Emerson CC200 Controller and Hardware Wiring User Guide

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Emerson CC200 Controller and Hardware Wiring

Specifications

- **Name**: CC200 Main Controller
- **Power Requirement**: 24VDC
- **Power Supply**: SELV/ Class 2 Source, 24VDC
- **Rated Impulse Voltage:** 0.5 kV (Main supply side) / 2.5 kV (Loads side)
- **Ambient Operating Temp:** 20-85% RH; non-condensing

- **Storage Temperature:** DIN Rail
- **Relative Humidity:** 7 3/16x 4 5/16x 3 (W x H x D)
- **Mounting**: Type 1 Enclosure
- **RS485 Port A:** Less than 1/6 unit loading; up to 57.6K Baud; Isolated; Dipswitch 150 ohm termination; 3-Terminal connector
- **RS485 Port B**: The RS485 Port A and B grounds are isolated from each other, circuit ground, and earth ground. Onboard 100-ohm resistors between RS485 C terminals and RS485 isolated grounds allow direct earth-ground connection of C terminals.
- **ETH1:** BACnet TCP/IP repeater (Ethernet 10/100)
- **ETH2**: BACnet TCP/IP repeater (Ethernet 10/100)
- **Purpose of Control:** Operating Control
- **Construction of Control:** DIN rail mounting control to be incorporated in Class I or Class Ii appliances
- **Pollution Degree**: 2
- **Type of Action:** 1.B
- **Over-voltage Category:** II

Power Supply Specifications

- Primary Power: 120VAC
- Secondary Power: 24VDC
- CC200 Power Requirement: 24VDC 60W
- Required Power Supply: CC200 Power Supply 24VDC 60W Copeland P/N 318-3183
- Power Supply Terminals: 2 (-V) & 3 (+V)
- CC200 Power Terminals: 72(+) –73(-) — 71(Earth)
- Wire Spec: 16 AWG or larger diameter wire
- 24VDC Max Wire Length: 20
- Mounting: DIN Rail Mounted
- Power Supply Dimensions: 2.06 x 3.54 x 2.14 (W x H x D)

Product Usage Instructions

CC200 Power Wiring

- **Step 1**: Mount Power Supply and CC200 Main Controller to DIN Rail.
- **Step 2:** Wire Secondary power from the Power Supply to the CC200 Main Controller.

    1. Reference specification and drawing for Terminal.
    2. This is Polarity Sensitive.

- **Step 3:** Wire Primary power to Power Supply.

    1. Reference the specification and drawing for Terminals.

Fan Motors Over 5A

Note: Fan motors over 5 amps must use the alternate wiring method with a pilot device between CC200 and the motor.

- **Step 1**: Verify power is OFF on the CC200 Main Controller.
- **Step 2:** Refer to the specification drawing below for the correct termination terminals and how to wire:

CC200 Main Controller Output Wiring

Note: Fan motors over 5 amps must use the alternate wiring method with a pilot device between CC200 and the motor.

- **Step 1:** Verify power is OFF on the CC200 Main Controller.
- **Step 2:** Refer to the specification drawing below for the correct termination terminals and how to wire:

CC200 Main Controller Output Specifications

- Relay Specifications:
  - CC200 Label: AMP/VAC
  - Loads Controlled: Fan/CT
  - Form C Relay/built-in CT:
    - NO: Resistive 5A, 240Vac or less Motor 5FLA, 30LRA, 240Vac or less Pilot Duty B300
    - NC: Resistive 5A, 240Vac or less Motor 5FLA, 30LRA, 240Vac or less Pilot Duty C300
  - AUX Relay:
    - Form C Relay NO: Resistive 12A, 240Vac or less Motor 10FLA, 60LRA, 240Vac or less Pilot Duty B300
    - NC: Resistive 12A, 240Vac or less Motor 5FLA, 30LRA, 240Vac or less Pilot Duty C300
  - LLSV:
    - Alarm Out, Door Alarm, Satellite for E2E control, backup for other RO
  - AO1 (AO) 4-20mA -10VDC:
    - Satellite for E2E control, future Light Dimming, future Anti-sweat
  - AO2 (AO) 4-20mA or 0-10VDC:

FAQ

- **Q:** What is the power requirement for the CC200 Main Controller?
- **A**: The CC200 Main Controller requires a 24VDC power supply.
- **Q:** What is the maximum wire length for the 24VDC power supply?
- **A:** The maximum wire length for the 24VDC power supply is 20 feet.
- **Q:** Can fan motors over 5 amps be connected directly to the CC200 Main Controller?
- **A:** No, fan motors over 5 amps must use the alternate wiring method with a pilot device between CC200 and the motor.

