

Engine Removal / Installation

Kawasaki 650 / 750

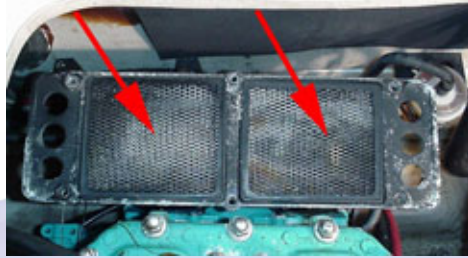
Step 1

Battery Removal

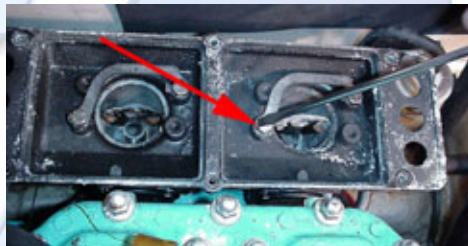


1.1 (Above) Remove the two retaining straps, disconnect the battery and remove it from the hull. Disconnect the negative (black) cable first, then the positive (red).

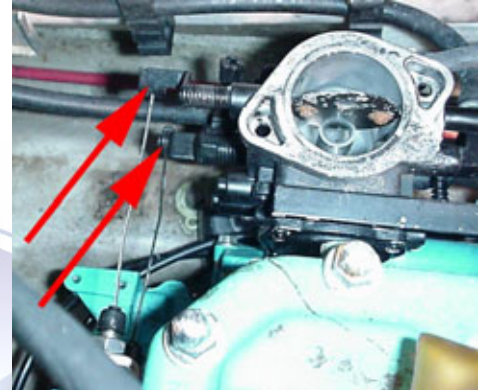
2.2 (Below) Pull out the flame arrestor screens.



2.3 (Below) Use a screwdriver to pry down the retaining tabs on the carb base bolts.



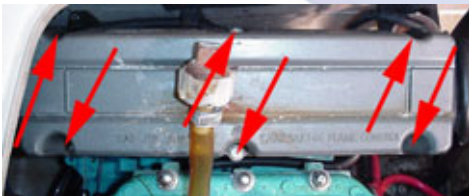
2.5 (Below) Disconnect the throttle and choke cable ends from the carbs.



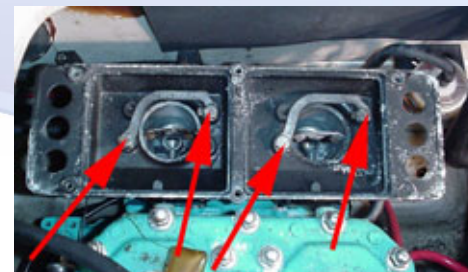
Step 2

Intake Removal

2.1 (Below) Remove the six 10mm bolts securing the flame arrestor cover to the base and remove it.



2.4 (Above) Remove the four 10mm bolts securing the flame arrestor base and carbs to the manifold and remove it.



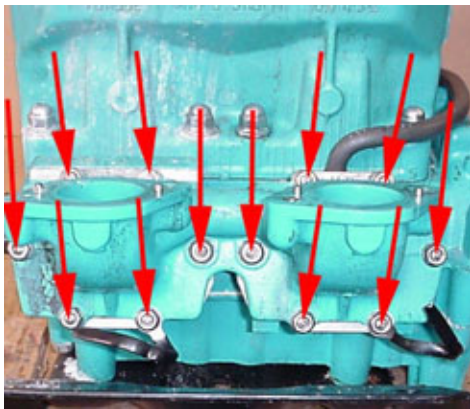
2.6 (Above) Loosen the gas tank cap to relieve pressure. Be sure the fuel switch is turned to the "OFF" position, and be aware of any fuel that may spill from the hoses. Make sure the hull is clear of any gasoline fumes before continuing work, especially with power tools. Disconnect the pulse line, fuel in and fuel out lines from the carbs.



