OWNER'S MANUAL

MODEL DH5F-333ARB – HEATED HOLDING CABINET

Supplier Name:	**MARSHALL AIR SYSTEMS, INC.**
Address:	419 Peachtree Drive South Charlotte, NC 28217
Model #:	_____
Serial #:	_____
Date Received:	_____
Date Installed:	_____
Telephone #:	704-525-6230
Fax #:	704-525-6229
Service Referral #:	800-722-3474
Local Service Name:	_____
	_____
	_____
Local Service #:	_____

PRODUCT DESCRIPTION

The heated holding cabinet features Marshall's own ThermoGlo™ heating technology. Heat radiates from every square inch of the upper and lower flat plate heating surfaces. This eliminates the need to clean intricate calrod, wire and reflector assemblies.

The cabinet can accommodate up to two 1/3 size pans 2 ½" deep per deck.

The cabinet features a time and temperature control as well as an on/off switch for each deck. This allows the user to run only the deck(s) of the cabinet needed to support the level of business during each part of the day or day of the week. Each pan has an associated three-digit display for the time and two LED indicator lights to the left and right of the time display. The LED will direct the operator which pans should be used first by displaying a green light while the back-up pan LED will display a red light.

GENERAL SPECIFICATIONS

Height:	19.750"
Width	15.375"
Depth:	15.625"
Weight:	70 lbs
# of Deck:	3
# Pans per Deck:	2
Electrical:	120V/9A
Cord:	36" Long w/ NEMA 5-15 plug
Approvals:	NSF, ETL/CETL

Patent Pending

169178 RV020216

OWNER'S MANUAL

MODEL DH5F-333ARB – HEATED HOLDING CABINET

FOR YOUR SAFETY

DO NOT STORE OR USE GASOLINE OR OTHER

FLAMMABLE VAPORS OR LIQUIDS IN THE

VICINITY OF THIS OR ANY OTHER APPLIANCE

AVERTISSEMENT
Ne pas entreposer ni utiliser de l'essence ni d'autres vapeurs ou liquides inflammables dans le voisinage de cet appareil, ni de tout autre appareil.

WARNING: IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, OR MAINTENANCE CAN CAUSE PROPERTY DAMAGE, INJURY OR DEATH. READ THE INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS THOROUGHLY BEFORE INSTALLING OR SERVICING THIS EQUIPMENT.

AVERTISSEMENT: Une installation, un ajustement, une altération, un service ou un entretien non conforme aux normes peut causer des dommages à la propriété, des blessures ou la mort. Lisez attentivement les directives d'installation et d'opération et d'entretien avant de faire l'installation ou l'entretien de cet équipement

KEEP THIS MANUAL IN A SAFE PLACE AND RETAIN FOR FUTURE USE.

Cabinet area must be kept free of combustible materials and the flow of ventilation air must not be obstructed. Operating personnel must not perform any maintenance or repair functions. Contact your Qualified Service Company.

Clean cabinet including shelves and base with a damp cloth/rag and a mild cleaner.

DO NOT USE A GREEN SCOTCH BRITE PAD OR ANY OTHER ABRASIVE CLEANING PAD. THE BLUE SCOTCH BRITE (NO SCRATCH) IS SAFE TO USE.

DO NOT USE CAUSTIC CLEANING SOLUTIONS SUCH AS OVEN CLEANER. USE ONLY MILD, NON-ABRASIVE CLEANER.

DO NOT IMMERSE IN WATER!

169178 RV020216

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MODEL DH5F-333ARB – HEATED HOLDING CABINET

TABLE OF CONTENTS

ILLUSTRATIONS

SCHEMATICS

169178 RV020216

OWNER'S MANUAL

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PRE-INSTALLATION

1. The cabinet is packaged to minimize the risk of shipping damage. Immediately upon receipt, make certain to inspect the cabinet for damage. **FILE ALL CLAIMS WITH THE FREIGHT CARRIER.**

2. Unpack and inspect the cabinet. **IF ANY CONCEALED DAMAGE, FILE ALL CLAIMS WITH THE FREIGHT CARRIER.**

FINAL INSTALLATION

1. Unpack cabinet and remove all protective paper or plastic covering from metal parts.

2. If applicable, make sure that the back air circulator plenum is well latched in place and plugged in to the cabinet(s). (See photos on page 7.)

