



Electronic Controller Systems

The Next
Degree Of Control

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Take refrigeration control to the next degree with Master-Bilt's electronic controller systems. The unbeatable combination of energy efficiency, accuracy and reliability gives this technology a clear advantage over traditional systems. Now you can monitor practically all functions of your refrigeration system and diagnose problems from one panel interface or remotely by internet. Controllers are standard equipment on many cabinets and merchandisers as well as an option in our walk-in refrigeration systems.

Benefits of Electronic Controller Boards

Increased Reliability

Because many mechanical parts are replaced with solid state technology, the reliability of the refrigeration system is greatly increased. Fewer parts also mean fewer potential problems and service calls. Downtime, when necessary, is greatly reduced.

Convenience

All control board functions and diagnostics are accessed through a simple-to-use panel display mounted on the cabinet or on the walk-in evaporator. An optional remote panel display is available for walk-in coolers and freezers.

Accuracy

Electronic controller board technology allows a vastly higher degree of precision over conventional methods when adjusting defrost and temperature settings.

Quicker Installation

Installation time is reduced because all the electrical components are pre-installed and tested at the factory. Because field assembly is minimal, you save on installation costs and wiring time as well.

Pre-set for Common Applications

Common industry temperature and defrost presets are already programmed into the control board. Just hook up the electrical supply and you're in business.

Demand Defrost: A Giant Leap in Efficiency

Eliminate unnecessary defrosts with Master-Bilt's revolutionary demand defrost technology featured in the Master Controller Reverse Cycle Defrost system.

Demand defrost offers a more efficient alternative to electric defrost. With most mechanically-based low temp refrigeration systems, electric heaters installed on evaporator coils are used to melt accumulated frost. The heaters are preset to engage at certain times of the day regardless of the amount of frost buildup on the coil.

Frost accumulation, however, is not always consistent. It is influenced by changeable conditions

like ambient temperature, humidity and product load. If a defrost is initiated before a significant amount of frost accumulates, the result is wasted energy.

Conversely, demand defrost constantly checks for the buildup of ice on an evaporator coil to determine if defrosting is required. If a defrost is needed, the standard reverse cycle defrost method is initiated. For more on reverse cycle defrost, see page 6.

Our extensive laboratory tests indicate that many unnecessary defrosts can be eliminated and electricity consumption reduced.

Standard Controllers For Cabinets

Controller Features

- Controllers are standard on many models. Consult individual spec sheets or operations manuals to determine if equipped.
- Solid state control for increased product reliability
- Digitally displays temperature, time and built-in diagnostics
- Regulates room temperature and defrost settings
- Pre-programmed settings for common industry applications
- Time defrost
- Audible and visual alarms
- Three relay outputs: compressor, defrost and evaporator fan
- Input voltage: 115V/208V/230V/1PH/50Hz/60Hz

Mechanical Parts Eliminated

- Room thermostat
- Defrost termination and fan delay control
- Defrost timer
- Compressor contactor when the freezer amp draw is less than 16 amp, single phase
- Digital temperature display or other temperature indicator

Parts Added (Factory-mounted)

- Controller with LED readout and setup keys
- Two solid state temperature sensors

Panel Interface Features*



Info/Setpoint button

Manual defrost/Decrease button

Manual activation/Increase button

Exit/Stand-by button

Thermostat output. Light next to this symbol indicates thermostat is in operation.

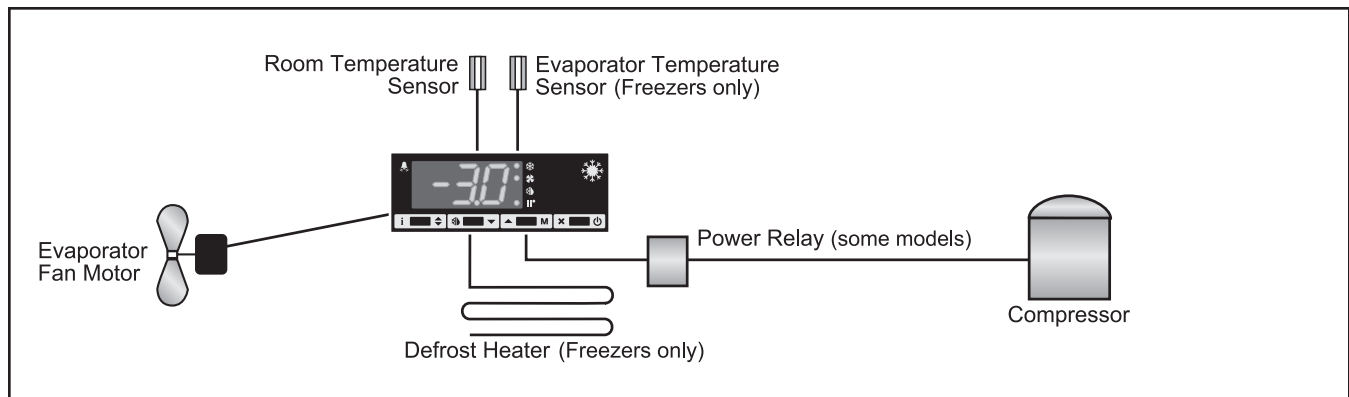
Fan output. Light indicates fans are running.