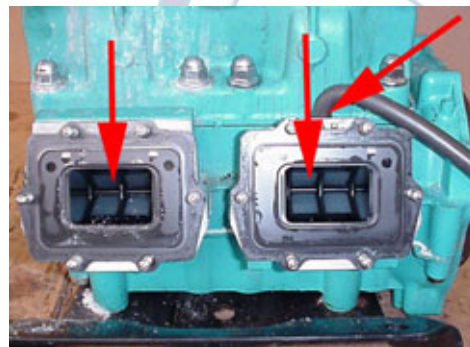
Engine Removal / Installation

Kawasaki 650 / 750

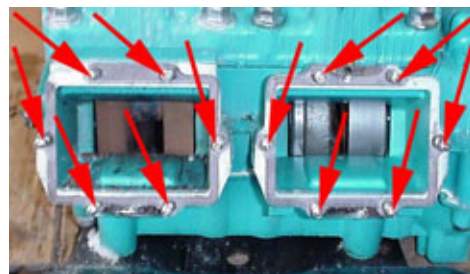
2.7 (Below) Remove the 12 10mm nuts from the intake manifold and pull it off.



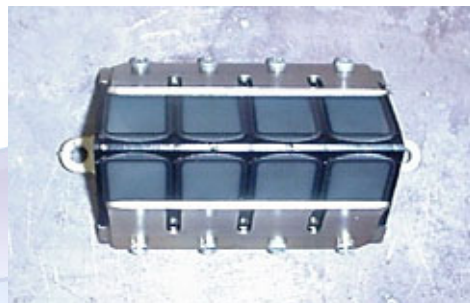
2.8 (Below) Pull out each reed cage assembly from the intake.



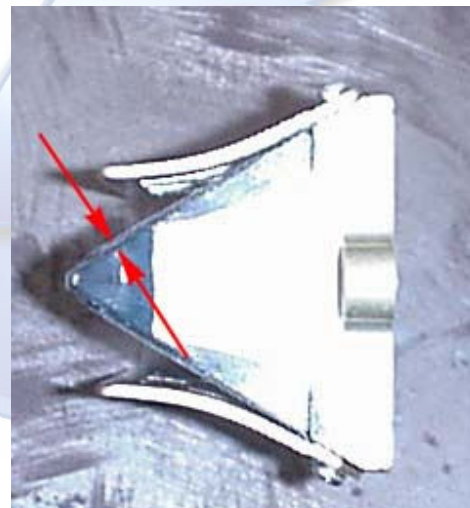
2.9 (Below) Remove the 12 6mm intake studs from the engine with a stud socket.



2.10 (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.



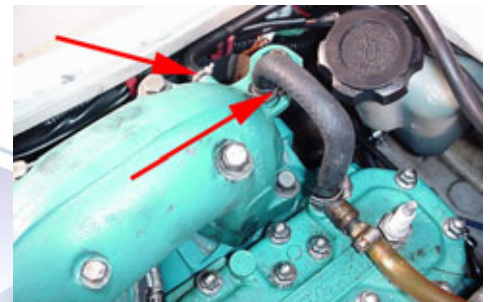
2.11 (Below) Look at each petal-to-cage surface and check for gap. If a gap of more than 0.015" is present, replace the petals.



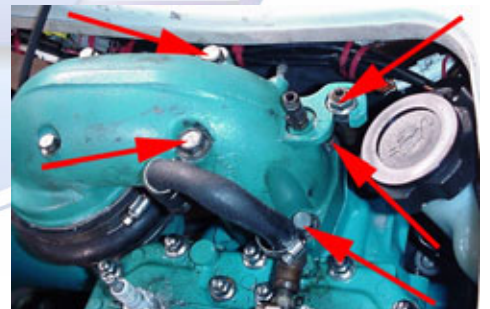
Step 3

Exhaust Removal

3.1 (Below) Remove the pipe cooling inlet and exit lines.



