



*Installation Manual
GM SMALL BLOCK CARBURATED*



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

*Version V1R3
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WHIPPLE SUPERCHARGER INSTALLATION MANUAL

This product is intended for use on **STOCK AND CUSTOM WELL-MAINTAINED ENGINES**. Installation on a worn-out or high use engines 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.

*****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. USE A WIDE BAND AIR FUEL SENSOR AND GAUGE TO SETUP CARBURETOR.

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.

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

Factory RPM limits should be maintained if installing on stock engines. If you are installing on a custom engine, contact the engine builder for ideal rpm range.

RECOMMENDED PREPERATION FOR INSTALL

It's mandatory that you replace the factory spark plugs with a minimum of 1 heat range colder. Proper spark plug gap is .032". Failure to replace spark plugs to the colder NGK could result in engine failure. Whipple only recommends NGK copper style plugs for supercharged applications.

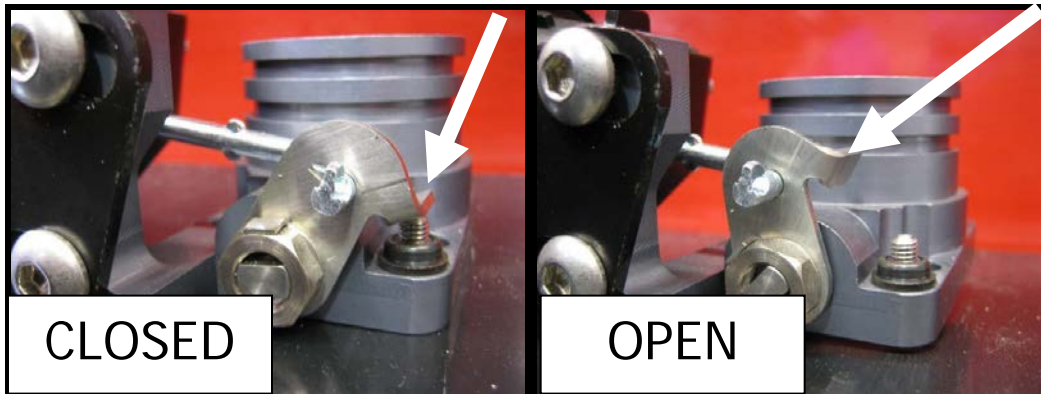
TOOLS RECOMMENDED

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, 0-15psi fuel pressure gauge with line kit and a torque wrench.

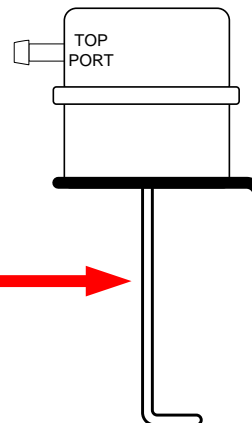
SYSTEM PERFORMANCE INFORMATION

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:

!! 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.

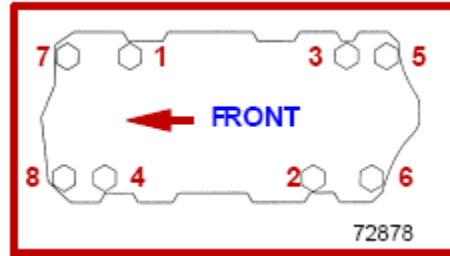
COMMON ABBREVIATIONS

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

INSTRUCTIONS

1. Disconnect (B+) battery cable.
2. Drain water from block using the factory drain plugs.
3. Remove the stock accessory belts.
4. Remove the stock circulating water pump and hoses. Clean the block surface.
5. Remove the stock crank pulley. Clean the harmonic balancer surface for the new pulley installation.
6. Remove the stock throttle linkage.
7. Remove the stock carburetor and flame arrestor.
8. Remove the distributor and intake manifold.
9. 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 3V accessory pulley to the harmonic balancer. Utilize the (3) 3/8" 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" 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.
10. Apply intake gaskets for new manifold. Install a 3mm bead of silicone around all 4 water passages of the cylinder head, both on the head surface as well as gasket to manifold surface.

