

MODEL APPLICATION

Year	Model	Beginning Frame No.
1994	ZX900-B1	JKAZX2B1□RA000001, or ZX900B-000001
1995	ZX900-B2	JKAZX2B1□SA018001, or ZX900B-018001
1996	ZX900-B3	JKAZX2B1□TA028001, or ZX900B-028001
1997	ZX900-B4	JKAZX2B1□VA038001, or ZX900B-038001

□ : This digit in the frame number changes from one machine to another.



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Kawasaki

Ninja ZX-9R



**Motorcycle
Service Manual**

Quick Reference Guide

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This quick reference guide will assist you in locating a desired topic or procedure.

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- Refer to the sectional table of contents for the exact pages to locate the specific topic required.

General Information

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1-2 GENERAL INFORMATION

Before Servicing

Before starting to service a motorcycle, careful reading of the applicable section is recommended to eliminate unnecessary work. Photographs, diagrams, notes, cautions, warnings, and detailed descriptions have been included wherever necessary. Nevertheless, even a detailed account has limitations, a certain amount of basic knowledge is also required for successful work.

Especially note the following:

- (1) **Dirt**

Before removal and disassembly, clean the motorcycle. Any dirt entering the engine or other parts will work as an abrasive and shorten the life of the motorcycle. For the same reason, before installing a new part, clean off any dust or metal filings.
- (2) **Battery Ground**

Remove the ground (-) lead from the battery before performing any disassembly operations on the motorcycle. This prevents:

 - (a) the possibility of accidentally turning the engine over while partially disassembled.
 - (b) sparks at electrical connections which will occur when they are disconnected.
 - (c) damage to electrical parts.
- (3) **Tightening Sequence**

Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit. Then tighten them evenly in a cross pattern. This is to avoid distortion of the part and/or causing gas or oil leakage. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter turn and then remove them. Where there is a tightening sequence indication in this Service Manual, the bolts, nuts, or screws must be tightened in the order and method indicated.
- (4) **Torque**

When torque values are given in this Service Manual, use them. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.
- (5) **Force**

Common sense should dictate how much force is necessary in assembly and disassembly. If a part seems especially difficult to remove or install, stop and examine what may be causing the problem. Whenever tapping is necessary, tap lightly using a wooden or plastic-faced mallet. Use an impact driver for screws (particularly for the removal of screws held by a locking agent) in order to avoid damaging the screw heads.
- (6) **Edges**

Watch for sharp edges, especially during major engine disassembly and assembly. Protect your hands with gloves or a piece of thick cloth when lifting the engine or turning it over.
- (7) **High-Flash Point Solvent**

A high-flash point solvent is recommended to reduce fire danger. A commercial solvent commonly available in North America is Stoddard solvent (generic name). Always follow manufacturer and container directions regarding the use of any solvent.
- (8) **Gasket, O-Ring**

Do not reuse a gasket or O-ring once it has been in service. The mating surfaces around the gasket should be free of foreign matter and perfectly smooth to avoid oil or compression leaks.
- (9) **Liquid Gasket, Non-Permanent Locking Agent**

Follow manufacturer's directions for cleaning and preparing surfaces where these compounds will be used. Apply sparingly. Excessive amounts may block engine oil passages and cause serious damage. An example of a non-permanent locking agent commonly available in North America is Loctite Lock'n Seal (Blue).
- (10) **Press**

A part installed using a press or driver, such as a wheel bearing, should first be coated with oil on its outer or inner circumference so that it will go into place smoothly.
- (11) **Ball Bearing and Needle Bearing**

Do not remove any ball or needle bearings that are pressed in unless it is necessary. If they are removed, replace them with new ones.

When installing a bearing, press it in with the marked side facing out using a suitable driver until it is bottomed. Bearings should be pressed into place by pushing evenly the bearing race which is affected by friction.

(12) Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals.

When pressing in a seal which has manufacturer's marks, press it in with the marks facing out. Seals should be pressed into place using a suitable driver, which contacts evenly with the side of seal, until the face of the seal is even with the end of the hole.

(13) Seal Guide

A seal guide is required for certain oil or grease seals during installation to avoid damage to the seal lips. Before a shaft passes through a seal, apply a little high temperature grease on the lips to reduce rubber to metal friction.

(14) Circlip, Retaining Ring

Replace any circlips and retaining rings that were removed with new ones, as removal weakens and deforms them. When installing circlips and retaining rings, take care to compress or expand them only enough to install them and no more.

(15) Cotter Pin

Replace any cotter pins that were removed with new ones, as removal deforms and breaks them.

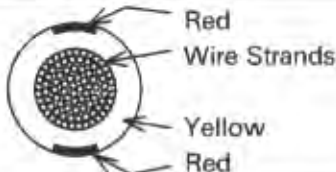
(16) Lubrication

Engine wear is generally at its maximum while the engine is warming up and before all the rubbing surfaces have an adequate lubricative film. During assembly, oil or grease (whichever is more suitable) should be applied to any rubbing surface which has lost its lubricative film. Old grease and dirty oil should be cleaned off. Deteriorated grease has lost its lubricative quality and may contain abrasive foreign particles.

Don't use just any oil or grease. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended. This manual makes reference to molybdenum disulfide grease (MoS₂) in the assembly of certain engine and chassis parts. Always check manufacturer recommendations before using such special lubricants.

(17) Electrical Wires

All the electrical wires are either single-color or two-color and, with only a few exceptions, must be connected to wires of the same color. On any of the two-color wires there is a greater amount of one color and a lesser amount of a second color, so a two-color wire is identified by first the primary color and then the secondary color. For example, a yellow wire with thin red stripes is referred to as a "yellow/red" wire; it would be a "red/yellow" wire if the colors were reversed to make red the main color.

