

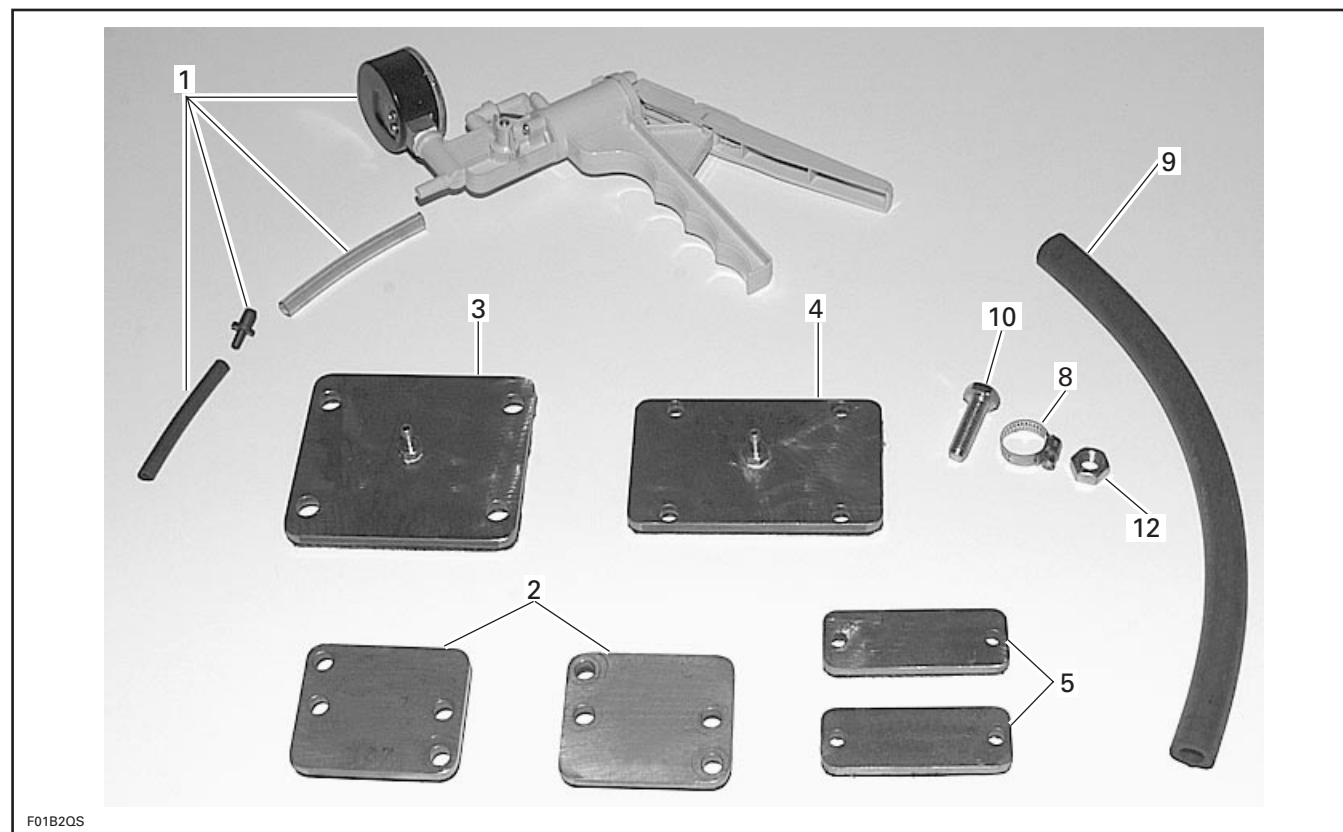


SEA DOO®

Jet Boats and Watercraft

ENGINE LEAK TEST KIT
(P / N 295 500 352)

PARTS TO BE INSTALLED



- | | |
|--|----------------------------|
| 1. Pressure Gauge | Hose Clamp |
| 2. Intake Plate (Punched No. 3) (2) | 9. Hose 12.5 mm (2) |
| 3. Exhaust Plate for 787 Engine (Punched No. 1) | Hose 8 mm |
| 4. Exhaust Plate for 587, 657, 717 Engines (Punched No. 2) | Hose 12 mm |
| 5. RAVE Plate for 787 Engine (Punched No. 4) (2) | Hose 20 mm |
| 6. Nipple (Not Shown) | 10. Screw M12 |
| 7. Adapter (Not Shown) | Screw M6 (4) |
| 8. Hose Clamp (4) | Screw M8 (7) |
| Hose Clamp (2) | Screw M10 (3) |
| | 11. Washer (Not Shown) (3) |
| | Washer (Not Shown) (3) |
| | 12. Nut M8 (3) |
| | Nut M10 |

GENERAL

The Sea-Doo leak test kit provides the means and procedures to test all engines. On multi-cylinder engines, cylinders can not be verified individually due to leakage from one cylinder to another through a common intake manifold.

