www.heatlinkgroup.com

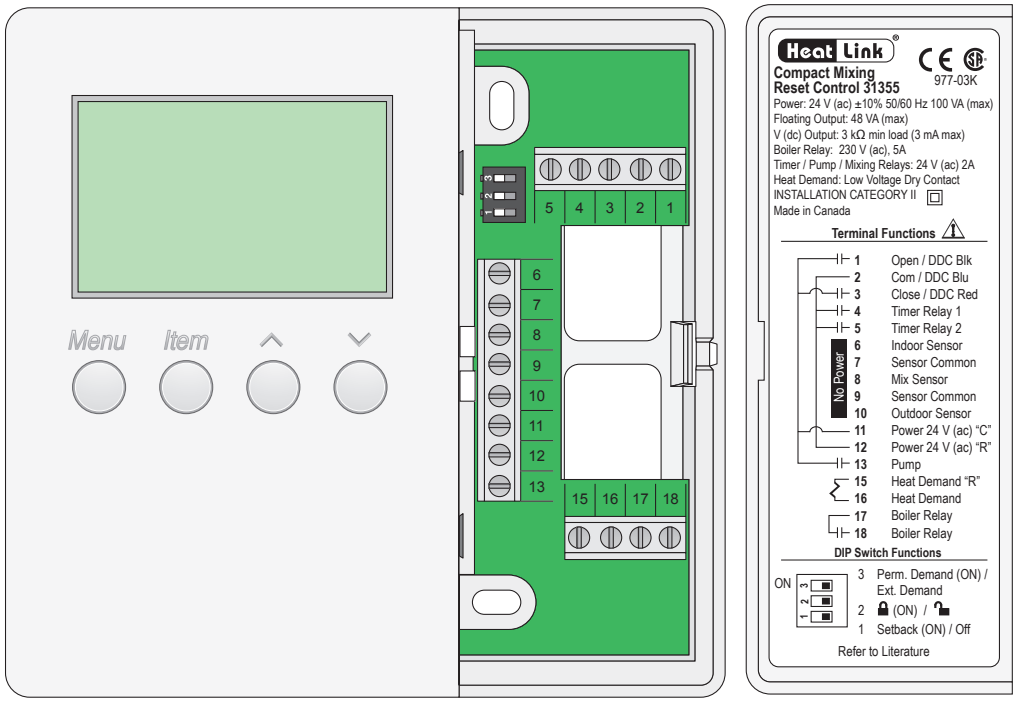
Installation and Setup Instructions
HeatLink® Compact Mixing Reset Control Stk# 31355

Description

The Compact Mixing Reset Control 31355 regulates the supply water temperature of an automated mixing valve in order to provide outdoor reset or setpoint operation. The 31355 provides a floating action or a 0/2 – 10 V (dc) signal to adjust the mixing valve position. The 31355 also includes two separate night setback channels.

Features

- Outdoor reset for energy savings
- Setpoint
- Floating action
- 0 - 10 V (dc)
- 2 - 10 V (dc)
- Two night setback channels



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Dip Switches

DIP Switch 3: Permanent / External Demand

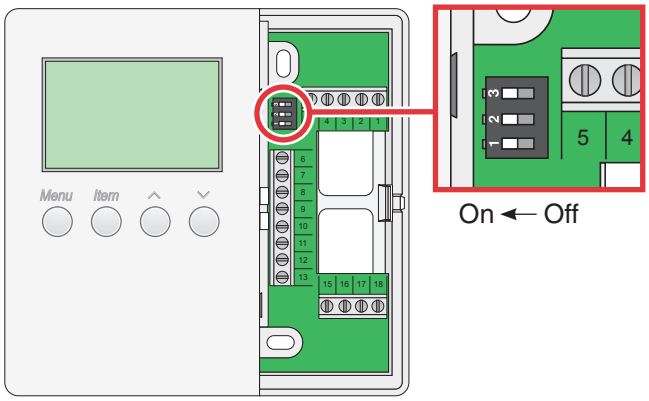
- Select whether the control should operate on a permanent demand or on an external demand.

DIP Switch 2: Locked / Unlocked

- Select to lock or unlock the access level. Select 'Lock' to prevent tampering.

DIP Switch 1: Setback / Off

- Select whether or not night setback is desired.



Access Levels

The control has 3 different access levels that restrict the number of viewable items.

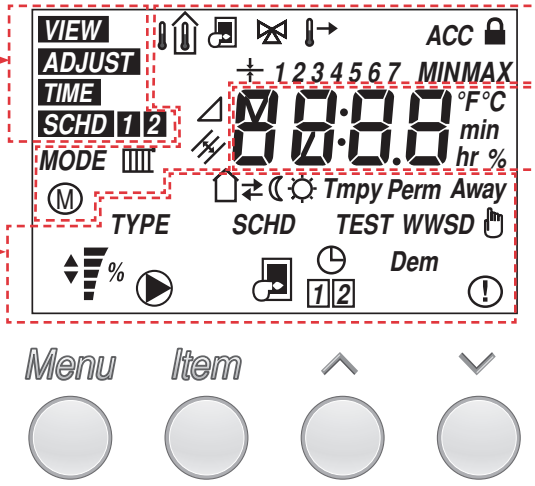
1) **Ad** = Advanced: This is the highest access level. This level provides access to all settings on the control.
2) **InS** = Installer: This is the default access level. This level is suitable for the installer and for troubleshooting.
3) **USEr** = User: This is the lowest access level. This level is suitable for the building occupants.

Set the Locked / Unlocked DIP switch to the Locked position to allow the access level to be hidden from view. The Locked position prevents unauthorized tampering with the access level.
The Access level for each item is shown in the View, Adjust, Time, Schedule 1 and Schedule 2 menu tables.

Display

Menu Field
Displays the current menu

Status Field
Displays the current status of the control's inputs, outputs and operation



Item Field
Displays an abbreviated name or symbol of the selected item

Number Field
Displays the current value of the selected item

Symbol Description

ACC	**ACCESS LEVEL** Shown when adjusting the access level.
Dem	**DEMAND** Shown when a permanent demand or an external demand is present.
	**BOILER** Shown when the control requires the boiler burner to fire.
	**PUMP** Shown when the control turns on the pump. Flashes during the pump purge.
	**LOCK / UNLOCK** A padlock is shown when the access level is locked.
	**WARNING** Shown when an error message is present on the control.
	**MIXING VALVE OUTPUT SCALE** The mixing valve position represented as a bar graph. Arrows show whether the valve is opening or closing.
	**TERMINAL UNIT** The type of space heating units. Select one of 6 different types.
	**OUTDOOR TEMPERATURE** Shown together with the current measured outdoor temperature.
	**INDOOR TEMPERATURE** Shown together with the current measured indoor temperature.
	**TARGET** Shown together with another symbol to indicate target temperature. Example shown: Indoor Target Temperature.
	**DESIGN** Shown together with another symbol to indicate design temperature. Example shown: Outdoor Design Temperature.
	**MIX** Shown together with another symbol to indicate mixing parameters.
	**SUPPLY TEMPERATURE** Shown together with another symbol to indicate supply temperature. Example shown: Mix Supply Temperature.
	**ROOM** Shown when adjusting room temperature.
	**MOTOR** Shown when adjusting motor speed.
	**MANUAL OVERRIDE** A temporary or permanent override has been manually selected.
TMPY	**TEMPORARY** A temporary override has been manually selected.
PERM	**PERMANENT** A permanent override has been manually selected.
	**WAKE** Wake time period event.
	**UNOCCUPIED** Unoccupied time period event.
	**OCCUPIED** Occupied time period event.
	**SLEEP** Sleep time period event.
Away	**AWAY** The away override has been manually selected.
WWSD	**WWSD** The outdoor temperature above which the heating is shut off.
	**TIMER 1** Shown when timer 1 schedule is in night setback.
	**TIMER 2** Shown when the timer 2 schedule is in night setback.
1 2 3 4 5 6 7	**DAYS OF THE WEEK** 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday 7 = Sunday

User Interface

The 31355 has four buttons: Menu, Item, Up, Down.

Menu Button

Each press and release of the Menu button advances the display to the next menu.

Five menus are available:

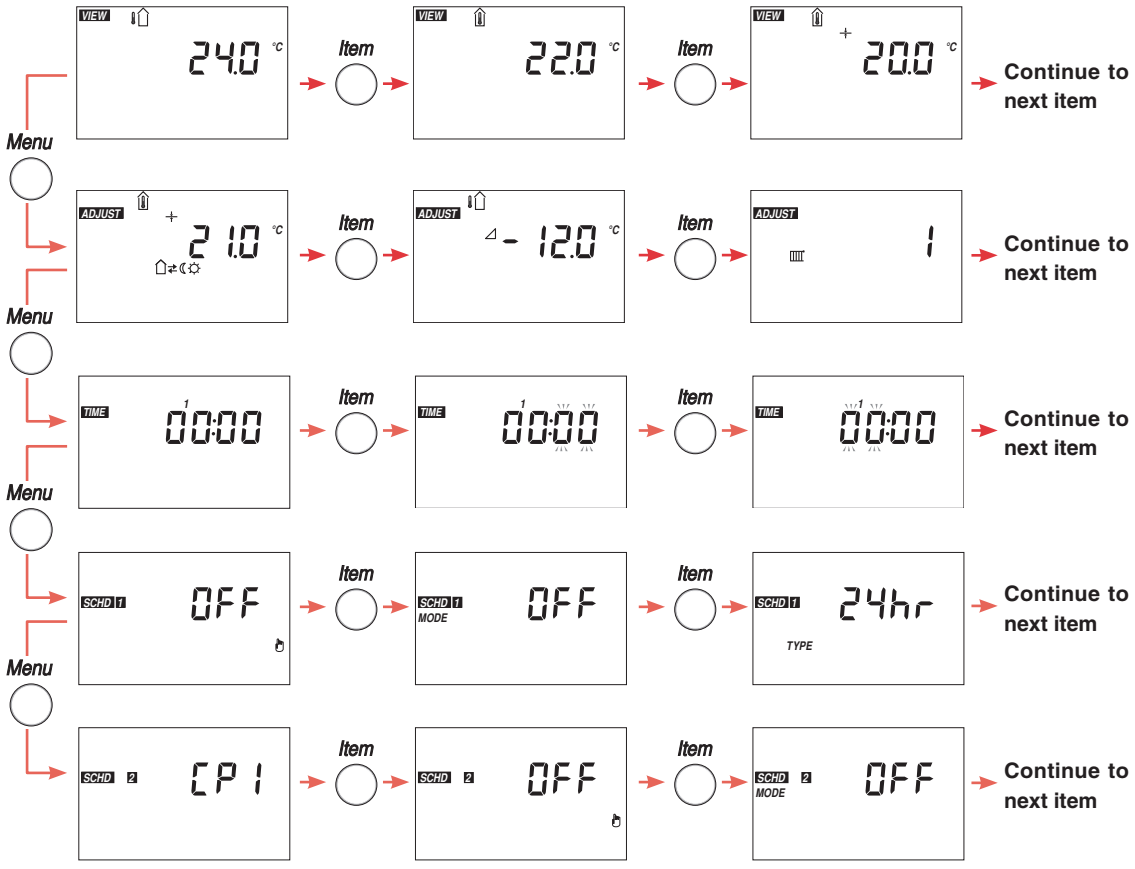
- VIEW
- ADJUST
- TIME
- SCHD 1 (Schedule 1)
- SCHD 2 (Schedule 2)

Item Button

Each press and release of the Item button advances the display to the next item in the same menu.

Up or Down Button

Each press and release of the up or down button changes the number value while in the 'ADJUST, TIME, SCHD 1, or SCHD 2' menus.



Setup

All settings are stored in permanent memory which is not affected by power loss.

Menu

Item

The View menu items display the current operating temperatures and status information of the system.

