

Electronic Thermostat Controller Installation Instructions



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Description

The Electronic Thermostat Controller (ETC) is a dedicated, direct digital control module that provides precise and integrated control of unitary, packaged, staged HVAC systems. This Logic One[®] module efficiently controls two stages of heating and cooling, a fan, and damper operation.

The ETC is available in four models.

MODEL	FEATURES
ETC-1	Comes with an analog damper output connection.
ETC-2	Comes with a digital damper output connection.
ETC-3	Comes with an analog damper output connection; can be installed in an approved environmentally protected enclosure at temperatures up to 158°F (70°C).
ETC-6	Comes with a digital damper output connection; allows connection of a 4–20 mA humidity sensor input (replaces zone setpoint reset connection) and can be installed in an approved environmentally protected enclosure.

This document provides instructions for mounting the ETC, connecting power, wiring the ETC, connecting network communications, setting the address, and checking installation.

Specifications

Power Requirements

Voltage: 24 VAC, Class 2
 Consumption: 8 VA

Operating Environment

Temperature: ETC-1 & ETC-2: Room temperature, not intended for outdoor installation. Maximum allowable temperature: 100°F (38°C)
 ETC-3 and ETC-6: –40° to 158°F (–40° to 70°C)
 Humidity: 0 to 99% Relative, Noncondensing

Physical Dimensions

Height: 5.5 inches
 Width: 8 inches
 Depth: 1.875 inches
 Weight: 1.75 lb

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Precautions

Take the following precautions during installation:

- Observe all national and local electrical codes.
- Observe voltage and current limits marked on the module.
- Do *not* connect 115 volts to any terminal of the ETC. The ETC is a Class 2 (low voltage) control device.

Mounting the ETC

The ETC-1 and ETC-2 are *not* intended for outdoor use and should be mounted in a controlled environment. The ETC-3 and ETC-6 can be mounted outdoors in an approved enclosure. All models should be mounted horizontally.

Use the following procedure and refer to Figure 1, as necessary, to mount the ETC.

Step	Procedure
1	Turn off all power to the HVAC equipment and to the ETC before installing the module.
2	Position the module against the mounting surface and mark the surface to show the location of the four mounting holes.
3	Drill holes at the spots marked in Step 2.
4	Insert screws (not included) and tighten to secure the module.

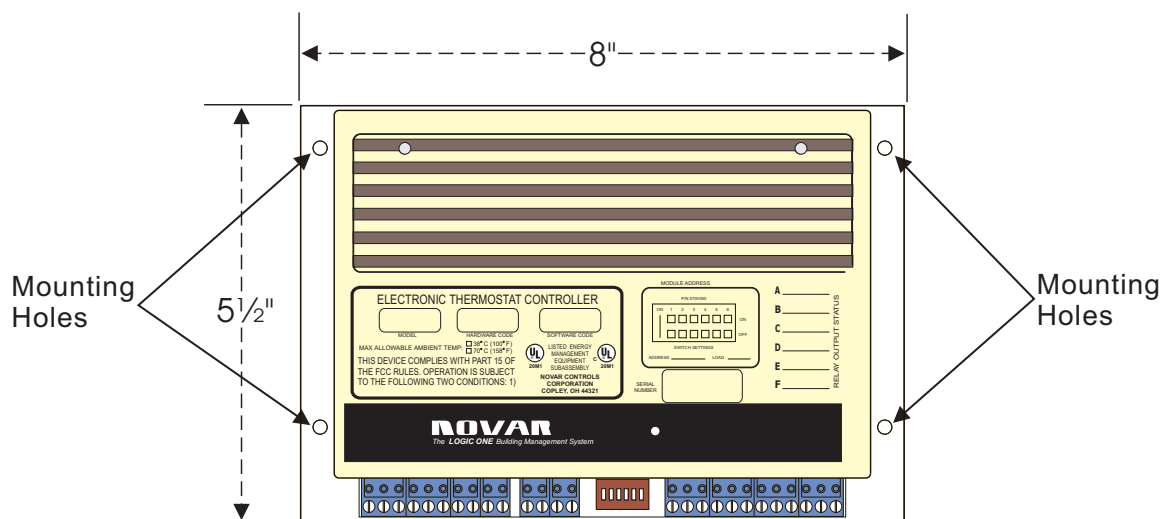


Figure 1. ETC mounting holes

Wiring the ETC's Inputs

The ETC has a removable terminal strip that uses screw connections. The inputs are Terminals 1 through 10, located at the left side of the terminal strip. Refer to Figure 2, as necessary, when making the wiring connections.

Auxiliary Potentiometer

An auxiliary potentiometer can be connected to the ETC-1, ETC-2, and ETC-3 at the terminals labeled Aux Pot.

