

# **MB MASTER-BILT**<sup>®</sup>

*Refrigeration Solutions*



## **IM-23GB**

### **Installation & Operations Manual**

#### **With TLY 25 Controller**

**Master-Bilt Products**  
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## INTRODUCTION

Thank you for purchasing **Master-Bilt** Ice Merchandiser. This manual contains important instructions for installing, using, cleaning, and servicing **Master-Bilt** Indoor Ice Merchandiser. A parts list is included with this manual. Read all documents carefully before installing or servicing your equipment.

## STORE CONDITIONS

The **Master-Bilt** Ice Merchandisers are designed to operate in a controlled environment. The temperature should be at 75°F or below for an indoor ice merchandiser, with relative humidity of 55% or less. At higher temperature or humidity conditions, the performance of these merchandisers may be affected and the capacity diminished.

The **Master-Bilt** Ice Merchandiser should not be positioned where it is directly exposed to rays of the sun or near a direct source of radiant heat or airflow. This will adversely affect the ice merchandiser and will result in poor performance.

If this ice merchandiser is to be located against a wall, there should be at least 6" space between the wall and the back of the unit. This space will allow for the circulation of air behind the ice merchandiser, which will prevent condensation on the exterior surfaces.

## WARNING LABELS AND SAFETY INSTRUCTIONS



This symbol is the safety-alert symbol. When you see this symbol on your ice merchandiser or in this manual, be alert to the potential for personal injury or damage to your equipment. Be sure you understand all safety messages and always follow recommended precautions and safe operating practices.



### NOTICE TO EMPLOYERS

You must make sure that everyone who installs, uses or services your cabinet is thoroughly familiar with all safety information and procedures.

Important safety information is presented in this section and throughout the manual. The following signal words are used in the warnings and safety messages:

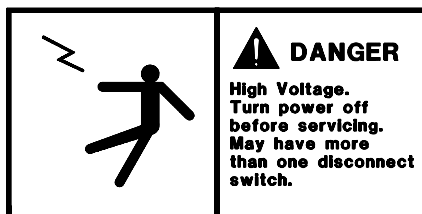
**DANGER:** Severe injury or death will occur if you ignore the message.

**WARNING:** Severe injury or death can occur if you ignore the message.

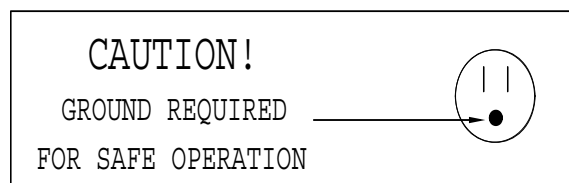
**CAUTION:** Minor injury or damage to your cabinet can occur if you ignore the message.

**NOTICE:** This is important installation, operation or service information. If you ignore the message, you may damage your cabinet.

The warning and safety labels shown throughout this manual are placed on your **Master-Bilt Products** cabinet at the factory. Follow all warning label instructions. If any warning or safety labels become lost or damaged, call your customer service department at (800)684-8988 for replacements



This label is attached on the cabinet back and in the machine compartment.



This label is located on the power cord.

## NOTICE

Read this manual before installing, cleaning, or performing any maintenance on your cabinet. Keep the manual and refer to it before doing any service on the equipment. Failure to do so could result in personal injury or damage to the cabinet.



### DANGER

Improper or faulty hook-up of electrical components on the refrigeration units can result in severe injury or death. All electrical wiring hook-ups must be done in accordance with all applicable local, regional or national standards.



### NOTICE

Installation and service of the refrigeration and electrical components of the cabinet must be performed by a refrigeration mechanic and/or a licensed electrician.

The portions of this manual covering refrigeration and electrical components contain technical instructions intended only for persons qualified to perform refrigeration and electrical work. This manual cannot cover every installation, use or service situation. If you need additional information, call or write us:

Customer Service Department  
**Master-Bilt Products**  
Highway 15 North  
New Albany, MS 38652  
Phone (800) 684-8988  
Fax (800) 684-8988

## GENERAL INSTRUCTIONS

1. Be sure the ice merchandiser is properly installed by competent service people.
2. Keep the ice merchandiser clean and sanitary so it will meet your local sanitation codes. Clean the unit with a mild detergent and water, then rinse.
3. Rotate your stock so that older stock does not accumulate.
4. Do not place product in the ice merchandiser when it is soft or partially thawed. Also, product should not be put in the ice merchandiser for at least 6 hours after it is started.
5. Stock ice merchandiser as quickly as possible, exposing only small quantities to condition temperatures for short periods of time.

