USER MANUAL

Cascade Sequencer Controller

For AM Series Boilers and Water Heaters

This device is intended for use with following AERCO AM Series Models:

Water Heaters:	Boilers:
• AM 399W	• AM 399B
• AM 500W	• AM 500B
• AM 750W	• AM 750B
• AM 1000W	• AM 1000B

AM Series

Latest Update: 04/29/2016

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A Watts Water Technologies Company

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INTRODUCTION

The AM Series Cascade Sequencer controller is used to control a cascade arrangement of up to eight (8) AM Series water heaters or boilers. This document provides instructions for installation and operation of the cascade sequencer.

Please note that the cascade sequencer requires a communications board be installed in each AM Series boiler or water heater. This board is present in every AM 500, 750, and 1000 but is an option on the AM 399 and must be installed prior to cascade sequencer installation. For further information see the AM Series Modbus installation Guide (TID-0123).

Cascade Sequencer Controller Front Panel (Cover closed)

The AM Series Cascade sequencer Kit is comprised of:

- AM Series Cascade Sequencer unit (P/N 62110095)
- AM Series Cascade Sequencer User Manual (OMM-0101)

WARNING!

Installer: Read the manual for the appliance(s), including this manual, before installing. Perform steps in the order given.

User: This manual is for use only by a qualified heating installer. Failure to comply with these provisions can lead to a dangerous situation and/or damage to property and equipment.

Installation and Alterations: Only a Qualified installer must carry out the installation and calibration of the appliance(s). Never modify the appliance or its flue gas carrying components in any way. This heater must be properly vented. Failure to follow these instructions could result in personal injury or death!

CHAPTER 1: INSTALLATION

1.1 Piping Installation

WARNING!

Prior to appliance installation and/or maintenance, disconnect the appliance's electrical power supply and shut off the inlet gas valve. Failure to follow these instructions could result in severe personal injury or death!

In order for the AM Cascade Sequencer to operate correctly, the AM Series heaters must be installed as shown in Figure 1-1.

Because the cascade general sensor is installed on the Master heater, the Master heater must always be the closest to the low loss header in order to provide the most accurate temperature measurement.

A maximum of eight (8) heaters may be connected into the cascade system.

NOTE:

Figure 1-1 shows only one piping configuration example. Other piping configurations are possible. Contact AERCO technical support for information concerning alternative configurations.

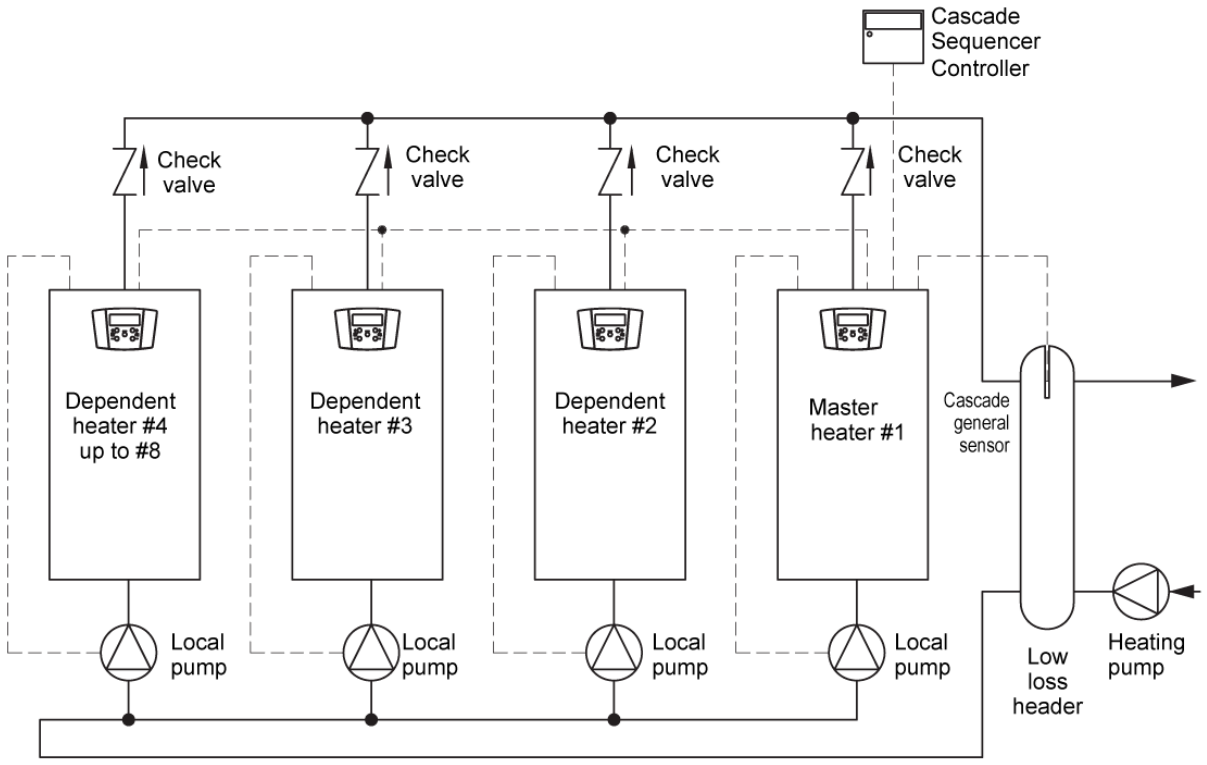

Figure 1-1: Cascade Sequencing Heater/Boiler Piping Installation

1.2 Electrical Installation

Access the electrical junction box as shown in Figure 1-2. Two wiring schematics (Figures 13a and 13b) are shown on the following pages that show wiring for earlier and later manufactured units. Determine which unit you have according to the two following conditions (a or b), then wire according to the referenced figure number:

a) If terminals 30 and 31 are **NOT** present in the electrical junction box, refer to **Figure 1-3a**.

b) If terminals 30 and 31 **ARE** present in the electrical junction box, refer to **Figure 1-3b**.

Installer must install all wires represented by dashed lines in Figures 1-3a and 1-3b. The "Cascade general sensor" is present inside each heater's accessory box. This sensor must be electrically wired to terminals 24 and 25 of the Master heater # 1 and placed into the low loss header of the cascade (see Figure 1-1).

The "daisy chain" wiring used to connect boilers should be shielded type and has a maximum length of 300 ft. Unshielded wire is acceptable but not recommended, and the maximum length is only 60 ft.

Depending on the control method of your system, additional wiring may be required. For outdoor reset using the included outdoor temperature sensor, connect the outdoor temperature sensor to terminals 14 & 15 of the Master boiler. For remote setpoint (0-10V) control, connect the 0-10V signal wires to terminals 22 & 23 of the master boiler. For Modbus control of the operating setpoint connect to terminals 18, 19, and 20. For further information on Modbus, see GF-146-MB.

If there is a water heater tank present in the system, the tank sensor should be placed in the bottom 1/3 of the tank. This sensor is included in the spare parts kit shipped with each unit, and is the same probe as the cascade header temperature sensor.

If using the AM for domestic hot water only, connect the sensor leads to terminals 24 and 25.

For further information on all of these control modes, consult the AM Series Boiler and Water Heater User Manual (GF-146).