Static bench testing before and after engine rebuilding is the most effective way to conduct leak testing. Onboard testing does not allow complete access to, and observation of all engine surfaces and should be avoided whenever possible.

When installing hoses from the kit to the engine, ensure to use the collars provided for a good sealing.

When pressurizing the engine, first confirm the sealing of the Leak Test Kit by spraying a soapy solution on all hoses, connections, fittings, plates etc. If it is leaking, bubbles will indicate location. Once it is confirmed to have no leaks, then the testing will continue.

Four areas will be tested in sequence as per the diagnostic flow chart (see the end of this document).

1. Engine cooling system test.
2. Engine test.
3. Crankcase rotary valve gear lubrication system.
4. Test after reassembly.

NOTE : If one leak is found, it is important to carry on and test the next items before overhauling engine. There is a possibility for multiple leaks. If one leak is found you will have to continue pumping to maintain the specified pressure until the next leak is found.

NOTE : A diagnostic flow chart is attached for visual reference at the end of this document.

PREPARATION

Verify fuel system for leaks.

WARNING : If any fuel leak is found or suspected, do not start the engine. Correct the leak and wipe off any fuel leakage. Failure to do this could result in an explosion. Do not use any electric power tools on craft unless system has passed a fuel leakage test.

With engine off, disconnect the BLACK negative cable FIRST.

WARNING : Always disconnect battery cables exactly in the specified order, BLACK negative cable first. Electrolyte or fuel vapors can be present in the engine compartment and a spark might ignite them. Disconnect the RED positive cable last.

NOTE : The disconnection of the battery will not affect the operation of any DESS equipped craft.

TESTING PROCEDURE

ENGINE COOLING TEST

Test pressure : 34 kPa (5 PSIG) for 3 minutes
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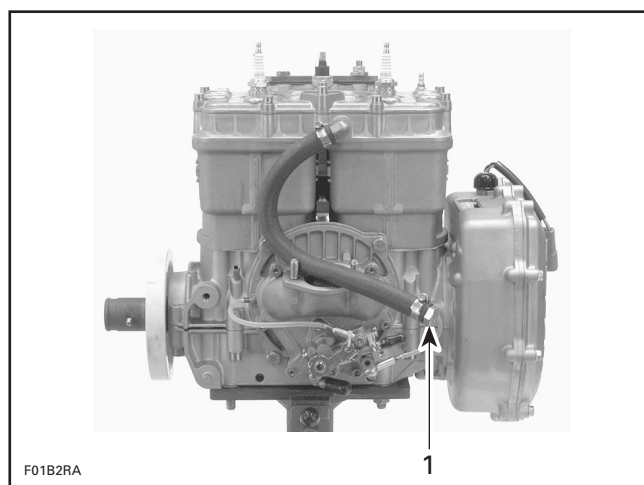
The cooling system is a total loss, non-enclosed design. To leak test the engine portion of the cooling system, it is necessary to eliminate all connections with intake / tuned pipe / muffler system. Disconnect production cooling hoses.

Remove the tuned pipe but leave the exposed exhaust manifold in place, on the engine. Remove the manifold gasket and ensure a clean surface is available.

Install the appropriate exhaust cover plate (punched no. 1 for 787 engine and no. 2 for other engines) from the Leak Testing Kit. Tighten plate using fasteners provided in the kit.

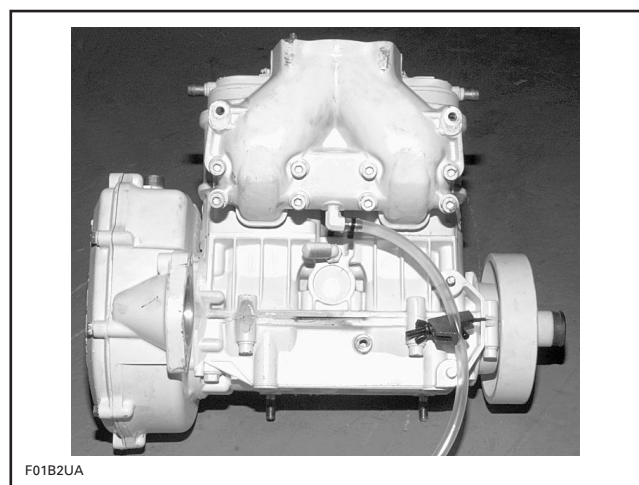
Use hose(s) provided in the kit and install on the engine.

