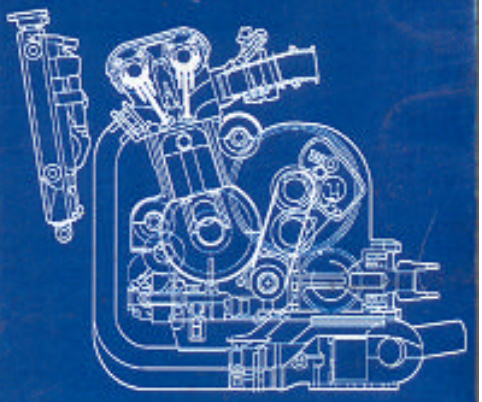
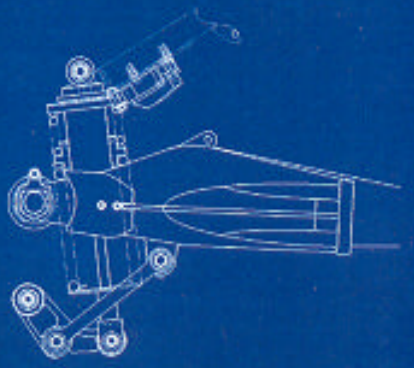
FJR1300 Technical Orientation Guide



YAMAHA



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FEATURES AND BENEFITS

The all-new FJR1300 is the latest addition to Yamaha's line of innovative concept motorcycles. Yamaha engineers designed the FJR1300 to provide optimum riding performance and touring comfort. Featuring Electronic Fuel Injection and a high-powered engine coupled to a lightweight chassis, the FJR1300 is the world's first performance tourer.

ENGINE FEATURES

- Compact 1298cc Liquid-Cooled 4-Stroke Inline 4-Cylinder
- DOHC 16-Valve Cylinder Head
- Single-Piece Cylinder and Crankcase
- Ceramic Composite Cylinder Coating
- Carburized Rods with Forged Pistons
- Dual Gear-Driven Secondary Counter Balancers
- Zero-lash Primary Gear
- Wet-Sump Oil System with Cartridge-Type Oil Filter
- Electronic Fuel Injection
- Newly Designed Exhaust System with Air Induction and Dual Catalytic Converters
- Constant-Mesh 5-Speed Transmission
- Shaft Drive

CHASSIS FEATURES

- Lightweight Aluminum Frame
- Fully Adjustable 48mm Front Forks
- Adjustable Link-Type Rear Suspension
- Full Fairing with Electrically Adjustable Windshield
- Large 25-Litre (6.6-Gallon) Fuel Tank
- Detachable Aluminum Rear Subframe
- Lightweight Cast Aluminum Swingarm
- Split Seat Design
- 237kg (522 lb) Dry Weight

ELECTRICAL FEATURES

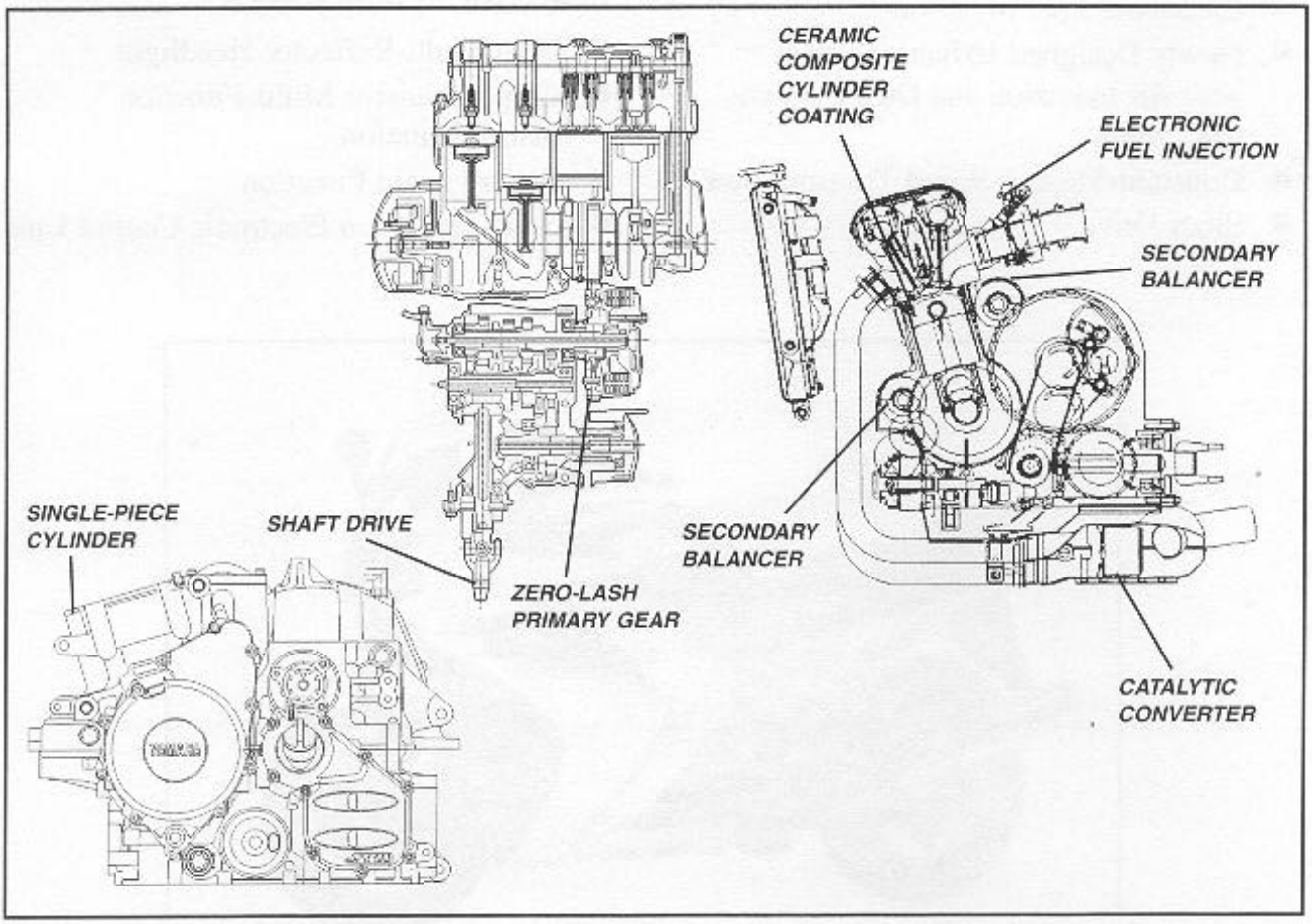
- Dual Multi-Reflector Headlight
- Comprehensive Multi-Function Instrumentation
- Hazard Light Function
- New Generation Electronic Control Unit

ENGINE SYSTEM

All-new from the oil drain bolt to the cylinder head covers, this 1298cc 4-stroke, DOHC inline 4-cylinder, 16-valve engine has been constructed using much of the advanced technology that is found on the YZF-R1 and FZ1 Fazer powerplants.

ENGINE FEATURES

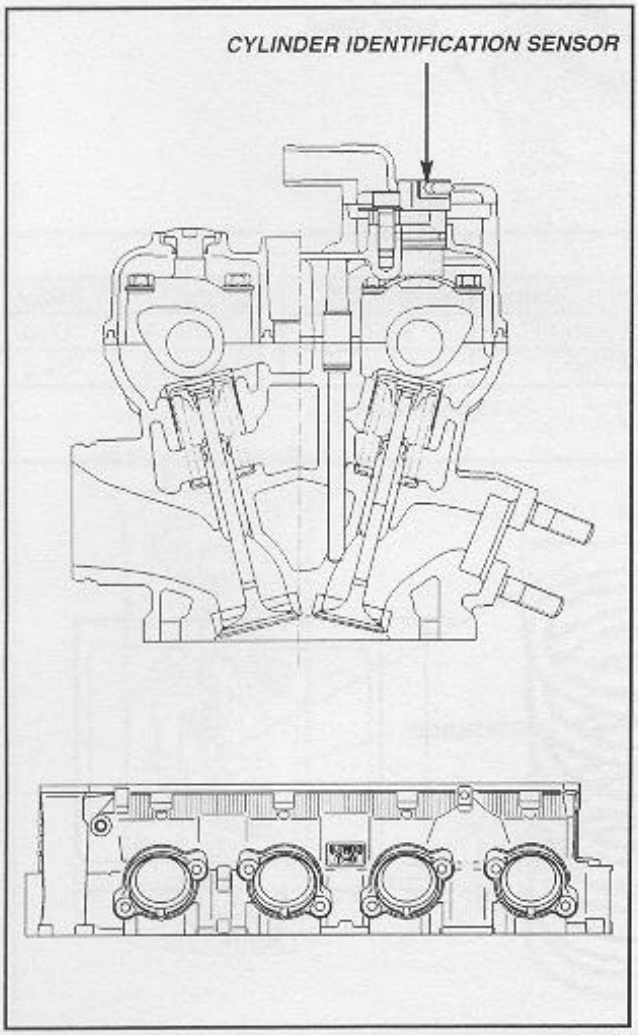
- Bore x stroke – 79.0mm x 66.2mm
- Displacement 1298cc
- 10.8:1 compression ratio
- Electronic fuel injection
- Single-piece cylinder and crankcase
- Ceramic-composite cylinder coating
- Dual secondary balancer system
- Zero-lash primary gear
- Dual catalytic converter
- Shaft drive
- Right-side-drive cam chain to reduce engine width

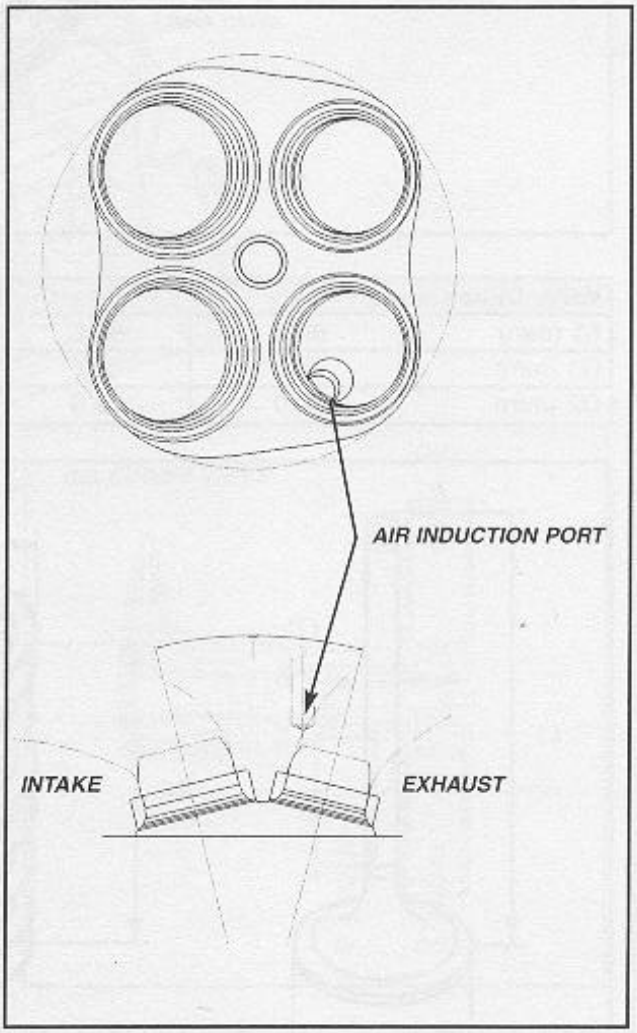


CYLINDER HEAD

- DOHC, 4-valves per cylinder
- Integrated air induction ports
- Side-draft intake port
- "Shim-under bucket" lifter design for low maintenance and high durability
- Valve adjustment interval: 40,000km (25,000 miles)
- Camshaft sensor = cylinder identification sensor
- Spark Plug: NGK CR8E
  Denso U24ESR-N

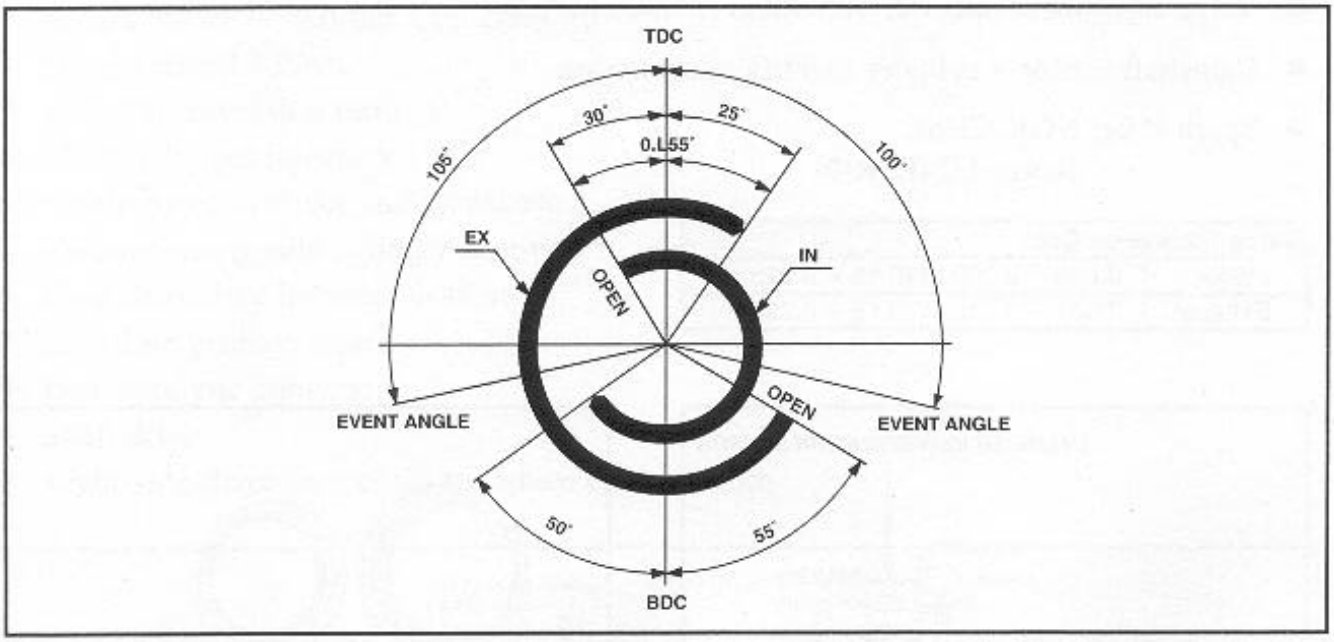
Valve Clearance Cold	
Intake	0.006 ~ 0.009 in (0.15 ~ 0.22mm)
Exhaust	0.007 ~ 0.010 in (0.18 ~ 0.25mm)





CYLINDER HEAD

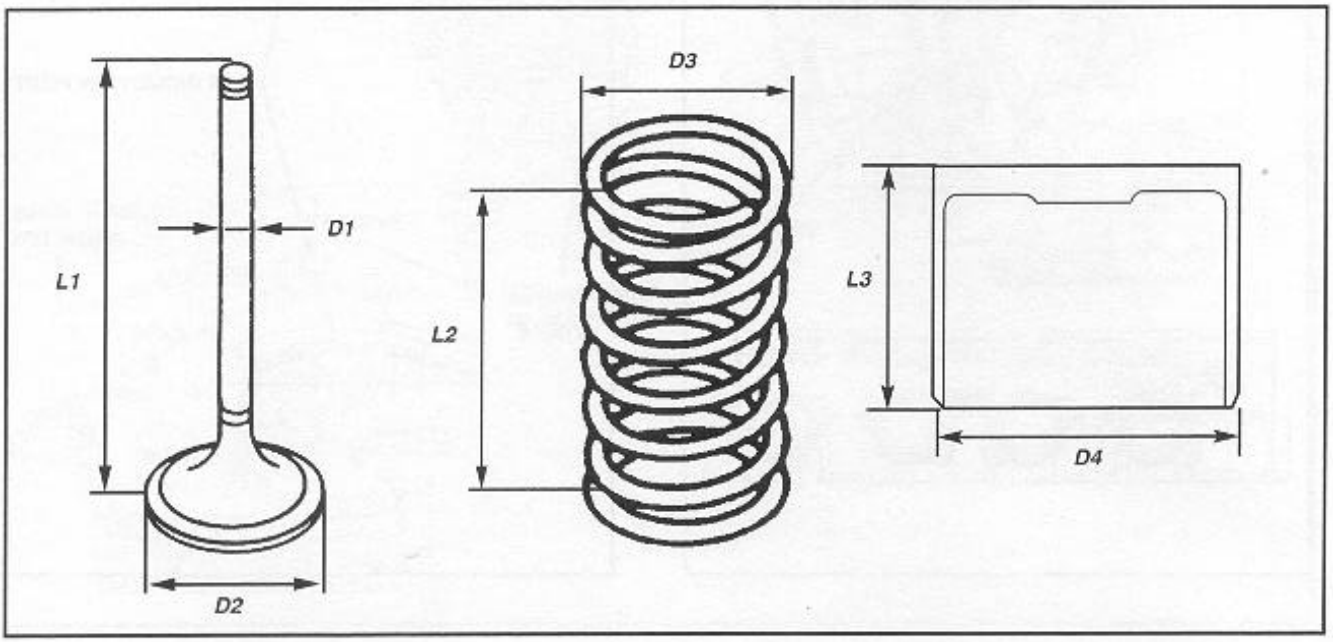
- Cam timing has been designed to produce massive low to midrange pulling power
- 30mm intake valves and 26mm exhaust valves with narrow 5mm stems
- Proven 3LD valve shims are used
- Single spring per valve



Valve Dimensions		
L1 (mm)	89.5	88.6
D1 (mm)	5.0	5.0
D2 (mm)	30.0	26.0

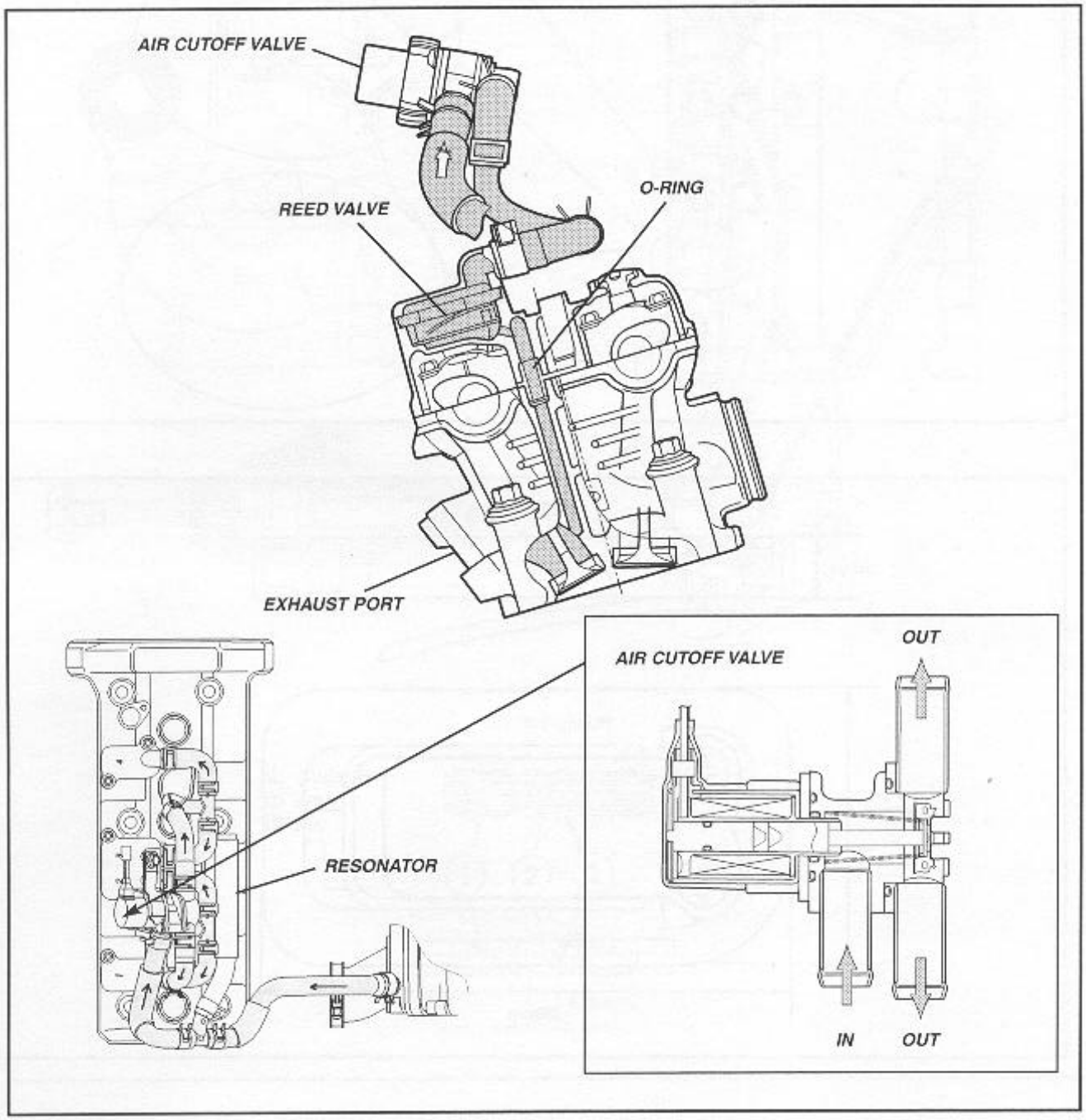
Valve Spring	IN and EX
L2 (mm)	39.7
D3 (mm)	21.2

