

Knightronix, Inc. 2212 Silver Lake Rd NW. New Brighton, MN 55112 USA. Phone (651) 636-1008

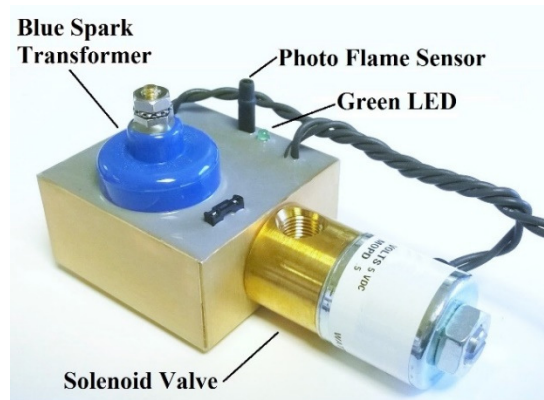
## Knightronix 24V Gas Light Igniter Operating Manual

Please read these instructions and contact Knightronix or Vulcan Lighting with any questions. Improper installation will damage the igniter module and void the warranty.

**A trained gas technician should be hired to remove or install a gas light igniter module. A trained electrician should be used to install or remove a 24VAC transformer or power supply.**

Before removing or installing an igniter module, close the gas valve supplying gas to the lamp, turn off the power, and insulate the low voltage power wires from each other, and from anything else, with electrical tape or wire nuts.

**CAUTION:** Verify there are no gas leaks prior to powering the gas light igniter. High temperature PTFE thread paste suitable for gas connections should be used to seal fittings.



Knightronix 24V Gas Light Igniter  
[www.vulcanlighting.com](http://www.vulcanlighting.com)

### Electrical Requirements

**WARNING:** Do NOT connect the igniter module directly to 120VAC. The igniter requires 24VAC or 24VDC. Input voltage to the igniter module should never exceed 30VAC. Do not connect the transformer backwards; this will damage the igniter module and transformer.

**WARNING:** The spark transformer generates a high voltage spark for ignition. Do not touch the top of the spark transformer, nuts, threaded post, or spark electrode when power is turned on. Keep hands and tools at least 2 inches away from the spark transformer, nuts, threaded post, and spark electrode. To avoid damaging a meter, do not try to measure the spark voltage.

**CAUTION:** To avoid damaging the spark transformer, do not apply more than 5 inch pounds torque to the top nut on the spark transformer. This is just about finger tight. Do not rotate the lower nut. Damage to the spark transformer can cause the ion flame sensor to fail.

Each igniter module requires up to 100mA at 24V. The igniter modules should be wired in parallel, so each igniter receives 24V. A 24VAC / 5 Volt Amp transformer can power 1 or 2 Knightronix gas light igniter modules. Larger 24VAC transformers may be provided by an installer to power more igniter modules. A Class 2 transformer or inline fuse on the low voltage secondary wiring is required to protect the wiring from overheating in a short circuit condition. An electrical installer should check with local code requirements and determine appropriate wire sizes depending on the installation.

The transformer must be installed in a dry location or waterproof junction box.

Two-conductor (stranded) cable, with 18AWG or larger wires, is suitable for many applications for the low voltage 24V wiring, depending on the number of igniter modules and wire lengths. Cable suitable for direct burial may be required depending on the installation. Depending on wire lengths and the number of igniter modules connected to a transformer, larger wire with lower resistance may be required to limit volt drop. To avoid wire damage from the heat of the flame, wires should be kept in the lower part of the lamp. High-temperature wire may be required inside the lamp and near the lamp in some applications.



## Typical Gas Consumption for a Gas Lamp

Approximate gas consumption for a single open flame burner (flame size: up to 2" to 4" high, 1.5" wide):

Natural gas: 1600 to 3800 BTU / Hour on 7" water column pressure, depending on the burner type and orifice.

Propane: 1600 to 1900 BTU / Hour on 11" water column pressure, depending on the burner type and orifice.

A manual valve may be used to reduce the flame size and gas consumption. A flame height of 2-3" is recommended for use with the igniter module.

If the gas line is too small, or too many gas lamps or other appliances are installed on the same gas line, the gas lamps may not ignite and burn properly. One lamp typically works well on 1/4" copper tubing. Multiple lamps or long gas line runs may require larger gas lines. A certified gas technician can determine the appropriate gas line size based on the number of lamps and appliances, lengths of the gas lines, and gas consumption for each lamp and appliance.

