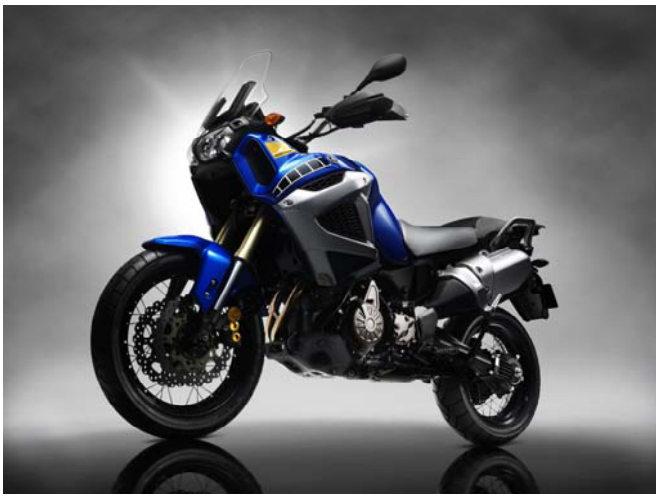
Media info	Super Ténéré revealed	25-02-2010

Yamaha reveals all new Super Ténéré

Yamaha is pleased to announce the introduction of an exciting all new transcontinental touring motorcycle whose heritage can be traced back to the origins of adventure riding… the XTZ1200 Super Ténéré.



Yamaha's new XTZ1200 Super Ténéré is the pinnacle of the Dakar bred range. It will arrive in New Zealand later this year, no price set as yet.

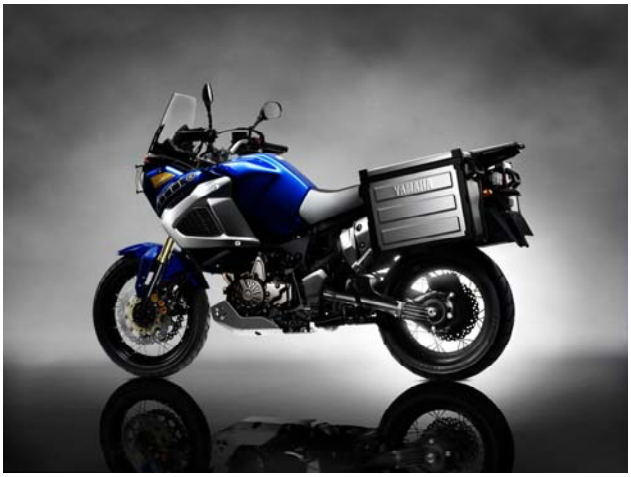
The new XTZ1200 inherits the spirit of the legendary Ténéré models that drove an era of Yamaha dominance during the 1980s and '90s in the Dakar Rally, widely known as the world's most demanding endurance rally.

It is designed to achieve a high-level balance of the qualities riders want in an intercontinental long-distance touring, including:

(1) Unmatched long distance capability
(2) Excellent dirt road performance
(3) Light and agile cornering on mountain roads

To realise the three qualities mentioned above, the engine and chassis were designed from scratch with developmental efforts focused on a centralised of mass chassis design, lower centre of gravity and the desired level of front wheel weight distribution.

Powered by a newly developed liquid-cooled 4-stroke 1199cc in-line twin cylinder engine, the XTZ1200 bristles with new control



If you need to cover long distances on dirt roads, look no further than the Super Ténéré. Perfect for Aussie conditions...

technologies aimed at offering outstanding long-distance touring performance.

The in-line twin-cylinder engine with a 270-degree crankshaft and 4-valve DOHC head sports a side-mounted radiator that contributes to centralisation of machine mass and mounted on a new frame. Also, the YCC-T (Yamaha Chip Controlled Throttle) seen on Yamaha Supersports machines now has traction control and a function enabling the rider to select running modes.

Other state-of-the-art technologies like a 3-position ABS system and adoption of a Unified Brake System are added to realise a higher level of touring performance. This is truly a model worthy of being called an ultimate machine for intercontinental adventure.

XTZ1200 development aim overview

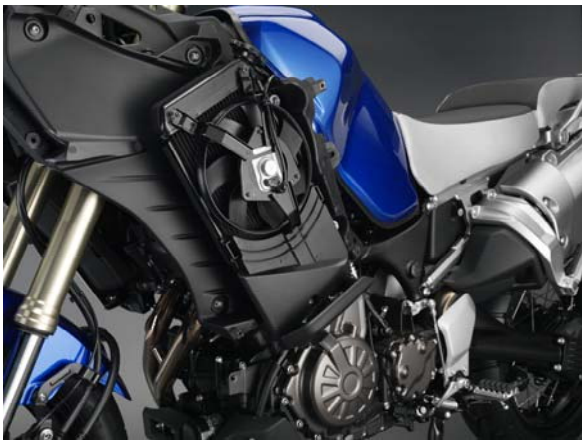
1) Long-distance touring comfort and enjoyment
   - Liquid-cooled 1199cc in-line 2-cylinder, 4-valve, 270-degree crank engine.
   - Compact design engine (2-axis primary balancer, crankcase with built-in oil tank)
   - YCC-T (Yamaha Chip Controlled Throttle)
   - 23-litre large-capacity, low centre of gravity fuel tank
   - Chassis designed for good performance even when carrying a pillion rider or baggage
   - Chassis design for good wind protection
   - Left-side radiator and right-side electrical component layout for centralisation of machine mass
   - Front-rear divided seat with height adjustment, multifunction carrier (3-way carrier)
   - New aluminium rims for tubeless tyres
   - 12V outlet and numerous accessories
   - Yamaha D-MODE power options
2) Excellent performance on dirt roads
   - Telescopic type upside-down front fork
   - Unified Brake System (front-rear unified brake system) and 3-position ABS
   - Chassis dimensions designed for light handling performance (mass centralisation and low centre of gravity)
   - Riding position designed for greater freedom, accommodating standing-position riding, etc.
   - Short muffler adopted to contribute the layout for centralisation of mass and lower centre of gravity

- Engine character tuned for good off-road drivability
- YCC-T with traction-control function
- Shaft drive with hypoid gear design

3) Light and agile cornering performance on mountain roads
   - Chassis layout for centralisation of machine mass and low centre of gravity
   - Fuel injection and YCC-T for better drivability
   - Torque curve combining power and drivability
   - Wide-ratio 6-speed transmission
4) Eco-friendly performance
   - Fuel injection system with 12-hole injector
   - 3-way catalyzer and separate O_2 sensors for each cylinder
   - Twin spark plugs for outstanding combustion efficiency

Background information: An Engine Built For Adventure
The XTZ1200 takes Dakar rally bike evolution one step further with a liquid-cooled, DOHC, 1199cc engine with 4-valve head pumping out more than 100bhp — plenty of power for crossing cities or crossing continents.

This high performing engine features forward inclined cylinders, allowing a highly efficient downdraft intake system. Although an inclined cylinder can result in a long front-to-back length, this tendency is offset by Yamaha's use of a compact, side-mounted radiator, an innovation that shortens the machine.



