



MTE + MTS IGNITION SYSTEM Installation and Operation Manual



**PLEASE 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.**

Chentronics, LLC
50 O'Hara Drive
Norwich, NY 13815, USA
TEL: +1.607.334.5531
info@chentronics.com
www.chentronics.com



Contents

1.0 Important Safety Information.....	3
2.0 Definitions.....	6
3.0 Chentronics High Energy Ignition Systems	6
4.0 MTE Specifications	7
4.1 Description of Equipment	7
4.2 Description of Equipment Protective System	7
4.3 Equipment Conditions of Use	7
4.4 Electrical and Physical Specifications	8
4.5 Electrical Area Classification and Safety Markings of MTE.....	8
5.0 MTS Specifications.....	9
5.1 Electrical Area Classification and Safety Markings of MTS.....	10
6.0 Installation and Operation Instructions	10
6.1 Installation	10
6.2 System Wire Information	11
6.3 System Schematic Diagram.....	12
7.0 Operational Inputs and Outputs.....	13
7.1 Applying Power to the Equipment and Sparking	13
7.2 Firing the Igniter.....	13
7.3 Spark Diagnostics	13
8.0 Standard Components and Accessories	15
8.1 Standard System Components.....	15
9.0 Special condition of use:.....	15
10.0 Warranty Instructions.....	15
11.0 Technical Support	15

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.

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 attached or the igniter port appropriately capped.

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 applicable local and national codes, standards, and ordinances.

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

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.

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 connecté ou le port d'allumage correctement fermé.

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 aux codes locaux et nationaux applicables, 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.

MTE – Micro Turbine Exciter. “MTE” is the certified model designation of the exciter described in this manual.

MTS – Micro Turbine System. “MTS” is the certified model designation of the ignition system which utilizes an assembly of certified components described in ITS20ATEX35641X and IECEx ETL 20.0031X. Please reference drawing “SYS-SureSpark MTS” for hazardous area boundaries.

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.

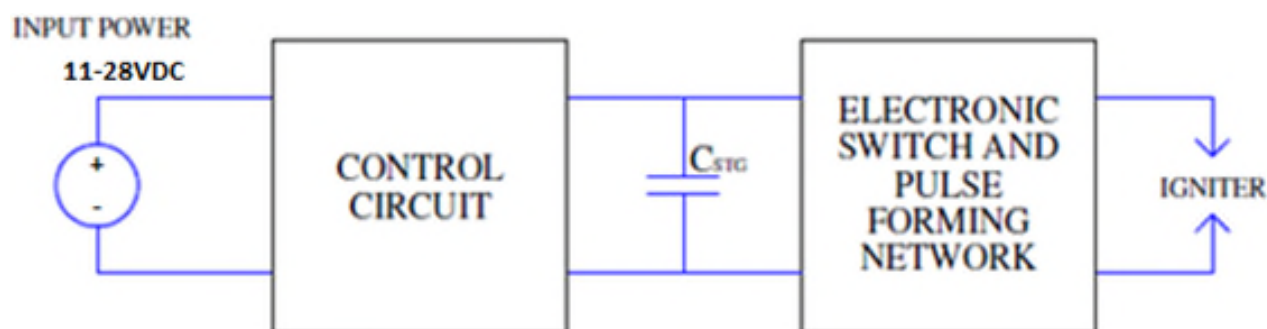


Figure 1: High Energy Exciter basic schematic.

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.

4.0 MTE Specifications

4.1 Description of Equipment

The Chentronics **SureSpark** MTE is a High Energy Ignition System for use with gas and/or biodiesel fuels directly while operating in a wide range of environmental conditions.

