MicroMetl

Since 1965

Controller Logic
Product Data Sheet









Foremost HVAC Accessory Manufacturer

MicroMetl

Since 1965

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HONEYWELL W7212 CONTROLS

For Mixing Boxes and Economizers

GENERAL

IMPORTANT: Read these instructions completely before attempting to install this economizer accessory.

These instructions are intended as a general guide and do not supersede local codes in any way.

All phases of the installation must comply with all NATIONAL, STATE and LOCAL CODES.

IMPORTANT: This document is the property of the end user and is to remain with the equipment.

FEATURES: The W7212A Economizer/Mixing Box control can be mounted directly to the matching M7215A motor, or can be remotely mounted for better access, or for use with any 2-10Vdc actuator motor, such as Belimo or Siemens.

- Operates from a Wall Thermostat and DCV sensor to provide a totally integrated control system
- Solid state control package provides accurate, reliable and stable control
- The Logic mounts remotely or on M7215 Actuator Motor
- Combines minimum and DCV maximum damper position potentiometers, and compressor staging relay functions with solid state Enthalpy or Dry Bulb changeover control
- Terminals included for switching between Occupied and Unoccupied operation
- Terminals included for connecting optional 9901-0101 (S963B) Remote Potentiometer for minimum outdoor air damper control
- LED's to indicate when free cooling is available; when module is in DCV Mode; and when Exhaust Fan contact is closed.

SAFETY CONSIDERATIONS

⚠ WARNING

Turn off main power to the roof top unit (RTU) or air handling unit (AHU). Lockout and tag disconnect switch before starting installation, performing service, or maintenance operations.

Electrical shock and/or moving parts could cause personal injury, or death.

⚠ CAUTION

When working on air conditioning equipment, observe precautions in literature, tags and labels attached to the unit and other safety precautions that may apply.

Installation and servicing of air conditioning equipment can be hazardous due to high pressures of hazardous gases, moving parts, electrical components, and sharp sheet metal parts. Wear safety glasses and gloves.

Only trained and qualified service personnel should install, service, or repair air conditioning equipment. Untrained personnel can perform basic maintenance functions of cleaning coils, and cleaning and replacing filters, but all other operations should be performed by trained service personnel.

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CONTROL LAYOUT

The W7212A control logic accepts the following inputs/outputs:

Damper Motor Output (+ / -)

Mixed Air/Discharge Air/Supply Air Temperature Sensor (3k-Ohm) – The Negative Temperature Coefficient (NTC) characteristic of this element causes a decrease in temperature with the increase in resistance. This resistance shift works in conjunction with the Economizer Logic to maintain a 50° F. to 56° F. discharge temperature

Outdoor Dry Bulb Temperature Sensor (4-20mA) – For Outdoor Temperature Reference control

Outdoor Enthalpy Sensor (4-20mA) – For Outdoor Enthalpy Reference control

Return Air Enthalpy Sensor (4-20mA) – For Comparative (Differential) Enthalpy control

Remote Minimum Position Potentiometer – 270 Ohm

Y1 and Y2 Inputs and Outputs (24Vac) – For Economizer Damper and Compressor control

