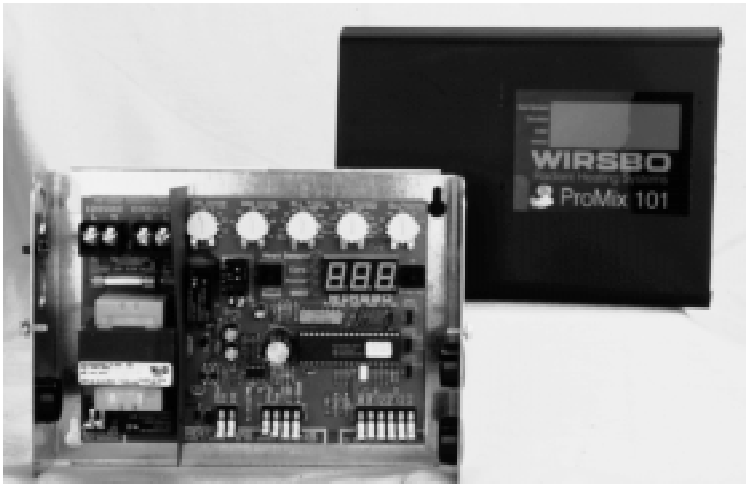
A3091000/A3091250
ProMIX™ 101 Radiant
Heating Reset Control

WIRSBO™

Installation and Operating Instructions

General Description

The ProMIX™ 101 Radiant Reset Control provides closed loop control of water in a secondary (radiant) loop of a heating system, based on outdoor air temperature and design temperature settings. It also provides protection against boiler condensation by monitoring and anticipating the boiler return water temperature. This control is designed specifically for radiant heating but is compatible with other types of hydronic heat distribution systems where the use of a weather responsive control is desired.



Features

- Provides outdoor reset control using a 3-way proportional valve in familiar plumbing configurations.
- Eliminates the need to analyze and select complex reset ratios – just set the design temperatures.
- No guessing about current conditions – the outdoor and radiant loop temperatures are displayed continuously, along with the secondary loop setpoint.
- Efficient use of boiler and circulator operation – only turned on to meet heating demands
- Helpful test mode for system setup and diagnostics.

Basic Operation

On installation, five design parameters must be set:

- **O**utdoor **A**ir **L**ow - the anticipated coldest outdoor design temperature. The same figure used to calculate heat loss and equipment loads.
- **O**utdoor **A**ir **H**igh - The average room setpoint temperature, for example 65°F. This value will also serve as the warm weather shutdown. Once outdoor temperature reaches the room setpoint temperature, the heat loss is zero and the control is deactivated.
- **P**rimary **L**oop **L**ow (minimum boiler return water temperature) - Some types of boilers require a minimum return water temperature to protect the boiler from condensing such as cast iron boilers. If no boiler return protection is required, this dial should be turned counter-clockwise to the "Cold Start" setting.
- **S**econdary **L**oop **H**igh (maximum radiant loop temperature) - the hottest water temperature required to satisfy the radiant panel at design conditions or coldest outdoor temperature. Refer to **OAL**
- **S**econdary **L**oop **L**ow (minimum radiant loop temperature) - the minimum water temperature required to meet the demands in the beginning and end of the heating season.

The design temperatures are read from the potentiometer dial settings when the system is first started up, and may be displayed and changed at anytime.

Three sensors are continuously monitored and displayed: Outdoor Air (**OA**), Primary Loop (**PL**), and Secondary Loop (**SL**). Also displayed is the optimum Secondary Loop Setpoint (**SLS**), calculated based on the design settings and the current OA temperature. (The colder it is outside, the warmer the desired water temperature.)

The **SL** sensor provides feedback for the control loop. To provide the proper temperature in the radiant loop, the control positions the valve using a proportional-integral algorithm. If the **PL** sensor indicates a possibility of the return temperature falling below the selected minimum, the opening of the valve is reversed to prevent condensation of the flue gases, and the boiler is turned on (if not already running) to raise the primary loop temperature.

The heat demand LED light when any of the heating zones calls for heat. Then the “Heat Demand” input causes the control to turn on the secondary circulator and the Circ. LED. The boiler and its LED are not turned on until the valve reaches 50% open. When the **SL** temperature is high enough to allow the modulation valve to close down to 10% open, the boiler output is turned off. The control will keep the boiler running for at least five minutes before the boiler shuts off.

