set-point limitation.

Standby (Setback)

During breaks or delays in production, it is possible to reduce the temperature of all zones by a specified amount through programming of a standby. The programmed standby (also referred to as "setback") is the difference in temperature by which all zones will reduce below their set-points when standby is activated. Standby is always OFF when the ASU is turned ON. In standby mode, the ready signal is OFF and the pump will stop.

Error Indication Messages

A controller display of "EO1" indicates that the selected zone (ie, a hose, applicator or the tank) has an open sensor. A display of "EO2" indicates a shorted sensor.

If either alarm occurs, first verify that the following three connections are made correctly:

1. The ASU-to-hose connection(s) located at the front of the ASU,
2. The hose-to-applicator connection(s),
3. The RTD Input connections (X4, X5 & X6) located on the Control Printed Circuit Board.

If the problem is not with a connection, check the sensor and replace if necessary.

Firmware Chip and Checksum

The firmware chip is on the Control Printed Circuit Board (see Ch. 7). Inscribed on the controller's chip is information that is required if your controller needs service, including the controller's checksum and software revision.

Chip example:



System Values That Are Permanently Programmed

- Minimum set-point value: 40°C (100°F).
- Maximum set-point value: 218°C (425°F).

System Values as Programmed by the Factory

Astro Packaging can set the controller's system values to customer's specs, if provided.

If customer's specs are not provided, the following values will be entered into the temperature controller at the factory. They may be changed by reprogramming through the keypad.

- Temperature Scale: displayed in degrees Fahrenheit
- Applicator (head) and hose set-points: OFF
- Tank Set-point: 177 C° (350°F)
- All zones are switched off, except for the tank
- Access Code: not active
- All programmable time delays: set to zero (0)
- Tolerance range for high & low temperature limits $\pm 27^{\circ}\text{C}$ ($\pm 50^{\circ}\text{F}$)

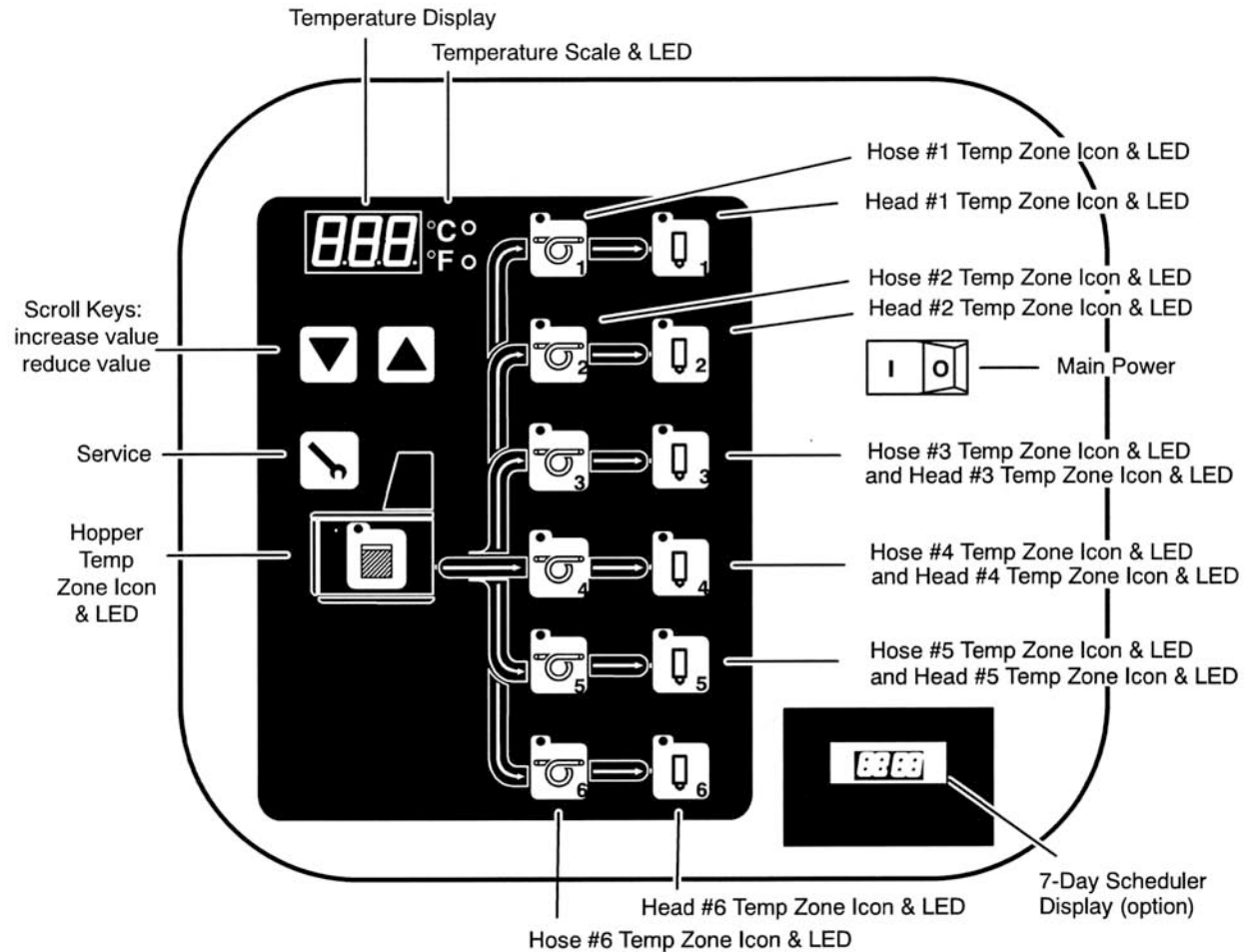
Helpful Tips for the User

- When the ASU is turned on, all temperature set-points and other operating parameters will be exactly where they were when the ASU was turned off.
- When the ASU is turned on, all system heaters go on unless they have previously been set below 40°C (100°F) (ie. switched OFF).
- When the ASU is turned on , the controller checks all RTDs. If a zone does not have a valid RTD, this zone will be switched off.
- WHEN THE ASU IS TURNED ON AND THE PUMP SWITCH IS TURNED ON THE PUMP WILL AUTOMATICALLY RUN WHEN ALL SET-POINTS ARE REACHED.

Chapter 5

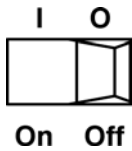
CONTROLLER PROGRAMMING INSTRUCTIONS

Controller Keypad



Programming

Turn Controller ON



Turn ON the main power switch
System will go through its self-diagnostics (CAL).
Controller will display "CAL".
Temperature zone LEDs will flash.

Controller will display "SS 1" (On) or "SS 0" (Off) to indicate status of the Sequential Startup feature (see info on "Sequential Startup" later in the chapter).

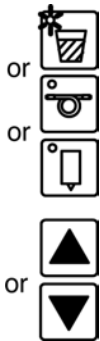
Controller will display firmware version, ie. VX.XX



or



Programming Temperature Set-points



(for a shortcut method of setting set-points, see "To Copy & Paste Set-points" on pg. 5-9)

Choose a temperature zone.
When flashing, the zone's set-point is displayed, and it can be programmed.

In order to program the temperature set-point, scroll up to increase value or down to reduce value.

After two seconds the display will read the actual temperature.
The set-point is stored.



Turning Temperature Zones ON/ OFF



Choose a temperature zone.

Scroll to reduce value until the temperature set-point shows "----". This temperature zone is now turned OFF.

To turn ON the temperature zone, increase the set-point.

When programming is complete, wait a few seconds and the controller will return to the ASU's actual temperature.



Keypad Locking

It is possible to lock or unlock the controller in order to restrict programming changes. To change the code which is necessary to over-ride or unlock the keypad lock, see Service Functions.

Note: the ASU is shipped with de-activated keypad lock. If the keypad lock must be used, an access code must be programmed prior to locking the keypad.

Locking or Unlocking the Keypad

Important Note: the controller must be in the Temperature Display mode in order to allow locking or unlocking of the keypad.

Locking the Keypad



Press the Down Scroll key, then hold and press the Service icon key.

You will see "Loc" to indicate that the Keypad Lock is active.



Unlocking the Keypad



Press the Down Scroll key, then hold and press the Service icon key.

You will see "Cod" to indicate that the access code is required.

or



Enter your access code by scrolling up or down.



Confirm your code input by pressing Tank key.

Notes:

1. Once the keypad lock is active, unauthorized programming is not possible, even after turning the ASU OFF, then back ON again.
2. Once the keypad lock is unlocked, programming is possible until the ASU is turned OFF, then back ON or the keypad is locked again.
3. If the keypad must be unlocked permanently, the access code must be de-activated in the Service Functions.

Service Functions

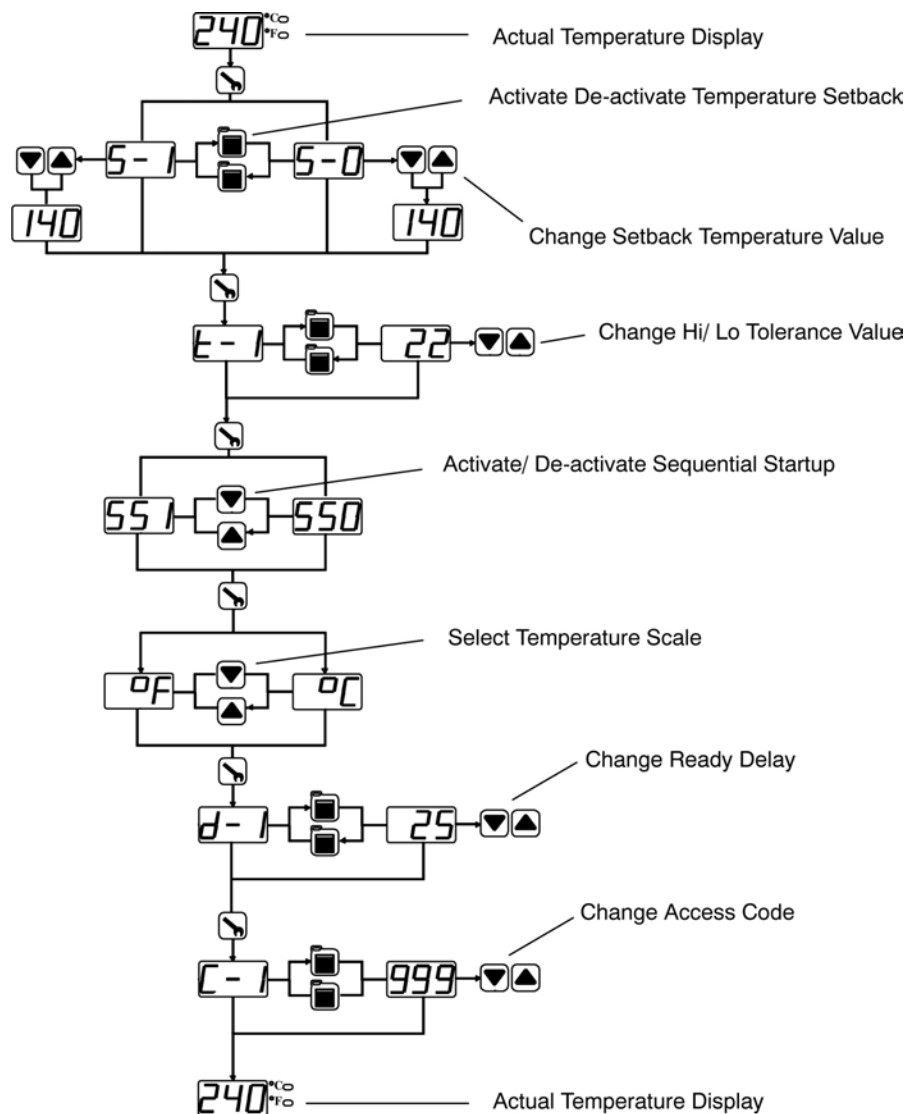
After the basic programming of Temperature Set-points is complete, the programmer proceeds to programming of the Service Functions, if desired.

The Service Functions are a continuous loop of programming steps ("functions") which the programmer moves through by pressing the "Service" key. These steps are described in this section of the chapter. The Service Functions loop and basic programming is diagrammed below.

There are three ways to exit the Service Functions loop:

1. Just wait (approx. 10 seconds) and the controller will automatically return to the actual temperatures display,
2. Press the Service key until you are back to the actual temperatures display, or
3. Press any Hose or Head key and you will return to the actual temperatures screen.

Diagram of the Service Functions Loop



Service Functions, cont.

Standby Programming

"Standby" is a temperature value by which all temperature zones will lower when Standby mode is activated. For example, if your temperature set-points are all 300 degrees, and you program a 100 degree Standby, then the Standby temperature of all zones will be 200 degrees. Similarly, if your temperature zones set-points vary, and you program a 100 degrees Standby, each zone's Standby temperature will be 100 degrees lower than its set-point.



Press Service icon to enter Service Functions.

You will see either "S--1" (standby is On) or "S--0" (standby is Off).



or



Press the Tank icon to activate/ de-activate Standby.



If desired, you may set the Standby temperature by scrolling up or down to desired temperature.



When programming is complete, wait a few seconds and the controller will return to the ASU's actual temperature.

Note: When Standby is active, the display will alternate between the ASU's actual temperature and S--1.

Service Functions, cont.

To Set Tolerance (Hi & Low Temperature Limits)

The Tolerance (high/ low alarm) set-point is a range (+ and -- the zone's temperature set-point) between which your ASU can safely operate. It's lower temperature represents the ASU's ready temperature. It's upper value represents the over-temperature point.

Setting the Tolerance range, for example: if the temperature set-point is 200 degrees, and the Tolerance set-point is 10 degrees, then the high alarm equals 210 degrees and the low alarm (ready temp) equals 190 degrees.



Press the Service icon twice to select the Tolerances of your temperature zones. An display of "t--1" indicates the Tolerance function has been selected.



Press the Tank button to display the Tolerance.



Use the scroll buttons to change the Tolerance range for all zones. Note: your Tolerance range must be a value between ± 50 degrees for Fahrenheit (± 27 degrees for Celsius).

When Tolerance programming is complete, wait a few seconds and the controller will return to the ASU's actual temperature.

