

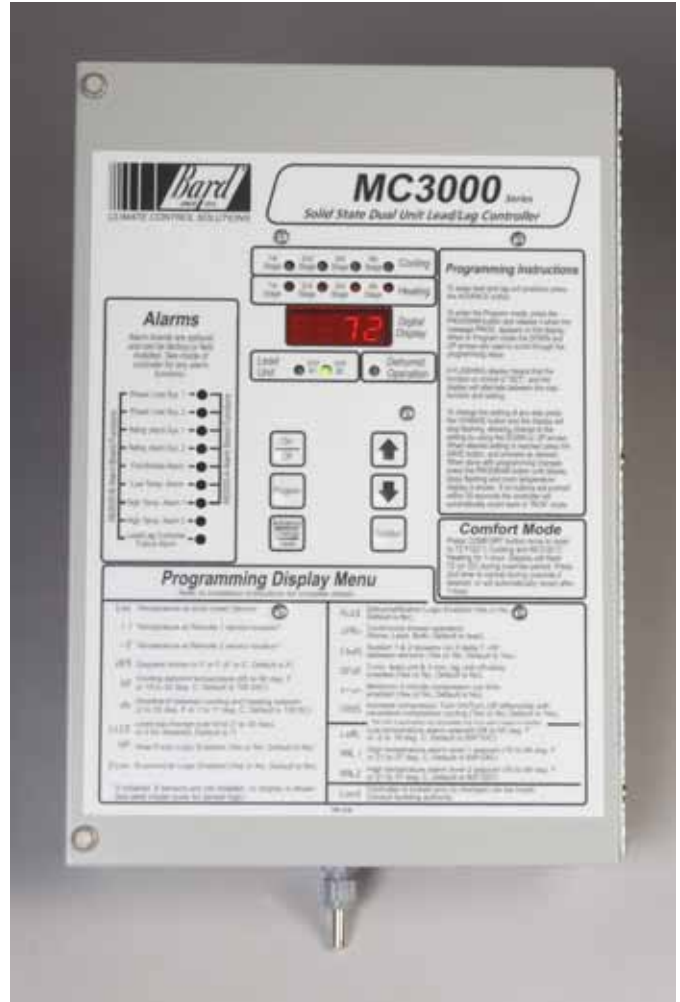


MC3000 Series Advanced Solid State Dual Unit Lead/Lag Controller

The MC3000 has 2 stages of cooling control available for each connected air conditioner. It is designed for systems with or without economizers or for systems with 2-stage or dual compressors. The 2nd stage available for each air conditioner permits complete and proper control when economizers are installed or when 2-stage or dual compressors are utilized, an important feature missing from other controller systems. With the addition of a simple 2 wire humidity controller as an input signal, it can provide electric reheat dehumidification circuit and can also be configured for use with heat pumps.

The MC3000, either in basic form or when equipped with optional alarm relay boards, is a fully functional controller with unique configurable capability. It replaces all dual unit controllers previously offered by Bard and other equipment suppliers. The MC3000 can be ordered as a basic controller only or factory equipped with one of two variations of alarm boards with varying amounts of alarm capabilities to fit the user's requirements.

If only the base controller is initially installed, it can be easily upgraded by simple snap-in of the alarm relay board and plug-in of the communication cable to the main controller board. This requires only the connection of the building alarm circuitry to the alarm relay outputs. Form C dry contact alarm relays are used, offering both NO and NC switching to meet the user's specific alarm protocol, providing complete flexibility to meet any user's requirements. All alarm actuations are individually indicated on the controller front panel, along with indication for active stages of cooling or heating, and which unit is currently "lead". A digital display indicates building temperature and is also used for all of the programming functions.



Key Design Features

Controller:

- Electronic (non-mercury) design
- Programmable
- Works with or without economizers
- Dehumidification control option
- Can be used with heat pumps

Alarm Boards:

- Can be specified with or without alarm boards
- Alarms boards can be added at any time
- Alarm circuits can be NO or NC logic

Ease of Installation:

- Powered by 24V from A/C units
- Phasing of 24V from units is not required
- Durable metal enclosure adequately sized for ease of conduit and wire installation

Certifications:

- Tested for FCC and CE requirements
- EN50082-2 Standard for Immunity
- EN55011 Standard for Emissions

Controller Models Available

- MC3000** Controller no alarms
- MC3000-A** Controller with Base Alarm Board
- MC3000-B** Controller with Enhanced Alarm Board

Alarm Board Add-Ons (Field-Installed)

- AB3000-A** Base Alarm Board
- AB3000-B** Enhanced Alarm Board



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Due to our continuous product improvement policy, all specifications subject to change without notice. Before purchasing this appliance, read important energy cost and efficiency information available from your retailer.

