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TRANE®

VariTrac™ II

Central Control Panel

Installation Guide

Software Version 2.0

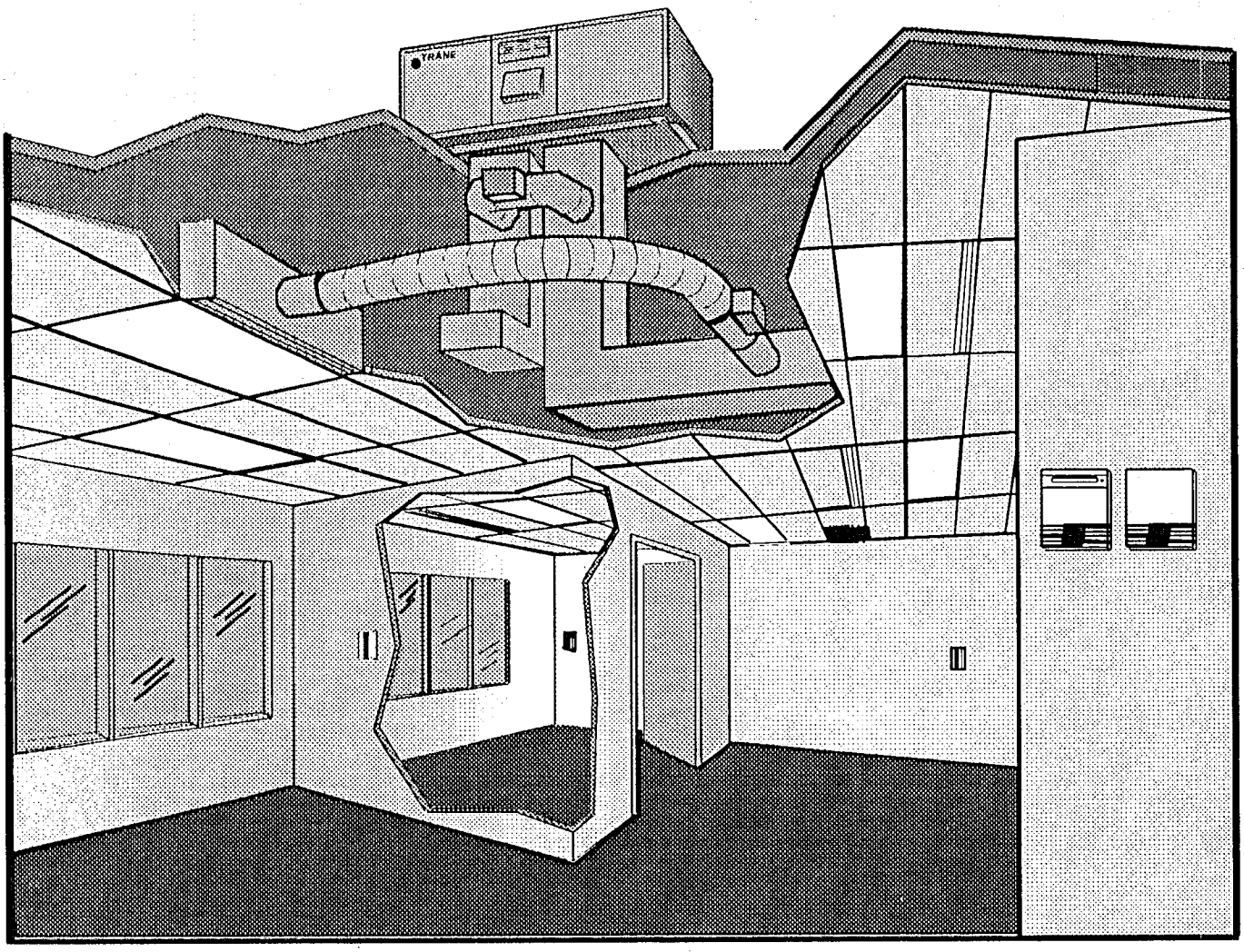


Table of Contents

About This Manual

Contents

This manual describes the steps required to install and configure the VariTrac II Changeover Bypass Zone Control System. Sections in this manual are as follows:

- FCC Information: Information about FCC approval and possible radio and telephone interference.
- System Overview: A brief description of the VariTrac II system, including an illustration of a typical VariTrac II application.
- Specifications: Technical specifications for the VariTrac II Central Control Panel unit.
- Getting Started: Pre-installation and setup information.
- Installing and Configuring the System: Installation and configuration information, including an installation checklist.
- Troubleshooting: General troubleshooting guidelines for common problems.

Naming Conventions

The following is a list of naming conventions that are used in this manual:

- *VariTrac II* and *CCP* refer to the VariTrac II Central Control Panel

Warnings and Cautions

Where appropriate, cautionary statements are used to signal procedures or conditions that require particular attention. A WARNING alerts installing contractors and service personnel to potential hazards that could result in personal injury or death. A CAUTION alerts the user to the risk of equipment damage. Your personal safety and the proper operation of these systems depend upon the strict observance of these precautions.

Related Literature

- VariTrac II Central Control Panel Operator's Guide

FCC Information

VariTrac II Radio and Television Interference

The VariTrac II generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio and television reception. The VariTrac II has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a commercial installation.

There is no guarantee that interference will not occur in a particular installation. If the VariTrac II does cause interference, consult a radio or television technician for suggestions to correct the problem. Also, the booklet *How to Identify and Resolve Radio–TV Interference Problems* is available from the U.S. Government Printing Office, Washington, D.C. 20402. Order stock #004-000-00345-4.

System Overview

Central Control Panel

The VariTrac II Central Control Panel serves as the central source of communications and decision making between the individual zones and the air conditioning unit. Inputs to the Central Control Panel consist of 24 volt AC power, communication wiring to the zone dampers, communication wiring to the Trane Building Automation System, a temperature sensor, and a system velocity/static sensor. Binary inputs consist of occupied/unoccupied, manual/auto changeover, and heat/cool mode. The system bypass damper is driven directly from the Central Control Panel. The heating, cooling and fan at the rooftop can be controlled through binary outputs on the accessory relay board, or if a Trane Voyager rooftop with micro controls is used, the Central Control Panel can control the heat, cool and fan, via a two-wire communication link and display status information from the micro control.

Unit Control Module (UCM)

A unit control module is mounted to each individual zone damper. Each UCM is capable of controlling local heat. The local heat may be duct or space mounted, and can be controlled as staged electric, pulse width modulating electric, and modulating or two position hot water. Inputs and outputs consist of the twisted pair communication link, zone temperature sensor, 24 volt AC power, damper motor control and heat outputs.

VariTrac Damper

The VariTrac damper is referred to by its diameter. Damper sizes are 6", 8", 10", 12", 14", and 16". The damper consists of an eighteen gauge galvanized steel cylinder with a round damper assembly connected to the drive shaft. Each VariTrac damper has a control box that encloses the UCM circuit board. The damper is designed to operate in static pressures up to 1.75" W. G.

Bypass Damper

The bypass damper consists of a VariTrac damper without the UCM circuit board. The bypass damper is provided with a 24 VAC electric actuator that is connected by three wires to the Central Control Panel.

System Temperature Sensor

The supply air temperature sensor is a two wire connection to the Central Control Panel. The VariTrac II system uses this supply air temperature information to determine the heat/cool action of each individual UCM, and to disable the rooftop unit when a high or low temperature limit is recognized. These high and low limits may be edited through the VariTrac II Central Control Panel.

Velocity Sensor

The velocity sensor consists of a differential pressure flow tube and a control box which houses the pressure transducer. Three wires from the velocity sensor connect it to the Central Control Panel. The velocity sensor is used to monitor system air flow and allow the Central Control Panel to position the bypass damper accordingly.

Static Sensor

The Static Pressure sensor is a field conversion of the Velocity Sensor. It consists of a duct mounted air flow tube and a control box which houses a pressure transducer. Three wires from the sensor connect to the Central Control Panel. The static pressure sensor can be used as an alternative to the velocity sensor depending on the application. The static pressure sensor is used to measure duct static pressure and allows the Central Control Panel to position the bypass damper to maintain a static pressure setpoint. A choice between Velocity and Static Sensor is made at the time of installation.

Auxiliary Temperature Sensor

The auxiliary temperature sensor is a two-wire connection that may be used with any UCM damper control. This may be used to allow the operator to monitor duct temperature or air temperature leaving a re-heat device. This sensor may also be used for automatic changeover of a UCM damper when no Central Control Panel is used.

Zone Temperature Sensors

Four types of zone temperature sensors are available:

- Sensor only
- Sensor with adjustable setpoint and communications jack
- Sensor with night setback override button, cancel button and communications jack
- Sensor with adjustable setpoint, night setback override button, cancel button, and communications jack

Time Clock

When the Central Control Panel is not connected to ICS equipment, a programmable time clock is available to provide an occupied/unoccupied binary input to the VariTrac II Central Control Panel. The time clock may be used as a 24-hour or 7-day control.

W-973 Interface (Optional)

The heating and cooling outputs of the Central Control Panel are binary. For this reason, when controlling a rooftop with a W-973 controller, it is necessary to convert the binary output of the Central Control Panel into an analog input to the W-973. The W-973 interface consists of a circuit board and metal enclosure. It may be mounted near the Central Control Panel or in the rooftop. Complete details of installation setup and wiring, along with a schematic are included with each interface. Refer to the service literature for the rooftop unit for further information.

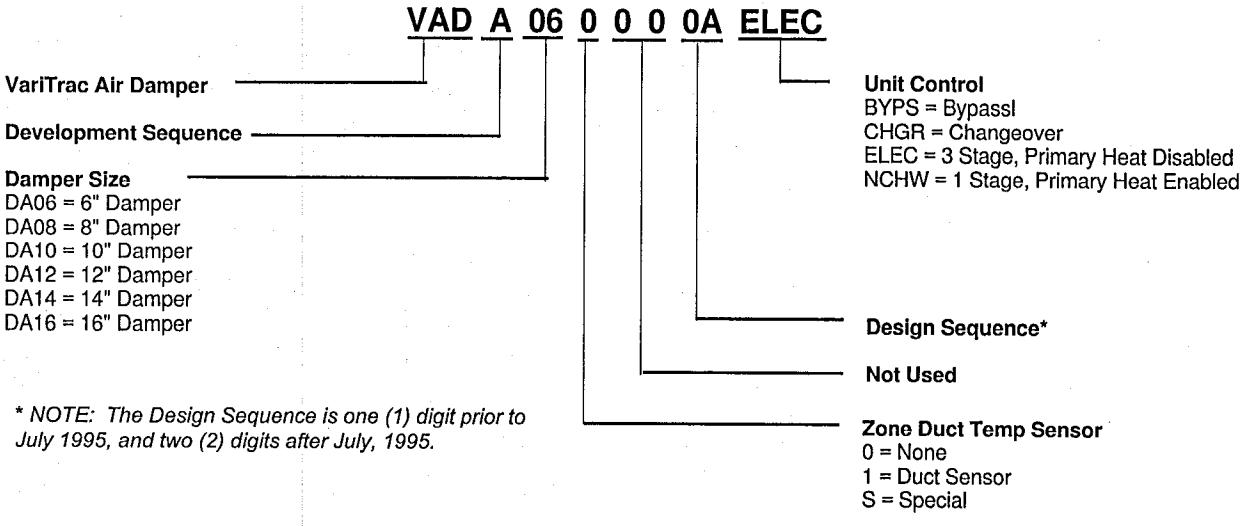
ABCDE Switch (Optional)

An optional RS-232 switch box is available to allow up to four Central Control Panels to connect to a single terminal. Rotating the switch allows for communication with each Central Control Panel.

Service Model Number Description

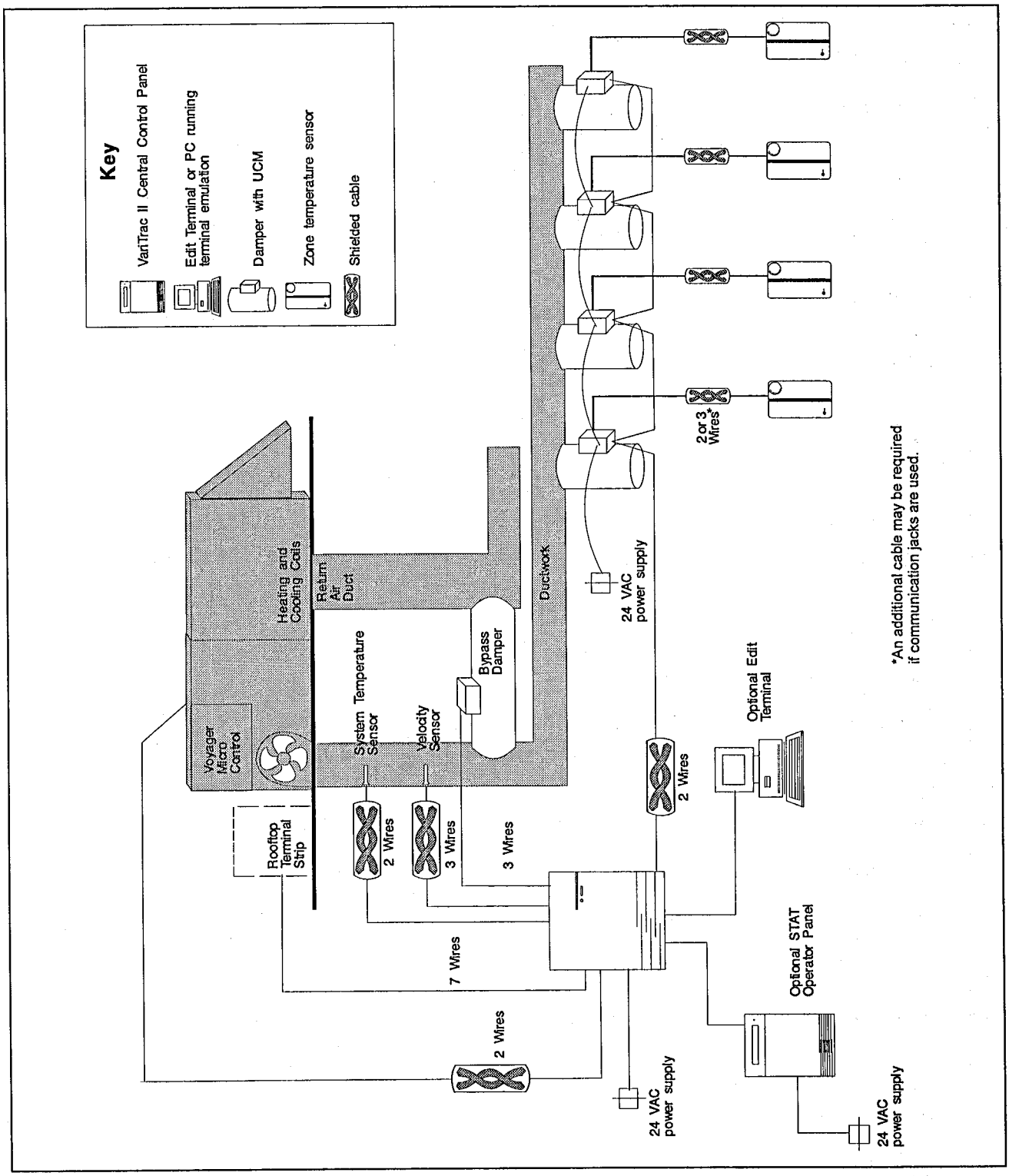
Service model numbers are used to determine the characteristics of the product, and should be used when ordering replacement parts. Each digit of the model number signifies characteristics of the product. For example:

Service Model Number Nomenclature — Dampers



** NOTE: The Design Sequence is one (1) digit prior to July 1995, and two (2) digits after July, 1995.*

Figure 1
VariTrac II System Configuration



NOTE: See wiring requirements for exact specifications.

Specifications

VariTrac II Central Control Panel

Power Requirements

20-30 VAC, 60 Hz, 1 Ph
30 VA Minimum (plus 2 VA for each Bypass Damper connected to the Central Control Panel)
Class 2 Transformer Required

Operating Environment

32 to 120° F
10 to 90% relative humidity, non-condensing

Storage Environment

-50 to 200° F
5 to 95% relative humidity, non-condensing

Cabinet

NEMA 1 Resin Enclosure —Plenum rated

Mounting

Mount directly on wall surface or mount on recessed 4" x 4" conduit box.

Dimensions

12" high x 9-3/4" wide x 2-3/4" deep

Weight

4 pounds

Communication Link Wiring

Communication Link wiring must be 18 AWG twisted, shielded pair wire. Each conductor must be stranded tinned copper. Maximum total wire length is 5,000 feet. Wire must meet Trane specifications. See the section "Communication Link Wire Specifications" for further information.

Analog Temperature Input

Thermistor device, range -30 to 150° F

Binary Input

Voltage Provided by VariTrac II CCP: 10 - 14 VDC
Current Provided by VariTrac II CCP: 10 - 14 mA
Note: Only "dry" contacts may be attached to binary inputs.

U.L. Approval

The VariTrac II Central Control Panel is U.L. approved.

Memory Backup

Upon a power loss, all operator-edited data stored in the VariTrac II Central Control Panel will be maintained permanently.

UCM Damper

Power Requirements

20-30 VAC, 60 Hz, 1 Ph
10 VA Minimum (plus load of optional heat outputs)
Class 2 Transformer Required

Operating Environment

32 to 120° F
10 to 90% relative humidity, non-condensing

Storage Environment

-50 to 200° F
5 to 95% relative humidity, non-condensing

Control Box

NEMA 1 metal enclosure —Plenum rated

Communication Link Wiring

Communication Link wiring must be 18 AWG twisted, shielded pair wire. Each conductor must be stranded tinned copper. Maximum total wire length is 5,000 feet. Wire must meet Trane specifications. See the section "Communication Link Wire Specifications" for further information.

Analog Temperature Input

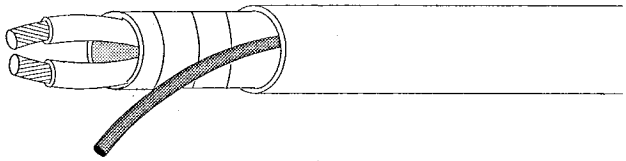
Thermistor device, range -30 to 150° F

Binary Outputs

Voltage Provided: 24 VAC from unit transformer
Current Provided: 10 VA maximum

Communication Link Wire Specifications

Figure 2
Communication Link Wire Specifications
(Trane ordering number 400-20-28)
18 AWG Plenum-Rated Shielded Pair Cable



Application:
Plenum-rated, communication link wiring, and sensor wiring for Trane Control Systems.

Construction:
Stranded tinned copper, insulated with extruded FEP conductors - cabled and shielded with overall aluminum/mylar tape and stranded tinned copper drain wire extruded solef (violet) jacket.

Listing/Rating:
300 Volt 150° C NEC 725-2 (b) Class 2, Type CL2P

Specifications:

Number of Conductors:	2
AWG Stranded:	18 19/30 (19 strands of 30 Gauge)
Insulation Thickness:	015 Inch/38 mm
Jacket Thickness:	009 Inch/23 mm
Nominal Diameter:	179 Inch/455 mm
Capacitance between Conductors:	25 picofarads/ft Maximum Certified
Conductor Color Code:	Black/White
Jacket Color:	Violet

Dimensions specified are nominal and are subject to normal manufacturing tolerances.