When the **OA** temperature reaches the room setpoint temperature or warm weather shutdown setting, the control will close the proportional valve, turn off the circulator and the boiler, and turn on the warm weather shut down LED.

At anytime during setup or operation, an error caused by a faulty sensor will be indicated on the display by the sensor name (**OA**/**PL**/**SL**), “**Err**”, and whether the sensor is open (**Opn**) or shorted (**Sht**). The test mode allows the inputs and outputs to be checked for proper operation.

Temperature Setting Guidelines

OAL: The outside design temperature should be set according to the standard design temperature for the geographic area.

OAH: The warm weather shutdown temperature should be set to the average thermostat setpoint temperature. This will also be the outdoor temperature at which no heat is desired.

PLL: The minimum boiler return temperature should be set according to the boiler specifications. For cold start boilers, or to disable boiler protection, set PLL to "Cold Start".

SLH: The maximum radiant loop temperature should be set to the water temperature needed when it is the coldest outside (at design temperature). This information is available through heat loss calculations using Wirsbo Radiant Express or the water temperature table in the Wirsbo Complete Design Assistance Manual. SLH setting should never exceed the recommended water temperatures for the method in which the tubing is installed.

SLL: The minimum radiant loop temperature should be set to the water temperature desired when the outdoor temperature is near the warm weather shutdown point. A typical setting is 80°F.

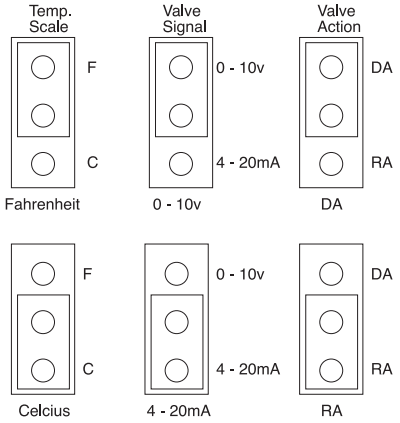
Zone Controls

For stable, even heating, use electronic thermostats (such as the DT10) with small differentials (1°F) to provide close room temperature control.

Important: Anticipating thermostats (such as the T86H and the Honeywell T87F) are not compatible with the Wirsbo ProMIX™ 101. The ProMIX™ control can be wired in conjunction with the Wirsbo Zone Control Module, or a single thermostat (DT10).

Installation

1. Mount the control on a wall near the modulating valve.
2. The outdoor air sensor should be mounted in a shady location, preferably on the north side of the building under the eaves or a window sill. Drill a ¼" hole through the wall and caulk the sensor in place so it is not in contact with the wall.
3. The primary loop (or boiler return) sensor and the secondary (or radiant) supply sensor should be installed in wells if possible. If installed in wells, a heat conductive paste should be used to eliminate the air space with in the well, to improve thermal transfer to the sensor. If wells are not used, tape the sensor securely to a metal pipe using aluminum tape. Cover with at least 1" thick insulation, extending 2" beyond each end of the sensor. Any additional wiring required to connect a sensor to the ProMIX™ control panel should be run with 18-22 AWG wire.
4. Wire the control as indicated by the terminal block labels or by the wiring schematic provided in Section 6. Be sure to provide an earth ground to the case.
5. The ProMIX™ 101 Controller comes with adjustable jumper settings set to operate in Fahrenheit temperature, direct acting and 0 - 10v modes. If settings are required other than the preset values, move the jumper (s) to the proper position. See chart below.



6. Set the design temperature knobs to the appropriate temperatures. The temperature setting can be fine tuned in the Power Up/Setup Display Sequence.
7. Turn on the 120VAC supply.
8. Hold the Display Button and press the Test/Reset button to enter the test mode.
9. Press the Display button repeatedly to test the inputs and outputs, and to fine-tune the temperature setting inputted in step 6.
10. Install the cover.

NOTE: Make sure sensor wires are routed away from motors, relays and other high voltage wiring in order to avoid erratic temperature readings due to noisy electronic environments. Attach the shields to the grounded case using the mounting screw near the sensor terminals.

