

Slide 1

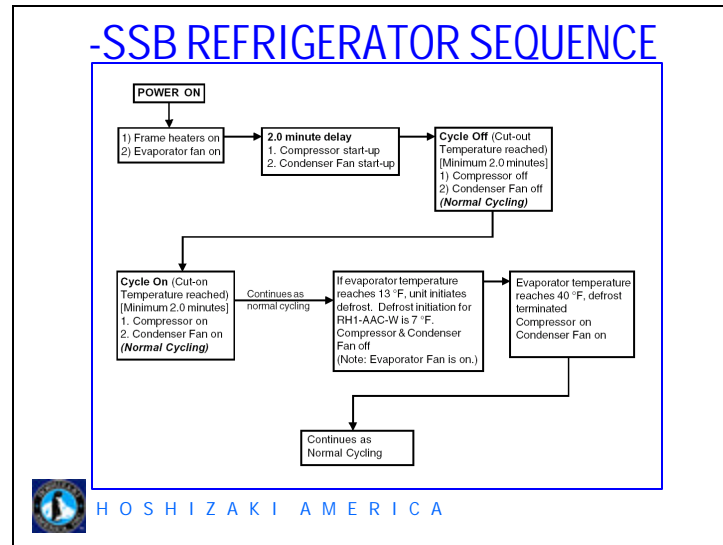


The Hoshizaki line of reach-ins consists of two types of refrigerators and freezers. The high end TEMPGUARD™ (-SSB) and the mid-range SAFETEMP™ (-AAC) are the two product lines available. The TEMPGUARD has all the features that you would expect to find in a high-end box such as, solid state control system including alarm and error codes, completely stainless steel interiors, doors and exterior sides, etc. The unit also has other features found exclusively on Hoshizaki products such as the EverCheck™ control board system. The TEMPGUARD™ and SAFETEMP™ is available in various configurations some of which are one, two, and three section refrigerators, one and two section freezers, with half door and glass door options. Combination units are also available with refrigerators and freezers in the same unit.

This module will concentrate on the TEMPGUARD™ (-SSB). The -AAC SAFETEMP™ will be covered in another module.

At the end of this module you will find a table with detailed specifications for all current Reach-In models.

Slide 2

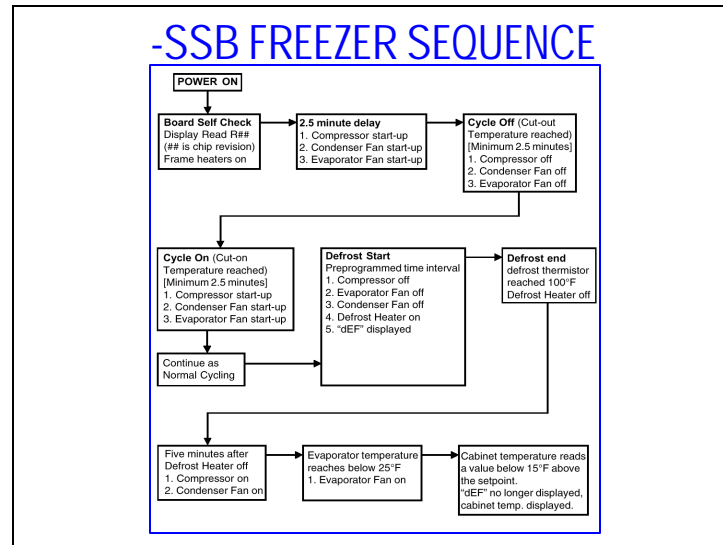


Refrigerator normal operation:

When the power switch is turned “ON”, the control board starts the delay timer count. 2.0 minutes later the compressor, condenser fan motor, and evaporator fan motor start. The evaporator fan circulates air across the coil, through the stainless air duct, and to the cabinet. The cabinet is cooled until the desired set-point temperature is reached. The average pull-down time for an empty box to the factory set point is 21~23 minutes. This pull-down time would obviously vary when product is included in the cabinet. When the set point is reached, the cabinet temperature thermistor (K4) signals the board to stop refrigeration. This signal is simply a change of resistance that causes the control board program to react accordingly. The compressor, condenser fan motor, and the evaporator fan motor stop. K4 will signal the control board to cycle the compressor, condenser fan motor, and evaporator fan motor on and off as needed, to maintain the desired cabinet set point temperature. There is always a 2.0 minute restart delay for the refrigeration components.

