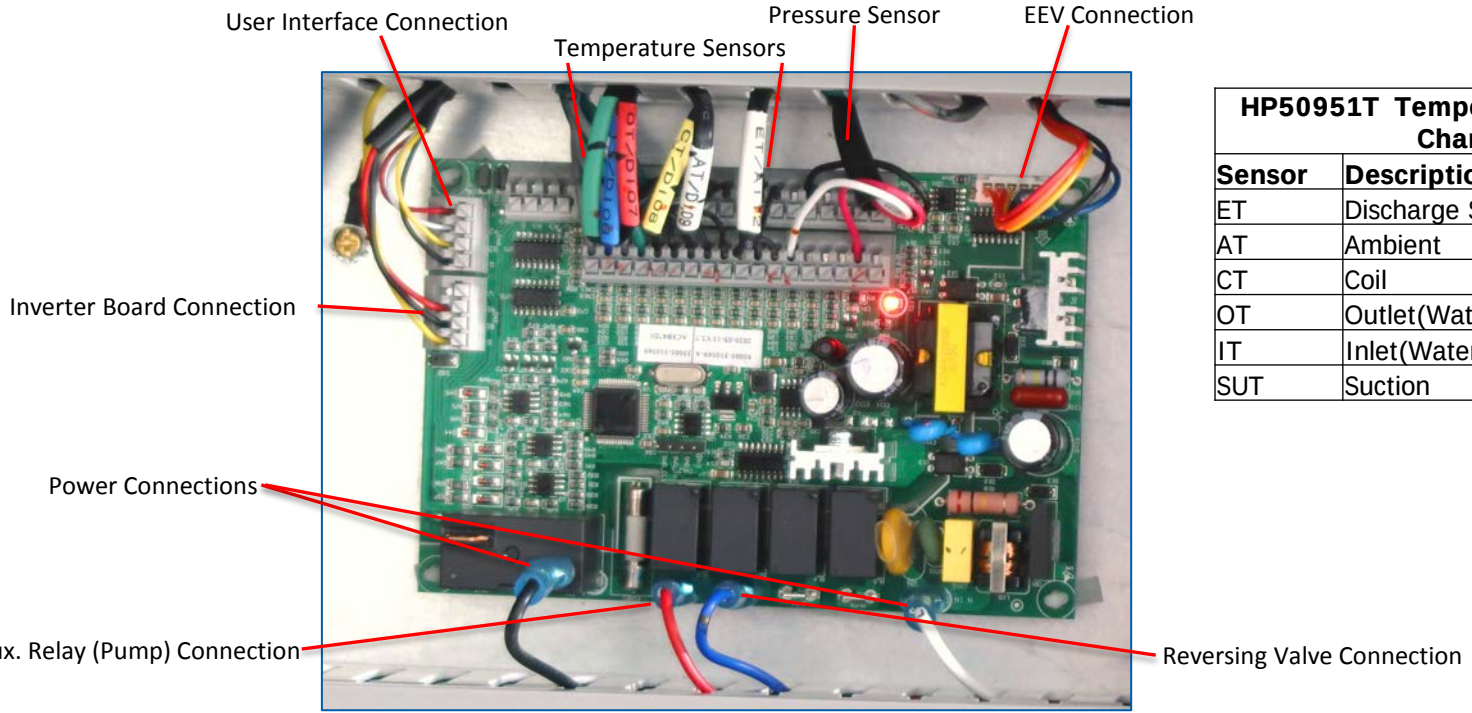
HAYWARD®

HP50951T

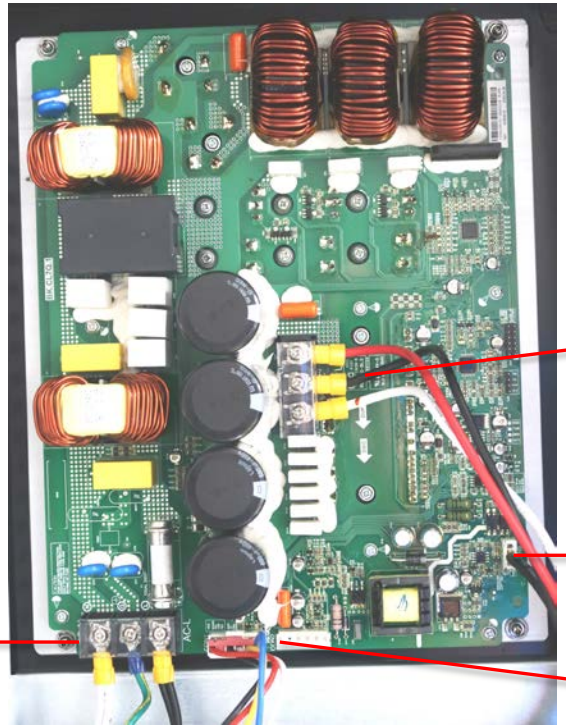
Troubleshooting Guide

Control Board (PC1002)



