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# **Pro-Drag2**

## **2 CHANNEL 500mJ**

### **CAPACITOR DISCHARGE**

### **IGNITION**

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**CHECK WEBSITE FOR UPDATED INSTRUCTIONS  
& ADDITIONAL INFORMATION**

# **CAUTION**

**THIS WIRING DIAGRAM IS  
APPLICABLE ONLY TO IGNITION  
SYSTEMS WITH SERIAL NUMBER  
PREFIX STARTING**

**53xxxx**

**USE OF INCORRECT DIAGRAM WILL  
VOID WARRANTY AND MAY DAMAGE  
UNIT**

**THE INSTALLATION OF ULTRA HIGH  
ENERGY IGNITION SYSTEMS  
REQUIRES ADVANCED KNOWLEDGE  
AND SKILLS.**

**IMPROPER INSTALLATION OR  
OPERATION OF THIS UNIT MAY  
CAUSE DAMAGE TO IGNITION  
SYSTEM AND/OR IGNITION COIL**

# INSTALLATION NOTES

(Pro-Drag 500mJ systems only)

## MOUNTING

Do not mount the unit where it will be exposed to water or other liquids, ensure the bottom condensation slots are unobstructed and oriented to permit gravity drain. Select a location away from intense heat and if required provide a source of cooling air to remove internally generated heat.

**Failure to use supplied rubber mounts will void warranty!** Suitable replacement anti vibration mounts are M&W #MNT002, or Paulstra Radiaflex #521128.

## IGNITION LEADS

Do not use plain metal wire or carbon core ignition leads.

Use spiral wound inductively suppressed metal core ignition leads such as those available from Magnecor [www.magnecor.com](http://www.magnecor.com).

## SPARK PLUGS

The use of use non resistor spark plugs (where possible) will greatly enhance ignition performance.

In some installations the use of resistor spark plugs may be unavoidable. In these cases ensure they are not damaged by testing internal resistance value as part of regular maintenance. Open circuit or high resistance may cause failure of spark plug wires, ignition coils and CDI.

The use surface discharge or semi surface discharge spark plugs are limited to naturally aspirated engines due to their large spark gaps.

## INSULATION PRECAUTIONS

Degrease spark plug insulators and coil/plug boots after handling to prevent tracking or insulation breakdown.

Use (supplied) dielectric grease on spark plug insulators and coil/plug boots to increase insulation properties and ease

installation/removal. Use of dielectric grease in main connector may reduce water ingress.

## WIRING & POWER SUPPLY

M&W CDI systems are designed to blow the external fuse under conditions of over voltage or reverse polarity. Faults such as loose battery terminals, poor wiring or defective alternator/regulator may also cause for this to occur. Fitting a larger capacity fuse won't disable this feature, will void warranty and may cause irreparable damage to unit. **Only fit the recommended size fuse!**

Main connector pins are designed to be roll crimped. Squeeze crimping or soldering will cause distortion resulting in misfiring or incorrect CDI operation.

Wire ignition system directly to battery. If required wire length exceeds recommendations use small paired battery cable (power and ground) to make up distance. Do not rely on vehicle chassis to provide ground path. If connected to a high impedance supply shared with ECU or its sensors erratic operation will be experienced.

Do not use voltage boosters as most can't provide the instantaneous current required for correct CDI operation.

When using a total loss electrical system install either a 16V or 18V battery to ensure supply voltage does not drop below 13V. If using extended voltage batteries isolate them during charging to prevent excessive voltage reaching the CDI and ECU.

Use twisted shielded pair wire for all coil connections. Twisted pair wire must be used for power/ground. Keep coil wires one continuous length from CDI and do not fit any intermediate connectors into harness. All coil negative wires must be joined at or in the cdi connector. Keep coil primary (CDI) wires away from HT leads, coil HV outlet and coil body to prevent a flashover occurring.

## TRIGGERING

Trigger input & coil output numbers (letters) indicate CDI ignition sequence not cylinder number.

500mJ Pro-Drag systems are fixed falling edge trigger.

**If CDI and ECU trigger edges do not match timing will be erratic!**

## POWER LEVEL SWITCH

M&W 500mJ ignition systems include a power level switch to allow a reduction of ignition energy during low load conditions.