When a lamp is installed, it may be necessary to bleed the air out of the gas line before the flames will ignite and burn properly. Water may get into gas lines if they're not used for months or years. If this is the case, the lines may need to be blown out and pressure tested by a certified gas fitter. Do not exceed the pressure rating on the manual gas valves. Manual gas valves are often limited to 1/2 P.S.I. maximum pressure. Use a sealed cap or plug instead of the manual valve to hold the pressure during a pressure test.

**Note: The transformer or power supply must be installed in a dry location or waterproof junction box.**

Knightronix recommends using a wall switch to turn an igniter module on and off, even if a daylight photo sensor or timer is used.

## LED Power / Status Indicator

**Check the Green LED Power / Status Indicator.** If an igniter does not spark when power is turned on, check the status of the green LED. The LED is a power and status indicator. Most installations use a 24VAC transformer, which provides 24VAC to 30VAC. Some installations may use a 24VDC regulated power supply. In bright daylight, the LED may have to be shaded to verify if it is lit or not.

**If the LED is not lit when the power switch is turned on, this may indicate the igniter is not getting the proper voltage. WARNING: if a transformer was not installed, or it was incorrectly installed, dangerous voltage might be present on the igniter module.** A trained electrician should verify the input voltage is 24V on the two dark grey input wires on the igniter module. If a 24VAC transformer is used, the AC scale on the digital volt meter can be used to measure the voltage. If a 24VDC power supply is used, the DC scale on the digital volt meter can be used to measure the voltage.

If the LED does not light when power is applied, check the two low voltage 24V wires to verify they are not damaged or shorted to each other or to the lamp. The 24V low voltage wires should be kept in the bottom of the lamp. If the wires are located in the upper part of the lamp, the wire insulation may be damaged from the excess heat from the flame. If the wire insulation melts, the wires can short out, damaging the transformer and igniter module.

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If the voltage is correct, and the LED is not lit, and there is no sparking or clicking when the power is turned on, it is possible the igniter module may have been damaged by overvoltage or a power surge from nearby lightning or a power line issue. Before removing the igniter module from the lamp, verify the spark gap is set up properly, and the photo flame sensor and optional daylight photo sensor are completely covered with black electrical tape or black heat shrink tubing.

If a fuse is installed in line with the 24VAC wiring, check the fuse and fuse holder for corrosion. Check the fuse to verify it's not blown. An ohmmeter can be used to check the resistance of the fuse and fuse holder. A good slow blow 0.25 Amp fuse may read about 1.5 to 4 Ohms. Check the spring in the fuse holder to verify it's pressing the fuse with enough force to make good contact. If a slow blow fuse is partially blown, the fuse may have a higher resistance of 1000 to 20,000 Ohms or more.

A partially blown fuse or corroded contacts may allow a small amount of current to pass through the fuse, and a Volt meter might show 24 VAC to 29 VAC on the wiring at the igniter module. There may be enough current through a partially blown fuse to turn on the green LED and even spark intermittently, but there may not be enough current to open the solenoid valve and spark consistently.

### Flame Photo Sensor and Daylight Photo Sensor Operation

There is a flame photo sensor on top of the igniter module, next to the green LED. The flame photo sensor may or may not be covered with black heat shrink tubing or black electrical tape. The igniter is programmed not to spark if the photo flame sensor is seeing daylight or light from another nearby electric or gas lamp. To test during the day, the photo flame sensor must be temporarily covered with black electrical tape. If the photo flame sensor is uncovered during normal operation, it may require a black open-ended sheath to block daylight or light from other sources.



Some igniter modules have an optional daylight photo sensor, installed on an 8"-12" long yellow and black wire attached to the top of the igniter module. The daylight photo sensor allows the gas lamp to run automatically dusk till dawn. The daylight sensor should be positioned so it can see outside the lamp, pointed away from any nearby lighting. If the daylight sensor is kept inside the lamp, it may see reflections of the flame off the glass, which could cause the lamp to cycle on and off at night.

If a lamp uses a daylight photo sensor for automatic dusk to dawn operation, we recommend keeping the flame photo sensor uncovered and directed toward the yellow part of the flame (during normal operation). The uncovered flame photo sensor and ion flame sensor (spark electrode) will both be used to detect flame; this will provide optimal flame detection.

