

# Engine Removal / Installation

Polaris 700

## 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).

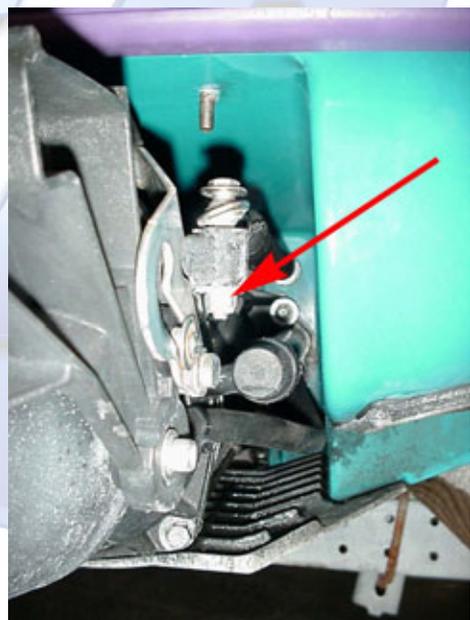
## Step 2

### Pump Removal

2.1 (Below) The pump assembly needs to be removed from the hull to facilitate driveshaft clearance for engine removal.



2.2 (Below) On the back of the pump assembly, the reverse gate rod (if equipped) and steering rod need to be removed. The steering rod nut can be removed using a 9/16" wrench.



2.3 (Below) Remove the reverse clip (if equipped) by bending the top tab and pushing the clip towards the bend to clear the pivot rod. It's easiest to use needle nose pliers to gently pry the top of the clip up while pushing to release it. After releasing the clip, slide the pivot rod out of the bushing from the bottom.



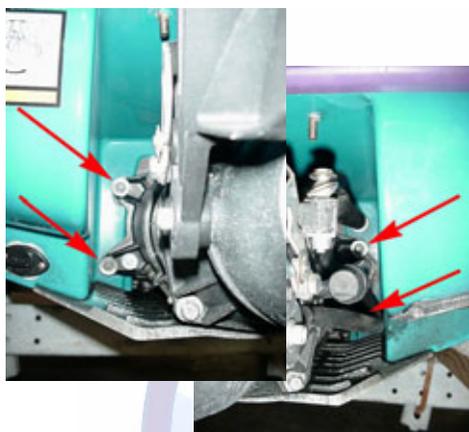
2.4 (Below) On the inside of the hull, at the rear, the cooling water intake and bilge hoses need to be removed. Loosen the hose clamps with a screwdriver, then work the hoses off the nipples.



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2.5 (Below) Now that all hoses and cables are detached, the pump assembly can be removed from the hull. There are 4 mounting bolts, 2 on either side of the pump assembly, that need to be removed. This is most easily done with a long socket extension, combined with a 15mm socket.



2.6 (Left) A good deal of force will be needed to remove the pump assembly from the hull at this point. Grasp the end of the pump and pull it up & down, left & right, to break the seal and free the assembly. Once it begins to break-free, pull the assembly straight back and remove the pump from the hull. Note that the driveshaft may not always come out with the pump assembly. If it stays in the hull, simply grab it and pull back to remove.



## Step 3

### Intake Removal

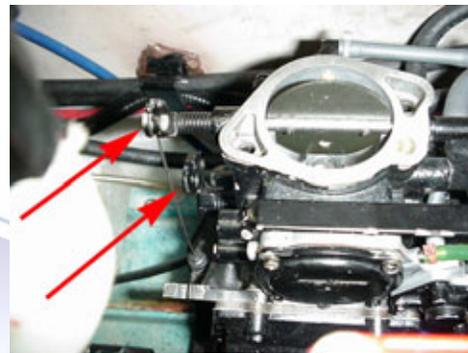
3.1 (Below) Remove the 13mm bolt from the flame arrestor assembly and remove it from the carbs.



3.2 (Below) Remove the four 10mm bolts securing the velocity stacks and carbs to the intake manifold and remove the stacks.



3.3 (Below) Remove the throttle, oil pump and choke cables from the carburetor assembly. Pivot the shafts for easy removal of the cable end-barrels.



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. Remove the fuel in, fuel return, pulse and oil injection lines from the carbs.