Install pump using reducer and appropriate tube(s) as necessary.



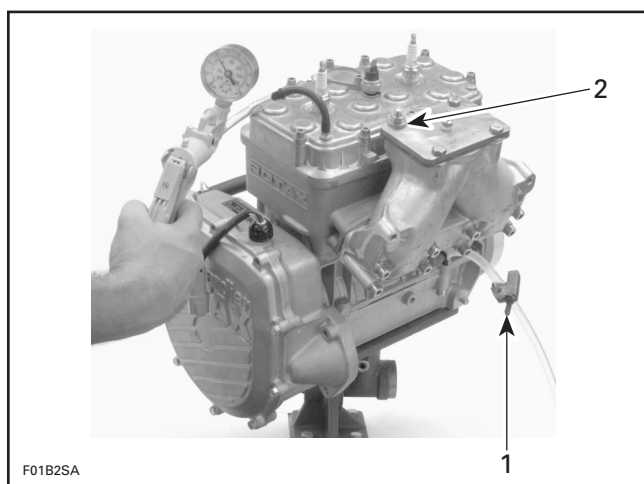
587 ENGINE

1. Hose with clamps. Plug end with a screw



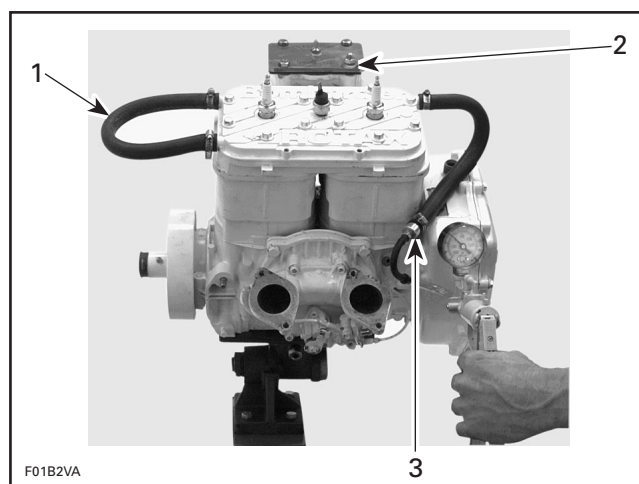
717 ENGINE

1. Plug exhaust manifold drain hose with a pincher



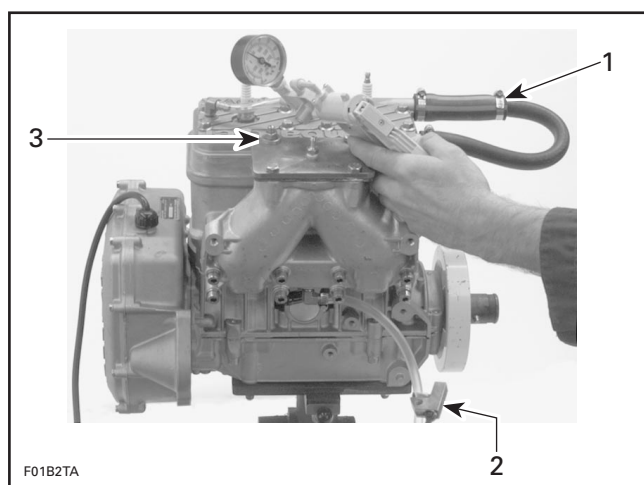
587 ENGINE

1. Plug exhaust manifold drain hose with a pincher
2. Use 2 washers on exhaust plate here



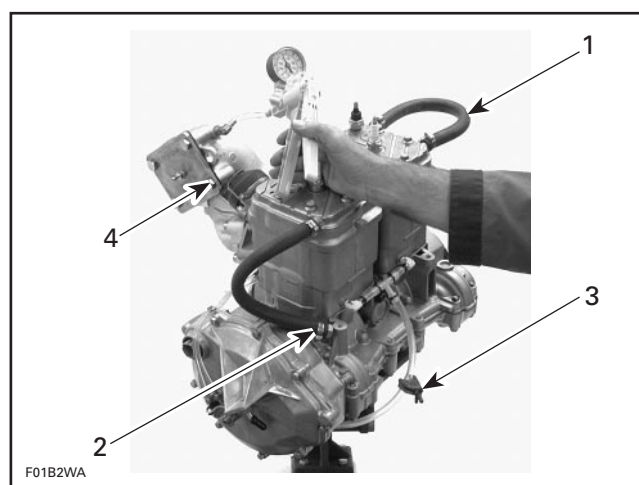
717 ENGINE

1. Loop hose and use clamps
2. Use 2 washers on exhaust plate here
3. Hose with adapter and nipple



657 ENGINE

1. Insert small hose inside large hose. Install clamps
2. Plug exhaust manifold drain hose with a pincher
3. Use 2 washers on exhaust plate here



787 ENGINE

1. Looped hose with clamps
2. Hose with clamps. Plug end with a screw
3. Plug exhaust manifold drain hose with a pincher
4. Use 2 washers on exhaust plate here

NOTE : Water is not required in the testing circuit.

Activate pump and pressurize engine cooling system to the recommended pressure.

Let engine stand for 3 minutes. If pressure drops, check all testing components.

- If tester kit is not leaking and pressure drops, check all external jointed surfaces, temperature sensor and the joint between the spark plug area and the engine head cover. If nothing is found here, there is an internal leak and carry on with the Engine Test noting there is a cooling leak and a new cylinder head O-ring / base gasket may be needed.
