SUZUKI

VS1400

SERVICE MANUAL

99500-39154-01E

FOREWORD

This service manual has been produced primarily for experienced mechanics whose job is to inspect, adjust, repair and service SUZUKI motorcycles. Apprentice mechanics and do-it-yourself mechanics, will also find this manual an extremely useful repair guide. This manual contains the most up-to-date information at the time of publication. The rights are reserved to update or make corrections to this manual at any time. Latermade modifications and changes will be explained to each SUZUKI distributor in respective markets, to whom you are kindly requested to make query about updated information, if any.

SUZUKI MOTOR CORPORATION
Motorcycle Service Department

VIEW OF SUZUKI VS1400GLF

VIEW OF SUZUKI VS1400GLP

GROUP INDEX

GENERAL INFORMATION

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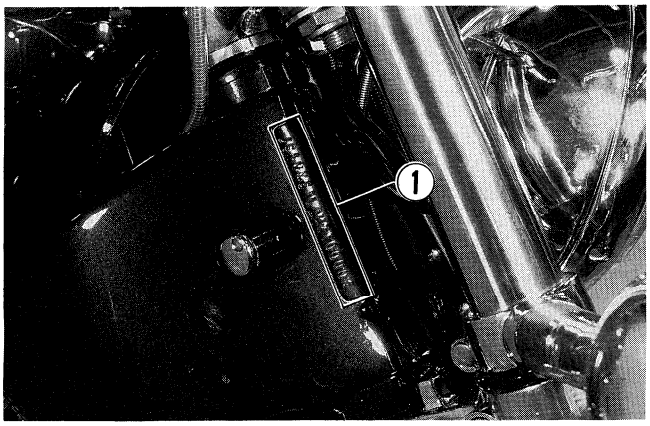
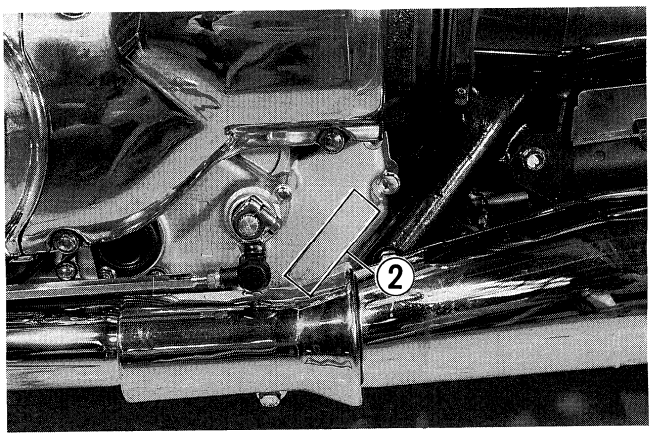
CONTENTS

SERIAL NUMBER LOCATIONS

The frame serial number of V.I.N. (Vehicle Identification Number) ① is stamped on the steering head pipe. The engine serial number ② is located on the left side of the crankcase. These numbers are required especially for registering the machine and ordering spare parts.





FUEL AND OIL RECOMMENDATIONS

FUEL

For CANADA

Use only unleaded or low-lead type gasoline of at least 85 – 95 pump octane ($\frac{R+M}{2}$ method) or 89 octane or higher rated by the Research method.

For the others

Use petrol with an octane number of at least 85 octane (Research method), preferably unleaded or low-lead.

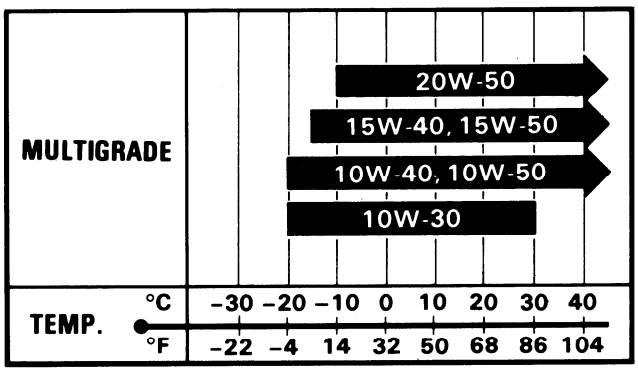
ENGINE OIL

For CANADA

Using a premium quality four stroke motor oil will increase the service life of your motorcycle. Use only oils which are rated SE or SF under the API classification system the viscosity rating should be SAE 10W-40. If an SAE 10W-40 motor oil is not available, select an alternative according to the chart.

For the others

Use a good quality SAE 10W-40 multi-grade motor oil.



FINAL GEAR OIL

Use SAE 90 hypoid gear oil which is rated GL-5 under API classification system. If you operate the motorcycle where ambient temperature is below 0°C (32°F), use SAE 80 hypoid gear oil.

FRONT FORK OIL

Use fork oil # 10.

BRAKE AND CLUTCH FLUID

Specification and classification:	DOT3, DOT4 or SAE J1703

WARNING:

- **Since the brake system and the clutch system of this motorcycle are filled with a glycol-based brake fluid by the manufacturer, do not use or mix different types of fluid such as silicone-based and petroleum-based fluid for refilling the system, otherwise serious damage will result.**
- **Do not use any brake fluid taken from old or used or unsealed containers.**
- **Never re-use brake fluid left over from the previous servicing and stored for a long period.**

BREAKING-IN PROCEDURES

During manufacture only the best possible materials are used and all machined parts are finished to a very high standard, but it is still necessary to allow the moving parts to "BREAK-IN" before subjecting the engine to maximum stresses. The future performance and reliability of the engine depends on the care and restraint exercised during its early life. The general rules are as follows.

- Upon reaching an odometer reading of 1 600 km (1 000 mi) you can subject the motorcycle to full throttle operation.
- Keep the these breaking-in engine speed limits:

		Initial 500 miles (800 km)	Up to 1 000 miles (1 600 km)	Over 1 000 miles (1 600 km)
Maximum recommended engine speed		4 000 r/min	5 000 r/min	6 000 r/min
Corresponding vehicle speed				
1st	miles/h	27	34	40
	km/h	40	50	65
2nd	miles/h	44	56	67
	km/h	70	90	105
3rd	miles/h	61	76	92
	km/h	95	120	145
Top	miles/h	78	98	117
	km/h	125	155	185

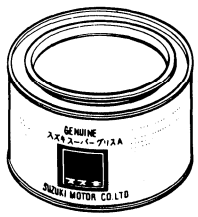
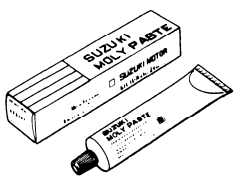
- Do not maintain constant engine speed for an extended time period during any portion of the break-in. Try to vary the throttle position.

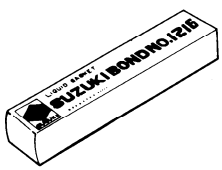
CYLINDER IDENTIFICATION

The two cylinders of this engine are identified as No. 1, and No. 2 cylinder, as counted from rear to front (as viewed by the rider on the seat).

SPECIAL MATERIALS

The materials listed below are needed for maintenance work on the VS1400GL, and should be kept on hand for ready use. They supplement such standard materials as cleaning fluids, lubricants, emery cloth and the like. How to use them and where to use them are described in the text of this manual.

Material	Part	Page	Part	Page
 SUZUKI SUPER GREASE "A" 99000-25010	• O ring of oil jet • De-comp shaft oil seal • Clutch push piece retaining hole • Secondary driven bevel gear oil seal • Final driven bevel gear coupling • Housing inside oil seal • Front wheel bearing • Steering inner race	3-25 3-28 3-53 4-7 4-28 6-13 7-4 7-22	• Drive joint O ring and final gear spline • Swing arm bearing	7-36 7-40
 SUZUKI MOLY PASTE 99000-25140	• Valve stem • De-comp shaft • Rocker arm shaft • Crank pin and bearing • Countershaft • Driveshaft • Camshaft journal • Clutch master cylinder	3-37 3-38 3-38 3-48 3-58 3-59 3-78 7-44		
 SUZUKI BOND No. 1215 99000-31110	• Oil pressure switch • Mating surface of crankcases • Mating surface of swingarm and final gear case • Mating surface of the final gear case and cover	3-24 3-61 4-28 7-40 4-27		
 THREAD LOCK SUPER "1303" 99000-32030	• Starter clutch allen bolt • Oil pump case screw • Secondary drive gear bearing retainer bolt • Secondary driven gear housing bolt • Cam sprocket bolt	3-55 3-56 3-60 3-68 3-77	• Bearing retainer bolt • Secondary driven bevel gear spacer • Final driven gear bearing retainer screw • Hub flange securing bolts • Driven joint stopper bolt	4-6 4-7 4-21 7-5 7-36
 THREAD LOCK "1305" 99000-32100	• Rotor bolt	3-63		

Material	Part	Page	Part	Page
 THREAD LOCK "1322" 99000-32110	• Oil separator bolts • Piston jet retainer bolt • Oil filter union boss (Crankcase side) • Bearing retainer • Final gear case bolt	3-25 3-25 3-26 4-22	• Pawl lifter stud bolt • Bearing retainer • Neutral stopper stud bolt • Gear shift cam retainer set bolt • Neutral stopper spring retainer nut	3-64 3-64 3-64 3-64 3-65
 THREAD LOCK "1342" 99000-32050	• Starter motor housing screw • Damper rod bolt • De-comp cable holder screw	6-13 7-17 3-29		
 THREAD LOCK SUPER "1360" 99000-32130	• Front wheel brake disc bolt • Rear wheel brake disc bolt	7-5 7-35		
 SUZUKI BOND No. 1216 99000-31160	• Mating surface of cylinder head and cylinder head cover • Cylinder head cover plug	3-80 3-81		
 THREAD LOCK SUPER "1333" 99000-32020	• Final gear bearing case	4-28		

PRECAUTIONS AND GENERAL INSTRUCTIONS

Observe the following items without fail when servicing, disassembling and reassembling motorcycles.

- Do not run engine indoors with little or no ventilation.
- Be sure to replace packings, gaskets, circlips, O-rings and cotter pins with new ones.

CAUTION:
Never reuse a circlip after a circlip has been removed from a shaft, it should be discarded and a new circlip must be installed.
When installing a new circlip, care must be taken not to expand the end gap larger than required to slip the circlip over the shaft.
After installing a circlip, always insure that it is completely seated in its groove and securely fitted.

