MASTER-BILT®
Refrigeration Solutions

GEL-6,9,12

Installation & Operations Manual

Master-Bilt Products
908 Highway 15 North
New Albany, MS 38652
Phone: (800) 684-8988

PN 018-90000
Rev 01-09-12

TABLE OF CONTENTS

INTRODUCTION

Thank you for purchasing a Master-Bilt cabinet. This manual contains important instructions for installing, using, and servicing a Master-Bilt **GEL** 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 **GEL** 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. It is not uncommon in a newly constructed store for the temperature and humidity to be above design conditions. These excessive conditions may produce sweating in the case until the store is operational and the ambient environment is more desirable.

The Master-Bilt **GEL** should not be positioned where it is directly exposed to rays of the sun or near a direct source of radiant heat or air flow. No HVAC return or supply air ducts may be located near case openings. This will adversely affect the case air flow and will result in poor performance. Do not open windows or doors that will affect the case air flow. The maximum air velocity near the case is 30 FPM.

This case is designed to be open to the front (customer side) of the case and open at the rear (server side) of the case. This case should not be placed against a wall that closes off the front or the rear of the case.

To comply with sanitation requirements; the cabinet must be sealed to the building floor with NSF Listed Silicone Sealant or mounted on 6" (Minimum) legs or casters."

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:

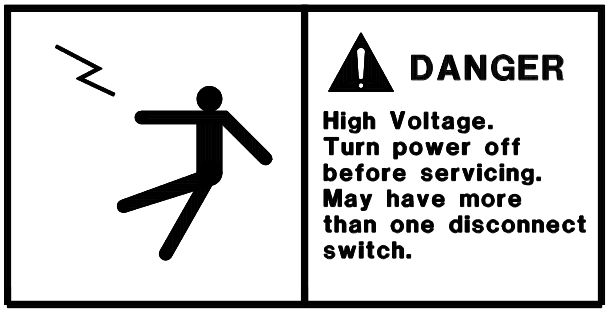
DANGER: Severe injury or death will occur if you ignore the message.

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

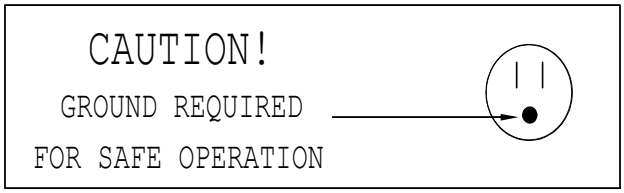
CAUTION: Minor injury or damage to your cabinet can occur if you ignore the message.

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.



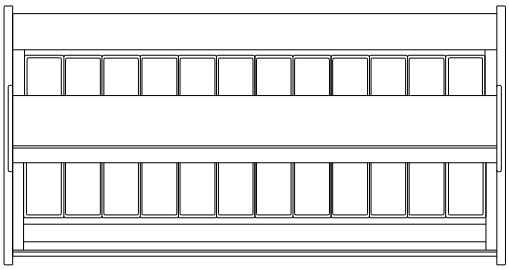
This label is attached to the cabinet power cord on models with a power cord.

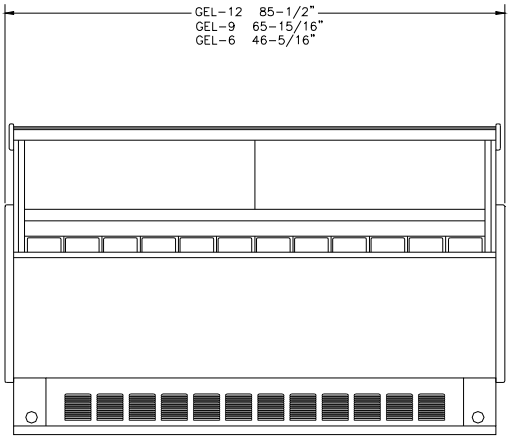
PRE-INSTALLATION INSTRUCTIONS

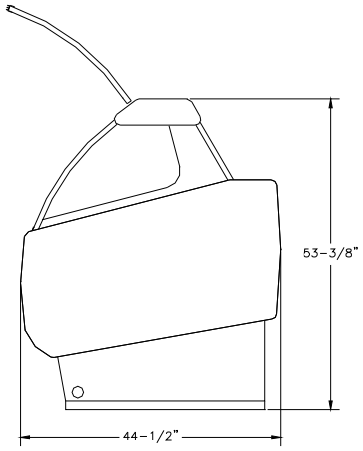
INSPECTION FOR SHIPPING DAMAGE

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 4 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.