Lifter	IN/EX
L3 (mm)	17.0
D4 (mm)	24.5



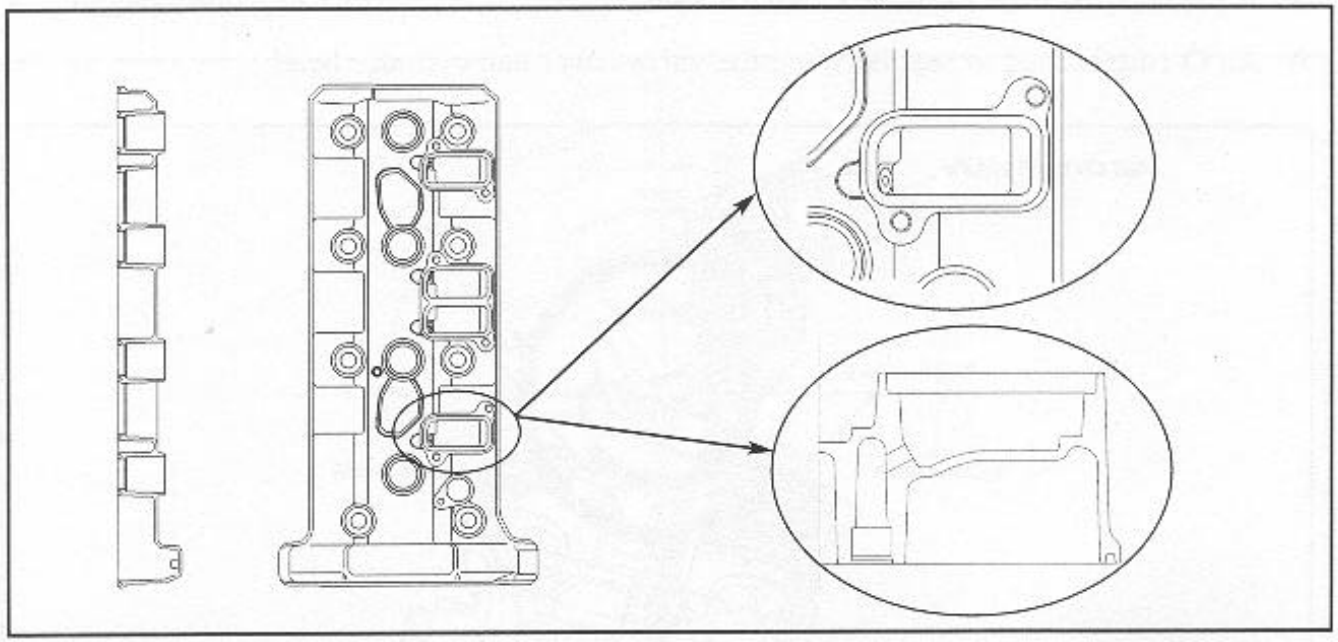
CYLINDER HEAD/AIR INDUCTION SYSTEM

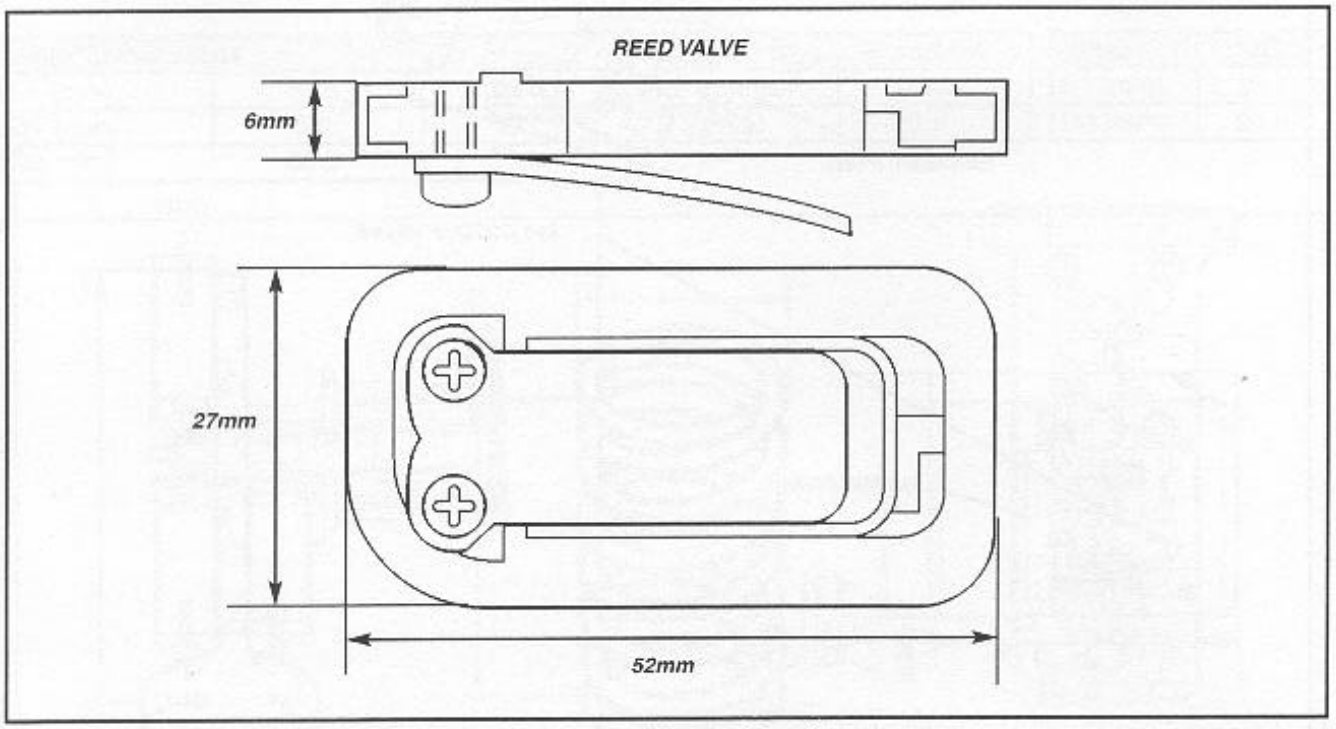
- Newly designed compact air induction system
- The air cutoff valve is electronically controlled by the ECU
- Air is supplied to the exhaust port through the valve cover and cylinder head
- A resonator is used to reduce intake sound
- An O-ring is used to seal between the valve cover and cylinder head



CYLINDER HEAD/AIR INDUCTION SYSTEM

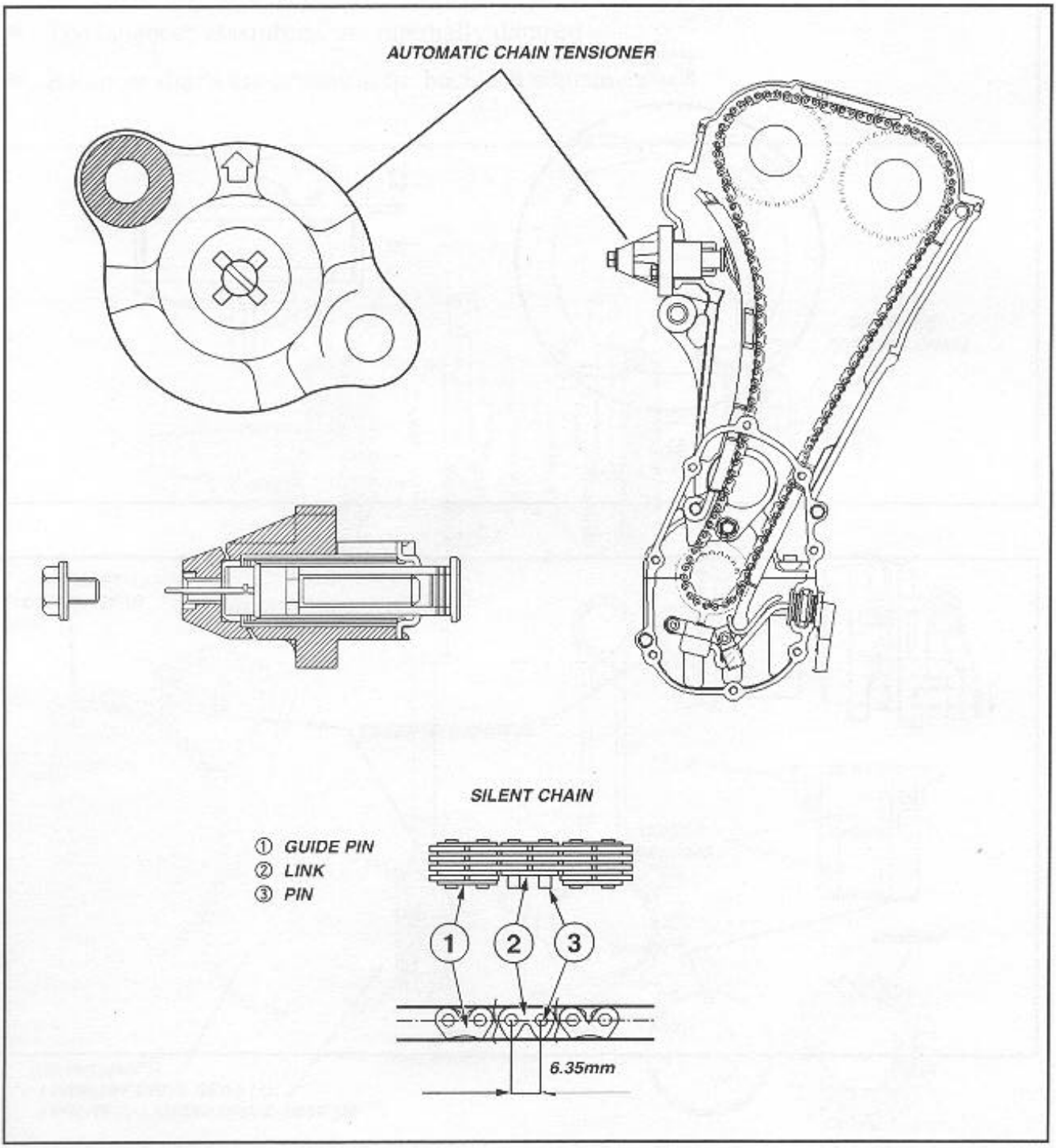
- Air induction reed valves are located in the valve cover
- 4 individual reeds are used, one for each cylinder
- Integrating the air induction system with the valve cover saves space and weight





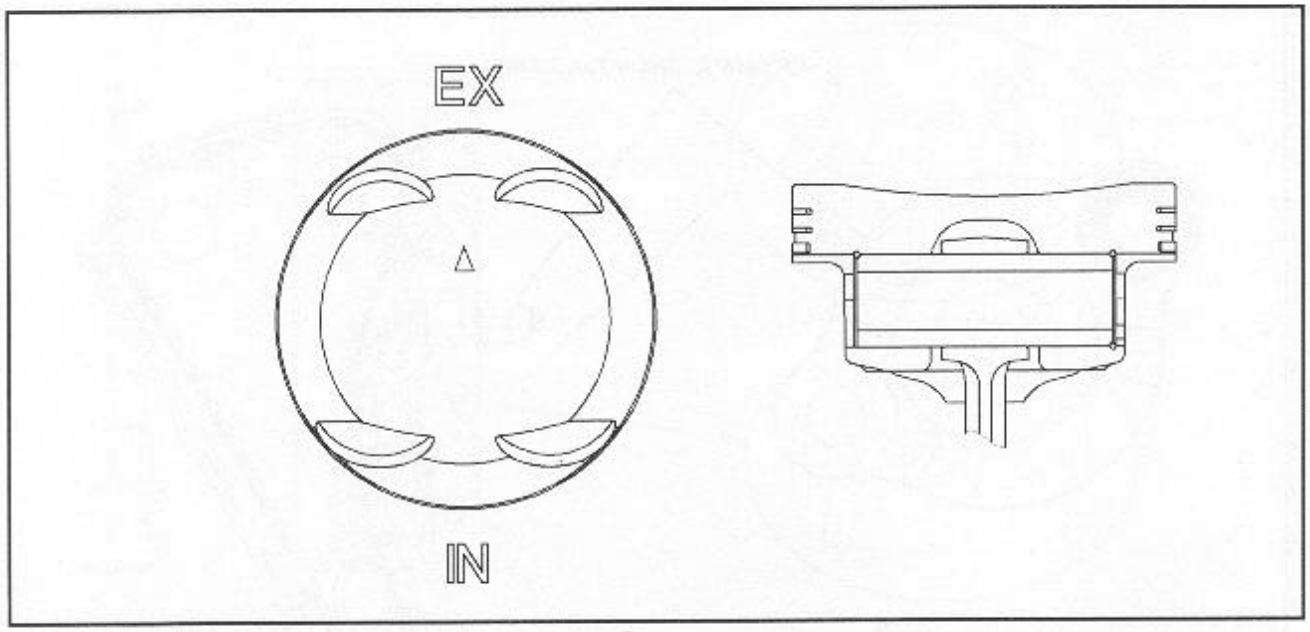
SIDE DRIVEN CAM CHAIN DRIVE

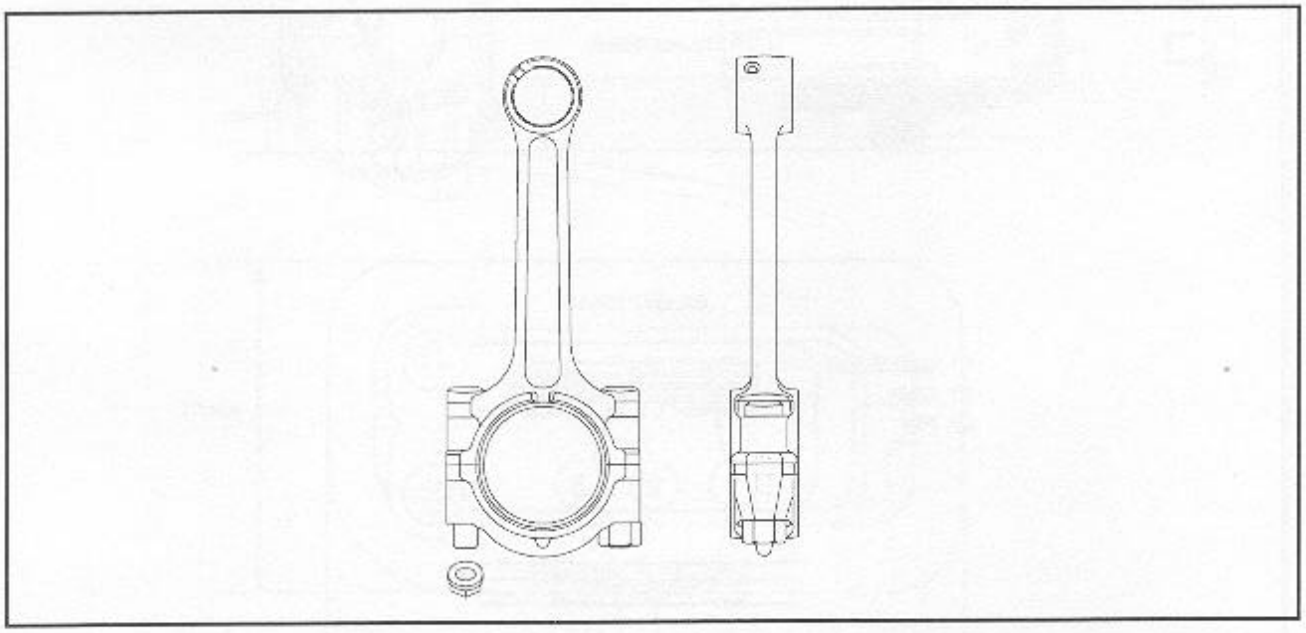
- Type-92 Borg Warner silent cam chain
- Automatic cam chain tensioner (similar to 2001 YZF-R6)
- Silent-chain, side-driven cams produce less noise and allows for a narrow engine design



PISTON/CONNECTING ROD

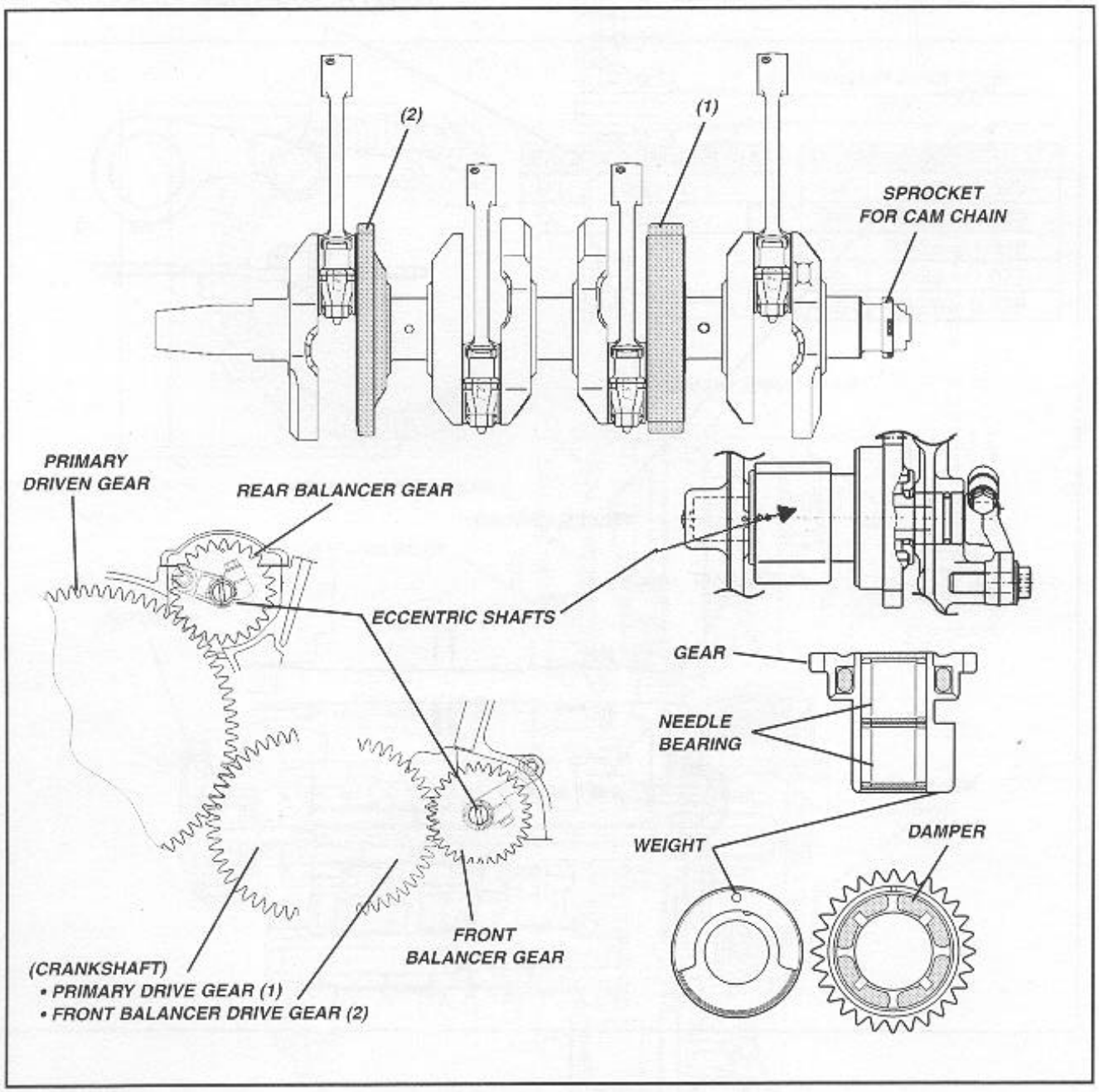
- A newly designed 79mm forged piston is used to reduce reciprocating mass
- 10.8:1 compression ratio
- Carburized (heat treatment with carbon) connecting rods are used to improve durability





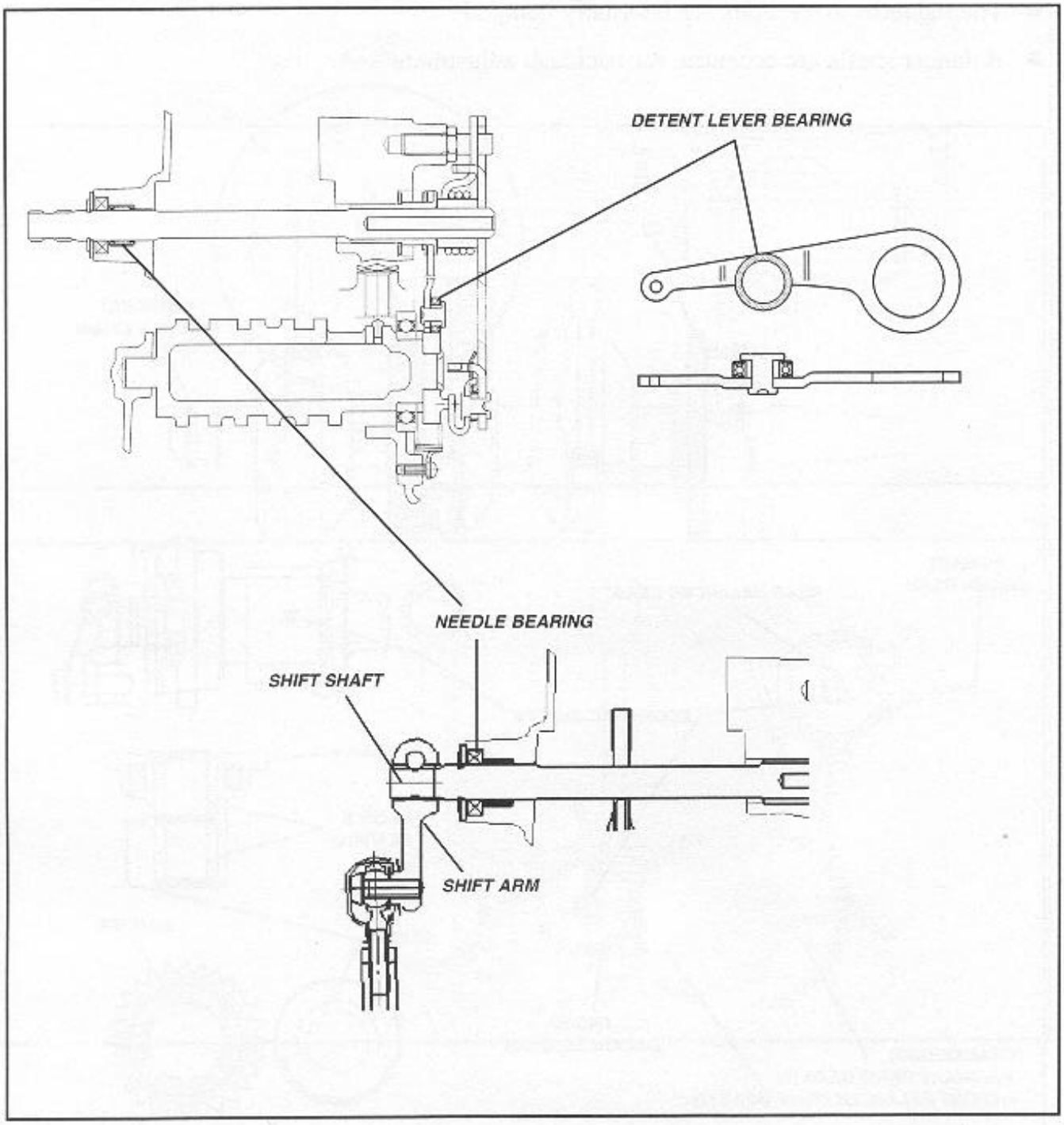
CRANKSHAFT/BALANCERS

- The compact crankshaft drives both the side-driven cam chain and secondary balancers
- Crank web (1) primary gear drives the primary driven gear (clutch basket) and rear balancer
- Crank web (2) drives the front balancer
- The balancer assemblies are internally damped
- Balancer shafts are eccentric for backlash adjustment



