



## MODEL 3100- ECR

Combination Low Water  
Cut-Off & Universal  
Temperature Limit Control  
for Gas Boilers

PATENT PENDING

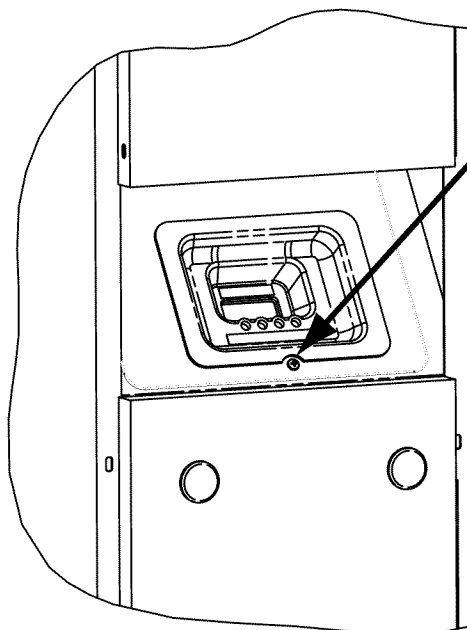
- Dual Function Design – HydroStat performs both high temperature limit and low water cut-off functions when installed with a Hydrolevel Electro-Well™.
- Digital Display – Easy to read LED continually displays boiler temperature. Also displays temperature limit and differential settings during adjustment.
- Easy to Set – Dials for setting temperature limits and differentials eliminate complicated programming.
- Advanced Micro-Controller Design – Utilizes dual thermistor technology for better accuracy, response and reliability.



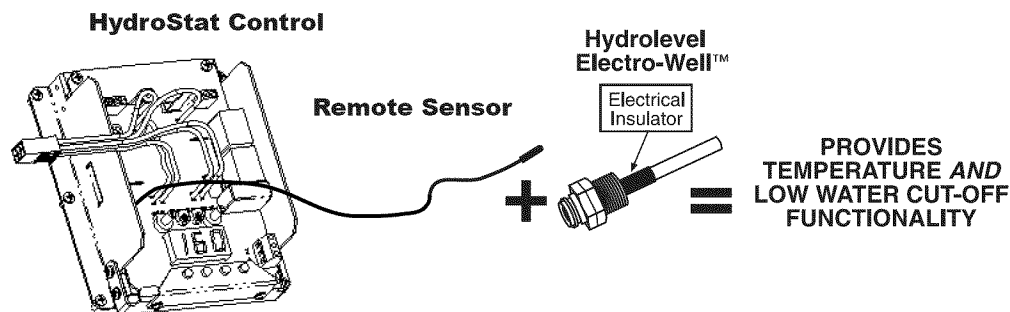
**WARNING** Electrical shock hazard. To prevent electrical shock, death or equipment damage, disconnect power supply before installing or servicing control. Only qualified personnel may install or service this control in accordance with local codes and ordinances. Read instructions completely before proceeding.



**CAUTION** To prevent serious burns, boiler should be thoroughly cooled before installing or servicing control.



Remove screw to access  
HydroStat control.

