

***Whipple Superchargers
350 MAG/6.2MX MPI 350/377 Black Scorpion Installation
Instructions
Motorola ECM 555 Models***



WHIPPLE SUPERCHARGERS
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A color PDF of this manual is available, email
tech@whipplesuperchargers.com for a copy

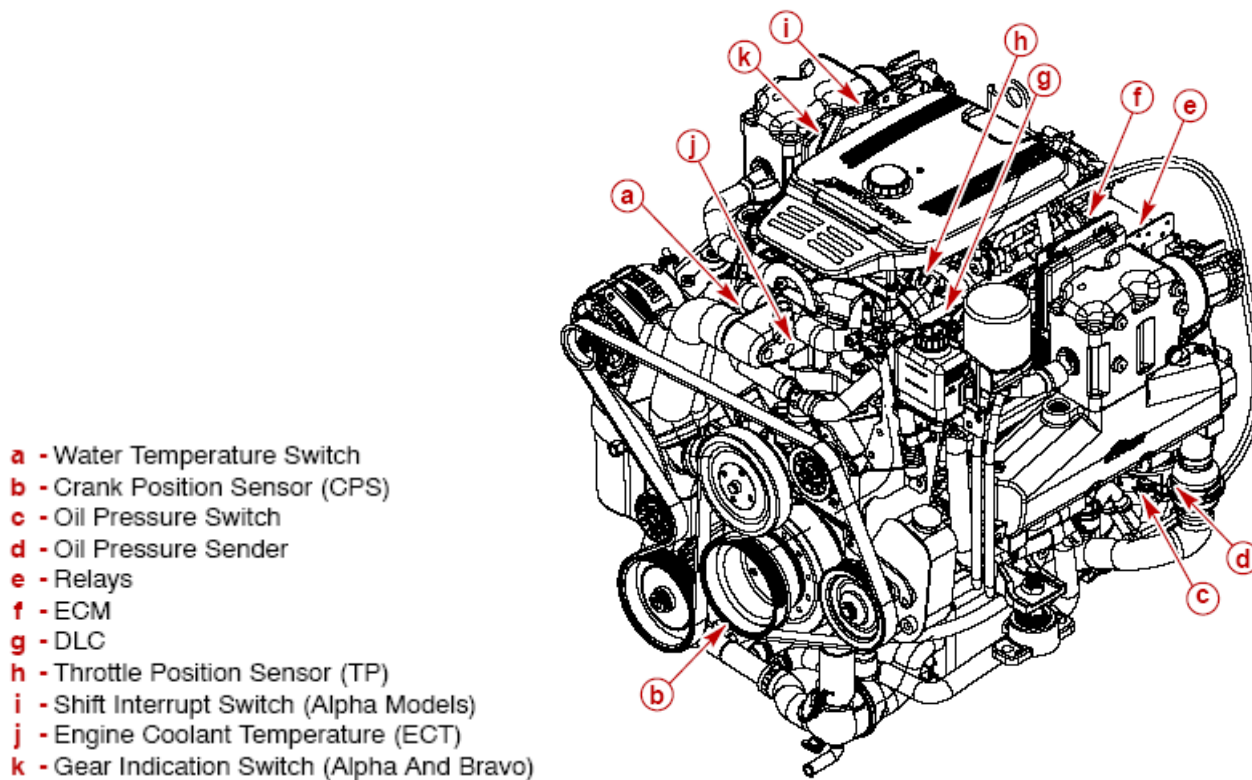
PREMIUM FUEL ONLY (91 OCTANE OR BETTER ALWAYS) RON+MON/2

***Version A1R16
Last Updated April 26th, 2017***

WHIPPLE SUPERCHARGER INSTALLATION MANUAL **(MY2002-2008 350/377/383 Mercury 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:



Ship to:
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.*

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. ALWAYS LISTEN FOR ANY SIGN OF ENGINE KNOCKING, IF PRESENT DISCONTINUE USE IMMEDIATELY.
3. DO NOT OPERATE ENGINE IN BOOST IF THE FUEL PRESSURE IS BELOW THE PRESSURE SPECIFIED BY WHIPPLE INDUSTRIES.
4. NEVER CHANGE COMPUTER CALIBRATION (Engine fuel, ignition timing, or the RPM limiter, nothing)! THIS COMPLETE SUPERCHARGER SYSTEM IS DESIGNED AND ENGINEERED TO MAXIMUM PERFORMANCE FROM THE WHIPPLE CALIBRATION. MODIFICATIONS MAY CAUSE SERIOUS DAMAGE TO THE ENGINE.

WARNING! The most important precaution you must take with the WHIPPLE CHARGER is **cleanliness**. This supercharger is a high quality, close tolerance compressor that cannot be subjected to dirt or any type of foreign material. Foreign material entering the supercharger will automatically void all warranties. DO NOT remove the protective seal on the supercharger prior to installation.

***WARNING!! CONSTANT ABUSE OF THE REV LIMITER
WILL CAUSE SEVERE ENGINE FAILURE!!***

GENERAL INFORMATION

This system requires a major fuel system modification. Use extreme caution around the high flammable fuel and fuel vapors.

Always wear appropriate safety goggles and gloves when required.



Always use caution around flammable liquids.

Run the engine before beginning installation of the kit until the fuel level 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 or higher.**

You will be required to disconnect all of the wiring connectors. It is very helpful to tag all wires for future reference.

PROPPING RPM RANGE

The Whipple small block EFI SC system has a RPM limit of 5750rpm. The Smartcraft Overspeed warning comes on at 5650 to let you know you are near max RPM. Maximum engine life will be from 5200-5400 max propping rpm. Short burst above 5400rpm will not be a problem, but prolong abuse of this rpm will shorten engine life, most noticeably valve train life.

RECOMMENDED PREPERATION FOR INSTALL

It's mandatory that you replace the factory spark plugs with a minimum of **NGK BR7EFS**. Proper spark plug gap is .035". Failure to replace spark plugs to the colder NGK could result in engine failure.

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, blue and red Loctite™, Teflon tape or thread sealant, electric or battery operated drill motor, various hole saws, electrical tape, wire crimpers or solder iron, 0-60 lb. fuel PSI gauge with line kit and a torque wrench. You may also want to tag each wire connection for easy installation.

EXTRA PARTS REQUIRED

The factory engines from Mercury are not equipped with oil coolers and have a very limited oil supply. Under WOT running, oil temp can reach critical levels and cause damage. Therefore, a remote mounted oil cooler his **HIGHLY** recommended. A low to medium duty cooler will significantly increase the reliability of the engine. This will increase oil capacity as well as help maintain oil temps.

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.

SYSTEM PERFORMANCE INFORMATION

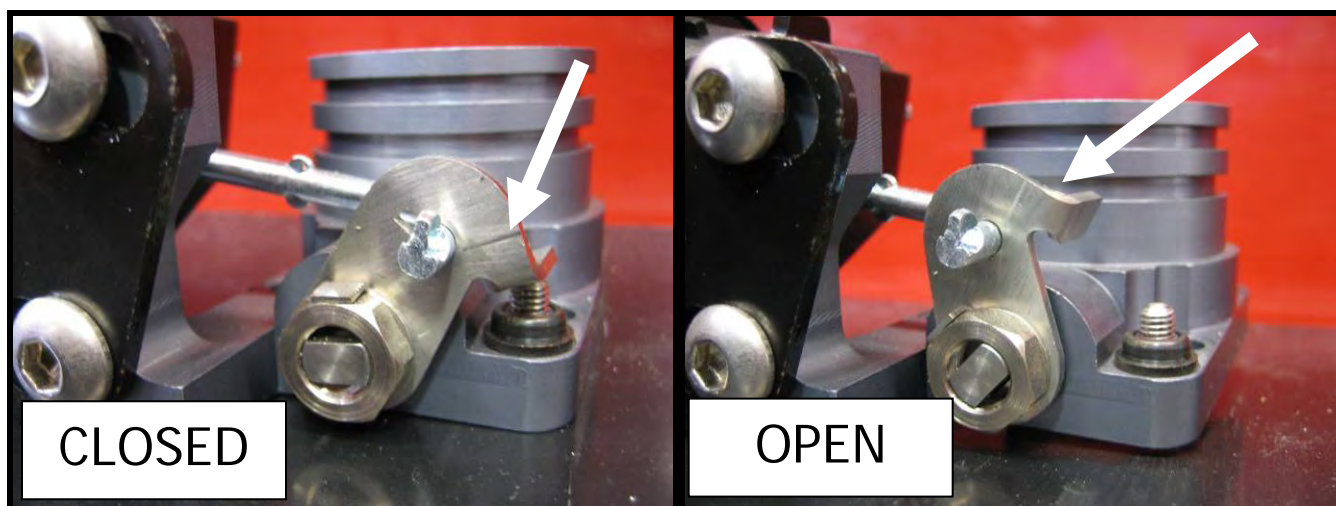
An electronic scanner is a tool used to display various engine parameters. This scanner can be installed and monitor all engine parameters while the boat is being operated. Some of these are items are: RPM, TPS volts, COOLANT temp, Oil PSI, Spark advance, IAC percentage and any TROUBLE CODES. You can purchase a hand held scanner from Rinda Technologies, for more information, go to www.rinda.com or (773) 736-6633. Rinda and Mercury Marine (for Mercury dealers) also offer laptop based programs that allows data logging and other features.

1. Idle speed system check - After the engine is at normal operating temperature (120deg. F), the engine will idle at 600 - 700 RPM, out of gear. To check the idle speed system, TPS voltage must be checked and set between .48-50v (using scan tool). You can use a MerCruiser scanner, Rinda scanner, Diacom Plus or a voltmeter. The light blue wire is your signal wire, the TPS is a 5v sensor. Without a scan tool, monitor the engine rpm. The motor should never die when shifting or decelerating, if it does, it will need more air through the throttle blades. Open the throttle stop to increase the air flow at idle. Make sure to test in the lake, in gear, rpm should only drop slightly while in gear. If it falls below 550, it needs more air to idle properly in gear. *Note: The engine must be turned off for 5 seconds and re-started to properly reset the learning of the IAC system.*

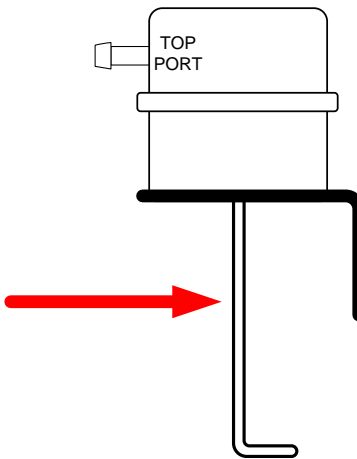
2. Engine Guardian. The Whipple SC system utilizes the factory sensors. The guardian system, when it detects a fault will limit the engine RPM until the code is removed or goes away. The factory horn will also beep to notify you of a potential problem. The most common is engine coolant temp, ideal temp operation is 120-140deg F and overtemp is set at 160deg F. Power may be reduced (reduced max engine rpm) if the temp exceeds 145deg F above 4000rpm) before setting a code.

3. Supercharger By-pass system. The supercharger is installed with a 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. If an actuator fails (from a misfire, back fire, etc), then it should be replaced immediately.

Actuator failure could lead to intercooler fires, poor performance and erratic idle. If the actuator fails, it could have an air leak which will result in poor idle qualities. A failed actuator will also allow the bypass to open it's internal butterfly during boost, which will circulate air and reduce airflow to the engine, consequently lowering the boost level and power.



1. Move actuator arm into actuator.
 2. Plug top port with finger while actuator is pressed in.
 3. Let go of actuator arm while finger is still on top port.
 4. If actuator is good, actuator arm will stay in the same position until you remove your finger. If bad, it will come back to it's relaxed position.
- IF BAD, REPLACE IMMEDIATELY



SYMBOL KEY

Throughout this installation guide you will see the following symbols used:

NOTE

Used to indicate tips and information to aid in installation, maintenance, or use of the supercharger.

!! CAUTION !!

Used to indicate precautions that must be taken to avoid damage to the supercharger and associated components.

⚠ WARNING!!

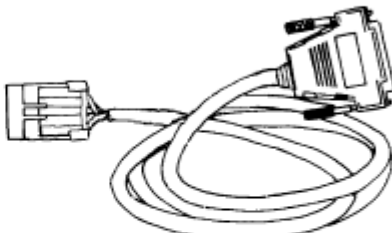
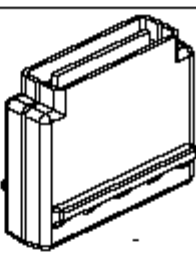

Used to indicate precautions that must be taken to avoid bodily injury as well as damage to the supercharger and associated components.

COMMON ABBREVIATIONS

SC	Supercharger
IC	Intercooler
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
ECM	Engine Control Module

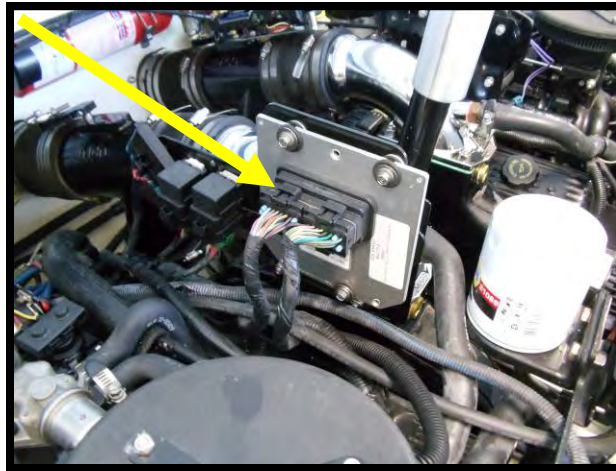
GENERAL INFORMATION

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.**

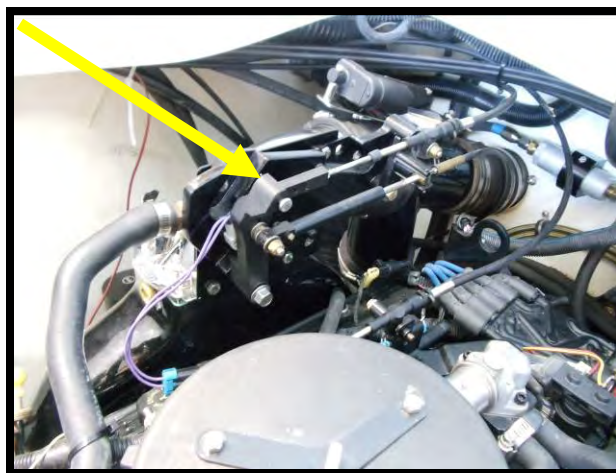
Harness Assembly / Diagnostic Tester	91-822560A13
Description: 25-pin to 4-pin Adaptor harness. For PCM 555 and ECM 555 models (4-pin connectors, no additional harness required).	 <p>74214</p>
Mercury MerCruiser DDT Cartridge Version 1.2	91-880118A2
Description: Use on PCM 555 and ECM 555 models.	 <p>78036</p>
Scan Tool Kit / Version 4.0	Note in Description
Description: 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 NOTE: Tool must be ordered from Rinda Technologies, Inc.	 <p>72428</p>

STEP-BY-STEP INSTALLATION INSTRUCTIONS

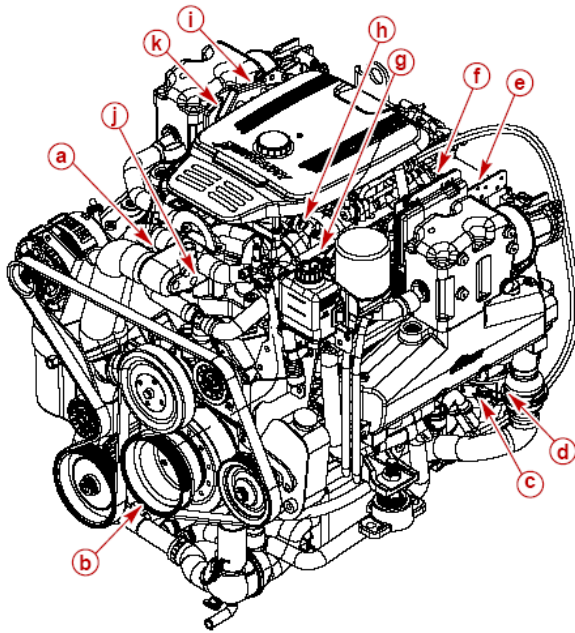
1. Disconnect the battery power by selecting the disconnect mode on the battery switch or removing the ground cable from all batteries.
2. Remove the factory PCM for recalibration, ship to Whipple Superchargers for recalibration.



