HydroStat®

Does It All!

The Universal

Temperature Limit and

Low Water Cut-Off for

Oil and Gas Fired Boilers

MODEL 3100
for gas-fired boilers

MODEL 3150
for oil-fired boilers

- **Replaces Cold Start and Triple-Action AquaStats***
  - Install HydroStat on existing immersion well – for full temperature functionality, *or*
  - Install HydroStat on an Electro-Well™ – to add low water cut-off protection
- **Simple dial-type temperature and differential settings**
- **Easy to wire – uses the same terminal designations as common Aquastat® models.**
- **Dynamic Temperature Display**
- **Four on-board diagnostic indicating lights**
- **Saves time, materials and wiring**

HYDROLEVEL COMPANY

Innovators in Boiler Protection Since 1965

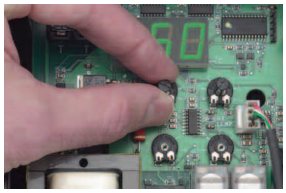
Patent Pending *Aquastat is a registered trademark of Honeywell International, Inc.

HydroStat® can be used in two ways.

By installing the control on an existing immersion well, HydroStat® can be used as a universal replacement for common Aquastat® models. Whether it's a cold start or a tankless coil boiler, Hydrostat® will provide all the temperature functions of the control being replaced.

Or, install HydroStat® on a Hydrolevel Electro-Well™ (sold separately) to automatically activate the low water cut-off function. With HydroStat® you can add low water cut-off protection to new or existing installations without the added time and cost to install a separate control.

Dial-Type Settings



Allows for quick and easy limit and differential settings.

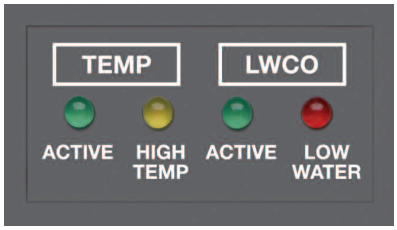
Dynamic Temperature Display

This 3-digit LED display continually indicates boiler temperature. Whenever the high limit, low limit or differential temperature dials are turned, the LED instantly changes to display the setting temperature. For a quick reference, the LED will scroll through the current temperature and differential settings each time the HydroStat® control is powered up.

Easy to Wire

HydroStat® uses the same terminal designations as common Aquastat® models. This makes field replacement fast and easy.

Four On-Board Diagnostic Indicating Lights



- TEMP **ACTIVE** – Indicates HydroStat® is powered and the temperature function is active.
- TEMP **HIGH TEMP** – Illuminates any time the boiler is off on high temperature limit.
- LWCO **ACTIVE** – Only illuminates when the HydroStat® is providing Low Water Cut-Off functionality. This function is activated by installing the control on a Hydrolevel Electro-Well™. This LED will not illuminate when installed on a standard immersion well.
- LWCO **LOW WATER** – Indicates a low water condition in the boiler.

Electro-Well™

To enable HydroStat's® low water cut-off function, Electro-Wells™ are available in four sizes to replace standard immersion wells. Remote mounting kits are also available.

Specifications

	Model 3100	Model 3150
Input voltage	120 VAC, 60 HZ	120 VAC, 60 HZ
Burner contacts	30 VA@24 VAC	7.4 FLA, 44.4 LRA@120 VAC
Circulator contacts	5.8 FLA, 34.8 LRA@120 VAC	5.8 FLA, 34.8 LRA@120 VAC
Operating range – low limit	Off or 110°F - 200°F	Off or 110°F - 200°F
Operating range – high limit	100°F - 220°F	100°F - 220°F
Operating range – differential	10°F - 30°F	10°F - 30°F

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HydroStat™

MODEL 3150

Combination Low Water Cut-Off & Universal Temperature Limit Control

120 VAC Operating Voltage

PATENT PENDING LISTED

- **Dual Function Design –** HydroStat performs both high temperature limit and low water cut-off functions when installed with a Hydrolevel Electro-Well™.
- **Replaces Common Aquastat* Models –** Can be installed on existing immersion wells to replace both cold-start and triple-action Aquastats®. Industry standard wiring designations make change-outs quick and easy.
- **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.

