Engine Removal / Installation

Yamaha 1200 pv

Step 1

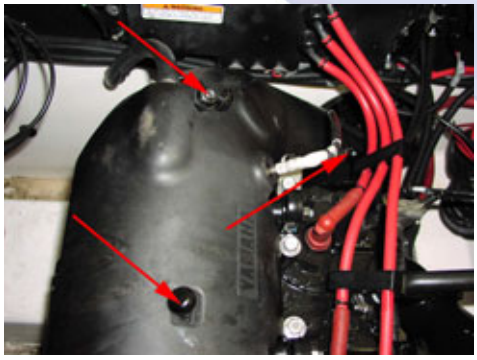
Battery Removal

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).

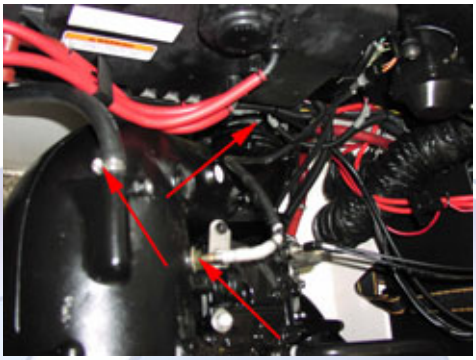
Step 2

Exhaust Removal

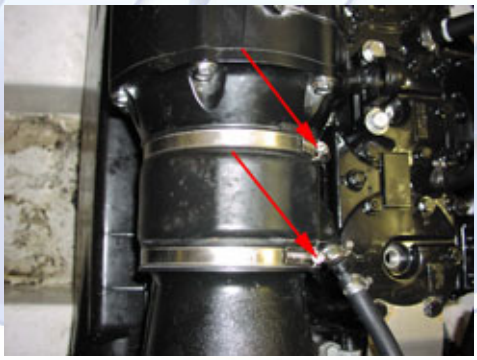
2.1 (Below) Pop open the three bolt covers on the exhaust heat shield and remove the three 10mm bolts.



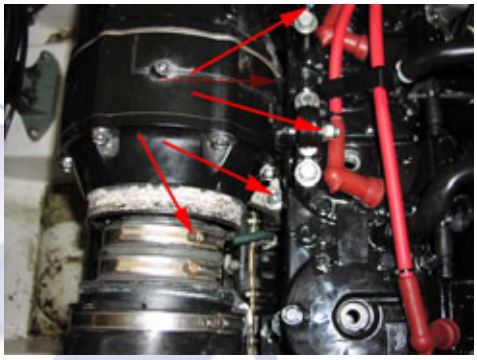
2.2 (Below) Loosen the band clamps around the stinger bypass water line and through-hull exhaust coupling. Remove the water line and using a 14mm wrench, remove the water sensor.



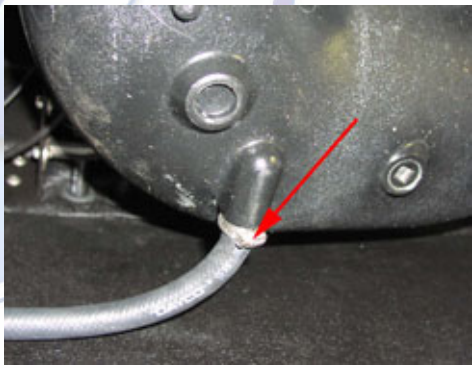
2.3 (Below) Loosen the band clamps securing the exhaust coupler jacket to the pipe and slide it all the way forward to clear the joint.



2.4 (Below) Loosen the rear band clamp securing the pipes together. Remove the four 12mm bolts and nuts securing the rear pipe section to the block. Remove the rear most bracket 12mm bolt securing the pipe to the bracket (not pictured). Remove the rear pipe section from the hull.



2.5 (Below) Remove the front exhaust water line.