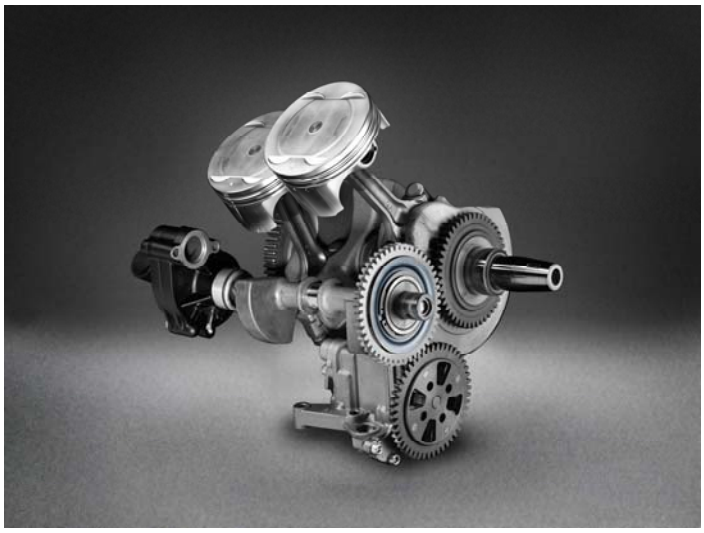
Side mount radiator allows a more compact design and aids mass centralisation for improved handling

The result is a slim and compact motorcycle with a short wheelbase that can easily negotiate narrow trails and streets. Other benefits of this engine layout include idealised front/rear weight distribution and excellent manoeuvrability thanks to improved mass centralisation. The XTZ1200 is also slim for a twin. The engine features a built-in oil tank design that ensures ample ground clearance. Lightweight, compact and offering a low centre of gravity, this is an ideal engine for an adventure machine.

One this engine's most interesting features — one which makes it particularly suitable for a twin-cylinder dual-purpose bike — is its 270° crankshaft and the superior traction this crank layout delivers. Because both cylinders fire closely together, traction is improved and the rider can better feel the grip at the rear tyre. This is one reason why single-cylinder engines are so widely used for dirt bikes. The 270° crank gives a twin a gutsy traction feel similar to that of a

single. This technology was developed by Yamaha for use on its winning Dakar rally racers.

To reduce rider workload in the rough stuff, the XTZ1200 is fitted with traction control. Both wheels are fitted with speed sensors. When the rear wheel spins faster than the front, the sensor signals the ECU to adjust the YCC-T throttle, ignition timing and fuel injection to control the power delivery to the rear wheel.



Compact forward inclined 270 degree parallel twin offers the ideal combination of power and traction

However, because the XTZ1200 is designed for riders of all skill levels, Yamaha recognises that experienced riders may use the throttle differently than less experienced riders. So the traction control feature has three modes: OFF, TCS1 and TCS2. This allows the rider to adjust the traction control to suit road conditions, rider skill level and personal preferences. This convenient feature is another example of how Yamaha's engineers made this heavyweight off-roader a very rider-friendly machine.

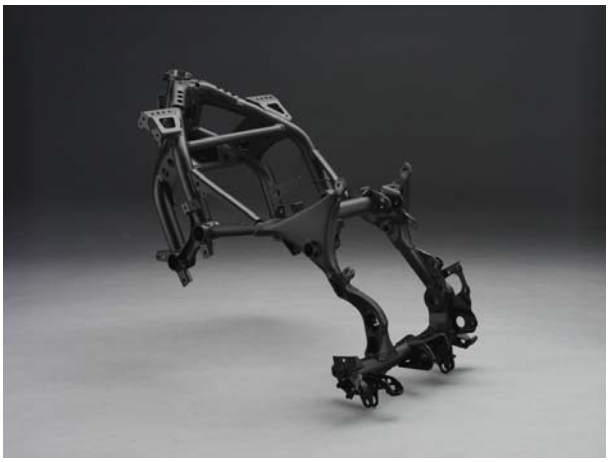
The fuel injection system is also tuned for off-road riding. Compared to a road bike, the XTZ1200 has a flatter, easier to use torque curve. The system has two settings, allowing the rider to switch between two different power curves. The S-mode is for sports riding, when the rider wants the most performance possible. The T-mode is used for touring and gives softer response and a more relaxing ride. Although traction is excellent under both settings, the milder power delivery of the T-mode is less tiring for the rider. In this way the XTZ1200's parallel twin engine can be adapted to a variety of riding conditions and rider preferences. This is another good example of how Yamaha's advanced technology makes motorcycles more rider-friendly.

A Tough Chassis For A Tough World

Another important element in long-distance riding is rider fatigue. Because chassis design plays an important role in reducing fatigue during long-distance rides.

On the XTZ1200 the engine is mounted as a stressed member, and the frame is designed to reduce rider fatigue over long distances. This is one reason that the main frame is made of steel, because

steel offers both strength and flexibility. Steel is very good at absorbing road impacts. Because riders are very sensitive to the location of the crankshaft, this frame locates the crankshaft low and very close to the foot pegs. This makes the XTZ1200 feel lighter than it actually is and makes the bike easier to ride.



High tensile steel dual backbone frame uses engine as stressed member and allows low mounted fuel tank

The dual backbone tubes extend from the steering head on each side of the engine, and the engine is mounted low in the frame at the cylinder head and crankcase. This layout not only lowers the centre of gravity of the fuel tank, it leaves space at the front for the airbox and throttle bodies and complements the straight, downdraft intake system. Another benefit is easy access to the engine and its related parts for maintenance, a feature that mechanics will appreciate. Components located far from the centre of gravity, such as the rear frame, are made of lightweight aluminium.

The suspension is also tuned for excellent compliance and for rider comfort. Both the front and rear units are initial load adjustable, making it easy to adjust the suspension to suit load and/or passenger carrying conditions. The rear suspension is also adjustable for rebound damping. Maintenance chores are further reduced by the use of reliable and clean shaft drive. On road or off, high speed or low, the XTZ1200's rugged and well-designed chassis delivers a superior ride quality across a very wide range of riding conditions.

The electrical components are located on the side of the engine, opposite the radiator. Although each individual component is small, each has its own wiring harness. By concentrating the battery and electrical components at the XTZ1200's centre of mass the length — and so the weight — of the wiring harness can be reduced. Another benefit of this layout is excellent access to the electrical components for maintenance.

Another welcome feature for a dual-purpose bike is the combination ABS/anti-lock and unified brake systems that help prevent wheel lock during braking. This function complements the traction control system, which aims to control drive force on slippery road surfaces. This newly developed ABS/Unified Brake System unit allows the rider to operate both the front and rear brakes simultaneously by simply pulling the front brake lever. Data from wheel speed sensors

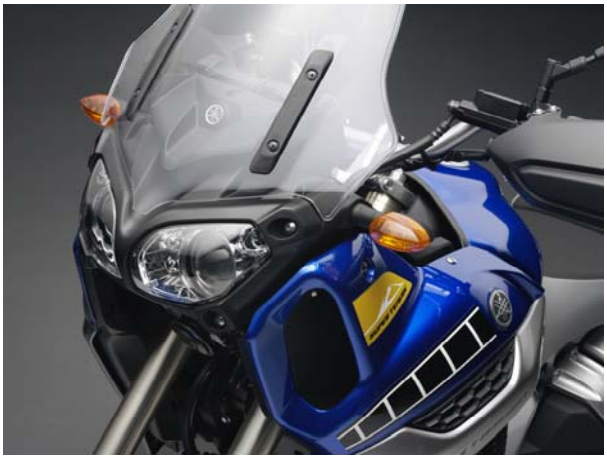
at the front and rear wheels and the rider's throttle work is used to calculate the various factors influencing the braking and automatically determine the proper amount of braking force for the rear wheel. This system also helps prevent the front and rear wheels from locking on slippery surfaces.

