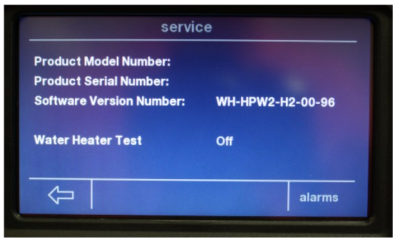
Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

No Power, Display, Fan or Compressor

Indications	**Display**
Nothing happens at all. No compressor motor; no fan; no display.	There is not a display code for this problem. Remember, the first thing we want to check is for the heater to be turned ON with the MODE selector.
Troubleshooting	**Solution**
1. See use and care manuals to turn unit ON and set operating MODE. 2. Check for the presence of power at the power connection plug. 3. If the display does not have any characters, then measure for 240V to the board between the black and red wires.	1. IF the touch screen display (TSD) is on, then enable heater by pressing the MODE button. 2. Set mode to Energy Saver and thermostat to 120^0F. 3. Heater may be in 'pre-warm' mode*. Verify 240V power at the lower/upper heating element screw terminals. 4. If there is power to the board and not TSD screen, then replace the primary control board. 5. If there is no power, check circuit breaker panel.

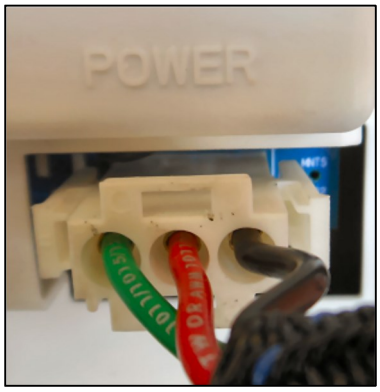
All current alarms and alarm history can be found by pressing "Service" then pressing "Alarms".

Setting MODE



Service

Alarms



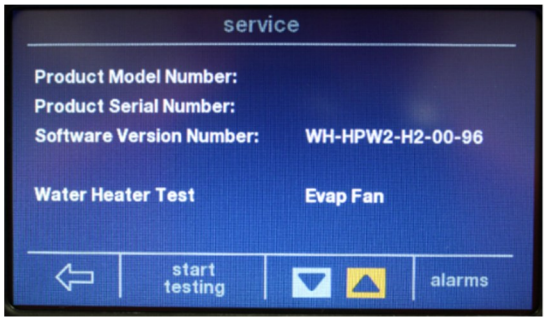
Control Power Plug Check

*When the control is powered up, or switched from "Water Heater OFF Mode" to an active mode or from the recovery of a tank thermistor failure and both the Lower Tank temperature is below 70^0F and the upper Tank temperature is below 75^0F, then the control enters a pre-warm mode before allowing a normal demand for heat. Pre-warm is not entered if tank temperature drops while running a normal heat demand.

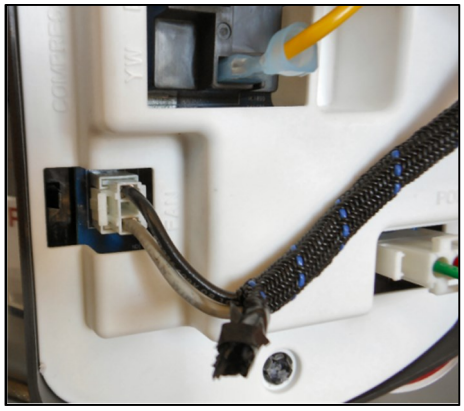
Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Fan does not run:

1. Place unit in operating mode that uses the FAN. (Heat Pump Only, Energy Saver or High Demand)
2. From the control panel locate the test mode screen:
    a. Press Service
    b. Press Test Mode
    c. Select EVAP FAN
    d. Press Start Testing
3. IF the fan runs, then the control board and fan are probably working properly.
4. Turn off test mode.



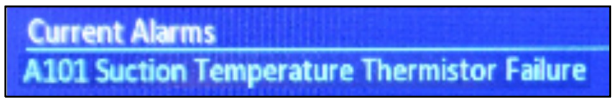
5. IF the fan does not run, the remove the control cover.
6. Locate the FAN connection Molex and measure for 240 volts AC between the black and grey wires with the Molex in place.
    a. If you have 240 volts AC, then set meter for AMP reading. (See your meter instructions on measuring AMPS!)
    b. Once you set your meter for AMPS, the fan should be ON. Measure for AMPS (any reading is fine) between the black and grey wires with the Molex in place.
    c. IF the fan does not RUN, then replace the fan assembly.
    d. IF the fan does run, then replace the control board.



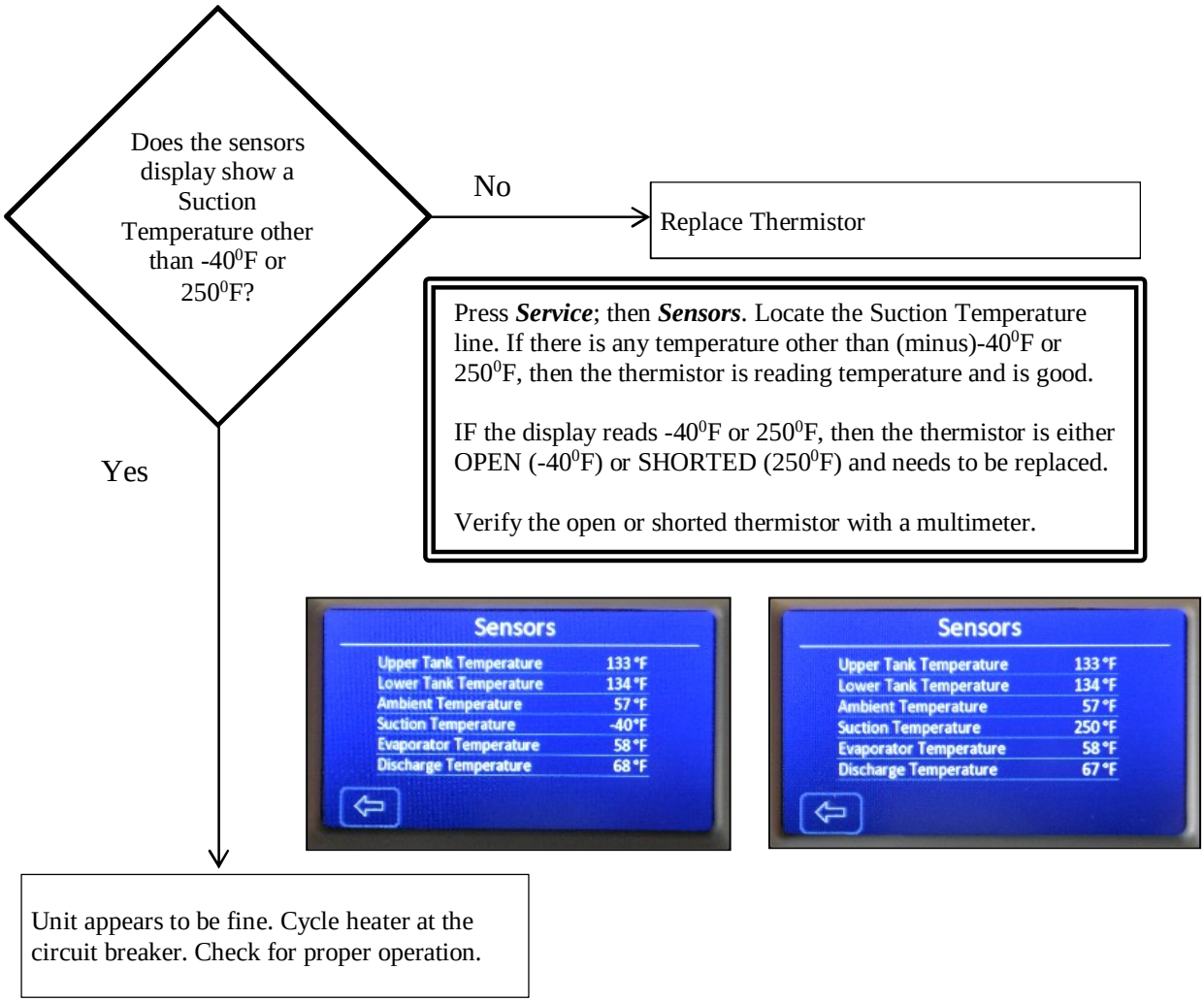
The control will energize electric heater elements if demand for heat exists and compressor is off because *Ambient temperature too high, Discharge Temperature Fault, Suction Temperature fault, Discharge - Suction Fault, Open High pressure switch*, or locked out due to too many faults (3 strike logic). The heater elements substitute for compressor until the fault clears and the anti-short cycle delay timer has expired.

Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Error A101 Suction Temperature Thermistor Failure

Indications	Display
Compressor Shutdown – Low Suction Thermistor Failure. This fault code indicates the thermistor is either in a 'short' or 'open' electrical status. The compressor remains locked out for the remainder of the heat demand.	**A101 Suction Temperature Thermistor Failure** 
Troubleshooting	**Solutions**
1. Thermistor damaged. 2. Control board is damaged	1. Replace thermistor 2. Replace control board

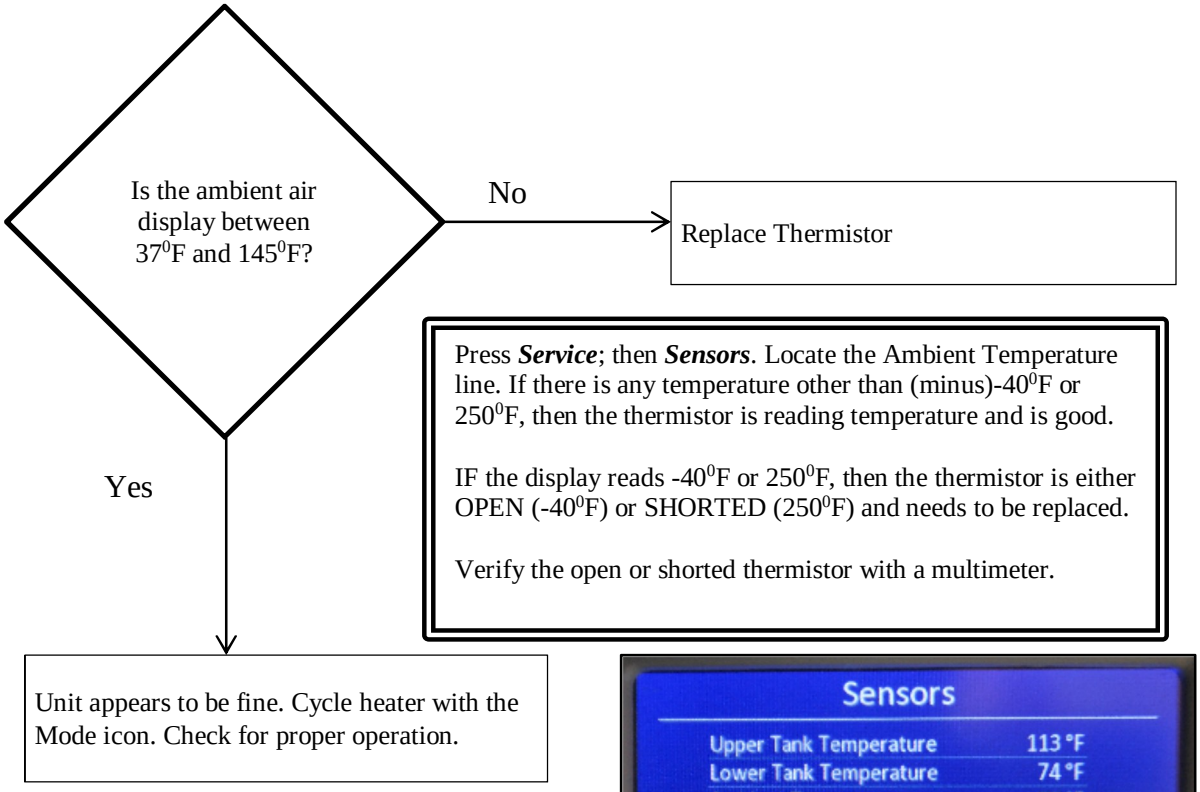
All supplied thermistors are Therm-O-Disc 11JH, grade 1; 10,000 ohms @ 25C.



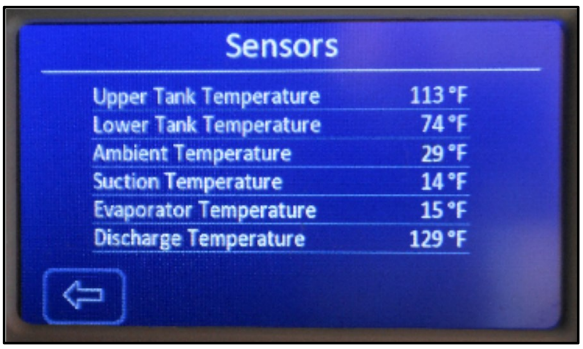
Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Error A102 Ambient Temperature Thermistor Failure

Indications	Display
Ambient Temperature Thermistor Failure - This fault code indicates the thermistor is either in a 'short' or 'open' electrical status. The compressor remains locked out for the remainder of the heat demand.	**A102 Ambient Temperature Thermistor Failure** 
Troubleshooting	**Solution**
1. Thermistor damaged. 2. Control board is damaged	1. Replace thermistor 2. Replace control board



Note: Gen4 HPWH will shut down all heating element operation at 145⁰F; and shut down the compressor at 160⁰F.