Engine Removal / Installation

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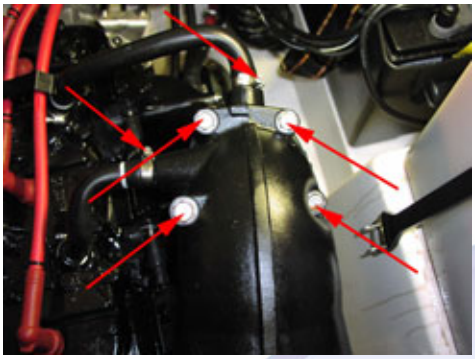
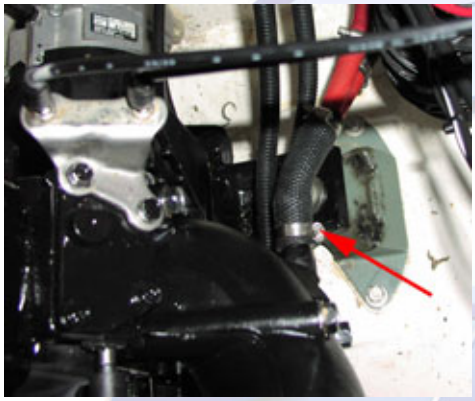
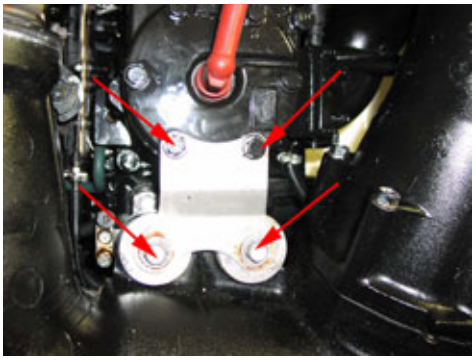
2.6 (Below) Remove the three exhaust header waterlines, and the four 12mm bolts securing it to the exhaust manifold.

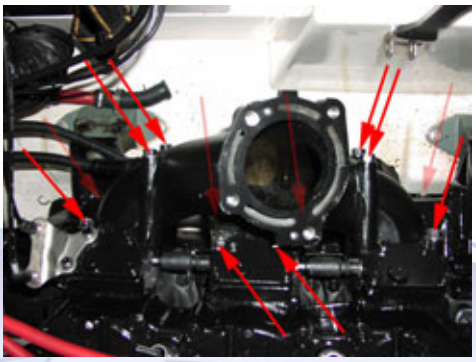




2.7 (Below) Remove the four 12mm bolts securing the front exhaust bracket to the pipe and block. Remove the bracket, then remove the pipe from the hull.



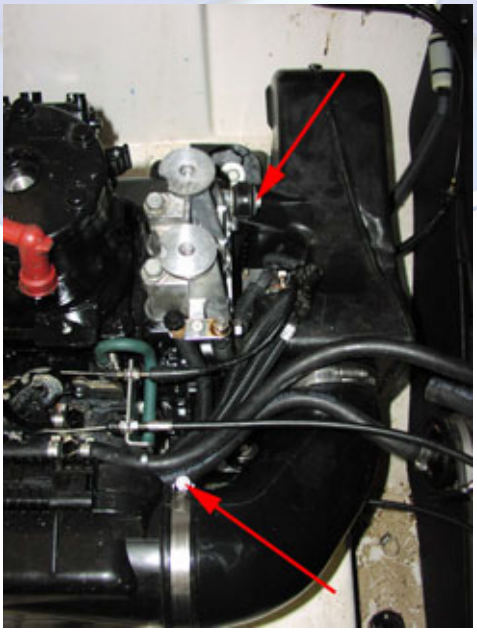
2.8 (Below) Remove the twelve 12mm bolts from the exhaust manifold and remove it from the hull.