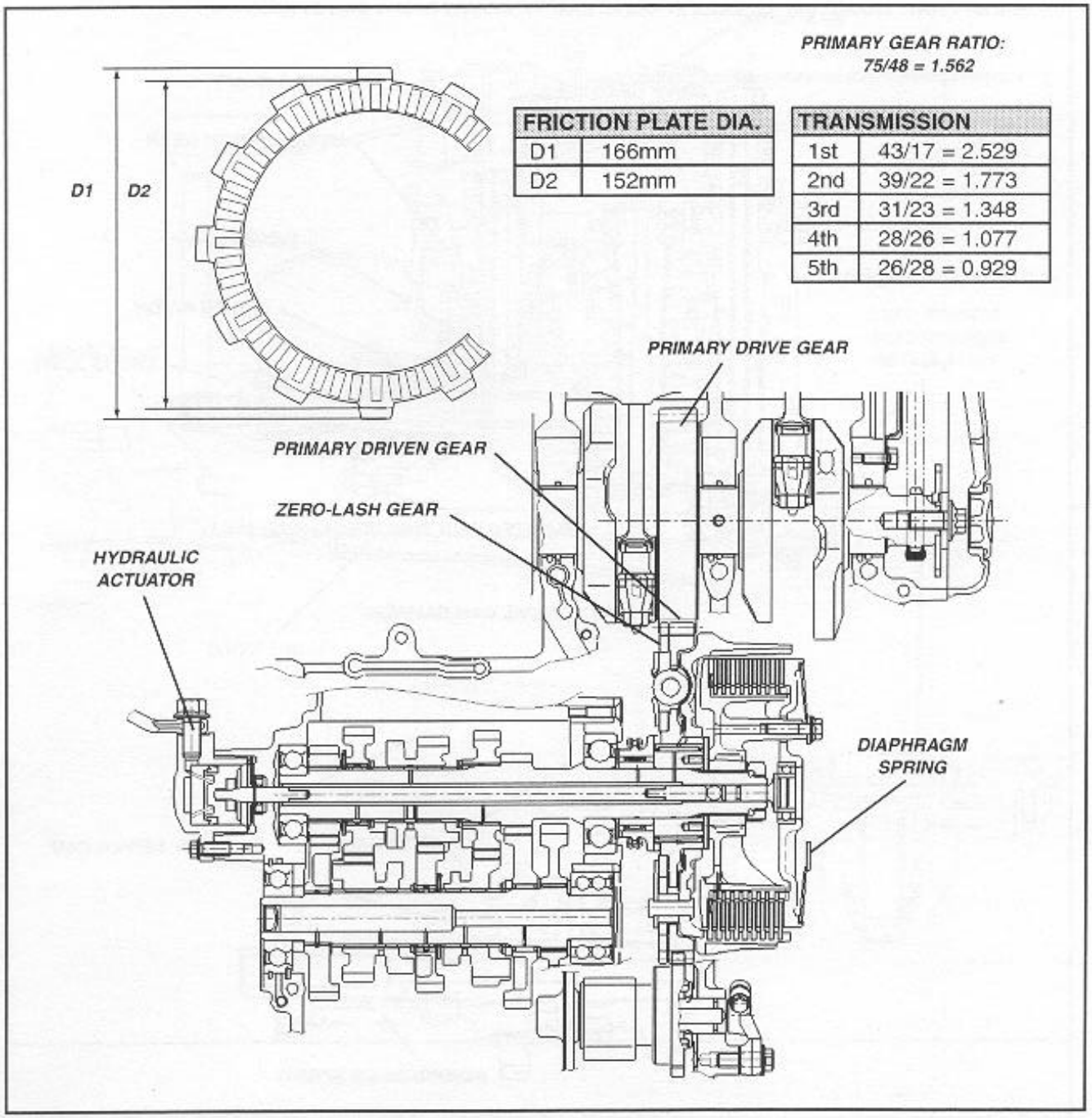
SHIFT MECHANISM

- The shift shaft is supported by a needle bearing to reduce friction
- The detent lever uses a bearing to improve shifting feel



TRANSMISSION/CLUTCH

- Wide-ratio constant mesh 5-speed transmission
- A zero-lash primary driven gear is used to reduce primary gear noise
- Hydraulic clutch actuation for reduced maintenance and increased rider comfort
- 8 Friction plates
  - 1 large-diameter inner plate
  - Spring cushion ring for smooth operation
- 7 steel plates
- Diaphragm clutch spring



FRICTION PLATE DIA.	
D1	166mm
D2	152mm

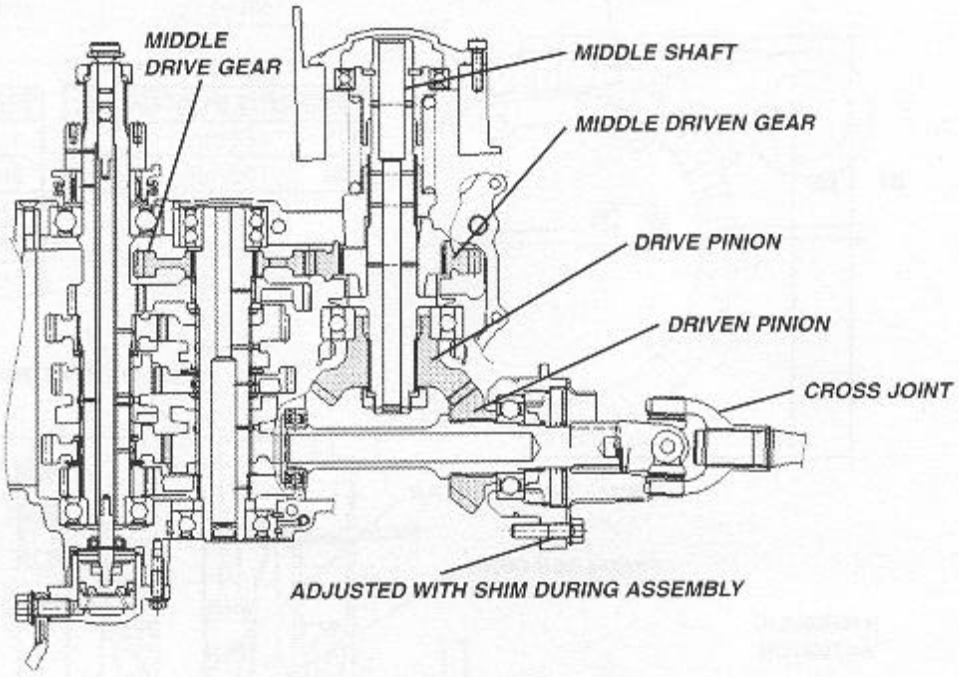
TRANSMISSION	
1st	43/17 = 2.529
2nd	39/22 = 1.773
3rd	31/23 = 1.348
4th	28/26 = 1.077
5th	26/28 = 0.929

MIDDLE DRIVE

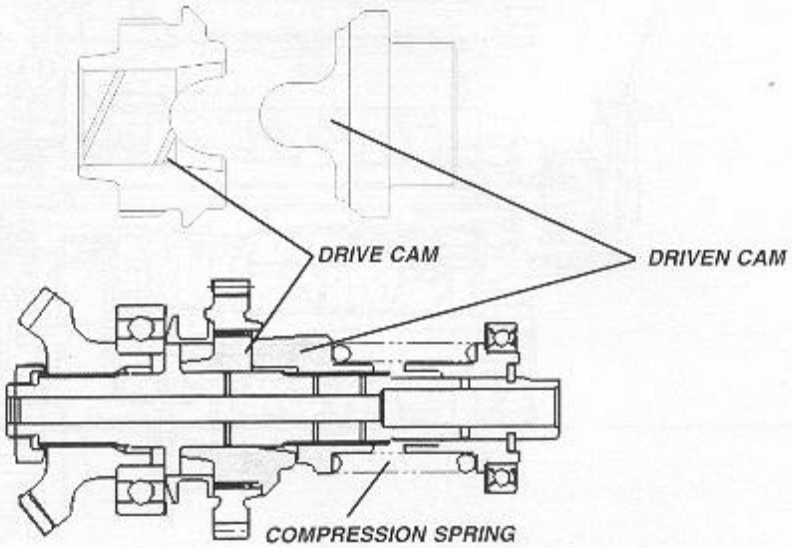
- The middle drive features mechanical cam dampers in its drive pinion, which makes for smoother transmission of power to the rear wheel. The dampers absorb shock due to rapid changes in torque.
- During assembly, the pinion backlash is adjusted with shims (similar to the V-Max).

MIDDLE DRIVE SPECIFICATIONS	
Middle driven gear/Middle drive gear	35/36
Driven pinion/Drive pinion	21/27
Secondary gear ratio	35/36 x 21/27 x 33/9 = 2.772

POWER FLOW: MIDDLE DRIVEN GEAR → DRIVE CAM → DRIVEN CAM → DRIVE PINION



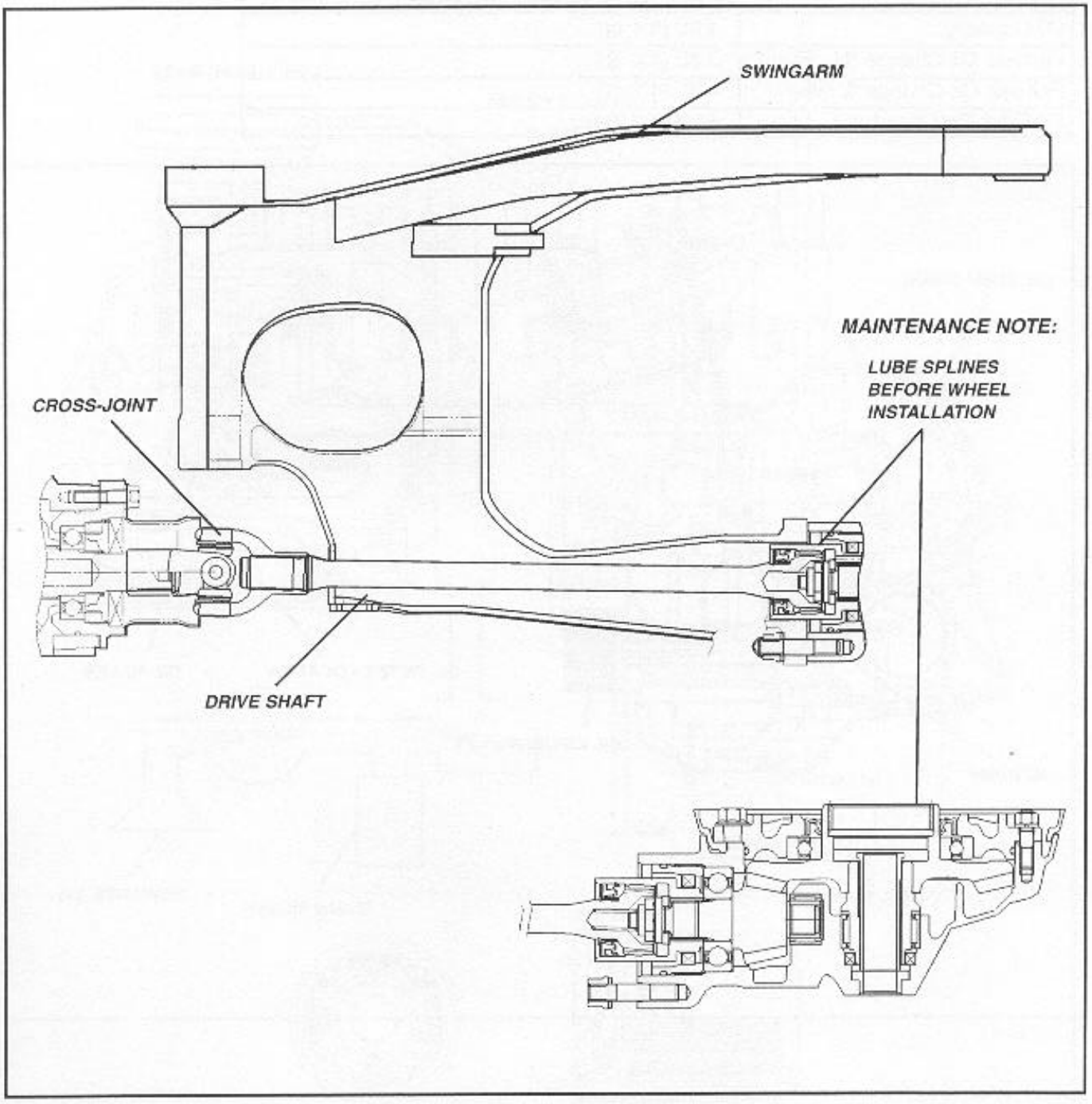
MECHANICAL CAM DAMPERS



FINAL DRIVE

- The final drive system is smooth, quiet, and low maintenance.
- The rear gear case body is the same as the V-Max.

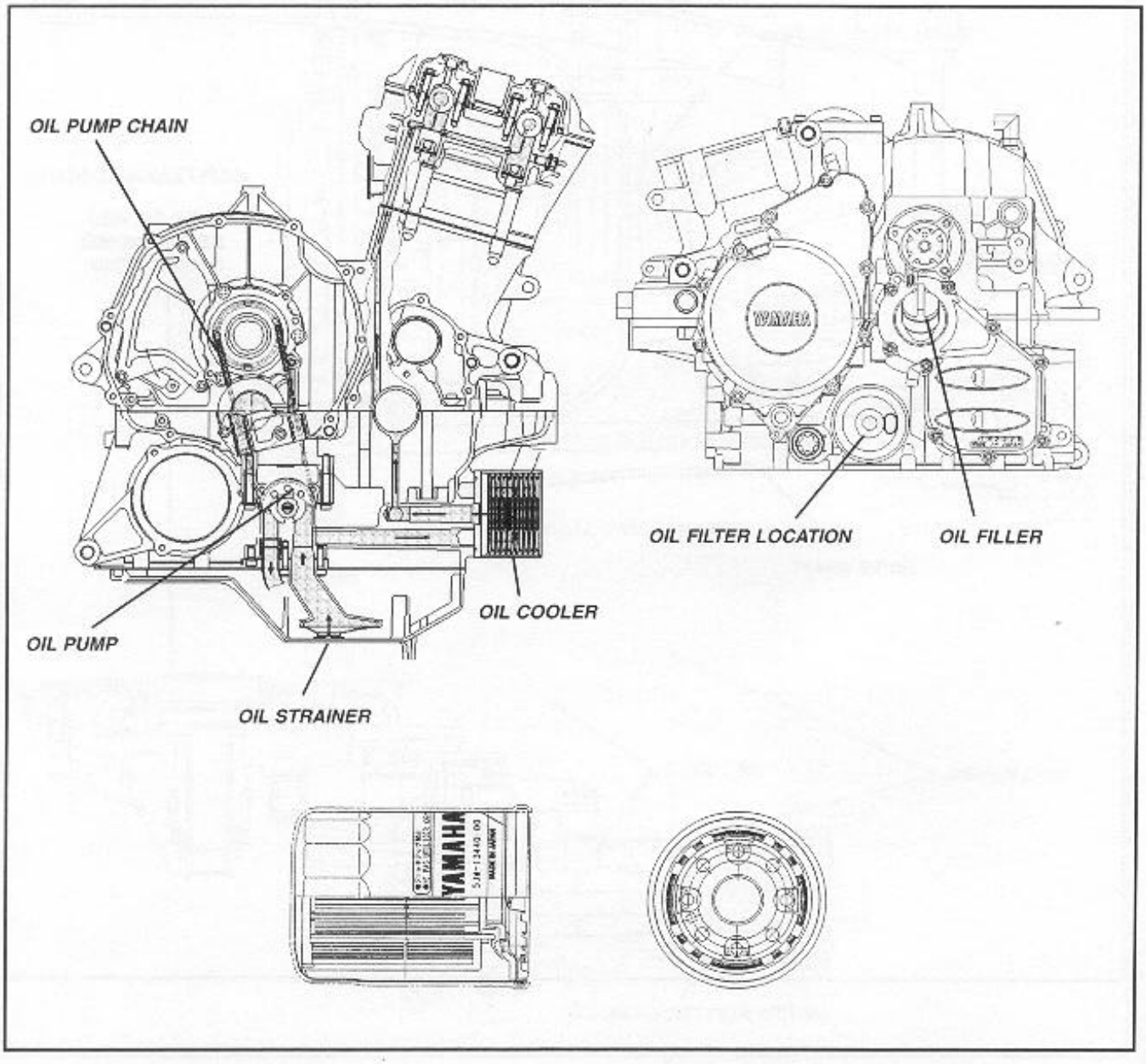
FINAL DRIVE SPECIFICATIONS	
Rear gear oil type	SAE 80 Hypoid GL4
Rear gear oil capacity	6.8 oz (200cc)
Gear ratio	33/9 3.66:1



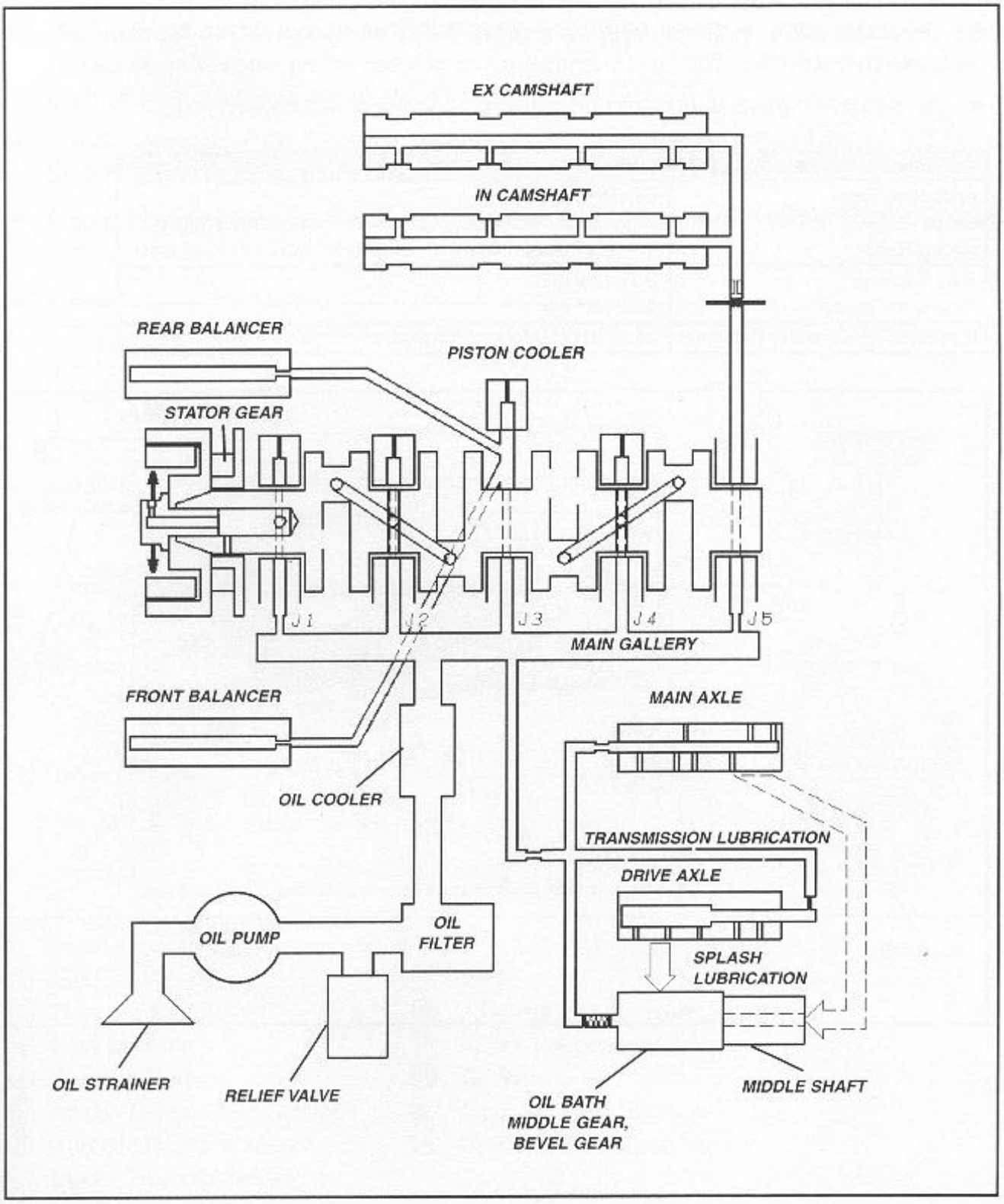
LUBRICATION SYSTEM

- Wet sump oiling system
- The trochoid oil pump is driven by a chain via the main axle shaft
- A new cartridge type oil filter (5JW) is used and is readily accessible on the left side of the engine (the oil wrench for 3FV filter can be used).

