Serving Quality on Demand®

MercoMax™ Forced Air Holding Cabinet (MHG) Original Instructions

Service Manual

This manual is updated as new information and models are released. Visit our website for the latest manual.

8197431

Part Number: MER_SM_8197431 11/2024

Safety Notices

⚠Warning

Read this manual thoroughly before operating, installing or performing maintenance on the equipment. Failure to follow instructions in this manual can cause property damage, injury or death.

⚠ DANGER

Do not install or operate equipment that has been misused, abused, neglected, damaged, or altered/ modified from that of original manufactured specifications.

⚠ DANGER

Keep power cord AWAY from HEATED surfaces. DO NOT immerse power cord or plug in water. DO NOT let power cord hang over edge of table or counter.

⚠Warning

Authorized Service Representatives are obligated to follow industry standard safety procedures, including, but not limited to, local/national regulations for disconnection / lock out / tag out procedures for all utilities including electric, gas, water and steam.

⚠Warning

Do Not Store Or Use Gasoline Or Other Flammable Vapors Or Liquids In The Vicinity Of This Or Any Other Appliance. Never use flammable oil soaked cloths or combustible cleaning solutions, for cleaning.

⚠Warning

This product contains chemicals known to the State of California to cause cancer and/or birth defects or other reproductive harm. Operation, installation, and servicing of this product could expose you to airborne particles of glasswool or ceramic fibers, crystalline silica, and/or carbon monoxide. Inhalation of airborne particles of glasswool or ceramic fibers is known to the State of California to cause cancer. Inhalation of carbon monoxide is known to the State of California to cause birth defects or other reproductive harm.

⚠Warning

Do not use electrical appliances or accessories other than those supplied by the manufacturer.

⚠Warning

Use caution when handling metal surface edges of all equipment.

⚠Warning

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision concerning use of the appliance by a person responsible for their safety. Do not allow children to play with this appliance.

⚠Warning

DO NOT use this product near water – for example, near a kitchen sink, in a wet basement, near a swimming pool, or similar locations.

NOTE: Proper installation, care and maintenance are essential for maximum performance and trouble-free operation of your equipment. Visit our website www.mercoproducts.com for manual updates, translations, or contact information for service agents in your area.

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Section 1
General Information

Model Numbers

Domestic Models
MHG22SAN1N
MHG22SAB1N/2N, 23, 24, 34, 32, 42

Understanding Model Numbers									
M	H	G	2	2	S	A	B	2	N
Merco	Hot Holding Cabinet	Customer	Rows (Shelves)	Columns (Trays per shelf)	Lower Heat	Upper Heat	Display	Control Faces	Connectivity
		G- General Market	2-4	2-4	S- Standard	A- Forced Air	B-Timer Bar N-None	1- One Side 2- Two Sided	N- None

Serial Number Information

MHG holding cabinet serial and model numbers are located on the data plate. Data plates are located on the bottom and the right end of the unit.

Always have the serial number of your unit available when calling for parts or service.

Service Personnel

All service on Merco equipment must be performed by qualified, certified, licensed, and/or authorized or service personnel.

Qualified service personnel are those who are familiar with Merco equipment and who have been authorized by Merco to perform service on the equipment. All authorized service personnel are required to be equipped with a complete set of service and parts manuals, and to stock a minimum amount of parts for Merco equipment. A list of Merco Factory Authorized Servicers (FAS's) is located on the Merco website at http://www.mercoproducts.com/Service#Service. Failure to use qualified service personnel will void the Merco warranty on your equipment.

Warranty Information

Visit http://www.mercoproducts.com/Service#Warranty to:

- Register your product for warranty.
- Verify warranty information.
- View and download a copy of your warranty.

Regulatory Certifications

Domestic Models are certified by:

- Underwriters Laboratories Sanitation
- Underwriters Laboratories (UL)
- Underwriters Laboratories of Canada (ULC)

Section 2
Installation

⚠ DANGER

Installation must comply with all applicable fire and health codes in your jurisdiction.

⚠ DANGER

Legs must be installed and the legs must be screwed in completely.

⚠ DANGER

Use appropriate safety equipment during installation and servicing.

⚠ Warning

Only trained and authorized service personnel or store manager should access the service screens. If changes to these settings are made incorrectly they will cause the unit to malfunction.

Location

⚠ Warning

This equipment must be positioned so that the plug is accessible unless other means for disconnection from the power supply (e.g., circuit breaker or disconnect switch) is provided.

⚠ Warning

Adequate means must be provided to limit the movement of this appliance without depending on or transmitting stress to the electrical conduit or gas lines.

⚠ Warning

To avoid instability the installation area must be capable of supporting the combined weight of the equipment and product. Additionally the equipment must be level side to side and front to back.

⚠ Warning

This equipment is intended for indoor use only. Do not install or operate this equipment in outdoor areas.

⚠ Caution

Do not position the air intake vent near steam or heat exhaust of another appliance.

The location selected for the equipment must meet the following criteria. If any of these criteria are not met, select another location.

- Holding cabinets are intended for indoor use only.
- The location MUST be level, stable and capable of supporting the weight of the equipment.
- The location MUST be free from and clear of combustible materials.
- Equipment MUST be level both front to back and side to side.
- Position the equipment so it will not tip or slide.
- Recommended air temperature is 41° - 86°F (5° - 30°C) .
- Proper air supply for ventilation is REQUIRED AND CRITICAL for safe and efficient operation. Refer to Clearance Requirements chart on page 2-2.
- Do not obstruct the flow of ventilation air. Make sure the air vents of the equipment are not blocked.

Weight of Equipment

Domestic Model	Weight
MHG22	49lbs/22kg
MHG23	120lbs/54kg
MHG24	120lbs/54kg
MHG34	150lbs/68kg
MHG32	62lbs/28kg
MHG42	77lbs/35kg

Clearance Requirements

⚠ DANGER

Minimum clearance requirements are the same for noncombustible locations as for combustible locations. The flooring under the appliance must be made of a noncombustible material.

⚠ DANGER

Risk of fire/shock. All minimum clearances must be maintained. Do not obstruct vents or openings.

Sides/Back
1.0″ (25mm)

Dimensions

Domestic Model	Width	Depth	Depth incl Timer Bars	Height
MHG22SAN1N	19.20″ (488mm)	13.00″ (330mm)	N/A	11.40″ (290mm)
MHG22SAB1N			15.50″ (394mm)	11.40″ (290mm)
MHG22SAB2N			18.0″ (457mm)	11.40″ (290mm)
MHG23SAB1N	29.70″ (754mm)		15.50″ (394mm)	11.40″ (290mm)
MHG23SAB2N			18.0″ (457mm)	11.40″ (290mm)
MHG24SAB1N	36.50″ (927mm)		15.50″ (394mm)	11.40″ (290mm)
MHG24SAB2N			18.0″ (457mm)	11.40″ (290mm)
MHG34SAB1N			15.50″ (394mm)	16.40″ (417mm)
MHG34SAB2N			18.0″ (457mm)	16.40″ (417mm)
MHG32SAB1N	19.20″ (488mm)		15.50″ (394mm)	16.40″ (417mm)
MHG32SAB2N	19.20″ (488mm)		18.0″ (457mm)	16.40″ (417mm)
MHG42SAB1N	19.20″ (488mm)		15.50″ (394mm)	21.30″ (541mm)
MHG42SAB2N	19.20″ (488mm)		18.0″ (457mm)	21.30″ (541mm)

Electrical Service

⚠ DANGER

Check all wiring connections, including factory terminals, before operation. Connections can become loose during shipment and installation.

⚠ DANGER

Copper wire suitable for at least 167°F (75°C) must be used for power connections.

⚠ Warning

This appliance must be grounded and all field wiring must conform to all applicable local and national codes. Refer to rating plate for proper voltage. It is the responsibility of the end user to provide the disconnect means to satisfy the authority having jurisdiction.

VOLTAGE, WATTS, RATED AMPERAGES & POWER CORD CHART

All electrical work, including wire routing and grounding, must conform to local, state and national electrical codes. The following precautions must be observed:

- The equipment must be grounded.
- A separate fuse/circuit breaker must be provided for each unit.
- A qualified electrician must determine proper wire size dependent upon location, materials used and length of run (minimum circuit amp capacity can be used to help select the wire size).
- The maximum allowable voltage variation is ±10% of the rated voltage at equipment start-up (when the electrical load is highest).
- Check all green ground screws, cables and wire connections to verify they are tight before start-up.

Units with plugs are supplied with approximately 9ft cords, maximum 10ft.

Domestic Model	Voltage, Cycle, Phase	Watts	Amps	Plug
MHG22	120, 60, 1	1920	16.0	5-20P
MHG23	208-230, 60, 1	3174	13.8	6-20P
MHG24	208-230, 60, 1	3680	16.0	6-20P
MHG34	208, 60, 1	3120	15.0	6-20P
MHG32	208-230, 60, 1	1840	8.0	6-20P
MHG42	208-230, 60, 1	3680	16.0	6-20P

Connect the power cord ensuring the plug is fully seated in the receptacle.

Section 3
Operation

⚠ DANGER

The on-site supervisor is responsible for ensuring that operators are made aware of the inherent dangers of operating this equipment.

⚠ DANGER

Do not operate any appliance with a damaged cord or plug. All repairs must be performed by a qualified service company.

⚠ DANGER

Never stand on the unit! They are not designed to hold the weight of an adult, and may collapse or tip if misused in this manner.

⚠ Warning

Do not contact moving parts.

⚠ Warning

All covers and access panels must be in place and properly secured, before operating this equipment.

⚠ Warning

Liquids such as water, coffee, or tea can be overheated beyond the boiling point without appearing to be boiling due to surface tension of the liquid. Visible bubbling or boiling when the container is removed from the microwave oven is not always present. THIS COULD RESULT IN VERY HOT LIQUIDS SUDDENLY BOILING OVER WHEN A SPOON OR OTHER UTENSIL IS INSERTED INTO THE LIQUID. To reduce the risk of injury to persons: Do not overheat the liquid. Stir the liquid both before and halfway through heating it.

⚠ Warning

Do not heat sealed containers or plastic bags in oven. Food or liquid could expand quickly and cause container or bag to break. Pierce or open container or bag before heating.

⚠ Warning

Racks, utensils, rack guides, and oven surfaces may become hot during or after use. Use utensils or protective clothing, like pan grips or dry oven mitts, when necessary to avoid burns.

⚠ Warning

DO NOT use the cavity for storage. DO NOT leave paper products, cooking utensils, or food in the cavity when not in use.

⚠ Caution

Do not block the supply and return air grills or the air space around the air grills. Keep plastic wrappings, paper, labels, etc. from being airborne and lodging in the grills. Failure to keep the air grills clear will result in unsatisfactory operation of the system.

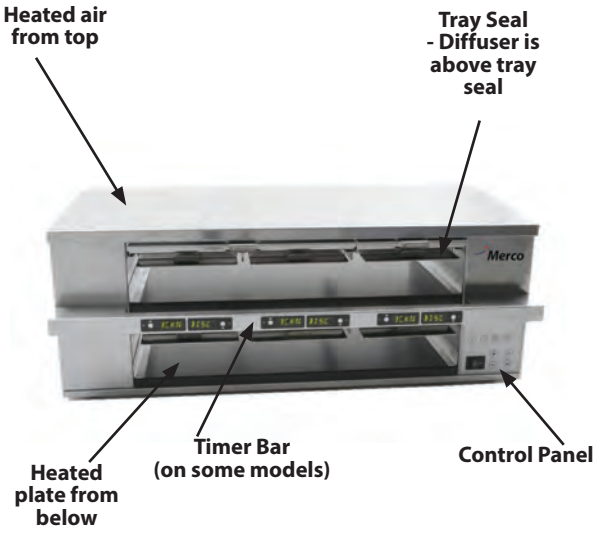
⚠ Caution

Some products such as whole eggs or sealed containers – for example, closed glass jars – are able to explode and SHOULD NOT be HEATED in this oven. Pressure may build up and erupt. Pierce yolk with fork or knife before cooking. Pierce skin of potatoes, tomatoes, and similar foods before cooking with microwave energy. When skin is pierced, steam escapes evenly.

⚠ Caution

DO NOT cover racks or any other part of the oven with metal foil. Airflow restriction will cause overheating of the oven.

Component Identification



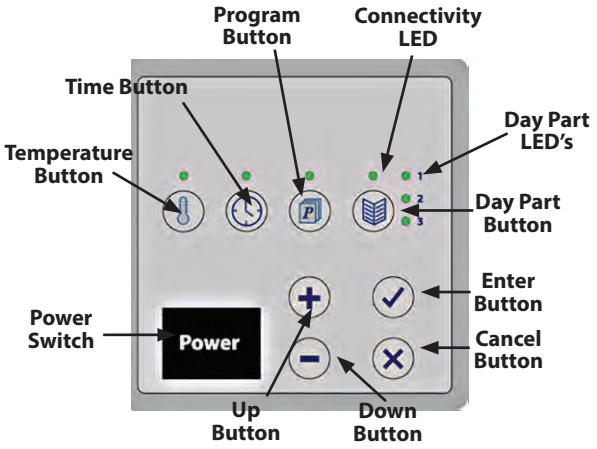
Control Zones

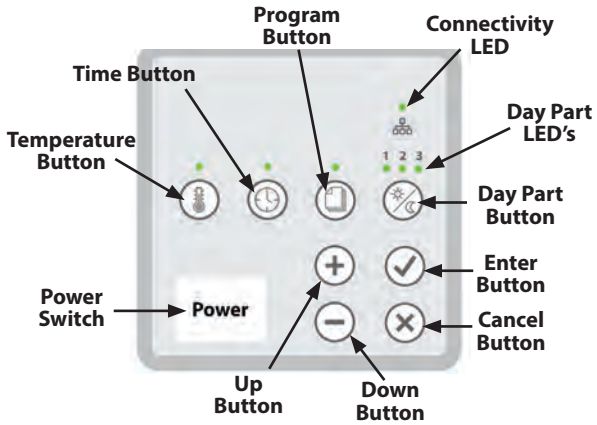
The rows are divided to zones, which are heated individually. Two bins will fit in one zone.

