



### MODEL 3000

220°F (104°C) Max High Limit

### MODEL 3000-190

190°F (88°C) Max High Limit

**High Temp Limit / LWCO Control with Thermal Targeting™ for Gas Water Boilers**

24 VAC Operating Voltage

PATENT NO. 7,891,572

## INSTALLATION INSTRUCTIONS and OPERATING MANUAL

- **Saves Fuel** – Features Thermal Targeting™ technology and Thermal Pre-Purge capability
- **Universal Design** – Replaces common High Temp Aquastats\*
- **Easy to Install** – Industry standard wiring, dial-type settings, no external sensors necessary
- **Operating Indicators** – LEDs and Test Button provide continual and on-demand status checks
- **Prioritizes Hot Water** – Gives priority to calls from indirect water heater

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

## Three Function Design

### Temperature Limit Control

Provides high limit functionality for cold start boilers.

### Low Water Cut-Off

Provides protection against potentially dangerous low water conditions when installed with the Hydrolevel Electro-Well™ (see page 2 for details).

### Boiler Reset Control

Utilizes *Thermal Targeting™* technology to conserve fuel by monitoring heating demand and establishing target boiler temperatures below the high limit setting (see page 5 for details).



Model 3000



### 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.



### WARNING

**Frozen pipes/water damage.** Central heating systems are prone to shut down as a result of power or fuel outages, safety related fault conditions or equipment failure. Installation of freeze protection monitoring or other precautions is recommended for unattended dwellings in climates subject to sustain below-freezing temperatures.



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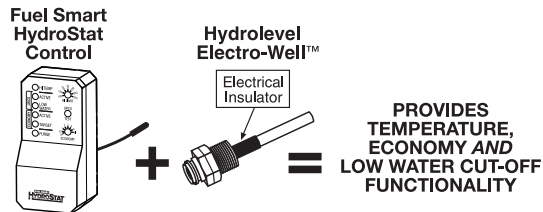
## IMMERSION WELLS

Fuel Smart HydroStat can be installed on an existing immersion well already in the boiler or on a Hydrolevel Electro-Well™ (sold separately). The low water cut-off function is automatically activated when installed on an Electro-Well™.

**IMPORTANT:** The control will not provide low water cut-off protection when installed on a standard immersion well.

**NOTE:** Do not use heat-conducting grease.

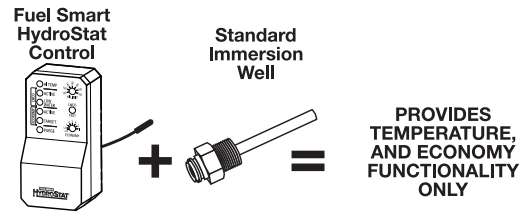
### Fuel Smart HydroStat installed with Hydrolevel Electro-Well™



**IMPORTANT:** For proper operation of the low water cut-off function, there must be a minimum of 1/2" clearance between the copper well tube and any surface within the boiler.

See Electro-Well models on page 8.

### Fuel Smart HydroStat installed with standard immersion well



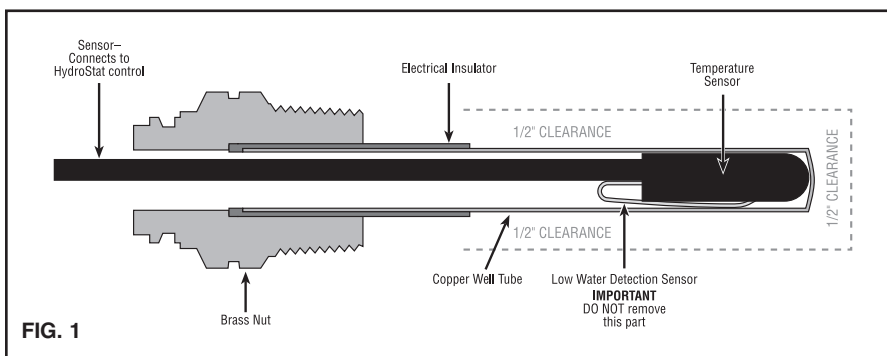
**NOTE:** When installed on a standard immersion well, the "LWCO Active" LED will not illuminate.