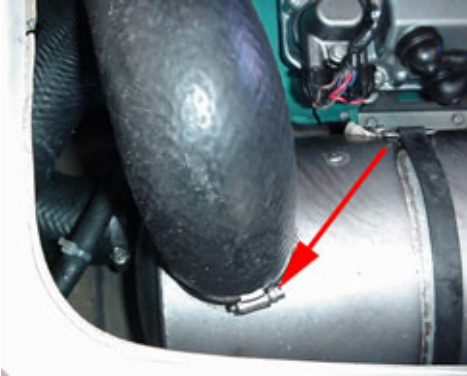
3.2 (Below) Remove the four 14mm bolts securing the exhaust pipe to the manifold, and the case-dump handle mount nut (handle removed for better view). Do not disturb the rubber stinger to head pipe joint. Replacement joint parts will often be necessary if this part is removed.



Engine Removal / Installation

Kawasaki 650 / 750

3.3 (Below) Loosen the waterbox clamps at the rear and pipe couplers and remove it from the hull.



3.4 (Below) Remove the lower exhaust cooling line. Remove the exhaust pipe from the hull.



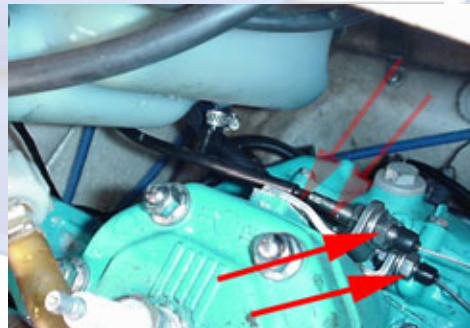
Step 4

Engine removal

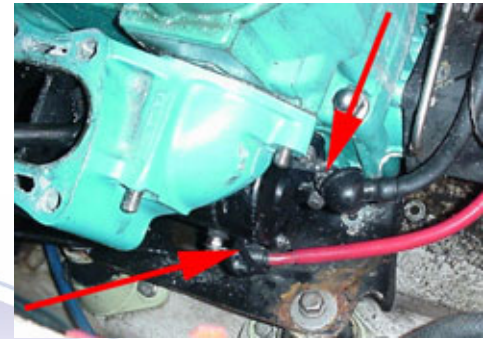
4.1 (Below) Detach the oil line from the pump, running from the tank and crimp or plug it.



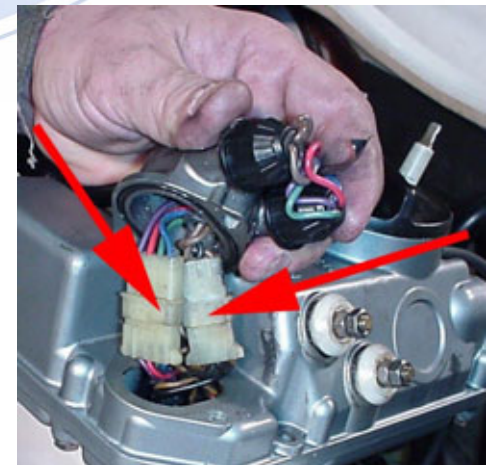
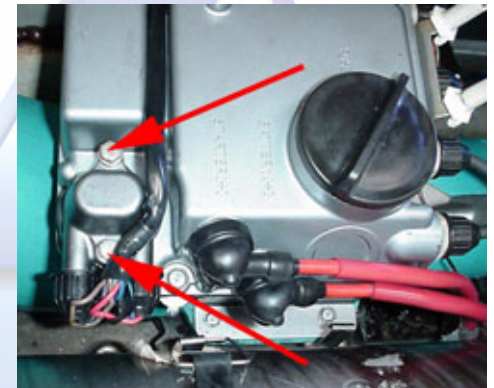
4.2 (Below) Remove the throttle and choke cables from the support bracket, and remove the two 10mm bolts securing the bracket to the engine – remove it.



4.3 (Below) Remove the starter positive and ground cables with a 10mm socket.



4.4 (Below) Remove the two 10mm bolts from the wiring cover on the electrical box, exposing the wiring harnesses. Disconnect the harnesses.



