

## **Installation and Operation Manual**



**EXCITER PN: 127T9801**

**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.**

FOR A LIST OF RELEVANT PATENTS AND TRADEMARKS PLEASE SEE [CHENTRONICS.COM/LEGAL-NOTICES](http://CHENTRONICS.COM/LEGAL-NOTICES)

# Contents

<b>1.0 Important Safety Information.....</b>	<b>3</b>
<b>2.0 Definitions.....</b>	<b>7</b>
<b>3.0 Chentronics High Energy Ignition Systems .....</b>	<b>7</b>
<b>4.0 System Specifications .....</b>	<b>8</b>
4.1 Description of Equipment .....	8
4.2 General Arrangements.....	8
4.3 Description of Equipment .....	9
4.4 Equipment Conditions of Use .....	9
4.5 System Electrical and Physical Specifications.....	10
<b>5.0 Installation Instructions.....</b>	<b>11</b>
5.1 Instructions for Lifting.....	11
5.2 Mounting .....	11
5.3 ARP 670 Harness and Igniter Installation.....	11
5.4 Wiring Installation.....	11
5.5 Installing the Igniter into a Burner .....	12
5.6 Equipment Earth Bond.....	12
5.7 Wiring Diagram Example.....	13
5.8 Terminal Key .....	14
5.9 System Schematic Diagram.....	16
5.10 Firing the Igniter.....	17
5.11 Spark Indicator .....	17
5.12 Diagnostic Feature .....	17
<b>6.0 Maintenance .....</b>	<b>18</b>
6.1 Service.....	18
6.2 Cleaning .....	18
<b>7.0 Standard Components and Accessories .....</b>	<b>19</b>
7.1 Standard ARP 670 Coaxial System Components .....	19
<b>8.0 Warranty Instructions.....</b>	<b>19</b>
<b>9.0 Technical Support.....</b>	<b>19</b>

## 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.**

**OBEDI 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 5.4 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 5.4 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.

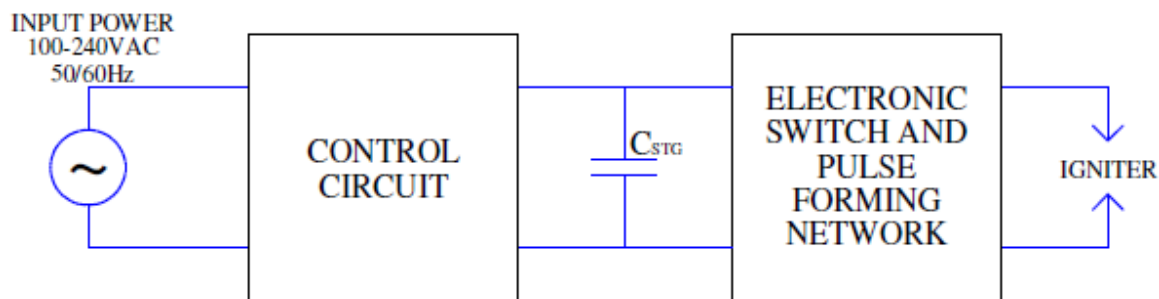


Figure 1: High Energy Exciter basic schematic.

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.