VIEW MENU

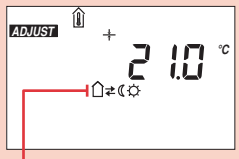
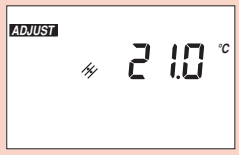
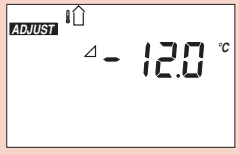
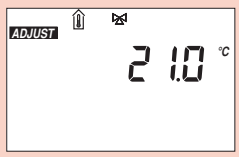
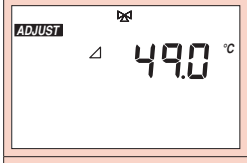
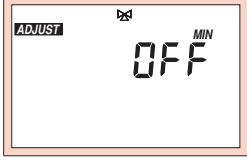
Item Field	Range	Access	Description
VIEW 24.0 °C	-60 to 65°C (-76 to 149°F)	Ad InS USEr	**OUTDOOR** • The measured outdoor temperature. • Only available when outdoor design is not set to off.
VIEW 22.0 °C	-30 to 130°C (-22 to 266°F)	Ad InS USEr	**INDOOR** • The measured indoor air temperature. • Only available when outdoor design is not set to off and when an indoor air sensor is used.
VIEW + 20.0 °C	– – –, -30 to 130 °C (– – –, -22 to 266°F)	Ad InS USEr	**INDOOR TARGET** • The desired indoor air temperature. • Only available when outdoor design is not set to off and when an indoor air sensor is used.
VIEW 50.0 °C	-30 to 130°C (-22 to 266°F)	Ad InS USEr	**MIX SUPPLY** • The measured mix supply temperature. • Not available in the User access level when an indoor air sensor is used.
VIEW + 50.0 °C	– – –, -30 to 130 °C (– – –, -22 to 266°F)	Ad InS	**MIX TARGET** • The temperature target the control is to maintain at the mixing valve outlet.
VIEW 1 SCHD	Wake ☼, Unocc, Occ, Sleep ☾, *TMPY*, *PERM*, *Away*, Override	Ad InS USEr	***Schd*** **SCHEDULE 1** • Schedule 1 operational status. • Only available when DIP switch 3 is set to External Demand.
VIEW 2 SCHD	Wake ☼, Unocc, Occ, Sleep ☾, *TMPY*, *PERM*, *Away*, Override	Ad InS USEr	***Schd*** **SCHEDULE 2** • Schedule 2 operational status. • Only available when DIP switch 3 is set to External Demand and the Schedule Mode is not set to OFF.
VIEW J11 TYPE	J11 alternating with 74A	Ad InS	***TYPE*** **TYPE** • The software version (J11 74 is constant).

After the last item, the control returns to the first item in the menu.

Setup: Adjust Menu
HeatLink® Compact Mixing Reset Control Stk# 31355

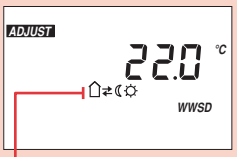
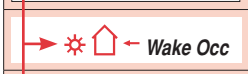
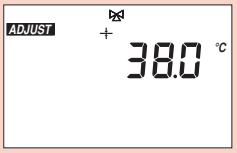
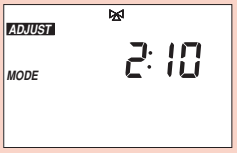
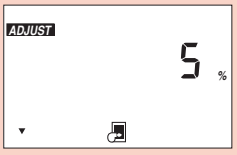
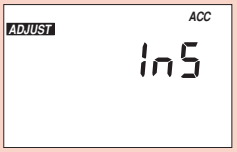
Menu | Item | ^ v

The Adjust Menu items are the programmable settings used to operate the mechanical equipment.

Item Field	Range	Access	Description
	4.5 to 35.0°C (40 to 95°F)	Ad InS USEr	**INDOOR TARGET** • Enter the desired indoor air temperature with indoor temperature feedback. • The control adjusts water temperature to maintain desired indoor air temperature. • Only available when an indoor sensor is connected, and outdoor design is not set to off and dip switch 3 is set to permanent demand. • For 2 event schedules: ☼, ☾. • For 4 event schedules: ☼, ⌂→, ⌂←, ☾.
☼ Wake	Default = 21.0°C (70°F)		
⌂→ UnOccupied	Default = 16.5°C (62°F)		
⌂← Occupied	Default = 21.0°C (70°F)		
☾ Sleep	Default = 16.5°C (62°F)		
	4.5 to 35.0°C (40 to 95°F) Default = 21.0°C (70°F)	Ad InS	**ROOM** • Increases or decreases the heat to the room when not using indoor temperature feedback. • Room setting fine tunes the mix supply water temperature. • Only available when there is no indoor sensor connected, and outdoor design is not set to off.
	-51.0 to 7.0°C, OFF (-60 to 45°F, OFF) Default = -12.0°C (10°F)	Ad InS	**OUT DESIGN** • Enter the coldest annual outdoor temperature of your area. • Setting outdoor design to off disables outdoor reset and enables setpoint operation.
	1, 2, 3, 4, 5, 6	Ad InS	**TERMINAL** • Enter the type of heating terminal units installed. **1** = Underfloor Heating (Wet) **2** = Underfloor Heating (Dry) **3** = Fan coil **4** = Fin tube convector **5** = Radiator **6** = Baseboard • Only available when outdoor design is not set to off.
	4.5 to 35.0°C (40 to 95°F) Default = 21.0°C (70°F)	Ad	**MIX INDOOR** • The outdoor reset characterized heating curve starting point. • Only available when outdoor design is not set to off.
	21.0 to 104.5°C (70 to 220°F) Default = 49.0°C (120°F)	Ad	**MIX DESIGN** • The water temperature required for heating on the coldest annual temperature of your area. • Only available when outdoor design is not set to off.
	OFF, 1.5 to 65.5°C (OFF, 35 to 150°F) Default = OFF	Ad	**MIX MINIMUM** • The minimum mix target outlet temperature. • Only available when outdoor design is not set to off.

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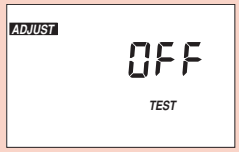
ADJUST MENU

Item Field	Range	Access	Description
	27.0 to 107.0°C (80 to 225°F) Default = 60.0°C (140°F)	Ad	**MAX** **MIX MAXIMUM** • The maximum mix target outlet temperature. • Only available when outdoor design is not set to off.
	4.5 to 38.0°C, OFF (40 to 100°F, OFF)	Ad InS	**WWSD** **WARM WEATHER SHUT DOWN** • The outdoor temperature above which the heating is shut off. • Only available when outdoor design is not set to off.
	Default = 22.0°C (72°F)		
	Default = 15.5°C (60°F)		
	15.5 to 93.5°C (60 to 200°F) Default = 38.0°C (100°F)	Ad InS	**MIX TARGET** • Setpoint mix target temperature. • Only available when outdoor design is set to off.
	0:10, 2:10, Flot Default = Flot	Ad	**MODE** **MIX MODE** • The control can provide 3 different output signals to a mixing valve actuator: **0:10** = 0 to 10 V (dc) analogue signal **2:10** = 2 to 10 V (dc) analogue signal **Flot** = 24 V (ac) floating action
	30 to 230 seconds Default = 150 seconds	Ad	**MOTOR SPEED** • The time to operate the mixing valve from fully closed to fully open. • The default value of 150s is the proper setting for the HeatLink® 56121 DDC actuator and 58100 series mixing valve motors.
	OFF, 0:05 to 10:00 Default = 0:20	Ad	mm:ss **PUMP** • System pump purge time once the heat demand is removed. • Use of this feature without a bypass or continuous flow loops can result in dead heading of the pump.
	10 to 70% (5% increments) Default = 25%	Ad	**BOILER ON** • Boiler on trigger point as the mixing valve opens.
	0 to 50% (5% increments) Default = 5%	Ad	**BOILER OFF** • Boiler off trigger point as the mixing valve closes.
	USEr, InS, Ad Default = InS	Ad InS	**ACC** **ACCESS LEVEL** • The control has 3 access levels: **Ad** = Advanced: All settings are available. **InS** = Installer: The factory default access level allows basic setting changes. **USEr** = User: Access level for building occupants. • The access level hides certain settings from the View, Adjust, Schedule 1 and Schedule 2 menus.

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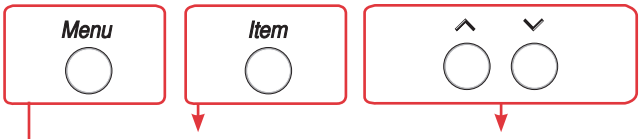
Adjust Menu (3 of 3)

ADJUST MENU

Item Field	Range	Access	Description
	OFF, FLd, MAn Default = OFF	Ad InS	***TEST*** **TEST** • Select the field test (FLd) or Maximum Heat (MAn) feature.
	°F, °C Default = °C	Ad InS USEr	***°F °C*** **TEMPERATURE UNITS** • Select either Celsius or Fahrenheit temperature units to display temperature.

After the last item, the control returns to the first item in the menu.

Time Menu (1 of 1)



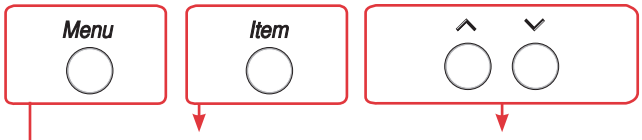
The Time menu items set the time clock and day.

TIME MENU

Item Field	Range	Access	Description
		Ad InS USEr	**CURRENT TIME AND DAY** • Displays the current time and day. • Only available when the Setback DIP switch is set to on.
	00 to 59	Ad InS USEr	**CLOCK MINUTES** • Set the minutes. • Only available when the Setback DIP switch is set to on.
	00 to 23	Ad InS USEr	**CLOCK HOURS** • Set the hours. • Only available when the Setback DIP switch is set to on.
	1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday 7 = Sunday Default = Monday	Ad InS USEr	**DAY OF THE WEEK** • Set the day of the week. • Only available when the Setback DIP switch is set to on.

After the last item, the control returns to the first item in the menu.

Schedule 1 Menu (1 of 1)



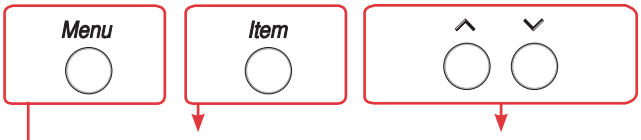
The Schedule menu items set the schedule type, the number of events per day, and the event times.

SCHD 1 MENU

Item Field	Range	Access	Description
	OFF, *TMPY* ☼, *PERM* ☼, *TMPY* ⌂→, *PERM* ⌂→, *TMPY* ⌂←, *PERM* ⌂←, *TMPY* ☾, *PERM* ☾, *Away* Default = OFF	Ad InS USEr	**MANUAL OVERRIDE** • Select a manual override for schedule 1. • Ignores the regular schedule. • Temporary manual override lasts 3 hours. • Permanent and Away manual override remains until manually changed.
	OFF, 2, 4 Default = OFF	Ad InS	***MODE*** **MODE** • Select the number of setback events per day for schedule 1. • Only available when the Setback DIP switch is set to on.
	24 hr, 5-11, 7dAY Default = 24hr	Ad InS	***TYPE*** **TYPE** • Select the type of repeating schedule for schedule 1. • Only available when the Setback DIP switch is set to on.
When a 5-11 or a 7 day schedule is selected, each day or group of days require individual event settings.			
	– –:– – to 23:50 PM Default = 06:00	Ad InS USEr	**DAY 1 TO DAY 7** **☼ WAKE** • Select the starting time for the Wake event for schedule 1. • Only available when the Setback DIP switch is set to on.
	– –:– – to 23:50 PM Default = 08:00	Ad InS USEr	**DAY 1 TO DAY 7** **⌂→ UNOCCUPIED** • Select the starting time for the Unoccupied event for schedule 1. • Only available when the Setback DIP switch is set to on.
	– –:– – to 23:50 PM Default = 16:00	Ad InS USEr	**DAY 1 TO DAY 7** **⌂← OCCUPIED** • Select the starting time for the Occupied event for schedule 1. • Only available when the Setback DIP switch is set to on.
	– –:– – to 23:50 PM Default = 22:00	Ad InS USEr	**DAY 1 TO DAY 7** **☾ SLEEP** • Select the starting time for the Sleep event for schedule 1. • Only available when the Setback DIP switch is set to on.

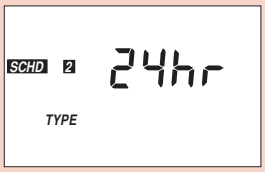
After the last item, the control returns to the first item in the menu.

Schedule 2 Menu (1 of 2)



The Schedule menu items set the schedule type, the number of events per day, and the event times.

SCHD 2 MENU

Item Field	Range	Access	Description
	CP1, On, OFF Default = CP1	Ad InS USEr	***Schd*** **SCHD** • Select whether night setback 2 is operational. **CP1 (Copy 1)**= Night setback schedule 2 copies the event times of schedule 1. **On** = Night setback schedule 2 operates on an independent schedule. **OFF** = Night setback schedule 2 is disabled.
	OFF, *TMPY* ☼, *PERM* ☼, *TMPY* ⌂→, *PERM* ⌂→, *TMPY* ⌂←, *PERM* ⌂←, *TMPY* ☾, *PERM* ☾, *Away* Default = OFF	Ad InS USEr	**MANUAL OVERRIDE** • Select a manual override for schedule 2. • Ignores the regular schedule. • Temporary manual override lasts 3 hours. • Permanent and Away manual override remains until manually changed.
	OFF, 2, 4 Default = OFF	Ad InS	***MODE*** **MODE** • Select the number of setback events per day for schedule 2. • Only available when the Setback DIP switch is set to on.
	24 hr, 5-11, 7dAY Default = 24 hr	Ad InS	***TYPE*** **TYPE** • Select the type of repeating schedule for schedule 2. • Only available when the Setback DIP switch is set to on.
When a 5-11 or a 7 day schedule is selected, each day or group of days require individual event settings.			
	– –:– – to 23:50 PM Default = 06:00	Ad InS USEr	**DAY 1 TO DAY 7** ☼ **WAKE** • Select the starting time for the Wake event for schedule 2. • Only available when the Setback DIP switch is set to on.
	– –:– – to 23:50 PM Default = 08:00	Ad InS USEr	**DAY 1 TO DAY 7** ⌂→ **UNOCCUPIED** • Select the starting time for the Unoccupied event for schedule 2. • Only available when the Setback DIP switch is set to on.
	– –:– – to 23:50 PM Default = 16:00	Ad InS USEr	**DAY 1 TO DAY 7** ⌂← **OCCUPIED** • Select the starting time for the Occupied event for schedule 1. • Only available when the Setback DIP switch is set to on.