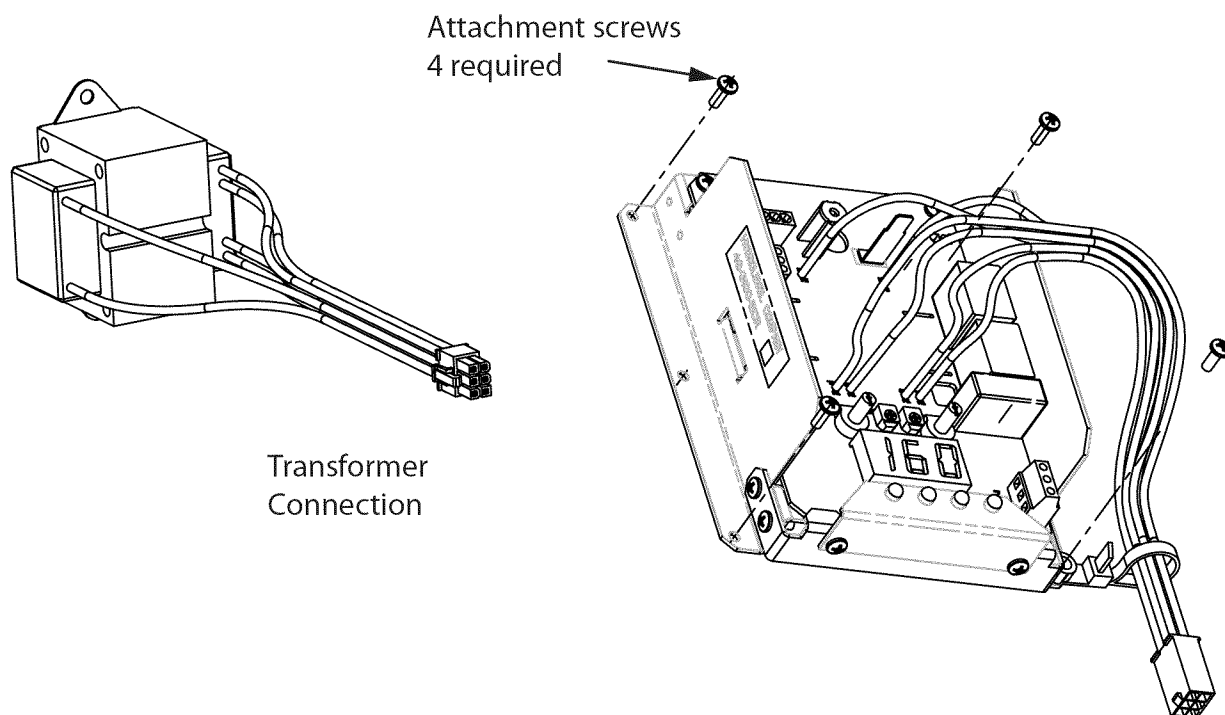


**Important:** The PWXL Boiler is equipped with a HydroStat Electro-Well. Do not replace the Electro-Well with a standard immersion well or the low water cut-off function will be disabled.

## MOUNTING THE CONTROL

**IMPORTANT:** This control requires the use of a Hydrolevel Company Electro-Well only. Use of an immersion type well produced by another manufacturer will eliminate the low water cut off function. The Electro-Well must remain in the tapping currently provided to insure safe operation.

- Step 1** The 6 screws must be used to install the control into the vestibule of the boiler. Make the transformer connection.



- Step 2** Establish the electrical connections as follows on page 3 .

## WIRING



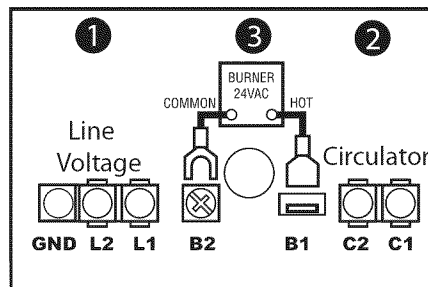
### WARNING

Electrical shock hazard. To prevent electrical shock, death or equipment damage, disconnect power supply before installing or servicing this control.

**STEP 1** Connect the 120VAC three position plug into the three position mating connector.

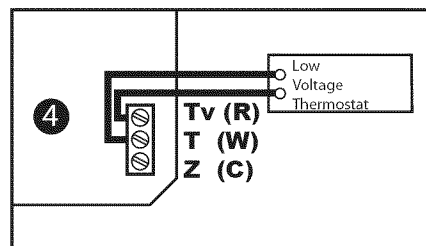
**STEP 2** Connect the Circulator two position plug into its mating connector.

**STEP 3** Connect wire from the 24VAC Burner Circuit to B1 (quick connect). Connect wire from the 24VAC Burner Circuit common to B2 (fork).



**STEP 4** Connect wires from Low Voltage Thermostat to T and TV.

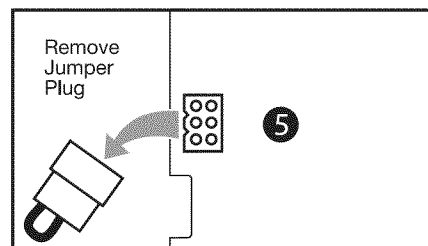
Terminals Tv (R), T(W) and Z(C) offer a 24V supply for operating the boiler and thermostat ONLY. DO NOT CONNECT ANY OTHER DEVICES TO THESE TERMINALS!



