

SmartSpark®

High Energy Ignition System Installation and Operation Manual



Part Numbers:

07000123-00

07000123-01

07000123-02

07000123-R3

07000123-R8

KEEP THIS MANUAL IN A SAFE PLACE FOR FUTURE REFERENCE

READ THIS MANUAL BEFORE USING THIS PRODUCT. FAILURE TO FOLLOW THE INSTRUCTIONS AND SAFETY PRECAUTIONS IN THIS MANUAL CAN RESULT IN SERIOUS INJURY OR DEATH OR DAMAGE TO EQUIPMENT.

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1.0 Important Safety Information



Read All Instructions before Using Equipment



The instructions provided in this manual have been prepared to serve as a general guide. It is intended for use by qualified personnel with knowledge of equipment of this type. It is not intended to cover all possible variations in equipment or to provide for specific operating problems which may arise.

You are responsible for adhering to all warnings or cautions provided in this Manual.

In addition to any general safety measures provided in this Manual, you must comply with all current national, state, local and company safety regulations at all times.

Safety Symbols used in this manual comply with ISO 3864.

THESE SYMBOLS ARE USED TO ALERT YOU TO POTENTIAL PERSONAL INJURY HAZARDS.

OBEY ALL SAFETY MESSAGES THAT FOLLOW THESE SYMBOLS TO AVOID POSSIBLE INJURY OR DEATH.



Indicates a hazard with a high level of risk which, if not avoided will result in death or serious injury.



Indicates a hazard with a medium level of risk which, if not avoided could result in death or serious injury.



Indicates a hazard with a low level of risk which, if not avoided will result in minor or moderate injury.



HAZARDOUS VOLTAGE

The equipment contains a High Energy Ignition System which contains **DANGEROUS AND POTENTIALLY LETHAL VOLTAGE**. To avoid risk of serious injury from electric shock, always follow the safety precautions listed below:

Disconnect power before servicing the equipment.

Ensure the equipment is appropriately bonded to earth before use. See Section **Error! Reference source not found.** regarding equipment earth bond locations.

Do not join or separate any connection to the equipment when the equipment is energized.

Do not apply power to the equipment without an igniter.

Keep the igniter firing end away from all personnel and flammable material.

The equipment must be installed and serviced by qualified personnel in accordance with this manual and applicable local and national codes, standards, and ordinances.

The equipment is not field-repairable. Do not attempt to disassemble or repair the equipment.

Les symboles de sécurité utilisés dans ce manuel sont conformes à la norme ISO 3864.

CES SYMBOLES SONT UTILISÉS POUR VOUS AVERTIR DES RISQUES DE BLESSURES POTENTIELS. RESPECTEZ TOUS LES MESSAGES DE SÉCURITÉ QUI SUIVENT CES SYMBOLES POUR ÉVITER LES BLESSURES POTENTIELLES OU LA MORT.



Indique un danger avec un niveau élevé de risque qui, s'il n'est pas évité, entraînera la mort ou des blessures graves.



Indique un danger avec un niveau de risque moyen qui, s'il n'est pas évité, pourrait entraîner la mort ou des blessures graves.



Indique un danger avec un niveau de risque bas qui, s'il n'est pas évité, entraînera des blessures mineures ou modérées.



TENSION DANGEREUSE

L'appareil contient un système d'allumage à haute énergie qui contient une **TENSION DANGEREUSE ET POTENTIELLEMENT MORTELLE**. Pour éviter les risques de blessures graves par électrocution, suivez toujours les précautions de sécurité indiquées ci-dessous:

Coupez l'alimentation avant l'entretien du matériel.

S'assurer que l'équipement est correctement mis à la terre avant l'utilisation. Voir la section **Error! Reference source not found.** concernant l'emplacement des liaisons à la terre de l'équipement.

Ne pas connecter ou séparer toute connexion à l'équipement lorsque l'appareil est sous tension.

Ne pas appliquer de tension à l'appareil sans un allumeur.

Gardez l'extrémité de l'allumeur loin de tout personnel et de matériels inflammables.

