

INSTALLATION INSTRUCTIONS MODELS RXRD-11MCDAM3 VERTICAL AIRFLOW ECONOMIZERS

▲ WARNING

THIS ACCESSORY IS TO BE INSTALLED BY A QUALIFIED, LICENSED SERVICE PERSON. TO AVOID UNSATISFACTORY OPERATION OR DAMAGE TO THE PRODUCT AND POSSIBLE UNSAFE CONDITIONS, INCLUDING ELECTRICAL SHOCK, REFRIGERANT LEAKAGE AND FIRE, THE INSTALLATION INSTRUCTIONS PROVIDED WITH THIS ACCESSORY MUST BE STRICTLY FOLLOWED AND THE PARTS SUPPLIED USED WITHOUT SUBSTITUTION. DAMAGE TO THE PRODUCT RESULTING FROM NOT FOLLOWING THE INSTRUCTIONS OR USING UNAUTHORIZED PARTS MAY BE EXCLUDED FROM THE MANUFACTURER'S WARRANTY COVERAGE.

▲ WARNING

DISCONNECT ELECTRICAL POWER TO THE UNIT. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

▲ WARNING

ADDING POWERED EXHAUST MAY BE REQUIRED IN BUILDINGS WITH EXCESSIVE ENVELOPE AIR LOSSES AND/OR RESTRICTIVE RETURN AIR CONDITIONS TO THE UNIT PREVENTING ADEQUATE RETURN AIR TO THE UNIT WHEN ECONOMIZER IS OPEN TO OUTSIDE AIR.

TOOLS REQUIRED FOR INSTALLTION:

3/8" Electric drill with 5/16" socket

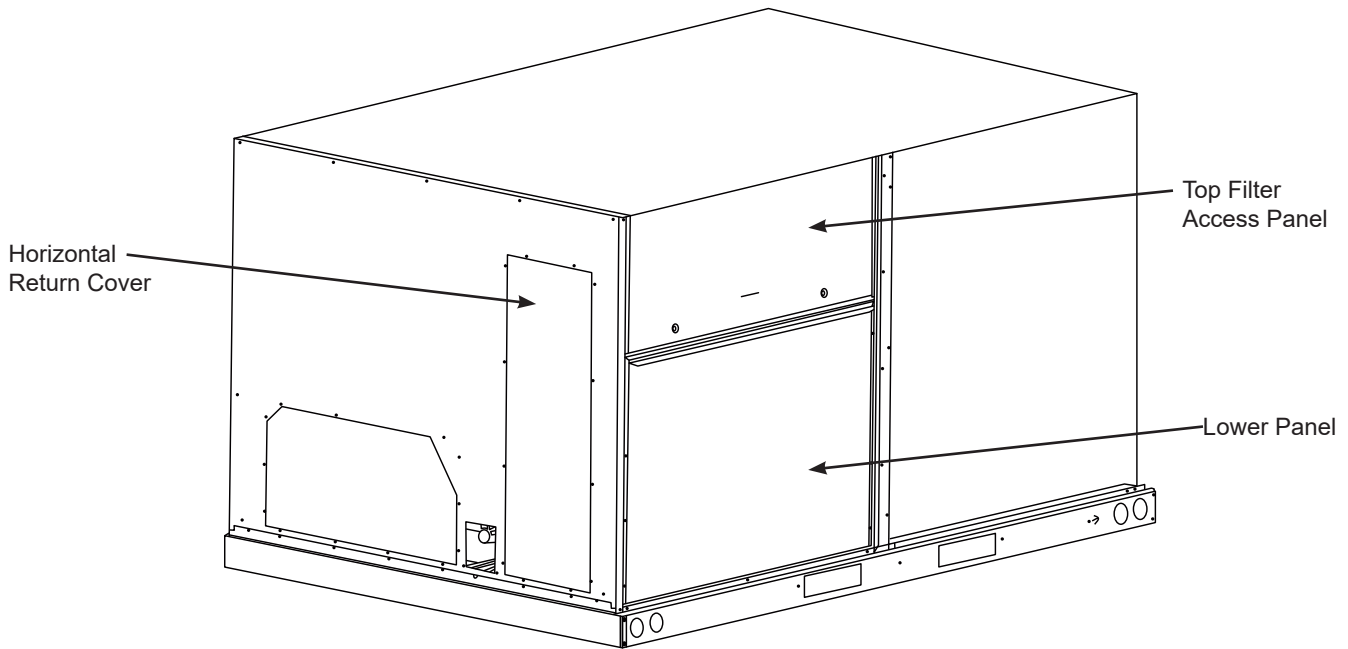
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TABLE 1

ITEM	DESCRIPTION	QTY	PART NO.
1	Economizer with actuator and outside air enthalpy sensor	1	ECD-RRC0CC-DCES/XCES
2	EconomizerTPNL	1	EC1124
3	Hood left side	1	EC1119
4	Hood right side	1	EC1120
5	Hood divider A/B	1	EC1118 / EC1123
6	Hood front support bracket	1	EC1121
7	Permanent water entrainment filter 34 3/4" x 12 1/4" x 1"	1	9460-3413
8	Hardware bag, Hood	1	9908-1080
9	Hardware bag - Siemens controller with attached wiring harness, MAT Sensor (9901-1619), (13) 1/2" #10 SMS Screws, (4) Zip ties, Enthalpy sensor (9901-3535)	1	9908-1381
10	Patch harness 45-42522-237	1	9908-2571

Note: This economizer meets state and national codes for leakage. The economizer must be installed square with +/- 1/32" to maintain tight damper seal. **SEE PAGE 4 FOR ILLUSTRATIONS.**

FIGURE 1



STEP 1:

Immediately upon receipt, all cartons and contents should be inspected for transit damage. Units with damaged cartons should be opened immediately. If damage is found, it should be noted on the delivery papers and a damage claim filed with the last carrier. Compare carton(s) contents to the PACKAGE CONTENTS List (**Table 1**) above to note any missing items.

STEP 2:

Remove HORIZONTAL RETURN COVER, TOP FILTER ACCESS DOOR, and LOWER PANEL from the unit and retain screws for reuse (**SEE FIGURE 1**).

Note: the lower panel will be used for the top of the economizer hood. **Note:** The economizer upper panel is shipped taped to the top of the economizer. Remove and set aside.

STEP 3:

Route the jumper harness as required. Reference the IO for the Jumper Wire Harness for installation.

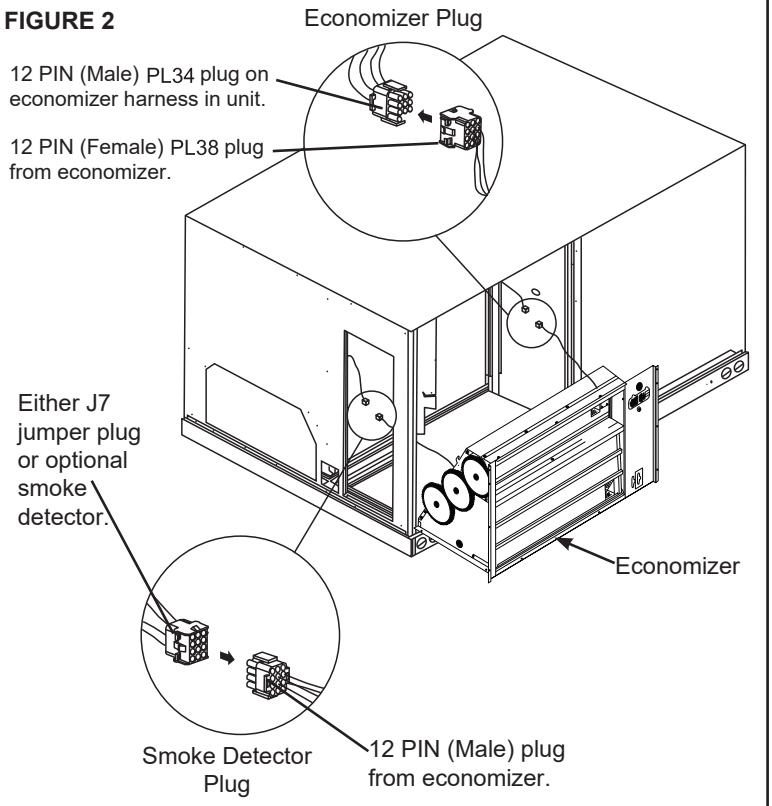
STEP 4:

Remove the jumper plug (PL36) from economizer harness in HVAC unit. Slide the economizer into the return air section (**SEE FIGURES 2 and 3**). Screw in place. After economizer is installed, connect unit's 12-pin ECONOMIZER PLUG (PL34) to economizer mating plug (PL38). If not using a field-installed smoke detector kit, reinstall the jumper plug (PL36) into other 12-pin plug from economizer – note this 12-pin plug will have only 3 wires connected to it. If using a field-installed smoke detector, retain the jumper plug (PL36) and attach it to the harness with one of the supplied zip ties for future troubleshooting, then install the smoke detector kit using provided instructions.

STEP 5:

Install outside air sensor on economizer per **FIGURE 3**, then remove the tape holding relief dampers closed.

FIGURE 2



STEP 6:

Install the economizer as shown in **FIGURE 2**. With supplied screws secure economizer on both side flanges and bottom flange with screws provided. Install ECONOMIZER TPNL (shipped taped to economizer damper) onto unit, at top of economizer (**SEE FIGURE 5**). This panel provides a transition between the filter door and the hood top. Screw in place through pre-punched hole in panel and into top hole of economizer damper. To ensure proper location, TPNL will be 25 7/8" from bottom of unit (**SEE FIGURE 5**).

