

Engine Removal / Installation

Tigershark 640 / 770

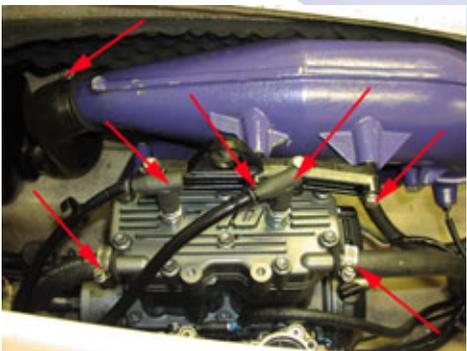
Step 1

Battery / Line Removal



1.1 (Above) Remove the two retaining straps, disconnect the battery and remove it from the hull. Disconnect the negative (black) cable first, then the positive (red).

1.2 (Below) Remove the two head cooling lines and spark plug boots. Remove the spark plugs. Loosen the clamp connecting the exhaust to the waterbox. Remove the 14mm exhaust brace bolt.



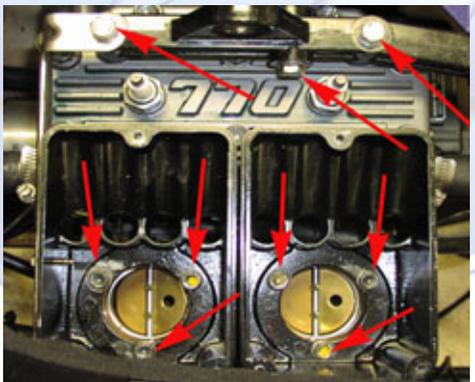
Step 2

Intake Removal

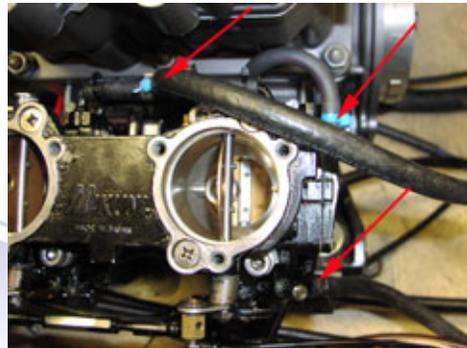
2.1 (Below) Remove the four 8mm bolts from the air box cover and remove the cover and flame arrestor screens.



2.2 (Below) Remove the six 10mm bolts connecting the air box to the carbs. Remove the three 14mm bolts holding the air box and exhaust to the head.



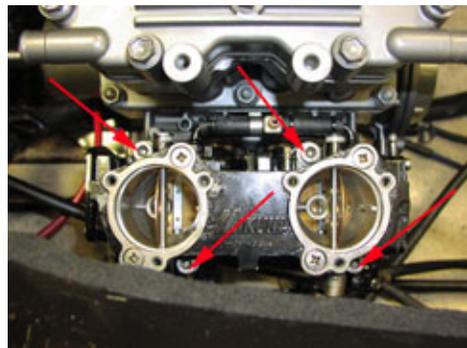
2.3 (Below) Remove the pulse line, fuel feed line and fuel return line. Make sure you plug or clamp the fuel lines to avoid fuel in your hull.



2.4 (Below) Remove the throttle cable using a 10mm wrench. Remove the choke cable by loosening the two 8mm bolts and sliding the metal shaft out.



2.5 (Below) Remove the four 5mm bolts securing the carbs to the intake manifold. Remove the carbs from the hull.

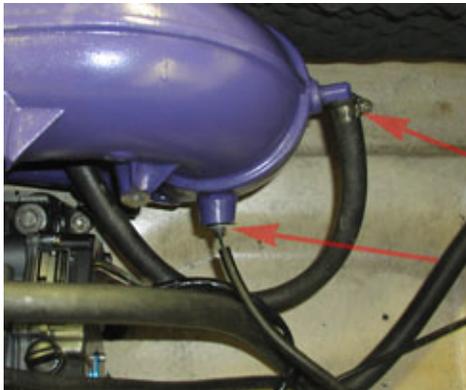


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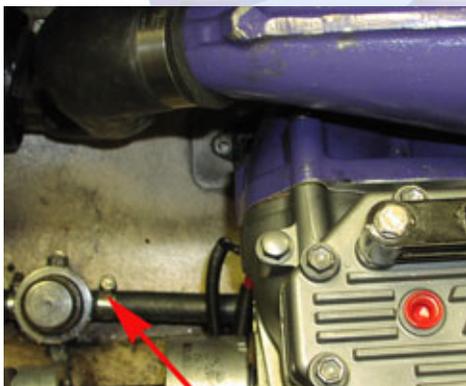
Step 3