**Note: if either the flame photo sensor or optional daylight photo sensor is detecting light, the igniter will not start its spark sequence. To test the igniter during the day, both photo sensor tips must be completely covered with black electrical tape or black heat shrink tubing. The sun may shine through fingers, hands, duct tape, and other colors of electrical tape, and prevent the igniter from sparking during the day.**

If either the flame photo sensor or the daylight photo sensor are uncovered, and the power switch is initially turned on during the day, the lamp will stay off until dusk. After ignition, if the daylight photo sensor (on the yellow and black wire) is covered with black electrical tape, the lamp should continue burning day and night, even

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with the photo flame sensor uncovered. If the flame blows out during the day, and the flame photo sensor is detecting daylight, the lamp will not relight until dusk.

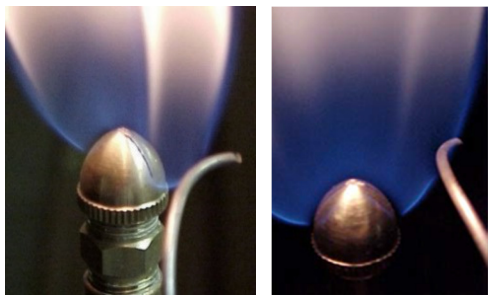
### Direct Wire Spark Electrode Setup

If the igniters spark when power is turned on, and the flames do not ignite consistently (ideally on the first burst of sparks), check the position of the spark electrode (spark probe). The spark gap should be about 1/4" to 5/16" between the spark probe and the burner tip. The sparks should hit the burner tip at or very near the burner slit where the gas is coming out. The electrode must be touching the flame for the ion flame sensor to detect the flame.

**Turn off the power to the gas light igniters, and let the burner and spark electrode cool before making any adjustments. To prevent stress on the spark transformer, hold the base of the spark electrode while adjusting the spark probe position and spark gap. Do not apply more than 5 inch pounds of torque to the top nut holding the spark electrode on the spark transformer. 5 inch pounds is just about finger tight. Do not rotate the bottom nut.**

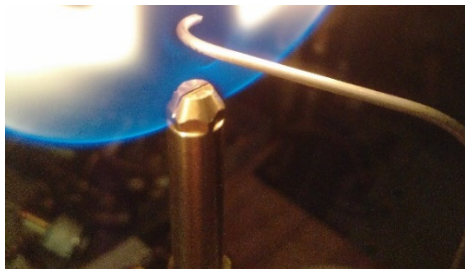
After making any adjustments, verify the flame is igniting consistently. Ideally the flame should ignite on the first burst of sparks. Test the ignition 10-12 times, with the glass doors closed to verify consistent ignition.

Once the flame is lit, verify the igniter stops sparking within a couple seconds. In breezy conditions, the flame may blow around a little, and the igniter may spark while the flame is burning. If the ion flame sensor or photo flame sensor cannot detect the flame after 5-10 ignition cycles, the solenoid valve may close, and the igniter will stay off until power is cycled off and on again.



The photos to the left show our recommended spark probe position for the round top burner tip and **Direct Wire Spark Electrode**. In the edge of the flame, there is a good air and gas mixture for proper ignition. If the spark gap is too close, there will not be enough air for consistent ignition. A spark gap of about 5/16" should work well with Knightronix gas light igniters manufactured with a blue spark transformer (used since about 2008). A shorter spark gap of about 3/16" may work better for igniters using the older black spark transformer. The sparks should

hit at or very near the burner slit where the gas is coming out. The spark electrode should always be touching the flame for the ion flame sensor to sense the flame properly. The photos below show our recommended spark probe position for the 3-pointed and 4-pointed flames.



### Dual Probe Spark Electrode



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**Caution: To avoid damage, do not bend or straighten the electrodes on the Dual Probe Spark Electrode.**

A dual probe spark electrode (similar to the one shown to the right) may be used with some gas lamps. Both electrodes must be touching the flame for the ion flame detection to work properly.

A set screw in the collar secures the bracket to the burner stem, and allows the electrode assembly to be rotated and adjusted up and down. A 3/32" hex key is required to loosen and tighten the set screw. Do not lose the set screw when making adjustments.

#### **Ion Flame Sensor**

In addition to the photo flame sensor, the igniter also has an ion flame sensor, which uses the ignition electrode to sense the flame. For ion flame detection to work properly, the ignition electrode and the burner tip must be touching the flame. If the electrode is outside the edge of the flame, the flame may ignite, but the ion flame sensor will not detect flame. If flame is not detected after 5-10 ignition cycles, the igniter and solenoid valve will shut down until power is turned off and back on again. If a dual probe spark electrode is used, both electrodes must be touching the flame for proper flame detection.