Do not manually activate this feature. Either install an adjustable 'Hobbs' style manifold pressure switch or use a programmable output from the ECU and wire so input is grounded as engine comes under load.

## TUNING

CDI systems are 'edge triggered' and not effected by dwell settings.

M&W CDI systems may reduce combustion delay and percentage misfire requiring a reduction in ignition timing. The resulting changes in combustion characteristics may also require alterations to fuel flow. Set ECU ignition delay to zero and tune engine as required.

The use of high power CDI systems with alcohol fuel will allow richer A/F ratios without loss of engine performance reducing exhaust gas temperature.

**Always re tune both fuel and timing curves after installing CDI ignition.**

## TACHO OUTPUT

The tacho output provides a 50% duty cycle square wave signal at battery supply voltage. This will work with most aftermarket digital tacho's however earlier types and those designed for coil negative triggering may not read accurately.

## LED INDICATOR

After applying power to switch wire the LED will illuminate for 1 second and extinguish. The LED will then flash briefly with each consecutive trigger event received (it may be necessary to view the LED directly on axis).

A repeated double flash of the LED may indicate a possible faulty ignition coil, faulty wiring, low supply voltage or damage to the CDI.

## TESTING

The CDI may be tested by momentarily grounding the trigger inputs causing the LED to flash and corresponding ignition coil to spark. **Do not conduct this test without grounded spark plugs installed!**

A more comprehensive test procedure may be found on our web site [http://www.mwignitions.com/pg\\_data\\_sheets.php](http://www.mwignitions.com/pg_data_sheets.php)

## SAFETY

Due to extreme energy and voltage levels developed by M&W 500mJ ignition systems it is strongly recommended caution be taken to ensure personnel safety and prevent ignition component damage.

Application of power to ignition system in combination with an inadvertent ignition event from either ECU being powered up/down or engine rotation can cause irreparable damage to ignition coils and CDI. Personnel in close proximity may suffer a painful electrical shock.

1. Install grounded metal studs in engine bay and transfer spark plug ends of HT leads to these between race events or at least when working on engine.
2. Install aircraft style guarded toggle switch in the CDI ignition switch wire circuit and disable it at all times except when running the engine.

## INSTALLATION PRECAUTIONS

**The main cause of CDI damage is conduction of high voltage to coil primary wiring.**

Care must be taken due to the propensity for HV flashovers and insulation breakdown caused by CDI ignitions unique characteristics.

It is essential to fully read and understand these instructions and have a comprehensive knowledge of automotive electrical systems before commencing installation.

For further instructions and cdi information check out the support tab on our web site <http://www.mwignitions.com>

# IGNITION COILS

(Pro-Street systems only)

## COIL SELECTION

Most inductive ignition coils will work reasonably well with CDI systems however for ultimate ignition energy and efficiency use a coil specifically designed for CDI use.

## COP COILS

COP (coil on plug) coils with inbuilt drivers are not suitable for use with CDI ignition. COP coils designed for inductive ignition may contain a blocking diode in the secondary winding which must be considered during wiring (see coil polarity note below). **Use resistive spark plugs with all COP coils. Keep plug gap < 0.025" (0.6mm) to prevent coil damage. DO NOT use AEM pencil coils under any circumstances!**

## FERRITE CDI COILS

Ferrite core cdi coils provide a lightweight solution for direct fire applications and give high secondary current however they may not be suitable for all applications due to their extremely short arc duration. The high level of EMI emitted by these coils may also require additional shielding to prevent electrical interference with the ECU or CDI. **Do not use ferrite coils in parallel wired pairs!**

## COIL POLARITY

All diagrams are shown for cdi style coils. For correct operation with inductive ignition coils wire the primary connections in reverse to maintain correct spark plug polarity.

