

Lab  ARMOR[®]

BEAD BATH™

**MODELS: 74300-706, 74300-714, & 74300-720
74200-706, 74200-714, & 74200-720**

100-120V/220-240V Models

MICROPROCESSOR CONTROLLED

INSTALLATION AND OPERATION MANUAL

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These units are TUV CUE listed as general purpose air incubators for professional, industrial or educational use where the preparation or testing of materials is done at approximately atmospheric pressure and no flammable, volatile or combustible materials are being heated. These units have been tested to the requirements of CAN/CSA-C22.2 No. 61010-1, second edition, including Amendment 1, or a later version of the same standard incorporating the same level of testing requirements. These units are not intended for hazardous or household locations or use.

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INTRODUCTION

Thank you for choosing a general purpose Bead Bath™. These units are not intended for use at hazardous or household locations.

Before you use the unit, read this entire manual carefully to understand how to install, operate, and maintain the unit in a safe manner. Your satisfaction with the unit will be maximized as you read about its safety and operational features.

Keep this manual on-hand so it can be used by all operators of the unit. Be sure all operators of the unit are given appropriate training before you put the unit in service.

Note: Use the unit only in the way described in this manual. Failure to follow the guidelines and instructions in this manual may be dangerous and illegal.



Warning: Use bead media only. Do not fill with liquid.

Avertissement: Utiliser un milieu de perles exclusivement. Ne pas remplir avec du liquid.

General Safety Considerations

Your Bead Bath™ and its recommended accessories have been designed and tested to meet strict safety requirements.

For continued safe operation of your bead bath, always follow basic safety precautions including:

- Read this entire manual before using the Bead Bath™.
- Be sure you follow any city, county, or other ordinances in your area regarding the use of this unit.
- Use only approved accessories. Do not modify system components. Any alterations or modifications to your bead bath may be dangerous and will void your warranty.
- The Bead Bath™ is designed for use with Lab Armor® Beads only. Do not use liquids in Bead Bath™ tank.
- Always plug the unit's power cord into a grounded electrical outlet that conforms to national and local electrical codes. If the unit is not grounded, parts such as knobs and controls may conduct electricity and cause serious injury.
- Do not connect the unit to a power source of any other voltage or frequency beyond the range stated on the power rating overlay at the rear of the unit.
- Do not modify the power cord provided with the unit. If the plug does not fit an outlet, have a proper outlet installed by a qualified electrician.
- Avoid damaging the power cord. Do not bend it excessively, step on it, place heavy objects on it. A damaged cord can easily become a shock or fire hazard. Never use a power cord after it has become damaged.
- Do not position equipment in a manner that prohibits access to power cord.
- Do not attempt to move the unit during operation or before the unit has been allowed to cool.

RECEIVING YOUR UNIT

Before leaving our factory, all units are packaged in high quality shipping materials designed to provide protection from transportation related damage.

Once a unit leaves our factory, safe delivery becomes the responsibility of the carrier who is liable for loss or damage to your unit. Damage sustained during transit is not covered under your unit warranty.

When you receive your unit, inspect it for concealed loss or damage to its interior and exterior. Should you find any damage to the unit, follow the carrier's procedure for claiming damage or loss.

Inspection Guidelines

Carefully inspect the shipping carton for damage. If the carton is damaged, report the damage to the carrier service that delivered the unit.

If the carton is not damaged, open the carton and remove its contents. Verify that all of the following equipment is included in the carton:

- One (1) Bead Bath™ unit
- One (1) bath cover
- One (1) power cord

Carefully check all packaging before discarding. Save the shipping carton until you are sure everything is in order.

Returning Shipment

If you must return the unit for any reason, first contact your service representative for authorization. You will be asked to provide the data plate information. See Recording Data Plate Information.

Recording Data Plate Information

Once you have determined the unit is free from damage, locate the data plate at the back of the unit. The data plate indicates your unit's model number and serial number. Record this information below for future reference.

Table 1. Data Plate Information

Model Number	
Serial Number	
Part Number	
Voltage	

GRAPHIC SYMBOLS

Your unit is provided with a display of graphic symbols that should help in identifying user adjustable components.

SYMBOL

IDENTIFICATION



Indicates that you should consult your operator's manual for further instructions.
Indique que l'opérateur doit consulter le manuel d'utilisation pour y trouver les instructions complémentaires.



Indicates "Temperature"
Repère "température"



Indicates "Over Temperature Protection"
Signale un "dépassement de température"



Indicates "AC Power"
Repère "secteur AC"



Indicates the power is "ON"
Repère de la position "MARCHE" de l'interrupteur d'alimentation



Indicates the power is "OFF"
Repère de la position "ARRÊT" de l'interrupteur d'alimentation



Indicates "Protective Earthground"
Repère de la "terre de protection"



Indicates "Up" and "Down" respectively
Touches de déplacements respectifs vers le "HAUT" et le "BAS"



Indicates "Manually Adjustable"
Signale un élément "réglable manuellement"



Indicates "Potential Shock Hazard" behind partition
Signale un "risque potentiel d'électrocution" au-delà de la cloison.



