ETM-3051 Service Manual

Introduction

Novar's Electronic Thermostat Modules (ETMs) are intelligent control modules that provide local, direct digital control of unitary, packaged, staged HVAC systems.

This document:

- Describes the ETM-3051.
- Lists precautions that should be taken by anyone who services the module.
- Explains the wiring connections
- Provides status and addressing information needed to troubleshoot the ETM
- Explains how to replace the ETM
- Explains how Novar's Wall-Mount Temperature Sensor (WTS-UVC) and Remote Temperature Sensor (RTS-UVC) work with the ETM

In addition, the document provides troubleshooting charts for:

- Communications loss
- Rooftop unit (RTU) response
- WTS-UVC Sensor Faults
- RTS-UVC Sensor Faults

Description

The ETM-3051 (Figure 1) is a panel-mount module that can be used to control the following loads:

- Fan
- Heating Stage 1
- Heating Stage 2
- Cooling Stage 1
- Cooling Stage 2
- Damper
- Night mode damper

In addition to the typical connections for discharge and return-air (or space) temperature sensors, the ETM-3051 provides a connection for a third temperature sensor that controls the space temperature. This sensor, called a switch-over sensor, provides the option of programming a fall-back control mode of operation. The fall-back mode of operation is programmed in Novar's software to switch control to the return-air sensor if the signal is lost from the switch-over sensor.

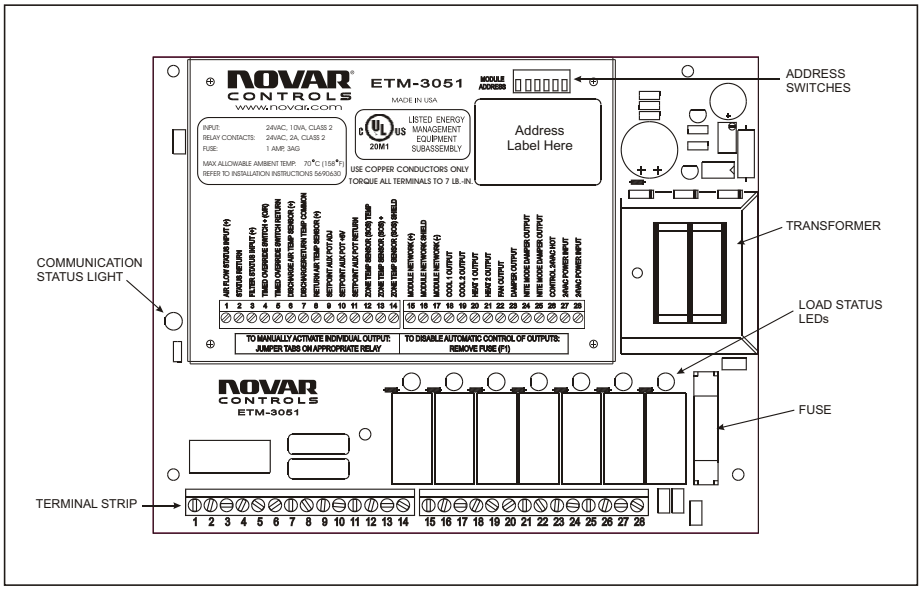


Figure 1. ETM-3051

Precautions

NOTE! To perform any of the operations outlined in this manual, a person must meet both of the following qualifications:

- Be a licensed electrician or a licensed HVAC technician.
- Have experience in troubleshooting building automation and HVAC controls.

WARNING! Some service and maintenance checks in this manual require that the unit's power be turned on. Multiple voltages at the HVAC unit present an electrical shock hazard that can cause injury or death. Before attempting to service an ETM-3051, turn off power to the HVAC unit at the disconnect switches. When performing the service checks that require power, turn on the power when necessary but be aware that the electrical shock hazard exists. No one should perform the operations outlined in this manual unless he or she meets the qualifications specified above and is trained and experienced in working with the following voltages:

- 24-VDC
- 24-VAC
- 110-VAC
- 208-VAC
- 277-VAC
- 480-VAC

Wiring Connections

The ETM-3051 terminal strip draws 10-VA current and provides terminals for the connections listed in Table 1. The shield on the ETM-3051 clearly identifies the intended use for each terminal connection.

