Tools you will need for this installation:

- Portable drill
- 7/8” Hole saw or step bit
- 1/8” Tip screwdriver
- Phillips bit
- 9/64” Drill bit

Figure 1

Parts included with the UV-SENSE-KIT:

<table>
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<td>UV Flame Sensor Relay</td>
</tr>
<tr>
<td>HF-7621</td>
<td>UV Flame Sensor Cable</td>
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<tr>
<td>GT3-1182</td>
<td>Time Delay Relay</td>
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<tr>
<td>GT3-1181</td>
<td>Time Delay Relay Base</td>
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<tr>
<td>FH-1310</td>
<td>Heyco Cord Connector</td>
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<td>FH-1309</td>
<td>Lock Nut for Cord Connector</td>
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<tr>
<td>THH-4129</td>
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<td>D67-0005</td>
<td>1/2” Coupler</td>
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<td>1/2” to 1/8” Reducer Bushing</td>
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Product Description

The UV flame detection kit was designed to replace the flame rod or probe that is used on Vision dryer controls that utilize the HF-4624 fenwal flame control board. (See Figure 2.) This flame controller uses a flame rectification circuit that in certain situations may not work reliably with certain gases.

The GSI part # D03-1168 UV flame relay sensor (See Figure 3) is more reliable since it picks up the UV light (in the 180-230 nm) that is naturally emitted in the flame when using LP, natural gas or propane as its fuel. It replaces the flame rod or probe located in the burner and re-produces the expected flame signal to the fenwal board.

This kit will include all the parts necessary to change the flame rectification sensing on a fan/heater used on portable dryers over to UV style flame sense.
Sight Tube Assembly Instructions

Locate 1/2” x 5” nipple (THH-4129) and attach the 1/2” coupler (D67-0005) to one end of this nipple. Then attach the 1/2” to 1/8” reducer bushing (007-1149-9) into the 1/2” coupling as shown in Figure 4. (No sealant is necessary.)

Sensor Mounting

The location to mount the sensor is critical in providing reliable flame sense. The sensor needs to have a constant view to the flame of the burner during all burner modes and operations. Typically the best location is just to the right of the inspection window plate as shown in Figure 5. The sensor tube needs to be pointing between the burner veins as shown in Figure 6 on Page 4. It is best if the sensor points slightly downward to allow any moisture that may be present to drain away from the UV sensor component.

Once you have determined the sensors location drill a 7/8” hole into the side of the can and attach the UV sight tube assembly into the hole using two (2) 1/2” lock nuts included with kit. Be sure to leave plenty of thread sticking through the burner can to mount the UV sensor.
Once UV sensor has been mounted to sight tube then attach the five (5) pin cable to sensor. Route the cable through the black plastic heyco cord connector (FH-1310) then through either an existing hole in the fan/heater control box or drill a new 7/8" hole. Try to keep the cable entrance location close to the relay and fenwal board.

Find a location to mount the 3" aluminum din rail and relay base inside the fan/heater control box. Drill two (2) 9/64" holes that will be used to mount the din rail to the heater back panel. Use the two (2) supplied self-tapping phillip screws (S-2786) in the drilled holes to mount the din rail. Once the din rail is secure snap the relay base to the din rail as shown in Figure 7.
Wiring Instructions

Disconnect power and lock out prior to performing this service.

The factory and the UV wirings diagram are included (Figure 9 on Page 6 and Figure 12 on Page 8) which will help show the difference between the current and modified versions.

1. Cut the supplied red wire into two (2) equal pieces. Strip the insulation off both ends of each wire. Attach one wire between terminals 10 and 11. Attach the other wire between terminals 5 and 6.

2. Locate the V1 wire on the fenwal board as shown in Figure 8. Leave the wire connected to the fenwal board and follow it to the terminal strip. Disconnect the wire which will be in terminal number 21 on the terminal strip.

3. Re-locate the grey wire to the relay base terminal 11 which will also contain a jumper wire between terminals 10 and 11.

4. Strip the insulation off both ends of the supplied grey wire. Attach one end of the grey wire to the terminal number 21 on the terminal strip (where you removed the grey wire above) and attach the other end to the relay base terminal 9.