3. Place cabinet in the stable base.

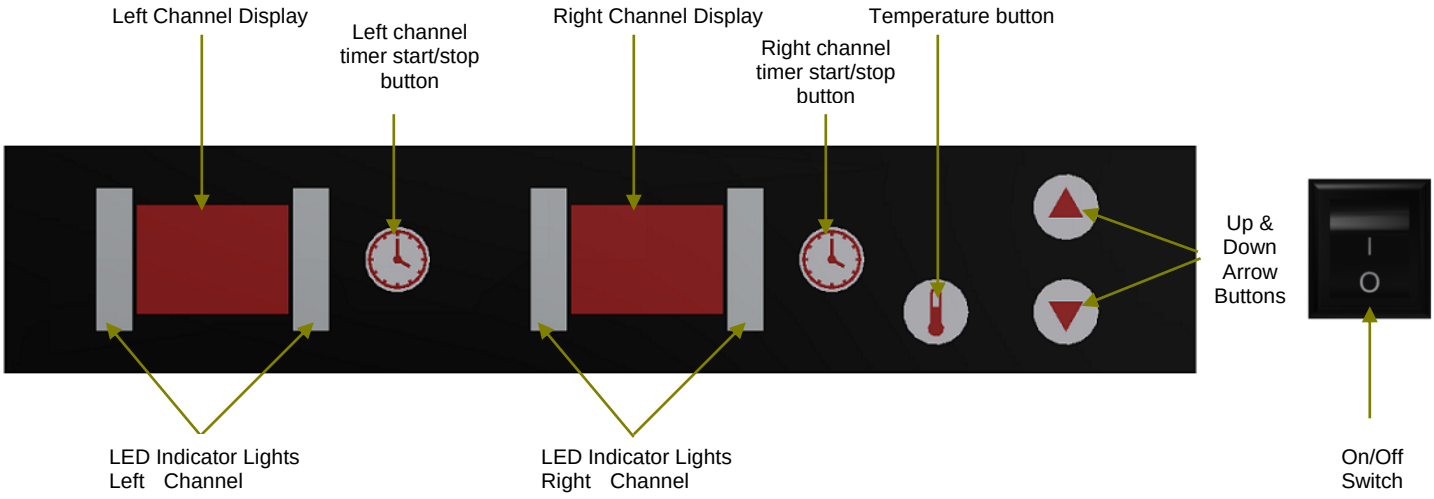
4. Plug cabinet into 120v receptacle rated for 15 amps.

5. Installation shall comply with the latest version of the National Electrical Code, NFPA 70.

6. Wash and sanitize all parts before placing them in the cabinet.

OPERATION

The following is the user interface layout for each deck.



CONTROLLER POWER UP:

1. Upon power up, the controller will briefly show the software version and then go to preheat mode and the display will show "PHt"

PREHEAT:

1. The controller will stay in preheat mode ("PHt") for the entire preheat period (preheat time parameter) even though both heaters (top and bottom) have reached set points before the end of that period. If the controller is inadvertently turned OFF and back ON, the preheat period can be bypassed by a 3 second press of the down arrow button only if both heaters are within the allowed differential temperature set points (preheat bypass temperature parameter).

2. After preheat, the controller goes into idle mode "---". At this time, any timer can be started.

HOLDING TIME CYCLES:

1. To start a cycle, press a timer start/stop button. The display will show the holding time value in minutes and starts the countdown. The LED bars for that timer channel will then light steady green.

2. When the timer reaches the pre-alert value, the display will then alternate between showing the remaining time and "drP" for DROP, the LED bars will start flashing and a beeping will start. The user then has to acknowledge the pre-alert by a press of the timer start/stop button. The display will then flash the remaining time for the rest of the cycle, the LED bars will go back to steady and the beeping will stop.

3. When the timer reaches the "000" value, the display will flash "000", the LED bars will flash red and the beeping will start until the user acknowledges the end of the cycle by pressing the timer start/stop button. The timer will then go back to idle mode "---", the led bars will turn OFF and the beeping will stop.

4. Any holding cycle can be cancel at any time by a **3 second press** of the timer start/stop button.

5. If at any time during normal operation, one heater's temperature is falling or rising out of the allowed differential from set point (ready mode differential parameter), the displays will alternate between current mode and "LO" or "HI" to alert the user that the heater's temperature is too low or too hi. This should remain until the heaters are back within the allowed differential.

CURRENT TEMPERATURES DISPLAY:

1. To view the heaters current temperature, press and hold the temperature button for 3 seconds. The display will then alternate between "toP" for top heater and its current temperature value.

2. To view the bottom heater current temperature, press the temperature button again. The

   display will then alternate between "bot" for bottom heater and its current temperature value.

3. A press of the temperature button will cycle between top and bottom current temperatures.

4. To exit temperature view mode and return to previous mode, press and hold the temperature button.

PROGRAMMING

HOLDING TIME:

1. To change a timer channel holding time value, the unit needs to be in preheat mode "PHt" or in idle mode "---".

2. Press and hold for 3 seconds the timer start/stop button for the channel to be changed. The display will then flash the current setting in minutes.

3. Use the up/down arrow buttons to change to new setting.

4. Press and hold start/stop button for 3 seconds to save the new setting and go back to idle mode.

5. If necessary, repeat for other channels.

USER LEVEL:

1. User level programming mode can be accessed during preheat or when all timers are in idle mode "---".

2. Press and hold for 5 seconds the up and down arrow buttons. The controller then goes into user programming mode and the display will alternate between the parameter display codes and the current value for that parameter. Here is the list of the user programming parameters and functionalities with their display code:

" CF"	Configuration download (see configuration download section)
"toP"	Top heater temperature set point (in degree Fahrenheit or Celsius)
"bot"	Bottom heater temperature set point (in degree Fahrenheit or Celsius)
"ALt"	Drop time (expressed as a percentage of the holding time)
"PHt"	Preheat time (in minutes)
"bPS"	Preheat bypass temperature (in degree Fahrenheit or Celsius)

3. Use the temperature button to cycle to the desired parameter.

4. To change the parameter value, use the up and down arrow buttons.

5. To turn a parameter "OFF" (if applicable) press and hold the down arrow button until the display shows "OFF". Any other value indicates that the parameter is turned "ON".

