Crestron **CHV-TSTAT & CHV-THSTAT**

Thermostats

Operations and Installation Guide

CRESTRON

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CRESTRON

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Contents

Quick Installation Reference

1. Select a suitable location and run the connecting wires from the heating/cooling system and the Cresnet system.
   Refer to page 5 for a description of the thermostat connectors.
   Refer to page 7 for Network wiring details.
   Use the appropriate wiring diagram:

   - Heating or Cooling System Powered (Refer to page 8).

   - Separately Powered (Refer to page 9).

   - Two Wire Heat Only (Refer to page 9).

   - Three Wire Heat Only with Fan (Refer to page10).

   - Single Stage Heat/Cool (Refer to page 10).

   - Single Stage Heat Pump (Refer to page 11).

   - Two Stage Heat Pump (Refer to page 11).

2. Separate the thermostat from the backplate to expose the connections and mounting holes.

3. Mount the thermostat backplate directly to the wall with wall anchors (not provided) and screws (not provided) or to a single-gang box (not provided) mounted horizontally, and connect the wiring. Refer to page 12 for detailed mounting instructions and page 5 for detailed connector information.

4. Install the thermostat on the backplate and setup the thermostat (Refer to page 14).

5. Configure the thermostat (Refer to Operating the Thermostat on page 18).

Thermostats: CHV-TSTAT and CHV-THSTAT

Introduction

Functions and Features

The CHV-TSTAT and CHV-THSTAT series are wall-mounted universal thermostats that can be part of a Crestron Home™ total control system. The thermostats are capable of controlling one or two-stage heating and cooling systems. Each thermostat is available in three colors: almond, black and white. The suffix 'A', 'B', and 'W', respectively denotes color, i.e., CHV-TSTATB is a black unit. For simplicity within this guide, color suffix is omitted and the designations CHV-TSTAT and CHV-THSTAT are used except where noted.

Functional Summary

- User adjustable temperature and/or humidity control of one and two-stage heating and cooling systems
- 128 x 64 transflective 2.75 inch (6.99 cm) LCD display
- Fahrenheit or Celsius indication
- Four-front panel buttons for setup, configuring and temperature/humidity adjustments
- Back light (with each button press) for night viewing
- Supports up to two remote temperature and/or temperature/humidity sensors. Future firmware releases will support up to four remote sensors per thermostat
- Operates as a stand-alone device or in a Cresnet System
- Extended functionality as a Cresnet device for lighting control, alarms, etc.

The CHV-TSTAT provides temperature control, while the CHV-THSTAT provides temperature and humidity control. Temperature and humidity information is provided through a transflective LCD display. Four front panel buttons and the LCD display provide temperature and/or humidity indication and control, current system status, and current fan mode. The LCD also provides status indicators denoting when heat, cool, humidity or fan outputs are energized; a message indicator, so users know when a message is waiting to be read; a net indicator to denote when the network is active and a hold indicator that identifies when the thermostat is overriding the Cresnet temperature set point commands.

Remote Sensors

The current firmware release supports the addition of two optional remote sensors: temperature only (CHV-RTS) and/or temperature/humidity (CHV-RTHS), for both thermostats.

Outdoor conditions can be imported from the optional external sensors CHV-RTS or CHV-RTHS, temperature and temperature/humidity respectively.

Subsequent firmware releases will support the addition of up to four optional remote sensors, in any combination, for each thermostat.

NOTE: The CHV-TSTAT and CHV-THSTAT allow the user to set a temperature that the heating and/or cooling system maintains. This is called the "Set Point". Refer to "Operating the Thermostat" on page 18 for more information.

NOTE: Installers should have a strong working knowledge of HVAC systems.

Heating and Cooling Systems

The CHV-TSTAT can control the following heating and cooling systems:

- One stage heat
- One stage heat, one stage cool
- One stage heat, one stage cool: heat pump with auxiliary heat
- Two stage heat
- Two stage heat, one stage cool
- One stage heat, two stage cool
- Two stage heat, two stage cool
- Two stage heat, two stage cool: heat pump with auxiliary heat

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NOTE: Two Stage Heating – Unlike traditional furnaces that turn on and run at full capacity with each demand for heating, two-stage heat operates like two separate furnaces to maintain more consistent comfort in your home. The unit starts out running in its first stage, and operates at about 68% of its heating capacity. This reduced capacity is sufficient to warm your home on mild winter days. But when the temperature outside goes very low, the furnace adjusts to full capacity (second stage) to meet the demand for heat within the home.

Specifications

The following table provides a summary of specifications for the CHV-TSTAT and CHV-THSTAT.

CHV-TSTAT and CHV-THSTAT Specifications

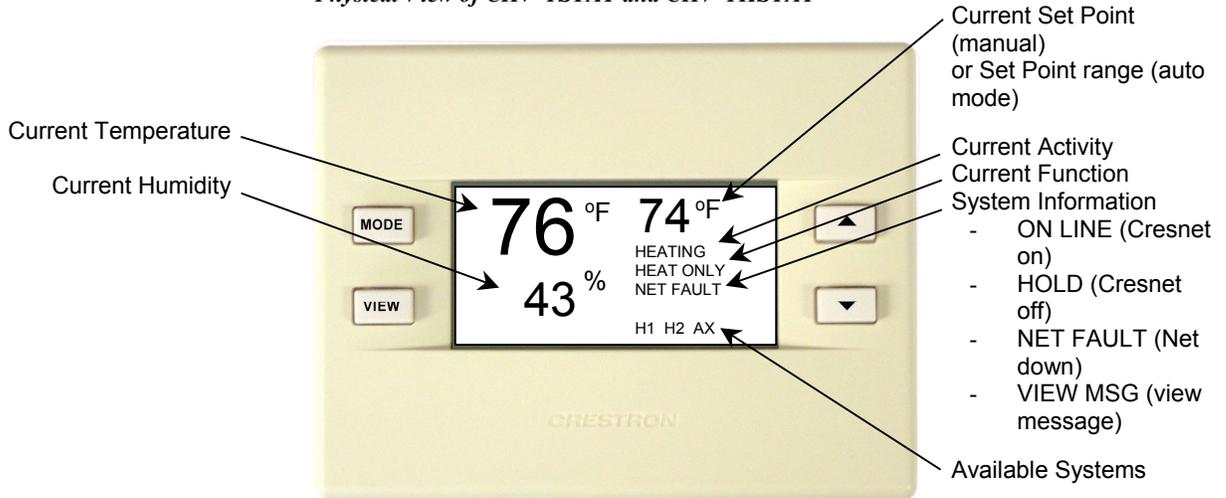| SPECIFICATION	DETAILS
Power Requirements	2 Watts (24 VAC @ 83mA) Heating or Cooling System Supplied
Crestron power factor	<1Watt (required for Cresnet communication only)
Default Network ID	2A
Control System Update Files[1,2,3]	
2-Series Control System	Version C2-2004.CUZ or later
CEN/CN-TVAV	Version 5.10.13V.UPZ or later
CNMSX-AV/PRO	Version 5.07.05X.UPZ or later
CNRACKX/-DP	Version 5.07.06W.UPZ or later
ST-CP	Version 4.00.49S.UPZ or later
LCD Display	128 x 64 Transflective 2.75 in (6.99 cm)
Screen Viewing Angles	Y Dir. (X=0º): +50º (from top) –50º (from bottom)
	X Dir. (X=10º): +50º (from right) –50º (from left)
Humidity Range	0 – 100%
Auto Setpoint Range (union of heat and cool setpoint ranges)	38 – 110°F (3 – 43°C)
Heat Only Setpoint Range	38 –- 90°F (3 – 32°C)
Cool Only Setpoint Range	59 – 110°F (15 – 43°C)
Temperature Measurement Range	0 – 110° (-18 – 43°C)
Firmware Update Files[4]	
CHV-TSTAT/CHV-THSTAT	CHVTSTAT.xx.UPG or later
Update File	CHVTHSTAT.x.x.UPG or later
Dimensions and Weight	Height: 3.75 in (9.50 cm)
	Width: 5.00 in (12.70 cm)
	Depth: 1.04 in (2.63 cm)
	Weight: 5.80 oz (165 g)

1. The latest versions can be obtained from the Downloads | Software Updates section of the Crestron website (www.crestron.com). Refer to NOTE after last footnote.
2. Crestron 2-Series control systems include the AV2, CP2, CP2E, MP2, MP2E, PAC2, PRO2, and RACK2.
3. CNX update files are required for either CNMSX-AV/Pro or CNRACKX/-DP. Filenames for CNX update files have a UPZ extension and ST-CP files are in one EXE or zipped UPZ file. To avoid program problems, make certain you are using the update file with the correct suffix letter (e.g., S, V, W, X).
4. Filenames for CHV update files have a UPG extension and are in one zipped UPG file. The '*x*' in the file name refers to the version number.

NOTE: Crestron software and any files on the website are for Authorized Crestron dealers only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).
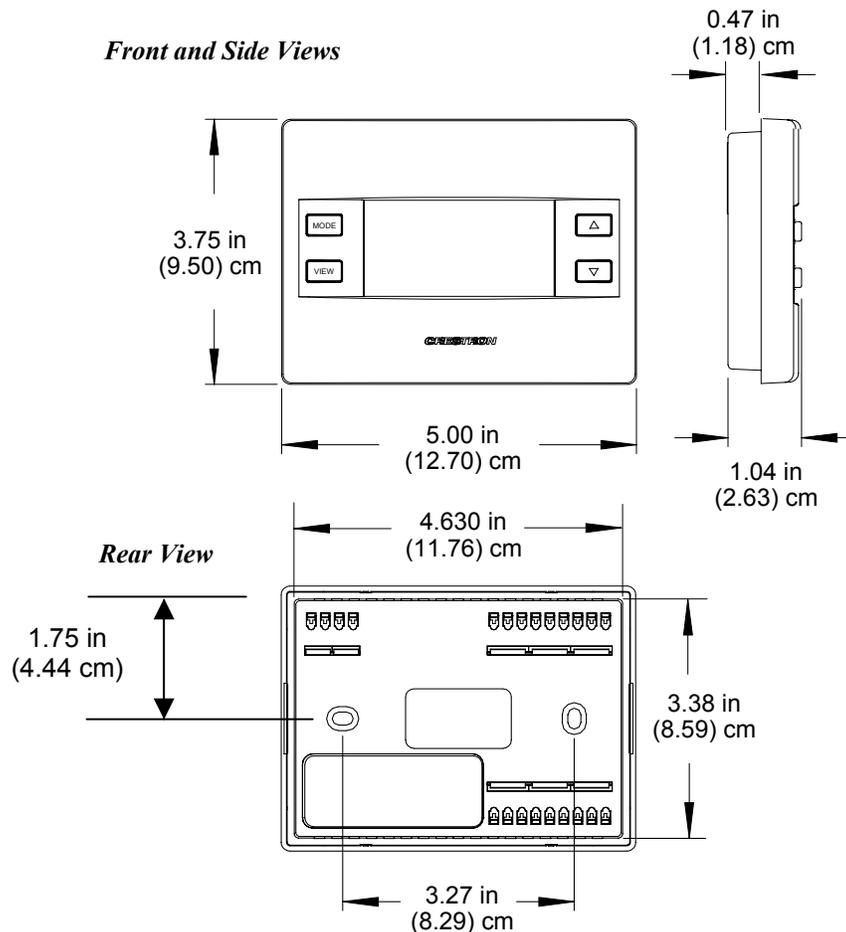
Physical Description

Refer to the illustrations below and on next page. The CHV-TSTAT and CHV-THSTAT are enclosed in a plastic enclosure with four buttons and an LCD display on the front. The back of the unit has ventilation slots, and holes for mounting the unit and wiring. The ventilation slots must be unobstructed for airflow to the unit.

Physical View of CHV-TSTAT and CHV-THSTAT

Current Temperature

Current Humidity

Current Set Point (manual)
or Set Point range (auto mode)

Current Activity
Current Function
System Information
- ON LINE (Cresnet on)
- HOLD (Cresnet off)
- NET FAULT (Net down)
- VIEW MSG (view message)

Available Systems

76 °F   74 °F
HEATING
HEAT ONLY
NET FAULT
43 %
H1 H2 AX

MODE
VIEW
▲
▼
CRESTRON

Front and Side Views

MODE
VIEW
△
▽
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3.75 in
(9.50) cm

5.00 in
(12.70) cm

0.47 in
(1.18) cm

1.04 in
(2.63) cm

Rear View

1.75 in
(4.44 cm)

4.630 in
(11.76) cm

3.38 in
(8.59) cm

3.27 in
(8.29) cm

Connection View (Backplate, view from the front with cover removed)
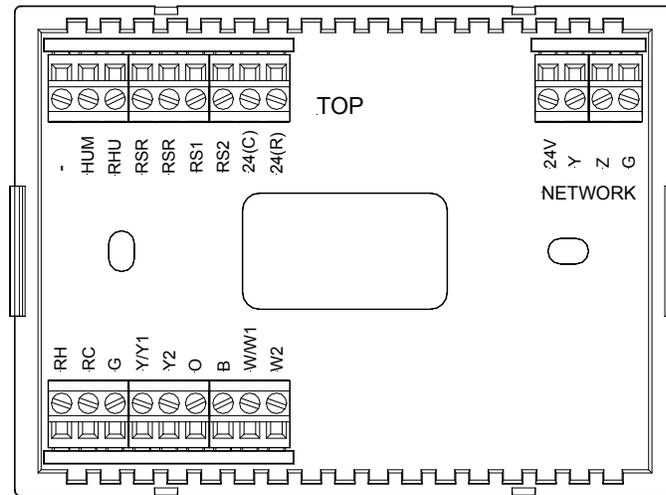
Ports

The CHV-TSTAT and CHV-THSTAT have four types of connections on the inside back plate (refer to graphic above).

