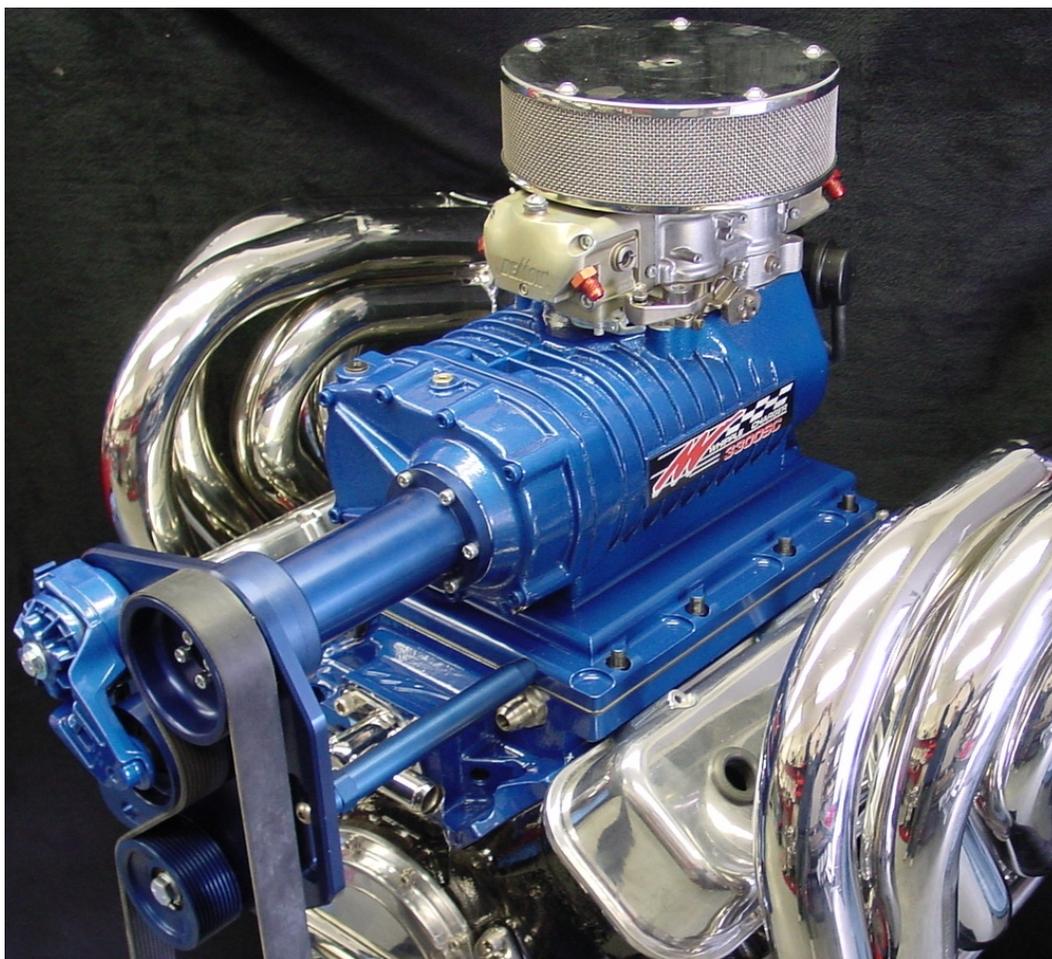


# MERCURY RACING 500HP CARB SUPERCHARGER INSTALLATION INSTRUCTIONS STAGE 1



**Last updated January 23rd, 2007**

## **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.**

### **RECOMMENDED PREPERATION FOR INSTALL**

It's highly recommended that you replace the factory spark plugs with a high-quality plug that's a minimum of one heat range colder than stock. For 502 magnums with stock cast iron heads, a **NGK R5673-7** works well. Proper spark plug gap is .032" - .035". Custom engines, different heads, camshafts, etc. may require different spark plugs.

### **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 boost gauge, 0-15 lb. fuel PSI gauge with line kit and a torque wrench.

### **EXTRA PARTS REQUIRED**

This system requires a new fuel system, we have supplied you with the appropriate fuel pump, regulator and filter, but you will be required to manufacture some fuel lines and supply your own fittings. Whipple recommends high grade, USGC approved lines only. This system also requires a new intercooler pickup to be installed, a sea-strainer is recommended. Whipple supplies a standard 90deg transom pickup although this may not work on your boat, if that's the case, you will need to install a different style of pickups. Consult the boat manufacture for the best location and style to produce as much water flow as possible. You must never run smaller than a 3/4" ID line to the intercooler. If running a strainer, you should run a larger line to the strainer, as this will be a restriction. Max PSI in the intercooler is 50psi which will be very difficult to reach with Whipple designed inlet fittings. You do not want to run the intercooler tee'd off the sea pump line, this will rob water from the engine and will lower overall reliability.

Whipple also highly recommends installing a mechanical vacuum/boost gauge. Typically a 0-20in HG vacuum/0-15psi boost gauge would work best. Whipple does it's best to estimate the proper boost levels, but because of the many variables from boat to boat and engine to engine, it's impossible to give exact boost levels. Therefore, you will have to run the engine under load (dyno or lake) to measure the boost level, which may require changing by the SC or crank pulley size.

## **WHIPPLE CHARGER INSTALLATION INSTRUCTIONS** **FOR 500HP CARB STAGE I AND II**

This product is intended for use on **WELL-MAINTAINED ENGINES**. Installation on a worn-out 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, check and change spark plugs, spark plug wires, distributor cap, and rotor if necessary. This will indicate the condition of the engine for reference.