Continued on next page.

Schedule 2 Menu (2 of 2)

SCHD 2 MENU

Item Field	Range	Access	Description
	– –:– – to 23:50 PM Default = 22:00	Ad InS USEr	**DAY 1 TO DAY 7** **SLEEP** • Select the starting time for the Sleep event for schedule 1. • Only available when the Setback DIP switch is set to on.

After the last item, the control returns to the first item in the menu.

Modes of Operation

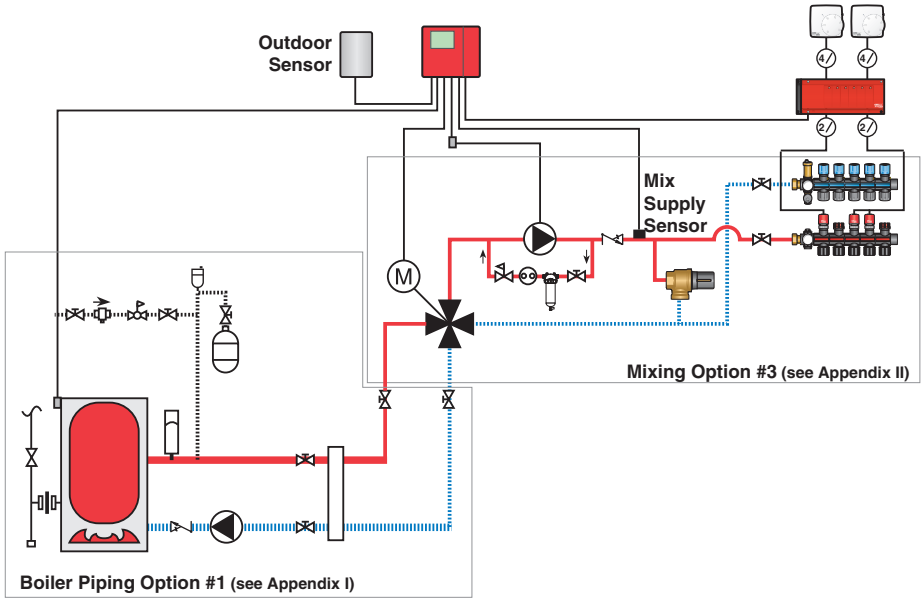
The 31355 can function in three different modes of operation.

1) Outdoor Reset Multizone Operation

- Indoor temperature feedback from Thermostats by use of the external heat demand input contacts.
- The heat demand is activated whenever a thermostat calls for heat.
- Whenever the control is powered up, a heat demand is present and not in WWSD, the control operates the valve, boiler and pump to maintain an outdoor reset mix target termperature at the mix supply sensor.
- The Room setting allows for manual parallel shifting of the heating curve.
- Two optional night setback schedules operate the Timer 1 and 2 relay contacts.

Required Settings:

- DIP Switch 3 = External Demand
- Indoor Air Sensor is not installed.
- Outdoor Design = Set to the coldest annual temperature in your area.

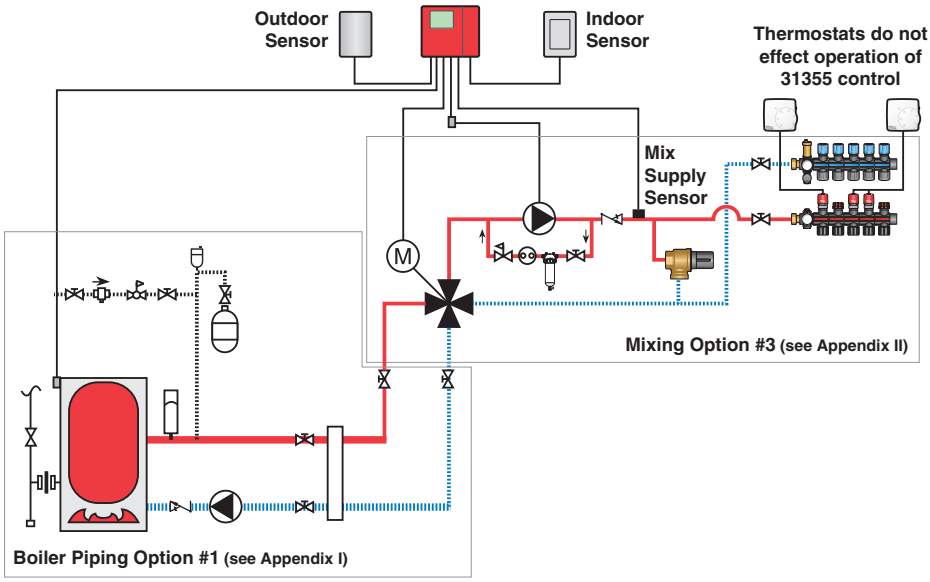


2) Outdoor Reset Single Zone Operation

- Indoor temperature feedback from external indoor air sensor.
- The control operates in permanent heat demand.
- Whenever the control is powered up and not in WWSD, the control operates the valve, boiler and pump to maintain an outdoor reset mix target temperature at the mix supply sensor.
- Indoor temperature sensing allows for automatic parallel shifting of the heating curve.
- Single setback schedule
- Timer relay 1 and 2 operate in parallel.

Required Settings:

- DIP Switch 3 = Permanent Demand
- Indoor Air Sensor is installed.
- Outdoor Design = Set to the coldest annual temperature in your area.

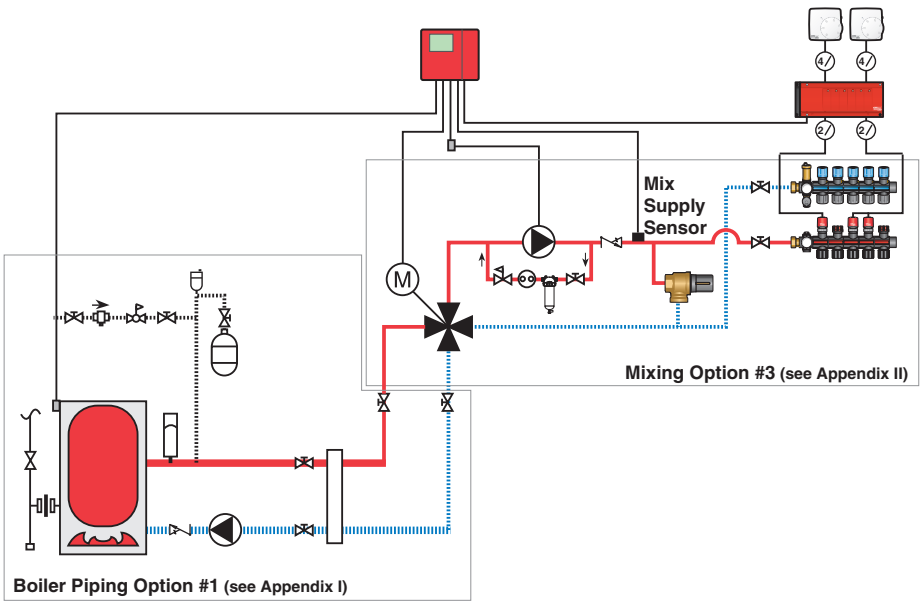


3) Setpoint Operation

- Optional indoor temperature feedback from Thermostats by use of external heat demand input contacts.
- The heat demand is active whenever a thermostat calls for heat (optional indoor temperature feedback) or when permanent heat demand is enabled.
- Whenever the control is powered up and a heat demand is present, the control operates the mixing valve, boiler and pump to maintain a setpoint mix target temperature at the mix supply sensor.
- The setpoint mix target temperature is set through the Mix Target setting.
- DIP Switch 3 = Permanent Demand: Schedule “2” and relay “2” operational.
- DIP Switch 3 = External Demand: Two optional night setback schedules operate the Timer 1 and 2 relay contacts.

Required Settings:

- DIP Switch 3 = Permanent Demand or External Demand
- Indoor Air Sensor is not installed.
- Outdoor Design = OFF



Sequence of Operation

Warm Weather Shut Down

Warm Weather Shut Down (*WWSD*) occurs when the outdoor air temperature is warmer than the WWSD setting (±1°F). If a setback schedule is selected, the control allows for two WWSD settings. If only one schedule is active, WWSD occurs with the appropriate schedule. If two schedules are active, *WWSD* ☼ ⌂← "WWSD Wake Occ" occurs when either one or both of the schedules are in the Wake Sleep events; and *WWSD* ⌂→ ☾ "WWSD Unocc Sleep" occurs when both schedules are in the Unocc Sleep events. Whenever the control is in WWSD, the *WWSD* segment is displayed.

Heat Demand

A heat demand is required in order for operation to occur. A heat demand is present when:

1) **Permanent Demand** – DIP Switch 3 is set to Permanent Demand.

or

2) **External Demand** – (DIP Switch 3 is set to external demand). Whenever a contact closure (short) is applied across the heat demand terminals (13 & 14) The *Dem* icon is turned on whenever a heat demand is present.

Mixing Valve Operation

Whenever the control is powered up, a heat demand is present and not in WWSD, the control provides a mixing output to an actuator which drives a mixing valve to maintain either an outdoor reset mix target temperature or setpoint mix target temperature at the mix supply sensor.

Output Signal *MODE*

The control can provide 3 different output signals to a mixing valve actuator:

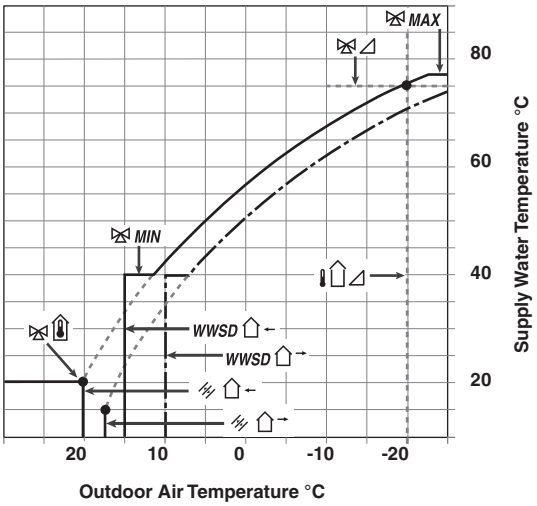
1) 0:10 = 0 to 10 V (dc) analogue signal
2) 2:10 = 2 to 10 V (dc) analogue signal
3) Flot = 24 V (ac) floating action. The control pulses the open or close outputs to actuate the mixing valve.

The 31355 control has a 15 second delay before operating the valve once a heat demand is applied. The 15 second delay is to allow the pump to circulate the water in the system and to stabilize temperatures so that the sensor does not see any temperature spikes.

The time to change from closing the valve to opening the valve is dependent on the Motor Speed and the PID error difference between the mix supply sensor and the mix target. Therefore, there is no fixed time to change from close to open on the valve.

Outdoor Reset Operation

The control adjusts the mix target temperature with changing weather conditions using a characterized heat curve. An outdoor sensor is required. Outdoor reset adjusts the mixing valve supply water temperature to compensate for additional heat loss as the outdoor temperature falls.



Sequence of Operation
HeatLink® Compact Mixing Reset Control Stk# 31355

There are 8 required settings for outdoor reset operation:

1) **Indoor or Room**

Indoor Sensor Feedback

- The indoor setting is only available when an indoor air sensor is present.
- Indoor sensor feedback allows the control to compensate for internal indoor heat gains and additional heat losses such as wind loss which outdoor reset does not account for.
- When an indoor sensor and a permanent demand is present, the Timer 1 and Timer 2 contacts are disabled. Instead, there are up to four separate Indoor Target temperature settings.

Room Setting (No Indoor Sensor Feedback)

- When an indoor air sensor is not present, the outdoor reset water temperature can be adjusted using the room setting.
- This provides fine tune adjustment by parallel shifting the entire heating curve.

2) **Outdoor Design** - The Outdoor Design is the coldest annual temperature in the area. If the Outdoor Design is set to OFF, the control operates in the setpoint operation and disables outdoor reset.

3) **Terminal Unit** - There are 6 different terminal units. When a terminal unit is selected, the control automatically changes the mix design, the mix minimum, and the mix maximum default settings. The defaults can be changed to better match the installed system.

4) **Mix Indoor** - The Mix Indoor is the starting point of the characterized heating curve. This is typically set to 21°C (70°F).

5) **Mix Design** - The water temperature required to heat the building on the coldest day of the year.

6) **Mix Minimum** *MIN* - The lowest mix water target temperature.