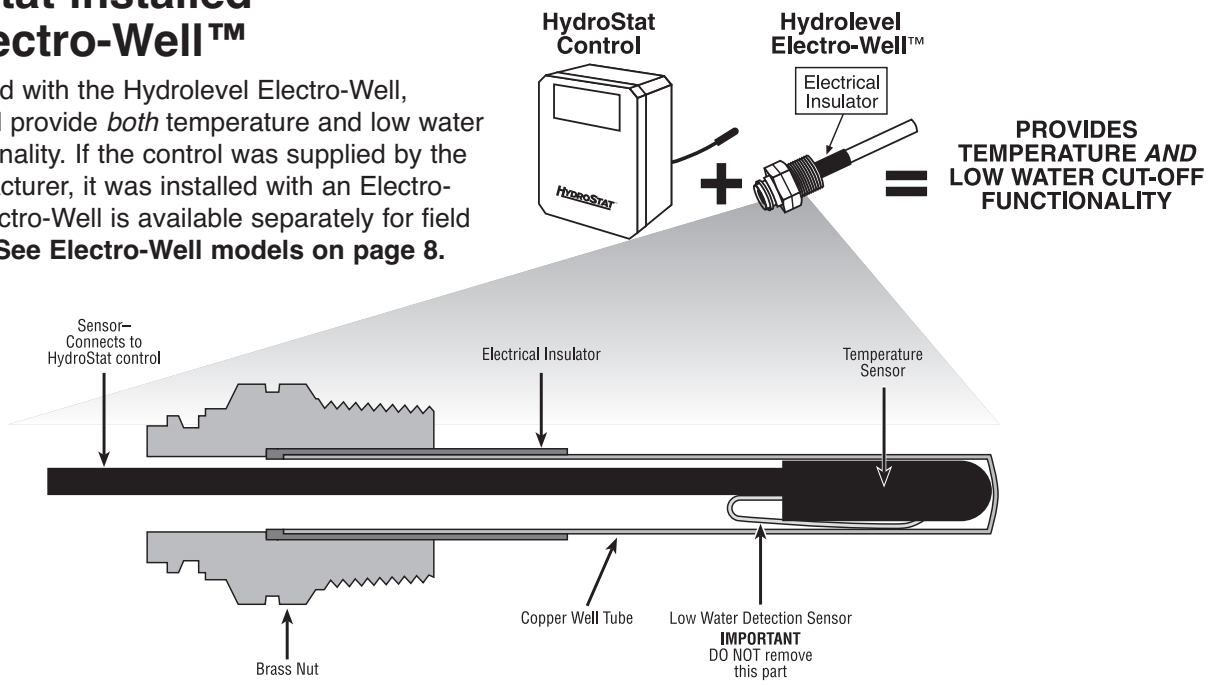
*Aquastat is a registered trademark of Honeywell International, Inc.

⚠ 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.

HydroStat installed with Electro-Well™

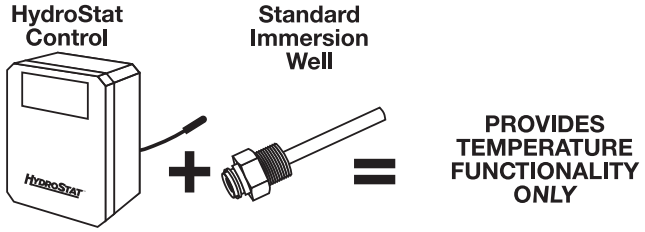
When installed with the Hydrolevel Electro-Well, HydroStat will provide *both* temperature and low water cut-off functionality. If the control was supplied by the boiler manufacturer, it was installed with an Electro-Well. The Electro-Well is available separately for field installations. **See Electro-Well models on page 8.**



OR

HydroStat installed with a standard immersion well

For field replacement of common Aquastat® models, HydroStat can be installed with the immersion well already on the boiler. In this configuration, HydroStat will provide the temperature functionality of the control being replaced, but will not provide low water cut-off functionality. The “LWCO Active” LED will not illuminate.



IMPORTANT **When installed on a standard immersion well, HydroStat will not provide low water cut-off functionality.**

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MOUNTING THE CONTROL

IMPORTANT Make sure that the immersion well or Electro-Well™ is installed on the boiler manufacturer's designated temperature limit control tapping. **Note:** If installing an Electro-Well, pipe sealing compound should be used. **Teflon tape is not recommended.**

STEP 1 Two mounting positions are available on the back of the control (Fig. 1). Select which of the two positions (2 knockouts) is best for the location of the control. Remove the knockout.

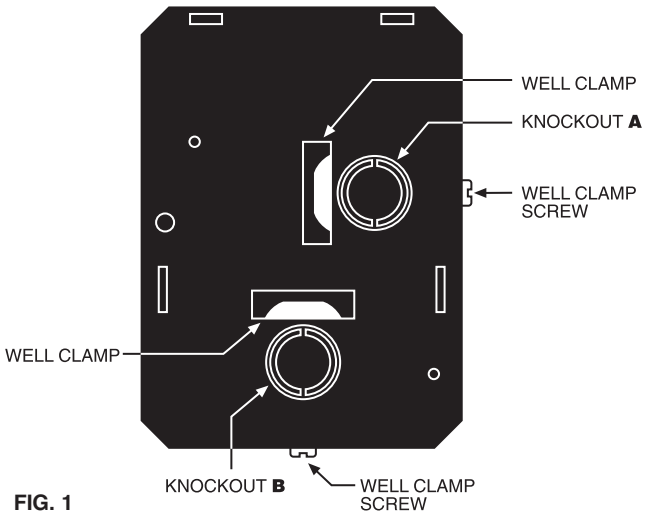


FIG. 1

STEP 2 Place control on the well. While holding box against well nut, tighten well clamp screw. (Fig. 2)