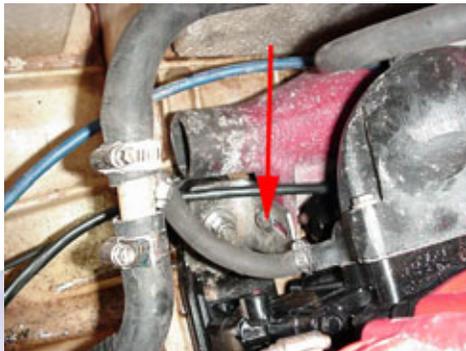
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3.4 (Below) Remove the carbs from the hull. Remove the pulse line from the engine.



4.2 (Below) Remove the 13mm bolt from the rear of the exhaust at the bracket.



4.4 (Below) Remove the front exhaust bracket bolt with a 13mm socket.



## Step 4

### Exhaust Removal

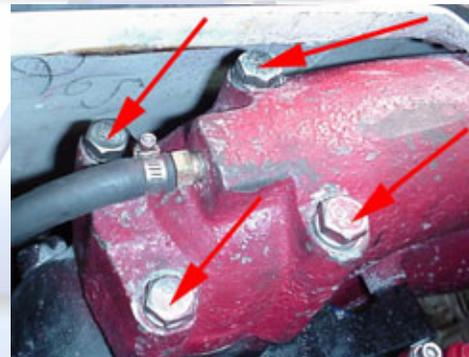
4.1 (Below) Loosen the waterbox to pipe coupler clamp and retaining strap. Remove the waterbox from the hull.



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



4.5 (Below) Remove the top Exhaust bolts with a 19mm socket and wrench. Remove the pipe from the hull.



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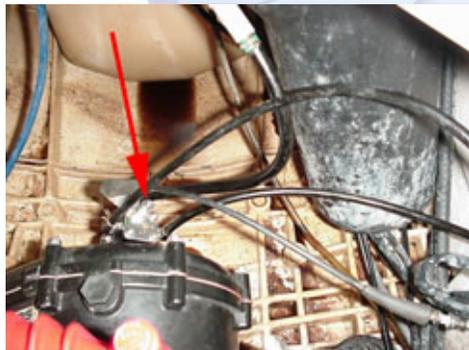
### Step 5

#### Engine Removal

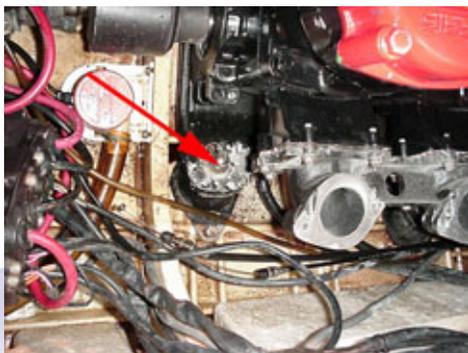
5.1 (Below) Remove the four Allen bolts securing the cooling rail to the head and remove it.



5.2 (Below) Remove the oil inlet line from the oil pump and pinch it off.



5.3 (Below) Remove the four 19mm bolts from the motor mounts.



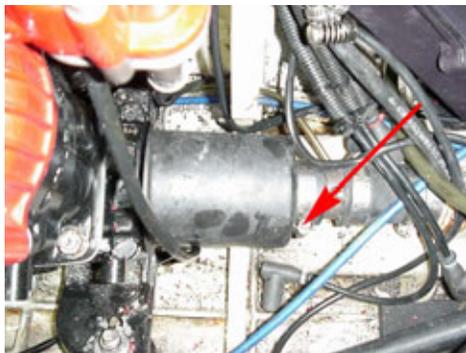
5.4 (Below) **NOTE: DO NOT CUT THE WIRES!** Disconnect all the wires coming through the grommet into the box. Note the location of the wires connected directly to the circuit board for later installation. All other wires are color coded. Remove the two Allen head bolts & grommet from the box then pull the wires through and out.