Feature Selection Guide	MC3000	MC3000-A	MC3000-B
2-unit lead/lag	Yes	Yes	Yes
Cooling stages (configured for non-economizer)	2	2	2
Cooling stages (configured for economizers) <i>See Note 3.</i>	4	4	4
Heating stages (configured for A/C with electric heat)	2	2	2
Heating stages (configured for Heat Pump)	4	4	4
Temperature control type	Electronic	Electronic	Electronic
Display (4 character .375" high LCD)	Digital	Digital	Digital
Stage "On" LED <i>(Includes 3rd & 4th Stages When Economizers Used)</i>	4 cool / 4 heat	4 cool / 4 heat	4 cool / 4 heat
Lead unit LED	Yes	Yes	Yes
Advance (switch) lead unit feature	Yes	Yes	Yes
One button comfort (72F for 1-hour) feature	Yes	Yes	Yes
Local sensor (standard with controller)	Yes	Yes	Yes
Remote sensors option (See Note 1 and 2)	2	2	2
Controller locking feature (prevents unauthorized changes)	Yes	Yes	Yes
Smoke/fire lockout circuit (immediate shutdown of controller & A/C)	Yes	Yes	Yes
Generator run feature (inhibits lag A/C unit operation)	Yes	Yes	Yes
Humidity control feature (requires optional sensor input)	Yes	Yes	Yes
Heat pump control feature	Yes	Yes	Yes
Selectable continuous fan control, lead-both-none	Yes	Yes	Yes
Both fans On @ 5F delta T between 2 sensors (selectable)	Yes	Yes	Yes
Control strategy to limit excessive compressor cycling	Yes	Yes	Yes
-48V backup power connection for emergency alarms	Yes	Yes	Yes
HVAC control relays convertible from NO to NC logic	Yes	Yes	Yes
20-gauge metal controller enclosure	Yes	Yes	Yes
Power loss alarm relay for both units	No	Yes	Yes
HP/LP refrigerant lockout alarm relay for both units	No	Yes	Yes
Smoke/fire alarm relay	No	Yes	Yes
Low temperature alarm thermostat and relay	No	Yes	Yes
High temperature #1 alarm thermostat and relay	No	Yes	Yes
Power loss alarm LED for both units	No	Yes	Yes
HP/LP refrigerant lockout LED for both units	No	Yes	Yes
Smoke/fire LED	No	Yes	Yes
Low temperature alarm LED	No	Yes	Yes
High temperature #1 alarm LED	No	Yes	Yes
High temperature #2 alarm relay	No	No	Yes
2nd stage cooling alarm relay	No	No	Yes
Controller failure alarm relay	No	No	Yes
Economizer relay (emergency vent strategy)	No	No	Yes
High temperature #2 alarm LED	No	No	Yes
Controller failure alarm LED	No	No	Yes

Note 1: Optional remote 25-foot space temperature sensors available, Bard PN 8612-023. Controller automatically detects any connected sensors.

Note 2: Multiple Sensor Control Strategy:

A. If only the standard local sensor is used, it will govern space temperature control along with low and high temperature alarm monitoring.

B. If 1 or 2 remote sensors are installed and connected, the temperature readout display and the building temperature are controlled to an average of connected sensors. If there is more than 10F difference from the highest to the lowest connected sensor, the actual control will be governed by the hottest sensor for cooling and the coldest sensor for heating.

Note 3: Also for use with A/C units that have either 2-stage compressors or units with 2 compressors.

