# OPERATIONS & MAINTENANCE MANUAL

Chentronics

**Chentronics Corporation**

# BD07070130

## High Energy Ignition Exciter

| ITEM | Part Number | REV |
|---|---|---|
| Exciter Internals with Standard Base Plate | BD07070130 | A |
| Output Harness | D44613NI | A |
| Igniter | 01000308 | A |
| | | |
| | | |

**THIS EQUIPMENT IS SUITABLE FOR NON-HAZARDOUS LOCATIONS ONLY**
**UNLESS EXCITER IS PLACED IN A RATED EXPLOSION PROOF ENCLOSURE**

# Table of Contents

## Revisions

| REV | DESCRIPTION OF CHANGE | PAGE | DATE |
|---|---|---|---|
| A | First Published Version | | 10SEP09 |
| | | | |
| | | | |

## Safety Information

### Area Certification

THIS EQUIPMENT IS SUITABLE FOR USE IN NON-HAZARDOUS LOCATIONS ONLY UNLESS INSTALLED IN A PROPERLY RATED EXPLOSION PROOF ENCLOSURE

### Replacement of Components

WARNING – EXPLOSION HAZARD – DO NOT REPLACE IGNITER UNLESS POWER HAS BEEN SWITCHED OFF.

AVERTISSEMENT – RISQUE D'EXPLOSION – COUPER LE COURANT AVANT DE REPLACEER L' IGNITER

### Disconnection of Equipment

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF.

AVERTISSEMENT – RISQUE D'EXPLOSION – AVANT DE DÉCONNECTER L'EQUIPMENT, COUPER LE COURANT

### Equipment Duty Cycle

WARNING – DO NOT OPERATE THE EXCITER OUTSIDE THE POWER ON / POWER OFF DUTY CYCLE. THE MAXIMUM ALLOWABLE DUTY CYCLE AS FOUND ON THE EQUIPMENT MAIN NAMEPLATE IS:

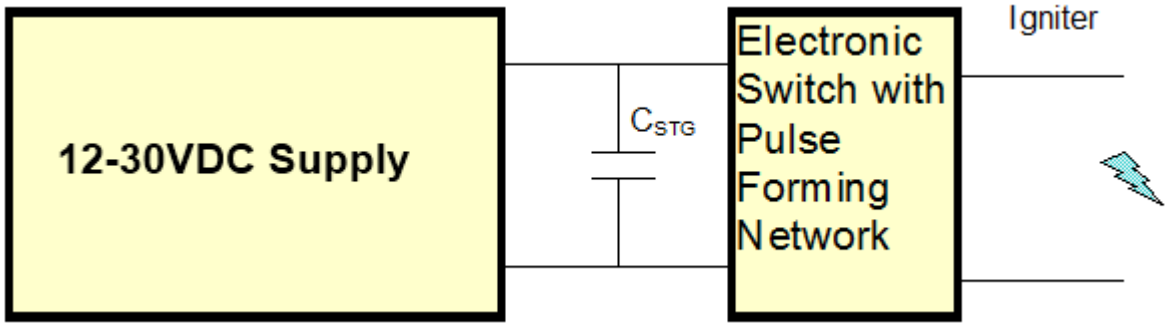
**30 SECONDS ON / 1 MINUTE OFF**

**NEVER REPEATEDLY APPLY AND REMOVE POWER OUTSIDE THIS DUTY CYCLE RANGE.**

## Exciter Description of Operation

The High Energy Ignition Exciter operates without gas discharge tubes. Energy accumulates on storage capacitor $C_{STG}$, as the exciter draws power from the input power line. The capacitor slowly accumulates charge to a preset voltage during the interval between sparks. When the capacitor has charged to a preset voltage, an electronic switch rapidly discharges the capacitor through a pulse-forming network into the igniter. Although the discharge current amplitude can vary from several hundred to several thousand amperes (depending on the application), the life of the electronic switch is not affected by the accumulation of these pulses.

The pulse-forming network controls the amplitude and duration of the discharge current pulse to provide characteristics, which enhance ignition and extend the life of the storage capacitor and igniter. While the exciter output is typically 2000V, the pulse-forming network can provide a 5000V-trigger voltage as needed.



