SureSpark™

127T9801

Installation and Operation Manual

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, DEATH, OR DAMAGE TO EQUIPMENT.

FOR A LIST OF RELEVANT PATENTS AND TRADEMARKS, PLEASE SEE CHENTRONICS.COM/LEGAL-NOTICES

Contents

1.0 Important Safety Information

Read All Instructions Before Using the Equipment

The instructions in this manual 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 national, state, local, and company safety regulations.

Safety Symbols used in this manual comply with ISO 3864.

THESE SYMBOLS INDICATE 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 severe injury.

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

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

DANGER

HAZARDOUS VOLTAGE

The equipment contains a High Energy Ignition System, which contains **DANGEROUS AND POTENTIALLY LETHAL VOLTAGE.** To avoid the 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 4.10 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 per 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.

DANGER

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 4.10 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 Definition

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 System Specifications

3.1 Description of Equipment

The Chentronics® SureSpark™ High Energy Exciter LO-2, LO-4, and LO-6 series high energy ignition systems are specifically designed to ignite the 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. The Igniter Wear indicator also turns 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.

3.2 General Arrangements

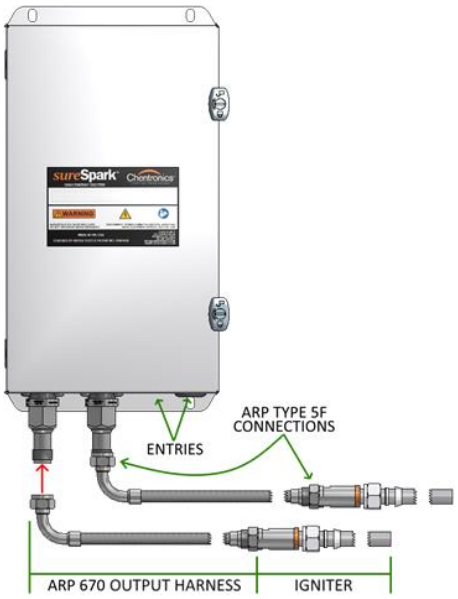


Figure 1: SureSpark™ High Energy Exciter Coaxial Dual Output ignition system general arrangement
NOTE: Harnesses and igniters are sold separately.

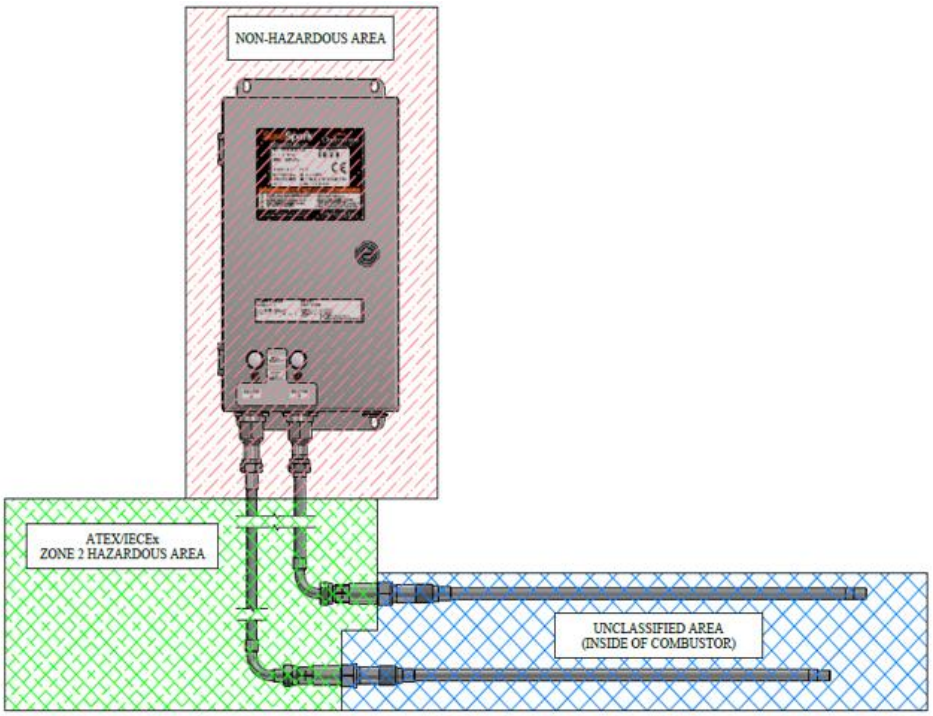


Figure 2: SureSpark™ High Energy Exciter LOTS system general arrangement.
NOTE: Harnesses and igniters are sold separately

3.3 Description of Equipment

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

3.4 Equipment Conditions of Use

The SureSpark™ High Energy Exciter 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 a conduit or an entry hub to protect the wiring from damage.
2. A switch or circuit breaker to separate the device from the 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. For the LO-2 series, +60°C shall not be exceeded.
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 adequately grounded. Please see Section 4.10 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.