Exhaust Removal

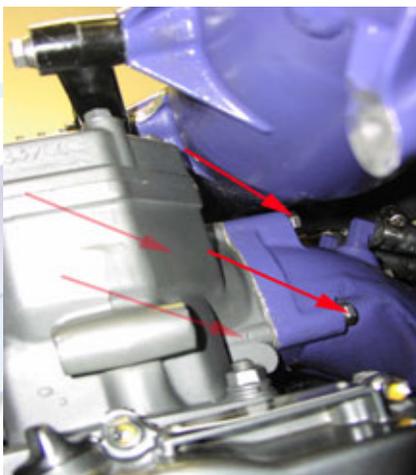


3.1 (Above) Remove the cooling line going to the exhaust. Using a 10mm socket, remove the temperature sensor from the exhaust.

3.2 (Below) Remove the cooling hose coming from the exhaust to the filter inlet.



3.3 (Below) Remove the three 14mm bolts securing the Exhaust to the engine. There is also a large 17mm bolt in the center of the exhaust manifold that should be removed.



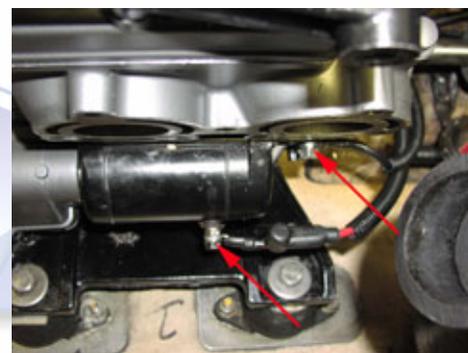
3.4 (Below) Remove the remaining Three 14mm bolts from the exhaust manifold. Remove the exhaust from the hull.



Step 4

Engine Removal

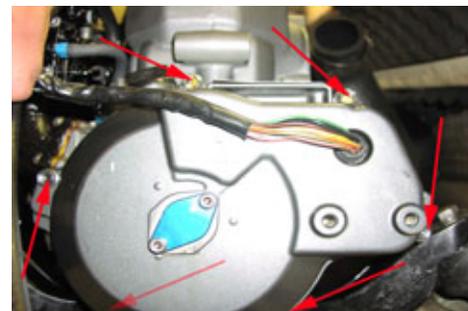
4.1 (Below) Using a 10mm socket, remove the positive cable going to the starter. Using a 12mm socket, remove the negative wire going to the engine block.



4.2 (Below) Remove the PTO shroud.



4.3 (Below) Remove the six 10mm bolts from the flywheel cover and remove the cover and leave it in the hull.



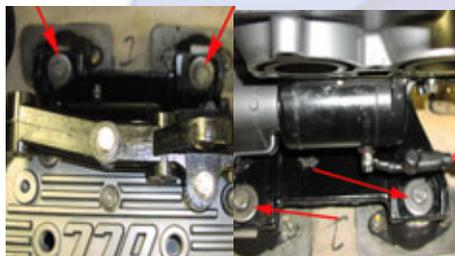
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4.4 (Below) Place a rope through the rear spark plug hole to keep the engine from spinning and remove the driveshaft by unscrewing it with a wrench spinning counter-clockwise. (Note: If you do not have the screw type PTO, simply pull the engine forward after the engine mounts are un-bolted.)



4.5 (Below) Remove the four 14mm engine mount bolts. Remove the engine from the hull.



Step 5

Accessory Removal

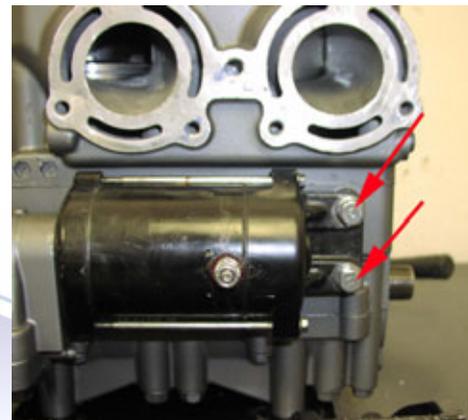


5.1 (Above) Remove the flywheel bolt. Remove the flywheel using a universal flywheel puller.

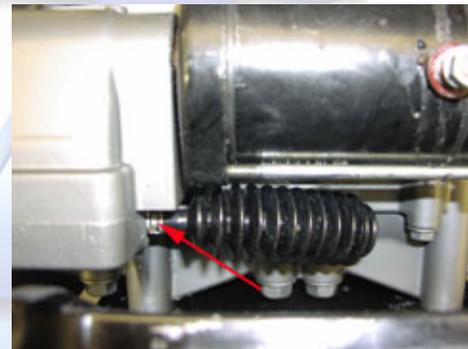
5.2 (Below) Remove the bendix from the flywheel housing.



