

prestige

Control Application Supplement - ACVMax



! WARNING

This document is intended to be used by a factory trained and qualified heating contractor or service technician only. Read all instructions within this document and within the PRESTIGE Boiler Installation and Maintenance Manual before proceeding. It is recommended to follow the procedures in the steps given. Skipping or missing procedural steps could result in severe personal injury, death or substantial property damage.

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Product and Safety Information

IMPORTANT INFORMATION - READ BEFORE PROCEEDING

 **WARNING**

This document is intended to be used by a factory trained and qualified heating contractor or service technician only. Read all instructions within this document and within the **PRES-TIGE Boiler Installation and Maintenance Manual** before proceeding. It is recommended to follow the procedures in the steps given. Skipping or missing procedural steps could result in severe personal injury, death or substantial property damage.

NOTICE

This Control Application Supplement applies to ACVMax controls with the following software version numbers:

Display SWv.1.22
Burner Controller SW v.0.30

The software version numbers are displayed on the initial screen after turning on the unit.

DEFINITIONS

The following terms are used throughout this manual to bring attention to the presence of potential hazards or to important information concerning the product.

 **DANGER**

Indicates the presence of a hazardous situation which, if ignored, will result in death, serious injury or substantial property damage.

NOTICE

Indicates special instructions on installation, operation or maintenance, which are important to the equipment but not related to personal injury hazards.

 **WARNING**

Indicates a potentially hazardous situation which, if ignored, can result in death, serious injury or substantial property damage.

BEST PRACTICE

Indicates recommendations made by ACV-Triangle Tube for the installers which will help to ensure optimum operation and longevity of the equipment.

 **CAUTION**

Indicates a potentially hazardous situation which, if ignored, may result in minor injury or substantial property damage.

NOTICE

ACV-Triangle Tube reserves the right to modify the technical specifications and components of its product without prior notice.

1.0 Operating Information

1.0 OPERATING INFORMATION

The ACVMax Boiler Management System is designed to be flexible yet easy to use. ACVMax monitors and controls the Prestige to operate as efficiently as possible. ACVMax monitors the boiler supply, return and flue gas temperatures and operates the igniter, gas valve and blower. ACVMax uses this information to modulate the boiler's firing rate to maintain the required setpoint.

ACVMax offers many advanced control options, which may be adjusted for various applications to achieve optimum boiler efficiency and operation.

- Two central / space heating (CH) call inputs with separate outdoor reset curves.
- Two temperature central/space heating (CH) temperature control via optional mixing valve.
- Domestic Hot Water (DHW) call input with optional priority.
- System temperature sensing and control with an optional system temperature sensor.
- Cascade function allows up to six Prestige boilers to operate together in a single heating system.
- Modbus interface for integrating with building management systems.

These advanced features are adjustable in the Installer Menu after entering an access code.

1.0 Operating Information

1.1 Entering Installer Access Code

The **INSTALLER** button (the small round button) provides the installing contractor with full access to all available features after entering an access code.

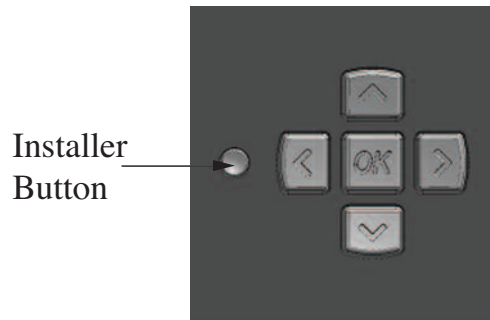


Fig. 1: ACVMax Navigation Buttons





Entering installer access code procedure

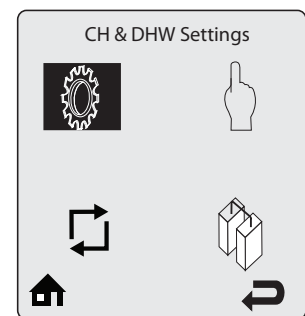
1. Press the round **INSTALLER** button.
2. Enter the installer access code “054” by using the **LEFT** and **RIGHT** buttons to select a digit and the **UP** and **DOWN** buttons to change the digit. Press the **OK** button to enter the access code.
3. The Installer Menu will be displayed after successfully entering the access code. The Home Screen will be displayed if the access code is not entered correctly.

NOTICE

Entering the installer access code allows the installer to make adjustments for 30 minutes. After 30 minutes, the access code will need to be entered again to make any adjustments.

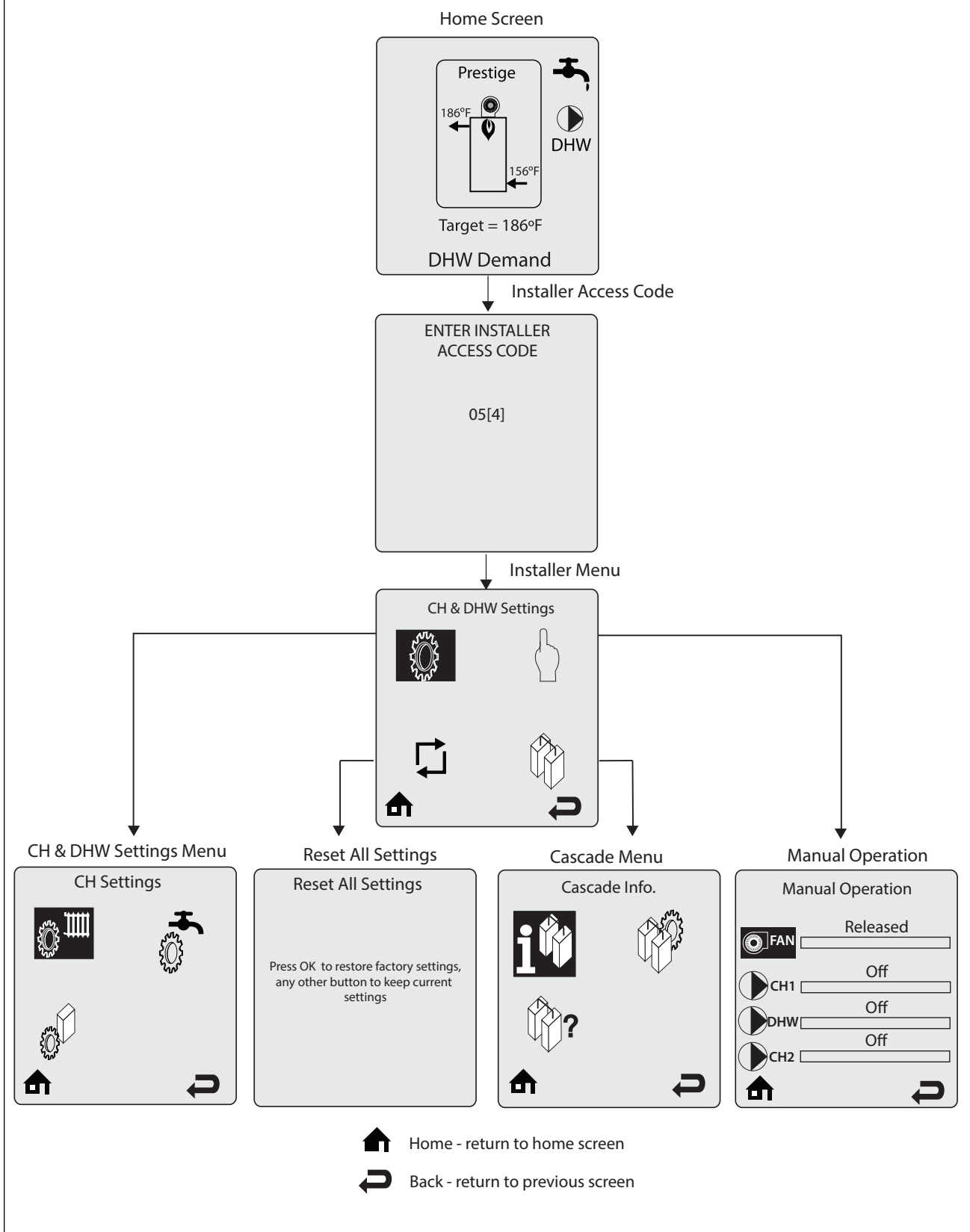
The Installer Menu is divided into four sections:

1. CH & DHW Settings  – Allows the installer to adjust the boilers central / space heating, domestic hot water and boiler settings for the application. See pages 5 through 35.
2. Manual Operation  – The burner and circulators can be manually enabled for testing. See page 59.
3. Reset All Settings  – Resets all CH, DHW, Boiler, and Cascade Settings back to the factory defaults. See pages 36 through 37.
4. Cascade  – Allows the installer to setup, adjust, and monitor the Cascade System. See pages 38 through 56.



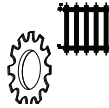
1.0 Operating Information

1.2 ACVMax Installer Menu Structure



2.0 CH Settings

2.0 CH SETTINGS



2.1 Navigation:


Home Screen > Installer Menu > CH & DHW Settings > CH Settings

The CH Settings menu contains settings related to central heating operation. Each line contains a CH Setting followed by its current value. Six CH Settings are displayed on the screen at one time. Press the **UP** or **DOWN** buttons to scroll through additional CH Settings.

2.2 Heating Operation

Default: Enabled

Heating Operation allows the central heating function to be enabled and disabled. Press the **UP** or **DOWN** buttons to select Enabled or Disabled then press the **OK** button to store the setting.

- **Enabled** - The Prestige will respond to a central heating call.
- **Disabled** - The Prestige will not respond to a central heating call. The heating operation disabled icon () is displayed on the home screen when central heating operation has been disabled.

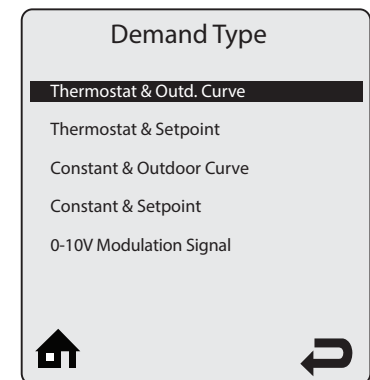
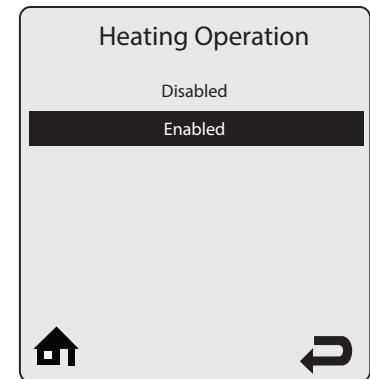
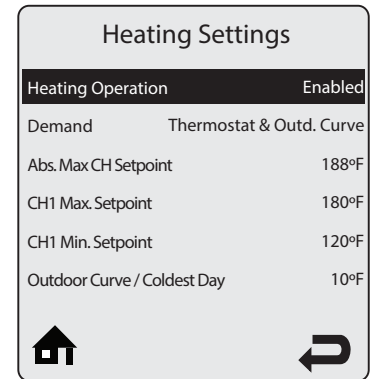
Freeze protection will remain enabled when Heating Operation is Disabled.

2.3 Demand Type

Default: Thermostat & Outd. Curve

Demand Type allows the installer to select how a CH Demand is generated. Press the **UP** or **DOWN** buttons to select the CH Demand Type then press the **OK** button to store the setting. The CH Demand options are:

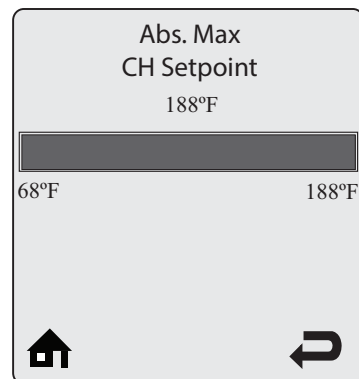
- **Thermostat & Outd. Curve** – A central heating call from a dry contact switch will enable the Prestige and the setpoint will vary with the outdoor temperature for central heating calls.
- **Thermostat & Setpoint** - A central heating call from a dry contact switch will enable the Prestige and the setpoint will be fixed for central heating calls.
- **Constant & Outdoor Curve** - The Prestige will maintain setpoint and the central heating circulators will be constantly enabled without an external call from a dry contact switch. The central heating circulators will be disabled when the outdoor temperature exceeds the Warm Weather Shutdown Temperature setting. The setpoint will vary with the outdoor temperature for central heating calls.
- **Constant & Setpoint** - The Prestige will maintain setpoint and the central heating circulators will be constantly enabled without an external call from a dry contact switch. The central heating circulators will be disabled when the outdoor temperature exceeds the Warm Weather Shutdown Temperature setting. The setpoint will be fixed for central heating calls.
- **0-10V Modulation Signal** – This option allows the Prestige firing rate to be controlled by an external control system with a 0-10 VDC signal.



2.0 CH Settings

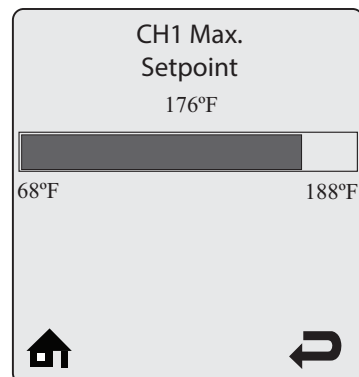
2.4 Absolute Max CH Setpoint **Default: 188°F [87°C]**

Absolute Max CH Setpoint can be used to prevent a user from adjusting the central heating setpoint or outdoor reset curve above a safe operating temperature in the EZ Setup Menu. A warning screen will be displayed in EZ Setup if the user attempts to raise the setpoint above the Absolute Max CH Setpoint. The Absolute Max CH Setpoint will be displayed on the outdoor reset curve in EZ Setup if the user selects an outdoor reset curve which goes above the Absolute Max CH Setpoint. Press the **LEFT** or **RIGHT** buttons to adjust the Absolute Max CH Setpoint then press the **OK** button to store the setting.



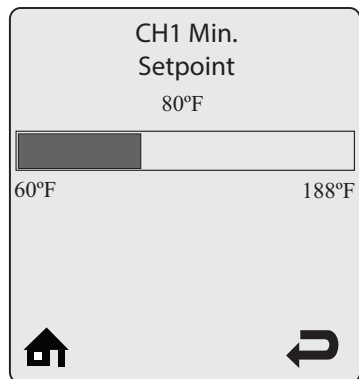
2.5 CH1 Maximum Setpoint **Default: 176°F [80°C]**

CH1 Maximum Setpoint is the maximum setpoint for a CH1 heating call when an Outdoor Curve option is chosen in Demand Type. CH1 Maximum Setpoint is the fixed setpoint for a CH1 heating call when a Setpoint option is chosen in CH Demand. Press the **LEFT** or **RIGHT** buttons to adjust the CH1 Maximum Setpoint then press the **OK** button to store the setting.



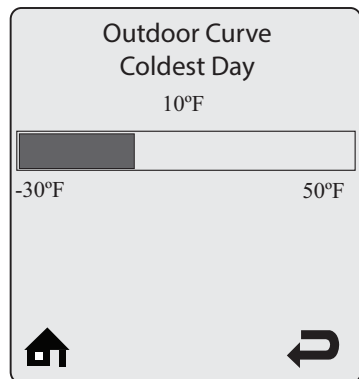
2.6 CH1 Minimum Setpoint **Default: 80°F [27°C]**

CH1 Minimum Setpoint is the minimum setpoint for a CH1 heating call when an Outdoor Curve option is chosen in Demand Type. This setting is not applicable when a Setpoint option is chosen in Demand Type. CH1 Minimum Setpoint must be set equal to or below the CH1 Maximum Setpoint. Press the **LEFT** or **RIGHT** buttons to adjust the CH1 Minimum Setpoint then press the **OK** button to store the setting.



2.7 Outdoor Curve Coldest Day **Default: 10°F [-12°C]**

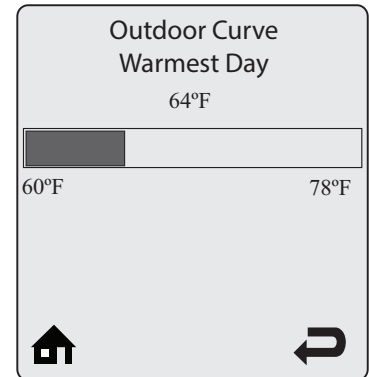
Outdoor Curve Coldest Day is the coldest outdoor design temperature of the heating system when an Outdoor Curve option is chosen in Demand Type. This setting is not applicable when a Setpoint option is chosen in Demand Type. Press the **LEFT** or **RIGHT** buttons to adjust the Outdoor Curve Coldest Day then press the **OK** button to store the setting.



2.0 CH Settings

2.8 Outdoor Curve Warmest Day **Default: 64°F [18°C]**

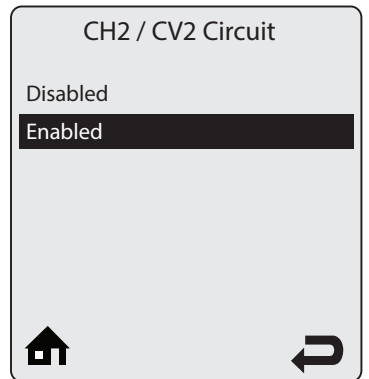
Outdoor Curve Warmest Day is the warmest outdoor design temperature of the heating system when an Outdoor Curve option is chosen in Demand Type. This setting is not applicable when a Setpoint option is chosen in Demand Type. Press the **LEFT** or **RIGHT** buttons to adjust the Outdoor Curve Warmest Day then press the **OK** button to store the setting.



2.9 CH2 Circuit **Default: Enabled**

CH2 Circuit allows the CH2 Maximum and Minimum Setpoints to be enabled and disabled. When disabled, the CH2 heating call will operate using the CH1 Maximum and Minimum Setpoints. Press the **UP** or **DOWN** buttons to select Enabled or Disabled then press the **OK** button to store the setting.

- **Enabled** – A CH2 heating call will use CH2 Maximum and Minimum Setpoints.
- **Disabled** – A CH2 heating call will use CH1 Maximum and Minimum Setpoints.




2.10 CH2 Maximum Setpoint **Default: 140°F [60°C]**

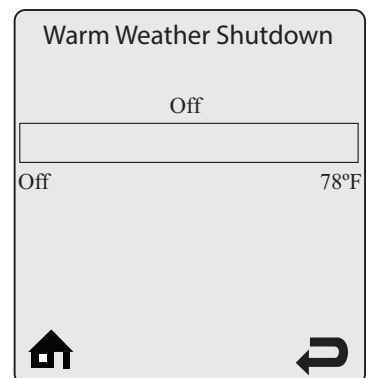
CH2 Maximum Setpoint is the maximum setpoint for a CH2 heating call when an Outdoor Reset option is chosen in CH Demand. CH2 Maximum Setpoint is the fixed setpoint for a CH2 heating call when a Setpoint option is chosen in CH Demand. Press the **LEFT** or **RIGHT** buttons to adjust the CH2 Maximum Setpoint then press the **OK** button to store the setting.

2.11 CH2 Minimum Setpoint **Default: 80°F [27°C]**

CH2 Minimum Setpoint is the minimum setpoint for a CH2 heating call when an Outdoor Reset option is chosen in CH Demand. This setting is not applicable when a Setpoint option is chosen in CH Demand. CH2 Minimum Setpoint must be set equal to or below the CH2 Maximum Setpoint. Press the **LEFT** or **RIGHT** buttons to adjust the CH2 Minimum Setpoint then press the **OK** button to store the setting.

2.12 Warm Weather Shutdown **Default: OFF**

Warm Weather Shutdown allows the installer to enter an optional outdoor temperature at which to disable the central heating function and any circulators placed into constant circulation with the Circulation Pump Permanent setting. The Prestige will continue to respond to a domestic hot water call or a 0-10V Modulation Signal when the outdoor temperature exceeds the Warm Weather Shutdown Temperature setting. Press the **LEFT** or **RIGHT** buttons to adjust the Warm Weather Shutdown Temperature then press the **OK** button to store the setting. The Warm Weather Shutdown icon  is displayed on the home screen when the outdoor temperature reaches the Warm Weather Shutdown Temperature.

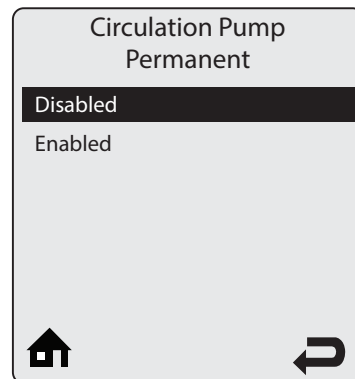


2.0 CH Settings

2.13 Circulation Pump Permanent Default: Disabled

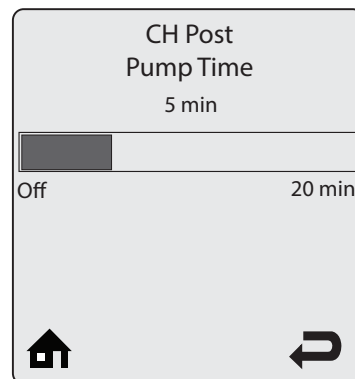
Circulation Pump Permanent allows the circulators configured for central heating calls in Pump Settings to be constantly enabled even without a central heating call. The Warm Weather Shutdown function will disable circulators enabled via this function. A domestic hot water call will cause the circulators to be disabled during the domestic call as long as DHW Priority is enabled. Press the **UP** or **DOWN** buttons to select Enabled or Disabled then press the **OK** button to store the setting.

