MicroMetl

Since 1965

Economizer
ECD-SRTCB-DC
Install Guide

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Small Rooftop Units
3 to 15 Tons (48/50LC 07-14 Not Included)
Accessory Ultra Low Leak
Vertical Economizer

Installation Instructions

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SAFETY CONSIDERATIONS

Installation of this accessory can be hazardous due to system pressures, electrical components and equipment, and equipment locations (such as a roof or elevated surface). Only trained qualified installers and service technicians should install, start-up, and service this equipment.

When installing this accessory, observe precautions in the literature and on any labels attached to the equipment and all other safety precautions may apply.

- Follow all safety codes.
- Wear safety glasses and work gloves.
- Use care in handling and installing the accessory.

It is important to recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, CAUTION, and NOTE. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices, which **may** result in minor personal injury or product and property damage.

NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

⚠ CAUTION

CUT HAZARD
Failure to follow this caution may result in personal injury.
Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing roof top units.

⚠ CAUTION

Failure to follow this caution may result in personal injury and damage to the unit. Cover the duct opening as a precaution so objects cannot fall into the return duct opening. Be sure to remove the cover when installation is complete.

Read these instructions completely before attempting to install the Accessory Ultra Low Leak Economizer.

⚠ WARNING

ELECTRICAL SHOCK HAZARD
Failure to follow this warning could cause personal injury or death. Before performing service or maintenance operations on the unit, always turn off main power switch to unit and install lock(s) and lockout tag(s). Unit may have more than one power switch. Ensure electrical service to rooftop unit agrees with voltage and amperage listed on the unit rating plate.

GENERAL

The Economizer system utilizes the latest technology available for integrating the use of free cooling with mechanical cooling for packaged rooftop units. The code compliant Siemens control system optimizes energy consumption, zone comfort, and equipment cycling by operating the compressors when the outdoor-air is below temp or enthalpy setpoint, integrating the compressor with outdoor air when free cooling is available, and locking out the compressor when outdoor-air temperature is too cold. Demand control ventilation is supported.

This Economizer can be used with 1, 2, 3 or multiple speed indoor fan motor units.

The Economizer system utilizes gear-drive technology with a direct-mount spring return actuator that will close upon loss of power. The Economizer system comes standard with fault detection and diagnostics (FDD), an outdoor air sensor, and mixed air temperature sensor (also called supply air temperature sensor). Outdoor enthalpy, indoor (return) dry bulb or enthalpy, and CO2 sensors are available for field installation.

Standard integrated barometric relief dampers provide natural building pressurization control. An optional power exhaust system is available for applications requiring even greater exhaust capabilities. The power exhaust set point is adjustable at the Economizer controller.

Unpack and inspect economizer contents from carton. Contact MicroMetl immediately if any parts are missing or damaged.

IMPORTANT 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 can be downloaded on Android or Apple(ISO 15.0 or later required) devices and can be found by searching "Climatix". The controller phone app requires the use of a WLAN stick which is available through MicroMetl or Siemens. Using the WLAN stick/phone app allows for many options including using GPS to set controller defaults to the installed climate zone, and copying the controller setting from one unit to the next, and others. WLAN stick can be removed and used on other units after programming.

IMPORTANT: These economizers meet all economizer damper requirements as specified in ASHRAE 90.1, IECC and California's Title 24. Economizer must be installed square to avoid damper leakage or damper binding. Squareness tolerance is ± 1/32 inch.

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

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Installation Video QR Code

Manual Programming Video QR Code

Climatix App Video QR Code

Table 1 - Carrier Usage Chart

CARRIER MODEL NUMBER	ECONOMIZER PART NUMBER
Small Cabinet EcoBlue units with Unit Control Board (UCB) & Vane Axial Fan	
48/50GC/GEJC 04-06 48/50FC/FE 04-07 50GCQ/GEQ 04-06 50FCQ/FEQ 04-07	ECD-SRT12CB-DC*S
Small Cabinet Legacy units with Central Terminal Board (CTB)	
48/50HC, LC, 04-06 48/50TC 04-07 50TCQ 04-07 50HCQ 04-06 50KCQ04-06 48/50KC 04-06	ECD-SRT12CB-DC*S
Large Cabinet	
50HCQ/GCQ/GEQ 07-09 50TCQ/FCQ/FEQ 08-12 48/050HC/GC/GE 07-12 48/50LC 07 48/50TC/FC/FE 08-14	ECD-SRT34CB-DC*S
Extra Large Cabinet	
48/50LC 08-12 50HCQ/GCQ/GEQ 12 50TCQ/FCQ/FEQ 14 48/50HC/GC/GE 14 48/50TC/FC/FE 16	ECD-SRT05CB-DC*S

Table 2 - Bryant Usage Chart

BRYANT MODEL NUMBER	ECONOMIZER PART NUMBER
Small Cabinet Axiom-Fan units with Unit Control Board (UCB) & Vane Axial Fan	
549/551/581K 551/581L 04-06 547/559/582K 547/559/582L 04-07	ECD-SRT12CB-DC*S
Small Cabinet Legacy units with Central Terminal Board (CTB)	
581J/551J 04-06 549J/547J/559J/582J 04-06 548J/580J/558J 04-07	ECD-SRT12CB-DC*S
Large Cabinet	
549J/K/L 07-09 581/551J/K/L 07-12 547/548J/K/L 08-12 559/580/582/558J/K/L 08-14	ECD-SRT34CB-DC*S
Extra Large Cabinet	
549J/K/L 12 547/548/551/581J/K/L 14 558/559/580/582J/K/L 16	ECD-SRT05CB-DC*S

Table 3 - ICP Usage Chart

ICP MODEL NUMBER	ECONOMIZER PART NUMBER
Small Cabinet X-Vane units with Unit Control Board (UCB) & Vane Axial Fan	
RGW/RAW/RAG/RGG/RHG/RHW 036-060 RGV/RAV/RAF/RGF/RHF/RHV 036-072	ECD-SRT12CB-DC*S
Small Cabinet Legacy units with Central Terminal Board (CTB)	
RGH/RAH 036-060 RGS/RAS 036-072 RHS 036-072 RHX/RHH 036-060 RGX/RAX 036-060	ECD-SRT12CB-DC*S
Large Cabinet	
RGH/RAH/RGG/RGW/RAW/RAG 072-120 RAS/RGS 089-119 RHH/RHW/RHG 072-102 RHS/RHF/RHV 090,120 RGF/RAF/RGV/RAV 090-150	ECD-SRT34CB-DC*S
Extra Large Cabinet	
RHH/RAS/RGS/RHG 120 RGF/RAF/RAV/RGV 180 RGH/RAH/RHS/RHF/RGG/RAG/RHV/RGW/RAW 150	ECD-SRT05CB-DC*S

Table 4 - Package Contents

ECONOMIZER PART NUMBER	QTY	CONTENTS
ECD-SRT12CB-DC*S ECD-SRT34CB-DC*S ECD-SRT05CB-DC*S	1	Economizer Damper Assembly with Actuator
	1	Siemens 9901-3534 Controller with Attached Harness*
	1	9901-1619 Mixed Air Temp Sensor*
	1	9901-1619/3535 Outside Air Temp Sensor*
	1	Hood Assembly with Top and 2 Sides
	1	Hood Divider
	1	Aluminum Filter (SRT05 gets 2)
	1	Hardware Bag (Tapped to OA damper blades)*

* Shipped in control bag for field installation *CBOX-CSRT15B-DC**

Table 5 - Economizer Sensor Usage

APPLICATION	ECONOMIZER WITH OUTDOOR AIR SENSOR Accessories Required
Outdoor Air Dry Bulb	9901-1619 outdoor air dry bulb sensor is field installed on "DCDS" economizer.
Single Enthalpy	9901-3535 outdoor air enthalpy sensor is field installed on "DCES" economizers
Mixed Air Sensor	9901-1619 provided with economizer and field installed in blower compartment.
Differential Dry Bulb or Enthalpy	KIT-3534-DIFFADB (Dry Bulb), KIT-3534-DIFFENT (Enthalpy) this will have to be order separately*

***** Includes 9901-1619/3535 sensor and wiring harness

NOTES:

1 - The controller's wiring harness is designed specifically for EcoBlue, Axiom-Fan, X- Vane units with the Unit Control Board (UCB). If your unit has the older CTB (Central Terminal Board) or Centrifugal Supply Blower then you must purchase a different harness (MicroMetl P/N 9962-2020). The harness that is factory attached to the Siemens controller must be removed and the 9962-2020 harness attached per the QR Code scan. SEE Figure 29 for wiring diagram.

2 - If you have a 48/50JC 04-07 unit with System VU, these controls will not work properly. Please let your distributor know that you will need a ECD-SRT12CB-D0DB-4 economizer.

3 - If you have a 48/50LC 07-14 unit, these controls will not work properly. Please let your distributor know that you will need a ECD-SRTCB-D2*H economizer.**

ACCESSORIES LIST - The Economizer system has several field-installed accessories available to optimize performance. Refer to Table 6 for authorized parts and power exhaust descriptions.