3.5 System Electrical and Physical Specifications

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 the jumper, apply power to begin sparking. Without the jumper, apply 24V DC, close contacts, or push-button switch (optional) to spark.
Exciter Spark Indicator:	When powered and standby, LED is solid **Yellow**. When attempting to spark, LED turns **Blue** and flashes off steadily when successful spark output currents are detected.
Igniter Wear Indicator:	When an igniter fault is detected, LED turns on solid **Red** and remains on until the spark signal is removed and re-applied.

Exciter Energy:	2x 12J min per Spark
Exciter Spark Rate:	2x 4 SPS min
Operating Temperature Limits:	-25°C to 75°C
Storage Temperature Limits:	-40°C to 105°C
Humidity:	0 to 100% condensing
Enclosure:	Brushed Stainless Steel (304 or 316) or Gray Painted Mild Steel
Weight:	Approximately 30lb (14 kg)
Dimensions:	10.0 x 7.0 x 17.3 in

4.0 Installation Instructions

4.1 Instructions for Lifting

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

4.2 Mounting

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

4.3 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 2.

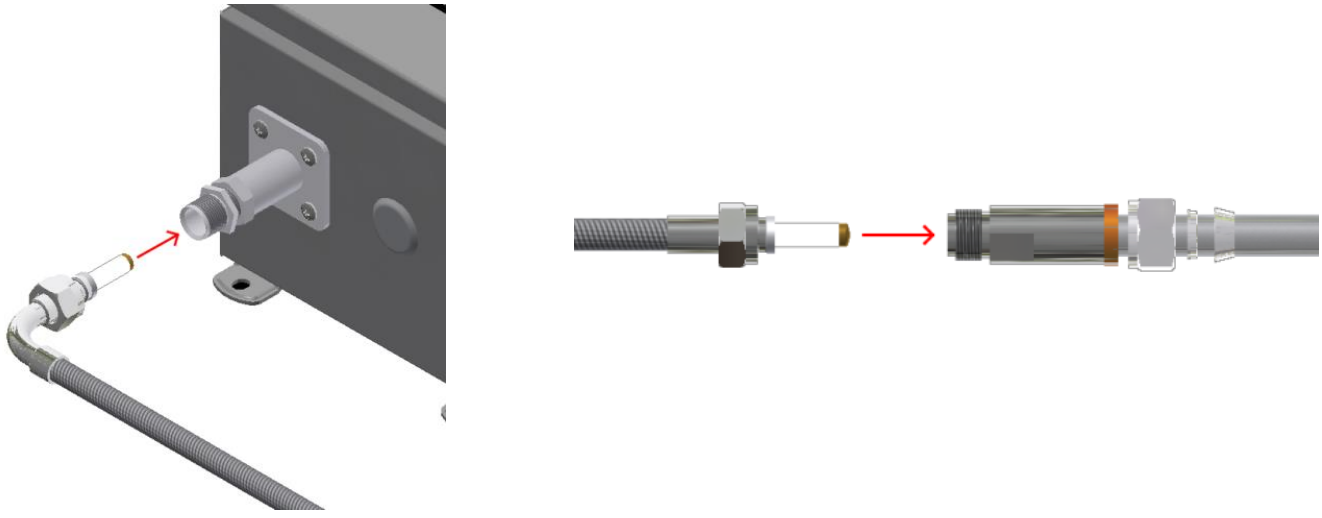


Figure 3: ARP 670 Coaxial Harness connections.

4.4 Safety wire Installation (Optional)

For applications in which electrical connections may be exposed to vibration, Chentronics® recommends that the customer further secure ARP connections with safety wire. This is a common practice in Aerospace as it helps prevent ARP connections from loosening during use. Please follow the installation instructions as stated in Figure 13 and Figure 14