Power-up/Setup Display Sequence

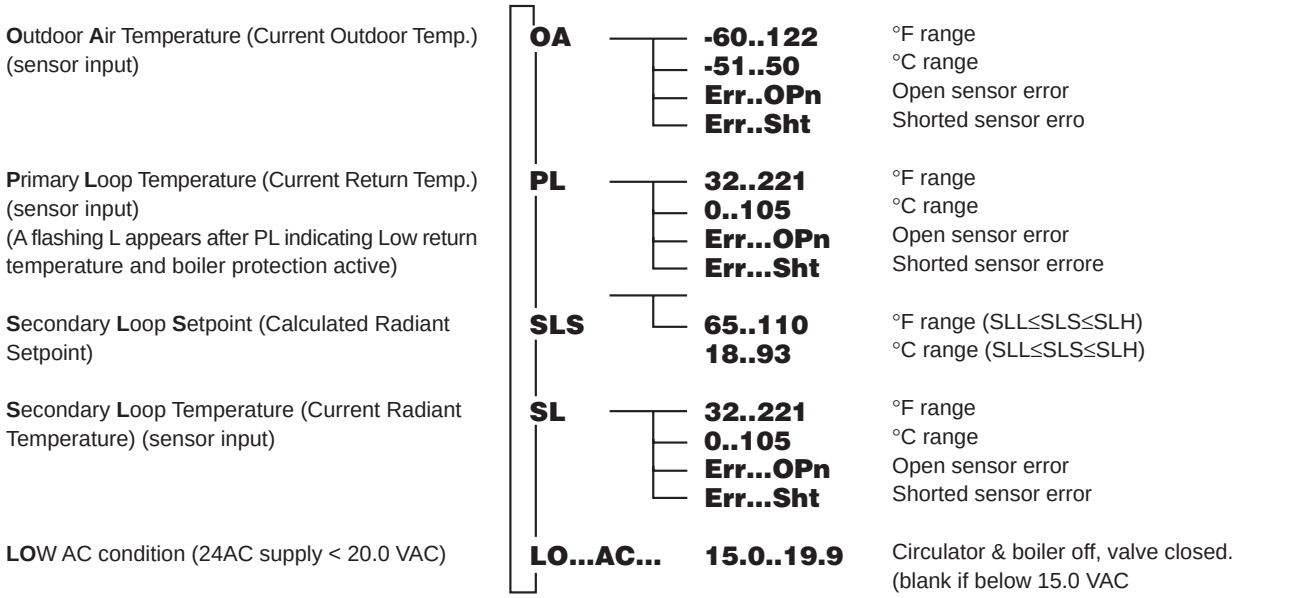
This mode is entered on power-up or any time the Display or Reset Button is pressed while running. On power-up or reset, the settings scroll through automatically. To scroll manually, press the Display button once. Then press it after each setting has been reviewed. If the display button is not pressed for 60 seconds, the control will revert to scrolling automatically. All of the settings may be adjusted while displayed.

Temperature Scale (jumper-selectable)	**t**	**°F**	Fahrenheit
		°C	Celsius
Control Signal **Out**put (jumper-selectable)	**Out**	**0.10**	0-10VDC
		4.20	4-20mADC
Valve **Act**ion (jumper-selectable)	**Act**	**dA**	Direct Acting closed at 0V, open at 10V)
		rA	Reverse Acting (closed at 10V, open at 0V)
Outdoor **A**ir **L**ow (Outdoor Design Temperature) (potentiometer adjustable)	**OAL**	**-60..41**	°F range
		-51..5	°C range
Outdoor **A**ir **H**igh (Warm Weather Shutdown) (potentiometer adjustable)	**OAH**	**40..70**	°F range (must be ≥OAL+20)
		4..21	°C range (must be ≥OAL+11)
Primary **L**oop **H**igh (Minimum Return Temperature) (potentiometer adjustable)	**PLL**	**60..150**	°F range
		15..65	°C range
Secondary **L**oop **H**igh (Max. Radiant Loop Temp.) (potentiometer adjustable)	**SLH**	**85..200**	°F range
		29..93	°C range
Secondary **L**oop **L**ow (Min. Radiant Loop Temp.) (potentiometer adjustable)	**SLL**	**65..110**	°F range (must be ≤SLH-20)
		18..43	°C range (must be ≤SLH-11)
Outdoor **A**ir Temperature (Current Outdoor Temp.) (sensor input)	**OA**	**-60..122**	°F range
		-51..50	°C range
		Err..OPn	Open sensor error
		Err..Sht	Shorted sensor error
Primary **L**oop Temperature (Current Return Temp.) (sensor input)	**PL**	**32..221**	°F range
		0..105	°C range
		Err...OPn	Open sensor error
		Err...Sht	Shorted sensor error
Secondary **L**oop Temperature (Current Radiant Temp.) (sensor input)	**SL**	**32..221**	°F range
		0..105	°C range
		Err...OPn	Open sensor error
		Err...Sht	Shorted sensor error
Continue in run mode (if scrolling manually, press Display button to continue)	**run**		
Brief delay between modes	**...**		

