HENNY PENNY

Engineered to Last

Henny Penny

Humidified Holding Cabinets

With Automatic Water Fill

Model AHC-993

Model AHC-990

TECHNICAL MANUAL

TABLE OF CONTENTS

SECTION 1. TROUBLESHOOTING

1-1. INTRODUCTION

This section provides troubleshooting information in the form of an easy to read table.

If a problem occurs during the first operation of a cabinet, recheck the installation per the Installation Section of the Operator's Manual

Before troubleshooting, always recheck the operation procedures in the Operator's Manual.

1-2. SAFETY

Where information is of particular importance or is safety related, the words NOTICE, CAUTION, or WARNING are used. Their usage is described below.

SAFETY ALERT SYMBOL is used with DANGER, WARNING, or CAUTION which indicates a personal injury type hazard.

NOTICE is used to highlight especially important information.

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

CAUTION used with the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

1-3. TROUBLESHOOTING

To isolate a malfunction, proceed as follows:

1. Clearly define the problem or symptom and when it occurs.
2. Locate the problem in the troubleshooting table.
3. Review all possible causes. Then, one at a time work through the list of corrections until problem is solved.

If maintenance procedures are not followed correctly, injuries and/or property damage could result.

1-3. TROUBLESHOOTING (continued)

Problem	Cause	Correction
	OPERATION	
A. Product not holding temperature	• Doors left open	• Keep doors closed except to load and serve product
	• Product held too long	• Hold product only for recommended times
	• Control temperature set too low	• Increase air temperature setpoint (SP-3) in Special Program Mode
	• Bad air heater	• Check heaters and replace if bad See Tech Mode items 10 and 16
	• Blower not working	• Check blower and replace if bad See Tech Mode item 18
	• Bad air heater, or blower relays	• Replace relay See Tech Mode items 10 and 16
	• Bad high limit	• Check high limit and replace if bad
	• Low or improper voltage	• Compare receptacle voltage to data plate voltage
	• Door gasket torn or worn	• Replace bad door gaskets
	• Air probe faulty, open (“E-6A”), or shorted (“E-6B”)	• Ohm out the probe and replace if necessary
B. Cabinet steaming or product soggy	• Humidity setpoint too high	• Decrease humidity setpoint (SP-4) in Special Program Mode
	• Water heater probe faulty, open (“E-12A”), or closed (“E-12B”)	• Ohm out the probe and replace if necessary
	• Bad humidity sensor (“E-17”)	• Replace humidity sensor
	• Relay stuck closed	• Replace relay
	• Vent stuck closed (“E-80”)	• Bad vent motor - replace • Bad vent motor relay - replace- See Tech Mode item 18 • Check alignment and condition of mechanical vent parts • Vent acorn nuts too tight, loosen if necessary

1-3. TROUBLESHOOTING (continued)

Problem	Cause	Correction
	OPERATION (Continued)	
C. Product dry	• Bad float switch	• Replace float switch
	• Bad water heater high limit	• Replace high limit
	• Bad water heater	• Check heater and replace if bad; see Tech Mode item 18
	• Humidity setpoint too low	• Increase humidity setpoint (SP-4) in Special Program Mode
	• No water in pan	• Turn water supply on • Adjust flow control valve • Check solenoid valve and relay
	• Vent stuck open ("E-80")	• Bad vent motor - replace; see Tech Mode item 18 • Bad vent motor relay - replace • Check alignment and condition of mechanical vent parts
	HEATING SYSTEM	
A. Unit not heating	• Bad control board	• Replace control board
	• Bad high limit	• Check high limit; replace if bad
	• Bad air heater or blower relays	• Replace relay
	• Bad air heater	• Check heaters and replace if bad; see Tech Mode item 18
	• Faulty wiring	• Check for loose connections or broken wires
B. Unit not reaching set temperature	• Blower not working.	• Check Blower and replace if bad; see Tech Mode item 18
	• Bad air heater	• Check heaters and replace if bad; see Tech Mode item 18
	• Bad air heater, or blower relays	• Replace relay
	• Doors left open	• Keep doors closed except to load and serve product
	• Door gasket torn or worn	• Replace bad door gaskets

1-3. TROUBLESHOOTING (continued)

Problem	Cause	Correction
HEATING SYSTEM (Continued)		
C. Unit Overheating ("E-5")	• Blower not working	• Check blower and replace if bad See Tech Mode item 18
	• Bad control board	• Replace control board
	• Relay stuck closed	• Replace relay

1-4. ERROR CODES AND WARNINGS

The display shows the following error codes and warnings when a fault is detected, along with an alarm sound. Both the heat and humidity systems shut down, except when specified otherwise.

Display	Cause	Panel Board Correction
"E-4 CPU TOO HOT"	• Control board too hot; unit overheating or louvers clogged	• Turn switch to OFF position, then back to ON; if display still shows "E-4", PC board is getting too hot; clean louvers and check cooling fan; if cooling fan is not working, have it replaced; once panel cools down, the controls should return to normal; if "E-4" persists, have the PC board replaced
"E-5 AIR TEMP TOO HOT"	• Faulty relay, PC board, or air probe	• Turn switch to OFF position, then back to ON; if display shows "E-5", heating circuits and temperature probe should be checked; once the unit cools down, the controls should return to normal; if "E-5" persists, have PC board replaced
"E-54A CPU TEMP SENSOR OPEN"	• Faulty PC board	• Turn switch to OFF position, then back to ON; if display shows "E-54A", the control should be re-initialized (see Programming Section); if the error code persists, have PC board replaced
"E-54B CPU TEMP SENSOR SHORTED"	• Faulty PC board	• Turn switch to OFF position, then back to ON; if display shows "E-54B", the control should be re-initialized (see Programming Section); if the error code persists, have PC board replaced
"E-6A AIR TEMP SENSOR FAILED OPEN"	• Faulty air probe	• Turn switch to OFF position, then back to ON; if the display shows "E-6", the temperature probe should be checked; once the temperature probe is repaired, or replaced, the controls should return to normal; if "E-6" persists, have the PC board replaced

1-4. ERROR CODES AND WARNINGS (Continued)

Display	Cause	Panel Board Correction
"E-6B AIR TEMP SENSOR FAILED SHORTED"	• Faulty air temperature probe	• Turn switch to OFF position, then back to ON; if the display shows "E-6", the temperature probe should be checked; once the temperature probe is repaired, or replaced, the controls should return to normal; if "E-6"persists, have PC board replaced
"E-12A WATER HEATER SENSOR FAILED OPEN"	• Faulty water heater probe	• Turn switch to OFF position, then back to ON; if the display shows "E-12A", the water heater should be checked and repaired or replaced (the water heater probe is built into the water heater); the controls should return to normal; if "E-12A" persists, have PC board replaced
"E-12B WATER HEATER SENSOR FAILED CLOSED"	• Faulty water heater probe	• Turn switch to OFF position, then back to ON; if the display shows "E-12B", the water heater should be checked and repaired or replaced (the water heater probe is built into the water heater); the controls should return to normal; if "E-12B" persists, have PC board replaced
"E-17 HUMIDITY SENSOR FAILED"	• Faulty humidity sensor	• Turn switch to OFF position, then back to ON; if the display shows "E-17", the humidity sensor should be checked; once the humidity sensor is repaired, or replaced, the controls should return to normal; if "E-17" persists, have PC board replaced
"E-41 SYSTEM DATA LOST"	• Memory scrambled	• Turn switch to OFF position, then back to ON; if the display shows "E-41", the control should be re-initialized (see Programming Section); if "E-41"persists, have PC board replaced

A humidity error only shuts down the humidity system. If a humidity error occurs, and you want to use the cabinet without humidity, turn the humidity off by following the directions for SP-4, Humidity Setpoint, in Special Programming Section of this manual. Once the setpoint is off, the alarm stops, but the error code shows in display. (Includes "E-12A", "E-12B", and "E-17").

1-4. ERROR CODES AND WARNINGS (Continued)

Display	Cause	Panel Board Correction
"E-46 DATA SAVE FAILED"	• Memory scrambled	• Turn switch to OFF position, then back to ON; if the display shows "E-46", the control should be re-initialized (see Programming Section); if "E-46"persists, have PC board replaced
"E-80 VENT STUCK OR BAD SWITCH"	• Vent on rear of module stuck or faulty vent activation switch	• Check vent on rear of module for obstructions, or have vent activation switch replaced • Vent acorn nuts too tight; loosen if necessary
"WATER LEVEL LOW, PLEASE ADD WATER" (Appears only if fill option is set to Manual)	• Water pan low on water or empty	• Fill water pan, in bottom of unit, to the maximum water fill mark; this warning won't shut down the heat or humidity
"WATER PAN NOT FILLING, CHECK WATER SUPPLY" (Appears only if fill option is set to Auto)	• Water supply turned off • Water flow reduced • Fill solenoid relay bad • Fill solenoid bad	• Turn water supply on • Adjust flow control valve • Check solenoid relay • Check solenoid valve
"CALL SERVICE, WATER HEATER FAILURE"	• Faulty relay or heater	• Check heater relay and heater
"PURGE"	Unit is purging humidity	No correcting action needed. If message continues, contact the Henny Penny Technical Support Line at 1-800-417-8405

1-5. INFO MODE

This mode records historic information on the holding cabinet and operator performance, which could help in troubleshooting a problem.

This mode records historic information on the unit and operator performance. Press PROG and INFO at the same time and "*INFO MODE*" shows on display. Press PROG or INFO to access the steps and press DOWN to view the statistics within each step.

Information Mode is intended for technical use, but the operator can view the following information:

1. Error Log - last 10 errors and time they occurred
2. Power Up Log - time of last 10 power-ups
3. Outputs/Inputs - shows the state of unit's inputs and outputs
   a. OUT V_S_F_W_A_ (vent motor, fill solenoid valve, fan, water heater, air heater, relay order from left to right)
   b. AMPS V_S_F_W_A_
   c. NC/GD V_S_F_W_A_ (no connect/ground detection on outputs to relays)
   d. All outputs and inputs V_S_F_W_A_ P_ (power switch input) E_(exhaust vent switch input) F_ (float switch input)
4. Vent - open or closed
5. CPU temperature
6. Cabinet air temperature
7. Water heater temperature
8. Food probe temperature
9. Humidity counts value
10. Humidity value
11. Water heater conditions
12. Analog inputs

1. E-LOG (error code log)
Press DOWN and "A. (time) *NOW*" shows in display.
This is the present date and time.

Press DOWN and if a error was recorded, "B. (date, time, and error code information)" shows in display. This is the latest error code that the controls recorded.

Press DOWN and the next latest error code information can be seen. Up to 10 error codes (B to K) can be stored in the E-LOG section.

1-5. INFO MODE (Continued)

Press  to continue to P-LOG.

2. P-LOG (power-up log)
Press ▽ DOWN and "A. (time) *NOW*" shows in display.
This is the present date and time.

Press ▽ DOWN and the latest power-up is shown, "B. (date, time,) PWR-UP".

Press ▽ DOWN and the next latest power-up date is shown. Up to 10 power-ups (B to K) can be stored in the P-LOG section.

Press  to continue onto the Outputs/Inputs.

3. OUTPUTS/INPUTS
This mode displays the status of components and inputs. If the input or output signal is detected, an identifying letter is displayed (see below). If the signal is not detected, "_" is displayed. Press ▽ DOWN to view the following:

a. "3. OUT V_S_F_W_A_" shows in the display. If the output is on, "*" shows beside the output letter. Ex: "V*". If the control senses a problem with the output, "*" flashes.

b. "AMPS V_S_F_W_A_" shows in the display. A checkmark ("√") beside the letter indicates normal amps. A flashing "X" beside the letter means a problem exists.

c. "NC/GD V_S_F_W_A_" shows in the display. This monitors a possible problem with the relays on the output PC board. A checkmark ("√") beside the letter indicates means everything on the output PC board is good. A flashing "X" beside the letter means a problem exists.

d. V_S_F_W_A_P_E_F_ shows in the display. If the output or input signal is detected, "*" shows beside the letter. Ex: "V*". If the control senses a problem with the output, "*" flashes.

Press  to continue to VENT.

4. VENT
This indicates whether the vent is open or closed.

Press  to continue to CPU TMP.

1-5. INFO MODE (Continued)

5. CPU TMP
This step shows the present PC board temperature.

Press  to continue to the Cabinet Air TMP.

6. CABINET AIR TMP
This step shows the present air temperature inside the cabinet.

Press  to continue to the Water Heater TMP.

7. WATER HEATER TMP
This step shows the present water heater temperature.

Press  to continue to Food TMP.

8. FOOD TMP
This step shows the present food probe temperature, if used.

Press  to continue to Humidity Counts Value.

9. HUMIDITY COUNTS VALUE
Factory use only!

Press  to continue to the Humidity Value.

10. HUMIDITY VALUE
This step shows the present humidity level inside the cabinet.

Press  to continue to the Water Heater Condition.

11. WATER HEATER CONDITION
This step shows water heater condition as GOOD or BAD.

Press  to continue to the Analog Inputs.

12. ANALOG INPUTS
This step displays the present status of any channel of the controller's a to d converter. This feature may be useful to a technician troubleshooting a problem with the controller.

The displayed value can be toggled between volts and bits by pressing  . If the displayed value has a decimal point, it is voltage (0 to 5 VDC). If no decimal point is shown, value is a-to-d bits (0 - 4095).

Press  and  to exit.

SECTION 2. LEVEL 2 PROGRAMMING

2-1. INTRODUCTION

The Tech Mode and Stats Mode in the Level 2 Programming, have information that could help in troubleshooting a problem with the unit.

2-2. TECH MODE

Press PROG and hold until "L-2 LEVEL 2", followed by, "CLOCK SET", shows in display.

Press PROG 3 times and "TECH", followed by, "ENTER CODE" shows in display.

Enter code,  to access the following items: (Use hidden buttons, see Section 3-3)

T-1 Software
T-2 Cabinet version
T-3 Push button test
T-4 All on display test
T-5 Segments test
T-6 Digits test
T-7 Decimal points test
T-8 LED test
T-9 Factory Use
T-10 Air temperature - user calibration/offset/highest value
T-11 Factory Use
T-12 Water heater temperature - user calibration/offset/highest value
T-13 Humidity - circuit calibration
T-14 Humidity sensor – calibration/offset; specific value sent with each humidity sensor
T-15 Humidity- user calibration/offset/highest value
T-16 CPU° - control temperature - highest value
T-17 Factory Use
T-18 Outputs/Inputs; on outputs steps use the four hidden buttons [1-4] to toggle on outputs; [1] - vent motor, [2] - auto fill solenoid valve, [3] - circulation fan, [4] - water heater, [5] - air heater
T-19 Total init – initialization of programming areas and statistics

PROG moves you forward through the above selections and INFO moves you backwards through the selections.

2-2. TECH MODE (Continued)

T-1: Software
This section shows "PN/ID/SRL"

Press and hold the  button. The Henny Penny EPROM part number is displayed.

Press and hold the  button. The customer ID (i.e. KFC) is displayed.

Press and hold the  button. The software revision level is displayed.

T-2: Cabinet Version
This section shows the model number, e.i. AHC-993.

T3: Push Button Test
Press any button on the control and a digital display feedback confirms the button is working.

T4: All On Display Test
Press any of the product buttons and every LED on the 16 digit display lights.

T5: Segments Test
Repeatedly pressing any product button lights one segments in every one of the 16 digit displays.

T6: Digits Test
Repeatedly pressing any product button lights all segments in one of the 16 digital displays. (Scrolls though all 16.)

T7: Decimal Points Test
Repeatedly pressing any product button lights a decimal point (DP) in one of the 16 digital displays. (Scrolls though all 16.)

T8: LED'S Test
Repeatedly pressing any product button lights individual LEDs. (Scrolls though all LEDs.)

T9: Air Temperature - Circuit Calibration
Factory use.

2-2. TECH MODE (Continued)

T10: Air Temperature - Calibration/Offset/Highest
This is a user calibration to make sure the display shows the actual air temperature.

Press and hold  and use 

to set the display to match the actual temperature. (+/-15° F)

Press and hold  to change the amount of the offset.(+/-15° F)

Press and hold  to view the highest air temperature recorded.

Press 

to reset highest temperature.

T11: Water Heater Temperature - Circuit Calibration
Factory use.

T12: Water Heater Temperature - Calibration/Offset/ Highest
This is a user calibration to make sure the display shows the actual water heater temperature.

Press and hold  and use 

to set the display to match the actual temperature. (+/-15° F)

Press and hold  to change the amount of the offset.(+/-15° F)

Press and hold  to view the highest air temperature recorded.

Press 

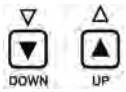
to reset highest temperature.

T13: Humidity - Circuit Calibration
See Section 3-3 on Humidity Sensor Calibration and Replacement.

T14: Humidity Sensor - Calibration/Offset
This is a specific value that is sent with the humidity sensor, when necessary. Otherwise, this value should be 0.

2-2. TECH MODE (Continued)

T15: Humidity - Calibration/Offset/Highest
This is a user calibration to make sure the display shows the actual humidity inside the cabinet.

Press and hold  and use 

to set the display to match the actual humidity. (0 to 100%)

Press and hold  to change the amount of the offset.(-0 to -99)

Press and hold  to view the highest humidity recorded.

Press 

to reset highest humidity.

T16: CPU° - Control Temperature - Highest Value
Press  to show the highest temperature to which the control board was exposed.

T17: View ADC Channel
Factory use.

T18: Outputs/Inputs
The following components can be tested:

 toggles the vent motor off and on.

 toggles the fill solenoid valve off and on.

 toggles the cooling fan off and on.

 toggles the water heater off and on.

 toggles the air heaters off and on.

T19: Total Initialization
This completely resets any accumulated information and changed settings in the controls. Contact Henny Penny before completing this step.

2-3. STATS MODE

Press PROG and hold until "L-2 LEVEL 2", followed by, "CLOCK SET", shows in display.

Press PROG 4 times and "STATS", followed by, "ENTER CODE" shows in display.

Enter code,  to access the following items: (Use hidden buttons, see Section 3-3.)

ST-1 Power live hours
ST-2 Power 'on' hours
ST-3 Power-ups count
ST-4 Errors count
ST-5 Air heat 'on' hours
ST-6 Water heater 'on' hours
ST-7 Circulation fan 'on' hours
ST-8 Water solenoid on hours
ST-9 Solenoid cycle count
ST-10 Longest solenoid on time; max.=5 minutes
ST-11 Vent motor
ST-12 Highest air temperature
ST-13 Highest water heater temperature
ST-14 Factory Use
ST-15 Highest humidity value
ST-16 Highest CPU temperature
ST-17 Water heater (too hot) cycle count
ST-18 Sys ram – fade count
ST-19 Hold ram – fade count
ST-20 Stat ram – fade count
ST-21 Ram data error count
ST-22 Data total loss count
ST-23 User init's count
ST-24 Auto init's count
ST-25 Error log
ST-26 Power-up log
ST-27 Factory Use
ST-28 Reset all stats

PROG moves you forward through the above selections and  moves you backwards through the selections.

2-3. STATS MODE (Continued)

ST-1: Power Live Hours
This section shows the number of hours the control has been on.

ST-2: Power On Hours
This section shows the number of hours the control has been on.

ST-3: Power Ups Count
This section shows the number of times the control has been turned on.

ST-4: Errors Count
This section shows the total number of all errors (displayed on control) that have occurred with the unit.