STEP 7:

Locate the lower panel removed in STEP 2. Easier if assembled upside down. Attach the left and right hood side to mounting flange on inside of panel. Use supplied screws to screw in place through pre-punched holes in panel. **SEE FIGURE 4**.

STEP 8:

Locate hood divider A/B from hood package and assemble it per **FIGURE 4** between the Left and Right hood sides using supplied screws.

STEP 9:

Insert the permanent filter into the hood using the hood divider to rest the filter on the hood divider. **SEE FIGURE 4**.

STEP 10:

Mount the hood assembly to RTU over the economizer. **SEE FIGURE 7**. You will need to temporarily remove the TPNL to install the hood kit. Then use supplied self tapping TEK screws into hood top as shown in **FIGURE 6**.

STEP 11:

Remove the unit panel covering the indoor blower section. Mount the provided mixed air / discharge air sensor in the indoor blower section. Wire tied to harness bundle. Connect two black wires with the 2-pin plug to the sensor. **SEE FIGURE 9** See wiring diagram. **SEE FIGURE 11**

STEP 12:

Installing the Siemens Controller - Secure Controller in the left side of the control panel as shown in **FIGURE 10** using existing pre-punched holes. Route the wiring harness as shown in Figure 10 and plug in as shown in Figure 10.

STEP 13:

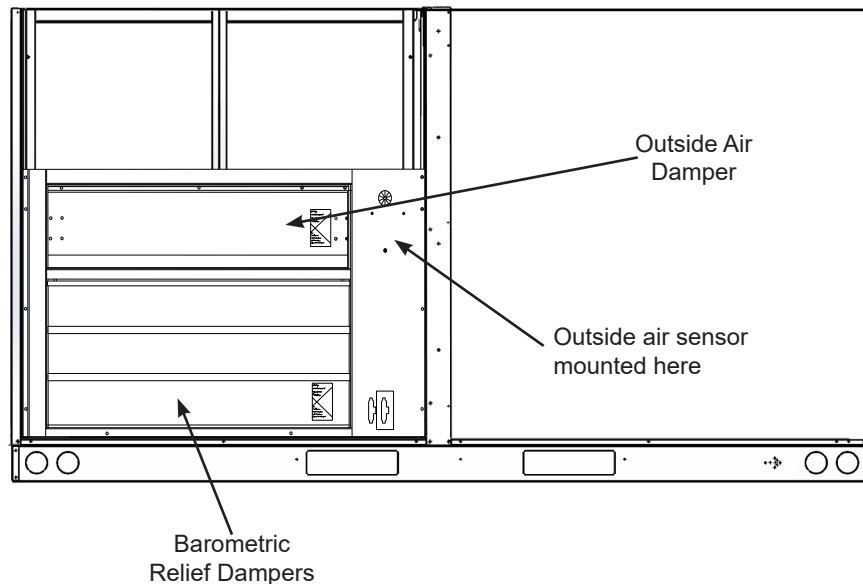
Reinstall the unit's horizontal return panel and the filter access panel. If the unit has a hinged filter access, screw the hinges into the provided holes in the TPNL.

STEP 14:

Upon unit startup, follow the Siemens economizer controller setup instructions on the following pages. See set points menu.

NOTE: FOR THOSE UNITS WITHOUT PREPUNCHED HOLES FOR THE SIEMENS CONTROLLER, A SEPERATE MOUNTING BRACKET IS INCLUDED. (TO BE ADDED WHEN CONTROLLER IS MOUNTED)

FIGURE 3



*Attach partially assembled hood onto unit with supplied screws (**SEE FIGURE 7**).