Table 6 —Economizer Field-Installed Accessories

DESCRIPTION	PART NUMBER
208/230v 1PH Prop Power Exhaust for Small Cabinet	PPD-SRT12CA-D-1V
460v 3PH Prop Power Exhaust for Small Cabinet	PPD-SRT12CA-D-4V
208/230v 1PH Prop Power Exhaust for Large Cabinet	PPD-SRT34CA-D-1V
460v 3PH Prop Power Exhaust for Large Cabinet	PPD-SRT34CA-D-4V
208/230v 1PH Prop Power Exhaust for Extra Large Cabinet	PPD-SRT05CA-D-1V
460v 3PH Prop Power Exhaust for Extra Large Cabinet	PPD-SRT05CA-D-4V
Enthalpy Sensor (OA)	9901-3535
Differential Dry Bulb/Enthalpy Sensor	KIT-3534-DIFFADB/DIFFENT
Economizer Angle Seal Kit for use on unit's with Hinged Filter Door - for Small Cabinet	0640-0100-HDANGL
Economizer Angle Seal Kit for use on unit's with Hinged Filter Door - for Large Cabinet	0640-0200-HDANGL
Economizer Angle Seal Kit for use on unit's with Hinged Filter Door - for Extra Large Cabinet	0640-0300-HDANGL

Compliance — Economizers meet California Energy Commission Title 24 prescriptive section 140.4 (damper leakage etc.), and mandatory section 120.2.i for Fault Detection and Diagnostic controls.

Economizers meet ASHRAE 90.1 damper leakage requirements and Fault Detection and Diagnostic requirements.

Economizers meet IECC damper leakage and Fault Detection and Diagnostic requirements.

Note: *IECC requires differential return air sensor, which must be ordered separately.*

See accessory KIT-3534-DIFFADB for DryBulb or

KIT-3534-DIFFENT for Enthalpy.

Outside air, return air, and relief dampers are AMCA rated.

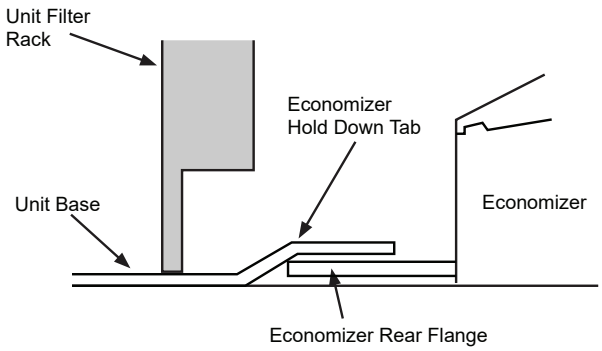


Fig. 3 - Rear Economizer Flange Installation

NOTE: For units:
48/50 DJ/HJ/LJ/TF/TFF/TJ/TJQ/TM 004-014, GJ 006-012, GJD/GJE/GJF 006-012, HE/HEQ 0003-006, HJQ/LJQ/QJ/TFQ 004-012, HM 007, LJD 008-014, LJE 008-012
548C 036-150, 549/551B 036-150, 549/551C 024-060, 558/580/581 C/D/F 036-150
PAE/PAH/PAS/PGE/PGH/PGS/PHE/PHH/PHS 090-150
The main harness of economizer control DC*S will have to be replace by 9962-2061 for Siemens Controller.
(This harness needs to be order separate)

INSTALLATION

Step 1: Turn off power supply(s) and install lockout tag.
Step 2: Remove the existing unit filter access panel. Raise the panel and swing the bottom outward. The panel is now disengaged from the track and can be removed. See ***Figure 1*** Set the filter door aside for re-installation later.

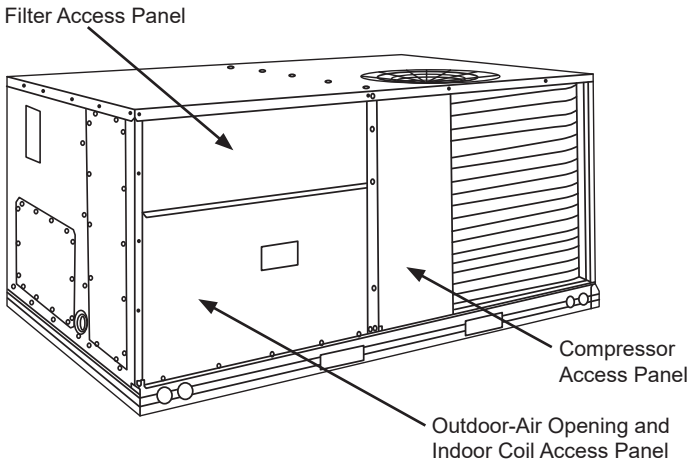


Fig. 1 - Typical Access Panel Locations

Step 3: Remove the indoor coil access panel and discard. See ***Figure 1.***
Step 4: Slide the economizer assembly into the rooftop unit. See ***Figure 2***.
Note: *Be sure to engage the rear economizer flange under the tabs on the unit base in the return air chamber. See* ***Figure 3***.

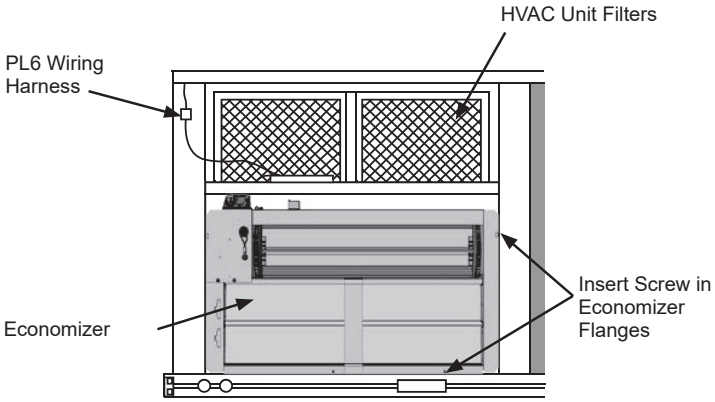


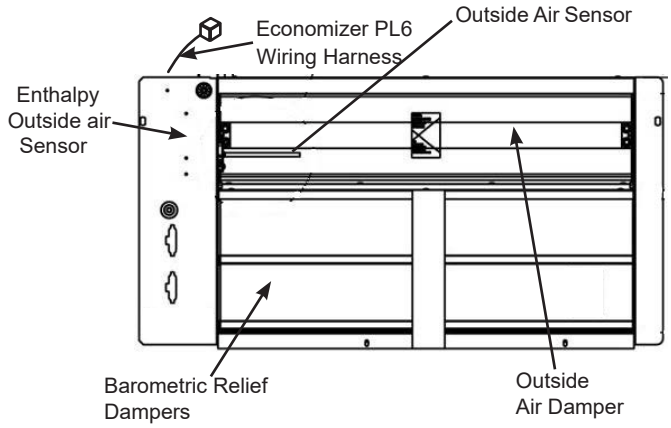
Fig. 2 - Economizer Installed on HVAC Unit

Step 5: Ensure economizer is square (tolerance +/- 1/32"). Screw the economizer to the unit along both side flanges and bottom flange. See ***Figure 2.***
Step 6: Remove the red tape securing the relief dampers for shipping purposes.

Step 7: Remove and save the 12-pin jumper plug from the unit economizer harness – located in the upper left corner of the unit. Insert the PL6 plug to the economizer actuator, then Insert the economizer plug into the unit wiring harness. See ***Figure 4***

Note: *the 12-pin jumper plug should be saved for future use, in the event that the economizer is ever removed. The jumper plug is not needed as long as the economizer is installed.*

Step 8: Screw OA sensor provided in parts bag with economizer directly through pre-punched holes located on economizer.
See ***Economizer Component Locations.***



Economizer Component Locations

Step 9: Remove the indoor blower access panel and the panel(s) covering the unit control box. See ***Figure 5.***
Step 10: In parts bag provided with economizer is the 9901-3534 Siemens controller (Siemens POL224.00) The economizer harness is attached to the controller. Screw the controller directly to the control box through pre-punched holes in control box to the left side of the UCD. See ***Figure 6***.

Parts Bag

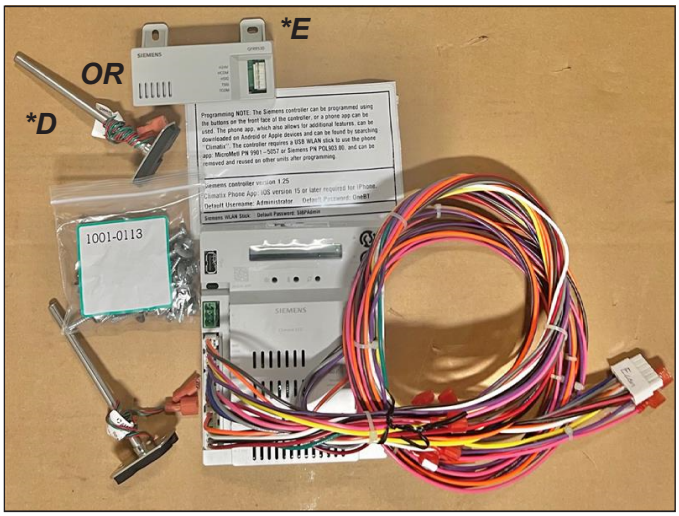
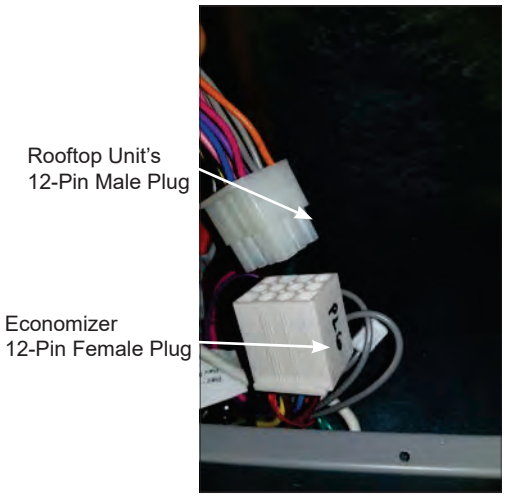