- If tester kit is not leaking and pressure holds, move on to the engine test procedure. Cooling system leak is now eliminated as a factor.

ENGINE TEST

Test pressure :
34 kPa (5 PSIG) for 3 minutes

Remove the carburetor(s) but leave the exposed intake manifold in place on the engine. Remove the manifold gasket and ensure a clean surface is available.

Install the appropriate intake cover plate(s) (punched no. 3) from the Leak Testing Kit. Tighten plates using fasteners provided in the kit.

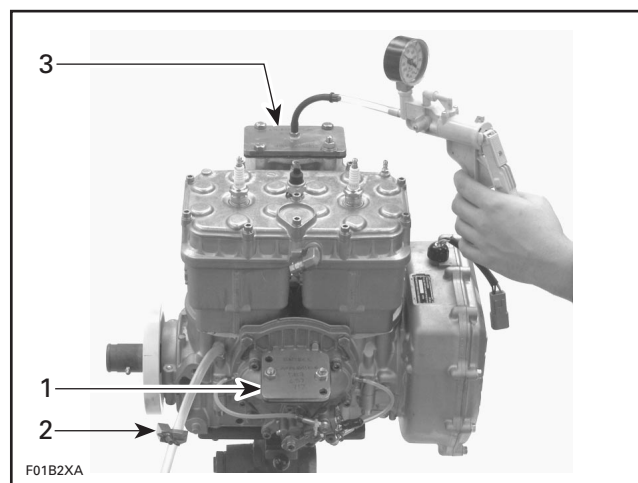
NOTE : On engines with the RAVE system, the boots and the O-rings could be checked for leaks by leaving the valves in place. Simply remove the covers to expose the boots.

On engines with the RAVE system, remove the RAVE valve assemblies and gaskets (for the MAG side, unscrew the cap to remove separately the housing and the valve). Install the appropriate cover plates (punched no. 4) from the kit. Tighten the plates using fasteners provided in the kit.

Ensure that the spark plugs are installed and tight. Using hose pincher P / N 295 000 076, block off impulse line.

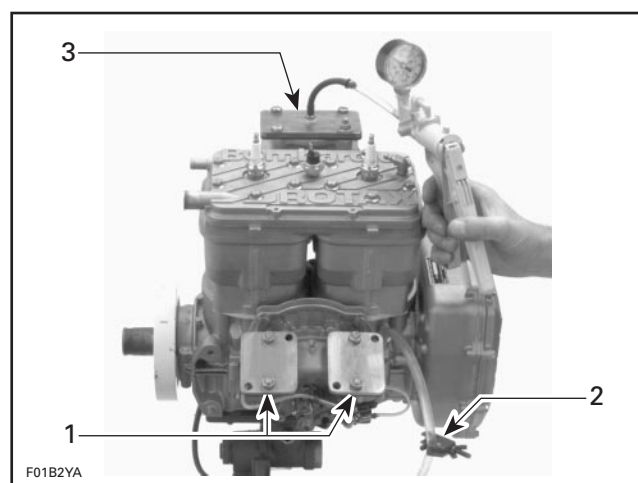
NOTE : Do not block off either of the 2 large hoses of the crankcase rotary valve gear lubrication system.