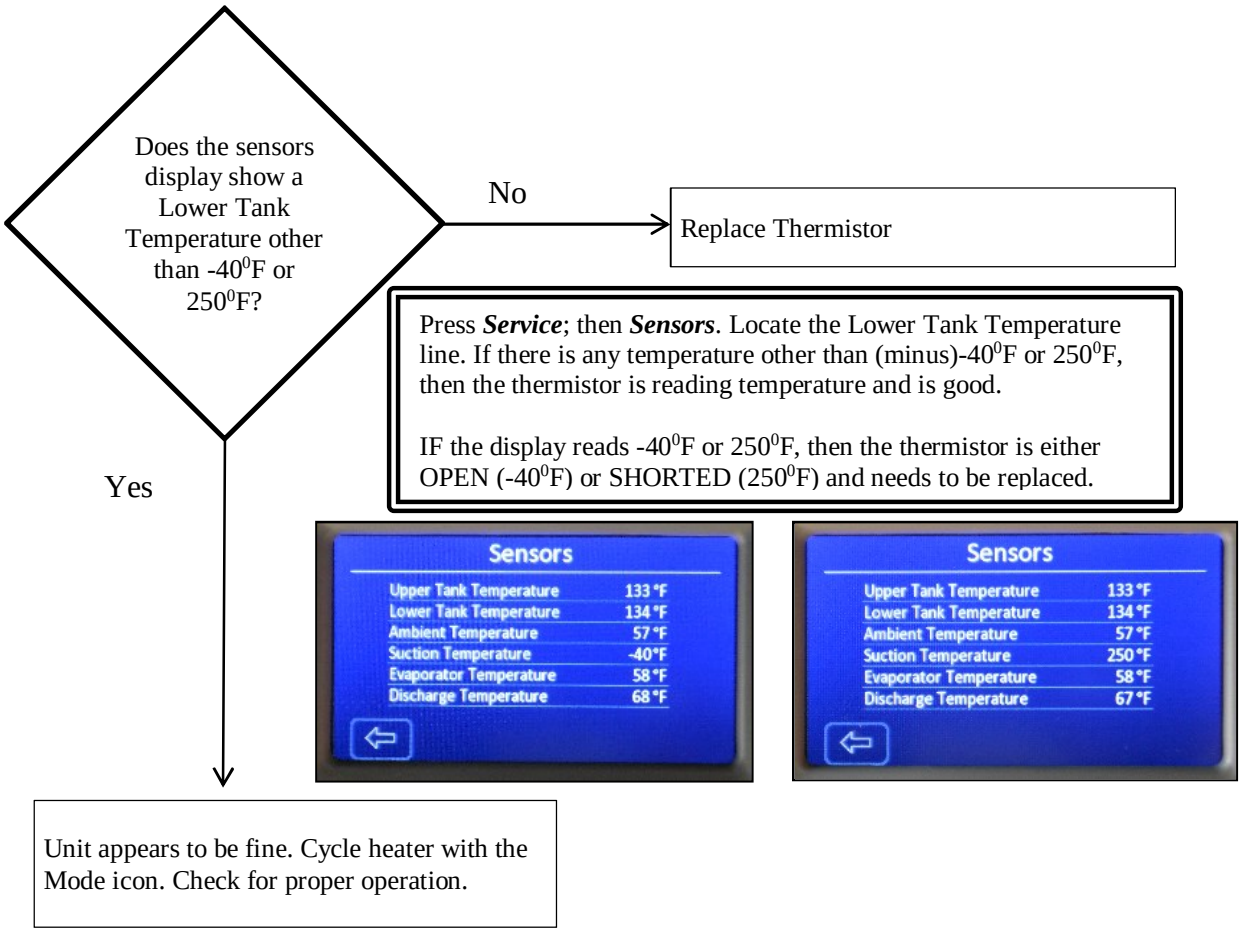
Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Error A103 Lower Heater Temp Thermistor Failure

Indications	Display
Lower Heater Temperature Thermistor Failure - This fault code indicates the thermistor is either in a 'short' or 'open' electrical status. The compressor remains locked out for the remainder of the heat demand. This thermistor is monitoring the lower tank temperature. *Only one heating element can be on at a time.*	**A103 Lower Heater Temp Thermistor Failure** 

Troubleshooting	Solution
1. Thermistor damaged. 2. Control board is damaged	1. Replace thermistor 2. Replace control board

Any failure of the upper or lower tank thermistors is a condition upon which no heat can be delivered either via electric heater elements or the heat pump. Additionally, if any of the following thermistors fail, compressor operation is not allowed: suction, ambient, evaporator and discharge temperature.



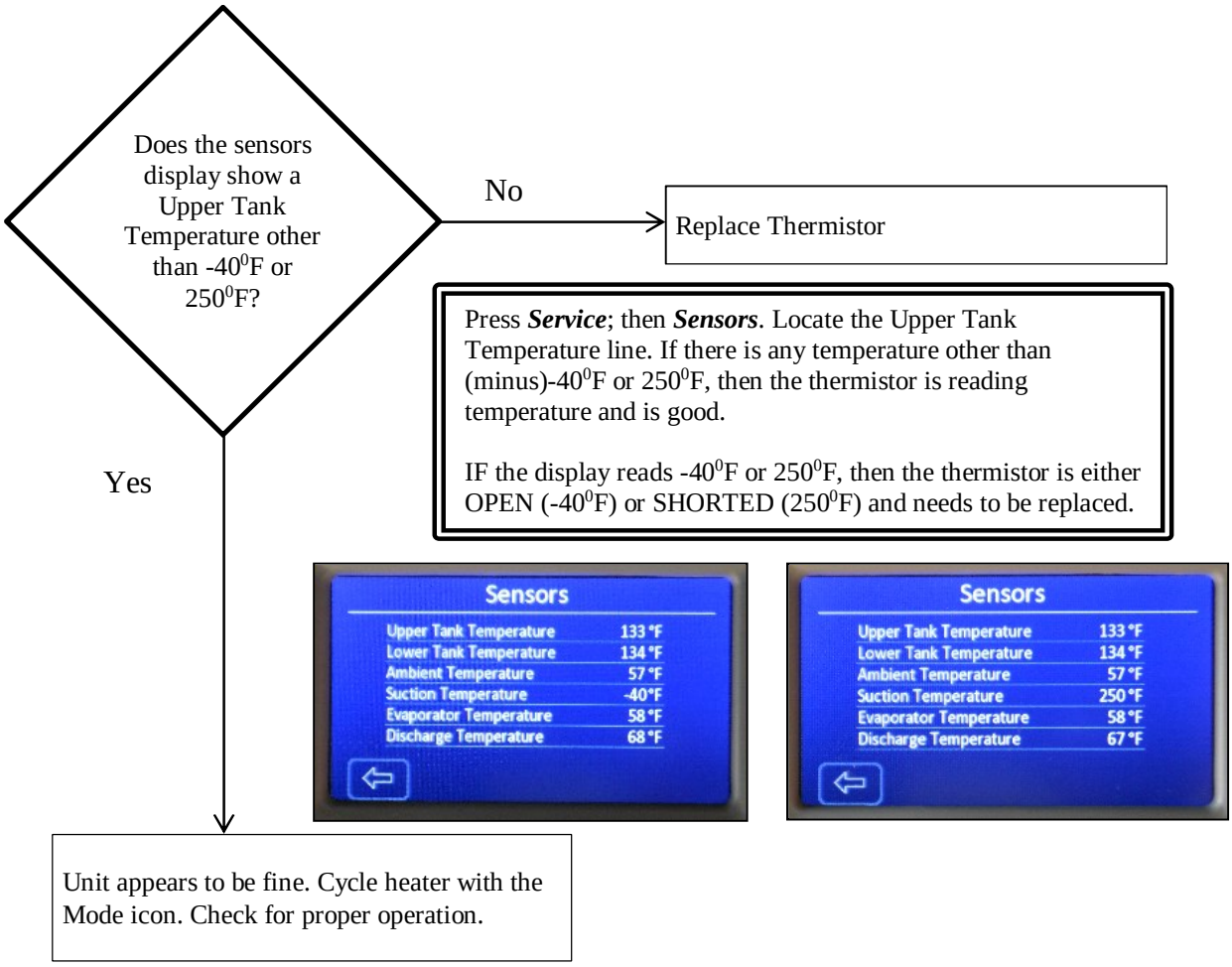
Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

Error A104 Upper Heater Temp Thermistor Failure

Indications	**Display**
Upper Heater Temperature Thermistor Failure - This fault code indicates the thermistor is either in a 'short' or 'open' electrical status. The compressor remains locked out for the remainder of the heat demand. This thermistor is monitoring the lower tank temperature. *Only one heating element can be on at a time.*	**A104 Upper Heater Temp Thermistor Failure** 
Troubleshooting	**Solutions**
1. Thermistor damaged. 2. Control board is damaged	1. Replace thermistor 2. Replace control board