Specifications/Features for Basic Controller

MC3000 Basic Controller

- Input power: 18 to 32VAC, 60/50Hz, power is supplied from A/C #1 and/or A/C #2
- Isolation circuitry: no line or low voltage phasing required
- Backup power: connection for -24VDC or -48VDC (-20 to -56V) maintains microprocessor operation, front panel indication, and alarm relay operation during commercial power outages
- Digital display: 4-character LCD
- Temperature display: F or C
- HVAC outputs: Form A (NO) relays (1A @ 24VAC)
- Cooling control stages: 2 for each A/C unit (4 total)
- Heating control stages: 1 for each A/C unit, 2 for each heat pump if so configured
- Dehumidification circuit: requires optional humidity controller as input signal
- Locking feature, allows controller to be "locked" so no unauthorized changes to programming can be made
- Operating temperature range: 0 to 120F (-18 to 49C)
- Storage temperature range: -20 to 140F (-29 to 60C)
- Temperature accuracy: +/- 1F from 60-85F (16-30C)
+/- 1% outside 60-85F
- Lead/lag changeover time: 0 to 30 days
- Timing accuracy: +/- 1%
- Inter-stage time delay: 10 seconds between stages
- Inter-stage differential: 4F (3C) for standard A/C mode
2F (1C) for economizer mode
- On-Off differential: 2F (1C) is standard, 4F (3C) when "excessive cycling" mode is enabled
- Cooling set point range: 65 to 90F (18 to 32C)
- Comfort setting-Cooling 72F, Heating 68F, for 1 hour
- Dead band (difference between cooling and heating set points): 2F to 20F (1C to 10C)
- Fire/smoke interface: standard NC circuit jumper, remove for connection to building system control, shuts down both A/C units immediately
- Generator run feature, inhibits lag A/C unit from operating if generator is operating (to limit amperage)
- Memory: EEPROM for set point and changeable parameters (maintains settings on power loss)
- Space temperature sensors: 1 local is standard, will accept up to 2 optional 25-foot remote sensors. When multiple sensors are used temperatures are averaged
- LEDs for basic controller: Lead unit, Cooling stages 1 through 4, Heating stages 1 through 4, Dehumidification operation
- Six (6) Push-button controls: On/Off switch-Change lead unit-Increase and Decrease set points-Program/Save-Comfort
- Controller Enclosure: 20-gauge pre-painted steel, 9.25"W x 13.50"H x 3.00"D, hinged cover, thirteen (13) .875" diameter electrical knockouts

Specifications/Features for Alarm Boards

MC3000A w/Optional Base Alarm Board (Inputs/Outputs)

- Refrigerant alarm from A/C #1, input
- Refrigerant alarm from A/C #2, input
- Power loss alarm A/C #1, Form C (SPDT) output
- Power loss alarm A/C #2, Form C (SPDT) output
- Smoke/fire alarm, Form C (SPDT) output
- Low temperature alarm, Form C (SPDT) output
- 1st stage (H1) high temperature alarm, Form C (SPDT) output
- Refrigerant system lockout A/C #1, Form C (SPDT) output
- Refrigerant system lockout A/C #2, Form C (SPDT) output

MC3000B w/Enhanced Version Alarm Board (Additional Outputs)

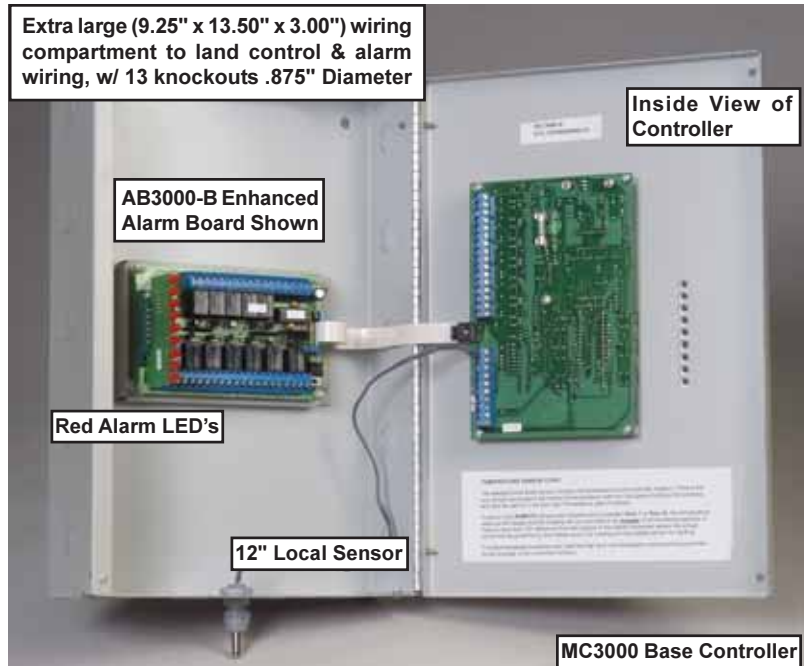
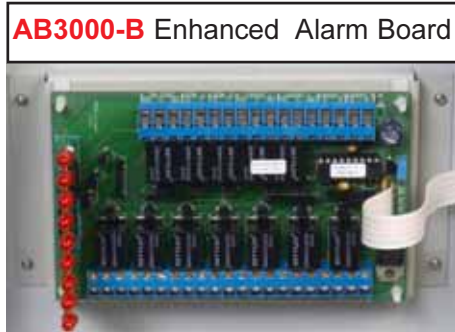
- All alarm inputs/outputs same as base version above, plus:
- 2nd stage (H2) high temperature alarm, Form C (SPDT) output
- 2nd stage cooling alarm, Form C (SPDT) output
- Controller system failure alarm, Form C (SPDT) output
- Emergency ventilation economizer outputs, Form A (SPNO) for both A/C #1 and A/C #2
 - Emergency ventilation option for either air conditioner with refrigerant alarm @ H1 high temp alarm set point
 - Emergency ventilation option for both air conditioners @ H2 high temp alarm set point