## MOUNTING THE CONTROL

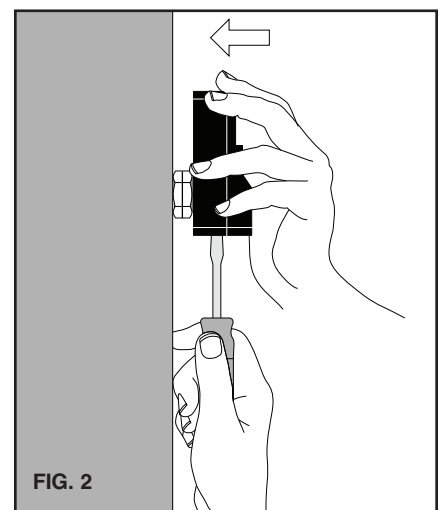
**IMPORTANT** Make sure that the immersion well or Electro-Well™ is installed in the boiler manufacturer's designated temperature limit control tapping.

**NOTE:** If installing an Electro-Well, pipe sealing compound should be used. Teflon tape is not recommended.

**STEP 1** Insert sensor ALL THE WAY into well. (Fig. 1)



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

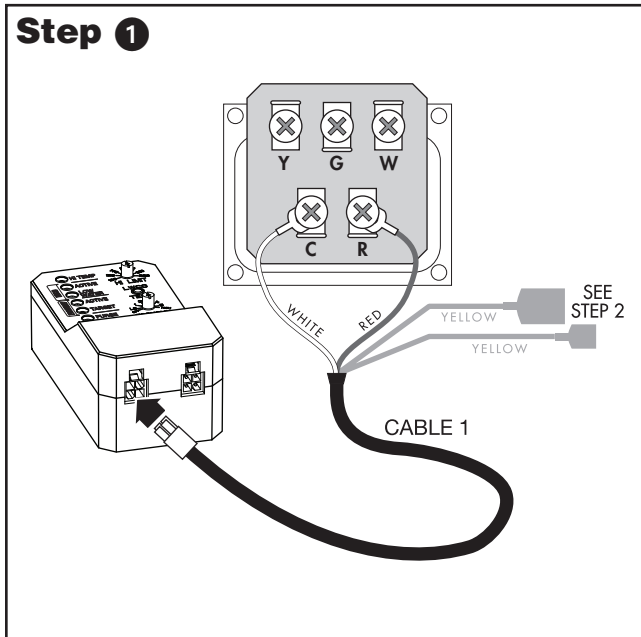


**NOTE:** In the case of space restrictions, the Fuel Smart HydroStat control may be mounted in a horizontal orientation without any loss of function.

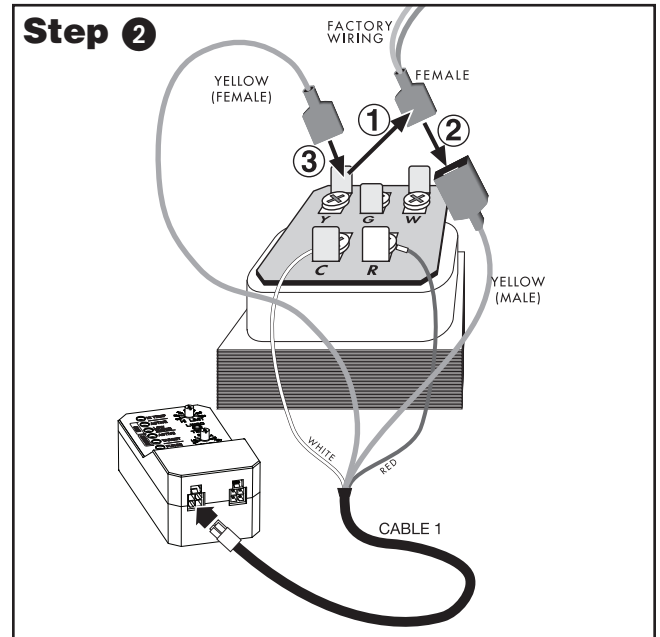
**⚠ WARNING** Electrical shock hazard. To prevent electrical shock, death or equipment damage, disconnect power supply before installing or servicing this control.

