

# **MB MASTER-BILT**<sup>®</sup> Refrigeration Solutions



**FIP-40**

**FIP-60**

## Installation & Operations Manual

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## INTRODUCTION

Thank you for purchasing a Master-Bilt<sup>®</sup> cabinet. This manual contains important instructions for installing, using, and servicing a Master-Bilt<sup>®</sup> FIP case. A parts list is included with this manual. Read all these documents carefully before installing or servicing your equipment.

## STORE CONDITIONS

The Master-Bilt<sup>®</sup> FIP cases are designed to operate in the controlled environment of an air-conditioned store. The store temperature should be at or below 75°F and a relative humidity of 55% or less. At higher temperature or humidity conditions, the performance of these cases may be affected and the capacity diminished.

The Master-Bilt<sup>®</sup> FIPs should not be positioned where it is directly exposed to rays of sun or near a direct source of radiant heat. This will adversely affect the case and will result in poor performance.



### NOTICE

**Read this manual before installing 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

## WARNING LABELS AND SAFETY INSTRUCTIONS



This symbol is the safety-alert symbol. When you see this symbol on your cabinet 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:

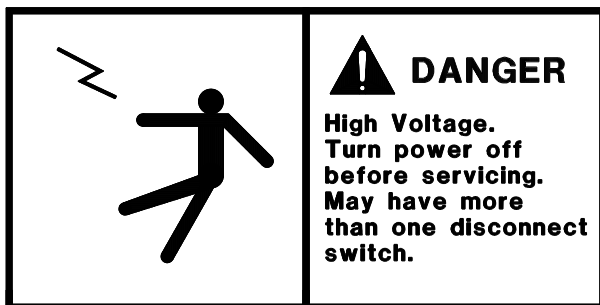
**DANGER:** Severe injury or death will occur if you ignore the message.

**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 located on top of the electrical control label and on the wiring channel.*



*This label is attached to the cabinet power cord on models with a power cord.*

## PRE-INSTALLATION INSTRUCTIONS

### INSPECTION FOR SHIPPING DAMAGE

You are responsible for filing all freight claims with the delivering truck line. Inspect all cartons and crates for damage as soon as they arrive. If damage is noted to shipping crates or cartons or if a shortage is found, note this on the bill of lading (all copies) prior to signing.

If damage is discovered when the cabinet is uncrated, immediately call the delivering truck line and follow up the call with a written report indicating concealed damage to your shipment. Ask for an immediate inspection of your concealed damage item. Crating material must be retained to show the inspector from the truck line.

## INSTALLATION INSTRUCTIONS

### GENERAL INSTRUCTIONS

1. Be sure the equipment is properly installed by competent service people.
2. Keep the equipment clean and sanitary so it will meet your local sanitation codes. Clean the cabinet with a mild detergent and water, then rinse.
3. Rotate your stock so that older stock does not accumulate. This is especially important for ice cream. A "First-In, First-Out" rotation practice will keep the products in good salable condition.
4. Do not place product in the case when it is soft or partially thawed. Also, product should not be put in the case for at least 6 hours after it is started.
5. Stock cases as quickly as possible, exposing only small quantities to store temperatures for short periods of time.
6. When replacing burned out fluorescent tubes, be sure that the electrical power to the lighting circuit is turned off.

### 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.

### LOCATION

Remove cabinet from crate base and slide into location. Cabinet must be level from side to side and front to back for correct draining of coil pan and for self-closing doors to operate correctly.

Check that all service valves (2) are open. Cut compressor hold-down strap and remove the compressor. The springs are secured for shipping by either tightening bolts or shipping strap. Remove the strap or loosen the hold-down bolts so that the compressor floats freely.

To comply with Sanitation requirements the cabinet must be sealed to the floor with a N.S.F. listed silicone sealant, mounted on casters, or with 6" minimum legs. 0" air space is required for the front and each side. The top and back of the cabinet must be left open for compliance.