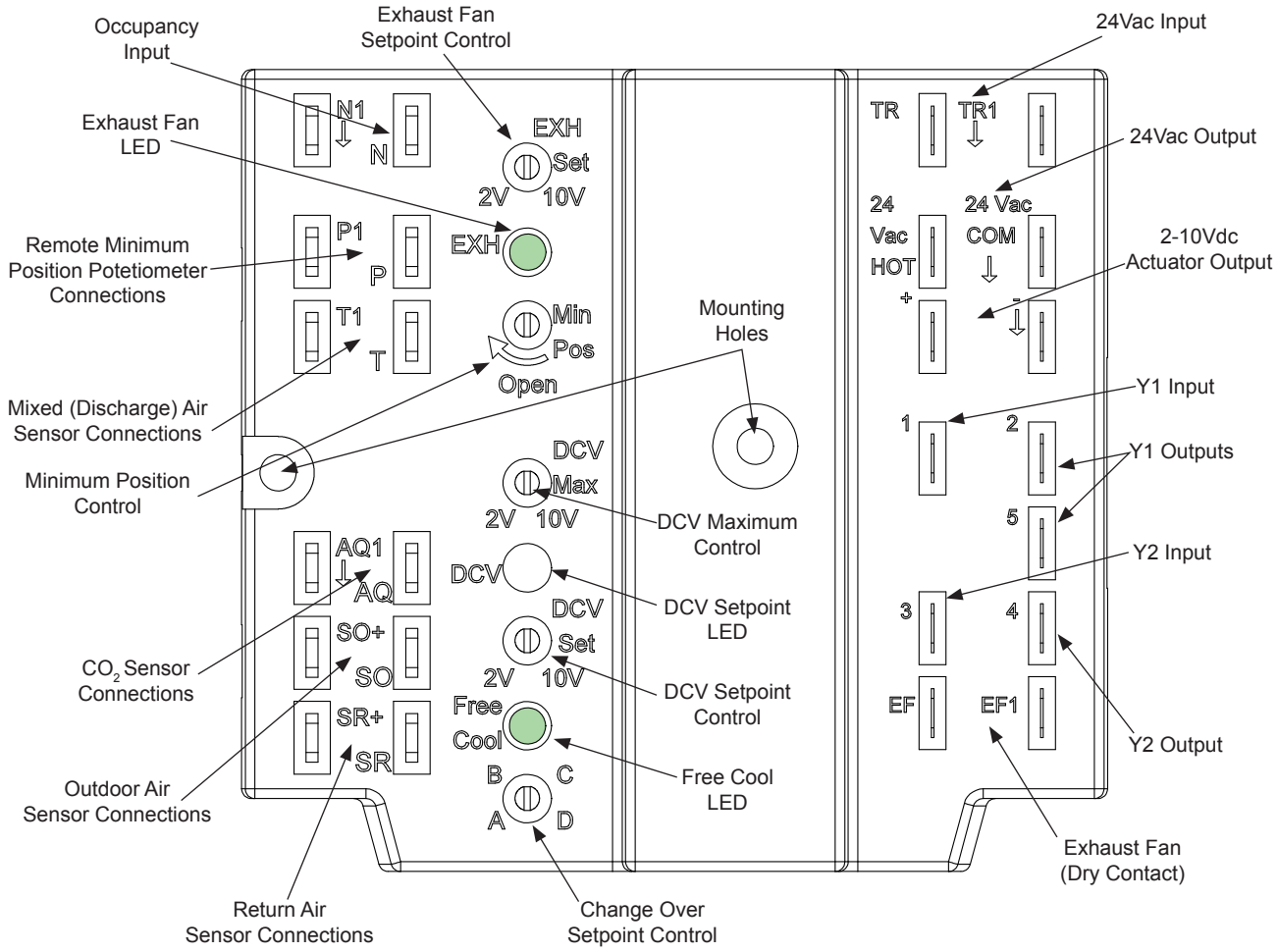
CO_2 Sensor (DCV) – 0-2-10Vdc

Power Exhaust (Dry Contact)

The 1008-0100 (Enthalpy) and 1009-0100 (Dry Bulb) options are fully modulating electronic controls for Economizers and Mixing Boxes. Incorporates a solid state Logic with Enthalpy or Dry Bulb sensing to use outdoor air for cooling, whenever possible, to reduce compressor operation and provide ventilation to the building. Additionally, the Demand Control Ventilation feature is included, but a CO_2 sensor is an option.

This Economizer System provides a true first stage cooling function when outdoor conditions are adequate for cooling, providing maximum energy economy during the cooling process.

During the Occupied Mode with the system in the Heating Mode, continuous Fan Operation, or in Cooling Mode when outdoor conditions are not suitable for lowering the indoor cooling load the Economizer is locked out and the outdoor air dampers are held in the minimum position.



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CONTROL LAYOUT (Cont'd)

On a call for first stage cooling (Y_1 - indoor wall thermostat) with outdoor air suitable for cooling the indoor and outdoor dampers will be controlled by the Economizer Logic to maintain a 50°F to 56°F operating range. As the mixed/discharge air temperature rises above 53°F the actuator will modulate open to admit outdoor air. As the mixed/discharge air drops below 53°F the actuator will proportion closed to reduce outdoor air. If the mixed air temperature drops below 45°F, the Logic will override the Minimum Position Setpoint to close the outside air dampers. This is to protect any Hot Water or Chilled Water coils that may be incorporated into the HVAC system from freezing.

If the outdoor air dampers are fully open and the indoor conditions cannot be met mechanical cooling will be sequenced on via Y_2 on the indoor thermostat.