OIL SPECIFICATIONS	
Oil Type	Yamalube 4
Grade	SAE 10W30 or SAE 20W40 API SE or higher
Oil Capacity	4.9L (5.1 qt)
Periodic Oil Change (No Filter)	3.8L (4.0 qt)
Periodic Oil Change & Filter	4.0L (4.2 qt)
Oil Filter Part Number	5JW-13440-00



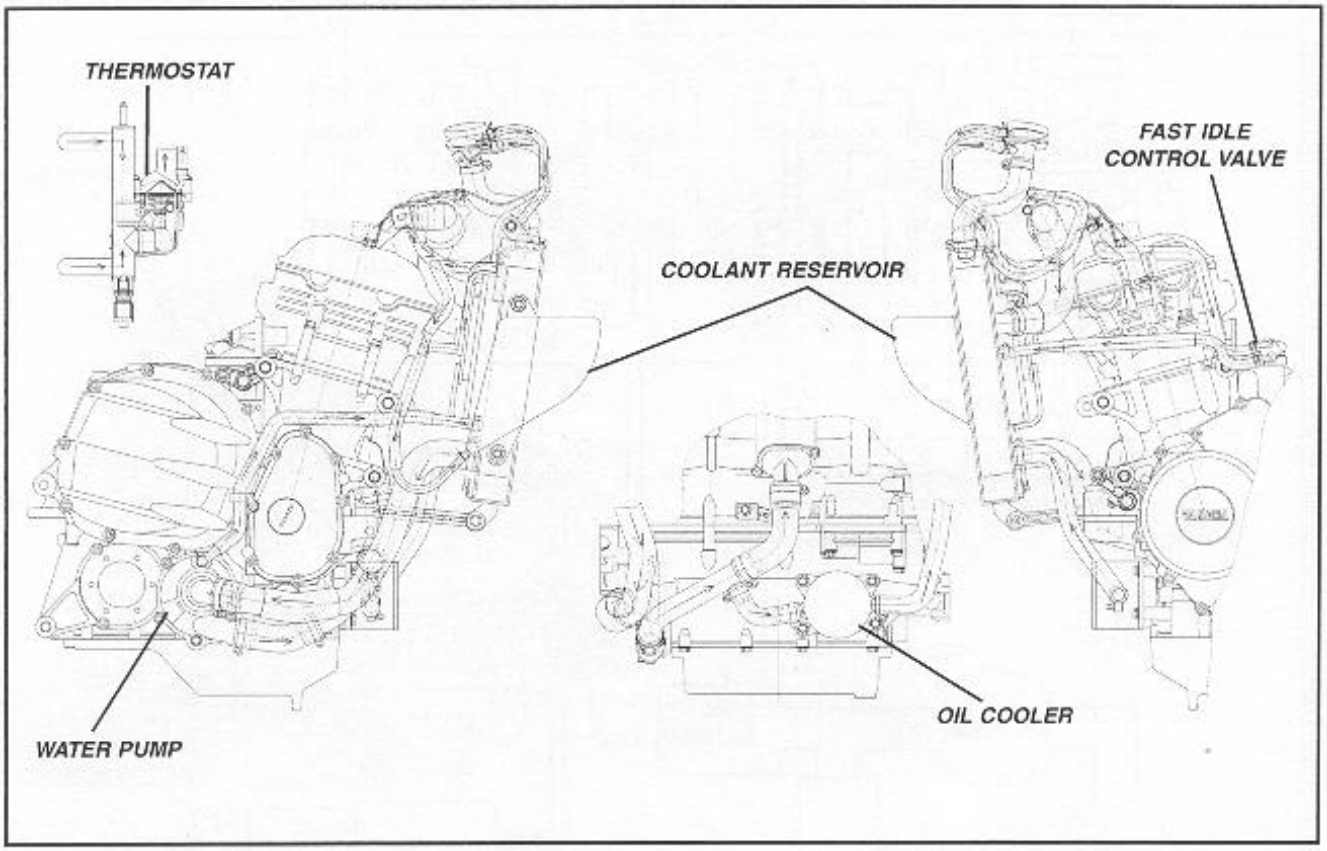
OIL LUBRICATION DIAGRAM



COOLING SYSTEM

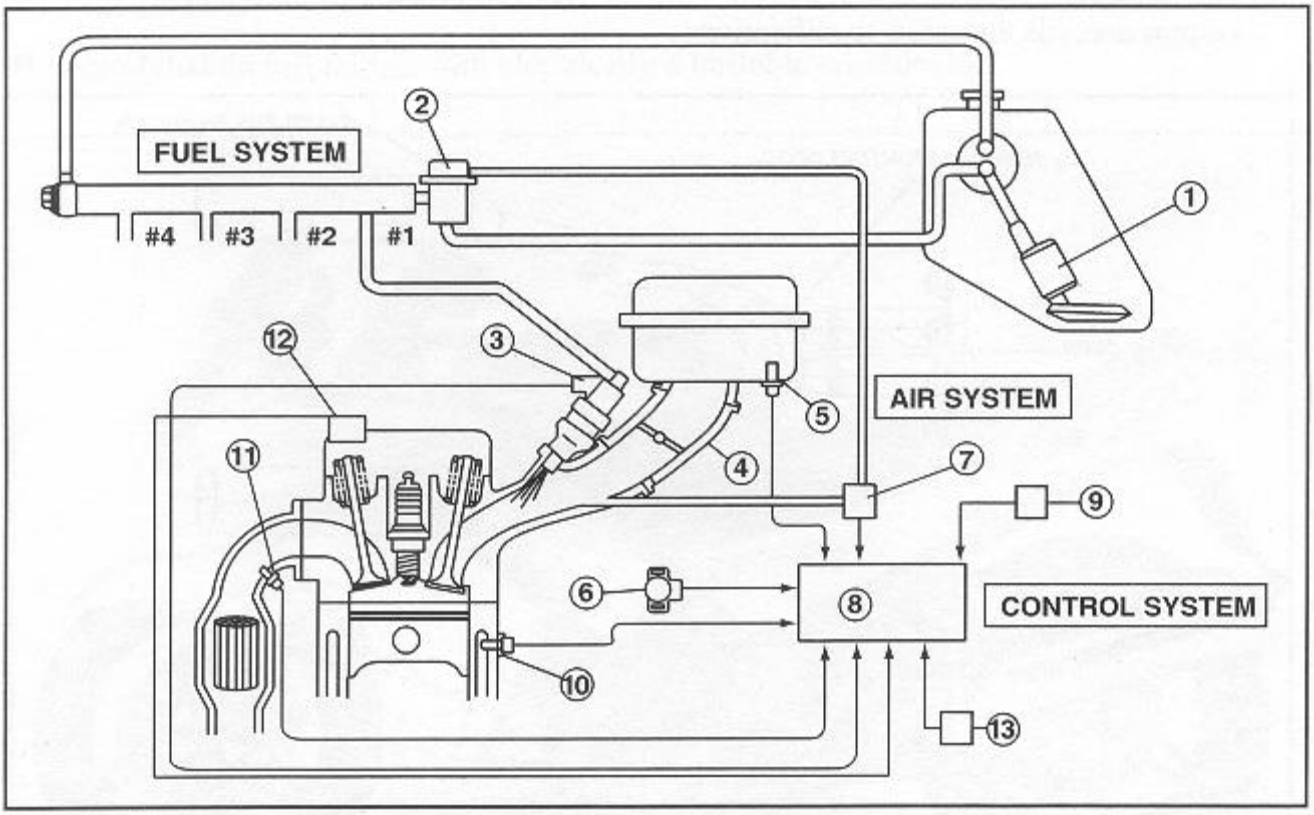
- The water pump is driven by the oil pump which in turn is driven by the main shaft (similar to the R6)
- Oil cooler – 9 plate aluminum / oil capacity: 65cc / coolant capacity: 82cc

COOLING SYSTEM SPECIFICATIONS	
Antifreeze Type Grade Mixing Ratio	Ethylene Glycol High-quality w/corrosion inhibitors for aluminum engines 1:1 (antifreeze: water)
Total Capacity Reservoir Capacity	3.7L (3.9 qt) 0.5L (0.5 qt)
Radiator Cap Opening Pressure	15.6 psi (110 kPa / 1.1kgf/cm²)



ELECTRONIC FUEL INJECTION

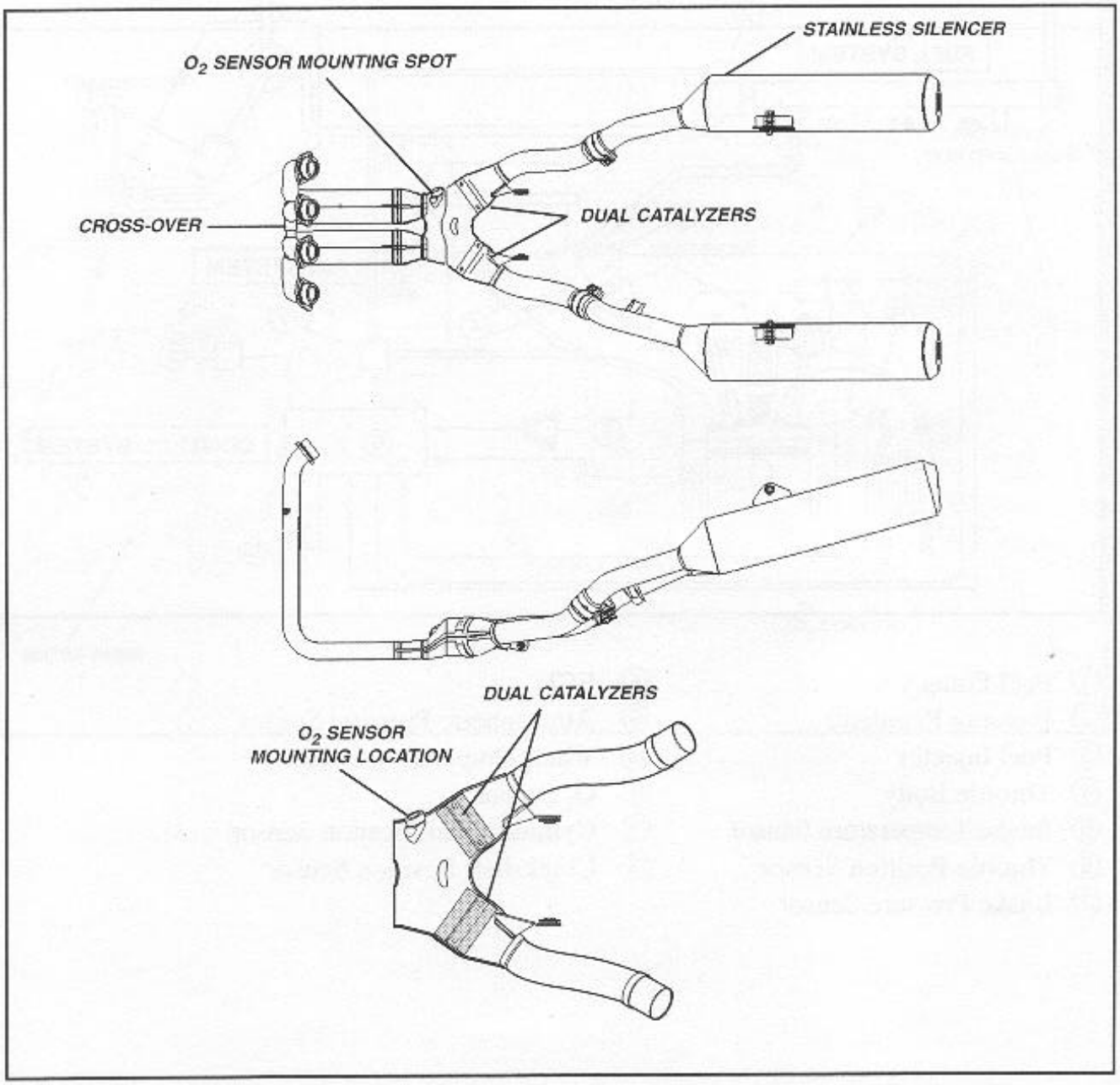
- The new FJR1300 is equipped with Electronic Fuel Injection. This highly efficient system ensures overall engine performance at varying altitudes and different weather conditions – together with good fuel economy.
- The combination of the Electronic Fuel Injection, 3-way catalyzers, and the Air Induction System results in emission levels well below emission regulations.
- For details about how the Electronics Fuel Injection system works, please see the Service Tips section and Service Manual.



① Fuel Pump
② Pressure Regulator
③ Fuel Injector
④ Throttle Body
⑤ Intake Temperature Sensor
⑥ Throttle Position Sensor
⑦ Intake Pressure Sensor
⑧ ECU
⑨ Atmospheric Pressure Sensor
⑩ Water temperature Sensor
⑪ O_2 Sensor
⑫ Cylinder Identification Sensor
⑬ Crankshaft Position Sensor

EXHAUST SYSTEM

- 4-2-1-2 split exhaust
- Heated O_2 sensor
- Metal honeycomb-type catalytic converters are used in two locations (Rhodium is used as the catalyzer)
- Stainless steel silencers
- Cross-over pipe from #2 and #3 cylinders improves mid-range torque
- This exhaust system in conjunction with the electronic fuel injection and air induction system exceeds emission specifications



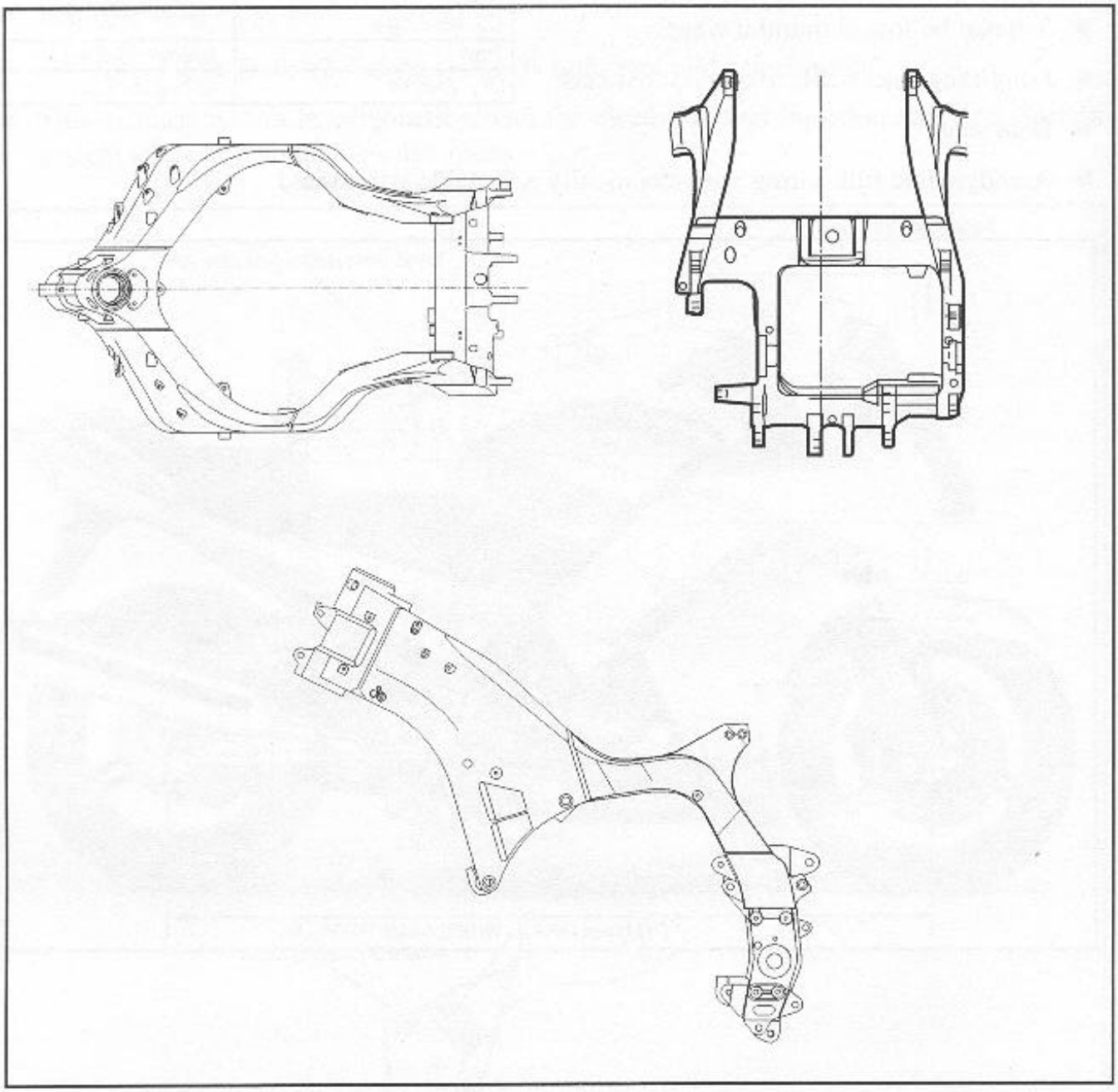
CHASSIS

- Lightweight cast-aluminum frame
- Massive Soqi 48mm front forks
- Link-type rear suspension
- Lightweight cast-aluminum swingarm
- 3-spoke hollow aluminum wheels
- Long-range steel 25L (6.6 gal) fuel tank
- Dual seat
- Aerodynamic full fairing with electrically adjustable windshield

CHASSIS SPECIFICATIONS	
Overall Length	2195mm (86.4 in)
Overall Width	758mm (29.8 in)
Overall Height	1304mm (51.3 in)
Seat Height	805mm (31.7 in)
Wheelbase	1515mm (59.7 in)
Caster Angle	26°
Trail	109mm (4.3 in)
Dry Weight	237kg (522 lb)

FRAME

- Diamond-shaped, twin-spar, lightweight, hollow cast-aluminum frame
- Detachable aluminum subframe
- The engine is used as a stress member



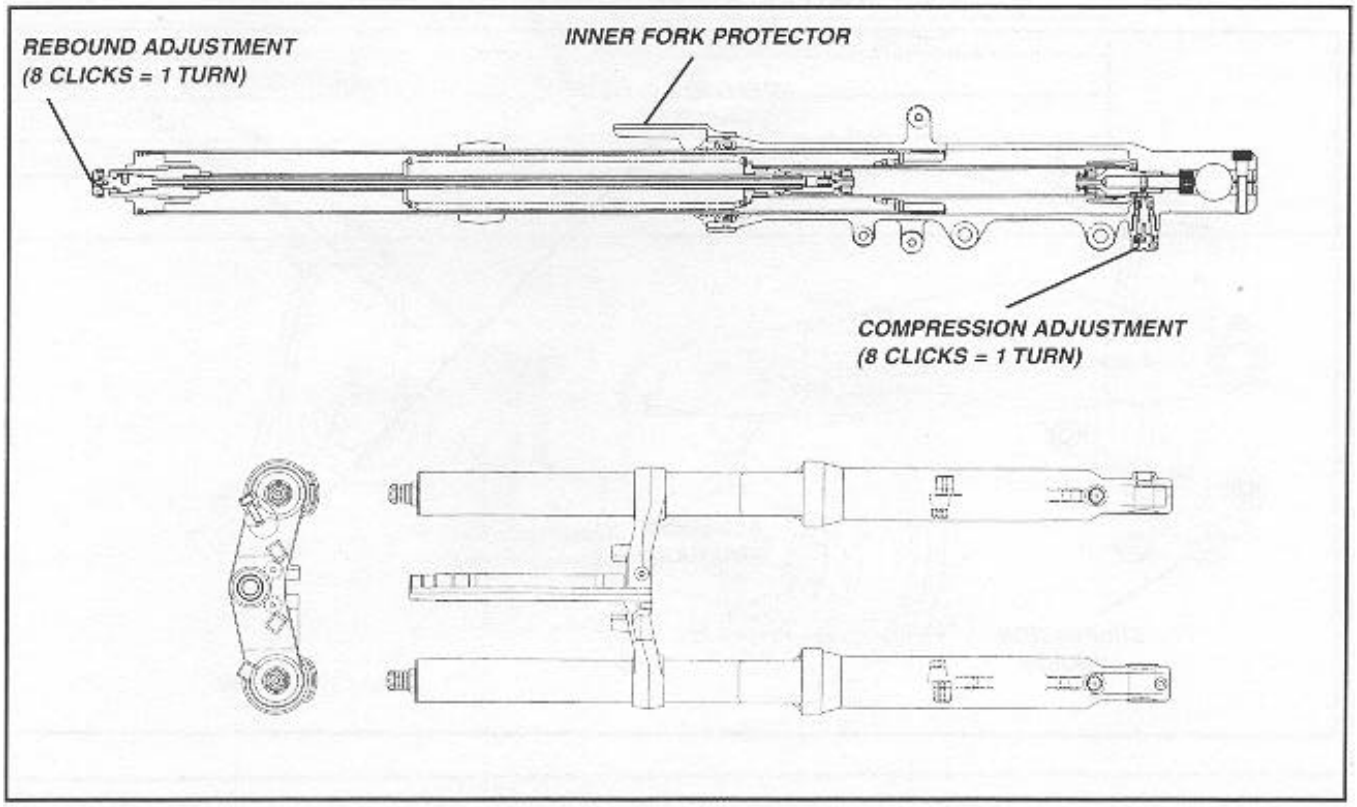
FRONT SUSPENSION

- Massive Soqi 48mm front forks
- Fully adjustable: preload, rebound and compression damping
- "01" Suspension oil

FRONT SUSPENSION SPECIFICATIONS			
Stroke	135mm (5.3 in)		
Spring Free Length Wire Diameter	 270.0mm (10.6 in) 4.7mm (0.19 in)		
Oil Quantity	700cc (23.7 oz)		
Oil Level (with spring removed) from the top of the inner tube with forks compressed	79.0mm (3.1 in)		
SUSPENSION SETTINGS	**Min. Soft**	**Std.**	**Max. Hard**
Spring Preload (each line = 2mm)	15mm	7mm	0mm
Compression (clicks out from fully in)	25	15	1
Rebound (clicks out from fully in)	25	10	1

NOTE:

- Effective Compression operating range is 1~25 clicks ± 4 clicks
- Effective Rebound operating range is 1~25 clicks ± 8 clicks
- Turning adjuster right (clockwise) = harder setting
- Turning adjuster left (counterclockwise) = softer setting



