

PALLADIOM

HomeWorks Palladiom Thermostat Configuration Guide



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Description

This programming guide provides information on how to configure the HomeWorks Palladiom Thermostat and the HomeWorks Palladiom HVAC controller (SMC55-HWQS, SMC55-RESI, SMC55-RESI-2). All the references made to SMC55-HWQS throughout the document will apply to SMC55-RESI and SMC55-RESI-2 as well.

The HomeWorks Palladiom thermostat and SMC55-HWQS are a two-piece solution offered by Lutron to control HVAC equipment. The thermostat provides the user interface and the SMC55-HWQS sends signals to control the HVAC equipment. The SMC55-HWQS must be configured correctly to control the HVAC equipment. The thermostat can also connect to third-party HVAC controllers, or be used as a Companion Thermostat, which is described in later sections.



Shock Hazard - Improper configuration can cause property damage, personal injury, or death. Installation and service must be performed by a licensed professional HVAC installer (or equivalent) or service agency.

This guide illustrates multiple steps for configuring the Palladiom thermostat and HVAC controller.

Step 1 illustrates how to identify the HVAC equipment and confirm system compatibility.

Step 2 covers the equipment configuration mode.

Step 3 explains the controller selection menu.

Step 4 details the basic parameters required to configure the SMC55-HWQS for compatibility.

Step 5 covers the details of the advanced parameters for the SMC55-HWQS which are used to modify the functionality of the HVAC equipment. Advanced parameters are set to a default value and should only be changed if the system needs further configuration.

After configuring both the basic and the advanced parameters, refer to Step 6 to verify the basic system functionality based on the configuration of the SMC55-HWQS.

Appendix A includes control diagrams to explain the On/Off deltas for heating and cooling stages.

Appendix B provides a worksheet which should be kept and used by the installer during installation. Before configuring the SMC55-HWQS, write the necessary values for the basic and advanced parameters in the allotted space.

Appendix C gives more details about the functionality of different buttons and user interface on the thermostat.

Step 1: Identify the HVAC Equipment and Confirm Device Installation

Identify the HVAC Equipment

First, identify the type of HVAC equipment that is installed. Check the installation manual or label on the HVAC equipment.

The Palladiom Thermostat solution is compatible with most residential HVAC systems, including:

1. Conventional forced air systems using gas, electric, or oil heat as well as compressor-based, cooling-only as split systems or packaged units.
2. Fan Coil Units (FCUs)
3. Heat-pump systems¹
4. Hydronic or electric underfloor/radiant heating systems¹
5. Specific VRF/VRV systems. See the **HomeWorks Palladiom Thermostat Specification Submittal** (Lutron P/N 3691033) at www.lutron.com for further information.

Confirm Device Installation

Confirm the Palladiom Thermostat is installed. For hardware installation and wiring details, refer to the **HomeWorks Thermostat Installation Guide** at <https://www.lutron.com/TechnicalDocumentLibrary/043527.pdf>. If connecting a third-party HVAC controller to the thermostat, refer to the controller's installation guides to confirm installation of the controller. Connecting the Palladiom thermostat to third-party controllers is explained in the following Lutron app notes:

Daikin® VRF Systems and Other VRF Systems

Requires one of these hardware options:

- HomeWorks Palladiom thermostat with HomeWorks processor and CoolAutomation™ interface.^{2,3}
See Application Note #650 (048650) at www.lutron.com
- HomeWorks Palladiom thermostat with HomeWorks processor and Airzone™ interface.^{2,4} See Application Note at www.airzonecontrol.com/na/en/

Mitsubishi® VRF Systems

Requires one of these hardware options:

- HomeWorks Palladiom thermostat and Mitsubishi® Procon A1M interface.² See Application Note #585 (048585) at www.lutron.com
- HomeWorks Palladiom thermostat with HomeWorks processor and CoolAutomation™ interface.²
See Application Note #650 (048650) at www.lutron.com
- HomeWorks Palladiom thermostat with HomeWorks Palladiom HVAC controller and Mitsubishi® thermostat controller interface.²
See Application Note #585 (048585) at www.lutron.com
- HomeWorks Palladiom thermostat with HomeWorks processor and Airzone™ interface.^{2,4} See Application Note at www.airzonecontrol.com/na/en/

LG® VRF Systems

Requires one of these hardware options:

- HomeWorks Palladiom thermostat and LG® PDRYCB500 interface.² See Application Note #627 (048627) at www.lutron.com
- HomeWorks Palladiom thermostat with HomeWorks processor and CoolAutomation™ interface.²
See Application Note #650 (048650) at www.lutron.com
- HomeWorks Palladiom thermostat with HomeWorks Palladiom HVAC controller and LG® thermostat controller interface.²
See Application Note #627 (048627) at www.lutron.com
- HomeWorks Palladiom thermostat with HomeWorks processor and Airzone™ interface.^{2,4} See Application Note at www.airzonecontrol.com/na/en/

Underfloor Heating Systems with Heatmiser Interface

Requires:

- HomeWorks Palladiom thermostat with HomeWorks processor and Heatmiser interface.² See Application Note #652 (048652) at www.lutron.com

¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

² Provided by others.

³ For information about additional CoolAutomation interfaces, see www.coolautomation.com

⁴ For information about additional Airzone™ interfaces, see www.airzonecontrol.com/na/en/

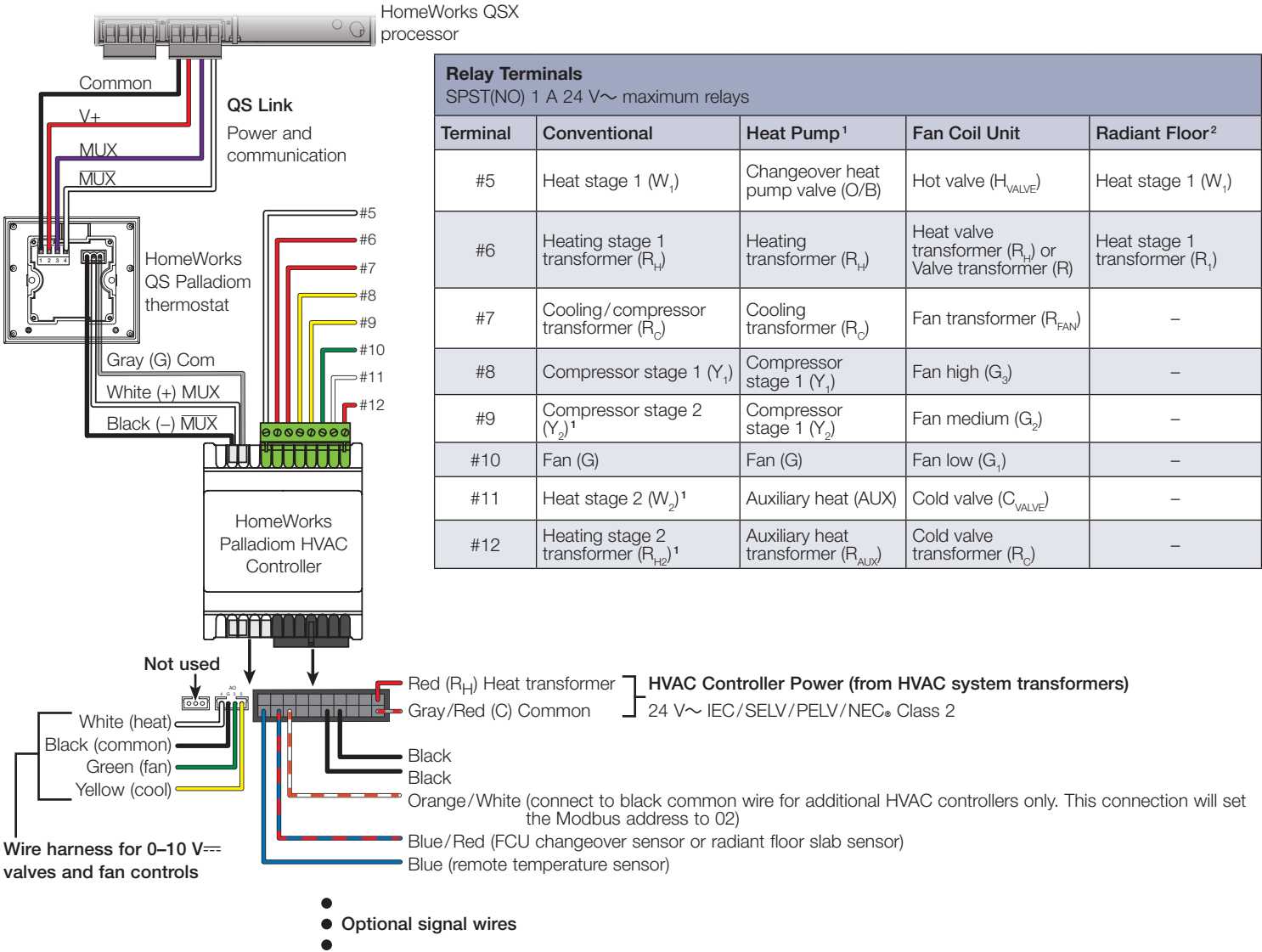
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Step 1: Identify the HVAC Equipment and Confirm Device Installation
(continued)

Confirm Device Installation (continued)

If connecting the Palladiom Thermostat to the SMC55-HWQS, they must be connected over the HVAC controller communication link. Refer to **Figure 1** for the wiring required to install the SMC55-HWQS with the thermostat. For hardware installation and wiring details refer to the **HomeWorks Thermostat Installation Guide** (P/N 043527) at www.lutron.com.

Figure 1: SMC55-HWQS Setup for Configuration Using a Thermostat




¹ Included with SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.
² Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

Programming Menu Overview

- 1. **Equipment configuration mode:** Indicates if 1 or 2 HVAC equipment types are used and what equipment is connected.
- 2. **HVAC controller selection mode:** Indicates what type of HVAC controller is being used and sets the address for it (if needed).
- 3. **Basic configuration mode:** Configures the HVAC controller according to the type of HVAC system.
Note: Depending on the options selected, certain programming modes may be skipped. It may be necessary to enter certain programming modes twice if there are two equipment types. The thermostat will only display menus that are relevant to the configurations selected.
- 4. **Advanced configuration mode (Optional)**

Step 2: Equipment Configuration Mode

Included with thermostat version 3.0 or later

**WARNING** **Shock Hazard.** Improper configuration can cause property damage, personal injury, or death. Installation and service must be performed by a licensed professional HVAC installer (or the equivalent) or service agency.

- 1. **Enter equipment configuration mode.** When a thermostat receives power, it will automatically enter equipment configuration mode if equipment configuration has not been previously completed.

If no HVAC controller is going to be connected directly to the thermostat, skip this section. This is known as a companion thermostat and configuration will be completed by a certified Lutron dealer via the Lutron Designer software.
- 2. **Select value for equipment configuration: Select the configuration option which describes the HVAC equipment connected to the thermostat.** Using the table below, press \wedge or \vee to select the correct equipment configuration being used and press and hold $\text{flame}|\text{snowflake}$ to save the configuration. The thermostat will then enter HVAC controller selection mode for the first zone.

Figure 2: Display on Thermostat in Equipment Configuration Mode

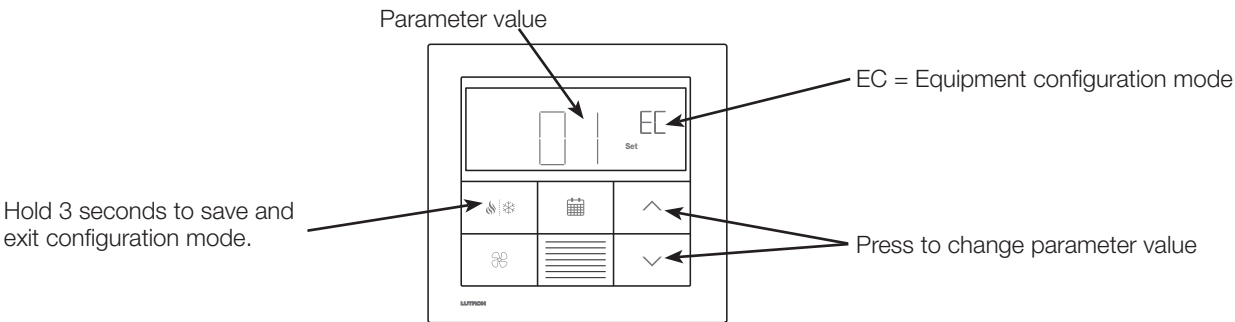



Table 1: Options for Equipment Configuration

Parameter Value	Equipment Type	Description	System Example
01	1	There is a single piece of equipment attached to the HVAC controller communication link.	The thermostat is connected to an SMC55-HWQS which handles both heating and cooling of the HVAC zone.
02	2 – both heating and cooling equipment connected to the thermostat	The thermostat controls two different HVAC equipment types. Both pieces of HVAC equipment are connected to the HVAC controller communication link.	The thermostat is connected to an SMC55-HWQS used for underfloor heating of the HVAC zone. There is also a Cool Automation CoolPlug or Airzone Aidoo Pro interface connected to the same thermostat used to cool the space. Both pieces of equipment are in the same HVAC zone and the thermostat can be used to heat or cool the zone.
03	2 – only heating equipment connected to the thermostat	The thermostat controls two different HVAC equipment types. Only heating equipment is physically connected to the HVAC controller communication link.	The thermostat is connected to an SMC55-HWQS used for underfloor heating of the HVAC zone. There is also 3rd party HVAC equipment connected to the HomeWorks processor via integration, which is used to cool the same zone. The thermostat can be used to heat or cool the zone.
04	2 – only cooling equipment connected to the thermostat	The thermostat controls two different HVAC equipment types. Only cooling equipment is physically connected to the HVAC controller communication link.	The thermostat is connected to a Cool Automation CoolPlug or Airzone Aidoo Pro interface to handle cooling the HVAC zone. There is also 3rd party HVAC equipment connected to the HomeWorks processor via integration, which is used to heat the same zone. The thermostat can be used to heat or cool the zone.

