

III FOR SERVICE TECHNICIAN USE ONLY III

GE Appliances GeoSpring™

Hybrid Heat Pump Residential

PF40S10*P*, PH40S10*P*, PF50S10*P*, PH50S10*N*, PH50S10*P*,
PF65S10*P*, PH65S10*N*, PH65S10*P*, PF80S10*P*, PH80S10*N*,
PH80S10*P*, PJ40S10*P*, PJ50S10*P*, PJ65S10*P*, PJ80S10*P*.

IMPORTANT SAFETY NOTICE

This information is intended for use by individuals possessing adequate background of electrical, electronic and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use. This quick reference guide is provided for information purposes only and does not replace, modify or change in any manner the Owner's Manual and Installation Instructions.

DISCONNECT POWER BEFORE SERVICING IMPORTANT- RECONNECT ALL GROUNDING DEVICES

All parts of this appliance capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts or washers used to complete a path to ground are removed for service, they must be returned to their original condition and properly fastened.

⚠ CAUTION

Double wall heat exchanger, suitable for potable water connection.

SPECIFICATIONS

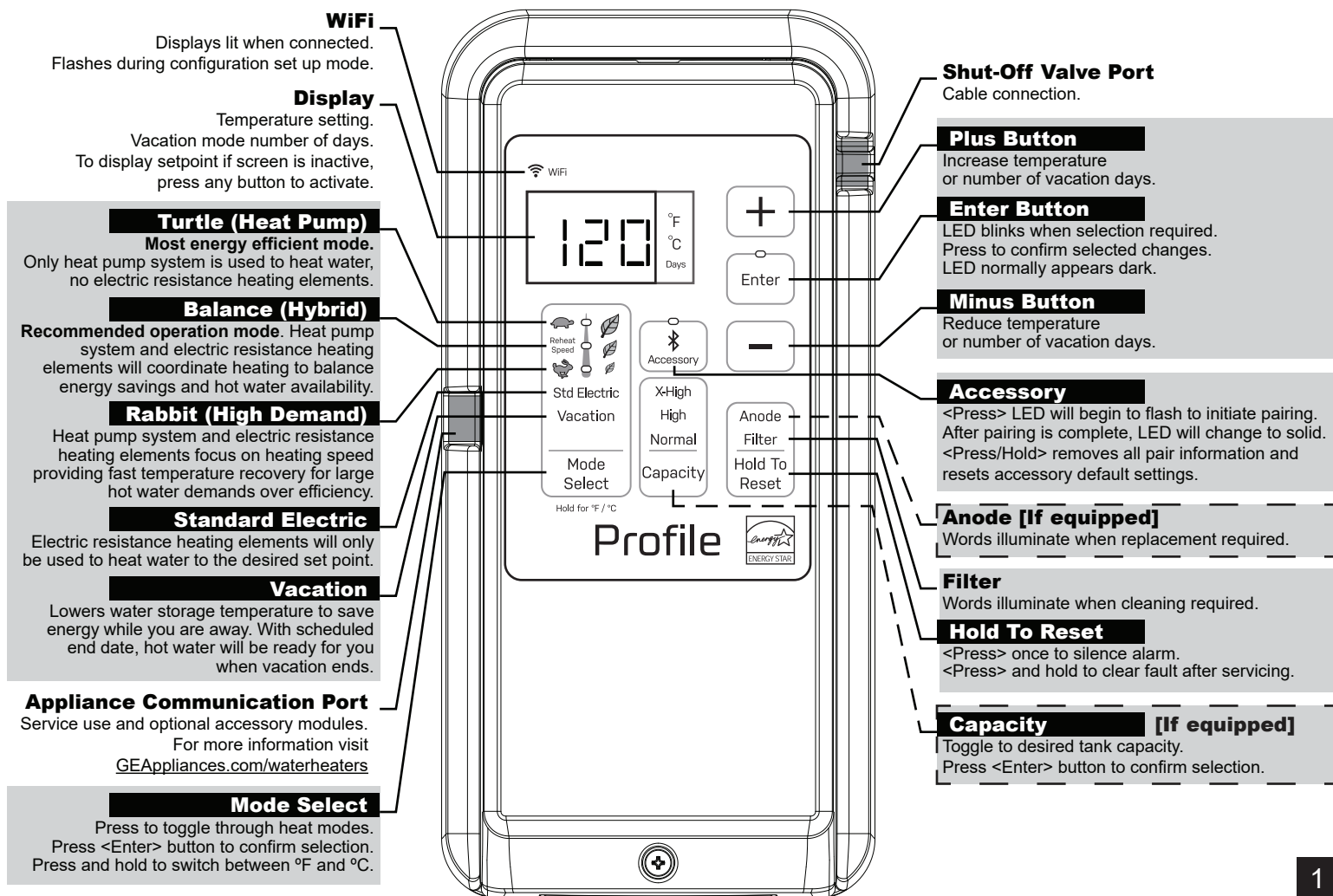
Capacity..... 40/50/65/80 US Gal
Tank Max Working Pressure..... 150 PSI/1034 kPa
Water Delivery Temperature Setpoint Range..... 100° F-150° F