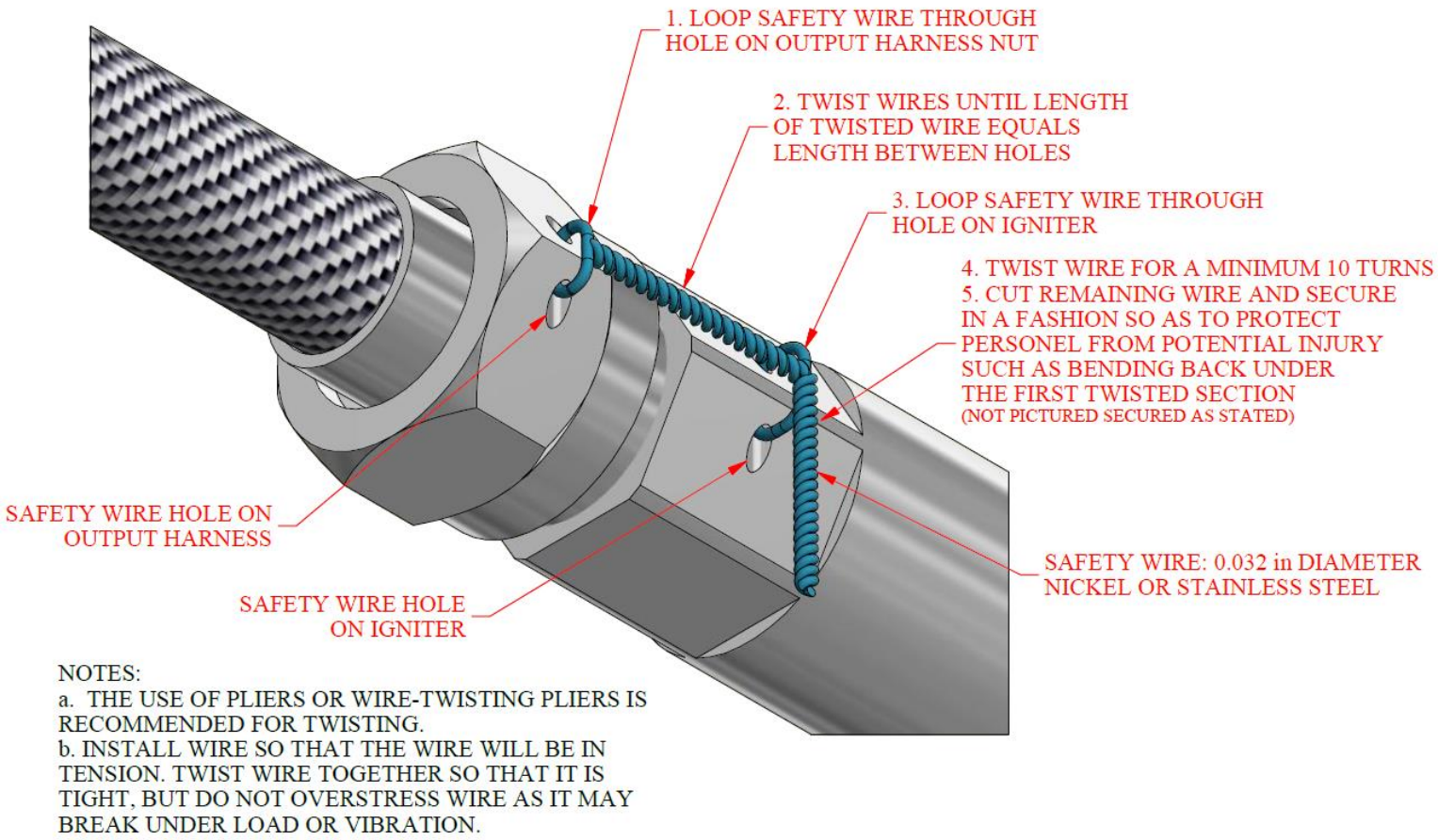


Figure 4: Safety Wire Installation – Output Harness to Igniter

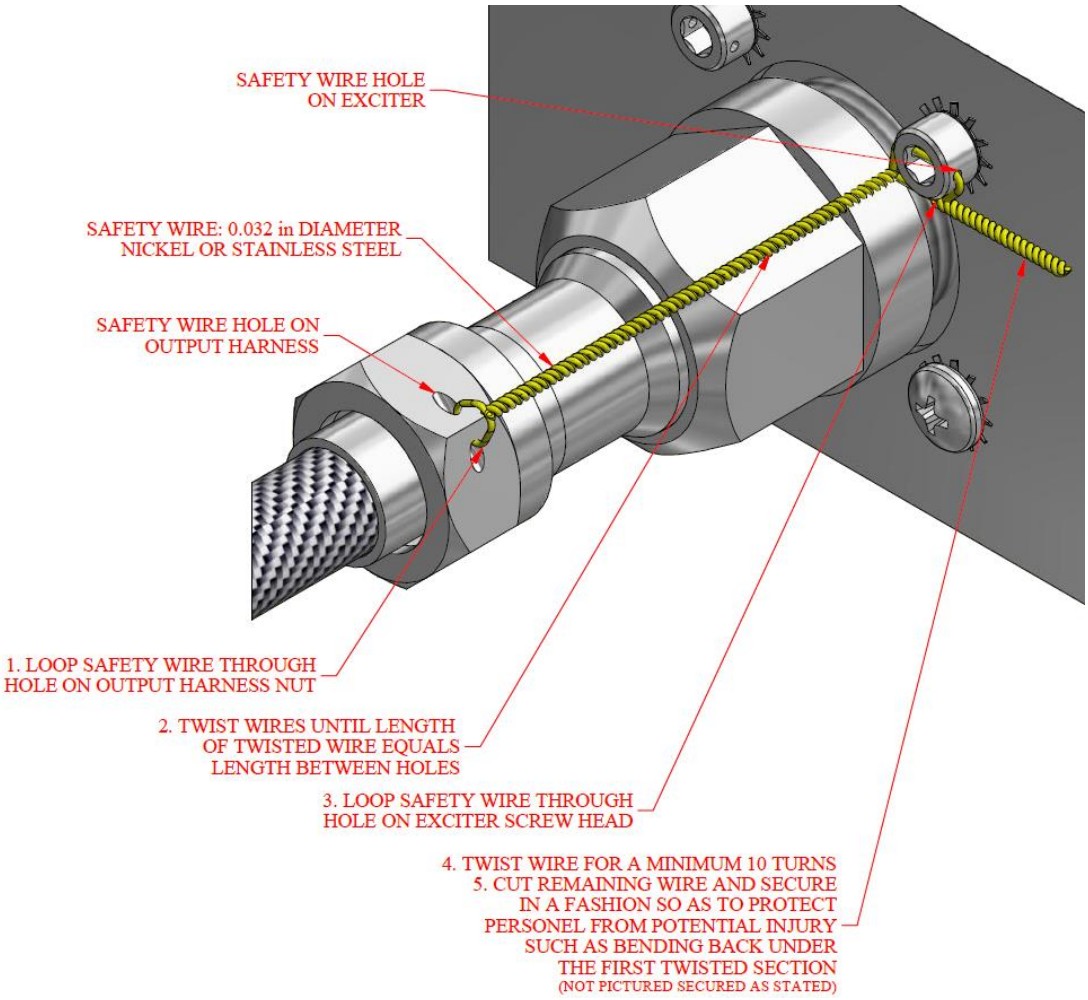


Figure 5: Safety Wire Installation – Output Harness to Exciter

4.5 Wiring Installation

Single unit exciter wiring

The SureSpark™ High Energy Exciter includes two enclosure entries for power/control. 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.

