Operation/Reference Guide

ViewStat

Communicating Thermostat

Product Category

Last Revised: 5/16/2008

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Product Information

Introduction

The ViewStat Communicating Thermostat (FIG. 1) operates similarly to a conventional thermostat but has the unique capability of being controlled, either locally or remotely from a NetLinx or Landmark control system. The ViewStat is compatible with any 24-volt controlled HVAC system. This manual describes how the ViewStat connects to several different types (see the*ViewStat Installation and Wiring* section on page 7).

NOTE

If there are any specific wiring needs or unusual wiring configurations please contact AMX Technical Support, and we will endeavor to find the answer, ***before your installation****.*

If necessary, contact AMX Technical Support for help with additional specific control wiring scenarios.

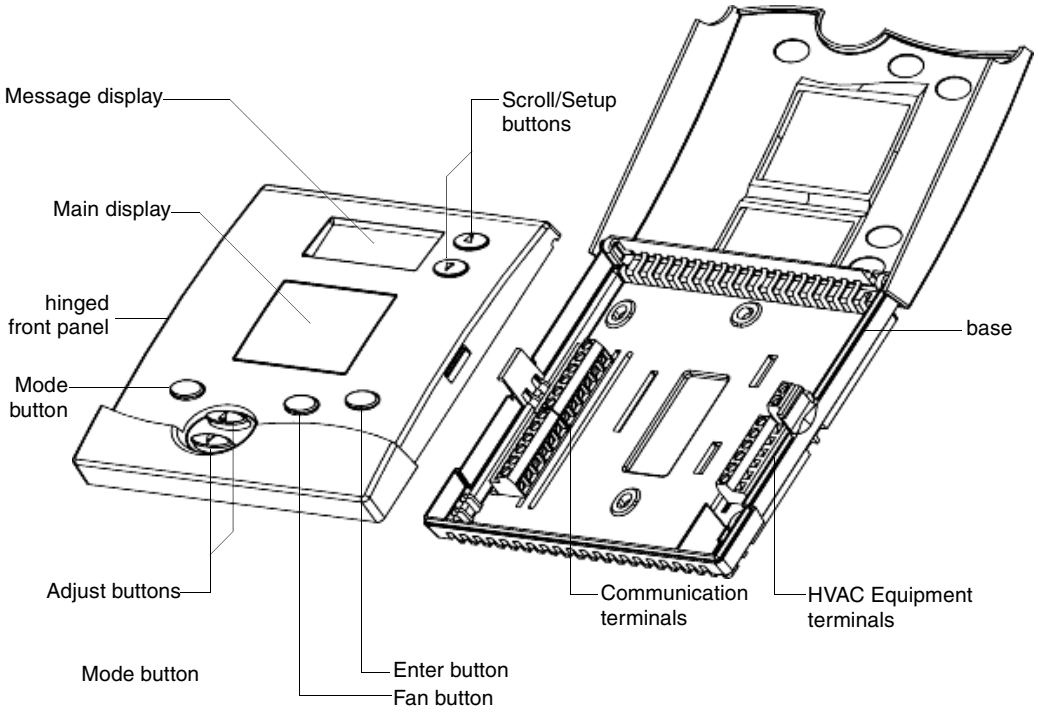


FIG. 1 ViewStat Communicating Thermostat

The ViewStat is designed to work with VST-TTM (Temperature) and VST-TRH (Temperature and Humidity) support modules, and remote sensors.

NOTE

For information on using the VST-TSTAT with an (optional) VST-DIST Distribution Panel for RS422 control, refer to the Wiring the VST-TSTAT to a VST-DIST Distribution Panel section on page 11.

System Components

The components in a complete ViewStat system (including optional accessories) are listed below:

System Components	
Component Name	**Description**
ViewStat (VST)	Communicating thermostat
VST-TTM	Temperature support module (optional)
VST-TRH	Temperature/Humidity support module (optional)
VST-TSF Flush-mount remote sensor	Indoor flush-mount temperature/relative humidity sensor (optional)
VST-TSO Duct/Outdoor remote sensor	Duct/Outdoor-mount temperature/relative humidity sensor (optional)
VST-DIST	Distribution Panel

ViewStat Specifications

ViewStat Specifications	
Control Ports	• HVAC control • ICSNet
Control Voltage	24 VAC ±20% or 24 VDC ±20% (delivered by an HVAC system or by an external power supply)
Switched Voltage	18 – 30 VAC
Maximum Operating Current	• 2 amps total at rated voltage, through all outputs. • 1 amps through any one output.
Maximum Surge Current	2.0 A
Control Accuracy	±1.0° F (± 0.56° C)
Control Range	40° – 90° F (4.44° – 32.22° C)
Operating Range	32° – 99° F (0° – 37.22° C)
Baud Rate	9600
Front Panel Components:	
Message display	Two types of messages are displayed, *Permanent* and *Temporary* Messages. • Permanent Messages are those that scroll continually during thermostat operation. • Temporary (flashing) Messages are intended to catch your eye and must be reset to be removed from the display. Thermostats are shipped with default (permanent) status messages (i.e. mode status, fan status, equipment status).
Scroll/Set-up buttons	The Scroll/Set-Up buttons function with the set-up features of the thermostat (see the*Set Up and Configuration* section on page 39). These buttons are located beneath the faceplate.
Main LCD display	The MAIN DISPLAY (see FIG. 16 on page 23) provides the mode status, temperature and system status information.
Mode button	Five modes of operation are available: OFF, COOL, HEAT, AUTO, and EM. HEAT (for heat pumps only). The mode of operation indicates how you want your heating and cooling equipment to operate. This button is located beneath the faceplate.
Fan button	The fan can be operated continuously (FAN ON) or only when there is a need to heat or cool. This button is located beneath the faceplate.
Enter button	The Enter (or Network Override) button is used to override the home automation system, to clear temporary flashing messages on the message display and with the set-up features of the thermostat.
Adjust buttons	The Adjust buttons adjust the heating and cooling temperature settings.

ViewStat Specifications (Cont.)	
Circuit Board Components:	
Communication and HVAC Equipment connectors	Terminals with captive-wire connectors that connects the Thermostat, HVAC equipment, control system, remote sensors and power supply. Refer to the *Wiring the Thermostat* section on page 20 for details.
DIP Switch	4-position DIP switch that configures the thermostat for various application types (Servant/Master, Electric/Fossil, Single/Multi, Heat Pump/Heat-Cool). Refer to the *Setting the DIP Switch* section on page 9 for details.
Enclosure:	
Material	White plastic with hinged faceplate and removable front panel.
ViewStat Dimensions (HWD)	5.01" x 5.52" x 1.15" (12.72 cm x 14.02 cm x 2.92 cm)
Weight	5.29 oz. (150 grams)
Included Accessories	• Cat5 Suppression Ferrite • 24 VAC Suppression Ferrite
Optional Accessories	• VST-TTM Remote Temperature support module (**FG944-10**) • VST-TRH Remote Temperature/Humidity support module (**FG944-20**) • VST-TSF Flush-mount indoor remote sensor (**FG944-30**) • VST-TSO Duct/outdoor remote sensor (**FG944-40**)
Remote Temperature Sensors:	
VST-TSF Dimensions:	• Cable length: 9.00"(228 mm) • Sensor depth: 0.85" (22 mm) • Sensor diameter: Ø1.50 (Ø38 mm)
VST-TSO Dimensions (HWD):	• 2.75" x 1.44" x 1.75 (70 mm x 37 mm x 44 mm)
Weight:	• VST-TSF: 0.5 lb (0.23 kg) • VST-TSO: 0.75 lb (0.34 kg)

Support Module Specifications

There are two types of support modules available for the ViewStat:

- **VST-TTM Temperature Module**: The VST-TTM support module offers versatility in climate control. A set of onboard dip switches on the VST-TTM circuit board allow you to determine whether you want the two remote temperature sensor inputs to control, monitor or do a combination of both. This temperature data is sent back to the ViewStat Thermostat, allowing you to accurately control and monitor temperature in a given area or multiple areas.
- **VST-TRH Temperature and Humidity Module**: The VST-TRH support module brings further versatility to the HVAC system. A set of onboard dip switches on the VST-TRH circuit board allow you to determine whether you want the two remote temperature sensor inputs to control, monitor, or both. The temperature/humidity data is sent back to the ViewStat, allowing you to accurately control and monitor temperature/humidity in a given area or multiple areas.

The ViewStat supports up to four Support Modules, and can display any one of the following:

- The remote temperature on support module address 1 if its mode is set to "Control".
- The average temperatures of all support modules set to "Control" mode.
- The humidity of the VST-TRH (Temperature and Humidity Module) set to "Control" mode.

VST-TTM and VST-TRH Remote Sensor Specifications	
Power supply	18 to 30 VAC or DC (24 V Nominal)
Support Module Dimensions (HWD)	2.50" x 3.50" x 0.88" (63 mm x 89 mm x 22 mm)
Max. relative humidity	90% (non-condensing)
Temperature: • Accuracy: • Maximum Display Range:	 Comfort Range: (60°F - 80°F): ± 1°F Control Range: (40°F - 100°F): ± 2°F Operating Range: (-40°F - 185°F): ± 3°F -40°F - 185°F
Humidity (VST-TRH only): • Accuracy: • Maximum Display Range:	 Comfort Range: (10% - 45%): ± 3% Control Range: (10% - 90%): ± 5% 0% - 90%

NOTE

Refer to theSupport Module Installation and Wiring section on page 33 *for information on configuring, installing and wiring the support modules and remote temperature sensors.*

Maximum Cable Distances

Maximum Cable Distances	
Between the VST and NetLinx or LandMark Controller:	1000’ (304.8m)
Between support module and VST:	1000’ (304.8m)
• Max. *cumulative* cable length between multiple support modules and VST:	1000’ (304.8m)
Between support module and remote sensor:	300’ (91.44m)

HVAC System Pre-Installation Check List

Before getting started, determine what type of heating system is/will be installed in the house. Then use the following table to determine if the proper numbers of wires are available, depending on the HVAC System type.

HVAC System Pre-installation Check List		
Application	**# of HVAC Wires**	**Wiring Diagram**
Single Stage Furnace & AC	5	FIG. 18 on page 26
Two Stage Furnace & Two Stage AC	7	FIG. 19 on page 27
Roof Top Unit (Two Stage Heat & Two Stage Cool)	7	FIG. 20 on page 28
Boiler with AC (Two Transformers)	5	FIG. 21 on page 29
Single Stage Heat Pump	7	FIG. 22 on page 30
Two Stage Heat Pump	9	FIG. 23 on page 31
First Stage Radiant Floor Heat Second Stage Furnace One Stage of Cooling	6	FIG. 24 on page 32

In addition to the wires necessary to support the HVAC system control, an RJ45-terminated Cat5 cable is necessary to support NetLinx or Landmark communications (see theViewStat Installation and Wiring section on page 7 *for details).*

ViewStat Installation and Wiring

This section covers the installation, wiring and checkout of a ViewStat Communicating Thermostat System.

1. 120 volts may cause serious injury from electrical shock. Disconnect electrical power to the HVAC system before starting installation. This system is a low-voltage system.
2. Improper installation may cause serious injury from electrical shock. This system must be installed by a qualified contractor in accordance with NEC Standards and applicable local and state codes.

Disconnecting Power to All HVAC Equipment

Since the ViewStats are wired directly to the HVAC equipment, the power must be shut off at the equipment. This can generally be accomplished by turning off the disconnect switch located near the equipment. If an obvious disconnect switch is unavailable, you will need to remove the circuit breaker or shut down the fuse serving the equipment.

Failure to disconnect power could result in damage to the HVAC equipment or thermostats. Leave power disconnected until all other electrical connections have been made and checked for accuracy.

Selecting the Thermostat Location

Determine if the thermostat will be operating alone, or with remote temperature sensors. If the unit is stand-alone there are certain measures that must be taken to ensure accurate temperature control.

Stand-alone thermostat mounting criteria

- One ViewStat per HVAC system.
- Mount on an interior wall.
- In a room frequently occupied.
- At least 18 inches (45.72 cm) from any outside wall.
- Approximately 5 feet (1.52 m) above the floor. Check with local building codes for height requirements in commercial applications.

DO NOT locate the thermostat:

- Behind doors, in corners or other dead air spaces.
- In direct sunlight or near lamps, appliances or other sources of radiant heat.
- On an outside wall or wall exposed to an unconditioned space (i.e. garage, etc.).
- In the flow path of a supply register, in stairways or near outside doors.
- On a wall where concealed pipes and/or duct work will affect the thermostat.
- Near sources of electrical interference such as arcing relay contacts.

With remote temperature sensors

Follow the guidelines for placement of the sensors and locate the thermostat indoors where operating range (see specs) will not be violated (i.e. do not install in a cold garage or hot equipment room). See the *Support Module Installation and Wiring* section on page 33 for details.

Removing the Faceplate from the Base

No tools are required to disassemble the thermostat – just use your hands to pull the front panel off of the base (FIG. 2).

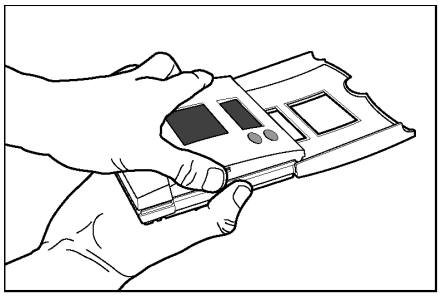


FIG. 2 Pulling the front panel off of the base

CAUTION

Loss of internal programs may result from static discharge to thermostat circuit board. Touch a grounded metal object to discharge any static charge before handling the circuit board.

While holding the base of the thermostat, apply pressure to the base of the latch with your thumb (FIG. 3). Both sides have a latch, but it is easiest to unlatch one side at a time.

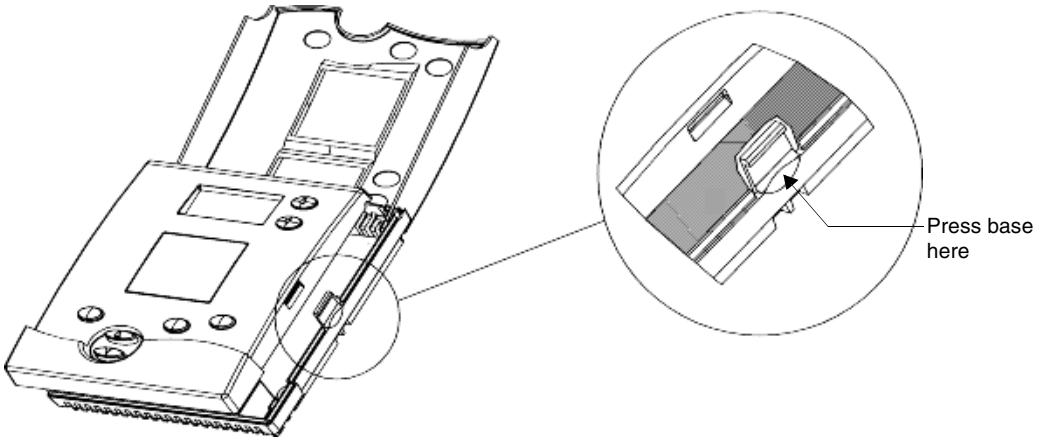


FIG. 3 Location of latch on base (one latch on each side)

Setting the DIP Switch

Set the DIP switch located on the thermostat circuit board (FIG. 4) according to the application needs (see the *DIP Switch Settings table* below for details).

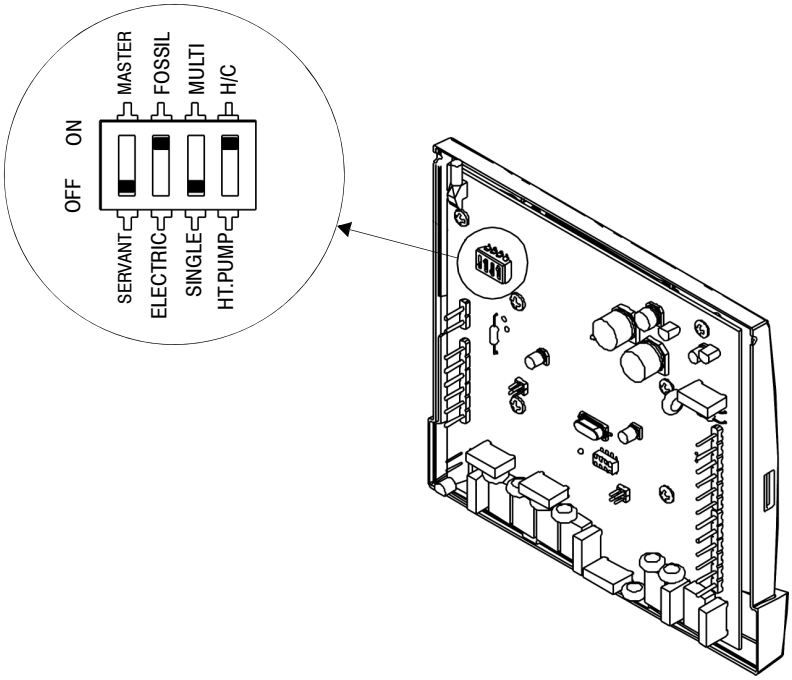


FIG. 4 Setting the DIP Switch

The following table shows what each switch corresponds to depending on position. Switch one should be set in the "OFF Servant" position unless you plan to broadcast readings from remote temperature sensors to other thermostats in the system when there is no control system in place.

DIP Switch Settings				
Application	**Switch #1**	**Switch #2**	**Switch #3**	**Switch #4**
Single Stage Furnace & AC	Servant	Fossil	Single	H/C
Two Stage Furnace & Two Stage AC	Servant	Fossil	Multi	H/C
Roof Top Unit (Two Stage Heat & Two Stage Cool)	Servant	Fossil	Multi	H/C
Boiler with AC (Two Transformers)	Servant	Fossil	Single	H/C
Single Stage Heat Pump	Servant	Electric	Single	HT. Pump
Two Multi-stage Heat Pump	Servant	Electric	Multi	HT. Pump
First Stage Radiant Floor Heat, Second Stage Furnace One Stage of Cooling	Servant	Fossil	Multi	H/C

Reassembly

No tools required – line up pins on circuit board with the corresponding terminal blocks. Use your hands to push the front panel securely to the mounted base.