## NOTICE TO STORE OWNERS / MANAGERS

**Moisture or liquid around or under the cabinet is a potential slip/fall hazard for persons walking by or working in the general area of the cabinet. Any cabinet malfunction or housekeeping problem that creates a slip/fall hazard around or under the cabinet should be corrected immediately.**

If moisture or liquid is observed around or under a **Master-Bilt** Ice Merchandiser, an immediate investigation should be made by qualified personnel to determine the source of the moisture or liquid. The investigation should determine if the ice merchandiser is malfunctioning or if there is a drainpipe leaking.

## MECHANICAL

Remove front grille and check refrigeration lines to see that they are free (not touching each other or compressor). Spin condenser fan blade to see that it is free.

The compressor is hermetic so it is internally spring mounted and ready to run.



## ELECTRICAL



**Before servicing electrical components in the case or the doors or door frames make sure all power to case is off. Always use a qualified technician.**

Check voltage and amps drawn on (Page 12-13) to determine proper line and fuse or circuit breaker size. Check power supply for low voltage. If voltage reads "115" with no load, and it drops below "100" when the compressor tries to start, it is an indication of too small supply wiring or too long to run.

It is recommended that a separate circuit be run for each ice merchandiser to prevent another appliance from blowing the fuse or breaker, causing loss of product.

## MASTER-BILT ELECTRONIC REFRIGERATION CONTROL (TLY-25)

### GENERAL DESCRIPTION

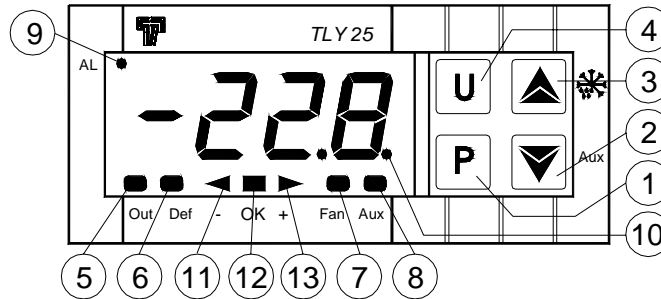
The model TLY-25/29 is a digital controller with microprocessor that is typically used in cooling applications that have temperature control with ON/OFF regulation and defrosting control with set time and hours intervals (Real Time Clock Defrosting) by means of electrical.

The instrument has 3 relay outputs, two inputs for PTC or NTC temperature probes and a digital input, that can all be configured.

The 3 outputs can be used for controlling the compressor or the temperature control device (OUT), the defrosting device (DEF), the evaporation fan (FAN) or, alternatively any of the previous functions, using an auxiliary device (AUX) or an alarm (AL).

The two inputs for the PTC and NTC temperature probes (which can be selected by parameter) can be used to measure the cell temperature (Pr1) and the evaporator temperature (Pr2).

# MICROPROCESSOR-BASED DIGITAL ELECTRONIC FREEZER CONTROLLER





- 1 - **Key P:** Used for setting the Set point and for programming the function parameters
- 2 - **Key DOWN/Aux:** Used for decreasing the values to be set and for selecting the parameters. It can also be programmed via the parameter "Fbd" to carry out other functions such as activating the Aux output, starting up the continuous cycle, selecting the active set point or turning on and off (stand-by) the device.
- 3 - **Key UP/DEFROST:** Used for increasing the value to be set, for selecting the parameters and for activating manual defrosting.
- 4 - **Key U:** Used for visualising the temperatures taken by the cell probes and evaporator (Pr1 and Pr2) and the internal clock (if present). It can also be programmed via the parameter "USrb" to carry out other functions, just like the key DOWN/AUX (see par. 4.12).
- 5 - **Led OUT:** Indicates the compressor output status (or the temperature control device) on (on), off (off) or inhibited (flashing)
- 6 - **Led DEF:** Indicates defrosting in progress (on) or dripping (flashing).
- 7 - **Led FAN:** Indicates fan output status on (on), off (off) or delayed after defrosting (flashing)
- 8 - **Led AUX:** Indicates AUX output status on (on), off (off) or inhibited (flashing)
- 9 - **Led AL:** Indicates the alarm status (on), (off) and silenced or memorized (flashing)
- 10 - **Led SET:** Indicates the input in programming mode and the programming level of the parameters. It also serves to indicate the Stand-by status.
- 11 - **Led -:** Indicates that a low temperature alarm is in progress (lit) or that a low temperature alarm has been memorised (flashing).
- 12 - **Led OK:** Indicates that no alarms are in progress
- 13 - **Led +:** Indicates that a high temperature alarm is in progress (lit) or that a high temperature alarm has been memorised (flashing)