Many off-road riders spend a lot of time riding on the foot pegs, where it is harder to use the rear brake pedal. Yamaha's new ABS/ Unified Brake System system allows the rider to confidently brake both wheels by using only the front brake lever. However, experienced off-road riders often make active use of the rear brake to control the bike's stability. The system on the XTZ1200 takes this into account by placing priority on the rider's brake work when the rear brake is applied first. As with previous models the Unified Brake System function is mounted on the hydraulic system and integral with the ABS unit in order to reduce un-sprung weight, a feature that significantly improves the bike's handling qualities.

Depending on the riding conditions, the Yamaha D-mode allows the rider to change the XTZ1200's power characteristics, making the bike much easier and more fun to ride on both dirt roads and paved secondary roads. These many rider-friendly features not only make the XTZ1200 easier to ride for a wide range of riders, they make off-road riding more interesting and interactive than ever before.

Sculptural Design Based On Functionality

The XTZ1200's sculptural design is based first and foremost on the interaction between rider and machine, it's a tough bike for a tough world. That's why its exterior has to be functional rather than just decorative. For example, on long trips fog lamps, a top case and side cases are indispensable, so the XTZ1200 was designed from the beginning with those options in mind.



Functional design includes air intake for side mounted radiator and excellent wind protection

From the large-capacity 23 litre fuel tank to the LED indicators and complete instrumentation, the front cowl is specially shaped to be both aerodynamically efficient and to give excellent wind and weather protection. However, the XTZ1200's side-mounted radiator and the electrical equipment box also function as structural elements. For the XTZ1200, the mounting stays for the lights have been redesigned so that those components that are easily damaged can be quickly replaced. Because the overall structure is strong, the weight of the stays and other metal parts can be reduced, reducing the weight around the

front area. This integrated exterior design accentuates the mounting bolts and also eases access to the interior of the bike for maintenance, thus serving both aesthetic and functional purposes.

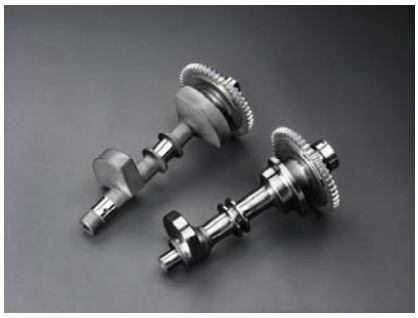
The cowling offers excellent wind protection, reducing rider fatigue on long trips. Crash guards for the machine are also fitted on each side of the cowl to minimise damage if the machine should fall. These guards are located and designed to serve a double function as hand holds for pushing or pulling the bike out of difficult situations.

Examples of optional equipment include a lens guard for the headlight, deflectors, a top case and right and left side cases. It is possible to carry a passenger while all three cases are mounted, equipment that will be appreciated by riders who do a lot of travelling.

Although the XTZ1200 is a new-era adventure touring machine, it still has the soul of the Super Ténéré. This flagship model of Yamaha's adventure brand shares the allure that inspires riders to set off for distant lands in search of adventures and exudes the commanding presence that demands attention and respect.

Super Ténéré in detail:
Engine features

1. Newly developed liquid-cooled, 4-stroke, in-line 2-cylinder engine



Twin engine balance system provides a smooth ride

The new XTZ1200's liquid-cooled, 4-stroke, in-line 2-cylinder, 1199cc fuel injected engine with a 2-axis primary balancer has been developed to provide outstanding performance in long-distance touring. With a bore x stroke of 98.0 x 79.5mm and a compression ratio of 11.0:1, it produces a max output of 80.9kW (110PS) @ 7250rpm. This bore × stroke spec is set to achieve the target output from a compact combustion chamber and contributes to the slim engine size.

2. Compact combustion chamber with twin spark plugs

To achieve outstanding combustion efficiency, the bore diameter was kept modest and two spark plugs were fitted to each cylinder. The valve positions and shape of the upper surface of the pistons were optimised to fit the twin spark plug design. Compared to a single-plug combustion chamber with the same bore diameter, the twin plug spec shortens the required flame diffusion distance and speeds combustion time, thus contributing to an outstanding torque character.

3. Downdraft air intake and 26-degree forward-inclined cylinder

One merit of the in-line 2-cylinde greater freedom of positioning for the intake system and fuel tank. The layout adopted on this model takes advantage of this with a design that optimizes both intake efficiency and chassis dimensions.
First of all, in order to realise a downdraft type intake that heightens intake efficiency, the cylinders are given a 26-degree forward incline and the air cleaner is positioned upward from the cylinders. And this air cleaner has a very space-efficient hemispherical form.

Optimising the relative positions of the various components has contributed to centralisation of machine mass while also helping achieved the desired short wheelbase dimension.

4. 270-degree crank

A 270-degree crank has been adopted with the aim of a good balance of torque and traction and for improved drivability over the entire speed range. Compared to the conventional 360-degree crank (in which the cranks of the left and right cylinders revolve in unison), the 270-degree crank means that the two cranks revolve with a 90-degree (1/4 of a revolution) offset between them in terms of connecting rod motion. This maintains a good crank balance and minimises the effect of inertial torque to accentuate easy-to-use torque and rear wheel

Crank offset explained

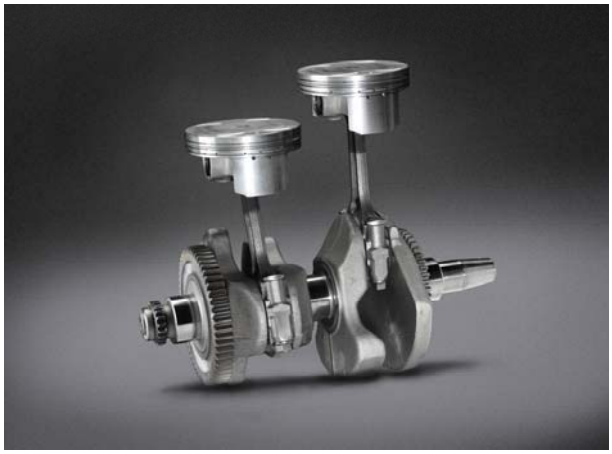
Torque is a force consisting of two components, the force created by combustion, called "combustion torque," and the force created by the reciprocating motion of the piston, called "inertial torque," and together that constitute the total torque created by the engine, called the "composite torque." What is generally referred to as "torque" is actually this "composite torque."

The "combustion torque" is the torque resulting from combustion and it is directly related to the rider's throttle work. In contrast, the "inertial torque" is dependent on engine rpm and is created by the revolutions of the crankshaft. Therefore it is not directly connected to the rider's throttle work. The "inertial torque" fluctuates due to the fluctuations in crankshaft revolution speed.

The inertial force of the moving piston varies in accordance with the position (angle) of the crank, with the inertial force working upward when the crankpin is in the upper half of its revolution and working downward when the crankpin is in the lower half. In other words, there are times when the inertial force causes the revolving speed of the crankshaft to quicken and times when it causes it to slow. This is the fluctuation in inertial torque. Also, in the case of a 360-degree crank 2-cylinder engine, the fact that the crankshaft and connecting rods of the right and left pistons are moving in unison, the amount of fluctuation in revolution doubles.