Remove shipping supports from bottom edge and top edge of doors.



## SERVICE INSTRUCTIONS

### 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.

It is recommended that a separate circuit be run for each cabinet to prevent another appliance blowing the fuse or HAC&R C/B, causing loss of product. This circuit should be sized according to the amp rating on the cabinet data label.



For models with electronic ballast and florescent light only



For replacement ballast, use only ballast that complies with UL Type CC rating if unit is equipped with electronic ballast.



**WARNING** Before making any change, the technician should disconnect power to the cabinet.

For models with LED lamp without ballast only

The light fixture has been redesigned and only suitable for specified self-ballasted LED (Part # 23-01929 & 23-01931) mentioned in service manual and wiring diagram. In no case, any florescent tube light can be used in this fixture.



- These lamp should be installed by licensed electricianas per local code.
- These lamps are to be used in indoor dry and damp location only.
- Not suitable for wet locations
- Risk of fire or electric shock
- These product is intended to be used with only the specific LED lamp. It is dangerous to use any other lamp which is not specified here.

## LIGHTED SIGN IN CANOPY INSTALLATION

1. Disconnect the power to the cabinet
2. Slide the finger below the canopy lens as shown and push the lens up till it disengages from the lip of the canopy.
3. Then slide down to take it out for service
4. While installing the lens please follow the instruction as shown in the pictures.
5. Make sure the top of the lens is securely positioned in the slot between the top retainer and top deck.
6. Once it is inbetween the top slot, push the lens up to make sure it is securely placed in the groove created by the hem structure of the lip of the the front deck canopy area.



## SPECIAL SERVICE SITUATION:

- A. There are rare occasions when the refrigerant charge must be evacuated from a cabinet in order to perform service work. In those situation, Master-Bilt recommends that a refrigerant reclaimer be used according to the EPA guidelines to eliminate the possibility of refrigerant being released to the atmosphere.
- B. If moisture or liquid is observed around or under a Master-Bilt<sup>®</sup> cabinet, an immediate investigation should be made by qualified personnel to determine the source of the moisture or liquid. The investigation made should determine if the cabinet is malfunctioning or if there is a simple housekeeping problem. Moisture or liquid around or under a 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 a cabinet should be corrected immediately.
- C.

## OPERATING CONDITIONS AND PRESSURES

With room ambient temperature of +80 F and cold cabinet (unit cycling on control):

Suction Pressure	2 to 10 psig
Head Pressure	240 to 260 psig

## TEMPERATURE SENSOR, DEFROST HEATER, AND FAN MOTOR REPLACEMENT



**WARNING** Before making any change, the technician should disconnect power to the cabinet.

To change a temperature sensor (cabinet zone sensor or defrost termination sensor), simply disconnect the sensor wires from the controller and replace the new sensor in the original position. Use plastic tie to tighten the zone sensor. Insert the sensor for defrost termination firmly into the evaporator coil, in between the fins. Make sure the sensor wires do not touch or are not close to any heater rods.

To change defrost heater – remove screws from drain pan and pull down – remove screws from coil mounting straps – spring straps open – remove heater shield – pull heater out of slots in coil fins.

To change fan motor – disconnect fan motor leads – remove screws from fan guards and motor mounts.



# MASTER-BILT® ELECTRONIC REFRIGERATION CONTROL

## DESCRIPTION



Fig.1 — Front panel



Info / Setpoint button.



