TEC22 Installation

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

Subject: TEC22 Installation
Date: January 04, 2024
Models / Parts Affected: Universal Electronic Temperature Control Kit (P#844950) & Wine/Chocolate (P#859024)
Voltages: All Voltages

Contents

Questions or Concerns

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Overview

The TEC22 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.

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 (P#844950)

- (1) Temperature Control
- (1) Temperature Control Knob
- (2) M4 x 12 mm 1/4" Hex Head Screws
- (1) Air Probe (green stripes)
- (1) Coil Probe (brown stripes)
- (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 Pan Head Screws

Wine/Chocolate Control Kit Components (P#859024)

- (1) Temperature Control
- (1) Temperature Control Knob
- (2) M4 x 12 mm 1/4" Hex Head Screws
- (1) Air Probe (green stripes)
- (1) Coil Probe (brown stripes)
- (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

Required Tools

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

- Gloves
- Flashlight
- 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

Table 1. Electrical Specifications	
Voltage	100-240 VAC
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 60 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)

Wine/Chocolate Settings

- Control knob #5 setting will run product temperatures of approximately 57°F (13.9°C). This is for red wine and chocolate.
- Control knob #7 setting will run product temperatures of approximately 45°F (7.2°C). This is for white wine.

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 appliance as shown in fig. 1. This label notifies users the appliance has been set to maintain a temperature above outside NSF perishable food storage guidelines.

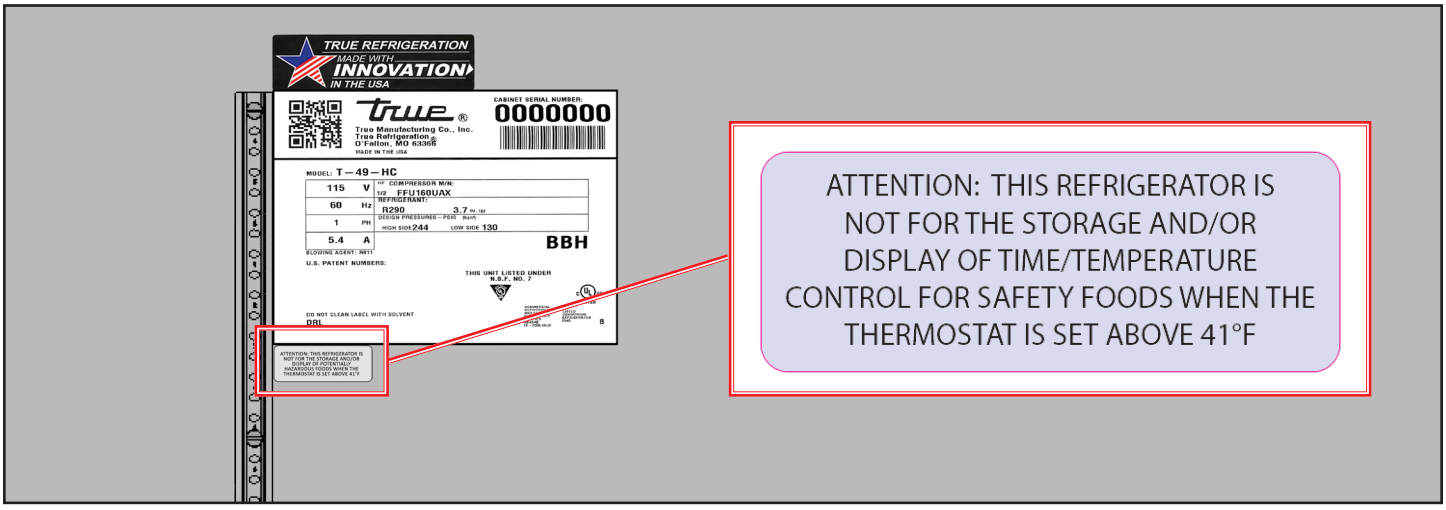

Fig. 1. Hazardous food warning label intended location.