Indicates "Hot Surface"
Signale une "surface à haute température"



Indicates "Unit should be recycled" (Not disposed of in land-fill).
Indique "l'appareil doit être recyclé" (Ne pas jeter dans une décharge)

INSTALLATION

Your satisfaction and safety require a complete understanding of this unit. Read the instructions thoroughly and be sure all operators are given adequate training before attempting to put the unit in service.

This equipment must be used only for its intended application; any alterations or modifications will void your warranty. Local city, county, or other ordinances may govern the use of this equipment. If you have any questions about local requirements, please contact the appropriate local agency. The end user may perform installation.

Environmental Conditions

Under normal circumstances these units are intended for use indoors, at room temperatures between 18° and 40°C, at no greater than 80% relative Humidity (at 25°C) and with a supply voltage that does not vary by more than 10% from the data plate rating. This equipment should not be operated at an altitude exceeding 2000 meters. Installation category is **II**, pollution degree 2. Customer service should be contacted for operating conditions outside of these limits.

Power Source

Check the data plate for voltage, cycle, and ampere requirements. If matched to your power source, plug the power cord into a grounded outlet.

Voltage should not vary more than $\pm 10\%$ from the data plate rating.

These units are intended for 50/60-HZ application. A separate circuit is recommended to prevent damage to the unit due to overloading or circuit failure.

Location

In selecting a location, consider all conditions that might affect performance, such as heat from radiators, ovens, autoclaves, etc. Avoid direct sun, fast-moving air currents, heating and cooling ducts, and high traffic areas. Allow a minimum of 10 cm between the unit and any walls or partitions that might obstruct free airflow.

Lifting and Handling

These units are heavy and care should be taken to use appropriate lifting devices that are sufficiently rated for these loads. The unit should be completely restrained from tipping during lifting or transport. All moving parts such as trays or covers should be removed during transfer to prevent shifting and damage. The bottom of the unit is hot during operation as is the bead in the tank. Always allow the unit to cool before attempting to move it.

Cleaning and Decontamination

In the event hazardous material is spilled onto or into the equipment appropriate decontamination must be carried out. If there is any doubt about the compatibility of decontamination or cleaning agents with parts of the equipment or with material contained, please contact the manufacturer.

Units are cleaned at the factory, but not sterilized. Remove any beads if assembled and clean the bath with a disinfectant that is suitable for your application. Separately wash beads. **CAUTION:** Avoid using strong acids, bases, including bleach solutions, and detergents, which can tarnish the beads. For additional information, see MAINTENANCE for cleaning instructions and precautions.

CONTROLS OVERVIEW

This section provides an overview of the panel controls. See Figure 1 for an illustration of the panel controls.

Figure 1. Control Panel



Power Switch

The Green I/O (On/Off) power switch controls all power to the unit. It must be in the I position to be ON and the green power on light illuminated before any systems are operational. The on/off switch must remain easily accessible at all times.

Main Temperature Controller

This control consists of the digital display and UP and DOWN arrow pads for inputting set point temperatures and calibration.

Fuses

The fuses are located at the back of the unit within the power inlet plug and 220v units also have a fuse holder located next to the inlet. The fuses act as a circuit breaker and will cut off power to the unit if there is an electrical surge or malfunction. The fuses must be in place for the unit to operate. Please contact customer service for more information.

Over Temperature Thermostat (OTL)

This controller is marked "Safety" and is completely independent of the Temperature Controller. The OTL guards against any failure of the Temperature Controller that would allow the temperature to rise past set point. If the temperature rises to the OTL set point, the OTL takes control of the heating element and allows continued use of the bead bath until the problem can be resolved or service can be arranged. The OTL is manually adjusted with a screwdriver or coin so accidental adjustment cannot occur.

Heating Activated

This light is ON when the Temperature Controller has activated the heating element to reach and maintain set point.

Over Temperature Activated Light

This light is ON when the Over Temperature Thermostat has been activated. Under normal operating conditions this light should never be on.

OPERATION

Filling with Lab Armor Beads and Turning on the Unit

To turn on the unit, perform the following steps:

1. Check power supply against unit serial plate; they must match.
2. Plug service cord into the electrical outlet. If supplied with a detachable cordset, plug the female end into the unit inlet and the male plug into the power supply. Verify that units requiring a fuse have the fuse installed in the power inlet.
3. Fill the bath with a minimum of three-fourths (3/4) volume with Lab Armor™ Beads. Do not use liquids in Bead Bath tank.
4. Push the Main power switch to the ON position and turn the Over Temperature Safety Thermostat to its maximum position, clockwise.

Setting Main Temperature Control

To enter set point mode on the control, push and release either the Up or Down arrow pad one time and the digital display will start to blink from bright to dim. While blinking, the digital display shows the set point that can be changed using the UP or DOWN arrow pads. If the arrow pads are not pressed for five (5) seconds, the display will stop blinking and will revert to reading the actual temperature in the bath. Allow at least twelve (12) hours for the temperature to stabilize.

