Savant® Centralized Climate Control

CLI-8000

Deployment Guide

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Safety

Before installing, configuring and operating SAVANT® or any other vendor equipment, SAVANT® recommends that each dealer and/or installer read all the required technical documentation. SAVANT® technical documentation is located on the SAVANT® Portal. Vendor documentation is supplied with each piece of equipment.

Read and understand all safety instructions, cautions and warnings in this document and the labels on the equipment.

Important, Caution, and Warning Classifications

Cautions and warnings provide information required to keep users or installers safe as well as prevents damage to equipment from occurring.

Icon	Description
	**Important** - Important describes special information for installing, configuring and operating equipment. **Caution** - Caution describes a situation that may cause damage to the equipment. **Warning** - Warning describes a situation that may present a physical danger to the installer or end-user. **Weight Injury** - Installing some of the Savant controllers require two installers to ensure safe handling during installation. Failure to use two installers may result in injury.
	**Electric Shock** - The 100-240V AC, 50-60 Hz power source can cause electric shock. The electrical shock has the potential to cause serious injury to installers and end-users. **Electrical Disconnect** - The outlets supplying the 100-240V AC, 50-60 Hz power and the inputs to this power source should be easily accessible in the event an electrical hazard or malfunction requires them to be disconnected.

Safety Statements

Follow the safety instructions listed below and apply where appropriate.

1. Read and keep these instructions.
2. Follow all instructions and heed all warnings.
3. Do not use equipment near water.
4. Clean only with dry cloth.
5. Do not block any ventilation openings. Install in accordance to the manufacturer's instructions.
6. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.
7. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
8. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and points where they exit the equipment.
9. Use only attachments/accessories specified by the manufacturer.
10. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer. When a cart is used, employ caution when stacking equipment and/or moving the cart and equipment to avoid injury from tip-over.
11. Refer all servicing to qualified service personnel only. Servicing is required when the equipment has been damaged in any way. This includes, but is not limited to, power-supply cord or plug damage, liquid or objects falling in the equipment, exposer to rain or moisture, has been dropped, or does not function normally.

Summary of Deployment

Follow the steps outlined in this section to ensure that the Centralized Climate Control system is deployed in a logical order. Use this list to ensure that all steps are performed in the order specified.

1. **Perform a Site Survey**
   Before any system design or configuration is performed, we recommend that a site survey is conducted to ensure that the system can be installed within the environment. Make note of the locations of the rooms, room names, and wiring distances.

2. **Create a List of Devices**
   Before starting the deployment, it is important to generate a list of what devices will be used and where they will be located. This will speed up the process of designing and configuring the system. Be sure to include the device type, and physical location in the list.

3. **Record all Device Information**
   Before deploying it is recommended that all serial numbers, MAC Addresses, Savant IDs, and any other specific information is recorded. This will allow for quick reference during deployment, installation, and in the future for troubleshooting.

4. **Research all Device Specifications**
   Knowing the capabilities of each device is important to ensure they meet all requirements of the system. Research the documentation on all components of the system for a general understanding of what the device is and how it is used in the system.

5. **Design the system**
   Generate a system design including all components as well as wiring locations and requirements.

6. **Install CLI-8000**
   Install the CLI-8000 Thermostat Processing Unit (TPU). Mount TPU and wire to the HVAC system. Refer to the Installation Procedures section.

7. **Install and Wire Remote Sensors**
   Install any required sensors. Refer to the Installation Procedures section for information on mounting and wiring the sensors.

8. **Power On**
   Connect input power and power on the system. Refer to the Input Power section.

9. **Configure CLI-8000**
   Configure the CLI-8000 to control a specific HVAC system. To configure the CLI-8000, the keypad and display on the front panel is used. Refer to the Keypad and Display User Guide for descriptions on each of the fields.

10. **Configure Sensors**
    Each of the Sensors installed need to be configured to communicate with the TPU. Refer to the HVAC Configuration Examples sections for information on configuring each of the sensors.

11. **Test System prior to connecting Savant Control system**
    Verify the system is operating correctly without the Savant Control System connected. Verify each zone is working as designed and configured.

12. **Configure Savant Control System**
    Once the system and configuration have been applied and is running as designed, the Savant Control System can be configured. The Savant Control system which uses an Apple iOS device for monitoring and control is created and configured through the RacePoint® BluePrint and TrueControl applications. Create and configure the Savant Control System and verify the system can be controlled using the iOS devices.

Deployment Steps

Follow these steps to successfully deploy the CLI-8000 Centralized Climate Control system. This page can be used as a checklist to record which steps have been completed.

1. Mount the CLI-8000 chassis ☐
   Refer to Mount CLI-8000

2. Wire relay banks on CLI-8000 to HVAC system ☐
   Refer to HVAC Relays - Wiring for relay descriptions and wiring.
   Refer to Wiring Examples for wiring diagrams of standard systems.

3. Sensor Description and Connection Information ☐
   Refer to Remote Sensors

4. Wire sensors to the CLI-8000 ☐
   Refer to the installation procedures for each sensor installed in your system

   - SST-TEMP1 - Installation
   - SST-OTEMP1 - Installation
   - CLI-PLEN1C / CLI-PLEN1R - Installation
   - CLI-SLAB1 - Installation
   - CLI-THFM1 - Installation

5. Connect Power to CLI-8000 chassis ☐
   Refer to Connect Input Power

6. Configure CLI-8000 to control and monitor the HVAC system ☐

   - HVAC Configuration Examples - Examples of standard HVAC installations
   - Keypad and User guide section - Definitions and Quick Reference Diagrams

7. Configure sensors in CLI-8000 ☐

   - SST-TEMP1 - Configuration
   - SST-OTEMP1 - Configuration
   - CLI-PLEN1C/CLI-PLEN1R - Configuration
   - CLI-SLAB1 - Configuration
   - CLI-THFM1 - Configuration

8. Test system to verify it is working as configured ☐

9. Add the CLI-8000 into the existing Savant Control system ☐
   Refer to the Savant Control Deployment section

10. Test system using the TrueControl II for iOS or TrueControl ☐

Optional Configuration Sections

The sections below are optional dependent on your installation. Refer to these sections as required

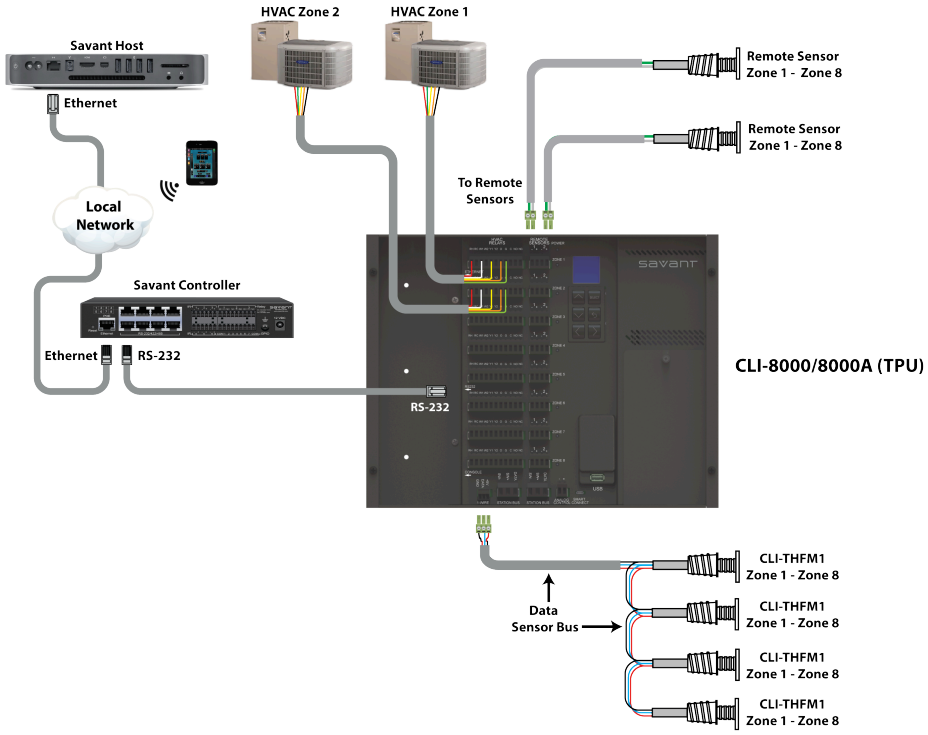
1. Zone Controller Groups ☐
   Refer to Zone Controller Groups - Configure

2. Firmware Upgrades ☐
   Refer to Firmware Upgrade section.

System Summary

The Savant® Centralized Climate Control system contains all the components needed to control the Heating Ventilation and Air Conditioning in a commercial or residential facility. The diagram below shows the complete system and a short description of each of the components.

System Diagram



⚠ **IMPORTANT !!** - Do not plug or unplug any of the sensors (2-wire or Station Bus) while power is applied to the CLI-8000. Inserting or removing a sensor while power is still applied could have detrimental affects to the system which includes a possible hardware failure.

CLI-8000

The CLI-8000 Thermostat Processing Unit processes the temperature and humidity data received from the various temperature and humidity sensors. The data received is processed and compared to a set of temperature and humidity set points. Control messaging is then sent to the HVAC system to correct any deviations from the set points. Typically mounted in a utility room, the CLI-8000 has eight separate zones that can control up to eight separate HVAC systems. These are marked as Zones 1-8 under the HVAC RELAYS heading on the front panel.

CLI-THFM1 Temperature/Humidity Sensors

The CLI-THFM1 combination temperature and humidity sensor is wired to a Data Sensor Bus. This bus communicates with the CLI-8000 through the DSB/One-Wire connection on the front panel. Up to eight sensors can be wired to this bus and each CLI-THFM1 has its own unique ID used to assign the sensor to a zone. The system supports up to two CLI-THFM1 sensors per zone.

Remote Two-Wire Temperature Sensors

Each zone on the front panel supports communications with either one or two remote two-wire temperature sensors. These sensors plug into the REMOTE SENSORS connection in each zone and supply temperature data to the CLI-8000. The sensors supported in the REMOTE SENSORS connection are the SST-TEMP1 indoor sensor, SST-OTEMP1 outdoor sensor, CLI-PLEN1R / CLI-PLEN1C residential/commercial plenum sensors, and the CLI-SLAB1 slab or floor heating sensor.

Savant Host

The Savant Host is used in a system that incorporates remote user control. The host receives information from an Apple iOS device within the Savant Control System and communicates this information to the Savant Controller. The Savant Control system software runs on the host and is used to control the temperature and humidity through devices such as the iPad or iPod. For installation and configuration information related to the Savant Host, refer to the **Savant Customer Community.**

Knowledge Base > Savant Hardware > Hosts and Servers

Savant Controller

The Savant Controller, such as the SSC-008 or SSC-0025, are installed in a system that incorporates remote user control through an Apple iOS device. The controller receives information from a Savant Host over a LAN and relays that information to the CLI-8000 over an RS-232 connection. For installation and configuration information, refer to the Savant Customer Community.

System Components - Descriptions and Specifications

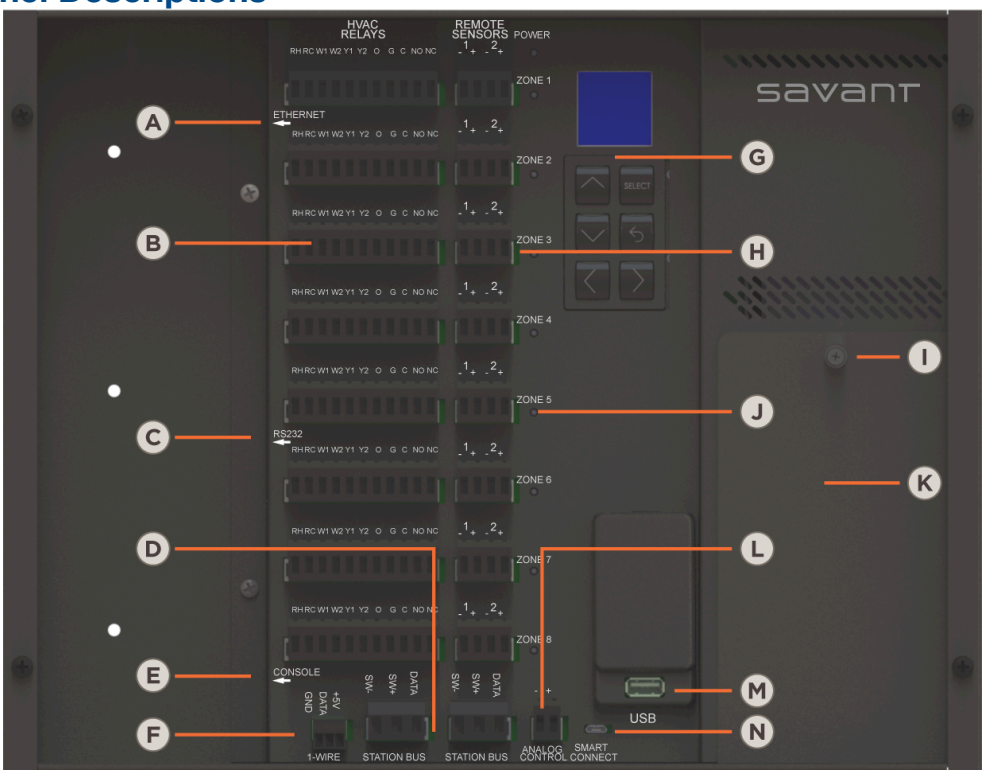
The next few sections give the specifications for each of the products supported in the system.

CLI-8000

The Savant® CLI-8000 eight zone Thermostat Processing Unit (TPU) is at the heart of the Savant® Centralized Climate Control system. By communicating with a number of remote sensors and optional user interfaces, the TPU can manage up to eight heating, ventilation, and air conditioning (HVAC) systems. The table below displays the specifications of the CLI-8000 as well as the cabling and wiring requirements.

Environmental	
Operating Temperature	32° to 104°F
Humidity	10% to 90% Relative Humidity (non-condensing)
Dimensions and Weight	
Height	12.17 in (30.91 cm) with cover; 11.05 in (28.07 cm) without cover
Width	15.48 in (39.32 cm) with cover; 14.23 in (36.14 cm) without cover
Depth	2.81 in (7.14 cm) with cover; 2.71 in (6.83 cm) with cover
Weight	8.75 lb (4.0 kg)
Power	
Power (Input Power)	24V AC (40VA) from external transformer (sold separately)
Power Draw (Maximum)	12W @ 24V AC
Cable Requirements	
Relay Bank to HVAC system	18 American Wire Gauge (AWG). Standard HVAC wiring (RH, RC, W1, W2, Y1, Y2, G, O, Aux) **Note:** In some instances, RH and RC can be jumped together.
Cable Requirements (Sensors)	
DSB/1-Wire	24 AWG (Cat 5) 600 feet (182 m) maximum (cumulative)
Remote Sensors	24 AWG (Cat 5) 500 feet (152 m) maximum
Compliance	
Safety and Emissions	FCC Part 15
RoHS	Compliant
Wiring Requirements (To HVAC system)	
To HVAC Relays	18 American Wire Gauge (AWG) Standard thermostat wiring and connections (RH, RC, W1, W2, Y1, Y2, G, O) **Note:** In some instances, RH and RC can be jumped together.
Front LEDs	
The LEDs on the front panel are used for diagnostic purposes. The zone LEDs indicate which zone has been selected via the keypad for configuration.	
Mounting	
CLI-8000 is wall-mounted typically in a utility room where the system can be easily accessed.	
Enclosure	
Metal enclosure, matte black with removable vented cover (CLI-8000). Mounting Options: Recess or Surface-mountable	
Minimum Supported Release	
Savant OS	da Vinci 6.0

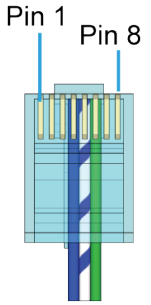
Front Panel Descriptions



Item		Description
A	Ethernet	Reserved for future use.
B	Relay Banks	Each relay bank or zone gets wired to an HVAC system. The CLI-8000 supports wiring up to eight individual HVAC systems.
C	RS-232	Connects to the Savant Controller when the Savant Control System is employed. Baud = 19200
D	Station Bus	Reserved for future use.
E	Console	Mini USB female connector (Serial UART); Debug terminal
F	DSB/1-Wire	The DSB/1-Wire connection connects the CLI-8000 to the Data Sensor Bus. The Data Sensor Bus is a serial bus based on the 1-Wire protocol. The Data Sensor Bus network supports the CLI-THFM1 Smart Sensor.
G	Keypad / Display	Used to configure and monitor the CLI-8000 system. Use the keypad to scroll through the available menus and configure each zone.
H	Remote Sensors	Indoor, Outdoor, Slab, and Plenum temperature sensors are connected here. The CLI-8000 supports connecting two remote sensors per zone.
I	Power Input Access	Remove the power input access screw and associated panel. This will give user access to the two position terminal block on the power supply board for wiring the 24V AC input power.
J	Zone LEDs	The zone LEDs indicate a zone has been selected via the keypad for configuration.
K	AC power input	Located at the bottom of the box is a ½ inch electrical box knockout. Remove the knockout and install a UL listed electrical box cable clamp. Wire the 24V AC from an external transformer to the terminal block located under the power input panel.
L	Analog Control	Reserved for future use.
M	USB	Reserved for future use.
N	Smart Connect	Maintenance functions such as firmware upgrades are accomplished through the **SmartConnect** connection. The **SmartConnect** port requires an SCA-CONF-xx or SCA-CONFL-xx SmartConnect cable and software to perform these functions. Refer to the Firmware Upgrade section for more information.

RS-232 Information

The RS-232 serial port located on the front panel connects the CLI-8000 to any Savant Controller with an RS-232 port. To connect the CLI-8000 to a Savant Controller, a Cat 5 straight-thru cable is required with a maximum length of 50 feet. All information shared between the Savant Control system and the CLI-8000 utilizes this connection. Refer to the table below for RS-232 pinout information.



RJ-45 Connector
(Gold Pins Facing Up)

Pin 1:	(Not Used)	**Pin 5:**	**TXD (RS-232)**
Pin 2:	(Not Used)	**Pin 6:**	**RXD (RS-232)**
Pin 3:	(Not Used)	Pin 7:	(Not Used)
Pin 4:	**GND (RS-232)**	Pin 8:	(Not Used)

RJ-45 to DB9 Adapters

Savant uses RJ-45 connectors for RS-232/422/485, other manufacturers devices may use the standard DB9. To make connection easy, Savant offers RJ-45 to DB9 adapters in a variety of configurations that can be used to connect to the CLI-8000 for RS-232 control. Be sure and choose the adapter that provides a proper connection to the control systems serial port. Refer to the manufacturer's support for the control systems configuration.

For more information on Savant RJ-45 to DB9 adapters, see **RS-232 Conversion to DB9 and RS-422/485 Pinout Application Note** located on the Savant Customer Community.

⚠ **IMPORTANT!** If you are using RJ-45 to DB9 adapters not supplied by Savant:

- Ensure that any wires required for communication/control are terminated within the adapter.
- Ensure that all wires NOT required for communication/control are NOT terminated in the connecter.
- Ensure that the unused wires in the connector are cut to prevent them shorting out, as they are still terminated in the RJ-45 connector on the controller side.

Remote Sensors

To allow for maximum flexibility in the design and wiring of an HVAC system, the CLI-8000 TPU can communicate with up to four temperature and two humidity sensors within each zone. The data from each sensor is received and processed contingent to the configuration set on the CLI-8000. If the Temp Function field is set to Avg, the average of all the sensors is calculated and used. If the Temp Function field is set to Max, the maximum value of all the sensors is used, and if the Temp Function field is set to Min, the minimum value of all the sensors is used. This value is recalculated and updated every five-seconds.

⚠ **IMPORTANT !!** - Do not plug or unplug any of the sensors (2-wire or Station Bus) while power is applied to the CLI-8000. Inserting or removing a sensor while power is still applied could have detrimental affects to the system which includes a possible hardware failure.

Temperature

The remote temperature sensors can be used in a variety of applications. In addition to monitoring both indoor and outdoor temperatures, both a furnace discharge temperature sensor (Plenum/DAT) and a floor temperature sensor (Slab) is supported. The chart below displays each of the sensors and where they connect to the system. The data collected from each sensor is processed within the TPU and either the average, maximum, or minimum value of all sensors is calculated and processed.

Front Panel Connection	Sensor	Indoor	Outdoor	DAT	Slab	Communication Type
Remote Sensor 1 in each zone.	SST-TEMP1 SST-OTEMP1 CLI-SLAB1	Yes	Yes	N/A	Yes	Point to Point connection from the sensor to the CLI-8000 using two-wire Cat 5 twisted pair or equivalent.
Remote Sensor 2 in each zone.	SST-TEMP1 SST-OTEMP1 CLI-PLEN1R/C CLI-SLAB1	Yes	Yes	Yes	Yes	Point-to-Point connection from the sensor to the CLI-8000 using two-wire Cat 5 twisted pair or equivalent.
DSB/1-Wire	CLI-THFM1 #1 remote sensor	Yes	N/A	N/A	N/A	Sensor is wired to the Data Sensor Bus with a maximum of two per zone and a total of eight per system. **Note:** Sensor has both temperature and humidity. Humidity is described in table below.
DSB/1-Wire	CLI-THFM1 #2 remote sensor	Yes	N/A	N/A	N/A	Sensor is wired to the Data Sensor Bus with a maximum of two per zone and a total of eight per system. **Note:** Sensor has both temperature and humidity. Humidity is described in table below.

N/A = Not Applicable

Humidity

Similar to temperature, each zone also supports communications with up to two humidity sensors. Like temperature, the humidity sensor data collected can be configured in the TPU to calculate and process the average, maximum, or minimum value.

Front Panel Connection	Sensor	Humidity	Communication Type
DSB/1-Wire	CLI-THFM1 #1 remote sensor	Yes	Sensor is wired to the Data Sensor Bus with a maximum of two per zone and a total of eight per system. **Note:** Sensor has both temperature and humidity. Temperature is described in the temperature table above.
DSB/1-Wire	CLI-THFM1 #2 remote sensor	Yes	Sensor is wired to the Data Sensor Bus with a maximum of two per zone and a total of eight per system. **Note:** Sensor has both temperature and humidity. Temperature is described in the temperature table above.

SST-TEMP1 Temperature Sensor

The SST-TEMP1 temperature sensor is a two-wire flush mount temperature sensor. It is plugged into the REMOTE SENSORS 1 and/or REMOTE SENSORS 2 connections on the front panel of the CLI-8000. Either one or two sensors can be plugged into each zone and the temperature data received from these sensors are processed and used to control the zone they are installed in. The Sens 1 Mode and Sens 2 Mode settings under the Temp Sensors menu must be set for these sensors to function as desired.

Environmental	
Temperature	32° to 158°F
Cable Requirements	
Cat 5 (24 AWG)	500 feet (152.4 m) (maximum)
Sensor Property	
Thermistor Accuracy	+/- 0.36°F
Platinum RTD Accuracy	+/- 0.72°F
Thermistor Range	-94°F to 302°F
Platinum RTD Range	-328°F to 572°F
Probe Material	Stainless Steel (Sensor is embedded in a plastic housing.)
Sensor Enclosure Length (Plastic)	0.625 in (1.59 cm)
Sensor Face Diameter (Plastic)	0.750 in (1.91 cm)
Anchor Length	1 in (2.54 cm)
Wire Length (From Sensor)	4 in (10.16 cm)
Cable Properties	FT4, 176°F, 600V
Compliance	
RoHS	Compliant
Painting the Sensor	
If desired, the SST-TEMP1 sensor can be painted to match the color of the wall. Prior to painting, prep the sensor by lightly sanding the plastic enclosure the sensor is potted in. Once roughed up, it can be painted.	
Plastering over the Sensor	
Savant does not recommend plastering over the sensor. The sensor is made from a nonporous plastic material and plaster will not bond to it well. In addition, the thermal properties of the sensor can be affected when embedded under a layer of plaster.	