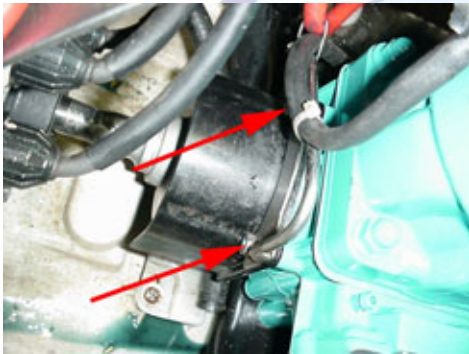
Engine Removal / Installation

Kawasaki 650 / 750

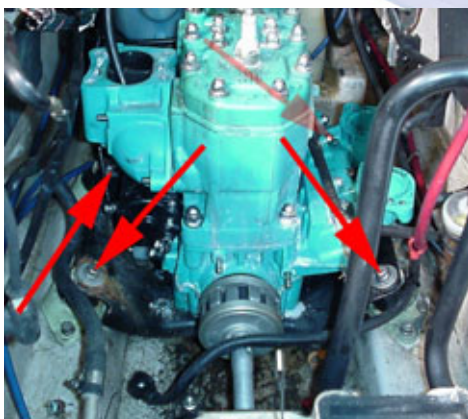
4.5 (Below) Remove the zip-ties securing the electrical wires along the hull. **NOTE: DO NOT CUT THE WIRES!**



4.6 (Below) Remove the two 10mm nuts securing the PTO shroud and remove it. Remove the studs with a 6mm stud socket.



4.7 (Below) Remove the four 14mm bolts from the engine mounts, and slide the engine forward and up, out of the hull.



Step 5

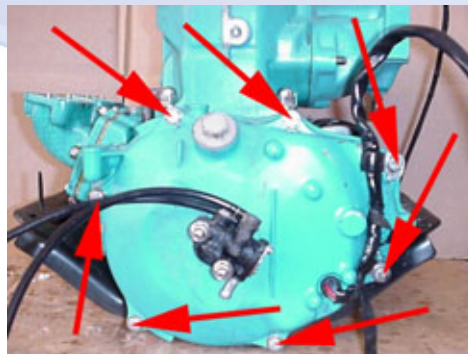
Accessory Removal

With the engine on the ground, workbench or some other solid surface, begin removing the external accessories that will NOT be shipped with the core.

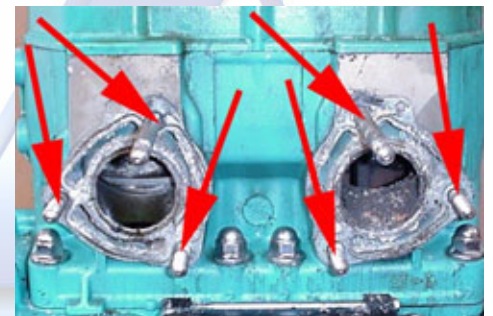
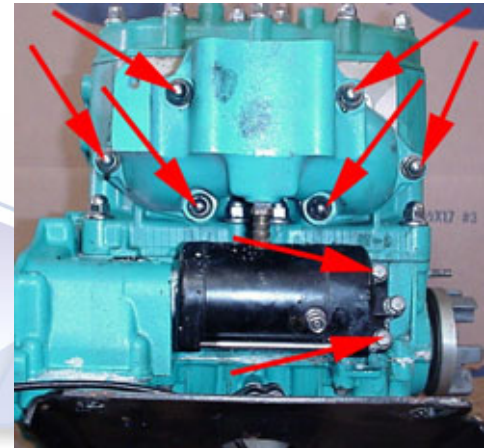
5.1 (Below) Remove the head cooling lines and spark plugs.



5.2 (Below) Remove the seven 10mm bolts securing the flywheel housing and remove it.



5.3 (Below) Remove the six 12mm nuts securing the exhaust manifold to the engine and remove the manifold.