Install air pump on the exhaust cover plate fitting.



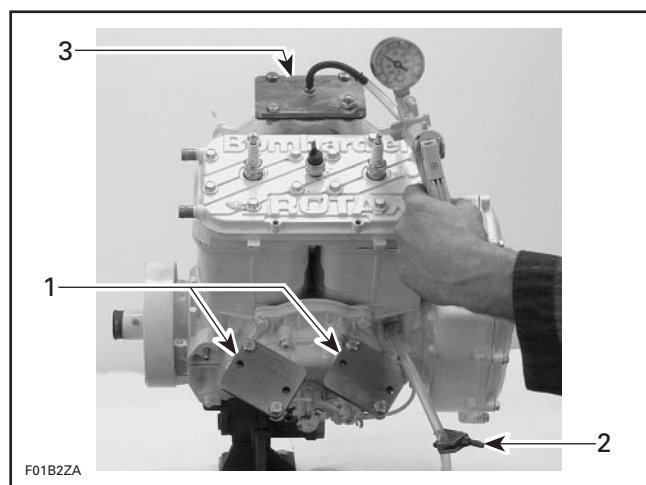
587 ENGINE

1. Intake plate
2. Plug impulse hose with a pincher
3. Exhaust plate



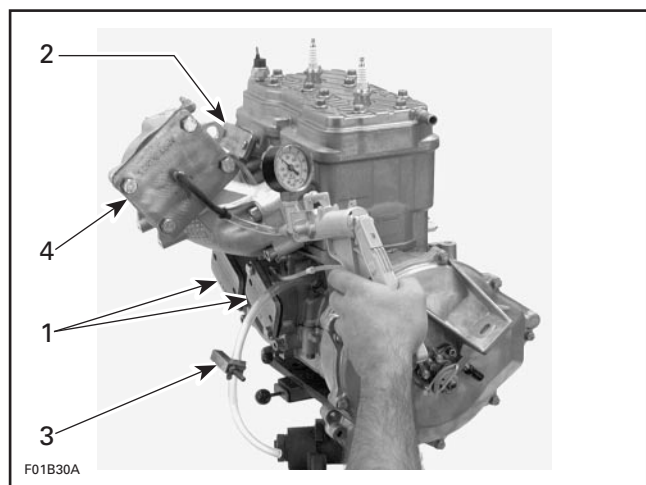
657 ENGINE

1. Intake plates
2. Plug impulse hose with a pincher
3. Exhaust plate



717 ENGINE

1. Intake plates
2. Plug impulse hose with a pincher
3. Exhaust plate



787 ENGINE

1. Intake plates
2. RAVE system plates
3. Plug impulse hose with a pincher
4. Exhaust plate

Activate pump and pressurize engine to the recommended pressure. Do not exceed this pressure.

Engine must stand this pressure for 3 minutes. If pressure drops before 3 minutes, check all testing components.

- If tester kit is not leaking then check engine as per following procedure.

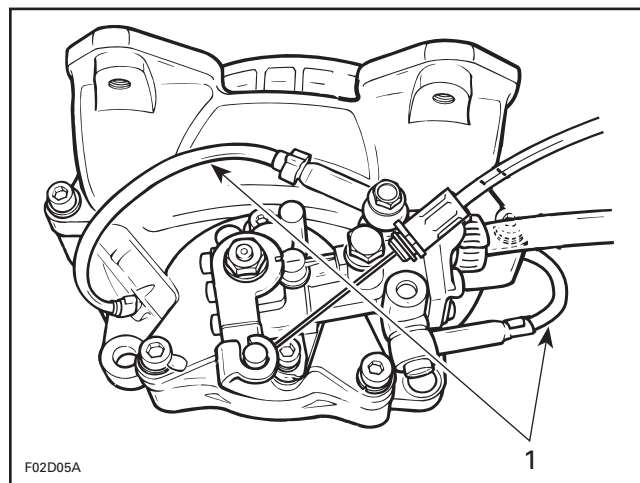
Check the following areas:

All jointed surfaces, screws, studs etc.