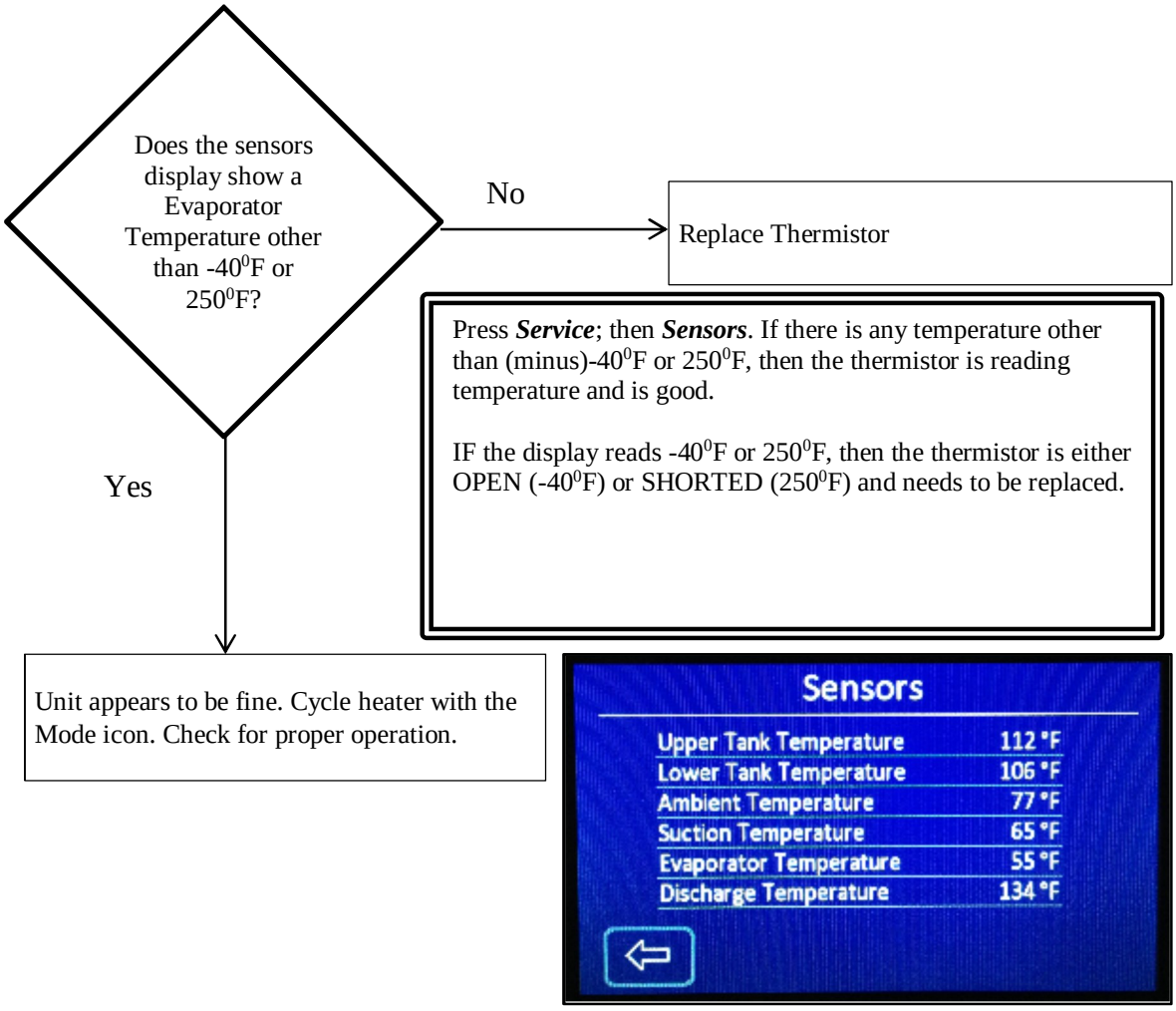
Any failure of the upper or lower tank thermistors is a condition upon which no heat can be delivered via either electric heating elements or the heat pump.



Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Error A105 Evaporator Temp Thermistor Failure

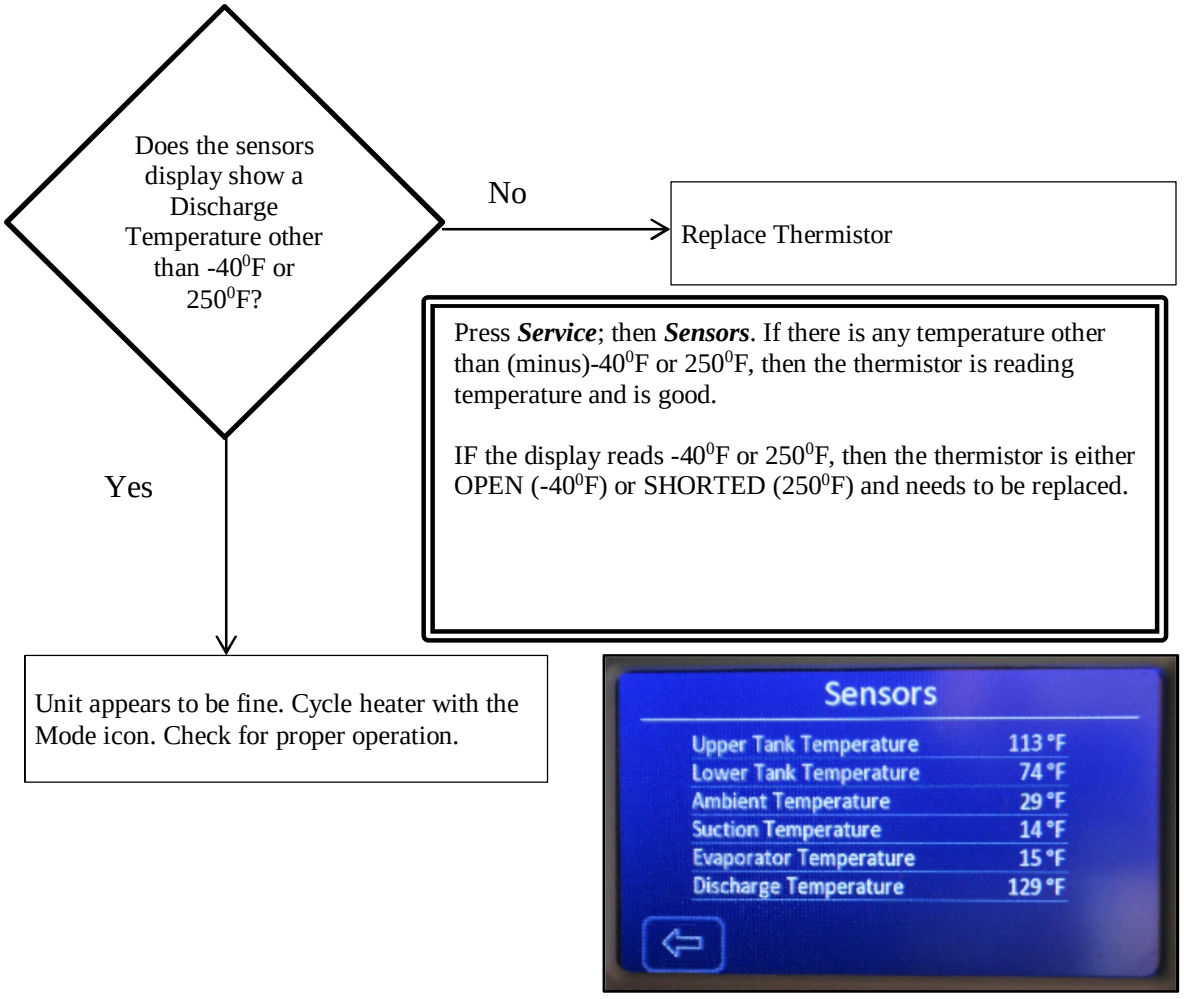
Indications	Display
Evaporator Temperature Thermistor Failure - This fault code indicates the thermistor is either in a 'short' or 'open' electrical status. The compressor remains locked out for the remainder of the heat demand. Electric heating elements complete the current water heating cycle.	**A105 Evaporator Temp Thermistor Failure** 
Troubleshooting	**Solutions**
1. Thermistor damaged. 2. Control board is damaged	1. Replace thermistor 2. Replace control board



Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Error A106 Discharge Temp Thermistor Failure

Indications	Display
Discharge Temperature Thermistor Failure - This fault code indicates the thermistor is either in a 'short' or 'open' electrical status. The compressor remains locked out for the remainder of the heat demand. remains locked out for the remainder of the heat demand. Electric heating elements complete the current water heating cycle.	**A106 Discharge Temp Thermistor Failure** 
Troubleshooting	**Solutions**
1. Thermistor damaged. 2. Control board is damaged	1. Replace thermistor 2. Replace control board

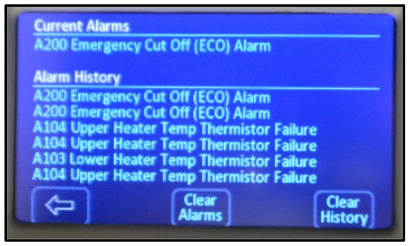


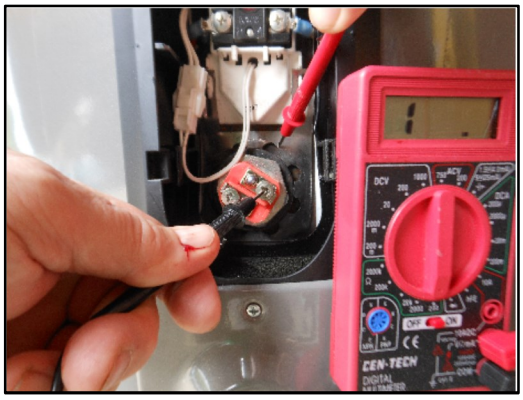
Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Error A200 Emergency Cut Off (ECO) Alarm

Indications	Display
If the emergency cut-off switch is detected by the control, the control will de-energize both compressor and electric heat element output relays. The switch itself will shut down electric and compressor heat as well.	**A200 Emergency Cut Off (ECO) Alarm** Current Alarms A200 Emergency Cut Off (ECO) Alarm
Troubleshooting	**Solutions**
This alarm indicated the mechanical ECO above the upper heating element has tripped. It sensed the water temperature, thru the tank steel, to be above 165^0F. Before resetting the ECO, check both the upper and lower heating elements for a grounded element.	1. Replace heating element if grounded. 2. Press RED reset button on the ECO 3. Check continuity 'top to bottom' on both sides of the ECO. If you have continuity between 1 and 2; and 3 and 4, then the ECO is not tripped.

From the Home screen, press Service, then Alarms.





To check for a grounded element, turn power off to Hybrid unit. Disconnect both wires on the heating element. Measure resistance from one of the two screws to the grounded tank. The circuit should be open (no resistance). If there is, replace heating element.

If the ECO is not tripped, but the control is still sending the alarm, replace the primary control board.

Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Error A004 Comp. Shutdown: Discharge-Suction Trip

Indications	**Display**
If compressor has run at least 5 minutes, and (Discharge Temp - Suction Temp) < 30^0F, the control will lock the compressor out for the remainder of the heat demand.	**A004 Comp. Shutdown: Discharge-Suction Trip**
Troubleshooting	**Solutions**
1. Confirm room sizing for adequate air space needed. 2. Go into the service screen and check all thermistor readings. (If compressor has been off for a bit then all thermistors should read about the same.) If it has been running then check readings and see if anything stands out as "suspicious. 3. Confirm the fan is running. This can be done by going into the test mode and testing fan. 4. Confirm how the unit was transported. Was it laying down in a truck or standing up. If we're getting A004 and the unit was transported laying down then most likely the refrigerant and compressor lubricants have gotten mixed together and the unit will have to be replaced. 5. Remove upper pan and inspection around compressor for refrigerant oil collecting on flat surfaces. 6. A. - check previous code history. If we have a lot of random codes in history then clear the history. Advise the customer to let the unit run for 24hrs and see what we have come back up. B. – If the only codes we are seeing is the A004 and all others checks are "good" then replace the control board with new software upgrade.	This can potentially be caused by: 1. Laying machine on its side while transporting causing improper R410A refrigerant movement 2. If the Discharge temp (higher temp after the compressor) is 30^0 less than the Suction temp (returning temp of 410A from the condenser), then a. Either the compressor is not working properly; b. Or the condenser is not releasing the heat into the tank water; c. Or the evaporator is not transferring enough heat into the refrigerant before it enters the compressor d. Or the R410A is below or above specifications

Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

A004 Comp. Shutdown: Discharge-Suction Trip

Is the discharge temp reading minus the suction temperature reading more than 30^0F?

No → See troubleshooting notes above.

Press ***Service***; then ***Sensors***. Locate the Discharge Temperature line and the Suction temp line. Subtract the suction from the discharge. The product should be => 35^0F.

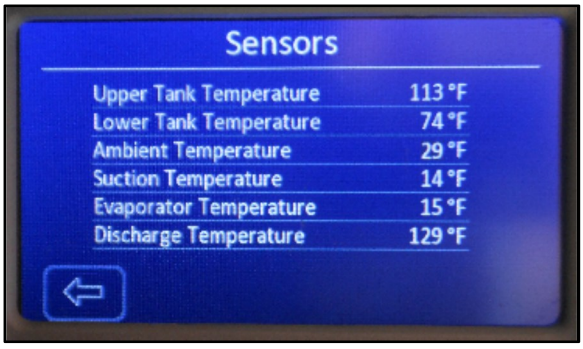
IF the display reads -40^0F or 250^0F, then the thermistor is either OPEN (-40^0F) or SHORTED (250^0F) and needs to be replaced.

Verify the open or shorted thermistor with a multimeter.

The unit defaults into electric heat only for the balance of the heating cycle; then reverts to previous mode if discharge temperatures are OK.