Step 3: Select the HVAC Controller¹

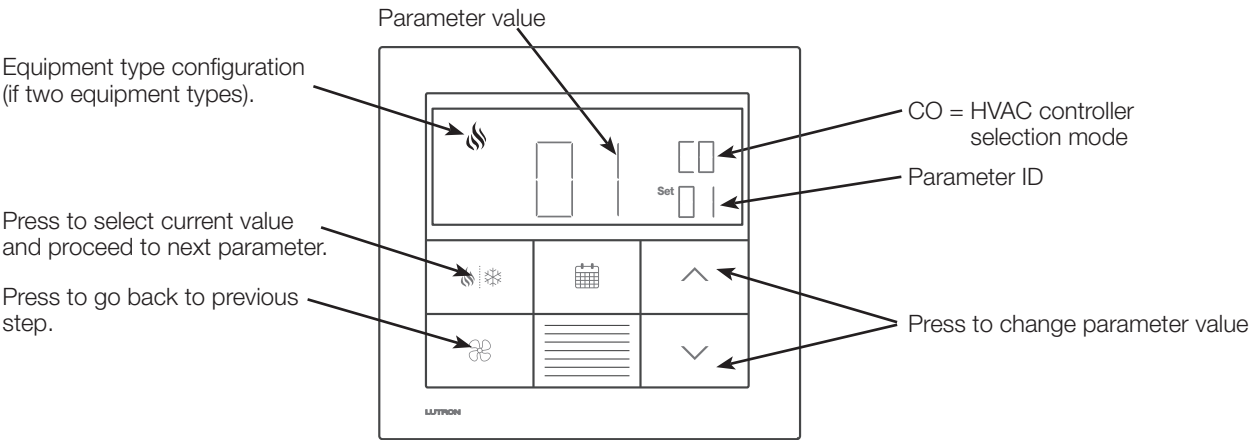
This section explains configuring the thermostat for the type of controller connected to it. Configuration is required when a new thermostat is added.

**WARNING**

Shock Hazard. Improper configuration can cause property damage, personal injury, or death. Installation and service must be performed by a licensed professional HVAC installer (or the equivalent) or service agency.

1. **Enter HVAC controller selection mode.** The thermostat will automatically enter HVAC controller selection mode if an HVAC controller has not previously been selected.
- If no HVAC controller is going to be connected directly to the thermostat, skip this section. This is known as a companion thermostat and configuration will be completed by a certified Lutron dealer via the Lutron Designer software.

Figure 3: Display on Thermostat in HVAC Controller selection mode



2. **Select value for parameter ID “01”: Select the HVAC controller connected to the thermostat.** Using the table below, press \wedge or \vee to select the correct option for the HVAC controller being used and press flame/snowflake .

Values based on HVAC controller				
	SMC55-RESI	Mitsubishi A1M	Cool Automation CoolPlug/Airzone Aidoo Pro	LG PDRYCB500
Parameter ID 01: HVAC controller option	01	02	03	04
Parameter ID 02: Modbus address	01-02*	01-31 (set by DIP switches 1-5)*	99*	01-08 (set by DIP switches 1-4)*

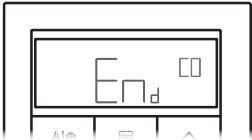
3. **Select value for parameter ID “02”: Select the Modbus address.*** Using the table above, press \wedge or \vee to select the desired Modbus address and press flame/snowflake .

* For information see instructions included with the controller.

4. **Exit HVAC controller selection mode.** When “End” is shown, press and hold flame/snowflake until the backlight flashes (3 seconds).
- Note:** “E1” will show on the display if the thermostat is not able to communicate with the HVAC controller. See the [Troubleshooting](#) section on page 30.

Note: If a new HVAC controller is connected to the thermostat, the HVAC controller selection mode will need to be re-entered. To re-enter the controller selection menu follow the steps below.

- a. Press and hold calendar and fan until the backlight flashes (3 seconds).
- b. **For controller selection mode** - Release the buttons and immediately press and hold \wedge until the backlight stops flashing and “CO” is shown (3 seconds).






¹ Included with HomeWorks Palladium Thermostat version 1.10 or newer.

Step 4: Set the SMC55-HWQS Basic Parameters for System Compatibility

This section explains the basic configuration parameters for the SMC55-HWQS. Basic parameters are the critical parameters which must be configured to control the HVAC equipment. The thermostat will not begin normal operation until these parameters are configured.

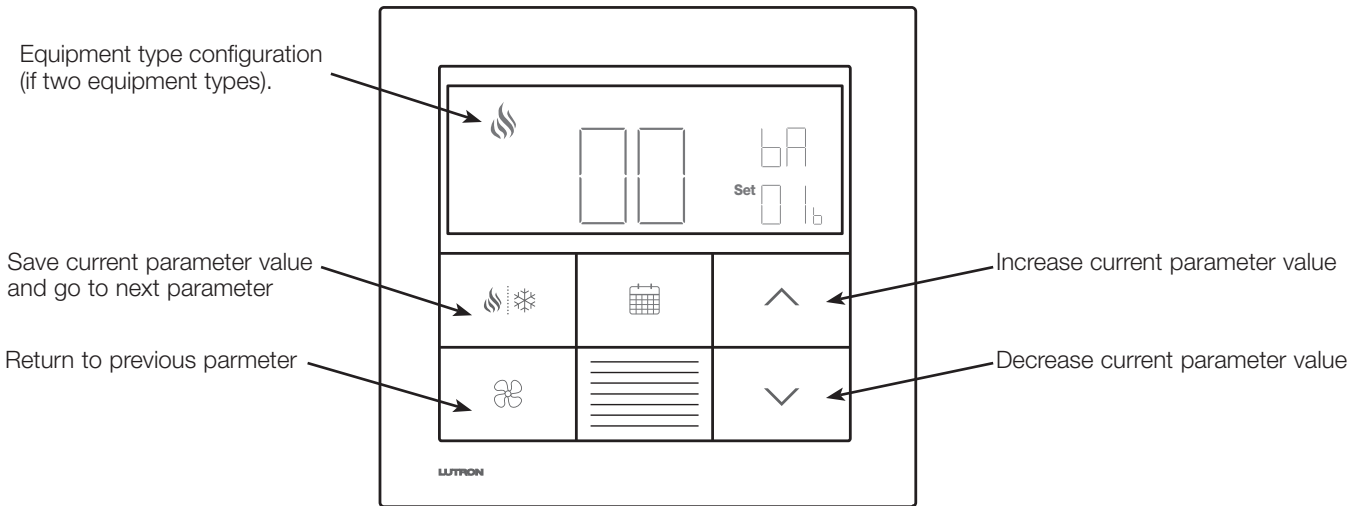
WARNING **Shock Hazard.** Improper configuration can cause property damage, personal injury, or death. Installation and service must be performed by a licensed professional HVAC installer (or the equivalent) or service agency.

If a thermostat is connected to an SMC55-HWQS that has not yet been configured, the thermostat will automatically enter Basic Configuration Mode. If it is desired to enter Basic Configuration Mode manually, follow the steps below.

- 1. Cycle power to the thermostat. The remaining 2 steps need to be completed within 15 minutes. If not, repeat Step 1.
- 2. Press and hold  and  for 3 seconds until the button backlight is lit and the display flashes.
- 3. Release the buttons and immediately (with in 15 seconds) press and hold  for 3 seconds until the button backlight stops flashing.

The display on the thermostat will be as shown in **Figure 4**:




Figure 4: Display on Thermostat in Basic Configuration Mode



In **Figure 4**, '01b' represents the basic configuration parameter for SMC55-HWQS. '00' represents the value of this parameter and 'bA' indicates that this is a basic parameter.

The following table describes the buttons that are used to select a value of the basic configuration parameter for configuring the SMC55-HWQS.

Table 2: Buttons Used for Configuring Basic Configuration Parameters

Thermostat Buttons	Action
	Press to increase/decrease the value of the basic configuration parameter being displayed on the thermostat.
	Press to save the value and go to the next applicable basic configuration parameter.
	Press and hold to exit the 'End' screen
	Press to go back to the previous parameter.

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Step 4: Set the SMC55-HWQS Basic Parameters for System Compatibility *(continued)*

Verify the wiring connections between the thermostat, the SMC55-HWQS, and HVAC equipment as shown in **Figure 1** before starting to configure the SMC55-HWQS. **Table 3** below lists the details of all the basic configuration parameters - applicable systems, basic configuration parameter index, description, default value, and the range of values for each parameter. For the HVAC system to function properly these parameters must be configured correctly.

Table 3: Basic Configuration Parameters

Applicable Systems	Basic Configuration Parameter	Name	Description	Default Value	Range
All	01b	System Type	00: Conventional system 01: Heat pump 02: 2-Pipe FCU 03: 4-Pipe FCU 04: Underfloor radiant heat 05: Underfloor electric heat	00: Conventional system	00–05
Heat Pump and Conventional	02b	Heat Stages	00: None (No Heat Stage) 01: 1 Stage (W₁) 02: 2 Stage: 1 Compressor and 1 Auxiliary 03: 2 Stage: 2 Compressor, No Auxiliary 04: 3 Stage: 2 Compressor and 1 Auxiliary	01: 1 Stage (W ₁)	00–04
	03b	Run Auxiliary Heat (Aux/W ₂) with other heat stages	00: No 01: Yes Skipped if no Aux/W ₂	01: Yes	00–01
	04b	Auxiliary Heat (Aux/W ₂) upstage delay	00: 0 minutes 01: 1 minute 02: 2 minutes 03: 5 minutes 04: 10 minutes 05: 20 minutes 06: 30 minutes 07: 1 hour 08: 2 hours 09: 4 hours 10: 8 hours 11-24: 11-24 hours Skipped if no Aux/W ₂	05: 20 minutes	00–24
	05b	Cool Stages	00: None (no cool stage) 01: 1 Cool stage (Y1) 02: 2 Cool stages (Y1, Y2)	01: 1 Cool stage (Y1)	00–02
Conventional	06b	Heat Fan Control	00: Equipment controls fan 01: Thermostat controls fan	01: Thermostat controls fan	00–01
Heat Pump	07b	Changeover/ Reversing Valve (O/B)	00: On for cooling (O) 01: On for heating (B)	00: On for cooling (O)	
Fan Coil Units and Radiant Floor	08b	Valve/Element Type	00: Relay 01: 0–10 V== 02: Floating point (Fan coil units only)	00: Relay	00–01
Fan Coil Units	09b	Fan Type	00: Relay (G1, G2, G3) 01: 0–10 V==	00: Relay (G1, G2, G3)	00–01
	10b	2-pipe Mode	01: Heat only 02: Cool only 03: Changeover	03: Changeover	01–03
Radiant Floor	11b	Floor Control Type	01: Indoor air only 02: Indoor air and floor limiting 03: Floor temperature only	01: Indoor air only	01–03

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Step 4: Set the SMC55-HWQS Basic Parameters for System Compatibility *(continued)*

The different basic configuration parameters and the values available for each of these parameters are listed below:

(01b): System Type

Use this parameter to select the HVAC system type. Refer to the HVAC equipment manual or label to identify the type of HVAC equipment. The different options available for this parameter are listed in the table below:

Table 4: Values for Different Types of HVAC Equipment

Available Options	Default Value
00: Conventional 01: Heat pump 02: 2-pipe FCU 03: 4-pipe FCU 04: Hydronic underfloor heating 05: Electric underfloor heating	00: Conventional

(02b): Heat Stages

Applicable systems: Conventional and Heat Pump.

Use this parameter to set the number of supported heat stages. This parameter will be skipped if you select an option anything other than '00: Conventional' or '01: Heat Pump' for the previous parameter (01b). Refer to the HVAC equipment installation manual or label for the number of supported heat stages. The different options available for this parameter are listed in the table below:

Table 5: Values for Different Heat Stages Based on System Type

System type (01b)	Values for heat Stages (02b)	Default Value
00: Conventional	00: No heat stage 01: 1 heat stage (W_1) 02: 1 primary source and 1 auxiliary source (W_2)	01: 1 heat stage (W_1)
01: Heat pump	00: No heat stage 01: 1 stage (W_1) 02: 2 stage (1 compressor and 1 auxiliary) 03: 2 stage (2 compressors and no auxiliary) 04: 3 stage (2 compressors and 1 auxiliary)	02: 2 stage (1 compressor and 1 auxiliary)

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Step 4: Set the SMC55-HWQS Basic Parameters for System Compatibility *(continued)*

(03b): Run Auxiliary Heat (Aux/W₂) With Other Heat Stages¹

Applicable Systems: Conventional and Heat Pump only if auxiliary heat stage is supported by the system.

Use this parameter to select whether or not the auxiliary heating stage can be allowed to run along with the other heat stages. This parameter will be skipped if you select an option anything other than '02: 2 stages' (1 Compressor and 1 Auxiliary/1 Primary source and 1 Auxiliary source [W₂]) or '04: 3 stage' (2 Compressor and 1 Auxiliary) for the previous parameter (02b).

Note for Heat Pump: If auxiliary heat stage runs on gas/oil then it is recommended to choose a value 00: Do not run auxiliary with other heat stages. Refer to the HVAC equipment manual to determine which value to select.

