

Tempest Torch

24V

Troubleshooting Guide



TRAVIS INDUSTRIES
HOUSE OF FIRE

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Travis Industries Certified Factory Training Program

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Power Requirements:

- Transformer Minimum Rating 50 volt-amps per torch connected
- 21VAC - 24VAC minimum 1.6 Amps
- Minimum 14 Gauge wire.

(Refer to the Installation manual for wire gauge requirements.)

Sequence of Operation:

- 1) Call for Ignition (power switch turned on - 110VAC supplied to the transformer).
 - 2) Transformer supplies 24VAC to control module (in the head of the torch).
 - 3) Control module supplies 24VAC to the Igniter. Igniter heats up (starts to glow red).
 - 4) Control module supplies 24VAC to the gas valve. Gas valve opens (this occurs approx. 3 seconds after the igniter glows red).
 - 5) The flame from the torch heats up the thermopile which produces a small electrical current.
 - 6) When the thermopile produces the appropriate millivolts, the igniter will turn off and the solenoid valve will stay open until power is turned off to the transformer or the thermopile stops producing the appropriate millivolts.
- The control module determines the state of the torch (fire or no fire) by looking at the percentage of voltage change from the thermopile (gain or loss - not a set voltage). If no fire is sensed by the control module, the igniter and gas valve will stay on for the full ignition sequence (approximately 35 seconds), after which they will close.
 - The torch will wait 30 seconds before it attempts to light again. The torch will attempt to light (3) times. If the torch does not successfully light in those three attempts, the torch will "lock out" or not attempt to relight until the lockout is reset.
 - To reset the torch from a lockout you must cycle the power supply off and back on to restart the sequence.

WARNING - *24VAC POWER SUPPLY IS POLARITY SENSITIVE*

NOTE: If the torch has had power supplied with the polarity switched, the control modules may be damaged which can result in failure to sense the flame or “cycling”. Often the torch will continue to work once the wiring is corrected. If a control module has failed, it will continue to cycle or light 3 times prior to lock out (because it is not sensing the flame properly). When this occurs, the module may show physical signs of damage such as:

- discolored wires where they come out of the module
- strong electrical burnt smell
- blistering of the control module housing
- control module cracked or melted

If these signs are present, the module has failed or will fail soon and should be replaced. If there are no visible signs of damage the module may continue to function as designed.

Trouble Shooting

Trouble shooting will require the torch head be disconnected from its mounting post.

• Torch does not Light and Igniter does not Glow Red

| Possible Cause: | What to Check: |
|-----------------------|--|
| Electrical power off | <ul style="list-style-type: none"> • Verify power 24VAC to module • Check circuit breaker or GFCI |
| Igniter failed | <ul style="list-style-type: none"> • Verify OHM's $3.5\Omega \pm .5\Omega$ • Supply 24VAC directly to igniter |
| Control Module failed | <ul style="list-style-type: none"> • Verify polarity of supplied power to control module. If polarity is reversed the module may have shorted and been damaged. |

• Igniter Glows Red but Torch Does Not Light

| Possible Cause: | What to Check: |
|------------------------------|---|
| Gas is off | <ul style="list-style-type: none"> • Turn on gas (check shut off valve) |
| Low gas pressure | <ul style="list-style-type: none"> • Verify supply pressure - NG = 7" W.C. or LP = 11" W.C. |
| Bad valve | <ul style="list-style-type: none"> • Verify OHM's $33.2\Omega \pm 1.0\Omega$ • Supply 24VAC directly to valve |
| Low power supplied to module | <ul style="list-style-type: none"> • Verify voltage at connection on the control module - Min. 21 volts at a 1.6 amp draw (torch must be in ignition cycle with igniter glowing red to measure voltage (gas does not need to be on)) • Verify wiring to torch head. • Check to make sure: <ul style="list-style-type: none"> ▪ Wire run from transformer to torch is not too long ▪ Proper wire gauge for the length of wire run ▪ Have exceeded the number of torches on one transformer. (See wiring requirements on pages 8 & 13) |

HINT: The igniter can glow red but not be hot enough to ignite the gas. Make sure to check the voltage to make sure it is sufficient.

HINT: Listen or feel for the solenoid on the gas valve to click open which should occur 5 seconds after power is applied (3 seconds after the igniter visibly glows red).

| • Torch Lights during Ignition Sequence then goes out during normal operation | |
|---|--|
| Possible Cause: | What to Check: |
| Polarity to Torches not correct | <ul style="list-style-type: none"> Verify wiring from transformer to torches is correct. Incorrect polarity will damage module |
| Thermopile failed or wired wrong | <ul style="list-style-type: none"> Check power output of thermopile. <u>The thermopile is polarity sensitive</u>, check connections and verify proper wiring. (see wire diagram - page 7). <ul style="list-style-type: none"> ▶ Torch senses a percentage of Millivolt increase for flame rectification to put torch in run mode (typically 50-60 MV) |
| Dirty air channel or burner | <ul style="list-style-type: none"> Remove glass and clean flame spreader Clean burner and Venturi (mixing tube) for possible bugs or debris |

HINT: Difference between **ignition sequence** and **cycling**: If both fire and igniter drop out at same time it is most likely the end of an ignition sequence (30 sec.).