L'équipement doit être installé et entretenu par du personnel qualifié, conformément à ce manuel, aux codes locaux et nationaux applicables, et aux normes et règlements en vigueur.

L'appareil n'est pas réparable sur site. Ne tentez pas de démonter ou de réparer l'équipement.

2.0 Definitions

Spark – An electric current arc.

High Energy Ignition – Electric spark ignition system utilizing high energy sparks for direct ignition of hydrocarbon fuels such as gas, diesel, or #6 oil.

High Energy Exciter – An electronic device that stores electric charge and releases it cyclically in abrupt bursts to an igniter to create high power sparks.

3.0 Chentronics High Energy Ignition Systems

Chentronics High Energy Ignition (HEI) systems directly ignite burner fuels by providing short time duration (impulse), high current electrical arcs commonly referred to as *sparks*. These sparks are generated by abruptly releasing electrical energy (charge) stored in large capacitors. The energy is released through an igniter driver circuit called a *pulse forming network* to specialized high energy igniters. The result is a high power spark with increased ability to ignite fuels.

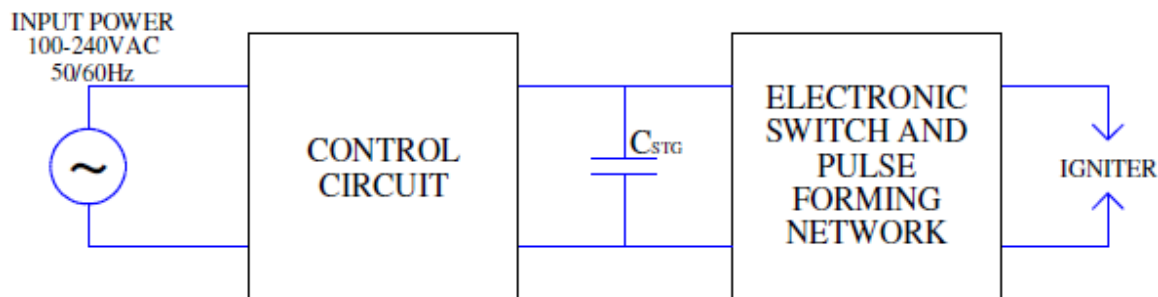


Figure 1: High Energy Exciter basic schematic.

Chentronics High Energy Ignition Systems are designed to operate in conditions of extreme temperature, moisture, and contamination; creating high power sparks that dependably provide direct spark ignition to a wide range of fuels in a wide range of adverse conditions. The igniter can spark even under water.



Figure 2: Igniter firing in water.

NOTE: Firing igniters submerged in water will cause them to excessively wear and reach end of life very quickly.

4.0 System Specifications

4.1 Description of Equipment

The Chentronics SmartSpark is a high energy ignition system for use with gas, #2 distillate, and diesel fuels. Designed with durability in mind, the SmartSpark is able to withstand temperature extremes and operate in up to 100% humidity. For convenience, there is an LED indicator on the front of the exciter which indicates when the igniter is sparking, when the igniter tip is failing, and when the igniter tip has failed. This allows the user to replace igniter tips before they fail, and prevent ignition faults from occurring.

4.2 Configurations:

The SmartSpark system model number 07000123 is available in five spark rate configurations:

Model 07000123-00

Spark Rate: 15 sparks per second (SPS) for 30 seconds, followed by 1SPS continuous
Duty cycle: 15 minutes on, 5 minutes off.

Model 07000123-01

Spark Rate: 1SPS continuous.
Duty Cycle: Continuous.

Model 07000123-02

Spark Rate: 2SPS continuous.
Duty Cycle: 15 minutes on, 5 minutes off.

Model 07000123-R3

Spark Rate: One spark every 3 seconds
Duty Cycle: Continuous.

Model 07000123-R8

Spark Rate: One spark every 8 seconds.
Duty Cycle: Continuous.

4.3 Equipment Enclosure

The electrical control and measurement equipment are completely encased in potting to prevent water and dust ingress. The stainless steel enclosure reduces corrosion which could compromise the enclosure and any earth ground connections.