The different options available for this parameter are listed in the table below:

Table 6: Values for Running Auxiliary Heat With Other Heat Stages

Run Aux/W ₂ With Other Heat Stages (03b)	Default Value of 03b
00: do not run auxiliary with other heat stages 01: Run auxiliary with other heat stages	01: Run auxiliary with other heat stages

(04b): Auxiliary Heat (Aux/W₂) Upstage Delay¹

Applicable systems: Conventional and Heat Pump only if an auxiliary heat stage is supported.

Use this parameter to select the delay between starting the first heat stage and starting the auxiliary heating stage. This parameter will be skipped if you select a system without auxiliary heat

The different options available for this parameter are listed in the table below:

Table 7: Values for Upstage Auxiliary Delay

Auxiliary Heat (Aux/W ₂) Upstage Delay (04b)	Default Value of 04b
00: 0 minutes 01: 1 minute 02: 2 minutes 03: 5 minutes 04: 10 minutes 05: 20 minutes 06: 30 minutes 07: 1 hour 08: 2 hours 09: 4 hours 10: 8 hours 11-24: 11-24 hours	05: 20 minutes

¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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Step 4: Set the SMC55-HWQS Basic Parameters for System Compatibility *(continued)*

(05b): Cool Stages

Applicable Systems: Conventional and Heat Pump.

Use this parameter to select the number of cool stages. This parameter will be skipped in the menu if you select any option other than '00: Conventional' or '01: Heat Pump' for the previous parameter (01b). Refer to your HVAC equipment installation manual or label for the number of supported cool stages. The different options available for this parameter are listed in the table below:

Table 8: Values for Cooling Stages

Values for Cooling Stages in 05b	Default Value
00: None 01: 1 stage 02: 2 stage	01: 1 stage

Refer to **Table 21** in **Appendix A** for the details about the different relays that get energized in the different cool stages for Heat Pump and Conventional systems.

(06b): Heat Fan Control

Applicable System: Conventional systems with at least one heat stage.

Use this parameter to specify if the SMC55-HWQS should turn on the fan when turning on the heat. For some HVAC system types, a control signal for the fan is not needed from the SMC55-HWQS because the equipment automatically turns the fan on when there is a call for heat. In such cases ensure that AUTO is enabled in the available Fan Modes in the HomeWorks QS designer software.

This parameter will be skipped and will default to have the fan turn on with the heating if you select a system type that is not conventional or has no heating stages. Refer to your HVAC equipment manual and HVAC equipment label to identify the type of conventional system. The different options available for this parameter are listed in the table below:

Table 9: Values for Heat Fan Type

Values for 07b	Default Value
00: Equipment controls the fan relay 01: Thermostat controls the fan relay	01: Thermostat controls the fan relay

(07b): Changeover/Reversing Valve (O/B) Type¹

Applicable System: Heat Pump.

Use this parameter to select the type of reversing valve: energize for heating or energize for cooling. This parameter will be skipped in the menu if you select any option other than '01: Heat Pump' for the previous parameter (01b). Refer to your HVAC equipment manual to identify the type of reversing valve (O/B). The different options available for this parameter are listed in the table below:

Table 10: Values for Different Types of Reversing Valves

Changeover/Reversing Valve (O/B) Type (07b)	Default Value
00: Energize for cooling (O) 01: Energize for heating (B)	00: Energize for cooling (O)

¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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Step 4: Set the SMC55-HWQS Basic Parameters for System Compatibility *(continued)*

(08b): Valve/Element Type

Applicable Systems: Fan Coil Units and Radiant Underfloor heating.

Use this parameter to select the type of valve control for heating and cooling. The heating and cooling valves can either have a relay control (two position On/Off) or a proportional control (0–10 V₌₌). This parameter will be skipped in the menu if you select any option other than ‘02: 2-pipe FCU’, ‘03: 4-pipe FCU’ or ‘04: Radiant Underfloor Heating’ for the previous parameter (01b). Refer to your HVAC equipment manual to identify the type of valve control supported by your HVAC equipment. The different options available for this parameter are listed in the table below:

Table 11: Values for Type of Valve Control

Valve/Element Type (08b)	Default Value
00: Relay 01: 0–10 V ₌₌ 02: Floating point (FCUs only) ¹	00: Relay

(09b): Fan Type

Applicable System: Fan Coil Units.

Use this parameter to select the type of control for fan. The fan can have either a relay control (3-speed fan control) or a proportional control (0–10 V₌₌).

Note: Some of the Fan Coil Units can have a two-pole contact closure with a 2-speed fan (medium and high) or a single speed fan (low). Refer to the wiring diagram in thermostat installation guide to install the SMC55-HWQS with Fan Coil Units with a 2-speed or single-speed fan.

This parameter will be skipped in the menu if you select any option other than ‘02: 2-pipe FCU’ or ‘03: 4-pipe FCU’ for the previous parameter (01b). Refer to HVAC equipment manual to identify the type of fan control supported by your HVAC equipment. The different options available for this parameter are listed in the table below:

Table 12: Values for Type of Fan Control

Fan Type (09b)	Default Value
00: Relay 3-speed fan 01: 0–10 V ₌₌ continuous speed	00: Relay 3-speed fan

¹ For floating point control, see Application Note #630. Basic Configuration set for the valve type is overridden when selecting Floating Point.

Step 4: Set the SMC55-HWQS Basic Parameters for System Compatibility *(continued)*

(10b): 2-Pipe Mode

Applicable System: 2-pipe Fan Coil Units.

Use this parameter to select the type of 2-pipe mode. Heat only mode is used only for heating, Cool only mode is used only for cooling. Changeover mode is used to either heat or cool depending on the temperature of the water in the pipes. In the changeover mode, a changeover sensor must be connected to the SMC55-HWQS. Refer to the Thermostat installation guide to install the changeover sensor.

When the water temperature is above the value selected for the advanced parameter 'ChangeOverToHeatTemperature', the SMC55-HWQS switches to the heating mode. It stays in the heating mode until the water temperature falls below the value selected for the advanced parameter 'ChangeOverToCoolTemperature'. When the water temperature is below the value selected for the advanced parameter 'ChangeOverToCoolTemperature', the SMC55-HWQS changes over to cooling mode. It stays in the cooling mode until the water temperature rises above the value selected for the advanced parameter 'ChangeOverToHeatTemperature'.

If the water temperature is between the two changeover points immediately after power up, the operating mode starts in the previous mode as per the value in the advanced parameter '2PipePreviousOperatingMode'. The water temperature is measured at 30 second intervals and the operating mode is updated accordingly.

This parameter will be skipped in the menu if you select any option other than 02: 2-Pipe for the previous parameter (01b). Refer to HVAC equipment manual to identify the type of 2-pipe FCU. The different options available for this parameter are listed in the table below:

Table 13: Values for 2-pipe Mode

2-Pipe Mode (10b)	Default Value
01: Heat only 02: Cool only 03: Changeover	03: Changeover

Continued on next page...

Step 4: Set the SMC55-HWQS Basic Parameters for System Compatibility *(continued)*

(11b): Underfloor Heating Control¹

Applicable Systems: Radiant Underfloor heating.

Use this parameter to select the type of control for radiant underfloor heating systems. Radiant underfloor heating systems can be controlled in three ways:

- 1. Based on indoor air temperature – This type of control is used to control the temperature depending on the room air temperature.
- 2. Based on floor temperature sensor – This type of control is used to control the temperature depending on the temperature measured by the floor temperature sensor.
- 3. Based on indoor air and floor limiting – This control type is similar to option ‘01: Indoor air temperature’. The air temperature is controlled with the added feature to always maintain the temperature of the floor between the Slab Minimum and Slab Maximum temperatures. This parameter will be skipped if you select any option other than ‘04: Radiant Underfloor Heating’ for the previous parameter (01b). The different options available for this parameter are listed in the table below:

Table 14: Values for Underfloor Control

Underfloor Heating Control (11b)	Default Value
01: Indoor air temperature 02: Indoor air and floor limiting 03: Floor temperature sensor only	01: Indoor air temperature

Note: Refer to the installation manual of the underfloor heating equipment to install the floor sensor if the control type selected is ‘02: Indoor Air and Floor Limiting’ or ‘03: Floor Temperature Sensor’ only.

¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

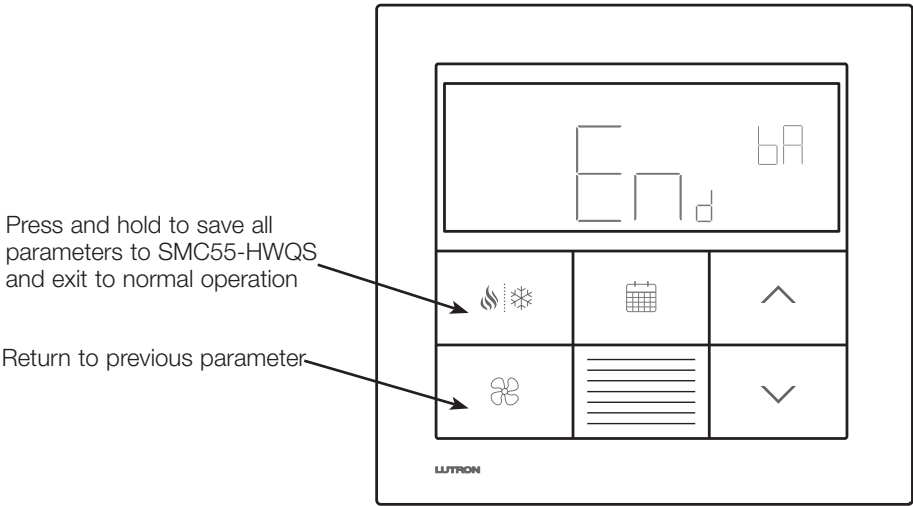
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Step 4: Set the SMC55-HWQS Basic Parameters for System Compatibility *(continued)*

Saving and Exiting Basic Configuration

Once the values for all the applicable basic configuration parameters are entered, the following will be displayed on the thermostat.

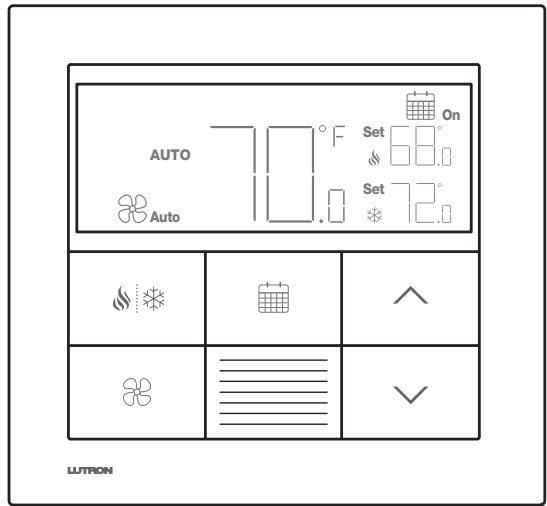
Figure 5: End Screen for Basic Configuration Parameters



The display in **Figure 5** indicates that all the parameters specific to the HVAC system type are selected. At this stage, it is recommended to verify the values selected for each parameter. To verify the values selected for each parameter press the fan icon button. Keep pressing the fan icon button until the values of all the parameters is verified. Once all the values are verified, press the heat/cold icon button till you enter the ‘End’ screen.




When in the ‘End’ screen, press and hold the heat/cold icon button until the button backlights flash and the display shows the current room temperature (3 seconds) or the HVAC controller selection mode for the second zone (depending on the equipment configuration). This is the normal operating mode and the thermostat and the SMC55-HWQS will start controlling the HVAC equipment. Refer to **Figure 6** for an example of the display in normal operating mode.

Figure 6: Normal Operating Mode of the Thermostat



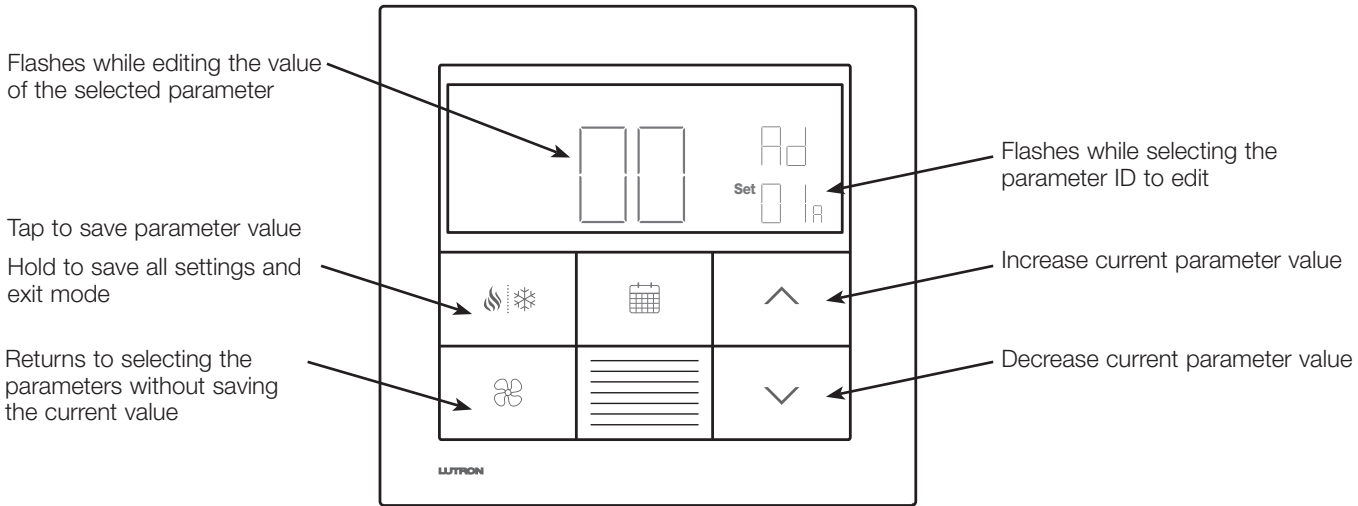
Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System

Use the Advanced Configuration Mode if any advanced configuration parameters must change from their default value. To change/modify the advanced parameters, follow the steps below.