Turning Sequential Startup ON/OFF

The Sequential Startup feature programs the order in which the temperature zones will come on at startup. A Sequential Startup of "SS1" (On) means the tank will begin heating first, then, when the hopper is ready, the other zones will begin heating. A Sequential Startup of "SS0" means Sequential Startup is Off and all zones will begin heating immediately.



Press the Service icon three times to set Sequential Startup.

The display will flash either "SS1" (sequential startup is ON) or "SS0" (sequential startup is OFF).



or



Scroll to choose between ON and OFF. When programming is complete, wait a few seconds and the controller will return to the ASU's actual temperature.

Note: Any time the ASU is switched ON, you will briefly see "SS1" or "SS0" displayed.



Service Functions, cont.

To Set Temperature Scale

The Temperature Scale may be set to display temperature either in degrees Celsius or Fahrenheit.



Press the Service icon four times to set the Temperature Scale.



Scroll to choose between Celsius ("C") or Fahrenheit ("F") as indicated by the Temperature Scale LED. When programming is complete, wait a few seconds and the controller will return to the ASU's actual temperature.

To Set Ready Delay

When the system is ready (all temperature zones are within tolerance), a ready delay may be programmed to delay the system's ready output signal.



Press the Service icon five times to set a Ready Delay.

You will see "d--1" to indicate you are in Ready Delay programming mode.



Press the Tank icon to display the Ready Delay.



To change a Ready Delay, scroll up or down to the desired length (in minutes) of delay.

0 = Default, no delay

99 minutes = maximum length of delay

When programming is complete, wait a few seconds and the controller will return to the ASU's actual temperature.

Service Functions, cont.

To Change Access Code (De-activate Keypad Locking)



x 6

To change the Access Code, press the Service icon six times.



You will see "C-1" to indicate you are in Access Code programming mode.



Press the Tank icon to see the programmed Access Code. For example, "999".



To change the Access Code, scroll up or down to the desired numeric value.



"-- -- --" = no Access Code (Access code is de-activated),

1 - 999 = possible Access Code values



When programming is complete, wait a few seconds and the controller will return to the ASU's actual temperature.

Controller Features

System Ready Indicator Light

When not in programming mode, a flashing temperature scale light (LED) indicates that the ASU is not "Ready" for production. This LED will cease to flash when all temperature zones are within the programmed temperature tolerance window.

Error Indication Messages

"EO1" = the temperature sensor is open (no sensor attached) or has high resistance.

"EO2" = the temperature sensor is shorted or has low resistance.

"EO3" or "EO4" = an internal error has occurred. The printed circuit board or the ASU must be returned to Astro Packaging for re-calibration.

"o -- t" = over-temperature on any zone. Power to all heaters is switched OFF. Recycle power (re-boot) and check which zone has caused the fault alarm.



To Copy and Paste Set-points

The Copy/ Paste feature of the controller copies the tank set-point and pastes it as the set-point of other temperature zones. The paste will apply to only temperature zones that are switched ON.



Set your Tank set-point as described earlier in this chapter.

Push and hold the Tank icon. While holding, press the #1 Hose icon. Release.

then



Push and hold the Tank icon again. While holding, press the #1 Head icon. Release.

The manually programmed set-point has now been pasted in to all turned on hose and head zones. When programming is complete, wait a few seconds and the controller will return to the ASU's actual temperature.

Chapter 6

PREVENTATIVE MAINTENANCE

Note: Re-read Chapter 1 “Safety Precautions” before performing any maintenance procedures. All maintenance procedures must be performed by qualified, trained technicians.

General Cleaning

The AP50/100 ASU enclosure is finished with an extremely durable powder coating. The enclosure may be cleaned with a variety of industrial cleaners following manufacturers’ directions. To prevent discoloration or deterioration of the ASU’s finish, avoid prolonged contact with strong solvents.



Preventive Maintenance Schedule

The AP30 ASU requires little maintenance. The tank is fitted with a coarse screen to prevent large debris from entering the system. Normally this screen does not require cleaning. The ASU parts that require regular, periodic maintenance are as follows:

Purging the Filter Manifold of Adhesive and Pressure

As a safety precaution, the ASU’s system should be purged of pressure and adhesive before attempting to change the output filter or before removing any of the hoses or applicators from their manifold port.

Refer to the illustration on page 6-2 while following these instructions.

WARNING	
	HIGH PRESSURE During the purging procedure, hot adhesives can come out of the manifold under high pressure. Wear a face shield, gloves and protective clothing. Stand clear of the ASU until all pressure is relieved.
	HOT ADHESIVE Avoid splashing hot adhesive. Position a heat-resistant container under the manifold’s purge drain before proceeding.

The ASU should be at operating temperature. Turn the ASU’s motor OFF.

1. Turn pump motor off.
2. Purge any adhesive back pressure by opening dispense gun.
3. With a hex key screwdriver (allen wrench), slowly loosen the purge screw (do not attempt to remove it) which is in the bleed valve’s port. Allow the adhesive and pressure to escape out of the manifold. The adhesive will flow into the heat-resistant container positioned below the manifold.

Output Filter

The output (pump filter) should be replaced monthly during the first few months of operation. After you gain experience with your system, you can determine how often you need to replace it. The output filter is located on the pump manifold.

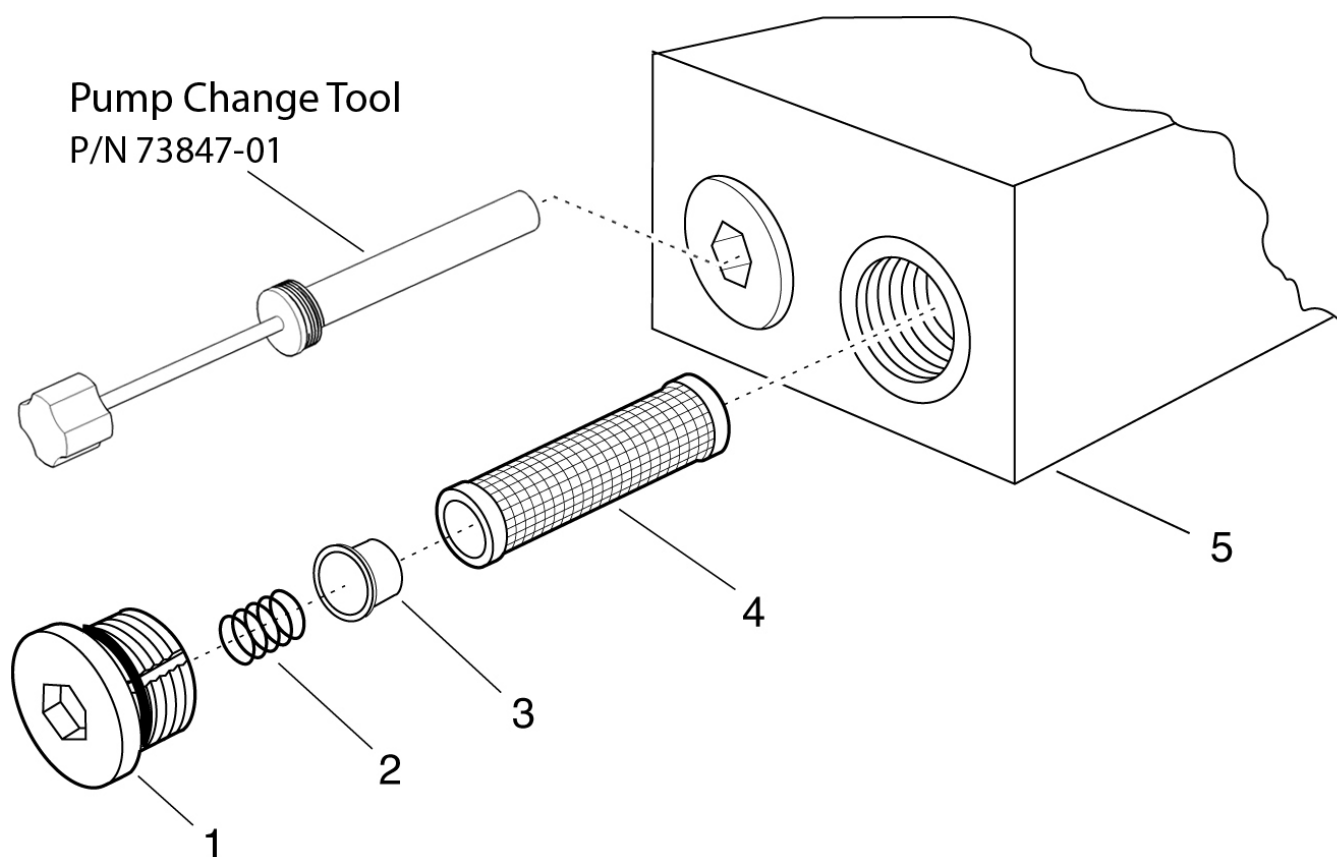
Use the following procedure to replace the output filter.

Note: This procedure need not be done if flow rates are adequate and no char is present in system.

1. Switch OFF the pump motor switch
2. Depressurize the system by activating the head until glue stops flowing.
3. Using 9/16 hex wrench, remove plug [1] from the end of the pump block [5] at the back of the unit.

CAUTION: Hot glue will leak out as fitting is removed.

4. Using needle nose pliers, remove plug the spring [2], thimble [3] and filter element [4].
5. Temporarily replace plug to prevent hot melt drainage.
6. Clean filter element or replace as required.
7. Re-install spring, thimble and filter element as removed.
8. Re-install plug.



Hose Fittings

All hose fittings should be checked for tightness after every three months of operation.

Fasteners

After the first ten hours of operation, check all set screws, socket head and cap screws for tightness. Thereafter, re-check all fasteners after every three months of operation.

Tank Screen Cleaning

1. Open tank lid and lift out tank screen with wire hook.
2. Remove any debris and replace.

NOTE: In high viscosity applications, the tank filter assembly should be removed. This filter is used to prevent damage to the pump in standard applications.

Summary of Preventive Maintenance Schedule

Monthly

Inspect output filter. Replace as required.

Check for leaking adhesive under the base plate, caused by a worn pump seal. Replace as required.

Every Three Months

Check all hose fittings for tightness.

Check all fasteners for tightness.

Inspect Tank Screen. Clean or replace as required.



Chapter 7


TROUBLESHOOTING

General Troubleshooting Notes

Note: Re-read Chapter 1 “Safety Precautions” before performing any troubleshooting or repair procedures. All troubleshooting or repair must be performed by qualified, trained technicians.

Handling Printed Circuit Boards (PCBs)

	DANGER HIGH VOLTAGE		WARNING HOT SURFACE
The AP50/AP100 uses electrical power that can be life threatening and hot-melt adhesives that can cause serious burns. Only qualified persons should perform service on the ASU.			

DANGER HIGH VOLTAGE	
	Before unplugging connectors from the Control PCB, ground yourself to the ASU by touching any available unpainted cool metal surface, mounting screws, etc. This will avoid electrical discharge to the PCB assembly when you are removing and replacing connectors.



CAUTION: Printed circuit boards (PCB) should be handled using the following procedures:

1. Wear a wrist grounding strap. If a grounding strap is not available, frequently touch a bare metal part of the ASU (unpainted frame, mounting screw, etc.) to safely discharge any electrostatic buildup on your body.
2. Handle a PCB by its edges only. Don't grip a PCB across its surface.
3. When removed from the ASU, the PCB must be packaged inside a metallized, static drain envelope. Do not place the removed PCB on a table, counter, etc. until it has first been placed in or on a static drain envelope.
4. When handing a PCB to another person, touch the hand or wrist of that person to eliminate any electrostatic charge before you hand the PCB to him.
5. When unwrapping a PCB from its static drain envelope, place the envelope on a grounded, nonmetallic surface.
6. To cushion a PCB for shipment, use only static-drain bubble pack. Do not use foam peanuts or bubble pack not known to be static draining.

Control Printed Circuit Board

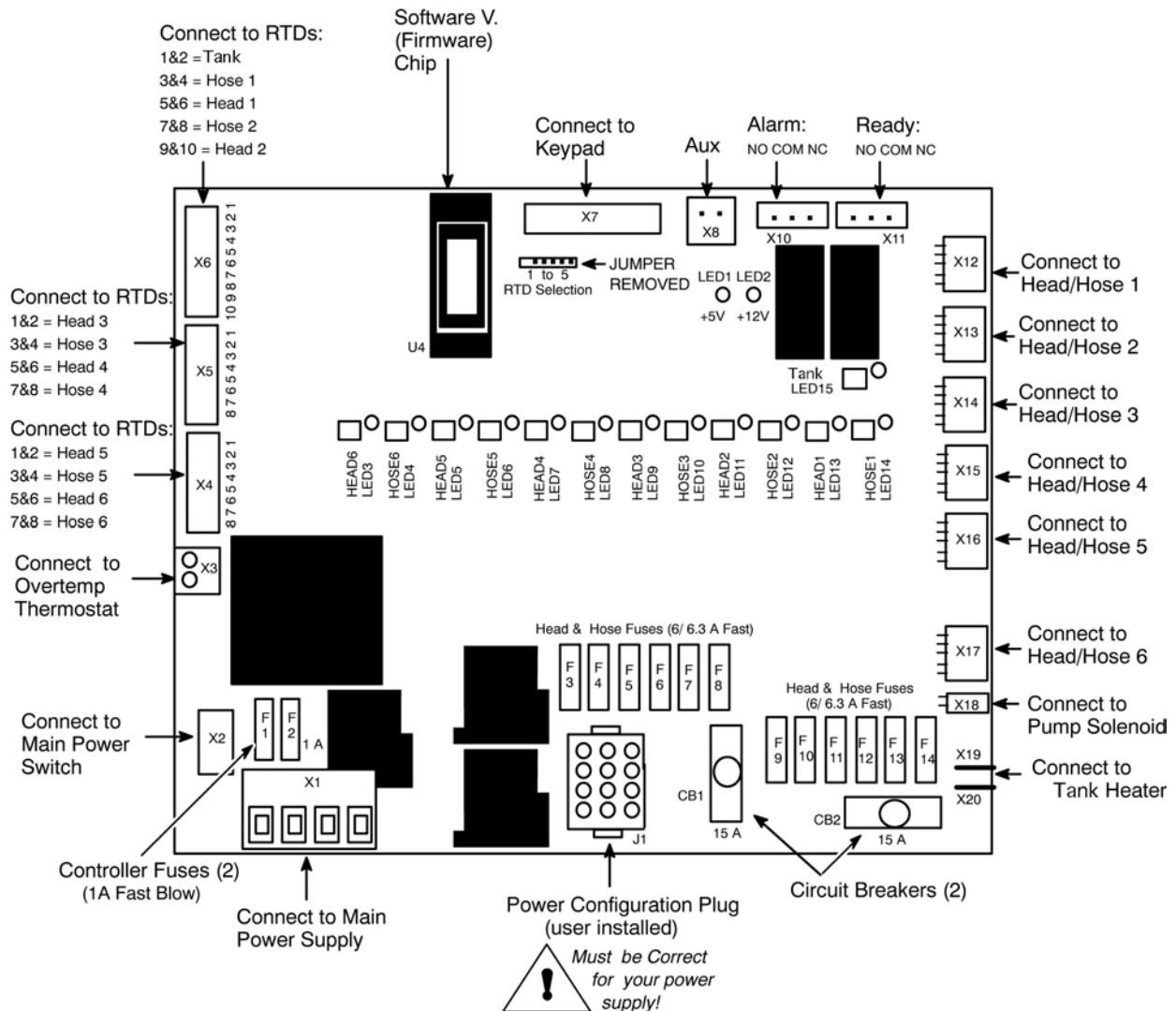
Notes:

1. The green LEDs cycle on and off as each heater outputs.
2. The Power Configuration Plug (user-installed) must be correct for your application or serious ASU damage will result. See Installation Chapter 3 for details.