- Tighten cylinder head and case bolts and nuts beginning with larger diameter and ending with smaller diameter, and from inside to outside diagonally, to the specified tightening torque.
- Use special tools where specified.
- Use genuine parts and recommended oils.
- When two or more persons work together, pay attention to the safety of each other.
- After the reassembly, check parts for tightness and operation.
- Treat gasoline, which is extremely flammable and highly explosive, with greatest care. Never use gasoline as cleaning solvent.

Warning, Caution and Note are included in this manual occasionally, describing the following contents.

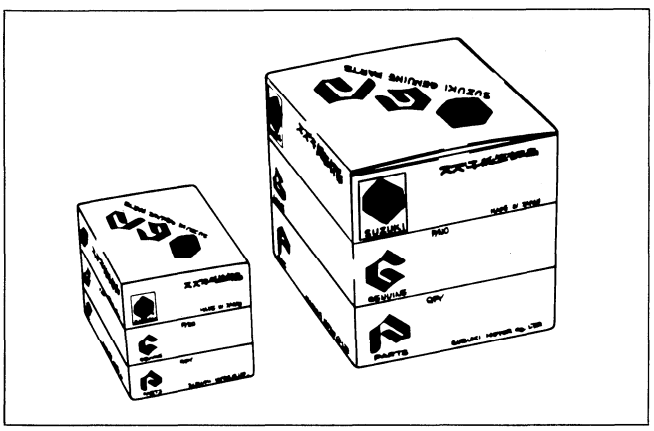
WARNING ..... When personal safety of the rider or the mechanic is involved, disregard of the information could result in injury.

CAUTION ..... For the protection of the motorcycle, the instruction or rule must be strictly adhered to.

NOTE ..... Advice calculated to facilitate the use of the motrcycle is given under this heading.

USE OF GENUINE SUZUKI PARTS

To replace any part of the machine, use a genuine SUZUKI replacement part. Imitation parts or parts supplied from any other source than SUZUKI, if used to replace SUZUKI parts can reduce the machine's performance and, even worse, could induce costly mechanical troubles.



SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2330 mm (91.7 in)
Overall width	710 mm (28.0 in) ... GLF 770 mm (30.3 in) ... GLP
Overall height	1135 mm (44.7 in) ... GLF 1220 mm (48.0 in) ... GLP
Wheelbase	1620 mm (63.8 in)
Ground clearance	145 mm (5.7 in)
Dry mass	242kg(533lbs)...GLF 243kg(535lbs)...GLP

ENGINE

Type	Four-stroke, 3 valves, OHC, 45-degree V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Piston displacement	1360 cm^3 (83.0 cu. in)
Compression ratio	9.3 : 1
Carburetor	MIKUNI BDS36SS .... front MIKUNI BS36SS ... rear
Air cleaner	Polyurethane foam element
Starter system	Electric starter motor
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	4-speed constant mesh
Gearshift pattern	1-down, 3-up
Primary reduction	1.645 (79/48)
Secondary reduction	0.852 (29/34 x 19/19)
Final reduction	2.666 (32/12)
Gear ratios, Low 2nd 3rd Top	3.000 (36/12) 1.823 (31/17) 1.333 (28/21) 1.041 (25/24)

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swinging arm, oil damped, spring pre-load 5-way adjustable
Steering angle	40° (right & left)
Caster	54°00′
Trail	166 mm (6.5 in)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc brake
Rear brake	Disc brake
Front tire size	110/90 – 19 62H
Rear tire size	170/80 – 15 77H
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)

ELECTRICAL

Ignition type	Transistorized
Ignition timing	2° B.T.D.C. below 1500 r/min and 30° B.T.D.C. above 4 000 r/min
Spark plug	N.G.K.: DPR8EA-9 N.D.: X24EPR-U9
Battery	12V 50.4 kC (14 Ah)/ 10HR
Generator	Three phase A.C.Generator
Fuse	10A x 4, 25A x 1

CAPACITIES

Fuel tank including reserve	13.0 L (3.4/2.8 US/Imp gal)
reserve	3.0 L (3.2/2.6 US/Imp qt)
Engine oil with filter change	4.3 L (4.5/3.8 US/Imp qt)
without filter change	3.7 L (3.9/3.2 US/Imp qt)
Front fork oil	354 ml (12.0/12.5 US/Imp oz)
Final bevel gear oil	200 – 220 ml (6.8 – 7.4/ 7.0 – 7.7 US/Imp oz)

These specifications are subject to change without notice.

PERIODIC MAINTENANCE AND TUNE-UP PROCEDURES

2

CONTENTS

PERIODIC MAINTENANCE SCHEDULE

IMPORTANT: The periodic maintenance intervals and service requirements have been established in acoordance with EPA regulations. Following these instructions will ensure that the motorcycle will not exceed emission standards and it will also ensure the reliability and performance of the motorcycle.

NOTE:
More frequent servicing may be performed on motorcycles that are used under severe conditions, however, it is not necessary for ensuring emission level compliance.

The chart below lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and to maintain proper emission levels. Mileages are expressed in terms of kilometer, miles and time for your convenience.

INTERVAL: THIS INTERVAL SHOULD BE JUDGED BY ODOMETER READING OR MONTHS WHICHEVER COMES FIRST	km	1 000	6 000	12 000	18 000	24 000
	miles	600	4 000	7 500	11 000	15 000
	months	2	12	24	36	48
Battery		–	I	I	I	I
Air cleaner element		Clean every 6 000 km (4 000 miles).				
Spark plug		–	I	R	I	R
Engine oil and oil filter		R	R	R	R	R
Engine idle speed		I	I	I	I	I
Automatic de-compression cable		I	I	I	I	I
Fuel line		I	I	I	I	I
		Replace every four years.				
Clutch hose		I	I	I	I	I
		Replace every four years.				
Clutch fluid		I	I	I	I	I
		Replace every two years.				
Final gear oil		R	–	I	–	I
Brake		I	I	I	I	I
Brake hose		I	I	I	I	I
		Replace every four years.				
Brake fluid		Replace every two years.				
Tire		I	I	I	I	I
Steering		I	I	I	I	I
Front fork		–	–	I	–	I
Chassis bolts and nuts		T	T	T	T	T

NOTE: T = Tighten, I = Inspect, R = Replace

MAINTENANCE AND TUNE-UP PROCEDURES

This section describes the servicing procedures for each items of the periodic maintenance requirements.

BATTERY

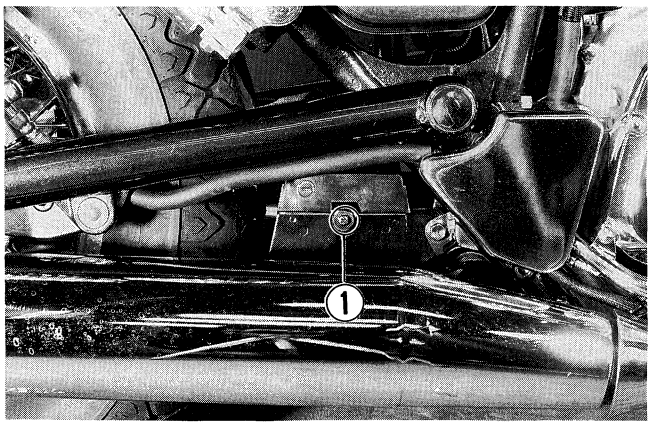
Inspect every 6 000 km (4 000 miles).

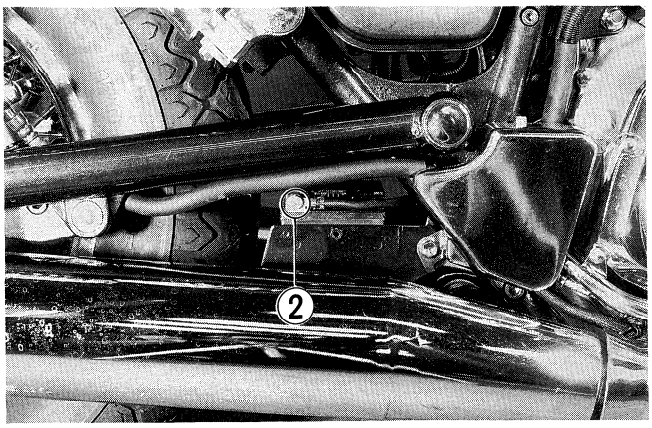
CAUTION:
The battery voltage should be checked after removing the battery from the machine to avoid making a short circuit between the machine and the probe of the tester.

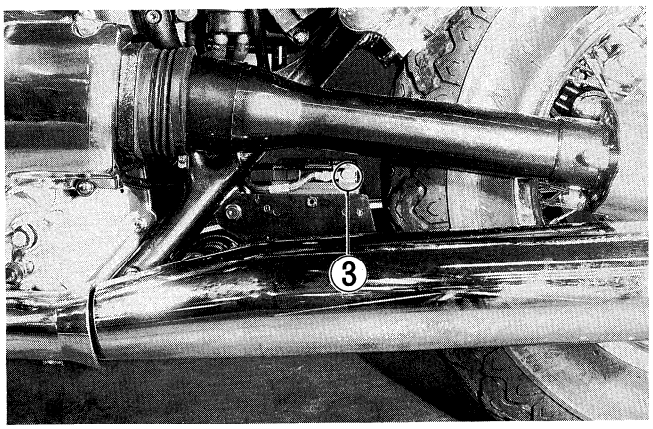
- Remove the battery cover by loosening two screws ①.
- Remove the battery ⊖ terminal screw ② to disconnect the ⊖ lead wire.

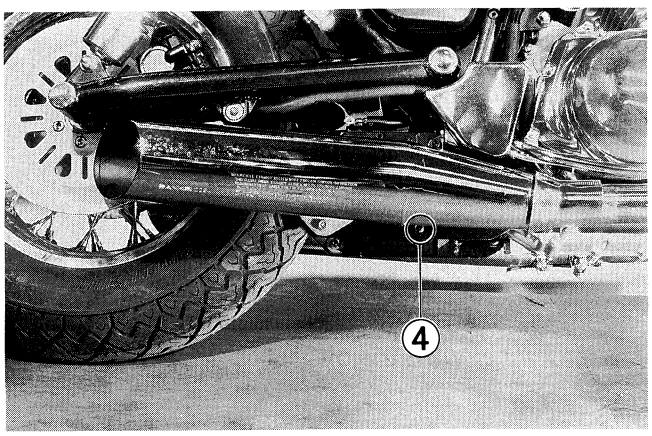
CAUTION:
When disconnecting the battery terminals, be sure to remove the ⊖ (negative) terminal first, then remove the ⊕ (positive) terminal. When connecting the battery terminals, be sure to connect the ⊕ (positive) terminal first, then the ⊖ (negative) terminal.