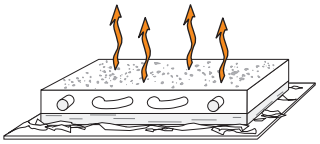
7) **Mix Maximum** *MAX* - The highest mix water target temperature. This can be used to help prevent overheating on a radiant floor.

8) **Warm Weather Shut Down** *WWSD* - When the outdoor temperature exceeds the Warm Weather Shut Down (WWSD) setting, the heating system is shut down by closing the mixing valve.

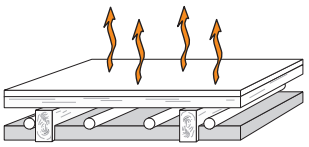
Terminal Unit	Mix Design	Mix MAX	Mix MIN
Underfloor Heating (Wet) (1)	49°C (120°F)	60°C (140°F)	OFF
Underfloor Heating (Dry) (2)	60°C (140°F)	71°C (160°F)	OFF
Fancoil (3)	88°C (190°F)	99°C (210°F)	38°C (100°F)
Fin-Tube Convector (4)	82°C (180°F)	93°C (200°F)	OFF
Radiator (5)	71°C (160°F)	82°C (180°F)	OFF
Baseboard (6)	66°C (150°F)	77°C (170°F)	OFF

Terminal Units

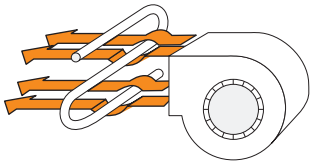
Underfloor Heating (Wet) (1)



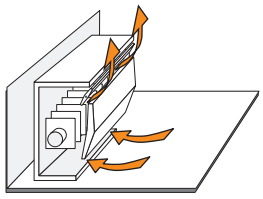
Underfloor Heating (Dry) (2)



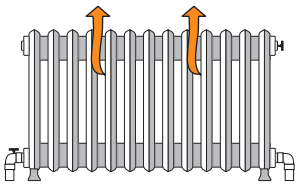
Fancoil (3)



Fin-Tube Convector (4)



Radiator (5)



Baseboard (6)



Setpoint Operation

The control can operate the mixing valve to maintain a fixed setpoint outlet temperature.
To enter the setpoint mix target temperature:
Press the Menu button to enter the 'ADJUST' menu.
Press the Item button to find Outdoor Design and set to 'OFF'.
Press the Item button to find Mix Target and set the mixing valve outlet temperature.

Boiler Output

Output Signal

The control operates the boiler relay as a boiler enable. The "Boiler ON" setting allows the adjustment of the boiler enable point as the mixing valve is opened (default of 25%). The "Boiler OFF" setting allows the adjustment of the boiler shut off point as the mixing valve is closed (default of 5%).
The boiler contact has a 3 minute minimum on time regardless if heat demand is removed. The pump is on while the boiler contact is on. Once the demand is removed, the mixing valve is closed. The minimum off time for the boiler relay is 20 seconds.
Warning:
The boiler minimum on time can cause the dead heading of the pump if no bypass or continuous flow loops are present.

Motor Speed

The control requires the motor speed time to operate the mixing valve from fully closed to fully open. The default value of 150s is the proper setting for the HeatLink® 56121 DDC actuator and 58100 series mixing valve motors.

Pump Operation

The control includes a powered boiler pump. When the DIP switch is set to permanent heat demand, the pump runs continuously except when control is in WWSD. When the DIP switch is set to external heat demand, the pump only operates when an external heat demand is applied and the control is not in WWSD. The pump symbol is shown while in the View menu and the pump is operating. Once the heat demand is removed, the pump continues to operate for the time set by the pump purge setting. During the pump purge, the pump symbol flashes while in the View menu.

Exercising

The control includes a feature which exercises the system pump and mixing valve in order to prevent corrosion and precipitate build-up due to prolonged periods of inactivity. If the pump has not run in the past 3 days, the pump will run for 10 seconds. If the mixing valve has not operated its full stroke in the past 3 days, the control will operate the valve to the fully open position and then back to the fully closed position.
TEST will be displayed during exercising and can be exited by pressing the down button.

Setting the Time

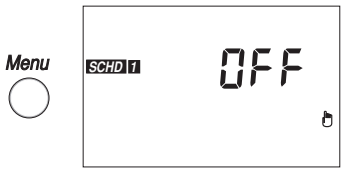
The control has an internal time clock. The time is maintained for at least 4 hours in the case of power loss. The time is visible in the 'TIME' menu only when DIP switch 1 is set to setback.
To set the time:

1) Press and release the Menu button until the 'TIME' menu is found.
2) Press and release the Item button. The minute numbers will flash. Press the up or down button to set the minutes.
3) Press and release the Item button. The hour number will flash. Press the up or down button to set the hour.
4) Press and release the Item button. The day of the week number will flash. Press the up or down button to set the day of the week.

Night Setback

- The control can also operate either one or two night setback channels. The night setback operates by opening or closing the timer 1 relay contact or the timer 2 relay contact at the event time. This causes thermostats to operate at their night setback temperature.
- When an indoor sensor and a permanent demand is present, the Timer 1 and Timer 2 contacts are disabled. Instead, there are up to four separate Indoor Target temperature settings.
- When the control is in single zone operation (Remote indoor sensor connected and DIP set to permanent demand), only channel 1 setback program is available. The channel 2 setback program is not shown and the control operates both the channel 1 relay and the channel 2 relay at the same time.
- The second night setback channel 'SCHD 2' can be set to one of three settings:

1) CP1 = schedule 2 copies schedule 1 event times.
2) On = setback schedule 2 is on and separate from schedule 1.
3) OFF = setback schedule 2 is off.



Manual Override

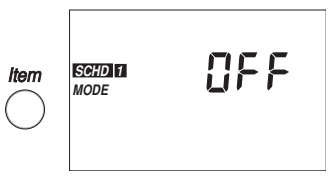
- Select a manual override to prevent the scheduled event from happening.

OFF = operate on scheduled night setback. This is the default setting.
Temporary Wake *TMPY* ☼ = temporarily operate at the Indoor Target Wake temperature or close the timer contact for 3 hours.
Permanent Wake *PERM* ☼ = permanently operate at the Indoor Target Wake temperature or close the timer contact.
Temporary Unoccupied *TMPY* ⌂→ = temporarily operate at the Indoor Target Unoccupied temperature or close the timer contact for 3 hours.
Permanent Unoccupied *PERM* ⌂→ = permanently operate at the Indoor Target Unoccupied temperature or close the timer contact.
Temporary Occupied *TMPY* ⌂← = temporarily operate at the Indoor Target Occupied temperature or close the timer contact for 3 hours.
Permanent Occupied *PERM* ⌂← = permanently operate at the Indoor Target Occupied temperature or close the timer contact.
Temporary Sleep *TMPY* ☾ = temporarily operate at the Indoor Target Sleep temperature or close the timer contact for 3 hours.
Permanent Sleep *PERM* ☾ = permanently operate at the Indoor Target Sleep temperature or close the timer contact.
Away = operate the indoor target at 17.0 °C (62.5°F) or close the timer contact. When using outdoor reset, the warm weather shut down occurs at 17.0°C (62.5 °C).

MODE

- Select how many night setback events should occur each day.

OFF = no night setback
2 = 2 setback events per day: ☼, ☾
4 = 4 setback events per day: ☼, ⌂→, ⌂←, ☾



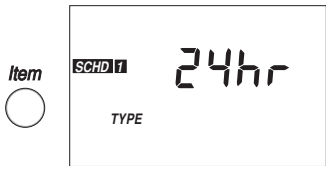
TYPE

- Select the type of repeating schedule.

24 hr = schedule repeats every 24 hours.
5-11 = schedule repeats every week. The 5 weekdays event times are grouped together. Saturday and Sunday have separate event times.
7dAY = schedule repeats every week. There are separate event times for each day.

Setting Event Times

- For each scheduled setback event, a time between 00:00 and 23:50 must be set.
- If it is desired to skip the scheduled setback event, set the event time to – –:– –.
- – –:– – is found between 23:50 and 00:00.



Temporary Override

- When an indoor sensor is present, the desired indoor temperature can be temporarily overridden by pressing the up ^ or down ˅ button.



- The temporary override remains in effect for 3 hours.
- To cancel the temporary override, press and hold the up ^ and down ˅ buttons together.

Installation

Step 1 – Contents

Type 31355 includes:

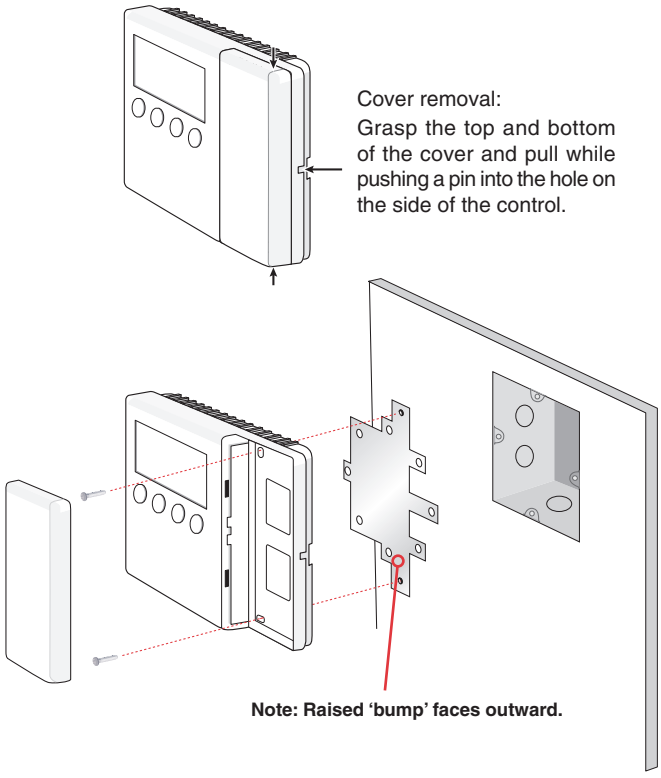
- One 31355 Mixing Control
- One Outdoor Sensor 30070
- One Universal Sensor 30071
- One Tie Strap
- One Mounting Bracket M3049
- One Data Brochure L631355D
- One Data Brochure L630070D
- One User Brochure L631355U

Step 2 – Mounting the Control

Step 2.1 – Mounting the Control to an Electrical Box

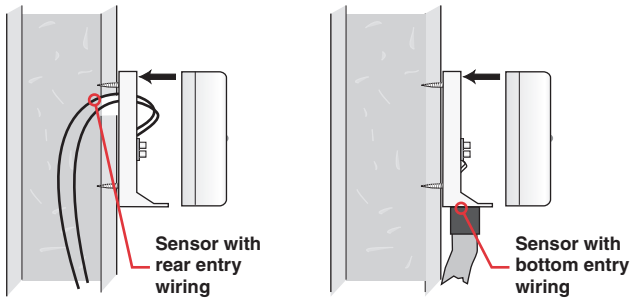
- Install the control on an interior wall with an electrical box approximately 1.5 m (5') above the floor.
- Do not mount the control in a location that may be affected by localized heat sources or cold drafts.
- Fasten the supplied Mounting Bracket screws onto a variety of electrical boxes using the supplied M3.5 x 0.6 x 40 mm (long) screws. Ensure the raised 'bump' face outwards.
- Fasten the control onto the Mounting Plate using the supplied M3 x 0.5 x 8 mm (short) screws.

2.2 – Mounting the Outdoor Sensor 30070

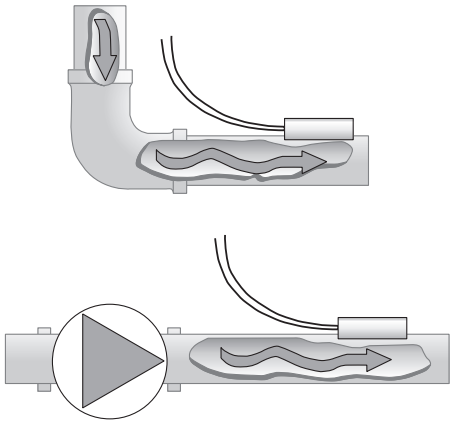


- Mount the Outdoor Sensor 30070 on a north facing wall to avoid direct sunlight.
- Install the Outdoor Sensor away from heat sources.
- Install at a height above the ground that will prevent accidental damage or tampering.

2.3 – Mounting the Mix Sensor 30071



- The Universal Sensor 30071 is used to measure the mix temperature. Install the 30071 downstream of the mixing valve and the pump.
- The 30071 can be strapped onto copper pipe using the supplied tie strap. Cover the sensor with insulation.
- The 30071 can be installed into a temperature well when using steel pipe.

