

# Q652B Solid State Ignitor Spark Generator

## PRODUCT DATA



## APPLICATION

The Q652B Solid State Ignitor Spark Generator is a light-weight solid state spark generator (ignitor) for use on commercial and industrial gas burners.

## FEATURES

- Ignites interrupted gas pilots with ignition electrodes spacings between:
  - Q652B1006 0.029 to 0.125 inches (0.7 to 3.2 mm).
  - Q652B1014 0.12 to 0.18 inches (3 to 4.5 mm)
- Q652B has 14.0 kV output peak voltage for reliable light-off.
- Recommended for interrupted ignition applications only.
- Mounts in the same space used by conventional ignition transformer.
- Withstands 90% relative humidity at 104°F (40°C).
- Weighs 1 pound (0.42 kilogram) versus up to 8-1/2 pounds (3.9 kilograms) for standard transformers.
- Meets Underwriters Laboratories Inc. (UL) requirements for radio frequency interference (RFI).

## SPECIFICATIONS

### IMPORTANT

*The specifications given in this publication do not include normal manufacturing tolerances. Therefore, this unit may not match the listed specifications exactly. Also, this product is tested and calibrated under closely controlled conditions and some minor differences in performance can be expected if those conditions are changed.*

**Model:** Q652B Single high voltage electrode for gas, with “Rajah” and screw connectors.

### Electrical Ratings:

Voltage and Frequency:

Q652B1006 - 120 Vac (+10%, -15%), 60 Hz.

Q652B1014 - 220 Vac (+10%, -15%) 60 Hz.

Output peak voltage at 21 kHz: 14.0 kV.

Secondary open circuit voltage: 10 kV equivalent RMS.

Power Consumption: 40 Watts nominal.

### Interrupted Ignition only:

Q652B1006 - Duty cycle: 20%; 45 seconds on/180 seconds off.

Q652B1014 - Duty cycle 33%; 60 seconds on/120 seconds off.

### Spark Characteristics:

Spark Gap:

Q652B1006 - 0.029 to 0.125 in. (0.7 to 3.2 mm).

Q652B1014 - 0.12 to 0.18 in. (3 to 4.5mm).

Firing Rate: 20,000 sparks per second.

Energy Discharge: 1 millijoule per spark.

Discharge Time: 50 microseconds per spark.

Maximum air velocity in gap is 55 ft. (16.76 m) per sec.

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## Q652B SOLID STATE IGNITOR SPARK GENERATOR

**Ambient Temperature Range:** -40°F to 113°F (-40°C to +45°C).

**Maximum Ambient Humidity:** 90% RH at 95°F (40°C).

**Weight:** 0.925 lb. (0.42 kg).

**Dimensions:** See Fig. 1.

**Approvals (Q652B1006 only):**

Underwriters Laboratories Inc. Component Recognized:  
File No. MH14381 (Gas).  
CSA File No. LA66894.

**Recommended Ignition Cable:**

50060793-001: 24 in. (610 mm) Ignition Cable Assembly with straight boots.

50060793-005: 8 in. (203 mm) Ignition Cable Assembly with straight boot and 90° boot.

50060793-003 Ignition Cable (per foot, specify required length).

50060793-006: 36 in. (914.4 mm) Ignition Cable Assembly.

50060793-012: 36 in. (914.4 mm) Ignition Cable Assembly with 90° boot and 1/4-in. spade terminal.

Cable should be rated for 25 kV at 482°F (250°C).

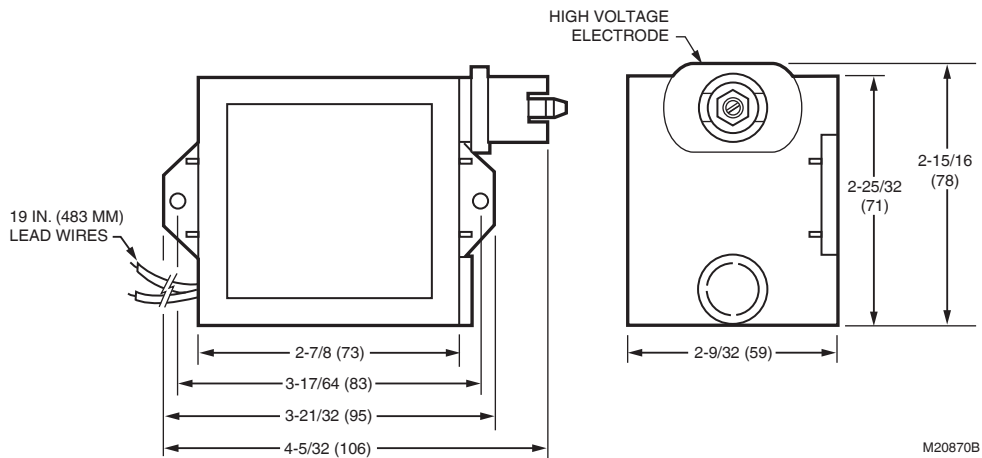


Fig. 1. Q652B dimensions in in. (mm).