Cycling occurs when the torch is in normal run mode (burner is on - Igniter is not on) and then repeatedly drops out and relights. (3x prior to locking out)

| • Flames are too short (under 6") | |
|---|--|
| Possible Cause: | What to Check: |
| The gas supply pressure to the appliance is too low | <ul style="list-style-type: none"> Not enough gas in LP tank Gas supply line or gas regulator sized incorrectly for load |

| • Flames do not Spiral | |
|----------------------------|---|
| Possible Cause: | What to Check: |
| Torch just turned on | <ul style="list-style-type: none"> Torch not warm yet - It takes 5 to 10 minutes for the torch to start up and the flame to spiral |
| Windy conditions | <ul style="list-style-type: none"> Wind will influence the flame quality and, if persistent, may lead to sooting on the glass |
| Glass not spaced correctly | <ul style="list-style-type: none"> Verify glass has an even gap on all four corners |

| • Glass is Sooty | |
|-------------------------|--|
| Possible Cause: | What to Check: |
| Blockage in burner | <ul style="list-style-type: none"> • Check for spider webs or debris in burner or Venturi (mixing tube) |
| Windy conditions | <ul style="list-style-type: none"> • Wind will influence the flame quality and can cause sooting |

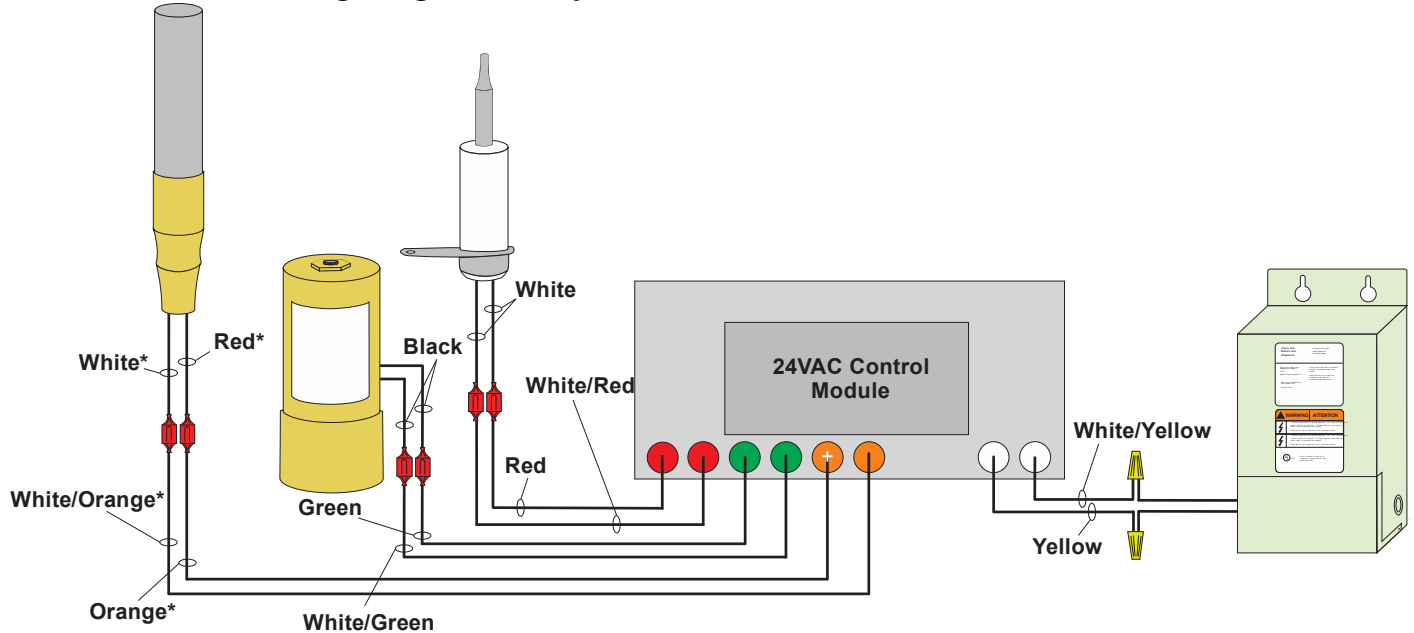
| • Torch does not shut down | |
|-----------------------------------|--|
| Possible Cause: | What to Check: |
| Valve stuck in open position | <ul style="list-style-type: none"> • Check for debris in gas supply line • Replace valve |

| • Torch makes Clicking Sounds | |
|--------------------------------------|---|
| Possible Cause: | What to Check: |
| Glass is moving inside frame | <ul style="list-style-type: none"> • This is normal – the metal around the glass expands and contracts with heat |