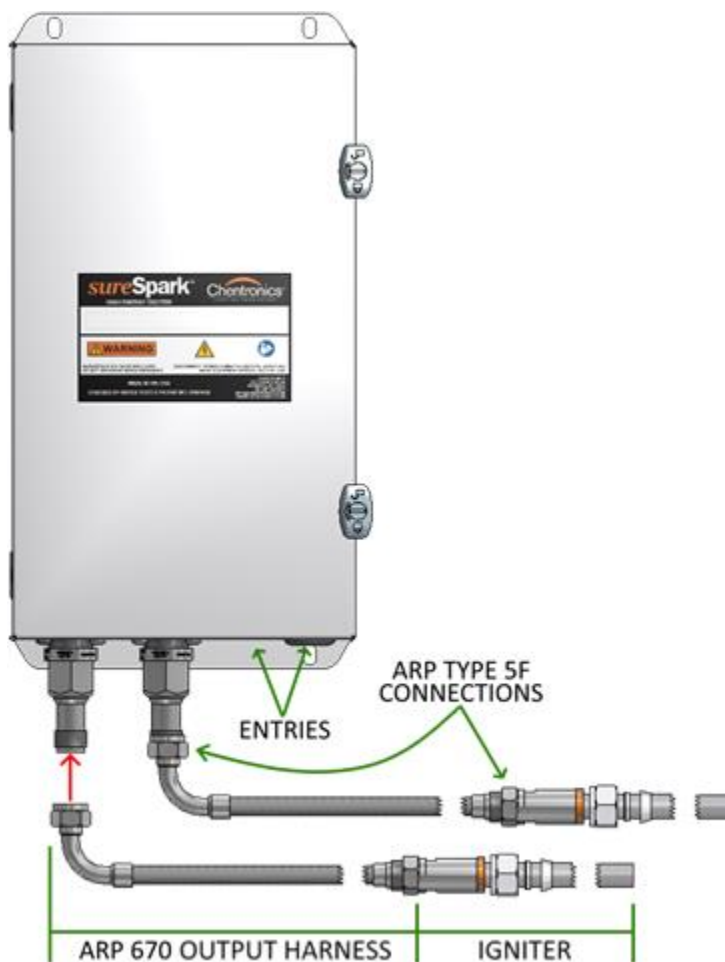
## 4.0 System Specifications

### 4.1 Description of Equipment

The Chentronics high energy ignition systems are specifically designed to ignite gas, light oil (#2), and diesel fuels directly while operating in a wide range of environmental conditions. For convenience, there is an external Spark LED (two for dual units, one per output) which indicates when the igniter is sparking and when the igniter tip needs to be replaced. This allows the user to replace igniter tips before they fail and prevent ignition faults from occurring. There is also an Igniter Wear indicator which turns on red when an igniter fault is detected and remains on until the run signal is cycled. This additional feature allows for easier location of failed units when multiple units are being operated simultaneously.

### 4.2 General Arrangements

#### 4.2.1 Typical Installation





#### **4.3 Description of Equipment**

The equipment is sealed in an enclosure which has an IP66 rating. The 304/316 stainless steel enclosure options provide NEMA Type 4X rating.

#### **4.4 Equipment Conditions of Use**

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

1. All wiring must be rated at or above 90°C. The installation must use conduit or an entry hub to protect the wiring from damage.
2. A switch or circuit-breaker to separate the device from mains must be included in the installation. The switch or circuit-breaker must be suitably located and easily reached. It is recommended that it be located near the exciter enclosure.
3. The lid shall not be unlocked or opened until the power has been turned off for at least 5 minutes.
4. The equipment shall not be subjected to ambient temperatures greater than +75°C, or less than -25°C while operating.
5. The equipment's igniter connections shall not be joined or separated when the equipment is in use (powered).
6. The equipment shall not be operated without an igniter attached.
7. Equipment shall be properly grounded. Please see Section regarding earth bond requirements in this manual.
8. The igniter, extension rod, or base rod must be secured to the grounded building frame using a metal fixture.

## 4.5 System Electrical and Physical Specifications

### 4.5.1 Dual Output LO-4 Specifications:

Application:	High-energy, direct-spark ignition system
Input Power:	100-240VAC 50/60Hz, 2A MAX
Exciter Type:	High Energy Ignition
Exciter Duty Cycle:	5 min on, 10 min off
Exciter Spark Command:	With jumper, apply power to begin sparking. Without jumper, apply 24V DC, close contacts, or push-button switch (optional) to spark.
Exciter Spark Indicator:	When powered and in standby, LED is on solid <b>Yellow</b> . When attempting to spark, LED turns <b>Blue</b> and flashes off at steady rate when successful spark output currents detected.
Igniter Wear Indicator:	When an igniter fault is detected, LED turns on solid <b>Red</b> and remains on until spark signal is removed and reapplied.
Exciter Energy:	12J min per Spark (each channel)
Exciter Spark Rate:	4 SPS min (each channel)
Operating Temp - Duty Cycle:	-25°C to 75°C, 5 MIN ON / 10 MIN OFF (with Igniter Load) -25°C to 85°C, 90 SEC ON / 90 SEC OFF (with Igniter Load)
Storage Temperature Limits:	-40°C to 105°C
Humidity:	0 to 100% condensing
Enclosure:	Brushed Stainless Steel (304 or 316)
Weight:	Approximately 30lb (14 kg)
Dimensions:	8.5 x 6.8 x 14.75 in

## 5.0 Installation Instructions

### 5.1 Instructions for Lifting

The exciter should be carried only by someone who is capable of safely lifting 35lb.