SST-OTEMP1 Temperature Sensor

The SST-OTEMP1 temperature sensor is a two-wire outdoor temperature sensor. Like the SST-TEMP1 sensor, it is plugged into either the REMOTE SENSORS 1 or REMOTE SENSORS 2 connections on the front panel. The CLI-8000 supports communicating with one outdoor sensor per zone. If there are two outdoor sensors plugged in and configured, the CLI-8000 will only recognize the first sensor it sees. The Sens 1 Mode or Sens 2 Mode settings under the Temp Sensors menu must be set to Out for this sensor to function as desired.

Environmental	
Temperature	-40°F to 248°F (-40°C to 120°C)
Cable Requirements	
Cat 5 (24 AWG)	500 feet (152.4 m) (maximum)
Sensor Wire length (From end of probe in housing)	18 in (45.72 cm)
Sensor Properties	
Thermistor Accuracy	+/- 0.36°F
Platinum RTD Accuracy	+/- 0.72°F
Thermistor Range	-94°F to 302°F
Platinum RTD Range	-328°F to 572°F
Probe Material	Stainless Steel
Probe Length (Total)	3.375 in (8.57 cm)
Housing Length (Including probe housing)	6 in (15.24 cm)
Thermistor Style	10K ohm@77°F, Type 2
Cable Properties	FT4, 176°F, 600V
Compliance	
RoHS	Compliant

CLI-PLEN1R/C

The CLI-PLEN1R (residential) and CLI-PLEN1C (commercial) temperature sensors are a two-wire furnace Discharge Air Temperature Sensor (DATS) used to monitor the temperature discharged from a furnace. On the front panel of the CLI-8000, the sensors plug into the REMOTE SENSORS port 2 connection of each zone. On the sensor side, the sensors are mounted in the plenum at the discharge side of the furnace and the temperature data received is compared with the DAT max and DAT min settings configured under the Adv HVAC menu. If the temperature rises above or falls below the maximum or minimum discharge temperature set, the furnace will be shut down. The Sens 2 Mode field in the Temp Sensors menu must be set to DATS for the sensors to function. One DATS sensor per zone is supported.

CLI-PLEN1R

Environmental	
Temperature	32°F to 158°F
Cable Requirements	
Cat 5 (24 AWG) twisted pair	500 feet (152.4 m) maximum
Sensor Property & Features	
Temperature Range (Thermistor)	-94°F to 302°F
Temperature Accuracy (Thermistor)	+/- 0.36°F
Probe Material	Stainless Steel
Probe Size (l x w)	9 in x 0.25 in (22.86 cm x .635 cm)
Probe Wire Length	9 feet (2.74 m)
Probe Wire Properties	FT4, 176°F, 600V
Compliance	
RoHS	Compliant

CLI-PLEN1C

Environmental	
Temperature	32°F to 158°F
Cable Requirements	
Cat 5 (24 AWG) twisted pair	500 feet (152.4 m) maximum
Sensor Property & Features	
Temperature Range (Thermistor)	-94°F to 302°F
Temperature Accuracy (Thermistor)	+/- 0.36°F
Probe Size (l x w)	12 in x 0.25 in (30.48 cm x .64 cm)
Probe Material	Stainless Steel
Probe Wire Length	8 in (20.32 cm)
Probe Housing (l x w)	4 in x 2.125 in (10.16 cm x 5.39 cm)
Probe Housing Depth (Not including cover)	1.5 in (3.81 cm)
Probe Housing Depth (including cover)	1.625 in (4.13 cm)
Probe Wire Properties	FT4, 176°F, 600V
Compliance	
RoHS	Compliant

CLI-SLAB1

The CLI-SLAB1 temperature sensor is a two-wire floor/slab sensor used to monitor the floor temperature for uses such as monitoring radiant heat. The sensor is typically mounted inside a tube such as PEX that is routed so that the sensor can be removed and replaced as necessary. Either one or two sensors can be plugged into each zone and the temperature data received from these sensors are processed and used to control the floor temperature in the zone where they are installed. The Sens 1 Mode and Sens 2 Mode fields under the Temp Sensors menu must be set properly for these sensors to function as desired.

Environmental	
Temperature	32°F to 158°F
Cable Requirements	
Cat 5 (24 AWG) twisted pair	500 feet (152.4 m) maximum
Sensor Property & Features	
Temperature Range (Thermistor)	-94°F to 302°F
Temperature Accuracy (Thermistor)	+/- 0.36°F
Probe Size (l x w)	0.6 in x 0.196 in (1.52 cm x .498 cm)
Probe Wire Length	4.4 in (11.18 cm)
Probe Material	Stainless Steel
Probe Wire Properties	UL2468 (26 AWG)
Compliance	
RoHS	Compliant

CLI-THFM1 Humidity/Temperature Sensor

The CLI-THFM1 combination temperature and humidity sensor is a smart sensor that communicates with the CLI-8000 through the DSB/1-Wire connection on the front panel. Each CLI-THFM1 smart sensor has a unique ID embedded in it that is used to identify the sensor and be able to configure it to a particular zone. Up to eight CLI-THFM1 temperature/humidity sensors can be wired to the Data Sensor Bus with a maximum of two sensors assigned to a zone. The DSB 1 and DSB 2 fields under the Temp Sensors menu must be set in each zone for the sensors to function as desired.

Environmental	
Temperature	32° to 158°F
Cable Requirements	
Cat 5 (24 AWG)	600 feet (182.88 m) maximum (cumulative)
Sensor Property	
Temperature Range	-40°F to 185°F
Temperature Accuracy	+/- 0.9°F from 14°F to 176°F +/- 2.7°F Outside this range
Humidity Accuracy	+/- 3.5% RH, max. error (Between 20% - 80% RH), +/- 5% outside this range
Humidity Range	0% to 100% RH, non-condensing 14°F to 140°F
Sensor Enclosure Length (Plastic)	1.750 in (4.45 cm)
Sensor Face Diameter (Plastic)	0.9 in (2.29 cm)
Anchor Length (Plastic)	1.375 in (3.49 cm)
Wire length (From connection on sensor)	4 in (10.16 cm)
# of Bussed Sensors	Up to eight CLI-THFM1 sensors can be wired to the Data Sensor Bus. Of the sensors wired to the Data Sensor Bus, up to two can be assigned to each HVAC Relay Bank or Zone.
Network	Sensors are 1-Wire compliant.
Integrated LED	Integrated LED for ease of setup and troubleshooting
Compliance	
RoHS	Compliant
Painting the Sensor	
If desired, the CLI-THFM1 sensor can be painted to match the color of the wall. Before painting, prep the sensor by lightly sanding the plastic enclosure the sensor is potted in. Once roughed up, it can be painted. **Note:** The hole in the end of the plastic piece that houses the sensor must be covered before painting. Failure to cover the hole allows paint to get on the sensor and damage to the sensor could occur.	
Plastering Over the Sensor	
Savant does not recommend plastering over the sensor. The sensor is made from a nonporous plastic material and plaster will not bond to it well. In addition, the thermal properties of the sensor can be affected when embedded under a layer of plaster.	

Firmware Upgrade

The firmware on the CLI-8000 can be upgraded at any time using the SmartConnect utility. There are a few ways with which the firmware can be downloaded. They are described below:

1. Download and install the file using the SmartConnect utility, SmartConnect cable and iPad® or iPod® (Internet access through wireless network is available on site).
2. Download file from Savant Web Site to a local PC. Through iTunes on an iPad® or iPod®, retrieve the file from the local PC and load into the SmartConnect Utility. Once loaded, it can be transferred to the CLI-8000 using the SmartConnect Utility and cable (Internet access not available at site).

Option 1: Download file using just Smart Connect (On site internet access)

Option 1 requires the following:

- SCA-CONF (30 pin) or SCA-CONFL (8 pin) Savant SmartConnect cable.
- iPad® or iPod®
- Wireless Internet access at job site.
- SmartConnect Application from Apple iTunes store loaded on iPad® or iPod®. (Requires an Apple iTunes Account)

Download/Install SmartConnect Utility

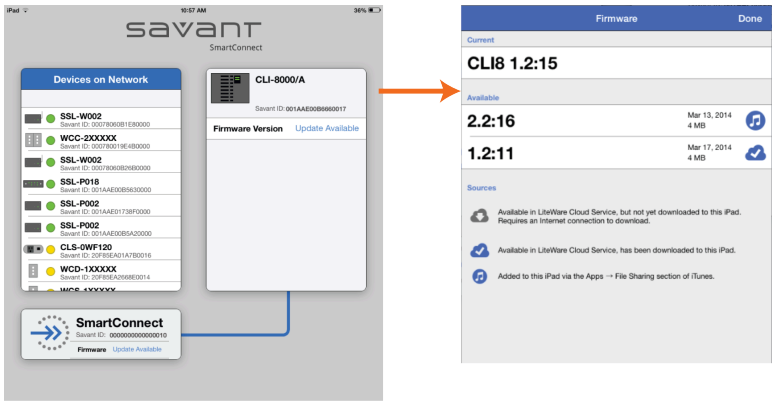
Download the Smart Connect utility from the Apple iTunes store to iOS device.

1. Go to the Apple iTunes Store by tapping the App Store icon on the iOS device.
2. Search for SmartConnect under Savant Systems. Download SmartConnect application to the IOS device. The application will automatically install after downloading.

Connect iOS device to CLI-8000 and download firmware

1. Plug the SmartConnect cable between the iOS device and the SmartConnect connection on the front panel. If the SmartConnect application doesn't automatically open, tap the SmartConnect Icon to open.
2. The application will open and display the SmartConnect device connected to the CLI-8000. Refer to the image below.
3. Tap the Firmware Version (Update Available) bar in the CLI-8000 screen and a Firmware screen will appear displaying both the *Current* version of firmware installed and any updated versions available from either iTunes or through iCloud. The screen capture below shows the following:
   - Software version 1.2:16 is available through iTunes
   - Software version 1.2:11 is available through iCloud.

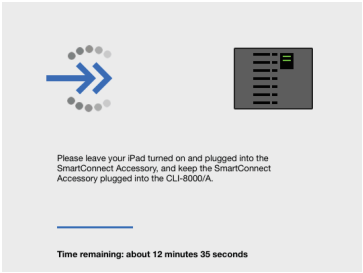
   Tap on whichever version you would like to install.



4. If there is an *Available* updated version, tap it and the ***Apply Firmware?*** box will appear. Tap **Apply** and the firmware will begin downloading to the CLI-8000.

   ⚠ **Very Important !!!!!!** - Once the download begins, it is extremely important that the complete process including the download, installation, and reboot be allowed to finish. Failure to allow this process to completely finish could have detrimental affects including having to send the system back to the factory for reprogramming.

5. As the firmware is downloaded, the SmartConnect screen will display the progress. Firmware download with the 30-Pin SCA-CONF takes approximately 19 minutes. Firmware download with the 8-Pin SCA-CONFL takes approximately 12 minutes.



6. Once completed, the SmartConnect application reboots as shown below.

7. After reboot, the screen defaults back to the **Firmware** screen. **DO NOT** remove cable at this time. Firmware is now installing into the CLI-8000. Firmware will take about 4 - 5 minutes to install. Once installed, the CLI-8000 will automatically reboot. Wait for it to finish the complete boot process.
8. Once the main menu is displayed again, the system can be disconnected.
9. Using the keypad on the front panel, verify the correct firmware is installed by scrolling down and selecting the **Settings** field.
10. From within the **Settings** menu, scroll down and select the **About** field. The new firmware will be displayed under the **FW Revision** heading.
    Note: For more information on the SmartConnect utility refer to the **SmartConnect Software Reference Guide** (009-1046-xx) on the **Savant Customer Community**.
    Products > Savant Hardware > SmartConnect

Option 2: Download through SmartConnect and iTunes

Option 2 requires the following:

- SCA-CONF (30 pin) or SCA-CONFL (8 pin) Savant SmartConnect cable.
- PC with iTunes and the firmware file **CLI8.savantFW** loaded on it.
- iPad® or iPod® with SmartConnect Application from Apple iTunes store loaded on. (Requires an Apple iTunes Account)

Download/Install Smart Connect Application

Download the Smart Connect application from the Apple iTunes store to iOS device.

1. Go to the Apple iTunes Store by tapping the App Store icon on the iOS device.
2. Search for SmartConnect under Savant Systems. Download the SmartConnect application to the IOS device. The application will automatically install after downloading.

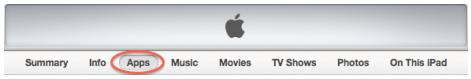
Obtain Firmware File

1. Contact Savant Support Personnel and obtain a copy of the latest firmware file (CLI8.savantFW).
2. Download the file to your local PC.

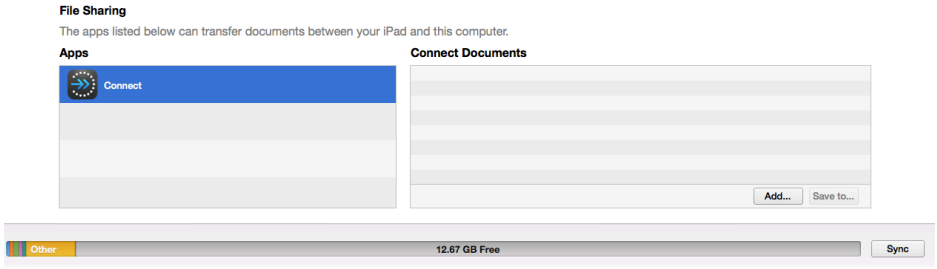
Load Firmware file into Apps data in iTunes

1. Plug iOS device into PC. Open iTunes application on the PC.
2. From the iTunes menu bar, select the iOS Device from the list of devices.

3. Once the device is selected, open the **Apps** tab



4. From the **Apps** screen, scroll down to the **File Sharing** section. Under the File Sharing heading are all the Apps installed on the iOS device for file sharing. Locate the SmartConnect application and select it.

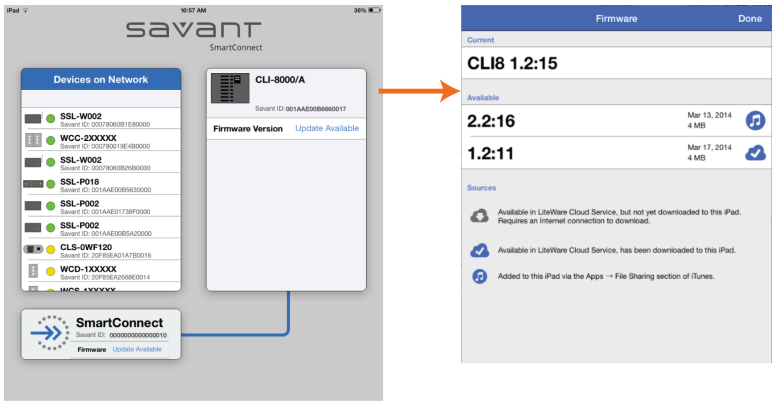


5. Under the Connect Documents heading, click the Add Add... button. Browse to the file **CLI8.savantFW** file and load it into the SmartConnect application. File is now ready to download from iOS device to the CLI-8000.
6. Disconnect from iTunes and remove from PC.

Connect iOS device to CLI-8000 and download firmware

1. Plug the SmartConnect cable between the iOS device and the SmartConnect connection on the front panel. If the SmartConnect application doesn't automatically open, tap the SmartConnect Icon to open.
2. The application will open showing the SmartConnect device connected to the CLI-8000. Refer to screen capture below.
3. Tap the **Firmware Version** (Update Available) field in the CLI-8000 screen and a **Firmware** screen will appear displaying both the **Current** version of firmware installed and any updated versions available from either iTunes or through iCloud. The image below shows the following:
   - Software version 1.2:16 is available through iTunes
   - Software version 1.2:11 is available through iCloud.

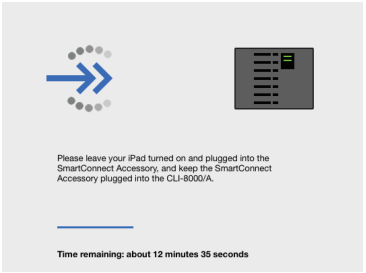
   Tap the version you would like to install.



4. If there is an *Available* updated version, tap it and the **Apply Firmware?** box will appear. Tap **Apply** and the firmware will begin downloading to the CLI-8000.

   ⚠ **Very Important !!!!!!** - Once the download begins, it is extremely important that the complete process including the download, installation, and reboot be allowed to finish. Failure to allow this process to completely finish could have detrimental affects including having to send the system back to the factory for reprogramming.

5. As the firmware is downloaded, the SmartConnect screen will display the progress. Firmware download with the 30-Pin SCA-CONF takes approximately 19 minutes. Download with the 8-Pin SCA-CONFL takes approximately 12 minutes.



6. Once completed, the SmartConnect application reboots.

7. After reboot, the screen defaults back to the **Firmware** screen. **DO NOT** remove cable at this time. Firmware is now installing into the CLI-8000. Firmware will take about 4 - 5 minutes to install. Once installed, the CLI-8000 will automatically reboot. Wait for it to finish the complete boot process. Once the main menu is displayed again, the system can be disconnected.
8. Verify the correct firmware is installed. Using the keypad on the front panel, scroll down and select the **Settings** field.
9. From within the **Settings** menu, scroll down and select the **About** field. The new firmware will be displayed under the FW Revision heading.

   Note: For more information on the SmartConnect Utility refer to the **SmartConnect Reference Guide** on the Savant Customer Community.

Installation Procedures

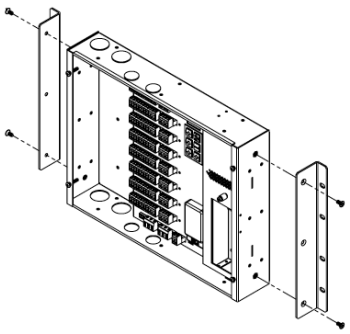
The installation procedures below start with installing the CLI-8000 Thermostat Processing Unit (TPU). Once installed, the individual sensors can be installed and wired.

Mount CLI-8000

Mount the TPU to an existing wall typically in a utility room. The system can be either flush mounted using a pair of mounting brackets or installed between two 16 inch on center studs. Both installations are described below.

Mount Using Brackets

1. Screw the mounting brackets to the right and left side of the TPU using (4) 10-32 x ⅜ inch FH machine screws.

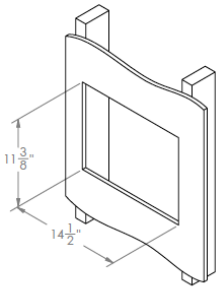


(2) Mounting Brackets (SMB-8000-00)
(4) Mounting Bracket Screws 10-32 x ⅜ inch FH

2. The mounting brackets are 16 inch on center so the TPU can be screwed to two adjacent studs. Locate two adjacent studs that are 16 inch on center.
3. Screw to the wall through the drywall and into the studs using appropriate self tapping drywall screws or equivalent.

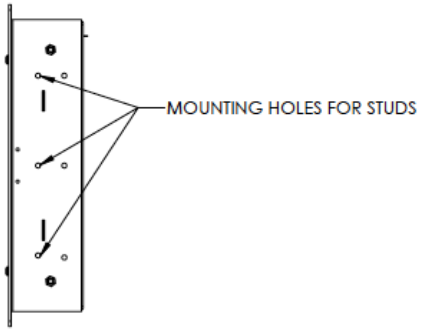
Mount Between Studs

1. Locate two adjacent studs that are 16 inch on center.
2. If there is drywall installed, cut drywall to the dimensions displayed below.



WALL CUTOUT

3. Slide TPU between the two studs. On the left and right panels are three mounting holes. Screw to the inside of the studs through these holes using appropriate self tapping wood screws or equivalent.



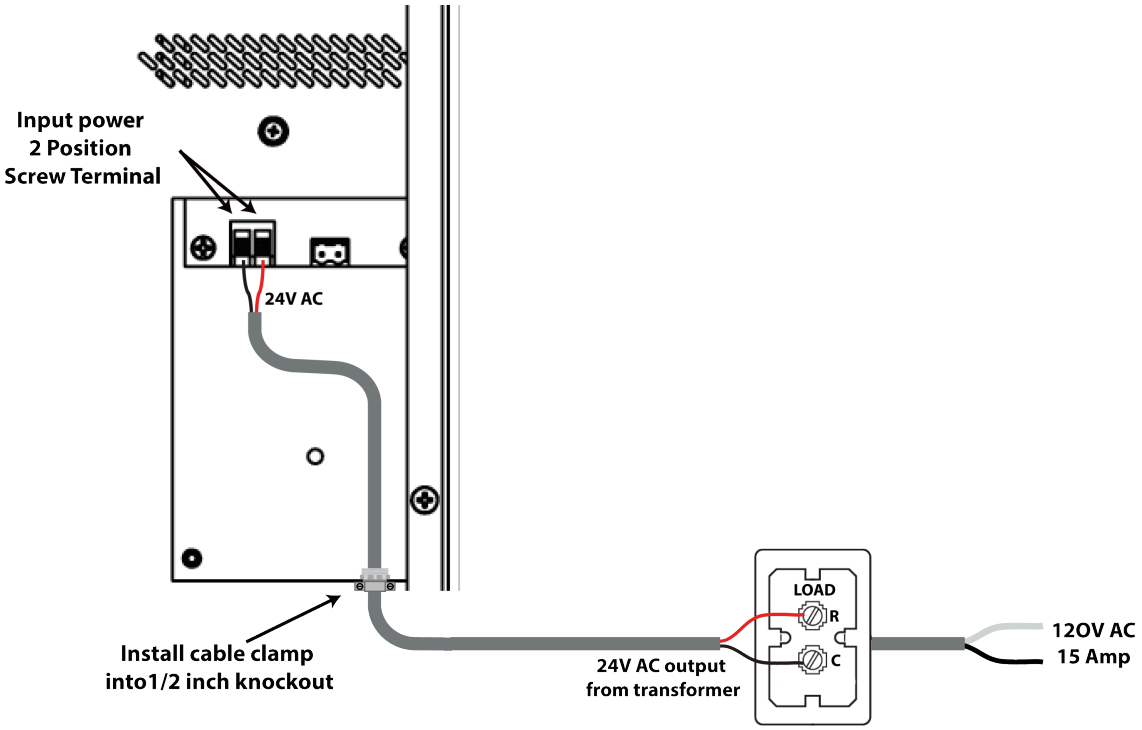
Input Power

The CLI-8000 gets its power from a 24V AC (40VA) transformer. Savant offers an optional transformer (PWR-2440-XX) that meets all the current and voltage requirements. Once mounted to an existing wall, the input power can be connected to the two position screw terminal located under the Power Input Access panel.

Connect Input Power to CLI-8000

1. Remove the Access Panel by unscrewing the Phillips screw holding the panel down. Refer to the product description within the System Components-Descriptions and Specifications section for the location of the Power Input Access Panel screw.
2. Located at the bottom right portion of the TPU is a ½ inch electrical box knockout. Remove the knockout and install a ½ inch UL rated electrical box cable clamp.
3. Connect an 18 AWG two-wire cable from the 24V AC transformer to the two position terminal block.