**\*\*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). SEVERE DAMAGE WILL OCCUR IF ANYTHING LESS IS UTILIZED. DO NOT TRY TO MIX LOWER OCTANE WITH HIGHER OCTANE. IF GAS RATING IS LOWER THAN 91, DRAIN AND REPLACE WITH 91 OCTANE.**

2 - ALWAYS LISTEN FOR ANY SIGN OF ENGINE KNOCKING, IF PRESENT DISCONTINUE USE IMMEDIATELY.

3 - DO NOT OVER FILL THE SUPERCHARGER FRONT GEAR CASE WITH OIL- SEVERE DAMAGE TO THE SUPERCHARGER WILL OCCUR.

4 - IF YOU HAVE ANY OIL-FED SUPERCHARGER SYSTEM, DO NOT START WITHOUT ENGINE WITHOUT BELT ON AND VERIFY OIL FLOW DURING INITIAL INSTALL.

**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**

1. Drain all the fuel if the grade is in question or old. Do not mix low octane with higher octane. If octane is lower than 91, drain until empty and fill with 91 or higher.
2. Check water block pressure. Whipple Superchargers have done numerous hours of testing and has found that under peak power or wide open throttle, the minimum water block pressure should never be below 20lbs. You never want to exceed 35lbs. For optimum power and reliability, engine operating temp of 110 deg. F and below is ideal. Hotter temps will have a higher tendency to detonate. In order to achieve this, you must run without a thermostat. If you do not have enough water flow the engine will get hot and be more likely to detonate, if you do not have enough pressure, you may develop hot spots in the heads. If you restrict the outlet to gain pressure, you will decrease flow. Whipple has found that under no circumstance does the Mercury strut style/side water pickups flow enough water to create this pressure. Whipple has also found that bolt-on nose cones with nose style pickups do not have enough water flow to create this pressure either. Mercury's low water pickup has been found to be sufficient, as well as Imco's bottom units, otherwise a low water pickup should be installed.
3. Supercharger by-pass system. The supercharger is installed with a by-pass system. This allows the supercharger to operate at higher efficiency. 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.
4. Never over fill the oil in the supercharger. If the SC is fed from the engine oil supply, follow the instructions as there are no warranties for superchargers ran without oil.
5. This system is made as a universal SC system and therefore each engine may vary on instructions and running/tuning.
6. Only use Black RTV silicone for sealing against gas.
7. Have your engine/vessel tested by a qualified carbureted tuner.

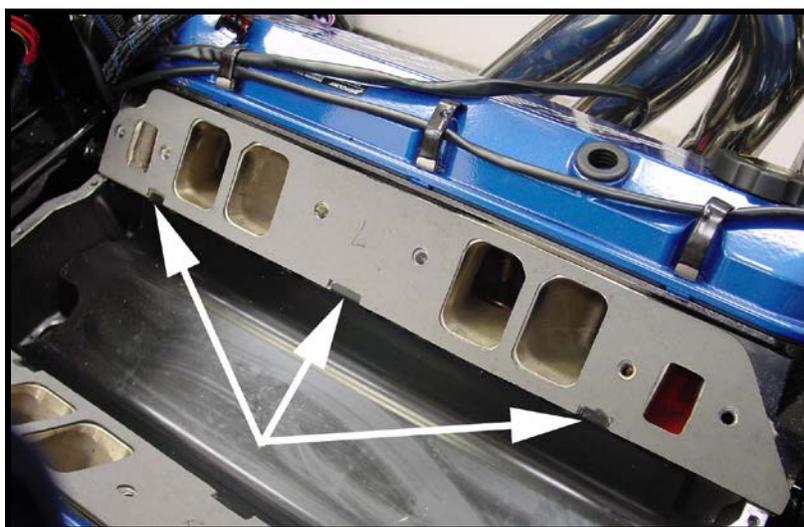
## **STEP-BY-STEP INSTALLATION INSTRUCTIONS**

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 following:
  - Flame arrestor
  - Fuel lines

- Throttle linkage
- Stock carb
- Fuel filter
- Belts
- Circulating water pump and hoses
- Water neck
- Crank pulley
- Distributor
- Manifold
- Disassemble Whipple blower system by:
- Remove blower and intercooler housing from the intake manifold by loosening the 6 metric bolts.

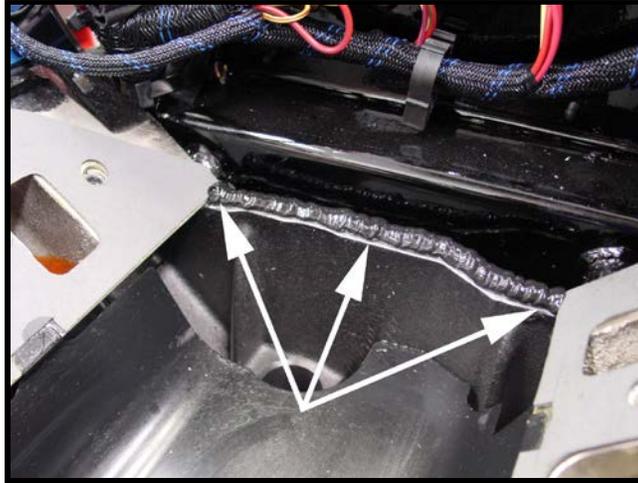
3. Intake manifold installation:

- Clean intake manifold and cylinder head surface.
- ➔ **NOTE.** Apply thick bead of RTV silicone around all 4 water passages on cylinder heads.
- ➔ **NOTE.** Mark and cut the intake gaskets to clear the galley pan mounts if required. **See figure.**



- Install new supplied intake gasket to cylinder head.