HP50951T Temperature Sensor Chart		
Sensor	**Description**	**Value**
ET	Discharge Sensor	50K
AT	Ambient	5k
CT	Coil	5k
OT	Outlet(Water)	5k
IT	Inlet(Water)	5k
SUT	Suction	5k

Inverter Board



E01 Error Code

- High Refrigerant pressure
- Switch opens at ~630 psi.
- Check switch continuity. Should be open if E01 is showing. If switch is closed with error showing replace control board
- EEV (electronic expansion valve) issue.
- In parameters check that EEV is set to “auto” (video)
- Waterflow issue.
- Ensure at least 40gpm through heat pump
- Overcharged.
- Highly unlikely. Remove charge and weigh in correct amount
- Normal high side operating pressure is 350-450 psi

E02 Error Code

- Low Refrigerant Pressure
- Switch opens at 14 psi
- Fan restriction.
- Remove restriction/clean evaporator coil
- Low refrigerant level.
- Normal operating low side pressures 135-160 psi.
- Low ambient temperature.
- Ambient temperature below 20°F when heat pump is operating can cause E02 error.
- EEV (electronic expansion valve) issue.
- In parameters check that EEV is set to “auto” (video)

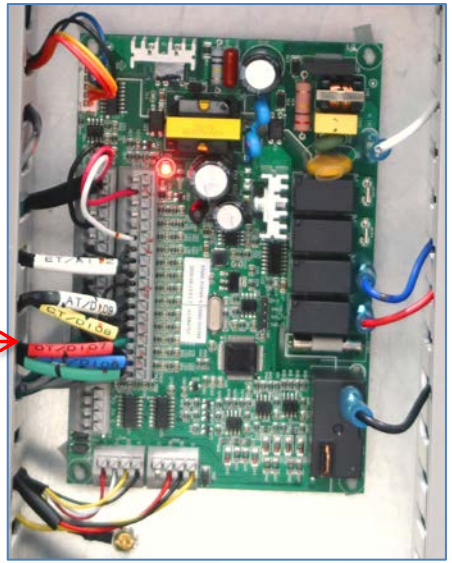
E03 Error Code

- Water Flow Switch Open
- Uses a flow switch, not a pressure switch
- Heat Pump requires a minimum 36gpm to close flow switch
- Ensure pump is running
- Check valve positions Ensure bypass valves are closed
- Clean filter
- Make certain flow switch is in correct orientation

E05 Error Code

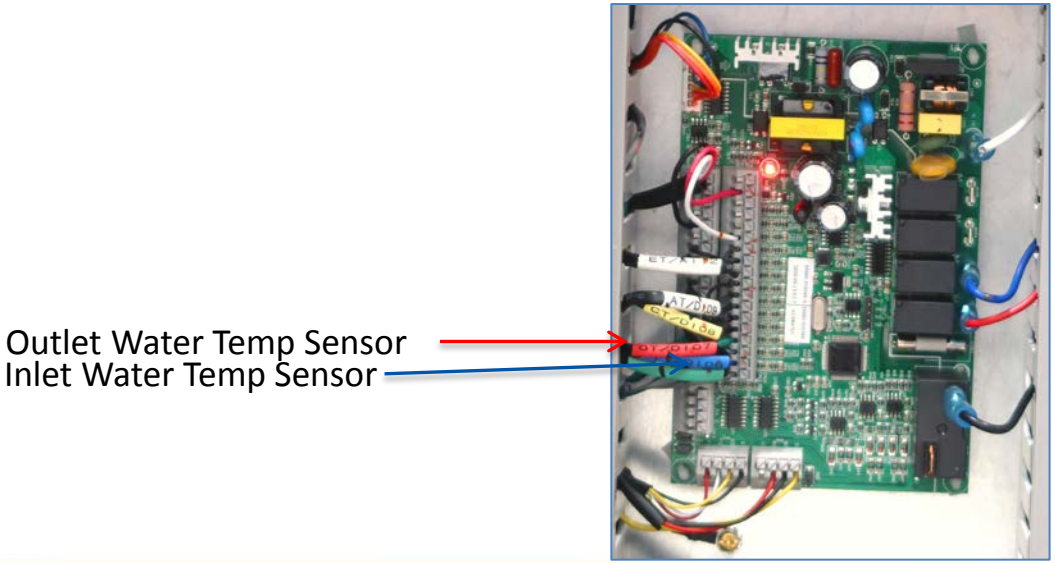
- Heat Pump can’t keep water above freeze point
- Detecting water temperature below 36°F.
- Check outlet water temp sensor (4.8k sensor)