CC200 Main Controller Specifications

Name	Description
Power Requirement	24VDC 71(Earth) – 72(+) – 73(-)
Power Supply	SELV/ Class 2 Source, 24VDC
Rated Impulse Voltage	0.5 kV (Main supply side) / 2.5 kV (Loads side)
Ambient Operating Temp	14°F to 122°F (-10°C to 50°C)
Storage Temperature	-40 to 185°F (-40 to 85°C)
Relative Humidity	20-85% RH; non-condensing
Mounting	DIN Rail
Dimensions Enclosure	7 3/16”x 4 5/16”x 3” (W x H x D) Type 1
RS485 Port A RS485 Port B	Less than 1/6 unit loading; up to 57.6K Baud; Isolated; Dipswitch 150 ohm te rmination; 3-Terminal connector. The RS485 Port A and B grounds are isolat ed from each other, circuit ground, and earth ground. Onboard 100 ohm resistors between RS485 “C” terminals and RS485 isolated grounds allow dir ect earth ground connection of “C” terminals.
ETH1 ETH2	BACnet TCP/IP repeater (Ethernet 10/100) BACnet TCP/IP repeater (Ethern et 10/100)
Purpose of Control	Operating Control
Construction of Control	l DIN rail mounting control to be incorporated in Class I or Class Ii appliances
Pollution Degree	2
Type of Action	1.B
Over-voltage Category	II

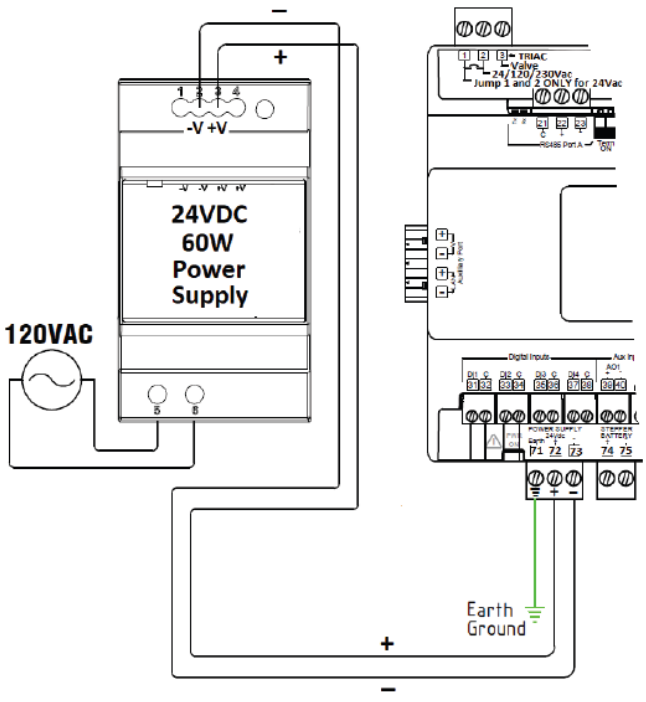
Power Supply Specifications

Power Supply Specifications	
Primary Power	120VAC
Secondary Power	24VDC
CC200 Power Requirement*	24VDC 60W
Required Power Supply*	CC200 Power Supply 24VDC 60W Copeland P/N 318-3183
Power Supply Terminals	2 (-V) & 3 (+V)
CC200 Power Terminals	72(+) –73(-) — 71(Earth)
Wire Spec	16 AWG or larger diameter wire
24VDC Max Wire Length 20”	20”
Mounting	DIN Rail Mounted
Power Supply Dimensions*	2.06” x 3.54” x 2.14” (W x H x D)

Note: If the CC200 system has three (3) expansion modules, the 92W P/N 318-3184 power supply is required.