4.4 Equipment Conditions of Use

The SmartSpark system equipment is subject to the following conditions of use and limitations:

1. The power cable shall not be disconnected from the exciter until the power has been turned off for at least 5 minutes.
2. Power shall not be applied to the power cable while it is disconnected.
3. The equipment shall not be subjected to ambient temperatures greater than +85°C or less than -40°C while operating.
4. No terminal connections should be joined or separated when the equipment is in use (powered).
5. The equipment shall not be operated without an igniter attached.

4.5 System Electrical and Physical Specifications

Application:	High-energy, direct-spark ignition system
Input Power:	100-240VAC 50/60Hz, 1A MAX
Exciter Type:	High Energy Ignition
Exciter Duty Cycle:	See Section 4.2.
Exciter Spark Command:	INPUT – Apply power to start exciter
Exciter Spark Detect Visual:	LED, Blue , flashes off at steady rate when successful spark output current detected
Exciter Power:	4J min per Spark
Exciter Spark Rate:	See Section 4.2.
Operating Temperature Limits:	-40°C to 85°C
Storage Temperature Limits:	-55°C to 100°C
Humidity:	0 to 100% condensing
Enclosure:	Polished 304 Stainless Steel
Weight:	Approximately 5lb [2.3 kg]
Dimensions:	Approximately 6.0 x 6.9 x 3.1 in

5.0 Installation Instructions

5.1 Igniter Installation

To install the igniter, connect the igniter shell to the LO output terminal and the center pin to the HI output terminal. These terminals are shown in the image below. The igniter should be installed only while there is no power being supplied to the exciter.

5.2 Input Power Cable Installation

To power exciter, connect mains input in the left three terminals, shown in Figure 4. The power cable should be installed only when the cable is not energized. Once connected, the cable should not be removed from the exciter until it has been de-energized for at least 5 minutes.

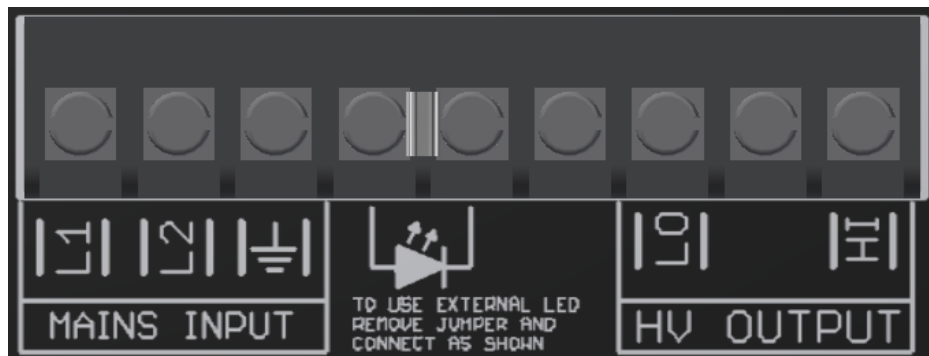


Figure 4:Terminal Block

5.3 General Arrangement

The equipment is generally configured in a way similar to that of Figure 5.