Torch Wiring Diagram

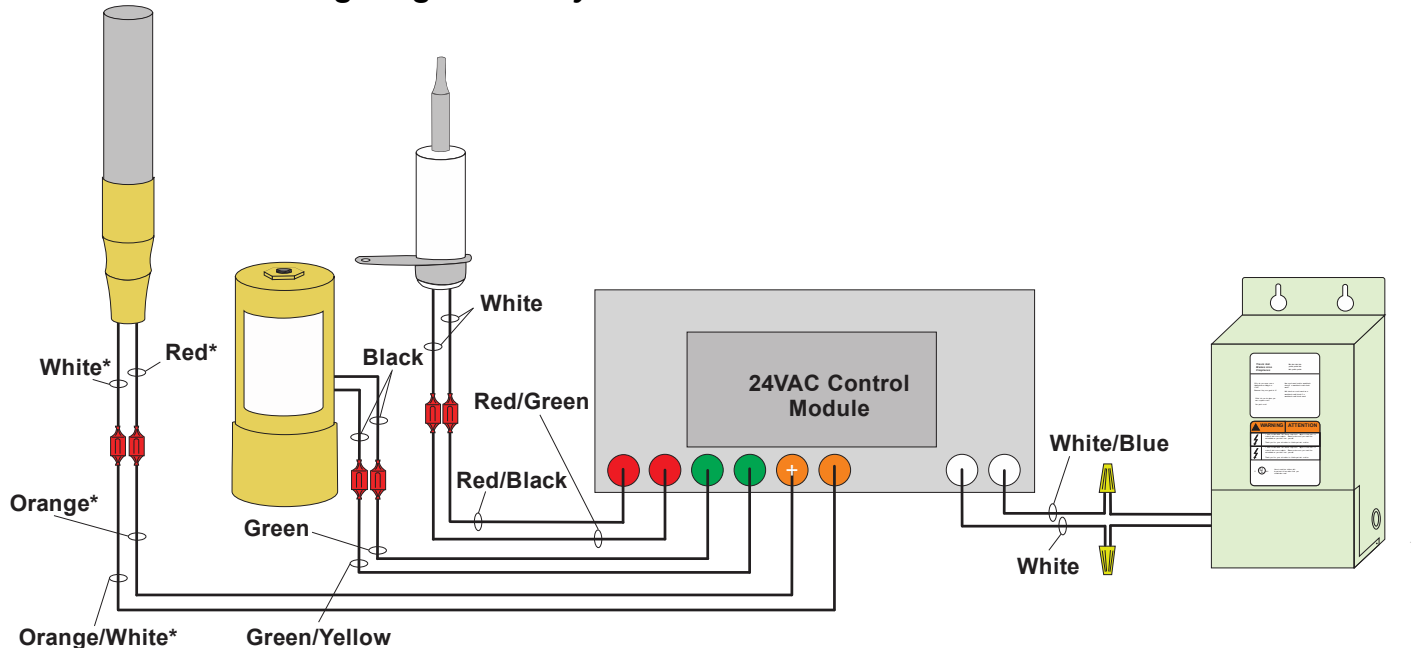
- All wiring inside the torch leads to the control module. The module has remained the same, but the color of the wires from the module has changed. See the two diagrams below.

Control Module Wiring Diagram – July 2019 or Later



*** NOTE:** The thermopile must connect to the control module as shown above (**white/orange** wire connects to the **white** thermopile wire and **orange** wire connects to **red** thermopile wire). **Do not reverse the wires.** If the wires are reversed, the torch will not work correctly.

Control Module Wiring Diagram – July 2019 or Earlier



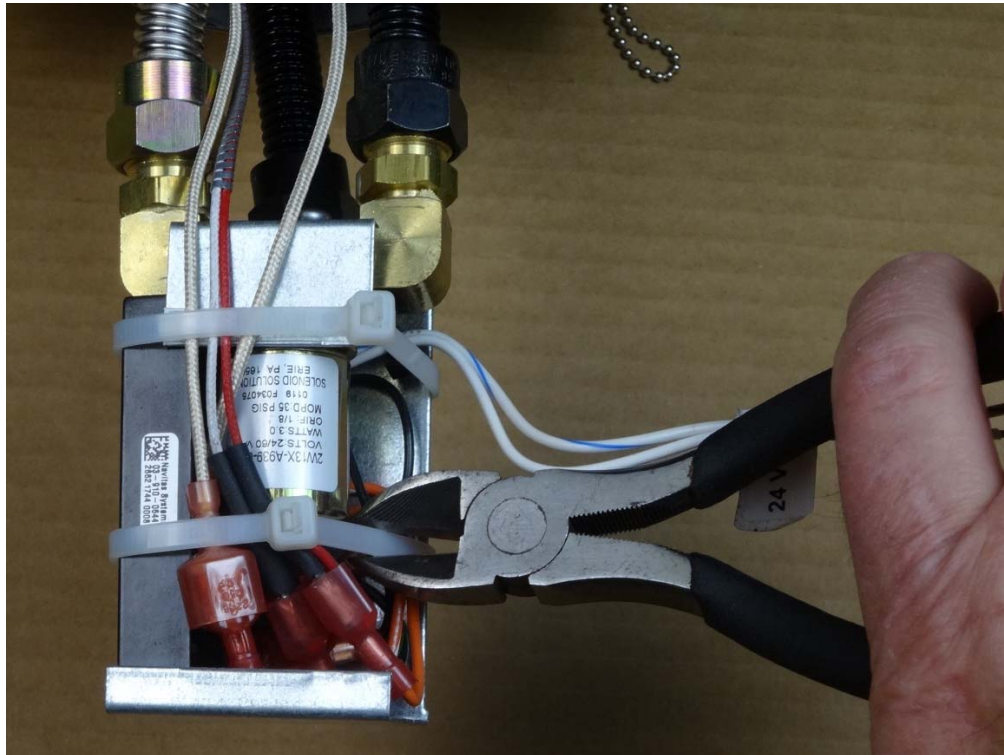
*** NOTE:** The thermopile must connect to the control module as shown above (**orange/white** wire connects to the **white** thermopile wire and **orange** wire connects to **red** thermopile wire). Do not reverse the wires. If the wires are reversed, the torch will not work correctly.

