Sollatek FCA23 Installation

STOP! All work detailed in these instructions must be done by a qualified technician.

Subject: Sollatek FCA23 Installation
Date: June 23, 2023
Models / Parts Affected: Electronic Temperature Control Kits P#848325 (Universal) & P#848326 (Wine/Chocolate)
Voltages: All Voltages

Contents

Questions or Concerns

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Overview

The Sollatek FCA 23 holds an average product temperatures of 32-40°F (0-4.4°C) for universal applications and 39-71°F (3.9-21.7°C) for wine/chocolate applications. The electronic temperature control **requires a neutral line** to complete the circuit.

NOTE: Always install the provided relay. Some applications may have an existing relay; in these cases replace the existing relay.

WARNING! Electrical shock or burn hazard. Powering off an electronic control does not remove power from all components. Unplug the unit or turn off the power supply before proceeding.

WARNING! Sharp edges. Take care when installing, cleaning, servicing, and maintaining the equipment.

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Kit Components

NOTE: Required components and quantities vary by model.

Universal Control Kit Components

- (1) Electronic Temperature Control
- (1) Black Probe (thermostat)
- (1) White Probe (defrost)
- (1) White/Blue Wire with 1/4" Blue Spade Connector
- (1) Black Wire (bare)
- (3) 1/4" Spade Connectors
- (2) 2-Way Lever Connectors
- (1) 3-Way Lever Connector
- (1) 5-Way Lever Connector
- (6) Small Cable Ties
- (2) 1/4" P-Clips
- (4) 3/16" Black P-Clips
- (6) 8-18 x 1/2" Hex Head Screws
- (2) 6-20 x 5/16" Phillips Hex Head Screws
- (2) M4 x 10 Pan Head Phillips Screws

Universal Control Relay Kit Components

- (1) Temperature Control Relay
- (1) Black Wire with 1/4" Blue Spade Connector
- (1) Brown/Red Wire with 1/4" Blue Spade Connector
- (1) Brown Wire with 3/16" Red Spade Connector
- (1) White Wire with 3/16" Red Spade Connector
- (4) 2-Way Lever Connectors
- (1) 3-Way Lever Connector
- (2) 5-Way Lever Connectors
- (2) M4 x 12 mm Hex Head Screws

Wine/Chocolate Control Kit Components

- (1) Electronic Temperature Control
- (1) Black Probe (thermostat)
- (1) White Probe (defrost)
- (1) White/Blue Wire with 1/4" Blue Spade Connector
- (1) Black Wire (bare)
- (3) 1/4" Spade Connectors
- (2) 2-Way Lever Connectors
- (1) 3-Way Lever Connector
- (1) 5-Way Lever Connector
- (6) Small Cable Ties
- (2) 1/4" P-Clips
- (4) 3/16" Black P-Clips
- (6) 8-18 x 1/2" Hex Head Screws
- (2) 6-20 x 5/16" Phillips Hex Head Screws
- (1) Hazardous Food Warning Label
- (2) M4 x 10 Pan Head Phillips Screws

Wine/Chocolate Control Relay Kit Components

- (1) Temperature Control Relay
- (1) Black Wire with 1/4" Blue Spade Connector
- (1) Brown/Red Wire with 1/4" Blue Spade Connector
- (1) Brown Wire with 3/16" Red Spade Connector
- (1) White Wire with 3/16" Red Spade Connector
- (4) 2-Way Lever Connectors
- (1) 3-Way Lever Connector
- (2) 5-Way Lever Connectors
- (2) M4 x 12 mm Hex Head Screws

Required Tools

Required tools include (but may not be limited to) the following:

- Gloves
- Wire Cutters/Crimpers/Strippers
- Phillips Screwdriver or Bit Driver
- Flat Blade Screwdriver
- 1/4" Hex Head Driver
- Needle Nose Pliers
- Volt Meter
- Adjustable Wrench
- Tape
- Marking Utensil
- Drill

NOTE: Required equipment varies by model

Control Specifications

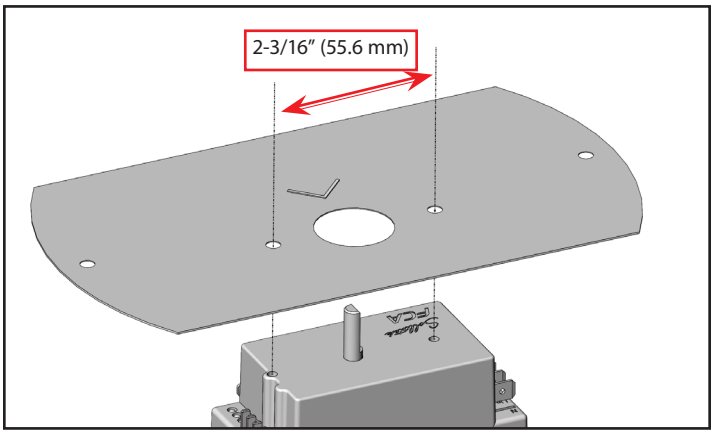

Fig. 1. The mounting holes measure 2-3/16" (55.6 mm) center-to-center. The replacement control mounts in the same location as the existing control.

Table 1. Electrical Specifications	
Voltage	75-240 V AC
Frequency	50/60 Hz

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Control Operation

The electronic temperature control...

- Cycles the compressor on and off based on the return air temperature. See table 2 and table 3.
- Automatically defrosts every four (4) hours of compressor run time.
- Initiates an additional defrost if the evaporator coil temperature drops to 9°F (12.8°C).
- Defrosts between 4 min minimum and 40 min maximum, or until the evaporator coil measures 38°F (3.4°C).

Table 2. Universal Control Setting Temperature Chart

Control Setting	Cut-In	Cut-Out	Avg. Product Temperature
	°F (°C)	°F (°C)	°F (°C)
#1	43 (6.1)	37 (2.7)	40 (4.4)
#2	42 (5.5)	36 (2.2)	39 (3.9)
#3	41 (5.0)	35 (1.6)	38 (3.3)
#4	40 (4.4)	34 (1.1)	37 (2.8)
#5	39 (3.8)	33 (0.5)	36 (2.2)
#6	38 (3.3)	32 (0.0)	35 (1.7)
#7	37 (2.7)	31 (-0.6)	34 (1.1)
#8	36 (2.2)	30 (-1.2)	33 (0.5)
#9	35 (1.6)	29 (-1.7)	32 (0.0)

Table 3. Wine/Chocolate Control Setting Temperature Chart

Control Setting	Cut-In	Cut-Out	Avg. Product Temperature
	°F (°C)	°F (°C)	°F (°C)
#1	74 (23.3)	68 (20.0)	71 (21.7)
#2	70 (21.1)	64 (17.8)	67 (19.5)
#3	66 (18.9)	60 (15.6)	63 (17.3)
#4	62 (16.6)	56 (13.3)	59 (15.0)
#5	58 (14.4)	52 (11.1)	55 (12.8)
#6	54 (12.2)	48 (8.9)	51 (10.6)
#7	50 (10.0)	44 (6.7)	47 (8.4)
#8	46 (7.7)	40 (4.7)	43 (6.2)
#9	42 (5.5)	36 (2.2)	39 (3.9)

Hazardous Food Warning Label (Wine/Chocolate Kit Only)

If adjusting the set point to 41°F (5°C) or greater, place the provided hazardous food warning label below the serial label inside the cabinet as shown in fig. 1. This label notifies users the cabinet has been set to maintain a temperature above outside NSF perishable food storage guidelines.