Attaching the MiniVerter to the ViewStat

Before attaching the MiniVerter to the rear of the ViewStat, connect the wiring, as described below:

1. Detach the faceplate from the base of the ViewStat.
2. Pull the stripped/tinned wires through the cutout in the center of the base (FIG. 5).

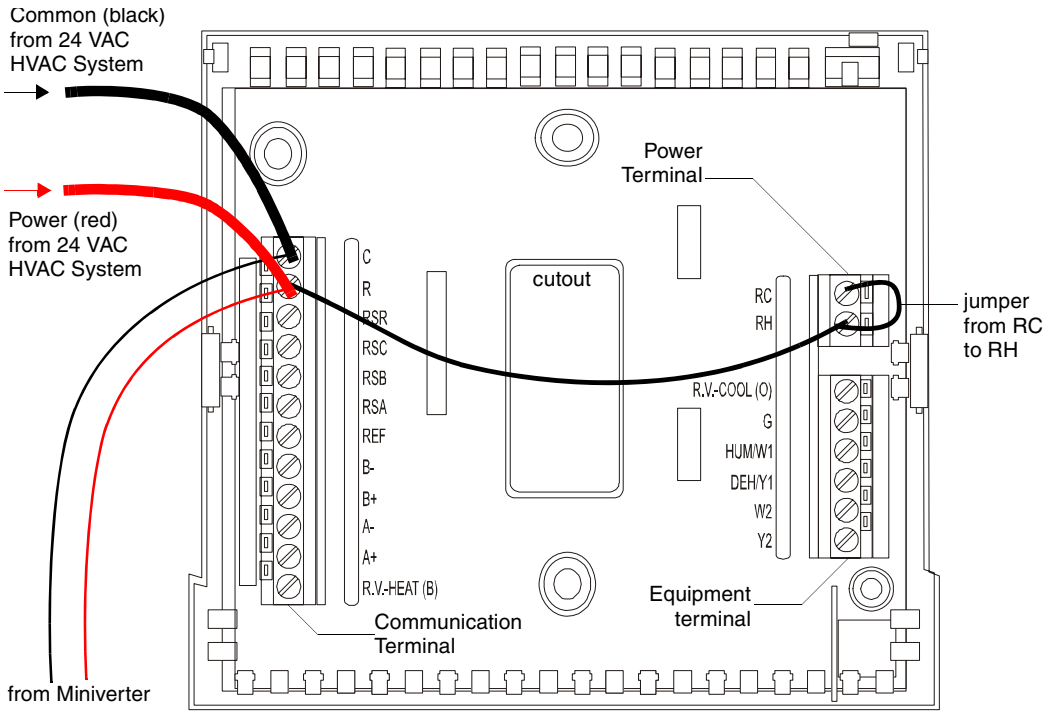


FIG. 5 ViewStat base with Communication, Power and Equipment terminals

Before mounting the ViewStat, you must attach the MiniVerter to the rear panel of the ViewStat, as described below:

1. Detach the faceplate from the base of the ViewStat.
2. Pull the stripped/tinned wires through the cutout in the center of the base (FIG. 5)
3. Connect the communications wiring:
   a. **Blue** to **B-**
   b. **Orange** to **B+**
   c. **Red/White** to **A-**
   d. **Black/White** to **A+**
4. Connect the power wiring:
   a. **Black** to **C**
   b. **Red** to **R**
5. Install a jumper from **RH** to **RC**.
6. Insert the MiniVerter (connector-side first) into the guide-slots located on the bottom of the MiniVerter mounting bracket (FIG. 6).
7. Slide the MiniVerter back into its locking position in the mounting bracket.
8. With the connector-side of the MiniVerter seated in the guide-slots, gently press the opposite side of the MiniVerter in and down, to snap it into its locked position on the mounting bracket.

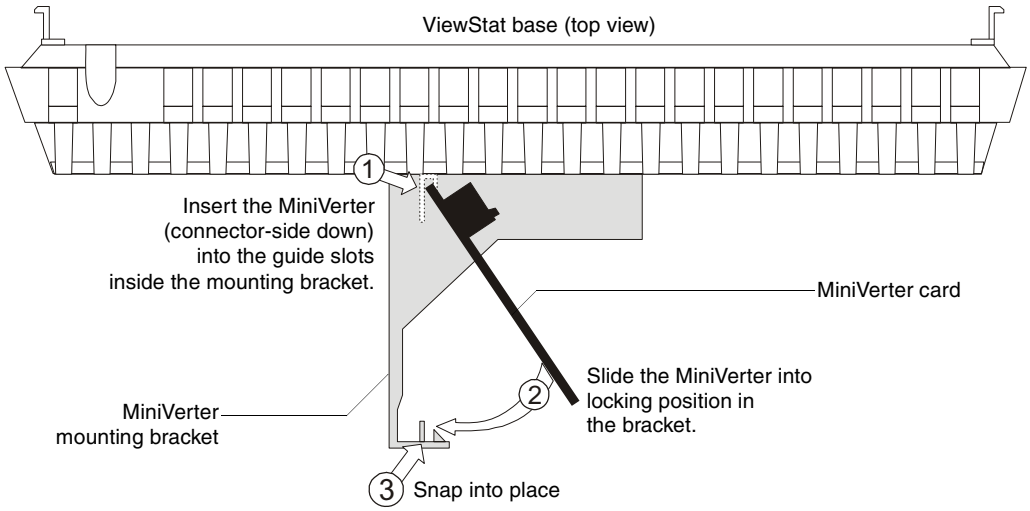


FIG. 6 Inserting the MiniVerter into the mounting bracket (top view).

NOTE

Repeated installation and removal of the MiniVerter bracket may result in damage to the bracket.

9. Connect the Cat-5 RJ-45 connector on the MiniVerter to the Control System (Master or ICSNet Hub).

Wiring the VST-TSTAT to a VST-DIST Distribution Panel

The optional VST-DIST Distribution Panel (not included) connects to up to eight VST-TSTAT thermostats, providing a convenient and effective method of wiring multiple thermostats to the control system's RS422 serial interface port.

The VST-DIST provides one RS422 interface to the control system and eight RS422 interfaces for the thermostats.

- Since the VST-DIST provides an RS422 interface to the control system, a MiniVerter (VST-MVRT) is not required for communication.
- The VST-DIST is intended for use with the VST-TSTAT, and is not intended for use with the VST, which includes a MiniVerter.

NOTE

The VST-DIST includes an Instruction Manual from the manufacturer with detailed installation instructions, and a decal on the inside of the front cover (reproduced in FIG. 7) gives wiring information for the panel.

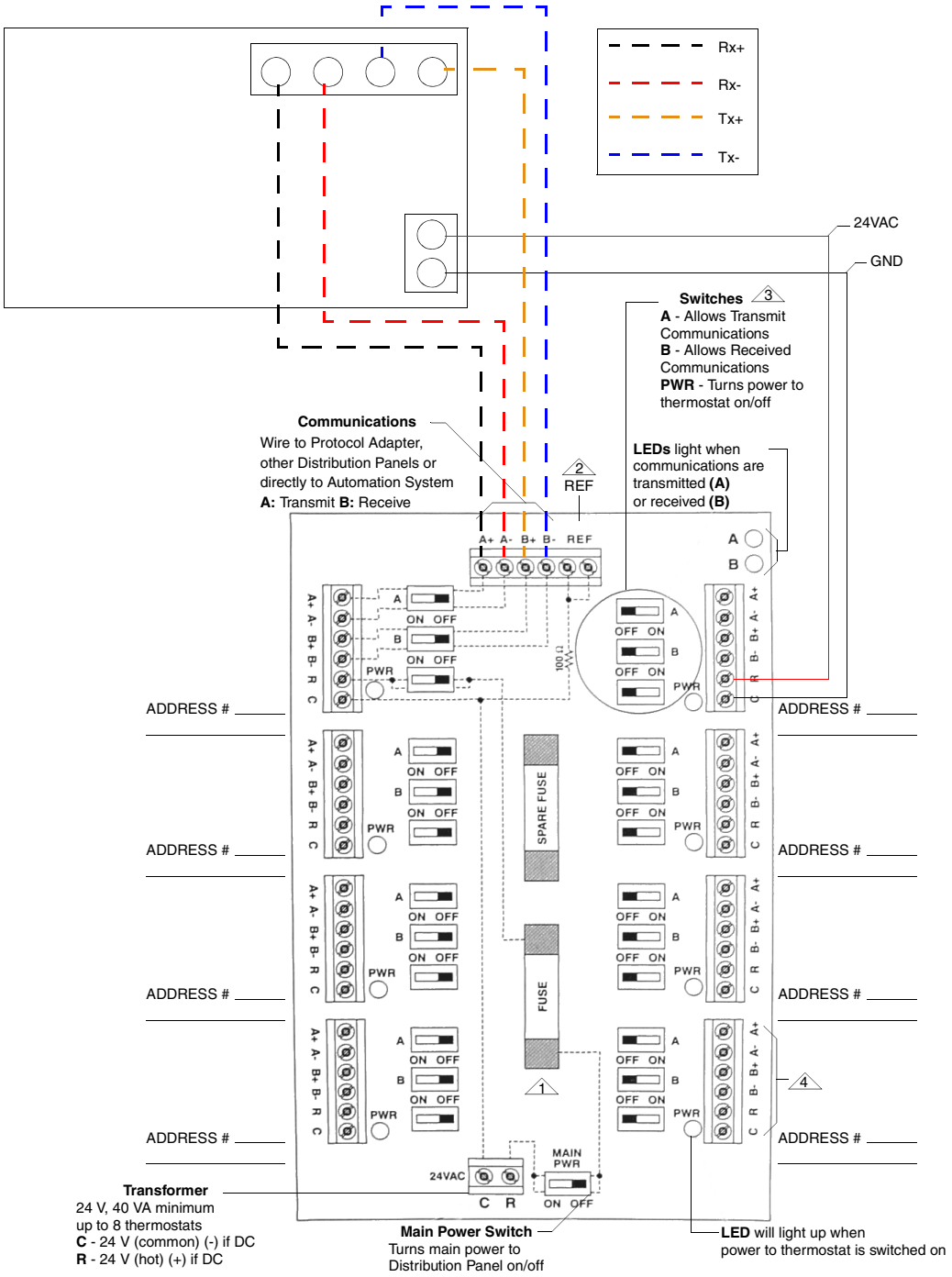


FIG. 7 Wiring the VST-TSTAT to a VST-DIST Distribution Panel

Mounting the Base to a Wall

There are four screw holes located on the base of the thermostat; two are for a junction box mounting, along with two for alternate mounting spacing. Use one of the holes on the top and one on the bottom.

1. Place the base over the wire hole opening in the wall; level the base and mark the screw hole mounting locations (leveling required for appearance only).
2. If using supplied wall anchors, drill 3/16" hole in the center of the marked locations and tap in the wall anchors. If using the supplied screws only, drill a 3/32" hole in the center of the marked locations.

CAUTION

Minimize wire entry hole size and seal – drafts from inside the wall could affect temperature readings.

3. Fasten the base to the wall with the supplied screws.
4. Seal wire entry using caulk, drywall putty or insulation.

CAUTION

Loss of internal programs may result from static discharge to thermostat circuit board. Installer must touch a grounded metal object before handling the circuit board.

Connecting the ViewStat to AMX Control Systems

When a Mini Verter is used the Viewstat has a single RJ-45 jack on the rear panel, and uses ICSNet cabling to connect to NetLinx or Landmark control systems.

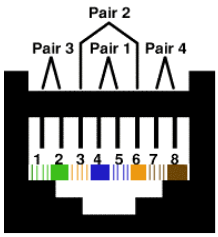
NOTE

The terms "PhastLink" and ICSNet" are essentially interchangeable within the context of cabling/connectors. They both use a standard 10BaseT type connection (i.e. Category 5 wire and RJ-45 connectors), and they share the same pinout information for the RJ-45 jacks. Generally the term "PhastLink" is used when dealing with Landmark, and "ICSNet" is used when describing NetLinx control systems.

The wires should be connected in the standard manner described in the following table. If standard EIA/TIA 568A/B color coding is followed, wiring problems will be minimized.

PHASTLink RJ-45 Pinout Information (EIA/TIA 568 A)

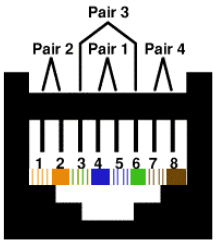
Pin	Wire Color	Polarity	Function
1	White/Green	+	Transmit
2	Green	-	Transmit
3	White/Orange	-	Mic
4	Blue	-	Ground
5	White/Blue	+	12 VDC
6	Orange	+	Mic
7	White/Brown	+	Receive
8	Brown	-	Receive



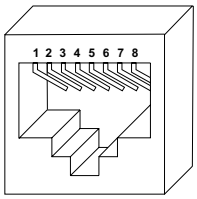
TIA 568A

NetLinx RJ-45 Pinout Information (EIA/TIA 568 B)

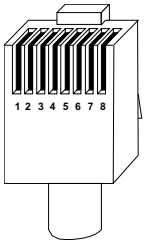
Pin	Wire Color	Polarity	Function
1	Orange/White	+	Transmit
2	Orange	-	Transmit
3	Green/White	-	Mic
4	Blue	-	Ground
5	White/Blue	+	12 VDC
6	Green	+	Mic
7	White/Brown	+	Receive
8	Brown	-	Receive



TIA 568B



(female)



(male)

RJ-45 connector - pin configurations

NOTE

It is important that the correct pairing is observed. *Transmit, Receive, and Mic need to be on twisted pairs. Splitting pairs (e.g., using a white/green wire with a blue/white wire for transmit) will result in increased crosstalk, and may result in bus failure or noise on the intercom.*

Connecting to an Axcess Control System (via AXC-232++, AXB-EM232, or Axcent3/PRO)

To connect the ViewStat to an Axcess control system via an Axcess Cardframe (cardframe must be equipped with an AXC-232 232/422/485 Control Card), AXB-EM232 Enhanced Master, or Axcent3(PRO) Controller, refer to the card-edge pinout information below:

Axcess System Card Edge Pinouts		
Pin	**Signal**	**Function**
1	GND	Ground (RS-232)
2	RX	Receive data (RS-232)
3	TX	Transmit data (RS-232)
4	+12V	Power
5	RX -	Receive data (RS-422)
6	RX +	Receive data (RS-422)
7	TX -	Transmit data (RS-422)
8	TX +	Transmit data (RS-422)
9	GND	Ground
10	CTS	Clear-to-send (hardware handshaking)
11	RTS	Ready-to-send (hardware handshaking)
12-16	not used	

FIG. 8 shows the wiring configuration for Axcess systems:

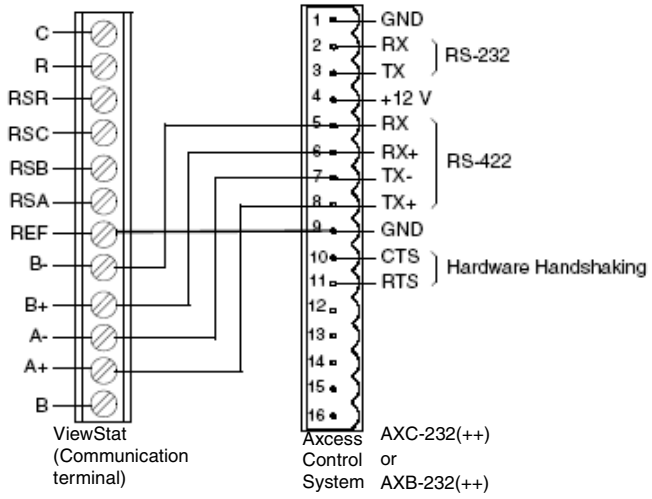


FIG. 8 Connecting the ViewStat to an Axcess Control System

Connecting to an Axcess Master Controller via the RS232/422/485 (DB-9) Port

The table below lists the connector pins, signal types, and signal functions for RS-232/RS-422/RS- 485 DB-9 (male) connector on an Axcess Master Controller (i.e. Axcent3 or Axcent3/PRO).

DB-9 Pinouts			Wiring and Baud Configurations		
Pin	**Signal**	**Function**	**RS-232**	**RS-422**	**RS-485**
1	RX-	Receive data		X	X (strap to pin 9)
2	RXD	Receive data	X		
3	TXD	Transmit data	X		
4	TX+	Transmit data		X	X (strap to pin 6)
5	GND	Signal ground	X	X	
6	RX+	Receive data		X	X (strap to pin 4)
7	RTS	Request to send	X		
8	CTS	Clear to send	X		
9	TX-	Transmit data		X	X (strap to pin 1)
The X's show where to terminate the wires on the DB-9 connector.					

FIG. 9 shows the wiring configuration for Axcess systems (using the DB-9 PROGRAM port).

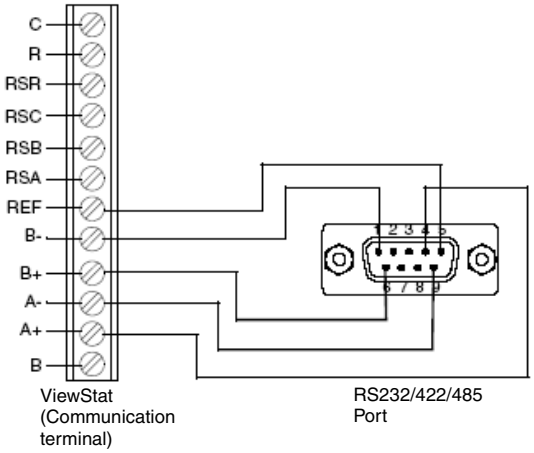


FIG. 9 Connecting the ViewStat to an Axcess Control System via the RS232/422/485 (DB-9) port

Connecting to NetLinx Integrated Controllers via the RS232/422/485 (DB-9) Port

The table below lists the connector pins, signal types, and signal functions for RS-232/RS-422/RS- 485 DB-9 (male) connector on an NetLinx Integrated Controllers (i.e. NI-2000/3000/4000).