**CAUTION!**

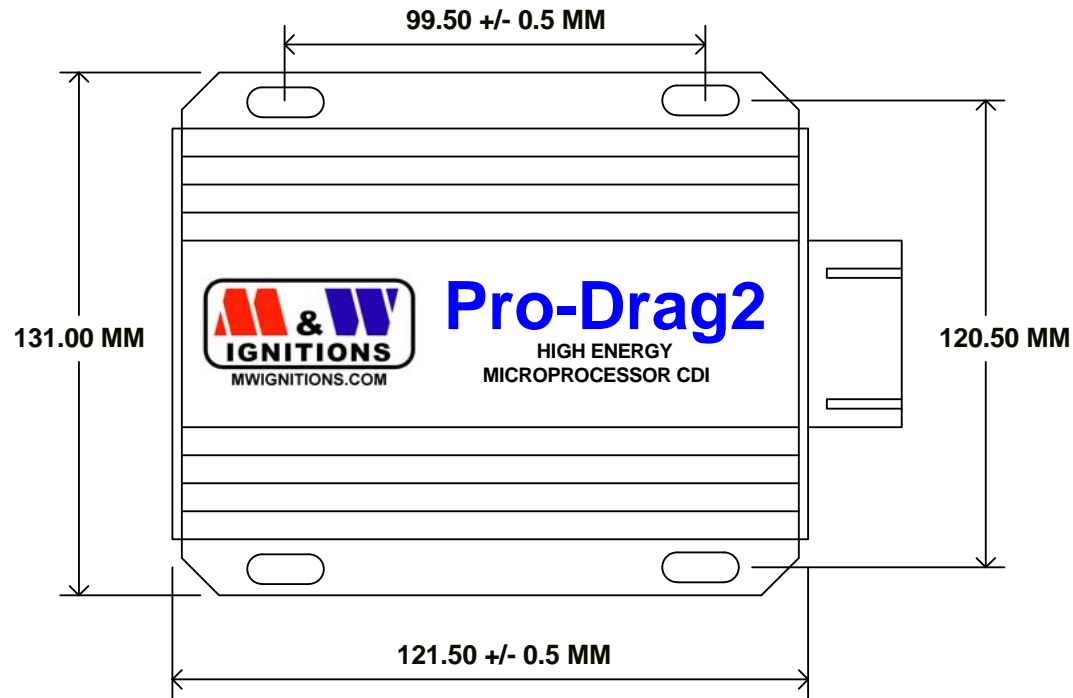
**IGNITION COIL DAMAGE MAY OCCUR IF  
OPERATED WITH AN EXCESSIVE SPARK GAP**

**FOR DRAG RACING USE ONLY**

**This unit is not designed for continuous operation in either high or low power modes**



**DISCONNECT POWER BEFORE WORKING ON UNIT**



**Slot dimensions - 5mm \* 10mm**

Title				<b>MOUNTING DIMENSIONS</b>	
Size	Number	<b>(C) M&amp;W Ignitions</b>		Revision	
A4				08.06.13.1	
Date:	10-Jun-2013	Sheet 1 of 1		Drawn By: M&W	
File:	D:\M&W\...\Mounting Dimensions.sch				



**FOR DRAG RACING USE ONLY**

**This unit is not designed for continuous operation in either high or low power modes**

**M & W IGNITIONS**

Performance & Quality since 1996

**CAUTION!  
HIGH VOLTAGE**



**DISCONNECT POWER BEFORE WORKING ON UNIT**

**VIEWED FROM BACK OF CONNECTOR**



**KEEP ALL INPUTS WELL SEPARATED FROM COIL OUTPUTS**

<b>1</b> +12V (Battery)	<b>7</b> Ground (Battery)	<b>13</b>
<b>2</b> +12V (Battery)	<b>8</b> Ground (Battery)	<b>14</b> Trigger B
<b>3</b>	<b>9</b> Power switch	<b>15</b> Trigger A
<b>4</b> Tacho	<b>10</b>	<b>16</b> Ignition switch
<b>5</b>	<b>11</b>	<b>17</b> Coil B -
<b>6</b> Coil A +	<b>12</b> Coil B +	<b>18</b> Coil A -

**SPECIFICATIONS**

Supply voltage = 13V - 18V DC negative ground  
 Startup voltage = 11V  
 Maximum supply current = 20A  
 Shutdown current <700uA  
 Maximum ignition frequency = 700Hz  
 Maximum energy limit = 500Hz/350Hz  
 Coil primary voltage = 400/500V  
 Spark energy = 320/500 millijoules  
 Trigger = 10mA open collector drive  
 Trigger edge = falling  
 Tacho = 12V, 100mA square wave  
 Maximum operating temperature = 105°C  
 Dimensions = 122L \* 110W \* 40H