- Remove the battery ⊕ terminal screw ③.
- Loosen two bolts ④ to open the battery case bottom plate and remove the battery.







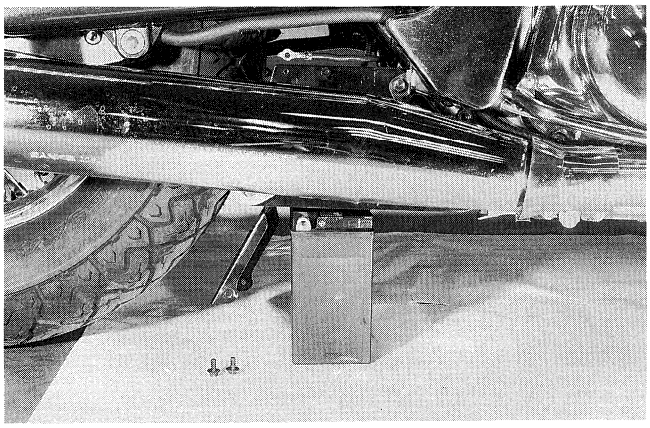


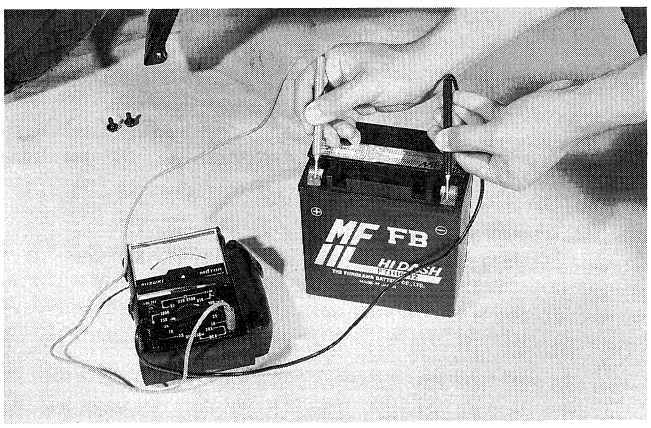
- Check the battery voltage with the SUZUKI pocket tester. If the voltage reading is below 12.0V, this battery needs recharging.

Battery voltage	Above 12.0 V

CAUTION:
Never charge a battery while still in the machine as damage may result to the battery or regulator/rectifier.

NOTE:
Read the ELECTRICAL SYSTEM section to keep excellent operational condition at all times.

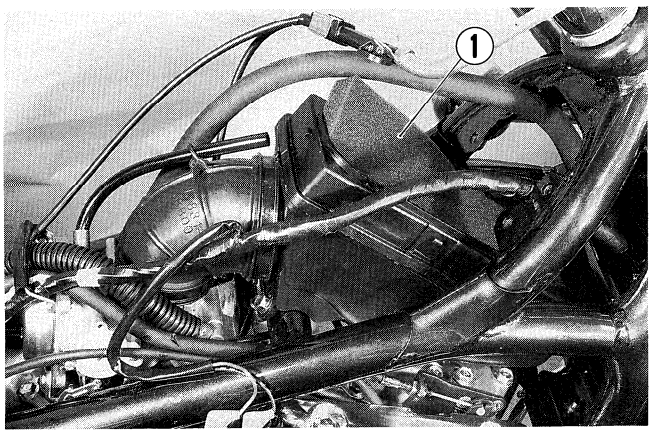




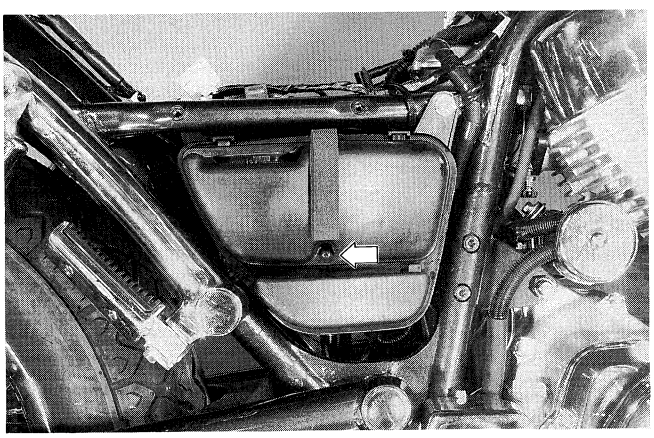
AIR CLEANER

Clean every 6 000 km (4 000 miles).

- Remove the seats and right frame cover. (Refer to page 3-3.)
- Remove the fuel tank bracket and the frame head covers. (Refer to page 3-6.)
- Remove the air cleaner cover and take off the front element ①.
- Remove the cover and take off the rear element ②.



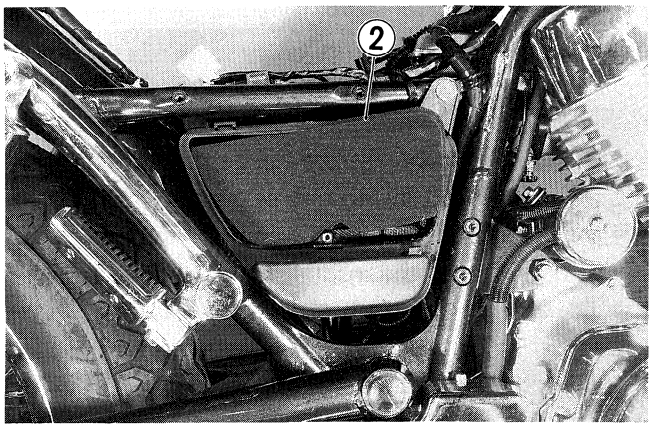
- Fill a washing pan of a proper size with non-flammable cleaning solvent. Immerse the element in the solvent and wash it clean.
- Squeeze the solvent off the washed element by pressing it between the palms of both hands. Do not twist and wring the element or it will develop tears.
- Immerse the element in a pool of motor oil and squeeze the oil from the element to make it slightly wet with the oil.

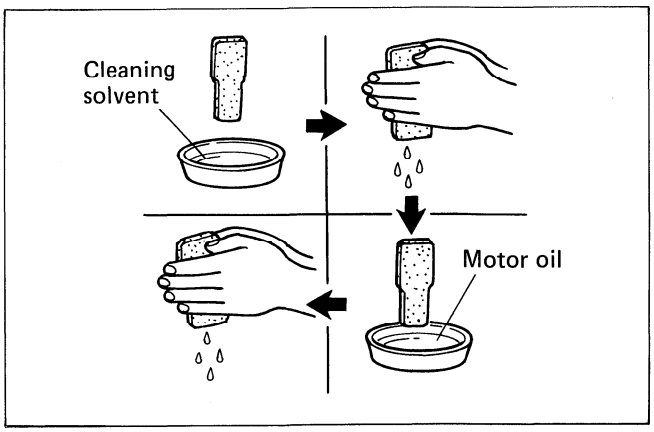


CAUTION:
Before and during the cleaning operation, carefully examine the element for any tears in the material. A torn element must be replaced with a new one.

- Reinstall the cleaned element in reverse order of removal. Be absolutely sure that the element is securely in position and is sealing properly.

CAUTION:
If driving under dusty conditions, the air cleaner element must be cleaned more frequently than it is with periodic maintenance. NEVER OPERATE THE ENGINE WITHOUT THE ELEMENT IN POSITION. Operating the engine without the air cleaner element will increase engine wear. Always be sure that the air cleaner element is in excellent operational condition at all times.





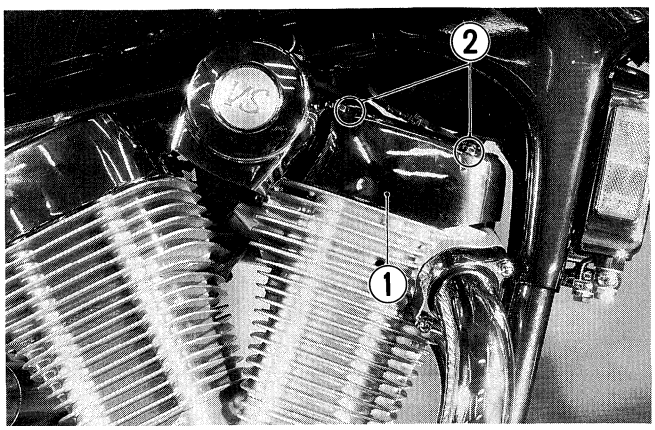
SPARK PLUG

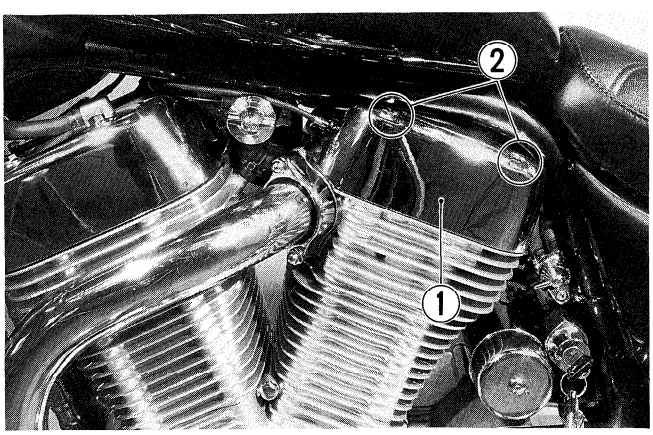
Clean every 6 000 km (4 000 miles) and replace every 12 000 km (7 500 miles).

- Remove the covers ① by loosening the bolts ②.

The plug gap should be adjusted to 0.8 – 0.9 mm using a thickness gauge (special tool). When carbon is deposited on the spark plug, remove the carbon with a spark plug cleaning machine or carefully using tool with a pointed end. If electrodes are extremely worn or burnt, replace the plug. Also replace the plug if it has a broken insulator, damaged thread, etc.

