SIDE X SIDE | 11/1/2006 | SXS2006-004

TECH EXCHANGE

SUBJECTS: 1. Checking 4-Stroke Engine Condition with a Leakdown Tester – All Models
2. Diagnosing Oil Consumption – All Models

Checking 4-Stroke Engine Condition with a Leakdown Tester – All Models

Checking compression is an important step when diagnosing performance issues or evaluating oil consumption (see the second subject in this Tech Exchange). Determining if there is adequate compression in today's 4-stroke motors is not just as easy as taking a compression test, because many 4-strokes now incorporate an auto-decompression mechanism that lowers the combustion chamber pressures while cranking the engine, allowing for easier starting. Because of this mechanism, it is difficult to get accurate compression readings using traditional compression testing procedures.

The most accurate way to test the condition of a 4-stroke engine is to perform a Leakdown test which can check the condition of the entire combustion chamber, including piston rings, valves, head gasket, and even the combustion chamber itself. A proper leakdown tester is a necessary tool in today's tool box.

Leakdown Testers

Yamaha offers two leakdown testers through K & L Supply (P/N: YB-35667A, and P/N: YB-45544, which is a combination Compression & Leakdown tester set, see following photos).

These tools are designed for engines like those Side x Side and ATV vehicles; most testers in the automotive market do not have the correct size spark plug adapters.

Using the Leakdown Tester

Whichever tester you use, it is important to follow the manufacturer's instructions carefully. Be sure to use the proper air pressure and to zero the meter before testing.

The percentage of pressure loss (the leakdown) is what you are looking for. The following guidelines apply to all engines:

Percentage	Rating
0 – 4 %	This is very uncommon, even in brand new or newly rebuilt engines. In fact, if you have a reading in this range, you should recheck your gauge to be sure it was set to zero before you began and then retest.
5 – 10%	This is the acceptable range most "healthy" engines achieve. A reading in this range indicates that engine internals are sealing properly.
Above 11%	A reading of 11% or more leakdown indicates a problem.

Diagnosing the Problem
Because of the pressurizing of the combustion chamber, it is relatively easy to locate the cause of the problem by listening to where the air is escaping.

If the sound is coming from the exhaust, it indicates an exhaust valve problem. Likewise, if it is escaping from the from the intake, then there is likely an intake valve problem (but remember that most crankcase breather hoses vent into the airbox, so verify the air coming through the airbox is not coming from the crankcase breather).

Listen for air escaping out the crankcase breather or remove the oil filler cap / dipstick and listen / feel for air. This would indicate air going past the piston and rings.

Once the source of the leakage has been determined, perform the necessary repairs and then re-test the leakdown.

Diagnosing Oil Consumption – All Models

Customers may sometimes express concerns about performance characteristics that are actually normal for a particular model. One such concern is oil consumption.

During normal engine operation, a certain amount of oil is consumed during the lubrication process. Some of the oil that lubricates the piston, cylinder, valves, and guides is consumed during the combustion process. This normal consumption cannot be avoided because of the need for lubrication.

The question is how much consumption is normal. Automotive and motorcycle industries have long had a guideline of about 1 quart per 1000 miles being considered acceptable. However, due to the wide array of operating conditions and usages of Side x Side and ATV vehicles, this sort of guideline is not very useful.

Many Rhinos are subjected to extended operation under heavy load. this operating condition will cause greater oil consumption in normal, properly functioning engines, and may be most noticeable in the larger displacement models because of their size.

The Leakdown Test (described in the first subject of this Tech Exchange) is an excellent diagnostic tool for oil consumption complaints, especially those where there is no visible oil smoke during normal operation (as would be expected with a valve guide or seal problem). It can help you quickly determine the condition of the engine which, if it is shown to be in the normal 5~10% range, can help alleviate customer concerns.

If you have a customer with a concern about oil consumption, do not miss the opportunity to explain steps that can be taken to minimize how much oil an engine uses:

- Proper air filter cleaning and oiling with quality foam-filter type oil.
- Periodic engine oil and filter maintenance.
- Pre-ride checks to be sure the radiator and/or oil cooler (front and back sides) are free and clear of debris.
- Pre-ride check of the engine oil level (also refer to Tech Exchange AT2006-005 for more information on oil checking).