DB-9 Pinouts			Wiring and Baud Configurations		
Pin	**Signal**	**Function**	**RS-232**	**RS-422**	**RS-485**
1	RX-	Receive data		X	X (strap to pin 9)
2	RXD	Receive data	X		
3	TXD	Transmit data	X		
4	TX+	Transmit data		X	X (strap to pin 6)
5	GND	Signal ground	X	X	
6	RX+	Receive data		X	X (strap to pin 4)
7	RTS	Request to send	X		
8	CTS	Clear to send	X		
9	TX-	Transmit data		X	X (strap to pin 1)
The X's show where to terminate the wires on the DB-9 connector.					

FIG. 9 shows the wiring configuration for NetLinx systems (using the DB-9 PROGRAM port).

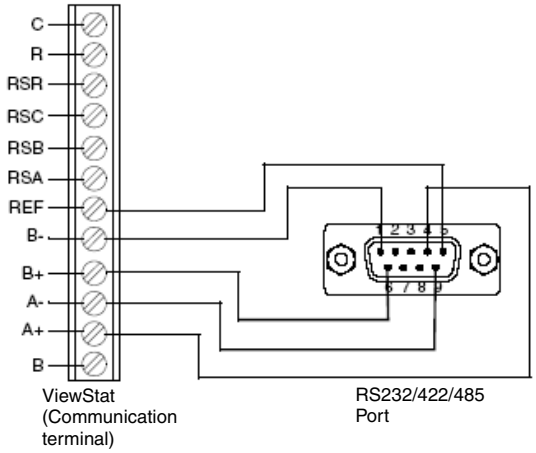


FIG. 10 Connecting the ViewStat to an NetLinx Integrated Control System via the RS232/422/485 (DB-9) port

Connecting to a NetLinx Master controller via NXC-COM card

The Viewstat can connect to a NetLinx NXF Cardframe or NXI equipped with a NXC-COM Dual COM Port Control Card. The following table shows the card edge pinout information for the NXC-COM card.

NXC-COM2 Pinouts			NXC-COM2 Wiring Configuration		
Pin	**Signal**	**Function**	**RS-232**	**RS-422**	**RS-485**
1	GND	Signal ground	X	X	
2	RXD1	Receive data	X		
3	TXD1	Transmit data	X		
4	CTS1	Clear to send	X		
5	RTS1	Request to send	X		
6	TX1+	Transmit data		X	X (strap to pin 8)
7	TX1-	Transmit data		X	X (strap to pin 9)
8	RX1+	Receive data		X	X (strap to pin 6)
9	RX1-	Receive data		X	X (strap to pin 7)
10	+12 VDC	Power	Optional	Optional	
11	GND	Signal ground	X	X	
12	RXD2	Receive data	X		
13	TXD2	Transmit data	X		
14	CTS2	Clear to send	X		
15	RTS2	Request to send	X		
16	TX2+	Transmit data		X	X (strap to pin 18)
17	TX2-	Transmit data		X	X (strap to pin 19)
18	RX2+	Receive data		X	X (strap to pin 16)
19	RX2-	Receive data		X	X (strap to pin 17)
20	+12 VDC	Power	Optional	Optional	

FIG. 11 shows the wiring configuration for NetLinx systems.

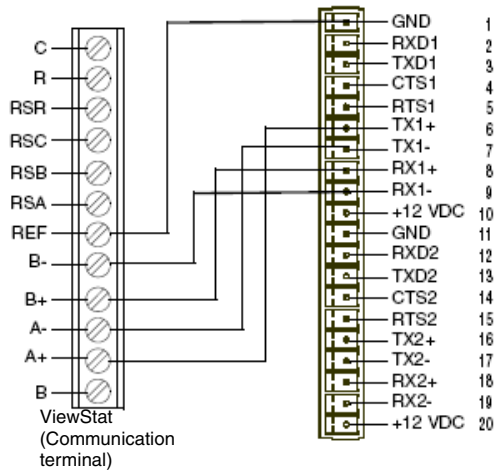


FIG. 11 Connecting the ViewStat to a NetLinx Control System

Connecting to a LandMark Control System

PhastLink cables are used to connect all PhastLink-compatible devices, including keypads, dimmers, J-box IR devices, amplifiers, audio switches, etc. The table below lists the RJ-45 pinout information.

RJ-45 Pinout Information

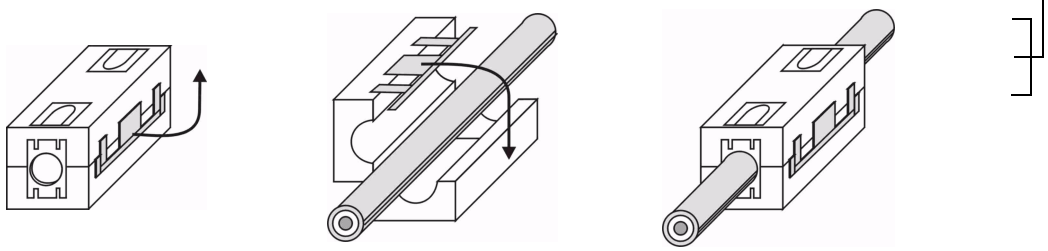
Pin	Wire Color	Polarity	Function
1	White/Green	+	Transmit
2	Green	-	Transmit
3	White/Orange	-	Mic
4	Blue	-	Ground
5	White/Blue	+	12 VDC
6	Orange	+	Mic
7	White/Brown	+	Receive
8	Brown	-	Receive

PhastLink uses a standard 10Base-T connection (i.e. Category 5 wire and RJ-45 connectors). The wire should be connected in the standard manner. If a consistent color code is used, wiring problems will be minimized.

It is important that the correct pairing is observed. Transmit, Receive, and Mic need to be on twisted pairs. Splitting pairs (e.g., using a white/green wire with a blue/white wire for transmit) will result in increased crosswalk, and may result in bus failure or noise on the intercom.

Installing the Cat5 Suppression Ferrite

Before connecting the ICSNet cable, install the Cat5 Suppression Ferrite (provided), as described below (no tools required):



Release the latch to open the plastic enclosure.

Insert the Cat5 cable and close the enclosure.

Installation complete.

FIG. 12 Installing the Cat5 Suppression Ferrite

1. The Cat5 suppression ferrite is housed in a plastic enclosure, with a latch release on one side. Pull to release the latch and open the enclosure.
2. Insert the Cat5 cable.
3. Snap the enclosure shut with the cable inside, and you're done.

Connecting to a NetLinx Control System

To connect a single ViewStat to a NetLinx control system, use ICSNet cabling to connect the RJ-45 jack on the ViewStat to any available ICSNet jack on the NetLinx Master. The maximum cabling distance between the ViewStat and Master is 1,000 ft (304.8 m).

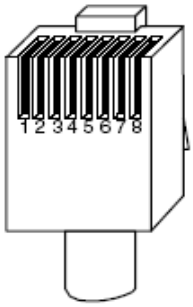
To connect multiple ViewStats to a NetLinx system, use a NetLinx Hub (NXC-NH) to add additional ICSNet ports to the system, connect the RJ-45 jack on the ViewStat to an available ICSNet jack on the Hub.

Connecting to a Landmark Control System

To connect a single ViewStat to a Landmark control system, use PhastLink cabling to connect the RJ-45 jack on the ViewStat to any available PhastLink jack on the Landmark Master (MCU). The maximum cabling distance between the ViewStat and MCU is 1,000 ft (304.8 m).

To connect multiple ViewStats to a Landmark system, use a Landmark Hub (PLH-RPT) to add additional PhastLink ports to the system, connect the RJ-45 jack on the ViewStat to an available PhastLink jack on the Hub.

Connecting the ViewStat to the HVAC System



Before connecting the ViewStat to the HVAC system, install the 24 VAC Suppression Ferrite, to eliminate any potential noise problems.

Installing the 24 VAC Suppression Ferrite

Before connecting the 24 VAC power supply cable to the HVAC system, install the 24 VAC Suppression Ferrite (provided), as described below (no tools required):

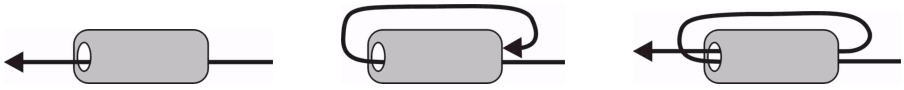


FIG. 13 Installing the 24 VAC Suppression Ferrite

1. Pass the 24 VAC power cable through the ferrite bead once.
2. Loop the cord around, and pass it through the ferrite bead once more.
3. Gently remove any excess slack in the cable, and you're done.

Wiring the Thermostat

1. Strip 1/4" (0.63 cm) of insulation from each wire to be used.
2. Secure wires into the terminals on the base according to the appropriate wiring diagram, as described in the following table. Refer to the *Wiring Diagrams* section on page 26. Use color-coding practices (i.e. white wire to W terminal) whenever possible.

- Single Stage Furnace & AC — Refer to FIG. 18 on page 26
- Two Stage Furnace & Two Stage AC — Refer to FIG. 19 on page 27
- Roof Top Unit (Two Stage Heat & Two Stage Cool) — Refer to FIG. 20 on page 28
- Boiler with AC (Two Transformers) — Refer to FIG. 21 on page 29
- Single Stage Heat Pump — Refer to FIG. 22 on page 30
- Two Stage Heat Pump — Refer to FIG. 23 on page 31
- First Stage Radiant Floor Heat
Second Stage Furnace One Stage of Cooling — Refer to FIG. 24 on page 32

3. Check each wire to ensure it is securely fastened, not broken, and exposed wires are not touching.

Communication and Equipment terminal wiring definitions

The following table describes the Communication and Equipment terminal wiring definitions (see FIG. 5 on page 10).

Communication and Equipment Terminal Wiring Definitions	
Communication Terminal	
C	Thermostat Voltage (common)
R	Thermostat Voltage (hot)
RSR (support module)	Thermostat Voltage (hot)
RSC (support module)	Thermostat Voltage (common)
RSB/RSA (support module)	Support module communication (half-duplex)
REF	Ground Reference
B-/B+	Receive
A-/A+	Transmit
Equipment Terminal	
RC	Switched Voltage (cool)
RH	Switched Voltage (heat)
RV COOL (O)	Reversing Valve - Cool (energized in Cool mode)
RV HEAT (B)	Reversing Valve - Heat (energized in other modes)
G	Fan
HUM/W1	1st stage Heat (non-heat pump) -or- 3rd stage Heat AND 1st Stage Emergency Heat (heat pump) -or- Humidification (with humidity control sensor)

Communication and Equipment Terminal Wiring Definitions (Cont.)	
Equipment Terminal (Cont.)	
DEH/Y1	1st stage Cooling (non-heat pump) -or- 1st stage Compressor (heat pump) -or- Dehumidification (with humidity control sensor)
W2	2nd stage Heat (non-heat pump) -or- 2nd stage Emergency Heat (heat pump)
Y2	2nd stage Cooling (non-heat pump) -or- 2nd stage Compressor (heat pump)

Connecting the ViewStat to the HVAC System

NOTE

A qualified HVAC technician should perform these steps step to ensure proper termination.

1. Make sure the HVAC system power is off.
2. The following figures (FIG. 14, FIG. 15) show wiring diagrams for several different HVAC equipment types. Use these diagrams as a reference only. Use color coding where possible.
   a. FIG. 14 shows a typical heat/cool wiring schematic:

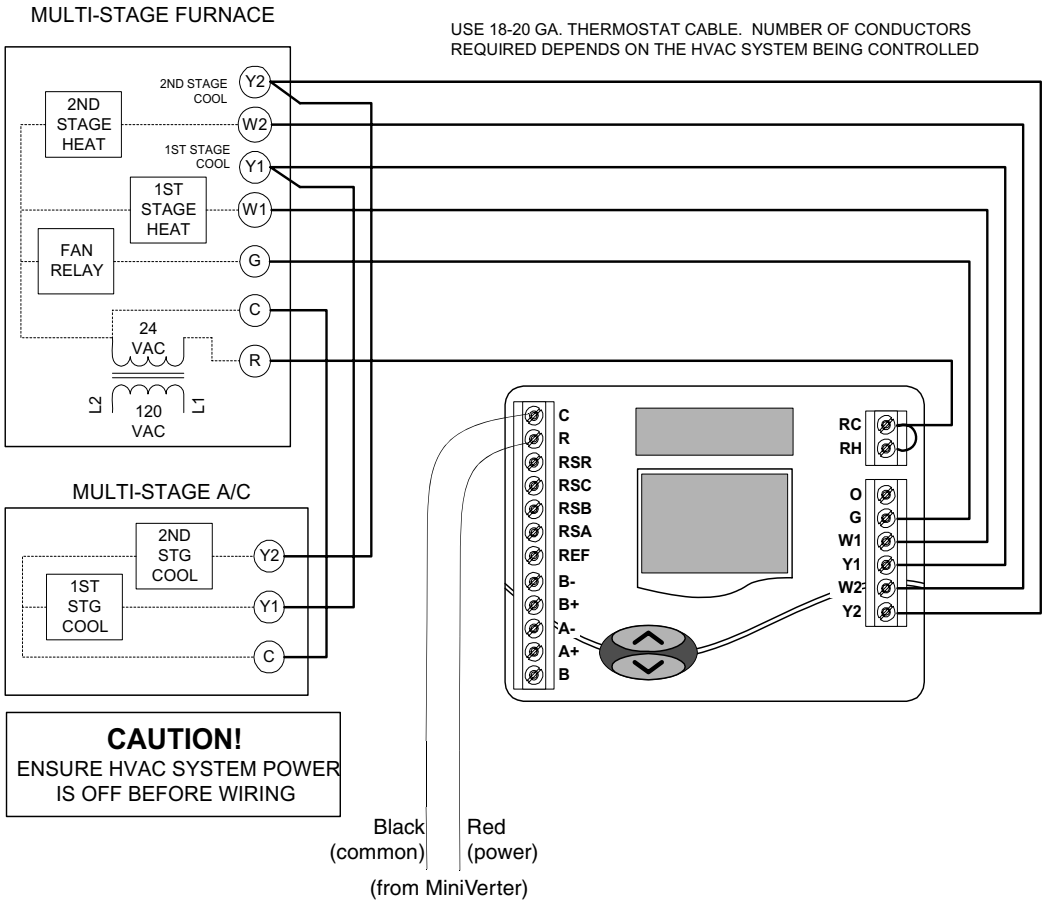


FIG. 14 Typical heat/cool wiring schematic

b. FIG. 15 shows a typical heat/cool wiring schematic:

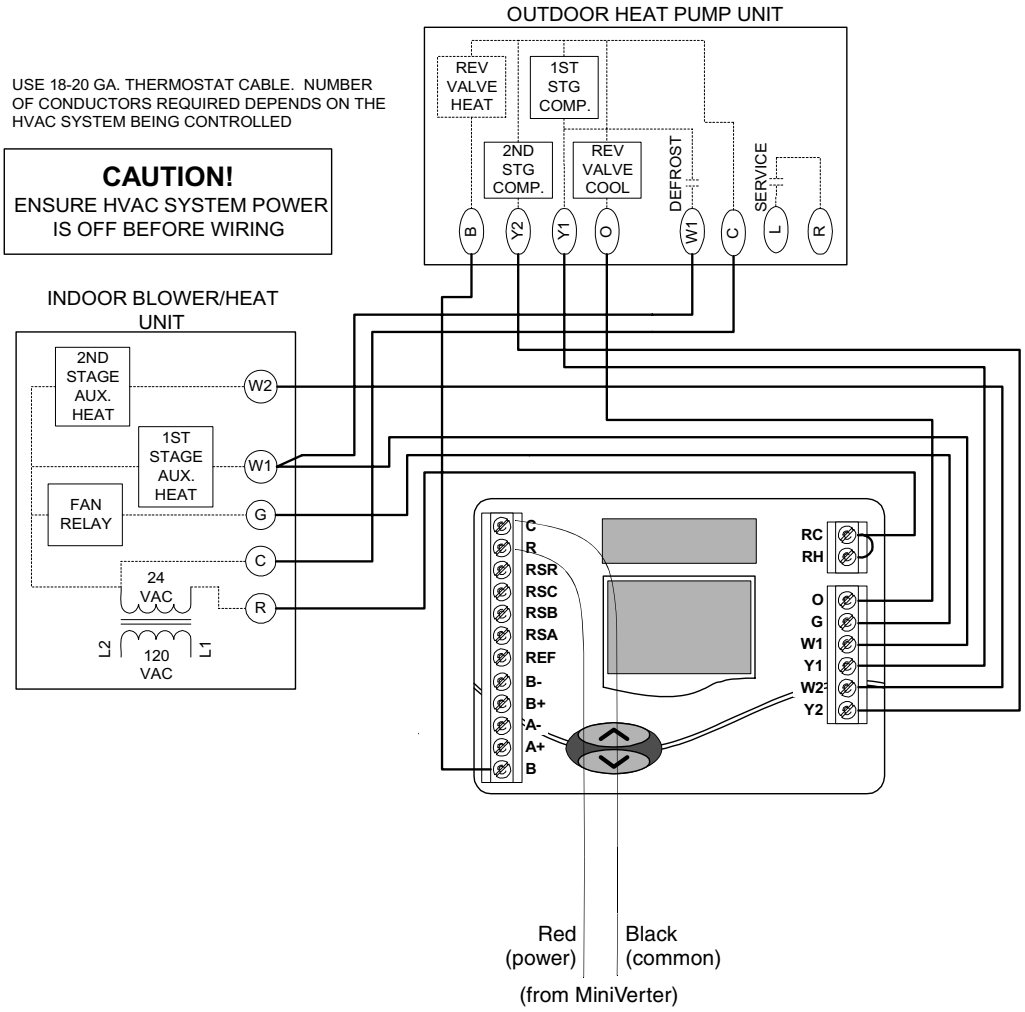


FIG. 15 Typical heat pump wiring schematic

NOTE

For additional HVAC system wiring diagrams (for Single-Stage Furnace and AC, Two-Stage Furnace and Two-Stage AC, Roof-Top Unit (Two-Stage Heat and Two-Stage Cool), Boiler With AC (Two Transformers), and Single Stage Heat Pump Configurations, refer to the Wiring Diagrams section on page 26.

Checking HVAC System Operation

Use the thermostat buttons to verify that the thermostat is controlling the equipment operation. A checkout procedure is supplied in the installation instructions supplied with thermostat. This procedure will verify only that the thermostat operates the equipment.