CAUTION: Using the incorrect power configuration plug may cause serious damage to the unit.

3. Fuses sizes are as shown in diagram below. The pump(s) is fused together with Head/ Hose #6 fuses.



Over-temp Thermostat

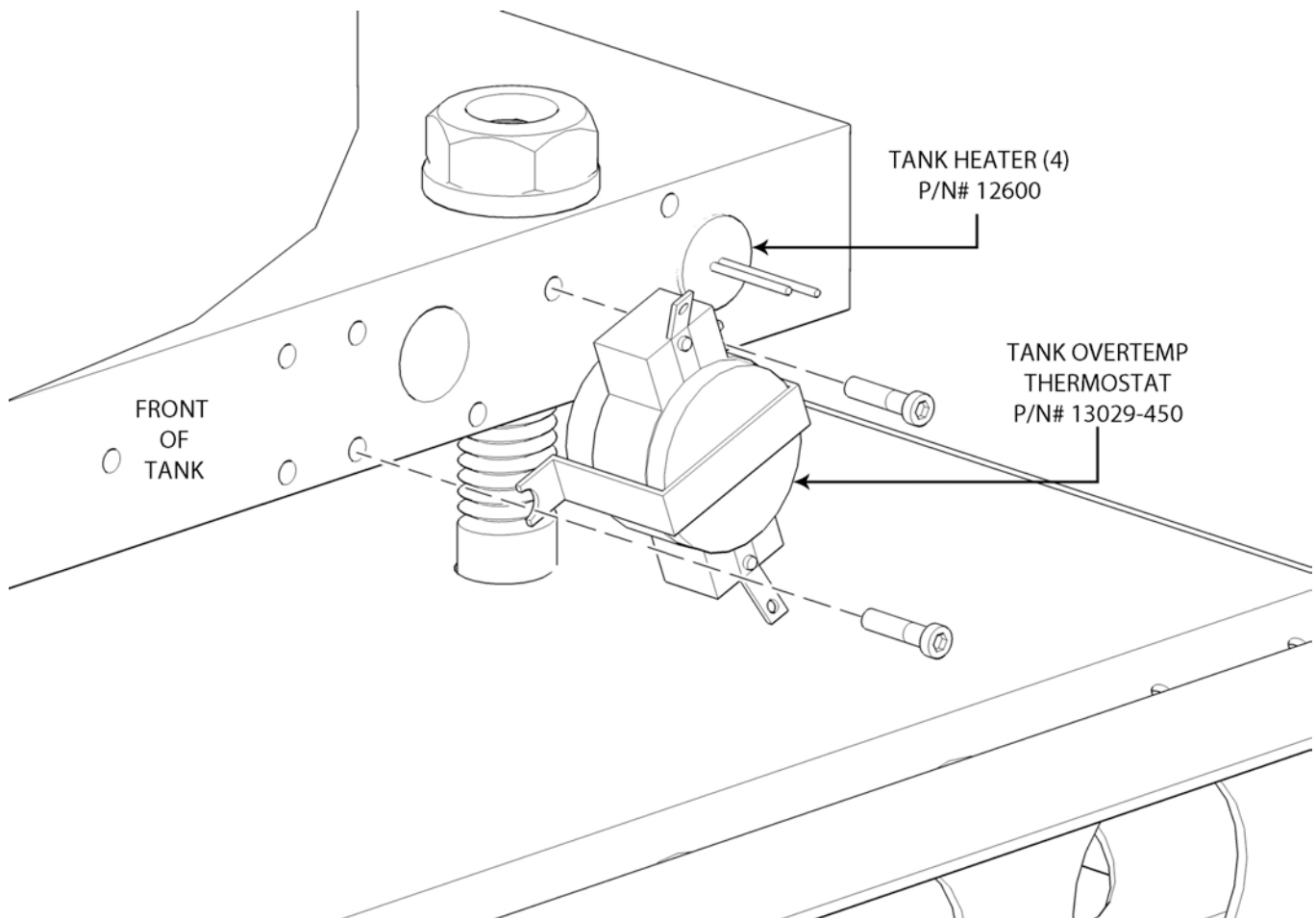
The over-temp thermostat cuts off power to **all temperature zones** if the tank temperature exceeds 224°C (435°F). The over-temp thermostat will reset automatically when the tank temperature drops.

Ready Contact to Parent Machine

A ready contact from the controller to the parent machine can enable the parent machine if it is connected on the control printed circuit board.

Temperature Zones Not Heating

If two temperature zones simultaneously cool down, the problem could be a bad fuse on the main PCB, as these fuses relate to hose/ head combinations. If only one temperature zone cools, the problem could be a bad heater or a PCB problem such as a PCB connection.



Resistance Tables

Temperature		Resistance in Ohms
°F	°C	
32	0	120.0
50	10	127.2
68	20	134.5
86	30	142.1
104	40	149.8
122	50	157.7
140	60	165.9
158	70	174.2
176	80	182.8
194	90	191.6
212	100	200.6
230	110	209.8
248	120	219.3
268	130	229.0
284	140	238.8
302	150	249.0
320	160	259.3
338	170	269.9
356	180	280.8
374	190	292.0
392	200	303.5
410	210	315.3
428	220	327.5

Temperature Sensor Resistance for Ni120 RTD

Hose Length		Resistance in Ohms Nominal @ 240 V
Meters	Feet	
1.2	4	467
1.8	6	287
2.4	8	228
3	10	177
3.7	12	144
4.9	16	108
7.3	24	67

Nominal Hose Heater Resistance for
Challenger Hoses

Watts	Resistance in Ohms Nominal @ 240 V
200	288
270	213
350	165
500	115
700	82

Nominal Head Heater Resistance

Nominal Voltage	Resistance in Ohms
240	57 - 76

Tank Heater Resistance

Note: Resistance is measured at ambient temperature (20°C/68°F).

Troubleshooting Guide

Preliminary Checks: Verify the following before proceeding

1. The ASU is switched on.
2. The ASU is supplied with power.
3. Electrical connections (including the power configuration plug) are correct.
4. Adhesive is in the hopper and it has had time to melt.

Error Messages (see also Chapter 4)

- EO1 = temperature zone has an open sensor
- EO2 = temperature zone has a shorted sensor
- EO3 or EO4 = internal error. ASU or pcb must be returned to Astro Packaging.
- o - t = Over-temperature check for faulty zone

Hose/ Applicator Troubleshooting Tip

Hose or applicator problems can be isolated by electrically connecting the applicator and hose to an alternate socket on the ASU. If the malfunction goes with the applicator and hose, the problem will usually be in the applicator or hose that was moved. If the malfunction does not move with the applicator and hose, the problem is probably in the ASU.

Problem	Possible Cause	Solution
Controller set-points are not adjustable.	1. Main Power switch OFF. 2. Control PCB inoperative. 3. Keypad is locked.	1. Switch ON. 2. Replace PCB 3. Unlock Keypad (see ch. 5 programming)
All channels display error message or wrong actual temperatures.	Control PCB in operative.	Replace Control PCB
System is not working, display is dark.	1. Ribbon connector X6 or harness X7 is disconnected. 2. Board fuse (F1 or F2) on the PCB is inoperative.	1. Check connection 2. Insert new fuse, if it blows, the Control PCB is inoperative.
Actual tank temperature is higher than set-point (over-temp).	1. Tank sensor not fully inserted. 2. Tank sensor inoperative. 3. Inoperative PCB.	1. Check tank sensor. 2. Replace tank sensors if resistance does not comply with resistance table. 3. Replace PCB.
Display for Tank = EO1	1. Plug connection X6 (1&2) on PCB is loose. 2. Temperature sensor inoperative.	1. Restore connection. 2. Replace sensor if resistance does not comply with resistance table.


Problem	Possible Cause	Solution
Display for Tank = E02	<ol style="list-style-type: none"> 1. Tank sensor short circuit. 2. Short circuit at plug connection X6 on Control PCB. 3. Inoperative PCB. 	<ol style="list-style-type: none"> 1. Replace sensor if resistance does not comply with resistance table. 2. Check and eliminate short circuit. 3. Replace PCB.
Tank does not heat, but LED is ON.	<ol style="list-style-type: none"> 1. Fuse 15/16 has tripped on PCB. 2. Tank heater element is inoperative. 3. Disconnection in tank heater circuit. 4. Inoperative PCB. 	<ol style="list-style-type: none"> 1. Replace fuses and observe ASU. If it blows again, check for a short circuit in heater. 2. Replace tank if element's resistance does not comply with resistance table. <i>Note: remove lead wires from heater element when measure resistance.</i> 3. Check and repair (see wiring diagram) 4. Replace PCB
Tank does not heat, and LED is OFF.	Inoperative PCB.	1. Replace PCB.
A Hose (or Head) temperature zone is not heating. Hose (or head) LED on the PCB is ON.	<ol style="list-style-type: none"> 1. Loose plug connection on PCB. 2. Heating element inoperative. 	<ol style="list-style-type: none"> 1. Check connectors X12, X13, X14, X15, and X17 and restore connection. 2. Check resistance and compare to resistance table on page 7-4. <ol style="list-style-type: none"> a. For head: if heater cartridge is inoperative, replace heater. b. For hose: if heating element is inoperative, replace hose.
A Hose & Head temperature zone is not heating.	<ol style="list-style-type: none"> 1. Disconnection between ASU and Hose (or between Hose and Head) 2. Hose (or Head) fuse on the PCB is inoperative. 	<ol style="list-style-type: none"> 1. Check plug connections. 2. Insert new fuse. If fuse blows again, check for a short circuit in heater. <i>Note: there are two fuses for each hose/head combination.</i>

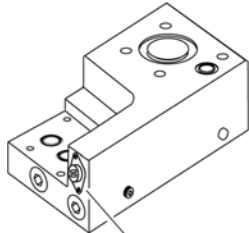
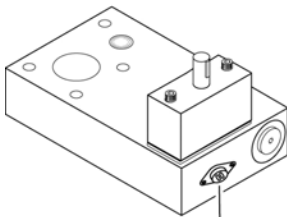
Problem	Possible Cause	Solution
A Hose (or Head) temperature zone is not heating. Hose (or head) LED on the PCB is OFF.	<ol style="list-style-type: none"> 1. Sequential heat-up may be inactive. 2. Inoperative PCB. 	<ol style="list-style-type: none"> 1. Check controller display at start-up. Re-program if necessary. 2. Replace PCB
A hose (or head) temperature zone's actual temperature is much higher than set-point.	<ol style="list-style-type: none"> 1. Inoperative Hose (or Head) triac on PCB (corresponding PCB LED is OFF). 2. Inoperative Hose (or Head) temperature sensor (corresponding PCB LED is ON). 	<ol style="list-style-type: none"> 1. Replace PCB. 2. Check resistance and compare to resistance table. <ol style="list-style-type: none"> a. For head: if sensor is inoperative, replace sensor. b. For hose: if sensor is inoperative, replace hose.
Display for Hose (or Head) = E01	<ol style="list-style-type: none"> 1. No Hose (or Head) is connected 2. Disconnection between ASU and Hose (or between Head and Hose) 3. Disconnection at X4, X5, or X6 on PCB. 4. Hose (or Head) sensor is inoperative. 	<ol style="list-style-type: none"> 1. Connect Hose (or Head) if needed. If not needed, ignore display. 2. Check plug connection. 3. Make proper connection. 4. Check resistance and compare to resistance table. <ol style="list-style-type: none"> a. For head: if sensor is inoperative, replace sensor. b. For hose: if sensor is inoperative, replace hose.
Display for Hose (or Head) = E02	<ol style="list-style-type: none"> 1. Hose (or Head) sensor short circuit. 2. Short circuit in plug connection between ASU and Hose(or between Hose and Head). 3. Inoperative PCB 	<ol style="list-style-type: none"> 1. Check resistance and compare to resistance table. <ol style="list-style-type: none"> a. For head: if sensor is inoperative, replace sensor. b. For hose: if sensor is inoperative, replace hose. 2. Make proper connection. 3. Replace PCB.