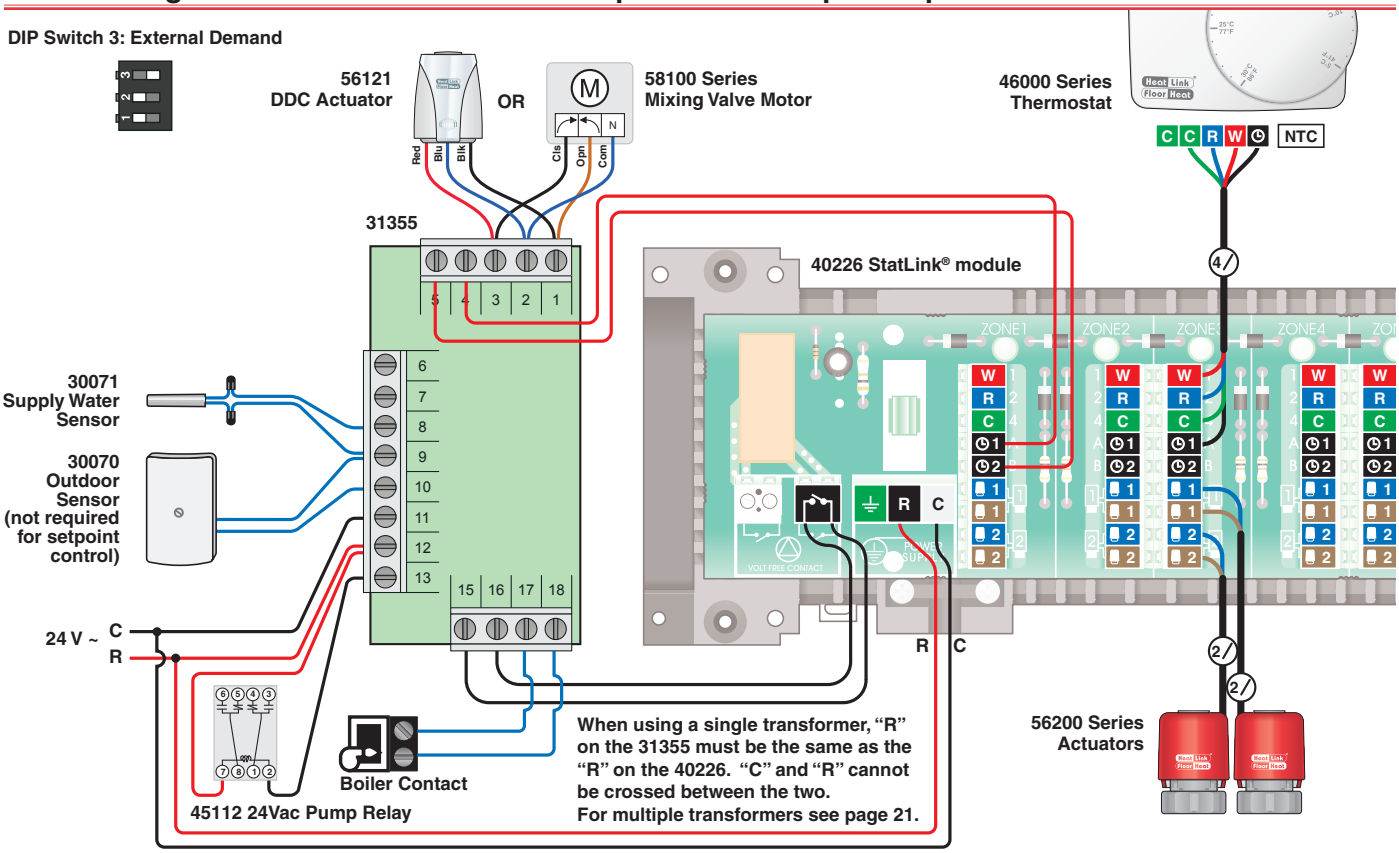


Step 3 – Wiring

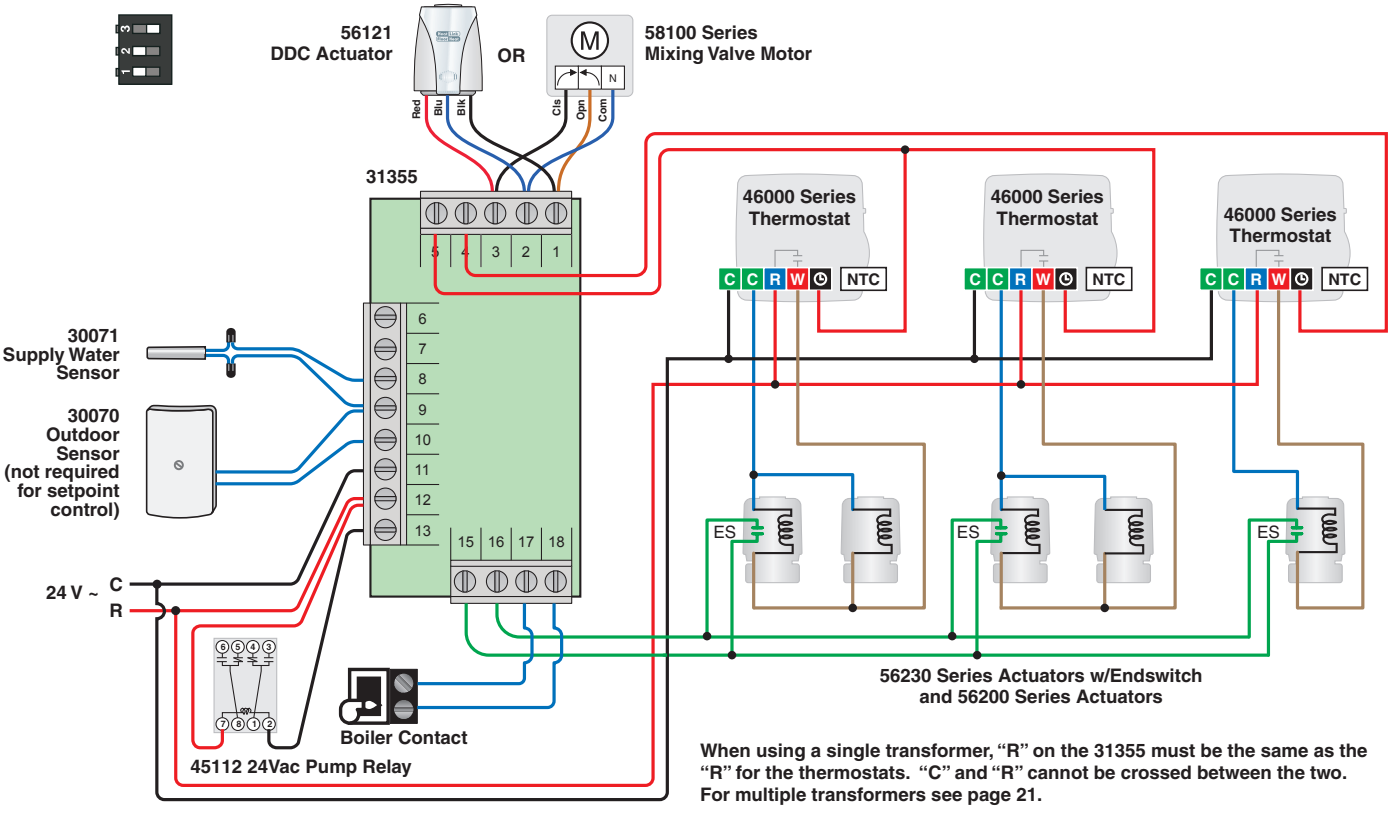
- Only qualified and competent personnel should attempt installation of the control.
- The power supply must be disconnected before starting with the installation.
- All wiring as per local electrical codes.
- Use 18 AWG (0.75 mm^2) wire and marrettes to extended sensor wires if needed.
- All wires are to be stripped to a length of 3/8" (9 mm) to ensure proper connection.

Input / Output	Mixing Control 31355 Terminal	Wire Voltage	Connects To...	On Device...
24 V (ac) Floating Action	1	Switched “C”	Open	Mixing Valve Motor 58130, 58150 or 58199
	2	“R”	Common	
	3	Switched “C”	Close	
0 - 10 V (dc)	1	“C”	Blk	DDC Actuator 56121
	2	“R”	Blu	
	3	Analog signal	Red	
2 - 10 V (dc)	1	“C”		3rd Party Actuator
	2	“R”		
	3	Analog signal		
Timer 1 ◷	4	Switched “R”	Timer ◷ 1	StatLink® module 40226 (Optional)
Timer 2 ◷	5	Switched “R”	Timer ◷ 2	StatLink® module 40226 (Optional)
Indoor Sensor	6	Analog signal	Sensor wire	Indoor Sensor 30076 (Optional)
	7	Analog signal	Sensor wire	
Mix Sensor	8	Analog signal	Sensor wire	Mix Sensor 30071
	9	Analog signal	Sensor wire	
Outdoor Sensor	9	Analog signal	Sensor wire	Outdoor Sensor 30070
	10	Analog signal	Sensor wire	
Power	11	“C”	C	Transformer
	12	“R”	R	
Pump Signal	12	“R”	2	24Vac Pump Relay 45112
	13	Switched “C”	7	
External Demand	15	24V	Dry contact	StatLink® module 40226
	16	24V	Dry contact	
Boiler	17	24V (external)	T	Boiler
	18	24V (external)	T	

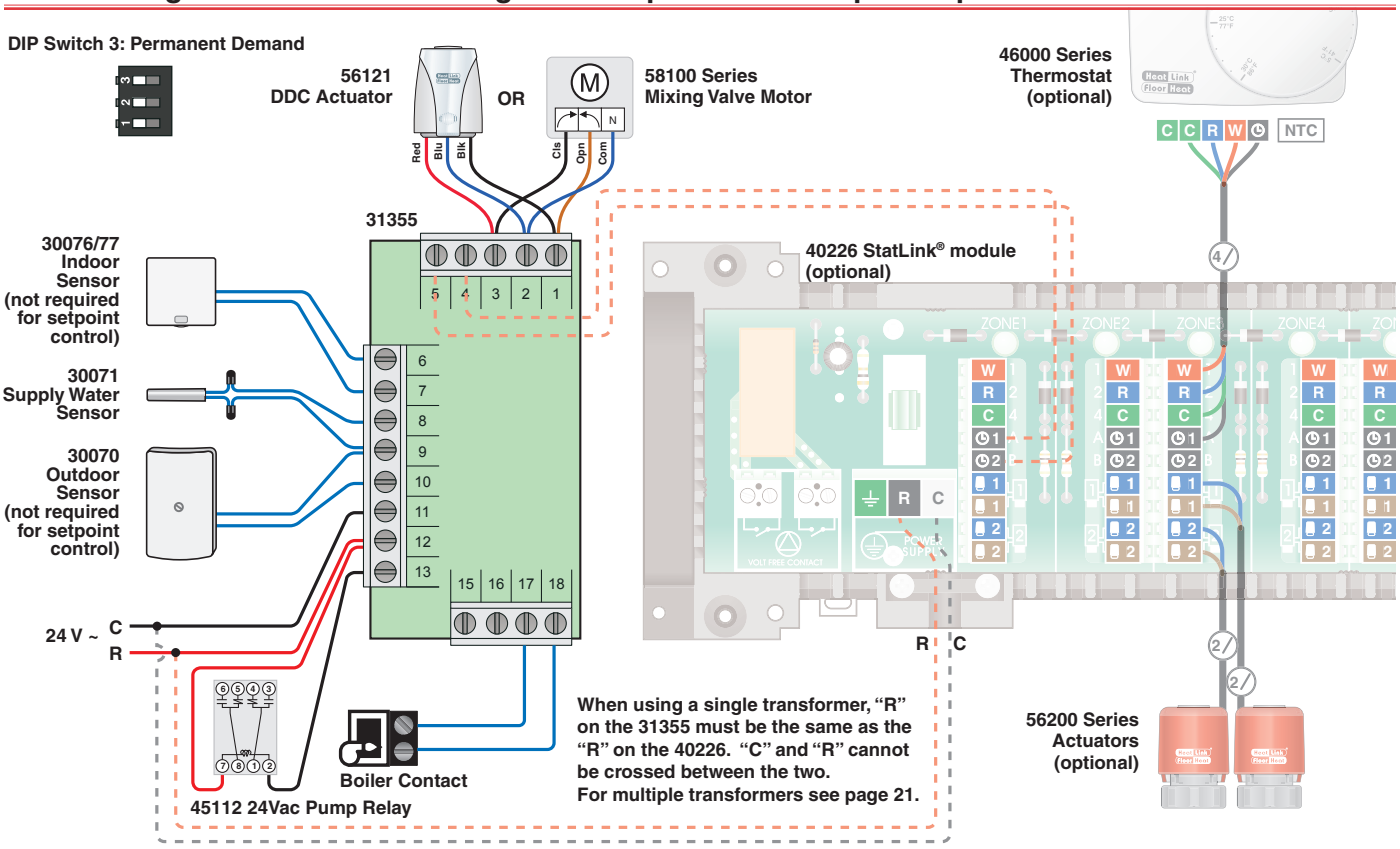
31355 Wiring for Outdoor Reset Multizone Operation or Setpoint Operation with StatLink®