The ignition circuit is unaffected by other (nearby) ignition sources, and multiple ignition cables can share the same tray.

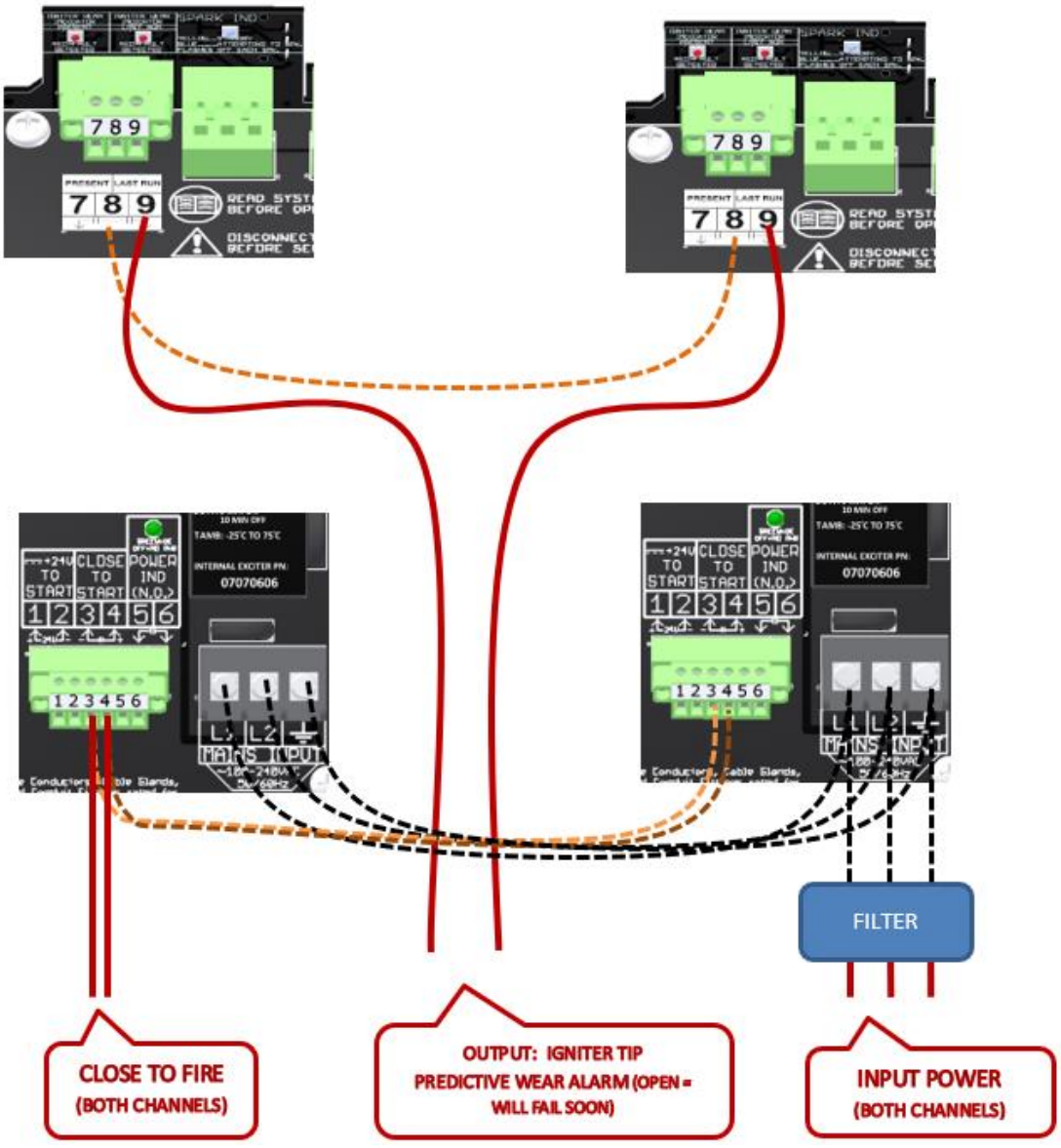
To power the exciters, apply 100-240VAC at 50/60 Hz between terminals L1 and L2 and connect the terminals marked with the ground symbol ⏚ to earth ground.