Day part menus can be changed as needed. However, the unit works in a default bin configuration that can't be revised with the controller.

Control Panel

Use the illustration below for the display that matches the unit.





Controls/Programming/Settings

The Merco Holding Cabinet has been designed to afford food service operators the ability to cook menu components in advance and then gently store that product in the holding bins until an order is received. Once that order has been placed, the crew can assemble the order using hot and fresh menu components from the holding bins. This allows for operators to serve to order, helping increase speed of service while maintaining high product quality standards.

- The holding cabinet blows heated air down from the upper platen to the food in the trays.
- Heated air removes moisture from the food surface, maintaining a crispy exterior and hot and moist interior.
- Airflow passes over the food items and exits through holes in the tray sidewalls.
- Dual function for grilled and fried food holding

TYPICAL OPERATOR ACTIONS

Action	Instructions
Turn Unit On	Push Power button.
Load bin with product	Pull out tray, load product and reinsert tray.
Empty bin	Pull out tray and remove product. Reinsert tray.

When the unit is first powered ON, it will begin to preheat. The displays will display PRE-HEAT alternating with the product name.

The holding cabinet will heat up to the pre-set default temperature. The holding cabinet has a default menu and zone assignment. These can not be adjusted from the cabinet. Adjustment of bin locations, times and temperatures can be performed from a PC application.

From the control panel only pre-programmed/pre-set day-parts can be changed. Zones and temperatures can not be adjusted.

The holding bin controller is, at all times, operating in one of the following modes. The indents indicate the sub-modes. Sub-modes are defined based on the navigation to the mode. I.e., to get to diagnostic mode you must be in active heating mode then enter programming mode.

- Pre-Heat Mode
- Active Heating Mode
  - » Diagnostic Mode
  - Temperature View Mode
    - » Diagnostic Temperature View Mode

PRE-HEAT MODE

The displays shall scroll **PRE-HEAT** alternating with the product name during the pre-heat mode until the heater reaches set point. The timer bar will display the product name once the pre-heat mode is completed. If a product is not assigned to the bin, the timer bar will display "- - - -". The LED corresponding to the active Day Part menu configuration will be on.

ACTIVE HEATING MODE

This is the active heating mode of operation. In active heating mode the displays will show the product name and the active day part LED light will be ON.

During active heating mode, press and hold enter for three (3) seconds to scroll the software version on the display.

TIME BUTTON

The time button is ON by default and is only applicable to active holding bins. The displays alternate between the actual hold time and the product name. Pressing the time button will switch off the timers and only display the product names.

TEMPERATURE VIEW MODE

Enter the temperature view mode by pressing the temperature button. The average temperature for each zone is displayed. Press the cancel button to exit.

CHANGING THE DAY PART

Pressing the Day Part button will change to one of six day parts (see matrix for which day part menu is displayed).

Default Day Part Menus			
Day Part #	**LED 1**	**LED 2**	**LED3**
1 (Breakfast)	●		
2 (Change Over 1)	●	●	
3 (Lunch)		●	
4 (Change Over 2)		●	●
5 (Dinner)			●
6 (Change Over 3)	●		●

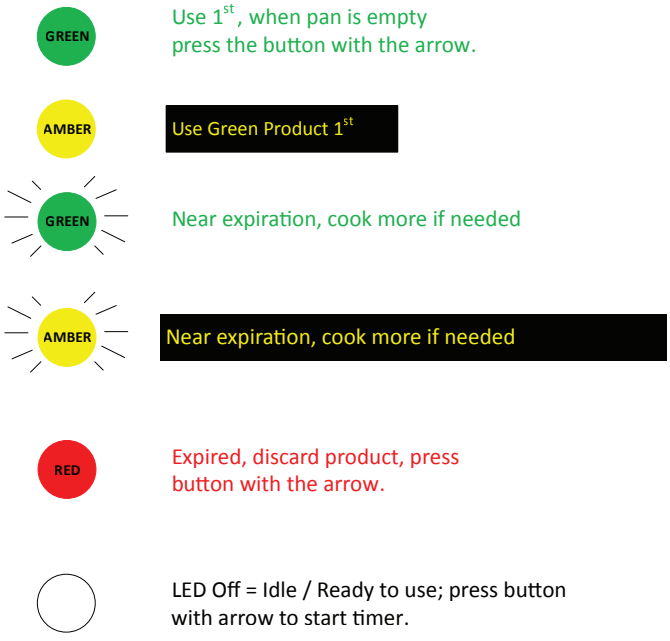
TIMER BARS

- Two timer bars on a 3-row cabinet.
- Top timer controls the top slots.
- Bottom timers control 2nd and 3rd slots.
- Note arrows at menu names.

LED INDICATORS

The timer bar's LED's indicate:

- Trays to pull from first
- When a product is near expiration.
- Product is expired.
- Bin is out of product



Section 4
Maintenance

⚠ DANGER

All utility connections and fixtures must be maintained in accordance with Local and national codes.

⚠ DANGER

It is the responsibility of the equipment owner to perform a Personal Protective Equipment Hazard Assessment to ensure adequate protection during maintenance procedures.

⚠ DANGER

Failure to disconnect the power at the main power supply disconnect could result in serious injury or death. The power switch DOES NOT disconnect all incoming power.

⚠ DANGER

Disconnect electric power at the main power disconnect for all equipment being serviced. Observe correct polarity of incoming line voltage. Incorrect polarity can lead to erratic operation.

⚠ Warning

When using cleaning fluids or chemicals, rubber gloves and eye protection (and/or face shield) must be worn.

⚠ Caution

Maintenance and servicing work other than cleaning as described in this manual must be done by an authorized service personnel.

Cleaning and Sanitizing Procedures

GENERAL

You are responsible for maintaining the equipment in accordance with the instructions in this manual. Maintenance procedures are not covered by the warranty.

Maintenance	Daily	After Prolonged Shutdown	At Start-Up
Exterior	X	X	X
Interior	X	X	X
Tray Seal & Air Diffuser	X	X	X
Plastic Trays and Inserts	X	X	X

EXTERIOR CLEANING

⚠ Warning

Never use a high-pressure water jet for cleaning or hose down or flood interior or exterior of units with water. Do not use power cleaning equipment, steel wool, scrapers or wire brushes on stainless steel or painted surfaces.

⚠ Caution

Never use an acid based cleaning solution on exterior panels! Many food products have an acidic content, which can deteriorate the finish. Be sure to clean the stainless steel surfaces of ALL food products.

The stainless steel outer case requires nothing more than a daily wiping with a damp cloth. If, however, an excessive amount of food particles/grease are allowed to collect, a non-abrasive cleaner (hot sudsy water) may be used. Wipe dry with a clean, soft cloth.

Always rub with the “grain” of the stainless steel to avoid marring the finish. Never use steel wool or abrasive pads for cleaning. Never use chlorinated, citrus based or abrasive cleaners.

Stainless steel exterior panels have a clear coating that is stain resistant and easy to clean. Products containing abrasives will damage the coating and scratch the panels. Daily cleaning may be followed by an application of stainless steel cleaner which will eliminate water spotting and fingerprints. Early signs of stainless steel breakdown are small pits and cracks. If this has begun, clean thoroughly and start to apply stainless steel cleaners in an attempt to restore the steel.

INTERIOR CLEANING

⚠Caution

Do not use caustic cleaners on any part of the oven or oven cavity . Use mild, non abrasive soaps or detergents, applied with a sponge or soft cloth. Never use sharp implements or harsh abrasives on any part of the oven.

The product trays, tray seals and air diffusers may be cleaned via dishwasher or with warm soapy water. Care must be taken to prevent water or cleaning compounds from getting on internal parts, especially the switches on the control panel.

PLASTIC TRAY CLEANING

⚠Caution

Environmental stress cracking can occur. Proper dilution and rinsing per detergent manufacturers' directions are mandatory.

Food-approved detergents can be used if they are diluted per manufacturers' directions and adequately rinsed away prior to high temp drying cycle. Basic alcohols such as isopropyl are acceptable for hard-to-remove stains. Otherwise, do not use organic solvents.

DAILY CLEANING INSTRUCTIONS

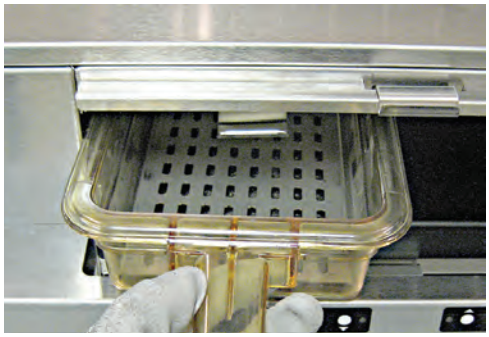
⚠Caution

The unit must be cool to the touch and disconnected from the power source prior to cleaning, to avoid contact with hot surfaces which may cause burns or injury. Use caution and wear appropriate safety equipment to avoid contact with hot surfaces that may cause severe burns or injury.

Unit must be cool to touch and disconnected from power source.

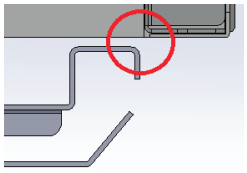
1. Wipe the stainless steel outer case with a damp cloth, rubbing with the grain of the steel. If an excessive amount of food particles/grease has collected, hot sudsy water (non-abrasive) may be used.

2. Remove trays.

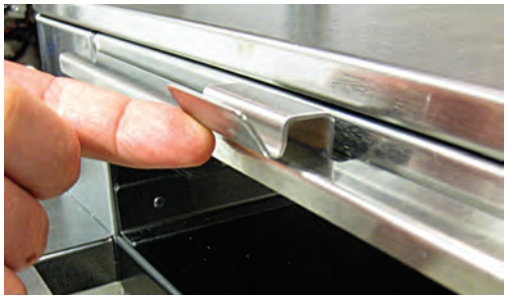


⚠Caution

Use caution when raising the locking clips to avoid pinching a finger between the air diffuser assembly and the back of the timer bar (see illustration below).



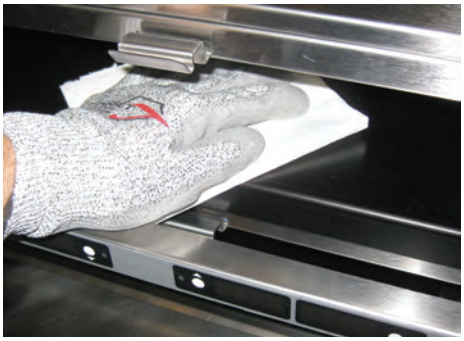
3. Raise/lift the locking clips to remove the air diffusers and/or tray seals.



4. Remove air diffuser assemblies

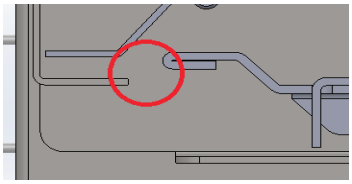
5. The product trays, tray seals and air diffusers may be cleaned via dishwasher or with warm soapy water.

6. Wipe the interior shelf with a damp cloth. If, however, an excessive amount of food particles/grease has collected, hot sudsy water (non-abrasive) may be used on the cloth.



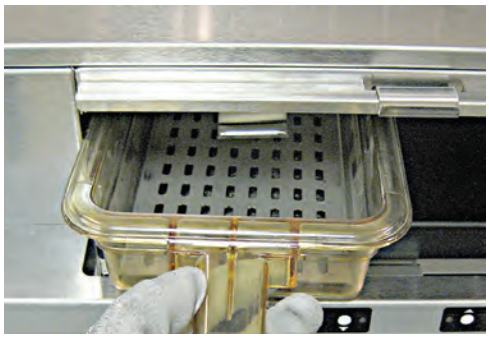
⚠Caution

Use caution when inserting the air diffuser into the unit to avoid pinching a finger between the air diffuser assembly and the back of the air plenum assembly on the rear of the unit (see illustration below).