NOTE: If you purchase cable from an alternate vendor, make sure the cable meets the technical specification in Figure 2

NOTE: Cable is also available without plenum-rated jacket for non-plenum applications.

Getting Started

Before you begin installing and configuring the VariTrac II system, please take some time to familiarize yourself with the system components and preview the installation procedures.

Here is a list of the installation and configuring procedures in a suggested order to be performed:

1. Unpacking and inspecting the components
2. Mounting the Central Control Panel
3. Setting CCP addresses
4. Connecting AC power wiring
5. Installing system supply air temperature sensor
6. Installing the system velocity/static sensor
7. Installing bypass dampers
8. Connecting input wiring
9. Connecting output wiring
10. Installing VariTrac dampers
11. Connecting UCM wiring
12. Setting UCM DIP Switches
13. Installing slaved dampers
14. Installing zone temperature sensors
15. Connecting communication link wiring
16. Wiring time clock
17. Installing and setting edit devices
18. Installing and setting the modem interface or edit terminal

CAUTION: The VariTrac II Central Control Panel is designed to work with the UCM III VariTrac damper, which is the production model beginning January 1995. If you are using the VariTrac II Central Control Panel with any dampers other than the UCM III, especially on a retrofit job, please consult the factory to confirm compatibility prior to installation.

Unpacking and Inspecting the Components

As you are unpacking the components, please take some time to inspect the system components for damage. Also, take time to match each component with its listing on the packing list, to ensure that none were lost during shipping.

The Central Control Panel and all of the necessary literature are shipped in the same package. When unpacking, make sure that the literature is not lost of discarded with the packing material. Visually inspect the Central Control Panel for obvious defects or damage. All components are thoroughly inspected before leaving the factory. Any claims for damage incurred in shipping must be filed with the carrier.

Installing and Configuring the System

Requirements

Location Within Building

The VariTrac II Central Control Panel should be mounted at a convenient level, located where it will be easily accessible. If possible, locate the VariTrac II Central Control Panel near the controlled equipment to reduce wiring cost.

Operating Environment

The VariTrac II Central Control Panel is designed for indoor use only. It should be located in a dust-free and corrosive-free environment, within a range of 32° to 120° F, and 10 to 90% humidity (non-condensing).

Clearances

The VariTrac II Central Control Panel can be mounted on any vertical flat surface. The VariTrac II Central Control Panel panel is approximately 12 inches high, 9-3/4 inches wide, and 2-3/4 inches deep (see Figure 4 on p. 10). With the front door cover open, the installer has access to the front, top, and bottom panels.

When mounted, the VariTrac II Central Control Panel should be easily accessible for making wiring connections and for servicing. Provide two inches of clearance on the left and right sides, and sufficient clearance above the unit to make conduit connections. At least 24 inches should be available in front of the unit for making wiring connections and performing maintenance.

Mounting the Central Control Panel

1. Open the shipping carton. Mount the enclosure (with circuit board) to wall. Three 3/16" holes are provided for mounting; use #8 mounting screws. As an alternate mounting method, a 4" x 4" knockout is provided for mounting the VariTrac II Central Control Panel to a 4" x 4" recessed metal conduit box; use two #8 mounting screws. The circuit board must be removed to provide access to this knockout. The unit weighs approximately 4 pounds.

   Figure 4 shows the VariTrac II Central Control Panel mounting dimensions.

2. Attach the front cover. For additional local security, use a Phillips screw to secure the door on the bottom and top right corner. See Figure 3.

Figure 3
Location of Front Panel Door Screws

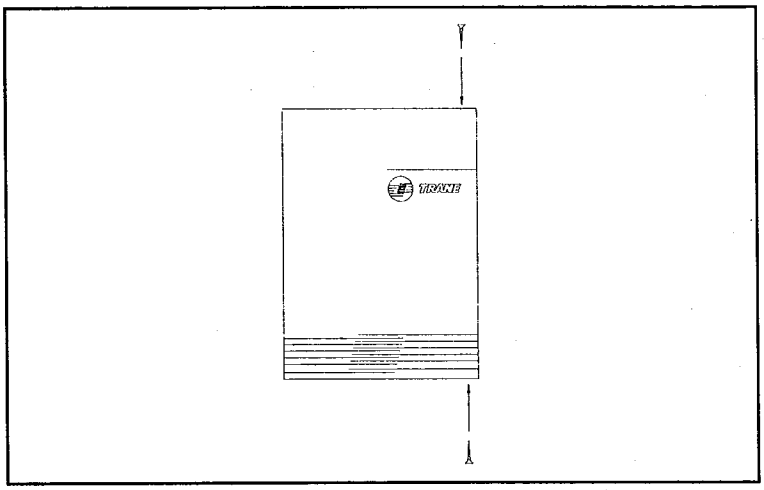
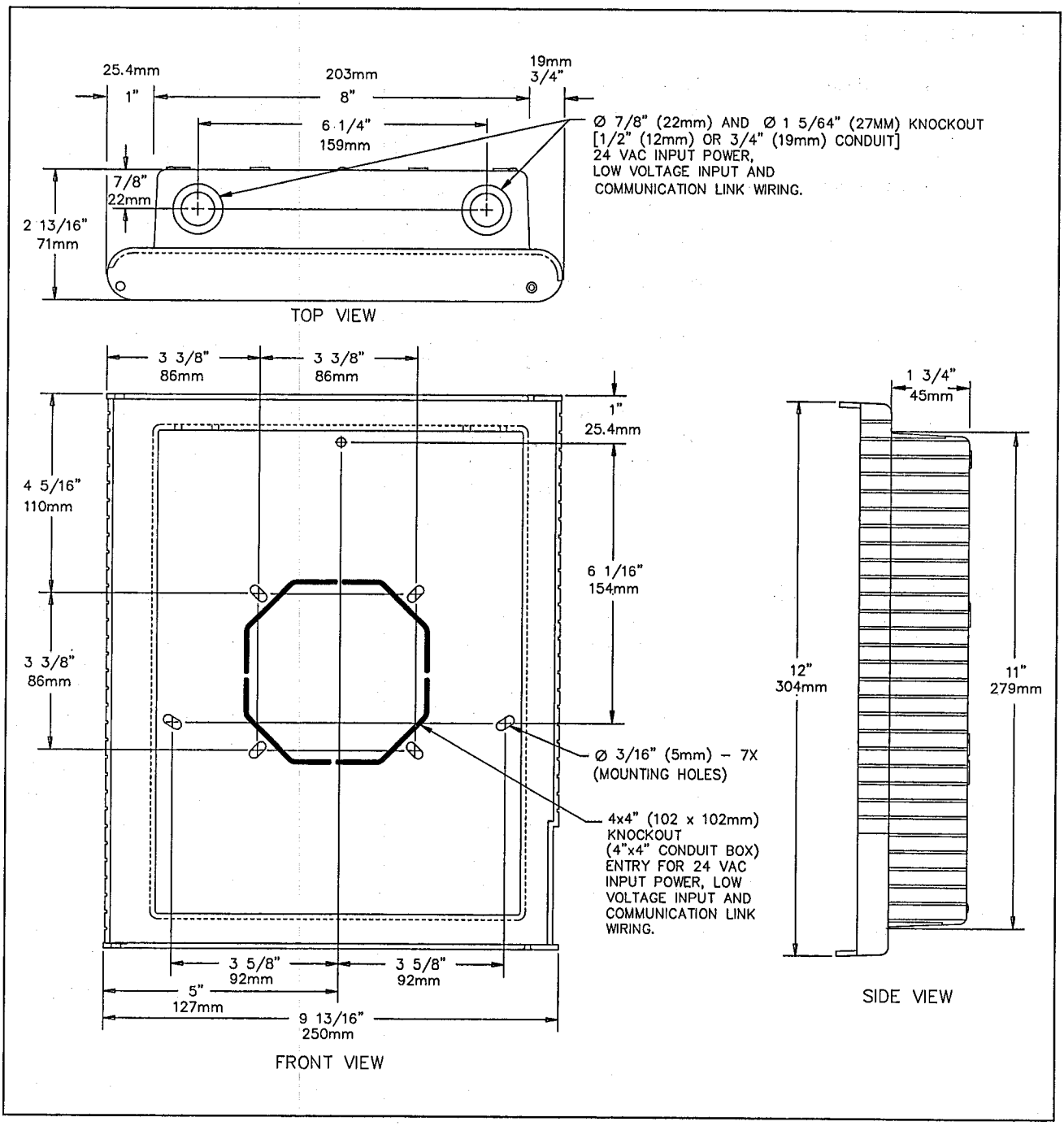


Figure 4
Dimensions for VariTrac II Central Control Panel Enclosure



Setting CCP DIP Switches

Two DIP switches on the VariTrac II Central Control Panel must be configured after installation. Dip switch S2, positions 1-5 are for addressing the VariTrac system when it is connected to a Trane Stat or Integrated Comfort™ System. See the following tables for proper switch positions. If an upper level system is not being used, these switches do not need to be set.

Dip switch S2, positions 6-8, and dip switch S3 configure the VariTrac II Central Control Panel for proper system operation. Refer to the following sections.

DIP Switch #2 Settings 1-5 on VariTrac II Central Control Panel

Table 1

DIP Switch Settings for VariTrac II Addresses When used with Trane STAT Products

Central Control Panel Number	DIP SW#2 Switch Settings				
	1	2	3	4	5
01	ON				
02		ON			
03	ON	ON			
04			ON		
		= Off			

Table 2
DIP Switch Settings for VariTrac II Addresses When used with Trane Building Management Systems

Central Control Panel Number	DIP SW#2 Switch Settings				
	1	2	3	4	5
01	ON				
02		ON			
03	ON	ON			
04			ON		
05	ON		ON		
06		ON	ON		
07	ON	ON	ON		
08				ON	
09	ON			ON	
10		ON		ON	
11	ON	ON		ON	
12			ON	ON	
13	ON		ON	ON	
14		ON	ON	ON	
15	ON	ON	ON	ON	
16					ON
17	ON				ON
18		ON			ON
19	ON	ON			ON
20			ON		ON
21	ON		ON		ON
22		ON	ON		ON
23	ON	ON	ON		ON
24				ON	ON
25	ON			ON	ON
26		ON		ON	ON
27	ON	ON		ON	ON
28			ON	ON	ON
29	ON		ON	ON	ON

DIP Switch #2 Settings 6-8 on VariTrac II Central Control Panel

Dip Switch 2-#6 - Type of Bypass Control
If dip switch #6 is OFF the VariTrac II Central Control Panel will control the bypass damper using Velocity Control. When the dip switch is in the ON position the CCP will control the bypass using static pressure control. This is determined by sensor type selected at installation.

Dip Switch 2-#7 - RS-232 Baud Rate Override
When dip switch #7 is in the OFF position the RS-232 port on the Central Control Panel will operate at the edited baud rate as set in the "CCP System Set-up" menu. When the dip switch is in the ON position, the RS-232 port is overridden to 1200 Baud.

Dip Switch 2-#8 - Local Test Mode
If Dip Switch #8 is in the OFF position the Central Control Panel will operate normally. When the Dip Switch is in the ON position, the CCP is placed in the Local Test Mode. See "Local Test Mode" section of the VariTrac II Central Control Panel Operators Guide for an explanation of Local Test Mode operation.

WARNING: Turning DIP switch #6 ON may energize the fan and both stages of heating and cooling at the rooftop unit. Before initiating this test, make sure that all persons, tools, etc., are clear.

DIP Switch #3 Setting 1-8 on VariTrac II Central Control Panel

DIP Switches #1 through #6
Used for local test mode only.

DIP Switch #7 – 2H2C or Heat Pump
If DIP switch #7 is off, the VariTrac II Central Control Panel will operate in the 2H2C mode. If DIP switch #7 is ON, the VariTrac II Central Control Panel will operate in the Heat Pump mode.

IMPORTANT: DIP switch #7 must be field set for heat pump applications.

DIP Switch #8 - Compressor Lockout (Emergency Heat)
If DIP switch #8 if off, the compressors will not be locked out. If DIP switch #8 in ON, the compressors will be locked out. Used in heat pump applications, this feature can lock out both compressors and allow auxiliary heat to be used as the first stage. Compressor lockout also disables the cooling stages on a 2H2C unit.

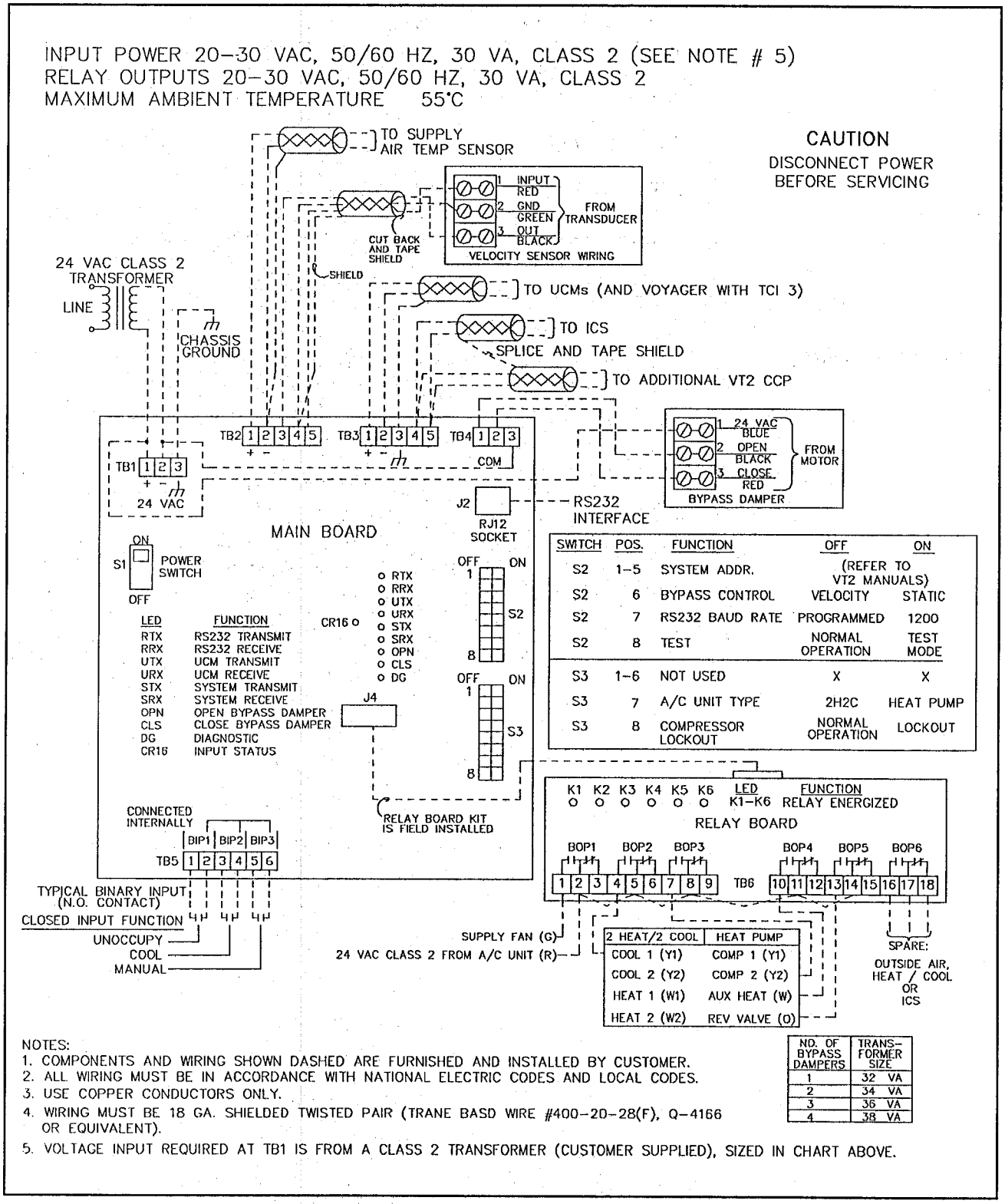
Connecting Field Wiring

Field wiring to the Central Control Panel includes:

- AC power wiring
- Input wiring
- Output wiring
- Communication link wiring

These procedures are detailed in the following sections. Refer to Figure 5 for wiring connections.

Figure 5
Field Wiring



Connecting AC Power Wiring

Power Supply

A dedicated 24 VAC, 30 VA class 2 transformer is required to power the VariTrac II Central Control Panel. Multiple VariTrac II Central Control Panels can be powered from a single, higher capacity class 2, 24 VAC transformer, adequately sized to provide 30 VA to each VariTrac II Central Control Panel.

CAUTION: The 24 VAC power supply must not be used to power any devices other than the VariTrac II Central Control Panel and the bypass damper. This could result in malfunction of the VariTrac II Central Control Panel due to electrical noise.

The VariTrac II Central Control Panel requires 3-wire service with a nominal voltage of 24 VAC and a utilization range of 20 to 30 VAC. All wiring must comply with the National Electrical Code and local codes.

WARNING: To prevent injury or death from electrical shock, disconnect power external to the VariTrac II Central Control Panel before making power connections.

AC Power Connections

The 24 VAC line can enter the VariTrac II Central Control Panel cabinet through the 4" x 4" knockout or through the knockouts in the top of the panel.

Figure 3 shows the 24 VAC conduit entry holes. Connect the 24 VAC line to the unit at TB1, located on the upper left corner of the VariTrac II Central Control Panel, as shown in Figure 5. Connect the 24 VAC wires to TB1-1 and TB1-2 and connect the ground wire from the circuit breaker panel ground to TB1-3. Use copper conductors only.

AC Power Checkout

1. After the 24 VAC connections have been made at TB1, apply AC power by closing the circuit breaker for the class 2 transformer.
2. Measure the voltages at TB1. The voltage between TB1-1 and TB1-2 should be 20 to 30 VAC, between TB1-1 and TB1-3 (ground) should be 20 to 30 VAC, and between TB1-2 and TB1-3 (ground) should be 20 to 30 VAC.

WARNING: When measurements must be made with the power on, use care to prevent injury or death from electrical shock.

Connecting Input Wiring

Analog Input Wiring Requirements

IMPORTANT: All input wiring must comply with applicable electrical codes. Metal conduit may be required by local codes when running wires for the temperature sensor input or binary input.

Use only stranded, tinned copper conductors for input wiring. The temperature sensor input and pressure sensor input must be shielded cable (meets or exceeds Trane specifications—see Communications Link Wiring Specifications section of this manual for details). The recommended wire size is 18 gauge. Do not run input wires in the same conduit or wire bundle with any AC power wires other than VariTrac II Central Control Panel 24 VAC power.

CAUTION: Running input wires in the same conduit or wire bundle with any AC power wires other than VariTrac II Central Control Panel 24 VAC power could cause the VariTrac II Central Control Panel to malfunction due to electrical noise.

For the VariTrac II Central Control Panel enclosure, the input wires should enter the cabinet through the conduit entry holes shown in Figure 4. Input wiring connections at the VariTrac II Central Control Panel are shown in Figure 5.

Binary Input Wiring

CAUTION: Controlling multiple VariTrac II Central Control Panel binary inputs from a single contact closure is not permitted.

CAUTION: Do not run binary input wires and AC power wires together in the same conduit or wire bundles.

Twisted pair wire is required for binary inputs, and it is recommended that 18-20 AWG wire be used. Use only copper conductors for binary input wiring.