Title <b>TWO CHANNEL 500mJ CDI IGNITION</b>		
Size A4	Number <b>(C) M&amp;W Ignitions</b>	Revision 25.06.13.1
Date: 25-Jun-2013	Sheet 1 of 1	
File: D:\M&W\...\Pro-Drag2_500_S3_1.sch	Drawn By: M&W	

**FOR DRAG RACING USE ONLY**

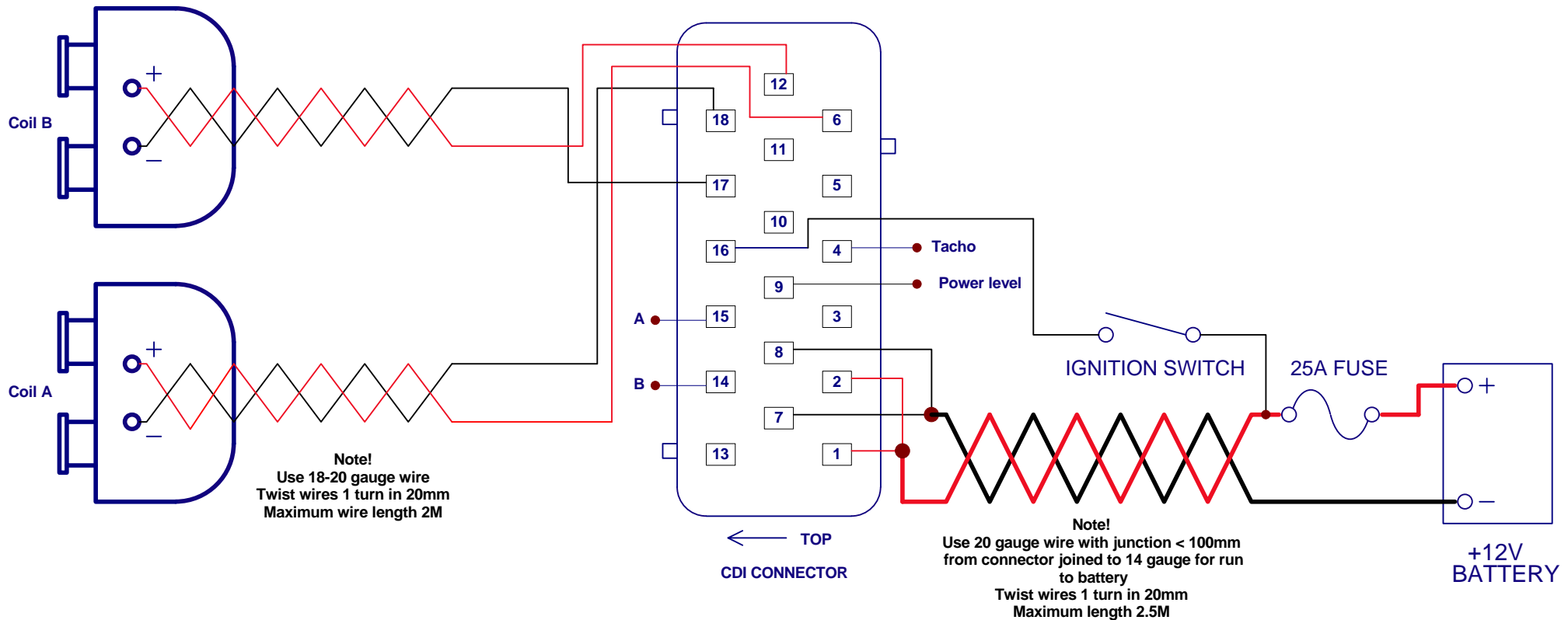
This unit is not designed for continuous operation in either high or low power modes

**M & W IGNITIONS**

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DISCONNECT POWER BEFORE WORKING ON UNIT