Outlet Water Temp Sensor



E06 Error Code

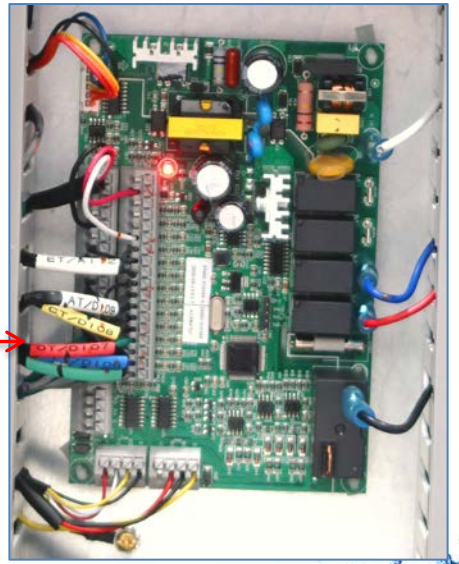
- Too Rapid Water Temperature fall in cooling mode (55°F ΔT between inlet and outlet temperature sensors)
- Check inlet and outlet temp sensors (4.8k sensors)



E07 Error Code

- Outlet water temperature approaching freezing.
- Ensure adequate waterflow through heat pump (min. 36 gpm- recommended 42 gpm)
- Check outlet water temperature sensor (4.8k sensor)

Outlet Water Temp Sensor



E08 Error Code

- Communication failure between main control board and user interface.
- Check connection between boards.

E19 Error Code

- Ambient Temperature too low for normal operation
- When any one of the inlet temperature, outlet temperature, water pipe temperature is between 35°F and 39°F, **AND** the ambient temperature is less than 32°F, and the heat pump is in standby mode, E19 shows and the circulation pump starts running (If connected to Heat Pump).
- Since it requires two sensors working in tandem to give this error code it is almost always an actual low ambient temperature issue.

E29 Error Code

- Ambient Temperature too low for normal operation
- When any one of inlet temperature, outlet temperature, water pipe temperature is less than 35°F, **AND** the ambient temperature is less than 32°F, and the heat pump is in standby mode, E29 shows and the heat pump shuts down.
- Since it requires two sensors working in tandem to give this error code it is almost always an actual low ambient temperature issue.

E51 Error Code

- Compressor overcurrent
- Check value of parameter H12 (should be 12)
- Ensure water flow is adequate
- Check compressor current

P01-P07 Error Code

- Temperature Sensor Error: Shorted or Open Sensor
- Check Sensor against correct Temp/Resistance Chart

HP50951T Temperature Sensor Chart		
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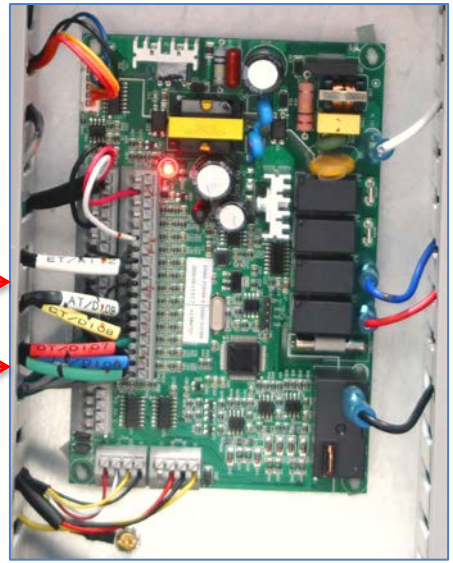
Temp Sensors