Fig. 4 - Connect Economizer Harness to Unit PL6 Economizer Harness



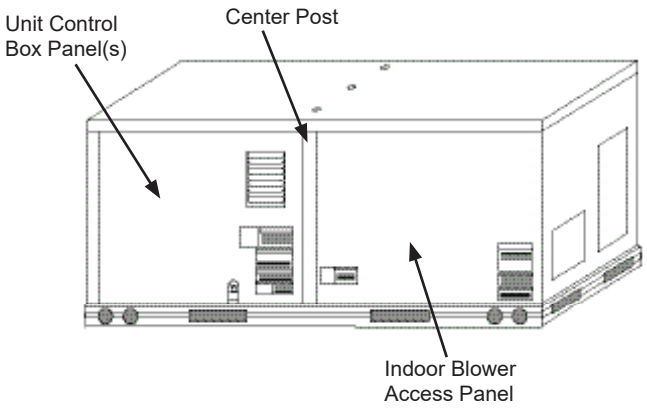


Fig. 5 - Typical Indoor Fan Motor Access Panel Locations

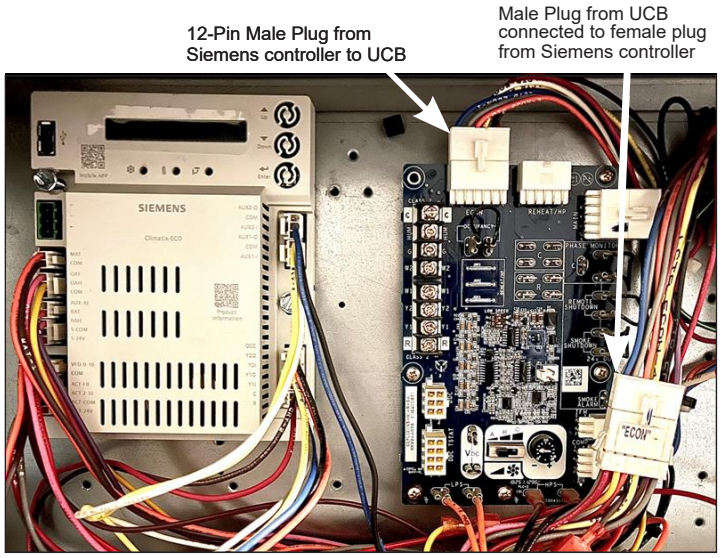


Figure 6 – Mount Controller Assembly in Unit Control Box next to Units with a UCB
(Some control box configurations may differ)

Step 11: Unplug the 12-pin male ECON plug currently connected to the top left plug on the Unit Control Board (UCB) and attach the 12-pin male plug labeled ECON from the Siemens controller to the UCB board port labeled ECON. See ***Figure 6 &7.***
Step 12: Connect the 12-pin male ECON plug removed from UCB to the 12-pin female plug labeled ECON-A from the Siemens controller harness. See ***Figure 6 & 8.***
Step 13: Route the 4 sensor wires (orange, brown, violet, and pink) into the blower section as shown in ***Figure 9.***
Step 14: Install the Mixed Air Sensor in the blower section.

a. 9901-1619 sensor which is a probe that includes a bottom mounting plate with 2 mounting holes, see ***Figure 10 & 11.*** Attach the orange wire from the harness to the green wire on the sensor and the brown wire to the red wire.

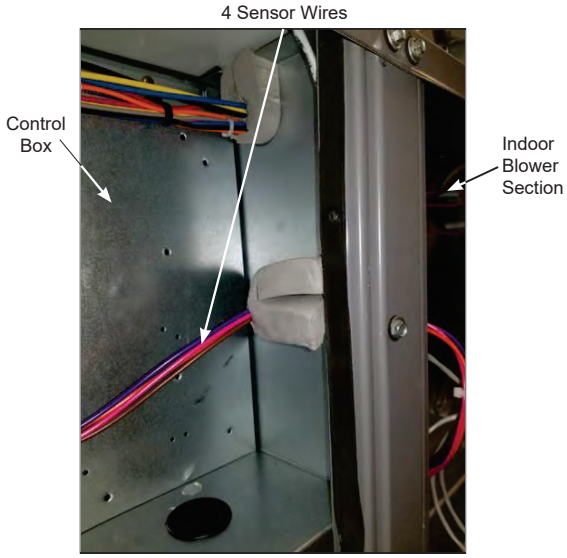


Figure 9 – Route 4 Sensor Wires to Indoor Blower Section

Figure 10– Install the 9901-1619 Mixed Air Sensor (6" Probe)

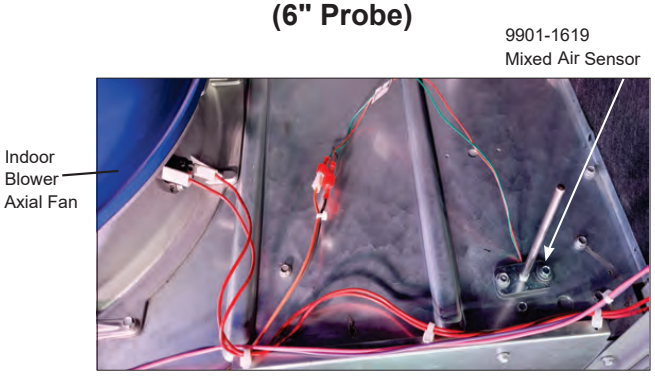
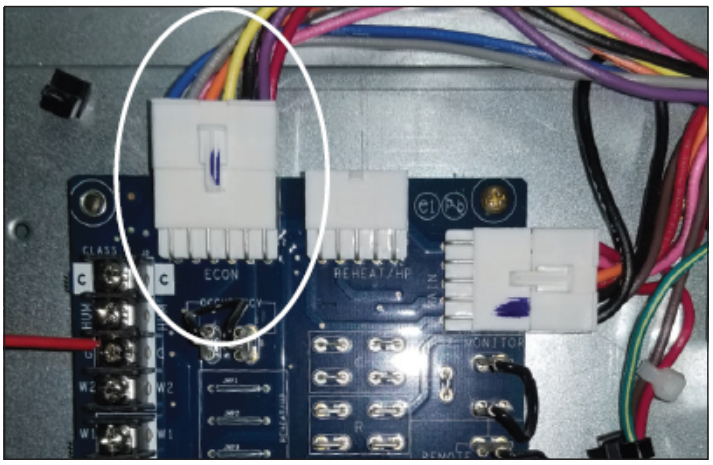


Figure 7 – Unplug ECON plug from Unit



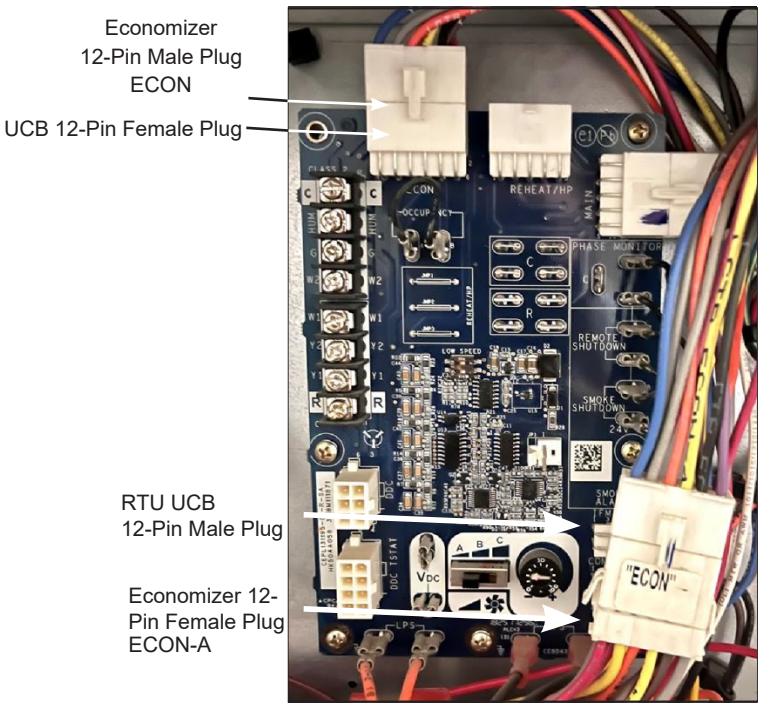


Figure 8 – Plug 12 Pin ECON plug into removed Unit Control Board (UCB) 12 Pin Plug and Connect 12-Pin Controller Plug to Unit Control Board

ATTENTION:

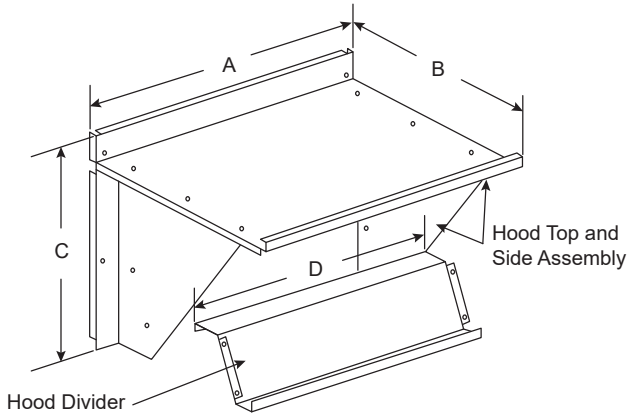
1 - The controller's wiring harness is designed specifically for EcoBlue, Axiom-Fan and X-Vane units with the Unit Control Board (UCB). If your unit has the older Central Terminal Board (CTB) or Centrifugal Supply Blower then you must purchase a different harness (MicroMetl P/N 9962-2020). The harness that is factory attached to the Siemens controller must be removed and the 9962-2020 harness.
2 - If you have a 48/50JC 04-07 unit with System VU, these controls will not work properly. Please let your distributor know that you will need a ECD-SRT12CB-D0DB-4 economizer.