Defrost output. Light indicates cabinet is in defrost mode.

Alarm

**Panel interface layout may vary.*

Cabinet System Diagram



Optional Master Controller Reverse Cycle Defrost For Walk-ins

Eco-Friendly System
Reduces Refrigerant Use

Maintaining proper, consistent temperature in a walk-in is vital for protecting perishable items. However, when evaporator coils are blocked due to ice build-up, they lose the ability to transfer heat properly. Temperatures in your refrigerated space can then rise and threaten stored products.

The Master Controller Reverse Cycle Defrost (RCD) system completely removes frost build-up in coils and works much faster than electric defrost heaters. Its patented design also saves up to 27% more energy than a traditional mechanical system.

Master Controller RCD is part of a Master-Bilt refrigeration system which also includes either a remote condensing unit or a multi-compressor system and one or more evaporator coils as well as a reverse cycle valve mounted to a condensing unit.

The Master Controller RCD system is highly efficient since it regulates an electric expansion valve in response to evaporator superheat and return air temperature. **It also features Demand Defrost technology which initiates reverse cycle defrosts only as needed allowing further energy savings.**

In addition to energy savings, the Master Controller RCD is designed to reduce installation labor and material costs:

- All the electrical components are pre-wired and tested at the factory
- No line voltage is required between evaporator coils and condensing units (two low voltage circuits are required to operate the Reverse Cycle Defrost valve and the compressor relay at the condensing unit, thermostat wire recommended)
- The walk-in doesn't have to be at operating temperature to confirm or set superheat (pre-programmed)
- No need to install a thermostat and solenoid or set a defrost schedule

In some cases, the savings on the wiring installation alone can cover the cost of the Master Controller Reverse Cycle Defrost.

Mechanical Parts Eliminated

- Room thermostat
- Defrost timer
- Thermostatic expansion valve
- Defrost termination and fan delay controls
- Defrost heater contactor
- Liquid receiver
- Head pressure control valve or condenser fan cycling control

Parts Added (Factory-mounted)

- Digital control board
- Three solid state temperature sensors
- Electric expansion valve
- Pressure transducer
- 24V transformer
- Optional remote display with communication cable
- External relay to control liquid line solenoid valve or compressor contactor
- Optional remote data logging/control system-

System Functions

- Pre-programmed settings for common industry applications
- Controls room temperature and defrost
- Electric expansion valve is modulated with evaporator superheat
- Three relay outputs: defrost heater (20A), evaporator fan (10A) and alarm (5A)
- Digitally displays status data such as temperature and error codes
- Defrost is based either on a schedule like a conventional time clock or on demand defrost mode which defrosts only as needed. The factory preset is to demand defrost.
- Master/slave application for up to a total of six evaporators
- Remote display, setting and communication option
- Operating voltage: 24V

Master Controller Interfaces

With the Master Controller, settings may be adjusted on the panel mounted directly to the evaporator. An optional remote panel is also available and can be located on a walk-in wall or door.

The user-friendly optional remote interface adds convenience by letting you adjust settings without having to enter the walk-in. All setting adjustments and diagnostics are controlled with the up/down keys and the enter key.

Both Master Controller interfaces feature two levels of access to system settings. The user level allows the adjusting of the room temperature set point while the technician's level opens access to all other temperature settings and operating parameters.