## Equipment Specifications

| | |
|---|---|
| **Mechanical:** | 304SS Sealed Enclosure |
| | Box dimensions: 3"dia X 8.5" |
| | Net Weight: 5 Lb. |
| **Input Power:** | 12-30 VDC 3 Amps Max |
| **Stored Energy:** | 3 Joules Minimum |
| **Spark Rate:** | 2-6 Sparks per Second typical |
| **Temperature:** | -25°C to 85°C |
| **Duty Cycle:** | 30 SECONDS ON, 1 MINUTE OFF (33%) |

# Installation Instructions

## Safety

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF.

AVERTISSEMENT – RISQUE D'EXPLOSION – AVANT DE DÉCONNECTER L'EQUIPMENT, COUPER LE COURANT

**WARNING!** Dangerous and potentially **LETHAL** voltages are present. READ DIRECTIONS BEFORE PROCEEDING. **DO NOT OPEN THE EXCITER ENCLOSURE for FIVE (5) MINUTES after operating the exciter.** This time is required to "bleed off" any high voltage residual charge left on the energy storage capacitor.

Please follow the order of installation shown in this manual:

1. Mount Exciter
2. Exciter Output Wiring
3. Rod Termination
4. Input Wiring

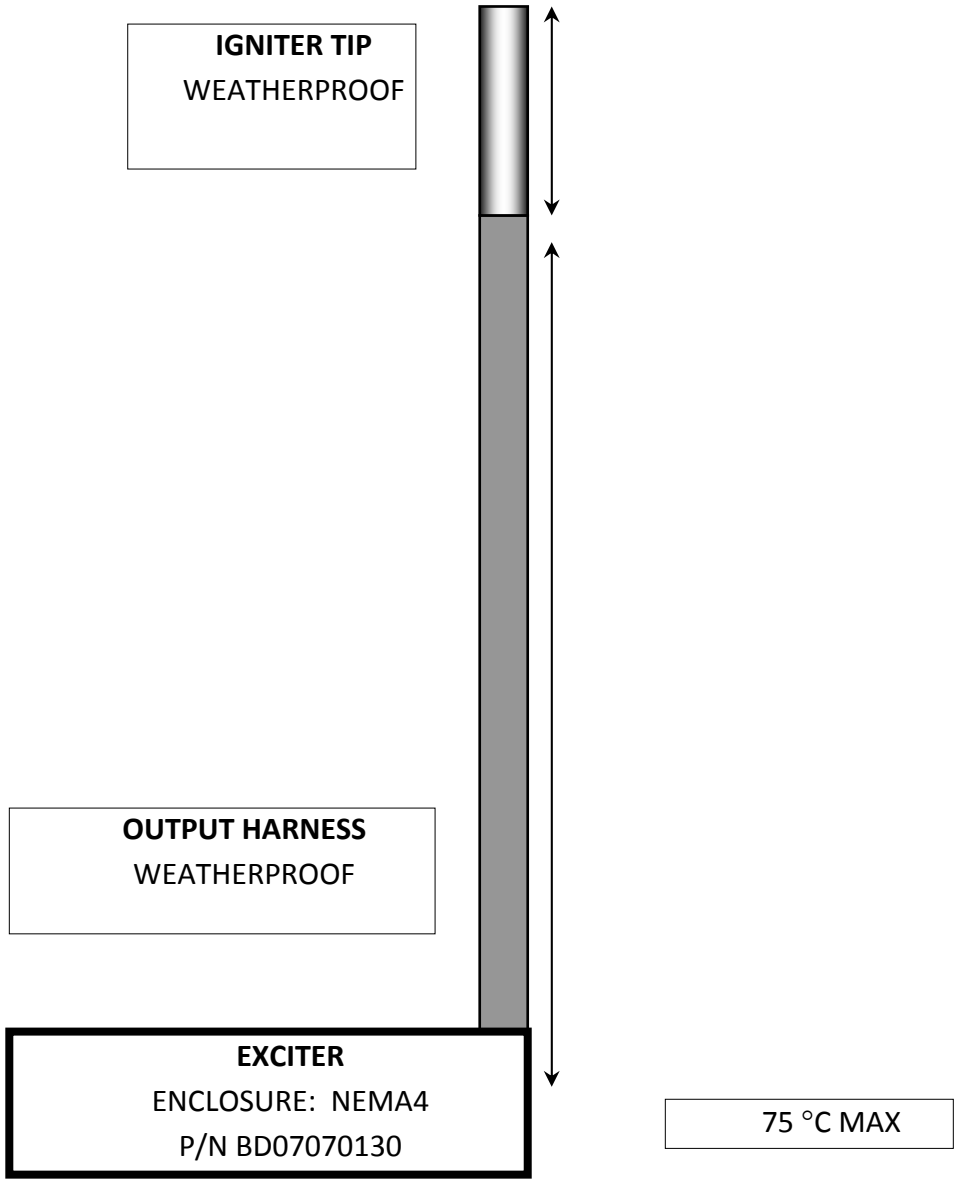
## Mounting

For mounting dimensions, refer to drawing "Exciter Installation". The exciter should be mounted to a firm structure. It will function properly in either a vertical or horizontal position. The exciter has an integrated input cable with 2 fly leads and a center output connector for the harness.

## Output Connections

Attach the OUTPUT HARNESS to the igniter. Attach the OUTPUT HARNESS to the exciter.

## Ignition Connection Diagram



## System Maintenance

WARNING –DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF.
AVERTISSEMENT –AVANT DE DÉCONNECTER L'EQUIPMENT, COUPER LE COURANT

WARNING –DO NOT REPLACE IGNITER UNLESS POWER HAS BEEN SWITCHED OFF.
AVERTISSEMENT –COUPER LE COURANT AVANT DE REPLACEER L' IGNITER

### Inspection

**EXCITER** – Visually inspect the exciter enclosure for any dents that would be indicative of damage. Check the electrical connections to ensure that they are secure.

**CABLE –** Check to ensure that the buttons on the connectors are straight and intact. Check to ensure that the connectors are secured to the cable hose. Using an ohmmeter, check the cable conductors to ensure continuity and insulation integrity by making the measurements in the table below:

| MEASUREMENT POINTS | REQUIRED VALUE |