## OPERATION


**Fan** The fan will run constantly except when a defrost is initiated, or when the evaporator temp is above 35°F. When in defrost mode the fan is off until the end of the defrost and the 2 minute drip time has passed. There is 2 minutes delay after a defrost before the fan comes on. The difference of the evaporator and room temperature of more than 9°F will override the fan delay. FAN LED indicator is flashing during 2 minutes drip period.

**Defrost** The control uses time defrosts with four defrost per day for oil return safety. The defrost timer begins counting on power up. For example, if a defrost is desired at 12 am, 6 am, 12m, and 6 pm then power up the unit at any of those four times.

## MANUAL DEFROST

1. Push this **DEFROST**  "UP/DEFROST" key for more than 5 seconds and a manual defrost will start, if the conditions are correct, the led DEF will light up and the instrument will carry out a defrosting cycle.
2. While in defrost, push and hold the **DEFROST**  key for more than 5 seconds and the controller will end the defrost cycle. The controller will then enter drip mode for 2 minutes. The DEF led is flashing in drip mode.

## HOW TO CHANGE SET POINTS

1. Press the **P**  until sp-1 is displayed.
2. Push **UP ▲** or **DOWN ▼** arrows to change the value.
3. To Exit: Press **SET + UP ▲** or wait 20 seconds without pressing a key.

**NOTE 1:** The set value is stored even when the procedure is exited by waiting the time-out to expire.

**NOTE 2:** Master-Bilt's SETPOINT is set at a recommended 20°F at the factory.

**NOTE 3:** If power is turned off to the unit, the set point returns to factory set value.



## LIST OF PARAMETERS

Here is a list of factory set parameters the value of which can not be change in the field without the password.

Symbols	Descriptions	Range	M/B Setting
<b>SPAt</b>	Active Set point	1 ÷ 2	<b>1</b>
<b>SP1</b>	Set Point 1	SPLL ÷ SPHL	<b>20</b>
<b>SP2</b>	Set Point 2	SPLL ÷ SPHL	<b>20</b>
<b>SEnS</b>	Probes Type	Ptc - ntc	<b>ntc</b>
<b>Unit</b>	Unit of measurement	°C - °F	<b>°F</b>
<b>diSP</b>	Normal Display (Room Temperature)	OFF - Pr1 - Pr2 - SP - CL	<b>Pr1</b>
<b>HSEt</b>	Differential	0 ÷ 30 °C/°F	<b>5</b>
<b>tonE</b>	Compressor will run for 6 minutes	OFF ÷ 99.59 min.sec	<b>6.00</b>
<b>toFE</b>	Then off for 4 Minutes	OFF ÷ 99.59 min.sec	<b>4.00</b>
<b>dtyP</b>	EL = electrical Defrost	EL - in	<b>EL</b>
<b>dint</b>	Defrosting interval	OFF ÷ 99.59 hrs.min	<b>6.00</b>
<b>dEFE</b>	Max. length of defrost cycle	0.01 ÷ 99.59 min.sec	<b>30.00</b>
<b>tEdF</b>	Defrost stop temperature	- 58 ÷ 302 °C/°F	<b>55</b>
<b>tdCO</b>	Compressor delay after defrost (drainage time)	OFF ÷ 99.59 min.sec	<b>2.00</b>
<b>dLo</b>	Defrost display	On - OFF - Lb	<b>lb</b>
<b>FLt</b>	High temperature fan off	- 58 ÷ 302 °C/°F	<b>45</b>
<b>PtC</b>	Compressor protection time	OFF ÷ 99.59 min.sec	<b>1.00</b>
<b>od</b>	Delay at power on	OFF ÷ 99.59 min.sec	<b>0.10</b>
<b>HAL</b>	High temperature Alarm threshold	OFF / - 58 ÷ 302 °C/°F	<b>32</b>
<b>ALd</b>	Temperature Alarms delay	OFF ÷ 99.59 min.sec	<b>30</b>

