

# Whipple Superchargers

## 496Mag – Mag HO

### Installation Instructions



**Version A1R8**

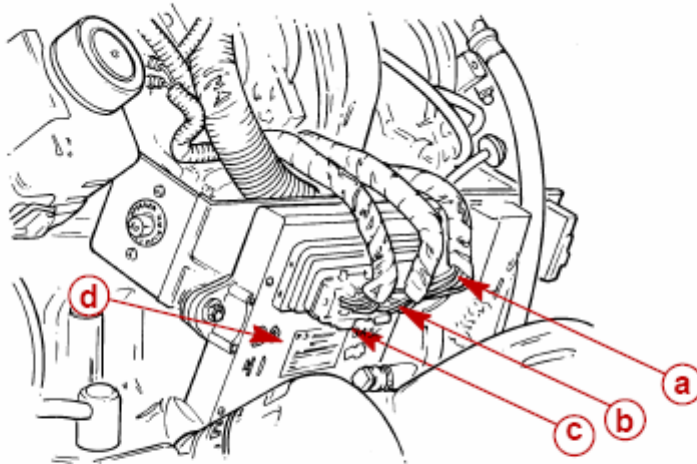
Last Updated May 14, 2007

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

This product is intended for use on **STOCK, UNMODIFIED, WELL-MAINTAINED ENGINES**. Installation on a worn-out or modified engine is not recommended and could result in failure of the engine or the supercharger. It is recommended to perform a compression test of all cylinders, and perform a cylinder pressure leak down procedure. This will indicate the condition of the engine for reference. Whipple also highly recommends water block pressure and fuel pressure gauges for constant monitoring during operation.

**YOU MUST SEND YOUR ECU IN FOR REPROGRAMMING TO WORK WITH THE WHIPPLE SUPERCHARGER SYSTEM. ACCOMPANY EACH COMPUTER WITH NAME, SHIPPING INFORMATION, CONTACT INFO, BOAT INFO AND IF ANY MODIFICATIONS HAVE BEEN MADE TO THE ENGINE. SEND FACTORY ECU TO:**

1. Disconnect A, B and C electrical connectors at engine control module (ECM). DO NOT touch connector pins when removing.



- a** - Connector A
- b** - Connector B
- c** - Connector C
- d** - ECM

77498

2. Remove ECM from electrical bracket.

**WHIPPLE SUPERCHARGERS  
ATTENTION: MARINE ECU RECAL DEPARTMENT  
3292 N. WEBER  
FRESNO, CA 93722  
559.442.1261**

**\*\*NOTICE: Installation of Whipple Supercharger products signifies that you have read this document and have agreed to the terms stated within.**

## **Whipple Charger Installations Instructions for Mercury Marine 496 Engines**

It is the purchaser's responsibility to follow all installation instruction guidelines and safety procedures supplied with the product as it is received by the purchaser to determine the compatibility of the product with the vessel or the device the purchaser intends to install the product on.

Whipple Supercharger assumes no responsibility for damages occurring from accident, misuse, abuse, improper installation, improper operation, lack of reasonable care, or all previously stated reasons resulting from incompatibility with other manufacturers' products.

There are no warranties expressed, implied, for merchantability or fitness for engine failure, parts failure, any type of damage to vessel in any way, or reimbursement for labor or inconvenience.

**For best performance and continued reliability the following are MANDATORY**

1. Use only premium grade fuel (91 octane or better).
2. Use only the supplied NGK BR7EFS spark plugs with .035" gap.
3. Inspect (every 25hours) and replace fuel filter and oil filter if necessary.
4. Always listen for any sign of engine knocking/detonation, if present, discontinue use immediately.
5. Do not operate engine in boost if the fuel pressure is below the pressure specified by Whipple Industries.
6. Never change the Whipple computer calibration program (engine fuel, ignition timing, or the RPM limiter, nothing)! This complete supercharger system is designed and engineered to produce the maximum performance possible from the stock engine. Any modifications can cause severe engine damage.
7. For proper engine life, maintain safe rpm levels, the proper propping rpm are as follows:
  - 496 Magnum (385HP): 4800 – 5000 RPM
  - 496 Magnum HO (425HP): 5000-5200 RPM
8. Do not continually run on the rev limiter, continued abuse of the rev limiter can cause severe engine damage. The RPM limiters are set as follows:
  - 496 Magnum (385HP): 5250 RPM
  - 496 Magnum HO (425HP): 5450 RPM

### **RECOMMENDATIONS**

1. In some situations, especially hot summer, hot water situations, the factory cooling system will have a problem maintaining temperature. We run a 120 thermostat and would like to see the motor run between 120-150 degrees. In order for some boats to do this, you may need to increase the heat exchanger capacity. Sen-Dure manufactures a drop in unit that replaces the factory unit and is 5" in ID for superior cooling. Sen-Dure's part number is #15006-1-5. You can contact them at 954.973.1260. 6785 NW 17<sup>th</sup> Ave. Ft. Lauderdale, FL 33309.
2. Extra gauges for increased awareness. We recommend running a electric fuel PSI gauge (0-60psi) for monitoring only (never tune from). We also recommend running a vacuum/boost gauge (0-15lbs) so you can monitor the boost level. When running in long periods, you will have more reliability and better fuel economy if you lessen the load on the engine by more trim and less boost.

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3. Mercury Marine runs a 100% mixture of engine coolant. Whipple recommends running a minimum of a 50/50 mix of glycol/distilled water. For environments with temps over 100deg F, we recommend running a 25/75 mix of glycol/distilled water. This will help the engine run at cooler temps for increased reliability and power.
4. Whipple also recommends running a water additive such as Redline Water Wetter. We recommend running 1-2 bottles. This helps reduce air bubble insulation and allows the coolant system to be more efficient at removing harmful heat.

### **GENERAL INFORMATION**

Run the engine before beginning installation of the kit until it is as close as possible to empty. Make sure that fuel tank does not have old gasoline, and contains only fuel that is 91 octane or better, before installing supercharger kit. If the octane of the fuel in the tank is old or unknown, **drain the tank until empty and fill with 91-octane premium fuel.**

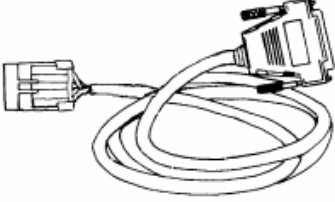
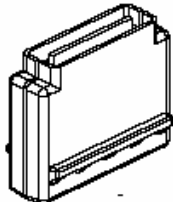

You will be required to disconnect a few wiring connectors. It may be helpful to tag the wires for future reference.

Never check fuel pressure with an electric fuel pressure gauge, use only as a reference once it's been checked with a high quality mechanical gauge.

### **TOOLS RECOMMENDED**

The following tools are required to complete the installation of this supercharger kit. Metric socket set, standard socket set, screwdrivers, torx head sockets, standard and metric end wrenches, standard and metric Allen wrenches, Loctite™, Teflon tape or thread sealant, electric or battery operated drill motor, various hole saws, electrical tape, wire crimpers or solder iron, volt meter, 90 lb. fuel pressure gauge with line kit and a torque wrench.

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<b>Harness Assembly / Diagnostic Tester</b>	<b>91-822560A13</b>
<b>Description:</b> 25-pin to 4-pin Adaptor harness. For PCM 555 and ECM 555 models (4-pin connectors, no additional harness required).	 <p style="text-align: right;">74214</p>
<b>Mercury MerCruiser DDT Cartridge Version 1.2</b>	<b>91-880118A2</b>
<b>Description:</b> Use on PCM 555 and ECM 555 models.	 <p style="text-align: right;">78036</p>
<b>Scan Tool Kit / Version 4.0</b>	<b>Note in Description</b>
<b>Description:</b> Hand-held Scan Tool updated for 2001. (refer to Service Bulletin 2001-1). Use with models: MCM/MIE EFI (TBI) and MPI Gasoline MCM/MIE 496/8.1S MPI PCM 555 1997 and Newer MCM/MIE Carbureted Models with Thunderbolt Ignition System MCM/MIE D-Tronic Diesel <b>NOTE:</b> Tool must be ordered from Rinda Technologies, Inc.	 <p style="text-align: right;">72428</p>

## **SYSTEM PERFORMANCE INFORMATION**

A MerCruiser scanner is an electronic tool used to display various engine parameters. This scanner can be installed and monitor all engine parameters while the boat is being operated. Some of these are items are: RPM, TPS volts, SPARK ADVANCE, COOLANT TEMP, IAC % and TROUBLE CODES. You can purchase this scanner or laptop based software from [www.rinda.com](http://www.rinda.com) (Rinda Technologies).

1. **Idle speed system check.** After the engine is at normal operating temperature (140deg. F), the engine will idle at 650 - 700 RPM, out of gear. To fully check the idle speed system, the IAC motor % and TPS voltage must be checked. A MerCruiser scanner will be required to display the actual % of the IAC, but you can check TPS voltage with a voltmeter. Set the scanner to display the IAC %. These should be close to 40 counts. The proper TPS voltage is between .65 - .70 volts. The TPS is a 5v sensor. If the counts are to low, adjust the closed throttle stop to close the throttle. If the counts are to high, adjust the throttle to open more. *Note: The engine must be turned off for 5 seconds and re-started to*

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

*properly reset the learning of the IAC system.* You can set the IAC motor without a scan tool. First set your TPS voltage. Start engine and adjust idle adjustment by watching rpm range. The motor should idle at 650-700rpm in neutral and only drop approximately 50-100rpm when going in gear. If the motor dies when shifting, increase the adjustment so the motor can get more air and the IAC motor will be more in it's range.

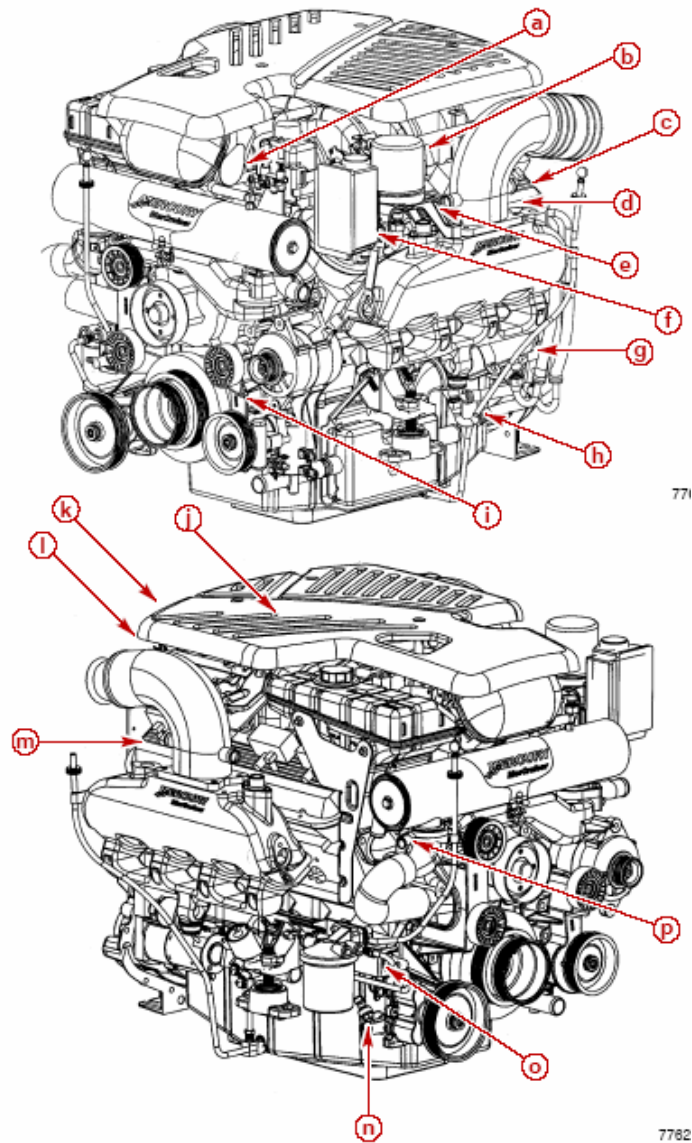
2. **Supercharger By-pass system.** The supercharger is installed with a unique "air by-pass system." This allows the supercharger to operate at higher efficiency under vacuum operation. It is advised to verify the operation of the bypass valve. At idle and low engine loads, the bypass will be open. At higher loads (engine in boost) the bypass will be closed. As the throttle is opened quickly the bypass valve will close momentarily. This verifies the bypass will close and is functioning.

### COMMON ABBREVIATIONS

ECT	Engine Coolant Temperature
IAT	Inlet Air Temperature
IAC	Idle Air Control
TPS	Throttle Position Sensor
MAP	Manifold Absolute Pressure
PCV	Positive Crankcase Ventilation
DEG	Degrees
KPA	Kilopascal
WOT	Wide Open Throttle
V	Volts
GND	Ground
PCM	Powertrain Control Module

# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

## Sensor Locations On The 8.1 liter (496 cid) Engine



- a** - Throttle Position Sensor (TPS)
- b** - Electronic Control Module (PCM)
- c** - Crankshaft Position Sensor (CPS)
- d** - Port Exhaust Manifold Coolant Temperature Sensor (EMCT)
- e** - Data Link Connector (DLC)
- f** - Drive Lube Monitor
- g** - Oil Pressure Sensor
- h** - Cool Fuel Pump Connector
- i** - Camshaft Position Sensor (CMP)
- j** - Manifold Absolute Pressure Sensor (MAP)
- k** - Manifold Air Temperature Sensor (MAT)
- l** - Idle Air Control Valve (IAC)
- m** - Starboard Exhaust Manifold Coolant Temperature Sensor (EMCT)
- n** - Seapump Pressure Sensor
- o** - Boost Fuel Pump Connector
- p** - Engine Coolant Temperature Sensor (ECT)

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

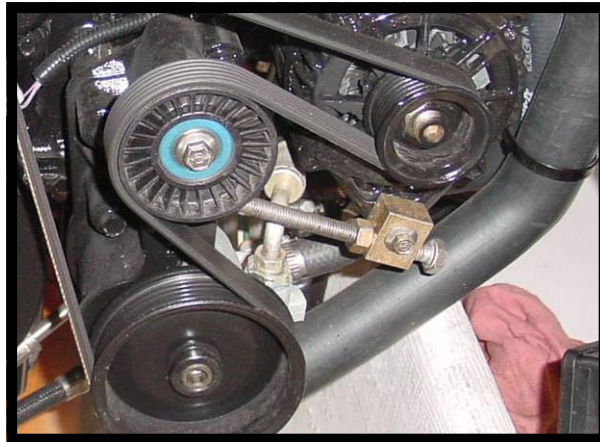
### STEP-BY-STEP INSTALLATION INSTRUCTIONS

1. Disconnect the battery power by selecting the disconnect mode on the battery switch or removing the ground cable from all batteries.
2. Drain approx. 2-3 gallons of coolant from engine.