- **Enabled** – The central heating circulators will be enabled for constant circulation without a central heating call.
- **Disabled** – The central heating circulators will only be enabled during a central heating call.



2.14 CH Post Pump Time Default: 5 Minute

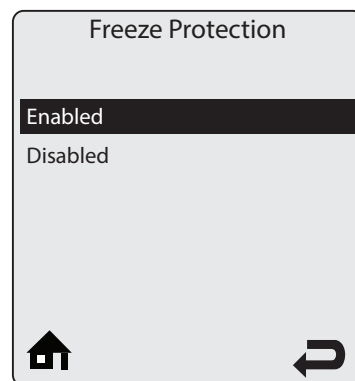
CH Post Pump Time sets how long the circulators configured for central heating calls in Pump Settings will continue to operate at the completion of a heating call. The CH Post Pump feature allows the heat remaining in the boiler at the completion of a call to be sent to the heating system, which will improve the overall efficiency of the system. Press the **LEFT** or **RIGHT** buttons to adjust the CH Post Pump Time then press the **OK** button to store the setting.



2.15 Freeze Protection Default: Enabled

Freeze Protection allows the freeze protection feature to be enabled and disabled. Press the **UP** or **DOWN** buttons to select Enabled or Disabled then press the **OK** button to store the setting.

- **Enabled** – The Freeze Protection feature is enabled to protect the boiler from freezing. This feature monitors the boiler water temperature and responds as follows when no call is present:
 - 46°F [8°C] – Circulators configured to respond to a CH1 Call are enabled.
 - 42°F [6°C] – Burner operates at low fire and circulators configured to respond to a CH1 or CH2 Call are enabled.
 - 60°F [15°C] – Freeze protection ends. Burner & all pumps turn OFF after completing CH Post Pump Time.
- **Disabled** – The Freeze Protection feature is disabled.



2.0 CH Settings

WARNING

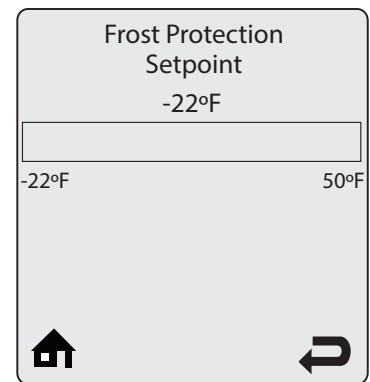
Freeze Protection should only be disabled when the system contains antifreeze to prevent the system from freezing. Serious damage could occur to the Prestige as well as the entire heating system if Freeze Protection is disabled without antifreeze in the system.

WARNING

The Prestige should NEVER be installed in a location where freezing could occur. Subjecting the Prestige to freezing conditions could lead to freezing of the condensate possibly causing serious injury or death.

2.16 Frost Protection Setpoint Default: -22°F [-30°C]

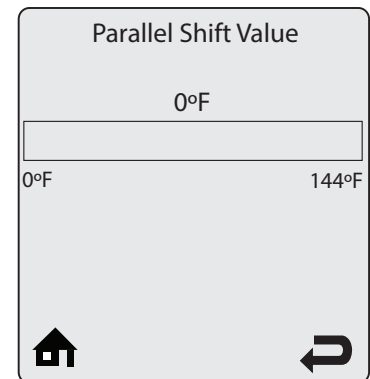
Frost Protection will enable the circulators configured for central heating calls in Pump Settings if the outdoor temperature falls below the Frost Protection Setpoint and no call is present. This feature requires using the outdoor temperature sensor and is always active and cannot be disabled. Press the **LEFT** or **RIGHT** buttons to adjust the Frost Protection Setpoint then press the **OK** button to store the setting.



The screenshot shows the 'Frost Protection Setpoint' menu. At the top, the title 'Frost Protection Setpoint' is displayed above the current value '-22°F'. Below this is a horizontal slider bar. The left end of the slider is labeled '-22°F' and the right end is labeled '50°F'. At the bottom of the screen, there are two icons: a house icon on the left and a right-pointing arrow icon on the right.

2.17 Parallel Shift Value Default: 0°F [0°C]

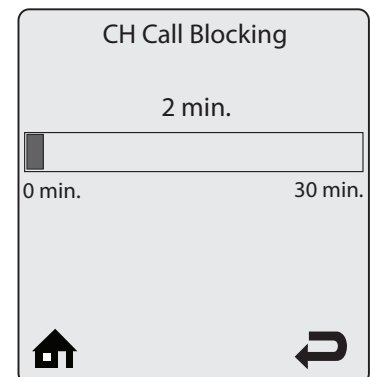
Parallel Shift allows the CH setpoint to be externally adjusted when a Constant option is chosen in CH Demand. When a Constant option is chosen in CH Demand, continuous CH1 and CH2 heating calls are generated. Simultaneous CH1 and CH2 calls will result in the Prestige operating at the highest CH1 or CH2 setpoint. The CH1 or CH2 Thermostat terminals with the highest setpoint will be used to adjust the setpoint. If the Thermostat terminals with the highest setpoint are open, the CH setpoint will decrease by the Parallel Shift Value. If the Thermostat terminals with the highest setpoint are closed, the CH setpoint will return to the highest CH1 or CH2 setpoint. Press the **LEFT** or **RIGHT** buttons to adjust the Parallel Shift Value then press the **OK** button to store the setting.



The screenshot shows the 'Parallel Shift Value' menu. At the top, the title 'Parallel Shift Value' is displayed above the current value '0°F'. Below this is a horizontal slider bar. The left end of the slider is labeled '0°F' and the right end is labeled '144°F'. At the bottom of the screen, there are two icons: a house icon on the left and a right-pointing arrow icon on the right.

2.18 CH Call Blocking Default: 2 Minute

CH Call Blocking sets the minimum time between burner firings for central heating calls. At the completion of a burner firing, the CH Call Blocking time will begin. The burner will not fire again until after the CH Call Blocking time has elapsed. The burner will not fire again until after the CH Call Blocking time has elapsed. The CH Call Blocking time only prevents the burner from firing, the central heating circulators will respond to a central heating call. This blocking time has no affect on domestic hot water calls. The CH Call Blocking feature prevents short cycling of the burner and extends the life of the burner components. Press the **LEFT** or **RIGHT** buttons to adjust the CH Call Blocking time then press the **OK** button to store the setting.



The screenshot shows the 'CH Call Blocking' menu. At the top, the title 'CH Call Blocking' is displayed above the current value '2 min.'. Below this is a horizontal progress bar with a dark grey fill. The left end of the bar is labeled '0 min.' and the right end is labeled '30 min.'. At the bottom of the screen, there are two icons: a house icon on the left and a right-pointing arrow icon on the right.

3.0 DHW Settings

3.0 DHW SETTINGS



3.1 Navigation:

Home Screen>Installer Menu>CH & DHW Settings>DHW Settings


The DHW Settings menu contains settings related to domestic hot water operation. Each line contains a DHW Setting followed by its current value. Six DHW Settings are displayed on the screen at one time. Press the **UP** or **DOWN** buttons to scroll through additional DHW Settings.

DHW Settings	
DHW Operation	Enabled
Demand	Thermostat
DHW Boiler Setpoint	186°F
DHW Setpoint	140°F
DHW On Differential	6°F
DHW Storage Adder	46°F

3.2 DHW Operation

Default: Enabled

DHW Operation allows the domestic hot water function to be enabled and disabled. Press the **UP** or **DOWN** buttons to select Enabled or Disabled then press the **OK** button to store the setting.

- **Enabled** - The Prestige will respond to a domestic hot water call.
- **Disabled** - The Prestige will not respond to a domestic hot water call. The domestic hot water operation disabled icon  is displayed on the home screen when domestic hot water operation has been disabled.

DHW Operation	
Disabled	
Enabled	

3.3 Demand

PRESTIGE Solo Default: Thermostat
PRESTIGE Excellence Default: Sensor

Demand Type allows the installer to select the type of device which will generate a domestic hot water call. Press the **UP** or **DOWN** buttons to select the DHW Demand Type then press the **OK** button to store the setting. The DHW Demand options are:

- **Thermostat** - A domestic hot water call from an aquastat or dry contact switch will enable the Prestige with a fixed setpoint for a domestic hot water call.
- **Sensor** - This option requires the use of Indirect Water Heater Sensor PSRKIT22 which is included with every PRESTIGE Solo. The PRESTIGE Excellence utilizes an Indirect Water Heater Sensor. The Prestige will monitor the DHW storage temperature and generate a domestic hot water call when the temperature drops below the DHW Setpoint - DHW On Differential.

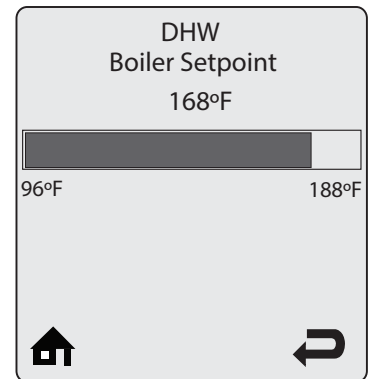
Demand Type	
Thermostat	
Sensor	

3.0 DHW Settings

3.4 DHW Boiler Setpoint

Default: 168°F [76°C]

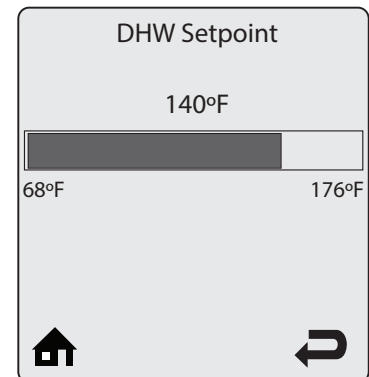
DHW Boiler Setpoint is the fixed boiler setpoint temperature during a domestic hot water call when the Thermostat option is chosen in DHW Demand. Press the **LEFT** or **RIGHT** buttons to adjust the DHW Boiler Setpoint then press the **OK** button to store the setting.



3.5 DHW Setpoint

Default: 140°F [60°C]

DHW Setpoint is the domestic hot water storage setpoint temperature when the Sensor option is chosen in DHW Demand. Press the **LEFT** or **RIGHT** buttons to adjust the DHW Setpoint then press the **OK** button to store the setting.



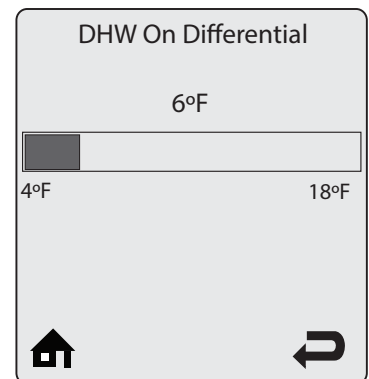
NOTICE

The boiler setpoint is automatically set to the DHW Setpoint + DHW Storage Adder when the Sensor option is chosen in DHW Demand. The boiler setpoint is limited to 194°F [90°C].

3.6 DHW On Differential

Default: 6°F [3°C]

DHW On Differential sets how far the DHW storage temperature must fall below the DHW Setpoint to create a domestic hot water call when the Sensor option is chosen in DHW Demand. The domestic hot water call will end when the DHW storage temperature rises above the DHW Setpoint. Press the **LEFT** or **RIGHT** buttons to adjust the DHW On Differential then press the **OK** button to store the setting.



! DANGER

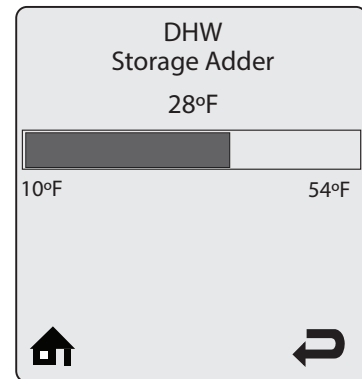
The DHW On Differential setting greatly affects the production of domestic hot water. A low setting could result in a rapid response to a domestic hot water call resulting in a potential scald hazard. It is strongly recommended that the installer utilize a thermostatic mixing valve on the hot water outlet of the Indirect Water Heater. Failure to comply could result in severe personal injury, death, or substantial property damage.

3.0 DHW Settings

3.7 DHW Storage Adder

Default: 46°F [25°C]

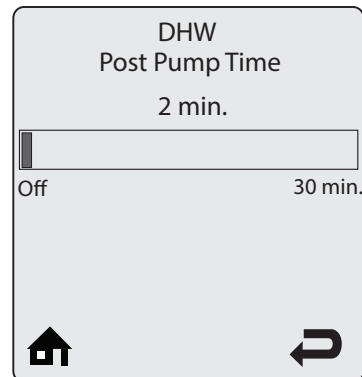
DHW Storage Adder is used to compute the boiler setpoint when the Sensor option is chosen in DHW Demand. The boiler setpoint will be DHW Setpoint + DHW Storage Adder for a domestic hot water call. Press the **LEFT** or **RIGHT** buttons to adjust the DHW Storage Adder then press the **OK** button to store the setting.



3.8 DHW Post Pump Time

Default: 2 Minute

DHW Post Pump Time sets how long the circulators configured for domestic hot water calls in Pump Settings will continue to operate at the completion of a domestic hot water call. The DHW Post Pump feature allows the heat remaining in the boiler at the completion of a call to be sent to the Indirect Water Heater, which will improve the overall efficiency of the system. Press the **LEFT** or **RIGHT** buttons to adjust the DHW Post Pump Time then press the **OK** button to store the setting.



3.9 DHW Priority Timeout

Default: Off

DHW Priority Timeout allows the installer to enter an optional time limit that a domestic hot water call has priority over a central heating call when DHW Priority is set to Enabled. Press the **LEFT** or **RIGHT** buttons to adjust the DHW Priority Timeout then press the **OK** button to store the setting.

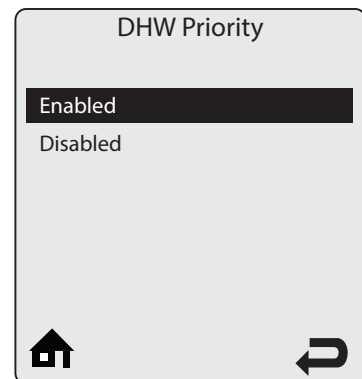


3.10 DHW Priority

Default: Enabled

DHW Priority allows the domestic hot water priority function to be enabled and disabled. Press the **UP** or **DOWN** buttons to select Enabled or Disabled then press the **OK** button to store the setting.

- **Enabled**- Domestic hot water calls will have priority over a central heating call. The boiler setpoint will be set to the domestic hot water setpoint during a domestic hot water call. The DHW circulator will be enabled and the heating circulators will be disabled during a domestic hot water call.
- **Disabled** - Domestic hot water calls will not have priority over a central heating call. The boiler setpoint will be set to the domestic hot water setpoint when only a domestic hot water call is present. The boiler setpoint will be set to the highest setpoint when simul-



3.0 DHW Settings

taneous domestic hot water and central heating calls are present. The DHW circulator will be enabled during a domestic hot water call. The heating circulators will be enabled during a central heating call.

WARNING

Simultaneous domestic hot water and central heating calls will result in the PRESTIGE operating at the highest target temperature when DHW Priority is set to Disabled. The use of a mixing device on the lower temperature zones may be required to protect the lower temperature zones from damage.

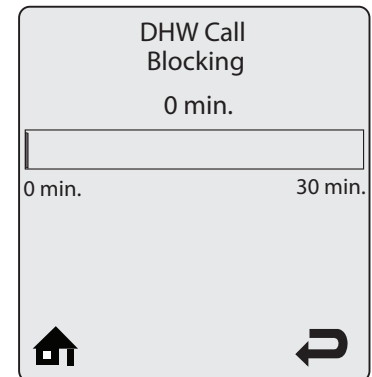
NOTICE

DHW Priority should only be set to Disabled when Prestige Model is set to Solo. Setting DHW Priority to Disabled when Prestige Model is set to Excellence will not disable DHW Priority.

3.11 DHW Call Blocking

Default: 0 Minute

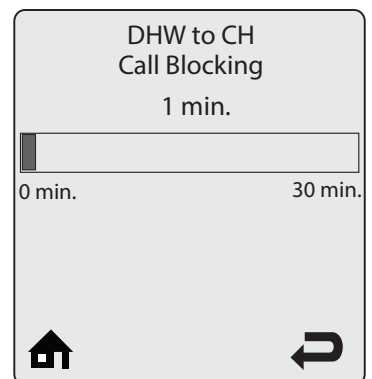
DHW Call Blocking sets the minimum time between burner firings for domestic hot water calls. At the completion of a burner firing, the DHW Call Blocking time will begin. The burner will not fire again until after the DHW Call Blocking time has elapsed. The DHW Call Blocking time only prevents the burner from firing, the circulators configured for domestic hot water calls in Pump Settings will respond to a domestic hot water call. This blocking time has no affect on central heating calls. The DHW Call Blocking feature prevents short cycling of the burner and extends the life of the burner components. Press the **LEFT** or **RIGHT** buttons to adjust the DHW Call Blocking time then press the **OK** button to store the setting.



3.12 DHW To CH Call Blocking

Default: 1 Minute

DHW To CH Call Blocking sets the minimum time between a DHW burner firing and a CH burner firing. At the completion of a DHW burner firing, the DHW to CH Call Blocking time will begin. The burner will not fire again for a central heating call until after the DHW To CH Call Blocking time has elapsed. The DHW To CH Call Blocking time only prevents the burner from firing, the circulators configured for central heating calls in Pump Settings will respond to a central heating call. This blocking time has no affect on domestic hot water calls. The DHW To CH Call Blocking feature prevents the burner from firing when switching from a domestic hot water call to a central heating call. This allows the remaining heat in the heat exchanger to be dissipated and potentially satisfy the central heating call. Press the **LEFT** or **RIGHT** buttons to adjust the DHW To CH Call Blocking time then press the **OK** button to store the setting.



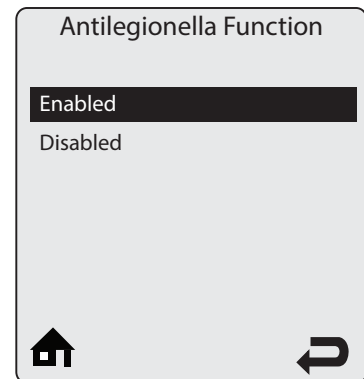
3.0 DHW Settings

3.13 Antilegionella Function

Default: Enabled

The Antilegionella Function ensures that an Indirect Water Heater is heated at least once per week to prevent the growth of Legionella bacteria. Press the **UP** or **DOWN** buttons to select Enabled or Disabled then press the **OK** button to store the setting.

- **Enabled**- When the Thermostat option is chosen in DHW Demand, a domestic hot water call is generated for 15 minutes once per week to heat the Indirect Water Heater. When the Sensor option is chosen in DHW Demand, a domestic hot water call is generated until the DHW storage temperature reaches 140°F [60°C] once per week. When the Sensor option is chosen in DHW Demand, the weekly timer is reset whenever the DHW storage temperature reaches 140°F [60°C] to prevent unnecessary firings. This function will be active even if DHW Operation has been set to Disabled.
- **Disabled** - The Prestige will only fire in DHW mode when a domestic hot water call is received.



WARNING

The Antilegionella Function should only be left enabled when an Indirect Water Heater is installed. Enabling the Antilegionella Function without an Indirect Water Heater will result in the Prestige firing once per week in DHW mode. This could cause a Manual Reset Hard Lockout resulting in substantial property damage.

BEST PRACTICE

The Antilegionella Function is most effective when the Sensor option is chosen in DHW Demand. The use of an Indirect Water Heater Sensor ensures that the domestic hot water is heated to 140°F [60°C] at least once per week.

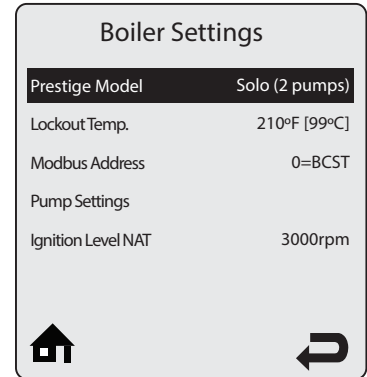
4.0 Boiler Settings

4.0 BOILER SETTINGS

4.1 Navigation:

Home Screen>Installer Menu>CH & DHW Settings>Boiler Settings

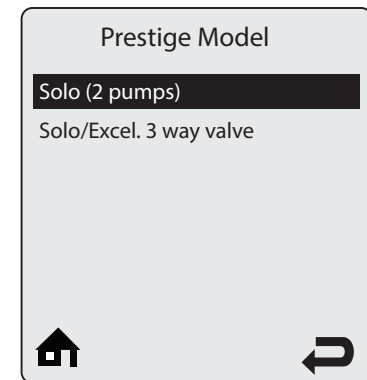
The Boiler Settings menu contains settings related to general boiler operation. Each line contains a Boiler Setting followed by its current value.



4.2 Prestige Model **PRESTIGE Solo Default: Solo (2 pumps)** **PRESTIGE Excellence Default: Solo/Excel. 3 way valve**

Prestige Model selects between Solo with pump operation and Excellence with 3-way diverter valve operation. Press the **UP** or **DOWN** buttons to select Solo (2 pumps) or Solo/Excel. 3 way valve then press the **OK** button to store the setting.