Step 15: Connect the pink and violet wires from the 4-wire harness to the pink and violet terminals in the wire bundle in the indoor blower section. See ***Figure 12.***

Step 16: If using differential return sensor or DCV sensor install it now. See installation details later in the instructions, and the wiring diagram for further information.

Step 17: Assemble the economizer hood by screwing the hood divider to the hood subassembly (top and sides). See **Figure 15**. Note on the ECD-SRT05CB-DC*S there is also a center hood filter divider – screw in place. See ***Figure 14.***

Step 18: Install aluminum filter(s) in economizer hood. Clips at top of hood will hold filters in place.



ECONOMIZER P/N	A	B	C	D	SHIP WT.
ECD-SRT12CB-DC*S	30.37”	17.43”	19.05”	29.5”	45 lb
ECD-SRT34CB-DC*S	40.37”	22.28”	24.48”	36.27”	80lb
ECD-SRT05CB-DC*S	52.92”	27.03”	33.41”	49.92”	98lb

NOTE: The ECD-SRT05CB-DC*S hood has 2 aluminum filters and a hood filter divider that installs between the filters.

Figure 13 – Economizer Hood Assembly

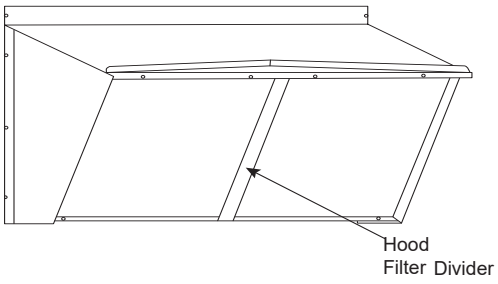


Figure 14 – Filter Divider ECD-SRT05CB-DC*S Hood

Step 19: Install economizer hood over economizer. Screw hood in place through pre-punched holes. Reinstall the units filter access door, see ***Figure 15*** Re-install the indoor blower access panel.

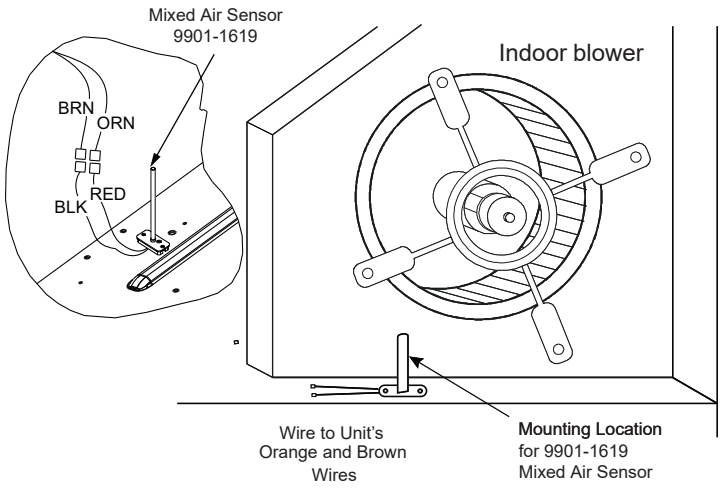


Figure 11 – Mount and connect Mixed Air Sensor 9901-1619

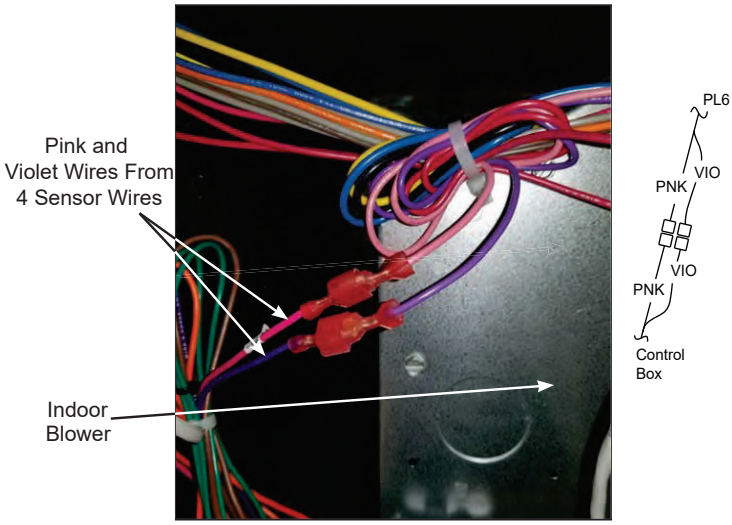


Figure 12 - Connect Pink and Violet Wires



Figure 15 – Install Economizer Hood

Step 20: After powering controller, program the Siemens POL224.00 controller per the instructions to follow. After all settings have been made, re-install the unit control box panel.

Economizer performance charts are on the right. See base unit installation manual to make adjustments to meet building ventilation requirements.

Step 21: For easier setup and configuration use the Siemens Climatix app on your phone or tablet (I-PHONES require ISO 15.0 or later). You will need to purchase a Siemens WLAN Stick (P/N 9901-5057 from Micrometl or P/N POL903.00 from Siemens). Once you have the WLAN Stick and have downloaded the Siemens app **"Climatix"**, you will be able to set up your economizer following the configurations on your device. The default username is Administrator and the default password is OneBT. Plug the WLAN Stick into the controller as shown in ***Figure 16.*** If you would like to set up multiple economizers with the same configurations, you can easily do that using the WLAN Stick and the saved information you have on your device.

Step 22: If you do not have a WLAN Stick then you can set up the economizer, using the keypad on the Siemens controller. **See I/O Configurations that need to be verified and updated.**

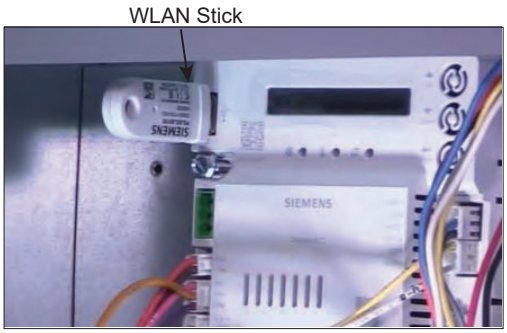
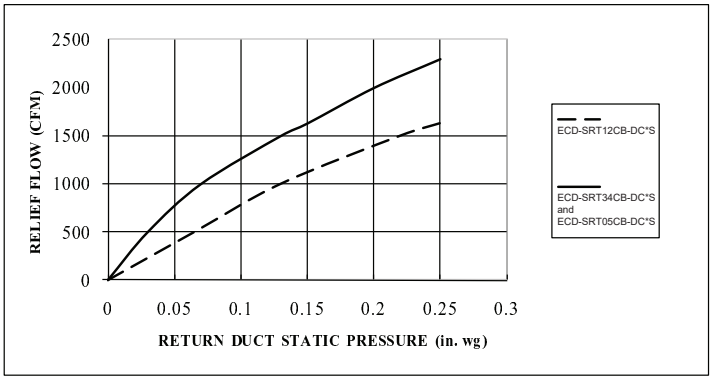
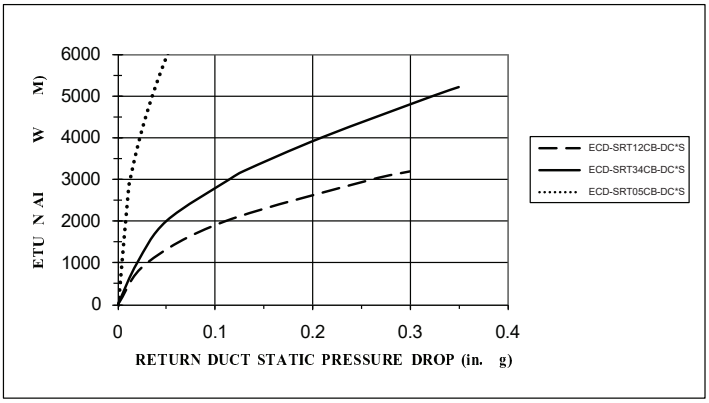


