

## TE 250

The 250cc 2-stroke engine has for long delivered the best combination of unsurpassed power and lightweight construction. The simplicity and low maintenance cost of the 2-stroke motor has made it a favourite amongst riders for generations. All the latest innovations have been brought into the 2-stroke enduro platform. Many parts of the TE 250 engine have been rearranged, modified, or developed from the ground up.

### Engine

With 9.000 rpm and an overall weight of just 24.8 kg, the new TE 250 engine sets the benchmark in the competitive E1 class. The new TE 250 is the perfect 2-stroke machine to compete with 250cc 4-stroke models.

Engine weights (incl. oil, gear lever, without clutch slave cylinder):

- TE 250 2024: 24.8 kg
- TE 250 2023: 26 kg

The lightweight engine is designed to provide more torque than any previous 250cc 2-stroke engine without losing its typical-2-stroke character.

The engine is designed to centralize rotating mass for optimal operation with the chassis resulting in a light and agile handling feel. Together with the benefits of mass centralization and reduced weight, the anti-squat behaviour of the chassis was significantly improved by changing the backbone of the steel frame concept while the engine is mounted symmetrically on both sides.

An all-new throttle body fuel injection system (Keihin 39 mm throttle body in combination with Vitesco EMS) and an electronic exhaust control was implemented on the TE 250 engine, allowing for a more compact engine design and free definable values for engine speed and load. The result is a tailor-made power delivery for each gear and every situation.

Another focus in development was put on the serviceability of the new TE 250 engine. Service markers on the engine (▲) clearly show where to use washers, making maintenance and servicing easier than in the past.

A new water pump concept includes a shaft featuring a drive wheel instead of the previous centrifugal regulator and is protected by the new aluminium diecast water pump cover. The new water pump concept is shared among all 2-stroke enduro engines, making it easy for dealers to supply spare parts in the rare case it's needed.

The changes to the engine alone make it easier to go faster for everyone, from beginners, racers, to seasoned professionals.

- Pinnacle of performance → high power output, 24.8 kg
- Mass-centralisation → significant benefits in handling and manoeuvrability
- Improved serviceability of engine internals → added service markers

### Cylinder head

The cylinder head cover now features an external water temperature sensor located within the tubing for a maximum level of accurate values. A "front" indication makes it close to impossible to mount the cylinder head the wrong way, which will help dealers but also tech-savvy end customers servicing engines by themselves.

The redesigned combustion chamber inserts follow the same logic. Mixing up inserts from different models will be a matter of the past. All these details significantly improve the overall engine quality.

The enduro specific cylinder timing and porting results in a higher compression ratio and no compromise between the motocross and enduro range as each engine configuration is tailor made for its own use case.

- "Front" indication on cylinder head → avoiding wrong installations
- Redesigned combustion chamber inserts → impossible to mix-up with insert of other models
- Enduro-specific cylinder timing and porting → enduro typical compression ratio without compromises

### Cylinder

The cylinder features a 66.4 mm bore. The highly innovative electronic exhaust control manages the opening of both, the main exhaust and lateral exhaust ports via newly developed kinematics, activated via an actuator. On the TE 250 the main exhaust port opens before the lateral exhaust port opens to deliver maximal, yet controllable power.

The results are a significantly improved rideability, engine control and a larger adjustability range of the engine characteristics (differences between the 2 engine maps).

The power valve can be controlled according to the throttle position and engine rpms (vs. only engine rpms on mechanical system). Additionally, its auto-calibrating, meaning there's no more hassle with wrong power valve adjustments.

The machined finish on the upper contour of the exhaust port ensures accurate port timing delivering unrivalled performance in every situation.

- Electronic exhaust control → tailor-made, linear and predictable power delivery
- Machined exhaust port → Outstanding performance and controllability

### Crankshaft

The crankshaft is designed with weight reduction in mind to increase the liveliness and response of the engine. The perfect balance of rotating masses is achieved by balancing the weights of the crankshaft flywheel, the new rotor and the counter balancer shaft. With a perfect combination of these components, vibrations are kept to an absolute minimum. Engine internals are also positioned to ensure that the rotational mass created has very little effect on the handling of the motorcycle.

- Lightweight crankshaft → responsive engine character
- Combination of crankshaft, rotor, and counter balancer shaft → very little vibration

### Counter balancer shaft

The TE 250 features a laterally mounted counter balancer shaft. This shaft significantly reduces vibrations resulting in a smoother and more comfortable ride with less rider fatigue.

- Counter balancer shaft → significantly reduced vibration

### Crankcases

The new TE 250 engine is designed with mass centralisation and weight reduction as one of the main criteria. As a result, the crankcases have been designed to house the internal components of the engine in the perfect position to achieve the ideal centre of gravity while adding the least possible weight. The casings are manufactured using a high-pressure die cast production process, resulting in thin wall thickness while retaining exceptional reliability.