FIGURE 4

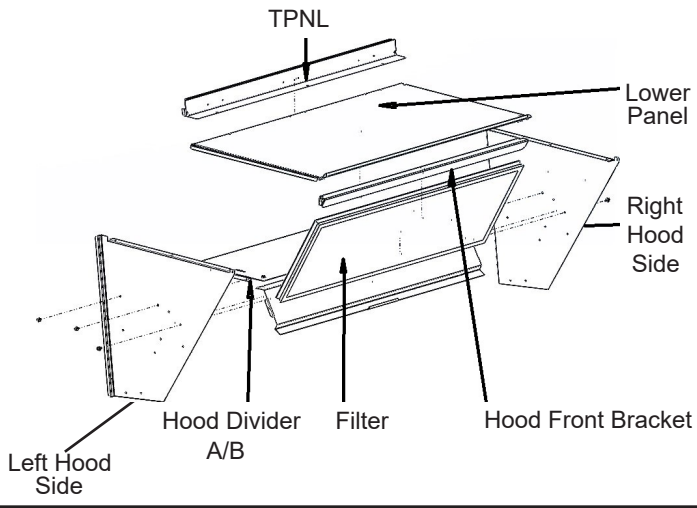


FIGURE 5

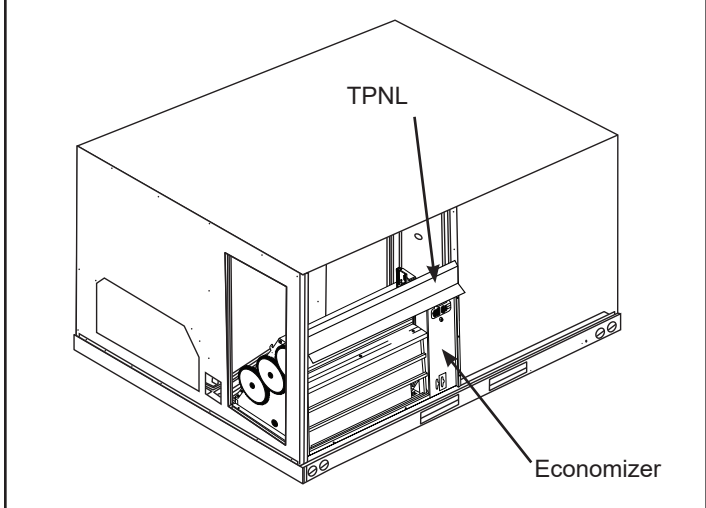


FIGURE 6

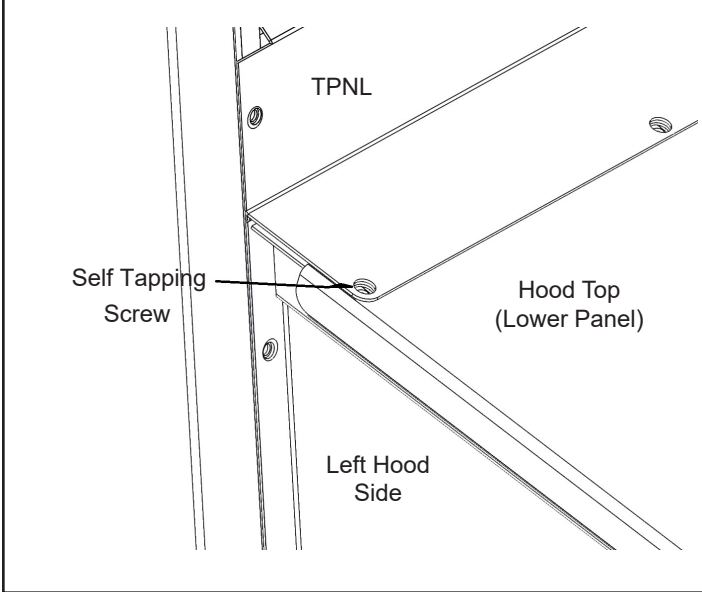


FIGURE 7

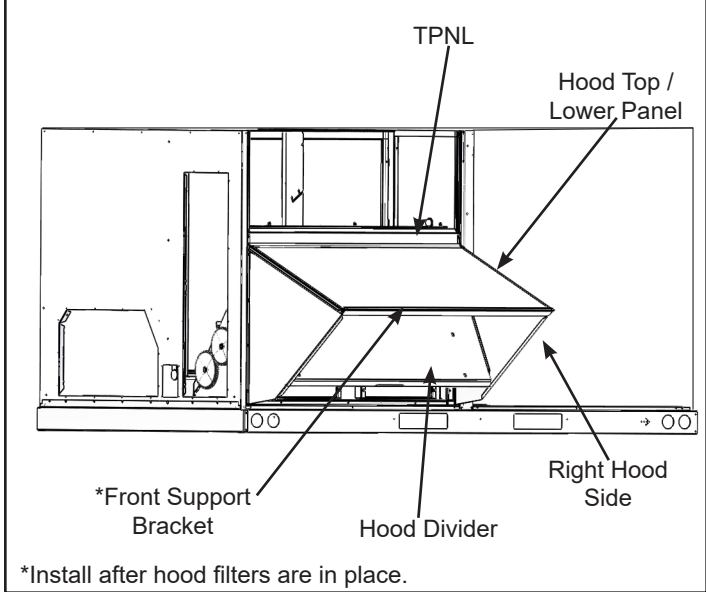


FIGURE 8

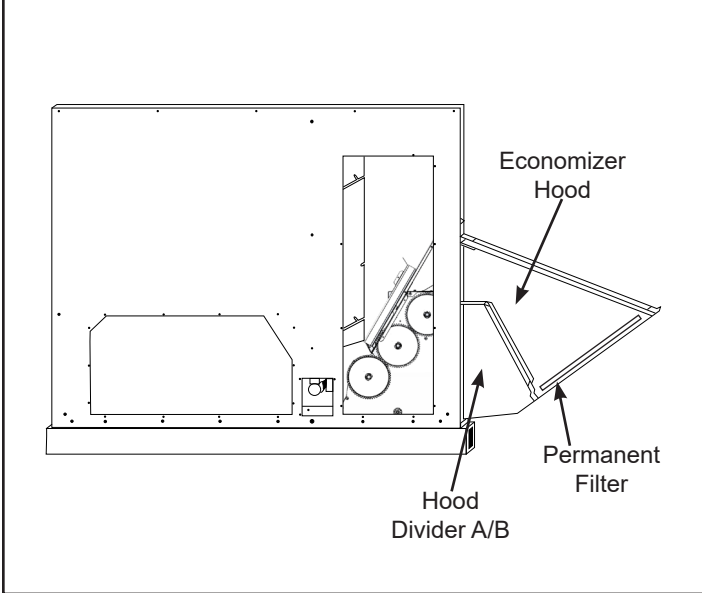


FIGURE 9

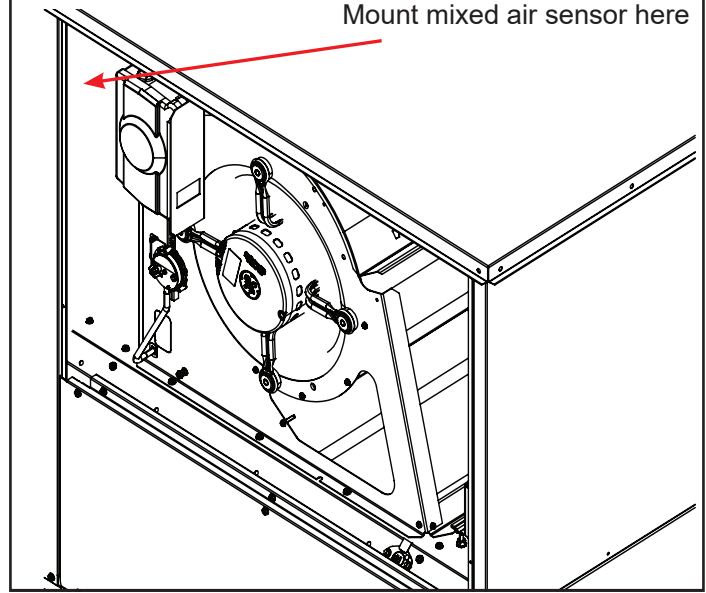


FIGURE 10

Siemens economizer controller field-mounted in control compartment of HVAC unit.

Unit control board factory-mounted in control compartment of HVAC unit.

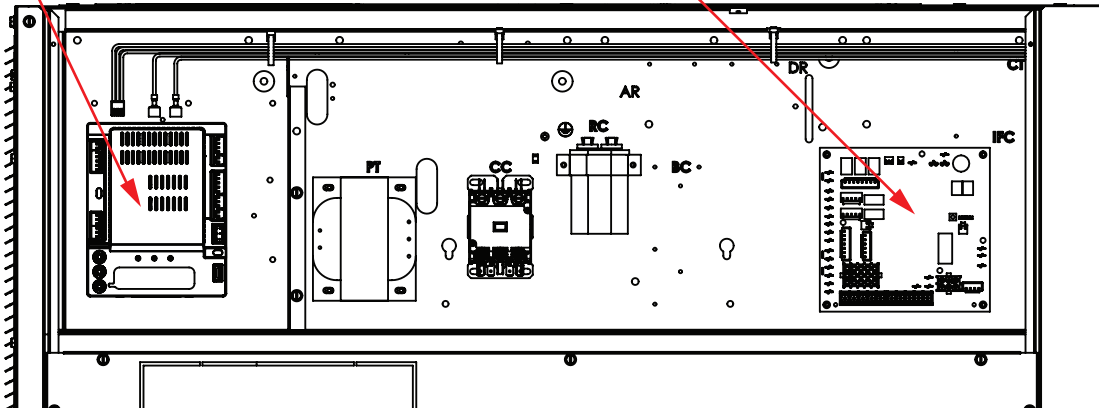
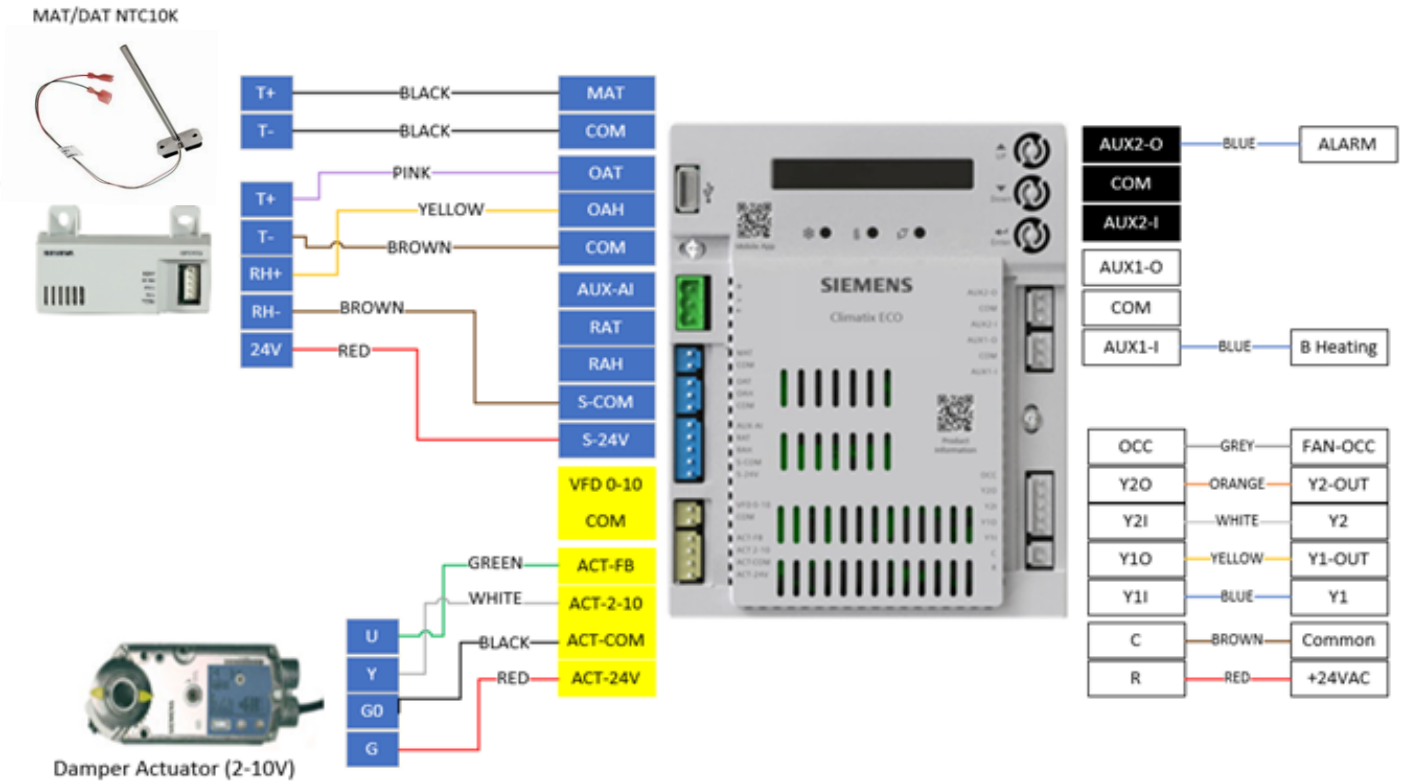


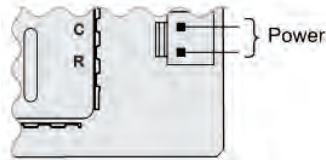
FIGURE 11- WIRING



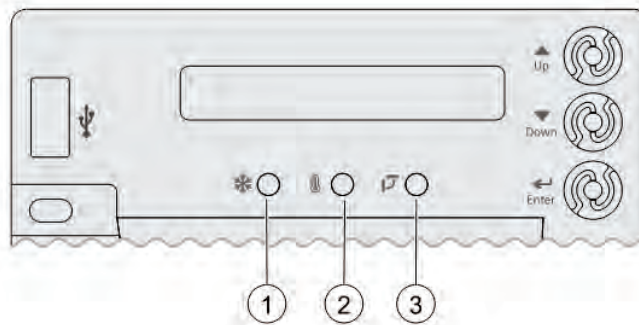
Interface Overview

Powering the Economizer Controller

Connect a 24 Vac external power supply source to the following terminals to power the Economizer Controller.



LED Indication



No.	Description
1	Free Cooling LED
2	Sensor LED
3	DAC LED

LED Indication

Status	Free Cooling LED	Sensor LED	DAC LED
Commissioning mode	Yellow Blinking	Yellow Blinking	Yellow Blinking
Power start-up	Yellow On	Yellow On	Yellow On
Free cooling is running	Green On	-	-
Free cooling is available but not running	Green Blinking	-	-
Not economizing when it should	Red Blinking	-	-
Economizing when it should not	Red On	-	-
Sensors working ok	-	Green On	-
Humidity sensor error	-	Yellow On	-
CO ₂ sensor error	-	LED Off	-

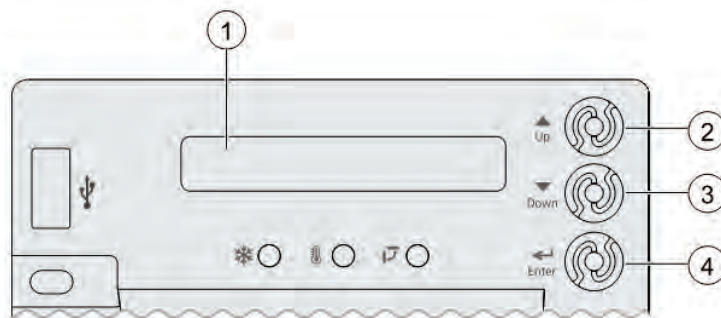
Status	Free Cooling LED	Sensor LED	DAC LED
Air temperature failure/fault	-	Red On	-
Excess outdoor air	-	Red Blinking	-
Damper working ok	-	-	Green On
Damper not modulating	-	-	Red On
Damper slippage	-	-	Red Blinking
Damper unplugged	-	-	Fast Red Blinking
Terminal ACT-FB is configured but no available feedback signal	-	-	LED Off

NOTICE

If different faulty events occur at the same time, sensor/DAC LED lights up following the priority below: Red -> Yellow -> Off. For example, if there is a humidity sensor error and air temperature failure at the same time, the sensor LED turns red rather than yellow.