### 5.2 Mounting

For mounting dimensions, refer to the equipment datasheet. The exciter should be mounted to a firm structure.

### 5.3 ARP 670 Harness and Igniter Installation

For ARP 670 Coaxial outputs, connect the 90° elbow of the harness to the output connector on the enclosure and wrench-tighten. Repeat this process on the other end of the harness to connect the harness to the igniter. See Figure 3.

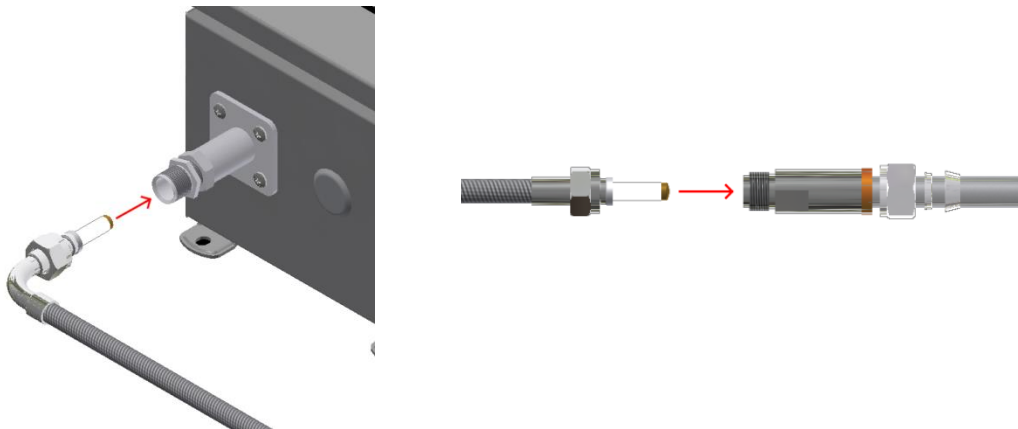
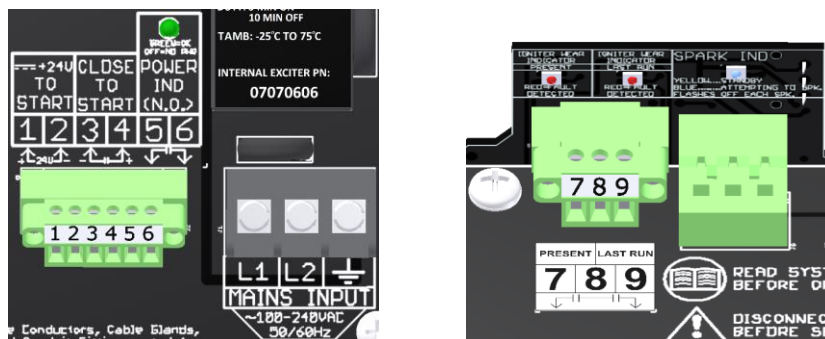


Figure 3: ARP 670 Coaxial Harness connections.

### 5.4 Wiring Installation

The exciter includes two enclosure entries for power/control wiring (three on dual output units). Wiring must be rated at least 90°C. Connections should be made only when the equipment and wiring are not energized. Once connected, the wiring should not be removed from the exciter until it has been de-energized for at least 5 minutes.

To power the exciters, apply 100-240VAC at 50/60 Hz between terminals L1 and L2, and connect the terminals marked with the ground symbol  $\perp$  to earth ground. Control wiring is connected to terminals 1-6 and terminals 7-9. The power/control terminals are shown in Figure 4.