## INSTALLATION

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced, flame safeguard control technician.
4. After installation is complete, check out product operation as provided in these instructions.

## ⚠ WARNING

**Electrical Shock Hazard.**

**Can cause serious injury, death or property damage.**

Disconnect power supply before beginning installation to prevent electrical shock and equipment damage. More than one disconnect may be required.

**IMPORTANT**

1. All wiring must comply with applicable local electrical codes, ordinances and regulations.
2. Voltage and frequency of the power supply must match the Q652B being used.
3. Make sure the Q652B is properly grounded.

## ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number. If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Honeywell Environmental and Combustion Controls Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care  
1885 Douglas Drive North  
Minneapolis, Minnesota 55422-4386
3. <http://customer.honeywell.com> or <http://customer.honeywell.ca>

International Sales and Service Offices in all principal cities of the world. Manufacturing in Belgium, Canada, China, Czech Republic, Germany, Hungary, Italy, Mexico, Netherlands, United Kingdom, and United States.



## CAUTION

**Equipment Damage Hazard.**  
**Improper grounding may burn out device.**  
 Ground Q652B chassis at all times, even for bench testing. Otherwise, device may burn out.

## Mounting

The Q652B can be mounted in any position. See Fig. 1 for mounting hole locations. Ensure that enough space is available to make the high voltage connections without difficulty.

## Wiring



## WARNING

**Electrical Shock Hazard.**  
**Can cause serious injury, death or property damage.**  
 Disconnect power supply before beginning wiring to prevent electrical shock and equipment damage. More than one disconnect may be required.

1. All wiring must comply with applicable Underwriters Laboratories Inc. regulations.
2. Voltage and frequency of the power supply:  
 Q652B1006 - 120 Vac, 60 Hz  
 Q652B1014 - 220 Vac, 60Hz
3. Be sure the mounting chassis of the Q652B is properly grounded.

**NOTE: Q652B power input wiring can be one of the following:**

1. Blue Wires: connect to normal Ignition output terminals of your device and L2. If your flame signal decreases when sparker is on, reverse the wiring connection.
2. Blue Wires with White Xs: Connect the white X'd lead to the output terminals of your device. The solid blue colored wire is connected to L2.
3. Blue and Brown Wires: Connect the blue wire to the output terminal of your device and the brown wire to L2.

## Ignition (Secondary) Wiring

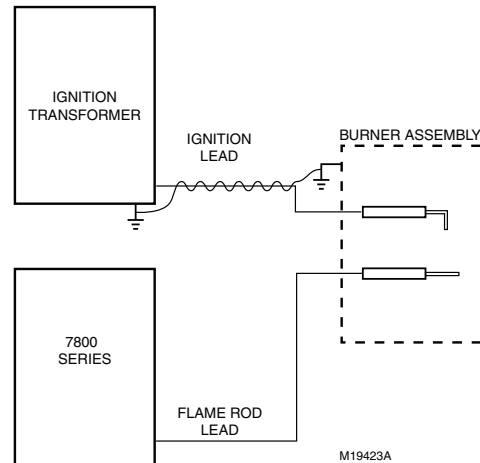
1. Keep the secondary cable as short as possible to keep radio frequency interference (RFI) to a minimum.
2. If the high voltage cable is longer than 24 inches (610 mm), modify it with insulating material in such a way that it stays more than 2 inches (51 mm) away from the ground terminal.
3. Ignition cable connections may be either "Rajah" or screw type. If screw connections are desired, simply loosen the "Rajah" terminal.
4. Use ignition cable rated for continuous duty at 350°F (177°C) and 20,000 volts. See Recommended Ignition Cable in the Specifications section.

### IMPORTANT

*The ignition cable should not exceed 40 inches (116 mm) in length.*

To ground the Q652B to the burner assembly:

1. Use 16 or 18 AWG wire.
2. Attach one end of the wire to the Q652B ignition transformer end (GND).
3. Wrap the wire around the igniter (high tension) lead as shown in Fig. 2. Four or five wraps are sufficient.
4. Connect the other end of the wire to the burner assembly (GND).
5. Make sure the ground connection between the Q652B and the burner body is secure.