P01-P07 Error Code

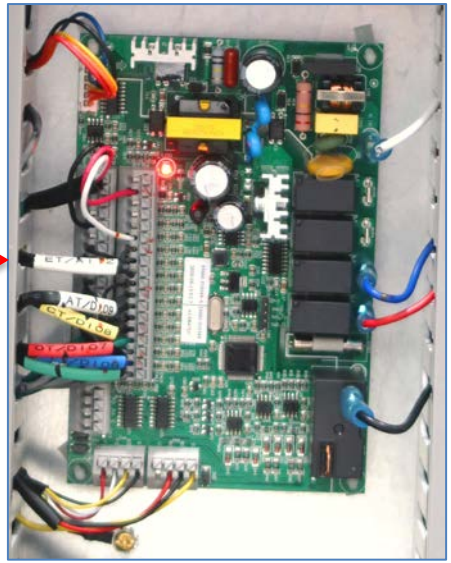
4.8 K ohm Sensor Temperature / Resistance Chart

Temperature °F	Temperature °C	Sensor resistance (Kohm)
180.0	82.2	0.549
175.0	79.4	0.601
170.0	76.7	0.659
165.0	73.9	0.722
160.0	71.2	0.793
155.0	68.4	0.872
150.0	65.7	0.961
145.0	62.9	1.06
140.0	60.2	1.17
135.0	57.4	1.294
130.0	54.7	1.434
125.0	51.9	1.591
120.0	49.2	1.768
115.0	46.4	1.968
110.0	43.7	2.194
105.0	40.9	2.451
100.0	38.2	2.741
95.0	35.4	3.072
90.0	32.7	3.448
85.0	29.9	3.879
80.0	27.2	4.37
75.0	24.4	4.935
70.0	21.7	5.583
65.0	18.9	6.328
60.0	16.2	7.187
55.0	13.4	8.18
50.0	10.7	9.334
45.0	7.9	10.671
40.0	5.2	12.23
35.0	2.4	14.044
30.0	-0.3	16.167
25.0	-3.1	18.655
20.0	-5.8	21.581
15.0	-8.6	25.036
10.0	-11.3	29.11
5.0	-14.1	33.95
0.0	-16.8	39.683

P081 Error Code

- DischargeTemperature Sensor Error: Shorted or Open Sensor
- Check Sensor against 50k Temp/Resistance Chart