- 1. Press and hold  and  for 3 seconds until the buttons backlight and the display flashes.
- 2. Release the buttons and immediately (with in 15 seconds) press and hold  for 3 seconds until the button backlights stop flashing. Advanced configuration parameter '01A' will be shown.





The display on the thermostat will be as shown in **Figure 7**.

Figure 7: Advanced Configuration Mode



In **Figure 7**, 01A represents the advanced configuration parameter for SMC55-HWQS. '00' represents the value of this parameter and 'Ad' indicates that this is an advanced configuration parameter. The following table describes the buttons that are used to select a value for the advanced configuration parameter to configure the SMC55-HWQS.

Table 15: Buttons Used to Select Advanced Configuration Parameters

Thermostat Buttons	Action
	Press to select the advanced parameter or the value of the advanced configuration parameter. Either the advanced parameter or value of the advanced parameter will flash on pressing the  button.
	Press and hold to exit the Advanced Configuration Mode.
	Press to increase/decrease the advanced parameter or value of the advanced parameter, whichever is flashing in the menu.
	Press to go back to previous parameter.

Continued on next page...

Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System *(continued)*

Table 16 lists out the details of all the advanced configuration parameters. Some of the advanced parameters are applicable to all types of HVAC equipment while some are applicable to a specific type of HVAC equipment. The table below also categorizes these parameters based on the type of applicable systems.

Table 16: Advanced Configuration Parameters for the SMC55-HWQS

Applicable Systems	Advanced Configuration Parameter	Name	Description	Default Value	Range
All	01A	Function Type	0: Operate with thermostat 1: Standalone 2: Not Configured	2: Not Configured (sets itself to 0 automatically when connected to a thermostat and basic configuration is entered)	0 – 2
	02A	Temperature Sensor Type	0: Flush mounted sensor connected to HVAC controller 1: Thermostat sensor	1: Thermostat sensor	0 – 1
	03A	Deadband	Inactive range above and below the Setpoint	1 °F	0.1 °F – 10 °F
All (except for radiant underfloor heat)	06A	Minimum Fan On Time	Minimum time fan is on in auto mode (minutes)	2 minutes	0 – 99
	07A	Overrun Cool Fan Time	Minutes the fan runs after cooling relay opens	0 minutes	0 – 99.9 (minutes)
	08A	Overrun Heat Fan Time	Minutes the fan runs after heating relay opens	0.1 minutes	0 – 99.9 (minutes)
	11A	Cool Fan on Delay	Time to delay start of fan after cooling starts. Only used with Fan Auto Speed when fan was last off.	0 seconds	0 – 99
	12A	Heat Fan on Delay	Time to delay start of fan after heating starts. Only used with Fan Auto Speed when fan was last off.	0 seconds	0 – 99
All	18A	Standalone Temperature Operation Mode	0: Off 1: Heat Only 2: Cool Only 3: Auto	3: Auto	0 – 3
	19A	Standalone Fan Mode (not applicable to radiant floors)	0: Off 1: Low 2: Medium 3: High 4: Auto 5: Single Speed On	4: Auto	0 – 5
	20A	Remote Sensor Temperature Offset	Temperature offset for remote temperature sensor. This allows for compensation based on the installation location of the probe.	0° F	-5.0 – +5.0
	26A	Cannot Reach Setpoint Timeout	Cannot reach setpoint alarm time threshold (minutes)	30 minutes	0.5 – 99.5
	27A	Cannot Reach Setpoint Action	0: Alarm and keep trying 1: Alarm and enter failsafe	0: Alarm and keep trying	0 – 1
FCUs with multi-speed fan	05A	Fan High Differential	Auto fan mode temperature difference in degrees to switch from medium to high fan speed	1.5 °F	0.1 – 10.0
	09A	Kick-Start Fan (multi-speed fan only)	0: Off 1: Set fan high for 1 second when turning on	0: Off	0 – 1

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Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System *(continued)*

Table 16: Advanced Configuration Parameters for the SMC55-HWQS *(continued)*

Applicable Systems	Advanced Configuration Parameter	Name	Description	Default Value	Range
2-pipe FCU	40A	Pipe Temperature for Changeover to Heat Mode	Pipe temperature that designates heating mode when using a 2-pipe system with a changeover sensor on the pipe.	82 °F	75 – 99
	41A	Pipe Temperature for Changeover to Cool Mode	Pipe temperature that designates heating mode when using a 2-pipe system with a changeover sensor on the pipe.	60 °F	32 – 70
	42A	Enable Purge Function	Turns the valve on if left dormant to refresh pipe temperature; 0: Disabled; 1: Enabled	1: Enabled	0 – 1
	43A	Purge Valve On-Time	Number of minutes to leave the valve on during a purge. 0: Disabled	2 minutes	0 – 60
	44A	Purge Valve Off-Time	Hours to leave the valve off between purges 0: Disabled	2 hours	0.5 – 99.5 (hours)
0–10 V _{DC} FCU	50A	Proportional Fan Minimum	The lowest percent output to apply for fan speed. This determines the low end-point of the fan being on. If at any time the fan output is 0% (Off), the valves will also close at 0%.	10%	0 – 100
	51A	Proportional Fan Low Speed	The % output to apply when the manual fan-speed is set to Medium.	20%	0 – 100
	52A	Proportional Fan Medium Speed	The % output to apply when the manual fan-speed is set to Medium.	60%	0 – 100
	53A	Proportional Fan High Speed	The % output to apply when the manual fan-speed is set to High.	100%	0 – 100
	54A	Minimum Valve Percent Open	The lowest % output to apply for valve opening. This determines the low end-point of the straight-line curve for valve opening.	10%	0 – 100
	55A	Valve Fully Open Differential	The temperature offset from deadband at which the valve is fully open (100% opening).	1 °F	.1 – 10.0
	56A	Non-proportional Analog output	Enable 0–10 V _{DC} outputs for non-proportional fan and valves.	True (1)	0: disabled 1: enabled
Floating Point Valves	60A	Enable Floating Point	0: Disabled, 1: Enabled (overrides basic valve configuration)	0: Disabled	0 – 1
	61A	Actuator Running Time	Actuator Running Time for Floating Point control.	150 seconds	1 – 999
Heat Pump ¹ and Conventional	70A	Minimum Compressor Run Time (MCRT)	Minimum run time for compressor.	0 minutes	0 – 99 minutes
	71A	Minimum Compressor Off Time (MCOT)	Minimum off time for compressor.	5 minutes	0 – 99 minutes
	72A	Heat stage 1 delay (WOD)	Minimum off time for W1 (conventional heat stage 1)	3 minutes	0 – 99 minutes
	74A	Heat Stage 1 (Y ₁ /W ₁) On	°F below setpoint to turn stage on.	1 °F	1 °F – 10 °F
	75A	Heat Stage 1 (Y ₁ /W ₁) Off	°F above setpoint to turn stage off.	1 °F	1 °F – 10 °F
Heat Pump ¹	76A	Heat Compressor Stage 2 (Y ₂) On	°F below setpoint to turn stage on.	2 °F	1 °F – 10 °F
	77A	Heat Compressor Stage 2 (Y ₂) Off	°F above setpoint to turn stage off.	0 °F	1 °F – 10 °F

¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladium Thermostat version 1.10 or newer.

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Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System *(continued)*

Table 16: Advanced Configuration Parameters for the SMC55-HWQS *(continued)*

Applicable Systems	Advanced Configuration Parameter	Name	Description	Default Value	Range
Heat Pump ¹ and Conventional	78A	Aux/W ₂ On	°F below setpoint to turn stage on. If auxiliary is stage 2, this differential is used to turn on.	3 °F	1 °F – 10 °F
	79A	Aux/W ₂ Off	°F above setpoint to turn stage off. If auxiliary is stage 2, this differential is used to turn off.	0 °F	1 °F – 10 °F
	80A	Cool Stage 1 On	°F above setpoint to turn stage on.	1 °F	1 °F – 10 °F
	81A	Cool Stage 1 Off	°F below setpoint to turn stage off.	1 °F	1 °F – 10 °F
	82A	Cool Stage 2 On	°F above setpoint to turn stage on.	2 °F	1 °F – 10 °F
	83A	Cool Stage 2 Off	°F below setpoint to turn stage off.	0 °F	1 °F – 10 °F
	84A	Compressor Cool Stage 2 Upstage Delay	Stage 2 cooling will not turn on until the first stage has run for the chosen duration. 0: 0 minutes, 1: 1 minute, 2: 2 minutes, 3: 5 minutes, 4: 10 minutes, 5: 20 minutes, 6: 30 minutes, 7: 1 hour, 8: 2 hours, 9: 4 hours, 10: 8 hours, 11–99: 11–99 hours	0 minutes	0 – 99 minutes
	85A	Compressor Heat Stage 2 Upstage Delay	Stage 2 compressor heating will not turn on until the first stage has run for the chosen duration. 0: 0 minutes, 1: 1 minute, 2: 2 minutes, 3: 5 minutes, 4: 10 minutes, 5: 20 minutes, 6: 30 minutes, 7: 1 hour, 8: 2 hours, 9: 4 hours, 10: 8 hours, 11–99: 11–99 hours	0 minutes, however thermostat will default based on stages	0 – 99 minutes
Heat Pump ¹	88A	Reversing Valve Delay (RVD)	Delay to wait for reversing valve to change over. When changing between heat and cool, the thermostat will turn off the compressor, then wait for MCOT. The thermostat will then change the state of the O/B signal, and wait for the reversing valve delay (RVD) before turning the compressor and fan back on.	1 second	0 – 99 seconds
Radiant Floor ¹	90A	Slab Maximum	If slab temperature rises above this maximum, must turn off regardless of air temperature.	85 °F	0 – 120 °F
	91A	Slab Minimum	If slab temperature falls below this minimum, must turn on regardless of air temperature.	60 °F	0 – 120 °F
	92A	Floor 100% Differential Temperature	°F below the setpoint to turn on system to 100%.	2.0 °F	0 – 20 °F
	93A	Floor 0% Differential Temperature	°F above the setpoint to turn on system to 0%.	2.0 °F	0 – 20 °F
	94A	Cycles Per Hour	Cycles per hour (CPH).	3 (20 minute signal period)	1-20 CPH

¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System *(continued)*

Parameters Applicable to All Types of HVAC Equipment

Some of the advanced configuration parameters are applicable to all types of HVAC equipment. This sections lists out the details about these parameters.

(01A) Function Type

Use this parameter to define if the SMC55-HWQS is configured to work with the thermostat or configured to work as a standalone device without the thermostat. The SMC55-HWQS can work as a standalone HVAC controller if a remote air sensor is connected to the SMC55-HWQS. The default value for this parameter is set as '02: Not Configured'. Saving and exiting the basic configurations mode will automatically set this parameter to '00: Operate with Thermostat' by default.

This parameter can be set to '01' to still function without the thermostat connected. Once the thermostat is connected, you must change the value of this parameter back to '00' so that the SMC55-HWQS should work with the thermostat.

Note: Standalone mode ('01') requires connecting a wired remote air temperature sensor to the SMC55-HWQS. See the SMC55-HWQS instruction sheet included in the box with the remote air temperature sensor. Set the parameter '02A' to '00: Remote Temperature Sensor' so that SMC55-HWQS can work with the remote sensor.

(02A) Temperature Sensor Type

Use this parameter to identify the temperature sensor used to measure the room temperature. Set this parameter to '01' if using the sensor inside the thermostat to measure the room temperature. Set this parameter to '00' if using the remote temperature sensor to measure the room temperature.

(06A) Minimum Fan On Time

Use this parameter to identify the minimum time the fan will run once it has turned on irrespective of whether or not the system is running. This minimum run time is used to avoid short cycling the fan motor.

(07A) Extended Cool Fan Time (OCFT)

Use this parameter to identify the extended amount of time which the fan runs after the system stops cooling. This is used to purge the cool air out of the vents.

(08A) Extended Heat Fan Time (OHFT)

Use this parameter to identify the extended amount of time which the fan runs after the system stops heating. This is used to purge the hot air out of the vents.

(11A) Cool Fan On Delay (CFOD)

Use this parameter to identify the time delay before the fan turns on after the system starts cooling. This is used so that uncomfortably hot air is not blown out of the vents.

(12A) Heat Fan On Delay (HFOD)

Use this parameter to identify the time delay before the fan turns on after the system starts heating. This is used so that uncomfortably cold air is not blown out of the vents.

(18A) Standalone Temperature Operation Mode

Use this parameter to identify the operating mode when the SMC55-RESI is set up to work in a standalone mode without the thermostat.

(19A) Standalone Temperature Fan Mode

Use this parameter to identify the fan mode when the SMC55-RESI is set up to work in a standalone mode without the thermostat.

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Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System *(continued)*

Parameters Applicable to All Types of HVAC Equipment *(continued)*

(26A) Cannot Reach Setpoint Timeout

Use this parameter to identify the maximum time it should take to reach the desired setpoint. If the desired setpoint is not reached within this time then an alarm is triggered to notify the user.

(27A) Cannot Reach Setpoint Action

Use this parameter to identify whether or not the system should continue heating or cooling after the alarm for 'Cannot Reach Setpoint' is triggered.

Set this parameter to '00' if the system should continue heating/cooling. Set this parameter to '01' if the system should stop heating or cooling when 'Cannot Reach Setpoint' alarm is triggered.