Defrost control: The defrost is temperature initiated and temperature terminated. Defrost will initiate by temperature through the defrost thermistor (K3). This thermistor is located in the fins of the evaporator coil evaporator. If the coil temperature gets below 13°F the unit will go into an off cycle defrost which consist of de-energizing the compressor and condenser fan motor. The evaporator fan will continue to run. When the evaporator temperature has reached 40°F the unit will cycle the compressor and condenser fan motor on and continue normal cycling.

Slide 3



Freezer Normal Operation:

When the power switch is turned “ON”, the control board starts the delay timer count. 2.5 minutes later the compressor, condenser fan motor, and evaporator fan motor start. The evaporator fan circulates air across the coil, through the stainless air duct, and to the cabinet. The cabinet is cooled until the desired set-point temperature is reached. The average pull-down time for an empty box to the factory set point is 21~23 minutes. This pull-down time would obviously vary when product is included in the cabinet.

When the set point is reached, the cabinet temperature thermistor (K4) signals the board to stop refrigeration. This signal is simply a change of resistance that causes the control board program to react accordingly. The compressor, condenser fan motor, and the evaporator fan motor stop. K4 will signal the control board to cycle the compressor, condenser fan motor, and evaporator fan motor on and off as needed to maintain the desired cabinet set point temperature. There is always a 2.5 minute restart delay for the refrigeration components.

Defrost:

The defrost system for all freezer models uses electric heater strips and is time initiated and temperature terminated through the control board. Freezer defrost can be set to occur 1, 2, 3, 4, 6, or 8 times a day using the **Guarded Access Menu**. The factory setting is 6 per day. This means an electric defrost will occur every 4 hours from when the freezer is started. The number of defrost needed per day will vary depending on how each customer uses the reach-in. The number

of defrost can be adjusted depending on freezer use. You may find that more defrost are required if the reach-in is opened frequently or operated in a humid environment.

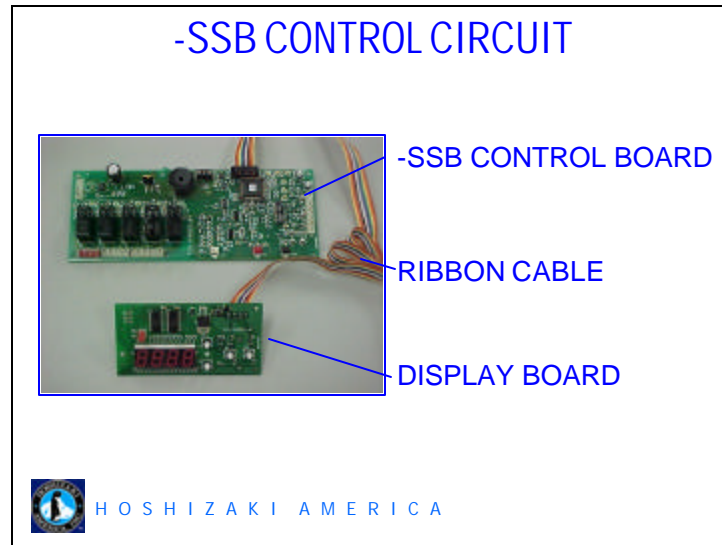
When a defrost occurs, “dEF” is displayed. During defrost, the evaporator fan motor, condenser fan motor, and compressor shut down and the electric heaters are energized. The heaters warm the evaporator coil to remove any ice build up. The defrost control thermistor (K3) terminates defrost once the center of the evaporator coil reaches 100°F. This should indicate a clear evaporator coil. Remember that this 100°F is coil temperature and is not circulated throughout the cabinet.

When the coil temperature reaches 100°F at K3, the control board de-energizes the defrost heaters and starts a 5 minute delay timer. After 5 minutes, the compressor and condenser fan motor restart and the evaporator coil begins to cool. Once the evaporator temperature reaches 0°F, K3 signals the board to restart the evaporator fan motor. When the temperature reaches within 15°F of the cabinet temperature set-point, the display changes from “dEF” to the cabinet temperature. The “dEF” display is maintained till the cabinet cools so that the customer will not be alarmed at a slightly higher than normal cabinet temperature.