6. When all parameters are set to desired values press and hold the temperature button to save new settings and exit to previous mode.

DEFAULT PRESET VALUES:

	DH5F-333ARB		
	Deck 1	Deck 2	Deck 3
Left Channel Holding Time (min)	30	30	30
Right Channel Holding Time (min)	30	30	30
Top Heater Set Point (ºF)	185	185	185
Bottom Heater Set Point (ºF)	185	185	185
Drop Time (%)	10	10	10
Pre-heat (min)	20	20	20
Pre-heat Bypass (ºF)	50	50	50

DAILY MAINTENANCE

1. Turn off the cabinet and allow it to cool for 20 minutes.
2. Clean cabinet including shelves and base with a damp cloth/rag and a mild cleaner.

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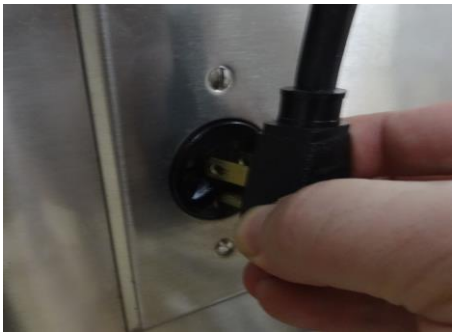
   DO NOT USE CAUSTIC CLEANING SOLUTIONS SUCH AS OVEN CLEANER. USE ONLY MILD, NON-ABRASIVE CLEANER.

   DO NOT IMMERSE IN WATER!
3. Clean any debris obstructing openings for cooling fan (on the right side cover top corner) as well as the openings for middle and bottom deck controllers (located on the right end of the middle and bottom controller crossbar). **THIS IS CRITICAL TO ACHIEVE PROPER COOLING OF THE UNIT.**
4. Allow sufficient drying time before attempting to use again.
5. Clean and sanitize all pans.

MONTHLY MAINTENANCE

1. Follow the daily schedule; there are no adjustments.



2. Unplug cabinet. **Do not pull on cord to unplug.** Grasp plug to unplug. See photo to the right.

3. Move cabinet and clean cabinet as described in Daily Cleaning and Counter. Focus cleaning on area under cabinet.

4. Remove the panel or rear air circulator (if applicable) by disconnecting the power cord and latch. See photo to the right. Wipe down with damp cloth.

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   DO NOT USE CAUSTIC CLEANING SOLUTIONS SUCH AS OVEN CLEANER. USE ONLY A MILD, NON-ABRASIVE CLEANER.

   DO NOT IMMERSE UNIT IN WATER!

5. Wipe the back surfaces of the shelves while the real panel or air circulator (if applicable) is off.

6. Inspect the condition of cord/plug. If damaged, have it replaced.

7. Inspect the condition of the control overlay. If damaged, have it replaced.

Service must be performed by a Qualified Service Company. The term "Qualified Service Company" means any individual, firm, corporation or company which is either engaged in and is responsible for the installation or replacement of electrical components and wiring for commercial kitchen appliances.

TROUBLESHOOTING CHART

Before trouble shooting is started: check unit is plugged in, check for tripped circuit breaker and check that power switch on.

**** DISASSEMBLING HEATER VOIDS WARRANTY ****

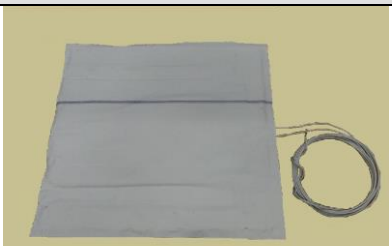
PROBLEM	POSSIBLE CAUSE	SOLUTION
1. CONTROL DISPLAYS "PHt"	A. NORMAL OPERATION CABINET HAS NOT BEEN ON FOR 20 MIN	A. WAIT 20 MINUTES
	B. INADVERTANT POWER DISRUPTION IF SWITCH TURNED OFF BY ACCIDENT, POWER DISRUPTION BY THUNDERSTORM ETC.	B. PRESS AND HOLD DOWN ARROW FOR 3 SECONDS TO CLEAR "PHt" CYCLE
2. UNIT WILL NOT TURN ON	A. UNIT UNPLUGGED	A. PLUG IN UNIT
	B. IS CONTROLLER ON/OFF SWITCH "ON"	B. TURN SWITCH ON
	C. OUTLET HAS NO POWER	C. CHECK CIRCUIT BREAKER
	D. CORD DEFECTIVE	D. REPLACE DEFECTIVE CORD
	E. DOES POWER SUPPLY BOARD HAVE 120V INCOMING	E. REPLACE SWITCH
	F. DOES POWER SUPPLY BOARD HAVE 8.5 VDC OUTGOING TO CONTROLLER	F. REPLACE POWER SUPPLY BOARD
	G. BAD CONTROLLER	G. REPLACE CONTROLLER
3. UNIT NOT HEATING	A. HEATER IS TURNED "OFF"	A. SEE "PROGRAMMING USER LEVEL" SECTION TO TURN HEATER ON
	B. WIRES NOT PLUGGED INTO BACK OF CONTROLLER	B. PLUG WIRES INTO CONTROLLER
	C. NO VOLTAGE TO DC SIDE OF SOLID STATE RELAY	C. LOOSE WIRES, REPLACE CONTROLLER