- ☐ ➔ **NOTE.** Apply a thick bead of black RTV silicone on the intake gaskets around the water passages to insure sealing around the water passages.
- ☐ ➔ **NOTE.** Apply a thick bead in the valley of the block, both front and rear. This should be a minimum of 3/8" ID tall. **See figure.**

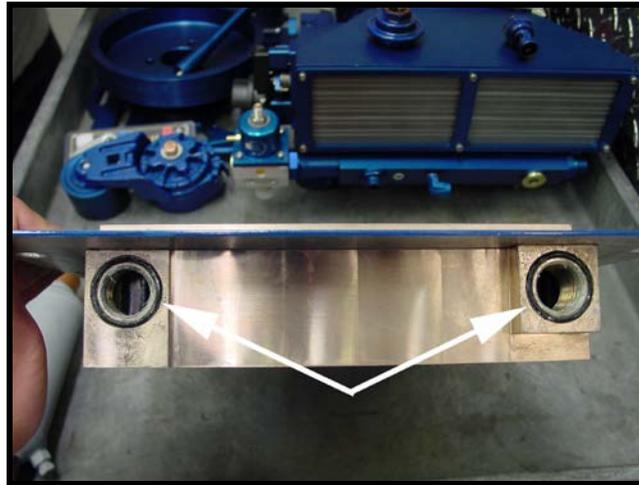


- ☐ Install intake manifold using the (11) – 3/8" x 1.5" socket head allens, (1) 3/8" x 1.5" hex head bolt and the .680" stainless washers. Utilize the hex head bolt in the forward most bolt on the inside of intake, **see figure** (above #2 cylinder). Torque bolts to 35 foot-pounds. **!! CAUTION !! Note: Install all bolts hand tight and align intake runners as much as possible.**



- ☐ Install supplied oring to manifold-to-intercooler flange surface. Apply a light amount of marine style grease to oring surface; follow by pushing the oring into its receiver groove. Bunch it up as much as possible, which will help as the oring shrinks. Once you have the oring all the way around, cut both ends so there straight and push into groove. These ends should bunch up together. You can also vulcanize them by roughing the edges and using "crazy glue" to mend the two together. Once completed, apply some more marine type grease to oring surface.

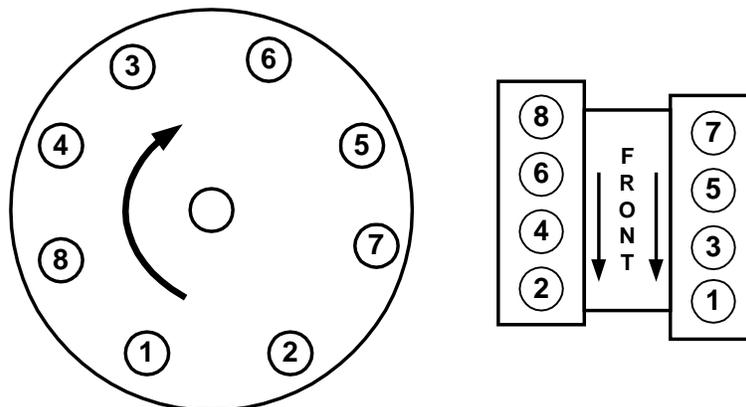
- ❑ **!! CAUTION !!** Apply light amount of marine type grease to orings on intercooler core front mounting surface (**see figure**), carefully install intercooler core into intake manifold. Take the two -12AN stainless water fittings, apply light amount of marine type grease around green oring, apply pipe sealant to threads and install into intercooler core evenly. Do not tighten one while one is loose, this could cause the core to go in unevenly.



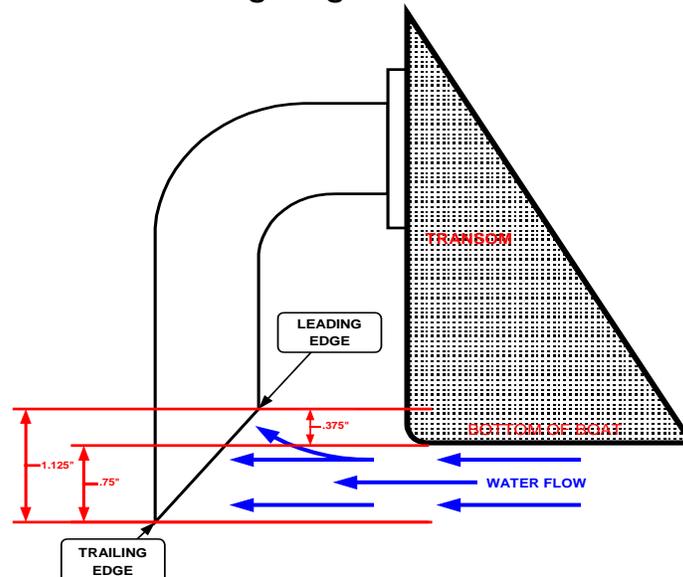
- ❑ Install supplied oring to supercharger adapter plate. Apply a light amount of marine style grease to oring surface; follow by pushing the oring into its receiver groove. Bunch it up as much as possible, which will help as the oring shrinks. Once you have the oring all the way around, cut both ends so there straight and push into groove. These ends should bunch up together. You can also vulcanize them by roughing the edges and using "crazy glue" to mend the two together. Once completed, apply some more marine type grease to oring surface.
- ❑ Install supercharger assembly by lying on intake manifold. Install the 7/16" socket head allen bolts and torque to 35 ft. lbs.

