



# **TROUBLESHOOTING GUIDE**

## **FOR HEAT PUMP BOOSTERS**

**MODELS:   HPB11, HPB15, & HPB22**

# PREFACE

This guide contains instructions for troubleshooting the Steffes Corporation room heating units: Models HPB 11, HPB 15, and HPB 22.

In compiling this guide, Steffes Corporation has used its best judgment based upon information available but disclaims any responsibility or liability for any errors or miscalculations, contained herein, or any revisions, hereof, or which result, whole or in part, from the use of this guide, or any revision hereof.

**If there are any questions, contact Steffes Corporation technical support at 1-888-STEFFES (783-3337)**

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### MISCELLANEOUS

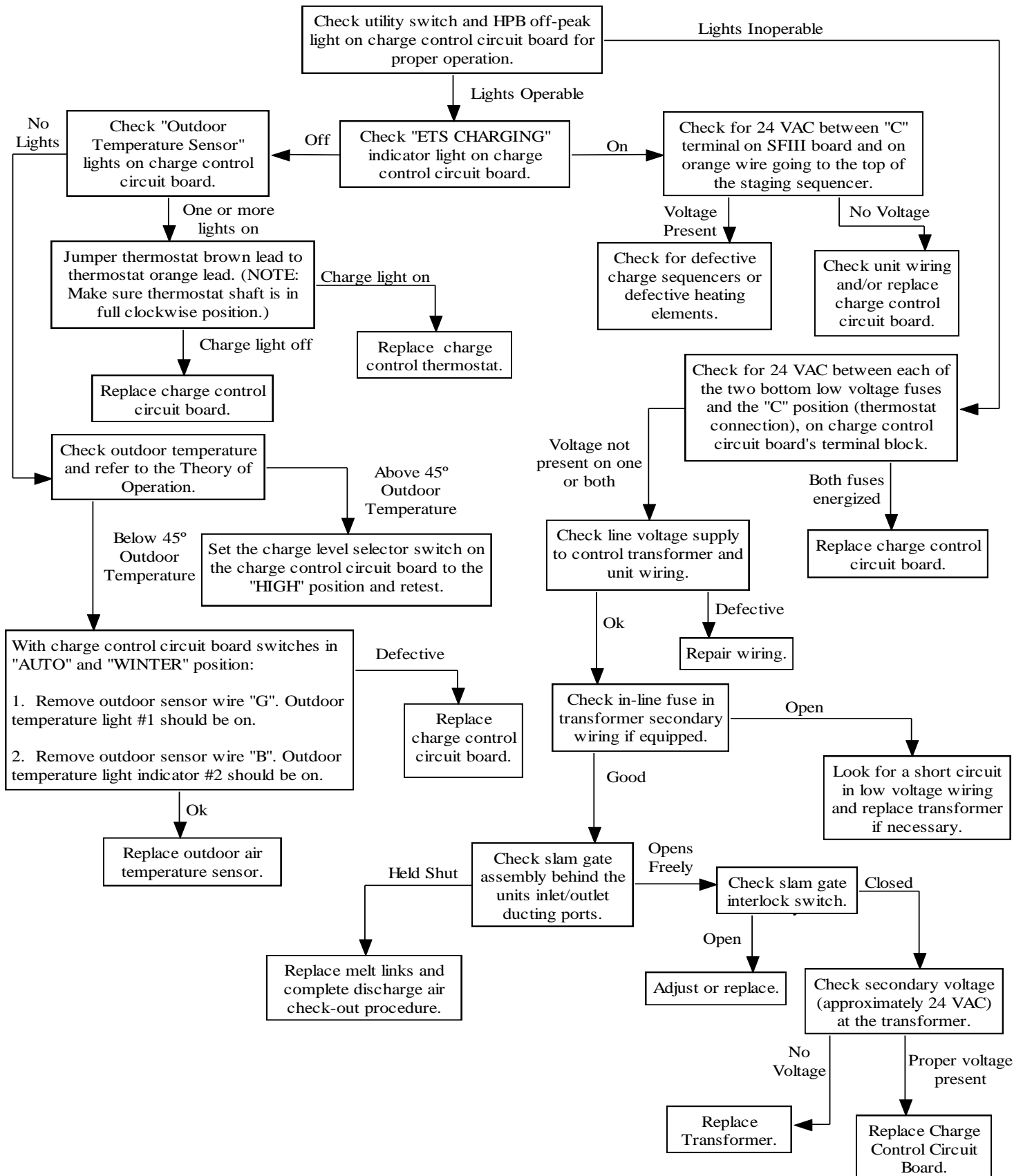
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# Heat Pump Booster