ST-5: Air Heat On Hours
This section shows the number of hours the air heaters have been on.

ST-6: Water Heater On Hours
This section shows the number of hours the water heater has been on.

ST-7: Circulation Fan On Hours
This section shows the number of hours the cooling fan has been on.

ST-8: Water Solenoid On Hours
Shows the number of hours the solenoid has been on.

ST-9: Solenoid Cycle Count
Shows the number of times the solenoid has been turned on.

ST-10: Longest Solenoid 'On' time. Maximum 5 minutes.
Shows the longest the solenoid has been on at any one time, to a maximum of 5 minutes.

ST-11: Vent Motor On Hours
This section shows the number of hours the vent motor has been on.

ST-12: Highest Air Temperature
This section shows highest air temperature sensed by the temperature probe.

2-3. STATS MODE (Continued)

ST-13: Highest Water Heater Temperature
This section shows the highest water heater temperature, sensed by the water heater temperature sensor.

ST-14: Highest Food Temperature
Factory use.

ST-15: Highest Humidity Value
This section shows the highest humidity value sensed by the humidity sensor.

ST-16: Highest CPU Temperature
This section shows the highest control board temperature sensed by the control.

ST-17: Water heater (too hot) cycle count
Shows the number of times the water heater has gotten too hot

ST-18: System Ram - Fade Count
This section shows the number of times the system memory has been lost during power up. Ex: °F or °C, or speaker volume.

ST-19: Hold Ram - Fade Count
This section shows the number of times the hold memory has been lost during a power up. May be lost at a power up, after a power loss, during a holding cycle.

ST-20: Stat Ram - Fade Count
This section shows the number of times the stats memory has been lost during power up. The information in the Stats Mode is updated every two hours, and this count lets you know that the updates were lost.

ST-21: Ram Data Error Count
This section shows the number of times the data was lost while operating, not during power up. (Should be a low number.)

ST-22: Data Total Loss Count
This section shows the number of times the data stored in the Eprom has been lost. Should see an "E-41" error code when this occurs.

ST-23: User Init's Count
This section shows the number of times the operator has initialized the controls.

2-3. STATS MODE (Continued)

ST-24: Auto Init's Count
This section shows the number of times the controls have initialized itself.

ST-25: Error Log
This section records the last 10 errors and the time they occurred. Press ▽ DOWN ▲ UP to view the log.

ST-26: Power Up Log
This section records the last 10 power ups and when they occurred. Press ▽ DOWN ▲ UP to view the log.

ST-27: Heat Up Log
Factory use.

ST-28: Resets All Stats
This section allows the user to reset all data stored in the Stats Mode. Press and hold ▽ DOWN for 3 seconds.

2-4. DATA LOGGING AND MANUFACTURING MODE

The Data Logging and Manufacturing Mode are mainly for Henny Penny use only. For more information on these modes, contact the Service Department at 1-800-417- 8405, or 1-937-456-8405.

SECTION 3. MAINTENANCE

3-1. INTRODUCTION

This section provides procedures for the checkout and replacement of the various parts used within the merchandiser. Before replacing any parts, refer to the Troubleshooting Section. It will aid you in determining the cause of the malfunction.

3-2. MAINTENANCE HINTS

1. You may want to use a multimeter to check the electric components.
2. When the manual refers to the circuit being closed, the multimeter should read zero unless otherwise noted.
3. When the manual refers to the circuit being open, the multimeter reads infinity.

3-3. HUMIDITY SENSOR CALIBRATION AND REPLACEMENT

The humidity sensor relays the cabinet humidity to the controls. If it becomes faulty, "E-17", then "HUMIDITY SENSOR FAILED" shows on the display. Replace sensor as follows:

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

Replacement:

1. Open operator side door of unit.

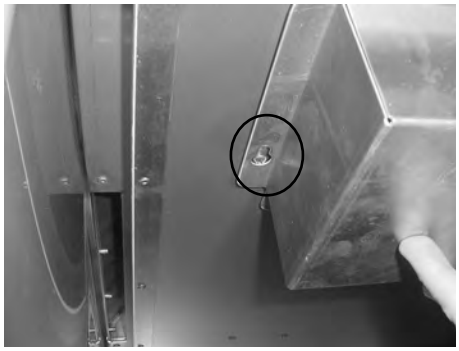


Figure 3-1

2. Using a Phillip's head screwdriver, remove the front screw and loosen the 2 side screws securing the sensor cover. Slide cover towards you and over loosened screws. Figure 3-1.

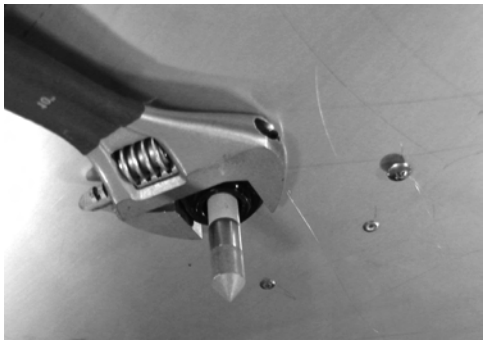


Figure 3-2

3. Using a 1-3/16" wrench, remove nut. Figure 3-2.

3-3. HUMIDITY SENSOR CALIBRATION AND REPLACEMENT (Continued)

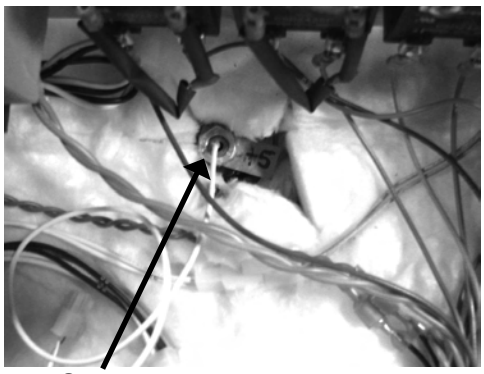


Figure 3-3

4. Using a Phillip's head screwdriver, remove the four screws securing the front panel.

5. Pull panel down, pull connectors from the back of it, and remove panel from unit.

6. Pull the sensor assembly from the top of the cabinet. Figure 3-3.

7. Remove strain relief from old sensor and install on new sensor.

8. Connect wires to control panel and re-install panel. Perform sensor calibration using below instructions before installing sensor cover.

9. After calibration is complete, install cover.

Calibration:

Calibrate the humidity sensor after a sensor or control replacement. A calibration board is supplied with each control kit and humidity sensor kit, but can also be ordered separately under part number 14391.

AHC-993 ONLY (AHC-990 continue onto step 12)

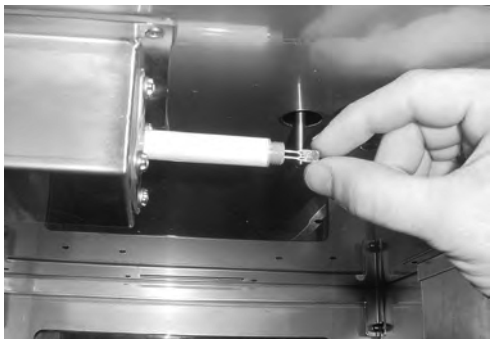


Figure 3-4

1. Unscrew the silver cap from humidity sensor.

2. Remove the two pronged sensor by grasping the edges. Figure 3-4.

NOTICE

Use caution not to touch the flat side, as it will throw the reading off.

4. Push and hold PROG until "Level 2" appears in display.

5. Press PROG to step through the menu until "TECH' is displayed.

3-3. HUMIDITY SENSOR CALIBRATION AND REPLACEMENT (Contd.)

6. Using the timer buttons, (Figure 3-5), enter code of 11221122. (Hidden buttons 1 through 5 left to right)

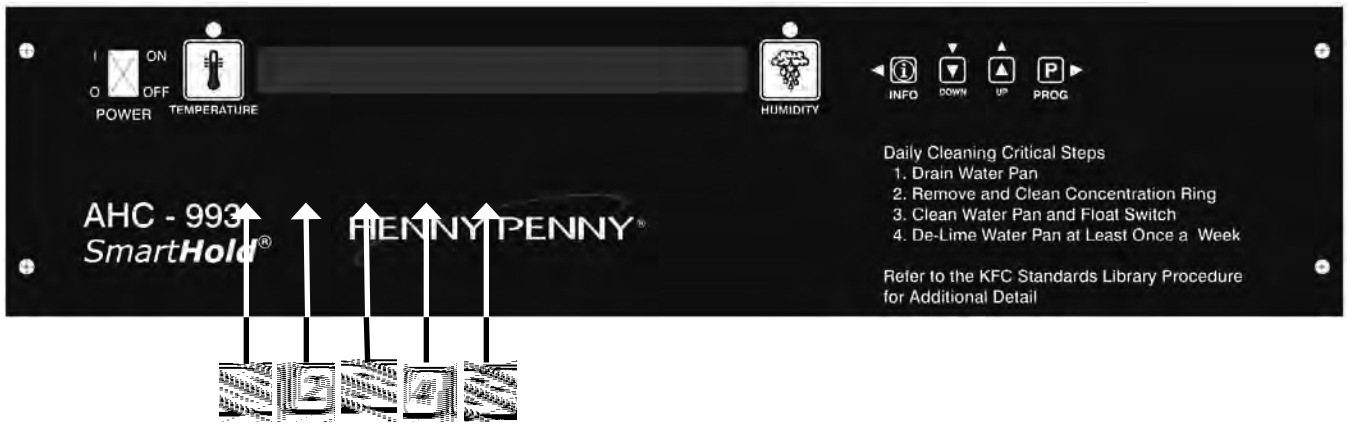


Figure 3-5

Figure 3-6

7. Press PROG to step through menu to "HUMIDITY--CIRCUIT CAL.
8. Insert the two prongs of the calibration board marked 20% into the humidity sensor. Figure 3-6.
9. Press and hold , then press DOWN . Release both buttons. a 4-digit number between 55.00 & 75.00 should display.

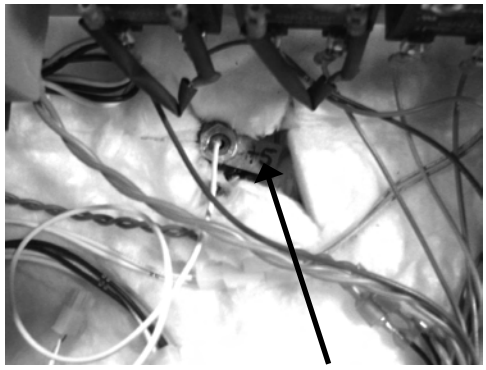


Figure 3-7

10. Reverse calibration board and insert the two prongs marked 80% into humidity sensor.
11. Push and hold then press DOWN . Release both buttons. a 5-digit number around 110.00 & 130.00 should display.
12. Push PROG to "HUMIDITY SENSOR -- CALIB/OFFSET".
13. Find the offset number on the mounting plate of the humidity sensor. Figure 3-7.
14. Push and hold , and press DOWN UP to enter offset value.
15. Press and hold PROG to exit Tech Mode.
16. Remove calibration board from controller and replace with humidity sensor connector.
17. Reinstall controller on unit and unit is ready for operation

3-4. POWER SWITCH REPLACEMENT

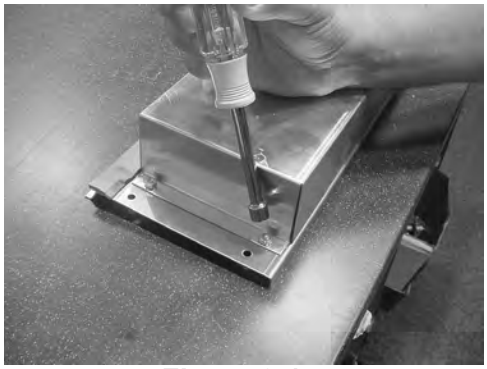


Figure 3-1

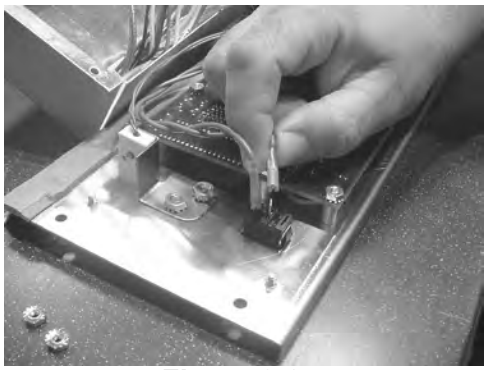


Figure 3-2

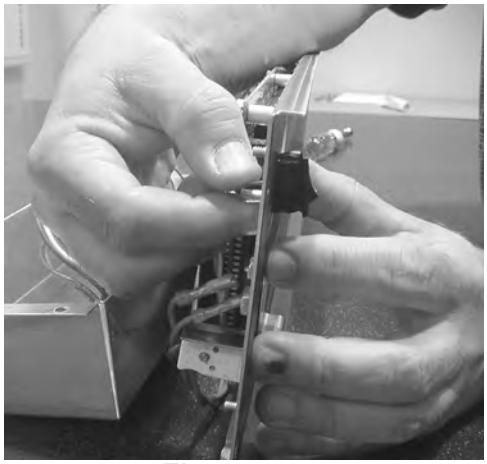


Figure 3-3

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

1. Using a Phillip's head screwdriver, remove the four screws securing the front panel.

2. Pull panel down, pull connectors from the back of it, and remove panel from unit.

3. Using 5/16" socket, remove the 4 nuts securing the control cover and remove cover. Figure 3-1.

4. Pull wires from switch and check across the 2 terminals for continuity. Figure 3-2. With switch in ON position, the circuit should be closed. In the OFF position, the circuit should be open. If the switch is defective, continue with step 5.

5. Pinch the tabs on the rear of the switch and pull the switch through the front of the panel. Figure 3-3.

6. Replace with new switch in reverse order and unit is now ready for use.

3-5. AIR TEMPERATURE PROBE REPLACEMENT

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

Figure 3-1

1. Using a Phillip's head screwdriver, remove the four screws securing the front panel.

2. Pull panel down, pull connectors from the back of it, and remove panel from unit.

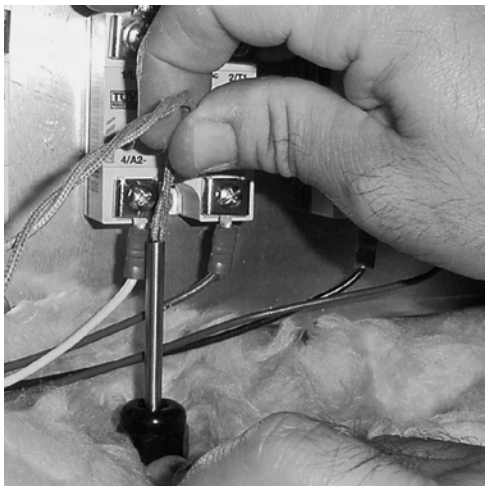


Figure 3-2

3. Unplug the wires to the probe. Figure 3-1.

4. Using a multimeter, or ohmmeter, check across the probe terminals for the correct ohms using the RTD Resistance Chart on the following page. If the probe proves faulty, continue onto step 5.

5. Using a 3/4" wrench, loosen probe strain relief and pull the probe from the unit. Figure 3-2.

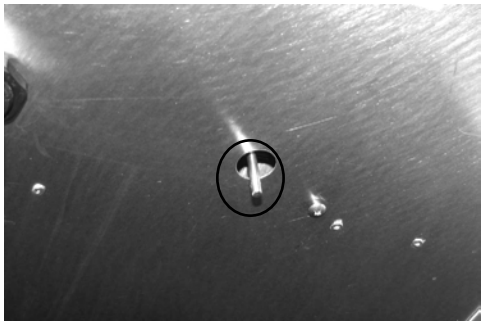


Figure 3-3

6. Slide new probe through the strain relief, extending the probe about 1" (25.4 mm) into the cabinet area. Figure 3-3.

7. Plug probe wires to the unit, tighten the strain relief, and replace front panel. Unit is now ready for use.

RTD Resistance Chart

Temp. F	Temp. C	Resistance Ohms	Temp. F	Temp. C	Resistance Ohms	Temp. F	Temp. C	Resistance Ohms	Temp. F	Temp. C	Resistance Ohms	Temp. F	Temp. C	Resistance Ohms
32	0.00	1000.00	76	24.44	1095.18	120 77	48.89	1189.67	164	73.33	1283.47	208	97.78	1376.57
33	0.56	1002.17	25.00	1097.33		121	49.44	1191.81	165	73.89	1285.59	209	98.33	1378.68
34	1.11	1004.34	78	25.56	1099.49	122	50.00	1193.95	166	74.44	1287.71	210	98.89	1380.79
35	1.67	1006.51	79	26.11	1101.64	123	50.56	1196.09	167	75.00	1289.84	211	99.44	1382.89
36	2.22	1008.68	80	26.67	1103.80	124	51.11	1198.23	168	75.56	1291.96	212	100.00	1385.00
37	2.78	1010.85	81	27.22	1105.95	125	51.67	1200.36	169	76.11	1294.08	213	100.56	1387.11
38	3.33	1013.02	82	27.78	1108.10	126	52.22	1202.50	170	76.67	1296.20	214	101.11	1389.21
39	3.89	1015.18	83	28.33	1110.26	127	52.78	1204.64	171	77.22	1298.32	215	101.67	1391.32
40	4.44	1017.35	84	28.89	1112.41	128	53.33	1206.78	172	77.78	1300.45	216	102.22	1393.42
41	5.00	1019.52	85	29.44	1114.56	129	53.89	1208.91	173	78.33	1302.57	217	102.78	1395.53
42	5.56	1021.69	86	30.00	1116.72	130	54.44	1211.05	174	78.89	1304.69	218	103.33	1397.63
43	6.11	1023.86	87	30.56	1118.87	131	55.00	1213.18	175	79.44	1306.81	219	103.89	1399.74
44	6.67	1026.02	88	31.11	1121.02	132	55.56	1215.32	176	80.00	1308.93	220	104.44	1401.84
45	7.22	1028.19	89	31.67	1123.17	133	56.11	1217.45	177	80.56	1311.05	221	105.00	1403.95
46	7.78	1030.36	90	32.22	1125.32	134	56.67	1219.59	178	81.11	1313.17	222	105.56	1406.05
47	8.33	1032.52	91	32.78	1127.47	135	57.22	1221.72	179	81.67	1315.28	223	106.11	1408.15
48	8.89	1034.69	92	33.33	1129.62	136	57.78	1223.86	180	82.22	1317.40	224	106.67	1410.25
49	9.44	1036.85	93	33.89	1131.77	137	58.33	1225.99	181	82.78	1319.52	225	107.22	1412.36
50	10.00	1039.02	94	34.44	1133.92	138	58.89	1228.12	182	83.33	1321.64	226	107.78	1414.46
51	10.56	1041.18	95	35.00	1136.07	139	59.44	1230.26	183	83.89	1323.76	227	108.33	1416.56
52	11.11	1043.35	96	35.56	1138.22	140	60.00	1232.39	184	84.44	1325.87	228	108.89	1418.66
53	11.67	1045.51	97	36.11	1140.36	141	60.56	1234.52	185	85.00	1327.99	229	109.44	1420.76
54	12.22	1047.67	98	36.67	1142.51	142	61.11	1236.65	186	85.56	1330.10	230	110.00	1422.86
55	12.78	1049.84	99	37.22	1144.66	143	61.67	1238.79	187	86.11	1332.22	231	110.56	1424.96
56	13.33	1052.00	100	37.78	1146.81	144	62.22	1240.92	188	86.67	1334.34	232	111.11	1427.06
57	13.89	1054.16	101	38.33	1148.95	145	62.78	1243.05	189	87.22	1336.45	233	111.67	1429.16
58	14.44	1056.32	102	38.89	1151.10	146	63.33	1245.18	190	87.78	1338.57	234	112.22	1431.26
59	15.00	1058.49	103	39.44	1153.24	147	63.89	1247.31	191	88.33	1340.68	235	112.78	1433.36
60	15.56	1060.65	104	40.00	1155.39	148	64.44	1249.44	192	88.89	1342.79	236	113.33	1435.46
61	16.11	1062.81	105	40.56	1157.53	149	65.00	1251.57	193	89.44	1344.91	237	113.89	1437.55
62	16.67	1064.97	106	41.11	1159.68	150	65.56	1253.70	194	90.00	1347.02	238	114.44	1439.65
63	17.22	1067.13	107	41.67	1161.82	151	66.11	1255.83	195	90.56	1349.13	239	115.00	1441.75
64	17.78	1069.29	108	42.22	1163.97	152	66.67	1257.95	196	91.11	1351.25	240	115.56	1443.85
65	18.33	1071.45	109	42.78	1166.11	153	67.22	1260.08	197	91.67	1353.36	241	116.11	1445.94
66	18.89	1073.61	110	43.33	1168.26	154	67.78	1262.21	198	92.22	1355.47	242	116.67	1448.04
67	19.44	1075.77	111	43.89	1170.40	155	68.33	1264.34	199	92.78	1357.58	243	117.22	1450.13
68	20.00	1077.92	112	44.44	1172.54	156	68.89	1266.46	200	93.33	1359.69	244	117.78	1452.23
69	20.56	1080.08	113	45.00	1174.68	157	69.44	1268.59	201	93.89	1361.80	245	118.33	1454.32
70	21.11	1082.24	114	45.56	1176.83	158	70.00	1270.72	202	94.44	1363.91	246	118.89	1456.42
71	21.67	1084.40	115	46.11	1178.97	159	70.56	1272.84	203	95.00	1366.02	247	119.44	1458.51
72	22.22	1086.55	116	46.67	1181.11	160	71.11	1274.97	204	95.56	1368.13	248	120.00	1460.61
73	22.78	1088.71	117	47.22	1183.25	161	71.67	1277.09	205	96.11	1370.24	249	120.56	1462.70
74	23.33	1090.87	118	47.78	1185.39	162	72.22	1279.22	206	96.67	1372.35	250	121.11	1464.79
75	23.89	1093.02	119	48.33	1187.53	163	72.78	1281.34	207	97.22	1374.46			