- **Solo (2 pumps)** - A CH Demand is satisfied using the circulators configured for central heating calls in Pump Settings. A DHW Demand is satisfied using the circulators configured for domestic hot water calls in Pump Settings.
- **Solo/Excel. 3 way valve** - CH and DHW Demands are satisfied by the built-in circulator and 3 way diverter valve.



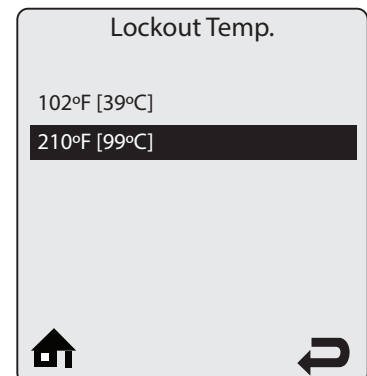
NOTICE

Excellence units also require setting Demand Type to Sensor for correct DHW operation.

4.3 Lockout Temp. **Default: 210°F [99°C]**

Lockout Temp. allows the High Boiler Temperature lockout (E3) to be temporarily adjusted down to 102°F [39°C] for inspector demonstration. Press the **UP** or **DOWN** buttons to select 210°F [99°C] or 102°F [39°C] then press the **OK** button to store the setting.

- **102°F [39°C]** – A High Boiler Temperature lockout (E3) will occur when the boiler temperature reaches 102°F [39°C].
- **210°F [99°C]** – A High Boiler Temperature lockout (E3) will occur when the boiler temperature reaches 210°F [99°C].

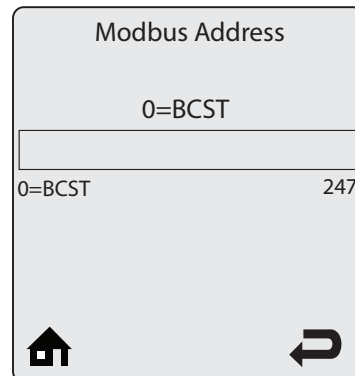


4.0 Boiler Settings

4.4 Modbus Address

Default:0=BCST

Modbus Address assigns the boiler with a unique address in the Modbus control system. Press the **LEFT** or **RIGHT** buttons to change the Modbus Address then press the **OK** button to store the setting. See Pages 57 & 58 for Modbus Interface information.



Modbus Address

0=BCST

0=BCST 247

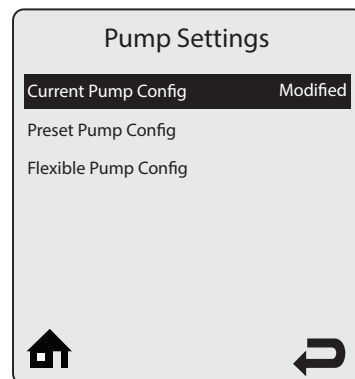
Home icon, Back icon

4.5 Pump Settings

Pump Settings allows the selection or assignment of the appropriate pump configuration for the installation piping arrangement. The current pump configuration will be displayed in the first line. There are numerous preset configurations to select from and a flexible configuration mode.

4.5.1 Current Pump Configuration

Current Pump Configuration displays the selected pump configuration or indicates that there is a custom pump configuration used by displaying “Modified.”



Pump Settings

Current Pump Config Modified

Preset Pump Config

Flexible Pump Config

Home icon, Back icon

4.5.2 Preset Pump Configuration

Prestige Model: Solo

Preset Pump Configuration will display thirteen options (Config 1 - Config 13) that correspond to specific hydraulic schemes. Please refer to Figs. 2 through 14 on pages 18-30. Press the **UP** or **DOWN** buttons to scroll through the options then press the **OK** button to store the setting.

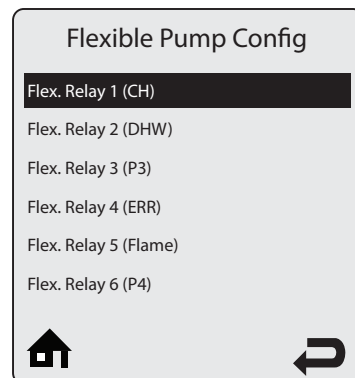
4.5.3 Preset Pump Configuration

Prestige Model: Excellence

Preset Pump Configuration will display four options (Solo/Excellence 1 - Solo/Excellence 4) that correspond to specific hydraulic schemes. Please refer to Figs. 15 through 18 on pages 31-34. Press the **UP** or **DOWN** buttons to scroll through the options then press the **OK** button to store the setting.

4.5.4 Flexible Pump Configuration

Flexible Pump Configuration allows the installer to customize the flexible relays to a specific installation arrangement that is not addressed in the Preset Pump Configuration options. There are a total of six Flexible Relays and an Error Relay setting that must be set.



Flexible Pump Config

Flex. Relay 1 (CH)

Flex. Relay 2 (DHW)

Flex. Relay 3 (P3)

Flex. Relay 4 (ERR)

Flex. Relay 5 (Flame)

Flex. Relay 6 (P4)

Home icon, Back icon

4.0 Boiler Settings

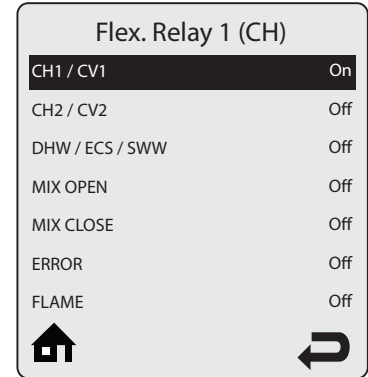
4.5.5 Flex. Relay Configuration

Each relay function has several options that must be set for activation. Press the **UP** or **DOWN** buttons to scroll through the options then press the **OK** button to toggle between the On/Off status. At the end of the list is **Save & Exit** which will store the settings for the particular relay.

- **On** - Activation of the relay will occur.
- **Off** - Activation of the relay will not occur.

The options are as follows:

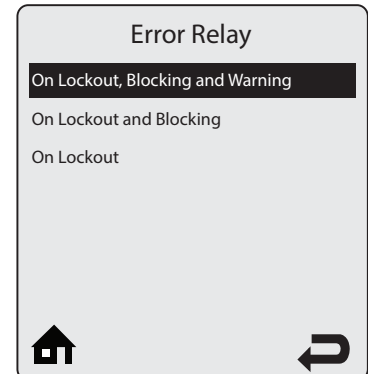
- **CH1/CV1** - Relay is activated at CH 1 Demand.
- **CH2/CV2** - Relay is activated at CH 2 Demand.
- **DHW/ECS/SWW** - Relay is activated at DHW Demand.
- **MIX OPEN** - Mixing valve open input is activated.
- **MIX CLOSED** - Mixing valve closed input is activated.
- **ERROR** - Relay is activated on error.
- **FLAME** - Relay is activated when appliance is running and a flame signal has been detected.
- **Save & Exit** - Store all settings to appliance and return to previous screen.



4.5.6 Error Relay

Error Relay allows the installer to select when to activate the Error Relay (alarm):

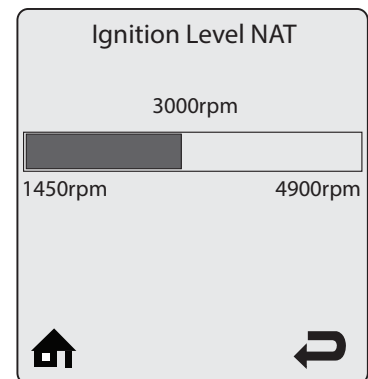
- **On Lockout, Blocking and Warning** - Relay is activated at a non-volatile lock-out, at a blocking error (self-resetting), or at a warning.
- **On Lock-out and Blocking** - Relay is activated at a non-volatile lock-out or at a blocking error (self-resetting).
- **On Lock-out** - Relay is activated at a non-volatile lock-out only.



4.6 Ignition Level NAT

Ignition Level NAT allows the installer to change the ignition fan speed to accommodate varying site conditions. Press the **LEFT** or **RIGHT** buttons to adjust the Ignition Level NAT then press the **OK** button to store the setting. Default values are:

Model	Natural Gas	Propane
Solo 80	3000 rpm	3000 rpm
Solo/Excellence 110	3500 rpm	3000 rpm
Solo 155	3500 rpm	3350 rpm
Solo 175	3500 rpm	3300 rpm
Solo 250	3700 rpm	3000 rpm
Solo 299/399	2600 rpm	2600 rpm