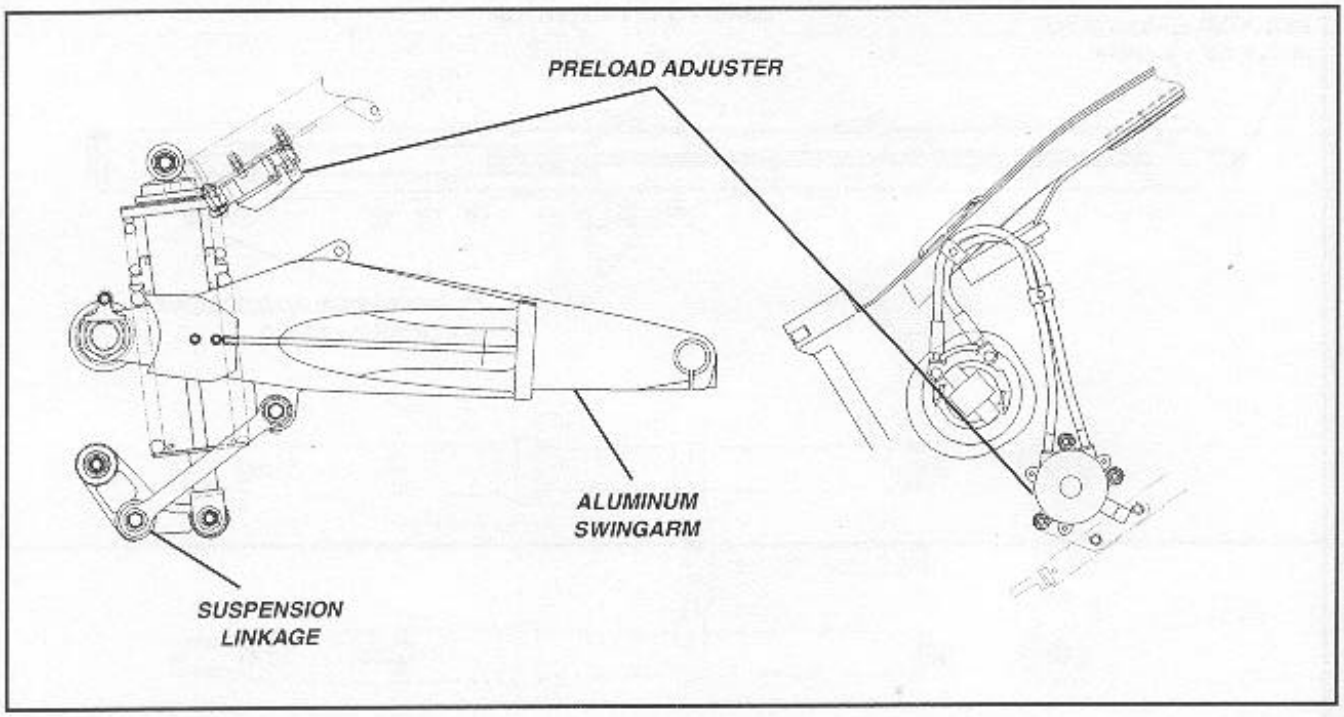
REAR SUSPENSION

- The FJR1300's link-type rear suspension incorporates an adjustable two-stage shock absorber that features a preload adjuster similar to TDM850, situated on the left side of the machine. This easily accessible lever can be used to select the appropriate preload setting for solo or two-up riding.
- Adjustable rebound damping
- Lightweight cast aluminum swingarm

REAR SUSPENSION SPECIFICATIONS			
Rear Shock	Soqi		
Rear Shock Stroke	60mm (2.4 in)		
Wheel Travel	125mm (4.9 in)		
Rear Shock Body Diameter	46mm (1.8 in)		
SUSPENSION SETTINGS	**Min. Soft**	**Std.**	**Max. Hard**
Rebound (clicks out from fully in)	25	8	3
Spring Preload Rider only = S Rider and Passenger = H	S	N/A	H

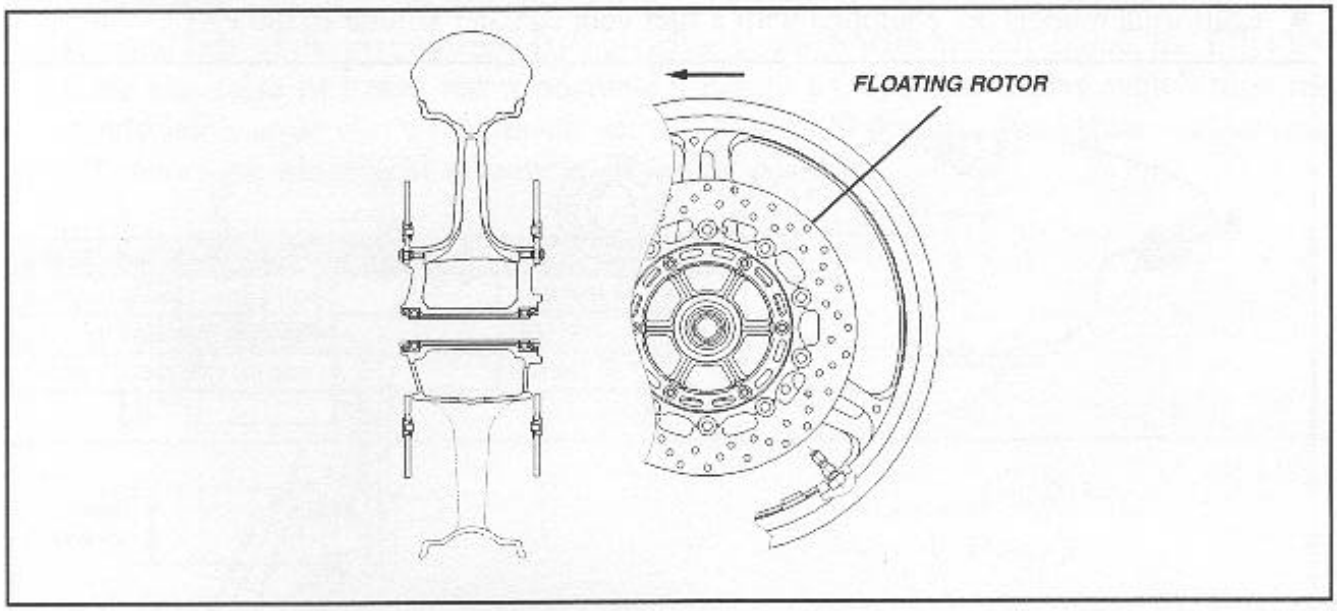
NOTE:

- Effective Rebound operating range is 3~25 ± 4 clicks
- Turning adjuster right (clockwise) = harder setting
- Turning adjuster left (counterclockwise) = softer setting

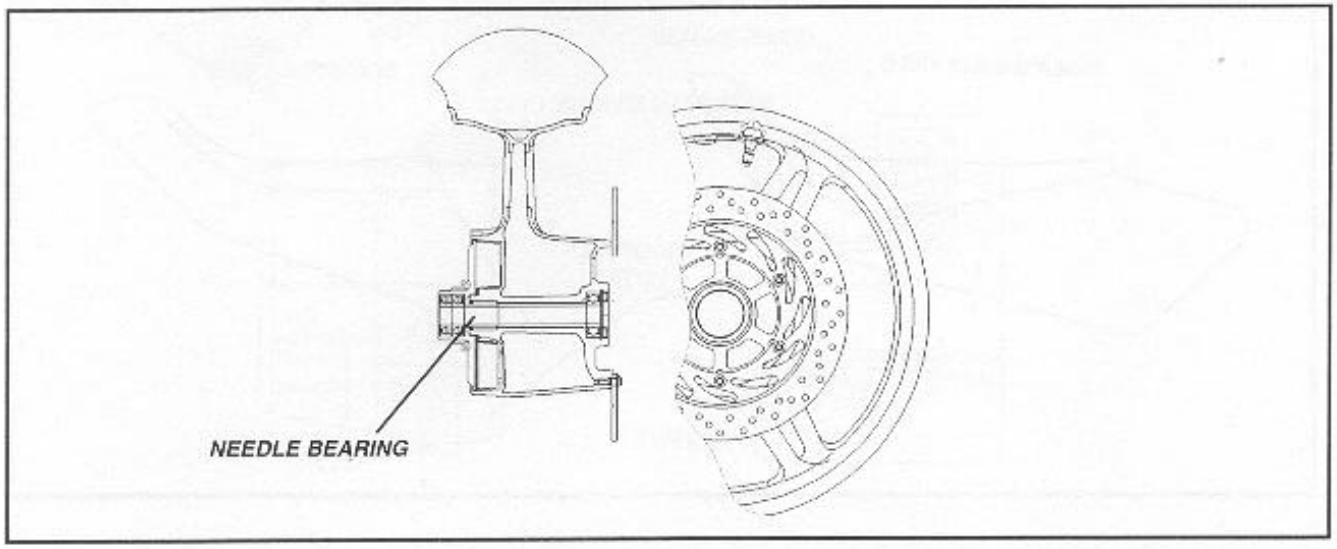


TIRES/WHEELS/BRAKES

FRONT	
Wheel	17 x MT 3.50 3-Spoke hollow aluminum
Tire Size	120/70 ZR17 Bridgestone/Metzler
Brake Rotor (dual) / Diameter / Thickness	Floating 298mm / 5.0mm
Brake Caliper (dual)	One piece R1 type 4-piston
Brake Pad Material	Sintered



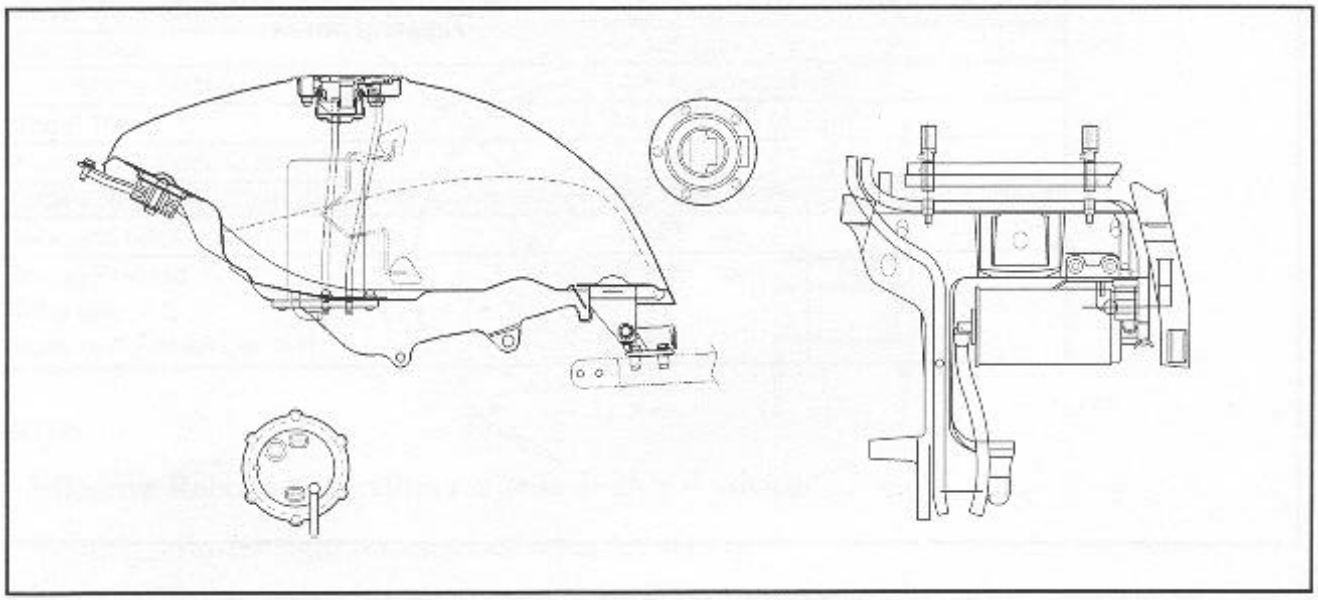
REAR	
Wheel	17 x MT 5.50 3-Spoke hollow aluminum
Tire Size	180/55 ZR17 Bridgestone/Metzler
Brake Rotor Diameter/Thickness	282mm/6.0mm
Brake Caliper	Pin Slide Type 2-Piston
Brake Pad Material	Sintered



FUEL TANK/SEAT

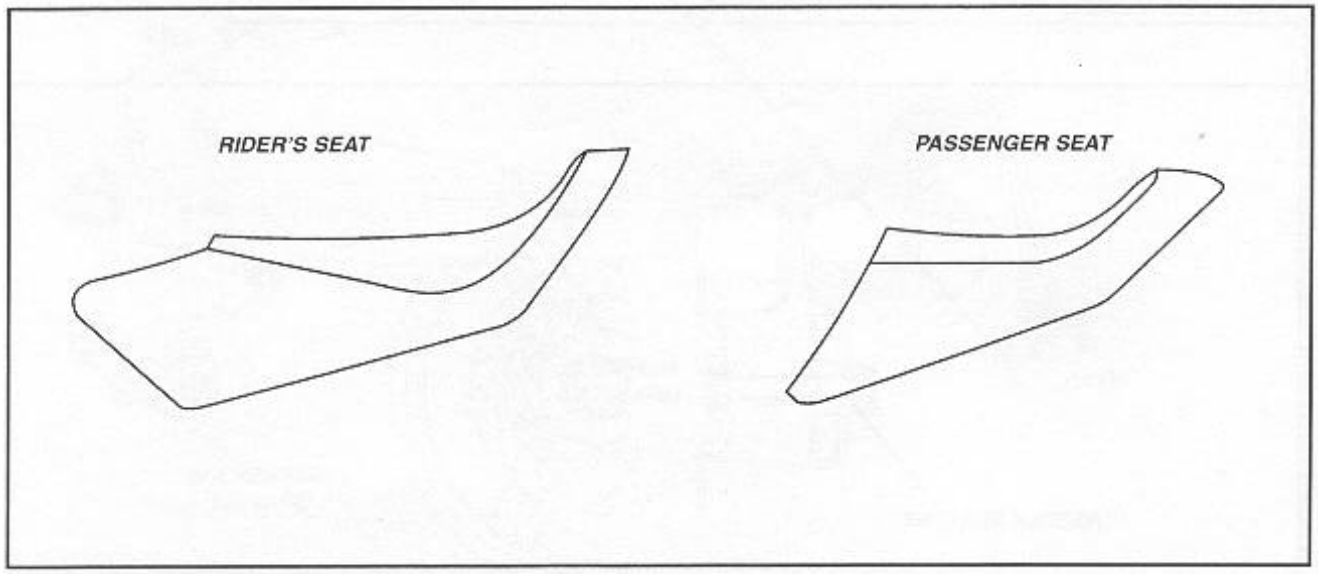
Fuel Tank

- Sleek and stylish steel 25L (6.6 gal) fuel tank
- 5L (1.3 gal) reserve
- Electric fuel pump equipped with a maintenance-free fuel filter
- Tank pivots on rear mount for easier access to disconnect fuel lines and fuel level sender
- California models are equipped with a fuel vent canister similar to the FZ1



Seat

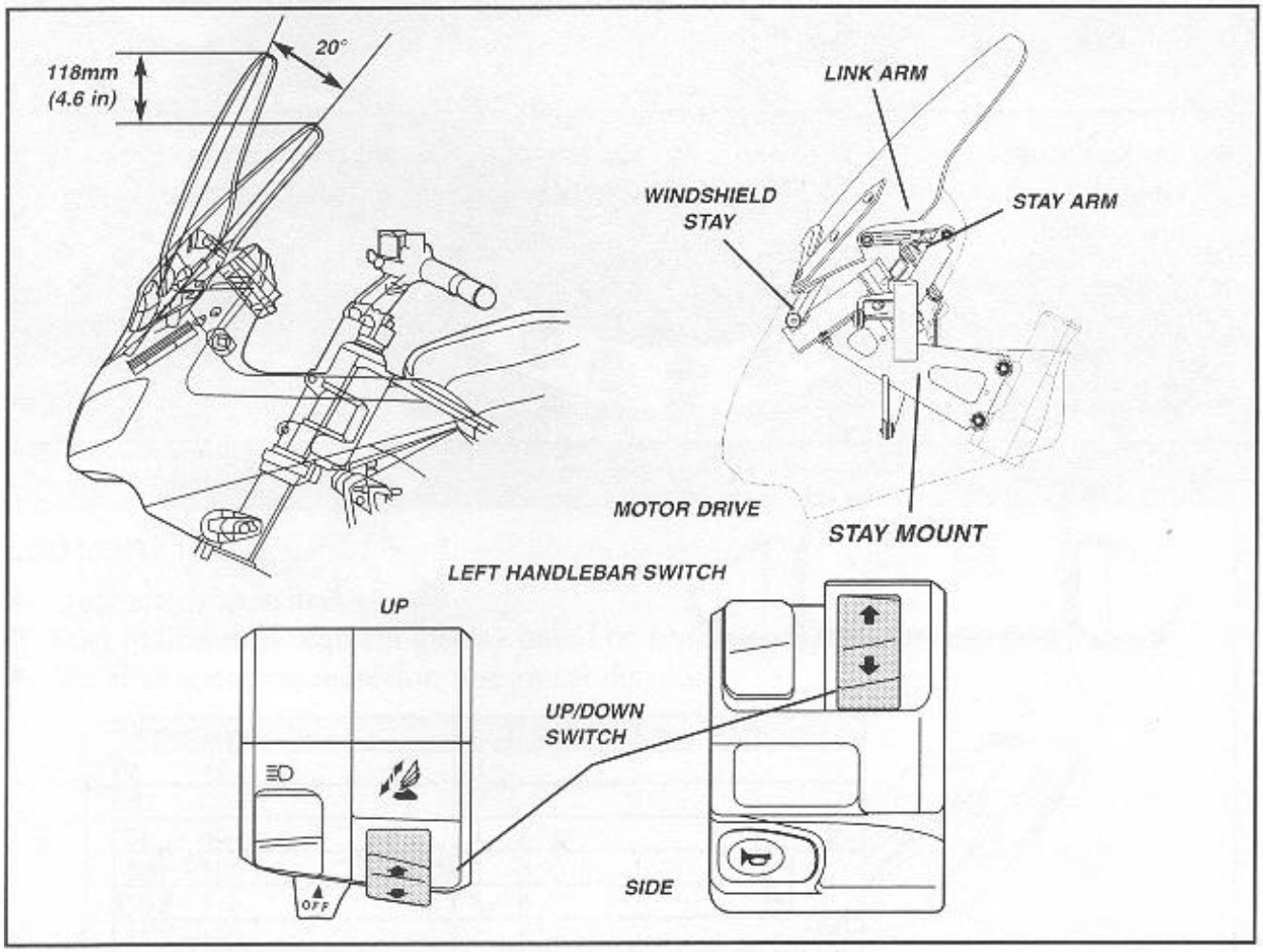
- The wide, sculpted riders and passenger seats are each constructed separately in order to best suit the individual needs of the rider and passenger.



ELECTRICALLY ADJUSTABLE WINDSHIELD

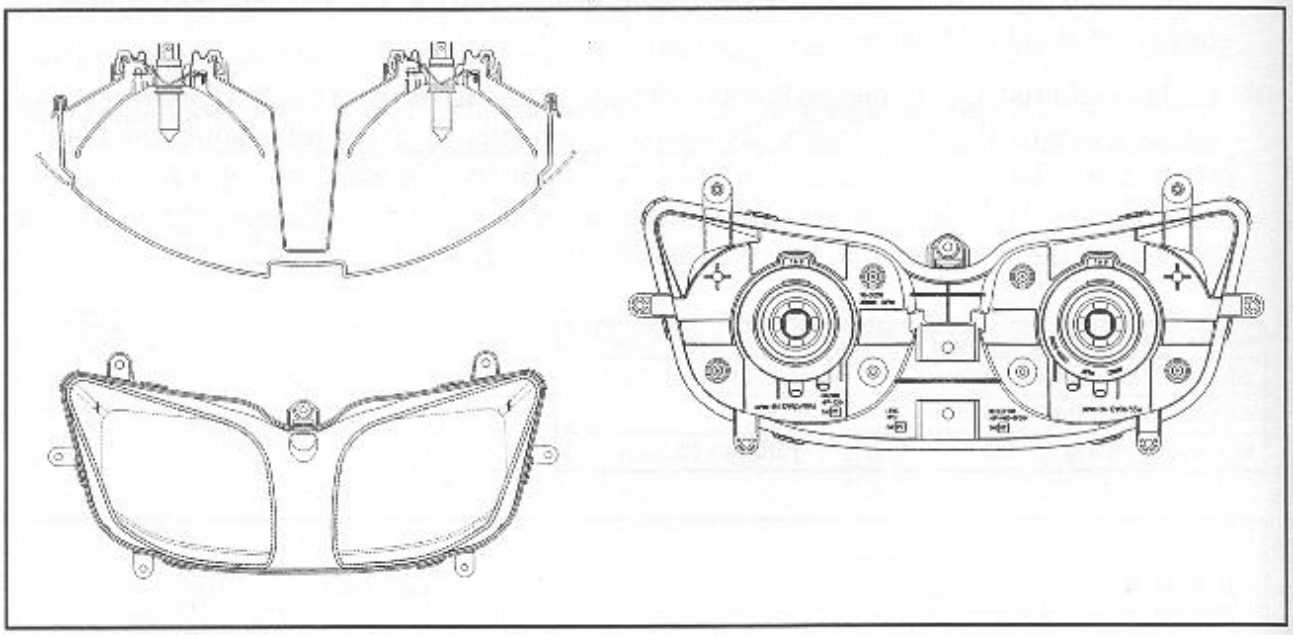
- A fixed windshield cannot be right for every rider in every situation. Therefore, our designers have developed a moveable windshield that can be easily and quickly adjusted to suit the individual requirements and riding positions of both the rider and passenger. For example, during city riding at lower speeds, the adjustable windshield would usually be in its low position, while on the highway, the fully extended position would offer improved wind protection.
- Lightweight linkages connected to the windshield are driven by a compact electrical motor situated behind the instruments. By operating a switch with the left thumb, the FJR1300 rider can raise or lower the windshield's height by 118mm, during which time the windshield's angle also automatically moves through 20 degrees. Turning the main switch off causes the windshield to move to its lowest position.