Alarm relays can be wired for NO (close on alarm) or NC (open on alarm) strategy.

Alarm relays can be used individually if there are enough available building alarm points, or can be arranged into smaller groups or even a single group so that all alarm capabilities can be utilized.

When multiple alarms are grouped together and issued as a single alarm, there will be no off-site indication of which specific problem may have occurred, only that one of the alarms in the group has been triggered. The individual alarm problem will be displayed on the LED display on face of the controller.

Note: All alarm/output relays are dry contacts rated 1A @ 24VAC, 120VAC, 150VAC



General Programming Overview

MC3000 Controller Buttons and Function

On/Off Button

1. Press and release the On/Off button to turn On controller, 4-character display will illuminate and Lead unit LED will light.
2. Press and release the On/Off button to turn Off controller. Controller will go dark and A/C units will stop.

Comfort Button

1. Press and release the Comfort button to change the Cooling Set Point to 72F and the Heating Set Point to 68F for a period of 1 hour.
2. Set Points will return to the programmed settings automatically after 1 hour.
3. Pressing the Comfort button during the 1 hour period will deactivate the Set Point change.
4. The temperature display will flash the current temperature while in override mode.

Program Button

1. Press the Program button and release it when the message "Prog" appears on the display.
2. Refer to Programming Instructions and follow these commands to change from Default settings.

Advance/Change/Save Button

1. Press and release the Advance button to swap lead and lag unit positions.
2. When in Program mode the Down and Up buttons are used to scroll through the programming steps.
3. A flashing display means that the particular function of that programming step is "set", and the display will alternate between the step function and the setting.
4. To change the setting press the Change button and the display will stop flashing, allowing change to the setting.
5. Use Down or Up arrows to change setting as desired, and press the Save button and proceed as desired.
6. When done with programming changes press the Program button until display stops flashing and room temperature is shown.

Up and Down Buttons

These buttons are used to change the settings in conjunction with the Advance/Change/Save button when in programming mode.

Controller Programmable Features and Default Settings

Feature Description	Range/Choice	Default
Cooling Set Point	65F to 90F (18C to 32C)	75F (24C)
Dead Band (difference between Cooling and Heating Set Points)	2F to 20F (1C to 10C)	10F (5C)
Lead/Lag Changeover Time	0 to 30 Days	7
Economizer Equipped	Yes/No	No
Heat Pump System	Yes/No	No
Humidistat Logic Enable (Requires optional humidity controller)	Yes/No	No
Continuous Blower Operation	None/Lead/Both	Lead
Continuous Blower (Both units) on 5F Delta T (Requires 1 remote sensor)	Yes/No	Yes
Minimum Compressor Off-Delay (3-minutes Lead, 4-minutes Lag)	Yes/No	No
Minimum Compressor Runtime Option (3-minutes)	Yes/No	No
Change Compressor Turn On/Turn Off w/ Excessive Cycling Rate	Yes/No	Yes
Standard On/Off differential is 2F (1C), When Excessive Cycling is Yes the differential is 4F (3C)		
Low Temperature Alarm Set Point (Requires Alarm Board)	28F to 65F (-2C to 18C)	50F (10C)
High Temperature Alarm #1 Set Point (Requires Alarm Board)	70F to 99F (21C to 37C)	85F (29C)
High Temperature Alarm #2 Set Point (Requires Alarm Board)	70F to 99F (21C to 37C)	90F (32C)