NET (Optional) – provides communication to the control system and Cresnet power to the CHV-TSTAT and CHV-THSTAT. If making network connections to Cresnet peripherals, refer to "Network Wiring" on page 7.

CRESNET CONNECTIONS (optional)

PIN	DESCRIPTION
24	+24VDC
Y	Cresnet Data
Z	Cresnet Data
G	Ground

REMOTE SENSING CONNECTIONS (optional)

PIN	DESCRIPTION
RSR	Remote Sensor Returns – Common sensor terminal
RS1	Remote Sensor terminal – Connect the sensor from RS1 to RSR
RS2	Remote Sensor terminal – Connect the sensor from RS2 to RSR

POWER CONNECTIONS (Required)

PIN	DESCRIPTION (refer to Power Connections on page 8)
24 (C)	24 VAC common terminal supplies remote 24 VAC power to thermostat.
24 (R)	24 VAC reference terminal. Can be connected to RH or RC by jumper setting, or tied directly to power source (refer to Power Connections on page 8)

CONTROL CONNECTIONS (System Dependent)

PIN	DESCRIPTION
HUM	Energized to RHU during humidity call
RHU	Reference for humidifier
RH	Reference Heat, used for calls to heating system
RC	Reference Cool, used for calls to cooling system
G	Fan, energized to RC during call for fan
Y/Y1	Compressor (stage one), energized to RC when compressor (or first stage) is run
Y2	Compressor (stage two), energized to RC on two-stage systems on call for second stage
O	Changeover control, energized to RC during cooling modes
B	Energized to RC during non-cooling modes
W/W1	Heat (single stage)/heat (stage one) energized to RH during a call for heat in heat/cool systems or aux heat in heat pump systems
W2	Heat (stage two), energized to RH during a call for second stage heat in heat/cool systems

Buttons

There are four buttons used to setup and adjust the thermostat.

MODE – Access to the user controls (System Mode, Fan Mode, Humidifier, Crestron System, and Global Update)

VIEW – Access to Humidity reading, Outdoor Temperature reading, and System Messages.

NOTE: When **VIEW** and **MODE** are pressed together and held for five seconds, the thermostat enters the system setup mode.

UP ▲ – Selects user modes and increments selection in setup modes

DOWN ▼ – Selects user modes and decrements selection in setup modes

Industry Compliance

As of the date of manufacture, this unit has been tested and found to comply with specifications for CE marking and standards per EMC and Radio Communications Compliance Labeling (N11785).

$$\mathsf{C}\,\mathsf{E} \quad \mathsf{C}$$

NOTE: This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Setup

Network Wiring

NOTE: When installing network wiring, refer to the latest revision of the wiring diagram(s) appropriate for your specific system configuration, available from the Downloads | Product Manuals | Software and Wiring Diagrams section of the Crestron website (www.crestron.com).

When calculating the wire gauge for a particular Cresnet run, the length of the run and the power factor of each network unit to be connected must be taken into consideration. If Cresnet units are to be daisy-chained on the run, the power factor of each unit to be daisy-chained must be added together to determine the power factor of the entire chain. If the unit is a home-run from a Crestron system power supply network port, the power factor of that unit is the power factor of the entire run. The length of the run in feet and the power factor of the run should be used in the following resistance equation to calculate the value on the right side of the equation.

Resistance Equation

$$R \ < \ \frac{40,000}{L \times PF}$$

Where: R = Resistance (refer to table below).
         L = Length of run (or chain) in feet.
       PF = Power factor of entire run (or chain).

The required wire gauge should be chosen such that the resistance value is less than the value calculated in the resistance equation. Refer to the table below.

Wire Gauge Values

RESISTANCE (R)	WIRE GAUGE
4	16
6	18
10	20
15	22
13	Doubled CAT5
8.7	Tripled CAT5

NOTE: All Cresnet wiring must consist of two twisted-pairs. One twisted pair is the +24V conductor and the GND conductor and the other twisted pair is the Y conductor and the Z conductor.

NOTE: For larger networks (i.e., greater than 28 network devices), it may be necessary to add a Cresnet Hub/Repeater to maintain signal quality throughout the network. Also, for networks with lengthy cable runs, it may be desirable to add a hub/repeater after only 20 network devices.

Identity Code

Every equipment and user interface within the network requires a unique Cresnet identity code (NET ID). These codes are assigned a two-digit hexadecimal number from 03 to FE. The NET ID of the unit must match the NET ID specified in the SIMPL Windows or D3 Pro program. Refer to "Setting the Net ID in Device Settings" on page 22 for an example of the SIMPL Windows procedure.
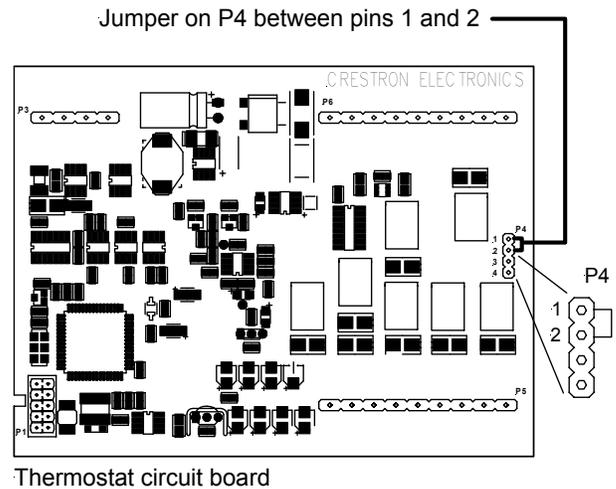
Wiring Diagrams

The wiring diagrams that follow show power wiring connections for the CHV-TSTAT and CHV-THSTAT. Choose one of the following methods.

Power Connections (Note the P4 Jumper Position on Circuit Board)
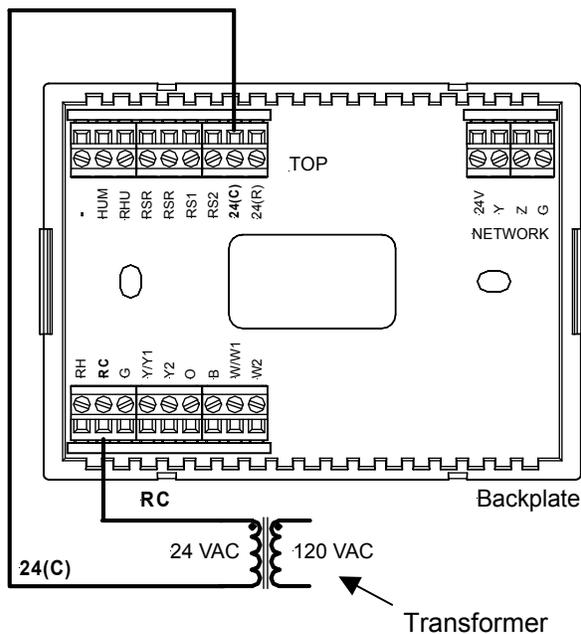
Heating System Powered
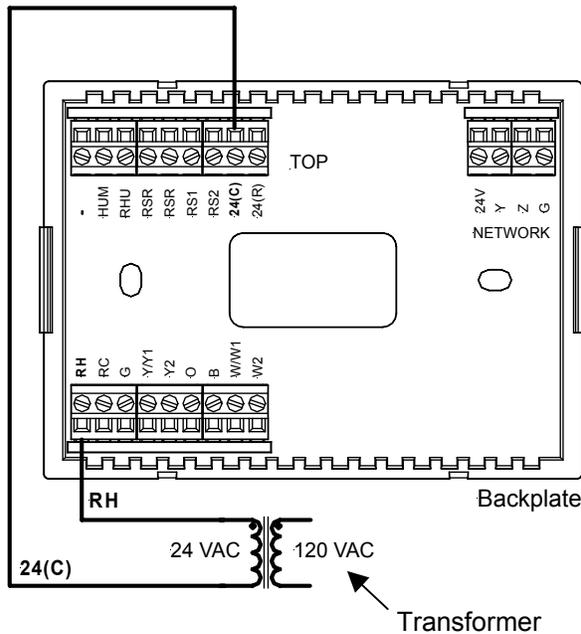
Jumper on P4 between pins 1 and 2

Cooling System Powered

Jumper on P4 between pins 3 and 4

Separately Powered (by an independent transformer)

Backplate

Thermostat circuit board
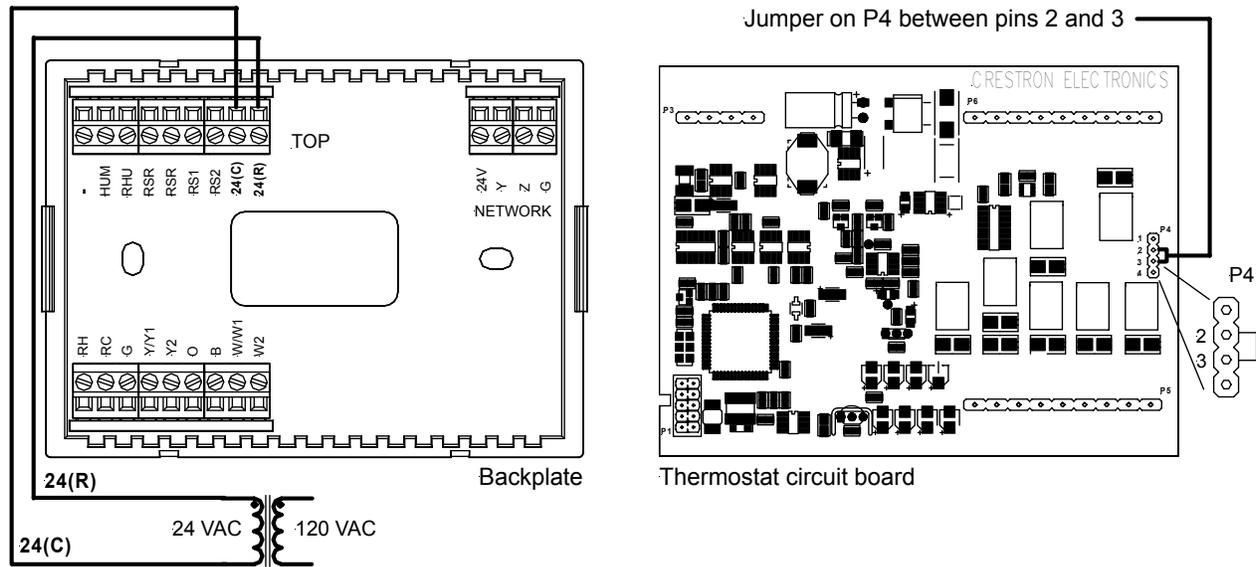
System Connections

The following diagrams are examples of connections for heat, heat/cool and one-stage and two-stage heat pump systems. Thermostat power connections are not shown in the following diagrams.

NOTE: For the power supply, provide disconnect means and overload protection as required.

NOTE: Use either connector O or B for changeover control.