WINDSHIELD SPECIFICATIONS	
Vertical Movement Stroke	118mm (4.6 in)
Vertical Operating Angle	20°
Motor Operating Stroke	80mm (3.1 in)

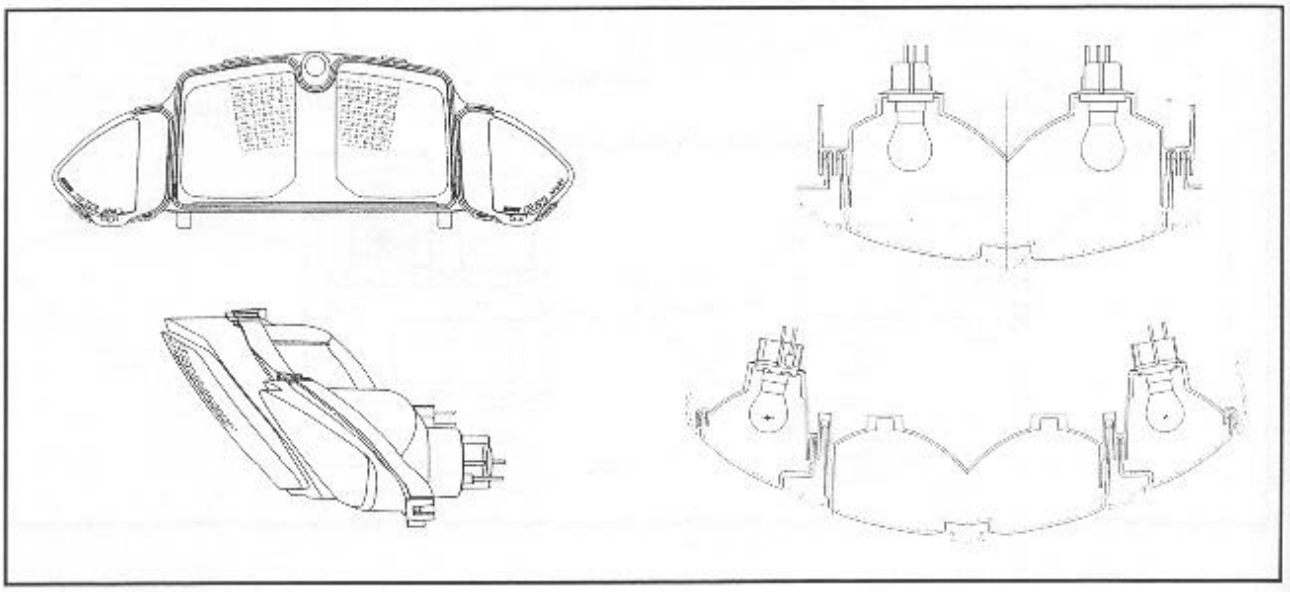


HEADLIGHT/TAILLIGHT

- Accentuating the FJR1300's ultra-sporty image are dual multi-reflector headlights, which are fitted with 60/55W bulbs

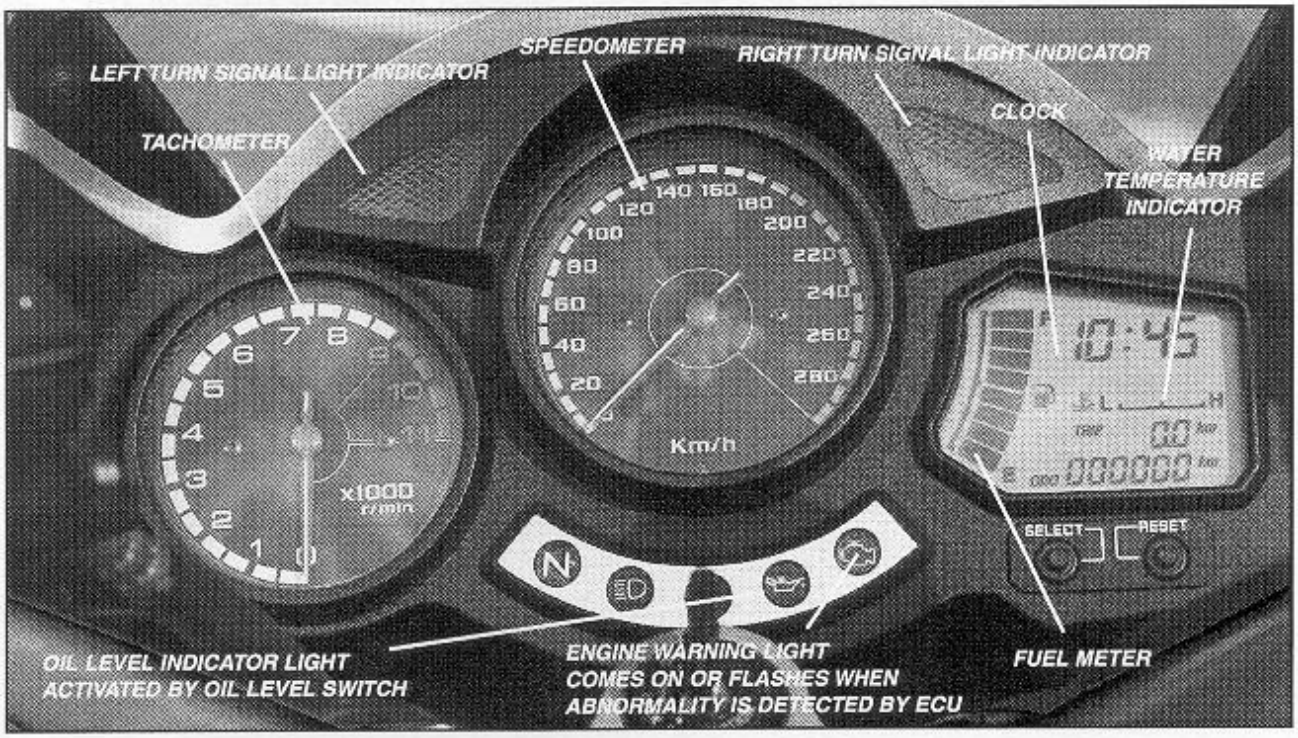


- Taillight dimensions are kept narrow to accommodate the optional side cases. For super-smooth lines, the rear end features a new-design dual-bulb taillight and integrated turn signals.
- Tail/brake light bulb: 12V 21/5W
- Turn signal light bulb: 12V 21W
- Hazard lights



COMPREHENSIVE INSTRUMENTATION

- Instrumentation information is fed directly from the machine's ECU, and has been constructed to the same high specifications as the engine and chassis. The comprehensive display includes:
- Electronic Speedometer (step-motor type)
- Electronic Tachometer (step-motor type)
- Fuel Gauge
- Coolant Temperature Gauge
- Odometer
- Trip Meters (Odometer/Trip 1/Trip 2/Trip F)
- Clock
- The display also features a range of indicator lights, including turn signal, high beam, oil level warning and engine warnings (European model shown).



LCD UNIT

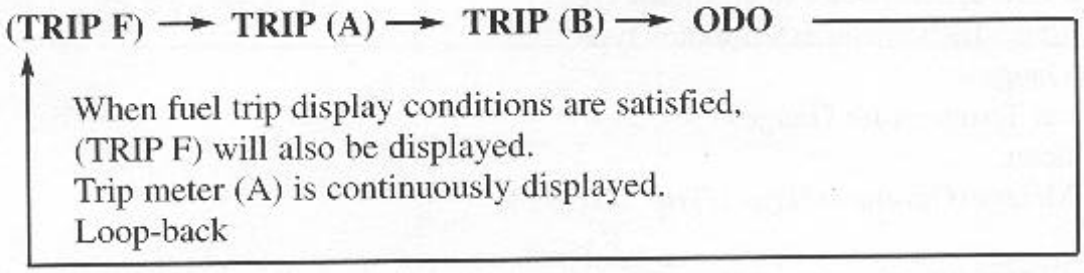
- Odometer/trip meters
- Fuel indicator: 8-segment display based on sender resistance value
- Water temperature indicator: 6-segment display

L
H

Water Temp (°C)	LCD Display (Segment)
0 ~ 40	
40 ~ 60	1
60 ~ 80	1 ~ 2
80 ~ 100	1 ~ 3
100 ~ 110	1 ~ 4
110 ~ 120	1 ~ 5
120 and above	1 ~ 5 on, 6 only flashing

1. Selection of meter display modes

Fuel Trip Meter, Trip Meter (A), Trip Meter (B), and Odometer



(1) Press the "Select" switch to change from Odometer to Trip A, Trip B, or Trip F and then back to Odometer

(2) To reset the trip meters select Trip A, Trip B, or Trip F and then press the "Reset" button for 1 second or more. The display will now read "0.0"

2. Clock Sett/ing

(1) To set the Clock, press the "Select" and "Reset" buttons simultaneously for 2 seconds or more. The "hour" display will now blink.

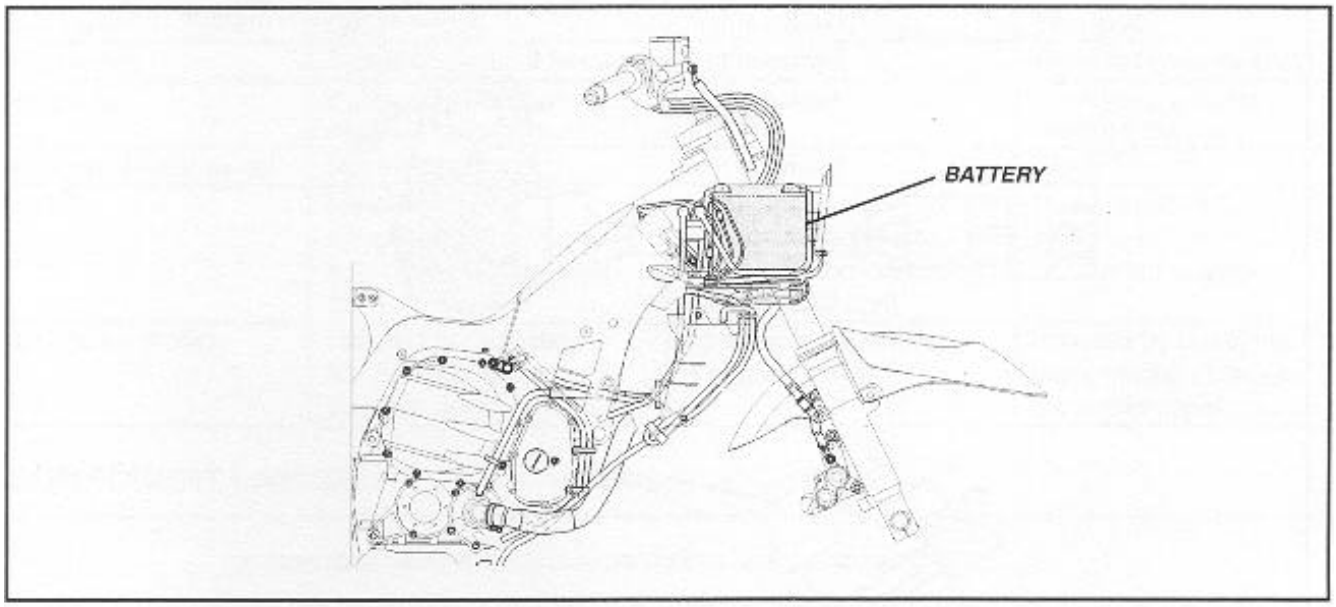
Press the "Reset" button to set the "hour".
Press the "Select" button to switch to the "minute" mode.
Press the "Reset" button to set the "minute".
Press the "Select" button to set the selected time.

NOTE: If the main switch is turned off before the clock setting process is completed, the settings will not be held in the memory.
During the time selection, if the "Reset" button is pressed and held down, the hours or minutes will continue to change until the proper time has been obtained and the button is released.

NOTE: Diagnostic/CO modes are accessible in the same manner as 2002 model YZFR1P.

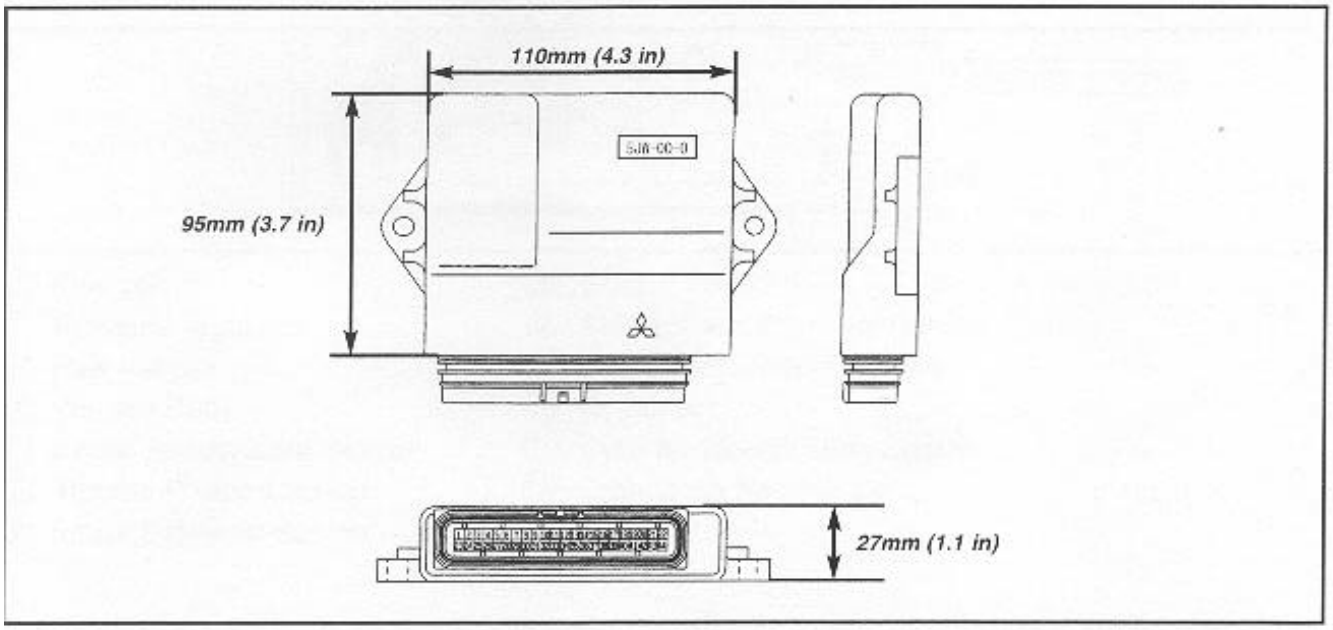
BATTERY/CHARGING

- GS GT14B-4
- AC magneto type
- Output: 14VDC / 490W / 35 AMPS @ 5000 RPM



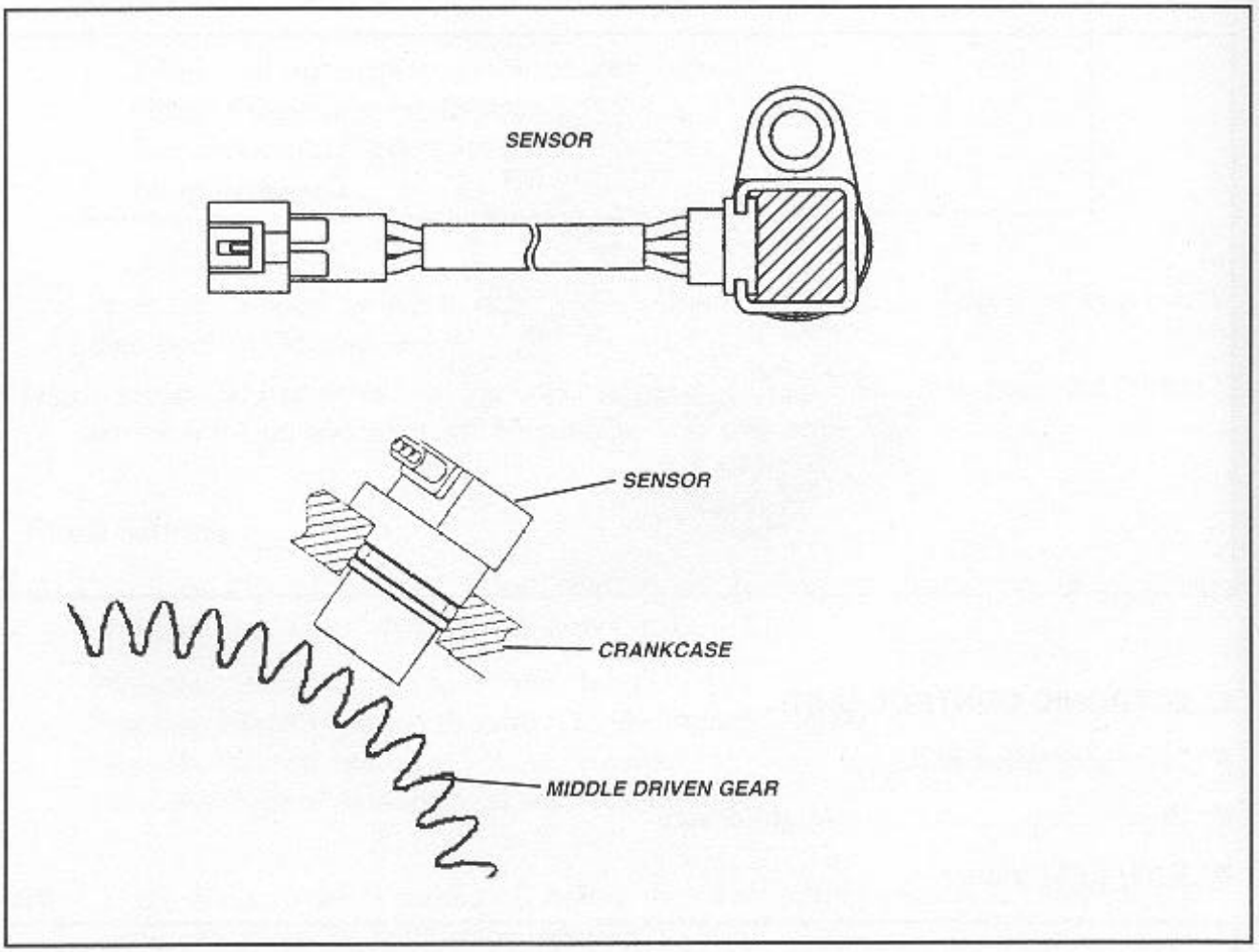
ELECTRONIC CONTROL UNIT

- New generation ECU
- Super-compact, and lightweight design
- 9200 RPM limiter



SPEED SENSOR

- A speed sensor is located at the rear of the crankcase
- The sensor counts the speed of teeth on the middle driven gear and sends electric signals to the ECU



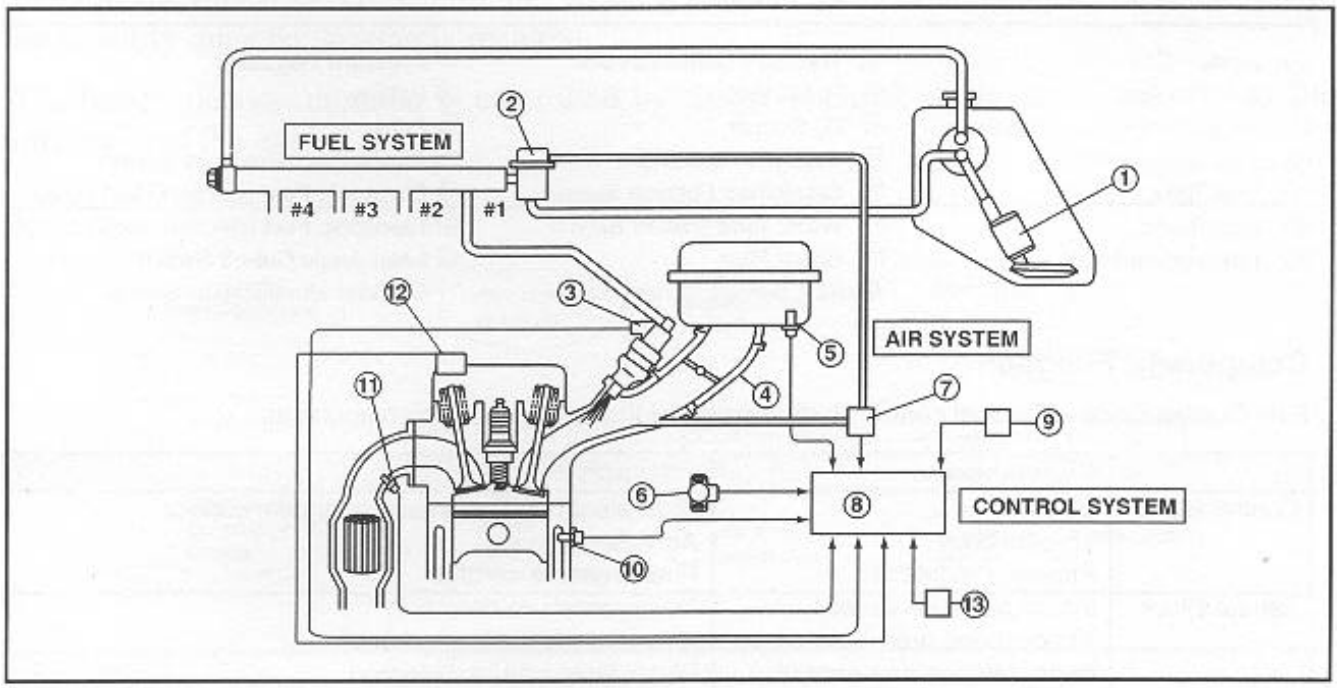
SERVICE TIPS

The new Mitsubishi Electronic Fuel Injection (EFI) System for the FJR1300 is a highly refined system that gives excellent performance and helps to maintain low levels of emissions.

The chart below gives comparison to past and present Yamaha electronic fuel-injected models.