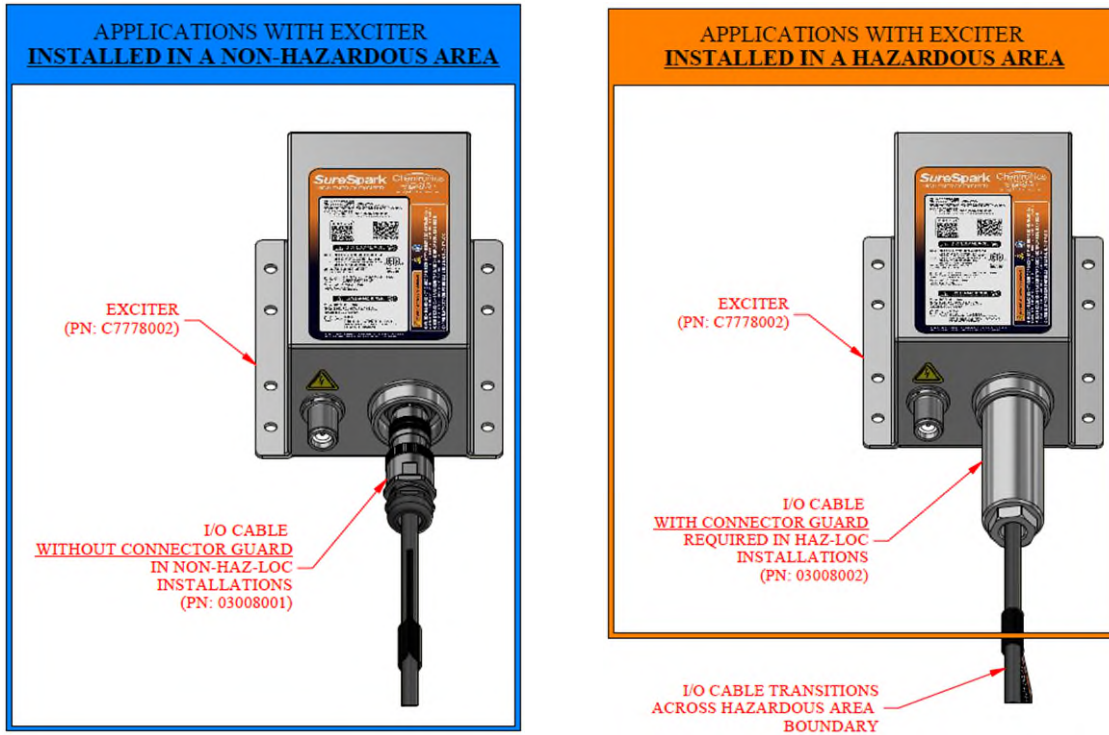


Figure 2: SureSpark MTE installed in Non-Hazardous Area and Hazardous Areas

4.2 Description of Equipment Protective System

The internal electronics assembly is silicone encapsulated inside a Stainless-Steel enclosure.

4.3 Equipment Conditions of Use

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

1. When in operation, the equipment shall not be subjected to temperatures outside the range given in the specifications section of this manual.
2. A switch, fuse, 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 equipment's power connections shall not be joined or separated when the equipment is in use (powered).
4. The equipment's high voltage output connections shall not be joined or separated when the equipment is in use (powered).
5. The equipment shall not be operated without an igniter attached.
6. The igniter, extension rod, or base rod must be secured to the grounded building frame or chassis using a metal fixture.

4.4 Electrical and Physical Specifications

Application:	Direct spark ignition of gas and biodiesel fuels
Input Power:	11-28 VDC, 1.5A MAX
Exciter Type:	High Energy Ignition
Exciter Duty Cycle:	1. 30 sec ON / 60 sec OFF 2. 20 sec ON / 30 sec OFF - repeated for 24 minutes, followed by 8 hours off
Exciter Spark Command:	Apply power to unit to begin sparking
Exciter Power:	2J per spark at 3-6 sparks per second
Operating Temperature Limits:	-25°C to +85°C
Storage Temperature Limits:	-40°C to +105°C
Enclosure:	316 Stainless Steel, encapsulated internal assembly
Electronics Assembly Weight:	Approximately 5lb
Dimensions:	Approximately 3.1 x 6.86 x 4.825 inches.

4.5 Electrical Area Classification and Safety Markings of MTE

The SureSpark MTE Exciter has been assessed and complies with the following Hazardous area and Safe Area standards:

US/CAN

UL 121201
CSA C22.2#213
UL 60079-0
UL 60079-7
UL 60079-15
CSA C22.2#60079-0
CSA C22.2#60079-7
CSA C22.2#60079-15



USA:

Class I, Division 2, Groups A, B, C and D T4
Class I, Zone 2 Group IIC T4
Class I, Zone 2 AEx ec nC IIC Gc T4 IP66 Canada:
Class I, Division 2, Groups A, B, C and D T4
Class I, Zone 2 Group IIC T4
Class I, Zone 2 Ex ec nC IIC Gc T4 IP66
-25°C to +85°C