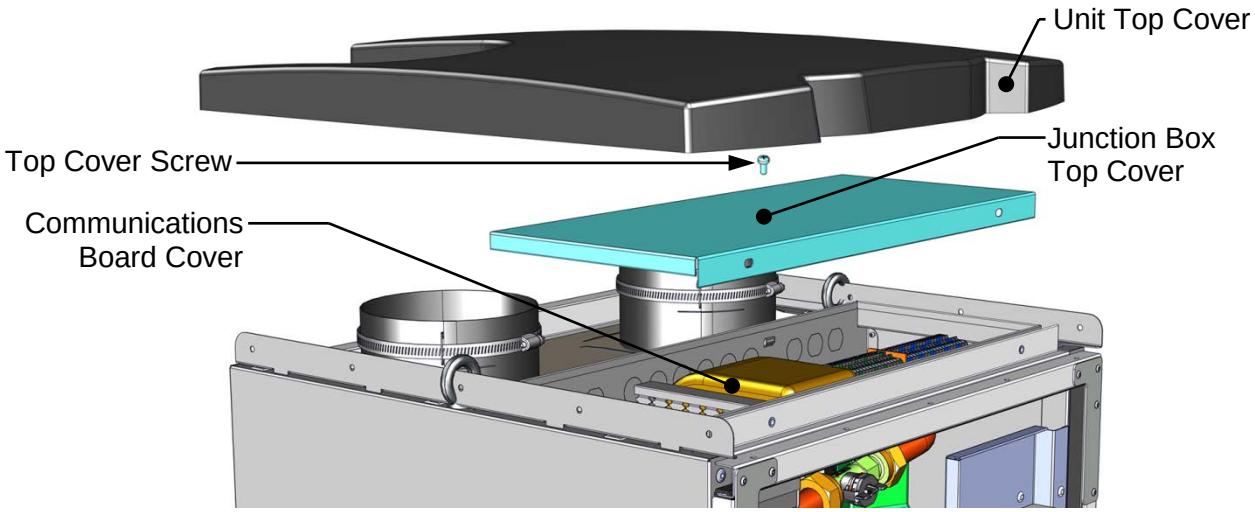

Figure 1-2: Accessing the Junction Box of the Master Heater

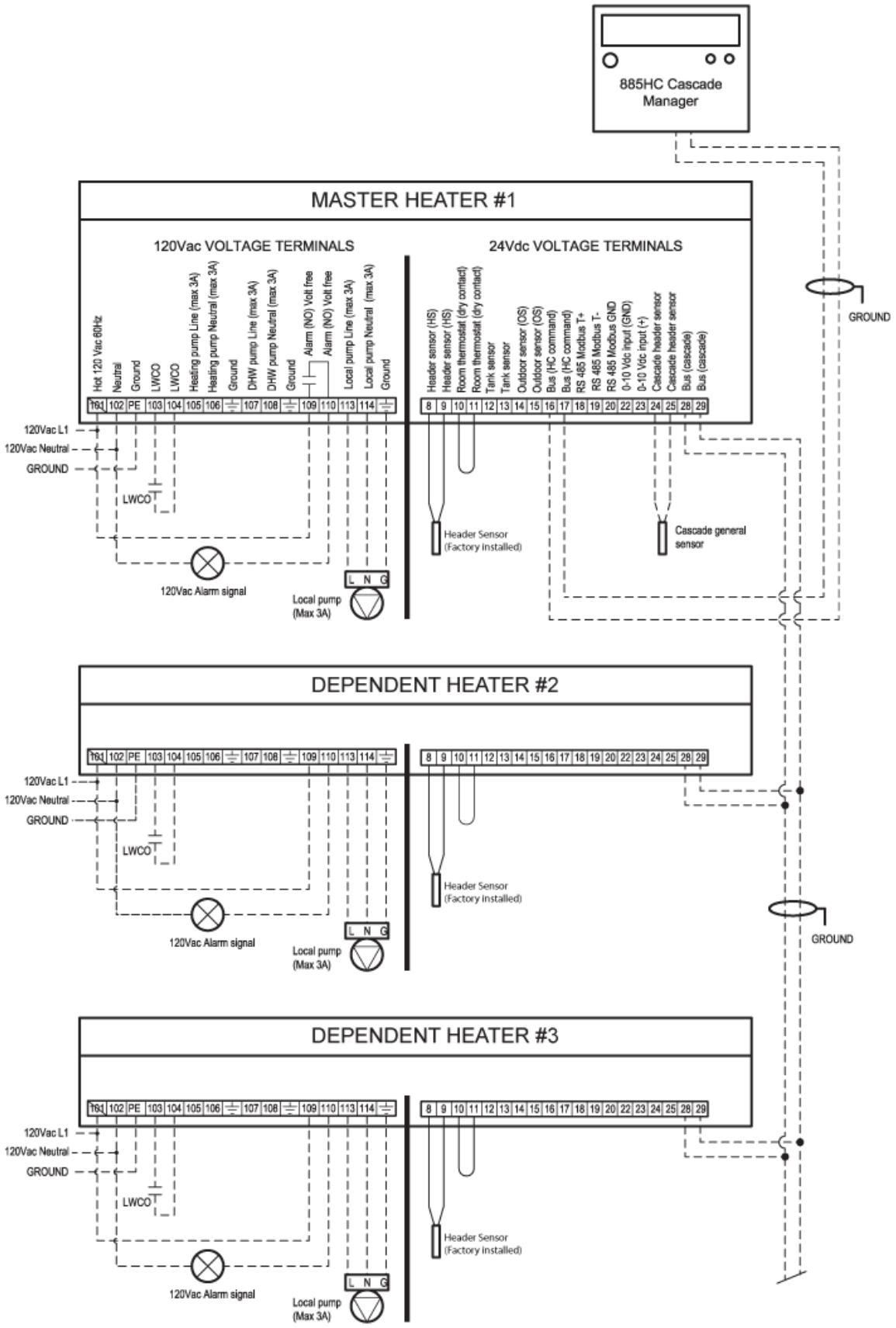

Figure 1-3a: Cascade Sequencing System Electrical Wiring (Units without Terminals 30 and 31)

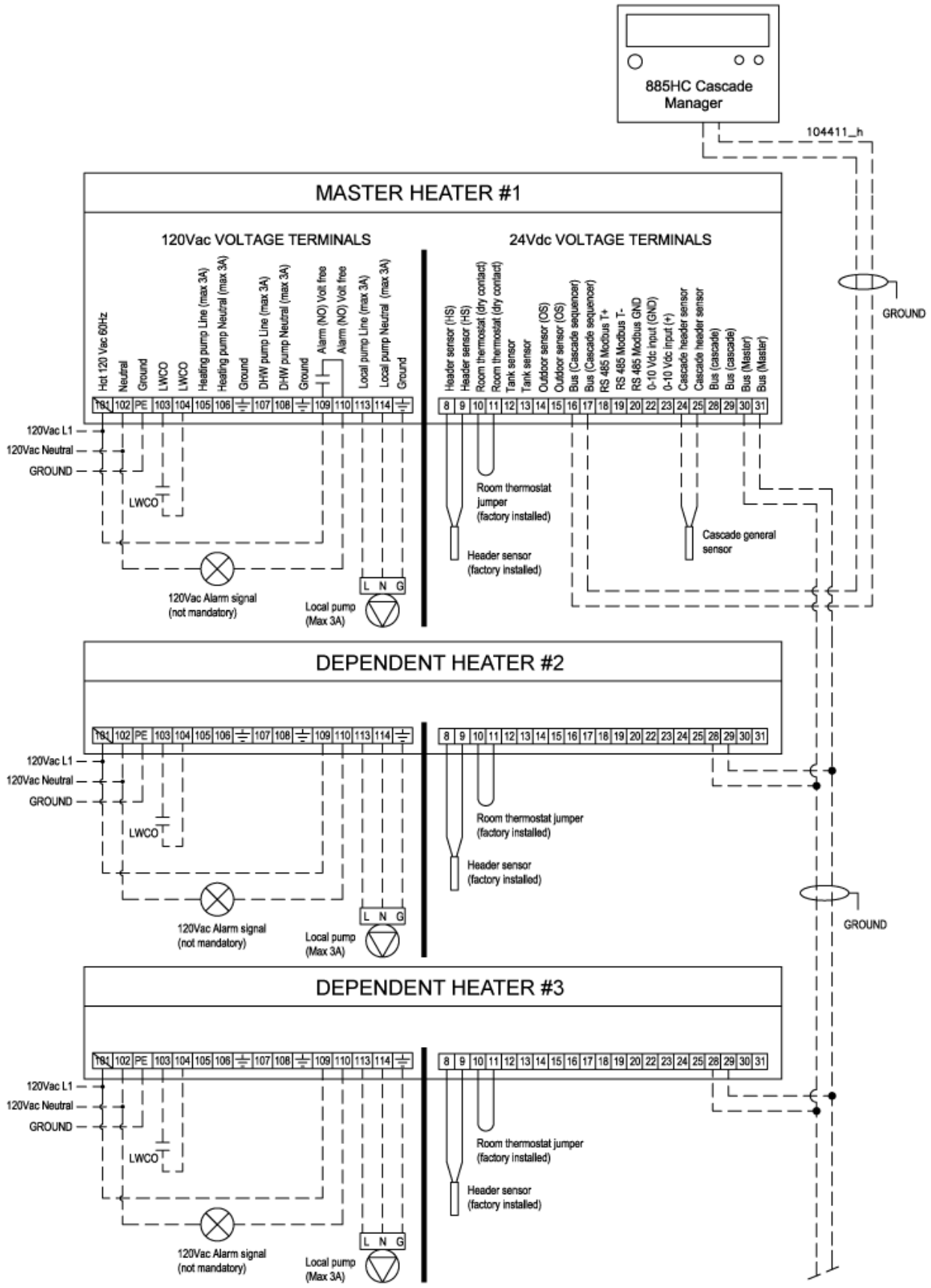

Figure 1-3b: Cascade Sequencing System Electrical Wiring (Units with Terminals 30 and 31))

1.3 Preparing the Cascade Sequencer for Use

The Cascade Sequencer is used to program the logic address of each heater, as well as control the final cascade system, and must be wired as described below.

Preparing the Cascade Sequencer for Use

1. Using a small flat head screwdriver, remove the rear cover of the Cascade Sequencer by levering up the panel via the slot, as shown in Figure 1-4.

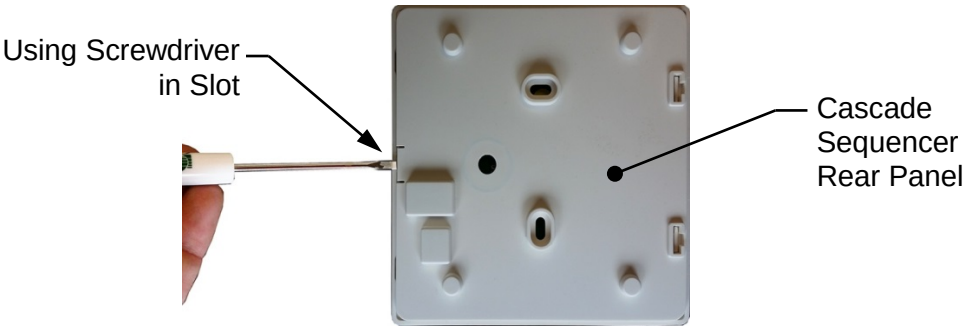

Figure 1-4: Opening Rear Panel of Cascade Sequencer

2. Connect two wires, each two feet (0.5m) long, to the two screw terminals on the Cascade Sequencer PCB, as shown in Figure 1-5. Wires do not have polarity.