The electric defrost system is backed up by two additional safeties. A one hour maximum defrost timer starts counting when the defrost begins. If the coil temperature fails to reach 100°F within one hour, this timer will terminate defrost and cause an E3 defrost alarm sounding 5 beeps every 10 seconds. A bi-metal switch also backs up the defrost system. This switch is mounted on the top of the evaporator coil. If the temperature at the top of the evaporator coil reaches 120°F, this switch opens to signal the board to shut down the electric heaters. The control board will continue in defrost with no electric heaters until the one hour timer causes an E3 alarm. Pressing the reset at the display panel will clear the E3 alarm.

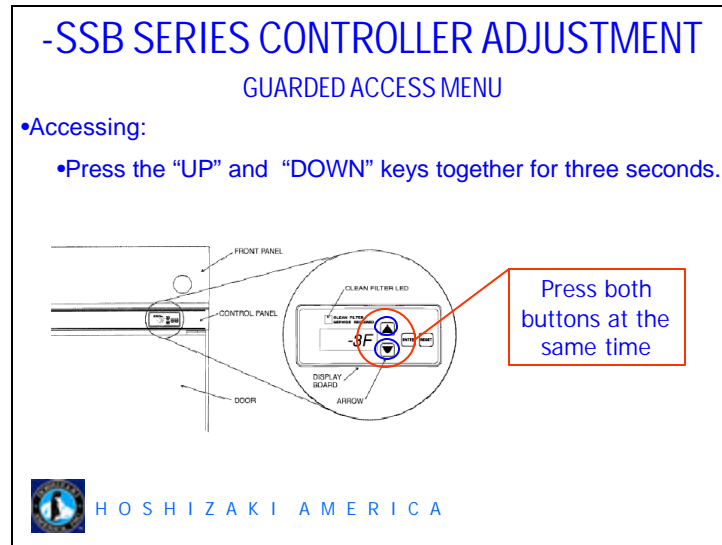
If 4 consecutive E3 alarms occur pressing the reset at the display will only silence the beeper. The E3 code will not clear until a service technician presses the master reset on the control board. Obviously, the defrost system should be checked for a problem in this case.

Slide 4



The –SSB uses an EverCheck™ control system that incorporates a control board, ribbon cable and display board. This system controls the unit operation and provides error alarms and diagnostic information to inform the customer of a potential problem before damage to the product occurs.

The same control board is used in either a Refrigerator or Freezer. DIP switches are set each application. This provides a universal replacement control for the –SSB product line. Follow the instructions provided with the replacement board to set the DIP switches for your application.



There are two menus incorporated in the –SSB, the **Guarded Access** menu and the **Diagnostic Menu**. These menus allow you to make adjustments in the operation of the unit as well as check diagnostic information when trouble shooting the reach-in.

By pressing the “UP” and “DOWN” arrow keys at the same time for 3 seconds you can gain access to the **Guarded Access Menu**.

Slide 6

-SSB SERIES CONTROLLER ADJUSTMENT
GUARDED ACCESS MENU

- 1st Adjustment:
 - Temperature Setpoint
Average cabinet temperature

- 2nd Adjustment:
 - Defrost Frequency
Refrigerator: Automatic defrost "df X" has no effect
Freezer: Ex. "df" 4 = 4 defrost per day

- 3rd Adjustment:
 - Units of display:
F = Fahrenheit C = Celsius

You can make three adjustments once you have accessed the Guarded Access Menu. To navigate to the next step press the "ENTER" button.

The first item that can be adjusted is the set point of the reach-in. This is the temperature that the unit will maintain. Factory default for the freezer is -3°F and the refrigerator is 36°F

The second item is the defrost frequency. This is the number of defrost per day and only applies to freezers. It can be adjusted for 1,2,3,4,6,8 defrost however. However the factory default adjustment is 6 per day

The third and final item that can be changed from this menu is the temperature scale that the display reads. Either F = Fahrenheit or C = Celsius .

To make adjustments in any of these steps use the "UP" and "DOWN" arrow keys. You must cycle through the entire menu, back to the temperature readout by pressing enter, before the changes will take affect.