|---|---|
| Center button to Center button | Less than one (1) ohm |
| Outer Conduit | Less than one (1) ohm |
| Center Button to Outer Conduit | Greater than ten (10) meg-ohms |

**IGNITER TIP** – Visually inspect to ensure that the firing end is not damaged or cracked.

## Cleaning

**WARNING! All power to the ignition exciter should be turned "OFF" and precautions taken to make sure it is not accidentally turned "ON" at least five (5) minutes prior to the opening of the Ignition Exciter Enclosure. This will allow time for the stored energy in the capacitors to dissipate. Failure to do this will result in severe personnel hazard. Dangerous and potential lethal voltages are present.**

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

**CABLE** – CAUTION: do not use acid or carbon tetrachloride as cleaning agents on conduit. 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.

**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.

## Repair

**WARNING!** The exciter module is **NOT REPAIRABLE**. It must be returned to the Factory to be refurbished. Failure to do this can result in severe personnel hazard. **Dangerous and potential lethal voltages are present.**

## Semi-Conductor Igniter Resistance Measurements

Depending on construction, semiconductor igniters are classified as thin film or bulk. The resistance of thin film semiconductor is typically 10 to 100 times greater than the resistance of bulk semiconductors when both are new. Chentronics manufactures thin film semiconductor igniters. Resistance for a new igniter is typically 10kΩ to 30kΩ when measuring current is near 1mA. A constant current source is required to measure resistance.

**Megohmmeter: (Biddle Model BM200, Fluke Model 1520) -** The electronic megohmmeter provides a constant measuring current for measurements below 100k when using the 1kV scale.