The length of the wire run should be limited to 1,000 feet or less. This 1,000 foot maximum should not be exceeded because of possible electrical noise problems with longer wire runs.

Refer to Figure 5 on page 14 for proper connection of the binary inputs.

Three binary inputs may be made to the VariTrac II Central Control Panel per the following:

1. Occupied/Unoccupied - This input is made by closing the connection between terminals 1 and 2 of TB5 at the VariTrac II Central Control Panel. This contact closure will most likely come from a time clock, however, any other device allowing a dry contact connection may be used. When the connection between terminals 1 and 2 is open, the VariTrac II Central Control Panel will operate in the occupied mode. When the connection is closed, the VariTrac II Central Control Panel will operate in the unoccupied mode.
2. Heat/Cool - This input is made by *closing* the connection between terminals 3 and 4 on terminal strip TB5 on the Central Control Panel. The closure would typically come from an auxiliary System Heat/Cool switch. When the connection is closed the system is in the Cool Mode. When the connection is open the system is in the Heat mode. See Binary input #3 below; Manual/Auto Changeover.
3. Auto/Manual Changeover - This input determines if the Central Control Panel is operating in the Manual or Auto changeover mode. When a connection is *closed* between terminals 5 and 6 on terminal strip TB5 of the CCP, the system is in the Manual Changeover mode. The Central Control Panel will then operate in the mode set by binary input #2-Heat/Cool. When the connection between terminals 5 and 6 is open, the system will operate in the Auto Changeover mode, ignoring the input status of input #2.

Installing the Optional Relay Board

Field Installation Instructions

Use the following procedure to install the Optional Relay Board Kit (P/N VA 40200887, X13650530-01) on the main board of the VariTrac II Central Control Panel.

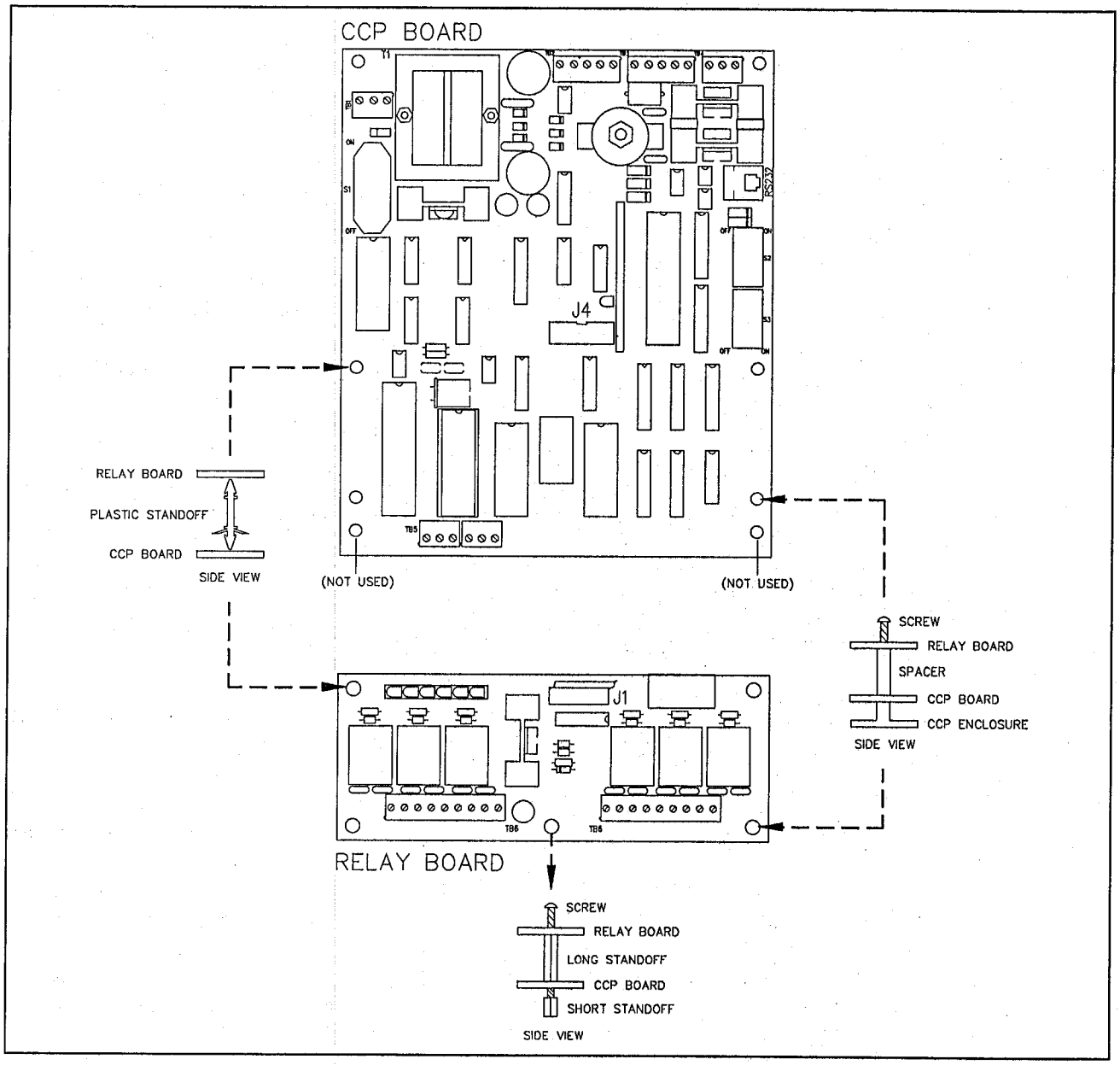
For all steps, refer to Figure 6 on the following page.

1. Remove the four screws holding the VariTrac II Central Control Panel PC board in the enclosure, and remove the board from the enclosure. (Two of these screws will not be reused.)
2. From the bag assembly, locate the long aluminum threaded standoff (3/4" with female threads both ends) and the short aluminum threaded standoff (3/8" with female threads on one end and male threads on the other).

   From the back of the CCP board, insert the male threaded end of the short aluminum standoff through the hole. Using the long standoff as a nut, thread the long standoff over the screw threads projecting through the hole, and tighten finger tight.
3. Locate the two 3/4" nylon standoffs with pressure fit tips. With the board component-side up, install the standoffs in the mounting holes on the CCP board. The end of the standoffs with "wings" should be toward the CCP board. The nylon standoffs should snap into place.

   Slip the top two mounting holes of the Relay Board over the extended plastic standoffs and push down until they snap into place. Be sure to support the CCP board from the bottom while pushing the Relay Board into place so you do not damage the board.
4. Plug the Relay Board cable (location J1) into the socket on the CCP board (location J4). Note the directional key at the top of the plug so the plug is inserted correctly in the socket. Use caution to prevent damage to the PC board when pushing on the cable plug.
5. From the bag assembly, locate the short screw. Thread the screw through the hole in the Relay Board and into the aluminum standoff installed in **Step 2.** Tighten to hold the Relay Board in place. Do not over-tighten.
6. Remount the CCP board in the enclosure using only the top two mounting holes and screws.
7. Locate the two 3/4", hollow aluminum spacers and the two 1-3/4" screws. Insert the spacers between the two PC boards at the lower left and lower right corners. Insert the long screws through the top Relay Board, through the spacer, and through the bottom CCP PC board, and into the plastic mounting hole in the enclosure base. Tighten to hold the entire assembly in place.

Figure 6
Installing Optional Relay Board



Connecting Output Wiring

IMPORTANT: All output wiring must comply with applicable electrical codes. Metal conduit may be required by local codes when running wires for the binary outputs.

Use only copper conductors for output wiring. The recommended wire size is 16-22 AWG. Do not run output wires in the same conduit or wire bundle with any AC power wires other than VariTrac II Central Control Panel 24 VAC power.

CAUTION: Running output wires in the same conduit or wire bundle with any AC power wires other than VariTrac II Central Control Panel 24 VAC power could cause the VariTrac II Central Control Panel to malfunction due to electrical noise.

For the VariTrac II Central Control Panel enclosure, the output wires should enter the cabinet through the conduit entry holes shown in Figure 4. Output wiring connections at the VariTrac II Central Control Panel are shown in Figure 7.

Binary Output Wiring

When the VariTrac II Central Control Panel is operating an HVAC system other than a Voyager Micro rooftop, the unit must be controlled using Binary Output relays. These relays are available when the optional relay board has been field-installed on the CCP.

Five binary outputs from the Central Control Panel are used to control the supply fan and up to two stages of cooling and two stages of heating at the air conditioning unit (three heat stages are available in heat pump application). A sixth binary output is available and may be used to enable/disable the economizer operation.

The wire from the air conditioning unit to the Central Control Panel consists of six wires, one from each stage of heating and cooling and the supply fan, and the "R" leg of the 24 VAC power source at the air conditioning unit.

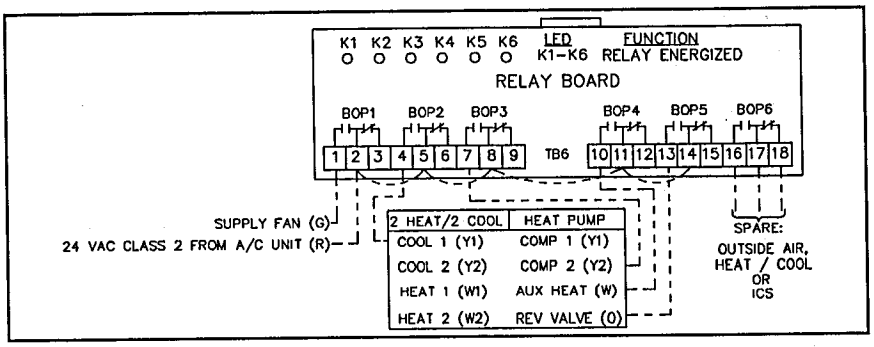
The "R" leg of the 24 VAC power source is terminated at terminal 2 on TB6 at the Central Control Panel and "daisy chained" to terminals 5, 8, 11, and 14.

The remaining wires are terminated per the diagram in Figure 7.

16-22 AWG wire is recommended. Use only copper conductors for binary output wiring.

Binary output relay contacts are rated at 24 VAC, 1 amp; 24 VA pilot duty.

Figure 7
Binary Output Wiring for Optional Relay Board



Connecting Communication Link Wiring

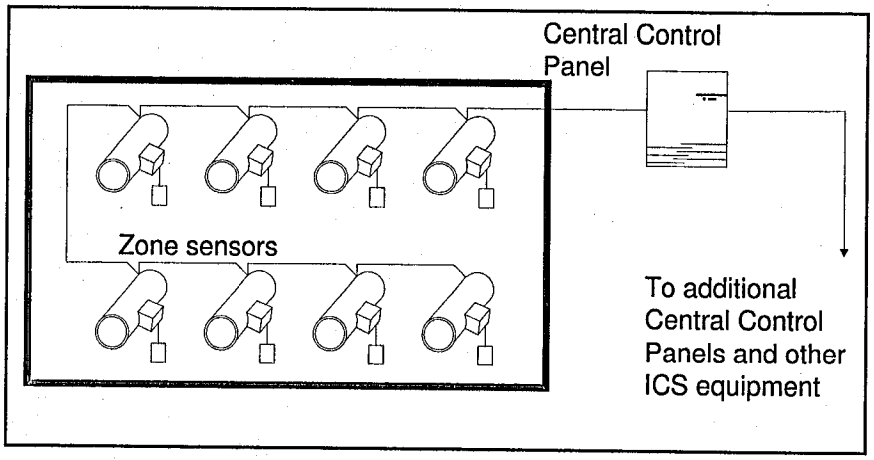
Field wiring for the communication link must meet the following requirements:

CAUTION: Connections between lengths of link wiring should be soldered and taped. In addition, if crimp connectors are used to connect to the UCM, the joint should be soldered. Wire nuts are not acceptable.

The VariTrac II Central Control Panel communication link (TB3-1, 2, and 3) is for communication from the VariTrac II Central Control Panel to UCM dampers and Voyager Rooftop units. Field wiring for the communication link must meet the following requirements.

1. All wiring must be in accordance with the National Electrical Code and local codes.
2. Communication link wiring must be 18 AWG twisted, shielded pair wire (meets or exceeds specifications for Trane 400-2028. See wiring specifications sections in this manual for further information).
3. At the VariTrac II Central Control Panel, the communication link wires must be connected to Terminals TB3-1 and TB3-2. Refer to Figure 9. It is important that you check the polarity for this connection.
4. The shield on the communication link wiring must be connected to TB3-3. At every junction, the shield should be spliced with the shield from the next section of communication link wiring and taped to prevent any contact between the shield and ground. At the end of the link, the shield should be cut and taped back.
5. The maximum total wire length is 5,000 feet for the communication link.
6. The communication link wiring cannot pass between buildings.
7. UCMs on the communication link can be connected in a "daisy chain" configuration. The daisy chain configuration is preferred over other wiring configurations because it is easier to solve communication problems by isolating portions of the communication link. However, star configurations are acceptable. See Figure 8 for an example of a daisy chain configuration.

Figure 8
Example of a Daisy Chain Configuration for Communication Link Wiring



8. Each Voyager Rooftop requires a Trane Communications Interface (TCI 3) board for connection to the VariTrac II Central Control Panel communication link.
9. Refer to the TCI 3 Installation Manual for more information on connecting a Voyager rooftop to the communication link.

Figure 9
UCM Communication Link Wiring

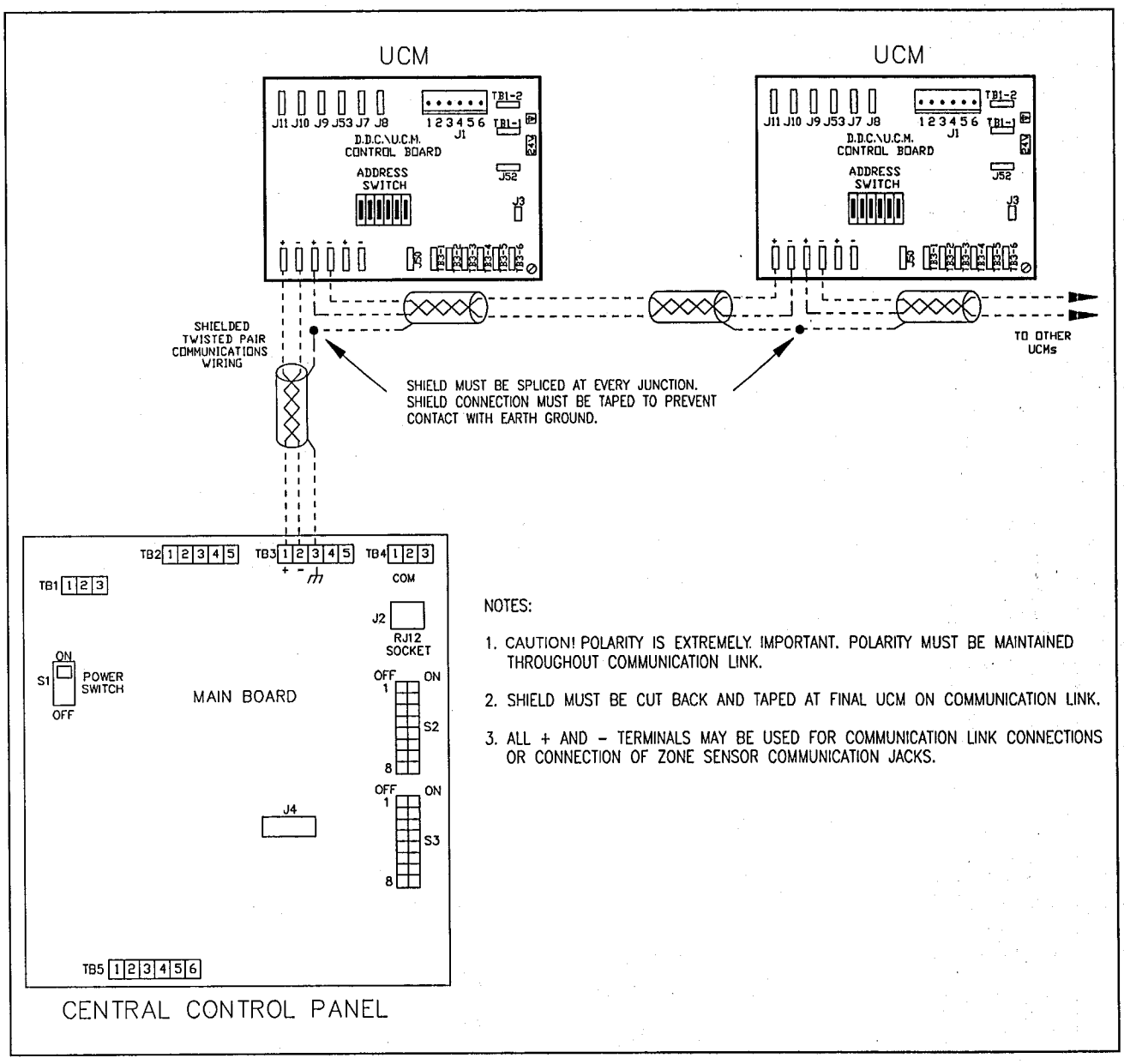
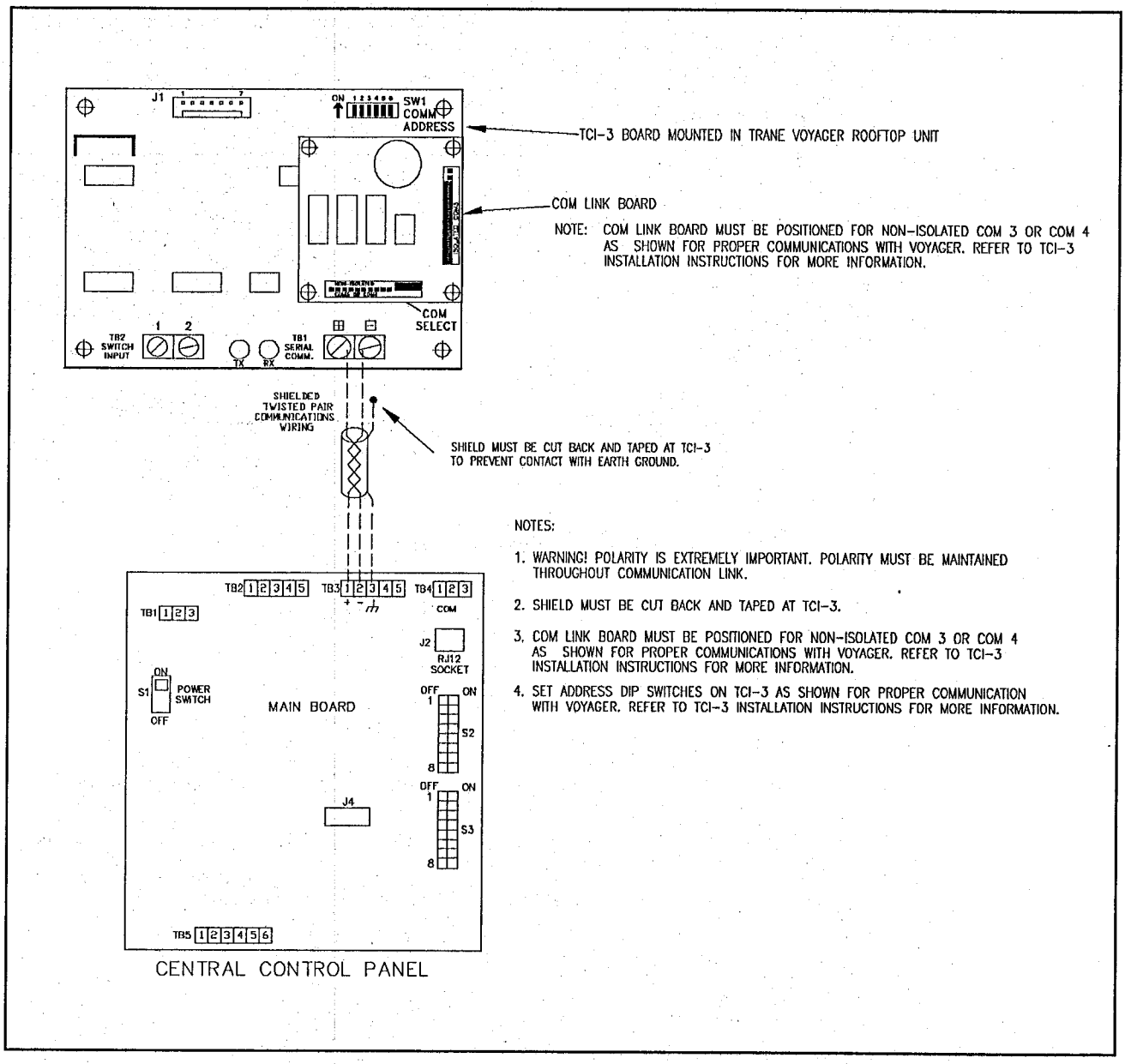


Figure 10
Voyager Communication Link Wiring



DIP Switch Settings (on TCI-3) for VariTrac II Central Control Panel

VariTrac II Central Control Panel	DIP Switch Settings					
	SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6
All	(See note)	**ON**	**ON**	**ON**	**ON**	**ON**

Note: *SW1-1 is used to enable (ON) or disable (OFF) the optional high temperature limit switch binary input (TB2 on the TCI board).*

Installing the System Temperature Sensor

Mounting the the System Temperature Sensor

The system temperature sensor should be located as near the discharge of the unit as possible.