Table 1. ETM-3051 Terminal Strip Connections

TERMINALS	PROVIDE CONNECTIONS FOR
4–5	Remote Override Switch Input
6–14	Temperature Sensor Inputs: ■ Terminals 7–8: Wall-Mount Temperature Sensor (5-VDC power) ■ Terminals 6–7: Duct Temperature Sensor (DTS) (5-VDC power) ■ Terminals 12–14: Wall-Mount Temperature Switch-Over Sensor (WTS-SOS) ■ Terminals 9–11: Setpoint adjustment **NOTE!** The WTS-SOS *or* the setpoint adjustment can be used, but not both.
15–17	Network Communications (2.5 VDC)
18–26	HVAC Control
27–28	24-VAC Power

NOTE! The ETM is a Class 2, low voltage device. Do not connect 115 volts to any terminal. The outputs are controlled by low voltage triacs. Do not exceed 24-VAC at 1 amp.

Troubleshooting the ETM-3051

WARNING! Before performing any of the operations outlined on the following pages, review the precautions listed in this document.

Before performing service on an ETM, locate and check the following items:

- ETM Communication status light-emitting diode (LED) located on the left side of the module (see Figure 1)
- ETM load status LEDs (see Figure 1)
- ETM address switches (see Figure 1)
- Rooftop unit (RTU) communicating with the ETM

The communication status LED indicates if the module is receiving electrical power and its current mode of operation. Table 2 explains the communication status LED's operation.

Table 2. ETM Communication Status LED Operation

IF THE COMMUNICATION STATUS LED	IT MEANS
Is completely off	The ETM is not receiving power.
Blinks off approximately every 15 seconds	The ETM is operating in normal/occupied mode.
Blinks on every 15 seconds for 3 minutes before switching to normal mode	The ETM is going through its initial power up.
Blinks on approximately every 15 seconds	The ETM is in unoccupied mode.
Blinks off 3 times approximately every 15 seconds	The ETM address is incorrect.
Blinks on and off steadily	The ETM has power but is not communicating.

The load status LEDs indicate which load(s) are being called for by the ETM.

The ETM's address switches must be set accurately for it to communicate with the appropriate rooftop unit and master controller. Typical ETM address settings (shown in Figure 2) coincide with the RTU number.