CC200 Power Wiring

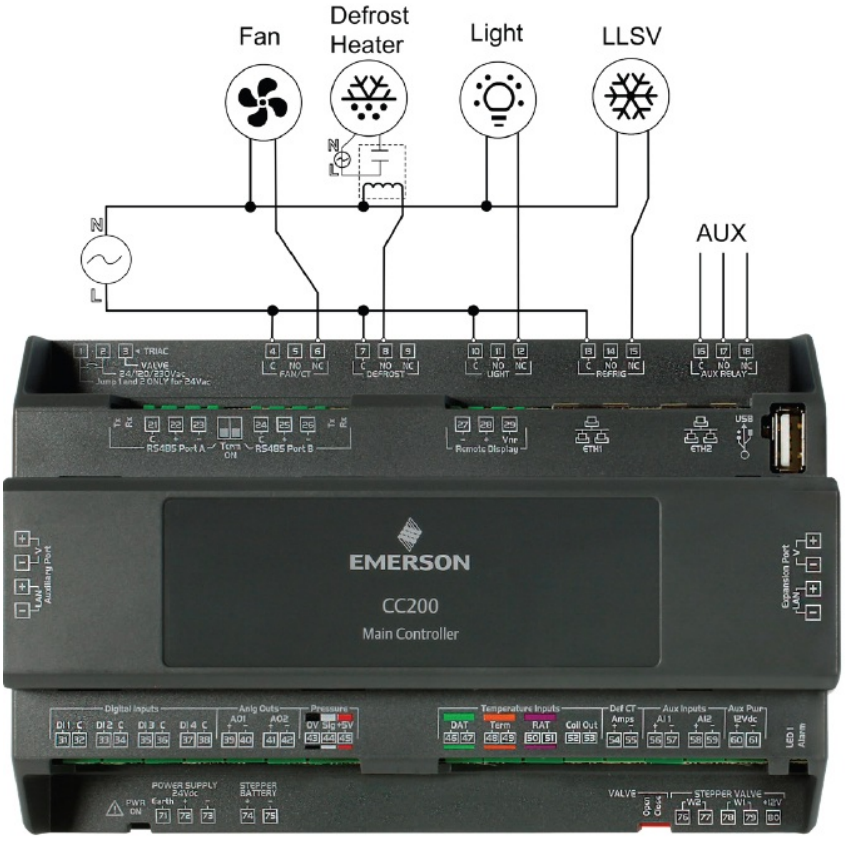
- **Step 1:** Mount Power Supply and CC200 Main Controller to DIN Rail.
  Step 2: Wire Secondary power from Power Supply to CC200 Main Controller.
  - Reference specification and drawing for Terminal.
  - This is Polarity Sensitive.
- **Step 3:** Wire Primary power to Power Supply.
  - Reference the specification and drawing for Terminals



CC200 Main Controller Output Wiring

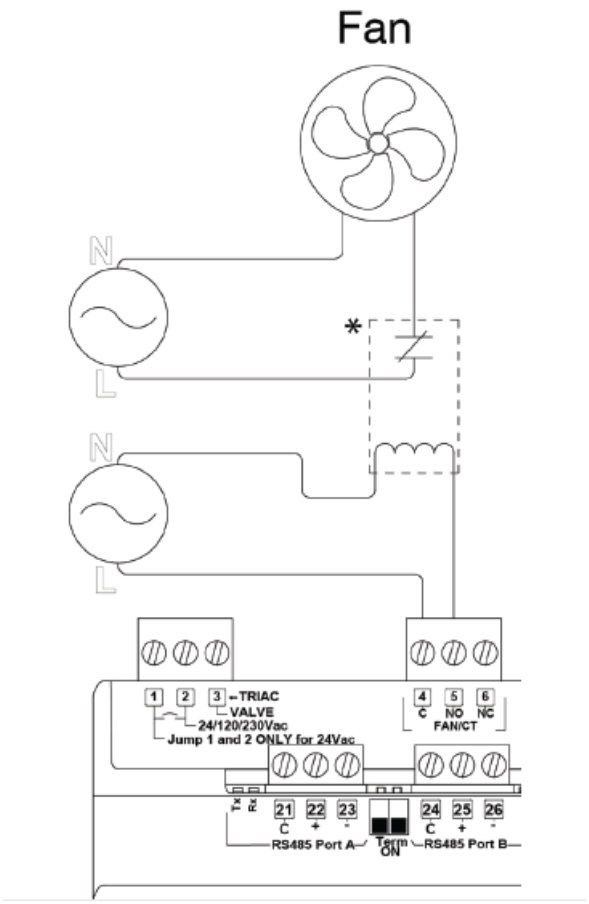
Note: Fan motors over 5 amps must use the alternate wiring method with a pilot device between CC200 and the motor.

- **Step 1**: Verify power is OFF on the CC200 Main Controller.
- **Step 2:** Refer to the specification drawing below for the correct termination terminals and how to wire:



CC200 Main Controller Output Wiring

For Fan Motors Over 5A



Alternative Fans Over 5 amps

CC200 Main Controller Output Specifications

Relay Specifications			
CC200 Label	**AMP/VAC**	**Loads Controlled**	**Terminal**
Fan/CT	Form C Relay/built in CT: **NO:** **Resistive** 5A, 240Vac or less **Motor** 5FLA, 30LRA, 240Vac or less **Pilot Duty** B300 **NC:** **Resistive** 5A, 240Vac or less **Motor** 5FLA, 30LRA, 240Vac or less **Pilot Duty** C300	Evap Fans	4(C) – 5(NO) – 6 (NC)
Defrost	Form C Relay **NO**: **Resistive** 12A, 240Vac or less **Motor** 10FLA, 60LRA, 240Vac or less **Pilot Duty** B300 **NC:** **Resistive** 12A, 240Vac or less **Motor** 5FLA, 30LRA, 240Vac or less **Pilot Duty** C300	Defrost Heaters	7(C) – 8(NO) – 9(NC)
Light		Case Lights	10(C) – 11(NO) – 12(NC)
Refrig		LLSV	13(C) – 14(NO) – 15(NC)
AUX Relay		Alarm Out, Door Alarm, S atellite for E2E control, backup for other RO	16(C) – 17(NO) – 18(NC)
AO1 (AO)	4-20mA -10VDC	Satellite for E2E control, *f uture Light Dimming, futu re Anti-sweat*	39(+) – 40(-)
AO2 (AO)	4-20mA or 0-10VDC	*Future Light Dimming*	41(+) – 42(-)
TRIAC	20W Max 24/120/230Vac	PMW Valve	1(Jmp) –2(Line)– 3(VALVE) Jump Terminals 1 and 2 ONLY f or 24Vac Valve

CC200 Main Controller Input Specifications

Input Specifications		
CC200 **Label**	**Description**	**Terminals and Colors**
DAT	Discharge Air	46 – 47 **Green**
TERM	Defrost Termination	48 – 49 **Orange**
RAT	Return Air	50 – 51 **Purple**
COIL OUT	Coil Out	52 – 53
PRESSURE	Evaporator Pressure Transducer	43(0v) – 44(Sig) – 45(+5V) Black – White – Red
Def CT Amps	Defrost Amps (electric defrost only)	54(+) – 55(-)
Aux Inputs AI and DI		
AI1 AI2	Configurable functions: External fan CT, Coil Inlet Tem p, Product Temp, Circuit Suction Temp	56(+) – 57(-) 58(+) – 59(-)
DI1 DI2 DI3 DI4	Door switch, service switch, dual temp switch, defrost term switch, leak shutdown, satellite 1 for E2E, satellite 2 for E2E	31(DI1) – 32(C) 33(DI2) – 34(C) 35(DI3) – 36(C) 37(DI4) – 38(C)

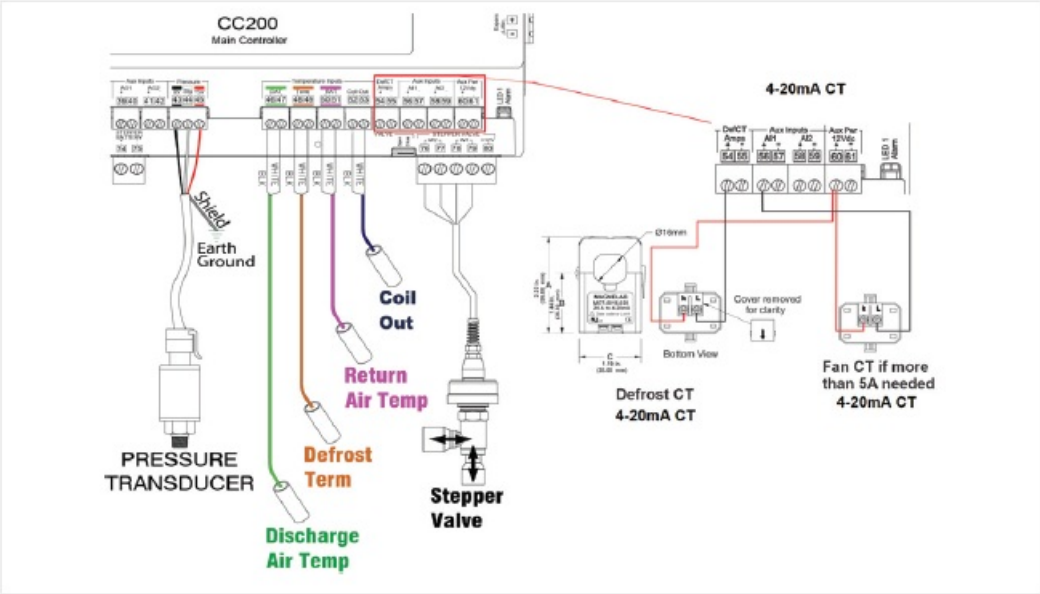
Wire Specifications for Extending Inputs

Wire Specifications for Extending Inputs	
Analog Temp Sensors or Digital Inputs	General Cable 92454A Copeland P/N 135-0600 or Belden 8761 Copeland P/N 035 -0002 or equivalent 2 conductors shielded 22 AWG or larger cable may be used to extend the length to a maximum of 50 ft. ***If the manufacturer harness must be extended, join wires with solder and ins ulate with heat shrink tubing.***
Pressure Transducer	Belden 28326AS Copeland P/N 135-2832 or Belden 8771 Copeland P/N 135-8771 or equivalent 3 conductors shielded 22 AWG or larger cable may be used to extend the length to a maximum of 50 ft. ***If the manufacturer harness must be extended, join wires with solder and ins ulate with heat shrink tubing.***

CC200 Input Wiring

- **Step 1**: Make sure the power is OFF to the CC200 Main Controller.