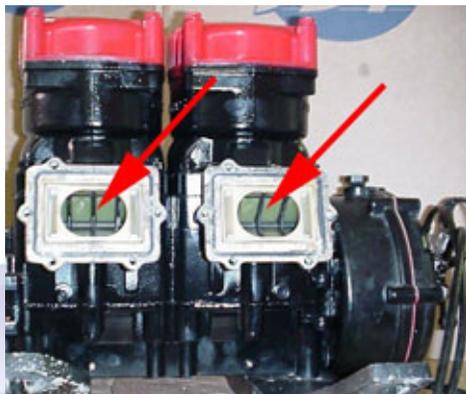
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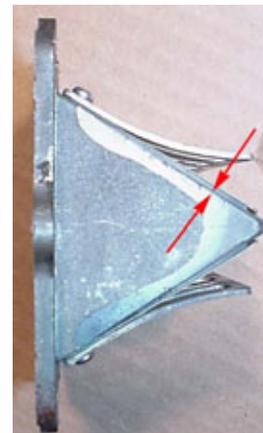
5.5 (Below) Loosen the clamp around the coupler cover and remove the cover. Lift the engine out of the hull.



6.2 (Below) Remove the reed cage assemblies and stuffers from the engine.



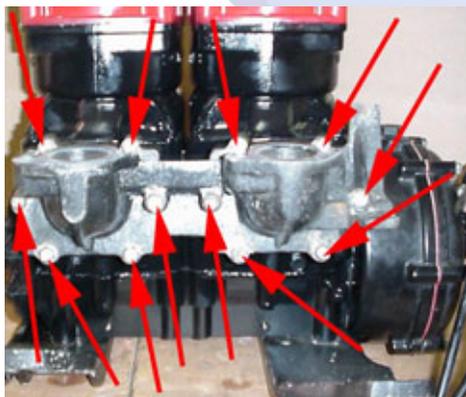
6.4 (Right) Look at each petal-to-cage surface and check for gap. If a gap of more than 0.015" is present, replace the petals.



## Step 6

### Accessory Removal

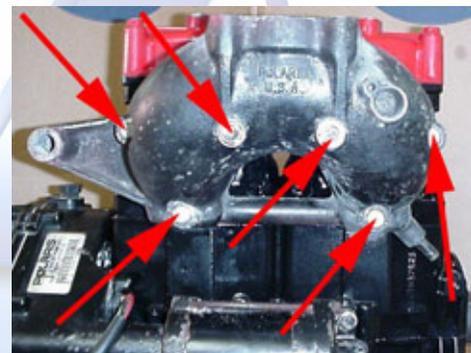
6.1 (Below) With the engine on the ground, workbench or some other solid surface, begin removing the external accessories that will NOT be shipped with the core. Remove the 12 10mm bolts securing the intake manifold to the block.



6.3 (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.



6.5 (Below) Remove the six 13mm bolts securing the exhaust manifold to the engine.



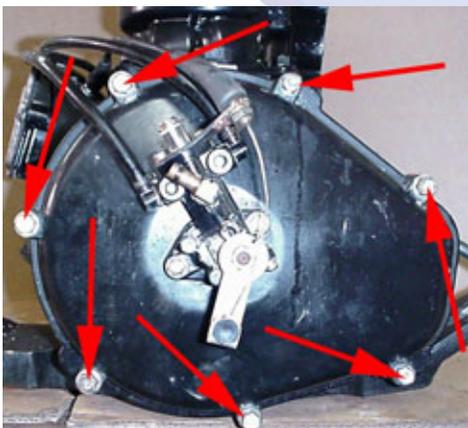
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6.6 (Below) Stuff a rag into one of the exhaust ports. Make sure the rag penetrates through the port, into the combustion chamber on top of the piston. This will prevent the engine from turning over while you remove the PTO coupler and flywheel.



6.7 (Below) Remove the seven 10mm bolts securing the flywheel cover and remove it.



6.8 (Below) Remove the flywheel nut with a 19mm socket.



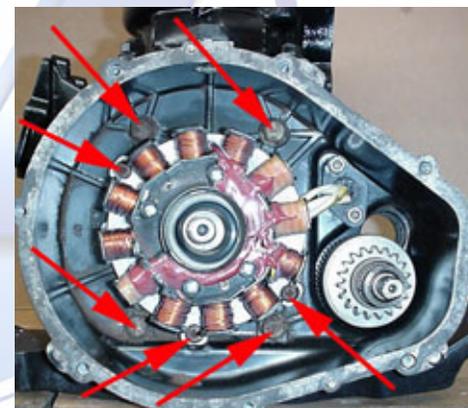
6.9 (Above) Use a universal flywheel puller to remove the flywheel from the crankshaft.