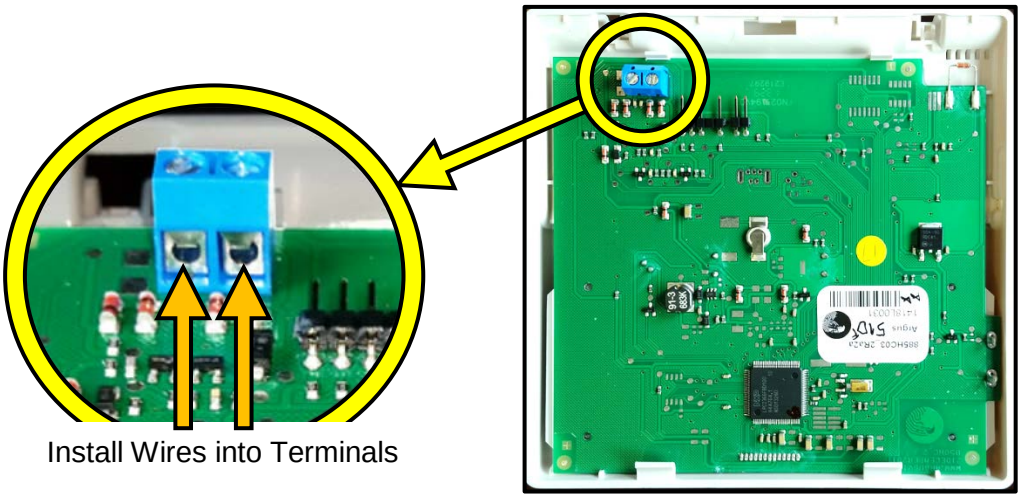

Figure 1-5: Connecting Wires to the Cascade Sequencer Terminals

3. Feed both wires through the rear panel conduit opening and snap rear panel onto rear of cascade Sequencer (Figure 1-6).

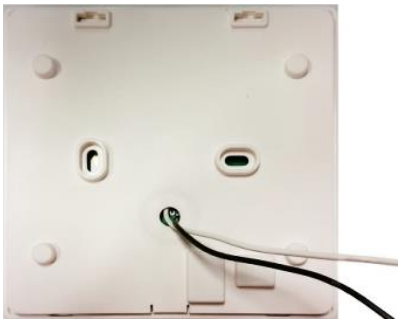

Figure 1-6: Replacing Rear Panel after Wiring

1.4 Rewiring the Master Boiler (Older Units ONLY)

IMPORTANT NOTES!

- **Procedure below is ONLY for units that do NOT have terminals 30 and 31 present.**
- **This procedure is performed ONLY on the Master boiler.**
- **For AM units WITH terminals 30 and 31 present, skip directly to Section 1.5**

NOTE:

Ensure that the heater being prepared as the Master heater is the one installed closest to the low loss header.

To electrically prepare an AM Series heater/boiler that is without terminals 30 and 31 for use as the Master appliance for the Cascade Sequencer, follow the instructions below.

Rewiring the Master Boiler (Units without Terminals 30 & 31)

1. Using a flat head screwdriver, open the communications board cover (see Figure 1-7).

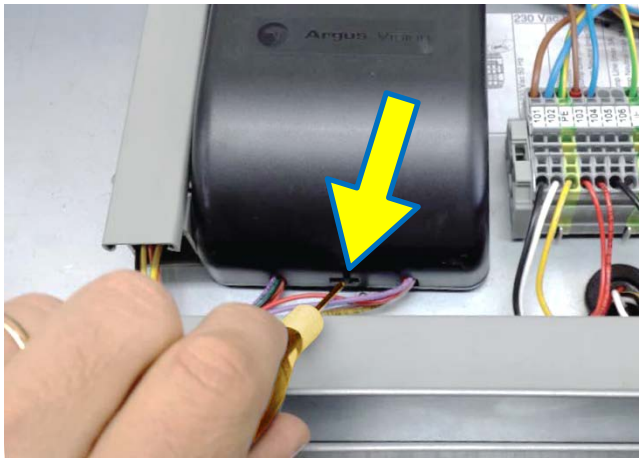

Figure 1-7: Using Screwdriver to Remove Communications Board Cover

2. Disconnect the 2-wire (pink/yellow) plug from the communications board (See Figure 1-8).

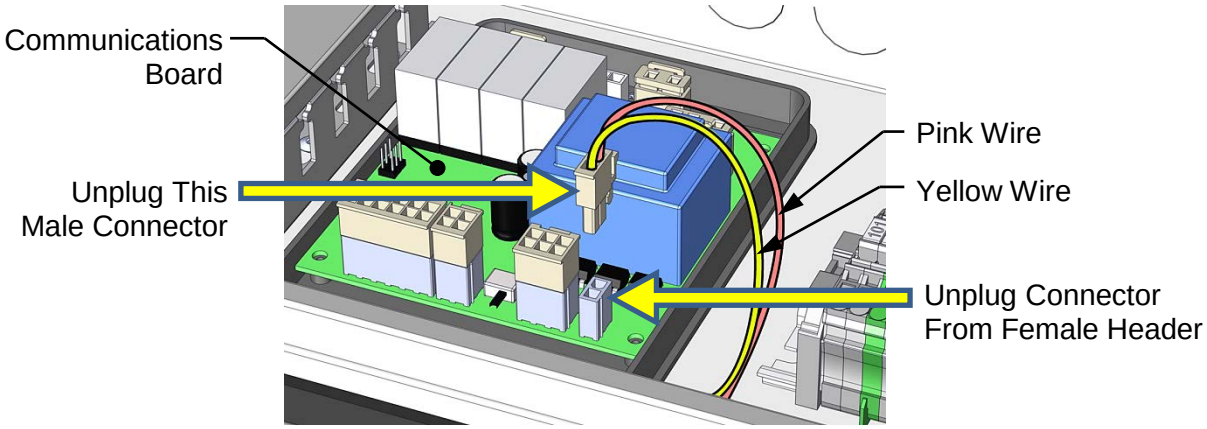

Figure 1-8: Removing 2-Wire Male Connector from Communications Board

Rewiring the Master Boiler (Units without Terminals 30 & 31) – **Cont.**

3. Open the wire conduit cover (See Figure 1-9).

Figure 1-9: Opening the Wire Conduit Cover

4. From the wire conduit, remove the two wires (pink and yellow) that are attached to the plug disconnected from the communications board in step 4 (Figure 1-10).