After the Economizer controller enters the running state, it may take one minute for peripheral devices to complete initialization. Before that, LED indication might be unstable.

User Interface



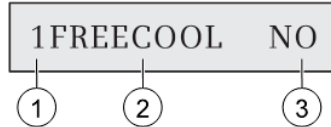
No.	Description
1	One-line LCD. After a period of inactivity, the controller displays the default HMI screen (free cooling status, '1FREECOOL YES' or '1FREECOOL NO')
2	Operation button (Up button) - Move to the previous value, step or category
3	Operation button (Down button)- Move to the next value, step or category
4	Operation button (Enter button): <ul style="list-style-type: none"> ● Press to edit the current value or option. ● Press to confirm a newly selected value or option. ● Press Enter + Up to jump up one entire category. ● Press Enter + Down to jump down one entire category.

Menu Structure

Menus are displayed in the Economizer Controller as per categories. There are eight first-level menus, each of which is represented by a number at the beginning of the line on the LCD. Pressing Enter + Up or Down can toggle between different first-level menus.

Submenus follow the numbered first-level menus closely. Pressing Up or Down can toggle between different submenus.

At the end of the line, the LCD displays the value of the current submenu (if any). If the value is editable, pressing Enter enters the Edit mode. The value is then highlighted for change. After making a change by pressing Up or Down, press Enter to confirm the change and exit the Edit mode.



No.	Description
1	Number representing the first-level menu of Status Display . Different numbers represent different menus: <ul style="list-style-type: none"> • 1: Status Display • 2: Basic Settings • 3: Advanced Settings • 4: Alarms • 5: Enter Configuration State and Reset • 6: I/O Config • 7: Testing • 8: Enter Running State
2	Submenu*
3	Value of the current submenu*

* See Setup and Configuration [→ 29] for detailed submenus together with possible values or ranges.

Functions

Free Cooling Economizing

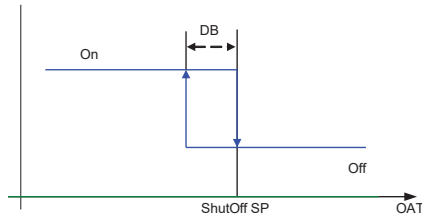
Free cooling uses unconditioned outside air to cool the space directly. The Economizer Controller enables or disables free cooling after it judges which control mode is active. It also uses hysteresis to ensure a smooth switchover.

Depending on the sensors that are used, there are four different control modes. In different control modes, the assessed conditions are different.

Control Mode	Used Sensors	Enable Free Cooling?
Control Mode 1 - Fixed Dry-bulb	OA (outside air) temperature sensor and MA (Mixed Air) temperature sensor	The outside-air dry-bulb temperature is compared with the set temperature shutoff setpoint. If the outside-air dry-bulb temperature is below the temperature shutoff setpoint, the outside air is used to meet all or part of the cooling demand.
Control Mode 2 - Differential Dry-bulb (Dual Dry- Bulbs)	OA temperature sensor, RA (Return Air) temperature sensor and MA temperature sensor	The outside-air dry-bulb temperature is compared with the return-air dry-bulb temperature. If both OAT and RAT are higher than the temperature high limitation, free cooling is prohibited. If OAT or RAT is lower than the temperature high limitation and the outside-air dry-bulb temperature is lower than the return-air dry-bulb temperature, the outside air is used to meet all or part of the cooling demand.
Control Mode 3 - Combination Fixed Enthalpy and Fixed Dry-bulb Control	OA temperature and humidity sensor, and MA temperature sensor	The outside-air dry-bulb temperature and enthalpy are compared with the set temperature and enthalpy shutoff setpoints. If the outside-air enthalpy is lower than the set enthalpy shutoff setpoint, and the outside-air dry bulb temperature is lower than the temperature shutoff setpoint, the outside air can be used for economizing.
Control Mode 4 - Combination of Differential Enthalpy and Fixed Dry-bulb	OA temperature and humidity sensor, RA temperature and humidity sensor, and MA temperature sensor	The outside-air dry-bulb temperature and enthalpy are compared with the temperature shutoff setpoint and return-air enthalpy. If both OA enthalpy and RA enthalpy are higher than the enthalpy high limitation, free cooling is prohibited. If OA enthalpy or RA enthalpy is lower than the enthalpy high limitation, outside-air enthalpy is lower than the return-air enthalpy, and the outside-air dry-bulb temperature is lower than the set temperature shutoff setpoint, then outside air can be used for economizing.

Default hysteresis setting

Hysteresis setting (DB) defaults to 2 °F.



Damper modulation during free cooling

Once outside air is suitable for free cooling, the controller modulates the damper based on MAT (mixed air temperature, default) or OAT (outside air temperature).

If MAT is used when free cooling is enabled, MAT setpoint ('3MAT SET', configurable under Advanced Settings [→ 33]) is used for MAT modulating. When MAT falls below the anti-freeze setpoint (3FRZ PROT), the damper either fully closes or opens to the minimum position (configurable under Advanced Settings [→ 33]).

- If MAT is lower than MAT setpoint, the damper is modulated to maintain MAT setpoint, towards fully closes or opens to the minimum position based on occupancy status if MAT continues dropping.
- If MAT is in the range [MAT setpoint, (MAT setpoint + neutral zone band (1 °F by default))], the damper position remains no change.
- If MAT is higher than (MAT setpoint + neutral zone band), the damper opens towards fully open.
- If MAT is 10 °F higher than MAT setpoint, the damper fully opens to 100%.

If OAT is used when there is a cooling demand, the damper can be opened to different positions depending on different outside air temperatures:

- If outside air is higher than 50 °F but lower than the temperature shutoff setpoint, the damper is fully open.
- If outside air is higher than OAT lockout setpoint but lower than 50 °F, linear modulation is applied when only Cooling Stage 1 input (Y1) is ON. Result of the following formula indicates the damper's open position:

$$\left(\frac{(\text{OAT} - \text{OAT Lockout Setpoint})}{(50 - \text{OAT Lockout Setpoint})} \right) * (80\% - \text{MIN POS}) + \text{MIN POS}$$

Note: When both free cooling and mechanical cooling are on, damper remains fully open regardless of the modulating logic.

5.2 Location-based Shutoff Setpoints

The Economizer Controller can get location-based temperature and enthalpy shutoff setpoints automatically if it is connected to the Climatix Mobile application. Once a WLAN stick is plugged, the Economizer Controller can establish network connection with the Climatix Mobile application. The temperature and enthalpy shutoff setpoints obtained via the phone or tablet's GPS functionality can then be synchronized to the Economizer Controller.

5.3 Cooling Stage Operation

The Economizer Controller accepts inputs for 1-, 2- and 3-stage cooling inputs, and reroutes to the RTU through the relay connection Y1, Y2 and AUX1/AUX2.

The operation of the cooling stages is determined by the availability of Free Cooling provided by the economizer operation mode. See Cooling Stage I/O Logic tables [→ 19].

Based on the use of Free Cooling, the operating modes are as follows:

- Y1 is Stage 1 Cooling Demand.
- Y2 is Stage 2 Cooling Demand.
- Y3 is Stage 3 Cooling Demand.
- Free Cooling is always the first cooling stage.
- Cooling Stage 1 call from the Commercial Thermostat (Y1) energizes the Y1 input to the Economizer Controller.
- Cooling Stage 2 call from the Commercial Thermostat (Y2) energizes the Y2 input to the Economizer Controller.
- Cooling Stage 3 call from the Commercial Thermostat energizes the AUX1/AUX2 input to the Economizer Controller.

Economizer condition met	Y1	Y2	Cooling Stage 1	Cooling Stage 2
No	On	On	On	On
No	On	Off	On	Off
No	Off	Off	Off	Off
Yes	On	On	On	On/Off*
Yes	On	Off	Off	Off
Yes	Off	Off	Off	Off

Table 1: 1- and 2-Stage Cooling I/O Logic

* If $OAT \leq MAT$ setpoint (3MAT SET), then Relay 2 is always **OFF** to disable Cooling Stage 2. Otherwise, if both stages of cooling (Y1 and Y2) are **ON** for more than a set time (15 minutes by default), Y2 remains **ON**, and the OAT is higher than MAT setpoint, then Relay 2 energizes to allow Y2 pass-through to enable Cooling Stage 2. If you want to change to another set time, configure '3STG3 DLY' as desired. See Advanced Settings [→ 33] for more details of '3STG3 DLY'.

Economizer condition met	Y1	Y2	Y3	Cooling Stage 1	Cooling Stage 2	Cooling Stage 3
No	On	On	On	On	On	On
No	On	On	Off	On	On	Off
No	On	Off	Off	On	Off	Off
No	Off	Off	Off	Off	Off	Off
Yes	On	On	On	On	On	On/Off*
Yes	On	On	Off	On	On/Off	Off
Yes	On	Off	Off	Off	Off	Off
Yes	Off	Off	Off	Off	Off	Off

Table 2: 1-, 2- and 3-Stage Cooling I/O Logic

* If $OAT \leq MAT$ setpoint, then Relay 3 is always **OFF** to disable Cooling Stage 3. Otherwise, if all cooling stages (Y1, Y2 and Y3) are **ON** for more than a set time (15 minutes by default), Y3 remains **ON**, and the OAT is higher than MAT setpoint, then Relay 3 energizes to allow AUX1/AUX2 pass-through to enable Cooling Stage 3. If you want to change to another set time, configure '3STG3 DLY' as desired. See Advanced Settings [→ 33] for more details of '3STG3 DLY'.