3-6. TRANSFORMER REPLACEMENT

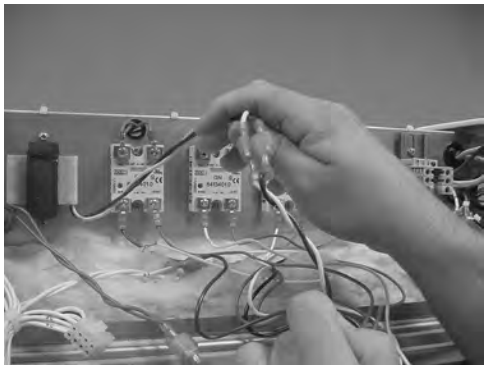


Figure 3-1

Figure 3-2

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

1. Using a Phillip's head screwdriver, remove the four screws securing the front panel.

2. Pull panel down, pull connectors from the back of it, and remove panel from unit.

3. Label wires to transformer and unplug wires to transformer. Figure 3-1.

4. Using a Phillip's head screwdriver, remove the 2 screws securing the transformer and pull transformer from unit. Figure 3-2.

5. Install new transformer in reverse order and unit is now ready for use.

3-7. RELAY REPLACEMENT

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

Checkout:

1. Using a Phillip's head screwdriver, remove the four screws securing the front panel.

2. Pull panel down, pull connectors from the back of it, and remove panel from unit.

The following checks are performed with the wall circuit breaker closed and the main power switch in the ON position. Extreme caution should be taken. Make connections before applying power, take reading, and remove power before removing meter leads, or electrical shock could result.

3. With power reapplied, let unit start heating up, or enter the Tech Mode in Special Program Mode and check the relays in the output test. (See T-18 in the Tech Mode Section)

4. With the component energized (example: air heaters), 0 volts should show on the output side of the relay, and 12 volts on the input side.

5. With the component not energized, 208 or 240 volts should show on the output side of relay, and 0 volts on input.

6. If voltage varies from steps 4 and 5, remove power to unit, pull input wires from relay and place leads of meter onto input wires. Reapply power to unit. When unit is running, the input wires to relay should show 12 vdc volts. If this proves true, the relay is faulty and continue onto step 7.

3-7. RELAY REPLACEMENT (Continued)

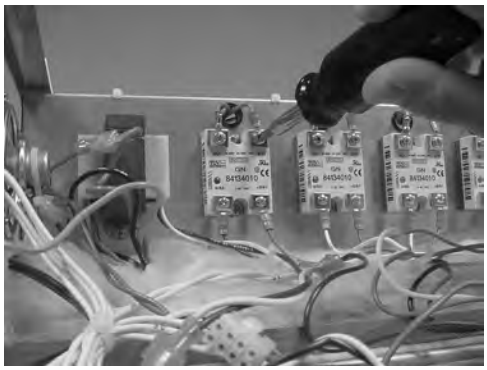


Figure 3-1

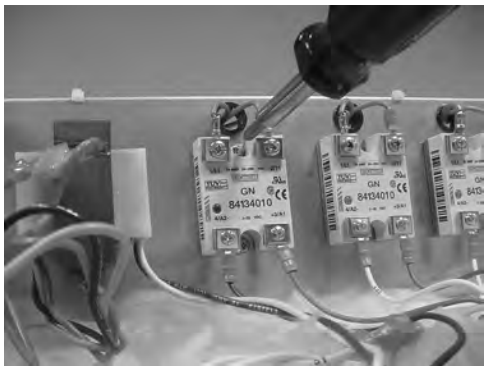


Figure 3-2

7. Label wires and then remove wires from relay using a Phillip's head screwdriver. Figure 3-1.

8. Using a Phillip's head screwdriver, remove the 2 screws securing the relay and remove relay from unit. Figure 3-2.

9. Coat the back of the relay with the thermal joint compound.

CAUTION

Failure to use the thermal joint compound will shorten the life of the relay.

10. Install new relay in reverse order and unit is now ready for use.

3-8. MODULE TOP REMOVAL

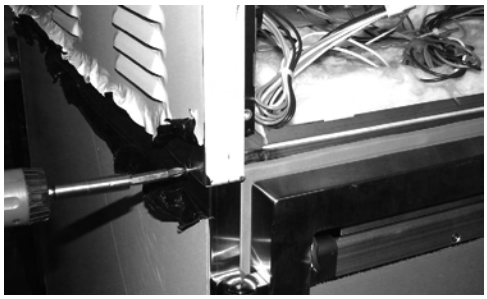


Figure 3-1

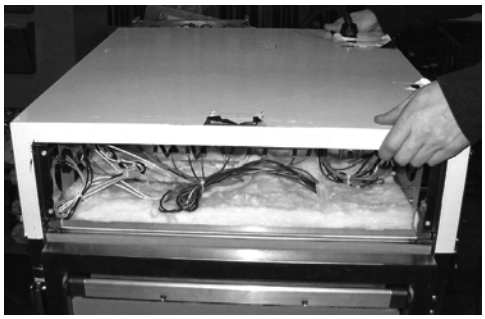


Figure 3-2

WARNING
SHOCK HAZARD

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

1. Using a Phillip's head screwdriver, remove the module screws from both sides. Figure 3-1.

2. Remove screws from front and rear panels.

3. Pull module top straight up from module. Figure 3-2.

3-9. COOLING FAN REPLACEMENT

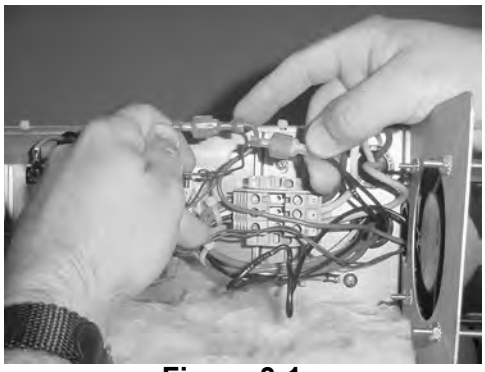


Figure 3-1

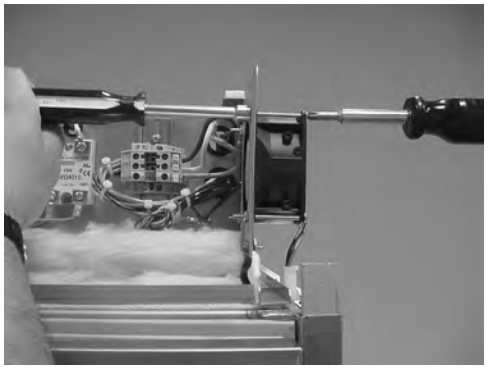


Figure 3-2

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

1. Remove module top per paragraph 3-10.
2. Unplug connectors to the cooling fan. Figure 3-1.
3. Remove screws and nuts securing the fan and remove fan from module. Figure 3-2.
4. Install new fan in reverse order and unit is now ready for use.

3-10. HIGH LIMIT-AIR HEATER REPLACEMENT

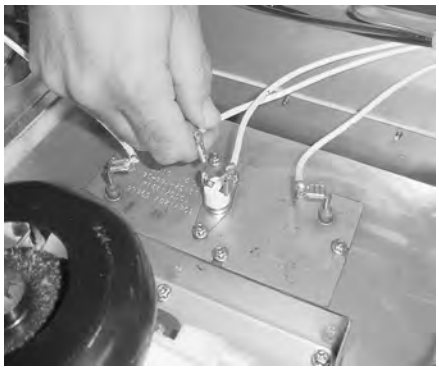


Figure 3-1

Figure 3-2

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

1. Remove module top per paragraph 3-10.
2. Remove wires from high limit. Figure 3-1.
3. Check across the terminals for continuity. If the unit is not heating, the circuit should be closed, or read no resistance. If high limit is defective, continue onto step 4.
4. Remove the 2 screws securing the high limit and remove high limit. Figure 3-2.
5. Install new high limit in reverse order and unit is now ready for use.

3-11. BLOWER MOTOR REPLACEMENT

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

Figure 3-1

1. Remove module top per paragraph 3-10.

2. Unplug wires to blower motor. Figure 3-1.

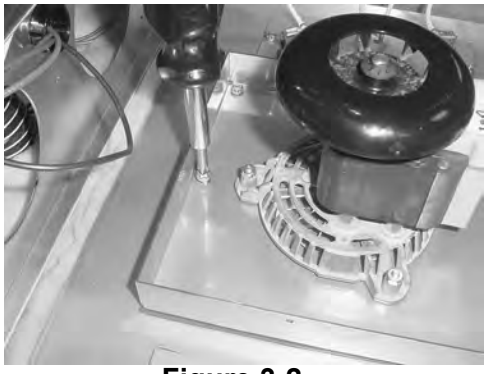


Figure 3-2

3. Using a Phillip's head screwdriver, remove the screws securing the blower bracket to the module. Figure 3-2.

Figure 3-3

4. Pull bracket from module. Loosen set screw on fan blade and pull blade from blower. Figure 3-3.

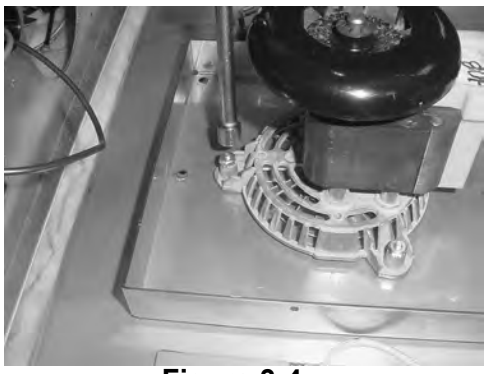


Figure 3-4

5. Remove the 3 nuts securing the blower to the bracket and remove blower motor. Figure 3-4.

6. Install new blower in reverse order, and unit is now ready for use.

3-12. AIR HEATER REPLACEMENT

Figure 3-1

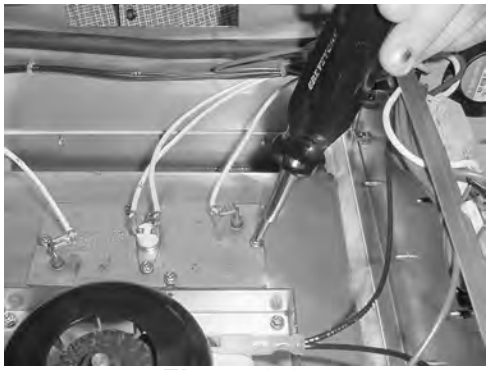


Figure 3-2

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

1. Remove module top per paragraph 3-10.
2. Disconnect the wires to the and high limit. Figure 3-1.
3. Using a Phillip's head screwdriver, remove 2 screws and high limit.
4. Using a Phillip's head screwdriver, remove the 4 screws securing the heater and remove heater. Figure 3-2.
5. Install new heater in reverse order and unit is now ready for use.

3-13. SPEAKER REPLACEMENT

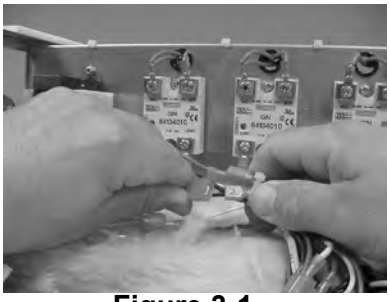


Figure 3-1

Figure 3-2

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

1. Remove the 4 screws securing the front panel.
2. Pull connectors from back of panel and remove panel.
3. Unplug wires to speaker. Figure 3-1.
4. Using a Phillip's head screwdriver, remove the screws securing the speaker and remove speaker. Figure 3-2.
5. Install new speaker in reverse order and unit is now ready for use.

3-14. COMPLETE PANEL OR PC BOARD REPLACEMENT

Figure 3-1

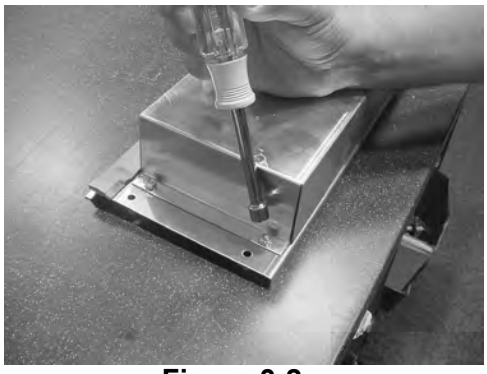


Figure 3-2

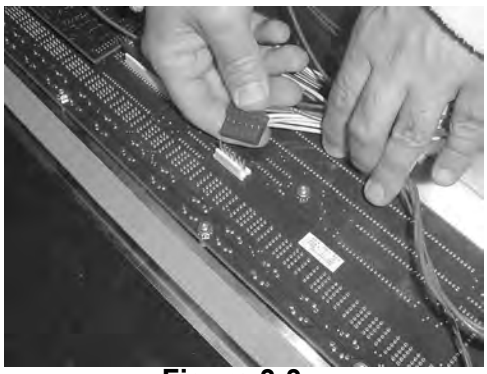


Figure 3-3

Figure 3-4

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

The complete control panel assembly can be replaced, or just the PC board. Follow steps 1 & 2 for the complete panel and continue with the remaining steps for the PC Board replacement.

1. Remove the 4 screws securing the front panel.

2. Pull connectors from back of panel and remove panel. Figure 3-1. Install complete panel in reverse order. When installing the PC board, continue to step 3.

3. Using 5/16” socket, remove the 4 nuts securing the control cover and remove cover. Figure 3-2.

4. Pull the connectors from PC Board. Figure 3-3.

5. Using 5/16” socket, remove the nuts securing the PC board and remove board. Figure 3-4.

6. Install new PC board in reverse order and unit is now ready for use.

3-15. FLOAT SWITCH REPLACEMENT

Figure 3-1

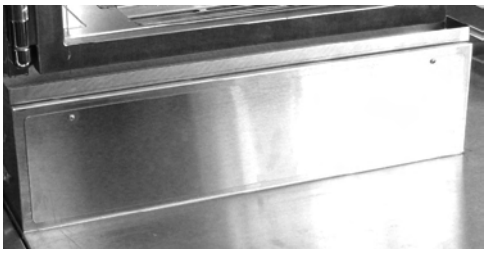


Figure 3-2

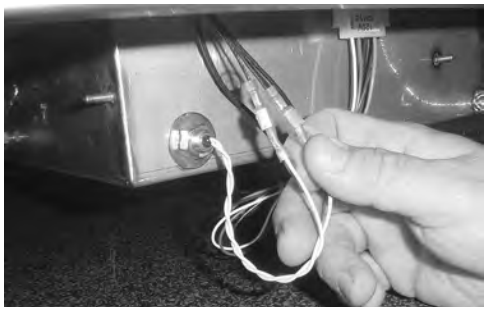


Figure 3-3

Figure 3-4

Figure 3-5

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

1. While wearing heat resistant gloves or using a grasping tool, remove overflow tube and allow water to drain from pan. Figure 3-1.

<u>Hot water!</u> Do not touch the overflow tube or place your hand in the water in the water pan when draining the unit. Failure to follow this warning could result in severe burns and injury.

2. Remove screws and lower access panel from rear of unit. Figure 3-2.

3. Unplug wires to float switch. Figure 3-3.

4. Remove nut securing the float switch and pull float switch from unit. Figure 3-4.

5. Install new float switch in reverse order, making sure float switch is in upright position. Figure 3-5.

6. Unit is now ready for use.

3-16. HIGH LIMIT - WATER HEATER REPLACEMENT

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

Figure 3-1

1. While wearing heat resistant gloves or using a grasping tool, remove overflow tube and allow water to drain from pan. Figure 3-1.

<u>Hot water!</u> Do not touch the overflow tube or place your hand in the water in the water pan when draining the unit. Failure to follow this warning could result in severe burns and injury.

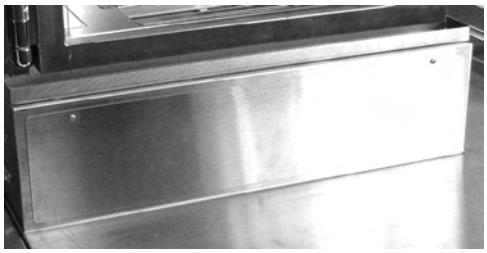


Figure 3-2

2. Remove screws and lower access panel from rear of unit. Figure 3-2.

Figure 3-3

3. Using an 11/32” socket or wrench, remove the nuts securing the water heater cover and remove cover. Figure 3-3.

Figure 3-4

4. Remove wire from high limit. Figure 3-4.

5. Check across the terminals for continuity. If the unit is not heating, the circuit should be closed, or read no resistance. If high limit is defective, continue onto step 6.

6. Remove the 2 nuts securing the high limit and remove high limit. Leave the standoffs in place.

7. Install new high limit in reverse order.

8. Unit is now ready for use.

3-17. WATER PAN HEATER REPLACEMENT

CAUTION

Make sure unit voltage matches the water heater voltage in kit, or damage to the water heater could result.