7. Reinstall cleaned air diffusers and tray seals.

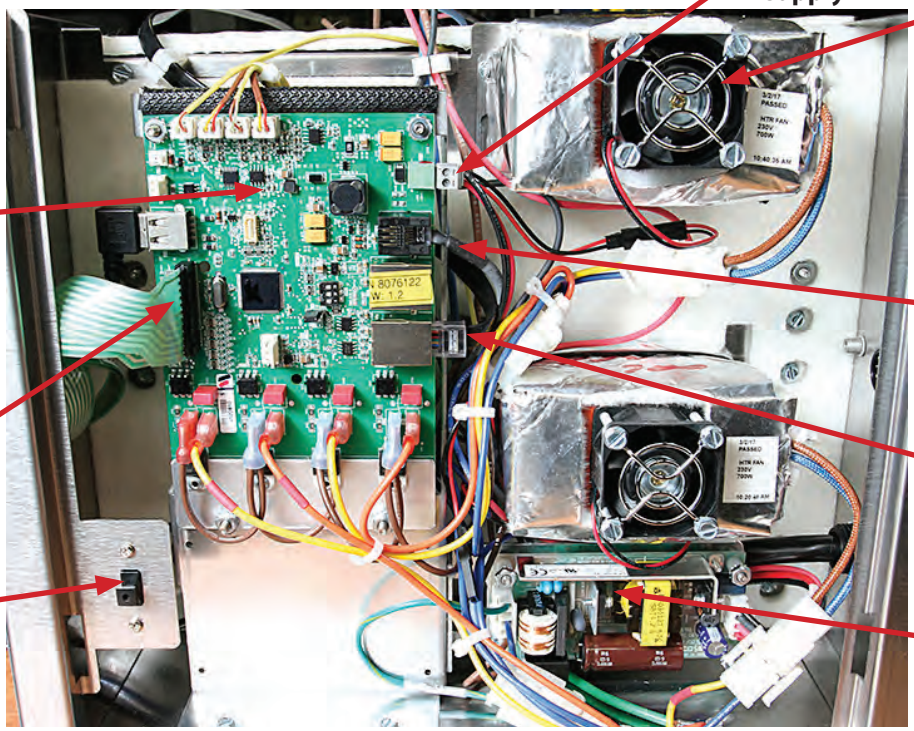
8. Reinstall the cleaned trays.



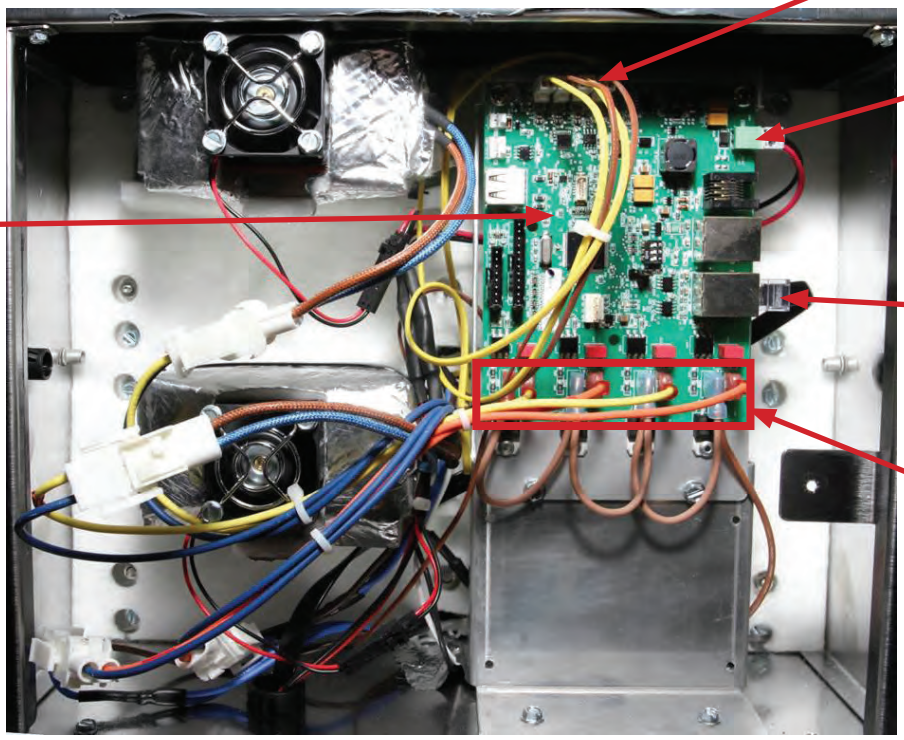
9. Plug the unit in.

Component Identification

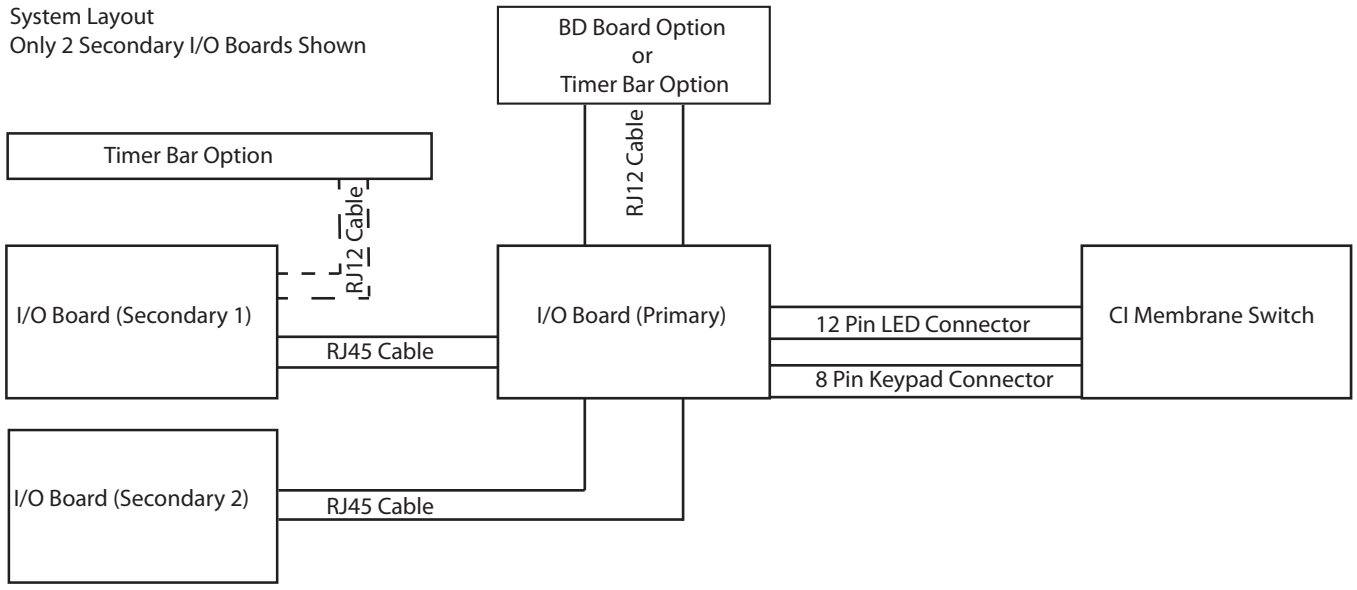
RIGHT SIDE



LEFT SIDE
(Opposite Control Side)

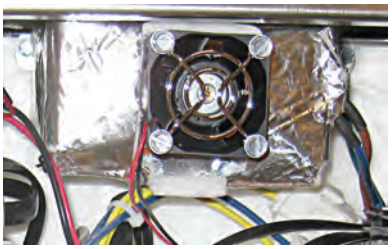


System Layout



INSTRUCTIONS FOR REPLACING AN AIR HEATER

1. Remove end panel.
2. Disconnect heater coil wire and fan wire from harness.
3. Remove the fasteners securing the air heater to the chassis.



4. Install new air heater with fasteners.
5. Reconnect electrical and reinstall end panel.

INSTRUCTIONS FOR REPLACING AN AIR HEATER PROBE

Air heater probes are located in the panel above the zone.

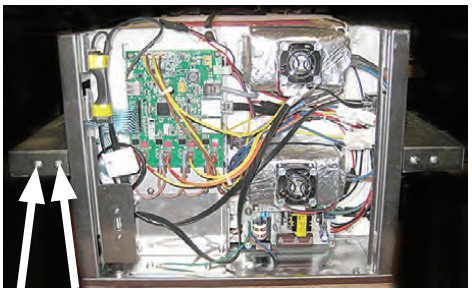
Top Zone Air Heater Probe Replacement

1. Remove the unit top.
2. Remove the insulation.
3. Remove probe, it will be thoroughly taped in place.
4. Attach a new probe in it's place and secure with aluminum tape.
5. Reverse steps to reassemble.

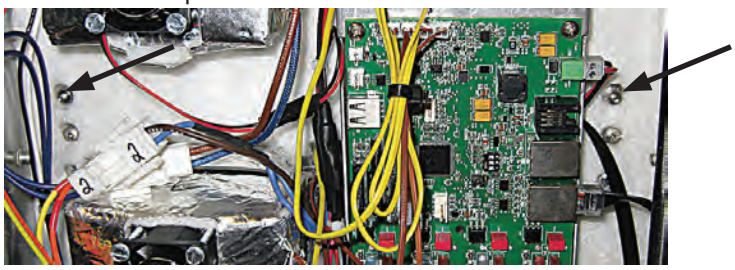
Lower Zone Air Heater Probe Replacement

These air heater probes are taped in the aluminum plate above the zone.

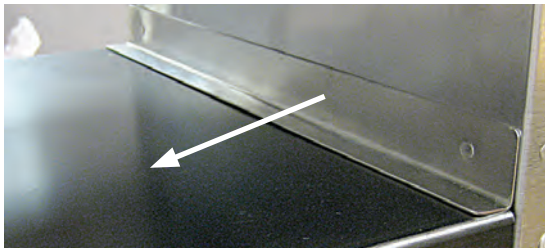
1. Remove air diffusers above pad heater by raising the locking clips and sliding the diffusers out of the cabinet.
2. Remove the end panels by sliding up and away from the cabinet.
3. Remove the timer bar above the zone by removing the two screws at each end and carefully lowering the bars.



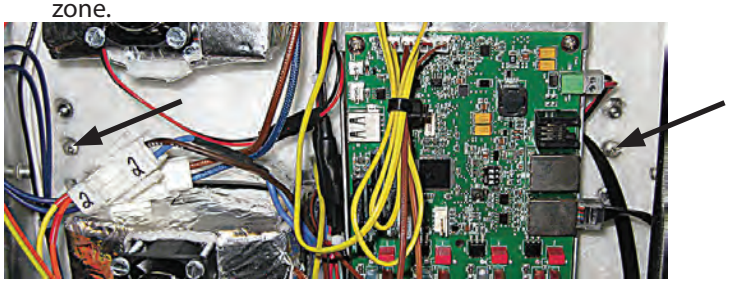
4. From each side remove nuts attached to the studs of both end clips.



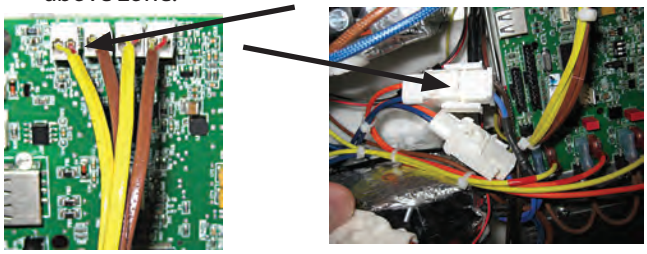
5. Remove the end clips by pulling away from the cabinet wall.



6. From each side remove hex shoulder screw and standard screws holding aluminum heater plate above zone.



7. Thermocouple connections, on both sides of the cabinet, are at the top of the IO board. Brown wires attach heater-plate related thermocouples. Yellow wires attach air heater thermocouples. Pay close attention to their placement. From both sides of the cabinet unplug heaters and probes associated with aluminum plate above zone.



8. Raise heater plate and slide out the insulation under the plate to gain access to air heater probe below.

9. Remove and replace air heater probe. Ensure the

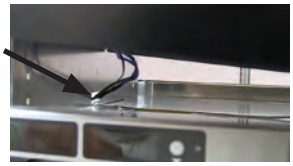
probe is secured with aluminum tape.

10. Reverse steps to reassemble.

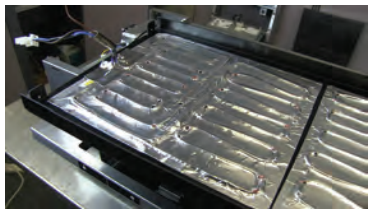
INSTRUCTIONS FOR REPLACING A HEATER PAD OR PAD HEATER PROBE

Pad heater probes are located in the heater pad assembly. **NOTE : Failed thermocouples require a heater pad replacement.**

1. Follow steps 1-7 in previous section.
2. Route the power coupling through the cabinet interior.



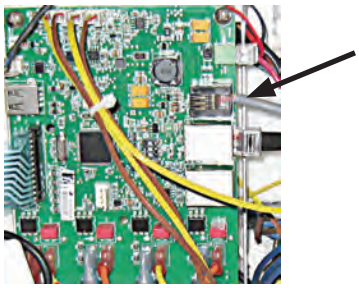
3. Pull the heater plate out carefully.
4. Flip the aluminum plate over. Peel the old heater pad off and attach the new one.



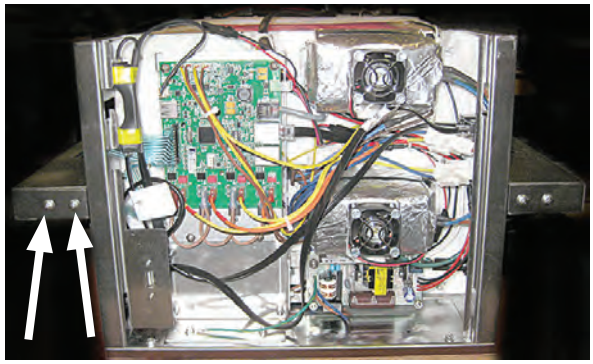
5. Reverse the steps to reassemble the cabinet.