31355 Wiring for Outdoor Reset Multizone Operation or Setpoint Operation without StatLink®

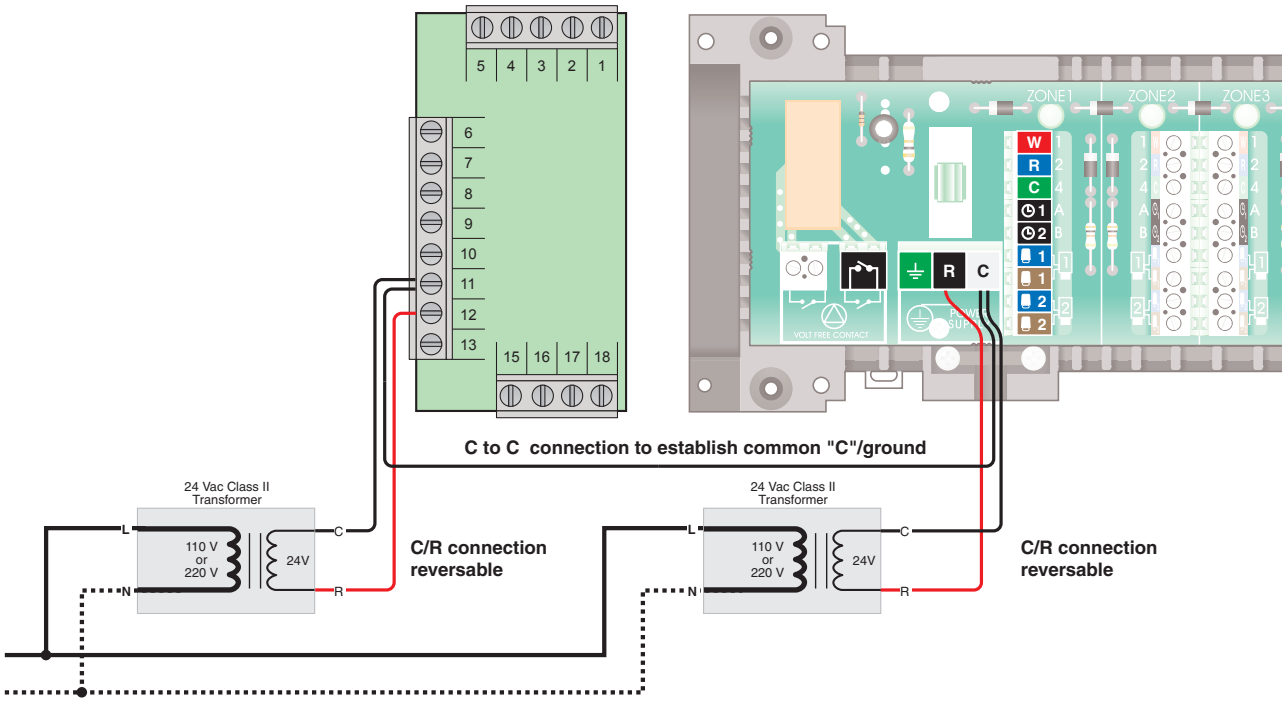


31355 Wiring for Outdoor Reset Single Zone Operation or Setpoint Operation



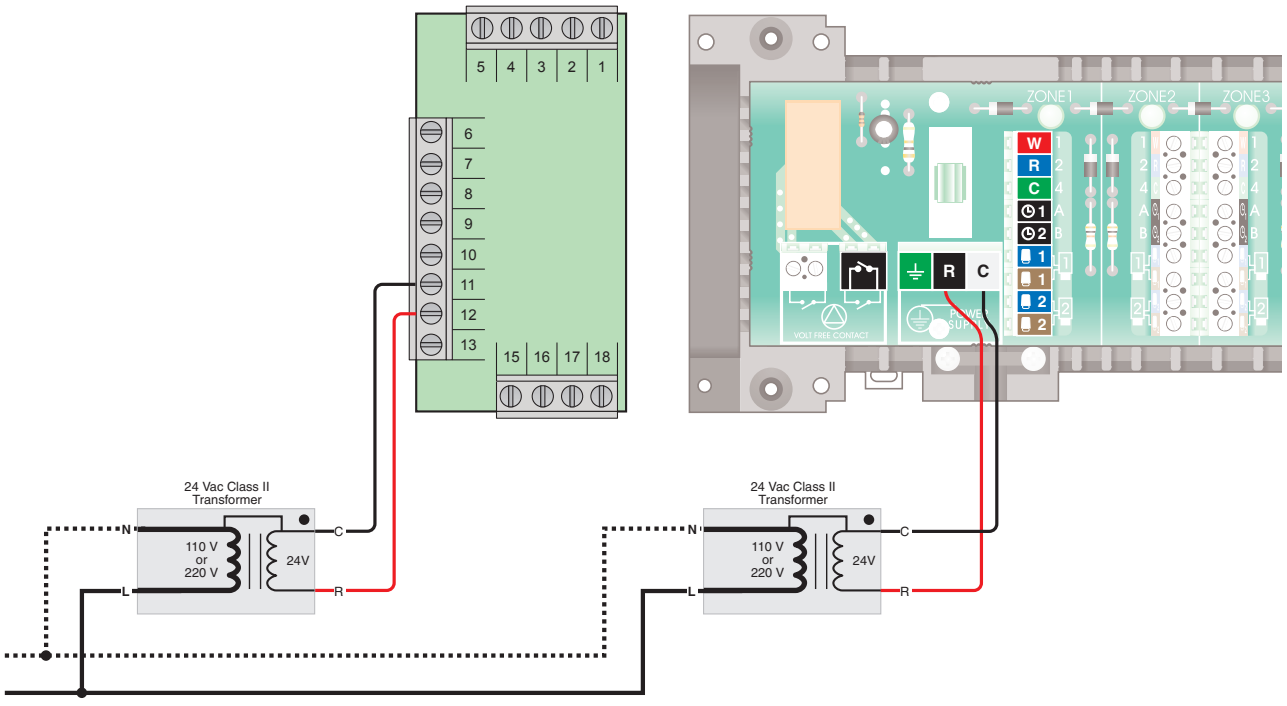
Using Multiple Transformers - Floating Neutral Transformers

Transformers where there is no connection between primary and secondary wiring or between ground and secondary wiring.



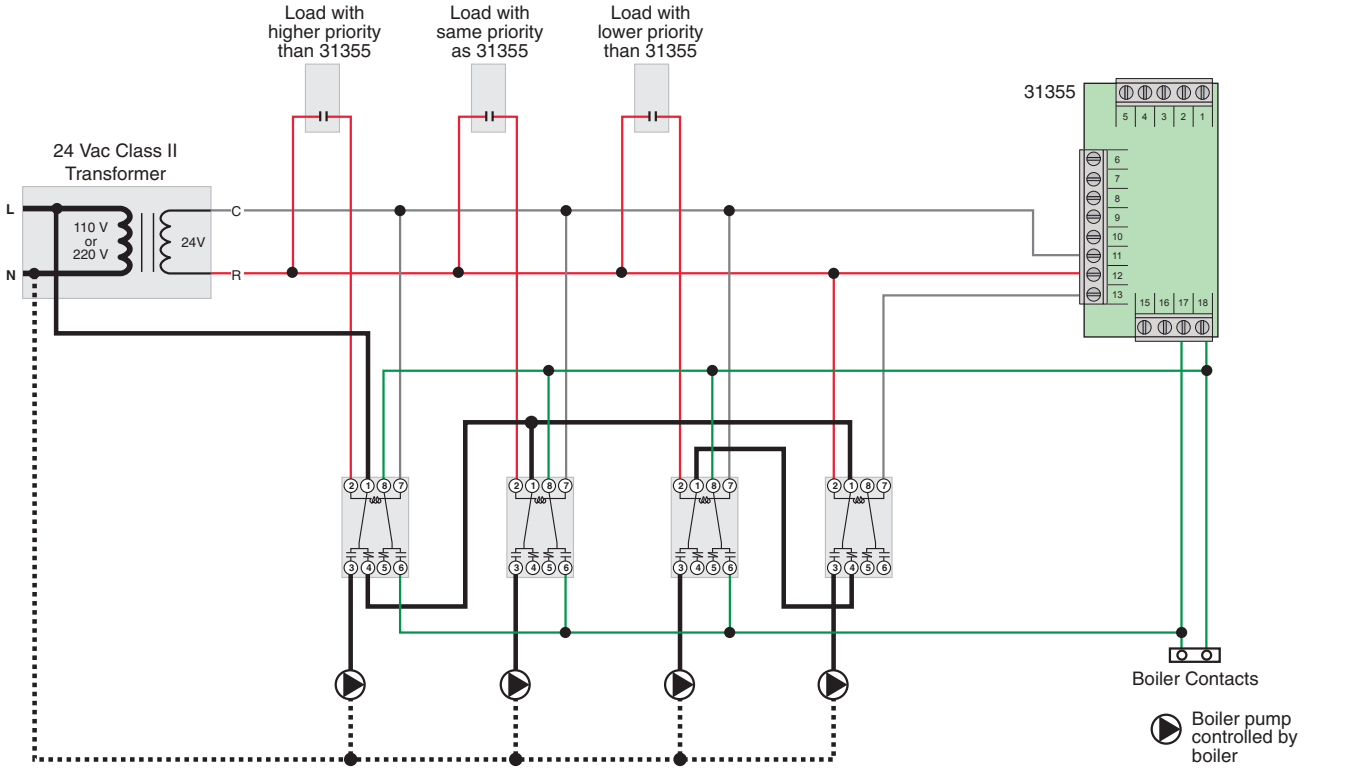
Using Multiple Transformers - Polarized or Grounded Transformers

Transformers with a “C” to “N” or “C” to ground connection.



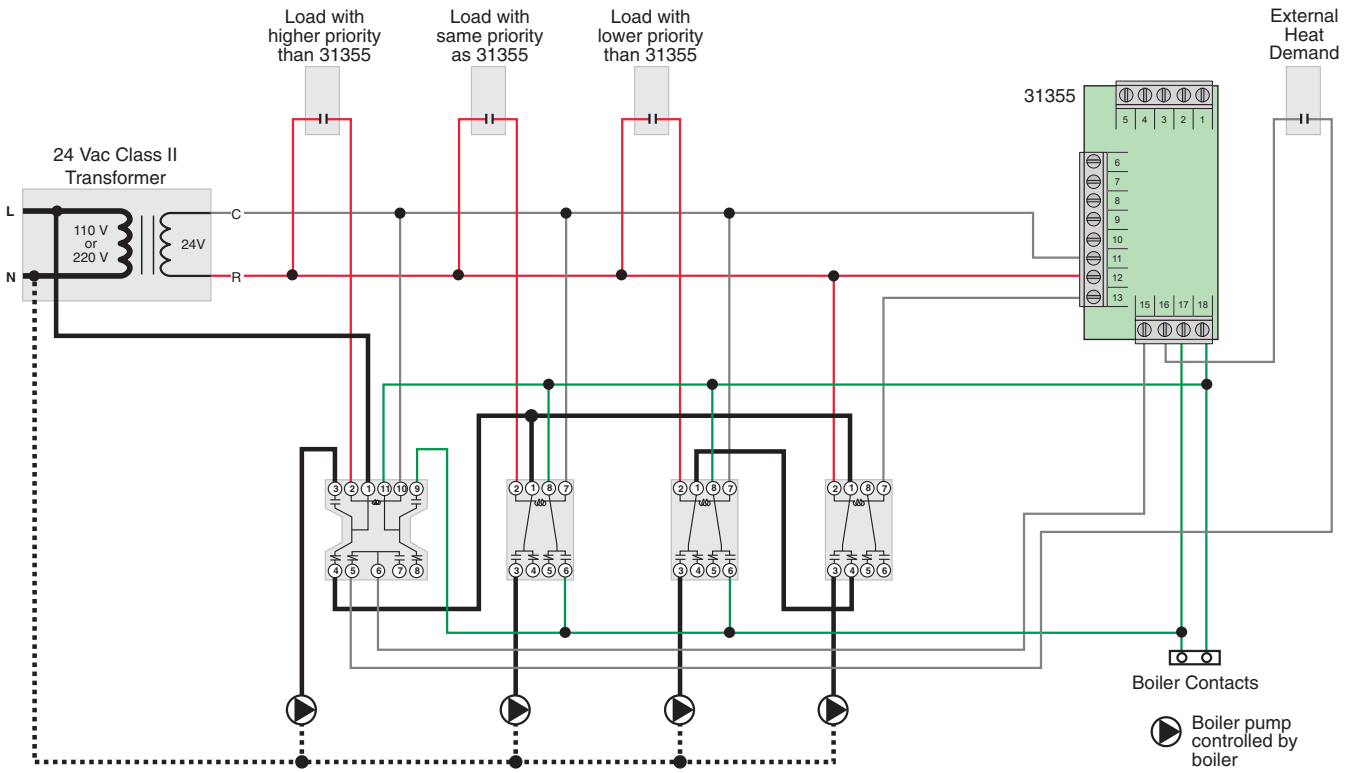
Wiring without separate primary pump

(or primary pump always on)