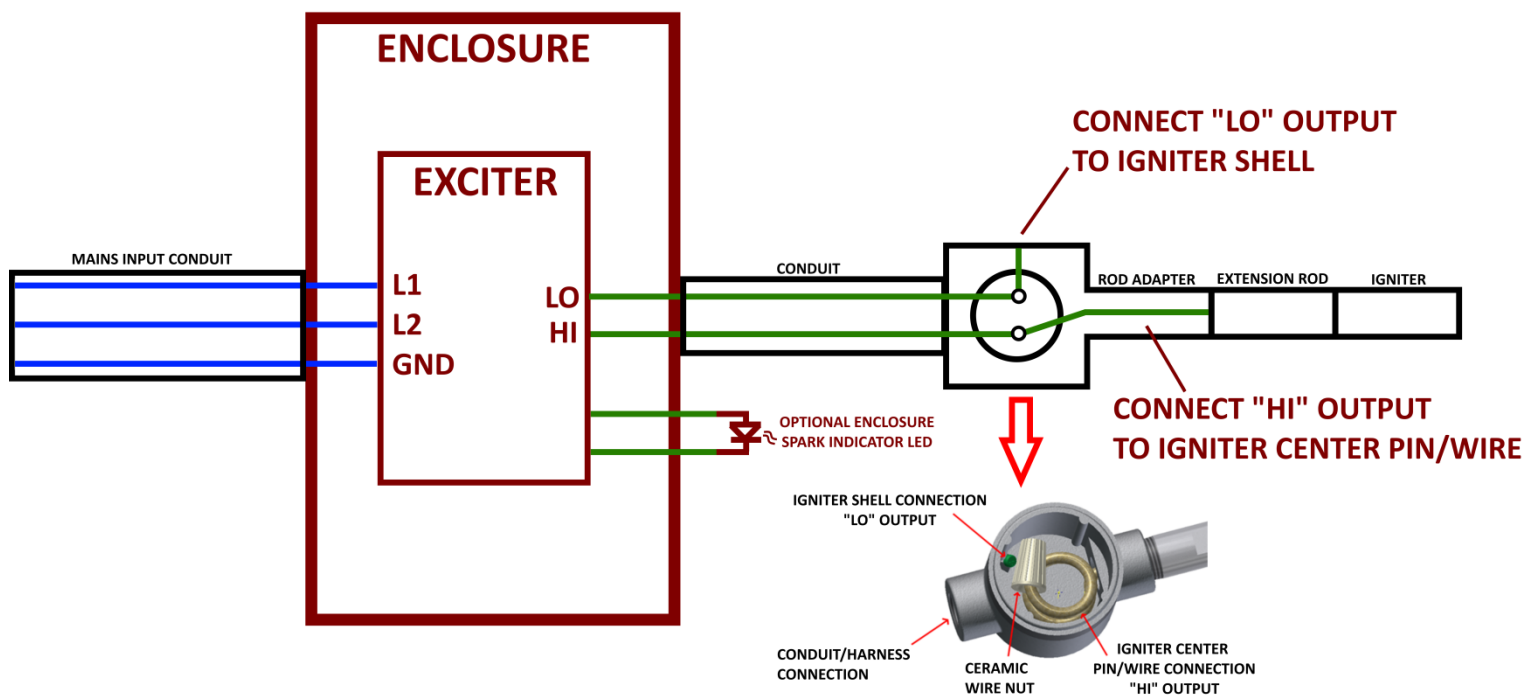


Figure 5: General Arrangement

5.4 System Schematic Diagram

The following schematic block diagram describes equipment functionality. Inputs are noted in blue text on the left, and outputs are located on the right.