## WIRING TO CONTROL CENTER

**USE CABLE 1 – For boilers equipped with a Honeywell R8285 Control Center or equivalent.**



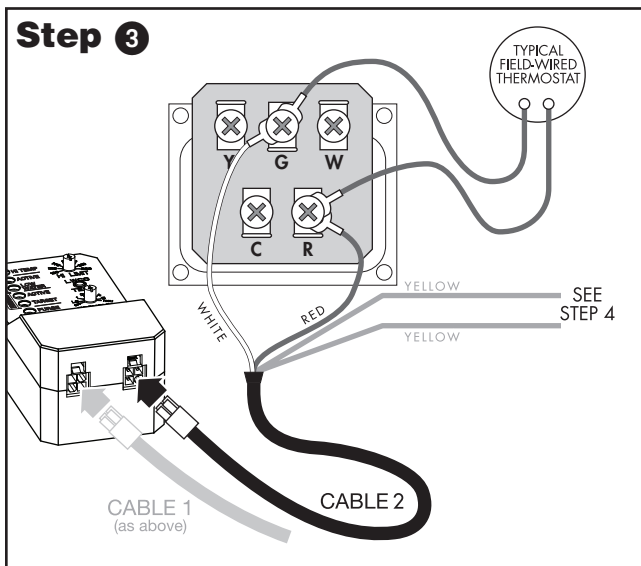
Connect the **WHITE** wire to **C** and the **RED** wire to **R** using the screw terminals on the control center.



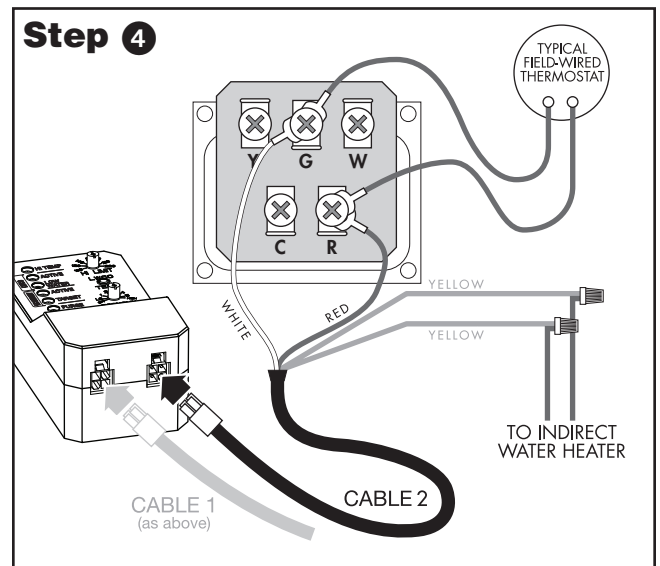
① Unplug the factory-wired quick connect from terminal **Y** and ② plug into **YELLOW** wire with *male* connector. ③ Plug **YELLOW** wire from cable with *female* connector into terminal **Y**.

**USE CABLE 2 – For Thermal Targeting and is optional. If Cable 2 is not used, turn Economy OFF.**

**IMPORTANT:** When installing with an indirect water heater, the indirect wiring cable will bypass the Thermal Targeting feature and allow the boiler to fire to the high limit setting to heat the indirect tank. The indirect signal must be separate from all heating zone signals. If you choose not to separate the indirect signal from the heating zones, the Economy Feature should be turned OFF to insure that the boiler supplies adequate temperature to heat the indirect tank (see page 5).



Connect the **WHITE** wire to **G** and the **RED** wire to **R** using the screw terminals on the control center. The **RED** and **WHITE** wires must be connected in parallel with the heating thermostat.