ATEX

EN 60079-0
EN 60079-7
EN 60079-15



II 3 G

Ex ec nC IIC T4 Gc IP66
-25°C ≤ Ta ≤ 85°C

ITS20ATEX15571X

IECEX

IEC 60079-0
IEC 60079-7
IEC 60079-15



Ex ec nC IIC T4 Gc IP66

-25°C to +85°C

IECEX ETL 20.0020X

US/CAN

UL 60730-1
UL 60730-2-5
CSA-E60730-1
CSA C22.2 No. 60730-2-5
ANSI Z21.20



CE

EN 61000-6-2
EN 61000-6-4
EN 60730-1
EN 60730-2-5
EN 63000: 2018



5.0 MTS Specifications

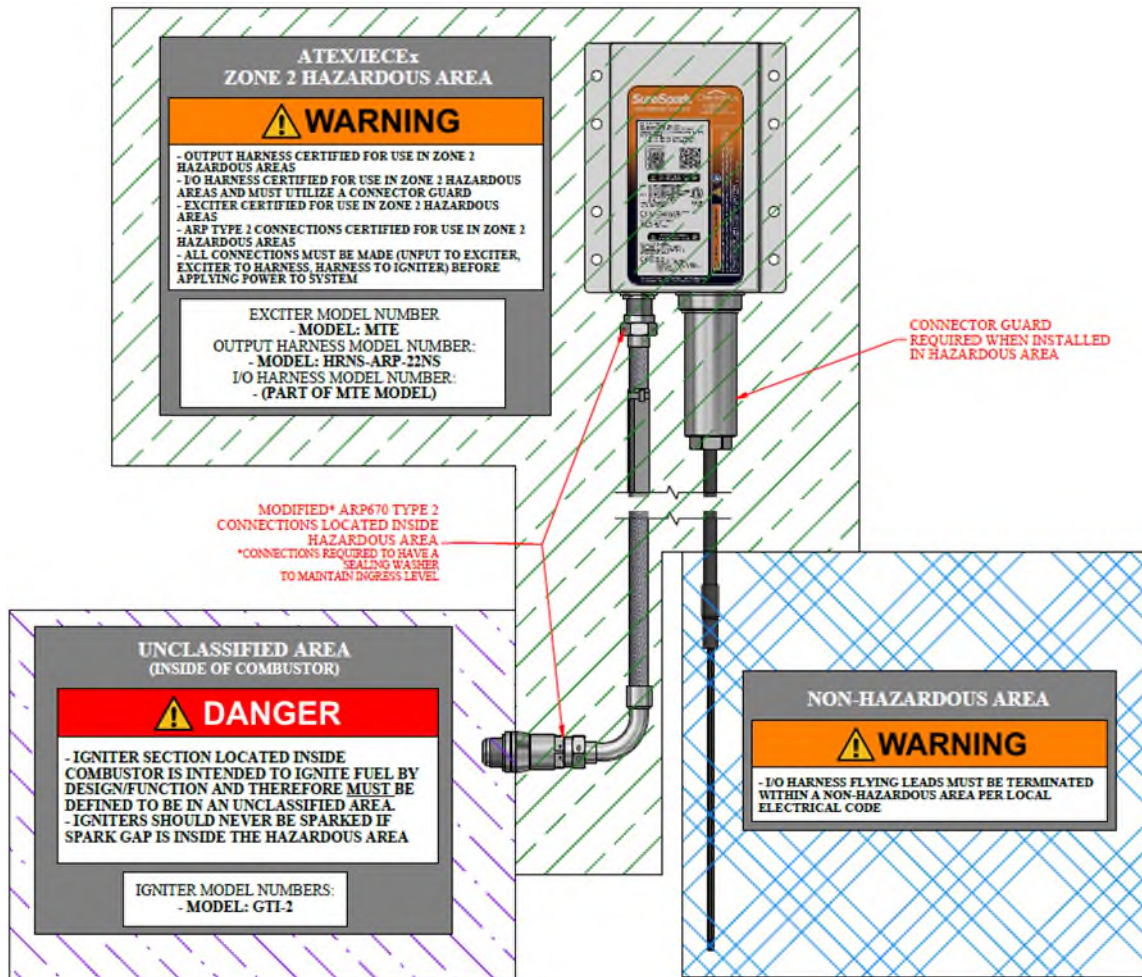


Figure 3: MTS Hazardous Area Boundaries

The Micro Turbine System, “MTS” is the certified model designation of the ignition system which utilizes an assembly of certified components described in ITS20ATEX35641X and IECEx ETL 20.0031X. The system consists of an Exciter, I/O Harness, Output Harness, and Igniter. Please reference drawing “SYS-SureSpark MTS” for hazardous area boundaries.