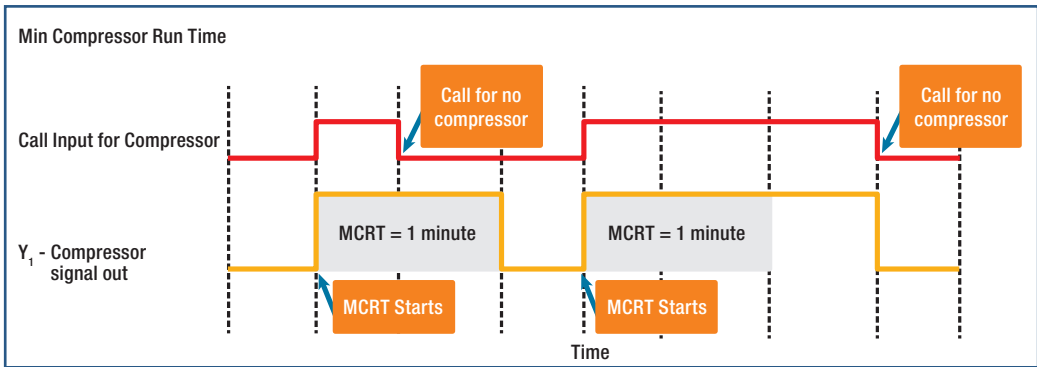
Parameters Applicable to Conventional and Heat Pump Systems

This section lists out the details of the advanced configuration parameters applicable to Conventional and Heat Pump systems.

(70A) Minimum Compressor Run Time (MCRT)

Use this parameter to identify the minimum time the compressor must run to ensure proper lubrication. Refer to **Figure 8** below. Even though the desired temperature setpoint is met the compressor will run for an additional amount of time till the minimum compressor run time expires.

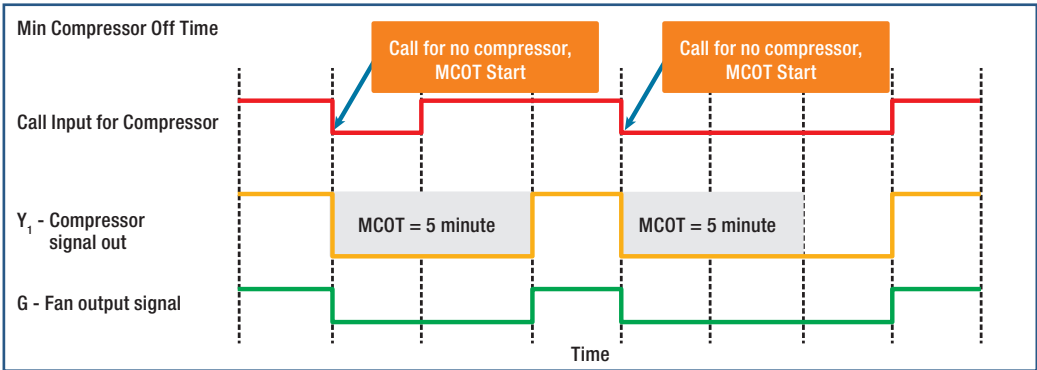
Figure 8: Compressor Runs Until Minimum Compressor Time Expires



(71A) Minimum Compressor Off Time (MCOT)

Use this parameter to identify the minimum time for which the compressor must remain Off before it can start. This delay is intended to reduce compressor restart stress. Fan will stay off in Auto mode during this delay. Refer to the **Figure 9** below, the compressor will start only after MCOT has expired.

Figure 9: Minimum Time for Which The Compressor Must Remain Off Before It Can Start



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Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System *(continued)*

Parameters Applicable to Conventional and Heat Pump Systems *(continued)*

(74A) Heat Stage 1–On Delta¹

Use this parameter to identify the temperature below the heat setpoint when Heat Stage 1 should turn on. Refer to the control diagrams in **Appendix A**. These diagrams graphically represent the Heat Stage 1-On Delta for Conventional and Heat Pump systems.

(75A) Heat Stage 1–Off Delta¹

Use this parameter to identify the temperature above the heat setpoint when Heat Stage 1 should turn off. Refer to the control diagrams in **Appendix A**. These diagrams graphically represent the Heat Stage 1-Off Delta for Conventional and Heat Pump systems.

(76A) Heat Stage 2 (Y₂/W₂/Aux)–On Delta¹

Use this parameter to identify the temperature below the heat setpoint when Heat Stage 2 should turn on. Refer to the control diagrams in **Appendix A**. These diagrams graphically represent the Heat Stage 2-On Delta for Conventional and Heat Pump systems.

(77A) Heat Stage 2–Off Delta¹

Use this parameter to identify the temperature above the heat setpoint when Heat Stage 2 should turn off. Refer to the control diagrams in **Appendix A**. These diagrams graphically represent the Heat Stage 2-Off Delta for Conventional and Heat Pump systems.

(78A) Heat Stage 3 (Aux)–On Delta¹

Use this parameter to identify the temperature below the heat setpoint when Heat Stage 3 (Aux) should turn on. Refer to the control diagrams in **Appendix A**. These diagrams graphically represent the Heat Stage 3-On Delta for Conventional and Heat Pump systems.

(79A) Heat Stage 3 (Aux)–Off Delta¹

Use this parameter to identify the temperature above the heat setpoint when Heat Stage 3 (Aux) should turn off. Refer to the control diagrams in **Appendix A**. These diagrams graphically represent the Heat Stage 3-Off Delta for Conventional and Heat Pump systems.

(80A) Cool Stage 1–On Delta¹

Use this parameter to identify the temperature above the cool setpoint when Cool Stage 1 should turn on. Refer to the control diagrams in **Appendix A**. These diagrams graphically represent the Cool Stage 1-On Delta for Conventional and Heat Pump systems.

(81A) Cool Stage 1–Off Delta¹

Use this parameter to identify the temperature below the cool setpoint when Cool Stage 1 should turn off. Refer to the control diagrams in **Appendix A**. These diagrams graphically represent the Cool Stage 1-Off Delta for Conventional and Heat Pump systems.

(82A) Cool Stage 2–On Delta¹

Use this parameter to identify the temperature above the cool setpoint when Cool Stage 2 should turn on. Refer to the control diagrams in **Appendix A**. These diagrams graphically represent the Cool Stage 2-On Delta for Conventional and Heat Pump systems.

¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System *(continued)*

Parameters Applicable to Conventional and Heat Pump Systems *(continued)*

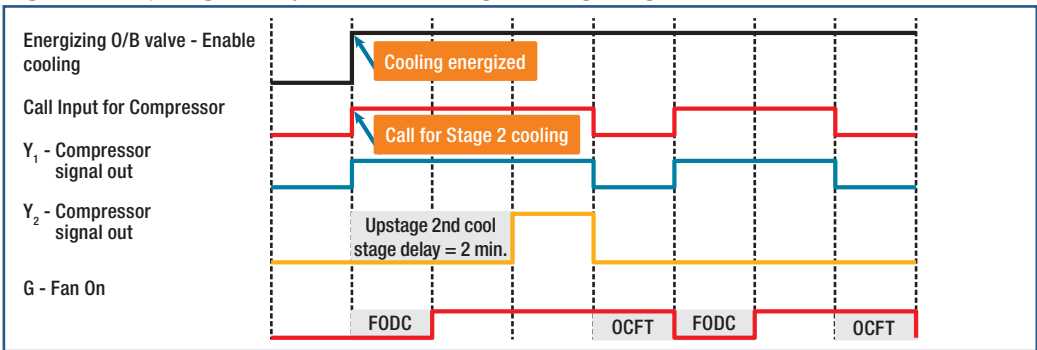
(83A) Cool Stage 2–Off Delta¹

Use this parameter to identify the temperature below the cool setpoint when Cool Stage 2 should turn off. Refer to the control diagrams in **Appendix A**. These diagrams graphically represent the Cool Stage 2-Off Delta for Conventional and Heat Pump systems.

(84A) Compressor Cool Stage 2 Upstage Delay (CC2SUD)¹

Use this parameter to identify the time delay after the first stage of cooling has started before the Stage 2 for cooling starts. Refer to **Figure 10** below for the upstage delay before the Stage 2 of cooling is turned on.

Figure 10: Upstage Delay Before Starting Cooling Stage 2



(85A) Compressor Heat Stage 2 Upstage Delay (CH2SUD)¹

Use this parameter to identify the time delay after the first stage of heating has started before the Stage 2 of heating starts.

(88A) Reversing Valve Delay (RVD)¹

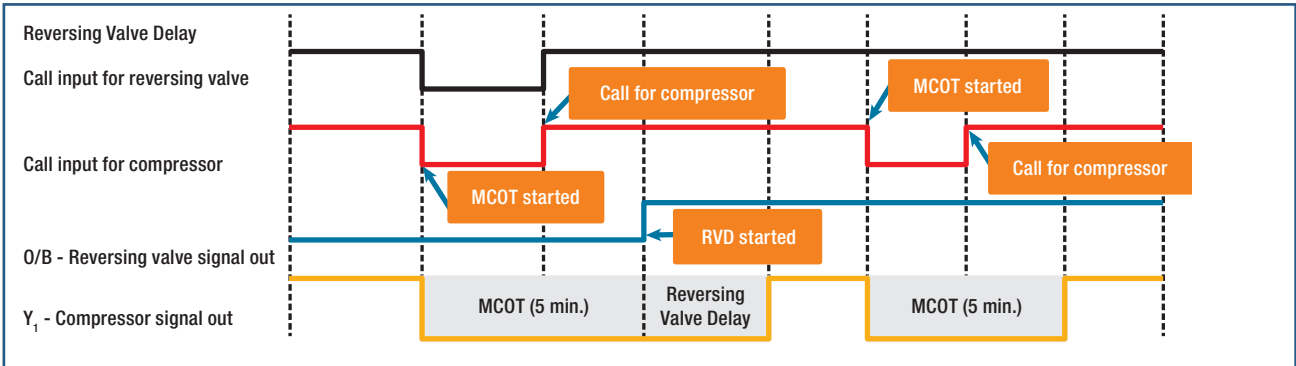
Applicable System: Heat pump only.

Use this parameter to identify the time delay required for energizing the reversing valve. RVD is used to ensure that the reversing valve is fully energized before turning on the compressor. This delay is used in the following scenarios:

- a. Turning on the SMC55-HWQS.
- b. Transitioning from heating to cooling and from cooling to heating (after MCOT expires).
- c. Transitioning from operating mode 'Off' to operating mode 'Heating', 'Cooling', or 'Auto' (after MCOT expires).

Refer to **Figure 11** below, the system will start after both MCOT and RVD have expired.

Figure 11: The Heat Pump Starts Heating/Cooling Only After Reversing Valve Delay Expires



¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer. Continued on next page...

Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System *(continued)*

Parameters Applicable for Radiant Underfloor Heating System¹

Radiant Underfloor Heating Control Summary

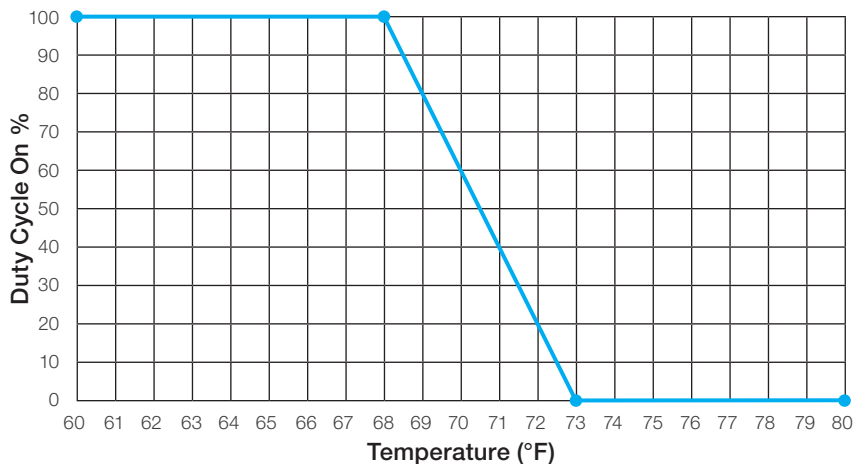
Pulse Width Modulation (PWM) Temperature Control (for relay signals only)

Both indoor air temperature control and floor temperature control uses a PWM control algorithm when using relays. PWM works by turning the heat on during a calculated percentage of the cycles per hour (parameter 94A).

For example, if the controller is configured to have 3 cycles per hour, there will be three 20-minute time periods in an hour. Every time period will have the heat on for a calculated percentage of the period, known as a “duty cycle”. The duty cycle is calculated mostly by the temperature difference from the setpoint.

- The duty cycle equals 100% of the time period when the temperature is at or below the setpoint minus the floor 100% differential (parameter 92A).
Example: If the setpoint equals 70 °F, the duty cycle is 100% when the temperature is at or below 68°F (70 °F – 2 °F).
- The duty cycle equals 0% of the time period when the temperature is at or above the setpoint plus the floor 0% differential (parameter 93A).
Example: If the setpoint equals 70 °F, the duty cycle is 0% (off) when the temperature is at or above 72 °F (70 °F + 2 °F).

Figure 12: Simplified Graph of the Duty Cycle Calculation



Short Cycle Prevention: To prevent the controller from cycling too quickly, duty cycle rounding is used if the cycle is almost fully on or off. If the duty cycle value is 95% or higher, the duty cycle is rounded to 100%. If the duty cycle value is below the minimum pulse width (Parameter 54A), the duty cycle is rounded to 0%.