#### FACTORY PART REMOVAL STEPS

3. Removal of stock items:

- Remove factory plastic engine cover.
- Remove flame arrestor.
- Remove shift cable assembly from factory bracket.
- Remove factory shift cable support bracket from engine.
- Remove throttle linkage from throttle body (retain stud, nuts and washers for later use).
- Remove throttle linkage anchor from intake (retain stud, nuts and washers for later use).
- Remove factory 6-rib belt by releasing belt tension. To achieve this, loosen the threaded pusher bolt located under the alternator. Loosen until you can pull belt off.



- Remove factory crank pulley by removing the factory 3 bolts.

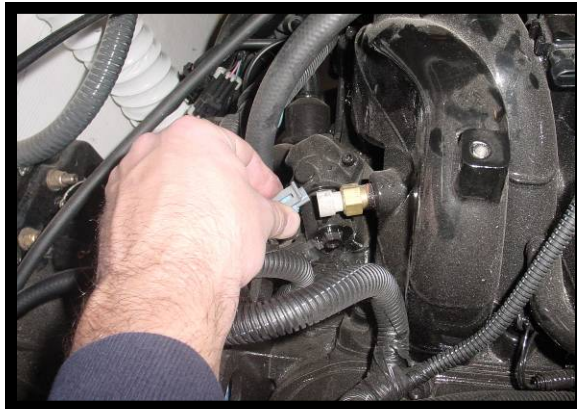


## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

- Unplug factory electrical plugs:
  - Throttle position (TPS) connector.



- Inlet Air Temp (IAT) connector.



- Manifold Absolute Pressure (Map) connector.



- Idle Air Control (IAC) connector. Squeeze and pull to remove connector.

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- Remove 3/8" rubber hose from IAC motor to factory throttle body.
- Unplug the main injector connector.



- Remove factory computer support bracket from intake and exhaust manifold. Pull bracket and wiring back for easier access to engine.
- Temporarily move the drive oil reservoir bottle to one side.
- Temporarily remove coolant over flow hose from clear plastic reservoir.

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- Remove factory fuel line from fuel rail using supplied tool.



- Remove the 10 factory intake manifold bolts.
- Remove intake manifold by lifting up and sliding back. Pull harness up and out of the way.
- Remove intake gaskets, clean both surfaces after removal.
- Remove factory exhaust risers. Between the riser and manifold, you will find a stainless venturi plate. Remove venturi plate and discard. Clean gasket material from riser. You should be able to utilize the factory gasket that was between the manifold and riser. Reinstall riser to manifold using factory nuts.



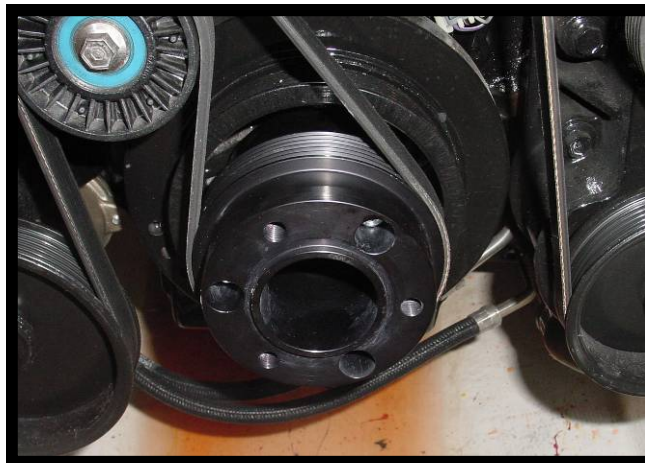
- Remove factory spark plugs. Use extreme caution when pulling the spark plug wires.
- Remove IAT sensor from intake manifold for later use.
- Remove IAC motor from intake manifold for later use.
- Remove factory 160 thermostat. To achieve this:
  - Remove the 2 large hose clamps holding heat exchanger in place.

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- Carefully pull up on heat exchanger, pull out the port side tube. You will then see the factory stat.
- Remove thermostat by removing the retaining plate above stat.
- Remove stat and rubber boot.
- Remove rubber boot from factory thermostat.

### INSTALATION STEPS

4. Install rubber boot around new low-temp 120 thermostat.
  - Relocate factory shift bracket to transom, utilize 2-3 stainless wood screws to secure. Make sure your linkage does not bind.
  - Install low-temp thermostat in stock location.
  - Install factory thermostat retaining plate.
  - Carefully reinsert heat exchanger to original position, reinstall factory clamps. Be sure to have tightening bolt on top of exchanger. This will insure that it's being pulled down in the center.
  - Install crank pulley base. Utilize the (3) 10mm x 80mm socket head allen bolts to secure crank pulley base. Apply light amount of blue Loctite #242. Torque to 35 foot-pounds.



- Install 8" crank pulley to crank pulley base. Utilize the (3) factory 10mm socket head allen bolts from the factory crank pulley. Torque to 35 foot-pounds. Apply light amount of blue loctite #242.

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- Install throttle linkage bracket to #6 & #8 ignition coils. Utilize the factory top two bolts to secure throttle bracket. **\*\*03-06 models** must use the 1" billet spacers and the supplied 6mm x 45mm socket head allen bolts to secure.



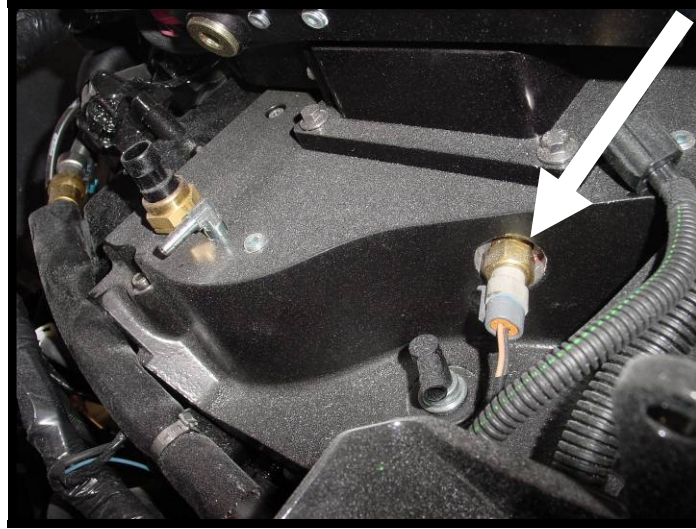
- Remove drive oil reservoir bracket from head.
- Install new drive oil reservoir relocation bracket by installing against the head, use factory nyloc nuts to secure bracket.
- Install drive reservoir bracket to relocation bracket using the supplied 3/8" x 3/4" socket head allen bolts. Some brackets may need slight trimming to fit.



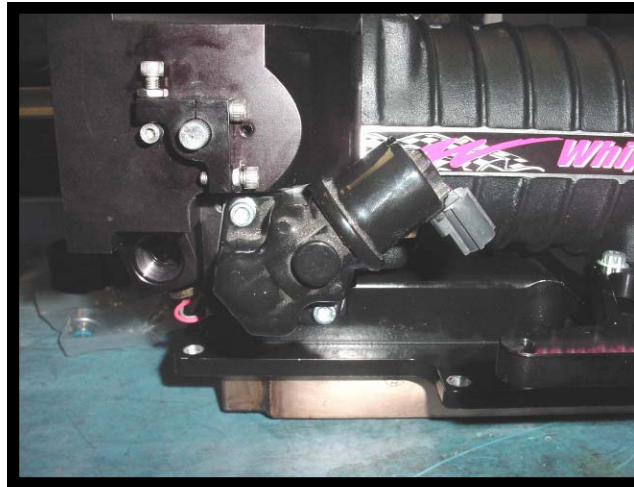
- Install new supplied NGK BR7EFS spark plugs. Proper plug gap is .035", check and verify each plug. Reinstall factory plug wires.
5. Intake manifold installation:
- Remove the (8) bolts 10mm bolts securing the intercooler housing to the manifold and split the supercharger/intercooler assembly from the intake manifold.

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- Install factory IAT sensor into the back starboard side 3/8" pipe port.

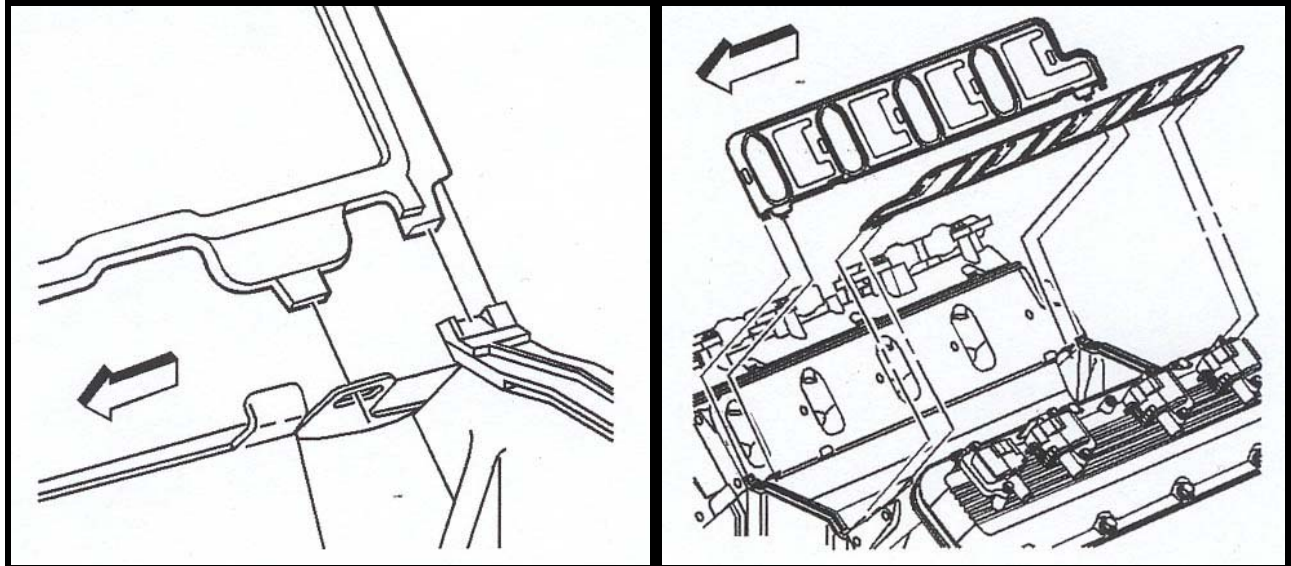


- Install factory IAC motor to billet throttle body. Utilize the new supplied gasket between the two surfaces. Secure with the supplied 1/4" x 3/4" socket head allen bolts. This will only mount one way.



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- Utilize the factory reusable intake gaskets, install against head. Make sure to read (this side down) on the bottom of each for proper installation. Replacement gaskets are available through Whipple or your Mercury Marine dealer if gasket is damaged.



- Apply a thick bead of black RTV silicone on the center valleys of the block, front and back. Run the bead all the way to the gasket edge.

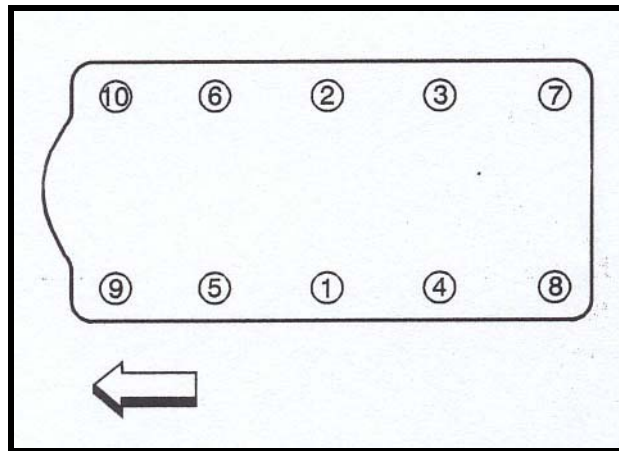


- Install intake manifold assembly carefully on engine. Do not smear silicone, if smeared, remove and reapply.

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- Utilize the 6 supplied (01-03) 6mm x 70mm (04-06 uses 6mm x 85mm) socket head allen bolts with the longer bosses and the 4 supplied (01-03) 6mm x 55mm (04-06 uses 6mm x 70mm) socket head allen bolts with the shorter bosses. Use supplied ¼" AN washers (12). Torque intake bolts in four passes using the supplied figure for proper torque sequence:

- First pass: 44 in lb.
- Second pass: 44 in lb.
- Third pass: 89 in lb.
- Final pass: 106 in lb.



### 6. Supercharger installation:

- Apply an approx. 2mm bead of black RTV silicone to manifold base, be sure to circle all 8-bolt holes.
- Carefully install supercharger to intake manifold. Utilize the (8) 10mm bolts that you removed earlier to secure supercharger assembly and install hand tight. Slide supercharger assembly forward, then torque to 30 ft/lbs.

### 7. Front plate/support installation (05-06 models, see noted revision):

- Install drive collar to front plate using the supplied ¼" x ¾" socket head allen bolts. Install hand tight for proper front plate alignment.
- Take front plate assembly and slide collar and front plate over the drive just slightly.
- Install the factory 6-rib belt and leave loose for the time being.
- Remove the 2 factory idler bolts where the front billet plate will be secured. Do not remove pulleys.

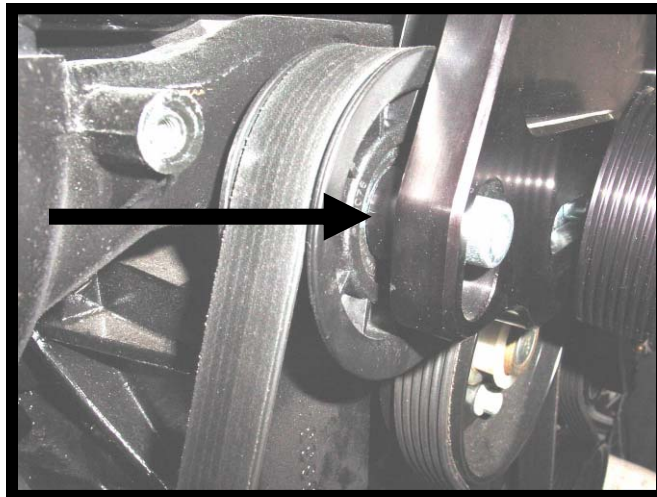


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- (05-06 models) Remove factory bolt from alternator mount and install offset spacer as shown in figure.