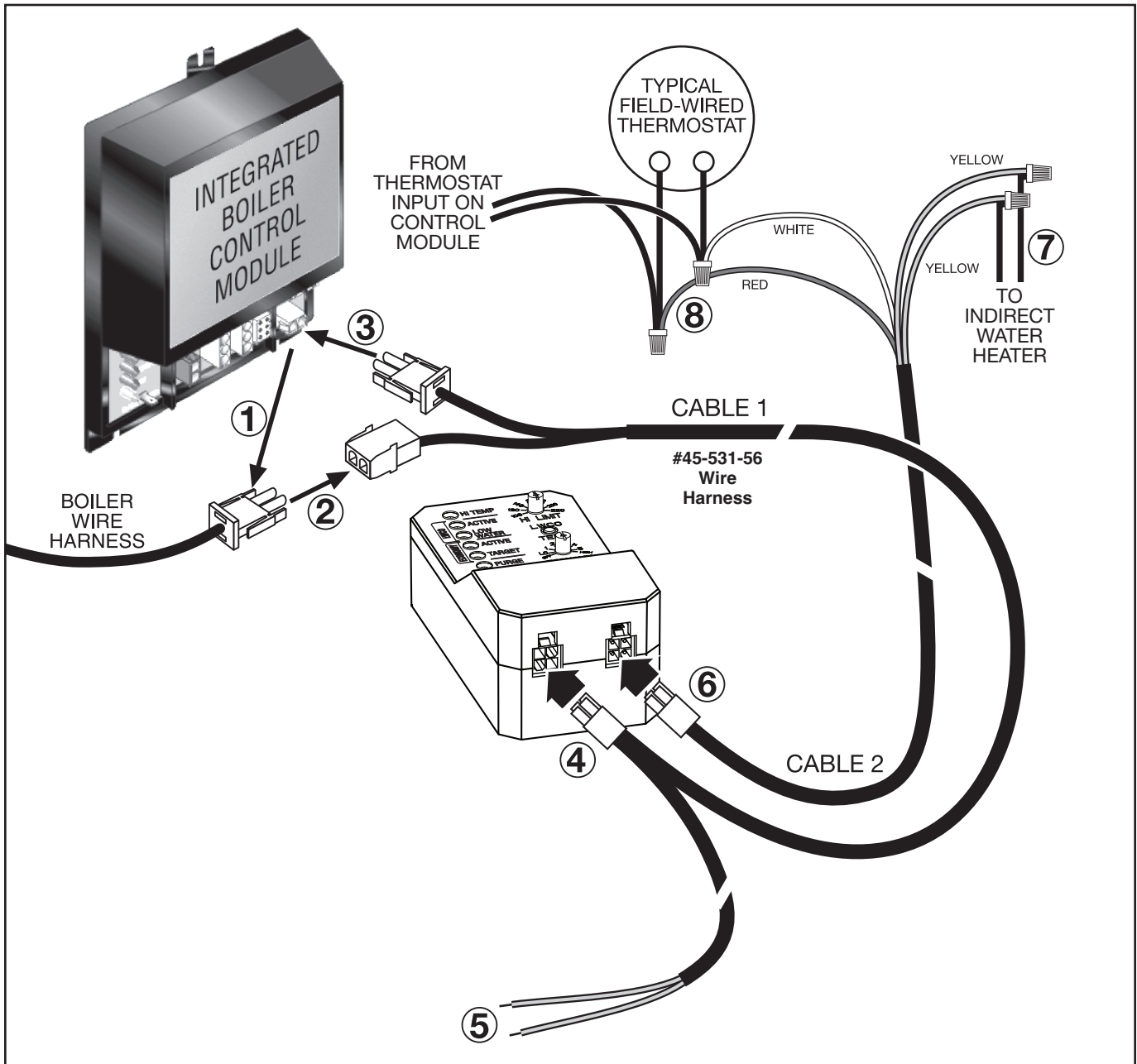
Connect the two **YELLOW** wires to the end switch from the indirect water heater relay. **NOTE:** If you are not connecting to an indirect water heater, the bare ends of the **YELLOW** wires must be capped off separately with wire nuts.