Calibrating the Main Temperature Control

We recommend that you calibrate your unit once it has been installed in its working environment and the chamber temperature has been stable at the set point for several hours.

1. Place a calibrated reference thermometer into a vessel filled with 25 ml or more of water. Place the vessel and thermometer into the center of the bath. Allow the thermometer to reach temperature and remain stable for one (1) hour.
2. Compare the reading on the reference thermometer with the temperature control display. If there is a difference, put the display into calibrate mode by pressing both the Up and Down arrow pads at the same time until the display flashed "CO" and then blinks the temperature.
3. When the decimal points are blinking, press the Up or Down arrow pad to adjust the display to match the reference thermometer. If the arrow pads are not pressed within five (5) seconds the display will revert to showing the temperature within the bath.
4. Allow the unit to stabilize for one (1) hour and repeat calibration if necessary.

Setting the Over Temperature Thermostat

To set the Over Temperature Thermostat, perform the following steps:

1. Verify that the Thermostat was set to its maximum position to allow the Bead Bath™ to stabilize.
2. Turn the Thermostat counterclockwise until the Safety indicator light turns on.
3. Turn the Thermostat clockwise until the Safety indicator light turns off.
4. Turn the thermostat clockwise again, 1/16" past the point where the indicator light went out. This will set the Thermostat at approximately 1°C above the Main Temperature set point.

Thaw Zone

For optimal thawing, use the "Thaw Zone". This zone is located at the rear, left-hand corner when viewing the unit from the front Control Panel.

MAINTENANCE

Warning: Prior to any maintenance or service on this unit, disconnect the power cord from the power supply and remove the beads from the tank. Before reattaching the unit to its power supply, be sure all volatile and flammable cleaners are evaporated and dry.



Avertissement: Avant d'effectuer toute maintenance ou entretien de cet appareil, débrancher le cordon secteur de la source d'alimentation. Avant de reconnecter l'appareil sur le secteur, s'assurer que tous les produits de nettoyage volatiles et inflammables sont complètement évaporés.



Cleaning

The unit chamber should be cleaned and disinfected prior to use.

To clean the bead bath, perform the following steps:

1. Clean the Bead Bath™ with mild soap and water solution. DO NOT USE chlorine-based bleaches, as they will damage the tank interior. DO NOT USE spray cleaners that may contain solvents, which could leak through openings and cracks and harm electrical part coatings. Failure to do this may permanently damage the unit.
2. Clean Bead Bath with a damp cloth with cleaning solution. Wipe the bath bank clean. Do not pour cleaning solution directly into the tank. Bead Bath was not designed to hold any liquid.
3. Separately wash beads clean of any spills with soap and water; *completely dry* beads before returning to the bath. If necessary, disinfect beads with a 70% ethanol solution. Avoid using strong acids, bases, including bleach solutions, and detergents, which can tarnish the beads.

Disinfecting

Disinfect the bath on a regular basis. To disinfect the incubator, perform the following steps.

1. Disinfect the bath, including all corners, using a suitable disinfectant. DO NOT USE spray disinfectants that might leak through openings and cracks and get on electrical components, or that may contain solvents, corrosives, or abrasives that will harm the stainless steel coatings. Special care should be taken when cleaning around sensing heads to prevent damage and around the door gasket so as not to impair the positive seal.
 2. If a hazardous material/substance has been spilled in the unit, immediately initiate your site's Hazardous Material Spill Containment protocol. Contact your local Site Safety Officer and follow instructions per the policy and procedures established for your site.
 3. There are many commercially available disinfectants available that are non-corrosive and non-abrasive and suitable for use on stainless steel surfaces. Contact your local Site Safety Officer for detailed information for the proper disinfectants suitable for your operation.
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Warning: Never clean the unit with alcohol or flammable cleaners and assure all volatile or flammable cleaners are evaporated and dry before reattaching the unit to the power supply.



Avertissement: Ne jamais nettoyer l'appareil à l'alcool ou avec des nettoyeurs inflammables et veiller à ce que les produits volatils ou inflammables soient entièrement évaporés avant de rebrancher le content d'alimentation de l'appareil.



No maintenance is required on electrical components. If the incubator fails to operate as specified, please review the Troubleshooting section prior to calling for service.

TROUBLESHOOTING

Should the unit malfunction, use this section to determine the problem and resolution. Troubleshooting topics include:

- Temperature
- Mechanical
- Miscellaneous

Warning: Troubleshooting procedures involve working with high voltages that can cause injury or death. Troubleshooting should be performed only by trained personnel.