MODEL SPECIFIC (Refer to Rating Plate on Product):

Electrical..... 120 VAC/60 Hz or [240/208 VAC 60 Hz]
Circuit Breaker..... Refer to Rating Plate MOP
Upper Element..... 120V models: 900W (3600W @ 240V)
Upper Element..... 240V models: 3600W or (5500W @ 240V)
Lower Element..... 120V models: 900W (3600W @ 240V)
Upper Element..... 240V models: 3600W or (5500W @ 240V)

REFRIGERATION SYSTEM

Refrigerant Charge (R1234YF) 40/50Gal 30 oz. (850g)
65/80Gal 32 oz. (900g)
Max High Side Pressure..... 350 psig (2.41 MPa)
Max Low Side Pressure..... 187 psig (1.29 MPa)



Wi-Fi CONNECT MODE

When Control is awake (setpoint temperature is displayed), WiFi Connect Mode can be initiated by pressing the <+> and <-> buttons simultaneously for 3 seconds. Refer to geappliances.com/connect for WiFi Connect procedure using applicable APP. Note that WiFi icon will start flashing when in Connection Mode and will light solid, once connected. The icon will remain unlit when not connected to WiFi, otherwise.

DISPLAY FAULT MODE

Display Fault Mode can be accessed by pressing and holding the <Enter> button for 3 seconds. A two-tone sound will be heard, indicating the action is successful. Critical Faults will be displayed without entering Fault Mode (normal consumer operation mode). Note that Control must first be awake to enter this mode, (press any button to awake Control, illuminating the 7 segment LEDs, showing set point temperature). Control display will scroll through all active faults in Fault Mode (both critical and non-critical Faults). Faults can be cleared, in Fault Mode by pressing and holding the <+> and <-> buttons simultaneously for 3 seconds. A two-tone sound will be heard, indicating the action was successful. Faults will return, if condition triggering faults reoccurs. Exit Display Fault Mode by pressing <Enter> button, or after 1 minute of button inactivity, the Control will time out.

MONITOR MODE / STATUS

Monitor Mode can be accessed by pressing and holding the <+> and <Enter> buttons simultaneously for 5 seconds. Note that Control must first be awake to enter this mode, (press any button to awake Control, illuminating the 7 segment LEDs, showing set point temperature). A two-tone sound will be heard, indicating the action was successful. A moment later, the Control will display the Software Version. Press the <+> or <-> buttons to move between Personality, T1, T2, 3a, 3b, T4, T5, T6, T7, Mixing Valve Position (if equipped), Voltage, Current, WiFi Strength, Anode Life (if equipped), Tank Recovery Time, and Capacity. The item ID will first display and then the display will list values. Exit Monitor Mode by pressing the <Enter> button, or after 15 minutes of button inactivity, the Control will time out.

MONITOR MODE / STATUS		
Item	ID	Description
SW Version	U	Software Version: 606- 128, etc.
Personality	PEr	Model personality ID (see Personality Table)
T1 Sensor	T1	Tank (Water) Lower Temperature
T2 Sensor	T2	Tank (Water) Upper Temperature
T3a Sensor	T3a	Evaporator Inlet Temperature
T3b Sensor	T3b	Evaporator Outlet Temperature
T4 Sensor	T4	Compressor Discharge Temperature
T5 Sensor	T5	Ambient Air Temperature
T6 Sensor*	T6	EMV Water Outlet Temperature
T7 Sensor*	T7	EMV Water Inlet Temperature
Valve Position*	POS	Range: full cold = 25; full hot = 360
Voltage	U	Voltage Reading (Volts)
Current	A	Current Reading (Amps)
WiFi Strength	5 10	Range: Off = 0; 1 = weak, 99 = strong
Anode Life #	AL	Percent Anode Life remaining (Alarm at 25%)
Tank Recovery Time	T	Tank recovery time to setpoint (Minutes)
Capacity	6AL	Gallons of hot water