Step	Procedure
1	Connect the wiper wire to Terminal 1.
2	Connect the clockwise wire to Terminal 2.
3	Connect the counterclockwise wire to Terminal 4 at the Temp Sensor Input label. <ul style="list-style-type: none"> ■ This connection allows adjustments to the zone setpoint.

Novar Controls' Futura Temperature Sensor (Model FTS-3A) can be used with the ETC to provide temperature setpoint adjustment. Novar Controls' *Futura Temperature Sensor (FTS-3) Installation Instructions* (Doc. No. 5602090) are included with the sensor.

NOTE! The ETC-6 uses Terminals 1 and 2 for the humidity sensor input connection. The setpoint adjustment wiring instructions for the auxiliary potentiometer *and* the Novar Controls sensors do not apply to the ETC-6. Refer to the "ETC-6 Humidity Sensor Input" section in this document for wiring instructions.

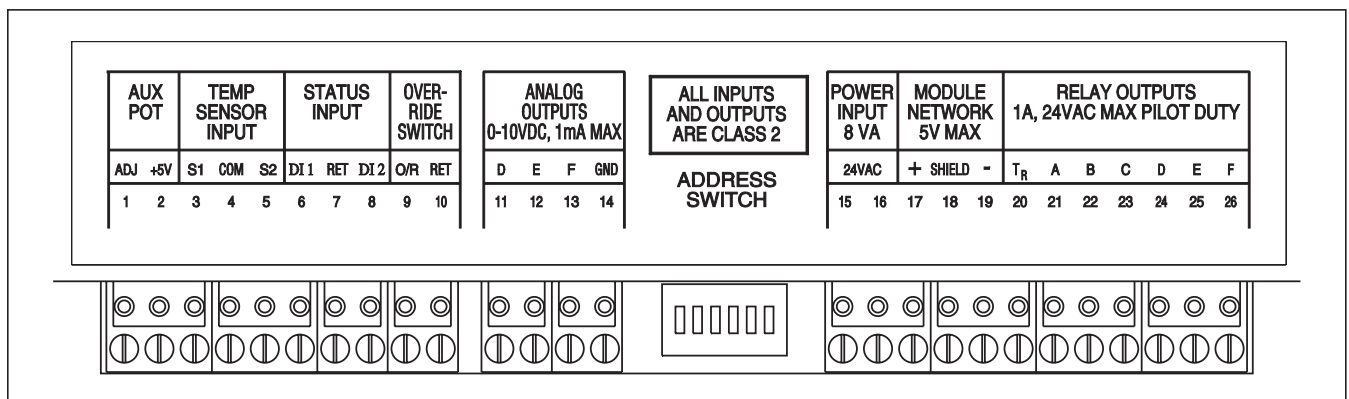


Figure 2. ETC terminal strip

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Temperature Sensor Inputs

The temperature sensor inputs are located under the Temp Sensor Input label on the terminal strip.

Each ETC must use the Remote Temperature Sensor (RTS-UVC) for discharge air *and* one of the following sensors:

- UVC Wall-Mount Temperature Sensor (WTS-UVC)
- Futura Temperature Sensor (FTS-3 or FTS-3A) with temperature setpoint adjustment

Use the following procedure to wire the sensor

Step	Procedure
1	Connect FTS-3 Terminal 4 (S1, +) to ETC Terminal 3 (S1 +).
2	Connect FTS-3 Terminal 3 (COM –) to ETC Terminal 4 (COM).
3	Connect the RTS-UVC red (+) lead to ETC Terminal 5 (S2).
4	Connect the RTS-UVC black (–) lead to ETC Terminal 4 (COM).

To wire the other sensors to the ETC, refer to their specific installation instructions.

NOTE! Maximum recommended sensor wire length for connecting the temperature sensors to the ETC is 100 feet using 22-gauge wire (Belden 8761, Novar Controls' WIR-1010, or equivalent).

Status Input

Terminals 6, 7, and 8, labeled Status Input, are for digital input connections. Terminals 6 and 7 are for the fan status and Terminals 7 and 8 are for the dirty filter status. These are dry contact closure, digital inputs and are connected as normally open with the fan status as closing when the fan is on and the filter status as closing when the filter is dirty.

Override Switch

A momentary contact switch can be connected as an override switch to Terminals 9 and 10, labeled Override Switch. The override switch can have a status light-emitting diode (LED). The time period that the override remains in effect is defined in the software. For information about connecting the timed override switch from the Futura Temperature Sensor (Model FTS-3 or FTS-3A), refer to that sensor's installation instructions.

