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2000

Top Fuel Harley

ELECTRICAL WIRING
&
OPERATING INSTRUCTIONS

Applicable
S/No's 93xxxx

FAILURE TO FOLLOW INSTRUCTIONS
WILL VOID WARRANTY

CONTENTS

Introduction

The new M&W 2000 TFH capacitor discharge ignition system is a revolutionary design based upon the latest high voltage technology producing in excess of 2,000mJ 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!

Use a dedicated high quality managed 16V lithium ion battery capable of minimum 50A continuous discharge current similar to those made by Full Spectrum Power.

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, failure to follow these guidelines will precipitate an uncommanded ignition event

- 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 signal indicates ignition status. Ideally it would be monitored on a cycle to cycle basis and status confirmed before next fuel injection event.

Do not supply fuel to motor unless fuel inhibit output >8V and immediately halt fuel flow if blow this voltage

TRIGGERING

The 2000 TFH ignition system may be triggered by either an ECU (variable timing) or crank trigger wheel and pair of Hall Effect switches (fixed timing). To simplify installation power for the hall switches is provided by the ignition system when Hall Effect option requested.

Triggering occurs 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.

KILL SWITCH

When an emergency kill or breakaway switch is required this is best implemented by interrupting the cdi switch circuit (terminal 26).

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 for approx 1 second
Normal operation:	Green led will flash with each trigger input Red led will illuminate
Over temperature:	Both LED's will flash simultaneously until transformer temperature below 80C (176F)
Output damage:	Red LED will flash three times in succession
Low coil voltage:	Red LED will flash four times in succession

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	2.45
4	Flags (see below)		
5	Firmware version		
6	Serial number high byte		
7	Serial number low byte		
	Flags		
Bit 0	Reserved		
Bit 1	Reserved		
Bit 2	Fuel inhibit	1 - Run	0 - Stop
Bit 3	Reserved		
Bit 4	High speed enable	1 - Run	0 - Stop
Bit 5	Reserved		
Bit 6	Reserved		
Bit 7	Reserved		

TUNING

CDI performance is not affected by changes in dwell settings!

CDI ignition will significantly alter combustion characteristics and ignition delay requiring a change 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.

FIRING COIL WITH EXCESSIVE SPARK PLUG GAP OR WITHOUT SPARK PLUG LEAD AND GROUNDED SPARKPLUG INSTALLED WILL DAMAGE COIL AND MAY DAMAGE IGNITON SYSTEM!

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 coils 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 personnel.

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CAUTION!
HIGH VOLTAGE

DISCONNECT POWER BEFORE WORKING ON UNIT

1 +12V (Battery)	13 Ground (Battery)	25
2 +12V (Battery)	14 Ground (Battery)	26 CDI switch
3 +12V (Battery)	15 Ground (Battery)	27 Trigger2 (*Hall2)
4 +12V (Battery)	16 Ground (Battery)	28
5	17 (*Hall -)	29 Trigger1 (*Hall1)
6 Fuel Inhibt (*Hall +)	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 +

*** HALL EFFECT TRIGGER OPTION UPON REQUEST**

SPECIFICATIONS

Operating voltage ..... 14.0V --> 18V DC
Startup voltage ..... >= 7V
Average supply current ..... 25A @ 7,000 rpm
Instantaneous peak current 50A
Power off current ..... < 200uA
Maximum speed @ 16V ..... 10,500 RPM
Spark energy ..... >2,000mJ / 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 **12.02.23.1**
Date: 13-Feb-2023		Sheet 1 of 1
File: D:\M&W\..\2000 TFH - specs.sch		Drawn By: WAG

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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