PROBLEM	POSSIBLE CAUSE	SOLUTION
3. UNIT NOT HEATING	D. SOLID STATE RELAY HAS DC VOLTAGE, NOT ALLOWING POWER TO PASS THROUGH	D. REPLACE SOLID STATE RELAY
	E. HEATING BLANKET WIRES HAVE POWER NOT HEATING	E. LOOSE WIRES, REPLACE HEATING BLANKET
4. LOW PRODUCT TEMPERATURE	A. TEMPERATURE SET POINTS ARE TOO LOW	A. ADJUST TO HIGHER TEMPERATURE SET POINT (SEE PROGRAMMING SECTION)
	B. EXCESSIVE AIR DRAFT(S)	B. SHIELD DRAFT(S)
5. HIGH PRODUCT TEMPERATURE	A. TEMPERATURE SET POINTS ARE TO HIGH	A. ADJUST TO LOWER TEMPERATURE SET POINT (SEE PROGRAMMING SECTION)
6. UNIT FLASHES "+Pr" "LO" (TEMPERATURE LOW)	A. EXCESSIVE AIR DRAFT(S)	A. SHIELD DRAFT(S)
	B. LOOSE WIRE IN ELECTRICAL CABINET	B. CHECK WIRING
	C. BAD TEMPERATURE SENSOR	C. REPLACE SENSOR
	D. BAD SOLID STATE RELAY	D. REPLACE SOLID STATE RELAY
	E. BAD HEATING BLANKET	E. REPLACE HEATING BLANKET
7. UNIT FLASHES "+Pr" "HI" (TEMPERATURE HIGH)	A. BAD SOLID STATE RELAY	A. REPLACE SOLID STATE RELAY
	B. BAD TEMPERATURE SENSOR	B. REPLACE TEMPERATURE SENSOR
	C. BAD CONTROLLER	C. REPLACE CONTROLLER

PROBLEM	POSSIBLE CAUSE	SOLUTION
8. ERROR CODE: "OPN" "UP" OR "LO" "OPEN TEMPERATURE SENSOR" "uP" UPPER DECK OR "LO" LOWER DECK	A. TEMPERATURE SENSOR WIRES BECAME DISCONNECTED	A. RECONNECT TEMPERATURE SENSOR WIRES
	B. BAD SENSOR	B. REPLACE SENSOR
	C. BAD CONTROLLER	C. REPLACE CONTROLLER
9. ERROR CODE "SHT" "uP" OR "LO" "SHORTED TEMPERATURE SENSOR" "uP" UPPER DECK OR "LO" LOWER DECK	A. TEMPERATURE WIRES ARE SHORTED	A. CHECK WIRES
	B. BAD SENSOR	B. REPLACE SENSOR
	C. BAD CONTROLLER	C. REPLACE CONTROLLER
10. TIMER COLOR LEDS NOT ILLUMINATING	A. BAD CONTROLLER	A. REPLACE CONTROLLER
11. ERROR "dft" ON POWER UP	A. INTERNAL MEMORY DAMAGED	A. REPLACE CONTROLLER
12. CABINET FAN NOT WORKING	A. NO VOLTAGE TO FAN	A. CHECK WIRING
	B. BAD FAN	B. REPLACE FAN

****NOTE**: When replacing sensor, a special heat sink sealant will be present when removing failed sensor. Applying new sealant is not required; however, be sure to utilize existing sealant when mounting new sensor.

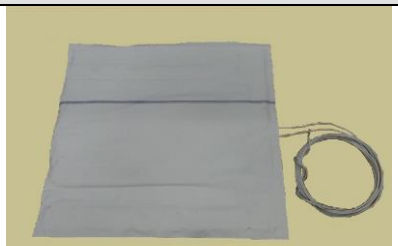
REPLACEMENT PARTS



Part Replacement Time: 43 min

504323 - Blanket, Heater 120V

These heating blankets are used in the bottom heaters of each deck. A defective blanket could cause non-heating of the associated deck bottom heater and therefore an undesired change in the food product quality.



Part Replacement Time: 43 min

504324 - Blanket, Heater 120V

These heating blankets are used in the top heaters of each deck. A defective blanket could cause non-heating of the associated deck top heater and therefore an undesired change in the food product quality.