**Figure 4: Exciter Input Terminals. Left: Main power/control terminals. Right: Diagnostic card control terminals.**

### **5.5 Installing the Igniter into a Burner**

Consult the burner manufacturer's instruction manual for igniter installation into your specific burner. Clamp the igniter rod or metal harness in place using metal fixtures/clamps.

### **5.6 Equipment Earth Bond**

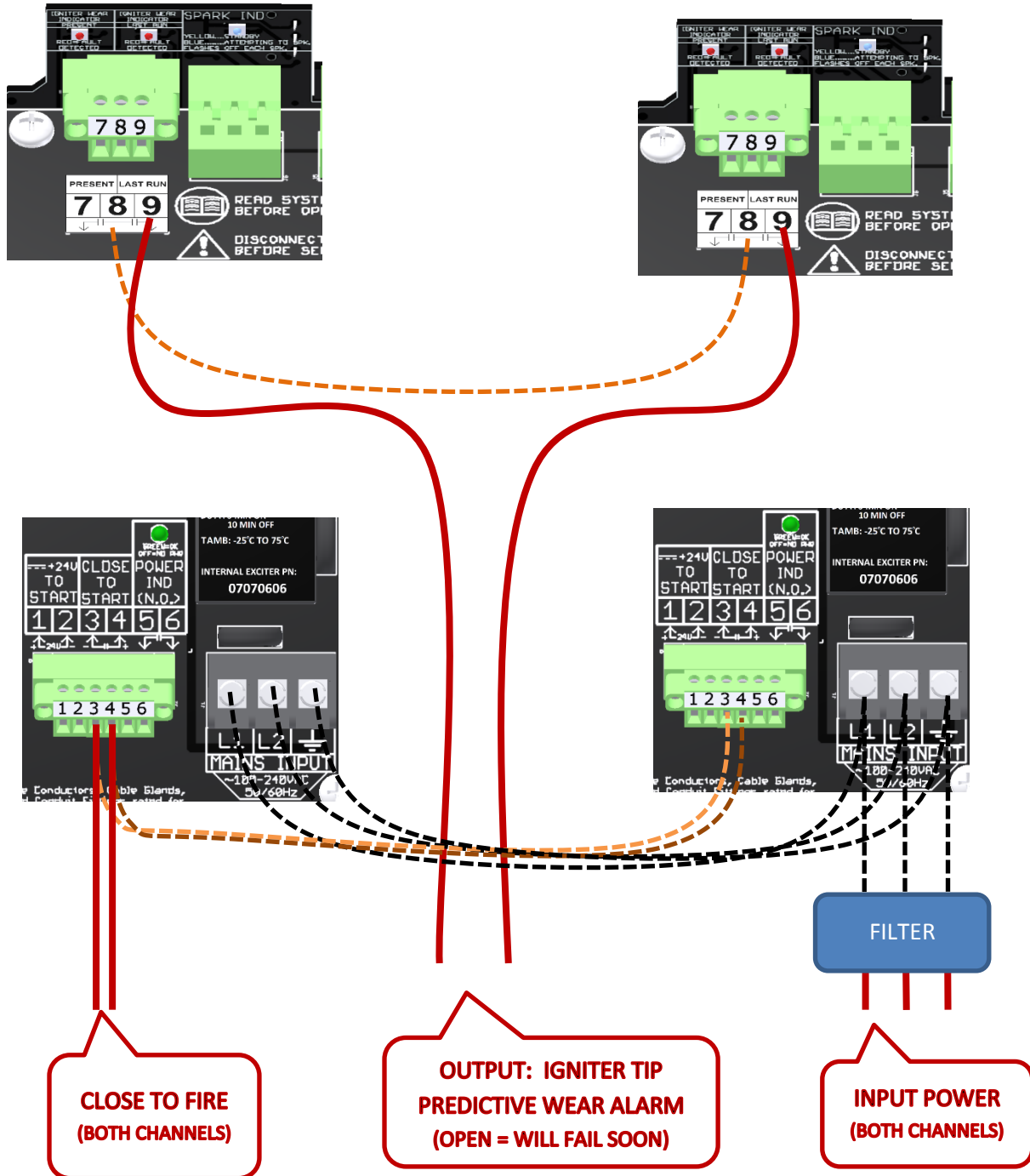
Main earth bond is located at the input terminal. Provide additional enclosure earth bonds per local electrical installation code, if required.