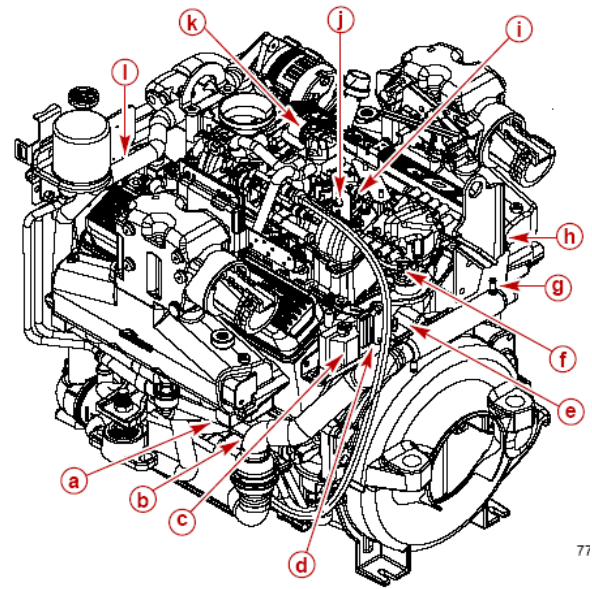
3. Remove stock spark plugs, (Whipple Superchargers recommends a NGK BR7EFS). Always check gap and only run plug gaps of .032" - .035". Torque to 11 ft/lbs.
4. Removal of stock parts:
 - ☐ Remove the plastic engine cover.
 - ☐ Remove the factory shift bracket assembly and set to the side of the engine for later relocation.



Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

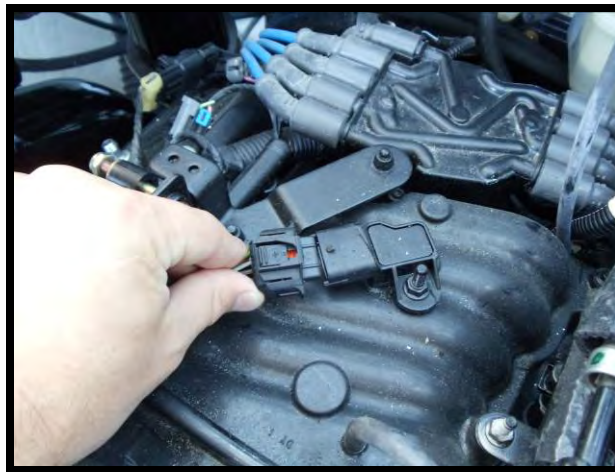


- a - Water Temperature Switch
- b - Crank Sensor
- c - Oil Pressure Switch
- d - Oil Pressure Sender
- e - Relays
- f - ECM
- g - DLC
- h - Throttle Position Sensor (TPS)
- i - Shift Interrupt Switch (Alpha Models)
- j - Water Temperature Sender
- k - Gear Indication Switch (Alpha And Bravo)



- a - Cool Fuel Harness Connector
- b - Knock Sensor
- c - Ignition Coil
- d - Ignition Module
- e - Transmission Temperature Connectors (If Equipped)
- f - Distributor Connector (Should Be Capped)
- g - Water Pressure Sender
- h - Knock Sensor
- i - Manifold Air Pressure / Temperature
- j - Circuit Breaker
- k - Idle Air Control
- l - MerCathode Controller

☐ Unplug factory TMAP (temperature and manifold pressure) sensor connector.

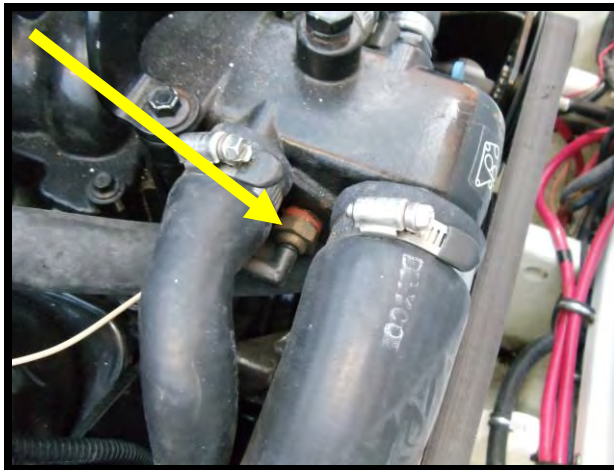


Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

- ☐ Unplug coolant electrical connector from coolant temp sensor.



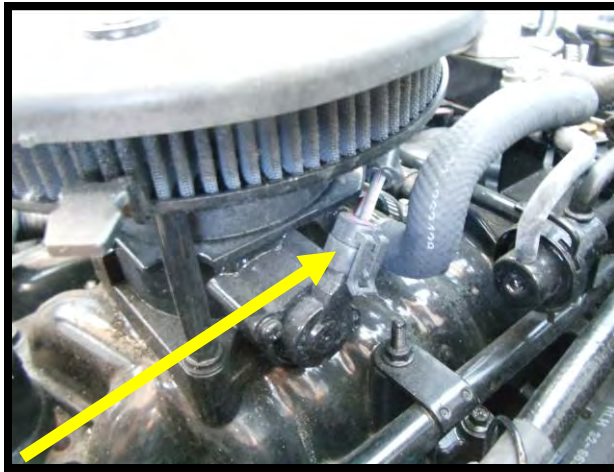
- ☐ Unplug coolant temp sender connector from sender.



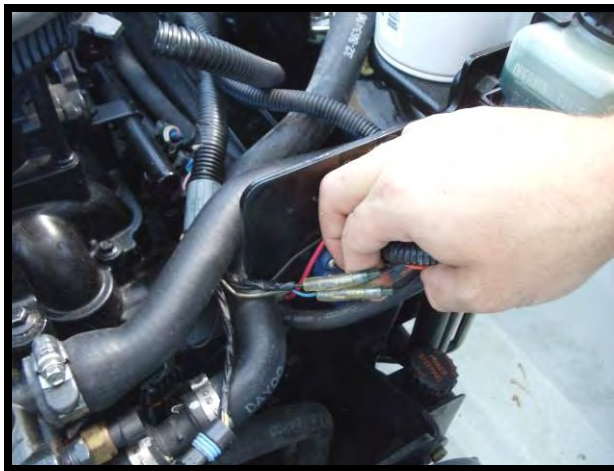
- ☐ Remove the coolant temp sensor with a $\frac{3}{4}$ " deep well socket.
- ☐ Remove the coolant temp sender with a 18mm deep well socket.
- ☐ Remove the thermostat housing and all of its hoses from the housing.

Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

- ☐ Find the TPS sensor and remove the connector by unlocking the locking tab and pulling away.



- ☐ Disconnect gear lube bullet connectors.

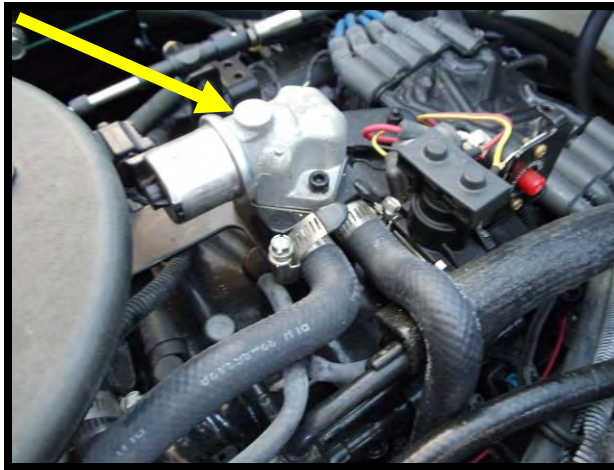


- ☐ Disconnect the ground wire from the Merthacode.

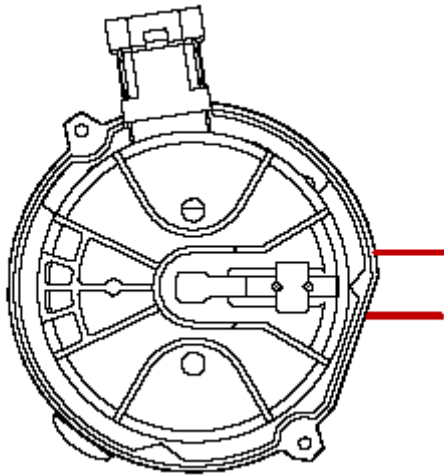


Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

5. Remove IAC and 50-amp breaker bracket from manifold by removing the (2) nyloc nuts with a 10mm socket.
6. Remove IAC motor from engine by removing the (2) SHCS with a 3/16" allen wrench.



7. Remove distributor cap.
8. Crank engine over by hand so that it's at #1 cylinder TDC. Verify that the rotor tang is in the proper location.



- ☐ Mark distributor, front and center for later installation.
- ☐ Remove distributor from engine.

Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

9. Disassemble 50-amp breaker & starter solenoid assembly by removing the (2) bolts using a 10mm socket.



10. Remove the 1/8" rubber fuel psi reference line from the plastic tee (hose will be used later, disregard the tee).
11. Remove factory hoses from thermostat housing by loosening hose clamps with 5/16" socket or nut driver and a hose removal tool to loosen hose from thermostat housing.



Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

12. Loosen the belt tensioner holding nut with a 5/8" socket. Release the tension on the idler pulley with a 3/8" wrench, walk the idler down the bracket and remove belt.



13. Remove the 4 hex bolts from the crankshaft accessory drive pulley.
14. Remove the self-locking nut and washer holding throttle cable to the throttle shaft and washer with a 7/16" socket.
15. Remove the throttle cable and temporarily install the washer and nut to the throttle shaft. Save the 2 steel sleeves for later use.
16. Remove throttle bracket from engine by removing the (2) nyloc nuts using a 10mm socket.
17. Remove the flame arrestor by removing the (3) nyloc nuts with a 10mm socket.
18. Remove the PCV line from the factory intake manifold.



19. Unplug all 8 injector connectors from injectors.

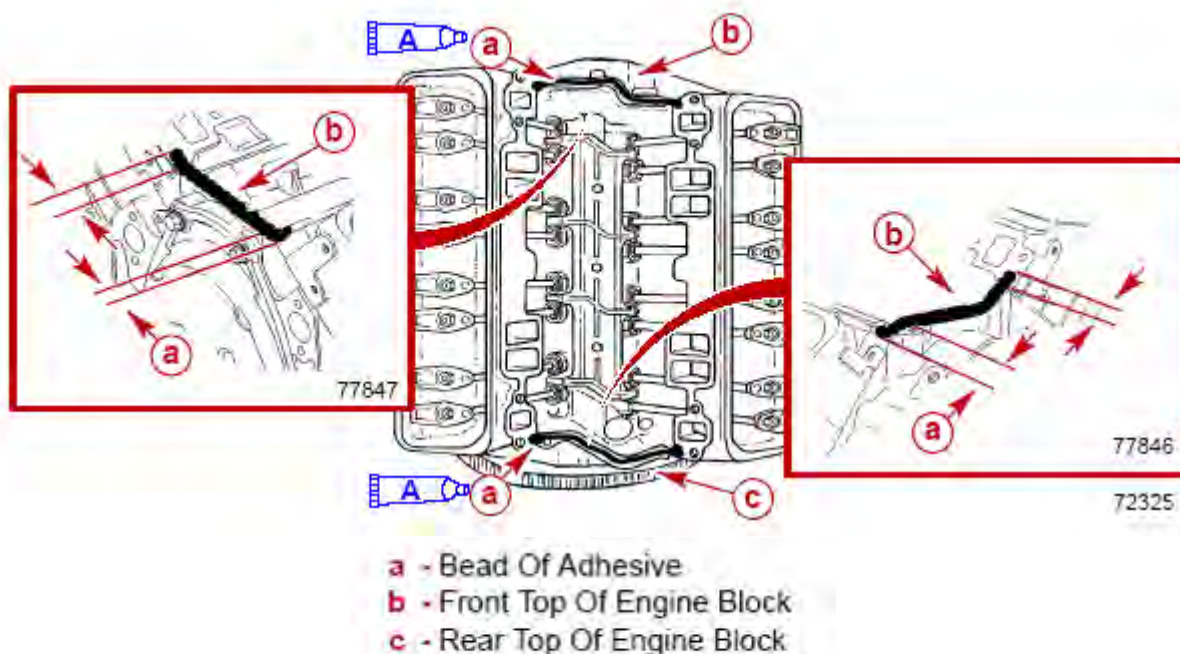
Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

20. Using the supplied fuel line removal tool, remove factory fuel line from factory fuel rail. To remove, insert proper sized plastic tool and push into open area of fuel fitting. Push the fuel line towards the plastic fitting while holding the plastic fitting in place. This will release the fuel line from the fitting.



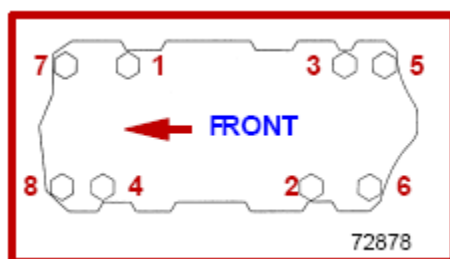
21. Remove intake manifold (8 bolts), using a 13mm socket. In some cases, it may be easier to loosen one valve cover to allow the manifold to come up.
22. Remove Whipple intake manifold from intercooler/SC assembly. The unit is partially assembled for freight, but is not sealed or torqued.
23. Clean factory intake manifold surface using a gasket scraper or razor blade.
24. ➡ **NOTE.** Apply a thick bead in the valley of the block, both front and rear. This should be a minimum of 3/8" tall. Make sure to circle all 4 water passages, this will ensure no water leaks later.





25. Install the supplied intake gasket set. Apply black RTV silicone around all 4 water passages.

26. Install intake manifold using the factory 8 hex head bolts. Starting from the center out, make 3 passes:

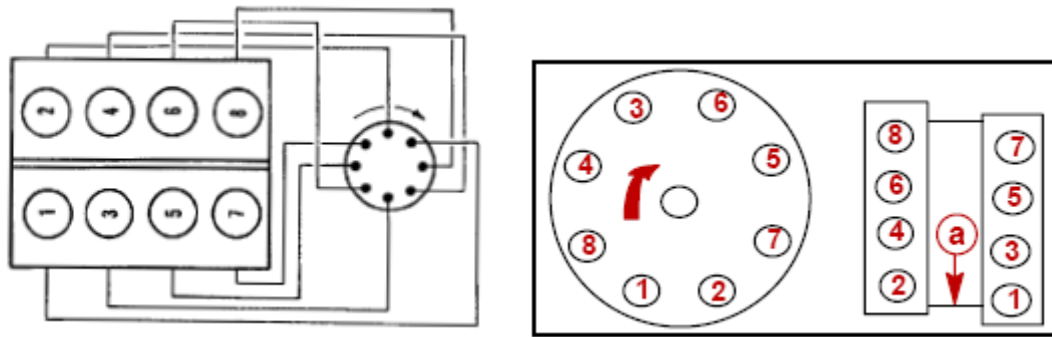


- ☐ Torque to 27 in/lbs.
- ☐ Torque to 106 in/lbs.
- ☐ Torque to 132 in/lbs.