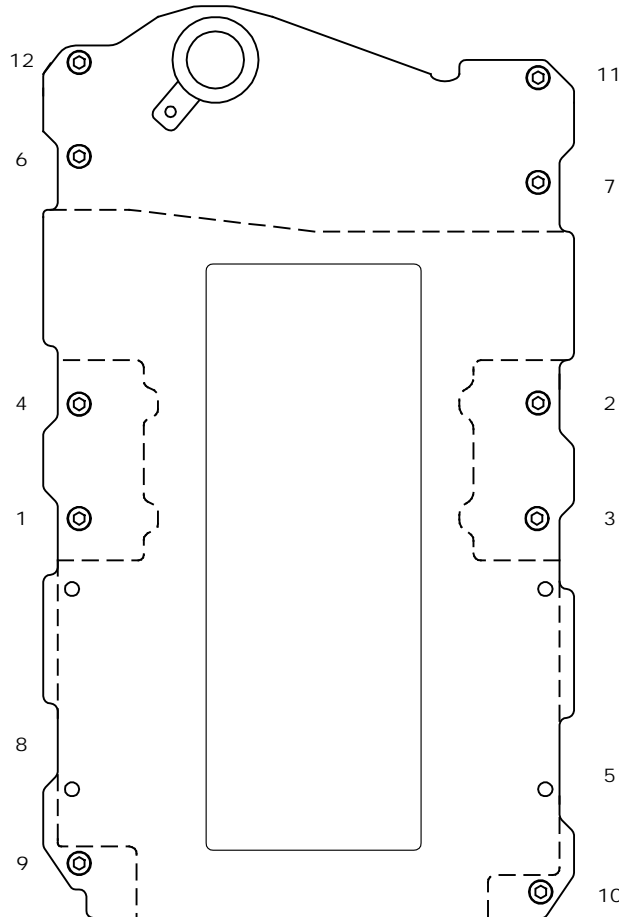
11. (8-BOLT) Install Whipple intake manifold and torque as the following diagram shows:



12. (12-BOLT) Install Whipple intake manifold and torque as the following diagram shows:

Small Block Intake Manifold Torque Pattern

- 1) Tighten all bolts until snug
- 2) Torque bolts to 25 ft. lbs in the torque sequence provided.
- 3) Now re-torque the intake bolts to 35 ft lbs. in same torque pattern.

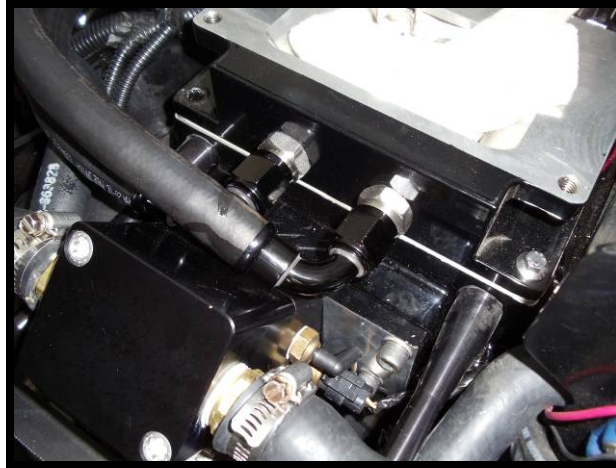


13. Install stock distributor. Set to 28 degrees total timing (spark may vary depending on application).

14. Install the supplied stainless steel water cross-over to the block. This unit can be mounted in 2 directions, use which is best for water inlet routing. Use the supplied 3/8" x 3/4" SHCS and 3/8" AN washer to secure cross over to block. Use the supplied gaskets between the cross over and engine block for sealing.

15. Intercooler water routing:

- Install an intercooler water feed source (pickup, tee, dual stage sea pump). 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 feed source 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.



16. 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.**

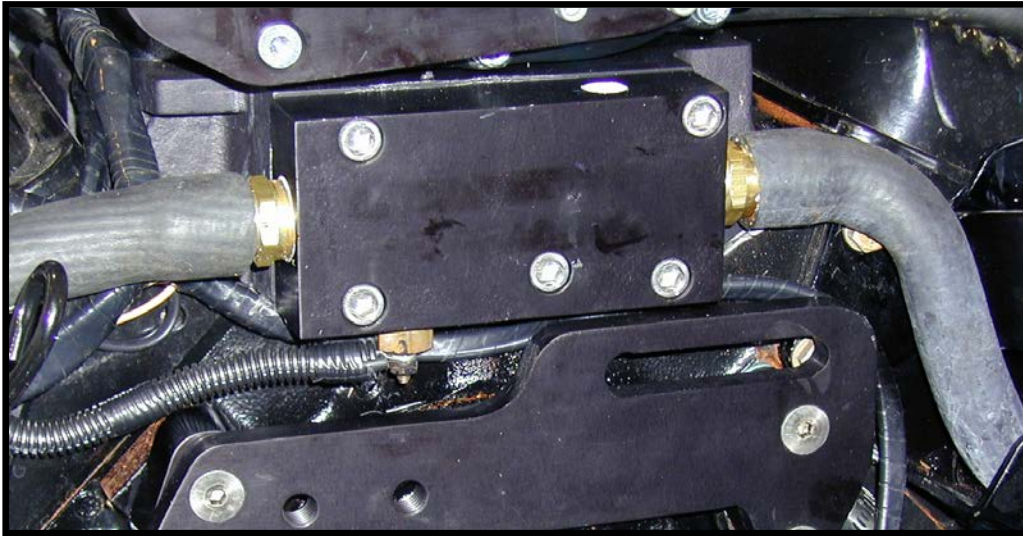
- Find visible location for thru-hull fitting above the water line.
- Mark your spot on the boat and drill 2 holes using a 7/8" hole saw.
- Apply marine type silicone to exposed wood and fiberglass as well as the back of thru-hull fittings.
- Insert fitting in boat and from the backside, install the aluminum nut. 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.