### 5.7 Wiring Diagram Example

One set of contacts is used to fire both exciters, wear indicator (fault) contacts for both exciters are wired in series.

CUSTOMER WIRING: —

CHENTRONICS PRE- WIRING: - - - - - - - - - - - - -



## 5.8 Terminal Key

The following functions illustrate the input and output functionality of the exciter.

### MAINS TERMINAL

L1

L2

### TERMINAL DESCRIPTION

Input power (L1/HOT) wire, 14AWG min., 300V min.

Input power (L2/NEUTRAL) wire, 14AWG min., 300V min.

Input (GROUND) wire, 14AWG, 300V min.

### OUTPUT TERMINAL

HI

LO

### TERMINAL DESCRIPTION

Output, Igniter center wire, 14AWG min., 2400V min.

Output, Igniter shell return, 14AWG min., 2400V min.

Return wire must connect directly from this output to harness/igniter shell, NOT to enclosure chassis.

**NOTE:** Chentronics harnesses and igniters are designed to be in compliance with Chentronics exciter requirements.

### +24V TO START

1-2

### TERMINAL DESCRIPTION

Input Spark Control – Applying a 24V<sub>DC</sub> signal to these terminals will energize the exciter to spark. Current draw is approximately 6mA.

### CLOSE TO START

3-4

### TERMINAL DESCRIPTION

Input Spark Control – Closing terminals 3-4 using a ZVC signal or a jumper wire will energize the exciter to spark. Relay must be able to withstand 24V<sub>DC</sub> when open and 40mA when closed.

**NOTICE:** Do not connect to the +24V TO START terminals and the CLOSE TO START terminals at the same time.

### POWER INDICATOR

5-6

### TERMINAL DESCRIPTION

Provides a closed contact output signal when proper input voltage is applied.

### IGNITER WEAR: PRESENT

7-8

### TERMINAL DESCRIPTION

Provides a closed contact output signal when spark rate is greater than the minimum spark rate.

Provides an open contact output signal when spark rate is less than the minimum spark rate.

### IGNITER WEAR: LAST RUN

8-9

### TERMINAL DESCRIPTION

Provides a latched open contact output signal when igniter wear is detected. Contacts will remain open until a start signal is re-applied, at which point they will reset closed until another fault is found. Pin 8 is shared in common between terminals 7 and 9.



## HAZARDOUS VOLTAGE

Do not separate any cables from the enclosure until the power has been disconnected for 5 minutes, and do not energize the cable while it is disconnected from the enclosure.

## TENSION DANGEREUSE

Ne pas séparer les câbles du boîtier jusqu'à ce que le courant a été coupé pendant 5 minutes, et ne pas alimenter le câble tandis qu'il est déconnecté du boîtier.



## STARTLING NOISE

Igniters can make a loud “snapping” or “popping” noise when fired. Anticipate this noise and warn others to expect it before operating the equipment. Alert others in area before operating equipment.

## BRUITS SAISSANTS/SURPRENANTS

Les allumeurs peuvent faire un fort bruit de « claquement » ou un bruit « sec » lors de l'allumage. Anticipez ce bruit et avertissez les autres de s'attendre à ce bruit avant de faire fonctionner l'équipement. Alertez tout individu dans la zone avant de faire fonctionner l'équipement.

### 5.9 System Schematic Diagram

The following schematic block diagram describes equipment functionality.