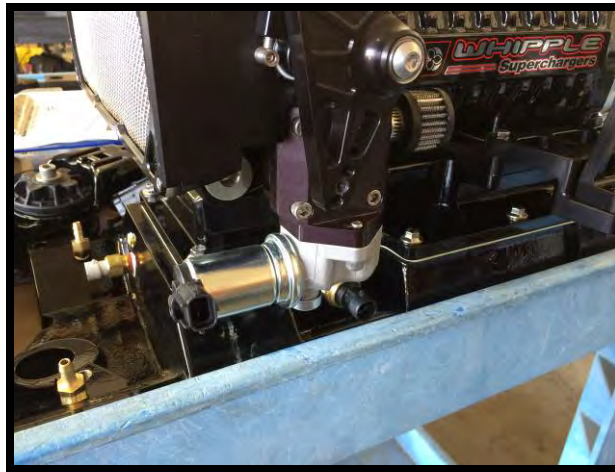
➤ **NOTE:** Install all bolts hand tight and slide intake forward as much as possible, and then stab the distributor to make sure everything lines up. If it does, proceed, if it does not, you may have to file one of the openings.

27. Secure the factory distributor with the factory clamp and the supplied 3/8" x 3/4" hex head steel bolt and 3/8" flat steel washer. Torque to 18 ft/lbs.

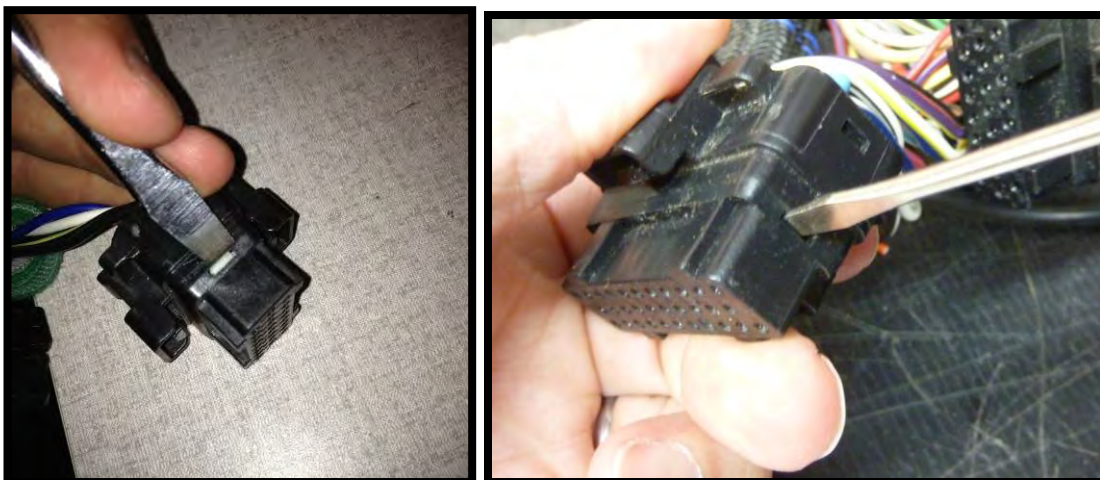
28. Re-install distributor cap and factory spark plug wires.



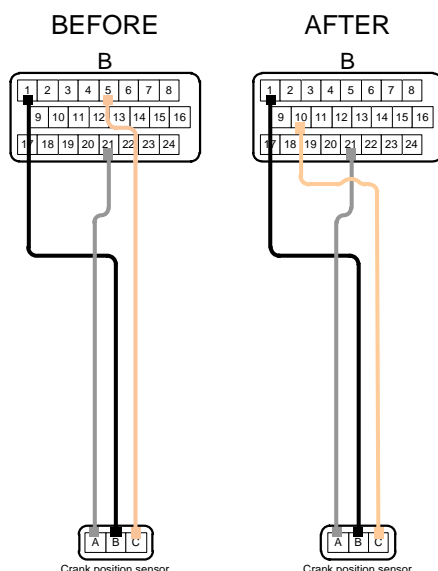
29. Install factory IAC motor to new billet throttle body using the supplied (2) $\frac{1}{4}$ " x $\frac{3}{4}$ " socket head allen bolt, use the supplied Ford IAC gasket for sealing. Torque to 20 in/lb.



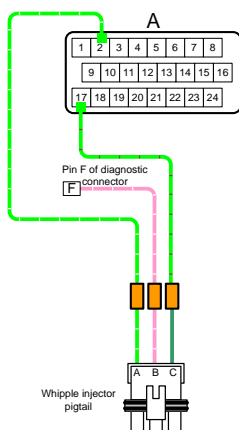
30. Model years **2005 and up** (excluding **Reman/Quicksilver**) are required to change the pin location of the crank signal wire. To release the pins in the black connector, use a small flat screw driver to press the white (or gray) tab on the side of the connector in. This will release the lock on the pin. To pull the pin, press in towards the connector, then lightly pull out. This may take a few attempts to wiggle the wire/pin loose.



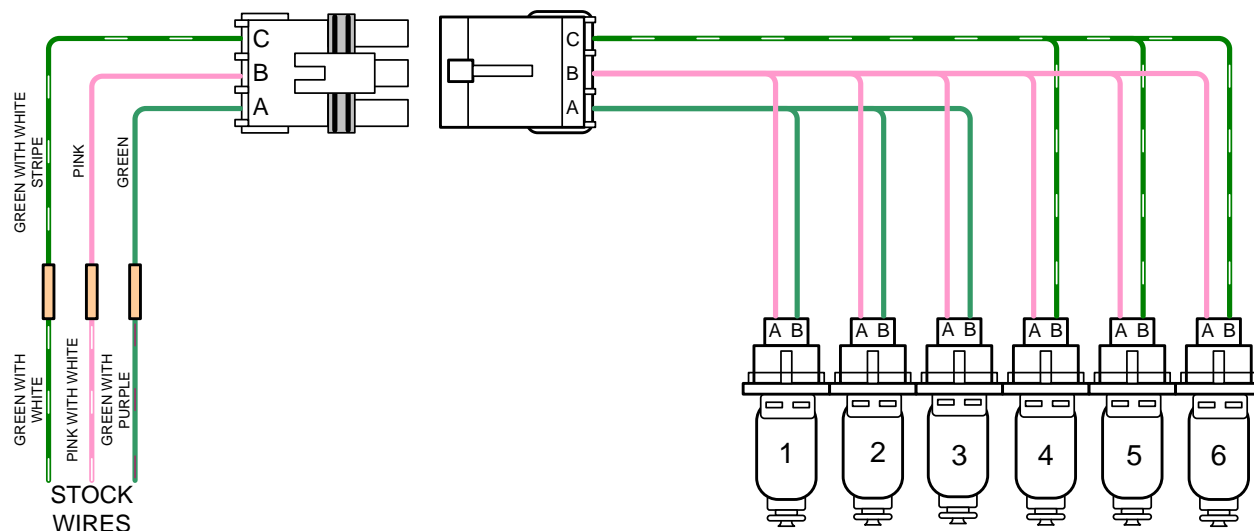
- ☐ **(2005+ MODELS ONLY)** (Excluding **Reman/Quicksilver**) Locate the factory 24-pin connector "B". Locate Pin #5 and #10. Remove the wire/pin from pin location #10, this will be discarded and not used. Remove the wire/pin from pin location #5. Install this wire, from pin #5 and now press it into pin location #10. Once this is in, use a small, flat head screw driver to press the lock on the side of the connector back in place. This moves the crank position signal wire from pin #5 to #10. The cam sensor is discarded and not used. Cover the discarded cam sensor signal wire with electric tape.



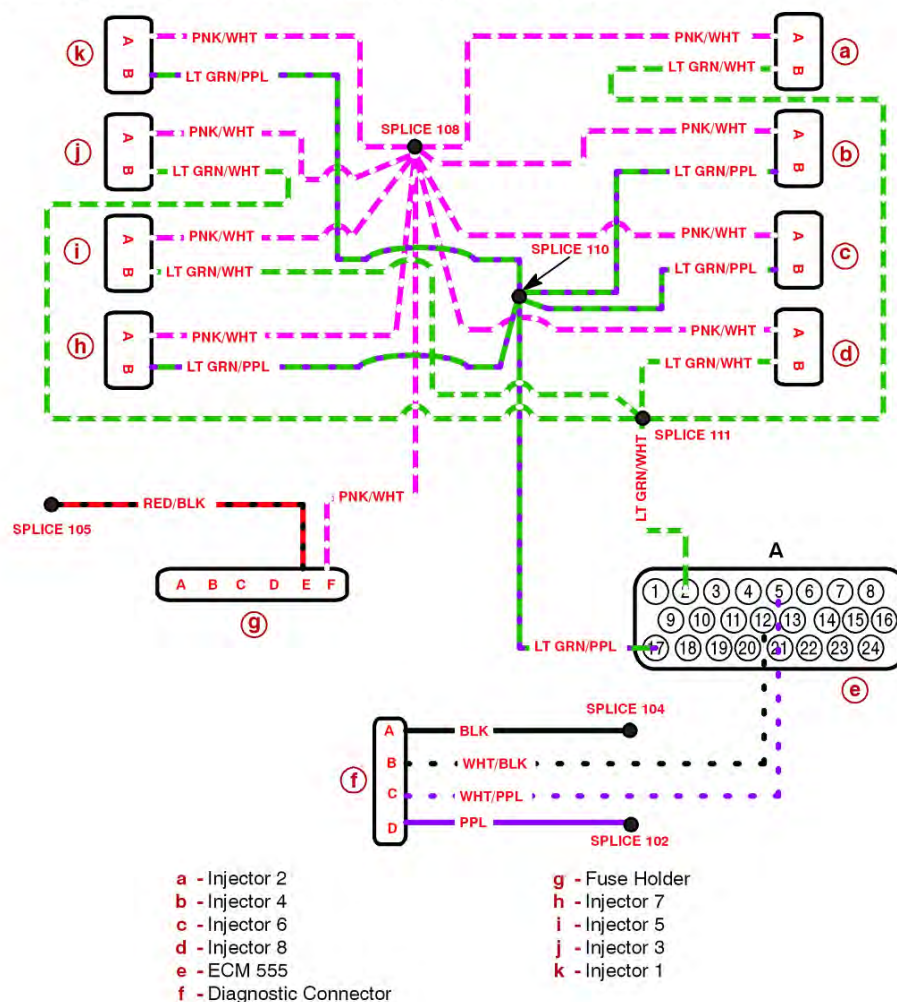
31. Locate the factory 8 injector connectors. Pull these wires out of the split loom by using a sharp razor to split the electric tape (be careful not to slice wires). You will find a solder joint where these wires end up going to only 3 wires (2 turn on grounds, 1 constant 12v+) or 5 wires (MY2005+, 4 turn on grounds, 1 constant 12v). Cut the factory injector connectors off when you get to the wires. **MY2005+ MODELS (excluding Reman/Quicksilver) WILL ONLY BE USING THE WIRES COMING FROM CONNECTOR "A", PINS #2 AND #17. PINS #1 AND 18 ARE NOT UTILIZED. VERIFY THE WIRE COLORS AT THE CONNECTOR SO YOU CONNECT TO THE PROPER WIRES.**



- ☐ **(02-04/Reman)** Locate the 6 injector pigtail preinstalled on the new injectors. Disconnect the 3-way pigtail with the bare wire ends. Using the salmon colored butt connectors, connect these to the 3 factory injector wires. Connect the wire from pigtail pin A (green) to the factory injector wire coming from connector "A", pin #2. Connect the wire from pigtail pin C (green/white) to the factory injector wire coming from connector "A", pin #17. Once these wires are butt connected, use a heat gun to shrink the connectors for proper sealing from water.



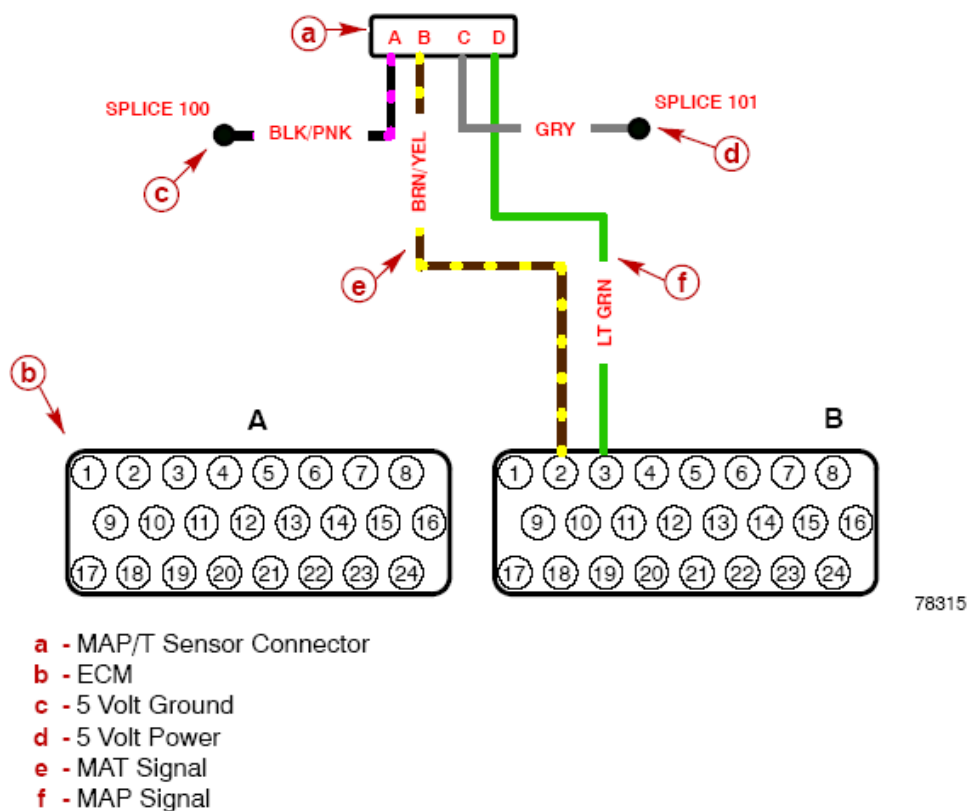
Fuel Injector Control Circuits and Diagnostic Circuits



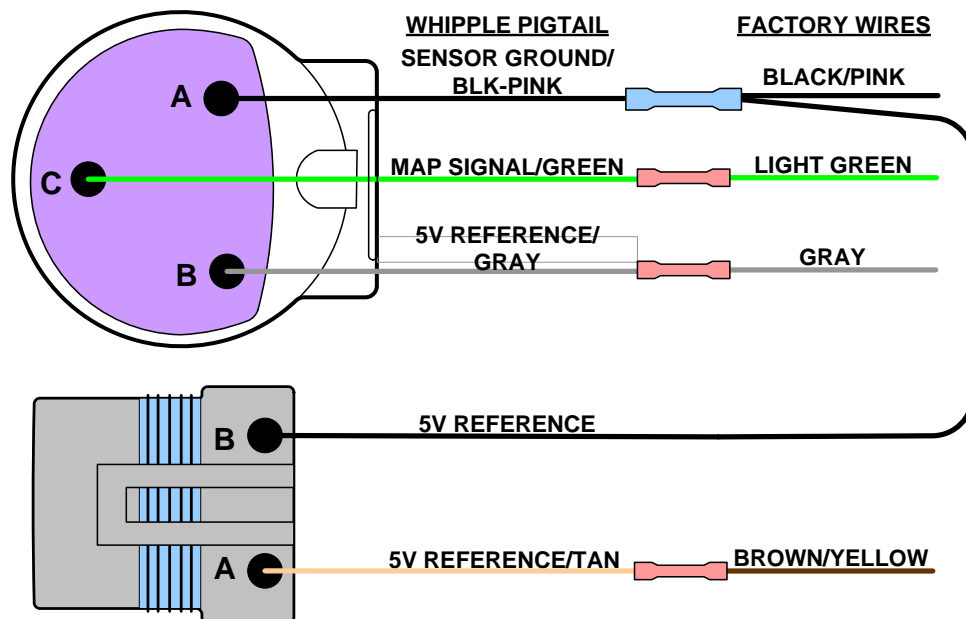
□ With injector wiring completed, use a volt meter and check continuity from fuse holder PIN F to the pink wire at PIN B of the injector pigtail. This will verify that you will have proper 12v when the engine is running. If you do not have continuity, the main power wire for the injectors was cut pass the the factory splice. Go back through the wiring and make proper connection.

