



2000

Top Fuel Harley

ELECTRICAL WIRING & OPERATING INSTRUCTIONS

Applicable
S/No's 93xxxx

**FAILURE TO FOLLOW INSTRUCTIONS
WILL VOID WARRANTY**

CONTENTS

2. Installation notes
8. Connections and specifications
9. Wiring
10. Mounting dimensions

Introduction

The new M&W 2000 TFH capacitor discharge ignition system is a revolutionary design based upon the latest high voltage technology producing 2,150mJ of ignition energy per cylinder for twin plug Top Fuel Harley drag bike motors.

WARNING

This is an Extreme ignition system and designed for short duration use on drag race only vehicles.

Installation

MOUNTING

Mount the unit in a dry location away from intense heat and ensure bottom condensation slots are unobstructed and oriented to permit gravity drain. Ensure a source of cooling air is available.

Failure to use supplied rubber mounts will void warranty!

Unit must be secured with no preload on rubber mounts in any axis and incapable of contacting any rigid part of the vehicle during mount deflection.

IGNITION LEADS

Use only inductively suppressed spiral wound metal conductor ignition leads. For best performance select leads with approximately 1,000 ohms per metre (300 ohm per ft) resistance similar to those produced by Magnecor.

Do not use carbon core or unsuppressed metal leads!

SPARK PLUGS

When using resistor spark plugs measure internal resistance as part of regular maintenance, replace immediately if out of tolerance.

If used on a blown motor do not use semi or full surface discharge spark plugs and keep spark plug gap ≤ 0.025 " (0.6mm)!

INSULATION PRECAUTIONS

Regularly degrease sparkplug insulators, coil HV towers, sparkplug boots, ignition coil boots and installation tooling to prevent high voltage arcing.

Use only clean dry gloves to handle spark plugs and high voltage components!

Use dielectric grease on sparkplug insulators, coil tower, inside sparkplug boots and ignition coil boots to improve insulation properties.

POWER SUPPLY

Reverse polarity will damage unit!

Always install external fuse or equivalent rated circuit breaker!

Optimal performance will be achieved using a 16V electrical system. For total loss applications a minimum 12Ah lithium battery similar to Full Spectrum P.16x should be used with a separate ecu power supply.

Disconnect battery during charging!

Shutdown voltage	<6.5V
Start-up voltage	>7.0V
Performance limited region	<14.0V
Minimum supply voltage	14.5V
Normal supply voltage	16.0V
Maximum supply voltage	18.0V

Connect power supply +/- inputs directly to battery, do not wire through PDM or other electrical management system!

WIRING

Use twisted shielded Tefzel M27500 for all wires and keep short as possible. See install diagram for correct gauge.

Keep coil primary wires well separated from HT leads, coil HV outlet, coil body and any ECU wiring!

Battery voltage sense line must be connected to main supply wire at point of quadfurcated prior to entering the cdi connector.

OPERATION

SAFE OPERATION

It is important to correctly sequence activation and deactivation of the ignition system to prevent uncommanded ignition events.

- CDI must be connected directly to battery and turned on/off via CDI switch input
- ECU must be fully initialised and all ignition output lines in a stable state prior to cdi being turned on
- CDI must be turned off via cdi switch input at least 500mS prior to ECU shutdown
- Do not connect or disconnect cdi main power supply to battery with power applied to cdi switch input

FUEL INHIBIT

Fuel inhibit output provides an easy to monitor ignition operating status.

Do not supply fuel to motor unless fuel inhibit output $>5V$ and immediately halt fuel flow if output $<5V$

TRIGGERING

2000 TFH systems fire on a falling (negative) edge trigger signal.

CDI SWITCH

CDI switch input is used for powering system up/down without disconnection from battery. Once switch input is enabled unit will conduct self test and boot sequence in preparation for operation. This input is not suitable for rapid interruption of ignition function.

