Kawasaki
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PRESS RELEASE

Kawasaki turbo

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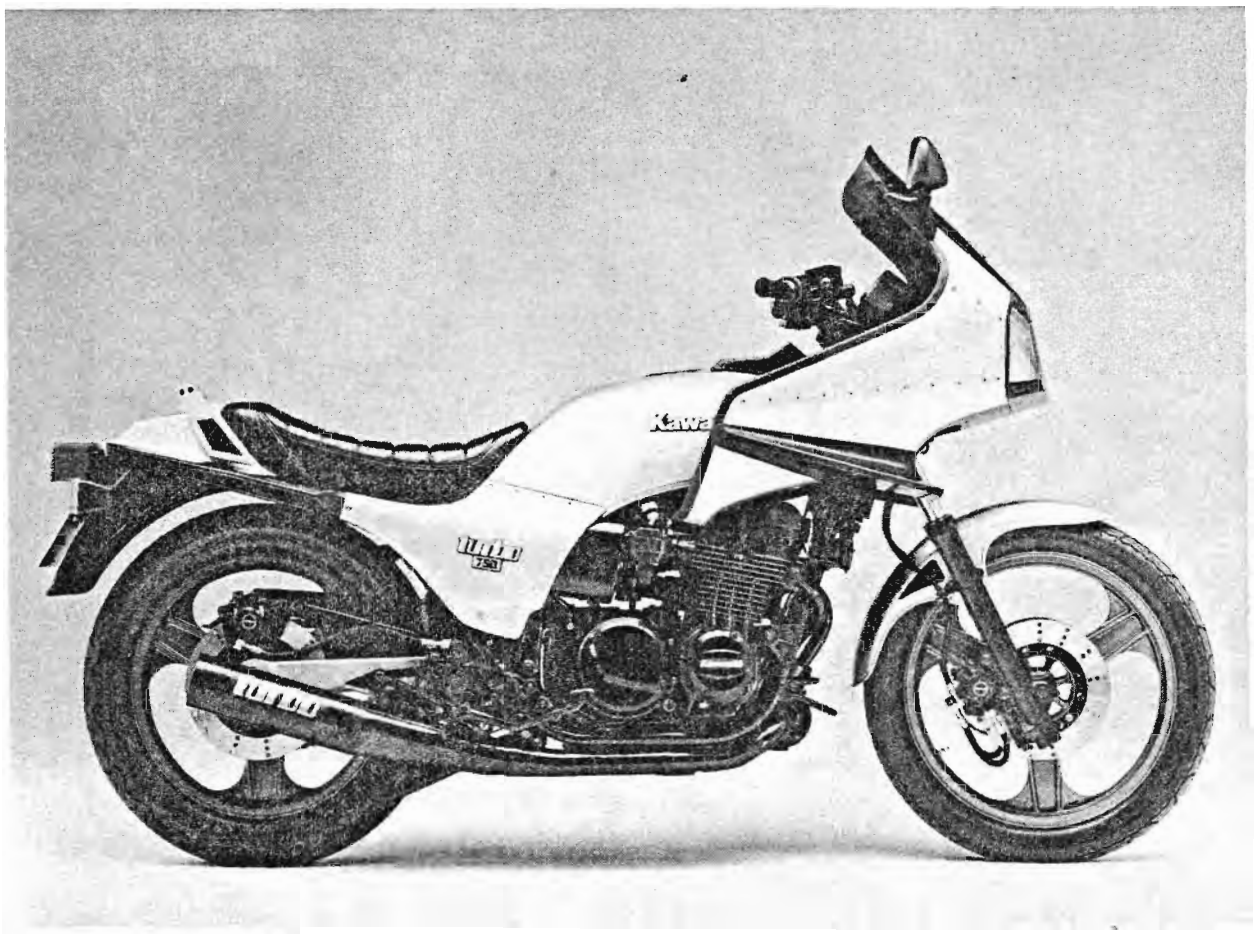
INFORMATION KIT

All information given below may be used without acknowledgement of source. Because Kawasaki Turbo is still under development, it must be understood that minor and even major design changes, and alterations in specifications, may occur.

We hope you will find this Information Kit helpful. Details are given wherever possible, but some items must remain on our 'secret list' for the interim.



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WHAT IS TURBOCHARGING?

The exhaust gas that rushes out of an engine has a lot of energy, which usually just runs to waste. A turbocharger is like a pump with two chambers. One - with a turbine - is in the exhaust system, the other - with a compressor - is in the engine air intake; the turbine and compressor are mounted on the same 'axle'.

Passing the exhaust gas through the turbine makes the turbine spin; that spins the compressor, blowing more air into the engine, which increases its effective capacity.

Compressing the air into the engine is a long-established way of extracting more power. The expression 'turbocharging' is used when the exhaust gas provides the energy; an alternative system is to drive the compressor by the engine, or even an electric motor - this is called 'supercharging'.

ADVANTAGES OF TURBOCHARGING

Turbocharging has two principal benefits:

* it enables additional power to be extracted from an engine
* it enables a given power to be obtained from a smaller, lighter engine.

These factors are particularly important to motorcycles, where size and weight have a very direct effect on handling, control, performance and fuel economy.

With turbocharging it is possible to use a smaller, lighter engine; when ridden moderately it will provide the excellent fuel economy of a conventional engine of the same size. However, when ridden enthusiastically, the faster exhaust stream causes considerable turbo boost, producing a considerable rise in peak power output - on Kawasaki Turbo it results in performance better than a 1000cc machine, and with the advantage of a superior power/weight ratio.