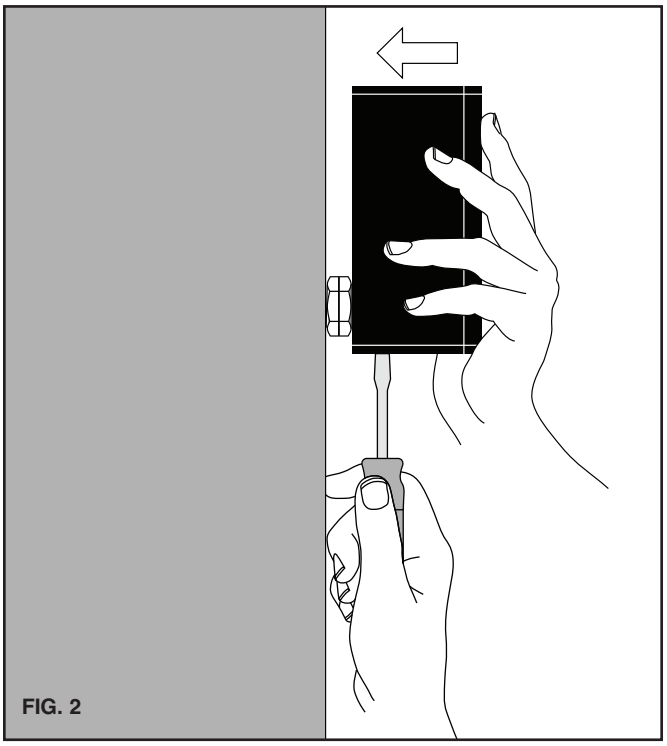


FIG. 2

STEP 3 Insert sensor ALL THE WAY into well through the knockout (A or B) you have chosen. (Fig. 3)

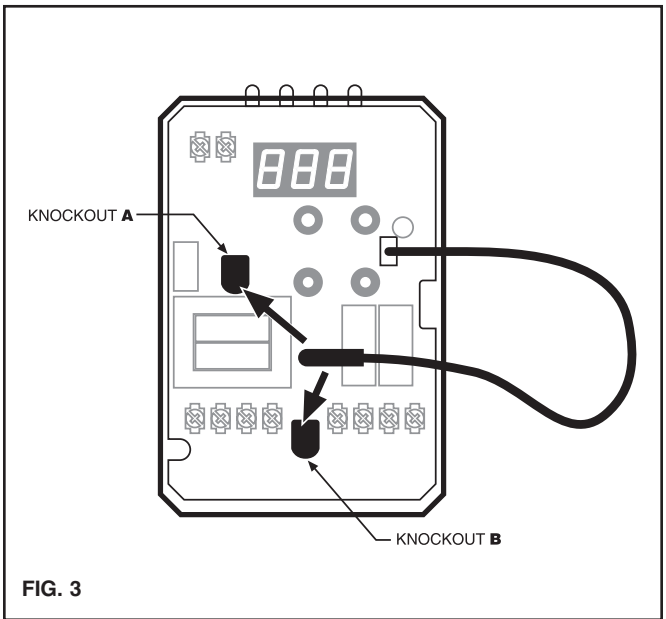


FIG. 3

NOTE: In the case of space restrictions, the HydroStat control may be mounted in a horizontal orientation without any loss of function. Hydrolevel recommends vertical mounting, when possible, for proper orientation of LED display.

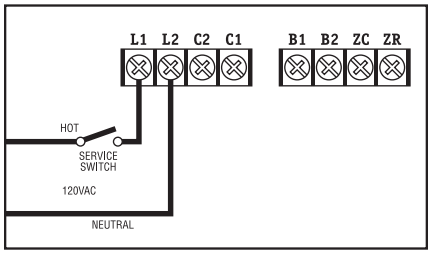
REMOTE MOUNTING

The following kits are available separately for mounting the HydroStat control box in a remote location. Each kit includes mounting hardware and a remote sensor.