| IGNITER TIP CONDITION | MAXIMUM | TYPICAL |
|---|---|---|
| NEW | 30 KΩ | 10 KΩ |
| USED | 300 KΩ | 30 KΩ to 300 KΩ |

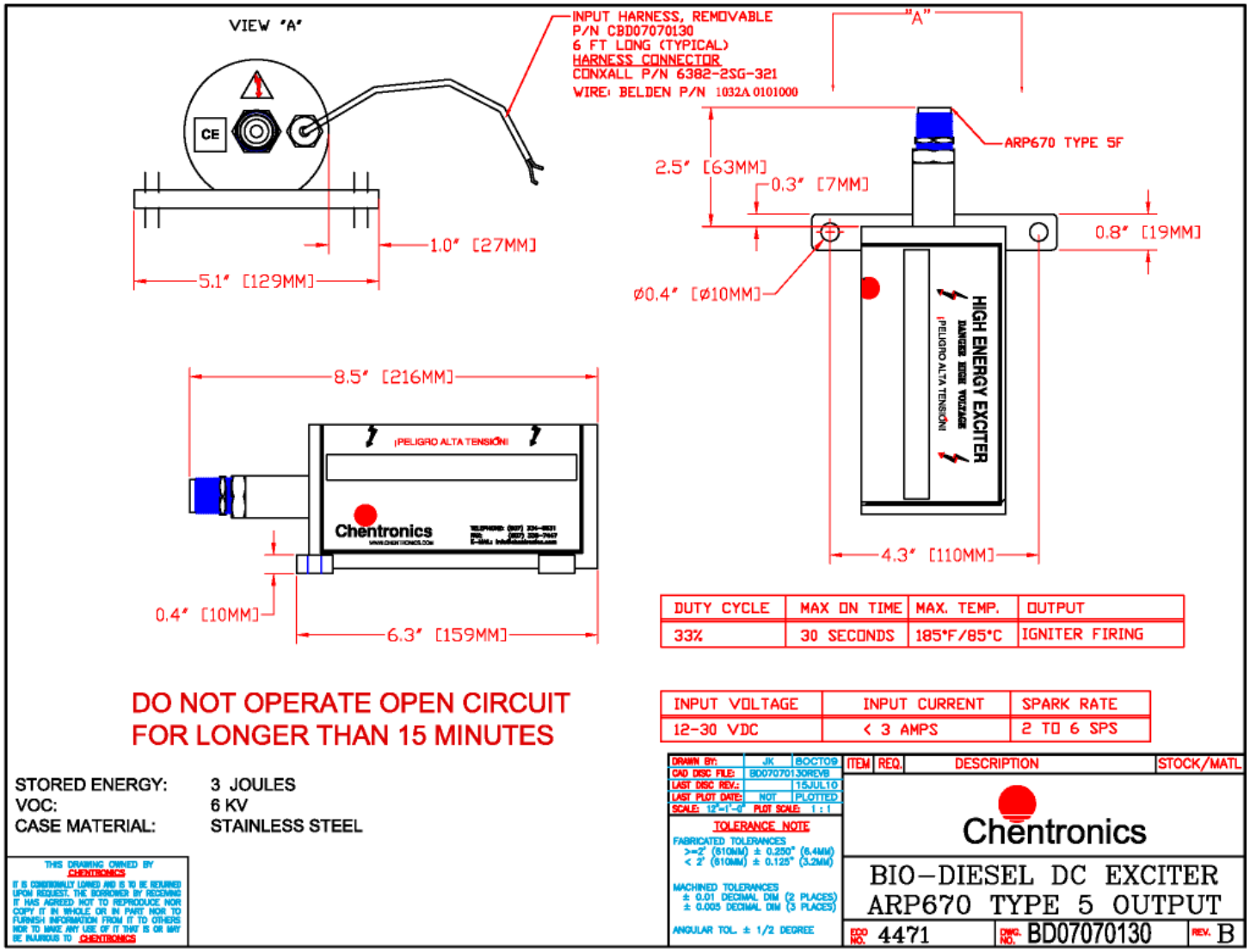
**Multimeter: (Fluke Model 87) -** Semiconductor material resistance decreases logarithmically as measuring current increases. Measuring current for the Fluke Model 87 Multimeter varies from 2 μA to 20 μA. Therefore resistance measurements with the Fluke Multimeter are approximately 50% greater than the Biddle Megohmmeter.

| CURRENT (μA) | RESISTANCE (kΩ Typical) |
|---|---|
| 10 | 13.7 |
| 100 | 12.7 |
| 1000 | 10.5 |
| 10000 | 8.1 |