Gear Pump Troubleshooting Guide

WARNING HOT SURFACE & ADHESIVE

Some of the procedures in the following Troubleshooting Guide require working near hot adhesive. Be sure to wear protective gloves, safety glasses and clothing and use proper tools for handling hot melt components

Problem	Possible Cause	Solution
<p>F  not operate</p>	<ol style="list-style-type: none"> 1. Check to see that F/C light on temperature control is on steady. 2. Pump motor switch on front panel is "OFF." 3. Check for output from X18 on power PCB. 4. No pump warm-up, t-stat is open and tank is hot. 5. Motor is bad. 	<ol style="list-style-type: none"> 1. If blinking, one or more temperature zones are cold. 2. Switch to "ON." 3. Check fuse F3 & F4. If there is no 230 V output and fuses are good replace Power PCB. 4. Replace Pump warm-up T-stat 5. Check 230V at 3 pin motor plug. If 230V is present replace motor
Low or Inconsistent Adhesive Output	<ol style="list-style-type: none"> 1. Output filter clogged. 2. Adhesive used is too viscous. 3. Blocked hose. 4. Blocked Applicator Heads 5. Flow control valve needs adjusting 	<ol style="list-style-type: none"> 1. Remove and inspect filter screen. Clean or replace as necessary. See Chapter 6 "Preventative Maintenance" for procedure. 2. Verify that system components are at proper temperature and that selected adhesive is correct for your application. 3. Inspect hose for kinks, internal plugs of debris or char (degraded adhesive). Clean or replace hoses as required. 4. Inspect heads for plugged nozzles, proper air valve operation or plugged filters. Clean or repair heads as needed. 5. Adjust flow control valve in for more pressure. (See page 3 -5)
Adhesive Leak at pump or manifold.	<ol style="list-style-type: none"> 1. Bad O-rings 2. Bad Pump Shaft Seals 	<ol style="list-style-type: none"> 1. Check O-rings between tank and pump manifold. Check O-rings between pump and pump manifold. 2. Replace seals. Replace pump.

Problem	Possible Cause	Solution
<p>Pump inoperative</p>  <p>PUMP WARM-UP THERMOSTAT (V2)</p>  <p>PUMP WARM-UP THERMOSTAT (V3 and V4)</p>	<ol style="list-style-type: none"> 1. Main Breaker 2. Insufficient Voltage 3. Faulty Warm-Up Switch 	<ol style="list-style-type: none"> 1. Turn the system power switch to the ON position. If switch light fails to illuminate, the switch may need replacement. System power switch and pump motor switch must both be in the ON position for pump to operate. 2. Determine the exact voltage of the melt unit. Insufficient voltage can be the cause of these problems. Voltage drops are common. Use a voltmeter to determine whether sufficient voltage is supplied to the melt unit component must be compatible to the melt unit or serious damage to the system will occur. Determine the exact voltage and frequency of the pump motor marked on the motor data label located on the motor. 3. Switch the pump motor ON/OFF switch to the ON position. Allow sufficient time for the melt tank to reach operating temperature. This will cause the pump warm-up switch to close, thus completing the pump motor circuit. If warm-up switch is faulty or rated at a higher temperature, it must be replaced.

Problem	Possible Cause	Solution
Pump inoperative (Continued)	<p>4. Plugged pump inlet port</p> <p>5. Motor Internal Thermal Protection</p> <p>6. Foreign material in pump and tank</p>	<p>4. Determine which pump is mounted to your melt unit. Look into the melt tank for any foreign material plugging the inlet pump port. Pump gears can freeze up; in which case the pump may need replacement or repair.</p> <p>5. The pump motor is normally the last item to check when troubleshooting. All motors have internal thermal protection. Switch OFF pump motor switch and allow the motor to cool for approximately 20 minutes. Turn pump switch back ON. If the motor still fails to operate, continue troubleshooting. Determine which pump motor is mounted in your melt unit. Look into the melt tank for any foreign material plugging the inlet pump port. Pump gears can freeze up; in which case the pump may need replacement or repair.</p> <p>6. Remove foreign material from pump and tank. Purge system with Red Baron (P.N. RB-5) if necessary.</p>

Problem	Possible Cause	Solution
Pump motor stalls	<ol style="list-style-type: none"> <li data-bbox="618 262 1002 296">1. Inadequate tank temperature. <li data-bbox="618 919 1002 953">2. Inoperable Flow Control Valve <li data-bbox="618 1125 1002 1192">3. Motor Internal Thermal Protection <li data-bbox="618 1577 1002 1644">4. Foreign material in pump and tank 	<ol style="list-style-type: none"> <li data-bbox="1031 262 1414 919">1. Adjust the tank temperature in chapter 5 of this manual. Inadequate tank temperature can affect the performance of your hot melt system. If the tank has reached an over-temperature condition, try turning the controller down. A failure of the solid state relay (closed position) can cause the tank to reach over temperature. Check the relay's continuity - failure of the relay is rare. If problem persists, replace faulty component (controller or relay). On units with Standby, make sure Standby switch is disengaged and in the Run position. <li data-bbox="1031 919 1414 1129">2. Adjust the flow control valve (FCV) correctly will produce the desired pumping performance of your melt unit. If the FCV is inoperable replace or repair it. (see page 3-5) <li data-bbox="1031 1129 1414 1577">3. The pump motor is normally the last item to check when troubleshooting. All motors have internal thermal protection. Switch OFF pump motor switch and allow the motor to cool for approximately 20 minutes. Turn pump switch back ON. If the motor still fails to operate, continue troubleshooting. Determine which pump motor is mounted in your melt unit. <li data-bbox="1031 1577 1414 1703">4. Remove foreign material from pump and tank. Purge system with Red Baron (P.N. RB-5) if necessary.

Problem	Possible Cause	Solution
<p>Pump motor stalls (Continued)</p>	<p>5. Increase tank and hose temperatures.</p> <p>6. Adhesive formulations</p>	<p>5. Increase melt tank and supply hose temperatures. If this does not improve performance, contact Astro Packaging concerning your adhesive and applications.</p> <p>6. Adhesive formulations tend to be a factor in each of the previously listed problems. System should be purged if formulation is incorrect.</p>

Problem	Possible Cause	Solution
Pump motor overload	<ol style="list-style-type: none"> <li data-bbox="610 258 1006 913">1. Inadequate Tank Temperature <li data-bbox="610 913 1006 1501">2. Pump Motor shuts off and/or breaker trips <li data-bbox="610 1501 1006 1749">3. Inoperable flow control valve 	<ol style="list-style-type: none"> <li data-bbox="1023 258 1412 913">1. Adjust the tank temperature in chapter 3 (see page 3-5) of this manual. Inadequate tank temperature can affect the performance of your hot melt system. If the tank has reached an over-temperature condition, try turning the controller down. A failure of the solid state relay (closed position) can cause the tank to reach over temperature. Check the relay's continuity - failure of the relay is rare. If problem persists, replace faulty component (controller or relay). On units with Standby, make sure Standby switch is disengaged and in the Run position. <li data-bbox="1023 913 1412 1501">2. Switch the pump motor ON/OFF switch to the ON position. Allow sufficient time for the melt tank to reach operating temperature. This will cause the pump warm-up switch to close, thus completing the pump motor circuit. When the pump motor experiences overload conditions, it will shut off, or the pump motor breaker will trip, or both. This is usually caused by insufficient pump warm-up time. If this problem persists, the pump switch/breaker may need replacement. <li data-bbox="1023 1501 1412 1749">3. Adjust the flow control valve (FCV) correctly will produce the desired pumping performance of your melt unit. If the FCV is inoperable replace or repair it. (see page 3-5)

Problem	Possible Cause	Solution
Pump motor overload (Continued)	<p>4. Motor Internal Thermal Protection</p> <p>5. Foreign material in pump or tank</p> <p>6. Increase tank and hose temperatures</p> <p>7. Adhesive formulations</p>	<p>4. The pump motor is normally the last item to check when troubleshooting. All motors have internal thermal protection. Switch OFF pump motor switch and allow the motor to cool for approximately 20 minutes. Turn pump switch back ON. If the motor still fails to operate, continue troubleshooting. Determine which pump motor is mounted in your melt unit.</p> <p>5. Remove foreign material from pump and tank. Purge system with Red Baron (P.N. RB-5) if necessary.</p> <p>6. Increase melt tank and supply hose temperatures. If this does not improve performance, contact Astro Packaging concerning your adhesive and applications.</p> <p>7. Adhesive formulations tend to be a factor in each of the previously listed problems. System should be purged if formulation is incorrect.</p>
Pump motor breaker throws	1. Incoming voltage	1. Incoming voltage: Determine exact voltage of the melt unit. Insufficient voltage can be the cause of these problems. Voltage drops are very common. Use a voltmeter to determine whether sufficient voltage is supplied to the melt unit. Also, the voltage of each melt unit or serious damage to the system will occur.

Problem	Possible Cause	Solution
Pump motor breaker throws	<p>2. Improper wiring</p> <p>3. Replace pump breaker</p> <p>4. Inoperable Flow Control Valve</p> <p>5. Motor Internal Thermal Protection</p>	<p>2. Refer to the electrical schematic and check the actual wire connections to ensure that the melt unit is wired properly. If the problem still exists, check the status of the specific components with a voltmeter (system powered), or with an ohmmeter (system unpowered, wire disconnected).</p> <p>3. Switch the pump motor ON/OFF switch to the ON position. Allow sufficient time for the melt tank to reach operating temperature. This will cause the pump warm-up switch to close, thus completing the pump motor circuit. Replace pump breaker.</p> <p>4. Adjust the flow control valve (FCV) correctly will produce the desired pumping performance of your melt unit. If the FCV is inoperable replace or repair it. (see page 3-5)</p> <p>5. The pump motor is normally the last item to check when troubleshooting. All motors have internal thermal protection. Switch OFF pump motor switch and allow the motor to cool for approximately 20 minutes. Turn pump switch back ON. If the motor still fails to operate, continue troubleshooting. Determine which pump motor is mounted in your melt unit.</p>
Pump leaks		Determine which pump is mounted in your melt unit. The pump performance depends upon certain pump and pump motor combinations. Tighten the FCV and pump mounting screws. If the pump continues to leak, replace o-ring.

Problem	Possible Cause	Solution
Adhesive Output too low	<ol style="list-style-type: none"> 1. Adjust the flow control valve. 2. Hose temperature controller 3. Inadequate tank temperature 4. Foreign material in pump and tank. 	<ol style="list-style-type: none"> 1. Adjusting the flow control valve (FCV) correctly will produce the desired pumping performance of your melt unit. If the FCV is inoperable, replace or repair it. (see page 3-5) 2. Adjust the supply hose temperature controller. Inadequate supply hose heat can affect the performance of your hot melt system. 3. Adjust the tank temperature controller according to chapter 5 of this manual. Inadequate tank temperature can affect the performance of your hot melt system. If the tank has reached an over-temperature condition, try turning the controller down. A failure of the solid state relay (closed position) can cause the tank to reach over-temperature. Check the relay's continuity - failure of the relay is rare. If problem persists, replace the faulty component (controller or relay). On units with Standby, make sure Standby switch is disengaged and in the Run position. 4. Remove foreign material from pump and tank. Purge system with Red Baron (p.n. RB-5) if necessary.

Problem	Possible Cause	Solution
Adhesive Output too low (continued)	<p>5. Incorrect pump and pump motor combination</p> <p>6. Internal Motor Thermal Protection</p> <p>7. Insufficient melt tank and supply hose temperatures.</p> <p>8. Incorrect Adhesive Formulation</p>	<p>5. Determine which is mounted in your melt unit. The pumping performance depends upon certain pump and pump motor combinations. Consult Astro Packaging for the proper pump combination needed for specific application.</p> <p>6. The pump motor is normally the last item to check when troubleshooting. All motors have internal thermal protection. Switch OFF pump motor switch and allow the motor to cool for approximately 20 minutes. Turn pump switch back ON. If the motor still fails to operate, continue troubleshooting. Determine which pump motor is mounted in your melt unit. Consult with Astro Packaging for properly rated pump motor for your specific application.</p> <p>7. Increase melt tank and supply hose Temperatures per chapter 5 of this manual. If this does not improve performance, consult Astro Packaging concerning your applications.</p> <p>8. Adhesive formulations tend to be a factor in each of the previously listed problems. System should be purged if formulation is incorrect. Clean applicator nozzle or change to larger nozzle.</p>

Problem	Possible Cause	Solution
Adhesive Output too high	<ol style="list-style-type: none"> 1. Adjust Flow Control Valve 2. Hose Temperature Controller 3. Inadequate tank temperature 4. Internal motor thermal protection 	<ol style="list-style-type: none"> 1. Adjusting the flow control valve (FCV) correctly will produce the desired pumping performance of your melt unit. If the FCV is inoperable, replace or repair it. (see page 3-5) 2. Adjust the supply hose temperature controller. Inadequate supply hose heat can affect the performance of your hot melt system. 3. Adjust the tank temperature controller according to chapter 5 of this manual. Inadequate tank temperature can affect the performance of your hot melt system. If the tank has reached an over-temperature condition, try turning the controller down. A failure of the solid state relay (closed position) can cause the tank to reach over-temperature. Check the relay's continuity - failure of the relay is rare. If problem persists, replace the faulty component (controller or relay). On units with Standby, make sure Standby switch is disengaged and in the Run position. 4. The pump motor is normally the last item to check when troubleshooting. All motors have internal thermal protection. Switch OFF pump motor switch and allow the motor to cool for approximately 20 minutes. Turn pump switch back ON. If the motor still fails to operate, continue troubleshooting. Determine which pump motor is mounted in your melt unit. Consult with Astro Packaging for properly rated pump motor for your specific application.

Problem	Possible Cause	Solution
Excessive smoking from tank and gun	<p>1. Inadequate tank temperature.</p> <p>2. Hose temperature controller</p> <p>3. Incorrect Adhesive formulations</p>	<p>1. Adjust the tank temperature controller according to chapter 5 of this manual. Inadequate tank temperature can affect the performance of your hot melt system. If the tank has reached an over-temperature condition, try turning the controller down. A failure of the solid state relay (closed position) can cause the tank to reach over-temperature. Check the relay's continuity - failure of the relay is rare. If problem persists, replace the faulty component (controller or relay). On units with Standby, make sure Standby switch is disengaged and in the Run position.</p> <p>2. Adjust the supply hose temperature controller. Inadequate supply hose heat can affect the performance of your hot melt system.</p> <p>3. Adhesive formulations tend to be a factor in each of the previously listed problems. System should be purged if formulation is incorrect.</p>

Chapter 8

DISASSEMBLY & RE-ASSEMBLY PROCEDURES

Disassembly Procedures

Note: Re-read Chapter 1 “Safety Precautions” before performing any disassembly procedures. All disassembly procedures must be performed by qualified, trained technicians.