09930-13210	Socket wrench
09930-14530	Universal joint
09914-24510	T handle
09900-20804	Thickness gauge





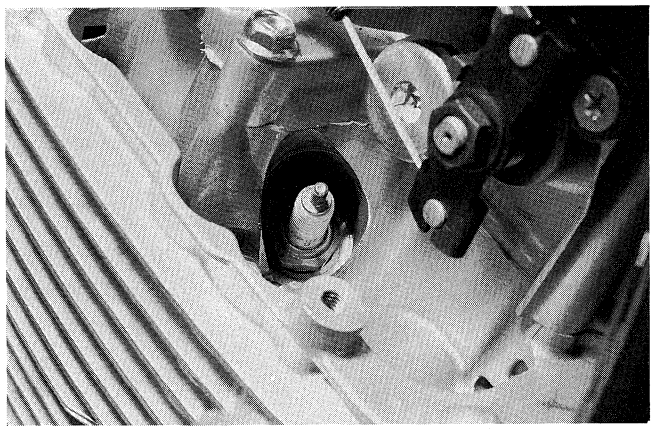
NGK DPR8EA-9 or NIPPON DENSO X24EPR-U9 listed in the table should be used as the standard plug. If the plugs need to be replaced, it is recommended that the standard plugs listed in the table be selected. However, the heat range of the plug should be selected to meet the requirements of speed, actual load, fuel, etc. Remove the plugs and inspect the insulators. Proper heat range would be indicated if all insulators were light brown in color. If they are blackened by carbon, they should be replaced by a hot type NGK DPR7EA-9 or NIPPON DENSO X22EPR-U9 and if braked white, by a cold type NGK DPR9EA-9 or NIPPON DENSO X27EPR-U9.

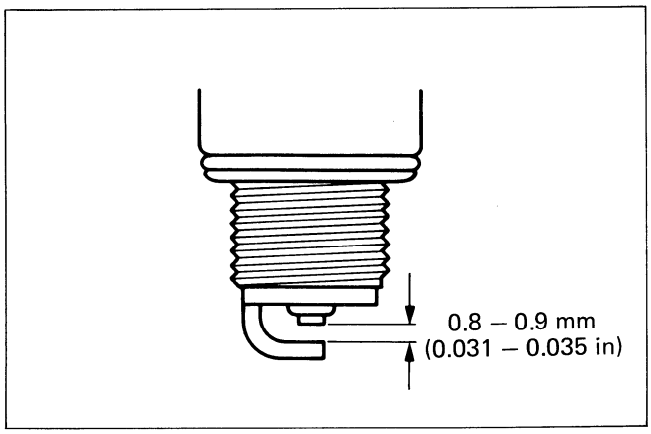
NOTE:
To check the spark plugs, first make sure that the fuel tank contains unleaded gasoline, and after a test ride, if the plugs are either sooty with carbon or burnt white, replace them altogether.

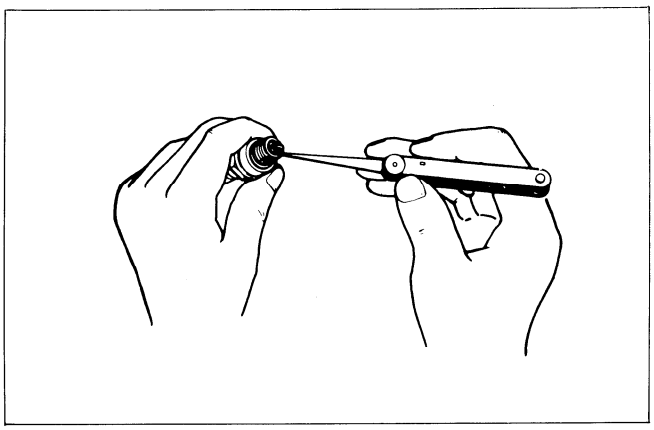
NOTE:
Confirm the thread size and reach when replacing the plug. If the reach is too short, carbon will be deposited on the screw portion of the plug hole and engine damage may result. If the reach is too long, the plug will hit the piston head causing the severe damage.

Spark plug gap	0.8 – 0.9 mm (0.031 – 0.035 in)

NGK	NIPPON DENSO	REMARKS
DPR7EA-9	X22EPR-U9	Hot type
DPR8EA-9	X24EPR-U9	Standard
DPR9EA-9	X27EPR-U9	Cold type







ENGINE OIL AND OIL FILTER

Replace initially at 1 000 km (600 miles) and every 6 000 km (4 000 miles).

The oil should be changed while the engine is hot. Oil filter replacement at the above intervals should be done together with engine oil change.

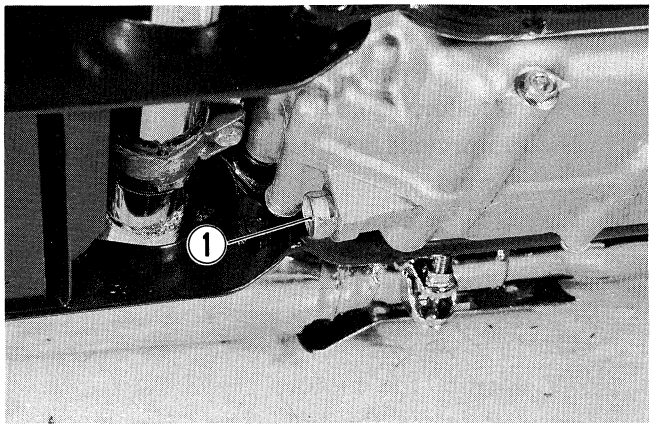
- Keep the motorcycle upright.
- Place an oil pan below the engine and drain the oil by removing the drain plug ① and filler cap ②.
- Remove the oil filter ③.
- Apply engine oil lightly to the gasket of the new filter before installation.

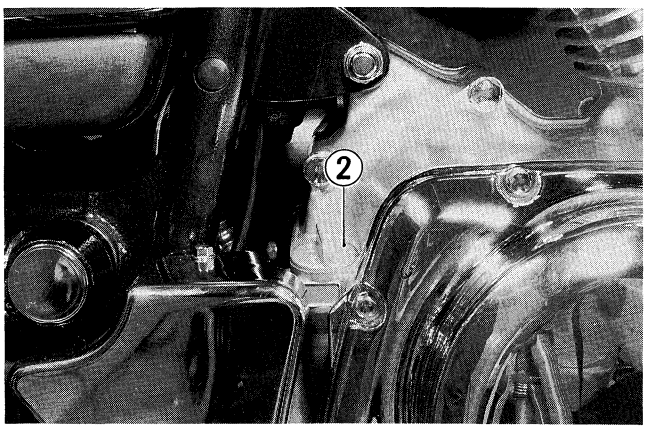
CAUTION:
Use SUZUKI motorcycle genuine oil filter only, since the other makes filters and after-market parts may differ in thread specifications (thread diameter and pitch), filtering performance and durability, which could cause engine damage or oil leakage. Suzuki automobile genuine oil filter is also not usable for the motorcycle.

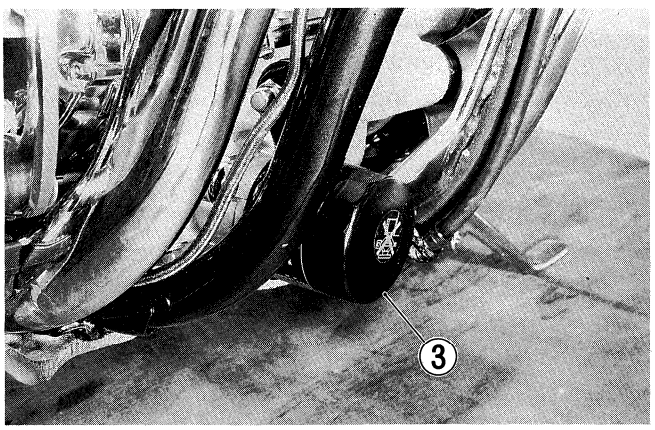
- Install the new filter turning it by hand until you feel the filter gasket contacts the mounting surface. Then tighten 2 turns using the oil filter wrench.

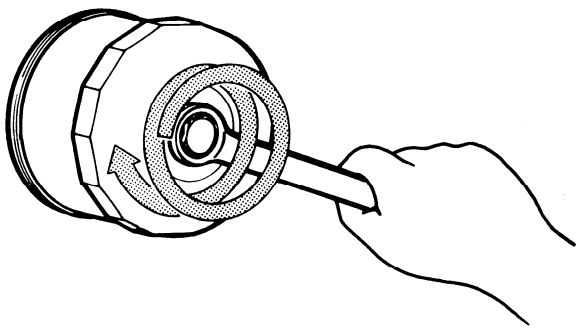
09915-40610	Oil filter wrench

- Fit drain plug ① securely, and install fresh oil through the filler. The engine will hold about 4.3 L (4.5 US qt) of oil.
  Use API classification of SE or SF oil with SAE 10W/40 viscosity.
- Start up the engine and allow it to run for a few minutes at idling speed.
- Check for oil leakage around the oil filter.
- Turn off the engine and wait about one minute, then check the oil level by the dipstick. If the level is below "F" line, supply oil until it reaches the "F" line.









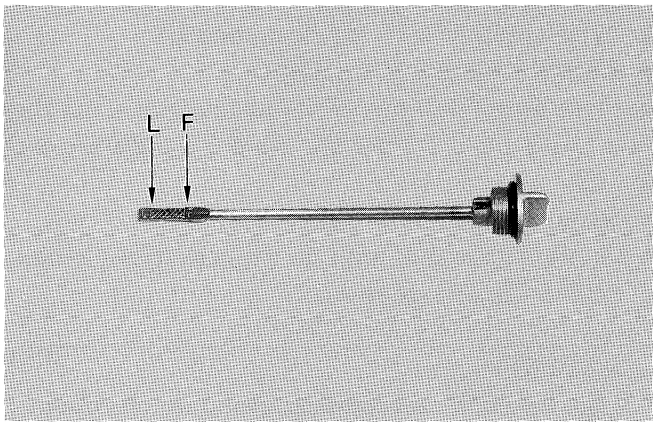
Tighten the filter 2 turns after contacting with the mounting surface.