Wire (cross-section)	Name of Wire Color
 <p>Red Wire Strands Yellow Red</p>	<p>Yellow/Red</p>

(18) Replacement Parts

When there is a replacement instruction, replace these parts with new ones every time they are removed. These replacement parts will be damaged or lose their original function once removed.

(19) Inspection

When parts have been disassembled, visually inspect these parts for the following conditions or other damage. If there is any doubt as to the condition of them, replace them with new ones.

Abrasion	Crack	Hardening	Warp
Bent	Dent	Scratch	Wear
Color change	Deterioration	Seizure	

(20) Specifications

Specification terms are defined as follows:

"Standards" show dimensions or performances which brand-new parts or systems have.

"Service Limits" indicate the usable limits. If the measurement shows excessive wear or deteriorated performance, replace the damaged parts.

1-4 GENERAL INFORMATION

Model Identification

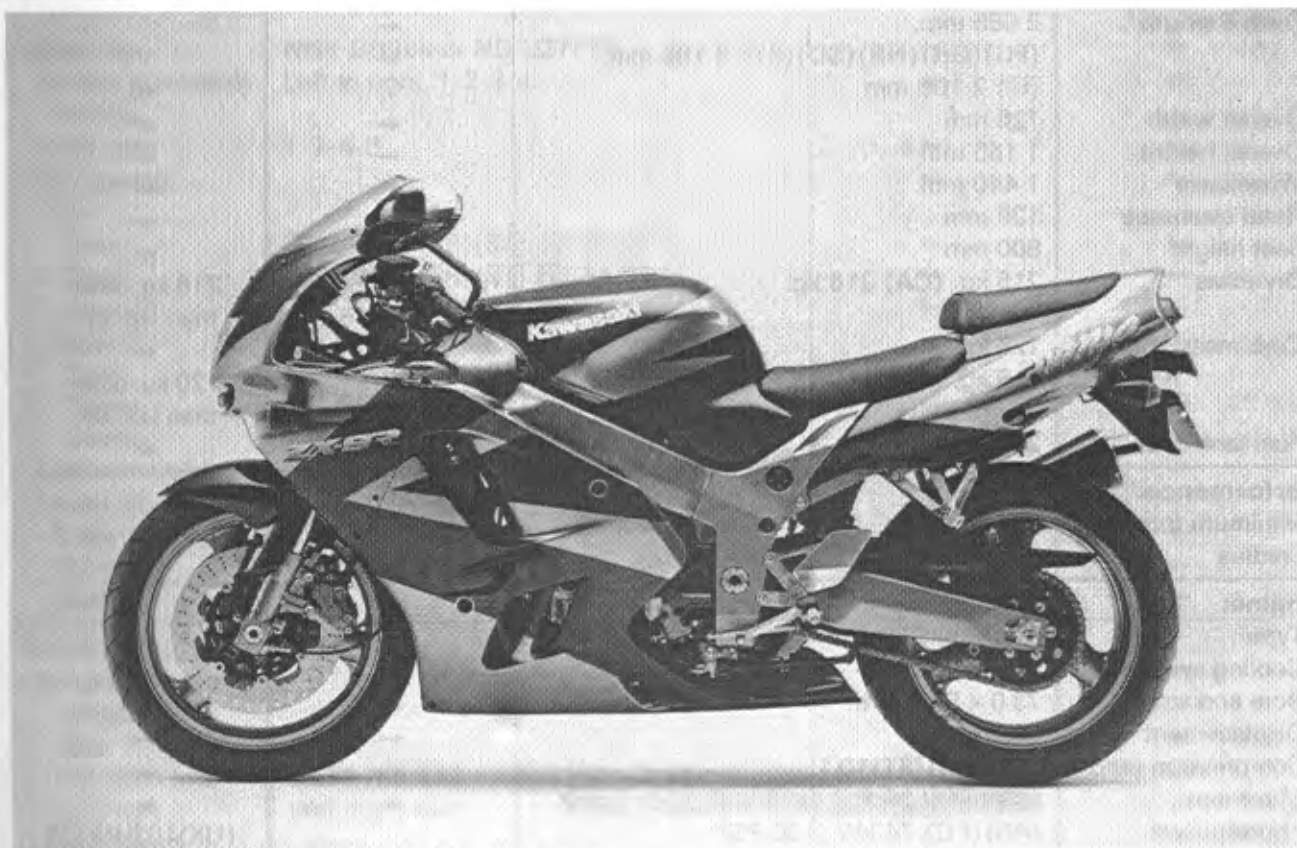
ZX900-B1 (US and Canada Models) Left Side View:



ZX900-B1 (US and Canada Models) Right Side View:



ZX900-B1 (Europe Model) Left Side View:



ZX900-B1 (Europe Model) Right Side View:



1-6 GENERAL INFORMATION

General Specifications

Items	ZX900-B1	ZX900-B2	ZX900-B3
Dimensions:			
Overall length	2 085 mm, (FG)(GR)(NR)(SD)(ST) 2 195 mm, (IT) 2 105 mm	↑ ↑	↑
Overall width	725 mm	↑	↑
Overall height	1 165 mm	↑	↑
Wheelbase	1 440 mm	↑	↑
Road clearance	125 mm	↑	↑
Seat height	800 mm	↑	↑
Dry mass	215 kg, (CA) 216 kg	↑	218 kg, other than US, CN
Curb massFront	125 kg	↑	↑
Rear	118 kg, (CA) 119 kg	↑	120 kg, other than US, CN
Fuel tank capacity	20 L	↑	↑
Performance:			
Minimum turning radius	3.5 m	↑	↑
Engine:			
Type	4-stroke, DOHC, 4-cylinder	↑	↑
Cooling system	Liquid-cooled	↑	↑
Bore and stroke	73.0 x 53.7 mm	↑	↑
Displacement	899 mL	↑	↑
Compression ratio	11.5,(FR)(ST)10.1	↑	↑
Maximum horsepower	102 kW (139 PS) @10 500 r/min (rpm), (AR)(FG) 74 kW (100 PS) @10 000 r/min (rpm)(DIN), (FR) 75.1 kW (102 PS) @9 800 r/min(rpm) (UTAC's norm), (SD) 63 kW (86 PS) @ 10 000 r/min, (ST) 45 kW (61 PS) @6 000 r/min (rpm), (UK) 92 kW (125 PS) @10 500 r/min (rpm)(ISO), (US) ---	↑	(UK)102kW(139 PS) @10 500 r/min(rpm) (FG)72kW(98 PS)@1000 r/min(rpm)
Maximum torque	96 N-m(9.8 kg-m, 70.9 ft-lb) @9 000 r/min(rpm), (FG)78 N-m(8.0 kg-m, 57.5 ft-lb) @7 000 r/min (rpm) (DIN), (AR) 79 N-m (8.1 kg-m, 58.6 ft-lb), @7 000 r/min (rpm) (DIN), (SD) 74 N-m (7.6 kg-m, 55.0 ft-lb) @7 000 r/min (rpm), (ST) 72 N-m (7.3 kg-m, 52.8 ft-lb) @5 500 r/min (rpm), (FR)(UK)(US) ---	↑	(AR)78 N-m(8.0 kg-m,57.0ft-lb) @7000r/min(rpm) (FG)77N-m(7.9kg-m, 57.0ft-lb)@7000 r/min(rpm)(DIN)
Carburetion system	Carburetors, Keihin CVKD 40 x 4	↑	↑
Starting system	Electric starter		↑
Ignition system	Battery and coil (transistorized)	↑	↑
Timing advance	Electronically advanced(digital igniter)	↑	↑
Ignition timing	From 10° BTDC @1 100 r/min (rpm) to 45° BTDC @5 800 r/min (rpm) (CA) From 10° BTDC @1 300 r/min (rpm) to 45° BTDC @5 800 r/min (rpm), (ST) From 5° BTDC @1 300 r/min (rpm) to 40° BTDC @5 800 r/min (rpm)	↑	↑

137hp

7.9 ft-lb

Items	ZX900-B1	ZX900-B2	ZX900-B3
Spark plug	NGK CR9EK or ND U27ETR	←	↑
Cylinder numbering method	Left to right, 1-2-3-4	←	↑
Firing order	1-2-4-3	←	↑
Valve timing:		←	↑
Inlet			
Open	39° BTDC, (FR)(ST) 20° BTDC	←	↑
Close	69° ABDC, (FR)(ST) 50° ABDC	←	↑
Duration	288°, (FR)(ST) 250°	←	↑
Exhaust			
Open	65° BBDC, (FR)(ST) 50° BBDC	←	↑
Close	35° ATDC, (FR)(ST) 20° ATDC	←	↑
Duration	280°, (FR)(ST) 250°	←	↑
Lubrication system	Forced lubrication (wet sump with cooler)	←	↑
Engine oil:			
Grade	SE, SF or SG class	←	↑
Viscosity	SAE10W-40, 10W-50, 20W-40, or 20W-50	←	↑
Capacity	4.0 L	←	↑
Drive Train:			
Primary reduction system:			
Type	Gear	←	↑
Reduction ratio	1.534 (89/58)	←	↑
Clutch type	Wet multi disc	←	↑
Transmission:			
Type	6-speed, constant mesh, return shift	←	↑
Gear ratios:			
1st	2.857 (40/14)	(E)(FG)(IT)(NL) (SP)(UK)2.785 (39/14)	(AR)(GR)(NR) 2.785(39/14)
2nd	2.055 (37/18)	(E)(FG)(IT)(NL) (SP)(UK)2.000 (36/18)	(AR)(GR)(NR) 2.000(36/18)
3rd	1.650 (33/20)	(E)(FG)(IT)(NL) (SP)(UK)1.619 (34/21)	(AR)(GR)(NR) 1.619(34/21)
4th	1.391 (32/23)	←	↑
5th	1.222 (33/27)	←	↑
6th	1.103 (32/29)	←	↑
Final drive system:			
Type	Chain drive	←	↑
Reduction ratio	2.750 (44/16)	←	↑
Overall drive ratio	4.656 @Top gear	←	↑

1-8 GENERAL INFORMATION

Items	ZX900-B1	ZX900-B2	ZX900-B3
Frame:			
Type	Tubular, double cradle		
Caster (rake angle)	24°	←	←
Trail	93 mm	←	←
Front tire:			
Type	Tubeless	←	←
Size	120/70 ZR17	←	←
Rear tire:			
Type	Tubeless	←	←
Size	180/55 ZR17	←	←
Front suspension:			
Type	Telescopic fork	←	←
Wheel travel	110 mm	←	←
Rear suspension:			
Type	Swingarm (uni-trak)	←	←
Wheel travel	145 mm	←	135 mm Other than US, CN
Brake type:			
Front	Dual disc	←	←
Rear	Single disc	←	←
Electrical Equipment:			
Battery	12 V 10 Ah	←	←
Headlight:			
Type	Semi-sealed beam	←	
Bulb	12V55/55W (quartz-halogen), (AS)(CA)(CN)(UK)(US) 12 V 60/55 W (quartz-halogen)	←	←
Tail/brake light	12 V 5/21 W × 2, (CA)(CN)(US) 12 V 8/27W × 2	←	←
Alternator:			
Type	Three-phase AC	←	←
Rated output	30.7 A/ 14 V @5 200 r/min (rpm)	←	←

Specifications are subject to change without notice, and may not apply to every country.