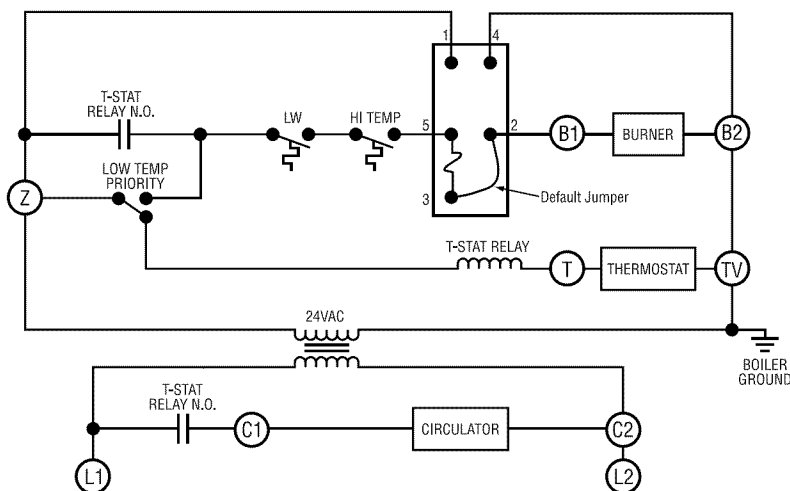
**STEP 5** If the boiler is equipped with a plug-in style vent damper, un-plug the factory installed jumper from the receptacle on the circuit board and replace it with the vent damper plug. NOTE: Once a vent damper plug is connected to the Hydrostat, the control is permanently altered, and will no longer function when the vent damper plug is disconnected.

**STEP 6** Insert the temperature sensor into the Electro-Well.

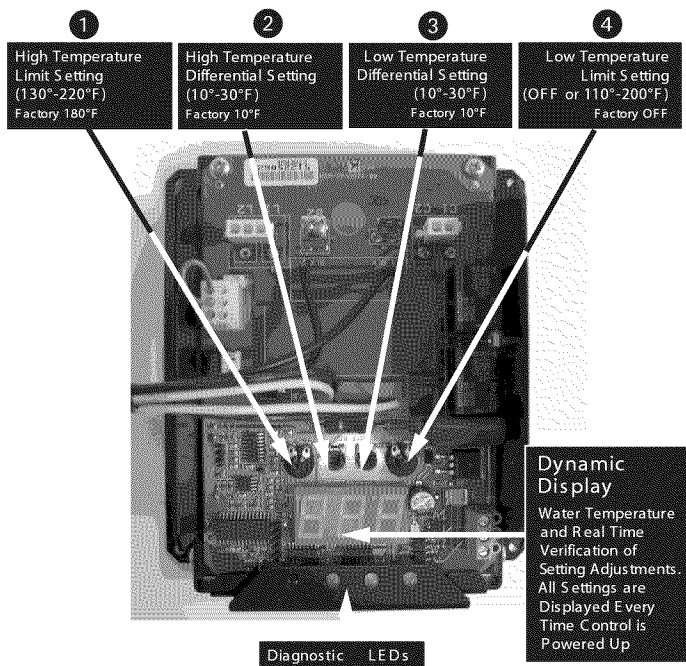
WARNING: DO NOT USE ANY HEAT TRANSFER GREASE OR PASTE



## SCHEMATIC/LADDER DIAGRAM



## SETTING THE CONTROL



NOTE: Be careful not to select overlapping temperature settings. For example: If the HIGH TEMPERATURE LIMIT is set at 180°F with a HIGH TEMPERATURE DIFFERENTIAL set at 20°F, then the LOW TEMPERATURE LIMIT needs to be set at 160°F (180°F - 20°F = 160°F) or below.

IMPORTANT: To prevent flue gas condensation and reduce fatigue caused by thermal cycling on conventional (non-condensing) boilers, both HIGH and LOW LIMIT set points should be 150°F or above (Limit Setting - Differential Setting  $\geq$  150°F). Boiler manufacturer's temperature requirements supercede these recommendations.