NOTE:
The oil level inspection should be performed under the following conditions:
* **The motorcycle is supported vertically on a level ground.**
* **The oil filler cap threads are not run in but touching the filler hole upper edge.**

CAUTION:
Never operate the motorcycle if the engine oil level is below the "L" (Low) line in the engine oil dipstick. Never fill the engine oil above the "F" (Full) line

NECESSARY AMOUNT OF ENGINE OIL

Oil change	3.7 L (3.9/3.2 US/Imp qt)
Filter change	4.3 L (4.5/3.8 US/Imp qt)
Overhaul engine	5.0 L (5.3/4.4 US/Imp qt)



CARBURETOR

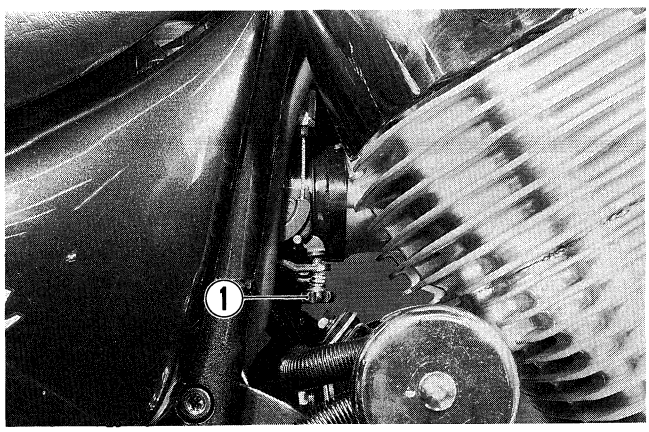
Inspect initially at 1 000 km (600 miles) and every 6 000 km (4 000 miles).

ENGINE IDLE SPEED

NOTE:
Make this adjustment when the engine is hot.

- Connect a tachometer.
- Start up the engine and set its speed at anywhere between 950 and 1 050 r/min by turning throttle stop screw ①.

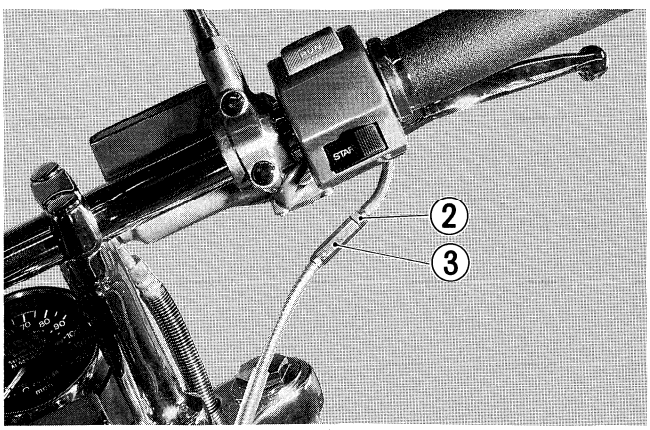
Engine idle speed	1 000 ± 50 r/min



THROTTLE CABLE PLAY

- Loosen the lock nut ② and turn the adjuster ③ to adjust the cable play. (Refer to page 5-21 for balancing two carburetors.)

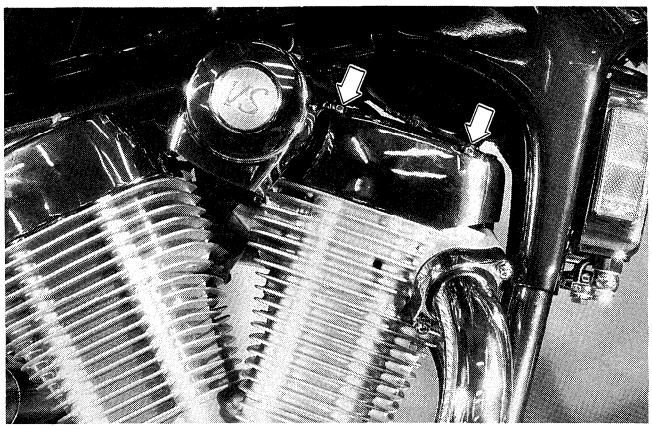
Throttle cable play	0.5 – 1.0 mm (0.02 – 0.04 in)

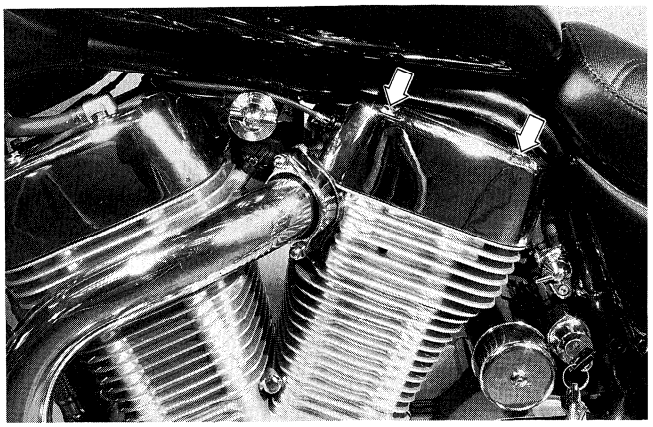


AUTOMATIC DE-COMPRESSION CABLE

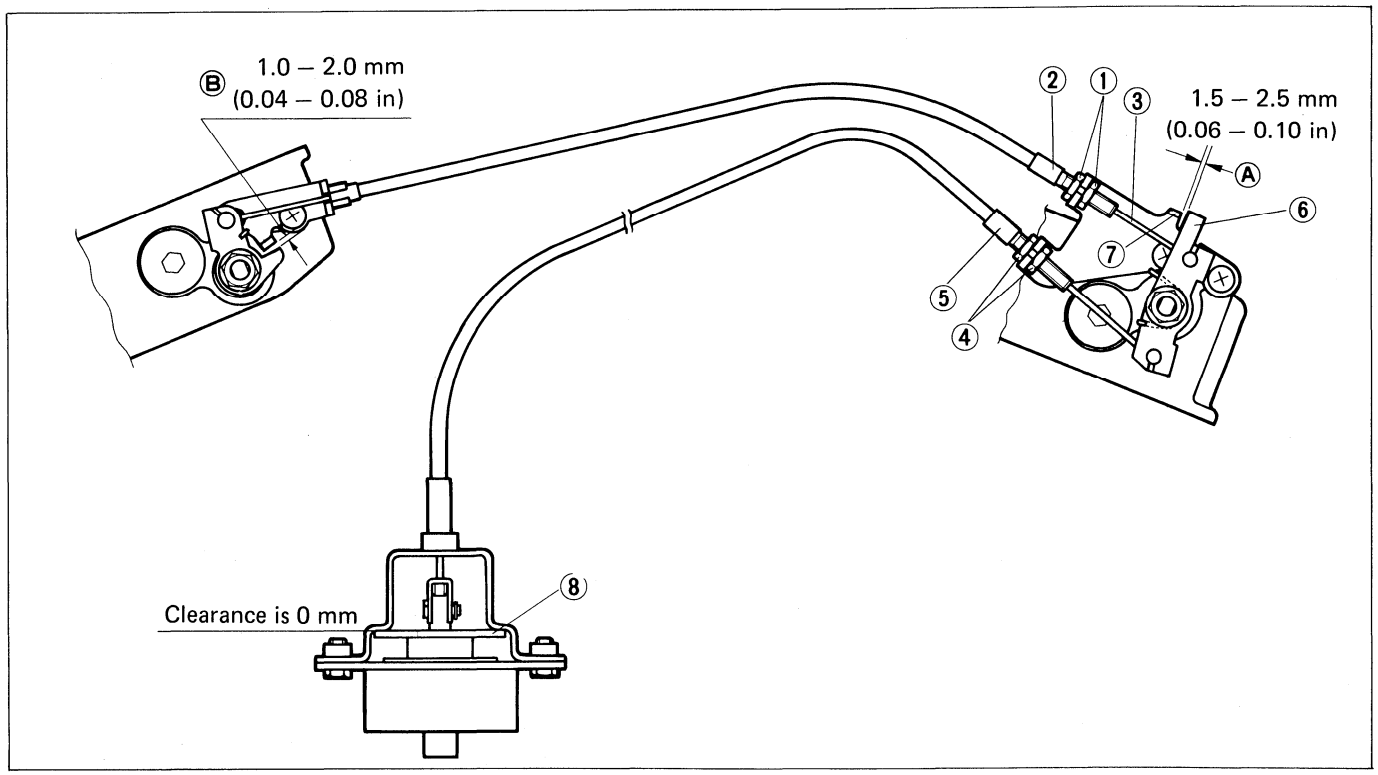
Inspect initially at 1 000 km (600 miles) and every 6 000 km (4 000 miles).

Incorrect adjustment of the cable slack may result in starting difficulties or engine damage. Check the cable slacks and if necessary, adjust as follows:





- Remove the engine side covers.
- Loosen the lock nuts ① and locate the end of the outer tube ② to make the cable ③ have an enough free play.
- Loosen the lock nuts ④ and locate the end of the outer tube ⑤ so that the clearance Ⓐ between the lever ⑥ and the stopper ⑦ is 1.5 – 2.5 mm (0.06 – 0.10 in), keeping the plunger ⑧ of the decompression solenoid at the top end.
- Tighten the lock nuts ④.
- Holding the above clearance, locate the tube end ② so that the clearance Ⓑ is 1.0 – 2.0 mm (0.04 – 0.08 in).
- Tighten the lock nuts ①.



FUEL LINE

Inspect initially at 1 000 km (600 miles) and every 6 000 km (4 000 miles).
Replace every four years.

Inspect the fuel line for damage and fuel leakage. If any defects are found, the fuel line must be replaced.