- ☐ Locate the factory 4-pin Temperature/MAP sensor connector (black-pink, brown-yellow, gray, green), cut the end off of it off. It's a good idea to cut at different lengths to space the butt connectors from each other.

MAP/T Circuit



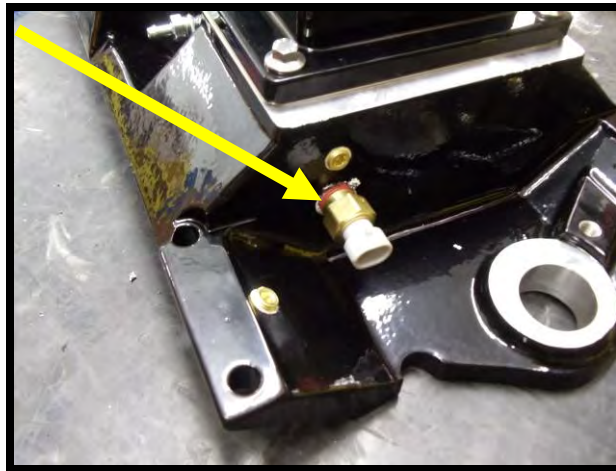
- ☐ Use the supplied heat shrink butt connectors to connect the supplied 3-pin pigtail connector (black, green, gray) and air temp sensor (with pre-installed wires) to the factory TMAP sensor wires (black-pink, green, gray, brown/yellow) as shown in image.



- ☐ Strip the wire ends of the pigtail and the factory wires. Strip double the standard length on the supplied pigtail black wire.
 - ☐ Fold the black pigtail wire exposed wire over once, then install in the blue butt connector. Crimp connector and give wire a tug to ensure proper installation.
 - ☐ Install the factory black/pink wire and the black wire from the air temp sensor (2-pin connector) by twisting the exposed wires together, then inserting into the blue butt connector. Crimp butt connector and give the wires a tug to ensure proper installation.
 - ☐ Connect the tan wire from air temp sensor (2-pin connector) to the brown/yellow wire from the factory harness, Use the salmon colored butt connector. Crimp connector and give wires a tug to ensure proper installation.
 - ☐ Connect the green pigtail wire (3-pin pigtail) to green wire from the factory harness. Use the salmon colored butt connector. Crimp connector and give wires a tug to ensure proper installation.
 - ☐ Connect the gray pigtail wire (3-pin pigtail) to gray wire from the factory harness. Use the salmon colored butt connector. Crimp connector and give wires a tug to ensure proper installation.
 - ☐ Use heat gun to shrink and shrink and seal butt connectors.
 - ☐ Leave the factory relays lying towards the back of the intake manifold, zip tie for clean installation.
32. Connect the supplied 2-bar map sensor pigtail connector to the supplied 2-bar map sensor located on the starboard side of the intake manifold.

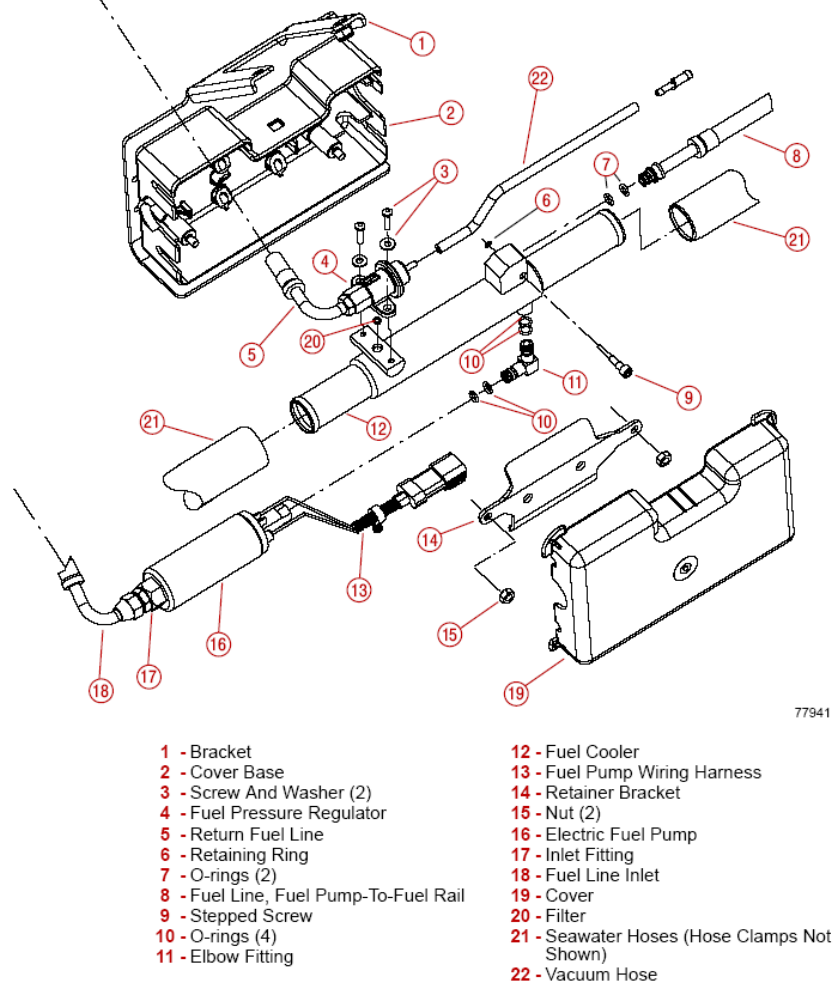


33. Connect the supplied IAT pigtail to the air temp sensor located in the back of the intake manifold.



34. **(02-04 models/Reman)** Remove factory fuel PSI regulator.

Cool Fuel System



Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

35. **(02-04 models/Reman)** Cut the top of the regulator off as shown. ➡ **NOTE:** Clean debris after cutting.

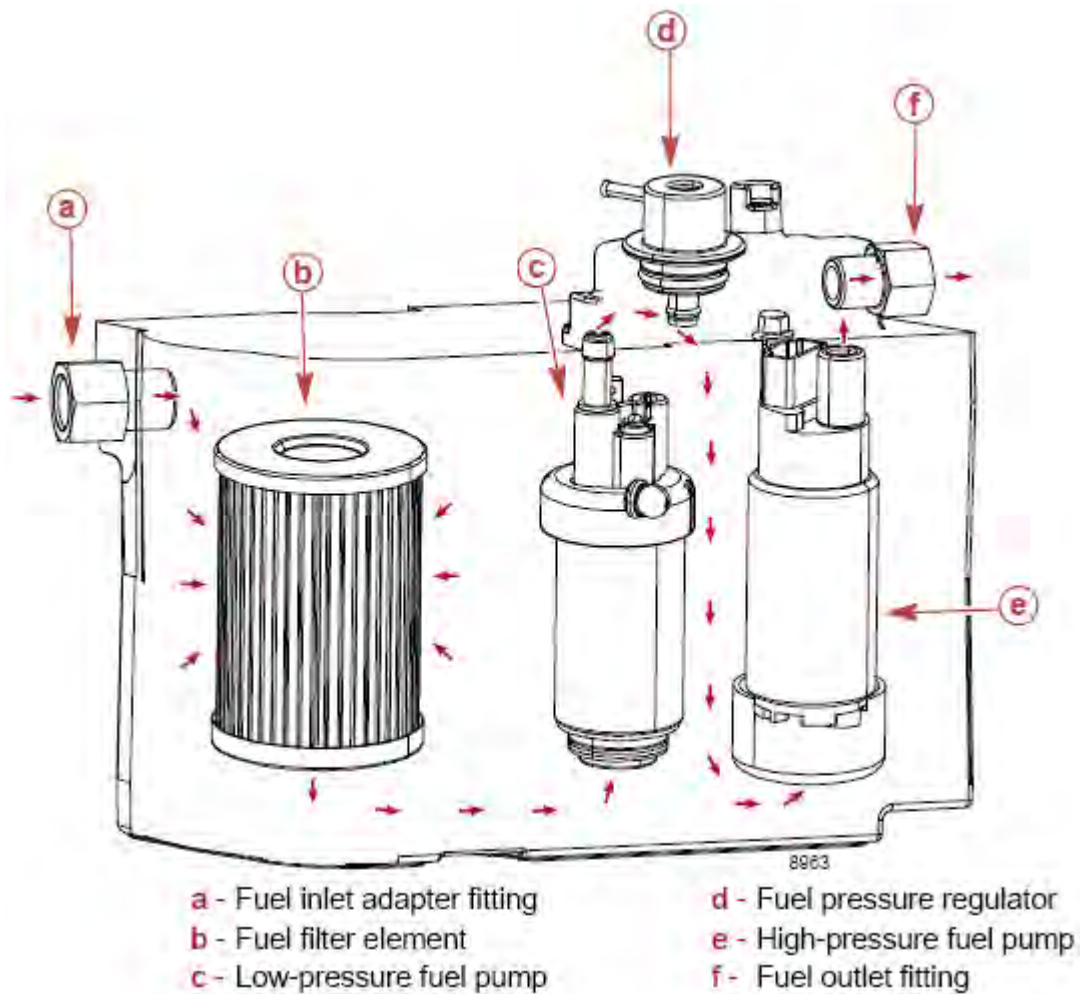


36. **(02-04 models/Reman)** Install spring in regulator and assemble regulator as shown by clamping around cut regulator using supplied oring to seal.



37. **(02-04 models/Reman)** Reinstall fuel pressure regulator, this will require you to cut some of the plastic housing for it to fit correctly.

38. **(2005+ 6.2MX MPI MODELS ONLY)** Remove the factory fuel PSI regulator from the fuel pump assembly, replace with new supplied regulator. 05-09 350 MAG MPI models use the factory fuel psi regulator (43psi).

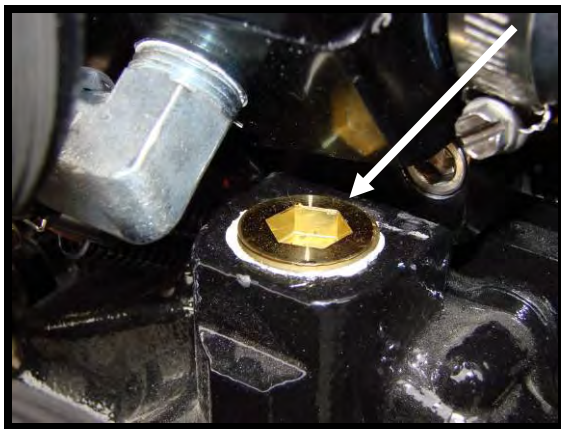
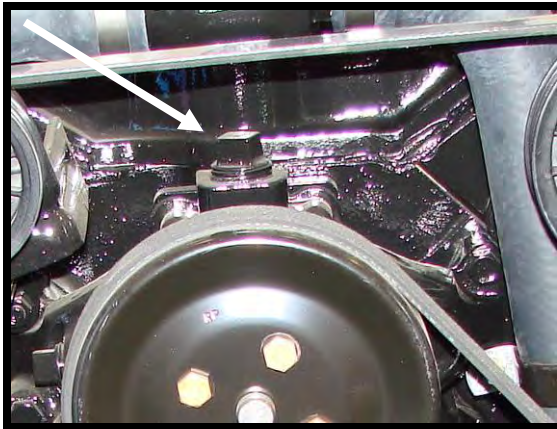


Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

39. Install vacuum line on new regulator barbed fitting that was routed from factory. Install the supplied 5/32" plastic barb and 90deg rubber fitting. Connect this end to 5/32" barb fitting located in Whipple intake manifold. Secure with zip-tie. Note: Will have to remove to set fuel pressure later.



40. Re-connect factory fuel pump electrical connection.
41. Remove pipe plug from circulating pump, replace with the supplied 3/4" brass allen style pipe plug. Apply thread sealant to threads.

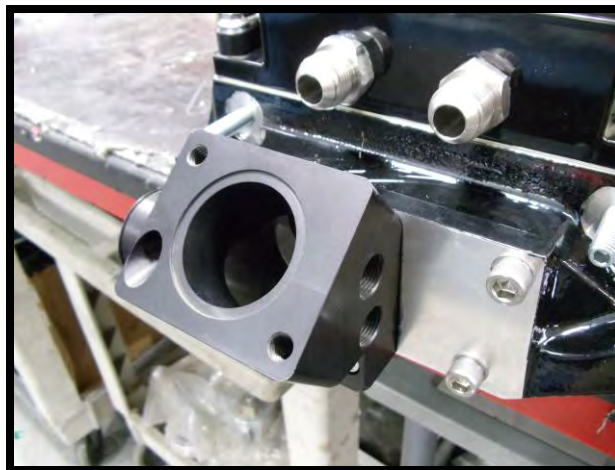


Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

42. (2008+ Models/Scorpion Inboard Engines/Mercury Quicksilver 6.2 REMAN Models) Install supplied low temp thermostat (120deg F) into manifold recessed area, pointed end facing out. Does not apply to 2002-2007 350 Mag/6.2MX motors. This is for engines equipped with dual fitting thermostat housing base (see 3rd picture).

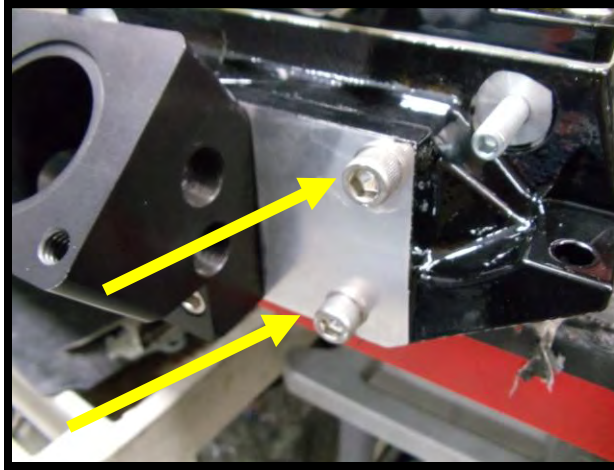


43. Install the base of thermostat housing using the supplied black RTV silicone (circle around each bolt passage) and 3/8" x 2" and 3/8" x 1 1/4" socket head allen bolts. Apply thread sealant to bolts, they go through the water passage. Torque to 20 ft/lbs.

