resideo

Q3451, Q3481 Single-Rod Pilot Burner/Igniter-Sensors

INSTALLATION INSTRUCTIONS

APPLICATION

The Q3451 and Q3481 Single-Rod Pilot Burner/Igniter-Sensors provide pilot flame ignition and sensing in intermittent pilot systems.

A pilot burner/igniter-sensor consists of a target type pilot burner with a combination spark igniter and flame sensor mounted in place of the thermocouple.

INSTALLATION

When Installing this Product...

1. Read these instructions carefully. Failure to follow instructions can damage product or cause a hazardous condition.
2. Check ratings given in instructions and on product to make sure product is suitable for your application.
3. Make sure installer is a trained, experienced service technician.
4. After completing installation, use these instructions to check out product operation.

⚠ WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury, or death.

Follow these warnings exactly:

1. Disconnect power supply before wiring to prevent electrical shock or equipment damage.
2. To avoid dangerous accumulation of fuel gas, turn off gas supply at appliance service valve before starting installation and perform Gas Leak Test after completion of installation.
3. Do not bend pilot tubing at the control or pilot after compression nut has been tightened. Gas leakage at the connection can result.

Follow appliance manufacturer instructions if available; otherwise, use instructions provided below.

Location

IMPORTANT

Be certain that:

- *the pilot flame does not touch adjacent parts.*
- *the pilot flame is not exposed to drafts that could push or pull the flame away from the sensor.*
- *falling scale is kept away from the pilot flame, which could impair ignition.*
- *main burner flame does not touch the pilot burner/igniter-sensor.*
- *the pilot burner/igniter-sensor is not exposed to igniting or extinguishing puffs from the main burner.*

1. Position the pilot burner/igniter-sensor for easy access and observation. In replacement applications, replace the pilot burner/igniter-sensor with an identical unit and position the new pilot burner/igniter-sensor in the same location and orientation as the original.
2. Mount the pilot burner/igniter-sensor on main burner. Mounting surfaces other than the main burner may shift, bend, or warp as furnace expands and contracts while operating. See Fig. 1.
3. Mount the pilot burner/igniter-sensor so that the pilot flame remains properly positioned with respect to the main burner flame. See Fig. 2.
4. Supply the pilot flame with ample air free of combustion products.

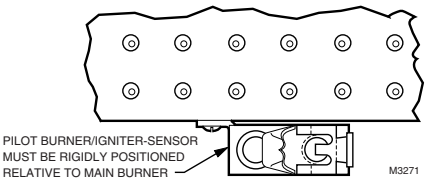

Fig. 1. Mount pilot burner/igniter-sensor on main burner.

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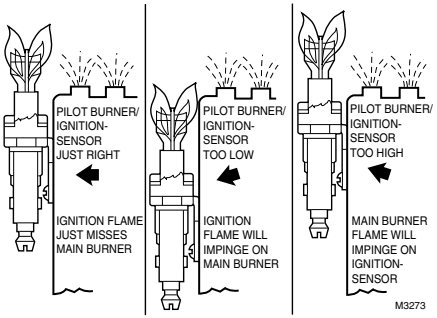

Fig. 2. Location of pilot burner/igniter-sensor.

Connect Pilot Gas Tubing

1. Cut tubing to desired length and bend as necessary for routing to pilot burner/igniter-sensor. Do not make sharp bends or deform the tubing. Do not bend tubing at control after compression nut has been tightened because this can result in gas leakage at connection.
2. Square off and remove burrs from the end of the tubing.
3. Push tubing into compression nut clearance hole until tubing bottoms.

NOTE: When replacing a control, cut off old compression fitting and replace with new compression fitting provided with new pilot burner. Never use old compression fitting because it might not provide a gas-tight seal. See Fig. 3.

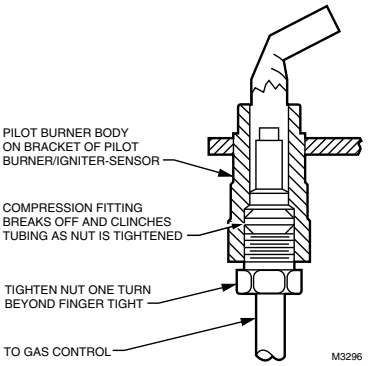

Fig. 3. Always use new compression fitting.