TEC22 Installation

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 white probe with a green stripe (thermostat) will be placed in the return air stream.

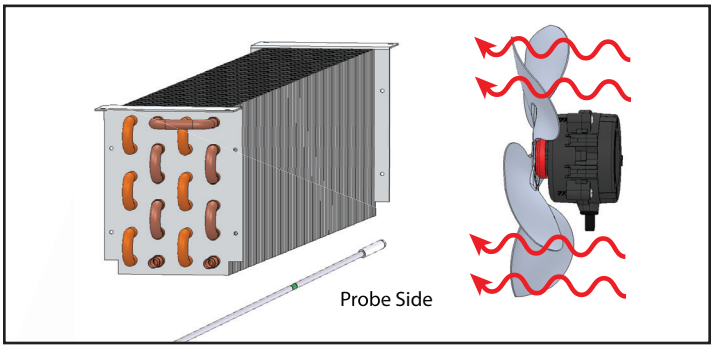

Fig. 1. The fan motor pushes air through the coil. Place probe on indicated side. Items not to scale.

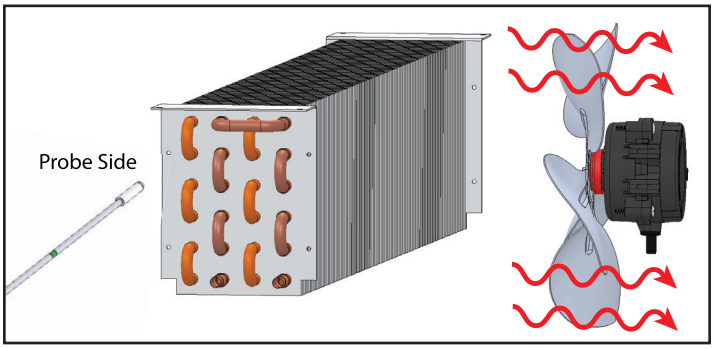

Fig. 2. The fan motor pulls air through the coil. Place probe on indicated side. Items not to scale.

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. 9).

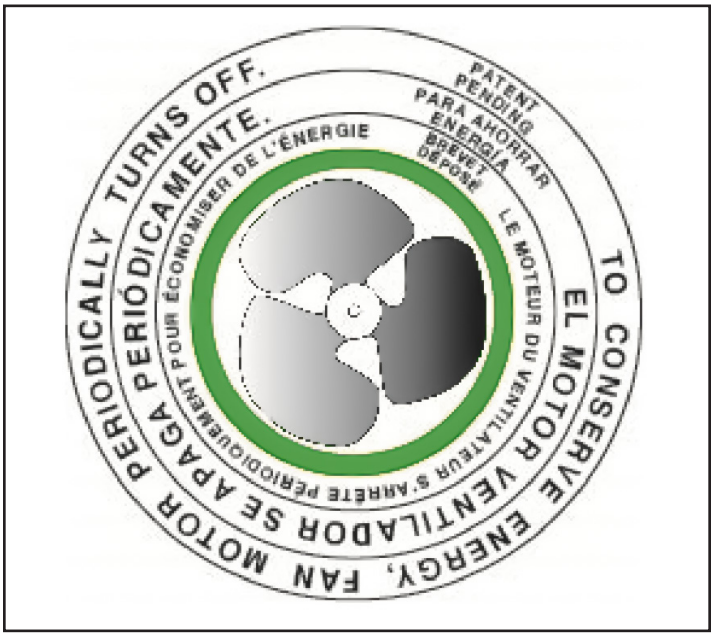

Fig. 3. Fan motor sticker will be on the evaporator housing.

TEC22 Installation

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 white probe with a green stripe (thermostat) in the return air stream (see pg. 4).

   NOTE: Be sure the white probe with a green stripe 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 probe with a brown stripe (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).