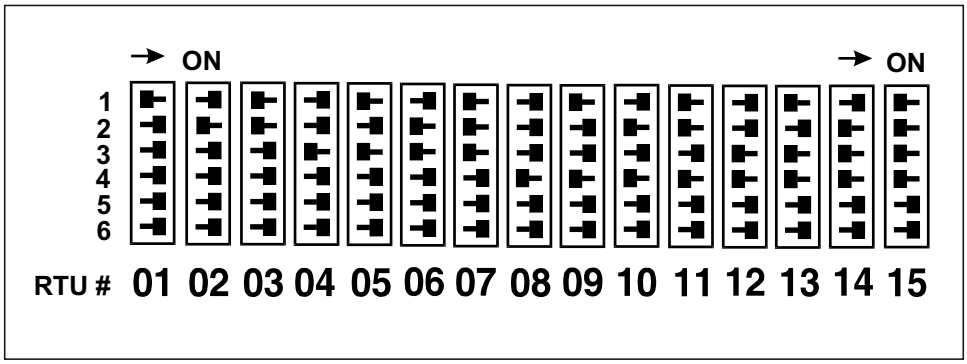
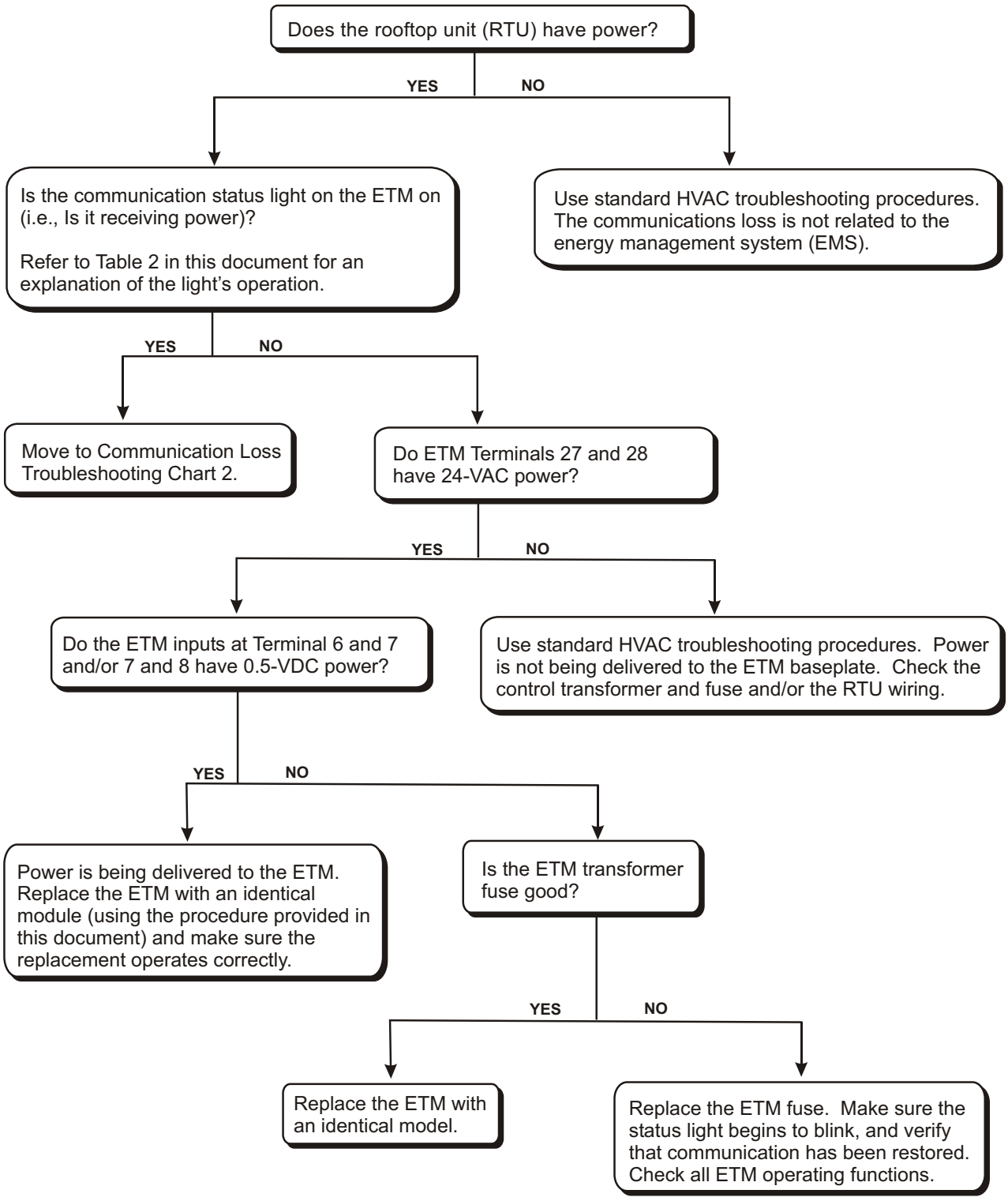