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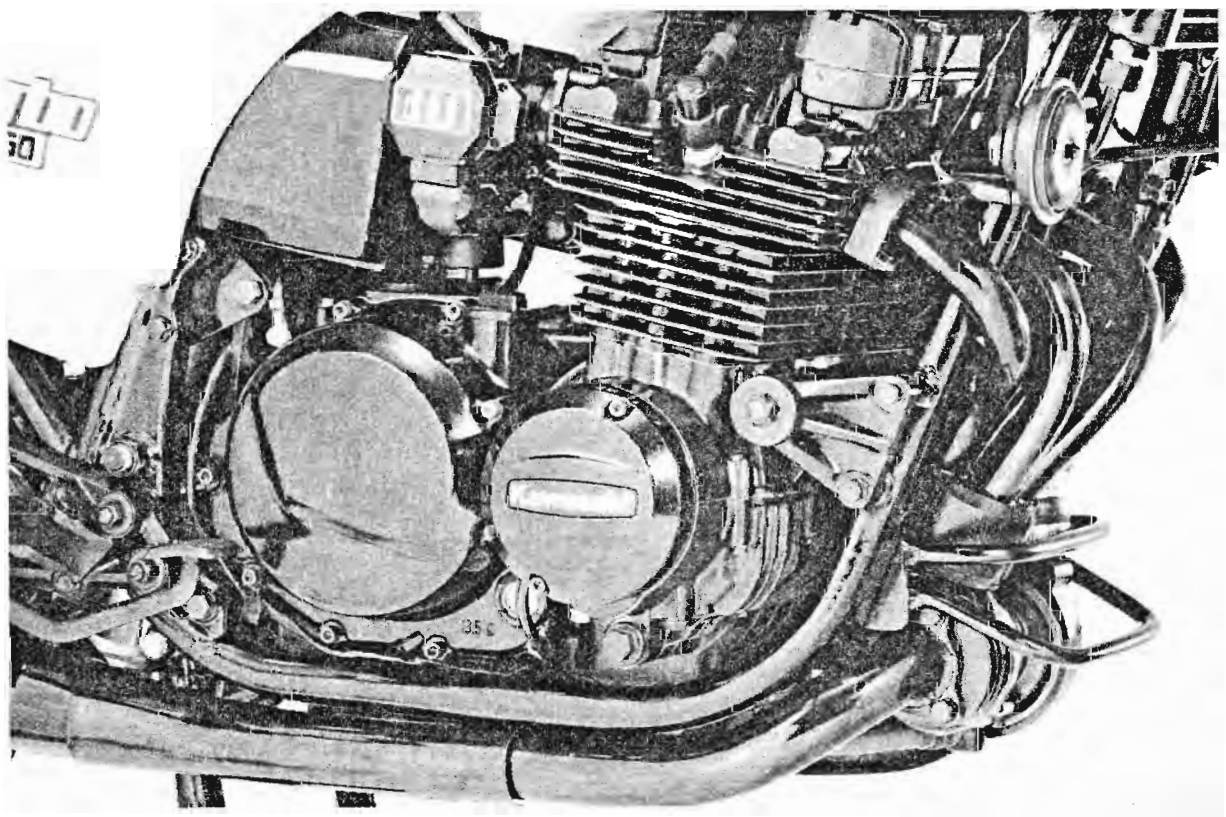
SPECIFIC DETAILS

ENGINE

4 stroke, DOHC, turbocharged, 4 cylinder, 66 X 54mm bore/stroke, 738cc, air cooled. Fundamentally the same unit as in the production 750cc series. Heavier duty bearings, pistons, clutch and other stressed components. Finished in black. Full flow oil cooler, frame mounted, below the steering head.



TURBOCHARGER

Kawasaki has proven conclusively that placing the turbocharger as close as possible to the exhaust ports minimises 'turbo lag' the delay between the build up of exhaust gas pressure and the time it takes for the turbine to spin into action. The faster turbo response gained more than compensates for the slightly longer induction path, compared to a turbo placed further from the exhaust ports.

LOW REV TURBO BYPASS

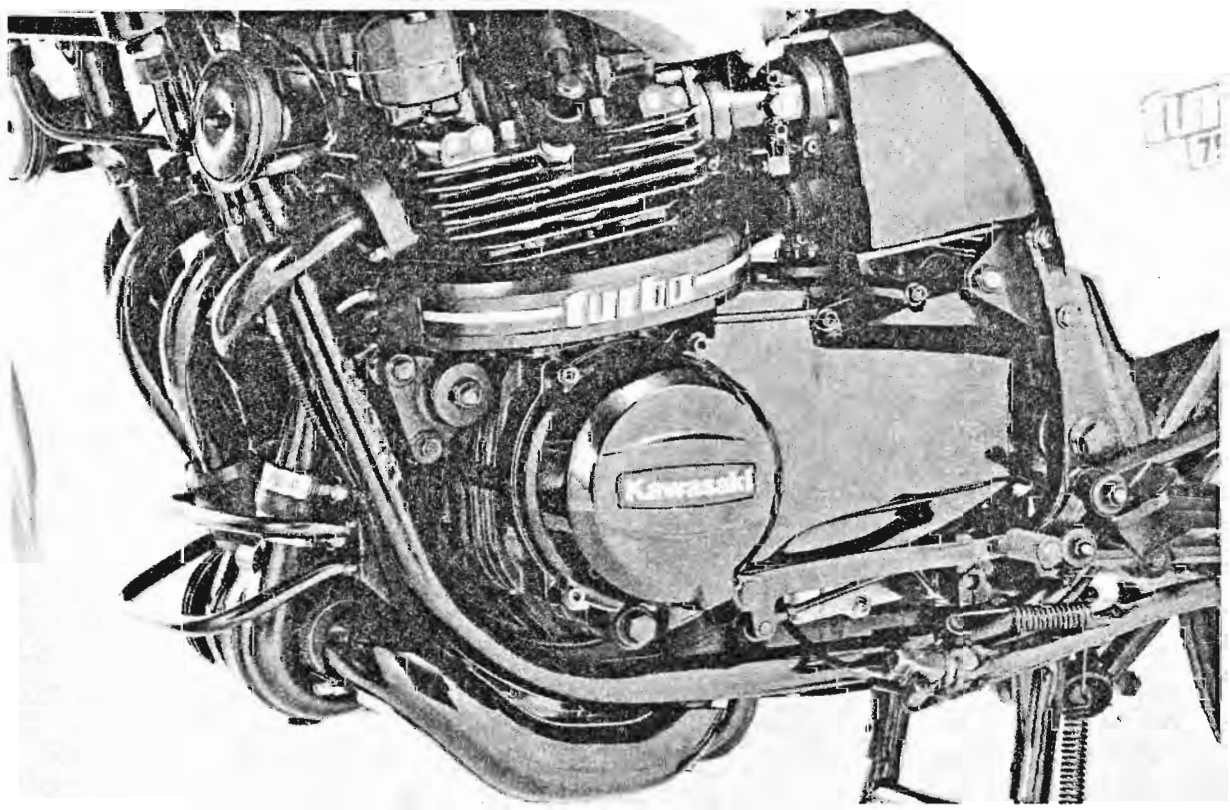
At low engine speeds a turbo can actually become a partial 'blockage' in the air intake system, resulting in low rev performance inferior to a non-turbocharged machine.
On Kawasaki Turbo the turbocharger is bypassed until boost is sufficiently high to close the bypass system.