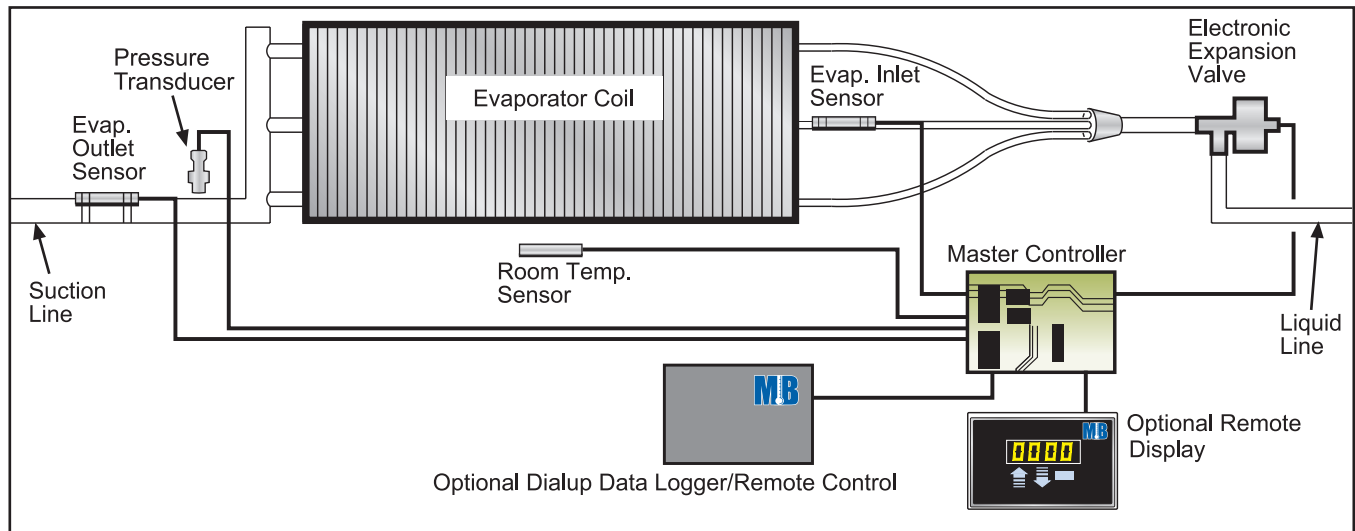


The Master Controller panel (shown above with housing removed) is mounted to the evaporator.



An optional remote panel (above) is also available.

Walk-in Master Controller System Diagram



Optional Master Controller Reverse Cycle Defrost For Walk-ins

Patented Process
Reduces Defrost Energy
Usage By Up To 80%

Reverse Cycle Defrost: Energy-Saving Innovation

Eliminate inefficient defrosts with Master-Bilt's patented* Reverse Cycle Defrost method. When the Master Controller's demand defrost determines a defrost is necessary, a reverse cycle valve installed on the refrigeration system's condensing unit is activated and the high temperature refrigerant flow is reversed. The refrigerant flows back through the evaporator coil heating it along its entire length and completely eliminates frost buildup.

Only a certain amount of the coil is heated by traditional defrost heaters, leaving ice deposits which weaken the evaporator's performance.

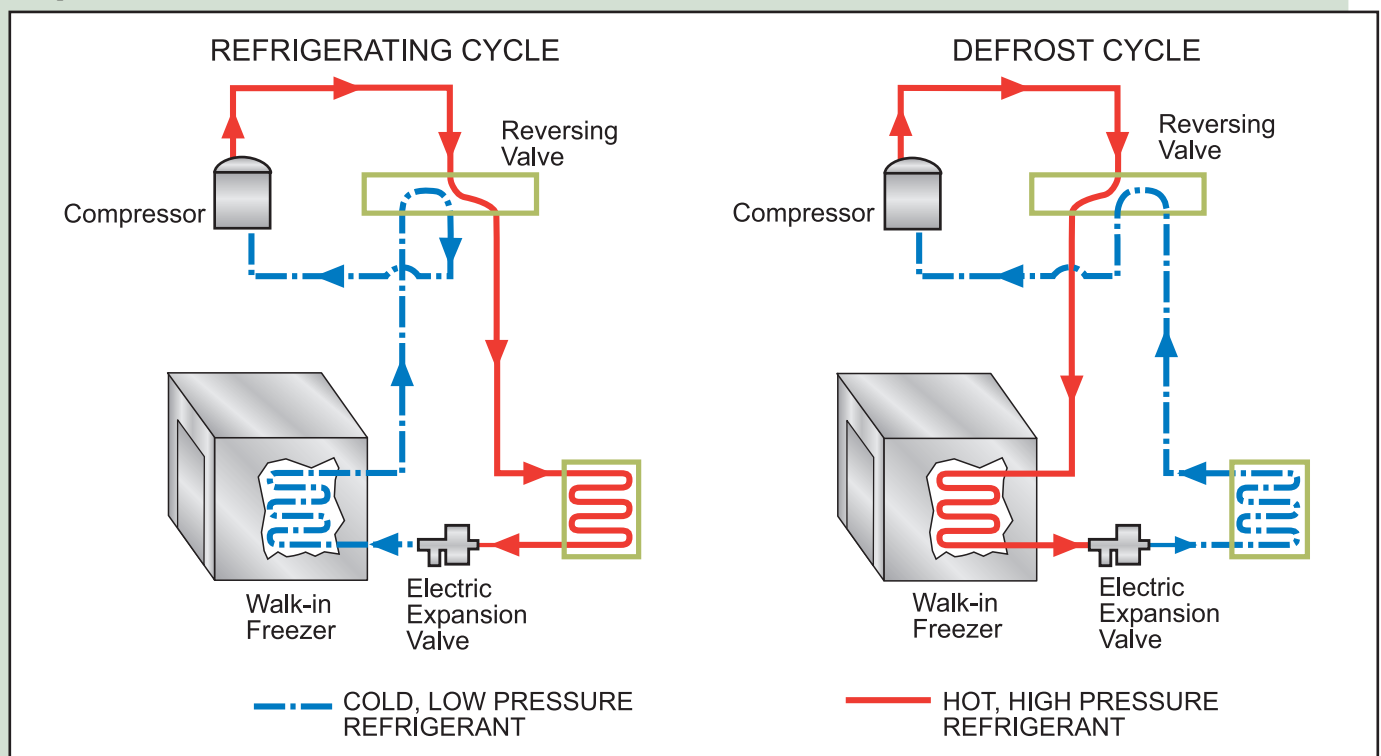
Reverse cycle technology offers several significant advantages. First of all, the process uses less energy than electric defrost heaters. **Reverse cycle reduces defrost energy usage by up to 80%.** This savings plus that gained from the demand defrost