17. Apply light amount of gasket cinch to manifold top 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.

18. Install supercharger/intercooler assembly by lying on intake manifold with throttle cable assembly as well. Install all intercooler mounting bolts hand tight and then slide the compressor assembly forward. Now torque intercooler mounting bolts to 25 ft/lbs.

19. Apply small amount of silicone sealer to thermostat housing mounting surface of manifold.

- Mount water distribution block on front side of manifold as shown in picture. Install pipe sealant to bolt threads (these go into wet passage).
- Apply small amount of Teflon sealant to threads of temp sender. Install temp sender on bottom of thermostat housing.



20. Front plate/support installation:

- Take the 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 blower pulley. Secure with the supplied 6mm x 14mm 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.

21. Tighten bypass hose clamps (located on rear of supercharger).

22. Install SC belt by releasing the tension from the tensioner using a ½" breaker bar. Loosen the mounting bolts on the sliding idlers. Once belt is on all pulleys, push both sliding idlers toward starboard side and then release the tensioner so that it's pointing at roughly a 5 O'clock position. Notice the stops on the tensioner, it must have a minimum of 1 ½" between stops to work properly.



23. **⚠ WARNING!!** Fill the new s/c compressor with oil per supplied instructions.

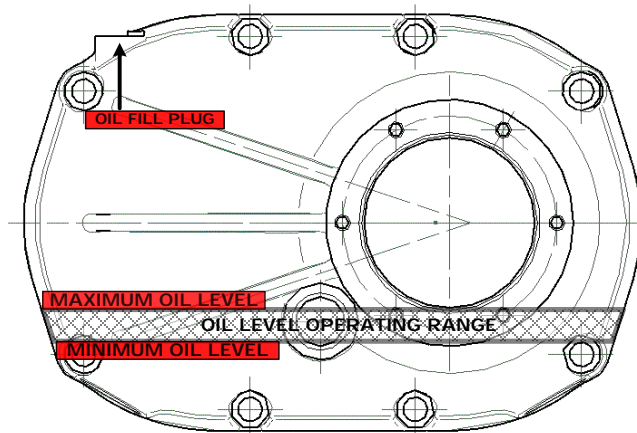
- Make sure the SC is sitting square/flat.
- Remove -4AN allen plug and fill SC with **WHIPPLE SC OIL ONLY!!**
- Fill to the middle of the sight glass. NOTE: The W200AX compressor takes a maximum of 6.8 fl/oz (200mL).
- Reinstall -4AN allen plug.
- NOTE: After running the SC, the oil level will lower 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 100 hours (every season) and only use **WHIPPLE SC OIL!!**

!! CAUTION !!

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

WHIPPLE SC OIL LEVEL

***Fill to center of oil sight glass. (W140R 5.8 fl/oz) (W200R 6.8 fl/oz)
DO NOT OVERFILL, WILL VOID WARRANTY!!***



24. Install the 91-octane decal on the dash, in a visible location.



25. Lay a thin layer of silicone sealant to supercharger/carburetor mounting flange. Install carburetor with spacer plate provided.
26. Install bypass vacuum hose to pure vacuum source (must be vacuum only, not boost). **Secure with wire tie.**
27. Install stock linkage (you're required to drill a hole in the bracket for best location). **DO NOT GET ALUMINUM SHAVING INTO THE SUPERCHARGER, SEVERE DAMAGE WILL OCCUR.**
28. Install proper fuel lines to carburetor.
29. Install high flowing flame arrestor. Remember that you're making nearly 50% more power, your stock flame arrestor will not be enough.

GENERAL CARBURETOR SETTINGS

These are only recommendations for starting points on stock, unmodified 350CI motors. This will not work on every application. Whipple does not offer these carbs, and does not offer tuning advice. This is only a recommendation.