- **Step 2:** Determine what sensors will be needed and wire per the specifications above
    - a. If the sensor needs to be extended Copeland only supports heat shrink and solder.
- **Step 3**: Determine how many coils are on the cases
    - For multi-coil cases, the CC200 supports one sensor per coil for discharge air, return air, defrost termination, and coil outlet. Pressure transducers for multi-coil cases may be installed one per coil or one for the entire case (parameter selectable).
    - For multi-coil cases, the sensors on coil #1 will terminate on the CC200 Main Controller. The second and third sensor coils will require an Expansion Module per coil and each coil's sensor will terminate on each of the Expansion Modules



CC200 Main Controller Input Wiring

CC200 Stepper Valve Wiring and Specifications

- Each CC200 STEPPER VALVE output when configured as "Bipolar" is capable of supplying up to 500mA/phase and driving 12 Volt 2-Phase bipolar permanent magnet stepper valves with constant 12 volts using Full Step mode 4-step drive sequence. Bipolar stepper valves with phase resistance less than 26 ohms or that require a voltage chopper constant current driver, CANNOT be driven with the CC200 system.
- Each CC200 STEPPER VALVE output when configured as "Unipolar" is capable of supplying up to 300mA/phase and driving 12 Volt 5-wire unipolar permanent magnet stepper valves with 1-2 Phase Half Step 8 pulse control sequence. Unipolar stepper valves with phase resistance less than 40 ohms CANNOT be driven with the CC200v system.

Stepper Valve (Sporlan CDS only)		
Stepper Valve	Bipolar	W2
		76(White) – 77(Black)
		W1
		78(Red) – 79(Green)
Stepper Valve – Expansion Module	Bipolar	W2
		33 (White) – 34 (Black)
		W1
		35 (Red) – 36 (Green)

Supported Stepper Valve List

The table below shows supported valves with recommended parameter values to configure each valve. For any valves not listed, obtain the valve manufacturer data sheet and contact Copeland for details on how to operate the valve with CC200. The table below shows supported valves with recommended parameter values to configure each valve. For any valves not listed, obtain the valve manufacturer data sheet and contact Copeland for details on how to operate the valve with CC200.

Valve Model	Motor Type	Max Steps	Step Rate	Overclose	Relax Steps
Sporlan SER-A, A(HP) AA, B, C, D	Bipolar	2500	200	10%	8
Sporlan SERI-G, J, K, L	Bipolar	2500	200	10%	8
Sporlan SER 1.5-20	Bipolar	1596	200	10%	8
Sporlan SEHI-100, 175	Bipolar	6386	200	10%	8
Sporlan SEI .5-11	Bipolar	1596	200	10%	8
Sporlan SEI 30	Bipolar	3064	200	10%	8
Sporlan SEI 50	Bipolar	6386	200	10%	8
Sporlan CDS or CDST 2, 4, 7	Bipolar	2500	200	10%	8
Sporlan CDS or CDST 9, 16, 17	Bipolar	6386	200	10%	8

Note: CC200 stepper valve calibration defaults to once per day during the first defrost. If the valve calibration parameter is changed to every defrost, adjust the overclose % parameter to 5%.

CC200 Stepper Valve Wiring

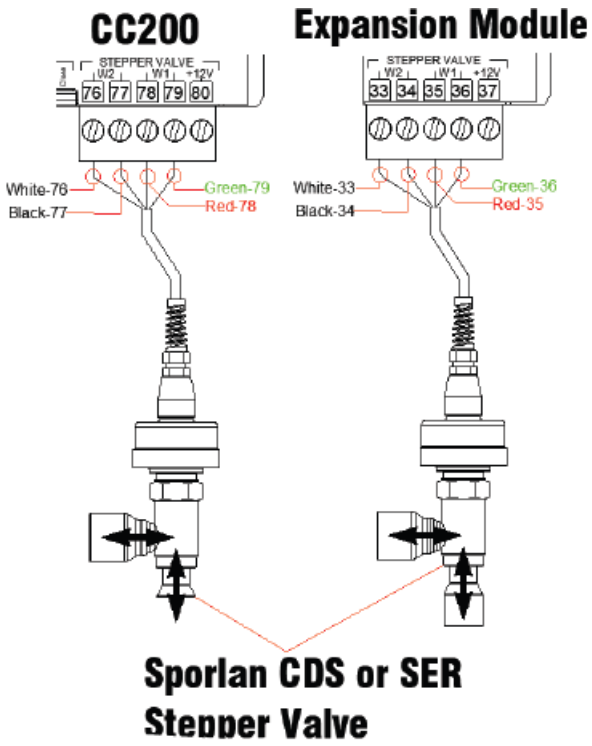
- **Step 1**: Make sure the power is OFF to the CC200 Main Controller.
- **Step 2:** The CC200 Case-control system (Main Controller + Expansion Modules) supports Electronic