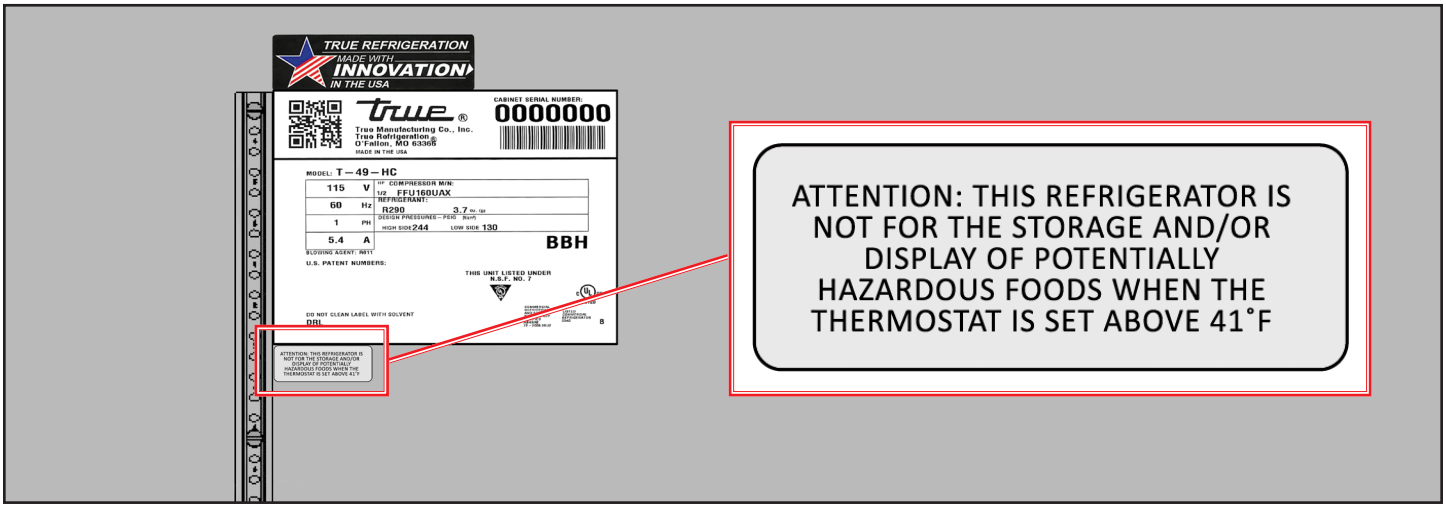

Fig. 2. Hazardous food warning label intended location.

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Before You Begin (Mechanical Controls)

If converting a mechanical control to an electronic control, see the following information. If replacing an electronic control, procede to "Temperature Control Installation" (pg. 6).

Determine Airflow Direction

Determine the airflow direction through the evaporator coil. See figs. 1 and 2. Airflow direction dictates probe placement. the black (thermostat) probe will be placed in the return air stream.

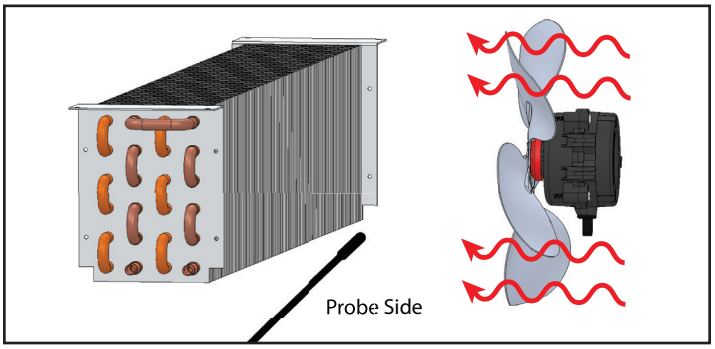

Fig. 1. The fan motor pushes air through the coil. Place probe on indicated side. Items not to scale.

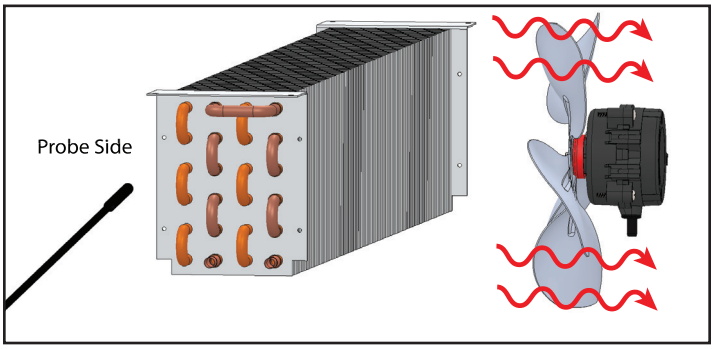

Fig. 2. The fan motor pulls air through the coil. Place probe on indicated side. Items not to scale.

Determine Voltage Wire & Label Wires

1. At the temperature control, with a volt meter, locate the following wires and mark them as directed below:
   - Line in/Line; Label wire **LINE**.
   - Line out/Load; Label wire **LOAD**.
2. Remove the mechanical control.

4-Wire Fan Motors

TRUE T-Series or GDM ONLY

Check the unit for a 4-wire evaporator fan motor or a sticker (see fig. 3) on the evaporator housing. If present, rewire the fan motor before proceeding. See "Rewiring the 4-Wire EBM Fan Motor" (pg. 15).

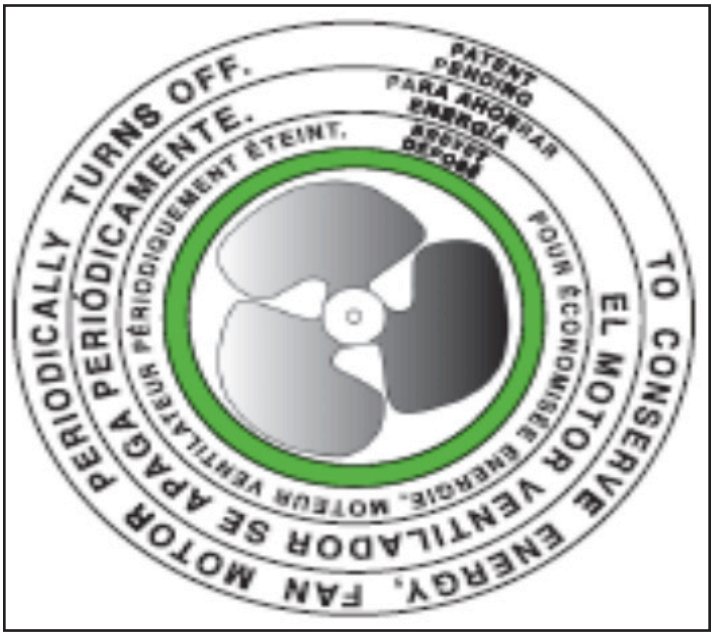

Fig. 3. Fan motor sticker will be on the evaporator housing.

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Probe Installation

Mechanical Control Probe Installation

1. Unplug the unit or remove the power supply.
2. Remove the existing probes.
3. With the provided mounting hardware (see fig. 1) install the provided black (thermostat) probe in the return air stream (see pg. 4).

   NOTE: Be sure the black probe does not contact a metal surface; otherwise, it will read surface temperature, instead of return air temperature.
4. On any airflow side of the evaporator coil, locate the horizontal and vertical centers. See fig. 2. Then, push the white (defrost) probe into the center.

   NOTE: Insert the probe flush with the coil fins. Tuck the coil fins around the probe to help secure it. See fig. 3.
5. Run the probe wires to the temperature control installation location.
6. With the provided 3/16" p-clips or cable ties, secure the probe wires to prevent contact with moving parts.
7. Proceed to "Temperature Control Installation" (pg. 6).

