

# Instructions to Install Replacement ZEC Controller Kit

These instructions explain how to replace existing unit controls with the ZEC controller kit.

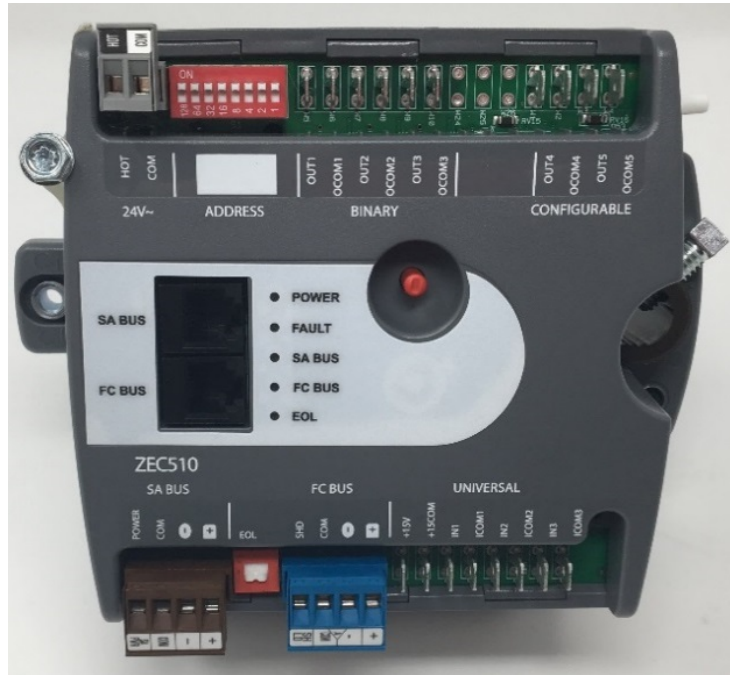


Figure 1 – ZEC Controller

## 1. SETUP

- a. Remove power to the unit in accordance with LOTO procedures.
- b. Tool(s) Required
  - i. 1/4" Nut driver
  - ii. 5/16" Nut driver

## 2. IDENTIFY COMPONENTS

- a. Locate the existing controls within the control enclosure.
- b. Confirm all parts listed in replacement kit are present. The part number of the retrofit kit will be 66-13070-xx through 66-13075-xx, where "-xx" is different depending on the selected control sequence and optional transformer.

QTY	Component	Description
1	Controller	ZEC controller (mounted in control enclosure)
1	50VA XFMR	Transformer (not included in every kit)
1	XFMR ground wire	Transformer ground wire (included only with transformer)
1	SAT (inlet) sensor	Supply Air (inlet) Temperature sensor (included only with EH)
1	SPDT Pressure Switch	Pressure switch (included only with fan powered boxes)
1	Enclosure	Control enclosure with 2-sided cover
1	Line Block	Line block for incoming power
1	-	Wiring Diagram (this is intended to be left with the unit after installation)

### 3. CONTROL ENCLOSURE: REPLACE CONTROLLER / ACTUATOR AND WIRING

#### Remove Existing Control Enclosure

- a. Decouple the actuator from the damper shaft.
- b. Disconnect and discard the wires between the actuator and controller.
- c. Remove and discard the existing damper actuator.
- d. Lift the remaining wires connected to the existing controls.
  - i. It is recommended to temporarily label these with the function associated with each wire (e.g., 24V power, thermostat, 1<sup>st</sup> stage EH, etc.).
- e. Remove the wires from the existing control enclosure and remove the control enclosure from the side of the equipment.

*Note: It is acceptable to remove the controls from the provided control enclosure and install them in the existing enclosure if it makes the replacement easier depending on the existing unit's configuration and additional parts in the existing control enclosure.*

#### Install Replacement Control Enclosure

- f. Install the replacement control enclosure.
- g. Secure the integral damper actuator onto the damper shaft and tighten.
- h. Terminate the lifted/labeled wires from the existing controls onto the ZEC controller in accordance with the provided diagram.
- i. *For units with Electric Heat:* Install supply air (inlet) temperature sensor in the inlet duct (with primary air) and wire to IN3/ICOM3 on the controller.
  - i. Recommended minimum distance of 1 to 1.5 duct diameters upstream of airflow probe.
- j. Connect the wires to the thermostat at the controllers 4-wire SA bus (POWER, COM, +, -)

*Note: Pay attention to the wire colors and their location because they'll land at the same place on the thermostat.*

### 4. THERMOSTAT: REPLACE THERMOSTAT AND WIRING

- a. Disconnect wires from the existing thermostat.
- b. Remove and discard the existing thermostat.
- c. Matching up the wire colors from the 4-wire SA bus on the controller, terminate the wires on the corresponding location on the 4-wire SA bus on the thermostat.
- d. Mount the thermostat.

### 5. VERIFICATION

- a. Verify all wiring connections per the wiring diagram provided with this kit and the original wiring diagram.
  - i. Ensure that no wires other than the ones specified above were disconnected.
  - ii. Ensure that the new wires have been connected as specified above.