HIGH SPEED DISABLE

High speed disable input allows for rapid interruption of ignition function without complete ignition shutdown. A fast reaction time (< 30uS) ensures suitability for ignition cut gear change etc. This input may also be used to temporarily disable ignition system while maintaining CAN data output however operation in this mode will limit cooling as generator remains active.

THERMAL MANAGEMENT

A cooling airflow will assist temperature recovery however it does not extend operation time!

Active temperature monitoring is used to prevent inadvertent damage through operation outside design parameters. If internal temperature exceeds 180C (356F) ignition system will shut down recovering when temperature drops below 80C (176F).

Present and peak temperature may be monitored via can data stream.

LED INDICATOR

Power up: Both Led's will flash alternately until supply exceeds 7V.

Boot: Both Led's illuminated steady for approx 1 second.

Normal operation: Green led will flash with each trigger input detected, red led will illuminate when high power mode active.

Over temperature: Both LED's will flash simultaneously until transformer temperature below 80C (176F)

Output damage: A repeated triple flash of red led.

CAN BUS DATA

Protocol: 1Mbps - 11 bit ID
CAN ID: 0x100 - custom available
Data rate: 10Hz
Termination: External terminating resistor required.
Firmware: V 0.1

Byte No.	Description	Unit	Multiplier
0	Internal temperature	°C	1
1	Peak internal temperature	°C	1
2	Supply voltage	V	0.1
3	Coil voltage	V	2.34
4	Flags (see below)		
5	Firmware version		
6	Serial number high byte		
7	Serial number low byte		
	Flags		
Bit 0	Temp sensor	0 - Ok	1 - Error
Bit 1	Temp sensor	0 - Ok	1 - Error
Bit 2	Fuel inhibit	1 - Ok	0 - Error
Bit 3	N/A		
Bit 4	High speed enable	0 - Stop	1 - Run
Bit 5	N/A	0 - Low	1 - High
Bit 6	N/A	0 - Low	1 - High
Bit 7	N/A	0 - Low	1 - High

TUNING

CDI performance is not affected by changes in dwell settings!

CDI ignition will significantly alter combustion characteristics requiring a changes in ignition timing and fuel flow maps.

Do not attempt to re-use exiting timing curves, set ECU ignition delay to zero and re-tune both fuel and timing after installation!

COIL SELECTION

Use only M&W COI006-18 coils or contact us for alternate recommendations.

Do not use COP coils, pencil coils or ferrite core coils such as Mercury, Prufex or MSD 8201

TESTING

When fault finding new installations the CDI may be manually fired by momentarily grounding each trigger input. If installed correctly this will cause the green LED to briefly flash and corresponding ignition coil to spark.

Do not conduct this test without grounded spark plugs installed!

SAFETY

This cdi system is capable of generating extreme voltages at very high current!

We strongly advise the provision of spark plug lead grounding points on all vehicles using this ignition.

These may simply be old spark plugs or sparkplug shaped metal studs welded & grounded to vehicle chassis.

When vehicle is not in use or immediately prior to any maintenance remove spark plug leads from spark plugs and attach to grounding points.

This will help prevent coil/lead/cdi damage and possible injury to nearby personnel.

M & W IGNITIONS

Unsurpassed Performance & Quality

CAUTION!
HIGH VOLTAGE



**DISCONNECT POWER BEFORE
WORKING ON UNIT**



1 +12V (Battery)	13 Ground (Battery)	25 Trigger 1a (link)
2 +12V (Battery)	14 Ground (Battery)	26 CDI switch
3 +12V (Battery)	15 Ground (Battery)	27 Trigger 2a (link)
4 +12V (Battery)	16 Ground (Battery)	28 Trigger 2b (link)
5	17	29 Trigger 1b (link)
6 Fuel Inhibit	18	30 High Speed Disable
7	19 CAN High	31
8	20	32 CAN Low
9	21 Coil 1B -	33 BV sense
10 Coil 2B +	22 Coil 2B -	34 Coil 1B +
11	23 Coil 1A -	35
12 Coil 1A +	24 Coil 2A -	36 Coil 2A +