(AR) : Austrian Model
 (AS) : Australian Model
 (CA) : California Model
 (CN) : Canadian Model
 (E) : European Model
 (FG) : German Model
 (FR) : French Model
 (GR) : Greek Model
 (IT) : Italian Model
 (NL) : Dutch Model
 (NR) : Norwegian Model

(SD): Swedish Model
 (SP) : Spanish Model
 (ST) : Swiss Model
 (UK): U.K. Model
 (US): U.S. Model

Periodic Maintenance Chart

The scheduled maintenance must be done in accordance with this chart to keep the motorcycle in good running condition. **The initial maintenance is vitally important and must not be neglected.**
 Refer to P.16-11 for '96 ZX900-B3 other than U.S. and Canadian Models.

OPERATION	FREQUENCY	Whichever comes first ↓ Every	†ODOMETER READING						
			800km	5000km	10000km	15000km	20000km	25000km	30000km
Spark plug - clean			•	•	•	•	•	•	
Spark plug - check*			•	•	•	•	•	•	
Valve clearance - check*		•		•		•		•	
Air suction valve - check*			•	•	•	•	•	•	
Air cleaner element and air vent filter - clean		•		•		•		•	
Air cleaner element and air vent filter - replace	5 cleanings					•			
Throttle grip play--check*		•		•		•		•	
Idle speed - check*		•	•	•	•	•	•	•	
Engine vacuum synchronization -check *		•	•	•	•	•	•	•	
Fuel system--check *				•		•		•	
Coolant - change	2 years							•	
Evaporative emission control system (Cal) - check*		•	•	•	•	•	•	•	
Engine oil - change	year	•		•		•		•	
Oil filter -replace		•		•		•		•	
Radiator hoses, connections - check*	year	•		•		•		•	
Fuel filter - replace			•		•		•		
Fuel hose - replace	4 years								
Clutch fluid level - check *	month	•	•	•	•	•	•	•	
Clutch fluid - change	2 years					•			
Clutch hose and pipe - replace	4 years								
Clutch master cylinder cup and dust seal -replace	2 years								
Clutch slave cylinder piston seal - replace	2 years								
Drive chain wear -check *			•	•	•	•	•	•	
Drive chain -lubricate	300 km								
Drive chain slack - check *	800 km								
Brake pad wear -check*			•	•	•	•	•	•	
Brake fluid level - check*	month	•	•	•	•	•	•	•	
Brake fluid - change	2 years					•			
Brake hose - replace	4 years								
Brake master cylinder cup and dust seal - replace	2 years								
Caliper piston seal and dust seal - replace	2 years								
Brake light switch - check*		•	•	•	•	•	•	•	
Steering - check*		•	•	•	•	•	•	•	
Steering stem bearing - lubricate	2 years					•			
Front fork oil - change								•	
Tire wear - check*			•	•	•	•	•	•	
Swingarm pivot, uni-trak linkage - lubricate				•		•		•	
General lubrication - perform			•	•	•	•	•	•	
Nuts, bolts, and fasteners tightness - check*		•		•		•		•	

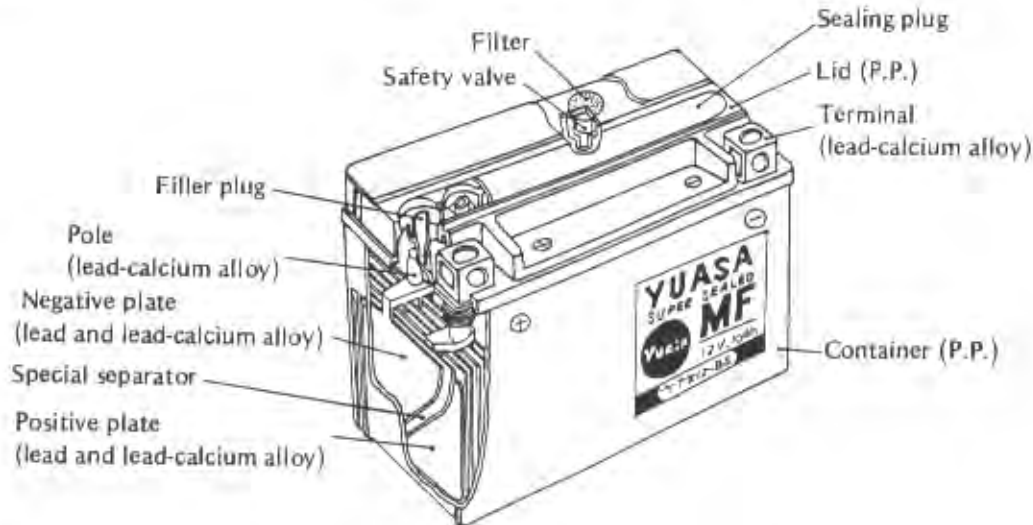
† : For higher odometer readings, repeat at the frequency interval established here.
 * : Replace, add, adjust, clean, or torque if necessary.

1-10 GENERAL INFORMATION

Technical Information - Maintenance Free Battery

A maintenance free battery is installed in this model. The maintenance free battery is a sealed type, and so cannot be performed the electrolyte level check and topping-up.