With an in-line 2-cylinder 270-dregree crank engine, the 90-degree offset (1/4 of a revolution) between the movements of the two connecting rods reduces the inertial torque to almost zero. This gives the composite torque and the combustion torque virtually equal values.

As a result, this contributes to more linear response to the rider's throttle work and superior traction characteristics.



connectivity. The firing intervals are at the 270- and 450-degree points.

One of the features of the new engine is the compact, lightweight design and layout of the shafts and periphery components in order to get room for the oil tank inside the crankcase.

This engine adopts 2-axis balancers with an optimised relationship between the balancer axes and the pumps, etc. In specific terms, 1) the axis of the forward balancer is positioned along the line where the upper and lower sections of the crankcase meet. This makes it possible to eliminate the shaft supporting the balancer and thus reduce weight and make more efficient use of space. Also, 2) the water pump and the forward balancer share the same axis, and 3) a design is adopted in which the oil pump is driven off the forward balancer shaft to also contribute to reduced weight and compactness.

5. Oil tank in crankcase for compactness and lower centre of gravity

The lubrication system is a dry sump type and a structure with the oil tank built into the crankcase has been adopted to enable the desired minimum ground clearance. This design with the oil tank built into the crankcase is one of the distinctive features of this new engine.

The adoption of a design with the oil tank positioned below the transmission shaft eliminates the need for a separate oil tank and piping, which contributes to centralisation of machine mass and a lower centre of gravity. In combination with the effects of the previously mentioned balancer axis positioning, this further contributes to a more compact engine design.

6. YCC-T with traction-control function developed based on MotoGP technology

A 12-hole injector is mounted in the intake manifold to inject a finely atomised spray of fuel at high pressure to fill the combustion chamber with the air-fuel mixture. This helps achieve excellent combustion and improve engine response. It is also an engine with outstanding environmental performance as well.

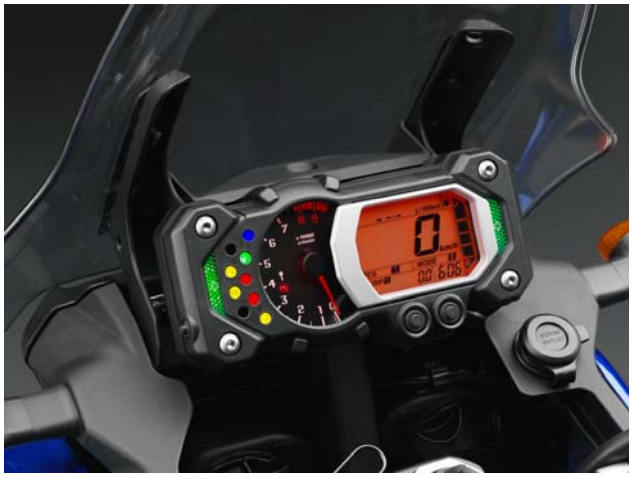
As a throttle valve controlling to regulate intake air volume, YCC-T (Yamaha Chip Controlled Throttle) is adopted. YCC-T monitors the rider’s throttle work and that input is processed by the ECU to calculate the ideal throttle valve opening in real time and send those signals to the servomotor operating the throttle valve to control the volume of intake air. The high-speed calculating function employed in this system renders calculations at increments of approx. 1/1000th of a second and is based on the same technology that has been used in this system since its adoption on the 2006 model YZF-R6.

What characterises the YCC-T adopted on XTZ1200 is the addition of a traction control function, based on technology fed back from the YZR-M1 MotoGP racer. Input from the front and rear wheel speed sensors is used to detect rear wheel spin, which is then processed instantaneously by the ECU and signals are sent to comprehensively regulate (1) YCC-T (2) ignition timing and (3) the volume of fuel injection.

This YCC-T with traction control thus serves to optimise traction at the rear wheel and minimise rear-wheel sliding, negative effects on machine attitude, especially on road surfaces with poor traction and during acceleration, and provide better overall drivability, especially during acceleration on road surfaces with poor traction, and provide better overall handling.

The traction control system also features a choice of two operating modes, a TCS1 (strong) and TCS2 (limited), as well as an Off option for the rider to select from with a button on the side of the meter panel.

The TCS1 is the standard traction control mode while the TCS2 is a mode with limited traction control that lets the rider enjoy more of the inherent machine movement. When Off is selected the traction control system does not function at all. The currently operating mode can be verified by the indicator on the meter panel.



Traction control can be set at strong, limited... or switched off. Power delivery can be set at Sports or Touring mode thanks to Yamaha's Chip Controlled Throttle system

The ability to select the desired traction control mode based on road conditions or rider taste is one more way this model supports the rider's enjoyment of touring performance and running performance.

7. Yamaha D-MODE select function

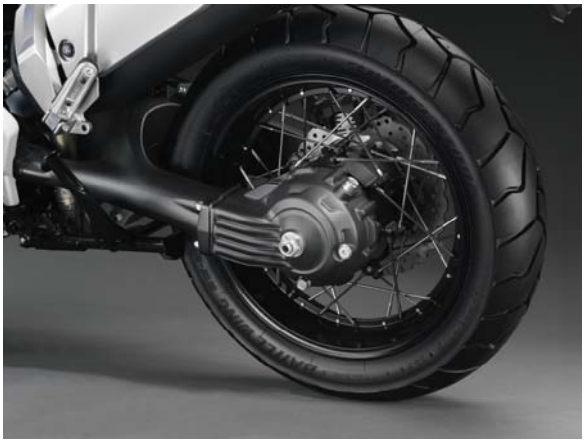
Equipping XTZ1200 with the D-MODE select function provides the capacity to adapt to an even wider rage of riding conditions. This is another feature enabled by YCC-T to optimise throttle valve opening. This mode selection device lets the rider choose between the S Mode that tweaks engine performance and response to provide a sportier ride and a T Mode tailored for ease of use in touring or around town riding. It offers another set of rider choices

to accommodate different preferences and riding conditions. The two modes can be selected with a switch on the handlebar.

8. Shaft drive with hypoid gear

In order to achieve a high level of reliability in a variety of conditions, a low-maintenance shaft drive unit is adopted. This shaft drive unit is the first on a Yamaha motorcycle to use what is called a hypoid gear. This compact-design unit helps to reduce un-sprung weight and mechanical noise as well.

In a conventional motorcycle shaft drive mechanism, the pinion gear (on the shaft axis) and the ring gear (on the bevel gear axis) mesh in a linear relationship in order to achieve an efficient transfer of drive force. However, this arrangement requires a large ring gear in order to achieve the necessary reduction ratio, which causes increased weight.



Final drive is via low maintenance shaft that employs a compact hypoid gear for less unsprung weight

The hypoid gear used on this model features an offset between the pinion gear and the ring gear axis that enables sufficient width of meshing gear teeth width (length) and provides the advantage of enabling the unit to be designed with a smaller ring gear diameter. (Approximately 10% smaller diameter than a conventional type for the same reduction ratio, enabling a compact rear gear case of just 176mm diameter.) This enables a reduction in rear un-sprung weight while contributing to excellent running stability.