INSTRUCTIONS FOR REPLACING A TIMER BAR

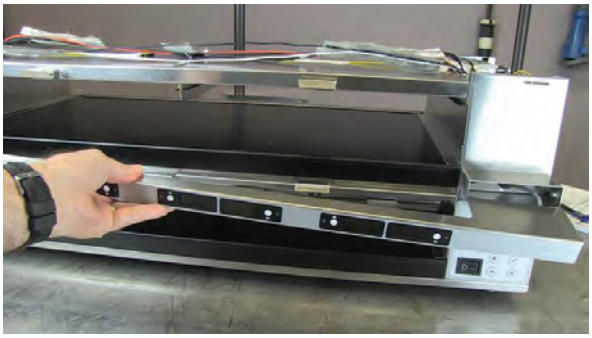
1. Remove the end panels by sliding up and away from the cabinet.
2. Disconnect the timer bar from the IO board.



3. Timer bars are secured with four screws and are connected to the IO board. Remove the timer bar by removing the two screws at each end and carefully lowering the bars.



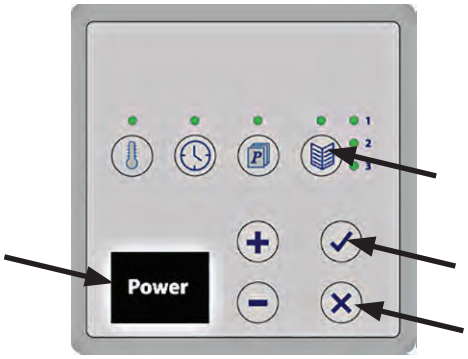
4. Remove and replace the faulty timer bar.



5. Reverse the steps to reassemble the cabinet.
6. When a timer bar is replaced it must be re-addressed, a process that establishes the positions it controls on the cabinet.
7. Readdress the timer bar using the steps in the next section.

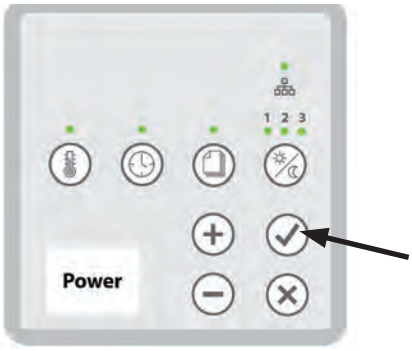
INSTRUCTIONS FOR SETTING REPLACEMENT TIMER BAR ADDRESS SWITCHES

1. Identify the location of the timer bar address on the illustration on the next page, to identify the address of the timer displays (example Zone 1 Left Side = Address 1; Zone 1 Right Side = Address 2).
2. With the power off, press and hold at the same time the Cancel(X), Enter(√) and Day Part (book icon) buttons.
3. Switch the power on with the buttons depressed.
4. Press the Cancel(X), Enter(√) and Day Part buttons simultaneously and cycle the power to ON to enter the timer address mode.



5. With addresses displayed press the Up and Down button on the timer display to adjust the address of each timer display.

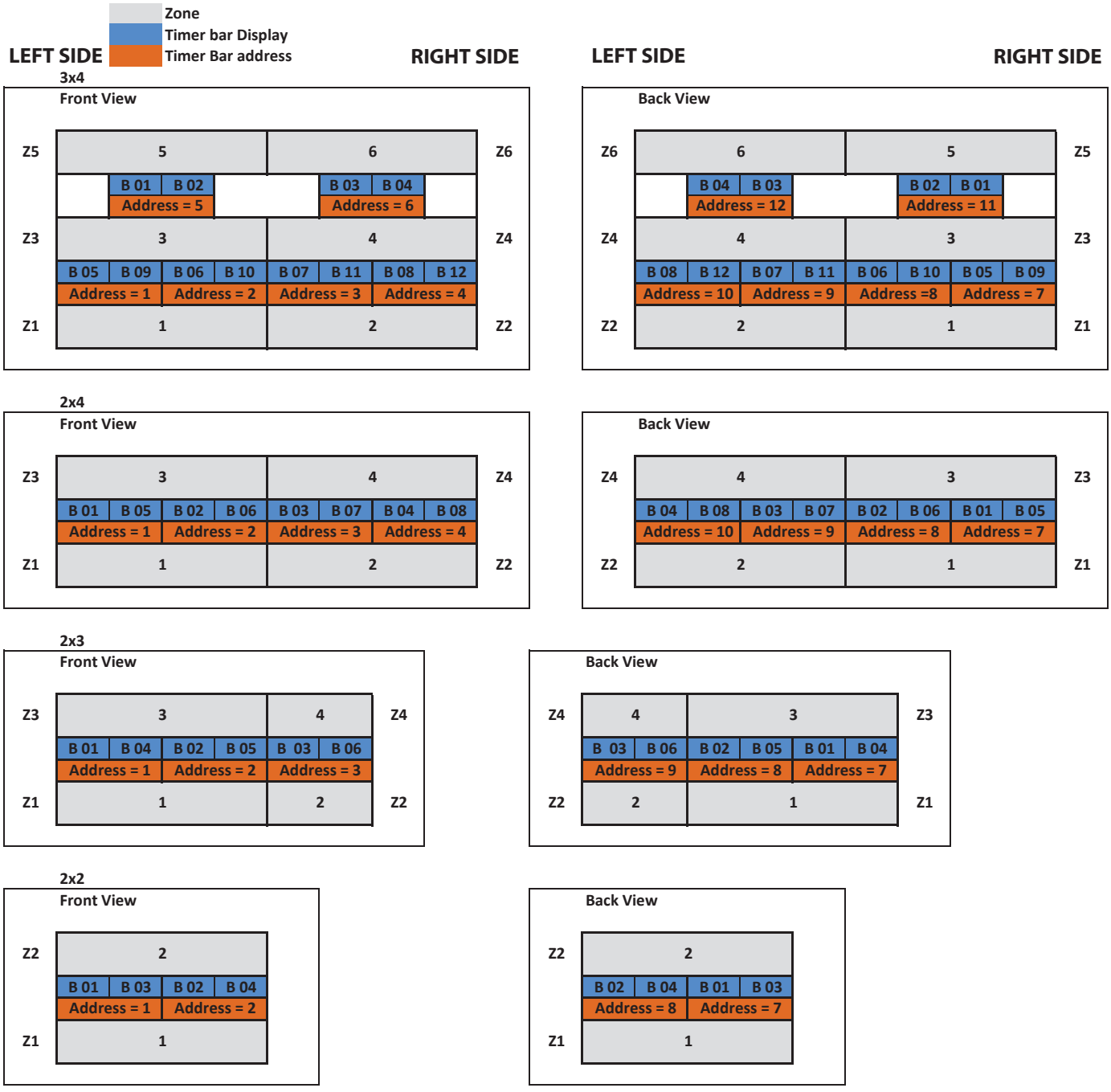
6. Once addresses have been properly configured press the Enter (√) button to save the addresses and the unit will reboot.



NOTE: If two or more timer boards are configured with the same address those boards shall display a warning message "ADD ERRx" (x=configured address).

The 2x4 cabinet (below) operates on the same operating system as the 3x4 although it lacks the bigger cabinet's top row, positions where the 5 and 6 displays reside. In assigning display numbers during a re-address of a 2x4, the 5 and 6 positions are left out. The numbering on the back begins at 7.

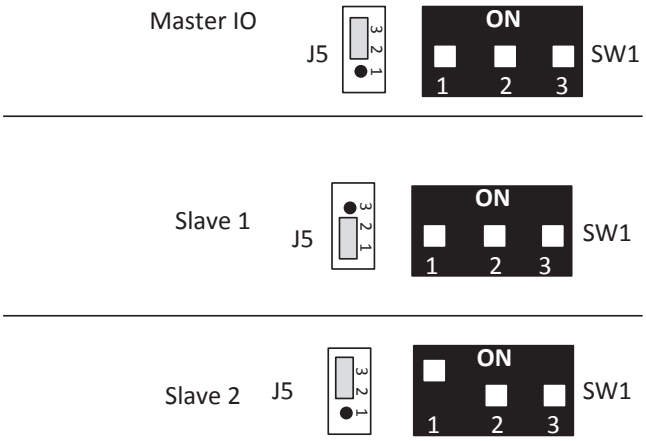
Below is a 3x4 cabinet with the 5 and 6 positions populated.


Zone
Timer bar Display
Timer Bar address
LEFT SIDE
RIGHT SIDE
3x4
Front View
Z5
5
6
Z6
B 01
B 02
B 03
B 04
Address = 5
Address = 6
Z3
3
4
Z4
B 05
B 09
B 06
B 10
B 07
B 11
B 08
B 12
Address = 1
Address = 2
Address = 3
Address = 4
Z1
1
2
Z2
LEFT SIDE
RIGHT SIDE
Back View
Z6
6
5
Z5
B 04
B 03
B 02
B 01
Address = 12
Address = 11
Z4
4
3
Z3
B 08
B 12
B 07
B 11
B 06
B 10
B 05
B 09
Address = 10
Address = 9
Address =8
Address = 7
Z2
2
1
Z1
2x4
Front View
Z3
3
4
Z4
B 01
B 05
B 02
B 06
B 03
B 07
B 04
B 08
Address = 1
Address = 2
Address = 3
Address = 4
Z1
1
2
Z2
Back View
Z4
4
3
Z3
B 04
B 08
B 03
B 07
B 02
B 06
B 01
B 05
Address = 10
Address = 9
Address = 8
Address = 7
Z2
2
1
Z1
2x3
Front View
Z3
3
4
Z4
B 01
B 04
B 02
B 05
B 03
B 06
Address = 1
Address = 2
Address = 3
Z1
1
2
Z2
Back View
Z4
4
3
Z3
B 03
B 06
B 02
B 05
B 01
B 04
Address = 9
Address = 8
Address = 7
Z2
2
1
Z1
2x2
Front View
Z2
2
B 01
B 03
B 02
B 04
Address = 1
Address = 2
Z1
1
Back View
Z2
2
B 02
B 04
B 01
B 03
Address = 8
Address = 7
Z1
1

INSTRUCTIONS FOR REPLACING AN IO BOARD

1. Disconnect power.
2. Remove the side of the cabinet associated with the IO board that needs replaced.
3. Mark wires and harnesses locations for easy reassembly.
4. Disconnect wires and harnesses.
5. Remove the existing IO board.
6. Service boards come with the DIP switch and jumper set to default positions. They must be repositioned to reflect the board being replaced. Reposition the settings on new IO board on J5 and SW 1 the same as the removed IO board (see illustrations to the right and below).
7. Carefully reattach all wires and harnesses.
8. Replace the cabinet side and reconnect to power to return to service.

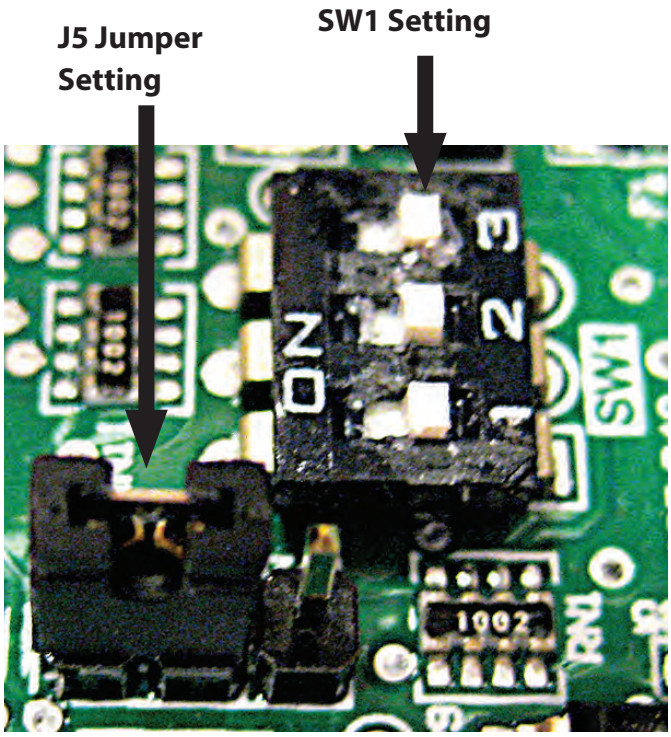
I/O Board Switch and Jumper Settings

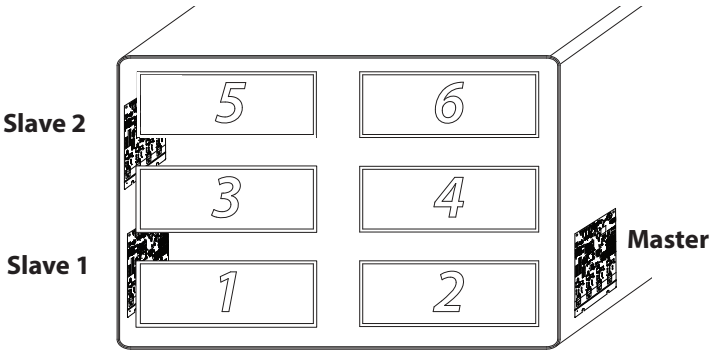


⚠Caution

Ensure SW1 dip switches and J5 jumper match the old I/O Board upon replacement. When the jumper is in the wrong position, zones will not display when checking temperature.

SW1 and J5 settings together define the system address.