The HVAC installer may need to connect 24VAC to the R and C terminals to check HVAC operation. If the automation system is to be installed after the HVAC installation, leave the R and C terminals connected to ensure the HVAC system operates. If the automation system is installed before either the placement of HVAC wiring or an external power supply is used, then do not connect HVAC wires to R and C.

When the thermostat is first turned on all of the graphics of the main LCD are momentarily displayed; this will look like FIG. 16.

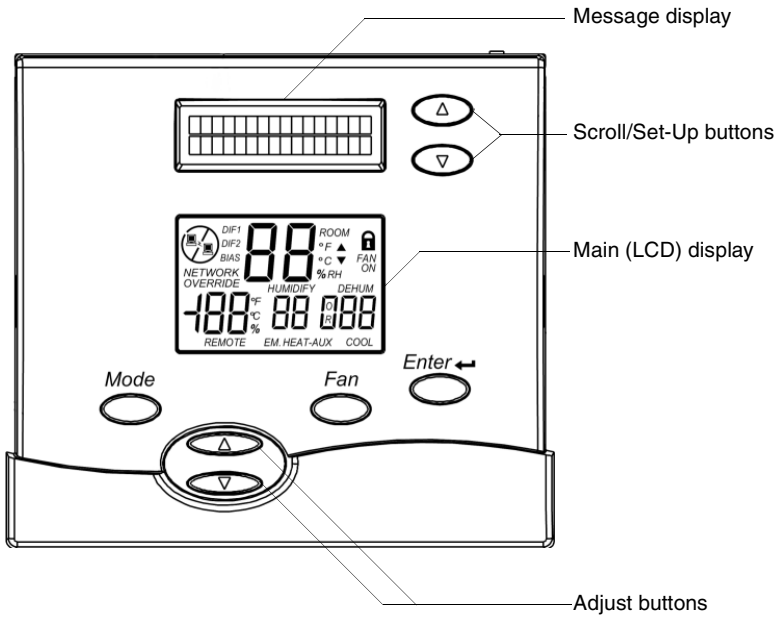


FIG. 16 Front panel (with all graphics on Main LCD displayed)

Check Out Procedure

CAUTION

The following check-out procedure will turn the heating and cooling equipment on and off. Do not operate in cooling at low outdoor temperatures. Do not operate in heating at high outdoor temperatures. Refer to the HVAC equipment manufacturer specifications for safe operating temperatures.

Use the Check Out procedure (below) to determine if the thermostat is controlling the HVAC equipment.

1. Press the **Mode** button, and look for the OFF message on the Main display.
2. Press the **Fan** button. The system blower should start and the message FAN ON appears on the Main display. Press **Fan** again to stop.
3. Press the **Mode** button until the COOL message appears, along with the current cool setting on the Main display.
4. Use the **down arrow** button to lower the set point 3°F below room temperature. In 5 to 10 seconds the first stage of cooling begins, and the COOL message icon begins to flash. If there is a second stage it will begin in four minutes.
5. Press the **Mode** button until OFF appears n the Main display. During Check-out, change the mode to override the Minimum On time delays.
6. Press the **Mode** button until the HEAT message appears, along with the current heat setting in the Main display.

7. Use the up arrow button to raise the set point 3°F above room temperature. In 5-10 seconds, the first stage of heating begins and the HEAT message icon begins to flash. If there is a second stage it will begin in 4 minutes.

   Heat Pump Only: The message HEAT -AUX is displayed when the auxiliary heat terminal (W1) is energized. The LED on top of the thermostat will illuminate.

8. Press the **Mode** button until OFF appears in the Main display. During Check-out, change the mode to override the minimum On time delays.

9. Press the **Mode** button until EM.HEAT appears on the Main display. Repeat step 7 to verify Emergency Heat operation.

Optional HVAC Set-Up Features

There are a number of HVAC features that can be configured for the particular application. These include temperature control options, display options and high/low balance points (heat pumps only).

- Temperature control options
- Balance points
- Display options

To access these HVAC set-up features

When first powered up, the message display will scroll through the current mode status, fan status, and heating/cooling output status. This is referred to as Passive Display because you do not interact with it. To get into the Set-Up Menu, press the Enter and Mode buttons at the same time. This is referred to as User Interactive Display, as the user navigates through various menu and sub-menu selections to change variables.

Set-Up is menu driven but only one menu item is visible at a time. FIG. 32 on page 39 shows the entire Main Menu. Selecting any one of the Main Menu items (by pressing the Enter button) will enter a corresponding Sub-Menu. The Scroll Up and Scroll Down buttons are used to move between menu items or change values.

The Enter button is used to select a menu item or enter a value. When in Thermostat Set-Up, if none of the three navigation buttons are pressed in 5 minutes, the display will return to Passive Display.

For detailed information on accessing and using the various Set-Up menus, refer to the *Set Up and Configuration* section on page 39.

Address the Thermostats and Set Highest Address

These steps must be done at each thermostat for communication to work properly.

1. Press the Mode and Enter buttons simultaneously at the thermostat. It may take a couple of tries to get them pressed together.

   This will enter the Thermostat Set Up Menu. The first menu item that will appear on the text messaging display is an informational item that indicates that only the Scroll Up, Scroll Down (two buttons located immediately to the right of the text display) and the Enter buttons are used in thermostat set up. This will remain on the display for approximately 5 seconds or until any of the three aforementioned buttons are pressed. Thermostat Set Up is a series of sub-menu's that allow you to customize the ViewStat in various ways. The *Set Up and Configuration* section on page 39 outlines the set up features. The following steps will guide you only through Communications Set Up sub-menu (FIG. 17).

2. Press the Scroll Down button until the "Communications Set Up" menu shows on the display.

3. Press the Enter button to select this menu.

4. The first sub-menu item is "Set Thermostat ADDRESS". Press the Enter button to select this item.

5. Set the address between 1 and 64 using the Scroll Up and Scroll Down buttons.
   - Each thermostat must have a unique address (i.e. no two thermostats can have the same address)
   - Start with address 1 and increment by 1 for each new address - do not skip an address. This will optimize communications speed.

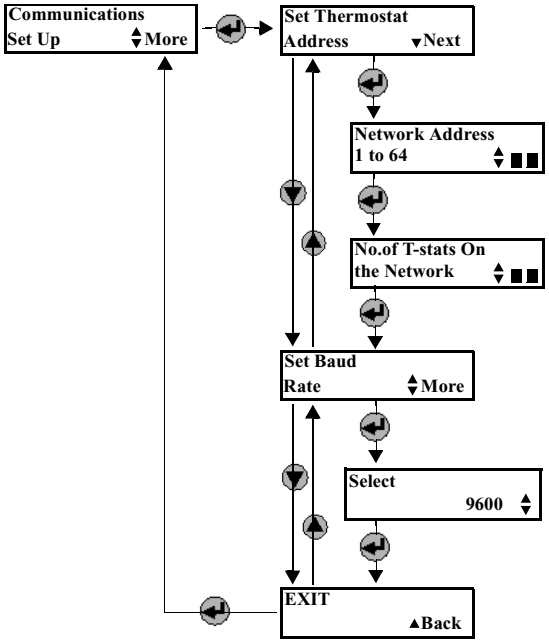


FIG. 17 Setting the thermostat address

NOTE

Write down the address for each thermostat.

6. After the address has been selected, press the Enter button to store the address.
7. Use the Scroll Up and Scroll Down buttons to set the "Number of Stats on the Network" to the highest address that will be on the thermostat network. This will be equal to the total number of thermostats on the network (unless one or more addresses are skipped - see step 5).

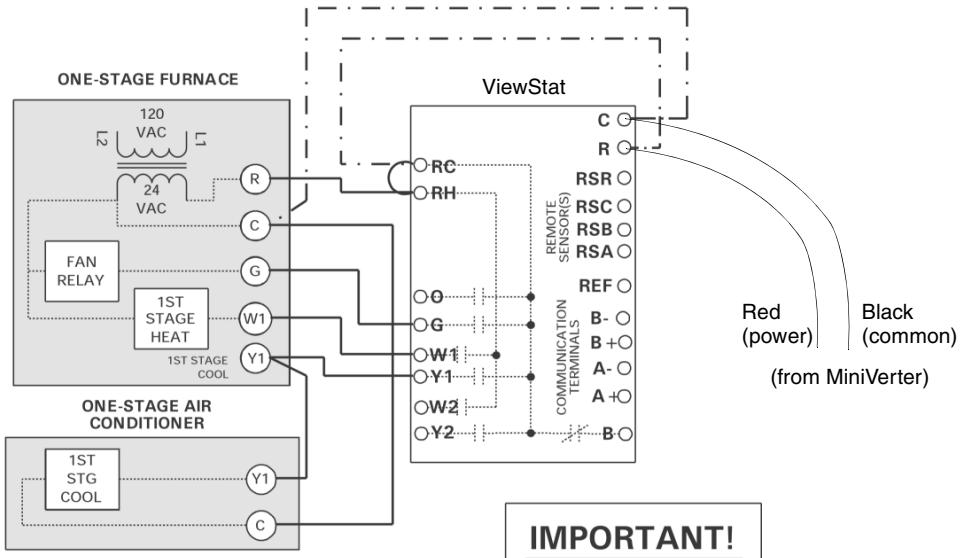
NOTE

This number must be set the same at each thermostat.

8. Press Enter to set the baud rate. The ViewStat must be set for 9600 baud to communicate with the miniverter. This is the default setting, and you shouldn't ever change this setting.
9. Press Enter to "Exit" the Communications Set Up sub-menu. This will return you to the main menu.
10. Press the Scroll Down button until "Exit" is displayed. Press the Enter button. The thermostat will then reset and return to normal operation.

Wiring Diagrams

Single-stage furnace and AC configuration.



NOTE: HVAC installer may need to connect 24V AC to the R and C terminals to check the HVAC operation. If the automation system is to be installed after the HVAC installation, leave the R and C terminals connected to ensure the HVAC system operates. If the automation system is installed before the HVAC wiring, then DO NOT connect HVAC wires to R and C.

IMPORTANT!

The B terminal is for reversing valve-heat. **DO NOT** connect the B terminal to common side of transformer.

24V FIELD WIRING
FACTORY WIRING
OPTIONAL 24V FIELD WIRING (SEE NOTE)

FIG. 18 Single-stage furnace and AC configuration

Two-stage furnace and two-stage AC configuration.

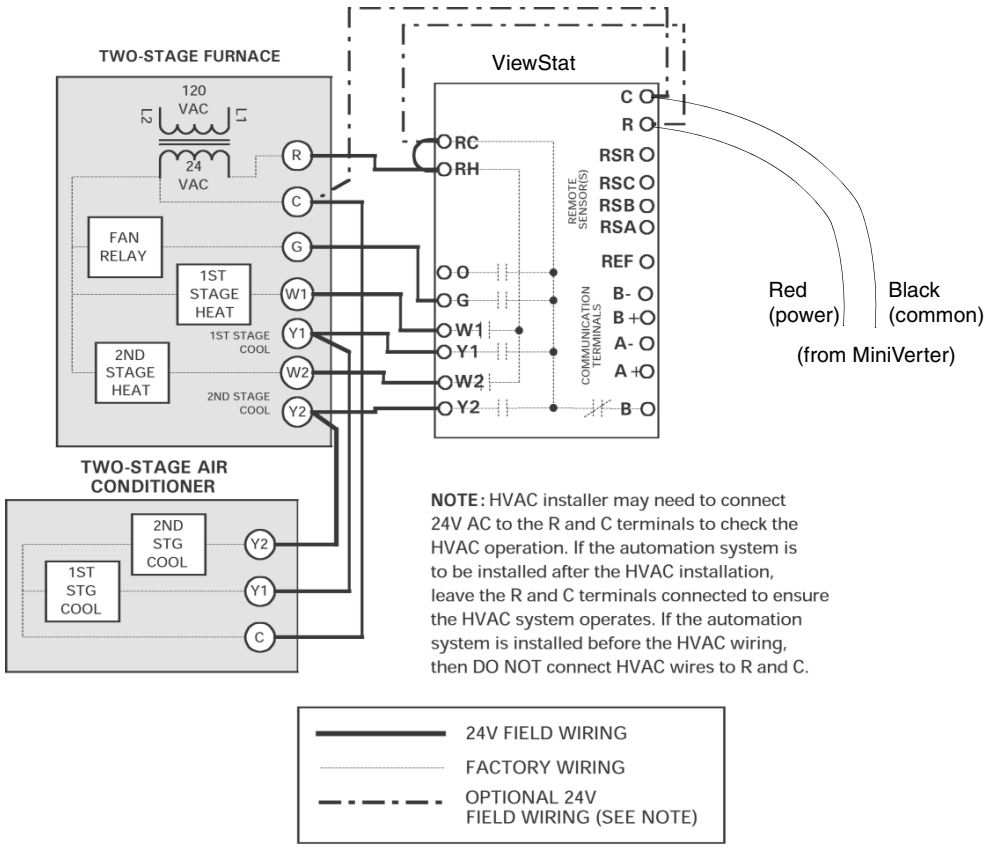


FIG. 19 Two-stage furnace and two-stage AC configuration

NOTE

IMPORTANT! *The B terminal is for reversing valve-heat. DO NOT connect the B terminal to the common side of the transformer.*

Roof top unit (two-stage heat and two-stage cool) configuration.

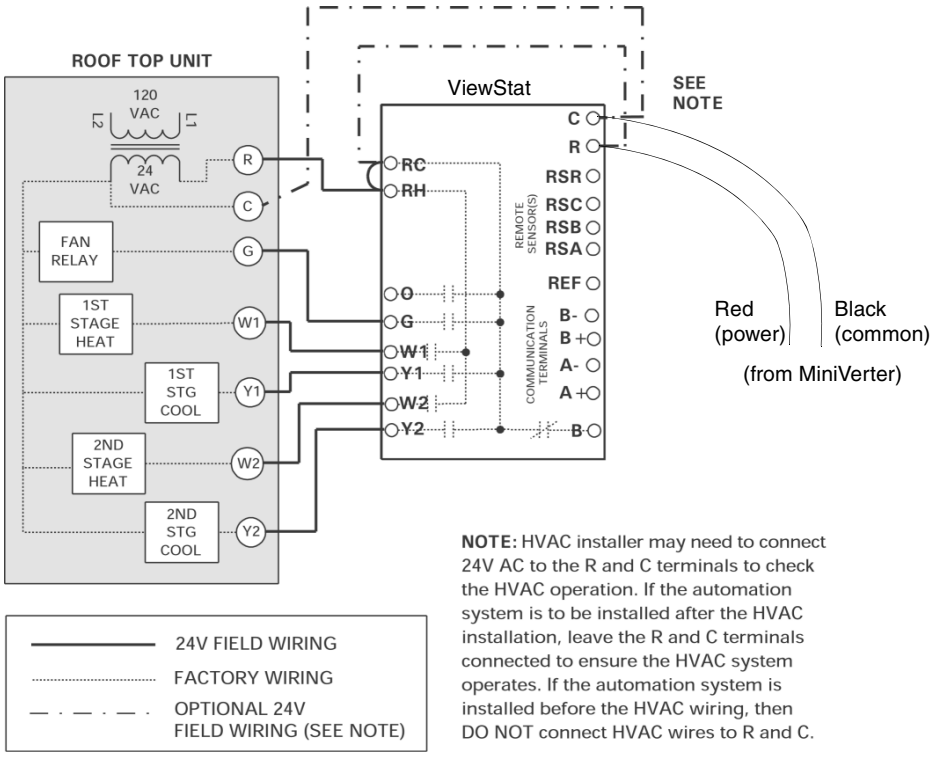


FIG. 20 Roof top unit (two-stage heat and two-stage cool) configuration

NOTE

IMPORTANT! *The B terminal is for reversing valve-heat. DO NOT connect the B terminal to the common side of the transformer.*

Boiler with AC (two transformers) configuration.