feature and elimination of head pressure control valves dramatically reduces electrical bills.

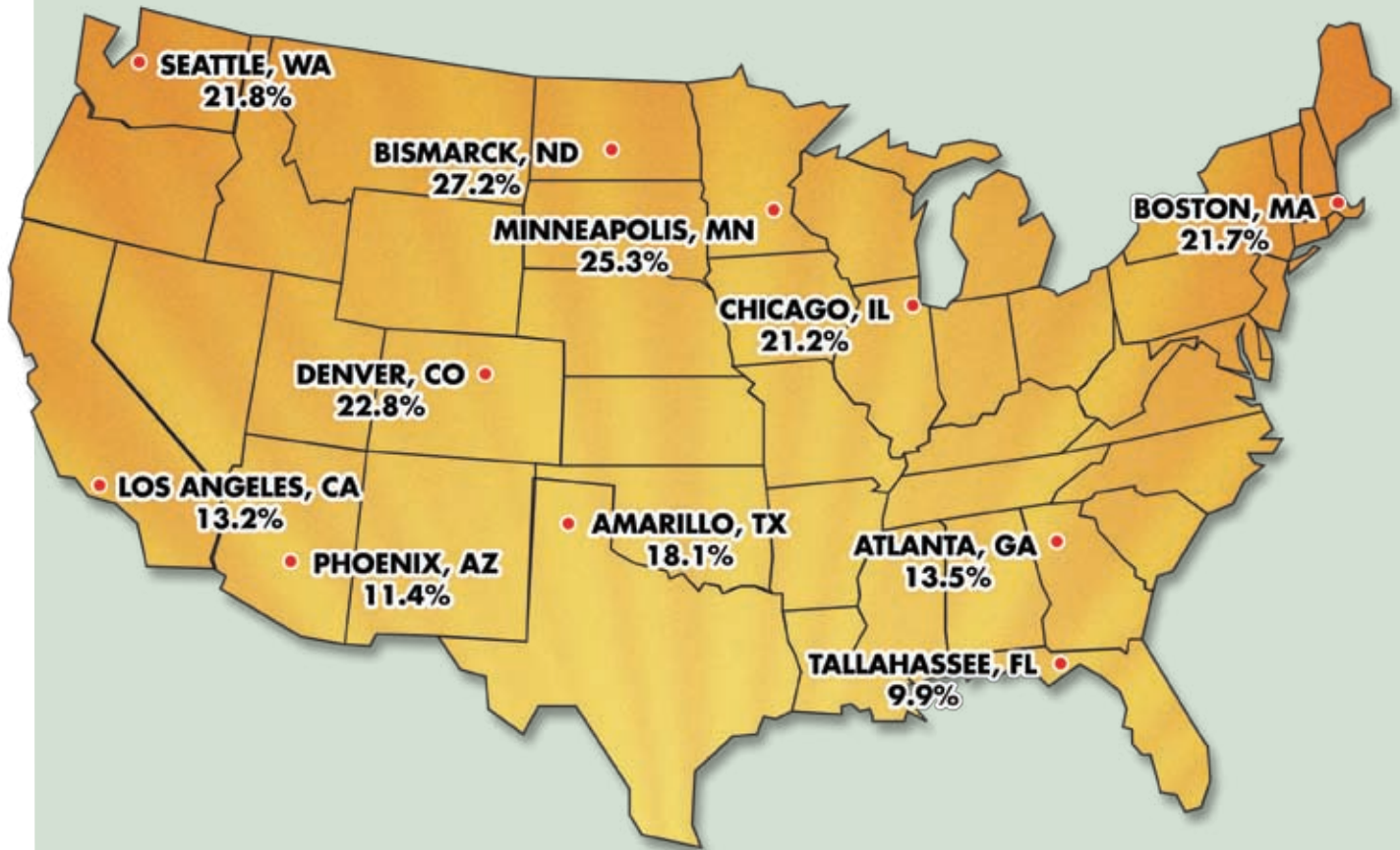
Reverse cycle eliminates not only the need for defrost heaters and head pressure control valves, but also check valves and expansion valves at the condenser. With reverse cycle, liquid receivers are also unneeded on most condensing units. Removing these components reduces the cost of the evaporator itself and saves on installation and wiring.