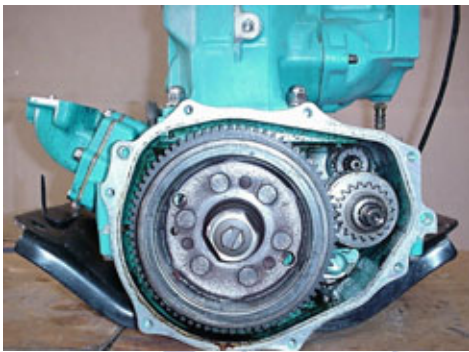


5.4 (Above) Remove the six 8mm studs with a stud socket.

Engine Removal / Installation

Kawasaki 650 / 750

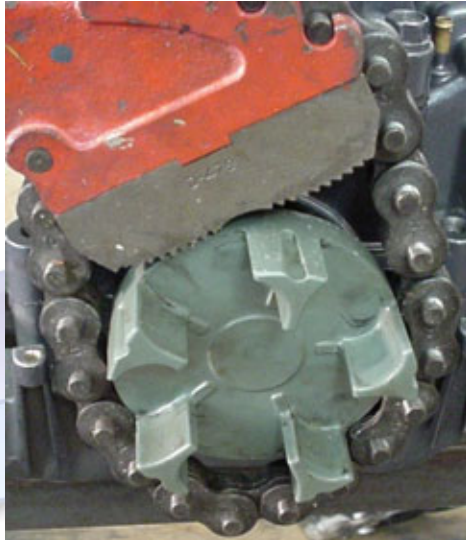
5.5 (Below) Unless you have a special Kawasaki Flywheel puller tool, you must now take your engine in to your local dealer to have them remove flywheel. This service should cost between \$10 and \$20. After the flywheel is removed, remove your starter bendix gear.



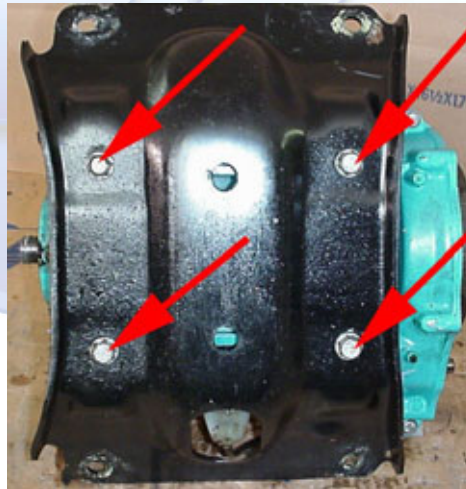
5.6 (Below) Stuff a rag into an open exhaust port. This will prevent the engine from turning over while removing the flywheel and PTO coupler.



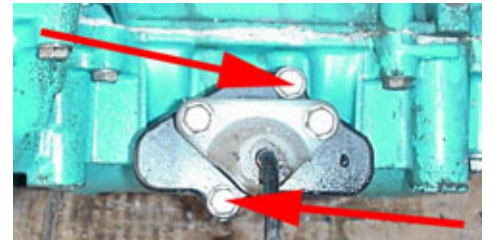
5.7 (Below) Use a chain wrench to remove the PTO flywheel.



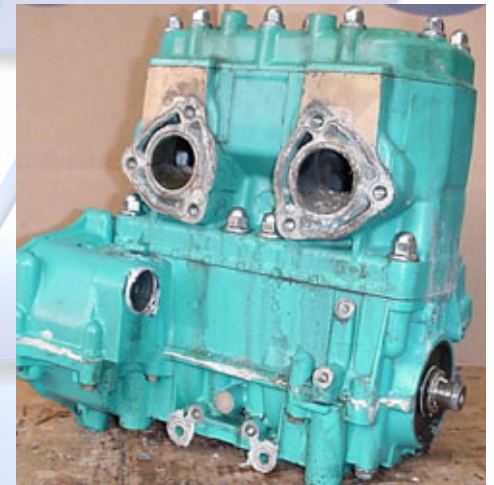
5.8 (Below) Remove the four bottom plate 14mm bolts and remove the plate.



5.9 (Below) Remove the two 12mm bolts securing the case dump mechanism to the engine and remove it.



With all of the external accessories removed, the engine is now ready to be packaged and shipped to SBT!



