

Installation Manual  
Central Processing Unit 0550  
Version 1.04

The HBX logo consists of the letters 'HBX' in a bold, black, sans-serif font. The letters are centered between two horizontal red bars, one above and one below. The background of the entire page features a pattern of thin, light-colored lines that create a sense of depth and movement, with a darker, more solid area on the left side.

**HBX**

Boiler Staging • Mixing • Differential Setpoint • Pump Sequencer • Dual Setpoint

**CPU-0550**

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HBX Control Systems Inc.



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## HBX CPU-0550 HYDRONIC CONTROLLER

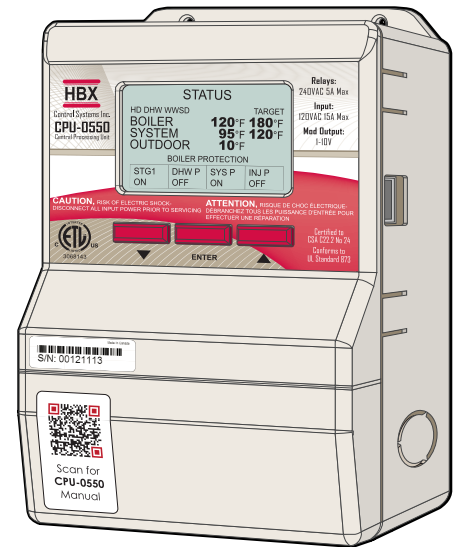
### INTRODUCTION

This manual will help with the installation, parameter setting, troubleshooting and general maintenance requirements for the controller. To guarantee the safe and reliable operation of this control, you must first read this manual in detail and take particular note to any and all warnings or caution directives prior to connecting to AC power.

Please consult and install the heating appliance in accordance with manufacture's recommendations.

### QR CODE

Each ECO-0550 is labeled with a QR code, which when scanned will link to a digital version of this manual. If this manual is ever lost or damaged, simply scan this with a compatible device to download the latest manual version.



### SAFETY SYMBOLS & WARNINGS



#### Extreme Hazard

This action poses a serious threat that could result in personal injury or death, as well as permanent damage to the equipment. Proceed with caution.



#### Moderate Hazard

This action may cause personal injury or have adverse effects on the installation process if handled incorrectly.



#### Disconnect Power Source

The presence of low voltage(24VAC) or high voltage(120VAC) could result in personal injury or permanent damage to components or equipment.



#### Point of Interest

This point clarifies pertinent information, or brings your attention to an action that may have adverse effects on the installation process.



#### Drawing Reference

Refer to the specified electrical or mechanical drawing at the back of the manual.



Only suitably qualified individuals with formal training in electrical and Hydronic controls should attempt the installation of this equipment. Incorrect wiring and installation will affect the warranty provided with this unit. Wiring must be completed in accordance with the codes and practices applicable to the jurisdiction for the actual installation.



Use only copper conductor supply wire suitable for at least 105 °C



The HBX CPU-0550 is a microprocessor based controller and as such is not to be regarded as a safety (limit) control. Please consult and install the heating or cooling appliance in accordance with the manufacturer's recommendations.

### RECEIPT & INSPECTION

After receiving, inspect the unit for any possible physical damage that may have occurred during transportation.

After unpacking the unit make sure the box contains:

- 1 x Remote Outdoor sensor
- 2 x Universal sensors
- 1 x Terminal Screwdriver (2.5mm)
- 2 x Cable ties
- 1 x Manual

## HBX CPU-0550 HYDRONIC CONTROLLER

### DESCRIPTION

The CPU-0550 is designed to be a stand-alone Outdoor Reset Control device. The purpose and function of the CPU-0550 is to provide control for multiple applications. The applications are selectable through push button operation on the programming interface and consist of Boiler, Mixing, Differential Setpoint control or Pump Sequencer.

#### Boiler Control

The use of the CPU-0550 as a Boiler Control allows the capability to run up to three On/Off boilers, or a single modulating boiler with DHW requirements.

#### Mixing Control

As a Mixing Control, the CPU-0550 has the capability to run a single On/Off or modulating boiler. Mixing types include Modulating Mixing, Floating Action Valve or Injection Pump

#### Differential Setpoint Control

The CPU-0550, when selected as a Setpoint Control, will allow for Dual or Differential Setpoint requirements.

#### Pump Sequencer

This control allows the system to sequence and cycle pumps, override pumps and turn the pump off when the outdoor temperature goes above a certain value (WWSD).

#### Dual Setpoint

This control is for use when one or two independent setpoints are needed.

## TECHNICAL DATA & DIMENSIONS

### TECHNICAL DATA

#### Specifications:

- 3 x Thermistor Input (10K Ohm)
- 2 x Miscellaneous Input Signal
- 3 x Relay Outputs (240VAC 10Amps) Dry Contacts
- 1 x Modulating Output / 2Amp Dry Contact (0-10VDC)
- Input: 120VAC +/- 10% 60Hz 20A Max

#### Weight:

0.408Kg

#### Dimensions:

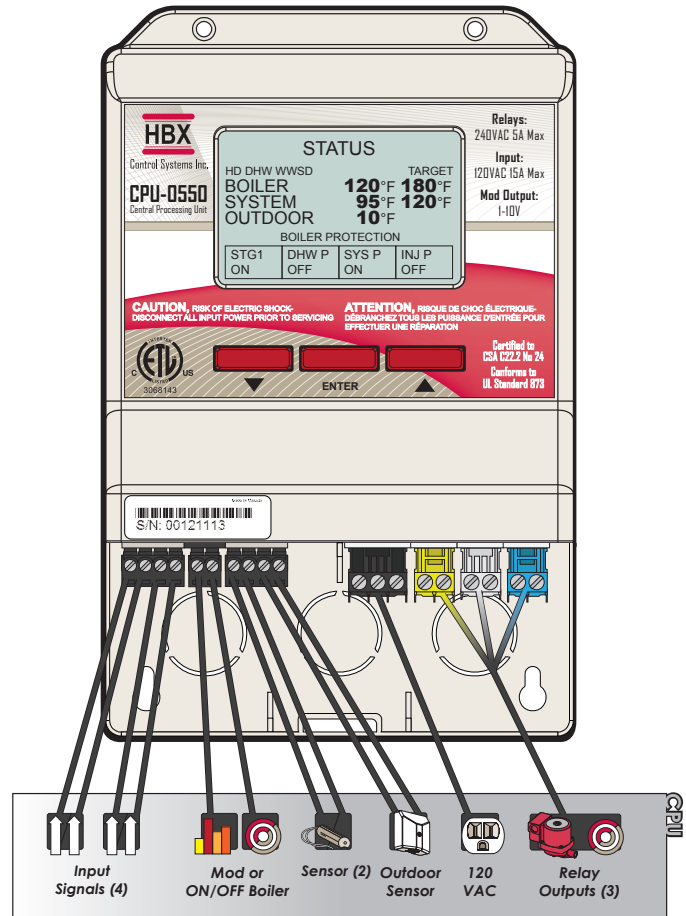
100mm W x 168mm H x 70mm

#### ETL Listings:

- Meets CSA C22.2 No. 24
- Meets UL Standard 873
- ETL Control No. 3068143

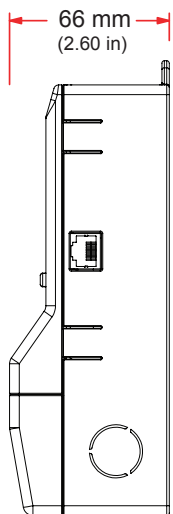
#### Storage:

50°F to 104°F (10°C to 40°C)

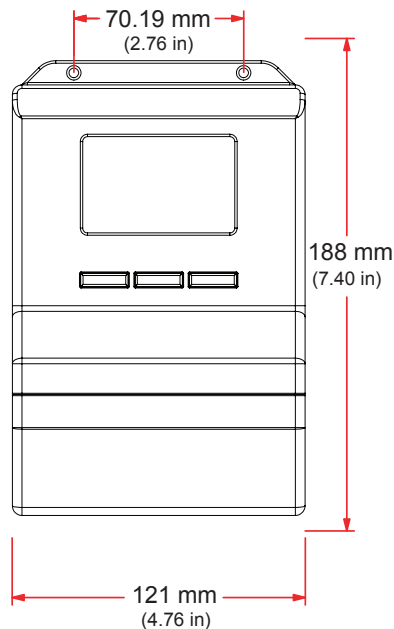


## DIMENSIONS

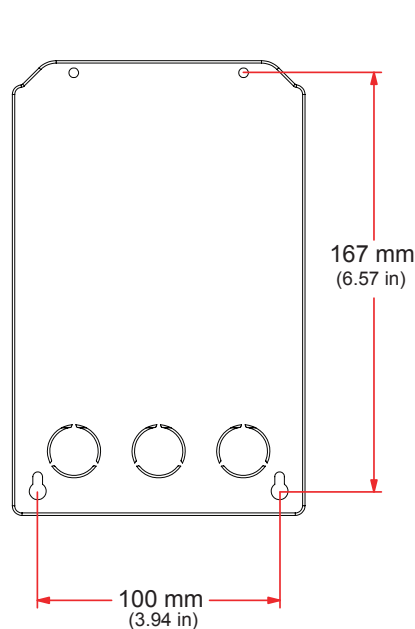
Side View



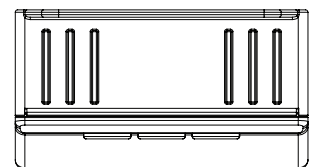
Front View



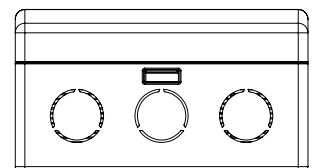
Rear View



Top View



Bottom View



## WIRING AND INSTALLATION

### Wiring

All signal wiring must be with a minimum of 18AWG wire at a maximum of 500ft.

#### 1, 2: Demand Signal 1

Apply heat demand from a dry contact, or 24VAC

#### 3, 4: Demand Signal 2

Used for DHW or Setpoint demand.

#### 5, 6: Modulating / Boiler Contacts

Modulating or Boiler 1 output. Also used in differential setpoint output for modulating devices.

#### Sensor Inputs

7, 10: Primarily used for boiler temperature but also used for setpoint 1 temperature in Setpoint controls.

8, 10: Used for DHW or setpoint on Boiler controls and low temperature system temperature on Mixing control. Also used for setpoint 2 temperature.

9, 10: Outdoor temperature. Only on Boiler and Mixing controls.

#### 18, 19: Relay 3

Generally used as a system pump in boiler mode, injection or system pump in mixing mode or as an alarm in pump sequencer mode.

#### 16, 17: Relay 2

Generally used as a pump contact valve or as a third stage boiler.

#### 14, 15: Relay 1

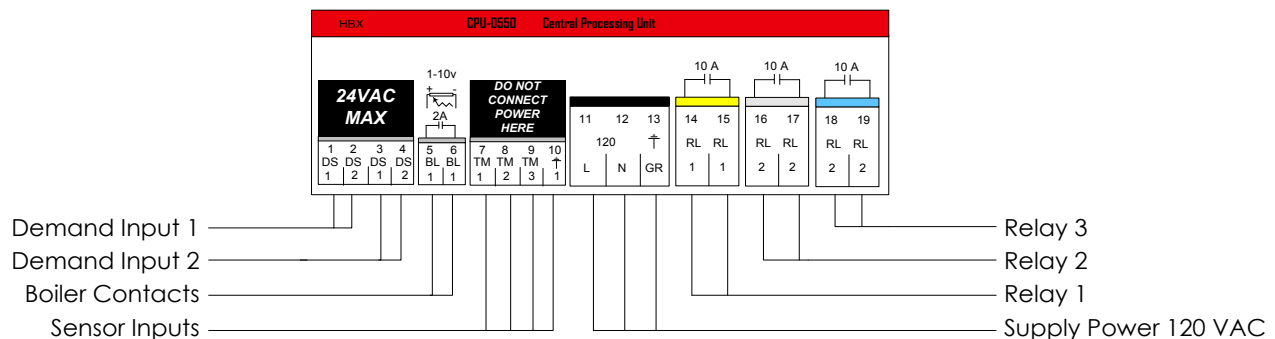
This relay is generally a pump contact or can be used as a second stage boiler or as a third stage boiler.



(Relays 1, 2 and 3 are dry contacts and rated for a maximum of 10 Amps.)



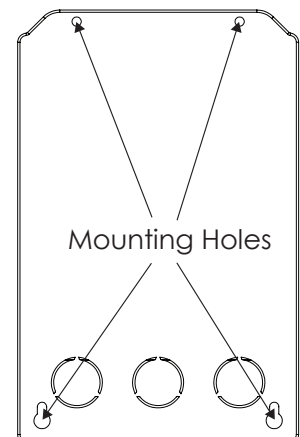
Please ensure no power is applied to pin 5, 6 when in any modulating mode.



### Installation

The CPU-0550 is designed to be wall mounted or installed in a separate electrical enclosure. The unit should be mounted inside and protected from falling water and high humidity conditions. With all the covers in place it is designed to protect any individual from accidental electrical shock. It is not suitable for installation in hazardous locations and should not be placed close to any electromagnetic fields.

- Identify the four mounting holes on the CPU-0550, mark on the wall the desired location of mounting.
- Pre-drill, anchor and fasten four screws for mounting.
- Hang CPU-0550 and fasten tight to desired locations
- Complete wiring connections in accordance with terminal locations.



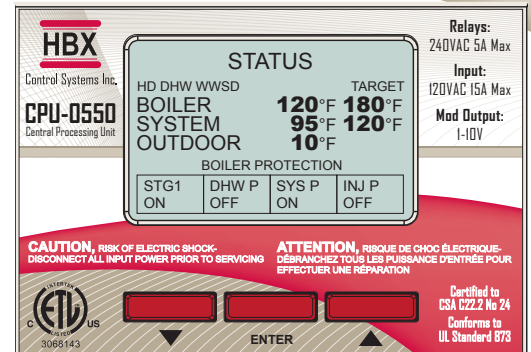
## NAVIGATING THE CPU-0550

All programming steps within the CPU-0550 are achieved by using the three buttons (and combination thereof) located below the screen.

The ▼ button is used to scroll down in menu screens and decrease a value within specific options.

The ▲ button is used to scroll up in menu screens and increase a value in specific options.

The **ENTER** button is used to access the setpoint menu and select a setting.



## CONTROL MODE

The programming instructions for the CPU-0550 are broken down into the four control modes listed below. When the control is first plugged in you are asked to select which control mode you would like your CPU-0550 to operate in. To select your control mode simply use the ▲ or ▼ buttons to select the correct mode then wait five seconds to accept your selection.