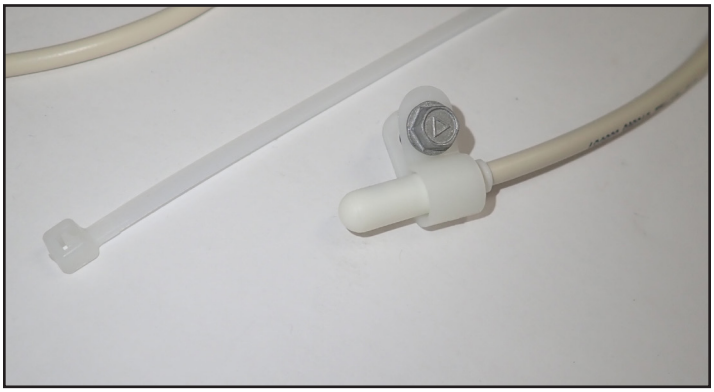

Fig. 1. Use a p-clip to secure the probe to the appliance or a cable tie to attach it to a bracket or wire.

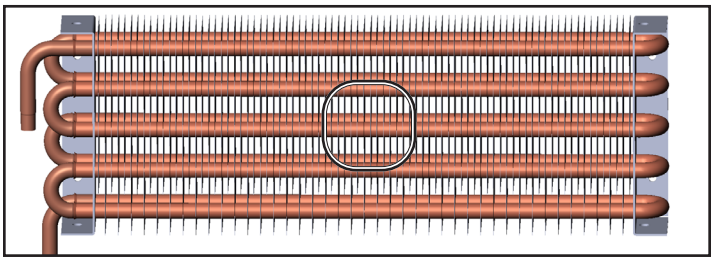

Fig. 2. Install the white probe tip in the center of the evaporator coil's airflow side.

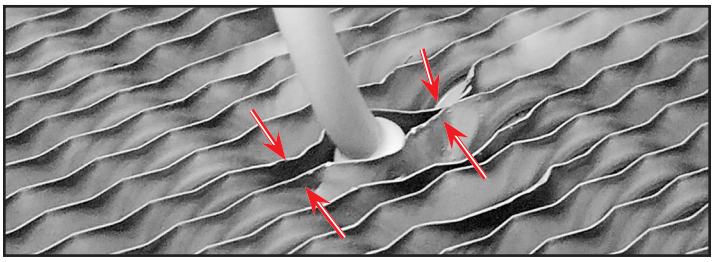

Fig. 3. Pinch the evaporator coil fins around the probe.

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:
   - **White probe with a green stripe** (thermostat) in the **return air stream** (see pg. 4).
   - **White probe with a brown stripe** (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).

TEC22 Installation

Temperature Control Installation

NOTE: If the provided probes do not reach the previous manufactured location, please install the replacement probes as close as possible to the original probe locations.

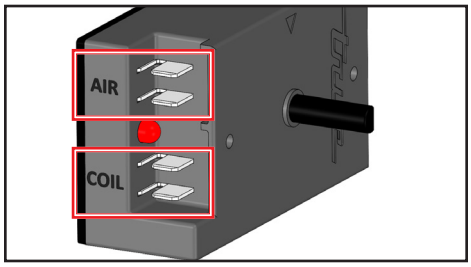

Fig. 1. Probe terminal locations. Polarity does not matter.

1. Connect the Probes to the Control

Connect the probes to the replacement temperature control as follows (see fig. 1):

- **White with a green stripe** (thermostat) probe to **AIR** terminal
- **White with a brown stripe** (defrost) probe to **COIL** terminal

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

2a. Direct Replacement

1. Unplug the appliance or remove the power supply.
2. Replace the control components and probes like-for-like.

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. 2):
   - **LINE** wire to **L** terminal
   - **LOAD** wire to **COMP** terminal
   - **Neutral** wire to **N** terminal

   NOTE: To cycle the evaporator fan motor on and off with the compressor, connect the wire powering the evaporator fan motor to FAN. See fig. 2.

   NOTE: If FAN is unused, cover it with a 1/4" female spade connector.
3. With the provided Phillips hex head screws, install the control in the appliance. See fig. 3.