During the Unoccupied period the Minimum Position is de-energized, and the outdoor air dampers are driven closed. However, all cooling functions remain operational, as described, above. Additionally, when power is terminated at TR and TR1 terminals the outdoor air dampers will drive fully closed, via a return spring fail safe feature.

ACTUATOR MOTOR

Honeywell:

Terminals that are exposed by removal of the actuator module are ¼" male spades labeled 24 VAC TR & TR1, and 2-10 VDC IN. When 24 VAC is applied to TR and TR1, and 2-10 VDC to the Positive (+) and Negative (–) terminals marked 2-10 VDC IN, the motor will drive proportionally to that voltage. For example, if 6.0 VDC is applied the motor will drive to approx. ½ of full travel. The 2-10Vdc OUT is not used with the W7212A control.

Belimo:

Like the Honeywell M7215 Actuator Motor, Belimo requires 24Vac to the motor at Black #1 (COM) and Red #2 (24V HOT) wires, and a 2Vdc to 10Vdc input (White #3 wire) to drive the motor open and closed. It also provides a 2Vdc to 10Vdc (Green, Orange or White #5 wire, depending on model) feedback signal. Like the M7215A motor the Feedback signal is not used with the W7212A.

These models are reversible. The direction in which the **spring turns the actuator back to its fail-safe position** is indicated with a symbol of a coiled spring inside a rectangle with CW (clockwise) on one side, and CCW (counter clockwise) on the opposite side. This symbol is located at the bottom of the range indicator.

A Directional Switch, or Proportional Control, also indicated by a CW and CCW symbol, is located at the bottom right or left of the actuator, depending on which side of the actuator you are facing. These symbols are accompanied by a dial that requires a screwdriver to switch between the two.

An auxiliary switch option is available on some models. These models are indicated with an "S" at the end of the model number (LF24-SR-**S**). An additional cable is supplied with three white wires marked S1, S2, and S3.

To close contacts on Damper Open Command, make wire connections at S1 and S3 (S2 will not be used). To set the auxiliary switch make sure the power is off, or the actuator motor is in the fully closed position. Turn the auxiliary switch dial to the desired position for the contacts to close (e.g. OA Damper open to 60%. As the damper opens the dial will rotate back towards Zero. When the dial rotates past Zero the contacts S1 to S3 will close.

Remember – Pay attention to the following:

- **Rotation of the actuator** – This is determined by facing the actuator. If the directional indicator is on the right marked with a **CW** then the motor rotates clockwise to its fail-safe position when power is removed. If the directional indicator is on the left marked with a **CCW** then the motor rotates counterclockwise to its fail-safe position when power is removed.
- **Directional Control** – This is a proportional control that determines whether the motor fully opens with a 10vdc signal, or a 2vdc signal. If the actuator is set up for a CCW fail-safe direction, then the directional control must also be CCW. ***Unless otherwise directed, set this switch to match the fail-safe rotation of the actuator***.
- **Auxiliary Switch –** Setting the Auxiliary switch requires the OA Damper to be fully closed before starting.

Siemens:

Like the Honeywell M7215 Actuator Motor and the Belimo, the Siemens requires 24Vac to the motor at Red #1 (24V HOT) and Black (COM) #2 wires, which is the reverse of the Belimo, and a 2Vdc to 10Vdc input at White #8 wire to drive the motor open and closed. It also provides a 2Vdc to 10Vdc (Green #9 wire) feedback signal, which is not used with the W7212A control.

Like the Belimo, these models are reversible and must be oriented properly. But unlike the Belimo, MicroMetl does not offer the Auxiliary Switch option with the Siemens.

Remember – Pay attention to the following:

- **Rotation of the actuator** – This is determined by facing the actuator. If the directional indicator is pointing up on the left then the motor rotates clockwise with spring return counterclockwise. This side will also have the Directional Control switches (see below). If the directional indicator is pointing up on the left then the motor rotates counterclockwise with spring return clockwise. There is no Directional Control Switches on this side.
- **Directional Control** – This is a proportional control that determines whether the motor fully opens with a 10vdc signal, or a 2vdc signal. These switches should never have to be changed, as this system should always be 2-10Vdc.