Yes

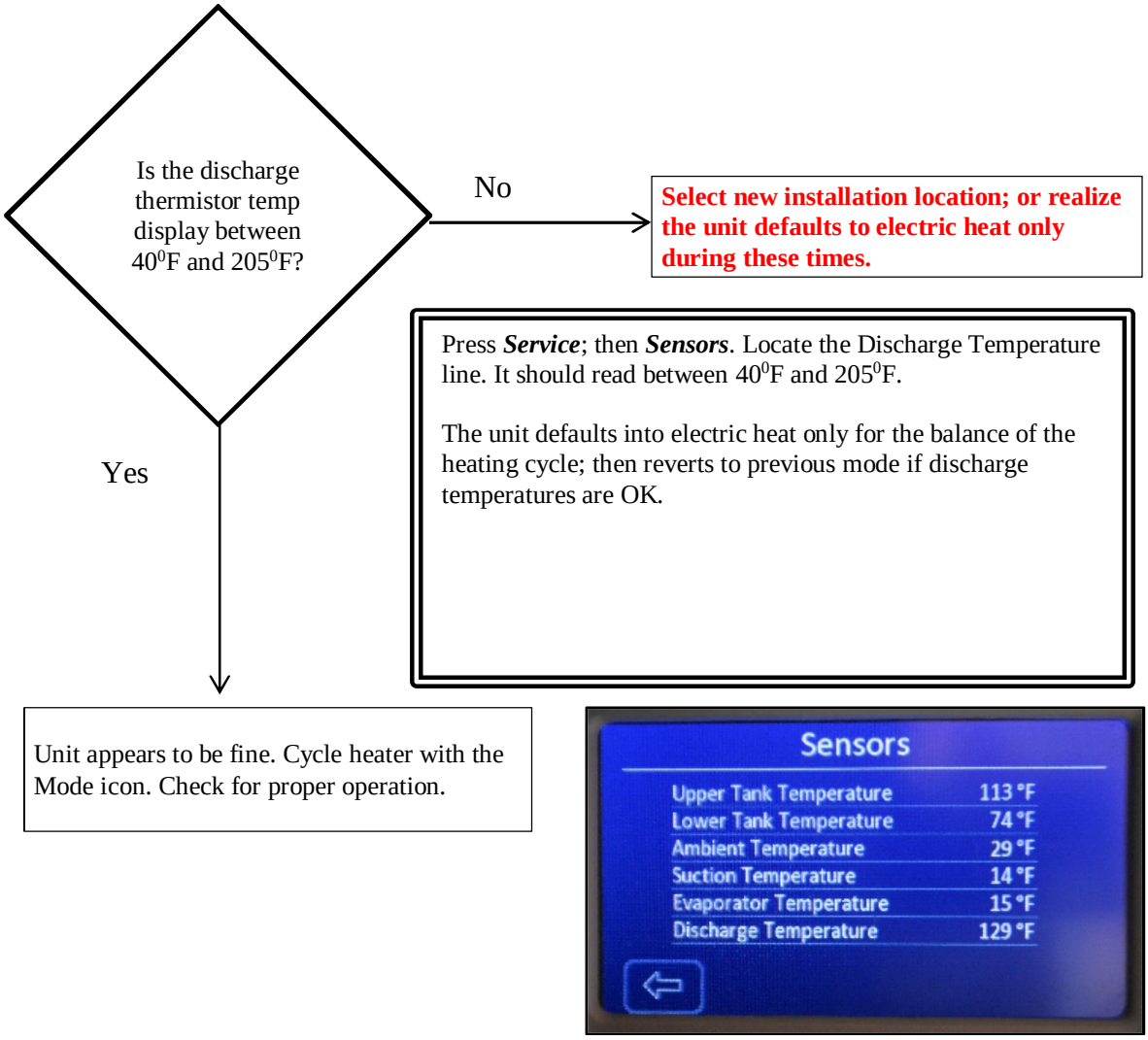
Unit appears to be fine. Cycle heater with the Mode icon. Check for proper operation.



Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

Error A005 Compressor Shutdown: Discharge Temp High

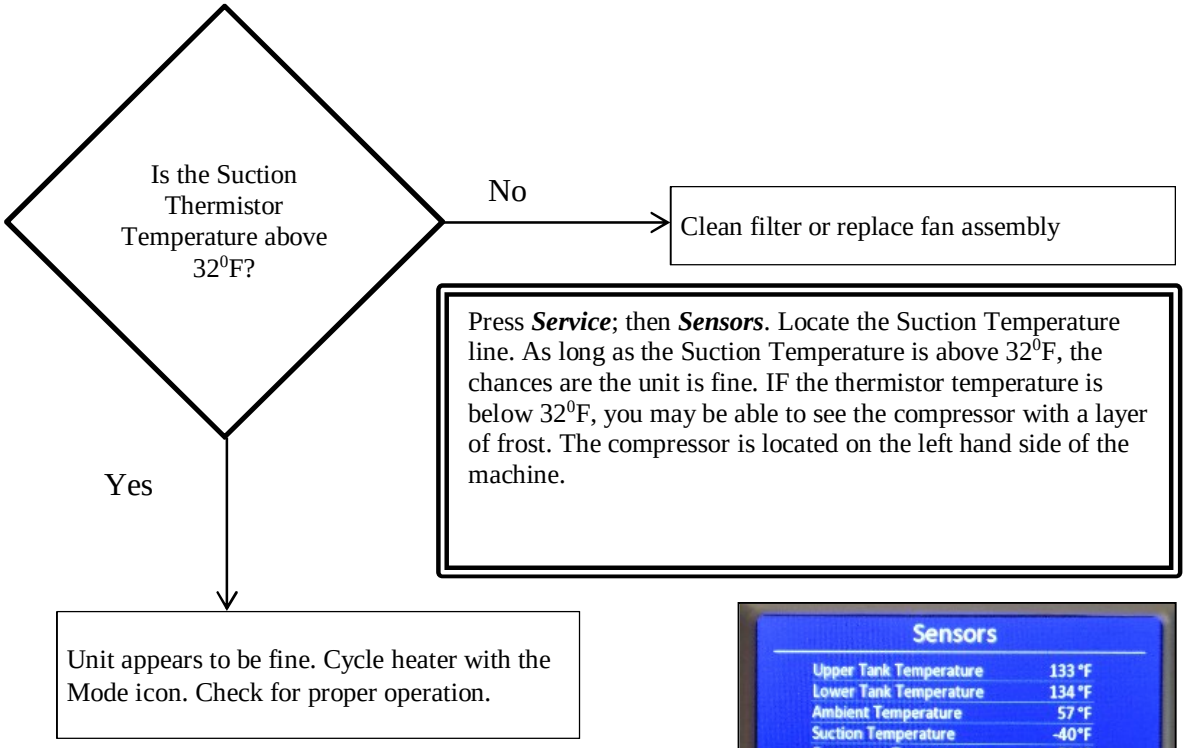
Indications	Display
The control shuts compressor off if discharge temperature is above @ 205dF. The compressor is allowed to run again after the anti-short cycle timer has expired provided the compressor has shut down less than 3 times during this demand cycle for heat. The electric heating elements are allowed to come off for the remainder of the demand cycle.	**A005 Compressor Shutdown: Discharge Temp High**
Troubleshooting	**Solutions**

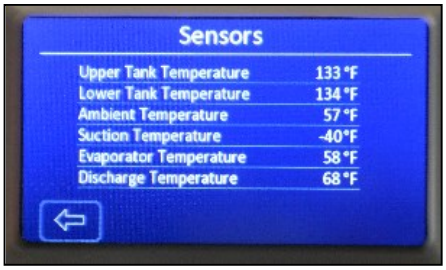


Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Error A006 Compressor Shutdown: Suction Temperature Low

Indications	Display
Suction temperature below 32^0F for more than 8 minutes. The control ignores suction temperature for the first 300 seconds of each compressor cycle. The control ignores the suction temperature an additional 90 seconds after the evaporator fan speed has stepped up to high because of low suction temperature. The control shuts off the compressor if suction temperature remains below 32^0F for 480 seconds. The compressor is allowed to run again after the anti-short cycle timer has expired provided the compressor has shut down less than 3 times during this demand cycle for heat.	**A006 Compressor Shutdown: Suction Temp Low**
Troubleshooting	**Solutions**
1. Check filter 2. Check that FAN is running	1. Clean and replace filter assembly 2. Replace fan

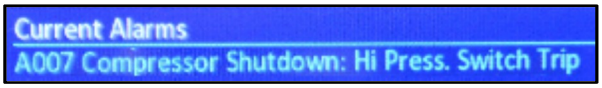




See also Section 1 No Power, No Controller, No Fan for more troubleshooting on fan.

Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

Error A007 Compressor Shutdown: Hi Press. Switch Trip

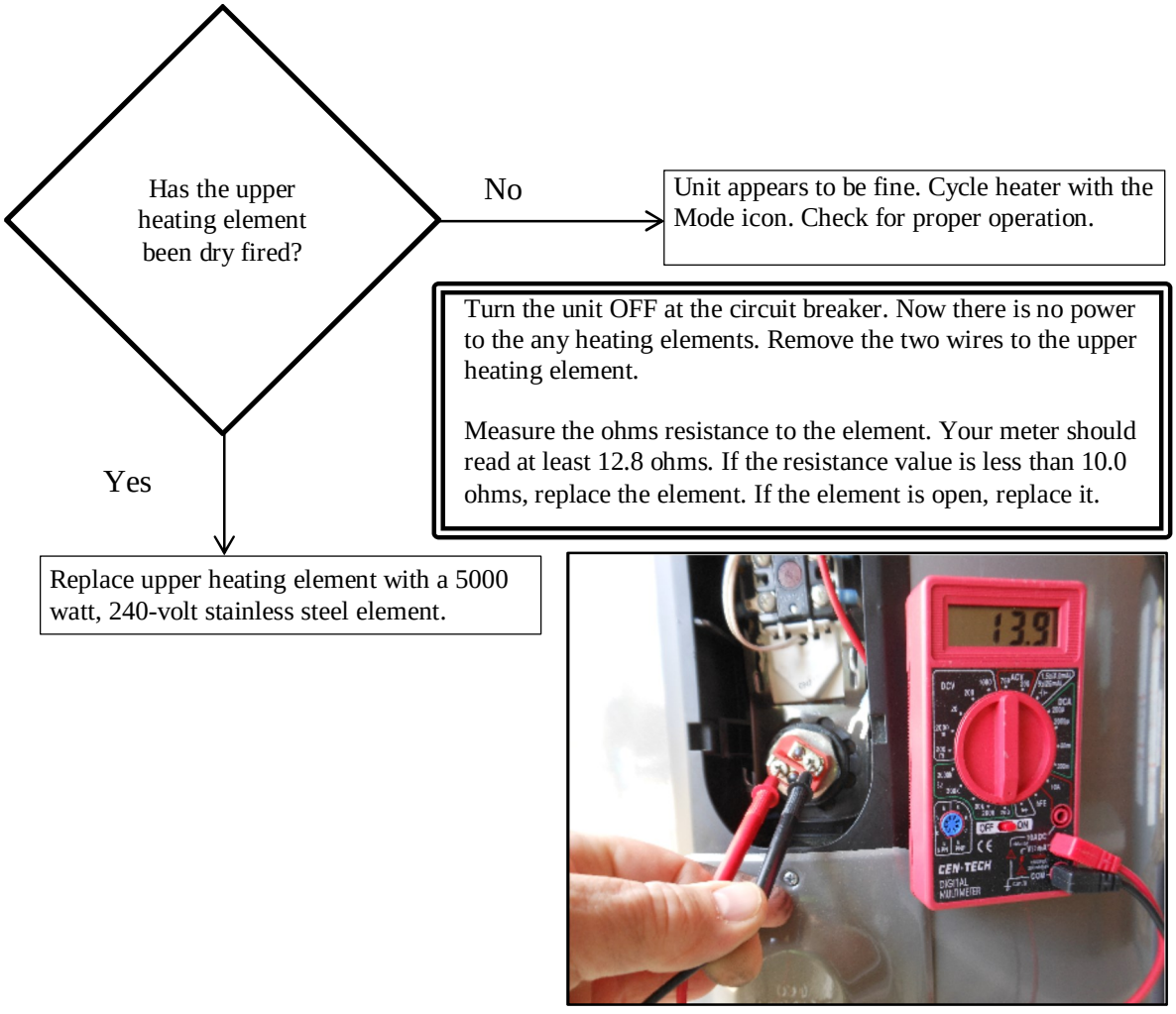
Indications	Display
The high pressure switch is part of the HPWH system that monitors the R410a refrigerant pressure. The control de-energizes compressor if the high pressure switch is open. The compressor is allowed to run again after the anti-short cycle timer has expired provided compressor has shut down less than 3 times during this demand cycle for heat.	**A007 Compressor Shutdown: Hi Press. Switch Trip** 
Troubleshooting	**Solutions**
In most cases, this alarm is because the refrigerant has not had time to transfer its heat into the water inside the tank. The returning refrigerant is at a higher temperature than normal and creates a higher pressure inside the HPWH system.	1. Lower tank thermostat to less than 135^0F 2. Move from High Demand Mode to Energy Saver Mode

Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Error A008 Detected Dry Fire Condition

Indications	Display
Control senses the conditions are present to dry fire the upper heating element and goes into alarm mode. Control samples upper tank thermistor; then turns on upper element for 30 seconds; then OFF. If upper tank thermistor temperature rises more than 2.5^{O}F in 45 seconds, then control locks out.	**A008 Detected Dry Fire Condition** 

Troubleshooting	Solutions
None. You do need to verify the upper heating element has not been damaged with an OHMS resistance test.	Fill tank and purge all air from the storage area by running a hot water faucet for 60 seconds. This unit has a hot outlet "J" tube. Purging from the T&P valve will not work to void all air from the storage tank.



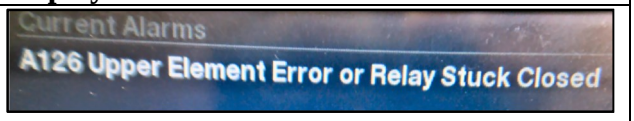
Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