You should only use a Coast Guard Approved Carburetor.

**Holley Double Pumper 650CFM. Part #4777S
50CC Pumps
.040 Squirters
Jets – 70 Primary, 75 Secondary
6-8psi of fuel pressure**

BEFORE STARTING THE ENGINE

△ WARNING!! 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.

PRIME FUEL PUMP WITH FUEL!! DO NOT RUN THIS PUMP DRY UNDER ANY CIRCUMSTANCES!!

***CRITICAL!!!
LAKE TEST***

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. **△ WARNING!!** Make sure 91 octane or higher is in the vessel. If unsure, drain the tank completely empty and fill with 91 or higher.
2. The cooling system is designed to run without a thermostat. Normal operating temps should be between 100-120deg F. If temps are climbing, water flow is not maintaining temperature, therefore it needs more water flow. If the motor runs too cold, you can install a restrictor into the thermostat housing to restrict water flow. Do not install a thermostat, it requires a bypass line behind the thermostat which you would need to drill the manifold. Side style pickups on drives are typically not adequate for proper flow, a low water nose style pickup or external pickup may need to be installed to keep a high water flow through the heat exchanger. If you have an XZ drive with dual water pickups, it is be necessary to plug side draft holes to increase pressure.
3. **△ WARNING!!** Fuel pressure is critical to keep the carburetor full during operation. Whipple highly recommends running a fuel PSI gauge (0-15). Under WOT, full boost, max rpm, the fuel pressure should be 9psi (+/- 2). 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.

FUEL IS UNDER PRESSURE!! Be very careful while removing the fuel rail bolts as fuel may be released under pressure. Prevent fuel spray by covering the injectors with a shop towel while the bolts are being loosened.

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, which ever comes first.
3. Check the supercharger/accessory drive belt. Adjust or replace as required.
4. Inspect and clean fuel filter every 25 hours.
5. Clean idle air motor conical filter every 15 hours.
6. Inspect spark plugs every 25 hours.
7. Inspect and verify bypass actuator movement every 25 hours.
8. Replace spark plugs every 50 hours or once a season, which ever comes first.
9. Replace distributor cap and rotor every 50 hours or once a season, which ever comes first.
10. Replace plug wires every 100 hours or every 2 seasons, which ever comes first.
11. Follow factory service intervals for all other components.

△ *WARNING!!* ***DO NOT!!!***

1. Never run octane less than 91, higher octane is always recommended.
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. **△ *WARNING!!*** Do not hook the new fuel pump to the trim pump! 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 140.
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 Map sensor, 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. Do not run more timing than 8 degrees base.
12. Never set engine timing out of base timing mode, it will not be accurate no matter what you think.
13. Only run spark plugs that are specified by Mercury Hi-Performance or one heat range colder.

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 6-7psi for stock engines (@ sea level) unless other requested. Additional pulley's are available for lower and higher boost levels.

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 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

Stock cast iron headers are extremely restrictive an limit power potential. High flow units such as Imco Power Flow's and CMI can significantly increase power and lower EGT's.

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, 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.

Whipple has found that 12.6:1 is approx. the best a/f for power but is very dangerous on pump 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. 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.

**SUPERCHARGED
TARGET AIR FUEL 91 OCTANE**

TARGET AIR FUEL RATIO/ALUMINUM HEAD

Manifold pressure/Boost					
RPM	-5	0	2.5	5	7.5
800	13.00	13.00	13.00	12.50	12.50
1000	13.00	13.00	13.00	12.50	12.50
2000	13.00	13.00	12.75	12.50	12.50
3000	13.00	13.00	12.75	12.50	12.25
4000	13.00	13.00	12.75	12.25	12.00
5000	13.00	13.00	12.50	12.00	11.80
6000	13.00	13.00	12.50	12.00	11.80

Common Error OK:

Rich .25
Lean .10

Common Error Not OK:

Rich .75
Lean .25

TARGET AIR FUEL RATIO/CAST IRON HEAD

Manifold pressure/Boost					
RPM	-5	0	2.5	5	7.5
800	13.00	13.00	12.75	12.00	12.00
1000	13.00	13.00	12.75	12.00	12.00
2000	13.00	13.00	12.75	12.00	12.00
3000	13.00	13.00	12.75	12.00	11.75
4000	13.00	12.75	12.25	11.75	11.75
5000	13.00	12.50	12.00	11.50	11.50
6000	13.00	12.50	12.00	11.50	11.50

Common Error OK:

Rich .25
Lean .10

Common Error Not OK:

Rich .75
Lean .25



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 # _____	