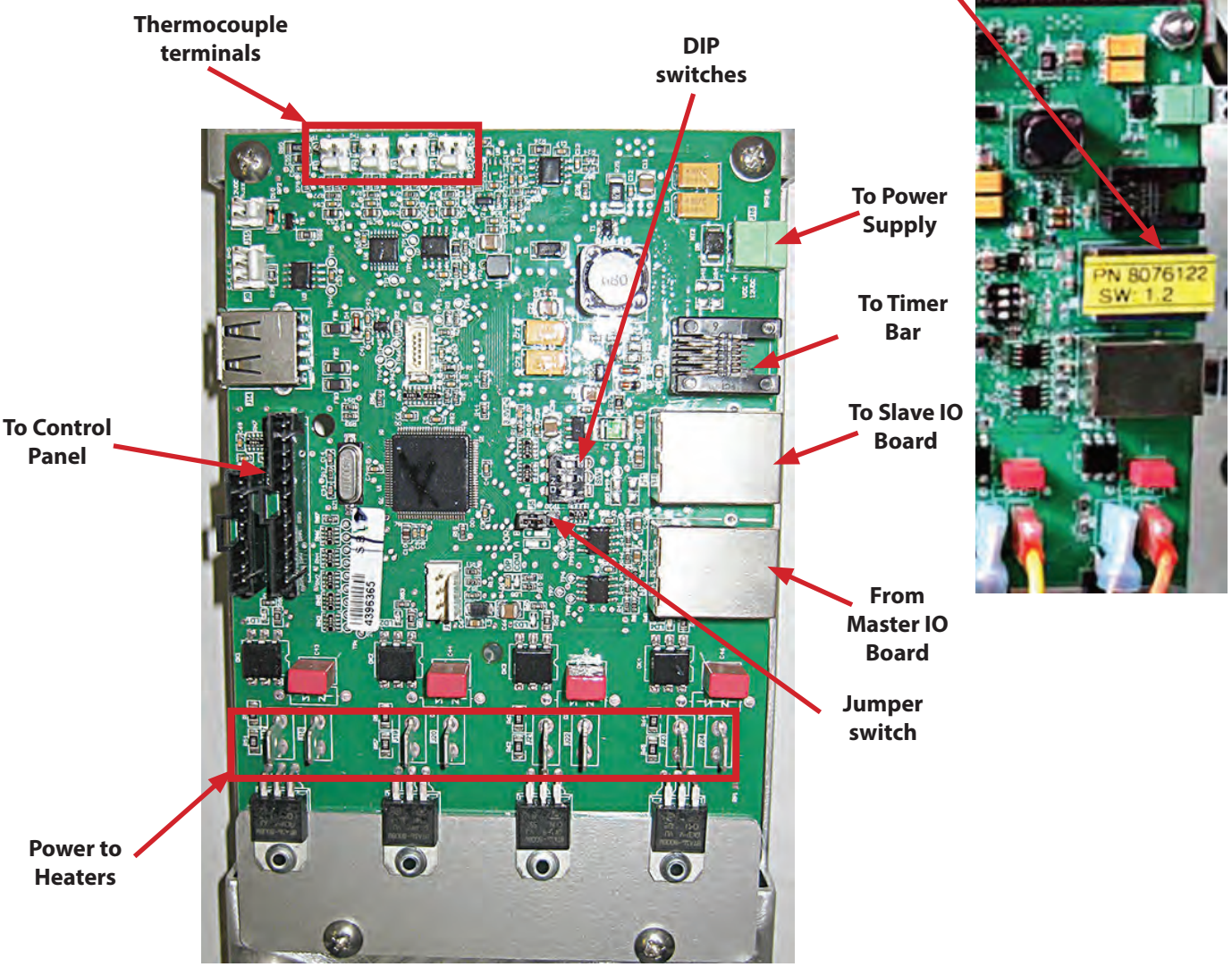




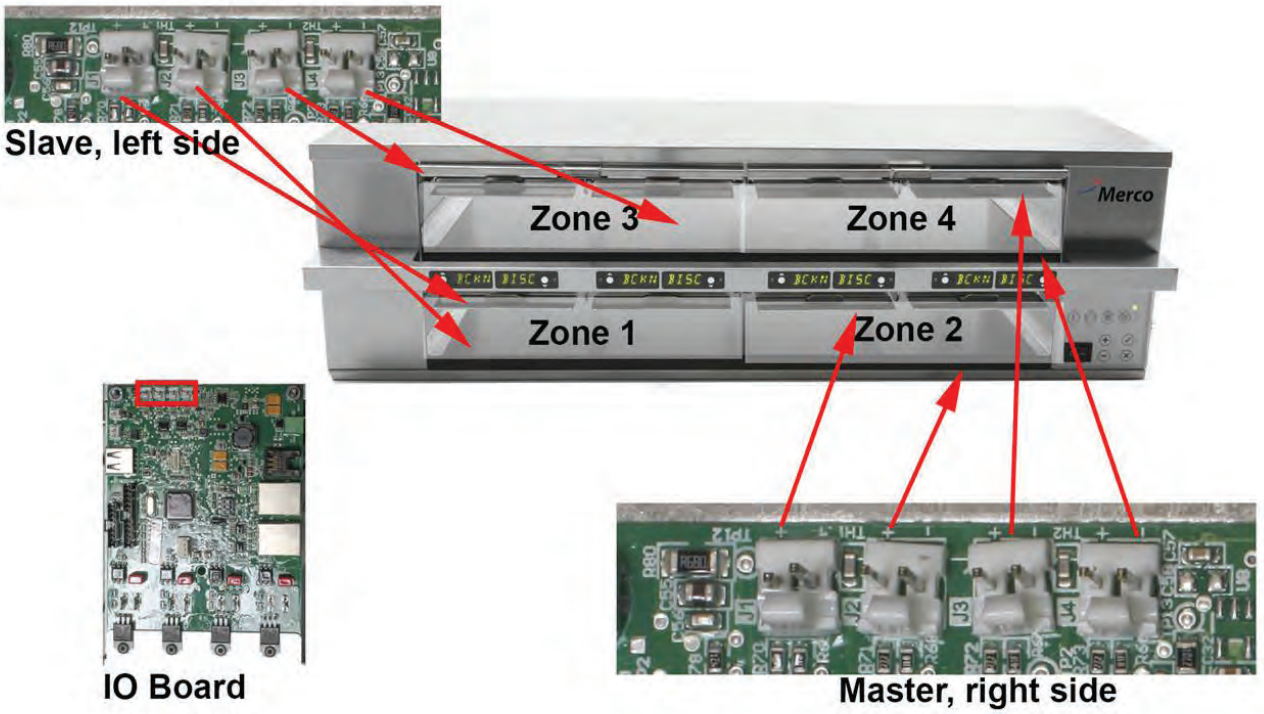
I/O Board

⚠ Caution

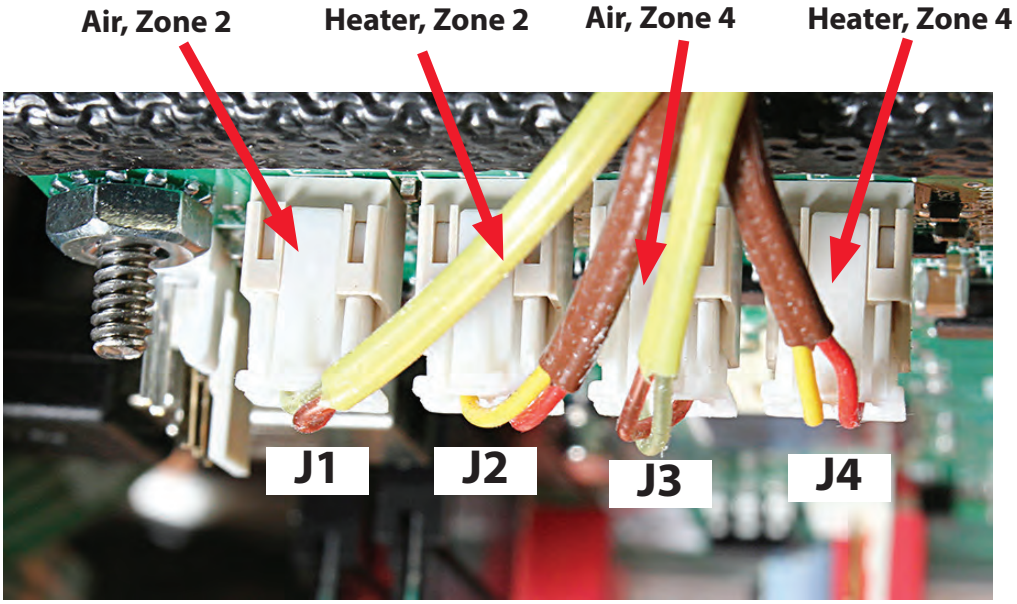
I/O Board must be loaded with software. A colored sticker will indicate when software is loaded and the color and part number to indicate software version.



Thermocouples monitors zones of the cabinet. The master, or right side IO board, monitors zones 2, 4, right side slots. The slave 1 board monitors zones 1,3, the left side slots.



THERMOCOUPLE CONNECTIONS ON MASTER IO BOARD



Section 5
Troubleshooting

Troubleshooting Charts

CABINET ISSUES

Problem	Probable Cause	Corrective Action
Cabinet not running	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Power cord unplugged.	Plug in power cord.
	Thermostat set too high.	Set thermostat to lower temperature on Merco Menu Connect.
	Main power switch turned off.	Turn main power switch on.
Cabinet temperature is too high	Thermostat set too high.	Set thermostat to lower temperature on Merco Menu Connect.
	Poor air circulation in cabinet.	Re-arrange product to allow proper air circulation.
	Exterior thermometer is out of calibration.	Replace thermocouple if defective.
Cabinet temperature is too low	Air diffuser out of unit.	Reinstall air diffuser.
	Product trays out of unit.	Reinstall product trays in unit.

HEATER/THERMOCOUPLE ERROR MESSAGES

Display	Probable Cause	Corrective Action
ErU1	Upper heater/thermocouple is shorted.	Check heater/thermocouple. If necessary replace part.
ErL1	Lower heater/thermocouple is shorted.	Check heater/thermocouple. If necessary replace part.
ErU2	Upper heater/thermocouple is open.	Check heater/thermocouple. If necessary replace part.
ErL2	Lower heater/thermocouple is open.	Check heater/thermocouple. If necessary replace part.
ErU3	Upper heater/thermocouple is below range.	Check heater/thermocouple. If necessary replace part.
ErL3	Lower heater/thermocouple is below range.	Check heater/thermocouple. If necessary replace part.
ErU4	Upper heater/thermocouple is above range.	Check heater/thermocouple. If necessary replace part.
ErL4	Lower heater/thermocouple is above range.	Check heater/thermocouple. If necessary replace part.

The software shall track the state of each thermocouple and the state of the thermocouple reading compared to the set point. If the software finds an error, it will begin to time it. When the timer reaches 15 minutes, an error code(s) will display (flash) on the screen. This shall continue indefinitely. Turning Off and On a unit will clear all thermocouple error displays.

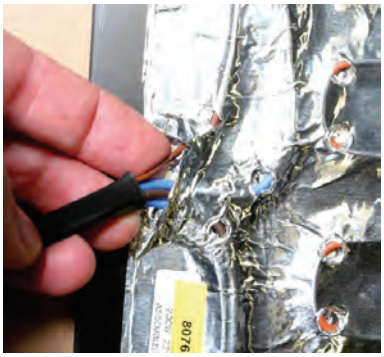
Heater/Thermocouple Troubleshooting

Upper Zone Thermocouple Shorted - Right Display Error Code ErU1

1. Remove the air diffuser and inspect the air heater probe near the upper baffle.
2. If end of probe is touching metal, move it. If the error clears, repair the end by adding high temp heat tape rated at 392°F or silicone sleeve to the probe end.
3. If moving or taping probe end doesn't fix error code, short is some place else.
4. Remove side panel.
5. Inspect probe wire where it connects to I/O board.
6. Check probe continuity to chassis.
7. Check continuity through probe.
8. Swap probe with error with an error free probe. Thermocouple state checks every 5 seconds. If error location switches, replace probe.

Lower Zone Thermocouple Shorted - Right Display Error Code ErL1

1. There is no physical inspection for the hot end of the pad heater probe.
2. Inspect probe wire where it connects to I/O board.
3. Check probe continuity to chassis. If probe is grounded to chassis replace probe.
4. Swap probe with error with an error free probe. Thermocouple state checks every 5 seconds. If error location switches, replace probe or pad.



The heater thermocouple (brown wire) is under the same tape as the heater. Failed thermocouples require a heater replacement.

Thermocouple Is Open - Right Display Error Code ErU2 or ErL2

1. Unplug the probe from the I/O board.
2. Check that end of probe has a ramp shape and there is no visible oxidation.
3. Plug probe back into I/O board, confirm connection snaps.
4. Check continuity through probe, if probe is open probe must be replaced.
5. Swap probe with error with an error free probe. Thermocouple state checks every 5 seconds. If error location switches, replace probe.

Thermocouple Reading is Below or Above Set Point - Right Display Error Code ErU3, ErL3, ErU4 or ErL4

1. Document all temperature readings for unit, each zone, upper and lower.
2. If the zone probes are switched, there will be two errors, one high and one low.
3. Check the I/O boards where the probes with errors plug in. There is yellow insulation jacket on the air probes and brown insulation jacket on the pad probes. Check that the probes alternate (yellow brown yellow brown) and are plugged in properly.
4. Heater outputs could be swapped, there will be two errors. Air heaters have yellow fiberglass wire. Pad heaters have brown silicone wire. Check that the wires alternate (fiberglass silicone fiberglass silicone).
5. The I/O board triac could be shorted or open. An orange LED is associated with each triac, it signals if the triac should be on or off.
6. Isolate each triac wire and check the amperage.
   - If the triac is supposed to be open and there is no current, the problem could be a heater. Check continuity through heating element.
   - If the triac light does not match the amperage, the triac is failing and the I/O board needs to be replaced.
   - Check input and output of triac, this could signal an I/O board failure.