6.10 (Below) Remove the two 10mm bolts securing the starter to the case.



6.11 (Below) Remove the three screws securing the stator and swing it aside to gain access to the flywheel housing bolts. Remove the four 13mm bolts securing the flywheel housing to the case and remove the housing.



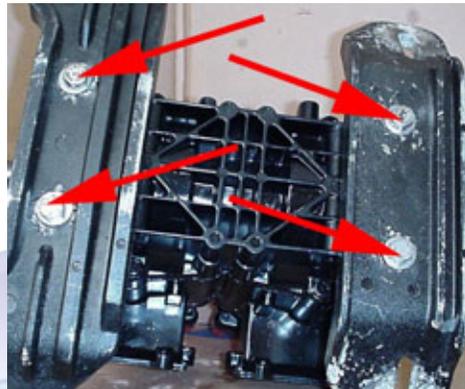
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6.12 (Below) Remove the starter bendix, and punch out the crank seal, replacing it with a new one.



6.14 (Below) Remove the engine saddles with a 16mm socket.



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

6.13 (Below) Use a 14" pipe wrench or chain wrench to remove the PTO coupler.



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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:

**6.14** Install the engine saddles.

- Torque to 40 ft. lbs.

**6.13** Stuff a rag into an open exhaust port. Install the PTO coupler.

- Torque to 50 ft. lbs.

**6.12** Install a new crank seal if you have not already done so.

**6.11** Install the starter, starter bendix and stator onto the flywheel housing and attach it to the case sealing with Loctite® 2 Gasket Sealer.

- Torque to 60 in. lbs.

**6.10** Install the starter and bolts.

- Torque to 108 in. lbs.

**6.9** Install the flywheel onto the crankshaft.

**6.8** Install the flywheel nut.

- Torque to 90 ft. lbs.

**6.7** Using a new gasket, install the flywheel housing. 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.

- Torque to 108 in. lbs.

**6.6** Remove the rag from the exhaust port.

**6.5** Using a new gasket, install the exhaust manifold.

- Torque to 22 ft. lbs.

**6.2 – 6.4** Install the reed cage assemblies and stuffers.

**6.1** Install the intake manifold.

Torque to 8 ft. lbs.

**5.5** Lift the new engine into the hull and place it on the engine mount studs. Replace the PTO shroud.

**5.4** Run the electrical wire in the hull and reconnect them in the electrical box.

**5.3** Spin the engine mount nuts onto the studs, and rock the mounts back & forth with your hands; try to break them. If any mount(s) fails, replace it before installing the new engine. Re-install engine mount bolts.

- Torque to 45 ft. lbs.

**5.2** Attach the oil line to the pump. **5.1** Using new gaskets, install the head cooling rail.

- Torque to 6 ft. lbs.

**4.5** Place the pipe in the hull and bolt it to the manifold.

- Torque to 22 ft. lbs.

**4.4** Install the front exhaust bracket bolt.

- Torque to 14 ft. lbs.

**4.3** Install the pipe cooling lines.

**4.2** Install the rear pipe mounting bolt.

- Torque to 14 ft. lbs.

**4.1** Install the waterbox, coupler and mounting strap.

**3.4** Install the pulse line to the engine and place the carbs in the hull.

**3.3** Install the oil injection lines, if equipped, and fuel lines. Using new gaskets, place the carbs on the manifold.

**3.3** Attach the carb control cables.

**3.2** Bolt the carbs to the manifold.

- Torque to 108 in. lbs.

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**3.1** Install the flame arrestor assembly and bolt.

- Torque to 3.3 ft. lbs.

**2.6** Install the drive shaft into the hull. You will feel it slide into the coupler by its spines. Apply 100% silicone to the pump housing on the o-ring to provide a seal to the hull. Slide the pump assembly over the shaft, meeting with the mounting bolts on the hull.

**2.5** Re-attach the pump mounting bolts to support the pump.

- Torque to 28 ft. lbs.