Figure 16 – WLAN Stick installed in the Siemens Controller



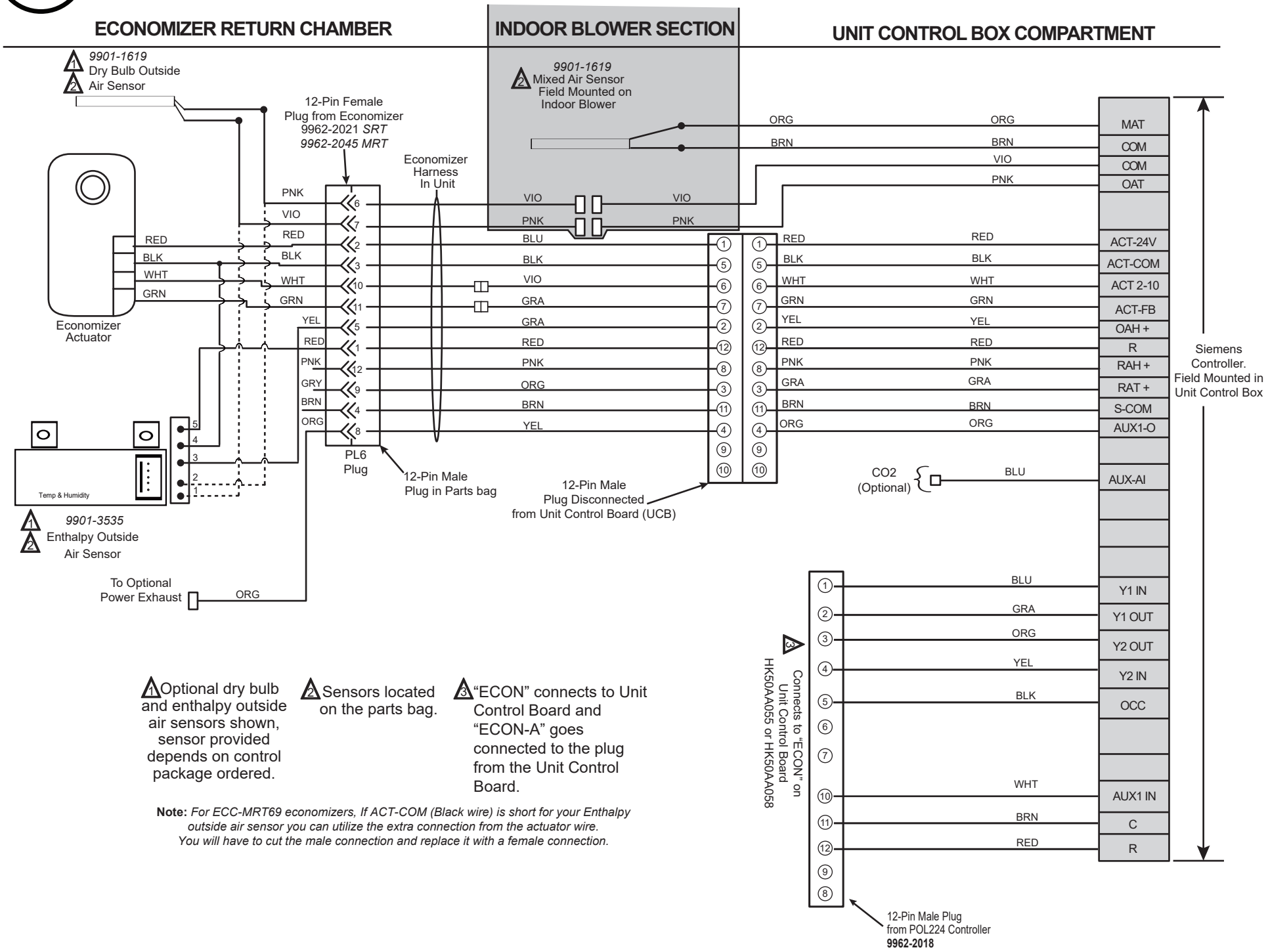
Barometric Relief Flow Capacity



Return Air Pressure Drop

MicroMetl

Wiring Diagram Supplement For Installing Siemens POL224.00 Economizer on Unit with Vane Axial Indoor Fan (with Unit Control Board HK50AA055 or HK50AA058)



1 Optional dry bulb and enthalpy outside air sensors shown, sensor provided depends on control package ordered.

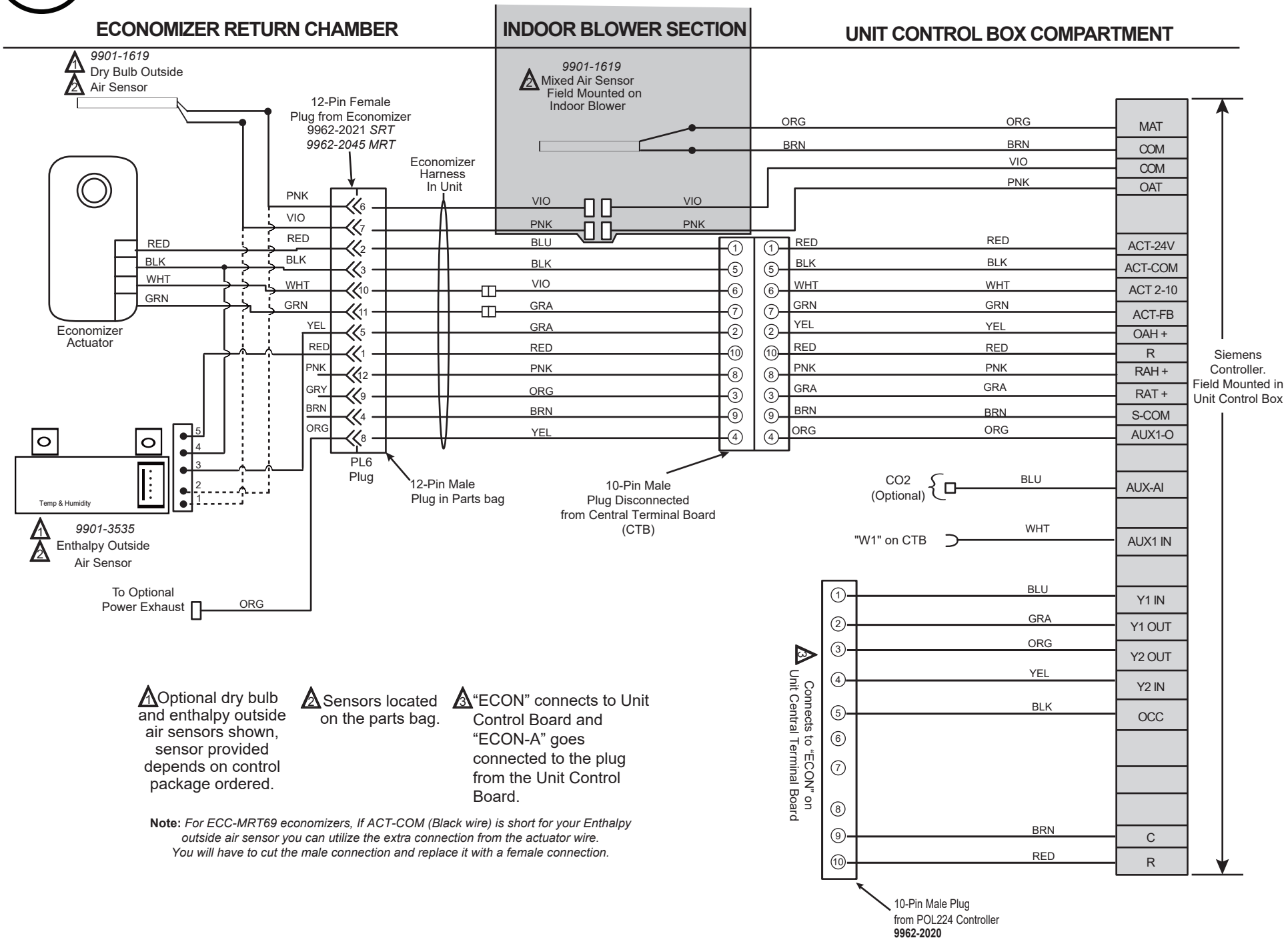
2 Sensors located on the parts bag.

3 "ECON" connects to Unit Control Board and "ECON-A" goes connected to the plug from the Unit Control Board.

Note: *For ECC-MRT69 economizers, If ACT-COM (Black wire) is short for your Enthalpy outside air sensor you can utilize the extra connection from the actuator wire. You will have to cut the male connection and replace it with a female connection.*

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Wiring Diagram Supplement For Installing Siemens POL224.00 Economizer on Unit with Central Terminal Board



1 Optional dry bulb and enthalpy outside air sensors shown, sensor provided depends on control package ordered.

2 Sensors located on the parts bag.

3 "ECON" connects to Unit Control Board and "ECON-A" goes connected to the plug from the Unit Control Board.

Note: *For ECC-MRT69 economizers, If ACT-COM (Black wire) is short for your Enthalpy outside air sensor you can utilize the extra connection from the actuator wire. You will have to cut the male connection and replace it with a female connection.*

FEATURES

- 2-10Vdc with signal inversion
- Economizer applications
- 4-20mA applications



987-105
GMA 151.1PRHEEM
GCA161.1P

Description	Label	Description	Function
Inverse Acting		**Direct-Acting**	**Input Signal Inversion**
Inverse-Acting Feedback		**Direct-Acting Feedback**	**Feedback Signal Inversion**
			Not In Use

Description	Label			Description	Function
Counterclockwise				Clockwise	Rotary angle direction
Active			0	Off	Self-adaptation to mechanical range
2-10 Vdc	2-10		0-10	0…10 Vdc	Positioning control signal 2-10 or 0-10
Offset 0-5V Span 2-30V	ADJ		0-10	0...10 Vdc	Positioning signal. Turn on or off capability to adjust offset/span.

DEMAND CONTROL VENTILATION

Refer to economizer wiring diagram and DCV instructions if demand control ventilation (CO2 sensor) is used. CO2 sensor will wire into the AUXAI connection at the Siemens controller. If a field installed CO2 sensor is connected to the economizer controller, a demand controlled ventilation strategy will operate automatically. As the CO2 level in the space increases above the setpoint (on the economizer controller), the minimum position of the dampers will be increased proportionally, until the Maximum Ventilation setting is reached. As the space CO2 level decreases because of the increase in fresh air, the outdoor damper will follow the higher demand condition from the DCV mode or from the free cooling mode.

INSTALLING DIFFERENTIAL RETURN AIR SENSOR

The KIt-3534-DIFFADB – Differential Dry Bulb return sensor kit must be field mounted in the system's return duct work. The kit includes a wiring harness, that connects the economizer harness in the return chamber of the unit, to the provided 9901-1619 sensor.