0–10 V_{DC} Control (for 0–10 V_{DC} signal only)

If the valve control is set to 0–10 V_{DC}, the controller provides a continuous voltage output to the valve actuator. Similar to PWM with relay control, the duty cycle calculated determines the output, but now in a voltage instead of an on/off interval. For example, a duty cycle of 30% is similar to a 3.0 V output signal to the valve actuator.

Duty Cycle Sample Adaptation (for both relay and 0–10 V_{DC} signals)

The radiant floor control algorithm also uses a duty cycle sample adaptation. The purpose of the adaptation is to dynamically change the duty cycle according to the newly sampled temperature.

¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System *(continued)*

Parameters Applicable for Radiant Underfloor Heating System¹*(continued)*

Parameter details

(54A) Minimum Pulse Width

The lowest valve on-time allowed. This determines the low-end point of the straight-line curve for valve duty cycle.

(90A) Slab Maximum

This parameter indicates the maximum temperature in Fahrenheit of the radiant floor after which the underfloor heating system stops heating irrespective of the indoor air temperature.

(91A) Slab Minimum

This parameter indicates the minimum temperature in Fahrenheit of the radiant floor below which the underfloor heating system starts heating irrespective of the indoor air temperature.

(92A) Floor 100% Differential Temperature

Use this parameter to indicate the temperature in Fahrenheit below the heat setpoint when the underfloor heating system is at maximum capacity.

(93A) Floor 0% Differential Temperature

Use this parameter to indicate the temperature in Fahrenheit above the heat setpoint when the underfloor heating system is at minimum capacity.

(94A) Cycles Per Hour (CPH)

Use this parameter to indicate the total number of heating/cooling cycles per hour. For example, setting this parameter to 3 cycles per hour indicates a 20 minute cycle.

Parameters Applicable for 0–10 V== Fan Coil Units

This section lists out the details of the advanced configuration parameters applicable to 0–10 V== Fan Coil Units.

(50A) Proportional Fan Minimum

This parameter indicates the minimum percentage output for the fan to turn on. Below this value the fan will remain off.

(51A) Proportional Fan Low Speed

This parameter indicates the percentage output required to set the manual fan speed to 'Low'.

(52A) Proportional Fan Medium Speed

This parameter indicates the percentage output required to set the manual fan speed to 'Medium'.

(53A) Proportional Fan High Speed

This parameter indicates the percentage output required to set the manual fan speed to 'High'.

(54A) Minimum Valve Percent Open

This parameter indicates the minimum percentage of output required to open the valves.

(55A) Valve Fully Open Differential

This parameter indicates the temperature offset from the deadband in Fahrenheit at which the valves are completely open.

(56A) Non-proportional Analog Output

This parameter indicates whether or not the valves follow non-proportional 0–10 V== output. Set this parameter to '01' if enabling non-proportional analog output for valves. When enabled, only two analog output values are used, 0 V== and 10 V==.

¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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Step 5: Set the SMC55-HWQS Advanced Parameters to Modify the Functionality of the HVAC System *(continued)*

Parameters Applicable for 2-pipe Fan Coil Units

This section lists out the details of the advanced configuration parameters applicable to 2-Pipe Fan Coil Units.

(40A) Change Over to Heat for Pipe Temperature

Use this parameter to indicate the temperature at which the operating mode of a 2-pipe FCU changes to heating. This is applicable only if a value of '03: Changeover' is selected for a basic configuration parameter (10b) is used.

(41A) Change Over to Cool for Pipe Temperature

Use this parameter to indicate the temperature at which the operating mode of a 2-pipe FCU changes to cooling. This is applicable only if a value of '03: Changeover' is selected for a basic configuration parameter (10b).

(42A) Enable Purge Function

Use this parameter to indicate whether or not to turn the valves on to refresh the temperature of the pipes when left dormant. Set this parameter to '00' to disable. Set this parameter to '01' to enable the purge functionality.

(43A) Purge Valve On-Time

Use this parameter to indicate the number of minutes for which the valve should be left open during the purge. Set this to '00' if the purge functionality is disabled in (42A).

(44A) Purge Valve Off-Time

Use this parameter to indicate the number of minutes to leave the valve closed in between the purges. Set this to '00' if the purge functionality is disabled in (42A).

Parameters Applicable to a FCU with Multi-Speed Fan

This section lists out the details of the advanced configuration parameters applicable to a FCU with multi-speed fan.

(05A) Fan High Differential

Use this parameter to indicate the difference between the measured room temperature and the setpoint temperature when the fan speed switches from 'Medium' to 'High' in Auto mode.

(09A) Kick-Start Fan

Use this parameter to indicate whether or not the fan should turn on at 'High' speed when turning on for the first time. Set this parameter to '00' to disable. Set this parameter to '01' to enable the fan to turn on at high speed for 1 second.


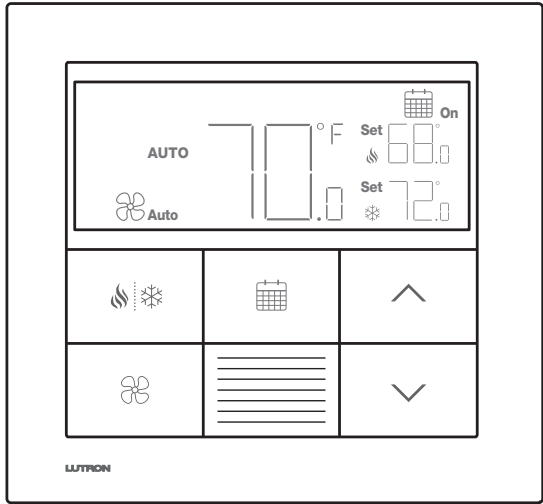








Once all the advanced parameters are configured, verify the values selected for each advanced parameter. To exit the Advanced Configuration Mode once all of the values are verified, hold the  button until the button backlights flash and the display shows the current room temperature (3 seconds). The thermostat will enter normal operating mode as shown in the example in **Figure 14**.

Figure 13: Normal Operating Mode of the Thermostat



Step 6: Verification

Follow the steps below to verify the system functionality.

1. Press the  button to enter Auto operating mode. Confirm that 'Auto' is displayed
2. Press the  button to cycle through the different supported fan modes and verify the fan is operational.
3. Verify heating:
 - a. Press the  button to increase the heat setpoint at least five degrees above the room temperature
 - b. If , 'Heat' and 'On' are flashing on the display, this indicates a recovery state, due to equipment protection delays. Heating will start once these delays expire. See the [Advanced Configuration](#) section for more details.
 - c. If the  animates and the words 'Heat' and 'On' are displayed, this indicates that the system has started heating.
4. Verify Cooling:
 - a. Press the  button to set the cool setpoint at least 5 °F below the room temperature.
 - b. If , 'Cool' and 'On' are flashing on the display, this indicates a recovery state, due to equipment protection delays. Cooling will start once these delays expire. See the [Advanced Configuration](#) section for more details.
 - c. If the  animates and words 'Cool' and 'On' are displayed - This indicates that the system has started cooling.

Troubleshooting

Symptom	Possible Cause	Solution
Display is blank	The thermostat does not have power.	Check the wiring to confirm that Common (Black) and V+ (Red) are connected to a 24–36 V $\overline{=}$ power supply.
E0 shown on the master thermostat	The thermostat temperature sensor is not functioning properly.	Contact Customer Assistance.
E0 shown on the companion thermostat	A companion thermostat will show E0 if the temperature sensor for that zone is missing.	Check the error code on the master thermostat.
E1 shown on the master thermostat	Wiring issue between the thermostat and the HVAC controller or HVAC controller does not have power.	Ensure that the HVAC controller communication link is wired correctly and isolated from all other connections and that the HVAC controller has power.
	The incorrect HVAC controller or Modbus address was selected.	Enter HVAC controller selection mode and select the correct HVAC controller and Modbus address.
E1 shown on the companion thermostat	Wiring issue between the processor and HVAC controller (if HVAC controller is connected to the processor).	Check the wiring between the processor and HVAC controller.
	The master thermostat (connected to the HVAC controller) is disconnected from the processor.	Ensure that the QS link between the master thermostat and the processor is wired correctly.
E2 shown on the display	Remote temperature sensor is malfunctioning or misconfigured.	Check the wiring between the sensor and the HVAC controller and confirm configuration.
E3 shown on the display	Changeover sensor malfunctioning or misconfigured (applicable only for 2-pipe systems).	Check the wiring between the sensor and the HVAC controller and confirm configuration.
E4 shown on the display	QS link wiring error or the thermostat did not get a temperature reading from the system.	Contact Customer Assistance
E5 shown on the display	Incorrect HVAC controller or thermostat model.	Ensure that SMC55-RESI and HQWT-T-HW are being used.
E6 shown on the display	Slab temperature sensor for underfloor heating is missing, malfunctioning, or misconfigured.	Check the wiring between the slab sensor and the HVAC controller and confirm configuration.
System is not heating/cooling.	The HVAC controller or HVAC equipment may not have power.	Ensure that the HVAC controller and HVAC equipment have power and are correctly wired. Consult an HVAC professional if the issue persists.
System is not heating / cooling as expected	Mounting location of the thermostat is incorrect.	Refer to Mounting section of the thermostat installation guide.
	Wiring issue between the HVAC controller and the HVAC system.	Check the Wiring section in the thermostat installation guide.
	The HVAC system may not have power.	Ensure that the HVAC system has power.

Appendix A

1.Heat Stage Relays

This table indicates the relays that will be energized for each heat stage based on the system type.

Table 17:

System	Heat Stages	Auxiliary Heat	1st Heat Stage	2nd Heat Stage	3rd Heat Stage	Auxiliary Only
Heat Pump ¹	1	None	Y ₁ and G			
	2	None	Y ₁ and G	Y ₁ , Y ₂ , and G		
	2	Electric	Y ₁ and G	Y ₁ , W ₂ , and G		W ₂ and G
	2	Gas/Oil	Y ₁ and G	W ₂ and G		W ₂ and G
	3	Electric	Y ₁ and G	Y ₁ , Y ₂ , and G	Y ₁ , Y ₂ , W ₂ , and G	W ₂ and G
	3	Gas/Oil	Y ₁ and G	Y ₁ , Y ₂ , and G	W ₂ and G	W ₂ and G
Conventional, thermostat controlled heating fan	1	None	W ₁ and G			
	2	None	W ₁ and G	W ₁ , W ₂ , and G		
Conventional, equipment controlled heating fan	1	None	W ₁			
	2	None	W ₁	W ₁ and W ₂		

2.Cool Stage Relays

This table indicates the relays that will be energized for each cool stage based on the system type.

Table 18:

System	Heat Stages	Auxiliary Heat	1st Heat Stage
Heat Pump ¹	1	Y ₁ , G, and O	
	2	Y ₁ , G, and O	Y ₁ , Y ₂ , G, and O
Conventional	1	Y ₁ and G	
	2	Y ₁ and G	Y ₁ , Y ₂ , and G

¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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Appendix A (continued)

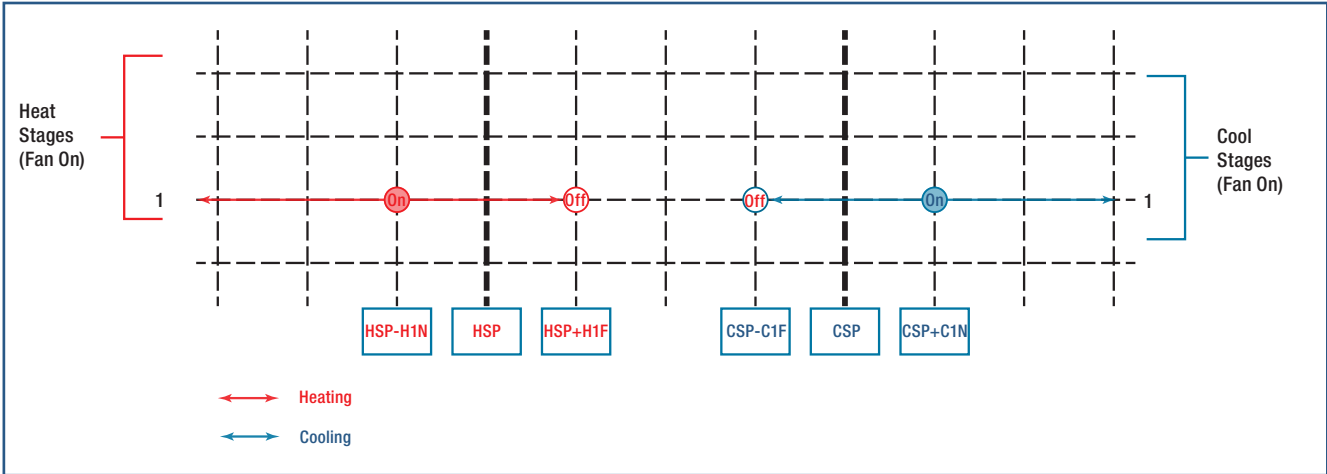
3.Control Diagrams For Turning On/Off Different Heat and Cool Stages

The control diagrams below graphically represent the on/off deltas for different heating and cooling stages.