NOTICE TO STORE OWNERS / MANAGERS

WARNING!

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 cabinet, an immediate investigation should be made by qualified personnel to determine the source of the moisture or liquid. The investigation should determine if the cabinet is malfunctioning or if there is a drainpipe leaking.

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

To clean the interior of the cabinet, the condensing unit and power to the merchandiser fans, lights, 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, Pans, etc. should be removed and cleaned separately. For cleaning the air discharge honey comb in the back wall. Romove the honey comb retainer, that's hold the honey comb in place, by unscrewing all the thrump scews. Gently pull out all the honey combs. Wash with hot warm water only and carefully replace it back. Be sure the honey combs is dry before putting it back inplace to provent from ice build up blocking the air flow.

The interior (as well as the exterior) of the cabinet 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 cabinet.*** 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 unnessarily 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 started 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.

Cabinet Monthly Checklist

1. Check condenser coil, clean if necessary.
2. Check service valve packing 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 for proper operation sequence in normal refrigeration cycle and defrost cycle (when applicable).

EXTERNAL CLEANING

Clean the front and side glass panels, and the end panels and serving surfaces with warm water and a mild detergent. Never use steel wool, abrasives, glass paper, or similar products. Never use acids, chlorines, ammonia, etc. as it could damage the cabinet surface.

WEEKLY DEFROSTING

For enhanced performance and efficiency, the Master-Bilt GEL series should be defrosted weekly for an extended period (at least twelve hours). To achieve this defrost, the cabinet should have a manual defrost first. Press and hold the button labeled “MAN DEF” for ten seconds on the control. (See the section of this manual labeled ELECTRONIC REFRIGERATION CONTROL). After the cabinet starts a defrost cycle, wait about 15 minutes, then disconnect the power supply to the cabinet and let the cabinet stand for this prolonged period. This will ensure that all ice has been defrosted and drained from the evaporator and storage area.

MECHANICAL

Remove front and rear 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.

Check that all service valves (2) are open. The springs are secured for shipping by either tightening bolts. Loosen the hold-down bolts so that the compressor floats freely. Check all refrigeration lines and electrical conduit for rubbing or chaffing, paying particular attention to area where lines enter the cabinet.

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.

ELECTRICAL

WARNING

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 the data label to determine proper line and fuse or circuit breaker size. Check power supply for low voltage. If voltage reads “230” with no load, and it drops below “207” 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 cabinet to prevent another appliance blowing the fuse or breaker, causing loss of product.

IMPORTANT

This cabinet is pre-wired internally for separate 115 and 230-volt circuits. “Tapping” or feeding the 115-volt circuit from 230-volt supply may result in overloaded circuit breakers or blown fuses and damage to electrical system, thereby voiding the warranty!

The cabinet should be grounded!

IMPORTANT

This cabinet will require a separate 115V circuit for the condensate drain pan unless the drain will be piped to a floor drain.