Note: 18 AWG is the minimum sized wire required when wiring the input power.

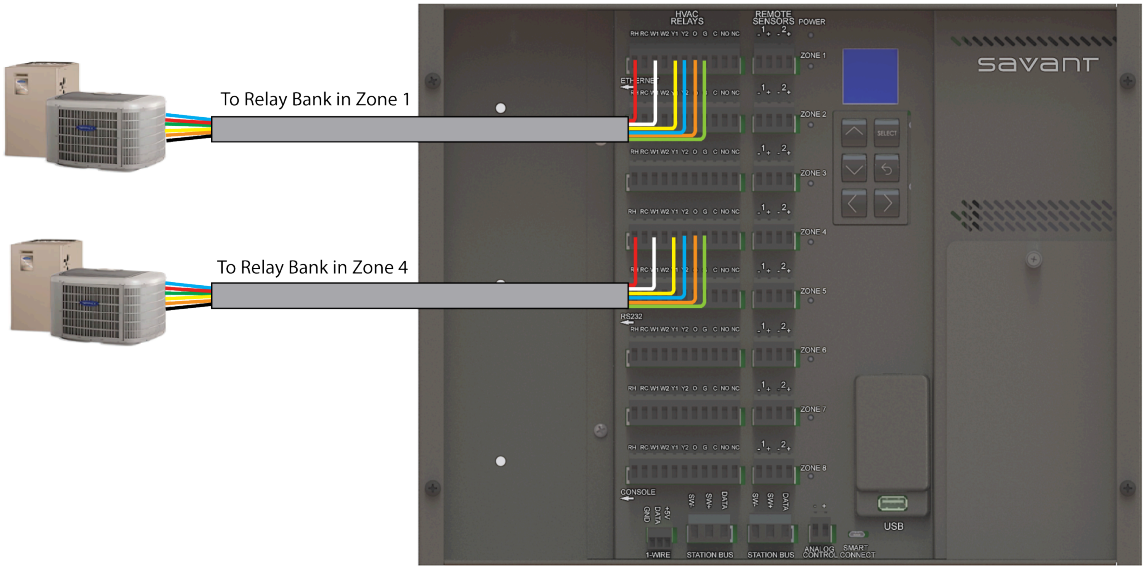


4. Connect the other side of the transformer to a 15 Amp (minimum) circuit. It is recommended that the CLI-8000 be connected to its own circuit.

   Note: There is no power switch on the CLI-8000. Do not switch the circuit breaker to the ON position until **ALL** wiring has been connected. Only after the wiring is complete should the circuit breaker be powered ON.

HVAC Relays - Wiring

Each zone on the front panel is wired to a separate HVAC system. The diagram below connects two separate HVAC systems. One system is wired to Zone 1 and Zone 4. Up to eight separate HVAC systems can be controlled by one CLI-8000. Refer to the table below for information on each individual connection made to the relay bank.



Relay Descriptions

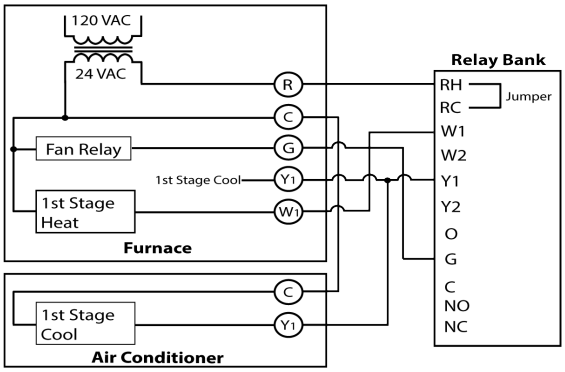
There is no set standard to the wiring requirements of an HVAC system. The number of conductors and colors vary depending on the type of installation being performed. It is recommended that you consult the HVAC manufacturer's documentation before wiring to the CLI-8000. The table below describes the wiring scheme that Savant® uses.

Relay	Wire Color	Description
RH	Red	Wired to hot side of the 24V AC transformer that is used on Heating Equipment.
RC	Red	Wired to hot side of the 24V AC transformer that is used on Cooling Equipment. **Note:** In some cases, one 24V AC transformer can supply voltage for both the heating and cooling system. In this scenario, a jumper will need to be installed between the RH and RC terminals of the Relay Zone.
W1	White	Wired to the 1st stage heating terminal (W1) on the HVAC system. If there are separate heating and cooling systems, (W1) is wired to the W1 terminal of each system. W1 is powered by the Rh terminal.
W2	Black	Wired to the 2nd stage heating terminal (W2) on the HVAC system. W2 is powered by the Rh terminal.
Y1	Yellow	Wired to the 1st stage cooling terminal (Y1) on the HVAC system. If there are separate heating and cooling systems, (Y1) is wired to the (Y1) terminal of each system. Y1 is powered by the RC terminal.
Y2	Blue	Wired to the 2nd stage cooling terminal (Y2) the cooling system. Y2 is powered by the RC terminal.
O	Orange	Wired to the O terminal on a Heat Pump system. The O terminal connects to the reversing valve. By reversing the air flow, the system can be used for either heating or cooling. O is powered by the RH terminal.
G	Green	Wired to the fan terminal (G) on the HVAC system. G is powered by the RC terminal.
C, NO, NC		C = Common Terminal NO = Normally Open, this terminal will be connected with C when the Aux Relay is ON. NC = Normally Closed, this terminal will be connected with C when the Aux Relay is OFF. The equipment connected to the Auxiliary Relay needs to be powered using a separate voltage source. Refer to the Auxiliary Relay section for more information on this.

Wiring Examples

Below are a few examples on how to wire the HVAC Relays on the front panel to an HVAC system.

Single Stage Furnace with Air Conditioner

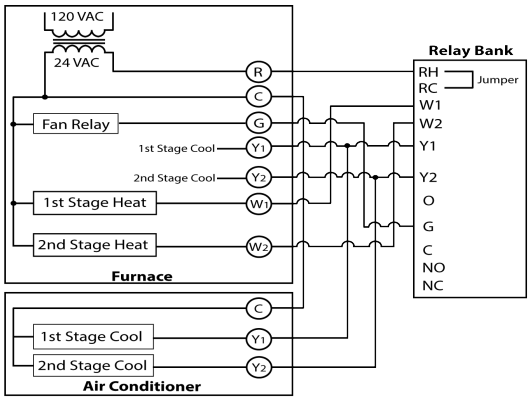


Single stage HVAC system that supports both heating and air conditioning.

- The transformer supplies 24V AC to the RH terminal to energize the relays for heating calls.
- A jumper is installed between RH and RC to supply 24V AC to energize the relays during cooling calls. In this scenario, both the furnace and air conditioner are energized using the same power supply.
- W1 from the relay bank is wired for one stage heating and Y1 from relay bank is wired for one stage cooling.
- G terminal from relay bank is wired for fan operation.

For information on configuring this system, refer to the Single Stage Furnace with Air Conditioner - Configuration section.

Two Stage Furnace with Air Conditioner

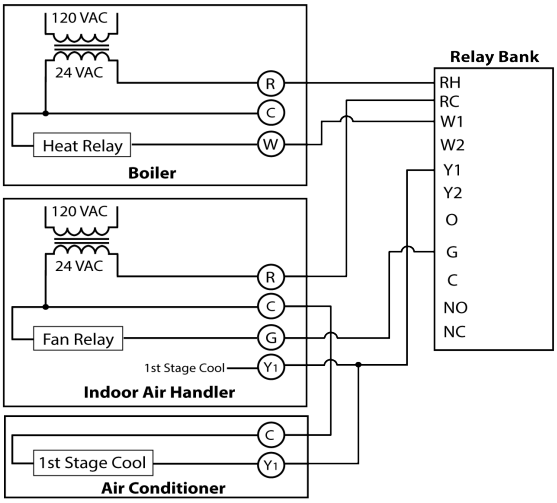


Two stage HVAC system that supports both heating and the air conditioning.

- The transformer supplies 24V AC to the RH terminal to energize the relays for heating calls.
- A jumper is installed between RH and RC to supply 24V AC to energize the relays during cooling calls. In this scenario, both the furnace and air conditioner are energized using the same power supply.
- With a two stage heating system, W1 and W2 from relay bank are wired for the first and second stages of heat.
- With a two stage cooling system, Y1 and Y2 from relay bank are wired for the first and second stages of cooling.
- G terminal is wired for fan operation.

For information on configuring this system, refer to the Two Stage Furnace with Air Conditioner - Configuration section.

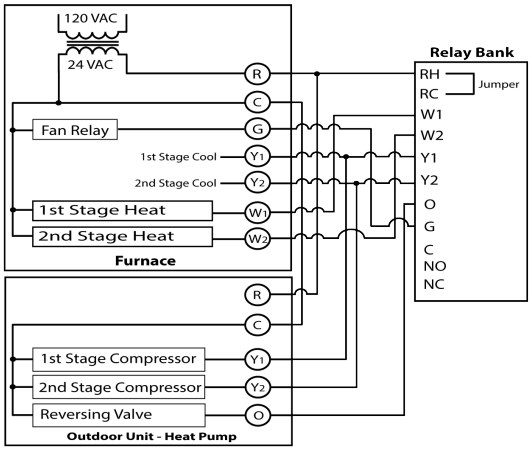
Boiler with Air Handler and Air Conditioner



This system uses a boiler for hot water and possibly radiant or baseboard heat. The air handler is used in conjunction with the air conditioner for cooling.

- A separate transformer supplies 24V AC to the RH and RC terminals to energize the relays for heating or cooling.
- The Y1 terminal from the relay bank is wired to both the air handler and air conditioner for cooling.
- The G terminal from the relay bank is wired to the air handler for fan operation.
- An external heat relay is required to control the boiler for radiant or baseboard heat.

Two Stage Heat Pump with Auxiliary Heat



This system uses an indoor air handler with condenser for supplying heat and an evaporator for supplying cool. The system has a reversing valve to select whether heated or cooled air is produced. The system has two stage heating as well as two stage cooling.

- The transformer supplies 24V AC to the RH terminal to energize the relays for heating calls.
- A jumper is installed between RH and RC to supply 24V AC to energize the relays during cooling calls.
- The W1 terminal from the relay bank is wired to the auxiliary heat in the air handler to supply one stage heat.
- The Y1 terminal from the relay bank is wired to the compressor or evaporator for one stage heating or cooling.
- The Y2 terminal from the relay bank is wired to the compressor or evaporator for second stage heating or cooling.
- The O terminal from the relay bank is wired to the reversing valve. The reversing valve will reverse the direction of air flow depending on whether heating or cooling is required.
- The G terminal from the relay bank is wired to the air handler for fan operation.

For information on configuring this system, refer to the Two Stage Heat Pump with Auxiliary Heat - Configuration section.

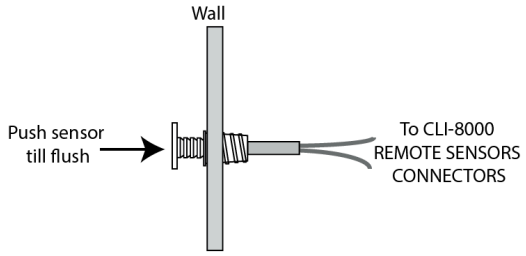
SST-TEMP1 - Installation

The SST-TEMP1 is installed using a combination wall anchor and flush mount sensor. Locate a position in the room to install the sensor. Typical installation would be in an open area that has plenty of air flow not near a window, fireplace, or register supplying warm air from the furnace.

The procedures below assume the wiring for each of the sensors has already been run throughout the facility or home.

Install sensor into wall

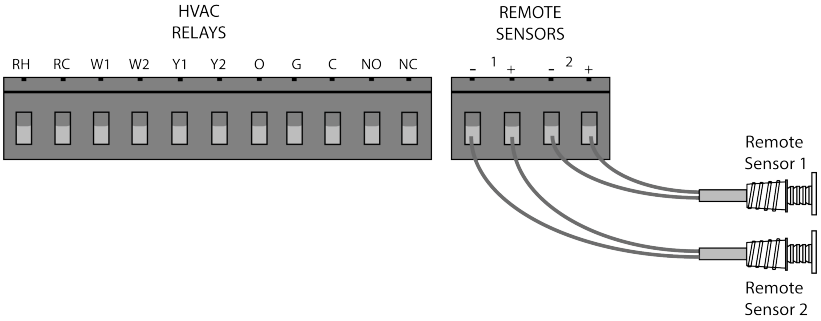
1. To install, locate a good location on the wall away from any heating ducts or windows.
2. Drill a ½ inch pilot hole into the wall where the sensor will be mounted.
3. Pull the wires designated for the sensor through the hole just drilled.
4. Insert the wires from the sensor through the wall anchor supplied with the sensor.
5. Connect wires from sensor to wires coming from wall using appropriately sized wire nuts (No polarity is observed).
6. Insert all wires and connections through the drilled hole and behind the wall.
7. Screw the wall anchor into the wall in a clockwise direction until the anchor stops and is flush with the wall.
8. Feed the wires from sensor through the wall anchor installed and into the wall. Press the sensor into the wall anchor till it is flush.



Connect to CLI-8000

The SST-TEMP1 temperature sensor sends temperature data through the REMOTE SENSORS 1 and 2 connections within each zone on the front panel. Instructions below connect the SST-TEMP1 to these ports.

1. Remove the 4-Pin screw terminal plug-in connector from the zone on the front panel where the sensor is being wired. The connector is located under the heading REMOTE SENSORS on the front panel.
2. With a screwdriver, turn the screws on the connector counterclockwise until the silver crimp in the front of the connector opens enough to slide the wire(s) from the sensor into the square slots.
3. Insert the two wires from each sensor into the terminal block as displayed below. (No polarity is observed)
4. Turn the screws clockwise until the silver crimp tightens around the wire. Tug on the wire a bit to verify the wires are installed securely.
5. Reinsert the connector into its respective position in the front panel.



6. For information on configuring the sensors to communicate with the CLI-8000, refer to the SST-TEMP1 - Configuration and Calibration section.

SST-OTEMP1 - Installation

The SST-OTEMP1 is an outdoor sensor mounted in a water tight mount.

Installation Guidelines

Use the following guidelines when mounting the SST-OTEMP sensor to the outside of a building.

- Choose a spot on the north side of the building away from direct sunlight for as much of the day as possible.
- Point the sensor downwards to avoid catching rain.
- The sensor enclosure has a female ½ inch NPT threaded fitting where the sensor exits the enclosure. A short length of ½ inch pipe or PVC can be screwed into the enclosure. This will protect the sensor from possible damage.
- Mount the sensor where it can be accessed for service.
- Mount sensor away from any exhaust ducts.

The procedures below assume the wiring for each of the sensors has already been run throughout the facility or home.

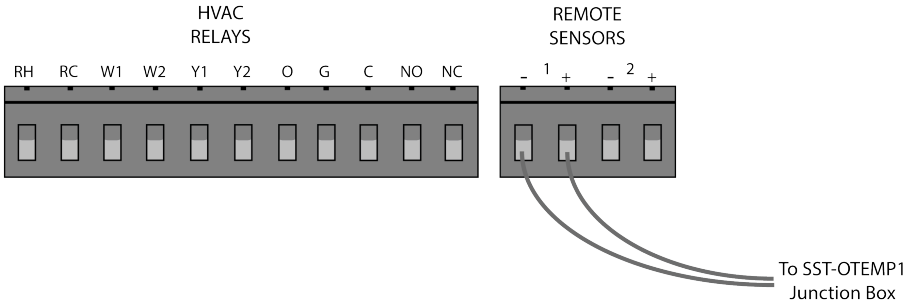
Installation Instructions

1. Drill a 3/4 inch (19.05 mm) hole through the wall.
2. Thread the wire from the sensor through the hole just drilled.
3. Fill hole just drilled with a generous amount of sealant or caulking.
4. Mount the sensor enclosure to the side of building with sensor pointing downward.
5. Screw on the cover of the sensor enclosure. Verify the gasket to cover is seated correctly.
6. On the inside of wall, mount an electrical junction box close enough for wires to be able to extend into box. Sensor wire extends 18 in (457.2 mm) from where wire exits the sensor enclosure.
7. Using appropriate sized wire nuts, connect the two wires from the sensor to the existing wiring.

Connect to CLI-8000

The SST-OTEMP1 is supported on either port 1 or port 2 of the REMOTE SENSORS connection on the front panel. The CLI-8000 supports communicating with only one outdoor temperature sensor. It is up to the installer to decide which port to utilize. Instructions below connect the SST-0TEMP1 to port 1 on the front panel.

1. Remove the 4-Pin screw terminal plug-in connector from the zone on the front panel that the sensor is being wired to. Connector is located under the heading REMOTE SENSORS on the front panel.
2. With a screwdriver, turn the screws on the connector counter clockwise until the silver crimp in the front of the connector opens enough to slide the wire(s) from the sensor into the square slots.
3. Insert the two wires from the SST-OTEMP1 sensor into the terminal block as displayed below. (No polarity is observed)
4. Turn the screws clockwise until the silver crimp tightens around the wire. Tug on the wire a bit to verify the wires are installed securely.
5. Reinsert the connector into its respective position.



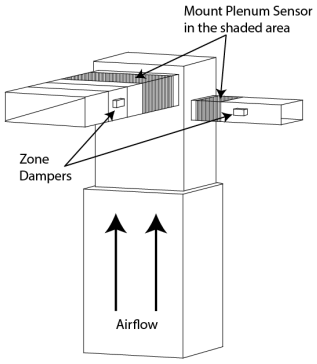
6. For information on configuring the sensors to communicate with the CLI-8000, refer to the SST-OTEMP1 - Configuration and Calibration section.

CLI-PLEN1C / CLI-PLEN1R - Installation

The CLI-PLEN1C (commercial) and CLI-PLEN1R (residential) 2-wire Plenum temperature sensors monitor the temperature of the air being discharged from the furnace. Both sensors are mounted in the Plenum ductwork using self-drilling or self-tapping sheet metal screws. Depending on your application will determine which sensor is best suited. The information below installs and configures the sensors to be used as DATS (Discharge Air Temperature Sensor).

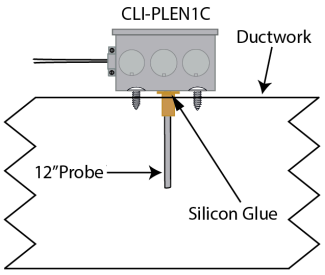
Install sensor into ductwork

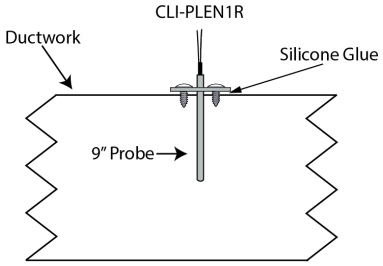
The Plenum sensor should be installed between the evaporator coil in the furnace and the bypass zone dampers on the supply trunks as shown by the shaded area of the diagram below.



1. In the shaded area shown above, drill a hole into the ductwork.

   CLI-PLEN1C = ⅝ inch (15.88 mm) hole
   CLI-PLEN1R = ¼ inch (6.35 mm) hole
2. Slide the sensor into the hole.
3. Add a small amount of high temperature silicone glue where the sensor mounts to the ductwork. This will prevent air leaks from occurring.
4. Insert (2) #6 self-tapping screws (not included) through the holes in the bottom of the electrical box and screw them into the ductwork. Refer to the diagram below.



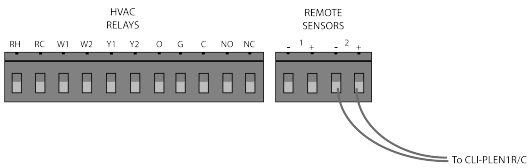


5. Connect the two wires from the sensor to the existing remote sensor cabling using the Dolphin Splice Connectors included in the Install Kit. No polarity is observed here.

Connect to CLI-8000

The CLI-PLEN1C and CLI-PLEN1R Plenum sensor is supported only on port 2 of the REMOTE SENSORS connection within each zone. Follow instructions below to wire sensor to front panel.

1. Remove the 4-position screw terminal from the REMOTE SENSOR connection on the TPU front panel.
2. Loosen the screws located on the top of the connector until the silver crimp in the front opens enough to slide the wire from the remote sensor cabling into the connector.
3. Insert the wires from the Remote Sensor cabling into the terminal block. Since only port 2 is supported when connecting a Plenum Sensor, slide wires into slots connected to port 2 only. No polarity is observed here.
4. Turn the screws clockwise until the silver crimp in connector clamps around the wire. Tug on the wire a bit to verify the wires are installed securely.
5. Plug the 4-position terminal block back into its REMOTE SENSORS mate.



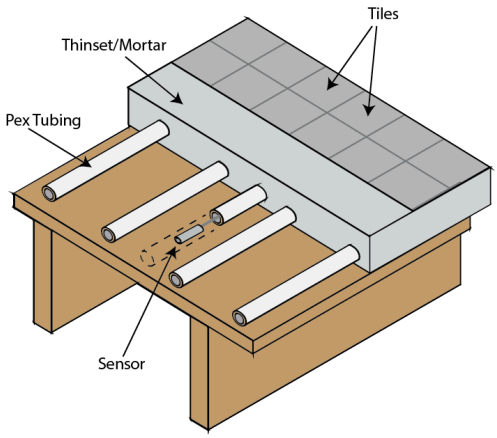
6. For information on configuring the sensors to communicate with the CLI-8000, refer to the CLI-PLENR/CLI-PLENC - Configuration

CLI-SLAB1 - Installation

The CLI-SLAB1 slab sensor is a floor heating sensor that monitors and transmits the floor temperature back to the CLI-8000. Below are instructions on installing the CLI-SLAB1 floor heating sensor.

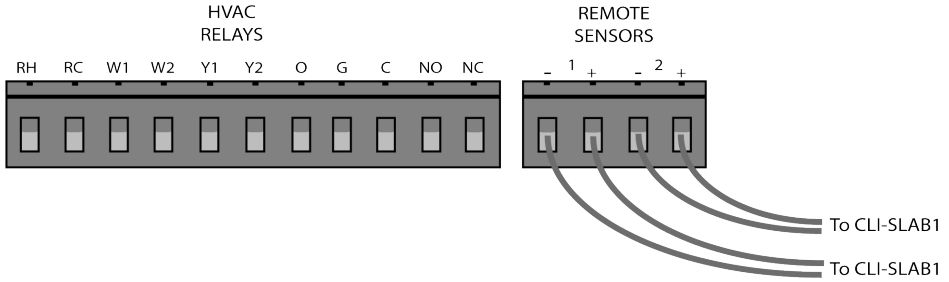
Installing sensor in floor

The CLI-SLAB1 flooring/slab two-wire sensor is secured to the floor typically inside a length of PEX tubing or metal conduit to both protect it during installation and to make it easy to remove and re-install in the event the sensor ever needs to be replaced. The illustration below shows the sensor being installed under a concrete floor. Note that the sensor is installed in a length of PEX tubing and is positioned mid-way between the two loops of tubing.



Connect to CLI-8000

1. Remove the 4-Pin screw terminal plug-in connector from the zone on the front panel that the sensor is being wired to. Connector is located under the heading REMOTE SENSORS on the front panel.
2. With a screwdriver, turn the screws on the connector counterclockwise until the silver crimp in the front of the connector opens enough to slide the wire(s) from the sensor into the square slots.
3. Insert the two wires from the CLI-SLAB1 sensor into the terminal block. Both port 1 and port 2 of the REMOTE SENSORS connection support the CLI-SLAB1 sensor (No polarity is observed).
4. Turn the screws clockwise until the silver crimp tightens around the wire. Tug on the wire a bit to verify the wires are installed securely.
5. Reinsert the connector into its respective position.