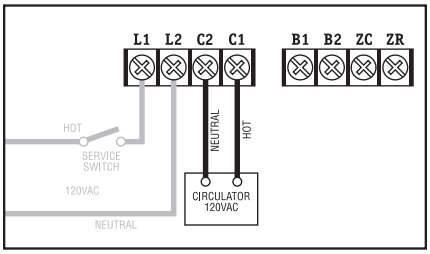
Part No.	Description
48-101	HydroStat Remote Mount Kit with 24" sensor
48-102	HydroStat Remote Mount Kit with 48" sensor

WIRING

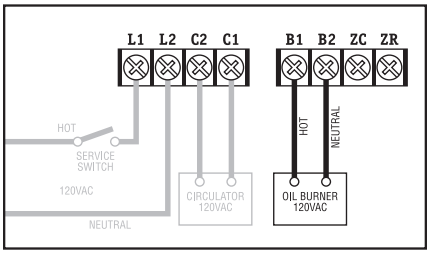
⚠ WARNING **Electrical shock hazard.** To prevent electrical shock, death or equipment damage, disconnect power supply before installing or servicing this control.



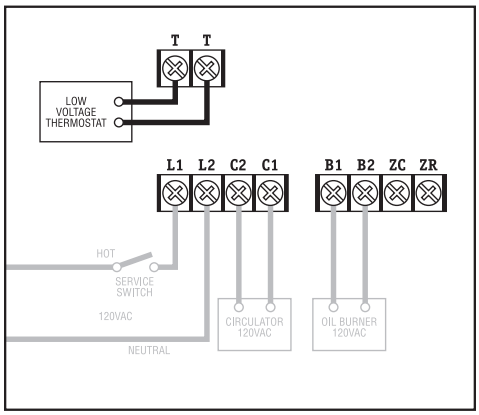
STEP 1 Connect 120 VAC Hot to terminal **L1.** Connect 120 VAC Neutral to terminal **L2.** Disconnect means and overload protection as required (provided by others).



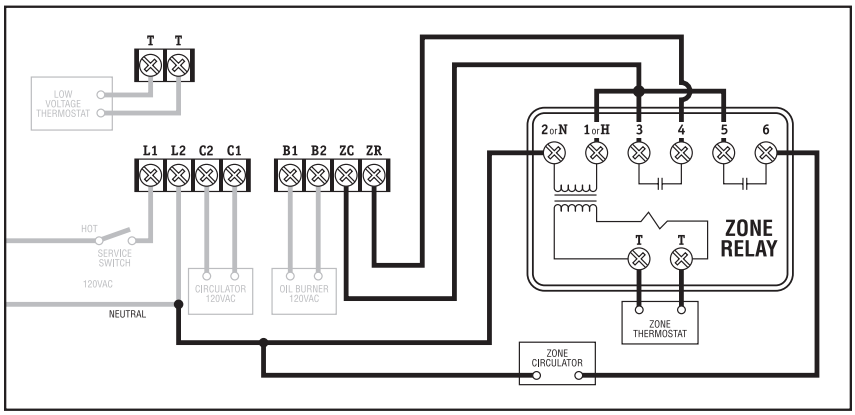
STEP 2 Connect the circulator to **C1** and **C2.** (C2 is neutral.)



STEP 3 Connect the burner circuit to **B1** and **B2.** (B2 is neutral.)