How To Test Components

Below you will find details of how to test the individual components of the tempest torch system. This information is for qualified technicians only.

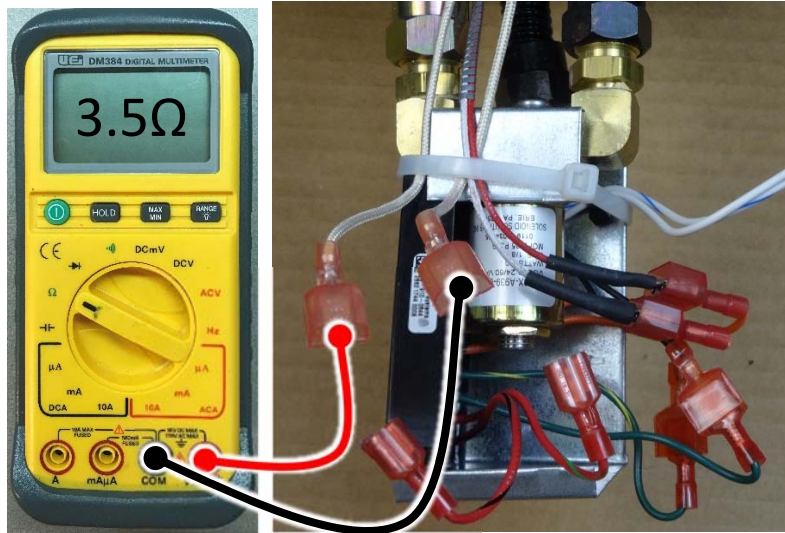
Gaining Access To Wires At The Torch Head

To test the components of the torch system you will need to gain access to the wires under the torch head. Remove the head from its mount (see installation manual for details). With the head removed, you will see a gas valve and control module and the control wiring all bundled together with zip ties. Carefully cut the zip ties to gain access to the quick connects which will be the testing points.



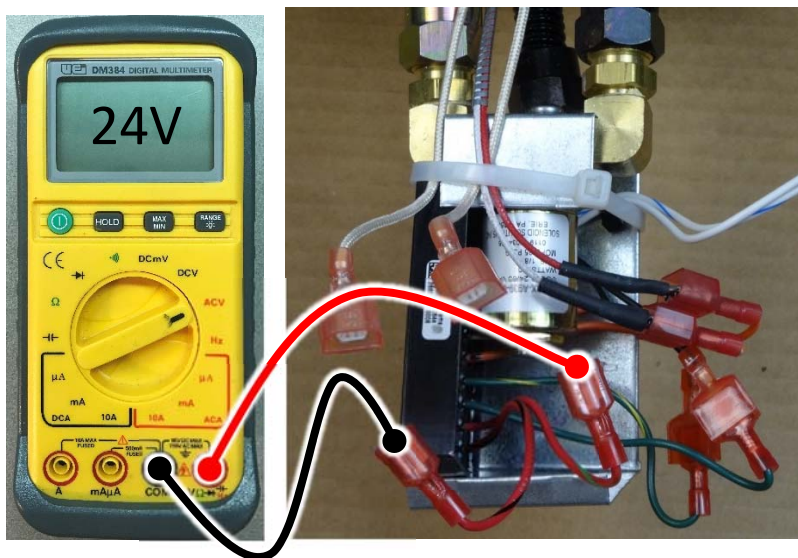
Testing Continuity Of The Ignitor

- Disconnect the two wires from control module (early models – Red/Black and Red/Green – Current models – Red and White/Red) to the ignitor wires (woven white).
- Set multi meter to read Ohms of resistance (Ω).
- Touch meter probes to the ignitor wires and take the reading. The ohms reading should be 3.5Ω +/- $.5\Omega$