HOT GAS REFRIGERANT PIPING

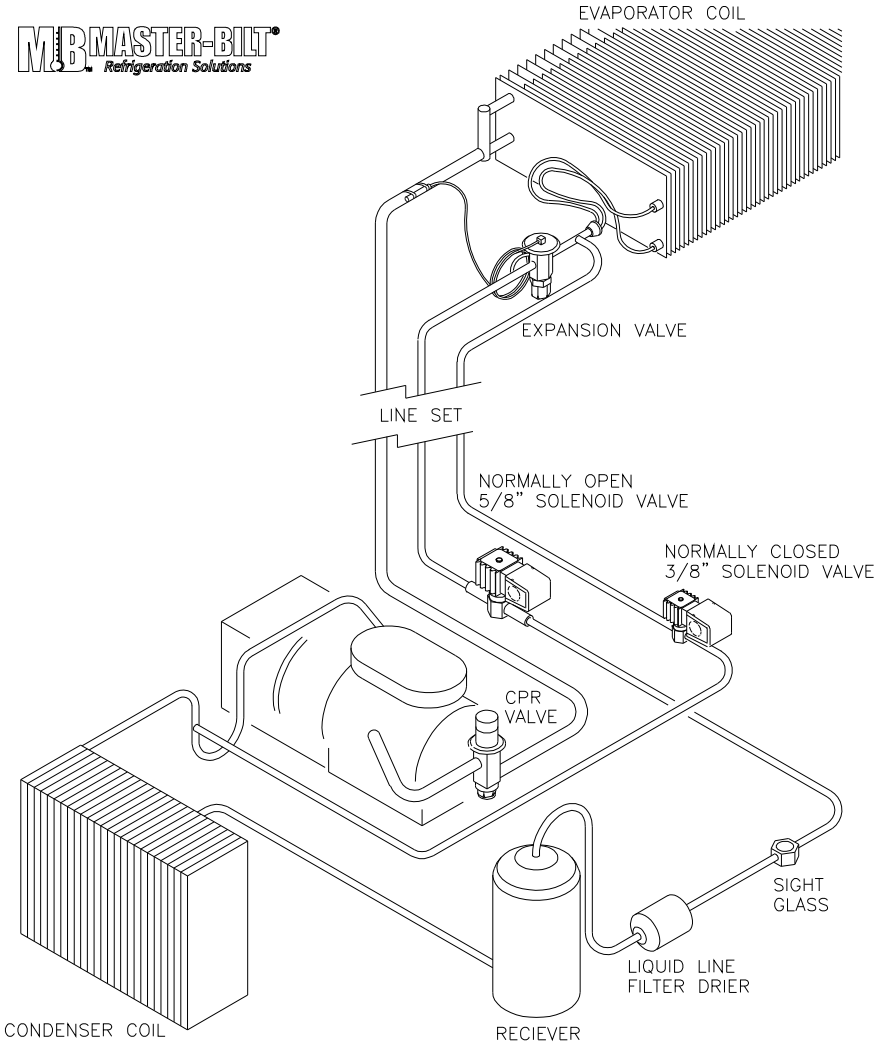
The Master-Bilt GEL series of cabinets is equipped with a hot gas defrost. This involves some extra piping from an electrical or air defrost system.

The diagrams here show only one condensing unit and one set of connection points at the evaporator. It should be noted, however, that the GEL-9 and GEL-12 have two condensing units, each unit having evaporator connection points at each end of the evaporator.

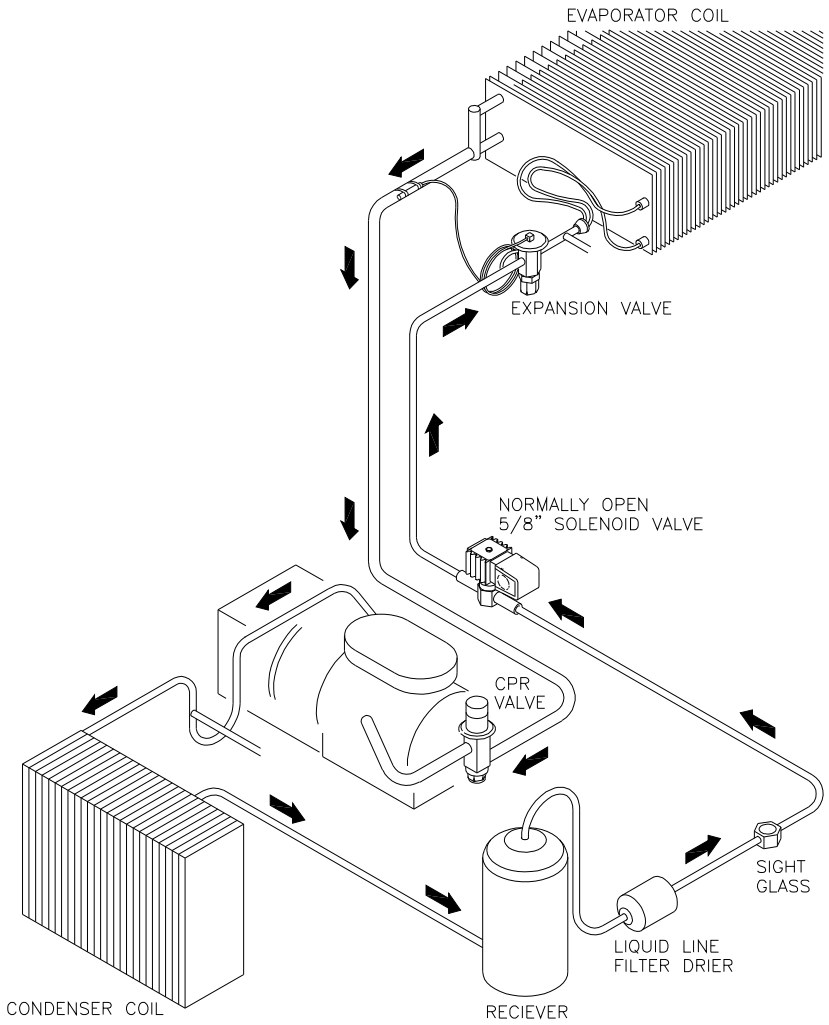
There are two solenoid valves. The 3/8" solenoid valve is normally closed and the 5/8" solenoid valve is normally open.