If the gas pressure is too high, the flame may jump off the burner tip, leaving a clear gap between the flame and the burner tip. With the 3-pointed and 4-pointed flames, this issue occurs more than with the round top burner tip. If there's a gap between the flame and burner tip, the ion flame sensor may not detect the flame. Sometimes turning the valve down to reduce the flame size can help keep the flame in contact with the burner tip.

#### **Ion Flame Sensor Maintenance**

Over time, oxidation and soot can build up on the burner tip and electrode, limiting the sensitivity of the ion flame sensor. If this happens, sparking may occur even while the flame is burning, and the flame may shut off and relight intermittently. Oxidation will appear as a dark or dull finish on the brass tip and metal electrode. Steel wool, fine emery cloth, a fingernail buffer, or green scouring pad can be used to remove the oxidation and polish the burner tips and spark electrode. After polishing the electrode and burner tip, a 0.010" feeler gauge or fine 600 grit sandpaper should be used to clean out the burner slit.

**Caution: The burner tip, burner, manual valve, and electrode will be very hot after the flame burns. Turn off the power to the gas light igniters, and let the burner tip and electrode cool before cleaning or making any adjustments. To prevent stress on the spark transformer, hold the base of the spark electrode while adjusting the spark probe position and spark gap. To prevent damage to the ion flame sensor, do not apply more than 5 inch pounds of torque to the nut holding the spark electrode on the spark transformer.**

#### **Ion Flame Sensor Test**

To test the ion flame sensor, turn off the power to the igniter module. Use the metal shaft of a screwdriver (with a plastic handle) to create a temporary connection between the spark electrode and the burner stem. Keep your hands clear of the spark electrode, metal screwdriver shaft, and the area above the burner tip where the flame may ignite. When the connection is made with the screwdriver, turn on power to the igniter module. The green LED should stay on solid a few seconds, and then start flickering off briefly about once every 2.5 seconds. The



*Note the angle of the electrodes*



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igniter should not start its spark sequence while the screwdriver is making the connection, simulating a flame. Remove the screwdriver and verify the igniter starts sparking.

### **Photo Flame Sensor and Sheath**

For optimal flame detection, or if the ion flame sensor is not working continually, the photo flame sensor can be uncovered and used to detect the flame. The igniter will not start sparking if the photo flame sensor is detecting daylight or other nearby lighting. If the lamp has a solid top, instead of glass panels in the top, a short black tube (about 3/4" length x 3/16" I.D.) can be placed over the exposed photo flame sensor. Black heat shrink tubing works well for a sheath. The tube (black inside and out) can be used to block out the sunlight and other nearby lighting, allowing the igniter to start its spark sequence during the day or night. The length and position of the sheath can be adjusted as necessary to block out more or less light. The photo flame sensor and tube should be directed toward the yellow part of the flame. The igniter module below has an open-ended sheath over the photo flame sensor.