## Function: Core Charging

**Problem: Unit will not charge (Unit has no core charge) or Control Board lights are off.**

*Before starting any of the procedures below, check voltage on load side of all HPB circuit breakers and check low voltage fuses on charge control circuit board. Place unit in off-peak mode.*

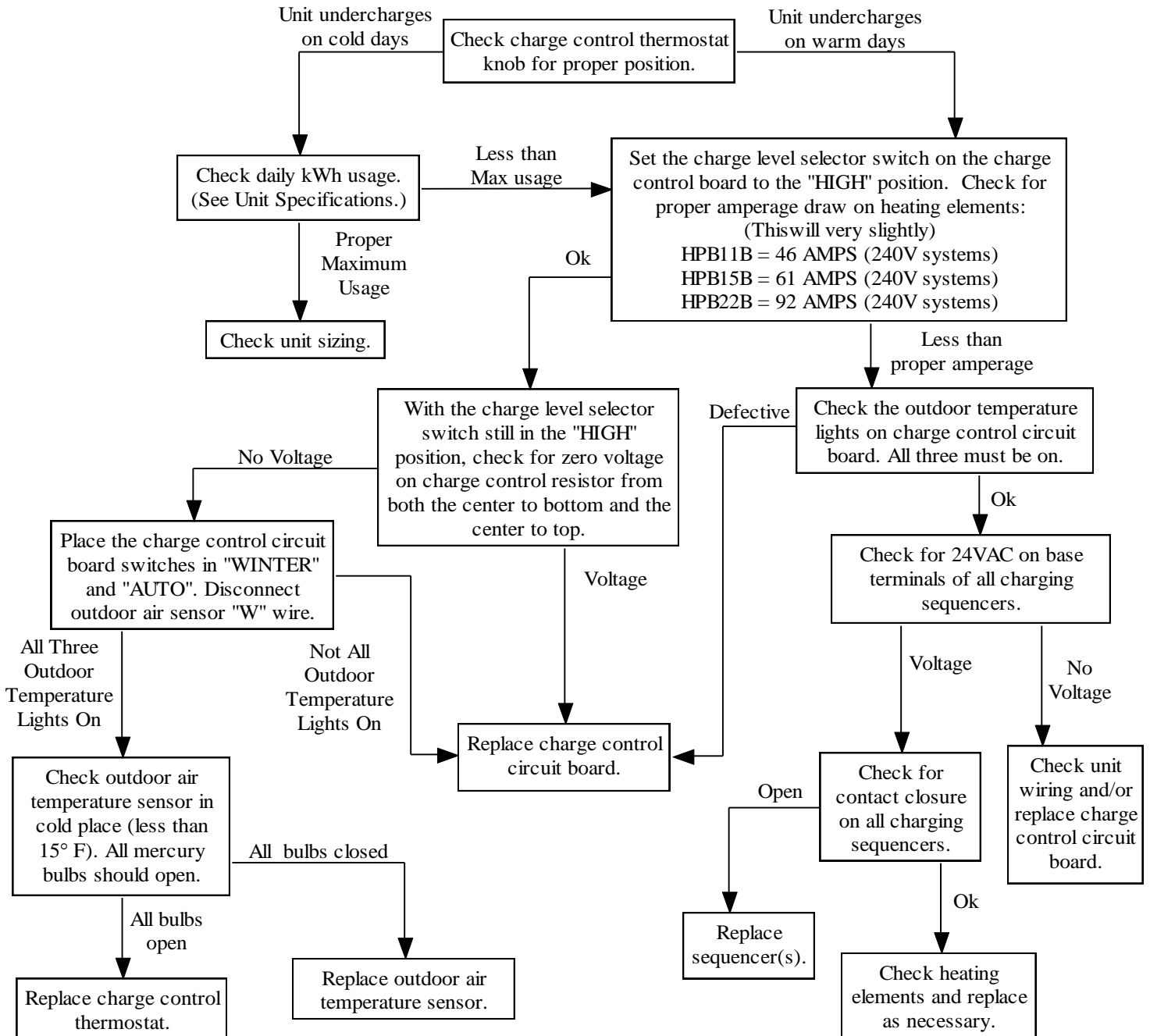


# Heat Pump Booster

## Function: Core Charging

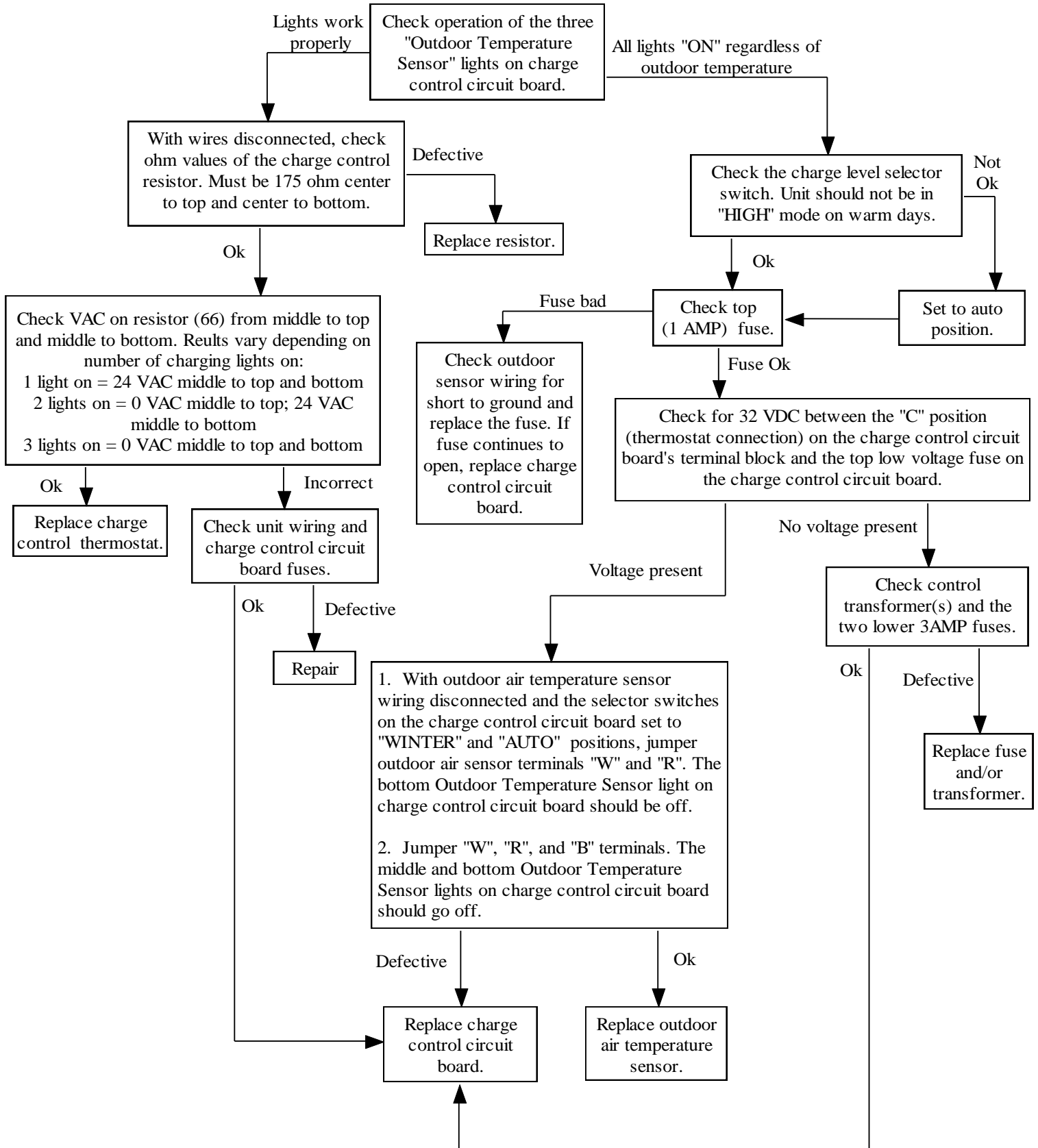
### Problem: Unit undercharges

*Before starting any of the procedures below, check voltage on load side of all HPB circuit breakers. Check for 24 VAC between each of the 3-amp low voltage fuses and the "C" position (thermostat connection) on the charge control circuit board's terminal block.*



**Heat Pump Booster**  
**Function: Core Charging**  
**Problem: Unit overcharges on warm days**

*Before starting any of the procedure below, check voltage on load side of all HPB circuit breaker and check low voltage fuses on charge control circuit board.*