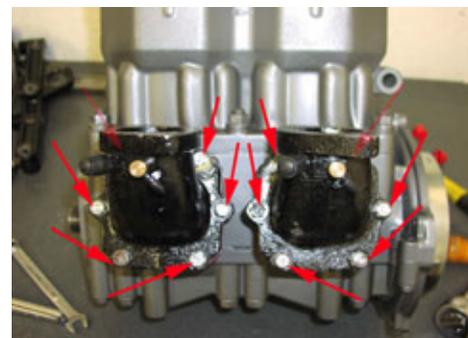
5.3 (Below) Remove the two 12mm bolts securing the starter to the engine.



5.4 (Below) Remove the expansion chamber from the engine block.



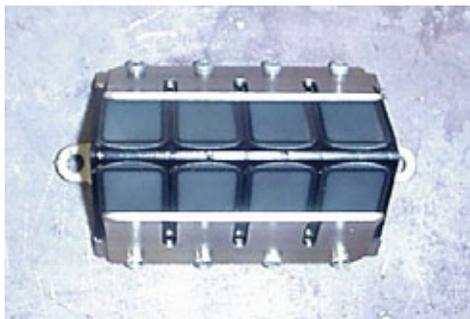
5.5 (Below) Remove the twelve 10mm nuts securing the intake manifold to the engine. Remove the studs and set aside for the new engine. Remove the reed valves from the engine.



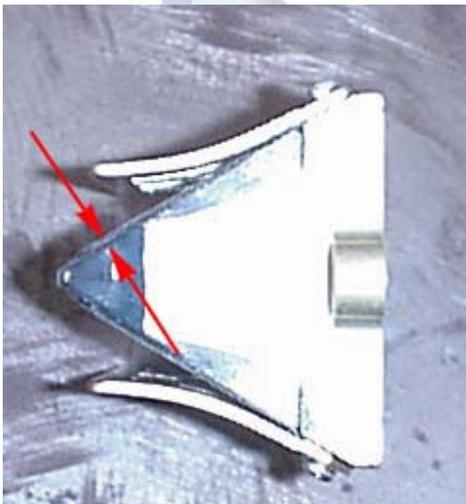
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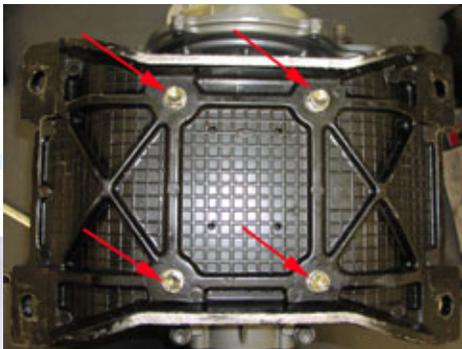
5.6 (Below) Inspect each reed assembly for damage and wear. Look at each reed petal and inspect the edges for signs of cracking, chipping or any missing parts. If any damage is present, replace the petals.



5.7 (Below) Look at each petal-to-cage surface and check for gap. If a gap of more than 0.015" is present, replace the petals.



5.8 (Below) Remove the four 14mm bolts securing the engine mount plate to the engine.



5.9 (Below) Place a rope in the cylinder to block the engine from turning. Using a Chain wrench, turn the PTO counter-clockwise. (It is a regular thread and is very difficult to break free.)



With all accessories removed, your engine is now ready to ship to SBT.

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Engine Installation

Oil Injection

It is SBT's recommendation that the oil injection pump be disabled, and block-off plate(s) be installed prior to use of the new engine in your ski. This is only recommended to insure reliable lubrication and extended engine life for all our customer's PWCs. Re-use of your functioning oil injection pump, if so equipped, does not void your warranty.

Paper Gaskets

It is SBT's recommendation that all paper gaskets be treated with Loctite® High-Tack Gasket Sealer prior to installation. Read and follow all instructions on the product canister to insure good gasket sealing on your new engine.

Special Gaskets

It is SBT's recommendation that all exhaust gaskets be sealed with Loctite® Copper Gasket Adhesive prior to installation. Read and follow all instructions on the product canister to insure good gasket sealing on your new engine.

Bolts

It is SBT's recommendation that all bolts be treated with Loctite® Medium Strength Threadlocker Blue (242) during assembly.

Break-In Oil

It is SBT's requirement that the new engine be broken-in with additional oil in the fuel supply for the first tank. Follow the mixing chart on the back of the bottle to determine quantity needed.