Error A001 Configuration Data Restore Failure

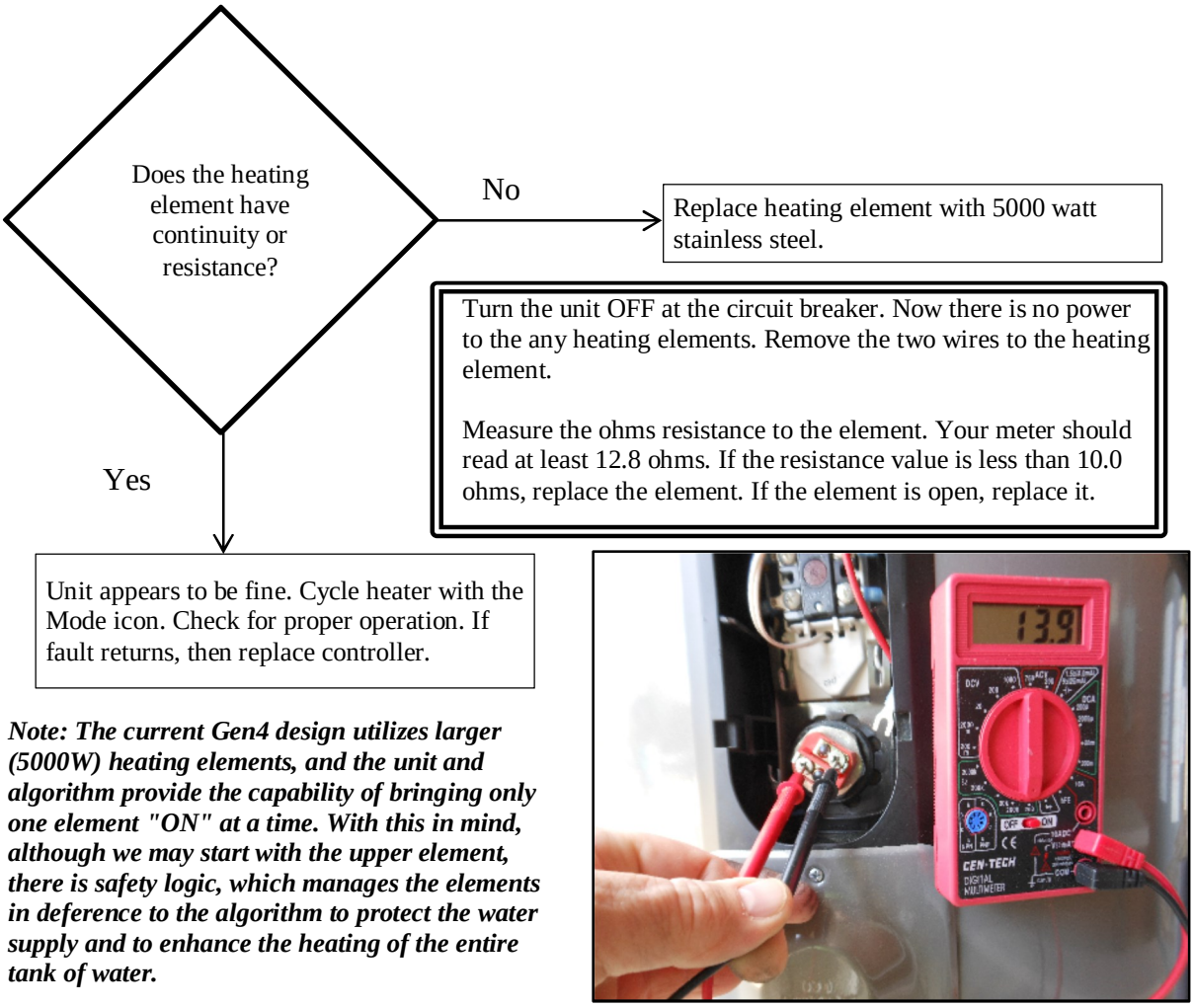
Indications	Display
This alarm means that the control board configurations were verified as faulty on a "restore". In general, the control will run on defaults but board replacement may be advised.	**A001 Configuration Data Restore Failure**
Troubleshooting	**Solutions**
None. This is all about software and data configuration. The control knows what it needs to do. Cycle heater at the circuit breaker. Check for proper operation.	Replace the control.

Heat Pump Water Heater (Generation 4) Troubleshooting (Effective 1 Nov 2016)

Error A125/126 Lower/Upper Element Error or Relay Stuck Closed

Indications	Display
The control board logic can detect 4 heating element errors: • lower element not connected or open • upper element not connected or open • lower element relay stuck on • upper element relay stuck on	

Troubleshooting	Solutions
1. Check resistance of the heating element	1. Replace element 2. Replace control board



Note: The current Gen4 design utilizes larger (5000W) heating elements, and the unit and algorithm provide the capability of bringing only one element "ON" at a time. With this in mind, although we may start with the upper element, there is safety logic, which manages the elements in deference to the algorithm to protect the water supply and to enhance the heating of the entire tank of water.

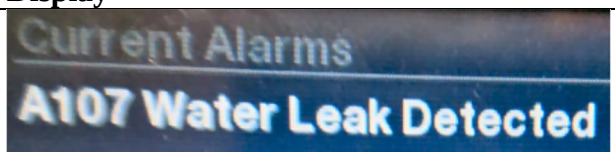
Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

Error A128/129 Lower/Upper Element Relay Failure to Close Error

Indications	Display
The A2D (analog to digital) converters for the hybrid are integrated into the controller. In order to qualify the operation of the converters it is reasonable to assume that the A2D counts for either the upper or lower tank temperatures must change periodically. If not, they can be assumed to be "stuck" whereby the unit will disable heating and call out one of these alarms. If the control board detects that its internal A2D converters are not functioning for 4 minutes continuously, an alarm will be generated.	
Troubleshooting	**Solutions**
1. Cycle heater at the circuit breaker and return to normal operations. If the fault code returns, replace the control board.	1. Replace control board

Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

Error A107 Water Leak Detected

Indications	Display
This alarm indicates the control board senses water in the drain pan (potential water heater leaking). The leak detector rope is placed in the drain pan and will tell the control board if it comes in contact with water.	

Troubleshooting	Solutions
1. Inspect the area of the leak detector rope for water 2. Check that the T&P valve is not operating due to thermal expansion	1. Remove leak detector rope and let it dry out (false alarm) 2. Replace tank due to internal tank leak

Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

Error A110 Lower Temperature Conversion Stuck Error
A111 Upper Temperature Conversion Stuck Error
A112 Upper/Lower Temperature Conversion Stuck Error
A113 A2D Reference Conversion Drift Error

Indications	Display
The A2D (analog to digital) converters for the hybrid are integrated into the controller. In order to qualify the operation of the converters it is reasonable to assume that the A2D counts for either the upper or lower tank temperatures must change periodically. If not, they can be assumed to be "stuck" whereby the unit will disable heating and call out one of these alarms. If the control board detects that its internal A2D converters are not functioning for 4 minutes continuously, an alarm will be generated.	**A110 Lower Temperature Conversion Stuck Error** **A111 Upper Temperature Conversion Stuck Error** **A112 Upper/Lower Temperature Conversion Stuck Error** **A113 A2D Reference Conversion Drift Error**
Troubleshooting	**Solutions**
1. Cycle heater at the circuit breaker and return to normal operations. If the fault code returns, replace the control board.	1. Replace controller

These faults mostly have to do with the controls boards reading (digital) of the resistance readings of the various thermistors (analog).

Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

Error T131 Clean Filter Reminder

Indications	**Display**
This alert means that the fan has run more than 1000 hours. No action other than alerting the customer. Clearing the alarm from the display will reset it for another 1000 hours.	
Troubleshooting	**Solutions**
None. This is a maintenance alert only.	Routine air filter cleaning is required for best performance. Clean by washing with mild detergent and water. Dry and replace. Reset and clear alarm.

Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)

Error T132 Water Heater difficulty satisfying demand

Indications	**Display**
This alarm means there has been a demand cycle for greater than 10 hours and has not satisfied. No action other than alerting the customer.	Check for system leaks, open faucets, pipes, etc
Troubleshooting	**Solutions**
This alarm may indicate a pipe leak, slab leak, faucet left on, dishwasher or clothes washer leak. This fault code can also appear if the cold water inlet temperature is very cold (35-45 degrees) and the hot water in the HPWH was totally used. More probable on the 65 and 80 gallon chassis while in Heat Pump Only mode.	Check and turn off all water faucets. Then check water meter to home. If water flow meter is turning, there is a hidden hot water leak somewhere not related to the water heater.

Heat Pump Water Heater (Generation 4)
Troubleshooting (Effective 1 Nov 2016)