Run Mode Display Sequence

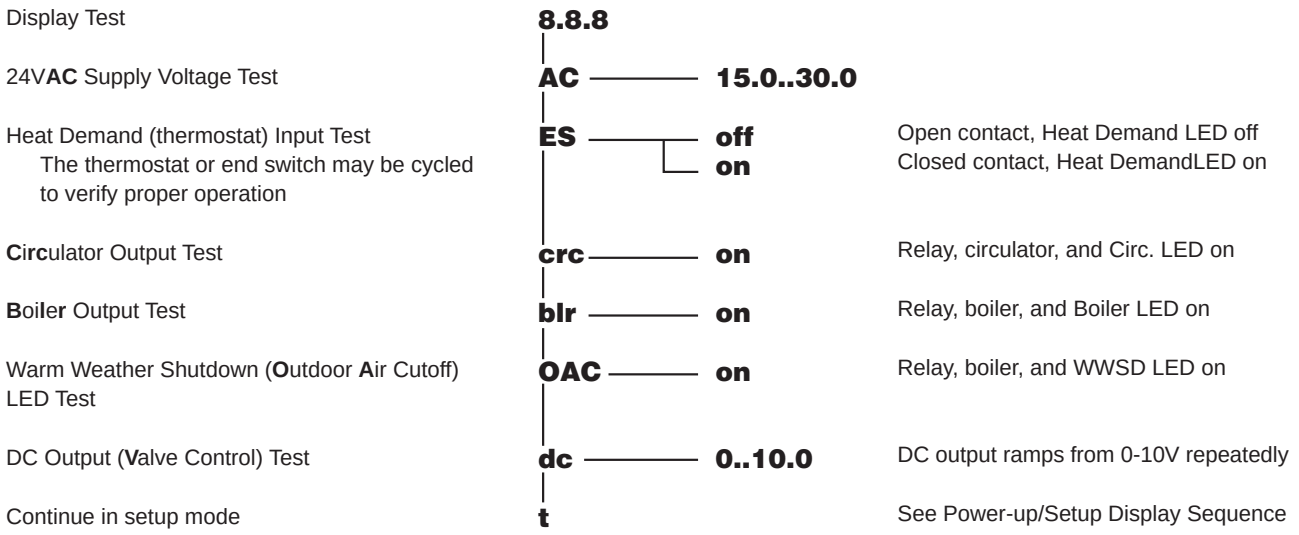
This mode is entered automatically after the power-up/setup sequence. It continuously loops until a button is pressed or power is lost.

Important: Any changes or adjustments made to the temperature or jumper settings are ignored until the test/reset or display button is pressed.

