

INSTALLATION INSTRUCTIONS

JOHNSON CONTROLS

BUILDING AUTOMATION CONTROLLER

This unit is equipped with Johnson Controls' digital controller UNT 1126. 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 return air and discharge air 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 N2 bus connection and an address selection are required.

For programming information specific to your building application, contact the local Johnson Controls 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.

The UNT controller is supplied in a pre-configured format where different operating sequences are obtained simply by adding the necessary sensors or output devices. In this way, a majority of applications can be addressed without the need for controller configuration in the field.

OPERATING MODES

Occupied Mode

- Indoor fan runs continuously (optional intermittent operation)
- Economizer opens to minimum position

- Occupied heating and cooling setpoints control system

Unoccupied Mode

- Indoor fan runs only with heating or cooling
- Economizer is closed (economizer operation optional)
- Unoccupied heating and cooling setpoints control system

Warm-up Mode

- Same as occupied mode, except economizer is closed
- Used while changing from unoccupied to occupied modes

Standby Mode

- Same as occupied mode, except standby heating and cooling setpoints control system
- Used with occupancy sensor in areas intermittently occupied

COOLING OPERATION

When zone temperature is below the cooling setpoint, all mechanical cooling will be off, and the economizer (if equipped) will be at minimum position. As zone temperature rises above the cooling setpoint, 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 setpoint, 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 setpoint, 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 setpoint. The zone temperature at which mechanical cooling is energized will be closer to the cooling setpoint when free cooling is not available.

Economizer Option

The UNT 1126 uses the input from the outdoor air enthalpy sensor, OAS, to determine if the outdoor air is suitable for free cooling.

During the occupied mode (default) the UNT 1126 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 UNT 1126 will enable free cooling. When free cooling is available, the economizer actuator will modulate in direct proportion to how far zone temperature is above the cooling setpoint. The economizer will modulate over a 3°F span of zone temperature. This means that when zone temperature is 1.5°F above the cooling setpoint, the economizer will be open to 50%. When zone temperature is 3° above the cooling setpoint, the economizer will be open 100%. A discharge air temperature sensor signals the economizer to drive closed on discharge air temps below 55°. If the discharge air sensor fails, or free cooling is not available, the economizer will not open beyond minimum position.

Heating Operation

As zone temperatures drop below the heating setpoint, 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 setpoint. Each stage of heat will operate with minimum ON and OFF times.

HEATING/COOLING LOCKOUT

An outdoor air enthalpy sensor (OAS) is installed, and will lockout mechanical cooling below 50°F outdoor air temperature. Likewise, mechanical heating will be locked out at outdoor temperatures above 60°F.

Airflow Status

All units are shipped with an airflow proving switch. Airflow must be confirmed before heating, cooling or economizer (if equipped) will be energized. Terminal W46 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 UNT 1126. If airflow is not proven, the contacts remain open, which prevents any mechanical function operation. If airflow is lost after being proven, the UNT 1126 will de-energize all heating, cooling and economizer systems.

OPERATION WITH TIME CLOCKS

The UNT 1126 controller may be used with conventional time clocks to signal occupied and unoccupied modes. The UNT 1126 is shipped with a jumper between terminals W32 & W36, causing the system to default to the occupied mode. For unoccupied mode without a time clock or occupancy sensor, this jumper can be removed. The time clock will connect across these same terminals, after removing the occupied jumper. One time clock may control several rooftop units; however, an isolated relay is needed for each UNT 1126. A simple day/night switch may be wired between W32 & W36 as a manual changeover.

START-UP INSTRUCTIONS

Upon initial power-up of the UNT 1126, 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 setpoints control system operation

Recommendation

A Zone Terminal Unit (P/N AS-ZTU100-0) or laptop PC with HVACPRO software is recommended to perform a complete system start-up procedure. If one of these accessories is not available, follow the basic procedure below,

1. If a zone sensor is installed, unplug it at the eight wire cable interface.
2. After a short delay, the fan should come on and operate continuously. If the fan operates for more than two minutes, the fan proving switch is functioning.
3. Verify the economizer actuator (if equipped) has opened the outdoor dampers to a minimum position of 15%.
4. With the indoor fan running, verify mechanical unit operation by installing jumpers on the unit terminal strip. Jumper R to Y1 for cooling stage #1. Add a jumper from R to Y2 for cooling stage #2. Remove these jumpers, then add a jumper from R to W1 for stage #1 heating, and R to W2 for stage #2 heating. Remove these jumpers.
5. If automatic unit operation is desired before connection to a BAS network, first determine which mode is required.
 - a. For a continuous OCCUPIED mode, the factory jumper between W32 and W36 must be in place, with or without a zone sensor.
 - b. For a continuous UNOCCUPIED mode, remove the factory jumper between W32 and W36, with or without a zone sensor.

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