TEMPGUARD™ (-SSB) DISPLAY CODES

- Alarm display~ Alternates between code and box temp.
- E1- High Cabinet temperature ~ 3 Beeps
25° F above set point for more than 4 hours
- E2- Low cabinet temperature ~ 4 Beeps
8° F Below set point for more than 1 hour
- E3- Freezer defrost over 1 hour ~ 5 Beeps
- E4- High pressure 3 x in 1 hour ~ 6 Beeps (5 x cuts off)
- E6 - E7 High voltage (8 Beeps) and Low voltage (9 Beeps)
- E8 - E9 Defrost or Cabinet temperature sensor failure (Continuous buzzer)
- E10 Communication error (Dual Temp only)
- dEF Unit in defrost or recovery
- CF~ Clean filter ~ 1 Beep.
- door~ Displays when open~ 2 Beeps if open>3 Min

TEMPGUARD (-SSB) ALARM CODES

There are several audible alarms and visual codes which may be displayed to alert the customer of potential problems before product is damaged. The display will alternate between the alarm code and box temp. Below you will find a brief explanation of each error. Also a label on the control box provides general information about these alarms and codes.

CF ~ Clean filter ~1 Beep

This alarm will be shown when the air filter has become clogged. There is a bi-metal (Klixon) switch on the discharge line that will send a signal to the board when the discharge line temp begins to rise. After cleaning the filter, allow time for the sensor to reset, then press “RESET” on the display board to reset the alarm.

“door” Displays when the door is open

When the door is open the display will read “door”, to alert the customer that the door may be ajar. If the door remains open for more than 3 minutes the unit will beep 2 times. This alarm will reset once the door is closed.

E1- High cabinet temperature ~ 3 Beeps

If the unit experiences a temperature of 25°F above set point for more than 4 hours the unit will sound a 3 beep alarm and display “E1” alternating with the box temperature.

E2– Low cabinet temperature ~ 4 Beeps

If the unit experiences a temperature of 8°F below the set point for more than 1 hour the unit will sound a 4-beep alarm and show “E2” on the display.

E3- Freezer defrost over 1 hour ~ 5 Beeps

The unit will show an “E3” and a five-beep alarm if the unit stays in defrost for more than one hour. This alarm will only be seen on freezer units.

E4- High pressure 3 x in 1 hour ~ 6 Beeps (5 x cuts off)

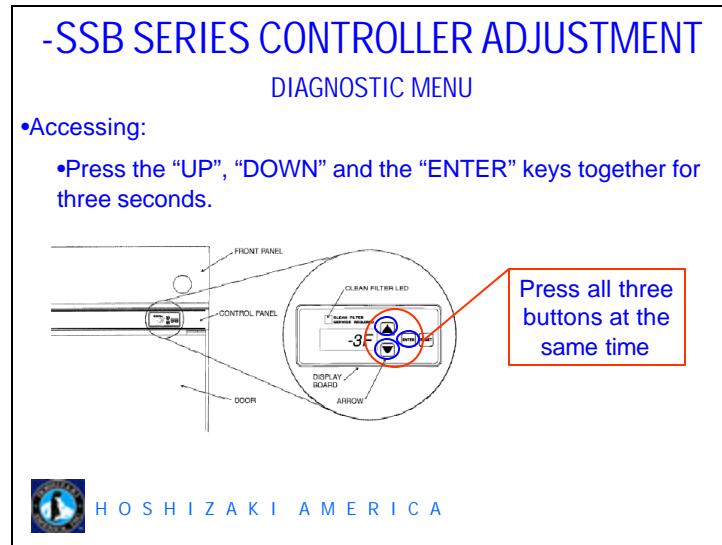
The unit will begin to signal “E4” if the unit has tripped on high pressure 3 times within a 1-hour period. If the unit cycles off 5 times in a 1-hour period the unit will shut down in order to protect the refrigeration components.

E6-E7 Voltage errors E6 High voltage safety. E7 Low voltage safety. Both of these alarms will automatically reset when the correct power is restored.

E8-E9 Thermistor alarms E8 Cabinet Thermistor failure. E9 Defrost Thermistor failure. The unit will continue to operate using factory default operation.

E10 Communication error

Only applies to dual temperature units and results when the cable connecting the two control boards is either shorted or open.



To assist in trouble shooting the –SSB series a Diagnostic Menu is provided. This menu gives you the ability to send the unit into a manual defrost, change display sensors, clear all error codes as well as provide you with detailed information regarding the past operation of the unit.