SPECIFICATIONS

Operating voltage 14.0V --> 18V DC
 Startup voltage >= 7V
 Maximum supply current 50A
 Power off current < 200uA
 Maximum speed @ 16V 10,000 RPM
 Spark energy 2,150mJ / cylinder
 Coil current >170A
 Trigger:
 Current 10mA
 Edge Falling
 Voltage rising >= 3.2V
 Voltage falling <= 1.6V
 Operating temperature <= 105°C
 Dimensions 179L * 137W * 50H
 Weight 1,500gm

Title		
SPECIFICATIONS		
Size A4	Number (C) M&W Ignitions	Revision 14.08.22.1
Date:	14-Aug-2022	Sheet 1 of 1
File:	D:\M&W\12000 TFH - specs.sch	Drawn By: WAG

Wire Specifications

POWER SUPPLY:

Use 12ga shielded wire from battery quadfurcated into 18ga wire <= 100mm from connector. Junction is best achieved using a Solistrand or similar butt splice / barrel crimp.

Maximum recommended wire length is 2M

IGNITION COILS:

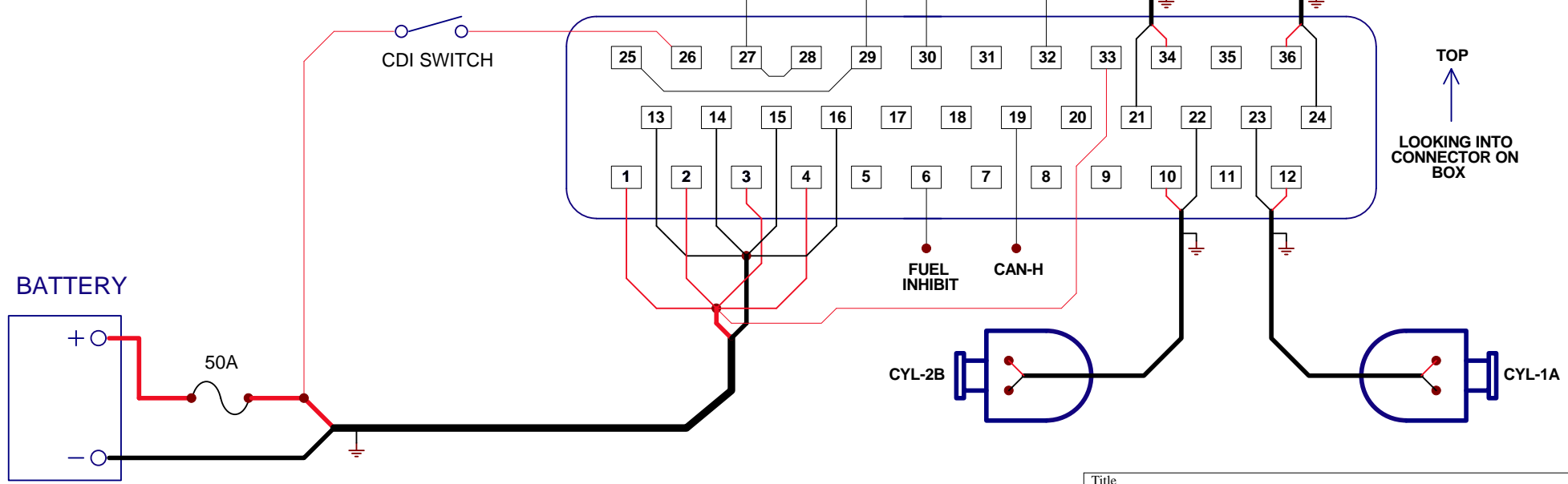
Use 18ga shielded wire from cdi to coils and keep as one continuous length.

Maximum recommended wire length is 2M

Read installation guide for important wiring details!