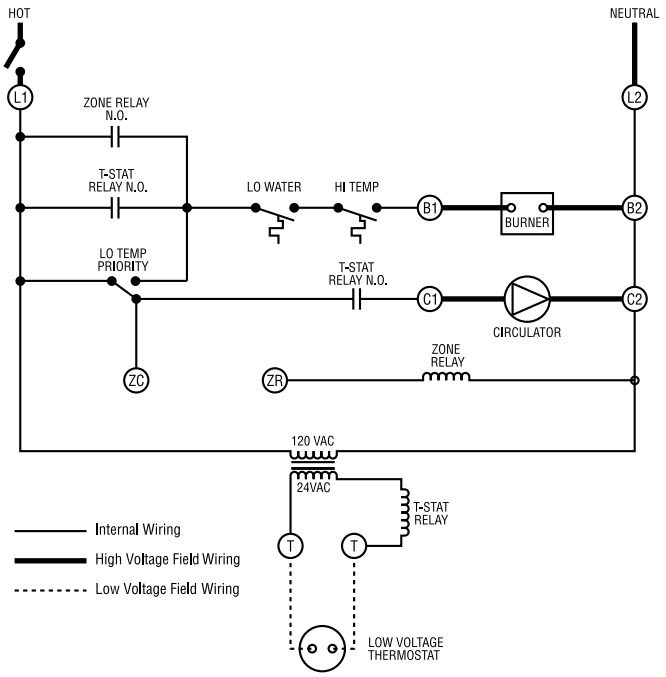


STEP 4 Connect the thermostat to **T** and **T.**

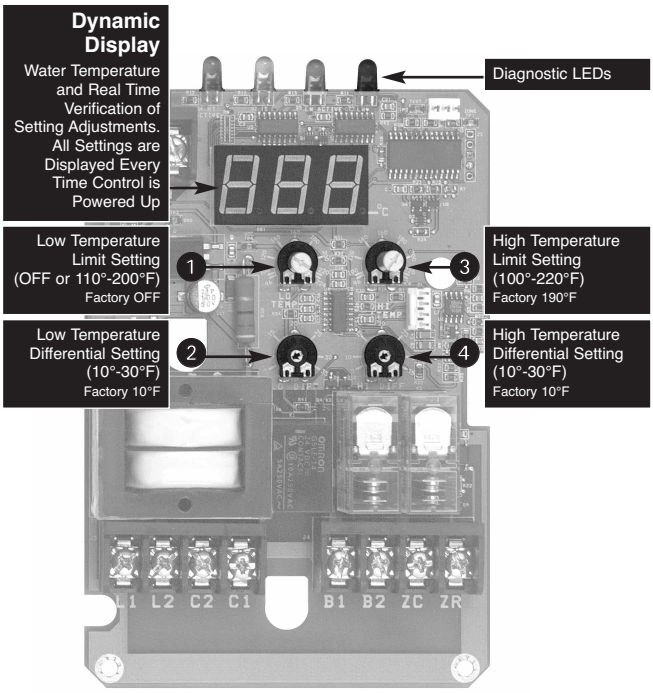


Multi-Zones Adding additional zones.

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 190°F with a HIGH TEMPERATURE DIFFERENTIAL set at 20°F, then the LOW TEMPERATURE LIMIT needs to be set at 170°F (190°F - 20°F = 170°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 ≥ 150°F). Boiler manufacturer's temperature requirements supercede these recommendations.

To set COLD START operation

Operates on call for heat only.

1. **Low Temperature Limit**
   Make sure Low Temperature Limit is turned fully counter-clockwise (OFF position).
2. **Low Temperature Differential**
   No change is required.
3. **High Temperature Limit**
   (factory setting = 190°F)
   Adjust setting until desired temperature is displayed.
4. **High Temperature Differential**
   (factory setting = 10°F)
   Using a small screwdriver, adjust setting until desired differential is displayed.

To set WARM START operation

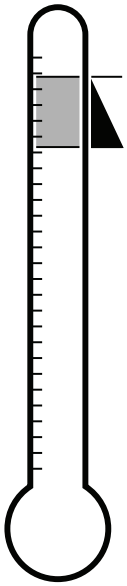
Maintains temperature for domestic hot water.

1. **Low Temperature Limit**
   Adjust setting until desired temperature is displayed.
2. **Low Temperature Differential**
   Using a small screwdriver, adjust setting until desired differential is displayed.
3. **High Temperature Limit**
   (factory setting = 190°F)
   Adjust setting until desired temperature is displayed.
4. **High Temperature Differential**
   (factory setting = 10°F)
   Using a small screwdriver, adjust setting until desired differential is displayed.

OPERATION

COLD START

Low Limit Switch = OFF



High Temperature Limit
(Adjustable 100° to 220°F)
De-energizes burner at HIGH LIMIT setting

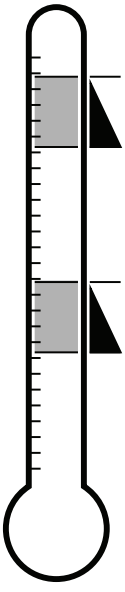
High Temperature Differential
(Adjustable 10° to 30°F)
Re-energizes burner when temperature falls to the HIGH LIMIT DIFFERENTIAL set point

Example
High Limit = 180°
Differential = 10°
On a call for heat, the burner will shut off at 180° and restart at 170° (180°-10°). The circulator will run as long as there is a call for heat.

WARM START

(maintains temperature for domestic hot water)

Low Limit Switch = ON



High Temperature Limit
(Adjustable 100° to 220°F)
De-energizes burner at HIGH LIMIT setting

High Temperature Differential
(Adjustable 10° to 30°F)
Re-energizes burner when temperature falls to the HIGH LIMIT DIFFERENTIAL set point

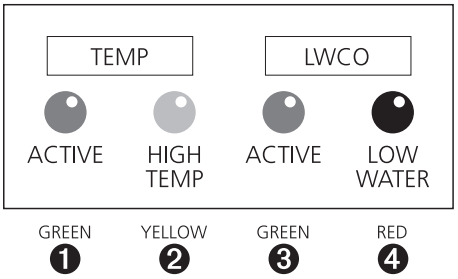
Example
High Limit = 180°
Differential = 10°
On a call for heat, the burner will shut off at 180° and restart at 170° (180°-10°). The circulator will run as long as there is a call for heat.