4. While holding tubing all the way in, engage threads and turn until finger tight.
5. Using a wrench, turn compression nut one turn beyond finger tight. Do not overtighten.
6. Connect other end of tubing to gas control according to gas controls manufacturer instructions.

Wire Igniter-Sensor

NOTE: The igniter-sensor must be mounted on the burner before connecting the wires.

Connect the control module ground wire to one of the igniter-sensor mounting screws to complete the system grounding.

Connect ground wire as follows:

1. Use 221 °F (105 °C) minimum thermoplastic-insulated wire for the ground leadwire (asbestos insulation is not acceptable).
2. A male 1/4 in. (6 mm) quick-connect terminal is provided on Resideo ignition modules. Fasten the female quick-connect to wire end at ignition module.
3. Strip other end and fasten under igniter-sensor mounting screw.
4. If necessary, use a shield to protect lead from radiant heat of burner.
5. The pilot burner serves as the grounding area for the flame signal. Run lead from the pilot burner to the common ground selected.

Connect the spark igniter rod cable as follows:
Connect the leadwire (with black insulated 1/4 in. quick connect) of the spark igniter rod to the spark terminal of the S8600 Ignition Module. Do not allow the leadwire to touch grounded metal surfaces because this reduces the voltage available at the spark gap.

STARTUP AND CHECKOUT

Perform Gas Leak Test

⚠ WARNING
Fire or Explosion Hazard.
Can cause property damage, severe injury, or death.
Check for gas leaks with soap and water solution any time work is done on a gas system.

Gas Leak Test:

1. Ensure that the gas supply is turned on at the appliance service valve.
2. Paint pipe connections upstream of the pilot burner with a rich soap and water solution. Bubbles indicate a gas leak.
3. If a leak is detected, tighten the pipe connections.
4. Set thermostat to call for heat to light the main burner.
5. With main burner in operation, paint the pipe joints (including adapters) and gas control inlet and outlet with a rich soap and water solution.
6. If another leak is detected, tighten the adapter screws, joints, and pipe connections.
7. Replace part if leak cannot be stopped.

Adjust Pilot Flame

The pilot flame should envelop 1/4 to 1/2 in. (6 to 13 mm) of the sensor tip. See Fig. 4. To adjust pilot flame:

1. Turn off the system by setting thermostat below the temperature to call for heat.
2. Disconnect lead to the MV terminal on the gas control.
3. Light the pilot by setting the thermostat to call for heat.
4. Remove the pilot adjustment cover screw from the gas control.
5. Turn the inner pilot adjustment screw clockwise to decrease or counterclockwise to increase pilot flame.
6. Always replace the pilot adjustment cover screw and tighten firmly after completing adjustment to ensure proper operation.

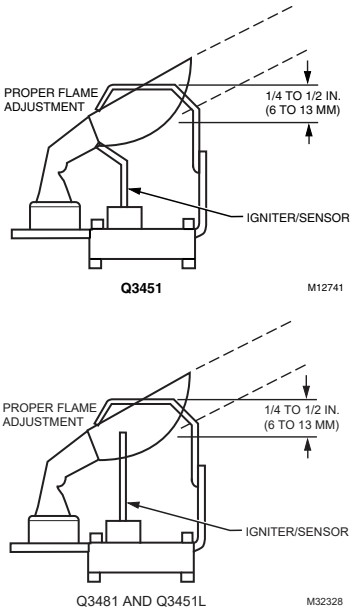

Fig. 4. A & B. Sensor tip must be in pilot flame.

SERVICE

⚠ WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury, or death.
Perform Gas Leak Test any time work is done to the system.

Check Pilot Outage

1. If the pilot flame goes out during ignition, but is properly adjusted, recheck the mounting and location instructions in Location section.
2. Refer to the ignition module instructions to check wiring between igniter-sensor and ignition module or between gas control and ignition module.
3. If all mounting and location instructions are followed but pilot continues to go out, construct a shield to protect pilot flame from main burner ignition, extinction and drafts. See Fig. 5.

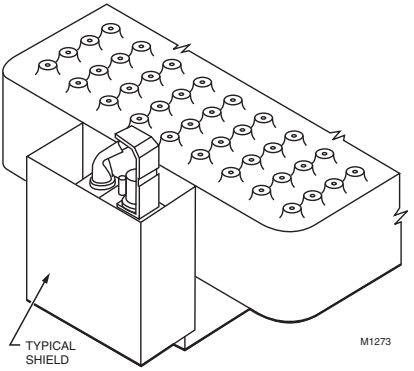

Fig. 5. Proper shielding of pilot flame.