* If equipped (EMV models only)

If equipped (Sensing Anode)

TEMPERATURE SENSOR [THERMISTOR] SPECIFICATIONS					
Sensor	Function	Wire Color	Max Temperature Range	Resistance range Ohms	Resistance at 77° F
T1	Lower Tank Sensor	Black	32° F -180° F	32.9K -1.09K	10K
T2	Upper Tank Sensor	Red	32° F -180° F	32.9K -1.09K	10K
T3a	Evaporator Inlet Temperature	Red	10° F -150° F	63.3K -2.04K	10K
T3b	Evaporator Outlet Temperature	White	10° F -150° F	63.3K -2.04K	10K
T4	Compressor Discharge Temperature	Black	32° F -252° F	176.3K -1.97K	55K
T5	Ambient Air Temperature	Yellow	10° F -150° F	63.3K -2.04K	10K
T6	EMV Outlet Sensor	Red	32° F -180° F	32.7K -1.17K	10K
T7	EMV Inlet Sensor	Aqua	32° F -180° F	32.7K -1.17K	10K

SERVICE MODE - ID SER

When in Monitor Mode, Service Mode can be accessed by pressing and holding the <+> and <Enter> buttons simultaneously for 5 seconds. A two-tone sound will be heard, indicating the action was successful. The Control will display “SER” to indicate the Control is now in SERVICE Mode. Press the <+> or <-> buttons to select the desired component to control. Press the <Enter> button to toggle control of the selected component.

When controlling the Upper or Lower Element, the display will first show “UE0” or “LE0”, indicating that the UE or LE is OFF (signified as 0). The Display will then show the current draw (in Amps), followed by “A”. Pressing the <Enter> button, will turn the respective Element ON (signified as 1), displaying “UE1” or “LE1”. The Display will then show the current draw, when the Element is energized. Note that only one Heating Element can be energized at a time, so turning ON a second Element will turn OFF the first Element.

When controlling the Mixing Valve, the Display will show “tSt” and will then indicate the test position of “Hot” (the normal operating position, set by the Control). Pressing the <Enter> button will then move the Mixing Valve to the full cold position (displayed as “CLd”). Pressing the <Enter> button repeatedly, will toggle the Mixing Valve between the “CLd” and “Hot” positions. Exit Service Mode by pressing <+> or <-> buttons until “SER” is displayed and then press <Enter>, returning to Normal Operation. Note that in Service Mode the selected Heating Element will remain ON for 5 minutes and will then turn OFF. Upon exiting Service Mode or after 15 minutes of inactivity, the Control will revert back to Normal Operation Mode.

SERVICE MODE		
Item	Operational Procedure	
Upper Element	UE	Upper Element (UE0 = OFF; UE1 = ON). Press <+> or <-> button to select component. Press <Enter> button to turn Element ON (1) or OFF (0). Once ON, the current draw will be shown on display, signified as “A” for Amps. The Element will turn OFF after 5 minutes, or when turning LE ON, or upon exiting Service Mode .
Lower Element	LE	Lower Element (LE0 = OFF; LE1 = ON). Press <+> or <-> key to select component. Press <Enter> button to turn Element ON (1) or OFF (0). Once ON, the current draw will be shown on display, signified as “A” for Amps. The Element will turn OFF after 5 minutes, or when turning UE ON, or upon exiting Service Mode .
Electronic Mixing Valve (EMV)	tSt	EMV Test (CLd = Full Cold; Hot = Normal Control position). Press <+> or <-> button to select component “tSt”. Press <Enter> button to toggle Control between “CLd” and “Hot” position. Mixing Valve returns to Normal operating state after 5 minutes or upon exiting Service Mode .
Heat Pump	HP	Heat Pump Test (HP0 = OFF; HP1 = ON). Pressing <Enter> button will turn on the Fan and Compressor Relays, start the Fan running at 50%, set the EEV to 150, and Compressor running at 3000rpm and display HP1. Pressing <Enter> again will exit the Heat Pump test back to HP0 and turn off the Fan and Compressor Relays.
Fan (When HP1 = ON)	FAN	Pressing <Enter> will cycle through the 3 test Fan speeds: On (50%), HI (75%) and LO (25%). Pressing <+> or <-> will step through to the next heat pump test option.
Electronic Expansion Valve (EEV) (When HP1 = ON)	EEV	Pressing <Enter> will cycle through 4 EEV settings: 40, 150, 300, 450. Pressing <+> or <-> will step through to the next Heat Pump test option.
Temperature Display (When HP1 = ON)	888	The Temperature Display options are a reduced set from Monitor Mode T3a, T3b, T4, T5 - they simply show the Sensor name alternating with the temperature. Pressing <Enter> does nothing, <+> or <-> steps to the next Heat Pump test option.