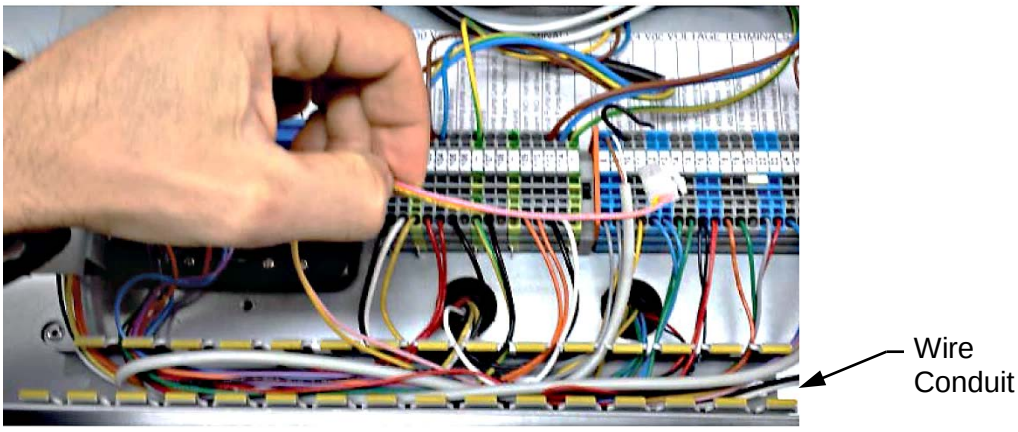

Figure 1-10: Removing Pink and Yellow Wires from Wire Conduit

5. Cut the connector from the pink and yellow wires and strip the insulation 1/4” (7mm) (Figure 1-11).

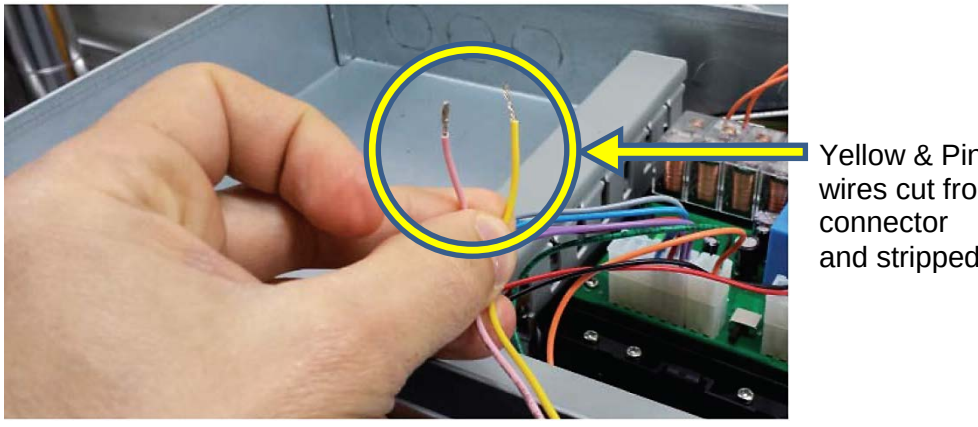

Figure 1-11: Removing 2-Wire Connector from Junction PCB

Rewiring the Master Boiler (Units without Terminals 30 & 31) – **Cont.**

6. Connect the pink wire together with the two black wires present on terminal #16 (See Figures 1-12).

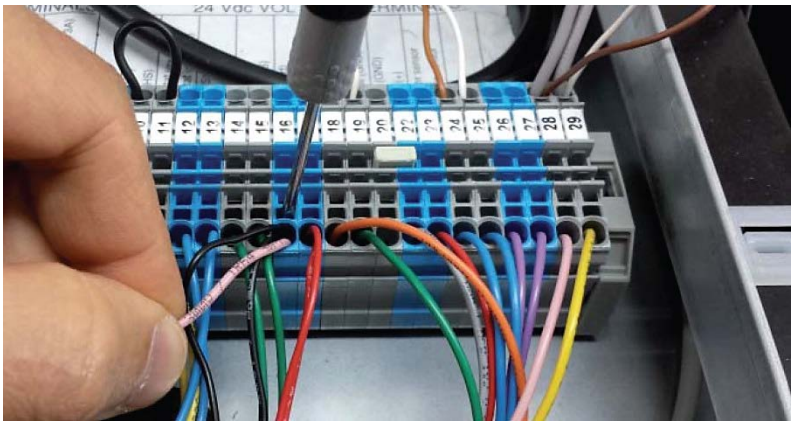

Figure 1-12: Connecting Pink Wire to Terminal #16

7. Connect the yellow wire together with the two red wires present on terminal #17 (See Figures 1-13). See Figure 1-14 for final wiring diagram.

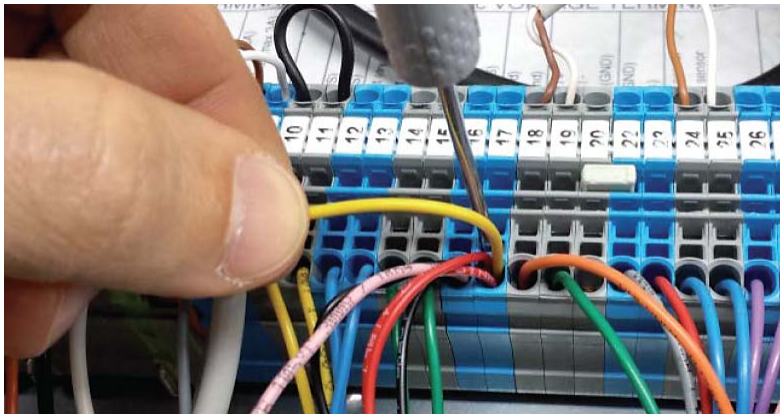

Figure 1-13: Connecting Yellow Wire to Terminal #17

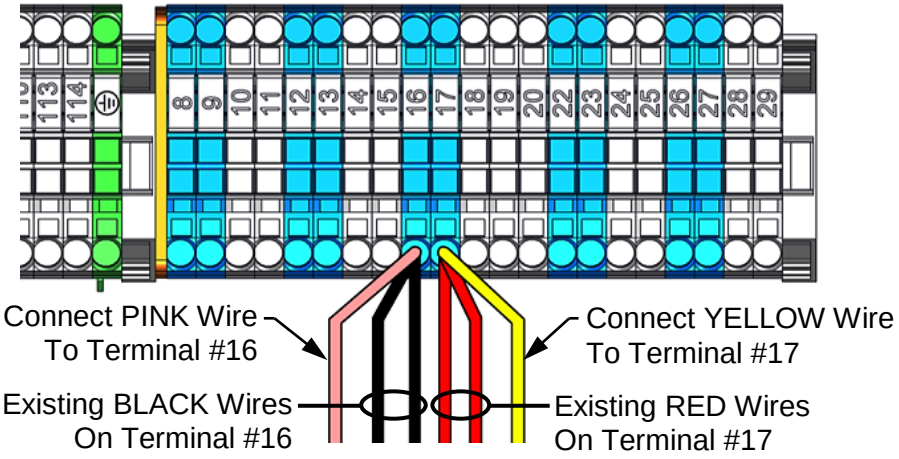

Figure 1-14: Terminal Wiring Diagram for Master Heater (NOTE: Other Wiring Not Shown for Clarity)

1.5 Setting Communications Board Switch to ON

NOTE:

All instructions hereafter apply to all applicable AM Series units, including older and newer units.

To prepare an AM Series heater/boiler for use with the Cascade Sequencer, the S4 switch on the communications board must be set to ON as described below.

Setting Communications Board Switch to ON

1. Gain access to the inside of the electrical junction box by removing the unit top cover and the electrical junction box top cover (see Figure 1-2).
2. Locate the communication board cover inside the junction box (see Figure 1-15).

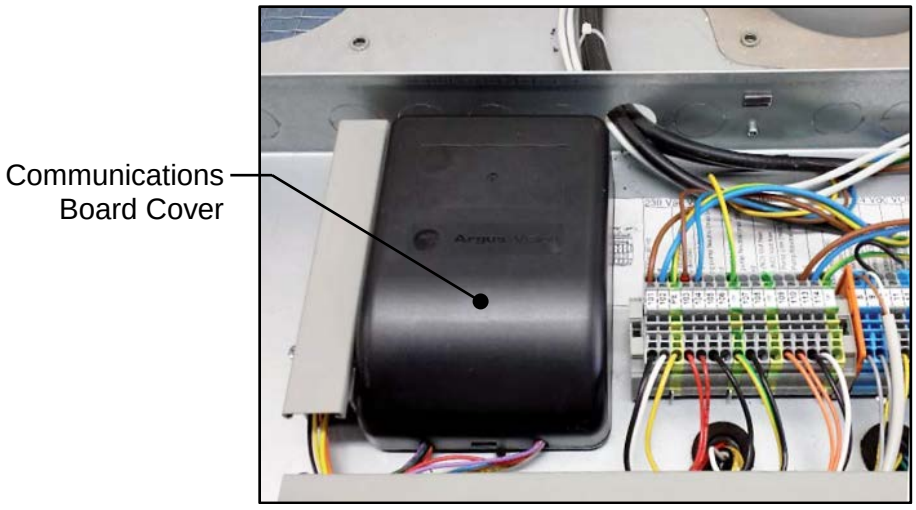

Figure 1-15: Locating the Communications Board inside Electrical Junction Box

3. Using a flat head screwdriver, open the communications board cover (see Figure 1-16).

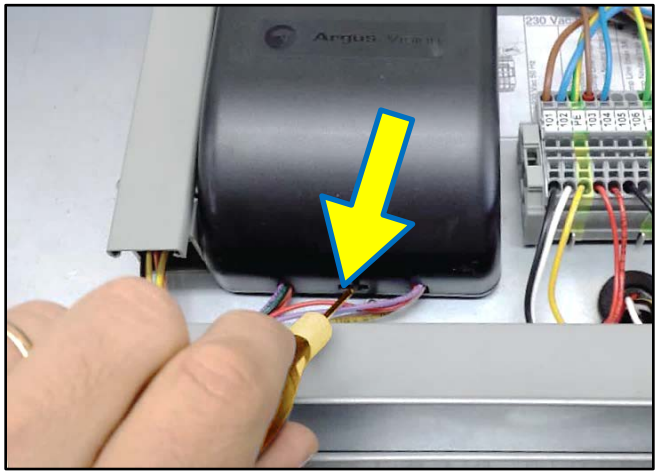

Figure 1-16: Removing Communications Board Cover

Setting Communications Board Switch to ON – **Continued**

4. Locate S4 switch at front edge of communications board per Figure 1-17.
5. Set S4 switch to ON (LEFT as you are facing the unit).