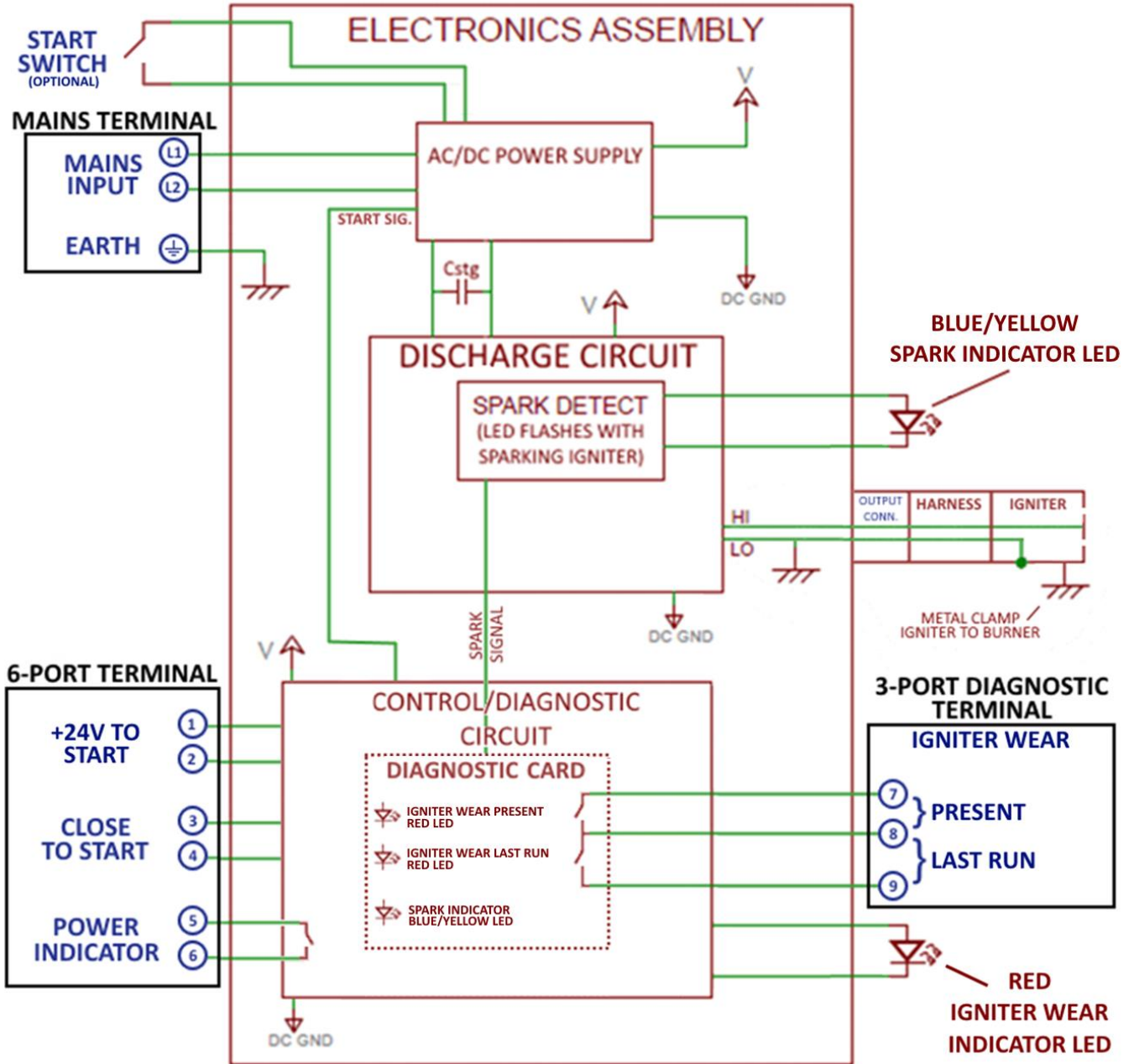


Figure 5: System schematic diagram.



### 5.10 Firing the Igniter

If a jumper is connected between pins 3 and 4 on the top board (CLOSE TO START Terminal), applying mains power to the input power terminals will begin sparking the igniter immediately. If a jumper is not used, the unit will power up in standby mode and can be fired using one of the following methods:

- Apply 24 V<sub>DC</sub> between terminals 1 and 2 (+24V TO START) to spark the igniter.
- Close (apply a ZVC signal) between terminals 3 and 4 (CLOSE TO START) to spark the igniter.
- If included, use the switch on the enclosure to fire the exciter.

**NOTICE:** Enclosure switches come in momentary (hold to fire) and sustained (push on/push off) varieties.

**NOTICE:** Do not connect to the +24V TO START terminals and the CLOSE TO START terminals at the same time. See Section 5.8.