Dual unit exciter internal wiring

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

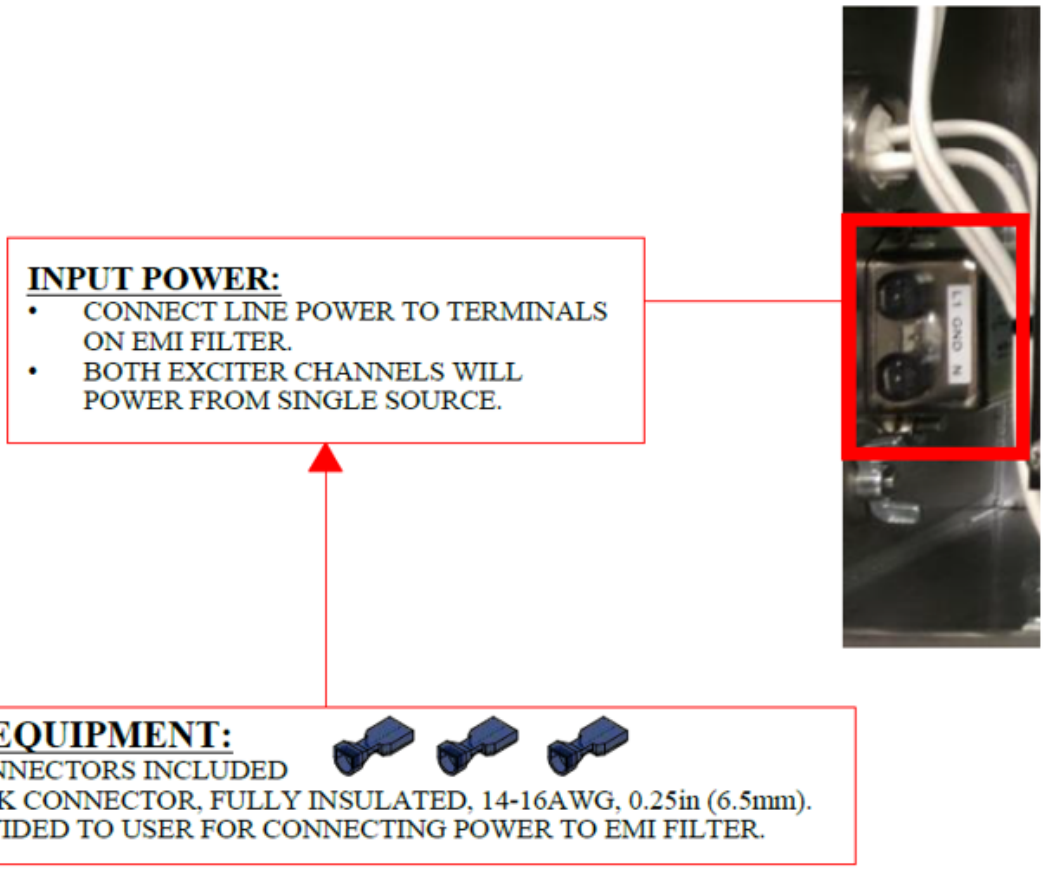
CUSTOMER WIRING:

CHENTRONICS PRE- WIRING:



Dual unit exciter input power wiring

There is an EMI filter located at the bottom of the enclosure. Both exciters are already wired into the EMI filter. Crimp the three provided connectors to Line wire (L1), Neutral (N), and Ground (G) and attach connectors to the EMI filter.



4.6 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 using metal fixtures/clamps.

4.7 Equipment Earth Bond

The main earth bond is located at the input power terminal for each module (see below).

All modules should connect separately to a single earth ground. For example, an enclosure with two modules should have individual wires from each earth terminal to the earth ground.