Discharge Temp Sensor



P081 Error Code

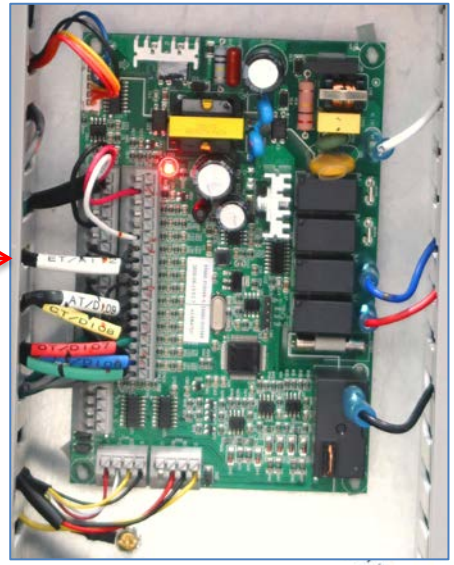
50K Thermistor Output Table

°F	°C	Ohms	°F	°C	Ohms	°F	°C	Ohms
-39	-39.44	1956240	37	2.78	151235	113	45.00	20651
-37	-38.33	1812199	39	3.89	142605	115	46.11	19716
-35	-37.22	1679700	41	5.00	134519	117	47.22	18829
-33	-36.11	1557748	43	6.11	126941	119	48.33	17987
-31	-35.00	1445439	45	7.22	119834	121	49.44	17187
-29	-33.89	1341952	47	8.33	113168	123	50.56	16421
-27	-32.78	1246540	49	9.44	106912	125	51.67	15699
-25	-31.67	1158525	51	10.56	100988	127	52.78	15013
-23	-30.56	1077290	53	11.67	95475	129	53.89	14360
-21	-29.44	1001621	55	12.78	90296	131	55.00	13740
-19	-28.33	932353	57	13.89	85428	133	56.11	13150
-17	-27.22	868317	59	15.00	80852	135	57.22	12588
-15	-26.11	809086	61	16.11	76547	137	58.33	12053
-13	-25.00	754271	63	17.22	72497	139	59.44	11544
-11	-23.89	703517	65	18.33	68685	141	60.56	11055
-9	-22.78	656499	67	19.44	65095	143	61.67	10593
-7	-21.67	612919	69	20.56	61685	145	62.78	10154
-5	-20.56	572506	71	21.67	58500	147	63.89	9734
-3	-19.44	534686	73	22.78	55499	149	65.00	9335
-1	-18.33	499905	75	23.89	52669	151	66.11	8954
1	-17.22	467604	77	25.00	50000	153	67.22	8590
3	-16.11	437592	79	26.11	47481	155	68.33	8243
5	-15.00	409692	81	27.22	45104	157	69.44	7912
7	-13.89	383745	83	28.33	42859	159	70.56	7593
9	-12.78	359601	85	29.44	40739	161	71.67	7292
11	-11.67	337126	87	30.56	38718	163	72.78	7004
13	-10.56	316194	89	31.67	36826	165	73.89	6729
15	-9.44	296522	91	32.78	35037	167	75.00	6466
17	-8.33	278353	93	33.89	33345	169	76.11	6215
19	-7.22	261408	95	35.00	31745	171	77.22	5975
21	-6.11	245599	97	36.11	30230	173	78.33	5745
23	-5.00	230842	99	37.22	28796	175	79.44	5526
25	-3.89	217062	101	38.33	27438	177	80.56	5314
27	-2.78	204189	103	39.44	26152	179	81.67	5113
29	-1.67	192156	105	40.56	24923	181	82.78	4921
31	-0.56	180906	107	41.67	23768	183	83.89	4737
33	0.56	170291	109	42.78	22674	185	85.00	4561
35	1.67	160449	111	43.89	21635	187	86.11	4392

P082 Error Code

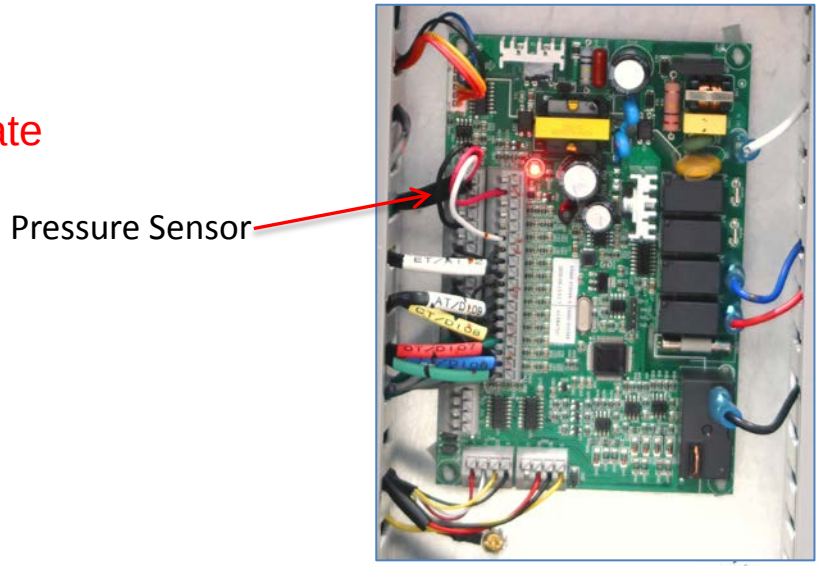
- DischargeTemperature Sensor Out of Range
- Compressor Overloaded
- Ensure EEV is in Auto mode (video)
- Ensure adequate water flow (40gpm)
- Check sensor against 50k temp/resistance chart