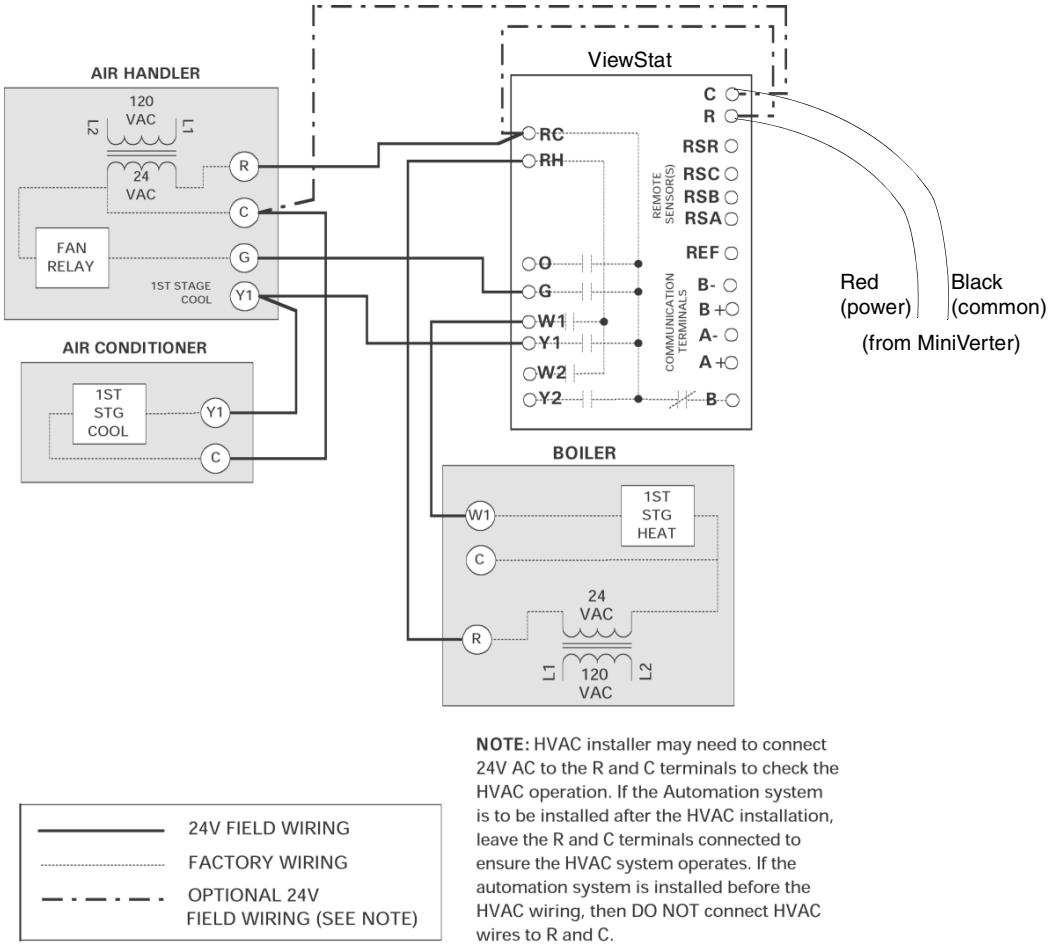


FIG. 21 Boiler with AC (two transformers) configuration

NOTE

IMPORTANT! *The B terminal is for reversing valve-heat. DO NOT connect the B terminal to the common side of the transformer.*

Single-stage heat pump configuration

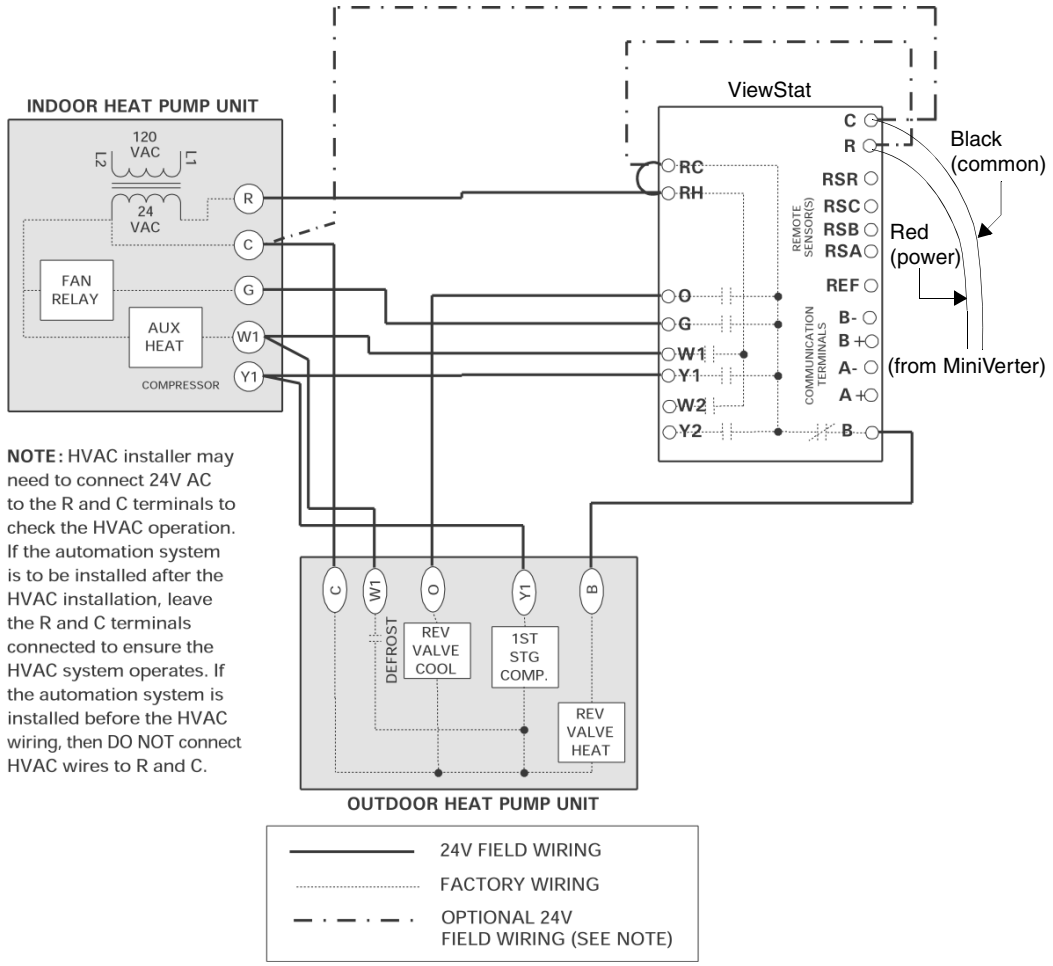


FIG. 22 Single-stage heat pump configuration

NOTE

IMPORTANT! *The B terminal is for reversing valve-heat. DO NOT connect the B terminal to the common side of the transformer.*

Two-stage heat pump configuration.

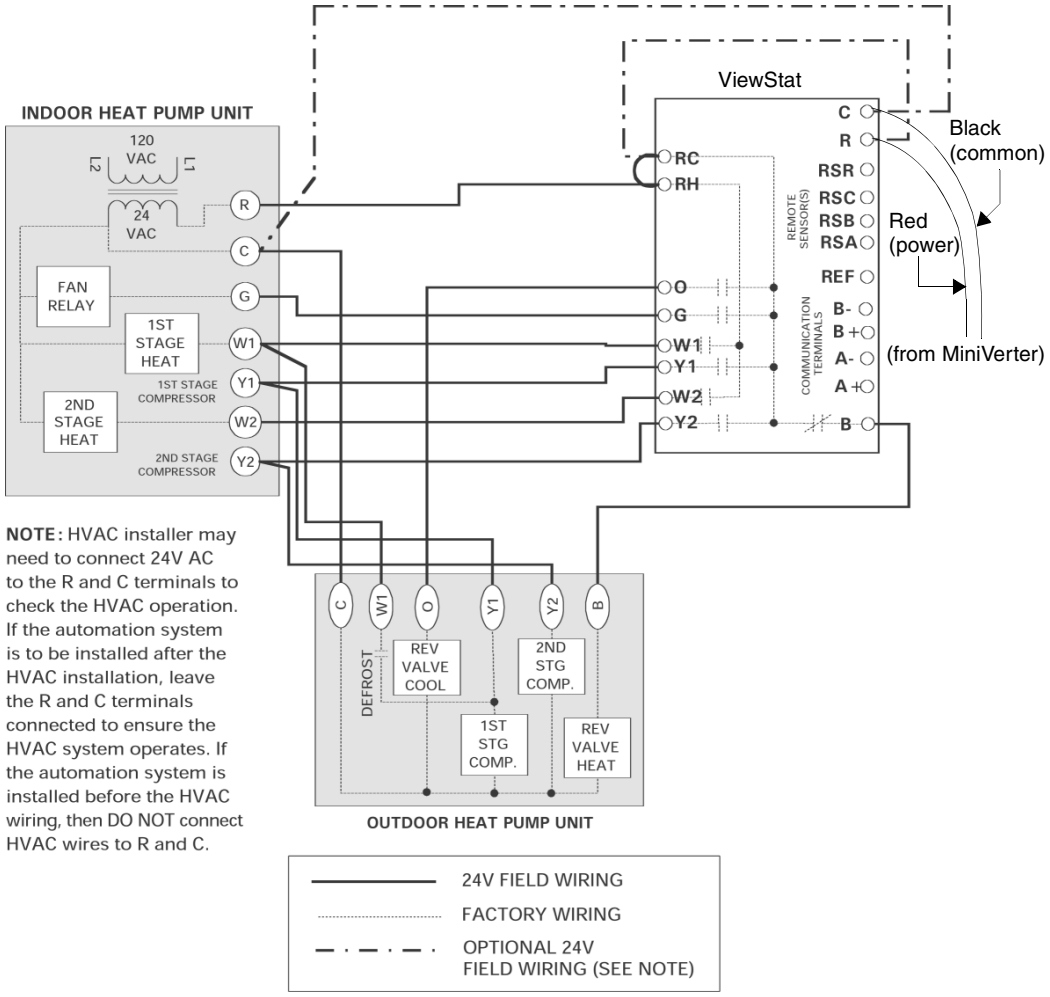


FIG. 23 Two-stage heat pump configuration

NOTE

IMPORTANT! *The B terminal is for reversing valve-heat. DO NOT connect the B terminal to the common side of the transformer.*

First- stage radiant floor heat, second-stage furnace one stage of cooling configuration.

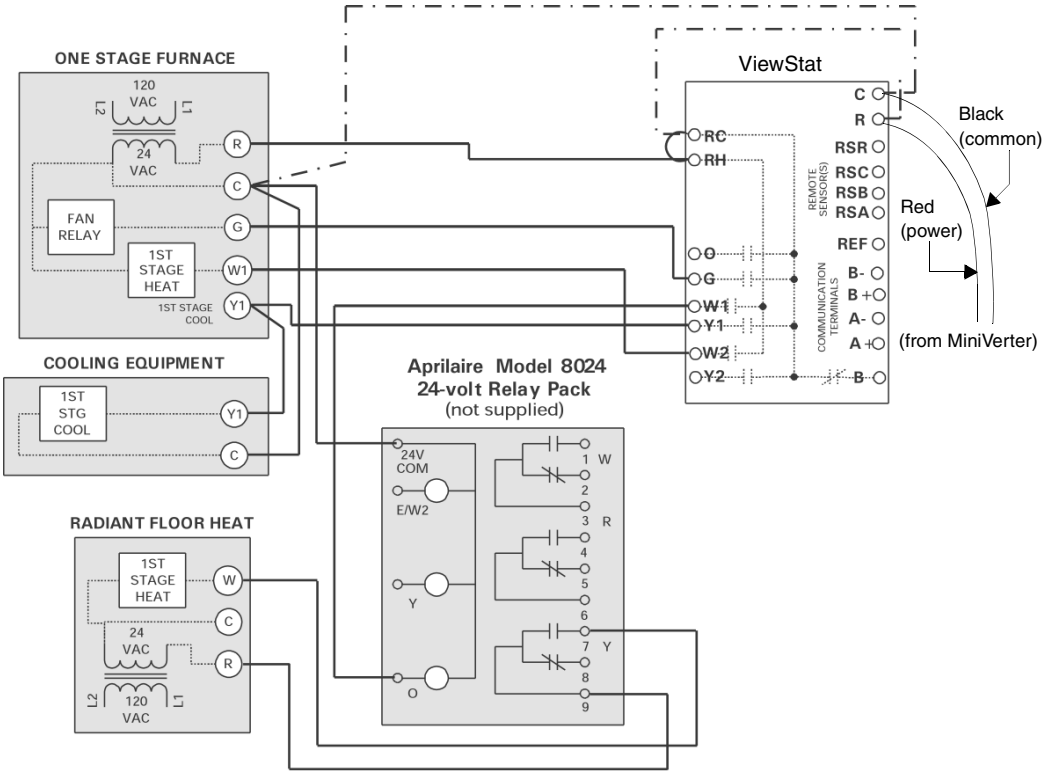


FIG. 24 First-stage radiant floor heat, second-stage furnace one stage of cooling configuration

NOTE

IMPORTANT! *The B terminal is for reversing valve-heat. DO NOT connect the B terminal to the common side of the transformer.*

Support Module Installation and Wiring

Follow the guidelines for placement of the support modules (as described below), and locate the ViewStat indoors where the operating range of the ViewStat (32° - 99°F/0° - 37°C) will not be violated (i.e. do not install in a cold garage or hot equipment room). Refer to the *Support Module Specifications* section on page 3 for more information on the modules.

The thermostat will display one of the following sets of information:

- The remote temperature on the support module at address 1 if its mode is set to "control".
- The average temperature of all support modules set to "control".
- The humidity of the VST-TRH sensors set to the "control" mode.

Installing the VST-TTM and VST-TRH Support Modules

Choosing a mounting location

In choosing a mounting location for the support module(s), locate an interior wall surface in an area free from drafts. The maximum distance from the thermostat is 1000 ft. (304.8 m).

- Do not mount support module on an exterior wall.
- Avoid routing wires near sources of noise such as computer monitors or fluorescent lights.

Single Support Module Installation

1. Install the Viewstat according to the instructions in the *ViewStat Installation and Wiring* section on page 7. Check to ensure that thermostat is operating (display shows correct temperature).

CAUTION

Remove the thermostat from its sub-base before wiring the support module to avoid damage from live wire.

2. Choose the wall location where the VST-TTM or VST-TRH module will be mounted. Run CAT-5 wire from the thermostat to the support module location (max distance = 1000 ft./304.8 m).
3. Open the support module case by pulling the cover straight forward, as shown in FIG. 25:

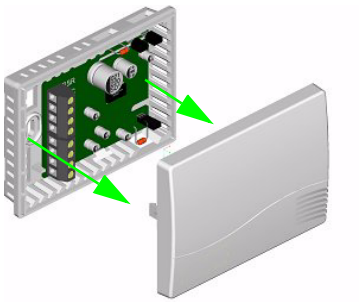


FIG. 25 Opening the support module case

4. Remove the circuit board from the base by pulling back the latch that holds it at the bottom center, as shown in FIG. 26:
5. Use the sub-base as a template to mark the mounting hole locations on the wall. The word "TOP" is written in the sub-base. Position the sub-base so that the wires can be pulled through the hole in the top left-hand corner. Drill size for the wall anchors is 3/16 inch. Mount the sub-base using the two #6 screws and anchors provided (larger screws will prevent the circuit board from properly snapping into place).

   If side access is preferred for wiring, clip out the side vents on the scored lines (FIG. 27).

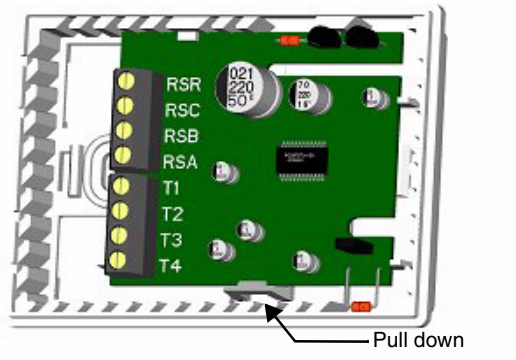


FIG. 26 Removing the circuit board

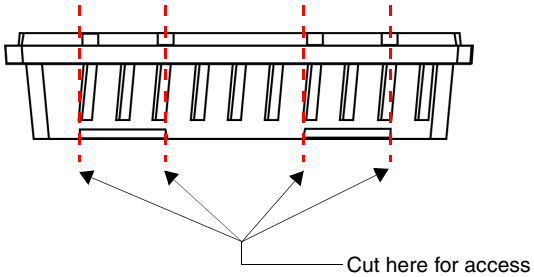


FIG. 27 For side access, cut out the side vents on the scored lines.

6. Snap the circuit board back into the sub-base by sliding the top of the board in first and then snapping down on the bottom. Check to be sure that the latch holds the board properly.
7. Strip ¼ inch of insulation from the four wires at the support module. Install the wires in the terminals labeled RSR, RSC, RSB and RSA. One twisted pair of wires should be used for the RSR and RSC connection and another pair of twisted wires should be used for the RSB and RSA connection. Push the extra wire back into the wall cavity. Seal the hole in the wall around the cable to eliminate any draft that might affect the sensor.
8. Connect the wires on the thermostat sub-base to the terminals labeled RSR, RSC, RSB and RSA on the ViewStat base (see FIG. 5 on page 10) and the Communication and Equipment Terminal Wiring Definitions table on page 20). Make sure that each terminal on the support module is wired to the terminal with the same label at the thermostat.
9. If necessary, change the Support Module DIP switch settings as described in *Setting the Support Module DIP Switches* section on page 35.

NOTE

DIP switches must be set prior to powering the support module (support module is powered when thermostat is returned to its base). If switches need to be changed after powering the support module, the thermostat must be removed from its base for a minimum of 15 seconds to ensure proper reset of the support module.

10. Mount the thermostat on the sub-base and confirm that it is displaying the right temperature from the support module or remote sensor.

Multiple Support Module Installation

Up to 4 support modules can be connected to provide temperature or humidity averaging in a large area or for several zones being controlled by the same system. The maximum cumulative distance of all the support modules from the ViewStat is 1000 ft (304.8 m).

FIG. 28 shows daisy-chaining of the VST-TTM Remote Temperature and VST-TRH Remote Temperature/ Humidity Sensors.

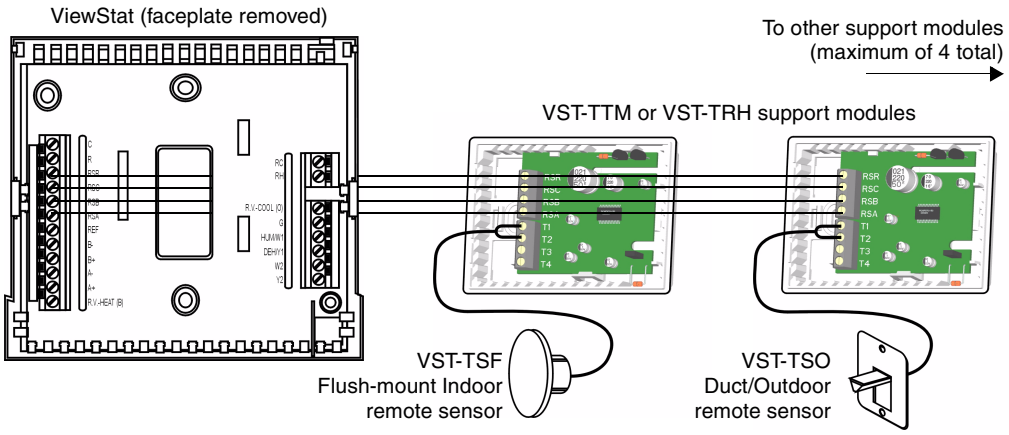


FIG. 28 Daisy-chaining VST-TTM Remote Temperature and VST-TRH Remote Temperature/Humidity support modules

CAUTION

Always make sure that there is no power to the modules by removing the thermostat from the sub-base.

1. Remove the thermostat from the sub-base.
2. Wire the first sensor using the single support module instructions. Daisy chain the remaining support modules as shown below (FIG. 29).

Thermostat	Module 1	Module 2	Module 3	Module 4
RSR	RSR	RSR	RSR	RSR
RSC	RSC	RSC	RSC	RSC
RSB	RSB	RSB	RSB	RSB
RSA	RSA	RSA	RSA	RSA

FIG. 29 Daisy-chaining support modules

3. Set the VST-TTM or VST-TRH Support Module DIP switches as described in the following *Setting the Support Module DIP Switches* section.
4. Replace the thermostat on the sub-base. Check for proper operation of each sensor.