Manual defrost / Decrease button

## OPERATION

### DISPLAY

During normal operation, the display shows either the temperature measured or one of the following indications:

<b>DEF</b>	Defrost in progress	<b>HI</b>	Room high temperature alarm
<b>REC</b>	Recovery after defrost	<b>LO</b>	Room low temperature alarm
<b>OFF</b>	Controller in stand-by	<b>E1</b>	Probe T1 failure
<b>CL</b>	Condenser clean warning	<b>E2</b>	Probe T2 failure
<b>DO</b>	Door open alarm		

### INFO MENU

The information available in this menu is:

<b>T1</b>	Instant probe 1 temperature	<b>TLO</b>	Minimum probe 1 temperature recorded
<b>T2</b>	Instant probe 2 temperature	<b>CND</b>	Compressor working weeks
<b>THI</b>	Maximum probe 1 temperature recorded	<b>LOC</b>	Keypad state lock

## INDICATIONS



Thermostat output



Fan output



Auxiliary output



Activation of 2nd parameter set



Alarm



Increase / manual activation button.



Exit / Stand-by button

**Compressor** When power is first turned on the controller will go through the start-up. After the start-up delay the compressor comes on. The LED indicator stays on while compressor relay is energized. Display will show actual box temperature. Picture above is the display layout. The compressor will be cycled off when the actual box temperature reaches its set point. The COMP indicator will be off..






**Fan** The fans will run in FTC mode except when a defrost is initiated, or when the evaporator temp is above the 30°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. If the Evaporator temperature is 35 °F or below the controller will override the fan delay. FAN LED indicator is on while FAN relay is energized.

**Defrost** The control uses time defrost with 2 defrost per day. The defrost scheme can be re-set the for special applications. During defrost the display will show dEF and the defrost LED indicator on. The control begins timing the defrost when power is turned on. Two defrost per day means it will occur every 12 hours. To have defrost occur at 8am, 2pm, 8pm, and 2am then power up at one of these four times.











## MANUAL DEFROST

Defrosting may also be induced manually by keeping the defrost button for 3 seconds. Once defrost has started, the defrost will go through a defrost and drip time pull down cycle.

## HOW TO CHANGE THE SETPOINT

- Press button  for at least half second, to display the setpoint value.
- By keeping button  pressed, use button  or  to set the desired value (adjustment is within the minimum **SPL** and the maximum **SPH** limit).
- When button  is released, the new value is stored.

## HOW TO CHANGE a parameter value

- The setup menu is accessed by pressing button + for 5 seconds.
- With button  or  select the parameter to be modified.
- Press button  to display the value.
- By keeping button  pressed, use button  or  to set the desired value.
- When button  is released, the newly programmed value is stored and the following parameter is displayed.
- To exit from the setup, press button  or wait for 30 seconds.

## LIST OF PARAMETERS

Here is a list of the parameters the value of which can be changed in the programming mode, as well as their ranges.

Display Symbol	Parameter	Range	Setting
<b>SP</b>	Temperature Set Point	SPL...SPH	-10°F
<b>HYS</b>	Temperature Differential	1 to 255°F	10°
<b>SPL</b>	Minimum Temperature limit setpoint	-50...SPH	-15°F
<b>SPH</b>	Maximum Temperature limit setpoint	SPH...120°	30°F
<b>AHA</b>	High Temperature alarm	-50...120°	30°F
<b>ALA</b>	Low Temperature Alarm	50...120°	-40F
<b>ATD</b>	Temperature Alarm Delay	0...120min	30min
<b>DFR</b>	Number of Defrost Cycle per 24hr	0...24	4/day
<b>DLI</b>	Defrost Termination Temperature	-50...120°	55°F
<b>DTO</b>	Maximum Defrost Duration	1...120min	30min

## 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 or contactor's.

## PROBE CONNECTIONS

The probes shall be mounted with the bulb upwards to prevent damages 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.