Expansion Valve (EEV) control using either Pulse Width Modulation (PWM) valves OR Stepper valves but NOT both.

The first case in a CC200 lineup (“a” Case) has support for control of the Electronic Evaporator Pressure Regulation (EEPR) stepper valve.

PWM EEV 1 or Stepper EEV 1 is always located on the CC200 Main Controller

- PWM EEV 2 or Stepper EEV 2 is always located on Expansion Module 1
- PWM EEV 3 or Stepper EEV 3 is always located on Expansion Module 2
- EEPR Location
  - ¾ When PWM EEV is used, EEPR is always located on CC200 Main Controller Stepper terminals
  - ¾ When Stepper EEV is used, EEPR is located on the last Expansion Module Stepper terminals
    - The wiring specification above is only for the Sporlan CDS and SER valves.
    - If other manufacturer valves are used, refer to the manufacturer’s specification and contact Copeland for instructions on how to terminate.
- **Step 3:** Refer to the drawing and specification for the termination of the valve



CC200 / Expansion Module Stepper Valve Wiring

CC200 Expansion Module Wiring and Specifications

CC200 Label	Description	Terminals and Color
DAT	Discharge Air	16-17 **Green**
TERM	Defrost Termination	18 – 19 **Orange**
RAT	Return Air	20 – 21 **Purple**
COIL OUT	Coil Out	22 – 23
PRESSURE	Evaporator Pressure Transducer	12(0v) – 13(Sig) – 14(+5V) Black – White – Red

Wire Specifications for Extending Inputs	
Analog Temp Sensors or Digital I nputs	General Cable 92454A Copeland P/N 135-0600 or Belden 8761 Copeland P/N 035-0002 or equivalent 2 conductor shielded 22 AWG or larger cable may be used to extend the length to a maximum of 50 ft. ***If the manufacturer harness must be extended, join wires with solder and insulate with heat shrink tubing.***
Pressure Transducer	Belden 28326AS Copeland P/N 135-2832 or Belden 8771 Copeland P/N 1 35-8771 or equivalent 3 conductor shielded 22 AWG or larger cable may b e used to extend the length to a maximum of 50 ft. ***If the manufacturer harness must be extended, join wires with solder and insulate with heat shrink tubing.***
EEV Stepper (Unipolar)	Use the manufacturer harness with a maximum length not to exceed 30 ft (10 meters).
EEPR Stepper (Bipolar) EEV Ste pper (Bipolar Walk-in applications)	Belden 28326AS Copeland P/N 135-2832 or Belden 9418 Copeland P/N 1 35-9418 or equivalent 4 conductor shielded 18 AWG or larger cable may b e used to extend the length to a maximum of 75 ft. ***If the manufacturer harness must be extended, join wires with solder and insulate with heat shrink tubing.***