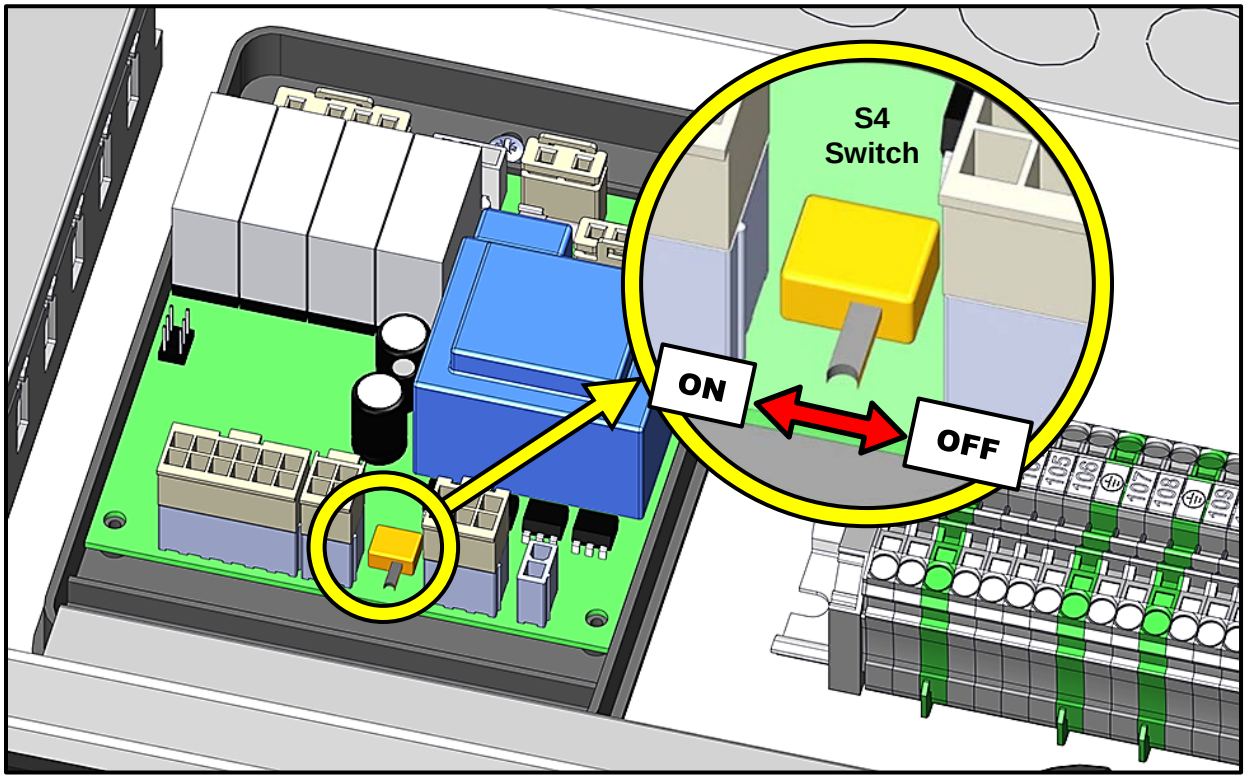

Figure 1-17: Setting Master Heater Communications Board S4 Switch

NOTE:
Wiring is not shown for image clarity.

1.6 Setting the Logic Address for Each Heater

Program the logic address of each heater using the Cascade Sequencer as described below.

Setting the Logic Address for Each Heater

NOTE:

See Section 1.2 and Figure 1-2 for how to access the electrical junction box and wiring terminals within. See Section 2 for operation of the unit and how access menus and parameters.

1. Ensure power is turned OFF to the boiler set up as the Master heater (heater #1).
2. Connect the two wires from the Cascade Sequencer to terminals 16 and 17 (see Figure 1-18) of the Master heater's electrical junction box.

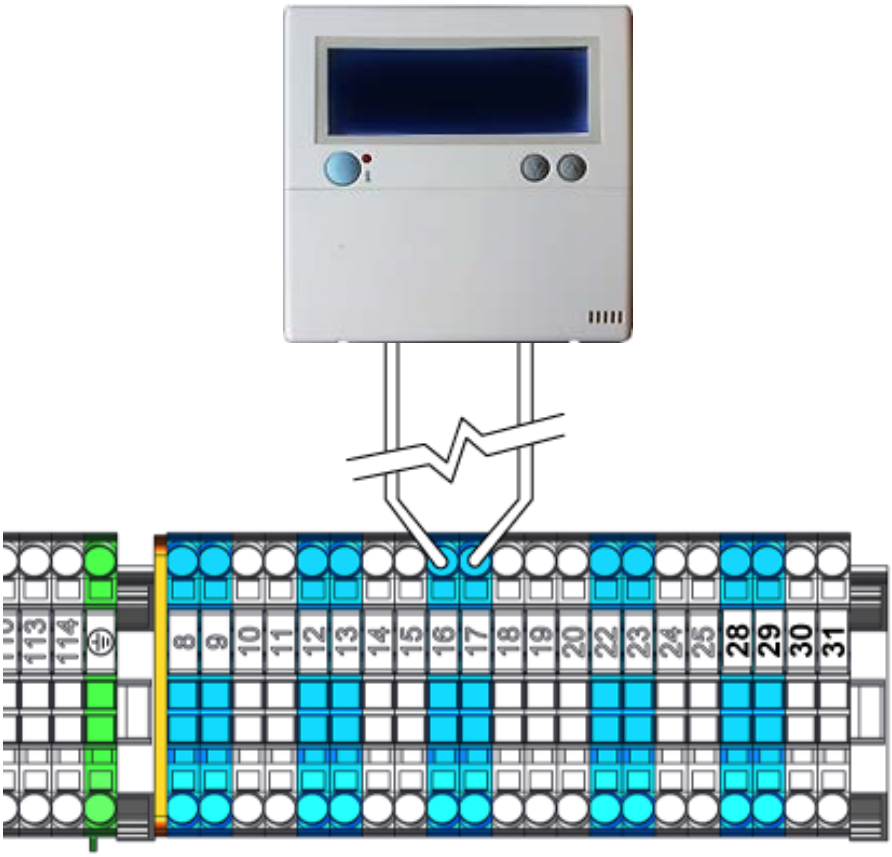

Figure 1-18: Wiring to Terminals 16 and 17 on AM Unit (Other wiring not shown for clarity)

NOTE:

The wiring diagram shown in Figure 1-18 applies to all heaters in cascade, as each will be programmed with a unique logic address using the Cascade Sequencer connected to the same terminals.

Setting the Logic Address for Each Heater - Continued

3. Turn the power ON to the Master heater (#1). The Cascade Sequencer will also power up.
4. Wait until the Cascade Sequencer recognizes the boiler and "E2Prom Err" is not displayed. This may take up to three minutes.
5. Using the Cascade Sequencer, set the Address to 1 as follows:

Logic Address Programming Procedure

a) Press and hold the **Home button** (see Figure 2-1 in Chapter 2) for eight (8) seconds, then release the button to display the Sub menu.

b) Once the Sub menu is displayed (Figure 1-19), use the **Up** or **Down buttons** (Figure 2-1) to scroll through the list of parameters. A dot appears to the left of the parameter to indicate it is selected (Figure 1-19).

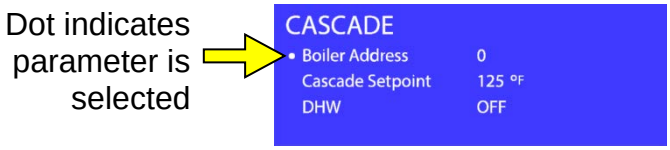

Figure 1-19: Sub Menu - Selecting the Parameter to Change

c) When the Boiler Address parameter is selected, press the **Ok button**. The dot then appears to the left of the parameter setting (Figure 1-20) and begins to blink, indicating it may be adjusted.

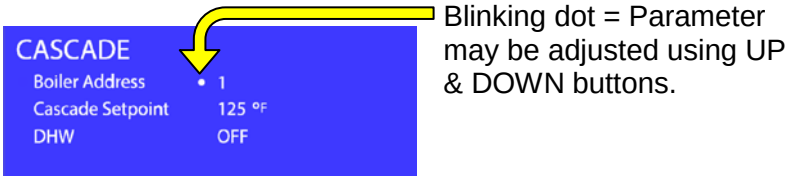

Figure 1-20: Sub Menu – Changing the Parameter Setting

d) Use the **Up** or **Down buttons** to change the parameter value up or down. For the Master heater, set this to 1. For each Dependent heater, a different address is set, from 2 to 8, depending on how many dependent heaters are in the cascade.

e) When the desired logic address number is displayed, save it by pressing the **Ok button**.

f) To return to the Main menu, press the **Menu button** (Figure 2-1).

g) Wait a minimum of 40 seconds until "#1" appears in the upper left of the center box of the sequencer display.

IMPORTANT NOTE!

After any change to a parameter, wait at least 40 seconds before exiting the sub menu or turning the power off.

6. Turn the power OFF to the Master heater.
7. Disconnect the two wires from terminals 16 and 17 of the Master heater
8. Connect the two wires from the Cascade Sequencer to terminals 16 and 17 of the first Dependent heater (heater #2).
9. On the communications board at top of unit, set the S4 Switch (see Figure 1-17) to ON.
10. Turn the power ON to the first Dependent heater (heater #2).

Setting the Logic Address for Each Heater - Continued

11. Repeat steps a) through g) in Step 5 setting the logic address to 2.
12. Turn the power OFF to the first Dependent heater (#2).
13. Disconnect the two wires from terminals 16 and 17 of the second Dependent heater (#1).
14. Repeat steps 1 to 12 on each dependent heater and set the Address sequentially for each AM unit in the cascade (up to seven Dependent heaters; heater #2 and up to #8).
15. After all dependent heaters have had the logic address set, wire the Cascade Sequencer to terminals 16 and 17 of the Master heater. The Cascade Sequencer is now set up for cascade operation. Ensure all switch settings match Figure 1-18a, 1-18b, or 1-18c in Section 1.9, depending on which models of AM Series units are being configured.
16. When addressing has been completed, turn the units on and allow the Cascade Sequencer to recognize each unit. All units present in the system should be shown on the Cascade Status Screen (see section 2.2).

1.7 Setting for Use with Boilers or Water Heaters

The Cascade Sequencer is set at the factory for boiler applications, but not for water heater applications. When your system is in place, and you wish to control water heaters, you must ensure all parameters of the Sub Menu are set as shown in the list in Section 2.1. Select the settings in the column for boilers if you are using boilers, or select the settings in the column for water heaters if you are using water heaters.