## ALARM SIGNALS

Message	Cause	Outputs
<b>-E1</b>	Reading Outside Range	Inputs
<b>E1</b>	Probe 1 bad or dis connected	Control goes into fail safe mode. Compressor on 6 minutes and of 4 minutes.
<b>-E2</b>	Reading Outside Range	Defrost end is timed
<b>E2</b>	Probe 2 bad or disconnected	Inputs
<b>AL</b>	Allarm in Progress	Outputs unchanged.
<b>EEPr</b>	Inernal Memory Error	Inputs

## OTHER SIGNALS

Message	Reason
<b>od</b>	Delay in switching on in progress
<b>dEF</b>	Defrosting in progress with "dLo" = Lb
<b>PdEF</b>	Post-defrosting in progress with "dLo" = Lb
<b>CC</b>	Continous Cycle in progress
<b>HI</b>	Maximum temperature alarm in progress
<b>LO</b>	Minimum temperature alarm in progress
<b>AL</b>	Digital input alarm in progress
<b>AP</b>	Door Open

## ELECTRICAL CONNECTIONS

The controller is provided with screw terminal block to connect cables with a cross section up to 2,5 mm<sup>2</sup>. Before connecting cables make sure the power supply complies with the control's requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay, in case of heavier loads use a suitable external relay.

## PROBE CONNECTIONS

The probes shall be mounted with the bulb upwards to prevent damage due to casual liquid infiltration. It is recommended to place the thermostat probe away from air streams to correctly measure the average room temperature. Place the defrost termination probe among the evaporator fins in the coldest place, where most ice is formed, far from heaters or from the warmest place during defrost, to prevent premature defrost termination.

## SERVICE INSTRUCTIONS

1. High head pressure and high back pressure:
  - A. Condenser coil clogged or restricted
  - B. Condenser fan motor defective.
  - C. Air discharge in rear of cabinet restricted.
2. Low back pressure and low head pressure:
  - A. Restriction in system.
  - B. Refrigerant undercharged.
  - C. Leak in system
3. Pressure normal – cabinet warm:
  - A. Coil blocked with frost (see #4).
  - B. Refrigerant undercharged.
  - C. Control set too warm.
4. Ice merchandiser not cycling – coil blocked with frost:
  - A. Defective temperature controller, or improper settings.
  - B. Refrigerant overcharged.
  - C. Location too hot.
  - D. Condenser clogged.
  - E. Condenser fan motor defective.
  - F. For freezer, defrost heater not operating.
  - G. Air leakage into ice merchandiser due to open door or faulty door seal.
5. Compressor starts and runs – but cycles on overload:
  - A. Low voltage
  - B. Relay defective.
  - C. Overload defective.
  - D. High head pressure (see #1).

## TROUBLE SHOOTING

Symptom-System Operates Long or Continuously		
Possible Problem	Possible Cause	Remedy
How Long do the doors stay open?	Door closer need adjust.	Adjust door closer and keep doors closed.
Is the condenser clean?	Dirty condenser.	Clean condenser
Are the condenser fans running?	Fans not running.	Repair or replace
Is the evaporator dirty or iced up?	Iced or plugged evaporator coil(s).	Defrost or clean (check control settings)
Are the evaporator fans running?	Fans not running.	Repair or replace
Have you checked the refrigerant level?	Shortage of refrigerant.	Repair leak and recharge.
Is there air or other non-condensables in the system?	Non-condensables in the system	Evacuate and recharge.
Are all controls functioning properly?	Control contacts or error codes.	Repair or adjust the control.
Checked expansion valve for Freezers?	Improper controls adjusted.	Clean or replace.
What is Evaporator Superheat?	Evaporator Superheat too high.	Adjust expansion valve to lower Superheat setting.
Where is condensing Unit located?	Location too warm. Air leaks or doors	Ventilate area or change to cooler location.
Is Box well sealed from air penetrations?	Wall panels not locked or wall penetrations not sealed.	Seal leaks, adjust doors or replace.
Is system capacity sufficient for product load?	Product load greater than system capacity.	add additional units or replace.