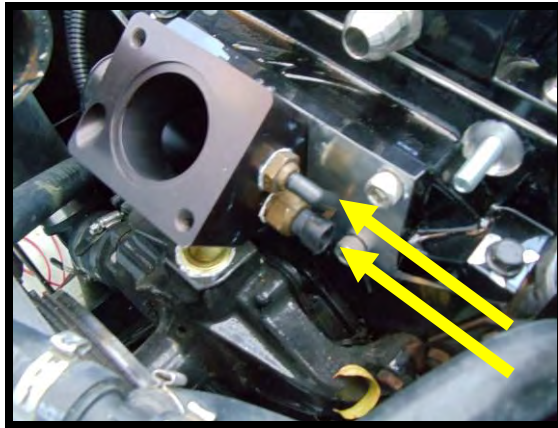
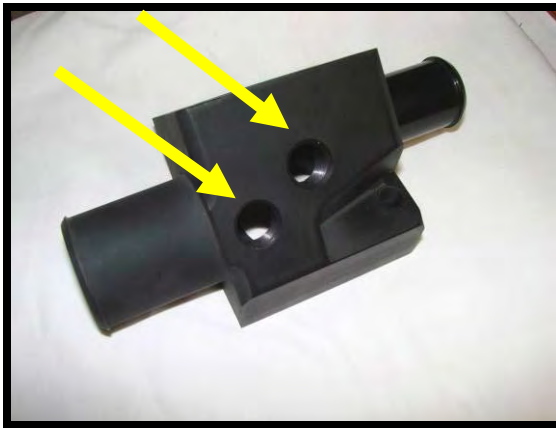


Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

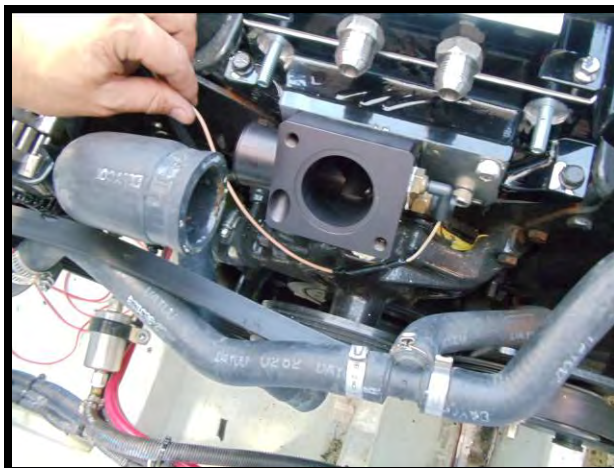
44. Install the 3/8" x 1/2" socket head allen bolts into the two empty bolt holes if not already previously done. Apply thread sealant to threads.



45. Install factory temperature sensor and gauge sender into thermostat housing. Apply thread sealant to threads.



46. Extend the factory sender tan wire with the supplied tan wire and salmon butt connectors. Use heat gun to shrink butt connectors. Install the supplied plastic loom over the wire for protection. Route the wire below the thermostat housing and behind the water pump.

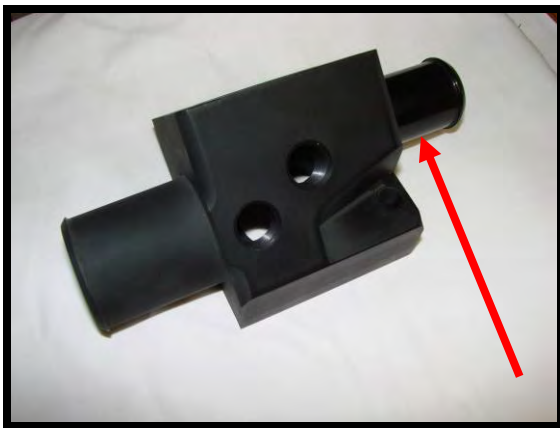
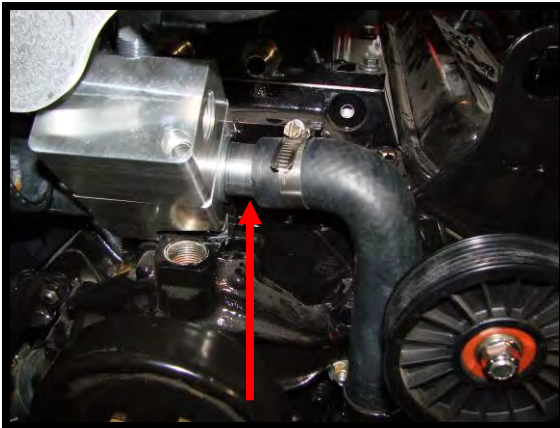


Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

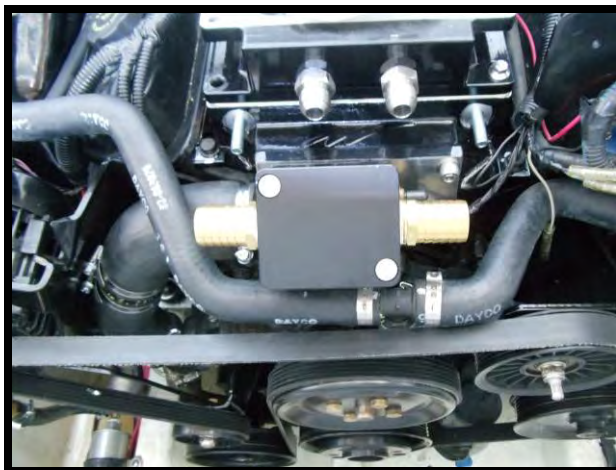
47. **(2002-2007 350 Mag/6.2MX Sterndrive Models)** Install thermostat into thermostat housing base by dropping the body into the recessed area. The pointed part of the stat should face up.



48. **(2008+ Models/Scorpion Inboard Engines/Mercury Quicksilver 6.2 REMAN Models)** Route the stock 1 ¼" inlet hose coming from the port side of the engine and route to the 1 ¼" inlet barb on the new thermostat housing. Secure with hose clamp.

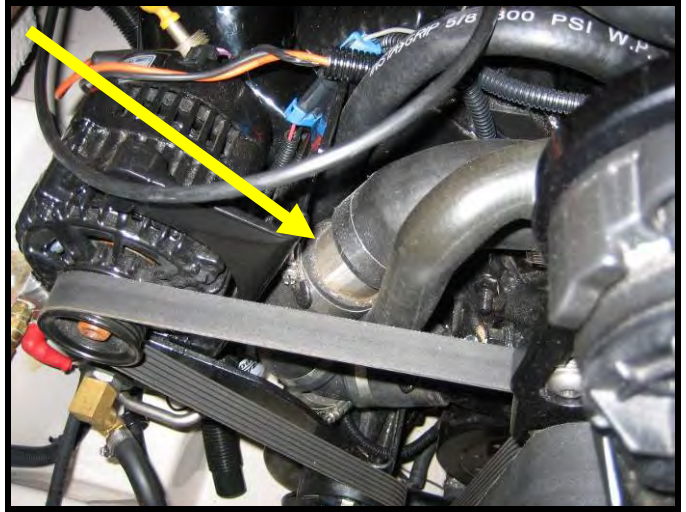


49. Install the thermostat housing top piece using the supplied black RTV silicone and the supplied (2) 3/8" x 2 ½" socket head bolts. Torque to 20 ft/lbs.

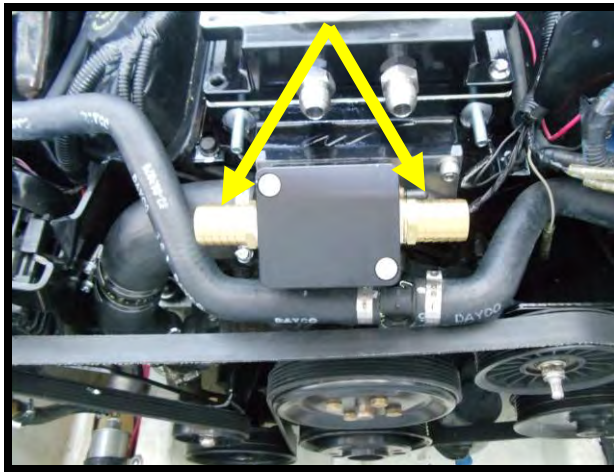


Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

50. Remove the factory 1 $\frac{3}{4}$ " circulating sea pump hose, cut approximately 2" - 3" of length from this hose, couple with the supplied stainless steel 1 $\frac{3}{4}$ " hose coupler.

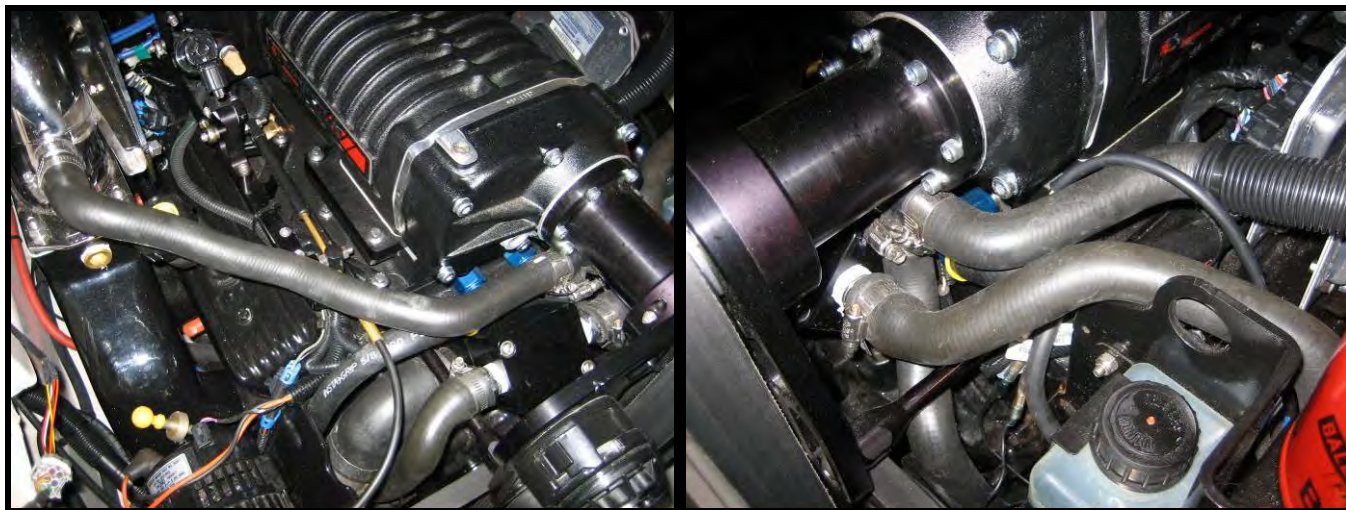


51. Install the $\frac{3}{4}$ " NPT to 1" barb fittings with pipe sealant into thermostat housing.



52. Reinstall the factory 1" rubber exhaust hose (bottom exhaust feed) to the 1" barb fittings in the thermostat housing top.

53. **(2002-2007 350 Mag/6.2MX Sterndrive Models)** Reinstall the factory 1" rubber hose from the factory plastic tee to the exhaust manifold risers.

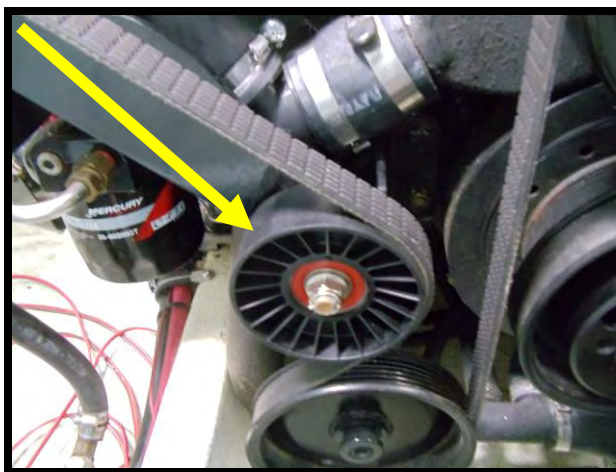


54. **(2008+ Models/Scorpion Inboard Engines/Mercury Quicksilver 6.2 REMAN Models)** Use the supplied 1" rubber caps and #16 hose clamps to block off the 1" exhaust manifold overflows. The exhaust manifolds will only be filled by the bottom inlet.

55. Install new crank pulley:

- ☐ Make sure the mounting surface of the new pulley on the front of the harmonic balancer is perfectly flat. If necessary, remove the imperfections or paint with a good flat file.
- ☐ Install the new Whipple crank pulley billet base to the harmonic balancer. Utilize the (3) 3/8" x 2" fine thread socket head allen bolts. Apply a light amount of blue Loctite on threads. Torque to 35 ft/lbs.
- ☐ Install the (1) 7/16" x 3" steel socket head allen bolt to the center of the crank pulley utilizing the factory flat washer, apply light amount of blue Loctite to threads. Torque to 60 foot-pounds.
- ☐ Install the Whipple crank 12-rib crank pulley to the billet base using the supplied (6) 3/8" x 1 1/4" steel socket head allen bolts with (6) 3/8" flat steel washers, apply light amount of blue Loctite on threads. Torque to 35 ft/lbs.

56. Install the supplied 3.5" (90mm) plastic idler in replace of the factory 3.0" (76mm) plastic idler pulley.



Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

57. Install factory 6-rib belt as it was stock. Tighten with the factory adjusting idler until belt is tight.

58. Intercooler water routing:

- ☐ Install the supplied stainless intercooler tee fitting into the factory water system. The best possible location is just after the outlet of the sea pump before the power steering cooler. Cut the factory hose, insert tee and secure tee with the supplied #20 hose clamps. **(DO NOT INSTALL TEE BEFORE SEA PUMP INLET)**
- ☐ Install supplied 5/8" ID hose from the intercooler tee to the 90deg intercooler fitting. Secure both ends with the supplied #10 hose clamps.
- ☐ Install 5/8" ID hose from fitting and route to thru-hull fitting you installed earlier.



59. Water dump fitting (Whipple supplied both a intercooler dump fitting and a black dump fitting, the block dump fittings creates more equal cooling in the back of the engine): **DO NOT RESTRICT OUTLET.**

- ☐ Find visible location for thru-hull fitting above the water line.
- ☐ Mark your spot on the boat and drill 2 holes using a 7/8" hole saw.
- ☐ Apply marine type silicone to exposed wood and fiberglass as well as the back of thru-hull fittings.
- ☐ Insert fittings in boat and from the backside, install the aluminum nuts. You will have to hold the dump fittings from twisting when installing. Smooth grip pliers work the best.
- ☐ Once tightened, wipe the excess silicone off and let the silicone dry.
- ☐ Install brass – 10 push lock fitting to intercooler dump fitting and follow by pushing the 5/8" ID hose on push lock fitting.
- ☐ Install the supplied brass tee fitting with the tapped block dump fitting. Apply light amount of pipe sealant to threads.
- ☐ Install the supplied 1/4" barb to 3/8" NPT fittings into the 3/8" tee fitting for the block dump. Apply light amount of pipe sealant to threads.
- ☐ Route the supplied 1/4" ID rubber hose from the 45deg fittings at the back of the intake manifold water passages, to the 1/4" 90deg fitting you installed into the block dump fitting. Secure with #4 hose clamps.

60. Apply light amount of gasket cinch to manifold top surface surface. Install supplied gasket to manifold top surface. If there is a problem with the gasket, you can use black RTV silicone (The Right Stuff/Permatex), approximately a 1mm bead to seal.