Discharge Temp Sensor



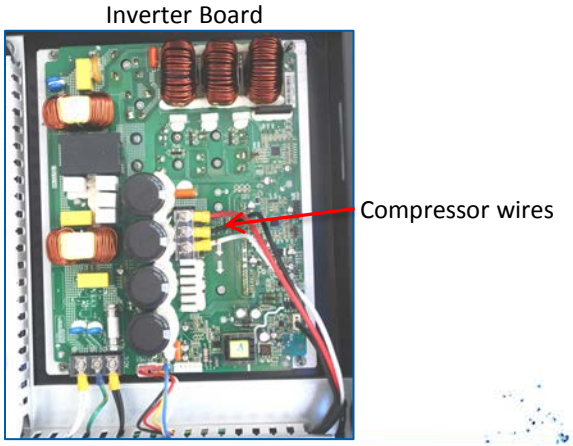
PP Error Code

- Pressure Sensor Error
- Sensor short circuit, open circuit or not connected
- Ensure Sensor is connected
- Check sensor for open or shorted condition
- No resistance or infinite resistance would indicate a failed sensor



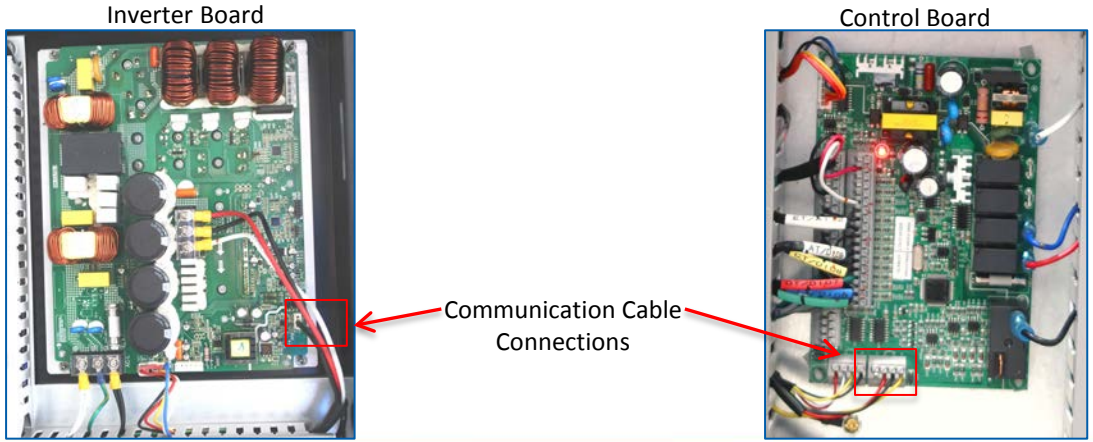
F01 Error Code

- MOP error
- Ensure parameter H12 is set to 12
- Check compressor resistance. Resistance should be the same between any two wires
- Check incoming power
- If resistance and voltage are good replace inverter board



F02 Error Code

- Inverter Offline
- No communication between Inverter board and control board
- Ensure communication cable is connected
- Connection CN2 on control board and CN9 on Inverter board



F03 Error Code

- IPM Protection
- Ensure compressor connection is good
- Ensure parameter H12 value is set to 12
- Check the resistance value of the compressor to confirm whether the compressor is damaged. Resistance should be the same between any two wires
- Check system pressure and compressor for blockage
- If all above check okay, replace the inverter board

F04 Error Code

- Compressor Start Failure
- Compressor Power Overload
- In parameters (066) check parameter H12. Value should be 12
- Check resistance between each pair of compressor wires (Black to White, White to Red, Red to Black) resistance should be exactly the same between each pair. If not replace compressor.
- If resistance is equal on all pairs replace Inverter board.

F05/F051 Error Code

- Fan Fault
- Motor Feedback open or shorted circuit
- Check to make sure fan is plugged in properly. CON1 on inverter board.
- Ensure fan can spin freely.
- Replace fan motor if plugged in and no restriction

F06/F026 Error Code

- Inverter overcurrent fault
- Inverter Power High
- Confirm incoming power is correct
- Amperage should not exceed 29A
- Turn off power to heat pump. Wait 5 minutes
- Check compressor and fan motor
- Verify EEV is set in auto mode and is operating
- Verify correct compressor is selected in parameter H12. Value should be 12
- Apply power to heat pump
- If error does not clear replace Inverter Board

F10 Error Code

- Inverter under voltage fault
- Incoming power too low
- Confirm incoming AC power is correct
- If incoming power is correct replace Inverter Board

F19, F20, F22 Error Code

- Inverter over temperature
- Inverter temperature out of range or near limits
- Ensure cooling fins on back of inverter board are clear.
- Turn off heat pump and allow 15 minutes to cool.
- If still showing error replace inverter board.