### CHOOSE CONTROL TYPE 1.04

- ▷ 1) STAGING
- 2) MIXING
- 3) DIFFERENTIAL
- 4) PUMP SEQ
- 5) DUAL SETPOINT

### Boiler Mode (Default = Boiler Mode)

Programming for this mode can be found on pages 8 through 13. This mode is used when running boilers only. The boiler configurations available in this mode are single modulating, On/Off boiler, two stage On/Off boiler and three stage On/Off boiler. With single and 2 stage boiler operation the control will run the boiler pump and DHW pump.

### CHOOSE CONTROL TYPE 1.04

- ▷ 1) STAGING
- ▷ 2) MIXING
- 3) DIFFERENTIAL
- 4) PUMP SEQ
- 5) DUAL SETPOINT

### Mixing Mode

Programming for this mode can be found on pages 14 through 21. This mode is used when running mixing pumps or valves. Mixing configurations include PMIP, Modulating, and Floating Action Valve. In this mode the control can run up to 2 on/off boilers or a single mod boiler, depending on other options selected in the control. In modes other than Floating Valve the control will run the injection and system pump.

### CHOOSE CONTROL TYPE 1.04

- 1) STAGING
- 2) MIXING
- ▷ 3) DIFFERENTIAL
- 4) PUMP SEQ
- 5) DUAL SETPOINT

### Differential Setpoint Mode

Programming for this mode can be found on page 22. This mode is used when running a differential setpoint. In differential mode, the control will also send a modulating signal output based on how far the control is from the differential. This can be used to run a pump in modulating applications for constant flow.

### CHOOSE CONTROL TYPE 1.04

- 1) STAGING
- 2) MIXING
- 3) DIFFERENTIAL
- ▷ 4) PUMP SEQ
- 5) DUAL SETPOINT

### Pump Sequencer

Programming for this mode can be found on page 23. This mode is used to provide pump control for two pumps in a duty, standby situation. This control allows the system to sequence and cycle pumps, override pumps and turn the pumps off when the outdoor temperature goes above a certain value (WWSD)

### CHOOSE CONTROL TYPE 1.04

- 1) STAGING
- 2) MIXING
- 3) DIFFERENTIAL
- 4) PUMP SEQ
- ▷ 5) DUAL SETPOINT

### Dual Setpoint

Programming for this mode can be found on page 25. This mode is used when one or two independent setpoints are needed. Each setpoint is set up individually and each has its own thermistor input and relay outputs: Each setpoint has its own normally open and normally closed contacts (which can be used for heating and/or cooling).

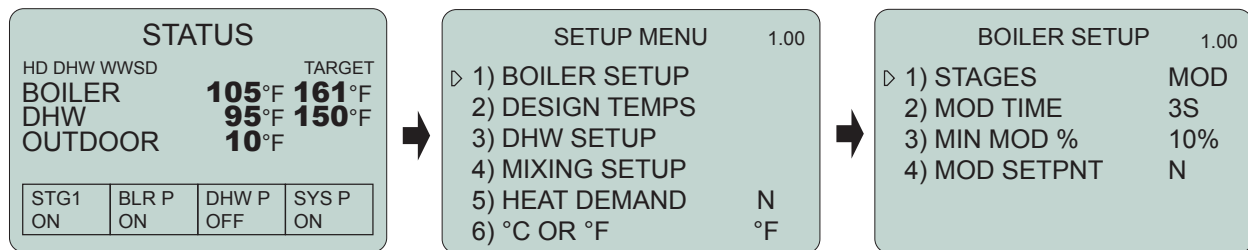
## SETUP MENU

the SETUP menu is used for entering the design values, as well as assign different control options. to access the setup menu, push the **ENTER** button on the STATUS screen. Use the ▲ or ▼ buttons to scroll through the various settings.

To select a parameter, align the cursor arrow ▶ with the desired parameter and press the **ENTER** button. the arrow will become solid ▶, which indicates that a parameter has been selected.

Adjust the setting to the desired value with the ▲ or ▼ buttons. Once the correct value is set, push the **ENTER** button. This will deselect the parameter.

To go to the previous screen, push and hold the **ENTER** button. If the SETUP menu is left for more than 90 seconds, the display will change to the STATUS screen and the control will resume operation.





## BOILER MODE

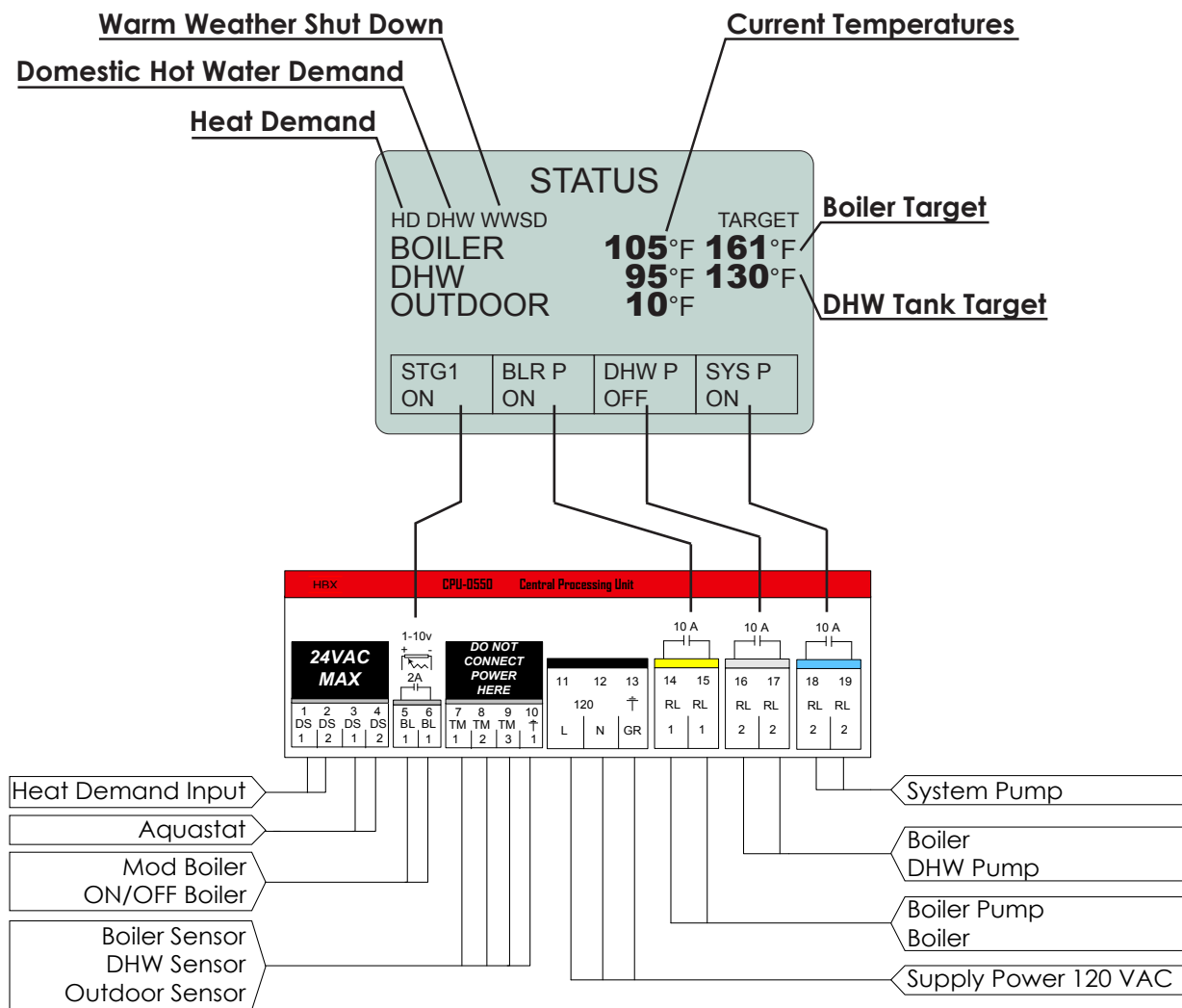
### Multicolour backlit Display

The Multicolour Backlit Display is one of the key features of the HBX Controls stand-alone CPU-0550 Control. Depending on which mode of operation is selected the screen colour will change to indicate information about the status of the system.

### Screen Colors

- Light Blue - No Heat Demand
- Red - Demand (DHW or Heat Demand) and Boiler running
- Yellow - Heat Demand ON, boiler running but in boiler protection
- Dark Blue - Heat Demand ON and boiler satisfied

### Status Screen



## BOILER MODE PROGRAMMING GUIDE

### 1) BOILER SETUP

SETUP MENU	1.00
▶ 1) BOILER SETUP	
2) DESIGN TEMPS	
3) DHW SETUP	
4) HEAT DEMAND	N
5) °C OR °F	°F

#### Boiler Setup

This setting is used to configure the boiler staging component in your system.

### 1 STAGE SETUP

BOILER SETUP	1.00
▶ 1) STAGES	<b>1</b>
2) DIFF	<b>20°F</b>

#### Stages

This setting will allow you to select the boiler stage.

(1 to 3, MOD) Default: 1

BOILER SETUP	1.00
1) STAGES	<b>1</b>
▶ 2) DIFF	<b>20°F</b>

#### Differential

Adjust this setting to the desired differential for the boiler. This will center the differential around the setpoint. (eg. 10°F below/above)

(2°F to 60°F) Default: 20°F

### 2/3 STAGE SETUP

BOILER SETUP	1.00
▶ 1) STAGES	<b>2</b>
2) DIFF	<b>20°F</b>
3) ROTATE	N
4) LAG TIME	<b>3M</b>

#### Stages

This setting will allow you to select the boiler stage.

(1 to 3, MOD) Default: 1

BOILER SETUP	1.00
1) STAGES	<b>2</b>
▶ 2) DIFF	<b>20°F</b>
3) ROTATE	N
4) LAG TIME	<b>3M</b>

#### Differential

Adjust this setting to the desired differential for the boiler. This will center the differential around the setpoint. (eg. 10°F below/above)

(2°F to 60°F) Default: 20°F

BOILER SETUP	1.00
1) STAGES	<b>2</b>
2) DIFF	<b>20°F</b>
▶ 3) ROTATE	N
4) LAG TIME	<b>3M</b>

#### Rotate

The time of rotation between boilers is 48 hours of run time. It means that the boilers are going to rotate when the first boiler exceeds the second by 48 hours and vice versa.

(Y/N) Default: N

BOILER SETUP	1.00
1) STAGES	<b>2</b>
2) DIFF	<b>20°F</b>
3) ROTATE	N
▶ 4) LAG TIME	<b>3M</b>

#### Lag Time

When the the boiler is set for two or more stages, this setting will be set for the minimum lag time between boiler stages. This is a time delay between stages. Even if th differential has been exceeded this time must elapse before that stage can come on.

(1M to 240M) Default: 3M

## MOD BOILER SETUP

BOILER SETUP 1.00

▶ 1) STAGES	MOD
2) MOD TIME	3S
3) MIN MOD %	35%
4) MOD SETPNT	N

### Stages

This setting will allow you to select the boiler stage.

(1 to 3, MOD) Default: 1

BOILER SETUP 1.00

1) STAGES	MOD
▶ 2) MOD TIME	3S
3) MIN MOD %	35%
4) MOD SETPNT	N

### Mod Time

This setting sets the time between the steps when the boiler needs to increase or decrease the firing rate. Each step is 1% for all situations.

(1S to 240S) Default: 3S

BOILER SETUP 1.00

1) STAGES	MOD
2) MOD TIME	3S
▶ 3) MIN MOD %	35%
4) MOD SETPNT	N

### Minimum Mod %

This setting is used to set the lowest modulating level the boiler can go down to. This will also be the starting point whenever there is a new demand.

(10% to 95%) Default: 35%

BOILER SETUP 1.00

1) STAGES	MOD
2) MOD TIME	3S
3) MIN MOD %	35%
▶ 4) MOD SETPNT	N

### Mod Setpoint

In this mode the 0-10VDC signal does not directly run the burner. The 0-10VDC signal is interpreted by the boiler as a setpoint. The boiler in this mode will modulate the burner to achieve that setpoint.

(Y/N) Default: N

## 2) DESIGN TEMPERATURE

SETUP MENU	1.00
1) BOILER SETUP	
▶ 2) DESIGN TEMPS	
3) DHW SETUP	
4) HEAT DEMAND	N
5) °C OR °F	°F

### Design Temperatures

Design Temperature allows you to customize each design temperature for your system

## DESIGN TEMPERATURES SETUP

DESIGN TEMPERATURES 1.00	
▶ 1) OUTDOOR	10°F
2) MAX BOILER	180°F
3) MIN BOILER	140°F
4) WWSD	70°F

### Outdoor Temperature

This is used in the outdoor reset design calculation. This option should be set to reflect your specific city or region.

(-50°F to 120°F) Default: 10°F

DESIGN TEMPERATURES 1.00	
1) OUTDOOR	10°F
▶ 2) MAX BOILER	180°F
3) MIN BOILER	140°F
4) WWSD	70°F

### Maximum Boiler Temperature

This is used in the outdoor reset design calculation, and also serves as the maximum setting for the boiler. This is the maximum boiler temperature for the coldest day.

(140°F to 200°F) Default: 180°F

DESIGN TEMPERATURES 1.00	
1) OUTDOOR	10°F
2) MAX BOILER	180°F
▶ 3) MIN BOILER	140°F
4) WWSD	70°F

### Minimum Boiler Temperature

This is the minimum boiler temperature. Set this to the temperature you would like the boiler to be when the outdoor temperature approaches WWSD.

(OFF/52°F to 200°F) Default: 140°F



**This is the supply Boiler Temperature. Keep this in mind when selecting this feature.**

DESIGN TEMPERATURES 1.00	
1) OUTDOOR	10°F
2) MAX BOILER	180°F
3) MIN BOILER	140°F
▶ 4) WWSD	70°F

### Warm Weather Shut Down

This setting is used to set the temperature in which the CPU-0550 will go into WWSD. If the system rises above this temperature, the system will be shut off. In WWSD the boilers and all pumps will shut off.

(35°F to 120°F) Default: 70°F

### 3) DHW SETUP

SETUP MENU	1.00
1) BOILER SETUP	
2) DESIGN TEMPS	
▶ 3) DHW SETUP	
4) HEAT DEMAND	N
5) °C OR °F	°F

#### Domestic Hot Water (DHW) Setup

DHW setup allows you to program domestic hot water options in your system.

### DOMESTIC HOT WATER SETUP

DHW SETUP	1.00
▶ 1) USE DHW	N
2) PRIORITY	N
3) FAST DHW	N
4) BOIL SETPNT	180°F
5) SETPOINT	130°F
6) DIFF	8°F

#### Use DHW

Once this option is enabled you will be able to program the remaining options for your DHW setup.