4.0 Boiler Settings

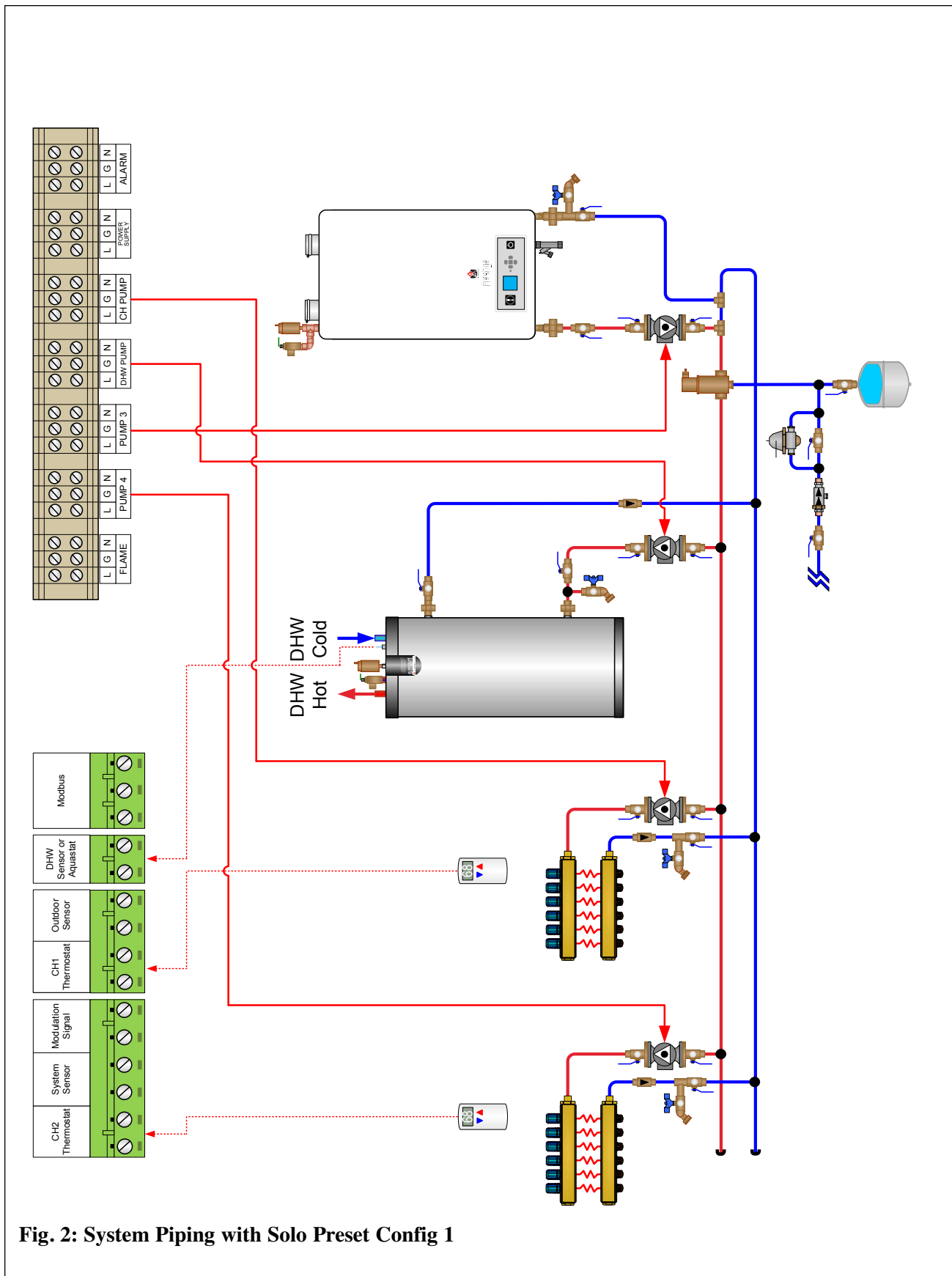


Fig. 2: System Piping with Solo Preset Config 1

4.0 Boiler Settings

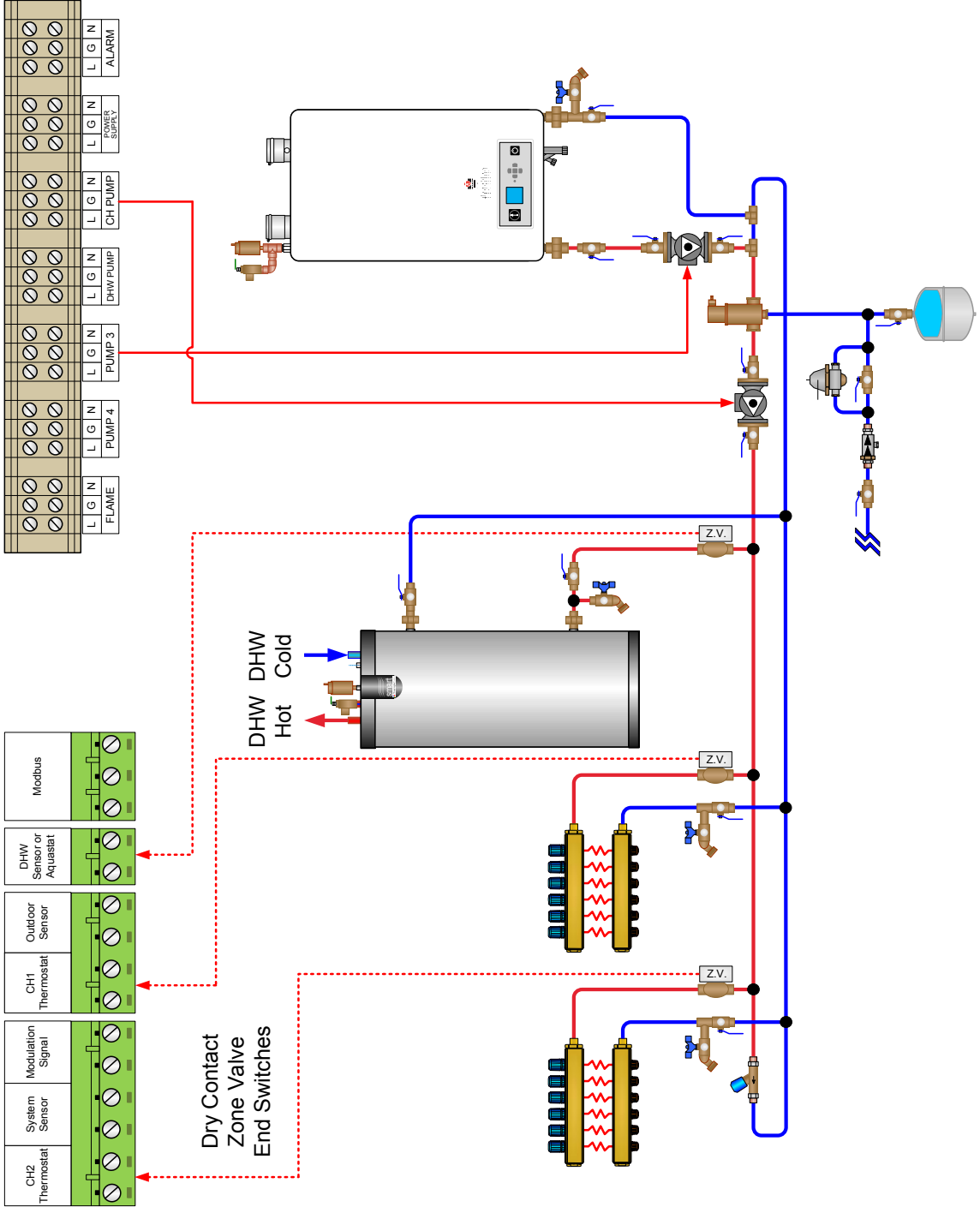


Fig. 3: System Piping with Solo Preset Config 2

4.0 Boiler Settings

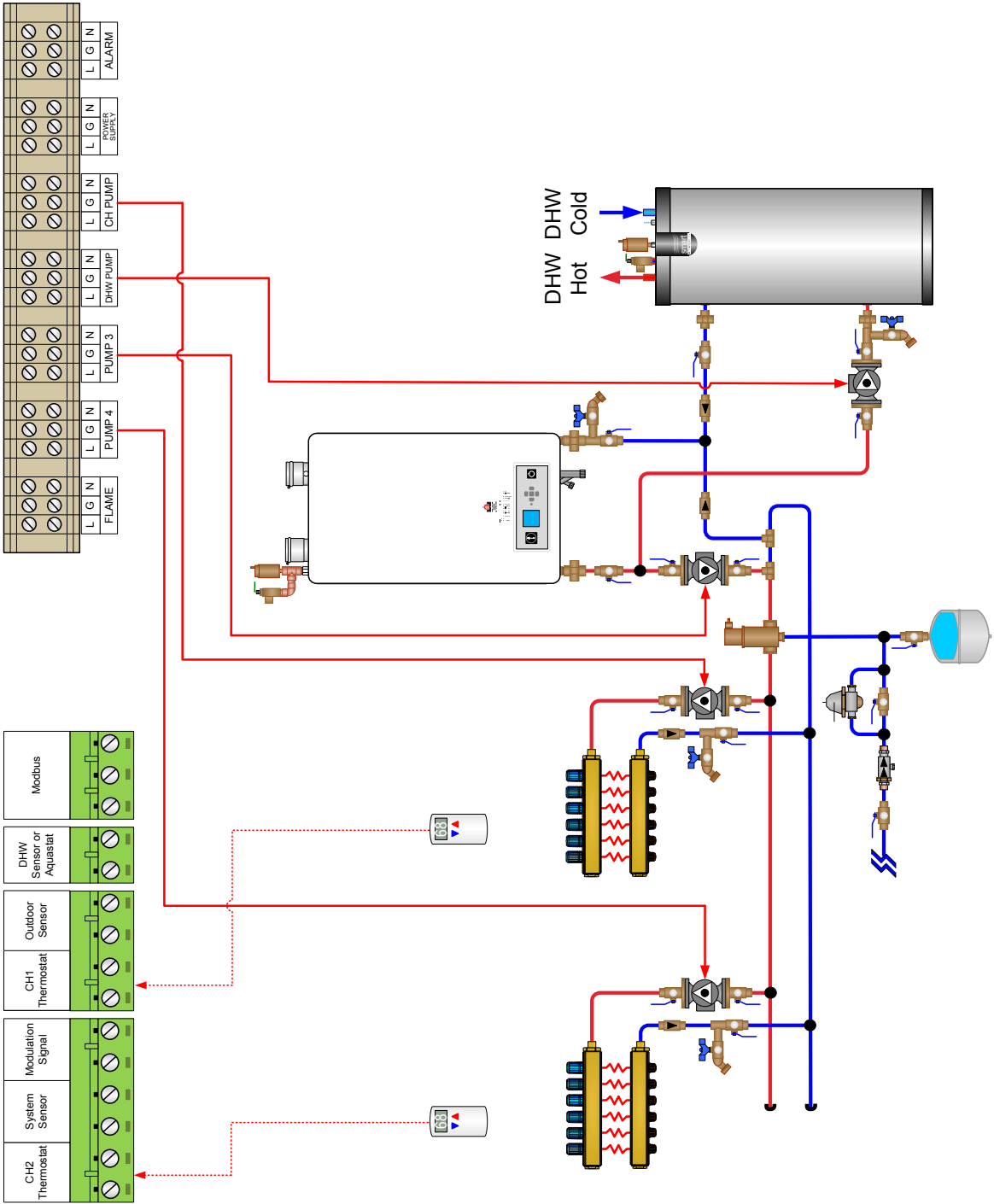


Fig. 5: System Piping with Solo Preset Config 4

4.0 Boiler Settings

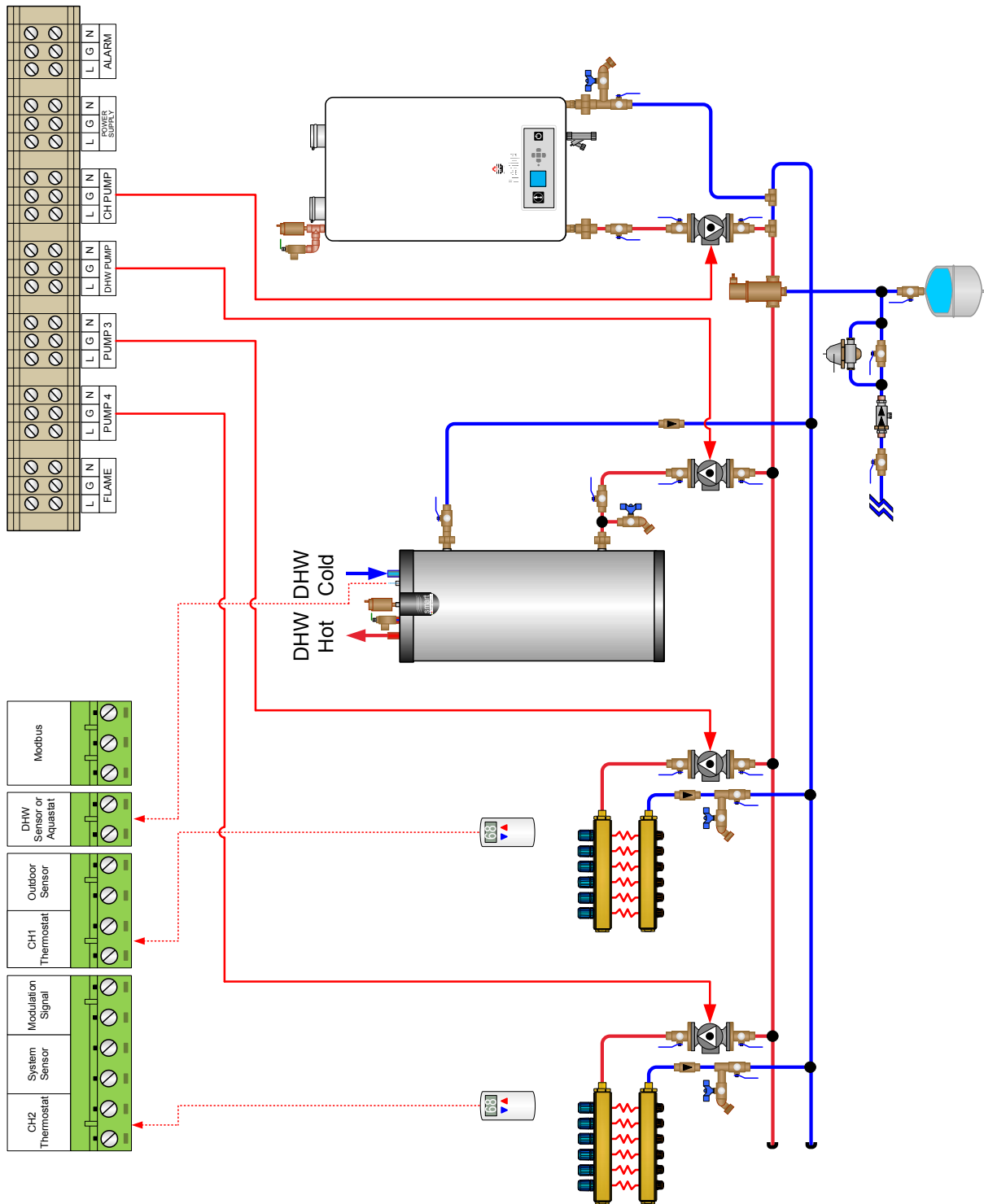


Fig. 6: System Piping with Solo Preset Config 5

4.0 Boiler Settings

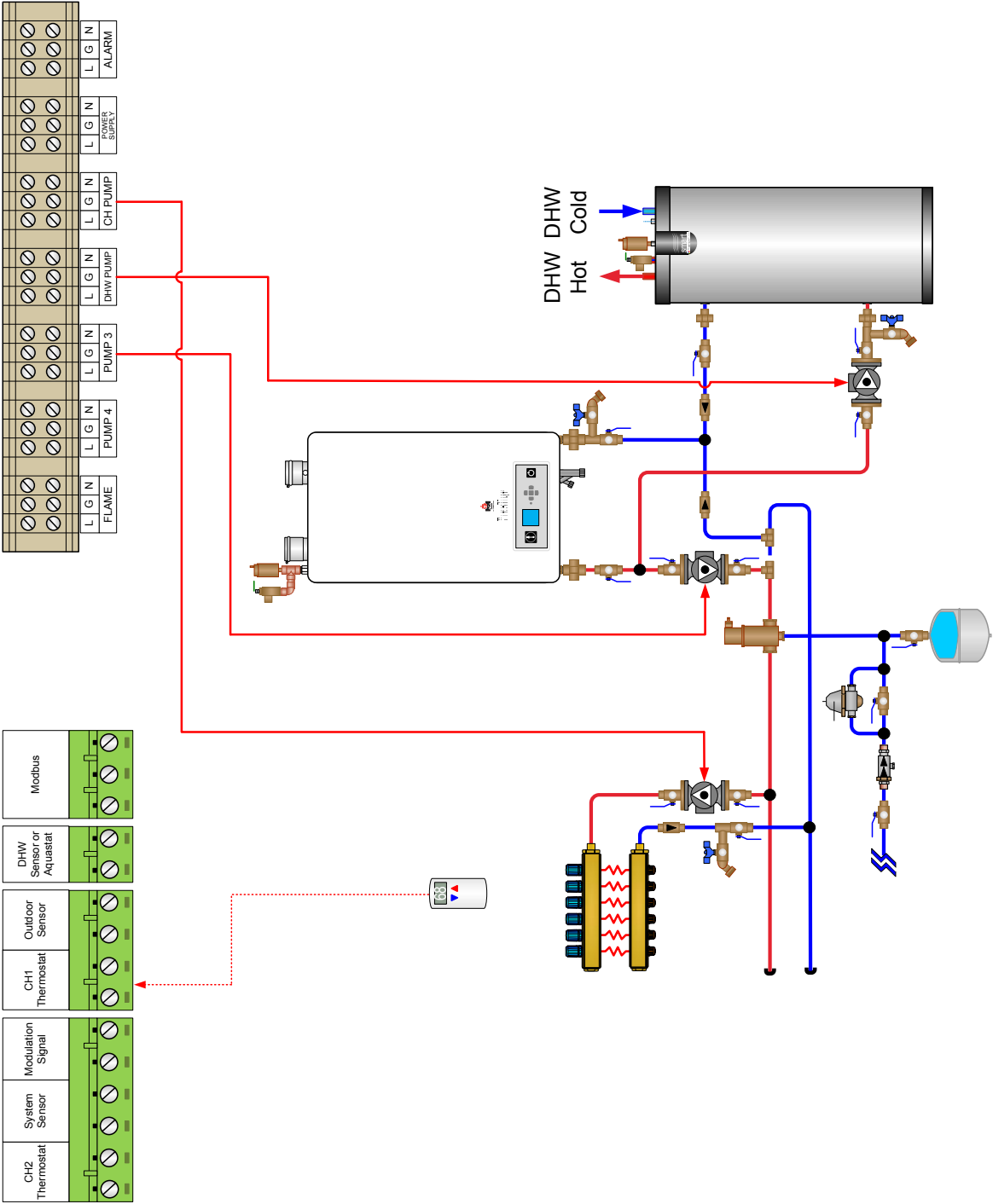


Fig. 7: System Piping with Solo Preset Config 6

4.0 Boiler Settings

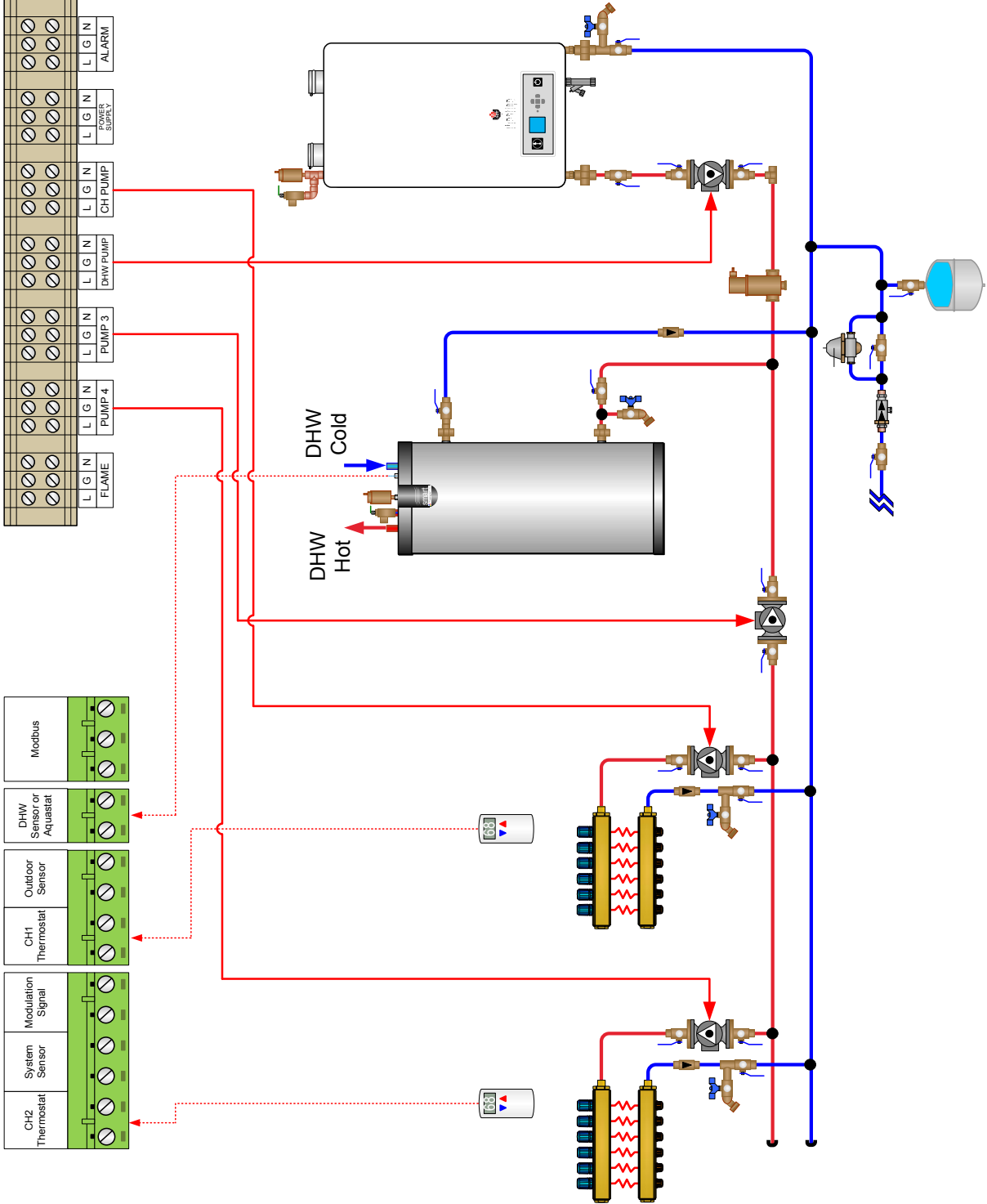
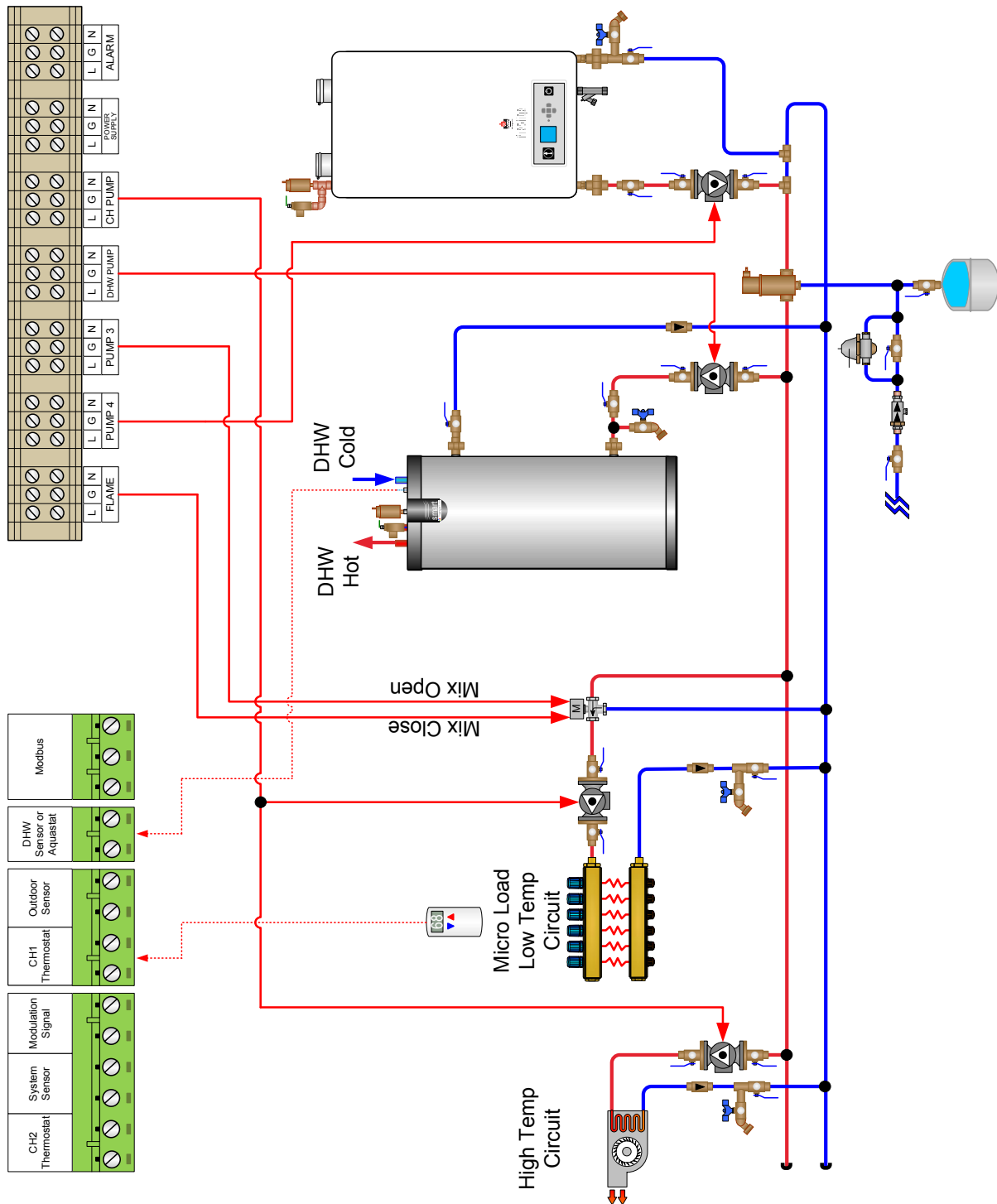


Fig. 9: System Piping with Solo Preset Config 8

4.0 Boiler Settings

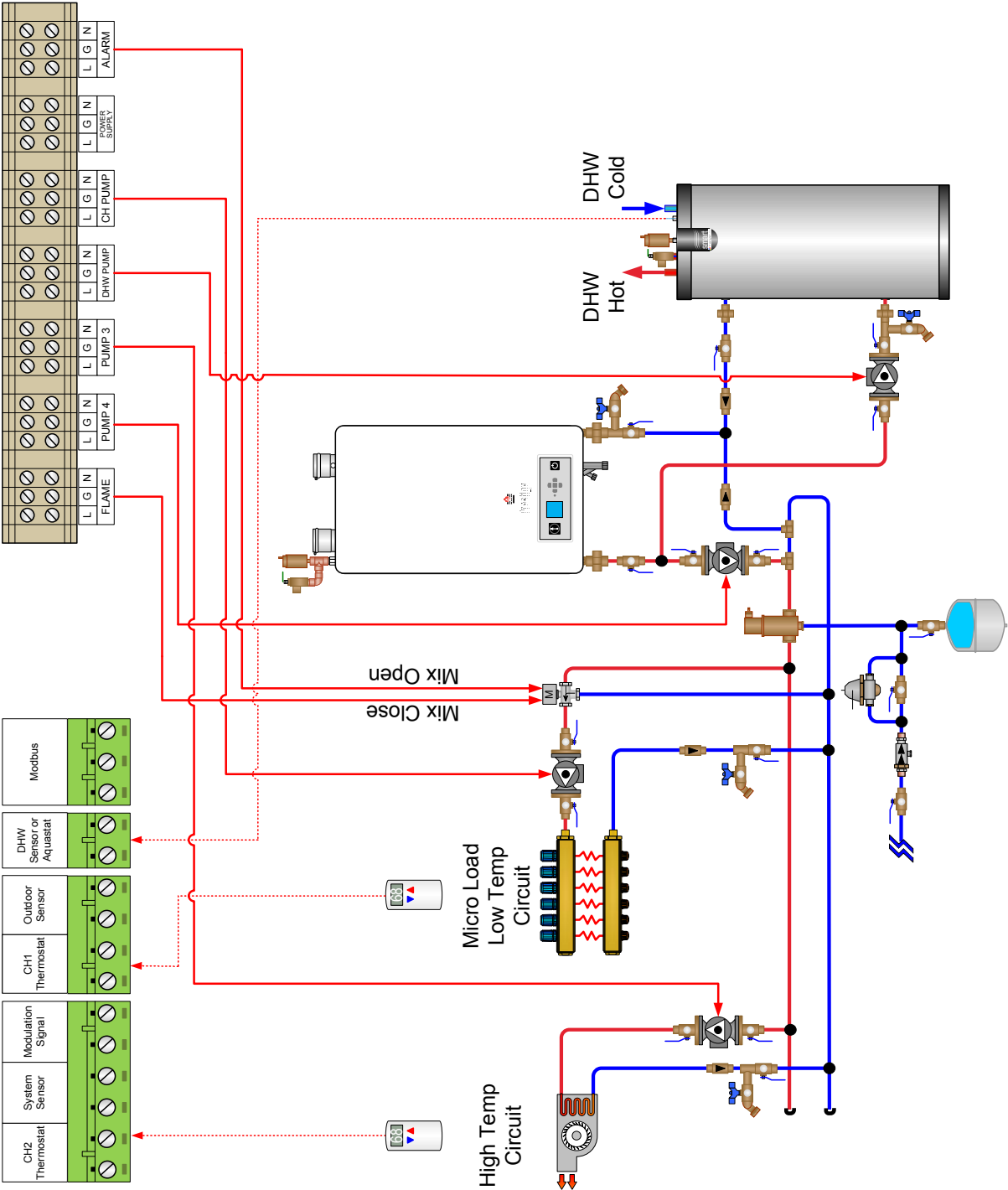


Note:

This Configuration requires that the Low Temp Pump and High Temp Pump be connected in parallel to the CH Pump Relay. An isolation relay is may be used to ensure the CH Pump Relay will not be overloaded during operation.

Fig. 10: System Piping with Solo Preset Config 9

4.0 Boiler Settings



Note:
This Configuration to be used where the Low Temp Circuit is a micro load as the High Temp Circuit will run for any call on the Low Temp Circuit to prevent boiler cycling.

