



March 2004



Trouble-Free ERV

Commercial Controls Supplement

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Commercial Controls and Interconnection Options

These controls are intended to turn RenewAire commercial energy recovery ventilation systems on and off at appropriate times. Specification, installation and set-up is an easy process. RenewAire units should be ordered with the 24 volt contactor option (CO) for all controls.

It is not necessary that RenewAire controls be used to operate RenewAire units. A wide range of controls or building automation systems may be used. Make sure units are ordered with compatible contactor control voltage.

RenewAire residential units have their own line of compatible controls that are not intended to operate RenewAire commercial units.

TC7D



Digital Time Clock

- Up to 8 on/off Cycles Per Day or 56 Per Week
- 24VAC Power Requirement
- Battery Back-Up
- Wall Mount or Outdoor Enclosure Options
- Wall Mount fits any 4" x 4" Electrical Box
- Optional RenewAire Transformer Relay Package May Be Used



TC7D-W
Wall Mount

TC7D-E Control
In NEMA 3R Enclosures

MC



Motion (Occupancy) Control

- Passive Infrared Sensor
- Adjustable Time-Off Delay to 30 Minutes
- 24VAC Power Requirement
- Ceiling Mount or Directable Wall Mount
- Covers up to 1500 sq. ft. floor space
 - Ceiling Mount- Walking Motion Coverage up to 22 foot radius hand motion coverage up to 12 foot radius
 - Wall Mount - Various Coverage Patterns up to 90 Linear Feet of Sensitivity
- Requires the Use of RenewAire Transformer Relay Package (Ordered Separately)



MC-C
Ceiling Mount

MC-W
Wall Mount

CO2



Carbon Dioxide Control

- Adjustable Control from 600-2000 PPM
- Digital Display
- 24VAC Power Requirement
- Computer/BAS Interface for Information & Control
- Self Calibrates During Periods of Low Occupancy
- Wall Mount or Add Duct Mount Accessory
- Requires the Use of RenewAire Transformer Relay Package (Ordered Separately)



CO2-W
Wall Mount

DMCO2
Duct Mount Accessory

DH24

Dehumidistat Control

DH24
Wall Mount



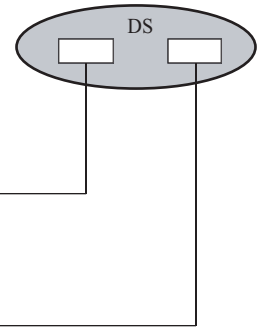
- Secondary Control to Time Clock or Other Primary Control
- Mechanical Switching of 24VAC (or 120VAC)
- Adjustable from 0 - 100% Relative Humidity
- Wall Mount to Single Gang Box
- Note: RenewAire ERVs are not to be used for applications where indoor relative humidity exceeds 50% RH for extended periods of time.

DS

Disconnect Switch



- Fused or Non-fused F or N _____
- Indoor or NEMA 3R Exterior Enclosures I or E
- Installation Voltage Must be Specified
115, 208-230, 460 _____
- Installed on Unit and Wired to Unit Contactor

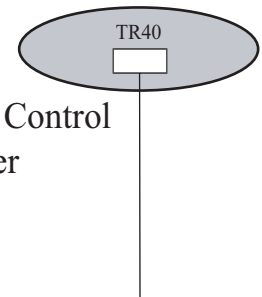


TR40

Transformer Relay Package



- Provides a 24VAC, 40VA Class II Power Supply for Unit Control
- Includes Isolation Relay with Low Voltage Circuit Breaker
- Handles any RenewAire Unit with 1 Contactor
- Installation Voltage Must be Specified
115, 208-230, 460 _____
- Installed in Unit Electric Box
- Available with 45CONT Contactor for EV450 Control Option (shipped loose)



IBC

Independent Blower Control

IBC



- Adds a Second Contactor to Allow Independent Control of Exhaust Fan and Supply Fan
- May Be Used to Provide Economizer (no heat recovery operation) Function
- Can Provide Relief Fan or Make-up Air Function to Benefit Building Pressurization
- Installed in Unit Electrical Box

Control Strategies for Energy Recovery Ventilation Systems

Ventilation air is required for all indoor spaces that are to be occupied, by most commercial mechanical codes and by ASHRAE 62 the engineering standard for "Ventilation for Acceptable Indoor Air Quality". With RenewAire Energy Recovery Ventilators (ERV) it is possible to satisfy these codes and standards for good IAQ and comfort conditions while lowering HVAC system utility costs and the capital costs compared to conventional HVAC system design.