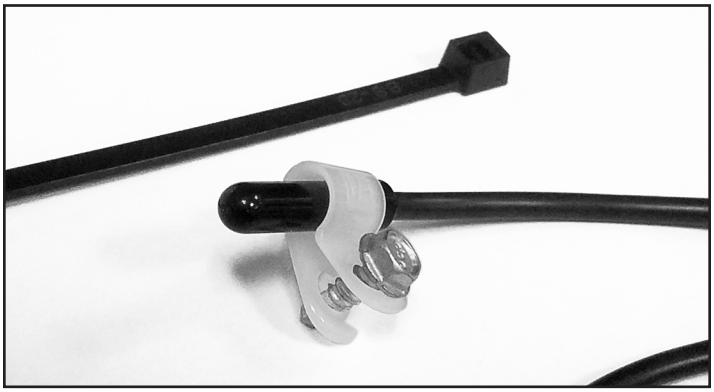

Fig. 1. Use a p-clip to secure the probe to the appliance or a cable tie to attach it to a bracket or wire.

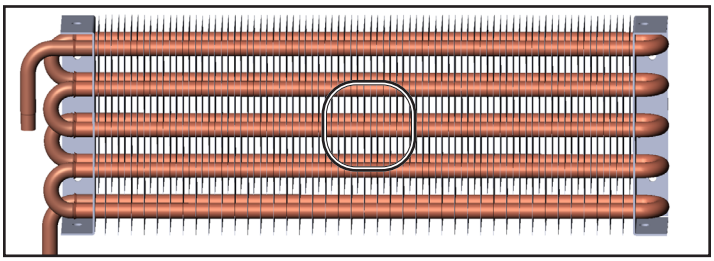

Fig. 2. Install the white probe tip in the center of the evaporator coil's airflow side.

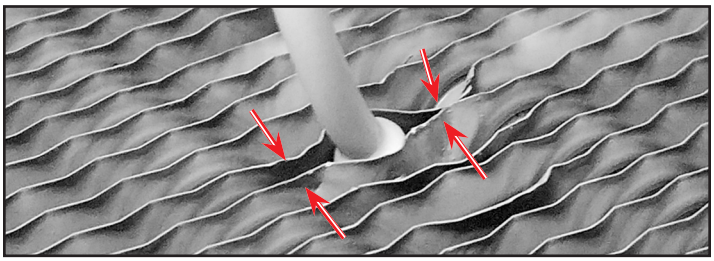

Fig. 3. Pinch the evaporator coil fins around the probe.

Electronic Control Probe Installation

1. Unplug the unit or remove the power supply.
2. Remove the existing probes.
3. Install the replacement probes in the original probe locations:
   - **Black** (thermostat) in the **return air stream** (see pg. 4).
   - **White** (defrost) in the **center of an airflow side of the coil** (see fig. 2)

Run the probe wires to the temperature control installation location.

4. With the provided 3/16" p-clips or cable ties, secure the probe wires to prevent contact with moving parts.
5. Proceed to "Temperature Control Installation" (pg. 6).

Sollatek FCA23 Installation

Temperature Control Installation

1. Connect the Probes to the Control

Connect the probes to the replacement temperature control as follows (see fig. 2):

- **Black** (thermostat) probe to **PRB1** terminal
- **White** (defrost) probe to **PRB2** terminal

NOTE: Confirm probe connections before proceeding. Reversing the wires will cause incorrect operation.

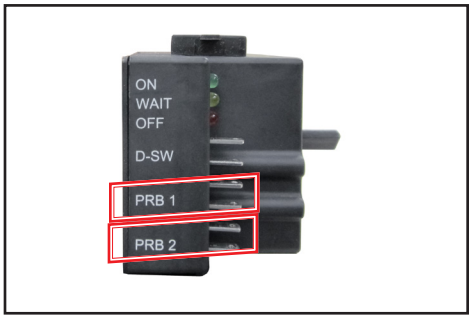

Fig. 2. Probe terminal locations.

2a. Direct Replacement

1. Unplug the appliance or remove the power supply.
2. Replace the control components and probes like-for-like.
3. Install the relay. See "Relay Installation" (pg. 8).

2b. Replace a Mechanical Control

1. With a provided lever connector, splice in a neutral wire from any component (such as the evaporator fan motor or electrical box) to connect to the replacement control.
2. Connect the marked wires (from pg. 4) to the replacement temperature control as follows (see fig. 3):
   - **LINE** wire to **Live In** terminal
   - **LOAD** wire to **Comp** terminal
   - **Neutral** wire to **Neutral** terminal

   NOTE: To cycle the evaporator fan motor on and off with the compressor, connect the wire powering the evaporator fan motor to Aux1. See fig. 3.
3. If **Aux1** is unused, cover it with the 1/4" female spade connector.
4. With the provided Phillips hex head screws, install the control in the appliance. See fig. 4.

   NOTE: DO NOT overtighten the screws.
5. Align the flattened edge of the control knob's slot with the temperature control's shaft. Push the knob onto the shaft.
6. Fully turn the knob counterclockwise and mark #0.
7. Turn the knob clockwise until your mark aligns with #5 before powering the appliance.

   NOTE: Powering the appliance when the control is set to #9 or #0 initiates test mode. To stop the test, remove power for five (5) min to reset the control. Then, set the control to #5 before reapplying power.
8. Install the relay. See "Relay Installation" (pg. 8).

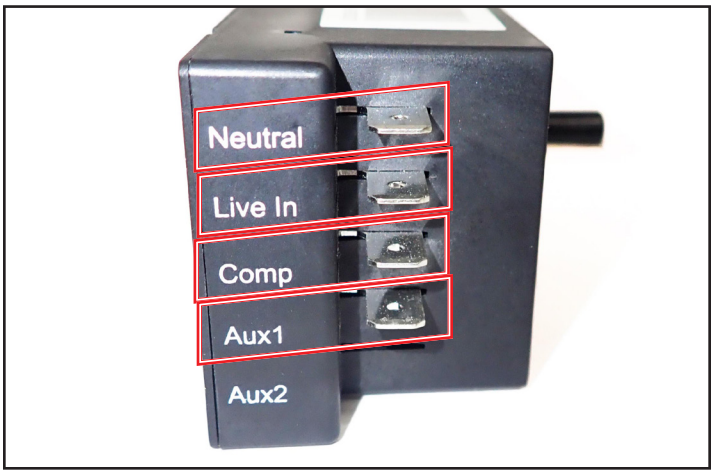

Fig. 3. Replacement temperature control terminals.

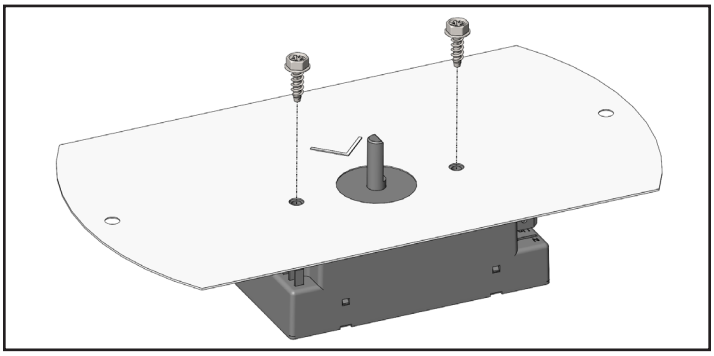

Fig. 4. DO NOT overtighten the screws when installing the control.

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2c. Replace a Sollatek FCA22

1. Label the existing temperature control's remaining wire connections.
2. Remove the existing temperature control.
3. Connect the labeled wires to the replacement temperature control as follows (see fig. 5):
   - **Neutral** wire to **Neutral** terminal
   - **Live in** wire to **Live In** terminal
   - **Comp** wire to **Comp** terminal
   - **Aux** wire to **Aux1** terminal

   NOTE: If Aux1 is unused, cover it with the 1/4" female spade connector.
4. With the provided Phillips hex head screws, install the control in the appliance. See fig. 4.