61. Install supercharger/intercooler assembly by lying on intake manifold with throttle cable assembly as well. ➡
NOTE: While installing SC/intercooler assembly, you must install the 3/8" x 1.5" socket head allen in the first throttle cable bracket/intercooler mounting area. It's too long to install afterwards.
- ☐ Install all other intercooler mounting bolts hand tight and then slide the compressor assembly forward. Now torque intercooler mounting bolts to 25 ft/lbs.
62. Front plate/support installation:
- ☐ Take the 7.16" round support stands and tighten on setscrews. The hex end will go against the SC/intercooler adapter plate, round end goes against manifold. Tighten using the hex area on stand.
- ☐ Take the front plate assembly and install the drive collar leaving all socket head allen bolts loose. Slide collar and plate over the drive leaving it all loose.
- ☐ Install the supplied 3/8" x 1.5" button head allen bolt and supplied .870" stainless washer into recessed and slotted area of front plate. This will secure the plate to the support stands. **Do not tighten, just install hand tight.**
- ☐ **!! CAUTION !!** With the front plate pushed against the support stands, tighten the collar around the drive (one 1/4" allen bolt). Follow by tightening the (4) front 1/4" socket head allen bolts. **Apply a light amount of blue Loctite #242 to threads.**
- ☐ Torque the 3/8" X 1.5" button head allen bolts to 25 ft. lbs.
- ☐ **!! CAUTION !!** Install the .50" (1/2") blower pulley spacer; follow by installing the blower pulley. Secure with the supplied 6mm x 22mm socket head allen bolts. Hold pulley from spinning by wrapping the supplied SC belt around pulley and pinch it together. Tighten blower pulley bolts to 110 inch pounds.
63. SC belt installation:
- ☐ Loosen the sliding idlers (grooved and smooth) with allen wrench or socket.
- ☐ Release the tension from the spring-loaded tensioner using a 1/2" breaker bar.
- ☐ Install the supplied 10 rib SC belt. Adjust the sliding idlers so the spring loaded tensioner is located in the middle of it's range.

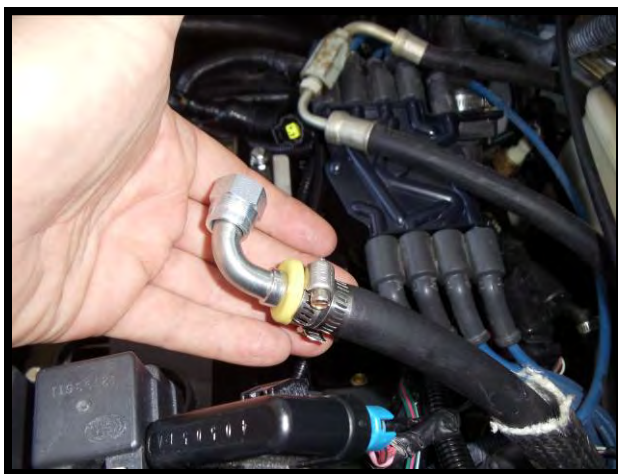


Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

64. Fuel system installation:

NOTE: The Whipple fuel system will only function properly when the fuel line inlet to the fuel filter does not have any large restriction.

- ☐ Locate the factory quick connect fitting that previously went to the fuel rail. Cut the factory connector off.
- ☐ Using the supplied 3/8" brass barb to barb fitting, press one end into factory fuel line you just cut. Use the supplied #6 clamps (2 per side) to secure factory hose to barb fitting.
- ☐ On the other end, use the new 3/8" fuel line supplied (**high PSI ONLY**), push hose over other end of barbed fitting. Use the supplied #6 clamps (2 per side) to secure factory hose to barb fitting.
- ☐ On the new end, route line to port side of Whipple fuel rail. Measure the proper length, cut hose to fit. Then install the supplied 90 deg -6AN fitting into hose. Make sure to push until it goes over every barb. Install fitting onto -6AN fitting on fuel rail.



- ☐ Route this fuel line to the inlet of the Whipple fuel rail and tighten line.

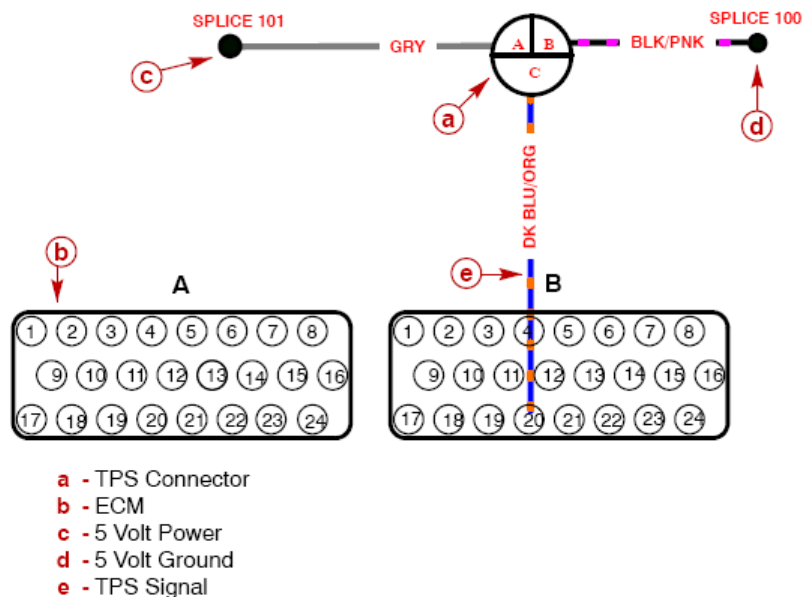
65. Install the 3/8" rubber 90 deg fitting on factory PCV valve (port side valve cover). Install the 3/8" plastic hose coupler into rubber 90 deg fitting. Route the new supplied 3/8" ID rubber hose from the factory PCV valve to the 3/8" barbed fitting located in the throttle body.



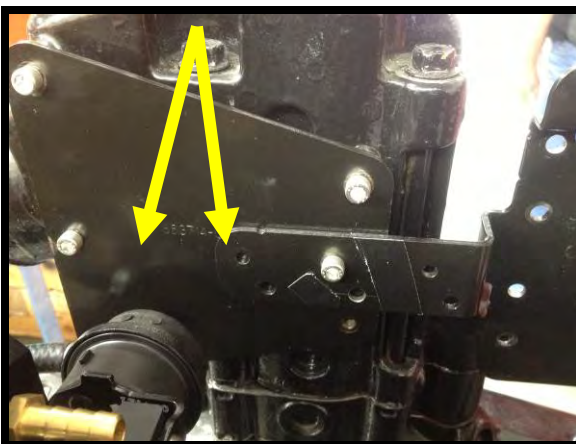
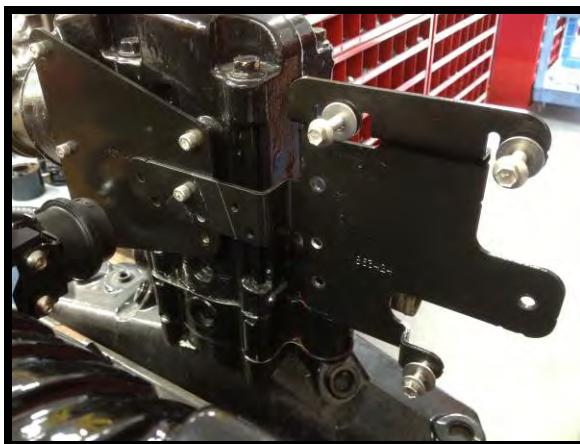
66. Install the supplied breather/filter (#1519) to the factory breather hose (starboard side valve cover) in the valve cover. Route to back of motor for clean installation.

67. Plug in the factory TPS connector to the new TPS sensor (verify wire colors match instructions so you don't plug in the wrong connector).

Throttle Position Circuit

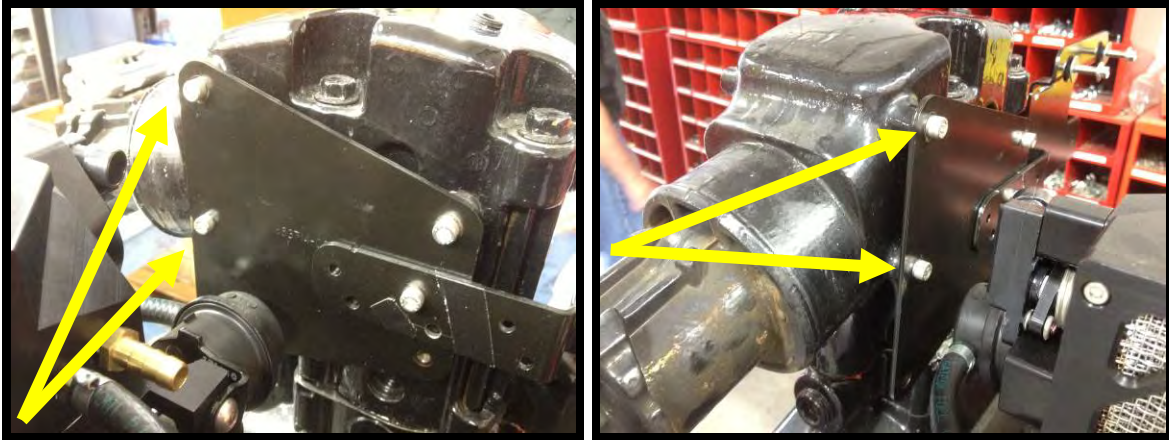


68. Install the factory PCM bracket on the factory flat steel bracket (located on inner port exhaust manifold). Use one of the pre-threaded holes to secure bracket and one of the $\frac{1}{4}$ " x $\frac{3}{4}$ " socket head cap screw/ $\frac{1}{4}$ " AN washer. Use a $\frac{1}{4}$ " drill bit and drill a second hole. Use the supplied $\frac{1}{4}$ " x $\frac{3}{4}$ "/ $\frac{1}{4}$ " AN washer while securing the bolt with the supplied $\frac{1}{4}$ " nut on the back of the bracket. This will essentially shift the PCM forward, allowing proper clearance of the bypass system.



Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

69. Install the Whipple supplied relay, fuse and breaker bracket by using the factory plastic push pins into the pre-drilled holes. Secure bracket with the supplied $\frac{1}{4}$ " x $\frac{3}{4}$ " socket head cap screw and $\frac{1}{4}$ " AN washers.



70. Reconnect the following electrical connections (if they have not already been connected):

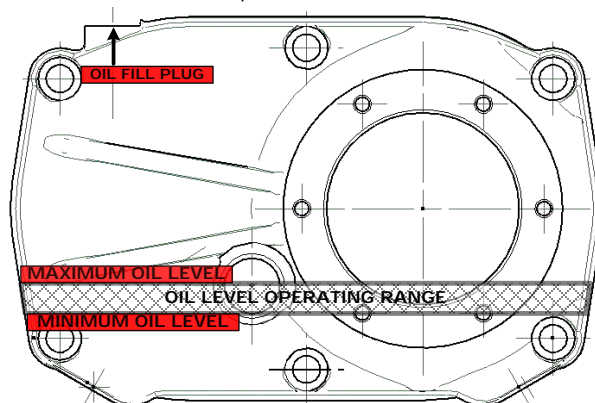
- ☐ Plug in factory ECT gauge sender connector (single wire) to sender you relocated to the new thermostat housing. This wire was previously extended.
- ☐ Plug in factory ECT connector to ECT sensor you relocated to the new thermostat housing.
- ☐ Plug in factory TPS connector to TPS sensor mounted on throttle body. Verify the color wire, its very common to connect the wrong 3-way into the TPS (Gray, Black/Pink, Blue/Orange).
- ☐ Plug in factory IAC connector to IAC motor mounted on throttle body.
- ☐ Plug in the new MAP sensor connector to MAP sensor (located in manifold). Verify the color wire, its very common to connect the wrong 3-way into the MAP sensor (Gray, Black, Green).
- ☐ Plug in the air temp sensor connector located in the back of the manifold.

71. Fill the new s/c compressor with oil.

- ☐ 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 SC OIL LEVEL

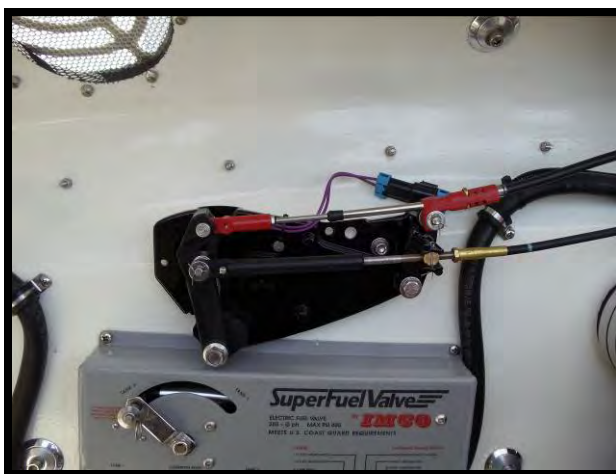
Fill to center of oil sight glass. 5.8 fl/oz. or 155cc.
DO NOT OVERFILL, WILL VOID WARRANTY!!



!! CAUTION !!

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

72. Relocate the factory shifter bracket to the transom or stringer. In some cases, the wires may need to be extended.



Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

73. Throttle linkage installation:

- ☐ Install supplied 1/4" linkage stud into anchor position and bell crank throttle arm. You may need to check linkage length to pick the appropriate hole.
- ☐ Install throttle linkage steel sleeve you removed from stock throttle linkage to "anchor" stud along with a 1/4" washer on both sides of the sleeve.
- ☐ Route linkage cable to the front starboard side of engine.
- ☐ Install factory throttle linkage anchor bolt into "L" adapter.
- ☐ Install factory throttle linkage bolt in 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 want to "preload" the linkage so the linkage slack is taken out and is forcing the throttle closed. This is very important to getting the motor to idle properly.
- ☐ Tighten all bolts, allens, etc. on throttle assembly.



74. Verify that the linkage does not go over center at any time. Should be able to go back and forth 100% without binding.

75. Install the supplied 91-octane only decal in a visible location, preferably by the gas gauge.



Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

76. Turn key to the on position and set fuel pressure to the following PSI (pump will prime for 4 seconds).



6.2MX MPI MODELS (including Reman motors) (all years) 43psi.



350 MAG MPI MODELS (all years) 43psi (2005+ models come equipped with this PSI from the factory).



350 BLACK SCORPION MODELS (all years) 43psi (new calibrations from 10/1/2012). Cals prior used 30psi.



377 BLACK SCORPION MODELS (all years) 43psi.

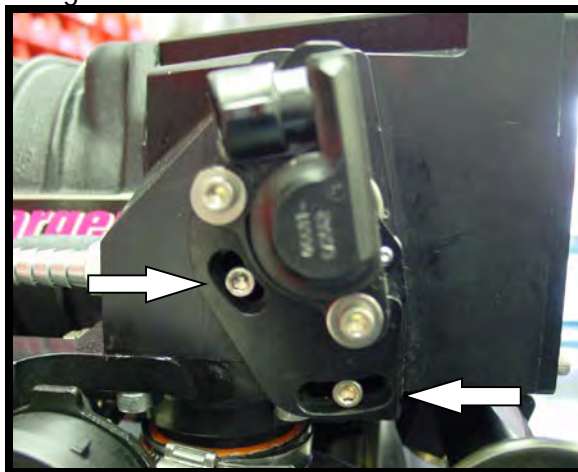
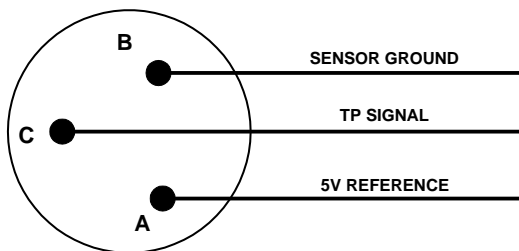
77. Adjust TPS voltage: **DO NOT START ENGINE WITHOUT SETTING!**



The TPS sensor is located on the port side of the throttle body. The sensor is installed onto a billet adapter that has two socket head allen bolts holding it in place. The billet adapter is slotted to allow adjustment to the TPS sensor.