Part Replacement Time: 6 min

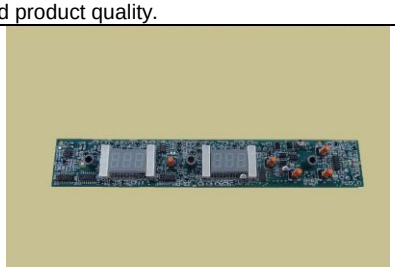
501193 - Connector, Strain Relief

Strain relief used with air circulator cord sets 502760 and 503362 and should be replaced if missing or damaged.

Part Replacement Time: 6 min

502080 - Connector, Strain Relief

Strain relief used with main power cord 504345 and should be replaced if missing or damaged.



Part Replacement Time: 22 min

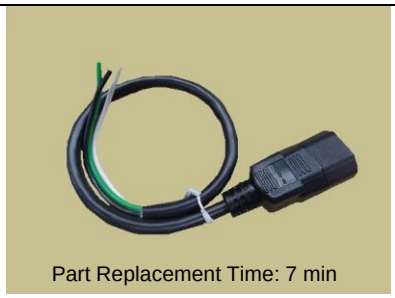
162866 – Control Kit

Time/temperature controller factory pre-programmed according to authorized settings. Replace if the controller is not operating according to specs or if it won't turn on when 8.5VDC is supplied to it.

Part Replacement Time: 7 min

504345 - Cord, 14/3 SJTOW W/STR 120V Plug

120V main power cord. Damaged cord can cause unit to stop operating and should be replaced.



Part Replacement Time: 7 min

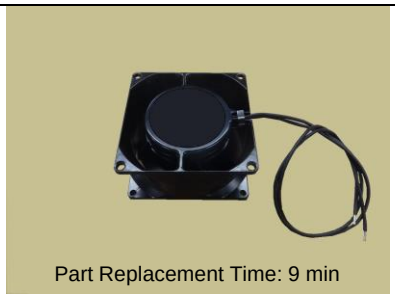
502760 - Cord Set, 18/3 SJTOW 120 V 16" LG
(For units w/ back air circulator only)

Cord set for back air circulator. Damage could cause air circulation to stop therefore altering food product quality. Should be replaced if damaged.

Part Replacement Time: 6 min

503362 - Cord Set, 18/3 SJTOW 120V 24" LG

Cord set used to connect air circulator to main unit. Damage could cause air circulation to stop therefore altering food product quality. Should be replaced if damaged.



Part Replacement Time: 9 min

504344 - Fan, Cooling, Boxer, 115VAC

Fan used inside control box to cool electrical components and in air circulator to force air flow around food products. Failure can cause electrical components to overheat and fail or alter food product quality. Should be replaced if worn or damaged.

REPLACEMENT PARTS

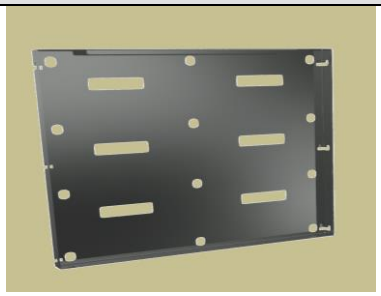
Part Replacement Time: 1 min

501867 – Feet, Rubber Black

Replace if damaged or missing.

504331 - Pan, 1/3 Amber 2 1/2" Tall

Standard 1/3 size pan used to hold food products



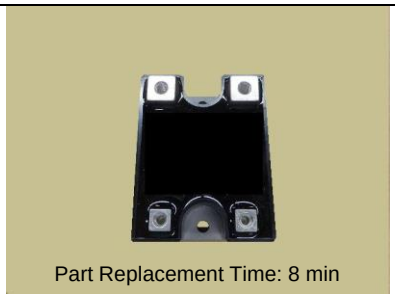
168982 – Rear Cover

Replace if damaged or missing.

Part Replacement Time: 10 min

504318 - Power Supply

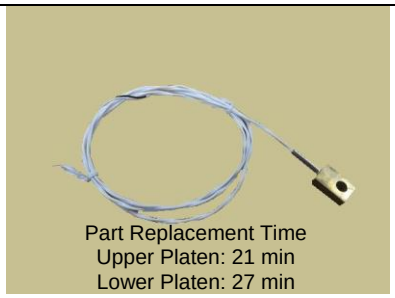
The 120VAC to 8.5VDC power supply is used to power the time/temperature controllers. A defective power supply could cause all controllers to not turn on when powered.



Part Replacement Time: 8 min

504023 - Relay, Solid State 25A

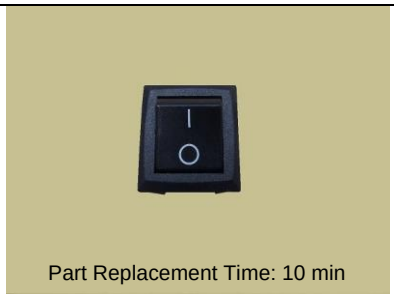
SSRs are used to turn on and off power delivered to their associated heater once it reaches temperature set point. Failure will cause the associated heater to excessively rise above set point and might cause permanent damage to it.