Temperature Troubleshooting

Problem	Possible Cause	Solution
Temperature too high	Insufficient quantity of beads.	Fill bath a minimum of three-fourths (3/4) full with beads.
	Main controller set too high	See Setting Main Temperature Control
	Main controller failed on	Call customer service.
Display reads "HI" or "400"+	Probe is unplugged	Call customer service.
	Probe is broken or wire to the sensor is broken.	Call customer service.
Temperature spikes over set point and then settles to set point.	Calibration issue	Recalibrate.
Temperature is too low	Over Temperature Safety is set too low.	See Setting Main Temperature Control.
	Bath temperature not recovered from bead being added.	Wait for display to stop changing.
	Unit not recovered from power failure or being turned off.	Bath will need a minimum of 8 hours to warm up and stabilize.
	Main controller failure	Confirm with front panel lights that controller is calling for heat.
Display reads "LO" but heating all the time	Control failure	Call customer service.

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Problem	Possible Cause	Solution
Unit will not heat over a temperature that is below set point	OTL has activated.	Confirm that set point is set high enough and that the Over Temperature Safety is not activated.
	Temperature calibration is not correct.	Check calibration. Using independent thermometer, follow instructions in Calibration.
Unit will not heat up at all	Controller Fault.	Do all controller functions work? Controller failure-call Customer Service.
	OTL has activated.	Set the Over Temperature Thermostat higher.
Indicated bath temperature unstable	Insufficient quantity of beads.	Fill bath a minimum of three-fourths (3/4) full with beads.
	Fluctuating by ± 0.1 ?	May be normal, especially without the use of bath cover.
	Ambient room temperature is radically changing	Temperature fluctuation due to door opening or room airflow from heaters or air conditioning. Stabilize ambient conditions.
	Electrical noise	Remove nearby sources of RFI including motors, arcing relays or radio transmitters
	Bad connection on temperature sensor or faulty sensor	Call customer service.
Will not maintain set point	Insufficient quantity of beads.	Fill bath a minimum of three-fourths (3/4) full with beads.
	Temperature set too low.	Assure that set point is at least 5 degrees over ambient room temperature.
	Ambient temperature too high.	See if ambient is fluctuating.
Cannot adjust set points or calibration	Controller hangs up.	Turn entire unit off and on to reset. If repeatedly happens, call Customer Service.
Calibrated at one temperature, but not at another	Set point too far from calibration point.	This can be a normal condition when operating temperature varies widely. For maximum accuracy, calibration should be done as close to the set point temperature as possible.

Miscellaneous Troubleshooting

Problem	Possible Cause	Solution
Unit will not turn on	No power.	Check wall power source.
	Fuse blown.	Check fuse/circuit breaker on unit or in wall.

Service

If this product should require service, contact your customer service representative.

PARTS LIST

Description	100-120V	220-240V
Element	9570932	9570936
Fuse, 6.3 AMP	3300515	3300515
Microprocessor Main Temp Control	1750849	1750849
Over Temperature Control	1750747	1750747
Pilot Lamp, Green	4650554	4650554
Pilot Lamp, Red	4650553	4650553
Power Cord	1800510	1800500
Power Switch	7850559	7850559
Rubber Feet w/ Screws	2700513	2700513
Tank 6L	9550877	9550877
Tank 14L	9550869	9550869
Tank 20L	9550879	9550879
Lab Armor® Beads 2 Liter*	42370-002	42370-002
Lab Armor® Beads 4 Liter*	42370-004	42370-004
Lab Armor® Beads 8 Liter*	42370-008	42370-008

**Ordered Separately*

UNIT SPECIFICATIONS

Weight

Model	Shipping	Net
74300-706	20 (lbs)	13 (lbs)
74200-706	9.1 (kg)	5.9 (kg)
74300-714	26.5 (lbs)	18 (lbs)
74200-714	12.0 (kg)	8.2 (kg)
74300-720	36 (lbs)	22 (lbs)
74200-720	16.3 (kg)	10.0 (kg)

Dimensions

Model	Exterior WxDxH	Interior WxDxH
74300-706	15.9 x 12.3 x 8.5 (in)	12.0 x 6.1 x 6.0 (in)
74200-706	40.4 x 31.2 x 21.6 (cm)	30.5 x 15.5 x 15.2 (cm)
74300-714	15.9 x 18.5 x 8.5 (in)	12.0 x 12.1 x 6.0 (in)
74200-714	40.4 x 47.0 x 21.6 (cm)	30.5 x 30.7 x 15.2 (cm)
74300-720	15.9 x 23.35 x 8.5 (in)	12.0 x 17.1 x 6.0 (in)
74200-720	40.4 x 59.3 x 21.6 (cm)	30.5 x 43.4 x 15.2 (cm)

Capacity

Model	Beads/Fill Line
74300-706 74200-706	4 Liters
74300-714 74200-714	12 Liters
74300-720 74200-720	16 Liters