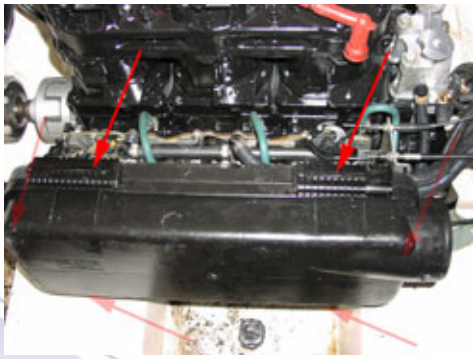
Step 3

Intake Removal

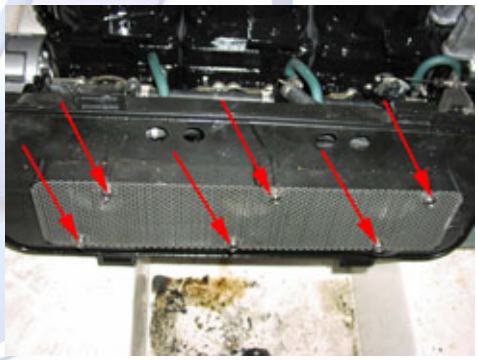
3.1 (Below) Remove the front air intake 10mm bolt and loosen the band clamp securing it to the airbox. Remove the intake.



3.2 (Below) Slide the six airbox cover retainers open and remove the cover.



3.3 (Below) Remove the six 10mm bolts securing the flame arrestor element to the carbs. Remove the flame arrestor assembly from the hull.



Engine Removal / Installation

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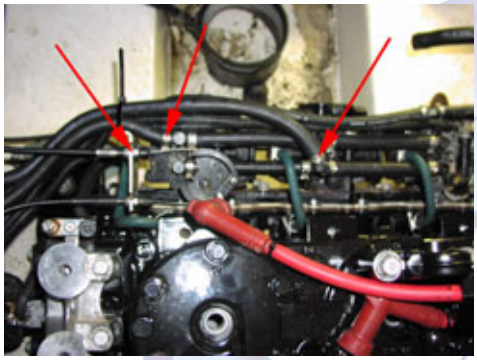
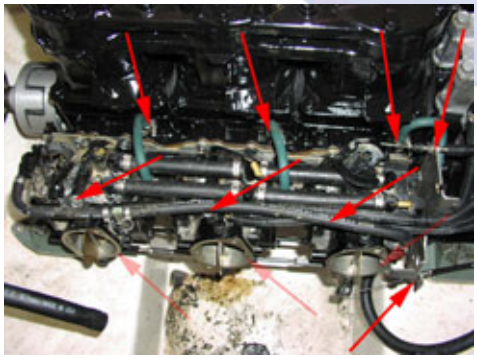
3.4 (Below) Loosen the gas tank cap to relieve pressure. Be sure the fuel switch is turned to the "OFF" position, and be aware of any fuel that may spill from the hoses. Make sure the hull is clear of any gasoline fumes before continuing work, especially with power tools. Disconnect the fuel in and fuel out lines from the carbs. Using a 10mm wrench loosen and remove the oil injection linkage from the carbs and brace.



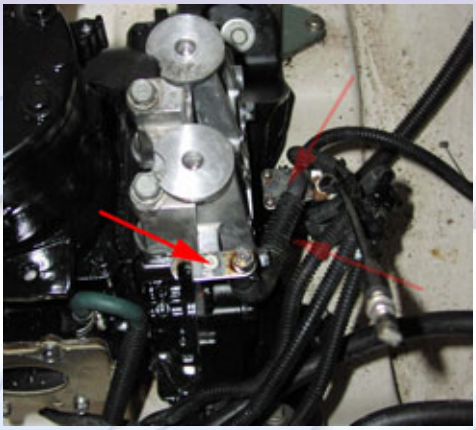
3.5 (Below) Remove the six 10mm bolts securing the carbs to the intake manifold. Loosen and remove the pulse lines, choke and throttle cables from the carbs. Remove the carbs from the hull.