	GTS1000	YZF-R7	FJR1300
Air Induction System	Not provided	Not provided	Provided
O_2 sensor	Provided (without heater)	Not provided	Provided (with heater)
Catalyst	Catalytic converter rhodium oxidation	Not provided	Catalytic converter rhodium oxidation
Gas emissions target	Not provided	Not provided	EU-2
ECU	Metallic casing 42-conductor non-waterproof coupler 630g	Resin-made, fully molded 60-conductor waterproof coupler 560g + 600g (CDI unit)	Resin-made, fully molded 44-conductor waterproof coupler 350g
CO gas emission	Possible by adjusting the controls located on the side of ECU	Possible by operating a separate switch box	Possible by using the clock setting switch of the meter panel

COMPONENT LAYOUT



① Fuel pump
② Pressure regulator
③ Fuel Injector
④ Throttle Body
⑤ Intake Temperature Sensor
⑥ Throttle Position Sensor
⑦ Intake Pressure Sensor
⑧ ECU
⑨ Atmospheric Pressure Sensor
Water Temperature Sensor
⑩ O_2 Sensor
⑪ Cylinder Identification Sensor
⑫ Crankshaft Position Sensor
⑬

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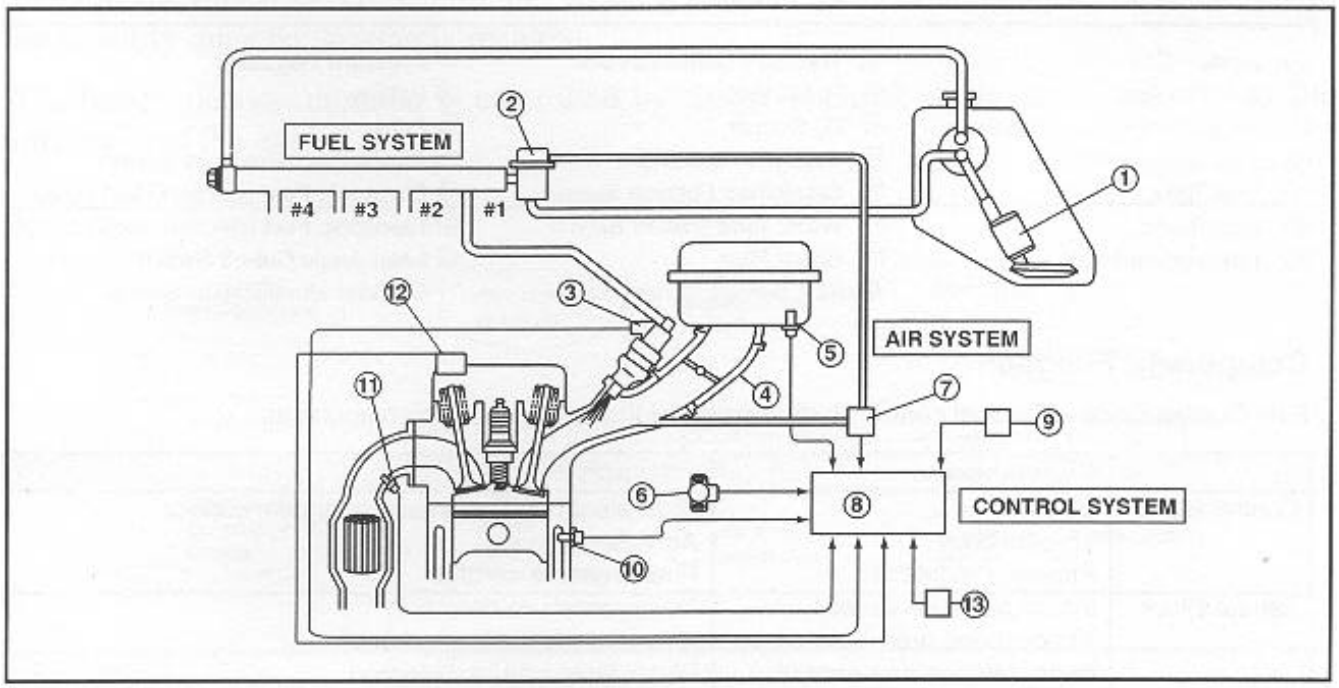

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Water Temperature Sensor
⑩ O_2 Sensor
⑪ Cylinder Identification Sensor
⑫ Crankshaft Position Sensor
⑬

FUEL CONTROL BLOCK

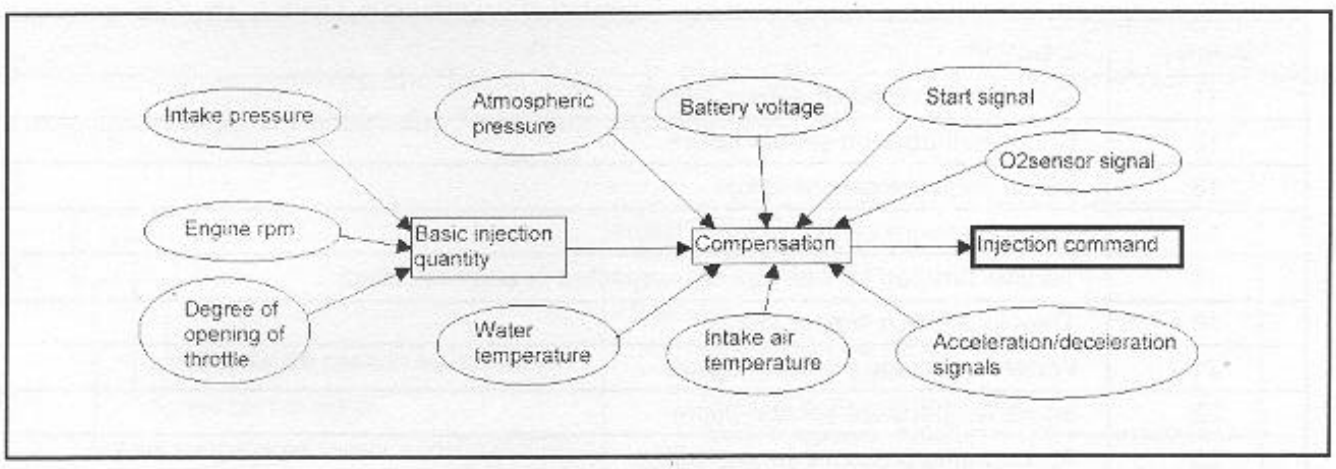
Integrated Engine Control System

The fuel injection period, injection timing, ignition timing and current passage time through the coil are controlled by the ECU. The ECU first calculates the intake air quantity using the signals received from the intake pressure sensor, throttle position sensor, cylinder identification sensor and crankshaft position sensor. It then decides the basic injection timing. Next is adding the compensation value calculated from the acceleration conditions and the values of the signals sent by sensors, such as the water temperature sensor, intake temperature sensor, atmospheric pressure sensor and the oxygen concentration sensor to decide the final injection timing. At the same time, it estimates the crank angle from the signals sent by the cylinder identification sensor and crankshaft position sensor to send the injection command to the injectors. It also calculates the ignition timing and current passage time, based on the signals received from the various sensors and controls the current passage through the ignition coil.

DECIDING THE BASIC INJECTION DURATION

To operate the engine at the optimum conditions, it is necessary to supply fuel at the optimum fuel-air ratio according to the intake air quantity that changes from moment to moment and to ignite the fuel at the correct timing. To supply fuel at the optimum fuel-air ratio, the intake air quantity must be accurately metered.

The basic injection duration is controlled by the ECU based on the data of the intake air quantity and the engine rpm.



DETECTION OF INTAKE AIR QUANTITY

The FJR1300 has two metering systems – the compact speed density system and the throttle speed system.

The advantage of combining both systems enables the metering of the intake air quantity with high accuracy at various operating conditions.

FUEL INJECTION TIME (RATE) CONTROL

The following table explains fuel injection time (rate) control based on sensor signals:

Signal	Explanation
Atmospheric pressure sensor signal	The injection time is reduced with decreases in atmospheric pressure.
Water temperature sensor signal	The injection time is increased with decreases in engine coolant temperature.
Battery voltage signal	The battery voltage is supplied to the ECU, and the injection time is controlled according to the particular voltage signal level. When the voltage decreases, the injection time will be increased to optimize the injection time.
Start signal	During engine start, the injection rate is increased according to the water temperature detected after complete combustion.
Acceleration/deceleration signals	During acceleration/deceleration, the injection time is increased/ decreased according to the detected throttle angle and engine speed.
O_2 Sensor signal	In accordance with the particular sensor signal level, the injection time is increased or reduced to obtain an air-fuel mixing ratio as close as possible to its theoretical value.
Intake temperature sensor signal	The injection time is increased with decreases in intake temperature.
Intake pressure sensor signal	The injection timing time (rate) is increased with decreases in intake manifold vacuum.

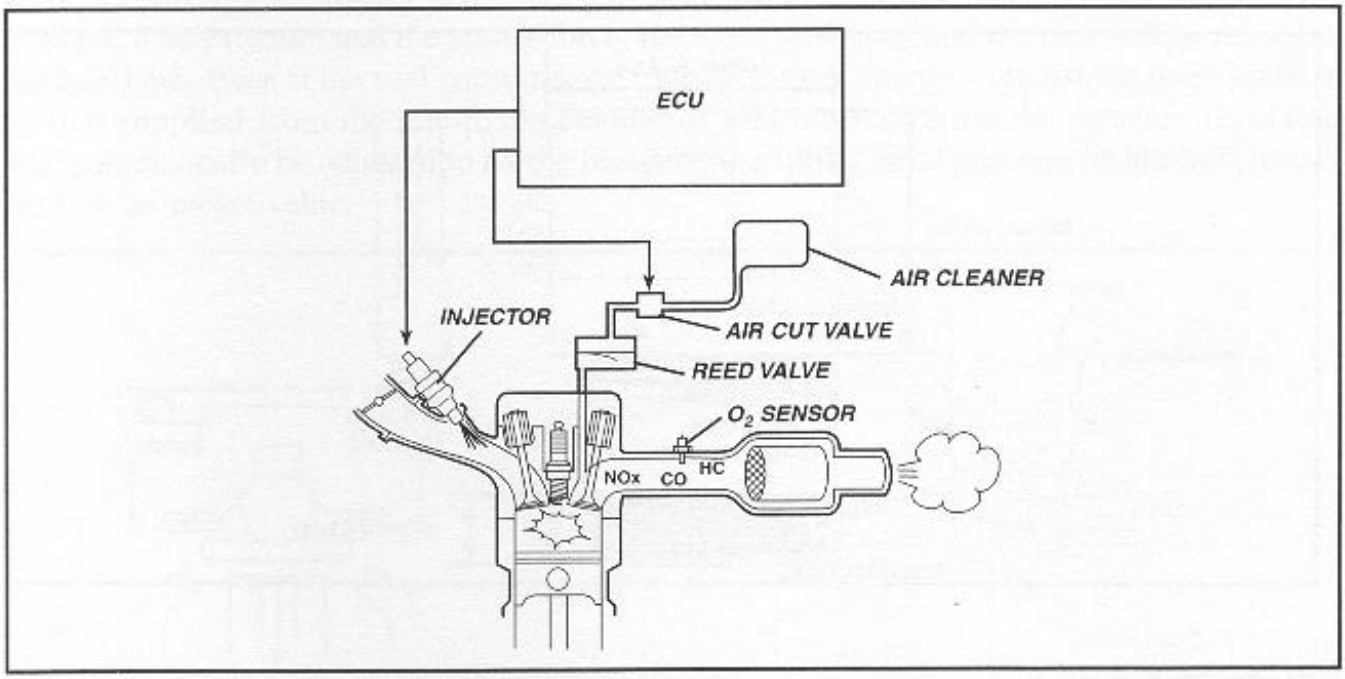
System Self-Diagnostics

If there is a malfunction with one the following items, the clock's LCD panel will display the failure code with the main switch on and the engine off.

Display	Meaning
11	Cylinder identification sensor failure.
12	Crankshaft position sensor failure.
13	Intake pressure sensor failure.
14	Intake pressure sensor pipeline failure.
15	Throttle position sensor wire disconnected or short-circuited.
16	Throttle position sensor stuck.
21	Water temperature sensor failure.
22	Intake temperature sensor failure
23	Atmospheric pressure sensor failure
24	O_2 Sensor failure
30	Lean angle cut-off switch activated.
31	Maximum allowable O_2 sensor correction level exceeded.
32	0_2 Sensor correction level too low.
41	Lean angle cutoff switch disconnected or short-circuited
42	Vehicle speed sensor or neutral switch failure.
43	Monitor voltage – Less than 3 volts
44	ECU Failure

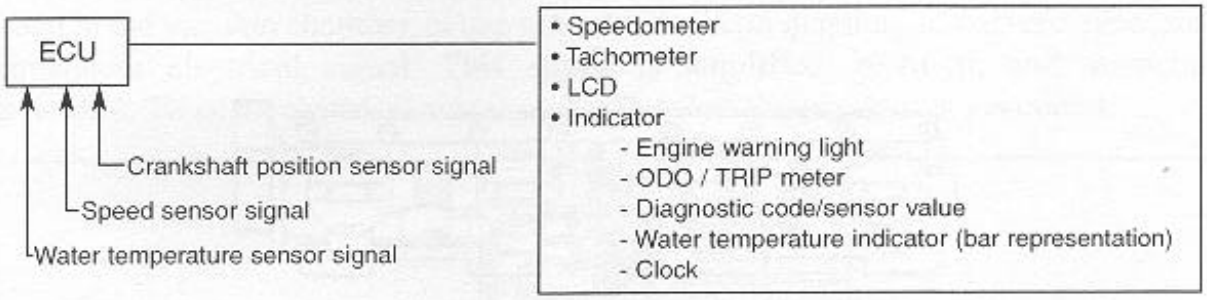
AIR INDUCTION SYSTEM (AIS)

During cold engine starts or idling, the vehicle is operated with a higher air-fuel ratio than its theoretical value. Therefore, secondary air is induced to accelerate the oxidation of HC in the exhaust. The on/off status of the air cut valve is automatically controlled by the ECU according to the water temperature, engine RPM and throttle angle.



METER PANEL / ECU COMMUNICATION

Communication between the Meter Panel and the ECU is achieved via a serial port type cable in order to exchange the following information.

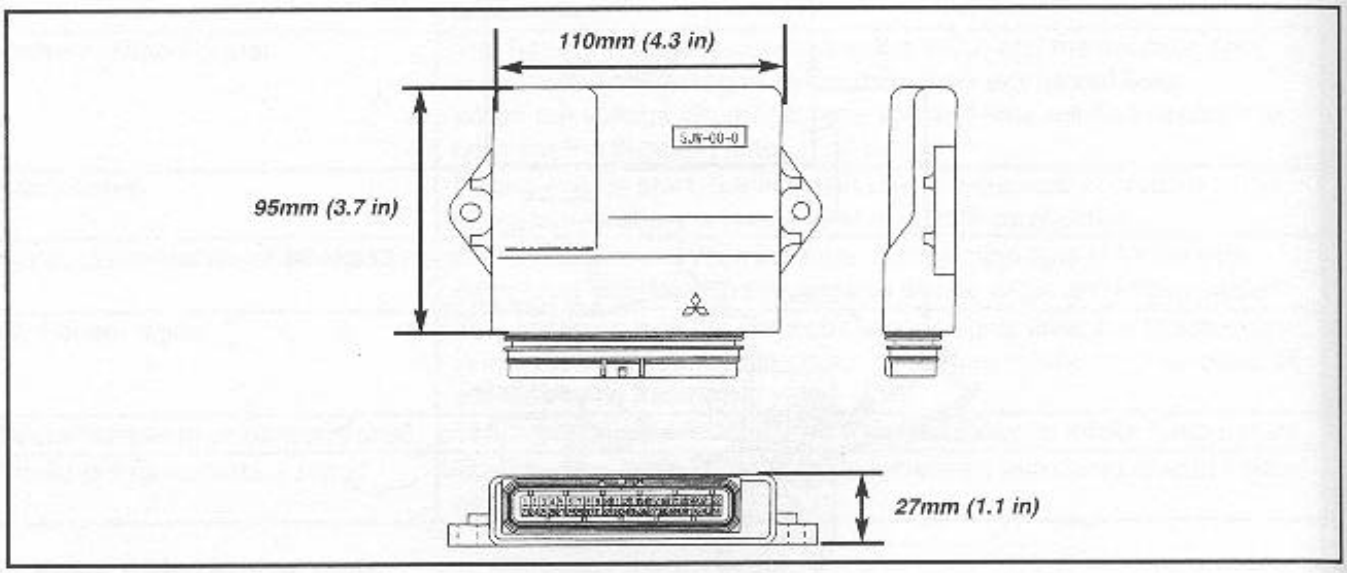


Communications From ECU To Meter Panel	Communications From Meter Panel to ECU
• Engine revolutions • Vehicle speed • Self-diagnostic error code • Engine warning light on/off • Water temperature • Diagnostic code/sensor value in diagnostic mode	• Switch signal status

INDIVIDUAL ELECTRONIC FUEL INJECTION COMPONENT FUNCTION

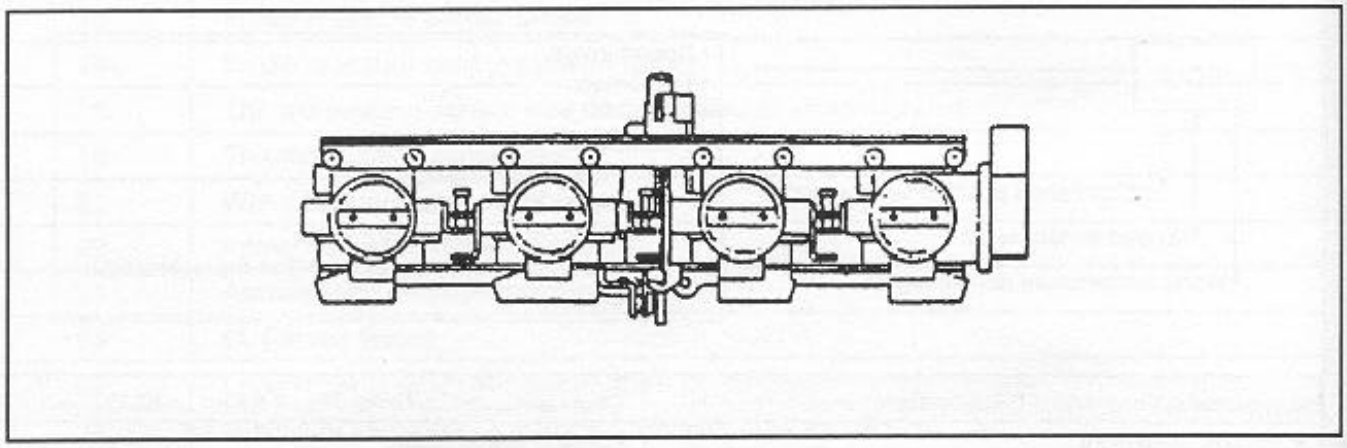
Electronic Control Unit (ECU)

- Controls complete electronic fuel injection and ignition system functions.
- Very compact and lightweight



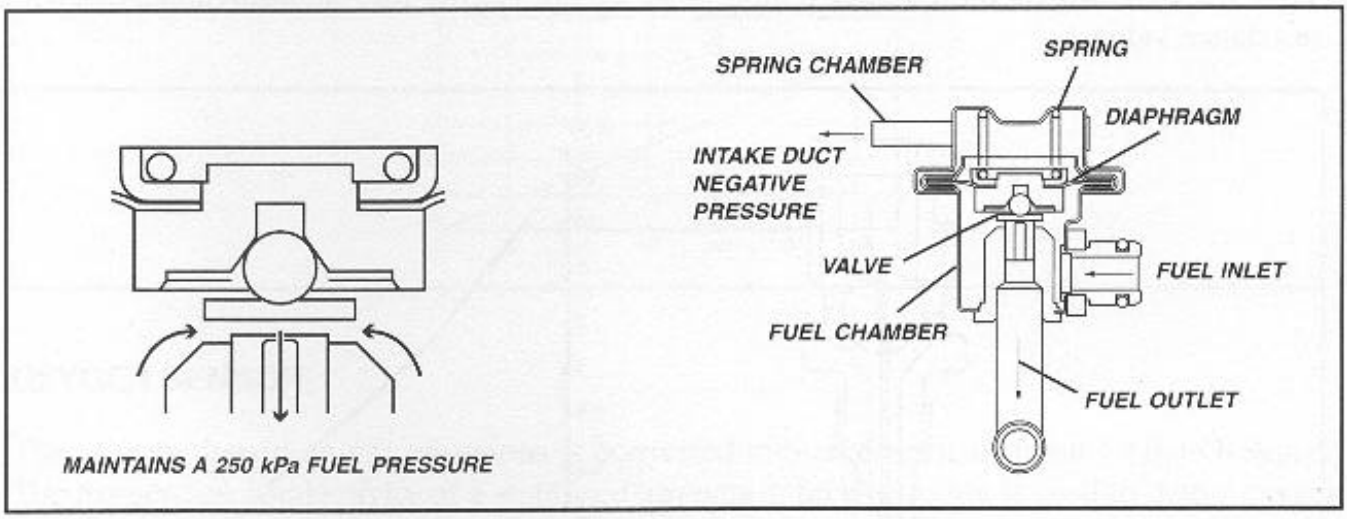
THROTTLE BODY

The throttle valves on the throttle body, as with the conventional carburetors, is mechanically controlled by the rider through the throttle cable. The opening and closing of the throttle changes the amount of intake air, and the engine output is controlled correspondingly.



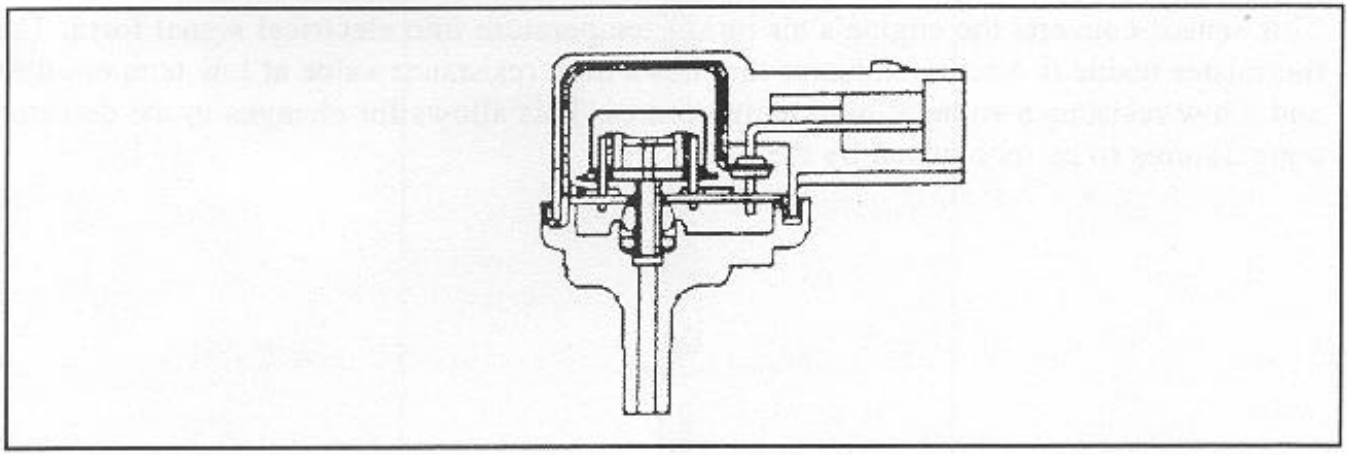
PRESSURE REGULATOR

The pressure regulator adjusts the fuel pressure applied to the injector and thus maintains a constant differential pressure against the internal pressures of each intake duct. The fuel that has been fed from the fuel pump flows into and fills the fuel chamber and applies pressure to the diaphragms. The intake duct negative pressure is transmitted to the spring chamber through the piping and if the fuel pressure exceeds the total pressure dictated by both the duct pressure and the spring force, the valve will open and the fuel will be return to the fuel tank. Even if the fuel consumption (injection rate) changes against the fixed volume of fuel supplied from the pump, the amount of fuel returned from the pressure regulator will automatically be adjusted to fix the fuel pressure (differential pressure inside each intake duct) at its preset value.