Two-wire Heat Only

Backplate
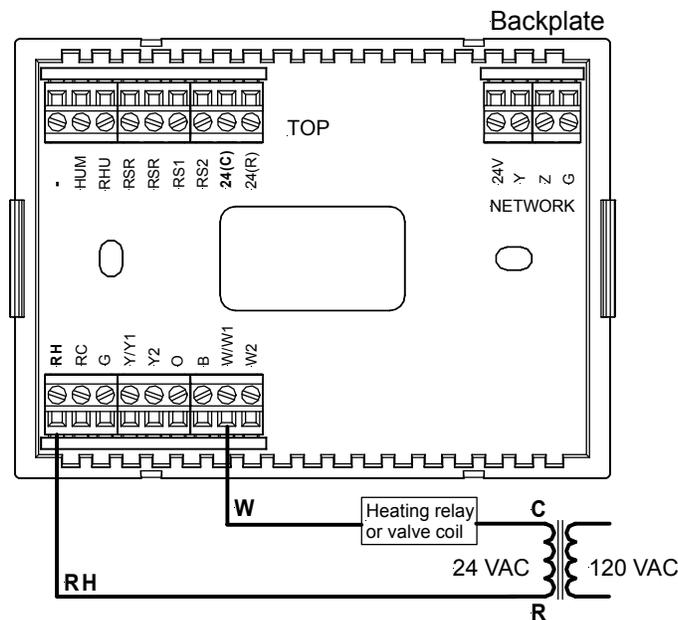
Three-wire Heat Only with Fan
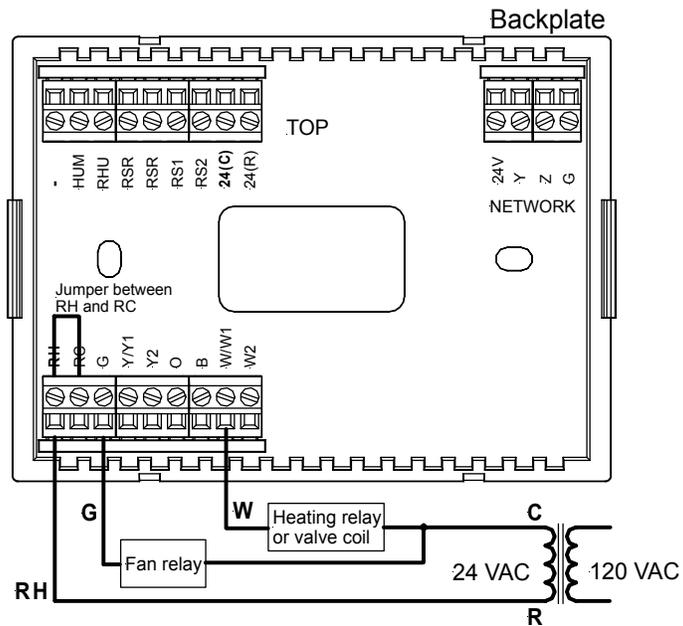
Single Stage Heat/Cool
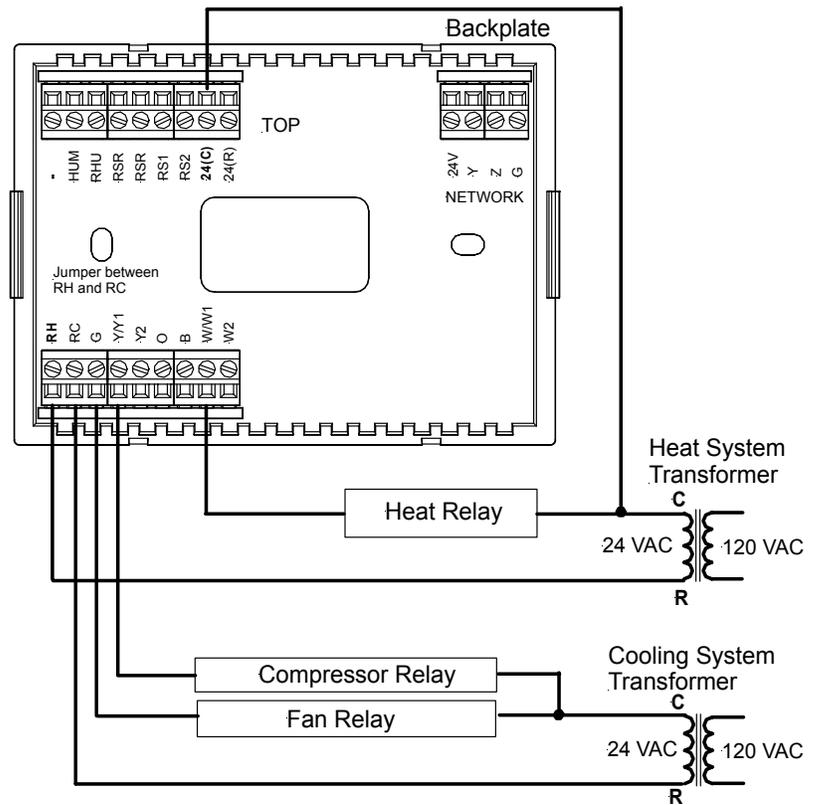
Single Stage Heat Pump
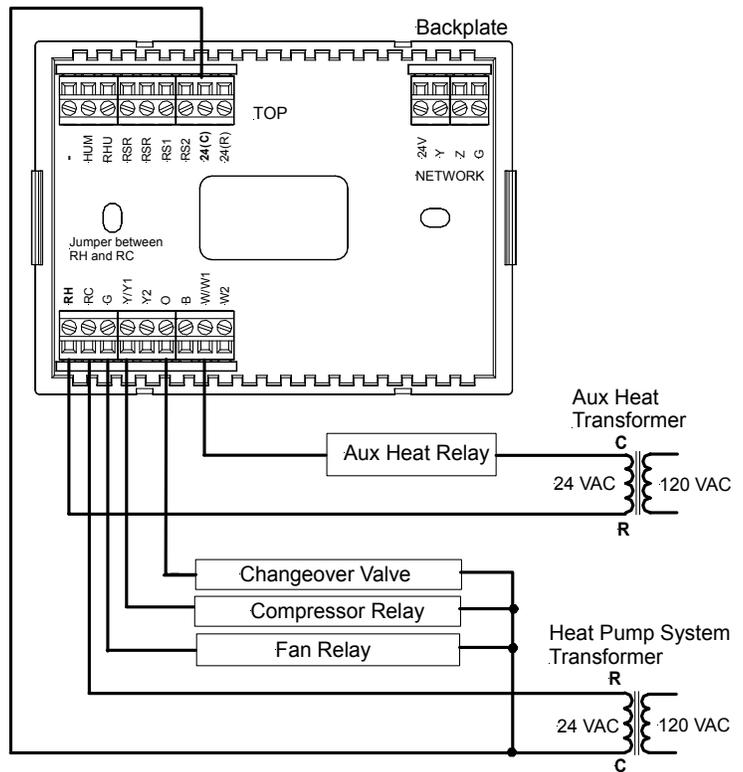
Two Stage Heat Pump
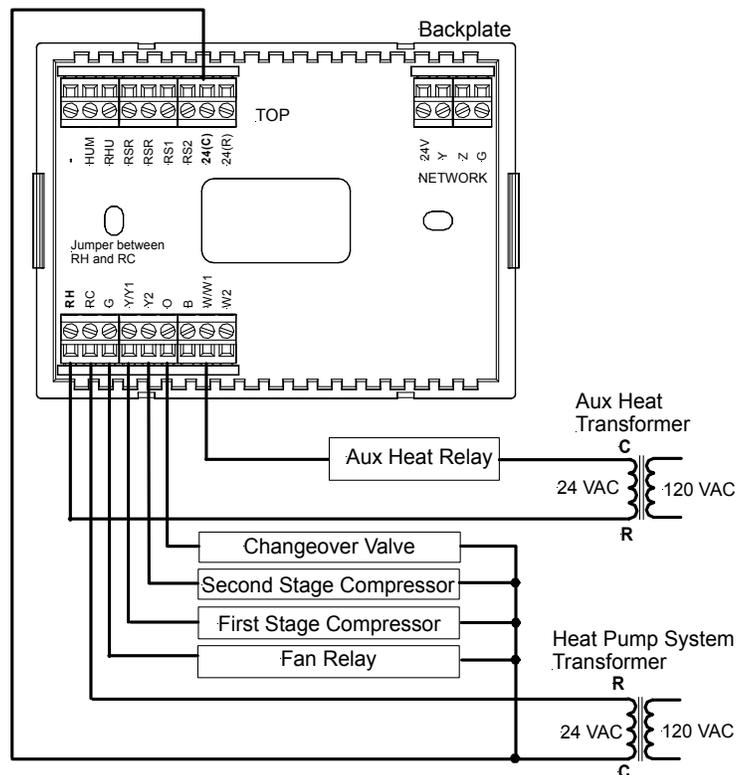
Installation

The location of the thermostat can affect its performance and efficiency. Install the thermostat away from direct sunlight, drafts, doorways, skylights, and windows. Also make sure the thermostat is conveniently located for programming, and do not mount on an exterior wall. The thermostats may be mounted directly to drywall or to a single-gang box. Refer to the following illustrations. Do the following to install the CHV-TSTAT or the CHV-THSTAT.

NOTE: When installing directly on drywall, use anchoring screws and hardware. Make sure the back of the thermostat is flush with drywall and the unit is level.

Required Hardware

- Thermostat
- Phillips screwdriver (not supplied)
- Two 6/32 x 1 inch panhead screws (supplied) for mounting to a single-gang box
- Single-gang box (not supplied)
- Wall anchors (not supplied) and screws (not supplied) for mounting directly to drywall

1. Separate thermostat front plate from back plate (you may need to exert force when removing the faceplate).

2. Turn of the circuit breaker when connecting power to the thermostat, and connect wiring as required (wiring goes through center hole on back plate).

3. Attach back plate to drywall with screws and anchors (anchor hardware not provided). Thermostat may also be mounted to a single-gang box mounted horizontally, using the two 6/32 x 1 in panhead screws provided. Ensure that the thermostat is level and the ventilation holes in the backplate are not blocked.

4. Note orientation of front plate connection leads and reattach the front plate on the back plate (make sure front plate snaps in place and no wires are pinched).

NOTE: If replacing an existing thermostat, make note of the wire colors and positions before removing the old thermostat.

Installation View – Single gang electrical box – horizontal mounting

NOTE: Install insulation in the gang box to prevent inaccurate readings.

Stud

Panhead
6/32 x 1 in

Single-gang
electrical box
(not provided)
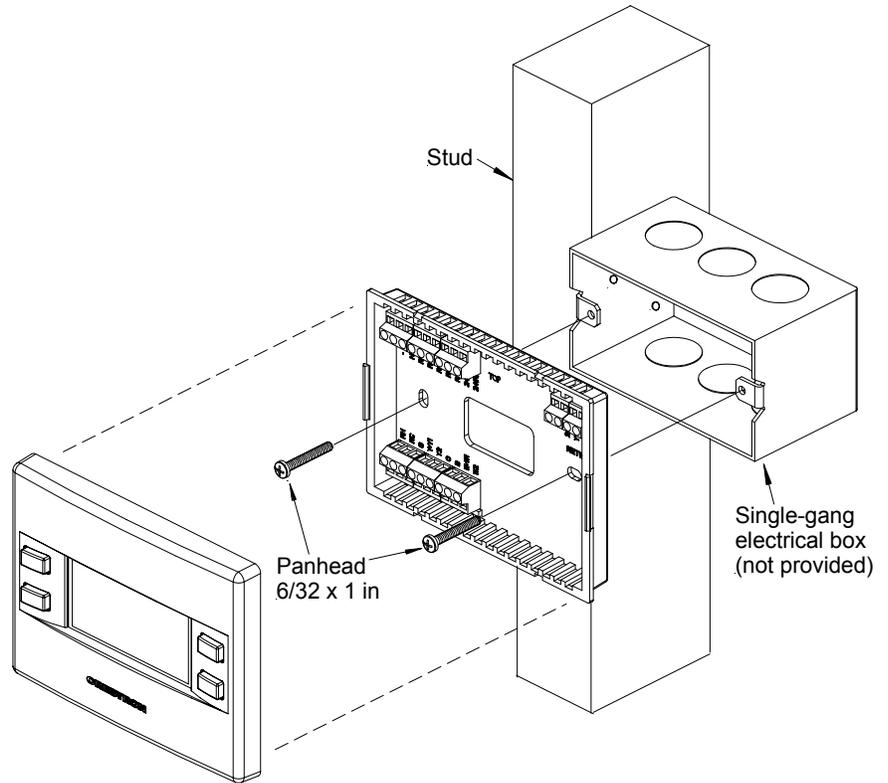
Installation view – Direct mount to wall

Wall Anchors
(not provided)

Mounting
Screws
(not provided)

Backplate
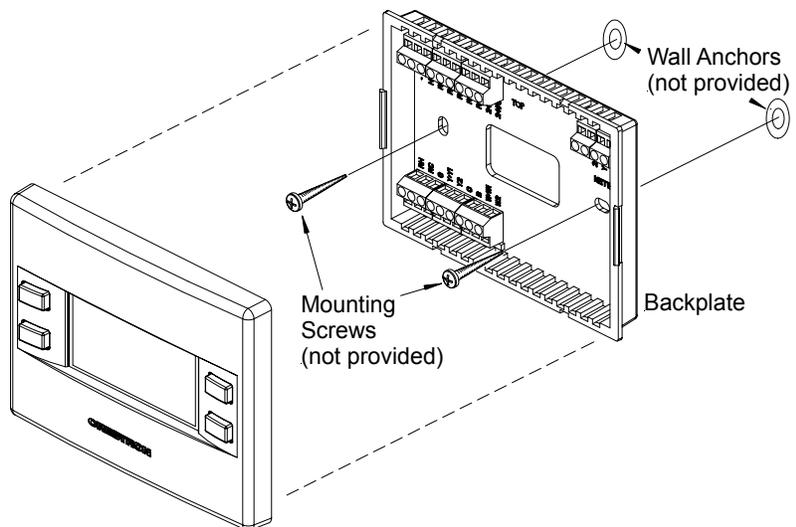
Thermostat Setup

After the thermostat is installed, it is necessary to set it up. Follow these directions. Press and hold the **MODE** and **VIEW** buttons simultaneously for five seconds to access the setup menus. The following setup screens appear in order: System Setup, System Preferences, Humidity and Fan Options, Device Options, Screen Options, Display Options, Sensors, and Service/Test. Use the **MODE** button to advance to the next setup screen.