6. For information on configuring the sensors to communicate with the CLI-8000, refer to the CLI-SLAB1 - Configuration and Calibration section.

CLI-THFM1 - Installation

The CLI-THFM1 smart sensor is installed using a combination wall anchor and flush mount sensor. Locate a position in the room to install the sensor. Typical installation would be in an open area that has plenty of air flow not near a window, fireplace, or register supplying warm air from the furnace.

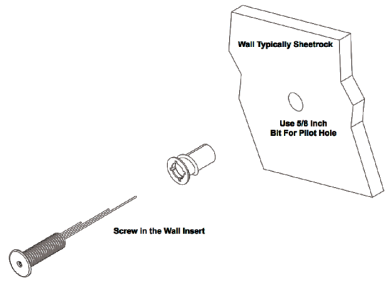
Install Sensor into Wall

1. To install the wall anchor, drill a ⅝ inch (15.88 mm) hole into the wall.
2. Pull the wires designated for the sensor out through the ⅝ inch (15.88 mm) hole just drilled.
3. Screw the wall anchor into the wall until flush.
4. Run the wires from the CLI-THFM1 sensor through the anchor and attach to the wires coming out of wall using the Dolphin Splice Connectors included with the install kit. The table below shows the sensor being wired using a Cat 5 cable. Savant has tested and recommends the wiring scheme shown in the table below.

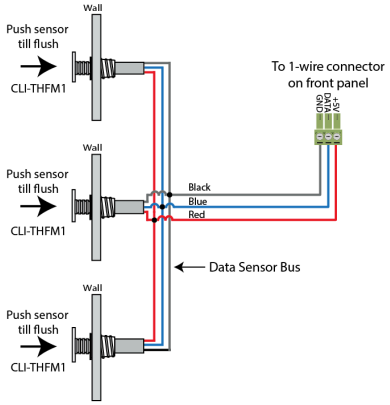
Wires from CLI-THFM1	Wires from Cat 5 cable	Description
Black	White/Blue Stripe	Gnd
Blue	Blue	Data
Red	Orange	+5V DC

Note: It is recommended but not required that the Dolphin Ratcheting Crimp Tool DR-4141 or DC-500F be used to terminate the connections.

5. Insert the wires back into the wall until all connections made are behind the wall.
6. Screw the wall anchor into the ⅝ inch hole in wall in a clockwise direction until the anchor stops and is flush with the wall.



7. Feed the remaining wires back behind the wall and press the sensor into the wall anchor until it is flush.
8. Mount and wire additional sensors as displayed in diagram below up to a maximum of eight sensors.



Wire CLI-THFM1 to front panel on CLI-8000

The Data Sensor Bus plugs into the DSB/1-Wire connection on the front panel in the following manner:

1. Remove the 3-Pin screw terminal block from its mate installed in the DSB/1-Wire connection. Connection is located towards the bottom left section of the front panel.

9. With a screwdriver, turn the screws on the connector counterclockwise until the silver crimp in the front of the connector opens enough to slide the wire(s) from the sensor into the square slots.
10. Insert the three wires (+5V DC, GND, DATA) from the sensor cabling into the terminal block. Refer to diagram above.
11. Turn the screws clockwise until the silver crimp tightens around the wire. Tug on the wire a bit to verify the wires are installed securely.
12. Insert screw terminal connector back into its mating DSB/1-Wire connection on the front panel.

⚠ Caution

It is recommended that power be removed from the system before plugging the CLI-THFM1 sensors into the connection on the front panel. Failure to remove power could result in damage to the sensor.

HVAC Configuration Examples

After installation is complete, the system can be configured. Below are various configuration procedures that can be used to aide in the process of setting up the system to run.

Single Stage Furnace with Air Conditioner - Configuration

1	Zone Detail > Fan Mode	Using < > arrow keys, set to Auto.	Setting Fan to Auto allows the fan to cycle on and off with heating and cooling calls.
2	Zone Detail > Cool SP	Using < > arrow keys, set the Cool Set Point.	If temperature rises above this set point, a call for cooling will occur.
3	Zone Detail > Heat SP	Using < > arrow keys, set the Heat Set Point.	If temperature falls below this set point, a call for heating will occur.
4	Zone Detail > Adv HVAC > HVAC Type	Using < > arrow keys, set to Stan	Stan is a system that has a separate furnace and air conditioner.
5	Zone Detail > Adv HVAC > Fan Type	Using < > arrow keys, set to Electric	Selecting Electric will activate the fan relay for heating and/or cooling calls. Selecting Gas will activate relay for cooling calls only.
6	Zone Detail > Adv HVAC > Aux Relay	Depending on how the Auxiliary Relay is being used, using < > arrow keys, select from list.	• Zone Controller Grouping • Humidifier or Dehumidifier • Vent Damper
7	Zone Detail > Adv HVAC > Heat Stg 2	Using < > arrow keys, set to Off.	By default, Heat Stg 2 is in the On position and needs to be disabled if one-stage heating is being configured.
8	Zone Detail > Adv HVAC > Cool Stg 2	Using < > arrow keys, set to Off	By default, Cool Stg 2 is in the On position and needs to be disabled if one-stage cooling is being configured.
9	Zone Detail > Adv HVAC > H/C Diff	Using < > arrow keys, set to the buffer between the Heat and Cool set points.	A buffer zone is created between the Heat and Cool set points. The default buffer is 3° F.
10	Zone Detail > Adv HVAC > Min Run(s) Zone Detail > Adv HVAC > Min Off(s)	Using < > arrow keys, set the On and Off time that a stage will remain in the On or Off state.	• Adv HVAC Settings
11	Zone Detail > Adv HVAC > Fan Cycle On Zone Detail > Adv HVAC > Fan Cycle Off	N/A	Not required when configuring system for heating or cooling. Refer to the Adv HVAC Settings section for more information.
12	Zone Detail > Adv HVAC > Stage Diffs	Using < > arrow keys, set the Heat Stage 1 On and Off Differentials.	Refer to Stage Differentials for more information.
13	Zone Detail > Adv HVAC > Max DAT Zone Detail > Adv HVAC > Min DAT	Using < > arrow keys, set the maximum and minimum discharge air temperature. Set only if a Plenum Sensor is installed.	• Plenum sensor (CLI-PLEN1R/C) Installation • Plenum Sensor (CLI-PLEN1C/R) Configuration
14	Zone Detail > Temperature Sensors	N/A	• SST-TEMP1 Installation • SST-TEMP1 Configuration • SST-OTEMP1 Installation • SST-OTEMP1 Configuration • CLI-SLAB1 Installation • CLI-SLAB Configuration • CLI-THFM1 Installation • CLI-THFM1 Configuration
15	Zone Detail > HVAC Mode	Using < > arrow keys, set to Auto	Setting HVAC Mode to Auto is for the case where heating and cooling will be used. If just heat is required, set to Heat. If just cooling is required, set to Cool.

N/A = Not Applicable

Two Stage Furnace with Air Conditioner and Humidifier - Configuration

1	Zone Detail > Fan Mode	Using < > arrow keys, set to Auto.	Setting Fan to Auto allows the fan to cycle on and off with heating and cooling calls.
2	Zone Detail > Cool SP	Using < > arrow keys, set the Cool Set Point.	If temperature rises above this set point, a call for cooling will occur.
3	Zone Detail > Heat SP	Using < > arrow keys, set the Heat Set Point.	If temperature falls below this set point, a call for heating will occur.
4	Zone Detail > Adv HVAC > HVAC Type	Using < > arrow keys, set to Stan	Stan is a system that has a separate furnace and air conditioner.
5	Zone Detail > Adv HVAC > Fan Type	Using < > arrow keys, set to Electric	Selecting Electric will activate the fan relay for heating and/or cooling calls. Selecting Gas will activate relay for cooling calls only.
6	Zone Detail > Adv HVAC > Aux Relay	Depending on how the Auxiliary Relay is being used, using < > arrow keys, select from list.	• Zone Controller Grouping • Humidifier or Dehumidifier • Vent Damper
7	Zone Detail > Adv HVAC > Heat Stg 2	Using < > arrow keys, set to On.	By default, Heat Stg 2 is in the On position. Verify this setting.
8	Zone Detail > Adv HVAC > Cool Stg 2	Using < > arrow keys, set to On.	By default, Cool Stg 2 is in the On position. Verify this setting.
9	Zone Detail > Adv HVAC > H/C Diff	Using < > arrow keys, set the buffer between the Heat and Cool set points.	A buffer zone is created between the Heat and Cool set points. The default buffer is 3°.
10	Zone Detail > Adv HVAC > Min Run(s) Zone Detail > Adv HVAC > Min Off(s)	Using < > arrow keys, set the On and Off time that a stage will remain in the On or Off state.	• Adv HVAC Settings
11	Zone Detail > Adv HVAC > Fan Cycle On Zone Detail > Adv HVAC > Fan Cycle Off	N/A	Not required when configuring system for heating or cooling. Refer to the Adv HVAC Settings section for more information.
12	Zone Detail > Adv HVAC > Stage Diffs	Using < > arrow keys, set the Heat Stage 1 and Stage 2 On/Off Differentials as desired.	Refer to Stage Differentials for more information.
13	Zone Detail > Adv HVAC > Aux Relay	Using < > arrow keys, set to Hum	The Auxiliary Relay can be used to control an external humidifier. Set the Aux relay to Hum to control a humidifier.
14	Zone Detail > Humidity Set > Hum Enable	Using < > arrow keys, set to On	Enable the humidifier through the Hum Enable field. For more information on installation and configuration, refer to the Auxiliary Relay section
15	Zone Detail > Adv HVAC > Max DAT Zone Detail > Adv HVAC > Min DAT	Set the maximum and minimum discharge air temperature. Set only if a Plenum Sensor is installed.	• Plenum Sensor (CLI-PLEN1R/C) installation • Plenum Sensor (CLI-PLEN1C/R) configuration
16	Zone Detail > Temperature Sensors	Using < > arrow keys, enable each of the sensors installed.	Refer to the links below for information on installing and configuring each of the sensors. • SST-TEMP1 Installation • SST-TEMP1 Configuration • SST-OTEMP1 Installation • SST-OTEMP1 Configuration • CLI-SLAB1 Installation • CLI-SLAB Configuration • CLI-THFM1 Installation • CLI-THFM1 Configuration
17	Zone Detail > HVAC Mode	Using < > arrow keys, set to Auto	Setting HVAC Mode to Auto is for the case where heating and cooling will be used. If just heat is required, set to Heat. If just cooling is required set to Cool.

Two Stage Heat Pump with Auxiliary Heat - Configuration

1	Zone Detail > Fan Mode	Using < > arrow keys, set to Auto.	Setting Fan to Auto allows the fan to cycle on and off with heating and cooling calls.
2	Zone Detail > Cool SP	Using < > arrow keys, set the Cool Set Point.	If temperature rises above this set point, a call for cooling will occur.
3	Zone Detail > Heat SP	Using < > arrow keys, set the Heat Set Point.	If temperature falls below this set point, a call for heating will occur.
4	Zone Detail > Adv HVAC > HVAC Type	Using < > arrow keys, set to HP	HP is for system utilizing a Heat Pump for cooling and heating.
5	Zone Detail > Adv HVAC > Fan Type	Using < > arrow keys, set to Electric	Selecting Electric will activate the fan relay for heating and/or cooling calls. Selecting Gas will activate relay for cooling calls only.
6	Zone Detail > Adv HVAC > CO Mode	Using < > arrow keys, set either Heat or Cool.	The setting of Heat or Cool is dependent on the system being controlled. • Setting to Heat will energize the O terminal/ relay during a call for heat but not energized during a call for cooling. • Setting to Cool will function in the opposite way where the O terminal is energized during a call for cooling but is not energized for a call for heat.
7	Zone Detail > Adv HVAC > Aux Relay	Depending on how the Auxiliary Relay is being used, using < > arrow keys, select from list.	• Zone Controller Grouping • Humidifier or Dehumidifier • Vent Damper
8	Zone Detail > Adv HVAC > Heat Stg 2	Using < > arrow keys, set to On.	Set Heat Stg 2 to On
9	Zone Detail > Adv HVAC > Cool Stg 2	Using < > arrow keys, set to On.	Set Cool Stg 2 to On
10	Zone Detail > Adv HVAC > Heat Stg 3	Using < > arrow keys, set to On.	Set Heat Stg 3 to On
11	Zone Detail > Adv HVAC > H/C Diff	Using < > arrow keys, set to the buffer between the Heat and Cool set points.	A buffer zone is created between the Heat and Cool set points. The default buffer is 3°.
12	Zone Detail > Adv HVAC > Min Run(s) Zone Detail > Adv HVAC > Min Off(s)	Using < > arrow keys, set the On and Off time that a stage will remain in the On or Off state.	• Adv HVAC Settings
13	Zone Detail > Adv HVAC > Fan Cycle On Zone Detail > Adv HVAC > Fan Cycle Off	N/A	Not required when configuring system for heating or cooling. Refer to the Adv HVAC Settings section for more information.
14	Zone Detail > Adv HVAC > Stage Diffs	Using < > arrow keys, set the Heat Stage 1 On and Off Differentials.	Refer to Stage Differentials for more information.
15	Zone Detail > Adv HVAC > Stage Diffs	Using < > arrow keys, set the Heat Stage 2 On and Off Differentials.	Refer to Stage Differentials for more information.
16	Zone Detail > Adv HVAC > Stage Diffs	Using < > arrow keys, set the Heat Stage 3 On and Off Differentials.	Refer to Stage Differentials for more information.
17	Zone Detail > Adv HVAC > Max DAT Zone Detail > Adv HVAC > Min DAT	Using < > arrow keys, set the maximum and minimum discharge air temperature. Set only if a Plenum Sensor is installed.	• Plenum sensor (CLI-PLEN1R/C) installation • Plenum Sensor (CLI-PLEN1C/R) configuration
18	Zone Detail > Temperature Sensors	N/A	• SST-TEMP1 Installation • SST-TEMP1 Configuration • SST-OTEMP1 Installation • SST-OTEMP1 Configuration • CLI-SLAB1 Installation • CLI-SLAB Configuration • CLI-THFM1 Installation • CLI-THFM1 Configuration
19	Zone Detail > HVAC Mode	Using < > arrow keys, set to Auto	Setting HVAC Mode to Auto is for the case where heating and cooling will be used. If only heating is required, set to Heat. If only cooling is required set to Cool.

SST-TEMP1 - Configuration and Calibration

The CLI-8000 needs to be configured to process the temperature data collected from the sensors installed in each zone. The example below describes how to enable the SST-TEMP1 sensor and then if required, calibrate it against a reference thermometer.

Keypad Menu

∧ ∨	Scrolls UP or DOWN the menu.
< >	Increments or Decrements a set value, or scrolls through a set of variables within a field.
SELECT	Selects the field currently highlighted.
↺	Reverts to a previous menu or level.

Comments on example below:

- Both sensors are configured as indoor sensors.
- The SST-TEMP1 sensors are referred to as Sens 1 and Sens 2 in the menus of the CLI-8000.

Configure Sensor Mode and Temp Function

SST-TEMP1 (Port 1 and 2) - Configure Sensor Mode and Temp Function.			
1	Zone Detail > Temp Sensors > Sens 1 Mode	Using < > arrow keys, set to On.	Sets the data received from the sensor plugged into port 1 of the REMOTE SENSORS connection to be processed as an indoor temperature sensor within the selected zone.
2	Zone Detail > Temp Sensors > Sens 2 Mode	Using < > arrow keys, set to On.	Sets the data received from the sensor plugged into port 2 of the REMOTE SENSORS connection to be processed as an indoor temperature sensor within the selected zone.
3	Zone Detail > Temp Sensors > Temp Func	Using the < > arrow keys, set to either Max, Min, or Avg.	Configures the CLI-8000 to collect data from all the sensors within the zone and process either the Max, Min, or Avg temp. This is recalculated every 5 seconds.
4	Zone Detail > Sensor Vals > Temp Sens 1	In the menu that opens, verify the Temp Sens 1 field is displaying a temperature.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.
5	Zone Detail > Sensor Vals > Temp Sens 2	In the menu that opens, verify the Temp Sens 2 field is displaying a temperature.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.

Calibrate (If required)

The calibration of each sensor requires data from a calibrated digital thermometer or temperature display to be used as a reference. Set the reference thermometer in the area and note the temperature displayed.

SST-TEMP1 - Calibrate (If Required)			
1	Zone Detail > Sensor Vals	Make note of temperature in the Temp Sens 1 field. Calculate the difference between the reference thermometer and what is being displayed.	Sens 1 Temp - Ref Temp = Cal Sens 1 Value
2	Zone Detail > Sensor Vals	Make note of temperature in the Temp Sens 2 field. Calculate the difference between the reference thermometer and what is being displayed.	Sens 2 Temp - Ref Temp = Cal Sens 2 Value
3	Zone Detail > Temp Sensors > Sens 1 Cal	Using < > arrow keys, enter the Sens 1 Cal value calculated above.	
4	Zone Detail > Temp Sensors > Sens 2 Cal	Using < > arrow keys, enter the Sens 2 Cal value calculated above.	
5	Zone Detail > Sensor Vals > Temp Sens 1	In the menu that opens, verify the temperature displayed on the reference thermometer and the temperature displayed on the Temp Sens 1 field is accurate to within .5° F.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.
6	Zone Detail > Sensor Vals > Temp Sens 2	In the menu that opens, verify the temperature displayed on the reference thermometer and the temperature displayed on the Temp Sens 2 field is accurate to within .5° F.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.

SST-OTEMP1 - Configuration and Calibration

The CLI-8000 needs to be configured to process data collected from each SST-OTEMP1 temperature sensor. The example below describes how to enable the SST-OTEMP and if required, calibrate it against a reference thermometer.

Keypad Menu

∧ ∨	Scrolls UP or DOWN the menu.
< >	Increments or Decrements a set value, or scrolls through a set of variables within a field.
SELECT	Selects the field currently highlighted.
↺	Reverts to a previous menu or level.

Comments on example below:

- Sensor is configured as an outdoor sensor.
- When configuring the sensor for use outdoors, the Temp Func field does not have to be configured as described in the SST-TEMP1 configuration above. The system supports communications with only one outdoor sensor per zone so the Min, Max, and Avg algorithm does not apply to outdoor sensors.
- If more than one outdoor sensor is installed and configured, the first outdoor sensor found during the software scan will be the sensor that is selected.

Configure Sensor Mode and Temp Function

SST-OTEMP1 (Port 1 and 2) - Configure Sensor Mode.			
1	Zone Detail > Temp Sensors > Sens 1 or Sens 2 Mode	Using < > arrow keys, set to Out.	Sets the data received from the sensor plugged into either port 1 or port 2 of the REMOTE SENSORS connection to be processed as an outdoor temperature sensor within the selected zone.
2	Zone Detail > Sensor Vals > Temp Out	In the menu that opens, verify the Temp Out field is displaying a temperature.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.

Calibrate (If required)

The calibration of each sensor requires data from a calibrated digital thermometer or temperature display to be used as a reference. Set the reference thermometer in the area and note the temperature displayed.

SST-OTEMP1 - Calibrate (If Required)			
1	Zone Detail > Sensor Vals > Temp Sens x	Make note of temperature in the Temp Sens 1 or Temp Sens 2 field. (Dependent on which port the sensor is plugged into) Calculate the difference between the reference thermometer and what is being displayed.	Temp Sens 1 - Ref Temp = Cal Sens 1 -or- Temp Sens 2 - Ref Temp = Cal Sens 2
2	Zone Detail > Temp Sensors > Sens 1 Cal	If sensor is plugged into the REMOTE SENSORS port 1, use the < > arrow keys to enter the Cal Sens 1 value calculated above.	
3	Zone Detail > Temp Sensors > Sens 2 Cal	If sensor is plugged into the REMOTE SENSORS port 2, use the < > arrow keys to enter the Cal Sens 2 value calculated above.	
4	Zone Detail > Sensor Vals > Temp Sens 1	If sensor is plugged into the REMOTE SENSORS port 1, verify the temperature displayed on the reference thermometer and the temperature displayed on the Temp Sens 1 field is accurate to within .5° F.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.
5	Zone Detail > Sensor Vals > Temp Sens 2	If sensor is plugged into the REMOTE SENSORS port 2, verify the temperature displayed on the reference thermometer and the temperature displayed on the Temp Sens 2 field is accurate to within .5° F.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.

CLI-PLEN1C/CLI-PLEN1R - Configuration

The CLI-8000 needs to be configured to process the data collected from the CLI-PLEN1R or CLI-PLEN1C temperature sensor. The example below describes how to enable the sensors and if required, calibrate them against a reference thermometer.

Keypad Menu

∧ ∨	Scrolls UP or DOWN the menu.
< >	Increments or Decrements a set value, or scrolls through a set of variables within a field.
SELECT	Selects the field currently highlighted.
↺	Reverts to a previous menu or level.

Comments on example below:

- Sensor is configured as a DATS (Discharge Air Temperature Sensor) sensor.
- The DATS selection is only supported on port 2 of the REMOTE SENSORS connection of each zone.
- When configuring the sensor for DATS the Temp Func field does not have to be configured as described in the SST-TEMP1 configuration above. When DATS is selected, the system supports communications with only one DATS sensor per zone so the Min, Max, and Avg algorithm does not apply to a DATS sensor.

Configure Sensor Mode

CLI-PLEN1R (Port 2 only) - Configure Sensor Mode and Temp Function.			
1	Zone Detail > Temp Sensors > Sens 2 Mode	Using < > arrow keys, set to DATS.	Sets the data received from the sensor plugged into port 2 of the REMOTE SENSORS connection to be processed as a Discharge Air Temperature Sensor installed in the Plenum of furnace ductwork.
2	Zone Detail > Sensor Vals > Temp DATS	In the menu that opens, verify the Temp DATS field is displaying a temperature.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.

Calibrate (Not Required for DATS)

CLI-SLAB1 Configuration and Calibration

The CLI-8000 needs to be configured to process the data collected from the CLI-SLAB1 temperature sensor. The example below describes how to enable the sensor and if required, calibrate it against a reference thermometer.

Keypad Menu

∧ ∨	Scrolls UP or DOWN the menu.
< >	Increments or Decrements a set value, or scrolls through a set of variables within a field.
SELECT	Selects the field currently highlighted.
↺	Reverts to a previous menu or level.

Comments on example below:

- Up to two sensors per zone are supported.
- Sensors are configured as an indoor temperature sensor within each zone.
- Sensors are supported on the REMOTE SENSORS port 1 and port 2 connection on the front panel.
- Sensors should be used and configured to their own separate zone. This zone would be used for controlling heating in the floor.

Configure Sensor Mode and Temp Function

CLI-SLAB1 (Port 1 and 2) - Configure Sensor Mode and Temp Function.			
1	Zone Detail > Temp Sensors > Sens 1 Mode	Using < > arrow keys, set to On.	Sets the data received from the sensor plugged into port 1 of the REMOTE SENSORS connection to be processed as an indoor temperature sensor within the selected zone.
2	Zone Detail > Temp Sensors > Sens 2 Mode	Using < > arrow keys, set to On.	Sets the data received from the sensor plugged into port 2 of the REMOTE SENSORS connection to be processed as an indoor temperature sensor within the selected zone.
3	Zone Detail > Temp Sensors > Temp Func	Using the < > arrow keys, set to either Max, Min, or Avg.	Configures the CLI-8000 to collect data from all the sensors within the zone and process either the Max, Min, or Avg temp. This is recalculated every 5 seconds.
4	Zone Detail > Sensor Vals > Temp Sens 1	In the menu that opens, verify the Temp Sens 1 field is displaying a temperature.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.
5	Zone Detail > Sensor Vals > Temp Sens 2	In the menu that opens, verify the Temp Sens 2 field is displaying a temperature.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.