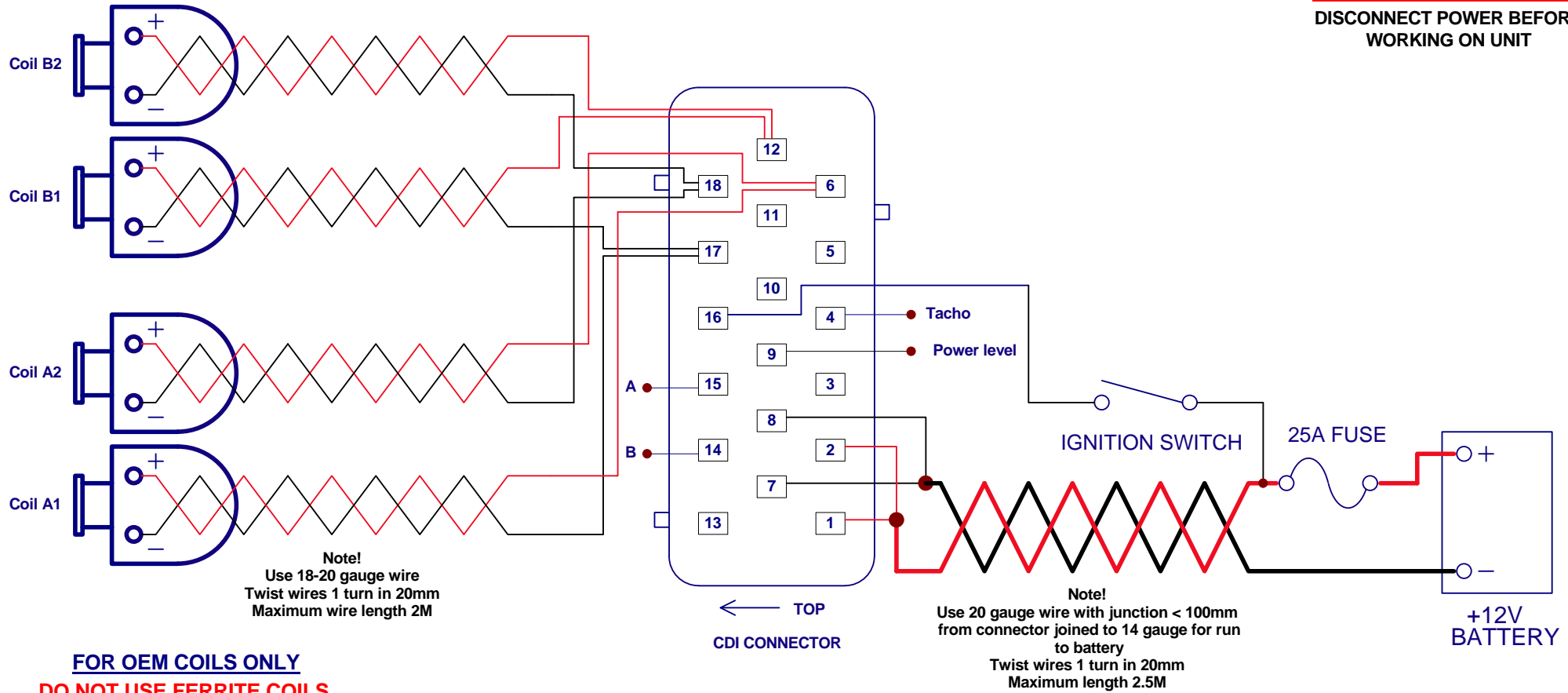
Title			TWO COIL WASTED SPARK IGNITION		
Size	Number		Revision		
A4	(C) M&W Ignitions		08.06.13.1		
Date:	10-Jun-2013	Sheet 1 of	1		
File:	D:\M&W\...\Pro-Drag2_500_S3_2.sch	Drawn By:	M&W		

**FOR DRAG RACING USE ONLY**

**This unit is not designed for continuous operation in either high or low power modes**



**DISCONNECT POWER BEFORE WORKING ON UNIT**



Title			FOUR COIL WASTED SPARK IGNITION		
Size	Number	(C) M&W Ignitions		Revision	08.06.13.1
A4					
Date:	10-Jun-2013	Sheet 1 of	1	Drawn By:	M&W
File:	D:\M&W\...\Pro-Drag2_500_S3_3.sch				

# FOR DRAG RACING USE ONLY

This unit is not designed for continuous operation in either high or low power modes

