MICHIGAN MOTORZ

Marine Engines & Parts

INSTALLATION MANUAL

COMPLETE TURN-KEY ENGINES

REVISION | 08132025.1

Congratulations on your decision to purchase a quality replacement engine from Michigan Motorz.
We appreciate your business and confidence in the Michigan Motorz brand, our products, and our personalized customer service and support.

This document explains the installation procedures that apply to the engine you've purchased.

Please keep it available for future reference.

TABLE OF CONTENTS

INSTALLATION GUIDE

1. **Basic Special Tools Requirements (Page 5)**
   - 1.1. MPI Models
   - 1.2. Carbureted Models
2. **Special Tools Needed for Service (Page 8)**
   - 2.1. Carbureted & MPI Models
     - 2.1.1. Scan Tool Rental Service
     - 2.1.2. **TABLE:** Special Tools
3. **Installation Dimensions (Page 10)**
   - 3.1. **TABLE:** Engine Measurements Chart
4. **Engine Specifications / Capacities (Page 11)**
   - 4.1. **TABLE:** Engine Specifications Chart
   - 4.2. **TABLE:** Fluid Capacities Chart
5. **Scheduled Boat Owner Maintenance (Page 12)**
6. **Engine Requirements (Page 14)**
   - 6.1. Engine Registration
   - 6.2. Engine Fuel & Oil Requirements
7. **Throttle & Shift Controls (Page 16)**
8. **Electrical Connections & Requirements (Page 17)**
   - 8.1. Battery Requirements
   - 8.2. ECM "Clean Power" Connection
   - 8.3. **DIAGRAM:** Trim Sender Connection (Sterndrive Models)
   - 8.4. **DIAGRAM:** Trim Pump Wiring (Sterndrive Models)
   - 8.5. Battery Cable Requirements
   - 8.6. 10-Pin Engine Wiring Harness Connector
   - 8.7. Transmission Connections (Inboard/V-Drive Models)
     - 8.7.1. Transmission Connections
     - 8.7.2. Transmission Temp Sender Connections
   - 8.8. 16-Pin Engine Wiring Harness Connector
9. **DIAGRAM: MPI Harness (Page 23)**
10. **DIAGRAM: Carbureted Harness (Page 24)**
11. **Shift Interrupt Connections (Sterndrive Models) (Page 25)**
    - 11.1. MPI Shift Interrupt
    - 11.2. Carbureted Shift Interrupt
    - 11.3. Testing Shift Interrupt Operation
12. **Ignition Timing (Page 26)**
    - 12.1. Carbureted Engines
    - 12.2. MPI Engines
13. **Fuel System Requirements (Page 28)**
    - 13.1. Carbureted Engine Requirements
    - 13.2. MPI Engine Requirements
    - 13.3. MPI Fuel Pump Connections
14. **Exhaust System Requirements (Page 30)**
    - 14.1. Exhaust Hose Outlet Requirements
15. **Cooling System Requirements (Page 31)**
    - 15.1. Seawater Pickup/Suction Hose
16. **Common Maintenance Items (Page 32)**
    - 16.1. **TABLE:** Common Maintenance Items

WARRANTY

1. **Warranty Terms (Page 39)**
   - 1.1. Acceptance of Warranty Terms
   - 1.2. What is covered by warranty
     - 1.2.1. Marine Brand-New Longblocks
     - 1.2.2. Marine Engine Replacement
     - 1.2.3. Field Repairs
     - 1.2.4. Warranty Disclaimer and Limitation of Liability
2. **Limited Warranty Adjustment Procedures and Other Limitations (Page 42)**
     - 2.1.1. How Do I Get Service?
     - 2.1.2. Warranty Claim Procedures
3. **Engine Installers Responsibility (Page 43)**
   - 3.1. Installers Responsibility
4. **Engine Owners Responsibility (Page 44)**
   - 4.1. Owners Responsibility
5. **What Is Not Covered By Warranty (Page 45)**
6. **Additional Terms and Conditions (Page 46)**
   - 6.1. Dispute Resolution
   - 6.2. Choice of Law and Venue
   - 6.3. Transferability
   - 6.4. Severability
   - 6.5. Modification of Waiver
   - 6.6. Third Party Beneficiaries
   - 6.7. Titles
   - 6.8. Entire Agreement
7. **Engine Warranty Registration Form (Page 48)**
8. **P.D.I. (Pre-Delivery Inspection) Form (Page 49)**
9. **Send Your Registration and PDI Forms (Page 50)**

PLEASE NOTE!

PLEASE READ THIS ENTIRE INSTALLATION GUIDE BEFORE ATTEMPTING TO INSTALL THE ENGINE IN THE BOAT!

IN ORDER TO BE ELIGIBLE FOR WARRANTY COVERAGE, YOUR ENGINE MUST BE REGISTERED WITHIN 90 DAYS FROM DATE OF DELIVERY.

NO WARRANTY CLAIMS WILL BE CONSIDERED WITHOUT REGISTRATION AND P.D.I. SHEET ON FILE.

THESE FORMS ARE AT THE END OF THIS WARRANTY PACKET.

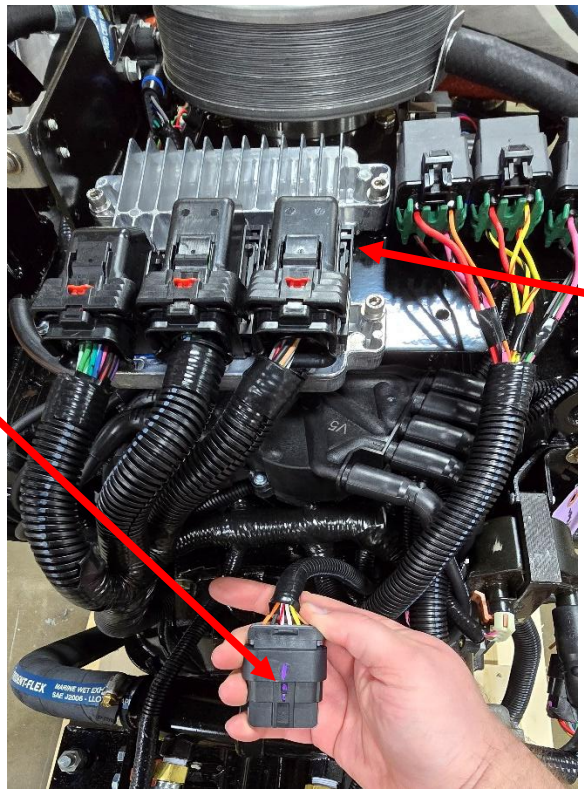
WARRANTY IS NOT ACTIVATED UNTIL ENGINE REGISTRATION AND P.D.I. SHEET IS RECEIVED.

BASIC SPECIAL TOOL REQUIREMENTS

MPI MODELS

Electronic Fuel Injected engines (Multi-Port Injected Engines, aka MPI engines) require the use of a diagnostic scan tool to be able to read information from the engine's computer, known as an Electronic Control Module (ECM). Without a scan tool, it is extremely difficult to accurately diagnose an engine properly.

NOTE: The diagnostic port, can be found on the back of the engine, just behind the ECM, shown here:



Any Diagnostic Scan Tool that is capable of reading information from a GM/Delphi MEFI 5 Series ECM will be compatible with the fuel injection system on these engines. We recommend a handheld TechMate™ or Diacom™, both available from Michigan Motorz, with the appropriate wire harness adapter (CANBUS).

Compatible scan tools are available from our website, www.michiganmotorz.com

MPI engines require the use of a sensitive Digital Multi-Meter for measuring the small voltages that are present in the circuits that send information to and from the ECM. A 12-volt test light is **NOT** adequate to be able to determine proper operation of these circuits.

Below you can find the recommended scan tools to use for our engines. Scan the QR code with your cell phone camera or tablet camera and it will take you to our website to purchase.

NOTE: If you use Diacom PC software, we strongly recommend making a recoding during your initial sea-trial so you have a base-line of data for your records and future reference if diagnosis is needed.

SCAN ME

Rinda Technologies

TechMate™

Handheld Scan Tool

MM P/N: 94070C

SCAN ME

Rinda Technologies

Diacom™

Windows-Based Scan Tool

MM P/N: 94030

If you already own one of these scan tools, but do not have the appropriate adapter, You will need the following:

SCAN ME

Rinda Technologies

94029

MEFI 5 CAN BUS

Gen 2 Adapter

(Included w/ TechMate 94070C)

MM P/N: 94029

CARBURETED MODELS

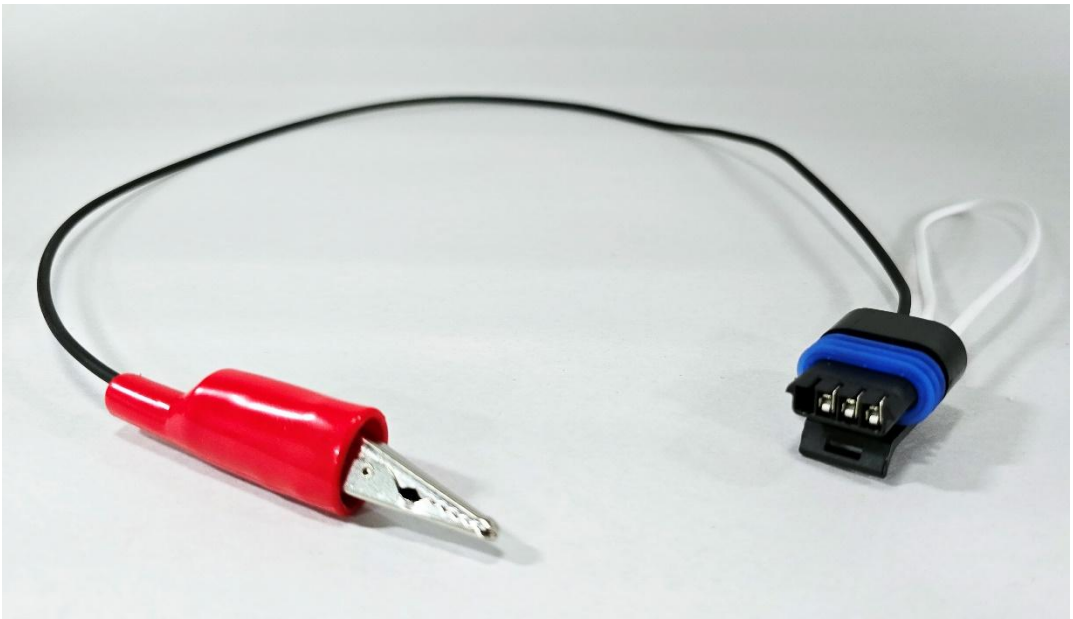
We use the Delco EST electronic ignition system on our carbureted engines. While carbureted models do not use an ECM like MPI models, they DO have an electronic distributor module that monitors engine speed and advances ignition timing accordingly using a pre-programmed ignition timing curve. Because these modules are programed to add some timing advance at idle speeds, It is necessary to turn-off all advance functions during ignition timing.

A special tool must be used to set timing on Delco EST, called a “timing shunt”. Failure to use a shunt while timing a Delco EST ignition system will result in improper BASE ignition timing, and likely result in catastrophic engine failure, not covered under the Michigan Motorz warranty policy.

Timing shunts are available for purchase on our website, www.michiganmotorz.com.

Delco EST Timing Shunt

MM P/N: 885163



SCAN ME

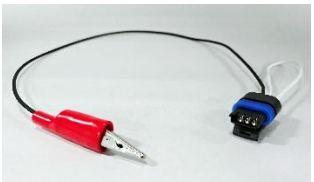
SPECIAL TOOLS NEEDED FOR SERVICE

CARBURETED & MPI MODELS

All carbureted and MPI engines built by Michigan Motorz have been designed to be serviced with the fewest specialty tools required. Below is a list of tools required to perform maintenance and service on your engine. Most tools can be purchased or rented at local auto parts stores.

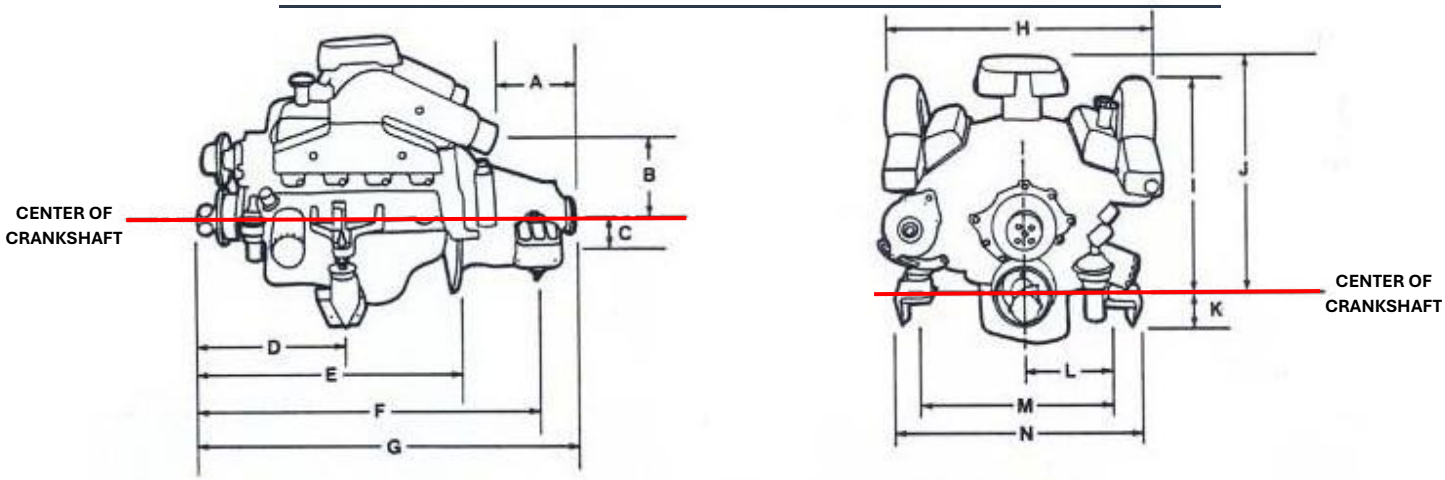
SCAN TOOL RENTAL SERVICE

Michigan Motorz does offer a TechMate™ handheld scan tool rental service. Call 1-877-MMOTORZ and speak to your engine sales representative for more details about scan tool rental.