### 5.11 Spark Indicator

The exciter is equipped with a yellow/blue LED enclosure spark indicator which will visually represent the functionality of the Exciter circuit. The LED indicator is on the front of the enclosure 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 solid yellow, it means the exciter is in standby mode and is ready to fire. If the LED is on blue and flashing at a constant rate, it means the igniter is firing correctly. If the LED is on blue 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 blue, it means the igniter tip has failed and must be replaced. See Table 1 for a quick reference.

Table 1: LED Indicator Key

Flash Rate	Color	Meaning
Always Off	OFF	Device Not Powered
Solid	YELLOW	Ready to Fire (Standby)
Steady Rate	BLUE	Normal Operation
Intermittent	BLUE	Igniter tip near end of life (replace soon)
Solid	BLUE	Igniter tip end of life (replace now)

### 5.12 Diagnostic Feature

There is a spark diagnostic feature which gives the exciter the ability to detect igniter faults. See Section 5.8 for a description of the IGNITER WEAR: PRESENT and IGNITER WEAR: LAST RUN terminals. There are also LEDs that correspond to these terminals. The IGNITER WEAR: PRESENT LED turns on when the spark rate drops below threshold. The IGNITER WEAR: LAST RUN LED turns on when the spark rate drops below threshold and stays off until the next start signal is applied, at which point it resets on. This LED is located both on the exciter and on the front panel of the enclosure. The diagnostic card also includes a blue/yellow Spark Indicator LED which serves the same function as the external Spark Indicator (See Section 5.11).

## 6.0 Maintenance

### 6.1 Service

The unit is not field-repairable. The exciter internal electronic assembly may be replaced on-site, but the power must be disconnected for at least five minutes before the cover is unlocked and/or removed.

**NOTICE:** *Be sure to take careful note of all connections before removing the exciter internal assembly. Reconnect new internal assembly in the same manner. Incorrect connections or failure to connect all leads can result in damage to equipment.*

### 6.2 Cleaning

- 6.2.1 **EXCITER** – Remove debris that may have accumulated inside the exciter enclosure with a vacuum or non-metallic brush.
- 6.2.2 **HARNESS** – Do not use acid or carbon tetrachloride as cleaning agents on conduit or harness. Clean the exterior with a stiff non-metallic brush moistened in cleaning solvents. Protect cable terminations from solvent contamination during cleaning. Heat or oil stains, which persist on the conduit after cleaning, are permissible.
- 6.2.3 **BASE ROD** – The ceramic well at the Base Rod end of the rod should be sprayed with a cleaning solvent or alcohol and if necessary, cleaned with a lint free rag.
- 6.2.4 **EXTENSION ROD** – The ceramic well at the igniter end of the rod should be sprayed with a cleaning solvent or alcohol and if necessary, cleaned with a lint free rag. The ceramic terminal end should be cleaned with a cleaning solvent or alcohol.
- 6.2.5 **IGNITER TIP** – The ceramic terminal end should be cleaned with a cleaning solvent or alcohol. The tip should be sprayed to remove oil or other hydrocarbons that may contaminate the ceramic surface. Do not clean with a wire brush.



HAZARDOUS VOLTAGE

Disconnect power before servicing the equipment.

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.

TENSION DANGEREUSE

Coupez l'alimentation avant l'entretien du matériel.

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.

## **7.0 Standard Components and Accessories**

The following is a sample of standard parts available for use with the SureSpark system. For additional parts and technical drawings please contact Chentronics.

### **7.1 Standard ARP 670 Coaxial System Components**

Harnesses – The exciter will Accept ARP 670 TYPE 5M connectors. Example PN: RP44613NI

Igniters – The exciter will fire Low Tension Semi-Conductor Igniters, Example PN: 09002233

**NOTE:** Contact Chentronics for additional component selection.

## **8.0 Warranty Instructions**

For warranty related inquires please contact Chentronics at TEL: +1.607.334.5531 or [info@chentronics.com](mailto:info@chentronics.com).

## **9.0 Technical Support**

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