(i) Construction

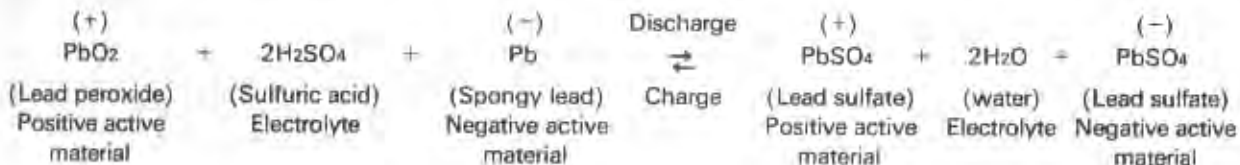


(ii) Main Features

- 1) Maintenance free..... It is not necessary to check the electrolyte level and top-up the electrolyte.
- 2) No electrolyte leakage..... As the electrolyte is retained firmly in the special separators, there is no free electrolyte in the battery.
- 3) Instant activation system..... It can be used instantly after filling only the electrolyte without initial charge.
- 4) One-push motion electrolyte filling..... It is possible to fill the electrolyte by easy one-push motion.
- 5) Safety construction..... If the battery internal pressure rises abnormally high, the safety valve opens to release the gas inside the battery to restore the normal pressure and prevent the battery from rupturing. After restoring the normal pressure, the safety valve closes and the battery is sealed again. Moreover, a ceramic filter is disposed on top of the safety valve under the lid to remove risk of ignition or explosion caused by fire from outside.
- 6) Compact and high performance..... No presence of free electrolyte allows the battery made lower in height, thus resulting in enhanced volume efficiency. Moreover, gas being absorbed inside the battery eliminates the need for a gas exhaust tube.
- 7) Strong charge/discharge characteristics It can amply withstand deep charge/discharge cycles.

(iii) Principle of Sealing Structure

A lead-acid battery operates under the following chemical reaction:



Normally in an ordinary lead-acid battery when it comes to an end of a charge, where the lead sulfate being a discharge product returns to lead peroxide and spongy lead, the charge current flowing thereafter is used exclusively to decompose electrolytically water from the electrolyte, thus resulting in generation of hydrogen gas from the negative plate and oxygen gas from the positive plate. The gases so generated are released out of the battery, causing the amount of electrolyte decreased to require occasional water replenishment.

A maintenance free battery, however, is so designed that, when it is overcharged, even if the positive plate is fully charged, the negative plate remains not fully turned to spongy lead. Therefore, even when the positive plate is overcharged generating oxygen gas, the negative plate is not fully charged, hence generating no hydrogen gas.

Moreover, the oxygen gas generated from the positive plate immediately reacts with the charged active material on the negative plate, and returns to water, with the ultimate result of no water loss.

1-12 GENERAL INFORMATION

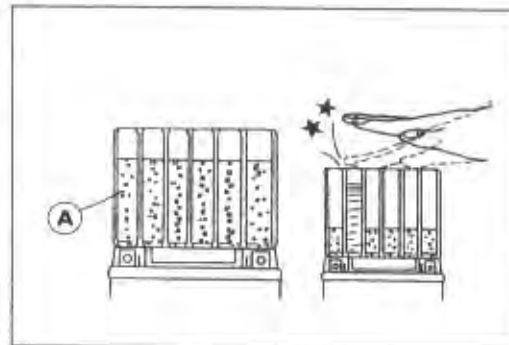
- Make sure air bubbles [A] are coming up from all six filler ports.
- Leave the container this way for 5 minutes or longer.

NOTE

○ If no air bubbles are coming up from a filler port, tap the bottom of the bottle two or three times. Never remove the container from the battery.

CAUTION

Fill until the container is completely emptied.



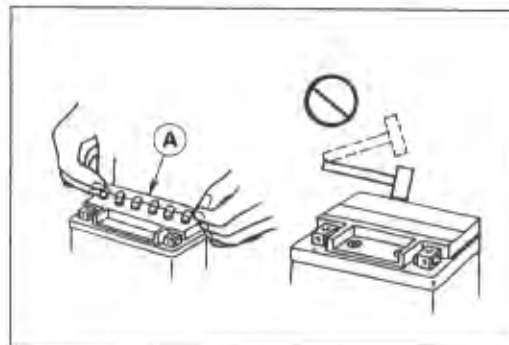
- Be certain that all the electrolyte has flowed out.
- Tap the bottom the same way as above if there is any electrolyte left in the container.
- Now pull the container gently out of the battery.
- Let the battery sit for 20 minutes. During this time, the electrolyte permeates the special separators and the gas generated by chemical reaction is released.
- Fit the strip of caps [A] tightly into the filler ports until the strip is at the same level as the top of the battery.

NOTE

○ Do not hammer. Press down evenly with both hands.

CAUTION

Once you installed the strip of caps after filling the battery, never remove it, nor add any water or electrolyte.



(V) Initial Charge

While a maintenance free battery can be used after only filling with electrolyte, a battery may not be able to sufficiently move a starter motor to start an engine in the cases shown in the table below, where an initial charge is required before use. However, if a battery shows a terminal voltage of higher than 12.5 V after 10 minutes of filling (Note 1), no initial charge is necessary.

Condition requiring initial charge	Charging method
At low temperatures (lower than 0°C)	1.2 A × 2 ~ 3 hours
Battery has been stored in high temperature and humidity.	1.2 A × 15 ~ 20 hours
Seal has been removed, or broken – peeling, tear or hole. (If you did not hear the air-sucking sound "Shoosh!" as you removed the seal.)	
Battery as old as 2 years or more after manufacture. Battery manufacturing date is printed on battery top. Example) <u>12</u> <u>10</u> <u>93</u> <u>T1</u> Day Month Year Mfg. location	

Note 1 : Terminal voltage – To measure battery terminal voltage, use a digital voltmeter.