To Access the RTD Sensors

Remove the pump and electronics cover.

a. **RTD for ASU:** Each ASU has one RTD located between the (4) cartridge heaters. This RTD slips into the tank and is easily plugged in electrically.

To Access the Electrical Components

(See illustrations on pages 10-3 & 8-1)

a. **Main On/ Off Switch Replacement:** Switch is located on the display panel.

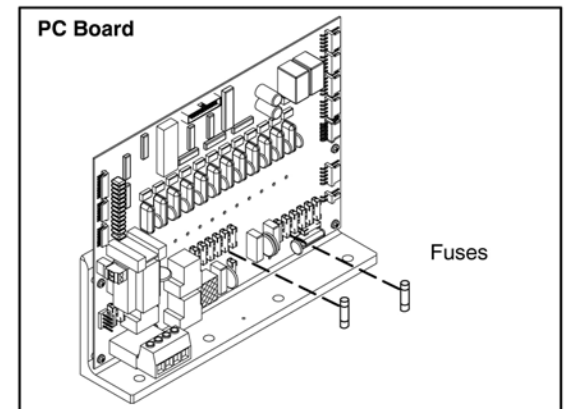
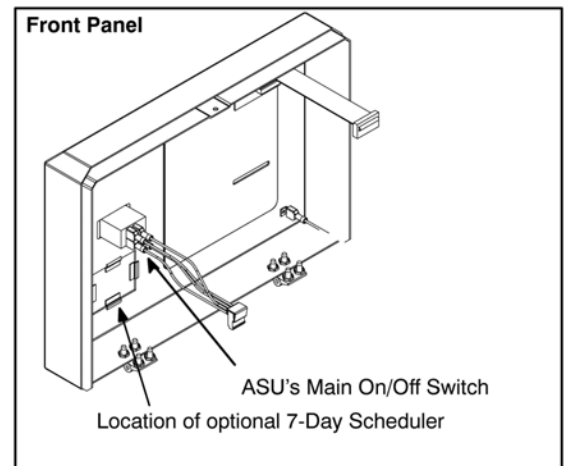
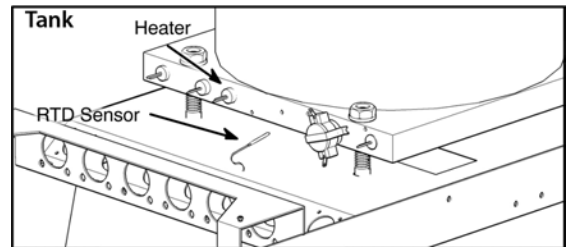
1. Free the old switch via two screws from the front.
2. Remove the switch through the back.
3. Disconnect two incoming and two outgoing power leads from the old switch and connect them to new switch.

b. **Fuse Replacement:**

Note: Use fuses as specified on page 7-2.

i. **Fuses on PC Board:** (see also detailed illustration on page 7-2 for sizes and locations of fuses). *Note on PCB fuses: each Hose #/Head # pair (ie: Hose #2/ Head #2) is fused with two fuses, either one of which can blow causing the zone to not heat.*

ii. **Fuses on tank:** Tank is fused with two resettable circuit breakers. Push the knob to re-set.



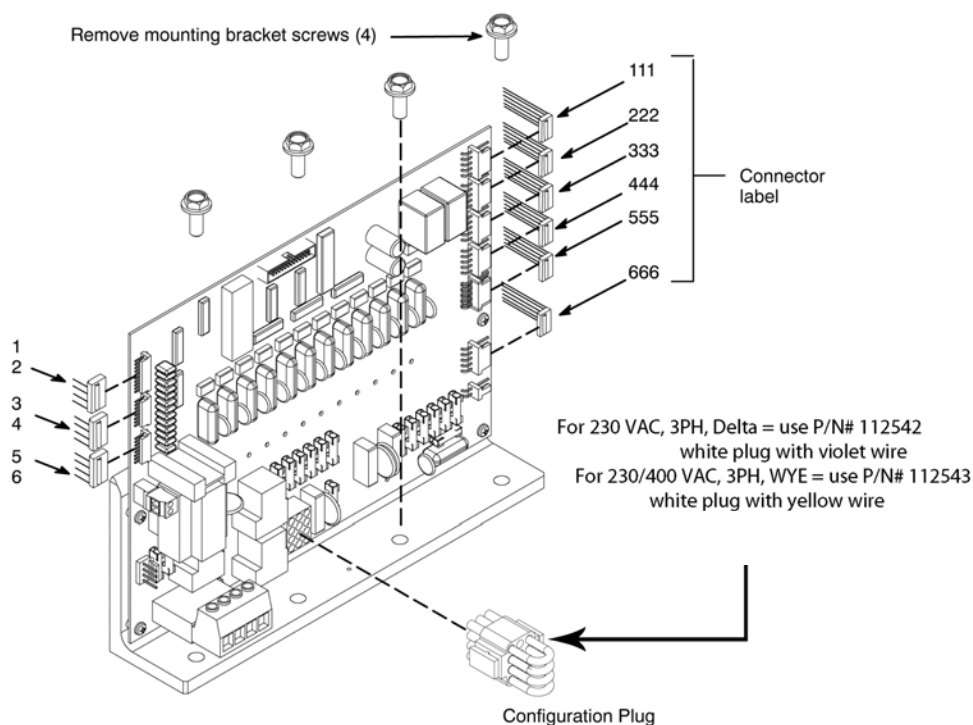
d. Printed Circuit Board Replacement:



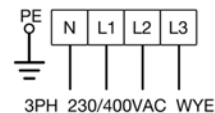
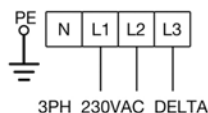
CAUTION: Reference the manual section entitled “Handling Printed Circuit Boards” on page-1 before proceeding.

For a detailed diagram of electrical components, see Chapter 10.

1. Disconnect all electrical connections to the board.
2. Remove the four mounting bracket screws.
3. Lift the old PCB and mounting bracket/ heat sink assembly from the ASU.
Note: Do not attempt to separate the PCB from its mounting bracket/ heat sink. It is all one assembly.
4. Remove the ASU configuration plug from the old PCB.
5. Place the new PCB and mounting bracket/ heat sink assembly in the ASU.
6. Re-install the four mounting bracket screws.
7. Re-install electrical connectors onto the board (refer to drawing on pg. 7-2, if necessary).
8. Re-install the ASU configuration plug onto the new PCB.



Line Input Power Plug for
each type of Power Supply:



LINE INPUT POWER PLUG WIRING

Re-Assembly Procedures

Unless noted, the ASU's re-assembly is simply the reverse sequence of the disassembly procedures. However, the following "cautions" should be followed (whenever they apply) for proper re-assembly:



CAUTION: In general, all *O-RINGS AND SEALS* should be replaced whenever hot-melt equipment is re-assembled. All new o-rings should be lubricated with o-ring lube (PN N07588).

CAUTION: *TAPERED PIPE THREADS* are found on air line fittings used with the pump air supply and on the outlet filter manifold. Apply thread sealant (PN N02892) whenever tapered pipe threaded parts are re-assembled.

CAUTION: *SOME FITTINGS* used for adhesive on the ASU have straight threads and o-ring seals. Use of thread sealant is not necessary with these parts, but the o-ring seals should be clean and lubricated. Tighten straight-threaded parts and fittings until their shoulders are firmly seated against the pump body (or other surface). Excessive torque may damage straight-threaded parts and the use of power wrenches is not recommended.

CAUTION: *HOT-MELT RESIDUE* should be cleaned from parts before they are re-assembled, particularly from threaded parts. As a precaution against adhesive residue preventing proper re-assembly, threaded parts should always be re-tightened at operating temperature.

Supply Hose Replacement

1. Switch OFF system power switch and allow the hot melt material in the melt tank to cool.



CAUTION

hot melt adhesive can cause difficulty in maintaining your unit. Be certain that all material in the tank has cooled before continuing with maintenance.

2. Switch ON system power switch and supply hose power switch for 5 minutes to allow fittings to warm-up. Switch OFF system power switch after 5 minutes has elapsed.
3. Disconnect power and tilt unit backwards.
4. Disconnect the supply hose electrical connector.
5. Remove screws from hose mounting block.
6. Loosen hose JIC fitting and remove screws from hose 90 degree fitting on the flow control valve.
7. Disconnect the applicator head's electrical connector and remove old supply hose from the #6 JIC fitting on the applicator head.
8. Install new supply hose on the melt unit.
9. Install applicator head on the new supply hose. Switch ON system power switch and supply hose power switch to determine if the applicator head and supply hose are operating properly.

Pump Motor Replacement

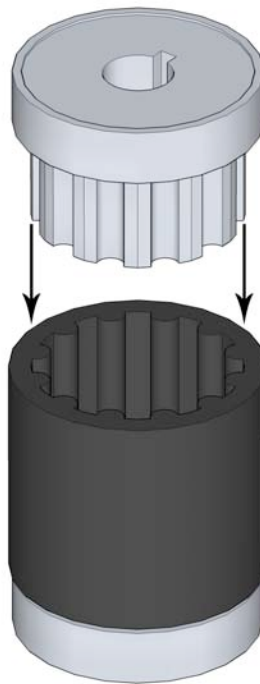
1. Switch OFF system power switch and disconnect melt unit.
2. Remove back panel (and housing for 170 rpm motor on AP50 melt units)
3. Disconnect motor electrical connector and remove fast-on connectors from capacitor.
4. Remove motor mounting bracket as a whole assembly from the melt unit.
5. Remove motor shaft coupling. Remove motor from mounting bracket.
6. Reassemble melt unit with new motor.
7. Turn motor ON (system warmed up) and observe motor and drive shaft coupling for misalignment. Loosen and retighten motor mounting bracket to realign as necessary.

NOTE: Motor must turn the pump shaft counterclockwise (looking down on the pump shaft).

8. Replace housing (for 170 rpm motor on AP50 melt units) and back panel.

V2 Pump Replacement

1. If it possible and can be done safely, pump out all the hot melt material in the melt unit, then switch off the system power switch and allow the melt unit to cool down completely. Otherwise switch off system power switch and allow adhesive in tank to completely solidify.
2. Switch on system power switch for 10 minutes to allow pump and flow control valve to warm up.
3. **If replacing pump with tank full of melted hot melt insert V2 pump change tool (see page 6 -2) into V2 pump block as shown. Be sure main circuit breaker is off on unit. The pump change tool will block flow of hot melt from the tank to the pump.**
4. Remove (4) Hex Head Bolts to remove motor and mounts from chassis. Unplug motor and set aside.
5. Remove (4) SHCS that mount V2 pump to pump block. Install new pump and o-rings to V2 pump block and make sure there is a minimum of 1/16" gap between motor and pump coupler.
6. **You must REMOVE THE V2 PUMP CHANGE TOOL AND INSERT THE PARKER PLUG BEFORE OPERATING PUMP.**



Chapter 9

COMPONENT ILLUSTRATIONS & BILL OF MATERIAL



WARNING

All parts must be periodically inspected and replaced if worn or broken. Failure to do this can affect equipment's operation and can result in personal injury.

Chapter Format

This chapter contains the component illustrations (exploded-view drawings) for each assembly of the AP530 ASU. These drawings are useful for finding part numbers as well as for use when maintaining or repairing the unit.