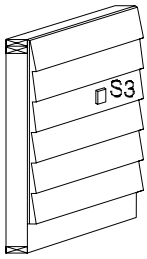


Test Mode Display Sequence

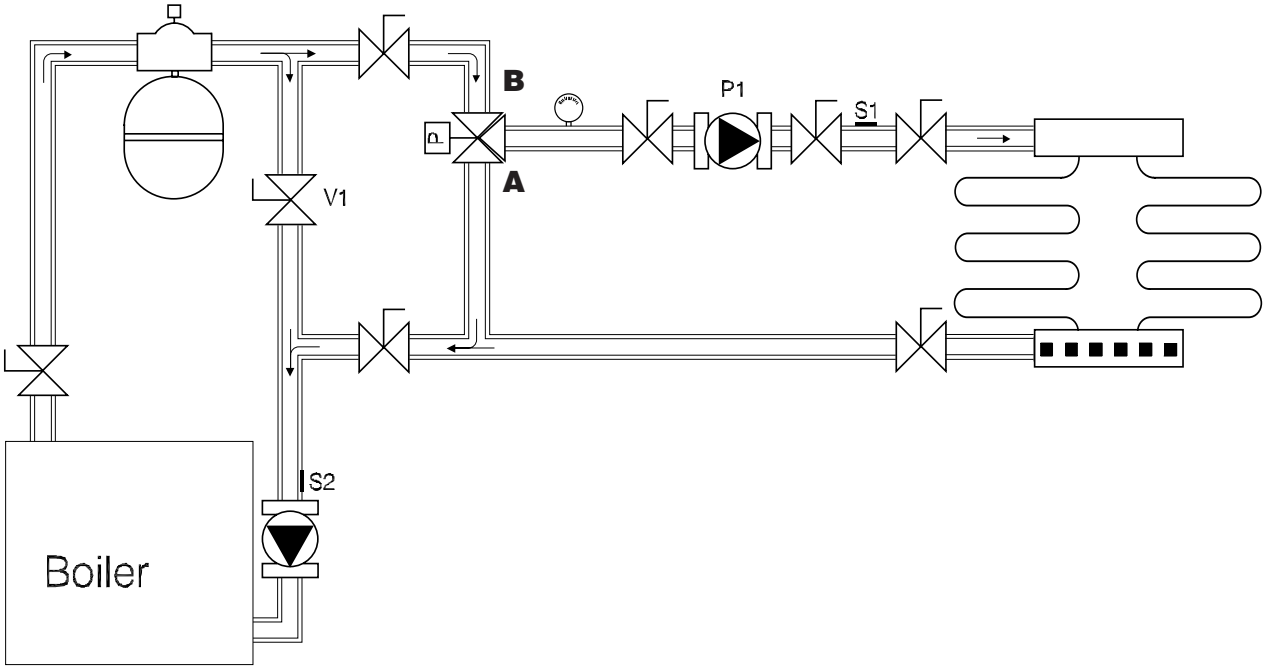
This mode is accessed by holding the display button and pressing the Test/Reset button. The sequence must be advanced manually by pressing the Display button after each step until the setup mode is reached.



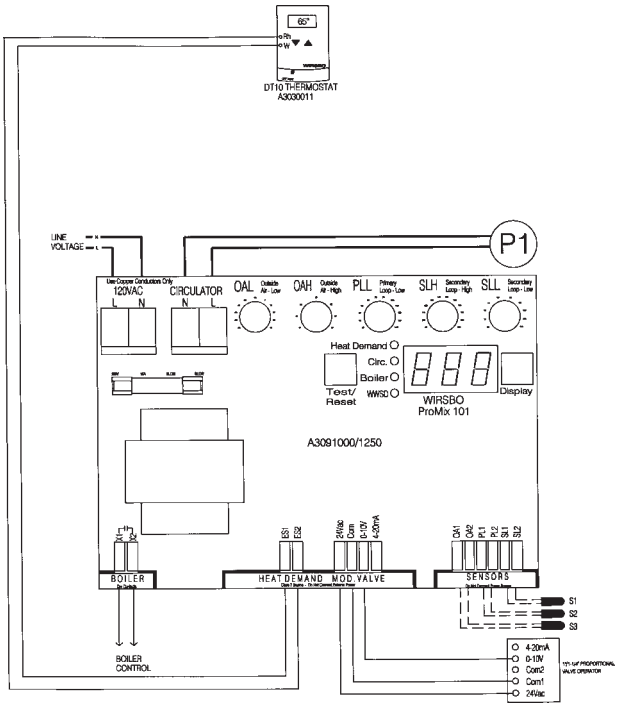
Non Condensing Boiler
Proportional Valve