Effective and efficient control of ventilation generally involves turning the ERV on when the space it ventilates is occupied and turning the ERV off when the space is unoccupied. RenewAire offers a selection of controllers, including time clocks, occupancy sensors (motion) and pollutant sensors (CO₂, humidity), that provide for easy installation and control of our ERVs. Other controls and control strategies such as building automation systems and variable frequency drive operation may be used as specified and sourced by other parties.

Is air change rate the same as ventilation rate?

Most mechanical codes have a separate requirement for air circulation and for ventilation. Air circulation (sometimes called "air change") is required to break down thermal stratification and provide uniform mixed air conditions throughout the space. Air circulation is required during occupied periods and is typically six air changes per hour. Air circulation is typically provided by running the air handler blower (Fan On) during occupied periods.

Ventilation involves exhausting air from an occupied space to the outdoors and providing an equal amount (generally balanced to within plus or minus 10% of the exhaust air volume) of outdoor air (make up air) back to the occupied space. The ventilation rate is determined by the use of the space and the number of occupants. Ventilation rates can vary significantly but are typically 25-35% of the total air circulation requirement (25-35% outdoor air fraction) although certain occupancies require up to 100% outdoor air.

How much ventilation is required?

ASHRAE 62, Table 2 specifies the "Outdoor Air Requirements of Ventilation". Two methods are provided to determine the number of occupants in a space, the first based on the design maximum occupancy in the space (for example, count the number of chairs in a dining room add a number for service staff) or the second method based on the square footage of the space being ventilated being used to compute the number of occupants. The table also specifies a ventilation rate per occupant, typically 15 CFM, based on how the space is being used. Remember these are minimum ventilation rates and that occupant comfort, productivity and health have been shown to benefit from increased levels of ventilation.

Can I interconnect an ERV to turn on when the thermostat in the space calls for heating or AC?

No, the need for ventilation does not match the run time of a furnace or AC as controlled by a thermostat. During times of moderate outdoor temperatures, heating and AC will run very little and spaces will be under-ventilated. During extreme temperature conditions, furnaces and AC systems may be running constantly, even during unoccupied times and hence over ventilate the space.

Note that it is common to give a signal to an air handler to run the fan constantly during a period when the space is occupied, to meet code required air circulation. This same signal could be given to the ERV since ventilation is also required during occupied periods. RenewAire units are available with 24 VAC contactors that could be energized with the "Fan ON" 24VAC signal. **Warning: 1. Make sure that the 24 VAC power source has a sufficient amp capacity to pull in both the air handler fan and ERV contactor in addition to any other loads on the power supply being used. 2. The use of an isolation relay may be required to prevent turning on the ERV when the air handle fan runs during a call for Heat or AC.**

What are the functional uses and operational advantages of various types of controls?

The selection of a control for a specific application of an ERV can be based on many different criteria. Some of these factors include: 1) how accurately will the control match the occupancy of the space; 2) ease of installation; 3) need for maintenance or calibration; 4) ease of operation setting or adjustment; 5) lifetime; and, 6) cost. Prime application and operational advantages for each type of control available from RenewAire follows:

Continuous operation, i.e. no control – uniform occupancy 24/365 means turn ERV on and let it run. Nursing Homes, Health Care, Animal Shelters, Pet Stores, Motels, Hotels, Correctional Facilities.

Time clock – Regular scheduled occupancy available in 24 hour or seven day versions. Bars, Restaurants, Beauty Salons, Offices, Retail.

Dehumidistat – A secondary control for occupancies where moisture is being generated. **Warning: RenewAire ERVs should not be used for indoor swimming pools and dedicated spa rooms where dehumidification is the primary concern.** Locker Rooms, Photofinishing Labs. Seasonal adjustment necessary to compensate for variations in average humidity levels.

Occupancy (Motion) Sensors – Inexpensive and stable way to control for variable occupancy schedules. School Classrooms, Conference and Meeting Rooms, Athletic Training Facilities. Adjustable run time after vacating space.

Carbon Dioxide Controllers – Human respiration is the only common source of CO₂ so it is a good indicator of occupancy and adequate ventilation. Projects with irregular occupancy patterns are the best application. Movie Theaters, Auditoriums, Gymnasiums, Music Clubs.

IAQ Controllers – Senses airborne chemicals which are generated variably in the space. Smoking Lounges, Bars, Printing Plants, Dry Cleaners.