The Economizer Controller can tolerate thermostat wiring mismatch, e.g. Thermostat Y1 -> Economizer Y2-In, Thermostat Y2 -> Economizer Y1-In. The handling logic is Stage = Y1I + Y2I + Y3I. For example, Y1O = 1 if Stage >= 1, Y2O = 1 if Stage >= 2, Y3O = 1 if Stage = 3.

Multi-Speed Fan Support

The Economizer Controller supports connection to 2- and 3-speed fans. When the unit is equipped with a multi-speed fan, the damper responds to multiple fan speeds via multiple minimum positions (**MIN POS**) to keep minimum airflow.

A multi-speed fan is not controlled by the Economizer Controller but an external logic board.

Y1	Y2	Spd L ¹⁾	Spd H ²⁾	PosL ³⁾	PosH ⁴⁾
X	-	X	-	X	-
X	X	-	X	-	X

Table 3: Damper MIN POS for 2-Speed Fan (No W1 or O/B)

Y1	Y2	W1 or O/B = B (Heating)	OB = O (Cooling)	Spd L ¹⁾	Spd H ²⁾	PosL ³⁾	PosH ⁴⁾
X	-	-	X	X	-	X	-
X	X	-	X	-	X	-	X
-	-	X	-	-	X	-	X

Table 4: Damper MIN POS for 2-Speed Fan (With W1 or O/B)

1 Spd L = Low Speed (Fan)

3 PosL = Damper MIN POS for Low-Speed Fan

2 Spd H = High Speed (Fan)

4 PosH = Damper MIN POS for High-Speed Fan

Y1	Y2	Y3	Spd L ¹⁾	Spd M ²⁾	Spd H ³⁾	PosL ⁴⁾	PosM ⁵⁾	PosH ⁶⁾
X	-	-	X	-	-	X	-	-
X	X	-	-	X	-	-	X	-
X	X	X	-	-	X	-	-	X

Table 5: Damper MIN POS for 3-Speed Fan (No W1 or O/B)

Y1	Y2	Y3	W1 or O/B = B (Heating)	OB = O (Cooling)	Spd L ¹⁾	Spd M ²⁾	Spd H ³⁾	PosL ⁴⁾	PosM ⁵⁾	PosH ⁶⁾
X	-	-	-	X	X	-	-	X	-	-
X	X	-	-	X	-	X	-	-	X	-
X	X	X	-	X	-	-	X	-	-	X
-	-	-	X	-	-	-	X	-	-	X

Table 6: Damper MIN POS for 3-Speed Fan (With W1 or O/B)

- | | |
|------------------------------|--|
| 1 Spd L = Low Speed (Fan) | 4 PosL = Damper MIN POS for Low-Speed Fan |
| 2 Spd M = Medium Speed (Fan) | 5 PosM = Damper MIN POS for Medium-Speed Fan |
| 3 Spd H = High Speed (Fan) | 6 PosH = Damper MIN POS for High-Speed Fan |

If a single-speed fan connects to the Controller, it opens directly on the call of cooling/heating. The damper position is PosH.

	1-stage Cooling ²⁾	2-stage Cooling ²⁾	3-stage Cooling ²⁾
1-speed Fan¹⁾	Spd H ³⁾ (regardless of cooling demand, OCC=Yes)	Spd H ³⁾ (regardless of cooling demand, OCC=Yes)	Spd H ³⁾ (regardless of cooling demand, OCC=Yes)
2-speed Fan¹⁾	Spd L ⁴⁾ (0 or 1 cooling demand) Spd H ³⁾ (2 cooling demands)	Spd L ⁴⁾ (0 or 1 cooling demand) Spd H ³⁾ (2 cooling demands)	Spd L ⁴⁾ (0 or 1 cooling demand) Spd H ³⁾ (2 or 3 cooling demands)
3-speed Fan¹⁾	Spd L ⁴⁾ (0 or 1 cooling demand) Spd H ³⁾ (2 cooling demands)	Spd L ⁴⁾ (0 or 1 cooling demand) Spd H ³⁾ (2 cooling demands)	Spd L ⁴⁾ (0 or 1 cooling demand) Spd M ⁵⁾ (2 cooling demands) Spd H ³⁾ (3 cooling demands)

Table 7: Different Fan Speeds with Different Configured Outputs

- | | |
|----------------------------------|------------------------------|
| 1 Configured by '6FAN'. | 4 Spd L = Low Speed (Fan) |
| 2 Configured by Y1O, Y2O or Y3O. | 5 Spd M = Medium Speed (Fan) |
| 3 Spd H = High Speed (Fan) | |

If a variable-speed fan is configured, the fan speed control logic is the same with 3-speed fan.

	1-stage Cooling ²⁾	2-stage Cooling ²⁾	3-stage Cooling ²⁾
1-speed Fan¹⁾	2VENTMIN H (regardless of cooling demand, OCC=Yes)	2VENTMIN H (regardless of cooling demand, OCC=Yes)	2VENTMIN H (regardless of cooling demand, OCC=Yes)
2-speed Fan¹⁾	2VENTMIN H (regardless of cooling demand, OCC=Yes)	2VENTMIN L (0 or 1 cooling demand) 2VENTMIN H (2 cooling demands)	2VENTMIN L (0 or 1 cooling demand) 2VENTMIN H (2 or 3 cooling demands)
3-speed Fan¹⁾	2VENTMIN H (regardless of cooling demand, OCC=Yes)	2VENTMIN L (0 or 1 cooling demand) 2VENTMIN H (2 cooling demands)	2VENTMIN L (0 or 1 cooling demand) 2VENTMIN M (2 cooling demands) 2VENTMIN H (3 cooling demands)

Table 10: Different Damper Position Setting with Different Configured Outputs (DCV is Disabled, CO₂ sensor is connected)

1 Configured by '6FAN'.

2 Configured by Y10, Y20 or Y30.

Variable-Speed Fan Support

Once a variable-speed fan is configured with the Economizer Controller via terminal VFD 0-10 and the Fan Configuration in Climatix Mobile or '6FAN' in the inbuilt menu is configured as 'VFD FAN', the controller can control the fan speed following the logic below:

OCC	Y1	Y2	Y3	W1 or O/B	6FAN	On	Spd L ¹⁾	Spd M ²⁾	Spd H ³⁾	Pos L ⁴⁾	Pos M ⁵⁾	Pos H ⁶⁾	DO ⁷⁾
Yes	x	-	-	-	VFD FAN	60%	x	-	-	x	-	-	On
Yes	x	x	-	-	VFD FAN	80%	-	x	-	-	x	-	On
Yes	x	x	x	-	VFD FAN	100%	-	-	x	-	-	x	On
Yes	-	-	-	x	VFD FAN	100%	-	-	x	-	-	x	On
Yes	-	-	-	-	VFD FAN	60%	x	-	-	x	-	-	On
No	x	-	-	-	VFD FAN	60%	x	-	-	-	-	-	On
No	x	x	-	-	VFD FAN	80%	-	x	-	-	-	-	On
No	x	x	x	-	VFD FAN	100%	-	-	x	-	-	-	On
No	-	-	-	x	VFD FAN	100%	-	-	x	-	-	-	On
No	-	-	-	-	VFD FAN	60% ⁸⁾	-	-	-	-	-	-	Off

Table 11: Variable-Speed Fan Control Logic During 3-Stage Cooling

OCC	Y1	Y2	W1 or O/B	6FAN	On	Spd L ¹⁾	Spd M ²⁾	Spd H ³⁾	Pos L ⁴⁾	Pos M ⁵⁾	Pos H ⁶⁾	DO ⁷⁾
Yes	x	-	-	VFD FAN	60%	x	-	-	x	-	-	On
Yes	x	x	-	VFD FAN	100%	-	-	x	-	-	x	On
Yes	-	-	x	VFD FAN	100%	-	-	x	-	-	x	On
Yes	-	-	-	VFD FAN	60%	x	-	-	x	-	-	On
No	x	-	-	VFD FAN	60%	x	-	-	-	-	-	On
No	x	x	-	VFD FAN	100%	-	-	x	-	-	-	On
No	-	-	x	VFD FAN	100%	-	-	x	-	-	-	On
No	-	-	-	VFD FAN	60% ⁸⁾	-	-	-	-	-	-	Off

Table 12: Variable-Speed Fan Control Logic During 2-Stage Cooling

- 1 Spd L = Low Speed (Fan)
- 2 Spd M = Medium Speed (Fan)
- 3 Spd H = High Speed (Fan)
- 4 Pos L = Damper MIN POS for Low-Speed Fan
- 5 Pos M = Damper MIN POS for Medium-Speed Fan
- 6 Pos H = Damper MIN POS for High-Speed Fan
- 7 Optional. Meaningful only if '6AUX1-O' or '6AUX2-O' is configured as 'SUP FAN'.
- 8 Adjustable later on if there is any customer request.

See I/O Configuration [→ 35] for configurations of '6FAN', '6AUX1-O' and '6AUX2-O'.

Cooling Delay via Increasing Fan Speed

If there is cooling demand while outside air is suitable for economizing, the Economizer Controller tries to increase fan speed to maximize the use of outside air first. If the cooling demand is not reached within a set time, mechanical cooling will be enabled.

