



## Technical Bulletin

### Technical Diagnosis and Solutions

Models Affected: Flammable Vapor Ignition Resistant (FVIR) Gas Water Heaters

With the new safety standards that have mandated FVIR (Flammable Vapor Ignition Resistant) water heaters, it is important for you (our customers and service technicians) to be able to easily diagnose and implement solutions that will take care of operational problems with these types of water heaters. This bulletin is intended to help you avoid typical installation issues with the water heater or the environment in which it's installed, and to help you understand what to do when you are trying to solve a problem.

The pilot thermocouple used in FVIR water heaters includes a one-shot temperature switch that opens the thermocouple circuit if the water heater is not receiving adequate combustion air for any reason. With several thousand FVIR water heaters now installed in the field, data suggests burner and pilot shutdown problems are being perceived as a thermocouple problem. Feedback regularly includes "my old water heater never had a problem". Let's examine the reasons the temperature switch in your thermocouple is being activated:

1. The water heater may be starved for combustion air. This causes the burner flame to get lazy and waiver around in the combustion chamber, causing the temperature switch inside the thermocouple to trip. Here are the things to check for and correct:
  - a. The water heater may be located in a closet or space that does not have openings for combustion air to get to the water heater. Openings in the closet must be provided per the installation instructions, which tell you how much open area you need. **IMPORTANT:** The instructions only cover the needs of the water heater. The air requirements of all gas-fired or air-consuming appliances in the closet or space must also be considered. Don't forget an electric dryer, it also consumes air.
  - b. The openings in the closet are smaller than what is needed to supply adequate combustion air. Review the installation instructions and information as noted in (a) above.
  - c. The water heater may be installed in a utility room or closet along with a furnace or air handler, with a return air duct that has not been attached, or it may have leaks that are not sealed. When this condition exists, the return air system creates a significant negative pressure on the installed space and significant down draft of the flue occurs at the water heater. Even if the utility room or closet has a door with louvers in it, a negative pressure may still exist. (When checking, be sure the furnace or air handler is ON and the doors are closed). When a down draft is created, the combustion products from the water heater can no longer exit up through the vent system. The flame inside the water heater will become lazy and wander around, causing the temperature sensor inside the thermocouple to trip. If you can't fix the problem, notify a water heater service organization. **THIS IS A SAFETY ISSUE AND THIS CONDITION MUST BE FIXED** by having the return air duct system corrected. For a temporary solution, keep any doors on the utility room or closet wide open.



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2. **There may not be a draft at the water heater draft hood.** With the water heater operating for 3 to 5 minutes, check for a draft at the inlet to the draft hood with a match or a small amount of smoke. Remember, when checking, be sure all appliances in the installed space are on and the doors are closed. If there isn't a draft, and you have ruled out or corrected items a, b and c above, check the vent system for restrictions or obstructions. Correct these and recheck for draft. You should also check the vent termination to be sure it is the correct height when it exits the home or structure. Refer to the installation instructions for how to evaluate this. Correct the vent height if needed and re-check the draft.
3. **The installed environment may be dirty.** The flame arrestor (stainless steel slotted plate) in the bottom of the combustion chamber is precision designed to combust flammable vapors safely inside the combustion chamber in the event that flammable vapors are present around your water heater. Although the flame arrestor tends to shed lint from the surface, in some cases it can become restricted. When this happens, the burner flame will become lazy and overheat the combustion chamber causing the temperature sensor inside the thermocouple to trip. You can diagnose this condition by inspecting the flame arrestor. To correct this and improve the environmental condition, clean the flame arrestor using a soft brush to clean the slots in the flame arrestor. A toothbrush works well. Be sure to clean both sides of the flame arrestor. Then vacuum the area free of any lint, etc. If you think the installation will be prone to repeated plugging, an external filter is available that can be easily installed. This will greatly extend the run time of the water heater in a dirty environment and will allow for easy periodic external cleaning. Call our service assistance number found in your installation manual or on your water heater to request the filter and installation instructions.
4. **A flammable vapor accident has occurred.** Of course, our desire to reduce the likelihood of a flammable vapor incident is the main reason that the new technology has entered the marketplace. So, if a flammable vapor event occurs, the temperature inside the combustion chamber will increase, causing the temperature sensor inside the thermocouple to trip. This event can be diagnosed as a flammable vapor accident if you see that the flame arrestor has been discolored like it has been overheated. There is no repair for this condition and the water heater must be replaced. If a flammable vapor incident has occurred, you must call the service assistance number found in your installation manual or on your water heater and report it. We will ask you to return the water heater to us at no cost to you.

Included in this kit, you'll find all parts and instructions necessary to complete your installation of this kit.

**PLEASE READ THE INSTRUCTIONS FULLY.**

If you have any questions or concerns related to FVIR water heaters, contact our  
Product Service & Support Department immediately at:

**1-800-999-9515**

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