- Spark plug base and insulator
- Cylinder head
- Cylinder base
- Crankcase halves (joint)

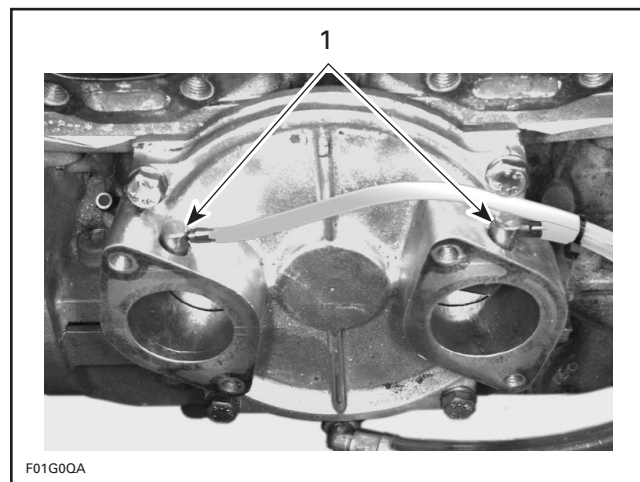
- Crankcase caps for counterbalancing shaft of 787 engine
- Rotary valve cover
- Oil injection pump mounting flange (O-ring seal)
- Bleed screws / plugs
- Intake and exhaust manifolds

Small oil injection lines and fittings : Check for air bubbles or oil column going toward pump. It indicates defective check valve in fitting.



587, 657 AND 717 ENGINES

1. Oil injection lines



787 ENGINE

1. Oil injection lines

If leaking continues then block off both hoses of the rotary valve gear lubrication system with hose pinchers P / N 529 030 400.

NOTE : If leakage stops at this point ignore the next steps and go directly to crankcase rotary valve lubrication test.

If leaking continues, remove PTO flywheel to check crankshaft outer seal (and additional O-ring on 787 engine).

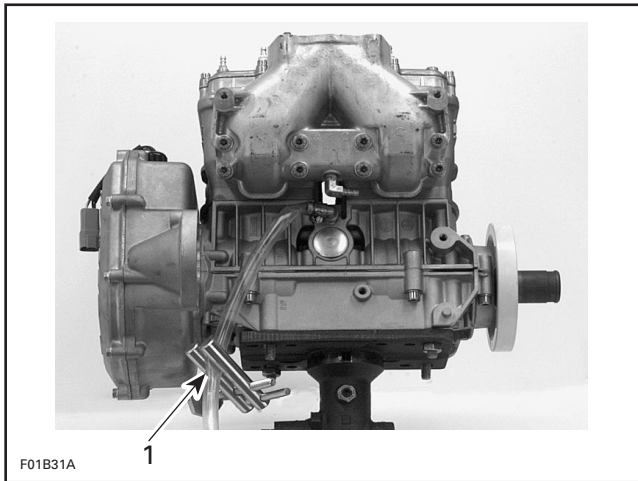
If leaking continues remove MAG side flywheel to check crankshaft outer seal.

If leaking persists then conduct crankcase rotary valve test.

CRANKCASE ROTARY VALVE GEAR LUBRICATION SYSTEM TEST

Test pressure : 34 kPa (5 PSIG)
for 3 minutes

Block 1 hose of rotary valve gear lubrication system with hose pincher P / N 529 030 400 and install Leak Test Kit reducer and nipple in the other.