Tool Function	For Carb or MPI Engine	Tool Photo	Description & Part Number	QR Code
Check Ignition Timing	Carb Only		**Digital Ignition Timing Light** P/N: Innova 5568 (Purchase Locally)	
Enable "BASE TIMING MODE" on Delco EST Distributors	Carb Only		**Delco EST Timing Shunt** P/N: 885163 (In-Stock at MMZ)	
Check for spark in-line between plug wire and spark plug	Carb & MPI		**In-Line Spark Plug Tester** P/N: Varies (Purchase Locally)	
Check voltage, continuity, resistance, etc.	Carb & MPI		**Digital Multi-Meter** P/N: Varies (Purchase Locally)	
Bump engine, start remotely and bypass boat harness and gauges	Carb & MPI		**Remote Starter Switch Kit** P/N: Innova 3630 (Purchase Locally)	

Check individual cylinder compression	Carb & MPI		**Compression Test Kit** P/N: Varies (Purchase Locally)	
Check cylinder leakage past piston rings, valves, blown head gasket	Carb & MPI		**Cylinder Leak-Down Test Kit** P/N: Varies (Purchase Locally)	
Check fuel pressure	Carb & MPI		**Fuel Pressure Test Kit** P/N: Varies (Purchase Locally)	
Check temperature of individual engine components	Carb & MPI		**Infrared Laser Thermometer** P/N: Varies (Purchase Locally)	
Check for codes, read ECM live data, perform tests	MPI Only		**Rinda Technologies TechMate™ Handheld Scan Tool** (P/N: 94070C) (In-Stock at MMZ) (Additional Adapters may be purchased for other applications)	
Check for codes, read ECM live data, view line-graphs of live data streams, perform tests, record/save data files to email	MPI Only		**Rinda Technologies Diacom™ PC-Based Scan Tool** (P/N: 94030) (In-Stock at MMZ) (Additional Adapters may be purchased for other applications)	
Scan Tool Adaptor for CAN-Bus (MEFI 5) connections to a TechMate™ or Diacom™ scan tool	MPI Only		Rinda Technologies CAN-Bus Adaptor (P/N: 94029) (In-Stock at MMZ)	

INSTALLATION DIMENSIONS



MEASUREMENT LETTER	DESCRIPTION	4.3L CARB	5.7L/6.3L CARB	5.7L/6.3L MPI	7.4L/8.2L CARB	8.2L MPI
A	TRANSMISSION LENGTH	SEE TRANS SPECS	SEE TRANS SPECS	SEE TRANS SPECS	SEE TRANS SPECS	SEE TRANS SPECS
B	CENTER OF EXHAUST OUTLET TO CENTER OF CRANKSHAFT		11 ¼ "	14 ½" (VARIES)		
C	HEIGHT ADJUSTMENT ABOVE (+) & BELOW (-) CENTER OF CRANKSHAFT		+ 1 ¼"	N/A		
			- ½"			
D	CENTER OF MOTOR MOUNT TO FRONT OF ENGINE		12 ½"	14 ½"		
E	TOTAL LENGTH OF ENGINE *NO TRANS*		34"	32"		
F	FRONT OF ENGINE TO CENTER OF REAR TRANS MOUNT		38"	N/A		
G	ENGINE AND TRANS TOTAL LENGTH		45"	N/A		
H	OVERALL WIDTH OF EXHAUST		27 ½"	29"		
I	CRANK CENTERLINE TO TOP OF EXHAUST ELBOW		18"	19 ½"		
J	CENTER OF CRANKSHAFT TO TOP OF WEATHER COVER		20 ¼"	21 ½"		
K	HEIGHT ADJUSTMENT BELOW CENTERLINE		5"	4 ¼"		
			6 ¼"	6 ¼"		
L	CENTER OF CRANK TO MOUNT (MINIMUM)		10"	11 ½"		
M	MINIMUM MOUNT WIDTH		22"	25 ½"		
N	MAXIMUM MOUNT WIDTH		24 ¾"	28"		

ENGINE SPECIFICATIONS / CAPACITIES

ENGINE SPECS	4.3L Vortec Carb	5.7L Vortec Carb	5.7L Vortec MPI	6.3L Vortec Carb	6.3L Vortec MPI	7.4L Gen 6 Carb	8.2L Carb	8.2L MPI
Number of Cylinders	V-6	V-8	V-8	V-8	V-8	V-8	V-8	V-8
Displacement (cubic inches)	262 c.i.	350 c.i	350 c.i.	383 c.i.	383 c.i.	454 c.i.	502 c.i	502 c.i.
Bore/Stroke (inches)	4.00 x 3.48 in.	4.00 x 3.48 in.	4.00 x 3.48 in.	4.03 x 3.75 in.	4.03 x 3.75 ci	4.25 x 4.00 in.	4.46 x 4.00 in	4.46 x 4.00 in
Compression Ratio	9.4:1	9.4:1	9.4:1	9.0:1	9.0:1	8.0:1	8.75:1	8.75:1
Compression Pressure (Note 1)	100 PSI (minimum)	100 PSI (minimum)	100 PSI (minimum)	100 PSI (minimum)	100 PSI (minimum)	100 PSI (minimum)	100 PSI (minimum)	100 PSI (minimum)
Idle RPM in Neutral (Note 2)	650 RPM (+/- 50 RPM)	650 RPM (+/- 50 RPM)	650 RPM (+/- 50 RPM)	650 RPM (+/- 50 RPM)	650 RPM (+/- 50 RPM)	650 RPM (+/- 50 RPM)	650 RPM (+/- 50 RPM)	650 RPM (+/- 50 RPM)
Operating Range at WOT	4,400 - 4,800 RPM	4,400 - 4,800 RPM	4,600 – 5,000 RPM	4,400 - 4,800 RPM	4,600 – 5,000 RPM	4,200- 4,600 RPM	4,200- 4,600 RPM	4,600-5,000 RPM
Oil Pressure @ 650 RPM	10 PSI (minimum HOT)	10 PSI (minimum HOT)	10 PSI (minimum HOT)	10 PSI (minimum HOT)	10 PSI (minimum HOT)	10 PSI (minimum HOT)	10 PSI (minimum HOT)	10 PSI (minimum HOT)
Oil Pressure @ 2,000 RPM	20-60 PSI (minimum HOT)	20-60 PSI (minimum HOT)	20-60 PSI (minimum HOT)	20-60 PSI (minimum HOT)	20-60 PSI (minimum HOT)	20-60 PSI (minimum HOT)	20-60 PSI (minimum HOT)	20-60 PSI (minimum HOT)
Oil Filter	WIX 51515	WIX 51515	WIX 51515	WIX 51515	WIX 51515	WIX 51515	WIX 51515	WIX 51515
Fuel Pump Pressure	4-7 PSI (maximum)	4-7 PSI (maximum)	54-60 PSI (running)	4-7 PSI (maximum)	54-60 PSI (running)	4-7 PSI (maximum)	4-7 PSI (maximum)	54-60 PSI (running)
Electrical System	12V DC	12V DC	12V DC	12V DC	12V DC	12V DC	12V DC	12V DC
Minimum Battery Requirements	650 c.c.a. 700 m.c.a. 120 Ah	650 c.c.a. 700 m.c.a. 120 Ah	650 c.c.a. 700 m.c.a. 120 Ah	650 c.c.a. 700 m.c.a. 120 Ah	650 c.c.a. 700 m.c.a. 120 Ah	650 c.c.a. 700 m.c.a. 120 Ah	650 c.c.a. 700 m.c.a. 120 Ah	650 c.c.a. 700 m.c.a. 120 Ah
Firing Order (LH/Standard Rot.)	1-6-5 4-3-2	1-8-4-3- 6-5-7-2	1-8-4-3- 6-5-7-2	1-8-4-3- 6-5-7-2	1-8-4-3- 6-5-7-2	1-8-4-3- 6-5-7-2	1-8-4-3- 6-5-7-2	1-8-4-3- 6-5-7-2
Spark Plug Type	AC Delco MR-43LTS	AC Delco MR-43LTS	AC Delco 41-993	AC Delco MR-43LTS	AC Delco 41-993	AC Delco MR-43LTS	AC Delco MR-43T	AC Delco MR-43T
Spark Plug Gap (inches)	0.035 in.	0.035 in.	0.060 in.	0.035 in.	0.060 in.	0.035 in.	0.035 in.	0.035 in.
Base Timing (at IDLE)	2º BTDC (USE SHUNT)	8º BTDC (USE SHUNT)	ECM CONTROLLED	8º BTDC (USE SHUNT)	ECM CONTROLLED	12º BTDC (USE SHUNT)	12º BTDC (USE SHUNT)	ECM CONTROLLED
Thermostat	160º F	160º F	160º F	160º F	160º F	160º F	160º F	160º F

FLUID CAPACITIES	4.3L Vortec Carb	5.7L Vortec Carb	5.7L Vortec MPI	6.3L Vortec Carb	6.3L Vortec MPI	7.4L Gen 6 Carb	8.2L Carb	8.2L MPI
Engine Crankcase Oil * (Capacity may vary w/ remote oil filter, oil cooler, etc.)	4 ½ Quarts (4.3 liters)	6 Quarts (5.7 liters)	6 Quarts (5.7 liters)	5 ½ Quarts (5.2 liters)	5 ½ Quarts (5.2 liters)	8 Quarts (7.6 liters)	8 Quarts (7.6 liters)	8 Quarts (7.6 liters)
Closed Cooling System (Capacity may vary between half kit, full kit, etc.)	Approximately 16 Quarts (Varies)	Approximately 18 Quarts (Varies)	Approximately 18 Quarts (Varies)	Approximately 18 Quarts (Varies)	Approximately 18 Quarts (Varies)	Approximately 24 Quarts (Varies)	Approximately 24 Quarts (Varies)	Approximately 24 Quarts (Varies)
Recommended Oil **	15W-40	15W-40	15W-40	15W-40	15W-40	15W-40	15W-40	15W-40
Recommended Fuel	89 Octane	89 Octane	89 Octane	89 Octane	89 Octane	89 Octane	89 Octane	89 Octane
Minimum Octane Fuel	87 Octane	87 Octane	87 Octane	87 Octane	87 Octane	87 Octane	87 Octane	87 Octane

* The actual amount of oil may vary depending on the angle of the engine in the boat after installation. ALWAYS use the dipstick to determine the EXACT quantity of oil required. DO NOT FILL ENGINE CRANKCASE ABOVE the "FULL" mark.

** Severe-duty (commercial applications) may require the use of strait-weight oil, such as SAE 30 or SAE 40, depending on ambient operating temperature and conditions.

SCHEDULED BOAT OWNER MAINTENANCE

Service Item	Service	DAILY CHECK	First 10 Hours (BREAK-IN PERIOD)	Every 50 Hours	Every 100 Hours	AT LEAST ONCE EACH YEAR
Engine Crankcase Oil Level *	CHECK / TOP-OFF	✓				
Engine Crankcase Oil & Filter	CHANGE	✓	✓		✓	✓
Any Leaking Fuel Lines/Hoses?	CHECK	✓				✓
Power Steering Fluid Level *(IF EQUIPPED W/ POWER STEERING)*	CHECK	✓				✓
Transmission Fluid Level *(IF EQUIPPED W/ TRANSMISSION)*	CHECK / CHANGE	✓		✓		✓
Outdrive Fluid Level *(IF EQUIPPED W/ OUTDRIVE)*	CHECK / CHANGE			✓		✓
Fuel/Water Separator Filter	CHECK / REPLACE		✓	✓		✓
Coolant Level in Heat Exchanger *(IF EQUIPPED W/ CLOSED COOLING)*	CHECK / TOP-OFF	✓				✓
Coolant Level in Overflow Bottle *(IF EQUIPPED W/ CLOSED COOLING)*	CHECK / TOP-OFF	✓				✓
Zinc Anode(s) in Heat Exchanger *(IF EQUIPPED W/ CLOSED COOLING)*	CHECK / REPLACE		✓	✓	✓	✓
Coolant Flush	REPLACE / FLUSH					✓
Seawater Side of Heat Exchanger (REMOVE END-CAPS TO INSPECT)	CLEAN / FLUSH					✓
Seawater Strainer Basket Clean?	CHECK / CLEAN	✓				✓
Engine/Drive Leaks? (WATER, FUEL, OIL, EXHAUST, ETC.)	CHECK / TIGHTEN		✓	✓	✓	✓
Belt Tension & Wear	CHECK / TIGHTEN / REPLACE		✓	✓	✓	✓

*ENGINE START-UP EACH DAY AND ONCE EVERY 8 HOURS OF OPERATION

Service Item	Service	DAILY CHECK	First 10 Hours (BREAK-IN PERIOD)	Every 50 Hours	Every 100 Hours	AT LEAST ONCE EACH YEAR
Spark Plug/Cap/Rotor Condition	CHECK / REPLACE		✓		✓	✓
Battery (CLEAN TERMINALS & FLUID LEVEL)	CHECK/ CLEAN		✓	✓	✓	✓
Battery Connections (+/- CLEAN/TIGHT CONNECTIONS ON ENGINE AND AT BATTERY)	CHECK / CLEAN		✓	✓	✓	✓
Lubricate Starter Bendix (GEAR AND SHAFT)	LUBRICATE			✓		✓
Engine Mounts Tight?	CHECK / TIGHTEN		✓		✓	✓
Exhaust Riser/Manifold Bolts Tight?	CHECK / TIGHTEN		✓	✓	✓	✓
Loose/Damaged Engine Parts?	CHECK / REPLACE				✓	✓
Wire Harness Connections Clean & Tight? (NO CORROSION/NO MOISTURE)	CHECK / CLEAN				✓	✓
Distributor Condition	CHECK / REPLACE				✓	✓
Water/Exhaust Hose Condition	CHECK / REPLACE				✓	✓
Sea Water Pump Impeller (CRANK/BELT DRIVE, OUTDRIVE)	REPLACE				✓	✓
Engine/Driveshaft Alignment	CHECK / ADJUST		✓		✓	✓
Engine Timing (CARB MODELS ONLY)	CHECK / ADJUST					✓
Check Carburetor (CARB MODELS ONLY) (CHOKE OPERATION, THROTTLE LINKAGE, MIXTURE, ETC)	CHECK / ADJUST					✓
Flame Arrestor & Crankcase Vent Tubes	CHECK / CLEAN			✓		✓
PCV Valve *(IF EQUIPPED)*	CHECK / CLEAN					✓

ENGINE REQUIREMENTS

ENGINE REGISTRATION

The engine must be registered within 10 days of installation. To register the engine, fill out the 2 forms at the end of this installation guide: the **ENGINE WARRANTY REGISTRATION FORM** and the **PDI FORM**. Incomplete forms will be rejected and automatically considered unregistered.