(Y/N) Default: **N**

DHW SETUP	1.00
1) USE DHW	N
▶ 2) PRIORITY	N
3) FAST DHW	N
4) BOIL SETPNT	180°F
5) SETPOINT	130°F
6) DIFF	8°F

#### DHW Priority

This selection will allow the DHW demand to override the heating system for a max of 60 minutes in order to satisfy the DHW demand. Once 60 minutes have passed and there is still unsatisfied heat demand, the control will automatically switch back to accommodate the demand for heat.

(Y/N) Default: **N**

DHW SETUP	1.00
1) USE DHW	N
2) PRIORITY	N
▶ 3) FAST DHW	N
4) BOIL SETPNT	180°F
5) SETPOINT	130°F
6) DIFF	8°F

#### Fast DHW (Only Applies to Multiple Boiler Operation)

This option will allow all the boilers to come on immediately when there is a call for DHW. The boilers will still stage off at the normal differential. This option allows for faster DHW heating.

(Y/N) Default: **N**

DHW SETUP	1.00
1) USE DHW	N
2) PRIORITY	N
3) FAST DHW	N
▶ 4) BOIL SETPNT	180°F
5) SETPOINT	130°F
6) DIFF	8°F

#### Boiler Setpoint

This option allows you to set the maximum boiler temperature when the DHW demand is on. This will override the calculated boiler target from the designs.

(50°F to 200°F) Default: **180°F**

DHW SETUP	1.00
1) USE DHW	N
2) PRIORITY	N
3) FAST DHW	N
4) BOIL SETPNT	180°F
▶ 5) SETPOINT	130°F
6) DIFF	8°F

#### Setpoint

This option allows you to select your DHW target temperature in the tank.

(50°F to 200°F) Default: **130°F**

DHW SETUP	1.00
1) USE DHW	N
2) PRIORITY	N
3) FAST DHW	N
4) BOIL SETPNT	180°F
5) SETPOINT	130°F
▶ 6) DIFF	8°F

#### Differential

This is the differential for the DHW tank. Set this parameter to the desired differential for the DHW tank.

(2°F to 60°F) Default: **8°F**

#### 4) HEAT DEMAND

SETUP MENU		1.00
1) BOILER SETUP		
2) DESIGN TEMPS		
3) DHW SETUP		
▶ 4) HEAT DEMAND	N	
5) °C OR °F	°F	

##### Heat Demand

This setting indicates that the CPU-0550 is in a permanent heat demand. This can be used instead of attaching a thermostat.

(Y/N) Default: **N**

#### 5) CELSIUS OR FAHRENHEIT

SETUP MENU		1.00
1) BOILER SETUP		
2) DESIGN TEMPS		
3) DHW SETUP		
4) HEAT DEMAND	N	
▶ 5) °C OR °F	°F	

##### Celsius or Fahrenheit

Use this setting to change the display format from Celsius (°C) to Fahrenheit (°F).

(°F/°C) Default: **°F**

## MIXING MODE

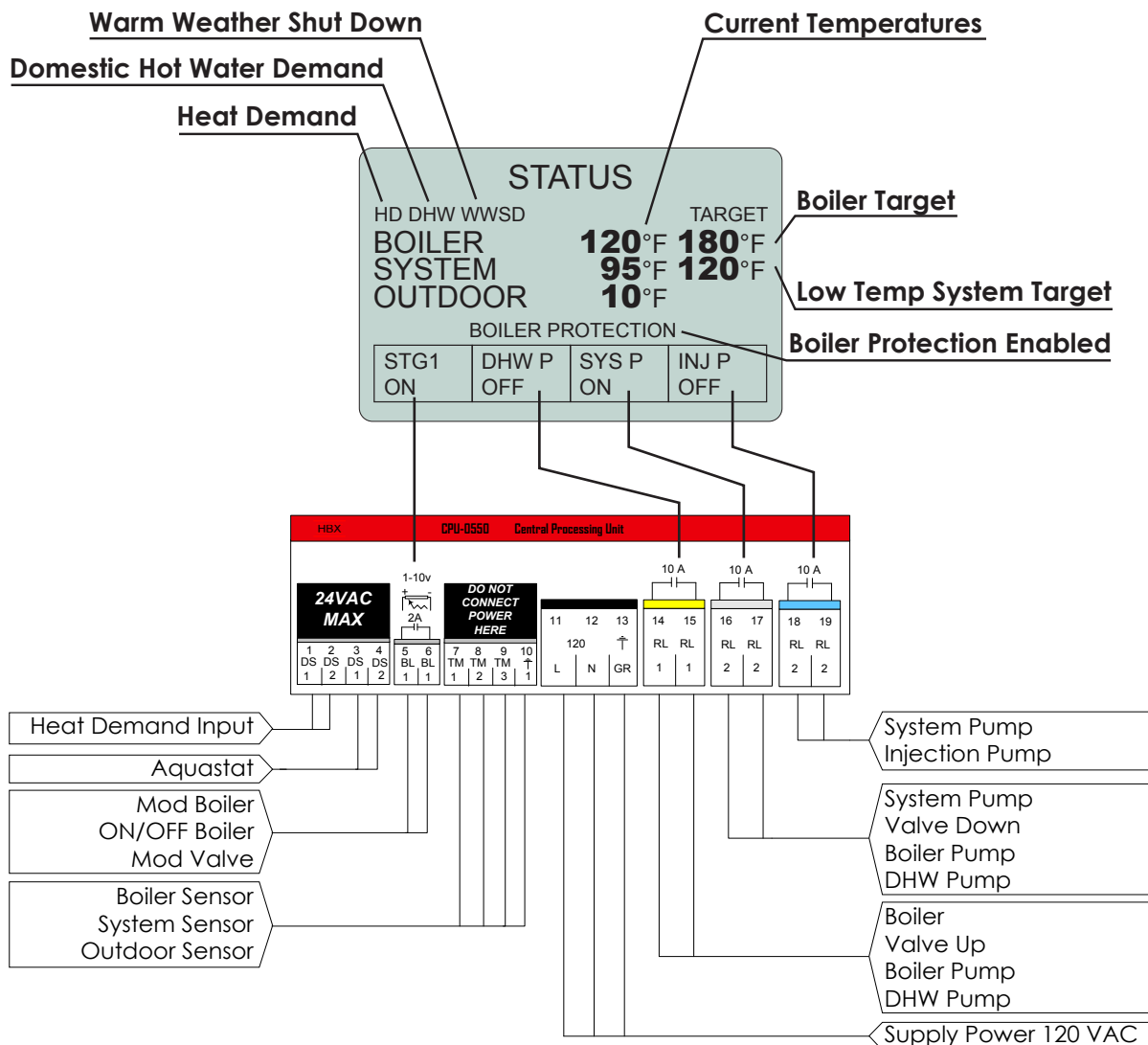
### Multicolour backlit Display

The Multicolour Backlit Display is one of the key features of the HBX Controls stand-alone CPU-0550 Control. Depending on which mode of operation is selected the screen colour will change to indicate information about the status of the system.

### Screen Colors

- Light Blue - No Heat Demand
- Red - Demand (DHW or Heat Demand) and Boiler running
- Yellow - Heat Demand ON, boiler running but in boiler protection
- Dark Blue - Heat Demand ON and boiler satisfied

### Status Screen



## MIXING MODE PROGRAMMING GUIDE

### 1) BOILER SETUP

SETUP MENU	1.00
▶ 1) BOILER SETUP	
2) DESIGN TEMPS	
3) DHW SETUP	
4) MIXING SETUP	
5) HEAT DEMAND	N
6) °C OR °F	°F

#### Boiler Setup

This setting is used to configure the boiler staging component in your system.

### 1 STAGE SETUP

BOILER SETUP	1.00
▶ 1) STAGES	<b>1</b>
2) DIFF	<b>20°F</b>

#### Stages

This setting will allow you to select the boiler stage.

(1 to 3, MOD) Default: 1

BOILER SETUP	1.00
1) STAGES	<b>1</b>
▶ 2) DIFF	<b>20°F</b>

#### Differential

Adjust this setting to the desired differential for the boiler.

(2°F to 60°F) Default: 20°F

### 2/3 STAGE SETUP

BOILER SETUP	1.00
▶ 1) STAGES	<b>2</b>
2) DIFF	<b>20°F</b>
3) ROTATE	N
4) LAG TIME	<b>3M</b>

#### Stages

This setting will allow you to select the boiler stage.

(1 to 3, MOD) Default: 1

BOILER SETUP	1.00
1) STAGES	<b>2</b>
▶ 2) DIFF	<b>20°F</b>
3) ROTATE	N
4) LAG TIME	<b>3M</b>

#### Differential

Adjust this setting to the desired differential for the boiler. This will center the differential around the setpoint. (eg. 10°F below/above)

(2°F to 60°F) Default: 20°F

BOILER SETUP	1.00
1) STAGES	<b>2</b>
2) DIFF	<b>20°F</b>
▶ 3) ROTATE	N
4) LAG TIME	<b>3M</b>

#### Rotate

The time of rotation between boilers is 48 hours of run time. It means that the boilers are going to rotate when the first boiler exceeds the second by 48 hours and vice versa.

(Y/N) Default: N

BOILER SETUP	1.00
1) STAGES	<b>2</b>
2) DIFF	<b>20°F</b>
3) ROTATE	N
▶ 4) LAG TIME	<b>3M</b>

#### Lag Time

When the the boiler is set for two or more stages, this setting will be set for the minimum lag time between boiler stages. This is a time delay between stages. Even if th differential has been exceeded this time must elapse before that stage can come on.

(1M to 240M) Default: 3M



## MOD BOILER SETUP

### BOILER SETUP 1.00

▶ 1) STAGES	MOD
2) MOD TIME	3S
3) MIN MOD %	35%
4) MOD SETPNT	N

#### Stages

This setting will allow you to select the boiler stage.

(1 to 3, MOD) Default: 1

### BOILER SETUP 1.00

1) STAGES	MOD
▶ 2) MOD TIME	3S
3) MIN MOD %	35%
4) MOD SETPNT	N

#### Mod Time

This setting sets the time between the steps when the boiler needs to increase or decrease the firing rate. each step is 1% for all situations.

(1S to 240S) Default: 3S

### BOILER SETUP 1.00

1) STAGES	MOD
2) MOD TIME	3S
▶ 3) MIN MOD %	35%
4) MOD SETPNT	N

#### Minimum Mod %

This setting is used to set the lowest modulating level the boiler can go down to. This will also be the starting point whenever there is a new demand.

(10% to 95%) Default: 35%

### BOILER SETUP 1.00

1) STAGES	MOD
2) MOD TIME	3S
3) MIN MOD %	35%
▶ 4) MOD SETPNT	N

#### Mod Setpoint

In this mode the 0-10VDC signal does not directly run the boiler. the 0-10VDC signal is interpreted by the boiler as a setpoint. The boiler in this mode will modulate the burner to achieve that setpoint.

(Y/N) Default: N

## 2) DESIGN TEMPERATURE

SETUP MENU	1.00
1) BOILER SETUP	
▶ 2) DESIGN TEMPS	
3) DHW SETUP	
4) MIXING SETUP	
5) HEAT DEMAND	N
6) °C OR °F	°F

### Design Temperatures

Design Temperature allows you to customize each design temperature for your system.

### DESIGN TEMPERATURES SETUP

DESIGN TEMPERATURES 1.00	
▶ 1) OUTDOOR	10°F
2) MAX BOILER	180°F
3) MIN BOILER	140°F
4) SYSTEM	120°F
5) MIN SYSTEM	70°F
6) WWSD	70°F

#### Outdoor Temperature

This is used in the outdoor reset design calculation. This option should be set to reflect your specific city or region.

(-50°F to 120°F) Default: 10°F

DESIGN TEMPERATURES 1.00	
1) OUTDOOR	10°F
▶ 2) MAX BOILER	180°F
3) MIN BOILER	140°F
4) SYSTEM	120°F
5) MIN SYSTEM	70°F
6) WWSD	70°F

#### Maximum Boiler Temperature

This is used in the outdoor reset design calculation, and also serves as the maximum setting for the boiler. This is the maximum boiler temperature for the coldest day.

(140°F to 200°F) Default: 180°F

DESIGN TEMPERATURES 1.00	
1) OUTDOOR	10°F
2) MAX BOILER	180°F
▶ 3) MIN BOILER	140°F
4) SYSTEM	120°F
5) MIN SYSTEM	70°F
6) WWSD	70°F

#### Minimum Boiler Temperature

This is the minimum boiler temperature. Set this to the temperature you would like the boiler to be when the outdoor temperature approaches WWSD. If the actual boiler temperature falls below this setting, the control will enter boiler protection mode and shut off mixing.

(Off/52°F to 200°F) Default: 140°F



**This is the supply Boiler Temperature. Keep this in mind when selecting this feature.**

DESIGN TEMPERATURES 1.00	
1) OUTDOOR	10°F
2) MAX BOILER	180°F
3) MIN BOILER	140°F
▶ 4) SYSTEM	120°F
5) MIN SYSTEM	70°F
6) WWSD	70°F

#### System Temperature

This is used to setup the maximum temperature for your low temperature system on the coldest day.

(20°F to 180°F) Default: 120°F

DESIGN TEMPERATURES 1.00	
1) OUTDOOR	10°F
2) MAX BOILER	180°F
3) MIN BOILER	140°F
4) SYSTEM	120°F
▶ 5) MIN SYSTEM	70°F
6) WWSD	70°F

#### Minimum System Temperature

This is used to setup the lowest temperature you would like in the low temperature system. The setpoint will hit this when the outdoor temperature approaches WWSD.

(20°F to 180°F) Default: 120°F

DESIGN TEMPERATURES 1.00	
1) OUTDOOR	10°F
2) MAX BOILER	180°F
3) MIN BOILER	140°F
4) SYSTEM	120°F
5) MIN SYSTEM	70°F
▶ 6) WWSD	70°F

#### Warm Weather Shut Down

This setting is used to set the temperature in which the CPU-0550 will go into WWSD. If the system rises above this temperature, the system will be shut off. In WWSD the boilers and all pumps will shut off.

(35°F to 120°F) Default: 70°F

### 3) DHW SETUP

SETUP MENU	1.00
1) BOILER SETUP	
2) DESIGN TEMPS	
▶ 3) DHW SETUP	
4) MIXING SETUP	
5) HEAT DEMAND	N
6) °C OR °F	°F

#### Domestic Hot Water (DHW) Setup

DHW setup allows you to program domestic hot water options in your system.