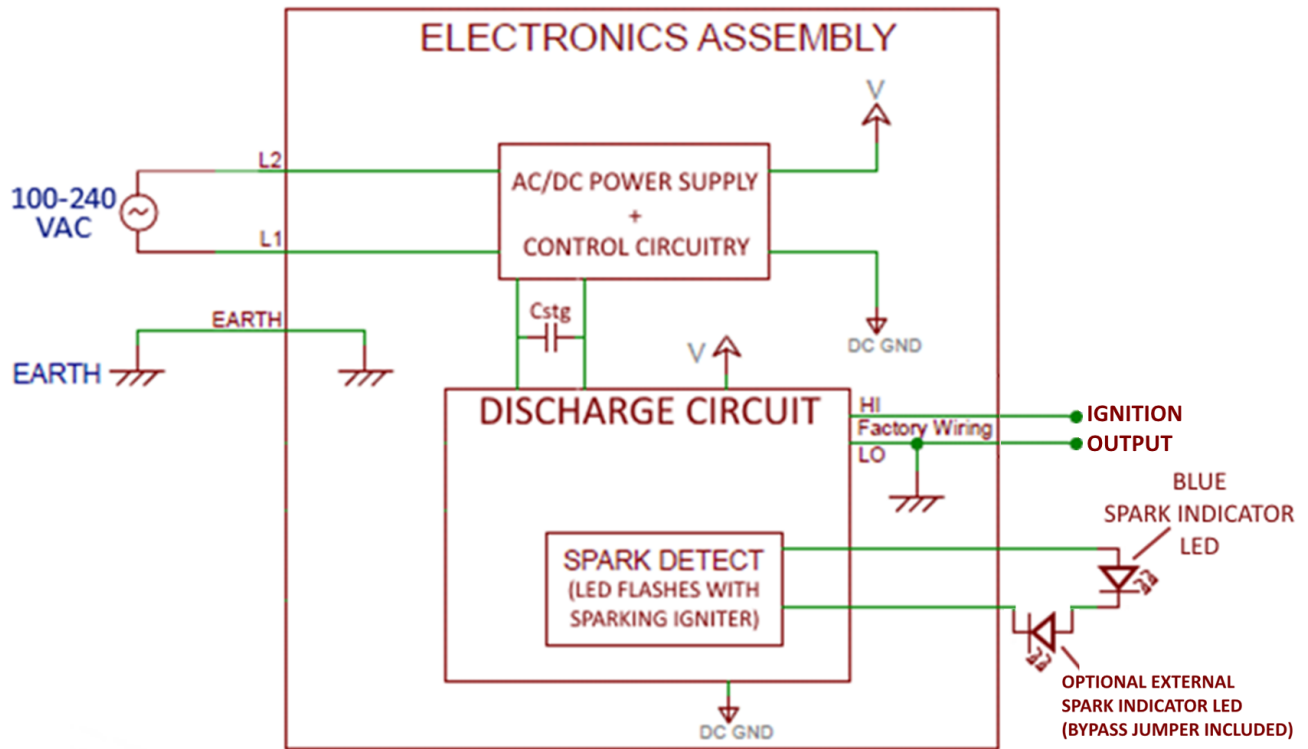


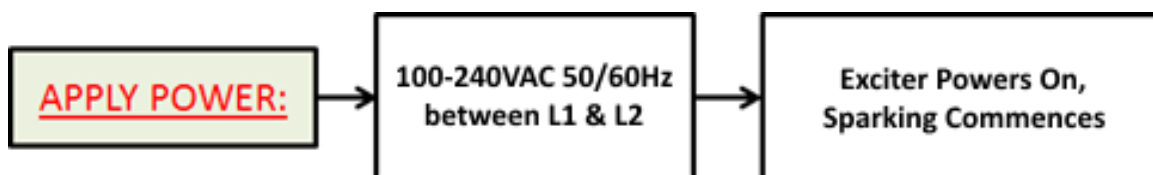
Figure 8: System schematic diagram.

6.0 System Operational Inputs and Outputs

The following functions illustrate the input and output functionality of the **SmartSpark**.

6.1 Applying Power to Equipment

To power the equipment, apply 100-240VAC 50/60Hz between wires L1 & L2, and connect the wire labeled GROUND to earth ground. This will initiate sparking at the igniter tip.



6.2 Firing the Igniter

The igniter fires when power is connected to the exciter. See Section 6.1.

6.3 Spark Indicator LED

The SmartSpark system is equipped with a blue spark indicator LED which will visually represent the functionality of the Exciter circuit. The LED indicator is on the front of the exciter to the left of the terminal block and flashes off steadily whenever a spark occurs. If the LED is off, it means that power is not being applied to the exciter. If the LED is on and flashing at a constant rate, this means the igniter is firing correctly. If the LED is on and flashing at an intermittent rate, it means the igniter tip is failing and needs to be replaced. Finally, if the LED is on solid, it means the igniter tip has failed and must be replaced. See Table 1 for a quick reference.

Table 1: LED Indicator Key

LED FLASH RATE	MEANING
Always Off	Device Not Powered
Steady Rate	Normal Operation
Intermittent	Igniter tip near end of life (replace soon)
Always On	Igniter tip end of life (replace now)

7.0 Warranty Instructions

For warranty related inquiries please contact Chentronics at TEL: +1.607.334.5531 or info@chentronics.com

8.0 Technical Support

For technical support related inquiries beyond the scope of this Installation and Operation Manual, please contact Chentronics at TEL: +1.607.334.5531 or info@chentronics.com