Provide additional enclosure earth bonds per local electrical installation code, if required.

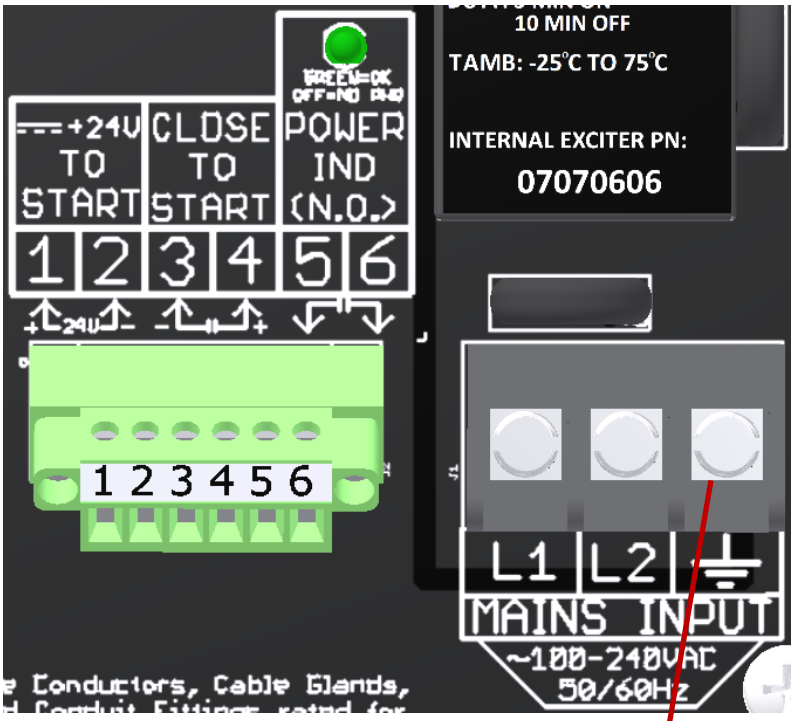
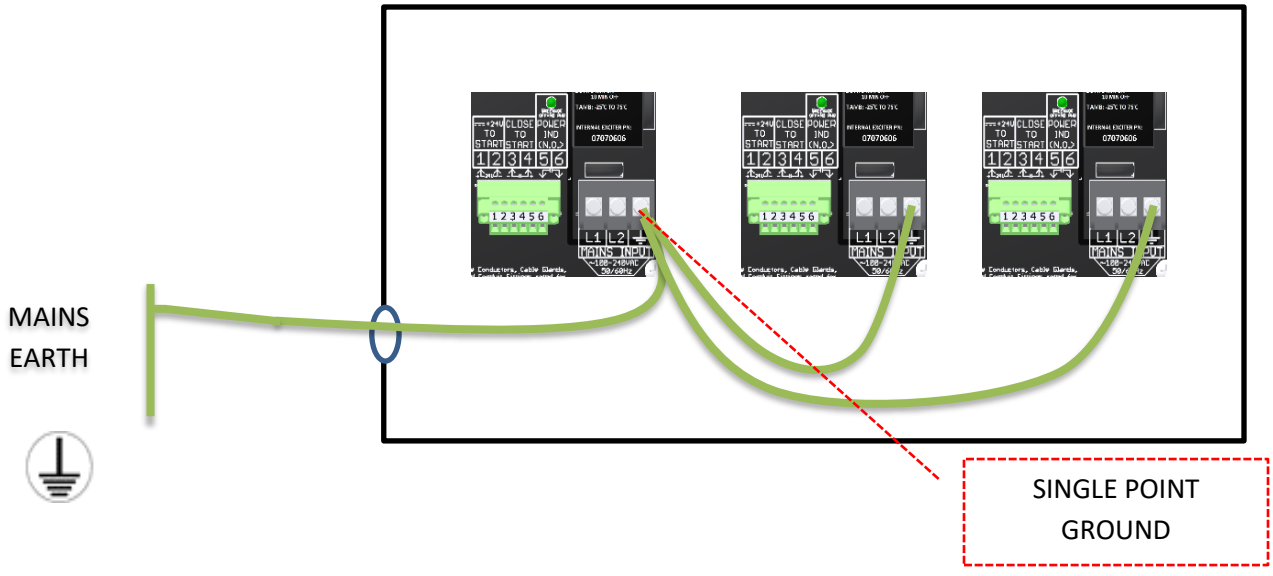


Figure 6: Earth grounding terminal



5.0 System Operational Inputs and Outputs

5.1 Terminal Key

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

MAINS TERMINAL	TERMINAL DESCRIPTION
L1	Input power (L1/HOT) wire, 14AWG min., 300V min.
L2	Input power (L2/NEUTRAL) wire, 14AWG min., 300V min.
⏚	Input (EARTH GROUND) wire, 14AWG, 300V min.