ASSOCIATED CONTROLS

Kawasaki Turbo is protected from exhuast pressure build-up by a waste gate which allows excess pressure to bypass the turbo and flow directly down the exhaust.

There is a pressure sensor in the air intake; its signals are part of the information continuously assessed by the fuel injection microcomputer.

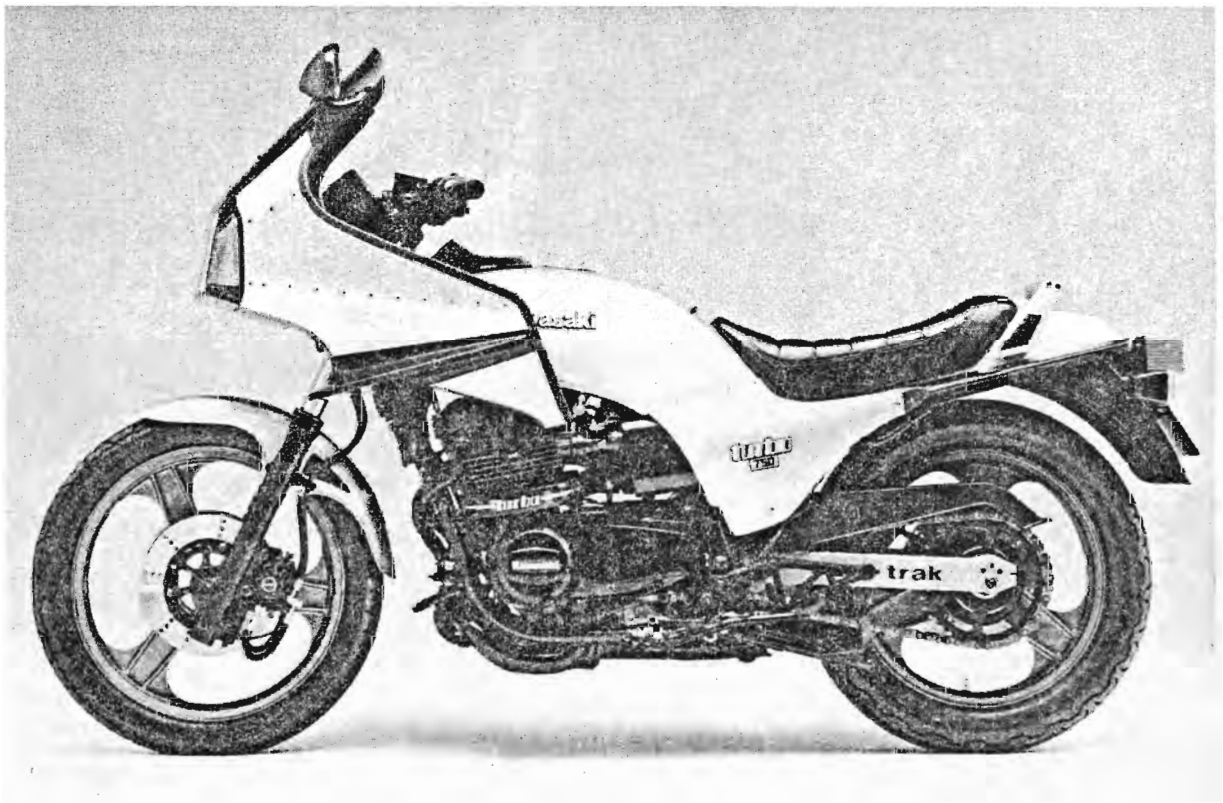
A boost gauge is mounted on the instrument panel.