PERSONALITY MODE

When in Service Mode, Personality Mode can be accessed by pressing and holding the <+> and <Enter> buttons simultaneously for 5 seconds. A two-tone sound will be heard, indicating the action was successful. A moment later, the Control will display the Personality ID of the model (signified by PER). The Personality ID number can be changed by selecting the <+> or <-> button (per Personality Table). Press the <Enter> key to Select the Personality and Exit Personality Mode.

PERSONALITY MODE		
Item	ID	Operational Procedure
Personality	PER	ONLY requires update if e2 Personality Module and Control Board is replaced. Press <+> to increase or <-> buttons to decrease. Press <Enter> to select change per Personality Tables and Exit Personality Mode.

PERSONALITY NUMBERS - USA			
Number	SKU	EMV	Volts
0	Invalid Number	-	-
16	PF40S10*P*	Yes	120
17	PF50S10*P*	Yes	120
18	PF65S10*P*	Yes	120
19	PF80S10*P*	Yes	120
20	PH40S10*P*	Yes	240
21	PH50S10*P*	Yes	240
22	PH65S10*P*	Yes	240
23	PH80S10*P*	Yes	240
24	PH50S10*N*	No	240
25	PH65S10*N*	No	240
26	PH80S10*N*	No	240

PERSONALITY NUMBERS - CANADA			
Number	SKU	EMV	Volts
0	Invalid Number	-	-
30	PJ40S10*P*	Yes	120
31	PJ50S10*P*	Yes	120
32	PJ65S10*P*	Yes	120
33	PJ80S10*P*	Yes	120

FAULT CODE TABLE

Fault	Condition	Action
10	Lower Element Failure (Under Current Condition)	Control energizes Lower Element, but the Sensor detects no current flow. Check respective Heating Element, wiring connections at Element, and Control. Use Service Mode to cycle Element and check current draw.
11	Upper Element Failure (Under Current Condition)	Control energizes Upper Element, but the Sensor detects no current flow. Check respective Heating Element, wiring connections at Element, and Control. Use Service Mode to cycle element and check current draw.
12	Lower Element Failure (Over Current Condition)	Control energizes Lower Element, but the Sensor detects high current flow. Check respective Heating Element, wiring connections at Element, and Control. Use Service Mode to cycle element and check current draw.
13	Upper Element Failure (Over Current Condition)	Control energizes Upper Element, but the Sensor detects high current flow. Check respective Heating Element, wiring connections at Element, and Control. Use Service Mode to cycle element and check current draw.
14	Compressor Failure	Possible refrigerant leak. Check Sealed System for leak. Check T4 Sensor mounting, wiring, and resistance. Check EEV wiring at Control, coil placement, and operation. Check Compressor, overloads, relay, and wiring. Use Service Mode to manually cycle Compressor ON/OFF.
15	Fan Failure	Check Fan, wiring, and Control connection. Check AC power output on Control Board (yellow connector): verify voltage. Use Service Mode to cycle Fan ON/OFF. Check for physical obstruction in Fan Blade. If Fan is running, but F15 is present, there is a Fan speed feedback failure. Replace Fan Motor.
16	Mixing Valve TCO Tripped	Confirm if other faults are present (press and hold <Enter> button for 3 seconds to display faults). If F63 present, then entire Mixing Valve assembly will need to be replaced. If only F17 is present, replace TCO and confirm outlet temperature remains in Control after correction. Software will need to be updated to latest version using SmartHQ App or using a Sum Module.
17	Missing Mixing Valve Jumper	Ensure non-EMV model jumper wire is present and connected correctly. Install Jumper wire, if missing (part of J802 connector plug).
18	Outlet Water Too Hot	Mixing Valve Failure. Disables Mixing Valve Mode and controls T2 to user setpoint until serviced (Normal Mode). Cycle Mixing Valve in Service Mode. If no movement, confirm wire connections at Motor and Control are correct. Replace Mixing Valve components if connections are correct.
19	Idle Current High	If TCO trips with F19 Fault, then defective relay on board. Replace control board and manually reset TCO. If TCO trips with no F19 fault, then defective Sensor.
20	Lower Element Start-Up Failure	Check respective Heating Element and wiring connections for independent faults in Service Mode.
21	Upper Element Start-Up Failure	Check respective Heating Element and wiring connections for independent faults in Service Mode.
30	T1 Failure	T1 Sensor is beyond normal 5° F -212° F temperature range. Check T1 Sensor mounting, wiring and resistance. Use Service Mode to monitor T1 Sensor temperature. If T1 Sensor checks OK, Control assembly may have failed.
31	T2 Failure	T2 Sensor is beyond normal 5° F -212° F temperature range. Check T2 Sensor mounting, wiring and resistance. Use Service Mode to monitor T2 Sensor temperature. If T2 Sensor checks OK, Control assembly may have failed.
32	T1/T2 Failure (Drift)	Check both T1 and T2 Sensors, wiring and mounting to determine cause for discrepancy. If no assembly issue found, monitor Sensor readings in Service Mode (comparing to actual water temperature) and replace inaccurate Sensor.
33	T2/T1 Failure (Drift)	Check both T1 and T2 Sensors, wiring and mounting to determine cause for discrepancy. If no assembly issue found, monitor Sensor readings in Service Mode (comparing to actual water temperature). Replace inaccurate Sensor.
34	T3a Failure	Check T3a Sensor mounting, wiring and resistance. Use Service Mode to monitor T3a Sensor temperature. If T3a Sensor checks OK, Control Assembly may have failed.
35	T3b Failure	Check T3b Sensor mounting, wiring and resistance. Use Service Mode to monitor T3b Sensor temperature. If T3b Sensor checks OK, Control Assembly may have failed.
36	T4 Failure	Check T4 Sensor mounting, wiring and resistance. Use Service Mode to monitor T4 Sensor temperature. If T4 Sensor checks OK, Control Assembly may have failed.
37	T5 Failure	Check T5 Sensor mounting, wiring and resistance. Use Service mode to monitor T5 Sensor temperature. If T5 Sensor checks OK, Control Assembly may have failed.
38	T6 Failure	Open/short or T6 Sensor is beyond normal 5° F -203° F temperature range. Check T6 Sensor mounting, wiring and resistance. Use Service Mode to monitor T6 Sensor temperature. If T6 Sensor checks OK, Control assembly may have failed.