9. Compact elliptical short muffler and 3-way catalyser

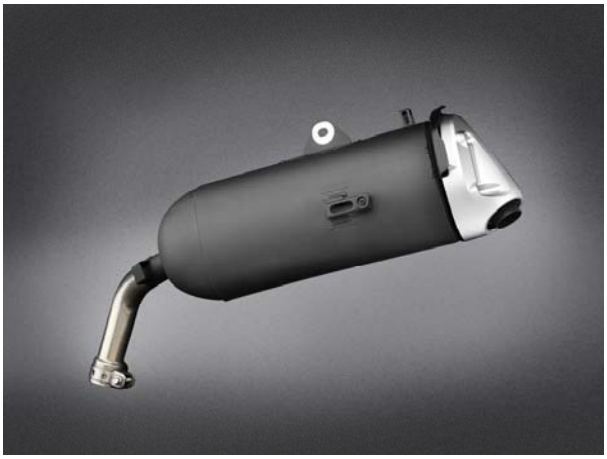
In order to provide a high level of exhaust efficiency and a pleasing exhaust sound, a 2-step expansion, 2-into-1 muffler is adopted. At the point where the two exhaust pipes meet a honeycomb type catalyser coated with precious-metal catalysing elements is positioned to provide excellent exhaust cleaning performance. For the muffler, a short, vertically elliptical cross-section muffler that contributes to a slimmer body design and better centralisation of machine mass is adopted.

The carbon monoxide (CO) and hydrocarbons (HC) resulting from the burning of gasoline in the engine are cleaned from the exhaust by a chemical reaction (oxidation) occurring when they come in contact with the platinum and rhodium elements in the catalyser. The nitrogen oxides (NOX) that are produced from naturally existing nitrogen (N) and oxygen in the air as a result of the high

temperatures caused by combustion of the gasoline are cleansed by a chemical reaction induced by contact with the rhodium element that returns them to their component elements (N) and (O) in a process called ‘reduction’.

To achieve the desired levels of this oxidation and reduction processes to clean the exhaust, the first requirement is that combustion occur with the optimum air-fuel ratio. For this reason, an O_2 sensor is mounted in the exhaust system to monitor the amount of oxygen remaining in the exhaust and this data is fed to the fuel injection system which is then fed back to adjust the fuel injection volume (in a process also called feedback control) to constantly maintain the optimum air-fuel ratio.

On the XTZ1200, with the unique exhaust pulse resulting from the 270-degree crank engine, an O_2 sensor is fitted for each of the two cylinders in order to provide highly accurate information about combustion conditions in real time and enable feedback that ensures control accuracy, thus achieving eco-friendly performance of a high level.



Compact two-into-one muffler meets the most stringent emission laws

10. Other engine-related features

1) Aluminium forged piston

A forged piston is characterised by a finer, more consistent metallurgic matrix that has greater strength and thus enables a lighter piston design that in turn reduces reciprocating mass, which means less vibration.

2) Carburised connecting rods

Carburising increases the carbon content in the surface area of the connecting rods to increase mechanical strength and ensure a high level of reliability.

3) Auto-decompression

A decompression mechanism that releases air compression in the cylinders when starting the engine is adopted. This helps reduce the size of the starter assembly that otherwise tends to be large on a large-displacement model.

4) New-design transmission and clutch

A newly designed wide-ratio 6-speed transmission is adopted to enable full enjoyment of torque-y engine performance from the low-speed range. A newly designed clutch is also adopted.

5) Low centre-of-gravity engine mounting

A compact design has enabled the engine mounting system with a lower centre of gravity. A crankshaft axis height of just 381.9mm

from the ground has been made possible despite a minimum ground clearance of 205mm.

Chassis features

1. New frame made of high-tensile steel pipe

The new model adopts a newly designed frame made of high-tensile steel pipe. With excellent rigidity-strength balance, the new frame contributes to a ride with softness well suited to the torque-y engine performance to help provide comfortable, enjoyable drivability, even in long-distance riding.

Made of steel with a precisely controlled carbon content, the high-tensile pipe provides good strength balance and flexibility. The design is intended to ensure good running performance even when carrying a load of luggage on the rear. It is also a design that makes positive use of the engine as a stressed member of the chassis.

The two backbone forms extending from the right and left of the head pipe are designed to accommodate the low mounting position of the engine's cylinder head and crankcase. It also helps enable a fuel tank design with a lower centre of gravity.

At the same time, the design makes it possible to achieve a straight-line layout for the air-cleaner box, throttle body and intake vent for the cylinder heads in front of the fuel tank. This is also a structure that enables easier access to the engine's peripheral components during maintenance and servicing.

The rear frame is made of expanded aluminium pipe in order to reduce weight and thus contribute to centralisation of machine mass. In addition, it is designed for a high level of rigidity to help prevent damage in the case of falls and the harsh conditions of running with a pillion passenger and outfitting the machine with three pannier cases.

2. Front fork with 43mm diameter inner tubes

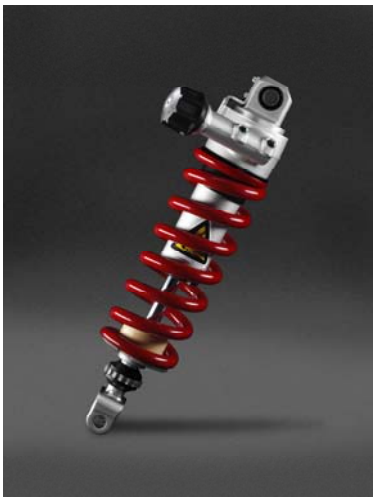
In order to provide natural handling in everything from long-distance running to riding on unpaved roads and mountain roads, and upside-down telescopic type front suspension with 43mm diameter inner tubes is adopted.

In addition to providing sufficient stroke and rigidity, the telescopic type fork has a character that allows the rider to enjoy cornering while sensing the road surface conditions. On the XTZ1200, this front suspension has been tuned with settings that provide the desired rigidity while bringing out the type of linear performance and gentleness that only an upside-down fork can offer. In order to compensate for difference in weight carried and the possible

presence of a pillion passenger, this suspension is fully adjustable for initial load and compression/rebound stroke damping force.

3. Low-pressure cast long swingarm and rear suspension

The swingarm is made by the metal-mould low-pressure casting method. Parts made by the low-pressure casting method contain virtually no impurities in the cast metal and can provide a superior strength-rigidity balance because less gas enters to form air pockets in the cast metal. Due to the fact that this model mounts a new engine that is shorter in the forward-rear dimension, it was possible to give the swingarm a length of 580mm that contributes to more stable machine movement and outstanding running/handling performance.

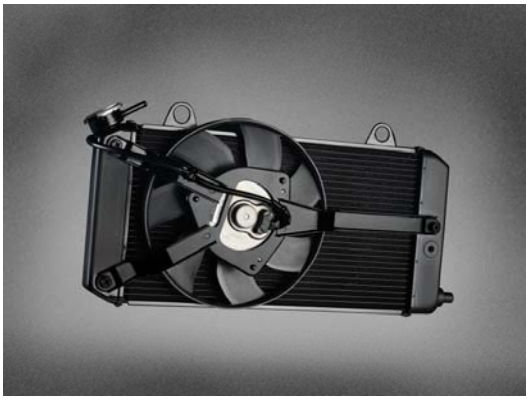


No tools are required to adjust the pre-load on the rear suspension

The rear suspension is a linked type Monocross suspension. It is adjustable for initial load and rebound-stroke damping force. Also, in order to make it easier to adjust the suspension to accommodate changing running conditions, the initial-load adjustment mechanism is designed so that adjustments can be made easily without the use of any tool.