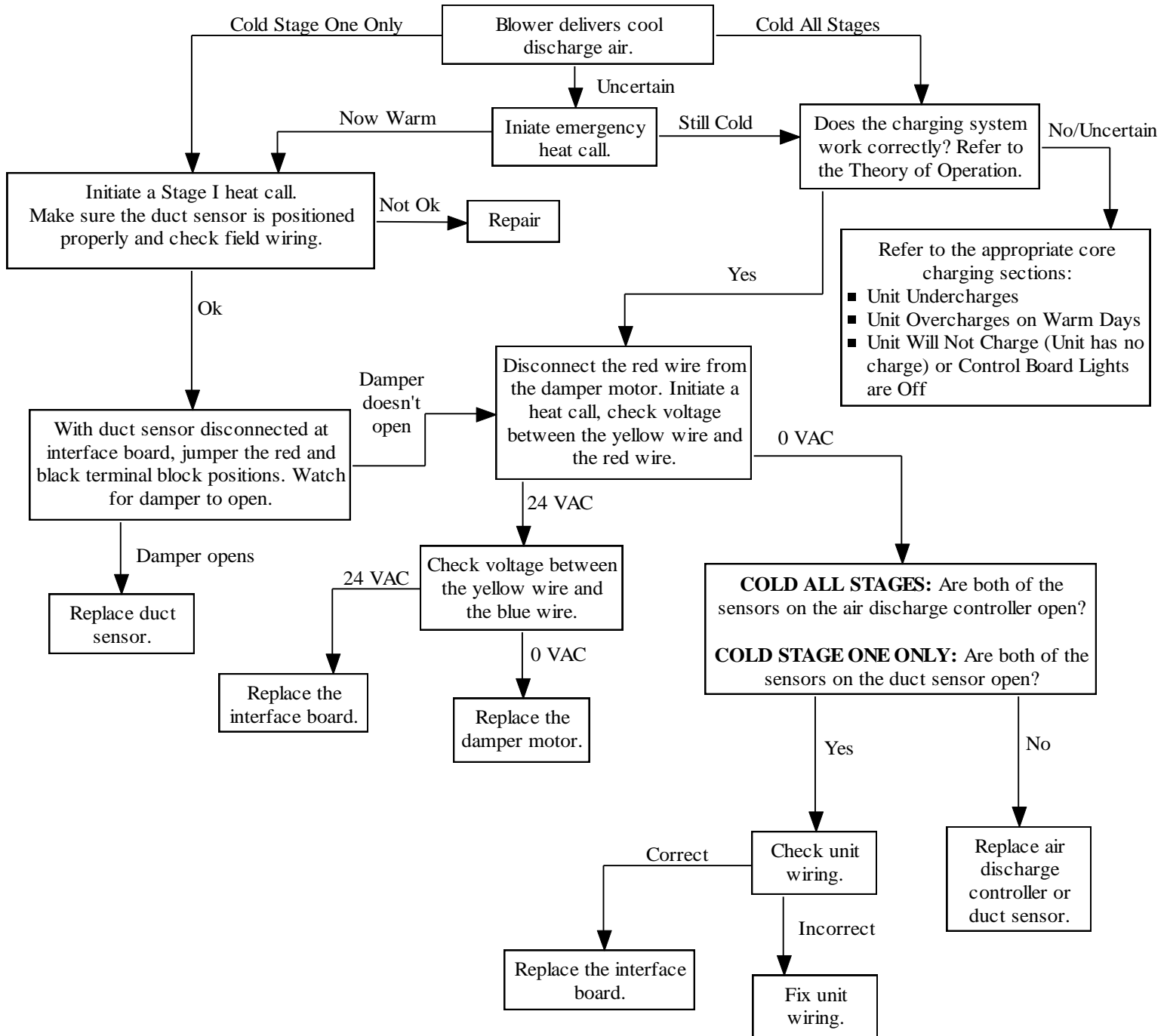


# Heat Pump Booster

## Function: Air Delivery

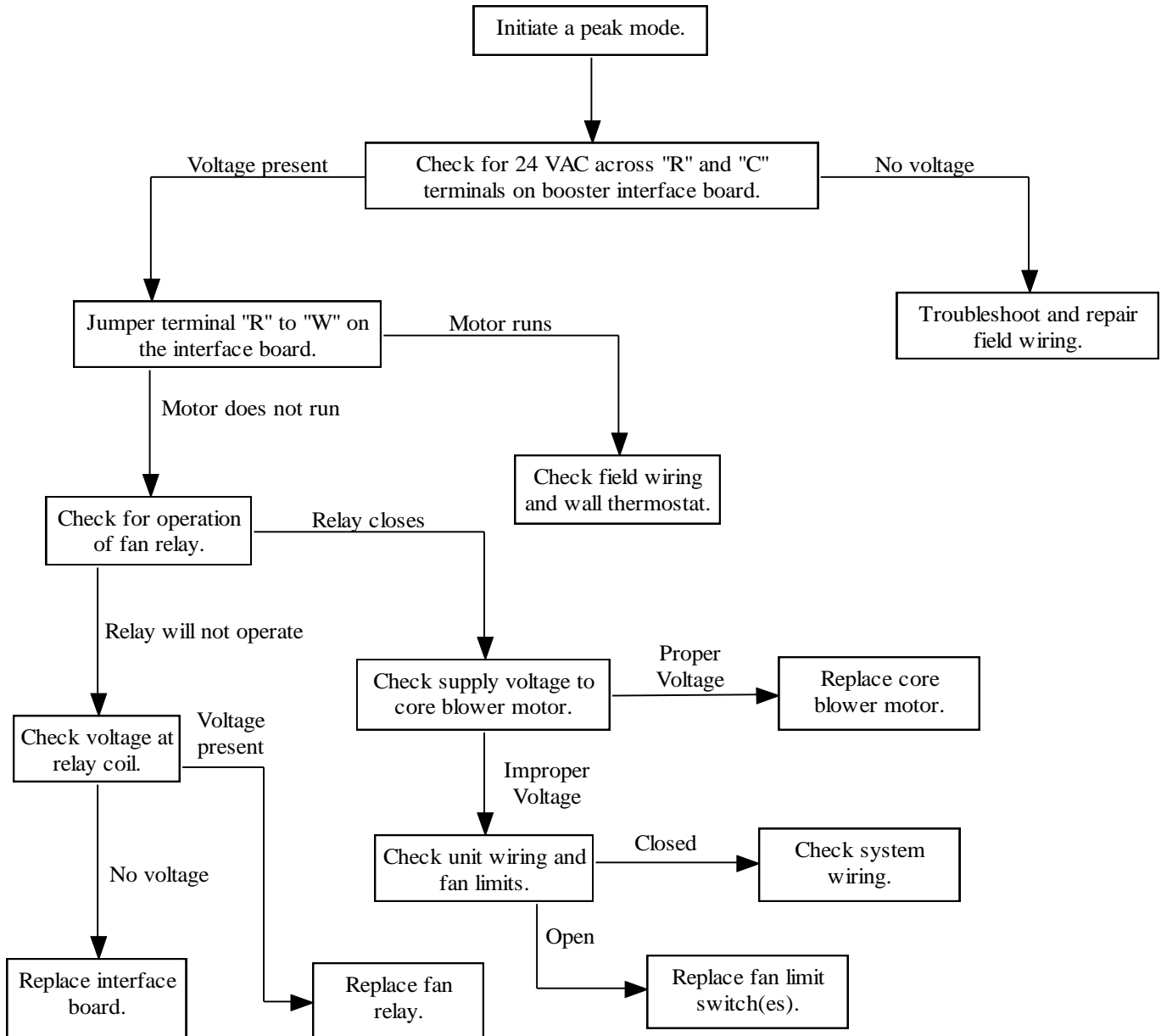
### Problem: Cool discharge air

*Before starting any of the procedure below, check voltage on load side of all HPB circuit breakers. Check for 24 VAC between each of the low voltage fuses the "C" position on the charge control circuit board's terminal block..*



**Heat Pump Booster**  
**Function: Air Delivery**  
**Problem: Blower does not run**

*Before starting any of the procedure below, check voltage on load side of all HPB circuit breakers. Check for 24 VAC between each of the low voltage fuses and the "C" position on the charge controls circuit board's terminal block. Put heater into peak mode.*