Electrical Connections

It is SBT's recommendation that all electrical connections be sanded, cleaned and secured during the assembly process. It is a common problem to not have solid connections due to corrosion, paint, poor wire condition, etc.

Disclaimer

While every precaution has been taken in the preparation of these guides, SBT assumes no responsibility for errors or omissions. Neither is any Liability assumed for damages resulting from use of the information contained herein. Publication of the procedures in these guides does not imply approval of the manufacturers of the products covered. Persons engaging in the procedures herein do so at their own risk

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Follow the removal steps in reverse order to install your new SBT short block assembly:

5.9 Place a rope in the cylinder to keep the engine from turning over. Screw the PTO onto the engine of the crankshaft.

- Torque to 60 ft. lbs.

5.8 Place the engine mount plate onto the engine and secure with four 14mm bolts.

- Torque to 35 ft. lbs.

5.5 Insert studs into the block for the intake manifold. Place the reed valves into the engine block. Using new gaskets, attach the intake manifold to the block.

- Torque to 9 ft. lbs.

5.4 Attach the expansion chamber to the new block.

5.3 Place the starter onto the engine and attach with two 12mm bolts.

- Torque to 8 ft. lbs.

5.2 Place the bendix into the flywheel housing.

5.1 Place the flywheel onto the crankshaft making sure to align the keyway on the crank with the keyway on the flywheel. Secure the flywheel with the flywheel bolt.

- Torque to 40 ft. lbs.

4.6 Place the engine into the hull.

4.5 Secure the engine using four 14mm bolts.

- Torque to 35 ft. lbs.

4.4 Place a rope into the spark plug hole and screw the driveshaft into the PTO. (If you do not have the screw-type PTO align the PTO coupler's and then tighten the engine mounts.

- Torque to 60 ft. lbs.

4.3 Using a new o-ring, place the flywheel cover onto the engine using six 10mm bolts. (Note: If you are using the oil pump make sure that the oil pump key is lined up with the crankshaft bolt.)

- Torque to 8 ft. lbs.

4.2 Place the PTO shroud onto the engine.

4.1 Replace the negative cable to the engine block using a 12mm bolt. Replace the positive cable using a 10mm nut.

- 10mm nut: Torque to 8 ft. lbs.

- 12mm bolt: Torque to 10 ft. lbs.

3.4 - 3.3 Using a new gasket, place the exhaust into the hull and attach it to the engine using six 14mm bolts and one 17mm bolt.

- 14mm bolt: Torque to 20 ft. lbs

- 17mm bolt: Torque to 22 ft. lbs.

3.2 Replace the cooling hose coming from the exhaust to the filter inlet.

3.1 Replace the cooling line going to the exhaust. Replace the temperature sensor using a 10mm bolt.

- Torque to 8 ft. lbs.

2.5 Using new gaskets, replace the carbs onto the intake manifold using four 5mm allen head bolts.

- Torque to 10 ft. lbs.

2.4 Replace the choke cable and tighten the 8mm bolts until snug. Replace the throttle cable and adjust as needed.

2.3 Replace the fuel feed line, fuel return line, and pulse line.

2.2 Place the exhaust mount bracket on the head and fasten using three 14mm bolts. Place the air box onto the carbs and attach using six 10mm bolts.

- 10mm Bolts: Torque to 10 ft. lbs.

- 14mm Bolts: Torque to 20 ft. lbs.

2.1 Replace the air box cover using four 8mm bolts.

- Torque to 6 ft. lbs.

1.2 Place the final exhaust bracket bolt into place using one 14mm bolt. Tighten the clamp connecting the waterbox to the exhaust. Place the head cooling lines into place and tighten the clamps. Using new spark plugs and screw them into the head. Place the spark plug boots onto the spark plugs.

- Torque to 20 ft. lbs.

1.1 Replace the battery into the hull and secure it using the two rubber straps. Connect the positive cable first and then the negative cable. Tighten the 10mm bolts until snug.

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Tools Needed:

Sockets

- 17mm socket
- 14mm socket
- 13mm socket
- 12mm socket
- 10mm socket
- 8mm socket

Sealers / Lubricants

- Loctite® Copper Gasket Adhesive
- Loctite® 2 Gasket Sealer
- Loctite® Medium Threadlocker (Blue) 242
- Loctite® High-Tach
- SBT Break-In Oil

Misc.

- Ratchet
- Long socket extension
- Short socket extension
- Screwdrivers
- Universal flywheel puller
(Available at most major auto parts stores for rent/lend/purchase)

Parts

- External Gasket Kit
- Zip-Ties

Wrenches

- 12mm wrench
- 10mm wrench
- Torque wrench
- Chain wrench