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INSTALLATION

Economizer Module Location and Mounting

MicroMetl does not always provide a mounted W7212A control. In some cases the control maybe mounted by the installer in the RTU control panel. In others the control may be mounted in an enclosure in the Outdoor Air Hood, or as in the case of Mixing Boxes, may require the installer to mount the control external of the mixing box on a panel, or the duct that is most convenient to access.

The W7212A module may be mounted in any orientation; however, mounting in the orientation that permits proper viewing is ideal.

IMPORTANT: Avoid mounting in areas where corrosive vapors can attack the metal parts of the module's circuit board.

IMPORTANT: The module must be mounted in a position that allows clearances for wiring, servicing, and removal.

Sensor Location and Mounting

The W7212A Economizer system uses proprietary sensors for control. The Mixed Air Temperature (MAT) Sensor (aka Discharge Air or Supply Air) is a 3k-Ohm NTC device. An MAT sensor is required for all applications and is typically mounted in the blower section of the HVAC unit.

The OAT sensor is the minimum requirement for outdoor air sensing typically installed at the OA damper opening. Field installation in the outdoor air opening of the outdoor air hood is required for Mixing Boxes. Optional Enthalpy Sensors are available for Referential (Outdoor only), or Differential (Comparative – Indoor and outdoor).

1. Install the Mixed/Discharge Air Sensor in the Supply Duct as shown in illustration (Fig. 1). It can also be inserted into the Blower Scroll. (Be sure to route wires away from moving parts).

2. Locate the Enthalpy or Adjustable Dry Bulb Sensor in the Outdoor Fresh Air Hood (not provided with Mixing Box). The sensor should be installed in a way that points the scoops toward the air inlet but out of direct sunlight, wind and rain.

3. Route wires to the Enthalpy/Dry Bulb and Mixed Air Sensors and connect. It may be necessary to extend the wires using 18ga. thermostat wire (field supplied).

4. Connect the two gray wires attached to Terminals T and T1 on the Economizer Logic to the Mixed Air Sensor per the wiring diagram

5. Connect the Orange and Green wires of the control harness to the Outdoor Enthalpy or Adjustable Dry Bulb Sensor previously installed, per the wiring diagram

6. Follow Startup Instructions

Note: Multiple diagrams may be provided for your convenience, or a specific diagram for a specific brand and/or model. If the former, choose the one that best fits your application and/or equipment.

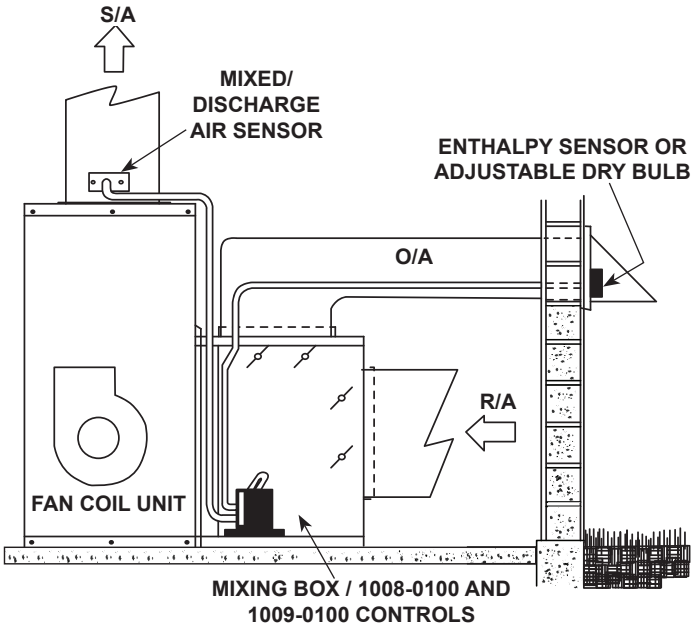


Fig. 1

PRE-START-UP

⚠CAUTION

Failure to observe the following caution could result in serious personal injury.

Always disconnect power before servicing any moving component or electrical component of the economizer.

1. Remove/open all access panels per the Economizer/Mixing Box instructions.

2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels that are attached to, or shipped with, the unit.

3. Review any individual component's literature (i.e. Honeywell components, Belimo Actuator, etc.) shipped with the unit.

4. Make the following inspections with regard to the economizer:

   a. Where applicable, verify that the shipping tape or fasteners placed over the economizer's relief dampers has been completely removed. Check that the dampers swing freely.

   b. Verify the economizer control wiring matches the provided wiring diagram and that all factory and field connections are secure.