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

## WIRING TO IGNITION CONTROL MODULE

*For use on boilers equipped with Integrated Boiler Control Module*



**CABLE 1** — ① Disconnect boiler wire Harness from the “SECONDARY” port on the Integrated Control Module and ② plug into female plug adapter on #45-531-56 Wire Harness. ③ Plug male adapter on #45-531-56 Wire Harness into “SECONDARY” port on the Integrated Control Module. ④ Plug the other end of the Wire Harness into the Model 3000 Low Water Cut-Off. ⑤ Connect the yellow wires in series with Limit Circuit.

**CABLE 2** — ⑦ Plug Wire Harness into the Model 3000 Low Water Cut-Off. ⑧ Connect the two YELLOW wires to the end switch from the indirect water heater relay. NOTE: If you are not connecting to an indirect water heater, the bare ends of the YELLOW wires must be capped off separately with wire nuts. ⑨ Connect the RED and WHITE wires in parallel to wiring from the thermostat input on the control module and the existing thermostat wiring.

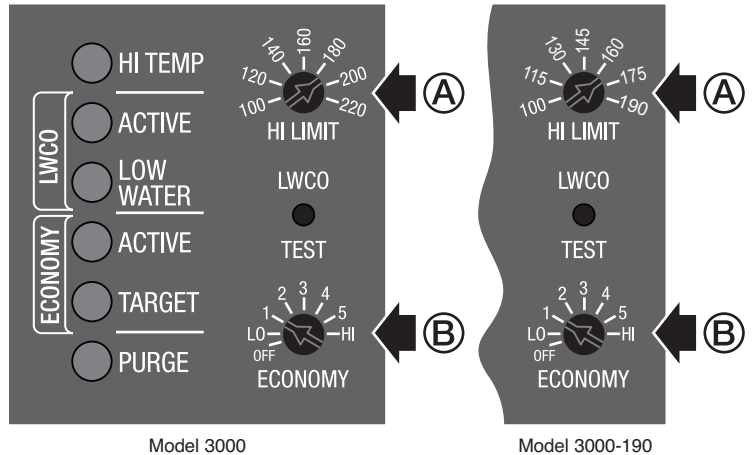
## SETTING THE CONTROL

### Setting the High Limit

The high limit is factory set at 190°F. To adjust, turn the HI TEMP Dial **A** to the desired setting. Setting range: Model 3000 – 100°-220°F  
Model 3000-190 – 100°-190°F

### Setting the Economy Feature

The Economy Feature is factory set for a 1 zone heating system. To adjust, turn the ECONOMY Dial **B** to the number of heating zones. **Do not include indirect water heaters in the number of heating zones.** The Economy Feature conserves fuel by reducing boiler temperature (see “How Thermal Targeting Works” below). If the heating system is unable to supply needed heat to the house, the ECONOMY Dial should be turned to a lower setting (example: In a three zone house, turn the dial to 2 or 1). Conversely, if the boiler provides adequate heat, added fuel savings can be achieved by selecting a higher setting (example: 4 or 5). If the heating and indirect water heater signals were not separated when wiring the control or if you do not use optional Cable 2, the Economy Feature must be turned OFF to insure the boiler supplies adequate temperature to heat the indirect tank.



#### SETTING

- OFF** Disables economy function. Will allow boiler to fire until hi-limit temp is reached and re-fire with a 10° subtractive differential.
- LO** Provides lowest level of fuel savings. Use this setting only if the house does not stay warm at higher settings.
- 1 Recommended setting for single zone systems
  - 2 Recommended setting for Two zone systems
  - 3 Recommended setting for Three zone systems
  - 4 Recommended setting for Four zone systems
  - 5 Recommended setting for Five zone systems
- HI** Provides highest level of fuel savings

### Differentials

Differentials are automatic and will vary based on control settings and boiler temperature.

### Activating Thermal Pre-Purge (optional)

Fuel Smart HydroStat has a Thermal Pre-Purge feature to maximize efficiency. When active, the control will purge higher boiler temperatures down to 135° at the start of any thermostat call and supply the latent energy in the boiler to the heating zone that is calling. During the purge cycle, the PURGE LED will light. If the heat is not sufficient to satisfy the thermostat, the control will energize the burner. This feature works with single-zone and multi-zone heating systems utilizing circulators or zone valves. No change in wiring is needed.