1. The MTE exciter (ITS20ATEX15571X) can be installed in a Hazardous area (Zone 2) if equipped with a connector guard. The ARP Harness (ITS16ATEX48444U) can be installed in Zone 2 configuration based on the model number specified in ITS16ATEX48444U.
2. If the MTE exciter is installed in a Non-Hazardous area a connector guard is not required. The ARP Harness (ITS16ATEX48444U) can be installed in Zone 2 configuration based on the model number specified in ITS16ATEX48444U.

5.1 Electrical Area Classification and Safety Markings of MTS

The SureSpark MTS Exciter has been assessed and complies with the following Hazardous area standards

ATEX

EN 60079-0

EN 60079-7



II 3 G Ex ec IIC T* Gc IP66

*Exciter: T4 at $-25^{\circ}\text{C} \leq \text{Ta} \leq 85^{\circ}\text{C}$

*Harness: T2 at $-40^{\circ}\text{C} \leq \text{Ta} \leq 240^{\circ}\text{C}$

ITS20ATEX35641X

IECEX

IEC 60079-0

IEC 60079-7



Ex ec IIC T* Gc IP66

*Exciter: T4 at $-25^{\circ}\text{C} \leq \text{Ta} \leq 85^{\circ}\text{C}$

*Harness: T2 at $-40^{\circ}\text{C} \leq \text{Ta} \leq 240^{\circ}\text{C}$

IECEX ETL 20.0031X

6.0 Installation and Operation Instructions

6.1 Installation

The SureSpark MTE and MTS system has an easy installation procedure; follow the instructions given

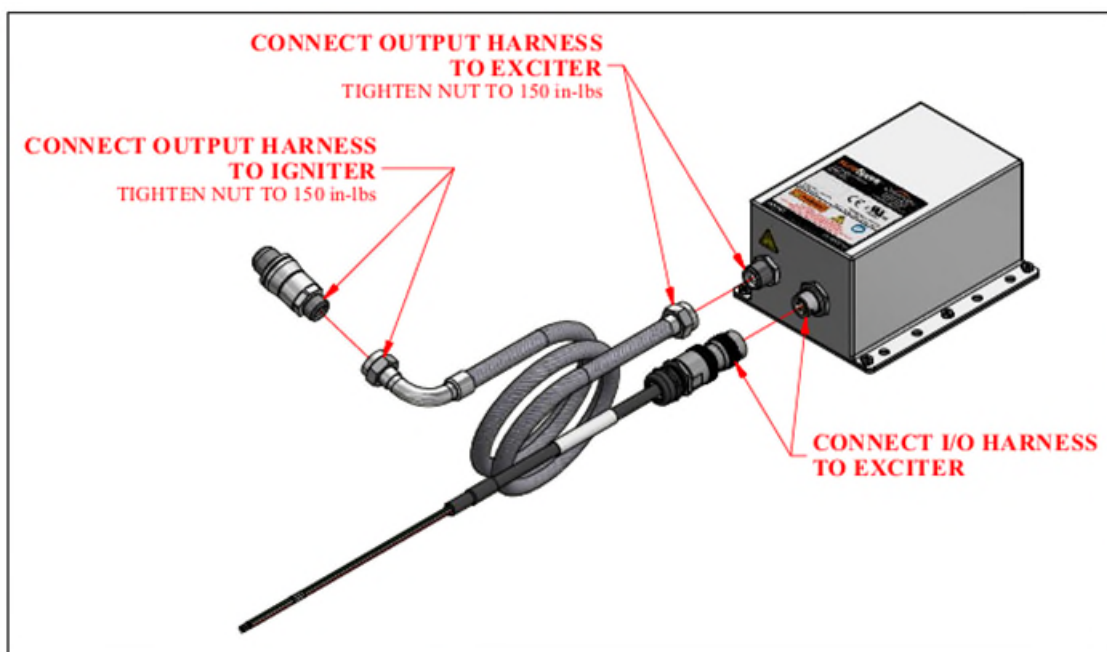


Figure 4: System Installation Notes

Input connector Installation:

The MTE exciter has a quick connect bayonet coupling connector. The connector is installed in place by turning a quarter inch turn in clockwise direction. **For installations in Hazardous Areas** the MTE Exciter must have connector guard installed. The guard covers the input cable connector. It is threaded into the enclosure and tightened to 10 ft-lb.