Calibrate (If required)

The calibration of each sensor requires data from a calibrated digital thermometer or temperature display to be used as a reference. Set the reference thermometer in the area and note the temperature displayed.

CLI-SLAB1 - Calibrate (If Required)			
1	Zone Detail > Sensor Vals	Make note of the temperature in the Temp Sens 1 field. Calculate the difference between the reference thermometer and what is being displayed.	Sens 1 Temp - Ref Temp = Cal Sens 1 Value
2	Zone Detail > Sensor Vals	Make note of the temperature in the Temp Sens 2 field. Calculate the difference between the reference thermometer and what is being displayed.	Sens 2 Temp - Ref Temp = Cal Sens 2 Value
3	Zone Detail > Temp Sensors > Sens 1 Cal	Using < > arrow keys, enter the Sens 1 Cal value calculated above.	
4	Zone Detail > Temp Sensors > Sens 2 Cal	Using < > arrow keys, enter the Sens 2 Cal value calculated above.	
5	Zone Detail > Sensor Vals > Temp Sens 1	In the menu that opens, verify the temperature displayed on the reference thermometer and the temperature displayed on the Temp Sens 1 field is accurate to within .5° F.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.
6	Zone Detail > Sensor Vals > Temp Sens 2	In the menu that opens, verify the temperature displayed on the reference thermometer and the temperature displayed on the Temp Sens 2 field is accurate to within .5° F.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.

CLI-THFM1 - Configuration and Calibration

Once installed, the CLI-8000 needs to be configured to process the data collected from each CLI-THFM1 smart sensor in the system. The examples below assign a sensor to a zone, configures the Sensor Mode, and configures the Temp Function. In the example, sensor DSB 1 and DSB 2 are configured as indoor sensors and the Average of the data received is processed.

Keypad Menu

∧ ∨	Scrolls UP or DOWN the menu.
< >	Increments or Decrements a set value, or scrolls through a set of variables within a field.
SELECT	Selects the field currently highlighted.
↺	Reverts to a previous menu or level.

Comments on example below:

- The CLI-THFM1 is referred to as DSB 1 and DSB 2 under the Temp Sensors Menu.
- The CLI-THFM1 is referred to as DSB 1 and DSB 2 under the Humidity Set Menu.
- Each sensor is labeled with a UID (Unique ID). This UID is used to identify the sensor on the 1-Wire network.

Assign sensor to a zone

To be able to communicate with the CLI-8000, the CLI-THFM1 humidity/temperature sensor must be assigned to a particular zone. Refer to procedure below.

CLI-THFM1 - Assign sensors to DSB Addr 1 and DSB Addr 2 fields (All in same zone).			
1	Zone Detail > DSB Cfg	If a CLI-THFM1 sensor is already assigned to the zone, a UID will be displayed under either the DSB 1 or DSB 2 Addr field. If not, **Not Assigned** will be displayed. The next few steps describe how to assign sensors to a zone.	If the UID of a CLI-THFM1 sensor is in the list, highlight the UID and Press the select key. This will illuminate the LED on the sensor to indicate which sensor matches up to that UID.
2	Zone Detail > DSB Cfg > DSB 1 Addr	Scroll down to **Not Assigned** and press the SELECT key.	Pressing <SELECT> key opens a menu displaying all available sensors wired to the Data Sensor Bus.
3	Zone Detail > DSB Cfg > DSB 1 Addr > <List of Sensor IDs>	Scroll down to one of the sensor UIDs. Highlight and SELECT from the list.	Pressing the <SELECT> key assigns that sensor/UID to DSB 1 Addr.
4	Zone Detail > DSB Cfg > DSB 1 Addr	Go up one level and verify the sensor UID is now assigned to DSB Addr 1.	After assigning the sensor UID, it will now be displayed under the DSB Addr 1 menu.
5	Zone Detail > DSB Cfg > DSB 2 Addr	Scroll down to **Not Assigned** and press the SELECT key.	Pressing <SELECT> key opens a menu displaying all available sensors wired to the Data Sensor Bus.
6	Zone Detail > DSB Cfg > DSB 2 Addr > <List of Sensor IDs>	Scroll down to one of the sensor UIDs. Highlight and SELECT from the list.	Pressing the <SELECT> key assigns that sensor/UID to DSB 2 Addr.
7	Zone Detail > DSB Cfg > DSB 2 Addr	Go up one level and verify the sensor UID is now assigned to DSB Addr 2.	After assigning sensor UID, it will now be displayed under the DSB Addr 2 menu.

Configure Sensor Mode and Temp Function for Temperature

Once the sensors have been assigned to a zone, the Sensor Mode and Temp Function can be configured.

CLI-THFM1 - Configure Sensor Mode and Temp Function for sensors DSB 1 and DSB 2.			
1	Zone Detail > Temp Sensors > DSB 1 Mode	Using < > arrow keys, set to On.	This enables the CLI-8000 to process the temperature data as DSB 1.
2	Zone Detail > Temp Sensors > DSB 2 Mode	Using < > arrow keys, set to On.	This enables the CLI-8000 to process the temperature data as DSB 2.
3	Zone Detail > Temp Sensors > Temp Func	Using the < > arrow keys, set to either Min, Max, or Avg.	Configures the CLI-8000 to collect the data from all the sensors within the zone and process either the Max, Min or Avg temp. This is recalculated every 5 seconds.
4	Zone Detail > Sensor Vals > Temp DSB 1	In the menu that opens, verify the Temp DSB 1 field is displaying a temperature.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.
5	Zone Detail > Sensor Vals > Temp DSB 2	In the menu that opens, verify the Temp DSB 2 field is displaying a temperature.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.

Configure Sensor Mode and Algorithm for Humidity

The CLI-THFM1 also has a humidity sensor. Configure the DSB 1 Mode, DSB 2 Mode, and Algorithm for the humidity portion of the CLI-THFM1 sensor. The procedure below assumes the sensors have already been assigned to a zone as described above.

CLI-THFM1 - Configure Sensor Mode and Humidity Algorithm.			
1	Zone Detail > Humidity Set > DSB 1 Mode	Using < > arrow keys, set to On.	Sets any humidity data collected from sensor 1 to be processed as a humidity data point inside the zone as DSB 1.
2	Zone Detail > Humidity Set > DSB 2 Mode	Using < > arrow keys, set to On.	Sets any humidity data collected from sensor 2 to be processed as a humidity data point inside the zone as DSB 2.
3	Zone Detail > Humidity Set > Algorithm	Using < > arrow keys, set to either Min, Max, or Avg.	Configures the CLI-8000 to collect the humidity data from all humidity sensors configured in the zone and process either the Max, Min or Avg humidity. This is recalculated every 5 seconds.
4	Zone Detail > Sensor Vals > Hum DSB 1	In the menu that opens, verify the Hum DSB 1 field is displaying a level of humidity.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Humidity Set menu.
5	Zone Detail > Sensor Vals > Hum DSB 2	In the menu that opens, verify the Hum DSB 2 field is displaying a level of humidity.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Humidity Set menu.

Calibrate Sensor (If Required) - Temperature Only

The calibration of each sensor requires data from a calibrated digital thermometer or temperature display to be used as a reference. Set the reference thermometer in the area and note the temperature displayed.

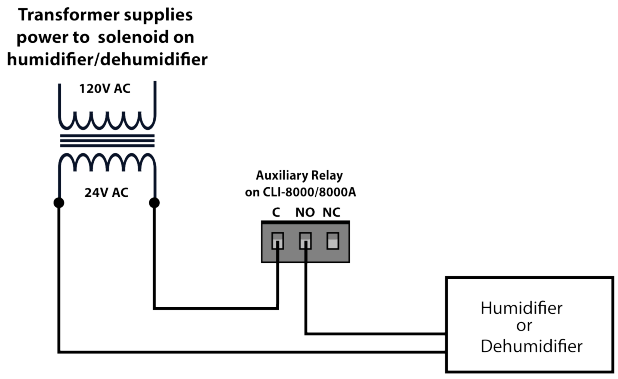
CLI-THFM1 - Calibrate (If Required)			
1	Zone Detail > Sensor Vals > Temp DSB 1	Make note of temperature in the Temp DSB 1 field. Calculate the difference between the reference thermometer and what is being displayed.	Temp DSB 1 - Ref Temp = Cal Sens 1 Value
2	Zone Detail > Sensor Vals > Temp DSB 2	Make note of temperature in the Temp DSB 2 field. Calculate the difference between the reference thermometer and what is being displayed.	Temp DSB 2 - Ref Temp = Cal Sens 2 Value
3	Zone Detail > Temp Sensors > DSB 1 Cal	Using < > arrow keys, enter the Cal Sens 1 Value calculated above.	
4	Zone Detail > Temp Sensors > DSB 2 Cal	Using < > arrow keys, enter the Cal Sens 2 Value calculated above.	
5	Zone Detail > Sensor Vals > Temp DSB 1	In the menu that opens, verify the temperature displayed on the reference thermometer and the temperature displayed on the Temp DSB 1 field is accurate to within .5° F.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.
6	Zone Detail > Sensor Vals > Temp DSB 2	In the menu that opens, verify the temperature displayed on the reference thermometer and the temperature displayed on the Temp DSB 2 field is accurate to within .5° F.	If 255 is displayed, there is either no data being collected or the sensor is disabled in the Temp Sensors menu.

Auxiliary Relay

The Auxiliary Relay can be used to control auxiliary equipment such as opening and closing a vent damper and switching on and off a humidification or dehumidification system. Depending on the type of equipment, the relay is controlling, will determine whether Normally Open (NO) or Normally Closed (NC) is connected. The Auxiliary Relay does not have a voltage connected to it and will need an external voltage source connected in series with the external equipment. It will support an external voltage of 24V AC at 1 AMP.

Note: The Auxiliary Relay can control an external piece of equipment such as a humidifier or dehumidifier, or be used in a Zone Controller Group to control zone dampers, but not both. If Auxiliary Relay is configured in a Zone Controller Group, it cannot be used to switch external equipment on and off.

Humidifier / Dehumidifier

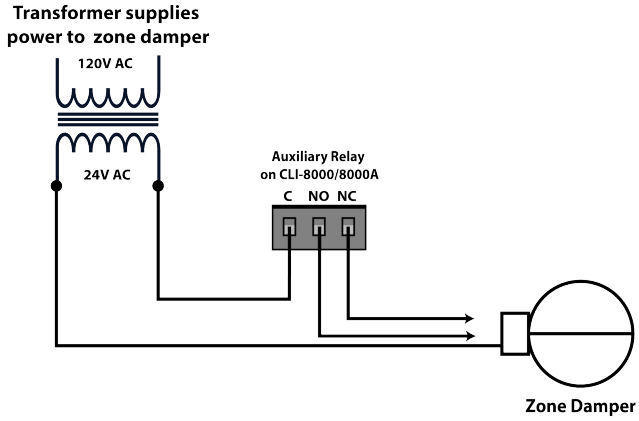


Configuration for Humidifier		
1	Zone Detail > Adv HVAC > Aux Relay	Using < > arrow keys, set to Hum
2	Zone Detail > Humidity Set > Hum Enable	Using < > arrow keys, set to On

Configuration for Dehumidifier		
1	Zone Detail > Adv HVAC > Aux Relay	Using < > arrow keys, set to DHum
2	Zone Detail > Humidity Set > Dehm Enable	Using < > arrow keys, set to On

External Vent Damper

An External Vent damper is used to circulate fresh air into the system. The system must be in an idle state for the vent damper to function.



Configuration for External Vent Damper		
1	Zone Detail > Adv HVAC > Aux Relay	Using < > arrow keys, set to Vent
2	Zone Detail > Adv HVAC > Fan Cyc On	Using < > arrow keys, set On time
3	Zone Detail > Adv HVAC > Fan Cyc Off	Using < > arrow keys, set Off time

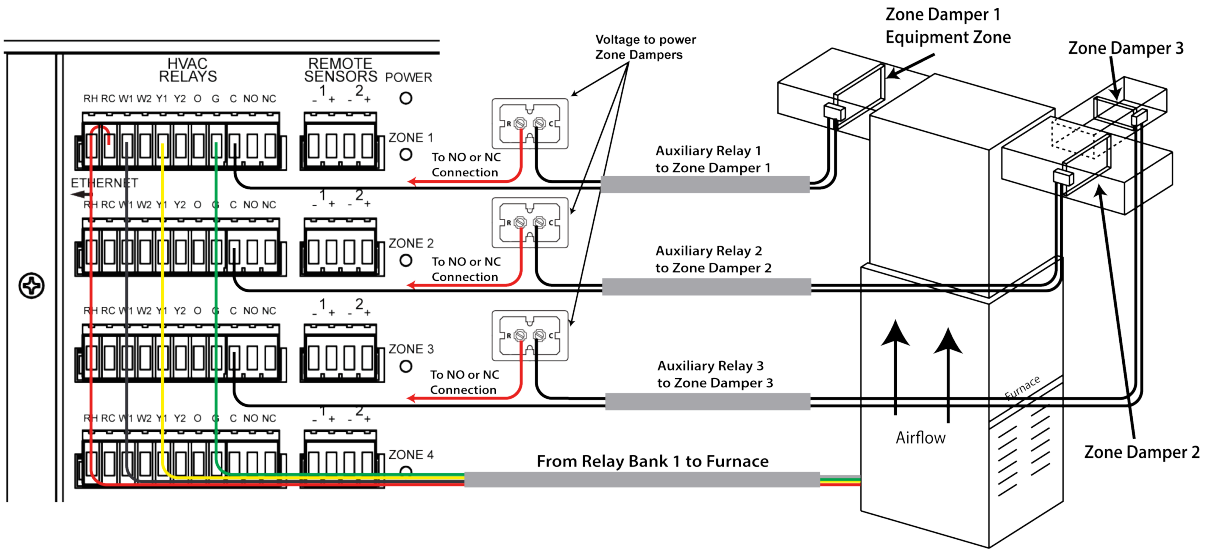
Zone Controller Groups

Zone Grouping allows a single HVAC system to be divided into smaller areas or zones. Each area or zone is created using Zone Dampers placed in strategic locations of the ductwork. For example, a three story home could be divided into three zones: first floor, second floor, and third floor. The temperature on each floor can now be handled separately with a finer granularity.

Grouping on the CLI-8000 uses one HVAC Zone that is set up as the equipment zone and up to three additional HVAC Zones set up as auxiliary zones. The auxiliary zones are in constant communication with the main equipment zone. When the data received from an auxiliary zone warrants a call for heat or cooling, the equipment zone opens and closes the correct Zone Dampers as required.

Zone Controller Groups - Wiring

When wiring a system that uses zone grouping, the zone configured as the equipment zone is wired to the installed HVAC system. The equipment zones auxiliary relay can also be wired to a zone damper in the system. On the remaining zones within the group, the auxiliary relays in each HVAC Zone is wired and used to control a separate zone damper within the system. Refer to the information below.



- When wiring the auxiliary relay, it's up to the installer to select the appropriate size and voltage transformer to power the zone dampers.
- Refer to the HVAC Relays - Wiring section for information on the C, NO, and NC connections on the front panel.

Zone Controller Groups - Configure

The steps below describe the steps required to configure a Zone Controller Group. The procedure sets up a Zone Controller Group with one equipment zone and two auxiliary zones. For more information on each of the fields, refer to the Groups Menu Description section below.

Zone Controller Group Configure			
1	Settings > Groups > Group 1 > Enabled	Using < > arrow keys, select Yes to enable Group 1.	Groups need to be enabled or disabled as required.
2	Settings > Groups > Group 1 > Equip Zone	Using < > arrow keys, select the zone that will be configured as the Equipment Zone	The equipment zone is the main zone of the Group. The Equipment Zone collects data from the Aux Zones and determines what to do. Control signaling is then sent to both the HVAC system and the Aux Zones.
3	Settings > Groups > Group 1 > Group Mode	Using < > arrow keys select the arbitrator logic. Refer to Groups Menu Descriptions section for information on the arbitrator selections	The arbitrator logic decides which zone gets satisfied first when a call for heating or cooling is initiated at the same time.
4	Settings > Groups > Group 1 > Aux Zone A	Using < > arrow keys, select the zone that will be configured as Auxiliary Zone A.	Auxiliary Zone A controls the Zone Damper for a second zone in the Zone Controller Group.
5	Settings > Groups > Group 1 > Aux Zone B	Using < > arrow keys, select the zone that will be configured as Auxiliary Zone B.	Auxiliary Zone B controls the Zone Damper for a third zone in the Zone Controller Group.
6	Settings > Groups > Group 1 > Aux Zone C	Using < > arrow keys, select **Off** to disable Zone C	Auxiliary Zone C is disabled in this example.
7	Settings > Groups > Group 1 > Edit Name	The < > arrows modify the character highlighted. The ∧ ∨ arrows move cursor left and right.	If desired, the name of the Zone Controller Group can be modified to a name that identifies the zone.
8	Equip Zone > Adv HVAC > Aux Relay	Using < > arrow keys, select Zone	When configuring a Zone Controller Group, the auxiliary relay in each Zone Controller Group must be set to **Zone**. Step 8 sets the auxiliary relay in the zone being configured as an Equipment Zone to **Zone**.

Zone Controller Group Configure			
9	Aux Zone A > Adv HVAC > Aux Relay	Using < > arrow keys, select Zone	When configuring a Zone Controller Group, the auxiliary relay in each Zone Controller Group must be set to **Zone**. Step 9 sets the auxiliary relay in the zone being configured as Auxiliary Zone A to **Zone**.
10	Aux Zone B > Adv HVAC > Aux Relay	Using < > arrow keys, select Zone	When configuring a Zone Controller group, each auxiliary relay in the Zone Controller Group must be set to Zone. Step 10 sets the auxiliary relay in the zone being configured as Auxiliary Zone b to **Zone**.
11	Settings > Groups > Group 1 > Group Status		Displays the current and previous status of what the HVAC equipment is doing in that group.

At this point, the system is configured as follows:

- The Equipment Zone is controlling both the HVAC system and Zone Damper from zone selected in step 2 above.
- Zone A is controlling zone damper from zone selected in step 4 above.
- Zone B is controlling zone damper from zone selected in step 5 above.
- Zone C is disabled.

Savant Control Deployment (Optional)

Once the CLI-8000 installation has been established and the system is running, the Control system for remote monitoring and control can be completed. The next few sections require the use of RacePoint Blueprint for layout of the system so that control can be established and User Interfaces created. Follow the steps below which will go through what is required to configure the system.

Note: To integrate the CLI-8000 into the Savant Control System, the RacePoint Blueprint application running must be version 6.0 or later.

RacePoint BluePrint™ configuration

The next section assumes the installer is an experienced BluePrint User. If you are not experienced using the Blueprint software, refer to any of the RacePoint Blueprint Guides in the Savant Customer Community.

Create both User and Global Type rooms

1. Create the rooms for the system.
   - Create one room that will include the CLI-8000 Savant Smart Climate 8-Zone Thermostat Processing Unit. This room is typically a Utility Room and should be created as Type: Global.
   - Create all remaining rooms that the User Interfaces will be used in. These rooms should be created as Type: User.

Add Equipment to Global room

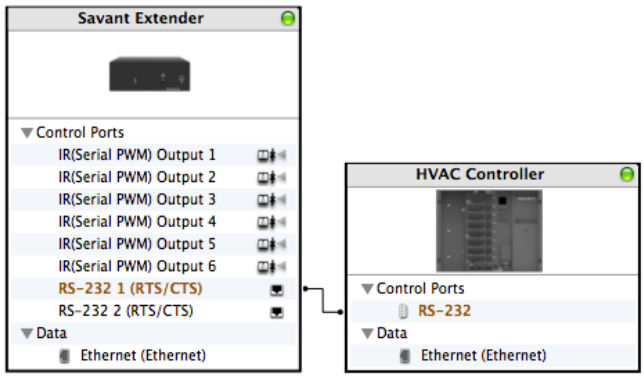
1. In the Global room created, add the following equipment
   - SSC-0008 or SSC-0025 Savant SmartController.
   - Savant Host.
   - CLI-8000 Thermostat Processing Unit
   - iPad® User Interface

Layout Rooms

Now that all the equipment has been placed in the rooms, the connections can be made.

1. Connect RS232 Port on CLI-8000 to RS-232 on Savant Controller
   - On the CLI-8000, right click the RS-232 Control Port and select **Savant Extender > RS232 1(RTS/CTS)**

   After all connections are made, the diagram should look similar to the layout below.



Add Apple iOS Device (iPad®, iPhone®)

To add a device such as an iPad®, simply add the device to the room created. Once added to the room, multiple users can be added to the device.

1. Add an iPad to the Utility Room
   - Add iPad to the Global Room.

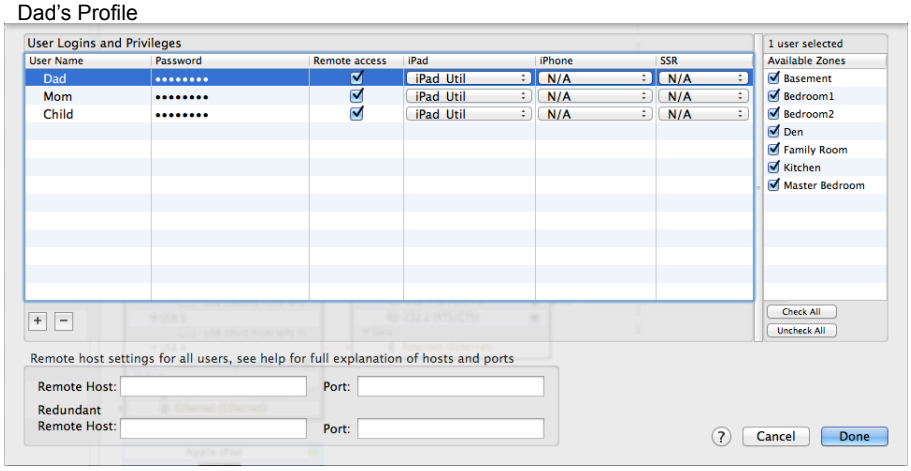
Add Users to iPad®

Each User added is given a level of functionality with which he or she can control. For example, Dad has full permissions to control the climate in every room whereas the Child does not have permissions to adjust climate in the Wine Cellar, Pool House, and Master Bedroom. Refer to the images below.

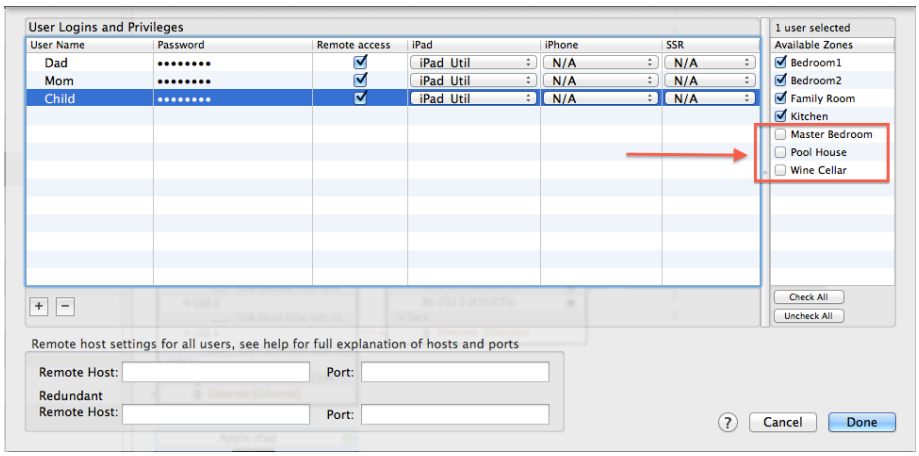
1. Add a User and Login credentials for the iPad.
   - Open the **Manage Logins** screen. From the menu bar in Blueprint, go to **Tools > Review > User Login Management**.
   - Click the + icon in bottom left of screen and add one or more users.
   - Each user can be given a different level of functionality by checking or unchecking certain rooms from the Available Zones column.