Fig. 11: System Piping with Solo Preset Config 10

4.0 Boiler Settings

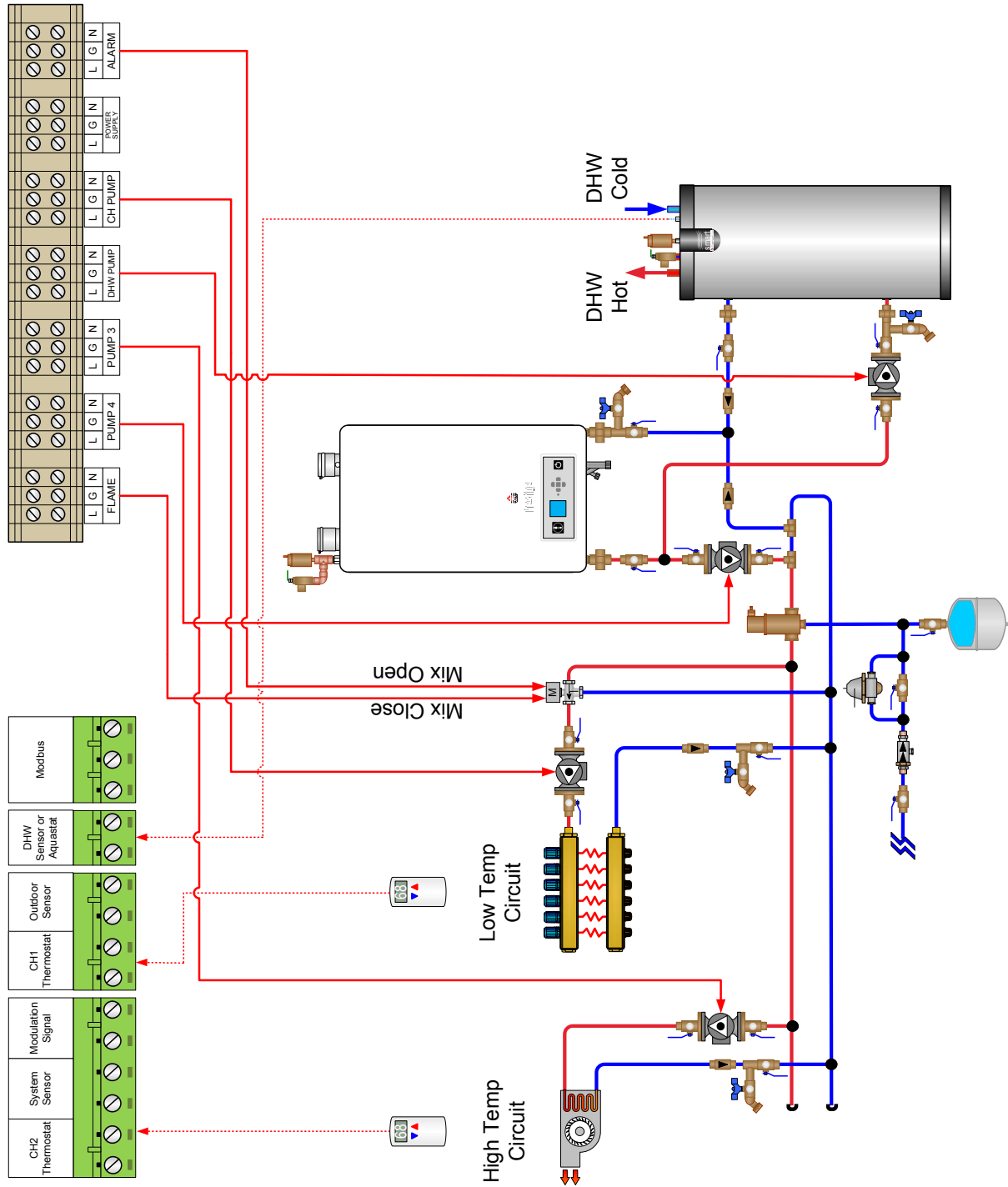


Fig. 12: System Piping with Solo Preset Config 11

4.0 Boiler Settings

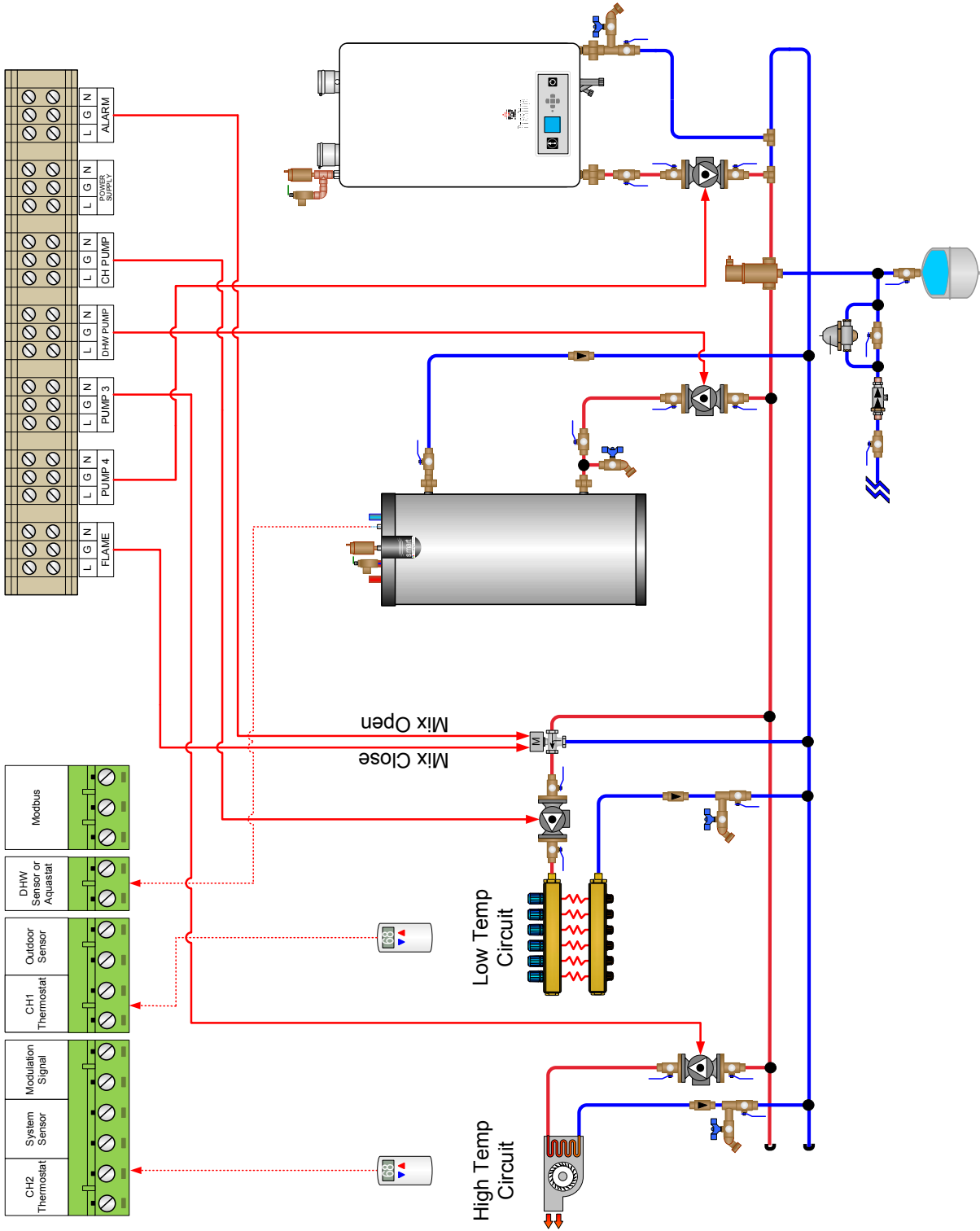


Fig. 13: System Piping with Solo Preset Config 12

4.0 Boiler Settings

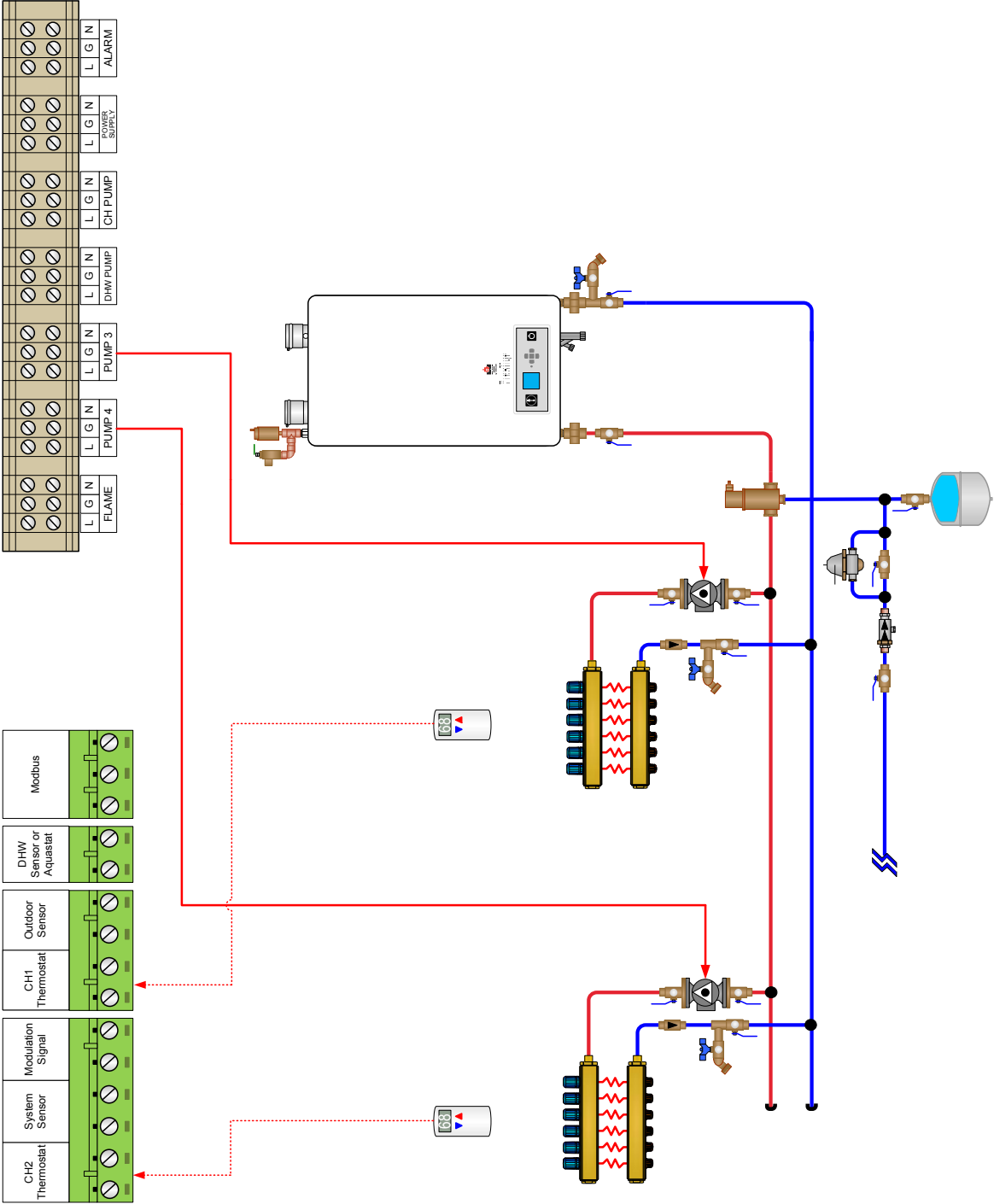


Fig. 15: System Piping with Excellence Preset Config 1

4.0 Boiler Settings

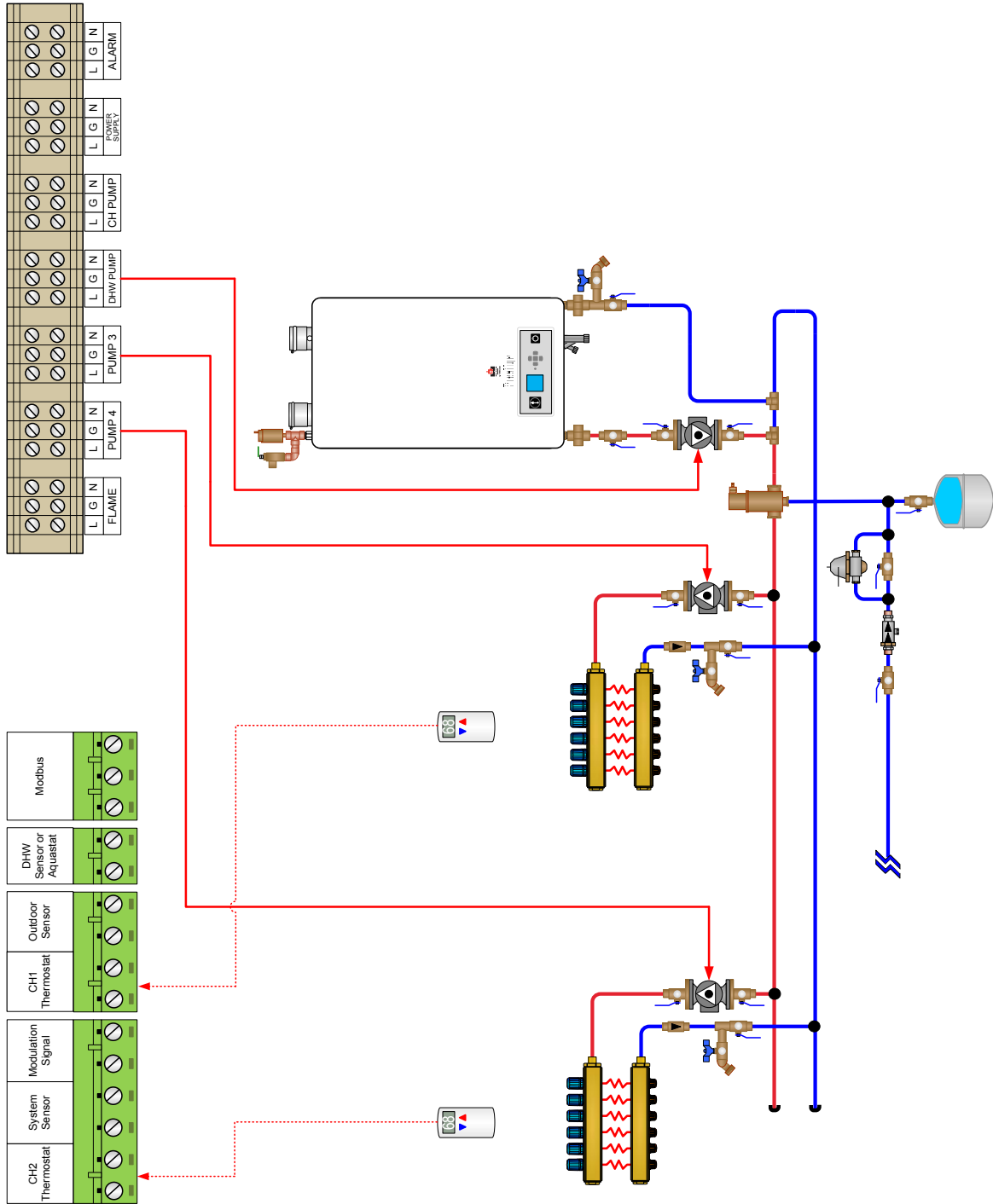


Fig. 16: System Piping with Excellence Preset Config 2

4.0 Boiler Settings

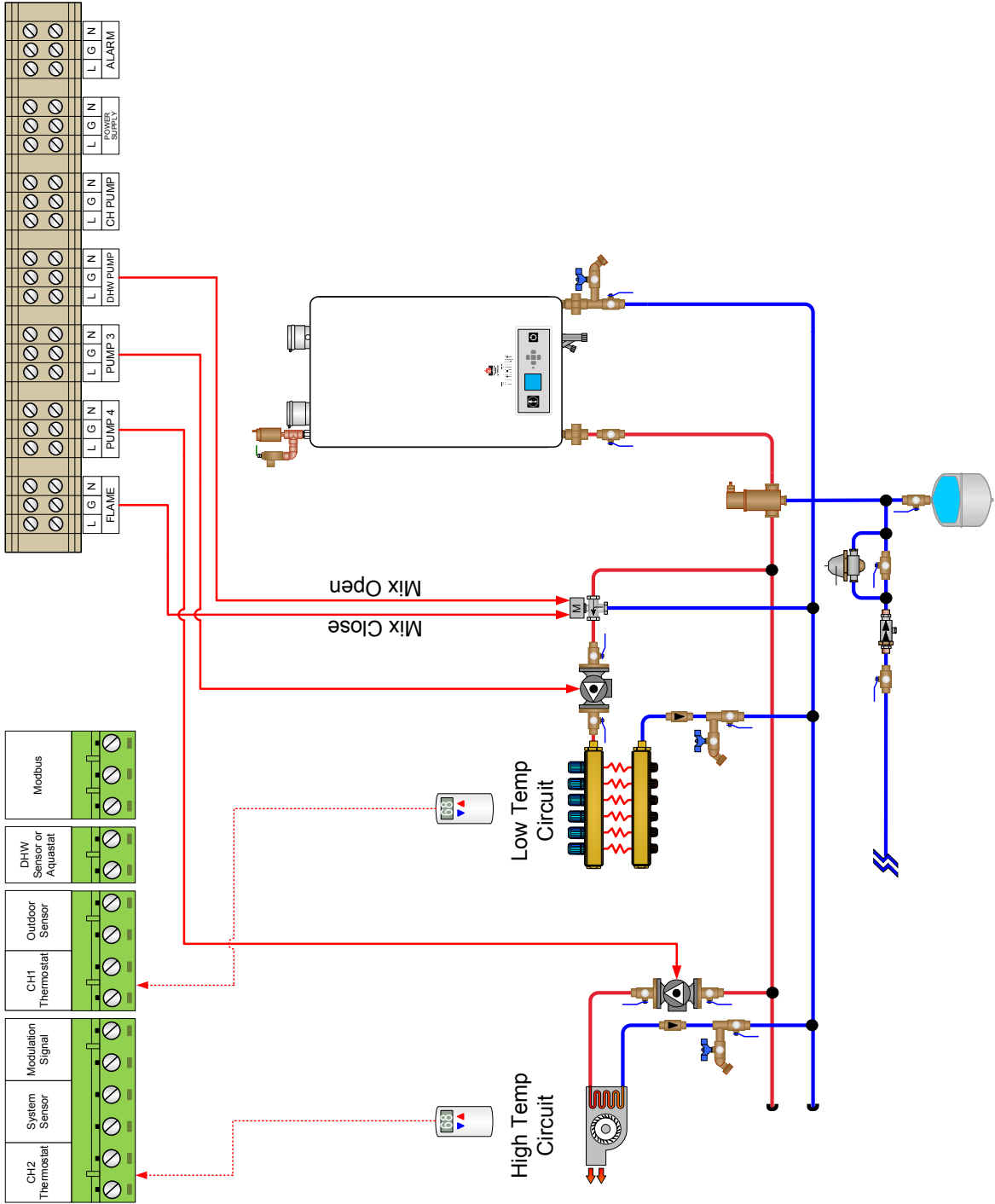


Fig. 17: System Piping with Excellence Preset Config 3

4.0 Boiler Settings

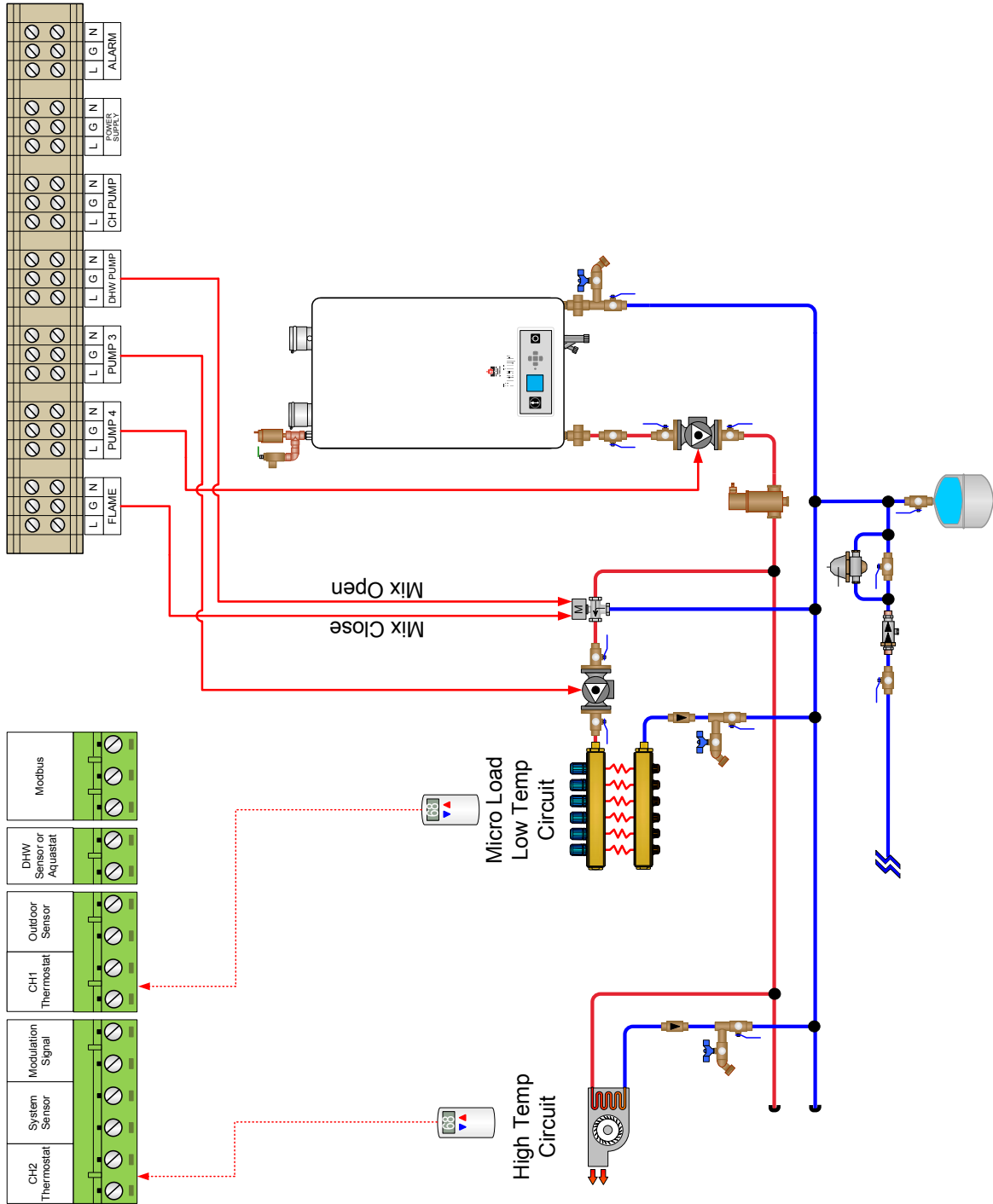


Fig. 18: System Piping with Excellence Preset Config 4

4.0 Boiler Settings

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5.0 RESET ALL SETTINGS

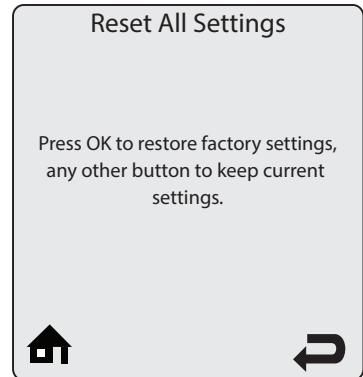
5.1 Navigation:

Home Screen>Installer Menu>Reset All Settings

Reset All Settings allows the installer to reset all CH, DHW, Boiler and Cascade settings back to the original PRESTIGE Solo factory defaults. Follow the onscreen instructions to reset all settings back to the original factory defaults.

NOTICE

PRESTIGE Excellence units require setting Prestige Model to Solo/Excel. 3 way valve and DHW Demand Type to Sensor after using the Reset All Settings function.