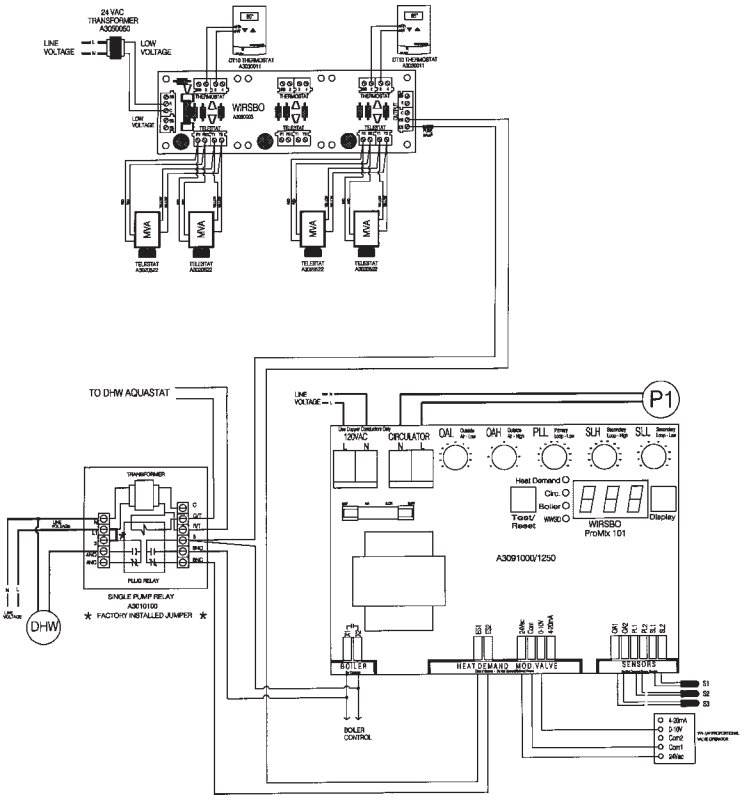
PLACE OUTDOOR SENSOR
ABOVE SNOW LINE
ON NORTH FACING WALL



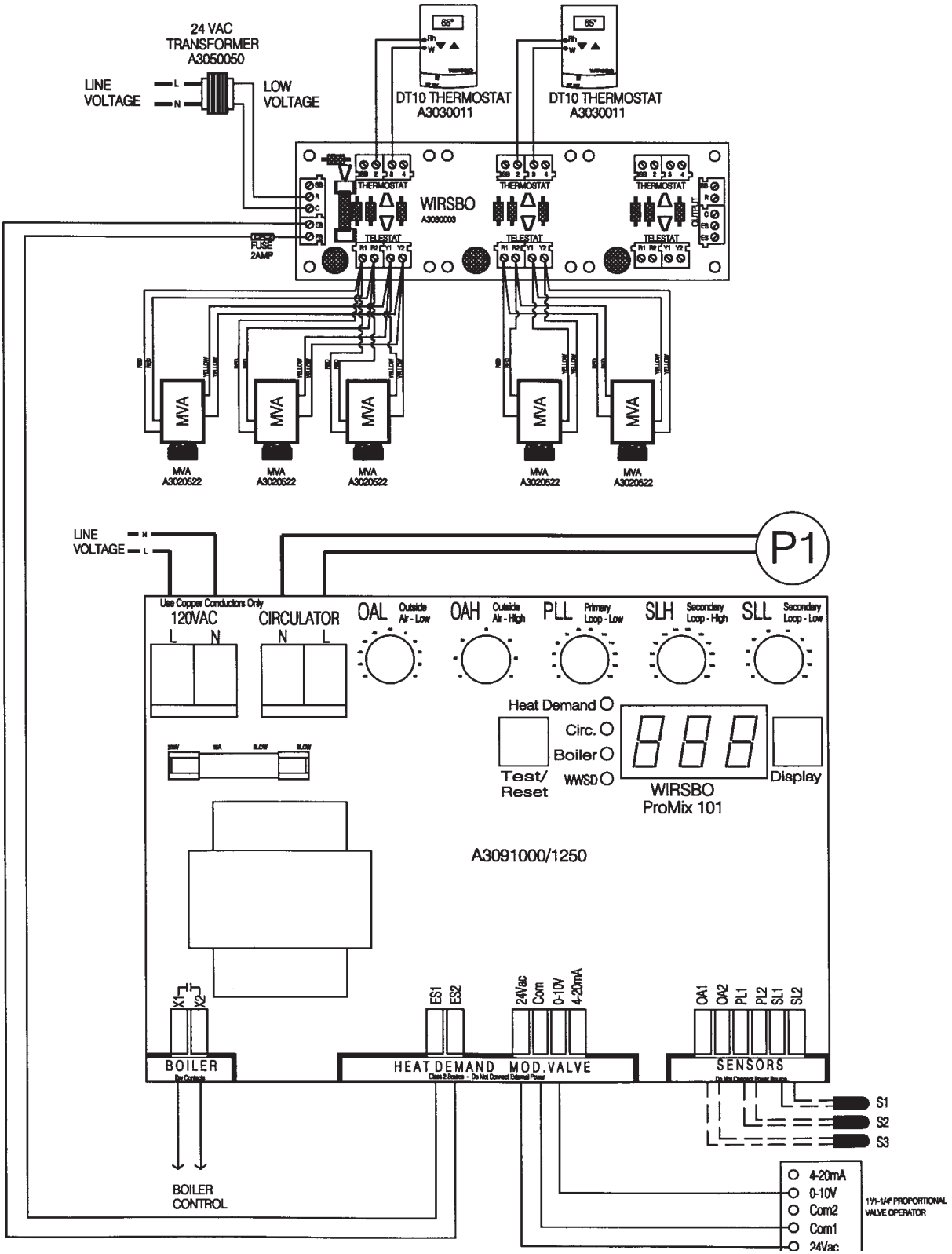
Typical Piping Arrangement using the Wirsbo ProMIX™ 101 Controller