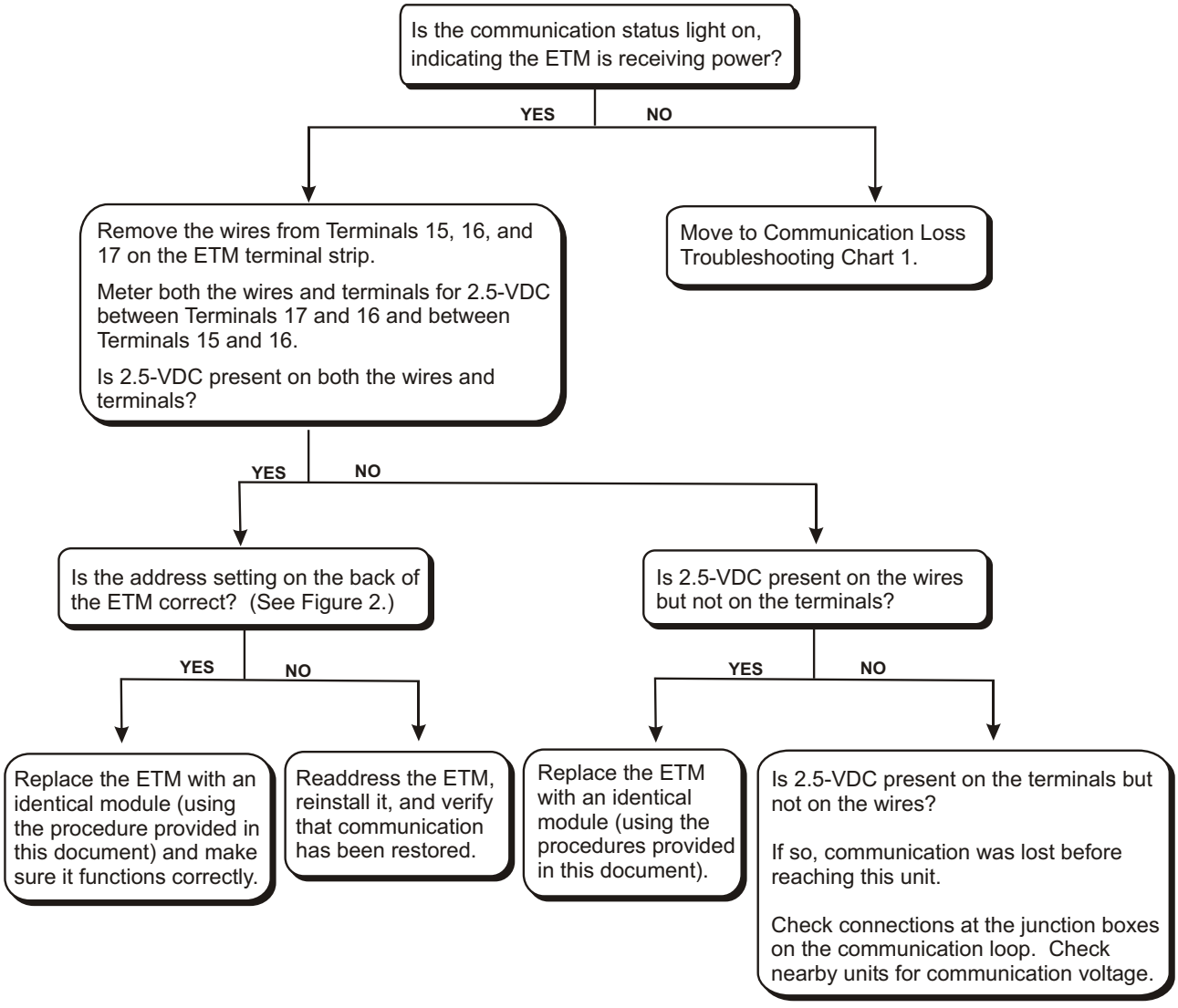