4. **Distributor installation.**

- ❑ Install the distributor into new manifold as it was in the stock manifold.



5. **Crank pulley installation.** Check and make sure the mounting surface of the crank pulley on the front of the balancer is perfectly flat. If necessary, remove the imperfections or paint with a good flat file. Install the Whipple crank pulley on the crankshaft. Use the 3 3/8" x 3 1/2" hex head bolts with 1 AN flat washer (goes against crank pulley) and lock washer (each bolt) and apply a small amount of Red Loctite™ on threads to new longer crank pulley bolts. Torque to 35 foot-pounds.
6. **Temperature sender installation.** Install your stock water temp sender into the front of the Whipple manifold or thermostat housing, whichever fits easier. Make sure to use pipe sealant. Use the supplied pipe plug to plug the other holes.
7. **Thermostat housing installation.** Use the supplied stainless thermostat housing by installing the thermostat housing gasket and the thermostat housing **without a thermostat**. Use the 2 3/8" x 3/4" stainless socket head allens to secure housing. Install the 2 extra 3/8" x 3/4" socket head allen bolts with teflon pipe sealant into extra holes in front of intake manifold.
8. **Water system and stainless cross-over.**
  - Install supplied cross over (inlet facing down towards port side) with the 4 - 3/8" x 3/4" socket head allen bolts. Use supplied gaskets to seal between cross over and block.
  - Route 1 1/4" hose to inlet, this may require replacing your factory hose or cutting your factory hose to fit.
  - Install the supplied 1" rubber plugs with #20 clamp over the riser exhaust bungs. These will not be utilized anymore. There will be enough water entering the bottom of the exhaust manifolds.
9. **Intercooler dump and engine block bleed off fittings: DO NOT RESTRICT OUTLET**
  - Find an accessible location on the transom of the boat, preferably 16"-28" past the centerline of the boat. Mark a spot for the -12AN stainless IC pickup. The pickup is made long so it can be cut to fit. **See following diagram:**



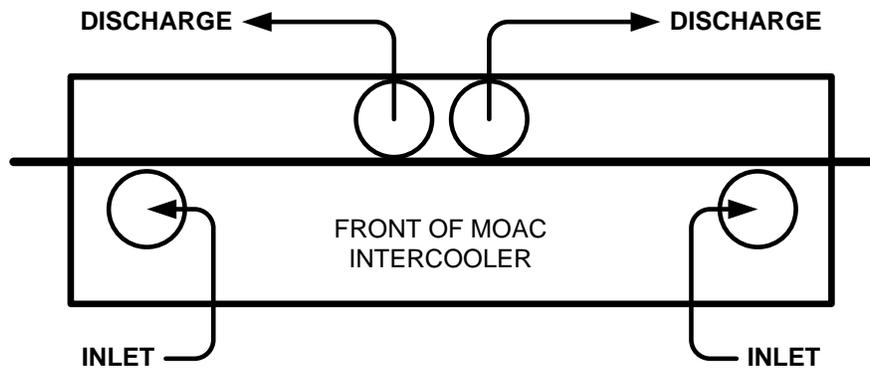
- Before installing the front plate system, it is best to install the 90-degree or 180-degree intercooler fittings now. Pre-route intercooler hose, both from the pickup to the intercooler as well as from the intercooler to the dump fitting. It does not matter what side you feed or drain the intercooler.
- Find a clear, visible location above the water line to install the IC dump fitting. It should be installed in a visible location so you can verify its functioning properly.
- Find another location for the block bleed off fitting. This does not need to be in a visible location and will be dumping water at all times.
- Drill a hole for the -12AN stainless water dump fitting. Use marine type silicone to seal fitting. You may also want to apply some fiberglass resin on the open wood so there is no rotting. Secure fitting by tightening the billet nut on the back side of the fitting and holding the fitting from the outside of the hull (do not let spin). Wipe excess silicone away.
- Drill a hole for the -8AN stainless block bleed off fitting. Use marine type silicone to seal fitting. You may also want to apply some fiberglass resin on the open wood so there is no rotting. Secure fitting by tightening the billet nut on the back side of the fitting and holding the fitting from the outside of the hull (do not let spin). Wipe excess silicone away.
- Apply some marine type grease to inside edge of 3/4" ID push on hose. Push 3/4" hose onto 90-degree or 180-degree intercooler fittings.
- Install 90-degree or 180 fitting to starboard side of intercooler. Tighten fitting. Route hose to thru-hull dump fitting or intercooler transom pickup.
- Repeat for the next 3/4" ID hose; push on to fitting, install onto cooler fitting. Route to intercooler transom pickup or thru-hull dump fitting.
- Push the 3/4" hose on to the -12AN brass push lock fitting. Install brass push lock fitting onto water dump fitting.
- Make sure the intercooler lines do not interfere with anything, can rub anything sharp or be in contact with something hot such as the headers.