Typical Field Application

Prerequisites:

- Outside air is suitable for economizing and free cooling is ON.
 - Fan connected to the controller supports multiple speeds. Cooling delay function doesn't work if only a one-speed fan is connected to the controller.
1. If it is a 2-speed fan and there are two cooling demand inputs/outputs, Y1-Input is called, the controller sets fan speed to Speed Low. Damper is fully open (100%).
 - If Y2-Input is called too, the controller increases fan speed to Speed High and starts fan delay (2FAN DLY) time. After the delay time runs out, the controller starts Y1-Output.
 - If the cooling demand is not reached within '3STG3 DLY' time and OAT is higher than MAT setpoint (3MAT SET), the controller starts Y2-Output.
 2. If it is a 3-speed fan, Y1-Input is called, the controller sets fan speed to Speed Low. Damper is fully open (100%).
 - If Y2-Input is called too, the controller increases fan speed to Speed Medium and starts '2FAN DLY' time. After the delay time runs out, the controller starts Y1-Output.
 - If Y3-Input is called too, the controller increases fan speed to Speed High and starts '2FAN DLY' time. After the delay time runs out, the controller starts Y2-Output.
 - If the cooling demand is not reached within '3STG3 DLY' time and OAT is higher than MAT setpoint, the controller starts Y3-Output.
 3. If a variable-speed fan is configured, cooling delay functions the same with 3-speed fan.

NOTICE
See more information about '2FAN DLY' and '3STG3 DLY' in Setup and Configuration [→ 29]. The default time is 5 and 15 minutes respectively.

Demand Control Ventilation (DCV)

The controller modulates the outside air damper based on the CO₂ level through the ppm value selected between the range of 500 and 2000 ppm. The measured CO₂ concentration value is compared with the set DCV setpoint. If the measured CO₂ concentration value is below the DCV setpoint, keep the damper to the minimum position. Otherwise, enable DCV.

Once DCV is enabled, the DCV PID starts to run to control the indoor CO₂ concentration value towards the DCV setpoint. The damper opens to the maximum position.

DCV is disabled if the controller receives no occupancy signal.

Setup and Configuration

Before setup and configuration, it is recommended to obtain some location-based values such as shutoff points or utilize the location services in the Climatix mobile application.

Set up and configure the Economizer Controller before putting it into usage. This can be accomplished by using the Climatix Mobile app or the inbuilt display. After sensor, compressor, thermostat or actuator is connected to the Economizer Controller, values/statuses are displayed in the Operating section of the Climatix Mobile application and on the LCD. You can manually change basic and advanced settings, configure I/Os and test the damper operation and any configured outputs by modifying the corresponding parameter values in the local device or Climatix mobile application. Following chapters describe a complete list of all parameters that you can find on the LCD display. Refer to it during your setup and configuration process. Note that parameters and display menus may display differently/dynamically if different applications are configured.

Not all operations are available on the local POL224.00. For example, you can only obtain shutoff setpoints and perform CFM commissioning via the Climatix mobile application. Setup and configuration on the local device are only recommended if operations from the Climatix mobile application are unavailable. Check the Climatix mobile application for all operations that can be performed from the mobile application end.

By connecting the RS485 port to a PC, all parameters are also readable or writable from PC tools such as Modbus Poll.exe via Modbus and Yabe.exe via MSTP (Bps 38400 (default), Bps 9600, Bps 19200, Bps 115200). Note that an external End of Line (EOL) element is required to achieve Baud Rate 115200 at a maximum cable length of 4000ft (1.2km).

Status Display

Parameter	Description	Value
1FREECOOL	Indicates if the system can use outdoor air for free cooling.	YES
1ECON ENAB	Indicates if outdoor air is being used for the 1st stage of cooling.	NO
1OCCUPIED	Indicates if the space is occupied. If you choose 'ALWAYS' for '6OCC ' when configuring I/Os, the parameter value is 'YES'; if you keep the default selection 'T-STAT' for '6OCC ' and the controller receives 24V signal from OCC input, the value is 'YES'. Otherwise, the value is 'NO'.	
1Y1-IN	Y1-In call from thermostat for Cooling Stage 1	ON
1Y1-OUT	Y1-Out signal to compressor for Cooling Stage 1	OFF
1Y2-IN	Y2-In call from thermostat for Cooling Stage 2	
1Y2-OUT	Y2-Out signal to compressor for Cooling Stage 2 Dynamic item. Appears only if Y2-Out terminal is configured.	
1AUX1-I	Aux1-In signal Dynamic item. Appears only if Aux1-In terminal is configured.	
1AUX1-O	Aux1-Out signal	

Parameter	Description	Value
	Dynamic item. Appears only if Aux1-Out terminal is configured.	
1AUX2-I	Aux2-In signal Dynamic item. Appears only if Aux2-In terminal is configured.	
1AUX2-O	Aux2-Out signal Dynamic item. Appears only if Aux2-Out terminal is configured.	
1COMP STAGE	Indicates compressor current stage.	Off 1 2 3
1HEAT ENAB	Indicates if heating is enabled.	YES
1MIX AIR LOW	Indicates if the anti-freeze protection function is enabled for a mixed air temperature sensor. If the detected air temperature is lower than the anti-freeze protection setpoint (3FRZ PROT), the parameter value is 'YES'. Otherwise, it is 'NO'.	NO
1MAT PRES	Indicates the present value of the mixed air temperature (MAT) sensor. Dynamic item. Appears only if 'MAT' or 'AUTO' is selected for '3DIF T LOC' under Advanced Settings [→ 33].	The corresponding detected value is displayed on the LCD.
1LAT PRES	Indicates the present value of the leaving air temperature (LAT) sensor. Dynamic item. Appears only if 'LAT' or 'AUTO' is selected for '3DIF T LOC'.	
1OAT PRES	Indicates the present value of the outdoor air temperature (OAT) sensor. Dynamic item. Appears only if an OAT sensor is configured.	
1OAH PRES	Indicates the present value of the outdoor air relative humidity (OAH) sensor. Dynamic item. Appears only if an OAH sensor is configured.	
1RAT PRES	Indicates the present value of the return air temperature (RAT) sensor. Dynamic item. Appears only if a RAT sensor is configured.	
1RAH PRES	Indicates the present value of the return air relative humidity (RAH) sensor. Dynamic item. Appears only if a RAH sensor is configured.	
1CO2 PRES	Indicates the present value of the CO ₂ sensor. Dynamic item. Appears only if a CO ₂ sensor is configured.	
1DCV STATUS	Indicates the demand control ventilation (DCV) status. Dynamic item. Appears only if a CO ₂ sensor is configured. Displays ON if the measured CO ₂ concentration value is above the DCV setpoint and OFF if below the DCV setpoint.	ON OFF
1FAN SPD LV	Indicates the current fan speed status (low, medium or high). If a one-speed fan is connected and configured, this item is invisible. If a variable-speed fan is configured, the fan speed control logic is the same with 3-speed fan. Dynamic item. Appears only if '6FAN' is configured as '2SPEED', '3SPEED' or 'VFD FAN' under I/O Configuration [→ 35].	L M H
1VFD SPD	Indicates the current VFD fan speed.	60%

Parameter	Description	Value
	Dynamic item. Appears only if '6FAN' is configured as 'VFD FAN'.	80% 100%
1ACT OUT	Indicates current position of damper actuator in V.	The corresponding detected value is displayed on the LCD.
1ACT FB	Indicates feedback signal of damper actuator in V.	
1ACT POS	Indicates current position of damper actuator in % Open.	
1ACT CNT	Indicates number of times actuator has cycled (1 cycle = 180 degrees of movement in any direction). Resettable via HMI item '8ACT CNT RESET' under Enter Running State [→ 38].	
1EQUIP	Indicates the equipment type. If 'HP(O)' or 'HP(B)' is chosen for '6AUX1-I', the parameter value is 'HP(O)' or 'HP(B)' respectively. If neither is chosen, the value is 'CON RTU'.	HP(O) HP(B) CON RTU
1INS	Indicates the installation date of the Economizer Controller. If the installation date is incorrect, press Enter to change and confirm month, date and year.	-

Basic Settings

Note: Editable in 1TOP LEVEL. Do not have to use '5ENTER CONFIG?' to change values.