5. Make sure that the Economizer/Mixing Box has been installed in accordance with the Installation Instructions and applicable codes.

6. Complete the pre-start-up inspections and fill out the appropriate sections on the Start-Up Checklist supplied with this documentation.

7. Complete the HVAC unit's pre-start-up procedures prior to starting on the Economizer start-up procedures. Have available the individual component documentation (*i.e.* Honeywell components, Belimo actuator, etc.) that may have shipped with the unit for reference.

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⚠CAUTION

Excercise care when adjusting the Changeover, Minimum Position, and DCV Setpoints.

EXCESSIVE FORCE MAY DAMAGE THE CONTROL

Changeover on an economizer can operate in two basic modes:

1) **Exclusive** operation where either the Economizer or the Mechanical Cooling function, but not both; OR

2) **Integrated** operation where the Economizer and Mechanical Cooling operate at the same time. **Integrated operation requires a Two Stage Cooling Thermostat.** *The **Integrated** Control Strategy is recommended for all Changeover Strategies, as it will provide the most energy savings and comfort.*

Outdoor Dry Bulb Changeover

The standard Economizer control strategy is shipped from the factory configured for Outdoor Dry Bulb changeover control. The outdoor air and mixed air temperature sensors are included as standard.

For this control mode, the outdoor temperature changeover is determined by an adjustable setpoint (dip switches) selected on the control. If the outdoor air temperature is above the setpoint, the economizer will adjust the outdoor air dampers to minimum position. If the outdoor air temperature is below the setpoint, the position of the outdoor air dampers will be controlled to provide free cooling using outdoor air. When in this mode, the LED next to the free cooling Enthalpy Setpoint Potentiometer will be on. The Enthalpy Setpoint on the Logic should be set to D.

The changeover temperature switch settings for the C7660 are shown below (Fig. 2) Default and factory setpoint is 63°F.

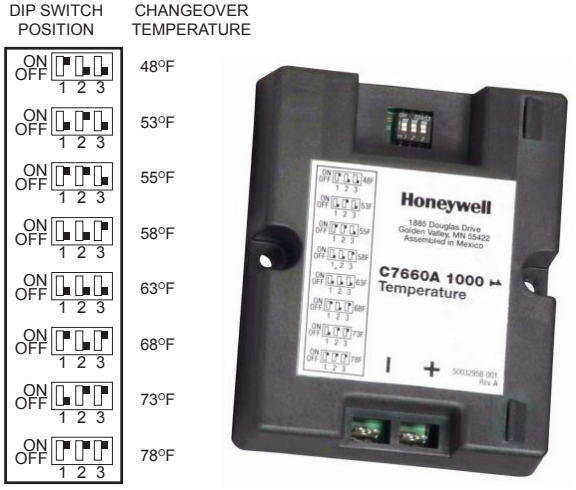


Figure 2

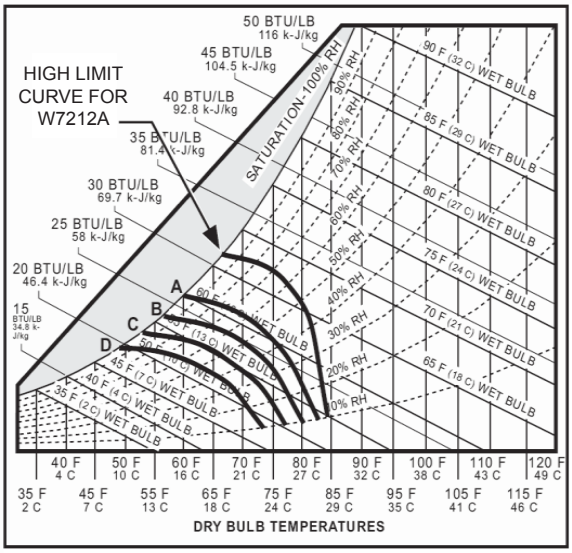
For **Exclusive** operation, the changeover setpoint needs to allow mechanical cooling when the economizer can no longer meet the cooling load requirement. The 63°F setting is the most typical changeover set point for this type of control but is dependent on the building and climate.

For **Integrated** operation, the changeover should be just at or just below the typical cooling setpoint expected in the zone served. For example, if the cooling setpoint is 74°F or 75°F, the changeover setpoint should be set at 73°F.