To gain access to this menu press the “UP”, “DOWN” and “ENTER” together for three seconds.

To make adjustments in any of these steps use the “UP” and “DOWN” arrow keys. You must cycle through the entire menu back to the temperature display by pressing the “ENTER” key before the changes will take affect.

-SSB SERIES CONTROLLER ADJUSTMENT
DIAGNOSTIC MENU

- 1st Command:
 - 1OFF Display shows Cabinet temperature
 - 1ON Display shows Evaporator temperature

Display automatically reverts back to cabinet temperature after five minutes.

- 2nd Command: (Freezer only)
 - 2OFF Manual defrost initiation option is not activated
 - 2ON Manual defrost initiation option is activated

Will begin defrost once complete menu has been cycled through
Does not change scheduled defrost time

The first command will be shown as “1OFF” when the display is using the cabinet thermistor to read temperature (Normal). If this step is changed to “1ON” the display will read the actual evaporator temperature using the defrost thermistor. The reading will automatically revert back to the cabinet temperature after five minutes. This feature can be used to check the coil temperature for five minutes intervals at any time during the cycle including defrost.


The second command is used only in freezer applications. When changed to “2ON” the unit will begin a manual defrost once the menu is cycled back to the temperature display.

-SSB SERIES CONTROLLER ADJUSTMENT
DIAGNOSTIC MENU

- 3rd Command:
 - 3OFF Unconditional alarm reset option not activated
 - 3ON Unconditional alarm reset option activated

Resets all alarm display codes. Complete alarm reset

- 4th Command:
 - 4 16 Number in right two digits represent Compressor run time in the last 24 hours (Example: 16 hours total run time in the last 24 hours)

 H O S H I Z A K I A M E R I C A

The third command in the Guarded Access Menu is used for unconditional alarm reset. This is done by changing to “3ON”

The fourth command will show the compressor run time in the last 24 hours.

-SSB SERIES CONTROLLER ADJUSTMENT
DIAGNOSTIC MENU

- 5th Command:
 - 5 50 Number in right two digits represent percent of Compressor run time for the last 5 cycles.

A cycle is from "off" to "on"

Does not use cycle terminated by a defrost or the first cycle after a defrost.

Value is saved every 5 cycles

- 6th command:
 - 6 45 Number in right two digits is Compressor run time for the last run cycle.

The fifth command will show the percentage of run time in the last five cycles.

The sixth, command compressor run time for the last run cycle.

-SSB SERIES CONTROLLER ADJUSTMENT
DIAGNOSTIC MENU

- 7th Command: (Freezer Only)
 - 7 45 Number in right two digits represent length of the last defrost.

- 8th Command:
 - 8 67 Number in right two digits represent the highest temperature recorded during the last high temperature alarm

Display will read "8--" if there has not been a high temp. alarm

Value saved every 8.5 minutes when in alarm

 H O S H I Z A K I A M E R I C A

The seventh command will show the length of the last defrost cycle (Freezer Only)

The eighth command is the highest temperature recorded during the last high temperature alarm.

-SSB SERIES CONTROLLER ADJUSTMENT

DIAGNOSTIC MENU

•9th Command:

- 9-10 Number in right two digits represent the lowest temperature recorded during the last low temperature alarm

Display will read "9--" if there has not been a low temp. alarm

Value saved every 8.5 minutes when in alarm

10th Command

- 0-25 Temperature of the evaporator when the fan will be energized.

- Note: All changes are made using the "UP" and "DOWN" arrow keys.
- You must advance all the way through the menu using the "Enter" key before any changes will be accepted.

The ninth command is the lowest temperature recorded during the last low temperature alarm.

The tenth command was added to Rev. 17 boards. This shows the temperature at which the evaporator fan motor will start when the unit cycles on or after a defrost. The factory default setting is 0°F

We hope that this training module gives you a basic understanding of the operation of the –SSB TempGuard™ reach-in refrigerators and freezers. You can access copies of the complete Service Manual at hoshizakiamerica.com or for hard copies, please contact your local distributor. If you need further assistance you can contact Technical Support at techsupport@hoshizaki.com or 1-800-233-1940.