HEATING SYSTEM TYPE
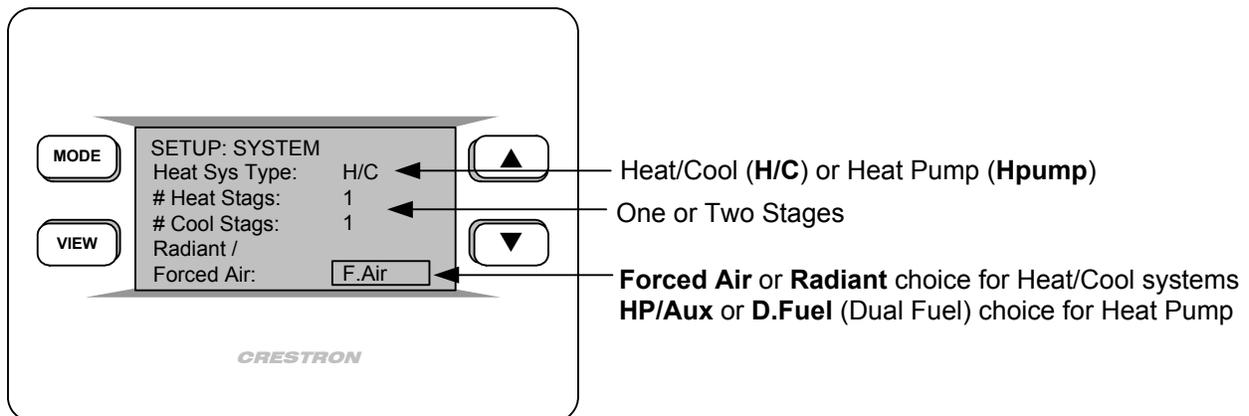
Press **VIEW** to select the parameter: Heating System Type (Heat/Cool or heat pump), Heat stages (1 or 2), Cool Stages (1 or 2), and radiant or forced air system. A box appears around the selected parameter.

Press the Arrow keys (▲ ▼) to enter the value of the selected parameter.

MODE	SETUP: SYSTEM		▲	
	Heat Sys Type:	H/C ◄		Heat/Cool (**H/C**) or Heat Pump (**Hpump**)
	# Heat Stags:	1 ◄		One or Two Stages
VIEW	# Cool Stags:	1	▼	
	Radiant /			
	Forced Air:	F.Air ◄		**Forced Air** or **Radiant** choice for Heat/Cool systems
				HP/Aux or **D.Fuel** (Dual Fuel) choice for Heat Pump

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SYSTEM PERFORMANCE

Press the **MODE** button to access the next menu, *SETUP: SYSTEM PERFORMANCE*. Press **VIEW** to select preferences. Press the Arrow keys (▲ ▼) to select the value of the parameter.

Anticipators
(valid selections are 1 through 6)
Low number = more frequent cycles and faster response (tighter regulation)
High number = less frequent cycles and slower response (looser regulation)

MODE	SETUP: SYSTEM PERF		▲	
	Heat Anticipator:	3		
	Cool Anticipator:	3		
VIEW	Auto Mode DdBand:	2^0 ◄	▼	
	HP Balance Pt:	0^0 ◄		
	AUX Balance Pt:	15^0 ◄		

Auto Mode Dead Band
(valid selections are 2 through 6^0)
The minimum differential between heating and cooling setpoints

HP Balance Point (Heat Pump Systems only)
Minimum outdoor temperature at which the heat pump will run (requires outdoor sensor)

AUX Balance Point (Heat Pump with Aux only)
Maximum outdoor temperature at which Aux Heat System supplements the heat pump (requires outdoor sensor)

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NOTE: Setting the HP Balance Point to 0º can disable Heat pump. Setting the Aux Balance Point to 90º can disable Aux Heat.

HUMIDIFIER/FAN OPTIONS

Press the **MODE** button to access the *SETUP HUMIDIFIER/FAN OPTIONS*. Press **VIEW** to select option. Press the Arrow keys (▲▼) to select the value of the parameter.
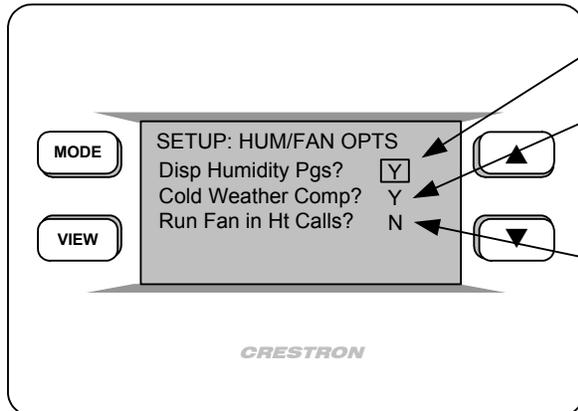
Display Humidity Pages?
Yes or No

Cold Weather Compensation?

Yes or No. Modifies the humidifier output to prevent condensation on the windows. Requires an outdoor temperature source

SETUP: HUM/FAN OPTS
Disp Humidity Pgs?   Y
Cold Weather Comp?   Y
Run Fan in Ht Calls? N

MODE

VIEW

CRESTRON

Run Fan in Heat Calls?
Yes or No
Most heating systems run the fan automatically. If your heating system requires fan control, select Yes.

DEVICE OPTIONS

Press the **MODE** button to access the *DEVICE OPTIONS*. Press **VIEW** to select options. Press the Arrow keys (▲▼) to select the value of the parameter.
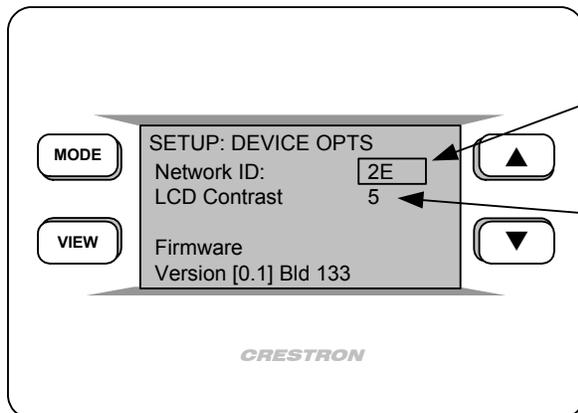
Select Network ID
Valid entries are 03 to FE in Hex to match the network ID set for the thermostat in SIMPL Windows

SETUP: DEVICE OPTS
Network ID: 2E
LCD Contrast   5

Firmware
Version [0.1] Bld 133

MODE

VIEW

CRESTRON

Select LCD Screen Contrast
(1 Lighter through 10 Darker)

SCREEN OPTIONS

Press the **MODE** button to access the *SCREEN OPTIONS*. Press **VIEW** to select each option. Press the Arrow keys (▲▼) to select the value of the parameter.

NOTE: The pages in the following setup screen refer to the screens that are seen by the user when the **VIEW** key is pressed in the normal operating mode.

Outdoor Page – Temperature/humidity of the outside sensor (if the optional sensor is installed)

Global Page – Temperature/humidity selection and system status for entire house. Allows setting of temperature/humidity throughout a multi-thermostat system from a single location. Must be wired and programmed as part of a Cresnet system.
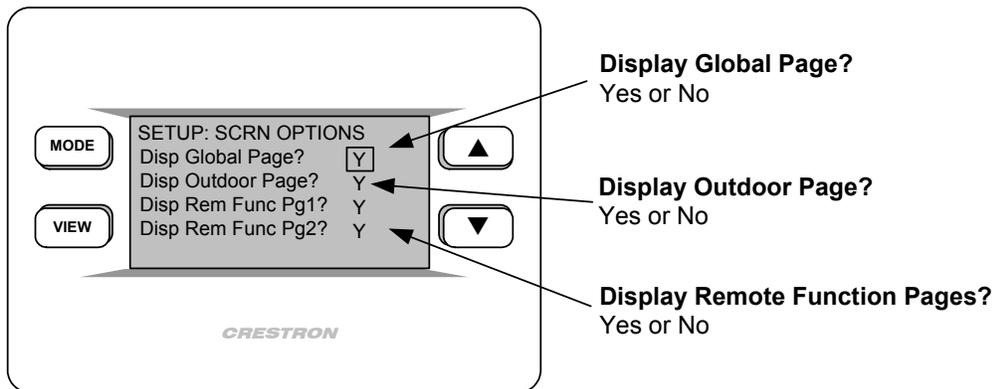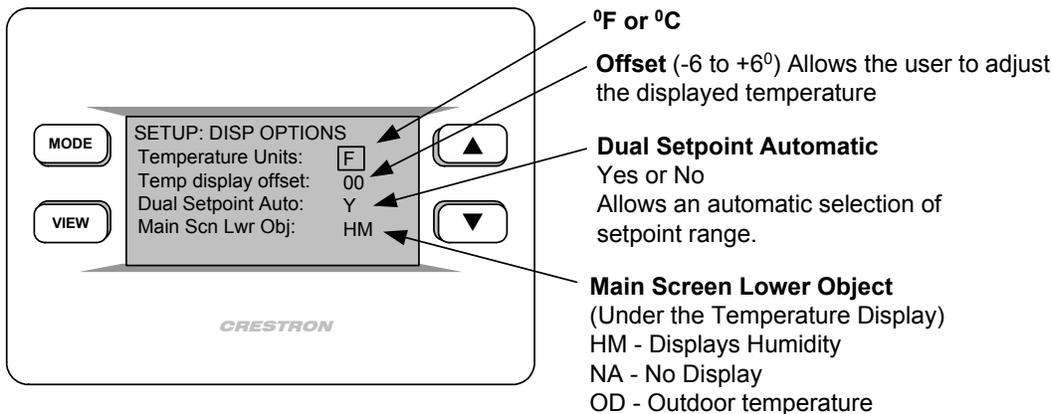
Remote Function Page(s) – When part of a Cresnet System, allows control of other functions (for example: lights, alarms, etc.). Each of the two pages has two definable buttons. The up ▲and down ▼ keys are set by indirect text for each page, refer to "CHV-TSTAT and CHV-THSTAT Advanced Symbol" on page 24.

Display Global Page?
Yes or No

```
SETUP: SCRN OPTIONS
Disp Global Page?    Y
Disp Outdoor Page?   Y
Disp Rem Func Pg1?   Y
Disp Rem Func Pg2?   Y
```

MODE   VIEW   ▲   ▼   CRESTRON

Display Outdoor Page?
Yes or No

Display Remote Function Pages?
Yes or No

DISPLAY OPTIONS

Press the **MODE** button to access the *DISPLAY OPTIONS*. Press **VIEW** to select options. Press the Arrow keys (▲▼) to select the value of the parameter.

⁰F or ⁰C

Offset (-6 to +6⁰) Allows the user to adjust the displayed temperature

```
SETUP: DISP OPTIONS
Temperature Units:   F
Temp display offset: 00
Dual Setpoint Auto:  Y
Main Scn Lwr Obj:    HM
```

MODE   VIEW   ▲   ▼   CRESTRON

Dual Setpoint Automatic
Yes or No
Allows an automatic selection of setpoint range.

Main Screen Lower Object
(Under the Temperature Display)
HM - Displays Humidity
NA - No Display
OD - Outdoor temperature

NOTE: Dual Setpoint Automatic – Selecting Yes allows the user to explicitly set the heat and cool setpoints in auto mode. Selecting No shows one setpoint and the thermostat automatically selects the operating systems to maintain that setpoint temperature.

SENSORS

Press the **MODE** button to access the *SENSORS*. Press **VIEW** to select each sensor type. Press the Arrow keys (▲ ▼) to select the value of the parameter.

NOTE: The sensors are used for Temperature/Humidity Averaging. Choose USE to include each sensor, or OMIT to exclude each sensor in the averaging equation. Choose OMIT if the remote sensors are not installed.