1.8 Dependent Heater Preparation – Setting Parameter 2003

Parameter 2003 is factory set to 0. However, this parameter should be checked for all dependent heaters to ensure parameter 2003 is set to 0.

Follow the instructions in Section 1.8.1 to access the Installer Menu on the AM Series boiler or water heater controller to confirm or change parameter 2003 to zero for all dependent heaters and the desired control settings of the Master heater (Section 1.8.1) for proper cascade operation. If you need more information concerning AM Series controller operation, consult the AERCO AM Series user manual (GF-146), and at Rev-D for all AM Series units of serial number 15000000 and above. Refer to Rev-C for all units with serial number 14999999 and below.

1.8.1 AM Series Controller - Installer Menu Navigation

This Installer Menu of parameters is available to qualified technicians for the purpose of analyzing the function of, and making adjustments to, the unit. In the case of setting up a cascade system, it is required that parameter 2003 be set to 0 for all dependent heaters (heaters #2 up to #8), and the Master heater (heater #1) set to the desired control mode.

To make these changes to Parameter 2003 in the Installer Menu, perform the following steps:

Installer Menu Navigation and Adjustment

1. To enter the Installer Menu, press and simultaneously hold down both the **RESET** and  buttons or 5 seconds until the  icon is displayed., then release the buttons. After entering the Installer Menu, the 2000 series of parameters are available for display and editing.
2. To scroll through the list of parameters, press buttons  and  .
3. Once parameter 2003 is displayed, it can be selected for editing by pressing the **RESET** button once (the displayed value will start blinking) and then using the  and  buttons to change the value, up or down to select the following:
   - **Dependent Heaters (Heaters #2 up to #8) 2003 Parameter Setting:**
     - **0 =** Cascade Dependent Heater
   - **Master Heater (Heater #1) Control Mode 2003 Parameter Setting:**
     - **00** = Constant Setpoint with Remote Enable
     - **01** = Outdoor Reset with Remote Enable
     - **02** = Outdoor Rest
     - **03** = Constant Setpoint
     - **04** = 0-10V Control (Remote Setpoint)
4. To confirm the new value, press and release the **RESET** button.
5. To exit the Installer Menu, press and hold RESET button for more than 5 seconds until the  icon is no longer shown in the display.

NOTE:

This instruction is only for setting parameter 2003. For information about other parameters in the Installer Menu, refer to the AM Series user manual (GF-146), Rev-D.

1.9 Review of All Parameters

Figures 1-18a, 1-18b, and 1-18c show the unit settings for a cascade setup for models AM 1000, AM 750, and AM 399-500, respectively, using three (3) to eight (8) units.

At the end of the installation process, all parameters (Address; Switch S4; 2003; 3001 and 3050) should have the values as shown on Figures 1-18a, 1-18b, and 1-18c.

If an attempt is made to operate the cascade system and the applicable parameters are not set to the values shown, one or more of the heaters in the cascade will display a 116 error (communication error) and will stop functioning.

