



UNITED COOLAIR

# EZ-Fit with Energy Recovery Wheel Sequence of Operations



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### EZ-Fit with Energy Recovery Wheel Sequence of Operation

The EZ-Fit paired with an energy recovery wheel is designed to supply 100% outside air at room neutral conditions.

#### **System Start/Stop**

The system is on when all enable points are set to the on position:

System ON/OFF: System ON/OFF is found in the System ON/OFF section of the controller's Main Menu using the display terminal/user interface.

Remote ON/OFF: If Remote ON/OFF is field wired (requires voltage free dry contact by the field), closing the switch remotely starts the unit. Opening the switch remotely stops the unit. A jumper wire is installed in the field termination points that must be removed during installation and replaced with the field provided switch.

BMS ON/OFF: (Optional) System must be enabled through the BMS. The default enable point is on/true.

#### **Damper Operation**

During system startup, the outdoor and exhaust dampers shall energize with a 120 second (adjustable) time delay standard. As an option proof by damper end switch shall prove dampers are open. Once the damper delay has elapsed or optional end switches are closed, the supply and exhaust air blowers are energized to provide air flow.

#### **Supply Blower Operation**

There are two options for controlling supply blower speed:

Static Pressure Control: An optional duct mounted static pressure transducer (factory provided field installed) can be used to control based on a VFD driven blower motor or ECM blower motors to maintain a duct pressure set point. It is recommended to have an air balancing contractor adjust the set point required to maintain the design air flow.

Constant Speed Set Point: An adjustable constant speed set point shall be provided to control the speed of the blowers based on a VFD driven blower motor or ECM blower motors to maintain a fixed speed set point. A field air balancing contractor is required to adjust the fan speed to maintain design air flow.

#### **Modes of Operation**

Upon blower start command, the airflow proving switch

(VFD method) or blower speed (rpm), (ECM blower method) after a 60 second (adjustable), is required in order to proceed with modes of operation. A loss of airflow alarm shall occur to alert customers the blower has not started. If proof of airflow occurs, the modes of operation shall proceed.

#### **Dehumidification Mode**

Dehumidification is based on the Supply Air Dew Point and Supply Air Dew Point Set Point. If the Outdoor Air Dew Point exiting the Energy Recovery Wheel is greater than the Supply Air Dew Point Set Point, Dehumidification Mode is active.

For Dehumidification Mode, compressors are ramped/staged based on total cooling demand. Total Cooling Demand is calculated based on the Air Leaving Evaporator Temperature Sensor (DXT) at the outlet of the Evaporator Coil and the Supply Temperature Cooling Set Point 55.0°F (adjustable). Dehumidification takes precedence over cooling mode. The Energy Recovery Wheel is on whenever Dehumidification Mode is active.

#### **Cooling Mode**

Cooling Mode is active when the Dehumidification Mode is satisfied and the Outdoor Temperature exiting the Energy Recovery Wheel rises above the Cooling Set Point of 65.0°F (adjustable) plus the Dead Band of 1.0°F (adjustable). Cooling Mode is active until the Outdoor Temperature exiting the Energy Recovery Wheel is less than the Cooling Set Point minus the Dead Band of 1.0°F (adjustable).

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#### **Heating Mode**

Heating Mode is active when the Dehumidification Mode is satisfied and the Outdoor Temperature exiting the Energy Recovery Wheel falls below the Heating Set Point of 50.0°F (adjustable) minus the Dead Band of 1.0°F (adjustable). Heating Mode is active until the Outdoor Temperature exiting the Energy Recovery Wheel is greater than the

Heating Set Point plus the Dead Band of 1.0°F (adjustable). Heaters are staged based on the Supply Air Temperature Sensor (SATS) mounted at the outlet of the supply air blower to meet the Supply Heating Set point of 85.0°F (adjustable). The Energy Recovery Wheel will be on when the Heating Mode is active.

### Ventilation Mode

Ventilation Mode is active when the Outdoor Air exiting the Energy Recovery Wheel is less than the Supply Dew Point Set Point, the Outdoor Air Temperature exiting the Energy Recovery Wheel is less than the Cooling Mode Set Point, and the Outdoor Air Temperature exiting the Energy Recovery Wheel is greater than the Heating Mode Set Point. The Energy Recovery Wheel is off during Ventilation Mode.

### Hot Gas Reheat

When in the Dehumidification Mode, the Modulating Hot Gas Reheat valve(s) shall be modulated to maintain a Reheat Set Point of 70.0°F (adjustable) based on Supply Air Temperature Sensor (SAT).