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

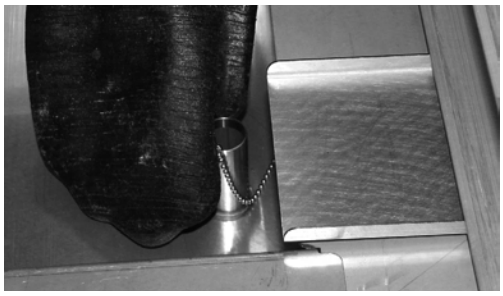


Figure 3-1

1. Disconnect or shut-off water supply. While wearing heat resistant gloves or using a grasping tool, remove overflow tube inside of unit and allow water to drain from pan. Figure 3-1.

<u>Hot water!</u> Do not touch the overflow tube or place your hand in the water in the water pan when draining the unit. Failure to follow this warning could result in severe burns and injury.

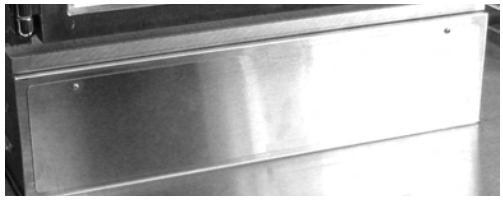


Figure 3-2

2. Allow unit cool. If Loctite is applied when unit is still hot, the Loctite will set before the nuts are installed.

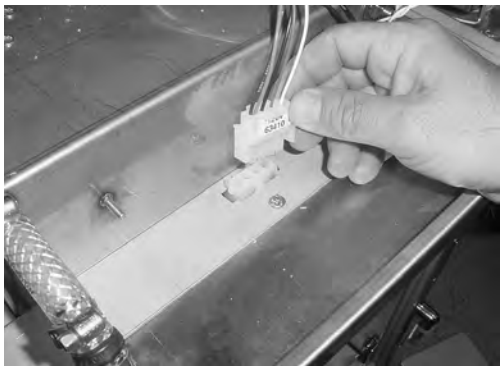


Figure 3-3

3. **COUNTERTOP MODELS -** Remove screws and both lower access panels. Figure 3-2. (Floor models continue onto step 4)

4. Using an 11/32” socket or wrench, remove the nuts securing the water heater cover and remove cover. (See Figure 3-3 on page 3-15.)

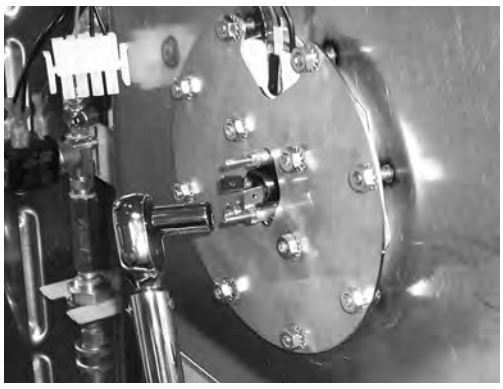


Figure 3-4

5. Unplug water heater and high limit wires. Figure 3-3.

6. Using a 1/4” socket, remove nuts securing the high limit and remove high limit & spacers. Figure 3-4.

3-17. WATER HEATER REPLACEMENT (Continued)

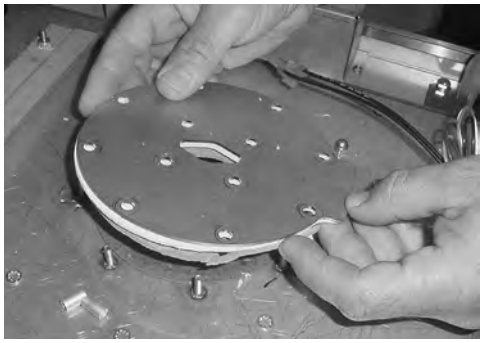


Figure 3-6

7. Remove the nuts securing the water heater plate and pull heater plate, insulation, water pan heater, and aluminum plate from the unit, and discard plate and insulation. Figure 3-6.

NOTICE

If using kits 140167, 140168 or 140169 and unit already has the lug heater (heater wires secured w/screw & nut), leave the octagon aluminum plate, remove the heater, insulation and heater plate & discard the insulation. Proceed to step 10

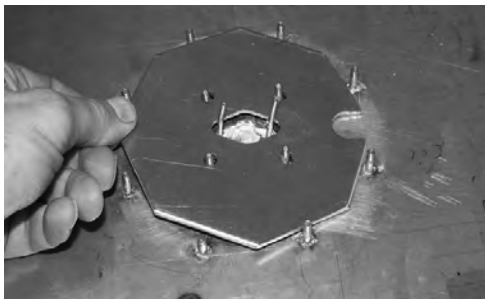


Figure 3-7

8. Locate the aluminum, octagon plate in the kit. Make sure the surface is free of debris and place the plate over the 4 long studs. Figure 3-7.

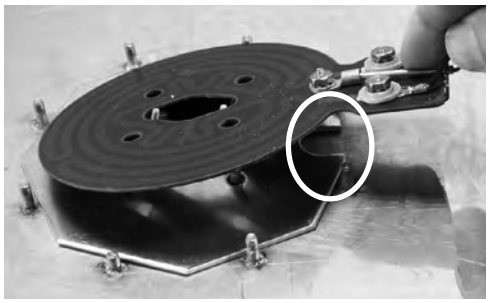


Figure 3-8

9. Install new heater, making sure the flat side is towards the plate, the wires are on top, and the terminal end aligns with the notch in the aluminum plate, as shown in Figure 3-8.

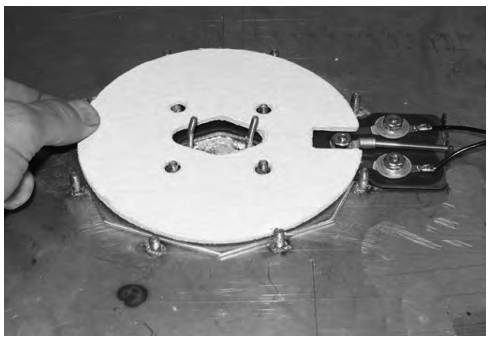


Figure 3-9

10. Install the new insulation from the kit, over the water pan heater, aligning the notch with the nut on the heater. Figure 3-9.

3-17. WATER PAN HEATER REPLACEMENT (Continued)

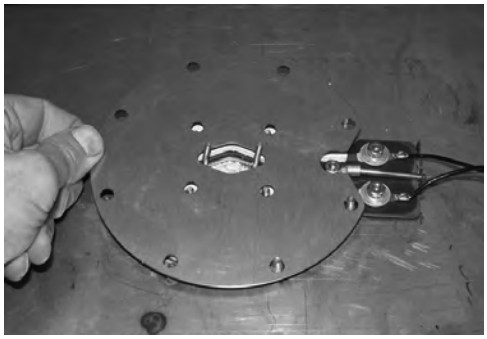


Figure 3-10

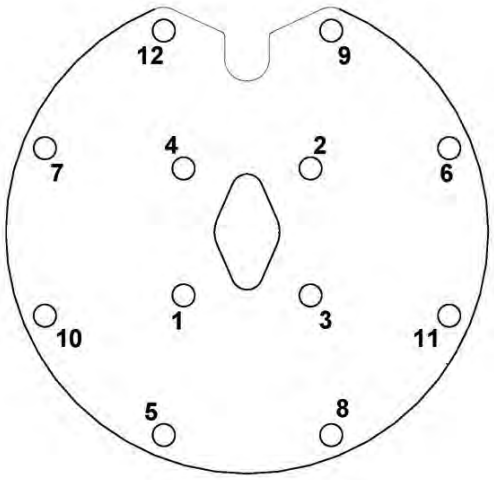


Figure 3-11

Figure 3-12

11. Place new cover plate from the kit, over the insulation, aligning the notch with the nut on the heater. Figure 11. (Kits 140167, 140168 or 140169 won't have new plate. Unit should already have notched plate.) Figure 3-10.

12. Apply Loctite thread locker (blue #246 MED/STR 450F) to the studs before installing nuts.

    Locate the 12 keps nuts from the kit and place them over the studs and finger-tighten. (Kits 140167, 140168 or 140169 won't have hardware. Re-use element hardware.)

    Using a torque wrench and a 11/32" socket, secure all the nuts to 7 inch lbs, following the pattern in Figure 3-11.

    Refer to torque wrench's manufacturer operator's instructions, if need be.

    Re-tighten the nuts to 12 inch lbs, again following the pattern in Figure 14. DO NOT overtighten.

    CAUTION

    Overtightening the nuts could damage the coating on the heater, causing the heater to fail prematurely.

13. Apply thermal compound (HP part no. MS01-368 - 251 thermal joint compound) to bottom of high limit and reinstall high limit with spacers, and reconnecting high limit wires and water pan heater wires to unit.

14. Reinstall water heater cover and re-connect water supply & drain.

15. If necessary, clean & delime any lime build-up under the concentration ring. Figure 3-12. Refer to KFC Standards Library procedure for further details.

16. Re-supply power to the unit.

17. Clear the error codes from the controls by re-intializing the controls in the Tech Mode, following the procedures below:

    Press and hold P until "L-2 LEVEL 2", followed by, "CLOCK SET", shows in display.

    Press P 3 times and "TECH", followed by, "ENTER CODE" shows in display.

3-17. WATER PAN HEATER REPLACEMENT (Continued)

Enter code, 

Press PROG until "DO TOTAL INIT" shows in the display.

Press and hold DOWN until the display counts down from 3, and the display flashes "-INIT-" then "INIT*DONE".

Press and hold PROG to exit programming and unit is now ready for use.

3-18. SOLENOID VALVE AND WATER STRAINER REPLACEMENT

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

1. While wearing heat resistant gloves or using a grasping tool, remove overflow tube and allow water to drain from pan. Figure 3-1.

<u>Hot water!</u> Do not touch the overflow tube or place your hand in the water in the water pan when draining the unit. Failure to follow this warning could result in severe burns and injury.

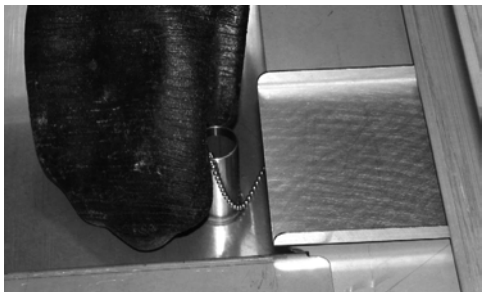


Figure 3-1

2. Remove screws and lower access panel from rear of unit. Figure 3-2.

Figure 3-2

3. Disconnect lead wires from solenoid valve. Figure 3-3.

4. Using a flat blade screwdriver, loosen hose clamp and remove hose from barb fitting.

5. Using a Phillips head screwdriver, remove 4 screws and remove bracket, valve, and strainer assembly from under cabinet.

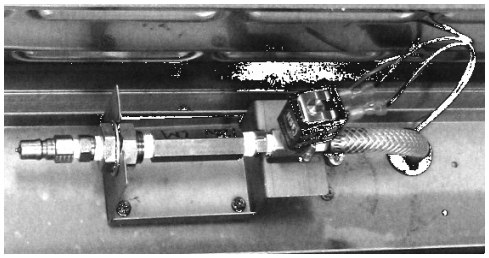


Figure 3-3

6. Using a Phillips head screwdriver, remove 2 screws and valve.

7. Using a 1" wrench, loosen bulkhead adapter nuts and remove bracket.

8. Disassemble parts as needed to repair or replace strainer or valve.

9. Reassemble repaired parts and install in reverse order.

3-19. DOOR GASKET REPLACEMENT

Figure 3-1

1. Pull the gasket to the side to expose the retainer screws. Figure 3-1.
2. Loosen the screws around the outside perimeter of the gasket.
3. With all the screws loose, the gasket should slide out from under the retainers.
4. Install new gasket in reverse order and unit is now ready for use.

3-20. VENT MOTOR REPLACEMENT

Figure 3-1

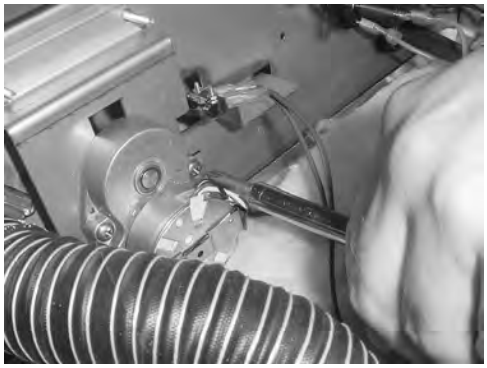


Figure 3-2

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

1. Remove module top per paragraph 3-10.
2. Using a 5/16” socket or nutdriver, remove the 4 nuts securing the bracket to the back panel. Figure 3-1.
3. Label and disconnect the wires to the vent motor.
4. Using a Phillip’s-head screwdriver, remove the vent motor from the bracket. Figure 3-2.
5. Install new vent motor in reverse order.

3-21. VENT MOTOR MICROSWITCH REPLACEMENT

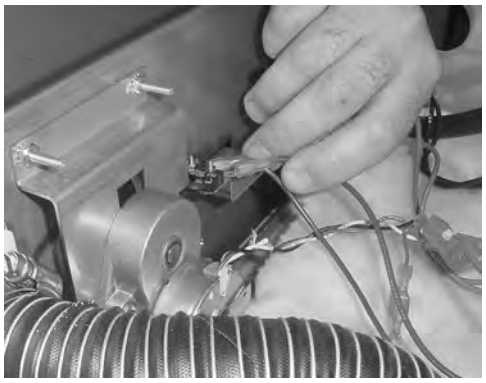


Figure 3-1

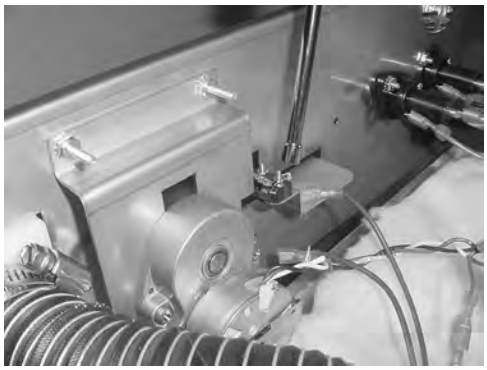


Figure 3-2

To avoid electrical shock or property damage, move the POWER switch to OFF and disconnect main circuit breaker, or unplug cord at wall receptacle.

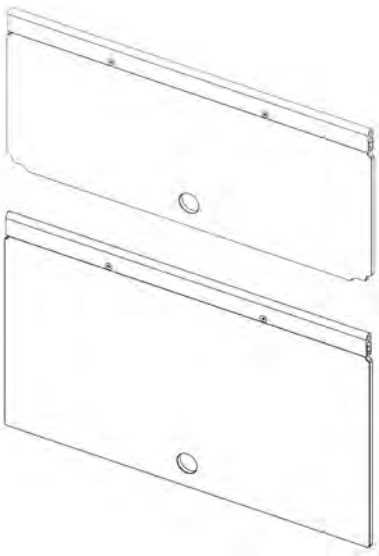
1. Remove module top per paragraph 3-10.

2. Label and pull the wire connectors from the microswitch. Figure 3-1.

3. Using a 3/16” socket or nutdriver, remove the nuts securing the microswitch and pull microswitch from unit. Figure 3-2.

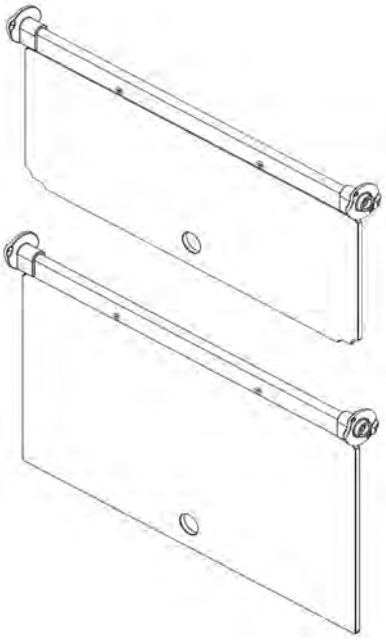
4. Install new microswitch in reverse order.

3-22. AHC-993 FLIP DOOR REPLACEMENT



94182
Door Assy.
w/cams-top

94183
Door Assy.
w/cams-bottom



94184
Door Assy.
w/extrusion-top

94185
Door Assy.
w/extrusion-
bottom

Flip Door Removal

1. Using door latch, open door assembly. Using both hands, pull back on cam on one end of flip door hinge.

2. While holding-in on cam, swing flip door out of frame.

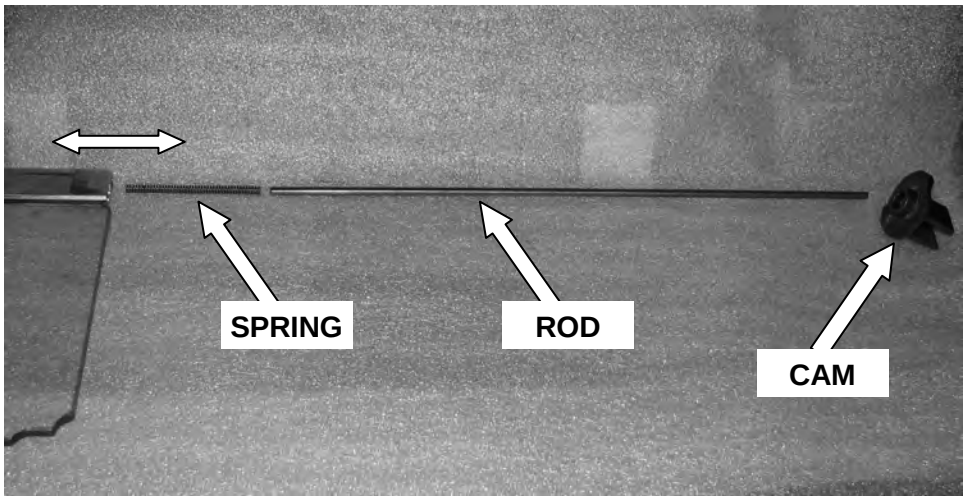
CAUTION

Once flip door is out of frame, hold cam tightly and then slowly release tension on cam. The cam secures a high-tension spring and rod that will fall-out of extrusion if released suddenly.

If replacing flip door assemblies with cams (part nos. 94182 & 94183) continue onto Step 4.

3-22. AHC-993 FLIP DOOR REPLACEMENT (Continued)

3. When replacing the flip door with extrusion MINUS the cams (part nos. 94184 & 94185) remove the spring and rod from the old door and insert into new door assembly. See below.

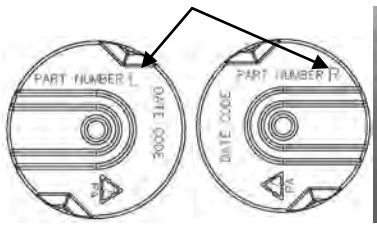


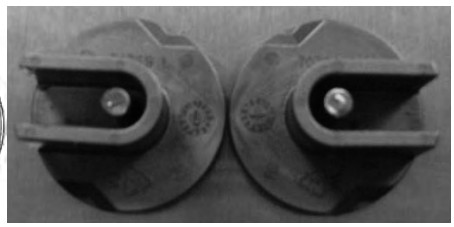
Installing Flip Door Assemblies

4. Install door assembly into door frame by inserting one cam located on the extrusion into the hinge side of the doo frame. Then in reverse order of installation (steps 1 & 2), depress the cam on the other end of the extrusion until the cam is secured in the door frame hole on the latch side of the door.