# DISCHARGE AIR

## Check-Out Procedure

### Models: HPB11B, HPB15B and HPB22B

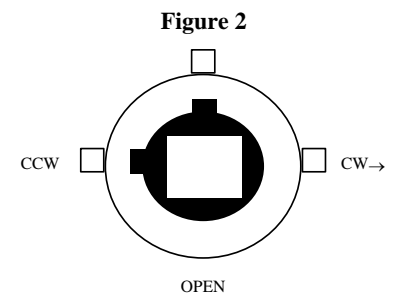
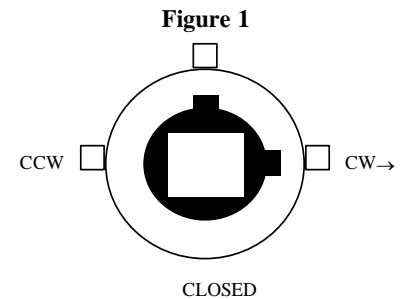
#### **CHECK OUT PROCEDURE:**

The failure of the melt link is often the result of another problem that exists within the booster. Typically, the failure is a direct result of the inability of the booster to regulate its output temperature. If the primary problem is not rectified, melt link failure could occur again. Thus, after the failed melt link has been replaced, the booster **MUST** be tested to ensure that failure will not reoccur.