Figure 2. ETM address settings

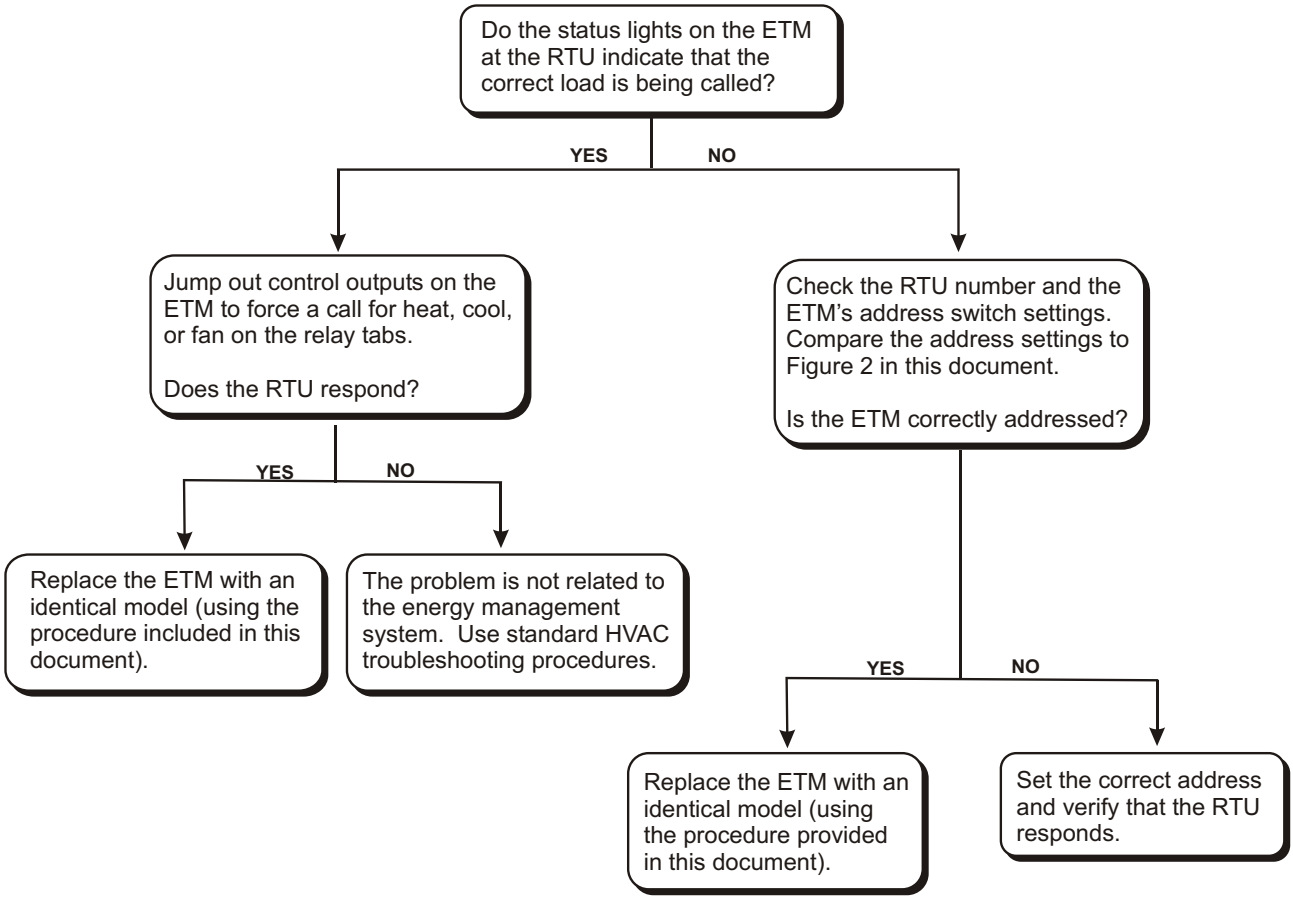
Communications Loss
Troubleshooting Chart 1
Checking the ETM and Its Baseplate for Power



Communications Loss
Troubleshooting Chart 2
Checking the Wires, Terminals, and Address



Rooftop Unit Does Not Respond to ETM Calls
Troubleshooting Chart 3



Replacing the ETM

If the troubleshooting procedures indicate that the ETM must be replaced, it must be replaced with an identical model. The following procedure explains how to replace an ETM-3051.

Step	Procedure
1	Disconnect all wires connected to the ETM-3051's terminal strip. ■ Identify each wire, if necessary, to make sure it will be reconnected to the appropriate terminal once the replacement ETM has been mounted.
2	Loosen and remove the mounting screws (see Figure 3) and remove the defective ETM.
3	Note the address settings on the defective ETM and set the replacement ETM's address switches to the correct address. ■ Refer to Figures 2, if necessary.
4	Align the replacement ETM over the mounting holes and insert and tighten the mounting screws.
5	Reconnect the wires to the terminal strip.
6	Check the status light to make sure power has been restored.
7	Make sure that communication has been restored.