The black powder coating provides additional durability and a premium look, while service markings and oil level markings improve the serviceability. Additionally, the engine is connected to the frame with symmetrical engine mounts (left and right side) resulting in an improved flex characteristic.

- Light and compact crankcase, optimised mass-centralisation
- Redesigned, symmetrical engine mounts
- Improved serviceability of engine internals with added service markers
- Optimized crank case pressure sensor: larger hose diameter, more robust against soiling with oil carbon particles, better signal quality and better engine load detection

### Gearbox

The 6-speed gearbox is manufactured exclusively by Pankl Racing Systems ensuring the highest level of durability and reliability. The gearbox features specific enduro gearing while the new gear lever features an innovative tip design that prevents dirt build-up. A new transmission ventilation concept rounds off the shift mechanism.

- 6-speed gearbox → manufactured by Pankl Racing Systems
- New gear lever → improved leverage, more smooth and precise shifting
- Improved shifting mechanism, friction optimized in every detail → less necessary lever force
- New gear ratio for model harmonization → almost identical feel to old gearing

### DDS Clutch

The TE 250 features a Dampened Diaphragm Steel (DDS) clutch. The exclusive characteristics of this system include a single diaphragm steel pressure plate instead of traditional coil springs. It integrates a damping system for better traction and durability. The clutch basket is a single-piece CNC machined steel component that allows the use of thin steel liners and contributes to the compact design of the engine.

- DDS clutch featuring consistent action and exceptional durability
- Light action with integrated damping system, increased traction and reliability

### EFI (TBI)

The Husqvarna 2-stroke enduro models come with an all-new electronics-controlled fuel injection. The Throttle Body Injection (TBI) was initially introduced with the 2023 2-stroke motocross range.

In cooperation with Keihin, we developed a 39 mm throttle body fulfilling the needs of an innovative and state of the art 2-stroke enduro injection. The ECU is supplied by Vitesco and works in harmony with the Keihin throttle body by always delivering the right amount of air-fuel mixture. Therefore, the ECU continuously analyses water temperature, air temperature, ambient pressure, pressure within the crankcase, rpm and Throttle Position (TPS) to calculate the perfect air-fuel mixture for any riding situation.

Additionally, the reed valve case received an important design update too. Newly added composite flaps on the outside of the reed valve case provide an improved sealing of the intake tract. This new design avoids fuel excess in extreme up or downhill sections, which could lead to overly rich engine settings while Boyesen Inc. continues to supply the carbon fibre reed petals inside the reed valve case.

A beneficial side effect of the new Electronic Fuel Injection and the ECU is the implementation of the innovative electronic exhaust control.

With all these innovative features it was also possible to further refine engine maps on the 250 enduro engine. Map 1 is the standard, more mellow map for linear, predictable power, while Map 2 is the more aggressive map for added throttle response and a crisper, explosive power output. Both maps can be selected via the new 2-stroke Map Select Switch on the left side of the handlebar.

- New EFI by Keihin (39 mm throttle body) → optimal power delivery and performance in any condition
- Updated reed valve case design → guarantees right air-fuel mixture even in most extreme up or downhill sections
- New injectors with improved Sauter Mean Diameter (SMD) → smaller droplets

### Oil Injection

Additionally, the ECU controls the specific amount of oil injected into the throttle body. It's not consistently a mix of 1:60 but varies pending on the riding situation and can be leaner or richer. The new TBI injection has the big benefit of a more homogeneous fuel/air mixture due to a later oil injection compared to the older TPI engine. Now (TBI), the injection point is at the membrane flange while in the past (TPI) the position was at the throttle body. The oscillation of membranes increases the oil/fuel mix further and leads to an unreached level of atomization. As a result, the engines have a lower risk of engine seizing, a better internal combustion and a better rideability in all conditions. The drawback is a higher fuel and oil consumption.

The engine character of the TPI engines was not known for being very lively. Actually, quite often in low revs with low engine loads, "oil nests" were common, which led to delayed and sluggish engine responses. This is now a thing of the past and the new engines are much more versatile, fulfilling the needs of different rider levels and use cases. From hard enduro to classic enduro.

### E-Start

The Husqvarna enduro range now comes with E-Start only. A kickstart is not in place any longer and cannot be retrofitted. The starter motor comes without any intermediate shaft, saving weight and allowing a compact engine design with perfect integration. A robust but also compact cover protects the starter motor from damages caused by roost or rocks. The 12.8V

2 Ah Lithium-Ion battery is placed under the rider's seat close to the centre of gravity. The engine can easily be put to life by pressing the new combined start/stop switch on the right side of the handlebar. A new high-quality stator and pickup is built into the TE 250 engine for improved reliability and an efficient power supply for the electronics.

- E-Start → less loss of time when stalling engine in races and improved user friendliness
- Li-Ion battery → lightweight, 1 kg lighter than a conventional battery
- High-quality stator and pickup → improved reliability / efficient power supply for electronics