During a normal refrigeration cycle the 3/8" valve is closed, the 5/8" valve is open and refrigerant is allowed to flow through the condenser coil and the expansion valve before flowing through the evaporator coil. See the figure on the next page.

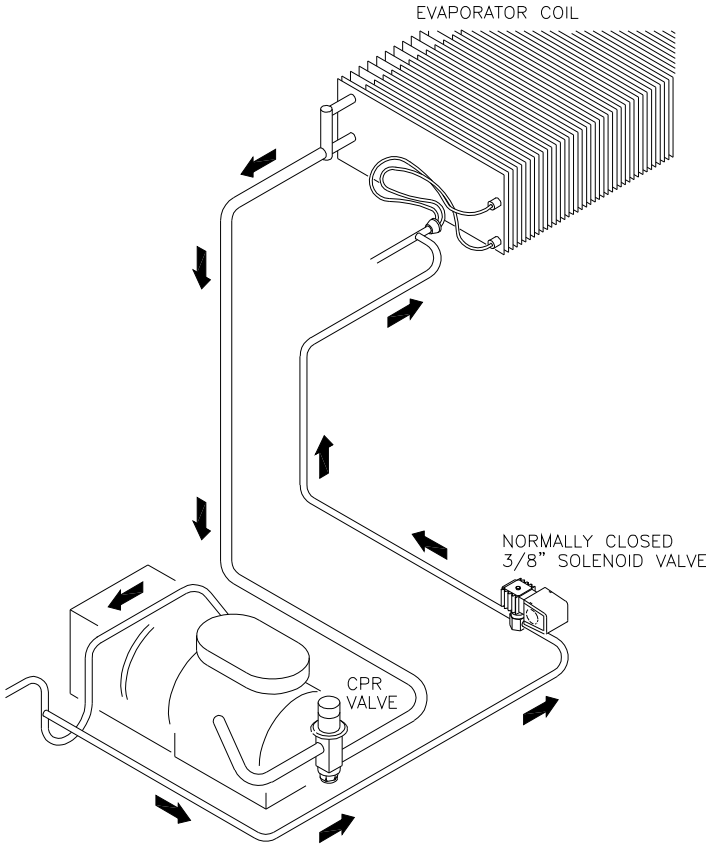
During a defrost cycle, both valves are energized. The 3/8" valve opens, the 5/8" valve closes, the condenser coil and the expansion valve are bypassed and "hot gas" is introduced to the evaporator coil for defrosting. See the figure on the next page.



GEL PIPING SCHEMATIC



NORMAL REFRIGERATION CYCLE
SOLENOID VALVES NOT ENERGIZED



HOT GAS DEFROST CYCLE
SOLENOID VALVES ENERGIZED

MASTER-BILT ELECTRONIC REFRIGERATION CONTROL

DESCRIPTION

Fig.1 — Front panel

i Info / Setpoint button.

Manual defrost / Decrease button.

INDICATIONS

Thermostat output

Fan output

RL3 Auxiliary output

II° Activation of 2nd parameter set

Alarm

M Increase / manual activation button.

Exit / Stand-by button.

OPERATION

DISPLAY

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

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

INFO MENU

The information available in this menu is:

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

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 constantly 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 4 defrost per day. The defrost scheme can be re-set the for special applications. During Hot-gas defrost the display will show dEF and the defrost LED indicator on. The control begins timing the defrost when power is turned on. Four defrost per day means it will occur every 6 hours. To have defrost occur at 8am, 2pm, 8pm, and 2am then power up at one of these four times.