## SENSOR PROBE TEMPERATURE AND RESISTANCE

### NTC10K Temperature - Resistance

-30	<b>-22</b>	109.522	113.347	117.294
-25	<b>-13</b>	84.823	87.559	90.374
-20	<b>-4</b>	66.270	68.237	70.255
-15	<b>5</b>	52.229	53.650	55.104
-10	<b>14</b>	41.477	42.506	43.557
-5	<b>23</b>	33.147	33.892	34.651
0	<b>32</b>	26.678	27.219	27.767
5	<b>41</b>	21.630	22.021	22.417
10	<b>50</b>	17.643	17.926	18.210
15	<b>59</b>	14.472	14.674	14.877
20	<b>68</b>	11.938	12.081	12.224

## FAN OPERATION AND VIBRATION; VOLTAGE CHECK

Check the operation of the fan blade and also check for vibration noises due to refrigerant lines rattling against one another. While the cabinet is in operation, check the voltage draw and the amperage draw versus this rating on the nameplate. Voltage should be checked at the compressor terminals while the compressor is initially starting. The FIP models are designed to operate at +/- 10% of 115/60/1. This means at time of start-up, the voltage should be between 103 volts and 126.5 volts at the compressor.

## FINAL 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 system for proper defrost settings and operation.
- E. Check condensing unit for vibrating or rubbing tubing. Dampen and clamp as required.

## MASTER-BILT® PART LIST

The table below gives Master-Bilt® part numbers. Use this chart when ordering replacement parts for your FIP cabinets. Always Advise Cabinet Serial Number When Ordering Parts

Description	FIP-40	Description	FIP-60
Coil Defrost Heater	17-09407	Coil Defrost Heater	17-09407
Compressor	03-15192	Compressor	03-15192
Condenser Coil	07-13241	Condenser Coil	07-13241
Condenser Fan Blade	15-13093	Condenser Fan Blade	15-13093
Condenser Fan Motor	13-00311	Condenser Fan Motor	13-00311
Cond. Fan Motor Bracket	13-13165	Cond. Fan Motor Bracket	13-13165
Contractor	19-13936 (115V) 19-13634 (220V)	Contractor	19-13936 (115V) 19-13634 (220V)
Front Grille	067-18111	Front Grille	065-18111
Rear Grille	067-18112	Rear Grille	065-18112
Door Frame Heater	17-09654 (115)	Door Frame Heater	17-09655 (115V)
Door Gasket	37-01313	Door Gasket	37-01384
Door Hinge	35-01450	Door Hinge	35-01450
Drain Line Heater	17-00404 (115V)	Drain Line Heater	17-00404(115V), 17-09063(220V)
Drier	09-09171	Drier	09-09171
Door Handle	35-01612	Door Handle	35-01612
Electronic Controller	19-14243 (115V) 19-14242 (220V)	Electronic Controller	19-14243 (115V) 19-14242 (220V)
Box sensor (T1)	19-14244	Box sensor (T1)	19-14244
Evaporator Sensor (T2)	19-14245	Evaporator Sensor (T2)	19-14245
Evaporator Coil	07-13288	Evaporator Coil	07-13288
Evaporator Fan Guard	25-01382	Evaporator Fan Guard	25-01382
Evaporator Fan Motor	13-13286 (115V)	Evaporator Fan Motor	13-13286
Expansion valve	09-09757	Expansion valve	09-09757
Self ballasted LED Lamp	23-01929	Self ballasted LED Lamp	23-01931
Front Glass	31-02470	Front Glass	31-03462
Heater Safety Control	19-01307	Heater Safety Control	19-01307
Lamp Switch (Toggle)	19-13118	Lamp Switch (Toggle)	19-13118
Leg Leveler, each	27-00592	Leg Leveler, each	27-00592
<b>Pilaster 24"</b>	33-01488	Shelf, Lower L.H	33-01399
Pilaster Clips	33-01011	Shelf, Upper L.H.	33-01398
Plastic Drain Assy	11-01759		
Power Cord	21-00312		
Rocker Switch	23-01673	Rocker Switch	23-01673
Shelf,	33-01721		