NOTE: Forms that are incomplete will NOT be eligible for warranty coverage or support.

ENGINE FUEL & OIL REQUIREMENTS

| IDLE MIXTURE SCREWS (CARBURETED ENGINES)

On certain carburetors, such as Holley and QuickFuel carbs, the idle mixture screws are sealed after they were adjusted at the manufacturing factory. It is unlawful for customers in the state of California to tamper with the sealing plugs and attempt to make idle mixture adjustments to the carburetor.

| FUEL REQUIREMENTS (CARBURETED AND MPI ENGINES)

- Michigan Motorz engines are designed to operate on regular unleaded fuel with an octane rating of 89 or higher.
- We recommend the use of **Sta-Bil fuel stabilizer** for boat users that consume less than a tank of fuel every two weeks. Todays fuels are far more susceptible to degradation and the use of a quality stabilizer will help ensure fewer problems for the occasional boater.

- If the boat has not been used for more than 30 days with fuel in the tank (even stabilized fuel), the boat may run poorly until the "old" fuel has been used up. **Michigan Motorz will *not* pay for repairs to carburetors or fuel injection components that are inoperable or damaged from old and/or poor quality fuel.**
- Michigan Motorz recommends 0% ethanol fuel. Ethanol damages fuel systems. It has shown to cause heavy deposits in carburetors, plugged fuel injectors, corroded fuel rails, and damage to fuel pumps over time. In some states though, the use of ethanol fuel is unavoidable. In this case, we recommend the use of **StarTron Enzyme Fuel Treatment** to combat the effects of ethanol in fuel. While Michigan Motorz (and most other manufacturers) do allow for up to 10% ethanol content, **any damage caused by ethanol is NOT COVERED UNDER THE MICHIGAN MOTORZ WARRANTY POLICY.** We strongly recommend maintaining a 0% ethanol fill-up at the gas station, if possible, to achieve the highest reliability from your engine.

| OIL REQUIREMENTS

We use and recommend a quality 15W-40 conventional (aka mineral) engine oil for use in all of our engines. Normally, 15W-40 is marketed as "diesel oil", as it contains Zinc (ZDDP) and other additives for severe-duty use conditions. Becsuse of this, it is a *fantastic* oil to use in gasoline engines that also see repeated severe-duty use. Because 15W-40 is a multi-viscosity oil, it acts as a thinner oil during cold start-ups (**15W**-40) but *thickens* when the engine warms up to operating temperature (15W-**40**). This aids in coating your valve train quicker when starting an engine cold, where a much thicker strait-weight oil, such as SAE 30 (30W-30) or SAE 40 (40W-40), will take longer to coat your valvetrain because it is so thick when cold. When using a thicker oil viscosity, it is recommended to increase the idle speed of the engine to around 1,000 RPM during your engine warm-up period to aid in coating your valvetrain with oil.

- Rotella T (T4) 15W-40 DIESEL OIL, or equivalent, meeting API oil specifications of SL/SJ/CI-4, CH-4, and CG-4.
- Oil *weight* may need to be adjusted based on your area (temperature) of normal use and operation. (Warmer climates may require 20W-40, 25W-40, etc.)
- Synthetic (or semi-synthetic) oil meeting these requirements is acceptable, but only **AFTER 100 hours of operation. The use of synthetic oil does *not* change the requirement for 100-hour (or annual) oil change intervals.**
- After your have completed the initial engine break-in (see our engine break-in guide), the engine oil MUST BE CHANGED after 10 hours to remove any fine break-in material suspended in the oil and trapped in the engine filter.

ROTELLA T4 15W-40

SYNTHETIC OIL:

DO NOT USE SYNTHETIC OIL DURING THE BREAK-IN PROCESS. ONLY USE CONVENTIONAL OIL. AFTER 100 HOURS, YOU MAY SWITCH TO SYNTHETIC BLEND OR FULL SYNTHETIC OIL.

THE USE OF SYNTHETIC OIL DURING BREAK-IN GREATLY REDUCES PROPER BREAK-IN OF PISTON RINGS AND CYLINDER WALLS.

NOTE: As temperature increases, you may need to increase the weight of your oil.

Alaska, Canada, Northern USA		Texas, Florida, Southern USA
COLDER CLIMATE	----------	WARMER CLIMATE
15W-40 Oil -	**20W-40 Oil** -	**25W-40 Oil**

THROTTLE & SHIFT CONTROLS

Michigan Motorz recommends the use of a single lever (Morse type) throttle/shift control. The use of a dual lever control, one that has a separate throttle and shift handle or a system utilizing a shift lever and a foot control is **not recommended.**

If an engine/drive control system is rigged that allows throttle movement independent of shift control, any damage to the transmission or drive train caused by shifting at too high of an RPM will not be covered under Michigan Motorz' Limited Warranty.

Combined Throttle/Shift
Remote Control

Separate Throttle/Shift
Remote Control

Foot Throttle
Remote Control

ELECTRICAL CONNECTIONS & REQUIREMENTS

BATTERY REQUIREMENTS

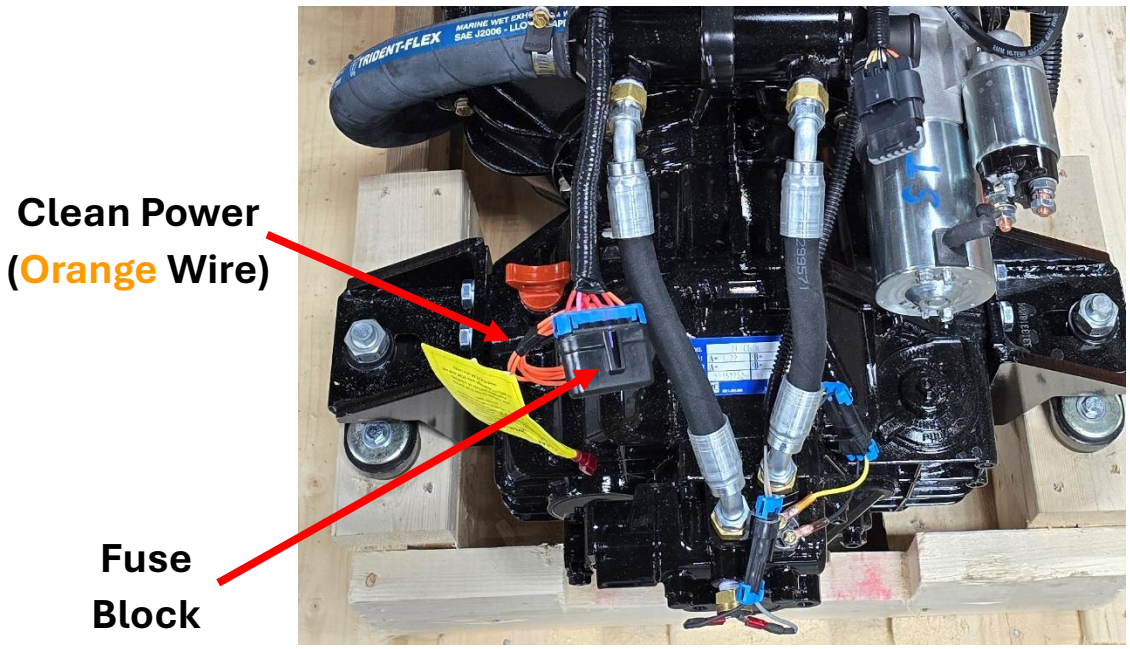
12 Volt Marine Type 650 cca/700 mca/120ah capacity and tapered post or side terminal connectors. Do **not** use a battery with wing nut connectors. Wing-nut connectors do NOT provide enough amperage to the starter motor while cranking and can melt battery cables!

In twin engine installations, a separate battery must be supplied for each engine. If battery switches are used, it is important that the switches be positioned to allow each engine to run off its own individual battery. Do not run the engines with the battery switches in the "**BOTH**" or "**ALL**" positions.

ECM "CLEAN POWER" CONNECTION

Clean power is a term used to describe power (12V+ DC) being provided to a device with minimal voltage fluctuation while cranking the engine to start. To prevent ECM damage while attempting to start your engine, our engines come equipped with a clean power wire to power the ECM directly.

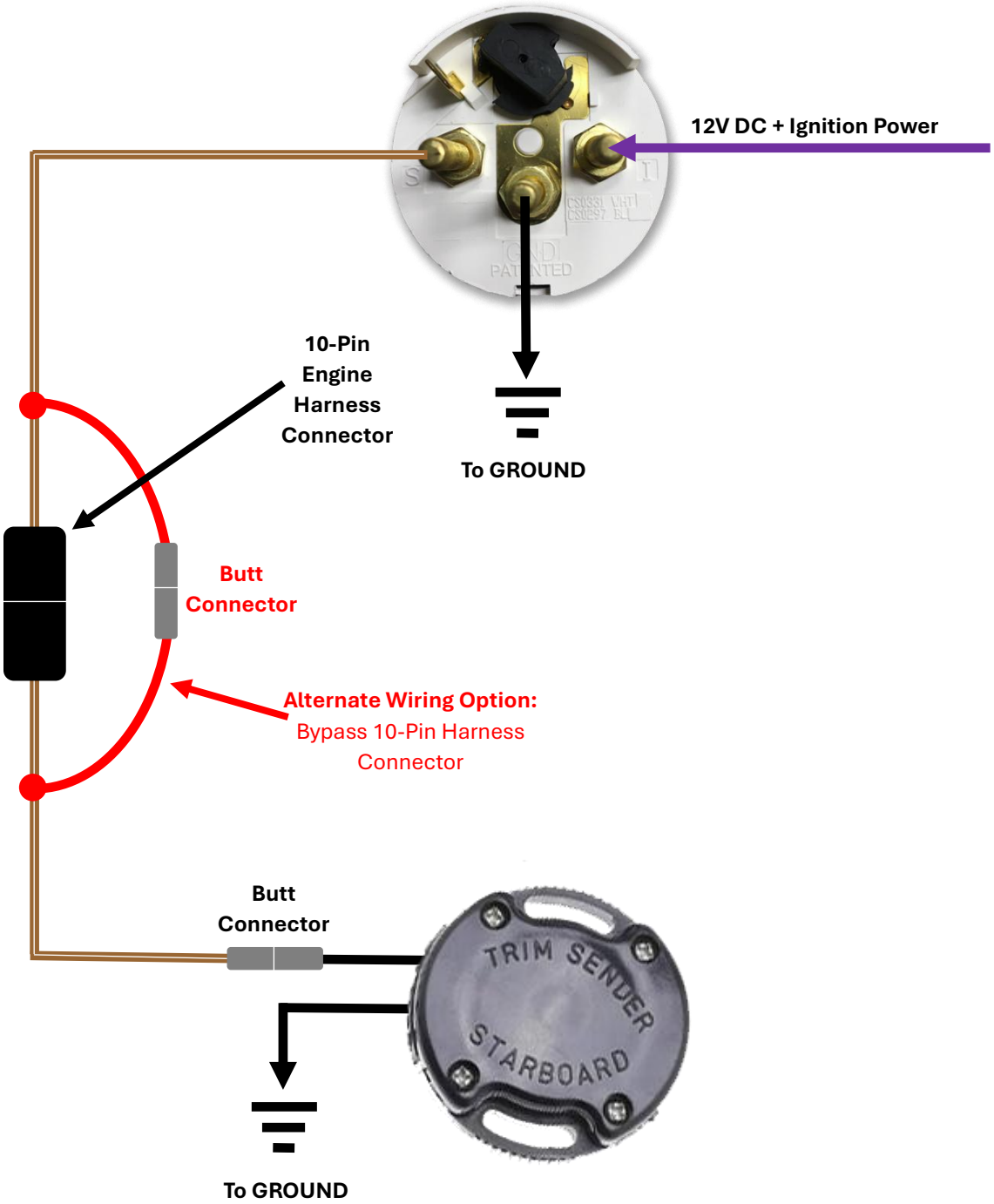
The clean power wire is located (**orange wire**, coiled up) on the rear of the engine and must be hooked up directly to the battery power. It will have a yellow tag on it when you receive the engine. **DO NOT INSTALL THIS WIRE ON THE STARTER SOLENOID OR ALTERNATOR OR VOLTAGE DROP WILL OCCUR AND DAMAGE YOUR ECM. IMPROPER INSTALLATION OF CLEAN POWER WILL VOID YOUR ECM WARRANTY.**



TRIM SENDER CONNECTION (STERNDRIVE MODELS)

The trim sending unit, located on the hinge-pin of your outdrive transom unit, sends a ***resistance*** signal to your trim gauge. Connecting your trim sender to the gauge is very simple. It is a single **brown**/**white** wire that sends a signal.