Figure 8 Locating the V1 grey wire on the fenwal board and terminal 21.
Figure 9 Wires to be Moved in Stock Fan/Heater Box (Original Wiring)
5. Disconnect the flame probe or sensor wire from terminal S1 which is shown in Figure 10. It is the thin red 18 gauge high temperature wire (Teflon) and tie it back out of the way. Attach the red wire from the UV sensor cable with the spade terminal attached to the S1 terminal of the fenwal. (You may need to peel back more of the grey sheathing of the UV cable to gain more length of the wire conductors to reach all the connection points.)

6. Strip the insulation off both ends of the supplied white wire and insert one end into either terminal 22 or 24 (whichever of the white terminals that contains a single wire) and the other end into terminal 2 of the relay base.

7. Attach the black wire from the UV sensor cable into terminal 2 of the relay base. This will provide the grounding path to the flame signal through neutral.

8. Attach the yellow wire from the UV sensor cable into terminal 1 (black terminal) of the terminal strip in the fan/heater box.

9. Attach the orange wire from the UV sensor cable into terminal 2 (white terminal) of the terminal strip in the fan/heater box.

10. Insert time delay relay into its socket and set the timer using the settings as shown in Figure 11.

**Figure 10 Flame Sensor Wire Location**

**Figure 11 Timer Settings and Connections**
Figure 12 UV Sensor and Relay Wiring
Operation

The UV sensor is highly sensitive to only UVC light that is present in flame. It can detect a small flame from a lit match over 6’ away. Because the particular wavelength “C” band of UV light this sensor is sensitive to (180-230 nm) is normally absorbed by the ozone present in our atmosphere the sensor will not be affected by normal sunlight.

The UV Sensor is powered up whenever the dryer controls are energized (orange and yellow wires). The rectified output (black and red wires) of the UV flame sensor is only active when the sensor senses flame through an internal relay. This is provided to the fenwal flame board between terminal S1 and the burner ground or AC Neutral.

The Time delay relay provides a means of self checking to test whether or not the sensor has possibly burned in a flame sense state. Or in other words the sensor has locked itself up by sensing UV flame even when flame is not present. So every ten (10) hours the timer will open up the internal contacts that provide the flame signal to the Vision Flame board J1-01. This interruption will force the controls to cycle power to the fenwal board in an attempt to relight the burner.

Normally, if the UV sensor stops sensing flame then the fenwal will resume by relighting the burner. This will cause a brief interruption in burner flame which will last for about five (5) seconds or so until the next timer relay cycle (ten (10) hours).

If the UV sensor has burned in and continues to sense flame even with no flame present then the fenwal board will go into a fault condition and will not allow the burner to relight. If the fenwal has a fault condition then the LED will repeatedly flash two (2) times then pause then flash two (2) times again until power is lost to the fenwal or the controls system shuts down with an error. This will occur after three (3) failed relight attempts to the burner.

Life expectancy of the UV sensor is rated for approximately 10000 hours of continuous operation which should provide many years of reliable use.

Testing

The sensor contains two (2) red LED lamps that will aid in troubleshooting flame sensing issues. One is labeled “FLAME STATUS” and the other “FLAME RELAY”.

FLAME STATUS indicates the strength of the flame signal. The brighter the LED, the stronger the flames signal.

FLAME RELAY turns on once the FLAME STATUS becomes strong enough. This is what activates the flame rectification circuit going to the fenwal board used in the Vision control system.

If the sight tube is positioned too close to the spark or the reducing bushing is not used then the flame sensor will falsely sense flame and activate the flame relay. This can be tested by dry firing the burner with the gas turned OFF. You may rarely see the FLAME STATUS light flicker briefly during this test but it should never be strong enough for the flame relay to become active.

If everything is working correctly the burner should attempt to relight three (3) times then controls will shut the system down with an ignition failure warning on the screen.

NOTE: The ignition source (spark) is very rich in Ultraviolet light. This can cause the UV sensor to sense flame if it can see the light that is emitted from the spark. This is the reason we choked the sight tube down to a 1/8” NPT opening is to reduce this effect.

Do not reverse the Yellow and Orange wires on the UV sensor when hooking it up to 120 VAC. The sensor is polarity sensitive and reversing these wires can destroy the sensor.