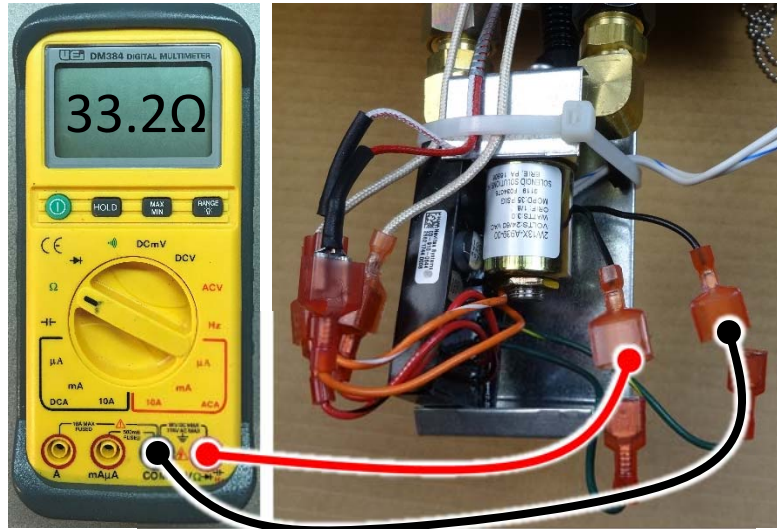
Testing Voltage to the Ignitor

- Disconnect the two wires from control module (early models – Red/Black and Red/Green – Current models – Red and White/Red) to the ignitor wires (woven white).
- Set multi meter to read AC Volts (VAC).
- Touch meter probes to the control modules wires. Turn power on to the torch and take the reading. The VAC reading should be 24V.



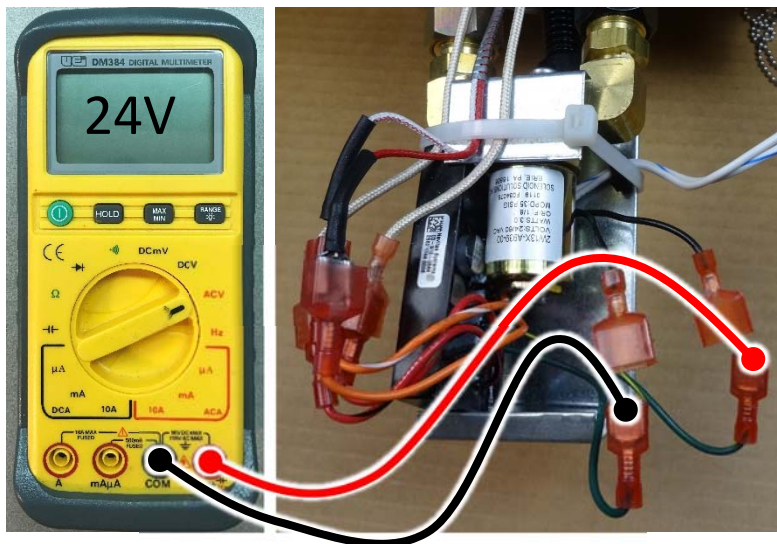
Testing Continuity Of The Valve

- Disconnect the two wires from control module (early models – Green/Yellow and Green – Current models – Green and White/Green) to the ignitor wires (woven white).
- Set multi meter to read Ohms of resistance (Ω).
- Touch meter probes to the ignitor wires and take the reading. The ohms reading should be $33.2\Omega \pm 1.0\Omega$



Testing Voltage to the Valve

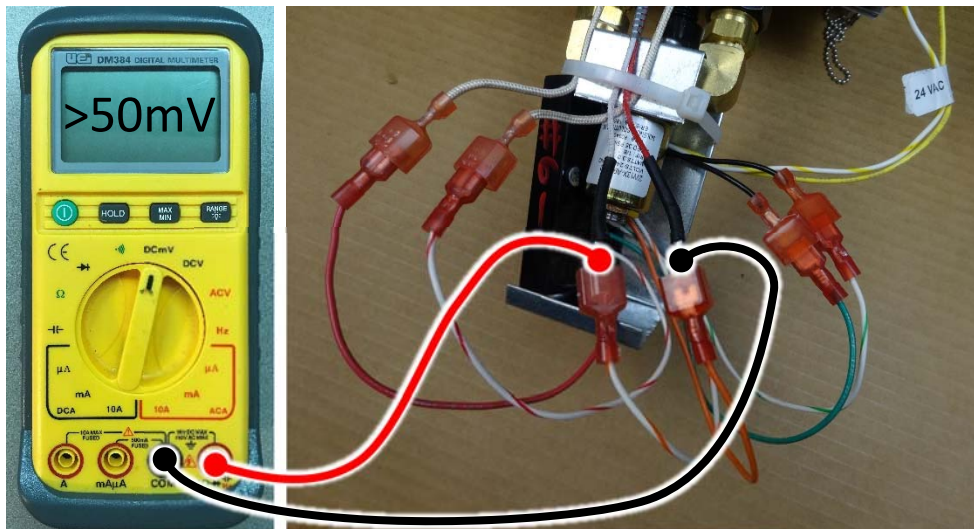
- Disconnect the two wires from control module (early models – Green/Yellow and Green – Current models – Green and White/Green) to the ignitor wires (woven white).
- Set multi meter to read AC Volts (VAC).
- Touch meter probes to the control modules wires. Turn power on to the torch and take the reading. The VAC reading should be 24V.