Trim Gauge (Rear)



TRIM PUMP WIRING (STERNDRIVE MODELS)

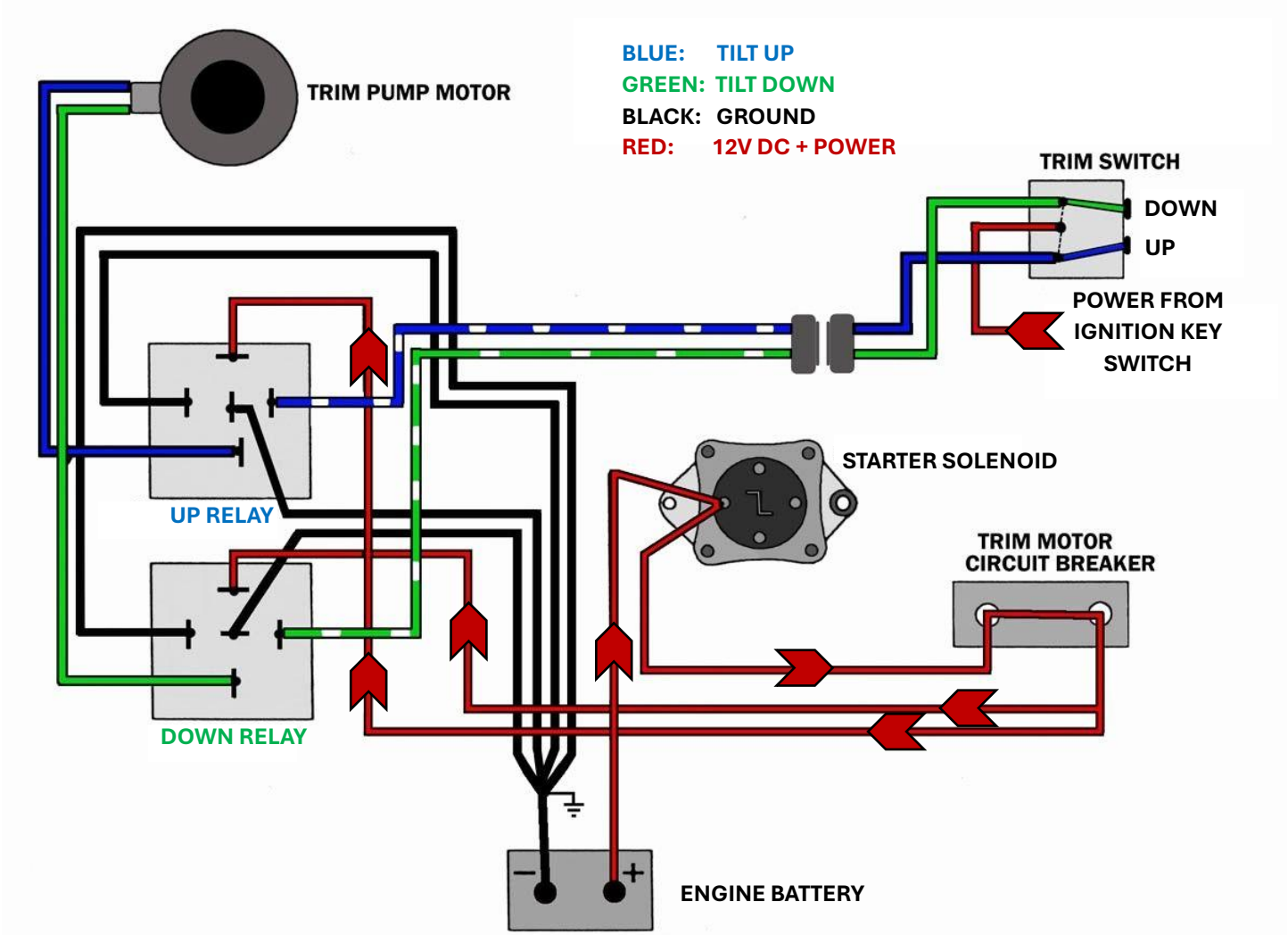
The trim pump, used in sterndrive applications (MerCruiser, Volvo Penta, and OMC) is a simple, reversable hydraulic pump motor used to tilt the outdrive unit up or down. Regardless of engine manufacturer, the pump motor normally consists of 2 colored wires (**GREEN** and **BLUE**) and sometimes a 3rd wire, **BLACK**.

There are a few variations of the trim wiring and components, but the basics remain the same: Spin the motor clockwise or counterclockwise to move the outdrive unit UP or DOWN. Some manufacturers use solenoids, some use relays. The buttons on the dash vary.

In short, one relay/solenoid controls the **UP** function (**BLUE**, think **UP** like the **sky**), and the other relay/solenoid controls the **DOWN** function (**GREEN**, think **DOWN** like **grass**). **Note: If you have a 3rd BLACK wire, it is used to GROUND the pump motor.**

Your trim switch on your shift controller (or dash-mounted switch) uses thinner gauge wires to remotely turn the UP or DOWN relays (or solenoids) ON/OFF. When ON, the relays/solenoids allow power to flow to the trim pump motor, turning the motor ON, which creates hydraulic pressure to move your trim cylinder arms in or out, moving your outdrive unit up or down.

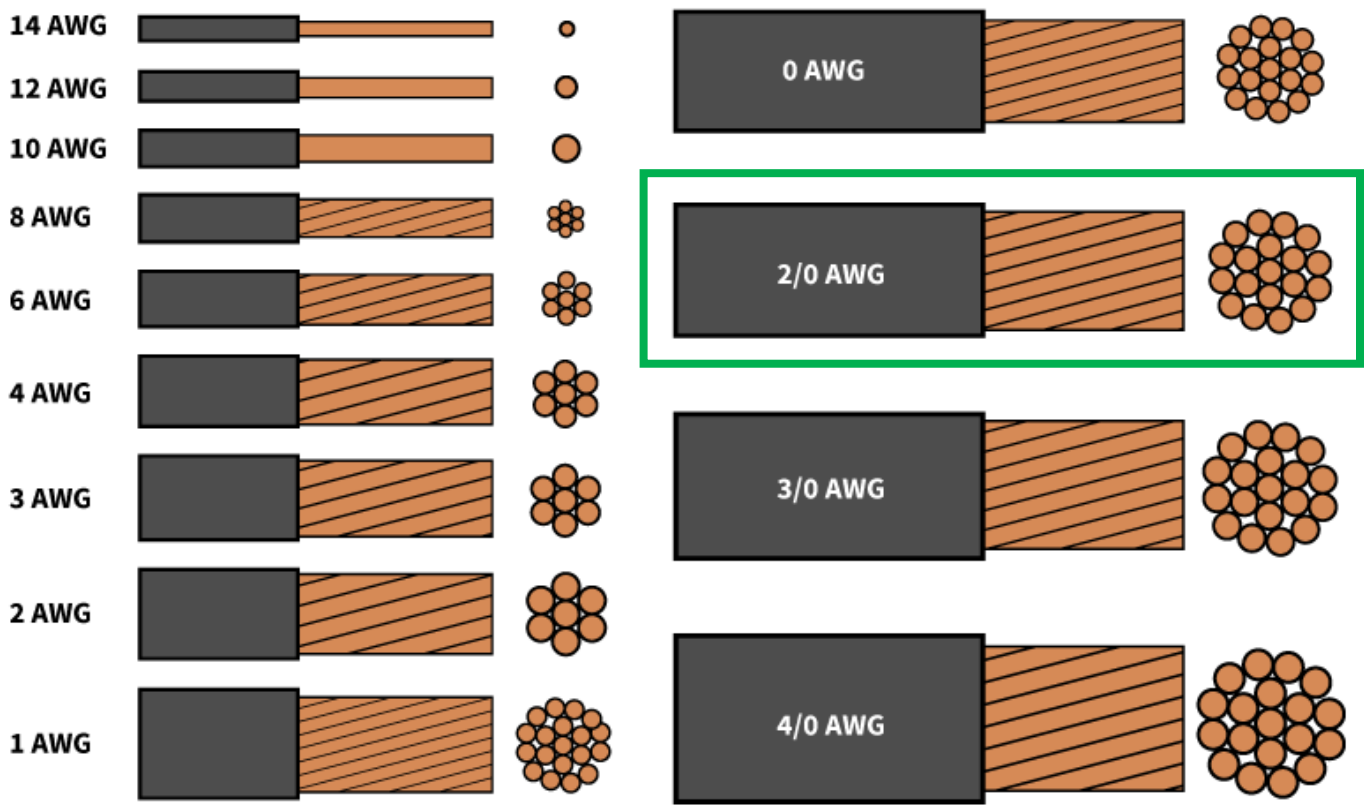
Below is a simplified diagram to understand the **basic** principles of operation (your wiring MAY be slightly different):



BATTERY CABLE REQUIREMENTS

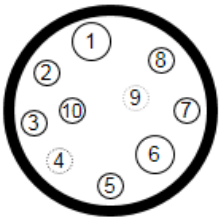
Battery cable size should be determined based on the TOTAL length of wire from the battery positive post, thru the battery switch, and to the starter motor. **Use the *SAME* gauge wire for the *GROUND* wire.**

Length	AWG (American Wire Gauge)
Up to 3 ½ ft.	4 AWG
3 ½ to 6 ft.	2 AWG
6 to 7 ½ ft.	1 AWG
7 ½ to 9 1/2 ft.	0 AWG
9 ½ to 12 ft.	**2/0 AWG (Most Common & Recommended Size)**
12 to 15 ft.	3/0 AWG
15 to 19 ft.	4/0 AWG



10-PIN ENGINE WIRING HARNESS CONNECTOR

- Do Not tap accessories into the engine harness.
- Do not puncture wires for testing (Probing).
- Do not reverse battery leads.
- Do not splice wires into harness.
- Do not attempt diagnostics without proper approved service tools.
- Your engine may be equipped with a round 10 pin connector or a rectangular 16 pin connector.



1.Ground - **Black**	6.Battery - Red
2.Tachometer - Grey	7.Starter Solenoid - Yellow/Red
3.Water Temperature - Tan	8. Oil Pressure - Blue
4.Engine Warning - Tan/Blue	9. N/A
5. Ignition - Purple	10. Trim Senders - Brown/White

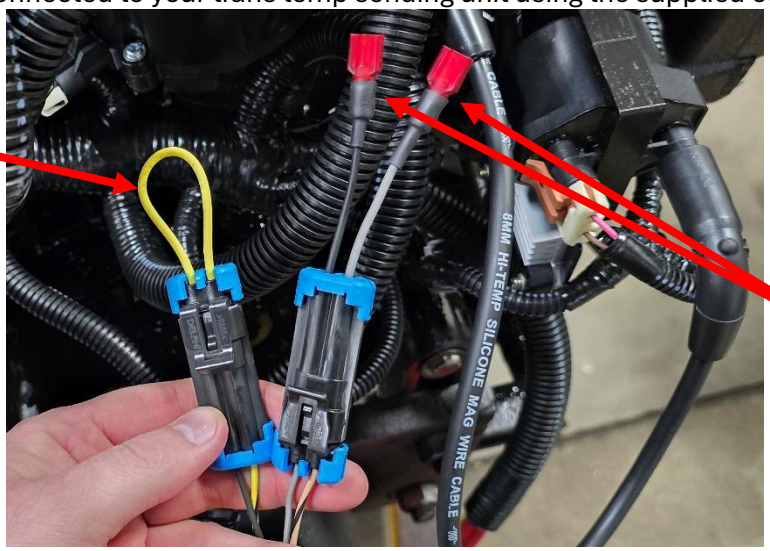
TRANSMISSION CONNECTIONS (INBOARD / V-DRIVE ONLY)

| TRANSMISSION CONNECTIONS

On the rear of the engine (flywheel side), a looped yellow wire will be installed on the engine when purchased. This is to be used for the neutral safety switch on an inboard. Loop will have to be ***cut*** and ring terminals installed to fit transmission.

| TRANSMISSION TEMP SENDER CONNECTIONS

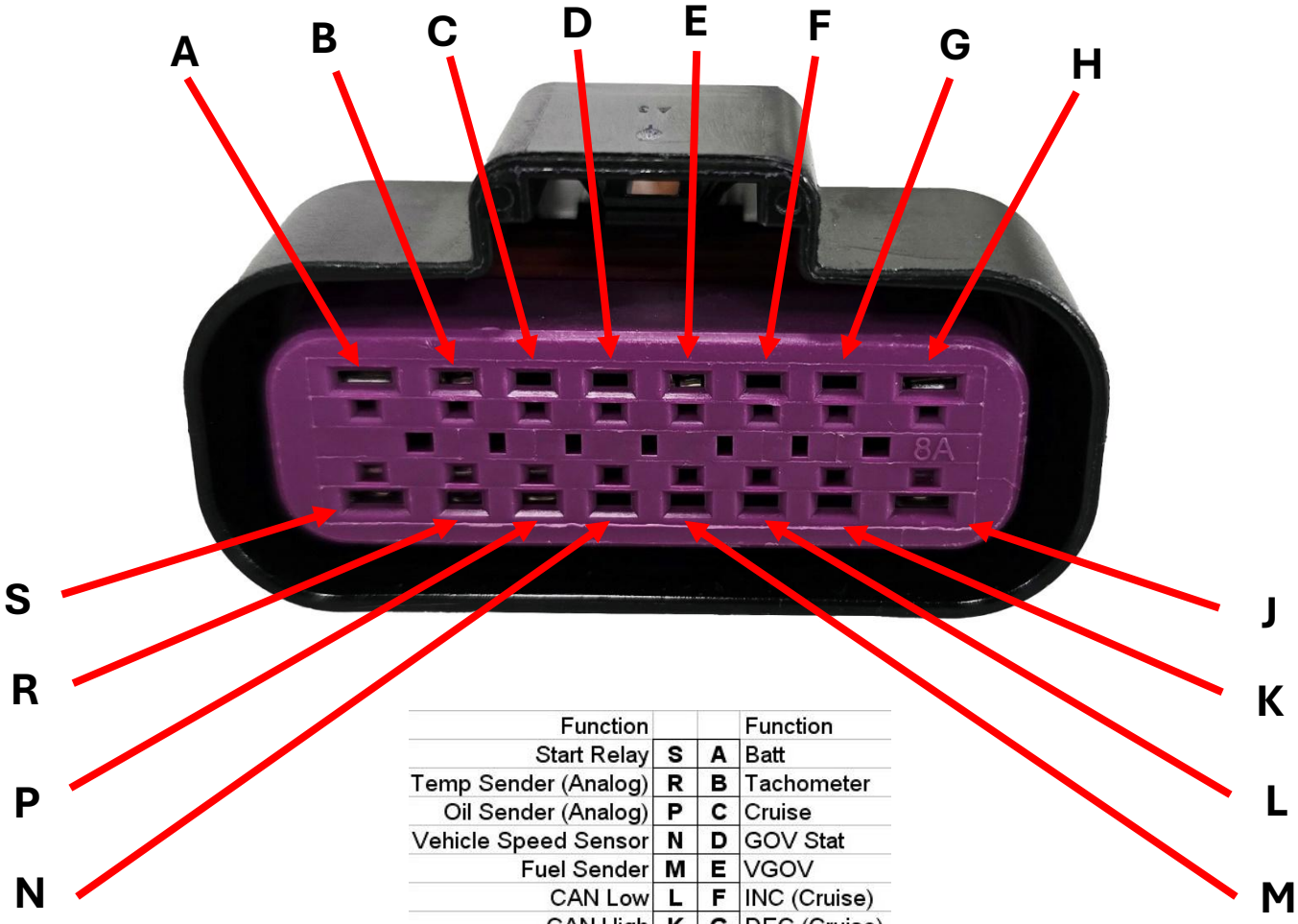
Next to the looped yellow wire, you will find the transmission temperature (Trans temp) wires (grey and black). These need to be connected to your trans temp sending unit using the supplied connector.