Temperature

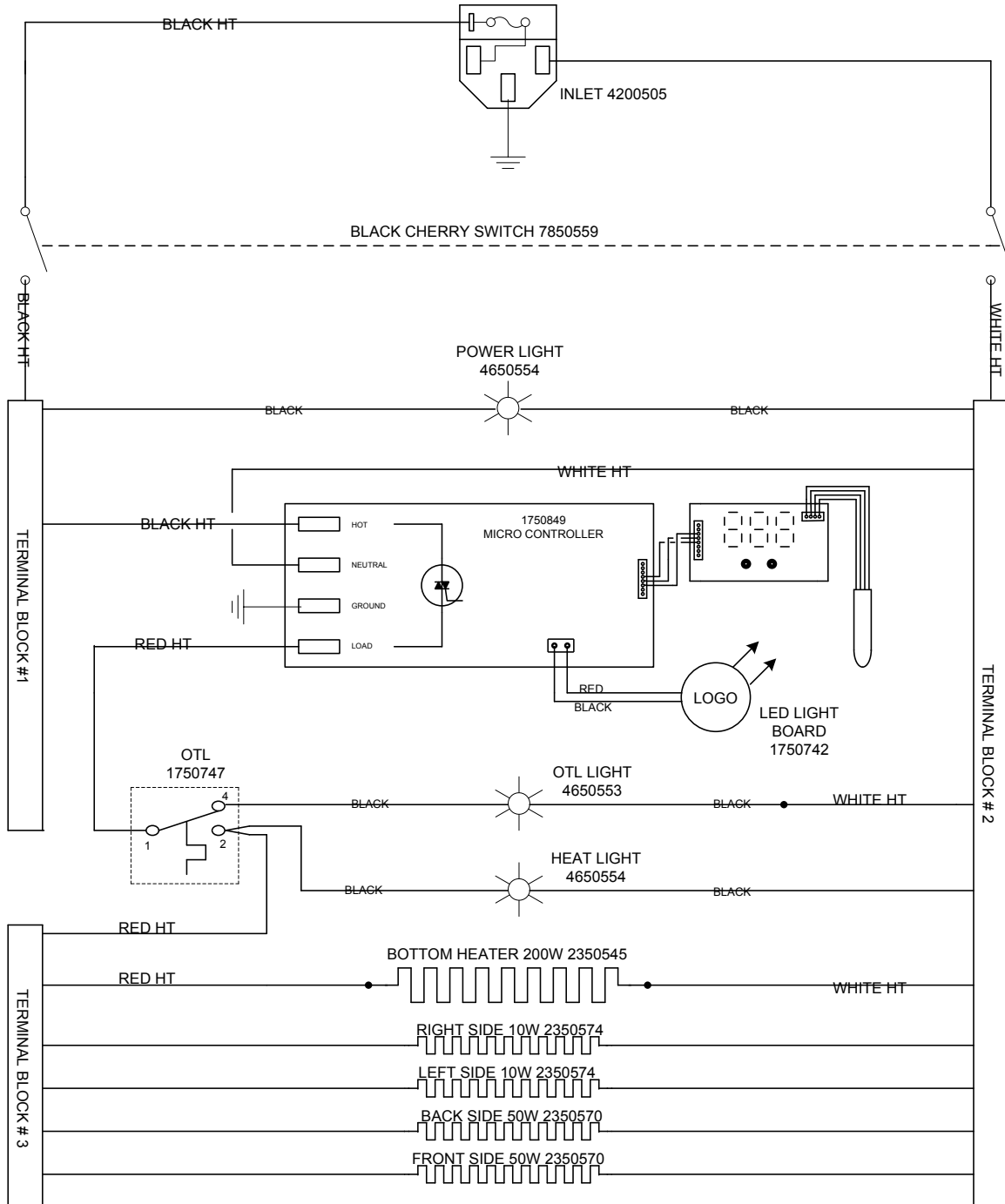
Model	Range	Uniformity	Sensitivity
74300-706 74200-706	Amb. +5°C to 80°C	±1.0°C @ 37°C	±.1°C
74300-714 74200-714	Amb. +5°C to 80°C	±1.0°C @ 37°C	±.1°C
74300-720 74200-720	Amb. +5°C to 80°C	±1.0°C @ 37°C	±.1°C