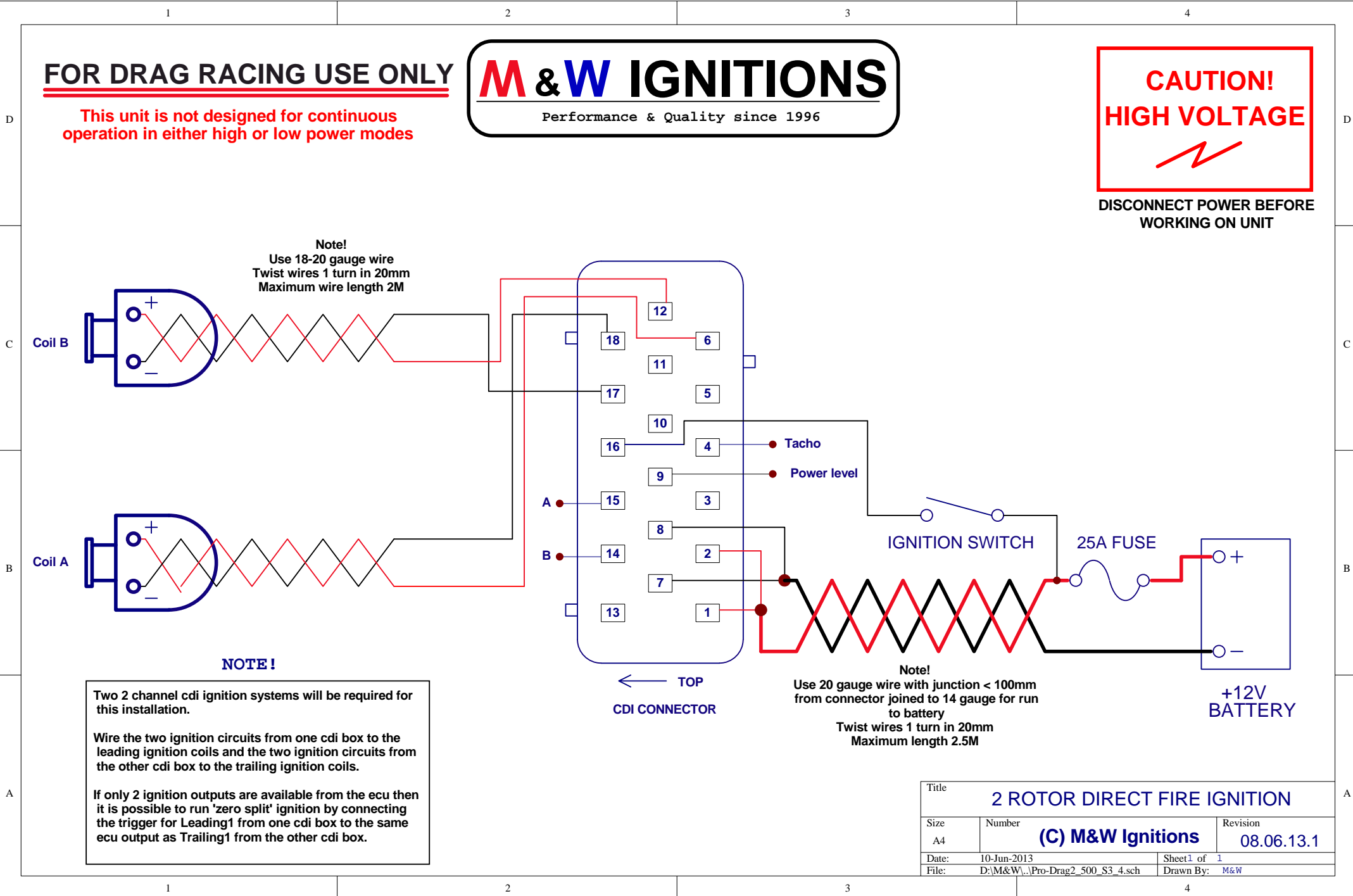
# M & W IGNITIONS

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**CAUTION!**  
**HIGH VOLTAGE**



DISCONNECT POWER BEFORE WORKING ON UNIT



Note!  
Use 18-20 gauge wire  
Twist wires 1 turn in 20mm  
Maximum wire length 2M

Coil B

Coil A

← TOP  
CDI CONNECTOR

Note!  
Use 20 gauge wire with junction < 100mm  
from connector joined to 14 gauge for run  
to battery  
Twist wires 1 turn in 20mm  
Maximum length 2.5M

+12V  
BATTERY

**NOTE!**

Two 2 channel cdi ignition systems will be required for this installation.