### **Basic Igniter Operation**

1. Verify there are no gas leaks prior to powering the igniter module. Do not turn on power to the igniter if you smell gas when the igniter power is off. The solenoid valve should be automatically closed when power is off. If you smell gas, and the solenoid valve is closed, keep the power off until a trained gas technician checks the installation for leaks and repairs all leaks.
2. A wall switch is recommended to control power to the igniter module, even if a daylight photo sensor, timer, or control system are used in addition to the switch. A wall switch allows the igniter to be restarted if it fails to ignite for any reason. The flame may not ignite or stay lit in windy conditions, or if the spark electrode and burner tip are not set up properly.
3. When 24V is applied to the igniter module input power wires, the green LED should turn on.
4. If the optional daylight photo sensor is dark (or not included), and the flame photo sensor is dark (or covered with black electrical tape or black heat shrink tubing), and the ion flame sensor does not detect a flame (or a short circuit between the spark electrode and burner), the igniter should start sparking, the solenoid valve should open, and the flame should ignite.
  - 4.1 If the igniter sparks, the solenoid valve opens, and the flame does not ignite, turn off power, let the burner and electrode cool, and check the spark electrode position. See **Spark Electrode Setup** section above.
  - 4.2 If the spark electrode position is OK, and the flame does not ignite, check the burner slit, burner tip, and electrode for oxidation or soot. If they require cleaning, turn off power, let the burner tip and electrode cool, and clean the burner tip, burner slit, and spark electrode; see **Ion Flame Sensor Maintenance** section above.
  - 4.3 During sparking, the flame can be lit manually with a butane lighter. This is helpful to determine if the burner tip is clogged and requires cleaning. If the tip is partially clogged, the flame may be distorted or smaller than normal. This may affect the ignition consistency and ion flame sensing.
5. Flame check:
  - 5.1 If a flame is detected by the ion flame sensor or photo flame sensor, the sparking should stop within a couple seconds, the solenoid valve should remain open, and the flame should continue burning.
  - 5.2 If a flame is not detected after 5 bursts of sparks (about 40 seconds), the solenoid valve will close for 30 seconds (purge time) to allow the gas to dissipate.
6. After the 30 second purge time, another spark cycle will start.
7. If the flame is not detected after 5 to 10 spark cycles (depending on the igniter model), the solenoid valve will close. The solenoid valve should remain closed until one of the following occurs.
  - 7.1 If 24V power is cycled off and on again (with the wall switch, timer, daylight photo cell, or control system), the igniter will check the flame and daylight sensors and start a new spark cycle, depending on the sensor states.
  - 7.2 If the optional daylight sensor is being used, the igniter will start a new spark cycle each evening.
  - 7.3 If the flame photo sensor detects light (from daylight or another light source), and then detects darkness, the igniter will check the flame and daylight sensors and start a new spark cycle, depending on the sensor states.
  - 7.4 If the flame ignites, and the igniter sparks intermittently while the flame is burning, the ion flame sensor and photo flame sensor may not be continually detecting the flame. The flame may go out and relight intermittently. This can happen if the flame is blowing away from the ion flame sensor (spark electrode). Following are a few things to check if the flame sensor is not detecting the flame. Check the position of the spark electrode and verify it is touching the flame. Verify the photo flame sensor is directed toward the yellow part of the flame. The burner tip, burner slit, and spark electrode may require cleaning to remove oxidation and soot. Verify there is not a gap between the flame and the burner tip. Refer to sections relating to **Ion Flame Sensor**, **Photo Flame Sensor**, and **Maintenance**



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above. Using the photo flame sensor will give optimal flame detection. A sheath may be required to block external light. The photo flame sensor may not work well with glass top lamps if there is other lighting above the gas light. After cleaning or making any adjustments, test the gas light igniter several times to verify it ignites consistently, and the sparking stops after the flame is lit.



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### Knightronix Gas Light Igniter Installation and Removal Notes

**Tools.** The following tools are recommended for installation and removal of the Knightronix gas light igniter in a gas lamp.

1. 1" crow foot wrench and handle.
2. 5/16" Nut driver or 5 inch-pound torque driver with a 5/16" socket and adapter. Capri Tools Capri Tools Certified 0.5 in. to 6 in. Precision Torque Screwdriver Set shown below right.
3. 7/16" Open end wrench (for 1/8" NPT hex nipple (male input) below solenoid valve).
4. 1/2" Open end wrench (for 1/8" NPT hex adapter (female input) below solenoid valve).
5. A locking pliers or appropriate wrench to hold the fitting in the bottom of the lamp while threading or unthreading the hex nipple or hex adapter (and igniter module).
6. TFE thread paste, suitable for gas.



**Warning:** Use high temperature TFE thread paste designed for gas connections and verify there are no gas leaks prior to powering igniter module.

**Warning:** Do not exceed 1/2 P.S.I. pressure on the brass manual valve or solenoid valve. The igniter and burner are designed for 7" water column natural gas pressure (0.25 P.S.I.), or 11" water column propane pressure (0.4 P.S.I.).

**Note:** The burner tip, burner, and orifice are different for natural gas and propane. The gas type must be specified when the igniter and burner are ordered.

**Caution:** to avoid damage, do not twist on the igniter module enclosure. Twisting can bend the box, break the moisture seal and damage the igniter module.

**Caution:** Do not squeeze or pinch the solenoid valve cover. This can damage the solenoid valve coil.

### Installation or Removal from lamp.

When installing or removing an igniter module, use a wrench on the fitting below the solenoid valve, and another wrench or locking pliers on the fitting in the bottom of the lamp. The hex nipple or hex adapter in the solenoid valve should stay in the solenoid valve.