Testing The Output Of The Thermopile

NOTE: You may need an extra set of hands to help with this test. Someone will need to hold the torch head so that it can be operated. Make sure not to touch hot surfaces.

- Make sure the two wires from control module (early models – Orange/White and Orange – Current models – Orange and White/Orange) connected to the Thermopile wires (Red and White).
- Make sure the solid colored wire from the module is connected to the RED wire from the thermopile. Polarity matters, so if this is not correct, change the wires so they are correct.
- Set multi meter to read DC millivolts (DC mV).
- Touch meter probes to the crimps. Turn the torch on, wait for the flame to light, and then take the reading. The DC mV reading should be above 50 mV.



- The control module determines the state of the torch (fire or no fire) by looking at the percentage of voltage change from the thermopile (gain or loss - not a set voltage). If no fire is sensed by the control module, the igniter and gas valve will stay on for the full ignition sequence (approximately 35 seconds), after which they will close.

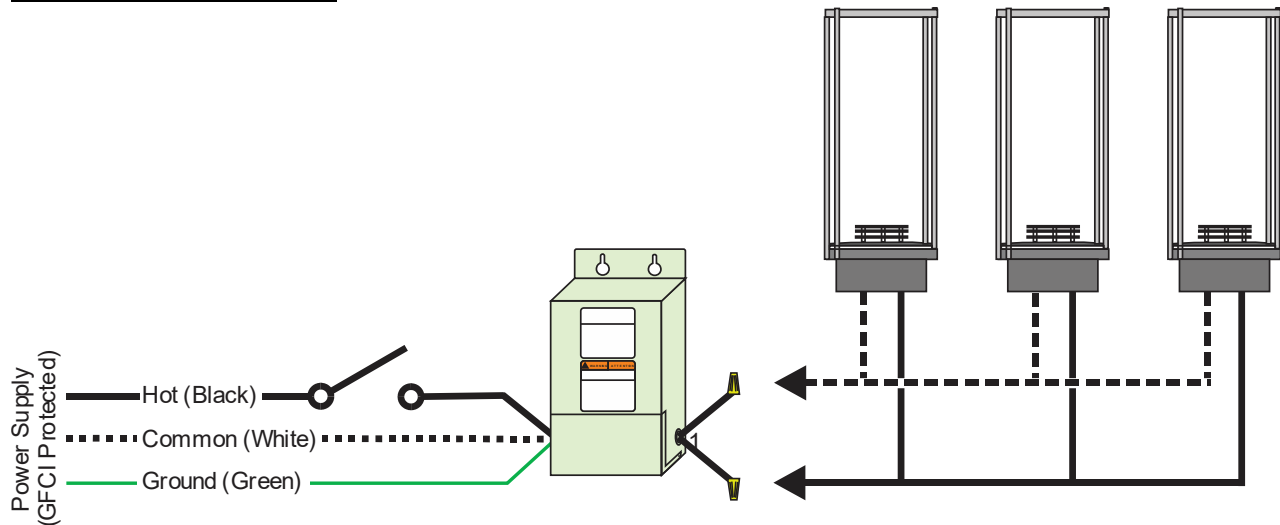
Wiring Multiple Torches to One Transformer

The manner in which you wire the torches to the transformer affects the maximum length of wire and wire gauge. Make sure to determine the wire configuration before installation. NOTE: You may use both direct-run and daisy-chain configurations.