Low Temperature Limit
(Adjustable 110° to 200°F)
De-energizes burner at LOW LIMIT setting

Low Temperature Differential
(Adjustable 10° to 30°F)
Re-energizes burner when temperature falls to the LOW LIMIT DIFFERENTIAL set point

Example
Low Limit = 150°
Differential = 10°
When there is no call for heat, the burner fires at 140° (150°-10°) to maintain boiler temperature. Burner shuts off at 150°.
NOTE: To prioritize domestic hot water the HydroStat control will not allow the circulator to operate at any time the temperature is below the low limit setting.

LED LEGEND



❶ TEMP **ACTIVE** Indicates that the HydroStat control is powered and that the temperature function is active.

❷ TEMP **HIGH TEMP** 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.

❸ LWCO **ACTIVE** Indicates that the low water cut-off (LWCO) function of the HydroStat control is active. When the control is installed with a Hydrolevel Electro-Well, this LED will be on at all times when the control is powered.

NOTE: If the control was installed with a well other than the Electro-Well, this LED will not illuminate. This indicates that the control is providing temperature function only.

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

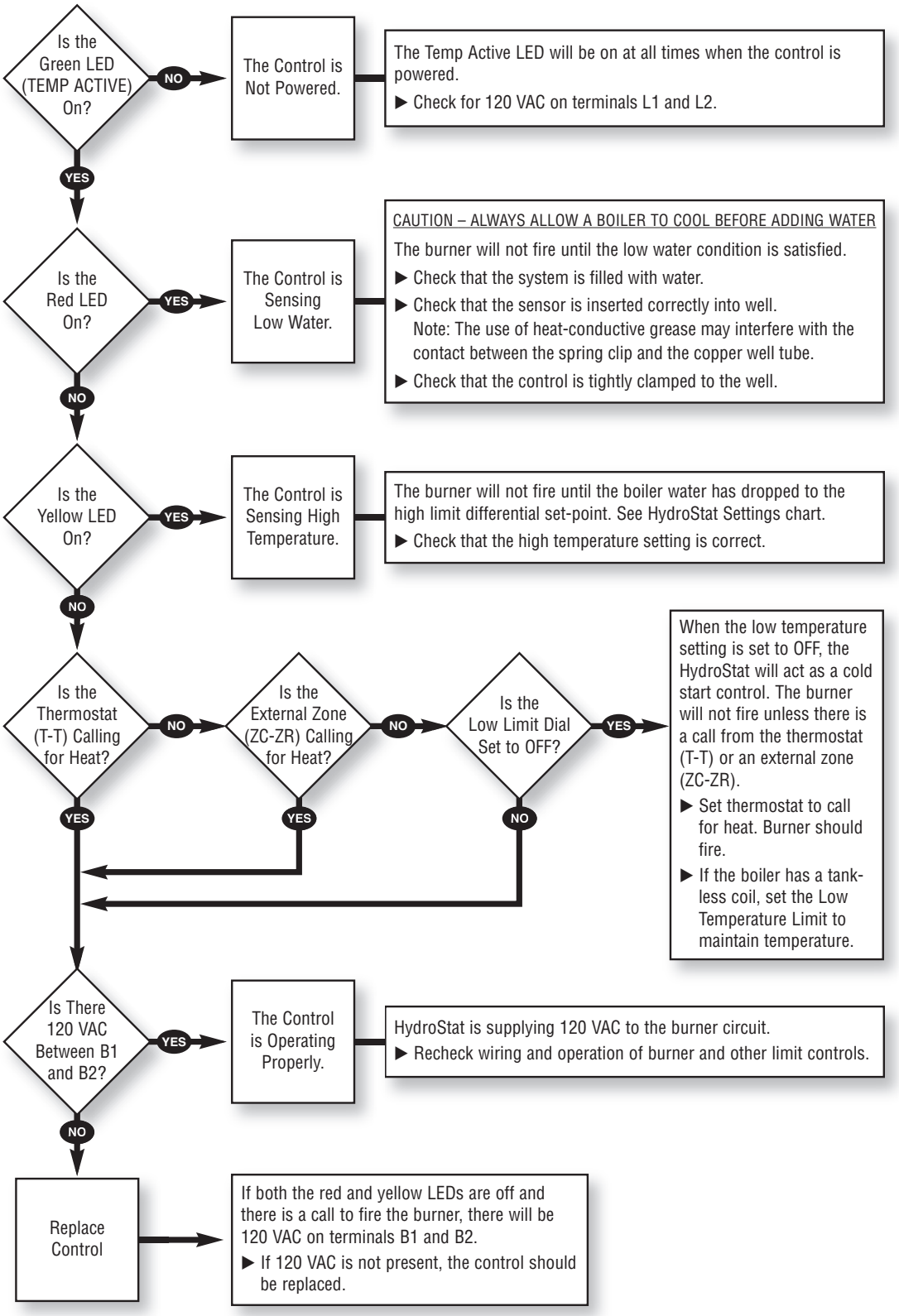
IMPORTANT:
The system must be checked by a qualified heating professional prior to resuming operation.