Part Replacement Time
Upper Platen: 21 min
Lower Platen: 27 min

502064 - Sensor, RTD, 48"

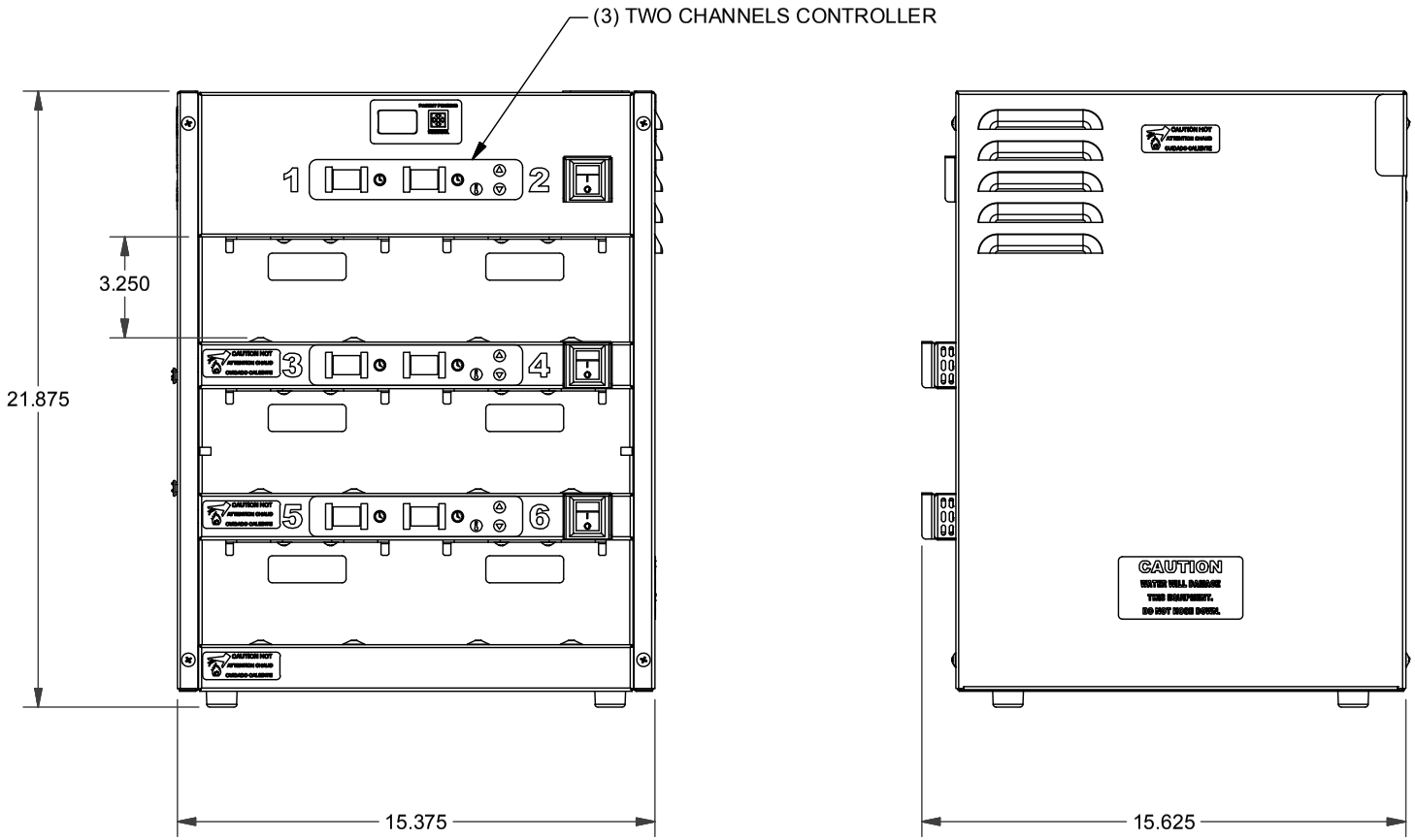
Used to read heater's temperature. If a RTD sensor goes bad or is disconnected, its associated controller will beep and the display will flash either "oPn" or "SHt" to indicate failure