NOTE: The thermostat will not leave the setup mode unless a valid sensor selection is made.
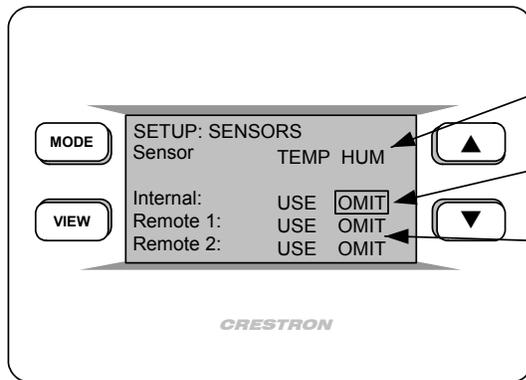
Select Sensor Type
Temperature and/or Humidity

Internal Sensor
Temperature/Humidity in CHV-THSTAT
Temperature only in CHV-TSTAT

Remote Sensors
CHV-RTS temperature only sensor
CHV-RTHS temperature/humidity sensor
Sensors may be indoor or outdoor.
Choose Use or Omit

```
SETUP: SENSORS
Sensor        TEMP  HUM

Internal:     USE  OMIT
Remote 1:     USE  OMIT
Remote 2:     USE  OMIT
```

LOCAL MODE

Press the **MODE** button to access the **LOCAL MODE** *SERVICE/TEST* setup screen. Press **VIEW** to select each parameter. Press the Arrow keys (▲ ▼) to select the value of the parameter. This page bypasses all system delays and is used by the installer to manually operate the HVAC system. Only one system can be run at a time.

NOTE: H1 – Single Stage Heating, H2 – Two stage Heating, C1 – Single Stage Cooling, C2 – Two Stage Cooling.
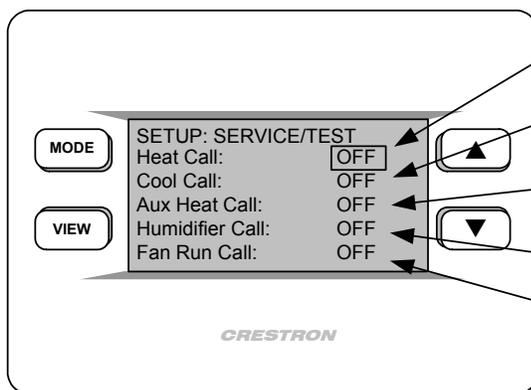
Heat Call
Choose Off, H1, or H2

Cool Call
Choose Off, C1 or C2

Aux Heat (ON or Off)
Only appears on heat pump systems

Humidifier Call (On or Off) CHV-THSTAT only

Fan Run Call (ON or OFF)

```
SETUP: SERVICE/TEST
Heat Call:        OFF
Cool Call:        OFF
Aux Heat Call:    OFF
Humidifier Call:  OFF
Fan Run Call:     OFF
```
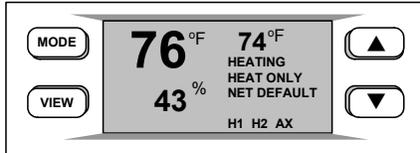
Press **MODE** button to return to the first screen. Simultaneously press and hold the **MODE** and **VIEW** buttons to return to normal operation mode.

NOTE: Thermostat will not leave the setup mode until a valid sensor selection is made.

Operating the Thermostat

After setup, configure the thermostat using the following screens.

Main Screen

MODE   **76**°F **74**°F   ▲
                HEATING
                HEAT ONLY
VIEW   **43**%   NET DEFAULT   ▼

                H1 H2 AX

The Main Screen displays the Current Temperature, System Mode, Fan Mode, and Set Point temperatures. The CHV-THSTAT also displays Relative Humidity and Humidifier Mode. Press the **up** ▲ arrow button to increase the set point temperature. Press the **down** ▼ arrow button to decrease the set point temperature.

This screen also indicates the system currently running:
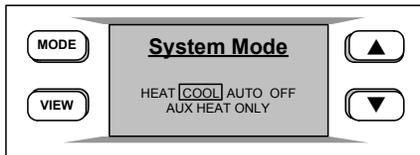
   H1 – Heat System or Stage 1 Heat System

   H2 – Stage 2 Heat System

   AX – Auxiliary Heating System

   C1 – Cooling System or Stage 1 Cooling System

   C2 – Stage 2 Cooling System

System Mode

MODE   **System Mode**   ▲

VIEW   HEAT COOL AUTO OFF   ▼
       AUX HEAT ONLY

NOTE: The AUX HEAT ONLY is for the backup heating system on Heat Pump systems only. Allows the backup system to operate without operating the heat pump.

It may also be necessary to access a series of screens. Pressing **MODE** button allows the user to access System Mode, Fan Mode, Crestron System On/Offline, and Global Update mode. The "System Mode" screen appears when the **MODE** button is initially pressed once. Use the **up** ▲ and **down** ▼ arrow buttons to select HEAT, COOL, AUTO, OFF or AUX Heat Only.

NOTE: The **AUTO** selection allows the system to switch between Heat and Cool automatically as needed to maintain the temperature.

Fan Mode

MODE   **Fan Mode**   ▲

VIEW   AUTO   ON   ▼

Pressing the **MODE** button again displays the "Fan Mode" screen.

Use the **up** ▲ and **down** ▼ arrow buttons to select AUTO or ON.

NOTE: In **AUTO**, the fan runs only when the system calls for heat or cool. In **ON**, the fan runs continuously.

Crestron System

MODE   **Crestron Sys**   ▲

VIEW   ONLINE   HOLD   ▼

Pressing the **MODE** button again displays the Crestron System screen.

Use the **up** ▲ and **down** ▼ arrow buttons to select ONLINE or HOLD (offline).

Global Update

| MODE	**Global Update**	▲
VIEW	SEND	▼

Pressing the **MODE** button again displays the Global Update screen. Allows a single thermostat location to update the current temperature settings to all other thermostats on the system.

Press the **down ▼** button to send the update.

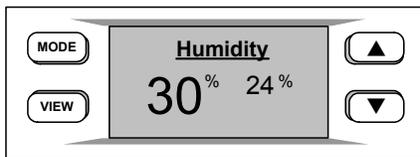Pressing the **MODE** button again returns you to the Main Screen (CHV-TSTAT only).

Humidifier

MODE	**Humidifier**	▲
VIEW	ENABLED DISABLED	▼
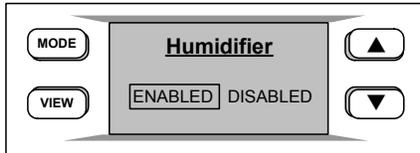
Pressing the **MODE** button displays the "Humidifier" screen (CHV-THSTAT only).

Use the **up ▲** and **down ▼** arrow buttons to select ENABLED or DISABLED.

Pressing the **MODE** button again returns you to the Main Screen

Humidity

MODE	**Humidity**	▲
VIEW	30% 24%	▼

Press the **VIEW** button to display the "Humidity" screen.

Use the **up ▲** and **down ▼** arrow buttons to adjust the Humidity Set Point level (CHV-THSTAT only).

NOTE: If a CHV-RTHS temperature/humidity sensor is installed, a CHV-TSAT can import and display the humidity.

Outdoor

MODE	**Outdoor**	▲
VIEW	32°F	▼
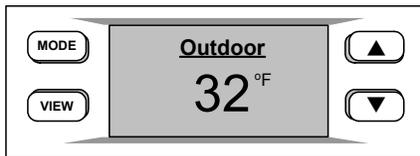
Press the **VIEW** button again to display the "Outdoor" screen. This allows the user to view the outdoor temperature (if an outdoor sensor has been installed) and outdoor humidity (if available). Outdoor temperature/humidity can come from an outdoor sensor wired directly to the thermostat or through the Cresnet system from another source.

Messages

MODE	<CLR **Messages**	▲
VIEW	Emergency Gen in Use	▼

Press the **VIEW** button again to display the "Messages" screen. This screen allows the user to view any text messages sent from the control system (Only when part of a Cresnet system).

Text messages are limited to 4 lines, approximately 20 characters per line. Allow for word wrap.

When part of a Cresnet system, the up ▲ and down ▼ arrow buttons can be used to enable other functions (i.e., lighting control, alarm system, etc.).

Press the **MODE** button to clear (CLR) the message(s). Acknowledges to the control system that the message has been read.

Programming Software

The CHV-TSTAT and CHV-THSTAT thermostats do not require programming when used as stand alone devices. Programming as part of a Cresnet System allows additional functionality, including:

Global Update and Global Page display – Allows viewing and setting the temperature/humidity for an entire house in a multi-thermostat system.

Remote Function pages – Allows system control of other functions (lighting, alarms, etc.). Two pages, two functions per page.

System Messaging – Allows the control system to send text messages to the thermostat.

NOTE: As of press time, Crestron D3 Pro does not yet support the thermostats. Version numbers and release dates to be announced.

Setup is easy thanks to Crestron's Windows®-based programming software. The Crestron D3 Pro Software creates a complete project, with no special programming required. The D3 Pro completes all necessary programming for a base system including the control system program. Once the D3 Pro creates the project, the system interfaces and program logic can be customized. It can easily be modified with Crestron development tools (i.e., SIMPL™ Windows®) software.

The program output of D3 Pro is a SIMPL Windows program with much of the functionality encapsulated in macros. Therefore, extending the capabilities of the system is very easy. Crestron D3 Pro and SIMPL Windows are intended for users with different levels of programming knowledge. The flexibility of each is proportional to the degree of programming expertise (i.e., the more flexible, the more a programmer needs to know and account for). Of course, one can initiate programming using the easiest method (Crestron D3 Pro) and use advanced techniques that are available from SIMPL Windows to customize the job.

The D3 Pro comes with templates for all supported interfaces. If a user wishes to create a touchpanel project using templates with a different look-and-feel this can be accomplished by making a custom template. This custom template can then be used by D3 Pro to create the final project files. The following are recommended software version requirements for the PC:

- D3 Pro. Requires SIMPL Windows.

- SIMPL Windows version 2.03.12 or later with library update file 197 or later.

- Requires SIMPL+ Cross Compiler version 1.1.

- Crestron Database version 15.8.5 or later. Required by SIMPL Windows.

Programming with the Crestron D3 Pro

The easiest method of programming, but does not offer as much flexibility as SIMPL Windows.

NOTE: As of press time, Crestron D3 Pro does not yet support the thermostats. Version numbers and release dates to be announced.

The Crestron D3 Pro offers automatic programming for residential and commercial systems. The interface of this tool guides you through a few basic steps for designating rooms and specifying the control system, devices, and functionality. The Crestron D3 Pro then programs the system, including all control system logic.

The Crestron D3 Pro is fully integrated with the Crestron suite of software development tools and accesses these tools behind the scenes, enabling you to easily create robust systems.

Programming with SIMPL Windows

NOTE: The following assumes that the reader has knowledge of SIMPL Windows. If not, refer to the extensive help information provided with the software.

NOTE: In the following description, the PRO2 control system is used.

SIMPL Windows is Crestron's software for programming Crestron control systems. It provides a well-designed graphical environment with a number of workspaces (i.e., windows) in which a programmer can select, configure, program, test, and monitor a Crestron control system. SIMPL Windows offers drag and drop functionality in a familiar Windows® environment.

This section describes a sample SIMPL Windows program that includes a CHV-TSTAT.

Configuration Manager is where programmers "build" a Crestron control system by selecting hardware from the *Device Library*. In Configuration Manager, drag the PRO2 from the Control Systems folder of the *Device Library* and drop it in the upper pane of the *System Views*. The PRO2 with its associated communication ports is displayed in the *System Views* upper pane.

PRO2 System View
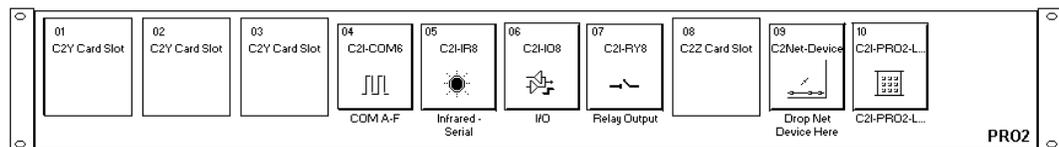
The *System Views* lower pane displays the PRO2 system tree. This tree can be expanded to display and configure the communications ports.

Expanded PRO2 System Tree
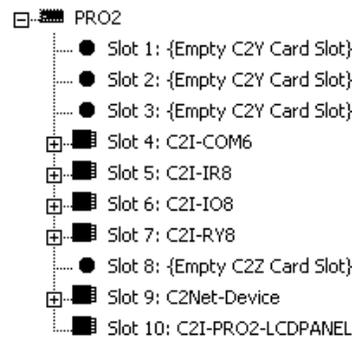
C2Net-Device Slot in Configuration Manager

To incorporate a CHV-THSTAT or CHV-TSTAT into the system, drag one of the symbols for the thermostat from the Crestron Sensing Modules folder of the *Device Library* and drop it on C2-NET Device slot in *System Views*. The PRO2 system tree displays the thermostat symbol in Slot 9, with a default NET ID of 2A as shown in the example graphic below.