**Fig. 2. Grounding the Q652B to the burner assembly.**

## Electrode Setting and Positioning

### Gas Burner Systems

Ignition electrode location must be found by trial and error, taking into account the following points:

1. Ignition electrodes must not interfere with the normal flame pattern.
2. Ignition electrodes should not be positioned such that they will be overheated by the flame.
3. The flame detection device must not be adversely affected. In the case of flame rod sensors make sure that the ignition spark does not disturb the flame signal unduly. See Ignition Spark Response Test in the Checkout section.

**NOTE: For ultraviolet (UV) sensors, ensure that the spark does not give a false flame indication. See Ignition Spark Response Test in the Checkout section.**

## OPERATION

### Principles of Operation

Referring to Fig. 2, it can be seen that the Q652 essentially comprises an RFI filter circuit, a solid state oscillator circuit and a high voltage transformer. The solid state oscillator is comprised of a transistor controlling an LC resonant circuit. The capacitor in the LC circuit charges and discharges and the voltage developed across the inductor is stepped up by the high voltage transformer.

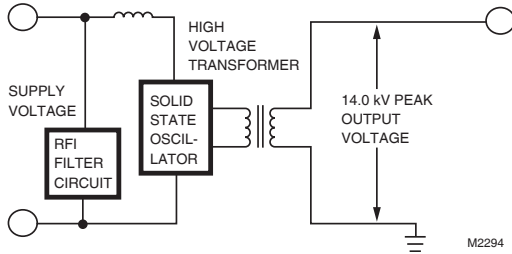


Fig. 3. Internal schematic of Q652B Solid State Ignitor Spark Generator.

## CHECKOUT

After the Q652B installation has been completed, make the following checks to ensure that the system is working properly.

### **⚠ WARNING**

**Explosion or Fire Hazard.**

**Can cause serious injury, death or property damage.**

Follow instructions on opening and closing fuel valves carefully to prevent fuel buildup and possible fire or explosion.

## Ignition Spark Response Test

The flame relay should not respond (pull in) to ignition spark. To determine flame detector sensitivity to ignition spark, perform the following steps:

1. Shut off the fuel supply to both pilot and main fuel valve manually.
2. Start system by raising controller set point or pressing start button.
3. Energize the Q652B Solid State Spark Generator so that ignition spark is produced between electrode and ground.
4. Check to make sure that ignition has not occurred (there should be no flame). Repeat steps 1 through 3 until there is no flame.
5. Check the flame relay on the flame safeguard control or the flame LED. If the relay has not pulled in (flame LED is off), the system is operating properly. Restore the fuel supply and continue the checkout with the Pilot Turndown Test.
6. If the flame relay pulls in (flame LED is on), stop the system as the flame safeguard control is indicating flame regardless of the condition of the pilot or main burner flame.
7. If a flame rod sensor is being used, ignition interference may be the cause of relay pull in. Ignition interference is most easily detected by measuring the flame current

with the ignition off, then on. A difference greater than 1/2 microampere (0.5 Vdc if using 7800 SERIES flame safeguard control) indicates the presence of ignition interference. If ignition interference is detected, take the appropriate following steps:

- a. Check for correct spacing of ignition electrode gap(s).
  - b. Depending upon the particular situation, rearrange the flame electrode, ignition electrode and ground to provide sufficient physical spacing to prevent electrical interaction (interference) between these components.
  - c. Add more ground area in the form of a flat plate between the flame rod and ignition electrode (refer to flame sensor instruction sheet).
  - d. Try wrapping the ground lead around the igniter wire as shown in Fig. 2, if not already done.
  - e. Repeat steps 1 through 6.
8. If the flame relay pulls in (flame LED is on), replace the flame safeguard control.
  9. If replacing the flame safeguard control does not eliminate flame relay pull in (flame LED on), contact your local Honeywell branch office.
  10. If an ultraviolet flame sensor is being used, the UV detector may be responding to the UV radiation being emitted by the electric spark. To determine whether the UV detector is responding to the ignition spark and to eliminate the response, try the following steps to eliminate the spark pickup:
    - a. Sight the UV detector far enough out on the pilot flame so the ignition spark is not sensed. If sensed, reverse the Q652 power leadwires.
    - b. Construct a barrier to block the ignition spark from the UV detector view.
    - c. Reposition the ignition electrode so it is screened by the pilot burner itself.
    - d. Restrict the UV detector viewing angle by using a slightly longer sighting pipe.
    - e. Repeat steps 1 through 6.
  11. If the flame relay pulls in (Flame LED on), replace the flame safeguard control.
  12. If replacement of the flame safeguard control does not eliminate the relay pull in, contact your local Honeywell branch office.

## Pilot Turndown Test

Refer to the flame safeguard control instructions for the exact procedure to be used in performing the pilot turndown test.

## Final Checkout

After other checks have been completed, restore the system to normal operation and observe at least one complete cycle to be sure of satisfactory burner operation.

## Automation and Control Solutions

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