NOTICE

Ensure the cams are on the correct end of extrusion. They are marked “L” for left hand and “R” for right hand. Doors will not stay up if reversed. See below.





5. Locate tube of spindle lube (part no. 12124) supplied with doors and place a small amount of lube on each cam.

NOTICE

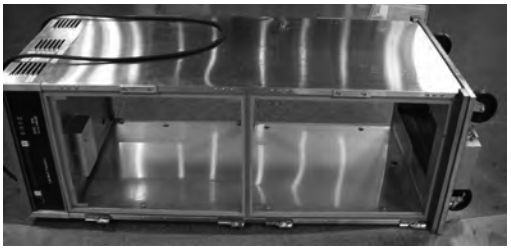
Continue to place spindle lube on ALL AHC-993 flip door cams in store. This will significantly increase the life of the cams.

3-23. WATER PAN REPLACEMENT

1. Disconnect the power supply to the unit.
2. Disconnect the water line leading to the unit. Drain any water in the water pan out.
3. Remove all trays from the cabinet. Remove all side racks (upper and lower for a 990).
4. Remove all four (4) doors from the 990 cabinets.

   For AHC-993, only remove the two (2) whole doors form the hinges. Do not remove the flip doors.
5. For AHC-990, using two people, lay the unit on its side.

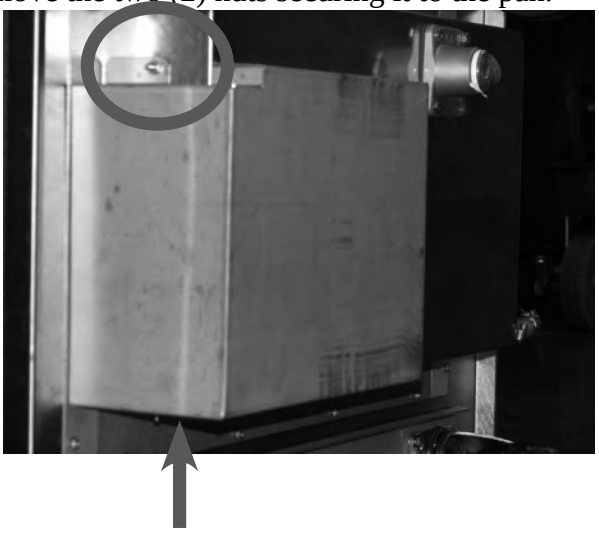
Use caution when laying unit down or removing from location. have assistance with performing this task.



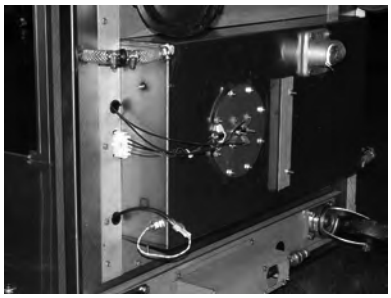
AHC-993 will have to be removed from the counter top and set on its side. Refer to the installation instructions in reverse order for removal.

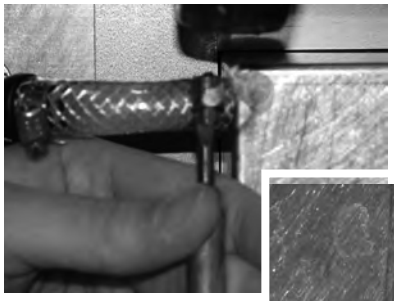
The following steps are for all units.

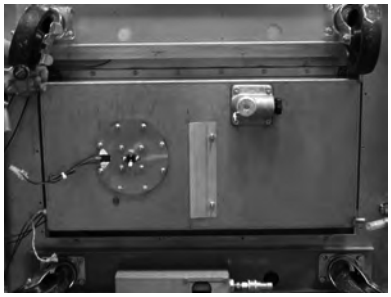
6. Locate the heater cover. Using a 11/32” socket or wrench, remove the two (2) nuts securing it to the pan.



3-23. WATER PAN REPLACEMENT (continued)







7. Remove the cover to expose the heater and wire connections.
8. Disconnect the 4-pin connecter
9. Disconnect the flag terminals from the high limit located in the middle of the heater.
10. Disconnect the floatswitch wires.

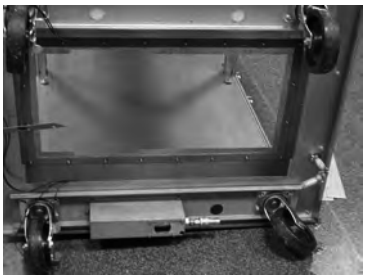
11. Using a 1/4” socket/nutdriver, or a flat-blade screwdriver, loosen the hose clamps on both sides of the water pan.

    Remove both water hose from the water pan.

12. Using a phillips head bit, remove the screws that secure the four (4) sheet metal pan retainers to the bottom-side of the unit.

    Set all retainers a side for reinstall.

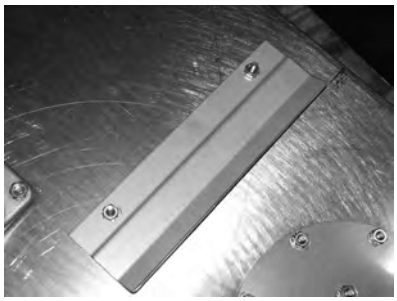
13. Using a 11/32” socket, remove all nuts that secure the water pan to the underside of the unit.
14. Remove water pan from unit.



NOTICE

It is Henny Penny’s recommendation to replace the water pan gasket while performing this procedure.

3-23. WATER PAN REPLACEMENT (continued)



15. With the water pan off, all the componants need removed and installed on the new water pan.

16. Using a 3/8” socket or wrench, remove the drain block. Remove the gasket.

    Install on the new water pan.

17. Using a 11/32” socket or wrench, remove the water pan heater cover guide.

    Install on the new water pan with the open end facing the water heater mounting studs.

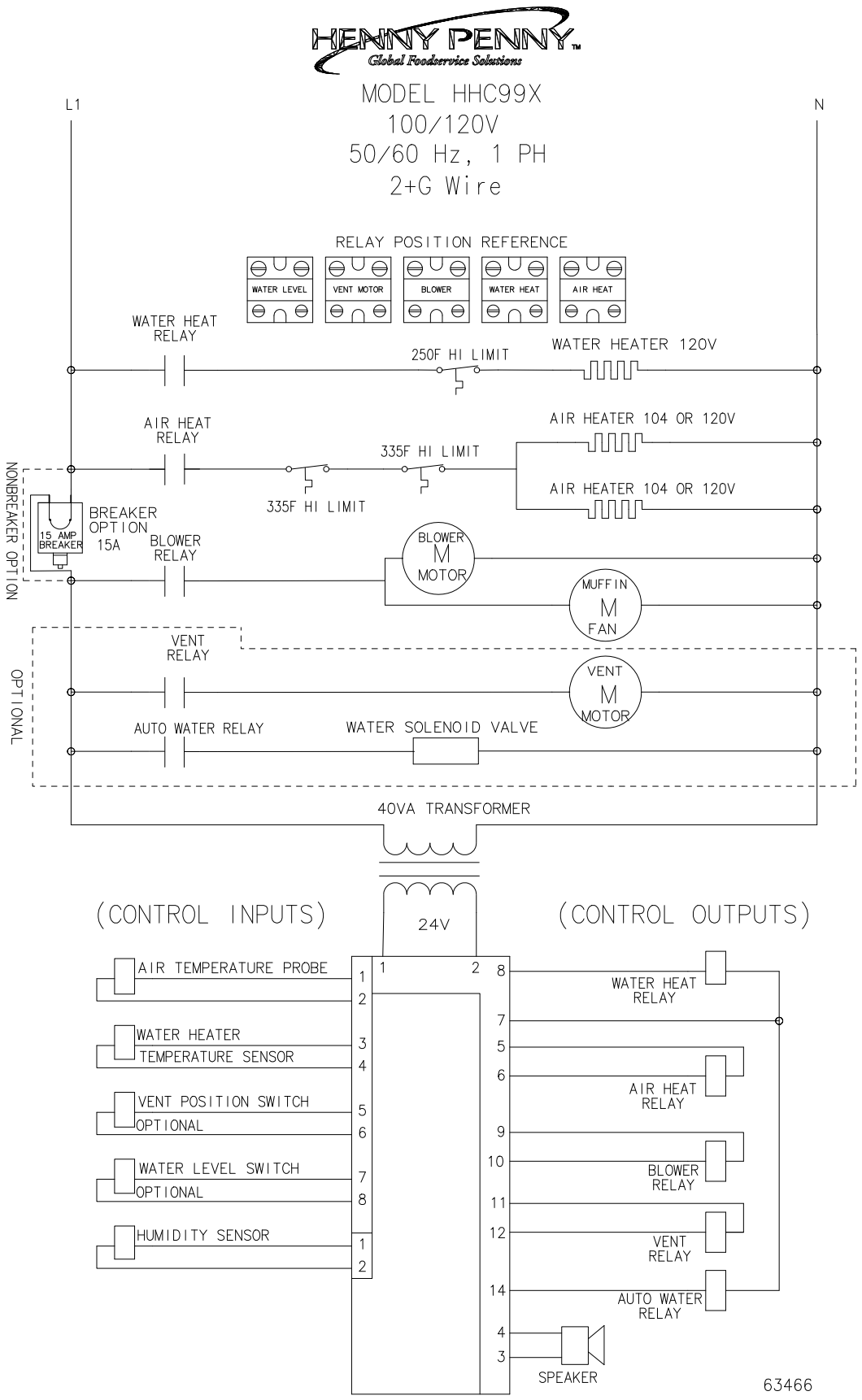
18. Using the steps provided in the “Water Pan Heater Replacement” and the “Floatswitch Replacement”, remove and install on the new water pan.

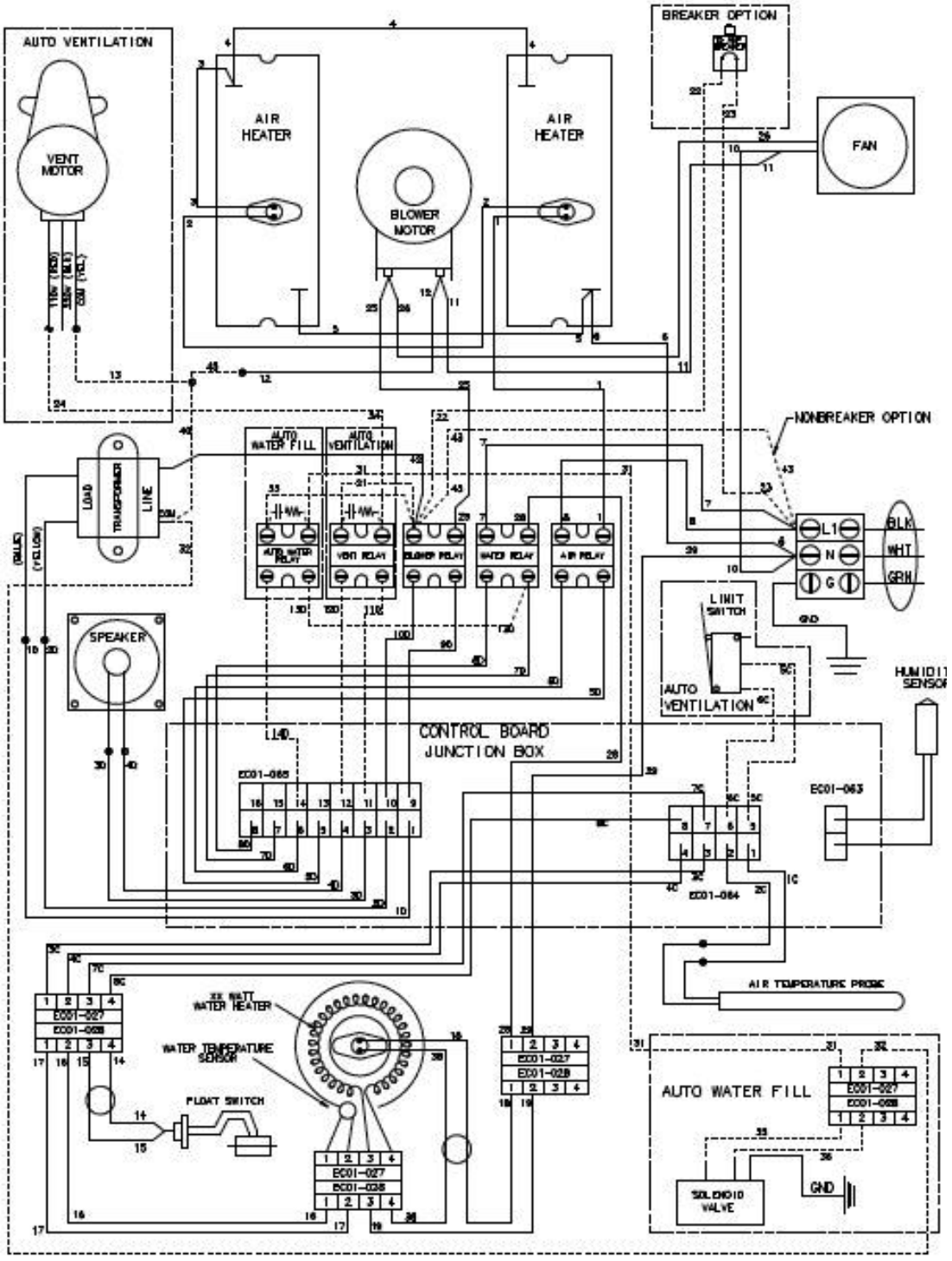
    Be sure to follow specs and torques per instructions.

19. Remove the drain plug and install in new water pan.

20. New water pan is now ready for installation.

21. Follow the removal instructions in reverse order to install.

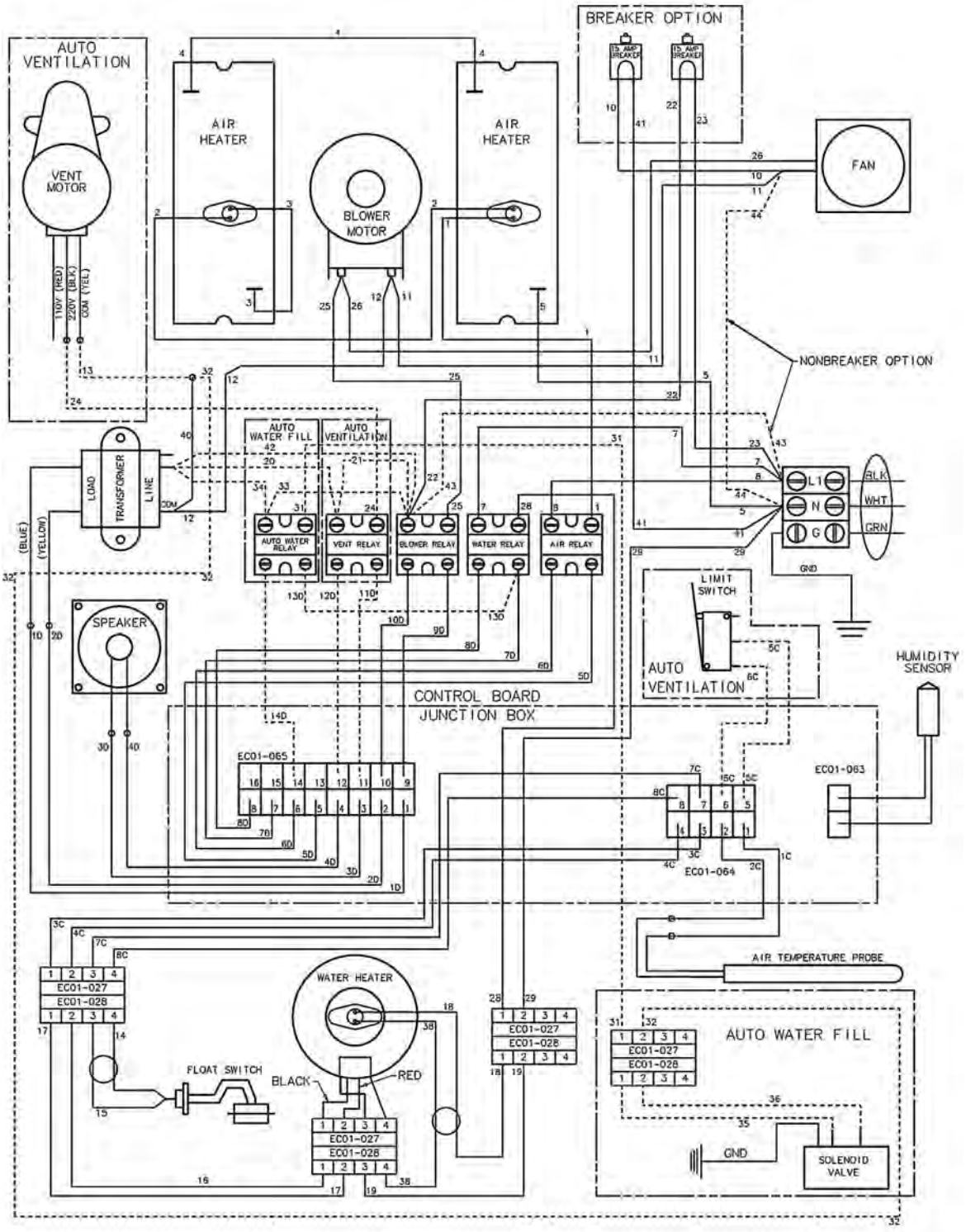

HENNY PENNY
Global Foodservice Solutions
MODEL HHC99X
100/120V
50/60 Hz, 1 PH
2+G Wire
L1
N
RELAY POSITION REFERENCE
WATER LEVEL
VENT MOTOR
BLOWER
WATER HEAT
AIR HEAT
WATER HEAT RELAY
250F HI LIMIT
WATER HEATER 120V
AIR HEAT RELAY
335F HI LIMIT
AIR HEATER 104 OR 120V
335F HI LIMIT
AIR HEATER 104 OR 120V
NONBREAKER OPTION
BREAKER OPTION
15A
15 AMP BREAKER
BLOWER RELAY
BLOWER M MOTOR
MUFFIN M FAN
VENT RELAY
VENT M MOTOR
OPTIONAL
AUTO WATER RELAY
WATER SOLENOID VALVE
40VA TRANSFORMER
24V
(CONTROL INPUTS)
(CONTROL OUTPUTS)
AIR TEMPERATURE PROBE
WATER HEATER TEMPERATURE SENSOR
VENT POSITION SWITCH OPTIONAL
WATER LEVEL SWITCH OPTIONAL
HUMIDITY SENSOR
WATER HEAT RELAY
AIR HEAT RELAY
BLOWER RELAY
VENT RELAY
AUTO WATER RELAY
SPEAKER
63466