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

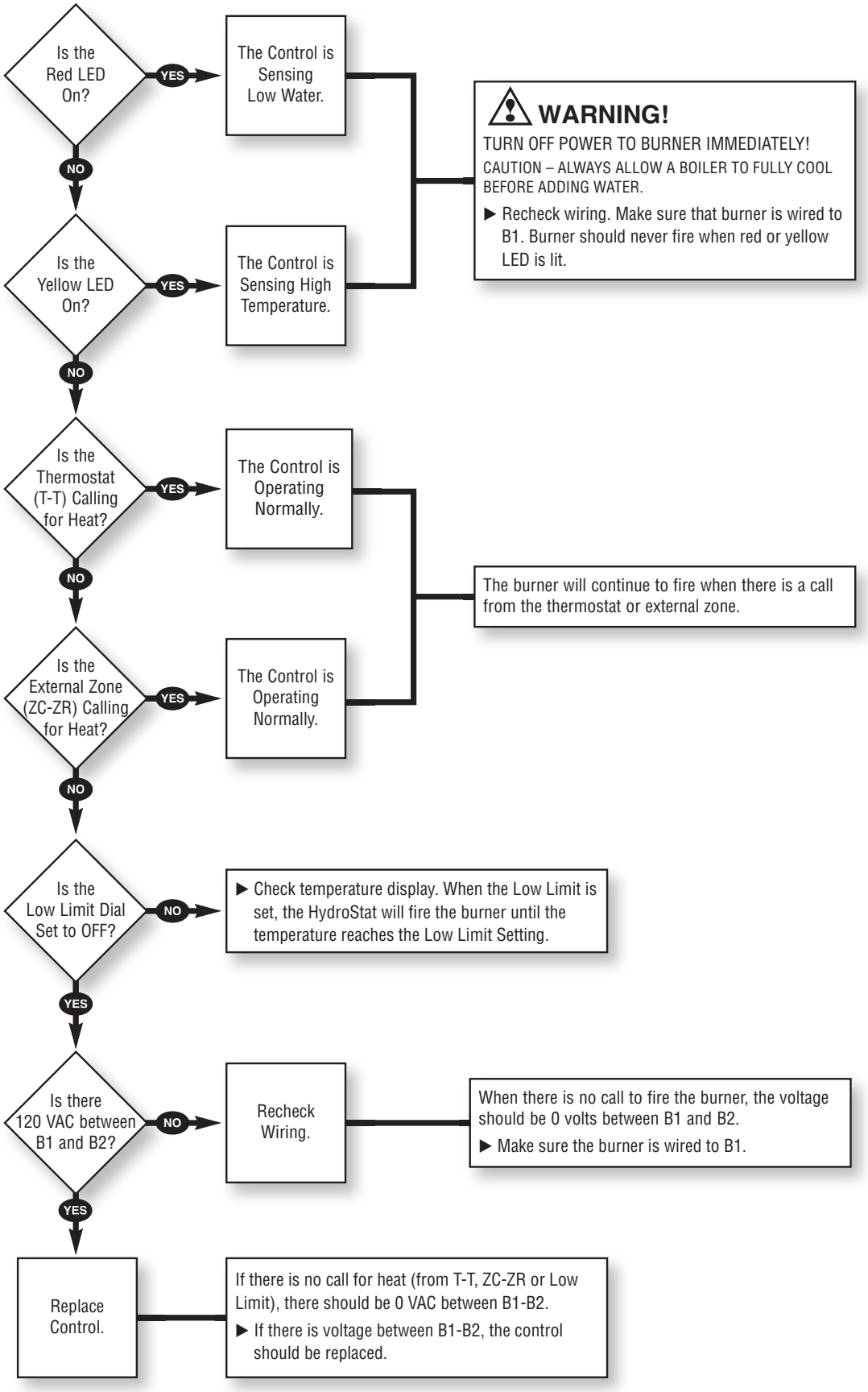
TROUBLESHOOTING

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.
No Domestic Hot Water	Make sure the low limit setting on the HydroStat is set properly. **NOTE:** If the low limit setting is dialed fully counter clockwise, it will shut off the low temperature maintenance feature and will function as a cold start control. If boiler is operating in conjunction with an indirect water heater, check to be sure the temperature control on the indirect tank is set properly. Make sure any valves in between domestic hot water heating device, boiler, and hot water taps are open.
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. If installed in an existing conventional well, check that hardened heat conducting grease has not impeded the insertion of the thermistor. Clean or replace the well to ensure proper insertion of the sensor.
LWCO “Active” Light (Green LED) Is Not On	The HydroStat will only provide low water cut-off functionality when used in conjunction with an insulated Electro-Well™. When attached to a standard immersion well, the LWCO “Active” light will remain off and the HydroStat will provide temperature functionality only.
Low Water Light (Red LED) Is On	**WARNING:** 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. **1.** 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. **2.** Remove well and examine for excessive residue build-up. Clean and re-install.