- Insert the supplied billet spacers between the idler and front plate. Insert the supplied 10mm x 45mm socket head allen bolts. Install hand tight.



- Make sure that the plate is not hitting either the idler pulley or circulating water pump pulley. If either is hitting, there are 2 stainless 1" shims to space out the plate.
  - Visually inspect front plate and make sure it's not bound anyway. It should be flat and even against spacers, this will automatically center the collar around SC drive. Once inspected, tighten 1/4" socket head allen on collar.
  - Apply light amount of blue Loctite to threads and snug up all 1/4" socket head allen bolts holding front plate to collar.
8. Install blower pulley with the supplied 6mm x 14mm socket head allen bolts. Hold drive hub from spinning by using a large metric allen in center of drive hub. Then tighten the supplied blower

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

pulley bolts to 110 inch pounds using a #5 metric allen.

### 9. Intercooler water dump fitting: **DO NOT RESTRICT OUTLET**

- Find visible location for dump above the water line. Remember, if you install the stainless tee for the intercooler, it will run all the time, even when idling.
- Mark your spot on the boat, drill a hole using a 3/4" hole saw.
- Apply marine type silicone to exposed wood and fiberglass as well as the back of thru-hull fitting.
- Insert fitting in boat and from the backside, install the aluminum nut. You will have to hold the dump fitting from twisting when installing.
- Install supplied brass – 8 push lock fitting to intercooler dump fitting. Secure dump fitting while tightening brass push lock fitting.
- Once tightened, wipe the excess silicone off for a clean installation.

### 10. Water routing:

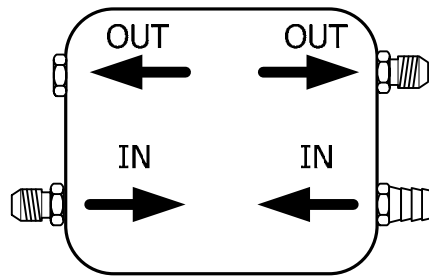
- For the water tee installation (separate IC pickups need to supplement the pickup for the tee), locate the factory hose coming from the sea pump outlet. Follow this hose to the back of the motor where it makes a 90° bend upwards. Find an area that has proper clearance for the intercooler tee. Be very careful of kinks to the factory hose and possible intercooler hose.
- For the fuel cooler installation, locate the factory hose coming from the sea pump outlet. Find an area that has proper clearance for the fuel cooler (can be mounted any angle), this can be installed anywhere after the sea pump. Be very careful of kinks to the factory hose and possible fuel lines. 3 possible locations, near the starter, after the oil cooler, or you can install in place of the factory fuel cooler (this requires you to remove the factory cool fuel assembly).
- (Intercooler tee installation) Sever factory hose and install stainless tee. Secure the factory 1.25" hose to the tee with the supplied #20 hose clamps.
- Install the supplied 5/8" ID hose from intercooler tee to the 90° intercooler inlet and secure with #10 hose clamps.
- Install 5/8" ID hose from starboard side intercooler fitting and route to intercooler dump fitting you installed earlier.
- Push the 5/8" ID hose on the brass push lock fitting. It's helpful to apply light amount of lubricant to hose before installing.

### 11. Fuel system installation: NOTE: Never use thread/pipe sealant on o-ring style fuel fitting.

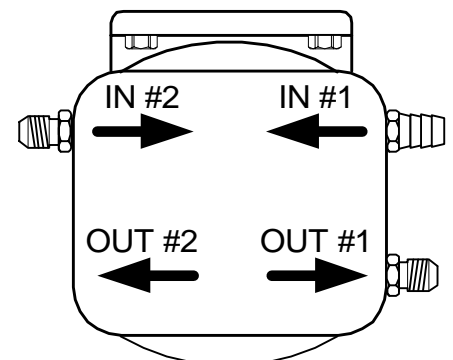
- (05-06 models)** Remove entire factory filter/pump assembly from engine.

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- (05-06 models)** Remote mount supplied fuel filter/water separator. Make sure you leave enough room to remove the fuel filter from the head for later service.
- (05-06 models)** Install the supplied ½" NPT to ½" 90deg barb fitting into the inlet #1 of the new fuel filter head. Apply light amount of pipe sealant to threads.
- (05-06 models)** Install the supplied ½" NPT to ½" barb fitting into the outlet #1 of the new fuel filter head. Apply light amount of pipe sealant to threads.
- (05-06 models)** Install the supplied ½" NPT to 3/8" barb fitting into the inlet #2 of the new fuel filter head. Apply light amount of pipe sealant to threads.
- (05-06 models)** Install the supplied ½" NPT plug into the outlet #2. Apply light amount of pipe sealant to threads.
- Inspect factory fuel lines from tank(s), check for any restrictions such as check valves and inline filters. All restrictions must be removed to allow proper fuel flow.
- (05-06 models)** If factory fuel line is smaller than ½" ID, replace the corresponding fittings and hose with USGC approved hose. Secure with #10 hose clamps.

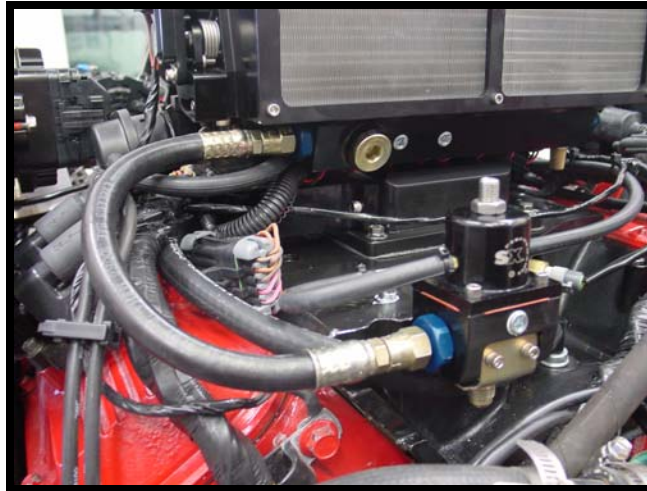


- Remove factory routed fuel line from the first stock fuel pump located just behind the stock fuel filter.
- Remove factory fuel lines and fittings from stock fuel filter.
- Install supplied ¼" NPT pipe to 3/8" barbed fitting into the stock fuel filter IN #1. Apply light amount of pipe sealant to pipe thread. Face barbed fitting straight down.
- Install (1) ¼" NPT pipe to -6 fuel fitting in the stock fuel filter OUT #1.
- Install (1) ¼" NPT pipe to -6 fuel fitting in the stock fuel filter IN #2.
- Install the (3) supplied -10 o-rings to the -10 fuel fittings. (Parts located in regulator and pump box).
- Install the (2) supplied -10 flow to -6 flare fittings. Install (2) in the inlet and outlet ports of the new hi-flow fuel pump.



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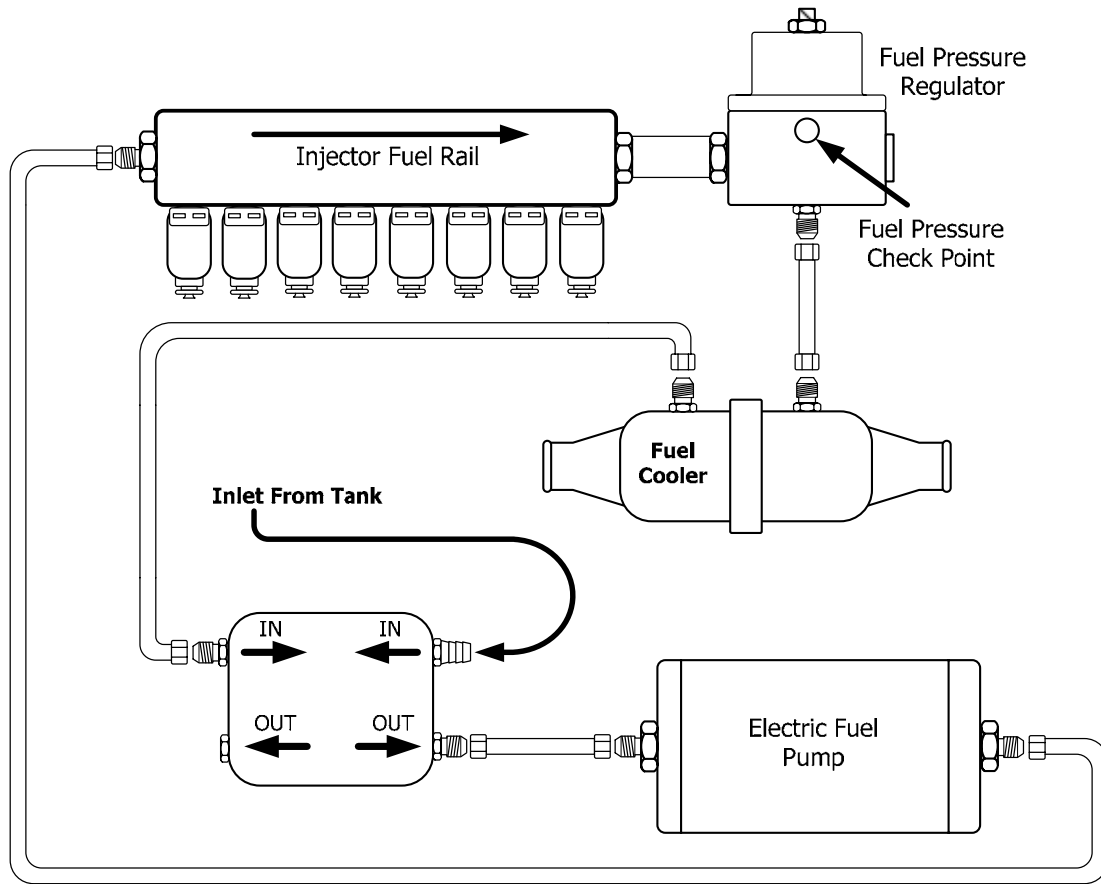
- Remote mount adjustable fuel psi regulator. This can be located off the back of the intake manifold, off the transom or anywhere near the SC. Ideally, this should be mounted within 18" of the fuel rail.



Picture is an example of remote mounting regulator

- Install -10 allen plug into fuel PSI regulator in unused regulator inlet.
- Install the supplied steel -6 flared fitting on the bottom side of the fuel pressure regulator.
- Install the supplied o-ring onto the 5/32" brass barbed fitting into the fuel pressure regulator. (Parts are in regulator box).
- Install supplied 1/8" pipe plug into fuel pressure regulator. Apply light amount of thread sealant to threads.
- Pre-plan the fuel line routing so you can mount the fuel pump and fuel cooler in proper locations.
- Find a secure location to mount hi-flow electric fuel pump. Note that this pumps vibrates and can cause a harmonic noise if not mounted securely.
- Install rubber strips on fuel pump clamps, mount pump in clamps using the supplied brackets, and tighten clamps. Make sure the rubber strips are on straight.
- Install pipe sealant to fuel cooler -6 steel fittings. Reinstall fittings to cooler.
- Find a secure mounting location for the fuel cooler, mount cooler. Remember that 5/8" water hose will be routed to cooler.
- Install factory fuel line from tank to barbed fitting, secure with factory clamp (utilize factory fuel line and clamp that routed to the first stock fuel pump).
- You must now manufacture fuel lines. Use only high quality, high-pressure fuel lines!!**

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- Manufacture fuel line utilizing 3/8" ID hose from the pump OUTLET to the -6 fitting on the port side fuel rail -6 fitting.
- Manufacture a fuel line utilizing 3/8" ID -6-fuel line from the regulator return to the new supplied fuel cooler.
- Manufacture another 3/8" ID -6-fuel line from the fuel cooler to the -6 fitting IN #2 on the fuel filter.
- Locate the barbed fitting on port side/rear of intake manifold (1/8"). Install supplied 1/8" vacuum hose and route to fuel pressure regulator barbed port. Secure with zip ties. Avoid tight bends and kinks.
- (05-06 models)** Manufacture a 1/2" ID USGC approved hose from the fuel filter outlet #1 to the fuel pump inlet. Secure hose to barb fitting with #10 hose clamp.
- (05-06 models)** Manufacture a 3/8" ID USGC approved hose from the fuel pump outlet to the Whipple fuel rail (either side).
- (05-06 models)** Manufacture a 3/8" ID USGC approved hose from the fuel rail to the fuel PSI regulator (either side of regulator).
- (05-06 models)** Manufacture a 3/8" ID USGC approved hose from the fuel PSI regulator

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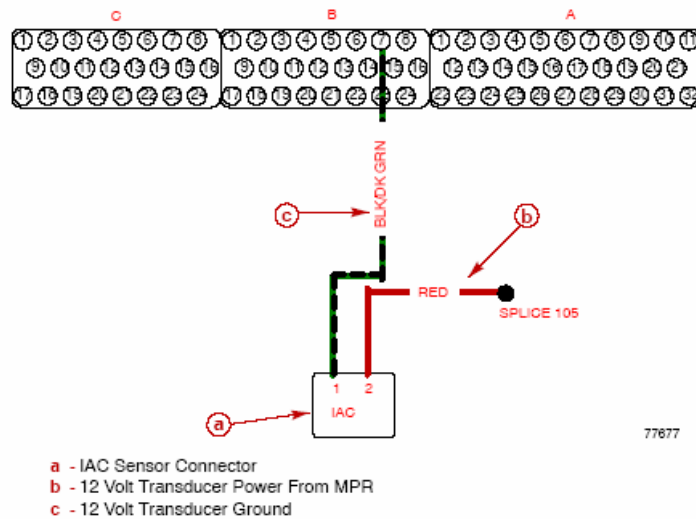
discharge fitting to the fuel cooler.

- (05-06 models) Manufacture a 3/8" ID USGC approved hose from the fuel cooler to the fuel filter inlet #2.

## 12. Wiring Instructions (some wires may need to be pulled from the split loom/electric tape for proper fitment, use extreme caution):

- Locate the main injector connector coming from the throttle body, plug into factory injector connector you unplugged from earlier.
- Locate the TPS extension harness. Connect the factory TPS connector to the female end of the extension harness.
- Plug in male end of TPS extension into new TPS sensor on port side of throttle body.
- Plug in factory IAC connector to IAC motor on starboard side. \*\*2003 models must extend these wires. Locate the supplied green wire and red wire, utilize the 4 salmon colored butt connectors to extend wire. These are heat shrink connectors, carefully apply heat until fully shrunk and sealed.