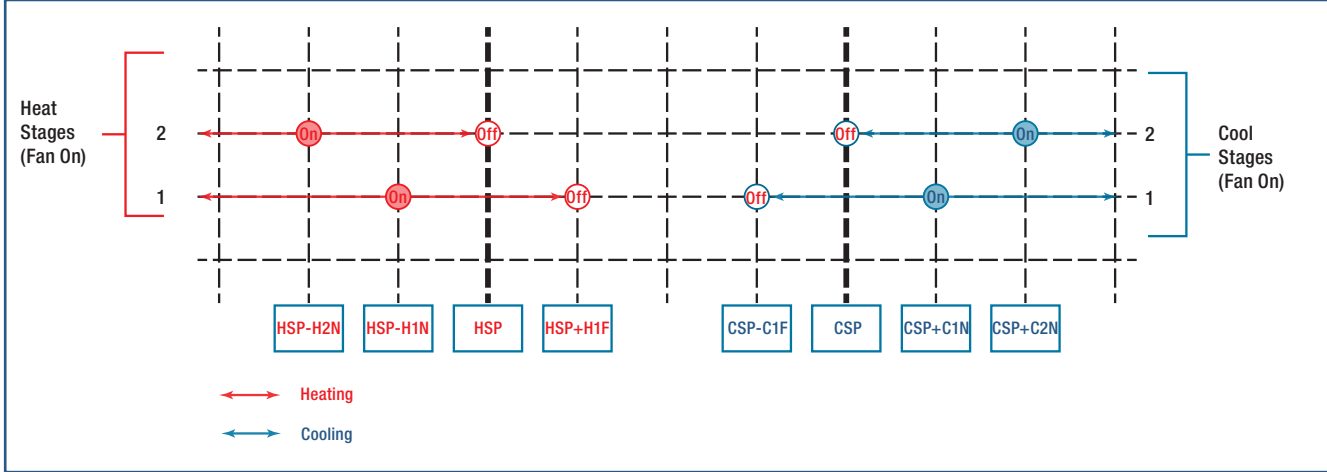
Table 19: Default Values for Heat and Cool Stages

Heat & Cool Stage	Advanced Parameter	Default Value
H1N: Heat Stage 1 on Delta	(74A)	1
H1F: Heat Stage 1 Off Delta	(75A)	1
H2N: Heat Stage 2 On Delta ¹	(76A)	2
H2F: Heat Stage 2 Off Delta ¹	(77A)	2
C1N: Cool Stage 1 On Delta	(80A)	1
C1F: Cool Stage 1 Off Delta	(81A)	1
C2N: Cool Stage 2 On Delta ¹	(82A)	2
C2F: Cool Stage 2 Off Delta ¹	(83A)	0

Control Diagram 1: Conventional or Heat Pump 1-Stage Heat, 1-Stage Cool



Control Diagram 2: Heat Pump 2-Stage Heat, 2-Stage cool (No Auxiliary)¹



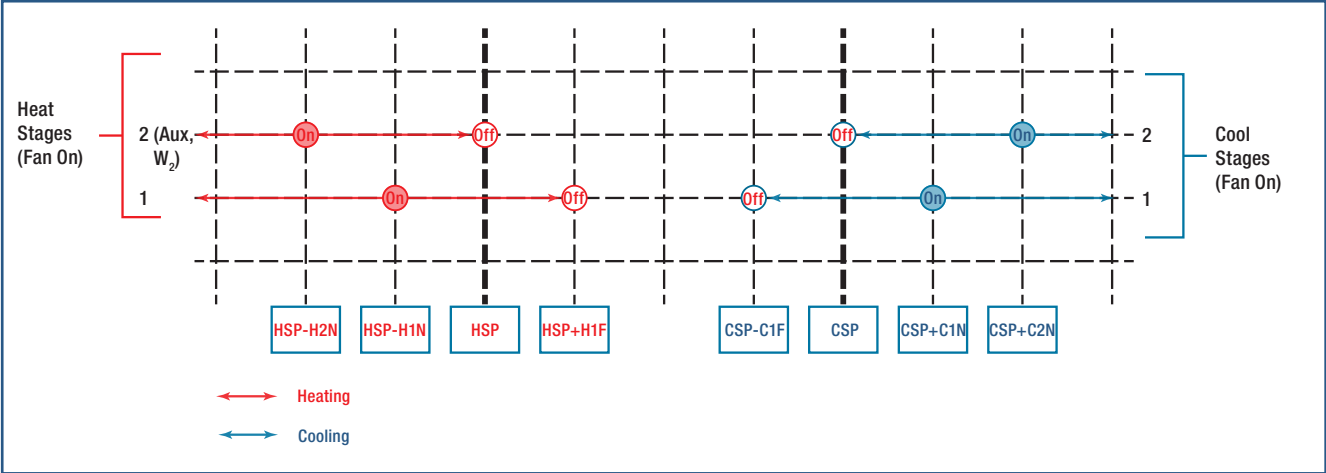
¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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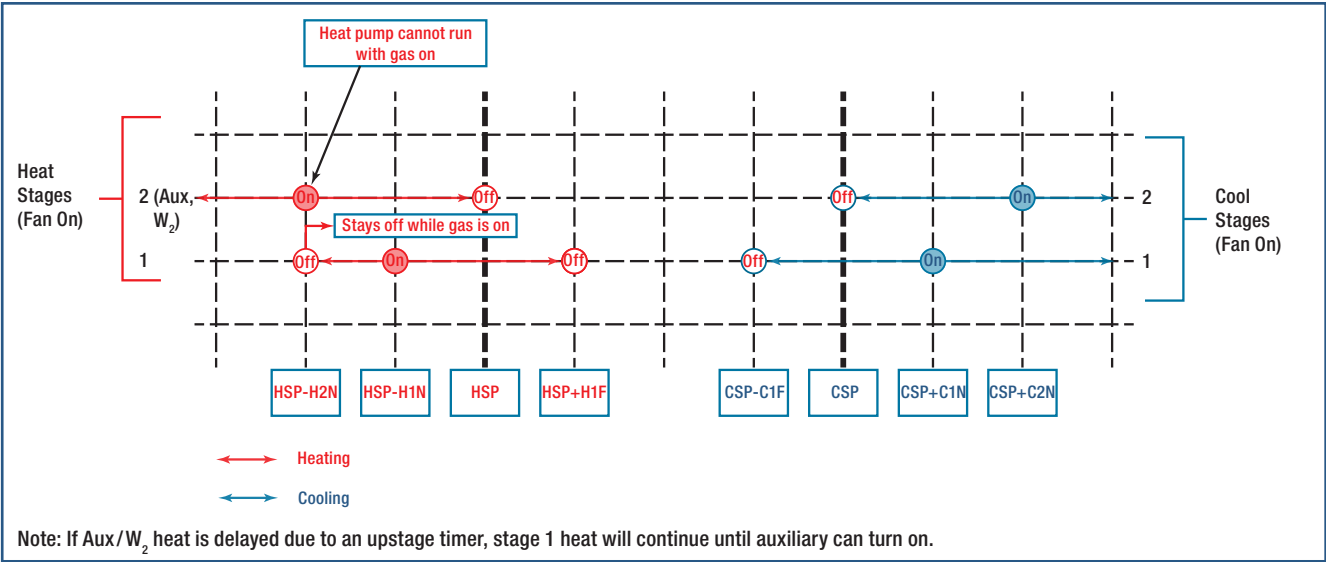
Appendix A (continued)

3.Control Diagrams For Turning On/Turning Off Different Heat and Cool Stages (continued)

Control Diagram 3: Heat Pump or Conventional, 2-Stage Heat With Aux/W₂ Heat (allowed to run with other heat stages), 2-Stage Cool¹



Control Diagram 4: Heat Pump or Conventional, 2-Stage Heat With Aux/W₂ Heat (NOT allowed to run with other heat stages), 2-Stage Cool¹



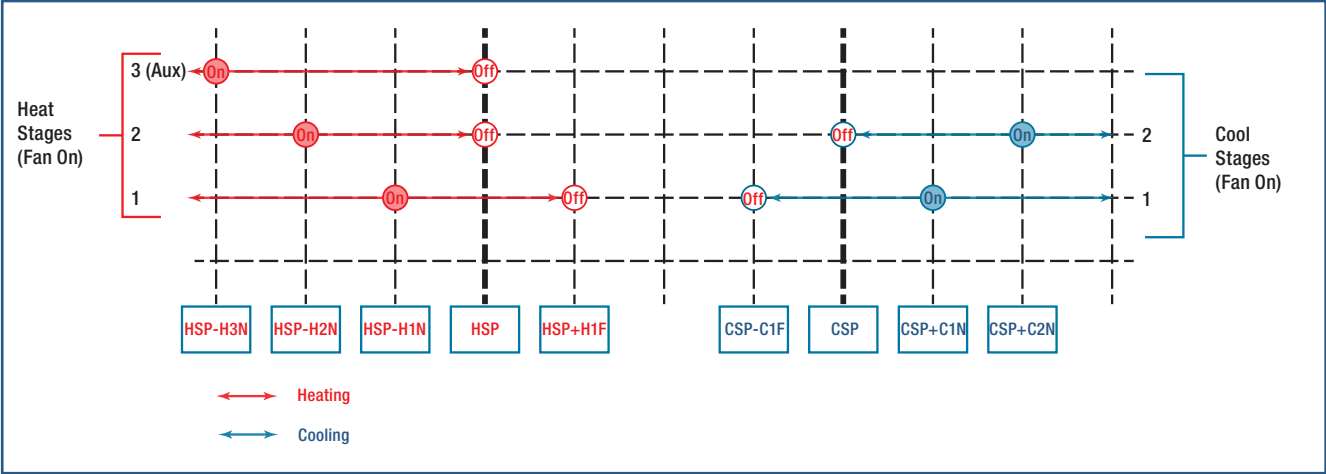
¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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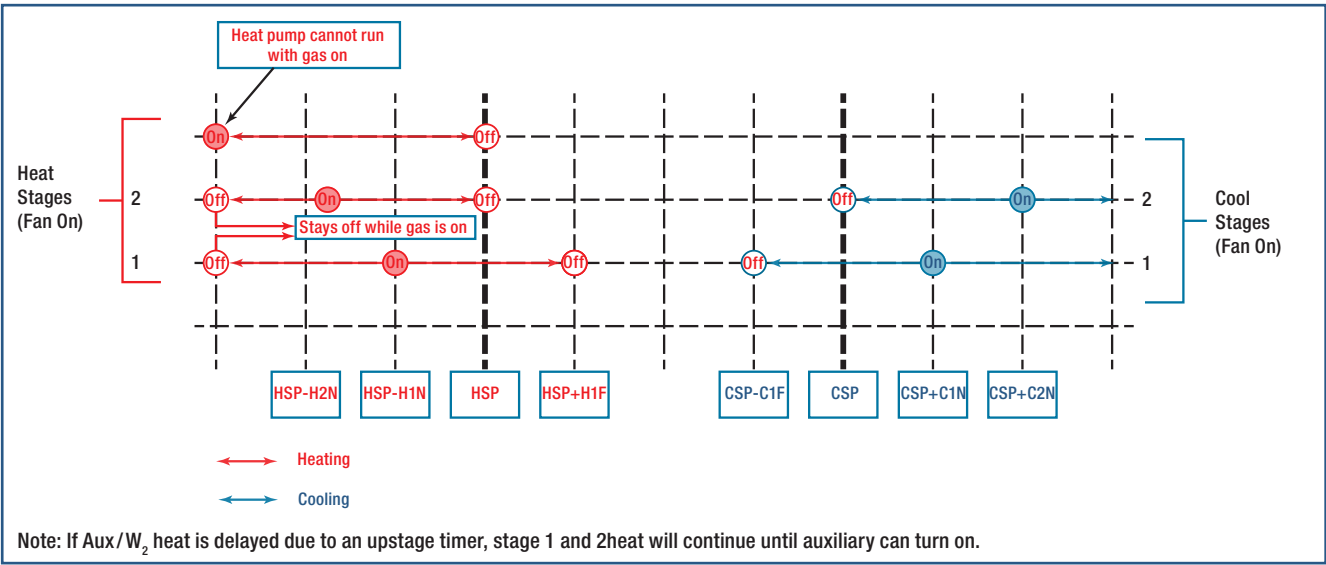
Appendix A (continued)

3.Control Diagrams For Turning On/Turning Off Different Heat and Cool Stages (continued)

Control Diagram 5: Heat Pump 3-Stage Heat With Auxiliary Heat (allowed to run with other heat stages), 2-Stage Cool¹



Control Diagram 6: Heat Pump 3-Stage Heat With Auxiliary Heat (NOT allowed to run with other heat stages), 2-Stage Cool¹



¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

Appendix B: Installation Worksheet

It is recommended that before beginning to configure the SMC55-HWQS, the required values for the necessary parameters should be marked. The values required to configure the HVAC system can be written in this worksheet and used by the installer during configuration.