CC200 Expansion Module Mounting and Installation

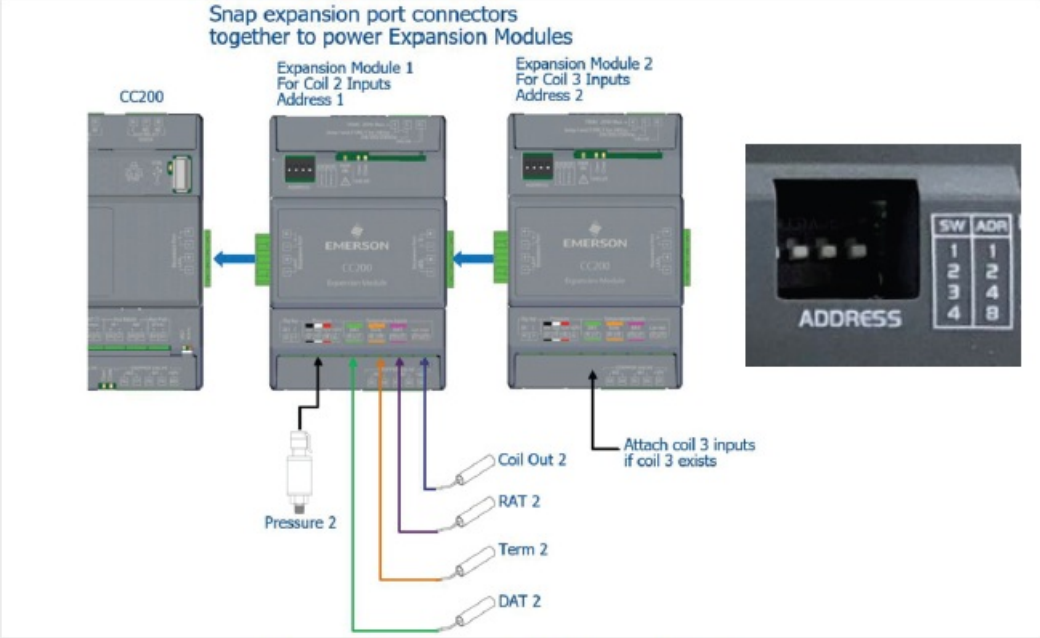
- **Step 1:** Determine if you need an Expansion Module.
  - a. You will add an Expansion for a second or third coil. Each coil will have temp sensors and a transducer and will be wired to the respective Expansion Module.
- **Step 2:** Addressing the Expansion Module
  - b. Set the address of each Expansion Module using the ON/OFF dip switch bank on the top left corner of the hardware (refer to Connecting Two Expansion Modules and Termination graphic).
  - Expansion Module one must be set to address 1, Expansion Module two to address 2, and Expansion Module three to address 3.

- **Step 3**: Install the Expansion Module.
  - Make sure power is OFF to the CC200 Main Controller. Power will be restored in a later step.
  - Install Expansion Module 1 on the DIN rail adjacent to the CC200's right side. The CC200 Expansion port terminal V+ should be aligned with Expansion Module 1 Expansion port terminal V+. Slide the Expansion Module into the CC200 Expansion port so both devices' Expansion port connectors fasten together.
  - If Expansion Modules 2 and 3 are present, connect to Expansion Module 1's Expansion port in the same manner described in the above step.

No wiring is needed between the CC200 Main Controller and CC200 Expansion Module. Power and communication are sourced from the CC200 Expansion port and passed through each Expansion Module Expansion port.

- Step 4: Terminate sensors on the Expansion Module and refer to the drawing and specifications above for terminal numbers and how to terminate.

Once all sensor terminations are complete and the Expansion Module Expansion port is securely plugged into the CC200 Expansion port, restore the 24VDC supply power to the CC200 Main Controller. Once connected, the Expansion Module PWR ON LED will illuminate green indicating supply power is present.



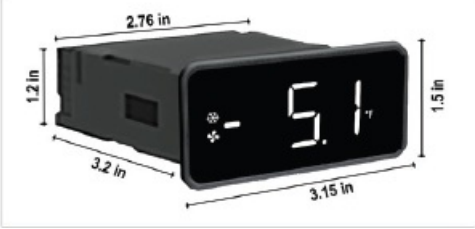
Connecting Two Expansion Modules and Terminators