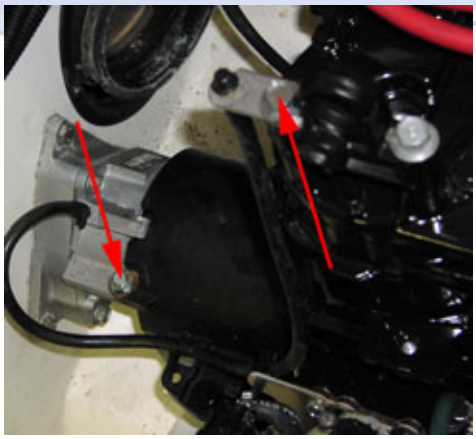
Step 4

Engine Removal

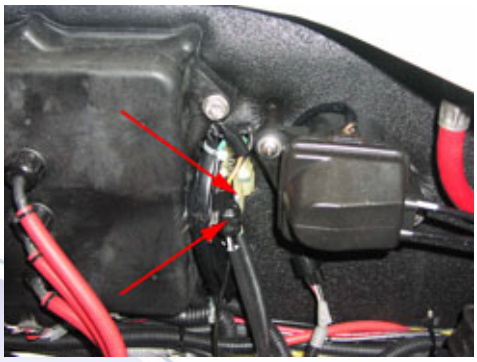
4.1 (Below) Remove the 10mm oil bleed screw bracket bolt, and the two 10mm bolts securing the oil pump to the flywheel cover. Remove the pump and set it aside in the hull.



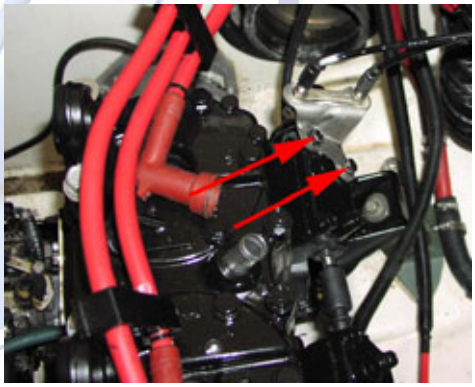
4.2 (Below) Remove the rear-most 14mm bolt from the exhaust bracket and set aside the pump shaft grease fitting bracket. Remove the 10mm bolt securing the PTO cover and remove the cover.



4.3 (Below) Undo the three electrical harnesses going to the flywheel and exhaust system.



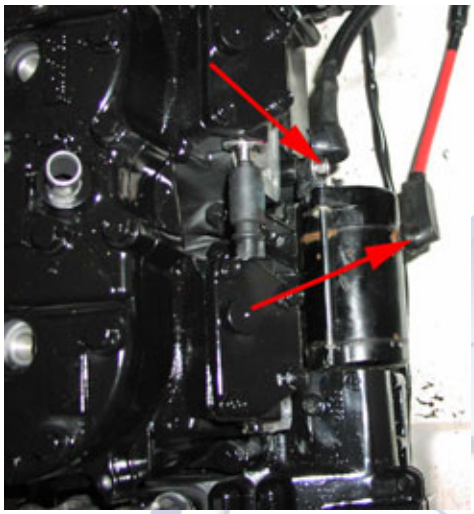
4.4 (Below) Remove the two 10mm bolts from the end of the rear power valve cover and remove the power valve actuator bracket and cables from the cam.



Engine Removal / Installation

Yamaha 1200 pv

4.5 (Below) Remove the 12mm bolt securing the ground cable to the block. Use an 10mm socket to remove the positive cable from the starter.



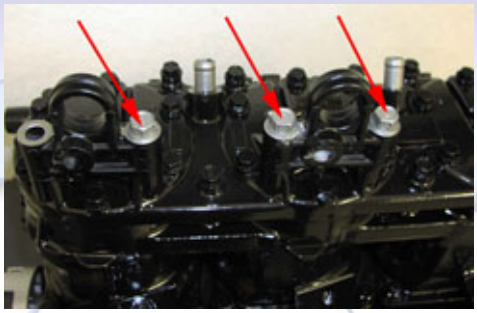
4.1 (Below) Remove the four 14mm motor mount bolts and remove the engine from the hull.