ADVANTAGES OF KAWASAKI TURBO DESIGN

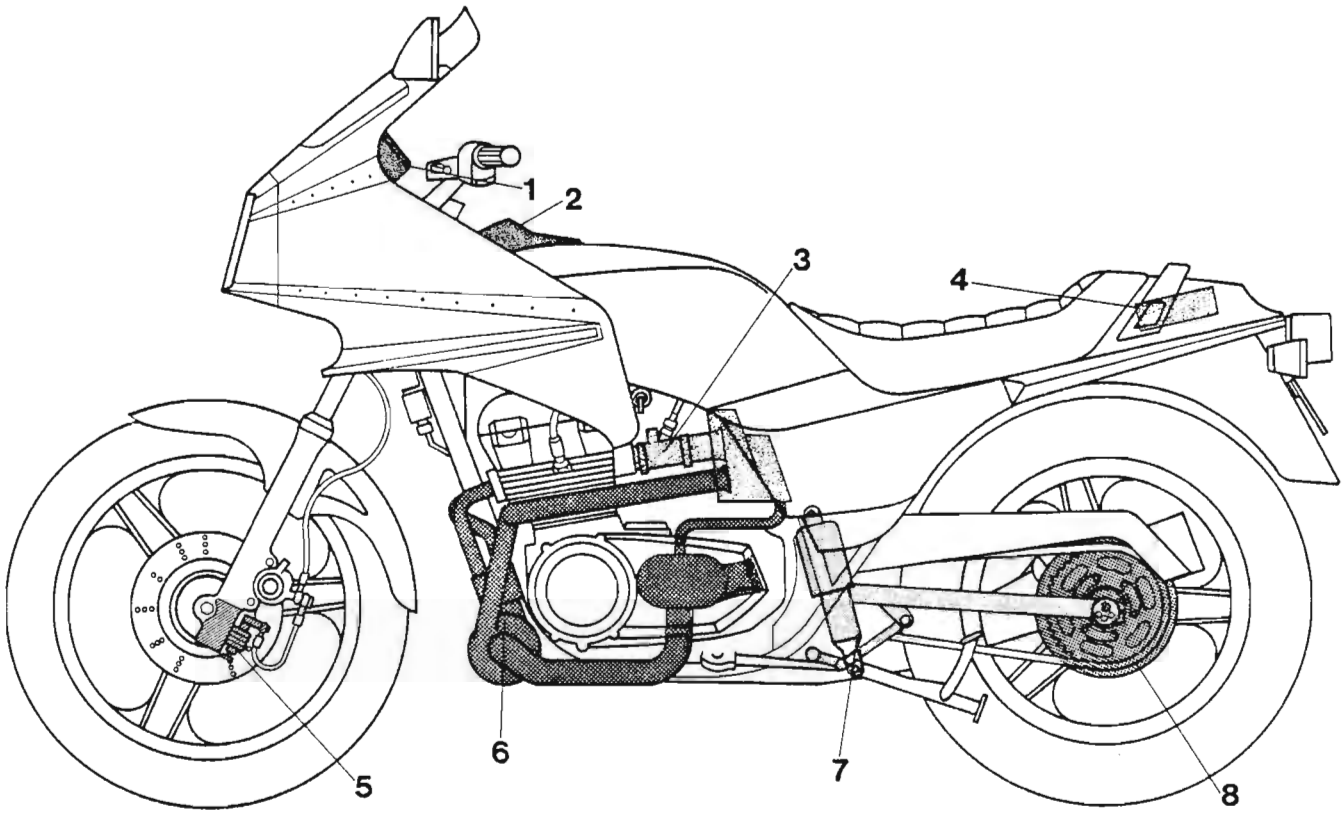
minimal lag in the exhaust/turbo flow
minimal loss of energy
the concentration of heat is isolated far away from the rider.

A highlight of the design is that Kawasaki engineers have been able to blend the individual exhausts together and place the turbo close to the ports without inducing power loss.



The emphasis is totally on functional efficiency; this results in a strong sense of power and purpose that makes Kawasaki Turbo a strikingly distinctive machine. It looks even more handsome in reality than in the photograph.
Several of the special features can be seen - anti-dive fork control, turbocharger, fairing, Uni-Trak rear suspension.

Kawasaki turbo



1. Electric instruments
2. Electronic monitor
3. DFI
4. DFI control unit
5. Anti-dive front suspension
6. Turbocharger
7. Uni-Trak rear suspension (air shock)
8. Ventilated rear brake disc

DIGITAL FUEL INJECTION (DFI)

Kawasaki has developed a unique new type of fuel injection system. Previously, an air flap in the induction system measured the air flow. This can suffer the disadvantage that there is no instantaneous increase in air flow at the moment of acceleration, resulting in slight lag.

Kawasaki's innovative new DFI is unique because it allows an air flow totally unimpeded by any measuring device. Instead, the precise position of, and any movement in, the throttle valve is instantly referred to the microcomputer by the throttle sensor.

The optimum fuel injection rate is constantly recalculated at very high speed by a digital microcomputer that receives information from various sensors recording

- throttle position.
- engine rpm
- turbo boost pressure
- altitude (air density changes)
- engine temperature
- intake air temperature.

INCREASED FUEL ECONOMY

Where engine revs allow, the microcomputer can completely cut off the fuel supply during deceleration, increasing engine braking and boosting fuel economy