### Sensors

OAT-IN: Displays the Outdoor Temperature IN entering the Energy Recovery Wheel. The Outdoor Temperature OUT Sensor is used for start/stop of the Energy Recovery Wheel.

OAT-OUT: Displays the Outlet Temperature OUT leaving the Energy Recovery Wheel. The Outdoor Temperature OUT is used to determine the Outdoor Air Dew Point leaving the Energy Recovery Wheel to determine if dehumidification mode is required. If the Outdoor Air Dew point is below the Supply Dew Point Set Point, the sensor will also determine if Cooling or Heating mode is required.

OAH-IN: Displays the Outdoor Humidity IN entering the Energy Recovery Wheel.

OAH-OUT: Displays the Outdoor Humidity OUT leaving the Energy Recovery Wheel. The Outdoor Humidity OUT is used to determine the Outdoor Air Dew Point leaving the Energy Recovery Wheel to determine if dehumidification mode is required.

DXT: Displays the Air Leaving Evaporator Temperature exiting the Evaporator Coil. The Air Leaving Evaporator

Temperature sensor is used to calculate the Cooling Demand to determine how much cooling/compressors are required to maintain Supply Dew Point Set Point or Supply Cooling Set Point.

SAT: Displays the Supply Air Temperature leaving the supply air blower outlet of the unit. Supply Air Temperature is used to calculate the demand for hot gas reheat in dehumidification and Heating Demand during Heating Mode.

EXT-IN: Displays the Exhaust Air Temperature In entering the Energy Recovery Wheel from the zones being conditioned.

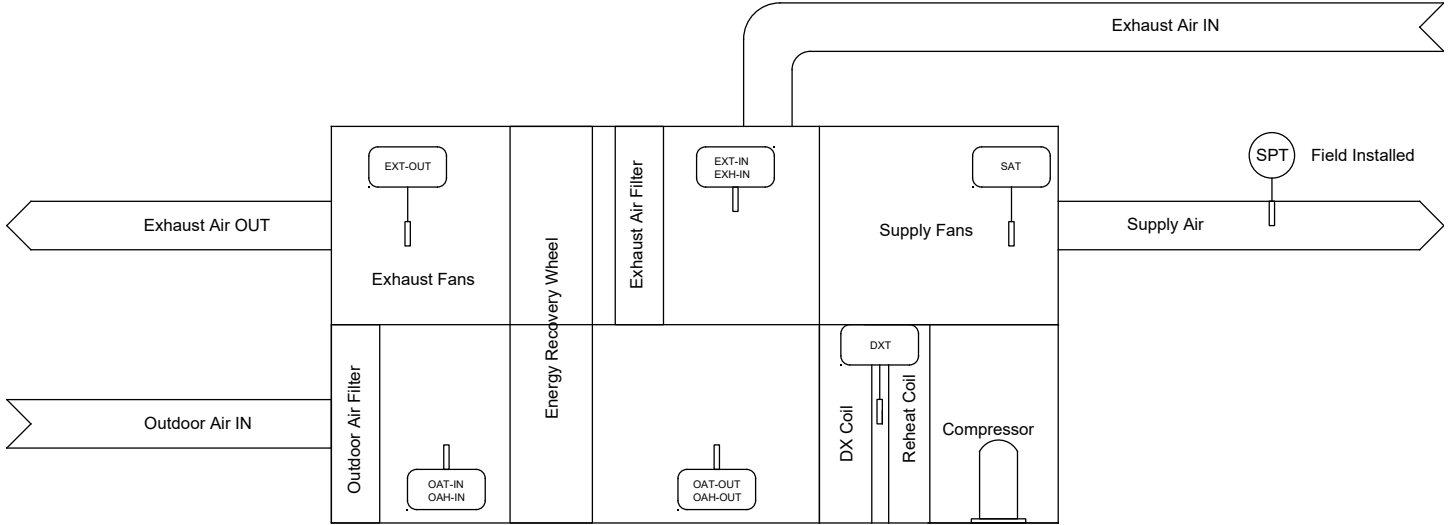
EXT-OUT: Displays the outlet temperature leaving the Energy Recovery Wheel.

EXH-IN: Displays the Exhaust Air Humidity In entering the Energy Recovery Wheel from the zones being conditioned.

SPT: As an option a duct mount static pressure transducer for monitoring duct static pressure is provided for field installation in the supply air ducting. The static pressure transducer shall be compared to the duct pressure set point for maintaining supply blower speed.

ERW Wheel Operation is determined based on output frequency and motor current.

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