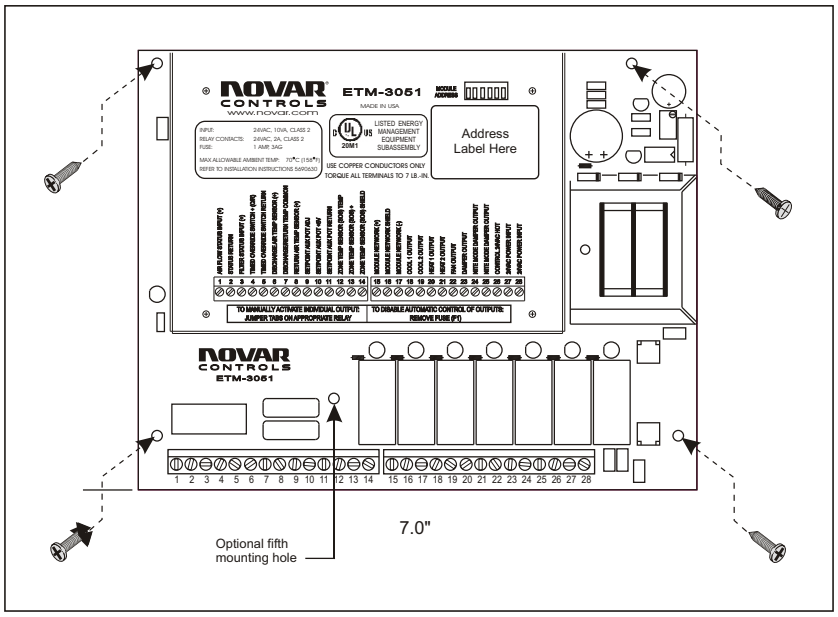


Figure 3. Mounting screws and holes for the ETM-3051

Any Novar Technology Center (NTC) or Novar account representative can provide instructions for returning the defective module.

UVC Wall-Mount Temperature Sensor

Novar's Wall-Mount Temperature Sensor (WTS-UVC; Figure 4) is designed for use with Novar's Unit Ventilator Controller.

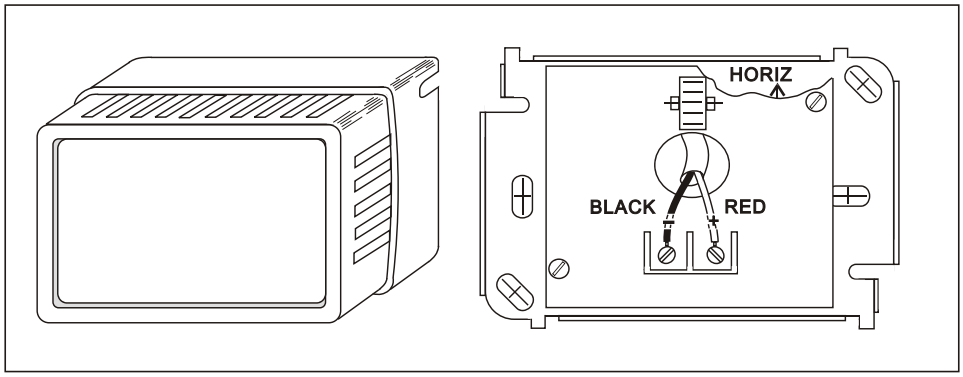


Figure 4. WTS-UVC

The sensor is mounted in the zone controlled by the RTU and uses a two-wire cable to:

- Receive power from the ETM.
  - — 0.55 VDC with the sensor attached
  - — 5 VDC with the sensor unattached or polarity reversed

NOTE! Polarity most be observed when the WTS-UVC is wired.