Parameter	Description	Range	Default
2TEMP OFF	Temperature shutoff setpoint. Automatically obtainable if a smartphone or tablet is connected to the network, a WLAN stick is plugged into the Economizer Controller and the mobile application is installed on the phone or tablet. You can also manually define this setpoint.	48...80 °F; increment by 1	63 °F
2ENTH OFF	Enthalpy shutoff setpoint. Automatically obtainable if a smartphone or tablet is connected to the network, a WLAN stick is plugged into the Economizer Controller and the mobile application is installed on the phone or tablet. You can also manually define this setpoint. Dynamic item. Appears only if an OAH sensor is configured.	22...30 Btu/lbm; increment by 1	28 Btu/lbm
2DCV	Demand control ventilation setpoint. Automatically obtainable if a smartphone or tablet is connected to the network, a WLAN stick is plugged into the Economizer Controller and the mobile application is installed on the phone or tablet. You can also manually define this setpoint. Dynamic item. Appears only if a CO ₂ sensor is configured.	500...2000PPM; increment by 100	1100PPM
2FAN L ACT	Damper minimum position when fan runs at a low speed. Dynamic item. Appears only if '6FAN' is configured as '2SPEED', '3SPEED' or 'VFD FAN' under I/O Configuration [→ 35].	2...10V; increment by 0.1	3.6V
2FAN M ACT	Damper minimum position when fan runs at a medium speed. Dynamic item. Appears only if '6FAN' is configured as '3SPEED' or 'VFD FAN'.	2...10V; increment by 0.1	3.2V
2FAN H ACT	Damper minimum position when fan runs at a high speed. Dynamic item. Appears only if '6FAN' is configured as '1SPEED', '2SPEED', '3SPEED' or 'VFD FAN'.	2...10V; increment by 0.1	2.8V

Parameter	Description	Range	Default
2VENTMAX L	DCV maximum position when fan runs at a low speed. Dynamic item. Appears only if a CO ₂ sensor is configured and '6FAN' is configured as '2SPEED', '3SPEED' or 'VFD FAN'.	2...10V; increment by 0.1	3.6V
2VENTMAX M	DCV maximum position when fan runs at a medium speed. Dynamic item. Appears only if a CO ₂ sensor is configured and '6FAN' is configured as '3SPEED' or 'VFD FAN'.	2...10V; increment by 0.1	3.2V
2VENTMAX H	DCV maximum position when fan runs at a high speed. Dynamic item. Appears only if a CO ₂ sensor is configured and '6FAN' is configured as '1SPEED', '2SPEED', '3SPEED' or 'VFD FAN'.	2...10V; increment by 0.1	2.8V
2VENTMIN L	DCV minimum position when fan runs at a low speed. Dynamic item. Appears only if a CO ₂ sensor is configured and '6FAN' is configured as '2SPEED', '3SPEED' or 'VFD FAN'.	2...10V; increment by 0.1	3.1V
2VENTMIN M	DCV minimum position when fan runs at a medium speed. Dynamic item. Appears only if a CO ₂ sensor is configured and '6FAN' is configured as '3SPEED' or 'VFD FAN'.	2...10V; increment by 0.1	2.7V
2VENTMIN H	DCV minimum position when fan runs at a high speed. Dynamic item. Appears only if a CO ₂ sensor is configured and '6FAN' is configured as '1SPEED', '2SPEED', '3SPEED' or 'VFD FAN'.	2...10V; increment by 0.1	2.3V
CFM COMM	Air Flow Chart. CFM commissioning can only be initiated from the mobile application. When CFM commissioning is in progress, the local device reads 'CFM COMM'.	-	-
2DEGREES	Temperature unit (°F or °C)	-	°F
2FAN	Fan CFM	100... 50,000CFM; increment by 100	5000CFM
2ERV SET	ERV outside air temperature setpoint. Dynamic item. Appears only if 'ERV' is selected for '6AUX1-O' or '6AUX2-O'.	0...50 °F; increment by 1	32 °F
2EX1 L	Exhaust Fan 1 low-speed parameter setting. Dynamic item. Appears only if: <ul style="list-style-type: none"> Exhaust Fan 1 is configured. '6FAN' is configured as '2SPEED', '3SPEED' or 'VFD FAN'. 	0...100%; increment by 1	65%
2EX1 M	Exhaust Fan 1 medium-speed parameter setting Dynamic item. Appears only if: <ul style="list-style-type: none"> Exhaust Fan 1 is configured. '6FAN' is configured as '3SPEED' or 'VFD FAN'. 	0...100%; increment by 1	60%
2EX1 H	Exhaust Fan 1 high-speed parameter setting Dynamic item. Appears only if: <ul style="list-style-type: none"> Exhaust Fan 1 is configured. '6FAN' is configured as '1SPEED', '2SPEED', '3SPEED' or 'VFD FAN'. 	0...100%; increment by 1	50%
2EX2 L	Exhaust Fan 2 low-speed parameter setting. Dynamic item. Appears only if:	0...100%; increment by 1	80%

Parameter	Description	Range	Default
	<ul style="list-style-type: none"> Exhaust Fan 2 is configured. '6FAN' is configured as '2SPEED', '3SPEED' or 'VFD FAN'. 		
2EX2 M	Exhaust Fan 2 medium-speed parameter setting Dynamic item. Appears only if: <ul style="list-style-type: none"> Exhaust Fan 2 is configured. '6FAN' is configured as '3SPEED' or 'VFD FAN'. 	0...100%; increment by 1	77%
2EX2 H	Exhaust Fan 2 high-speed parameter setting Dynamic item. Appears only if: <ul style="list-style-type: none"> Exhaust Fan 2 is configured. '6FAN' is configured as '1SPEED', '2SPEED', '3SPEED' or 'VFD FAN'. 	0...100%; increment by 1	75%
2THL	Temperature high limitation Dynamic item. Appears only if an RAT sensor is configured.	0...100%; increment by 1	83 °F
2EHL	Enthalpy high limitation Dynamic item. Appears only if an RAH sensor is configured.	22...30 Btu/lbm; increment by 1	33 Btu/Lbm
2FAN DLY	Cooling delay via increasing fan speed	0...30 min; increment by 1	5 min

Advanced Settings

Parameter	Description	Value/Range	Default
3FREEZE POS	Anti-freeze protection damper position (closed or minimum)	CLO MIN	CLO
3STG3 DLY	Highest stage cooling delay time	0...240m; increment by 5	15m
3SD ACT POS	Damper position during shutdown (open or closed)	CLO OPN	CLO
3DIF T LOC	MAT sensor location: <ul style="list-style-type: none"> Choose 'MAT' if the sensor is installed before the DX (Direct Expansion) coil. Choose 'LAT' if the sensor is installed after the DX coil. Choose 'AUTO' to let the Economizer Controller automatically detect the location. 	MAT LAT AUTO	LAT
3LAT LOW	Low limit of leaving air temperature Dynamic item. Appears only if 'LAT' or 'AUTO' is selected for '3DIF T LOC'.	35...65 °F; increment by 1	45 °F
3LAT HIGH	High limit of leaving air temperature Dynamic item. Appears only if 'LAT' or 'AUTO' is selected for '3DIF T LOC'.	70...180 °F; increment by 1	80 °F
3OAT CAL	OAT sensor calibration	-2.5...2.5 °F; increment by 0.5	0 °F
3RAT CAL	RAT sensor calibration Dynamic item. Appears only if an RAT sensor is configured.		

Parameter	Description	Value/Range	Default
3OAH CAL	OAH sensor calibration Dynamic item. Appears only if an OAH sensor is configured.	-10...10%; increment by 0.5	0%
3RAH CAL	RAH sensor calibration Dynamic item. Appears only if an RAH sensor is configured.		
3MAT CAL	MAT or LAT sensor calibration	-2.5...2.5 °F; increment by 0.5	0 °F
3MAT SET	Setpoint of MAT or LAT sensor	38...70 °F; increment by 1	53 °F
3FRZ PROT	Anti-freeze protection setpoint of MAT sensor	35...55 °F; increment by 1	45 °F
3OAT LOCK	OAT lockout setpoint for anti-freeze protection	-45~80 °F; increment by 1	32 °F

Alarms

Parameter	Description
NO ALARM	No alarm is activated.
4MAT SEN ALARM	MAT sensor has failed, gone out of range or become disconnected.
4CO2 SEN ALARM	CO ₂ sensor has failed, gone out of range or become disconnected.
4OAT SEN ALARM	OAT sensor has failed, gone out of range or become disconnected.
4OAH SEN ALARM	OAH sensor has failed, gone out of range or become disconnected.
4RAT SEN ALARM	RAT sensor has failed, gone out of range or become disconnected.
4RAH SEN ALARM	RAH sensor has failed, gone out of range or become disconnected.
4FREEZE ALARM	Anti-freeze notification when MAT sensor is below anti-freeze protection setpoint.
4RTU SHUTDOWN	Notification of Shutdown Active when 'SHUTDOWN' is chosen for '6AUX1-I' or '6AUX2-I'.
4ACTUATOR ALARM	Actuator gets disconnected or has failed.
4ACT UNDER V	Voltage received by the actuator is below expected range.
4ACT OVER V	Voltage received by the actuator is above expected range.
4ACT STALLED	Damper actuator stopped before achieving commanded position.
4ACT SLIPPING	Damper actuator slips after reaching commanded position.
4NOT ECON	Not Economizing when it should
4ECON SHOULDNT	Economizing when it should not
4EXCESS OA	Excess outdoor air. Outside air intake is significantly higher than it should be

Parameter	Description
4LLA ALARM	Leaving air temperature is lower than the low limit (3LAT LOW).
4HLA ALARM	Leaving air temperature is higher than the high limit (3LAT HIGH).
4HEAT ALARM	Economizer heating error
4COOL ALARM	Economizer cooling error

All alarms are dynamic items. An alarm appears only if a related symptom mentioned above is detected.

An alarm activation triggers a general alarm, then the configured system alarm output (AUX1-O or AUX2-O) is activated. If there is no alarm, 'NO ALARM' is displayed on the HMI.

Enter Configuration State and Restart

Parameter	Description
5CONFIG STATE	Change to Configuration State. Press Enter to confirm the change.
5ENTER CONFIG?	Confirm the change to Configuration State.
5RESTART	Restart the Economizer Controller. Press Enter to confirm the restart.
5CONF RESTART?	Confirm the restart.

I/O Configuration

Programming NOTE: The Siemens controller can be programmed using the buttons on the front face of the controller, or a phone app can be used. The phone app, which also allows for many other features, can be downloaded on Android or Apple devices and can be found by searching "Climatix". The controller requires a USB WLAN stick to use the phone app: MicroMetl PN 9901-5057 or Siemens PN POL903.00, and can be removed and reused on other units after programming.