ETC-6 Humidity Sensor Input

The ETC-6 provides a connection for a 4–20 mA relative humidity sensor (Novar Controls Part No. RH-3S) input at Terminals 1 and 2 on the terminal strip.

Use a two-conductor shielded cable (Belden 8761, Novar Controls WIR-1010, or equivalent) and observe polarity.

Step	Procedure
1	Connect the negative (–) wire from the humidity sensor to ETC Terminal 1.
2	Connect the positive (+) wire from the humidity sensor to ETC Terminal 2.

The setpoint adjustment feature is not available on the ETC-6.

Wiring the ETC's Outputs

The ETC-1 and ETC-3 provide an analog damper output and the ETC-2 and ETC-6 provide a digital damper output. The other outputs remain the same for the models and are shown in Table 1.

The locations of the output terminals are shown in Figure 2 and described in the “Analog Outputs” and “Relay Outputs” sections of this document.

Table 1. ETC Outputs				
OUTPUT	CONTROL OPERATION			
	ETC-1	ETC-2	ETC-3	ETC-6
ANALOG OUTPUTS:				
Terminal 11 (D)	Damper	Not Active	Damper	Not Active
Terminal 12 (E)	Not Active	Not Active	Not Active	Not Active
Terminal 13 (F)	Not Active	Not Active	Not Active	Not Active
DIGITAL (RELAY) OUTPUTS:				
Terminal 21 (A)	Fan	Fan	Fan	Fan
Terminal 22 (B)	Cooling Stage 2	Cooling Stage 2	Cooling Stage 2	Cooling Stage 2
Terminal 23 (C)	Heating Stage 2	Heating Stage 2	Heating Stage 2	Heating Stage 2
Terminal 24 (D)	Not Active	Damper	Not Active	Damper
Terminal 25 (E)	Heating Stage 1	Heating Stage 1	Heating Stage 1	Heating Stage 1
Terminal 26 (F)	Cooling Stage 1	Cooling Stage 1	Cooling Stage 1	Cooling Stage 1

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Analog Outputs

Terminals 11–13 (D–F), the analog outputs, are located under the Analog Outputs label, immediately to the right of the input connections. These are 0–10 VDC, 1 mA maximum connections.

The ETC-1 and ETC-3 use Terminal 11 (D) for damper control. The other connections are not active. Terminal 14 is a ground connection for the 0–10 VDC signal. None of these outputs are used on the ETC-2 or ETC-6.

Relay Outputs

Terminals 21–26 (A–F), the digital relay outputs, are located at the far right side of the terminal strip under the Relay Outputs label. These are the actual output connections. Connect the wiring for these outputs as shown in the model configuration table. On the ETC-2 and ETC-6, the digital damper output is Terminal 24 (D). On the ETC-1 and ETC-3, this output is not active because the damper is controlled by an analog signal.

The digital relay output status LEDs are located on the case of the ETC.

- If the contact is closed, the relay is energized and the LED is on.
- If the contact is open, the relay is de-energized and the LED is off.

Terminal 20 is for one side of a 24-volt source to be regulated (switched) through Terminals 21–26 (A–F). The relay outputs are isolated from the other connections to permit the additional power source. The transformer powering the module can be used if the transformer is properly rated.

Network Communications

Use a suitable shielded cable (Belden 8761, Novar Controls WIR-1010, or equivalent) to make the communication connections between the ETC and the module communication terminals of the executive module.

On the ETC, the connections are Terminals 17, 18, and 19, located under the Module Network label. Make certain that the positive (+) and negative (–) connections are made correctly.

WARNING! The Shield connection (Terminal 18) is not a ground like the other common grounds on the terminal strip. It is dedicated for communications only. Do *not* connect any other grounds to the Shield connection.

Setting the Module Address Switches

Every Logic One module must have a unique address for the executive module to identify it. Addresses are assigned in the software during system programming. The system configuration printout shows the address of the ETC being installed.

The address switch is located in the middle of the terminal strip (see Figure 2). The EP/2 is designed to accept module addresses from 00 to 127 for any type of Logic One module. Address settings 64 through 127 duplicate the sequence of settings shown in Figure 3 (address setting 64 is the same as address setting 00, etc.).

NOTE! Address 00 may not be used by the ETC when operating on an EC (the IOM section of the EC uses address 00).

The EP/2 requires a Network Expander to communicate with addresses 64 through 127. Only unitary controllers can be connected to the Network Expander. More information about setting addresses 64 through 127 can be found in Novar Controls' *Network Expander Module Installation Instructions* (Doc. 5600290). When connecting additional modules to the EP/2, remember not to exceed their 128-input or 128-output limits.