IAC CIRCUIT



77677

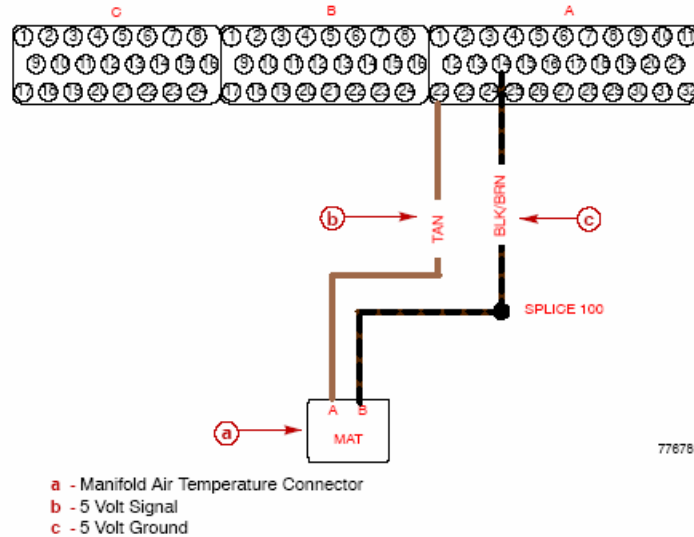
The idle air control (IAC) valve is a 12 volt circuit powered by the MPR. It is located at the top rear of the engine. The normal resistance value for the IAC at 21 degrees C (70 degrees F) is 10.1 ohms.

A malfunction of the IAC will set a fault of IAC Output.

# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

- Install factory connector to Inlet Air Temp sensor on starboard side. \*\*2003 models must install IAT extension harness for proper fitment. Plug in the factory IAT connector into the female end of the extension harness. Plug in male end of extension into IAT sensor.

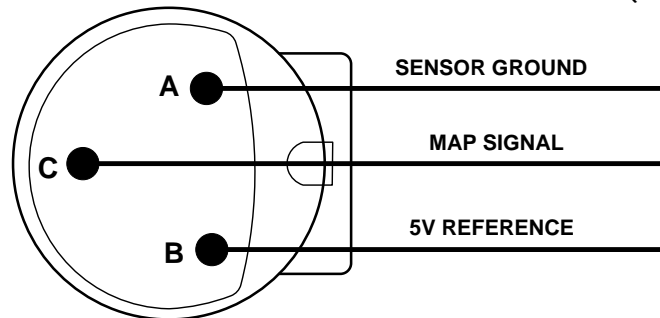
MAT CIRCUIT



The manifold air temperature (MAT) sensor is a thermistor that controls signal voltage to the PCM. It is located at the rear of the engine in the intake manifold plenum. When intake air is cold, the sensor resistance is high. As the air temperature rises, resistance lowers. At normal engine operating temperature, 71-82 degrees C (160-180 degrees F), the voltage will measure about 1.5 to 2.0 volts. The normal resistance value for the MAT sensor at 21 degrees C (70 degrees F) is 3.14 kohms.

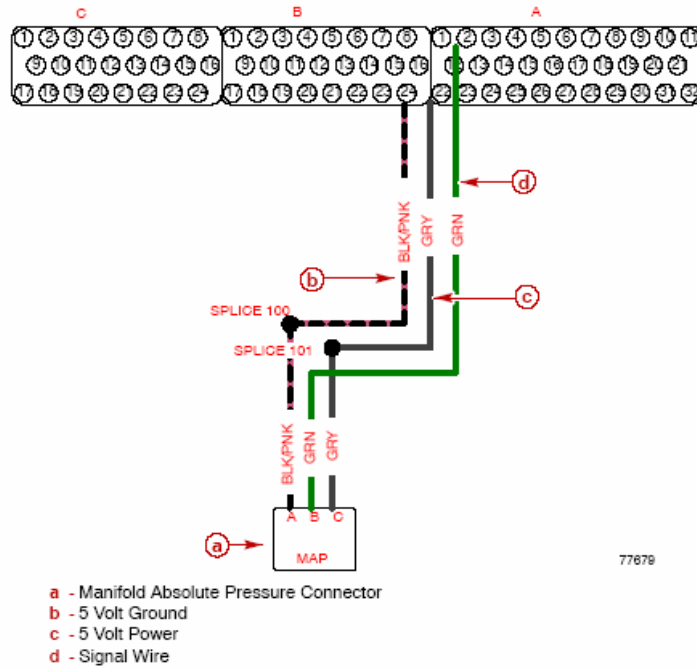
A malfunction in the MAT will set the fault of AIR TMP CKT Hi or AIR TMP CKT Lo.

- Locate the factory map sensor connector, cut the connector off leaving only 1" of wire coming from the connector.
- Connect the supplied 2-bar map connector to factory wires using the supplied salmon colored butt connectors.
  - Gray wire to gray wire (5V reference).
  - Green wire to green wire (signal wire).
  - Black with a red trace wire to black with a red trace wire (sensor ground).



# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

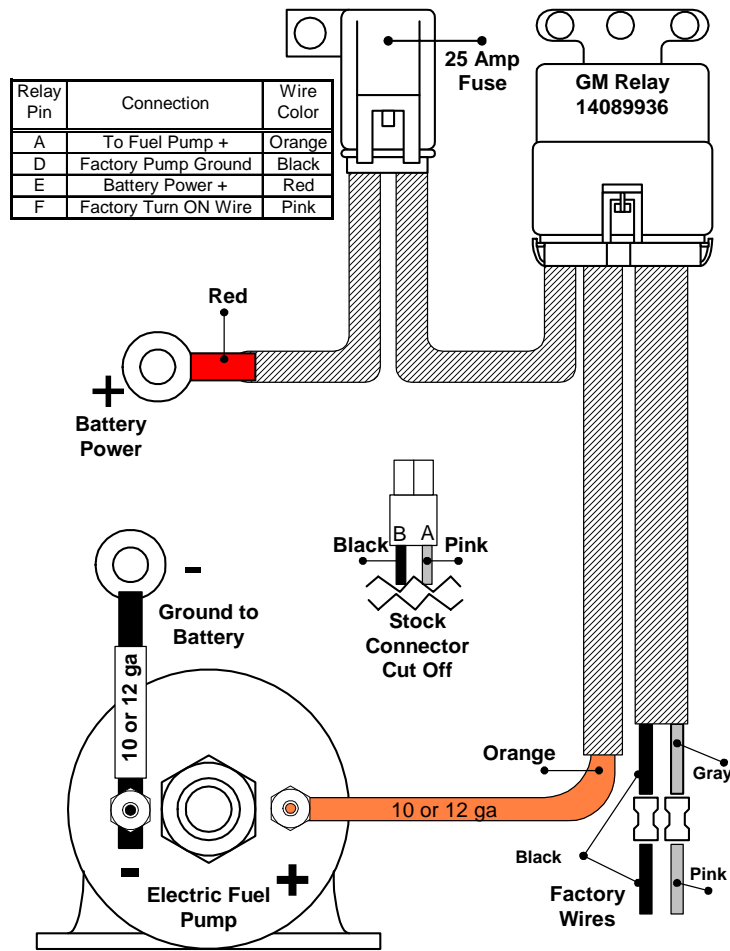
MAP CIRCUIT



Locate the factory electric fuel pump connector. Note that there are two electric fuel pumps on this engine, a primer pump next to the fuel filter, a main pump in the cool fuel box. **Disconnect both stock fuel pump connectors.**



# Whipple Charger Installations Instructions for Mercury Marine 496 Engines



- Cut one of the factory fuel pump connectors off (whichever is closest to new hi-flow pump).
- Connect (see following diagram for reference) as follows:
  - Connect the new fuel pump harness GRAY wire to factory PINK wire.
  - Connect new harness BLACK wire to factory BLACK wire.
  - Mount relay and fuse junction on back of engine or transom.
- Route 12ga. red wire from fuse junction directly to battery POSITIVE +.
- Route 12ga. orange wire to electric fuel pump POSITIVE +.
- Route 12ga black wire, from new fuel pump NEGATIVE – directly to battery NEGATIVE.

13. Locate the 1/2" hose you removed from the factory IAC system originally. Locate the 1/2" barbed fitting in front of intake manifold. Install 1/2" hose on barbed fitting (secure with factory clamp) and route to back of engine. Install supplied 1/2" breather to end of 1/2" hose (secure with factory clamp).

14. Locate the PCV valve installed on the backside of the intake manifold.

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

- Install the 3/8" hose onto the valve. Route towards the port side of throttle body.
- Install 3/8" plastic barb to end of hose, then install rubber 3/8" 90° to plastic barb.
- Install the rubber 90° to 3/8" barb coming from throttle body.

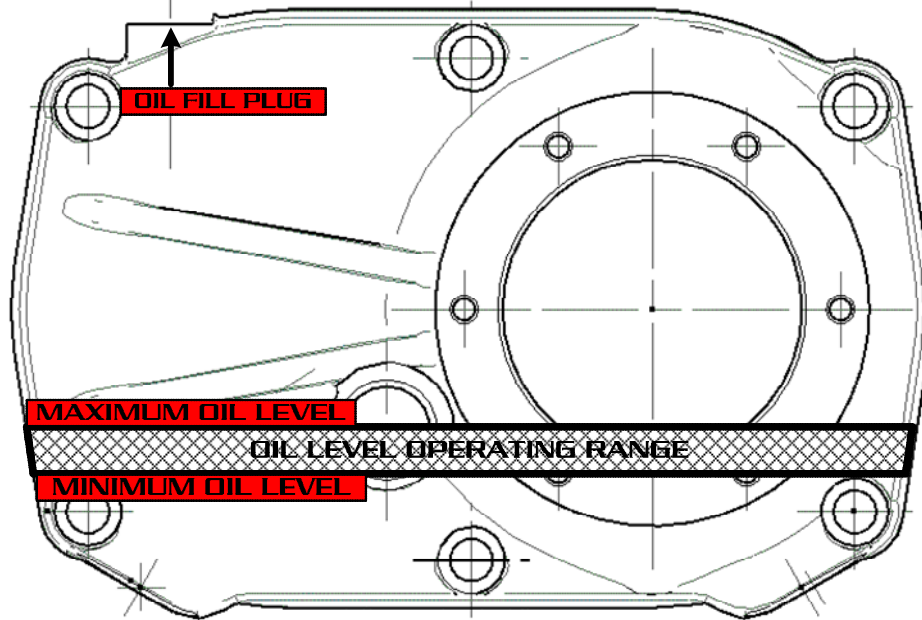


15. Fill supercharger with Whipple SC oil to middle of sight glass. **DO NOT OVERFILL SUPERCHARGER OIL LEVEL. MAX LEVEL IS 5.8 FL OZ. (155cc).**
- Make sure the SC is sitting square/flat.
  - Remove -4AN allen plug and fill SC with **WHIPPLE SC OIL ONLY!!**
  - Fill to the middle of the sight glass. NOTE: The W140AX compressor takes a maximum of 5.8 fl/oz.
  - Reinstall -4AN allen plug.
  - NOTE: After running the SC, the oil level will lower due to oil filling the bearings. The proper level should be between the bottom of the sight glass and the middle.
  - Change SC oil every season or 200 hours, only use **WHIPPLE SC OIL ONLY!!**

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

### WHIPPLE SC OIL LEVEL

Fill to center of oil sight glass. 5.8 fl/oz. or 155cc.  
DO NOT OVERFILL, WILL VOID WARRANTY!!



### **!! CAUTION !!**

**Severe damage to the compressor will occur if you overfill the supercharger front gear case.**

16. Refill engine coolant system by filling in the clear plastic reservoir. Fill to the proper "cold" level. Use only distilled water to top the system off, this will give you a higher mixture of water to coolant for better overall cooling. 2-3 bottles of water additives such as Redline Water Wetter can also be used. Ideal coolant to water mixtures is 50/50 (NOTE: Mercury uses 100% glycol coolant).
17. Install SC belt by releasing the tension from the tensioner and loosening the mounting bolt on the sliding idler.
  - Once belt is on all pulleys, push the sliding idler towards starboard side until you can release the tensioner so that it's pointing at an approx. 5 O'clock position. Notice the stops on the tensioner, it must have play both forward and backwards to work properly.

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

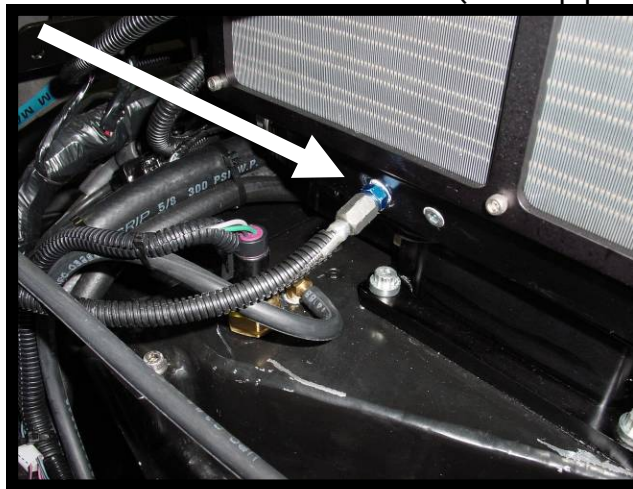


18. Turn battery power on or reconnect electric connection to engine.

**PRIME FUEL PUMP WITH FUEL!! DO NOT RUN THIS PUMP DRY UNDER ANY CIRCUMSTANCES!! THERE ARE NO WARRANTIES FOR PUMPS RAN DRY.**

19. Adjust fuel pressure TEMPORARILY: **DO NOT RUN PUMP DRY!!!!**

- Install quality mechanical fuel pressure gauge (do not use electric gauges to tune) to the 1/8" pipefitting located on the backside of the fuel rail (utilize pipe fitting closest to port side).