   NOTE: DO NOT overtighten the screws.
5. Align the flattened edge of the control knob's slot with the temperature control's shaft. Push the knob onto the shaft.
6. Fully turn the knob counterclockwise and mark #0.
7. Turn the knob clockwise until your mark aligns with #5 before powering the appliance.

   NOTE: Powering the appliance when the control is set to #9 or #0 initiates test mode. To stop the test, remove power for five (5) min to reset the control. Then, set the control to #5 before reapplying power.
8. Install the relay. See "Relay Installation" (pg. 8).

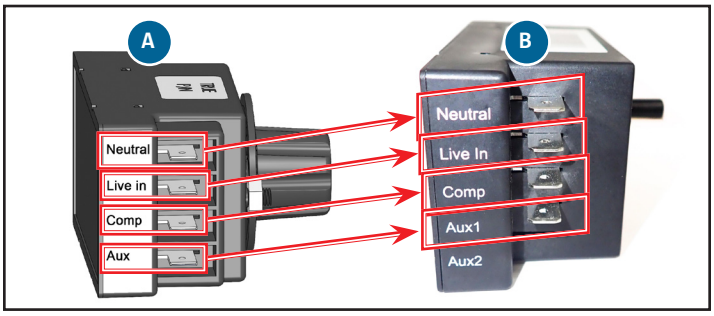

Fig. 5. Existing wiring configuration (A) and the replacement wiring configuration (B).

2d. Replace a TEC22

1. Label the existing temperature control's remaining wire connections.
2. Remove the existing temperature control.
3. Connect the labeled wires to the replacement temperature control as follows (see fig. 6):
   - **N** wire to **Neutral** terminal
   - **L** wire to **Live In** terminal
   - **COMP** wire to **Comp** terminal
   - **FAN** wire to **Aux1** terminal

   NOTE: If Aux1 is unused, cover it with the 1/4" female spade connector.
4. With the provided Phillips hex head screws, install the control in the appliance. See fig. 4.

   NOTE: DO NOT overtighten the screws.
5. Align the flattened edge of the control knob's slot with the temperature control's shaft. Push the knob onto the shaft.
6. Fully turn the knob counterclockwise and mark #0.
7. Turn the knob clockwise until your mark aligns with #5 before powering the appliance.

   NOTE: Powering the appliance when the control is set to #9 or #0 initiates test mode. To stop the test, remove power for five (5) min to reset the control. Then, set the control to #5 before reapplying power.
8. Install the relay. See "Relay Installation" (pg. 8).

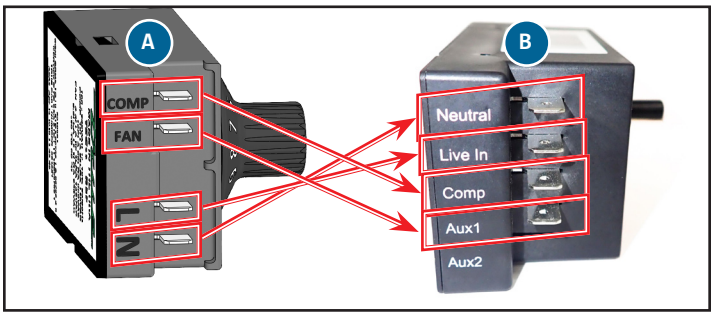

Fig. 6. Existing wiring configuration (A) and the replacement wiring configuration (B).

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Relay Installation

1. Connect the Provided Wires to the Provided Relay

1. Connect the provided wires to the provided relay as follows (see fig. 1):
   - **White** Wire with 3/16" Red Spade Connector to **Upper Left** Terminal
   - **Brown** Wire with 3/16" Red Spade Connector to **Lower Left** Terminal
   - **Black** Wire with 1/4" Blue Spade Connector to **COM** Terminal
   - **Brown/Red** Wire with 1/4" Blue Spade Connector to **NO** Terminal
2. Proceed to the appropriate section.

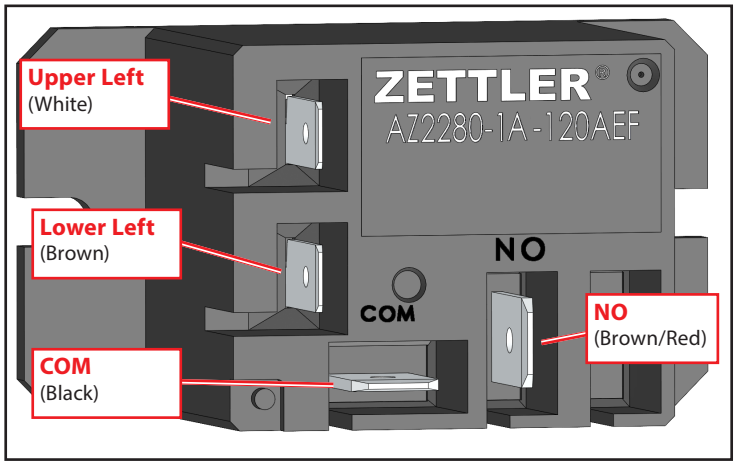

Fig. 1. Provided wire locations on the provided relay terminals.

2a. Replace the Existing Relay

1. With provided lever connectors, connect the wires from the existing relay terminals (see fig. 2) to the provided relay wires as follows:
   - **Terminal #4** Wire to **Black Relay** Wire
   - **Terminal #6** Wire to **Brown/Red Relay** Wire
   - **Terminal #0** Wire to **Brown Relay** Wire
   - **Terminal #1** Wire to **White Relay** Wire
2. Remove the existing relay.
3. Install the replacement relay in the original relay location.
4. Restore power and verify operation.

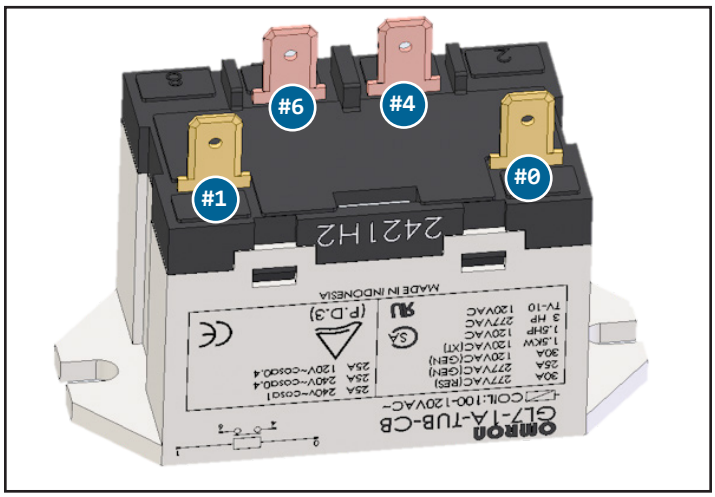

Fig. 2. Existing relay terminal configuration.

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2b. Add the Provided Relay (Appliances with an Electrical Box)

1. Access and open the electrical box.
2. With the provided lever connectors, connect the provided relay to the appliance as follows (see fig. 3).
   - **Black Relay Wire** to **Line Voltage** from **Main Power Cord**
   - **Brown/Red Relay** Wire to **Compressor/Condenser Fan** Motor
   - **Brown Relay** Wire to **Temperature Control Comp** wire
   - **White Relay** Wire to **Neutral** from **Main Power Cord**
3. Install the relay in the electrical box.
4. Restore power and verify operation.