MODEL	RH1-SSB	RH2-SSB	RH3-SSB	FH1-SSB	FH2-SSB	RFH2-SSB	
Type	Refrigerator	Refrigerator	Refrigerator	Freezer	Freezer	Refrigerator	Freezer
Voltage/Frequency/Phase	115/60/1	115/60/1	115/60/1	115/60/1	115/60/1	115/60/1	
Running Amps (A)	7.0	10.0	10.2	8.6	11.5	14.3	
Circuit Breaker (A)	15	15	15	15	20	30	
Engy. Consump. (kWHr/Day)	7	11.7	14.2	13.0	22.1	17.6	
Heat Rejection (BTU/Hr)	1000	1665	2020	1850	3140	2500	
Voltage Range (V)	104-126	104-126	104-126	104-126	104-126	104-126	
Ambient Range (°F)	45-100	45-100	45-100	45-100	45-100	45-100	
Cabinet Temperature Control	Electronic	Electronic	Electronic	Electronic	Electronic	Electronic	
Control Setpoint Range (°F)	36 to 50	36 to 50	36 to 50	-10 to 25	-10 to 25	36 to 50	-10 to 25
Factory Setting (°F)	36 +/- 3	36 +/- 3	36 +/- 3	-3 +/- 3	-3 +/- 3	36 +/- 3	-3 +/- 3
Total Refrigerated Volume (ft^3)	22.3	48.5	74.7	22.3	48.5	22.3	22.3
Total Shelf Space (ft^2)	16.1	35.3	54.0	16.1	35.3	16.1	16.1
Exterior/Interior Finish	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	
Solid Door Liner	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	
Half Door Liner	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	
Defrost System	Off Cycle	Off Cycle	Off Cycle	Electric Heat	Electric Heat	See RH1-SSB	See FH1-SSB
Defrost Initiation	13°F Coil Temp	13°F Coil Temp	13°F Coil Temp	Time 6/day (Adj.)	Time 6/day (Adj.)		
Defrost Termination	40°F Coil Temp	40°F Coil Temp	40°F Coil Temp	100°F Coil Temp	100°F Coil Temp		
Defrost Maximum	N/A	N/A	N/A	60 minutes	60 minutes		
Defrost Safety	N/A	N/A	N/A	Bi-metal / 120°F	Bi-metal / 120°F		
Comp delay @ startup	2.5 min.	2.5 min.	2.5 min.	2.5 min.	2.5 min.		
Comp delay @ end Defrost	2.5 min.	2.5 min.	2.5 min.	5 min	5 min		
Fan operation during defrost	ON	ON	ON	OFF until 0°F coil	OFF until 0°F coil		
Display during defrost	Temp	Temp	Temp	* dEF	* dEF		
Compressor Manufacturer	Tecumseh	Tecumseh	Copeland	Tecumseh	Copeland		
Compressor Model	AE9415EZXA	AKA9427ZXA	JS35C1E-CAA-252	AJA2425ZXA	RS80C1E-CAA		
Comp. Capacity W / BTUH	435 / 1490	790 / 2700	1035 / 3530	720 / 2450	2390 / 3730		
Comp. RLA / LRA	4.5 / 29	7.8 / 48	9.2 / 46	7.9 / 68	18.6 / 72.5		
Comp. SWR ohms	5.05	4.6	9.58	3.06	5.013 ~ 5.767		
Comp. RWR ohms	1.83	0.66	0.88	0.48	0.38 ~ 0.438		
Comp. POE Oil Amount	10 fl. oz.	17 fl. oz.	20 fl. oz.	26 fl. oz.	24 fl. oz.		
Start Capacitor	243-292 mfd@110V	161-193 mfd@165V	43-52 mfd@220V	270-324 mfd@165V	88-106 mfd@330V		
Run Capacitor	N/A	N/A	15 mfd@440V	15 mfd@370V	25 mfd@370V		
Refrigerant Type / Control	R-404A / TXV	R-404A / TXV	R-404A / TXV	R-404A / TXV	R-404A / TXV		
Refrigerant Charge (ozs./g)	12.2 / 345g	18.2 / 515	21.9 / 620	16.6 oz. / 470g.	21.5 oz. / 570g.		
Refg. Cir. Protection (auto reset)	HP Control	HP Control	HP Control	HP Control	HP Control		
Door Types	Full/Half	Full/Half	Full/Half	Full/Half	Full/Half	Full/Half	
Agency Approvals	UL/cUL/NSF	UL/cUL/NSF	UL/cUL/NSF	UL/cUL/NSF	UL/cUL/NSF	UL/cUL/NSF	