Step 5

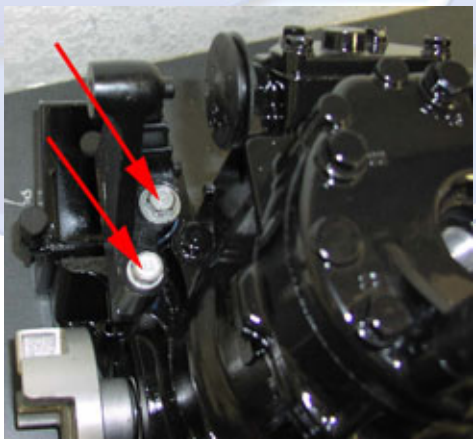
Accessory Removal

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) Using a 14mm socket remove the exhaust bracket from the head.



5.2 (Below) Using a 12mm and 14mm socket remove the rear exhaust bracket.



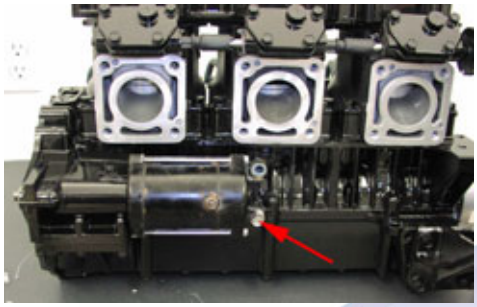
5.3 (Below) Stuff a rag into an open exhaust port. This will prevent the engine from turning over while removing the flywheel and PTO coupler. Use a chain wrench to remove the PTO flywheel.

5.4 (Below) Gently pull out the PTO shroud mounting stubs.

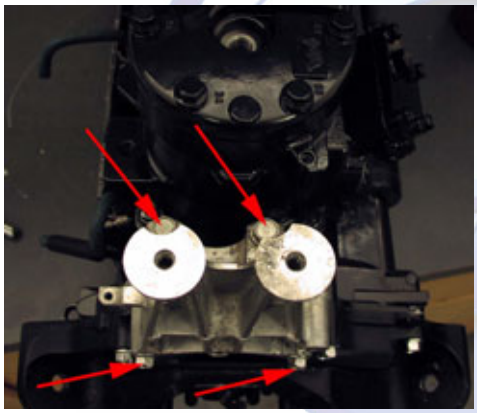
Engine Removal / Installation

Yamaha 1200 pv

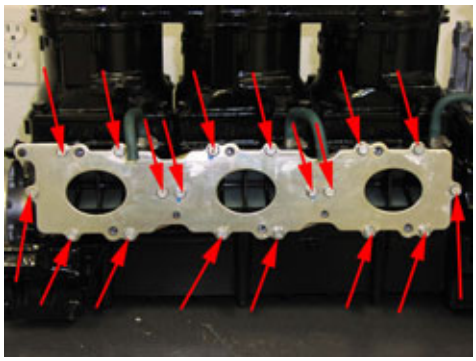
5.5 (Below) Remove the remaining 12mm bolt securing the starter to the case and pull the starter out.



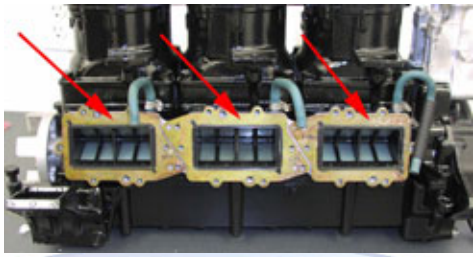
5.6 (Below) Remove the four 12mm bolts securing the front exhaust bracket to the block.



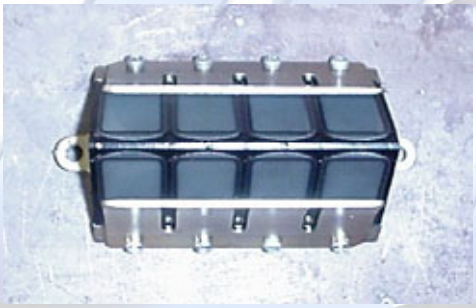
5.7 (Below) Remove the eighteen 10mm bolts securing the intake manifold to the case.