## CHECK LIST

- A. Check operating pressures.
- B. Check electrical requirements of unit to supply voltage.
- C. Set temperature control for desired temperature range.
- D. Check condensing unit for vibrating or rubbing tubing. Dampen and clamp as required.
- E. Replace all service valve caps and latch unit covers.
- F. Check that evaporator fan runs after initial pull down.

## CABINET CLEANING PROCEDURES



### WARNING!

To avoid electrical shock, disconnect main power supplies to the merchandiser before beginning this procedure. May have more than one disconnect switch.

The exterior of the ice merchandiser should simply be wiped clean with a damp cloth daily. This will be sufficient to keep the unit looking its finest. **Do not use a brush, scouring pad, or any abrasive material on the painted surfaces!**

To clean the interior of the ice merchandiser, the condensing unit and power to the merchandiser fans and heaters should be shut off. **Disconnect all power before cleaning!** All product in the cabinet should be removed and stored in an appropriate facility. All shelving, trays, etc. should be removed and cleaned separately.

The interior (as well as the exterior) of the ice merchandiser may be cleaned with a germicidal detergent at the manufacturer's recommended concentration. **Do not use any ammonia-based products as this may damage the electrical components in the unit.** Again, do not use a brush, scouring pad, or any abrasive material on the painted surfaces. Use a soft brush or cleaner pad for built-up dirt, stains, or spills. Remove only the necessary mechanical parts to access the evaporator coil and fan housing. Care should be taken not to unnecessarily soak fan motors, electrical connections, controls, or any wire raceway. Wipe all surfaces with a damp cloth. A sanitizer should then be thoroughly sprayed onto the surfaces and again wiped with a damp cloth.

Remove only the necessary mechanical parts to access the condenser coil and compressor housing. Care should again be taken not to unnecessarily soak fan motors, electrical connections, time clock, ballasts, or any wire raceway. Check the condenser coil to insure that it is not clogged with dirt, dust, or lint. A dirty or clogged condenser coil will result in diminished performance of the cabinet. The condenser should be brushed with a plastic bristled brush. For dust or dirt that has accumulated deep inside the condenser, use compressed air to blow the dirt through the coil. Do not let dust or dirt accumulate on the fan blades. If dust or dirt is noticeable, simply wipe the fan blades with a damp cloth as with other surfaces. After cleaning, replace any equipment that was previously removed and start the condensing unit and return power to the lights, fans, and heaters.

**CLEANING:** As a regular maintenance routine, the condenser coil should be cleaned approx every 6 to 12 months, depending on store conditions.

Keep the equipment clean and sanitary so it will meet your local sanitation codes. Wipe up all spills, clean with water and a mild detergent, then rinse with clean water. Wipe the exterior and gasket area as needed.

## ICE MERCHANDISER MONTHLY CHECKLIST

1. Check condenser coil, clean if necessary.
2. Check service valves for leaks evident by oil traces.
3. Check for obstruction restricting air flow over the evaporator coil and the condenser coil. Insure that the air intake is not obstructed.
4. Check for excessive noise.
5. Check for proper temperature, adjust if necessary.
6. Check door gaskets for proper seal against cabinet.
7. Check doors for self closing, adjust tension if necessary.
6. Check for proper operation sequence in normal refrigeration cycle and defrost cycle.