   NOTE: DO NOT overtighten the screws.

   NOTE: Be sure to align the control's embossed arrow (near the shaft) with the control cover's embossed arrow.
4. Align the flattened edge of the control knob's slot with the temperature control's shaft. Push the knob onto the shaft.
5. Fully turn the knob counterclockwise and mark #0.
6. Turn the knob clockwise until your mark aligns with #5.

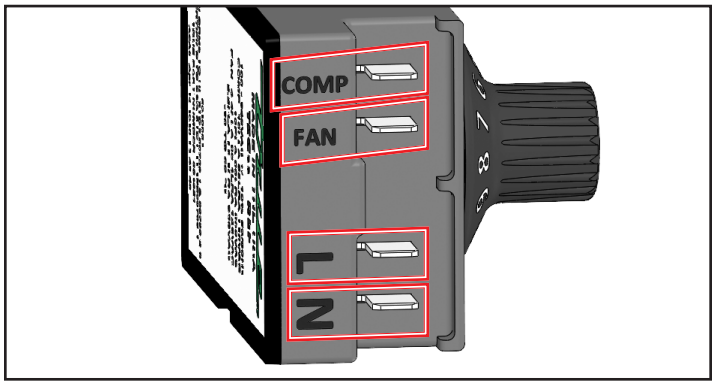

Fig. 2. Replacement temperature control terminals.

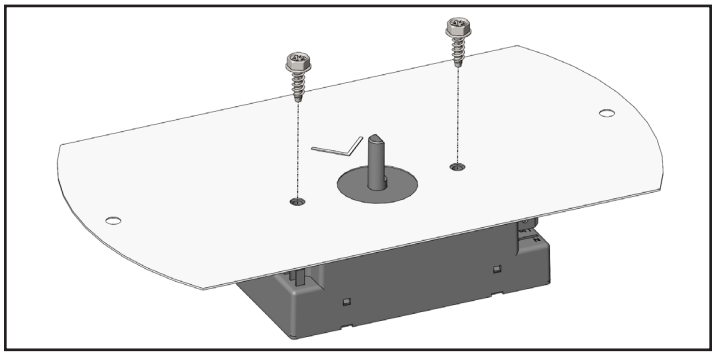

Fig. 3. DO NOT overtighten the screws when installing the control.

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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. 4):
   - **Neutral** wire to **N** terminal
   - **Live in** wire to **L** terminal
   - **Comp** wire to **COMP** terminal
   - **Aux** wire to **FAN** terminal

   NOTE: If FAN is unused, cover it with a 1/4" female spade connector.
4. With the provided Phillips hex head screws, install the control in the appliance. See fig. 3.

   NOTE: DO NOT overtighten the screws.

   NOTE: Be sure to align the control's embossed arrow (near the shaft) with the control cover's embossed arrow.
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.

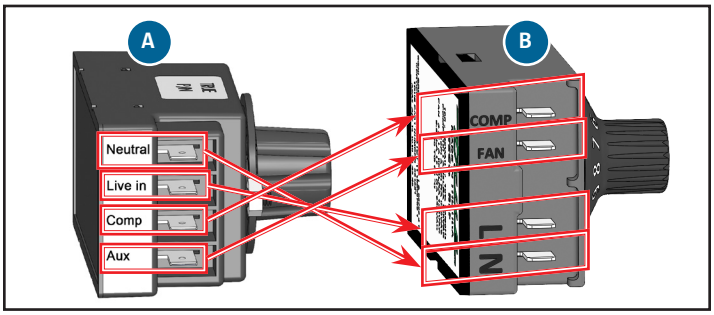

Fig. 4. Existing wiring configuration (A) and the replacement wiring configuration (B).

2d. Replace a Sollatek FCA23

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 **N** terminal
   - **Live In** wire to **L** terminal
   - **Comp** wire to **COMP** terminal
   - **Aux1** wire to **FAN** terminal

   NOTE: If FAN is unused, cover it with a 1/4" female spade connector.
4. With the provided Phillips hex head screws, install the control in the appliance. See fig. 3.