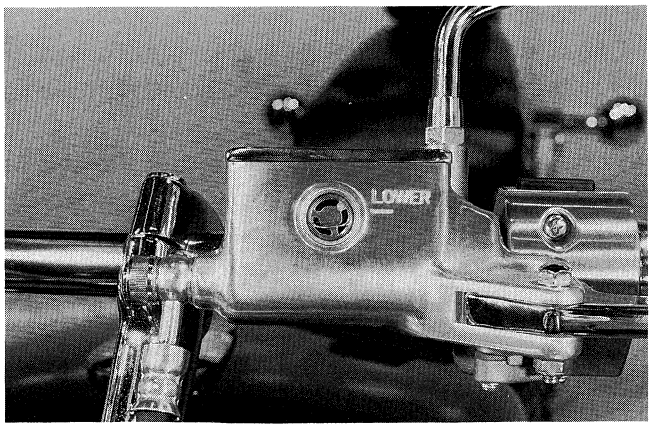
CLUTCH

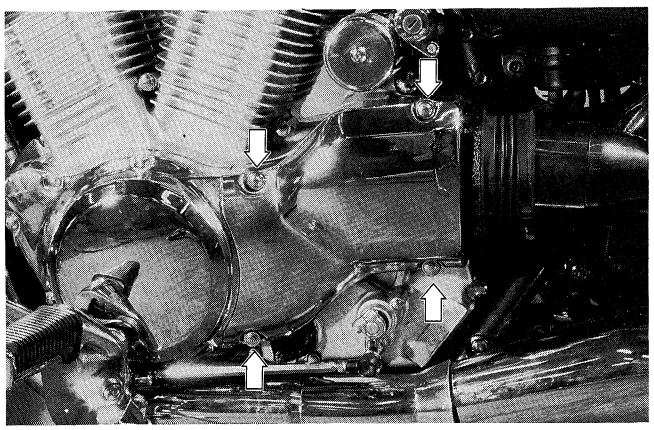
Inspect initially at 1 000 km (600 miles) and every 6 000 km (4 000 miles).
Replace fluid every two years.
Replace hoses every four years.

CLUTCH FLUID LEVEL

- Keep the motorcycle upright and place the handlebars straight.
- Check the clutch fluid level in the reservoir.
- If the level is found to be lower than the lower mark, replenish with BRAKE FLUID that meets the following specification.

Specification and classification	SAE J1703, DOT 3 or DOT 4



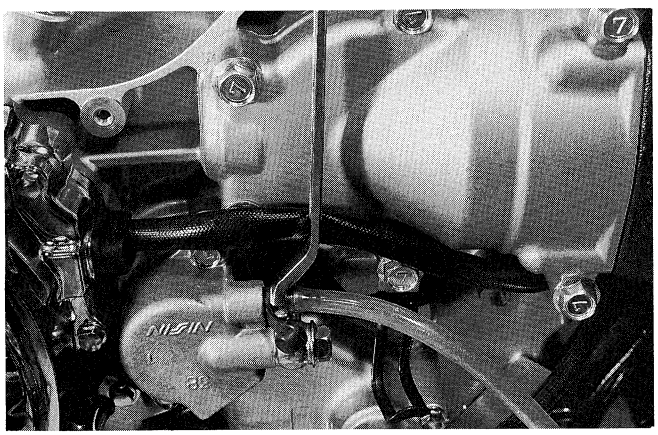


BLEEDING AIR FROM THE CLUTCH FLUID CIRCUIT

The clutch fluid circuit may be purged of air in the following manner.

- Fill up the master cylinder reservoir to the upper end of the inspection window. Replace the reservoir cap to prevent entry of dirt.
- Remove the secondary gear case cover.
- Set the vacuum pump gauge ① and the receptacle ② as shown in the picture.

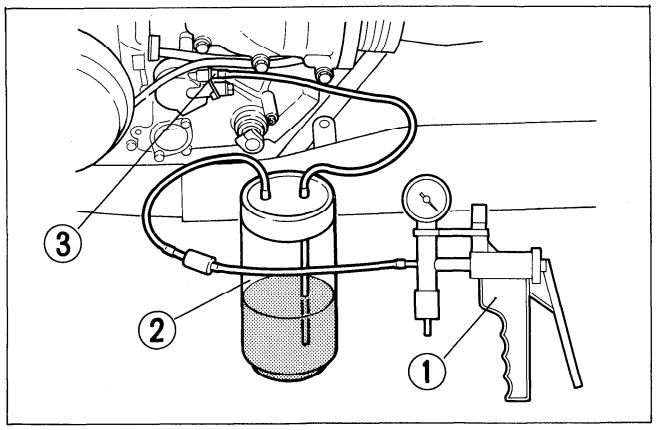
09917-47910	Vacuum pump gauge



- Squeeze and release the clutch lever several times in rapid succession, and at the same time pump the vacuum pump gauge several times. At the last squeezing of the clutch lever, squeeze it fully without releasing it and loosen the bleeder valve ③ by turning it a quarter of a turn so that the fluid runs into the receptacle. Then close the bleeder valve.
- Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.
- Close the bleeder valve, and disconnect the pipe. Fill the reservoir to the upper end of the inspection window.

Bleeder valve tightening torque	6 – 9 N·m (0.6 – 0.9 kg-m, 4.5 – 6.5 lb-ft)

WARNING:
The clutch system of this motorcycle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based and petroleum-based. Do not use any brake fluid taken from old, used or unsealed containers. Never re-use the brake fluid left over from the last servicing and stored for long periods.



NOTE:
Replenish the clutch fluid reservoir as necessary while bleeding the clutch system.
Make sure that there is always some fluid visible in the reservoir.

CAUTION:
Handle the brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials, etc.

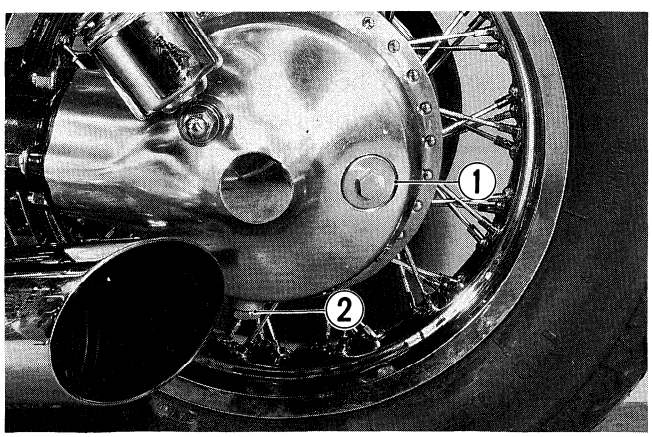
FINAL GEAR OIL

Replace initially at 1 000 km (600 miles) and inspect every 12 000 km (7 500 miles).

To change the final gear oil, locate the motorcycle on level ground, keep it upright and carry out the following steps. Use SAE # 90 hypoid gear oil.

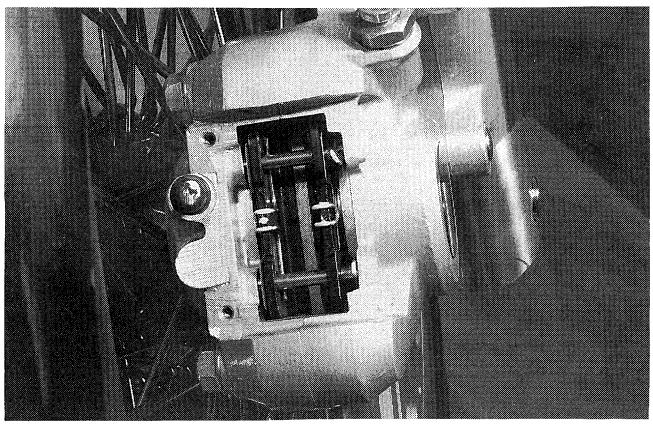
- Drain oil by removing filler cap ① and drain plug ②.
- Refit drain plug ② and pour the specified oil in through the filler hole until it runs out from the filler hole.
- Refit filler cap ①.

NOTE:
The amount of oil to be replaced is 200 – 220 ml (6.8 – 7.4/7.0 – 7.7 US/Imp oz).



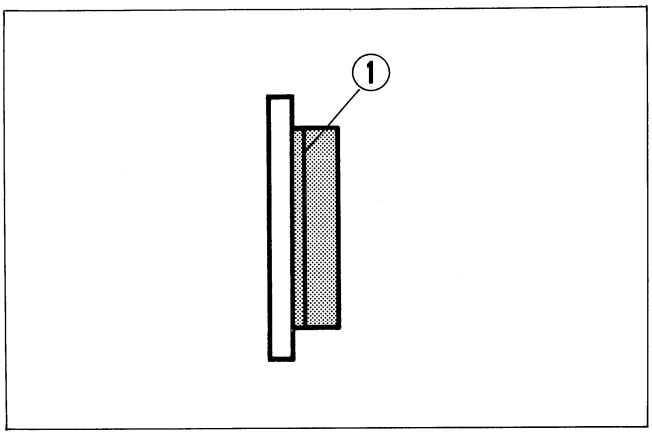
BRAKE

Inspect initially at 1 000 km (600 miles) and every 6 000 km (4 000 miles).
Replace fluid every two years.
Replace hoses every four years.



BRAKE PADS

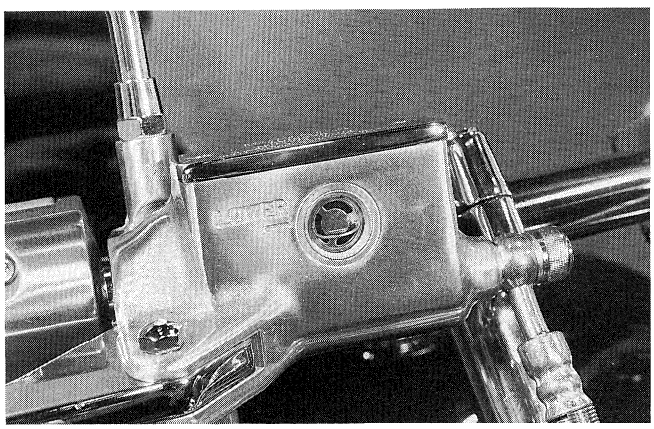
Wearing condition of brake pads can be checked by observing the limit line ① marked on the pad. When the wear exceeds the limit line, replace the pads with new ones. (Refer to page 7-6 and 7-26.)



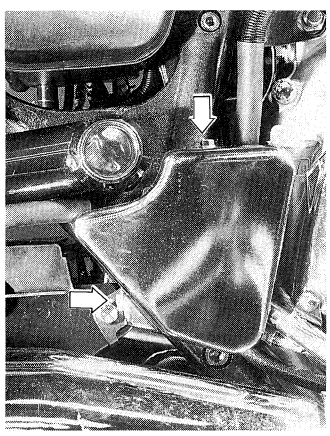
BRAKE FLUID LEVEL

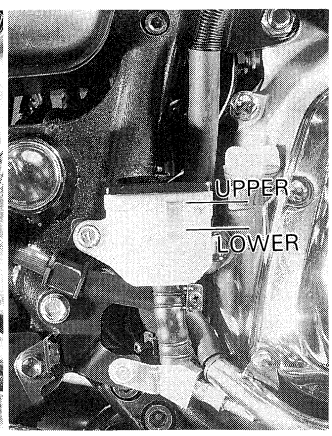
- Keep the motorcycle upright and place the handlebars straight.
- Remove the rear brake reservoir cover.
- Check the brake fluid level in the reservoir.
- If the level is found to be lower than the lower mark, replenish with brake fluid that meets the following specification.