27485
120V-60hz-1ph

NOTICE

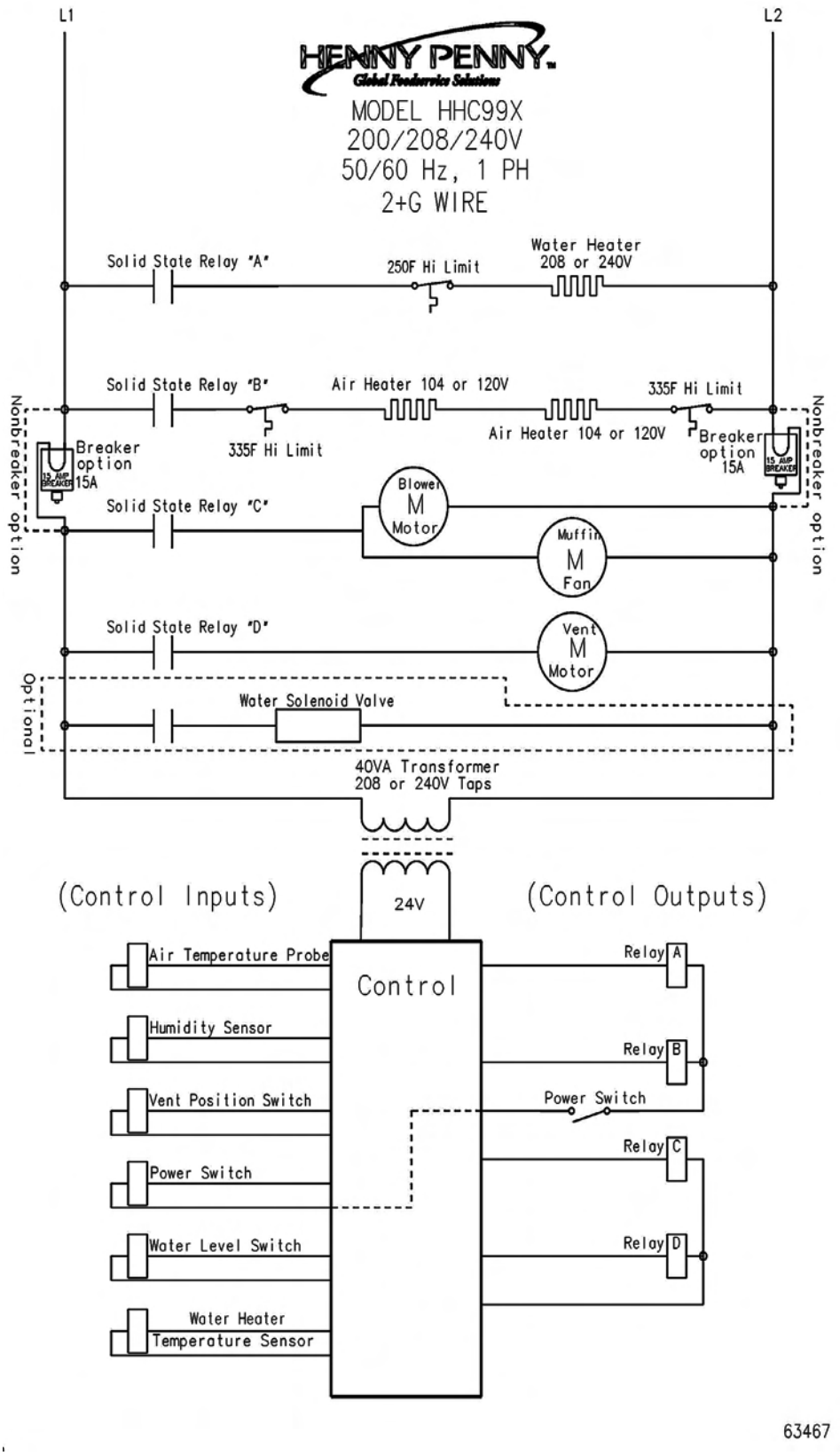
- Dashed lines indicate control module can be wired for either auto ventilation control or auto water fill
- Transformer: connect wire #20 to primary wire



27486
200-240V-50/60hz-1ph

NOTICE

• Transformer: connect wire #20 to the appropriate primary wire (208 or 240V)


L1
L2
HENNY PENNY
Global Foodservice Solutions
MODEL HHC99X
200/208/240V
50/60 Hz, 1 PH
2+G WIRE
Solid State Relay "A"
250F Hi Limit
Water Heater
208 or 240V
Solid State Relay "B"
Air Heater 104 or 120V
335F Hi Limit
Air Heater 104 or 120V
335F Hi Limit
Nonbreaker option
Breaker option 15A
15 AMP BREAKER
Solid State Relay "C"
Blower M Motor
Muffin M Fan
Solid State Relay "D"
Vent M Motor
Optional
Water Solenoid Valve
40VA Transformer
208 or 240V Taps
24V
(Control Inputs)
(Control Outputs)
Air Temperature Probe
Humidity Sensor
Vent Position Switch
Power Switch
Water Level Switch
Water Heater Temperature Sensor
Control
Relay A
Relay B
Power Switch
Relay C
Relay D
63467

SECTION 4. PARTS INFORMATION

4-1. INTRODUCTION

This section lists the replaceable parts of the Henny Penny AHC-993 and AHC-990.

4-2. GENUINE PARTS

Use only genuine Henny Penny parts in your cabinet. Using a part of lesser quality or substitute design may result in damage to the unit, or personal injury.

4-3. WHEN ORDERING PARTS

Once the parts that you want to order have been found in the parts list, write down the following information:

Example:	Item Number	4
	Part Number	16684
	Description	Cooling Fan

From data plate, list the following information:

Example:	Product Number	HHC990.0
	Serial Number	AW001IE
	Voltage	208 Volt

4-4. PRICES

Your distributor has a price list and will be glad to inform you of the cost of your parts order.

4-5. DELIVERY

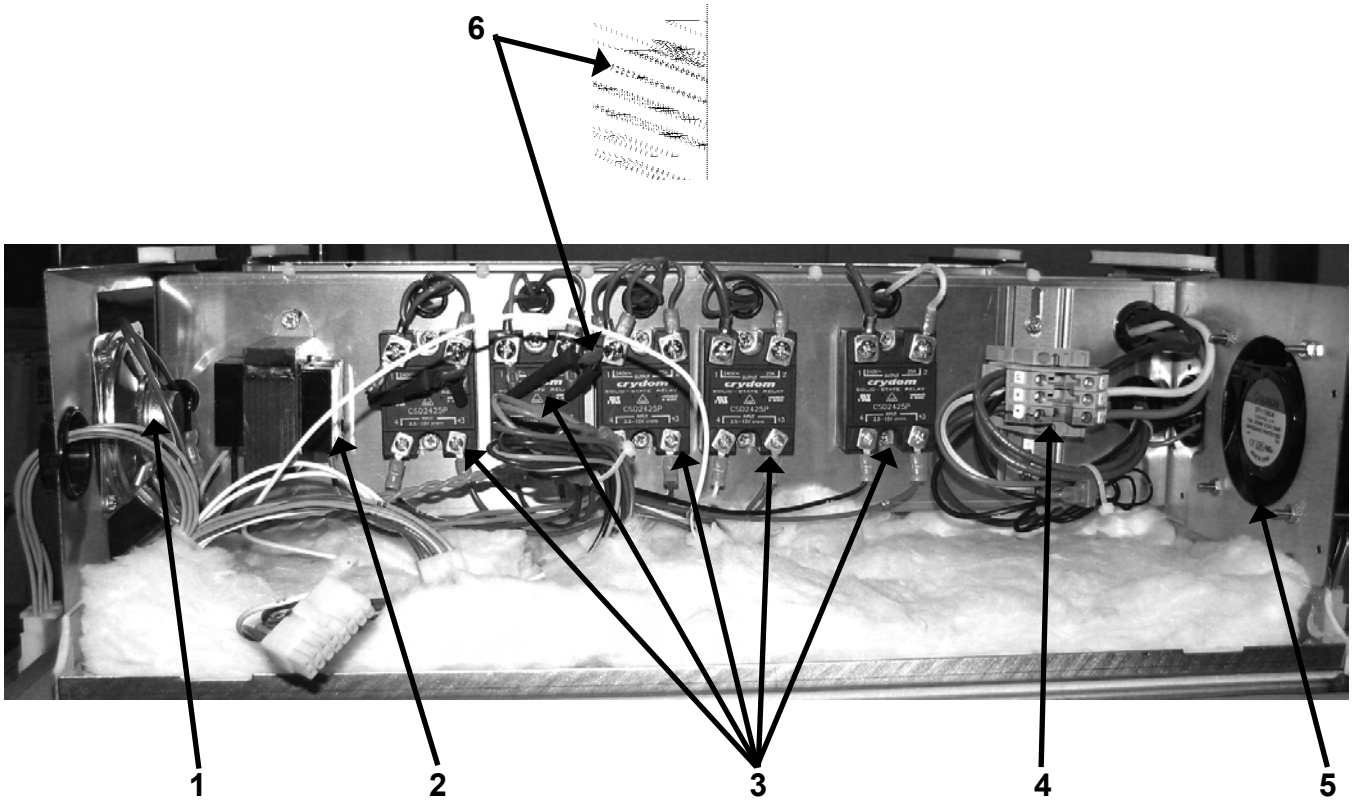
Commonly replaced items are stocked by your local distributor and will be sent out when your order is received. Other parts will be ordered, by your distributor, from Henny Penny Corporation.

4-6. WARRANTY

All replacement parts (except lamps and fuses) are warranted for 90 days against manufacturing defects and workmanship. If damage occurs during shipping, notify the carrier at once so that a claim may be properly filed. Refer to warranty in the front of the manual for other rights and limitations.

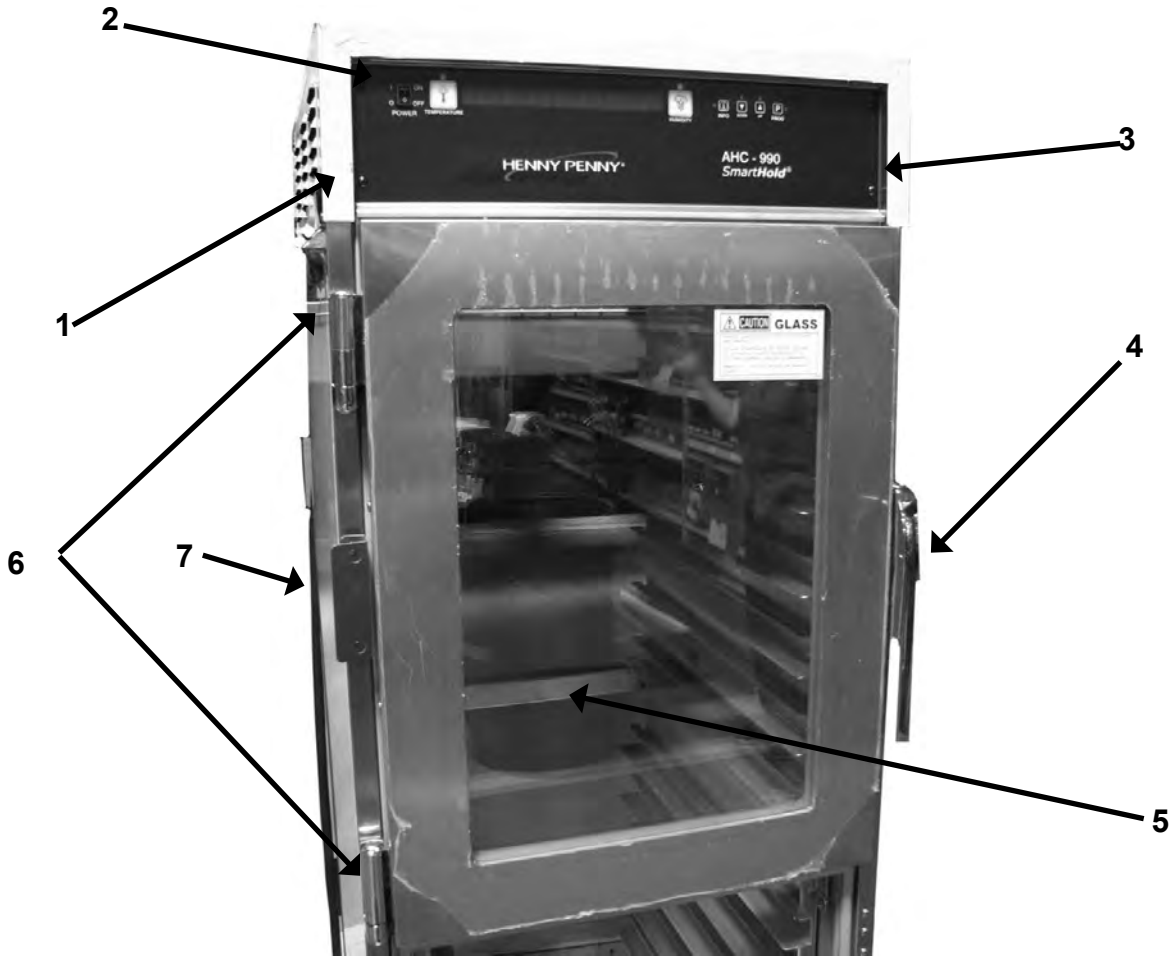
4-7. RECOMMENDED SPARE PARTS FOR DISTRIBUTORS

Recommended replacement parts are indicated with A or B in the parts lists:
A = parts to be stocked on service vans or trucks
B = parts to be stocked at the distributor/KES location.
Inventory on all other parts not identified, should be based upon usage in the territory. Please use care when ordering recommended parts, because all voltages and variations are marked. Distributors should order parts based upon common voltages and equipment sold in their territory.



Item	No.	Part No.	Description	Quantity AHC-993	Quantity AHC-990
B	1	63419	Speaker Assembly	1	1
A	2	63460	Transformer Assembly - 120V Pri.-24 Sec.	1	1
A	3	40645	Relay - 25A - Solid State	5	5
	4	93847	Terminal Block Assembly	1	1
B	5	16684	Cooling Fan Assy - 120V	1	1
B	6	66879	Assy - Resistor Capacitor	2	2

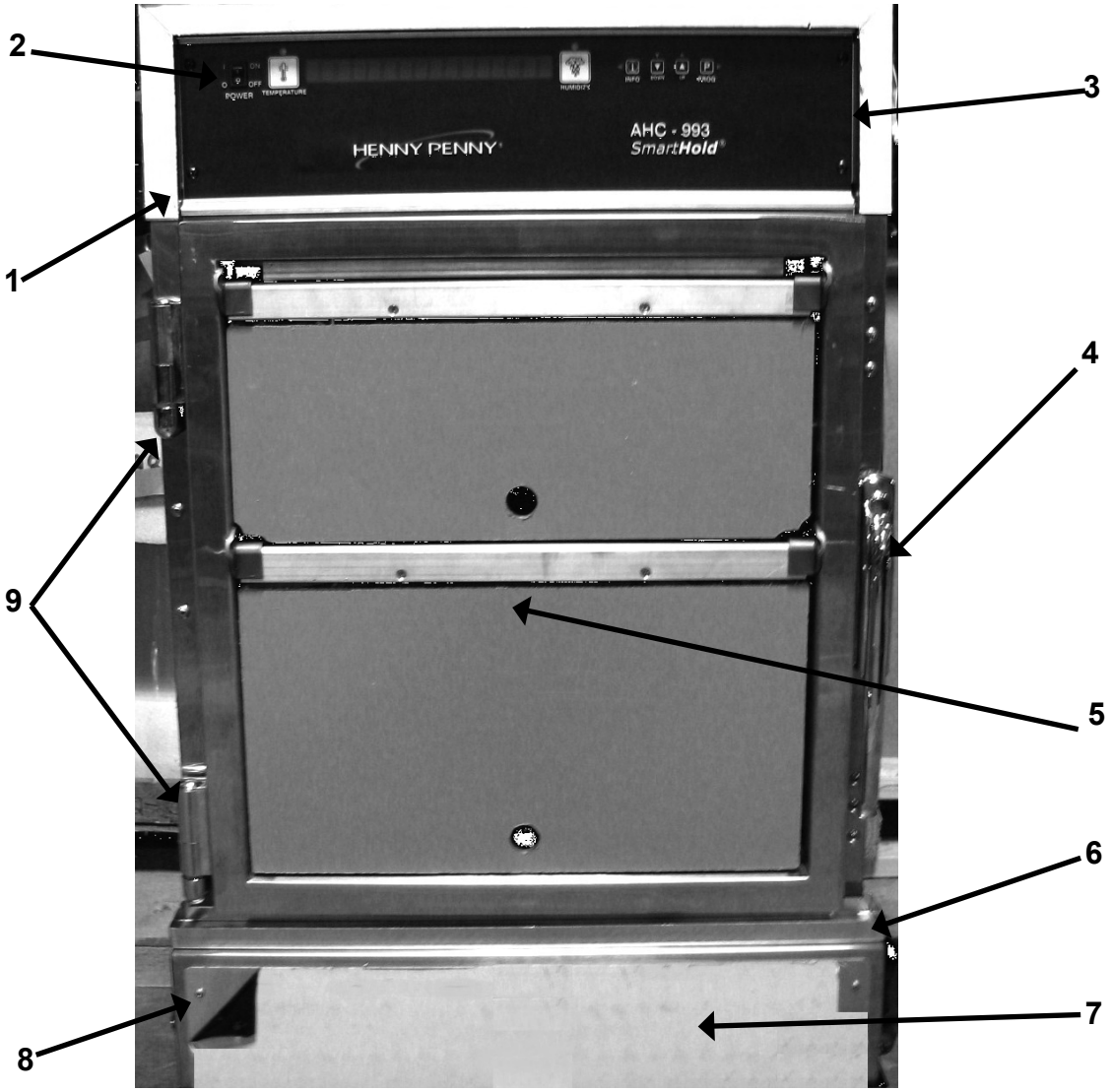
Recommend Parts: A=Truck Stock/B=Dist. Stock



AHC-990 Floor Model

Item No.	Part No.	Description	Quantity
B 1	140165	Kit - Control Board	1
A 2	63464	Power Switch	1
3	90730	Decal - Control AHC-990	1
B 4	14272	Kit - Door Handle	2
5	154616-003	Assy - AHC-990 Glass Door - RH Top	2
5	154616-004	Assy - AHC-990 Glass Door - RH Bottom	2
5	154616-001	Assy - AHC-990 Glass Door - LH Top	2
5	154616-002	Assy - AHC-990 Glass Door - LH Bottom	2
B 6	14271	Kit - Door Hinge	4
7	27149	Door Stop	4
8*	86850	Service Pack - 5 in. Casters	1
	27154	Caster - 5 in. Swivel - Locking	2
	27155	Caster - 5 in. Swivel	2
	LW01-002	Lockwasher Split Ring - 1/4	16
	SC01-039	Screw - 1/4-20 x 1 Hex Head	16
9*	93007	Assy-Thumb Screw (on back panel)	2
10*	EF02-125	Breaker-Push Button Reset	