DOMESTIC HOT WATER SETUP													
<table border="1"> <tr> <td>DHW SETUP</td> <td>1.00</td> </tr> <tr> <td>▶ 1) USE DHW</td> <td>N</td> </tr> <tr> <td>2) PRIORITY</td> <td>N</td> </tr> <tr> <td>3) FAST DHW</td> <td>N</td> </tr> <tr> <td>4) BOIL SETPNT</td> <td>180°F</td> </tr> <tr> <td colspan="2">AQUASTAT ONLY IN MIXING MODE</td> </tr> </table>	DHW SETUP	1.00	▶ 1) USE DHW	N	2) PRIORITY	N	3) FAST DHW	N	4) BOIL SETPNT	180°F	AQUASTAT ONLY IN MIXING MODE		<p><b>Use DHW</b> Once this option is enabled you will be able to program the remaining options for your DHW setup.  (Y/N) Default: <b>N</b></p>
DHW SETUP	1.00												
▶ 1) USE DHW	N												
2) PRIORITY	N												
3) FAST DHW	N												
4) BOIL SETPNT	180°F												
AQUASTAT ONLY IN MIXING MODE													
<table border="1"> <tr> <td>DHW SETUP</td> <td>1.00</td> </tr> <tr> <td>1) USE DHW</td> <td>N</td> </tr> <tr> <td>▶ 2) PRIORITY</td> <td>N</td> </tr> <tr> <td>3) FAST DHW</td> <td>N</td> </tr> <tr> <td>4) BOIL SETPNT</td> <td>180°F</td> </tr> <tr> <td colspan="2">AQUASTAT ONLY IN MIXING MODE</td> </tr> </table>	DHW SETUP	1.00	1) USE DHW	N	▶ 2) PRIORITY	N	3) FAST DHW	N	4) BOIL SETPNT	180°F	AQUASTAT ONLY IN MIXING MODE		<p><b>Priority</b> This selection will allow the DHW demand to override the heating system for a max of 60 minutes in order to satisfy the DHW demand. Once 60 minutes have passed and there is still unsatisfied heat demand, the control will automatically switch back to accommodate the demand for heat.  (Y/N) Default: <b>N</b></p>
DHW SETUP	1.00												
1) USE DHW	N												
▶ 2) PRIORITY	N												
3) FAST DHW	N												
4) BOIL SETPNT	180°F												
AQUASTAT ONLY IN MIXING MODE													
<table border="1"> <tr> <td>DHW SETUP</td> <td>1.00</td> </tr> <tr> <td>1) USE DHW</td> <td>N</td> </tr> <tr> <td>2) PRIORITY</td> <td>N</td> </tr> <tr> <td>▶ 3) FAST DHW</td> <td>N</td> </tr> <tr> <td>4) BOIL SETPNT</td> <td>180°F</td> </tr> <tr> <td colspan="2">AQUASTAT ONLY IN MIXING MODE</td> </tr> </table>	DHW SETUP	1.00	1) USE DHW	N	2) PRIORITY	N	▶ 3) FAST DHW	N	4) BOIL SETPNT	180°F	AQUASTAT ONLY IN MIXING MODE		<p><b>Fast DHW (Only Applies to Multiple Boiler Operation)</b> This option will allow all the boilers to come on immediately when there is a call for DHW. The boilers will still stage off at the normal differential. This option allows for faster DHW heating.  (Y/N) Default: <b>N</b></p>
DHW SETUP	1.00												
1) USE DHW	N												
2) PRIORITY	N												
▶ 3) FAST DHW	N												
4) BOIL SETPNT	180°F												
AQUASTAT ONLY IN MIXING MODE													
<table border="1"> <tr> <td>DHW SETUP</td> <td>1.00</td> </tr> <tr> <td>1) USE DHW</td> <td>N</td> </tr> <tr> <td>2) PRIORITY</td> <td>N</td> </tr> <tr> <td>3) FAST DHW</td> <td>N</td> </tr> <tr> <td>▶ 4) BOIL SETPNT</td> <td>180°F</td> </tr> <tr> <td colspan="2">AQUASTAT ONLY IN MIXING MODE</td> </tr> </table>	DHW SETUP	1.00	1) USE DHW	N	2) PRIORITY	N	3) FAST DHW	N	▶ 4) BOIL SETPNT	180°F	AQUASTAT ONLY IN MIXING MODE		<p><b>Boiler Setpoint</b> This option allows you to set the maximum boiler temperature when the DHW demand is on. This will override the calculated boiler target from the designs.  (50°F to 200°F) Default: <b>180°F</b></p>
DHW SETUP	1.00												
1) USE DHW	N												
2) PRIORITY	N												
3) FAST DHW	N												
▶ 4) BOIL SETPNT	180°F												
AQUASTAT ONLY IN MIXING MODE													

## 4) MIXING SETUP

SETUP MENU	1.00
1) BOILER SETUP	
2) DESIGN TEMPS	
3) DHW SETUP	
▶ 4) MIXING SETUP	
5) HEAT DEMAND	N
6) °C OR °F	°F

### Mixing Setup

Mixing Setup is used to select your mixing device.

### INJECTION PUMP MIXING SETUP

MIXING MENU	1.00
▶ 1) MIXING TYPE	INJ

### Mixing Type

Use this option when using a primary/secondary injection style piping. This selection will take hot water from the primary loop and inject it into the secondary loop, ensuring proper temperature control in the low temperature system.

(INJ/FLO/MOD) Default: **INJ**

### FLOATING ACTION VALVE SETUP

MIXING MENU	1.00
▶ 1) MIXING TYPE	FLO

### Mixing Type

Use this option when you are using a 3 or 4 way mixing valve. This will run your floating (power open/power close valve) and mix the temperature down in your low temperature system.

(INJ/FLO/MOD) Default: **INJ**

### MODULATING OUTPUT SETUP

MIXING MENU	1.00
▶ 1) MIXING TYPE	MOD
2) MOD TIME	3S
3) MIN MOD%	10%

### Mixing Type

Use this option when you need to have a 1-10VDC signal to run your mixing device. This could be used for a modulating valve or to a VFD, to ensure the proper temperature in the low temperature system.

(INJ/FLO/MOD) Default: **INJ**

MIXING MENU	1.00
1) MIXING TYPE	MOD
▶ 2) MOD TIME	3S
3) MIN MOD%	10%

### Mod Time

This setting sets the time between the steps when the valve needs to increase or decrease the firing rate. Each step is 1% for all situations.

(1S to 240S) Default: **3S**

MIXING MENU	1.00
1) MIXING TYPE	MOD
2) MOD TIME	3S
▶ 3) MIN MOD%	10%

### Minimum Mod %

This setting is used to set the lowest modulating level the valve can go down to. This will also be the starting point whenever there is a new demand.

(10% to 95%) Default: **10%**

## 5) HEAT DEMAND

SETUP MENU	1.00
1) BOILER SETUP	
2) DESIGN TEMPS	
3) DHW SETUP	
4) MIXING SETUP	
▶ 5) HEAT DEMAND	N
6) °C OR °F	°F

### Heat Demand

This setting indicates that the CPU-0550 is in a permanent heat demand. This can be used instead of attaching a thermostat.

(Y/N) Default: **N**

## 6) CELSIUS OR FAHRENHEIT

SETUP MENU	1.00
1) BOILER SETUP	
2) DESIGN TEMPS	
3) DHW SETUP	
4) MIXING SETUP	
5) HEAT DEMAND	N
▶ 6) °C OR °F	°F

### Celsius or Fahrenheit

Use this setting to change the display format from Celsius (°C) to Fahrenheit (°F).

(°F/°C) Default: **°F**

## DIFFERENTIAL SETPOINT MODE

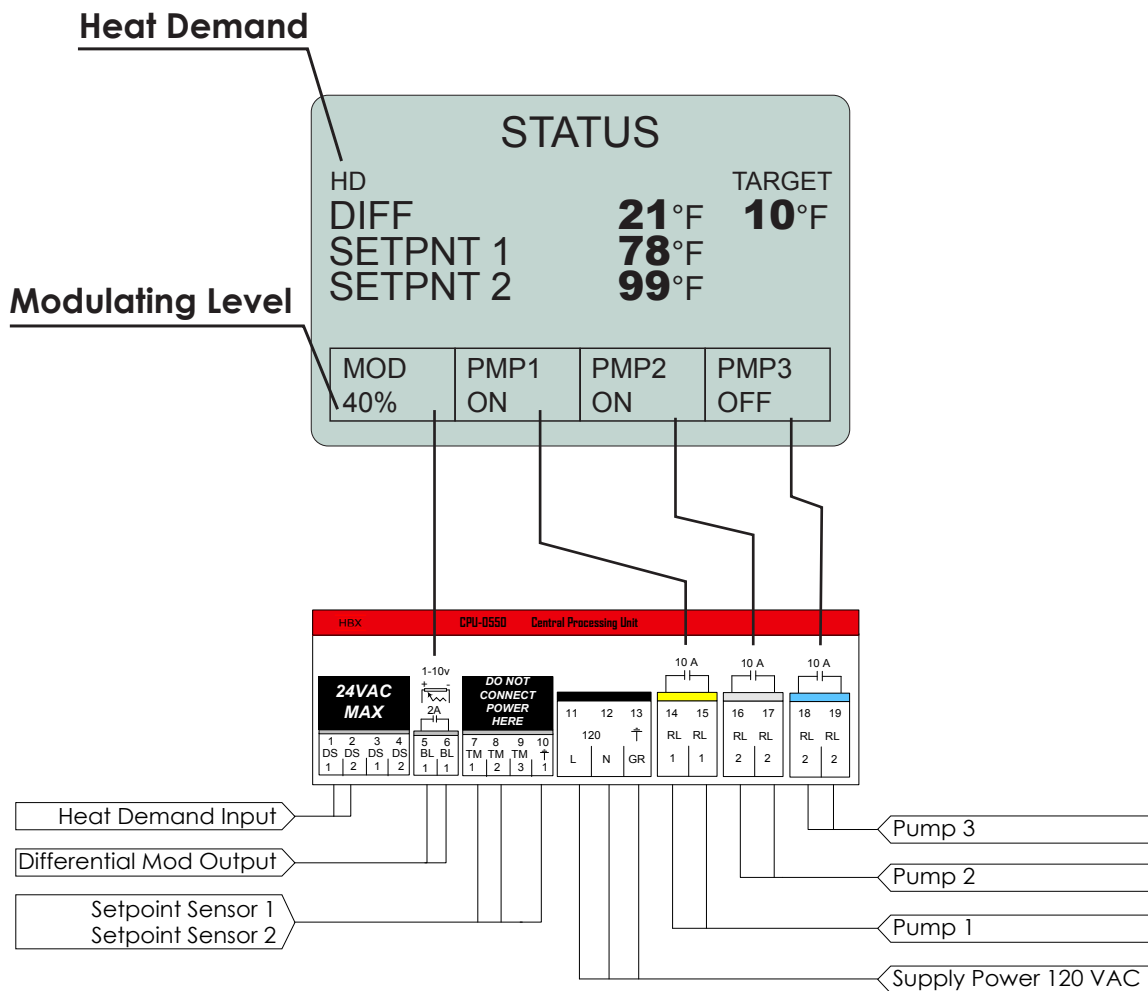
### Multicolour backlit Display

The Multicolour Backlit Display is one of the key features of the HBX Controls stand-alone CPU-0550 Control. Depending on which mode of operation is selected the screen colour will change to indicate information about the status of the system.

### Screen Colors

Light Blue - No Heat Demand  
Red - Heat Demand

### Status Screen



## DIFFERENTIAL SETPOINT MODE PROGRAMMING GUIDE

### DIFFERENTIAL SETPOINT SETUP

SETUP MENU	1.00
▶ 1) DIFF	6°F
2) MOD TIME	3S
3) MIN MOD	30%
4) °C OR °F	°F

#### 1) Differential

Use this setting to set the differential between setpoint 1's temperature and setpoint 2's temperature.

(1°F to 100°F) Default: 6°F

SETUP MENU	1.00
1) DIFF	6°F
▶ 2) MOD TIME	3S
3) MIN MOD	30%
4) °C OR °F	°F

#### 2) Mod Time

This setting sets the time between each step of the 0-10VDC output when the modulating output needs to increase or decrease.

(1S to 240S) Default: 3S

SETUP MENU	1.00
1) DIFF	6°F
2) MOD TIME	3S
▶ 3) MIN MOD	30%
4) °C OR °F	°F

#### 3) Minimum Mod %

This setting is used to set the lowest modulation level the modulating output can go down to. It can also be used to set the minimum position on valves.

(10% to 95%) Default: 30%

SETUP MENU	1.00
1) DIFF	6°F
2) MOD TIME	3S
3) MIN MOD	30%
▶ 4) °C OR °F	°F

#### 4) Celsius or Fahrenheit

Use this setting to change the display format from Celsius (°C) to Fahrenheit (°F).

(°F/°C) Default: °F

## PUMP SEQUENCER MODE

### STATUS SCREEN

#### Multicolour backlit Display

The Multicolour Backlit Display is one of the key features of the HBX Controls stand-alone CPU-0550 Control. Depending on which mode of operation is selected the screen colour will change to indicate information about the status of the system.

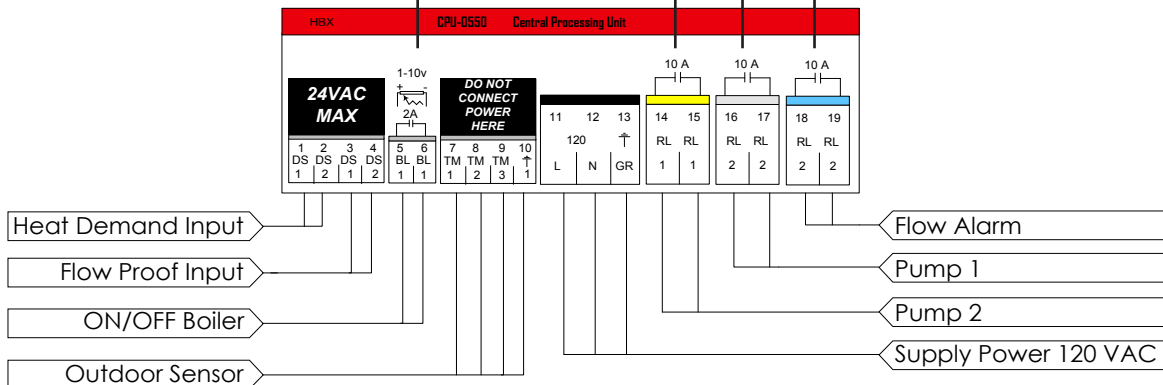
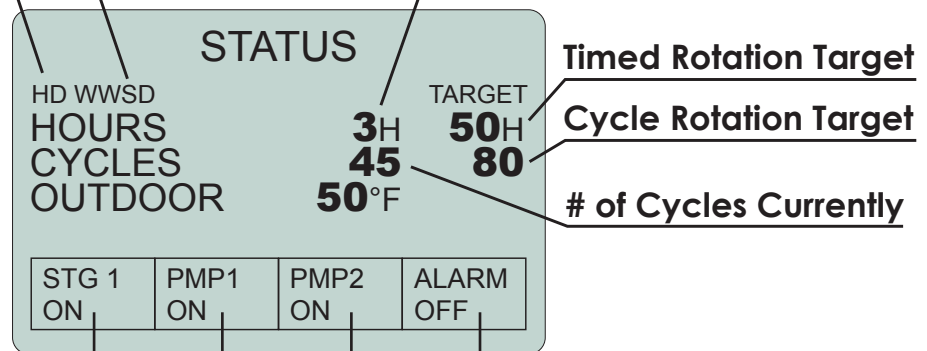
#### Screen Colours

- Light Blue - No Demand
- Dark Blue - Pump Running
- Red - Flow Alarm

### Warm Weather Shut Down

#### Heat Demand

#### # of Runtime Hours





## PUMP SEQUENCER MODE PROGRAMMING GUIDE

### PUMP SEQUENCER SETUP

SETUP MENU	1.00
▶ 1) OVERRIDE 1	N
2) OVERRIDE2	N
3) SEQ TIME	OFF
4) SEQ CYCLES	OFF
5) WWSD	60°F
6) °C OR °F	°F

#### 1) Manual Override 1

This setting is used to put Pump 1 in manual override. When set to yes, the pump relay is permanently on.