6.0 Factory ACVMax Settings

6.0 FACTORY ACVMAX SETTINGS

Section	Setting	Factory Default	Minimum Setting	Maximum Setting	EZ Setup Reset	Installer Reset
2.2	Heating Operation	Enabled				✓
2.3	Demand Type	Thermostat & Outd. Curve			✓	✓
2.4	Absolute Max CH Setpoint	188°F [87°C]	68°F [20°C]	188°F [87°C]		
2.5	CH1 Maximum Setpoint	180°F [82°C]	68°F [20°C]	188°F [87°C]	✓	✓
2.6	CH1 Minimum Setpoint	80°F [27°C]	60°F [15°C]	188°F [87°C]	✓	✓
2.7	Outdoor Curve Coldest Day	10°F [-12°C]	-30°F [-34°C]	50°F [10°C]		✓
2.8	Outdoor Curve Warmest Day	64°F [18°C]	60°F [15°C]	78°F [25°C]		✓
2.9	CH2 Circuit	Enabled				✓
2.10	CH2 Maximum Setpoint	140°F [60°C]	68°F [20°C]	194°F [90°C]	✓	✓
2.11	CH2 Minimum Setpoint	80°F [27°C]	60°F [15°C]	190°F [88°C]	✓	✓
2.12	Warm Weather Shutdown	OFF	OFF	78°F [25°C]	✓	✓
2.13	Circulation Pump Permanent	Disabled				✓
2.14	CH Post Pump Time	5 Minute	OFF	20 minutes		✓
2.15	Freeze Protection	Enabled				✓
2.16	Frost Protection Setpoint	-22°F [-30°C]	-22°F [-30°C]	50°F [10°C]		✓
2.17	Parallel Shift Value	0°F [0°C]	0°F [0°C]	144°F [80°C]		✓
2.18	CH Call Blocking	2 Minute	0 minute	30 minutes		✓
3.2	DHW Operation	Enabled				✓
3.3	Demand Type	Thermostat (Solo) Sensor (Excellence)				
3.4	Boiler DHW Setpoint	168°F [76°C]	96°F [35°C]	188°F [87°C]	✓	✓
3.5	DHW Setpoint	140°F [60°C]	68°F [20°C]	176°F [80°C]	✓	✓
3.6	DHW On Differential	6°F [3°C]	4°F [-15°C]	18°F [-8°C]		✓
3.7	DHW Storage Adder	28°F [15°C]	10°F [0°C]	54°F [30°C]		✓
3.8	DHW Post Pump Time	2 Minute	OFF	120 minutes		✓
3.9	DHW Priority Timeout	Off	OFF	120 minutes	✓	✓
3.10	DHW Priority	Enabled				✓
3.11	DHW Call Blocking	0 Minute	0 minute	30 minutes		✓
3.12	DHW to CH Call Blocking	1 Minute	0 minute	30 minutes		✓
3.13	Antilegionella Function	Disabled				✓*
4.2	Prestige Model	Solo (2 pumps) Solo/Excel. (3 way valve)				✓**
4.3	Lockout Temp.	210°F [99°C]				✓
4.4	Modbus Address	0=BCST	0	247		✓
4.5	Pump Settings	Solo/Excellence 2				✓
4.6	Ignition Level NAT					
7.5.2	Stage Delay	60 Seconds	0 second	255 seconds		✓
7.5.3	Minimum Firing Rate	25%	0%	100%		✓
7.5.6	Maximum Firing Rate	852 MBH [250kW]	0 MBH [0kW]	869 MBH [255kW]		✓
7.5.7	CH/DHW Boilers	0	0	6		✓
7.5.8	Automatic Rotation	Enabled				✓
7.5.9	CH Proportional Gain	7	0	255		✓
7.5.10	CH Integral Gain	245	0	255		✓
7.5.11	DHW Proportional Gain	7	0	255		✓
7.5.12	DHW Integral Gain	245	0	255		✓

* Installer Reset will reset value to Enabled.

** Installer Reset will reset value to Solo (2 pumps).

7.0 Cascade




7.0 CASCADE

7.1 Cascade Operating Information

The ACVMax Boiler Management System includes a Cascade function which allows multiple Prestige boilers to operate together without the need for an external controller. One Prestige will be selected as the Master and will be wired to accept all the low voltage control signals. The other Prestige boilers will be designated as Slaves and will only have a communication cable connecting them to the other boilers in the Cascade System.

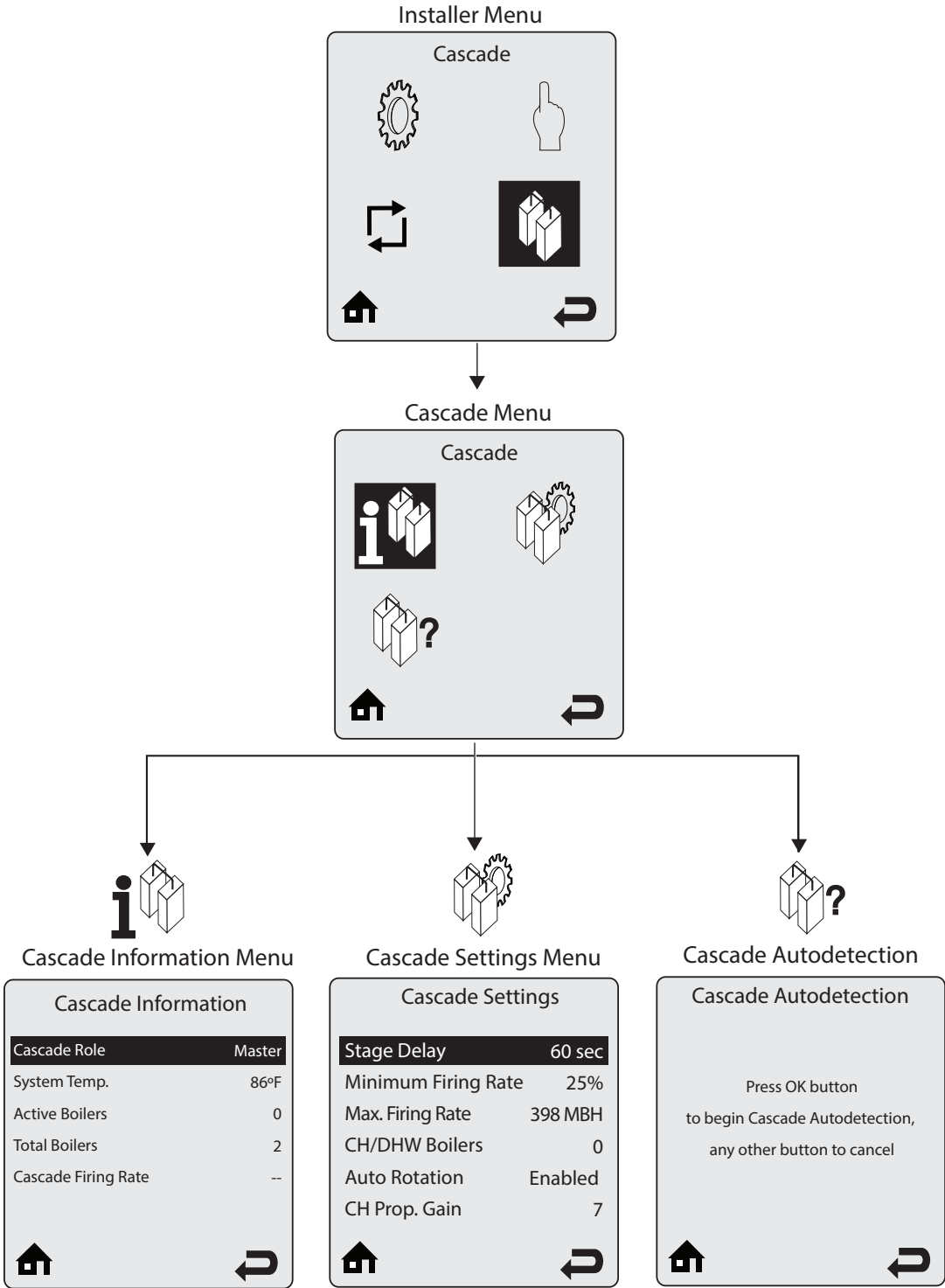
- The Cascade function allows up to six identical Prestige boilers to operate together in a single heating system.
- Parallel Modulation fires as many boilers as possible to maximize system efficiency.
- Lead Stage Automatic Rotation rotates the lead boiler to ensure even wear on each boiler in the Cascade System. This function can be disabled by the Automatic Rotation Setting.

The Cascade Menu is divided into three sections

1. Cascade Information  – Provides real time operating information of the Cascade System. See page 50.
2. Cascade Settings  – Allows the installer to adjust the Cascade System settings for the application. See pages 51 through 56.
3. Cascade Autodetection  – Automatically finds and configures each boiler of the Cascade System. See page 42.

7.0 Cascade

7.2 ACVMax Cascade Menu Structure



7.0 Cascade

7.3 Cascade Installation

7.3.1 System Piping

Standard Cascade installations will utilize a balanced manifold system as the primary / secondary connection to the system piping as shown in Figure 21 on page 44 or a reverse return piping arrangement as shown in Figure 23 on page 46. Split Cascade installations will utilize a balanced manifold system as the primary / secondary connection to the central heating loop. Each boiler configured to respond to a domestic hot water call will also have a direct connection to the indirect water heater as shown in Figure 25 on page 48. Reference the Prestige Installation and Maintenance Manual for general boiler installation and piping requirements.

7.3.2 System Sensor Installation

Cascade operation requires a System Temperature Sensor to be installed on the common supply header downstream of all boilers in the system. Place the System Temperature Sensor within 10' of the last boiler in the Cascade System for an accurate temperature reading. Proper placement and installation of the System Temperature Sensor is critical for reliable cascade operation. The type of System Temperature Sensor chosen also greatly affects the accuracy of the system temperature readings.

Three types of System Temperature Sensor are available:

- **Direct Immersion** - A direct immersion temperature sensor (MDRKIT05) is the recommended type since it will provide the most accurate water temperature readings. Install the 1/2" NPT direct immersion temperature sensor in a tee on the common supply header downstream of all boilers in the system. Ensure that the temperature sensor probe is directly in the water flow but not touching the opposite side of the tee. Wire the sensor to terminals 3 & 4 of X5 on the control module of the Master boiler.
- **Dry Well Installation** - A temperature sensor (PSRKIT22) installed in a dry well will measure up to 10°F [5°C] lower than the actual water temperature. All water setpoints must be lowered at the Master boiler by 10°F [5°C] from the desired setpoints for reliable Cascade operation. Install a 3/8" ID drywell in the common supply header downstream of all boilers in the system. The drywell should be long enough to be directly in the water flow for the most accurate temperature reading. Insert the temperature sensor into the well and wire to terminals 3 & 4 of X5 on the control module of the Master boiler.
- **Pipe Mounted Installation** - A temperature sensor (PTSENS12) mounted to the outside of the pipe will measure up to 20°F [11°C] lower than the actual water temperature. All water setpoints must be lowered at the Master boiler by 20°F [11°C] from the desired setpoints for reliable Cascade operation. The Pipe Mounted temperature sensor can be directly strapped to the outside of a 1" to 3" metallic pipe. Install the temperature sensor as follows:

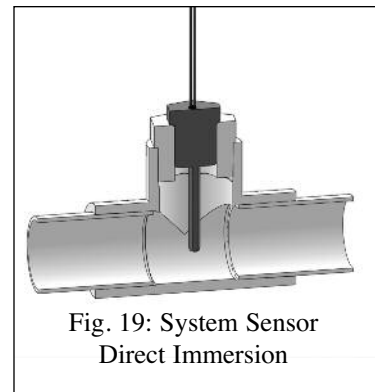


Fig. 19: System Sensor Direct Immersion

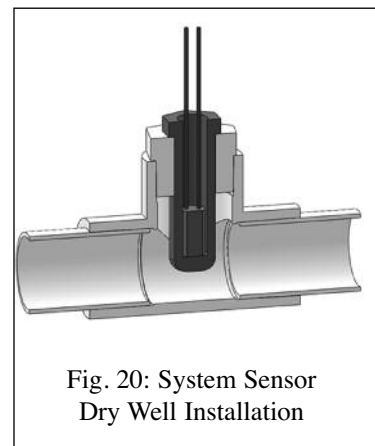


Fig. 20: System Sensor Dry Well Installation

7.0 Cascade

1. Remove the white plastic cover from the sensor
2. Cut a small slit in the gasket seal on the end of the sensor.
3. Route 18 AWG 2-wire cable or similar cable through the seal gasket into the enclosure.
4. Push down on the orange wire terminal retainers to insert the wires into the sensor terminals. Release the orange wire terminal retainers and confirm that the wires are firmly attached to the sensor terminals.
5. Select a location for the sensor on the common supply header downstream of all boilers in the system. Clean the pipe with fine sandpaper or emery cloth to ensure the pipe is clean and sensor will make good contact with the pipe.
6. Press the white cover onto the sensor and strap the sensor to the pipe using the included wire tie.
7. Wire the sensor to terminals 3 & 4 of X5 on the control module of the Master boiler.

7.3.3 Cascade Communication Cable

- A communication cable PACAB01 must be installed between each boiler in the Cascade System. The cable has a 4 pin molex connector on one end and a 6 pin molex connector on the other end. The 4 pin molex connector plugs into the Cascade Master X16 connector on the control module of the Master boiler or prior Slave boiler in cascades of three or more boilers. The 6 pin molex connector plugs into the Cascade Slave connector of the Slave boiler. Reference Figures 22, 24 and 26 on pages 45, 47 and 49 for wiring details.

7.3.4 Low Voltage Wiring Connections

- Thermostat Wiring – CH1 and CH2 calls must be wired into the Cascade Master.
- Outdoor Sensor Wiring – The outdoor temperature sensor must be wired into the Cascade Master.
- Domestic Hot Water Wiring – A DHW call must be wired into the Cascade Master.
- Additional Boiler Limits – Boiler Limits must be wired into each boiler in the Cascade System. When a boiler limit opens, that particular boiler will lockout and will be removed from Cascade System operation. The other boilers in the Cascade System will continue to operate if they are not in a lockout.
- External Modulation Control – An External Modulation Signal must be wired into the Cascade Master. The modulation signal will control the firing rate of the entire Cascade System, not just the Cascade Master.
- Modbus Wiring – A building management system (BMS) connection must be wired into the Cascade Master to obtain cascade system and Master boiler information.

7.0 Cascade

7.3.5 Line Voltage Wiring Connections

- Circulator Wiring - Reference Figures 22, 24 and 26 on pages 45, 47 and 49 for circulator wiring required for each type of Cascade System. The circulator connections used will depend on the systems piping layout.

NOTICE

All circulators are powered from a common 5A fuse located on the control module. The total combined amp draw of the all circulators must not exceed 5 amps at any time. Use an isolation relay to lower the total combined amp draw if exceeding this limits.

- Power Supply – A dedicated 120 VAC / 15A minimum service must be used to power the boilers in the Cascade System. Multiple boilers in the Cascade System can be placed on the same electrical circuit. Each boiler can draw a maximum of 8 amps.
- Alarm Wiring – The alarm contact closes whenever that particular Prestige is in a condition set by the Error Relay Setting. The alarm contact will also close on the Master boiler when any of the Slave boilers are locked in a condition set by the Error Relay setting.

7.3.6 Cascade Autodetection

7.3.6.1 Navigation:

Home Screen>Installer Menu>Cascade>Cascade Autodetection

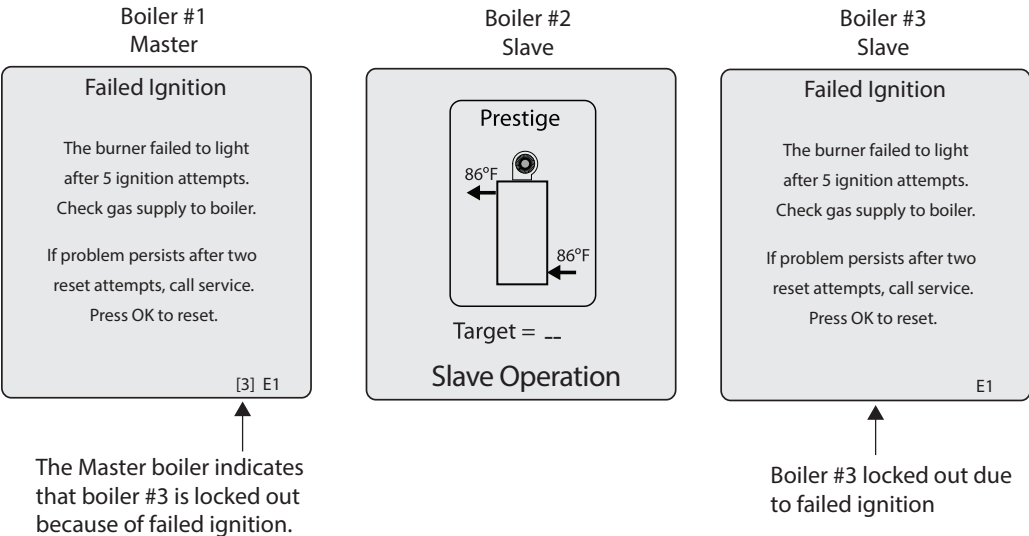
The Cascade System must be configured after wiring is completed and any required adjustments are made in Cascade Settings. The Cascade Autodetection function automatically finds and configures all boilers in the Cascade System. This eliminates the need to manually configure each boiler of the Cascade System. Select Cascade Autodetection on the Master boiler then follow the onscreen instructions to perform Cascade Autodetection. Once Cascade Autodetection is finished, a message will be displayed indicating how many boilers have been found. If the number of boilers found is correct, press **OK** to finish Cascade Autodetection. If the number of boilers found is not correct, check the cascade communication cables between the boilers and repeat Cascade Autodetection.



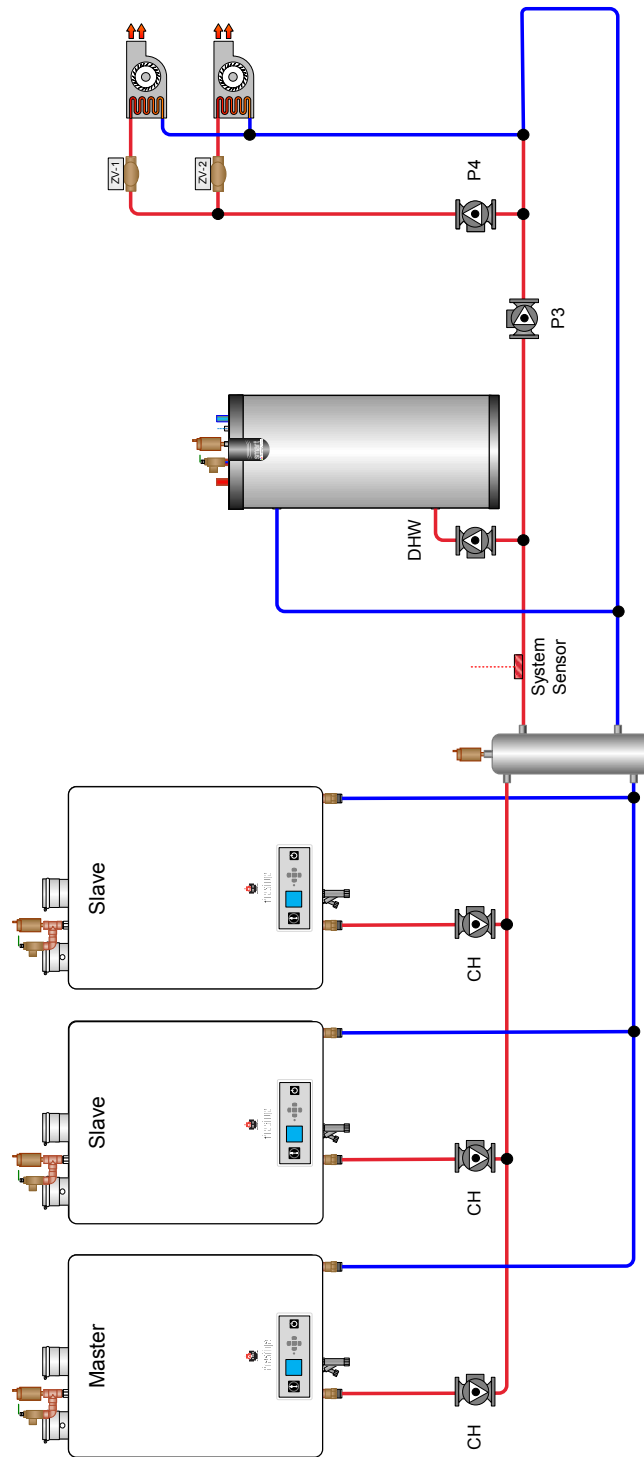
7.0 Cascade

7.3.7 Lockouts

If a lockout occurs to a boiler in a Cascade System, it will be removed from Cascade System operation. The remainder of the Cascade System continues to operate and the next available boiler will fire if necessary. The Lockout Screen will be displayed on the locked out boiler as well as the Master boiler. The Master boiler Lockout Screen will also indicate which boiler in the Cascade System is locked out.