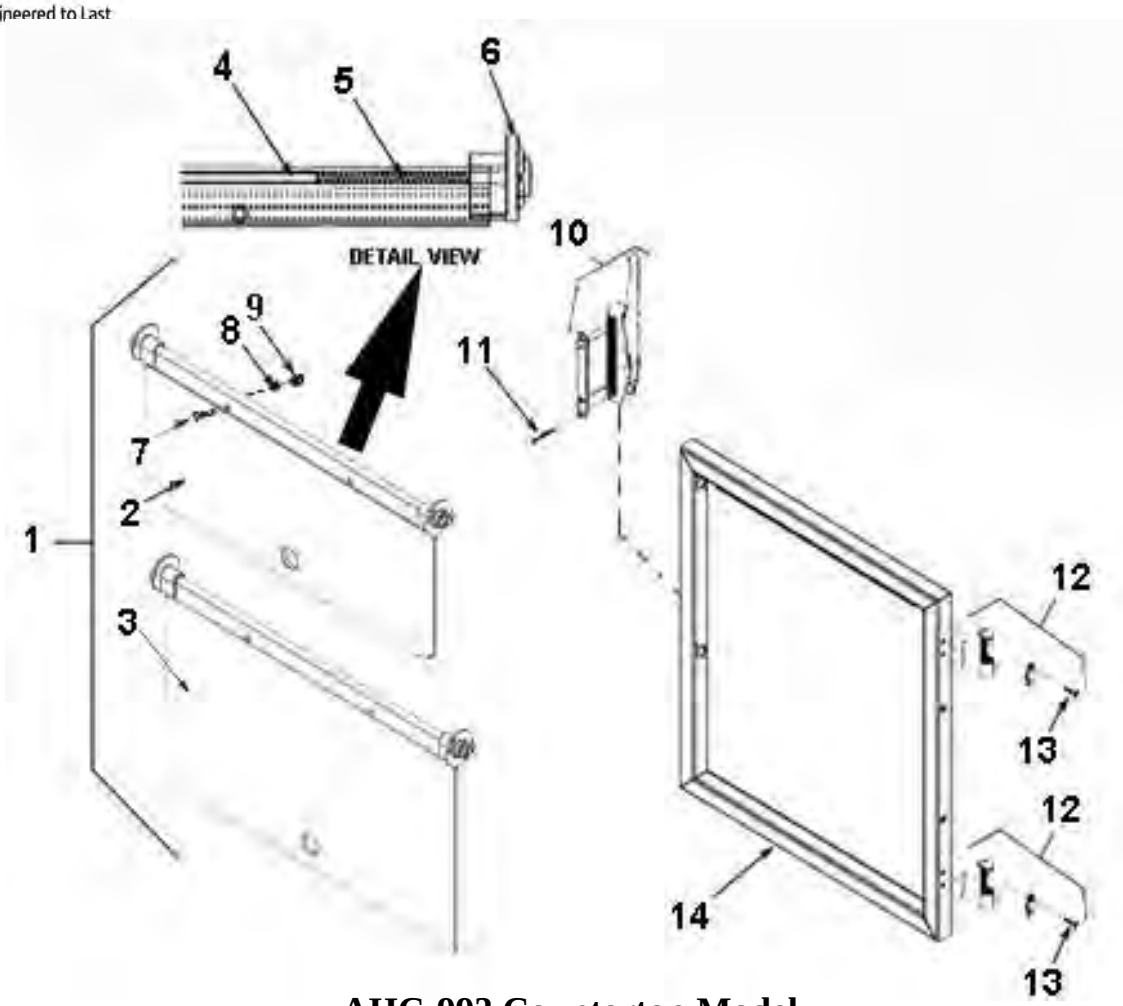
Recommend Parts: A=Truck Stock/B=Dist. Stock
*not shown



AHC-993 Countertop Model

Item No.	Part No.	Description	Quantity
B 1	88747RB	Kit - Control Board SN: DC1011047 & Before	1
B 1	140166	Kit - Control Board SN: DC1011048 & After	1
A 2	63464	Power Switch	1
3	89360	Decal - Control AHC-993	1
B 4	14272	Kit - Door Handle	2
5	87198	Assy-Door-Flip-RH-1/3 Size (Parts breakdown on next page)	1
5	87934	Assy-Door-Flip-LH-1/3 Size (Parts breakdown on next page)	1
6	88490	Shroud - Base	1
7	89260	Plate - Service Access	2
8	SC06-026	Screw	4
B 9	14271	Kit - Door Hinge	4
10*	93007	Assy-Thumb Screw (on back panel)	2

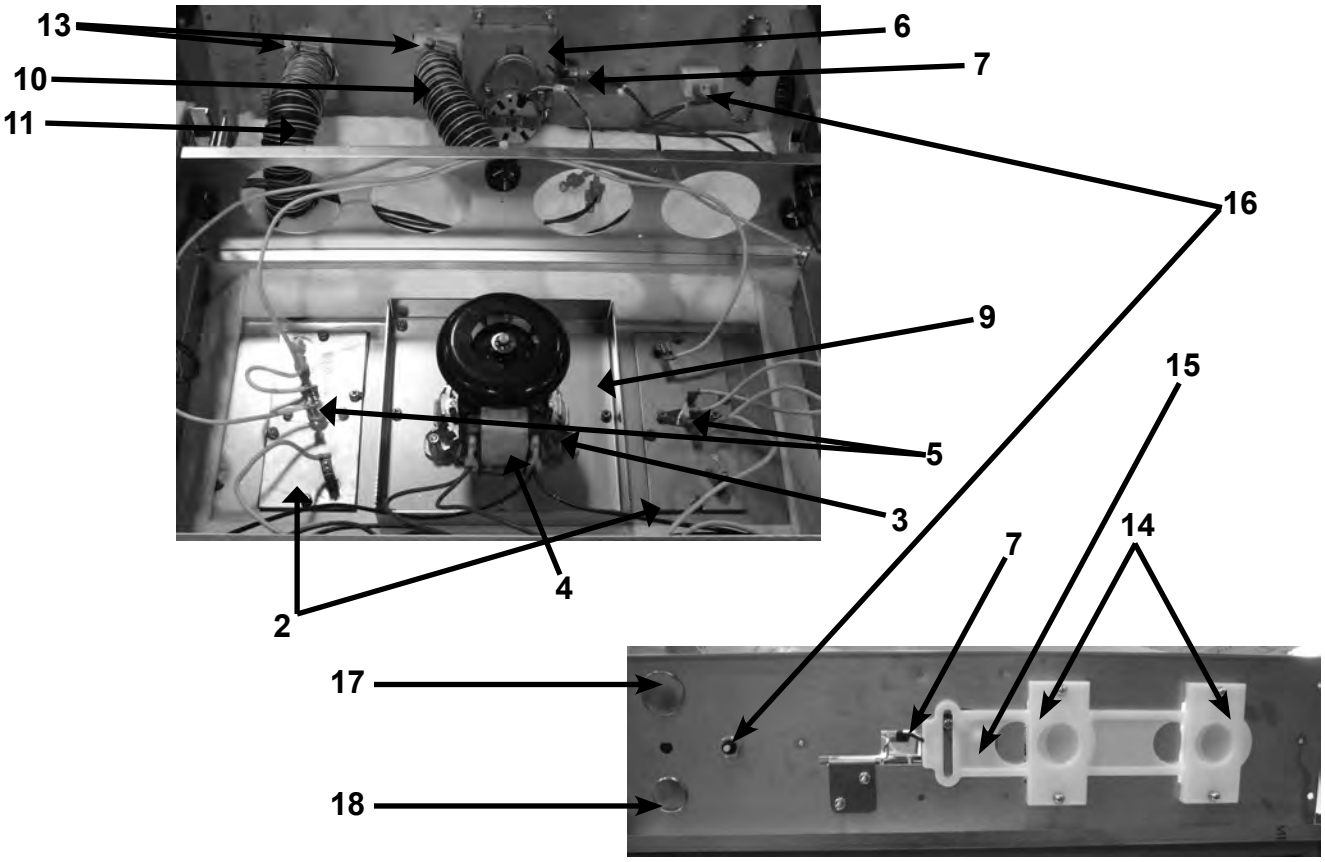
Recommend Parts: A=Truck Stock/B=Dist. Stock
*not shown



AHC-993 Countertop Model

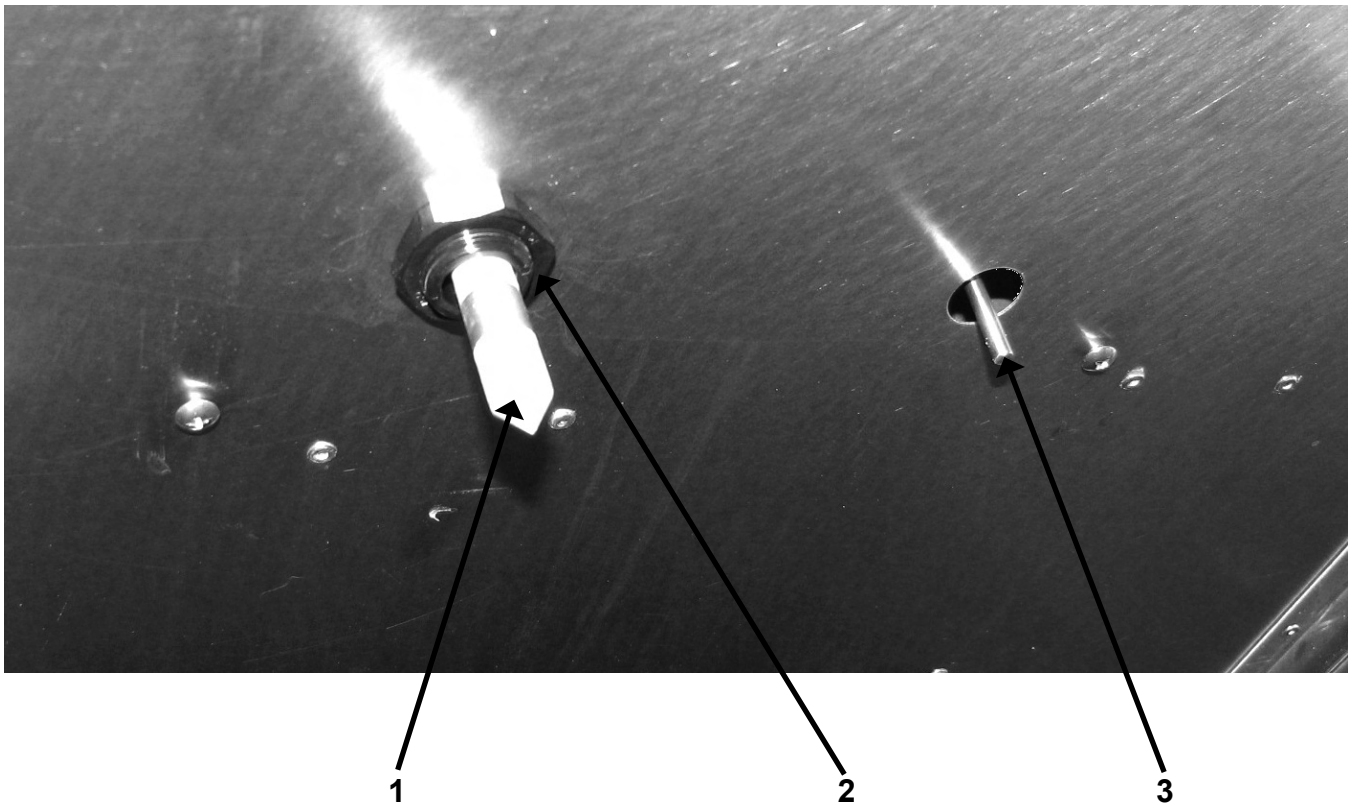
Item No.	Part No.	Description	Qty Per Door
1	87198	Assy-Door-Flip Complete - RH-1/3 Size	1
1	87934	Assy-Door-Flip Complete - LH-1/3 Size	1
B 2	94182	Assy-Flip Door-Top w/Cams	1
B 2	94184	Assy-Flip Door-Top w/Extrusion only	1
B 3	94183	Assy-Flip Door-Bottom w/Cams	1
B 3	94185	Assy-Flip Door-Bottom w/Extrusion only	1
4	71067	Rod-Flip-Door	1
5	71316	Spring-Flip Door	1
A 6	70768	Cam-Flip Door-RH	2
A 6	70769	Cam-Flip Door-LH	2
7	SC01-032	Screw	2
8	LW02-006	Lockwasher	2
9	NS03-024	Nut	2
B 10	14272	Kit-Door Handle	1
11	SC01-186	Screw	4
B 12	14271	Kit-Door Hinge	2
13	SC01-086	Screw	4
14	87199	Weld Assy-Flip Door Frame-RH-1/3 Size	1
14	87935	Weld Assy-Flip Door Frame-LH-1/3 Size	1
A 15*	12124	Spindle Lube	1
16*	97418	Service Pack-993 Flip Up Doors	1/Unit

Recommend Parts: A=Truck Stock/B=Dist. Stock



Item No.	Part No.	Description	Quantity
1*	26906	Power Cord 120V 20AMP	1
1*	72532	Power Cord Assembly - 120/30A TWIST LK- AHC-990/993	1
A 2	64126	Air Heater Assy-600W-120V (includes 63815 gasket) - AHC-993	2
A 2	64127	Air Heater Assy-900W-120V (includes 63815 gasket) - AHC-990	2
B 3	63360	Fan Blade - 5-3/8”	1
4	63362	Blower - Motor 208V	1
A 4	63363	Blower - Motor 120V	1
A 5	18201	Sensor - High Limit - 335 Deg.	2
B 6	63829	Assy - Vent Motor - 110	1
B 7	64098	Assy - Sealed Switch and Actuator	1
8*	63814	Gasket - Plate - Blower Motor Mounting	1
9	59496	Stud Assy-Motor Mounting Plate	1
10	63461	Vent Hose-Intake	1
11	63462	Vent Hose-Exhaust	1
13	93388	Track-Vent Slide-Channel	2
14	63473	Slide-Front	2
15	63469	Vent Slide	1
16	EF02-125	Breaker-Push Button	1
17	PL01-033	1 1/8 Plug Button	1
18	PL01-004	7/8 Plug Button	1

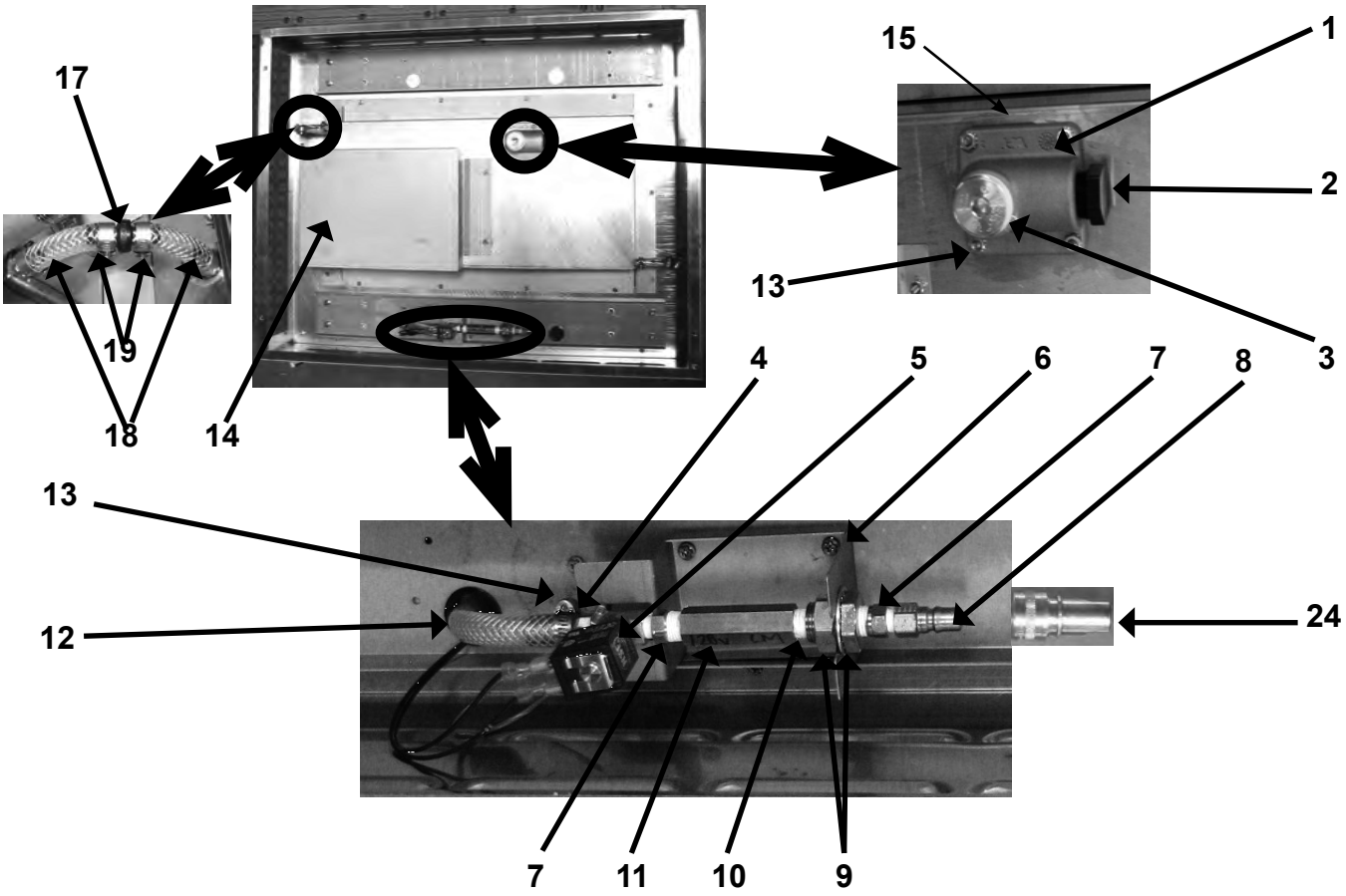
Recommend Parts: A=Truck Stock/B=Dist. Stock
*not shown



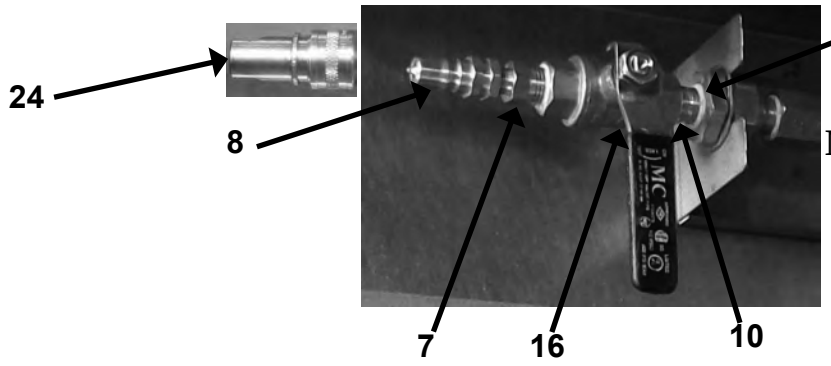
Item No.	Part No.	Description	Quantity
A 1	140135	Kit -AHC-993 Humidity Sensor	1
A 1	140212	Kit -AHC-990 Humidity Sensor	1
2	EF02-124	Strain Relief	1
A 3	81673	Probe-Air Temp	1
A 4*	14391	Kit - Calibration Board	1
5*	59383	Assy - Sensor Housing and Bracket	1

