

Multi-Unit Sequencing

Multi-unit sequencing is a unit-to-unit networking option for AboveAir's Standard (MC-2000, MC-4000, or MC-6000) controllers. This allows up to 16 units to be wired into a private network. This option is most frequently utilized where system redundancy is a concern; the control can be set to operate the HVAC units for N+X redundancy, where N is the number of active units and X is the number of redundant units.

System Set Up

Most system parameters are set at the Primary unit, typically Unit 1 (adjustable), and broadcast to the other units. These are as follows:

- Select Primary: This selection sets the primary unit for control of the network.
- Select Backup: This is the unit that will serve as the backup to the network's primary.
- Number of Units: The total number of units to be networked together (2-16).
- Number of Standby: The number of redundant units.
- Cool Assist: Enable cooling assist operation for the system, described herein.
- Comm Fail Delay: Time delay in seconds for communication failure to rotate units.
- Timed Rotate: Select timed rotation schedule (None, Daily, Weekly, or Monthly)
- Time: Time for rotation based on 24-hour clock.
- Weekday: Day of week for rotation if using the weekly selection.
- Day of Month: Day of month for rotation is using the monthly selection.
- Cool Assist Set Point: Set point for sequencing standby units for cooling assist operation.
- Cool Assist Deadband: Dead band for sequencing standby unit for cooling assist operation.

Secondary and back-up units must be individually enabled for multi-unit sequencing. All wiring should be completed prior to enabling the multi-unit sequencing option; the network wiring connections are made via a 3-wire daisy chain, as indicated on the wiring diagrams included with the units.

Sequence of Control

Unit Operation

During normal operation, the primary unit will designate N units (number of units - number of standby units) for operation. All other units shall remain in standby mode.

Timed Rotation (Optional)

In order to balance system run times, the active units and standby units may be rotated based on the following operation:

- No timed rotation
- Daily rotation at a constant time of day (every day @ 9:00)
- Weekly rotation at a constant time of day and constant weekday (every Tuesday @ 9:00)
- Monthly rotation on a constant day and at a constant time (every 2nd day of the month @ 9:00)

All clock settings are based on a 24 hour clock.

Alarming & System Availability Rotation

The primary unit shall ensure that the required number of active units are operational. The following system states will designate that a unit is not available for operation:

- If a unit is disabled via the system enable at the keypad, then the unit is unavailable for operation.
- If a unit is in a critical alarm state (life safety alarm, air proving alarm), then the unit is unavailable for operation. The primary unit shall call the next available unit for operation.
- If the unit's cooling components are disabled due to an alarm state (condensate alarm, high refrigerant pressure, low refrigerant pressure, or *optional* pump status/water flow failure) or manually disabled at the keypad, then the unit is unavailable for operation.

If a unit is unavailable for operation and currently called for operation by the primary unit, the primary unit shall energize the next available unit.

Back-Up Control

In the event of a power failure/failure of communication with the primary unit for a time delay (60 seconds, adjustable), a designated back-up controller (Unit 2, selectable) shall temporarily assume control of the network.

If both the primary and back-up are offline for the time delay, then any remaining units shall operate in stand-alone mode until communication is restored.

Cool Assist (Optional)

If the primary unit remains above the cool assist set point (77 deg F, adjustable) by one half of the cool assist dead band (2 deg F, adjustable) for the cool assist delay time (5

minutes, adjustable), then standby units will begin to activate sequentially.

Upon a fall in temperature below the cool assist set point by one half of the cool assist dead band, the units will be deactivated in a last in-first out sequence. All units will complete their minimum run times to prevent compressor short cycling.

Note: All units should be set with identical set points when utilizing cooling assist.