Setting the Support Module DIP Switches

Both the VST-TTM and VST-TRH support modules contain a 6-position DIP switch (FIG. 30) located on the circuit board to set the support modules address, mode (monitor/control), and the temperature sensor source (T1/T2 or Onboard Sensor). The ViewStat displays the temperature reading of whichever remote sensors are connected to support modules *in control mode*. When multiple support modules are connected and in control mode, the ViewStat displays an average of all incoming temperature readings. If all connected support modules are set to monitor mode, then the ViewStat displays the temperature reading from the on-board sensor, and the temperature from the remote sensor (or the average temperature if you're using multiple sensors) is displayed as the REMOTE temperature.

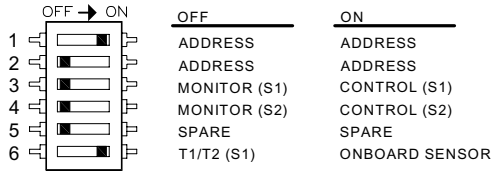


FIG. 30 VST-TTM or VST-TRH support module DIP switch

DIP switches 1 and 2: Address (1-4)

The following diagram shows how to set the top two address DIP switches. Each support module must have its own address (1-4).

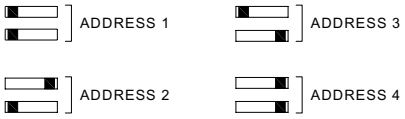


FIG. 31 Setting the top two address switches (switches 1 and 2)

DIP switch 3: Temperature Sensor 1

Each support module has two sensors: Sensor 1 and Sensor 2. Determine whether you want the Sensor 1 input to monitor or control temperature. If DIP switch number 3 is in the "off " position, it will monitor the temperature.

NOTE

If the support module is set to Address 1 and the Sensor 1 input is set to "monitor", then the monitored temperature will be displayed as the remote temperature in the lower left hand corner of the thermostat. Otherwise, the monitored value will only be available through the home automation system.

If DIP switch 3 is set to the "on" position, it will use the Sensor 1 temperature to control the thermostat. The sensor control temperature will be displayed on the thermostat. If multiple sensors are daisy chained together, all of the sensors set to control will be averaged and the average temperature will be displayed on the thermostat.

Dip switch 4: Temperature Sensor 2 (VST-TTM support module only)

Sensor 2 is for an external flush-mount or outdoor/duct temperature sensor for the VST-TTM support module.

Determine whether you want the Sensor 2 input to monitor or control temperature. If DIP switch number 4 is in the "off " position, it will monitor the temperature.

If DIP switch 4 is set to the "on" position, it will use the reported temperature to control the thermostat. The sensor control temperature will be displayed on the thermostat. If multiple support modules are daisy chained together, all of the sensors set to control will be averaged and the average temperature will be displayed on the thermostat.

Dip switch 4: Humidity Sensor 2 (VST-TRH support module only)

Sensor 2 is for an onboard humidity sensor for the VST-TRH support module.

Determine whether you want the Sensor 2 input to monitor or control humidity. If DIP switch number 4 is in the "off" position, it will monitor the humidity level (%).

If DIP switch 4 is set to the "on" position, it will control the humidity level and the value will be displayed on the thermostat (with a % sign to indicate humidity). Up to 4 support modules can be daisy chained together. All humidity sensors that are set to "Control" mode will be averaged and the average humidity will be displayed on the thermostat.

NOTE

If any of the remaining temperature sensors are also set to "control", the temperature control averaging will override the humidity control averaging and humidity control values will be ignored by the thermostat. To ensure that the thermostat recognizes humidity control values, make sure that all temperature sensors (for this thermostat) are set to the "Monitor" mode.

DIP switch 6: T1/T2 or Onboard Sensor

Determine whether you want the Sensor 1 input to use the temperature sensed by the onboard thermistor or to use the input from a remote sensor (i.e. flush mount sensor or duct/outdoor sensor). If DIP switch number 6 is in the "off" position it will use the remote sensor inputs (T1/T2). If the DIP switch is in the "on" position, it will use the temperature input from the onboard thermistor. This option only exists for the Sensor 1 input and can still be configured to monitor or control.

NOTE

The ViewStat will not display temperature or humidity (Sensor 1 or Sensor 2) values if DIP switch 6 is set to T1/T2 without wiring a sensor to the T1/T2 terminal. If a sensor is connected to the T1/T2 terminal; DIP switch 6 ***MUST*** *be set to* ***Off*** *or an invalid temperatures will be reported to the ViewStat.*

Applications

Heat Pump Applications

If the support module is being used with a heat pump thermostat with auxiliary heat, the thermostat can be configured to disable the use of auxiliary heat during warm weather and to lock out the compressor when the outdoor temperature is too cold. This allows for the most efficient use of energy.

At warmer temperatures, a heat pump will operate much more efficiently than the auxiliary heat. It can save energy to disable auxiliary heat in some cases, for example, when returning from a setback on a mild day. The temperature above which auxiliary heat is disabled is the auxiliary lockout temperature or high balance point. Refer to the thermostat user manual for a detailed explanation.

Air-to-air heat pumps become less efficient as the outdoor temperature drops. The temperature at which it becomes more efficient to use auxiliary heat instead of the heat pump is the balance point or low balance point.

Configure the temperature sensor (T1/T2) that you are using to sense outdoor temperature to the "Monitor" mode by setting the DIP switch 3 to the "off" position and the support module address to number 1. The high and low balance points are set at the thermostat.

Humidity Control (VST-TRH only)

In order to set your thermostat up as a humidity controller, you will need at least one (up to four for averaging) VST-TRH (temperature/humidity) support module(s) wired to the thermostat.

1. Locate the VST-TRH Support Module in the area that you want to control humidity.
2. Set the T3/T4 sensor (Humidity) Input to "Control" by moving the # 4 DIP switch to the "on" position. Up to four T3/ T4 humidity sensors can be set to control and the reported values will be averaged and displayed on the thermostat.

NOTE

None of the temperature sensors connected to this ViewStat can be set to control mode because a control temperature input to the ViewStat will override a control humidity input. Make sure all temperature sensors connected to this ViewStat are set to "Monitor".

3. Once the humidity control sensor(s) have been wired to the ViewStat, the thermostat display will change to indicate % RH instead of °F/°C. The thermostat mode selections will also change to reflect humidity control. The modes are "*Humidify*", "*Dehumidify*", "*Humidify or Dehumidify*" and "*Off*". Humidification/ Dehumidification set points are changed the same way that temperature control set points would be changed.

Mode of Operation Set to "Humidify"

The B terminal is continually energized in the "Humidify" mode. When the thermostat calls for humidity, the W1/HUM terminal will energize. If the minimum off time of 2 minutes has not elapsed since the previous call, no terminals will energize until it has. All energized terminals will remain energized for the minimum on time of 2 minutes.

Mode of Operation Set to "Dehumidify"

The O terminal is continually energized in the "Dehumidify" mode. When the thermostat calls for dehumidification, the Y1/DEHUM terminal will energize. If the minimum off time of 4 minutes has not elapsed since the previous call, no terminals will energize until it has. All energized terminals will remain energized for the minimum on time of 4 minutes.

Troubleshooting Remote Sensors

- **Thermostat has no display:** Check 24 VAC supply. Check for incorrect wiring between the thermostat and support module. Incorrect wiring can damage the thermostat and transformer or blow a fuse in the equipment.

  Also, verify that all support modules have a unique address.
- **Thermostat displays very high temperature or humidity:** Ensure that DIP switch 6 is set properly. If DIP switch 6 is set to T1/T2 and a sensor has not been wired to the T1/T2 terminal, no temperature or humidity readings will be displayed. Also, if DIP switch 6 is set to onboard and a remote sensor has been wired to the T1/T2 terminal, incorrect temperature readings will be displayed. Check wires on remote sensors (flush mount or outdoor/duct) to ensure that they are not touching. If they are, separate them.
- **Thermostat displays very low temperature:** Remote sensor (flush mount or outdoor/duct) is not connected to support module properly. Check wiring.
- **Thermostat doesn't display remote temperature/humidity:** Make sure that the support module is set to address 1. Reset support module after changing any DIP switches by turning off power for approximately 15 seconds.
- **Thermostat displays RH instead of °F or °F instead of RH:** Make sure that monitor/control DIP switches are set correctly. Reset support module after changing any DIP switches by turning off power for approximately 15 seconds.

Set Up and Configuration

The ViewStat has many features that can be adjusted to customize operations. *Temperature Control Set Up*, *Balance Point Set Up* and *Communications Set Up*, in particular, should only be adjusted with the help of a qualified service technician.

When first powered up, the Message Display will scroll through the current mode status, fan status, and Heating/Cooling output status. This is referred to as Passive Display because you do not interact with it. To get into the set-up menu, press the **Enter** and **Mode** buttons simultaneously.

Thermostat Set-Up is menu driven but only again, one menu item is visible at a time. FIG. 32 shows the entire Main Menu. Selecting any one of the Main Menu items (by pressing the Enter button) will enter a corresponding Sub-Menu. The Scroll Up and Scroll Down buttons are used to move between menu items or change adjustable values. The Enter button is used to select a menu item or enter a value. When in Thermostat Set-Up, if none of the three navigation buttons are pressed in 5 minutes, the display will return to Passive Display.

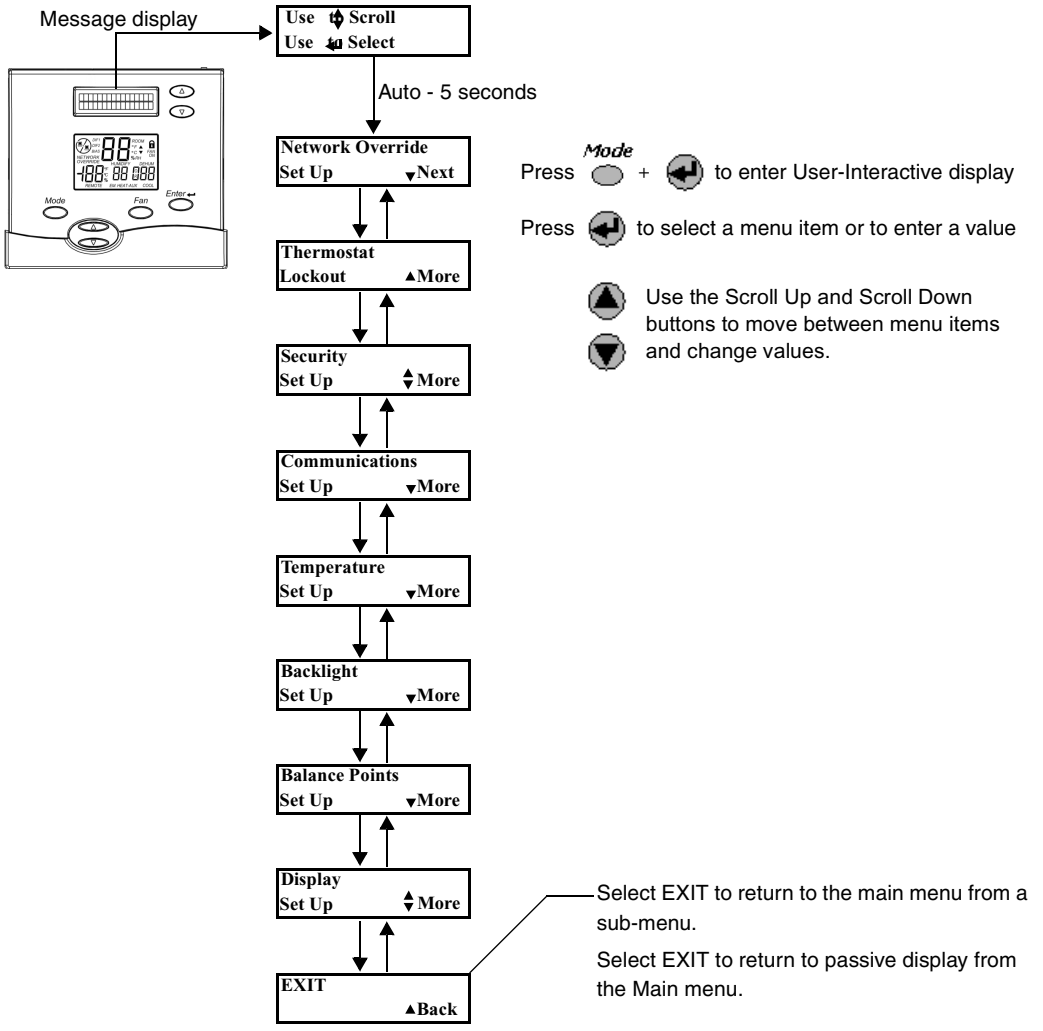


FIG. 32 Main Menu

The following items are configured in thermostat set-up:

Network Override Set-Up

This enables or disables the Network Override feature. When Network Override has been invoked the thermostat will only respond to the buttons of the thermostat; commands sent by the automation system are ignored.

Pressing the Enter button activates Network Override. However, you can disable this feature if you don't want users to be able to activate Network Override. Enabling and Disabling of this feature is done through Thermostat Set-Up (FIG. 33).

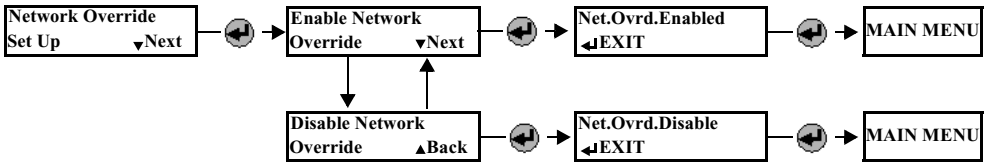


FIG. 33 Network Override set-up

Thermostat Button Lockout

This feature partially or completely disables the buttons of the thermostat. For example, the MODE and FAN status can be set and then locked, so the buttons will not allow those settings to be changed. Additionally, this can be set to allow changes for a limited time and amount of change. For example, you can limit temperature changes to ±3°, if desired (FIG. 34).

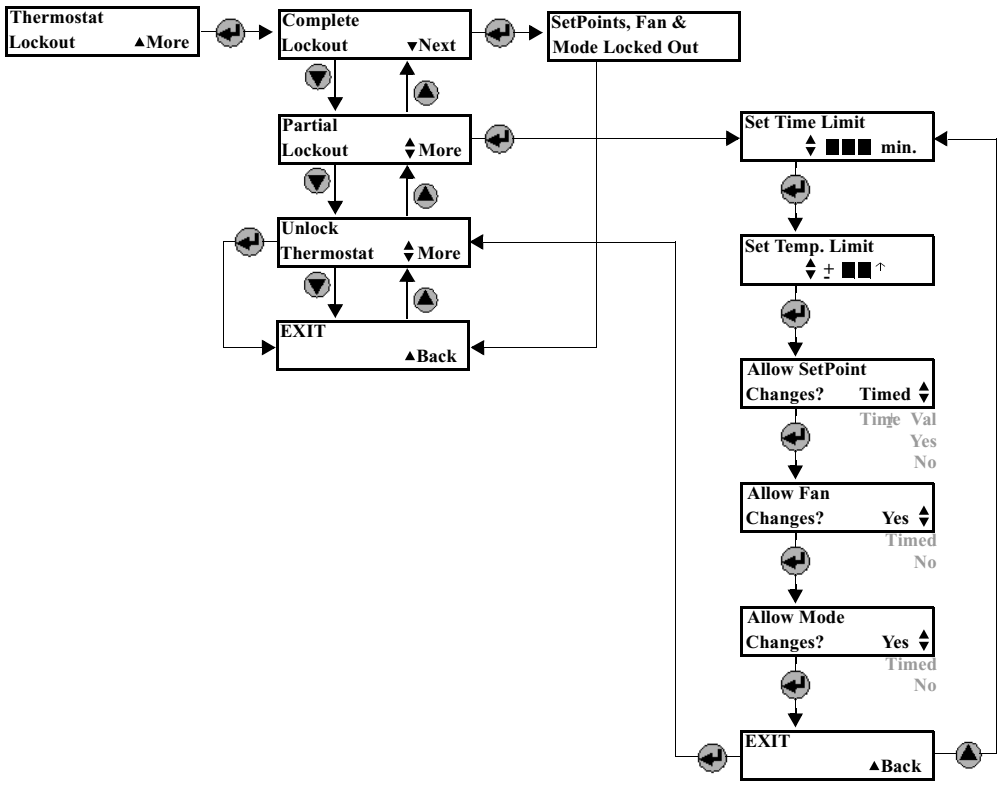


FIG. 34 Thermostat Button Lockout

Security Set-Up

This prevents unauthorized individuals from accessing Thermostat Set-Up. A code can be setup that must be entered to gain entry into Thermostat Set-Up (FIG. 35).

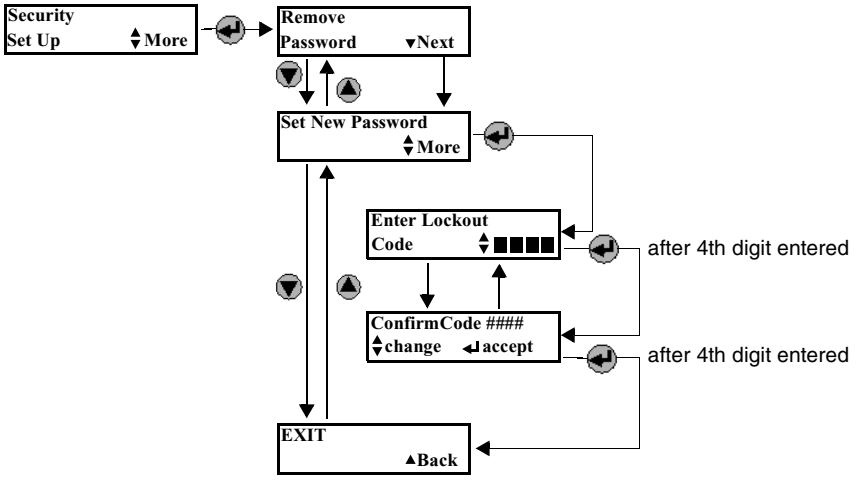


FIG. 35 Security set-up

FIG. 36 shows the display when a password has been activated, and entry into Thermostat Set-Up menu is attempted..