(Y/N) Default: N

SETUP MENU	1.00
1) OVERRIDE 1	N
▶ 2) OVERRIDE2	N
3) SEQ TIME	OFF
4) SEQ CYCLES	OFF
5) WWSD	60°F
6) °C OR °F	°F

#### 2) Manual Override 2

This setting is used to put Pump 2 in manual override. When set to yes, the pump relay is permanently on.

(Y/N) Default: N

SETUP MENU	1.00
1) OVERRIDE 1	N
2) OVERRIDE2	N
▶ 3) SEQ TIME	OFF
4) SEQ CYCLES	OFF
5) WWSD	60°F
6) °C OR °F	°F

#### 3) Sequential Time

This setting is used to set the rotation time for the pumps.

(OFF/1 to 240H) Default: 72H

SETUP MENU	1.00
1) OVERRIDE 1	N
2) OVERRIDE2	N
3) SEQ TIME	OFF
▶ 4) SEQ CYCLES	OFF
5) WWSD	60°F
6) °C OR °F	°F

#### 4) Sequential Cycles

This setting is used to set the number of demands that are given before the pumps will rotate.

(OFF/1 to 240 Cycles) Default: OFF



**Use caution. Sequential Time and Sequential Cycles will override each other. Use only one or the other.**

SETUP MENU	1.00
1) OVERRIDE 1	N
2) OVERRIDE2	N
3) SEQ TIME	OFF
4) SEQ CYCLES	OFF
▶ 5) WWSD	60°F
6) °C OR °F	°F

#### 5) Warm Weather Shut Down

This setting is used for Warm Weather Shut Down. This will turn the pumps off when the outdoor temperature goes above this setting.

(35°F to 120°F) Default: 70°F

SETUP MENU	1.00
1) OVERRIDE 1	N
2) OVERRIDE2	N
3) SEQ TIME	OFF
4) SEQ CYCLES	OFF
5) WWSD	60°F
▶ 6) °C OR °F	°F

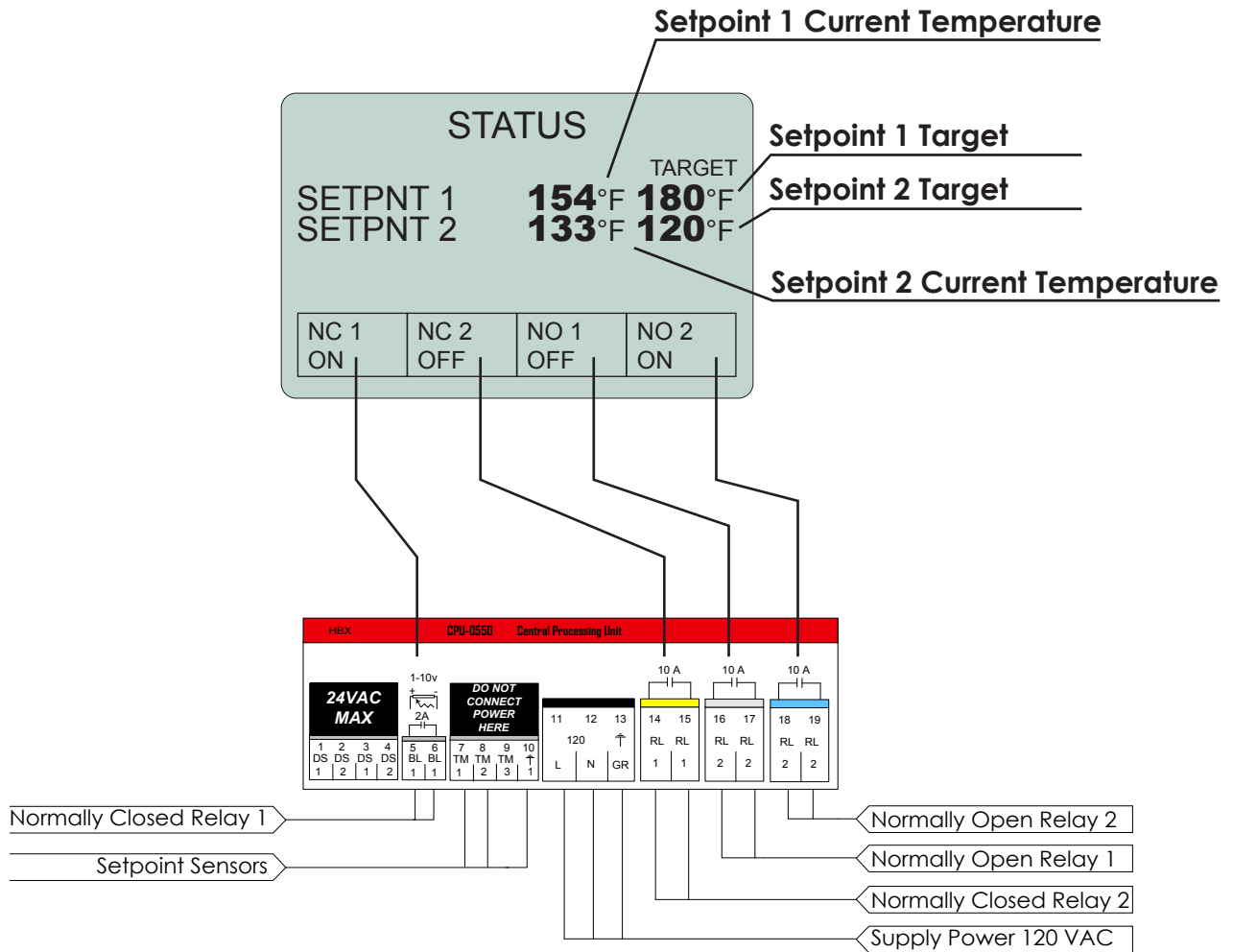
#### 6) Celsius or Fahrenheit

Use this setting to change the display format from Celsius (°C) to Fahrenheit (°F).

(°F/°C) Default: °F

## DUAL SETPOINT MODE

### STATUS SCREEN



Normally Closed is typically used in a heating logic application. Normally Open is typically used in a cooling logic application.

## DUAL SETPOINT MODE PROGRAMMING GUIDE

### DUAL SETPOINT SETUP

SETUP MENU 1.04

▶ 1) SP 1 TEMP	180°F
2) SP 1 DIFF	6°F
3) SP 2 TEMP	120°F
4) SP 2 DIFF	8°F
5) LAGTIME	3M
6) °C OR °F	°F

#### 1) Setpoint 1 Temperature

This setting is used to set the desired temperature for setpoint 1.

(1°F to 200°F) Default: 180°F

SETUP MENU 1.04

1) SP 1 TEMP	180°F
▶ 2) SP 1 DIFF	6°F
3) SP 2 TEMP	120°F
4) SP 2 DIFF	8°F
5) LAGTIME	3M
6) °C OR °F	°F

#### 2) Setpoint 1 Differential

This setting is used to set the differential for setpoint 1.

(2°F to 100°F) Default: 6°F



6°F differential would be 3°F above and 3°F below the target

SETUP MENU 1.04

1) SP 1 TEMP	180°F
2) SP 1 DIFF	6°F
▶ 3) SP 2 TEMP	120°F
4) SP 2 DIFF	8°F
5) LAGTIME	3M
6) °C OR °F	°F

#### 3) Setpoint 2 Temperature

This setting is used to set the desired temperature for setpoint 2.

(1°F to 200°F) Default: 120°F

SETUP MENU 1.04

1) SP 1 TEMP	180°F
2) SP 1 DIFF	6°F
3) SP 2 TEMP	120°F
▶ 4) SP 2 DIFF	8°F
5) LAGTIME	3M
6) °C OR °F	°F

#### 2) Setpoint 2 Differential

This setting is used to set the differential for setpoint 2.

(2°F to 100°F) Default: 6°F



8°F differential would be 4°F above and 4°F below the target

SETUP MENU 1.04

1) SP 1 TEMP	180°F
2) SP 1 DIFF	6°F
3) SP 2 TEMP	120°F
4) SP 2 DIFF	8°F
▶ 5) LAGTIME	3M
6) °C OR °F	°F

#### 5) Lagtime

This setting is used to set lagtime. When this is set above zero, the control will wait the specified amount of time before turning the relays on.

(0M to 240M) Default: 3M

SETUP MENU 1.04

1) SP 1 TEMP	180°F
2) SP 1 DIFF	6°F
3) SP 2 TEMP	120°F
4) SP 2 DIFF	8°F
5) LAGTIME	3M
▶ 6) °C OR °F	°F

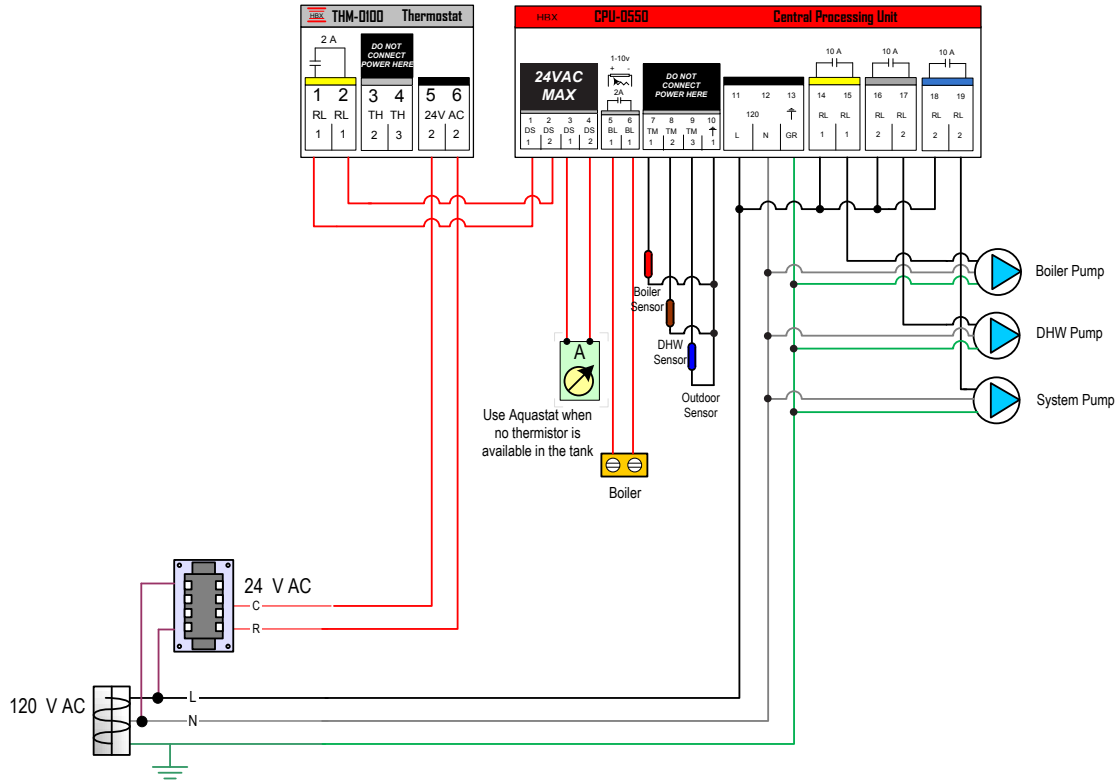
#### 6) Celsius or Fahrenheit

Use this setting to change the display format from Celsius (°C) to Fahrenheit (°F).