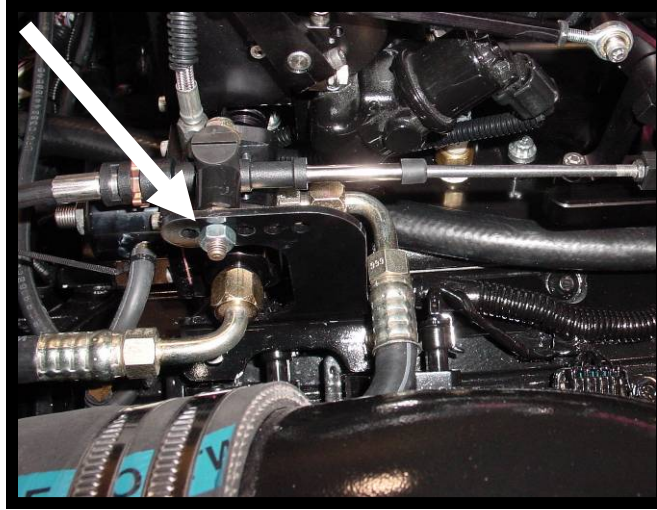


- Prime fuel system so that filter is full of 91-octane gas.
- Turn key "on" and quickly bleed air from fuel line anywhere on pressure side.
- Turn key to on position, look at pressure and adjust close to **43lbs**. **This is temporary to get the engine running.**

20. Throttle linkage installation:

**496 TBI \_8**

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

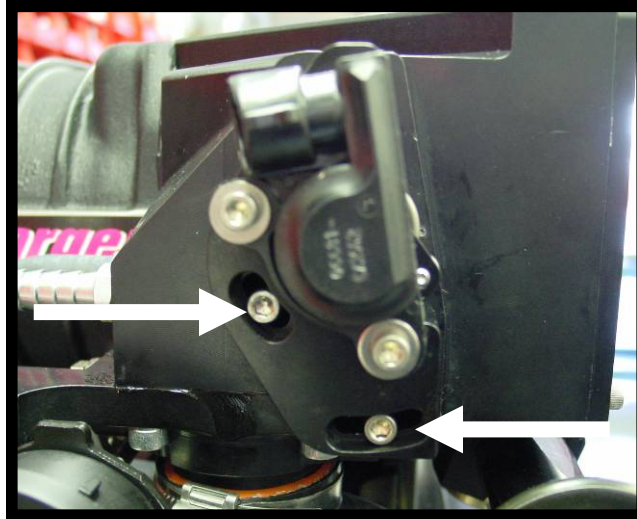


- Install factory throttle linkage anchor bolt into the supplied steel throttle bracket.
- Install factory throttle linkage bolt in bottom hole of throttle arm.
- Adjust linkage so that the linkage barely fits on the linkage bolt, so that the linkage is always being forced to its maximum closing position. You should just be able to get linkage end on, this will always "pre-load" the throttle linkage.
- Some may require a small heim joint adjustment, use extreme caution! Never let the linkage go over center. Lock heim joint nuts before proceeding.
- Tighten all bolts, allens, etc. on throttle assembly.
- Verify that the linkage does not go over center at any time. Should be able to go back and forth 100% without binding.

- On the opposite side of the linkage, locate the TPS sensor. With the key on, the TPS voltage must be between .65 - .68v with the throttle in the closed position. Open and close the

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

linkage 4-5 times and verify that you get a consistent TPS voltage with the throttle closed. To check voltage, use a Mercury scan tool or a 0-5v volt meter. Probe the blue wire at the sensor for your signal. To adjust, loosen the billet-mounting bracket that it's mounted too, loosen allens and twist until desired voltage is achieved.

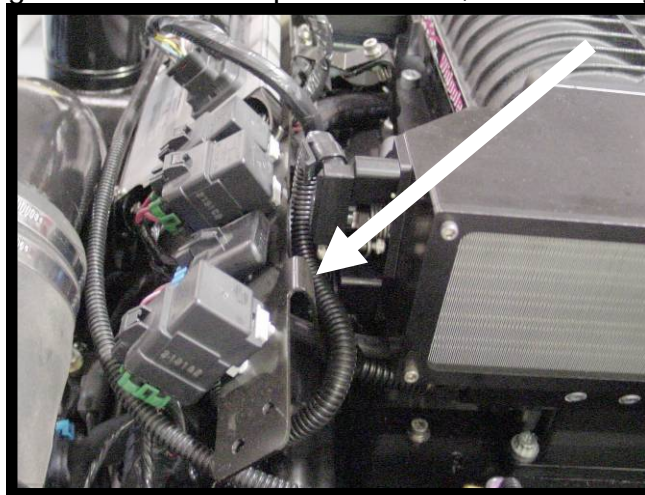


- With key power on, open (100%) and close throttle 4-5 times, with the throttle closed, verify that TPS voltage is the same as what you set earlier. If it's higher, you need to preload the linkage more so it is consistent in closing at the same spot.

21. Verify that the linkage never can go over center, very important!! If it can go over center, you must adjust heim to extend in length so it cannot go over center.

22. Computer bracket installation:

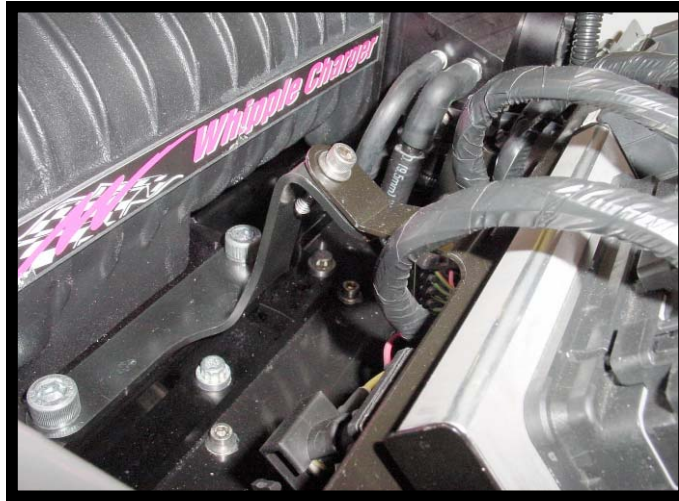
- Reinstall stock computer/relay bracket to exhaust manifold and new support bracket. Locate the last support leg on the stock computer bracket, bend this leg down so it's out of the way.



- Connect front support leg to the Whipple support bracket. Utilize the 1/4" x 3/4" socket head allen bolt, (2) 1/4" washers and 1/4" nut to secure. This may require some bending to fit

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

between supercharger and exhaust manifold.



23. Adjust fuel pressure, VERY IMPORTANT, MOTOR WILL NOT IDLE IF SET INCORRECTLY.

### **YOU MUST USE A HIGH QUALITY, HIGH ACCURACY MECHANICAL FUEL PRESSURE GAUGE ONLY!!!**

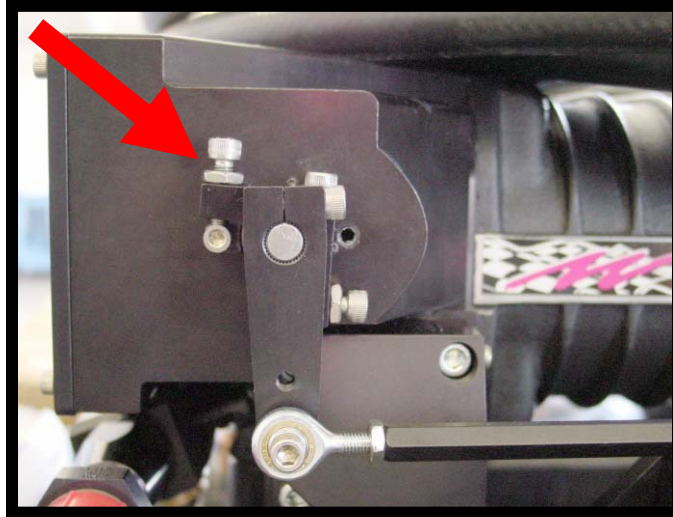
- Turn key on and adjust pressure close to 43 lbs. by turning allen set screw on regulator (clockwise for more pressure, counter clockwise for less).
- Start engine, with **NO** vacuum reference, adjust fuel pressure until you reach exactly 43 lbs. of fuel pressure. Tighten nut on regulator so allen does not vibrate out. **DO NOT USE ELECTRIC FUEL PRESSURE GAUGES OR GAUGES THAT HAVE LARGE GAPS BETWEEN NUMBERS!!**
- Install 1/8" vacuum/boost line onto regulator barbed fitting. Secure lines with zip ties. With motor running in vacuum at an idle, pressure should drop once line is connected. Pressure should be between 47-49psi under WOT/full boost.

### **IDLE SPEED SETTING**

24. Some motors may need an idle adjustment. First, you must understand the ECU has a desired idle speed that the motor is always going to try to achieve. The rpm idle speed should be 650-725 rpm once motor is up in the 120+ range of engine coolant temperature.

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

- As shown in the following **figure**, you must adjust the setscrew to raise or lower the idle speed. Note that this is where the throttle stops in the relaxed or returned position and a large adjustment will require the TPS voltage to be reset.



### **Engines that idle to high:**

- This means either there's a vacuum leak or there is too much air going by the throttle blades. To lower airflow at idle, take the set screw/throttle stop and lower it. This allows the throttle blade to close more when returned. Make small adjustments such as 1/8<sup>th</sup> turns. **NOTE: Don't forget to tighten locking nut after adjustment.**
- If an engine sticks at high idle after a run or after revving engine up, the TPS voltage is too high. In order to fix this, lower the voltage .02-.05v from your original setting.

### **Engines that idle to low:**

- This means there's not enough air being fed to engine. To increase airflow at idle, take the set screw/throttle stop and turn it clockwise. Make small adjustments such as 1/8<sup>th</sup> turns. **NOTE: Don't forget to tighten locking nut after adjustment.**
- Rev engine up past 2500 rpm and bring back at a rapid rate. The motor should not die, it should come back to the desired idle speed within 1-5 seconds. If it dies, then it needs more air so follow instructions for engines that idle too low.

### **Motors that idle high only after revving the engine or there are no more adjustments to be made:**

- This means the TPS voltage is slightly off and that it does not return to its "Closed Loop Idle System," or the throttle is not returning to it's closed position (check to make sure it's preloaded). TPS voltage must be between .65-.70v with the throttle in the closed position.

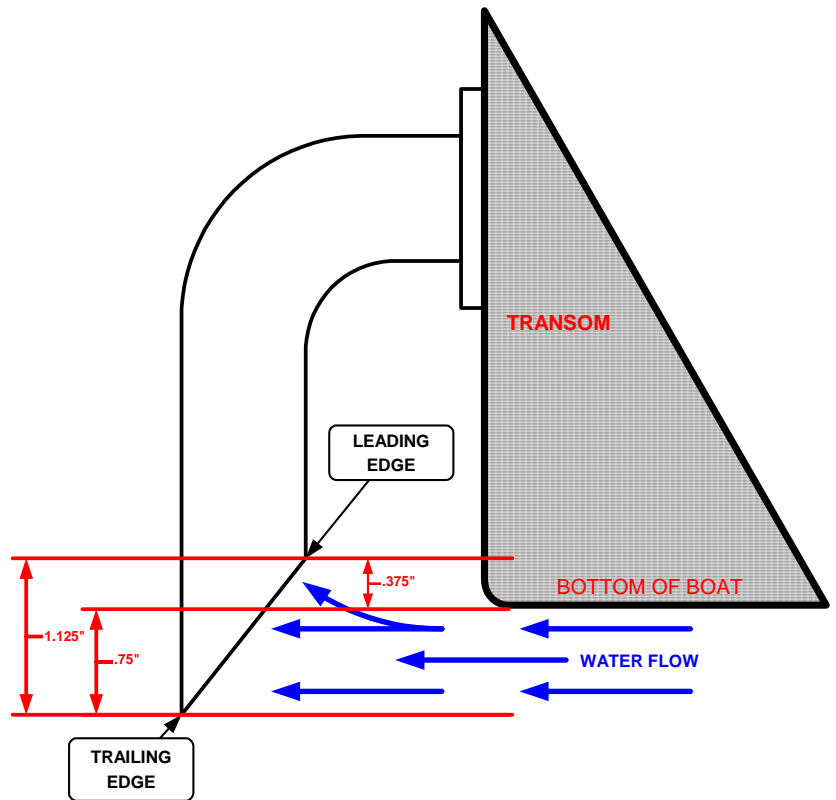


## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

**MOTORS THAT START UP INCREDIBLY RICH MEANS YOU HAVE NOT SET THE TPS (THROTTLE POSITION SENSOR) VOLTAGE, FOLLOW INSTRUCTIONS TO PROPERLY ADJUST.**

### **IF YOU ARE INSTALLING THE -10 INTERCOOLER PICKUP, FOLLOW THESE INSTRUCTIONS.**

- Find a clear location on the transom for the water pickup. Ideally you want to not want to disturb the water in front of the propeller.
- Drill a hole through the transom to mount pickup.
- Mark pickup and cut so that you have a minimum of 1/2" on the trailing edge. Maximum is 1" which is typically too much drag. 3/4" is ideal for most boats. Make sure that the leading edge is higher than the bottom of the boat, otherwise the lip will drag and will not help scoop water. Typically this is a 45° to 60° angled cut.
- Mount with stainless wood screws (not included).
- Route 5/8" line to pickup, install brass push lock -10 fitting onto hose end and install push lock fitting to scoop.



## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

# CRITICAL!!!

## LAKE TEST

### POST-INSTALLATION CHECKLIST

After installing the Whipple supercharger kit it is imperative that the following checklist be performed. Failure to perform these simple tests may result in severe engine damage.

1. Make sure 91 octane or higher is in the vessel. If unsure, then drain the tank completely empty and fill with 91 or higher.
2. Fuel pressure is the most critical parameter and must be checked during wide-open throttle operation. Install a quality fuel pressure gauge to the extra port located closest to the port side of Whipple SC fuel rail (1/8" pipe). Attach the fuel pressure gauge with a long enough hose so that it may be visible during operation. Under WOT, full boost, max rpm, the fuel pressure should be 48 lbs (+/- 1lbs). This procedure takes two people, one to drive and the other to observe the gauge. Perform the test in a safe area. If it does not maintain fuel pressure, you must find the restriction, as this results in a lean air to fuel condition and can cause severe engine damage.

## MAINTENANCE AND SERVICE

**It is recommended that the following items be checked at normal service intervals**

1. Check supercharger oil every 10-15 hours of operation.
2. Change supercharger oil every 50 hours or every season, whichever comes first.
3. Check the supercharger/accessory drive belt. Adjust or replace as required.
4. Inspect and replace fuel filter every 50 hours.