C2Net Device, Slot 9
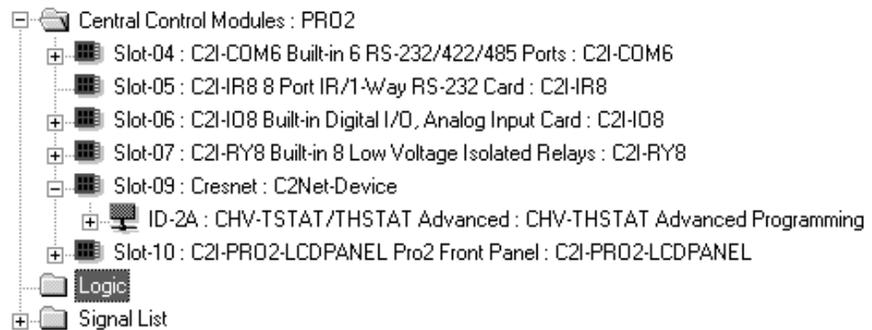
Setting the Net ID in Device Settings

Double-click the thermostat icon in the upper pane to open the "Device Settings" window. This window displays the device information. Select the *Net ID* tab to change the Net ID, as shown in the following graphic.

"Device Settings" Window for the CHV-THSTAT
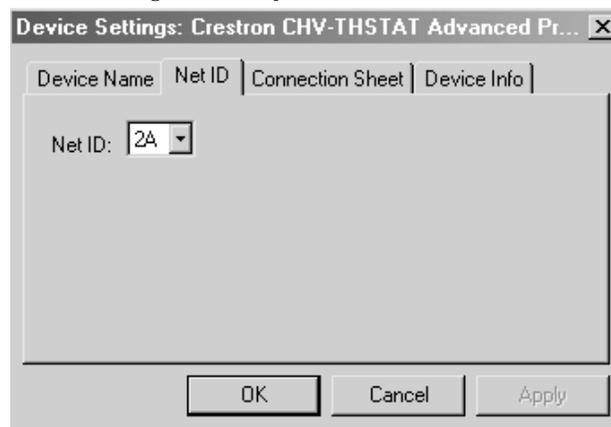
Basic and Advanced Symbols in Programming Manager

Programming Manager is where programmers "program" a Creston control system by assigning signals to symbols.

You may choose between two different symbol sets for the thermostats, advanced and basic. The advanced symbol allows a broader range of functions, including the ability to control other devices (lighting, alarms, etc.), interact with other thermostats, receive messages from the Crestron system, import and export temperature and humidity information. The basic symbol, while simpler, still provides all the necessary connections to operate and control a Heating Ventilation and Air Conditioning (HVAC) system.

CHV-TSTAT AND CHV-THSTAT BASIC SYMBOL

The following diagram shows the basic thermostat symbols in the SIMPL Windows' Programming Manager. Refer to page 27 for a detailed description of the inputs and outputs

Detail View of the Basic CHV-THSTAT and CHV-TSTAT Symbol

Digital Inputs/Outputs

Detail View of the Basic CHV-THSTAT and CHV-TSTAT Symbol

Analog Inputs/Outputs

SETPOINT_1	SETPOINT_1_F
SETPOINT_2	SETPOINT_2_F
HUM_SETPOINT	HUM_SETPOINT_F
	REGULATION_TEMP_F
OUTDOOR_TEMP	OUTDOOR_TEMP_F
	REGULATION_HUMID_F
OUTDOOR_HUM	OUTDOOR_HUMID_F
INDOOR_HUM	
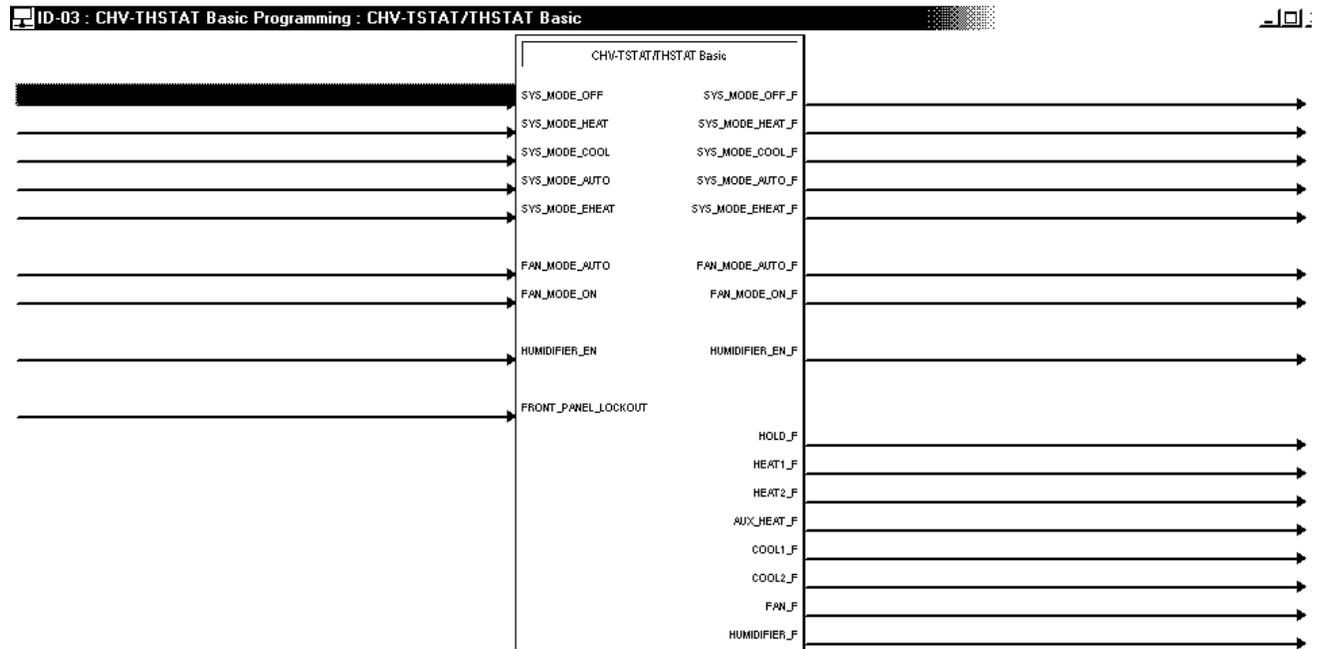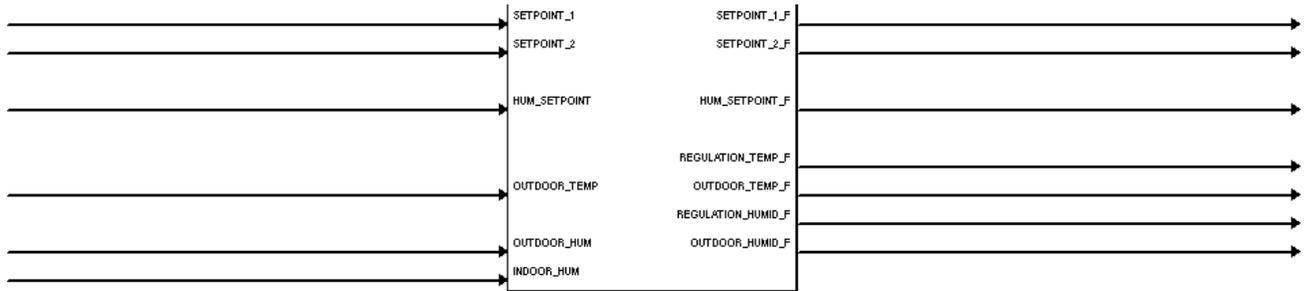
CHV-THSTAT AND CHV-TSTAT ADVANCED SYMBOL

The advanced symbol allows additional functionality, including: Global Update and Global Page display, Function pages, and System Messaging. Refer to page 27 for a detailed description of the inputs and outputs.

Detail View of the Advanced CHV-THSTAT and CHV-TSTAT Symbol

Digital Inputs/Outputs

ID-29 : CHV-TSTAT Advanced Programming : CHV-TSTAT/THSTAT Advanced

CHV-TSTAT/THSTAT Advanced

SYS_MODE_OFF	SYS_MODE_OFF_F
SYS_MODE_HEAT	SYS_MODE_HEAT_F
SYS_MODE_COOL	SYS_MODE_COOL_F
SYS_MODE_AUTO	SYS_MODE_AUTO_F
SYS_MODE_EHEAT	SYS_MODE_EHEAT_F
FAN_MODE_AUTO	FAN_MODE_AUTO_F
FAN_MODE_ON	FAN_MODE_ON_F
HUMIDIFIER_EN	HUMIDIFIER_EN_F
	GLOBAL_UPDATE_BTN_F
MESSAGE_ICON_ON	
FRONT_PANEL_LOCKOUT	
RUN_BACKLIGHT	
	HOLD_F
	BTN_PRESS_1_F
	BTN_PRESS_2_F
	BTN_PRESS_3_F
	BTN_PRESS_4_F
	HEAT1_F
	HEAT2_F
	AUX_HEAT_F
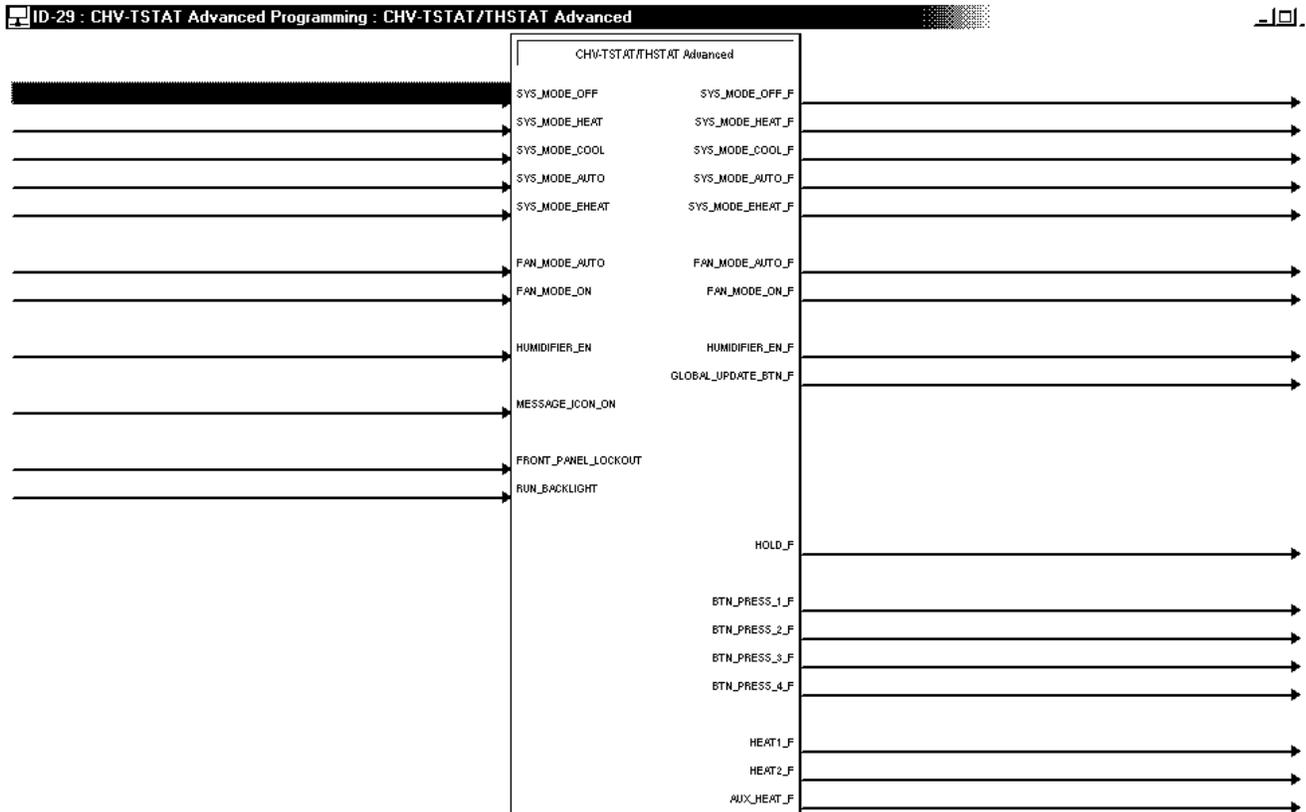
Detail View of the Advanced CHV-THSTAT and CHV-TSTAT Symbol