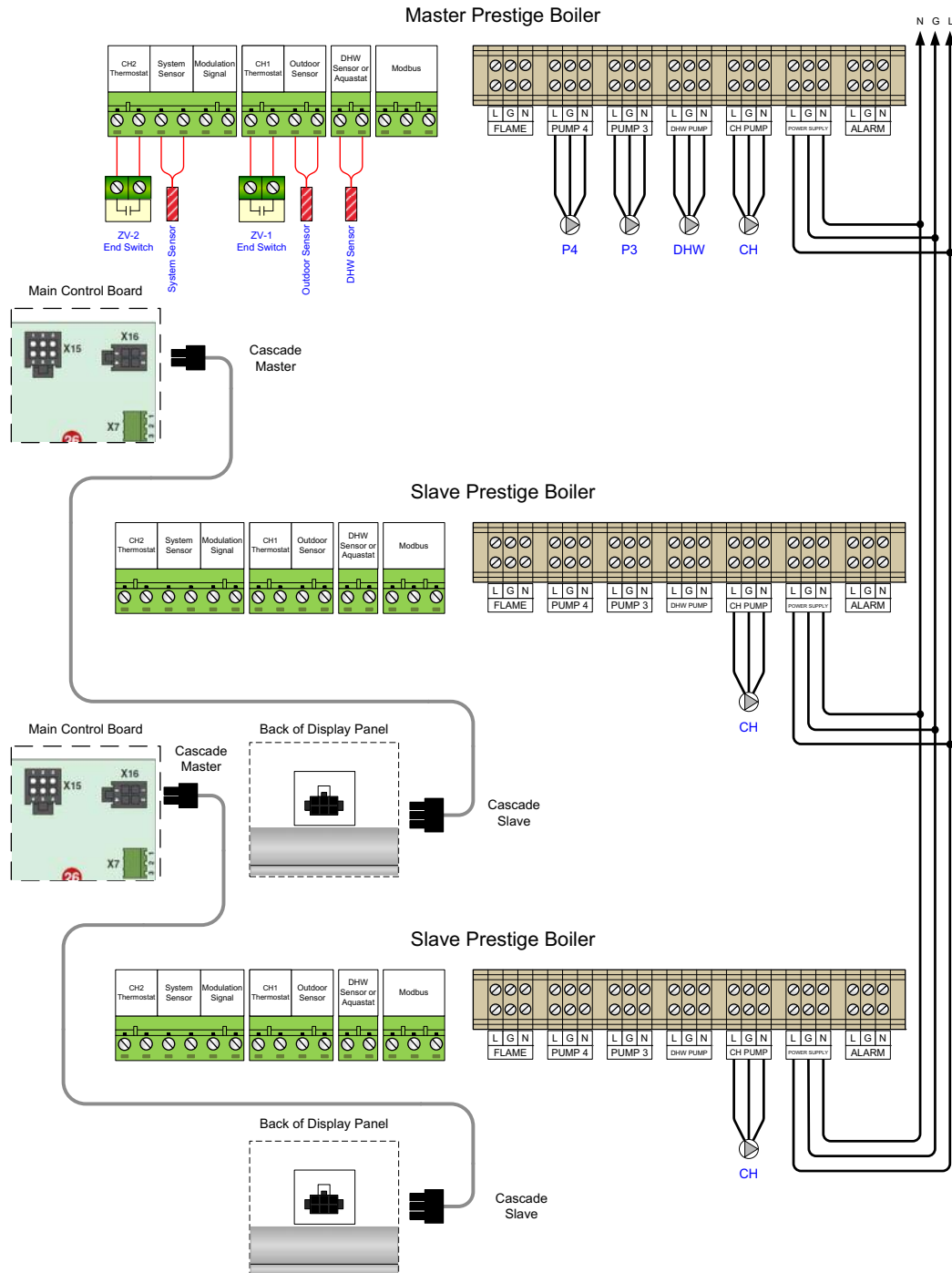
7.0 Cascade



Note: Reference Fig. 22, page 45 for cascade wiring.

Fig. 21: Primary Secondary Cascade Piping

7.0 Cascade



Note: Reference Fig. 21, page 44 for cascade piping.

Fig. 21: Primary Secondary Cascade Wiring

7.0 Cascade

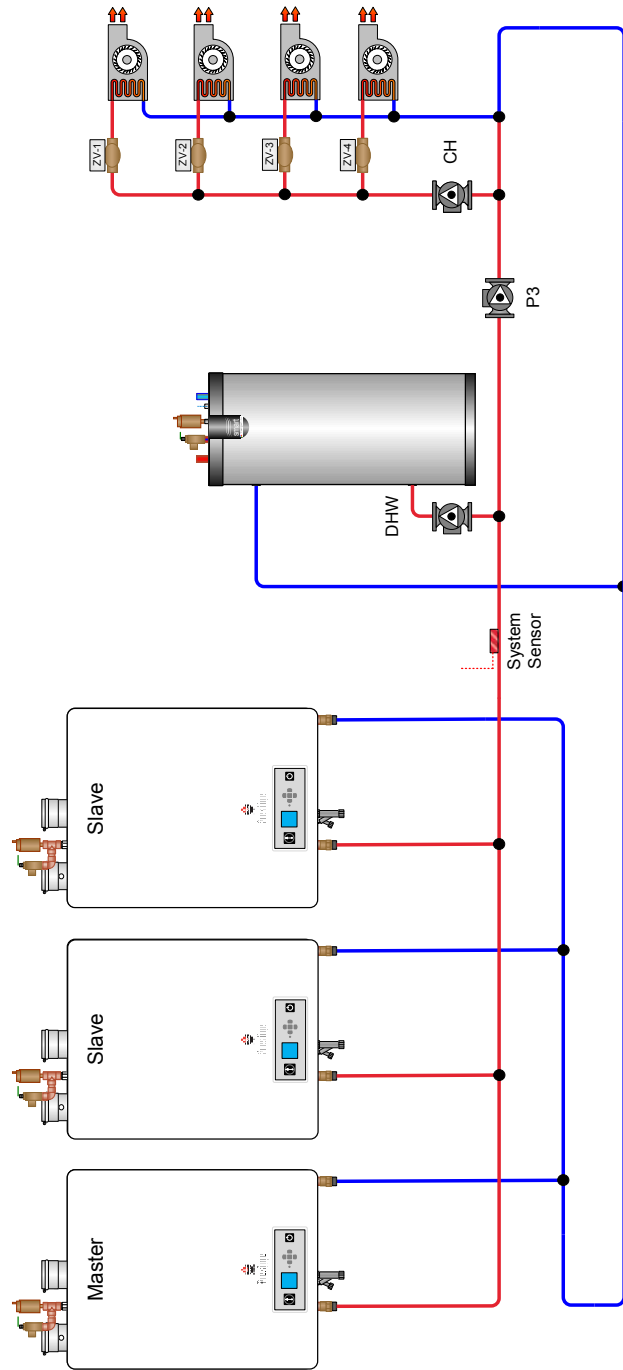
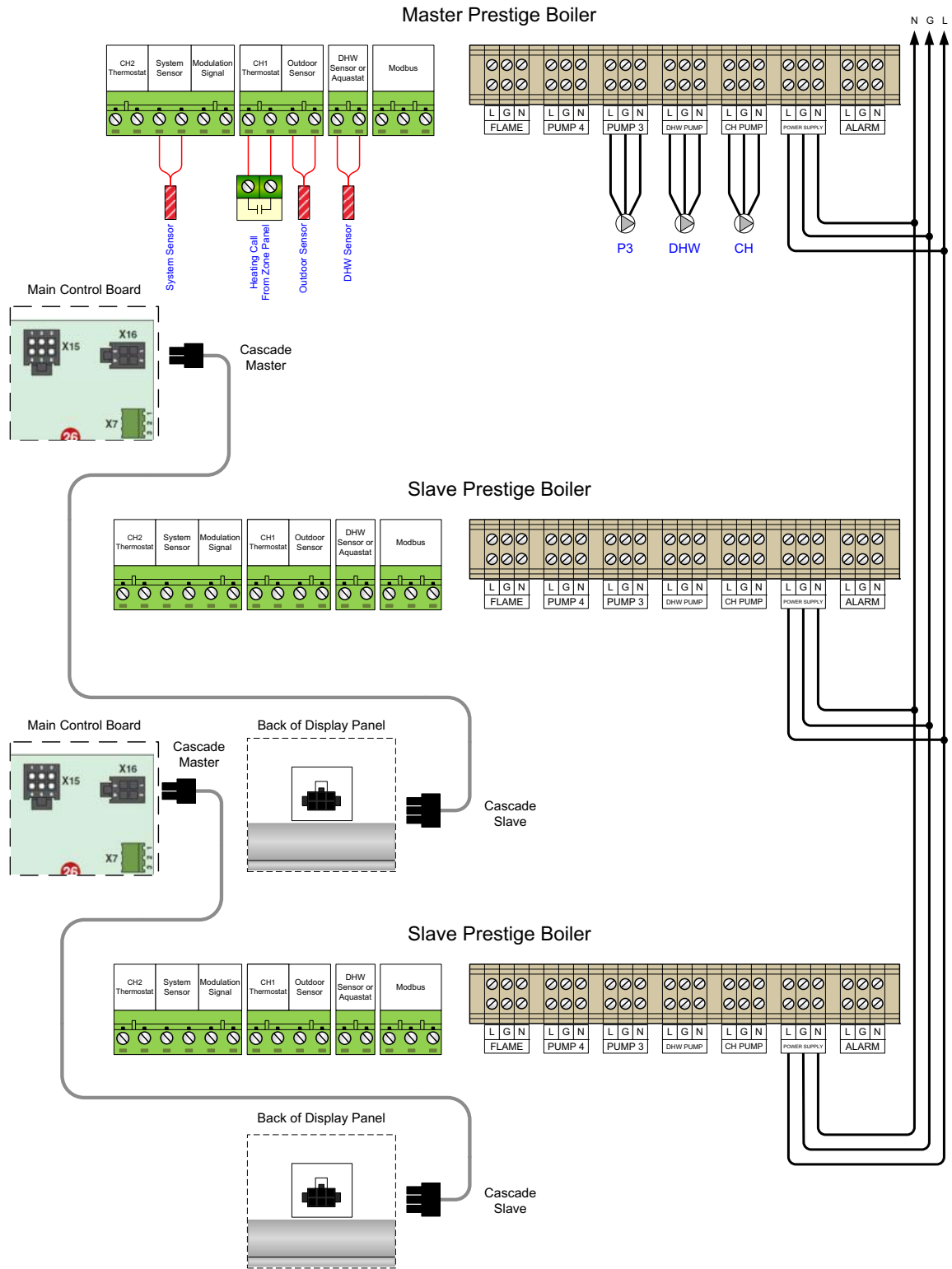


Fig. 23: Reverse Return Cascade Piping

Note: Reference Fig. 24, page 47 for cascade wiring.

7.0 Cascade



Note: Reference Fig. 23, page 46 for cascade piping.

Fig. 24: Reverse Return Cascade Wiring

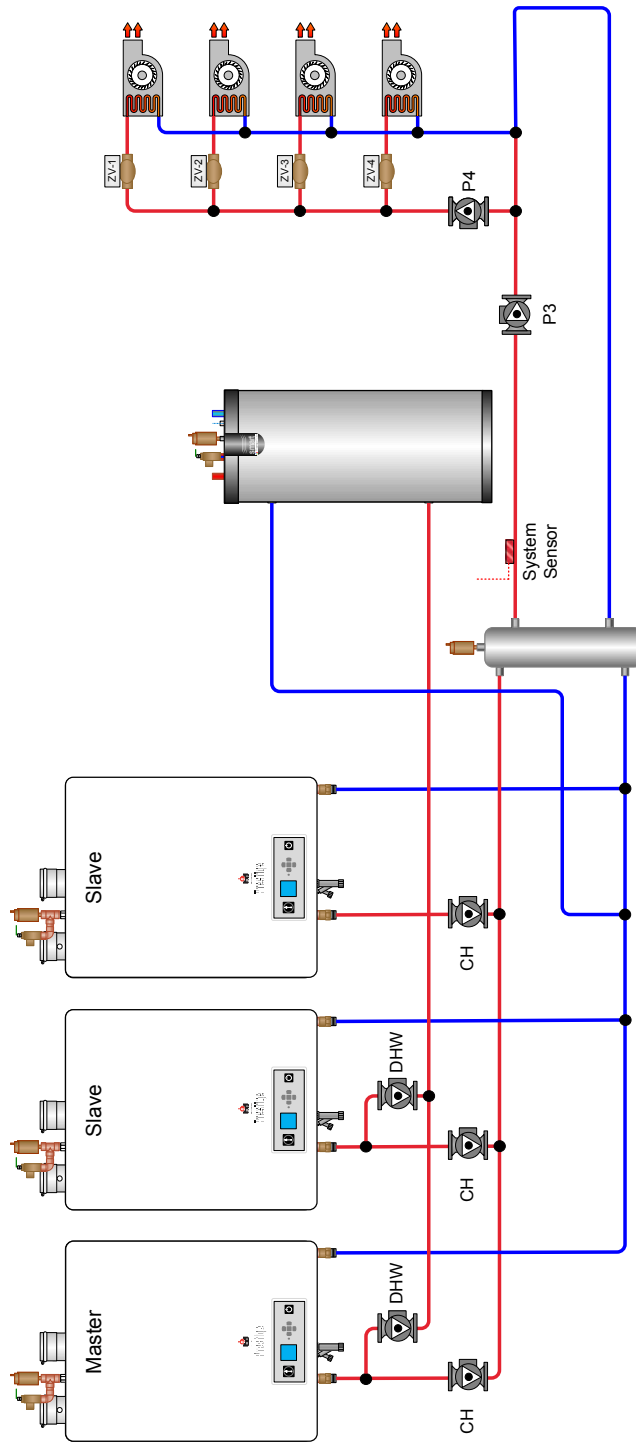
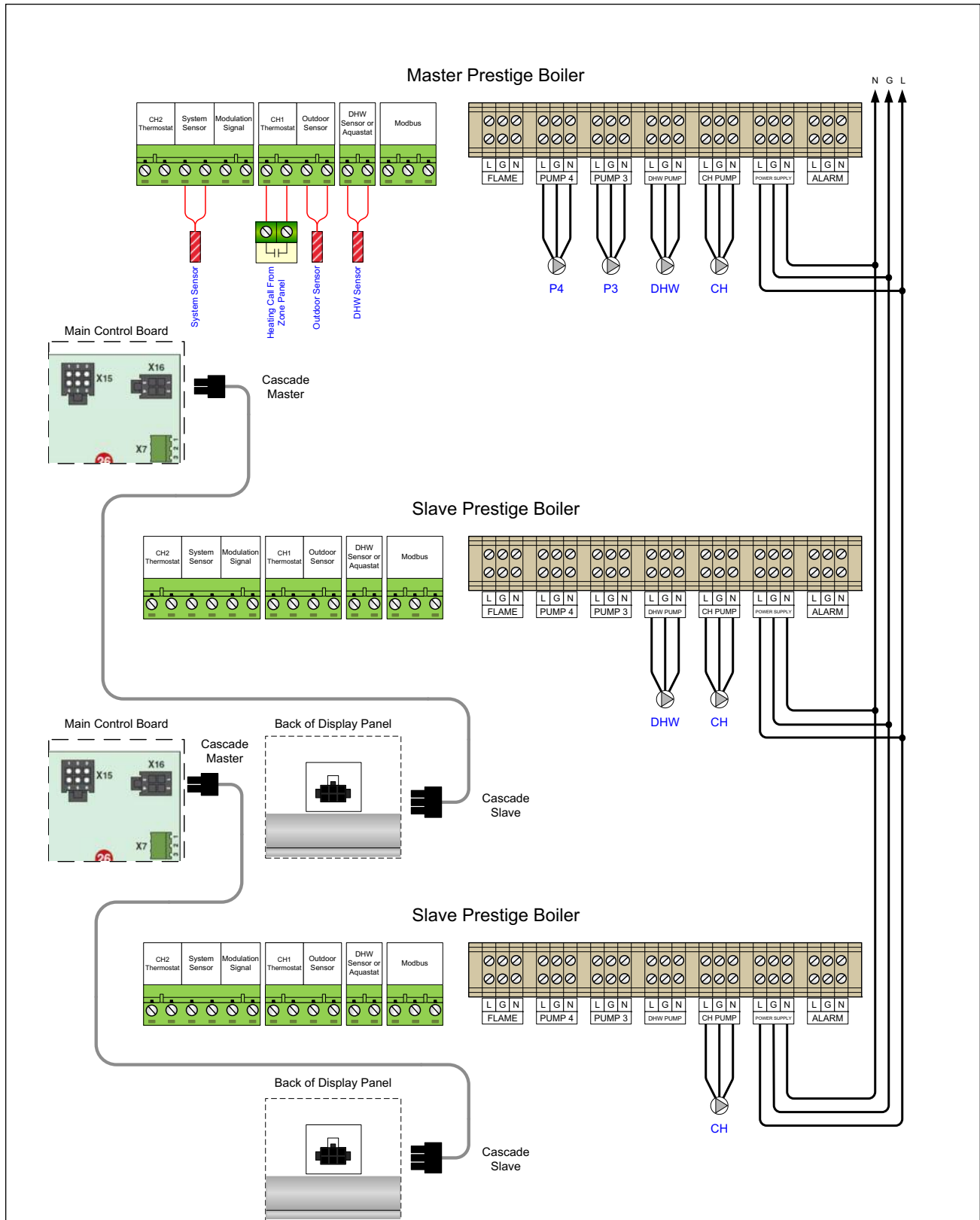


Fig. 25: Split Cascade System

Note 1: Reference Fig. 26, page 49 for cascade wiring.

Note 2: DHW Priority must be set to Enabled in DHW Settings of the Cascade Master for proper operation.

7.0 Cascade



Note: Reference Fig. 25, page 48 for cascade piping.

Fig. 26: Split Cascade Wiring

7.0 Cascade

7.4 Cascade Information



7.4.1 Navigation:

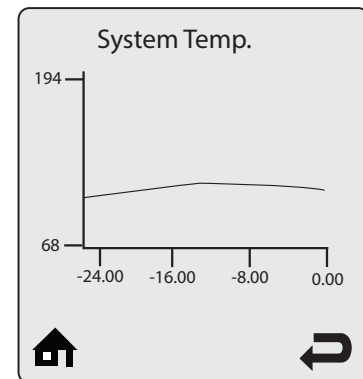
Home Screen>Installer Menu>Cascade>Cascade Information

Cascade Information provides real time operating information of the Cascade System. Each line contains an information item followed by its current value. See below for a list of all Cascade Information items.

Cascade Information	
Cascade Role	Master
System Temp.	86°F
Active Boilers	0
Total Boilers	2
Cascade Firing Rate	--

7.4.2 System Temperature Logging

System Temperature has a logging function which records one sample every 12 minutes to produce a graph of the last 24 hours. Select System Temperature in Cascade Information then press the **OK** button to view the graph.



Cascade Information Items

Information Item	Description
Cascade Role	<p>Displays the current role of the Prestige in the Cascade System. Cascade Role will be one of the following:</p> <ul style="list-style-type: none"> • Master – Indicates this Prestige is the Master boiler in the Cascade System. • Slave – Indicates this Prestige is a Slave boiler in the Cascade System. • Standalone – Indicates this Prestige is not part of a Cascade System.
System Temperature	Displays the current system temperature reading wired to the Master boiler. If the system sensor is not wired in to the Master boiler, "--" is displayed.
Active Boilers	Displays the current number of boilers fired in the Cascade System.
Total Boilers	Displays the total number of boilers in the Cascade System.
Cascade Firing Rate	Displays the current firing rate of the entire Cascade System.

7.0 Cascade

7.5 Cascade Settings



7.5.1 Navigation:

Home Screen>Installer Menu>Cascade>Cascade Settings

The Cascade Settings menu contains settings related to cascade operation. Each line contains a Cascade Setting followed by its current value. Six Cascade Settings are displayed on the screen at one time. Press the **UP** or **DOWN** buttons to scroll through additional Cascade Settings.

NOTICE

Cascade Setting changes must be made only on the Cascade Master. Cascade Autodetection must be performed after making any changes to a Cascade Setting before the change will take effect.

7.5.2 Stage Delay

Default: 60 Seconds

Stage Delay sets the time delay before enabling or disabling a boiler in the Cascade System. The Stage Delay begins once the Master boiler determines that a boiler must be enabled to reach the setpoint or when the Master boiler determines a boiler should be disabled because of a decreasing load. Press the **LEFT** or **RIGHT** buttons to adjust the Stage Delay then press the **OK** button to store the setting. Adjusting the Stage Delay will have the following effects:

- **Increase Stage Delay**

- Reaching the setpoint could take longer due to a longer delay between enabling boilers.
- Overshooting the setpoint could occur due to boilers staying on longer before being disabled.

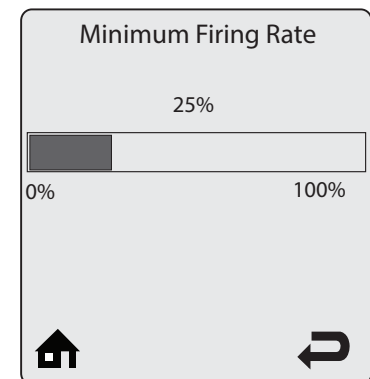
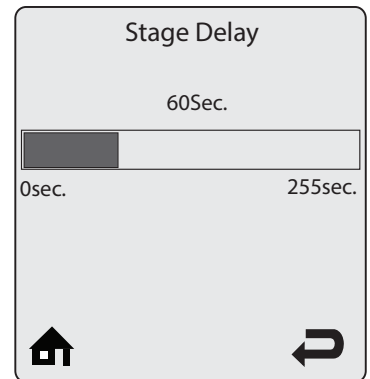
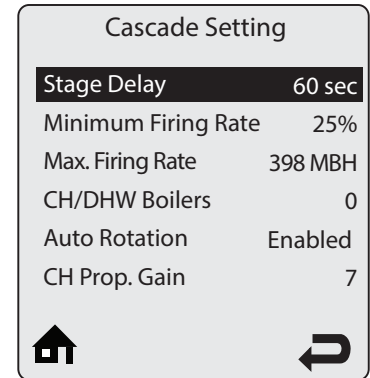
- **Decrease Stage Delay**

- Overshooting the setpoint could occur due to boilers being enabled quicker.
- Boilers will be disabled quicker, possibly increasing boiler cycling and decreasing runtimes.