Recommend Parts: A=Truck Stock/B=Dist. Stock
*not shown

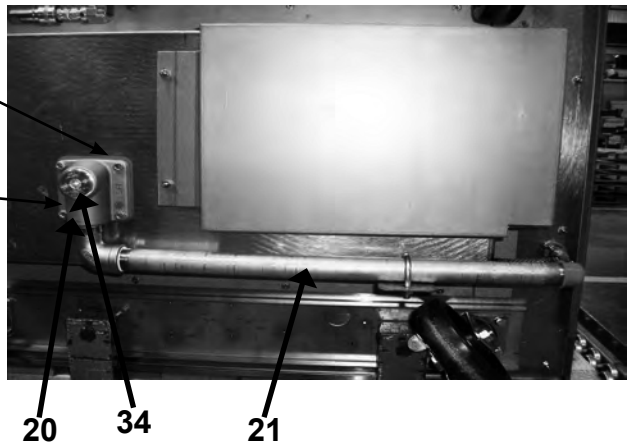
ALL UNITS BUILT BEFORE JAN. 1, 2012



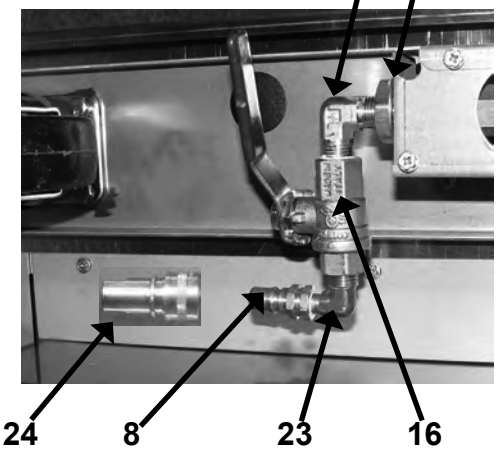
UNITS BUILT AFTER JAN. 1, 2012

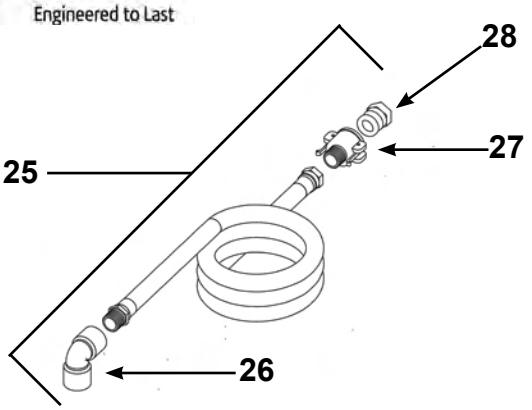


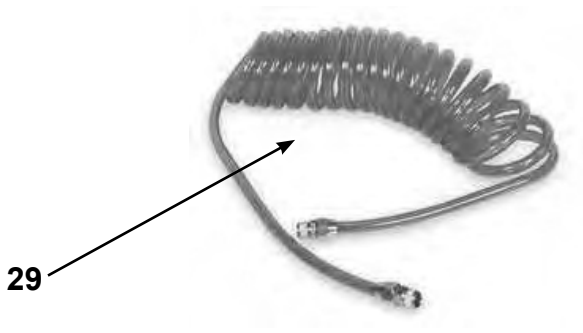
Model AHC-993



Model AHC-990

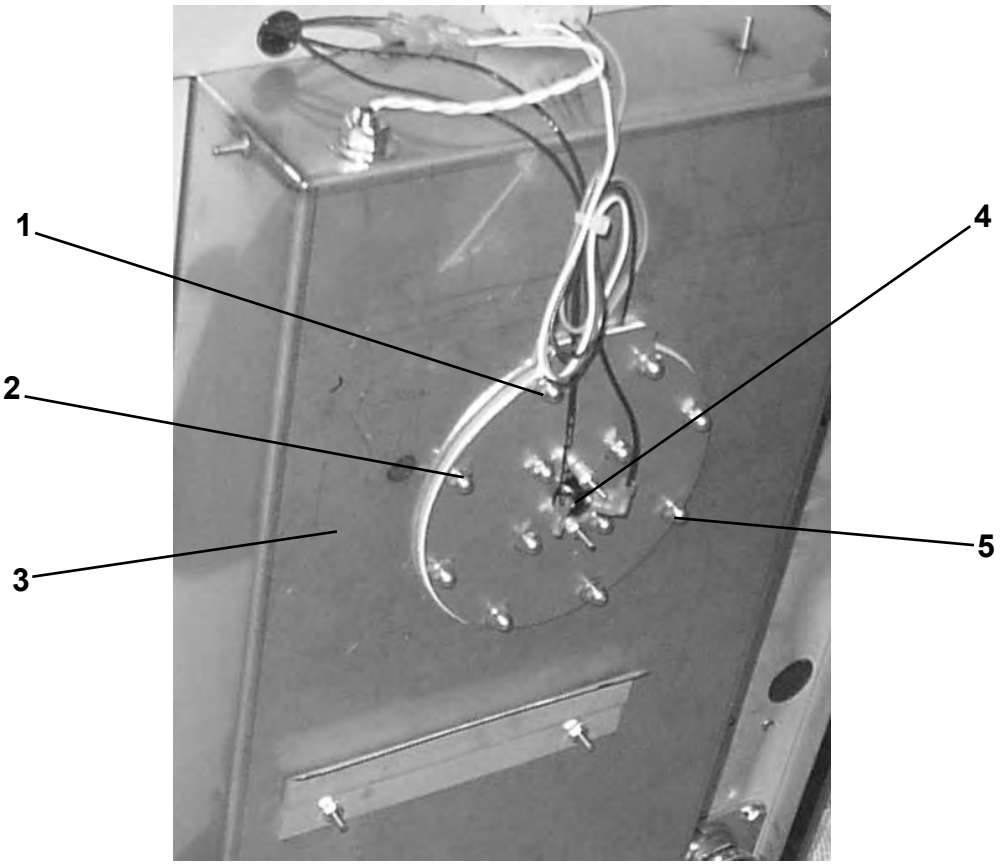






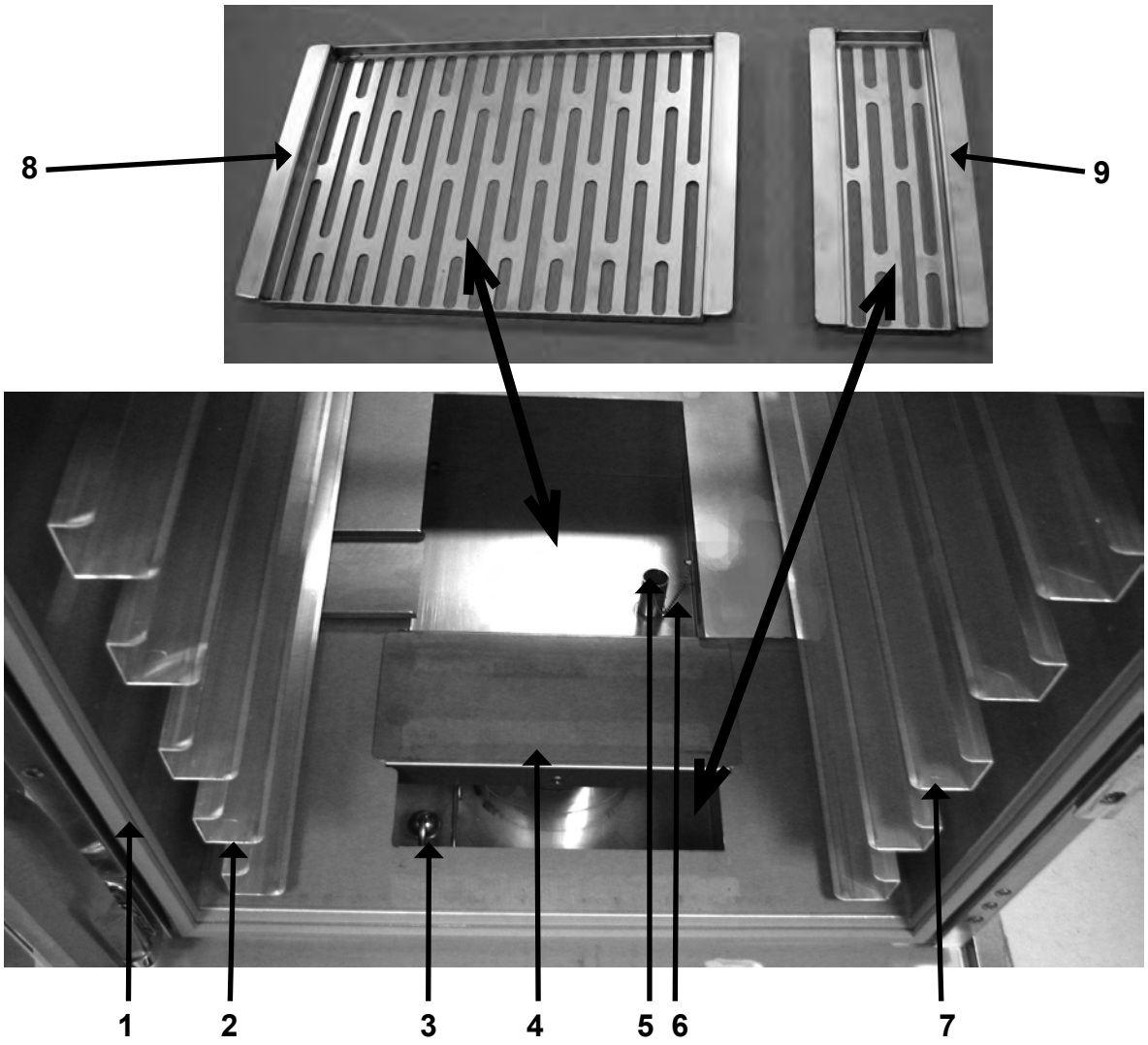
	Item No.	Part No.	Description	Quantity
	1	22472	Block-Drain	1
	2	FP01-009	Pipe Plug-3/4”	1
	3	FP01-021	Pipe Plug-1”	1
	4	FP01-152	Fitting-Barb	1
B	5	80701	Valve-Solenoid (120V)	1
	5	80700	Valve-Solenoid (208V)	1
	6	88518	Bracket-Solenoid Bottom	1
	7	FP01-012	Nipple Reducing (1/4 TO 1/8)	2
B	8	FP01-155	Plug - Quick Disconnect (male)	1
	9	FP01-013	Bulkhead Adapter	1
	10	FP02-009	Nipple-Close	1
B	11	83514	Strainer-Water	1
	12	26968-005	Hose	1
	13	MS01-263	Hose Clamp	1
	14	64351	Cover - Water Pan Heater	1
B	15*	90470	Gasket - Drain Block	1
B	16	93387	Flow Valve - 1/4 - Female - Ball (All units after 1/1/2012)	1
B	17	64154	Check Valve (993’s before 03/01/2011 & All 990’s)	1
	18	63463	Water Pan Hose - AHC-990	2
	18	26968-006	Water Pan Hose - AHC-993	1
	19	MS01-263	Clamp - Hose	2
	20	FP01-265	Elbow - 3/4” 90 Degree SS Street	1
	21	FP02-089	Nipple - 3/4” x 17” LG SS	1
	22	FP01-271	Elbow - 1/4” NPT Male 90 Degree Brass	1
	23	FP01-272	Elbow - 1/4 x 1/8 NPT Male Brass	1
B	24	FP01-154	Socket - Quick Disconnect (female)	1
B	25	03697	Accessory - AHC990 Drain Hose Assy.	1
	26	FP01-268	Elbow-FNPT 3/4 x 3/4 Plastic	1
	27	FP01-269	Coupling-Hose Socket 3/4	1
	28	FP01-270	Coupling-Hose Plug 3/4	1
	29	03705	Access- AHC 99X Water Inlet	2
	30*	FP01-275	Reducer- 1/8 MNPT to 1/4 FNPT BR	2
	31*	03706	AHC-990 Drain Cap & Plug	1
	32*	FP01-270	Coupling-Hose Plug 3/4	1
	33*	FP01-276	Cap-Hose Coupling 3/4	1
	34	FP01-274	Plug-Pip 1” SS	1

(#22 & #23 - If unit has standared elbows instead of male elbow,s remove elbow & close nipples and replace with FP01-271 or FP01-272)
Recommend Parts: A=Truck Stock/B=Dist. Stock / *not shown



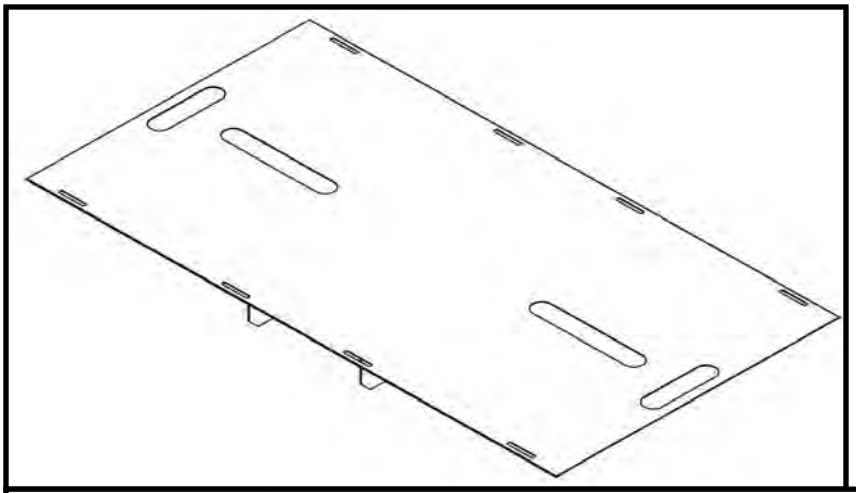
Item No.	Part No.	Description	Quantity
A 1	140170	Kit - Water Pan Heater - 120V	1
1	140171	Kit - Water Pan Heater - 208V	1
1	140172	Kit - Water Pan Heater - 240V	1
2	NS02-007	Nut Hex Keps - #8-32 C	12
3	140308	120V AHC-99X Water Pan Assy	1
3	140309	208V AHC-99X Water Pan Assy	1
3	140310	240V AHC-99X Water Pan Assy	1
A 4	63831	Hi Limit - Water Pan	1
5*	63810	Gasket - Tank Water Reservoir	1

Recommend Parts: A=Truck Stock/B=Dist. Stock
*not shown

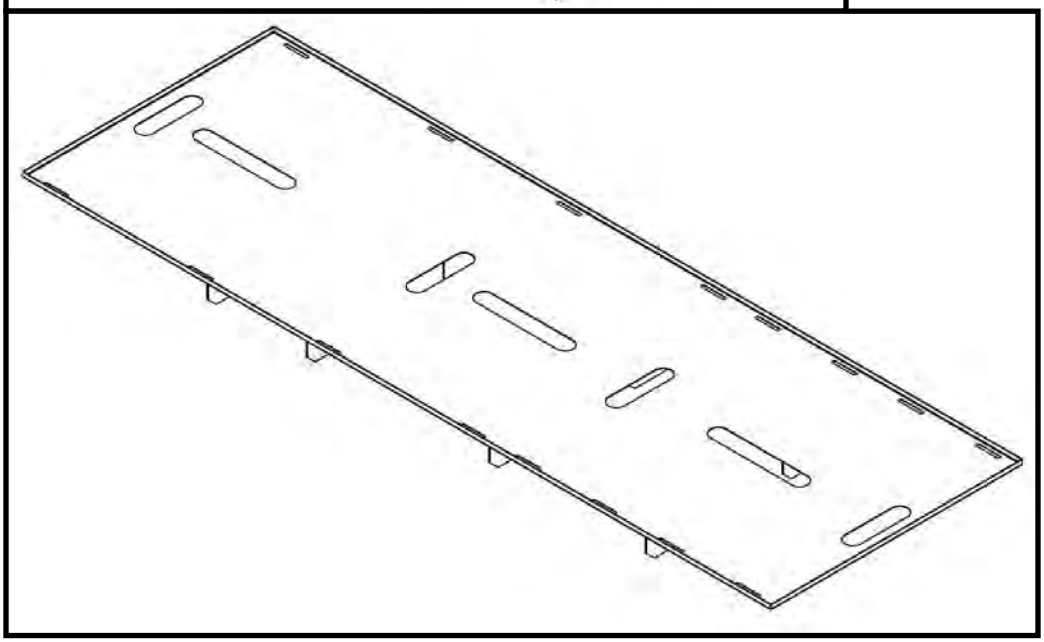


Item	No.	Part No.	Description	Quantity
B	1	25793	Gasket - Door - AHC-993	2
B	1	25643	Gasket - Door - AHC-990	4
	2	87203	Assy. - Air Duct - W/Scoop - AHC-993	1
	2	27895	Assy. - Air Duct - Upper - AHC-990 - 13 tray	2
	2	90784	Assy. - Air Duct - Lower - W/Scoop - AHC-990 - 13 tray	1
A	3	140245	Kit- Switch - Float Assembly	1
	4	63525	Assy-Water Pan Cover & Ring (concentration ring)	1
	4	SC01-076	Screw - #8-32 x 1/4 PH THD S	8
	4	ME50-048	Standoff - .25 dia. x .63 lg. #8-32 SS	4
B	5	28071	Overflow Tube	1
	6	79107	Chain Assy - Retaining	2
	7	91478	Assy. - Air Duct - W/O Scoop AHC-993 (5/25/2011 & after)	1
	7	91492	Assy.-13 Tray Air Duct-Lower-W/O Scoop-990 (5/25/2011 & after)	1
	8	88933	Cover - Slotted Rear Water Pan (Long)	1
	9	88936	Cover - Slotted Front Water Pan (Short)	1
	10*	93820	Screen - Drain	1
	11*	WA02-016	Washer-Teflone (located behind float switch)	1

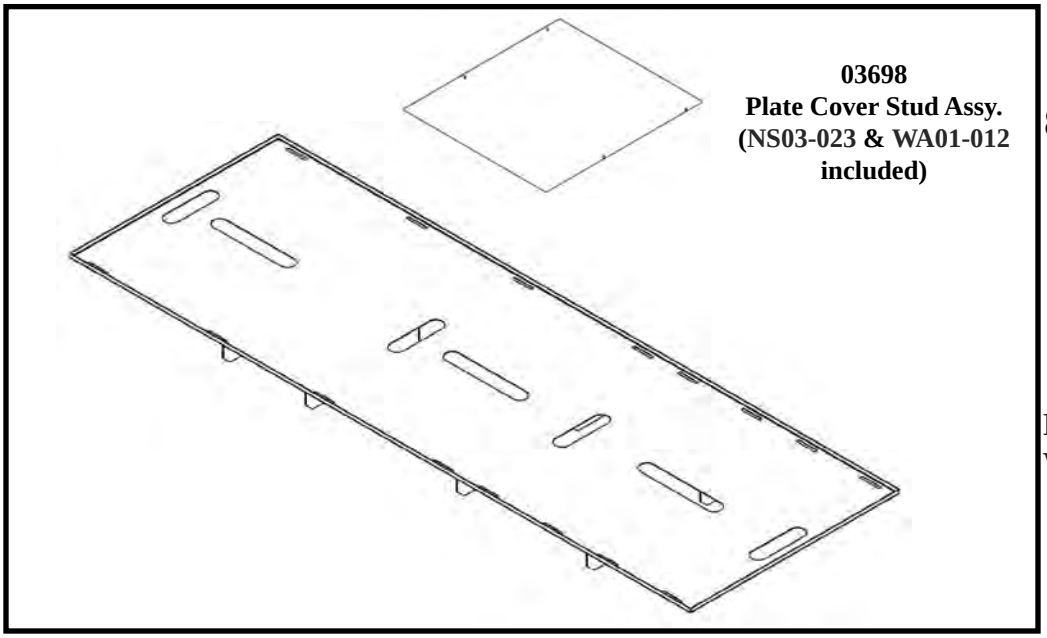
Recommend Parts: A=Truck Stock/B=Dist. Stock
*not shown



03681 - 5 ft. Adaptor Plate
(Replacing HCW-5 with 2 AHC-993's)



03689
8 ft. Adaptor Plate
(Replacing HCW-8 with 3 AHC-993's)



03700
8 ft. Adaptor Plate w/Cover
(Replacing HCW-8 with 2 AHC-993's)

(not shown:
NS03-023 - Acorn Nut
WA01-012 - Washer
quantities 4)