Digital Outputs

COOL1_F	→
COOL2_F	→
FAN_F	→
HUMIDIFIER_F	→
MSG_WAITING_F	→
HEAT_COOL_SYS_F	→
HEATPUMP_SYS_F	→
HEAT_1_STG_F	→
HEAT_2_STG_F	→
COOL_1_STG_F	→
COOL_2_STG_F	→
TEMP_IN_F	→
TEMP_IN_C	→
DISP_FP_HUM_F	→
DISP_FP_OD_F	→
DISP_HUM_F	→
DISP_GLOBAL_F	→
DISP_OUTDOOR_F	→
DISP_REM_BUTTONS1_F	→
DISP_REM_BUTTONS2_F	→
DUAL_SP_AUTO_MODE_F	→
LOW_TEMP_HUM_COMP_F	→
USE_LOC_TEMP_F	→
USE_R1_TEMP_F	→
USE_R2_TEMP_F	→
OMIT_LOC_TEMP_F	→
OMIT_R1_TEMP_F	→
OMIT_R2_TEMP_F	→
R1_T_OUTDOOR_F	→
R2_T_OUTDOOR_F	→
USE_LOC_HUM_F	→
USE_R1_HUM_F	→
USE_R2_HUM_F	→
OMIT_LOC_HUM_F	→
OMIT_R1_HUM_F	→
OMIT_R2_HUM_F	→
R1_H_OUTDOOR_F	→
R2_H_OUTDOOR_F	→
DUAL_FUEL_HP_F	→
RADIANT_F	→
FAN_IN_HEAT_F	→

Detail View of the Advanced CHV-THSTAT and CHV-TSTAT Symbol

Analog Inputs/Outputs

SETPOINT_1	SETPOINT_1_F
SETPOINT_2	SETPOINT_2_F
HUM_SETPOINT	HUM_SETPOINT_F
	REGULATION_TEMP_F
	BUILT_IN_TEMP_F
	REM1_TEMP_F
	REM2_TEMP_F
OUTDOOR_TEMP	OUTDOOR_TEMP_F
	REGULATION_HUMID_F
	BUILT_IN_HUMID_F
	REM1_HUMID_F
	REM2_HUMID_F
OUTDOOR_HUM	OUTDOOR_HUMID_F
INDOOR_HUM	
	HEAT_ANTICIPATOR_F
	COOL_ANTICIPATOR_F
	AUTO_MODE_DEADBAND_F
	HP_BALANCE_PT_F
	AUX_BALANCE_PT_F
	LCD_CONTRAST_F
	TEMP_DISP_OFFSET_F

Detail View of the Advanced CHV-THSTAT and CHV-TSTAT Symbol

Serial Inputs

| MESSAGE |
| BUTTON_LABEL_1 |
| BUTTON_LABEL_2 |
| BUTTON_LABEL_3 |
| BUTTON_LABEL_4 |
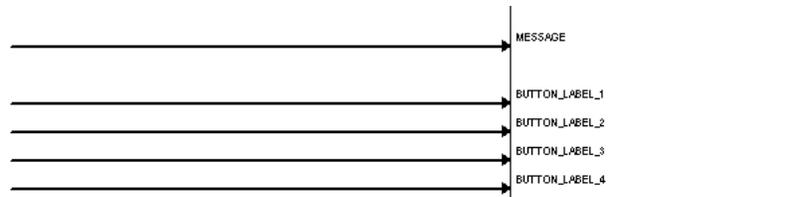
Thermostat Symbol Definitions

The following tables contain a detailed description of the inputs and outputs for the basic and advanced CHV-TSTAT and CHV-THSTAT symbols.

System Mode Related Digital Joins

Signal Name	Symbol*	I/O	Definition
SYS_MODE_OFF	Both	Input	Selects off mode (no HVAC system operation)
SYS_MODE_HEAT	Both	Input	Selects heat only mode when asserted
SYS_MODE_COOL	Both	Input	Selects cool only mode when asserted
SYS_MODE_AUTO	Both	Input	Selects auto mode when asserted
SYS_MODE_EHEAT	Both	Input	Selects emergency heat only mode on heat pump systems Has no effect if sent to a heat/cool (H/C) system
SYS_MODE_OFF_F SYS_MODE_HEAT_F SYS_MODE_COOL_F SYS_MODE_AUTO_F SYS_MODE_EHEAT_F	Both	Output	Outputs for the joins above Can be used as feedback to show actual system mode status since the mode can be changed from the thermostat end or through Cresnet

*Joins are either available in **both** basic and advanced symbols or in the **advanced** symbol only.

Fan Mode Related Digital Joins

Signal Name	Symbol	I/O	Definition
FAN_MODE_AUTO	Both	Input	Selects auto fan mode when asserted
FAN_MODE_ON	Both	Input	Selects fan ON mode, fan runs continuously
FAN_MODE_AUTO_F	Both	Output	Feedback for the auto fan mode join above
FAN_MODE_ON_F	Both	Output	Feedback for the on fan mode join above

System Operation Feedback Digital Joins

Signal Name	Symbol	I/O	Definition
HEAT1_F	Both	Output	Asserted for the duration that heat stage 1 is running
HEAT2_F	Both	Output	Asserted for the duration that heat stage 2 is running
AUX_HEAT_F	Both	Output	Asserted for the duration that auxiliary heat is running (Heat pump only)
COOL1_F	Both	Output	Asserted for the duration that cooling stage 1 is running
COOL2_F	Both	Output	Asserted for the duration that cooling stage 2 is running
FAN_F	Both	Output	Asserted for the duration that the fan is on for any reason
HUMIDIFIER_F	Both	Output	Asserted for the duration that the humidifier is running
HOLD_F	Both	Output	Indicates that the thermostat has been set "offline" by the user active = offline, inactive=online

Other Digital Joins

Signal Name	Symbol	I/O	Definition
GLOBAL_UPDATE_BTN	Advanced	Input	Output that is asserted when the global update "send" button is pressed
MESSAGE_ICON_ON	Advanced	Input	Causes the front panel third text line to flash "view msg" alternately with "on line/offline," alerting the user to check a message that was sent to the thermostat
FRONT_PANEL_LOCKOUT	Both	Input	Causes the buttons on the thermostat to become inoperable when asserted, Useful for locking out changes in operation by users
RUN_BACKLIGHT	Advanced	Input	Triggers the backlight to turn on for its 8 seconds
BTN_PRESS_1_F	Advanced	Output	Asserted for the duration that remote button 1 is pressed (up button, remote page 1)
BTN_PRESS_2_F	Advanced	Output	Asserted for the duration that remote button 2 is pressed (down button, remote page 1)
BTN_PRESS_3_F	Advanced	Output	Asserted for the duration that remote button 3 is pressed (up button, remote page 2)
BTN_PRESS_4_F	Advanced	Output	Asserted for the duration that remote button 4 is pressed (down button, remote page 2)
MSG_WAITING_F	Advanced	Output	Asserted when an indirect text message is received on $message join and latched until the user presses the "CLR" button on the message screen

Humidifier Related Joins (all analog values are in whole %)

> **NOTE:** All humidity-related analog values are input and output as whole numbers. Example: For 47% humidity, the reading is sent as 47.

Signal Name	Symbol	I/O	Definition
HUMIDIFIER_EN	Both	Input	Enables the humidistat operations when asserted (Digital)
HUMIDIFIER_EN_F	Both	Output	Feedback for above (Digital)
HUM_SETPOINT	Both	Input	Analog join that sets the humidity setpoint, 5-70%, all other values ignored, All values are whole numbers, so sending 38 changes the setpoint to 38%
HUM_SETPOINT_F	Both	Output	Feedback output so that changes in the value can be monitored by the control system
OUTDOOR_HUM	Both	Input	Input allowing the outdoor humidity value to be displayed on the "outdoor" page even if the particular unit does not have an outdoor remote sensor
OUTDOOR_HUM_F	Both	Output	Output for outdoor humidity It is only active when a particular unit has a remote outdoor sensor connected Otherwise, zero is output
INDOOR_HUM	Both	Input	Input allowing display of indoor humidity on the front panel Importing the value this way is required only if setup was a TSTAT with non-humidity remotes (no way of measuring indoor humidity) The network input value is overridden by a measured value if one is available

Humidifier Related Joins (continued)

Signal Name	Symbol	I/O	Definition
OUTDOOR_HUMID_F	Both	Output	Analog value that is output if a connected remote temperature/humidity sensor is declared as "outdoor" Can be used to distribute the reading to other thermostats for display purposes
REGULATION_HUMID_F	Both	Output	The "regulation" humidity that a thermostat is using, This is the average of the humidity sensor inputs declared "use" in set-up This output is only active when a thermostat setup has humidity sensing capability, either by being a CHV-THSTAT or a CHV-TSTAT with humidity remote (Analog)
BUILT_IN_HUMID_F	Advanced	Output	Humidity value of built-in sensor (Analog) Output will send out the sensor values even if the sensor is declared, "omit"
REM1_HUMID_F	Advanced	Output	Humidity value of remote 1 sensor (Analog) Output will be zero if the sensor is not installed Output will send out the sensor values even if the sensor is declared "omit"
REM2_HUMID_F	Advanced	Output	Humidity value of remote 2 sensor (Analog) Output will be zero if the sensor is not installed Output will send out the sensor values even if the sensor is declared "omit"

HVAC Related Analog Joins

NOTE: All temperatures except for setpoint values are expressed in tenths of degrees. For example: sending 703 means 70.3.

Signal Name	Symbol	I/O	Definition
SETPOINT_1	Both	Input	The primary setpoint value, in whole numbers, Example: 71 means the setpoint is 71 degrees, It is the value used in heat, cool, and "aux heat only" modes, When operating in auto mode, setpoint_1 can mean two things, depending on setup, If the option "dual setpoint auto" is Yes, then setpoint is the heat setpoint If No is selected, then setpoint is the only setpoint (single-point auto only has one setpoint)
SETPOINT_1_F	Both	Output	Output of setpoint 1, in whole numbers
SETPOINT_2	Both	Input	Secondary setpoint value, which is ONLY used as the cooling setpoint in auto when "Dual setpoint auto" is selected as Yes
SETPOINT_2_F	Both	Output	Output of setpoint 2, in whole numbers
OUTDOOR_TEMP	Both	Input	Input that allows the outdoor temperature value to be retrieved from Cresnet for display on the "outdoor" page, This value is ignored when a thermostat has a remote-outdoor sensor connected to it Also used for balance point action on heat pump systems, in 10ths of degrees
OUTDOOR_TEMP_F	Both	Output	Output used for sending outdoor temperature to other units It takes the value of remote sensors declared "OD"(Outdoor) Output is zero if no remotes are declared "OD", in 10ths of degrees

HVAC Related Analog Joins (continued)

Signal Name	Symbol	I/O	Definition
REGULATION_TEMP_F	Both	Output	Temperature used for regulation, this is the mean (averaged) temperature for all sensors declared "use", in 10ths of degrees
BUILT_IN_TEMP_F	Advanced	Output	Temperature of the built-in sensor, in 10ths of degree, Note that the values are reported regardless of the use/OD/omit setting
REM1_TEMP_F	Advanced	Output	Temperature of remote 1 sensor, in 10ths of degree Unconnected sensors are reported as 0, Note that the values are reported regardless of the use/OD/omit setting
REM2_TEMP_F	Advanced	Output	Temperature of remote 2 sensor, in 10ths of degree Unconnected sensors are reported as 0, Note that the values are reported regardless of the use/OD/omit setting

Indirect Text Joins (Serial)

Signal Name	Symbol	I/O	Definition
MESSAGE	Advanced	Input	Used for sending a message to the thermostat Appears on the "messages" view screen
BUTTON_LABEL_1	Advanced	Input	Provides the soft button label for the first remote function button (up button, page 1)
BUTTON_LABEL_2	Advanced	Input	Provides the soft button label for the second remote function button (down button, page 1)
BUTTON_LABEL_3	Advanced	Input	Provides the soft button label for the third remote function button (up button, page 2)
BUTTON_LABEL_4	Advanced	Input	Provides the soft button label for the fourth remote function button (down button, page 2)

Advanced Setup Related Analog Joins

Signal Name	Symbol	I/O	Definition
HEAT_ANTICIPATOR_F	Advanced	Output	Heat anticipator value, 1-6 (refer to page 16)
COOL_ANTICIPATOR_F	Advanced	Output	Cooling anticipator value, 1-6 (refer to page 16)
AUTO_MODE_DEADBAND_F	Advanced	Output	Auto mode deadband value, 2-6 degrees (refer to page 16)
HP_BALANCE_PT_F	Advanced	Output	Heat pump balance point, 0-90˚F (refer to page 16)
AUX_BALANCE_PT_F	Advanced	Output	Aux balance point, 0-90˚F (refer to page 16)
LCD_CONTRAST_F	Advanced	Output	LCD contrast value, 1-10
TEMP_DISP_OFFSET_F	Advanced	Output	Offset to be added to measured temperature value to correct display to user preference, -6 - +6 degrees

Setup Related Digital Joins

Signal Name	Symbol	I/O	Definition
HEAT_COOL SYS_F	Advanced	Output	Asserted when the system is heat/cool type (as opposed to heat pump)
HEATPUMP_SYS_F	Advanced	Output	Asserted when system type is heat pump

Setup Related Digital Joins (continued)