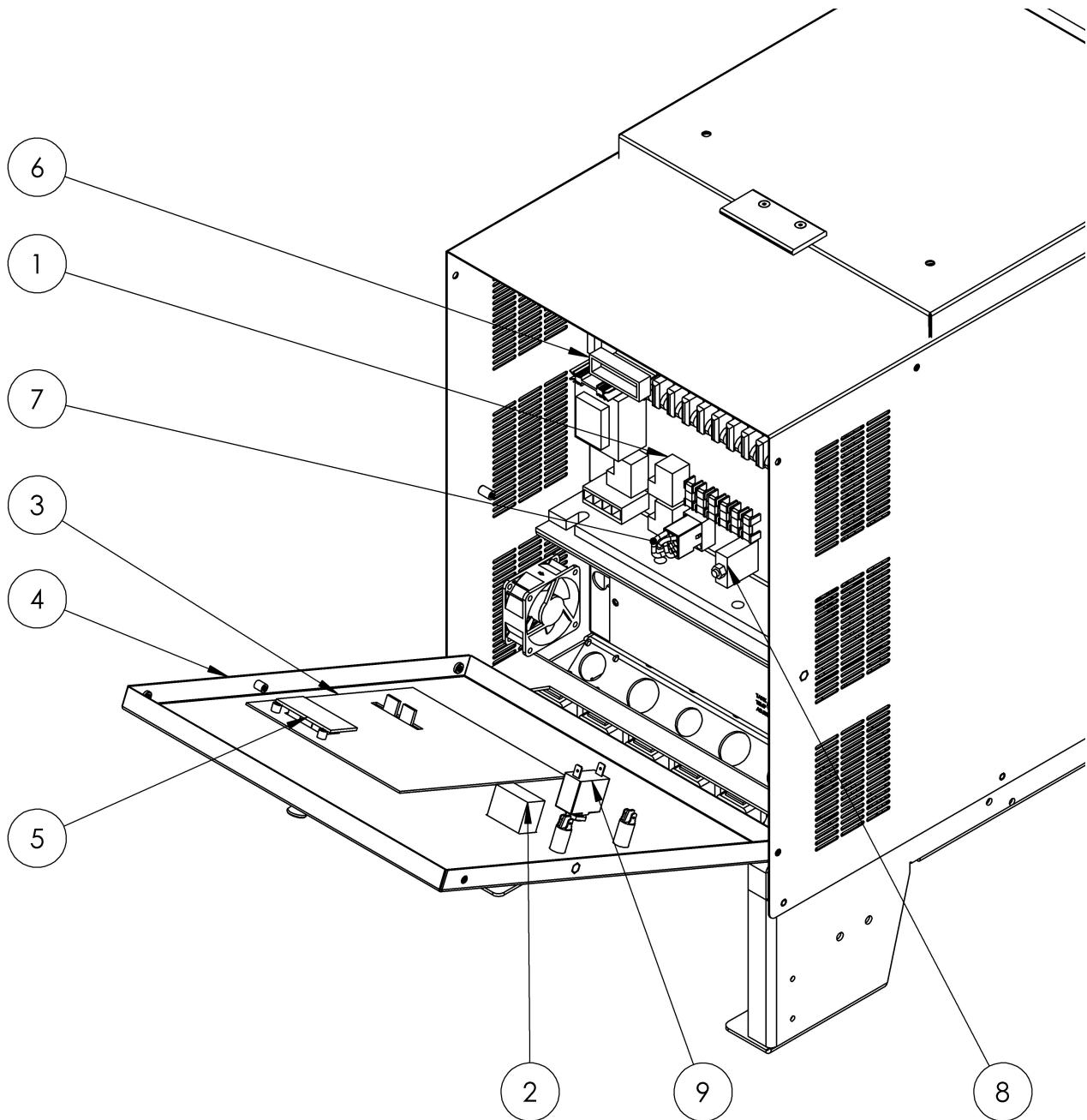
Recommended Service Parts List

Category	Part Number	Description	Qty.
Electrical	111941	Breaker Tank Heater 15 amps	2
	111941-20	Breaker Tank Heater 20 amp	2
	12055B-25	Motor Breaker 2.5 amp	1
	79068-265	Kit, pump warm-up t-stat	1
	108566	Fuse, 6.3 amp/Super fast 5x20 (temperature zones)	20
	112568	Fuse, 10 amp, fast (tank)	5
	102762	Fuse, 1 amp, fast blow (pc board)	5
	110720	RTD Sensor, N120	1
	13029-450	Over-temp switch assembly	1
	SPB0010	Printed Circuit Board & Heat sink Assy.	1
	110747	Rocker Switch (control panel on/off)	1
	112470	Battery (for optional 7-Day Scheduler)	1
Filters	79064	Kit, pump filter	1
	73289	Tank Filter	1
Misc.	10417	V2 Pump O-rings	2
	10432	Pump block O-ring	1
Kits	79179-3	Kit, V2 Pump	2
	79082-7	Flow Control Valve	1
	73847-01	V2 Pump change tool	1

Front Panel and Electrical Components Assembly

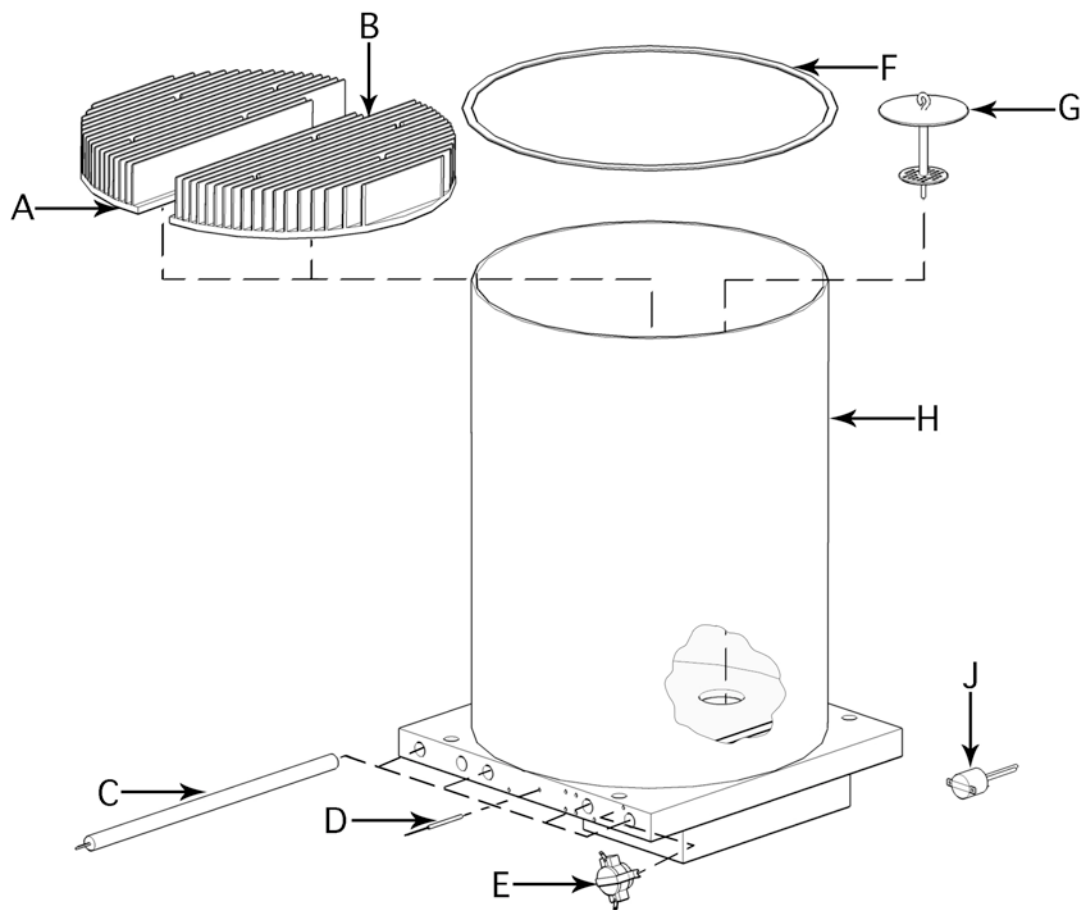
Item No.	Part No.	Description	Qty.
1	SPB0010	Heat Sink PCB Assembly	1
2	110747	Switch, DPDT, Rocker, Sealed	1
3	112425	Switch Membrane	1
4	70339-86	AP50 Front Panel	1
4	70339-87	AP100 Front Panel	1
5	112428	PCB LED Display	1
6	106379	PCB Ribbon Cable	1
7	116182	Power Configuration Plug Kit	1
8	111941	Circuit Breaker, 15A	1
9	12055B-25	Motor Breaker, Toggle Switch	1

Component Illustration: Front Panel & Electrical Components Assembly



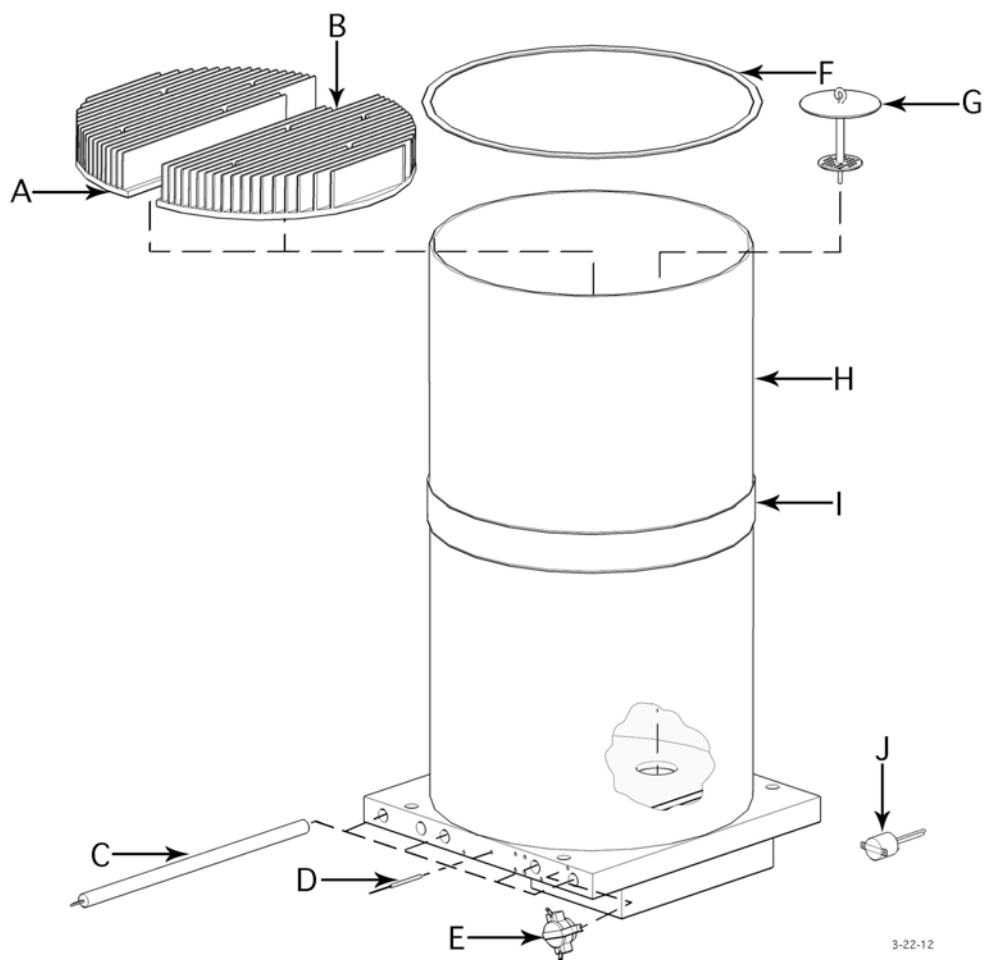
Tank Assembly & Components AP50

Item No.	Part No.	Description	Qty.
A	70352-1TF	Melt Grid (Left Side)	1
B	70352-2TF	Melt Grid (Right Side)	1
C	12600-59	Tank Heater, 600 W (2,400 W)	4
D	110720	Tank RTD Sensor	1
E	13029-450	Tank Over-temp Switch	1
F	20020	Tank Seal	1
G	73289	Tank Screen	1
H	73335	Tank Assembly	1
J	79068-265	Pump Warm Up Switch (Mounts to Pump Block)	1



Tank Assembly & Components AP100

Item No.	Part No.	Description	Qty.
A	70352-1TF	Melt Grid (Left Side)	1
B	70352-2TF	Melt Grid (Right Side)	1
C	12600-59	Tank Heater, 600 W (2,400 W)	4
D	110720	Tank RTD Sensor	1
E	13029-450	Tank Over-temp Switch	1
F	20020	Tank Seal	1
G	73289	Tank Screen	1
H	73271	Tank Assembly	1
I	12610	Tank Band Heater	1
J	79068-265	Pump Warm Up Switch (Mounts to Pump Block)	1

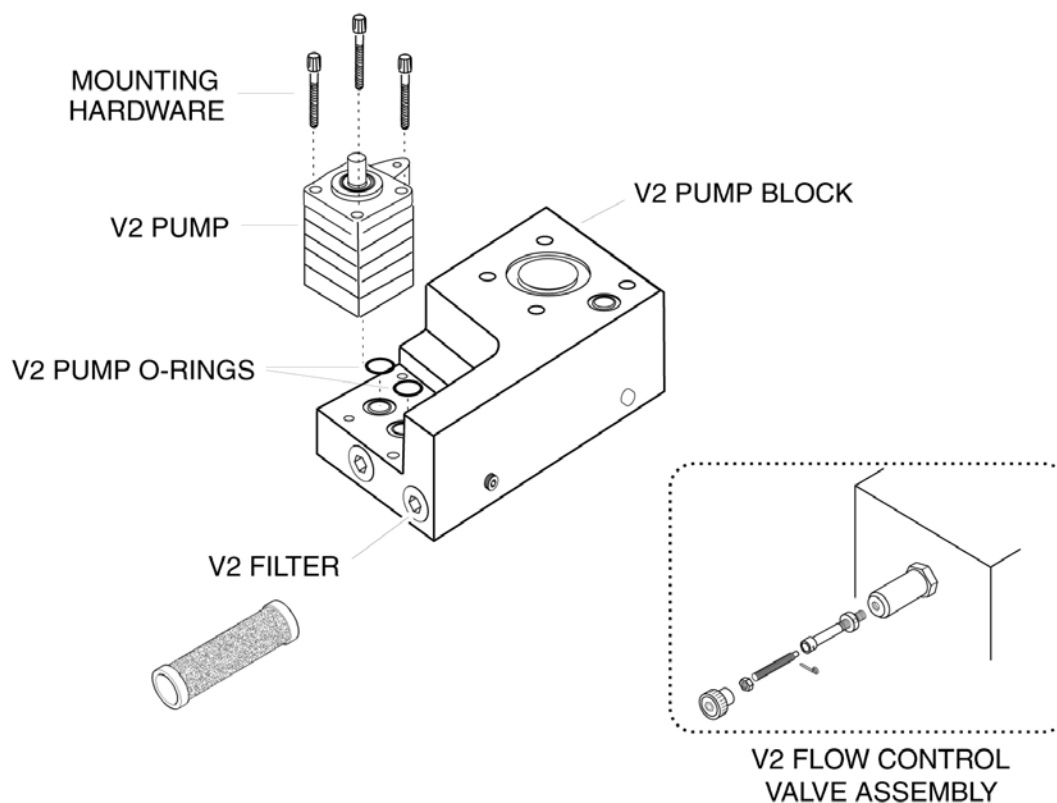


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Pumps, V2 & Accessories

Item	Description (Quantity)	Part Number
	V2-545 Pump Block & FCV complete.	79211-07
	V2-545 Pump (Replacement for Existing V2)	79179-3
	Flow Control Valve Kit, V2	79082-7
	Drain Valve Kit	79057-1
	Tank Screen	73289
	Kit, Knob Assembly FCV, V2/V3 Retrofit	79287-02
	Pump Block O-Ring Kit, V2	79070-1
	Kit, V2 Pump Teflon O-Ring, 30/50/100 lb. MU	79290-04
	Pump Insulation Kit, V2, 30 lb. MU	79176-4
	Pump Insulation Kit, V2, 50/100 lb. MU	79176-3
	Pump Filter Kit, 50 Mesh	79064