#### To Activate Thermal Pre-Purge

Push and hold the LWCO TEST button for 10 seconds. The PURGE LED will blink twice and remain on as long as your finger is on the button. To deactivate the feature, push and hold the button a second time for 10 seconds. The PURGE LED will blink twice and turn off.

## SYSTEM START-UP

At initial start up, with the Economy Feature active, the control establishes a 145°F target temperature. To test the high limit shut-off function, the Economy Dial must be turned to OFF. Once tested, restore the Economy setting. If the heating demand is high, the target will increase over time to satisfy the heat load.

## HOW THERMAL TARGETING WORKS

Thermal Targeting technology analyzes thermostat activity and continually evaluate how much heat the house requires. When it is very cold outside, the heat demand is high and the Fuel Smart HydroStat will raise the boiler's Target temperature to provide needed heat to the home. When the outside temperature is milder, the heat demand is lower. During these periods, the Fuel Smart HydroStat will lower the boiler's Target temperature – saving fuel – while continuing to provide comfort to the house.

## LED LEGEND and LWCO TEST BUTTON

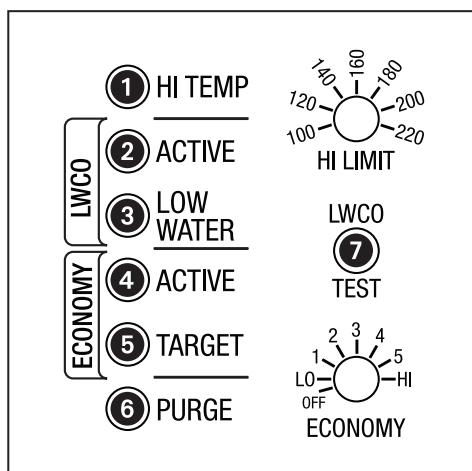
**1 HI TEMP** Illuminates when the boiler water temperature reaches the high limit setting. It will remain lit until the water temperature falls 10° (see High Limit Differential on page 5). The Fuel Smart HydroStat prevents burner operation while this LED is on.

**2 LWCO ACTIVE** Indicates that the low water cut-off (LWCO) function of the Fuel Smart HydroStat 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. **IMPORTANT:** If the control is installed with a well other than the Electro-Well, this LED will not illuminate indicating that the control is not providing low water cut-off functionality.

**3 LWCO LOW WATER** Illuminates if the boiler is in a low water condition. The Fuel Smart HydroStat will prevent burner operation during this condition. **IMPORTANT:** The system must be checked by a qualified heating professional prior to resuming operation.

**WARNING: DO NOT ADD WATER UNTIL THE BOILER HAS FULLY COOLED.**

**4 ECONOMY ACTIVE** Indicates that the Thermal Targeting function is active and the Fuel Smart HydroStat will reduce boiler temperature to conserve fuel. The Economy feature is activated using the ECONOMY dial. (See “How Thermal Targeting Works” on page 5 for more information).



Model 3000 shown above.  
Model 3000-190 has 190° max high limit.

**5 ECONOMY TARGET** When the Economy feature is active, the Fuel Smart HydroStat continually sets target temperatures below the high limit setting to maximize fuel efficiency. When the boiler water reaches the target temperature, the LED illuminates and the burner will shut down. The boiler water will continue to circulate and heat the house as long as the thermostat call continues. The LED will stay lit until the boiler temperature drops below the differential (see Differentials on page 5) at which point the boiler will be allowed to fire again. **NOTE:** This LED illuminates regularly during normal boiler operation.

### 6 PURGE

The control is purging latent heat from the boiler and will not fire until the temperature drops to 135°F. See page 5 for additional information on Thermal Pre-Purge.