The KIT-3534-DIFFENT – Differential Enthalpy return sensor kit must be field mounted in the system's return duct work. The kit includes a wiring harness, that connects the economizer harness in the return chamber of the unit, to the provided 9901-3535 sensor.

When using the differential return enthalpy or dry bulb temperature option, see California Tittle 24 setting requirements by region.

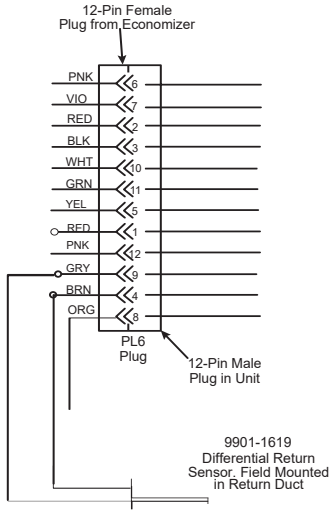
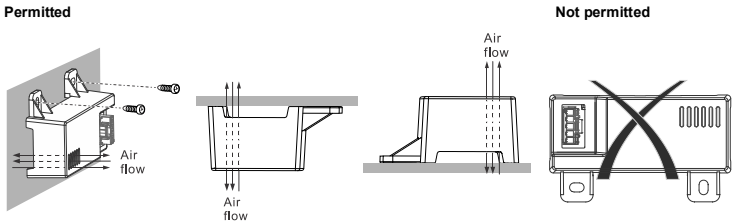


Figure 30
Wiring Differential Return Air Sensor



⚠Do not use sensors in areas with possible acid fumes or chemical vapors that can corrode sensor metal parts or with volatile or explosive gases.

CALIFORNIA'S TITLE 24 HIGH TEMPERATURE LIMIT SETTINGS

California's Title 24 code requires a high temperature limit setting for all dry bulb outside air economizer change over. The temperatures vary by the region within California. See Table 7 for high limit settings.

Table 7 – California Title 24 Regional High Limit Dry Bulb Temperature Settings

DEVICE TYPE*	CLIMATE ZONES	REQUIRED HIGH LIMIT (ECONOMIZER OFF WHEN): DESCRIPTION
FIXED DRY BULB	1, 3, 5, 11-16	OAT exceeds 75°F
	2, 4, 10	OAT exceeds 73°F
	6, 8, 9	OAT exceeds 71°F
	7	OAT exceeds 69°F
DIFFERENTIAL DRY BULB	1, 3, 5, 11-16	OAT exceeds RA Temp.
	2, 4, 10	OAT exceeds -2°F
	6, 8, 9	OAT exceeds -4°F
	7	OAT exceeds -4°F
FIXED ENTHALPY† + FIXED DRY BULB	ALL	OAT exceeds 28 Btu/lb of dry air or OAT exceeds 75°F

* Only the high limit control devices listed are allowed to be used and at the setpoints listed. Others such as Dew Point, Fixed Enthalpy, Electronic Enthalpy, and Differential Enthalpy Controls, may not be used in any climate zone for compliance with Section 140.4(e)1 unless approval for use is provided by the Energy Commission Executive Director.

† At altitudes substantially different than sea level, the Fixed Enthalpy limit value shall be set to the enthalpy value at 75°F and 50% relative humidity. As an example, at approximately 6,000 foot elevation, the fixed enthalpy limit is approximately 30.7 Btu/lb.

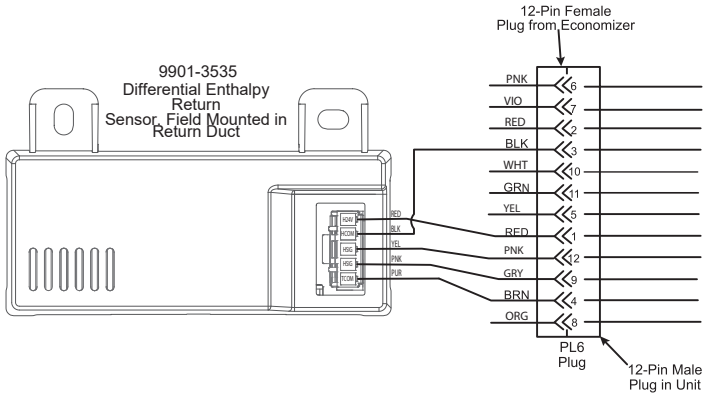


Figure 31 – Wiring Differential Return Enthalpy Sensor

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I/O Configuration **21**

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"Make sure your app is updated to the most recent version"

If multiple operators: Make sure to name your Wifi Stick differently from other to prevent cross connection.

If configuring more than one unit make sure you close the app before connecting to the next logic.

Manual Programming Video QR Code

Climatix App Video QR Code

Siemens Quick StartUp Guide

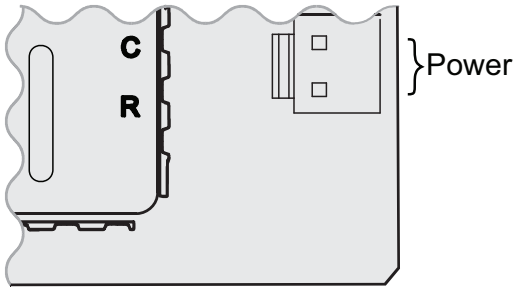
Siemens Quick APP StartUp Guide pdf

Siemens Quick StartUp Guide pdf

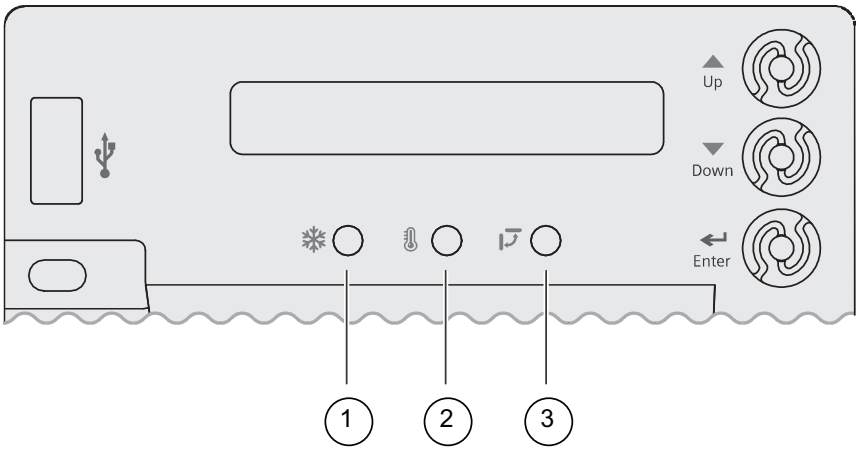
Interface Overview

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

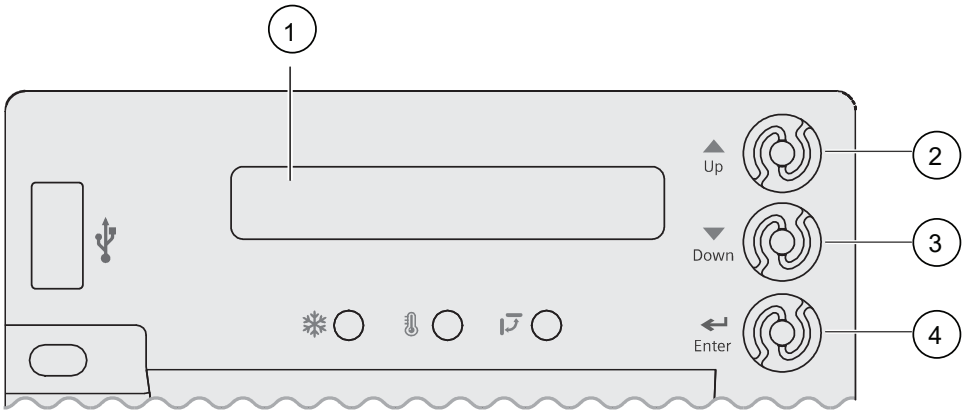
Status	Free Cooling LED	Sensor LED	DAC LED
Commissioning mode	Yellow Blinking	Yellow Blinking	Yellow Blinking
Power start-up	Yellow On	Yellow On	Yellow On
Free cooling is running	Green On	-	-
Free cooling is available but not running	Green Blinking	-	-
Not economizing when it should	Red Blinking	-	-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

Status	Free Cooling LED	Sensor LED	DAC LED
Humidity sensor error	-	Yellow On	-
CO_2 sensor error	-	LED Off	-
Air temperature failure/fault	-	Red On	-
Excess outdoor air	-	Red Blinking	-
Damper working ok	-	-	Green On
Damper stalled	-	-	Red On
Damper slippage	-	-	Red Blinking
Actuator alarm is reported	-	-	Fast Red Blinking
Terminal ACT-FB is configured but no available feedback signal (under-range or over-range)	-	-	LED Off

NOTICE	
!	If different faulty events occur at the same time, sensor/DAC LED lights up following the priority below: Red (Fast Blinking) -> Red (On, Steady) -> Red (Blinking) -> Yellow -> Off -> Green. 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



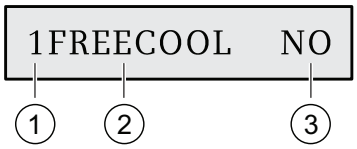
No.	Description
1	One-line LCD. After a period of inactivity, the controller displays the default HMI screen (free cooling status, '1FREECOOL YES' or '1FREECOOL NO')
2	Operation button (Up button) - Move to the previous value, step or category
3	Operation button (Down button)- Move to the next value, step or category

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.