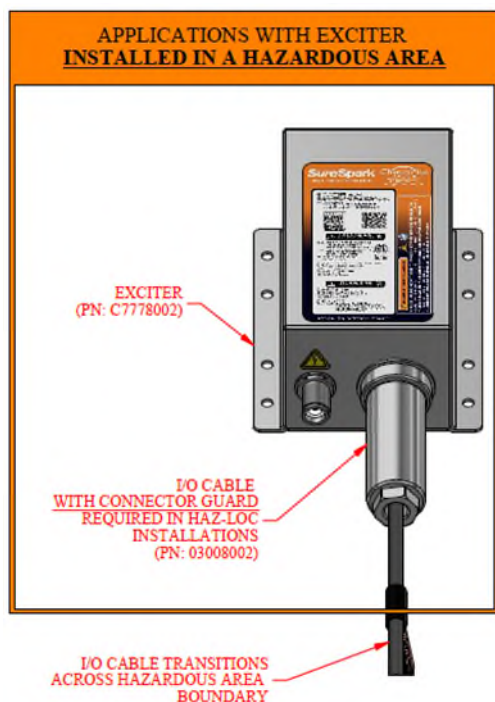


Figure 5: Input Connector Guard

Output Harness installation:

The ARP Type 2 Harness is used for the output of the MTE exciter. The connection is made by tightening the coupling nut to 12.5 ft-lb [150 in-lb]. A copper sealing washer is required as part of this connection (shipped with the output harness).

6.2 System Wire Information

The connections to the SureSpark MTE/MTS system are given in Table 1 and Figure below. All wires are 20 AWG stranded. Use terminal blocks and associated wiring fixing elements suitable for 20 AWG stranded wire.

Table 1: System Connections

Function	Connector Pin (on Exciter)	Wire Number (on mating I/O Harness)
Unused	Unused	1
Spark Relay Normally Closed Contact	D	2
Spark Relay Common Contact	C	3
Spark Relay Normally Open Contact	B	4
+24VDC	A	5
24VDC Return	F	6
Earth	E	Green/Yellow

6.3 System Schematic Diagram

The following schematic block diagram describes equipment functionality. Power/control cable wires for connecting the equipment to installation labeled in blue circles at left.