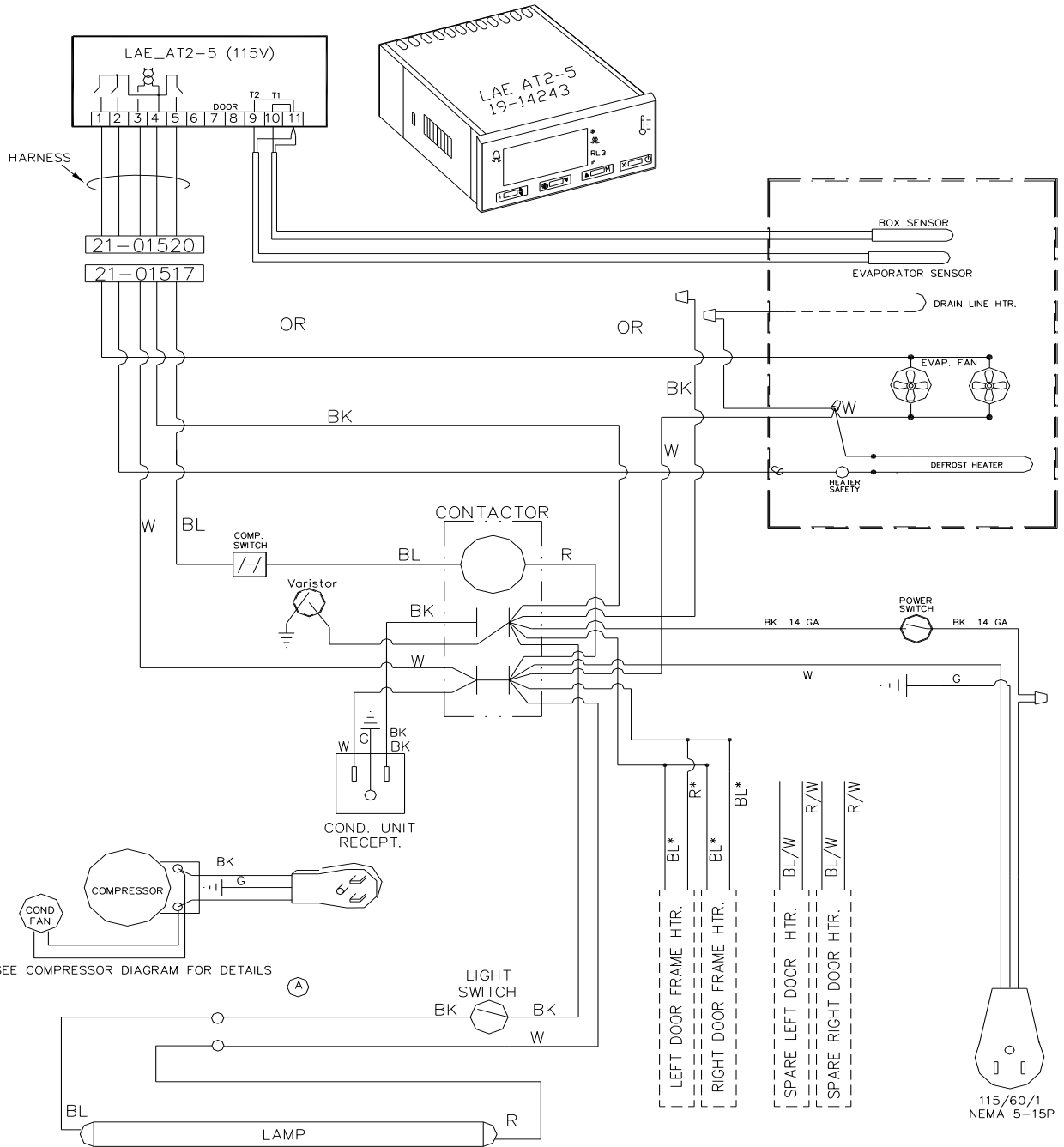
## SALE AND DISPOSAL

### OWNER RESPONSIBILITY

If you sell or give away your Master-Bilt® cabinet 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) 684-8988.

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





REVISIONS			PART NO. 065-90001	MODEL(S) FIP-60
A	Replaced flourescent bulb w/ led replacement	11/7/16		