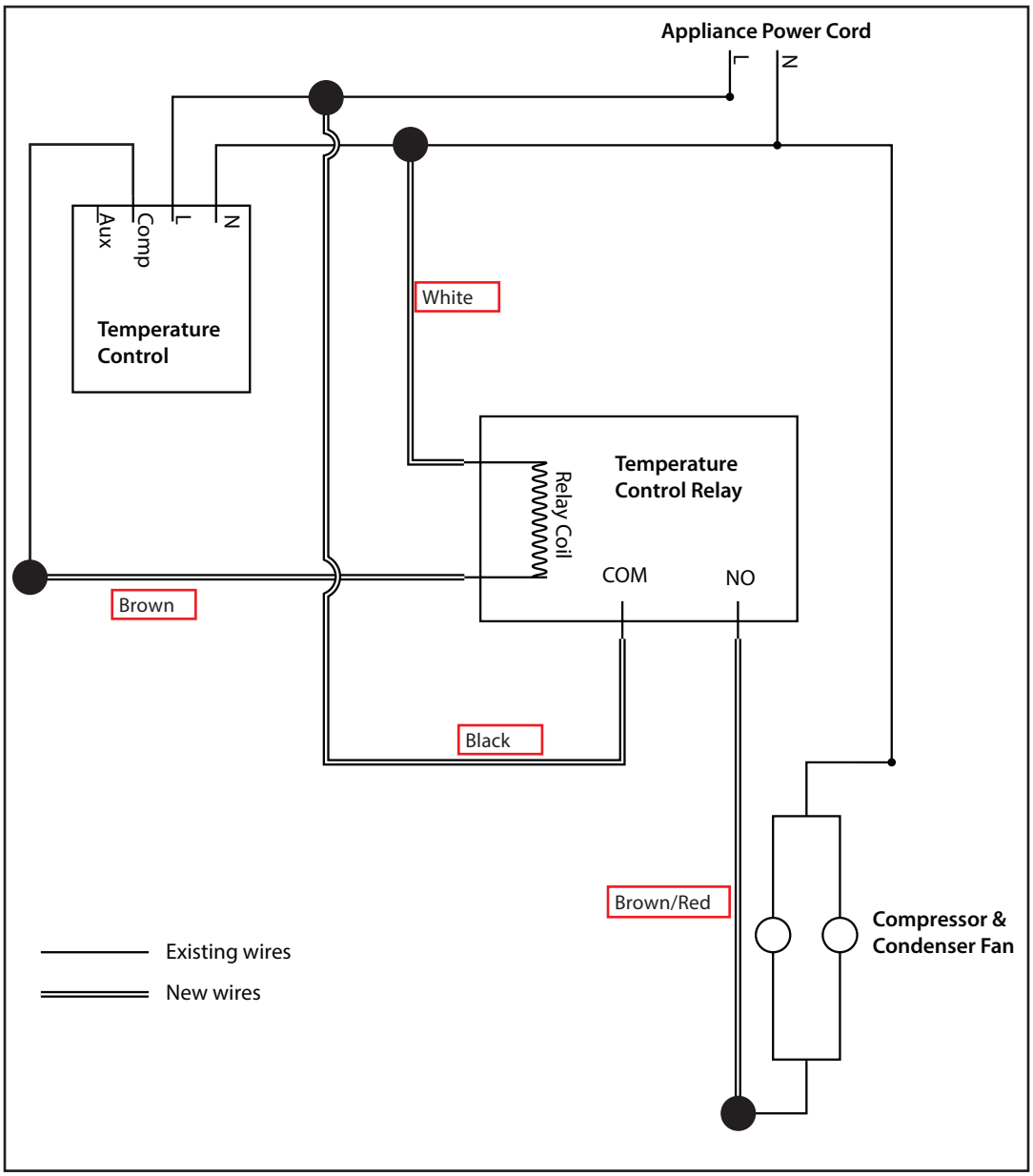

Fig. 3. Relay and temperature control wiring diagram.

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2c. Add the Provided Relay (Appliances without an Electrical Box)

Appliances without electrical boxes will have one of three terminal blocks.

A. Black 4-Wire Terminal Block

1. Access the terminal block.
2. Cut the terminal block wires going to the temperature control. See fig. 4, "Cut here".
3. With the provided lever connectors, connect the relay wires to the terminal block wires as follows (see fig. 4):
   - **Black Relay** Wire to **#3** and **#4**
   - **Brown/Red Relay** Wire to **#1**
   - **Brown Relay** Wire to **#2**
   - **White Relay** Wire to **#5** (neutral for temperature control)
4. With the provided hardware, install the relay.
5. Restore power and verify operation.

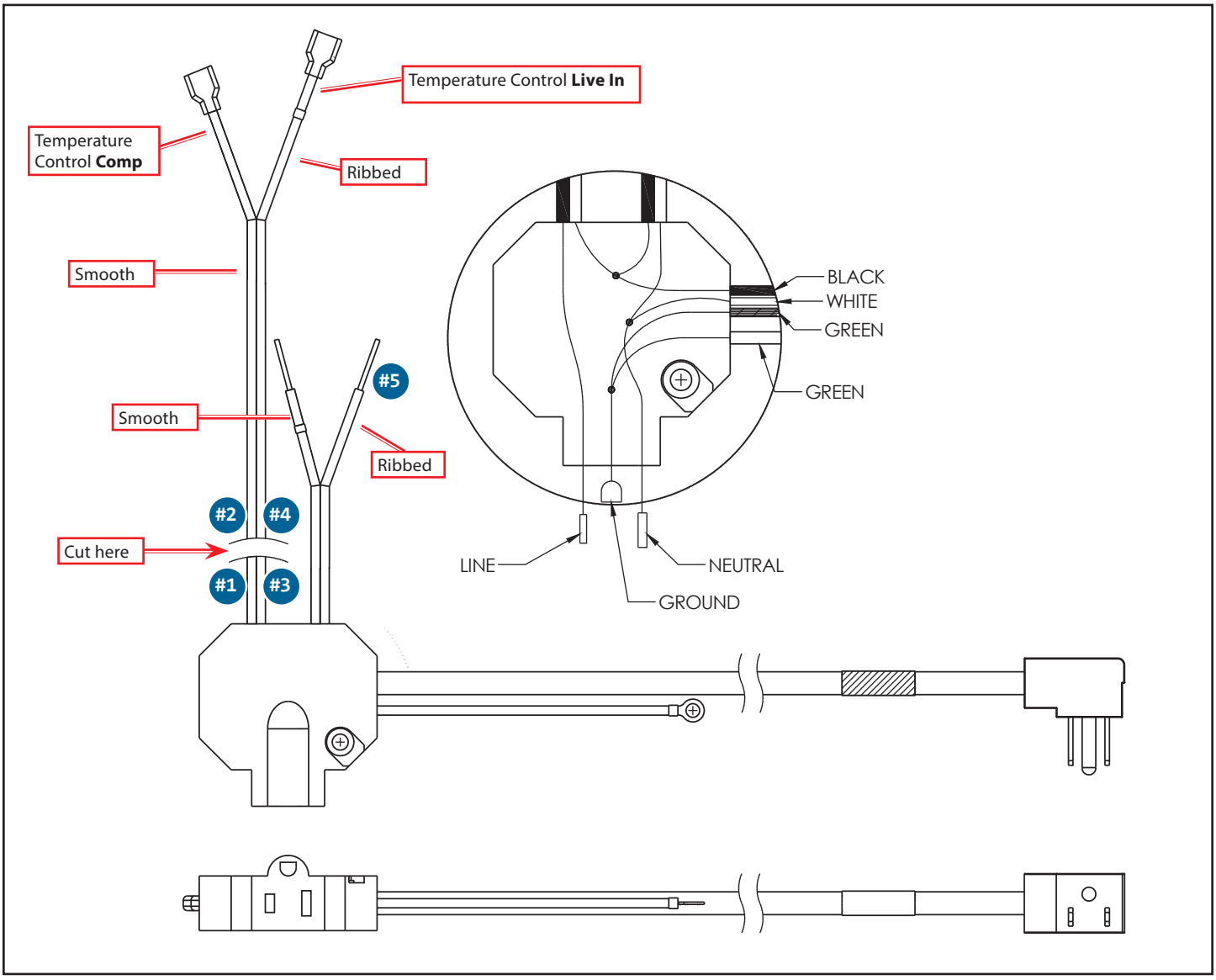

Fig. 4. Black 4-wire terminal block diagram.