Power Requirements

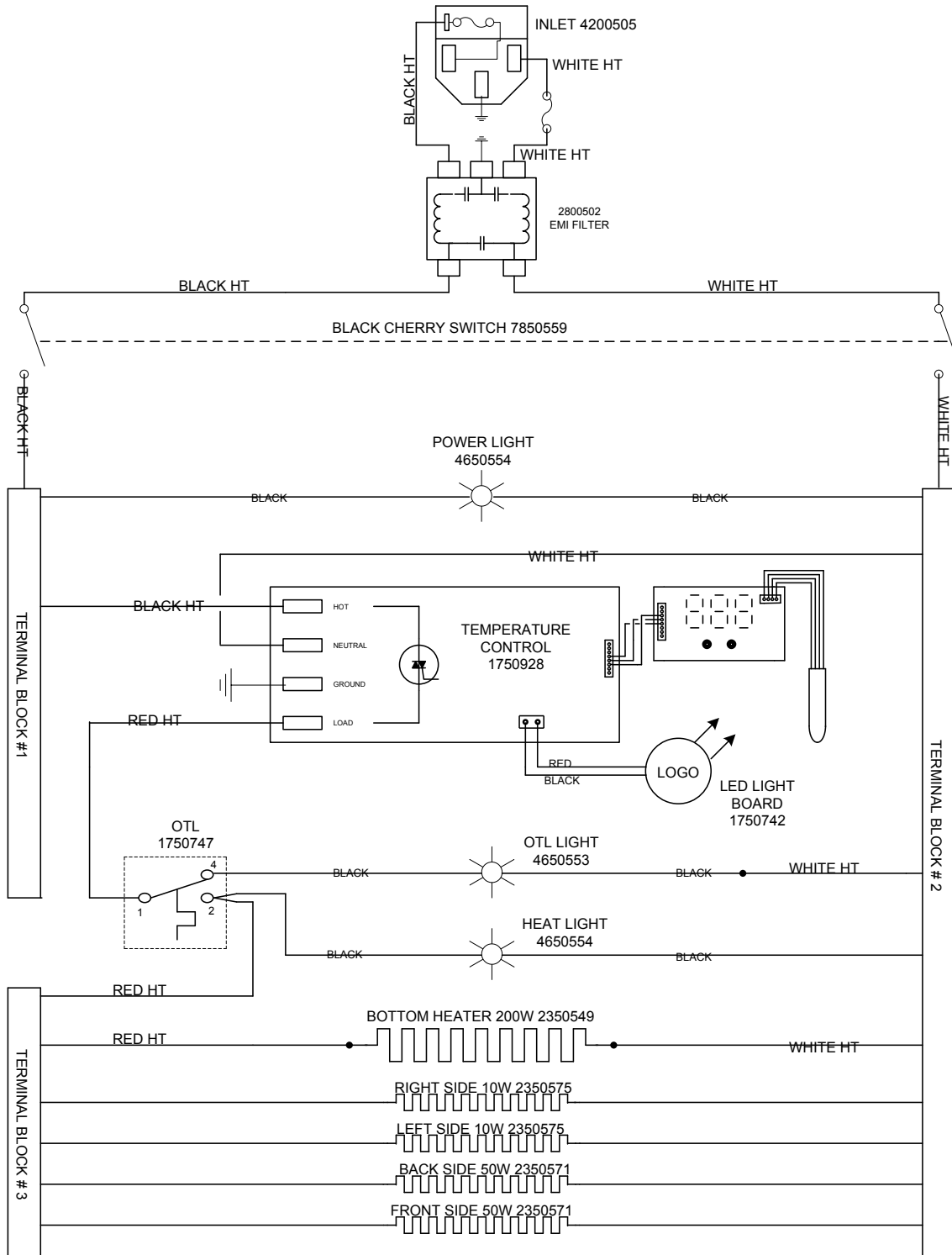
Model	Voltage
74300-706 74200-706	Volts 100-120 V~ 3.0 A 50/60 Hz Volts 220-240 V~ 2.0 A 50/60 Hz
74300-714 74200-714	Volts 100-120 V~ 4.5 A 50/60 Hz Volts 220-240 V~ 2.5 A 50/60 Hz
74300-720 74200-720	Volts 100-120 V~ 6.0 A 50/60 Hz Volts 220-240 V~ 3.0 A 50/60 Hz