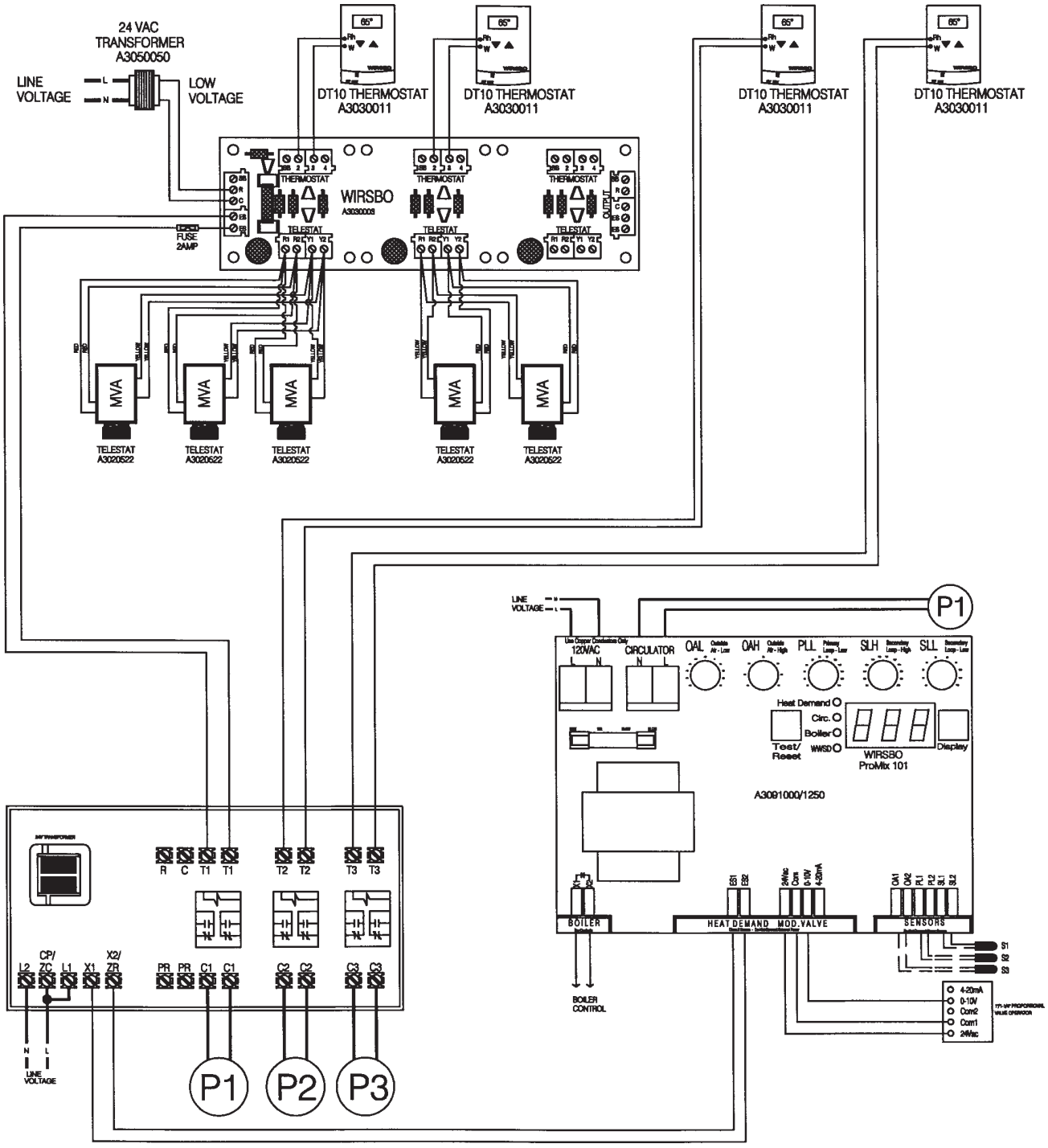
Typical wiring using the ProMIX™ 101 Controller and a Wirsbo DT10 Thermostat