4. New-design side-mounted radiator that contributes to cooling performance and handling stability

A side-mounted radiator is adopted. It is mounted on the left side of the machine in a design that provides the necessary cooling performance, helps enable a short wheelbase and contributes to centralisation of machine mass. Despite being a compact double-core type radiator with a core size of 320mm x 170mm, 2.1LLC litre capacity, it provides outstanding cooling performance thanks to the optimised air intake vents and the added effect of running wind directly cooling the cylinders and head.



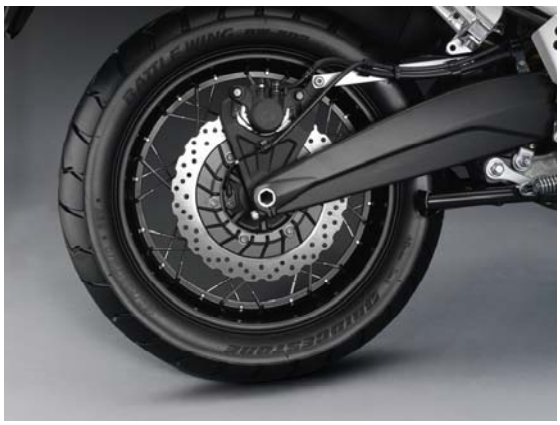
Side mount radiator keeps both bike and rider cool

In this design, the airflow runs through the inner spaces of the machine to the radiator and is then released out to the side. This reduces the effect of radiator heat on the rider to make the ride more comfortable and enjoyable.

On the opposite (right) side of the machine the electrical components are grouped along with the battery, which is one of the weightiest components on the machine. This layout helps to reduce the overall length of the harness, reduces weight and contributes to centralisation of machine mass. It is also a design that takes into consideration ease of serviceability when checking the electrical components.

5. ABS and Unified Brake System (front-rear unified brake system)

Two distinct features that contribute to touring performance are the Unified Brake System (front-rear unified brake system) and ABS adopted on this model. Unified Brake System is a system in which operating the front brake lever also initiates the application of braking force by the rear brake. When the front brake is operated, electronic control comes into play to regulate the amount of brake force generated by the rear brake based on the strength of the front brake application (hydraulic pressure), running speed and the amount of added weight the machine is carrying. As with a conventional ABS equipped machine, the ABS function comes into effect to prevent wheel locking on slippery surfaces where it is easy to lose tyre grip.



When the rear brake is applied first, the unified system is cancelled. This adds to the control options available

This system functions to provide a more enjoyable ride especially while standing when it is more difficult to perform delicate rear brake (foot) operations. To accommodate pillion riding or riding with a considerable load of luggage, this Unified Brake System is designed for highly precise control of the brake force applied by the rear brake.

The system is also designed to meet the needs of off-road riding where the rear brake is used actively to maintain the stability of machine attitude (lean, etc.). In short, the system is designed so that the Unified Brake System function is cancelled at times when the rear brake is applied before the front brake.

Plus a linear-control ABS system is adopted. It is a system that supports the rider’s braking operation in a variety of situations such as at times when sudden braking is necessary or when there is a sudden change in road surface conditions.

In this ABS unit, the ECU and hydraulic body are combined in a single integrated unit for greater compactness that increases the freedom of layout while contributing to centralisation of machine

mass. Also, the system uses the same front and rear wheel sensors as the traction control system.

The ABS system's ECU receives information from the front and rear wheel sensors about wheel rpm and calculates in real time the wheel speed and rate of deceleration, machine running speed and slippage. When slippage and wheel deceleration rate surpass the determined levels, the system diagnoses a wheel locking tendency and sends signals to the hydraulic control unit. Based on these signals from the ECU, the hydraulic control unit reduces hydraulic pressure when a locking tendency occurs and increases the hydraulic pressure again when the locking tendency is resolved. The repetition of this process makes it possible to provide braking without wheel locking.

The system adopted on XTZ1200 is the most advanced type with improvements particularly in the feeling when the ABS function goes into effect. It is a linear control ABS system with step-less, infinitely variable hydraulic pressure adjustment to provide the appropriate amount of pressure based on wheel lock conditions and force of lever application in order to achieve smooth braking.

The front brake uses a 310mm rotor with wave-pattern and opposed-piston callipers. The rear brake has a 282mm rotor with piston-slide type callipers.

It should also be noted that the systems are designed with the Unified Brake System function built into the ABS unit and no Unified Brake System specific parts on the callipers. This helps reduce un-sprung weight and contributes to excellent handling agility.

6. Vertically elongated fuel tank that contributes to centralisation of machine mass

A large-capacity 23-liter fuel tank is adopted to accommodate long distances between fuel stops. By positioning the frame's tank rail low it has been possible to adopt a vertically elongated fuel tank design that fits behind the air cleaner and cylinders with a sense of consolidated mass. Increasing the efficiency of the volume/surface area ratio has also helped to reduce unit weight. This layout promotes centralisation of machine mass and minimises the effect of changes in the fuel level on the running/handling feeling.

7. Double T type aluminium rims and spokes

The aluminium rims are specially designed for mounting tubeless tyres and feature two rails (Double T type) on the inside of the rim side of the narrower front wheel. These rails support the L-shaped ends of the spokes, while in the hub side the spokes are attached with a tightening nipple structure. This enables the setting of an optimum spoke angle to provide reliability with regard to shocks from the road and the rigidity necessary for good handling performance.

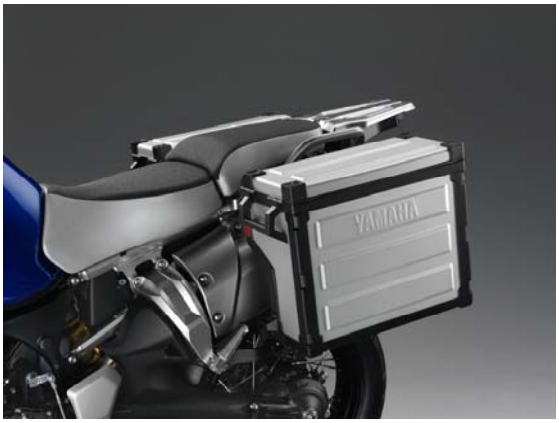
On the rear rim with its added width, only one rail is necessary. The tubeless tyre sizes are 110/80R19MC 59V for the front and 150/70R17MC 69V for the rear.

8. Solenoid operated Hi-Lo switching projector type headlight

The newly adopted projector type headlight on this model features a solenoid operated shade piece that moves up and down to set the high beam and low beam. In this way, the same projector headlight provides both high and low beam, thus ensuring good forward illumination and enabling a more compact front assembly. It is the same mechanism used on the headlight of the '09 model YZF-R1. At the rear, an impressive LED taillight is adopted.

9. Adjustable seat, 3-way carrier

To ensure greater comfort in long-distance riding and ease of leg reach to the ground, a front-rear divided seat is adopted that features height adjustment (2-level adjustment with a height difference of 25mm) for the rider's seat.