Outdoor Enthalpy Changeover

For Outdoor Enthalpy Changeover the standard Outdoor Dry Bulb Sensor is replaced with an Enthalpy Sensor in the same mounting location. The outdoor air damper moves to its minimum position when the outdoor air enthalpy rises above the enthalpy changeover setpoint. The outdoor enthalpy changeover is determined by the indoor Enthalpy Setpoint Potentiometer on the Economizer Logic control. The setpoint is A, B, C, or D. The factory installed 620-ohm jumper must be in place across terminals SR and + on the Economizer Logic control. Ideally, the setpoint should be as close to the indoor setpoint as possible.

Note: On Economizers, if ordered for Outdoor Enthalpy Changeover the sensor is factory installed and the wires are factory landed on the control. No changes are required by installer. For Mixing Boxes, however, the wires are landed on the control logic but the sensor must be installed in the Outside Air Hood. Field supplied wire will be required.



Control Curve	Control Point (Approximate Temperature at 50% Humidity)
A	73°F (23°C)
B	70°F (21°C)
C	67°F (19°C)
D	63°F (17°C)
Knob turned to D	For Differential Enthalpy (2 Sensor)

Differential Enthalpy Control

For Differential Enthalpy Control, the Economizer Logic control uses two Enthalpy Sensors, one in the outside air and one in the return air. The Economizer Logic control compares the outdoor air enthalpy to the return air enthalpy to determine economizer use. The control selects the lower enthalpy air (return or outdoor) for cooling. For example, when the outdoor air has a lower enthalpy than the return air, the economizer opens outdoor damper to bring in outdoor air for free cooling.

Replace the standard outside air Dry Bulb Sensor with the accessory Enthalpy Sensor in the same mounting location. Mount the Return Air Enthalpy Sensor in the return airstream. The Return Air Enthalpy Sensor is wired to terminals SR and + (after removing the 620-ohm resistor) on the Economizer Logic control. The outdoor enthalpy changeover is no longer determined by the setpoint potentiometer on the economizer control. When using this mode of changeover control, turn the Enthalpy Setpoint Potentiometer fully clockwise to the D setting.

Note: If ordered with Differential Enthalpy Changeover the wires are factory landed on the control, but the sensor must be installed in Return Air Duct.

Note: Differential Enthalpy Requires a Two Stage Cooling Thermostat!

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Minimum Position Control:

There is a minimum damper position potentiometer on the economizer control. The minimum damper position maintains the minimum airflow into the building during the heating and continuous fan modes.

When using Demand Controlled Ventilation, the minimum damper position represents the minimum ventilation position for VOC's (Volatile Organic Compounds) ventilation requirements only. The maximum demand ventilation position is used for fully occupied ventilation.

When Demand Controlled Ventilation is **not** being used, the Minimum Position Potentiometer should be used to set for building VOC's, as well as the occupied ventilation requirements. The DCV MAX Potentiometer should be turned fully counter clockwise to full closed position.

Note: Remote control of the economizer damper is desirable when requiring additional temporary ventilation. If a field supplied remote potentiometer (MicroMetl part # 9901-0101) is wired to the economizer control, the minimum position of the damper can be controlled from a remote location. To control the minimum damper position remotely, remove the factory installed jumper on the P and P1 terminals on the economizer control. Wire the field supplied potentiometer to the P and P1 terminals on the economizer control. Turn the Minimum Position Potentiometer on the control logic fully clockwise.

Note: In November of 2009 Honeywell made a change to the W7212 to meet California Title 24 Standards. This standard requires the control to Default to the DCV MAX Setpoint in the event of a CO_2 sensor failure. This feature can cause conflict with Minimum Position adjustment. Before making any adjustment to the Minimum Position, turn the DCV MAX POT to the full CCW position.

To determine the minimum position setting, calculate the appropriate mixed air temperature using the following formula.

Note: At least 10°F temperature difference should be present between the outdoor and return air temperatures when performing this task.

(TO x OA) + (TR x RA) = TM

Where: TO = Outdoor Air Temperature
OA = Desired percent of Outdoor Air
TR = Return Air Temperature
RA = Desired percent of Return Air
TM = Mixed Air Temperature

As an example, if local codes require 10% outdoor air during occupied conditions, the outdoor air temperature is 60°F, and the return air temperature is 75°F; what would the mixed air temperature be?