### To set COLD START operation

*Operates on call for heat only.*

- 1 High Temperature Limit  
(factory setting = 180°F)  
Adjust setting until desired temperature is displayed.
- 2 High Temperature Differential  
(factory setting = 10°F)  
Using a small screwdriver, adjust setting until desired differential is displayed.
- 3 Low Temperature Differential  
No change is required.
- 4 Low Temperature Limit  
Make sure Low Temperature Limit is turned fully counter-clockwise (OFF position).

### To set WARM START operation

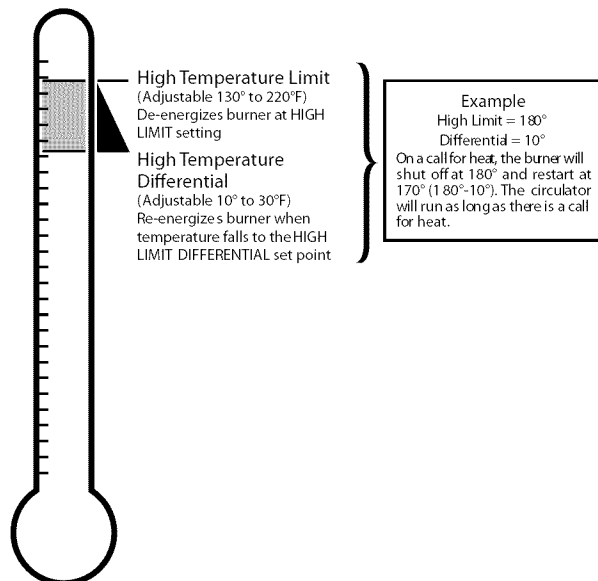
*Maintains temperature in boiler.*

- 1 High Temperature Limit  
(factory setting = 180°F)  
Adjust setting until desired temperature is displayed.
- 2 High Temperature Differential  
(factory setting = 10°F)  
Using a small screwdriver, adjust setting until desired differential is displayed.
- 3 Low Temperature Differential (factory set = 10°F)  
Using a small screwdriver, adjust setting until desired differential is displayed.
- 4 Low Temperature Limit (factory set = off)  
Adjust setting until desired temperature is displayed.

## OPERATION

### COLD START

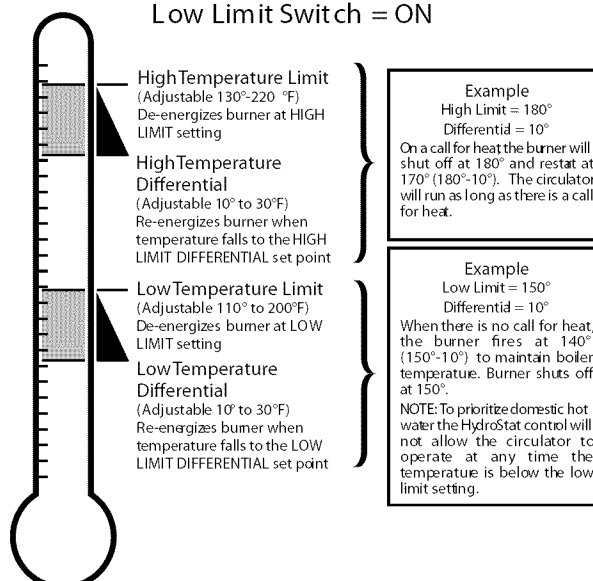
Low Limit Switch = OFF



### WARM START

(maintains temperature for domestic hot water)

Low Limit Switch = ON



## LED LEGEND

**1 LOW WATER** Indicates that the boiler is in a low water condition. The HydroStat control will prevent burner operation during this condition.

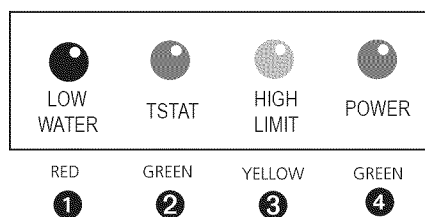
**IMPORTANT:**

The system must be checked by a qualified heating professional prior to resuming operation.

**WARNING: ALLOW THE BOILER TO FULLY COOL BEFORE ADDING WATER.**

**2 TSTAT**

Indicates that the circulator is running and water is flowing through the boiler due to a call from the thermostat(s).