Fault	Condition	Action
39	T7 Failure	Open/short or T7 Sensor is beyond normal 5° F -203° F temperature range. Check T7 Sensor mounting, wiring and resistance. Use Service Mode to monitor T7 Sensor temperature. If T7 Sensor checks OK, Control assembly may have failed.
41	Sensing Anode Failure	Check to ensure the Tank is full of water. Fault may occur if Tank is empty. Check Anode Wire Connections on the Board and at the Anode Rod. Check if any Sensor Connections are shorted to earth ground. Check if Anode is shorted to Tank.
42	Condensate Sensor Failure	The Control detects the Sensor output is at or nearly shorted or open circuit. Check Condensate Sensor mounting, wiring and resistance. Repair as required.
46	Frozen Evaporator	Failure to defrost. Verify Filters are clean. Check refrigerant charge, evacuate and re-charge as needed.
47	Sealed System Vapor Lock	Refrigerant is not moving as expected in the system, likely some restriction. Check refrigerant charge, evacuate and re-charge as needed.
48	Ambient Temperature Out of Operation Range	Unit will operate in Standard Electric Mode only while out of range. Verify that Ambient Temperature of unit is within the requirements. If Ambient Temperature is within range, check that T5 Sensor is functioning correctly.
49	Main Control Board Temperature Failure	Temperature readings on the Main Control Board surface are greater than 200° F. Inspect wiring to verify no damage. Replace Main Control Board. Ensure all screws and connections are tight.
50	Lost Inverter Communication	Check all wire connections on Inverter. Check Compressor TCO, to confirm it is not open. If all connections are correct, replace the Inverter. If issue persists after replacing Inverter, replace Compressor.
51	Inverter Software Incompatible	This could happen at initial start-up of unit or if Inverter or Main Control Board have been replaced. Verify that both Inverter and Control Board are updated to the latest released software version.
52	Low Compressor Discharge Temperature	Check that T4 Sensor is mounted in correct location (on the Discharge Tube, inside Insulation Jacket). Check that T4 Sensor is functioning correctly. Check refrigerant charge, evacuate and re-charge as needed.
53	Evaporator Unexpected Frost	Evaporator is freezing in normal ambient condition. Verify that Filters are clean and installed properly. Check that T3a and T5 Sensors are reporting correct values. Check that Fan is functioning correctly, with no obstructions in Fan Blade. Check that EEV is functioning correctly. Go to Service Mode, manually move the EEV position. Check refrigerant charge, evacuate and re-charge as needed.
54	Uncontrolled Superheat (EEV)	Refrigerant is flowing correctly in the Sealed System, but cannot control superheat. Check that EEV is functioning correctly (including all wire connections and Motor is fully seated). Go to Service Mode, manually move the EEV position.
55	EEV Failure	Electronic Expansion Valve (EEV) is out of range. Check that EEV is functioning correctly (including all wire connections and Motor is fully seated). Go to Service Mode, manually move the EEV position. If issue persists, replace EEV assembly (coil and valve).
56	Sealed System Leak	Indicates that Sealed System has low charge. Check for leaks in Sealed System, replace components as needed. Evacuate and re-charge unit.
57	Concurrent Load	Water Heater Overcurrent Condition. If new unit or unit that has just been serviced, check to verify that Heating Elements are correct wattage. If this is a unit that has been operating, check Main Control Board Relays. Check all wire connections to verify no damage.
60	No AC Power Detected	Check that unit incoming power is wired correctly.
61	Tank Regulation Fault	T2 Sensor greater then setpoint temperature. Verify that no preheat is used on incoming water supply. If preheated, must be less than setpoint temperature. Check Relays on Main Control Board, replace Board if Relay is not functioning. Check T2 Sensor value, verify it is reporting correctly.
62	Inlet Cold Water Too Hot	Verify that no pre-heat is used on incoming water supply. If pre-heated, must be less than setpoint temperature. Check T7 Sensor value, verify it is reporting correctly.
63	Mixing Valve Failure	Mixing Valve has lost ability to control outlet water temperature. Check that Mixing Valve wire connections are secure. Replace Mixing Valve Assembly.
70	Sensing Anode Depleted	Replace the Sensing Anode Rod. The Control has calculated that the Anode Rod has been mostly consumed or the time in operation has exceeded the replacement timeline threshold.
71	Current Sensor Failure	Replace Main Control Board.
72	Low Voltage while Operating	Verify incoming power is connected properly. If this is a continued issue, replace the Main Control Board.
73	Condensate Overflow Protection	Water Heater will only operate in Standard-Electric Mode. Check to make sure the Condensate Drain Pan drain is not blocked. If clear and fault still continues, check that the Condensate Probes are installed properly.