   NOTE: DO NOT overtighten the screws.

   NOTE: Be sure to align the control's embossed arrow (near the shaft) with the control cover's embossed arrow.
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.

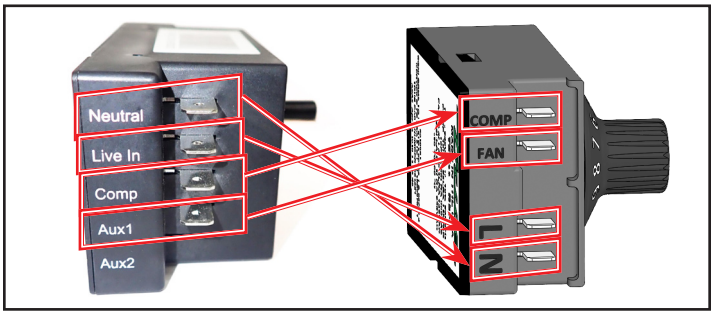

Fig. 5. Existing wiring configuration (A) and the replacement wiring configuration (B).

TEC22 Installation

Troubleshooting

Basic Troubleshooting

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

- Check the terminal connections:
  - If the power wires (**L** and **COMP**) are reversed, the control indicator light will not light and the compressor will not start. See fig. 1. for light location.
  - If the probe wires are reversed, the control will not cycle correctly.
- Check if the white probe with a green stripe is touching metal. If so, the probe is reading surface temperature instead of return air temperature.

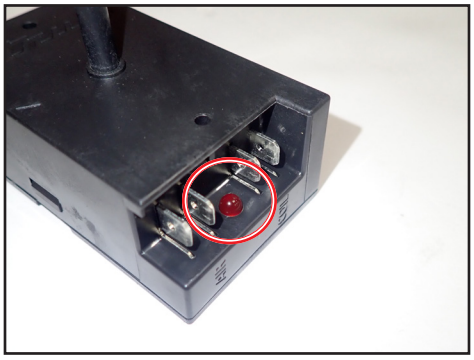

Fig. 1. Indicator light location.

Table 1. Control Indicator Light Codes

Repeating Pattern												Meaning
ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	Standby (Knob = Off)
ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	Air Probe Error
ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	Coil Probe Error
ON	ON	ON	ON	OFF	OFF	ON	ON	ON	ON	OFF	OFF	Max Cold (Knob = 9)
ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	Normal Operation

Table 2. Temperature-to-Resistance

This table shows the expected cut-in/cout-out range of the TEC22 electronic temperature control.

NOTE: This information is for diagnostic purposes only.

Temperature °F (°C)	KΩ Value	Temperature °F (°C)	KΩ Value
-40 (-40)	338.20	41 (5)	25.40
-31 (-35)	243.60	50 (10)	19.90
-22 (-30)	177.50	59 (15)	15.70
-13 (-25)	130.60	68 (20)	12.50
-4 (-20)	97.20	77 (25)	10.00
5 (-15)	72.99	86 (30)	8.10
14 (-10)	55.35	95 (35)	6.50
23 (-5)	42.32	104 (40)	5.30
32 (0)	32.70	113 (45)	4.40

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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 **FAN** terminal. See fig. 3.

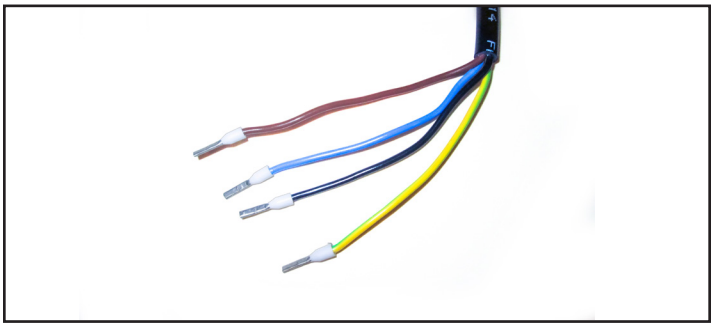

Fig. 1. The four fan motor wires and wire sleeve.