WARNING! Make sure power to the ETC is turned off before setting or changing the address.

ADDRESS	SWITCH SETTINGS	ADDRESS	SWITCH SETTINGS	ADDRESS	SWITCH SETTINGS	ADDRESS	SWITCH SETTINGS
00	ON ↑ 1 2 3 4 5 6 TTTTTT	16	ON ↑ 1 2 3 4 5 6 TTTTTT	32	ON ↑ 1 2 3 4 5 6 TTTTTT	48	ON ↑ 1 2 3 4 5 6 TTTTTT
01	TTTTTT	17	TTTTTT	33	TTTTTT	49	TTTTTT
02	TTTTTT	18	TTTTTT	34	TTTTTT	50	TTTTTT
03	TTTTTT	19	TTTTTT	35	TTTTTT	51	TTTTTT
04	TTTTTT	20	TTTTTT	36	TTTTTT	52	TTTTTT
05	TTTTTT	21	TTTTTT	37	TTTTTT	53	TTTTTT
06	TTTTTT	22	TTTTTT	38	TTTTTT	54	TTTTTT
07	TTTTTT	23	TTTTTT	39	TTTTTT	55	TTTTTT
08	TTTTTT	24	TTTTTT	40	TTTTTT	56	TTTTTT
09	TTTTTT	25	TTTTTT	41	TTTTTT	57	TTTTTT
10	TTTTTT	26	TTTTTT	42	TTTTTT	58	TTTTTT
11	TTTTTT	27	TTTTTT	43	TTTTTT	59	TTTTTT
12	TTTTTT	28	TTTTTT	44	TTTTTT	60	TTTTTT
13	TTTTTT	29	TTTTTT	45	TTTTTT	61	TTTTTT
14	TTTTTT	30	TTTTTT	46	TTTTTT	62	TTTTTT
15	OFF ↓ 1 2 3 4 5 6 TTTTTT	31	OFF ↓ 1 2 3 4 5 6 TTTTTT	47	OFF ↓ 1 2 3 4 5 6 TTTTTT	63	OFF ↓ 1 2 3 4 5 6 TTTTTT

Figure 3. Electronic Thermostat Controller Address Settings

Supplying the ETC with Power

The ETC is powered by 24 VAC. It is rated at 8 VA. Connect the 24 volts to Terminals 15 and 16 under the Power Input 8 VA label.

NOTE! The 24-VAC power connection is isolated. One transformer can be used to power multiple modules within the restrictions of an 8-VA consumption.

Checking Installation

When installation is complete, check the following items to make sure the ETC is operating correctly.

- Turn on the power to the ETC and to the HVAC system and its control circuitry. If the module is operating properly, the ETC begins to control the HVAC unit after performing a self-diagnostic check and establishing communications with the executive module.
 - Check the schedule status indicator LED located on the module's case above the terminal strip. If the module is communicating properly, this LED should flash according to the schedule mode.
 - If the ETC is in scheduled off mode, the LED is off and flashes on briefly when communicating.
 - If the ETC is in scheduled on mode, the LED is on and flashes off briefly when communicating.
 - Check the timed override switch (if one has been installed and programmed) by pressing it during a scheduled off mode. If the module is operating correctly, the LED flashes rapidly until the override period ends.
 - Check the six relay output status LEDs. They indicate the status of each active digital output (depending on the ETC model configuration). The LEDs should be lit when the corresponding digital output is on.
 - Monitor the executive module display for alarm messages indicating ETC malfunctions. Use the executive module's keypad to change the ETC's setpoints and monitor their status display for proper response.
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Model and Part Numbers

Use the part numbers shown in Table 2 to order the necessary Novar Controls parts.

Table 2. Novar Controls Model and Part Numbers		
PRODUCT	MODEL NO.	PART NO.
Electronic Thermostat Controller (with analog damper, five inputs, and five outputs)	ETC-1	738003000
Electronic Thermostat Controller (with digital damper, five inputs, and five outputs)	ETC-2	738002000
Electronic Thermostat Controller (with analog damper, five inputs, and five outputs; can be mounted outdoors)	ETC-3	738013000
Electronic Thermostat Controller (with digital damper, five inputs, and five outputs; equipped with input for RH-3S humidity sensor)	ETC-6	738016000
Two-conductor shielded cable (Belden #8761 equivalent)	WIR-1010	709001000
Remote Temperature Sensor	RTS-UVC	736003000
Wall-Mount Temperature Sensor	WTS-UVC	736002000
Futura Temperature Sensor	FTS-3	732403000
Futura Temperature Sensor with adjustable setpoint	FTS-3A	732401000
Relative Humidity Sensor (space-mount)	RH-3S	780011000

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