**2.4** Re-attach the pump mounting bolts to support the pump.

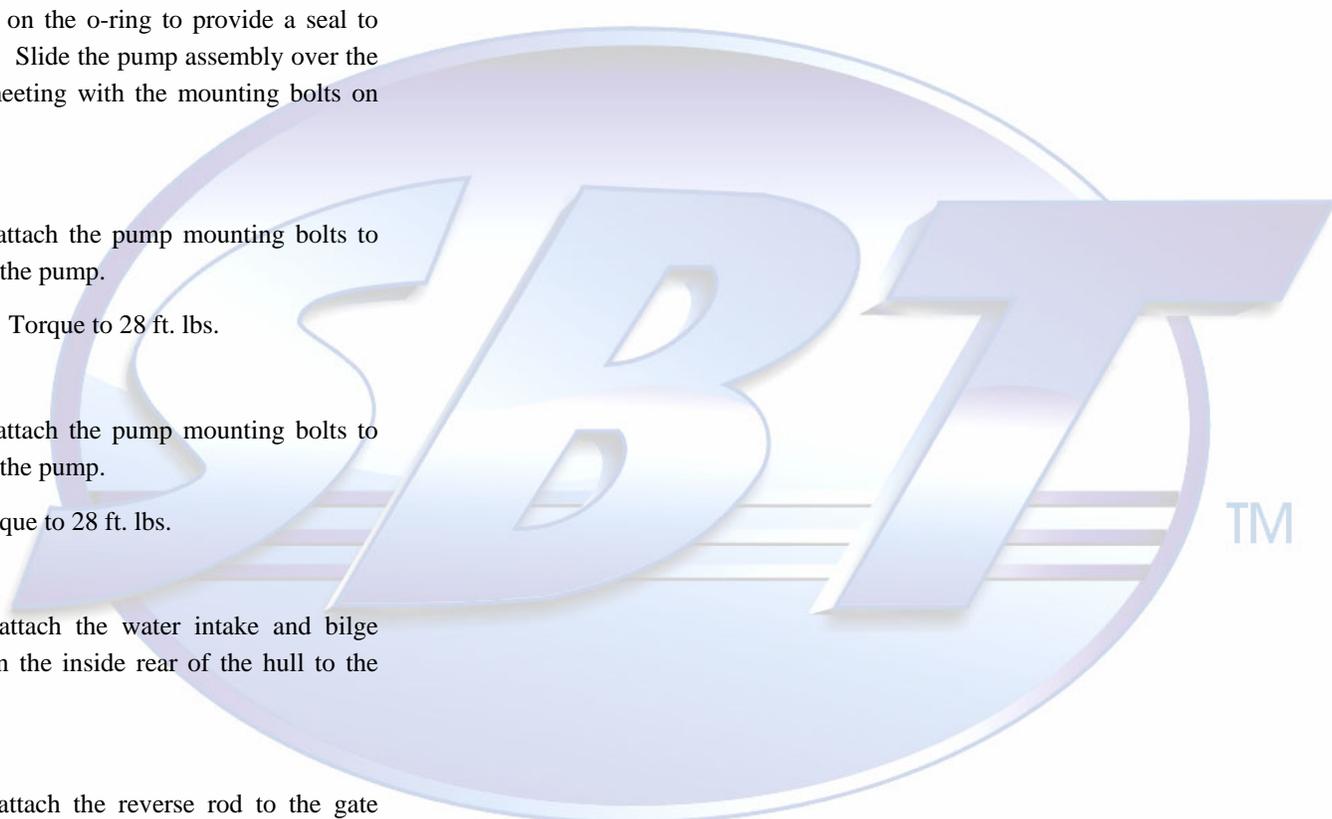
- Torque to 28 ft. lbs.

**2.3** Re-attach the water intake and bilge hoses on the inside rear of the hull to the pump.

**2.2** Re-attach the reverse rod to the gate and install the clip (if equipped). Re-attach the steering rod to the steering nozzle.

- Torque to 8 ft. lbs.

**1.1** Install the battery, making sure it has a full charge. Attach the positive wire first.



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## **Tools Needed:**

### **Sockets**

- 17mm socket
- 14mm socket
- 13mm socket
- 12mm socket
- 10mm 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
- Breaker-bar/chain wrench
- Universal flywheel puller (Available at most major auto parts stores for rent/lend/purchase)

### **Parts**

- External Gasket Kit
- Zip-Ties

### **Wrenches**

- 10mm wrench
- 9/16" wrench
- Torque wrench
- Chain/pipe wrench