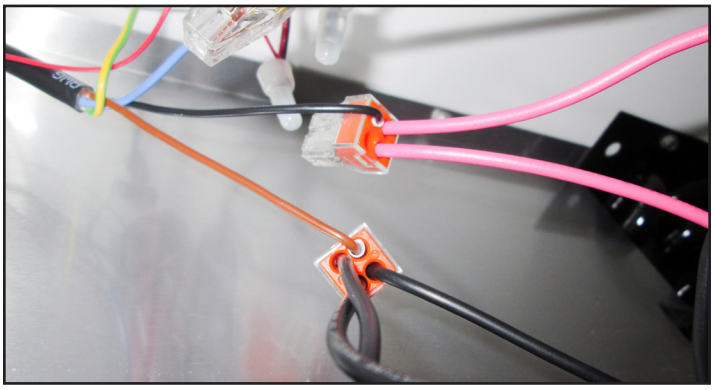

Fig. 2. EBM fan motor original black and brown connections.

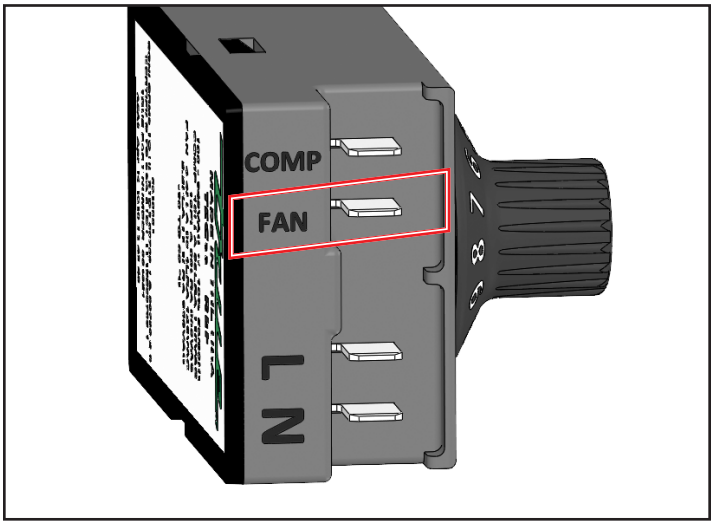

Fig. 3. **FAN** terminal of the replacement electronic temperature control.

TEC22 Installation

Control Knob Cover Installation

NOTE: Must use aluminum standoffs with the TEC22 control. If the present control knob cover uses white nylon standoffs, contact our parts department at 800-424-8783 or PartsInquiries@TrueMfg.com to order the TEC22 control knob cover kit P#857329.

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

1. With the thread-forming screws, cut threads in the control screwholes. See fig. 4.
2. With the thread-forming screws, install the knob and knob cover per fig. 5.

   NOTE: Do not overtighten the screws.

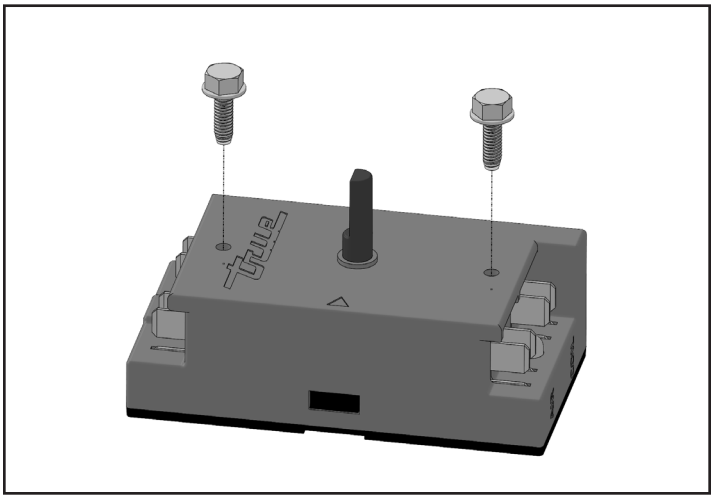

Fig. 4. Cut the threads in the control screwholes.