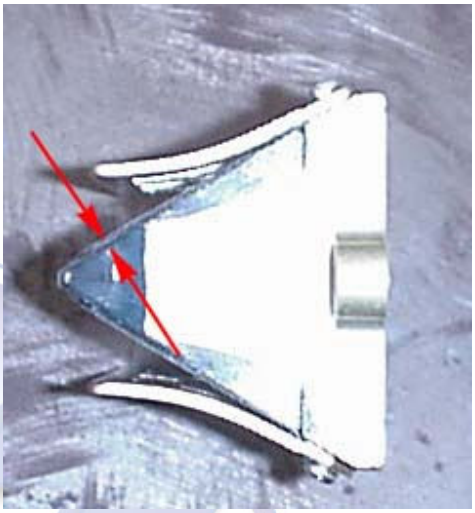
5.8 (Below) Remove the reed cage assemblies.



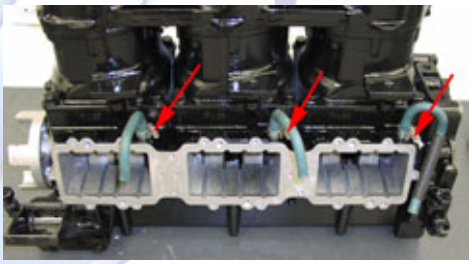
5.9 (Below) Inspect each reed assembly for damage and wear. Look at each reed petal and inspect the edges for signs of cracking, chipping or any missing parts. If any damage is present, replace the petals.



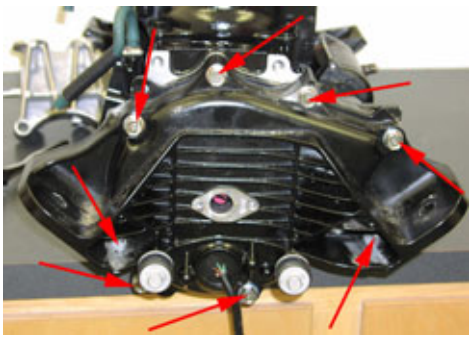
5.10 (Below) Look at each petal-to-cage surface and check for gap. If a gap of more than 0.015" is present, replace the petals.



5.11 (Below) Remove the pulse lines.



5.12 (Below) Remove the eight 14mm bolts securing the flywheel cover to the case. Remove the cover and fish the electrical cables through the hole.



Engine Removal / Installation

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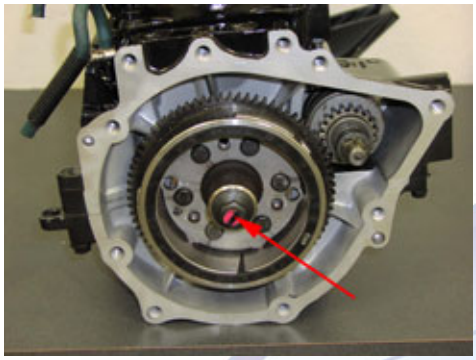
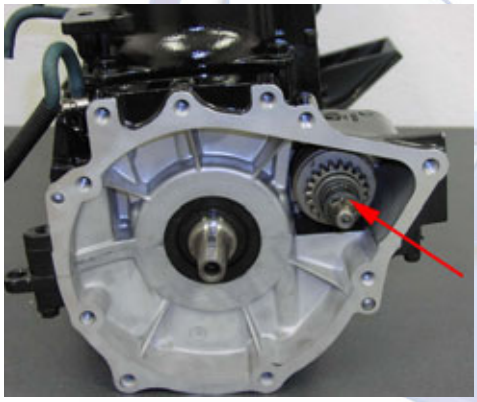
5.13 (Below) Using a 17mm socket remove the flywheel nut. Pull the flywheel off the crankshaft with a universal flywheel puller.