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*It is recommended to use a few tie straps for this step: they're cheap!!!*

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**STAGE 2 SYSTEMS UTILIZE DUAL INLET/DUAL OUTLETS**



10. **Front plate installation.** The front plate assembly has been assembled for easy installation.
- Install the 2 3/8" x 2" studs into manifold.
  - Install round support stands onto 3/8" 2" studs you just installed.
  - Slide front plate over drive and install the two 2 - 3/8" x 1" button head allens into front stands. Do not tighten at this time.
  - Do not tighten the front collar at this time. Install the blower pulley with the 4 - 6mm and torque to 150 in. lbs.
  - Put a straight edge on the blower pulley and check the alignment of the front plate (blower pulley to one of the idlers).
  - Once it's aligned, remove the 1/4" socket head allen bolts, apply light amount of blue Loctite #242 to the threads and reinstall/tighten.
  - Tighten 2 - 3/8" x 1" button head allens into front support stands through the front plate.
11. **Block bleed off instructions.**
- Install the supplied 45deg brass fittings into back 1/8" NPT ports (use pipe sealant on threads). Tighten them so they are facing towards the back of the engine.
  - Install the 1/4" supplied hose to the end of these fittings. Route hose to the dump fitting you routed previously. Secure the 1/4" hose with the supplied #4 hose clamps.
12. **Vbelts.**
- Install the supplied #7380 and #7516 vbelts to the accessories. Use the factory adjustments to put tension on the belts.

### 13. Fuel filter installation.

- Install the new supplied fuel filter based in the factory location or where it would best be suited for easy access.

### 14. Electric fuel pump installation. Find a good location for the electric fuel pump, preferably below the fuel filters highest point. Install the pump to this location.

- A wiring harness is supplied to power the fuel pump. Find the relay on the harness and the red wire coming out of it. Route this to 12V ignition on.
- Take the pink wire out of the harness and route to red wire from Mallory electric pump.
- Take blue wire with white trace and route to oil switch wire. The stock oil switch wire is blue with tan stripe.
- Black wire on the Mallory fuel pump goes to a Ground connection.

### 15. Carburetor installation. **Note: You must drill the carb adapter for your linkage bolt holes.** Whipple has tested the 500 HP motor and has found that every one is a little different. Whipple feels that the stock carb with the new fuel system should run close to being the correct air/fuel ratio with the 7-9 pounds of fuel pressure **ON STOCK UNMODIFIED ENGINES.** But because every motor is different, you must test and tune the motor before it's considered ok.

- Apply light amount of RTV silicone sealant to supercharger/carb mounting flange.
- You must install carb adapter and carburetor at the same time using the (4) 5/16" x 1 3/4" stainless socket head allen bolts and 5/16" AN washers.
- Using your factory throttle linkage assembly, relocate the throttle linkage anchor piece to the Whipple supplied throttle bracket. Secure with factory fastners. Install linkage to carburetor.
- Reinstall factory flame arrestor using factory nyloc nut.

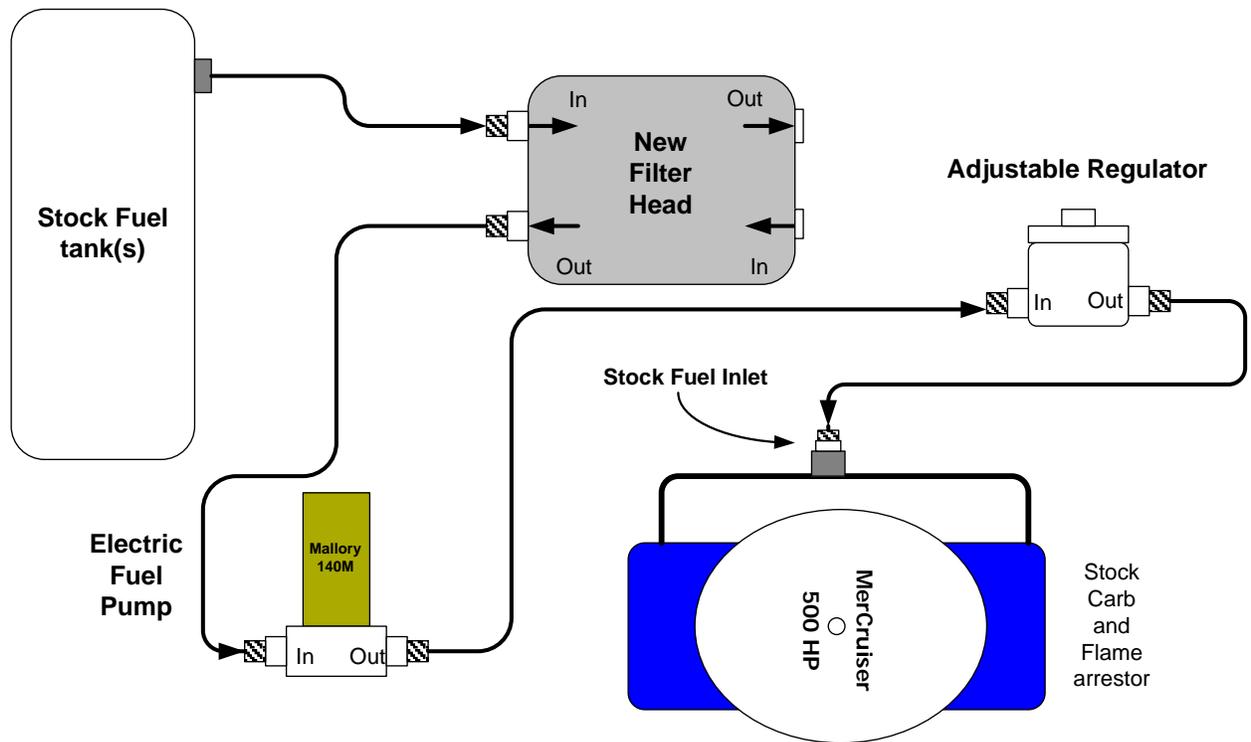
### 16. DOMINATOR/Install carburetor:

- For 4500 Dominator series carbs, install directly to supercharger.

