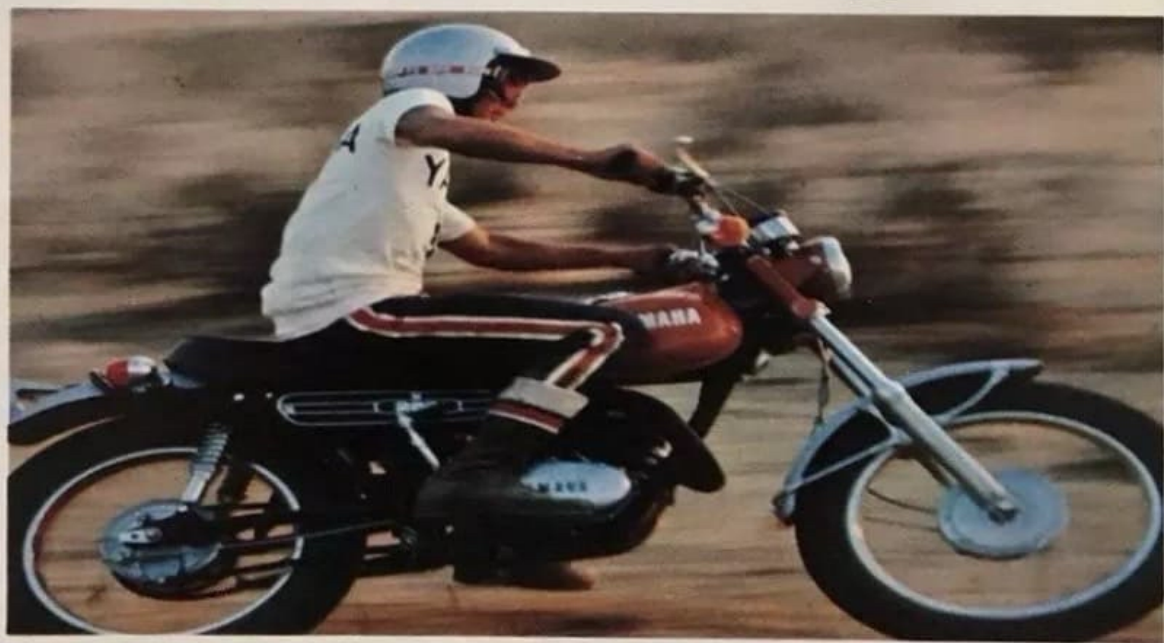


TORQUE INDUCTION



YAMAHA

TORQUE INDUCTION

An exclusive new Yamaha system to provide better performance.

Over six years ago, the engineers at the Yamaha Research Institute took on a problem that has long plagued many riders: how to get more *effective* horsepower. Riders who buy motorcycles on the basis of advertised high RPM horsepower often find that overall performance is poor. Under heavy loads, many bikes stutter and stall... spark plugs foul. The bikes may have high peak horsepower running flat-out, but they lack *effective* performance overall.

After a thorough study of this problem, Yamaha engineers confronted a fundamental fact: if you want better overall performance, you need a better breathing engine. By "better breathing" we mean the ability of the engine to get the fuel/air mixture it needs *when it needs it*. Engineers call an engine's breathing process "induction."

Yamaha's answer for "better breathing" is Torque Induction. Torque Induction is a unique method for supplying the fuel/air mixture to the engine, based on engine *demand* rather than an arbitrary mechanical induction system such as the piston skirt or a crankshaft-mounted rotary valve.

Here's how Yamaha Torque Induction works.

Yamaha has designed a unique stainless steel reed valve located between the carburetor and cylinder. The valve works independently on a demand basis. There's



no mechanical device, such as a rotary valve or piston skirt to govern its opening and closing.

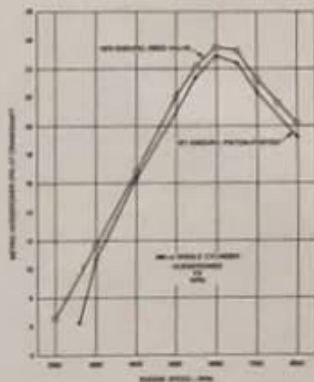
When the piston starts up, it creates a vacuum within the crankcase. Atmospheric pressure forces the Torque Induction valve open, and a fresh fuel/air charge is rammed into the crankcase.



When the piston starts down, it compresses the fuel/air charge in the crankcase. The Torque Induction valve senses this compression and automatically closes to prevent the "blow back" or escape of the fuel/air charge. Older induction systems do not have this ability to sense when to close. These older systems are normally designed so that the breathing time, or the time that the valve or port is open, is constant. In addition, the breathing times are adjusted to an RPM point that engineers *estimate* as an average for engine operation—or at a point where the engine achieves maximum horsepower. Consequently, at any RPM point other than the

design average, a portion of the fuel/air charge will "blow back" out through the carburetor and rob the engine of the fuel and air it needs to give effective overall performance.

The graph at the right is an example of Torque Induction at work. It compares the horsepower curve of a 1971 Enduro without Torque Induction to an identical 1972 model equipped with the new system. The increase in performance is quite obvious. Note, at approximately 2600 RPM, Torque Induction provides a 40% increase in horsepower and continues to provide a performance advantage over the entire power band—graphic proof of Torque Induction's effectiveness.



A 7th port for better performance, cooler running.

With Torque Induction, Yamaha added a unique 7th port that gives your bike more muscle at the top end. The 7th port improves performance by (1) allowing more fuel/air mixture to be "rammed" into the combustion chamber and (2) by simultaneously improving the "scavenging," or removal, of exhaust gases. The blast of cool fuel/air mixture directly from the carb into the combustion chamber helps cool the engine, and greatly extends piston life.

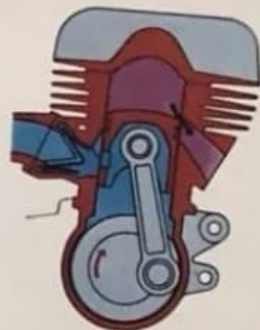
With Torque Induction, your Yamaha runs cooler and breathes better over its entire RPM range, for roaring response in the dirt and greater peak power on the street.

THE INSIDE STORY

of Torque Induction®

Ignition, Power and Exhaust

The piston approaches top dead center, and the spark plug fires. Combustion pressure forces the piston down. As the piston crown passes the exhaust port, exhaust gases begin to flow out.



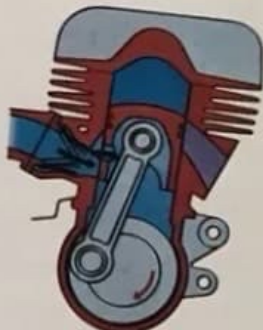
Transfer

As the piston continues down, it passes the transfer ports, opening them. They allow the compressed fuel/air mixture in the crankcase to flow into the combustion chamber. All the remaining exhaust gases within the chamber are pushed out by this transfer action.



Compression

The piston starts up, closing all ports. As it moves up, it compresses the fuel/air charge for ignition. At the same time, the upward movement of the piston creates a suction effect or "demand" in the crankcase.



Induction

The "demand" continues to be created by the piston traveling upward, causing atmospheric pressure to "ram" air into the crankcase. The steel reed valve remains open, and the fuel/air mixture continues to flow in. This is the real secret behind Torque Induction®. There is no mechanically-governed device to arbitrarily open the crankcase—sometimes at the wrong time. The fuel/air mixture from the carb comes in only when it is wanted.

Torque Induction® means more horsepower at all rpms, for better performance and cooler running throughout the entire operating range of your Yamaha. See your dealer for additional details on this Yamaha exclusive feature.