   Refer to images below. The Dad and Mom have full access but the Child has access to everything except the Wine Cellar, Pool House, and Master Bedroom.

Dad's Profile

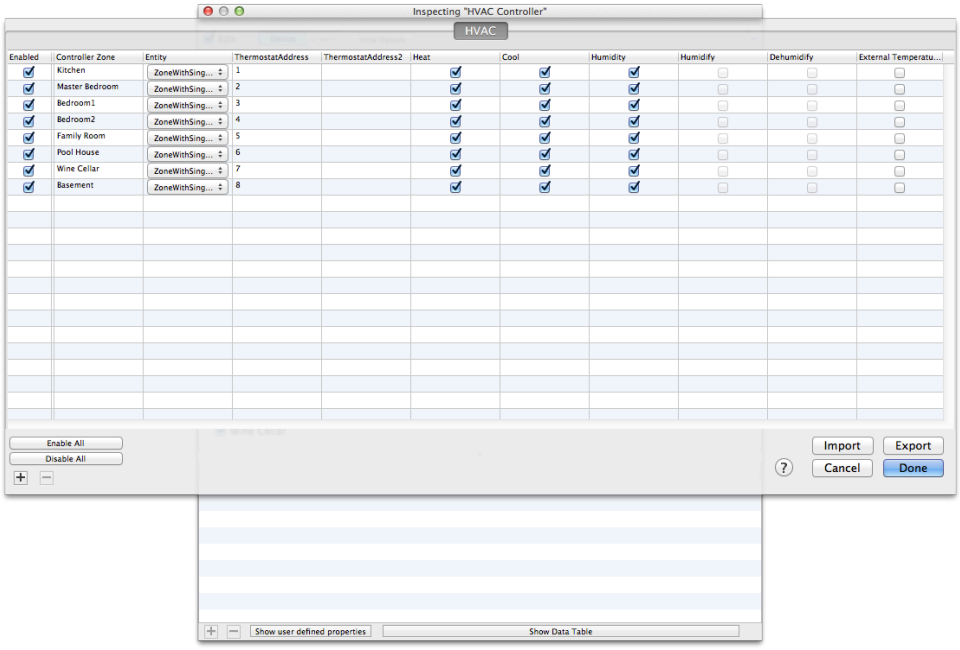


Child's Profile



Create Data Table on CLI-8000

1. Open the Inspector for the CLI-8000 TPU. In the **Show:** drop-down menu of the **Inspector** (Under Notes Box), select **Enabled in Zones**. All rooms created should now be visible in the **Inspector**. Enable or Disable each zone by checking or unchecking the zones.
2. Click **Show Data Table** button in the bottom right of the inspector. An **HVAC** Data table will appear.
3. Add each room to the Data Table:
   - Click the + (Add) icon in the bottom left of the data table screen to add an entity to the data table.
   - In the **Controller Zone** column, add one of the rooms previously created. Room name added in the Controller Zone must be identical to what it was originally named.
   - In the **Entity** field, select **ZoneWithSingleHumidityPoint**.
   - In the **Thermostat Address** field, enter an address for the room assigned to the controller zone. The ThermostatAddress entered maps to the eight zones on the CLI-8000.
   - Leave the **ThermostatAddress2** field blank. It is currently not being utilized.
   - The **Heat**, **Cool**, **Humidity**, and **External Temperature Sensor** functions are reserved for future use. Leaving them checked is OK.
   - Select Done button.
4. Add all the rooms/zones to the data table.



5. Save the configuration, **Generate Services**, **Update all UI** screens, and **Sync with Services**.
6. Upload configuration to the Host.

True Control™

The Savant Centralized Climate Control system can be integrated with Savant's own TrueControl™ application. TrueControl™ is installed on any Apple® iOS device. Once the application is installed it needs to be connected to a configured and running instance of RacePoint Blueprint™. Once connected, the TrueControl™ application can control and monitor the climate from any room. For information on installing and connecting the TrueControl™ application to Blueprint, refer to the **TrueControl User Guide** (009-0865-xx) on the Savant Customer Community.

Climate Screen

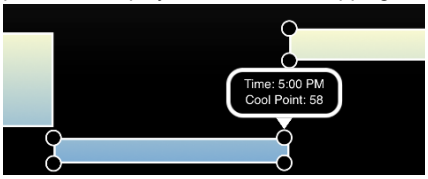
1. Navigate to the Climate Screen by tapping the Environment icon in the categories toolbar and then the Climate icon. The HVAC Control user interface appears. You will now be able to navigate through each room and monitor/modify the temperature and humidity using an Apple iOS device such as an iPad.

HVAC Schedule

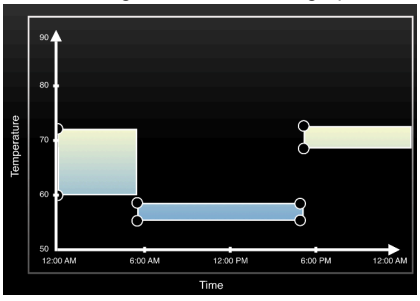
The HVAC Schedule in TrueControl™ gives an end user the ability to control their HVAC system using scheduled set-points for temperature and humidity. The schedules can be configured using the TrueControl™ application.

To open the Scheduler:

1. From the categories dock, tap the Settings icon.
2. From the Services dock, tap the schedule icon and the schedule screen will appear. From here, a schedule can be created.
3. The black dots represents the set points of the scheduler. Tap the dots and move them to the desired time and temperature set-points. As displayed below, when tapping the black dots, the time and temperature of that set point is displayed.



4. After finishing the schedule, the graph will look like the following:



The schedule above is a fall schedule where the temperature from 12:00AM to 6:00AM is set to not go below 60°F and not go above 72°F. From 6:00 AM to 5:00 PM the temperature is kept between 55°F and 58°F. At 5:00 PM the temperature is set to stay between 68°F and 72°F

5. Tap the Sched. button. In the Schedules box that appears, click the **+** icon to add the schedule just created.
6. Enter a name that describes this schedule and save it.
7. Once the schedule is complete, to get back to the **Climate** main screen, tap the environment icon . At this point the climate icon will reappear in the Services dock. Tap the **Climate** icon and the Main Climate screen will reappear.

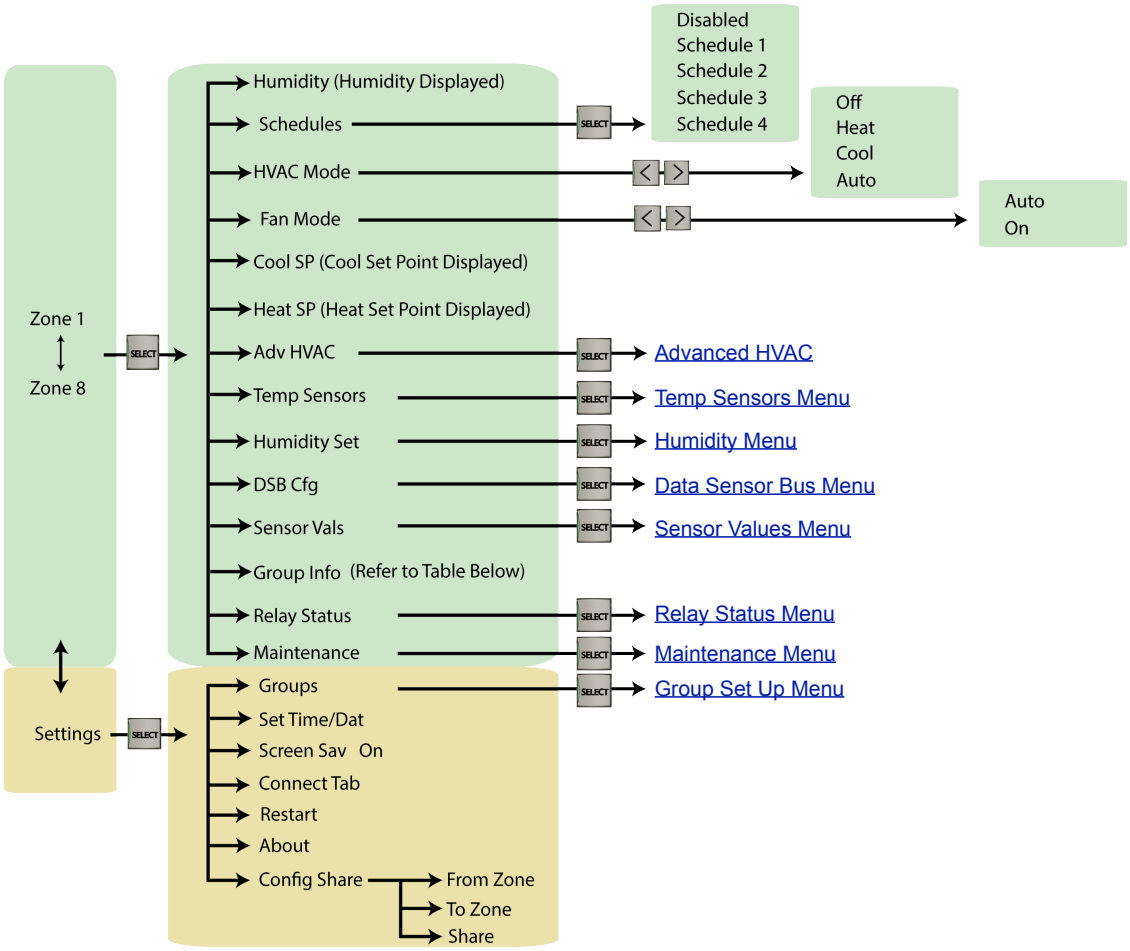
Keypad and Display User Guide

On the front panel of the CLI-8000 Thermostat Processing Unit is a keypad and display. The keypad and display is used for setting up, monitoring, and controlling each HVAC zone. By navigating through the keypad, information on each zone can be viewed and/or configured. Tasks such as configuring set points, HVAC system type, Data Sensor Bus, and enabling a variety of maintenance functions can be achieved. Use the information below to aid in navigating through the keypad and display.

Main Menu

By default, the keypad of the CLI-8000 displays the current time and date. Press any key on the keypad and the Main Menu displaying all the available zones will appear. The diagram and its corresponding table below displays the top two layers of menus in the keypad.

Note: The keypad and display have many menus and submenus. Because there are many menus within the keypad it is impossible to display all the layers in one diagram. Links were added to both the diagrams and tables in each section make it easier to navigate through the menus. (Links are typically an underlined blue font)



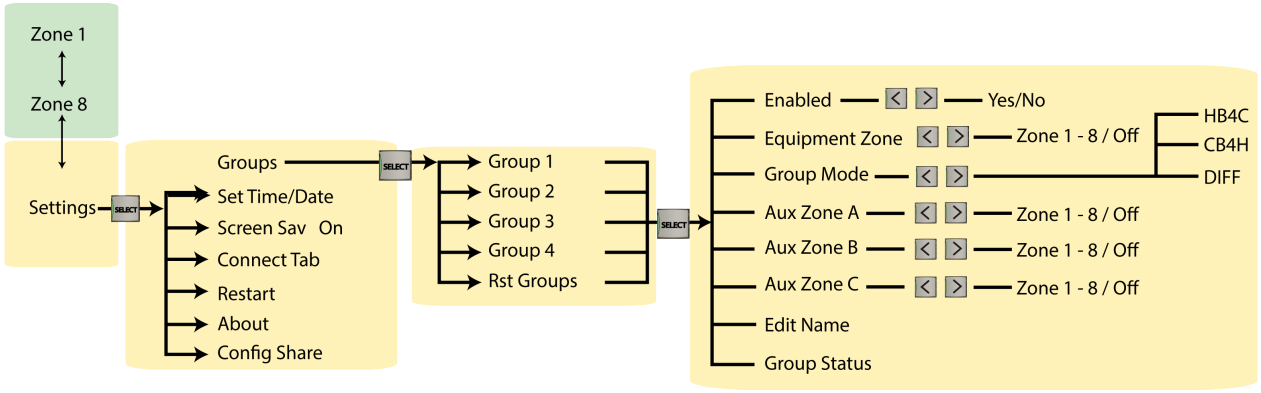
Zone Menu Descriptions

Function		Description
Humidity		Displays the humidity level in the zone after the humidity data from each sensor within that zone has been collected. The humidity displayed depends on how the Humidity Algorithm is set (Maximum, Minimum, or Average) within the Humidity Set menu.
Schedules		Select the **Schedules** field and any schedules created using the True Control™ and Blueprint applications will be displayed here. Scroll to the desired schedule and select.
HVAC Mode	**Off**	System is Off.
	Heat	Only heating cycles are enabled. System calls for heat when the temperature in the zone falls below the heat set point. Relays W1, W2, or both should be wired to run in this mode.
	Cool	Only cooling cycles are enabled. System calls for cooling when the temperature in the zone rises above the cooling set point. Relays Y1, Y2, or both should be wired to run in this mode.
	Auto	Both heating and cooling cycles are enabled. System calls for heat when the temperature in the zone falls below the heat set point and calls for cooling when the temperature rises above the cooling set point. Relays W1, W2, or both, and Y1, Y2, or both should be wired to run in this mode.

Function		Description
Fan Mode	**On**	Fan is always running.
	Auto	The fan is automatically turned ON or OFF due to heating calls, cooling calls, or the Fan Cycler.
Cool SP		The Cool SP is the high temperature set point. If the temperature goes above this set point, the system will call for cooling. The set point is adjusted in 1° increments using the < and > arrow keys.
Heat SP		The Heat SP is the low temperature set-point. If the temperature goes below this set-point, the system will call for heat. The set-point is adjusted up or down in 1° increments using the < and > arrow keys.
Adv HVAC		The Advanced HVAC Menu configures settings such as the HVAC Type, Fan Type, Heat/Cool Staging, heating and cooling time thresholds, and fan cycle times. Pressing the <SELECT> key opens the Advanced HVAC Menu.
Temp Sensors		The system supports a range of temperature sensors. Scroll down and select the Temp Sensors field. Within the Temp Sensors menu, each sensor can be configured and calibrated.
Humidity Set		The settings pertaining to humidity are configured within the Humidity Set menu. Scroll down, highlight the Humidity Set field, press the <SELECT> key, and the Humidity Set menu will open. Within the Humidity Set menu, various humidity settings are configured.
DSB Cfg		The Data Sensor Bus (DSB) is a one wire protocol bus used to monitor temperature and humidity. The CLI-THFM1 temperature/humidity sensor is the sensor that connects to this bus. Any sensors connected to the Data Sensor Bus can be viewed and assigned to a specific zone within the DSB Cfg menu. Scroll down and select the DSB Cfg field to open the DSB Cfg set up screen. For more information, refer to the DSB Cfg (Data Sensor Bus) menu.
Sensor Vals		The current temperature and/or humidity for each sensor connected is displayed under the Sensor Vals menu. Scroll down and select the Sensor Vals screen. For more information, refer to the Sensor Value menu.
Group Info Displays the status of the various zone controller groups configured.		**Group ID** - Displays the ID of the Zone Controller Group where the zone is located.
		Mode - Displays the mode (CB4H, HBFC, DIFF) configured on the Zone Controller Group.
		Aux Relay - Displays the mode configured on the Auxiliary Relay. The mode was set in the Aux Relay field under the Adv HVAC menu. When Off is displayed, nothing is connected to relay.
		Equip Control - Displays the status of the Zone Controller Group. • No = Group is Disabled • Yes = Group is Enabled
Relay Status		The status of each relay is displayed. Also, along with the relay status, the state of the HVAC system is displayed. For more information, refer to the Relay Status menu.
Maintenance		Various maintenance tasks such as resetting the system processor, setting and resetting the filter run time, and resetting log levels are performed from the maintenance field. Press the <SELECT> key to open the Maintenance field. For more information, refer to the Maintenance menu.

Settings Menu

The Main menu also contains a **Settings** field. Scroll down to the Settings field and press the <SELECT> key to open the Settings menu. The Settings Menu contains the menus required to set up Zone Controller Groups as well as a few maintenance commands.



Settings Menu Descriptions

Function	Description	
Groups	Groups 1 - 4	When configuring a Zone Controller Group, a maximum of four groups can be created. Under each group, one Equipment Zone and up to three Auxiliary Zones are configured. For more information on configuring each group, refer to the Groups Menu Descriptions information below.
	Reset Groups	Resets all Groups to their default states.
Set Time/Date	Sets the time and date that is displayed on the keypad display. Scroll down and select the **Screen Sav** field. The Screen Sav menu will open and the date and time can be modified.	
Screen Sav	By default, the Screen Sav field is set to On. In this mode, if a key on the keypad display is not been pressed for two minutes, the display will automatically revert to displaying the Time and Date. By modifying the **Screen Sav** value to Off, the screen will never revert to the date and time screen.	
Connect Tab	Resets the USB port. To reset, highlight the Connect Tab heading and press the <SELECT> key.	
Restart	Highlight and press the <SELECT> key to restart the TPU processor. This is a soft restart and none of the settings will be modified.	
About	Displays the latest installed Hardware and Firmware Revisions. Below are a few examples: HW: 02.12 FW: 01.02.011	
Config Share	The configuration created in any zone can be shared/copied into any other zone. The menus under the **Share Config** menu allow you to share configurations between zones. The procedure described below takes the configuration created in Zone 1 and shares that configuration with Zone 3 and Zone 5. The procedure assumes you are already in the **Share Config** menu. 1. Using the ∧ ∨ arrows keys navigate to the **From Zone** menu item. 2. Using the < > arrow keys select the zone that the configuration will be shared from. In this example, **Zone 1** was selected. 3. Using the ∧ ∨ arrow keys go down one menu item to the **To Zone** line. 4. Press the **SELECT** key to enter the **To Zone** menu. 5. From within the **To Zone** menu scroll using the ∧ ∨ arrow keys through the **Share to** zones. Press the **SELECT** key and to highlight each zone that the configuration will be shared. In this example, Zone 3 and Zone 5 was chosen. 6. Once all zones have been highlighted, press the ↩ back arrow key to go back one menu. 7. Using the ∧ ∨ arrow keys go down one menu item to the **Share** line. 8. Press the **SELECT** button. This will share the configuration from Zone 1 selected in the **From Zone** menu line to Zone 3 and Zone 5. These zones were selected under the **To Zone** menu item in step 5. 9. Verify the sharing worked by comparing the configuration in each of the **To Zone(s)** is the same as the configuration set in the **From Zone.**	

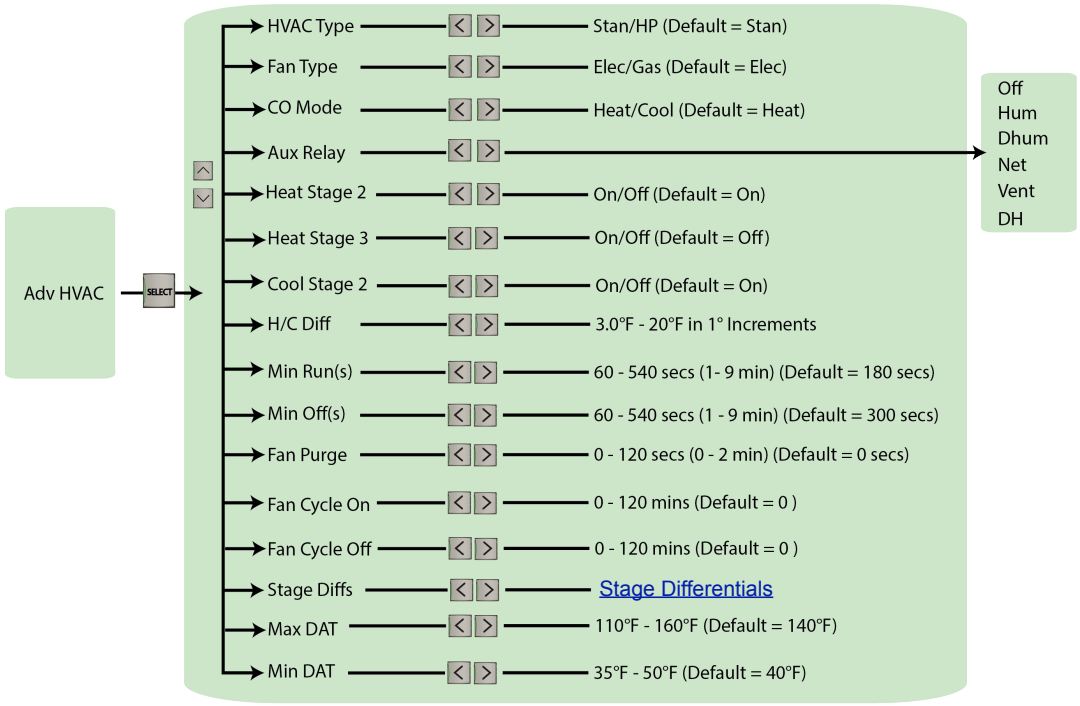
Groups Menu Descriptions

Under the Settings menu, scroll to and select the Groups field. A Groups menu will open displaying Groups 1 - 4. These represent the four Zone Controller Groups that can get configured. Scroll to and select any one of the four Groups and the Group Detail menu opens. The Group Detail menu is used to configure each individual Zone Controller Group. The information below describes the fields associated with the Group Detail menu. For a step by step procedure on how to configure a Zone Controller Group, refer to the Zone Controller Groups - Configure section in this document.

Function		Description
Enabled		Each Zone Controller Group can be enabled or disabled by setting the Enabled field to either Yes or No. Scroll down and highlight the Enabled heading. Using the < or > arrow keys, select either Yes or No.
Equipment Zone		The Equipment Zone field assigns a zone to be the equipment zone in a Zone Controller Group. Scroll down to the Equip Zone field and using the < or > arrow keys, select which zone will be the Equipment Zone. **Note:** The Equipment Zone is wired to the HVAC system as well as one of the zone dampers when configuring a Zone Controller Group.
Group Mode	**HB4C**	Heating Before Cooling - If a call for both heating and cooling is initiated at the same time, the room that requires heating will be satisfied first. Once satisfied, the system will then satisfy the cooling call.
	CB4H	Cooling Before Heating - If a call for both heating and cooling is initiated at the same time, the room that requires cooling will be satisfied first. Once satisfied, the system will then satisfy the heating call.
	DIFF	If a call for both heating and cooling is initiated at the same time, the zone with the temperature that is furthest away from its set point will be satisfied first.
Aux Zone A		Auxiliary Zone A field assigns a zone to be auxiliary Zone A in a Zone Controller Group. Aux Zone A can be any zone (Zone 1-8) that is not already being used. Scroll down to the Aux Zone A field and using the < or > arrow keys, select from the list of zones, which zone will be Auxiliary Zone A. **Note:** Auxiliary Zone A, B, and C are wired to a vent damper. The Equipment Zone receives data from the sensors installed in each room. The data received tells the Equipment Zone which zones need to be heated or cooled. The Equipment Zone then determines which vent dampers to open, and which to close, to satisfy the temperature or humidity of each room.
Aux Zone B		Auxiliary Zone B field assigns a zone to be auxiliary Zone B in a Zone Controller Group. Aux Zone B can be any zone (Zone 1-8) that is not already being used. Scroll down to the Aux Zone B field and using the < or > arrow keys, select from the list of zones which zone will be Aux Zone B.
Aux Zone C		Auxiliary Zone C field assigns a zone to be auxiliary Zone C in a Zone Controller Group. Aux Zone C can be any zone (Zone 1-8) that is not already being used. Scroll down to the Aux Zone C field and using the < or > arrow keys, select from the list of zones which zone will be Aux Zone C.
Edit Name		The name of the Zone Controller Group is modified using the Edit Name field. Scroll down and select the Edit Name field. • The Up/Down arrow keys move the curser from left to right and right to left. • The Left/Right arrow keys change the characters.
Group Status		Scroll down and select the Group Status field to open up the Group Status menu. In the Group Status menu, the current and previous state the HVAC equipment is displayed.