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B. White 6-Wire Terminal Block

1. Access the terminal block.
2. Cut the terminal block wires going to the temperature control. See fig. 5, "Cut here".
3. With the provided lever connectors, connect the relay wires to the terminal block wires as follows (see fig. 5):
   - **Black Relay** Wire to **#3** and **#4**
   - **Brown/Red Relay** Wire to **#1**
   - **Brown Relay** Wire to **#2**
   - **White Relay** Wire to **#5** (neutral for temperature control)
4. With the provided hardware, install the relay.
5. Restore power and verify operation.

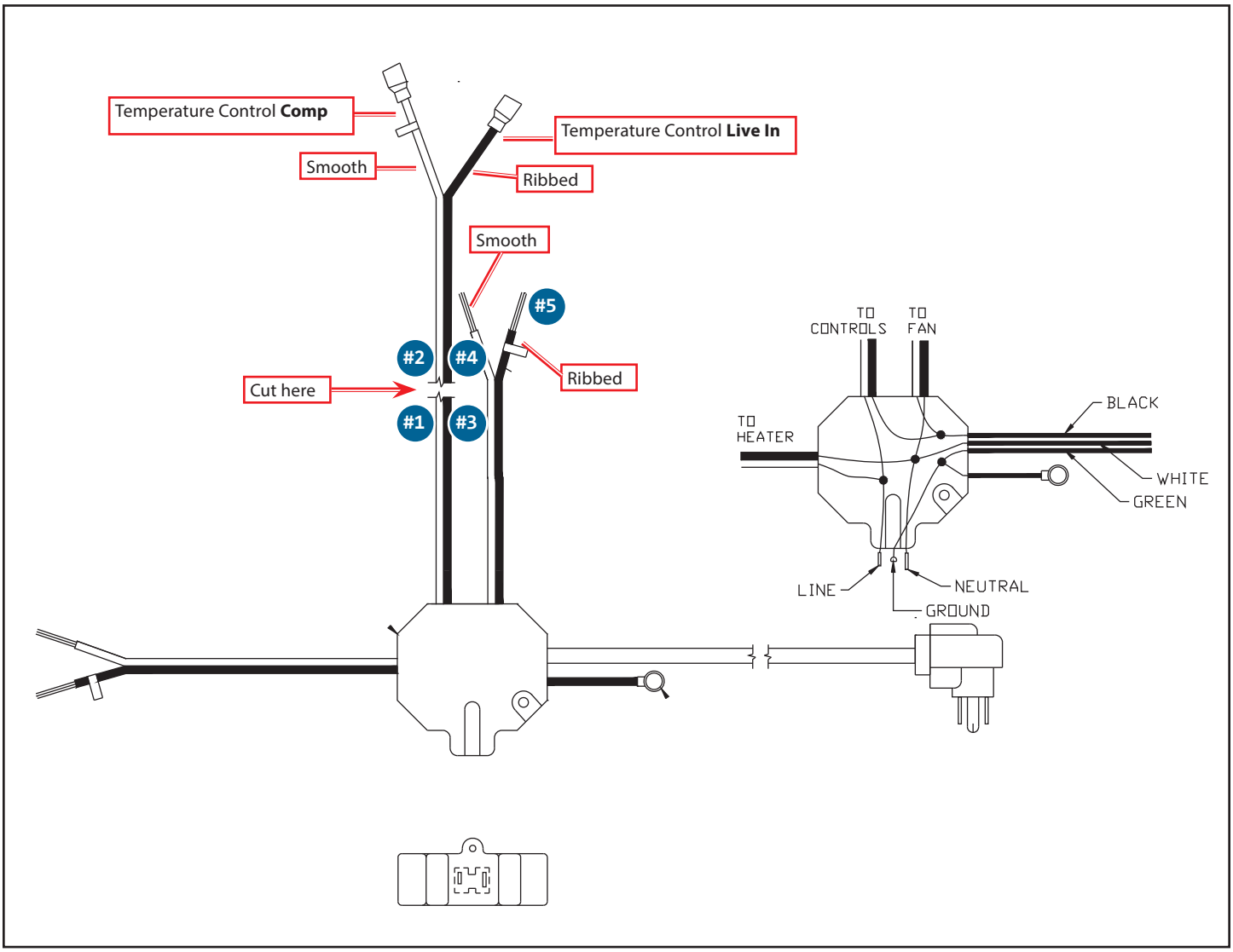

Fig. 5. White 6-wire terminal block diagram.

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C. Black/Blue 6-Wire Terminal Block

1. Access the terminal block.
2. Cut the terminal block wires going to the temperature control. See fig. 6, "Cut here".
3. With the provided lever connectors, connect the relay wires to the terminal block wires as follows (see fig. 6):
   - **Black Relay** Wire to **#3** and **#4**
   - **Brown/Red Relay** Wire to **#1**
   - **Brown Relay** Wire to **#2**
   - **White Relay** Wire to **#5** (neutral for temperature control)
4. With the provided hardware, install the relay.
5. Restore power and verify operation.