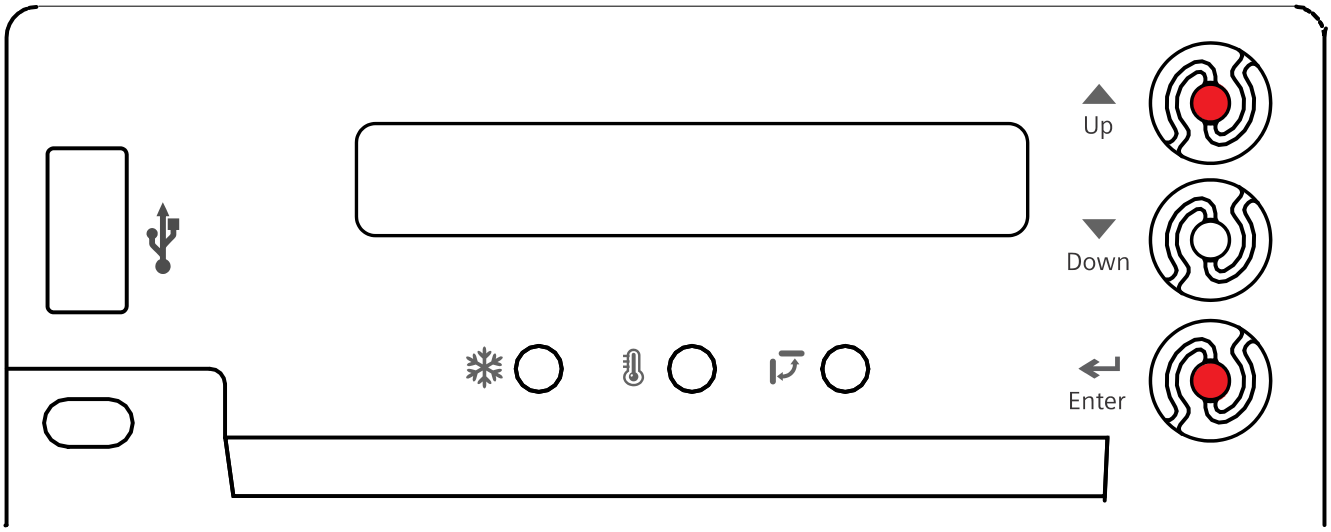
Submenus follow the numbered first-level menus closely. Pressing Up or Down can toggle between different submenus.

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: ● 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 [→ 32] for detailed submenus together with possible values or ranges.



**** Pressing Enter + Up or Down can toggle between different first-level menus.***

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.

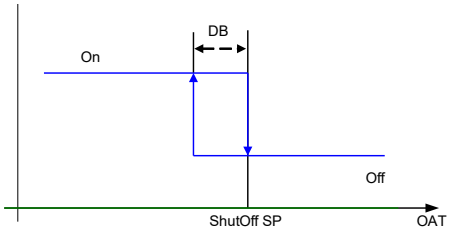
Depending on the sensors that are used, there are four different control modes. In different control modes, the assessed conditions are different.

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 (2TEMP OFF). 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 (2THL), 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 (2ENTH OFF), 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 (2EHL), 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) between OAT and temperature shutoff setpoint defaults to 2 °F (non-changeable).

The temperature shutoff setpoint decides when to disable free cooling when the outside air temperature increases. However, once free cooling is disabled after the increased temperature is higher than the temperature shutoff setpoint, the hysteresis setting decides when to enable free cooling. When the temperature decreases and drops 2 °F (hysteresis setting) below the temperature shutoff setpoint, free cooling is enabled.



Damper modulation during free cooling

Once outside air is suitable for free cooling, the controller modulates the damper based on MAT (mixed air temperature) or OAT (outside air temperature), depending on whether you configured the related parameter in the Climatix mobile application. If not, MAT modulating is used by default. **Note:** MAT temperature may be obtained by an MAT, LAT (default) or automatically.

If MAT is used when free cooling is enabled, MAT setpoint ('3MAT SET', configurable under Advanced Settings [→ 36]) 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 ('3FREEZE POS', configurable under Advanced Settings [→ 36]).

- 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, non-changeable))], 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 (Y1I) is ON. Result of the following formula indicates the damper's open position:

  ```
  ((OAT - OAT Lockout Setpoint) / (50 - OAT Lockout
  Setpoint)) * (80% - MIN POS) + MIN POS
  ```

Note: After the Controller receives the second cooling demand, the damper fully opens regardless of the modulating logic. After fan delay time (2FAN DLY) runs out, mechanical cooling turns on.

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.

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 [→ 20].

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[1)]	On/Off[2)]
Yes	On	Off	Off	Off
Yes	Off	Off	Off	Off

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

1 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.

2 If Y1O is **ON** for more than a set time (15 minutes by default, changeable via Parameter '3STG3 DLY)', Y2I cooling demand remains **ON**, and OAT is lower than MAT setpoint (3MAT SET), then Relay 2 is **OFF** to disable Cooling Stage 2. If the OAT is higher than the MAT setpoint, then Relay 2 energizes to allow Y2 pass-through to enable Cooling Stage 2.

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[1)]	On[2)]	On/Off[4)]
Yes	On	On	Off	On[1)]	On/Off[3)]	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

[1] 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.

[2] If Y3-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 Y2-Output.

[3] If Y1O is **ON** for more than a set time (15 minutes by default, changeable via Parameter '3STG3 DLY)', Y2I cooling demand remains **ON**, and OAT is lower than MAT setpoint (3MAT SET), then Relay 2 is **OFF** to disable Cooling Stage 2. If the OAT is higher than the MAT setpoint, then Relay 2 energizes to allow Y2 pass-through to enable Cooling Stage 2.

[4] If Y2O is **ON** for more than a set time (15 minutes by default, changeable via Parameter '3STG3 DLY)', Y3I cooling demand remains **ON**, and OAT is lower than MAT setpoint (3MAT SET), then Relay 3 is **OFF** to disable Cooling Stage 3. If the OAT is higher than the MAT setpoint, then Relay 3 energizes to allow Y3 pass-through to enable Cooling Stage 3.

The Economizer Controller tolerates thermostat wiring mismatch (e.g. Thermostat Y1 -> Economizer Y2-In, Thermostat Y2 -> Economizer Y1-In). It doesn't recognize if signal comes from Y1-In or Y2-In but calculates the number of received signals and decides the number of cooling/heating demands based on the received signal number. The handling logic is Stage =Y1I + Y2I + Y3I.

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 (Cooling, No W1 or O/B)

Y1	Y2	W1 (Heating)	OB = B (Heating)	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 (Heating, With W1 or O/B)

1 Spd L = Low Speed (Fan)
2 Spd H = High Speed (Fan)
3 PosL = Damper MIN POS for Low-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 (Cooling, No W1 or O/B)

Y1	Y2	Y3	W1 (Heating)	OB = B (Heating)	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 (Heating, With W1 or O/B)

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

If a single-speed fan connects to the Controller, the fan speed is Spd H. The damper position is PosH.

	1-stage Cooling[2]	2-stage Cooling[2]	3-stage Cooling[2]
1-speed Fan[1]	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 Fan[1]	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 Fan[1]	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'.
2 Configured by Y1O, Y2O or Y3O.
3 Spd H = High Speed (Fan)
4 Spd L = Low Speed (Fan)
5 Spd M = Medium 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 Fan[1]	PosH[3] (regardless of cooling demand, OCC=Yes)	PosH[3] (regardless of cooling demand, OCC=Yes)	PosH[3] (regardless of cooling demand, OCC=Yes)
2-speed Fan[1]	PosH[3] (regardless of cooling demand, OCC=Yes)	PosL[4] (0 or 1 cooling demand) PosH[3] (2 cooling demands)	PosL[4] (0 or 1 cooling demand) PosH[3] (2 or 3 cooling demands)
3-speed Fan[1]	PosH[3] (regardless of cooling demand, OCC=Yes)	PosL[4] (0 or 1 cooling demand) PosH[3] (2 cooling demands)	PosL[4] (0 or 1 cooling demand) PosM[5] (2 cooling demands) PosH[3] (3 cooling demands)

Table 8: Different Damper Minimum Positions with Different Configured Outputs

1 Configured by '6FAN'.
2 Configured by Y1O, Y2O or Y3O.
4 PosL = Damper MIN POS for Low-Speed Fan.
5 PosM = Damper MIN POS for Medium-Speed Fan.

3 PosH = Damper MIN POS for High-Speed Fan.

If DCV (demand control ventilation) is enabled, each fan speed corresponds to two damper position ventilation setpoints (VENT MIN, VENT MAX), e.g., PosL corresponds to 2VENTMIN L... 2VENTMAX L.