NOTE

The master key password is 7777.

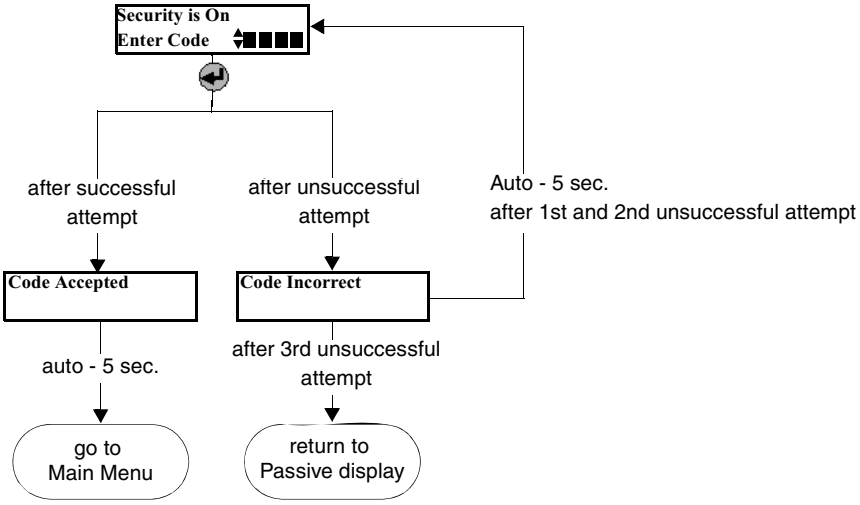


FIG. 36 Master key password

To reset the password to 7777, you must cycle power to the ViewStat.

NOTE

An easy way to cycle power on the ViewStat without having to remove power from the HVAC system is to remove the ViewStat faceplate from the base (see FIG. 2 and FIG. 3 on page 8), then replace it.

Communications Set-Up

This is where the thermostat address is entered. Additionally, the total number of thermostats (or the highest addressed stat on the network) is entered here to optimize communication timing. Consult a qualified service technician before changing any of the values in this Sub-Menu (Sub-Menu not shown).

Temperature Set-Up

The first and second stage differentials can be changed, as can the display temperature offset. The differentials set the tightness of the temperature control. If the equipment is operating too often, or the temperature swings are uncomfortably large, the differentials can be increased or decreased respectively. The temperature offset (calibration) allows the user to "customize" the temperature shown on the display. Consult a qualified HVAC service technician before changing any of the values in this Sub-Menu (Sub-Menu not shown).

Temperature Control Options	
OFFSET	Allows the user to offset the displayed room temperature ±3°F from true temperature. This thermostat is calibrated to be within ±1°F of true temperature.
1ST STAGE DIFFERENTIAL	Determines the level of control and consequently the cycle rate. Adjustable between 0.5°F and 2.0°F, this is the value above/below the set point that the temperature must rise (fall) to start the cooling (heating). It is also the value below (above) the set point that the temperature must fall (rise) for the cooling (heating) to stop. For example, if the temperature setting was 70°F and the 1st stage differential was set at 0.5°F, in the heat mode the heat would come on at 69.5°F and stay until the temperature was 70.5°F. A small differential will result in a tighter control, but more heating/cooling cycles.
2ND STAGE DIFFERENTIAL	Again adjustable between 0.5°F and 2.0°F, this also determines the level of control by determining when to use the 2nd stage of heating or cooling. It can also be used to keep 2nd stage cooling from coming on too soon when 1st stage is acting to control temperature levels or to keep costly auxiliary heat from coming on too soon when the heat pump is sufficient.

Backlighting Set-Up

Both displays have backlighting which can be controlled in three ways (FIG. 37). First, backlighting can be turned on every time a button is pushed. Second, it can be configured to come on with a button push, but only when the ambient light is below a preset value. When "only when needed" is selected, the user can select from two levels of ambient light. Finally, it can be disabled.

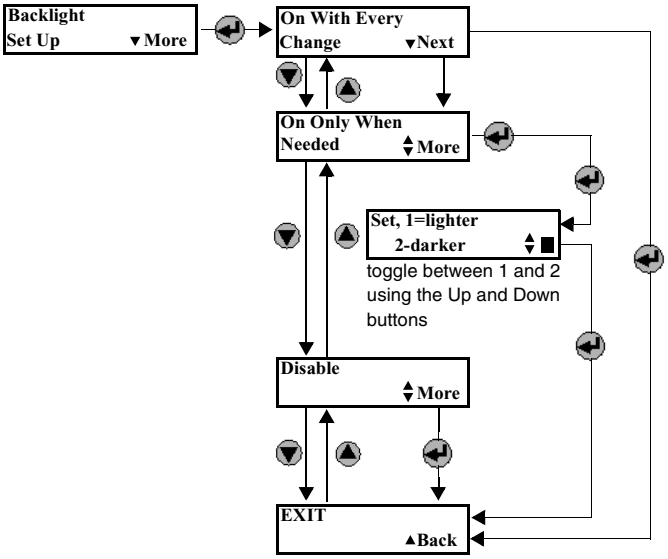


FIG. 37 Backlighting set-up

Balance Point Set-Up

Balance points limit heat pump operation when the outdoor temperature is too high or too low. It requires an optional support module with an outdoor temperature sensor. Consult a qualified HVAC service technician before changing any of the values in this Sub-Menu (Sub-Menu not shown).

These values are adjustable, but are only used by the thermostat when it has been configured to operate as a heat pump, and when a remote outdoor temperature sensor (with address #1) is wired to the thermostat (see the *Heat Pump Applications* section on page 37 for details).

Balance Point Options	
LOW BALANCE POINT	the outdoor temperature below which compressor terminals will not be energized.
HIGH BALANCE POINT	the outdoor temperature above which the auxiliary heat terminal will not be energized in the HEAT mode (does not effect Emergency Heat operation).

Display Set-Up

Here the temperature scale can be changed to °C or °F, and the temperature settings can be setup to always display or only when being changed (FIG. 38). The message display, when not being used for Thermostat Set-Up will, by default, scroll through three messages showing the status of the mode, fan, and equipment output. A fourth, date and time, can also be displayed in the scroll list.

Display Set-Up Options	
TEMPERATURE SCALE	all temperatures displayed including room temperatures and set points can be °F or °C.
SHOW TEMPERATURE SET POINTS ALWAYS	keeps the temperature settings visible on the display at all times.
SHOW TEMPERATURE SET POINTS ONLY IF CHANGED	displays the temperature settings (heat and/or cool) only when the user changes them. The first press of either the up or down adjust buttons will display the settings.
SHOW DATE AND TIME	the message display will, by default, scroll three messages showing the status of the mode, fan and equipment outputs. A fourth, date and time, can also be displayed in the scroll list.

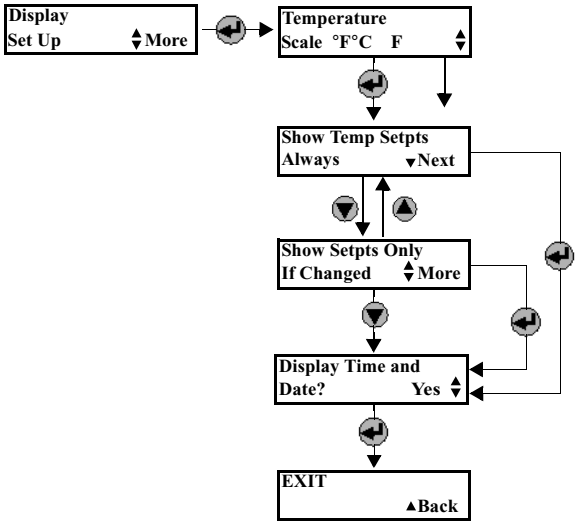


FIG. 38 Display set-up

Using the NetLinx Module to Program the ViewStat

AMX_ViewStat NetLinx Module - Overview

The ViewStat Communicating Thermostat may be controlled from a NetLinx system using the *AMX_ViewStat* NetLinx module. This module requires ViewStats to be connected through an ICSNet interface.

The ViewStat module is designed to save you the work of manually coding the entire ViewStat command set. By using the module, you'll save time, and still take full advantage of the ViewStat's features. While it is strongly recommended that you use the NetLinx module, it is also possible to write your own code "from scratch".

For a detailed description of the NetLinx programming protocol for the ViewStat, refer to the "ViewStat Programming Protocol Reference Manual", available on the AMX.COM web site.

When connecting thermostats (thermostat/mini-verter pair), it is best to initialize each mini-verter separately. If all mini-verter devices have the same device number and are on the bus at the same time, an initialization problem can occur where all devices obtain the same new device identification number. This is different from the serial number of the thermostat that is set locally at the thermostat.

The ViewStat may be controlled from a NetLinx system using the AMX_ViewStat NetLinx module. This module requires ViewStats to be connected through an ICSNet interface. The number of thermostats is limited by the number of ICSNet devices that may be connected at one time to the master. The initialization sequence is shown below.

```
DEFINE_DEVICE
VST     = 34001:1:0
VST_1   = 1:1:0
VST_2   = 2:1:0
VST_OPS = 33001:1:0

DEFINE_VARIABLE
VST_ZoneCnt      = 1
Scale            = 1

dev VSTArry[]    =
{
       VST_1,
       VST_2
}
integer VSTStatNum[] =
{
       1,
       1
}
DEFINE_MODULE 'AMX_VST' myVST (VSTArry, VST_OPS, VSTStatNum, VST_ZoneCnt, Scale)
```

It is important that the serial number array be the same length as the device array. If the serial number array happens to be shorter, the length will be set to that of the device array and the new members of the array will be set to the value 1. The two arrays are used to associate the ICSNet device number to the stat number of the thermostats (set locally through the thermostat's user interface)

Upon initialization, the VST module will retrieve the current settings of all of the thermostats on the network. This operation may take several seconds. During this time the NetLinx program will start receiving strings representing the states of all of the thermostat's controls. The above default temperature scale is Fahrenheit.

The ViewStat Communicating Thermostat is an enhanced version of the OPStat with the communication board built into the thermostat, advanced features and two displays. One display is for temperature, mode, limit settings, lock status, fan status, network communication and humidity. The second display is used for general text messaging for date, time, event status, and setup mode and user notifications.

The ViewStat can monitor remote temperature and humidity, has a flexible text mode setup and interface, and has the ability to lock local control of the thermostat.

Care must be taken when attaching to remote sensors in that the remotes can turn the thermostat into a humidity sensor that doesn't display the temperature in the main window. When acting as a humidity sensor, the temperature can be retrieved through the control interface only. The remote temperature is displayed in minor sections of the main window while the remote humidity inhabits the window center. When a remote sensor is attached, humidity changes do not generate a Change Of State message. Also, as a humidity sensor, the mode button will change from humidity to dehumidify and report accordingly over the control interface. To retrieve humidity, there is a conditional poll generated upon temperature events if the temperature event came from a humidity-supported device.

The VST_ZoneCnt is used to affect the wait period between successive commands being sent to the thermostats. The larger the VST_ZoneCnt value is, the longer the time delay between global commands becomes. The VST_ZoneCnt variable is associated with the serial number of a thermostat.

To install the ViewStat module, the developer must create an array of devices and an array of integers that stand for the serial number of the thermostat corresponding to the physical ICSNet device. Unless otherwise needed, the serial number of all thermostats should be set to '1', to allow the quickest response from the thermostat on global commands.

ViewStat also provides feedback from its local buttons: enter, scroll up, and scroll down. This allows the control system to track the menu navigation if desired.

The following diagram gives a graphical view of the interface between the NetLinx program and the NetLinx module.

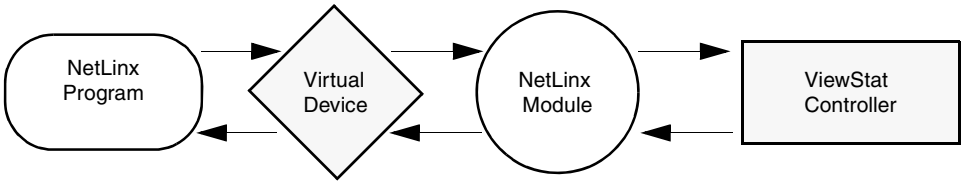


FIG. 39 Interface between the NetLinx program and the NetLinx module.

The ViewStat Model

The model will define a security system as consisting of the following components:

1. **System**: This refers the controller and all that it controls.
2. **Zone**: The system will consist of one or more ViewStat zones. A zone is nothing more than an area that can be controlled separate from other areas. Zones have their own temperature settings.
3. **Thermostat**: Each zone contains a thermostat. The thermostat is used for reading temperature and controlling when to turn on/off equipment as needed to maintain the desired temperature setting. Thermostats can control fans, heat, A/C., etc.
4. **Setpoint**: There are two types of setpoints: heat and cool. When the temperature reaches or falls below the heat setpoint the thermostat will turn the heat on (call for heat). When the temperature reaches or exceeds the cool setpoint the thermostat will turn the air conditioner on (call for air). These are also called comfort points. A user can keep the temperature within these points at all times by setting the setpoint values. For example, to maintain a temperature of 68-72 degrees the heat setpoint would be set to 68, the

cool setpoint would be set to 72. While the temperature is within this range nothing is done. Once the temperature falls outside this range the system takes action and switches to the appropriate mode.

5. **Humidify/Dehumidify**: Some systems can maintain the humidity level within a certain range. These are similar to temperature setpoints except instead of temperature control equipment the system is controlling humidify and dehumidify equipment.

Command Interface - SEND_COMMANDs

Various system wide operations may be performed by the NetLinx program via SEND_COMMANDs sent to the virtual device controlling the thermostats.

The supported commands are listed below.

Command Interface - SEND_COMMANDs	
Command	**Description**
'T-<tstat> COOL-<val>'	Set cool set point. Parameters: • <tstat> : id of thermostat/zone • <val>: + = increase cool set point by one degree - = Decrease cool set point by one degree 60-108 = new cool set point (F) Examples: 'T-4 COOL--' 'T-1 COOL-76'
'T-<stat> COOL?'	Query for current cool set point. Parameter: • <tstat>: id of thermostat/zone Example: 'T-16 COOL?'
'T-<tstat> DATE-<val>'	Set date. Parameters: • <tstat> : id of thermostat/zone • <val> : MMDDYY Example: 'T-1 DATE-030894'
'T-<tstat> DATE?'	Requests current date on thermostat
'T-<tstat> DEHUMIDIFY-<val>'	Set dehumidify set point. Parameters: <tstat> : id of thermostat/zone <val>: + = Increase dehumidify set point by one percent - = Decrease dehumidify set point by one percent 10-90 = dehumidify set point (in percent) Example: 'T-6 DEHUMIDIFY-70'
'T-<stat> DEHUMIDIFY?'	Query for current dehumidify set point. Parameter: • <tstat> : id of thermostat/zone Example: 'T-1 DEHUMIDIFY?'

Command Interface - SEND_COMMANDs (Cont.)	
Command	**Description**
'T-<stat> FAN?'	Query for current fan state. Parameter: • <tstat> : id of thermostat/zone Example: 'T-2 FAN?'
'T-<tstat> FMODE-<val>'	Set fan mode. Parameters: • <tstat> : id of thermostat/zone • <val> : 0 = let thermostat control the fan 1 = turn fan on T = toggle fan mode Example: 'T-12 FMODE-AUTO'
'T-<stat> FMODE?'	Query for current fan mode. Parameter: • <tstat> : id of thermostat/zone Example: 'T-2 FMODE?'
'T-<tstat> HEAT-<val>'	Set heat set point. Parameters: • <tstat> : id of thermostat/zone • <val> : + = increase heat set point by one degree - = decrease heat set point by one degree 38..88 = new heat set point (F) Examples: 'T-1 HEAT-+' 'T-1 HEAT-68'
'T-<stat> HEAT?'	Query for current heat set point. Parameter: • <tstat> : id of thermostat/zone Example: 'T-4 HEAT?'
'T-<tstat> HMODE-<val>'	Set humidify mode. Parameters: • <tstat> : id of thermostat/zone • <val>: OFF = disable (no humidity control) HUMID = enter humidify mode DEHUM = enter dehumidify mode AUTO = automatically control humidity based on humidify and dehumidify set points. T = toggle humidify mode Example: 'T-6 HMODE-AUTO'

Command Interface - SEND_COMMANDs (Cont.)	
Command	**Description**
'T-<stat> HMODE?'	Query for current humidify mode. Parameter: • <tstat> : id of thermostat/zone Example: 'T-22 HMODE?'
'T-<tstat> HOLD-<val>'	Set thermostat hold state. Parameters: • <tstat> : id of thermostat/zone • <val>: 0 = take thermostat out of hold mode 1 = place thermostat in hold mode T = toggle hold state Example: 'T-2 HOLD-ON'
'T-<stat> HOLD?'	Query for current hold state. Parameter: • <tstat> : id of thermostat/zone Example: 'T-1 HOLD?'
'T-<tstat> HUMIDIFY-<val>'	Set humidify set point. Parameters: • <tstat> : id of thermostat/zone • <val>: + = Increase humidify set point by one percent - = Decrease heat set point by one percent 10-90 = humidify point (in percent) Example: 'T-6 HUMIDIFY-30'
'T-<stat> HUMIDIFY?'	Query for current humidify set point. Parameter: • <tstat> : id of thermostat/zone Example: 'T-1 HUMIDIFY?'
'T-<tstat> HUM?'	Query for current inside humidity. Parameter: • <tstat> : id of thermostat/zone Example: 'T-14 HUM?'
'T-<tstat> ID?'	Get thermostat identification number.