### 7 LWCO TEST Button

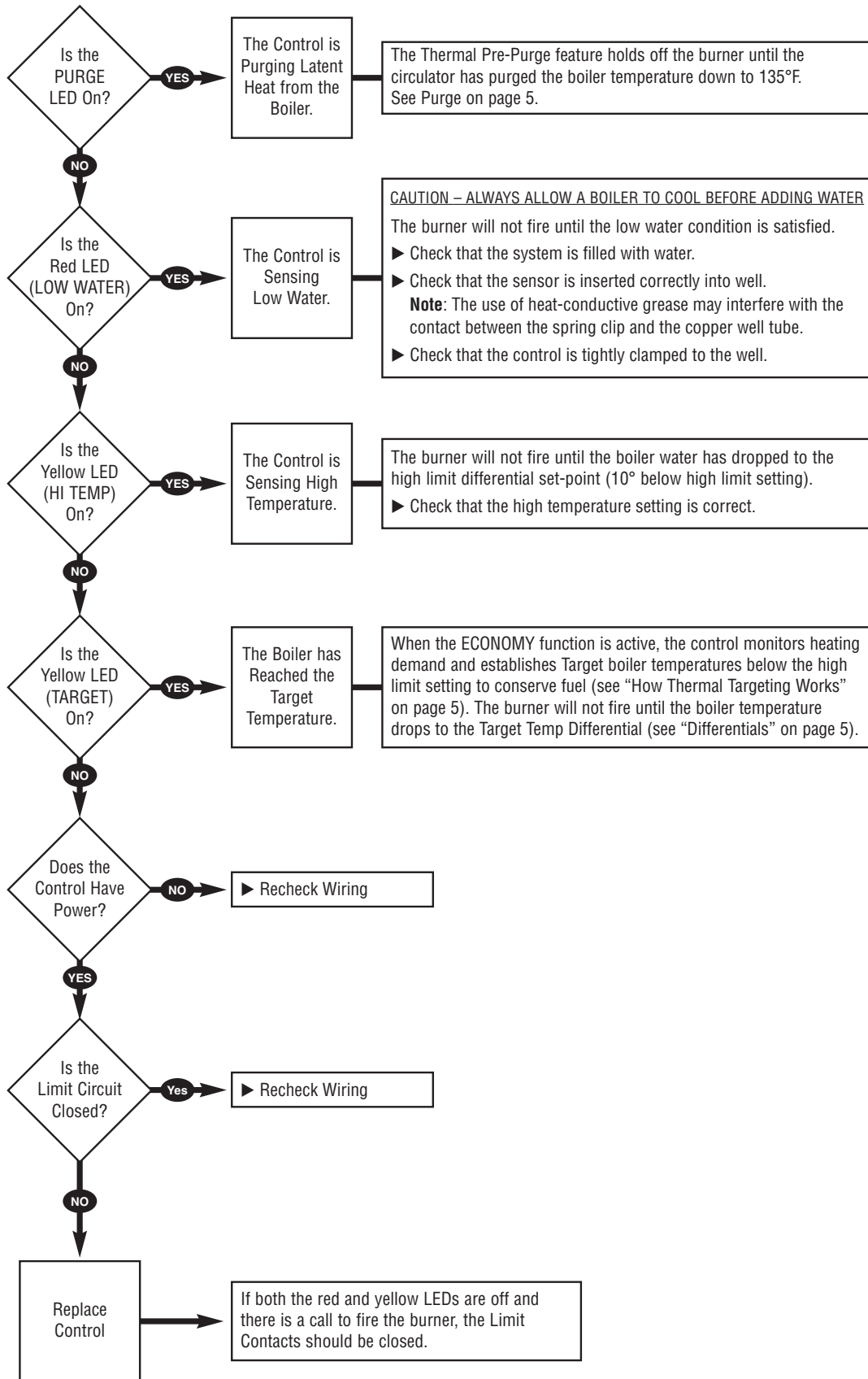
**To Test Low Water Cut-Off:** Press and hold the LWCO TEST button.

The red Low Water light should illuminate and the burner circuit should de-energize. **NOTE:** The control must be installed with a Hydrolevel Electro-Well for low water cut-off functionality (see page 2 for more details).