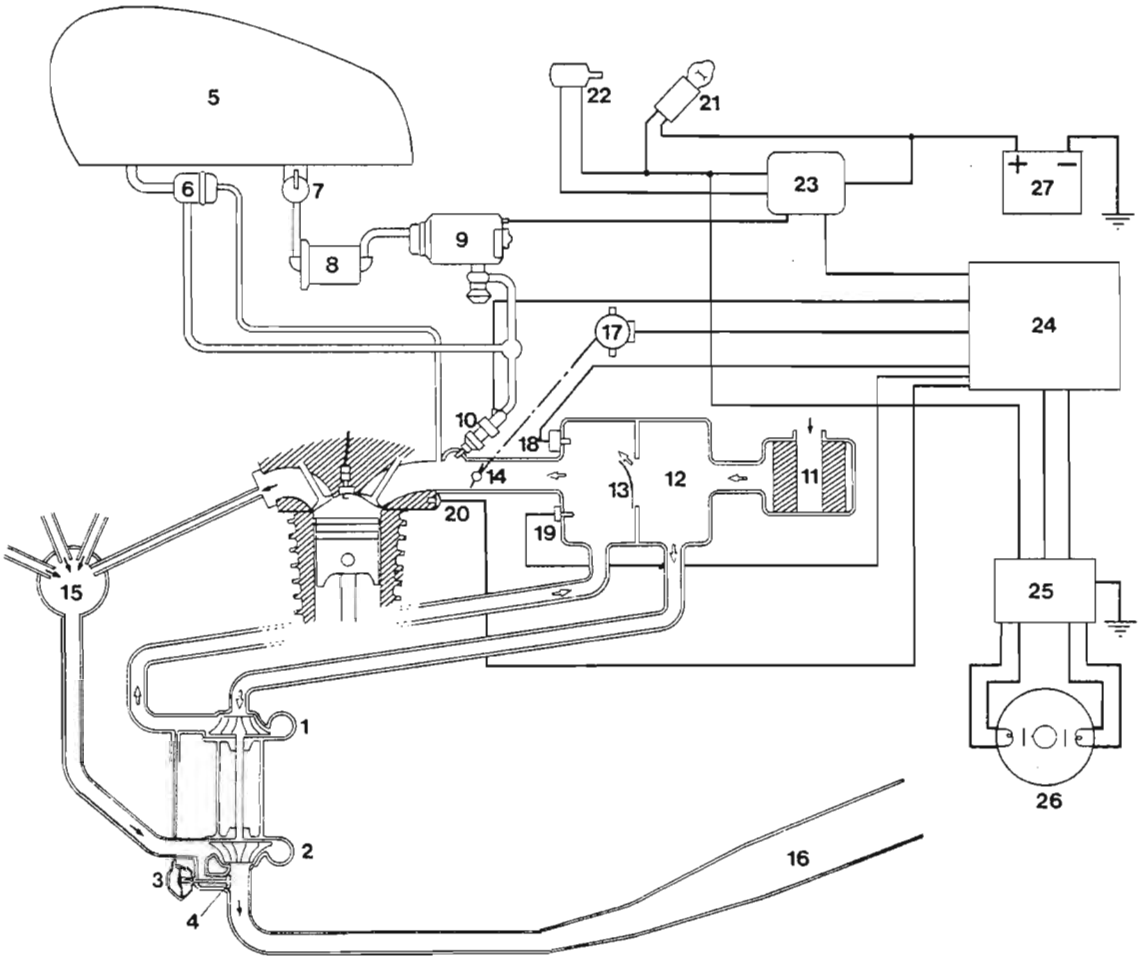
Eliminating all air flow measuring devices minimises air turbulence and restrictions.

Altogether, DFI offers improvements in fuel economy over a wider range of riding conditions.

BENEFITS OF DFI

- faster response
- smoother control
- easier starting, cold and hot
- greater simplicity
- better high altitude performance
- better fuel economy
- reduced exhaust emissions.

turbo & d.f.i System



1. Compressor
2. Turbine
3. Waste gate actuator
4. Waste gate valve
5. Fuel tank
6. Fuel pressure regulator
7. Fuel tap
8. Fuel filter
9. Fuel pump
10. Injector
11. Air cleaner
12. Surge chamber
13. Reed valve
14. Throttle valve
15. Exhaust collector manifold
16. Muffler
17. Throttle sensor
18. Air pressure sensor
19. Air temperature sensor
20. Engine temperature sensor
21. Ignition switch
22. Starter switch
23. Relay
24. DFI control unit
25. Ignitor
26. Timing rotor
27. Battery

ANTI-DIVE, AIR ADJUSTABLE FRONT SUSPENSION

ANTI-DIVE

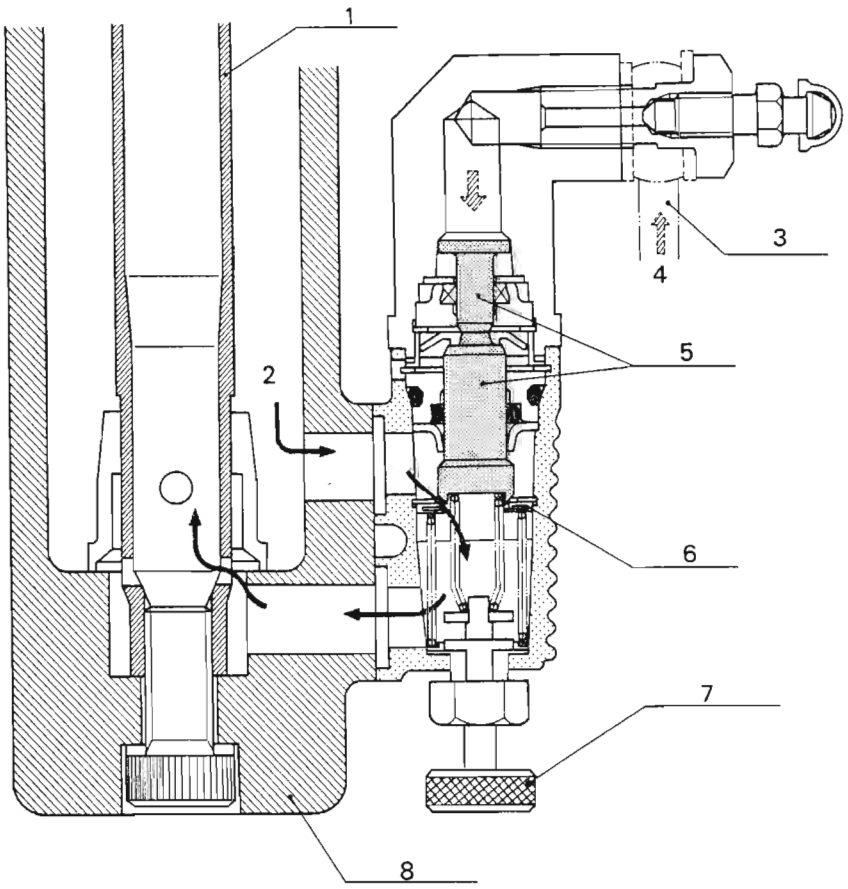
Anti-dive control is achieved by a variable control valve in the hydraulic damping system of each fork leg. When the front brake is applied, the rise in hydraulic pressure is also fed to the control valves. As braking pressure is increased, so the control valve increasingly limits the flow of oil in the fork legs, building resistance to the speed at which the legs can move. Control is adjustable.