**3 HIGH LIMIT** Illuminates when the boiler water temperature reaches the high limit setting. It will remain lit until the water temperature falls below the high limit setting less the differential setting. The HydroStat control will prevent burner operation while this LED is on.

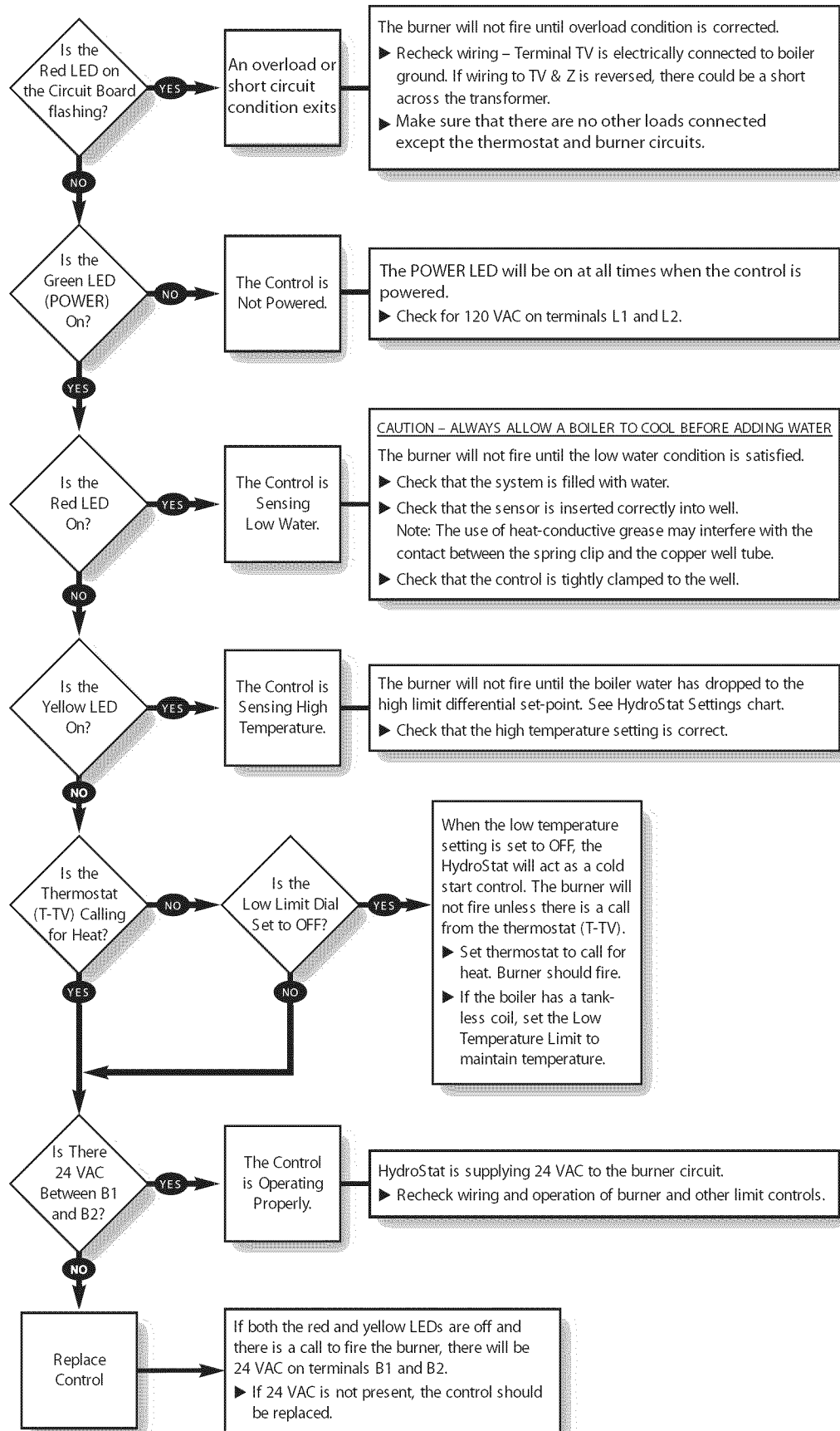
**NOTE:** This LED illuminates regularly during normal boiler operation.