REACH-IN SPECIFICATIONS

MODEL	RFH3-SSB		RH1-SSB-GD	RH2-SSB-GD	RH3-SSB GD	PTR1SSB	RH1-AAC
Type	Refrigerator	Freezer	Refrigerator	Refrigerator	Refrigerator	Pass Through Refrigerator	Refrigerator
Voltage/Frequency/Phase	115/60/1		115/60/1	115/60/1	115/60/1	115/60/1	115/60/1
Running Amps (A)	16.3		9.4	12.7	15	12.0	6
Circuit Breaker (A)	30		15	20	20	15	15
Engy. Consump. (kWHr/Day)	21.1		13.9	25.5	29.1	16	6.4
Heat Rejection (BTU/Hr)	3000		1975	3620	4130	2273	910
Voltage Range (V)	104-126		104-126	104-126	104-126	104-126	104-126
Ambient Range (°F)	45-100		45-100	45-100	45-100	45-100	45-100
Cabinet Temperature Control	Electronic		Electronic	Electronic	Electronic	Electronic	Electronic
Control Setpoint Range (°F)	36 to 50	-10 to 25	36 to 50	36 to 50	36 to 50	36-50 F	37 to 55
Factory Setting (°F)	36 +/- 3	-3 +/- 3	36 +/- 3	36 +/- 3	36 +/- 3	36°	39
Total Refrigerated Volume (ft^3)	48.5	22.3	22.3	48.5	74.7	23.8	22.3
Total Shelf Space (ft^2)	35.3	16.1	16.1	35.3	54.0	16.1	16.1
Exterior/Interior Finish	22 gauge Stainless		22 gauge Stainless	22 gauge Stainless	22 gauge Stainless	Stainless	Stainless / Aluminum
Solid Door Liner	22 gauge Stainless		Glass	Glass	Glass	N/A	Stainless
Half Door Liner	22 gauge Stainless		N/A	N/A	N/A	Stainless & Glass	Stainless
Defrost System	See RH2-SSB	See FH1-SSB	Off Cycle	Off Cycle	Off Cycle	Off Cycle	Off Cycle
Defrost Initiation			13°F Coil Temp	13°F Coil Temp	13°F Coil Temp	10°F Coil Temp	13°F Coil Temp
Defrost Termination			40°F Coil Temp	40°F Coil Temp	40°F Coil Temp	40°F Coil Temp	40°F Coil Temp
Defrost Maximum			N/A	N/A	N/A	N/A	N/A
Defrost Safety			N/A	N/A	N/A	N/A	N/A
Comp delay @ startup			2.5 min.	2.5 min.	2.5 min.	2.5 min.	2.0 min.
Comp delay @ end Defrost			2.5 min.	2.5 min.	2.5 min.	N/A	2.0 min.
Fan operation during defrost			ON	ON	ON	ON	ON
Display during defrost			Temp	Temp	Temp	Temp	Temp.
Compressor Manufacturer			Tecumseh	Tecumseh	Copland	Tecumseh	Danfoss
Compressor Model			AKA9427ZXA	AKA9455ZXA	RS64C1E-CAA	AKA9427ZXA	NF7FX
Comp. Capacity W / BTUH			790 / 2700	1160 / 5450	1893 / 6460	790 / 2700	500/1700
Comp. RLA / LRA			7.8 / 48	10. / 50	11 / 59	7.8 / 48	4 / 28
Comp. SWR ohms			4.6	5.95	5.282 ~ 6.078	4.6	6.6
Comp. RWR ohms			0.66	0.69	0.533 ~ 0.613	0.66	1.9
Comp. POE Oil Amount			17 fl. oz.	17 fl. oz.	24 fl. oz.	17 fl. oz.	10.8 fl. oz.
Start Capacitor			161-193 mfd@165V	72-88 mfd@250V	72-86 mfd@330V	161-193 mfd@165V	280 mfd@120V
Run Capacitor			N/A		30 mfd@440V	N/A	N/A
Refrigerant Type / Control			R-404A / TXV	R-404A / TXV	R-404A / TXV	R-404a / TXV	R-134a / Cap Tube
Refrigerant Charge (ozs./g)			15.7 / 445	21.5 / 610	31.5 / 893	15.7 / 445	9.7 / 275
Refg. Cir. Protection (auto reset)	HP Control	HP Control	HP Control	HP Control	HP Control		
Door Types	Full/Half		Full Glass	Full Glass	Full Glass	Half Front and Rear	Full/Half
Agency Approvals	UL/cUL/NSF		UL/cUL/NSF	UL/cUL/NSF	UL/cUL/NSF	UL/cUL/NSF	UL/cUL/NSF