Specification and classification	SAE J1703, DOT 3 or DOT 4



WARNING:
The brake system of this motorcycle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based and petroleum-based fluid for refilling the system, otherwise serious damage will be caused. Do not use any brake fluid taken from old or used or unsealed containers. Never re-use the brake fluid left over from the last servicing and stored for long periods.





WARNING:
Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces.
Check the brake hoses for cracks and hose joint for leakage before riding.

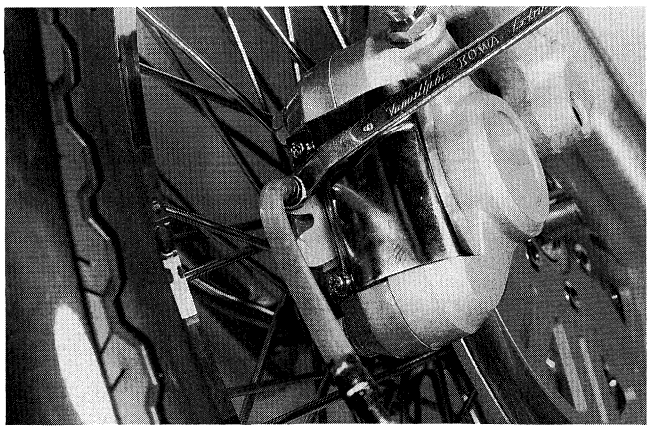
BLEEDING AIR FROM THE BRAKE FLUID CIRCUIT

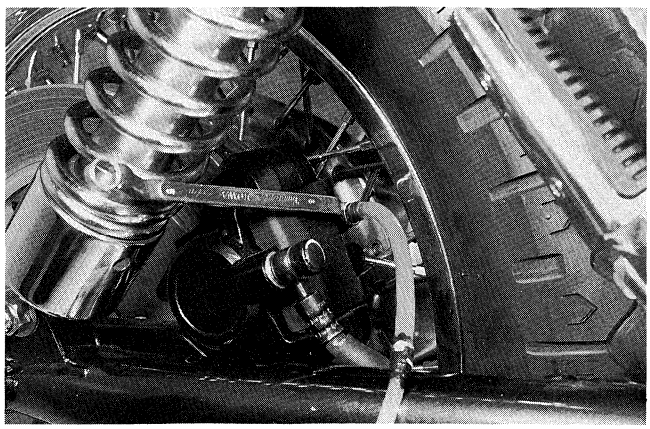
Air trapped in the fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by "sponginess" of the brake lever and also by lack of braking force. Considering the danger to which such trapped air exposes the machine and rider, it is essential that, after remounting the brake and restoring the brake system to the normal condition, the brake fluid circuit be purged of air in the following manner:

- Fill up the master cylinder reservoir to the upper end of the inspection window (for front brake) or upper line (for rear brake). Replace the reservoir cap to prevent entry of dirt.
- Attach a pipe to the caliper bleeder valve, and insert the free end of the pipe into a receptacle.
- Squeeze and release the brake lever several times in rapid succession, and squeeze the lever fully without releasing it. Loosen the bleeder valve by turning it a quarter of a turn so that the brake fluid runs into the receptacle; this will remove the tension of the brake lever causing it to touch the handlebars grip. Then, close the valve, pump and squeeze the lever, and open the valve. Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.
- Close the bleeder valve, and disconnect the pipe. Fill the reservoir to the upper end of the inspection window (for front brake) or upper line (for rear brake).

Bleeder valve tightening torque	6 – 9 N·m (0.6 – 0.9 kg-m 4.5 – 6.5 lb-ft)

NOTE:
Replenish the brake fluid reservoir as necessary while bleeding the brake system.
Make sure that there is always some fluid visible in the reservoir.





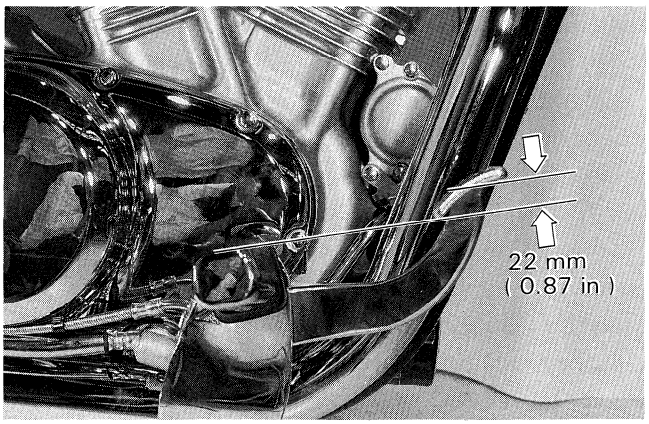
CAUTION:
Handle the brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials, etc.

- The only difference between bleeding the front and rear brakes is that the rear master cylinder is actuated by a pedal.

BRAKE PEDAL HEIGHT

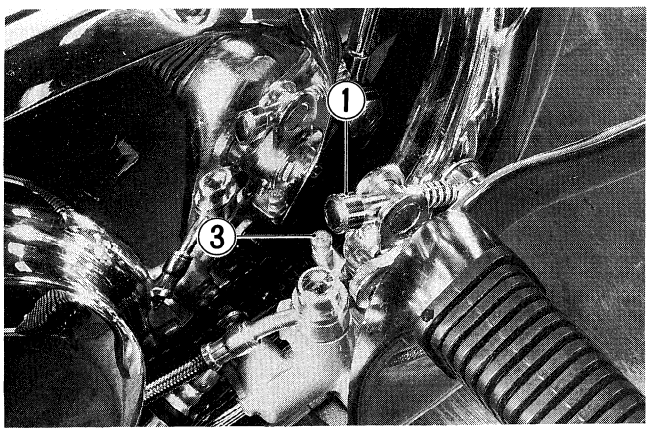
Turn the pedal height adjuster ① so that the brake pedal is located 22 mm (0.87 in) above the top face of the footrest.

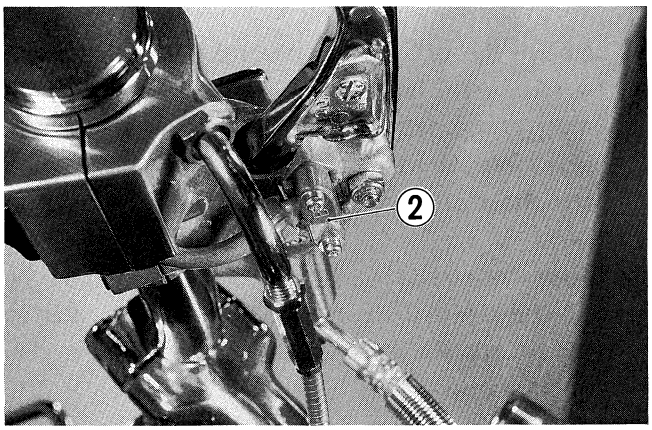
Brake pedal height	22 mm (0.87 in)



BRAKE LIGHT SWITCHES

Adjust both brake light switches ② and ③, front and rear, so that the brake light comes on just before a pressure is felt when the brake lever is squeezed, or the brake pedal is depressed.





TIRE

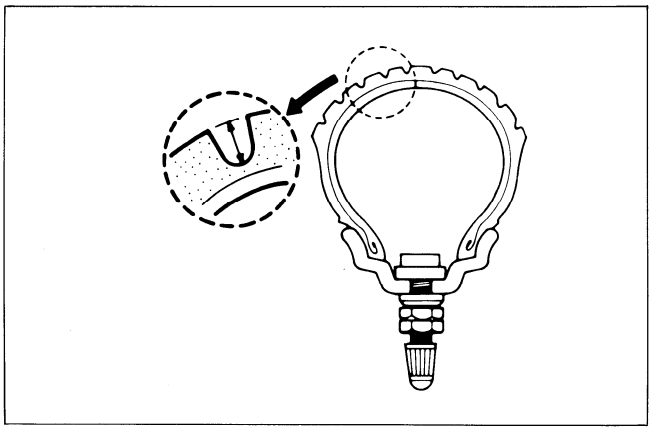
Inspect initially at 1 000 km (600 miles) and every 6 000 km (4 000 miles).

TIRE TREAD CONDITION

Operating the motorcycle with excessively worn tires will decrease riding stability and consequently invite a dangerous situation. It is highly recommended to replace the tire when the remaining depth of tire tread reaches the following specifications.

Tire tread depth limit

FRONT	REAR
1.6 mm (0.06 in)	2.0 mm (0.08 in)



TIRE PRESSURE

If the tire pressure is too high or too low, steering will be adversely affected and tire wear increased. Therefore, maintain the correct tire pressure for good roadability or shorter tire life will result.

CAUTION:
The standard tire fitted on this motorcycle is 110/90-19 62H for front and 170/80-15 77H for rear. The use of a tire other than the standard may causes instability. It is highly recommended to use a SUZUKI genuine tire.

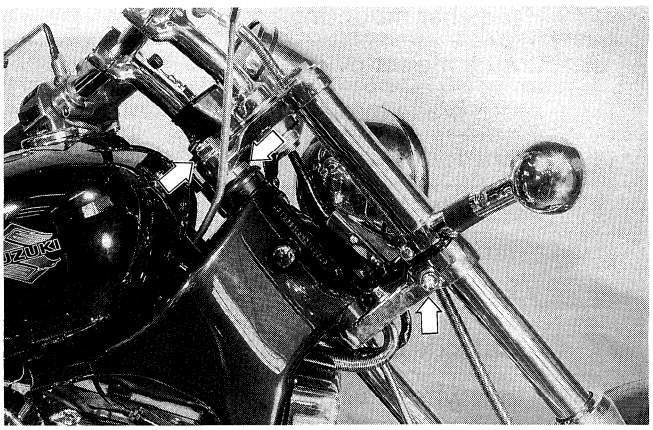
Cold inflation tire pressure is as follows.

	FRONT			REAR		
	kPa	kg/cm^2	psi	kPa	kg/cm^2	psi
Solo riding	200	2.00	29	200	2.00	29
Dual riding	200	2.00	29	225	2.25	33

STEERING

Inspect initially at 1 000 km (600 miles) and every 6 000 km (4 000 miles).