# DO NOT!!!

1. Never run octane less than 91, higher octane will only increase reliability and durability.
2. Do not use octane booster, these are very hard on the spark plugs and only increase a few points. Example: 87 octane with octane booster, may raise a few "points" to 87.5, which is not acceptable.
3. Do not hook the new fuel pump power or ground to the trim pump or trim tabs! It will lose voltage when the trim pump is used and the motor will run lean.
4. Never operate engine if overheating.
5. Never operate engine in boost if water temp exceeds 165.
6. Do not operate engine in boost if water pressure has fallen below standard levels.
7. Do not operate engine in boost if fuel pressure falls below standard levels.
8. Do not tee the vacuum/boost line feeding the fuel pressure regulator, use the other pipe holes located in the manifold.
9. Do not design your own fuel system, the system is designed for use and installation as we specify.
10. Do not design your own water system, this system has been designed and tested to work according to our specifications.
11. Only run spark plugs that are specified by Whipple Superchargers.

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

TROUBLE SHOOTING 496 MAG & MAG HO ENGINES											
<b>Symptom</b>	<b>Solution</b>										
1 Lack of engine performance. Engine not pulling the same rpm as last season.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">1</td> <td style="padding: 2px;">Check TPS voltage. Should be between .65-.70v with throttle closed.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">2</td> <td style="padding: 2px;">Verify that Map sensor connector is making proper connection and that no wires cross at any time.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">3</td> <td style="padding: 2px;">Verify that the ECT is plugged in and is making proper contact.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">4</td> <td style="padding: 2px;">Check fuel pressure at the fuel rail with accurate MECHANICAL gauge. Should be 38 - 40psi @ idle.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">5</td> <td style="padding: 2px;">Install Mercury scan tool and perform code check.</td> </tr> </table>	1	Check TPS voltage. Should be between .65-.70v with throttle closed.	2	Verify that Map sensor connector is making proper connection and that no wires cross at any time.	3	Verify that the ECT is plugged in and is making proper contact.	4	Check fuel pressure at the fuel rail with accurate MECHANICAL gauge. Should be 38 - 40psi @ idle.	5	Install Mercury scan tool and perform code check.
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2 Engine will not idle. Dies when going into gear. Hard starting. Idles below 600rpm.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">1</td> <td style="padding: 2px;">Open throttle blade to allow more air to enter the engine. There is a screw that is used as a throttle stop when throttle is closed, loosen nut and adjust open.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">2</td> <td style="padding: 2px;">If the system has been installed for a while, check that the idle air control motor filter is not plugged. Located below the IAC motor.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">3</td> <td style="padding: 2px;">Perform spark plug check, replace if worn or fouled.</td> </tr> </table>	1	Open throttle blade to allow more air to enter the engine. There is a screw that is used as a throttle stop when throttle is closed, loosen nut and adjust open.	2	If the system has been installed for a while, check that the idle air control motor filter is not plugged. Located below the IAC motor.	3	Perform spark plug check, replace if worn or fouled.				
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3 Engine idles too high. Will not come down to idle rpm.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">1</td> <td style="padding: 2px;">Adjust throttle blade stop so that the blade closes more at its closed position.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">2</td> <td style="padding: 2px;">Check TPS voltage. Should be between .65-.70v with throttle closed.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">3</td> <td style="padding: 2px;">Verify that the linkage is closing all the way, some linkages may bind and not push the throttle body closed completely.</td> </tr> </table>	1	Adjust throttle blade stop so that the blade closes more at its closed position.	2	Check TPS voltage. Should be between .65-.70v with throttle closed.	3	Verify that the linkage is closing all the way, some linkages may bind and not push the throttle body closed completely.				
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4 Lack of engine performance. Engine not pulling the same rpm as last season.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">1</td> <td style="padding: 2px;">Check boost level, standard boost levels are between 5-6lbs at WOT.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">2</td> <td style="padding: 2px;">Perform spark plug check, replace if worn or fouled.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">3</td> <td style="padding: 2px;">Verify that engine water block pressure is above 25lbs at WOT. Engine coolant temp should not exceed 160 if water flow is adequate.</td> </tr> <tr> <td style="width: 20px; text-align: center; vertical-align: top;">4</td> <td style="padding: 2px;">Check octane level, must be minimum of 91 octane.</td> </tr> </table>	1	Check boost level, standard boost levels are between 5-6lbs at WOT.	2	Perform spark plug check, replace if worn or fouled.	3	Verify that engine water block pressure is above 25lbs at WOT. Engine coolant temp should not exceed 160 if water flow is adequate.	4	Check octane level, must be minimum of 91 octane.		
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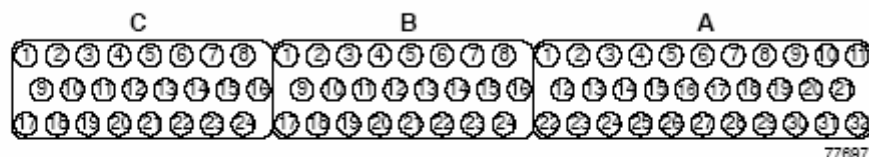
# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

## Wire Splice Description

Splice Number	Description
100	5 Volt Transducer Ground
101	5 Volt Transducer Power For Sensors
102	Fused 20 AMP 12 Volt Power, Key ON Only
103	Continuous 12 Volt Battery Power
104	Battery Ground
105	Main Power Relay, Key ON Only
106	Coil Return
107	Fused 12 Volt Power to the PCM
108	Fused 12 Volt Power to the Fuel Pump Relay and the Injectors
110	Continuous 12 Volt Battery Power to the Main Power Relay
111	Fused 12 Volt Power to the Fuel Pumps

## PCM 555 Pinout

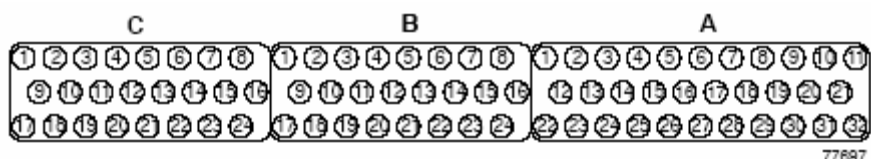
This is a quick reference guide to the pins of the PCM. It can be used to verify broken pins and what they control and to help in checking wire continuity for suspect sensors.



### Connector A

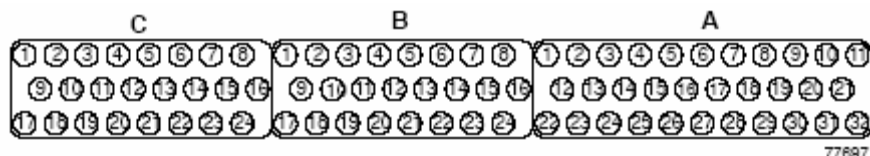
- 1 - Key-on Power
- 2 - Empty
- 3 - Map Sensor Connector Pin B
- 4 - Oil Pressure Sensor Connector Pin C
- 5 - Pitot Pressure Smart Transom Connector Pin D
- 6 - Throttle Position Sensor Connector Pin C
- 7 - Empty
- 8 - Trim Position Smart Transom Connector Pin C
- 9 - Starboard Tab Position Tab Connector Pin A
- 10 - Port Tab Position Tab Connector Pin B
- 11 - CAN Line Pos (+) Connector Pin J
- 12 - Steering Position Smart Transom Connector Pin E
- 13 - Seawater Temperature Paddle Wheel Connector Pin D
- 14 - MAT Sensor Connector Pin B
- 15 - Coolant Temperature Sensor Connector Pin B
- 16 - Port Exhaust Water Temperature Connector Pin B
- 17 - Starboard Exhaust Temperature Connector Pin B
- 18 - Data Link Connector Pin C
- 19 - Port Knock Sensor Connector Pin B
- 20 - Starboard Knock Sensor Connector Pin B
- 21 - CAN Line Neg (-) Connector Pin K
- 22 - Splice 100
- 23 - Splice 101
- 24 - Seapump Pressure Connector Pin C
- 25 - Fuel Level Connector Pin C
- 26 - Fuel Level Connector Pin B
- 27 - Empty
- 28 - Data Link Connector Pin B
- 29 - Port Knock Sensor Connector Pin A
- 30 - Starboard Knock Connector Pin B
- 31 - CAN2 Line Pos (+) Connector Pin G
- 32 - CAN2 Line Neg (-) Connector Pin H

# Whipple Charger Installations Instructions for Mercury Marine 496 Engines



## Connector B

- 1 - Splice 106 Coil Return
- 2 - Port Coil 1 Connector Pin G
- 3 - Paddle Wheel Connector Pin C
- 4 - Main Power Relay Pin 85
- 5 - Empty
- 6 - CAM Sensor Connector Pin C
- 7 - IAC Connector Pin 1
- 8 - Transmission Temperature Ground
- 9 - Port Coil 5 Connector Pin C
- 10 - Port Coil 3 Connector Pin F
- 11 - Fuel Pump Relay Pin 85
- 12 - Tachometer
- 13 - Empty
- 14 - Crankshaft Position Sensor Connector Pin C
- 15 - Charging Harness Connector Pin F
- 16 - Drive Lube Monitor Or Transmission Oil Temperature Switch
- 17 - Splice 107
- 18 - Splice 107
- 19 - Empty
- 20 - Fuel Injector 4 Connector Pin B
- 21 - Charging Harness Connector Pin D
- 22 - Fuel Injector 3 Connector Pin A
- 23 - CAN Line Connector Pin E
- 24 - Empty

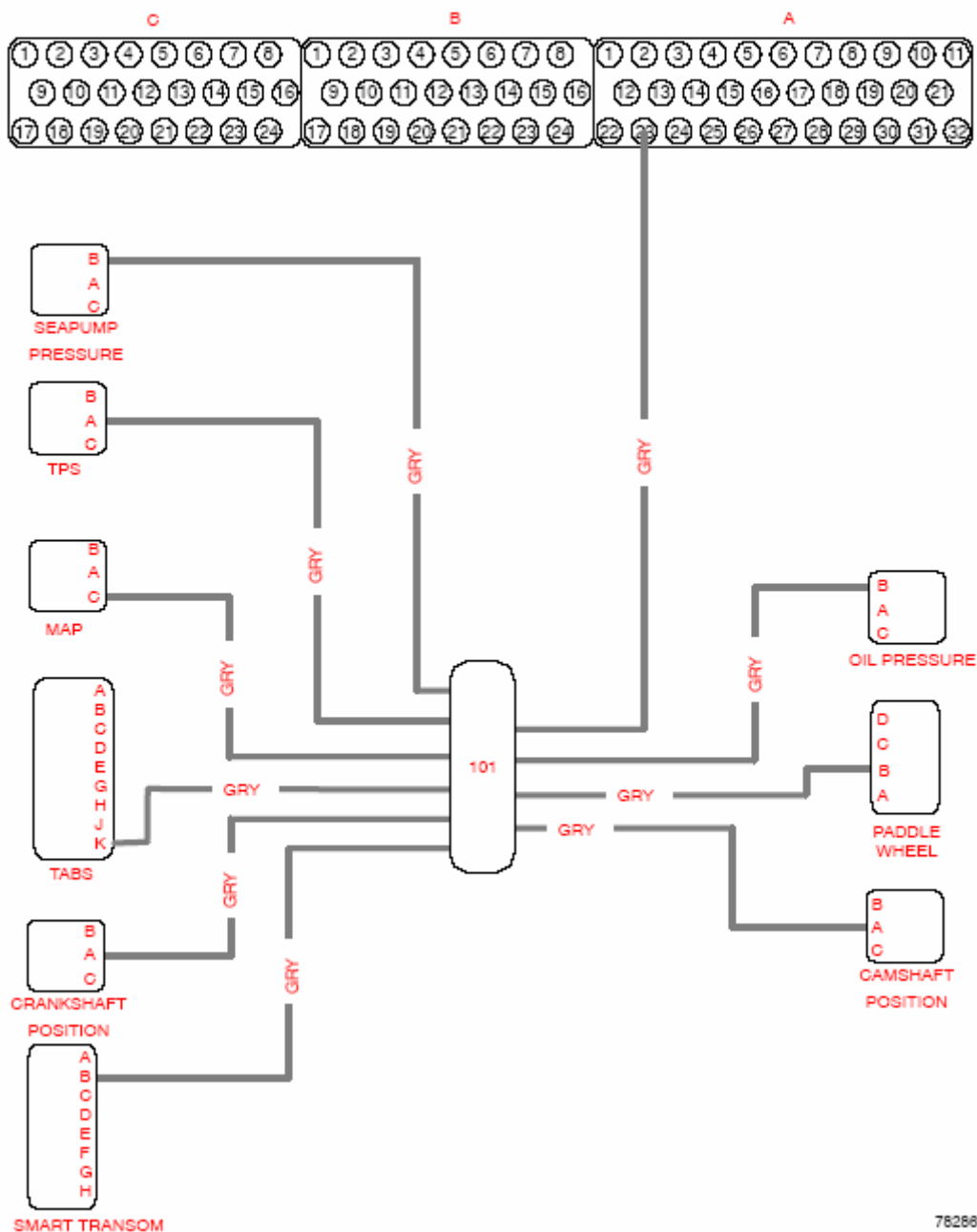


## Connector C

- 1 - Port TAB Up Solenoid Connector Pin G
- 2 - Empty
- 3 - Fuel Injector 8 Connector Pin E
- 4 - Empty
- 5 - Fuel Injector 7 Connector Pin G
- 6 - Fuel Injector 1 Connector Pin H
- 7 - Starboard Coil 4 Connector Pin C
- 8 - Starboard Coil 2 Connector Pin B
- 9 - Starboard TAB Up Solenoid Connector Pin C
- 10 - Starboard TAB Down Solenoid Connector Pin D
- 11 - Fuel Injector 2 Connector Pin F
- 12 - Starboard Coil 6 Connector Pin F
- 13 - Port Coil 7 Connector Pin B
- 14 - Starboard Coil 8 Connector Pin G
- 15 - Splice 104
- 16 - Splice 104
- 17 - Empty
- 18 - Empty
- 19 - Port TAB Down Solenoid Connector Pin H
- 20 - Smart Transom Connector Pin G
- 21 - Fuel Injector 6 Connector Pin D
- 22 - Trim Up Relay Pin 85
- 23 - Fuel Injector 5 Connector Pin C
- 24 - Splice 104