Seat is height adjustable and three-way carrier adds to the creature comforts you'd expect on the ultimate long distance adventure bike

The standard equipment plastic resin carrier is a 3-way carrier type designed to accommodate a wide range of uses. The three patterns are:
1) Standard form
2) Fitted with a top case (option) and
3) A flat carrier surface extending to the pillion seat area.

In the standard form 1) the carrier can be used with a pillion rider aboard. The top case form 2) accommodates a top case (option) with no special attachment parts necessary. In the flat carrier form 3) the tandem seat is removed and the position of the carrier adjusted to form a single extended flat carrier surface. Also, this carrier surface forms a nearly flat extended surface when side cases (option) are mounted on either side.

10. Handlebar and footrest designs to accommodate a variety of riding conditions

Design efforts have been made to accommodate the various type of riding positions involved in long-distance and off-road riding. Particular attention is given to the handlebar position, angle of handlebar bend, inward and downward, to accommodate both the sitting position and posture of long-distance riding and off-road riding in the standing position. What's more, the footrests have

been designed not only with regard to shape and size but also fitted with a specially designed hollow rubber insert for the upper surface of the footrest. When the rider is seated, this rubber pad provides a cushioning bulge. Then, when the rider stands during off-road riding, the pad flattens to enable boot sole to come in contact with the full surface of the footrest to the outer metal portion for better machine hold.

11. Abundant range of options

To answer the needs associated with an adventure tourer model like this, a lineup of specialised option parts and components has been developed simultaneously with the XTZ1200 to be sold as Genuine Yamaha Parts and accessories. These options include the following.

1) Fog lamp kit
2) High windscreen
3) Top and side cases
4) Steel pipe engine guard (protecting the cowling and the sides of the engine)
5) Grip heaters
6) Headlight protector and
7) Large aluminium skid plate (protects engine bottom).

Super Ténéré development: Evolution of a Legend

The first time the Ténéré name was used on a Yamaha motorcycle was with the XT600Z Ténéré of 1983. This model was a further development of the adventure machine XT500, and giving it the name of the Ténéré Desert that formed part of the Paris-Dakar course was symbolic of Yamaha's determined challenge to conquer that rally.

The aim to increase the scale of off-road performance led to the birth of the larger displacement twin-cylinder XTZ750 Super Ténéré in 1989. This XTZ750 Super Ténéré and the successive Yamaha rally machines went on to a number of dramatic Dakar Rally competitions and make the Ténéré name synonymous with the great challenge of the Dakar Rally for many adventurous riders.

In developing this new model, our development team made its fundamental aim the continuation of this Ténéré spirit in the hearts of adventurous riders while developing a machine with the high level of potential necessary to meet the demands of grand-scale intercontinental touring.

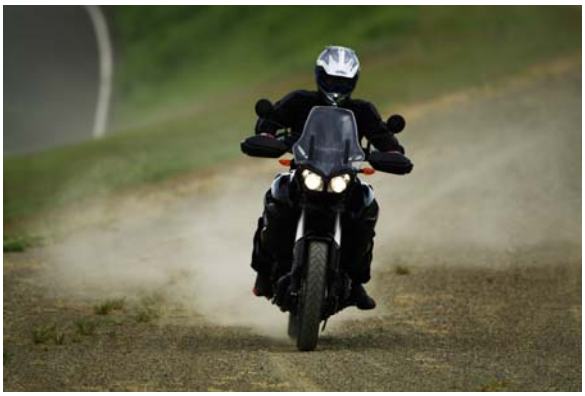
Building on the base of off-road running performance that has been the Ténéré signature until now, a higher level of performance on mountain roads has been developed, as well as greater comfort for long-distance rides. What we sought was a fusion of these three types of performance. In this sense you can say that we undertook the development of an ultimate all-rounder that goes beyond what would have been possible with simply a further development of the existing Super Ténéré.

Ténéré means off-road riding

When we rode across the European continent, what we recognised was the desire for plenty of power. For example, we felt the desire for the kind of performance that lets you accelerate with enjoyable power from a high gear without downshifting while riding on secondary roads. From the beginning the development team imagined the power unit should be an in-line twin engine of 1000cc or more, but it was by no means decided that it should have a 270-degree crank.

There is certainly appeal in the smooth engine that comes from a 360-degree crank. But there is also a strong appeal in the traction that a 270-degree crank provides.

We took on the very difficult challenge of exploiting the positive characteristics of a 270-degree crank engine while also getting closer to the smooth feeling of a 360-degree crank. Our aim was a 270-degree crank with a new flavour.



Two-mode traction control system, D-MODE power options and Unified Braking System all allow the rider to choose level of assistance provided

First, a prototype was constructed. This was a process of confirming the concept and directions for development. This represented Yamaha's first attempt at developing a twin-cylinder 270-degree crank engine of over 1000cc. The biggest hurdle to overcome in this task was how to balance the opposing elements of high power output and lightweight. Then we considered what technologies and methods to use in order to build in a high level of rider-machine communication on top of that.

We also concentrated on achieving good off-road performance from a litre machine. We considered the possibilities of drivability unique to a litre machine with its powerful torque unprecedented in previous off-road models. One device we chose to help achieve this was traction control. Our development team decided to adopt a two-mode (with OFF also possible) system to enable the rider to adjust the control function to fit different riding conditions and personal preferences.

We also took into consideration the fact that it is difficult to use the rear foot brake when riding in the standing position in off-road riding. To support the rider with greater ease of use in that type of riding condition, we adopted a Unified Brake System. This system

activates an appropriate level of rear wheel braking based solely on the rider's input on the front brake lever, without use of the rear brake pedal.

Ténéré means mountain road performance

One of the challenges and great joys a continental tourer model can bring is crossing mountain ranges. But crossing mountain passes can bring great changes not only in altitude but also in weather and road surface conditions. Here, you want a motorcycle that provides the traction the rider expects and anticipates during cornering. The 270-degree crank engine is one that delivers more positive combustion torque that contributes to good traction characteristics while also giving a pleasing sense of engine pulse. Together these qualities help the rider enjoy cornering more fully and positively.

One of the key points in achieving our project goal of a 270-degree crank engine with smoothness close to a 360-degree crank was the adoption of the Yamaha Chip Controlled Throttle (YCC-T) with special settings tailored to the 270-degree crank. Another point involves the adaptation and optimisation with the shaft drive. One of the characteristics of shaft drive is the ability to expand the range of top gear toward the low rpm end. In other words it can be used to bring out power development character that doesn't quit, and a feeling of too sharp response is avoided.

We began the development with comparison tests between a 270-degree crank engine with shaft drive and one with chain drive to determine the right directions for development. After that repeated analysis and riding tests led us to optimum specs for the middle gear damper and changing the spring load and spring rate to optimise the damper characteristics.

This combined with the optimized YCC-T settings to successfully achieve performance with both the traction made possible by a 270-degree crank and a feeling closer to the smoothness of a 360-degree crank engine. Indeed, what we achieved was a 270-degree crank engine with an entirely new flavour.