REACH-IN SPECIFICATIONS

MODEL	RH2-AAC	RH3-AAC	FH1-AAC	FH2-AAC
Type	Refrigerator	Refrigerator	Freezer	Freezer
Voltage/Frequency/Phase	115/60/1	115/60/1	115/60/1	115/60/1
Running Amps (A)	8.0	12.0	8.8	12.0
Circuit Breaker (A)	15	15	15	20
Engy. Consump. (kWhr/Day)	9.8	15.2	15	24
Heat Rejection (BTU/Hr)	1390	2161	2158	3400
Voltage Range (V)	104-126	104-126	104-126	104-126
Ambient Range (°F)	45-100	45-100	45-100	45-100
Cabinet Temperature Control	Electronic	Electronic	Electronic	Electronic
Control Setpoint Range (°F)	37 to 55	37 to 55	-10 to 28 F	-10 to 28 F
Factory Setting (°F)	39	39	0	0
Total Refrigerated Volume (ft^3)	48.5	74.7	22.3	48.5
Total Shelf Space (ft^2)	35.3	54	16.1	35.3
Exterior/Interior Finish	Stainless / Aluminum	Stainless / Aluminum	Stainless / Aluminum	Stainless / Aluminum
Solid Door Liner	Stainless	Stainless	Stainless	Stainless
Half Door Liner	Stainless	Stainless	Stainless	Stainless
Defrost System	Off Cycle	Off Cycle	Electric Heat	Electric Heat
Defrost Initiation	13°F Coil Temp	13°F Coil Temp	Time 6/day (Adj.)	Time 6/day (Adj.)
Defrost Termination	40°F Coil Temp	40°F Coil Temp	100°F Coil Temp	100°F Coil Temp
Defrost Maximum	N/A	N/A	60 Minutes	60 Minutes
Defrost Safety	N/A	N/A	Bi-metal / 120°F	Bi-metal / 120°F
Comp delay @ startup	2.0 min.	2.0 min.	5 min. after def. complete	5 min. after def. complete
Comp delay @ end Defrost	2.0 min.	2.0 min.	5 min	5 min
Fan operation during defrost	ON	ON	OFF until evap. 0°F	OFF until evap. 0°F
Display during defrost	Temp.	Temp.	* dEF	* dEF
Compressor Manufacturer	Danfoss	Tecumseh	Tecumseh	Copeland
Compressor Model	NF11FX	AKA4482YXA	AJA2425ZXAXA	RS80C2E-CAA-219
Comp. Capacity W / BTUH	735/2500	1090 /8200	755 / 2450	1740 / 8170
Comp. RLA / LRA	5 / 28	12.3 / 59.0	7.9 / 68.0	18.6 / 72.5
Comp. SWR ohms	3.6			
Comp. RWR ohms	1.0			
Comp. POE Oil Amount	10.8 fl. oz.	17.3 fl. oz.	26.0 fl. oz.	24.0 fl. Oz.
Start Capacitor	410 mfd@120V	64-77 mfd@250V	270-324 mfd@165V	88-106 mfd@330V
Run Capacitor	N/A	N/A	15 mfd@370V	25mfd@370V
Refrigerant Type / Control	R-134a / Cap Tube	R-134a / Cap Tube	R-404a /TXV	R-404a /TXV
Refrigerant Charge (ozs./g)	11.6 / 330	20.6 / 585	16.6 / 470	20.1 / 570
Refg. Cir. Protection (auto reset)	HP Control	HP Control	HP Control	HP Control
Door Types	Full/Half	Full/Half	Full/Half	Full/Half
Agency Approvals	UL/cUL/NSF	UL/cUL/NSF	UL/cUL/NSF	UL/cUL/NSF