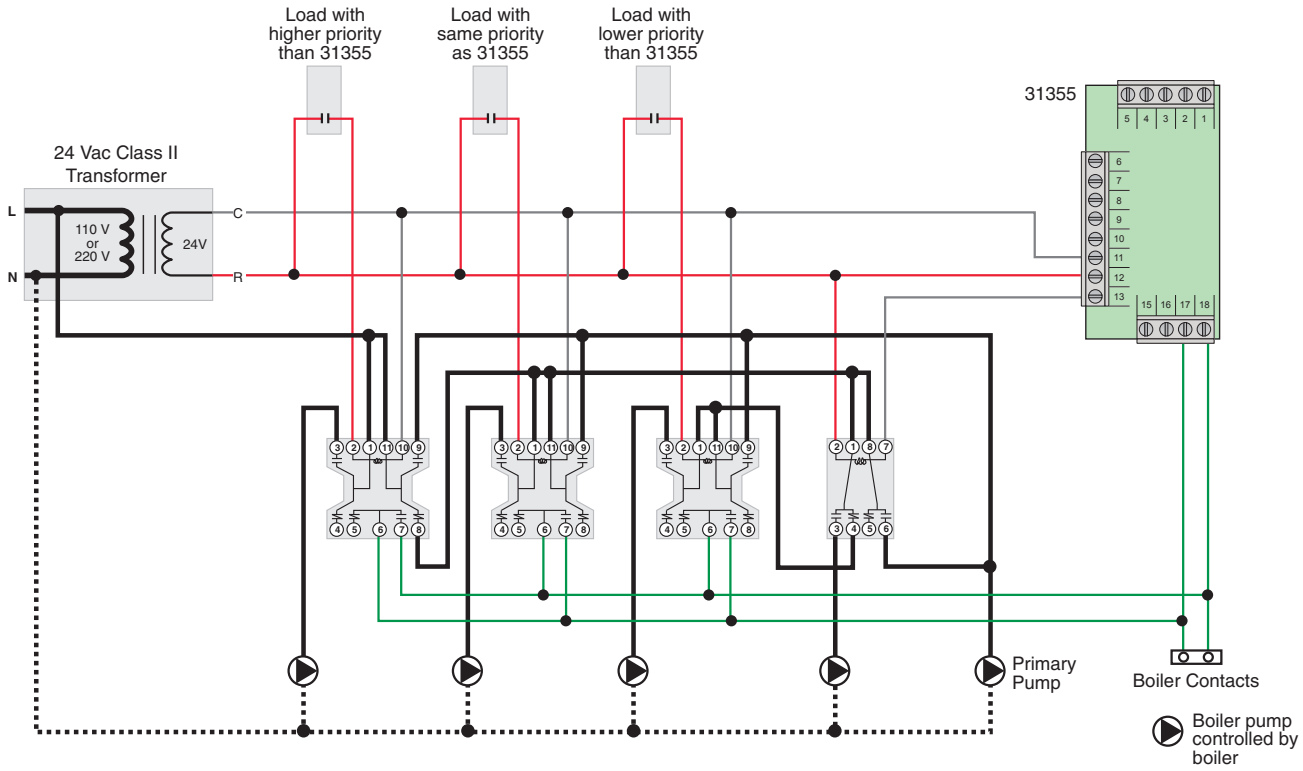


Wiring without separate primary pump (priority using “Heat Demand”)

(or primary pump always on)



Wiring with primary pump



Cleaning the Control

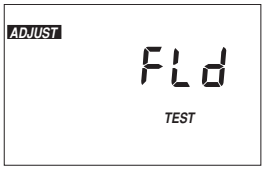
The control's exterior can be cleaned using a damp cloth. Moisten the cloth with water and wring out prior to wiping the control. Do not use solvents or cleaning solutions.

Testing

- The control includes a test sequence that operates each of the control's outputs.
- Use the test sequence for troubleshooting the control operation and the wiring.
- When a Demand is present, each step can be paused for 5 minutes by pressing and releasing the down button.
- Press the down button to cancel the pause and resume the test sequence.

To Start the Field Test Sequence:

1) Set DIP switch 2 to Unlocked.
2) Press the Menu button to enter the Adjust menu.
3) Set the Access level item to Advanced (Ad) or Installer (InS).
4) Set the Test item to 'FLd'.



Step 1	Open the mixing valve to the fully open position over the motor speed setting.	▲%
Step 2	Close the mixing valve to the fully closed position over the motor speed setting.	▼%
Step 3	The pump is activated and remains on until the end of Step 4.	
Step 4	Close boiler relay contact for 10 seconds.	
Step 5	If channel 1 relay operational, close timer channel 1 relay contact for 10 seconds.	1
Step 6	If channel 2 relay operational, close timer channel 2 relay contact for 10 seconds.	2

Max Heat Feature (heat demand must be present)

- Use the Max Heat feature for purging air from the system and system start up.
- The mixing valve maintains the Mix Maximum temperature as the mix target at the mixing valve outlet.
- The WWSD is disabled.
- The system pump is active.
- The Max Heat lasts for 24 hours and then automatically times out.

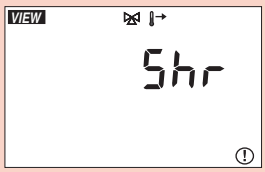
To start the 'MAX HEAT' feature:

1) Set DIP switch 2 to Unlocked.
2) Press the Menu button to enter the Adjust Menu.
3) Set the Access level to Advanced (Ad) or Installer (InS).
3) Set the Test item to 'MAn'.

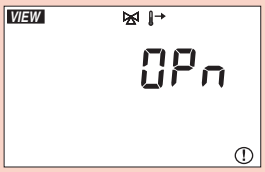
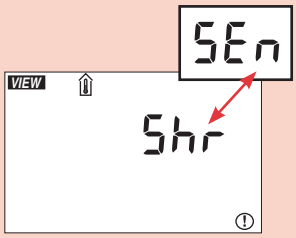
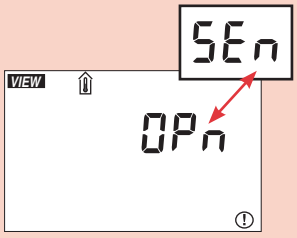
To cancel the 'MAX HEAT' feature:

- Set the Test item to 'OFF'.

ERROR MESSAGES (1 OF 2)

Error Message	Description
	**CONTROL ERROR** • There is an internal control problem. The Adjust menu default settings have been loaded into memory. The control stops operation until settings are checked by the installer. To correct the error: 1) Set the control to the Advanced access level. 2) Check all items in the ‘Adjust’ menu.
	**SCHEDULE 1 ERROR** • There is an internal control problem. The default schedule 1 settings have been loaded into memory. The control continues operation without using the setback schedule. To correct the error: 1) Set the control to the Advanced access level. 2) Check all items in the ‘Schedule 1’ menu.
	**SCHEDULE 2 ERROR** • There is an internal control problem. The default schedule 2 settings have been loaded into memory. The control continues operation without using the setback schedule. To correct the error: 1) Set the control to the Advanced access level. 2) Check all items in the ‘Schedule 2’ menu.
	**OUTDOOR SENSOR SHORT CIRCUIT** • The control continues to operate and assumes a temperature of 0°C. • Check the outdoor sensor resistance reading using an ohmmeter. • Compare the resistance reading to the temperature chart in the L630070. • Check for short circuits along the outdoor sensor wires. • The error message is cleared once the outdoor sensor short circuit is corrected and one of the buttons is pressed.
	**OUTDOOR SENSOR OPEN CIRCUIT** • The control continues to operate and assumes a temperature of 0°C. • Check the outdoor sensor resistance reading using an ohmmeter. • Compare the resistance reading to the temperature chart in the L630070. • Check for loose connections and broken wires along the outdoor sensor wires. • The error message is cleared once the outdoor sensor open circuit is corrected and one of the buttons is pressed.
	**MIX SENSOR SHORT CIRCUIT** • The control continues to operate the mixing valve at a fixed output. • Check the mix sensor resistance reading using an ohmmeter. • Compare the resistance reading to the temperature chart in the L630070. • Check for short circuits along the mix sensor wires. • The error message is cleared once the mix sensor short circuit is corrected and one of the buttons is pressed.

ERROR MESSAGES (2 OF 2)

Error Message	Description
	**MIX SENSOR OPEN CIRCUIT** • The control continues to operate the mixing valve at a fixed output. • Check the mix sensor resistance reading using an ohmmeter. • Compare the resistance reading to the temperature chart in the L630070. • Check for loose connections and broken wires along the mix sensor wires. • The error message is cleared once the mix sensor open circuit is corrected and one of the buttons is pressed.
	**INDOOR SENSOR SHORT CIRCUIT** • The control continues to operate, but with no indoor feedback. • Check the indoor sensor resistance reading using an ohmmeter. • Compare the resistance reading to the temperature chart in the L630070. • Check for short circuits along the indoor sensor wires. • The error message is cleared once the indoor sensor short circuit is corrected and one of the buttons is pressed.
	**INDOOR SENSOR OPEN CIRCUIT** • The control continues to operate, but with no indoor feedback. • Check the indoor sensor resistance reading using an ohmmeter. • Compare the resistance reading to the temperature chart in the L630070. • Check for loose connections and broken wires along the indoor sensor wires. • The error message is cleared once the indoor sensor open circuit is corrected and one of the buttons is pressed.

For all options hot water migration/gravity flow is possible in the supply riser. Unless the load has a positive shut off, a Flow check or Spring loaded check valve is required.

Option #1: Low Loss Header

Low Loss Header - default (using 3rd party low loss header)

Pros:

- Supply water temperature the same for each load
- Simple piping, reduced installation labour
- No dissimilar pump interference

Cons:

- Premanufactured header cost
- Requires check valve to prevent reverse flow in loop with pump off. (The above mentioned measures to prevent heat migration/gravity flow in the supply riser will at the same time prevent reverse flow.)

Low Loss Header - alternative (job site piped low loss header)

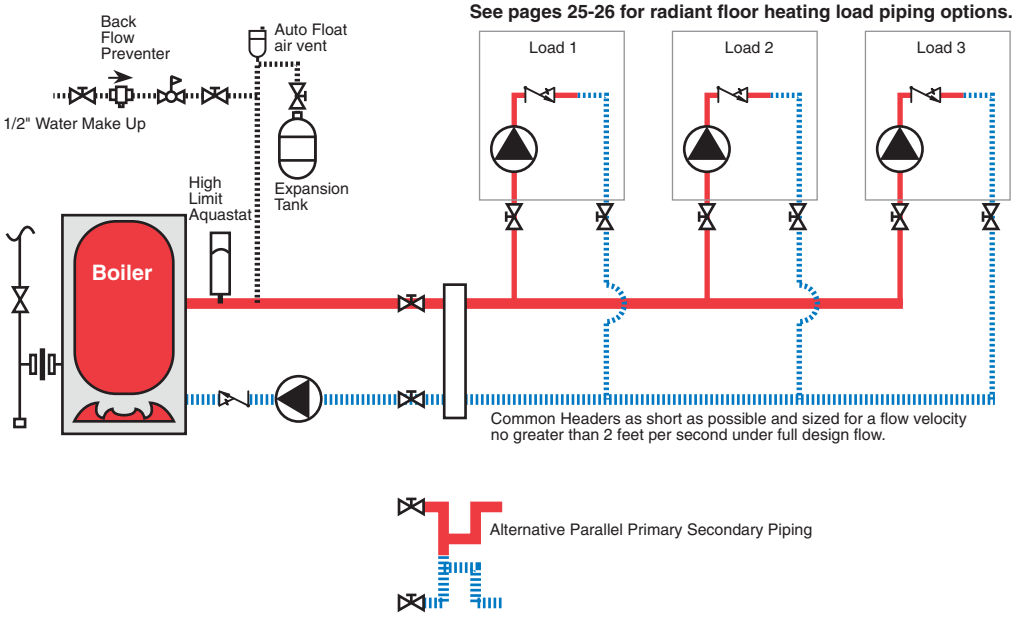
Pros:

- Supply water temperature the same for each load
- No dissimilar pump interference

Cons:

- Critical on site installation (Tee spacing and pipe sizing)
- Requires check valve to prevent reverse flow in loop with pump off. (The above mentioned measures to prevent heat migration/gravity flow in the supply riser will at the same time prevent reverse flow.)

See pages 25-26 for radiant floor heating load piping options.