One of the basic factors in achieving light and pleasurable cornering performance in a motorcycle is designing the engine and chassis for good centralisation of machine mass. Even for a continental tourer model with a displacement of 1000cc or more, the rider naturally wants the agility and performance to be able to actively enjoy cornering. That is why this engine has been designed in all aspects for optimum lightness and compactness. For the dry sump lubrication system adopted to help achieve the desired minimum ground clearance, a tank-in-case dry sump system is adopted to move the initially separate outside oil tank into the crankcase and thus contribute to better centralisation of mass. This was Yamaha's first effort to design this for a public road-legal on-off-road production model.

For the engine balancer an innovative 2-axis type was adopted. Greater compactness and centralisation of mass were achieved with a design where the front-side balancer shares the same axis with the water pump and other measures. Further design improvements throughout the chassis also contributed to centralisation of machine mass. Representative among these is the adoption of a side-mounted radiator design, which contributes to improved front-rear centralisation of mass while also helping to achieve an optimum wheelbase dimension. All of these are design measures aimed at achieving a higher level of rider-machine communication through the total performance package, from the engine to the detail components of the chassis.

Ténéré means long-distance touring

What riders want in a long-distance touring machine is good on-board comfort (seat cushioning, air protection, comfortable riding position, etc.) a comfortable ride (suspension, vibration, sound, etc.) and good rider protection (wind, splash protection). In the development process these basic long-distance tourer qualities were tackled first of all. The twin headlights are not simply a symbol of Yamaha sport bikes but also, in connection with the adjoining front cowl, help in limiting the back-swirl of wind at the rider's chest. This also combines with the separate (two-part) seat design, with its new shape, cushion and cover material, to help create a comfortable rider space.

Another focus of development efforts for the XTZ1200 was the riding position. In cross-continental touring, one is certain to encounter various types of road-surface conditions. In some off-road riding in particular, the rider will choose to ride in the standing position for considerable periods. In light of this, the handlebar height, angle of downturn and inward bend have been set to best accommodate both standing and seated riding positions.

For long continental touring trips over numerous days, load-carrying capacity is another important factor. Generally speaking, in order to obtain good handling performance while carrying a full load, the chassis must have the right level of rigidity and strength.

What we focused on was achieving a design that enables a near duplication of the solo-riding handling characteristics under different load conditions, including when riding with a pillion rider or a full load of luggage. The idea was that even if the rider will inevitably feel the added weight when carrying luggage or a pillion rider on the machine, it is still possible to maintain the same solo handling characteristics.

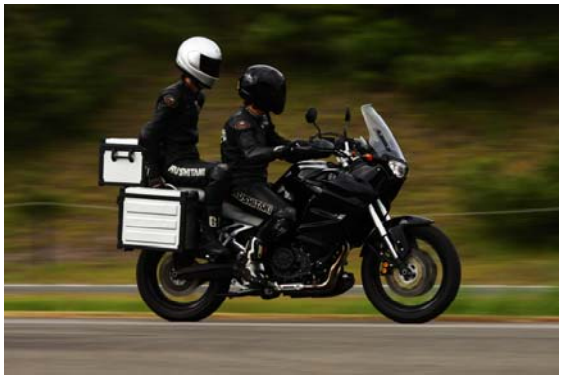
The riding environment and the rider's condition are constantly changing elements. So we adopted a system that provides a choice of T (Touring) Mode and S (Sports) Mode. There are times when

you want to ride seriously and other times when you just want to enjoy the scenery as you ride, and this function fulfils those needs.

Test team analysis
The XTZ1200 owes much to the DNA engrained in Yamaha adventure bikes from more than 30 years of development since the original XT500.

One example of this DNA is the running test method we call “team test riding.” In developing running performance, the repetition of analysis and actual running tests is everything. In many cases, analysis may produce the desired performance specs for things like rigidity and control maps, but when tried in actual track tests it is found that further perfecting and adjusting are necessary. Even if the desired rigidity is achieved, it may be affected by factors like the points of flexibility of the frame, characteristics of the alloys used or slight differences in the ECU mapping.

Sometime solutions can be found through the intuition of experienced engineers, but what Yamaha put most trust in is the “team test riding” process, in which five or six test riders work as a team taking turns riding the machine and then together discussing their evaluations or issues to be worked on further. No matter how good a test rider may be, they are still human and there will inevitably be some things that they don’t notice. But working together as a team ensures that someone will notice what another did not, and by discussing together, they will gradually bring the machine to the point of having the right handling performance.



Thorough testing of the prototype models ensure the final product performs as planned

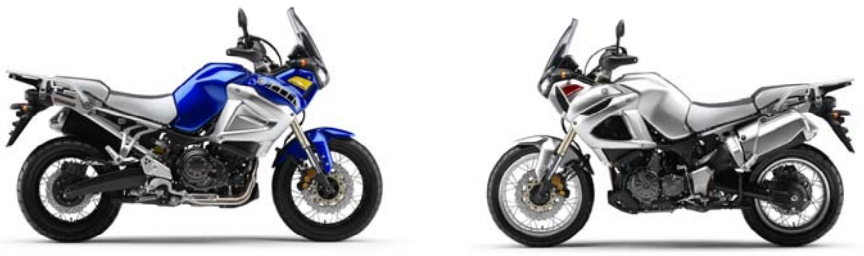
On the other hand, XTZ1200 also has some unique and highly detailed design elements. The rubber pad on the upper surface of the footrests is hollow and arched to provide greater comfort. But when the rider stands up on the footrests to manipulate the bike in demanding off-road situations, the rubber pads flatten so the sole of the rider’s boot comes in contact with the surface of the footrest, including the outer aluminium rim for better hold. This is a design detail specifically for on- off-road riding. And, riders who actually use this model for intercontinental riding will discover more of these design details.

Comment by the XTZ1200 development Project Leader, Mr. Ikuo Ishizuka.
“We don’t think of the XTZ1200 as a motorcycle in the usual sense of a product of industrial manufacturing. We feel that we were given

the chance to produce something that embodies the dreams of riders like intercontinental touring and, when used, will be a machine that creates Kando and irreplaceable memories for them. That is why we tried our best to build a dependable partner that will perform beyond the rider's expectations in all of the different types of adventure riding situations we could imagine. So we used our experience and the latest technologies to build as much performance, functionality and reliability as well as the sensual performance we built into it. I hope the XTZ1200 will help riders realise their greatest riding dreams."*

* Kando is a Japanese word for the simultaneous feeling of deep satisfaction and intense excitement that people experience when they encounter something of exceptional value.

2010 XTZ1200 Super Ténéré specifications	
Engine	Liquid cooled, 4-stroke DOHC 4 valve, forward-inclined parallel 2-cylinder with YCCT + traction control
Displacement (cc)	1199
Bore x stroke	98.0 X 79.5 mm
Compression	11.0:1
Transmission	Constant mesh, 6-speed
Chassis	Steel tube backbone
Length (mm)	2250
Width (mm)	980
Height (mm)	1410
Seat Height (mm)	Low - 845mm / High - 870mm
Wheelbase (mm)	1540
Clearance (mm)	205
Wet weight	261kg with 23 litres of fuel
Fuel tank	23.0 litres
Suspension	Telescopic forks 190mm front travel Swingarm 190mm rear travel
Brakes	Dual disc 310mm front, single disc 282mm rear, ABS + unified braking system
Tyres	110/80 x 19 front and 150/70 x 17 rear
Price and availability	TBA
Warranty	24 months, unlimited kms parts and labour



Colour options are Yamaha Blue and Silver Tech