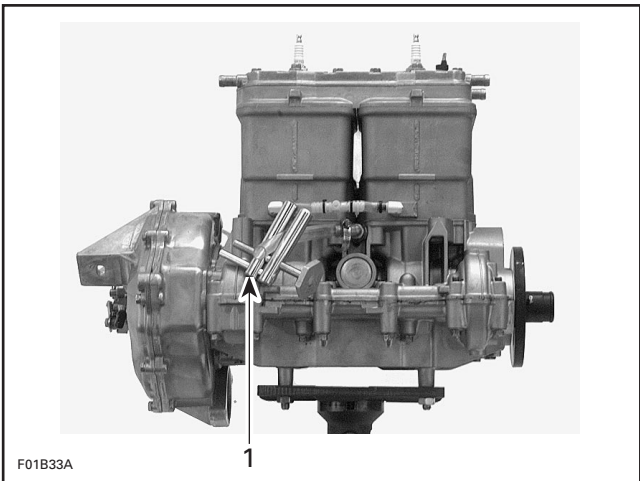
587, 657 AND 717 ENGINES

1. Block this hose with a pincher



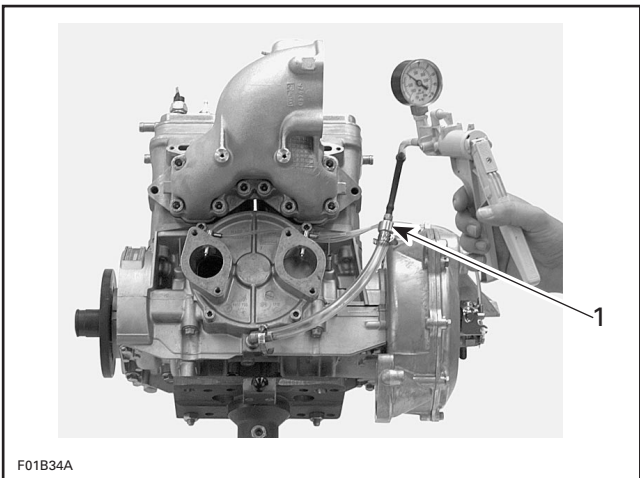
587, 657 AND 717 ENGINES

1. Hose with reducer and nipple



787 ENGINE

1. Block this hose with a pincher



787 ENGINE

1. Hose with reducer and nipple

NOTE : It is preferable to have reservoir oil drained from system prior to testing but not mandatory.

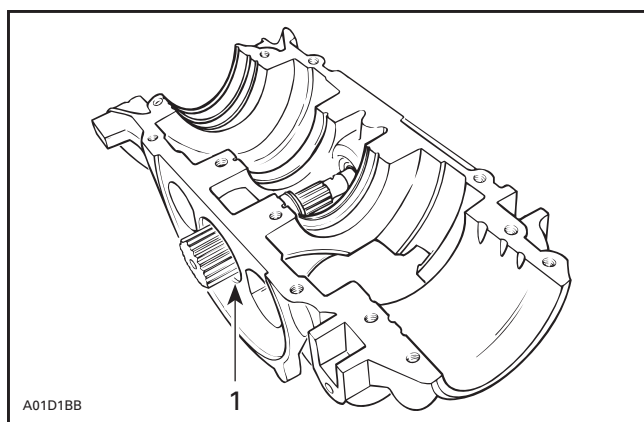
Install air pump on adapter and pressurize as before.

Check cap of rotary valve shaft reservoir in crankcase. It is located just below the oil hose fitting.

Remove PTO side spark plug. If pressure drops, it indicates a defective PTO side crankshaft seal.

Remove MAG side spark plug. If pressure drops, it indicates a defective MAG side crankshaft seal.

If there is a leak, it indicates a defective rotary valve shaft seal. Remove rotary valve cover and check for seal leak with soapy water solution.