16-PIN ENGINE WIRING HARNESS CONNECTOR

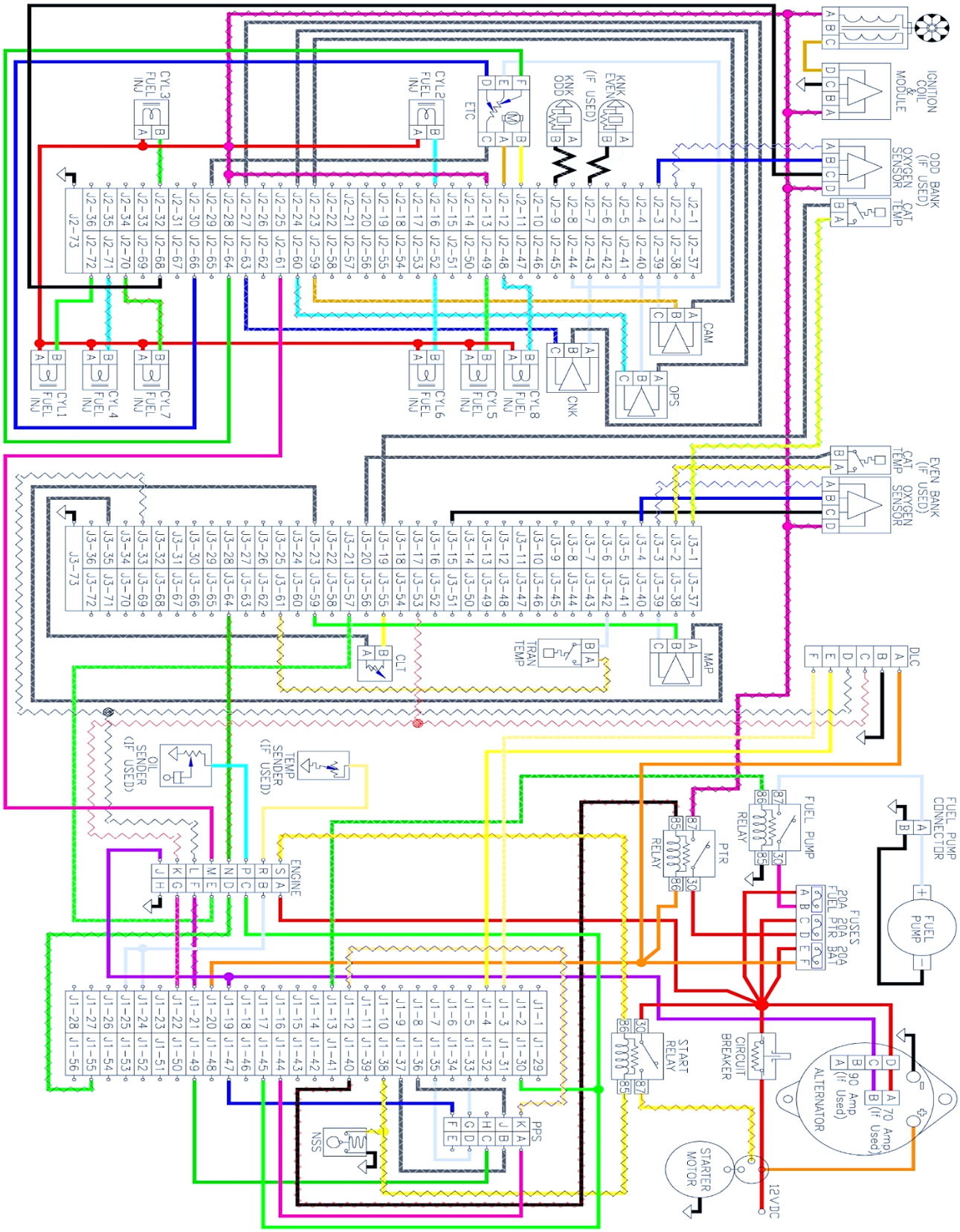
Carbureted Michigan Motorz engines come equipped with the round 10-pin connector. MPI Michigan Motorz engines come equipped with a 16-pin rectangular harness connector. When re-powering a boat, we use a 10-to-16 pin harness adaptor to allow existing boat harnesses to connect directly to our MPI engines.

SCAN ME

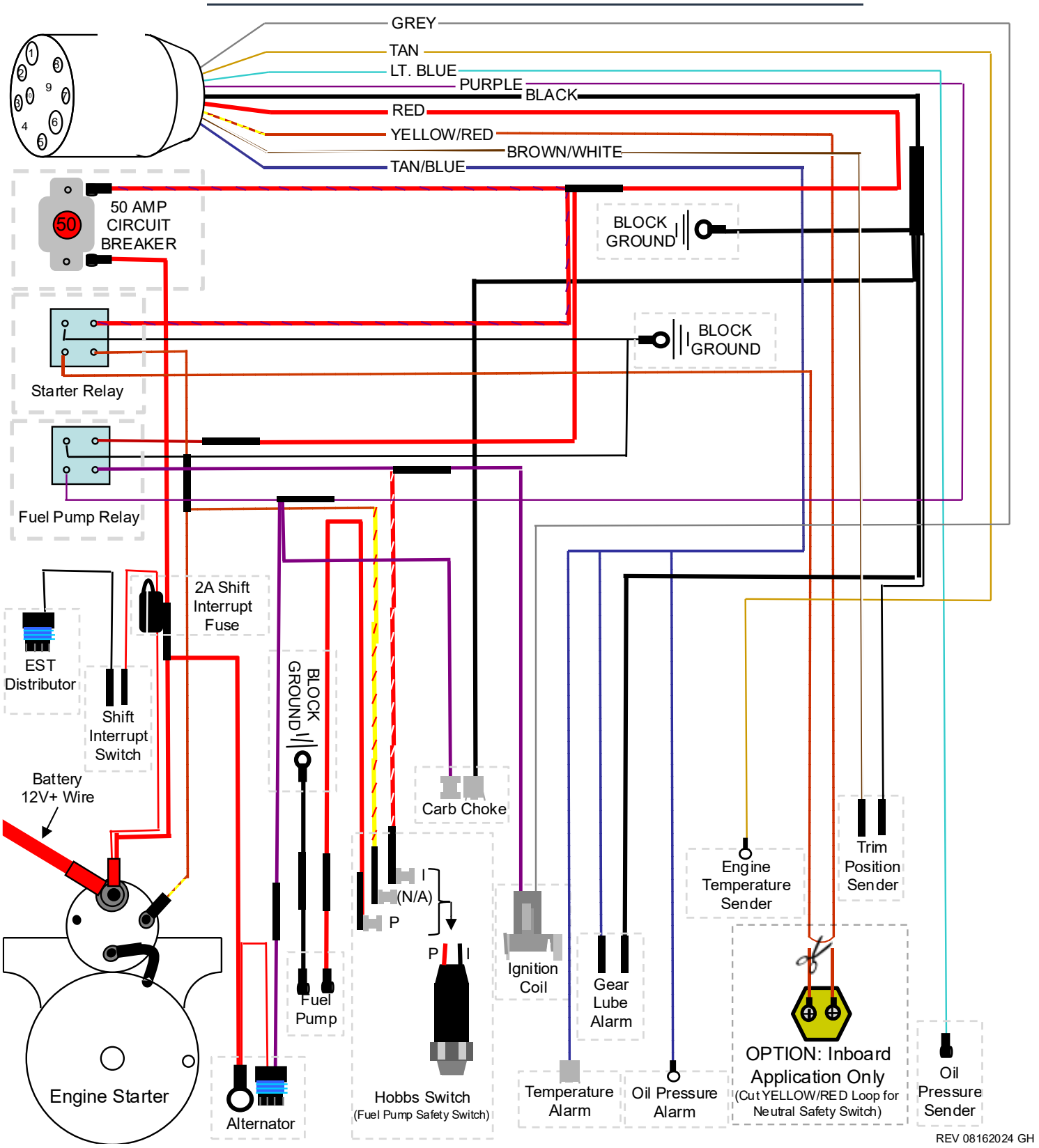


Function			Function
Start Relay	S	A	Batt
Temp Sender (Analog)	R	B	Tachometer
Oil Sender (Analog)	P	C	Cruise
Vehicle Speed Sensor	N	D	GOV Stat
Fuel Sender	M	E	VGOV
CAN Low	L	F	INC (Cruise)
CAN High	K	G	DEC (Cruise)
Ignition	J	H	Ground

MPI HARNESS DIAGRAM



CARBURETED HARNESS DIAGRAM



SHIFT INTERRUPT CONNECTIONS

Some engines manufacturers of *sterndrive* engines use a shift interrupt switch to aid in shifting functions of the outdrive.

The purpose of a "shift interrupt switch" is to allow *smooth* shifting into gear and out of gear - without damaging your outdrive gear teeth. Proper shifting is performed at idle speed, and the shift interrupt switch allows the RPM of the engine to drop for a split-second, thereby allowing gear teeth to mesh smoothly without grinding and damage.

Manufacturers, such as Mercury (MerCruiser) will **GROUND** the ignition system (Thunderbolt Ignition), effectively killing ignition spark for a split second. Other manufacturers apply **12V DC +** to the ignition module (Delco EST Ignition), which tells the module to kill spark also. Both methods, grounding, or applying 12V DC + power, need a switch installed in the ignition circuit to effectively allow the shift interrupt function to work as designed. The switch simply opens and closes the circuit, regardless of negative or positive. This switch is positioned on a shift bracket, to be toggled momentarily during a shift cycle.

| MPI SHIFT INTERRUPT

When re-using your existing shift bracket, you will need a **NORMALLY CLOSED** switch. Test your switch with a multimeter to confirm. Simply cut the **BROWN** wire, shown below, and install your **NORMALLY CLOSED** shift interrupt switch in-line with this wire.

| CARBURETED SHIFT INTERRUPT

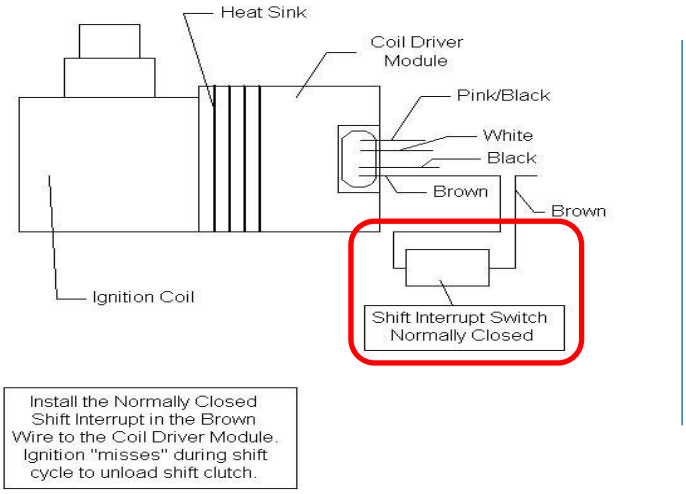
When re-using your existing shift bracket, you will need a **NORMALLY OPEN** switch. Test your switch with a multimeter to confirm. Simply connect your switch to the **RED** and **BLACK** wires, located next to your carburetor, shown below.

| TESTING SHIFT INTERRUPT OPERATION

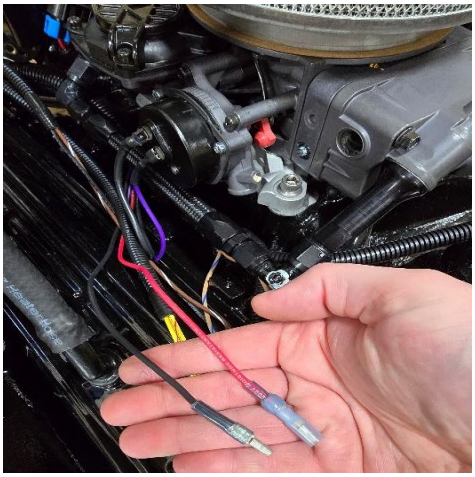
To test proper operation, start the engine, and press the switch. If the engine stops, your switch is working properly. During normal operation, this switch will be tapped for a split-second, effectively causing the engine RPMs to drop below normal idle speed and allowing proper shifting in (and out) of gear.

If your engine stalls when shifting, shift cable adjustment is needed, or shift cable replacement. Older, worn shift cables with slop or binding will cause erratic shift interrupt switch operation. Please refer to your OEM outdrive service manual to correctly adjust shift cables. If you are unfamiliar with shift cable adjustment, please see a qualified local marine engine dealership to adjust your shift linkage properly.