1. Check for proper connection of the remote mounted duct sensor, "IF USED".

**CAUTION: Shorting of the duct sensor to the ductwork WILL cause a malfunction in the booster and result in the melt link failing. An inspection of the duct sensor mounting and clearance must be performed.**

2. Remove the electrical panel cover on the front of the booster.
3. Disconnect blowers to test damper operation by removing the purple wire from the blower relay. Energize the booster's control circuit to observe the damper motor.
4. With no heat call to the booster, the damper motor should go to a fully closed (CW) position. (See Figure 1)
5. Now, initiate a Stage 2 heat call from the booster's room thermostat. The damper motor should go to a fully open (CCW) position. (See Figure 2)
6. If the damper does not move to an opened and closed position as shown in Figures 1 and 2, check the damper system for mechanical binding and/or for damper motor malfunction.
7. De-energize the control circuit and remove the "RED" damper motor wire from the CCW terminal.
8. Energize the control circuit again and initiate another heat call from the booster's room thermostat.
9. Check voltage from the COM terminal and the now disconnected "RED" wire on the damper motor. 24 VAC should be present. Also, check the voltage between the COM and CW terminal. No voltage should be present.
10. Remove the air discharge sensor. Inspect the temperature sensing bulbs for separations or breaks in the mercury columns at the center of the bulbs. It may be necessary to warm the bulbs to fully view the mercury columns. In many cases, if a separation exists, it can be removed by the heating of the sensor causing the mercury to move to the top of the bulb.



**CAUTION: Overheating the bulb can cause it to burst. SAFETY GLASSES MUST BE WORN WHEN HEATING THE BULBS.**

**NOTE: Early booster models incorporated an air discharge sensor that signaled the booster's control system directly. Newer models use triac controls. If the booster that is being serviced does not have the triac switches on the air discharge sensor, it is recommended that the sensor be replaced.**

11. De-energize the control circuit. Jumper between the upper and lower copper bulb mounting brackets of the 145 degree mercury bulb (inner bulb) on the air discharge sensor which is located in the base of the booster.
12. Energize the control circuit and check the status of the #4 LED Red light on the booster's interface board. This light must be energized (indicates the damper is satisfied).
13. Retest the voltage at the damper motor. (Refer to steps 7, 8 and 9.) If the booster does not respond correctly to the voltage check, replace the air discharge sensor. Voltage should be zero between the COM terminal and "RED" damper motor wire. It should also be zero between the COM terminal and the CW terminal.
14. De-energize the control circuit again. With the 145 degree sensing bulb jumper still in place on the air discharge sensor, jumper between the upper and lower copper bulb mounting brackets of the 160 degree sensing bulb (outer bulb).