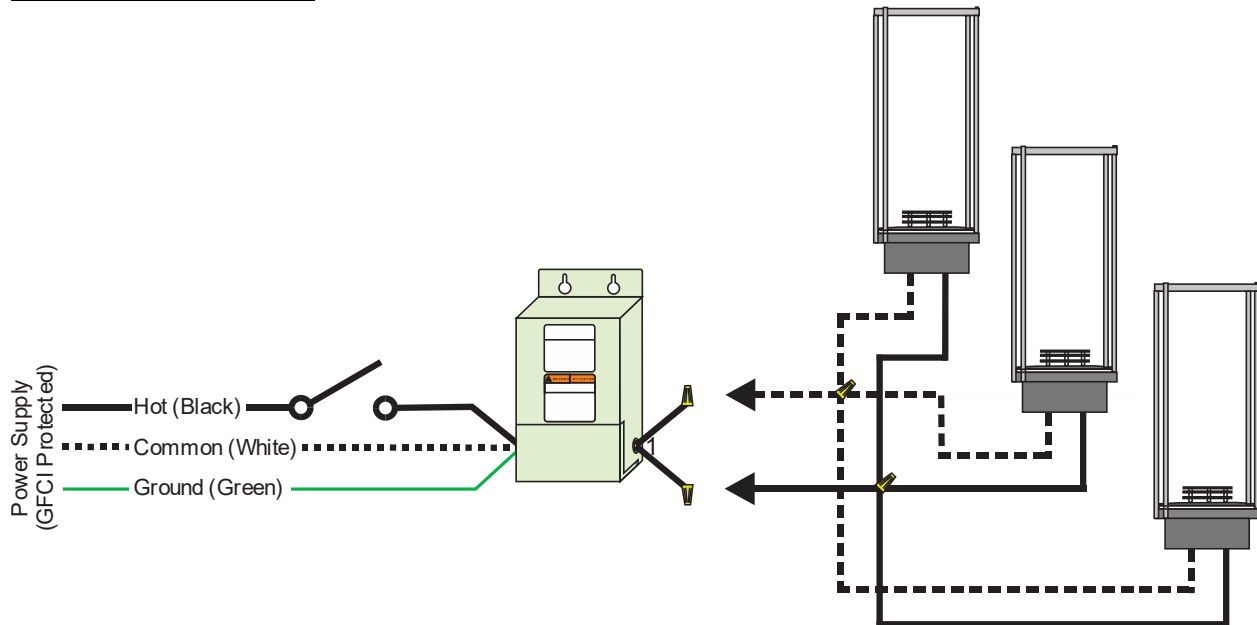


Polarity must be maintained in all multiple torch installations. Failure to maintain polarity will result in damage to the control module.

Daisy-Chain Example



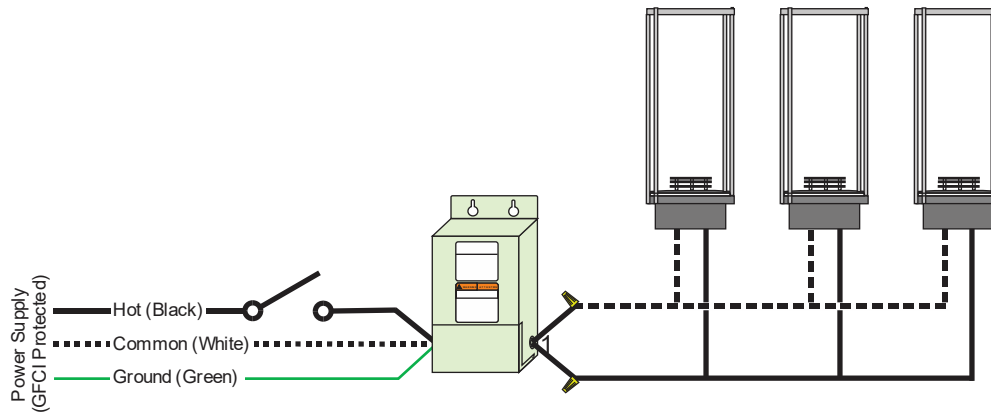
Direct-Run Example



Daisy-Chain Wire Length Chart

This type of wire configuration allows for torches to be wired in a series, reducing the amount of wire used. Use the charts below to determine the correct wire gauge and length. In the example below, the transformer has 3 torches on one branch.

How to Calculate Wire Length: Add together all of the wire length(s) used for the entire installation. If you have one 80' length and three 20' lengths, your wire length would be 140'.



24 Volt Lead

| Wire | | <u># Of Torches On Branch</u> | | | | |
|-------------|-----|-------------------------------|----------|----------|----------|----------|
| | | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> |
| 14 G | min | 0' | 0' | 0' | 0' | 0' |
| | max | 113' | 71' | 49' | 37' | 28' |
| 12 G | min | 0' | 0' | 0' | 0' | 0' |
| | max | 173' | 108' | 75' | 55' | 43' |
| 10 G | min | 0' | 0' | 0' | 0' | 0' |
| | max | 266' | 165' | 115' | 85' | 65' |