EQUALISED AIR ADJUSTMENT

Fork preload adjustment is carried out by variations in air pressure. Only one air valve is used, because the legs are coupled by a equalising tube to ensure exact balance. Stiction is minimised by a permanent low-friction coating on the tube sliding surfaces.

BENEFITS

Improved tyre/road adhesion
Harder, faster braking is possible
Greater stability
Improved comfort
Extra safety
Variable adjustment to provide optimum settings for wide-ranging conditions
More progressive springing, and always the extra comfort of a cushion of air.



1. Inner cylinder
2. Fork hydraulic oil
3. Brake hose
4. Brake pressure
5. Piston
6. Control valve
7. Anti-dive adjuster
8. Fork outer tube

UNI-TRAK REAR SUSPENSION

With the very considerable extra power available, Kawasaki considered that it was highly desirable to use a version of the company's Uni-Trak system. Uni-Trak is Kawasaki's unique pivot lever system using a single, inboard-mounted spring/shock absorber. It has been one of the important factors in enabling the world championship-winning Kawasaki KR250 and KR350 GP machines to be pushed to new limits of wheel adhesion and braking. The system has also appeared on the AR and AE series.

ULTRA-PROGRESSIVE ACTION

Conventional rear suspensions tend to be insufficiently supple over small road surface imperfections, yet they can have insufficient control to securely cushion large wheel movements, thus disturbing whel adhesion and rider control.

The version of Uni-Trak on Kawasaki Turbo has been developed especially to provide a steeply progressive rear suspension characteristic, with softer initial movement and a very rapid rise in control over the final part of the stroke. To achieve this, the shock absorber operation has been reversed - i.e. the top is fixed to the frame, the lower end is operated via a compound lever action. Both ride quality and wheel adhesion set very high levels, making the machine exceptionally stable at high speeds over widely varying surfaces without readjustment of the suspension settings.

The single shock absorber eliminates left/right imbalance. Its placement brings it closer to the machine's centre of gravity, and keeps it low - the first contributes to stability, the second to directional stability.
The leverage ratio of approximately 2:1 means that the shock absorber speed is half normal speed; this results in less heat build-up, contributing to more consistent damping. There is also less friction - less stiction.

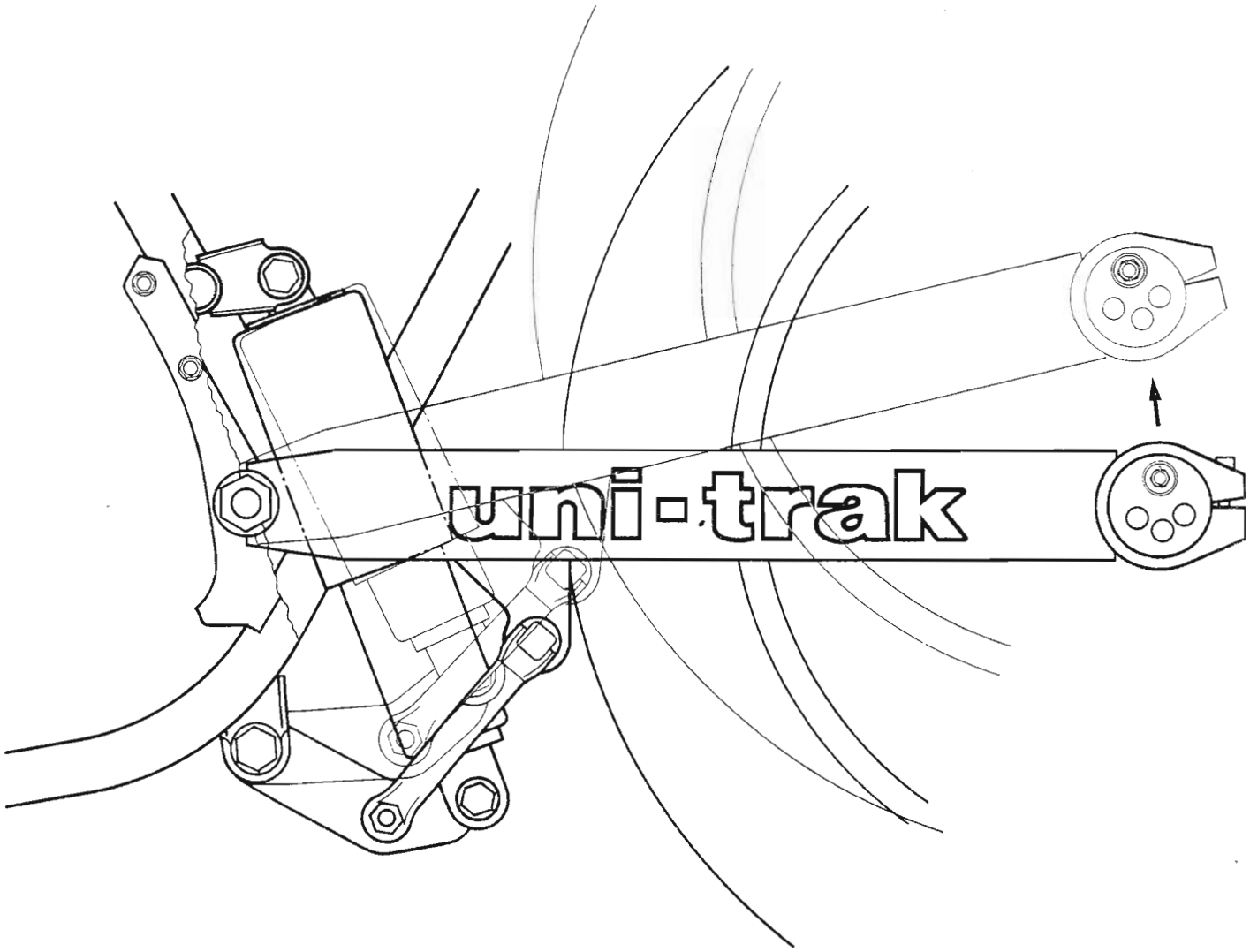
VARIABLE DAMPING, AIR ADJUSTMENT

A multi-position control in the side cover provides variable damping. Preload adjustment is by air pressure, as at the front. However, because of the highly progressive control afforded by Kawasaki Turbo's Uni-Trak, adjustment for many general variations in riding conditions are not necessary.