Engine Removal / Installation

Kawasaki 650 / 750

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.

Engine Removal / Installation

Kawasaki 650 / 750

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

5.9 Install The case dump mechanism.

- Torque to 69 in. lbs.

5.8 Install the bed plate.

- Torque to 27 ft. lbs.

5.7 Stuff a rag into an exhaust port. Install the PTO flywheel.

- Torque to 29 ft. lbs.

5.5 - 5.6 Install the bendix. Place the flywheel on the crankshaft and tighten the nut.

- Torque to 94 ft. lbs.

5.4 Install the exhaust studs, just to snug.

5.3 Install the starter and using new gaskets, exhaust manifold.

- Torque to 8.5 ft. lbs. (starter)
- Torque to 14.5 ft. lbs. (exhaust manifold)

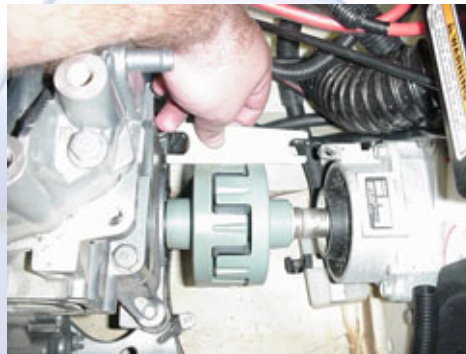
5.2 Using a new gasket, install the flywheel cover.

- Torque to 69 in. lbs.

5.1 Using pipe tape, install the head cooling line fitting.

4.7 Spin the engine mount bolts into the mounts, and rock them back & forth with your hands; try to break them. If any mount(s) fails, replace it before installing the new engine. Place the engine in the hull and slide it back onto the driveshaft coupler.

Your new engine may require re-shimming. Shims are necessary between the engine mounts and brackets to properly align the engine and pump shafts. If you do not have enough factory shims with your hull, very thin, wide washers may be substituted.



Take a small straight edge and place it on the coupler. You are looking for an even match all the way around the coupler. Place shims where necessary to align the couplers.

Tighten the motor mounts.

- Torque to 33 ft. lbs.

4.6 Install the PTO shroud studs to snug and install the cover.

4.5 Run the electrical wires and replace the zip-ties.

4.4 Reattach the wiring harnesses at the electrical box and replace the cover.

4.3 Reattach the starter wires.

4.2 Install the carb cable support bracket and reattach the cables.

- Torque to 69 in. lbs.

4.1 Reattach the oil line to the pump. Open the bleed screw and allow the line to bleed for at least one minute to remove air pockets. It is SBT's recommendation that the oil pump be left off the new engine, and a block-off plate be installed at this time.

3.4 Place the exhaust pipe in the hull. Attach the lower cooling line.

3.3 Install the waterbox and clamps.

3.2 Fasten the exhaust pipe to the manifold, and the case dump handle mount.

- Torque to 36 ft. lbs. (exhaust)
- Torque to 14.5 ft. lbs. (cable)

3.1 Install the pipe cooling inlet and exit lines.

Engine Removal / Installation

Kawasaki 650 / 750



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Kawasaki 650 / 750

2.9 – 2.11 Install the intake studs just to snug.

2.8 Install the reed cage assemblies into the engine.

2.7 Using a new gasket, install the intake manifold.

- Torque to 87 in. lbs.

2.6 Using new gaskets, install the carbs to the manifold and reattach all the lines.

- Torque to 69 in. lbs.

2.5 Reattach all the carb cables.

2.4 Install the flame arrestor base and bolts.

- Torque to 69 in. lbs.