MPI SHIFT INTERRUPT



CARB SHIFT INTERRUPT



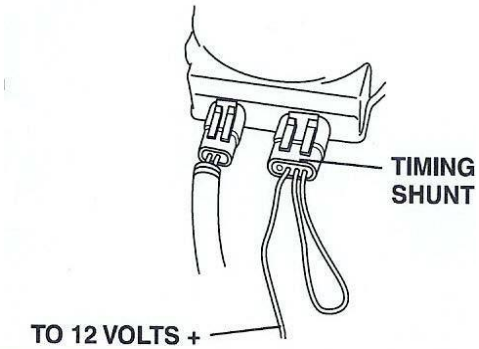
IGNITION TIMING

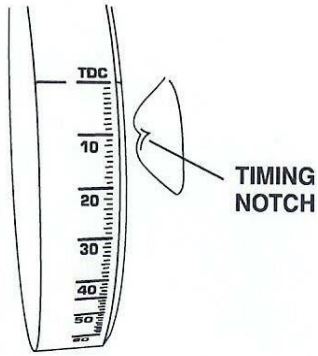
CARBURETED ENGINES

Michigan Motorz sets ignition timing on all its complete turn-key carbureted engines at our factory, prior to shipping. It has been properly set and verified. You do not need to adjust timing on a brand new turn-key engine.

If you need to reset timing or need to verify timing, the procedure is as follows:

1. Install the timing shunt into the distributor as shown below.
2. Connect a digital timing light inductive clamp to the #1 spark plug lead. We recommend the Innova 5568 Timing Light, which can be rented or purchased at most local auto parts stores.
3. Start engine.
4. Connect the loose end of the black wire (alligator clip) to 12 volts positive. Battery + post, 50A main circuit breaker, alternator, or starter motor solenoid + post will work.
5. Adjust the idle to 750-850 RPM.
6. Set timing by turning the distributor to achieve 8 degrees BTDC as shown.
7. Disconnect timing shunt from 12 volts and remove from distributor.
8. Reset idle to 750 RPM for inboard or sterndrive engines.





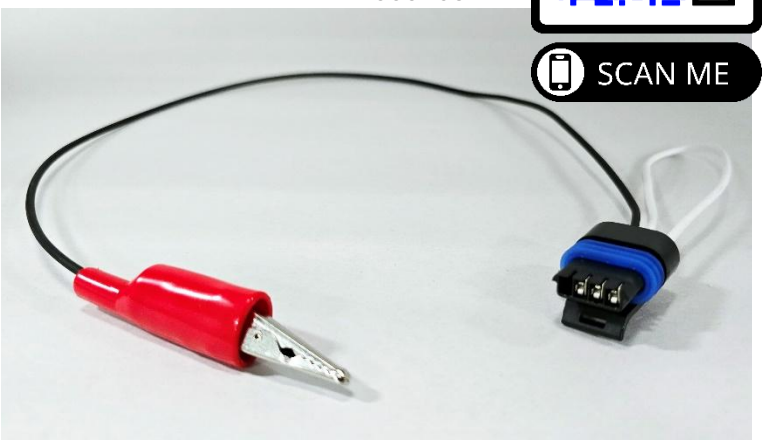
INNOVA 5568
Digital Timing Light

P/N: 5568 (Purchase Locally)

SCAN ME

Delco EST Timing Shunt
MM P/N: 885163

SCAN ME



MPI ENGINES

The ignition timing on the MPI engines is not adjustable, however, the distributor does need to be installed in a very specific orientation. If the distributor on the 5.7L MPI is removed, it must be re-aligned using the following procedure:

Fuel Injected Engines with Delco HVS Distributor (High Voltage Switch, aka "Flat Cap" Distributor)
(Spark plug wires attaching at the side of distributor)

1. Bring #1 piston to TDC on the *compression* stroke.

2. Turn the distributor rotor and shaft so the rotor tang is pointing towards the notch with the number 8 (See figure 1). Install the distributor making sure the distributor gear engages with the oil pump drive shaft. Lightly tighten the distributor hold down screw.

3. Connect a scan tool (TechMate/Diacom) to the data link connector on the engine wiring harness. **Diacom PC software or TechMate handheld scan tool is required. See "Special Tools" for more information.**

4. Start the engine and link the scan tool to the ECM.

5. Bring the engine RPM to 1,200 (or higher) and monitor the **CAM ANGLE** data on the scan tool. Rotate the distributor till the cam retard indicates 705 degrees (+/- 5 degrees). The engine RPM must be raised to get an accurate reading.

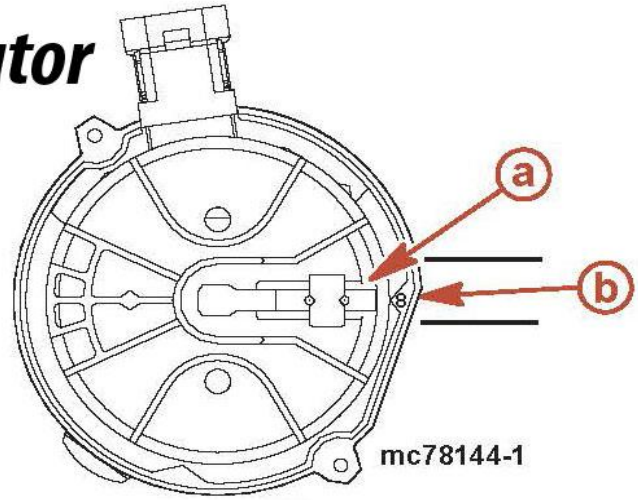
   Note: If you can't get the cam angle adjusted to specification, you may have to remove the distributor and reinstall it 1 gear tooth left *or* right of its original position.

6. Tighten the distributor hold down clamp and verify the reading.

7. Turn off the engine and disconnect the scan tool.

Figure 1

Delco HVS Distributor



a - Rotor tang

b - "8" on housing

FUEL SYSTEM REQUIREMENTS

For re-power applications, all existing fuel lines must be inspected for possible degradation, dry-rot, and/or restrictions. Fuel tanks should be installed below the level of the fuel system on the engine.

It is recommended that an anti-siphon valve be included in the fuel tank, and also the law in most states. **The use of a water/fuel separator filter is HIGHLY recommended for the best fuel quality.**

Damage to the fuel pumps, injectors, and engine caused by water, rust, ethanol, or any other contamination in the fuel is NOT COVERED under the Michigan Motorz warranty policy.

CARBURETED ENGINE REQUIREMENTS

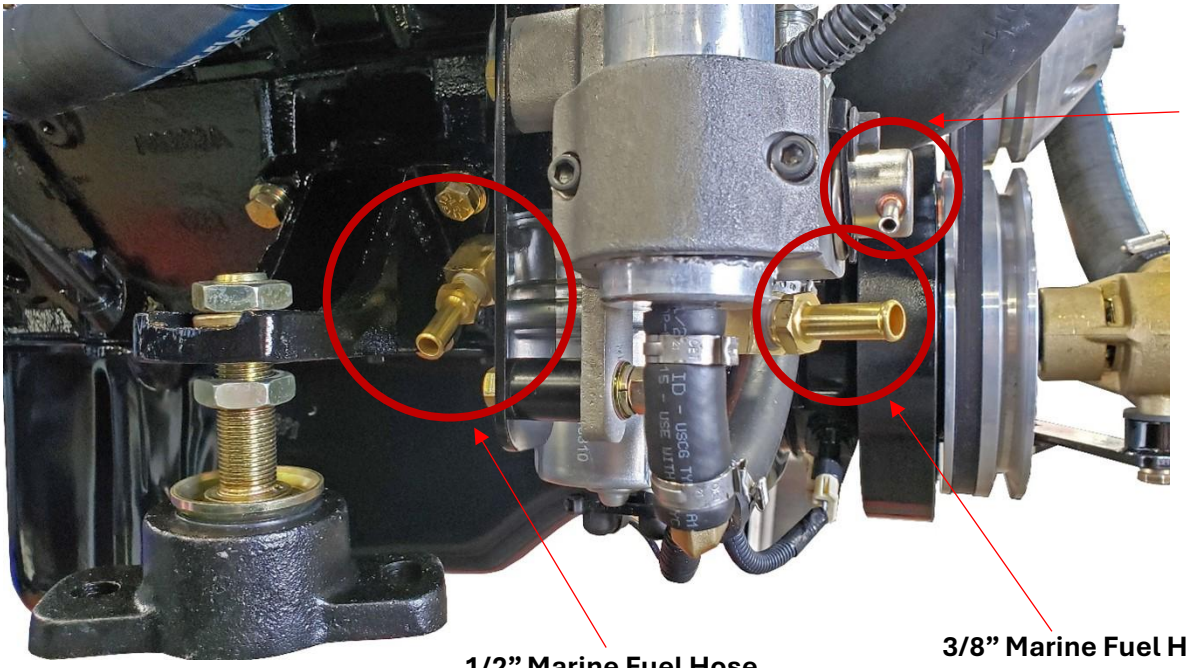
- 3/8" Inside Diameter Type A1 USCG Approved fuel line required.
- If the boat is powered by twin engines, it is recommended that a separate fuel supply line from the tank to the engine be supplied for each engine.

MPI ENGINE REQUIREMENTS

- **Suction Line:** 1/2" Inside Diameter Type A1 USCG Approved fuel line required.
- **Return Line:** 3/8" Inside Diameter Type A1 USCG Approved fuel return line required. Fuel Return must be unrestricted and enter the top of the fuel tank.
- **DO NOT** install the **return line** into a water/fuel separator "IN" port, creating a loop-back. This traps vapors in the fuel rail and causes crank/no-start issues when the engine is hot.
  When the return line is plumbed properly (directly back to the fuel tank), the air in the system is purged during key-on cycles, when the fuel pumps turn-on.
- If the boat is powered by twin engines, a **separate** fuel supply pickup and fuel return line for each engine is **required**.
- On twin fuel tank boats, the fuel tank that is selected for use **must** have the return line run back to it also. Tank A must return to tank A. **However, if you draw fuel from tank A, and return to tank B, you will have fuel dump overboard through the vent on Tank B once it becomes full.**
- The fuel pressure regulator is *PRESET* to 4 BAR (approx. 56-60 PSI). You do NOT need a vacuum hose connection for this regulator.

MPI FUEL PUMP CONNECTIONS

Fuel connections for the fuel pump are shown below. Please note, this diagram does *not* show a remotely mounted water/fuel separator filter. Michigan Motorz strongly recommends installing a suitable water/fuel separator kit for engine component longevity and reliability.



4-BAR Fuel Pressure Regulator
(NO Vacuum Hose Connection Required)

1/2" Marine Fuel Hose
(FUEL INLET)

3/8" Marine Fuel Hose
(FUEL RETURN)
(**MUST** CONNECT DIRECTLY TO FUEL TANK TO PURGE AIR IN SYSTEM)

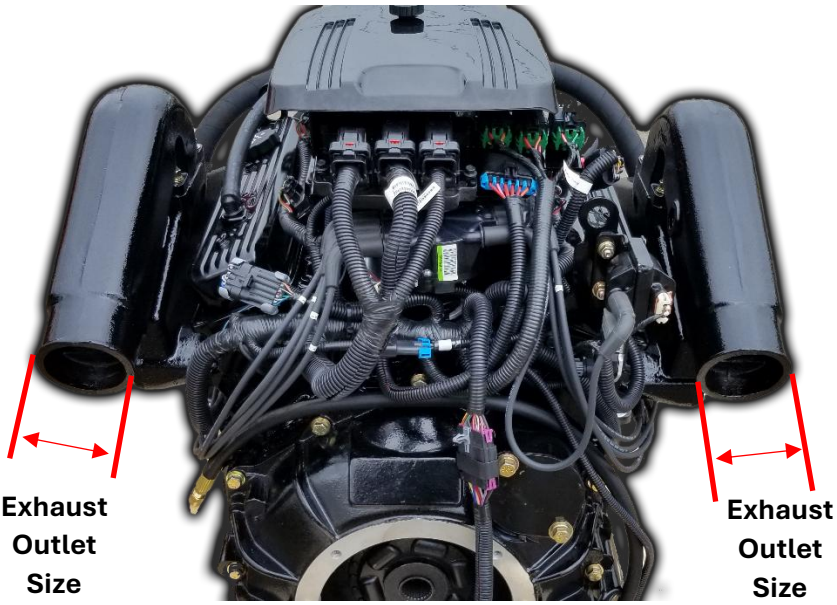
Trident Marine Fuel Hose

Hard Plastic Inner "Barrier Liner"

EXHAUST SYSTEM REQUIREMENTS

EXHAUST HOSE OUTLET REQUIREMENTS

- Hardwall (wire-reinforced) hose must be used. Soft-wall (not wire-reinforced) hose can bend/kink/collapse and cause restrictions and damage to your engine.
- 5.7L Carb and MPI engines - 3 1/2" I.D. MINIMUM Exhaust Outlet. It is acceptable for these units to exhaust through the hull and/or through the prop in sterndrive applications.
- 7.4L / 8.2L Carb and MPI engine - 4" ID Exhaust Outlet. Through hull exhaust only.
- Exhaust Outlets in thru-hull exhaust systems must be equipped with external or internal flappers to prevent water from entering the engine through the exhaust.
- Exhaust outlets in thru-prop exhaust systems must be equipped with external flappers to internal flappers to prevent water from entering the engine through the exhaust.
- Exhaust hoses must be installed to prevent water from returning to the engine. Exhaust hoses must have a slope of 1/2" per foot of length from the engine to the exhaust outlet, MINIMUM.
- The distance from the top of the exhaust elbow to the water line must be a minimum of 13" with a normal load in the boat. If the distance from the top of the exhaust elbow to the water line is less than 13", exhaust risers (spacers) must be installed between the exhaust manifold and exhaust elbow to raise the exhaust elbow to a minimum of 13" above the water line.
- The Exhaust outlet must be slightly above the water line with the boat at rest in the water and a normal load aboard.