INTAKE PRESSURE SENSOR

The internal pressure of the intake duct is converted into an electrical signal. The sensor unit provided in the vacuum chamber, at one side of the silicon diaphragm, converts pressure into an equivalent electrical signal. This signal is amplified, rectified, and temperature-compensated. Thus, an electrical signal proportional to the pressure is generated.

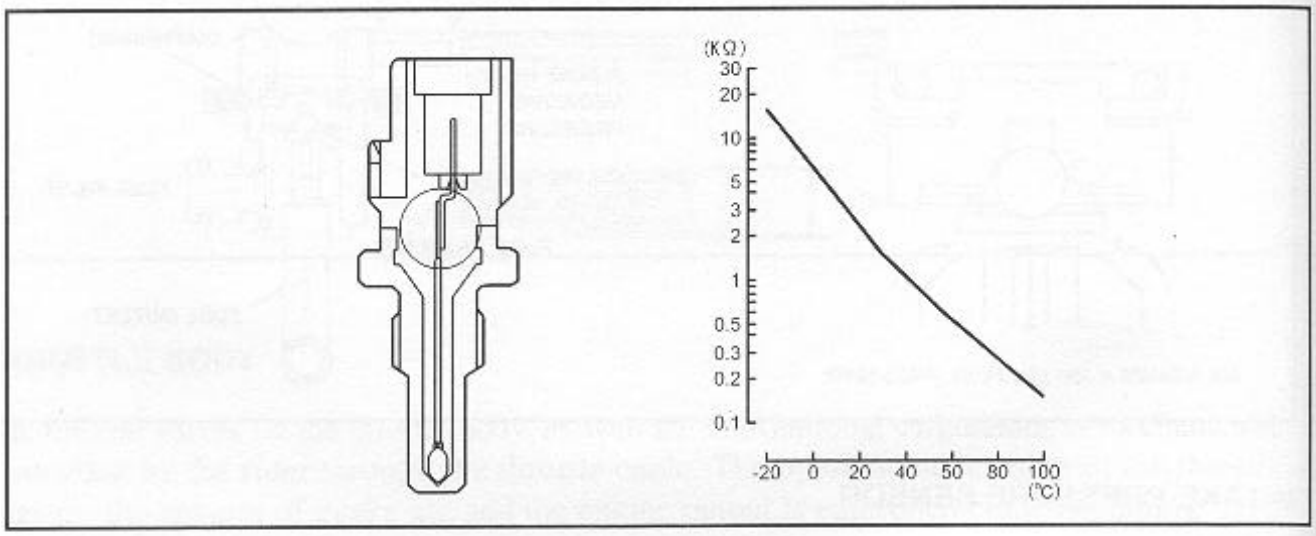


ATMOSPHERIC PRESSURE SENSOR

This sensor compensates for any changes in air density due to changes in the atmospheric pressure in high-altitude areas. The principle of operation and the function of the sensor are the same as that of the intake pressure sensor.

WATER TEMPERATURE SENSOR

This sensor converts the coolant temperature of the engine into an equivalent electrical resistance value.

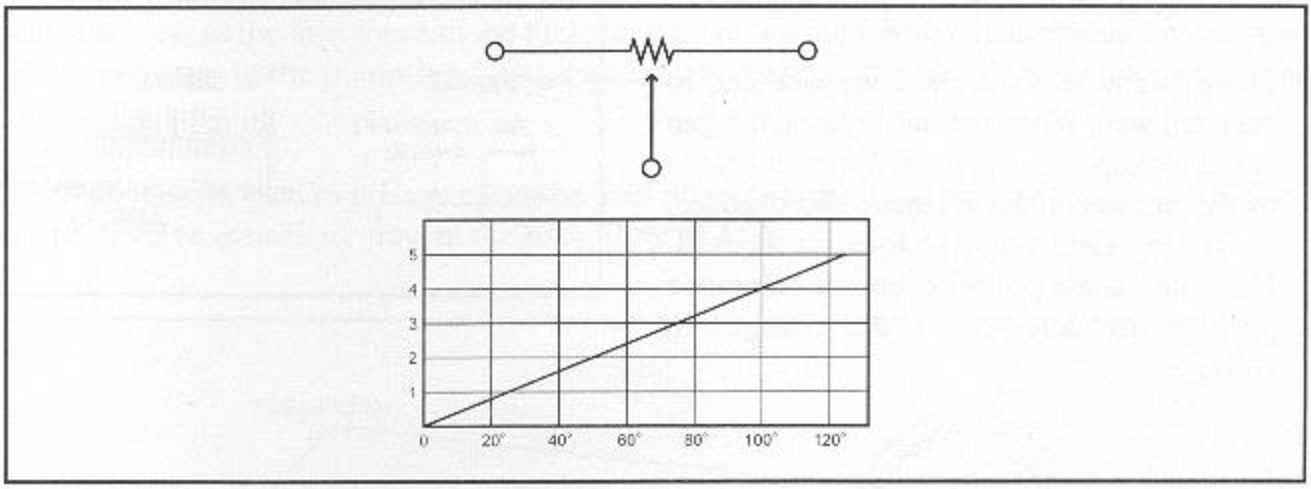


INTAKE TEMPERATURE SENSOR

This sensor converts the engine's air intake temperature into electrical signal form. The thermister inside is a semiconductor that has a high resistance value at low temperatures and a low resistance value at high temperatures. This allows for changes in the detected temperatures to be recognized by the ECU.

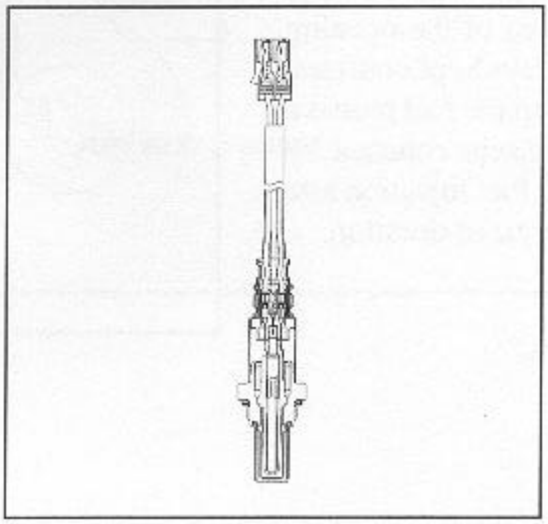
THROTTLE POSITION SENSOR

This sensor converts the mechanical angle of the throttle valve into electrical signal form. The angle is converted into a voltage- dividing ratio according to the position between the sliding contacts linked to the throttle shaft and the resistor circuit board. During actual operation, a fixed voltage of 5 V is constantly supplied across the resistor by the ECU, the voltage of the sliding contacts is substituted for the voltage- dividing ratio.



OXYGEN SENSOR

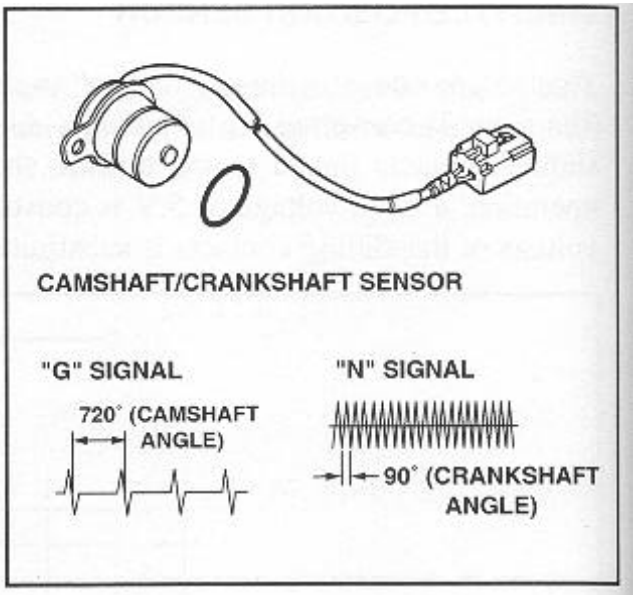
The oxygen density in gas emissions is converted into an electrical signal by the O_2 sensor. The oxygen ion conductivity of a stabilized zirconia solid electrolyte is used to detect oxygen density. Both sides of the zirconia element are formed into a test tube with a platinum electrode. The outside of the electrodes are exposed to gas emissions so that one oxygen contrast cell is formed. Therefore, electromotive force proportional to the difference between the oxygen density in gas emissions and the oxygen density in the atmosphere is generated and the corresponding voltage value is read by the ECU. A heater within the sensor minimizes the activation time of the O_2 sensor.



CYLINDER IDENTIFICATION SENSOR ("G" Signal)/ CRANKSHAFT SENSOR ("N" Signal)

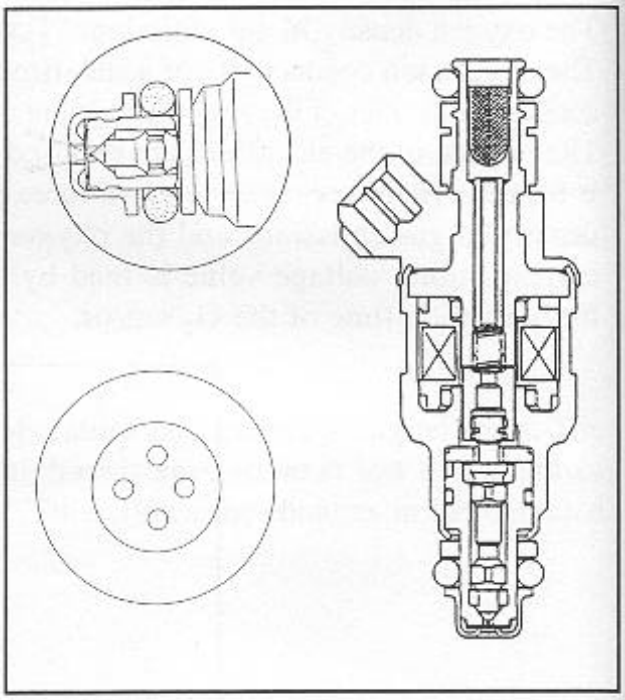
One electromagnetic pickup is installed in the cylinder head cover for cylinder identification and one pickup in the crankcase for detecting the crankshaft rotation angle.

There is a hole set in the cam lobe and in the crankweb. When the unit rotates, the gap in the pickup coil, changes. When it passes by the pickup coil the magnetic flux changes, generating electromotive force in the coil. The crank angle poisition and its reference position are detected by the changes in voltage.



FUEL INJECTOR

The injector delivers the fuel under command of the ECU. The core of the injector is pressed by a spring, as shown in the figure. The core has an integrated needle at the bottom to block the fuel feed line. When current is applied to the core, it is pulled upward and moves until the flange between the core and the needle touches the spacer. This arrangement maintains constant needle travel and thus the cross-sectional area of the opening in the fuel feed line is always kept constant. Since the difference between the fuel pressure and the intake pressure is kept constant by the pressure regulator, the fuel injection rate is proportional to the energized duration.

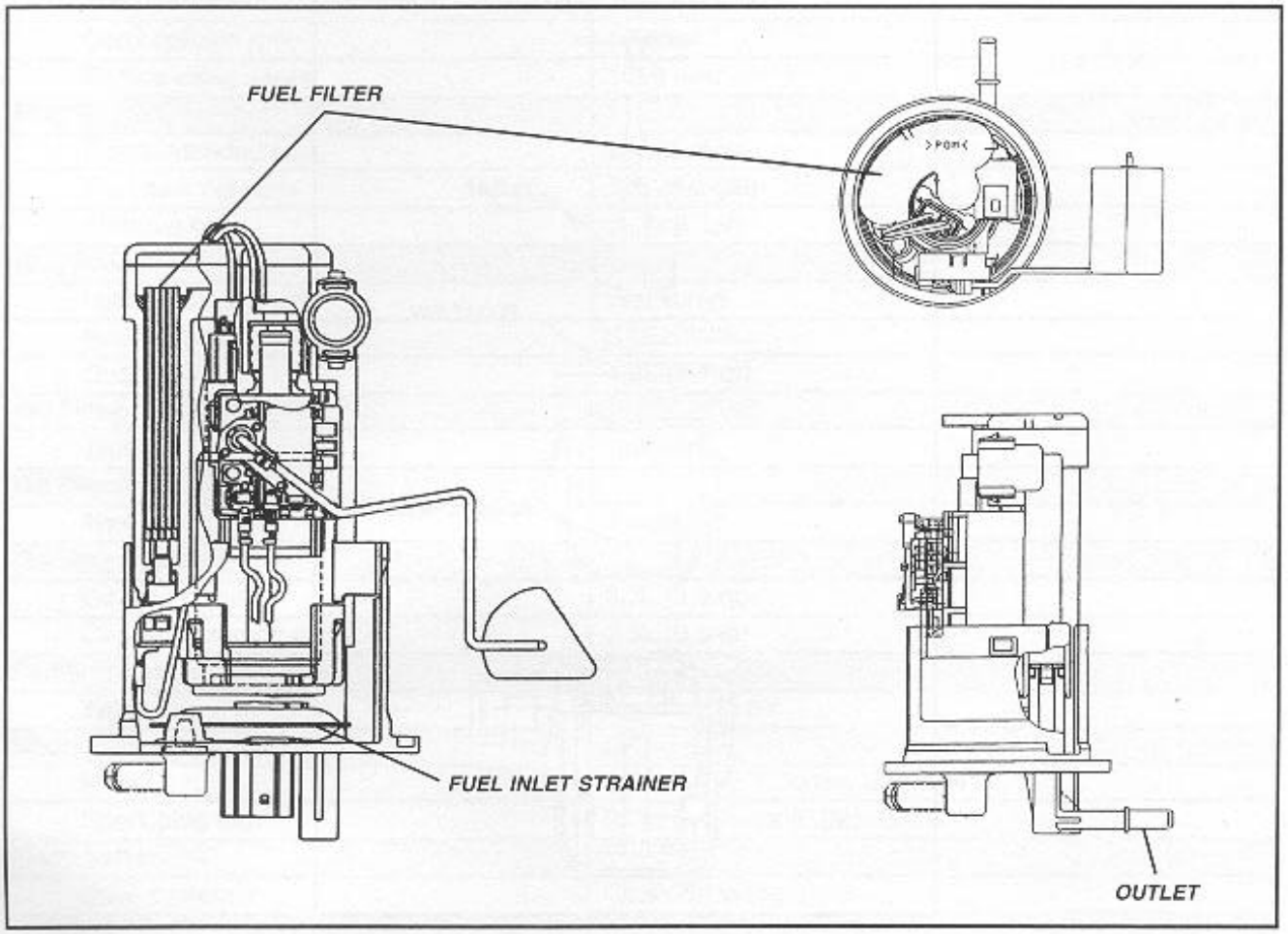


FUEL PUMP AND FILTER

The fuel pump feeds the fuel from the tank to the pressure regulator and then to the injectors. The unit consists of a pump, electric motor, filter, and valves. The pump is a Wesco-type rotary pump. The motor shaft and the rotating section of the pump are directly connected.

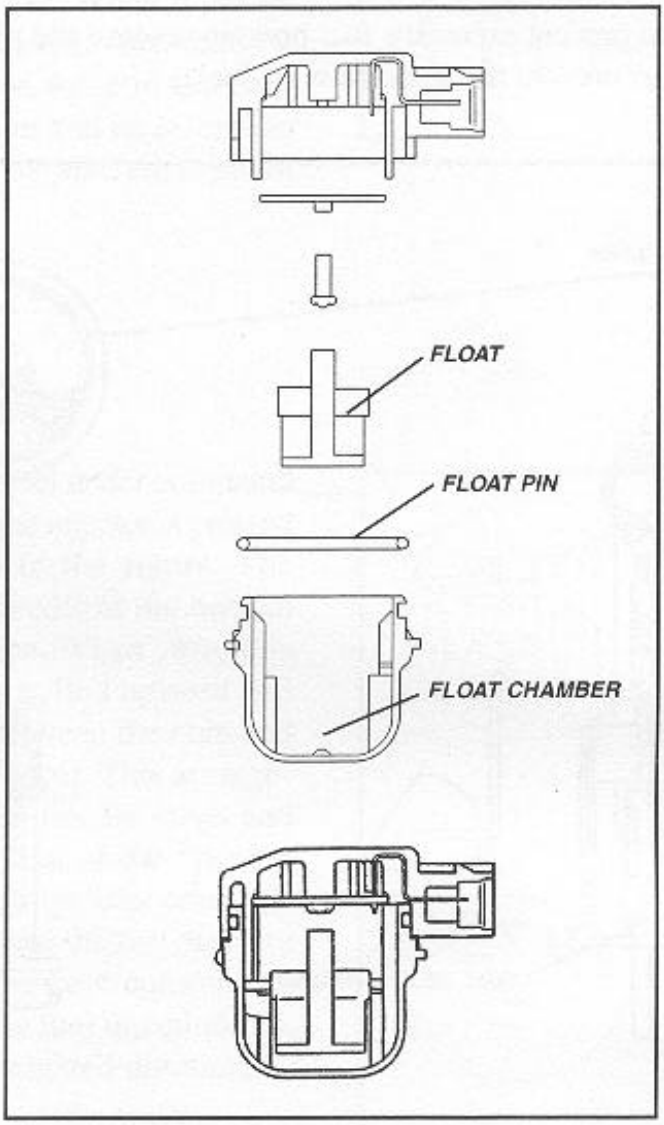
The fuel filter is located at the intake port of the pump to prevent any foreign substances within the fuel tank from entering the pump and subsequent fuel line. This filter prevents unusual wear to the injectors and the fuel pump by removing foreign matter from the gasoline. Foreign matter in the pump-fed fuel is removed by passing the fuel through the paper filter within the housing.

A relief valve is used to prevent excessive fuel pressure even if the pipeline clogs. In addition, a check valve is used to prevent the back-flow of fuel.



LEAN ANGLE CUT-OFF SWITCH

The engine will stop running if the vehicle falls over or significantly tilts. This function is activated by the Lean Angle Cut-Off Switch and the ECU. If the vehicle tilts to either the left or right by approximately 70° or more, with respect to its vertical position, the appropriate signal will be sent from the Lean Angle Cut-Off switch to the ECU, which will then deactivate the fuel injection and ignition. The engine will not stop while cornering, however. If the detection of an overturn has stopped the engine, this state will be held (latched) inside the ECU until the ignition switch has been temporarily turned off and then turned back on.



GENERAL SPECIFICATIONS

FJR1300 – General Specifications	
Dimensions:	
Overall length	2195mm (86.4 in)
Overall width	758mm (29.8 in)
Overall height	1304mm (51.3 in)
Seat height	805mm (31.7 in)
Wheelbase	1515mm (59.7 in)
Weight:	
Dry (without oil and fuel)	237kg (522 lb)
Engine:	
Engine type	Liquid-cooled, 4-stroke, DOHC, 16-valve, inline 4-cyl.
Displacement	1298cc
Cylinder arrangement	Forward-inclined, parallel 4-cylinder
Bore x stroke	79.0 x 66.2mm
Compression ratio	10.8:1
Engine idling speed	1050 rpm
Fuel:	
Recommended fuel	Inleaded fuel
Fuel tank capacity	25L (6.6 gal)
Reserve only	5L (1.3 gal)
Engine Oil:	
Lubrication system	Wet sump
Recommended oil	SAE20W/40
Quantity	4.9L (5.1 qt)
Oil Filter:	
Type	Cartridge
Oil Pump:	
Type	Trochoidal
Cooling System:	
Coolant capacity	3.7L (3.9 qt)
Coolant reservoir capacity	0.5L (0.5 qt)
Starting System:	
Type	Electric starter
Spark Plugs:	
Model	NGK: CR8E / Denso: U24ESR-N
Spark plug gap	0.7mm~0.8mm (0.025~0.032 in)
Camshafts:	
Drive system	Chain drive (right)
Cylinders:	
Cylinder arrangement	Forward-inclined, parallel 4-cylinder
Clutch:	
Type	Wet, multiple disc

Transmission:	
Transmission type	Constant mesh 5-speed
Gear ratio – 1st	43/17 (2.529)
Gear ratio – 2nd	39/22 (1.773)
Gear ratio – 3rd	31/23 (1.348)
Gear ratio – 4th	28/26 (1.077)
Gear ratio – 5th	26/28 (0.929)
Primary reduction ratio	75/48 (1.563)
Secondary reduction ratio	35 / 36 x 21 / 27 x 33 / 9 = 2.773
Final transmission	Shaft
Shifting Mechanism:	
Type	Shift drum
Air Filter:	
Type	Dry element
Chassis:	
Frame type	Diamond
Caster angle	26°
Trail	109mm (4.3 in)
Front Wheel:	
Wheel type	Cast wheel
Rim size	17 x MT3.50
Wheel travel	135mm (5.3 in)
Tire type	Tubeless
Size	120/70 ZR17 (58W)
Model (Manufacturer)	Metzeler MEZ4 / Bridgestone FBT020F
Rear Wheel:	
Wheel type	Cast wheel
Rim size	17 x MT5.50
Wheel travel	125mm (4.9 in)
Tire type	Tubeless
Size	180/55 ZR17 (73W)
Model (Manufacturer)	Metzeler MEZ4 / Bridgestone FBT020R
Front Brakes:	
Brake type	Dual-disc brake
Brake disc diameter	298mm (11.7 in)
Recommended fluid	DOT 4
Rear Brake:	
Brake type	Single-disc brake
Brake disc diameter	282mm (11.7 in)
Recommended fluid	DOT 4
Front Suspension:	
Front suspension type	Telescopic forks, 48mm tubes
Front suspension stroke	135mm (5.3 in)
Rear Suspension:	
Rear suspension type	Link-type swingarm
Rear shock stroke	60mm (2.4 in)

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