(VI) Precautions

1) No need of topping-up

No topping-up is necessary in this battery until it ends its life under normal use. Forcibly prying off the sealing plug to add water is very dangerous. Never do that.

2) Refreshing charge

If an engine will not start, a horn sounds weak, or lamps are dim, it indicates the battery has been discharged. Give refresh charge for 5 to 10 hours with charge current shown in the specification (see the Electrical System chapter).

When a fast charge is inevitably required, do it following precisely the maximum charge current and time conditions indicated on the battery.

CAUTION

This battery is designed to sustain no unusual deterioration if refresh-charged according to the method specified above. However, the battery's performance may be reduced noticeably if charged under conditions other than given above. Never remove the sealing plug during refresh charge.

If by chance an excessive amount of gas is generated due to overcharging, the safety valve operates to keep the battery safe.

3) When you do not use the motorcycle for months

Give a refresh charge before you store the motorcycle and store it with the negative lead removed. Give a refresh charge every six months during storage.

4) Battery life

If the battery will not start the engine even after several refresh charges, the battery has exceeded its useful life. Replace it. (Provided, however, the vehicle's starting system has no problem.)

▲WARNING

Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

No fire should be drawn near the battery, or no terminals should have the tightening loosened.

The electrolyte contains sulfuric acid. Be careful not to have it touch your skin or eyes. If touched, wash it off with liberal amount of water. Get medical attention if severe.

(VII) Interchangeability with Ordinary Battery

A maintenance free battery can fully display its performance only when combined with a proper vehicle electric system. Therefore, replace a maintenance free battery only on a motorcycle which was originally equipped with a maintenance free battery.

Be careful, if a maintenance free battery is installed on a motorcycle which had an ordinary battery as original equipment, the maintenance free battery's life will be shortened.

1-14 GENERAL INFORMATION

Technical Information - Alternator Unit

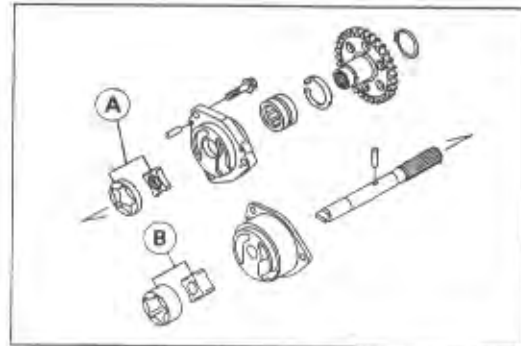
An alternator [A] with a regulator/rectifier built in is mounted on the crankcase, behind the cylinder. The conventional alternator is installed on the crankshaft end.

Benefits are as follows: Shortened engine width offers larger banking angle and smaller inertia when turning the motorcycle. The alternator output is increased comparing with the conventional alternator owing to increased alternator capacity itself, increased alternator speed over the crankshaft speed, and the alternator cooling fan.



Technical Information - Engine Lubrication System

The ZX-9R oil system has dual oil pumps, with one pump (Sub-Oil Pump Rotor) [A] feeding pressurised oil to the oil cooler and the other (Main Oil Pump Rotor) [B] to the top end, crank, and transmission. However, the main oil pump rotor width, at a mere 14 mm, significantly reduces mechanical loss. This two-pump system helps ensure reliable lubrication by avoiding drops in oil pressure during extreme riding conditions.



To cool the oil, a liquid-cooled oil cooler [A] is employed, which offers several advantages over the air-cooled type.



First, having almost the same cooling capability, the liquid-cooled oil cooler is more compact than the air-cooled oil cooler, fitted easily in the engine, and helps easy maintenance of engine. Next, since the cooler is installed right on the crankcase without oil hoses, there is little chance of a major oil leak and little oil pressure drop in the cooler.

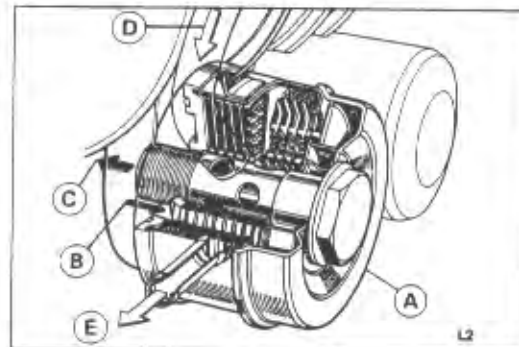
Liquid-cooled Oil Cooler [A]

Hot Oil [B]

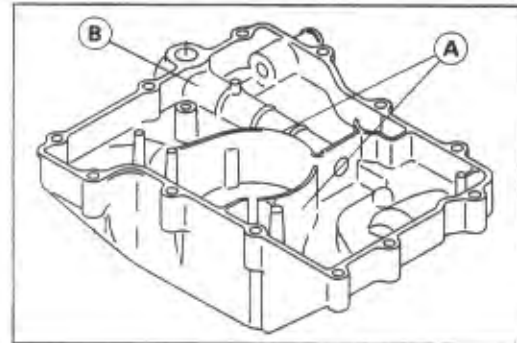
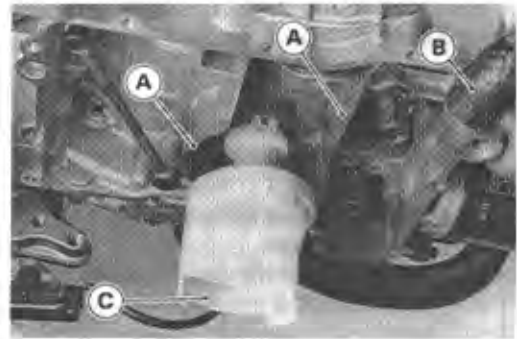
Cold Oil [C]