MANUAL DEFROST

Hot-gas Defrosting may also be induced manually by keeping the defrost button for 3 seconds. Once defrost has started, the controller 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 ✕+i for 5 seconds.
- With button ▼ or ▲ select the parameter to be modified.
- Press button i to display the value.
- By keeping button i pressed, use button ▼ or ▲ to set the desired value.
- When button i 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	Factory Setting
SP	Temperature Set Point	SPL…SPH	-10°F
HYS	Temperature Differential	1 to 255°F	7°
SPL	Minimum Temperature limit setpoint	-50…SPH	-20°F
SPH	Maximum Temperature limit setpoint	SPH…120°	15°F
AHA	High Temperature alarm	-50…120°	30°F
ALA	Low Temperature Alarm	50…120°	-40F
ATD	Temperature Alarm Delay	0…120min	30min
DFR	Number of Defrost Cycle per 24hr	0…24	4/day
DLI	Defrost Termination Temperature	-50…120°	55°F
DTO	Maximum Defrost Duration	1…120min	20min

ELECTRICAL CONNECTIONS

The controller is provided with screw terminal block to connect cables with a cross section up to 2,5 mm^2. 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.

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 front 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. Cabinet not cycling – coil blocked with frost:
    A. Defective temperature controller.
    B. Refrigerant overcharged.
    C. Evaporator Fan Motor defective.
    D. Hot gas defrost duration not long enough or too few defrosts.
    E. Condenser clogged.
    F. Condenser fan motor defective.
    G. Hot gas solenoid valve defective

5. Copressor starts and runs – but cycles on overload:
    A. Low voltage
    B. Relay defective.
    C. Overload defective.

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 sight glass for proper refrigerant charge, if provided.

