

# **INSTALLATION INSTRUCTIONS**

## **NOVAR UCM**

### **BUILDING AUTOMATION CONTROLLER**

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**This unit is equipped with Novar's UCM digital controller. The controller will operate as a "stand-alone" device, or can be integrated with a Building Automation System (BAS).**

#### **FIELD WIRING CONNECTIONS**

In addition to the high voltage connections shown in the unit installation instructions, the following connections are required.

1. **Stand-Alone Operation** - All units are equipped with a return air and discharge air temperature sensors and are ready for stand-alone operation. A zone temperature sensor may be installed in place of the return air sensor but is not included.
2. **Building Automation System Operation** - For networking with a BAS system, with or without a zone temperature sensor, the two-wire bus connection and an address selection are required.

For programming information specific to your building application, contact the local Novar office/distributor.

#### **SEQUENCE OF OPERATION**

All of the following operational sequences are provided on a stand-alone basis, and do not require connection to a BAS system, except as noted

#### **COOLING OPERATION**

When zone temperature is below the cooling set point, all mechanical cooling will be off, and the economizer (if equipped) will be at minimum position. As zone temperature rises above the cooling set point, cooling will be energized.

If free cooling is available, the economizer (if equipped) will open beyond the minimum position. (See economizer option below) As zone temperature continues to rise above the cooling set point, the first stage (Y1) of mechanical cooling will be energized. A further rise in zone temperature will bring on the second stage (Y2) of mechanical cooling, if equipped. A two minute delay between the first and second stage of cooling is factory set in the controller. Each stage of mechanical cooling will also operate with minimum OFF and ON times.

As the zone temperature falls toward the cooling set point, stages of mechanical cooling will de-energize in reverse order, and then the economizer will close to minimum position.

When free cooling is not available, or economizer is not installed, stages of mechanical cooling will be energized as zone temperatures rise above the cooling set point. The zone temperature at which mechanical cooling is energized will be closer to the cooling set point when free cooling is not available.

#### **Economizer Option**

The UCM uses the input from the network to determine if the outdoor air is suitable for free cooling.

During the occupied mode (default) the UCM sends a 0-10VDC signal to the economizer actuator causing the actuator to go to minimum position for ventilation. On a call for first stage cooling, if the outdoor air is suitable, the UCM will enable free cooling. When free cooling is available, the UCM sends a 0-10VDC signal to the economizer actuator to maintain 55°F discharge air temperature.

#### **Heating Operation**

As zone temperatures drop below the heating set point, the first stage of heat (W1) will be energized. If the zone temperature continues to drop, the second stage of heat, if equipped (W2) will be energized after a two minute interstage delay. Stages will be turned off in reverse order as the zone temperature approaches the heating set point. Each stage of heat will operate with minimum ON and OFF times.

#### **Airflow Status**

All units are shipped with airflow proving circuits. Airflow must be confirmed before heating, cooling or economizer (if equipped) will be energized. Terminal DI1 is the confirmed status input for the indoor blower. When airflow has been proven, the air proving switch contacts close, sending a signal to the UCM. If airflow is not proven, the contacts remain open which prevents any mechanical function operation. If airflow is lost after being proven, the UCM will de-energize all heating, cooling and economizer systems.

## Dirty Filter/Unit Lockout Status

All units are shipped with a dirty filter switch and a unit lockout circuit. If the dirty filter switch indicates excessive pressure drop across the filters, an input will be provided to terminal 8 "DI2" on the UCM to indicate that service is required.

All units are equipped with a lock-out relay that provides input to the UCM if a malfunction in the unit occurs. The lock-out relay gets its input from the unit control board's "X" terminal. If a compressor locks out or if a limit switch trips, the unit control board "X" terminal will energize the lock-out relay and the relay's normally open contacts will close and send a signal to UCM terminal 8 "DI2". The UCM will then send an alarm to the facility management system; however, the cooling, heating, and economizer operation will not be interrupted by the UCM. This is the same status input as the dirty filter switch input.

## START-UP INSTRUCTIONS

Upon initial power-up of the UCM, the unit will be in OCCUPIED mode, which corresponds to the following operation:

- Economizer (if equipped) opens to minimum position
- Indoor fan operates continuously
- Occupied set points control system operation.

## Factory Default Settings

Function	Default
Cooling Setpoint	74°F
Heating Setpoint	70°F
Economizer Damper Position	15 - 20%
Occupancy	Occupied