Fault	Condition	Action
74	Dirty Air Filter	Clean the Filters. Make sure there are no obstructions on the Inlet and Outlet Ducts. Check for faulty T3a or T5 Sensors. Check for Sealed System leak.
75	Dry Tank Fault	Insufficient water in the tank. Confirm Water Heater is completely filled with water. Check for faulty T1 or T2 Sensors if tank is full of water.
76	Installation Miswire	Voltage is below limit at power-up. Make sure that the proper supplied voltage is connected correctly to the water heater.
77	Stuck Key Fault	Check for a damaged or misaligned Keypad Button. Repair or replace.
78	Water Leak Detected	Check Leak Sensor and investigate cause.
79	Sabbath Water Overtemperature	Informational fault. Water at bottom of Tank is >113° F. Too hot for Sabbath Mode.
81	Water Leak Sensor Low Battery	Replace Battery on the Leak Detector.
90	Personality Module Missing	E2 Personality Module unplugged. Unit will continue to operate using previously stored personality on Main Control Board. Replace Personality Plug and assign correct personality.
91	Data Flash Fault	New E2 Plug detected on old PCB (0 personality value). After power cycle, the Main Control Board personality will be flashed unto the eeprom.
92	Personality Mismatch	After power cycle, the eeprom personality will be flashed unto the new Main Control Board.
93	No Personality Assigned	No personality identified. Main Control Board and E2 Module likely replaced, and neither have an assigned Personality. "PER" will show up on Display. Enter the correct personality using the <+> and <-> and press <Enter>.
94	WiFi Failure	Verify WiFi Board is connected to the Main Control Board. If the fault remains, then replace the WiFi Board.
95	CTA Software Mismatch	Update the Main Control Board and CTA to the latest compatible versions.
96	CTA Low Battery	Replace the Battery on the CTA Module.