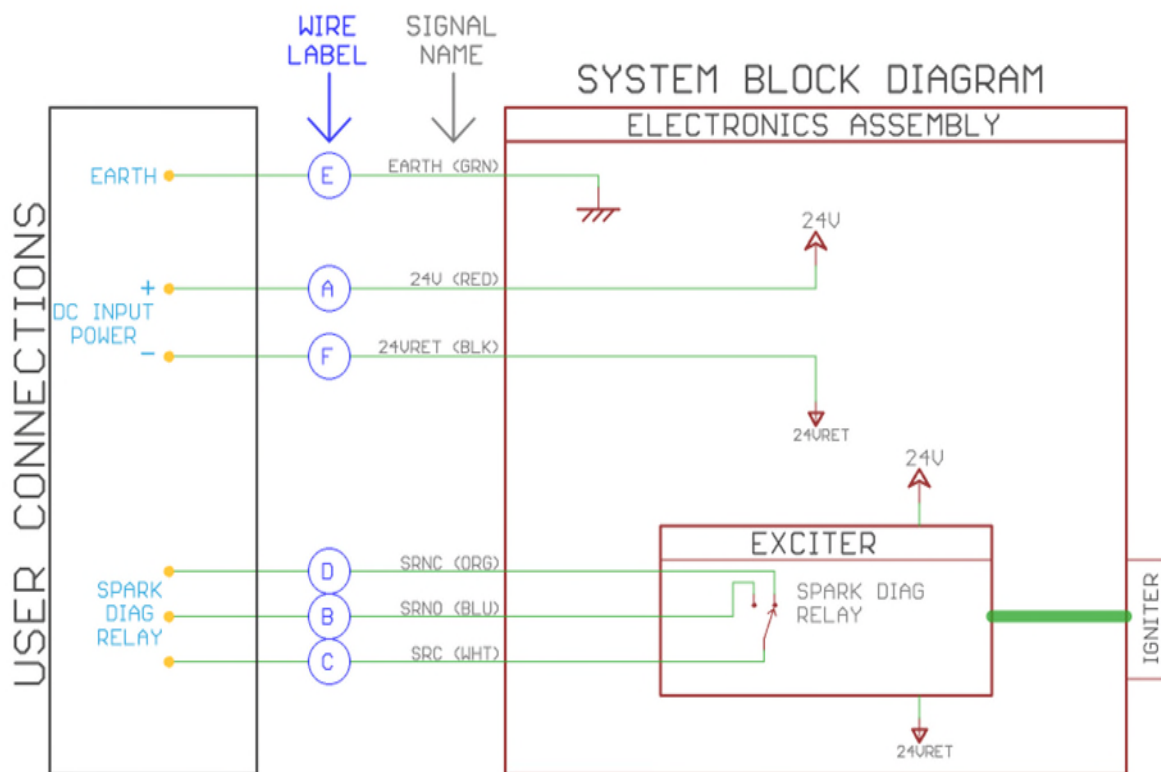


Figure 6: System Schematic Diagram

⚠ 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 area before operating equipment.

⚠ CAUTION

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.

7.0 Operational Inputs and Outputs

The following functions illustrate the input and output functionality of the **SureSpark MTE/MTS**.

7.1 Applying Power to the Equipment and Sparking

To power the equipment, apply 11-28 VDC between wires 5 & 6, and connect the green/yellow wire to earth ground. This will initiate sparking at the igniter tip.




EXPLOSION HAZARD

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.

RISQUE D'EXPLOSION

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

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7.2 Firing the Igniter

The igniter fires when power is connected to the exciter. See Section 7.1.

7.3 Spark Diagnostics

Chentronics Spark Diagnostics are designed to warn the user when an igniter is approaching the end of its useful life and should be replaced. This system monitors the rate of ignition pulses as they leave the exciter. If this rate drops below a minimum threshold (roughly less than 4 spark rate per second) then the spark relay changes state.

Chentronics MTE exciter uses a normally closed (NC) and normally open (NO) set of contacts to convey the spark rate of the exciter. Please see table below

Table 2: Spark Diagnostic connections

Function	Connector Pin (on Exciter)	Wire Number (on mating I/O Harness)
Spark Relay Normally Closed Contact	D	2
Spark Relay Common Contact	C	3
Spark Relay Normally Open Contact	B	4

Table 3: Spark Diagnostic function

	Exciter input power status	Relay status		Igniter wear status
		NC relay (checked between Wire 2 and Wire 3)	NO relay (checked between Wire 3 and Wire 4)	
1	Not powered	Closed (shorted)	Open	-
2	Powered	Open	Closed (shorted)	Igniter is sparking at 4-6 sparks per second. Igniter tip is in good condition and does not need replacement
3	Powered	Closed (shorted)	Open	Igniter is sparking at less than 4 sparks per second. Igniter tip will soon need replacement or needs immediate replacement. Please see section 8.1 for replacement parts

*Please read the table horizontally

Per table 3:

1. When the exciter is not powered, you will get a closed/ shorted contact between Wire 2 and 3, and you will get an open contact between Wire 3 and 4.
2. **Condition in which igniter tip does not need replacement:**
Condition When the exciter is powered and the igniter tip is in a **good condition** (providing sparks above 4 sparks per second), you will get a closed/ shorted contact between Wire 2 and 3, and you will get an open contact between Wire 3 and 4.
3. **Condition in which igniter tip needs replacement:**
When the exciter is powered and the igniter tip is in a **near end of life or at end-of-life condition** (providing below 4 sparks per second), you will get an open contact between Wire

2 and 3, correspondingly you will get a closed contact between Wire 3 and 4. Please see section 8.1 for replacement parts*

*Note: With power applied, the spark relay will change state from the Unpowered condition to the Normal Operation (Spark OK) condition. The relay will remain in this state for a minimum of 3 seconds while the diagnostic circuit gathers spark diagnostic data and if a Spark Fault is detected the relay will then change state to the Spark Fault condition.

8.0 Standard Components and Accessories

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

8.1 Standard System Components

Output Harness – RD442MNI

I/O Harness – 03008002

Igniter tip - 09000175

9.0 Special condition of use:

Special conditions of use:

- The equipment should only be used in an area that has low risk of impact.
- The equipment should be used in area that is free from falling debris.
- The equipment should be placed in an area that do not have any mechanical hazard.
- The equipment shall not be subjected to human abuse.
- Exciter can only be used with ARP Harness's certified per IECEx ETL 16.0005U, ITS16ATEX48444U and ITS20ATEX35618U

10.0 Warranty Instructions

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

11.0 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