Wire the two ignition circuits from one cdi box to the leading ignition coils and the two ignition circuits from the other cdi box to the trailing ignition coils.

If only 2 ignition outputs are available from the ecu then it is possible to run 'zero split' ignition by connecting the trigger for Leading1 from one cdi box to the same ecu output as Trailing1 from the other cdi box.

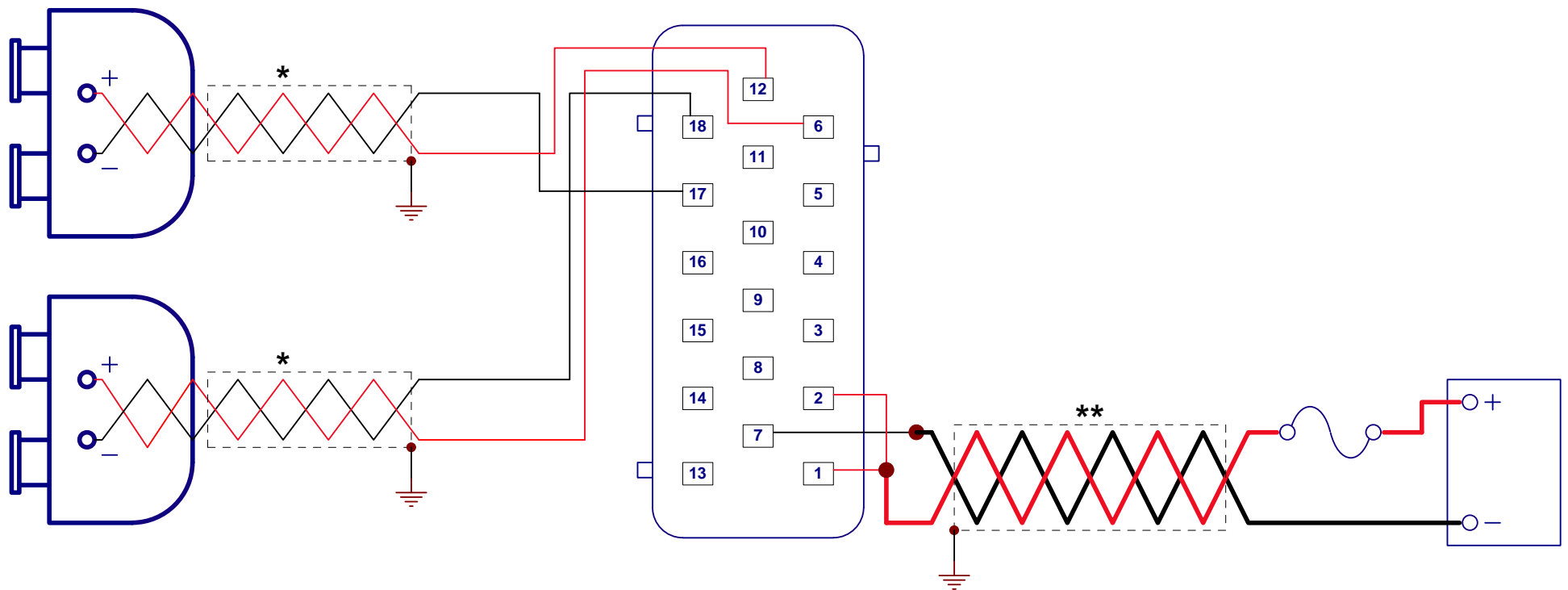
Title			2 ROTOR DIRECT FIRE IGNITION		
Size	Number	(C) M&W Ignitions		Revision	08.06.13.1
A4					
Date:	10-Jun-2013	Sheet 1 of	1	Drawn By:	M&W
File:	D:\M&W\...\Pro-Drag2_500_S3_4.sch				

# M & W IGNITIONS

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**CAUTION!**  
**HIGH VOLTAGE**

**DISCONNECT POWER BEFORE WORKING ON UNIT**



\* Use twisted shielded cable grounded at one end only  
 \*\* Shielded power cables required for Australian EMC compliance

Title			SHIELDING & EMC COMPLIANCE		
Size	Number	<b>(C) M&amp;W Ignitions</b>		Revision	
A4				08.06.13.1	
Date:	10-Jun-2013	Sheet 1 of	1	Drawn By:	M&W
File:	D:\M&W\EMC.sch				