***Discharge Air Check Out Procedure Continued...***

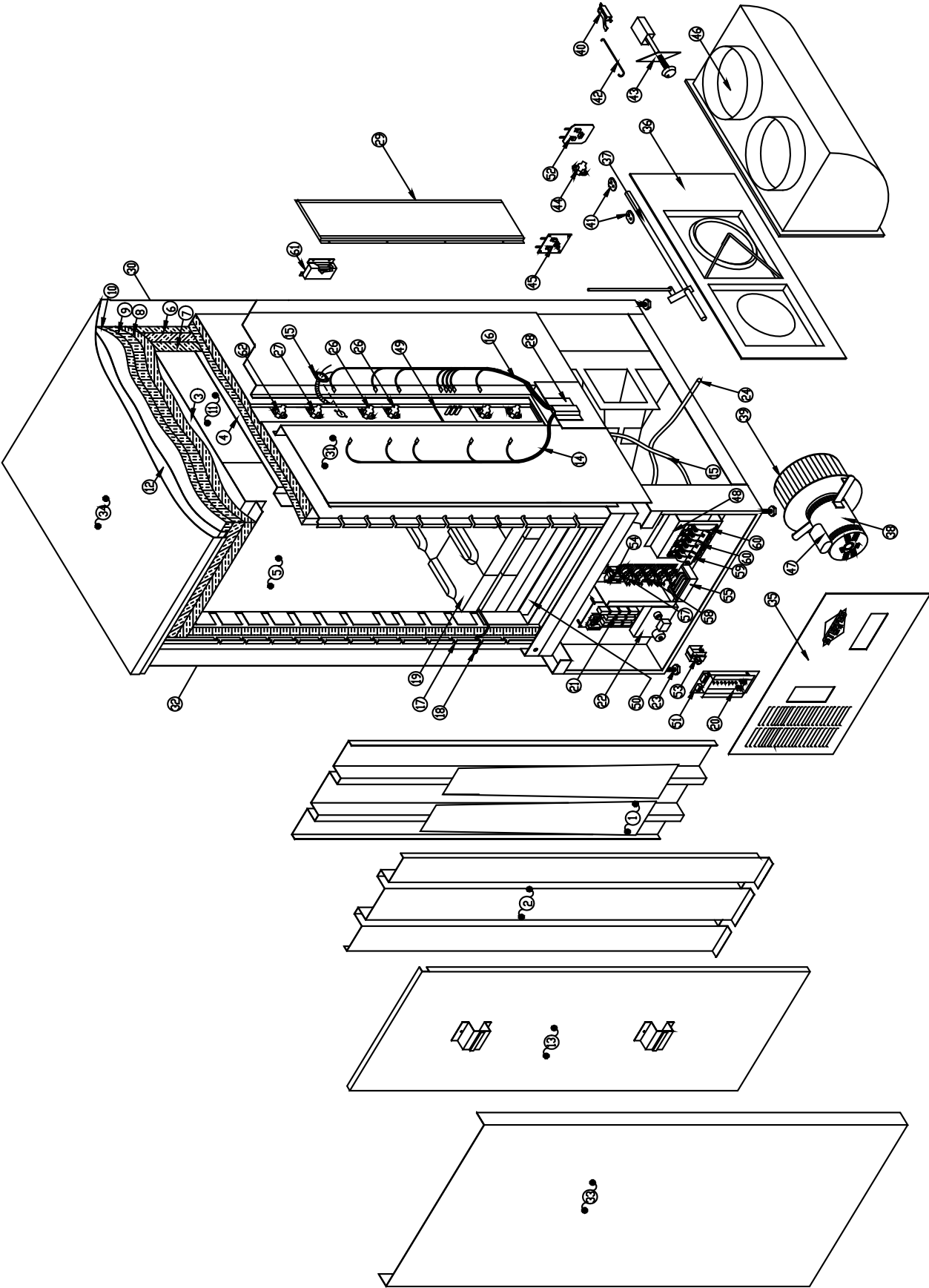
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15. Energize the control circuit and check the #4 yellow LED light on the interface board. It should remain on (indicates the damper is satisfied), and there should be 24 VAC between the CW terminal and the COM terminal on the damper motor.
16. If any of the voltage tests performed in this check-out procedure do not yield the correct results, check connections from the booster's interface board to the air discharge sensor.
17. If all systems check-out, de-energize all circuits and reconnect all wires, remove all jumpers, and reassemble the booster by reversing the disassembly procedure.
18. Restore power to the booster.

***Consult the factory with questions or if assistance is required with replacing the melt link or checking any the systems described in this procedure.***

***THIS PROCEDURE MUST BE PERFORMED BY A QUALIFIED ELECTRICIAN***

# EXPLODED VIEW DIAGRAM



# HPB PARTS LIST

*NOTE: When ordering replacement parts, please include unit model number and serial number.*