(60 x .10) + (75 x .90) = 73.5 F

- To insure proper operation in cool weather install a jumper between terminals T and T1
  - Ensure that the factory installed jumper is in place across terminals P and P1.
- Turn exhaust fan pot fully CW
- Turn Min Pos and DCV max fully CCW
- Turn DCV set fully CW
- Connect 24Vac across terminals TR and TR1 via the fan circuit.
- Carefully adjust the minimum position potentiometer until the measured mixed air temperature matches the calculated value.
  - With the Minimum Position POT turned CCW to the outdoor damper closed position, turn the Minimum Position POT CW approximately equal to the % of outdoor damper air desired. Wait until the damper blades have stopped moving then measure the mixed air temperature. Adjust the minimum position up or down to increase or decrease the temperature. Make only small changes and give the dampers time to travel to their stopped position before making any other measurements or changes. Repeat until mixed air temperature is achieved.

Depending on the amount of time needed to make these adjustments, it may be necessary to recalculate the mixed air temperature as the indoor and outdoor temperatures change.

Note: When the economizer control board receives initial power, it can take the damper up to 2-1/2 minutes before it begins to position itself. After the initial positioning, subsequent changes to damper position will take up to 30 seconds to initiate. Damper movement from full open to full close (or vice versa) may take up to 2-1/2 minutes.

- If not setting DCV setpoints, remove jumper between terminals T and T1
- Make note of the Minimum Position. You will need to return to this setting after making other adjustments.

Demand Control Ventilation:

Indoor Air Quality (IAQ) Sensor

The IAQ input can be used for Demand Control Ventilation (DCV) control based on the level of CO_2 measured in the space, or return air duct. Mount the optional IAQ sensor according to manufacturer specifications. The IAQ sensor should be wired to the AQ and AQ1 terminals of the controller.

Note: If a separate field-supplied transformer is used to power the IAQ sensor, the sensor must not be grounded. A Ground Loop Circuit may be the result keeping the control from operating correctly. Additionally, the economizer control board could be damaged.

Setting the DCV Setpoint

The DCV Setpoint is the point at which the Economizer Logic responds to the signal from the CO_2 Sensor. If the DCV Setpoint feature is not utilized, the DCV Setpoint potentiometer must be turned CCW to match the Minimum Position Setpoint.

Adjust the DCV Setpoint potentiometer to correspond to the DCV voltage output of the indoor air quality sensor, as follows:

1. After setting Minimum Position, make note of the position by checking the voltage output at +/- terminals, or mark the damper position with a permanent marker.
2. Remove CO_2 Sensor from the AQ and AQ1 terminals.
3. Install a jumper between VDC Output + terminal and AQ.
4. Connect 24VAC to TR and TR1.
5. Connect Digital Multi Meter to VDC Output Terminals + and –.
6. Turn MIN POS POT to the desired voltage output (scaling should be provided by the sensor manufacturer).
7. Turn the DCV Set POT Counter Clockwise until the LED illuminates.
8. Return MIN POS POT to original setpoint.
9. Remove jumper.

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SETUP AND CONFIGURATION (Cont'd)

Setting the DCV Maximum position

Setting the DCV Max POT limits the amount of air that can be exhausted when DCV ventilation is required.

Note: Setting the DCV Max Position requires the same math as the Minimum Position. Follow ASHRAE standards to determine DCV Max requirements.

Set the DCV MAX POT to a voltage setting equal to the value required for maximum ventilation.

1. Remove CO_2 Sensor from the AQ and AQ1 terminals
2. Connect 24VAC to TR and TR1
3. Adjust DCV Max to the desire setting
4. Remove previously installed jumpers and reconnect sensors.

Note: If additional ventilation is required the DCV overrides the outdoor air minimum position when there is no cooling required. When there is Free Cooling available the dampers will override the DCV, if necessary. If the mixed air temperature drops below 45°F the logic will override both cooling and DCV requirements to drive the outside air damper closed. This is designed to prevent any possibility of freezing water coils that might be in the system.

Exhaust Set Point Adjustment

The exhaust set point will determine when the (optional) power exhaust fan runs based on damper position. The setpoint is modified with the Exhaust Fan Setpoint (EXH SET) potentiometer. The setpoint represents the damper position above which the exhaust fans will be turned on. When there is a call for exhaust the LED will be illuminated. However, the economizer control provides a 60 second delay (± 30) before exhaust fan activation to allow the dampers to open. This delay allows the damper to reach the appropriate position to avoid unnecessary fan overload.