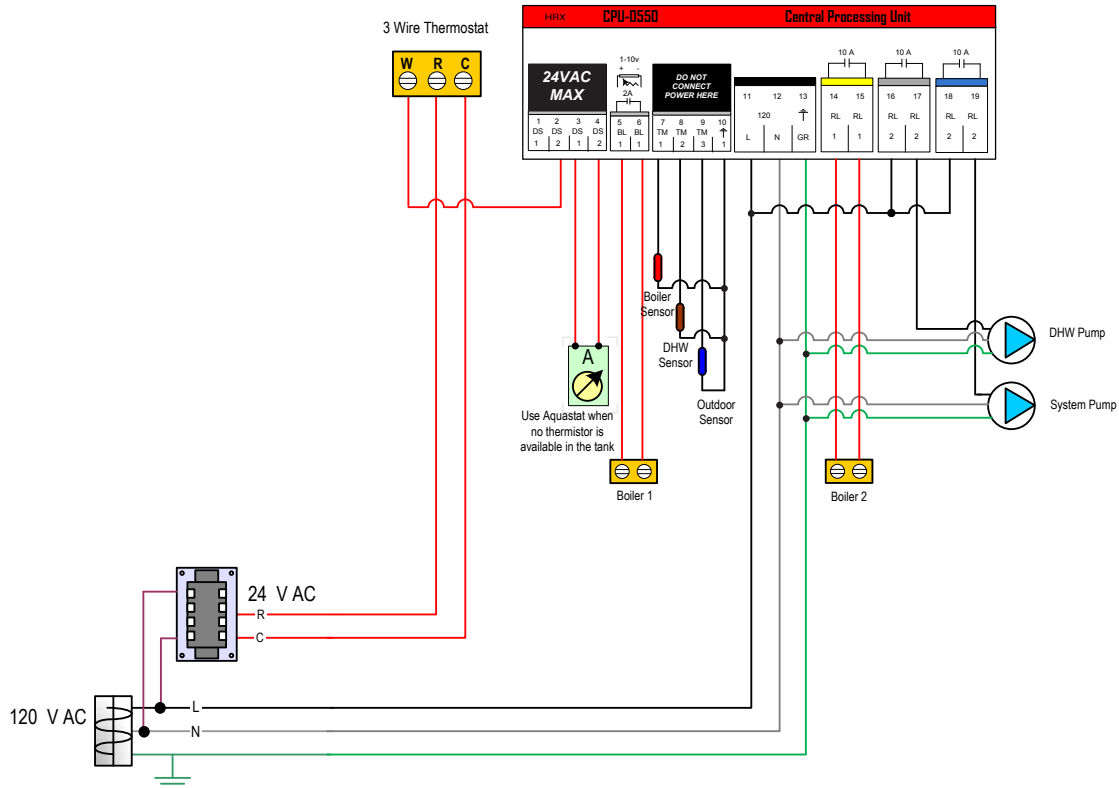
(°F/°C) Default: °F

# STAGING MODE WIRING DIAGRAMS

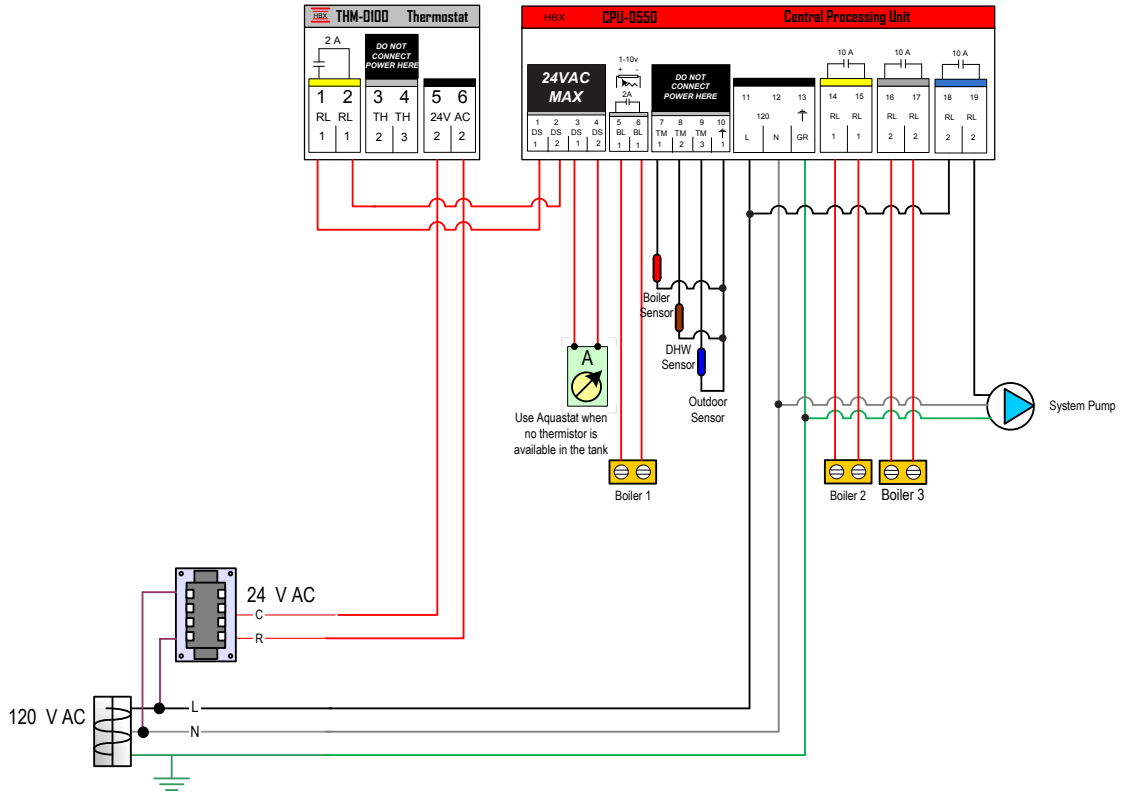
## 1) Single On/Off boiler with DHW pump



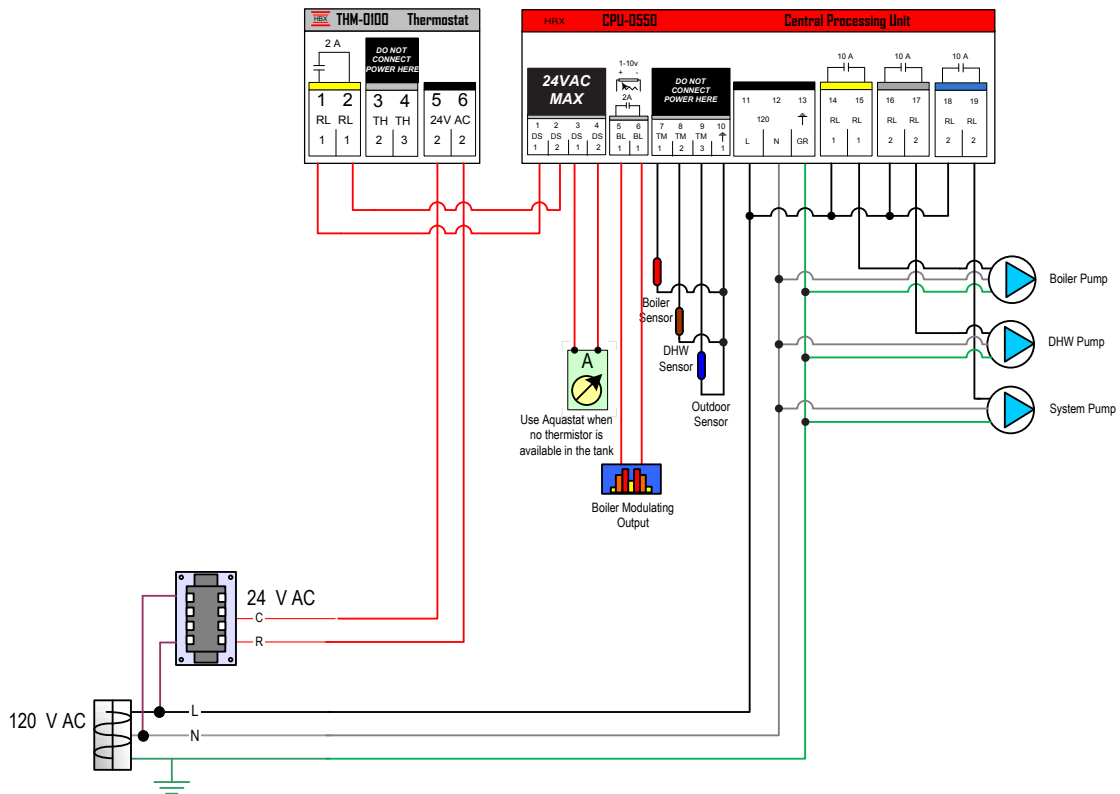
## 2) Two On/Off boilers with DHW pump



### 3) Three On/Off boilers

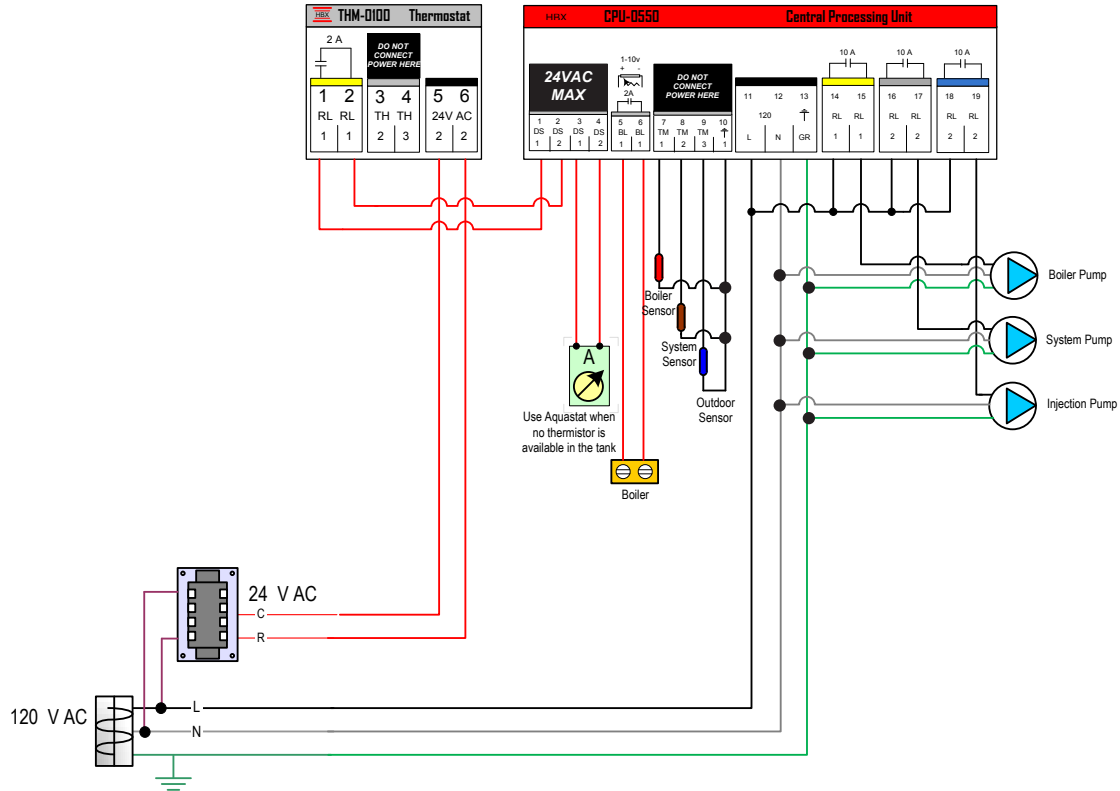


### 4) Single modulating boiler with DHW pump

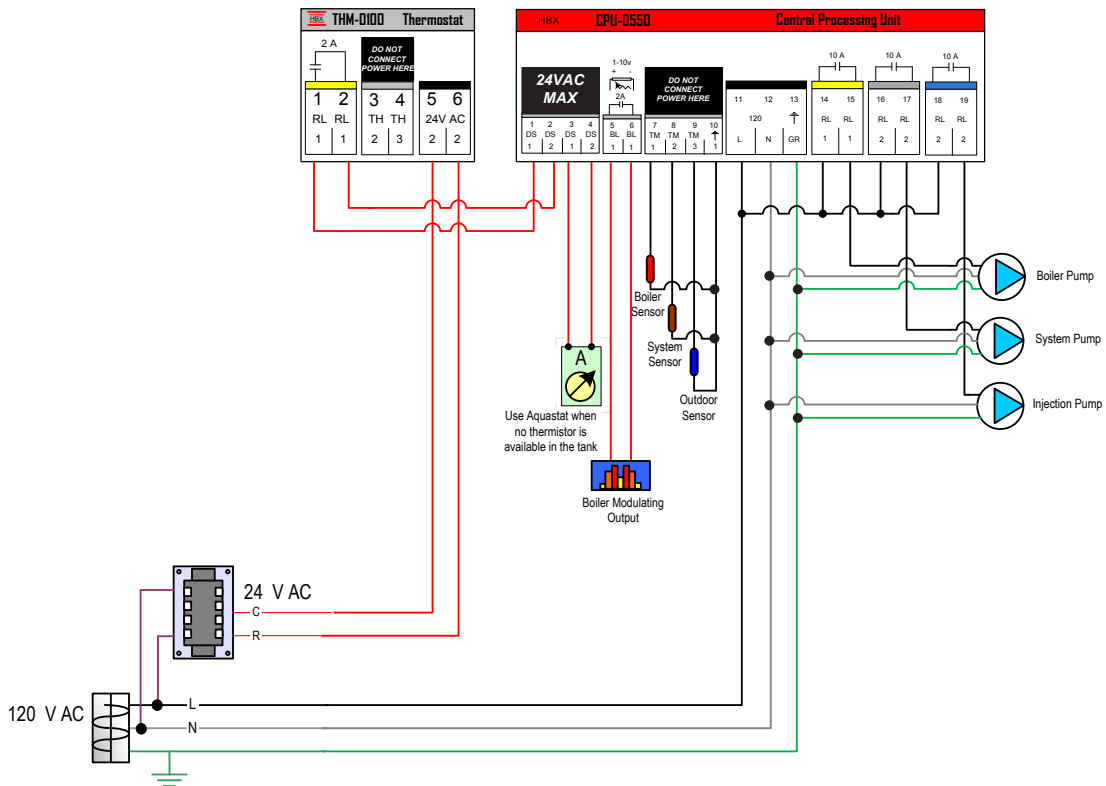


# MIXING MODE WIRING DIAGRAMS

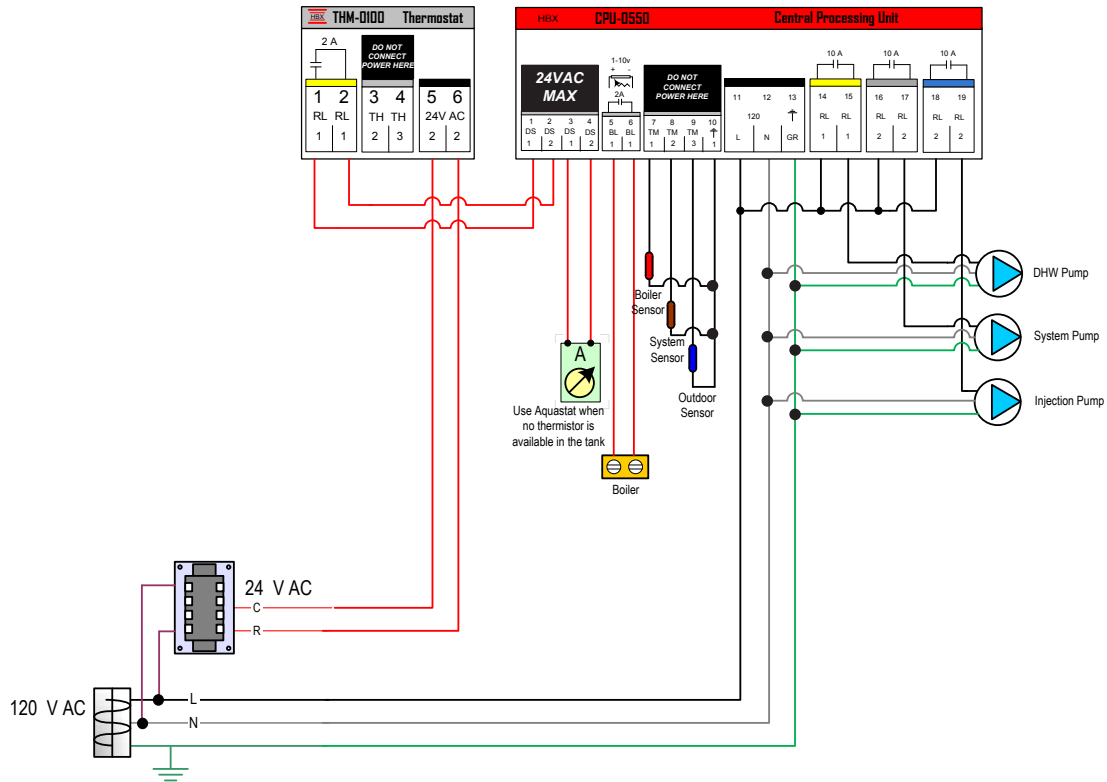
## 1) Single ON/OFF boiler with injection pump