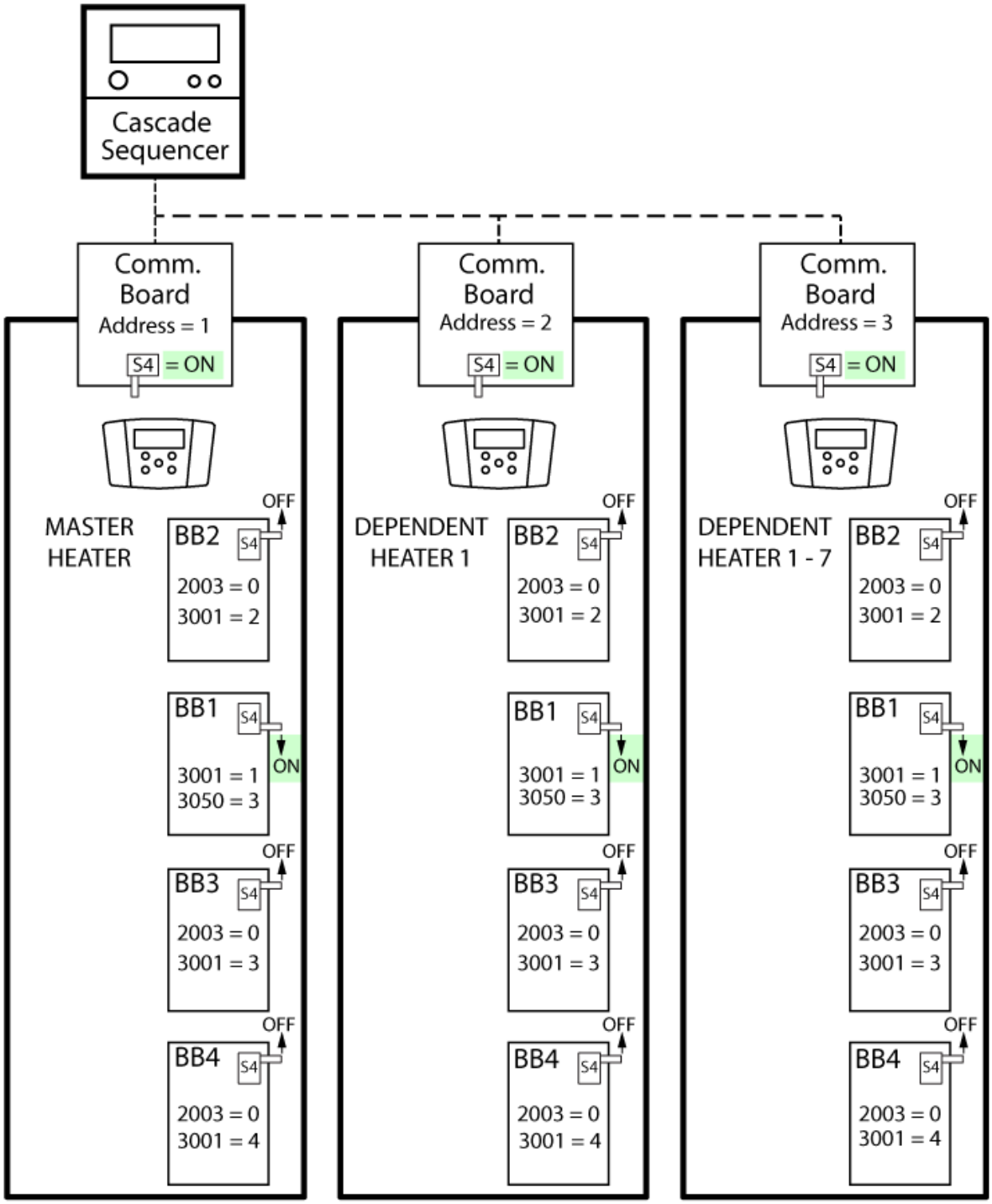

Figure 1-18a: AM 1000 Cascade Configuration and Settings Diagram

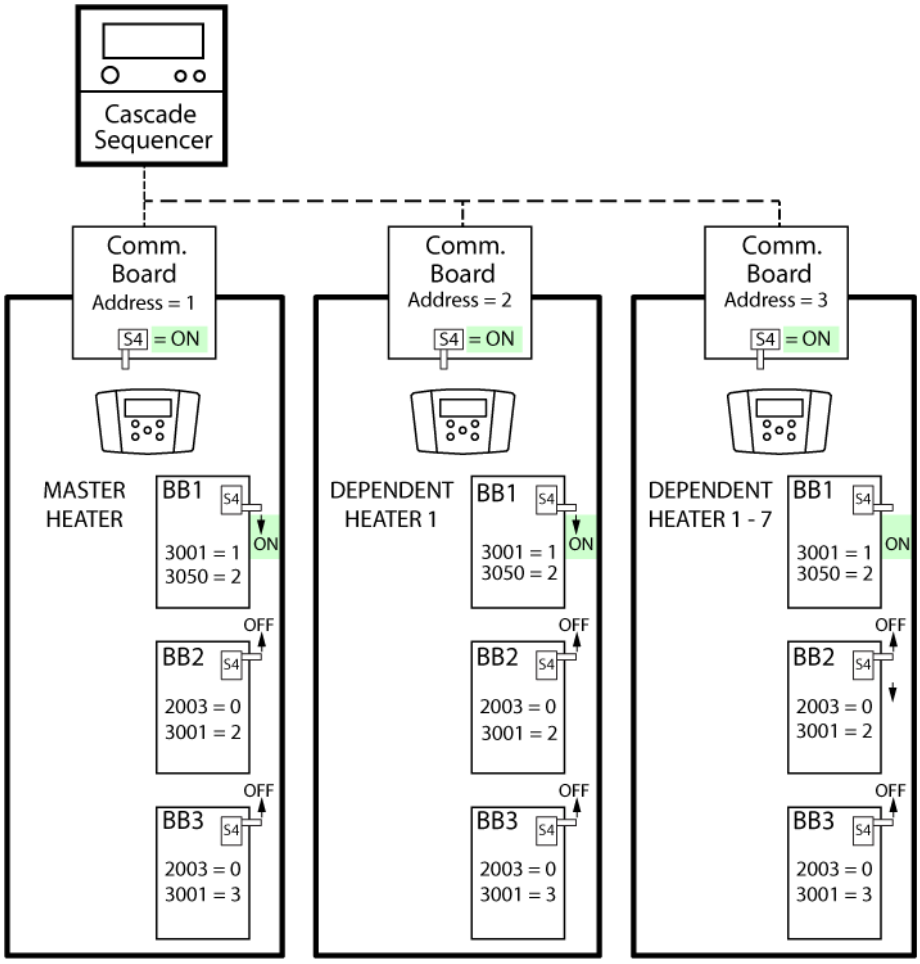

Figure 1-18b: AM 750 Cascade Configuration and Settings Diagram

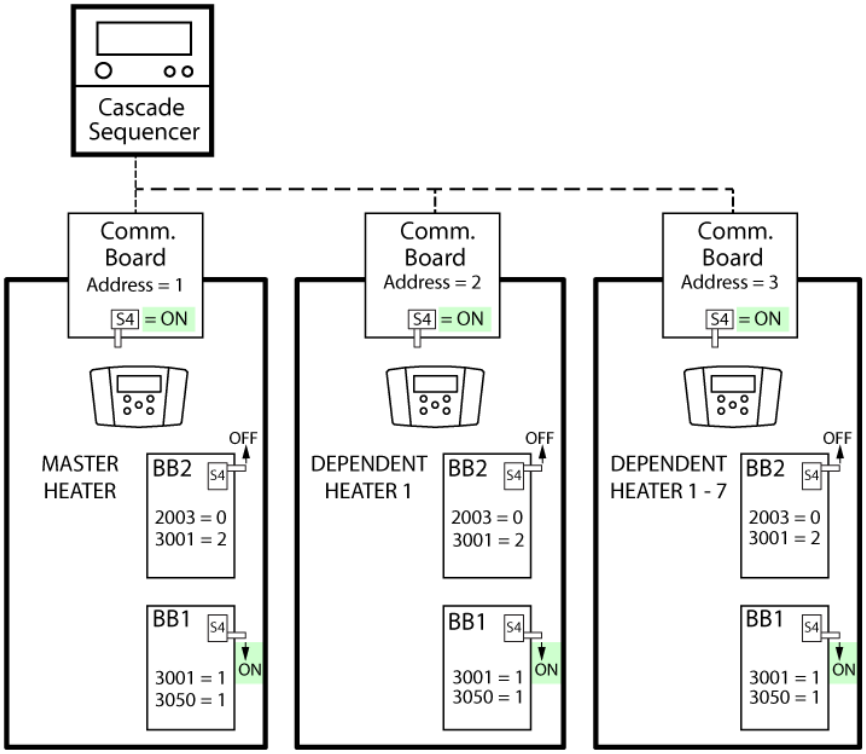

Figure 1-18c: AM 399-500 Cascade Configuration and Settings Diagram

1.10 Removing the Cascade Sequencer

To remove the cascade sequencer from the system and return all units to normal boiler operation as un-sequenced, individual units, perform the following procedure:

Removing the Cascade Sequencer

1. Connect the Cascade Sequencer to the last dependent boiler per Section 1.6 and set cascade logic address to 0.
2. One at a time, connect the Cascade Sequencer to each dependent boiler per Section 1.6 and set cascade address to 0 until all dependent heaters are set to 0.
3. Connect the Master boiler per Section 1.6 and set cascade address to 0.
4. Unwire the cascade sequencer from the system and remove all daisy chain wiring between the heaters.

CHAPTER 2: OPERATION

NOTE:

After turning on power, wait at least 40 seconds for communication between sequencer and heaters to finish before performing any operations. Wait for the cascade manager to recognize the address of the master boiler or water heater.

2.1 Cascade Sequencer Display and Controls

The AM Series Cascade Sequencer features a display and lower cover that is opened to reveal a number of buttons, as shown in Figure 2-1. In the default display shown in Fig- 2-1, the icons labeled "M" and "D" in the left display field represent the firing rate and current state of the first and second burners in the master unit and are not important to the function of the cascade manager. Similarly, the information field only refers to the Master boiler.

If the outdoor temperature sensor is not connected it will display a temperature of "-40". Similarly, if the cascade temperature sensor is not connected it will display a temperature of roughly 12 to 14 degrees.

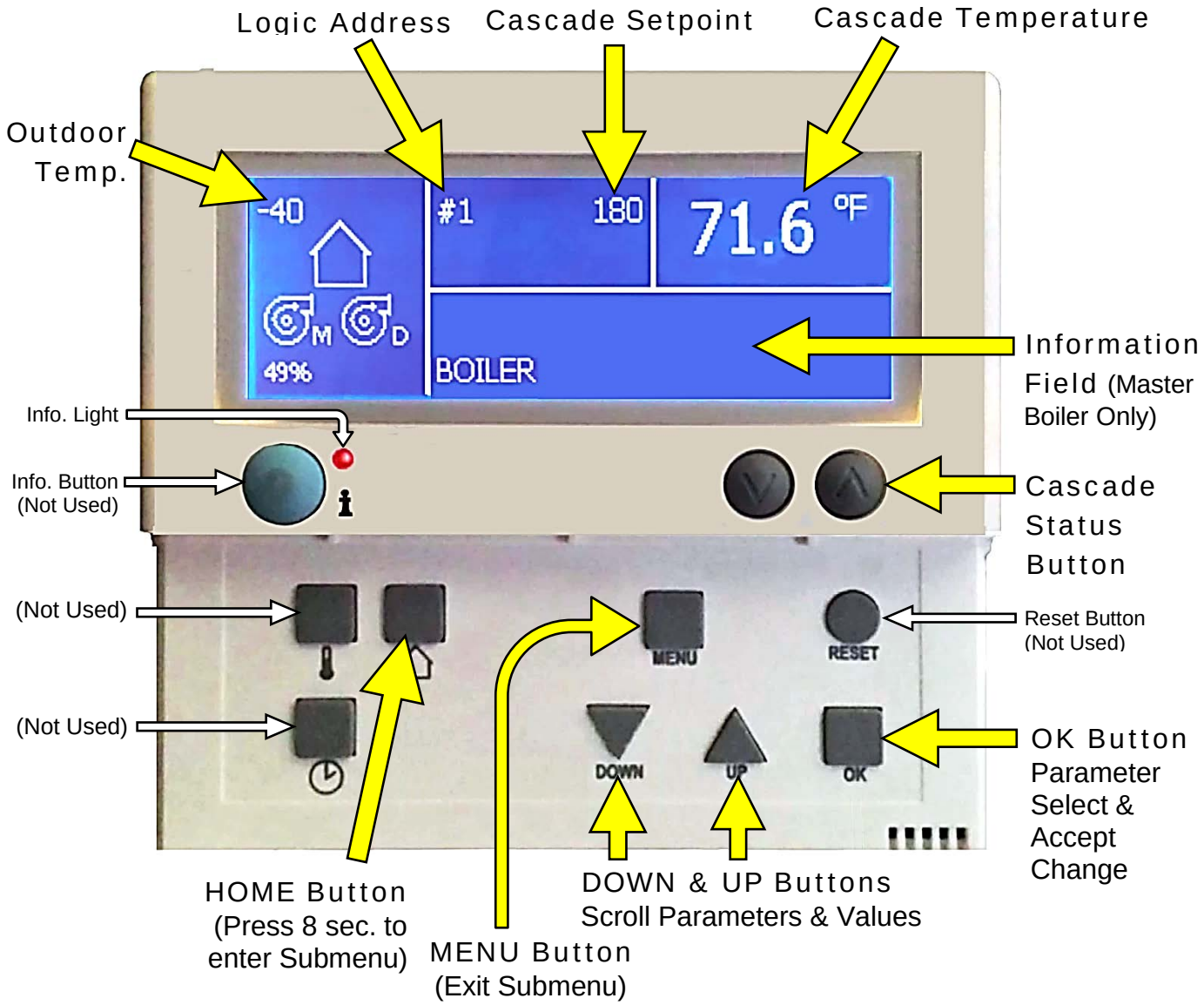

Figure 2-1: Cascade Sequencer Front Panel Features (Lower Cover Open)

2.2 Cascade Status Button

By pressing the Cascade Status button (Figure 2-1), the lower half of the display will change to show the status of the cascade boilers (Figure 2-2). The designated number for each boiler in the cascade system will be displayed, such as 1, 2, 3, 4, etc., up to 8. If there is a request for heating for any heater, a flame icon will appear under that heater's number. The absence of a flame icon under the number represents a heater in standby mode. If there is a fault, a "wrench" icon will be displayed under the heater's number.

The Cascade Status display shown in Figure 2-2 indicates there are three heaters in the cascade, with numbers 1 and 2 calling for heat, and number 3 in standby mode.

NOTE: Due to the slow communication protocol, it may take up to 40 seconds for the Cascade Status screen to update the status of an individual boiler or water heater.