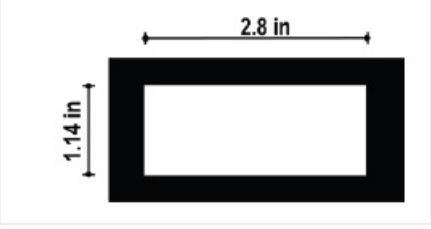
CC200 Case Display

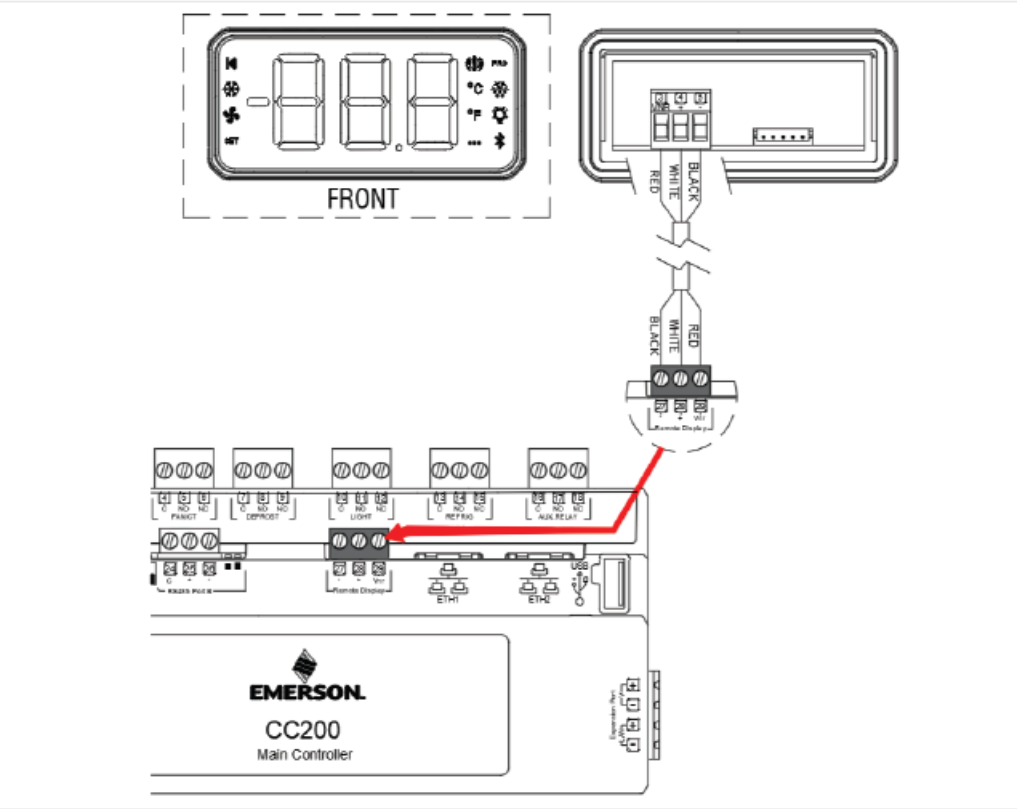
CC200 Case Display Specifications	
Power Requirement	Powered from the CC200 Case Controller
Rated Impulse Voltage	330
Purpose of control	Operating Control
Construction of control	Panel mounting control to be incorporated in Class III appliances
Type of Action	1.B
Enclosure	Type 1
Over-voltage Category	I
Required Wire	Belden #8771 3C22AWG or Belden #8772 3C20AWG, Max 50 ft.
Mounting	Use the white sliding clips that are provided with the CC200 Display
Operating Temp	14°F to 122°F (-10°C to 50°C)
Relative Humidity	20 to 85 RH% (non-condensing humidity)
Protection	Body: IP20; Front: IP65
Pollution Degree	2
Points	**CC200 Terminals to CC200 Display Terminals**
–	27(-) to 5(-)
+	28(+) to 4(+)
VNR	29(VNR) to 3(VNR)

CC200 Case Display Wiring

- Step 1: Make sure power to the CC200 Main Controller is turned OFF.
- Step 2: Make termination from the CC200 Main Controller to the CC200 Display.
    - It is critical that these terminations are made correctly as this can result in damage to both devices if not terminated correctly.
    - Clip and insulate shield at both ends of the Belden connection cable. Keep cable length at less than 50 ft (15 meters).
- Step 3: Power ON the CC200 Main Controller







Part Numbers for Ordering

*Copeland Part Number	Description
810-3180	CC200 Main Controller
318-3181	CC200 Expansion Module
318-3182	CC200 Case Display
318-3183	CC200 Power Supply 24VDC 60W
318-3184	CC200 Power Supply, 24VDC, 3.83A, 92W, DIN Mount **Note: If the CC200 system has three (3) expansion modules, the 92W P/N 318-3184 power supply is required.**
501-1122	Discharge Air Temperature Sensor
501-1127	Defrost Termination Temperature Sensor
501-1128	Return Air Temperature Sensor
501-1125 (blue) 501-1126 (red)	Coil Out Temperature Sensor
800-2100	100lb Pressure Transducer
800-2650	Copeland 650 PSIG Pressure Transducer
261-0001	CC200 Defrost/Fan CT, 20A (4-20mA)
261-0002	CC200 Walk-In Defrost CT, 50A (4-20mA)
302-0100	CC200 Case Display Bracket **Note: For use with 318-3182 CC200 Case Display**
302-0105	Deli Case Display Bracket

Cold Chain Connect is the CC200 mobile application for setting parameters, graphing inputs and outputs, setting service overrides, and viewing alarms. Cold Chain Connect provides a window into CC200 operation and diagnostics directly at the location of the refrigerated fixture or walk-in box

Download Cold Chain Connect for Android™ at Google Play Store

- Scan the QR code for the Cold Chain Connect App

Download Cold Chain Connect from the App Store®:

- Scan the QR code for the Cold Chain Connect App.

contact

- For Technical Support:
- Call: 833-409-7505 or
- Email: ColdChain.TechnicalServices@copeland.com
- For the full user manual,
- scan the QR code:
- copeland.com

Documents / Resources

	Emerson CC200 Controller and Hardware Wiring [pdf] User Guide CC200 Controller and Hardware Wiring, CC200, Controller and Hardware Wiring, Hardware Wiring, Wiring

References

- Copeland | Copeland US
- User Manual