



**Capable
Controls** inc.

2XXXX OPERATION AND INSTALLATION INSTRUCTIONS UNIVERSAL DIRECT SPARK IGNITION CONTROL

The 2xxxx series are microprocessor based Direct Spark Ignition Control systems. The microprocessor provides reliable software control of all timings and drives a diagnostic led. It is designed for direct burner supervision and can be used with all gases. It provides ignition sequence, flame monitoring, and safety shutout for direct spark ignition boilers, furnaces and other heating appliances.

The control replaces many existing direct spark ignition controls with flame rectification flame sense and spark ignition made by various manufacturers. Controls replaced should have the following characteristics.

Single rod (local sense) or Dual rod (remote sense) flame sensing.
100 percent shutoff/lockout no retry.
Natural, LP or manufactured gas.
Trial times of 5 seconds or longer.
Pre-purge times of 10 seconds or less.

Specifications

Electrical ratings:

| | |
|--------------------|--------------------------|
| Voltage | 24VAC (+/- 20%) 50/60 Hz |
| Valve | 2A maximum |
| Operating current | 0.2A |
| Wiring connections | 1/4" male spade |

Environmental: -40 to +170 degrees F (-40 to +77 C)

Pre-purge time: 0 - 45 seconds

Trial For Ignition: 5 – 90 seconds

Flame failure response time: 2 second maximum

Retry Time 0 – 5 – 60 minutes

Flame failure Re-ignition time 0.5 seconds

Minimum flame current required: 0.15 microamperes

Type of gas: Natural, LP, or manufactured

Recommended Spark Gap: 0.2 inches maximum, use noise suppression wire only

Sequence of Operation

When call for heat from thermostat turns on, after a 1 second maximum diagnostic period the pre-purge period will start. During the 9 second pre-purge period the led will blink 1/2 sec on 1/2 sec off. At the end of the pre-purge period (10 sec total) the spark will start and the gas valve will turn on starting trial for ignition period.

During the trial for ignition period the control sparks for 4 seconds while rapidly flashing led. It then turns off spark and led for 1 second while checking flame sense. This cycle will repeat until flame is detected or trial time is over.

When flame is detected, the spark will stop and valve and led will stay on. The control will remain in this state until flame is lost or call for heat ends. If flame is lost, led, and valve are turned off for 0.5 seconds and a new trial for ignition sequence will start.

If flame is not detected during trial for ignition period, the valve will be shut off. The control will go into lockout flashing the led until call for heat ends removing power.

Led Indications during normal operation

| | |
|------------------------|---------------------------|
| Steady on | Flame detected, burner on |
| .50 sec on .50 sec off | Pre-purge period |
| .10 sec on .10 sec off | Trial time spark on |
| .25 sec on 1.0 sec off | Trial time |

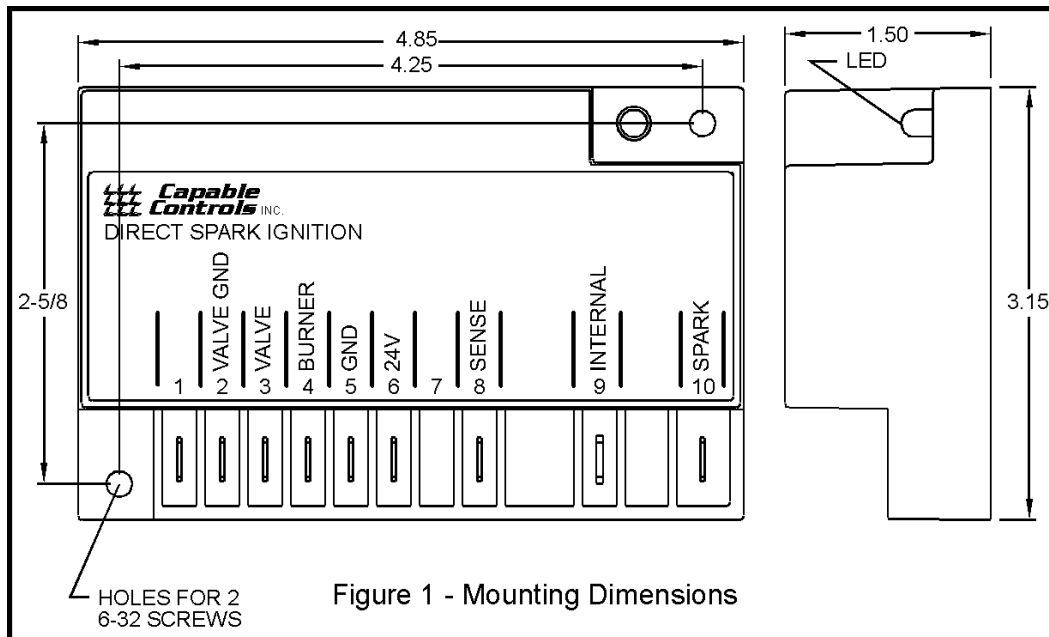
If the control goes to lockout because a fault was detected, the spark and valve will be turned off. The led will flash an error code blinking .25 second on and .25 second off for each count of the error code with 1 second off between codes. The control will remain in this condition until power is removed by turning off call for heat. Codes other than 1 indicate a problem with the control and it should be replaced.

Error codes are:

| | |
|--------|--|
| 1 | Failure to detect pilot flame during trial time. |
| 2 | Flame sense circuit error. |
| 3 | Pilot valve circuit error. |
| 5 to 9 | Microcontroller error. |

Mounting and wiring

The 2XXXX controls are not position sensitive. It may be mounted horizontally or vertically with #6 sheet metal or machine screws. Mounting holes are on 4 -1/4 by 2-5/8 centers. See figure 1 below.



Power must be provided from a properly sized 24 volt class 2 transformer. All wiring must be done in accordance with both local and national electrical code. All wiring and initial operation must be performed by a qualified service technician.

The high voltage spark cable should be of the noise suppression type rated for at least 15kV and must not be in continuous contact with a metal surface. If separate flame sense probe is used, the sense wire must be separated from the high voltage wire by a minimum of 1/4".

The control is supplied with a jumper wire between SENSE and INTERNAL terminals and is ready for internal (one rod) flame sense. With the jumper in, flame is sensed through the high voltage spark wire. The jumper must be removed for external (two rod) flame sense and the sense electrode wired to SENSE terminal.

The schematics in Figures 2 and 3 show typical wiring hookups for the control when using internal (one rod) flame sense and external (two rod) flame.