OUTPUT TERMINAL	TERMINAL DESCRIPTION
HI	Output, Igniter center wire, 14AWG min., 2400V min.
LO	Output, Igniter shell return, 14AWG min., 2400V min. Return wire must connect directly from this output to the harness/igniter shell, NOT to the enclosure chassis. **NOTE:** Chentronics® harnesses and igniters are designed to operate with Chentronics® exciters.

+24V TO START	TERMINAL DESCRIPTION
1-2	Input Spark Control – Applying a $24V_{DC}$ signal to these terminals will energize the exciter to spark. The current draw is approximately 6mA.

CLOSE TO START	TERMINAL DESCRIPTION
3-4	Input Spark Control – Closing terminals 3-4 using a ZVC signal or a jumper wire will energize the exciter to spark. The relay must withstand $24V_{DC}$ when open and 40mA when closed.

***NOTICE:* Do not simultaneously connect the +24V TO START terminals and the CLOSE TO START terminals.**

POWER INDICATOR	TERMINAL DESCRIPTION
5-6	Provides a closed contact output signal when the proper input voltage is applied. Contact rating: 250VAC / 355VDC max; 240mA max; 16-22 AWG

IGNITER WEAR: PRESENT	TERMINAL DESCRIPTION
7-8	Provides a closed contact output signal when the spark rate exceeds the minimum. Provides an open contact output signal when the spark rate is less than the minimum. Contact rating: 250VAC / 355VDC max; 240mA max; 16-22 AWG

IGNITER WEAR: LAST RUN	TERMINAL DESCRIPTION
8-9	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 common between terminals 7 and 9. Contact rating: 250VAC / 355VDC max; 240mA max; 16-22 AWG

DANGER

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.

CAUTION

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 the area before operating equipment.

BRUITS SAISISSANTS/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.

5.2 Electrical Area Classification and Safety Markings

LO-2 AND LO-4 INTERNAL CERTIFICATIONS

RECOGNIZED COMPONENT
ETL LISTED c US
Intertek

USA: CLASS I DIVISION 2 GROUPS ABCD T3A
CANADA: CLASS I DIVISION 2 GROUPS ABCD T3A

INTERNAL UNIT TESTED PER THE FOLLOWING STANDARDS:
USA» UL 1012, UL 121201
CANADA» CSA C22.2#213, CSA C22.2#107.1

LO-2 AND LO-4 EXTERNAL CERTIFICATIONS

UK CA CE

TESTED PER THE FOLLOWING STANDARDS:
EUROPE» EN 61000-6-2, EN 61000-6-2, EN 61010, EN 63000
UK» EN 61000-6-2, EN 61000-6-2, EN 61010, EN 63000

LOTS SYSTEM CERTIFICATIONS

CE
Ex

II 3 G
Ex db nA IIC T4 Gc IP65
Exciter: -25°C ≤ Ta ≤ +75°C
Barrier Glands: -25°C ≤ Ta ≤ +100°C
Harness: -40°C ≤ Ta ≤ +240°C
ITS19ATEX44842

Ex db nA IIC T4 Gc IP65
Exciter: -25°C To +75°C
Barrier Glands: -25°C To +100°C
Harness: -40°C To +240°C
IECEx ETL 19.0022

MODEL GTLO-1-4
KCS
Ex d nA IIC T4 (IP65)
20-GA4BO-0767X

MODEL GTLO-2-4
KCS
Ex d nA IIC T4 (IP65)
20-GA4BO-0768X

5.3 System Schematic Diagram

The following schematic block diagram describes equipment functionality.