## TROUBLESHOOTING

<b>Burner Will Not Fire</b>	See Flow Chart, page 7
<b>No or Insufficient Domestic Hot Water</b>	If installed with an indirect water heater, insure that the end switch in the relay box controlling the indirect water heater is properly connected to Cable 2 (see wiring steps 3 and 4 on page 3). This will insure that the domestic water calls are prioritized. If Cable 2 is not used, turn the Economy Feature OFF.
<b>House Will Not Get or Stay Warm</b>	1. Check for air-bound radiators. 2. Check thermostat settings including heat anticipator settings (common on non-digital thermostats). 3. Check the Economy setting. The Economy feature, much like outdoor reset controls, lowers average boiler temperature and can slow or the house from coming up to temperature. Move to a lower setting (see “Setting the Economy Feature” on page 5).
<b>Low Water Light (Red LED) is On</b>	<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> <p>The LOW WATER light indicates that the control is not detecting water in the boiler.</p> <ol style="list-style-type: none"> <li>If the light is on and 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>

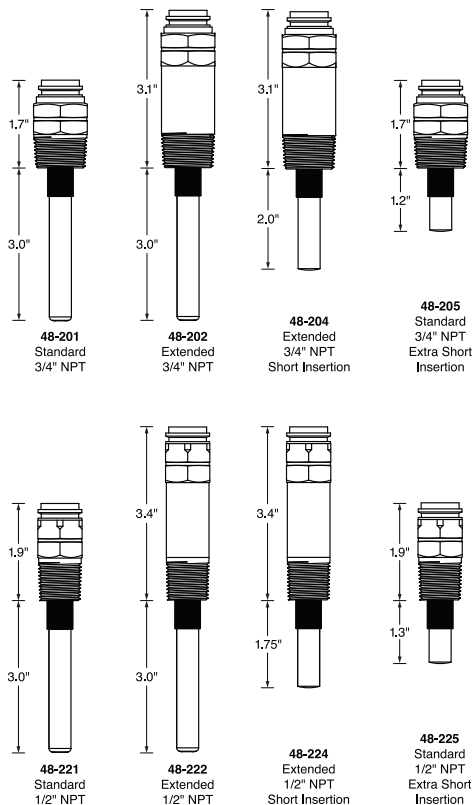
# Troubleshooting Flow Chart – Burner Will Not Fire



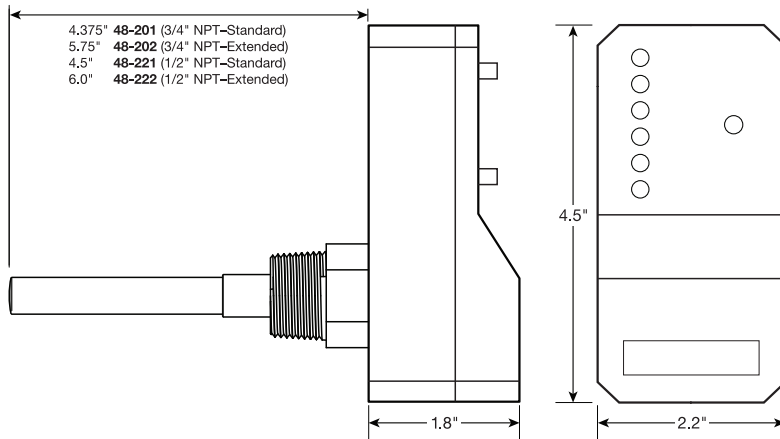
## MAINTENANCE

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



## DIMENSIONS



## SPECIFICATIONS FUEL SMART HYDROSTAT MODEL 3000 and MODEL 3000-190

Input voltage	24 VAC, 60 HZ
Burner contacts	50 VA@24 VAC Pilot Duty
Ambient temperature	Room
Operating range—low limit	Off or 110°F (43°C) - 200°F (93°C)
Operating range—high limit	<b>Model 3000:</b> 100°F (38°C) - 220°F (104°C) <b>Model 3000-190:</b> 100°F (38°C) - 190°F (88°C)



## 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.