Advanced HVAC

The Advanced HVAC settings field includes the settings associated with the type of HVAC system as well as any settings associated with configuring heating and cooling stage and time thresholds. Refer to the information below.

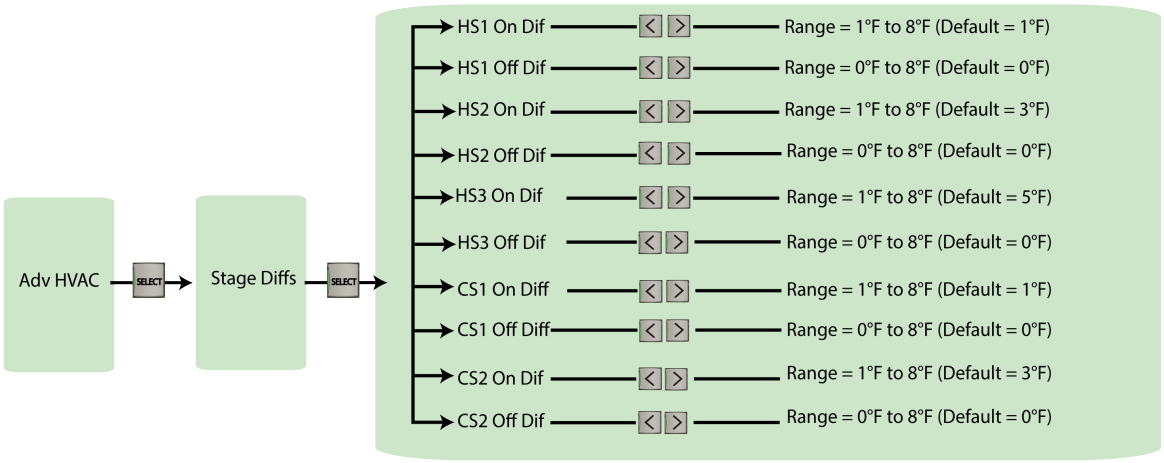


Function		Description
HVAC Type	**Stan**	Standard system with separate furnace and air conditioner for heating and cooling.
	HP	HVAC system uses a Heat Pump type system for both cooling and/or heating.
Fan Type	**Gas**	Fan relay activates for cooling calls only.
	Elec	Fan relay activates for heating and cooling calls.
CO Mode	**Heat**	In a Heat Pump system, the reversing valve can be set to supply heating or cooling. During a call for heat, the O terminal/relay is energized. During a call for cooling, the O terminal/relay is not energized.
	Cool	In a Heat Pump system, the reversing valve can be set to supply heating or cooling. During a call for cooling, the O terminal/relay is energized. During a call for heat, the O terminal/relay is not energized.
Aux Relay	**Off**	The relay has no function.
	Hum	Instructs the Auxiliary Relay to control an external humidification system. The output NO is the active port when the humidity level in the room is below the Humidity Set Point - Auxiliary Relay On Differential. Auxiliary Relay On Differential is set under the Humidity Set > Adv Humidity menu. **Note:** HVAC mode must be set to Heat or Auto and the last call was for heat.
	Dhum	Instructs the Auxiliary Relay to control an external dehumidification system The output NO is the active port when the humidity of the room is above the Humidity Set Point + Auxiliary Relay On Differential. Auxiliary Relay On Differential is set under the Humidity Set > Adv Humidity menu. **Note:** HVAC mode must be set to Cool or Auto and the last call was for cool.
	Net	The selection Net will instruct the Auxiliary Relay to be controlled by the Savant System and the NO and NC outputs are active depending on certain triggers and workflows set in the Savant Software.
	Vent	The selection Vent will instruct the Auxiliary Relay to control an external vent damper. The output NO is active when the fan state is On and the Fan Cycler is active.
	DH	The Relay is assigned as an external dehumidification fan speed control output (DH) for use with air handlers having an external DH fan control input to slow fan speed during dehumidification. Relay is OFF during normal operation when RH level is below the RH set point. Relay is ON when RH level is above the RH set point.
	Zone	Set to Zone if Zone Controller Groups are being configured.

Function	Description
Heat Stage 2	If second stage heating is required, set to On using the < and > arrow keys. If single or one stage heating is required, set to Off.
Heat Stage 3	If third stage heating is required, set to On using the < and > arrow keys. If only one or two stage heating is required, set to Off. Stage 2 heating must be set to On for Stage 3 heating to work.
Cool Stage 2	If second stage cooling is required, set to On using the < and > arrow keys. If single or one stage cooling is required, set to Off.
H/C Diff	Sets the minimum buffer allowed between the Heat SP value and the Cool SP value. The default value is 3°F and is configurable from 3°F to 20°F using the < and > arrow keys. For example, the minimum buffer (H/C Diff) between the Heat and Cool Set Point is set to 5° and the Heat SP is set at 65°. In this example, the Cool SP cannot be set to a value less than 70°.
Min Run(s)	Sets the minimum amount of time a stage must remain on, once it has been turned on. The default value is 180 seconds (3 min) and is configurable from 60 to 540 sec (1 min to 9 min) using the < and > arrow keys.
Min Off(s)	Sets the minimum amount of time a stage must remain off, once it has been turned off. The default set is 300 seconds (5 min) and is configurable from 60 to 540 sec (1 min to 9 min) using the < and > arrow keys.
Fan Purge	Fan Purge keeps the fan running after either a heating or cooling cycle has ended (high temp set point reached). The default value is 0 seconds and is configurable from 0 to 120 seconds (0 to 2 min) using the < and > arrow keys.
Fan Cycle On	The fan in an HVAC system can be cycled On or Off periodically without any calls for heating or cooling. The Fan Cycle On sets the amount of time the fan will run during this cycle. The default time is set to 0 and is configurable from 0 - 120 minutes.
Fan Cycle Off	The fan in an HVAC system can be cycled On or Off periodically without any calls for heating or cooling. The Fan Cycle Off sets the amount of time the fan will be off during this cycle. The default time is set to 0 and is configurable from 0 - 120 minutes.
Stage Diffs	Stage differentials are programmable values that are extensions of the heating and cooling set points. Each heating or cooling stage has a configurable differential that turns the different stages of the heating or cooling equipment On or Off. For more information, refer to the Stage Differentials menu.
Max DAT	The Discharge Air Temperature is the temperature of the air being discharged out of the furnace. The default max temperature is set to 140°F and is configurable from 110°F to 160°F using the < and > arrow keys. If the air temperature rises above the Max DAT, the HVAC system will shut down. The Discharge Temperature is measured using the Plenum Sensor. Savant Recommends using either the CLI-PLEN1R or CLI-PLEN1C plenum sensor.
Min DAT	The Discharge Air Temperature is the temperature of the air being discharged out of the furnace. The default min temperature is set to 40°F and is configurable from 35°F to 50°F using the < and > arrow keys. If the air temperature falls below the Min DAT, the HVAC system will shut down. Discharge Temperature is measured using the Plenum Sensor. Savant Recommends using either the CLI-PLEN1R or CLI-PLEN1C plenum sensor.

Stage Differentials

Stage differentials are programmable values that are extensions of the heating and cooling set points. Each heating or cooling stage has a configurable differential that turns the different stages of the heating or cooling equipment On or Off. The CLI-8000 supports three stages of heating and two stages of cooling. The stage differential values configured are a +/- deviation from the heating or cooling set points.



Function	Description
HS1 On Diff	The Heat Stage 1 On Differential configures the number of degrees below the Heat SP before Stage 1 heating is engaged. Range = 1°F to 8°F (Default = 1°F) Example: • Heat SP = 60° • Heat Stage 1 On Differential = 2° • Stage 1 Heat is enabled when temperature reaches 58°
HS1 Off Diff	The Heat Stage 1 Off Differential is applicable after Heat Stage 1 has been running. Heat Stage 1 Off Differential configures the temperature that Heat Stage 1 will shut off at. Range = 0°F to 8°F (Default = 0°F) (Heat Stage 1 Off Differential temperature = Heat SP - Heat Stage 1 Differential) Example: • Heat SP = 60° • Heat Stage 1 Off Differential = 1° • Stage 1 Heat is turned off when temperature reaches 59°
HS2 On Diff	Heat Stage 2 On Differential configures the number of degrees below the Heat SP before Stage 2 heating is engaged. Range = 1°F to 8°F (Default = 3°F) Example: • Heat SP = 60° • Heat Stage 2 On Differential = 3° • Stage 2 Heat is enabled when temperature reaches 57°
HS2 Off Diff	The Heat Stage 2 Off Differential is applicable after Heat Stage 2 has been running. Heat Stage 2 Off Diff configures the temperature that Heat Stage 2 will shut off at. Range = 0°F to 8°F (Default = 0°F) (Heat Stage 2 Off differential temperature = Heat SP - Heat Stage 2 Differential) Example: • Heat SP = 60° • Heat Stage 2 Off Differential = 2° • Stage 2 Heat is turned off when temperature reaches 58°

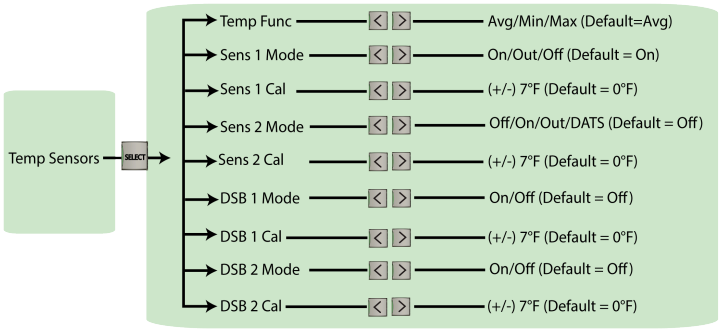
Function	Description
HS3 On Diff	Heat Stage 3 On Differential configures the number of degrees below the Heat SP before Stage 3 heating is engaged. Range = 1°F to 8°F (Default = 5°F) Example: • Heat SP = 60° • Heat Stage 3 On Differential = 5° • Stage 3 Heat is enabled when temperature reaches 55°
HS3 Off Diff	The Heat Stage 3 Off Differential is applicable after Heat Stage 3 is engaged and running. Heat Stage 3 Off Diff configures the temperature that Heat Stage 3 will shut off at. Range = 0°F to 8°F (Default = 0°F) (Heat Stage 3 Off differential temperature = Heat SP - Heat Stage 3 Differential) Example: • Heat SP = 60° • Heat Stage 1 Off Differential = 4° • Stage 2 Heat is turned off when temperature reaches 56°
CS1 On Diff	The Cool Stage 1 On Differential configures the number of degrees above the Cool SP before Stage 1 cooling is engaged. Range = 1°F to 8°F (Default = 1°F) Example: • Cool SP = 70° • Cool Stage 1 On Differential = 2° • Cool Stage 1 cooling is enabled when temperature reaches 72°
CS1 Off Diff	The Cool Stage 1 Off Differential is applicable after Cool Stage 1 is engaged and running. Cool Stage 1 Off Differential configures the temperature that Cool Stage 1 will shut off at. Range = 0°F to 8°F (Default = 0°F) (Cool Stage 1 Off differential temperature = Cool SP + Cool Stage 1 Differential) Example: • Cool SP = 70° • Cool Stage 1 Off Differential = 1° • Stage 2 Cooling is turned off when temperature reaches 71°
CS2 On Diff	Cool Stage 2 On Differential configures the number of degrees above the Cool SP before Stage 2 cooling is engaged. Range = 1°F to 8°F (Default = -3°F) Example: • Cool SP = 70° • Cool Stage 2 On Differential = 5° • Stage 2 cooling is enabled when temperature reaches 75°
CS2 Off Diff	The Cool Stage 2 Off Differential is applicable after Cool Stage 2 is engaged and running. Cool Stage 2 Off Differential configures the temperature that Cool Stage 2 will shut off at. Range = 0°F to 8°F (Default = 0°F) (Cool Stage 2 Off differential temperature = Cool SP + Cool Stage 2 Differential) Example: • Cool SP = 70° • Cool Stage 2 Off Differential = 4° • Stage 2 Cooling is turned off when temperature reaches 74°

Additional Information:

- Typically a small differential results in tighter control but the heating/cooling cycles increase.
- The Heat Stage Off Differential value must be lower than the Heat Stage On Differential Value.
- The Cool Stage Off Differential value must be lower than the Cool Stage On Differential Value.

Temp Sensors

There are a variety of both local and remote temperature sensors available to the system. The fields within the Temp Sensors menu configures the type of sensor, whether they are Enabled or Disabled, and what their function is (indoor, outdoor, DATS; Discharge Air Temperature Sensors).

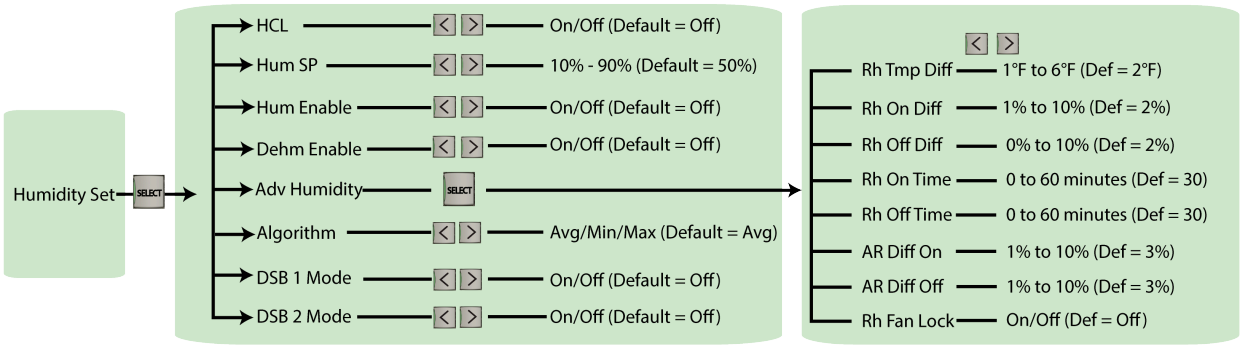


Setting		Description
Temp Func	**Max**	Within the Zone status field, numerous temperature sensors can be configured to send data to the TPU. How the data is handled is configured in the **Temp Func** field. When set to Max, the temperature processed will be the highest temperature collected from all the sensors enabled in that zone. The Max temp value is calculated every 5 secs.
	Avg	Within the Zone status field, numerous temperature sensors can be configured to send data to the TPU. How the TPU handles this data is configured in the **Temp Func** field. When set to Avg, the temperature processed will be the average temperature collected from all the sensors enabled in that zone. The Max temp value is re-recorded every 5 secs. **Note:** The Outdoor, Plenum, and Slab sensors are not factored when Avg is selected.
	Min	Within the Zone status field, numerous temperature sensors can be configured to send data to the TPU. How the TPU handles this data is configured in the **Temp Func** field. When set to Min, the temperature processed will be the lowest temperature collected from all the sensors enabled in that zone. The Min temp value is calculated every 5 secs.
Sens 1 Mode	**On**	If the sensor plugged into the REMOTE SENSORS port 1 connection is configured as On, in the Sens 1 Mode field, it should be installed as an indoor sensor. When set to On, the sensor is processed with other sensors enabled in this zone to calculate the maximum, minimum, or average temperature.
	Out	If the sensor plugged into the REMOTE SENSORS port 1 connection is configured as Out in the Sens 1 Mode field, it should be installed as an outdoor sensor. When set to Out, the sensor is processed in the TPU as a single outdoor temperature. **Note:** Only one outdoor sensor can be configured per zone. If more than one outdoor sensor is configured, the first sensor set within the Temperature Sensors list will be used. All other sensors configured as Out will be ignored.
	Off	If the sensor plugged into the REMOTE SENSORS port 1 connection is configured as Off in the Sens 1 field, the TPU will not process the data received from this sensor.
Sens 1 Cal		The Sens 1 Cal field is used to calibrate Remote Sensor 1 if calibration is required. The range for calibration is +7°F to -7°F. Refer to the calibrate section in the SST-TEMP1 - Configuration and Calibration section for more information.
Sens 2 Mode	**Off**	If the sensor plugged into the REMOTE SENSORS port 2 connection is configured as Off in the Sens 2 Mode field, the TPU will not process the data received from this sensor.
	On	If the sensor plugged into the REMOTE SENSORS port 2 connection is configured as On in the Sens 2 Mode field, it should be installed as an indoor sensor. When set to On, the sensor is processed with other sensors enabled in this zone to calculate the maximum, minimum, or average temperature.
	Out	If the sensor plugged into the REMOTE SENSORS port 2 connection is configured as Out in the Sens 2 Mode field it should be installed as an outdoor sensor. When set to Out, the sensor is processed in the TPU as a single outdoor temperature. **Note:** Only one outdoor sensor can be configured per zone. If more than one outdoor sensor is configured, the first sensor set within the Temperature Sensors list will be used. All other sensors configured as Out will be ignored.
	DATS	If the sensor plugged into the REMOTE SENSORS port 2 connection is configured as DATS in the Sens 2 MODE field, it is configured as a Discharge Air Temperature Sensor that is installed within the air duct at the point the air is discharged from the furnace. The TPU collects the data from this sensor. If the temperature goes above the Max DAT set point or below the Min DAT set point, the TPU will turn off all heat or cooling relays and turn on the fan and/or zone dampers. When set to DAT, the sensor is not used when calculating the minimum, maximum, or average temperature described above.

Setting		Description
Sens 2 Cal		The Sens 2 Cal field is used to initially calibrate Remote Sensor if calibration is required. The range for calibration is +7°F to -7°F. Refer to the calibrate section in the SST-TEMP1 - Configuration and Calibration section for more information.
DSB 1 Mode	**Off**	The TPU does not process any temperature data received from this sensor.
	On	When set to On, The TPU processes the temperature data received from sensor DSB 1. The data from this sensor can be used along with data from any other sensor enabled within the same zone to calculate the average temperature within that zone. The sensors on the Data Sensor Bus have a User ID assigned to them and need to be assigned to a zone. Refer to the CLI-THFM1 - Configuration and Calibration section for information on assigning sensors to a zone.
DSB 1 Cal		The DSB 1 Cal field is used to calibrate the DSB 1 sensor against a known calibrated sensor if calibration is required. The range for calibration is +7°F to -7°F. Refer to the calibrate section in the CLI-THFM1 - Configuration and Calibration section for more information on this.
DSB 2 Mode	**Off**	The TPU does not process any temperature data received from this sensor.
	On	When set to On, the TPU processes the temperature data received from sensor DSB 2. The data from this sensor can be used along with data from any other sensor enabled within that zone to calculate an average temperature within that zone. The sensors on the Data Sensor Bus have a User ID assigned to them and need to be assigned to a zone. Refer to the CLI-THFM1 - Configuration and Calibration section for information on assigning sensors to a zone.
DSB 2 Cal		The DSB 2 Cal field is used to calibrate THE DSB 2 sensor against a known calibrated sensor if calibration is required. The range for calibration is +7°F to -7°F. Refer to the calibrate section in the CLI-THFM1 - Configuration and Calibration section for more information on this.

Humidity Set

The Humidity Set Menu configures the settings required to control the humidity levels within a room or zone.



Function		Description
HCL	**Off** **On**	The Humidity Control Logic (HCL) field turns On or Off the Humidity Control Logic algorithm. When set to On, the HCL is enabled and the settings under the Adv Humidity menu below can be configured. For information on each of the settings in the HCL, refer to the Humidity Control Logic Functionality section below.
Hum SP		The Hum SP (set point) sets the level of humidity desired within a zone. If the humidity varies from the set point configured, the system can be configured to switch on a Humidification or Dehumidification system. The Auxiliary Relay under the Adv HVAC menu must be set to either Hum or Dhum for this to function correctly.
Hum Enable		If the humidity level falls below the Hum SP a humidification system can be switched on. For this to function correctly, the Auxiliary Relay under the Adv HVAC menu must be set to Hum and the HUM Enable field under the Humidity Set menu must be set to On. **Note:** The level at which a humidification system can turn On or Off can be adjusted using the Auxiliary Relay On and Off Differentials parameter configured in the Humidity Control Logic section.
Dehm Enable		If the humidity level rises above the Hum SP a dehumidification system can be switched on. For this to function correctly, the Auxiliary Relay under the Adv HVAC menu must be set to Dhum and the Dehm Enable field under the Humidity Set menu must be set to On. **Note:** The level at which a dehumidification system can turn On or Off can be adjusted using the Auxiliary Relay On and Off Differentials parameter configured in the Humidity Control Logic section.
Adv Humidity		Refer to the Humidity Control Logic Functionality section below.
Algorithm	**Avg**	Within each zone, multiple humidity sensors can be configured to send data to the TPU. When set to Avg, the humidity data is collected and the average of all the sensors enabled in that zone is calculated and processed. Data is calculated every five-seconds.
	Min	Within each zone, multiple humidity sensors can be configured to send data to the TPU. When set to Min, the humidity data is collected and the lowest value of all the sensors enabled in that zone is calculated and processed. Data is calculated every five-seconds.
	Max	Within each zone, multiple humidity sensors can be configured to send data to the TPU. When set to Max, the humidity data is collected and the highest value of all the sensors enabled in that zone is calculated and processed. Data is calculated every five-seconds.
DSB 1 Mode		When set to On, the humidity information collected from the CLI-THFM1 sensor 1 is read and processed by the TPU. When set to Off the information is not read or processed.
DSB 2 Mode		When set to On, the humidity information sent from the CLI-THFM1 sensor 2 is being read and processed by the TPU. When set to Off the information is not read or processed.

Humidity Control Logic (HCL) functionality

The Humidity Control Logic (HCL) works to make the HVAC system run efficiently and works to prevent a humidifier and a cooling cycle from working against each other. The bullets below are all functions of the HCL Logic.

- The HCL only allows a dehumidifier to be turned on if the previous call was for cooling.
- The HCL only allows a humidifier to be turned on if the previous or current call to the HVAC system is for heating.
- The HCL extends an active call if the humidity level is not met.

By following the rules above, the HCL works to prevent a scenario where a call for humidity happens during or immediately after a call for cooling has occurred. These two functions would work against each other so the HVAC system runs inefficiently.

The functions described in the table below all have to do with the HCL functionality. Each function in the HCL is described below with an example of how the function works in a real time scenario.