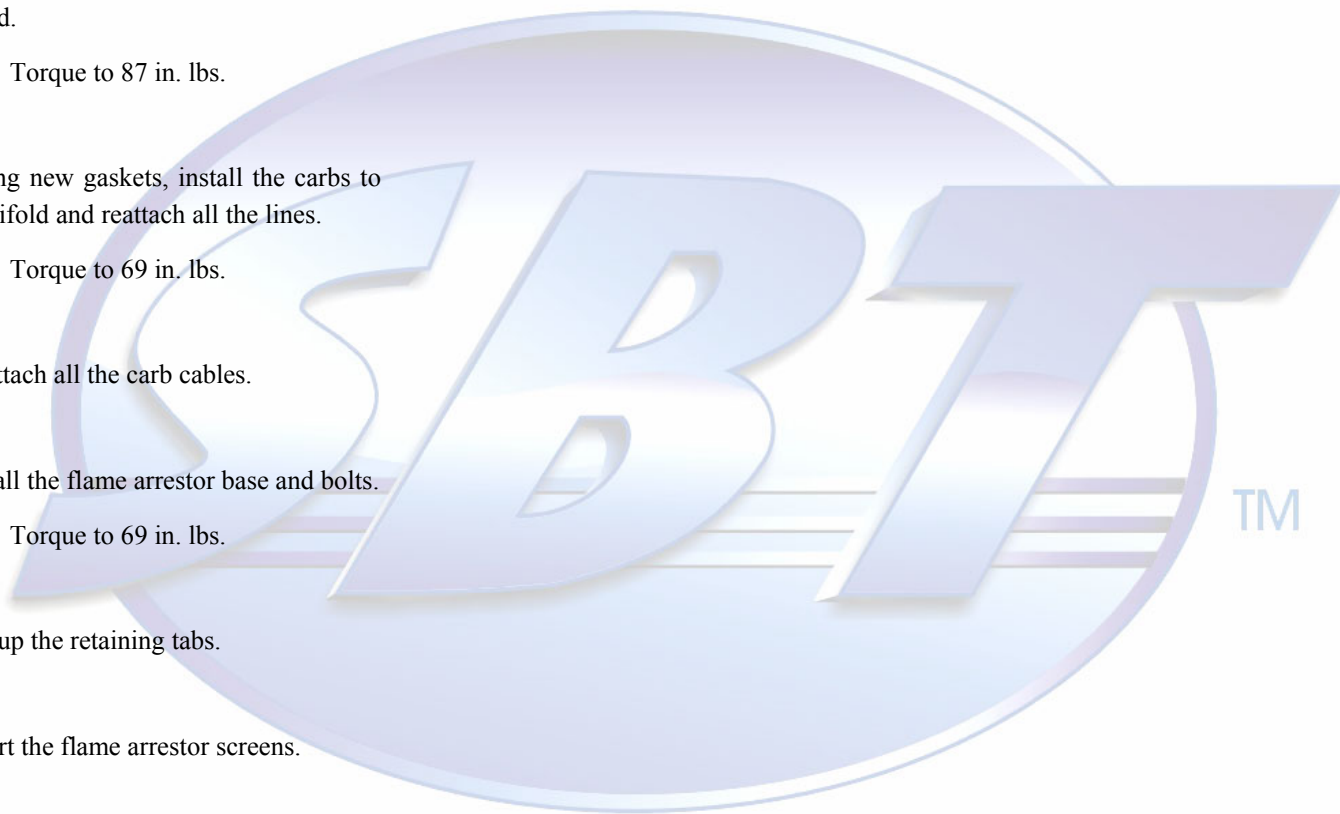
2.3 Pry up the retaining tabs.

2.2 Insert the flame arrestor screens.

2.1 Install the flame arrestor cover.

- Torque to 69 in. lbs.

1.1 Install the battery, making sure it's fully charged and the wires are in good condition.



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Kawasaki 650 / 750

Tools Needed:

Sockets

- 14mm socket
- 12mm socket
- 10mm socket

Misc.

- Ratchet
- Long socket extension
- Short socket extension
- Screwdrivers
- 6mm stud socket*
- 8mm stud socket*

Wrenches

- 10mm wrench
- Torque wrench
- Chain wrench

Sealers / Lubricants

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

Parts

- External Gasket Kit
- Zip-Ties

* If no stud sockets are available, you may double-nut the studs to remove/install them. Place two nuts on the stud and tighten them together. Wrench against the bottom one to remove the stud, wrench against the top nut to install the stud.