A 1" crow foot wrench can be used on the brass body of the solenoid valve when installing or removing an igniter module, or installing or removing a burner or fitting on the solenoid valve.

Below is a link to additional gas light igniter documentation:

[https://www.vulcanlighting.com/DealerInfo/PFD%20Files/24V\\_Ion\\_QuickInstall.pdf](https://www.vulcanlighting.com/DealerInfo/PFD%20Files/24V_Ion_QuickInstall.pdf)



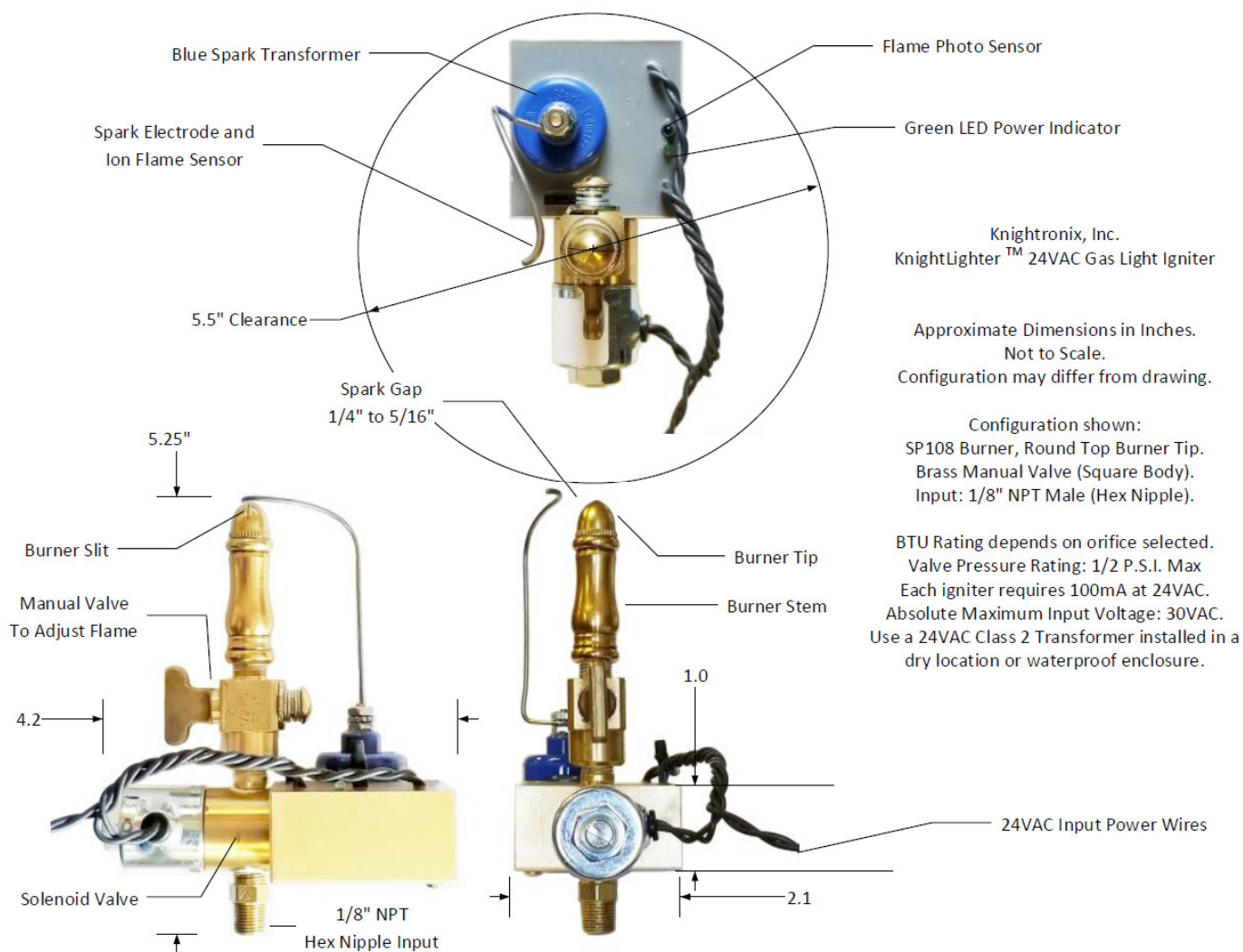
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Please contact Knightronix / Vulcan Lighting with any questions regarding the igniters. If you call 651-636-1008 from the lamp we may be able to help determine what is required to resolve the gas lamp igniter issues. Sometimes it's helpful to see close-up photos or video of the lamp, igniter module, burner, and electrode with the flame burning. You may email questions and photos to [info@vulcanlighting.com](mailto:info@vulcanlighting.com).