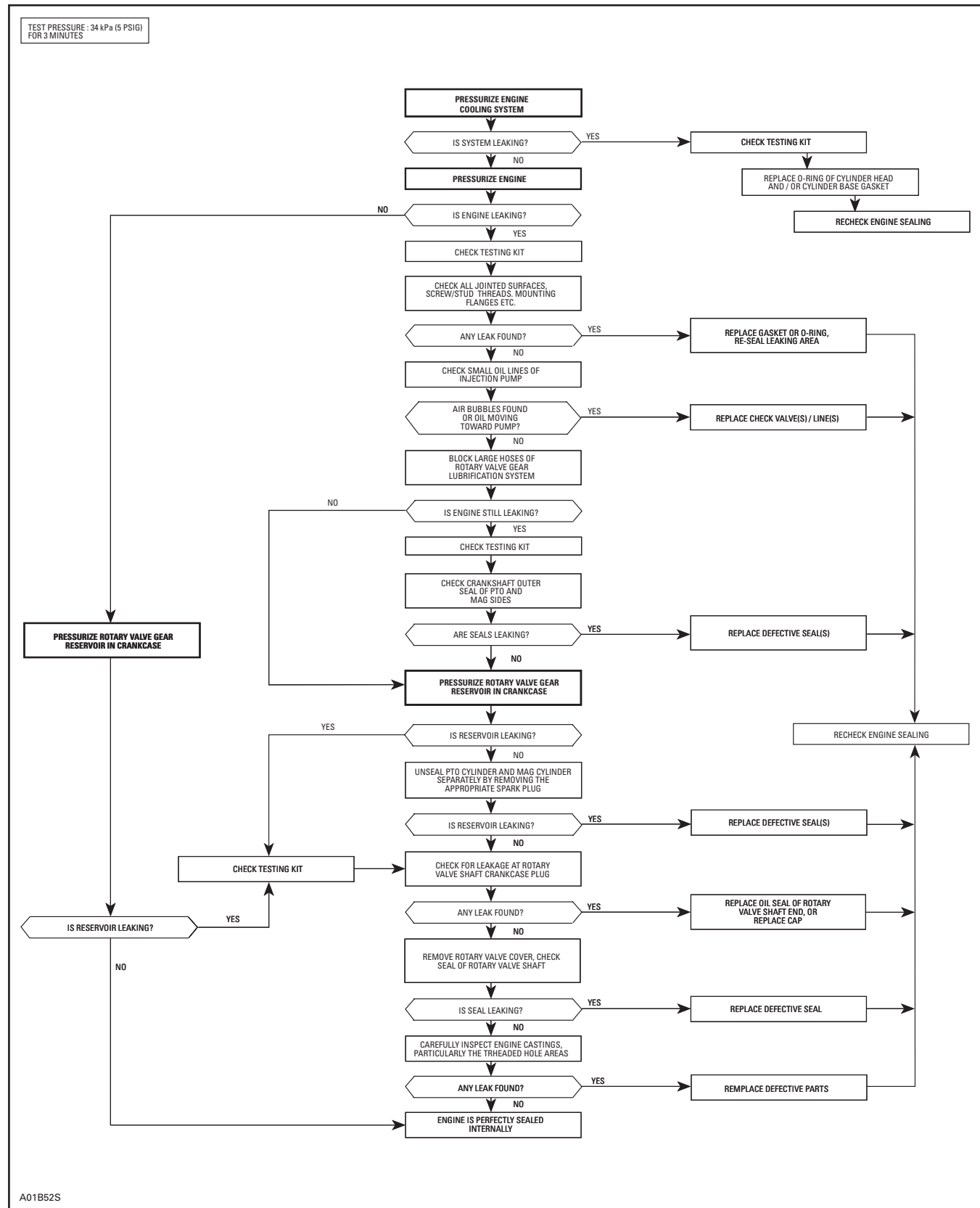
1. *Seal*

If leak persists, it indicates a defective casting somewhere in the engine. Disassemble engine and carefully check for defects in castings. Pay attention to tapped holes which may go through sealed areas of engine and thus lead to leakage.

REASSEMBLY TEST

After reassembly of engine always recheck for leakage on the bench and after installation in craft.

ENGINE LEAK DIAGNOSTIC FLOW CHART



295 500 352

1.	529 021 800	Pressure Gauge	Manomètre
2.	295 000 148	Intake Plate (Punched No. 3) (2)	Plaque d'admission (n° 3 poinçonné) (2)
3.	295 000 146	Exhaust Plate For 787 Engine (Punched No. 1)	Plaque d'échappement pour moteur 787 (n° 1 poinçonné)
4.	295 000 147	Exhaust Plate For 587,657, 717 Engines (Punched No. 2)	Plaque d'échappement pour moteurs 587, 657 et 717 (n° 2 poinçonné)
5.	295 000 149	RAVE Plate For 787 Engine (Punched No. 4) (2)	Plaque RAVE pour moteur 787 (n° 4 poinçonné) (2)
6.	408 201 100	Nipple (Not Shown)	Raccord (non illustré)
7.	517 234 900	Adapter (Not Shown)	Adaptateur (non illustré)
8.	293 650 037	Hose Clamp (4)	Collier de serrage (4)
	293 650 051	Hose Clamp (2)	Collier de serrage (2)
	293 650 038	Hose Clamp	Collier de serrage
9.	276 000 001	Hose 12.5 mm (2)	Boyau 12.5 mm (2)
	275 000 007	Hose 8 mm	Boyau 8 mm
	275 000 008	Hose 12 mm	Boyau 12 mm
	276 000 032	Hose 20 mm	Boyau 20 mm
10.	222 025 075	Screw M12	Vis M12
	222 061 665	Screw M6 (4)	Vis M6 (4)
	222 082 065	Screw M8 (7)	Vis M8 (7)
	222 002 065	Screw M10 (3)	Vis M10 (3)
11.	224 081 201	Washer (Not Shown) (3)	Rondelle (non illustrée) (3)
	224 001 211	Washer (Not Shown) (3)	Rondelle (non illustrée) (3)
12.	228 081 045	Nut M8 (3)	Écrou M8 (3)
	228 001 045	Nut M10	Écrou M10