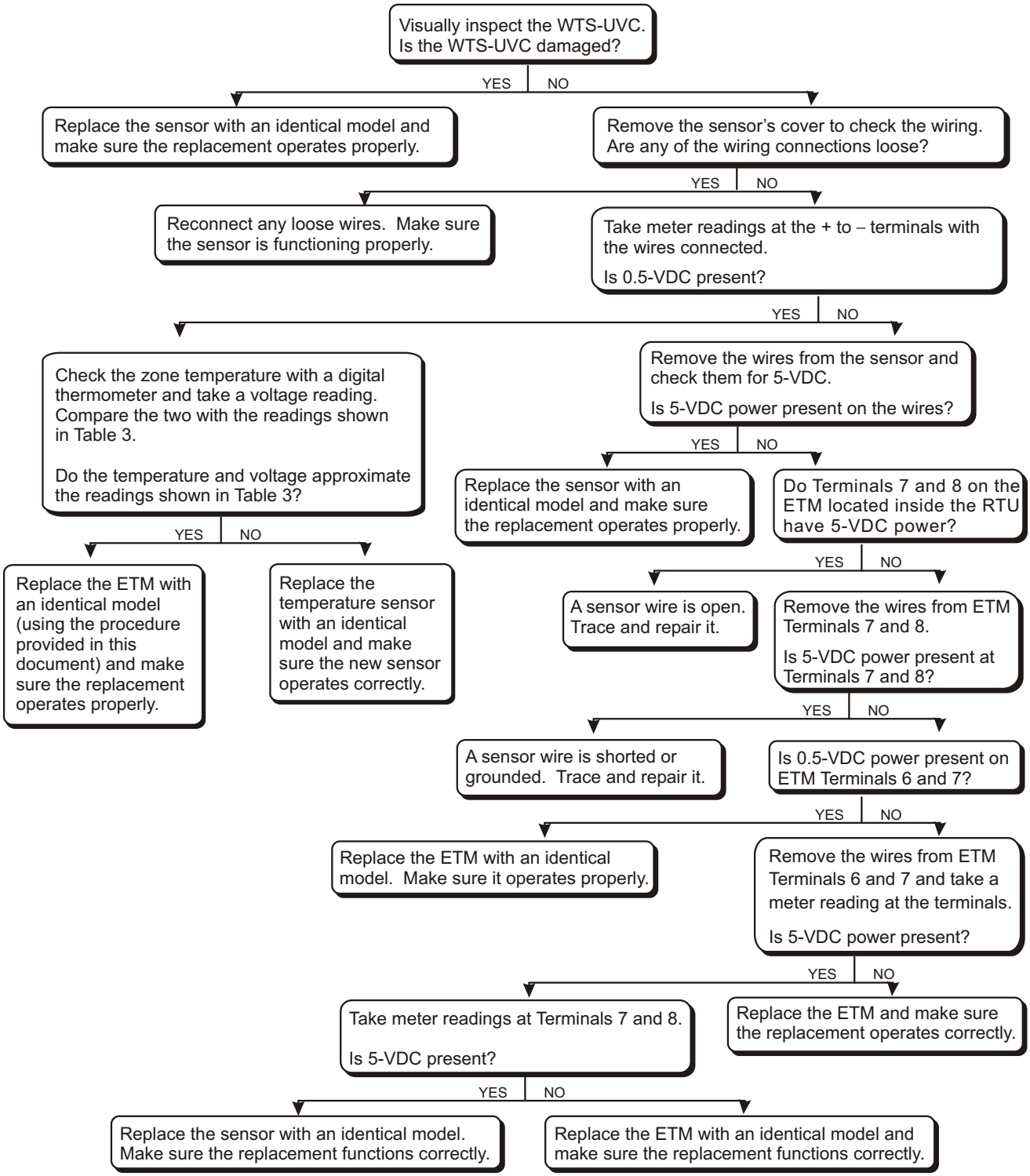
- Send the ETM a DC voltage signal proportional to the space temperature. The ETM translates the signal into a 40°–150°F reading as shown in Table 3.

Table 3. WTS-UVC Signal Translation

APPROXIMATE VOLTAGE	APPROXIMATE TEMPERATURE (IN DEGREES FAHRENHEIT)
0.591	50
0.582	57
0.557	77
0.535	95
0.510	115
0.465	150

The sensor is permanently calibrated at the factory. The following chart should be used to troubleshoot WTS-UVC faults.

WTS-UVC Sensor Faults
Troubleshooting Chart



Remote Temperature Sensor

Novar's supply-air Remote Temperature Sensor (RTS-UVC; Figure 5) uses a two-wire cable to:

- Receive DC voltage from the ETM.
  - — 0.55 VDC with the sensor attached
  - — 5 VDC with the sensor unattached or polarity reversed

NOTE! Polarity must be observed when the RTS-UVC is wired.

- Send the ETM a DC voltage signal proportional to the supply-air temperature. The ETM translates that signal into a 40°–150°F reading as shown in Table 4.