Troubleshooting Flow Chart 1 – Burner Will Not Fire



Troubleshooting Flow Chart 2 – Burner Will Not Shut Down



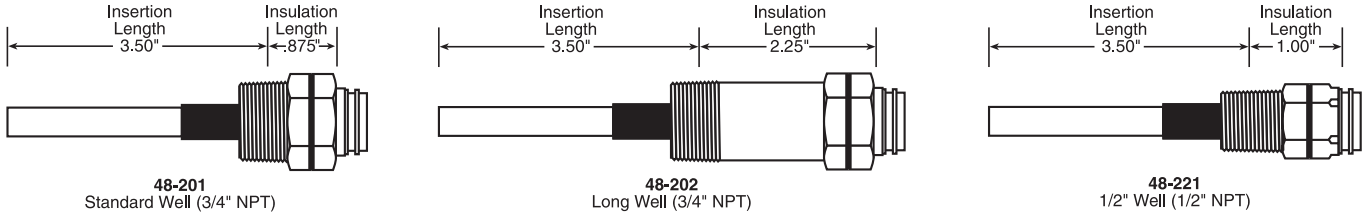
LOW WATER CUT-OFF TEST PROCEDURE

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 Re-energize power to the control. The red LOW WATER light should come on and the burner should not fire. ❺ Turn power off again and reinstall the sensor in the well. ❻ Re-energize power to the control. The green LWCO ACTIVE light should illuminate and the burner should fire.

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.**

ELECTRO-WELLS

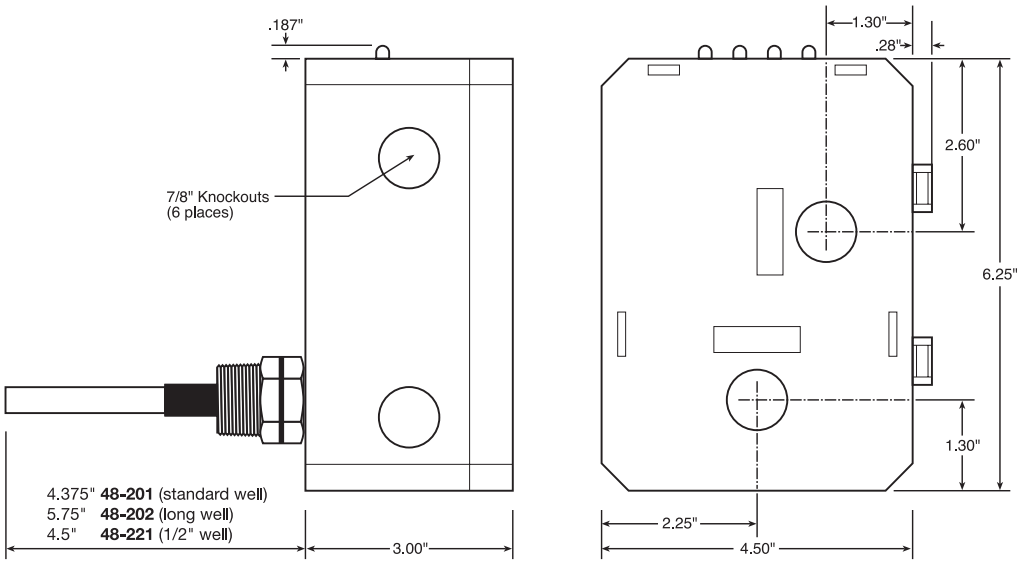


48-201
Standard Well (3/4" NPT)

48-202
Long Well (3/4" NPT)

48-221
1/2" Well (1/2" NPT)

DIMENSIONS



SPECIFICATIONS – HYDROSTAT MODEL 3150

Input voltage	120 VAC, 60 HZ
Burner contacts	7.4 FLA, 44.4 LRA@120 VAC
Circulator contacts	5.8 FLA, 34.8 LRA@120 VAC

Operating range – low limit	Off or 110°F - 200°F
Operating range – high limit	100°F - 220°F
Operating range – differential	10°F - 30°F

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MADE IN USA

LIMITED MANUFACTURER'S 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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