A 3/8" hole must be drilled in the ductwork to insert the temperature sensor. Two sheet metal screws will secure it in place.

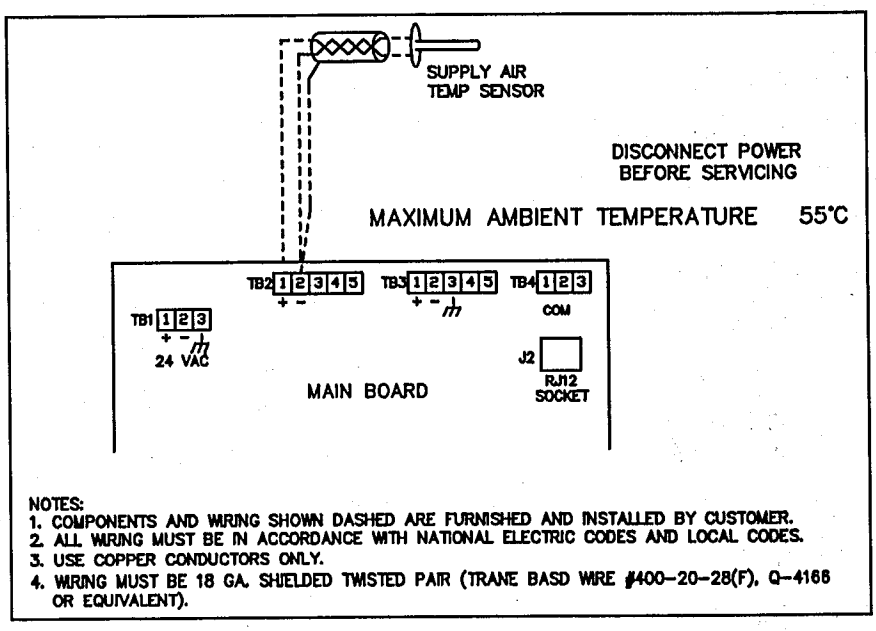
Connecting System Temperature Sensor Wiring

Since the velocity sensor will also be near this location, the two temperature sensor wires may be run over to the two unused terminals (4 and 5) in the velocity sensor control box.

This will allow for a single 5 conductor wire to be run from the velocity sensor back to the Central Control Panel. If this option is not desirable, the two sensor wires may be run directly to the Central Control Panel.

The shield at the temperature sensor must be taped. Connect the shield at the Central Control Panel to terminal TB2-2. See Figure 11.

Figure 11
System Temperature Sensor Wiring



IMPORTANT: Twisted, shielded pair wire is required for this temperature sensor wiring, and it is recommended that 18 gauge wire (meets or exceeds Trane wire specifications) be used. Use only stranded, tinned copper conductors. Do not run the temperature sensor wires in the same conduit or wire bundle with any AC power wires other than VariTrac II Central Control Panel 24 VAC power.

The maximum wire length for the temperature sensor wiring is limited to 300 feet because of possible electrical noise problems with longer runs.

Installing the System Velocity Sensor

The system velocity sensor should be located between the supply fan and the bypass dampers in the least turbulent location as possible. It is recommended that the distance between the sensor and the nearest upstream transition be 2 to 3 equivalent duct diameters.

CAUTION: A label on the sensor indicates the intended direction of airflow for sensing "velocity pressure." Reversing the flow sensor in the air stream will cause faulty system operation.

Mounting the System Velocity Sensor

If the supply duct branches out at the riser, install the velocity sensor in the largest supply duct.

A 3/8 inch hole in the duct work is required to insert the sensor. Secure the sensor with a minimum of 3 sheet metal screws.

Connecting System Velocity Sensor Wiring

As noted in *Installing System Temperature Sensor*, it is possible to run a single strand of 5 conductor wires to accommodate both the flow sensor and the temperature sensor.

IMPORTANT: 18/3AWG twisted shielded wire is required for the velocity sensor.

Converting the System Velocity Sensor to a Static Pressure Sensor

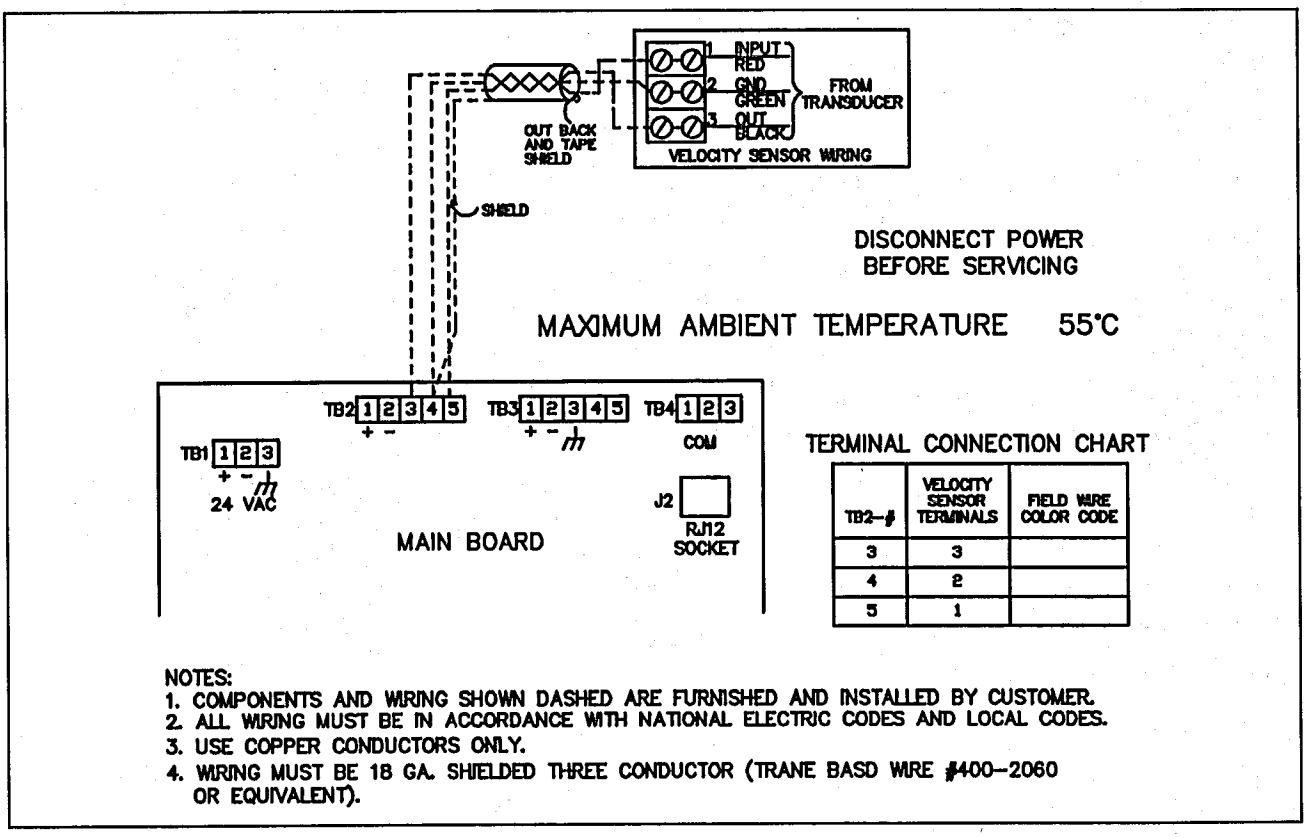
Velocity pressure sensing is the method of choice in a VariTrac system, because it shows proof of air flow across the HVAC unit, as well as providing the necessary information to position the bypass damper. If difficulty is encountered sensing velocity pressure because of air flow turbulence in the duct or other factors, the sensor and system can be converted to operate on static pressure using the same sensor.

To convert the system to static pressure:

1. Turn OFF the power to the VariTrac II Central Control Panel.
2. Turn DIP switch S2-6 to the ON position.
3. At the Velocity/Static pressure sensor:
   - Remove the sensor cover.
   - Remove the mounting screws holding the sensor to the duct.
   - Rotate the sensor 90 degrees in the duct so the "Velocity" air flow arrow is positioned at right angles to the actual air flow.
   - Remove the "LO" tube from the pressure transducer. Only the tube marked "HI" remains connected.
   - Replace the cover on the pressure sensor.
4. Turn ON the power to the VariTrac II Central Control Panel.

The system will now function using static pressure to position the bypass damper. No wiring changes are required.

Figure 12
System Velocity / Static Sensor Wiring



Installing Bypass Dampers

Mounting the the Bypass Dampers

The bypass damper(s) should be located before the first zone runout from the supply air duct.

Any VariTrac dampers or supply duct branches should be installed downstream of the bypass dampers. The distance between the bypass dampers and the velocity and temperature sensors should be 2-3 equivalent duct diameters.

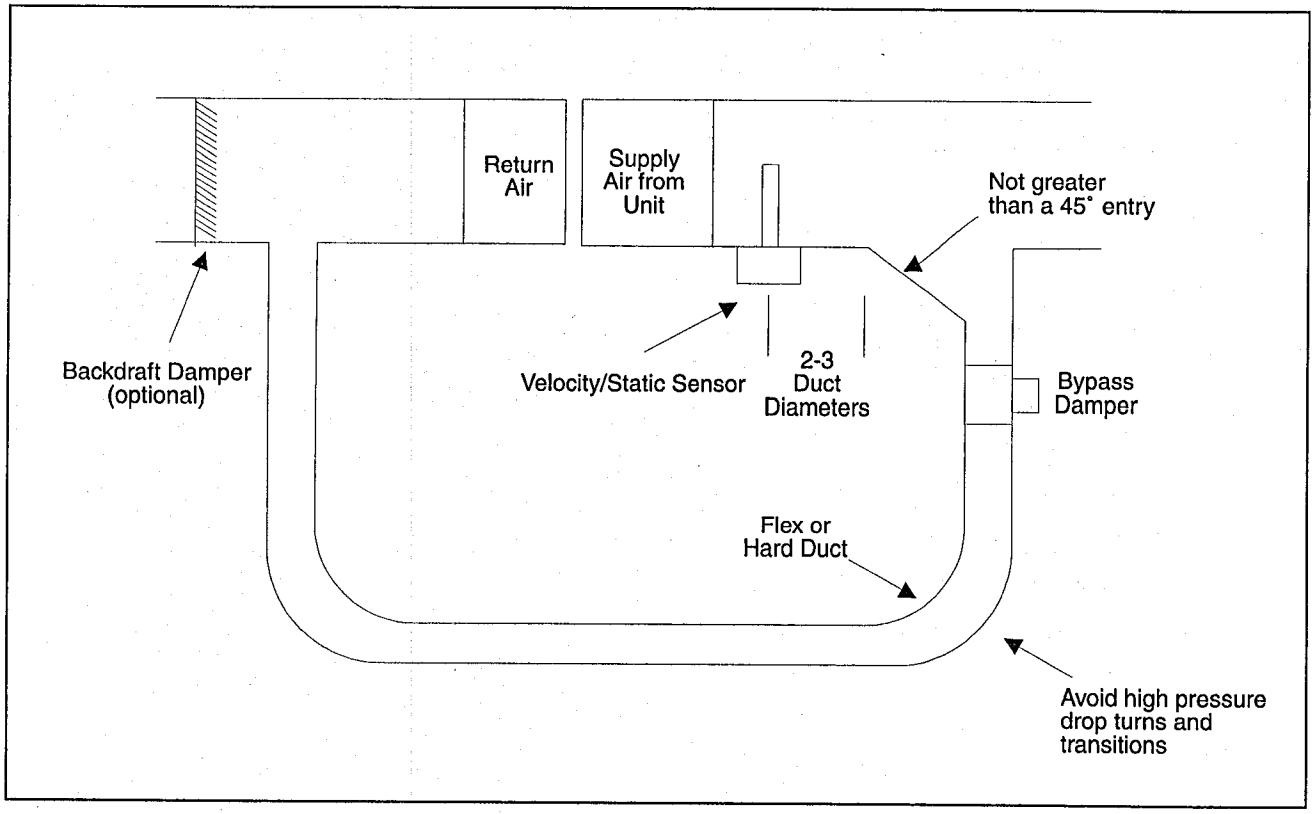
In a ducted return system, the bypass dampers will be ducted directly to the return air duct. It is recommended that the bypass damper(s) be connected to the main trunk with a 45 degree entry (see Figure 13).

In systems with plenum return, the bypass damper should be ducted into the return air riser. Confirm that enough relief or exhaust exists to prevent return plenum pressurization.

The bypass damper is differentiated from other dampers in the system by the absence of an electronic circuit board.

NOTE: The use of a relief fan or backdraft damper is strongly recommended in the return air system. This will prevent bypassed air from pressurizing the return air duct system and spilling out of the return grills into the conditioned space, especially when the unit is in the economizer mode.

Figure 13
Bypass Damper Installation



Connecting Bypass Damper Wiring

Wiring requirements are 3 conductors 16 - 20 AWG. Wiring connections are as shown in Figure 14.

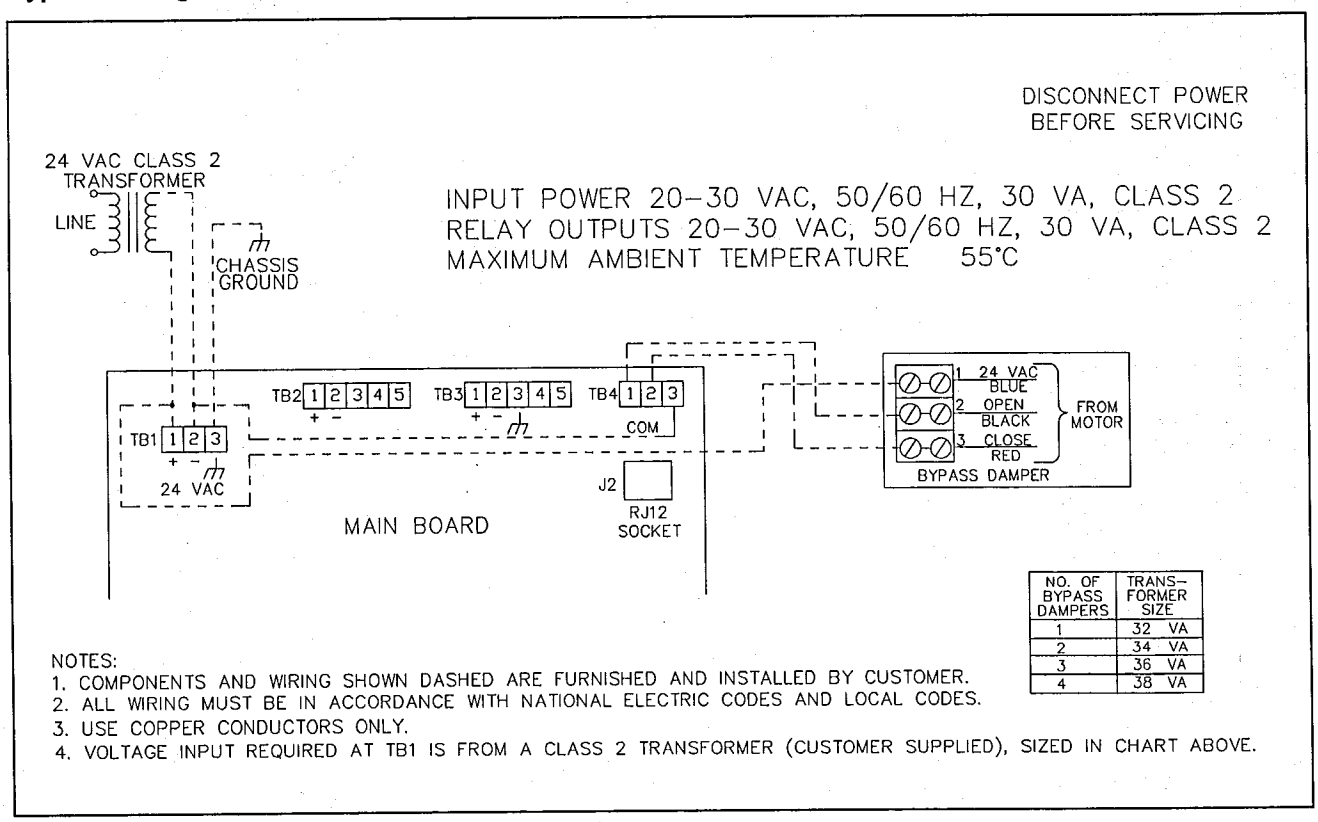
IMPORTANT: Multiple bypass dampers may be powered by the Central Control Panel. Power may be "slaved" from damper to damper. The bypass outputs at the Central Control Panel are rated at 24 VAC, 1.5 amp, 36 VA. Each bypass damper requres 2 VA at 24 VAC.

CAUTION: When hanging straps are used to support the damper, mounting screws must be located towards the ends of the damper. This is necessary to avoid interference with the rotating damper. A label attached to the dampers indicates the acceptable areas for mounting screws.

IMPORTANT: It is important to note the intended direction of air flow when installing the damper. A label for this is present on each damper assembly.

CAUTION: The control box on each bypass damper must be positioned to orient the drive shaft horizontally. Failure to do this may result in drive train malfunction (see Figure 16).