26 Volt Lead*

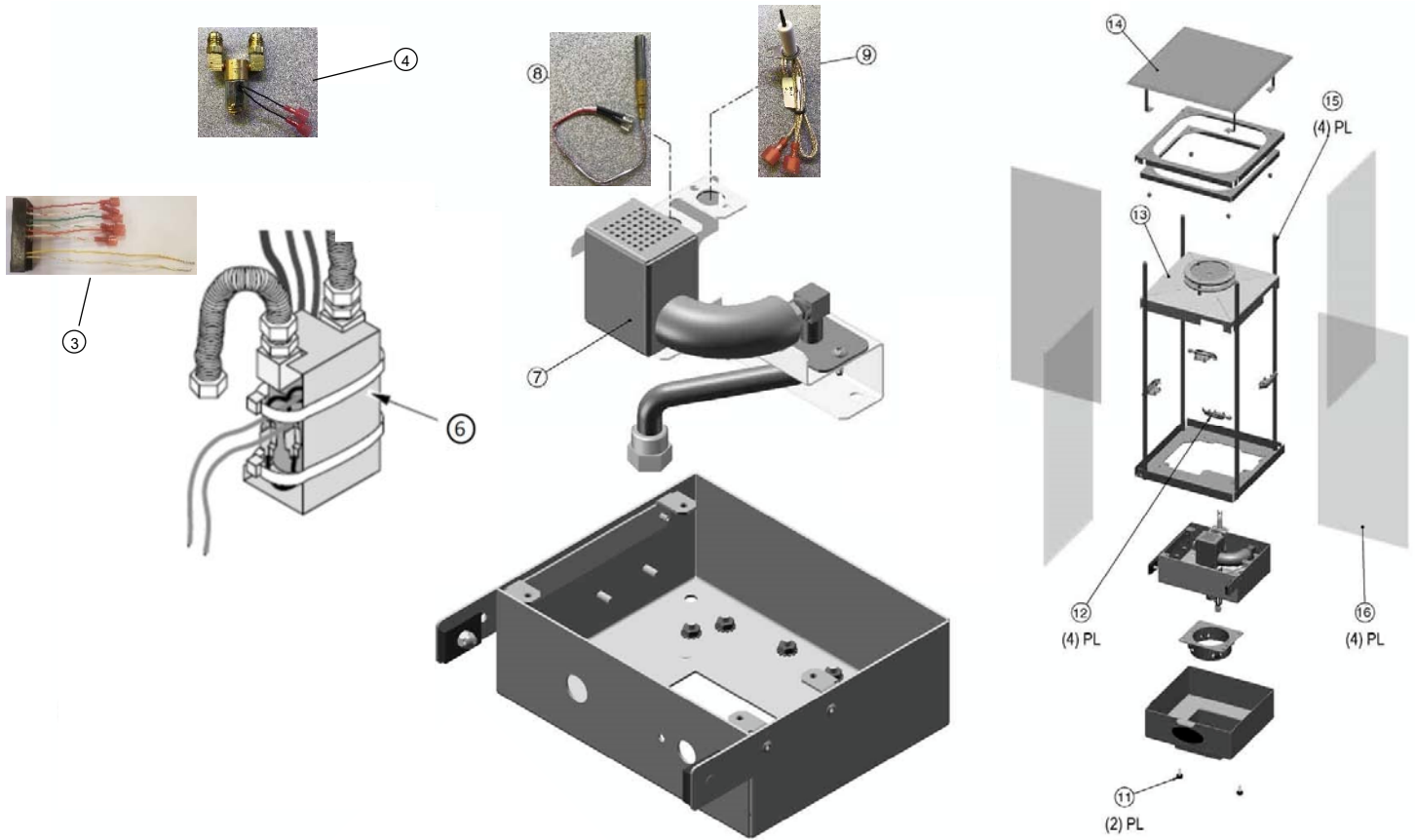
| Wire | | <u># Of Torches On Branch</u> | | | | |
|-------------|-----|-------------------------------|----------|----------|----------|----------|
| | | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> |
| 14 G | min | 27' | 10' | 1' | 0' | 0' |
| | max | 184' | 118' | 85' | 65' | 51' |
| 12 G | min | 41' | 16' | 2' | 0' | 0' |
| | max | 281' | 179' | 129' | 99' | 79' |
| 10 G | min | 63' | 23' | 3' | 0' | 0' |
| | max | 432' | 276' | 198' | 151' | 121' |

28 Volt Lead*

| Wire | | <u># Of Torches On Branch</u> | | | | |
|-------------|-----|-------------------------------|----------|----------|----------|----------|
| | | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> |
| 14 G | min | 104' | 62' | 40' | 27' | 19' |
| | max | 242' | 157' | 113' | 88' | 71' |
| 12 G | min | 160' | 94' | 61' | 41' | 28' |
| | max | 369' | 238' | 173' | 134' | 108' |
| 10 G | min | 245' | 144' | 93' | 63' | 43' |
| | max | 566' | 366' | 266' | 206' | 165' |

* Not available on some transformers.

Replacement Parts



| <u>Part #</u> | <u>Description</u> | <u>Diagram #</u> |
|---------------|----------------------------------|------------------|
| 250-01800 | SCW, PHMS M4 x 20mm PK OF 6# | 2 |
| 250-04553 | CONTROL MODULE | 3 |
| 250-04554 | GAS CONTROL VALVE | 4 |
| 250-04552 | CONTROL MODULE ASSEMBLY, TEMPEST | 6 |
| 250-04610 | BRN SYSTEM ASSY, TMP(EI) LP | 7 |
| 250-04609 | BRN SYSTEM ASSY, TMP(EI) NG | 7 |
| 250-04550 | THERMOPILE, TEMPEST | 8 |
| 250-04549 | IGNITER, TEMPEST | 9 |
| 250-01799 | THUMB SCREW, TEMPEST TORCH | 11 |
| 250-01445 | GLASS RETAINER (TEMPEST) 1 EACH | 12 |
| 250-01790 | FLAME SPREADER w/PYRMD- NG | 13 |
| 250-01791 | FLAME SPREADER w/PYRMD - LP | 13 |
| 250-01256 | RAIN CAP ASS'Y, TEMPEST | 14 |
| 250-01257 | VERTICLE ROD w/SCRWS, TEMPEST | 15 |
| 250-01251 | GLASS - TEMPEST | 16 |
| 250-04611 | STOVE PACK, TEMPEST ELCTRC IGN | |
| 250-01789 | BALL VALVE, (SHUT-OFF) TEMPEST | |
| 250-04612 | MANUAL | |