Option #2: Parallel Primary/Secondary

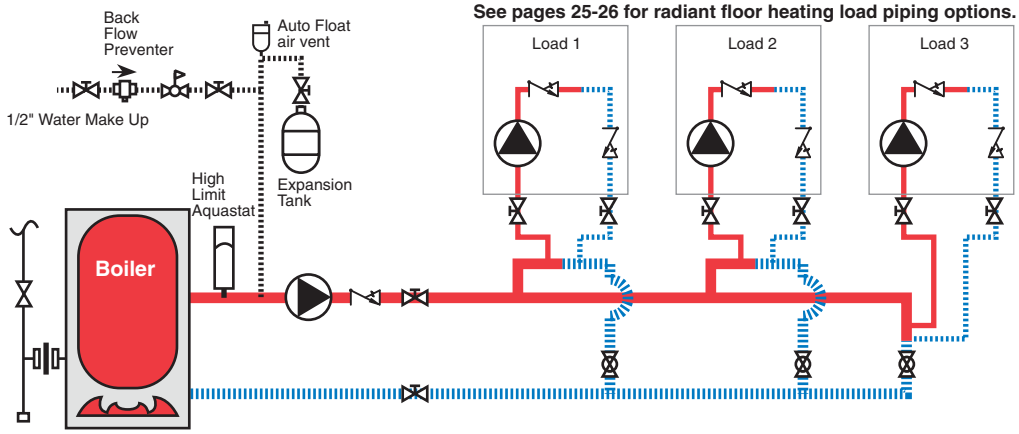
Pros:

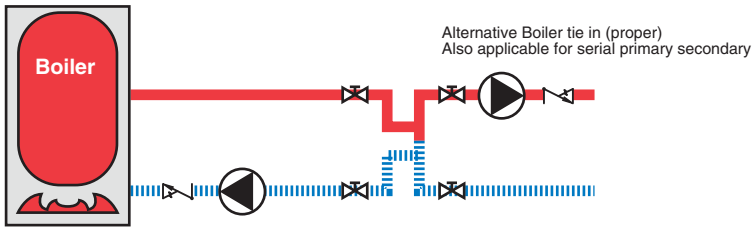
- Supply water temperature the same for each load
- No possible pump interference

Cons:

- Requires additional balancing valves for each load take off.
- Hot water migration/gravity flow possible in return riser. Flow check, Spring loaded check valve or thermal trap required in return riser.
- Critical on site installation (Tee spacing and pipe sizing)
- Complex piping

See pages 25-26 for radiant floor heating load piping options.





Proper Primary/Secondary piping (shown as alternative boiler tie in), requires an additional pump and triple (rather then the much more common double) pole relays (see page 22).

Option #3: Series Primary/Secondary

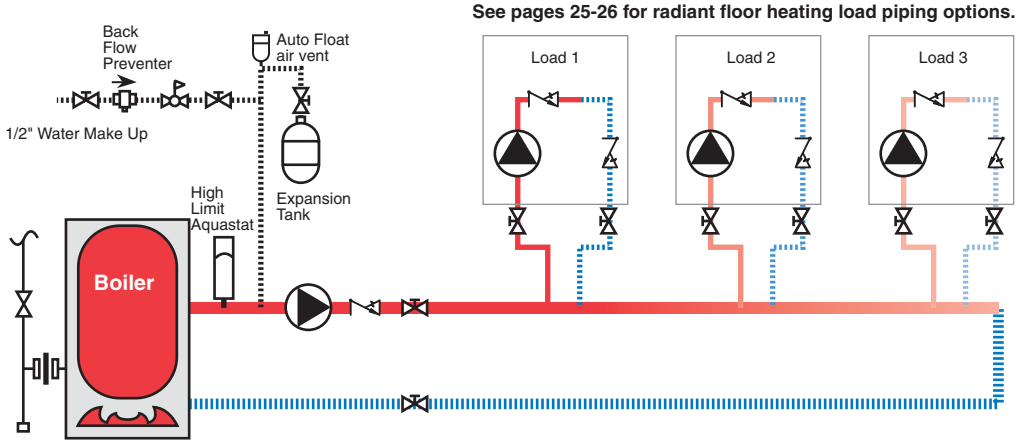
Pros:

- Automatic priority
- No possible pump interference

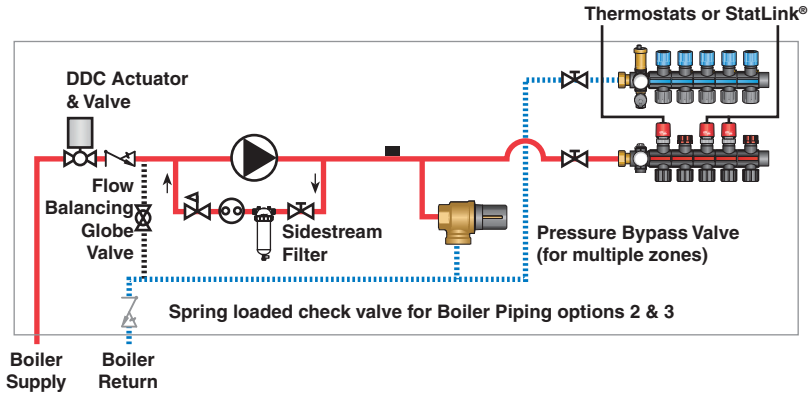
Cons:

- Supply water temperature lowers for each load, this change of temperature is not constant. Some loads may not function if temperature is too low.
- Very expensive to alter priority sequence (note: all loads are prioritized)
- Hot water migration/gravity flow possible in return line. Flow check, Spring loaded check valve or thermal trap required in return riser.
- Critical on site installation (Tee spacing and pipe sizing)

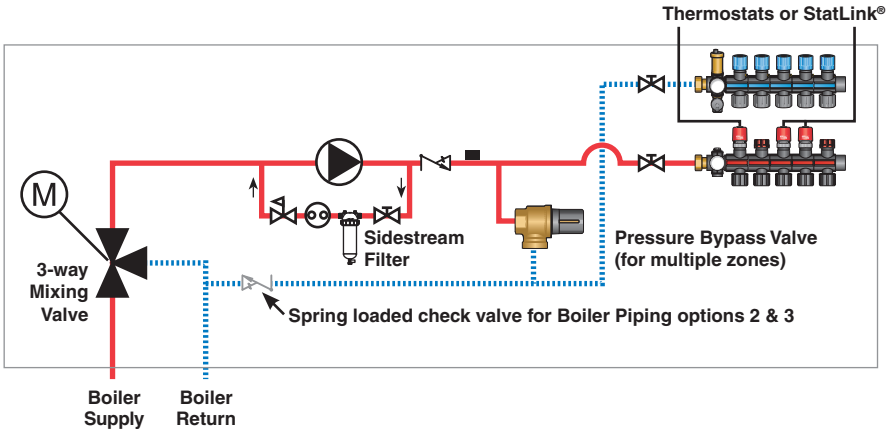
See pages 25-26 for radiant floor heating load piping options.



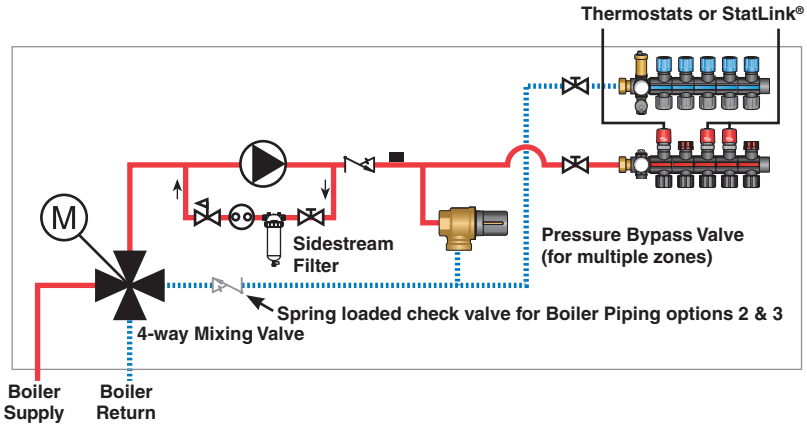
Option #1: 2-way Injection



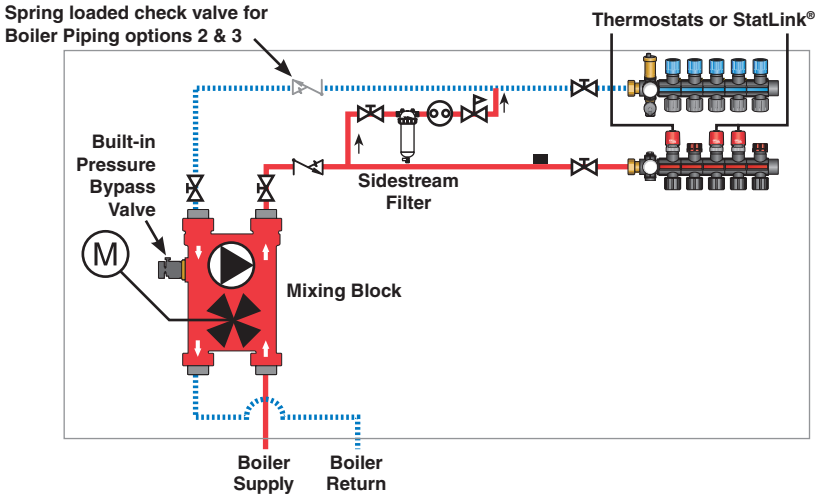
Option #2: 3-way Mixing



Option #3: 4-way Mixing



Option #4: 4-way Mixing Block



Technical Data

Mixing Control 31355:	
Packaged weight	600 g (1.3 lbs)
Enclosure	White PVC plastic
Dimensions	4-1/2" H x 4-11/16" W x 15/16" D (114 mmx 119 mm x 24 mm)
Ambient conditions	Indoor use only, 32 to 122°F (0 to 50°C), <90% RH non-condensing
Power	24 V (ac) ± 10% 50/60 Hz, 50 VA (max), 4.5 VA standby
Floating output	24 V (ac) 48 VA (max)
0/2 -10 V (dc) output	2 kΩ minimum load (5 mA maximum current)
Boiler relay	230 V (ac) 5 A
Timer / Pump / Mixing relays	24 V (ac) 2 A
Pump Output	24 V (ac) 48 VA (max) powered output
Mixing demand	Low voltage dry contact
Sensors	NTC thermistor, 10 kΩ @ 77°F (25°C ± 0.2°C) ß = 3892
– included	Universal Sensor 30071 and Outdoor Sensor 30070
– optional	Indoor Sensor 30076, 30077

The 31355 control has been approved to the following standards:

- CSA C22.2 No 24-93 Temperature Indicating & Regulating Equipment
- UL 873 Eleventh Edition Temperature Indicating & Regulating Equipment
- Control has been tested to meet CE requirements.

Limited Warranty and Product Return Procedure

HeatLink® warrants to the original purchaser each HeatLink® product against defects in workmanship and materials when the product is installed and used in compliance with HeatLink's instructions. This limited warranty covers the cost of parts and labour provided by HeatLink® to correct defects in the materials and/or workmanship. Returned products that are fully operational are not considered warranty cases. HeatLink® also does not cover parts and labour to remove, transport or reinstall a defective product. HeatLink® will not be liable for any damage other than repair or replacement of the defective part or parts and such repairs or replacement shall be deemed to be the sole remedy from HeatLink®. This warranty shall not apply to any defects caused or repairs required as a result of unreasonable or negligent use, neglect, accident, improper installation, or unauthorised repair or alterations. In case of defect, malfunction or failure to conform to warranty, HeatLink® will for a warranty period of 18 months from the date of invoice to the original purchaser or 12 months from the date of installation of the product, whichever occurs first, repair, exchange or give credit for the defective product. Any express or implied warranty which the purchaser may have, including merchantability and fitness for a particular purpose, shall not extend beyond 18 months from date of invoice or 12 months from the date of installation of the product, which ever occurs first.

Replacements: HeatLink® can send replacement product if requested. All replacements are invoiced. Any possible credit for the replacement will only be issued once the replaced product has been returned to HeatLink®.

Product Return Procedure: Product that are believed to have failed must be returned to HeatLink®. When agreed to by HeatLink®. The installer or other qualified service person must, at the owners expense, determine which component has failed. The product must be returned complete with all of its components (sensors, base, etc.) Products must be returned together with the proof of purchase to the original purchaser who then returns the product to HeatLink® After receiving a returned goods authorisation (RGA) number from HeatLink®.

Please include the following information with the product: The full address of the original purchaser, the RGA number and description of the problem.

For returns in Canada or the U.S.A., please have product returned to HeatLink Group Inc., 4603E 13th Street N.E., Calgary, Alberta, Canada, T2E 6M3, Ph. 1-800-661-5332.
For returns in Ireland, please have product returned to HeatLink Ireland, Cappincur, Tullamore, Co. Offaly., Ph. 057 - 932 4062.

- If returned during the warranty period and the product is defective, HeatLink® will issue full credit for the returned product less cost of missing parts.
- If returned during the warranty period and the product is fully operational, HeatLink® will return the product to the original purchaser for a testing cost of $40.00 plus shipping.
- If returned during the warranty period and the product is not damaged and is fully operational, HeatLink® can take back the product for a return charge of 50% of the product's net value. This request has to be specified otherwise the product will be returned with a testing cost of $40.00 plus shipping.
- If returned after the warranty period and the product needs repair, HeatLink® will repair and return the product. Repair and shipping costs will be invoiced. HeatLink's repair costs are calculated at $40.00 / hour plus the cost of parts. If the repair costs will be more than $60.00 a repair estimate will be sent to the original purchaser.

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