COMMUNICATION ERROR MESSAGES

Display	Probable Cause	Corrective Action
MOD-ERR1	Timer bar lost communication with I/O board.	Check the timer bar connection on I/O board.
MOD-ERR2	Master I/O board lost communication with the slave I/O board.	Check the connections between I/O boards.
***STANDALONE**	No issue	Normal Message.

The standalone message is eliminated by pressing the X button.

DIAGNOSTIC MODE

Press the program button and then press and hold the program button for 3 seconds to enter Diagnostic Mode.

The program LED will flash. The segments in the timer bar display will start illuminating one after another. Once all the segments of all the characters are illuminated on the timer display press the √ button.

The software shall track the state of each thermocouple and the state of the thermocouple reading compared to the set point.

If the software finds an error, it will begin to time it. When the timer reaches 15 minutes, an error code(s) will display (flash) on the screen. This shall continue indefinitely.

Turning Off and On a unit will clear all TC State Display flags and reset all TC temp timer's to 0.

Pressing the button on the timer display shall illuminate the led indicators.

Press the X button to exit.

TEMPERATURE VIEW MODE

Enter the temperature view mode by pressing the temperature button. The average temperature of the lower and upper heaters for each zone is displayed. Press the X button to exit.

DIAGNOSTIC TEMPERATURE VIEW MODE

Press the temperature button or when already in the temperature view mode press and the hold temperature button for 3 seconds to display the actual thermocouple temperature. The upper temperature is displayed with a "U" and the lower temperature is displayed with an "L" (example : U180 = Upper temperature of 180F). Press the X button to exit.

TIME BUTTON

Pressing the time button displays the time remaining on the timer bars for the active bins holding a product.

LOAD NEW SOFTWARE VIA USB

With unit running at temperature, insert the USB drive with the new software into the USB port.

Below are the displays as the software loads:

- **Bottom Left Timer:** USB COPY SUCCESS
- **Bottom Left Timer:** SW UPGRADE IN PROGRESS.
- **Other Timers:** - - - -.
- **Timer LED's:** red/green until update is complete.
- **Bottom Left Timer:**

…blank as it is updated,
…returns to SW UPGRADE IN PROGRESS
…SW UPGRADE SUCCESS
…Software versions.

- Complete upgrade by pressing √

Remove the USB drive.

To check the software version press and hold the √ button for three seconds. The software versions are displayed. Press the X button to exit.

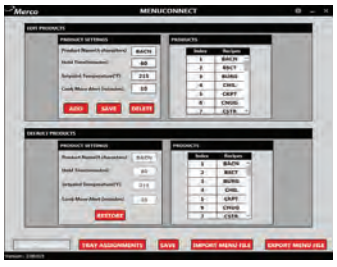
LOAD NEW MENUS VIA USB

A PC program allows cabinets to be configured on the screen. The resulting file is transferred to the cabinet with a USB flash drive.

Six day parts are possible to configure.

The menu file (mercomax.cbr) must be loaded to the root menu of USB.

While the unit is ON, insert the USB with the mercomax.cbr file into the port. The unit will detect the new menu file and begin installation.



Once the menu file is loaded the display will scroll MENU UPLOAD SUCCESSFUL. Press the √ button to acknowledge.

The display changes to Preheating. When Preheating is scrolling remove the USB.

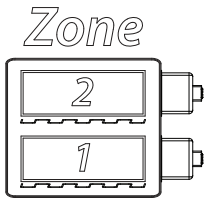
If the menu failed to load the display will scroll INVALID FILE MENU. Press the √ button to acknowledge.

Section 6
Charts

Zone Diagrams & Heating Element Specifications

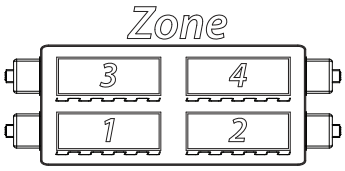
Key	Air Heater	Pad Heater

MHG22SAN**



Location	Heater	Model	Description	Cold Resistance	Part Number
All Zones	Air Heater	MHG22SA**N	700W, 120V	19.6Ω +/- 5%	1087309SP
All Zones	Pad Heater	MHG22SA**N	330W, 120V	43.33Ω +/- 10%	8076100
There are two bins per zone.					

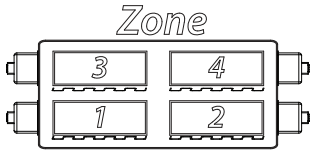
MHG23SAN**

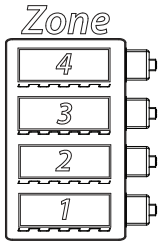


Location	Heater	Model	Description	Cold Resistance	Part Number
Zones 1, 2, 3 & 4	Air Heater	MHG23SA**N	700W, 230V *	71.8Ω +/- 5%	1087310SP
Zones 2 & 4	Pad Heater	MHG22SA**N	100W, 230V	529Ω +/- 10%	8076098
Zones 1 & 3	Pad Heater	All Models	200W, 230V	265.5Ω +/- 10%	8076099

In zones 1 & 3 there are two bins per zone.
In zones 2 & 4 there is one bin per zone.
***NOTE: If voltage is greater than 230V use Air Heater 1087290SP (450W, 230V)**

MHG24SAN and MHG42SA**N**

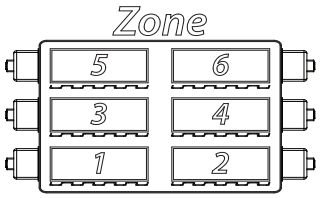


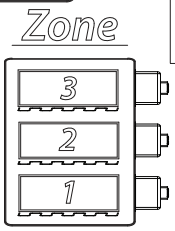


Location	Heater	Model	Description	Cold Resistance	Part Number
All Zones	Air Heater	MHB24SA**N	700W, 230V*	71.8Ω +/- 5%	1087310SP
		MHB42SA**N	450W, 230V	111.7Ω +/- 5%	1087290SP
All Zones	Pad Heater	All Models	200W, 230V	265.5Ω +/- 10%	8076099

There are two bins per zone.
***NOTE: If voltage is greater than 230V use Air Heater 1087290SP (450W, 230V)**

MHG34SAN and MHG32SA**N**





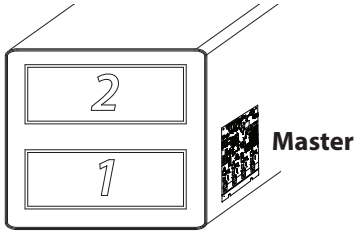
Location	Heater	Model	Description	Resistance	Part Number
All Zones	Air Heater	All Models	450W, 230V	111.7Ω +/- 5%	1087290SP
Zones 1-5	Pad Heater	All Models	200W, 230V	265.5Ω +/- 10%	8076099
Zone 6	Pad Heater	MHB34SA**N	200W, 230V	265.5Ω +/- 10%	8076101

There are two bins per zone.
***NOTE: If voltage is greater than 230V use Air Heater 1087290SP (450W, 230V)**

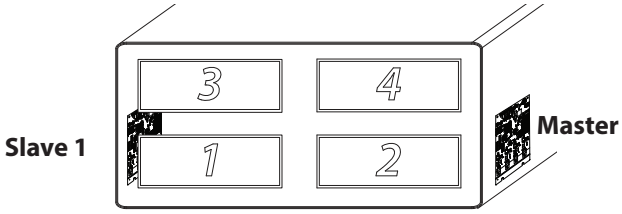
I/O Board Connections

MHG22

Primary 0A I/O Board			
Zone	**Heater Type**	**Heater Connect to:**	**Probe Connect to:**
2	Air	J22	J3
	Pad	J24	J4
1	Air	J18	J1
	Pad	J20	J2



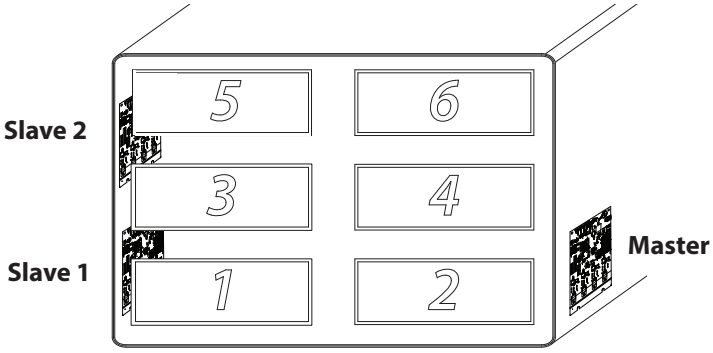
MHG23 & MHG24



Primary 0A I/O Board			
Zone	**Heater Type**	**Heater Connect to:**	**Probe Connect to:**
4	Air	J22	J3
	Pad	J24	J4
2	Air	J18	J1
	Pad	J20	J2

Secondary 0B I/O Board			
Zone	**Heater Type**	**Heater Connect to:**	**Probe Connect to:**
3	Air	J22	J3
	Pad	J24	J4
1	Air	J18	J1
	Pad	J20	J2

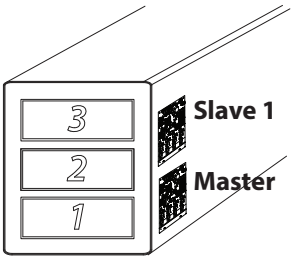
MHG34



Secondary 1A I/O Board			
Zone	**Heater Type**	**Heater Connect to:**	**Probe Connect to:**
6	Air	J22	J3
	Pad	J24	J4
5	Air	J18	J1
	Pad	J20	J2
Primary 0A I/O Board			
4	Air	J22	J3
	Pad	J24	J4
2	Air	J18	J1
	Pad	J20	J2

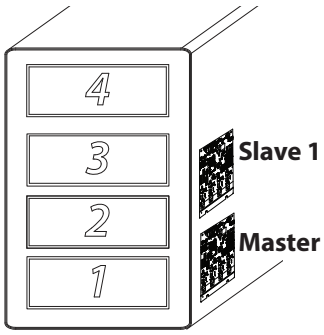
Secondary 0B I/O Board			
Zone	**Heater Type**	**Heater Connect to:**	**Probe Connect to:**
3	Air	J22	J3
	Pad	J24	J4
1	Air	J18	J1
	Pad	J20	J2

MHG32



Secondary 0B I/O Board			
Zone	**Heater Type**	**Heater Connect to:**	**Probe Connect to:**
3	Air	J22	J3
	Pad	J24	J4
1	Air	J18	J1
	Pad	J20	J2
Primary 0A I/O Board			
Zone	**Heater Type**	**Heater Connect to:**	**Probe Connect to:**
2	Air	J18	J1
	Pad	J20	J2