**4 POWER** Indicates that the HydroStat control is powered and that the temperature function is active.

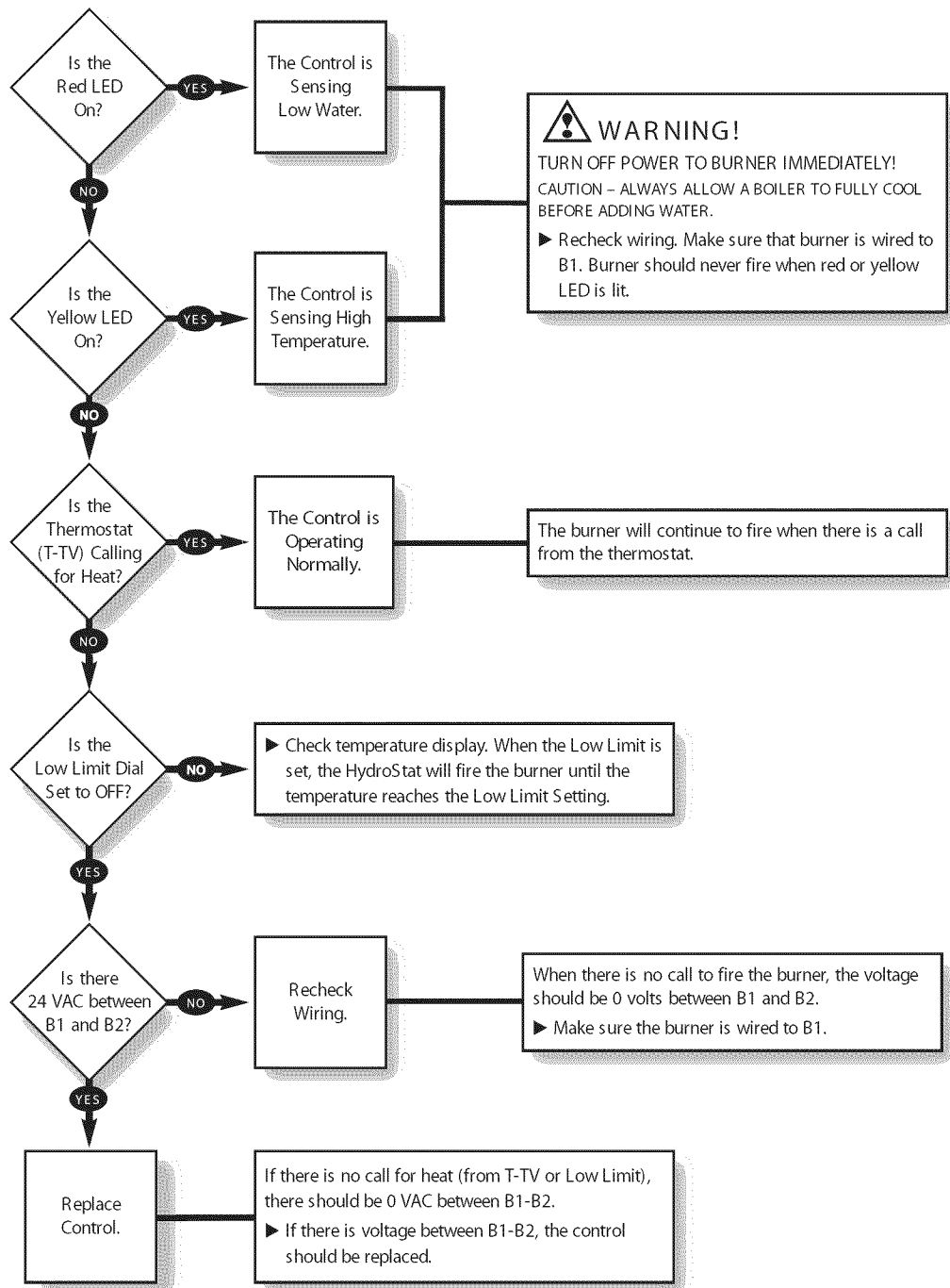
## TROUBLESHOOTING

Burner Will Not Fire	See Flow Chart 1, page 6
Burner Will Not Shut Down	See Flow Chart 2, page 7
Temperature Display Exceeds High Limit Setting	Under normal operation, boiler temperature will continue to rise after the control shuts off the burner. This condition, known as "thermal stacking", results from hot boiler surfaces continuing to release heat into the boiler water.
Red Light on Circuit Board is Flashing	The red light to the left of the temperature display will flash if the transformer has been overloaded. (See top portion of troubleshooting flow chart on page 6.)
No Domestic Hot Water	If the boiler is equipped with a tankless coil, make sure the low limit setting on the HydroStat is set properly. <b>NOTE:</b> If the low limit setting is dialed fully counter clockwise, it will shut off the low temperature maintenance feature.
Boiler Will Not Maintain Low Limit Temperature	Check for overlapping high temperature setting. If the high limit setting is set below the low limit setting, the control will default to the high limit setting and the corresponding high limit differential setting.
Temperature Display Differs from Boiler T&P Gauge Temperature Reading	Temperature variances can result from differing water temperatures within the boiler or different reaction times of the two devices. If the HydroStat temperature is significantly below the T&P gauge temperature, make sure the thermistor is inserted all the way to the end of the well. <b>DO NOT USE ANY HEAT TRANSFER PASTE OR GREASE</b>
TSTAT Light (Green LED) Is Not On	The TSTAT light indicates when there is a call for heat. If a call is known to be present, and this light is not on, check to see if the circulator is actively circulating water. If not, check circulator and thermostat wiring.
Low Water Light (Red LED) Is On	<p><b>WARNING:</b> A low water condition is a serious and potentially dangerous condition. Do not attempt to add water to a hot boiler. Allow the boiler to fully cool before adding water.</p> <ol style="list-style-type: none"> <li>If the heating system is filled with water, pull the sensor out of the well and inspect it. Make sure that the metal clip on the sensor is intact. This metal clip must be in contact with the inside of the copper well in order for the control to sense the presence of water. Check that the well does not have excessive build-up of heat transfer grease that may interfere with clip contacting the well.</li> <li>Remove well and examine for excessive residue build-up. Clean and re-install.</li> </ol>