## PARTS LIST

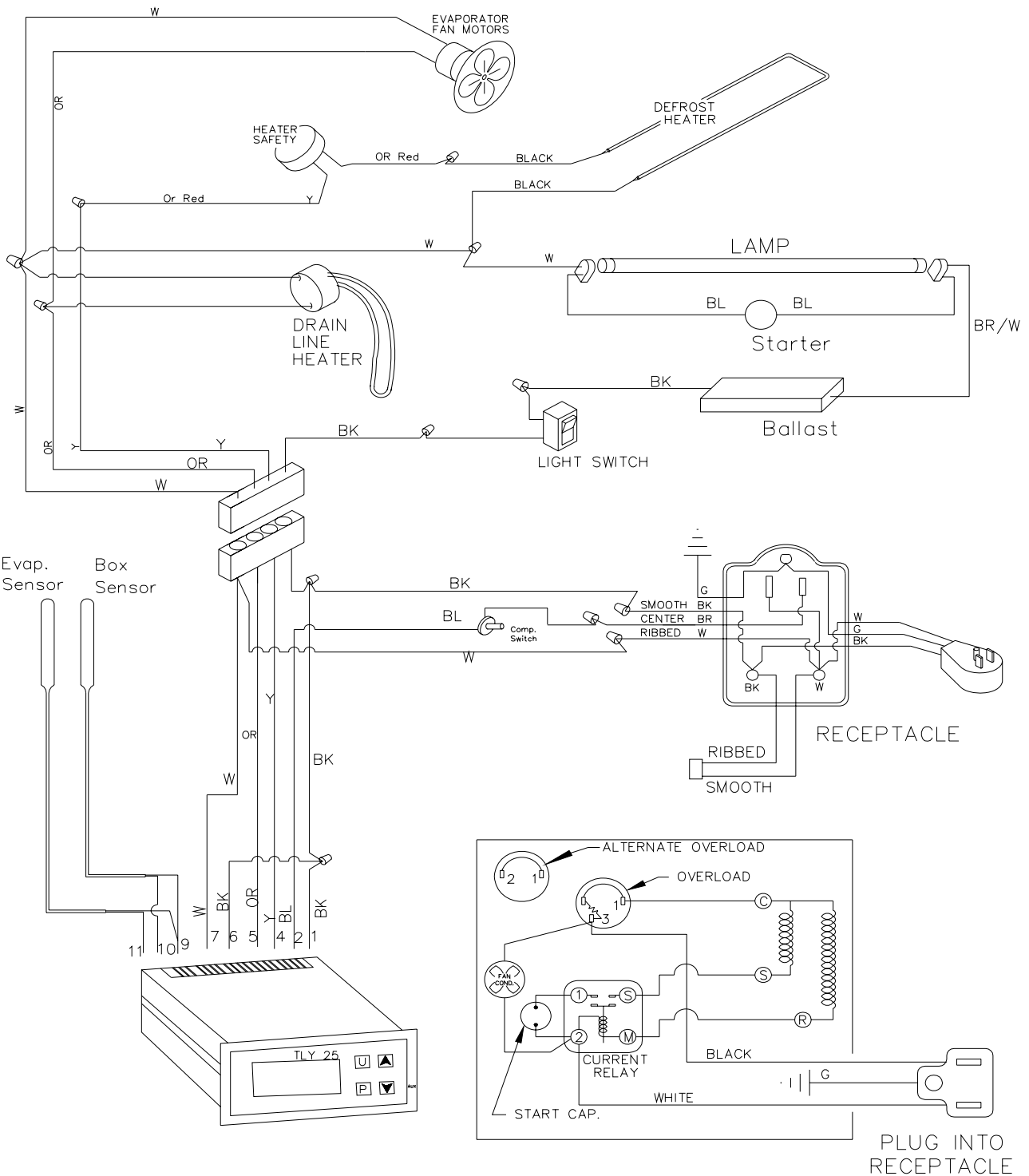
PART DESCRIPTION	IM-23
Condensing unit/1st run units	01-01733
Compressor (AEA44440YXA)	03-50330
Bottom Shelf	33-01453
Light Switch	23-50562
Ballast	23-00349
evaporator coil	07-13288
evaporator fan motor	13-13198
evaporator fan blade	15-13106
evaporator fan guard	25-01324
Wall Gard	25-01344
drain flanges with adapter	11-01410
drain line heater wire	17-00404
heater clip	17-09431
drier	09-09308
grill	256-28900
rear Cover	255-11714
Cap Tube	11-01450
heater safety	19-01164
vinyl tube	11-00876
coil defrost heater	17-09407
TLY-25 Control w/ Sensors	19-13952
TLY Controller	19-13992
Sensors	19-13953
glass door	31-02672
Starter	23-01092
Leg Leueler	27-00592
Condensate Pan	001-13001
toggle switch	19-3118
Evap Motor Bracket	13-13165
condensate pan clip	21-01284
Lamps 15W	23-00329
Lamp Shield	25-01273
Rear Grille	25-00104

## SALE AND DISPOSAL

### OWNER RESPONSIBILITY

If you sell or give away your **Master-Bilt** Ice Merchandiser you must make sure that all safety labels and the Installation - Service Manual are included with it. If you need replacement labels or manuals, **Master-Bilt** will provide them free. Contact the customer service department at **Master-Bilt** at **(800)-647-1284**.

The customer service department at **Master-Bilt** should be contacted at the time of sale or disposal of your cabinet so records may be kept of its new location.



IM-23

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