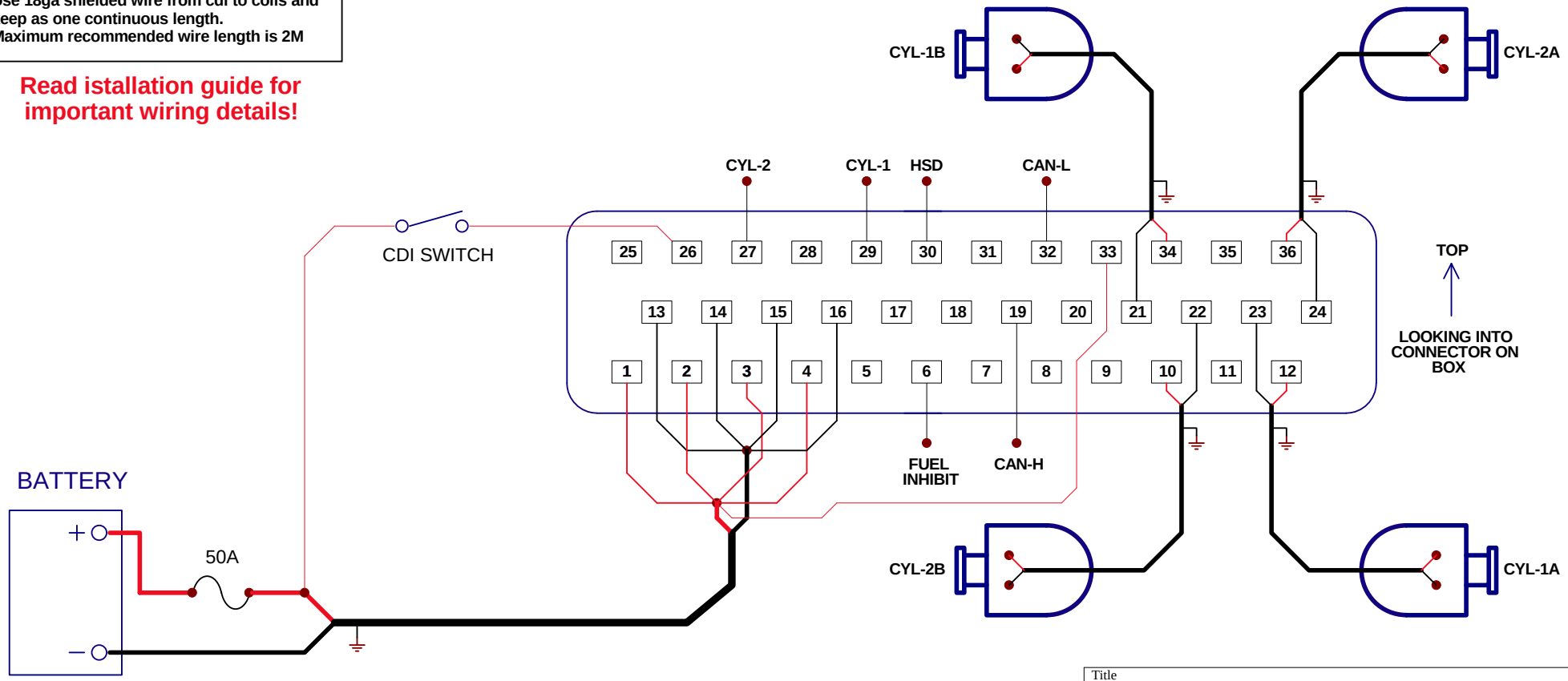
IGNITION COILS:

Use 18ga shielded wire from cdi to coils and keep as one continuous length.
Maximum recommended wire length is 2M

Read istallation guide for important wiring details!

CAUTION! HIGH VOLTAGE

DISCONNECT POWER BEFORE WORKING ON UNIT



Reverse polarity connection without fuse installed will damage unit!

Title: TWIN PLUG - TOP FUEL HARLEY		
Size: A4	Number: (C) M&W Ignitions	Revision: 12.02.23.1
Date: 12-Feb-2023		Sheet 1 of 1
File: D:\M&W\..\2000 TFH wiring.sch		Drawn By: WAG

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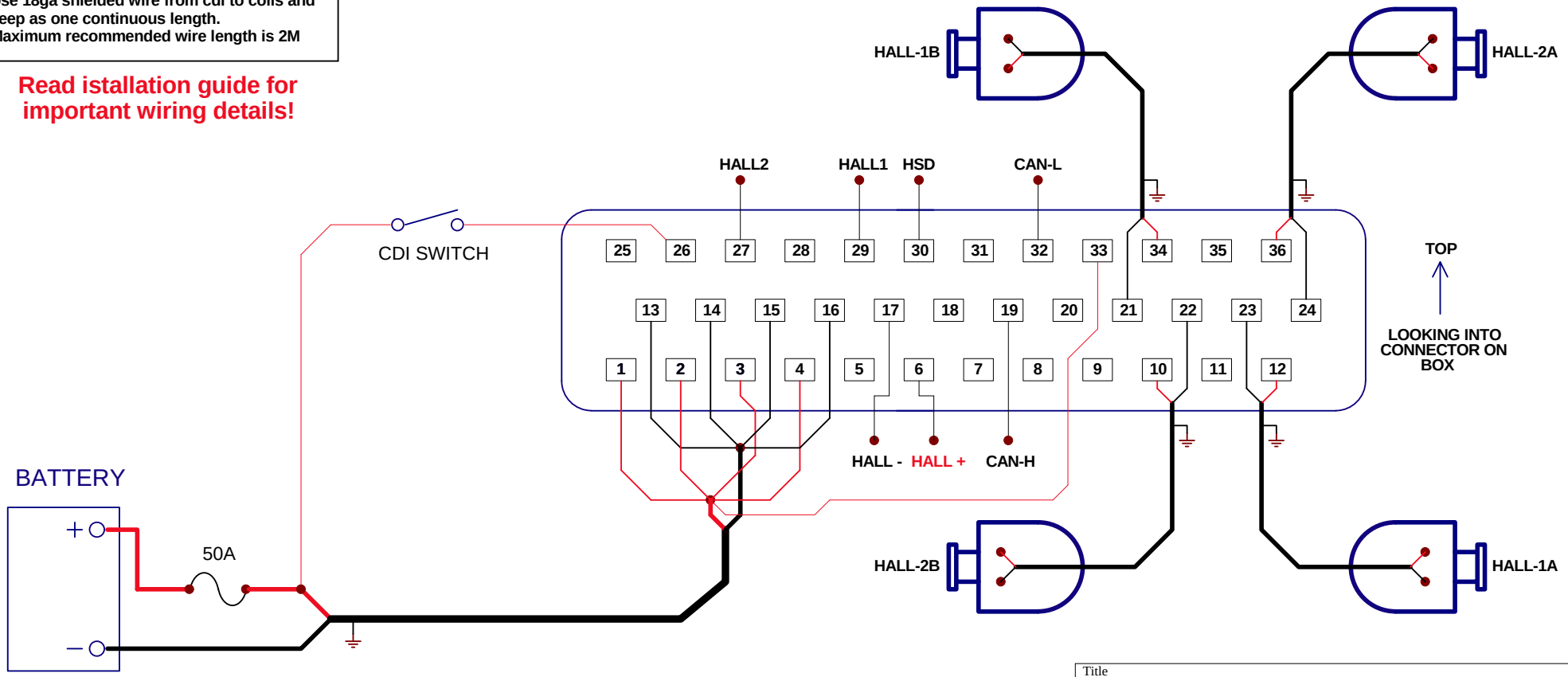