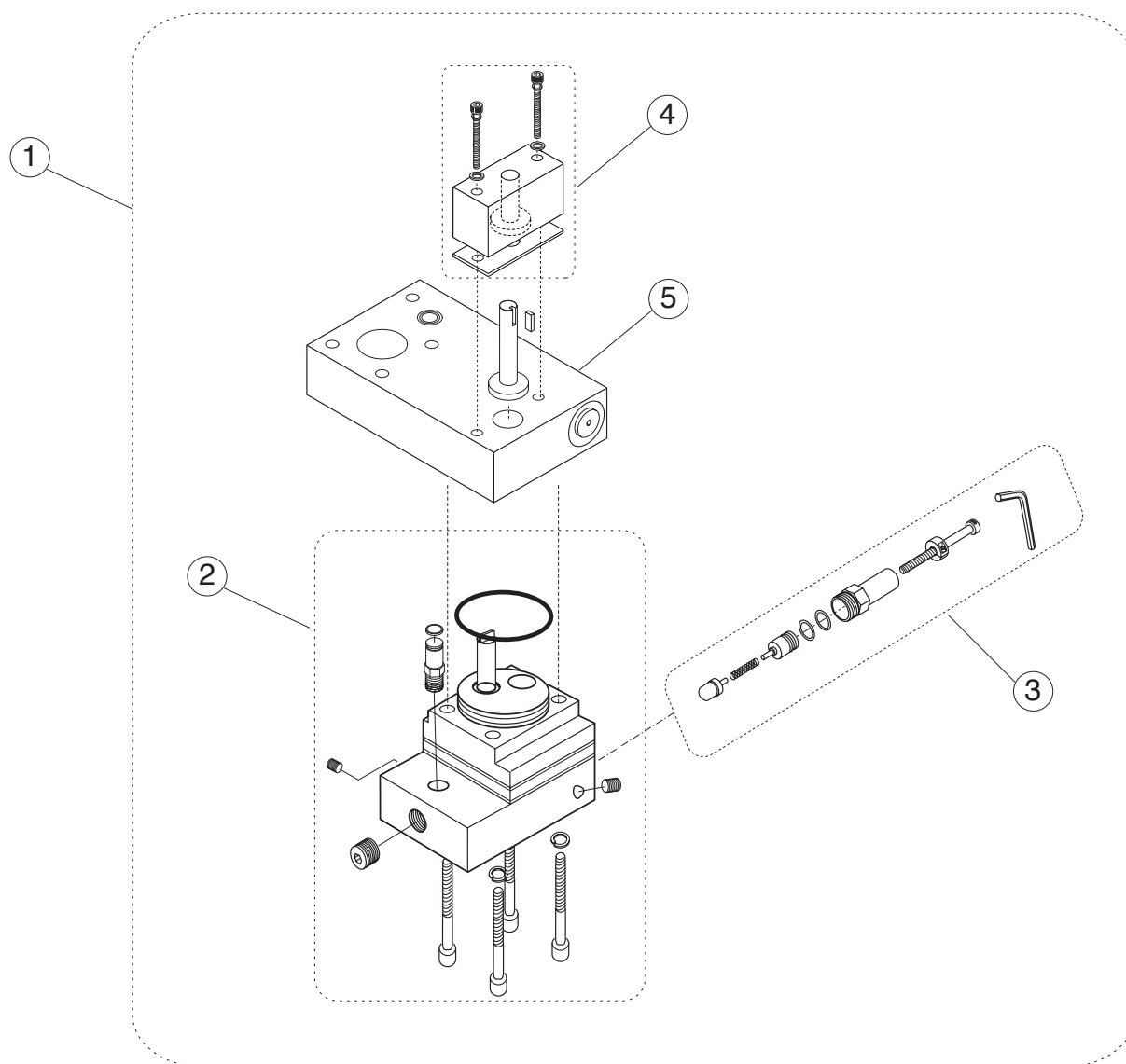
Note: Teflon O-Rings are recommended for Polyamide. Contact your Local distributor for Assistance



Pumps, V3 and Accessories

Item	Description	Part Number
1	V3-675 Pump, complete (filter block & FCV)	79211-11
2	V3-675 Pump Assembly with integrated FCV	79204-8
3	V3 Flow Control Repair Kit	79082-8
4	Drive Shaft Assembly, KB/AP 30, 50, 100	73274-2
5	Pump Block, V1/V3/V4, KB & AP Series	70337-1
-	Pump Filter Kit, 50 Mesh	79064
-	Pump Insulation Jacket, V3	99702

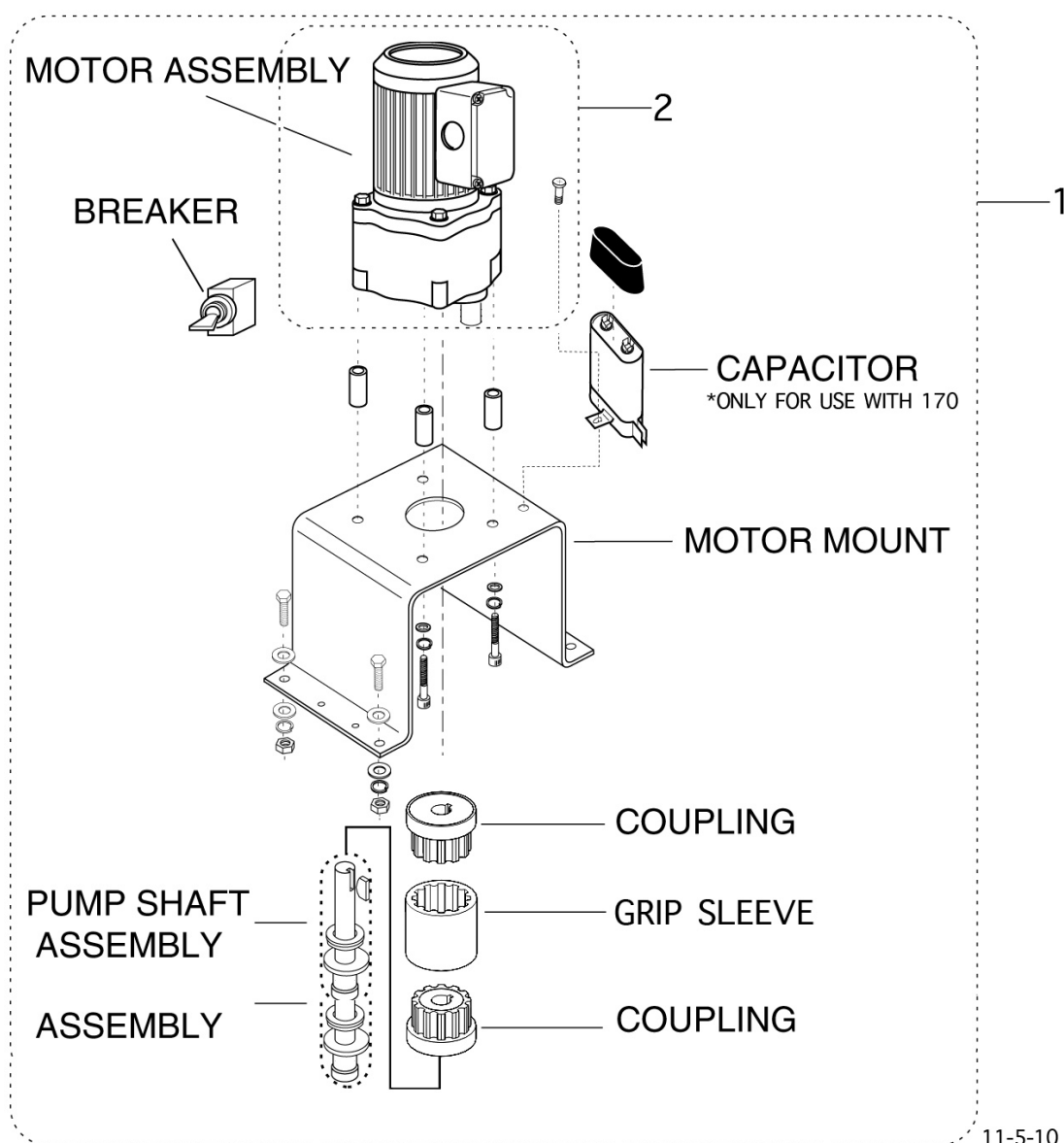
NOTE: Teflon o-rings are recommended for polyamide.



Standard Fan-Cooled Motors

Item	Description (Quantity)	Part Number
Optional	Motor Assembly, 86/72 RPM 200/230 VAC, 60/50Hz	73012-42
Optional	Motor Group, 1/6 hp, 86RPM 200/230 VAC, 60Hz	73278-42
2	Kit, Motor & Capacitor, 1/3 hp, 170 RPM, 200/230 VAC, 60Hz	79414-01
1	Motor Group, 1/3 hp, 170RPM 200/230 VAC, 60Hz	73278-98
Optional	Motor Group, Variable Speed 50/60 Hz with controls	73278-99

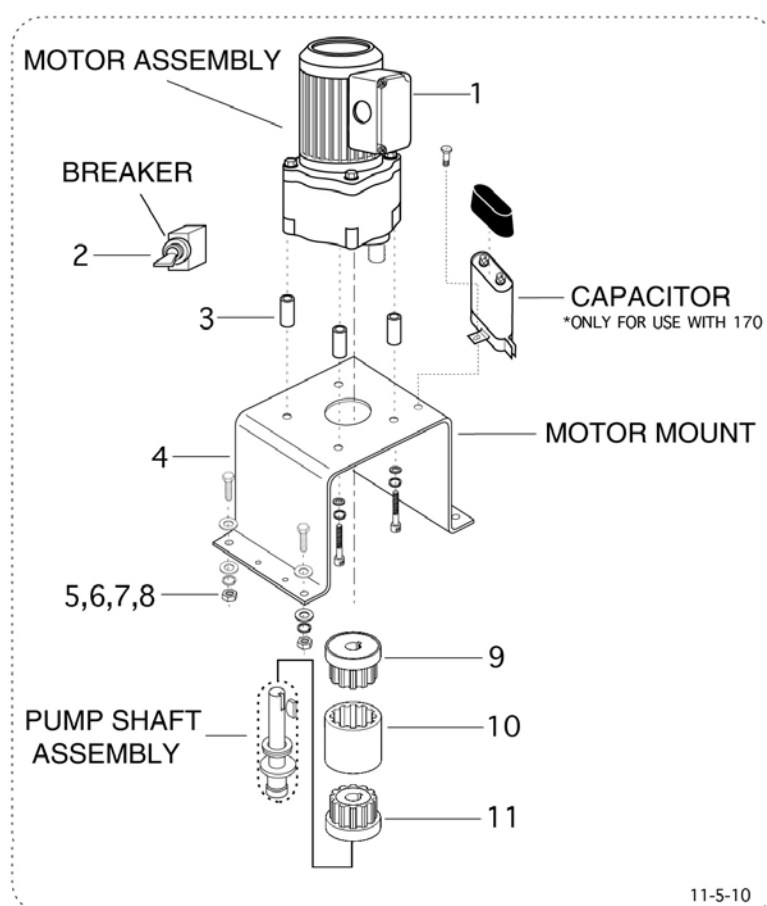
Note: Motor Group includes motor assembly, capacitor, pump "On/Off" breaker and motor mount. Motor assembly is the basic motor, intended for replacement of existing motor only.



170 RPM Motor Group (P/N 73278-98)

Item No.	Part No.	Description	Qty.
1	73012-8	170 rpm Motor	1
2	12055A-15	2.5 AMP Breaker	1
3	14471-14	Spacer	4
4	70710	Motor Mount	1
5	14431-GDN	HH Bolt, 1/4-20 X 1.5"	4
6	14456-GA	1/4" flat washer	8
7	14451-GA	1/4" lock washer	8
8	14441-GA	1/4-20 Hex Nut	4
9	18425-3/4	40 EZ 3/4" Bore w/ Keyway	1
10	18425-9C	Gear Grip Sleeve, Black	1
11	18425-1/2	40 EZ 1/2" Bore w/ Keyway	1

* Common motor breakers. Contact factory for system compatibility.

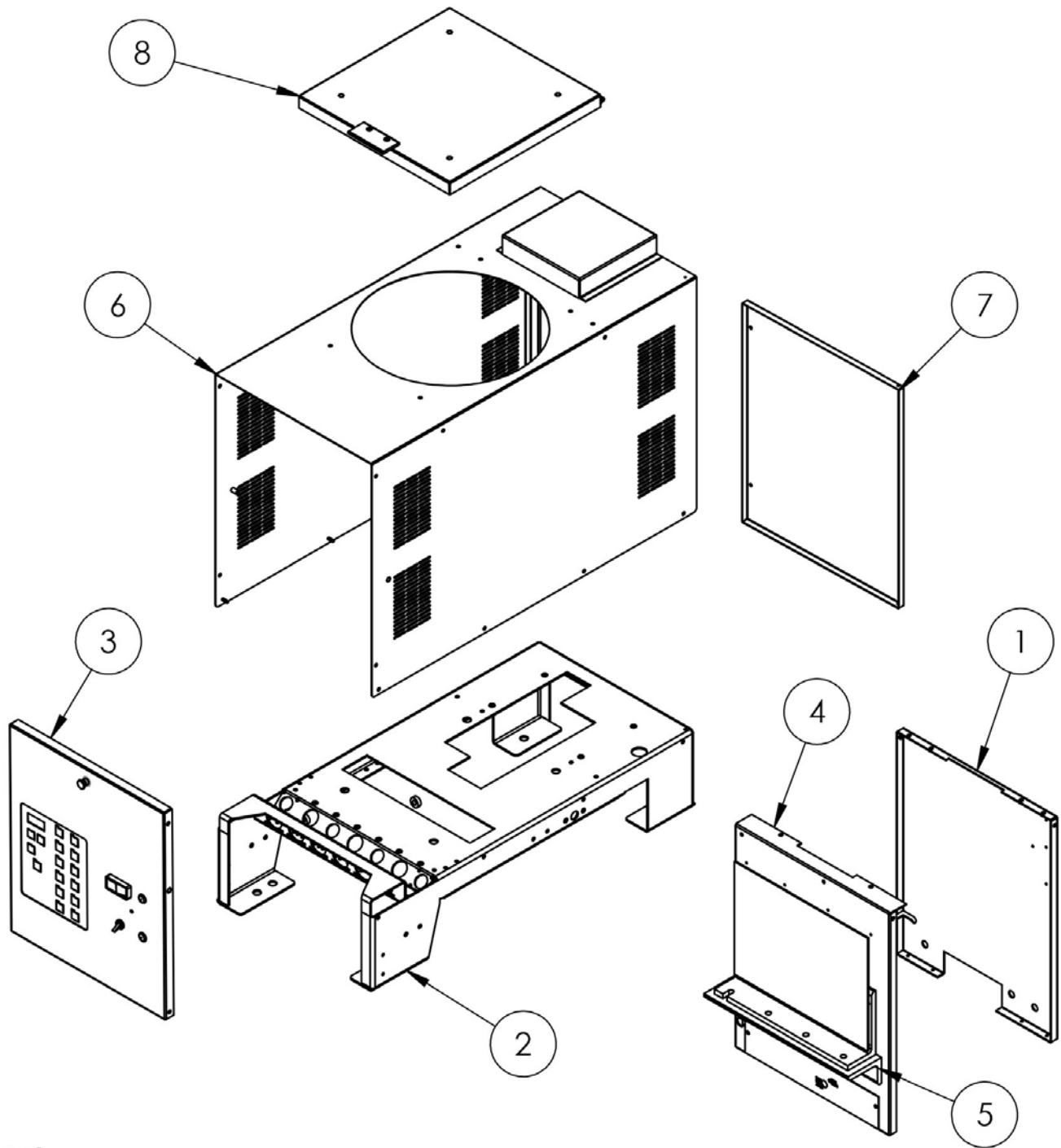


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Exterior Panel and Controls Parts List AP50