With the key in the on position, with the TPS sensor connected, probe the blue wire (signal wire) in the TPS connector with a volt meter. The TPS sensor is a 0-5v sensor and needs to be in the .50v - .55v range. To adjust, loosen the allens holding the adapter on to the throttle body, rotate the billet adapter clockwise to raise the voltage, counter clockwise to lower the voltage. Once set, tighten allen bolts, turn ignition off for 5 seconds, turn ignition on, open the throttle to 100% and then close. Measure the TPS voltage again and make sure it is consistently returning to the same voltage.



BEFORE STARTING THE ENGINE

MAKE SURE THE THROTTLE CABLE OPERATION IS CORRECT. WITH THE ENGINE OFF, MOVE THE THROTTLE A FEW TIMES TO FULL OPEN AND CLOSED POSITIONS. THERE SHOULD BE NO BINDING OR STICKING AND SHOULD OPERATE FREELY.

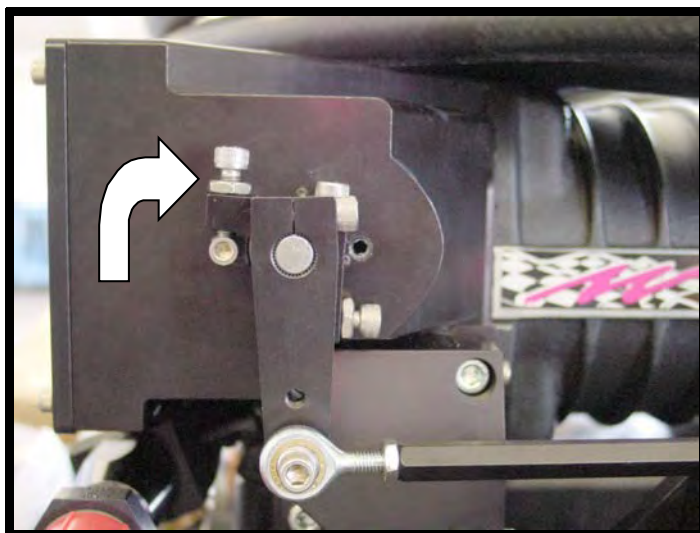
IDLE SPEED SETTING

78. 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 675 rpm once motor is up in the 120+ range of engine coolant temperature.

Temp F	50	66	82	97	113	129	145	160	176
Neutral	750	725	700	675	650	650	650	650	650
In Gear	750	725	700	675	650	650	650	650	650

☐ On the starboard side of throttle body, there's the linkage arm that is pushed over a splined shaft. Behind this is the throttle stops, one for wide open throttle and one for idle, you can adjust this screw to raise the idle speed or lower the idle speed.

☐ As shown in the following figure, you must adjust the socket head allen to raise or lower the idle speed. Note that this is where the throttle stops in the relaxed or returned position. Turn clockwise to raise rpm (allows more air to enter engine), turn counter clockwise to lower rpm (decreases air into engine).



☐ After adjusting, verify that TPS voltage has not moved out of range, if it has, readjust only the sensor.

Engines that idle to high:

☐ This means either there's a vacuum leak, too much timing 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 1/8th turns. **NOTE: Don't forget to tighten locking nut after adjustment.**

Engines that idle to low:

☐ This means either there's not enough air being fed to engine or not enough timing. To increase airflow at idle, take the socket head allen bolt/throttle stop and raise it so when the throttle is in its relaxed position, it will be slightly open more. Make small adjustments such as 1/16th turns. **NOTE: Don't forget to tighten locking nut after adjustment.**

☐ If the engine is loping between 600-1000, open the blade). If the RPM is to high, you must close the blade

(lower the voltage). If you do have a scanner, watch the IAC %. You want it to be between 0-40%. You must shut the motor off for 5 seconds to reset the IAC motor. If you do not have a scanner, you can adjust this setscrew until you see the motor idles around 700 on the tachometer, the motor should not hunt more than 100 RPM.

- ☐ 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:

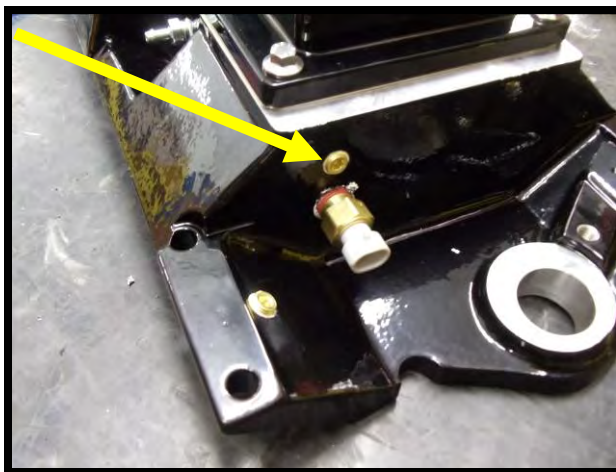
- ☐ This means the TPS voltage is slightly off and that it does not return to its "Closed Loop Idle System." To fix this, you must loosen the TPS sensor (located on port side of throttle body) and push the bottom out towards the back of the boat. This will lower the TPS voltage. Tighten allens and try starting it again. You may want to use the scanner or a volt-meter (0-5volt sensor output) to watch the voltage come down. Ideal voltage should be in the range of 0.50 – 0.55 volts.

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. To measure boost, install a fitting in the intake manifold, there are 3 additional 1/8" NPT holes for boost readings.
3. 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 at the fuel rail (1/8" NPT). 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 48-50psi (+/- 1psi). 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.
4. Intercooler water flow. The intercooler dump fitting should be passing a steady stream of water 1-2 feet past the thru-hull dump at high speeds.
5. To test manifold pressure, or to install a vacuum/boost gauge, there is an extra 1/8" port at the back of the intake manifold.



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.
5. Backflush intercooler once a season or every 50 hours, whichever comes first.
6. Replace spark plugs once a season or every 50 hours, whichever comes first.
7. Remove and clean stainless steel flame arrestor elements from Whipple throttle body every 25 hours.

NEVER/DO NOT!!!

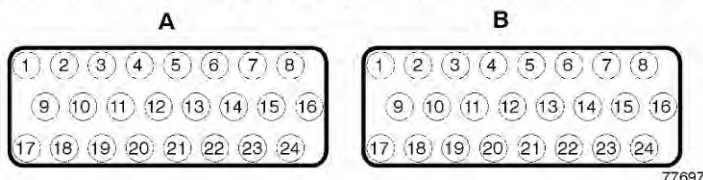
1. Never run octane less than 91.
2. Do not use octane booster, these are very hard on the spark plugs and only increase a few points. Example: 87 octane with octane booster, may raise a few "points" to 87.5, which is not acceptable.
3. Never operate engine if overheating.
4. Never operate engine in boost if water temp exceeds 150.
5. Never operate engine in boost if oil PSI falls below 20psi.
6. Do not operate engine in boost if fuel pressure falls below standard levels.
7. Do not design your own fuel system, the system is designed for use and installation as we specify.
8. Do not design your own water system, this system has been designed and tested to work according to our specifications.

DIAGNOSTIC INFORMATION

2002-2005 Pinout

ECM Pinout

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

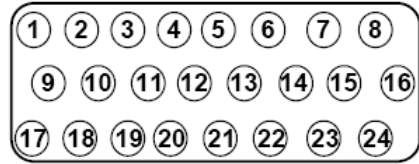
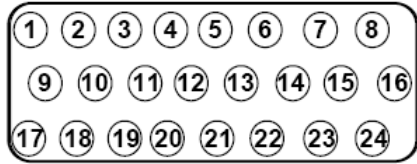


Connector A	Connector B
1 -Empty	1 -Splice 100
2 -Fuel Injector Circuit, Injectors 2, 3, 5, 8	2 -MAPT Connector Pin 2
3 -Empty	3 -MAPT Connector Pin 4
4 -CAN Line Connector Pin J	4 -Fuel Level Connector Pin C
5 -Diagnostic Connector Pin C	5 -Empty
6 -Odd Knock Connector Pin B	6 -Empty
7 -Even Knock Connector Pin B	7 -Oil Pressure Connector Pin C
8 -Splice 109	8 -Transom Connector Pin E
9 -10-Pin Connector Pin 4	9 -Paddle Wheel Connector Pin C
10 - 10-Pin Connector 2	10 -Crankshaft Connector Pin C
11 - CAN Line Connector Pin K	11 -Seapump Pressure Connector Pin C
12 - Diagnostic Connector Pin B	12 - Transom Connector Pin D
13 - Odd Knock Connector Pin A	13 - Digital Trim
14 - Even Knock Connector A	14 -Coolant Connector Pin B
15 - CAN Line Connector E	15 - Empty
16 - Splice 104	16 - Empty
17 - Fuel Injector Circuit, Injectors 1,4 6, 7	17 - Empty
18 - Empty	18 - Splice 102
19 - Fuel Pump Relay Pin 86	19 - Shift Interrupt Connector Pin C
20 - IAC Connector Pin 1	20 - Throttle Position Connector Pin C
21 - Gear Indicator Connector Pin B	21 - Splice 101
22 - Main Power Relay Pin 85	22 - Paddle Wheel Connector Pin D
23 - Splice 106	23 - Coil Driver Connector Pin B
24 - Splice 104	24 - Empty

Wire Splice Description

Splice Number	Description
100	5 Volt Transducer Ground
101	5 Volt Transducer Power
102	Wake Line
103	12 Volt 50 amp Protected
104	12 Volt Engine Ground
105	12 Volt From MPR
106	Switched 12 Volt Fused
107	12 Volt Fused
108	12 Volt Fused to All Injectors
109	Transmission and Drive Lube
110	Injectors 1, 4, 6, 7
111	Injectors 2, 3, 5, 8
113	Tachometer Lead
114	Ignition Coil and Coil Driver

2006-2008 Pinout

A		B	
			
Connector A		Connector B	
1	Fuel injector circuit, injectors 4 and 7	1	Splice 100
2	Fuel injector circuit, injectors 5 and 8	2	MAPT connector pin 2
3	Empty	3	MAPT connector pin 4
4	CAN line connector pin J	4	Fuel level connector pin C
5	Diagnostic connector pin C	5	Crankshaft connector pin C
6	Odd knock connector pin B	6	Empty
7	Even knock connector pin B	7	Oil pressure connector pin C
8	Splice 109	8	Transom connector pin E
9	10-pin connector pin 4	9	Paddle wheel connector pin C
10	10-pin connector pin 2	10	Camshaft connector pin C
11	CAN Line connector pin K	11	Seapump pressure connector pin C
12	Diagnostic connector pin B	12	Transom connector pin D
13	Odd knock connector pin A	13	Digital trim
14	Even knock connector pin A	14	Coolant connector pin B
15	CAN Line connector pin E	15	Empty
16	Splice 104	16	Empty
17	Fuel injector circuit, injectors 1 and 6	17	Empty
18	Fuel injector circuit, injectors 3 and 2	18	Splice 102
19	Fuel pump relay pin 86	19	Shift interrupt connector pin C
20	IAC connector pin 1	20	Throttle position connector pin C
21	Gear indicator connector pin B	21	Splice 101
22	Main power relay pin 85	22	Paddle wheel connector pin D
23	Splice 106	23	Coil driver connector pin B
24	Splice 104	24	Empty

10559

Engine Guardian System

General Description

Engine Guardian is the focal point of the self-diagnostic strategy on these engines. It helps protect the engine from possible damage that could result from several faulty conditions. The system monitors the sensors incorporated on the engine and if a malfunction is discovered, a fault description is stored in the PCM and available power is normally reduced. By ensuring that engine output is at a low enough level, the engine is better protected from thermally induced failures.

For example, if an open or short is found in any sensor, available power will be reduced to 90% of total, the Audio Warning System Alarm will sound 2 beeps per minute (2 Bp/min) and the Smartcraft gauges will display a warning lamp. In a seawater pump pressure low condition, the maximum rpm will vary with the pressure and temperature of the engine and could be limited to idle in extreme cases of overheating, a constant beep will sound and Smartcraft gauges will display a warning lamp.

IMPORTANT: Engine Guardian cannot guarantee that engine damage will not occur when adverse operating conditions are encountered. Engine Guardian is designed to warn the operator of an adverse condition and to reduce power by limiting rpm in an attempt to reduce possible engine damage. The boat operator is ultimately responsible for proper engine operation.

Approximate Temperature - to - Resistance Values		
Degrees F	Degrees C	ohms
210	100	185
160	70	450
100	38	1,800
70	20	3,400
40	4	7,500
20	-7	13,500
0	-18	25,000
-40	-40	100,700

Warning Chart

The engine warning system incorporates an audio alarm and, if installed, Smartcraft Gauges System. 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	Smartcraft Gauges	Audio Alarm	Available Power	Description
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 Open ¹	Yes	2 Bp/min	100%	Coil harness wire open
EST 1 Short ¹	Yes	2 Bp/min	100%	Coil harness wire short
Fuel Injector 1-7-4-6 Open	Yes	2 Bp/min	100%	Fuel injector wire open
Fuel Injector 3-5-2-8 Open	Yes	2 Bp/min	100%	Fuel injector wire open
Guardian Strategy	Yes	Constant	0% - 100%	Protection Strategy
IAC Output LO/HI ²	Yes	2 Bp/min	90%	Open
Knock Sensor 1 Lo	Yes	2 Bp/min	90%	Open
Knock Sensor 1 Hi	Yes	2 Bp/min	90%	Short
Low Drive Lube Strategy	Yes	Constant	100%	Low oil in sterndrive
Low Oil Pressure Strategy	Yes	Constant	0 - 100%	Low oil pressure strategy

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.

NOTE: ¹ GM EFI ignition system failure open or shorted, driver will flag EST 1 fault.

NOTE: ² TPS must see 5% throttle then back to 0% to flag IAC fault.

NOTE: ³ 2-wire sensor open will read sensor Hi on scan tool.

NOTE: ⁴ VDC PWR Low - if shorted or no voltage engine will not start; if VDC PWR voltage falls below 22 volts will set sensor faults.

NOTE: ⁵ Shift Switch - will activate code when engine rpm are above 3500 rpm and 40% load.

Warning Chart (continued)

Fault	Smartcraft Gauges	Audio Alarm	Available Power	Description
Main Power Relay Output	Yes	No	N/A	Engine will not start
Main Power Relay Backfeed	Yes	No	N/A	Engine will not start
MAP Sensor 1 Input High	Yes	2 Bp/min	90%	High voltage or short
MAP Sensor 1 Input Low	Yes	2 Bp/min	90%	Open, no visual on SC1000
Oil PSI CKT Hi	Yes	2 Bp/min	90%	Open, defaults to 50.7 psi
Oil PSI CKT Lo	Yes	2 Bp/min	90%	Short, defaults to 50.7 psi
Overspeed	Yes	Constant	rpm limit	Engine over rpm limit
Pitot CKT Hi	No	No	100%	Short or high voltage
Pitot CKT Lo	No	No	100%	Open
Sea Pump PSI Lo	Yes	Constant	6-100%	Guardian Strategy
Sea Pump CKT Hi	Yes	2 Bp/min	90%	Open - 0 psi reading
Sea Pump CKT Lo	Yes	2 Bp/min	90%	Voltage high or short
Sea Water Temp	No	No	N/A	Defaults to -31 degrees C
Fuel Level #1	No	No	N/A	Only if turned on
STB EMCT CKT Hi	N/A	N/A	N/A	N/A
STB EMCT CKT Lo	N/A	N/A	N/A	N/A
STB EMCT CKT Overheat	N/A	N/A	N/A	N/A

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.