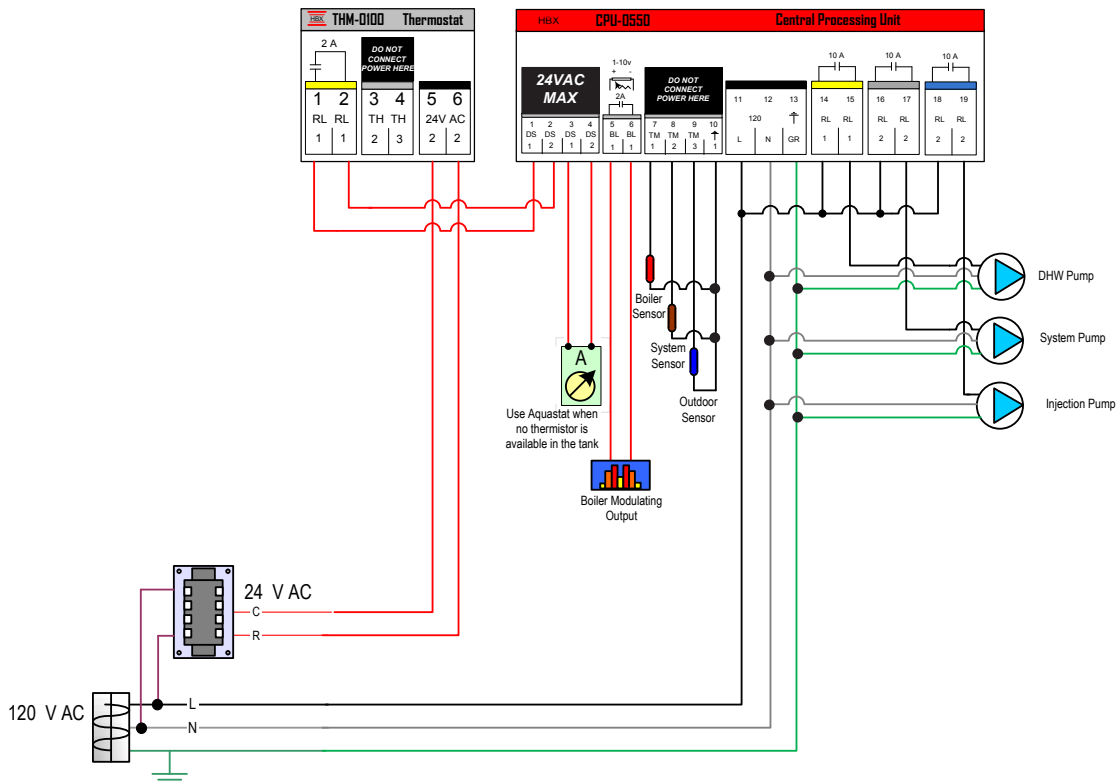
## 2) Single modulating boiler with injection pump



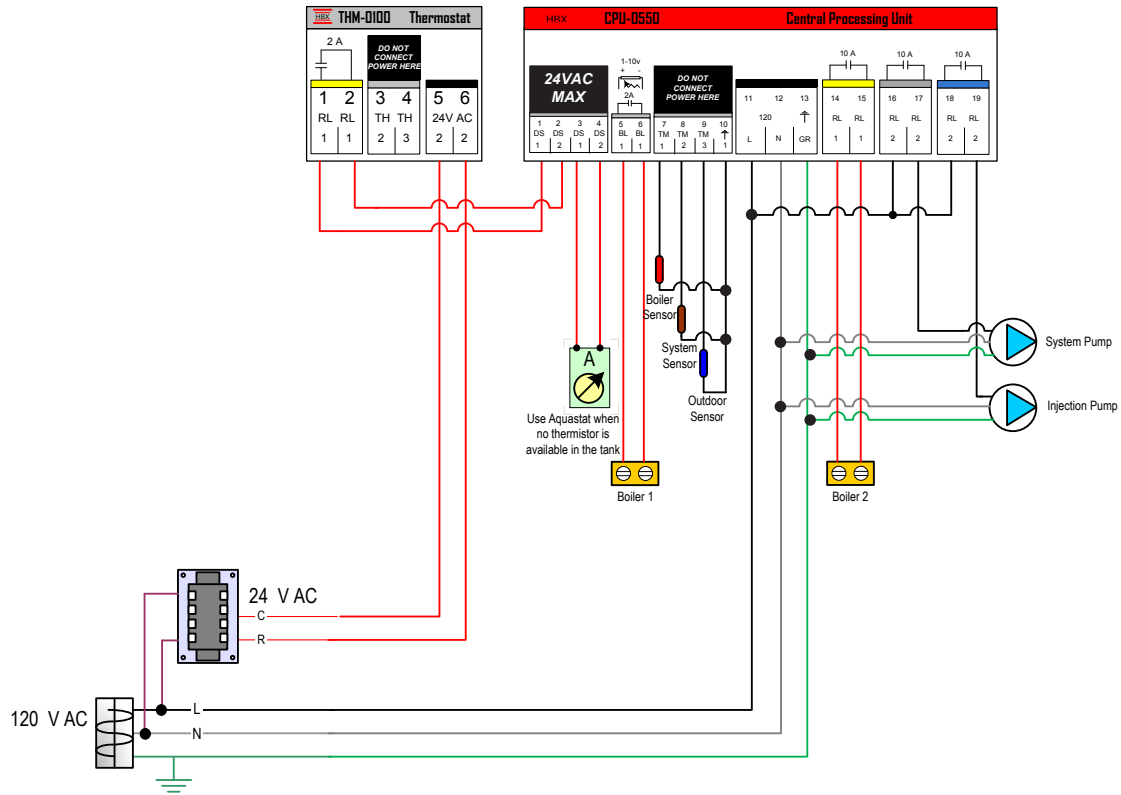
### 3) Single On/Off boiler with injection pump and DHW pump



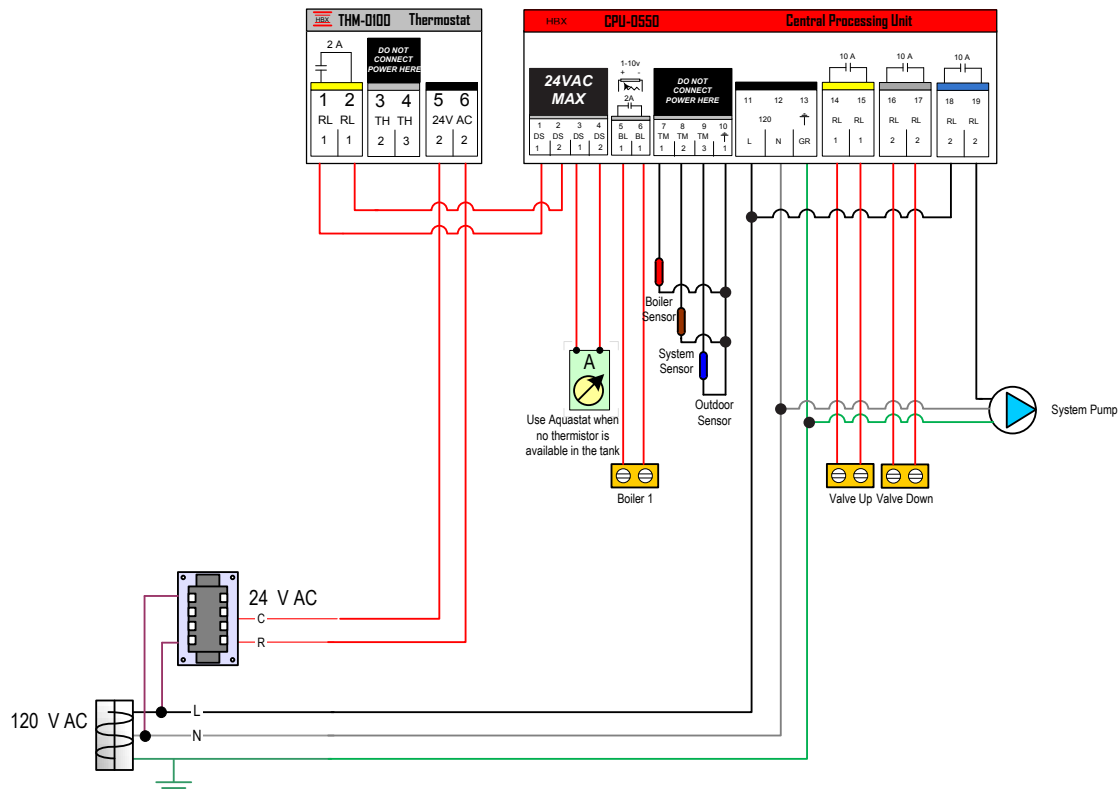
### 4) Single modulating boiler with injection pump and DHW pump