SOPHISTICATED TYRE ADHESION

For optimum adhesion at very high speeds, the tyres need to be able to follow road contours exceedingly rapidly. Excessively firm damping prevents this. Kawasaki Turbo's suspension will allow very light control of initial movements, and build progressively, at rates that vary according to suspension movement speed, thus providing outstanding control and stability. It also enables a very pleasant level of softness for slow and irregular surfaces, with complete freedom from both floating and jolts at high speed.

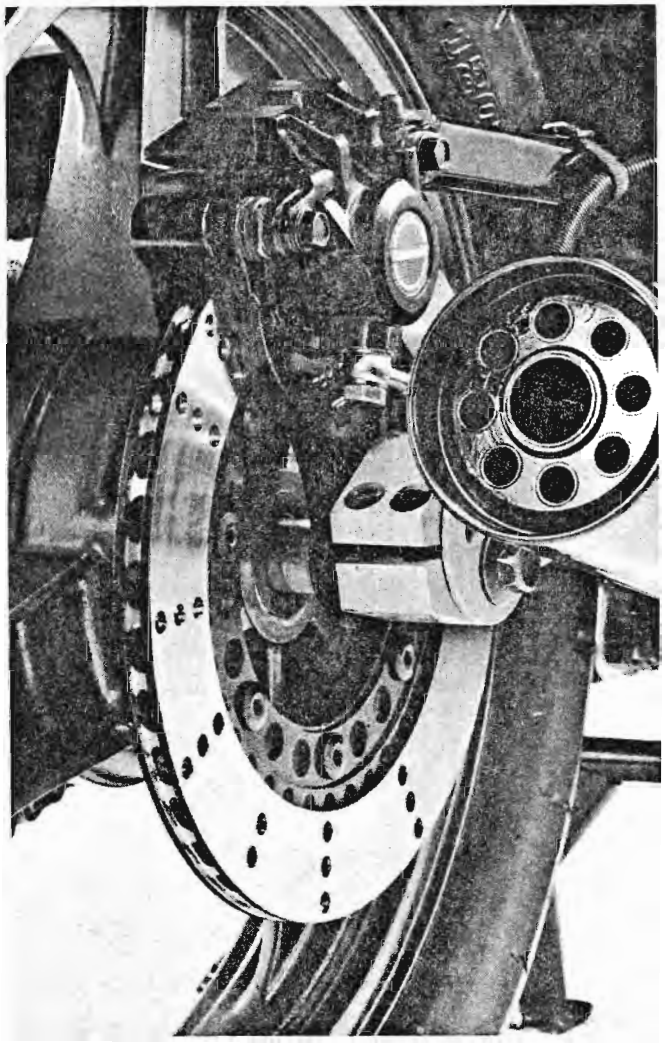
uni-trak

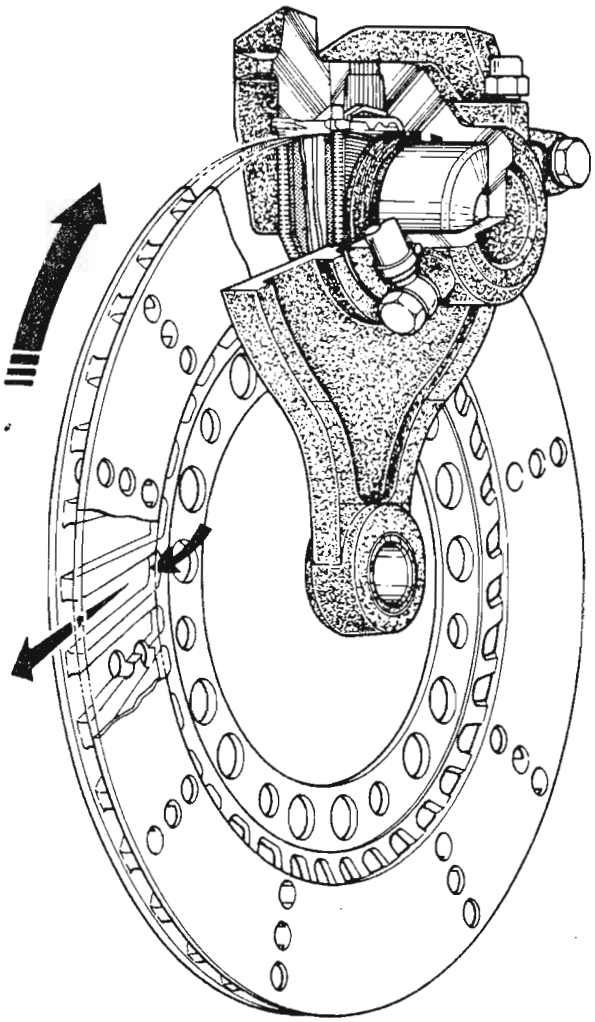


BENEFITS

Sophisticated tyre/road adhesion under widely varying conditions
Improved adhesion allows later, heavier braking
Superior stability
Increased safety
Greater comfort.