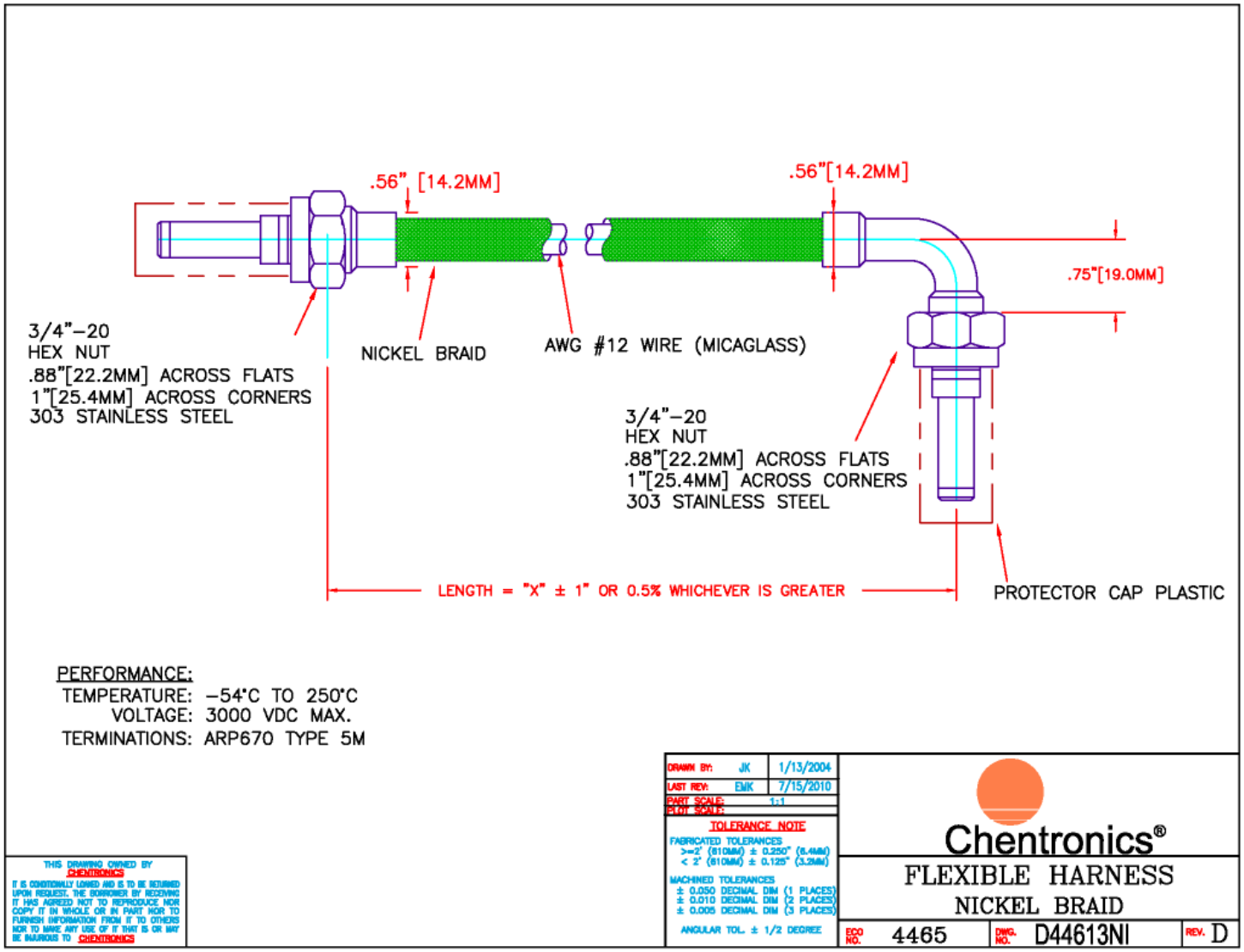
Using a Multimeter to measure resistance of new igniters is normally not a problem. Igniters that have been placed in service and occasionally new igniters can develop a hairline crack, such that contact is lost between the semiconductor and the center electrode. When this happens, the 0.6V source voltage of the Multimeter cannot bridge the hairline crack, and the resistance appears as an open circuit. During igniter operation, it is normal for hairline cracks to develop. A long as the trigger voltage from the exciter is within specification; these cracks can be bridged and healed over. (That is, an electrode that has lost contact with the semiconductor material will, after further operation, make contact again). As igniters age, the resistance of the semiconductor material can increase by a factor of 25. Measuring current from the Multimeter is similarly decreased while the current from the Megohmmeter remains nearly constant. For worn semiconductors, the Multimeter can read 10 to 20 times higher than the Megohmmeter. The high source voltage, 1000V, and the constant current make the Megohmmeter a better choice for measuring semiconductor igniter resistance.

# Drawings

## Exciter, P/N BD07070130



## Harness, P/N D44613NI



## Igniter, P/N 01000308