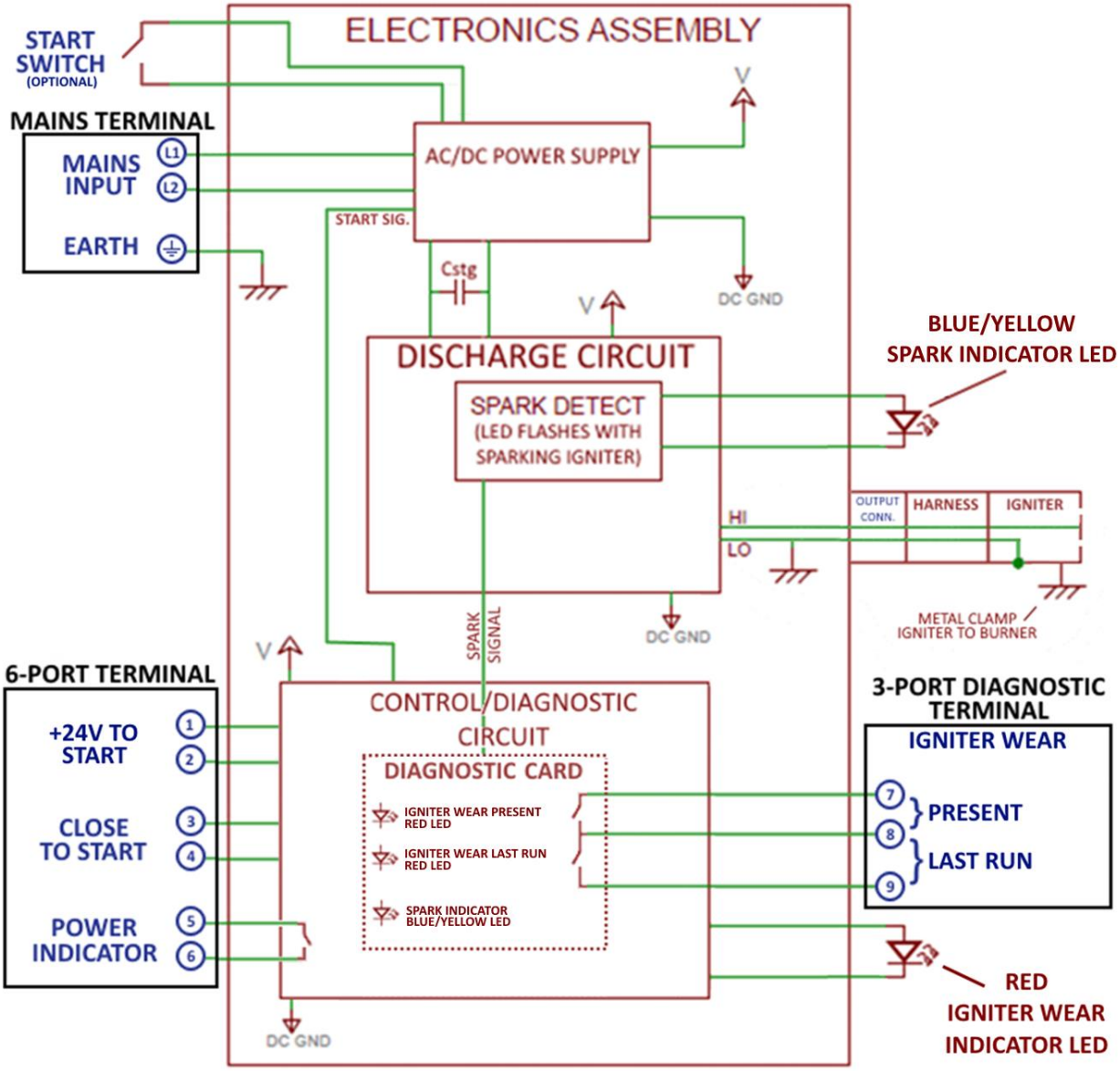


Figure 7: System schematic diagram.

5.4 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_{DC} 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 simultaneously connect the +24V TO START terminals and the CLOSE TO START terminals. See Section 5.0.**

5.5 Spark Indicator

The SureSpark™ High Energy Exciter system 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, power is not applied to the exciter. If the LED is on solid Yellow, the exciter is in standby mode and ready to fire. If the LED is Blue and flashing constantly, the igniter is firing correctly. If the LED is Blue and flashing intermittently, the igniter tip is reaching the end of life and needs to be replaced. Finally, if the LED is solid Blue, the igniter tip has failed and must be replaced. See Table 1 for a quick reference.

Table 1: LED Indicator Key

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)

5.6 Igniter Wear Detection

The spark diagnostic feature gives the exciter the ability to detect igniter faults. See Section 5.0 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 the threshold. The IGNITER WEAR: LAST RUN LED turns on when the spark rate falls below the threshold and stays off until the next start signal is applied. This LED is on the exciter and the enclosure's front panel. The diagnostic card also includes a blue/yellow Spark Indicator LED, which serves the same function as the external Spark Indicator (See Section 5.5).

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 removed.

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

6.2 Cleaning

EXCITER – Remove debris that may have accumulated inside the exciter enclosure with a vacuum or non-metallic brush.

HARNESS – Do not use acid or carbon tetrachloride as cleaning agents on conduits or harnesses. Clean the exterior with a stiff non-metallic brush moistened with cleaning solvents. Protect cable terminations from solvent contamination during cleaning. Heat or oil stains, which persist on the conduit after cleaning, are permissible.

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.

EXTENSION ROD – The rod's ceramic well at the igniter end 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.

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.

DANGER

HAZARDOUS VOLTAGE

Disconnect power before servicing the equipment.

TENSION DANGEREUSE

Coupez l'alimentation avant l'entretien du matériel.

7.0 Standard Components and Accessories

The following is a sample of standard parts available with the SureSpark™ High Energy Exciter system. For additional parts and technical drawings, please get in touch with 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 inquiries, please get in touch with Chentronics® at TEL: +1.607.334.5531 or info@chentronics.com.

9.0 Technical Support

For technical support-related inquiries beyond the scope of this Installation and Operation Manual, please get in touch with Chentronics® at **TEL: +1.607.334.5531 or info@chentronics.com.**