5.14 (Below) Pull the bendix assembly out of the case.



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

Engine Removal / Installation

Yamaha 1200 pv

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

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

5.14 Place the bendix assembly in the case.

5.13 Using a new flywheel key, place the flywheel on the crank and tighten the retaining bolt.

- Torque to 54 Ft. Lbs.

5.12 Using a new o-ring, install the flywheel cover and bolts.

- Torque to 11 .

5.11 Replace the pulse lines.

5.8 – 5.10 Install the reed cage assemblies as shown in the picture.

5.7 Install the intake manifold.

- Torque to 9 Ft. Lbs.

5.6 Install the front exhaust bracket.

- Torque to 28 Ft. Lbs.

5.5 Install the starter and the bottom mounting bolt.

- Torque to 28 Ft. Lbs.

5.4 Install the rubber PTO cover mounting studs.

5.3 Install the PTO coupler.

- Torque to 54 Ft. Lbs.

5.2 Install the rear exhaust bracket.

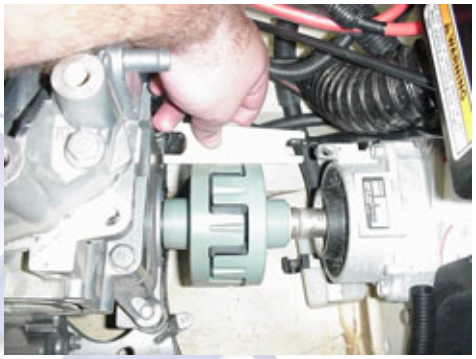
- Torque to 28 Ft. Lbs.

5.1 Install the top exhaust brackets, and leave out the rear-most bolt.

- Torque to

4.6 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.

4.5 Install the ground cable and remaining starter bolt. Make sure the connection surface is sanded and clean.

- Torque to 28 Ft. Lbs.

4.4 Install the power valve cables and bracket.

- Torque to 7.2 ft. lbs.

4.3 Plug in the three electrical harnesses.

Engine Removal / Installation

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4.2 Install the pump grease bracket and bolt. Install the PTO shroud and bolt.

- Torque to 7.2 ft. lbs. (bracket)
- Torque to 16 ft. lbs. (bolt)

4.1 Align the oil pump key and using a new gasket, reinstall the pump. Install the bleed screw bracket.

- Torque to 8.7 ft. lbs.
- Torque to 8.7 ft. lbs.

3.4 – 3.5 Using new gaskets, install the carbs on the intake manifold. Re attach the pulse lines, fuel lines, throttle and choke cables.

- Torque to 16 ft. lbs.

3.3 Install the flame arrestor base and elements to the carbs.

- Torque to 12 ft. lbs.

3.2 Install the flame arrestor cover.

3.1 Install the air intake.

- Torque to 16 ft. lbs.

2.8 Using a new gasket, install the exhaust manifold.

- Torque to 16 then 28 ft. lbs.

2.6 - 2.7 Install the exhaust head pipe to the manifold using a new gasket, and install the front bracket. Install the head pipe waterlines.

- Torque to 28 ft. lbs.
- Torque to 28 ft. lbs.

2.5 Install the front exhaust waterline.

2.4 Install the rear pipe section to the cylinders and install the bolts.

- Torque to 28 ft. lbs.

2.3 Install the exhaust water jacket coupler.

2.2 Install the through-hull coupling clamp, exhaust rear waterline and temp sensor.

- Torque to 28 ft. lbs.

2.1 Install the exhaust heat shield.

- Torque to 8.7 ft. lbs.

Engine Removal / Installation

Yamaha 1200 pv

Tools Needed:

Sockets

- 17mm socket
- 14mm socket
- 12mm socket
- 10mm socket

Sealers / Lubricants

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

Misc.

- Ratchet
- Long socket extension
- Short socket extension
- Screwdrivers

Parts

- Installation Gasket Kit
- Zip-Ties

Wrenches

- 14mm wrench
- Torque wrench
- Chain wrench