Figure 14
Bypass Wiring



Installing VariTrac Dampers

A sketch of the basic installation of the damper is shown in Figure 15. The damper may be connected to hard duct or flex duct at either ends. It is recommended to use flex duct on the discharge side of the damper.

CAUTION: When hanging straps are used to support the damper, mounting screws must be located towards the ends of the damper. This is necessary to avoid interference with the rotating damper. A label attached to the damper indicates the acceptable areas for mounting screws.

CAUTION: It is important to note the intended direction of air flow when installing the damper. A label for this is present on each damper assembly.

CAUTION: The control box on each damper must be positioned to orient the drive shaft horizontally. Failure to do this may result in drive train malfunction. (See Figure 16.)

Figure 15
VariTrac Damper Installation

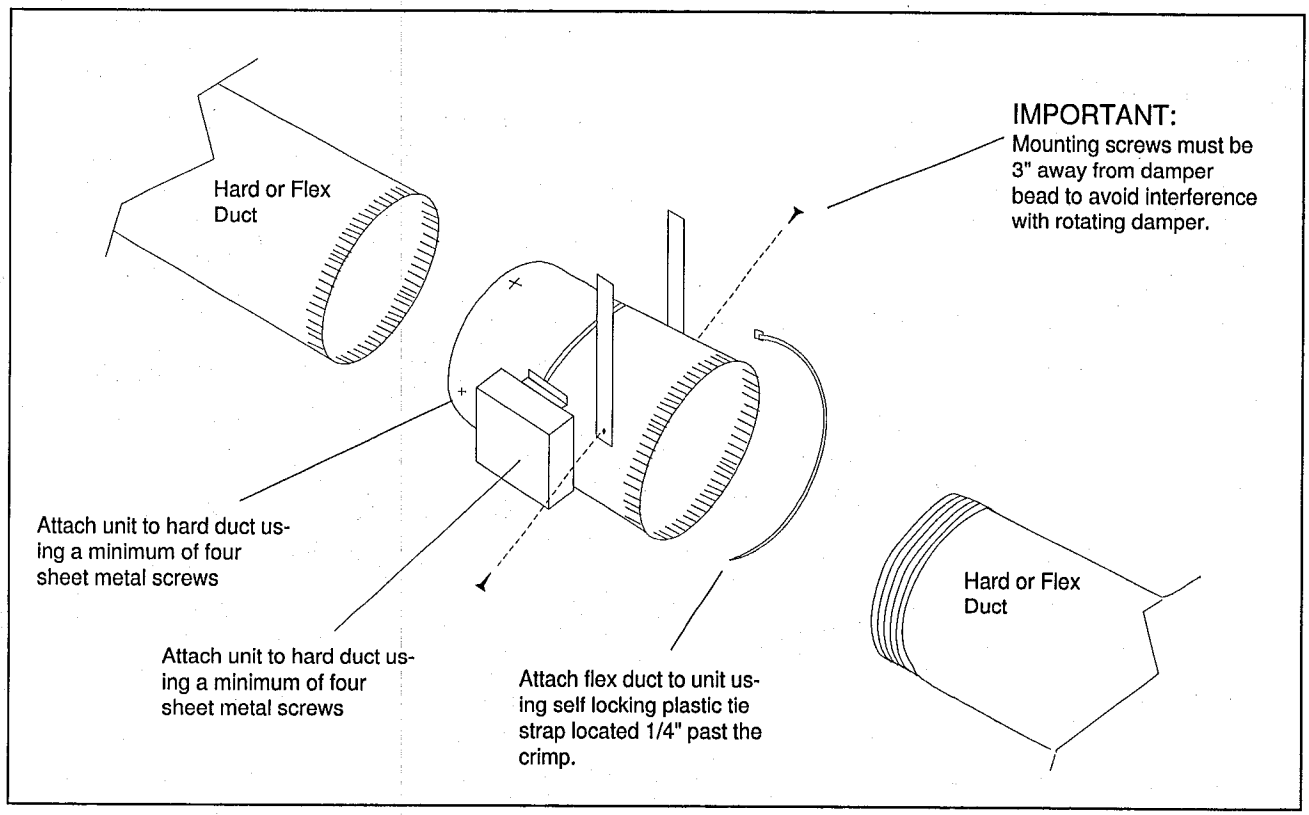
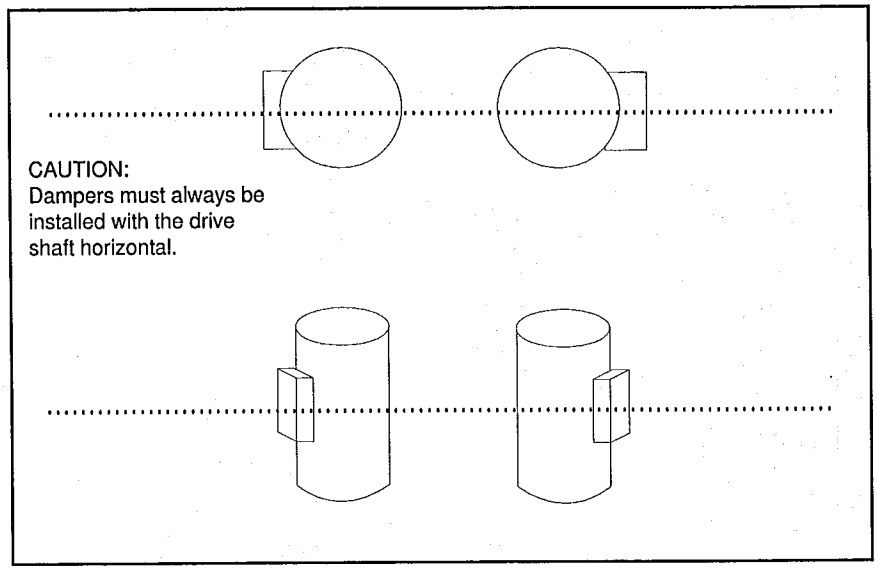


Figure 16
Proper Damper Mounting Positions



Connecting UCM Wiring

CAUTION: Use copper conductors only. The use of aluminum or other types of wire may result in overheating and equipment damage.

Connect the power to terminals 1 (+) and 2 (-) of TB1.

24 VAC is required to power the UCM control. Acceptable voltage tolerance is 20 VAC to 28 VAC.

Use 18 - 20 AWG for power wiring.

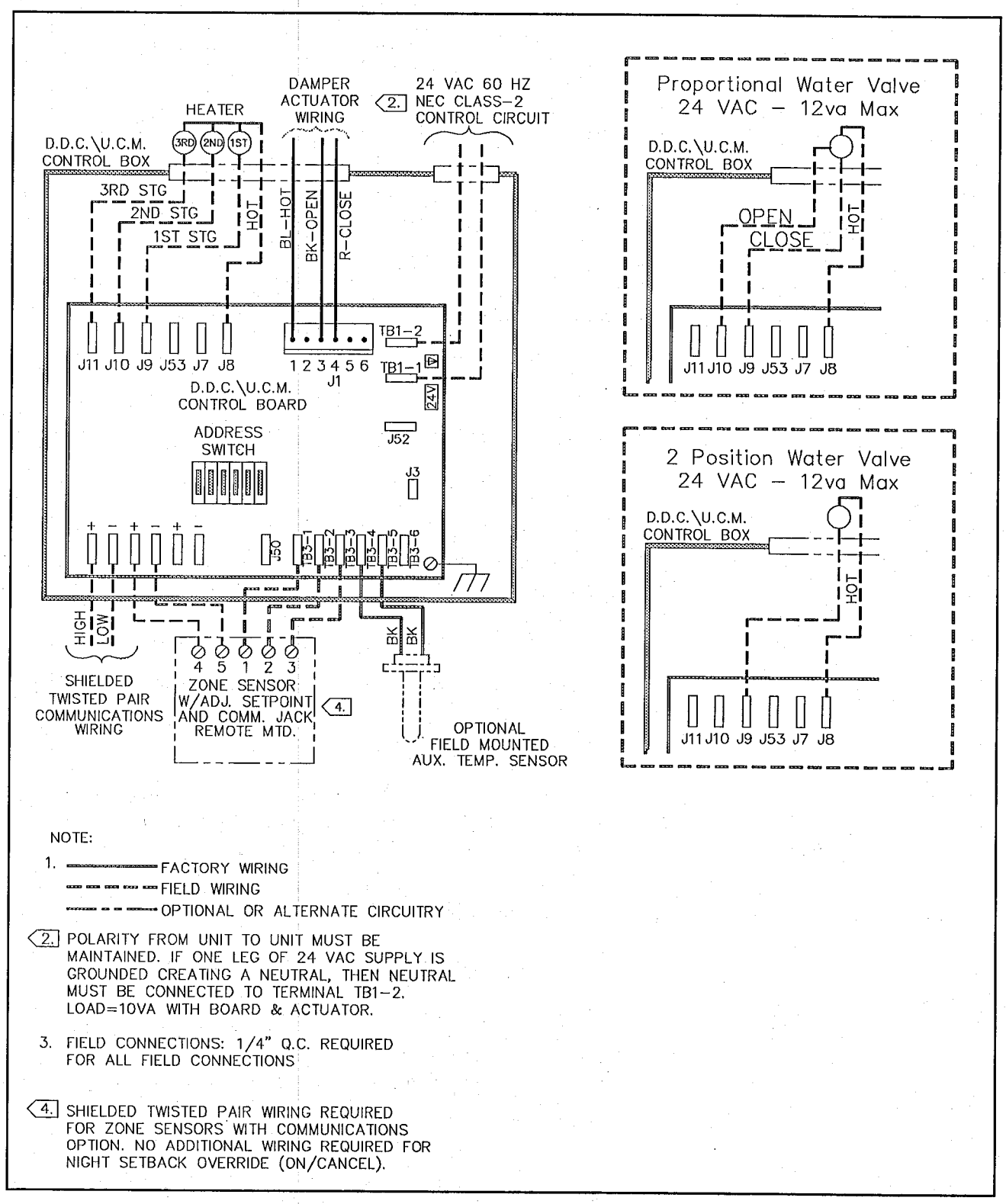
IMPORTANT: When powering multiple UCMs from one transformer, polarity must be maintained. Terminal 1 is designated positive (+) and terminal 2 is negative (-) to unit casing ground.

CAUTION: UCM control box cover must be replaced after field wiring to prevent any electromagnetic interference.

The power consumption for an auto-changeover, cooling only UCM (model CHGR) is 10 VA.

Units with reheat outputs (ELEC and NCHW) are rated at 10 V.A. maximum for each output. To determine the total UCM power requirements simply add the power consumption per stage to the circuit board power requirement (10 VA).

Figure 17
UCM Wiring



NOTE:

1. ——— FACTORY WIRING
   - - - - - FIELD WIRING
   ——— - - ——— OPTIONAL OR ALTERNATE CIRCUITRY

2. POLARITY FROM UNIT TO UNIT MUST BE MAINTAINED. IF ONE LEG OF 24 VAC SUPPLY IS GROUNDED CREATING A NEUTRAL, THEN NEUTRAL MUST BE CONNECTED TO TERMINAL TB1–2. LOAD=10VA WITH BOARD & ACTUATOR.

3. FIELD CONNECTIONS: 1/4" Q.C. REQUIRED FOR ALL FIELD CONNECTIONS

4. SHIELDED TWISTED PAIR WIRING REQUIRED FOR ZONE SENSORS WITH COMMUNICATIONS OPTION. NO ADDITIONAL WIRING REQUIRED FOR NIGHT SETBACK OVERRIDE (ON/CANCEL).

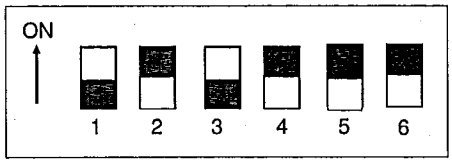
Setting UCM DIP Switches

Each device connected to the VariTrac II Central Control Panel must have its DIP switch set to a specific address. No two devices (of the same type) can have the same address. Table 3 lists the address settings for UCMs connected to the VariTrac II Central Control Panel.

Table 3
DIP Switch Settings for UCM Damper Addresses

UCM Number	DIP Switch Settings					
	1	2	3	4	5	6
01		ON	ON	ON	ON	ON
02	ON		ON	ON	ON	ON
03			ON	ON	ON	ON
04	ON	ON		ON	ON	ON
05		ON		ON	ON	ON
06	ON			ON	ON	ON
07				ON	ON	ON
08	ON	ON	ON		ON	ON
09		ON	ON		ON	ON
10	ON		ON		ON	ON
11			ON		ON	ON
12	ON	ON			ON	ON
13		ON			ON	ON
14	ON				ON	ON
15					ON	ON
16	ON	ON	ON	ON		ON
		= Off				

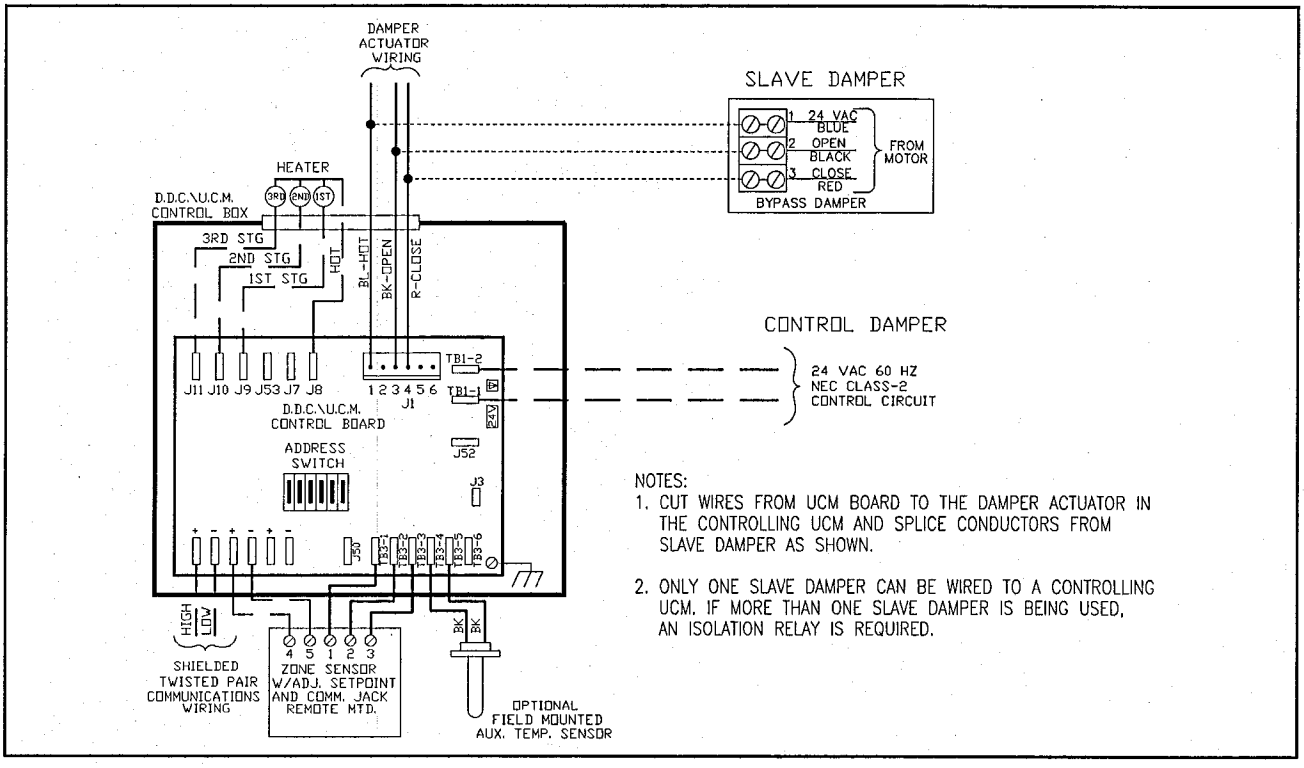
EXAMPLE—Address #5



Installing Slaved Dampers

In some applications it may be desirable to control an additional damper from a single UCM. This "slaved" damper does not require a UCM circuit board. For this reason a model BYPS damper is spliced directly to the outputs of the UCM controlling the primary damper. See Figure 18.

Figure 18
Wiring for Slaved Damper

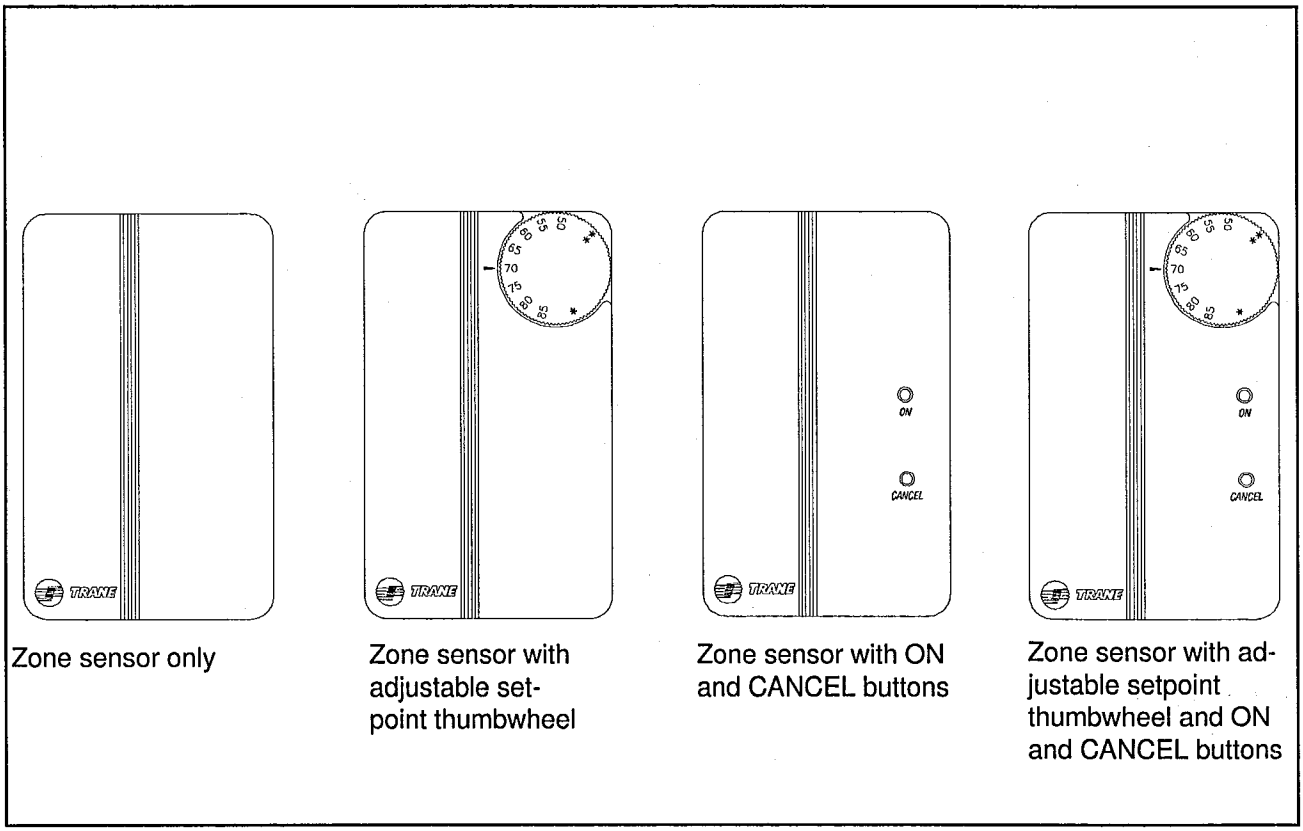


Installing Zone Temperature Sensors

Four zone temperature sensor options are available (see Figure 19):

- Zone sensor only
- Zone sensor with adjustable setpoint thumbwheel
- Zone sensor with ON and CANCEL buttons
- Zone sensor with adjustable setpoint thumbwheel and Timed Override, ON, and CANCEL buttons

Figure 19
Zone Sensor Options



Location

Proper location of the temperature sensor is crucial to maintain occupant comfort. Generally, the sensor should be placed in the most critical area of the zone where there is free circulation of air. It should be mounted on a flat interior surface, approximately 54" from the floor or as specified by the project plans and specifications.