Command Interface - SEND_COMMANDs (Cont.)	
Command	**Description**
'T-<tstat> LIGHT-<val>'	Control backlight on thermostat. Parameters: • <tstat> : id of thermostat/zone • <val> : 0 = off 1 = on T = toggle Example: 'T-1 LIGHT-T'
'T-<tstat> LOCK-<val>'	Set thermostat lock state. Parameters: • <tstat> : id of thermostat/zone • <val> : 0 = unlock thermostat 1 = lock thermostat T = toggle lock state Example: 'T-2 LOCK-ON'
'T-<stat> LOCK?'	Query for current lock state. Parameter: • <tstat> : id of thermostat/zone Example: 'T-10 LOCK?'
'T-<tstat> MENU-<val>'	When on, displays text as set by the MSG command. Parameters: • <tstat> : id of thermostat/zone • <val> : 1 = enables display of 'msg' message 0 = disables display of 'msg' message
'T-<tstat> MENU?'	Gets the current menu state
'T-<tstat> MODE-<val>'	Set HVAC mode. Parameters: • <tstat>: id of thermostat/zone • <val>: OFF = disable (no cool, no heat) HEAT = enter heat mode (no cool) COOL = enter cool mode (no heat) AUTO = let thermostat control heat and cool based on set points. T = toggle HVAC mode Example: 'T-6 MODE-AUTO'
'T-<stat> MODE?'	Query for current HVAC mode. Parameter: • <tstat> : id of thermostat/zone Example: 'T-1 MODE?'

Command Interface - SEND_COMMANDs (Cont.)	
Command	**Description**
'T-<tstat> MSG-<text>'	Displays text on thermostat window when MENU is enabled.
'T-<tstat> OUTHUM?'	Query for current outside humidity. Parameter: • <tstat> : id of thermostat/zone Example: 'T-14 OUTHUM?'
'T-<tstat> OUTTEMP?'	Query for current outside temperature. Parameter: • <tstat> : id of thermostat/zone Example: 'T-2 OUTTEMP?'
'T-<tstat> PASSTHRU-<data>'	Send data to thermostat with no processing by the module. The user can use this to send commands directly to the thermostat. Parameters: • <tstat>: id of thermostat/zone • <data> : data to send to thermostat Example: 'T-1 PASSTHRU-SOME COMMAND TO SEND'
'T-<tstat> TEMP?'	Query for current inside temperature. Parameter: • <tstat> : id of thermostat/zone Example: 'T-4 TEMP?'
'T-<tstat> TIME-<val>'	Set time. Parameters: • <tstat> : id of thermostat/zone • <val>: HHMMSS (24-hour clock) Example: 'T-1 TIME-163248'
'T-<tstat> TIME?'	Requests current time on thermostat.
'T-<tstat> TXT-<line>,<val>'	Set text message to be displayed in rolling message. Parameters: • <tstat> : id of thermostat/zone • <line>: 1-4 = message number to be set • <val> : string of text Example: 'T-8 MSG-1,Hello World!'
'T-<tstat> TXT?<line>'	Read text to be displayed on thermostat. Parameters: • <tstat> : id of thermostat/zone • <line>: 1-4 = message number to read • <val> : string of text Example: 'T-8 MSG-1,Hello World!'

Command Interface - SEND_COMMANDs (Cont.)	
Command	**Description**
'SCALE-<val>'	Global command to set the temperature scale. Parameter: • <val> : C = Celsius F = Fahrenheit (default) Example: 'SCALE-F'
'SCALE?'	Query for the current temperature scale. Example: 'SCALE?'
'USEDEBUG-<val>'	Global command to enable the sending of debug data to device 0. Parameter: • <val>: 1 = enables 0 = disables
'USEDEBUG?'	Query for the current debug state.
'VERSION?'	Query for the current version number of the NetLinx module. Example: 'VERSION?'

String Feedback

The NetLinx module will provide feedback to the glue code for ViewStat system changes via string events. Below are the strings supported. Data coming from the module will be in the form of strings. Data going to the module will be in the form of commands.

String Feedback	
String	**Description**
'T-<tstat> COOL-<val>'	Reports current cool set point. Parameters: • <tstat> : id of thermostat/zone • <val> : 60..108 = new cool set point (F) Example: 'T-1 COOL-76'
'T-<stat> DATE-<val>'	Reports thermostat date. Parameter: • <val>: MMDDYY, 062102 = (June 21, 2002)
'T-<tstat> DEHUMIDIFY-<val>'	Reports current dehumidify set point. Parameters: • <tstat> : id of thermostat/zone • <val> : 2-99 = dehumidify set point (in percent) Example: 'T-6 DEHUMIDIFY-70'

String Feedback (Cont.)	
String	**Description**
'T-<stat> FAN-<val>'	Reports current fan state. Parameters: • <tstat> : id of thermostat/zone • <val> : 0 = fan is off 1 = fan is on Example: 'T-2 FAN-1'
'T-<tstat> FMODE-<val>'	Reports current fan mode. Parameters: <tstat> : id of thermostat/zone <val> : ON = fan on AUTO = thermostat will control the fan Example: 'T-12 FMODE-AUTO'
'T-<tstat> HEAT-<val>'	Reports current heat set point. Parameters: • <tstat> : id of thermostat/zone • <val> : 38..88 = current heat set point (F) Example: 'T-1 HEAT-68'
'T-<tstat> HMODE-<val>'	Reports current humidify mode. Parameters: • <tstat> : id of thermostat/zone • <val> : OFF = disabled (no humidity control) HUMID = humidify mode DEHUM = dehumidify mode AUTO = automatically controlled based on humidify and dehumidify set points. Example: 'T-6 HMODE-AUTO'
'T-<tstat> HOLD-<val>'	Reports current thermostat hold state. Parameters: • <tstat> : id of thermostat/zone • <val> : ON = thermostat in hold mode OFF = thermostat no in hold mode Example: 'T-2 HOLD-ON'
'T-<tstat> HUM-<val>'	Reports current inside humidity. Parameters: • <tstat> : id of thermostat/zone • <val> : 0..100 = humidity level (%) Example: 'T-14 HUM-56'

String Feedback (Cont.)	
String	**Description**
'T-<tstat> HUMIDIFY-val>'	Reports current humidify set point. Parameters: <tstat> : id of thermostat/zone <val> : 0-97 = humidify point (in percent) Example: 'T-6 HUMIDIFY-30'
'T-<stat> ID-<val>'	Reports identification number of thermostat.
'T-<tstat> LOCK-<val>'	Reports current thermostat lock state. Parameters: • <tstat> : id of thermostat/zone • <val> : ON = thermostat is locked OFF = thermostat is unlocked Example: 'T-2 LOCK-ON'
'T-<stat> MENU-<val>'	Reports Menu state, ON/OFF.
'T-<tstat> MODE-<val>'	Reports current HVAC mode. Parameters: • <tstat> : id of thermostat/zone • <val> : OFF = disabled (no cool, no heat) HEAT = heat mode (no cool) COOL = cool mode (no heat) AUTO = thermostat automatically controls heat and cool based on set points. Example: 'T-6 MODE-AUTO'
'T-<tstat> OUTHUM-<val>'	Query for current outside humidity. Parameters: • <tstat> : id of thermostat/zone • <val> : 0..100 = humidity level (%) Example: 'T-8 OUTHUM-68'
'T-<tstat> OUTTEMP-<val>'	Reports current outside temperature. Parameters: • <tstat> : id of thermostat/zone • <val> : current outside temperature Example: 'T-2 OUTTEMP-84'
'T-<stat> PMES<num>-<val>'	Reports scrolling message. Parameters: • <num>: message 1-4 • <val>: data that message happens to be

String Feedback (Cont.)	
String	**Description**
'T-<tstat> TEMP-<val>'	Reports current inside temperature. Parameters: • <tstat> : id of thermostat/zone • <val> : current inside temperature Example: 'T-4 TEMP-76'
'T-<stat> TIME-<val>'	Reports thermostat time. Parameter: • <val>: HHMM, 1630 = (4:30 p.m.)
'T-<tstat> TXT-<line>,<val>'	Reports the text to be displayed for that message. Parameters: • <tstat> : id of thermostat/zone • <line>: 1-4 = message number • <val> : string of text Example: 'T-2 MSG-2, 'Went shopping''
'SCALE-<val>'	Reports current temperature scale. Parameter: • <val> : C = Celsius F = Fahrenheit (default) Example: 'SCALE-F'
'USEDEBUG-<val>'	Displays debug state. Parameter: • <data> : 1 = enabled 0 = disabled
'VERSION=xx.yy'	Reports current version number of the NetLinx module. Example: 'VERSION=2.46'

Operating the Thermostat

This section describes the front panel components, and gives instructions for operating the ViewStat thermostat. FIG. 40 shows the front panel.

Front Panel Components

Message Display

Two types of messages are displayed, *Permanent* and *Temporary* Messages. Permanent Messages are those that scroll continually during thermostat operation. Temporary (flashing) Messages are intended to catch your eye and must be reset to be removed from the display. Thermostats are shipped with default (permanent) status messages (i.e. mode status, fan status, equipment status).

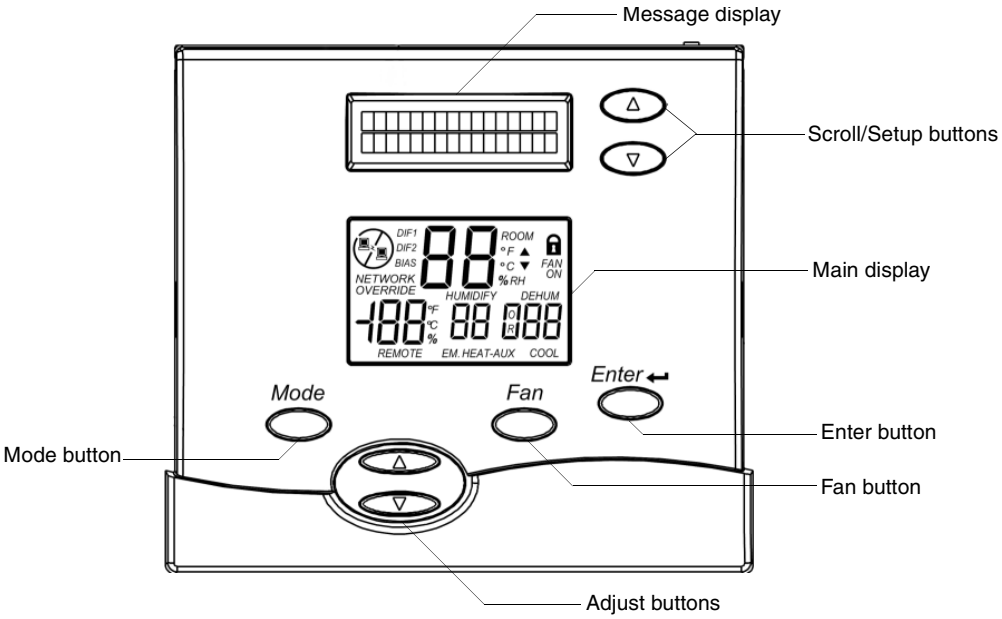


FIG. 40 ViewStat Thermostat (front panel)

Scroll/Set-up buttons

The Scroll/Set-Up buttons function with the set-up features of the thermostat (refer to the *Set Up and Configuration* section on page 39 for details).

Mode button

Five modes of operation are available on the ViewStat thermostat:

- OFF
- COOL
- AUTO
- HEAT
- EM. HEAT (for heat pumps only)

The mode of operation indicates how you want your heating and cooling equipment to operate.

Adjust buttons

The Adjust buttons adjust the heating and cooling temperature settings.

Fan button

The fan can be operated continuously (FAN ON) or only when there is a need to heat or cool.

Enter button

The Enter (or Network Override) button is used to override the home automation system, to clear temporary flashing messages on the message display and with the set-up features of the thermostat.

Main display

The Main display (FIG. 41) provides the mode status, temperature and system status information.

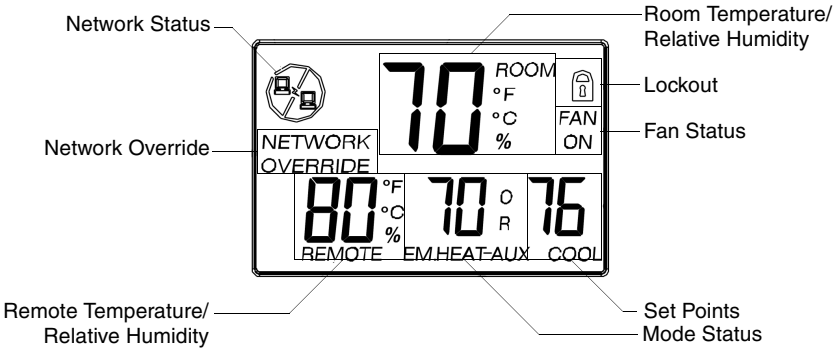


FIG. 41 Main Display window

The following table describes the items on the Main display:

Main Display	
MODE STATUS	Shows the current mode of operation: OFF, COOL, HEAT or COOL, EM. HEAT (for heat pumps only), and HEAT. The current mode will flash to show when the equipment is running.
SET POINTS	Shows the Heating and/or Cooling temperature settings.
FAN STATUS	FAN ON indicates the fan is set to operate continuously.
LOCKOUT	The lockout setting shows the thermostat buttons have been locked out and the thermostat settings can not be changed at the thermostat.
ROOM TEMPERATURE	Shows the current room temperature. The temperature can be displayed in °F or °C. This would show relative humidity (%) if the thermostat has been installed with an optional humidity control sensor.
REMOTE TEMPERATURE/ RELATIVE HUMIDITY	A temperature and/or a relative humidity value will be displayed alternately here when an optional remote temperature and/or humidity sensor has been installed (typical use is for outdoor temperature).
NETWORK OVERRIDE	When NETWORK OVERRIDE is displayed, the thermostat has been taken off-line from the system. The thermostat can then only be operated at the thermostat.
NETWORK STATUS	This computer icon shows the thermostat is connected to the system. The icon will flash when the thermostat sends or receives information. If there is no activity on the system for 15 minutes the icon will be crossed out. This does not mean the thermostat is unable to communicate, only that there has been no communication to this thermostat in 15 minutes.

Operating The Thermostat

Notes on temperature adjustments:

- The COOL setting must always be a minimum of 2° (F or C) higher than the HEAT setting. The thermostat will automatically maintain the 2° difference. For example, if the Cooling set point is 75°F and one changes the Heating set point to 74°F, the thermostat will automatically change the Cooling set point to 76°F.
- The lockout icon will appear on the display when attempting to make a change, if the thermostat has been configured to be locked out or the desired change violates the thermostat limits (i.e. lowest allowable HEAT setting is 40°F, highest allowable COOL setting is 90°F, etc.). Lockout configuration can be altered in set-up menu (see the *Thermostat Button Lockout* section on page 40).

Selecting the Mode

The thermostat can be set to OFF, COOL, HEAT or COOL (auto-changeover), EM. HEAT (for heat pumps only), and HEAT modes. To set, press the **Mode** button until the desired mode appears on the display (FIG. 42).

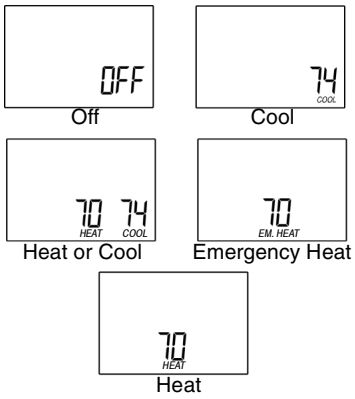


FIG. 42 Mode messages

- The following table describes each of the modes:

• OFF	Select the OFF mode to prevent the heating and cooling equipment from operating.
• COOL	COOL appears on the display and only the cooling equipment will be operated to maintain the temperature at the COOL setting. COOL will flash on the main display when the cooling equipment is operating.
• HEAT	HEAT appears on the display and only the heating equipment will be operated to maintain the temperature at the HEAT setting. HEAT will flash on the main display when the heating equipment is operating.
• AUTO (heat or cool auto-changeover)	HEAT or COOL appears on the display. Either the heating or cooling equipment will operate to maintain the room temperature at or above the HEAT setting and at or below the COOL setting. HEAT or COOL will flash when the respective equipment is operating.
• EMERGENCY HEAT (EM. HEAT for heat pump equipment only)	EM. HEAT appears on the display and only the back-up heat source will be operated to maintain the room temperature above the HEAT setting. This is generally more expensive than using the heat pump (HEAT MODE), so use accordingly. Typical usage is when the heat pump has malfunctioned.

CAUTION

Do not set the thermostat to OFF mode during periods when freezing temperatures could occur.

Setting temperatures

Press the **Up** or **Down adjust button**. The setting to be changed will begin to flash. Press and hold the button to change the setting.

- If operating in the HEAT mode, the only temperature set point available to change is the Heat setting. When the room temperature drops below this setting the heat will come on (call for heating) to raise the temperature. EM. HEAT mode uses the HEAT setting.
- If operating in the COOL mode, the only temperature set point available to change is the COOL setting. When the room temperature rises above this setting the Cooling will come on (call for cooling) to lower the temperature.
- If operating in AUTO (HEAT or COOL) mode, the first press of the Up or Down adjust button will indicate which of the two temperature settings will be adjusted – it will be the one flashing.
- If this is not the desired temperature to adjust, press the **Mode** button to access the other temperature setting.

Fan operation

The thermostat can operate the fan either continually (FAN ON), or only during Heating and Cooling calls. Press the **Fan** button to toggle between these two options. FAN ON is recommended for media/electronic air cleaners, ventilating equipment, and to allow for humidification in mild climates.

Backlight operation

Operation of the backlight is configured in the Thermostat Set-Up. Depending on the set-up, the backlight will light at the press of any button, or it can be disabled (see the*Backlighting Set-Up* section on page 42). The backlight will stay on for 10 seconds after the last press of a button.

Network override

If the Network Override has not been disabled in the Thermostat Set-Up, the Network Override can be initiated by pressing the **Enter** button. When initiated, the thermostat is taken offline from the automation system. The thermostat can then only be operated at the thermostat. Pressing the Enter button again will restore network communication.

Clearing a temporary flashing message

Custom Home Automation systems have the ability to send a temporary message to the message display. This message will flash until the user acknowledges the message. To acknowledge message press the **Enter** button.

In Case Of Power Failure

This thermostat does not require a battery. If the power goes out, the screen is blank. During the period the power is off, the heating/cooling system will not operate. When power is restored, the thermostat will return to the previous settings. The thermostat is equipped with a continuous memory feature which does not require a battery.

Cleaning the Thermostat

If the surface of the thermostat becomes dirty it can be cleaned with plain water or with a non-abrasive household cleaner, including glass cleaner. When using any cleaner be careful not to get any into the interior of the thermostat. Do not spray any liquid directly onto the thermostat. Spray the cleaner onto a soft cloth and wipe the surface of the thermostat.

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