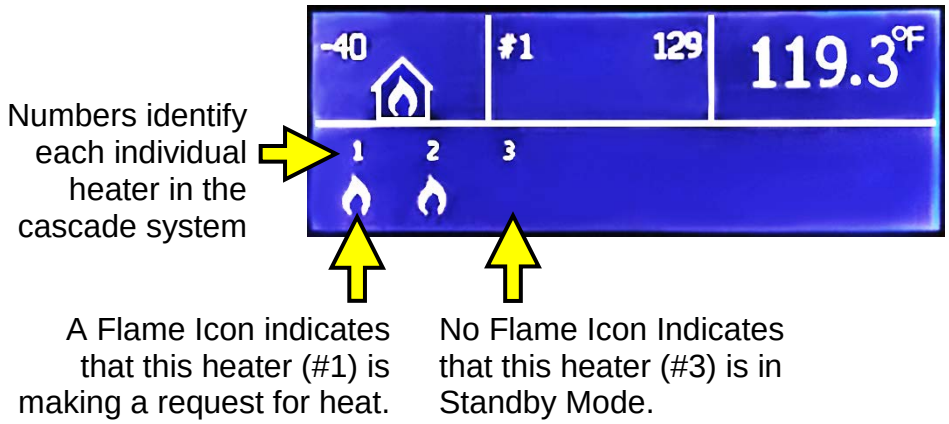

Figure 2-2: Cascade Status Display (When Cascade Button Pressed)

2.3 Submenu Navigation, and Parameter Settings

The sub-menu may be accessed, navigated, and parameters changed as instructed below.

Submenu Navigation and Parameter Settings

1. To access the Submenu, press and hold the **Home button** (Fig. 2-1) for eight seconds, then release.
2. Use the **Up** or **Down buttons** (Figure 2-1) to scroll through the list of Submenu parameters. A dot to the left of the parameter indicates it is currently selected (Fig. 2-3).

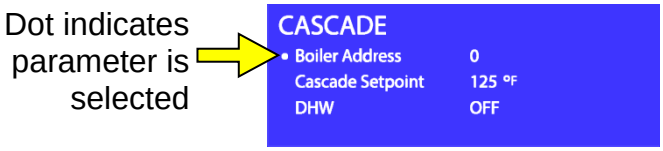

Figure 2-3: Sub Menu - Selecting the Parameter to Change

3. When desired parameter is selected (dot), press **Ok button**. The dot will then appears to the left of the parameter setting (Figure 2-4) and begins to blink, indicating it may be adjusted.

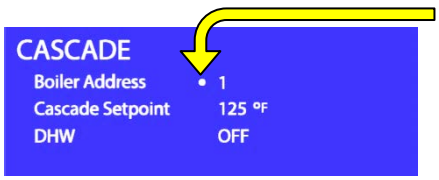

Figure 2-4: Sub Menu – Changing the Parameter Setting

Submenu Navigation and Parameter Settings – Continued

4. Use the **Up** or **Down buttons** to change the parameter value up or down.
5. When the desired value is displayed, save it by pressing the **Ok button**. To reject the change, do not press OK, and instead skip to the next step.
6. To leave the Sub Menu and return to the Main menu, press the **Menu button** (Figure 2-1).

IMPORTANT NOTE!

After any change to a parameter, wait at least 40 seconds before exiting the sub menu or turning the power off.

2.4 Sub-Menu Parameter Descriptions

Below is a list of Menu parameters and descriptions. The table in the next section lists the range and default settings for each parameter.

Cascade Sequencer Parameter Descriptions	
PARAMETER	**DESCRIPTION**
Boiler address	Boiler cascade logic address. **NOTE:** This is NOT the Modbus address. Refer to the AM User Manual GF-146 for how to set the Modbus address.
Cascade setpoint	Cascade header setpoint
DHW ON..OFF	Enable / disable control for an indirect water heater
Start delay time	Delay for a call of the next boiler
Stop delay time	Delay to remove the call to the next boiler
Start boiler diff	Temperature differential to call the next boiler
Stop boiler diff	Temperature differential to remove the call to the next boiler
Stop all boiler diff	Temperature differential to remove the call to all boilers
Max offset up	Maximum difference *above* the header setpoint that any one boiler is allowed to reach.
Max offset down	Maximum difference *below* the header setpoint that any one boiler is allowed to reach.
Rotation interval	How often the “lead” boiler is rotated.
P Value	Proportional band of the PID temperature control of the cascade general sensor
I Value	Integral band of the PID temperature control of the cascade general sensor
D Value	Derivative band of the PID temperature control of the cascade general sensor
Slew rate	Slew rate is a low level parameter. It determines how fast the output of a PID can change per amount of time.
System correction	The system correction value is added to the measured system temperature. This corrected value is used for control. If the measured sensor value deviates from the real temperature then you can correct it with this parameter.
Mod delay factor	Delay to the start of modulation of any boiler.

2.5 Sub-menu Parameter Range and Default settings

Below is a list of the menu parameters with range and default settings. There is a table in the previous section that provides a description of each parameter.

Cascade Sequencer Sub-Menu Parameter List						
PARAMETER	UNITS	RANGE	FACTORY	BOILER SETTINGS	WATER HEATER SETTINGS	CUSTOM
Boiler address	/	0 …..16	0	0 - Stand Alone heater 1 – Master Heater 2 – 1st Dependent Heater 3 – 2nd Dependent Heater 4 – 3rd……etc	0 - Stand Alone heater 1 – Master Heater 2 – 1st Dependent Heater 3 – 2nd Dependent Heater 4 – 3rd……etc	
Temperature Unit	-	°C - °F	-	-	-	
Cascade Setpoint	°F	68..194	140	140	140	
DHW ON..OFF	/	ON - OFF	OFF	ON (only if you want to drive an indirect water heater)	OFF	
Start delay time	sec	0 - 1200	600	600	15	
Stop delay time	sec	0 - 1200	600	600	15	
Start boiler diff	°F	0.9 - 22.5	5	5	5	
Stop boiler diff	°F	0 - 45	2	2	2	
Stop all boiler	°F	0 - 45	18	18	18	
Max offset up	°F	0 - 36	18	18	18	
Max offset down	°F	0 - 36	18	18	18	
Rotation interval	Days	0 - 30	5	5	5	
P Value	/	0 - 255	20	20	20	
I Value	/	0 - 120	120	120	120	
D Value	/	0..255	0	0	0	
Slew rate	/	1 - 255	5	5	5	
System correction	°F	0 - 18	0	0	0	
Mod delay factor	min	0 - 60	4	4	0	

2.6 Troubleshooting Guide

Below is a list of possible issues and corrective actions.

Cascade Sequencer Troubleshooting Guide	
ISSUE	**CORRECTIVE ACTION**
Cannot set the unit address when installing cascade sequencer **OR** When trying to set the unit address, the new address does not appear on the cascade sequencer.	• Double check all wiring. • Ensure settings and switches are correct as per Figure 1-18. • Contact AERCO Customer Service.
Cascade system does not seem to be communicating correctly.	• Double check all wiring. • Ensure settings and switches are correct as per Figure 1-18. • Make sure that all units show up under the Cascade Status menu.
When trying to set the unit address, "#5" appears on all units.	This may indicate incorrect software in the communications module. Contact AERCO technical support for further information.
Domestic water heating tank is not reacting quickly.	Check that the parameters are all set according to the "Water Heater Settings".
System loop is not reaching desired setpoint.	• Check the location of the cascade header temperature sensor. Ensure that the sensor is located such that it will see flow from both the primary and secondary loops. • Check parameters 1120-1123 on each unit. Ensure that all modules are running at maximum capacity. If not, wait 10 minutes for burners to modulate up and check again. • Check each unit's outlet temperature on the individual boiler or water heater interface. If Cascade Setpoint + Max Offset Up is less than or equal to any individual unit's outlet temperature, increase the Max Offset Up parameter.
Outdoor air temperature sensor on cascade sequencer shows "-40".	• Check that the sensor is wired to terminals 14 & 15 of the master boiler. • Make sure all electrical connections are tight. • Check sensor resistivity.
Cascade sequencer header temperature displays a low value (10-16°F).	Check that the cascade header temperature sensor is installed in terminals 24 & 25 of the master boiler or water heater.
Err 116 on boiler/water heater or other fault on Cascade Sequencer that will not clear.	Ensure the boiler will operate without faults when not connected to the Cascade Sequencer. Only then should the Sequencer be installed.

Cascade Sequencer Troubleshooting Guide	
ISSUE	**CORRECTIVE ACTION**
Cascade Sequencer screen flashes on and off rapidly.	Ensure the S4 switch on the Communications Module is ON (to the left).
Cascade Sequencer screen does not light up.	• Ensure the wires are connected to both the Sequencer and terminals 16 & 17 of the boiler being addressed • Ensure the S4 switch on the Communications Module is ON (to the left).
Boiler address is correctly set in each unit but the units do not display on the Sequencer screen.	• Ensure the daisy chain wires are correctly in place. • Ensure the Cascade Status Menu is being displayed on the Sequencer. • Turn off all boilers. Turn boiler #1 on and wait for the Sequencer to recognize it, up to 3 minutes. Then turn boiler #2 on and wait for the Sequencer to recognize it, up to 3 minutes. Continue for all units present.
Dependent boiler seems to be operating independently.	Verify that the unit is still present on the communication chain by looking at the Sequencer's Cascade Status menu.
Cascade Sequencer screen does not match actual boiler operation.	• Ensure the Cascade Status menu is being displayed on the Sequencer. • Wait 40 seconds and re-check. The communication protocol used may take up to 40 seconds to update current unit status.

NOTES:

Change Log:

Date	Description	Changed By
11/18/2015	**Rev-C:** Combined Rev-B with new Rev-C manual to cover units S/N 14999999 and lower, and 15000000 and higher.	Curtis Harvey
04/29/2015	**Rev D:** Added Cascade Sequencer part number to section. Reformatted and redesigned per new standard, corrected per markup per AM drawn from new manual. Udated images, instructions, secs, and troubleshooting.	Curtis Harvey