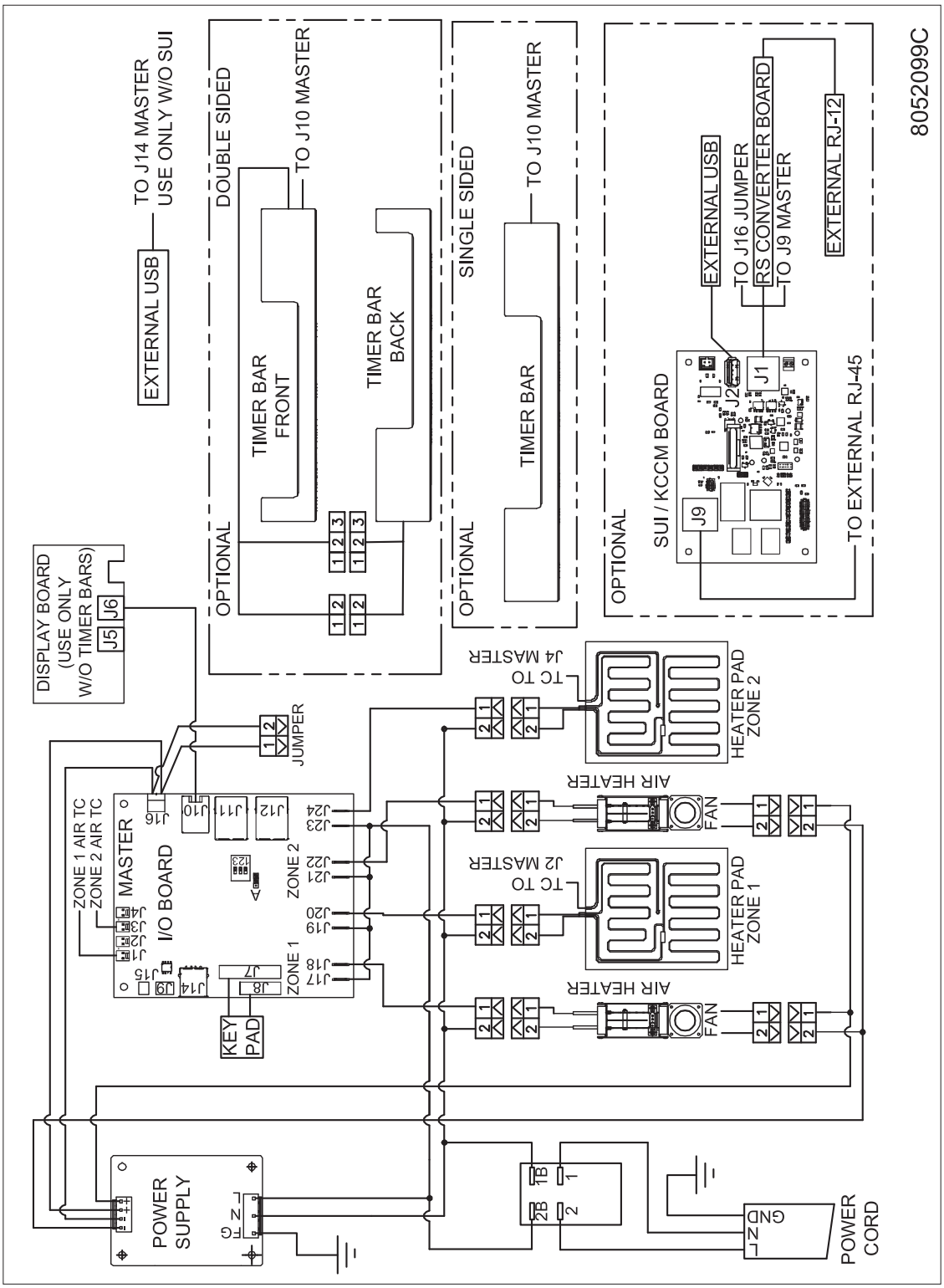
MHG42



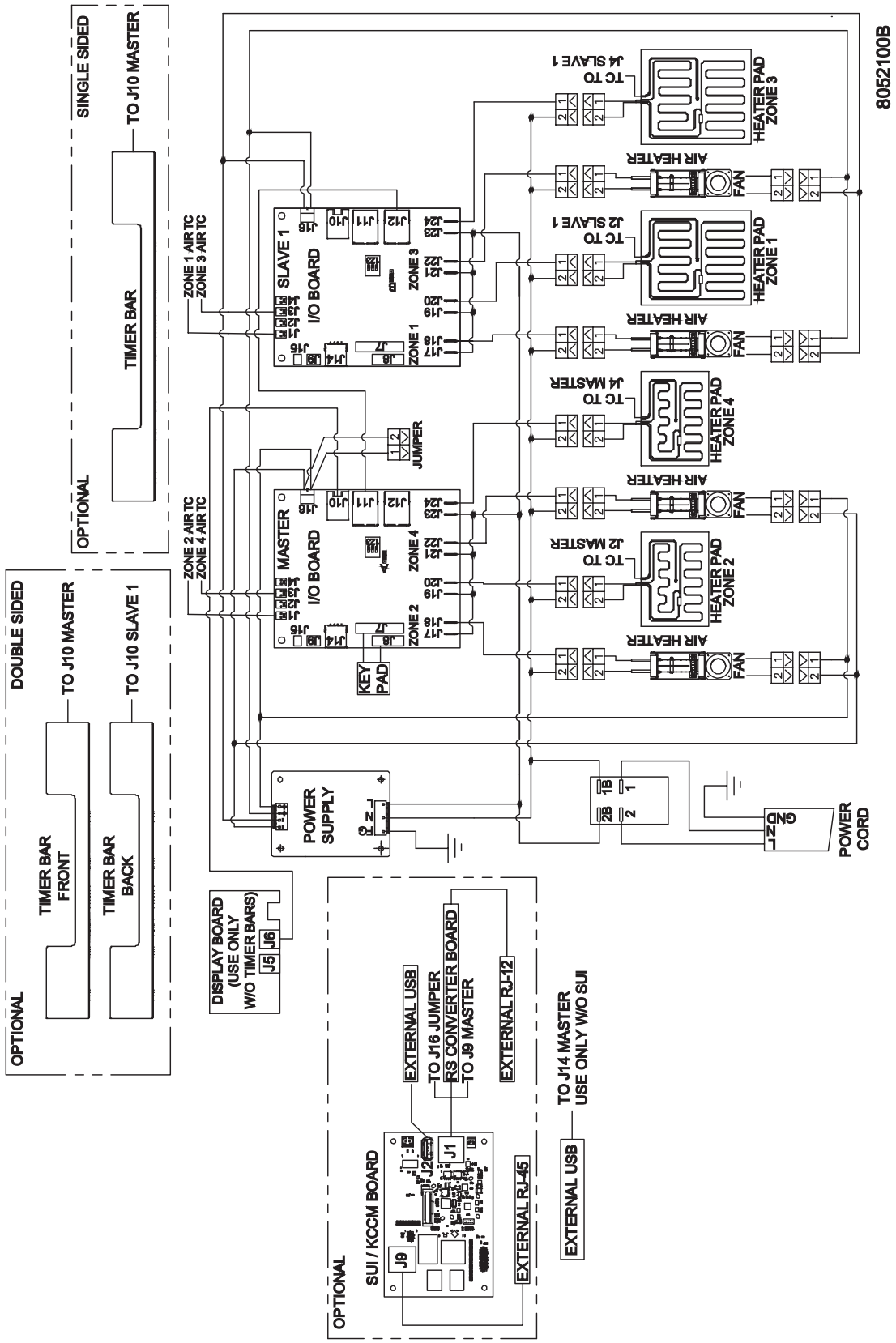
Secondary 0B I/O Board			
Zone	**Heater Type**	**Heater Connect to:**	**Probe Connect to:**
3	Air	J22	J3
	Pad	J24	J4
1	Air	J18	J1
	Pad	J20	J2
Primary 0A I/O Board			
Zone	**Heater Type**	**Heater Connect to:**	**Probe Connect to:**
4	Air	J22	J3
	Pad	J24	J4
2	Air	J18	J1
	Pad	J20	J2

Section 7
Wiring Diagrams

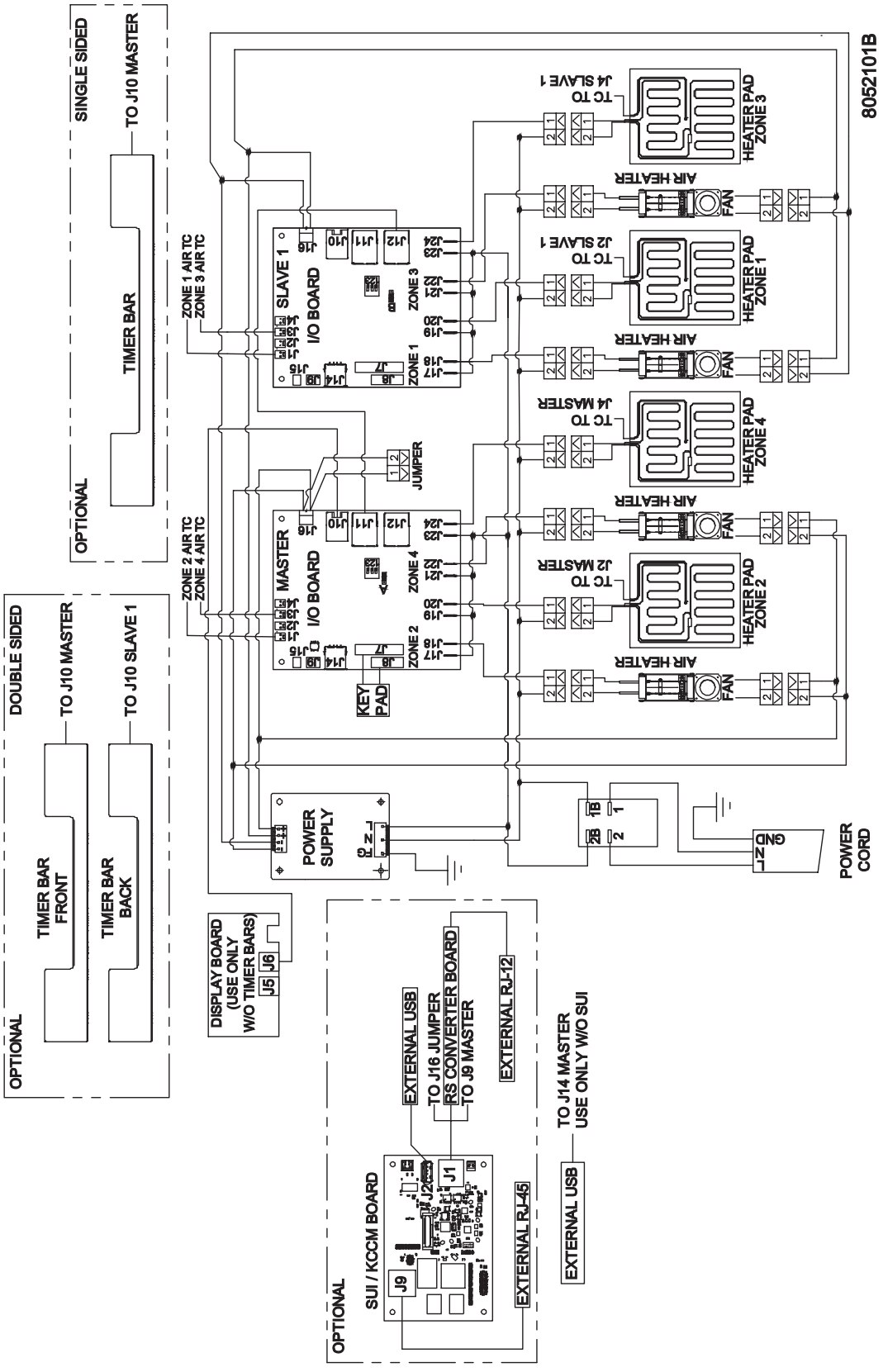
MHG22 - 2x2



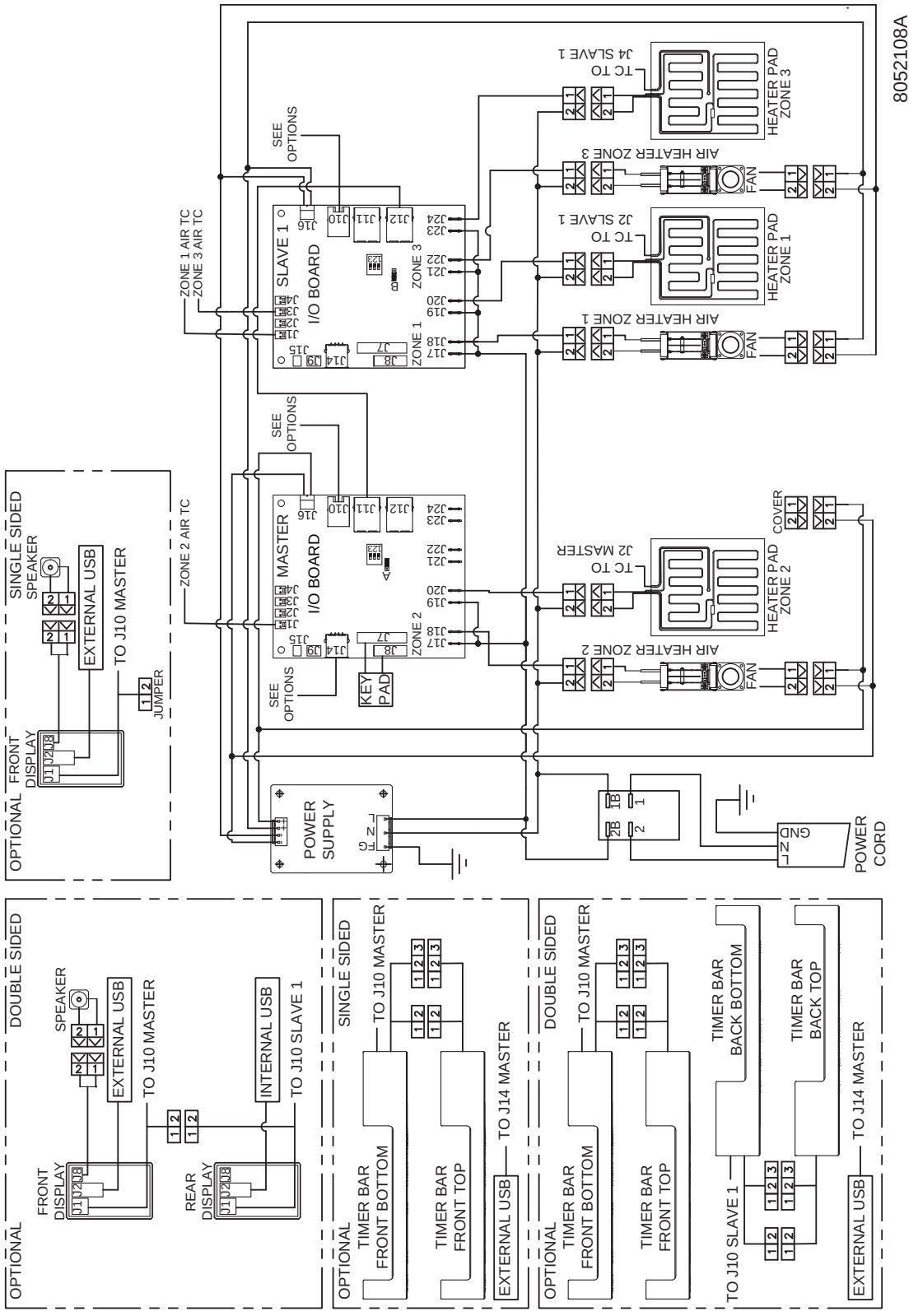
MHG23 - 2x3


8052100B
SINGLE SIDED
TO J10 MASTER
TIMER BAR
OPTIONAL
DOUBLE SIDED
TO J10 MASTER
TO J10 SLAVE 1
TIMER BAR FRONT
TIMER BAR BACK
OPTIONAL
ZONE 1 AIR TC
ZONE 3 AIR TC
ZONE 2 AIR TC
ZONE 4 AIR TC
SLAVE 1 I/O BOARD
MASTER I/O BOARD
JUMPER
KEY PAD
POWER SUPPLY
POWER CORD
HEATER PAD ZONE 3
HEATER PAD ZONE 1
HEATER PAD ZONE 4
HEATER PAD ZONE 2
AIR HEATER FAN
TC TO J4 SLAVE 1
TC TO J2 SLAVE 1
TC TO J4 MASTER
TC TO J2 MASTER
DISPLAY BOARD (USE ONLY W/O TIMER BARS)
J5
J6
OPTIONAL
SUI / KCCM BOARD
J9
J1
J2
EXTERNAL USB
TO J16 JUMPER
RS CONVERTER BOARD
TO J9 MASTER
EXTERNAL RJ-12
EXTERNAL RJ-45
TO J14 MASTER
USE ONLY W/O SUI
EXTERNAL USB