Check the Pilot and the Main Burner Lightoff

1. Set the thermostat to call for heat.
2. Watch the pilot burner during the ignition sequence. See if:
   - Ignition spark continues after the pilot is lit.
   - Pilot lights and the spark stops, but main burner does not light.
   - S8600B only: Pilot lights, the spark stops and main burner lights, but the system locks out.
3. If pilot burner is functioning correctly, assure adequate flame current as follows:
   - Turn off the furnace at the circuit breaker or fuse box.
   - Clean the flame rod with an emery cloth.
   - Make sure the electrical connections are clean and tight. Replace the damaged wire with moisture-resistant no. 18 wire rated for continuous duty up to 221 ºF (105 ºC).
   - Check for cracked ceramic insulator, which can cause short to ground, and replace pilot burner/igniter-sensor if necessary.
   - At the gas control, disconnect main valve wire from the TH or MV terminal.
   - Turn on the power and set the thermostat to call for heat. The pilot should light but the main burner will remain off because the main valve actuator is disconnected.
   - Check the pilot flame. Make sure it is blue, steady and envelops 1/4 to 1/2 in. (6 to 13 mm) of the sensor rod. See Fig. 6 for possible flame problems and causes.
   - If necessary, adjust the pilot flame by turning the pilot adjustment screw on the gas control clockwise to decrease or counterclockwise to increase pilot flame. After adjustment, always replace pilot adjustment cover screw and tighten firmly to assure proper gas control operation.
   - Set thermostat below the room temperature to end the call for heat.

4. Recheck ignition sequence as follows:
   - Reconnect the main valve wire.
   - Set the thermostat to call for heat.
   - Watch the ignition sequence at burner.
   - If spark still does not stop after pilot lights, replace the ignition module.
   - If the main burner does not light or if main burner lights but the system locks out, check the module, ground wire, and gas control as described in the control module instructions.

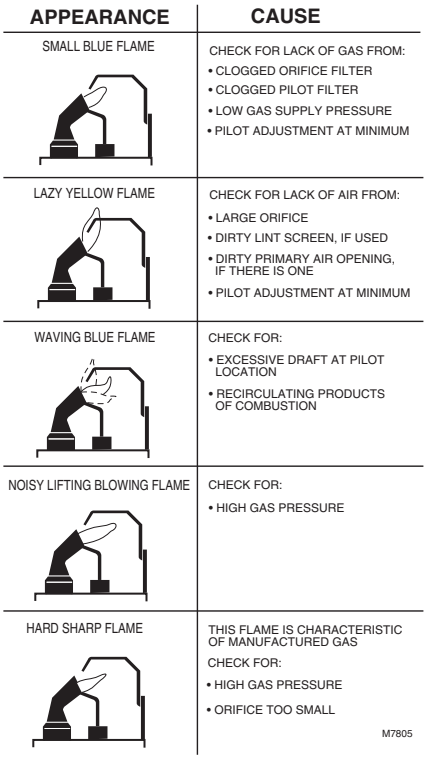

Fig. 6. Examples of unsatisfactory pilot flames.

Check Ignition and Sense Leadwires

1. Assure that the spark igniter rod leadwire is not in contact with metal surfaces.
2. Assure that the connections to the ignition module and the igniter and sensor are clean and tight.

Check Spark Gap

Check that spark gap is within the specifications listed in Table 1. If the gap is outside this specification, use a needle-nose pliers to bend the rod to bring the gap within the specification.

Table 1. Spark Gap Specification.

Model Number	Minimum Gap	Maximum Gap
Q3451	.080 in.	.140 in.
Q3481	.090 in.	.140 in.

Check Grounding

1. If ground is poor or erratic, safety shutdown will occur. Therefore, if frequent shutdowns are reported, check the ground precautions in the Wire Igniter-Sensor section.
2. If leadwire is damaged or deteriorated, use no. 14 to 18 gauge, moisture-resistant, thermoplastic, insulated wire with 221 °F (105 °C) minimum rating as replacement.
3. Excessive temperature at the ceramic flame rod insulator permits electrical leakage to ground.
   a. If bracket is bent, bend it back to the correct position.
   b. If insulator is cracked, replace the Spark Rod/Flame Rod Assembly.

Test Safety Lockout

Refer to appliance manufacturer instructions to test for proper safety lockout times.

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