NOTE: ¹ GM EFI ignition system failure open or shorted, driver will flag EST 1 fault.

NOTE: ² TPS must see 5% throttle then back to 0% to flag IAC fault.

NOTE: ³ 2-wire sensor open will read sensor Hi on scan tool.

NOTE: ⁴ VDC PWR Low - if shorted or no voltage engine will not start; if VDC PWR voltage falls below 22 volts will set sensor faults.

NOTE: ⁵ Shift Switch - will activate code when engine rpm are above 3500 rpm and 40% load.

Warning Chart (continued)

Fault	Smartcraft Gauges	Audio Alarm	Available Power	Description
Steer CKT Hi	No	No	100%	Short or high voltage
Steer CKT Lo	No	No	100%	Open
TPS1 CKT or Range Hi	Yes	2 Bp/min	90%	Short or high voltage
TPS1 CKT or Range Lo	Yes	2 Bp/min	90%	Open or low voltage
Trim CKT or Range Hi	Yes	No	100%	Open or high voltage
Trim CKT or Range Lo	Yes	No	100%	Short
5 VDC PWR Low ⁴	Yes	2 Bp/min	90%	Short or low - engine may not start
MAT Sensor Hi	Yes	2 Bp/min	90%	Open - default to -32 degrees F
MAT Sensor Lo	Yes	2 Bp/min	90%	Short - default to -32 degrees F
Shift Switch ⁵	Yes	2 Bp/min	90%	Open 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.

NOTE: ¹ GM EFI ignition system failure open or shorted, driver will flag EST 1 fault.

NOTE: ² TPS must see 5% throttle then back to 0% to flag IAC fault.

NOTE: ³ 2-wire sensor open will read sensor Hi on scan tool.

NOTE: ⁴ VDC PWR Low - if shorted or no voltage engine will not start; if VDC PWR voltage falls below 22 volts will set sensor faults.

NOTE: ⁵ Shift Switch - will activate code when engine rpm are above 3500 rpm and 40% load.

Data Collection

The following charts can be filled out to help troubleshoot problems with the engine. With this information the Mercury MerCruiser Customer Service personnel will be better able to identify the potential problem.

PCM 555/ECM 555 Scan Tool Worksheet

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

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	FPC TOTAL	mg	oz
IAC PWM	%	%	FUEL PRESSURE	kpa	psi
SPARK ANG BTDC					
NOTES					

PCM 555/ECM 555 Scan Tool Worksheet (continued)

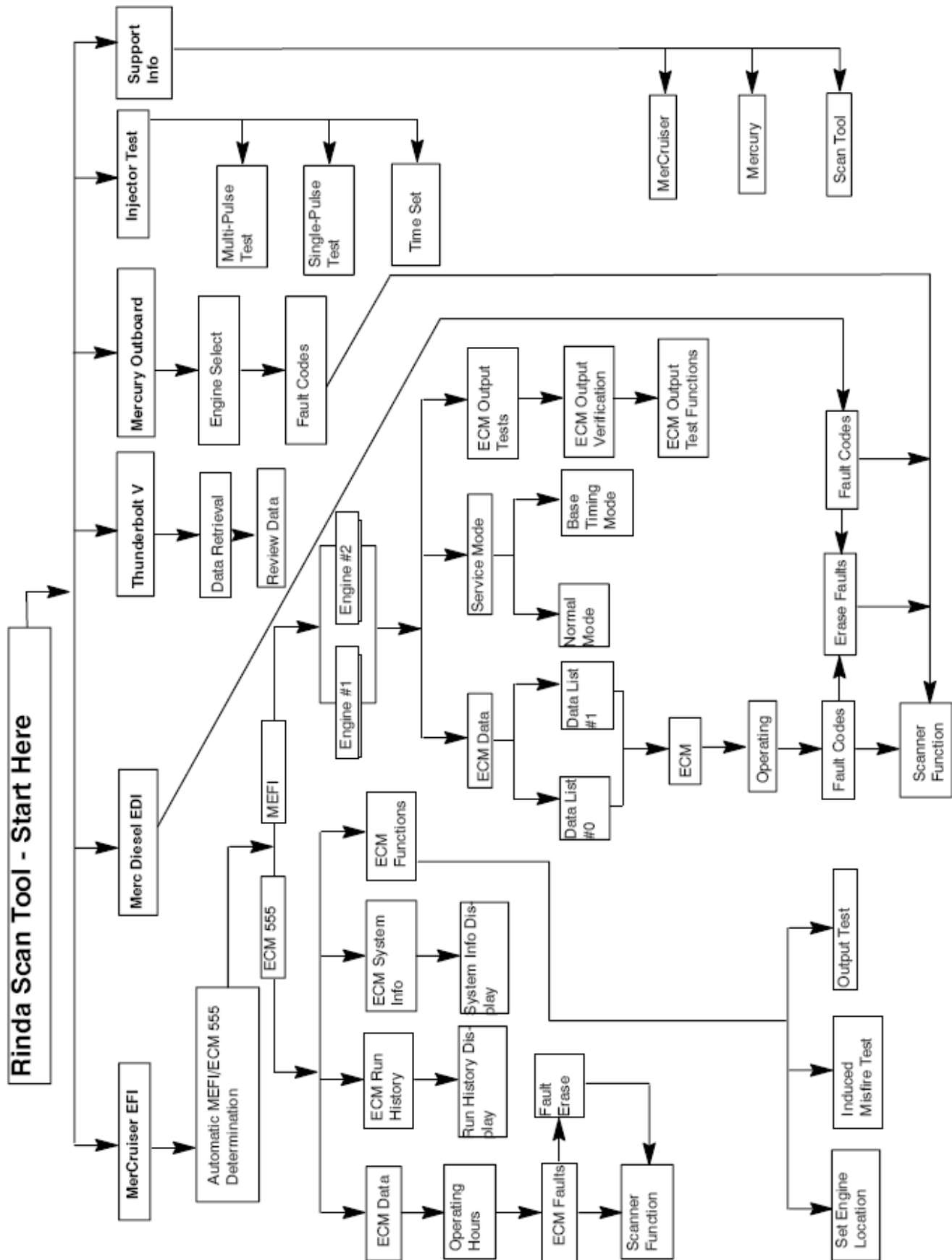
Idle / Closed Throttle / In Gear					
Engine Conditions	Metric	SAE	Engine Conditions	Metric	SAE
RPM			BARO (pressure)	kpa	psi
BATTERY VOLTAGE	volts	volts	STB EMCT	C	F
PWR 1 VOLTS	volts	volts	PORT EMCT	C	F
MAP (pressure)	kpa	psi	OIL (pressure)	kpa	psi
FUEL LEVEL			ECT	C	F
AVAILABLE POWER	%	%	SEAPUMP PRESSURE	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	%	%	SEAPUMP 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					

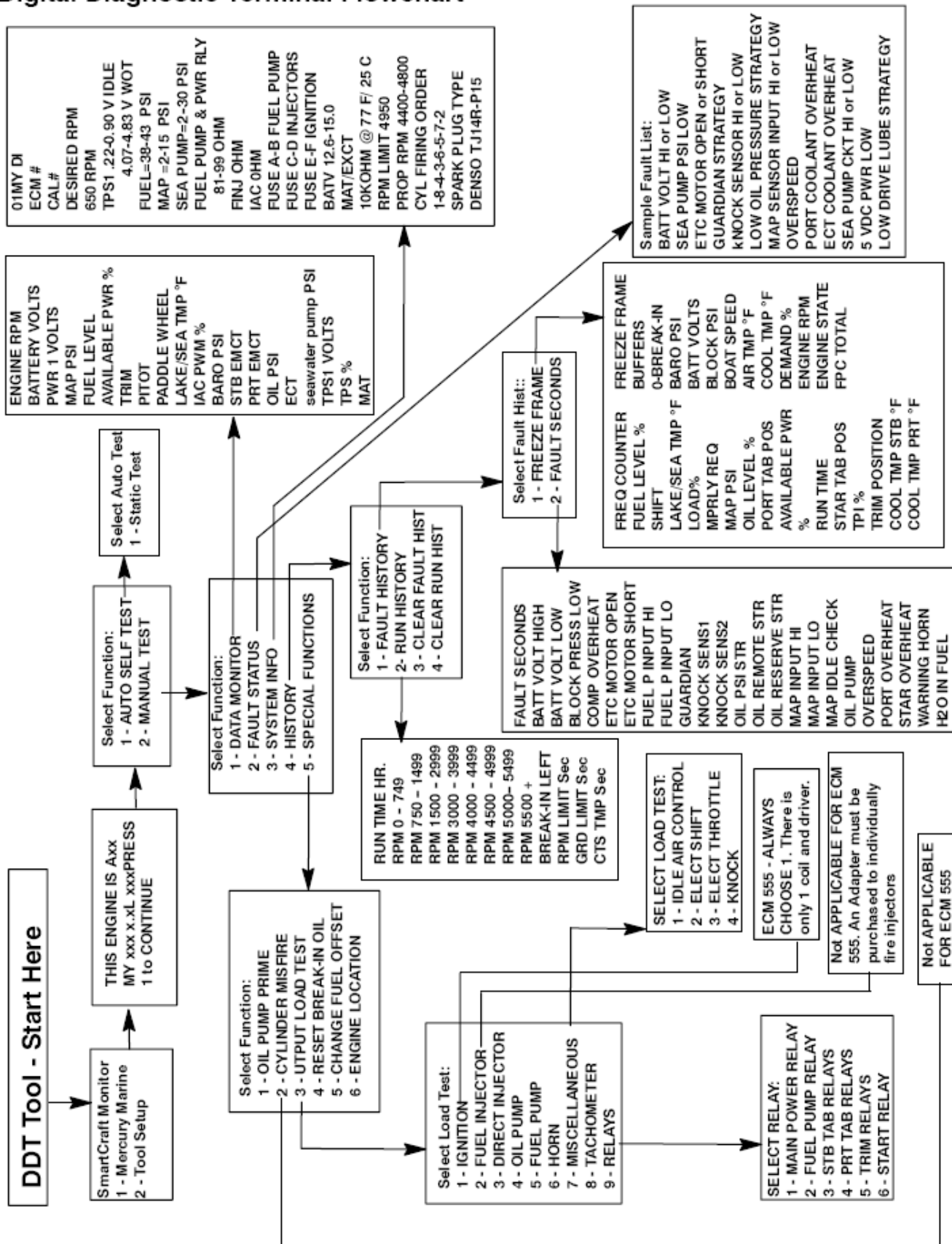
ECM 555/ECM 555 Scan Tool Worksheet (continued)

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 %	%	%	SEAPUMP 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 %		%		%	SEAPUMP 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									



Digital Diagnostic Terminal Flowchart



IMPORTANT INFORMATION

SPEEDS

Due to the variance in boats and combinations, it's impossible to guarantee the speed increases or stability of the boat with the increased power and larger propellers. You must use your discretion for proper boating safety. In most applications, you will need 4 pitches larger propellers to maintain proper rpm ranges when supercharged.

BOOST LEVELS

All Whipple kits are shipped with approximately 5-6psi for stock engines (@ sea level). Additional pulley's are available for lower and higher boost levels, the supplied ECM has been calibrated for 4-10lbs of boost, sea level to 6000 feet elevation. Higher boost levels must run higher octane levels such as 100LL, 104, 110, 116, etc. Whipple does not recommend exceeding 8psi of boost on stock engines at anytime.

MUFFLERS

Many states are now mandating lower DB levels and some must use mufflers to reach those levels. There are many different systems out there, and we cannot test them all. It's very important that you measure your boost level in the engine before and after the muffler s installed. If the mufflers are limiting flow, you will see an increase in boost. While the effective power may be the same, this can increase cylinder temperatures to critical levels and should be avoided. Whipple has tested Gibson and Imco muffler tips and have found these to be very effective at lowering the DB level while not limiting exhaust flow. Again, there are many different systems out there so some testing may be required.

EXHAUST HEADERS

The stock cast iron headers work with stock boost levels. Upgraded exhaust systems such as Imco Power flows, Eddie Marine, Lightning and CMI will help performance and reliability by lowering the back pressure, thus lowering cylinder temps.

FUEL SYSTEM

The Whipple fuel system (flow) needs no additional changes for power levels up to 600HP. After 600HP, the supplied fuel pump will reach it's maximum capacity and will need to be replaced to a larger size, consequently, to reach this power level, internal engine modifications will be required. Consult your authorized Whipple dealer for more information.

AIR FUEL RATIO

Air fuel ratio is the measurement of the amount of air and fuel being burned during the combustion process. In order for you to monitor the air fuel ratio, you must have a 18mm stainless steel bung welded into the collector of the header or tailpipe (aftermarket exhaust only) or a billet spacer between the riser and exhaust manifold (stock). With aftermarket systems, it must be within 2" of the sealing flange or in the tail pipe, approx. 2" away from the sealing flange. This must be double welded to insure that there are no water leaks. There are many companies that can do this for you, CMI, Teague Custom Marine, Imco, Eddie Marine, Stellings, etc.

There are currently many different air fuel-monitoring systems and accuracy is not always guaranteed. Wide band oxygen sensors vary over time and deteriorate with uses of leaded gasoline. Whipple only uses Horiba wide band analyzers and UEGO 6-wire sensors, the most accurate available. Our sensors are checked after every use and transfer functions are changed every time so make sure you're using an accurate meter. There are currently quite a few meters on the market that do the job pretty well, some good low cost a/f meter at www.aemelectronics.com, www.ngk.com, www.innovatemotorsports.com, www.fuelairspark.com, www.autometer.com.

The Whipple supplied calibration has a conservative tune where WOT should be around 11.50-11.85:1. Idle A/F will vary depending on engine temp, but this should roughly be 13:1. Cruising, mid level rpms and throttle ranges should come to 13:1. As boost increases, the air fuel will get progressively richer. Adjusting the static pressure will either richen or lean the entire curve, this should only be done with an accurate a/f meter. Whipple has found that 12.6:1 is approx. the best a/f for power (at WOT) but is very dangerous on pump gas and should only be run that way on custom, purpose built motors or on race gas. Be very careful, too lean of an air fuel ratio increase cylinder temps and increase the chance of detonation, which is detrimental to engine life.

FUEL OCTANE

Never run a fuel octane that is below 91octane, (RON+MON)/2. It is recommended, when available, to run 92-94 octane.

Whipple Charger Installations Instructions for Mercury 350/377/383 Mercury Engines

Never mix mid level (below 91) with 91+, this is very dangerous and can cause severe engine damage. Do not attempt to increase octane ratings with octane boosters, these are very hard on spark plugs and many brands do very little to the actual octane rating. For emergence situations, the best octane booster found to date is made by NOS, the "Off-road" formula has shown to increase the octane rating nearly 2.5 points when mixed at it's most concentrated level. Again, this is very hard on spark plugs so constant use will require increased spark plug maintenance.

INTERCOOLER WATER FLOW

The intercooler does not need water being run through it at all times. It's main function is to remove the heat from the compression of air, therefore you should always have water flow when your in boost to help reduce the manifold air temperature. The intercooler can withstand 50psi and becomes more effective with more water flow, therefore it's ideal to pump as much water through the intercooler as possible, giving you the coolest discharge temps.

The intercooler should be flushed every time its run in salt or brackish water and should be back-flushed every 50 hours to ensure proper cooling.

FUEL LEVEL

Never operate at WOT when the vessel fuel levels are below a ¼ tank. Low fuel levels could cause the fuel pump to cavitate and you'll have fuel flow spikes resulting in lean conditions and consequently detonation.



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 # _____	