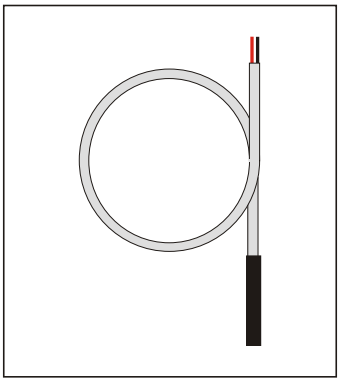


Figure 5. RTS-UVC

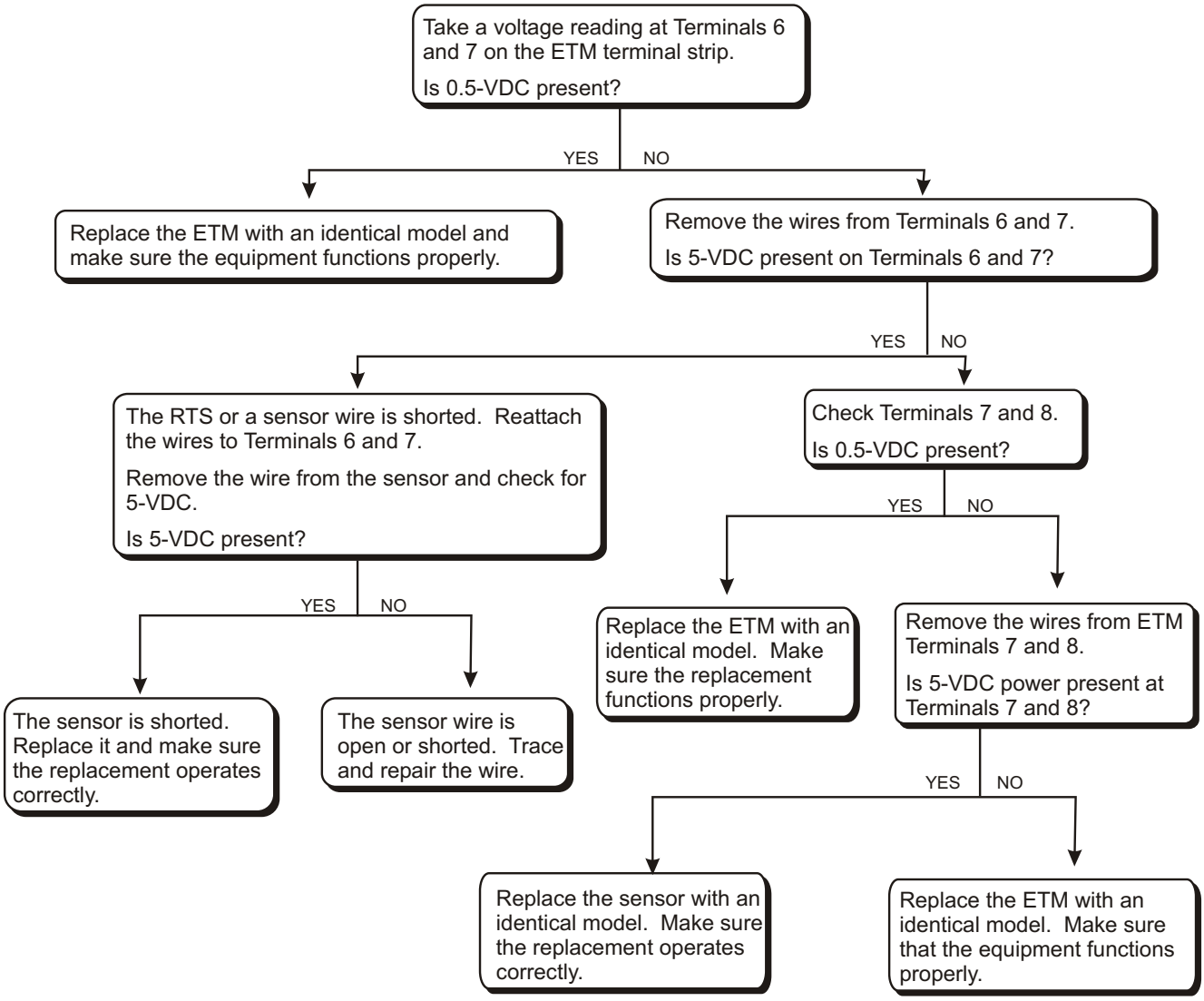
Table 4. RTS-UVC Signal Translation

APPROXIMATE VOLTAGE	APPROXIMATE TEMPERATURE (IN DEGREES FAHRENHEIT)
0.591	50
0.582	57
0.557	77
0.535	95
0.510	115
0.465	150

The sensor is permanently calibrated at the factory. The following troubleshooting chart should be used to troubleshoot RTS-UVC faults.

NOTE! The return-air sensor must be unplugged for proper control.

RTS-UVC Sensor Faults
Troubleshooting Chart



Novar; 6060 Rockside Woods Blvd., Cleveland, OH 44131
Tel.: 800.348.1235 www.novar.com