Function		Description
HCL	**Off**	Humidity Control Logic is disabled. The HCL algorithms are disabled.
	On	Humidity Control Logic is enabled. The HCL algorithms described below are enabled.
	Rh Tmp Diff	Sets the **Relative Humidity Temperature Differential** parameter used in the HCL algorithm. Below is an explanation on the functionality of this parameter. A cooling cycle is initiated because the temperature rises above the Cool SP. The HCL function extends the cool cycle and allows the temperature to drop below the Cool SP if the (HUM SP + Rh On Diff) was not reached. If the Temp drops below the Cool SP by more than the (Cool SP - Rh Tmp Diff), the cooling cycle is terminated. (Differential Temperature Range = 1°F - 6°F) **Example:** Cool SP = 80°, Hum SP = 45%, Rh Tmp Diff = 3°F, Rh On Diff = 1%, Rh Off Diff = 2%, New Cool SP = 80° - 3° = 77°F • A cooling cycle has been initiated because the temperature rises above the Cool SP of 80°. • Upon cooling the space to 80°F the HCL engages and extends the cool call because the current Relative Humidity (now at 54%) is still above the (Hum SP + Rh On Diff= 46%). • If the space reaches the New Cool SP of 77°F before reaching the Hum SP, the cooling cycle is terminated **Additional Info:** In the example above, the following conditions can also terminate the cool cycle. • The Timer set in the Rh On Time parameter expires. • The Rh Off Diff threshold (Hum SP - Rh Off Diff = 43%) is reached.
	Rh On Diff	Sets the **Relative Humidity On Differential** parameter used in the HCL algorithm. Below is an explanation on the functionality of this parameter. A cooling cycle is initiated because the temperature rises above the Cool SP. The cooling cycle lowers the temp down to the Cool SP. If however, the humidity in the space remains above the (Hum SP + Rh On Diff) set point the cool cycle will be extended. (Differential Percentage Range = 1 to 10%) **Example:** Cool SP = 80° Hum SP = 45%, Rh On Diff = 4%, Rh Off Diff = 2%, Rh Tmp Diff = 3°F • A cooling cycle has been initiated because the temperature rises above the Cool SP of 80°F. • The cooling cycle lowers the temperature back to the Cool SP of 80°F. However, the humidity which is now at 54% is still higher than the (Hum SP + Rh On Diff = 49%). • At this point the cooling cycle is extended. **Additional Info:** In the example above, the following conditions can also terminate the cooling cycle. • The Hum SP - Rh Off Diff (45% - 2% = 43%) is reached. • The Timer set in the Rh On Time parameter expires. • The Rh Tmp Diff (Cool SP - Rh Tmp Diff = 77°F) is reached.

Function		Description
	Rh Off Diff	Sets the **Relative Humidity Off Differential** parameter used in the HCL algorithm. Below is an explanation on the functionality of this parameter. A cool cycle has been extended for a reason such as the (HUM SP + Rh On Diff) has not been reached. The function of the Rh Off Diff is to terminate the cool cycle when the humidity reaches the (HUM SP - Rh Off Diff). (Differential Percentage Range = 0 to 10%) **Example:** Cool SP = 80°F Hum SP = 45%, Rh On Diff = 4%, Rh Off Diff = 2%, Rh Tmp Diff = 3°F • A cooling cycle has been initiated because the temperature rises above the Cool SP of 80°F. • The cooling cycle lowers the temperature back to the Cool SP of 80°F. However, the humidity which is now at 54% is still higher than the (Hum SP + Rh On Diff = 49%). At this point the cooling cycle is extended. • After some time, the (Hum SP - Rh Off Diff = 43%) threshold is reached. The cool cycle is terminated at this threshold. **Additional Information:** In the example above, the following conditions can also terminate the cooling cycle. • The Timer for the Rh On Time has expired. • The Rh Tmp Diff (Cool SP - Rh Tmp Diff = 77°F) is reached.
	Rh On Time	Sets the **Relative Humidity On Time** parameter used in the HCL logic. Below is an explanation on the functionality of this parameter. Upon a space meeting its Cool SP the HCL will extend the cool cycle if the (Hum SP + Rh On Diff) is not met. The Rh On Time function specifies how long the cool cycle is extended. (On Time Range = 0 - 60 minutes) **Example:** Cool SP = 80°F Hum SP = 45%, Rh On Diff = 4%, Rh Off Diff = 2%, Rh Tmp Diff = 3°F, Rh On Time = 10 minutes • A cooling cycle has been initiated because the temperature rises above the Cool SP = 80°F. • The cooling cycle lowers the temperature back to the Cool SP of 80°F. However, the humidity which is now at 54% is still higher than the (Hum SP + Rh On Diff = 49%). At this point the cooling cycle is extended. • The Rh On Time defines the maximum amount of time the cool call may be extended. **Additional Information:** In the example above, the following conditions can also terminate the cooling cycle. • The Rh Off Differential Humidity threshold of (45% - 2% = 43%) is reached. • The Rh Tmp Diff (Cool SP - Rh Tmp Diff = 77°F) is reached.
	Rh Off Time	Sets the **Relative Humidity Off Time** used in the HCL logic. Below is an explanation on the functionality of this parameter. • A cool call cannot be extended a second time until the Rh Off Timer expires. (Off Time Range = 0 - 60 minutes) **Example:** The parameters above initiate a call for cooling. The parameters that initiated the call eventually get satisfied and the call for cooling is terminated. The HVAC system cannot extend another call for cooling until after timer set in the Rh Off Time is satisfied.
	AR Diff On/ Off	Sets the **Auxiliary Relay On or Off Differential.** Below is an explanation on the functionality of this parameter. **Dehumidify:** If the relative humidity in a room rises above the (Humidity Set Point + Auxiliary Relay On Differential) the NO (Normally Open) output will activate to turn on external equipment to dehumidify the room. The external equipment will turn off when the humidity level falls to the (Humidity SP - Auxiliary Relay Off Differential). **Note:** Dehumidifier must be set in the Auxiliary Relay menu of the Advanced HVAC menu. **Humidify:** If the relative humidity in a room falls below the (Humidity Set Point - Auxiliary Relay On Differential) the NO (Normally Open) output will activate to turn on external equipment to humidify the room. The external equipment will turn off when the humidity level rises to the (Humidity SP + Auxiliary Relay Off Differential). **Note:** Humidifier must be set in the Auxiliary Relay menu of the Advanced HVAC menu

Function	Description
AR Fan Lock	Locks the state of the fan to the state of the auxiliary relay when relay is in humidifier, dehumidifier, or network mode.

Additional Information:

For the Humidity Control Logic to function, the following must be satisfied:

- The HVAC Mode set in the Zone Menu must be set to either Auto or Cool.
- The HCL functionality set in the Humidity Set menu must be set to On.

DSB Cfg (Data Sensor Bus)

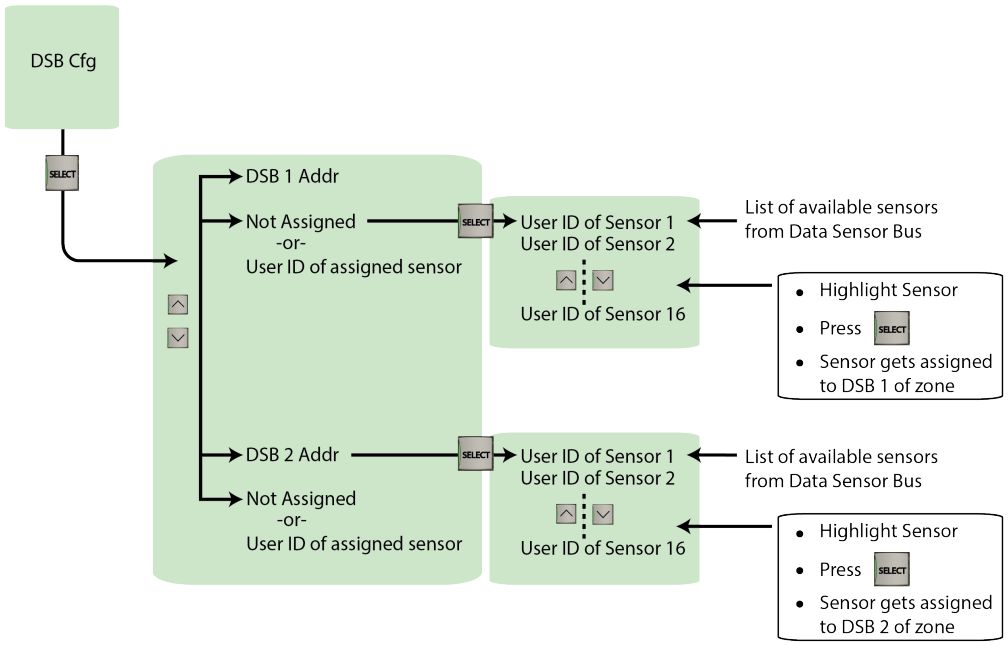
Under the DSB Cfg menu, the IDs of all available CLI-THFM1 temperature/humidity sensors wired to the Data Sensor Bus are displayed. Each sensor is assigned to a zone using these IDs. A maximum of two sensors can be assigned to a zone. They are referenced as DSB 1 Addr or DSB 2 Addr. How to configure to each zone is described below.

1. From within any zone, scroll up or down using the ∧ and ∨ arrow keys and select the DSB Cfg field.

   Note: Within the DSB Cfg menu, headings DSB 1 Addr and DSB 2 Addr are displayed. Under each of these headings, *Not Assigned* is displayed if no sensors have been assigned to this zone.
2. To assign a sensor to ., scroll to Not Assigned under the DSB 1 Addr heading and press the <SELECT> key.
3. The next screen is a list of ID's corresponding to all sensors connected to the Data Sensor Bus. Scroll down the list to the ID of the sensor that will be assigned to the DSB 1 Addr field. Highlight and press the <SELECT> key. This will assign that sensor to the DSB 1 Addr of the zone you are currently in.
4. Once complete, go up one level using the ↩ key. The ID of the sensor will now be displayed under the DSB 1 Addr heading. This indicates the sensor has been assigned as DSB 1 Addr in that zone.
5. Repeat for the DSB 2 Addr field as required.
6. Repeat the process for each sensor connected to the Data Sensor Bus. Please note that only two CLI-THFM1 sensors can be assigned to each zone.

   Note: If there is an ID displayed in either the DSB 1 or DSB 2 heading of any zone but there are no sensors connected to the Data Sensor Bus, the UIDs need to be unassigned. To do this:

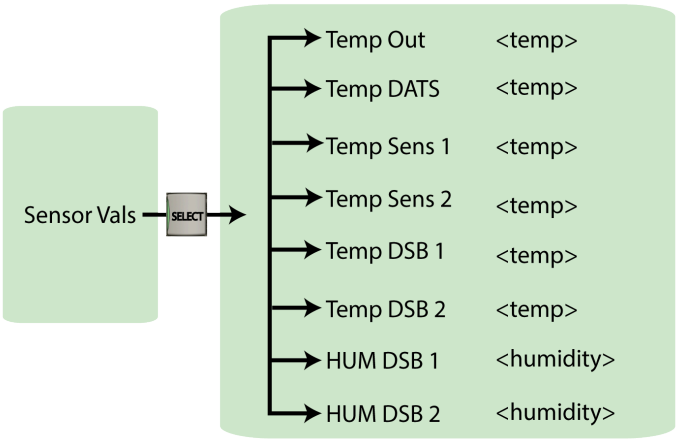
   - Navigate to the **Zone > DSB Cfg > DSB 1 Addr or DSB 2 Addr** menu (Whichever menu has the rogue UID assigned to it).
   - Un-assign the sensor by scrolling down and selecting Not Assigned. This will remove any sensor UIDs displayed that do not have a sensor tied to it.



Sensor Vals

The Sensor Vals field displays the temperature or humidity information received from each sensor that is installed and configured. If the sensor is either not installed or installed but not configured, the field will display 255. To configure a sensor to display its information in this screen, the following has to be set:

- The Sensor Mode within the Temperature Sensors and/or Humidity Set menu needs to be configured. Each sensor is different. refer to information below for information on each sensor.
- In the case of the Keypad (Thermostat Display), the Address entered in the Keypad x Address field must match the address configured in the Thermostat Display itself.



Sensor	Description
Temp Out	Temp Out field displays the Outdoor temperature if the mode in either the Temp Sen 1 or Temp Sens 2 fields is set to Out. **Note:** Only one outdoor sensor can be configured per system. If more than one outdoor sensor is configured, the first sensor set within the Temp Sensors list will be used. All other sensors configured as OUT, will be ignored.
Temp DATS	Displays the temperature of the air being discharged from the furnace. The mode set in the Temp Sens 2 field must be set to DATS.
Temp Sens 1	Temp Sens 1 field displays the temperature collected from the two-wire sensor plugged into the REMOTE SENSORS port 1 connection on the front panel. The sensor communicates over a two wire twisted pair. The following must be configured to display the temperature collected. • The Sens 1 Mode in the Temp Sensors menu must be set to either On or Out.
Temp Sens 2	Temp Sens 2 field displays the temperature collected from the two-wire sensor plugged into the REMOTE SENSORS port 2 connection on the front panel. The sensor communicates over a two wire twisted pair. The following must be configured to display the temperature collected. • The Sens 2 Mode in the Temp Sensors menu must be set to either On, Out, or DATS.
Temp DSB 1	Temp DSB 1 field displays the temperature collected from the sensor (CLI-THFM1) wired to the Data Sensor Bus that has been assigned to the zone being configured. This sensor communicates through the DSB / 1-WIRE connection on the front panel. The following must be configured to display the temperature: • Temp DSB 1 Mode field from the Temp Sensors menu must be set to ON. • Sensor must be assigned to the zone being configured. Refer to the DSB Cfg section above.
Temp DSB 2	Temp DSB 2 field displays the temperature collected from the sensor (CLI-THFM1) wired to the Data Sensor Bus that has been assigned to the zone being configured. This sensor communicates through the DSB / 1-WIRE connection on the front panel. The following must be configured to display the temperature: • Temp DSB 2 Mode field from the Temp Sensors menu must be set to ON. • Sensor must be assigned to the zone being configured. Refer to the DSB Cfg section above.
Hum DSB 1	The HUM DSB 1 field displays the humidity collected from the sensor (CLI-THFM1) wired to the Data Sensor Bus that has been assigned to the zone being configured. This sensor communicates through the DSB / 1-WIRE connection on the front panel. The following must be configured to display the temperature: • DSB 1 Mode field from the Humidity Set menu must be set to ON. • Sensor must be assigned to the zone being configured. Refer to the DSB Cfg section above.
Hum DSB 2	The HUM DSB 2 field displays the humidity collected from the sensor (CLI-THFM1) wired to the Data Sensor Bus that has been assigned to the zone being configured. This sensor communicates through the DSB / 1-WIRE connection on the front panel. The following must be configured to display the temperature: • DSB 2 Mode field from the Humidity Set menu must be set to ON. • Sensor must be assigned to the zone being configured. Refer to the DSB Cfg section above.

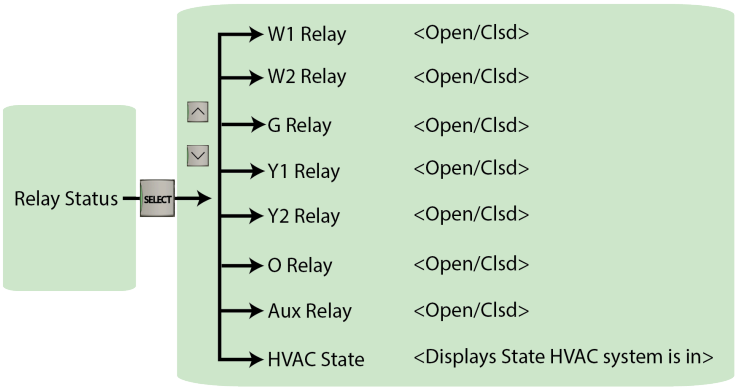
Group Info

For the information in the Group Info menu to be valid, the current zone being viewed needs to be configured into a Zone Controller Group. Status about the Zone Controller Group can be viewed in the Group Info menu.

Function	Description
If the zone currently being viewed is part of a Zone Controller Group:	
Group ID	The ID of the Zone Controller Group is displayed.
Mode	The Mode configured on the Zone Controller Group is displayed.
Aux Relay	The setting configured on the Auxiliary Relay is displayed.
Equip Control	Whether the zone is configured as an Equipment Zone is displayed. Yes or No

Relay Status

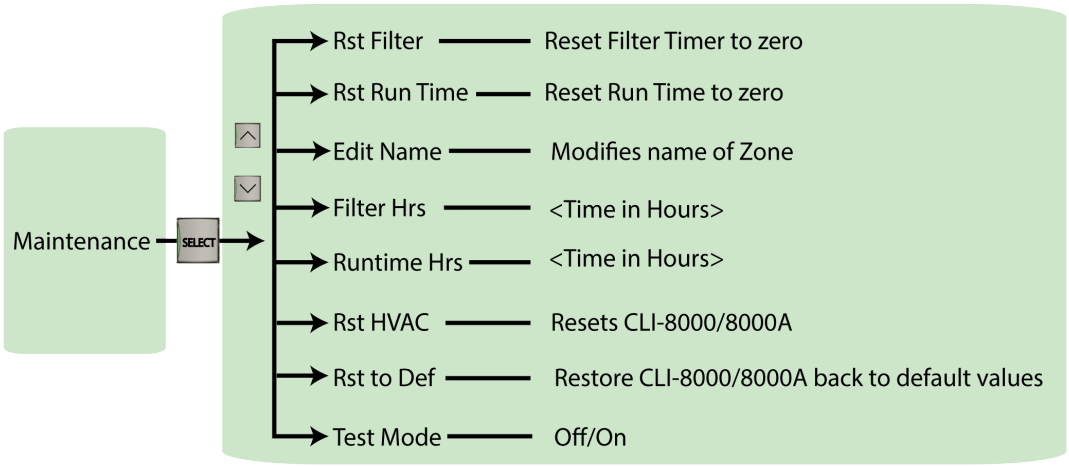
The Relay Status field displays the status of each relay within the selected zone. The last entry “HVAC State” displays what state the HVAC system is in.



Relay	Description	
W1 Relay	Displays the status of relay associated with the W1 output in each zone. W1 sends commands to control 1st stage heating functions.	
W2 Relay	Displays the status of relay associated with the W2 output on each zone. W2 sends commands to control 2nd stage heating functions.	
G Relay	Displays the status of relay associated with the G output on each zone. G sends commands to control the fan.	
Y1 Relay	Displays the status of relay associated with the Y1 output in each zone. Y1 sends commands to control 1st stage cooling.	
Y2 Relay	Displays the status of relay associated with the Y2 output in each zone. Y2 sends commands to control 2nd stage cooling.	
O relay	Displays the status of relay associated with O output in each zone. O or C0 (ChangeOver) sends commands to control the reversing valve.	
Aux Relay	Displays the status of relay associated with the C, NO, and NC output in each zone. Open indicates the 24V AC signal is sent to output NC (Normally Closed). Closed Indicates the 24V AC signal is sent to output NO (Normally Open). The Auxiliary Relay is used for controlling external equipment such as a humidification or dehumidification system.	
HVAC State Displays the state of the HVAC system.	IDLE	Idle
	H1MR	Heat Stage 1 Minimum Run Time
	H1	Heat Stage 1
	H1MO	Heat Stage 1 Minimum Off Time
	H2MR	Heat Stage 2 Minimum Run Time
	H2	Heat Stage 2
	H2MO	Heat Stage 2 Minimum Off Time
	H3MR	Heat Stage 3 Minimum Run Time
	H3	Heat Stage 3
	H3MO	Heat Stage 3 Minimum Off Time
	C1MR	Cool Stage 1 Minimum Run Time
	C1	Cool Stage 1
	C1MO	Cool Stage 1 Minimum Off Time
	C2MR	Cool Stage 2 Minimum Run Time
	C2	Cool Stage 2
	C2MO	Cool Stage 2 Minimum Off Time
	DATS	Discharge air temperature Alarm State
	HUM	Indicates an extended cool call due to HCL.

Maintenance

Within each zone menu is a Maintenance field. The Maintenance menu has both global commands and commands that are specific to the zone that user is currently working in. The Maintenance menu monitors filter and furnace run times as well as a variety of reset commands. Refer to the information below



Function	Description
Rst Filter	Resets the timer associated with filter maintenance. After changing the filter within the furnace, the Rst Filter should be reset to zero. Highlight the Rst Filter selection and press the <SELECT> key. This will reset the timer to zero. To verify, view the Filter Hrs selection under the Relay Status fields. It should now display zero.
Rst Run Time	Resets the timer associated with how many hours the furnace was On or running. Highlight the Rst Run Time selection and press the <SELECT> key. This will reset the timer to zero. To verify, view the Run Time Hrs selection under the Relay Status fields. It should now display zero.
Edit Name	The EDIT Name field lets a user edit the name of the zone. Highlight the edit name field and press the <SELECT> key. In the next field, enter a new name using the < and > arrow keys. The new name entered should describe the zone. Ex. floor1
Filter Hrs	Number of hours the fan has run since the filter was last changed and reset. **Note:** The Filter Hrs timer can be reset through the Rst Filter command under the Maintenance field.
Runtime Hrs	Up time or number of hours the system has run. This can be reset through the Rst Run Time field above.
Reset HVAC	The Reset HVAC resets the HVAC state functionality. After resetting, the HVAC will be forced to the idle state. • To reset, scroll to and highlight the Rst HVAC field. • Once the Rst HVAC field is highlighted, press the <SELECT> key. To verify the Reset HVAC state worked, navigate to the Relay Status menu. The HVAC State field will now display IDLE.
Rst to Def	Resets all settings to their default values within that zone.
Test Mode	Test Mode is used for troubleshooting purposes only. When in Test Mode, each relay can be switched on or off through the Relay Status menu. By default, the Test Mode is set to Off. To enable test mode, highlight the Test Mode field and use the < > keys to set to On. In Test Mode, the following is modified: • The relays under the Relay Status field can each be manually switched from On to Off and Off to On. • Test Mode is not supported in zones that are configured in a Zone Controller Group. **Note:** Status of the relay should not be modified unless advised to do so by Savant Support Personnel. Modifying the Relay Status is for testing and troubleshooting purposes only.

Note: If required, the system can be power cycled by holding the < and > buttons on the keypad simultaneously for three-seconds.

Appendix A: Firmware Release Information

Firmware 1.2.20 June 2014

Release: FW: 1.2.20

Release Date: June 2014

CLI-8000 Enhancements

The following enhancements have been included with this latest firmware release.

- **Sharing Configurations Between Zones**
  User can now copy a configuration that exists on one zone and add it into one or more available zones.
- **LED Display Blanks from Non Use**
  After two minutes of not pressing any of the keys on the keypad display, the LED screen on the front panel will automatically default to a blank screen. To wake up the screen, press any key.

  Note: The time the screen takes to go blank is 2 minutes. If the screensaver timeout is changed, the time it takes for the screen to go blank increases or decreases with the screen saver time entered.

Appendix B: Document Revision History

009-1073-03

Section	Update
Auxiliary Relay	Added sentence - It will support an external voltage of 24V AC at 1 AMP.

009-1073-02

Section	Update
RS-232 Information	Added information regarding the RS-232 Serial Port (SCR-41564)
Savant Control Deployment System Components - Descriptions and Specifications	Added information regarding the version of da Vinci software required to integrate the CLI-8000 into a Savant Development system (SCR-41353).
System Summary Remote Sensors	Added information about not plugging and unplugging the 2-wire remote sensors while power is applied or damage to CLI-8000 could occur (SCR-42607).
Deployment Steps	Added a checklist of steps required to install and configure the CLI-8000.

009-1073-01

Section	Update
Appendix A: Firmware Upgrades	Added Appendix A - Firmware Upgrades section.
Settings Menu	New menu item describing the new Config Share functionality.

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