Typical wiring using the ProMIX™ 101 Controller, Wirsbo Zone Control Module and a Single Pump Relay to provide Domestic Hot Water Priority



Typical wiring using the ProMIX™ 101 Controller with Wirsbo Zone Control Module



**Typical wiring using the ProMIX™ Controller,
Wirsbo Zone Control Module and Multiple Pump Relay.**

Fine Tuning

1. If heating is inadequate at relatively warm outdoor temperatures (below OAH), increase the minimum loop temperature (SLL) by 5°-10°F.
2. If heat output is excessive at relatively warm outdoor temperatures (below OAH), decrease the minimum loop temperature (SLL) by 5°-10°F. This condition may signal faulty room temperature control devices (i.e. thermostats).
3. If heating is inadequate at relatively cold outdoor temperatures (above OAL), raise the outdoor temperature (OAL) by 5°-10°F. If the outdoor temperature is below OAL, the SL temperature should be at its maximum. SLH should not be increased above the maximum temperature limitation for the installation method.
4. If the heat output is excessive at moderately cold outdoor temperatures (well above the OAL), decrease the outdoor design temperature (OAL) by 5°-10°F. If the outdoor temperature is at or below the OAL, SLH may be decreased by 5°-10°F. Excessive heat output may signal that maintenance is required for the manifold supplying the area that is over heating.

NOTE: Changes to the temperature settings are read only while displayed, after a reset or a power loss.

Important: Any changes or adjustments made to the temperature or jumper settings are ignored until the test/reset or display button is pressed.

Specifications

External Power Supply` circuit	120 VAC +10%, -15%, 50/60 Hz, 15A branch
Fuse	250V 15A slow blow, such as Buss MDA15
Internal Transformer	24 VAC. 25 VA not available for external loads except as specified
Outputs	
1. Proportional Valve	Supply: 24 VAC, 10 VA Control: 0-10 VDC into 500Ω minimum direct or reverse acting 4-20 mA into 300Ω maxi mum direct or reverse acting
2. Secondary Circulator	N.O. relay contact (switched line) 12-22 AWG copper wire only ¼ HP @ 120 VAC
Full Load:	7.4 A
Locked Rotor:	43.2 A
Resistive:	10 A
3. Boiler Control Signal	N.O. relay contract (dry contacts) limited to 18-22 AWG copper wire (24VAC recommended) ¼ HP @ 120 VAC
Full Load:	7.4 A
Locked Rotor:	43.2 A
Resistive:	10 A
Inputs:	
1. Heat Demand	Contact closure (24VAC supplied)
2. Temperature Sensors	10k thermistors, -60° to 220°F, -51° to 104°C (supplied)
Environmental:	
1. Operating Temperature	40° to 104°F (4° to 40°C
2. Shipping/Storage Temp.	-20° to 140°F (-29° to 60°C)
3. Moisture	95% RH non-condensing
4. Mounting Location	Solid wall, away from heat source and direct sun