### 17. Fuel line installation.

- Modify the stock inlet fuel line that went to the stock fuel filter. Route it to the inlet side of the new supplied fuel filter base. Should be a minimum of 1/2" ID hose and should only be USGC approved hose.
- Manufacturer a high quality, USGC approved hose from the outlet side of the fuel filter to the inlet side of the electric fuel pump.
- Manufacturer a high quality, USGC approved hose from the outlet side of the fuel pump to the inlet side of the fuel psi regulator.

- Manufacturer a high quality, USGC approved hose from the fuel PSI regulator outlet side to the carburetor inlet.
- All fuel lines must be secured with clamps for safety.



## 18. Bypass hose routing:

- a. Take the rubber 1/4" hose coming from the bypass valve actuator and route directly to open port at the rear of the blower manifold. There is a supplied 90deg brass fitting. This will see engine vacuum and boost. Install zip tie to hold in place.

## **BEFORE STARTING THE ENGINE**

## 19. Supercharger oiling instructions for self-contained units. 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 W200 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 ONLY!!**

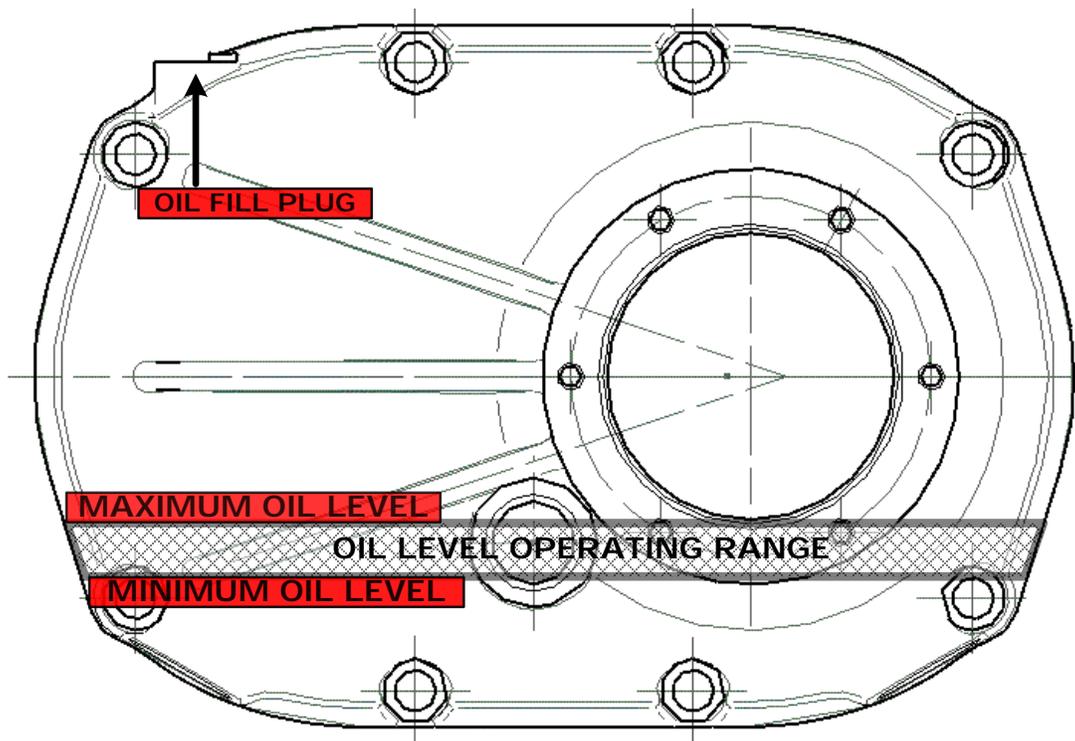
**!! CAUTION !!**

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

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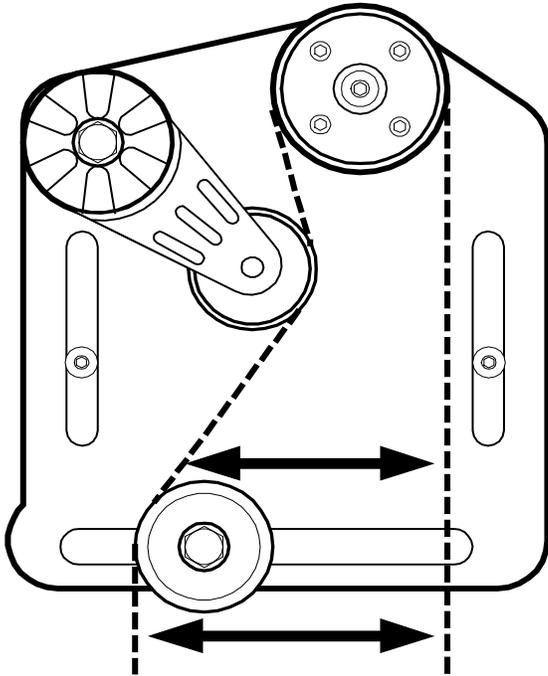
**WHIPPLE SC OIL LEVEL**

**Fill to center of oil sight glass. 6.8 fl/oz. or 200cc.  
DO NOT OVERFILL, WILL VOID WARRANTY!!**



***DO NOT OVER FILL THE GEAR CASE. SEVERE SUPERCHARGER DAMAGE WILL OCCUR IF THE OIL LEVEL IS OVER FILLED.***

**MAKE SURE THE THROTTLE CABLE OPERATION IS CORRECT. WITH THE ENGINE OFF, MOVE THE THROTTLE A FEW TIMES TO FULLY OPEN AND CLOSED POSITIONS. THERE SHOULD NOT BE ANY BINDING OR STICKING AND MUST OPERATE FREELY.**