E. Check system for proper defrost settings and operation.

F. Check condensing unit for vibrating or rubbing tubing. Dampen and clamp as required.

G. All valves should be completely opened counter-clockwise.

H. Check packing nuts on all service valves.

I. Replace all service valve caps and latch unit covers.

MASTER-BILT PART LIST

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

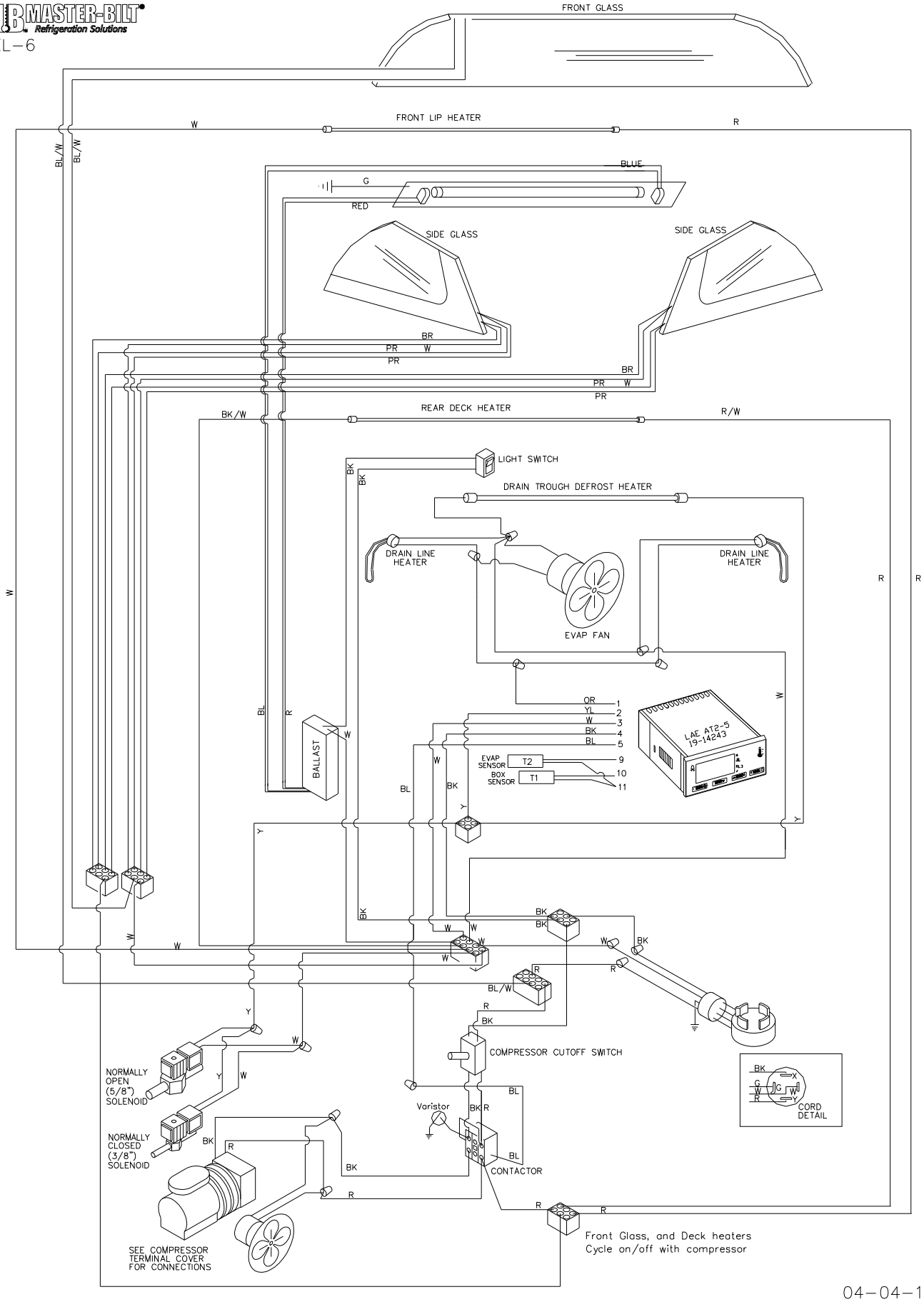
Description	GEL-6	GEL-9	GEL-12
Ballast	23-01709	23-01704	23-01704
36” Bulb/Lamp F25T8	23-01577		23-01577(2)
24” Bulb/Lamp F32T8		23-01576 (2)	
Bulb Holder	23-50562(2)	23-50562(4)	23-50562(4)
Bulb Shield	25-01274	25-01274 (2)	25-01274 (2)
Drain Trough Heater	17-09435	17-09436	17-09437
Compressor	03-14985	03-14985 (2)	03-14985 (2)
Anti-Sweat Heater Front	17-09432	17-09433	17-09434
Anti-Sweat Heater Rear Deck	17-09432	17-09433	17-09434
Condenser Coil	07-13076	07-13076 (2)	07-13076 (2)
Condenser Fan Blade	15-13093	15-13093	15-13093
Condenser Fan Motor	13-01283	13-01283	13-01283
Electronic Controller	19-14243	19-14243	19-14243
Cabinet Sensor (T1)	19-14244	19-14244	19-14244
Defrsot Sensor (T2)	19-14245	19-14245	19-14245
CRO Valve	09-00992	09-00992	09-00992
Drier	09-09171	09-09171	09-09171
Evaporator Coil	07-13313	07-13314	07-13315
Evaporator Motor/Blade Assy	13-13199	13-13199	13-13199
3/8” Solenoid Valve	09-09645	09-09645	09-09645
5/8” (Hot Gas) Solenoid Valve	09-09826	09-09826	09-09826
Expansion Valve	09-09453	09-09453	09-09453
Lamp Switch	23-50793	23-50793	23-50793
Receiver Tank	09-01162	09-01162	09-01162
Contactor	19-13934	19-13934 (2)	19-13934 (2)
Time Delay Relay		19-13707	19-13707

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.