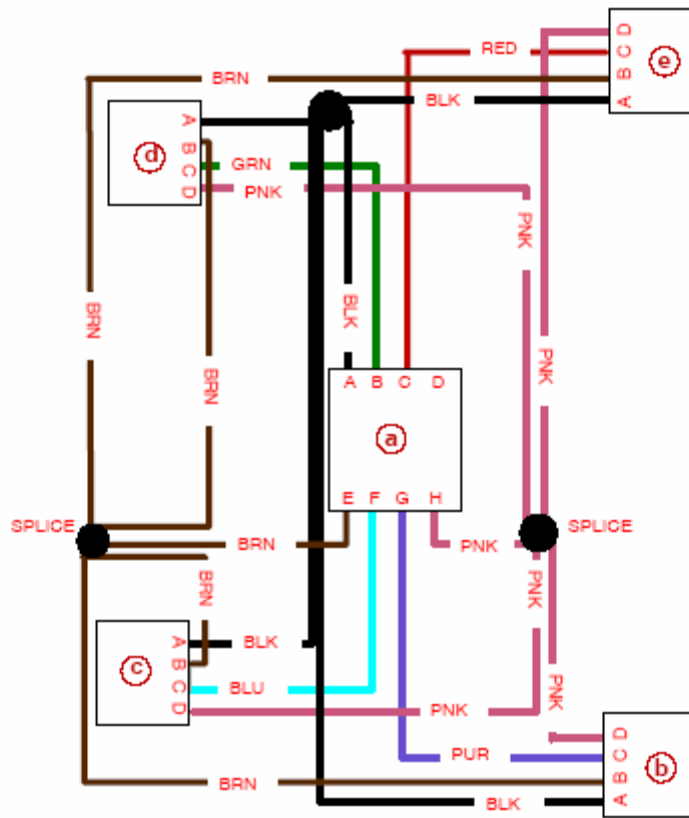
# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

## 5 VOLT SENSOR CIRCUIT



# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

## COIL HARNESS CIRCUIT



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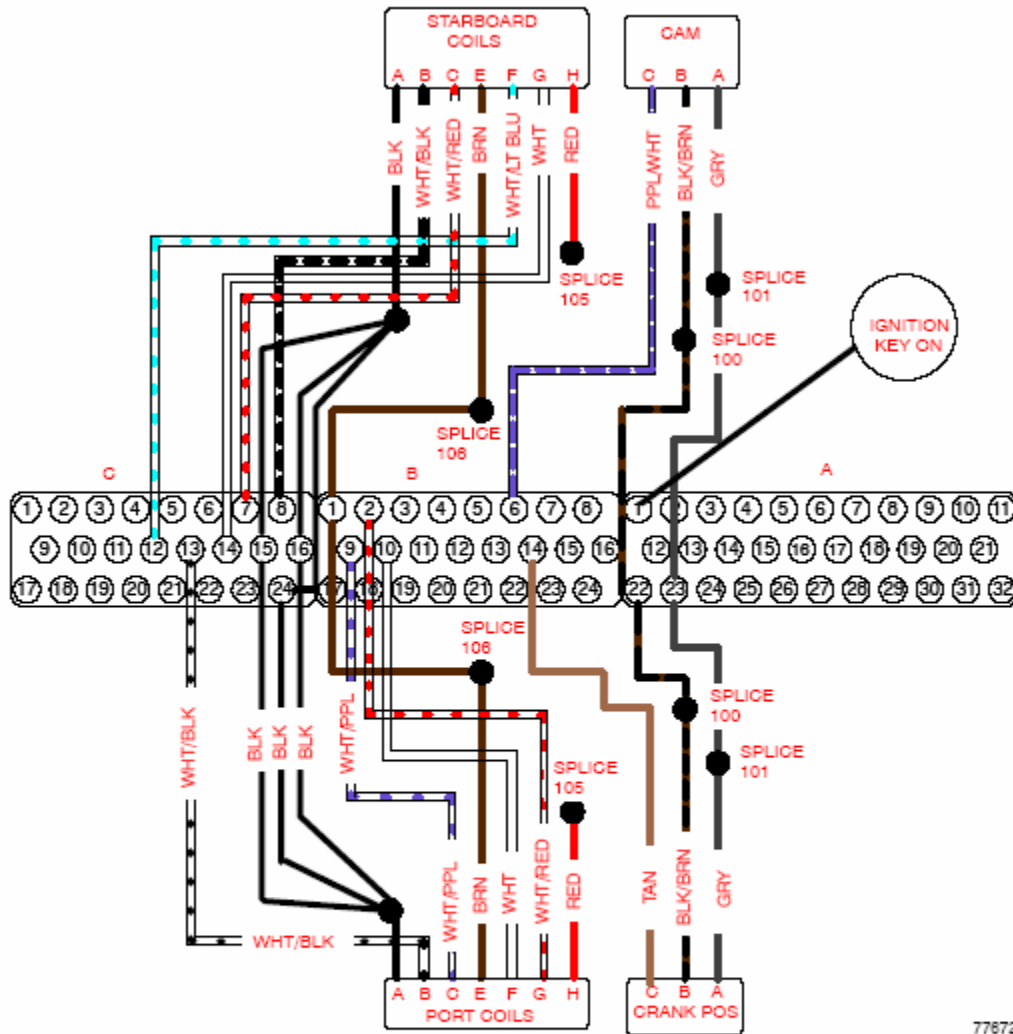
- a - Coil Harness To Engine Harness Connector
- b - 1 And 8 Coil Connector
- c - 3 And 6 Coil Connector
- d - 5 And 4 Coil Connector
- e - 7 And 2 Coil Connector

There are 2 coil harnesses on the engine, one for each side of the engine. The harnesses are wired identically. The signal wire color for coils 1 and 8 is BLU, coils 3 and 6 is PUR, 5 and 4 wire is GRN, and 7 and 2 is RED. The PNK wire is 12 volt power, the BRN wire is 5 volt power and the BLK wire is ground. If a possible problem is suspected in the ignition system, check for faults once with key ON and once with engine running. An EST Open will only register a fault in a key ON only state and an EST Short will only register with the engine operating.

A malfunction in the coil harness will set the fault of EST 1-8 Open or EST 1-8 Short.

# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

## IGNITION CIRCUIT



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With initial key ON, 12 volt power is sent from the battery through the purple lead in the 10-pin harness to the pink lead at Engine Harness Pin C. This is wake up power to the PCM. The PCM powers pin B4 which in turn pulls the MPR low. The MPR powers the coils through Splice 105 and powers the engine for ignition.

PCM Pinout	Cylinder	PCM Pinout	Cylinder	PCM Pinout	Cylinder
B2	1	C8	2	B9	5
C7	4	C13	7	C14	8
B10	3	C12	6		

CV



# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

## Warning System

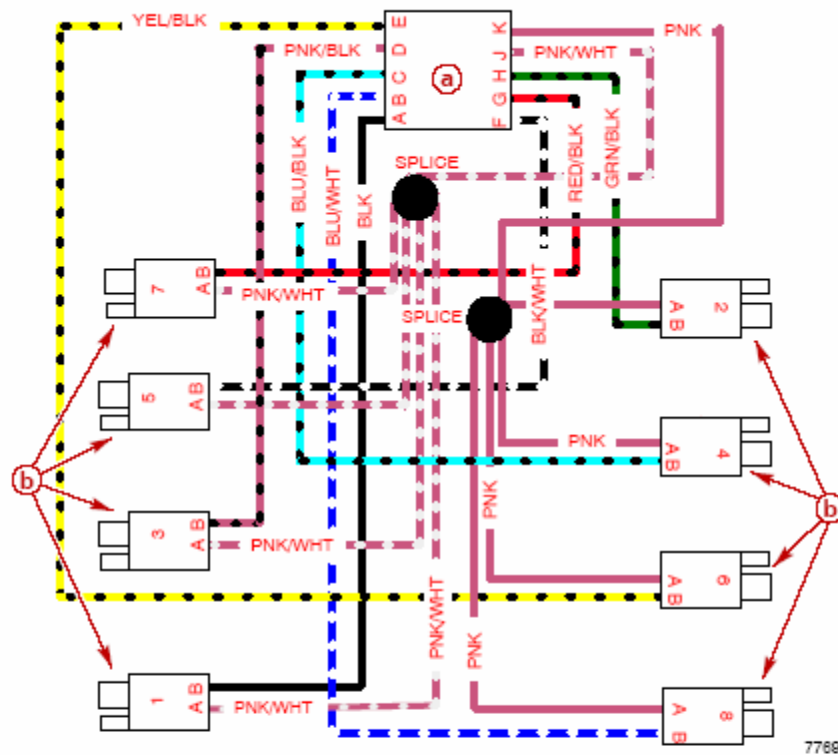
The engine warning system incorporates an audio alarm and, if installed, a SC1000 System Monitor. When the key switch is turned to the ON position, the audio alarm will momentarily activate to test the warning system. The alarm should sound once if the system is operable. This table is a quick guide, showing what warning output will accompany a fault.

Fault	SC1000	Audio Alarm	Available Power	Description
Cam Sensor	Yes	2 Bp/min	90%	Open or short, engine must be cranking to set this fault code.
ECT CKT HI	Yes	2 Bp/min	90%	Open
ECT CKT LO	Yes	2 Bp/min	90%	Short
ECT Coolant Overheat	Yes	Constant	6-100 %	Engine guardian overheat condition
EST 1-8 Open	Yes	2 Bp/min	NA	Coil harness wire open
EST 1-8 Short	Yes	2 Bp/min	NA	Coil harness wire short
Fuel Injector 1-8 Open	Yes	2 Bp/min	NA	Fuel injector wire open
Fuel Injector 1-8 Short	Yes	2 Bp/min	NA	Fuel injector wire short
IAC Output	Yes	2 Bp/min	90%	Only with rpm
Knock Sensor 1	Yes	2 Bp/min	90%	Alarm sounds for 20 seconds in NEUTRAL and indefinitely in gear.
Knock Sensor 2	Yes	2 Bp/min	90%	Alarm sounds for 20 seconds in NEUTRAL and indefinitely in gear.
Low Drive Lube Strategy	Yes	Steady Bp	0-100%	Low oil in sterndrive
Low Oil Pressure Strategy	Yes	Constant	0-100%	Low oil pressure strategy
MAP Sensor 1 Input High	No	2 Bp/min	90%	Short, no visual on SC1000
MAP Sensor 1 Input Low	No	2 Bp/min	90%	Open, no visual on SC1000
MAT Sensor	Yes	2 Bp/min	90%	Open or short in MAT circuit

*NOTE: If any 5v sensor becomes shorted to ground the engine will not start. If the engine is operating when the short occurs the engine may stop operating and will not start.*

# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

## FUEL INJECTOR HARNESS



- a - Injector Harness To Engine Harness Connector
- b - Individual Injector Connectors

The fuel injectors receive fused 12 volt power from Splice 108 (Pins J and K) on the injector harness. The PCM signals the injector to fire by pulling the 12 volts to ground and completing the circuit. The normal resistance at 21 degrees C (70 degrees F) is 12.5 ohms.

A malfunction in the fuel injector harness will set the fault of FINJ 1-8 Open or FINJ 1-8 Short.

When the fuel injector driver wire is shorted to ground, the scan tool will read Open Sensor, this means that the fuel injector is full Open.

When the fuel injector is shorted, the scan tool will read Short Injector.

A shorted 12 volt fuel injector power lead will blow the injector fuse E-F; the scan tool will read Bad Fuel Pump Fuse.

## Whipple Charger Installations Instructions for Mercury Marine 496 Engines

Fault	SC1000	Audio Alarm	Available Power	Description
Oil PSI CKT Hi	Yes	2 Bp/min	90%	Short, defaults to 51.7 psi
Oil PSI CKT Lo	Yes	2 Bp/min	90%	Open, zero oil pressure
Overspeed	Yes	Constant	RPM Limit	Engine over rpm limit
Port EMCT CKT Hi	Yes	2 Bp/min	90%	Open, defaults to 32 degrees F (0 degree C)
Port EMCT CKT Lo	Yes	2 Bp/min	90%	Short, defaults to 32 degrees F (0 degree C)
Port EMCT CKT Overheat	Yes	Constant	6-100%	Overheat condition, 212 degrees F (100 degrees C) limit
Sea Pump PSI Lo	Yes	Constant	6-100%	Low water pressure strategy, defaults to 43.4 psi
Sea Pump CKT Hi	Yes	2 Bp/min	90%	Open
Sea Pump CKT Lo	Yes	2 Bp/min	90%	Short
STB EMCT CKT Hi	Yes	2 Bp/min	90%	Open, defaults to 32 degrees F (0 degrees C)
STB EMCT CKT Lo	Yes	2 Bp/min	90%	Short, defaults to 32 degrees F (0 degrees C)
STB EMCT CKT Overheat	Yes	Constant	6-100%	Overheat condition, 212 degrees (100 degrees C) limit
Steer CKT Hi	Yes	No	No	Open and short
TPS1 CKT Hi	Yes	2 Bp/min	90%	Short, signal to 5v+, engine will not start. Refer to data monitor screen.
TPS1 CKT Lo	Yes	2 Bp/min	90%	Open
TPS 1 Range Hi	Yes	2 Bp/min	90%	Above 4.8v, 994 counts
TPS 1 Range Lo	Yes	2 Bp/min	90%	Below 0.5v, 35 counts
Trim CKT Hi	Yes	No	No	Short, high range, visual warning on SC1000 only.
Trim CKT Lo	Yes	No	No	Open, low range, visual warning on SC1000 only.
5 VDC PWR Low	Yes	2 Bp/min	varies	Short any 5v+ to ground

**NOTE:** If any 5v sensor becomes shorted to ground the engine will not start. If the engine is operating when the short occurs the engine may stop operating and will not start.

# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

## Reference Charts

8.1 LITER/496 CID RESISTANCE READINGS AT 70 DEGREES F (21 DEGREES C)

Sensor	Pinout	Value
SEA PUMP, OIL, PITOT PRESSURE	A-B	31.5 kohms
	A-C	42.9 kohms
MAT	A-B	3.14 ohms
ECT	A-B	3.12 kohms
EMCT	A-B	11.01 kohms
MAP	A-B	9.33 kohms
	A-C	3.89 ohms
	B-C	5.44 kohms
CAMSHAFT SENSOR	A-B	24.04 mohms
	B-C	24.5 mohms
CRANKSHAFT SENSOR	A-B	23.30 mohms
	B-C	23.21 mohms
IAC	1-2	10.1 ohms
FUEL INJECTOR	A-B	12 ohms
TRIM SENDER set to index mark	A-B	0.614 mohms

All values have a range of +/- 2 percent.

# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

## PCM 555/ECM 555 DDT/Rinda 8.1 liter (496 cid)/GM EFI SCAN TOOL SHEET

Dealer #		Seawater Temperature	
Engine S/N		Ambient Air Temperature	
Engine Type		Engine Run Time	
PCM Part #		Altitude	
Exhaust		Propeller Pitch	
Drive Type And Ratio		Propeller Type	Stainless Steel      Aluminum

Idle / Closed Throttle / Neutral					
Engine Conditions	Metric	SAE	Engine Conditions	Metric	SAE
RPM			BARO (pressure)	kpa	psi
BATTERY VOLTAGE	volts	volts	STB EMCT	C	F
PWR 1 VOLTS	volts	volts	PORT EMCT	C	F
MAP (pressure)	kpa	psi	OIL (pressure)	kpa	psi
FUEL LEVEL			ECT	C	F
AVAILABLE POWER	%	%	SEAPUMP PRESSURE	kpa	psi
TRIM			TPS 1 VOLTS	volts	volts
PITOT			TPS	%	%
PADDLE WHEEL			MAT	C	F
LAKE/SEA TEMP	C	F	FPG TOTAL	mg	oz
IAC PWM	%	%	FUEL PRESSURE	kpa	psi
SPARK ANG BTDC					
NOTES					

# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

Idle / Closed Throttle / In Gear					
Engine Conditions	Metric	SAE	Engine Conditions	Metric	SAE
RPM			BARO (pressure)	kpa	psi
BATTERY VOLTAGE	volts	volts	STB EMCT	C	F
PWR 1 VOLTS	volts	volts	PORT EMCT	C	F
MAP (pressure)	kpa	psi	OIL (pressure)	kpa	psi
FUEL LEVEL			ECT	C	F
AVAILABLE POWER	%	%	SEAPUMP PRESSURE	kpa	psi
TRIM			TPS 1 VOLTS	volts	volts
PITOT			TPS	%	%
PADDLE WHEEL			MAT	C	F
LAKE/SEA TEMP	C	F	FPC TOTAL	mg	oz
IAC PWM	%	%	FUEL PRESSURE	kpa	psi
SPARK ANG BTDC					
NOTES					

In Gear 2000 rpm					
Engine Conditions	Metric	SAE	Engine Conditions	Metric	SAE
RPM			BARO PSI	kpa	psi
Battery Voltage	volts	volts	STB EMCT	C	F
PWR 1 Volts	volts	volts	PORT EMCT	C	F
MAP PSI	kpa	psi	OIL PSI	kpa	psi
FUEL LEVEL			ECT	C	F
AVAILABLE POWER	%	%	SEA/PUMP PRESSURE	kpa	psi
TRIM			TPS 1 VOLTS	volts	volts
PITOT			TPS %	%	%
PADDLE WHEEL			MAT	C	F
LAKE/SEA TEMP	C	F	FPC TOTAL OZ.	mg	oz
IAC PWM	%	%	FUEL PRESSURE	kpa	psi
SPARK ANG BTDC					
NOTES					

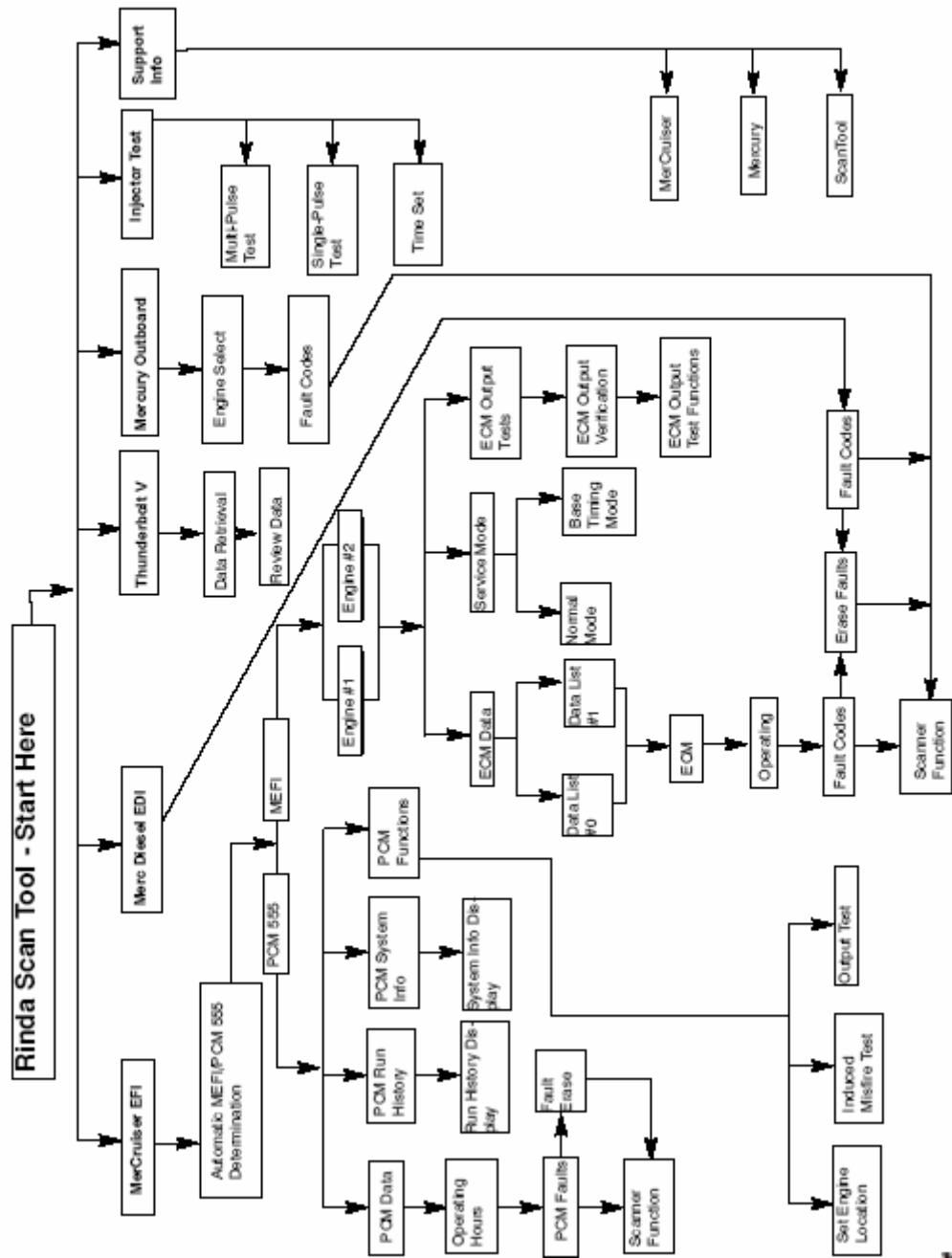
# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

In Gear 3000 rpm					
Engine Conditions	Metric	SAE	Engine Conditions	Metric	SAE
RPM			BARO PSI	kpa	psi
Battery Voltage	volts	volts	STB EMCT	C	F
PWR 1 Volts	volts	volts	PORT EMCT	C	F
MAP PSI	kpa	psi	OIL PSI	kpa	psi
FUEL LEVEL			ECT	C	F
AVAILABLE POWER %	%	%	SEA/PUMP PRESSURE	kpa	psi
TRIM			TPS 1 VOLTS	volts	volts
PITOT			TPS %	%	%
PADDLE WHEEL			MAT	C	F
LAKE/SEA TEMP.	C	F	FPC TOTAL OZ.	mg	oz
IAC PWM %	%	%	FUEL PRESSURE	kpa	psi
SPARK ANG BTDC					
NOTES					

WOT/In Gear/Trim									
Engine Conditions	Metric	Scale	SAE	Scale	Engine Conditions	Metric	Scale	SAE	Scale
RPM					BARO PSI		kpa		psi
Battery Voltage		volts		volts	STB EMCT		C		F
PWR 1 Volts		volts		volts	PORT EMCT		C		F
MAP PSI		kpa		psi	OIL PSI		kpa		psi
FUEL LEVEL					ECT		C		F
AVAILABLE POWER %		%		%	SEA/PUMP PRESSURE		kpa		psi
TRIM					TPS 1 VOLTS		volts		volts
PITOT					TPS %		%		%
PADDLE WHEEL					MAT		C		F
LAKE/SEA TEMP.		C		F	FPC TOTAL OZ.		mg		oz
IAC PWM %		%		%	FUEL PRESSURE		kpa		psi
SPARK ANG BTDC									
NOTES									

# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

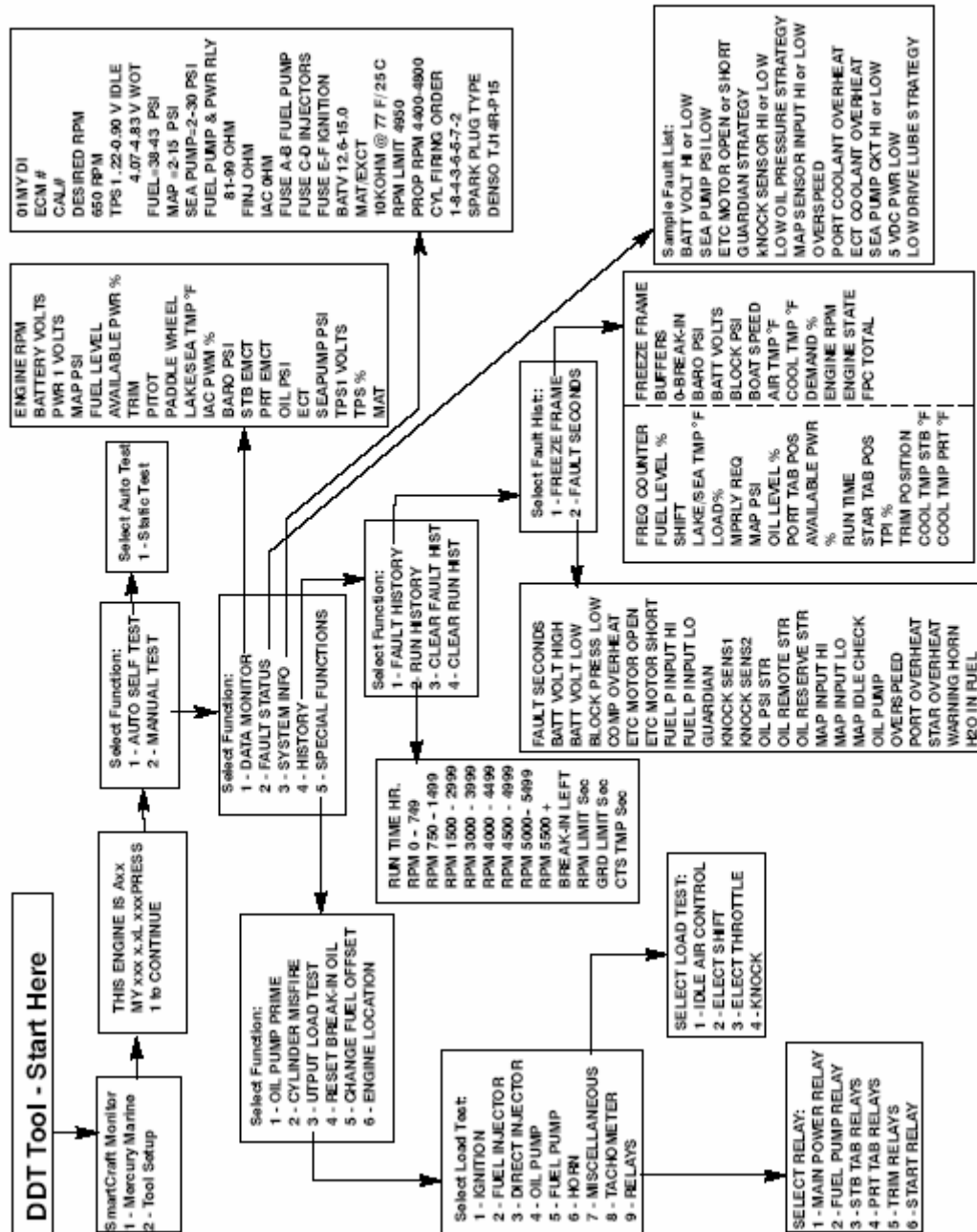
## Mercury MerCruiser Scan Tool Flowchart





# Whipple Charger Installations Instructions for Mercury Marine 496 Engines

## Digital Diagnostic Terminal Flowchart



# Whipple Charger Installations Instructions for Mercury Marine 496 Engines



## LIMITED WARRANTY

All merchandise manufactured by Whipple Industries is fully warranted against defects in workmanship and materials to the original purchaser of the Whipple Supercharger System. The limited warranty must be signed, dated and returned to Whipple Industries within 14 days of the purchase date accompanied by a copy of the original sales invoice.

If an item is suspected of being defective, return it to Whipple Industries for inspection after obtaining the proper Return Authorization Number. If an item is determined to be defective, we will repair or replace it at our discretion within a period of one year from the shipping date on your invoice.

Whipple Industries Inc. limited warranty specifically does not apply to products which have been (a) modified or altered in any way, (b) subjected to adverse conditions such as misuse, neglect, accident, improper installation or adjustment, dirt, or other contaminants, water, corrosion or faulty repair; or (c) used in other than those specifically recommended by Whipple Industries Inc. All products designed for off-road use are considered racing parts and carry no warranty, either expressed or implied, as we have no control over how they are used.

On warranty items, repair/replacements will be limited to parts manufactured by Whipple Industries and will not include claims for labor or inconvenience. All other merchandise distributed by Whipple Industries is warranted in accordance with the respective manufacturer's own terms of warranty. This warranty is expressly made in lieu of any and all other warranties expressed or implied, including the warranties of merchantability and fitness.

Whipple Industries will not be responsible for any other expenses incurred by the customer under the terms of this warranty, nor shall it be responsible for any damages either consequential, special, contingent, expenses or injury arising directly or indirectly from the use of these products.

Whipple Industries reserves the right to determine whether the terms of the warranty, set out above, have been properly complied with. In the event that the terms are not complied with, Whipple Industries shall be under no obligation to honor this warranty. By signing this form, you understand and agree to the terms above.

NAME (Print) _____	ADDRESS _____
SIGNATURE _____	CITY _____ STATE _____ ZIP _____
DATE _____	PHONE _____
SC SERIAL # _____ (Found on compressor bearing plate)	EMAIL _____ (Optional)
VIN OR VESSEL # _____	