

TC 125

Engine

All the latest innovations have been brought into the 2-stroke motocross platform and many parts of the TC 125 engine have been rearranged, modified, or developed from the ground up when compared to the previous generation. With 38.5 hp and an overall weight of just 17.9 kg, the engine sets the benchmark in the competitive 125cc class. The lightweight engine is designed to provide more torque than any 125cc 2-stroke engine on the market while maintaining a high-revving, lightweight 2-stroke character.

The engine is designed to centralize rotating mass for optimal performance with the chassis creating in a light and agile handling feel. The fuel injection system (Keihin EFI, 39 mm throttle body in combination with Vitesco EMS), and an electronic exhaust control allow for a more compact engine design with an engine map designed for each gear. The result is a tailor-made power delivery for every situation.

Another focus during development of the TC 125 engine was put on the serviceability of the engine. Draining noses for liquids, an oil level indicator and added service markers on the engine (▲) clearly show where to use washers, making maintenance and servicing much easier.

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

A flange bushing on the swingarm bolts of the TC 125 provides advanced durability and gives the swingarm architecture the life span it deserves without keeping much attention to it in terms of service.

The versatile TC 125 engine allows all riders from beginners through to seasoned professionals to ride faster and reduce their lap times.

- Pinnacle of 2-stroke performance → 38.5 hp, 17.9 kg
- No jetting changes → 2-stroke EFI technology
- Mass-centralisation → significant benefits in handling and manoeuvrability
- Easy serviceability of engine internals → added service markers and draining noses for liquids

Cylinder head

The cylinder head features an external water temperature sensor for a clear indication of the engine's running condition. A "front" indication makes it close to impossible to mount the cylinder head the wrong way, which not only helps mechanics but also riders servicing engines by themselves.

The 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 serviceability.

Motocross specific cylinder timing and porting results in a high compression ratio for the TC 125 and no compromise between the TC and TE range.

- “Front” indicator on cylinder head → avoid incorrect installation
- Specific combustion chamber inserts → impossible to mix-up with inserts from other models
- Motocross specific cylinder timing and porting → pure motocross performance

Cylinder

The cylinder features a 54 mm bore. The highly innovative electronic exhaust control manages the opening of both the main exhaust and lateral exhaust ports via an actuator. On the TC 125, both the lateral exhaust ports and the main exhaust port open simultaneously to deliver the maximum power.

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

- Electronical exhaust control → tailormade, 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 (300 g lighter than the previous generation). The perfect balance of rotating masses is achieved by balancing the weights of the crankshaft flywheel and the rotor. With this weight combination, vibrations are kept to an absolute minimum. The crankshaft is 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 and rotor → very little vibration

Crankcases

The TC 125 engine is designed with mass centralisation and weight reduction as 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 and ensure the lowest 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 to the engine cover while service 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 optimized flex characteristic.

- Light and compact crankcase, optimised mass-centralisation
- Symmetrical engine mounts
- Easy serviceability of engine internals with added service markers and draining noses for liquids

Electronic Fuel Injection (EFI)

The TC 125 features Electronic Fuel Injection. In cooperation with Keihin, a 39 mm throttle body was developed. The Electronic Control Unit (ECU) comes from Vitesco and works in harmony with the Keihin throttle body by always delivering the perfect fuel/air mixture. The ECU continuously analyses water temperature, air temperature, ambient pressure, pressure within the crankcase, rpm, and throttle position (TPS) to calculate and deliver the perfect fuel/air mixture for any riding situation.

Composite flaps on the outside of the reed valve case provide exceptional sealing of the intake tract. This design prevents excess fuel build-up in extreme up or downhill sections which can lead to overly rich engine settings. Industry leaders Boyesen Inc. supplies the carbon membranes for the reed valve.

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

With all these innovative features, it was possible to introduce different engine maps on the TC 125. Map 1 (white) is designed for hard pack while Map 2 (green) is more aggressive and suited to sand and heavier track conditions. Either map can be engaged via the 2-stroke Map Select Switch on the left side of the handlebar.

- EFI by Keihin (39 mm throttle body) → optimal power delivery and performance in any condition (no more re-jetting)
- Updated reed valve case design → guarantees correct fuel/air mixture even in the most extreme up or downhill sections

E-Start

The TC 125 comes with electric start. A kickstart is no longer in place 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 compact cover protects the starter motor from damage caused by roost or rocks. The 12,8V 2 Ah Lithium-Ion battery is placed under the seat and close to the centre of gravity. The engine can easily be started by pressing the combined start/stop switch on the right side of the handlebar. A high-quality stator and pickup from Mitsuba are built into the engine for outstanding reliability and an efficient power supply for the electronics.

- Electric start → saves time if the engine is stalled during races
- High-quality stator & pickup from Mitsuba → advanced reliability and efficient power supply for electronics

Gearbox

The 6-speed gearbox is manufactured exclusively by Pankl Racing Systems ensuring the highest level of durability and reliability. The gearbox features specific motocross gearing while the gear lever features an innovative tip design that prevents dirt build-up.

The shifting is made effortless with the optimized shift drum and shift fork. The shift shaft offers optimal leverage, resulting in a smooth and precise feel when shifting. The lever design and the transmission ventilation concept round out the gearbox features.

- 6-speed gearbox → manufactured by Pankl Racing Systems
- Optimized shift drum and shift fork → Optimal leverage for smooth and precise shifting

- Friction optimized shifting mechanism → less necessary lever force needed to change gear

DS clutch

The TC 125 features a Diaphragm Steel (DS) clutch. The exclusive characteristics of this system include a single diaphragm steel pressure plate instead of traditional coil springs. 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. The clutch slave cylinder is shared among all 2-stroke engines and brings the advantage to dealers of keeping less spare parts in stock.

- DS clutch → lightweight with consistent modulation and exceptional durability

Clutch slave cylinder → easy serviceability for mechanics