Job Name:

HVAC system type:

Table 20: Basic Configuration Parameters

Applicable Systems	Basic Configuration Parameter	Name	Description	Default Value	Range	Value to be Set
All	01b	System Type	00: Conventional system 01: Heat pump 02: 2-Pipe FCU 03: 4-Pipe FCU 04: Underfloor radiant heat 05: Underfloor electric heat	00: Conventional system	00–05	
Heat Pump ¹ and Conventional	02b	Heat Stages	00: None (No Heat Stage) 01: 1 Stage (W₁) 02: 2 Stage: 1 Compressor and 1 Auxiliary 03: 2 Stage: 2 Compressor, No Auxiliary 04: 3 Stage: 2 Compressor and 1 Auxiliary	01: 1 Stage (W ₁)	00–04	
	03b	Run Auxiliary Heat (Aux/W ₂) with other heat stages	00: No 01: Yes Skipped if no Aux/W ₂	01: Yes	00–01	
	04b	Auxiliary Heat (Aux/W ₂) upstage delay	00: 0 minutes 01: 1 minute 02: 2 minutes 03: 5 minutes 04: 10 minutes 05: 20 minutes 06: 30 minutes 07: 1 hour 08: 2 hours 09: 4 hours 10: 8 hours 11-24: 11-24 hours Skipped if no Aux/W ₂	05: 20 minutes	00–24	
	05b	Cool Stages	00: None (no cool stage) 01: 1 Cool stage (Y1) 02: 2 Cool stages (Y1, Y2)	01: 1 Cool stage (Y1)	00–02	
Heat Pump ¹	06b	Heat Fan Control	00: Equipment controls fan 01: Thermostat controls fan		00–01	
	07b	Changeover/ Reversing Valve (O/B)	00: On for cooling (O) 01: On for heating (B)			
Fan Coil Units and Radiant Floor ¹	08b	Valve/Element Type	00: Relay 01: 0–10 V== 02: Floating point (Fan coil units only)		00–01	
Fan Coil Units	09b	Fan Type	00: Relay (G1, G2, G3) 01: 0–10 V==		00–01	
	10b	2-pipe Mode	01: Heat only 02: Cool only 03: Changeover		01–03	
Radiant Floor ²	11b	Floor Control Type	01: Indoor air only 02: Indoor air and floor limiting 03: Floor temperature only		01–03	

¹ Included with SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

² Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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Appendix B: Installation Worksheet *(continued)*

Job Name:

HVAC system type:

Table 21: Advanced Configuration Parameters for the SMC55-HWQS

Applicable Systems	Advanced Configuration Parameter	Name	Description	Default Value	Range	Value to be Set
All	01A	Function Type	0: Operate with thermostat 1: Standalone 2: Not Configured	2: Not Configured	0 – 2	
	02A	Temperature Sensor Type	0: Flush mounted sensor connected to HVAC controller 1: Thermostat sensor	1:Thermostat sensor	0 – 1	
All (except for radiant underfloor heat)	06A	Minimum Fan On Time	Minimum time fan is on in auto mode (minutes)	2 minutes	0 – 99	
	07A	Overrun Cool Fan Time	Minutes the fan runs after cooling relay opens	0 minutes	0 – 99.9 (minutes)	
	08A	Overrun Heat Fan Time	Minutes the fan runs after heating relay opens	0.1 minutes	0 – 99.9 (minutes)	
	11A	Cool Fan on Delay	Time to delay start of fan after cooling starts. Only used with Fan Auto Speed when fan was last off.	0 seconds	0 – 99	
	12A	Heat Fan on Delay	Time to delay start of fan after heating starts. Only used with Fan Auto Speed when fan was last off.	0 seconds	0 – 99	
All	18A	Standalone Temperature Operation Mode	0: Off 1: Heat Only 2: Cool Only 3: Auto	3: Auto	0 – 3	
	19A	Standalone Fan Mode (not applicable to radiant floors)	0: Off 1: Low 2: Medium 3: High 4: Auto 5: Single Speed On	4: Auto	0 – 5	
	20A	Remote Sensor Temperature Offset	Temperature offset for remote temperature sensor. This allows for compensation based on the installation location of the probe.	0° F	-5.0 – +5.0	
	26A	Cannot Reach Setpoint Timeout	Cannot reach setpoint alarm time threshold (minutes)	30 minutes	0.5 – 99.5	
	27A	Cannot Reach Setpoint Action	0: Alarm and keep trying 1: Alarm and enter failsafe	0: Alarm and keep trying	0 – 1	
FCUs with multi-speed fan	05A	Fan High Differential	Auto fan mode temperature difference in degrees to switch from medium to high fan speed	1.5° F	0.1 – 10.0	
	09A	Kick-Start Fan (multi-speed fan only)	0: Off 1: Set fan high for 1 second when turning on	0: Off	0 – 1	

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Appendix B: Installation Worksheet *(continued)*

Job Name:

HVAC system type:

Table 21: Advanced Configuration Parameters for the SMC55-HWQS *(continued)*

Applicable Systems	Advanced Configuration Parameter	Name	Description	Default Value	Range	Value to be Set
2-pipe FCU	40A	Pipe Temperature for Changeover to Heat Mode	Pipe temperature that designates heating mode when using a 2-pipe system with a changeover sensor on the pipe.	82° F	75 – 99	
	41A	Pipe Temperature for Changeover to Cool Mode	Pipe temperature that designates heating mode when using a 2-pipe system with a changeover sensor on the pipe.	60° F	32 – 70	
	42A	Enable Purge Function	Turns the valve on if left dormant to refresh pipe temperature; 0: Disabled; 1: Enabled	1: Enabled	0 – 1	
	43A	Purge Valve On-Time	Number of minutes to leave the valve on during a purge. 0: Disabled	2 minutes	0 – 60	
	44A	Purge Valve Off-Time	Hours to leave the valve off between purges 0: Disabled	2 hours	0.5 – 99.5 (hours)	
0–10 V _{DC} FCU	50A	Proportional Fan Minimum	The lowest percent output to apply for fan speed. This determines the low end-point of the fan being on. If at any time the fan output is 0% (Off), the valves will also close at 0%.	10%	0 – 100	
	51A	Proportional Fan Low Speed	The % output to apply when the manual fan-speed is set to Medium.	20%	0 – 100	
	52A	Proportional Fan Medium Speed	The % output to apply when the manual fan-speed is set to Medium.	60%	0 – 100	
	53A	Proportional Fan High Speed	The % output to apply when the manual fan-speed is set to High.	100%	0 – 100	
	54A	Minimum Valve Percent Open	The lowest % output to apply for valve opening. This determines the low end-point of the straight-line curve for valve opening.	10%	0 – 100	
	55A	Valve Fully Open Differential	The temperature offset from deadband at which the valve is fully open (100% opening).	1° F	.1 – 10.0	
	56A	Non-proportional Analog output	Enable 0–10 V _{DC} outputs for non-proportional fan and valves.	True (1)	0: disabled 1: enabled	
Floating Point Valves	60A	Enable Floating Point	0: Disabled, 1: Enabled (overrides basic valve configuration).	0: Disabled	0 – 1	
	61A	Actuator Running Time	Actuator Running Time for Floating Point control.	150 seconds	1 – 999	
Heat Pump ¹ and Conventional	70A	Minimum Compressor Run Time (MCRT)	Minimum run time for compressor.	0 minutes	0 – 99 minutes	
	71A	Minimum Compressor Off Time (MCOT)	Minimum off time for compressor.	5 minutes	0 – 99 minutes	
	72A	Heat stage 1 delay (WOD)	Minimum off time for W ₁ (conventional heat stage 1).	3 minutes	0 – 99 minutes	
	74A	Heat Stage 1 (Y ₁ /W ₁) On	°F below setpoint to turn stage on.	1° F	1° F – 10° F	
	75A	Heat Stage 1 (Y ₁ /W ₁) Off	°F above setpoint to turn stage off.	1° F	1° F – 10° F	
Heat Pump ²	76A	Heat Compressor Stage 2 (Y ₂) On	°F below setpoint to turn stage on.	2° F	1° F – 10° F	
	77A	Heat Compressor Stage 2 (Y ₂) Off	°F above setpoint to turn stage off.	0° F	1° F – 10° F	

¹ Included with SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

² Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladiom Thermostat version 1.10 or newer.

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Appendix B: Installation Worksheet *(continued)*

Job Name:

HVAC system type:

Table 21: Advanced Configuration Parameters for the SMC55-HWQS *(continued)*


Applicable Systems	Advanced Configuration Parameter	Name	Description	Default Value	Range	Value to be Set
Heat Pump ¹ and Conventional	78A	Aux/W ₂ On	°F below setpoint to turn stage on. If auxiliary is stage 2, this differential is used to turn on.	3° F	1° F – 10° F	
	79A	Aux/W ₂ Off	°F above setpoint to turn stage off. If auxiliary is stage 2, this differential is used to turn off.	0° F	1° F – 10° F	
	80A	Cool Stage 1 On	°F above setpoint to turn stage on.	1° F	1° F – 10° F	
	81A	Cool Stage 1 Off	°F below setpoint to turn stage off.	1° F	1° F – 10° F	
	82A	Cool Stage 2 On	°F above setpoint to turn stage on.	2° F	1° F – 10° F	
	83A	Cool Stage 2 Off	°F below setpoint to turn stage off.	0° F	1° F – 10° F	
	84A	Compressor Cool Stage 2 Upstage Delay	Stage 2 cooling will not turn on until the first stage has run for the chosen duration. 0: 0 minutes, 1: 1 minute, 2: 2 minutes, 3: 5 minutes, 4: 10 minutes, 5: 20 minutes, 6: 30 minutes, 7: 1 hour, 8: 2 hours, 9: 4 hours, 10: 8 hours, 11–99: 11–99 hours	0 minutes	0 – 99 minutes	
	85A	Compressor Heat Stage 2 Upstage Delay	Stage 2 compressor heating will not turn on until the first stage has run for the chosen duration. 0: 0 minutes, 1: 1 minute, 2: 2 minutes, 3: 5 minutes, 4: 10 minutes, 5: 20 minutes, 6: 30 minutes, 7: 1 hour, 8: 2 hours, 9: 4 hours, 10: 8 hours, 11–99: 11–99 hours	0 minutes, however thermostat will default based on stages	0 – 99 minutes	
Heat Pump ¹	88A	Reversing Valve Delay (RVD)	Delay to wait for reversing valve to change over. When changing between heat and cool, the thermostat will turn off the compressor, then wait for MCOT. The thermostat will then change the state of the O/B signal, and wait for the reversing valve delay (RVD) before turning the compressor and fan back on.	1 second	0 – 99 seconds	
Radiant Floor ¹	90A	Slab Maximum	If slab temperature rises above this maximum, must turn off regardless of air temperature.	85 °F	0 – 120 °F	
	91A	Slab Minimum	If slab temperature falls below this minimum, must turn on regardless of air temperature.	60 °F	0 – 120 °F	
	92A	Floor 100% Differential Temperature	°F below the setpoint to turn on system to 100%.	2.0 °F	0 – 20 °F	
	93A	Floor 0% Differential Temperature	°F above the setpoint to turn on system to 0%.	2.0 °F	0 – 20 °F	
	94A	Cycles Per Hour	Cycles per hour.	3 (20 minute signal period)	1-20 CPH	






¹ Included with SMC55-HWQS/SMC55-RESI-2 version 7420 or newer, SMC55-RESI version 7302 or newer and HomeWorks Palladium Thermostat version 1.10 or newer.

Appendix C: User Interface for the Thermostat



Once the system is configured, verify the user interface and functionality of the thermostat.


The following steps illustrate details about the user interface of the thermostat.

1. Press the  button to cycle through the different available fan modes. The fan modes cycle through only those modes which are selected during configuration.




Fan Mode	Symbol on the Thermostat
Low	
Medium	
High	
On	 On
Auto	 Auto

2. Press the  button to toggle the schedules between On and Hold.





Schedule Status	Symbol on the Thermostat
On	 On
Hold	 Off

The schedule will be enabled only if a HomeWorks processor is connected to the thermostat. In standalone systems (thermostat and SMC55-HWQS without the HomeWorks QS processor), when pressing the  button the schedule will toggle between ‘Hold’ and ‘On’ but will change back to the default ‘Hold’ state after two seconds.

3. Press the   button to cycle through the different operating modes.

Operating Modes	Symbol on the Thermostat
Heat	 Heat On
Cool	 Cool On
Auto	AUTO
Off	OFF
Auxiliary only	Only Aux  Heat On

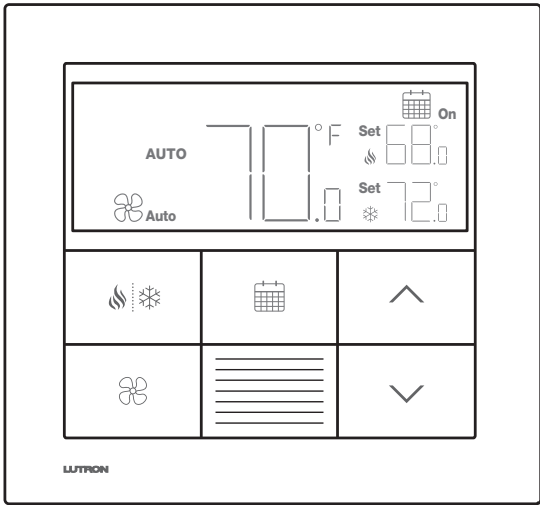
The operating modes cycle through only those modes that are selected during the installation.

4. In the Heat operating mode, press the   buttons to increase or decrease the heating setpoint temperature.
5. In the Cool operating mode, press the   buttons to increase or decrease the cooling setpoint temperature.

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Appendix C: User Interface for the Thermostat *(continued)*

6. In Auto mode, you will see both heat and cool setpoints as shown in the image below:



Heat setpoint is represented by the symbol next to the setpoint value whereas the cool setpoint is represented by the symbol next to the setpoint value.

In this mode, on the first press of the / buttons either the heat setpoint value or the cool setpoint value will start flashing. Press the / button if you want to select the value of the other setpoint.

Press the / buttons again to increase/decrease the value of the setpoint that is flashing.

Appendix D: Reenter Configuration Menus

If any changes are needed after the initial configuration has been completed, follow the steps below.

1. Press and hold and until the backlight flashes (3 seconds). Release the buttons and immediately press and hold:
 - a. to reenter Equipment Configuration mode. “EC” will be shown on the display.
 - b. to reenter Controller Selection mode. “CO” will be shown on the display.
 - c. to reenter Basic Configuration mode. “bA” will be shown on the display.

Appendix E: Determine Firmware Version (optional) (Only available with thermostat version 3.05 or later)

1. To determine the **Firmware Version of the thermostat**, hold and buttons for 3 seconds and the firmware version of the thermostat will be shown.
2. If thermostat is used in combination with SMC53/SMC55 then within 10 seconds of completing Step 1:
 - a. Press the button for the **Firmware Version of the FCU Controller**.

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