DISCONNECT POWER BEFORE WORKING ON UNIT



TOP
↑
LOOKING INTO CONNECTOR ON BOX

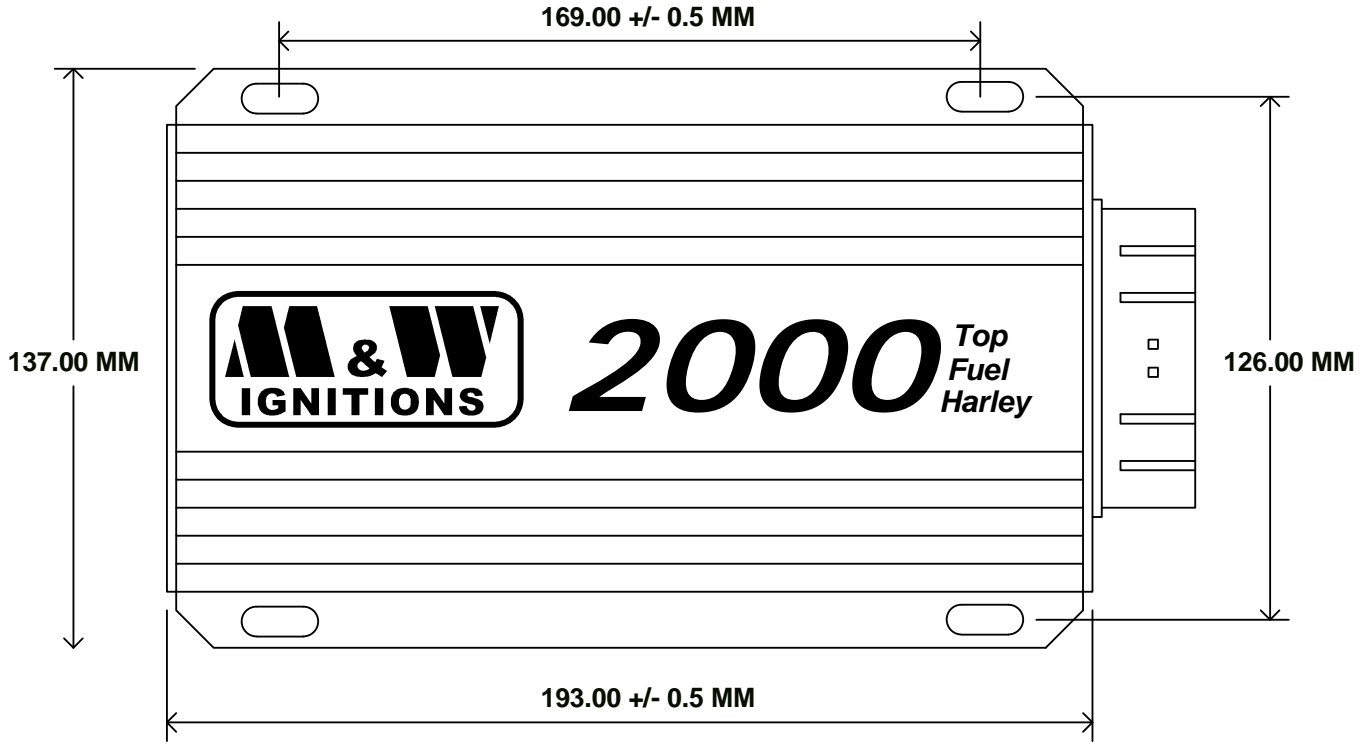
Reverse polarity connection without fuse installed will damage unit!

Title			TWIN PLUG - TOP FUEL HARLEY		
Size	Number	Revision		(C) M&W Ignitions	
A4		22.08.22.1			
Date:	22-Aug-2022	Sheet 1 of	1		
File:	D:\M&W\12000 TFH wiring.sch	Drawn By:	WAG		

CAUTION!
HIGH VOLTAGE



**DISCONNECT POWER BEFORE
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Slot dimensions - 5mm * 10mm

Title				2000 Top Fuel Harley	
Size	Number	Revision			
A4	(C) M&W Ignitions	14.08.22.1			
Date:	14-Aug-2022	Sheet	1	of 1	
File:	D:\M&W\12000 TFH Dimensions.sch	Drawn By:	WAG		