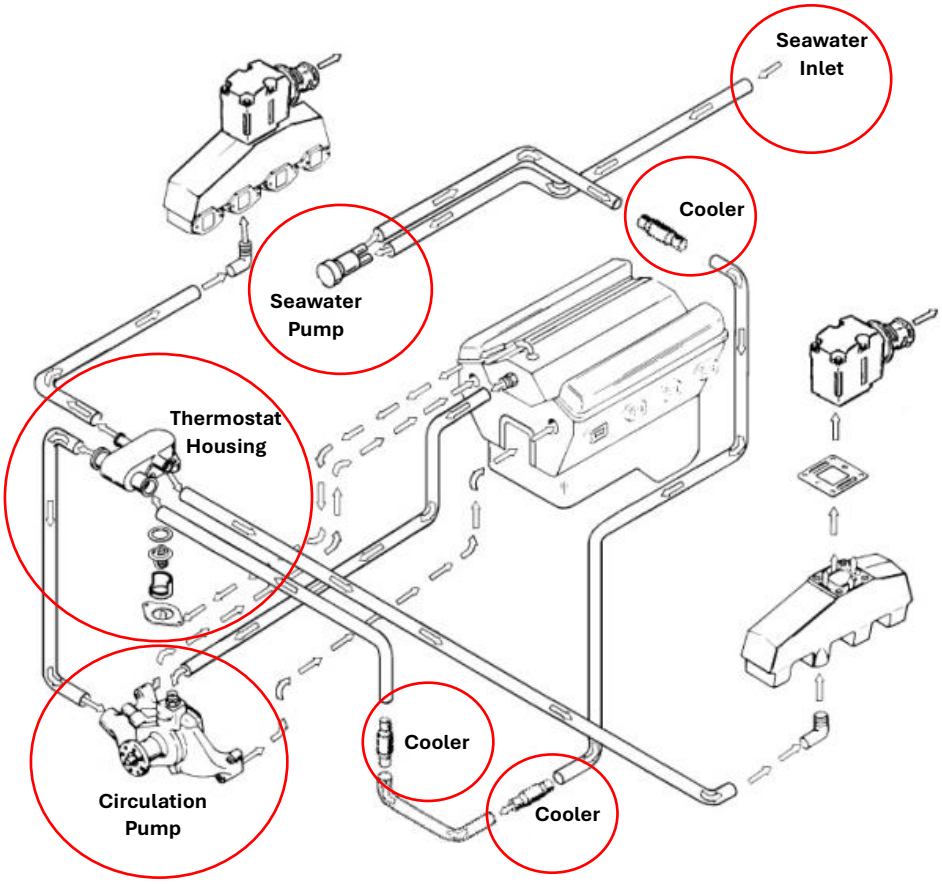


COOLING SYSTEM REQUIREMENTS

SEAWATER PICKUP / SUCTION HOSE

- Water pickup must be large enough to allow sufficient water flow to the engine. The water pickup must also supply a positive head while the boat is underway.
- Water inlet hose must be wire-reinforced (hardwall) hose of adequate wall thickness to prevent it from collapsing from pump suction. Softwall hose WILL collapse and cause overheating.
- Water inlet hose must have a minimum inside diameter of 1-1/4".
- Seacock must have an internal cross-sectional area equal to or greater than the seawater hose.
- If a sea strainer is installed, it must be of a sufficient size to allow an adequate supply to be supplied to the engine. The sea strainer must be capable of flowing a minimum of 30 gallons per minute (114 liters per minute).

Basic Sea-Water Cooled Engine Water Flow Diagram



COMMON MAINTENANCE ITEMS

NOTE: Use your smartphone camera to scan the QR codes to look-up parts on our website.

Part Number & Description	For Carb / MPI Engine	Part Photo	Used on:	QR Code
AC Delco MR43T Spark Plug	Carb Only		Pre-Vortec Engines, Short-Reach Cylinder Heads	
AC Delco MR43LTS Spark Plug	Carb Only		Vortec Applications, Long-Reach Cylinder Heads	
AC Delco 41-993 Spark Plug	MPI Only		MPI Applications	
636126 Fuel Pressure Regulator (4 Bar / 58 PSI)	MPI Only		MPI Applications	
Wix 51515 Oil Filter For Remote Oil System	Carb & MPI		MMZ Remote Oil Filter Kits	

Part Number & Description	For Carb / MPI Engine	Part Photo	Used on:	QR Code
550045126 Rotella T 15W-40 Oil (Gallon)	Carb & MPI		MMZ Recommended Engine Oil	
550045141 Rotella T 15W-40 Oil (Quart)	Carb & MPI		MMZ Recommended Engine Oil	
Sierra 18-7844 Water/Fuel Separator Filter (Short)	Carb & MPI		Remotely Mounted Water/Fuel Seperator Kits	
Sierra 18-7848-1 Water/Fuel Seperator Kit	Carb & MPI		MMZ Recommended Water/Fuel Separator Kit	
Sierra 18-5278 Delco EST V6 Cap/Rotor Kit	Carb Only		V6 Delco EST Applications	
Sierra 18-5281 Delco EST V8 Cap/Rotor Kit	Carb Only		V8 Delco EST Applications (Small Blocks and Big Blocks)	

Part Number & Description	For Carb / MPI Engine	Part Photo	Used on:	QR Code
Sierra 18-5247 Delco HVS V8 Cap/Rotor Kit	MPI Only		V8 Delco HVS Applications (5.7L / 6.3L MPI)	
4.3L-SPWS 4.3L V6 Delco EST Spark Plug Wire Set (Delco EST Distributors Only)	Carb Only		V6 Delco EST Applications	
5.7L-SPWS V8 Delco EST Spark Plug Wire Set (Delco EST Distributors Only)	Carb Only		V8 Delco EST Applications (Small/Big Blocks)	
28-0866FM V8 Delco HVS Spark Plug Wire Set (Delco HVS Distributors Only)	MPI Only		V8 Delco HVS Applications 5.7L/6.3L	
18-5913-1 14" Bottom-Mount Starter	Carb/MPI		Bottom Mount Starter, 14" Flywheel	

Part Number & Description	For Carb / MPI Engine	Part Photo	Used on:	QR Code
50-808011A05 14” Top-Mount Inboard Starter	Carb/MPI		Top-Mount Starter, 14” Flywheel	
20113 70A Alternator V-Belt	Carb/MPI		Standard 70 Amp Output	
18-2124M 4.3L Circulating Water Pump (No Bypass Hole)	Carb Only		4.3L Applications	
18-684M 4.3L/5.7/6.3L Circulating Water Pump (Bypass Hole)	Carb/MPI		4.3L/5.7L/6.3L Applications	
18-685M 7.4L/8.2L Circulating Water Pump	Carb/MPI		7.4L/8.2L Applications	
10-24946-01 F6 Crank Driven Sea Water Pump	Carb/MPI		4.3L/5.7L/6.3L Applications	

Part Number & Description	For Carb / MPI Engine	Part Photo	Used on:	QR Code
09-812BT-1 F6 Crank Driven Sea Water Pump: IMPELLER KIT	Carb/MPI		4.3L/5.7L/6.3L 7.4L/8.2L Applications	
P4594 Carter Low Pressure Electric Fuel Pump Kit w/ Switch	Carb/MPI		4.3L/5.7L/6.3L/ 7.4L/8.2L Applications	
556184 Pierburg High-Pressure Electric Fuel Pump	MPI Only		5.7L/6.3L/8.2L Applications	
496050 Bosch Fuel Injector	MPI Only		5.7L/6.3L/8.2L Applications	
Moeller 03578910 Fuel Sending Unit w/ Fuel Return Port	MPI Only		5.7L/6.3L/8.2L Applications	
DB Electrical 113-22002 Tilt/Trim Harness & Relay Kit	MPI Only		Late Model Volvo Penta Applications	

Part Number & Description	For Carb / MPI Engine	Part Photo	Used on:	QR Code
HE-87430 & HE-87414 Fuel Pump & Starter Relay Kit	Carb		4.3L/5.7L/7.4L/8.2L Applications	
MM-FUEL-ADAPTOR	MPI Only		5.7L/6.3L/8.2L Applications	

NEED HELP?

If you can't find the answer or diagram you are looking for, give us a call, or send us an e-mail. For fastest assistance, speak with your sales representative *first*, as they will likely have the answers you need. Feel free to take photos or video and send it to us so we can best understand your situation.

Engine Tech Support:

1-877-MMOTORZ

Option 7, then Option 1

warranty@michiganmotorz.com

IMPORTANT: Make sure to have your Invoice, Order Number, or Engine Serial Number!

WARRANTY TERMS

ACCEPTANCE OF WARRANTY TERMS

You, by the purchase of a product from Michigan Motorz, LLC ("Michigan Motorz") that is covered by Michigan Motorz New Engine Limited Warranty Agreement ("Agreement"), denote your acceptance of the terms of conditions of this Agreement. The terms "You" or "Purchaser" means you the original purchaser of the product, your agents, beneficiaries, or heirs.

We warrant each new Michigan Motorz marine engine and accessories attached thereto (hereinafter collectively referred to as "product") manufactured by us to be free from defects in material and workmanship. Product models that have a compression ratio over 9.4:1 are not covered under this limited warranty. This warranty shall remain in effect for a period of TWO (2) YEARS for pleasureboat use, or 90 DAYS (3 MONTHS) for commercial vessel use, from the date of shipment to you from Michigan Motorz or the date of pick-up by customer, whichever occurs first.

HIGH-OUTPUT models (7.4L HO, 8.1L HO, and 8.2L models) are a PARTS-ONLY warranty. No labor will be allowed under this warranty policy. Check the website, www.michiganmotorz.com, for current warranty coverage on your model.

ALL WARRANTY REPLACEMENTS AND FIELD REPAIRS MUST BE PRE-APPROVED. A REFERENCE NUMBER MUST BE OBTAINED BEFORE ANY SERVICE IS PERFORMED.

WHAT IS COVERED BY WARRANTY?

Our obligation under this warranty shall be limited to repairing a defective part or, at our option, replacing such part or parts as shall be necessary to remedy any malfunction resulting from defects in material or workmanship as covered by this warranty. Replacement parts provided may be in new, remanufactured or used condition, at our discretion.

Any repair or replacement will be covered under warranty for NINETY (90) DAYS or the remainder of the original warranty period, whichever is longer. We reserve the right to change or improve the design of any product without assuming any obligations to modify any product previously manufactured. All repairs or replacements **MUST** be approved in advance by Michigan Motorz in order for the repair or replacement to be covered under this Agreement.

| MARINE BRAND-NEW TURN-KEY ENGINES

- 2 YEARS (730 Days) / Unlimited Hours for **pleasurecraft** use from the date of shipment to you from Michigan Motorz or the date of pick-up by customer, whichever occurs first.
- 90 DAYS (3 Months) for **commercial vessel** use from the date of shipment to you from Michigan Motorz or the date of pick-up by customer, whichever occurs first.

| MARINE ENGINE REPLACEMENT

Should Michigan Motorz determine that your engine needs to be replaced, Labor will be paid according to flat rate time at your current shop labor rate not exceeding $85.00 an hour. Maximum labor time for marine engine replacement is $1,350.00, whichever is less.

| FIELD REPAIRS

Parts supported by the manufacturer or by customer at cost, not retail prices. Labor will be paid according to flat rate time at your current shop labor rate not exceeding $85.00 an hour. Maximum time/labor allowance for field repairs shall not exceed replacement time/labor amount.

WARRANTY ONLY COVERS DEFECTIVE MATERIAL INSTALLED BY THE MANUFACTURER OR DEFECTIVE LABOR PERFORMED BY THE MANUFACTURER.

| WARRANTY DISCLIMER AND LIMITATION OF LIABILITY

EXCEPT FOR THE WARRANTIES EXPRESSED IN THIS AGREEMENT, MICHIGAN MOTORZ DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE TOTAL LIABILITY, IF ANY, OF MICHIGAN MOTORZ AND THAT OF ITS OFFICERS, DIRECTORS, SHAREHOLDERS, AGENTS AND EMPLOYEES TO PURCHASER FOR DAMAGES WITH RESPECT TO THIS AGREEMENT AND THE ENGINE OR PARTS SOLD SHALL NOT EXCEED THE PURCHASE PRICE RECEIVED FOR PRODUCTS OR SERVICES RENDERED. IN NO EVENT SHALL MICHIGAN MOTORZ, ITS OFFICERS, DIRECTORS, SHAREHOLDERS, AGENTS, AND EMPLOYEES HAVE ANY LIABILITY FOR PUNITIVE, EXEMPLARY, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST PROFITS OR REVENUES. THE LIMITATIONS AND EXCLUSIONS IN THIS PARAGRAPH SHALL APPLY TO ALL CLAIMS OF EVERY NATURE, KIND AND DESCRIPTION, WHETHER ARISING FROM BREACH OF CONTRACT, BREACH OF WARRANTY, STRICT LIABILITY, NEGLIGENCE OR OTHER TORT, OR OTHERWISE. DAMAGES AS LIMITED BY THIS PARAGRAPH IS PURCHASER'S SOLE AND EXCLUSIVE REMEDY IN THE EVENT THAT ANY OTHER REMEDY PROVIDED IN THIS AGREEMENT FAILS OF ITS ESSENTIAL PURPOSE.

This warranty is the only warranty made by the manufacturer or the seller applicable to its engines. This written warranty is understood to be the complete and exclusive agreement between the parties, superseding all prior agreements, verbal or written, and all other communications between the parties regarding any warranty. No installer, distributor, or any employee or agent is authorized to state or imply any additional warranties, nor to assume any of its products unless made in writing and signed by an official of the manufacturer.

In no case shall the manufacturer of the seller be liable for any special incidental or consequential damage (including without limitation, loss of profits, loss of revenue, cost of capital, cost of substitute equipment, down time, claims of third parties and injuries to person or property) based upon breach of warranty, breach of contract, negligence, strict liability in tort or any other legal theory.

LIMITED WARRANTY ADJUSTMENT PROCEDURES AND OTHER LIMITATIONS

HOW DO I GET SERVICE?

In order to be eligible for service under this warranty you **MUST** fill out and return the warranty registration card AND pre-delivery inspection checklist attached below, within 90 days of the engine being shipped to you, in order for you to be eligible for service coverage under this warranty.

WARRANTY CLAIM PROCEDURES

A claim shall be made under this warranty by contacting Michigan Motorz for a Return Material Authorization (RMA) number. Once you have received the RMA, you are to deliver the product for inspection to Michigan Motorz or authorized Michigan Motorz dealers authorized to service the product. Michigan Motorz shall then arrange for the inspection and repair, provided such service is covered under this warranty. Michigan Motorz in its sole discretion may determine if the claimed fault or repair requested is covered by this warranty. You are responsible for properly packaging your product, paying all shipping costs, loss or damage to the product during shipping, and any other taxes, fees or charges associated with transporting the product to Michigan Motorz. Further, if the service is *not* covered by this warranty, the purchaser shall pay for all related labor and material. Any product or parts shipped by purchase for inspection or repair must be shipped with the transportation charges prepaid to Michigan Motorz.