START-UP INSTRUCTIONS

1. After unit is wired begin start-up procedures.
2. Set thermostat functions to OFF. Set comfort levels to minimum cool and minimum heat.
3. Turn unit power on, following manufacturer's start up instructions.
4. Turn thermostat fan function to ON. Unit indoor blower should start and damper motor will drive to minimum vent position. Minimum vent. position should be adjusted on the economizer logic for the proper percentage of outdoor air.
5. Switch the thermostat function from OFF to HEAT or AUTO.
   a. Bring the comfort setpoint for heat up to engage first stage heating. Follow manufacturer's procedures to check heating cycle.
   b. Bring the comfort setpoint for heat up to engage second stage heating if available. Check this heating cycle also.
   c. Under no circumstance should the economizer operate in a heating mode except for minimum vent position.
6. Change the thermostat function from HEAT to COOL or leave in AUTO. Drop the comfort setpoint down to engage first stage call for cooling. The first stage cooling call energizes terminal 1 on the economizer logic. If the outdoor air is:
   a. Above the dry bulb temperature setting (Dry Bulb Strategy), the A through D setpoint (Single or Reference Enthalpy Strategy), or the indoor enthalpy (Dual or Differential Enthalpy Strategy), the first stage mechanical cooling will be commanded on. As the comfort setpoint is reduced more to energize Y_2 there will be a second call for cooling which will bring on second stage mechanical cooling, if utilized.
   b. Below the setpoint (described in a. above) the first stage call for cooling will open the economizer. As the comfort setpoint is reduced more to energize Y_2 there will be a second call for cooling which will bring on First stage mechanical cooling to back up the economizer.
7. If using power exhaust or CO_2 control refer to those instructions for details.
8. Once all stages have been cycled, and all adjustments made return thermostat to its proper operating mode, replace all doors, panels and hoods.
9. Leave a copy of these instructions with the equipment.

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STARTUP CHECKLIST

I. PRELIMIANRY INFORMATION

Project Name:_____ Unit Tag:_____

Model Number:_____ Serial Number:_____

Start-up Date:_____ Certified Technician:_____

Certification Number:_____

II. PRE-STARTUP (insert checkmark in Box as each item is completed)

Shipping tape removed from relief blades and the blades swing freely.

Economizer Controls are wired correctly per the wire diagram.

All connections and wire harness plugs are properly connected and secure.

All panels are properly installed and all screws are in place.

III. STARTUP AND TESTING

Step 1: Power up HVAC unit with thermostat in occupied mode calling for fan only

With minimum position POT turned fully CCW the outside damper is fully closed

With minimum position POT turned fully CW the outside damper is fully open

Step 2: Simulate a cooling load with Y1 only energized

Outside air damper modulates open to maximum position

Return air damper is completely closed when outside damper is 100% open

Step 3: Simulate a cooling load with Y1 and Y2 energized

Outside air damper modulates open to maximum position

Return air damper is completely closed when outside damper is 100% open

Outside air damper is 100% open and first stage mechanical cooling is energized (where applicable)

Step 4: Set Minimum Position determined by governing body (See Recorded Data below). De-energize Y1 and Y2 with fan only running

Verify the outside dampers close to the proper minimum position

Set DCV Setpoint (if using CO_2 sensing)

Set DCV MAX Setpoint (if using CO_2 sensing)

Step 5: Set thermostat to unoccupied mode calling for fan only (can be simulated by disconnecting 'N' terminal)

Verify outside damper closes 100%

Step 6: If using CO_2 sensing, blow on CO_2 Sensor or provide CO_2 gas to drive up DC Voltage output

Outdoor damper should drive open to DCV MAX Setpoint

IV. RECORD OPERATING CONDITIONS

Changeover Setpoint: A ___ B ___ C ___ D ___

Control Strategy: Dry Bulb ___ Enthalpy ___ Differential Enthalpy ___ Other _____

Outdoor Air Dry Bulb Temperature: _____

Return Air Dry Bulb Temperature: _____

Return Air Wet Bulb Temperature: _____

Percent of outside air at minimum position: _____

Minimum position is set according to: ASHRAE ____ Cal Title 24 ____ Washington Energy Code ____ Local Code ____
Other: _____

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