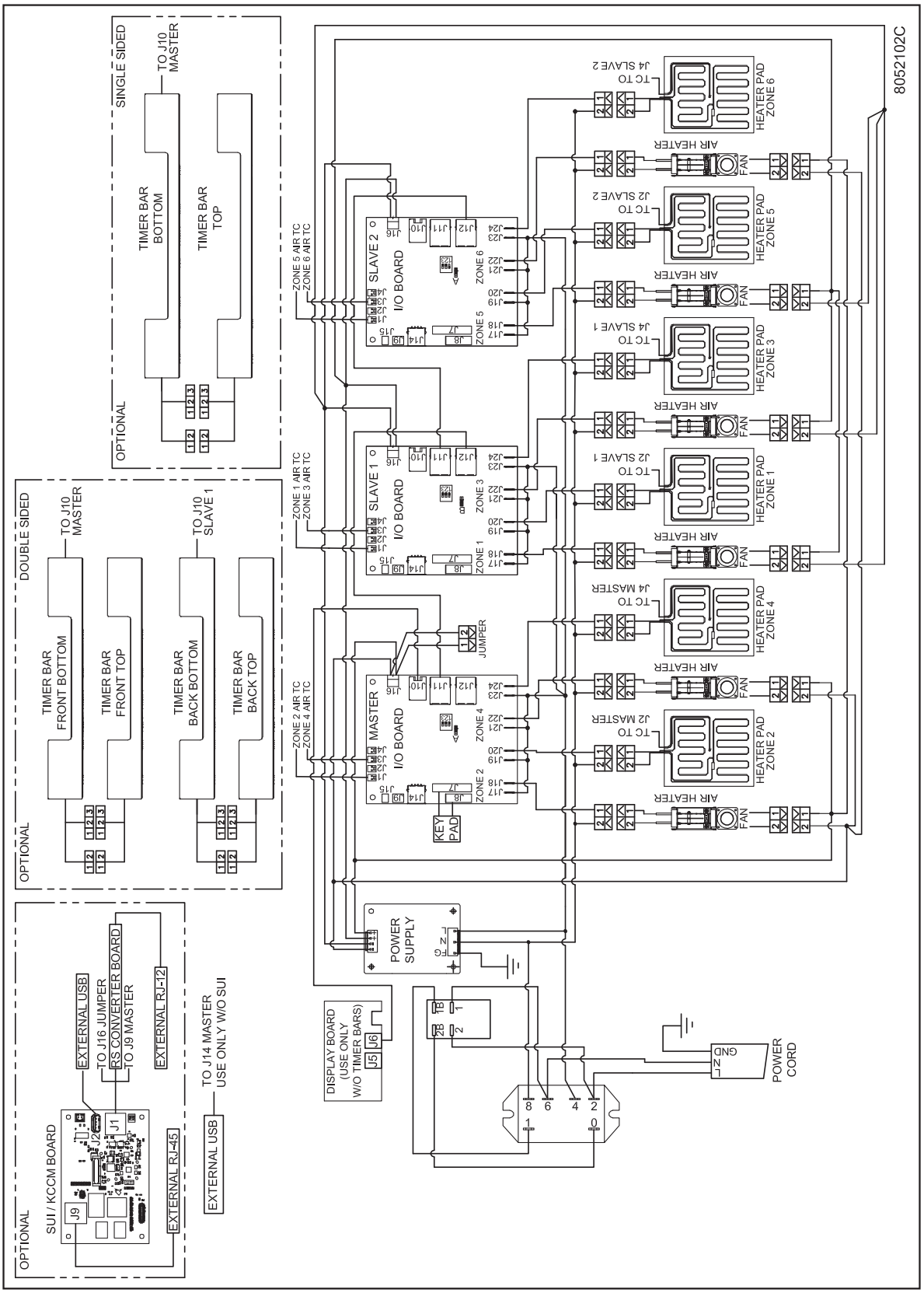
MHG24 - 2x4


8052101B
SINGLE SIDED
TO J10 MASTER
TIMER BAR
OPTIONAL
DOUBLE SIDED
TO J10 MASTER
TO J10 SLAVE 1
TIMER BAR FRONT
TIMER BAR BACK
OPTIONAL
ZONE 1 AIR TC
ZONE 3 AIR TC
ZONE 2 AIR TC
ZONE 4 AIR TC
SLAVE 1 I/O BOARD
MASTER I/O BOARD
JUMPER
KEY PAD
POWER SUPPLY
DISPLAY BOARD (USE ONLY W/O TIMER BARS)
J5 J6
TC TO J4 SLAVE 1
TC TO J2 SLAVE 1
TC TO J4 MASTER
TC TO J2 MASTER
HEATER PAD ZONE 3
HEATER PAD ZONE 1
HEATER PAD ZONE 4
HEATER PAD ZONE 2
AIR HEATER FAN
POWER CORD
GND
OPTIONAL
SUI / KCCM BOARD
EXTERNAL USB
TO J16 JUMPER
RS CONVERTER BOARD
TO J9 MASTER
EXTERNAL RJ-12
EXTERNAL RJ-45
TO J14 MASTER
USE ONLY W/O SUI
EXTERNAL USB

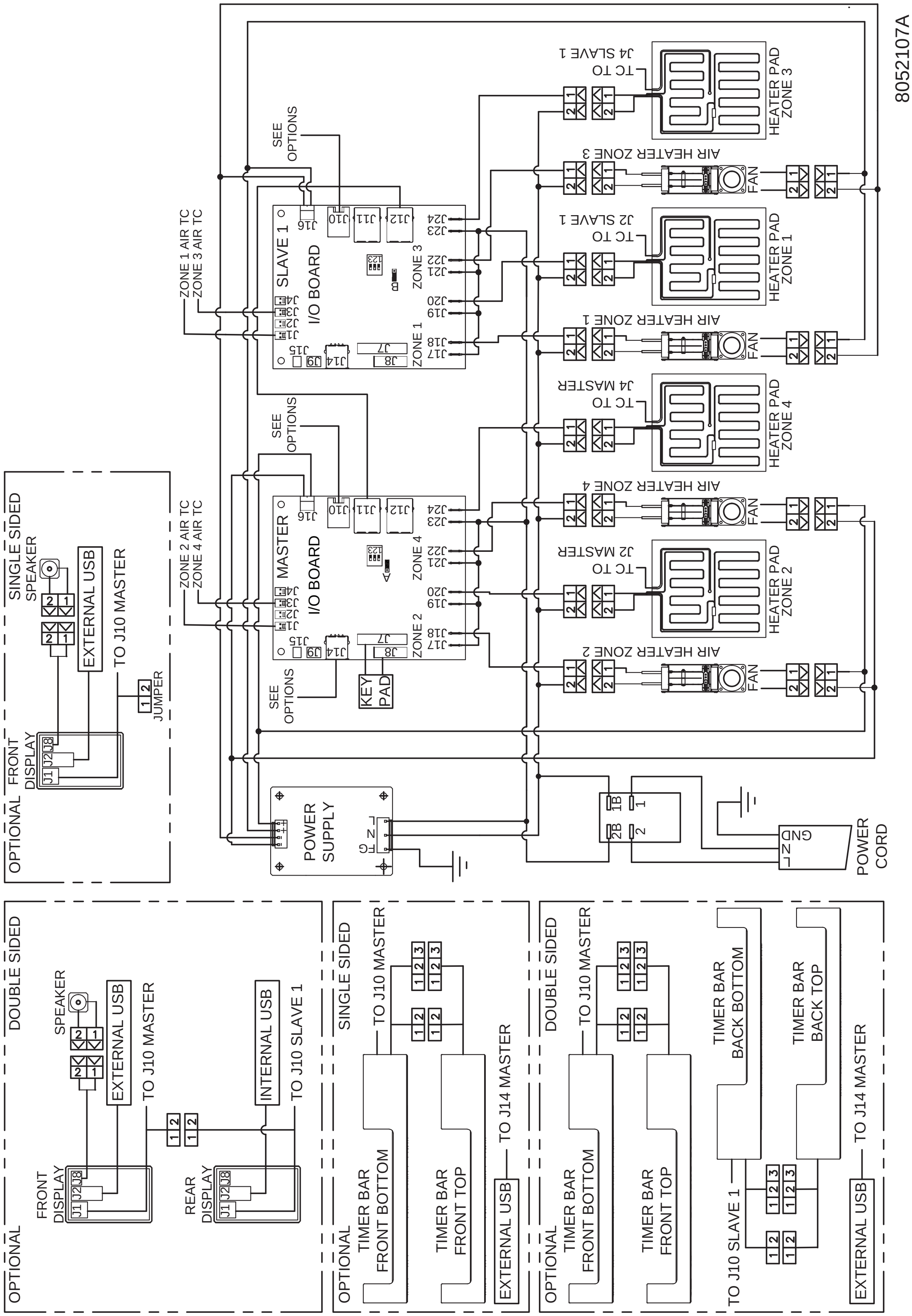
MHG32 - 3x2


8052108A
SLAVE 1 I/O BOARD
MASTER I/O BOARD
SEE OPTIONS
ZONE 1 AIR TC
ZONE 3 AIR TC
ZONE 2 AIR TC
J4 SLAVE 1 TC TO
J2 SLAVE 1 TC TO
J2 MASTER TC TO
HEATER PAD ZONE 3
HEATER PAD ZONE 1
HEATER PAD ZONE 2
AIR HEATER ZONE 3
AIR HEATER ZONE 1
AIR HEATER ZONE 2
FAN
COVER
KEY PAD
POWER SUPPLY
POWER CORD
GND
OPTIONAL
SINGLE SIDED
FRONT DISPLAY
SPEAKER
EXTERNAL USB
TO J10 MASTER
JUMPER
DOUBLE SIDED
REAR DISPLAY
INTERNAL USB
TO J10 SLAVE 1
TIMER BAR FRONT BOTTOM
TIMER BAR FRONT TOP
TO J14 MASTER
TIMER BAR BACK BOTTOM
TIMER BAR BACK TOP

MHG34 - 3x4


8052102C
SINGLE SIDED
OPTIONAL
TO J10 MASTER
TIMER BAR BOTTOM
TIMER BAR TOP
DOUBLE SIDED
OPTIONAL
TO J10 MASTER
TO J10 SLAVE 1
TIMER BAR FRONT BOTTOM
TIMER BAR FRONT TOP
TIMER BAR BACK BOTTOM
TIMER BAR BACK TOP
OPTIONAL
SUI / KCCM BOARD
EXTERNAL USB
TO J16 JUMPER RS CONVERTER BOARD TO J9 MASTER
EXTERNAL RJ-12
EXTERNAL RJ-45
TO J14 MASTER USE ONLY W/O SUI
EXTERNAL USB
ZONE 5 AIR TC
ZONE 6 AIR TC
ZONE 1 AIR TC
ZONE 3 AIR TC
ZONE 2 AIR TC
ZONE 4 AIR TC
SLAVE 2 I/O BOARD
SLAVE 1 I/O BOARD
MASTER I/O BOARD
ZONE 6
ZONE 5
ZONE 3
ZONE 1
ZONE 4
ZONE 2
JUMPER
KEY PAD
POWER SUPPLY
DISPLAY BOARD (USE ONLY W/O TIMER BARS)
POWER CORD
GND
LINE
J4 SLAVE 2
J2 SLAVE 2
J4 SLAVE 1
J2 SLAVE 1
J4 MASTER
J2 MASTER
TC TO
HEATER PAD ZONE 6
HEATER PAD ZONE 5
HEATER PAD ZONE 3
HEATER PAD ZONE 1
HEATER PAD ZONE 4
HEATER PAD ZONE 2
AIR HEATER
FAN

MHG42 - 4x2


8052107A
SLAVE 1
I/O BOARD
MASTER
I/O BOARD
ZONE 1
ZONE 2
ZONE 3
ZONE 4
ZONE 1 AIR TC
ZONE 3 AIR TC
ZONE 2 AIR TC
ZONE 4 AIR TC
SEE OPTIONS
KEY PAD
HEATER PAD ZONE 1
HEATER PAD ZONE 2
HEATER PAD ZONE 3
HEATER PAD ZONE 4
AIR HEATER ZONE 1
AIR HEATER ZONE 2
AIR HEATER ZONE 3
AIR HEATER ZONE 4
FAN
TC TO J4 SLAVE 1
TC TO J2 SLAVE 1
TC TO J4 MASTER
TC TO J2 MASTER
POWER SUPPLY
POWER CORD
GND
OPTIONAL
SINGLE SIDED
DOUBLE SIDED
SPEAKER
EXTERNAL USB
INTERNAL USB
TO J10 MASTER
TO J10 SLAVE 1
TO J14 MASTER
JUMPER
FRONT DISPLAY
REAR DISPLAY
TIMER BAR FRONT BOTTOM
TIMER BAR FRONT TOP
TIMER BAR BACK BOTTOM
TIMER BAR BACK TOP

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