Avoid locating sensors in the following places:

- where direct sunlight may fall on or near it
- in areas blanketed by air from diffusers
- on surfaces having an uncooled or unheated area behind them, such as an outside wall or the wall of an unoccupied storeroom

- near sources of heat, such as radiant heat from the sun, heat from equipment (appliances, computers, copiers, etc.), or heat from concealed pipes or chimneys
- in areas subject to drafts
- in dead spots behind doors, draperies, or in corners

Mounting the Zone Temperature Sensors

The zone temperature sensor consists of three basic parts: a base, a cover, and an adjustment knob (available only with externally adjustable versions).

Before mounting a zone temperature sensor, you must first remove the cover. Follow these steps to remove the zone temperature sensor cover:

1. Note the position of the adjustment knob (if present), then pull the knob out of the cover.
2. Using a small screwdriver, place the blade behind the knob and gently pry it from the cover.
3. Once the knob is removed, grasp the cover near the top and pull it away from the base.

After mounting a zone temperature sensor, you must replace the cover, and, if applicable the adjustment knob. Follow these steps to replace the zone temperature sensor cover:

1. Align the cover with the sides of the base
2. Press the cover directly toward the wall until it snaps into place.

To replace the adjustment knob:

1. Align the knob to the position noted prior to its removal.
2. Push the stem through the cover hole until the stem sits firmly in setpoint potentiometer VR3.
3. Turn the knob to ensure that it rotates freely through the entire range of temperature settings.

Wall Mounting

Follow these steps to mount the zone temperature sensor directly on a wall:

1. With the cover removed, feed the controller wires through the rectangular opening in the base of the sensor.
2. Ensuring that the base is level, position the back of the base over the wire entry in the wall.
3. Mark the centers of the two oblong mounting holes, then set aside the base.
4. At each of the marked location on the wall, drill a 3/16" diameter hole approximately 1" deep.
5. Insert a plastic anchor into each hole until they are firmly seated.
6. Feed the controller wires through the base, and fasten the base to the wall with the supplied mounting screws.
7. Connect the controller wires to TB1 on the temperature sensor (See Figure 20).
8. Replace the cover.

Junction Box Mounting

Follow these steps to mount the zone temperature sensor to a vertical Junction Box:

1. With the cover removed, feed the controller wires through the rectangular opening in the base of the sensor.
2. Using two #6-32 screws, fasten the base to the junction box's threaded mounting holes.
3. Connect the controller wires to TB1 on the temperature sensor (See Figure 20).
4. Replace the cover.

Junction Box Adapter Plate Mounting

Follow these steps to mount the zone temperature sensor to a horizontal Junction Box:

1. Select the appropriate mounting holes on Adapter Plate to match the box mounting holes. Perforate the selected mounting holes as well as the appropriate sensor mounting holes using a scratch awl or other sharp object. Route the wires through the hole in the mounting plate, and secure the plate to the box with the screws provided.
2. With the cover removed, feed the controller wires through the rectangular opening in the base of the sensor.
3. Using two screws supplied with the sensor, fasten the sensor base to the Adapter Plate.
4. Connect the controller wires to TB1 on the temperature sensor (See Figure 20).
5. Replace the cover.

Zone Temperature Sensor Wiring

Each unit must be controlled by a zone temperature sensor which is designed specifically for use with the UCM control. Field wiring for the zone temperature sensors must meet the following requirements.

Zone sensor wiring must be 18 AWG twisted (shielded).

1. Tape the shield of the zone temperature sensor wires back at the zone temperature sensor and connect the other end to terminal J-50 on the circuit board (ground).
2. Tape back the shield of the communication link (if used) at the zone temperature sensor and splice the other end into the adjoining communication link shield.

   If local codes require enclosed conductors, the zone temperature sensor wires should be installed in conduit. Do not route zone temperature sensor wires in conduit with 24 volt or any other high power conducting wires.

Depending on the zone temperature sensor options being used, a different number of conductors may be required to run from the UCM to the zone temperature sensor. The following table lists various options and number of wires required.

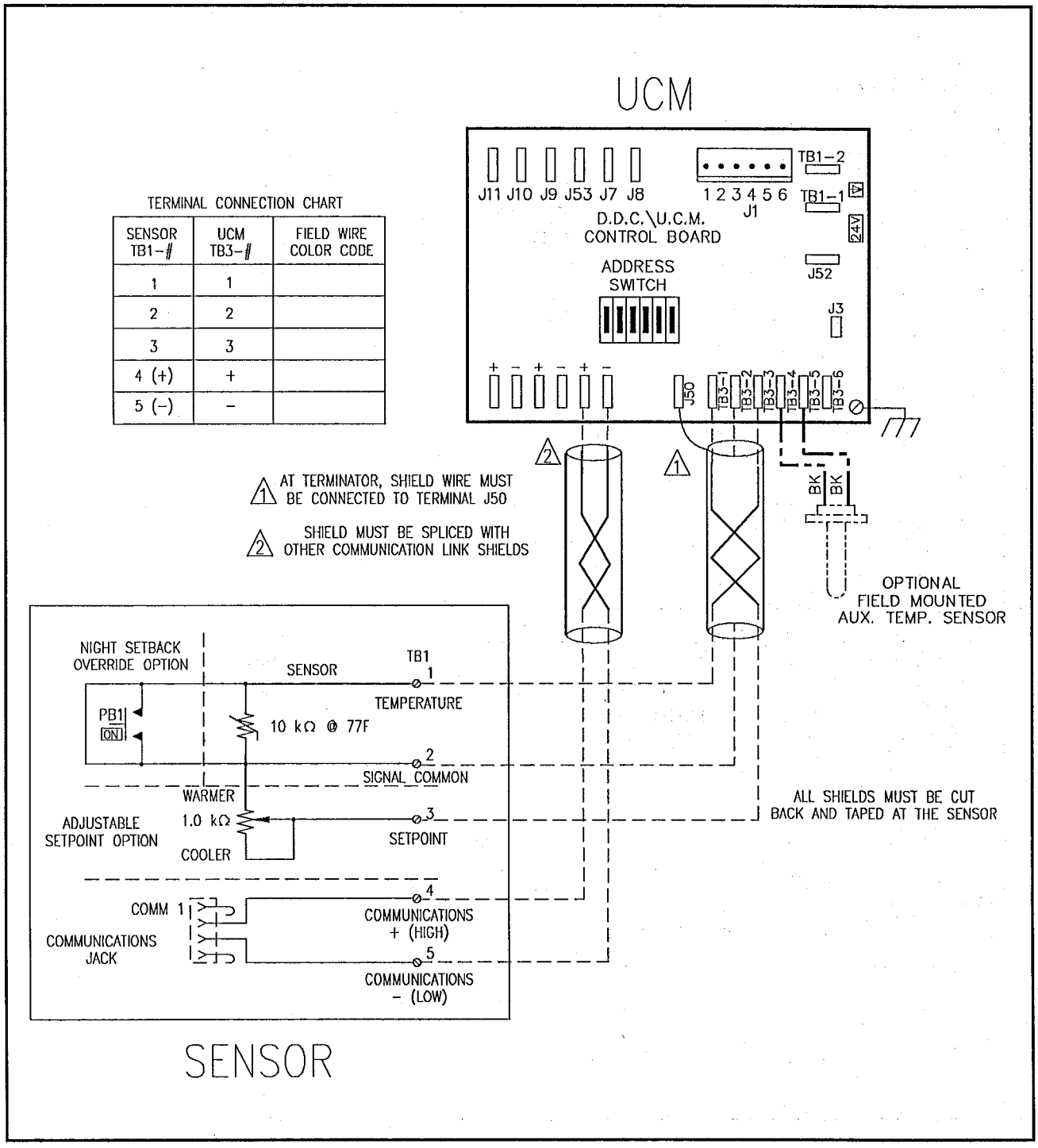
Table 4
Zone Sensor Options

Zone Sensor Option	Number of Wires Required*
Sensor only	2
Sensor with adjustable setpoint	3
Sensor with night setback override and cancel buttons	2
Sensor with adjustable setpoint and night setback override and cancel buttons	3

NOTE: Wire must be 18 AWG twisted (shielded).

** NOTE: Some sensors have a communication jack available as an option. If these jacks are to be used, they must be wired to the UCM using a* ***separate*** *two-conductor, shielded cable that meets the specification for communication link wiring. The communication jacks do not need to be wired for the system to operate properly.*

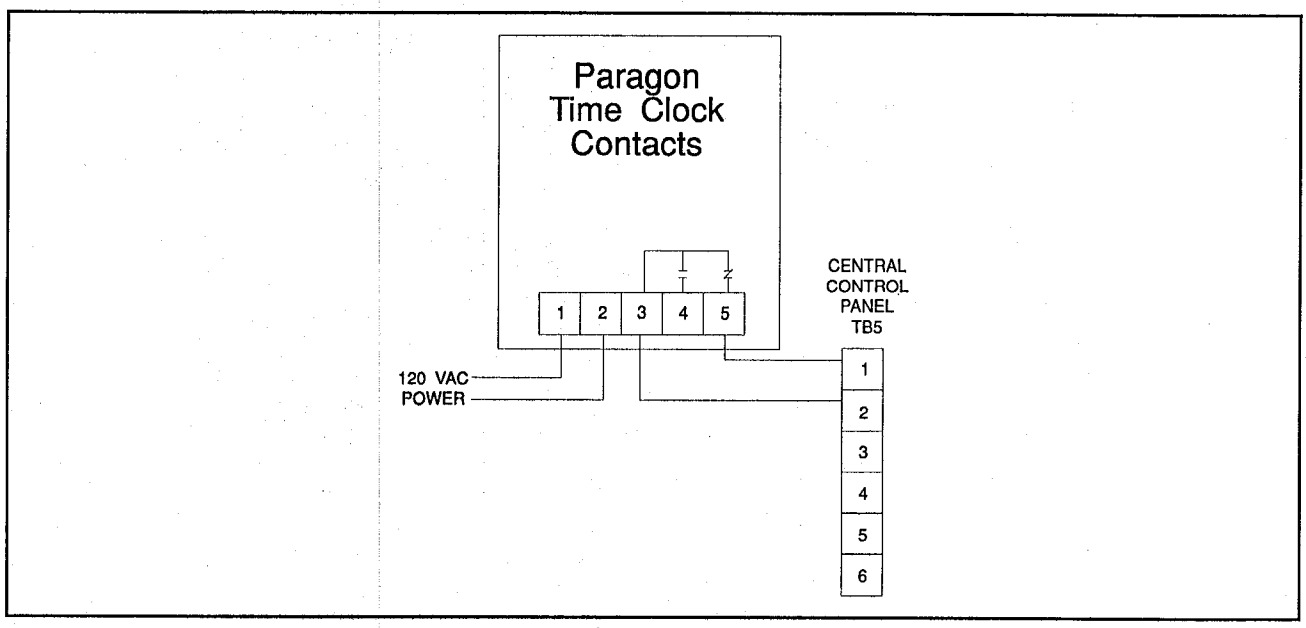
Figure 20
Zone Temperature Sensor Controller Wiring

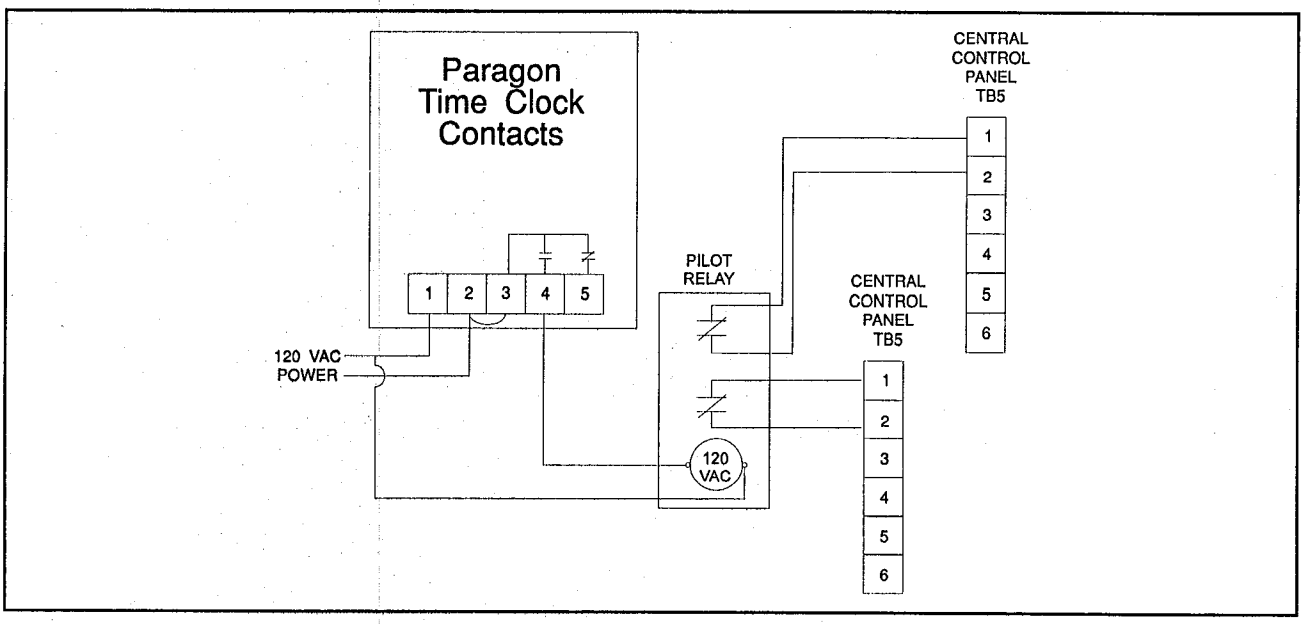


Time Clock Wiring

An optional Paragon EC 7000 programmable time clock is available to provide an occupied/unoccupied binary input to the *Central Control Panel. The time clock may be utilized as a 24 hour or 7 day control. In some applications it may be necessary to control more than one Central Control Panel from a single time clock.*

Figure 21
Time Clock Wiring

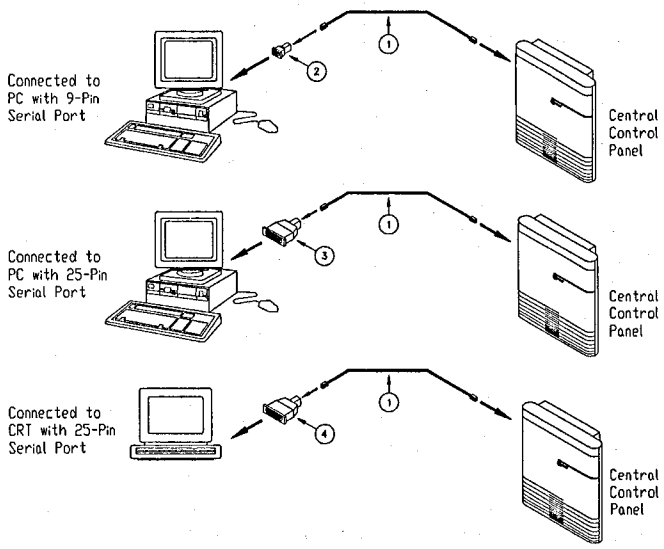




Connecting Edit Devices

A PC running terminal emulation software or a CRT may be connected directly to a Central Control Panel for editing. Figure 22 indicates the proper adapter and cables for connecting edit terminal devices.

Figure 22
Modular Adapters, Cable, and Connections for Edit Terminal (RS-232) Communication Devices



#	Part No.	Description
1	35914260	RJ-12 to RJ-12 Cable *
2	35914262	Adapter: 9 Pin Female (PC)
3	35914263	Adapter: 25 Pin Female (PC)
4	35914264	Adapter: 25 Pin Male (Edit Terminal)

** **Cable Note:** This is **not** a regular phone cable. Common twisted telephone cable will not work in this application.*

NOTE: All cable part numbers are included in the Edit Terminal Cable Kit.

Setting Edit Devices

When a CRT terminal or PC with dumb terminal emulation software is used with the VariTrac II Central Control Panel, the baud rate must match that which is set in the VariTrac II Central Control Panel memory. The baud rate is the rate of data exchange between the VariTrac II Central Control Panel and the external device. The VariTrac II Central Control Panel and the external device must have the same baud rate setting.

The default baud rate of the VariTrac II Central Control Panel edit terminal port is 1200. Available baud rates for the VariTrac II Central Control Panel are 300, 1200, 2400, 4800, and 9600. Use the highest baud rate that is common to both the VariTrac II Central Control Panel and the external device. Refer to the operator's manual supplied with the external device to determine the baud rates that are available.

Other communications interface functions may also have to be set on the external device. Some of these functions and settings are listed in Table 5.

NOTE: DIP switch S2-7 can be used to help establish communications with a VariTrac II Central Control Panel where the current baud rate setting is unknown. When switch S2-7 is place in the ON position, the Central Control Panel will be set to 1200 baud, regardless of the edited value.

Table 5
Edit Terminal Device Settings

Function	Setting
Baud Rate	Same as VariTrac II Central Control Panel
Half or Full Duplex	Full Duplex
Parity	0, Space, None
Upper/Lower Case	Upper Case Only
Auto Line Feed	Off
Number of Data Bits	8

Connecting Modem Devices

Remote communications with a VariTrac II Central Control Panel can be accomplished through a Trane Building Management System if one exists, or with a stand-alone modem attached to a single Central Control Panel via the RS-232 port.

It is recommended that a Trane-supplied 14,400 baud US Robotics Sportster fax/data external modem be used for VariTrac II Central Control Panel applications. The 14,400 baud modems require hardware and software configurations for use with the Central Control Panel. See the VariTrac II Central Control Panel Operator's Guide VADA-OG-2 for modem configuration details. Physical connection of the modem to the VariTrac II Central Control Panel is shown in Figures 23 and 24.