Part Replacement Time: 10 min

502425 - Switch, Double Pole

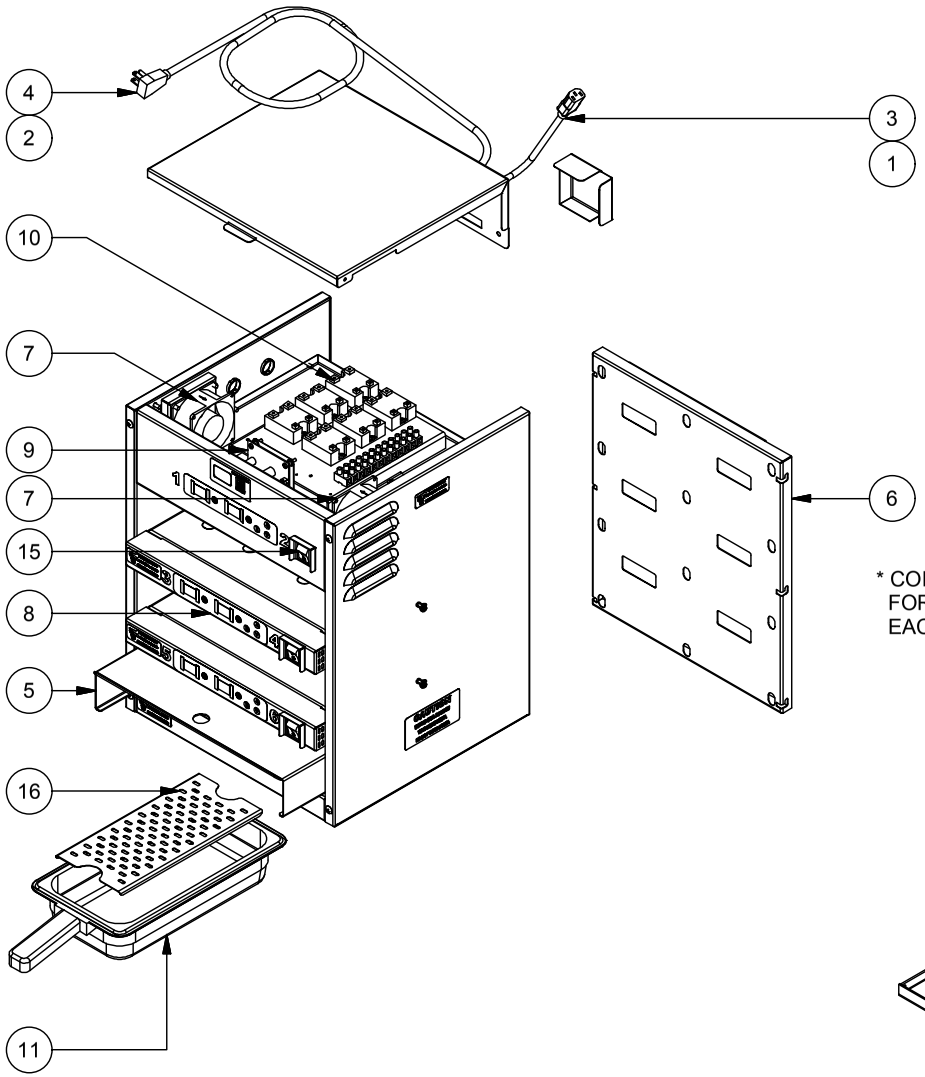
One switch for each deck is used to allow energy efficiency. A bad switch could cause the associated controller to not turn on. Bad or damaged switches should be replaced immediately.



OVERALL DIMENSIONS DH5F-333ARB

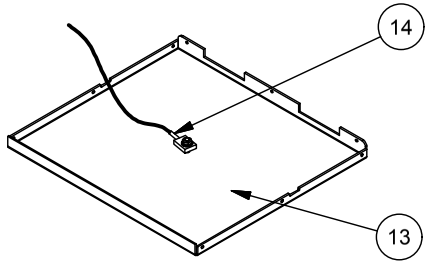
FIGURE 1

169178FIG1 RV020216

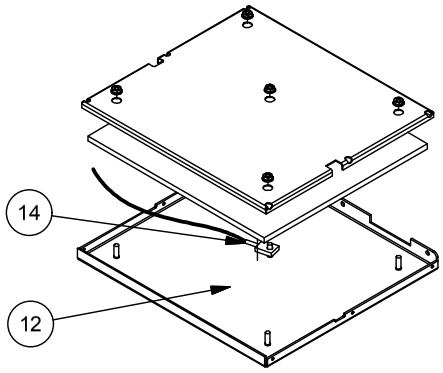


Parts List			
ITEM	PART NO.	DESCRIPTION	QTY
1	501193	CONNECTOR, STRAIN RELIEF .625"HOLE	1
2	502080	CONNECTOR, STRAIN RELIEF .875 HOLE	1
3	503362	CORD SET, 18/3 SJTOW 120V, 24" LONG	1
4	504345	CORD, 14/3 SJTOW W/STR 120V PLUG	1
5	168983	COVER, 2.5" PAN (OPTIONAL)	3
6	168982	COVER, REAR	1
7	504344	FAN, COOLING, BOXER, 115VAC	2
8	162866	CONTROL, WITH LED *** CONTROLS ARE SHIPPED WITH INSTRUCTIONS FOR THE SIMPLE PROGRAMMING NEEDED. ***	3
9	504318	POWER SUPPLY	1
10	504023	RELAY, SOLID STATE 25A	6
11	504331	PAN, 1/3 AMBER 2 1/2" TALL	6
12	504323	BLANKET, BOTTOM HEATER	2
13	504324	BLANKET, TOP HEATER	3
14	502064	SENSOR, RTD, 48"	3
15	502425	SWITCH, CURVETTE, DOUBLE POLE	1
16	504378	TRIVET, DRAIN SHELF 1/3 SIZE PAN	6

* CONTROLS ARE SHIPPED WITH INSTRUCTIONS FOR THE SIMPLE PROGRAMMING NEEDED FOR EACH SHELF REPLACEMENT.