SCHEMATICS

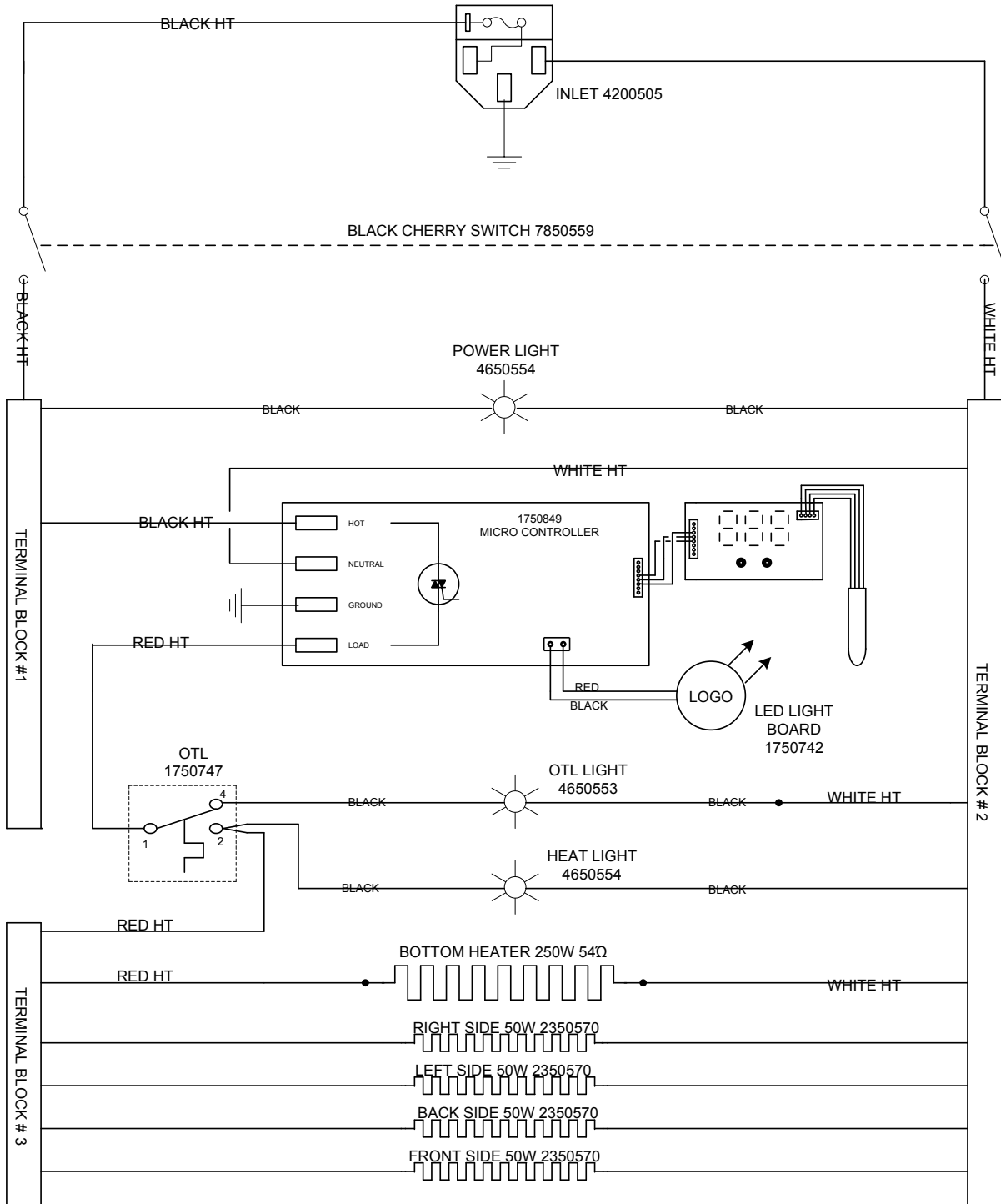
WIRE DIAGRAM
74300-706



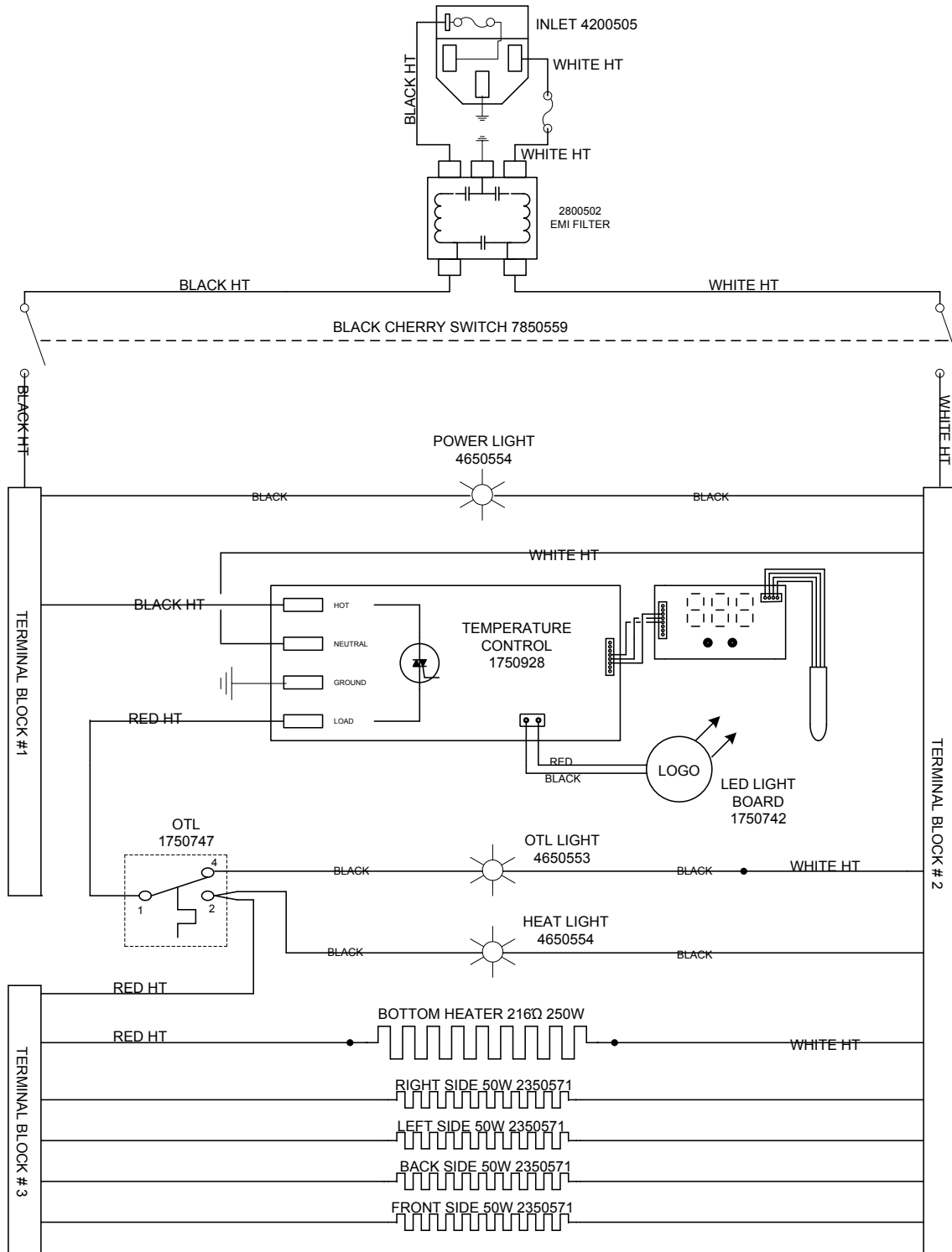
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