Figure 23
Typical VariTrac II Central Control Panel Remote Interface Communication Connections

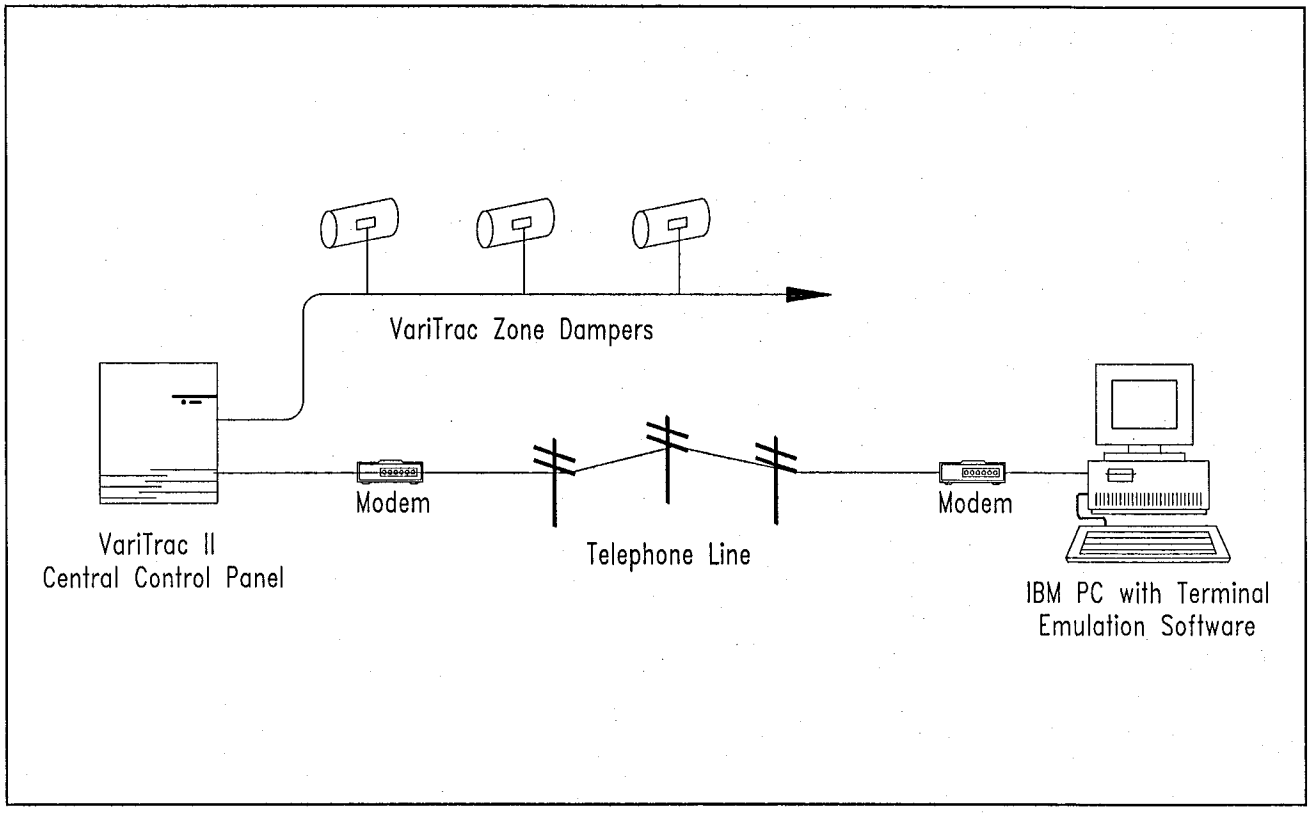
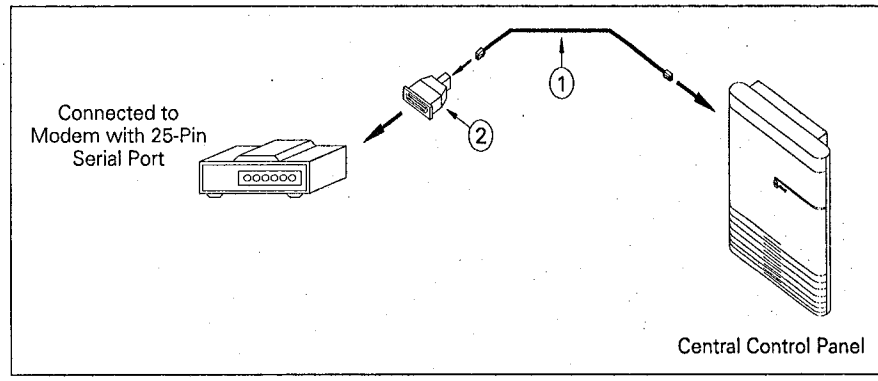


Figure 24
Modular Adapters, Cable, and Connections for External Modems



#	Part No.	Description
1	35914260	RJ-12 to RJ-12 Cable *
2	35914269	Adapter: 25 Pin Male (Modem)

** **Cable Note:** This is **not** a regular phone cable. Common twisted telephone cable will not work in this application.*

NOTE: All cable part numbers are included in the Edit Terminal Cable Kit.

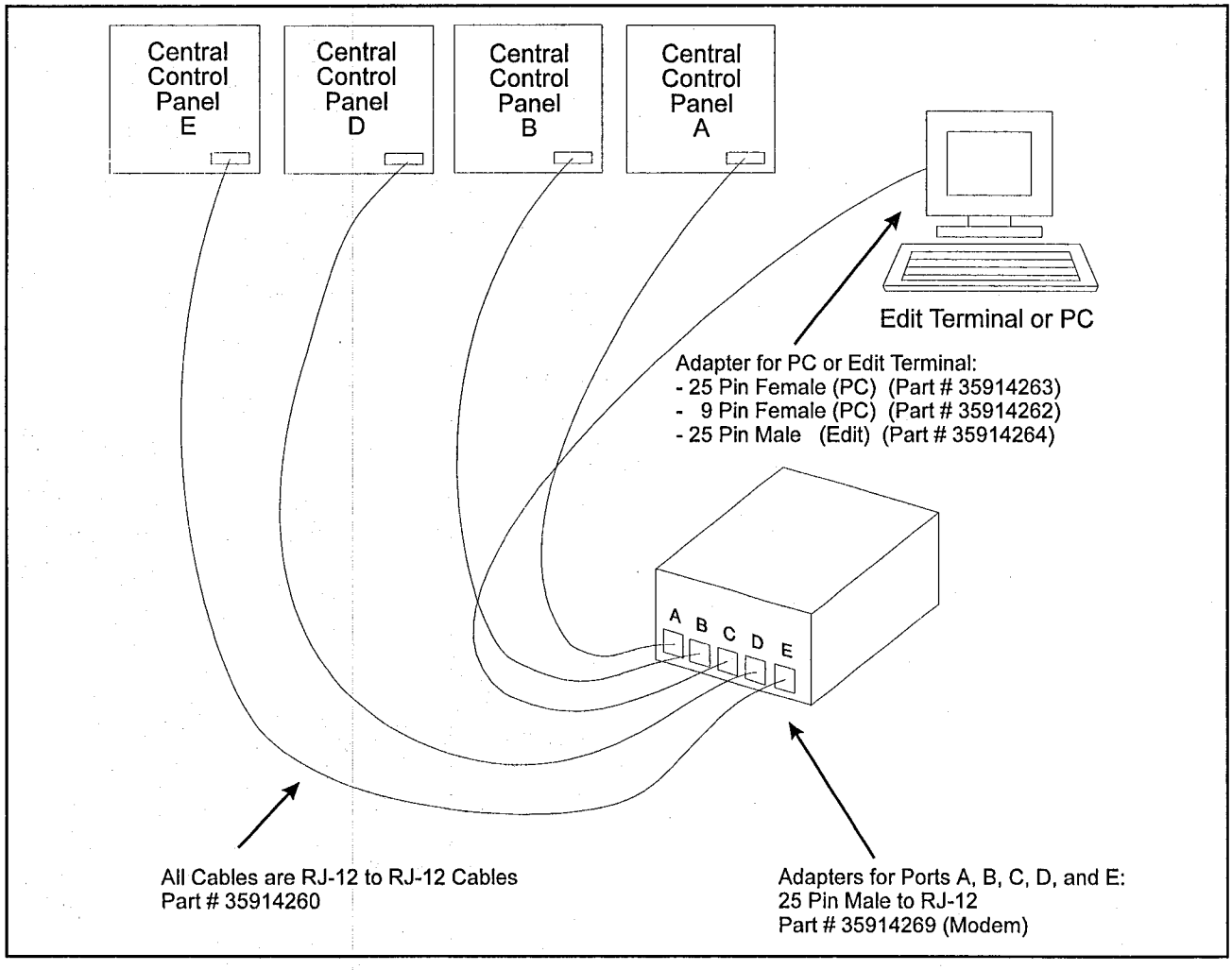
Central Control Panels with ABCDE Switch (Optional)

An optional switch box is available to allow up to four Central Control Panels to connect to a single terminal. The switch allows you to manually change between Central Control Panels by rotating a knob on the face of the ABCDE box. The ports on the switch box are computer style DB-25 Female. Special adapters and cables are required to allow connection of these ports to the RJ-12 style connector on the VariTrac II Central Control Panel. The adapters and cables are available in the "VariTrac II Edit Terminal Cable Kit." Cable and adapter configurations are shown in Figure 25.

NOTE: The maximum cable length from the terminal to the Central Control Panel is 50 feet whether an ABCDE switch is used or not.

NOTE: If the terminal is replaced by a modem, then all adapters must be modem adapters.

Figure 25
ABCDE Switch Wiring



NOTE: All cable part #s are included in the Edit Terminal Cable Kit.

STAT 4

A Stat 4 Operators Panel is available to provide monitoring and control of VariTrac systems and UCM zones from one central location. Up to two VariTrac II Central Control Panels can be connected to the Stat 4.

The Stat 4 provides a 2 line by 40 character screen to display operator information, and an easy to use 16 button keypad for system control. The Stat 4 will add the following capabilities to the VariTrac system:

Setpoint Control

Stat 4 allows an operator to control setpoints for each UCM connected to the system. Setpoints are maintained during a power outage without the use of batteries. Available setpoints for all VariTrac zones are as follows:

- Occupied Heat Setpoint
- Unoccupied Heat Setpoint
- Occupied Cool Setpoint
- Unoccupied Cool Setpoint

VariTrac II Group Scheduling

The UCM zones on a VariTrac II system can be scheduled in groups. The zones are assigned to their "Groups" by their communications dip switch address setting done during installation and commissioning of the VariTrac II Central Control Panel. A total of four groups are available.

Daylight Saving Time

Stat 4 automatically implements daylight saving time and leap year changes.

Holiday Dates- Up to 24 holiday dates can be defined for the Stat 4 system.

Timed Override

A group can be placed into occupied setpoints for two hours using the Stat 4 keypad.

Optimal Start

VariTrac groups will be optimally started based on a degrees per hour ramp.

Alarms

Temperature and system failure alarms are indicated on the Stat 4 display screen. Voyager Rooftop unit alarms will also be displayed.

Alarm Log

The Stat 4 maintains an Alarm Log of the last 32 alarms.

Password Security

The Stat 4 front panel is guarded by a password.

Auto-logoff

If there are no key hits on the front panel for five minutes Stat 4 will be logged off .

Installation Checklist

Complete this checklist as the VariTrac II Central Control Panel is installed to verify that all recommended installation procedures are accomplished before the unit is started. This checklist does not replace the detailed instructions provided in the manual. Read the entire manual carefully to become familiar with the installation procedures before installing the unit.

Shipment

☐ VariTrac II Central Control Panel inspected for shipping damage and claim filed, if necessary.

☐ Zone dampers and accessories inspected for shipping damage and claim filed, if necessary.

Unit Location

☐ VariTrac II Central Control Panel installed in environment that meets temperature and humidity requirements.

☐ VariTrac II Central Control Panel securely mounted on wall at an accessible level.

☐ Proper clearances around VariTrac II Central Control Panel.

AC Power Wiring

☐ Field installed AC power wiring complies with all applicable codes.

☐ 24 VAC line from dedicated class 2 transformer connected to VariTrac II Central Control Panel at TB1.

☐ Voltage measured at TB1-1 to TB1-2 is 20 to 30 VAC.

☐ Assure that a reliable earth ground has been attached to TB1-3.

Installing the Supply Air Temperature Sensor

☐ Supply air temperature sensor properly mounted in supply duct.

☐ Shielded cable properly connected at sensor and routed back to VariTrac II Central Control Panel.

☐ If Voyager rooftop is being used, Voyager mixed air sensor has been relocated to supply air.

Installing System Velocity/Static Sensor

☐ Velocity/static pressure sensor properly located and mounted in supply duct per instructions.

☐ Velocity/static pressure sensor correctly oriented in duct vs. airflow direction.

☐ Shielded cable properly connected at sensor and routed back to VariTrac II Central Control Panel.

Installing Bypass Dampers

☐ Bypass damper(s) properly installed between supply/return ductwork per instructions.

☐ Low voltage cable properly connected at dampers and routed back to VariTrac II Central Control Panel.

Installing and Setting External Devices

- ☐ Optional time clock and system status panel and switches mounted per instructions.
- ☐ Low voltage wiring routed back to VariTrac II Central Control Panel for termination.
- ☐ Edit terminal or modem properly installed and configured.

Input Wiring

- ☐ Field installed input wiring complies with all applicable codes.
- ☐ Temperature sensor is installed with twisted, shielded pair wiring and terminated at TB2-1 and TB2-2 on the Central Control Panel.
- ☐ Velocity/pressure sensor is installed with twisted, shielded three-conductor wiring and terminated at TB2-3, TB2-4, and TB2-5.
- ☐ Optional time clock and system switches terminated at TB5-1 through TB5-6 per instructions.

Output Wiring

- ☐ Field installed output wiring complies with all applicable codes.
- ☐ Wiring not in same conduit with line voltage.
- ☐ Bypass damper wiring properly terminated at TB4-1, TB4-2, and TB1-1.
- ☐ If optional field-installed relay board is used, unit wiring is properly terminated at terminals TB6-1 through TB6-18 per correct diagram.

Setting DIP Switches

- ☐ Dip switch S2-1 through S2-5 set to OFF unless Integrated Comfort™ System system is being used for control. (See ICS installation sheets for correct setting if ICS is being used.)
- ☐ Dip switch S2-6 properly set for velocity control or static pressure control.
- ☐ Dip switch S2-8 set to OFF for normal operation.
- ☐ Dip switch S3-7 set to proper position for heat pump vs. 2 Heat/2 Cool operation.
- ☐ Dip switch S3-8 set to OFF for normal operation unless compressor lockout is desired. (See Compressor Lockout section of this manual for instructions.)

Installing VariTrac Dampers

- ☐ UCM dampers mounted and secure according to recommendations.

Installing Zone Temperature Sensors

- ☐ Sensors are properly mounted per instructions and in the correct space.

☐ Shielded sensor wiring properly terminated at the zone sensor and routed to the correct UCM damper. Sensor wire shield should be cut and taped to prevent contact with earth ground.

Connecting UCM Wiring

☐ UCM power is properly wired to TB1-1 and TB1-2. Note that TB1-2 is COMMON (case ground) if grounded secondary transformers are being used. Confirm polarity from one UCM to the next if more than one UCM is being powered from a single transformer.

☐ Confirm acceptable voltage present between 20 VAC and 28 VAC.

☐ Ensure that the sensor is properly terminated at terminals TB3-1, TB3-2, and TB3-3.

☐ If optional remote heat is being used, confirm wiring per appropriate diagram.

Communication Link Wiring

☐ Field installed communications wiring complies with all applicable codes.

☐ VariTrac II Central Control Panel communication link wiring to UCMs is connected at TB3-1, TB3-2, and TB3-3 on the Central Control Panel.

☐ Communication link wire shields spliced at each device junction and taped to prevent contact with earth ground.

System Start-Up & Checkout

Prepower-Up Checkout—Central Control Panel

Before powering the Central Control Panel it is recommended that the following checks be made in order to prevent damage to the system components.

1. Measure the supply voltage to the Central Control Panel TB1-1 and TB1-2. The supply voltage should be between 20 VAC and 30 VAC.
2. Check to make sure that the bypass damper is wired as detailed in the Installation and Wiring section of this manual.
3. Assure that a reliable ground has been attached to TB1-3 on the Central Control Panel.
4. Check the UCM communication link to assure that the wire designated as (+) is connected to the TB3-1 and the wire designated as (-) is terminated at the TB3-2. The shield must be connected to TB3-3.
5. Check to be sure that the discharge air temperature sensor is wired to TB2-1 and TB2-2. Additionally, the shield should be terminated to TB2-2.
6. Check to be sure the velocity/static sensor has been correctly wired as detailed in the Installation and Wiring section of this manual.
7. Verify the proper setting of the Central Control Panel S2 and S3 dip switches. If the switch is set incorrectly it will cause improper operation of the Central Control Panel. See the Installation and Wiring section of this manual for more details.
8. WARNING! The following tests should not be performed until all people and equipment are clear of the air conditioning unit.

If the air conditioning unit is being controlled by the optional field installed relay board, check the operation of the supply fan and heating and cooling stages. To do this, jumper the appropriate terminals of the binary output terminal block TB6. Performing this check assures that the wires have been properly terminated at the Central Control Panel and that the air conditioning unit is operational.

Prepower-Up Checkout—UCM

1. Verify that the damper has been installed with the drive shaft in the horizontal position. This is necessary to prevent damage to the drive assembly. See the Installation and Wiring section of this manual for more details.
2. If hanging straps are used, check to assure that all mounting screws are a minimum of three inches away from the center damper bead. This is necessary to allow full rotation of the damper.
3. Check the supply voltage at TB1-1 and TB1-2. Polarity is important, notice that TB1-1 is designated (+) and TB1-2 is designated (-) to unit casing ground. The acceptable voltage present is 20 VAC to 28 VAC.
4. Verify that communications wiring has properly been terminated at TB2-1 (+) and TB2-2 (-). Polarity is important.
5. Verify that zone sensor connections are correct as detailed in the Installation and Wiring section of this manual.
6. Verify that the proper unit address has been set on each UCM.

Power-Up Sequence Occupied Mode

After the system is completely wired and installed it will be ready for the initial power-up. Upon power-up the Central Control Panel and UCMs will initiate the following sequence of events.

1. Turn the power switch on the Central Control Panel on.
2. The LEDs on the Central Control Panel labeled OPN, CLS, DG, AND CR16 will light up. OPN LED will go off indicating a successful RAM test. The CLS LED will go off indicating a successful Operating ROM test. The DG and CR16 LEDs will go off indicating a successful Program ROM test. The DG LED will begin to blink at a steady rate to indicate all is well. The CR16 LED will remain lit only if one or more of the VariTrac II Central Control Panel BIPs on terminal strip TB5 is closed, or if the supply air temperature sensor is shorted.
3. The main menu will be displayed on the screen.
4. The UCM LEDs on the Central Control Panel labeled UTX (Transmit) and URX (Receive) will alternate rapidly during the scan of the UCMs. After the scan is complete, the UTX LED will go on and off approximately once per second.
5. This is a good time to display the SERVICE MENU to identify any UCMs on the loop that may not be communicating. (See the COMMUNICATION WIRING CHECKOUT section of this section for details). It is only necessary for one UCM on the communications loop to be communicating for the Central Control Panel start-up sequence to begin.
6. The CCP prepares for velocity/static calibration. At least one UCM must be communicating for the Central Control Panel to operate. UCMs begin driving open to perform their position calibration.
7. After 3 minutes, UCMs are driven to maximum position, and the bypass begins to close.
8. The "zero flow" voltage reading is taken with the fan off.
9. System fan is turned on for 45 seconds.
10. High flow velocity sensor voltage is taken and stored in the Central Control Panel.
11. The bypass damper is then driven to 50% and released and the UCMs are released from their MAX flow position.
12. UCM scan is made, and heating/cooling callers are established.
13. Fan will remain on if edited to occupied fan mode "on".
14. Fan will energize if occupied fan mode is edited to "auto" and sufficient requests are present.
15. The control action of each UCM changes as appropriate.
16. Heating or cooling is staged appropriately.