## 6. CONFIGURATION (as necessary)

- a. Connect the MAP configuration tool to either the thermostat or the controller and allow time to confirm connection.
- b. Connect to the MAP using a Wi-Fi enabled device (e.g., cell phone, tablet, laptop).
- c. Login to the MAP and navigate to the **Devices** tab, selecting the ZEC from the **Device List**.
- d. Navigate to the **Setup** section of the **Home Page** menu:
  - i. **Occupancy Polarity**: Defines the normal position of the sensor contact: **Close** or **Open** (e.g., Close means that contact opens when occupied). When **Occupancy Sensor Enable** is **TRUE**, this will be **Close**.
  - ii. **Occupancy Sensor Enable**: Determines if a pressure switch is used to sense occupancy (air handler on) when the damper valve is closed. Enviro-Tec equipment includes the pressure switch for fan powered (series and parallel flow) boxes.
  - iii. **Damper Mode**: Sets the direction to close the primary air damper. This can be set to **Normal** (counterclockwise to close) or **Reverse** (clockwise to close). Check which direction closes the dampers and use the **Damper Mode** parameter to set the direction. Enviro-Tec equipment closes clockwise (**Reverse**).
  - iv. **Supply Area**: Used to calculate the supply flow. Refer to the values below for Enviro-Tec equipment depending on unit size and damper rotation angle.
  - v. **Supply Airflow Pickup Gain**: Shows the K-factor for the box. This parameter calibrates the flow. Refer to the values below for Enviro-Tec equipment depending on unit size and damper rotation angle.
  - vi. **Occupancy Determination Flow Setpoint**: Threshold that determines occupancy; above this setpoint, the system is occupied. For fan powered boxes with pressure switch, set to 10000 CFM to use pressure switch input only.

Enviro-Tec Equipment			
Inlet Size	Damper Rotation	Supply Area	Supply Airflow Pickup Gain (K-factor)
04	90	0.09	1.63
05	90	0.14	1.66
06	90	0.20	2.90
08	90	0.35	2.52
10	90	0.55	2.41
12	90	0.79	2.38
14	90	1.07	2.29
16	90	1.40	2.29
18	90	1.77	2.43
19	90	1.97	2.92
22	90	2.64	2.65
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10	45	0.56	2.58
12	45	0.78	2.49
13	45	0.89	1.93
14	45	0.97	2.40
16	45	1.43	2.28

- e. Navigate to the **Commissioning** section of the **Home Page** tab to set the following flow parameters:
- i. **Cooling Max Flow:** Sets the maximum supply airflow of the VAV box when cooling. Adjustable: 0 cfm to 10,000 cfm.
  - ii. **Occupied Cooling Min Flow:** Sets the minimum supply airflow of the VAV box when cooling. Adjustable: 0 cfm to 10,000 cfm.
  - iii. **Occupied Heating Min Flow:** Sets the minimum supply airflow of the VAV box when heating. Adjustable: 0 cfm to 10,000 cfm. Note: When the zone is heating, the supply airflow is constant and there is no maximum heating air-flow.
  - iv. **Unoccupied Cooling Min Flow:** Sets the minimum supply airflow of the VAV box when in unoccupied cooling mode. Adjustable: 0 cfm to 10,000 cfm. For standalone, we recommend setting equal to the Occupancy Determination Flow Setpoint parameter.
  - v. **Unoccupied Heating Min Flow:** Sets the minimum supply airflow of the VAV box when in unoccupied heating mode. Adjustable: 0 cfm to 10,000 cfm. For standalone, we recommend setting equal to the Occupancy Determination Flow Setpoint parameter.
  - vi. **Warmup Min Flow:** Displays the minimum flow to the VAV box during morning warm-up. Adjustable: 0 cfm to 10,000 cfm.
  - vii. **Staged Reheat Min Flow:** Sets the minimum heating flow for staged reheat control. Adjustable: 0 cfm to 10,000 cfm.

Parameter Name	Single Duct	Series Flow	Parallel Flow
<b>Cooling Maximum Flow</b>	Max Primary CFM	Max Primary CFM	Max Primary CFM
<b>Occupied Cooling Min Flow</b>	Min Primary CFM	Min Primary CFM	Min Primary CFM
<b>Occupied Heating Min Flow</b>	Heat CFM or Min Primary CFM for Cooling Only	PAFH or Min Primary CFM for Cooling Only	PAFH or Min Primary CFM for Cooling Only
<b>Unoccupied Cooling Min Flow</b>	100	0	0
<b>Unoccupied Heating Min Flow</b>	100	0	0
<b>Warmup Min Flow</b>	Min Primary CFM	Min Primary CFM	Min Primary CFM
<b>Staged Reheat Min Flow</b>	70 * EH kW	0	0

- f. Navigate to the **Setpoints** section of the **Home Page** tab to set the following parameters:
- i. **Occupied Cooling Setpoint:** When occupied, the thermostat controls cooling to this level. Set above occupied heating setpoint. Adjustable: 46°F to 99°F. Enviro-Tec factory default: 72°F
  - ii. **Occupied Heating Setpoint:** When occupied, the thermostat controls heating to this level. Set below occupied cooling setpoint. Adjustable: 45°F to 98°F. Enviro-Tec factory default: 68°F
  - iii. **Unoccupied Cooling Setpoint:** When unoccupied, the thermostat controls cooling to this level. Adjustable: 46°F to 99°F. Enviro-Tec factory default: 55°F
  - iv. **Unoccupied Heating Setpoint:** When unoccupied, the thermostat controls heating to this level. Adjustable: 45°F to 98°F. Enviro-Tec factory default: 85°F
- g. Confirm unit operates as desired and leave the provided wire diagram in the control enclosure.