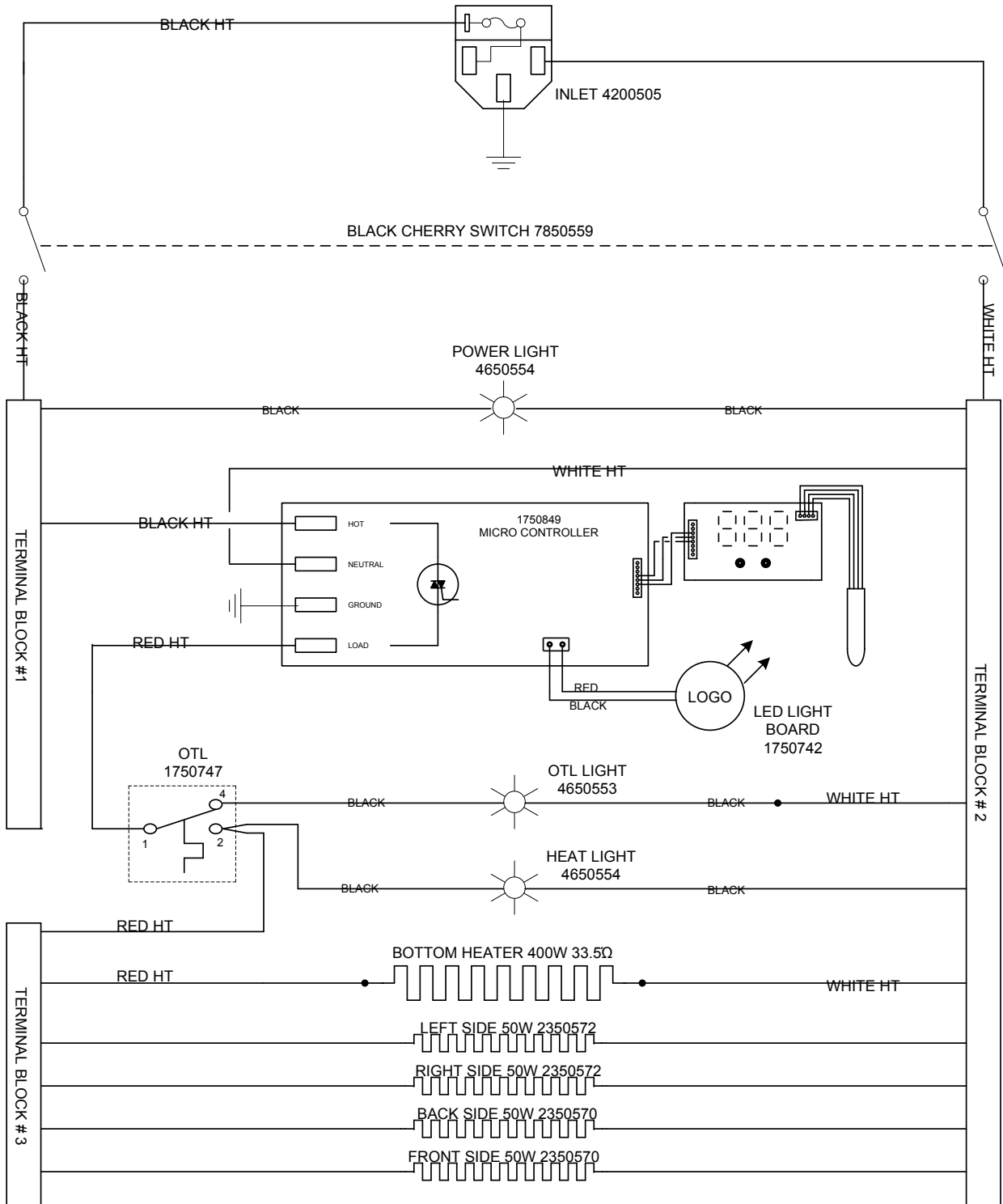
WIRE DIAGRAM 74300-714



WIRE DIAGRAM 74200-714



WIRE DIAGRAM 74300-720



WIRE DIAGRAM 74200-720