Reverse polarity connection without fuse installed will damage unit!

Title: 2000 TFH HALL EFFECT OPTION		
Size: A4	Number: (C) M&W Ignitions	Revision: 12.02.23.1
Date: 13-Feb-2023		Sheet 1 of 1
File: D:\M&W\..\2000 TFH wiring 2.sch		Drawn By: WAG

CAUTION!
HIGH VOLTAGE

DISCONNECT POWER BEFORE WORKING ON UNIT

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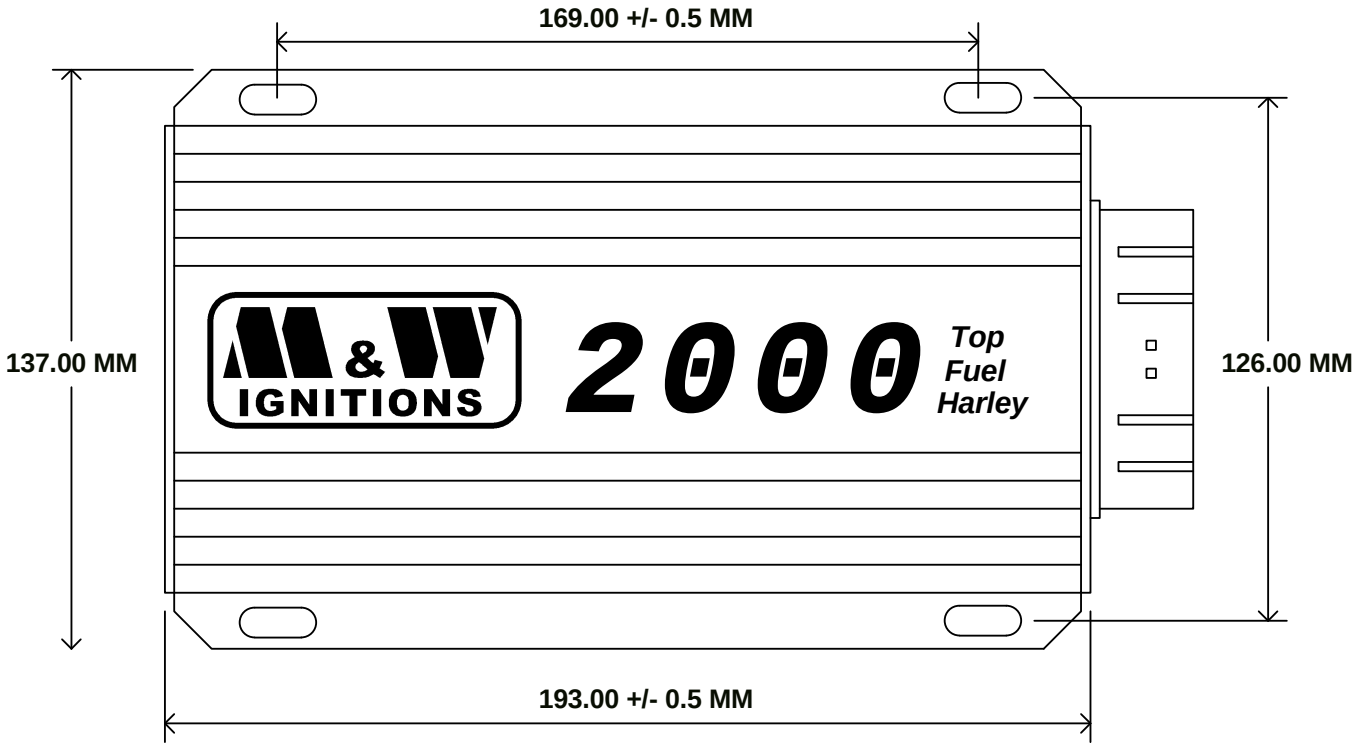

Slot dimensions - 5mm * 10mm

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