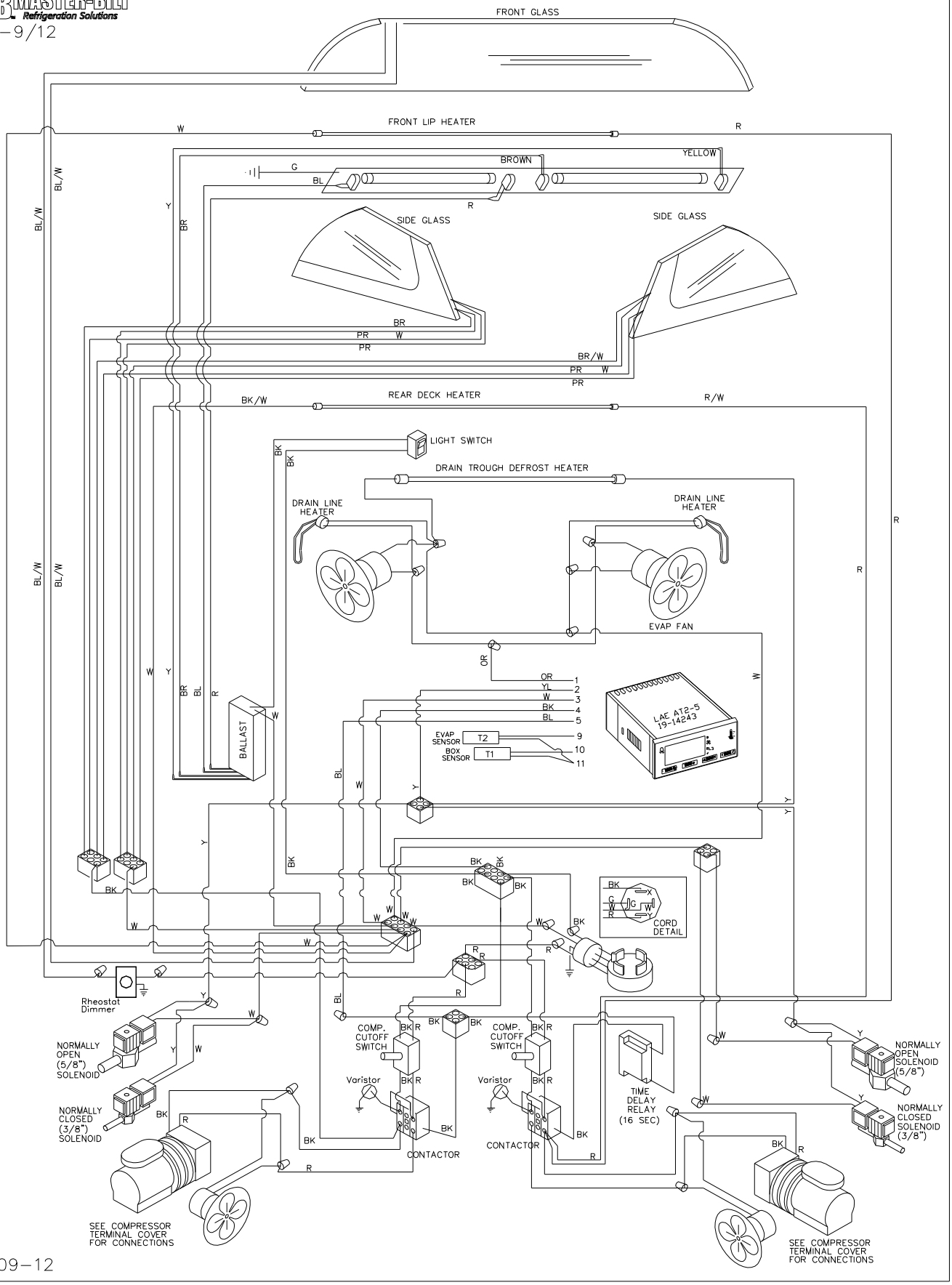
The customer service department at Master-Bilt should be contacted at the time of sale or disposal of your cabinet so records may be kept of its new location.


FRONT GLASS
FRONT LIP HEATER
W
R
BL/W
BL/W
BLUE
G
RED
SIDE GLASS
SIDE GLASS
BR
PR
W
PR
BR
PR
W
PR
REAR DECK HEATER
BK/W
R/W
LIGHT SWITCH
BK
BK
DRAIN TROUGH DEFROST HEATER
DRAIN LINE HEATER
DRAIN LINE HEATER
EVAP FAN
W
R
R
BL
R
BALLAST
W
OR 1
YL 2
W 3
BK 4
BL 5
EVAP SENSOR T2 9
BOX SENSOR T1 10
11
LAE AT2-5 19-14243
W
BL
BK
Y
Y
Y
BK
BK
BK
W
W
W
W
W
W
W
BK
R
R
BL/W
R
BK
Y
W
COMPRESSOR CUTOFF SWITCH
NORMALLY OPEN (5/8") SOLENOID
Y
W
BL
Varistor
BK R
NORMALLY CLOSED (3/8") SOLENOID
BK
R
BK
R
BL
CONTACTOR
R
R
BK
G
W
R
X
G
W
Y
CORD DETAIL
SEE COMPRESSOR TERMINAL COVER FOR CONNECTIONS
Front Glass, and Deck heaters
Cycle on/off with compressor

04-04-11

MASTER-BILT Refrigeration Solutions

GEL–9/12



01–09–12

MASTER-BILT Refrigeration Solutions