Climatix Phone App: IOS version 15 or later required for iPhone. **Default Username:** Administrator **Default Password:** OneBT

Siemens WLAN Stick: Default Password: SIBPAdmin

Parameter	Description	Value	Default
6OCC	Configures if occupancy status receives signal from the connected thermostat or is displayed as 'ALWAYS' in the Economizer Controller.	T-STAT ALWAYS	T-STAT
6AUX1-I	<ul style="list-style-type: none"> None Cooling stage 3 (Y3) from thermostat Heat Conventional (W1) from thermostat Heat pump (reversing valve O) Heat pump (reversing valve B) Pre-occupancy signal from thermostat Shutdown signal from RTU 	NONE Y3 IN W1 HP(O) HP(B) PREOCC SHUTDOWN	W1
6AUX2-I	<ul style="list-style-type: none"> None Cooling stage 3 (Y3) from thermostat Heat stage 1 (W1) from thermostat Heat pump (reversing valve O) Heat pump (reversing valve B) Pre-occupancy signal from thermostat Shutdown signal from RTU 	NONE Y3 IN W1 HP(O) HP(B) PREOCC SHUTDOWN	NONE
Parameter	Description	Value	Default
	Note: Whichever is chosen for '6AUX1-I' doesn't appear in the list of '6AUX2-I'.		
6OAT SIG	Configures signal type of OAT sensor.	0-10V NTC10K	NTC10K
6RAT SIG	Configures signal type of RAT sensor.	0-10V NTC10K NONE	NONE
6OAH SIG	Configures signal type of OAH sensor.	0-10V	NONE
6RAH SIG	Configures signal type of RAH sensor.	4-20mA NONE	
6MAT SIG	Configures signal type of MAT or LAT sensor.	0-10V NTC10K	NTC10K
6AUX-AI1	Auxiliary AI-1. Configurable as: <ul style="list-style-type: none"> CO₂ sensor Static pressure (temporarily for CFM commissioning) sensor None 	PRESSURE CO2 NONE	NONE
6X-AI1 SIG	Configures CO ₂ sensor type.	0-10V 2-10V 0-5V	0-10V
6CO2 Rng L	Configures the low limit of CO ₂ measuring range.	0...500; increment by 10	0
6CO2 Rng H	Configures the high limit of CO ₂ measuring range.	1000...3000; increment by 50	2000
6AUX-AI2	Choose 'ACT FB' if feedback signal is available from the connected damper actuator. Otherwise, choose 'NONE'.	ACT FB NONE	ACT FB
6AUX-AO	Choose 'VFD' if a VFD (Variable Frequency Drive) is connected to the Economizer. Otherwise, choose 'NONE'.	VFD NONE	NONE
6Y2O	Choose 'COOL 2' if Cooling Stage 2 is available (another compressor is connected to the Economizer). Otherwise, choose 'NONE'.	COOL 2 NONE	COOL 2

Parameter	Description	Value	Default
6AUX1-O	Auxiliary DO-1. Configurable as: <ul style="list-style-type: none"> • None • Cooling stage 3 output • Exhaust fan (1 or 2) • Variable speed supply fan • Alarm output to thermostat (Title 24) • ERV 	NONE Y3O EXHAUST SUP FAN ALARM ERV	EXHAUST
6AUX2-O	Auxiliary DO-2. Configurable as: <ul style="list-style-type: none"> • None • Cooling stage 3 output • Exhaust fan (1 or 2) • Variable speed supply fan • Alarm output to thermostat (Title 24) • ERV <p>Note: Of all but Exhaust Fan, whichever is chosen for '6AUX1-O' doesn't appear in the list of '6AUX2-O'.</p>	NONE Y3O EXHAUST SUP FAN ALARM ERV	ALARM
6FAN	Configures fan speeds of the variable speed supply fan.	1SPEED 2SPEED 3SPEED VFD FAN	2SPEED
6RS485	Switch between MSTP and Modbus slave.	MSTP MODBUSSLV	MSTP

Test

Parameter	Description
7DAMPER MIN POS	Press Enter to test if the Economizer Controller can drive damper to minimum position.
7DAMPER CLOSE	Press Enter to test if the Economizer Controller can drive damper to 100% Closed.
7DAMPER OPEN	Press Enter to test if the Economizer Controller can drive damper to 100% Open.
7DAMPER ALL	Press Enter to perform all the above tests.
7DAMPER	Press Enter to test if the Economizer Controller can drive damper to the selected voltage.
7Y1O	Press Enter to test if the Economizer Controller can turn on or off the first stage of cooling (close or open relay Y1O).
7Y2O	Press Enter to test if the Economizer Controller can turn on or off the second stage of cooling (close or open relay Y2O).
7AUX1-O	Press Enter to test AUX1-O connection (close or open relay AUX1-O).
7AUX2-O	Press Enter to test AUX2-O connection (close or open relay AUX2-O).
7AUX AO	Press Enter to test if the Economizer Controller can set the AUX AO (VFD0-10) to the selected voltage.

Enter Running State

Parameter	Description
8RUN STATE	Change to Running State. Press Enter to confirm the change.
8ENTER RUN?	Confirm the change to Running State.
8FACTORY DEF	Perform factory resetting. Press Enter to confirm the reset.
8DEF CONFIRM?	Confirm the factory resetting.
8ACT CNT RESET	Damper count reset
8VER x.x.x	Firmware version information such as 0.1.10.

Troubleshooting

Symptom	Reason	Solution
The Economizer Controller/ Mechanical Cooling is not operating	No input power	Use a multi-meter to check if there is 24 Vac +/- 25% (18 Vac - 30 Vac) at the POWER terminals. If there is no voltage or if the voltage is significantly low, check the transformer output voltage at the RTU. If 24 volts is not present at the transformer secondary side, check the primary line voltage to the transformer. If the line voltage is not present at the transformer primary side, check the primary power to the RTU, fuses, circuit breaker, and so on.
	Brownout	If voltage is below 17 Volts, the Economizer Controller may be in Brownout Protection mode. This mode disables all of the relay outputs. When the power is 19 Vac or higher, the Economizer Controller and RTU operate normally.
	Y1/Y2 signal is missing from the thermostat	Mechanical Cooling doesn't run until there is cooling demand (Y1/Y2 Active). Check the wiring from Y1I and Y2I terminals to the commercial thermostat. 24V should be present between Y1I /Y2I and Y1O/Y2O respectively.
	24 Vac~ and 24 Vac ⊥ are incorrectly wired	24 Vac power supply has polarity when all devices are powered by the same 24 Vac transformer; reversing polarity may cause a short circuit that can damage the system. Follow the transformer polarity mark, check the wiring of 24V~ (or G or 24V+) and ensure that they are tied to the same polar of 24 Vac power supply; while checking the wiring of ⊥ (or G0 or 24V- or COM) and ensure that they are all tied to another polar of 24 Vac power supply.
Free Cooling LED is solid RED	Sensor, damper or the whole working system may not work properly	Check sensor, damper or the whole working system following the detailed alarm information.
Free Cooling LED is blinking RED	Not economizing when it should	Check the whole Economizer working system such as sensor, damper and thermostat.
Sensor LED is solid RED	Mixed Air (MA) sensor error	Check the MA sensor, it must be either a Type II NTC 10K or 0-10Vdc sensor.
	Outside Air (OA)/Return Air (RA) sensor error	Check the wiring and signal of OA sensor. If in Differential (DIFF) mode, check the RA sensor too. The following sensor signals are valid: <ul style="list-style-type: none"> ● Type II NTC 10K or 0-10Vdc temperature ● 0-10Vdc or 4-20 mA humidity
	Air temperature failure/fault	Check the air temperature sensor signal. The valid signal must be Type II NTC 10K or 0-10Vdc.
Sensor LED is blinking RED	Excess outdoor air	Check the whole Economizer working system such as sensor, damper and thermostat.
Sensor LED is yellow	Humidity sensor error	Check humidity sensor connection, sensor signal (under range or over range) and sensor signal type.
Sensor LED is OFF	CO ₂ sensor error	Check CO ₂ sensor connection, sensor signal (under range or over range) and sensor signal type.
DAC LED is blinking RED	Damper slippage	Check if the damper works properly.
DAC LED is blinking RED quickly	Damper unplugged	Check if the damper is connected or not.

Symptom	Reason	Solution
DAC LED is OFF	Terminal ACT-FB is configured but no available feedback signal	Check if the feedback signal is connected or not; check if ACT-FB is faulty or not.
The controller has no alarm, but the Free Cooling LED never turns on even though the OA seems to be suitable for Free Cooling	Shutoff SP setting error	The shutoff temperature and/or enthalpy setpoint is incorrectly set up. Consult an HVAC professional to set up the shutoff setpoint correctly.
	OA temp is too low	The OAT is too low; therefore, there is no cooling demand. This could possibly enable anti-freeze protection.
	OA temp is too high or too humid	In DIFF mode, even though OA temperature is lower than RA temperature, if both OA and RA temperatures exceed the high limit, Free Cooling turns off. In Differential Enthalpy control mode, even though OA enthalpy is lower than RA enthalpy, if both OA and RA enthalpy exceed the high limit, Free Cooling turns off.
An alarm is displayed on the LCD	Sensor, damper or the whole working system may not work properly	Check sensor, damper or the whole working system following the detailed alarm information.
RS485 communication failure	RS485 signal or configuration error	Check wiring, configuration, Baud Rate (using mobile app) and other network communication parameters.
Firmware update failure	Application file is damaged Operation is incorrect USB flash disk doesn't work properly	Reload a BIN file, restart the controller, update firmware following Firmware Update [→ 28] or change a USB flash disk. Contact your service provider if failure still exists.
WLAN connection failure	WLAN stick error or wrong user name and password	Plug out and plug in the WLAN stick, enter a correct user name and password, restart the controller or change a WLAN stick. If the WLAN stick is POL903.00/100, the default user name and password are Siemens-WiFi-Administrator and OneBTAdmin. See document CC1N7219en for more details.