If an igniter / burner assembly does not function, it is usually repairable. Please contact Knightronix for an RMA number before sending an igniter module / burner assembly back to Knightronix for an estimate to evaluate and repair the igniter.

Thank you,

Knightronix, Inc. & Vulcan Lighting



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## Knightronix 24VAC 5VA Class 2 Transformer Model: KNXFMR-24V-5VA-200

This 24 Volt / 5 Volt Amp transformer can power 1 or 2 Knightronix 24VAC gas light igniters.

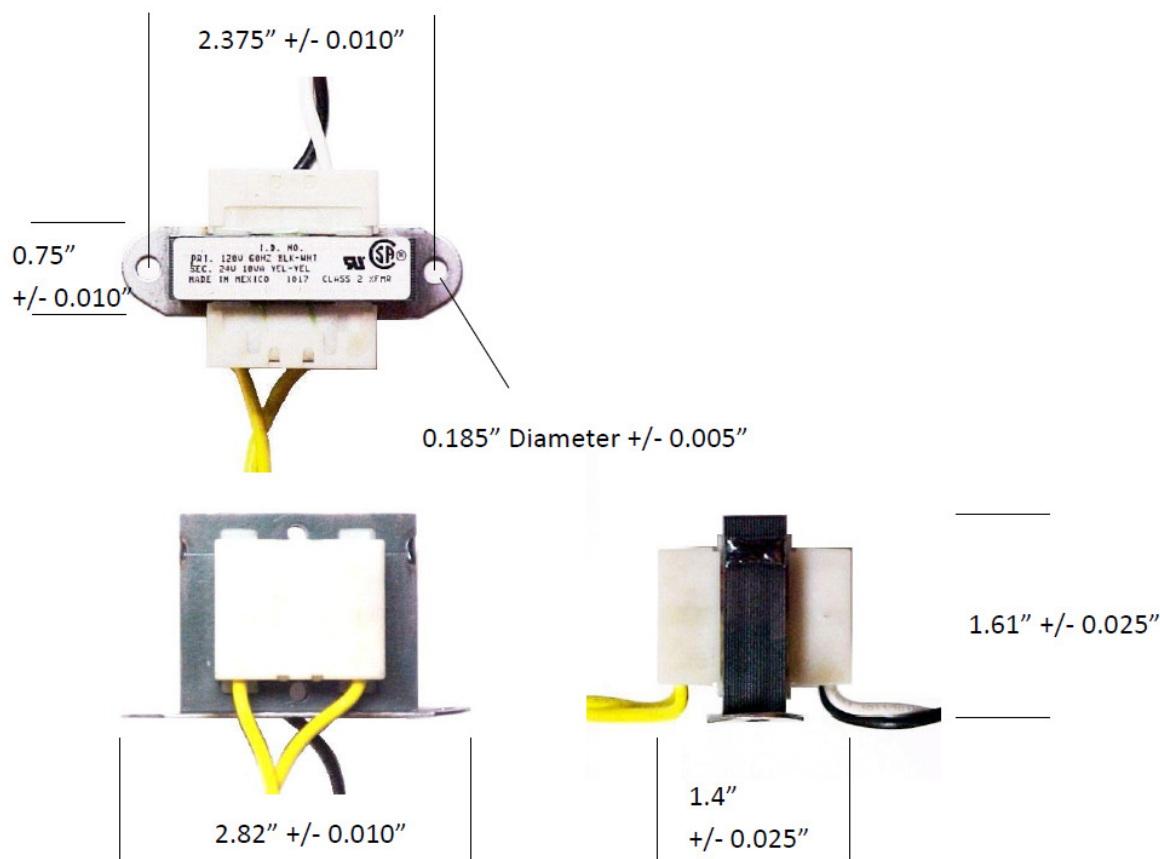
Approximate Dimensions in Inches

Primary: 120V 60Hz; Black / White

Secondary: 24VAC / 5 Volt Amp; Yellow / Yellow

CSA and UL Listed

To order visit [www.vulcanlighting.com](http://www.vulcanlighting.com)



Note: transformer must be installed in a dry location or waterproof enclosure.