7.5.3 Minimum Firing Rate

Default: 25%

Minimum Firing Rate is the minimum firing rate of a single boiler in the Cascade System. The Master boiler uses this setting to determine when boilers can be enabled and disabled. Setting the Minimum Firing Rate below the recommended minimum will result in boilers being enabled too quickly which may cause sharp increases in temperature from the Cascade System. Setting the Minimum Firing Rate above the recommended minimum will delay the enabling of boilers which may lower the system efficiency. Press the **LEFT** or **RIGHT** buttons to adjust the Minimum Firing Rate then press the **OK** button to store the setting. For the minimum and maximum recommended settings refer to Table 6 on page 52.



7.0 Cascade

7.5.4 Boiler Enabling Algorithm

The Master boiler uses the following algorithm to determine when the next boiler can be enabled:

$$\frac{\text{Number of Boilers Firing} + 1}{\text{Number of Boilers Firing}} \times \text{Minimum Firing Rate} = \text{Individual Boiler Firing Rate}$$

Once the currently fired boilers reach the calculated firing rate, the next boiler can be enabled without affecting the overall cascade firing rate. For example, the calculation for a Cascade System consisting of two PRESTIGE Solo 399s would be:

$$\frac{1 + 1}{1} \times 25\% = 50\%$$

Once the first PRESTIGE Solo 399 firing rate reaches 50%, the second PRESTIGE Solo 399 can be enabled. Both will then fire at the minimum 25% firing rate so that the overall output from the Cascade System remains the same.

7.5.5 Boiler Disabling Algorithm

Once the firing rate of all currently fired boilers decreases to the Minimum Firing Rate, a boiler can be disabled. The boilers which continue to fire will increase their firing rate if required to replace the output of the disabled boiler.

NOTICE

Stable cascade operation requires that all boilers in a Cascade System be the same size. Mixing boiler sizes in a Cascade System could lead to temperature fluctuations and erratic cascade operation.

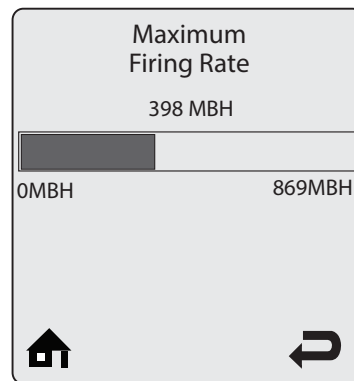
7.5.6 Maximum Firing Rate

Default: 398 MBH

Maximum Firing Rate is the maximum firing rate of a single boiler in the Cascade System. Press the **LEFT** or **RIGHT** buttons to adjust the Maximum Firing Rate then press the **OK** button to store the setting. The recommended settings are:

Table 6: Min/Max Firing Rate

Prestige Model	Minimum Firing Rate	Maximum Firing Rate
Solo 80	20%	80 MBH
Solo/Excellence 110	19%	110 MBH
Solo 155	19%	153 MBH
Solo 175	19%	170 MBH
Solo 250	19%	240 MBH
Solo 299	25%	299 MBH
Solo 399	19%	399 MBH



7.0 Cascade

7.5.7 CH/DHW Boilers

Default: 0

The CH/DHW Boilers setting specifies how many boilers in a Split Cascade System will respond to a domestic hot water call. The CH/DHW Boilers always begins with the Master boiler. The remaining boilers of the Cascade System will only respond to central heating calls. This allows the Cascade System to satisfy both central heating and domestic hot water calls at the same time. At the completion of a domestic hot water call, the CH/DHW Boilers will again be available to respond to central heating calls. Press the **LEFT** or **RIGHT** buttons to adjust the CH/DHW Boilers setting then press the **OK** button to store the setting.

NOTICE

Splitting the Cascade System into CH only and CH/DHW boilers requires the boilers to be piped as shown in Figure 25 on page 48. The CH/DHW boilers must be piped to both CH and DHW loads directly for proper operation.

NOTICE

DHW Priority must be set to Enabled in DHW Settings of the Cascade Master for proper operation.

NOTICE

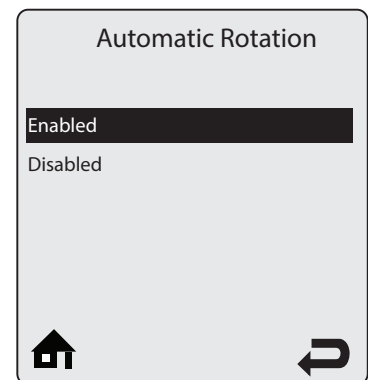
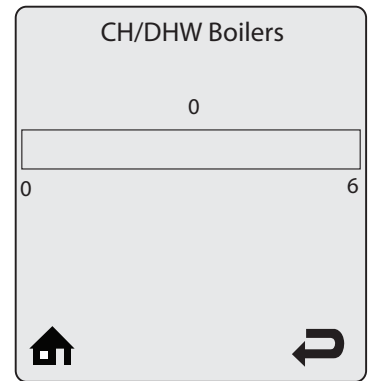
All CH/DHW Boilers will respond to a domestic hot water call. It is important that the domestic load is capable of transferring all of the heat generated to prevent excessive boiler cycling.

7.5.8 Automatic Rotation

Default: Enabled

Automatic Rotation allows the lead stage automatic rotation function to be disabled. Press the **UP** or **DOWN** buttons to select Enabled or Disabled then press the **OK** button to store the setting.

- **Enabled** – The lead boiler automatically rotates every time a call for heat is received when a Switch option is chosen in CH Demand or every 24 hours when a Constant option is chosen in CH Demand.
- **Disabled** – The lead boiler is always the Master boiler followed by each Slave boiler.



7.0 Cascade

7.5.9 CH Proportional Gain

Default: 7

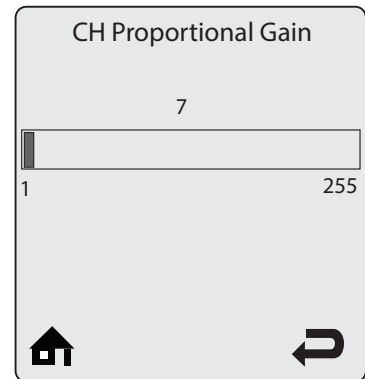
CH Proportional Gain allows the cascade response to be adjusted for a central heating call. CH Proportional Gain has the greatest influence when the system temperature is far away from the setpoint. Press the **LEFT** or **RIGHT** buttons to adjust the CH Proportional Gain then press the **OK** button to store the setting.

- **Increase CH Proportional Gain**

- The Cascade System will reach setpoint faster, but overshooting the setpoint may occur.
- To reach the setpoint faster, increase the CH Proportional Gain value by 2. Perform Cascade Autodetection and initiate a central heating call. Observe the cascade response and make further adjustments if necessary.

- **Decrease CH Proportional Gain**

- The Cascade System will take longer to reach the setpoint, but setpoint overshooting is minimized.
- If the setpoint is reached too quickly, decrease the CH Proportional Gain value by 2. Perform Cascade Autodetection and initiate a central heating call. Observe the cascade response and make further adjustments if necessary.



NOTICE

Only make adjustments to this setting after consulting ACV-Triangle Tube Technical Support. Improper adjustment of CH Proportional Gain could lead to temperature fluctuations and erratic cascade operation.

7.5.10 CH Integral Gain

Default: 245

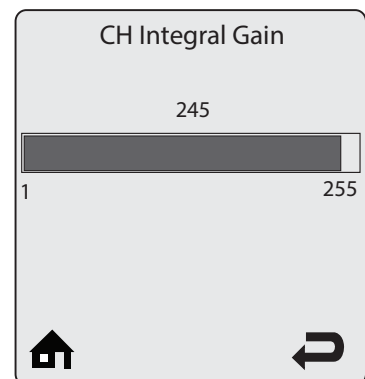
CH Integral Gain allows the cascade response to be adjusted for a central heating call. CH Integral Gain has the greatest influence when the system temperature is close to the setpoint. Press the **LEFT** or **RIGHT** buttons to adjust the CH Integral Gain then press the **OK** button to store the setting.

- **Increase CH Integral Gain**

- The Cascade System will take longer to reach the setpoint, but setpoint overshooting is minimized.
- If the setpoint is reached too quickly, increase the CH Integral Gain value by 2. Perform Cascade Autodetection and initiate a central heating call. Observe the cascade response and make further adjustments if necessary.

- **Decrease CH Integral Gain**

- The Cascade System will reach setpoint faster, but overshooting the setpoint may occur.



7.0 Cascade

- To reach the setpoint faster, decrease the CH Integral Gain value by 2. Perform Cascade Autodetection and initiate a central heating call. Observe the cascade response and make further adjustments if necessary.

NOTICE

Only make adjustments to this setting after consulting ACV-Triangle Tube Technical Support. Improper adjustment of CH Integral Gain could lead to temperature fluctuations and erratic cascade operation.

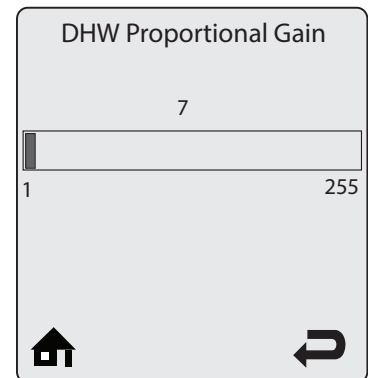
7.5.11 DHW Proportional Gain **Default: 7**
DHW Proportional Gain allows the cascade response to be adjusted for a domestic hot water call. DHW Proportional Gain has the greatest influence when the system temperature is far away from the setpoint. Press the **LEFT** or **RIGHT** buttons to adjust the DHW Proportional Gain then press the **OK** button to store the setting.

- **Increase DHW Proportional Gain**

- The Cascade System will reach setpoint faster, but overshooting the setpoint may occur.
- To reach the setpoint faster, increase the DHW Proportional Gain value by 2. Perform Cascade Autodetection and initiate a domestic hot water call. Observe the cascade response and make further adjustments if necessary.

- **Decrease DHW Proportional Gain**

- The Cascade System will take longer to reach the setpoint, but setpoint overshooting is minimized.
- If the setpoint is reached too quickly, decrease the DHW Proportional Gain value by 2. Perform Cascade Autodetection and initiate a domestic hot water call. Observe the cascade response and make further adjustments if necessary.



NOTICE

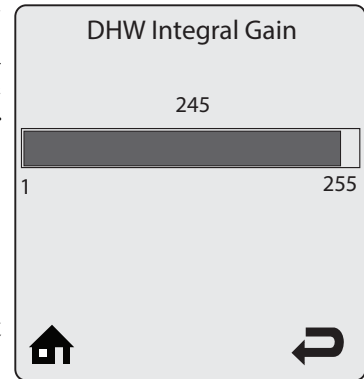
Only make adjustments to this setting after consulting ACV-Triangle Tube Technical Support. Improper adjustment of DHW Proportional Gain could lead to temperature fluctuations and erratic cascade operation.

7.0 Cascade

7.5.12 DHW Integral Gain

Default: 245

DHW Integral Gain allows the cascade response to be adjusted for a domestic hot water call. DHW Integral Gain has the greatest influence when the system temperature is close to the setpoint. Press the **LEFT** or **RIGHT** buttons to adjust the DHW Integral Gain then press the **OK** button to store the setting.



- **Increase DHW Integral Gain**

- The Cascade System will take longer to reach the setpoint, but setpoint overshooting is minimized.
- If the setpoint is reached too quickly, increase the DHW Integral Gain value by 2. Perform Cascade Autodetection and initiate a domestic hot water call. Observe the cascade response and make further adjustments if necessary.

- **Decrease DHW Integral Gain**

- The Cascade System will reach setpoint faster, but overshooting the setpoint may occur.
- To reach the setpoint faster, decrease the DHW Integral Gain value by 2. Perform Cascade Autodetection and initiate a domestic hot water call. Observe the cascade response and make further adjustments if necessary.

NOTICE

Only make adjustments to this setting after consulting ACV-Triangle Tube Technical Support. Improper adjustment of DHW Integral Gain could lead to temperature fluctuations and erratic cascade operation.

8.0 Modbus Interface

8.0 MODBUS INTERFACE

The Modbus Interface allows a Building Management System (BMS) to directly connect to the Prestige. A BMS can read information from the boiler to determine its operating state, lockout status, sensor readings, etc. A BMS can also operate the boiler by providing a setpoint.

Table 7: Modbus Configuration	
Protocol	MODBUS RTU
Baud Rate	38400bps
Data Length	8
Parity	None
Stop Bits	1
Physical Layer	RS485 (2 wire)

Table 8: Supported Commands		
DEC	HEX	Description
03	0x03	Read Holding Registers
04	0x04	Read Input Registers
06	0x06	Write Single Register
16	0x10	Write Multiple Registers
17	0x11	Report Slave ID

Table 9: Holding Registers (Read/Write)				
Address DEC (HEX)	Supported Commands	Description	Byte: Format	Notes
512 (0x0200)	0x03 0x06 0x10	CH Demand	MB:U8 LB:U8	<p>Writing 0= Modbus CH1 Demand has priority over a DHW call 255 = DHW call has priority over a Modbus CH1 Demand</p> <p>Reading 0 = No CH Calls Present 255 = CH1 or CH2 Call Present</p> <p>Writing 0 = End CH1 Demand 255= Begin CH1 Demand A CH1 Demand lasts for 30 seconds from the last successful write.</p>
513 (0x201)	0x03 0x06 0x10	Maximum Firing Rate	LB:U8	Value = Maximum Firing Rate % This register becomes active when 255 is written to register 512 (0x0200)
514 (0x202)	0x03 0x06 0x10	CH Setpoint	LB:U8	Value = CH Setpoint °C This register becomes active when 255 is written to register 512 (0x0200)
1280 (0x0500)	0x03	CH1 Maximum Setpoint	LB:U8	Value = °C
1281 (0x0501)	0x03	DHW Storage Setpoint	LB:U8	Value = °C

8.0 Modbus Interface

Table 10: Input Registers (Read Only)

Address DEC (HEX)	Supported Commands	Description	Byte: Format	Notes
0 (0x0000)	0x04	Boiler Status	LB: Flag8	Bit: Description 0: PC Manual Mode 1: DHW Mode 2: CH Mode 3: Freeze Protection Mode 4: Flame Present 5: CH(1) Pump 6: DHW Pump 7: System / CH2 Pump 0 = Off, 1 = On
1 (0x0001)	0x04	Lockout Status	MB: Flag8 LB:U8	Bit: Description 1: Lockout Code Type 0 = Automatic Reset Lockout 1 = Manual Reset Lockout Value = Lockout Code
2 (0x0002)	0x04	Lockout Status	LB:U8	0 = Single / Master Boiler 1 = Slave 1 2 = Slave 2 3 = Slave 3 4 = Slave 4 5 = Slave 5 F = Single / Master Display
768 (0x0300)	0x04	Boiler Supply Temperature / System Temperature	S16	Value = 0.1°C Invalid Value = 32768 (0x8000) Value is the Boiler Supply Temperature unless the System Temperature Sensor is installed
769 (0x0301)	0x04	Boiler Return Temperature	LB:S8	Value = °C Invalid Value = 65472 (0xFFC0)
770 (0x0302)	0x04	DHW Storage Temperature	LB:S8	Value = °C Invalid Value = 32768 (0x8000)
771 (0x0303)	0x04	Boiler Flue Temperature	LB:S8	Value = °C Invalid Value = 65472 (0xFFC0)
772 (0x0304)	0x04	Outdoor Temperature	LB:S8	Value = °C Invalid Value = 32768 (0x8000)
773 (0x0305)	0x04	Future Use	LB:U8	
774 (0x0306)	0x04	Flame Ionization Current	LB:U8	Value = Flame Current µA
775 (0x0307)	0x04	Boiler / Cascade Firing Rate	LB:U8	Value = Firing Rate %
776 (0x0308)	0x04	Boiler Setpoint	LB:U8	Value = °C Invalid Value = 32768 (0x8000)

9.0 Manual Operation

9.0 MANUAL OPERATION



9.1 Navigation:

Home Screen>Installer Menu>Manual Operation

The Manual Operation Screen allows the burner and circulators to be manually enabled for testing.

9.2 Fan

Press the **OK** button while the FAN icon is highlighted to manually fire the burner and power the CH (1) circulator. Press the **LEFT** and **RIGHT** buttons to adjust the firing rate from 1 % (Low Fire) to 100% (High Fire). Hold down the **LEFT** or **RIGHT** buttons to rapidly increase or decrease the firing rate. Press the **OK** button again while the FAN icon is highlighted to shutdown the burner when finished.

NOTICE

An adequate CH load must be present to dissipate the heat generated while the burner is manually fired. If an adequate CH load is not available, an indirect water heater can be used to dissipate the heat by creating a domestic hot water call which will enable the DHW circulator.

9.3 CH CH1

Press the **OK** button while the CH CH1 icon is highlighted to manually power the CH (1) circulator. Press the **OK** button again while the CH CH1 icon is highlighted to shutdown the CH (1) circulator.

NOTICE

The Auxiliary Boiler circulator is also powered when the CH (1) circulator is manually enabled.

9.4 DHW

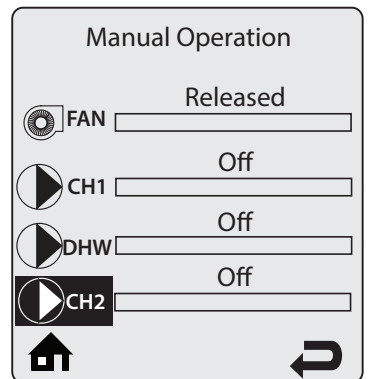
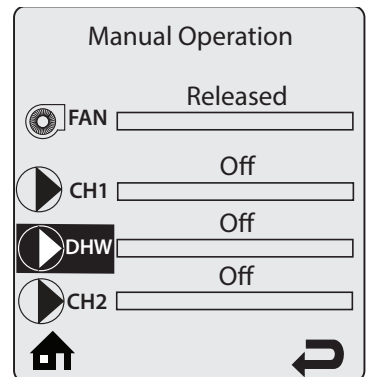
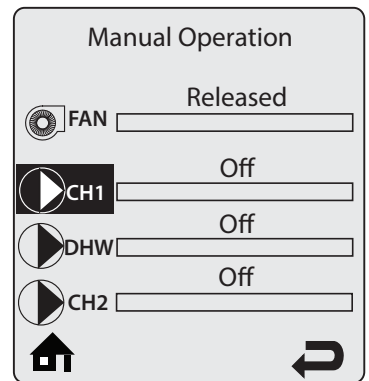
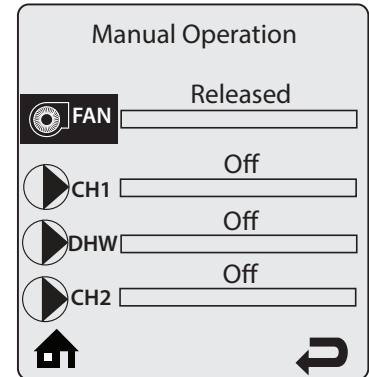
Press the **OK** button while the DHW icon is highlighted to manually power the DHW circulator. Press the **OK** button again while the DHW icon is highlighted to shutdown the DHW circulator.

NOTICE

The Auxiliary Boiler circulator is also powered when the DHW circulator is manually enabled.

9.5 SYS CH2

Press the **OK** button while the SYS CH2 icon is highlighted to manually power the System circulator. Press the **OK** button again while the SYS CH2 icon is highlighted to shutdown the System circulator.



Additional quality water heating equipment available from ACV- Triangle Tube

MAXI-FLO AND SPA HEAT EXCHANGERS



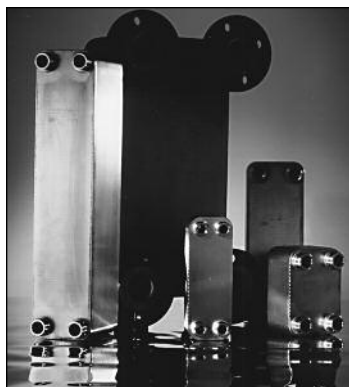
- Construction of high quality corrosion resistant stainless steel (AISI 316) or titanium
- Specially designed built-in flow restrictor to assure maximum heat exchange
- Compact and light weight
- Available in 8 sizes that can accommodate any size pool or spa

SMART INDIRECT FIRED WATER HEATERS



- Exclusive tank-in-tank design
- Stainless steel construction
- Available in 7 sizes
- Limited LIFETIME residential warranty
- 6 year Limited commercial warranty
- Self cleaning/self descaling design

TTP BRAZED PLATE HEAT EXCHANGERS



- For domestic water, snow melting, radiant floor, refrigeration
- Plates made of stainless steel, with a 99.9 % copper and brazed, ensuring a high resistance to corrosion
- Self cleaning and self descaling
- Computerized sizing available from ACV- Triangle Tube
- Available in capacities from 25,000 BTU/hr to 5,000,000 BTU/hr



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