Item No.	Part No.	Description	Qty.
	70350	Heater Access Cover	1
1	70343-1	Baffle	1
2	70338-1	Chassis	1
3	112557	Control Panel & Front Door	1
4	70368-3	Electrical Panel	1
5	70586-39	Power Board Mount	1
6	70584-3	Housing	1
7	70341-1	Rear Panel	1
8	73283-1	Tank Lid Cover	1

Component Illustration: Exterior Panels & Controls AP50

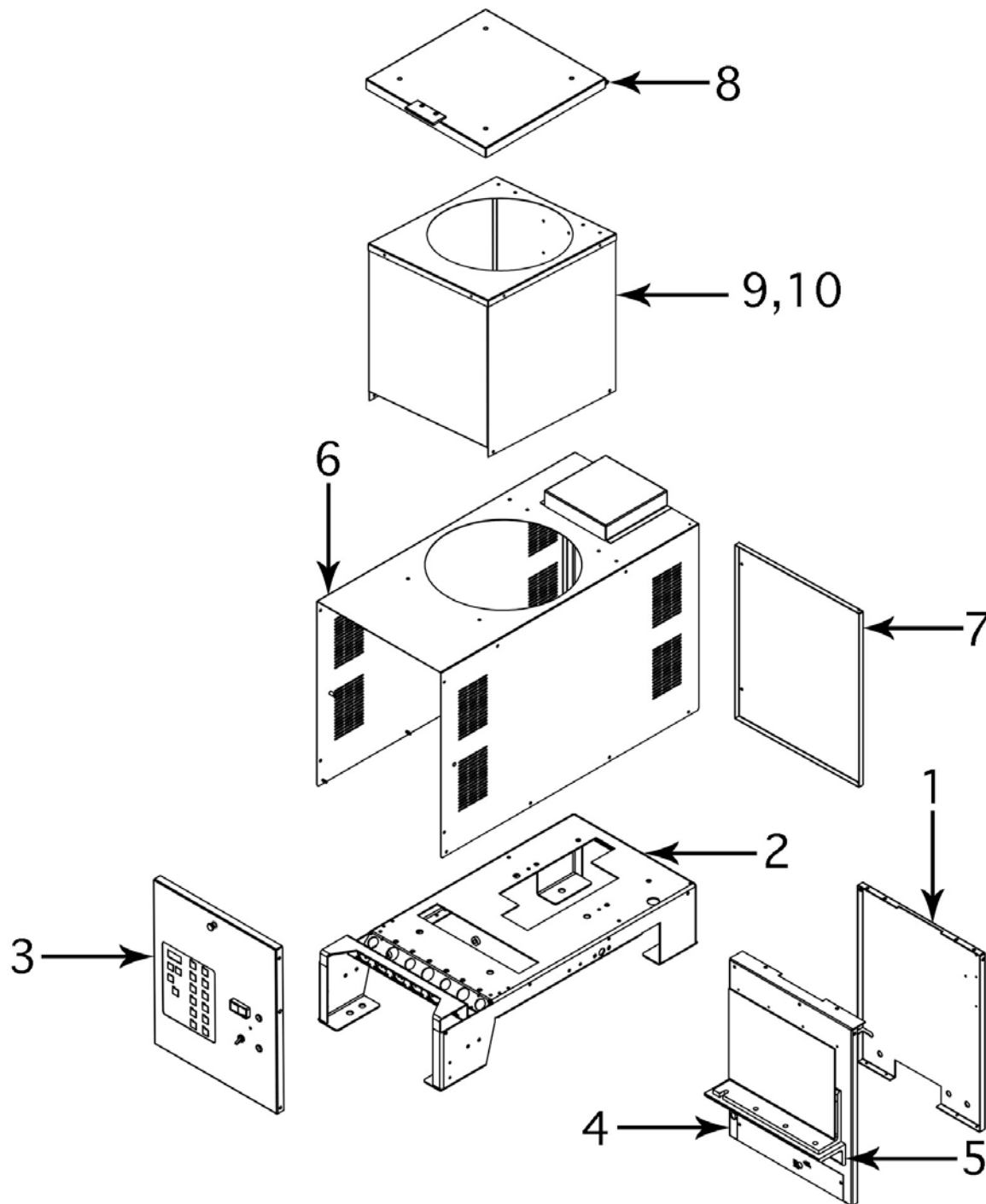


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Exterior Panel and Controls Parts List AP100

Item No.	Part No.	Description	Qty.
	70350	Heater Access Cover	1
1	70343-1	Baffle	1
2	70338-1	Chassis	1
3	70339-87	Control Panel & Front Door	1
4	70368-3	Electrical Panel	1
5	70586-39	Power Board Mount	1
6	70584-3	Housing	1
7	70341-1	Rear Panel	1
8	73283-1	Tank Lid Cover	1
9	70357-1	Housing Extension	1
10	70357-2	Housing Extension Cover	1

Component Illustration: Exterior Panels & Controls AP100



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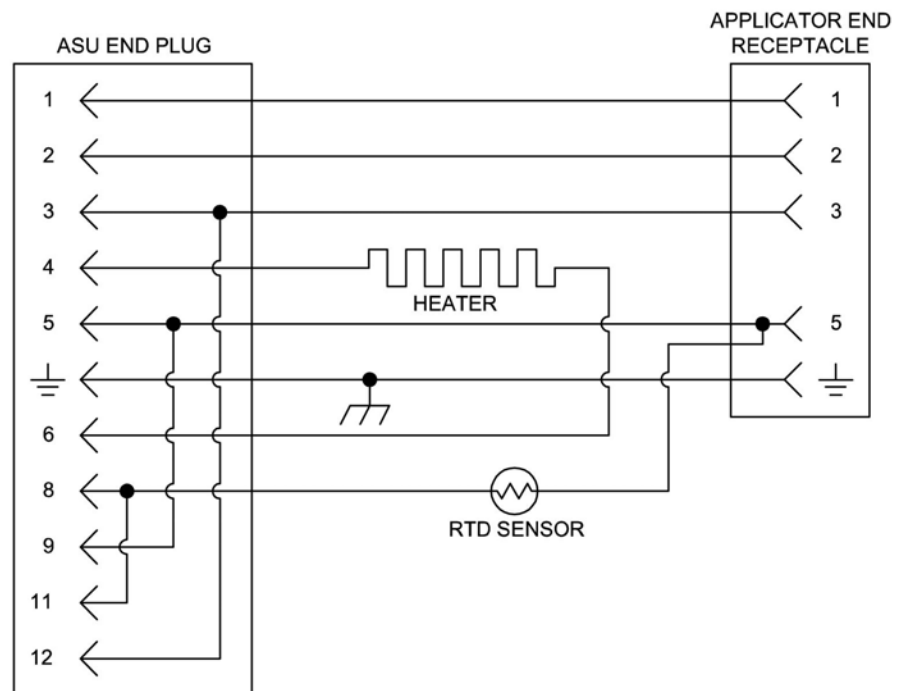
Chapter 10

SYSTEM SCHEMATICS & ENGINEERING DRAWINGS

System Schematics & Engineering Drawings

FUNCTION:

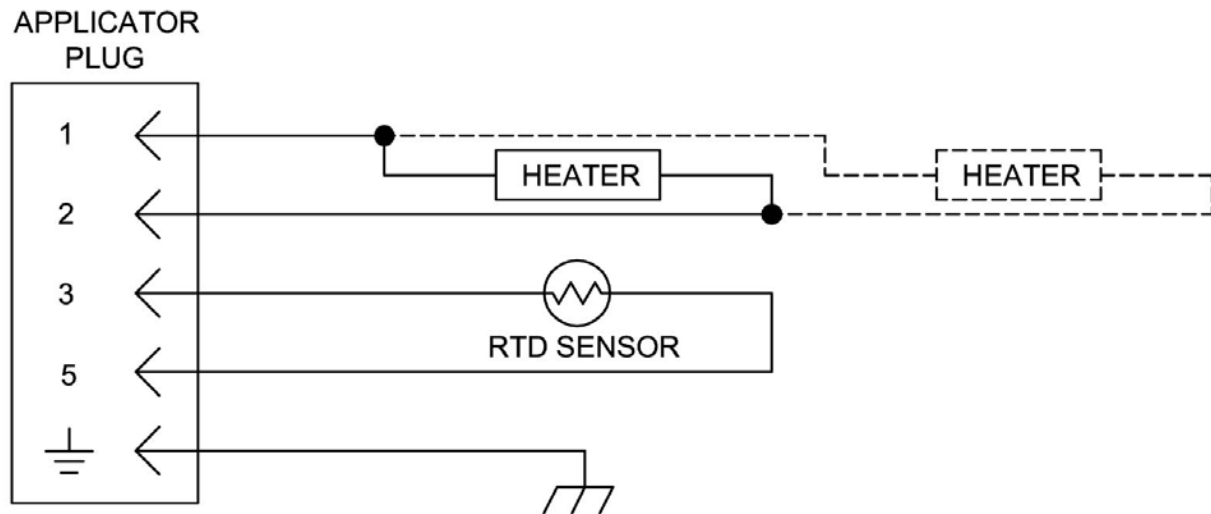
APPL. HEATER
 APPL. HEATER
 APPL. SENSOR
 HOSE HEATER
 HOSE/APPL. SENSOR
 GROUND
 HOSE HEATER
 HOSE SENSOR
 SENSOR JUMPER
 SENSOR JUMPER
 SENSOR JUMPER



SCHEMATIC, ASTRO PACKAGING HOSE
WITH 120 OHM Ni SENSOR

4-5-12

System Schematics & Engineering Drawings



SCHEMATIC, ASTRO PACKAGING APPLICATOR
WITH 120 OHM Ni SENSOR

4-S-12

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Warranty

- A. Astro Packaging warrants its products, when operated and maintained in accordance with Astro Packaging recommended procedures, are free of defects in material and workmanship during the periods indicated below commencing with the date the product is placed in service.

Product	Warranty Period
1. Tank heater (including entire tank when heater is cast into tank)	5 years or 10,000 hours of use, whichever occurs first
2. Melt unit (unless specified below); pattern controller; head driver	1 year or 2000 hours of use whichever comes first
3. Stationary hose; automatic electric head; standard pail unloader; standard pail unloader; standard accessory purchased with a system	1 year or 2000 hours of use whichever comes first
4. Manual hose; handgun; Astromini; any butyl system; any PUR system (including hose, gun, or head used with PUR); any spare or replacement components; industrial heated hose; nozzle; nozzle bar	6 months or 1,000 hours of use, whichever comes first
5. Rebuilt equipment	90 days or 500 hours of use, whichever comes first

B. The sole liability of Astro Packaging and exclusive remedy extended to any Astro Packaging customer shall be limited to replacing or repairing, at the option of Astro Packaging, any product returned under the terms of this warranty. Labor and related expenses incurred to install replacement or repaired parts are not covered by this warranty.

C. Astro Packaging is not responsible for repair or replacement of any product that has been subject to abuse, misuse, alteration, accident, or negligent use, nor for repairs made by an unauthorized person or with parts other than those provided by Astro Packaging.

D. Astro Packaging assumes no responsibility for the performance of adhesives or other materials used with its products.

E. The warranty for a product repaired or replaced under this warranty shall continue in effect for the remainder of the original warranty period, or for ninety (90) days following the day of shipment by Astro Packaging of the repaired or replaced product, whichever period is longer.

F. No warranty is made with respect to custom products or products developed, designed and manufactured to customer specifications, except as specifically stated in writing by Astro Packaging.

G. Astro Packaging is responsible only for payment of shipping charges for delivery of repaired or replaced product, via the least expensive means of transport, to customer or an authorized Sales and Service Center in the Continental United States only. Payment for shipment to Astro Packaging or an authorized Sales or Service Center for evaluation, repair or replacement is the responsibility of the customer.

H. For service under this warranty, contact Astro Packaging or the Authorized Representative which the product was purchased.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY EXPRESSED OR IMPLIED, INCLUDING THE WARRANTY OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE



Equipment Record

Record the information below on all equipment received and retain for your records.

(Systems, melt unit, hose, guns, heads, pattern controllers, drivers, etc)

Products were purchased from: _____
Astro Packaging Authorized Sales and Service Center

Product Model/Description _____ Serial No. _____

Product Part Number _____ Order No. _____

Date Received _____ Start-Up Date _____ Invoice No. _____

Product Model/Description _____ Serial No. _____

Product Part Number _____ Order No. _____

Date Received _____ Start-Up Date _____ Invoice No. _____

Product Model/Description _____ Serial No. _____

Product Part Number _____ Order No. _____

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