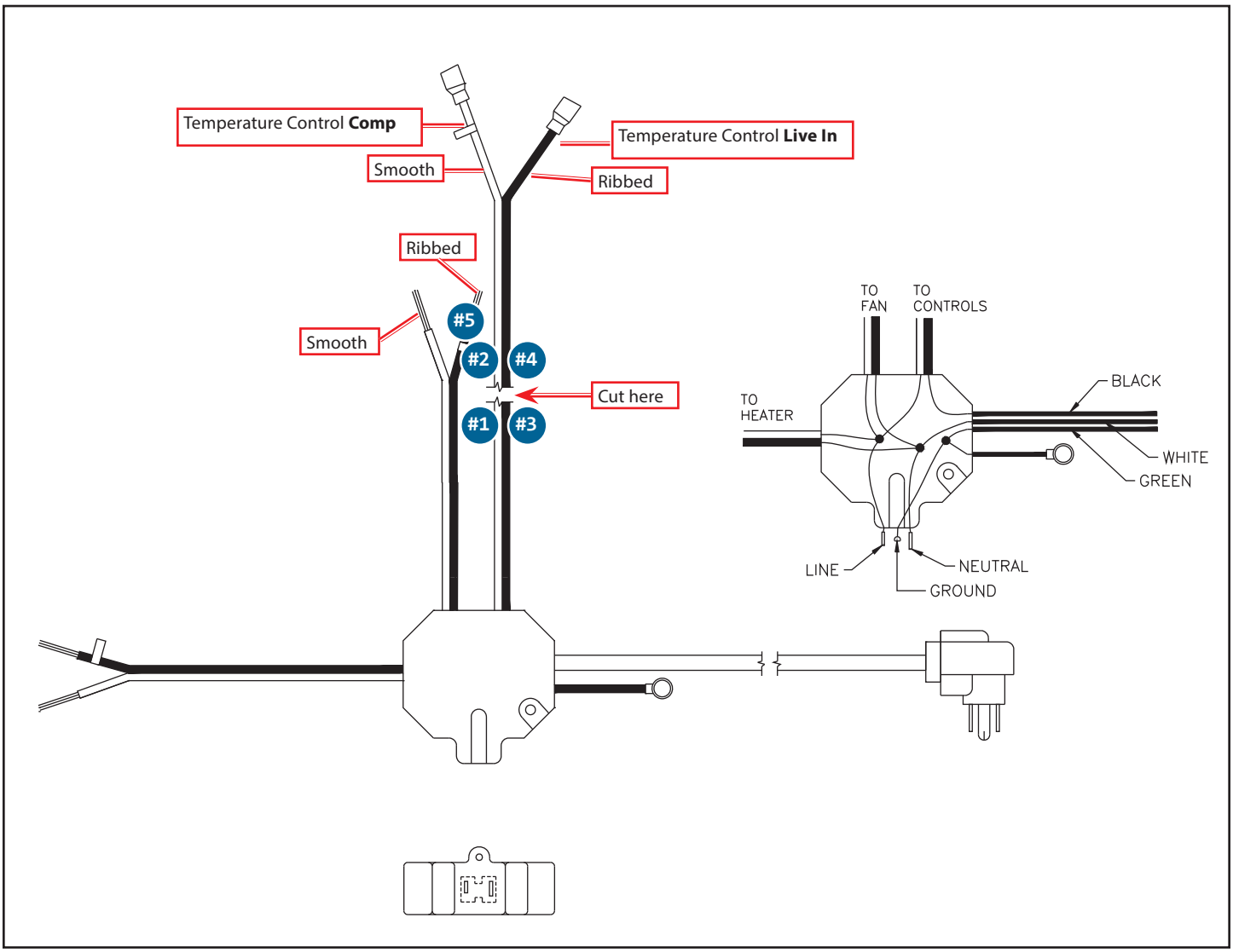

Fig. 6. Black/Blue 6-wire terminal block diagram.

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Troubleshooting

Basic Troubleshooting

In addition to reading the control indicator light codes [see "Control Indicator Light Codes Table" (pg. 13)], note the potential solutions below:

- Check the terminal connections:
  - If the power wires (**Live In** and **Comp**) are reversed, the control indicator lights will not light and the compressor will not start. See fig. 1. for light locations.
  - If the probe wires are reversed, the control will not cycle correctly.
- Check if the black probe is touching metal. If so, the probe is reading surface temperature instead of return air temperature.

Fig. 1. Indicator light locations.

Table 1. Control Indicator Light Codes

Red LED	*Yellow LED*	*Green LED*	*Meaning*
ON	OFF	ON	Defrost mode
Flashing	ON	Flashing	Mini-defrost mode
Cycling	OFF	Cycling	Pre-defrost mode
Flashing	OFF	Flashing	Drip down mode
OFF	ON	ON	Post-defrost recovery mode
OFF[1]	One (1) Blink[2]	OFF	Probe #1 faulty; good voltage
OFF[1]	Two (2) Blinks[2]	OFF	Probe #2 faulty; good voltage
ON	One (1) Blink[2]	OFF	Probe #1 faulty; bad voltage
ON	Two (2) Blinks[2]	OFF	Probe #2 faulty; bad voltage
Cycling	Cycling	Cycling	Knob set to #0 (off position)
OFF[1]	OFF	ON	On mode
OFF[1]	Flashing	ON	On mode, but compressor is off due to door switch operation
ON	OFF	OFF	Bad voltage; cooling demand
Flashing	OFF	OFF	Bad voltage; temperature satisfied
OFF	ON	OFF	Wait mode; cooling demand
OFF	Flashing	OFF	Wait mode; temperature satisfied, protection delay not over
OFF	OFF	Flashing	Wait mode; temperature satisfied, protection delay over
Flashing	Flashing	Flashing	Test mode
Cycling[3]	Cycling[3]	OFF	Bad frequency detection
Flashing[4]	Flashing[4]	Flashing[4]	Internal power supply failure

NOTE: All cycling and flashing is for one (1) sec duration unless otherwise specified

1: LED comes on momentariliy during under voltage and over voltage blind time
2: Every two (2) sec
3: Every half (0.5) sec
4: Five (5) times a sec

Sollatek FCA23 Installation

Table 2. Temperature-to-Resitance

Table 2 shows the expected cut-in/cut/out range of the Sollatek FCA23 electronic temperature control.

NOTE: This information is for diagnostic purposes only.

Temperature °C (°F)	Resistance k-Ohms	Temperature °C (°F)	Resistance k-Ohms
-10 (14.0)	548.267	25 (77.0)	100.000
-9 (15.8)	519.821	26 (78.8)	95.692
-8 (17.6)	492.994	27 (80.6)	91.592
-7 (19.4)	467.688	28 (82.4)	87.687
-6 (21.2)	443.810	29 (84.2)	83.969
-5 (23.0)	421.271	30 (86.0)	90.427
-4 (24.8)	399.992	31 (87.8)	77.051
-3 (26.6)	379.896	32 (86.6)	93.835
-2 (28.4)	360.911	33 (91.4)	70.768
-1 (30.2)	342.971	34 (93.2)	67.844
0 (32.0)	326.015	35 (95.0)	65.055
1 (33.8)	309.982	36 (96.8)	62.395
2 (35.6)	294.819	37 (98.6)	59.857
3 (37.4)	280.475	38 (100.4)	57.434
5 (41.0)	254.054	39 (102.2)	55.122
6 (42.8)	241.890	40 (104.0)	52.914
7 (44.6)	230.369	41 (105.8)	50.805
9 (48.2)	209.115	42 (107.6)	48.790
10 (50.0)	199.314	43 (109.4)	46.866
11 (51.8)	190.021	44 (111.2)	45.026
12 (53.6)	181.209	45 (113.0)	43.268
13 (55.4)	172.849	46 (114.8)	41.587
14 (57.2)	164.918	47 (116.6)	39.980
15 (59.0)	157.391	48 (118.4)	38.443
16 (60.8)	150.245	49 (120.2)	36.972
17 (62.6)	143.590	50 (122.0)	35.564
18 (64.4)	197.014	60 (140.0)	24.386
19 (66.2)	130.891	70 (158.8)	17.035
20 (68.0)	125.073	80 (176.0)	12.110
21 (69.8)	119.542	90 (194.0)	8.750
22 (71.6)	114.283	100 (212.0)	6.419
23 (73.4)	109.283		
24 (75.2)	104.526		

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Appendix

Rewiring the 4-Wire EBM Fan Motor

If the evaporator fan motor cycles or is a 4-wire motor, it must be rewired to operate correctly with the new electronic temperature control. See the procedure below.

1. Locate the black EBM wire sleeve containing **black**, **brown**, **blue**, and **green**/**yellow** wires. See fig. 1.
2. Cut the **black** and **brown** fan motor wires 1" (25.4 mm) from their respective connectors. See fig. 2.
3. With a provided 2-way lever connector, cap the **black** wire left attached to the original connector.
4. With a provided 2-way lever connector, cap the **brown** wire left attached to the original connector.
5. Strip 7/16" (11.1 mm) of insulation from the **fan motor side** of the **black** and **brown** wires.
6. With a provided 3-way lever connector, connect the stripped black and brown fan motor wires to the provided bare **black** wire.
7. Crimp a provided spade connector to the bare **black** wire.
8. Connect the **black** wire to the temperature control **Aux1** terminal. See fig. 3.

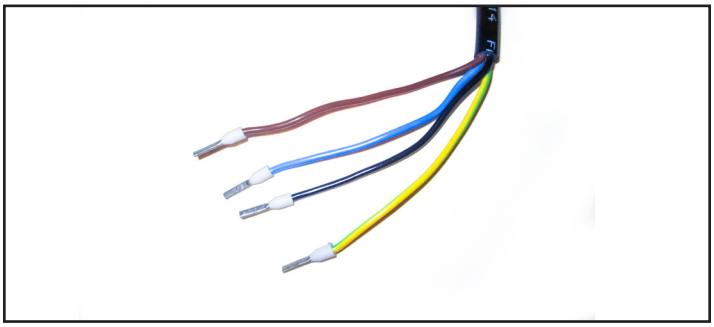

Fig. 1. The four fan motor wires and wire sleeve.