## 5) Two On/Off boilers with injection pump

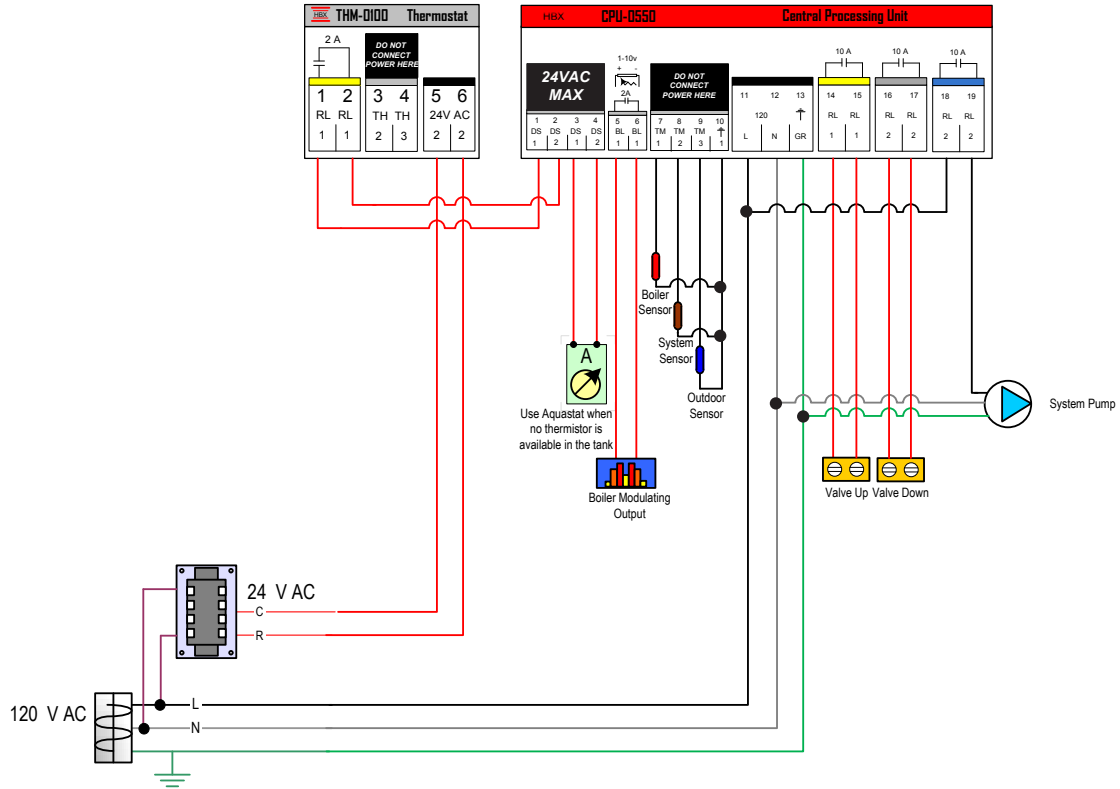


## 6) Single On/Off boiler with a floating action valve (power open/power close)

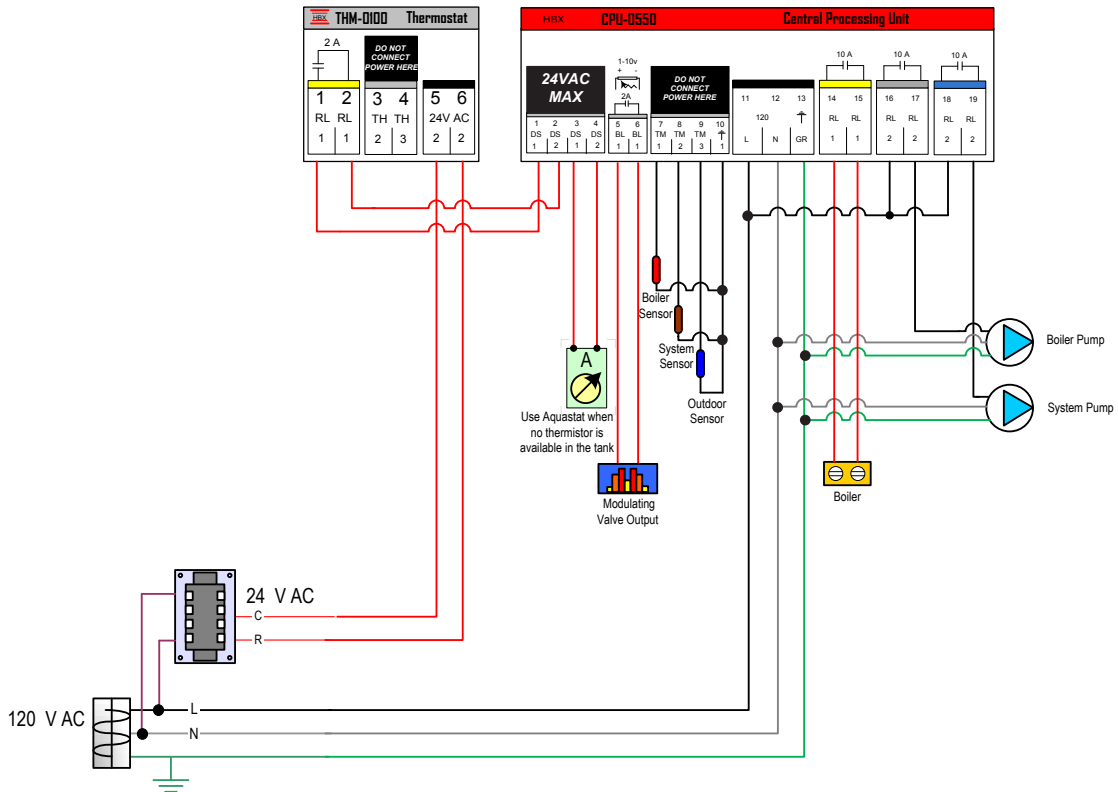




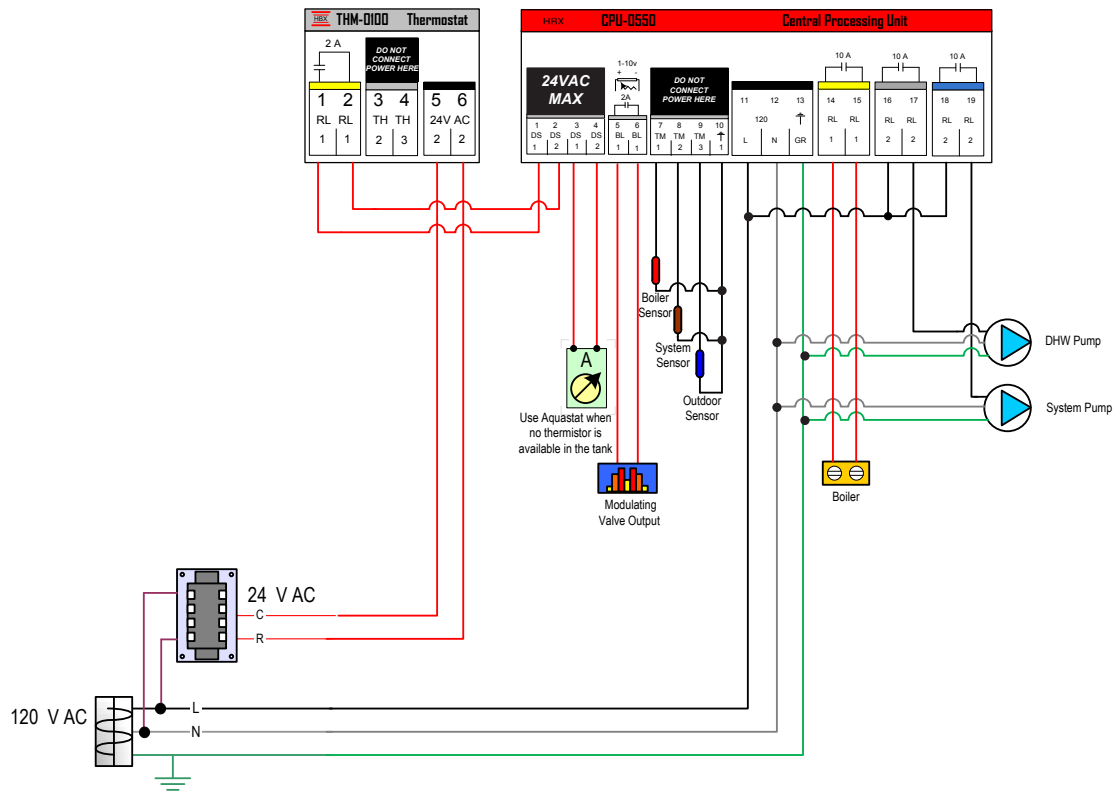
## 7) Single modulating boiler with a floating action valve (power open/power close)



## 8) Single On/Off boiler with modulating valve output (1-10VDC)

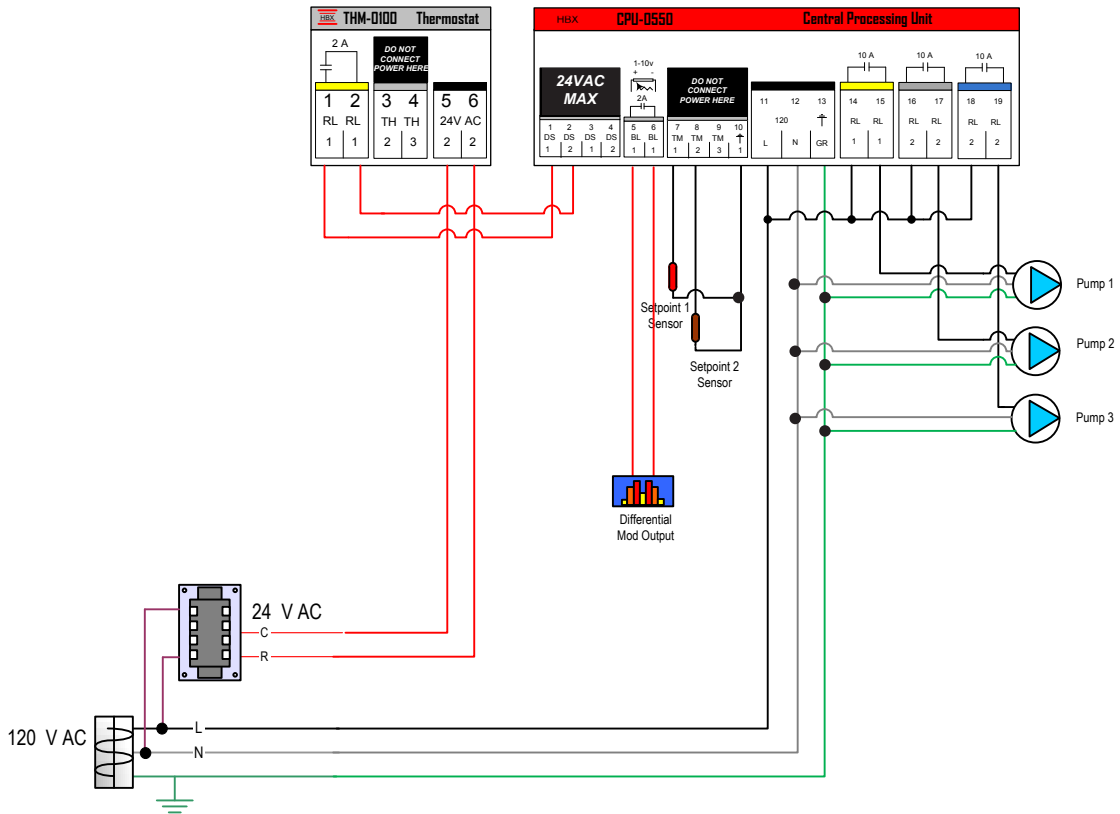


## 9) Single On/Off boiler with modulating valve output (1-10VDC) and DHW pump



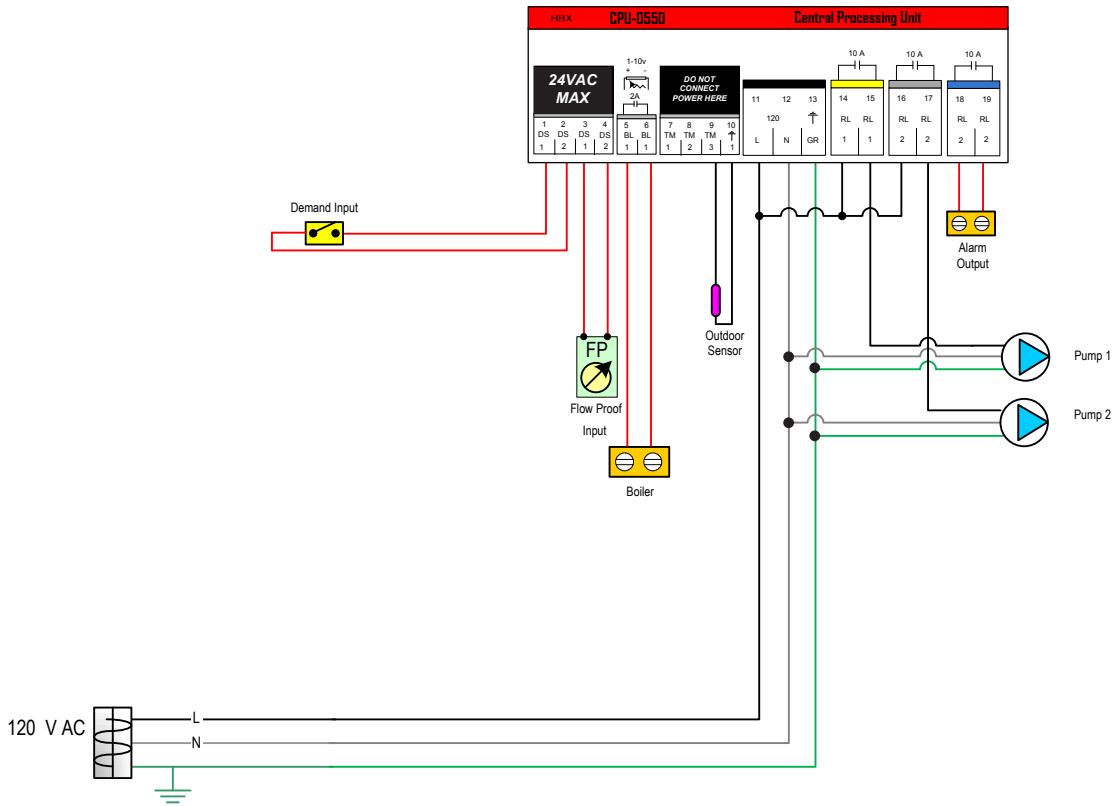
# DIFFERENTIAL MODE WIRING DIAGRAM

## 1) Differential Setpoint



# PUMP SEQUENCER MODE WIRING DIAGRAM

## 1) Pump Sequencer







### Limited Warranty

HBX Controls warrants each of its products to be free from defects in workmanship and materials under normal use and service for a period of 24 months from date of manufacture or 12 months from date of purchase from an HBX Authorized Dealer, if within the above documented period after date of manufacture.

If the product proves to be defective within the applicable warranty period, HBX on its sole discretion will repair or replace said product. Replacement product may be new or refurbished of equivalent or better specifications, relative to the defective product. Replacement product need not be of identical design or model. Any repair or replacement product pursuant to this warranty shall be warranted for not less than 90 days from date of such repair, irrespective of any earlier expiration of original warranty period. When HBX provides replacement, the defective product becomes the property of HBX Controls.

Warranty Service, within the applicable warranty period, may be obtained by contacting your nearest HBX Controls office via the original Authorized Agent and requesting a Return Material Authorization Number (RMA #). Proof of purchase in the form a dated invoice/receipt must be provided to expedite the issuance of a Factory RMA.

After an RMA number has been issued, the defective product must be packaged securely in the original or other suitable shipping package to ensure that it will not be damaged in transit. The RMA number must be visible on the outside of the package and a copy included inside the package. The package must be mailed or otherwise shipped back to HBX with all costs of mailing/shipping/insurance prepaid by the warranty claimant.

Any package/s returned to HBX without an approved and visible RMA number will be rejected and shipped back to purchaser at purchaser's expense. HBX reserves the right, if deemed necessary, to charge a reasonable levy for costs incurred, additional to mailing or shipping costs.

### Limitation of Warranties

If the HBX product does not operate as warranted above the purchasers sole remedy shall be, at HBX's option, repair or replacement. The foregoing warranties and remedies are exclusive and in lieu of all other warranties, expressed or implied, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for a particular purpose/application. HBX neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale, installation maintenance or use of HBX Controls products.

HBX shall not be liable under this warranty; if its testing and examination discloses that the alleged defect in the product does not exist or was caused by the purchasers or third persons misuse, neglect, improper installation or testing, unauthorized attempts to repair or any other cause beyond the range of intended use, or by accident, fire, lightning or other hazard.

### Limitation of Liability

In no event will HBX be liable for any damages, including loss of data, loss of profits, costs of cover or other incidental, consequential or indirect damages arising out of the installation, maintenance, commissioning, performance, failure or interruption of an HBX product, however caused and on any theory of liability. This limitation will apply even if HBX has been advised of the possibility of such damage.

### Local Law

This limited warranty statement gives the purchaser specific legal rights. The purchaser may also have other rights which vary from state to state in the United States, from Province to Province in Canada and from Country to Country elsewhere in the world.

To the extent this Limited Warranty Statement is inconsistent with local law, this statement shall be deemed modified to be consistent with such local law. Under such local law, certain disclaimers and limitations of this statement may not apply to the purchaser. For example, some states in the United States, as well as some governments outside the United States (including Canadian Provinces), may:

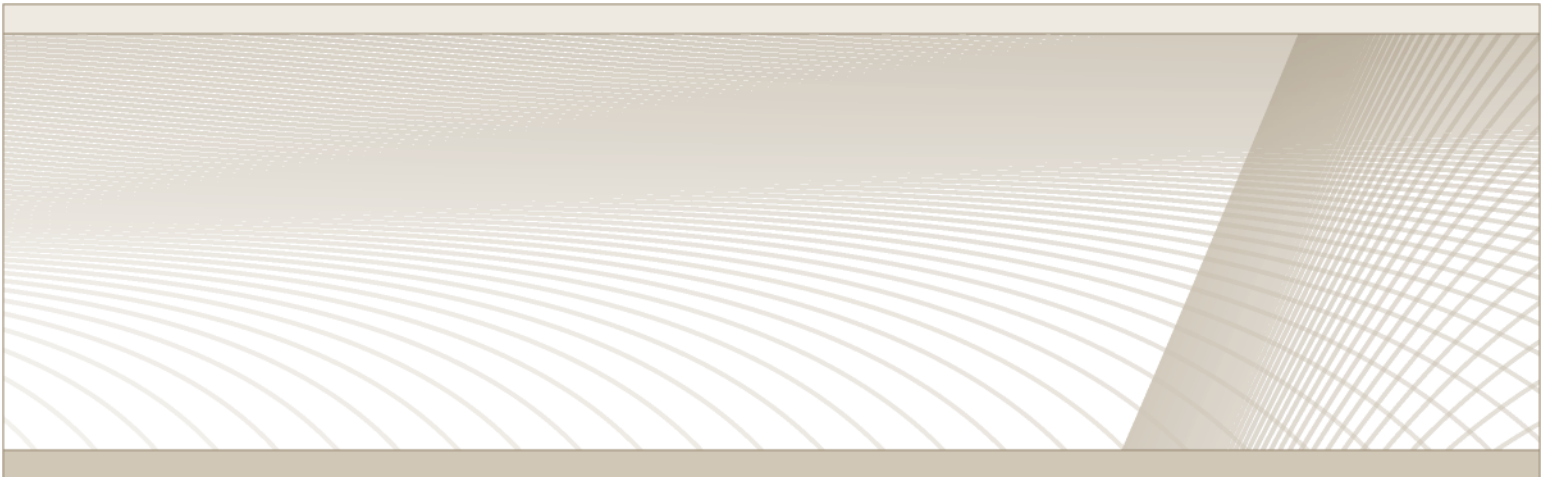
Preclude the disclaimers and limitations in this statement from limiting the statutory rights of a consumer (e.g. United Kingdom);

Otherwise restrict the ability of a manufacturer to enforce such disclaimers or limitations; or

Grant the purchaser additional warranty rights which the manufacturer cannot disclaim, or not allow limitations on the duration of implied warranties.

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