20. **Supercharger belt installation.**

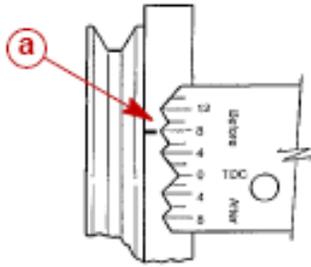
- Loosen the sliding idler and push it in as far as possible.
- The new crank pulley has extra ribs. Get a straight edge against the crank pulley and align the supercharger belt accordingly. If you pulled everything forward, then 10-rib belt should be located one groove in from the front and back.
- Take the slack out of the spring-loaded tensioner with a ½" breaker bar, route the belt around the crank pulley, sliding idler and blower pulley.
- With the slack off the tensioner, push the sliding idler against the belt as far as possible and tighten the bolt.
- Release the tensioner and make sure you have at least ½" of throw left in the tensioner. The tensioner must be able to go back and forth to keep the slack out of the belt.

21. **Fuel pressure.**

- When starting the engine for the first time, crank the fuel PSI regulator adjustment screw 1 rotation. Once the motor has fired, set the fuel pressure at 8psi-10psi. Make sure to use a high quality mechanical gauge for measurement.

22. **Set timing.**

- b. Connect timing light to number 1 ignition wire.
- c. Start the engine and let idle (may have to give some slight throttle).
- d. Manually adjust throttle so engine RPM is steady 5000rpm (may vary depending on ignition system). Factory 500HP's come with 34 deg's total advance. Whipple recommends running 28-30 deg's for 91-93 octane applications.
- e. Shine the timing light at the timing mark indicator located on the timing chain cover.
- f. Adjust the distributor until you get the desired total advance. Turn clockwise to retard timing, counter-clockwise to advance timing.
- g. Torque distributor bolt down bolt to 25 foot-pounds.



**a** - Timing Marks

23. **Idle setting.** After starting the engine, follow your standard idle setting procedures. When the air fuel ratio and timing are correct, the motor should idle at a consistent 800rpm.

## **LAKE TESTING**

- Check boost with an accurate vacuum/boost gauge. You should be getting 5.5-6.5lbs of boost on stock unmodified engines. Anything higher than this should call Whipple to get a larger diameter SC pulley.
- To prevent severe damage, you must follow your standard performance tuning steps. Make sure to check the spark plugs at 1000 rpm intervals. Always check 4 plugs, preferably (3,5,4,6 cylinders).
- Any more timing than 30deg total advance under boosted engine conditions is not recommended with 91-93 octane fuel on stock unmodified engines. Modified engines should contact Whipple for advice.
- Never run a hotter spark plug than what's factory recommended. Installing one heat range colder plug is recommended, gap to .035".
- If you do not know how to tune a carbureted motor, contact a certified engine builder/tuner to do it for you. If your motor is not properly tuned, severe damage will occur.
- Always listen for engine knock, if you hear it, discontinue use immediately and diagnose the cause.

## **MAINTENANCE AND SERVICE**

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

1. Check the supercharger/accessory drive belt. Adjust or replace as required.
2. Change supercharger oil every 50 hours or once a season if self-contained unit. Use only Whipple approved SC oil.
3. Back flush intercooler every season or every 50 hours.
4. Inspect fuel filter every 25 hours. Replace every 50 hours or once a season, whichever comes first.
5. Change spark plugs every 50 hours. Always run the gap between .032" and .035".
6. Follow standard Mercury winterizing instructions.

## 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

Whipple recommends 6-7psi for stock engines (@ sea level) that are equipped with cast-iron cylinder heads (91-octane or higher). Whipple does it's best to get the boost level as close as possible but because of the amount of variables, it's impossible to guarantee the exact amount of boost.

Boost levels must be checked before running continuous WOT. Exhaust systems, carb size, cubic inch, cams all affect boost levels. Additional pulleys are available for lower and higher boost levels. For custom engine builds, consult your engine builder or Whipple representative for proper 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 has 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 MANIFOLDS/HEADERS

The stock cast-iron Mercury Marine headers are not very good. Aftermarket exhaust systems will help performance and may also change the boost level. Whipple has had great success with CMI E-tops, Imco Powerflow's and Hardin Marine's Typhoons headers. Other exhaust system may work as good or better, but Whipple has not been able to test all of the different systems out there.

### 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, NGK (AFx) offers a low cost a/f meter at [www.ngk.com](http://www.ngk.com). Autometer also has a new line of gauges featuring wide-range sensors and digital displays, [www.autometer.com](http://www.autometer.com).

A standard tune where WOT should be around 11.75-12:1. 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. Whipple has found that 12.6:1 is approx. the best a/f for power. Be very careful though, 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 91 octane, (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 its most concentrated level. Again, this is very hard on spark plugs so constant use will require increased spark plug maintenance.

For applications where 93-94 octane is available, you can typically run 1psi (per 2 octane points) more boost or 2 deg's of spark

## Whipple Charger Installations Instructions for Mercury 500HP SC Stage 1 & 2

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advance with the same safety margin.

### INTERCOOLER WATER FLOW

The intercooler does not need water being run through it at all times. Its main function is to remove the heat from the compression of air; therefore you should always have water flow when you're 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.

### AIR FILTER/FLAME ARRESTOR

Whipple has found the K&N 10 x 3" "Extreme" filter (filter located on top of carb as well as 360deg) works the best in most applications. Short arrestors such as 10 x 2" typically starve the supercharger for air.