TOP HEATER ASSEMBLY

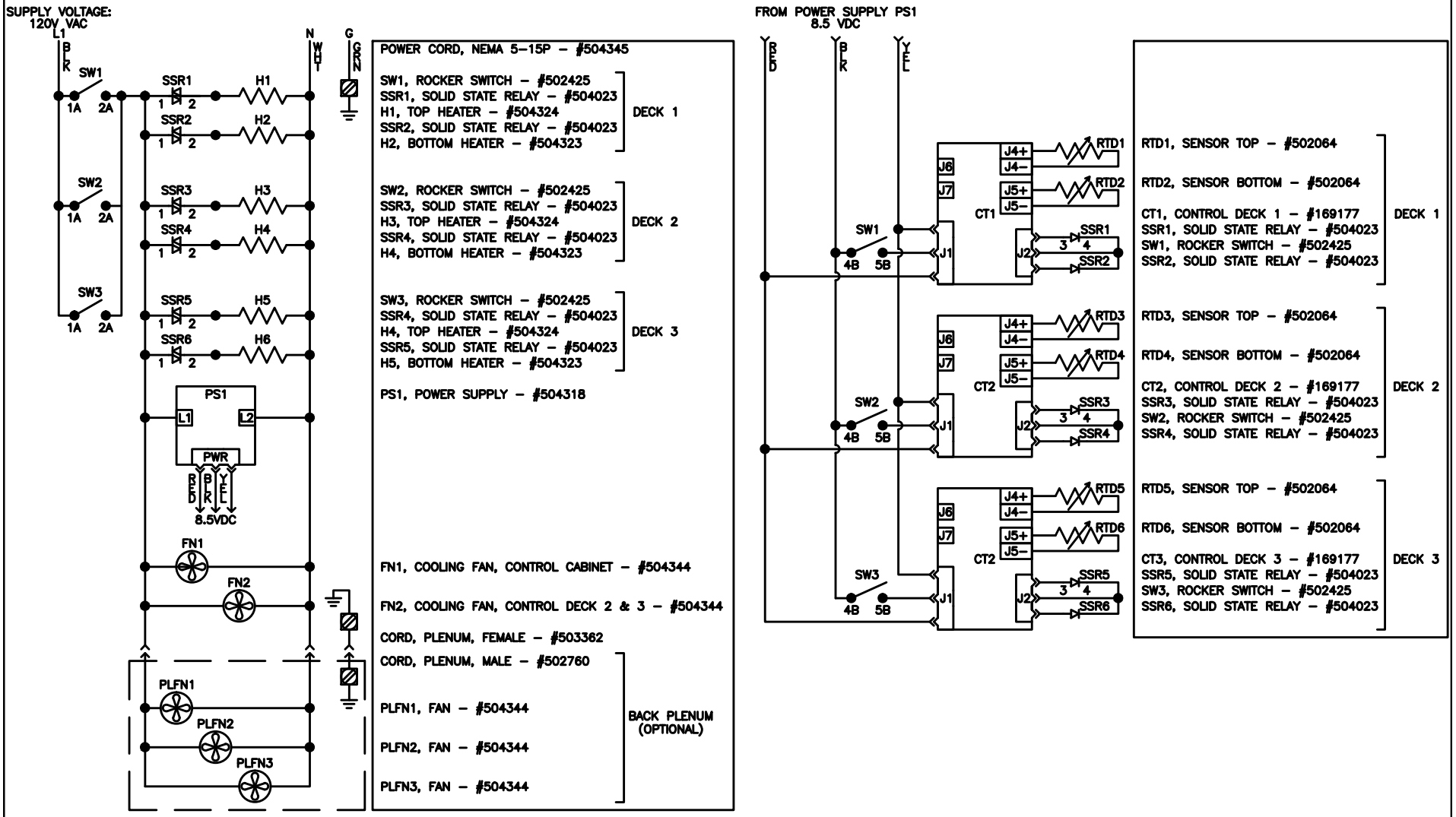


BOTTOM HEATER ASSEMBLY

REPLACEMENT PARTS DH5F-333ARB

FIGURE 2

169178FIG2 RV020216



REV	DESCRIPTION	DATE	REV. BY
–	–	–	–

DRAWN BY: S.A. DATE: 2/3/2016

GENERIC NAME: SCHEMATIC

PRODUCT LINE: HHC | PRODUCT CLASS: HHC

MATERIAL: REFERENCE

__.___" X __.___"

MARSHALL AIR SYSTEMS, INC.

SCHEMATIC
HOLDING CABINET, 120V 9A

SIZE: A | ROUTE.: ELECT | DWG. NO.: 169175 | REV.: 0

SCALE: NTS | IMAGE MAY BE REDUCED NTS | CODE: DH5F-333ARB