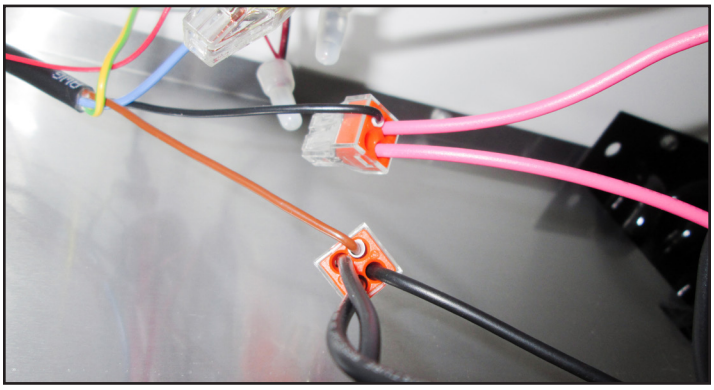

Fig. 2. EBM fan motor original black and brown connections.

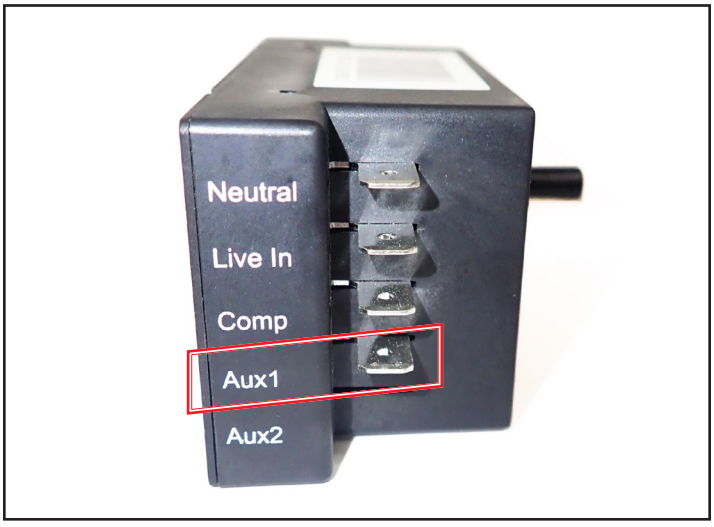

Fig. 3. **Aux1** terminal of the replacement electronic temperature control.

Sollatek FCA23 Installation

Control Knob Cover Installation

If the control knob cover is present, install the knob cover as described below.

1. With the provided Phillips hex head screws, cut threads in the control screwholes. See fig. 4.
2. install the knob and knob cover per fig. 5. Use the provided pan head Phillips screws.

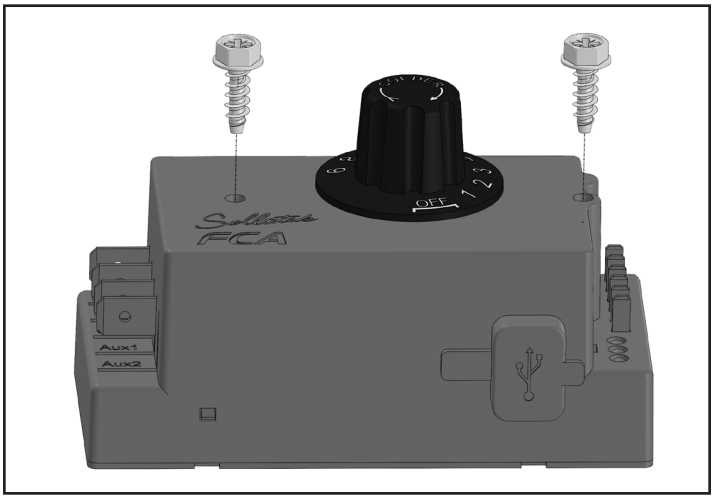

Fig. 4. Cut the threads in the control screwholes.

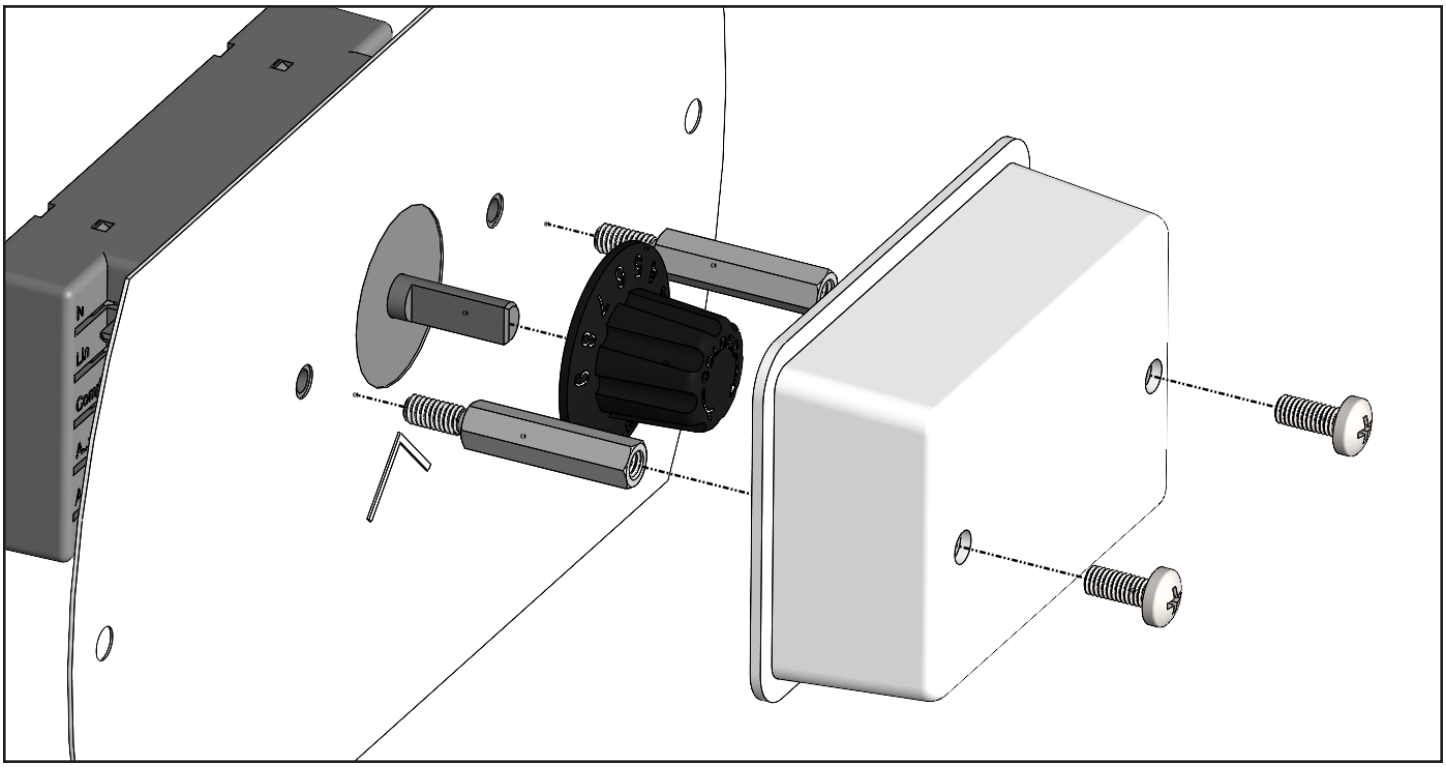

Fig. 5. Exploded view of control knob and control knob cover installation.