# Troubleshooting Flow Chart 1 – Burner Will Not Fire



## Troubleshooting Flow Chart 2 – Burner Will Not Shut Down



## LOW WATER CUT-OFF TEST PROCEDURE

HydroStat's low water cut-off function is active when the control is installed on a Hydrolevel Electro-Well. To test the low water cut-off function:

❶ Turn OFF power to the control. ❷ Set the thermostat to call for heat. ❸ Gently slide the sensor out of the well to simulate a low water condition. ❹ Turn ON power to the control. The red LOW WATER light should come on and the burner should not fire. ❺ Turn OFF power again and reinstall the sensor in the well. The sensor should be tight against the bottom of the well. ❻ Turn ON power to the control. The burner should fire.

NOTE: Do not remove the sensor from the well while the control is powered.

## MAINTENANCE

Remove the Electro-Well from the heating system every five years and clean any scale or sediment deposits from all parts that are exposed to the boiler water. After cleaning, reinstall the well using pipe sealing compound. Teflon tape is not recommended.

## SPECIFICATIONS – HYDROSTAT MODEL 3100-ECR

Input voltage	120 VAC, 60 HZ	Operating range – low limit	Off or 110°F - 200°F
Burner contacts	30 VA@ 24 VAC	Operating range – high limit	130°F - 220°F
Circulator contacts	5.8 FLA, 34.8 LRA@ 120 VAC	Operating range – differential	10°F - 30°F



### LIMITED MANUFACTURERS WARRANTY

We warrant products manufactured by Hydrolevel Company to be free from defects in material and workmanship for a period of two years from the date of manufacture or one year from the date of installation, whichever occurs first. In the event of any claim under this warranty or otherwise with respect to our products which is made within such period, we will, at our option, repair or replace such products or refund the purchase price paid to us by you for such products. In no event shall Hydrolevel Company

be liable for any other loss or damage, whether direct, indirect, incidental or consequential. This warranty is your EXCLUSIVE remedy and shall be IN PLACE OF any other warranty or guarantee, express or implied, including, without limitation, any warranty of MERCHANTABILITY or fitness for a particular purpose. This warranty may not be assigned or transferred and any unauthorized transfer or assignment thereof shall be void and of no force or effect.



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