Unoccupied Mode Sequence

Each time the Central Control Panel enters the unoccupied mode a velocity sensor self-calibration sequence similar to the one that takes place upon power up is initiated.

Powering Down the System

Whenever it is necessary to perform service work on the air conditioning unit, the Central Control Panel power must be turned off. This is necessary to avoid the unnecessary tagging of zones and avoiding personal injury.

UCM LEDs

The UCM has a red and yellow LED on the circuit board which can be used to help diagnoses communication or circuit board problems. The conditions indicated by the LEDs are as follows:

Red LED

"ON" - normal operation.

"OFF" - No 24 VAC power, or defective board.

"BLINKING" - defective board.

Yellow LED

"ON" - reversed communication link polarity.

"SLOW BLINK" - indicates communication on the link not intended for that particular UCM.

"FAST BLINK" - indicates the UCM was communicated with by the Central Control Panel and responded back.

"OFF" - no communication activity present on the communication link.

Displayed Failures

At power-up the Central Control Panel performs a self-check of several system components. If a failure is recognized it will be displayed in the AHU Status menu.

Velocity Sensor Calibration Failure

If a velocity sensor calibration failure is determined, the Central Control Panel will:

- While using velocity control, the previous Zero Flow and 100% Flow reference values will be used. If no stored values exist, 0.25 VDC will be used as the Zero Flow value.

- While using static pressure control, the previous Zero Static and Reference Static values will be used. If no previous values exist, 0.25 VDC will be used as the default Zero Static value and 1.00 IN (delta voltage = 0.75 VDC) will be used as the reference static pressure.

The zone dampers will continue to control normally. A failed calibration of the velocity sensor may indicate that the position or location of the sensor is not optimum. See the "Velocity Sensor Positioning" section in this manual, for more details. The following conditions will create a velocity sensor calibration failure:

1. The fan does not run during the start-up calibration sequence.
2. No UCM can be driven to OPEN or to MAX due to group level overrides
3. No UCMs are communicating
4. The Zero Flow/Zero Static reading was not in the range of 0.15 to 0.45vdc
5. The 100% flow value or design static pressure value is too low

Supply Air Temperature Sensor Failure

If a supply air temperature sensor failure is determined, the Central Control Panel will issue a command for all dampers to drive to maximum and the bypass to 50%. All stages of heating, cooling, and the fan are de-energized. This is a priority shut-down. This failure will be apparent in the AHU Status menu. A shorted or open temperature sensor is the cause.

Communication Failure

If a communication failure is determined (no UCMs communicating), the Central Control Panel will de-energize all stages of heating, cooling, and the fan, and the bypass drives to 50%. Individual UCM communications failures will be displayed in the Service Summary Menu. Check all wiring connections and polarity. See the Communications Troubleshooting section in this manual for more details.

Zone Sensor Failure

If the zone sensor fails the damper will drive to minimum position, and its vote will be excluded.

Thermostat Setpoint Failure

If a thermostat setpoint failure is determined, the UCM will immediately use the edited occupied cooling and heating setpoints.

Undisplayed Failures

Auxiliary Sensor Failure

If the auxiliary sensor circuit is open, the temperature reading will be dropped from the display screen. If the auxiliary sensor is open and being used on a stand alone UCM to establish the control action, the UCM will remain in the control action it was before the failure occurred.

Velocity Sensor Troubleshooting

The velocity sensor signal enables the Central Control Panel to recognize system flow and adjust the bypass damper accordingly. If a problem exists with the sensor or its location, a failure will be reported on the "Supply Air Flow" status line and the bypass damper will be controlled with default values. Frequently a Velocity Sensor failure is a result of location of airflow turbulence. The simplest solution is to convert the system to Static Pressure control (see "Converting the System Velocity Sensor to a Static Pressure Sensor" in this manual). If a "failure" persists, perform the following steps:

1. Turn on the Central Control Panel and read the velocity sensor transducer input voltage across terminals TB2-4 and TB2-5. Voltage should be between 4.50 VDC and 5.50 VDC.
2. Read the transducer output voltage across terminals TB2-3 and TB2-4. Voltage should be between .150 VDC and .450 VDC. Record the zero flow voltage.
3. Wait approximately 4 minutes after power-up for the system fan to start. Read the transducer output voltage again across terminals TB2-4 and TB2-5. The difference between this voltage land the zero flow voltage should be .100 VDC minimum.

If a minimum voltage change of .100 VDC is not present, this most likely indicates the orientation, or location is not correct. See the following section titled "Velocity Sensor Location" for more information.

4. If a defective transducer is suspected, check the output voltage with a low pressure source and Magnahelic gauge. Record the zero flow voltage. Connect a low pressure source and Magnahelic gauge to the "hi" port of the transducer. Input 1" of pressure. The voltage should be approximately .750

VDC greater than the zero flow voltage. The reading on the voltmeter will include the zero flow voltage.

CAUTION: Do not exceed 2" of input pressure, the transducer will be damaged.

As discussed in the previous section, the velocity sensor signal change must be .100 VDC minimum or a "AHU air flow" "failed" message will be displayed.

Zone, Auxiliary and System Temperature Sensor Checkout

If an erroneous temperature is being reported to the UCM or Central Control Panel, it is possible to use the temperature-resistance Table (Table 8) to verify the integrity of the adjustable setpoint potentiometer or the sensor. The resistance should be measured across the terminals to which the device is connected. For details of the terminal connections see the Installation and Wiring section of this manual.

Table 6
Temperature Resistance Table

Temp	Thermostat Thumbwheel Resistance	Sensor Resistance
55	792	16958
56	772	16541
57	753	16135
58	733	15741
59	714	15358
60	694	14962
61	675	14605
62	656	14257
63	636	13918
64	617	13588
65	597	13266
66	578	12652
67	558	12346
68	539	12347
69	519	12056
70	500	11771
71	481	11493
72	461	11222
73	442	10957
74	422	10698
75	403	10445
76	383	10197
77	364	9995
78	344	9718
79	325	9487
80	306	9260
81	286	9038
82	267	8821
83	247	8608
84	228	8399
85	208	8195

NOTE: Thumbwheel resistance checks are made at terminals 2 and 3 on the zone sensor. Temperature sensor resistance is measured at terminals 1 and 2 of the zone sensor. Disconnect the zone sensor from the UCM when making these checks.

UCM Remote Heat Checkout

In order to check the operation of the remote heat outputs on the UCM board, it is necessary to either turn the adjustable zone sensor to full heating, or adjust the temperature setpoints at the Central Control Panel. Remember, the Model DCWA reheat outputs are enabled in either the heating or cooling control action and model DCEA is disabled in the heating control action. To check the reheat outputs, follow the procedure described below:

1. Disconnect any connections to Terminals J8, J9, J10 or J11.
2. Place a 500 -1000 ohm resistor between Terminals J8 (common) and either of the Terminals J9, J10 or J11 that are being used. This is necessary to simulate a load condition across the triacs within the circuit board.
3. Measure the voltage between J8 (common) and the appropriate output (J9, J10, J11). When the heat is off the voltage will measure between 0 and 1.5 VAC.

When heat is on voltage should read 24 VAC.

Central Control Panel Input/Output Test

WARNING: Initiating this test will energize the fan and both stags of heating and cooling at the rooftop unit. Before initiating this test make sure that all persons, tools, etc. are clear.

The S3 dip switches located on the Central Control Panel are capable of performing a test of the binary output relays, the binary inputs and the supply air temperature and velocity sensor analog inputs. To initiate this test, the following steps need to be performed:

1. Turn the Central Control Panel power off.
2. Turn the dip switch #S2-8 to the ON position. Turn dip switches S3-1 to S3-8 to off.
3. Turn the Central Control Panel power on, and wait 20 seconds.
4. The Central Control Panel is now in the local test mode and will respond to the following input/output tests until the Central Control Panel is powered off and dip switch #S2-8 is placed back into the OFF position.

Binary Input Tests

1. Disconnect all binary inputs to the Central Control Panel TB5.
2. Close binary input #1 with a jumper wire. LED CR16 should go on.
3. Remove the jumper from binary input #1.
4. Close binary input #2 with a jumper wire. LED CR16 should go on.
5. Remove the jumper wire from the binary input #2.
6. Close binary input #3 with a jumper wire. LED CR16 should go on.
7. Remove the jumper wire from binary input #3 and leave the binary inputs open to continue the following binary output and analog input tests.

Analog Input Test

The following steps define the procedure necessary to test the supply air temperature and system velocity sensor inputs to the Central Control Panel:

Supply Air Temperature Input Test

1. Disconnect the supply air temperature sensor from Central Control Panel terminals TB2-1 and TB2-2.
2. Disconnect the Velocity Sensor from Terminals TB2-3, 4, and 5.

3. Input a resistance value between 9.4K and 10.5K across terminals TB2-1 and TB2-2. LED CR16 should go on.

Velocity Sensor Input Test

1. In order to perform this test a voltage between .25 VDC and 0.7 VDC must be present at terminals TB2-3 and TB2-4. This voltage would most likely come from the pressure transducer in the system velocity sensor control box. If system pressure is not sufficient enough to create at least .25 VDC, then an alternate pressure source must be used to apply pressure to the transducer.

CAUTION: Do not over pressurize the transducer. The maximum pressure signal should not exceed 2 inches H20.

2. When a voltage between .28 VDC and 0.7 VDC is applied to terminals TB2-3 and TB2-4, LED CR16 should go on.

Binary Output Test

The following steps identify the procedure necessary to turn on the Central Control Panel binary outputs:

- Switch #S3-1 on: K1 Relay on
- Switch #S3-2 on: K2 Relay on
- Switch #S3-3 on: K3 Relay on
- Switch #S3-4 on: K4 Relay on
- Switch #S3-5 on: K5 Relay on
- Switch #S3-6 on: K6 Relay on
- Switch #S3-7 on: Drive bypass open
- Switch #S3-8 on: Drive bypass closed

NOTE: The Central Control Panel power must be turned off and dip switch #S2-8 returned to the off position before repowering the Central Control Panel to return to normal operation.

System Troubleshooting

Following are some troubleshooting guidelines. For problems that cannot be resolved using these guidelines, contact your Trane representative for service help.

Symptom

Room too hot or cold; inadequate control.

Probable Cause

(1) Zone thermostat not located in zone or near drafts, sunlight or shade.

(2) Not enough or too much air.

(3) Damper is binding

(4) Improper UCM, zone sensor, or Central Control Panel wiring.

Recommended Action

(1) Relocate thermostat

(2) Verify the "minimum supply flow" setpoint for the bypass system is not too high or low. Lowering the setpoint will allow more air to the zones before beginning to bypass. Raising the setpoint will allow bypass to begin earlier, reducing air to the zones.

Compare zone and bypass damper sizes to airflow/velocity requirements.

(3) Verify damper operation by driving fully open and closed.

- Replace/repair damper
- Check damper installation to insure it is not binding.

(4) Verify all wiring.

Symptom

Central Control Panel will not enable heat/cool/fan.

Probable Cause

(1) Central Control Panel dip switch S2-8 is in the test mode (on).

(2) Supply air temp sensor is "failed".

(3) Auto/manual binary input #3 is "Manual" which will disable heating or cooling.

(4) No UCMs Communicating.

(5) Incorrect supply voltage.

(6) Incorrect Wiring

(7) "Supply Temp Limits" set too high/low.

(8) "System Type" incorrectly configured.

(9) "Compressor Lockout" is enabled.

Recommended Action

(1) Flip switch 2-8 off, turn off Central Control Panel power and then turn back on.

(2) A "Failed" message will be displayed in the "System Status" menu. Check wiring and compare resistance to temperature using Table 9.

(3) Remove binary input between terminals TB5-5 and TB5-6 or disable through ICS, if used.

(4) View the "Service Summary" menu to verify no communications. Follow the communications troubleshooting procedures in this manual.

(5) Check for 20.4 to 27.6 VAC at Central Control Panel terminals TB1-1 and TB1-2.

(6) Utilize the input/output test mode with dip switch 2-8 to verify Central Control Panel operation.

- Manually energize the fan/heat/cool stages by jumping the appropriate terminals TB6-1 through 18.

(7) Verify settings in "System Set-Up Menu" and change if necessary.

(8) Check for correct position of dip switch S3-7 on the Central Control Panel. If a change is made, turn off the Central Control Panel and then turn it back on.

(9) Flip dip switch S3-8 on the Central Control Panel off. Turn off the power to the CCP and then turn it back on.

Symptom

System airflow "Failed."

Probable Cause

(1) Fan doesn't run during velocity sensor self-calibration.

(2) Velocity sensor transducer wires are open or shorted.

(3) Defective transducer or poor velocity sensor location.

Recommended Action

(1) Check binary output wiring to system fan.

(2) Check wiring from CCP to velocity/static pressure sensor.

(3) Check to insure 4.50 to 5.50 VDC supply voltage is between terminals TB2-4 an TB2-5.

- Check to insure .100 to 400 VDC output voltage is between terminals TB2-3 and TB2-4 with system fan off.

(4) See Velocity Sensor Troubleshooting section on page 36 for more details.

Symptom

Terminal won't communicate with Central Control Panel.

(1) Baud rate in Central Control Panel or terminal set incorrectly. Terminal set-up incorrect.

(2) RS-232 cable defective

(3) "Num" key on keyboard is depressed.

(4) Incorrect supply voltage

Recommended Action

(1) Baud rates must be set the same on the Central Control Panel and terminal. See the Programming section for more details.

(2) Check the cable to verify operation.

(3) Touch "Num" key to release.

(4) Check for 20.6 to 27.6 VAC at Central Control Panel terminals TB1-1 and TB1-2.

Symptom

UCM won't communicate with Central Control Panel.

Probable Cause

(1) Communication link polarity is reversed.

(2) UCM not addressed correctly.

(3) Communication link signal has interference.

(4) Incorrect wire used.

(5) Incorrect supply voltage.

(6) Defective board. (Follow the "Communication Checkout" procedure in this manual for more details).

Recommended Action

(1) Check communication link wiring connections and polarity.

(2) Verify dip switch settings on UCM. Assure that the dip switches were not incorrectly set due to the damper being mounted upside down.

(3) Communication link should not be routed near or with any voltage source.

(4) Recommended wire is twisted, shielded pair.

(5) Confirm power input to Central Control Panel and UCMs is 20.6 to 27.6 VAC.

(6) Disconnect the communication link from the board and check the boards ability to communicate with the service tool. If no communication, the board is defective.

Symptom

UCM reports erroneous zone temperature or setpoint information.

Probable Cause

(1) T-Stat wired incorrectly.

(2) Defective thermostat.

Recommended Action

(1) Check wiring for correct connections.

(2) Disconnect the zone sensor from the UCM and using an OHM meter, measure the resistance across terminals TB3-1 and 2 (zone temp sensor) and TB3-2 and 3 (set point). Compare resistance to temperature using Table 6. Additionally, measure these values at the zone sensor terminals 1 and 2 (zone temp sensor) and terminals 2 and 3 (set point). These values should be very near those measured above. If not, the connecting wiring is faulty.

Index

Index

W

Z

General Notes:

1. Refer to VAV-IOP-1B "VAV DDC UCM Hardware Modifications and Feature Changes" for a detailed discussion on UCM V3.2 ASIC and later versions.
2. Refer to VAV-IOP-1A "Wireless Zone Sensor Supplement" for a detailed discussion on the installation, programming and troubleshooting of the VAV wireless zone sensor system.

Page No.	Description
4	Zone Temperature Sensors: ADD "Wireless Zone Sensor with adjustable setpoint, night setback override button, cancel button and communications jack". Fig. 19, p.33 does not show wireless sensor. Refer to Wireless Zone Sensor Supplement VAV-IOP-1A.
7	Analog Temperature Input: "Thermistor device, range –30 to 150° F, ADD "Wireless Zone Sensor, Wireless VAV Network".
14	Fig. 5, Field Wiring: Transformer sizing chart referenced in Note 5. DELETE line with 4 dampers and 38 VA.
15	AC Power Connections: CHANGE "Figure 3 shows the 24 VAC..." *to read* "Figure 4, p. 10 shows the 24 VAC..."
25	Fig. 12, System Velocity / Static Sensor Wiring: CHANGE Note 4. "Wiring must be 18 GA. three conductor (Trane BASD wire #400-2060 or equivalent)" *to read* "Wiring must be 18 GA. three conductor (Trane BASD wire #400-2067 or equivalent)."
27	Fig. 14, Bypass Wiring: Transformer sizing chart referenced in Note 4. DELETE line with 4 dampers and 38 VA.
30	Figure 17, UCM Wiring: Refer to VAV-IOP-1B "VAV DDC UCM Hardware Modifications and Feature Changes" for a detailed discussion on UCM V3.2 ASIC and later versions. Twisted shielded wiring no longer required for zone sensors with UCM V3.2 ASIC or later verisons.
32	Fig. 18, Wiring for Slaved Dampers: CHANGE the wiring shown for the Optional Field Mounted Aux. Temp. Sensor *from* solid lines *to* dashed lines.
33	Installing Zone Temperature Sensors. ADD "Wireless Zone Sensor with adjustable setpoint, night setback override button, cancel button and communications jack". Fig. 19, p.33 does not show wireless sensor. Refer to Wireless Zone Sensor Supplement VAV-IOP-1A.
35	Zone Temperature Sensor Wiring: CHANGE "Zone sensor wiring must be 18 AWG twisted (shielded).", *to read* "Zone sensor wiring must be 18 AWG twisted (shielded cable not required with UCM V3.2 ASIC or later). The two notes (#'s 1 & 2) which follow this sentence in the manual, only apply to UCM's prior to UCM V3.2 ASIC."
36	Table 4, Zone Sensor Options: ADD "Wireless Zone Sensor, Number of Wires required = 0. Wireless zone sensors reside on the VAV Network communications link".
36	Table 4, Zone Sensor options: CHANGE "Note: Wire must be 18 AWG twisted (shielded)", *to read* "Zone sensor wiring must be 18 AWG twisted (shielded cable not required with UCM V3.2 ASIC or later versions)."
37	Fig. 20, Zone Temperature Sensor Controller Wiring: ADD to Note 1. "UCM V3.2 ASIC and later verisons do not have spade terminal J50 for shield termination. Shielded cable no longer required with UCM V3.2 ASIC and later versions."
37	Fig. 20, Zone Temperature Sensor Controller Wiring: CHANGE note stating "All Shields must be cut back and taped at the sensor", to read "For UCM V3.2 *non*-ASIC or earlier versions, all shields must be cut back and taped at the sensor. Shielded cable no longer required with UCM V3.2 ASIC and later. Refer to VAV-IOP-1B "VAV DDC UCM Hardware Modifications and Feature Changes" for a detailed discussion on UCM V3.2 ASIC and later versions.
50	Velocity Sensor Troubleshooting: CHANGE item 3 "...across terminals TB-2-4 and TB2-5.", *to read* ""...across terminals TB-2-3 and TB2-4."
50	Velocity Sensor Troubleshooting: CHANGE item 3 "The difference between this voltage land the...", *to read* "The difference between this voltage and the...".

Price $8.00

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Library	Service Literature
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