### FUEL LEVEL

Never operate at WOT when the vehicle 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.



# service bulletin

MERCUISER HI-PERFORMANCE SERIES No. 2001-01

WARRANTY INFORMATION

SERVICE INFORMATION

▲ = Revised May 2002. This bulletin supercedes the previous bulletin 2001-01 April 2001

## Engine Block Water Pressure Requirements

### Models

All MerCruiser Hi-Performance Series Bravo Models.

### Situation

#### LOW OR EXCESSIVE ENGINE WATER PRESSURE

#### ▲ CAUTION

Overheating from insufficient cooling water will cause engine and drive system damage. Ensure that there is sufficient water always available at water inlet holes during operation.

Engine water pressure has become an increased concern on MerCruiser Hi-Performance Series engines that make use of the dual water inlet Bravo gear case. The dual water inlet gear case may not supply adequate water pressure and flow to the engine at the high drive installation "X" dimension heights that were used with the Low Water Inlet gear case. The power package installer must verify that the drive height will provide the engine with an adequate flow of water that meets the Mercury Racing specification for block water pressure.

#### Block Water Pressure Specification

- 20-30 psi (138-207 kPa) at Wide Open Throttle (WOT)
- Take pressure readings at the block drains on either side of the engine.
- Test at varying trim angles and in turns.

#### Operating engine with block water pressure below 20 psi (138 kPa):

- Overheating and engine damage can occur.

#### Operating engine with block water pressure above 30 psi (207 kPa):

- Leaks at the water pump and head gasket as well as water hose failure.

## ENGINE BLOCK WATER PRESSURE REQUIREMENTS

### GEAR CASE FEATURES THAT AFFECT WATER PRESSURE

#### Low Water Pickup Gear Case

- Water inlets located below torpedo to provide water pressure at higher "X" dimensions than with a dual water inlet gear case.
- Due to a small amount of total water inlet area, there is high suction at the water inlets. The results of which are:
  - a. Will clog easily with any bottom contact.
  - b. Susceptible to clogging if run close to the bottom in shallow water or operated in weedy areas.
- At positive trim angles the inlets are under the torpedo in a low pressure area and may not supply adequate cooling water.

#### Dual Water Inlet Gear Case

- Will self clean if plugged by incidental contact with bottom, run very close to the bottom in shallow water or operated in weedy areas. (See following information on how to clear a gear case that has become clogged)
- Can deliver water to engine at all trim angles and turning attitudes if the gear case is not installed at too high an "X" dimension.
- Has increased total water inlet area which slows the velocity of the incoming water. The water inlets are less likely to draw in weeds and debris with lower water velocity.

### Correction

#### BLOCK WATER PRESSURE IS BELOW SPECIFICATION - DUAL WATER INLET GEAR CASE

- Lower the "X" dimension.
- Install stainless steel plugs in the upper 4 holes of the strut water inlets (See information following on installing plugs).
- Install a low water pickup gear case.
- Install a transom or through-hull water pick-up.

**NOTE:** Because stepped bottom boats have a layer of air under the boat, engine overheating can occur due to an aerated water supply with the use of transom or through-hull water pickups. Do not locate water pick-ups in an aerated water supply.

#### BLOCK WATER PRESSURE IS BELOW SPECIFICATION - LOW WATER INLET GEAR CASE

- Lower the "X" dimension.
- Change to a propeller that will reduce the positive trim angle of the gear case.
- Install a transom or through-hull water pick-up.

**NOTE:** Because stepped bottom boats have a layer of air under the boat, engine overheating can occur due to an aerated water supply with the use of transom or through-hull water pickups. Do not locate water pick-ups in an aerated water supply.

#### BLOCK WATER PRESSURE IS ABOVE SPECIFICATION - LOW WATER OR DUAL WATER INLET GEAR CASE

- ▲ Install Water Bypass Kit P/N 863208A3.

## ENGINE BLOCK WATER PRESSURE REQUIREMENTS

### INSTALLING PLUGS IN STRUT INLETS OF DUAL WATER INLET DRIVE

Plug the upper four strut water inlet holes on each side of the gear case with stainless steel plugs (P/N 22-16581).

1. Tap water inlet holes with a 1/16-27 tapered pipe tap. Tap only to the depth required to bring the head of the plug flush with the water inlet hole.
2. Coat threads of stainless steel plugs with Mercury/Quicksilver Perfect Seal and thread into tapped holes until flush.
3. Paint plugs to help retard corrosion.

### CLEARING A DUAL WATER INLET DRIVE

If engine temperature begins to rise and clogging of the water inlets is suspected.

- Idle the boat out to deep water.
- Bring the boat up on plane but operate at a moderate speed until the engine temperature and block water pressure returns to normal.

If engine temperature is normal but block water pressure is low.

- Clear the line going to the block water pressure gauge. It may take several clearings before the engine and line are free of debris.

### Warranty

Proper installation of the MerCruiser Hi-Performance Series power package is the responsibility of the installer. Thorough boat testing must be done to insure that Mercury's specification for block water pressure is met.

### SOME GENERAL EXCLUSIONS FROM WARRANTY

- Modifications to the drive (plugging the upper strut water inlets) cooling water system or boat in order to bring the engine water pressure into the required specification.
- Component failures due to overheating or excessive water pressure.



## 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 # \_\_\_\_\_ EMAIL \_\_\_\_\_

(Found on compressor bearing plate) (Optional)

VIN OR VESSEL # \_\_\_\_\_