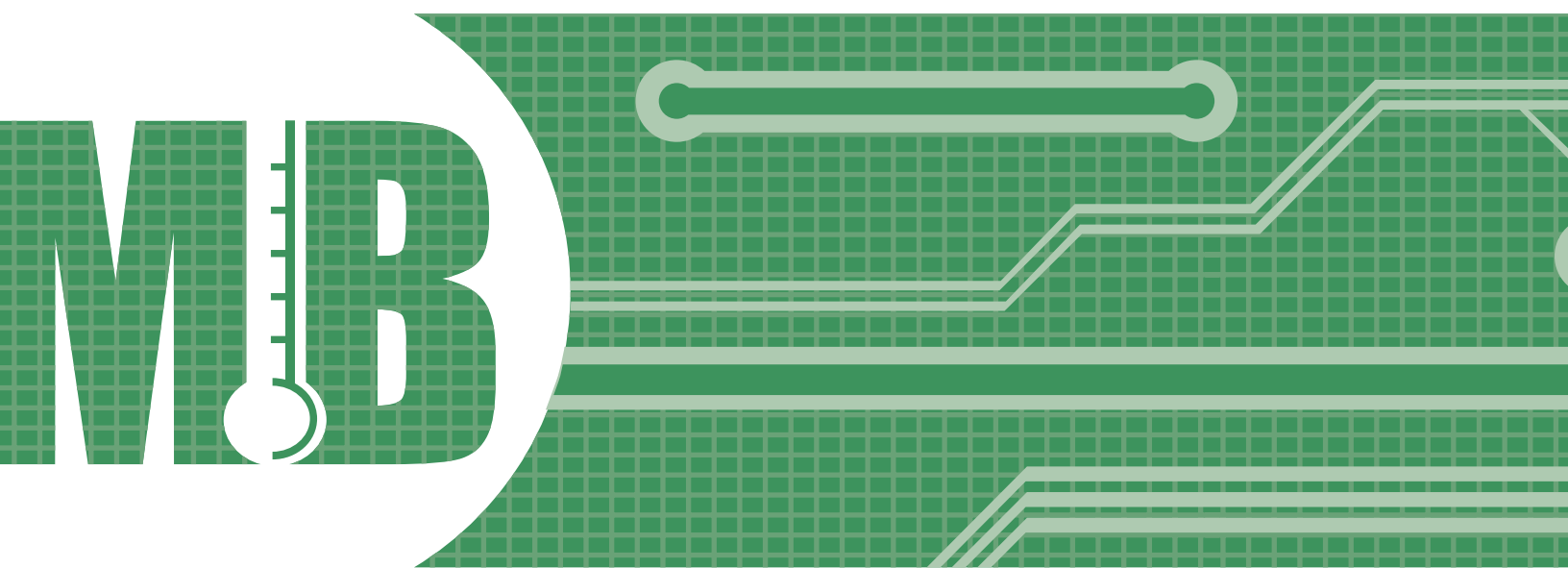
Defrost time is also greatly lessened. The average defrost time for a freezer with electric heaters is 20 to 30 minutes. Reverse cycle can perform a completely "clean" defrost in as little as 3 to 5 minutes in a freezer or 1½ to 2 minutes in a cooler. Because the defrost is so rapid, there's no noticeable increase in freezer temperature and the product temperature rise is also significantly less.

*U.S. patent no. 7,073,344



Master Controller Reverse Cycle Defrost Estimated Annual Energy Savings





For the latest product information and specifications go to www.master-bilt.com/products/products.htm.



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