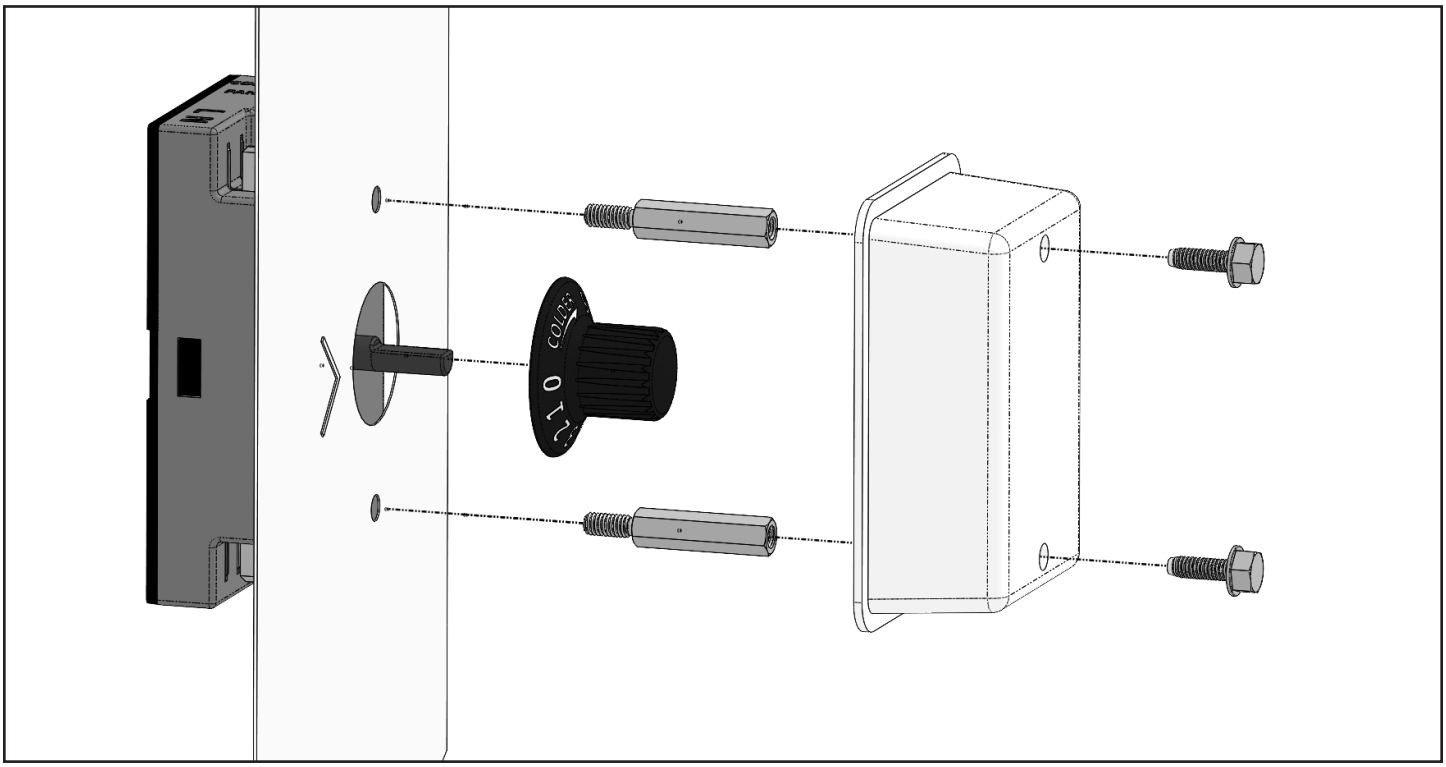

Fig. 5. Exploded view of control knob and control knob cover installation.