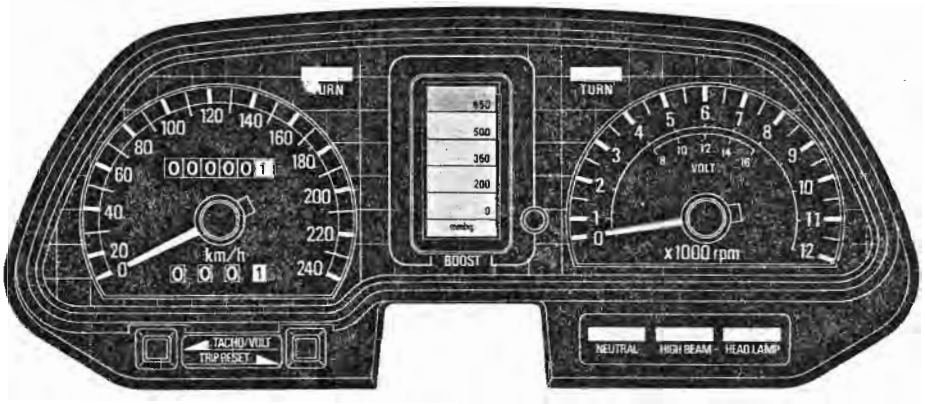
VENTILATED REAR DISC
The single rear disc is ventilated. Under hard and fast riding, the very considerable extra fade resistance of a ventilated disc provides superior stopping power and control.





INSTRUMENTATION

Any form of essential instrumentation that requires the rider to make a specific eye movement or re-focussing adjustment to read it can be dangerous. For this reason Kawasaki has retained large, clearly marked analogue instruments for speedometer and tachometer, and placed them where they fall within the rider's peripheral vision. Both instruments are electric; the tachometer functions as a battery voltage indicator when a check button is pushed. Turbo boost indication is by a large LCD unit.



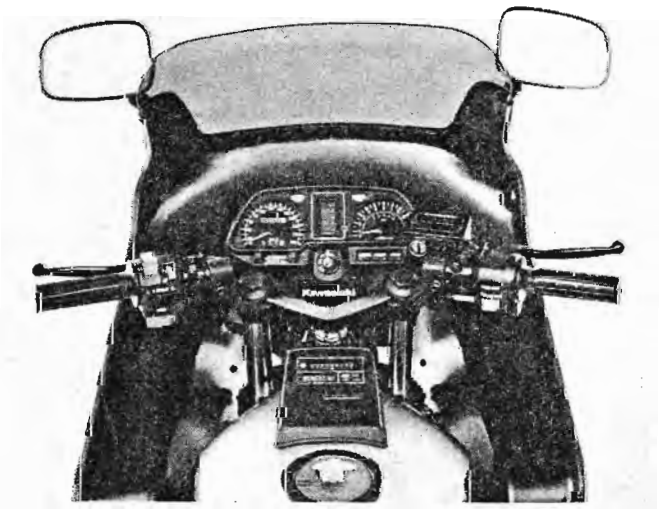
ELECTRONIC MONITOR PANEL

On the fuel tank is a second panel. This contains an electronic monitor system, with warning lights that identify the particular source of trouble or potential problem.

The monitor panel also includes LCD multi-step gauges for fuel level and oil temperature.

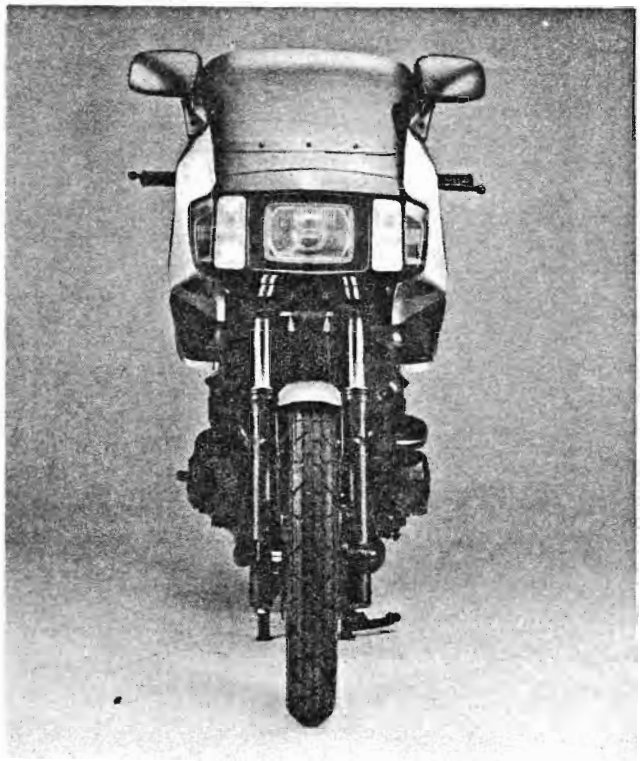
The extra brightness of an LED is used to attract attention for low fuel level.

LCD displays are used for a digital clock, and as warning lights for low oil level, overheating, low battery electrolyte level and DFI malfunction.



HIGHLY AERODYNAMIC FAIRING

A half fairing is an integral part of the design. This was developed by KHI; its excellent aerodynamics are designed to enhance stability, high speed fuel economy, and of course provide protection for the rider from wind and rain.



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SPECIFICATIONS

ENGINE:

Type	4 stroke, DOHC, turbocharged, 4 cylinder
Bore X stroke	66 X 54 mm
Displacement	738cc
Induction	D F I (Digital Fuel Injection)
Ignition	Transistorised Ignition
Maximum power	110 PS/8,500 rpm
Maximum torque	9.5 kg-m/6,500 rpm

FRAME:

Overall length		2,220 mm
Overall width		780 mm
Overall height		1,240 mm
Wheelbase		1,460 mm
Dry weight		225 kg
Fuel tank capacity		20 litres
Instruments		Electric speedometer/tachometer with electronic monitor
Brakes	Front	Dual discs
	Rear	Ventilated disc
Tyres	Front	100/90 - V19
	Rear	120/90 - V18
Suspension	Front	Leading axle air fork with anti-dive mechanism
	Rear	Uni-trak, air-adjustable shock absorber

Specifications may change without notice.