Signal Name	Symbol	I/O	Definition
DUAL_FUEL_HP_F	Advanced	Output	Asserted when dual-fuel heat pump system declared, In conventional heat pump systems, aux heat may be used to supplement heat pump heat, In dual-fuel setups, the aux heat output runs in place of the heat pump in cold weather Requires outdoor temperature source
RADIANT_F	Advanced	Output	Asserted when a heat/cool system is declared as Radiant, Radiant systems require slightly different control characteristics than forced air systems
FAN_IN_HEAT_F	Advanced	Output	Asserted when "Run Fan in Heat" is "yes", Most heating systems control the fan if it is needed, but some systems may require the fan to be controlled by the thermostat
HEAT_1_STG_F	Advanced	Output	Asserted when one stage of heat is defined
HEAT_2_STG_F	Advanced	Output	Asserted when two stages of heat are define
COOL_1_STG_F	Advanced	Output	Asserted when one stage of cooling is defined
COOL_2_STG_F	Advanced	Output	Asserted when two stages of cooling are defined
TEMP_IN_F	Advanced	Output	Asserted when Fahrenheit units are used
TEMP_IN_C	Advanced	Output	Asserted when Celsius units are used
DISP_FP_HUM_F	Advanced	Output	Asserted when front panel object is set to be humidity
DISP_FP_OD_F	Advanced	Output	Asserted when front panel object is outdoor temperature
DISP_HUM_F	Advanced	Output	Asserted when humidity pages are enabled
DISP_GLOBAL_F	Advanced	Output	Asserted when global update page is enabled
DISP_OUTDOOR_F	Advanced	Output	Asserted when outdoor page is enabled
DISP_REM_BUTTONS1_F	Advanced	Output	Asserted when remote button page 1 is enabled
DISP_REM_BUTTONS2_F	Advanced	Output	Asserted when remote button page 2 is enabled
DUAL_SP_AUTO_MODE_F	Advanced	Output	Asserted when using 2 point auto mode, unasserted means using single point auto mode
LOW_TEMP_HUM_COMP_F	Advanced	Output	Asserted when low temperature humidity compensation is enabled, helps prevent condensation on windows in cold weather

Sensor Setup Related Digital Joins

Signal Name	Symbol	I/O	Definition
USE_LOC_TEMP_F	Advanced	Output	Asserted when using built in temperature sensor
USE_R1_TEMP_F	Advanced	Output	Asserted when using remote 1 temperature sensor
USE_R2_TEMP_F	Advanced	Output	Asserted when using remote 2 temperature sensor
OMIT_LOC_TEMP_F	Advanced	Output	Asserted when Omitting built in temperature sensor
OMIT_R1_TEMP_F	Advanced	Output	Asserted when Omitting remote 1 temperature sensor
OMIT_R2_TEMP_F	Advanced	Output	Asserted when Omitting remote 2 temperature sensor
R1_T_OUTDOOR_F	Advanced	Output	Asserted when remote 1 temperature sensor has been declared as outdoor (OD)
R2_T_OUTDOOR_F	Advanced	Output	Asserted when remote 2 temperature sensor has been declared as outdoor (OD)
USE_LOC_HUM_F	Advanced	Output	Asserted when using built in humidity sensor (THSTAT)
USE_R1_HUM_F	Advanced	Output	Asserted when using remote 1 humidity sensor
USE_R2_HUM_F	Advanced	Output	Asserted when using remote 2 humidity sensor

Sensor Setup Related Digital Joins (continued)

Signal Name	Symbol	I/O	Definition
OMIT_LOC_HUM_F	Advanced	Output	Asserted when Omitting built in hum sensor (THSTAT)
OMIT_R1_HUM_F	Advanced	Output	Asserted when Omitting remote 1 humidity sensor
OMIT_R2_HUM_F	Advanced	Output	Asserted when Omitting remote 2 humidity sensor
R1_H_OUTDOOR_F	Advanced	Output	Asserted when remote 1 humidity sensor is outdoor
R2_H_OUTDOOR_F	Advanced	Output	Asserted when remote 2 humidity sensor is outdoor

Problem Solving

Troubleshooting

The table below provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

CHV-TSTAT/CHV-THSTAT Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
No display	No power from system	Check for +24V on pins 24(C) and 24(R)
	Incorrect mounting to backplate	Check thermostat mounting
Heating/Cooling system not operating*	No power to thermostat	Check circuit breaker
		Check 24V connection at thermostat and at furnace/air conditioner
		Recheck wiring connections
	Thermostat minimum off times operating both systems	Wait 5 minutes
Indicator displays Heat On, but no heat from register	Fan turns on when furnace reaches setpoint	Wait five minutes, then recheck registers.
Cannot change temperature setting	The upper or lower temperature limits were reached.	Setpoint heat range is 38 – 90º F (3-38º C). Setpoint cool range is 59-100º F (15 – 38º C)
Furnace cycles too quickly	Anticipator setting too low	Reprogram anticipator. Refer to "Thermostat Setup" on page 14
High temperature variance	Anticipator setting too high	Reprogram anticipator. Refer to "Thermostat Setup" on page 14

*H1, H2, C1, C2 may appear but the system will not activate until the 5 minute timer guards have been satisfied.

Further Inquiries

If after reviewing this Operations and Installation Guide, you cannot locate specific information or have questions, please take advantage of Crestron's award winning customer service team by calling:

- In the US and Canada, call Crestron's corporate headquarters at 1-888-CRESTRON [1-888-273-7876].

- In Europe, call Crestron International at +32-15-50-99-50.

- In Asia, call Crestron Asia at +852-2341-2016.

- In Latin America, call Crestron Latin America at +5255-5093-2160.

- In Australia and New Zealand, call Creston Pacific at +613-9480-2999

Firmware Upgrades

To take advantage of all the features, it is important that the unit contains the latest firmware available. Therefore, please check Crestron's website (http://www.crestron.com/downloads/software_updates.asp) for the latest version of firmware. Not every product has a firmware upgrade, but as Crestron improves functions, adds new features, and extends the capabilities of its products, firmware upgrades are posted. If you have questions regarding upgrades procedures, contact Crestron customer service.

Future Updates

As Crestron improves functions, adds new features, and extends the capabilities of this product, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

Check the Crestron website (www.crestron.com) periodically for manual update availability and its subjective value. Updates are available from the Download | Product Manuals section and are identified as an "Addendum" in the Download column.

Appendix A: Glossary

Anticipators – Used to anticipate the drop or rise in temperature and energize the appropriate system before reaching the set point.

Balance Point – The lowest outdoor temperature at which the refrigeration cycle of a heat pump will supply the heating requirements without the aid of a supplementary heat source.

Blower (Fan) – An air-handling device for moving air in a distribution system.

BTU - British Thermal Unit – In scientific terms, it represents the amount of energy required to raise one pound of water one degree Fahrenheit. One BTU is the equivalent of the heat given off by a single wooden kitchen match.

Call – A call is when the thermostat requests the heating or cooling system to turn on.

Damper – Found in ductwork, this movable plate opens and closes to control airflow. Dampers are used effectively in zoning to regulate airflow to certain rooms.

Dead Band – The minimal differential between Heating and Cooling.

Dual Fuel – A heat pump used in conjunction with an existing furnace.

Emergency Heat (Supplementary Electric Heat) – The auxiliary or emergency heat provided at temperatures below a heat pump's balance point. It is usually electrical resistance heat.

Forced Air – A type of heating system that uses a blower motor to move air through the furnace and into the ductwork.

Furnace – Equipment used to convert heating energy, such as fuel, oil, gas or electricity, to usable heat. It usually contains a heat exchanger, a blower and the controls to operate the system.

Heat Exchanger – A device for the transfer of heat energy from the source to the conveying medium of air or water. Most common combinations are: Refrigerant to air or Refrigerant to water (DX), Water to air (hydronic), Steam to air, Steam to water.

Heat Pump – A unit that both cools and heats. A heat pump system can be either a split system or a packaged system. A heat pump can be used in conjunction with a gas/oil/LP furnace (using the furnace instead of electric resistance heat when temperatures fall below about 35 F).

Humidity – The total amount of moisture in air. Relative humidity (RH) is the amount of moisture in air, relative to its total capability based upon its temperature (dewpoint). Moisture will condense on surfaces that are below this dewpoint.

HVAC – Heating, ventilation and air conditioning.

Setpoint – The thermostat temperature set to begin heating or cooling.

Time Delay (Timer Guards) – Refers to a safety device or circuit that will not allow restart for 5 minutes.

Two Stage Heating/Cooling – The heating or cooling unit starts out running in its first stage, and operates at about 68% of its capacity. When the temperature outside goes very low or very high, the system adjusts to full capacity (second stage) to meet the demand.

Appendix B: About Heat Pumps

A heat pump extracts available heat from one area and transfers it to another. Even cold air contains some heat, and heat pumps can extract heat from the outside air on a cold day and transfer it indoors to maintain a comfortable temperature. A heat pump also works in reverse during the summer, extracting heat from indoors and transferring it outdoors.

In the heating mode, the efficiency of a heat pump decreases as the outdoor air temperature decreases.

Heat Pump Operation

Heat flows naturally from a warm area to a cooler area, and the heat pump takes advantage of this principle. The heat pump essentially consists of a compressor, an inside coil and fan, and an outside coil and fan. A refrigerant flows inside the coils, under pressure applied by the compressor.

The refrigerant boils at a very low temperature (as low as -15° F) and becomes a vapor, just as water becomes a vapor (steam) when boiled. This vapor is sucked into the compressor where it becomes a high pressure, high temperature vapor.

When heating, the refrigerant is then forced through a coil within part of the heat pump located indoors. A fan blows cool air over the coil, the vapor cools, turns back to a liquid, releasing heat that is blown through a duct system to heat the house.

The cycle begins again as the cooled liquid refrigerant is pumped back outside after releasing it's heat. On the way, it passes through an expansion valve, lowering the refrigerant's pressure and temperature again so it can boil more easily in the outdoor coil.

In its cooling mode the heat pump system works in reverse, extracting available heat from indoors and transferring it outside.

Heat pumps are most economical when they can be used year-round for both winter heating and summer cooling.

The efficiency of a heat pump varies significantly with the outdoor temperature. While a heat pump may be twice as efficient as a conventional heating system at 50°F. When the outdoor temperature drops to less than 30°F, the heat pump must be supplemented with an auxiliary heating system such as electric resistance. At temperatures of 15°F or less the heat pump may shut off and the backup heating system takes over. This is the heat pump balance point. In a dual-fuel system, the heat pump is supplemented with a standard furnace, which takes over when it becomes more efficient than the heat pump at very low temperatures.

Return and Warranty Policies

Merchandise Returns / Repair Service

1. No merchandise may be returned for credit, exchange, or service without prior authorization from CRESTRON. To obtain warranty service for CRESTRON products, contact the factory and request an RMA (Return Merchandise Authorization) number. Enclose a note specifying the nature of the problem, name and phone number of contact person, RMA number, and return address.

2. Products may be returned for credit, exchange, or service with a CRESTRON Return Merchandise Authorization (RMA) number. Authorized returns must be shipped freight prepaid to CRESTRON, Cresskill, N.J., or its authorized subsidiaries, with RMA number clearly marked on the outside of all cartons. Shipments arriving freight collect or without an RMA number shall be subject to refusal. CRESTRON reserves the right in its sole and absolute discretion to charge a 15% restocking fee, plus shipping costs, on any products returned with an RMA.

3. Return freight charges following repair of items under warranty shall be paid by CRESTRON, shipping by standard ground carrier. In the event repairs are found to be non-warranty, return freight costs shall be paid by the purchaser.

CRESTRON Limited Warranty

CRESTRON ELECTRONICS, Inc. warrants its products to be free from manufacturing defects in materials and workmanship under normal use for a period of three (3) years from the date of purchase from CRESTRON, with the following exceptions: disk drives and any other moving or rotating mechanical parts, pan/tilt heads and power supplies are covered for a period of one (1) year; touchscreen display and overlay components are covered for 90 days; batteries and incandescent lamps are not covered.

This warranty extends to products purchased directly from CRESTRON or an authorized CRESTRON dealer. Purchasers should inquire of the dealer regarding the nature and extent of the dealer's warranty, if any.

CRESTRON shall not be liable to honor the terms of this warranty if the product has been used in any application other than that for which it was intended, or if it has been subjected to misuse, accidental damage, modification, or improper installation procedures. Furthermore, this warranty does not cover any product that has had the serial number altered, defaced, or removed.

This warranty shall be the sole and exclusive remedy to the original purchaser. In no event shall CRESTRON be liable for incidental or consequential damages of any kind (property or economic damages inclusive) arising from the sale or use of this equipment. CRESTRON is not liable for any claim made by a third party or made by the purchaser for a third party.

CRESTRON shall, at its option, repair or replace any product found defective, without charge for parts or labor. Repaired or replaced equipment and parts supplied under this warranty shall be covered only by the unexpired portion of the warranty.

Except as expressly set forth in this warranty, CRESTRON makes no other warranties, expressed or implied, nor authorizes any other party to offer any warranty, including any implied warranties of merchantability or fitness for a particular purpose. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty. This warranty statement supercedes all previous warranties.

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