DWG. REF. NO.	DESCRIPTION	HPB11 ITEM NO.	HPB15 ITEM NO.	HPB22 ITEM NO.
1.	Stainless Steel Panel, Back	1140098	1140099	1140388
2.	Stainless Steel Panel, Front	1140128	1140129	1140380
3.	Aluminized Steel Panel, Top	1140085	1140085	1140085
4.	Aluminized Steel Panel, Right	1140142	1140141	1140384
5.	Aluminized Steel Panel, Left	1140089	1140088	1140392
6.	2" Blanket Insulation, Back & Sides (Outer)	1050050	1050055	1050035
7.	2" Blanket Insulation, Back & Sides (Inner)	1050051	1050056	1050041
8.	2" Blanket Insulation, Top & Front (Inner)	1050052	1050057	1050047
9.	2" Blanket Insulation, Top & Front (Middle)	1050053	1050058	1040048
10.	1" Blanket Insulation, Top & Front (Outer)	1050054	1050059	1050049
11.	Galvanized Steel Panel, Back	1140087	1140097	1140396
	Galvanized Steel Panel, Right	1140087	1140097	1190395
	Galvanized Steel Panel, Left	1140087	1140097	1140397
12.	Galvanized Steel Panel, Top	1140084	1140084	1140084
13.	Galvanized Steel Panel, Front	1140086	1140093	1140400
14.	Element Wiring Harness	1040017	1040019	1040246
15.	Core Temperature Sensor	1040020	1040020	1040020
16.	Main Wiring Harness	1040016	1040018	1040244
17.	Element Jumpers	1040014	1040015	1040037
18.	Heating Element (277 V, 1830W)	1014022R	1014022R	1014022R
	Heating Element (208V, 1830W)	1014013R	1014013R	1014013R
	Heating Element (240V, 1830W)	1014014R	1014014R	1014014R
19.	Heat Storage Brick	1903004	1903004	1903004
20.	Control Board Mounting Plate	1140140	1140140	1140140
21.	Relay Interface Board (SFIII)	1023007R	1023007R	1023007R
22.	Damper Motor	1021003R	1021003R	1021003R
23.	Leveling Legs	1159004	1159004	1159004
24.	Fan Wiring Harness	1040013	1040013	1040013
25.	Base Assembly	1141132	1141132	1141132
26.	Core Charging High Limit Switch Assembly	1040011R	1040011R	1040011R
27.	130° F Low Core Temperature Switch	1040007R	1040007R	1040007R
28.	Limit Bar Channeling Plate	1140070	1140070	1140070
29.	Limit Bar Louvre Panel	1140077	1140136	1140136
30.	Painted Panel, Back	1140100	1140101	1140364
31.	Painted Panel, Right	1140147	1140148	1140356
32.	Painted Panel, Left	1140081	1140137	1140376
33.	Painted Panel, Front	1140090	1140102	1140372
34.	Painted Panel, Top	1140074	1140074	1140074
35.	Electrical Panel Cover	1140095	1140080	1140080
36.	Air Delivery Damper Assembly	1140111	1140111	1140111
37.	Core Damper Linkage Assembly	1141129	1141129	1141129
38.	Core Blower Motor (1/3 HP, 1625 RPM)	1040084	1040084	1040084

DWG. REF. NO.	DESCRIPTION	HPB11 ITEM NO.	HPB15 ITEM NO.	HPB22 ITEM NO.
39.	Core Blower Wheel	1020002R	1020002R	1020002R
40.	Slam Gate Interlock Switch	1024004	1024004	1024004
41.	Slam Gate Melt Link	1159005	1159005	1159005
42.	Slam Gate Melt Link Linkage	1140236	1140236	1140236
43.	Slam Gate Actuator Complete	1141131	1141131	1141131
44.	Air Discharge High Limit	1012012R	1012012R	1012012R
45.	Air Discharge Controller	1040053R	1040053R	1040053R
46.	Inlet/Outlet Plenum Assembly	1190004	1190004	1190004
47.	Motor Run Capacitor	1018017	1018017	1018017
48.	Circuit Breaker Standoff	1140139	1140139	1140139
49.	Charge Control Resistor	1017027	1017027	1017027
50.	Hardboard Base Insulation	1050060	1050061	1050061
51.	Charge Control Circuit Board (SFIII)	1023005	1023005	1023005
52.	Low Temperature Duct Sensor	1040054R	1040054R	1040054R
53.	Charge Control Thermostat Assembly	1040033R	1040033R	1040033R
54.	Fan Relay	1018008	1018008	1018008
55.	40VA Control Transformer	1017034	1017034	1017034
56.	Electrical Panel	1140072	1140072	1140072
57.	Stage 2 Time Delay Sequencer	1019000	1019000	1019000
58.	Charging Sequencers	1019002	1019002	1019002
59.	15 Amp Circuit Breaker – GE Brand*	1024012R	1024012R	1024012R
	15 Amp Circuit Breaker – Siemens Brand*	1024000R	1024000R	1024000R
60.	60 Amp Circuit Breaker (208/240V) – Siemens Brand*	1024002R	1024002R	1024002R
	60 Amp Circuit Breaker (208/240V) – GE Brand*	1024013R	1024013R	1024013R
	60 Amp Circuit Breaker (277V) – GE Brand*	1024014	1024014	1024014
61.	Outdoor Air Temperature Sensor Assembly	1040032	1040032	1040032
62.	285° Core Temperature Control	N/A	N/A	1040039

\* When replacing breakers in a Steffes heating system, it is important to replace with like brand heaters.