Cold Coolant [D]

Hot Coolant [E]



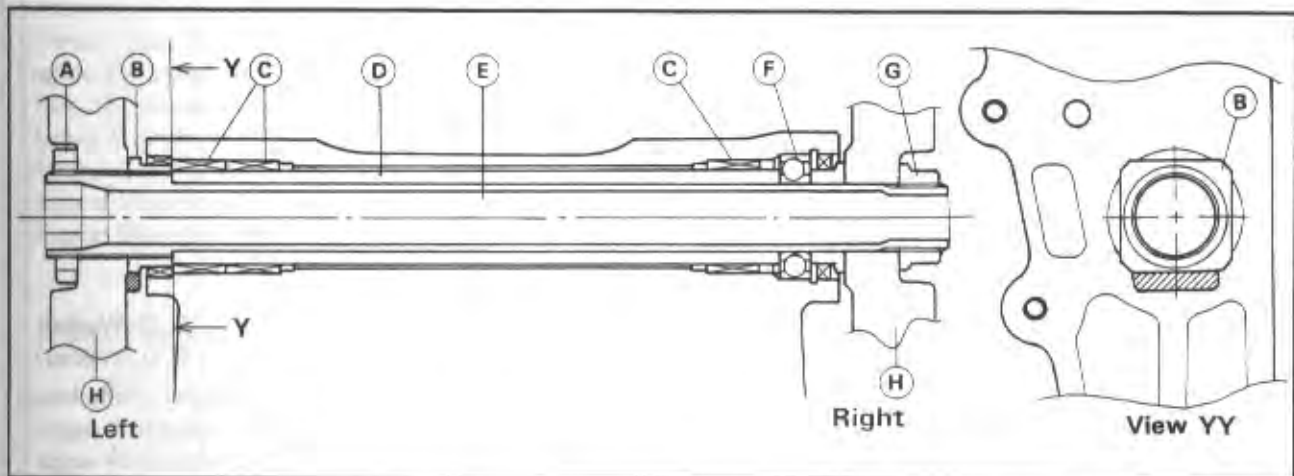
The semi-dry sump system is designed to reduce oil stirring loss by keeping the oil from collecting in the crankcase below the crankshaft and in the clutch. Baffles [A] and passages [B] are fitted in the crankcase below the transmission to collect the oil at once as it returns from the lubrication system, feeding it to the oil pump inlet [C] and away from the crankcase and clutch basket.



Technical Information - Swingarm

The swingarm pivots are equipped with low-friction needle bearings for smooth working. On the rightside is a ball bearing which supports the thrust loads and eliminates even slight lateral play of the swingarm. This strengthens swingarm rigidity, especially its torsional rigidity, offering the motorcycle easier and smoother drive under severe riding conditions. The pivot parts are tightened against the frame in this order: the collar [B] and pivot shaft [E], the pivot nut [G], and the pivot locknut [A], so the pivot shaft [E] and ball bearing [F] can be installed without any frame deformation and any gap to the frame.

This prevents scraping of the seating surfaces and possible gaps among the aluminum pivot parts.



A. Swingarm Pivot Locknut
 B. Collar
 C. Needle Bearings

D. Sleeve
 E. Swingarm Pivot Shaft
 F. Ball Bearing

G. Swingarm Pivot Nut
 H. Frame

1-16 GENERAL INFORMATION

Torque and Locking Agent

The following tables list the tightening torque for the major fasteners requiring use of a non-permanent locking agent or liquid gasket.

Letters used in the "Remarks" column mean:

- L** : Apply a non-permanent locking agent to the threads.
- LG** : Apply liquid gasket to the threads.
- Lh** : Left-hand threads.
- M** : Apply molybdenum disulfide grease.
- O** : Apply an oil to the threads and seating surface.
- S** : Tighten the fasteners following the specified sequence.
- SS** : Apply silicone sealant.
- St** : Stake the fasteners to prevent loosening.
- R** : Replacement parts

The table below, relating tightening torque to thread diameter, lists the basic torque for the bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value. All of the values are for use with dry solvent cleaned threads.

Basic Torque for General Fasteners

Threads dia. (mm)	Torque		
	N-m	kg-m	ft-lb
5	3.4 ~ 4.9	0.35 ~ 0.50	30 ~ 43 in-lb
6	5.9 ~ 7.8	0.60 ~ 0.80	52 ~ 69 in-lb
8	14 ~ 19	1.4 ~ 1.9	10.0 ~ 13.5
10	25 ~ 34	2.6 ~ 3.5	19.0 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45
14	73 ~ 98	7.4 ~ 10.0	54 ~ 72
16	115 ~ 155	11.5 ~ 16.0	83 ~ 115
18	165 ~ 225	17.0 ~ 23.0	125 ~ 165
20	225 ~ 325	23 ~ 33	165 ~ 240

Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Fuel System:				
Carburetor Holder Bolts	12	1.2	104 in-lb	
Fuel Tap Plate Screws	0.8	0.08	7 in-lb	
Vacuum Valve Drain Screw	1.0	0.10	9 in-lb	
Cooling System:				
Water Hose Clamp Screws	2.5	0.25	22 in-lb	
Water Pipe Bolt (Water Pump)	9.8	1.0	87 in-lb	
Coolant Air Bleeder Bolt (Water Pump)	9.8	1.0	87 in-lb	
Coolant Drain Plug (Water Pump)	9.8	1.0	87 in-lb	
Radiator Fan Switch	18	1.8	13.0	
Water Temperature Sensor	7.8	0.80	69 in-lb	SS
Water Pump Cover Bolts	9.8	1.0	87 in-lb	
Engine Top End:				
Spark Plugs	13	1.3	113 in-lb	
Air Suction Valve Cover Bolts	9.8	1.0	87 in-lb	
Cylinder Head Cover Bolts	9.8	1.0	87 in-lb	
Pickup Coil Cover Bolts	9.8	1.0	87 in-lb	L
Camshaft Chain Tensioner Mounting Bolts	12	1.2	104 in-lb	L
Camshaft Chain Tensioner Cap Bolts	8.3	0.85	74 in-lb	
Camshaft Cap Bolts	12	1.2	104 in-lb	S
Water Pipe Flange Bolts (Cylinder Head)	12	1.2	104 in-lb	
Water Hose Fitting Bolts (Cylinder)	9.8	1.0	87 in-lb	
Oil Hose Banjo Bolt	34	3.5	25	
Cylinder Head Bolts: M10 (New Parts)	54	5.5	40	S, O (Washer)
M10 (Used Parts)	49	5.0	36	S, O (Washer)
M6	12	1.2	104 in-lb	S
Left Cylinder Head Cover Screws	4.9	0.50	43 in-lb	
Cylinder Head Jacket Plugs	25	2.5	18.0	L
Camshaft Chain Guide Bolt	25	2.5	18.0	
Inlet Pipe Fittings	4.9	0.50	43 in-lb	
Inlet Pipe Plugs	4.9	0.50	43 in-lb	
Cylinder Damper Cover Bolts	9.8	1.0	87 in-lb	L
Exhaust Pipe Clamp Bolts	12	1.2	104 in-lb	
Carburetor Holder Bolts	12	1.2	104 in-lb	

Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Clutch				
Clutch Lever Pivot Bolt	1.0	0.10	9 in-lb	
Clutch Lever Pivot Bolt Locknut	5.9	0.60	52 in-lb	
Starter Lockout Switch Screws	1.0	0.10	9 in-lb	
Clutch Slave Cylinder Bleed Valve	7.8	0.80	69 in-lb	
Clutch Reservoir Cap Screws	1.5	0.15	13 in-lb	
Clutch Master Cylinder Clamp Bolts	11	1.1	95 in-lb	S
Oil Filler Plug	1.5	0.15	13 in-lb	
Clutch Cover Bolts	9.8	1.0	87 in-lb	L(2, Front)
Clutch Cover Damper Bolts	9.8	1.0	87 in-lb	L
Clutch Hub Bolts	25	2.5	18.0	L
Clutch Spring Bolts	8.8	0.90	78 in-lb	
Clutch Hub Nut	135	14.0	100	R
Clutch Hose Banjo Bolts	25	2.5	18.0	
Engine Lubrication System:				
Oil Filler Plug	1.5	0.15	13 in-lb	
Engine Drain Plug	20	2.0	14.5	
Oil Filter(Cartridge type)	Hand-Tight or 9.8	Hand-Tight or 1.0	Hand-Tight or 87 in-lb	R, O
Oil Filter Mounting Bolt	25	2.5	18.0	L(Tap End)
Oil Pan Bolts	12	1.2	104 in-lb	
Exhaust Pipe Clamp Bolts	12	1.2	104 in-lb	
Oil Pressure Relief Valves	15	1.5	11.0	L
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in-lb	
Oil Pressure Switch	15	1.5	11.0	SS
Oil Pump Bolts	12	1.2	104 in-lb	L
Oil Cooler Bolt	49	5.0	36	O
Oil Hose Clamp Screws	2.5	0.25	22 in-lb	
Oil Pipe Flange Bolt (Crankcase Front)	9.8	1.0	87 in-lb	
Oil Hose Elbow Bolts (under pickup coil cover)	9.8	1.0	87 in-lb	L
Oil Hose Banjo Bolts (Cylinder Head)	34	3.5	25	
Crankcase Main Oil Passage Plugs	20	2.0	14.5	SS
Alternator Shaft Oil Pipe Bolt	12	1.2	104 in-lb	L
Transmission Oil Pipe Holder Bolt (Right Side)	12	1.2	104 in-lb	L
Engine Removal/Installation:				
Side Stand Bracket Bolts	49	5.0	36	
Down Tube Bolts and Nuts	44	4.5	33	
Engine Collar Bolts	9.8	1.0	87 in-lb	
Engine Mounting Locknuts	49	5.0	36	
Engine Mounting Bolts and Nuts				
Front	44	4.5	33	
Rear	59	6.0	43	
Engine Mounting Bracket Bolts				
Front	44	4.5	33	
Crankshaft/Transmission:				
Upper Alternator Chain Tensioner Pivot Bolt	12	1.2	104 in-lb	L
Upper Alternator Chain Tensioner Set Bolt	12	1.2	104 in-lb	L
Upper Chain Tensioner Locknut	25	2.5	18.0	
Lower Alternator Chain Tensioner Bolts	12	1.2	104 in-lb	L, Automatic
Alternator Shaft Bearing Holder Bolts	12	1.2	104 in-lb	L
Alternator Shaft Oil Pipe Bolt	12	1.2	104 in-lb	L
Alternator Shaft Bolt	25	2.5	18.0	Engine



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