If you require a new part immediately and cannot wait for the product to be inspected by Michigan Motorz, You agree to pay a deposit equal to the value of the replacement part(s) shipped to you to be held until the claimed defective part(s) can be inspected by Michigan Motorz. You agree that this deposit will be applied in full to pay for the cost of the new part should Michigan Motorz examine the returned part and determine, in its sole discretion, that it is not defective.

The owner's bill of sale with the date of purchase is the only valid registration identification and must be presented at the time warranty service is required.

Michigan Motorz's obligation under this warranty is strictly and exclusively limited to the repair and replacement of defective parts, and Michigan Motorz does not assume or authorize anyone to assume from them any other obligation. There are no warranties which extend beyond the description hereof.

Note: In the event that a warranty claim is required outside the continental United States with the exception of Alaska and Hawaii, there may be additional charges not covered under warranty based on local practices and conditions, such as but not limited to freight, insurance, taxes, license fees, import duties and any and all other financial charges, including those levied by governments, states, territories, and their respective agencies which will be the responsibility of the purchaser.

ENGINE INSTALLERS RESPONSIBILITY

INSTALLERS RESPONSIBILITY

Please make sure the following is adhered to:

1. Explain warranty coverage and service procedures to the owner and assure owner's manual (if applicable) is given to boat owner for his or her records.

2. See that the PDI and registration forms are completed and mailed.

3. Diagnose all complaints to determine the cause of original engine failure. If cause of engine failure is not due to material or labor furnished by the manufactured, request for credit should not be submitted. Michigan Motorz is responsible for the provided engine, not parts reused from the original engine. Should these reused parts cause an engine failure, Michigan Motorz cannot be held responsible for those parts OR engine failure.

4. The installer must run-test the engine prior to installation. Michigan Motorz will not be responsible for any costs and/or charges associated with removal, repair, or reinstallation of any such engine that was installed without first being run tested.

WARRANTY ONLY COVERS DEFECTIVE MATERIAL INSTALLED BY THE MANUFACTURER OR DEFECTIVE LABOR PERFORMED BY THE MANUFACTURER.

ENGINE OWNERS RESPONSIBILITY

OWNERS RESPONSIBILITY

You've made an excellent choice in purchasing a Michigan Motorz Engine. To insure long engine life and trouble-free performance, it should be properly maintained. This includes, but is not limited to:

1. Oil and filter change after initial 10 hours (break-in period). Then, regular oil and filter changes every 100 hours or once a season, whichever occurs first.
2. Regular check of all fluid levels throughout the engine. Engine oil must be at a safe level regardless of engine condition. Damage caused by running the engine without adequate oil in the crankcase is not covered under this warranty.
3. Tune-up, belt, filter and hose replacement at necessary intervals or whenever substandard performance is experienced.
4. Cooling system must operate at normal temperature. Thermostat, water pump, leaks and corrosion are the responsibility of the boat owner. Freezing or low coolant level damage is not covered under this warranty.
5. Proper ignition system installation and timing. Ignition system must be timed properly AND advancing properly. Ignition systems that over-advance and cause head gasket damage or piston damage will NOT be covered under warranty.

We recommend you keep all engine installation and service records with the owner's manual. You may be required to provide proof of maintenance records in the event a customer service/warranty situation arises.

There are many things that can cause an engine to fail over which the manufacturer has not control, and are not covered by the manufacturer's service warranty. Some of, but not all of the reasons are as follows:

1. **Holes burned in pistons** caused by detonation. Be sure engine is installed and tuned properly.
2. **Excessive operating temperatures.** Excessive temperature can be injurious to engine life. There are many causes for excessive engine temperature over which the manufacturer has no control.
3. **Improper or lack of lubricant.** Engine may lockup with incorrect, low, or no oil in the crankcase.
4. **Water intrusion** from any source outside of manufacturer defect, such as faulty water-cooled exhaust manifolds or risers, intake manifolds with leaky water crossovers, etc.

WHAT IS NOT COVERED BY WARRANTY

Since this warranty applies to defects in material and workmanship, it does not apply to:

- Old and/or used engine parts installed on the replacement engine purchased from Michigan Motorz
- Shop supplies used in performing warranty work (i.e. rags, sealants, lubricants, etc.)
- Incidental and consequential damages (storage charges, telephone or rental charges of any type, inconvenience or loss of time or income).
- Minor adjustments and tune-ups; including checking, cleaning or adjusting spark plugs, carburetor setting, filters, belts, controls and checking lubrication.
- Use of accessories or parts not manufactured or sold by Michigan Motorz.
- Failure caused by neglect, lack of maintenance, accident, abnormal operation, improper installation, improper preparation, improper winterization, improper dealer set-up or improper service or normal wear and tear.
- Failure of the installer to run-test the engine prior to installation and all costs and charges associated with removal, repair, or reinstallation of any such engine that was installed without first being run tested.
- Haul-out, launch, towing charges, removal and /or replacement of boat partitions or material because of boat design for necessary access to the Product. Reasonable access must be provided to the product for warranty service.
- Transportation charges and/or travel time.
- Service requested by customer other than that necessary to satisfy the warranty obligation.
- Oils, lubricants or fluids used in normal maintenance.
- Participation in or preparing for racing or other competitive activity.
- Any action that will change the intended use of the product or that will affect the product's operation
- Alteration or removal of parts or accessories.
- Starter motors and/or armatures or field coil assembly, which have been damaged from excessive cranking, condensation, or submersion.
- Water entering the engine via the intake or exhaust system or submersion.
- Use of fuels and lubricants that are not suitable for use with or on the product.
- Failure of any parts caused by lack of cooling water which results from starting motor out of water or foreign materials blocking intake passages.
- Air freight, next-day or second-day air, or any special delivery fees, unless authorized by Michigan Motorz prior to ordering of parts.
- Certain parts may be tested on receipt by Michigan Motorz. Parts found to be free of defects will be returned to the dealer and no credit will be issued. If the part has already been credited, the dealer account will be debited.

ADDITIONAL TERMS AND CONDITIONS

DISPUTE RESOLUTION

You agree that any dispute between You and Michigan Motorz will be resolved exclusively and finally by arbitration administered by the American Arbitration Association (AAA) and conducted under its rules, except as otherwise provided below. The arbitration will be conducted before one arbitrator in accordance with the Federal Arbitration Act 9 USC 1 et seq, and will be limited solely to the Dispute between You and Michigan Motorz.

All statute of limitations that would otherwise be applicable in a judicial action brought by a party will apply to the arbitration. In the arbitration, the parties agree that the law for the State of Michigan shall apply. The arbitration shall be in Madison Heights, Michigan, which You agree is a reasonably convenient location. The Arbitration will be conducted according to the AAA Commercial Arbitration Rules and Mediation Procedures. Any decision rendered in such arbitration proceedings will be final and binding on each of the parties, and judgment may be entered thereon in any court of competent jurisdiction. Should either party bring a Dispute in a forum other than AAA, the arbitrator will award the other party its reasonable costs and expenses, including attorneys' fees, incurred in staying or dismissing such other proceedings or in otherwise enforcing compliance with this dispute resolution provision. You understand that you would have had a right to litigate disputes through a court, and that you have expressly and knowingly waived that right and agreed to resolve any Disputes through binding arbitration.

For the purposes of this section, the term "Dispute" means any dispute, controversy, or claim arising out of or relating to (i) this Agreement, its interpretation, or the breach, termination, applicability or validity thereof, or (ii) the purchase or use of any product, accessory, service or otherwise from Michigan Motorz. Information may be obtained from the AAA online at http://www.adr.org/, by calling 1- 800-778-7879 or writing to 1633 Broadway, 10th Floor, New York, New York 10019.

CHOICE OF LAW AND VENUE

This Agreement is governed by the laws of the State of Michigan, without giving effect to conflicts of law rules. You agree that if any dispute is found not to be subject to the Dispute resolution clause, that the sole venue will be that of the court with the appropriate jurisdiction in Oakland County, Michigan and you agree that you are subject to and agree to submit to the personal jurisdiction of the appropriate court in Oakland County, Michigan.

TRANSFERABILITY

This warranty covers the original purchaser *only* and is non-transferable. You may not assign, delegate, or transfer this warranty.

SEVERABILITY

If any provision, paragraph or subparagraph of this Agreement is adjudicated by any Court to be void and unenforceable in whole or in part, such adjudication shall not be deemed to affect the validity of the remainder of the Agreement, including any other provision, paragraph or subparagraph. Each provision, paragraph or subparagraph of the Agreement is declared to be separable from each other provision, paragraph or subparagraph and constitutes a separate, distinct covenant.

MODIFICATION AND WAIVER

No waiver or modification of the Agreement shall be valid unless it is in writing and signed by Michigan Motorz. Furthermore, any waiver by either party of any breach of any provision of this Agreement shall not operate or be construed as a waiver of any subsequent breach.

THIRD PARTY BENEFICIARIES

This Agreement will not confer any rights or remedies on any third party, other than the parties to this Agreement and their respective successors and permitted assigns.

TITLES

Titles and headings to articles, sections, or paragraphs in this Agreement are inserted for convenience of reference only and are not intended to affect the interpretation or construction of the agreement.

ENTIRE AGREEMENT

This Agreement contains the entire understanding of the parties involved and supersedes all previous oral and written agreements with regard to subject hereof.

ENGINE WARRANTY REGISTRATION FORM

2- Year Factory Limited Warranty

Engines **CANNOT** be registered over the phone.

QUESTIONS?
1-877-MMOTORZ

REQUIRED to be registered:

1.) Copy of the purchase invoice required to certify eligibility.

2.) Copy of completed, signed, and dated PDI form is required for warranty eligibility.

Customer Information: **All Fields are Required for Engine Registration!**

Customer Name: _____ Date of Purchase: _____

Address: _____

City: _____ State: _____ Zip: _____

Home Phone: _____ E-Mail: _____

Installer/Dealer Information: Michigan Motorz Invoice #: _____

Dealer Name: _____ Mechanic Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Dealer Phone: _____ Fax: _____

Email: _____ MM Engine Item #: _____

Engine #1 Serial Number: _____ Twin #2 Serial Number: _____
(Michigan Motorz Engine S/N) *(For Twin Engine Installs Only)*

Date Installed: _____ Hull ID: _____ Hull Material: _____

Boat Length: _____ Boat Type: _____ Water Type: _FRESH / BRACKISH / SALT_
(Circle)

Dealer Signature: _____ Date: _____
My signature is my representation the information provided above is correct.

P.D.I. (PRE-DELIVERY INSPECTION) FORM

Pre-Delivery Inspection Checklist
(Dealer to inspect engine before customer takes delivery of the boat)

N/A	Checked/ Adjusted	Task
		Check Before Running:
☐	☐	Drain plug in and petcocks closed
☐	☐	Seawater inlet valve OPEN
☐	☐	Engine mounts tight
☐	☐	Engine alignment
☐	☐	Engine alignment
☐	☐	Drive unit fasteners torqued
☐	☐	Power trim cylinders: fasteners tight
☐	☐	Battery fully charged and secured
☐	☐	All electrical connections tight
☐	☐	Exhaust system hose clamps tight
☐	☐	All fuel connections tight
☐	☐	Correct rotation propeller (installed/torqued)
☐	☐	Throttle, shift, and steering system fasteners tightened properly
☐	☐	Crankcase oil level
☐	☐	Power trim fluid level
☐	☐	Sterndrive unit fluid level
☐	☐	Power steering fluid level
☐	☐	Closed cooling level
☐	☐	Transmission fluid level
☐	☐	Alternator belt tension
☐	☐	Seawater pickup pump belt tension
☐	☐	Power steering pump belt tension
☐	☐	Audio warning (buzzer) system operation

DATE: _____

DEALER / TECH NAME:_____

DEALER / TECH SIGNATURE:_____

N/A	Checked/ Adjusted	Task
		On-Water Testing:
☐	☐	Engine alignment (inboards only)
☐	☐	Starter neutral safety switch operation
☐	☐	Water pump operation
☐	☐	Instruments operation
☐	☐	Fuel leaks
☐	☐	Oil leaks
☐	☐	Water leaks
☐	☐	Base (initial) ignition timing set at _____°
☐	☐	Idle RPM: _____ within specifications (in *neutral*)
☐	☐	Idle RPM: _____ within specifications (in *forward* gear)
☐	☐	WOT RPM: _____ within specifications (Wide Open Throttle, in *forward* gear)
☐	☐	Forward/Neutral/Reverse gear operation
☐	☐	Steering operation throughout range
☐	☐	Acceleration from idle RPM
☐	☐	Power trim operation
☐	☐	Trim tab adjustment/boat handling
		After On-Water Testing:
☐	☐	Propeller nut torque
☐	☐	Fuel, oil, coolant, water, and fluid leaks
☐	☐	Oil and fluid levels
☐	☐	Verify presence of operation and maintenance manual
		Ignition System:
☐	☐	Base (initial) ignition timing set at _____°
☐	☐	Total ignition timing advance at WOT _____°
☐	☐	Ignition coil voltage while running: _____ D.C.

SEND YOUR REGISTRATION AND P.D.I. FORMS

NOTE: WARRANTY IS **NOT** ACTIVATED UNTIL YOU COMPLETE THESE FORMS!

FAX COMPLETED FORMS TO:

248-951-2922

E-MAIL COMPLETED FORMS TO:

WARRANTY@MICHIGANMOTORZ.COM

MAIL COMPLETED FORMS TO:

MICHIGAN MOTORZ, LLC.
ATTN: WARRANTY REGISTRATION DEPT.
32333 Mally Drive
Madison Heights, MI 48071

ONLINE REGISTRATION FORMS:

SCAN ME

P.D.I. SHEET (SEA-TRIAL) FORM

SCAN ME

ENGINE WARRANTY REGISTRATION FORM