	1-stage Cooling[2)]	**2-stage Cooling[2)]**	**3-stage Cooling[2)]**
1-speed Fan[1)]	2VENTMIN H to 2VENTMAX H (regardless of cooling demand, OCC=Yes)	2VENTMIN H to 2VENTMAX H (regardless of cooling demand, OCC=Yes)	2VENTMIN H to 2VENTMAX H (regardless of cooling demand, OCC=Yes)
2-speed Fan[1)]	2VENTMIN H to 2VENTMAX H (regardless of cooling demand, OCC=Yes)	2VENTMIN L to 2VENTMAX L (0 or 1 cooling demand) 2VENTMIN H to 2VENTMAX H (2 cooling demands)	2VENTMIN L to 2VENTMAX L (0 or 1 cooling demand) 2VENTMIN H to 2VENTMAX H (2 or 3 cooling demands)
3-speed Fan[1)]	2VENTMIN H to 2VENTMAX H (regardless of cooling demand, OCC=Yes)	2VENTMIN L to 2VENTMAX L (0 or 1 cooling demand) 2VENTMIN H to 2VENTMAX H (2 cooling demands)	2VENTMIN L to 2VENTMAX L (0 or 1 cooling demand) 2VENTMIN M to 2VENTMAX M (2 cooling demands) 2VENTMIN H to 2VENTMAX H (3 cooling demands)

Table 9: Different Damper Position Setting with Different Configured Outputs (DCV is Enabled)

1 Configured by '6FAN'. 2 Configured by Y1O, Y2O or Y3O.

If CO_2 sensor is connected but DCV is disabled, each fan speed corresponds to one minimum damper position ventilation setpoint.

	1-stage Cooling[2)]	**2-stage Cooling[2)]**	**3-stage Cooling[2)]**
1-speed Fan[1)]	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 Fan[1)]	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 Fan[1)]	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, CO_2 sensor is connected)

1 Configured by '6FAN'. 2 Configured by Y1O, Y2O or Y3O.

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	6FAN	VFD Speed	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	-	-	-	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	-	-	-	VFD FAN	60%[8)]	x	-	-	-	-	-	Off

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

OCC	Y1	Y2	Y3	W1 (Heating)	O/B = B (Heating)	6FAN	VFD Speed	Spd L[1)]	Spd M[2)]	Spd H[3)]	Pos L[4)]	Pos M[5)]	Pos H[6)]	DO[7)]
Yes	x	-	-	-	x	VFD FAN	60%	x	-	-	-	-	x	On
Yes	x	x	-	-	x	VFD FAN	80%	-	x	-	-	-	x	On
Yes	x	x	x	-	x	VFD FAN	100%	-	-	x	-	-	x	On
Yes	-	-	-	x	-	VFD FAN	100%	x	-	-	-	-	x	On
No	x	-	-	-	x	VFD FAN	60%	x	-	-	-	-	-	On
No	x	x	-	-	x	VFD FAN	80%	-	x	-	-	-	-	On
No	x	x	x	-	x	VFD FAN	100%	-	-	x	-	-	-	On
No	-	-	-	x	-	VFD FAN	100%	x	-	-	-	-	-	On

Table 12: Variable-Speed Fan Control Logic During 3-Stage Heating

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 [→ 38] 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 after Y1-Output is ON 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 after Y2-Output is ON 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 [→ 32]. The default time is 5 and 15 minutes respectively.

Demand Control Ventilation (DCV)

The controller modulates the outside air damper based on the CO_2 level through the ppm value selected between the range of 500 and 2000 ppm. The measured CO_2 concentration value is compared with the set DCV setpoint. If the measured CO_2 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 CO_2 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 NO
1ECON ENAB	Indicates if outdoor air is being used for the 1st stage of cooling.	
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 OFF
1Y1-OUT	Y1-Out signal to compressor for Cooling Stage 1	
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.	

Parameter	Description	Value
1AUX1-O	Aux1-Out signal **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 NO
1MIX AIR LOW	Indicates if the anti-freeze protection function is enabled for a mixed air temperature sensor. If air temperature (obtained by an MAT, LAT (default) or automatically) is lower than the anti-freeze protection setpoint (3FRZ PROT), the parameter value is 'YES'. Otherwise, it is '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 [→ 36].	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 an RAT sensor is configured.	
1RAH PRES	Indicates the present value of the return air relative humidity (RAH) sensor. **Dynamic item**. Appears only if an 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 [→ 38].	L M H

Parameter	Description	Value
1VFD SPD	Indicates the current VFD fan speed. **Dynamic item**. Appears only if '6FAN' is configured as 'VFD FAN'.	60% 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 [→ 41].	
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
1OAT LOCK	Indicates status of the OAT cooling lockout function.	NO LCKOUT OVRD
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 [→ 38].	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
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

Parameter	Description	Range	Default
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: ● 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: ● 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: ● 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: ● Exhaust Fan 2 is configured. ● '6FAN' is configured as '2SPEED', '3SPEED' or 'VFD FAN'.	0...100%; increment by 1	80%
2EX2 M	Exhaust Fan 2 medium-speed parameter setting **Dynamic item**. Appears only if: ● Exhaust Fan 2 is configured. ● '6FAN' is configured as '3SPEED' or 'VFD FAN'.	0...100%; increment by 1	78%
2EX2 H	Exhaust Fan 2 high-speed parameter setting **Dynamic item**. Appears only if: ● 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.	80...100 °F; increment by 1	83 °F
2EHL	Enthalpy high limitation **Dynamic item**. Appears only if an RAH sensor is configured.	30...50 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) when the Controller is under MAT-based anti-freeze protection.	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: ● 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 (For 4LLA ALARM) **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 (For 4HLA ALARM) **Dynamic item**. Appears only if 'LAT' or 'AUTO' is selected for '3DIF T LOC'.	70...158 °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.		
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
3ACT TOLR	Actuator tolerance setpoint between output (in percentage) and feedback (in percentage).	0...15%; increment by 1	8%
3OAT LOCK	OAT lockout setpoint for the OAT cooling lockout function.	-45...80 °F; increment by 1	32 °F
3OAT LCKOVRD	When OAT LOCKOUT is enabled, choose to override the cooling lockout function or not.	YES NO	NO
3OAT LCKODLY	Indicates the overridden time if 'YES' is selected for '3OAT LCKOVRD'.	0...300 min; increment by 1	45 min

Alarms

Parameter	Description
NO ALARM	No alarm is activated.
4MAT SEN ALARM	MAT/LAT 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. **Note:** MAT temperature may be obtained by an MAT, LAT (default) or automatically.
4RTU SHUTDOWN	Notification of Shutdown Active when 'SHUTDWN' is chosen for '6AUX1-I' or '6AUX2-I'.
4ACTUATOR ALARM	Actuator output has failed, or the gap between the actuator output (in percentage) and feedback (in percentage) is bigger than the actuator tolerance setpoint (3ACT TOLR).
4ACT UNDER V	Voltage received by the actuator is below expected range (2-10 Vdc).
4ACT OVER V	Voltage received by the actuator is above expected range (2-10 Vdc).
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
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).

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

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	Auxiliary DI-1. Configurable as: ● 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 SHUTDWN PREOCC HP(B) HP(O) W1 Y3 IN	W1
6AUX2-I	Auxiliary DI-2. Configurable as: ● 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 **Note:** Whichever is chosen for '6AUX1-I' doesn't appear in the list of '6AUX2-I'.	NONE SHUTDWN PREOCC HP(B) HP(O) W1 Y3 IN	NONE
6OAT SIG	Configures signal type of OAT sensor.	NTC10K 0-10V	NTC10K
6RAT SIG	Configures signal type of RAT sensor.	NONE 0-10V NTC10K	NONE
6OAH SIG	Configures signal type of OAH sensor.	0-10V NONE 4-20mA	NONE
6RAH SIG	Configures signal type of RAH sensor.		
6MAT SIG	Configures signal type of MAT or LAT sensor.	NTC10K 0-10V	NTC10K
6AUX-AI1	Auxiliary AI-1. Configurable as: ● CO_2 sensor ● Static pressure (temporarily for CFM commissioning) sensor ● None	NONE PRESSURE CO2	NONE
6X-AI1 SIG	Configures CO_2 sensor type. **Dynamic item**. Appears only if 'CO2' is selected for '6AUX-AI1'.	0-10V 2-10V 0-5V	0-10V
6CO2 Rng L	Configures the low limit of CO_2 measuring range. **Dynamic item**. Appears only if 'CO2' is selected for '6AUX-AI1'.	0...500; increment by 10	0
6C02 Rng H	Configures the high limit of CO_2 measuring range. **Dynamic item**. Appears only if 'CO2' is selected for '6AUX-AI1'.	1000...3000; increment by 50	2000

Parameter	Description	Value	Default
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'.	NONE VFD	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
6AUX1-O	Auxiliary DO-1. Configurable as: ● None ● Cooling stage 3 output ● Exhaust fan (1 or 2) ● Variable speed supply fan ● Alarm output to thermostat (Title 24) ● ERV	NONE ERV ALARM SUP FAN EXHAUST Y3O	EXHAUST
6AUX2-O	Auxiliary DO-2. Configurable as: ● None ● Cooling stage 3 output ● Exhaust fan (1 or 2) ● Variable speed supply fan ● Alarm output to thermostat (Title 24) ● ERV **Note:** Of all but **Exhaust Fan**, whichever is chosen for '6AUX1-O' doesn't appear in the list of '6AUX2-O'.	NONE ERV ALARM SUP FAN EXHAUST Y3O	ALARM
6FAN	Configures fan speeds of the variable speed supply fan.	1SPEED 2SPEED 3SPEED VFD FAN	2SPEED
6RS485	Switch between MSTP and Modbus subordinate.	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 and then drive damper to 100% Closed.
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 andY1O/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 wring 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	MAT/LAT 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: ● 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	Actuator alarm is reported	Check if actuator output has failed, or the gap between the actuator output (in percentage) and feedback (in percentage) is bigger than the actuator tolerance setpoint (3ACT TOLR).

Symptom	Reason	Solution
DAC LED is OFF	Terminal ACT-FB is configured but no available feedback signal	Check if the feedback signal is under range or over range; 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 the OAT cooling lockout function.
	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 [→ 30] 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-Stick and SIBPAdmin. See document CC1N7219en for more details.

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