Taper roller type bearings are applied on the steering system for better handling.
Steering should be adjusted properly for smooth manipulation of handlebars and safe running.
Too stiff steering prevents smooth manipulation of handlebars and too loose steering will cause poor stability.
Check that there is no play in the front fork assembly by supporting the machine so that the front wheel is off the ground, with wheel straight ahead, grasp lower fork tubes near the axle and pull forward. If play is found, perform steering bearing adjustment as described in page 7-23 of this manual.



FRONT FORK

Inspect every 12 000 km (7 500 miles).

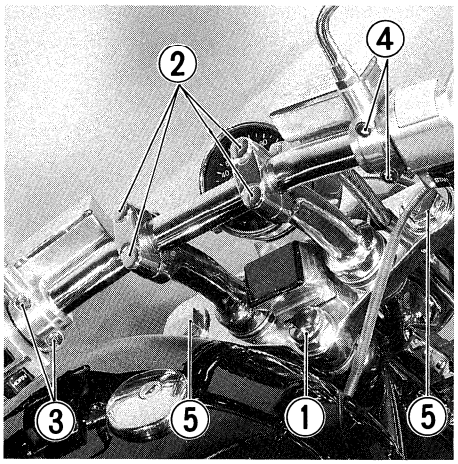
Inspect the front fork oil leakage, scoring and scratches on the outer surface of the inner tube and replace the defective parts, if necessary. (Refer to page 7-12.)

CHASSIS BOLTS AND NUTS

Tighten initially at 1 000 km (600 miles) and every 6 000 km (4 000 miles).

The nuts and bolts listed below are important safety parts. They must be retightened periodically to the specified torque with a torque wrench. (Refer to page 2-16 for the location of the following nuts and bolts on the motorcycle.)

	Item	N·m	kg-m	lb-ft
①	Steering stem head nut	80 – 100	8.0 – 10.0	58.0 – 72.5
②	Handlebar mounting bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
③	Clutch master cylinder mounting bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
④	Front brake master cylinder mounting bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
⑤	Front fork cap bolt	45 – 55	4.5 – 5.5	32.5 – 39.8
⑥	Handlebar holder nut	80 – 100	8.0 – 10.0	58.0 – 72.5
⑦	Front fork lower clamp bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
⑧	Front axle	36 – 52	3.6 – 5.2	26.0 – 37.5
⑨	Front axle clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
⑩	Front wheel hub flange bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
⑪	Front brake caliper housing bolt	15 – 20	1.5 – 2.0	11.0 – 14.5
⑫	Front brake caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
⑬	Brake hose union bolt (10 mm)	20 – 25	2.0 – 2.5	14.5 – 18.0
⑭	Brake hose union bolt (14 mm)	30 – 35	3.0 – 3.5	21.5 – 25.3
⑮	Air bleeder valve	6 – 9	0.6 – 0.9	4.5 – 6.5
⑯	Brake disc bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
⑰	Spoke nipple	4 – 5	0.4 – 0.5	3.0 – 3.5
⑱	Clutch hose union bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
⑲	Rear brake master cylinder mounting bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
⑳	Brake pedal boss bolt	6 – 10	0.6 – 1.0	4.5 – 7.2
㉑	Footrest mounting bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
㉒	Swingarm pivot nut	50 – 80	5.0 – 8.0	36.0 – 58.0
㉓	Rear shock absorber upper mounting nut	20 – 30	2.0 – 3.0	14.5 – 21.5
㉔	Rear shock absorber lower mounting bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
㉕	Rear axle nut	60 – 96	6.0 – 9.6	43.5 – 69.5
㉖	Rear brake caliper housing bolt	15 – 20	1.5 – 2.0	11.0 – 14.5
㉗	Rear brake caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
㉘	Rear torque link nut	40 – 60	4.0 – 6.0	29.0 – 43.4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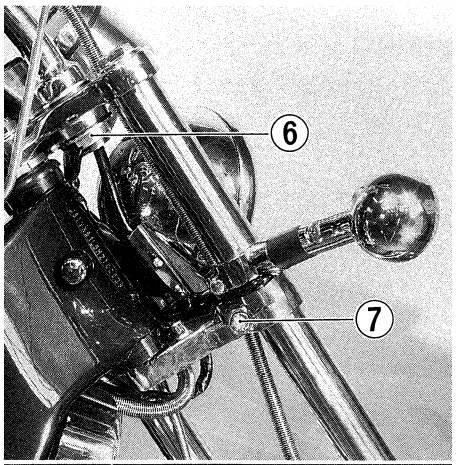
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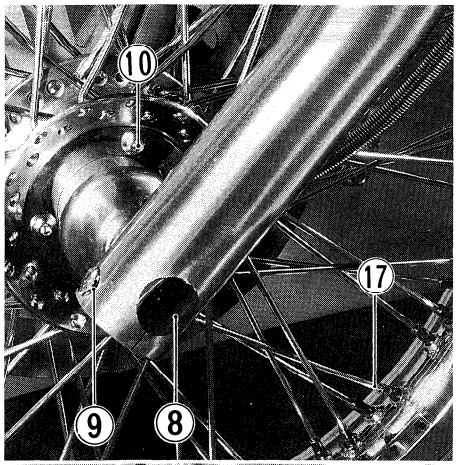
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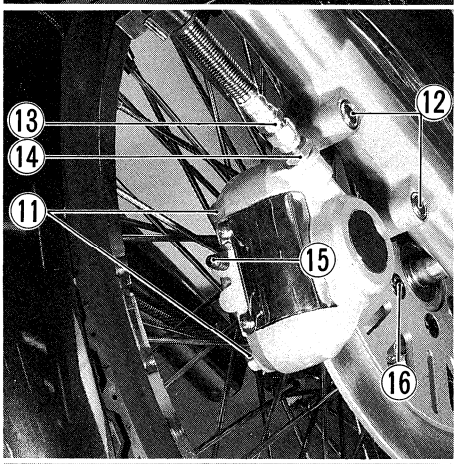
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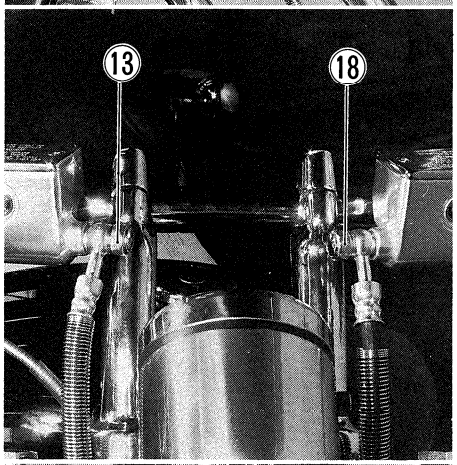
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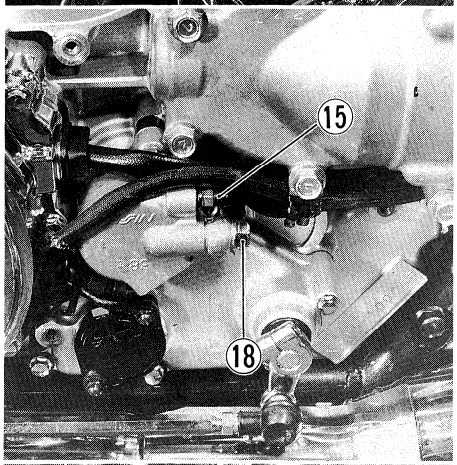
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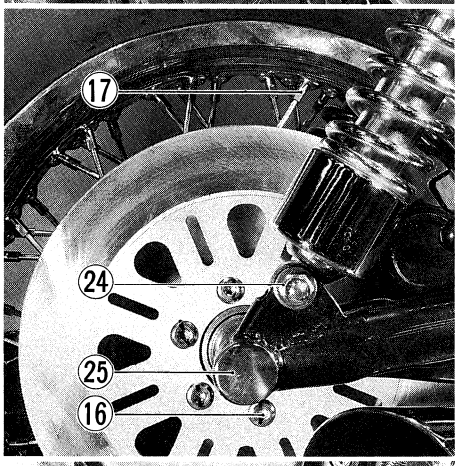
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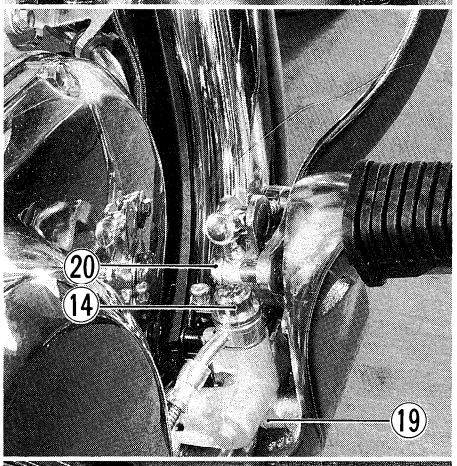
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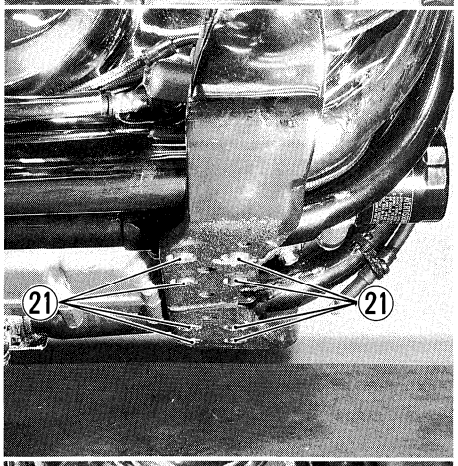
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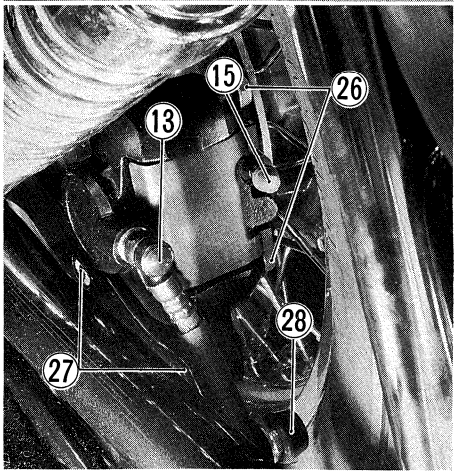
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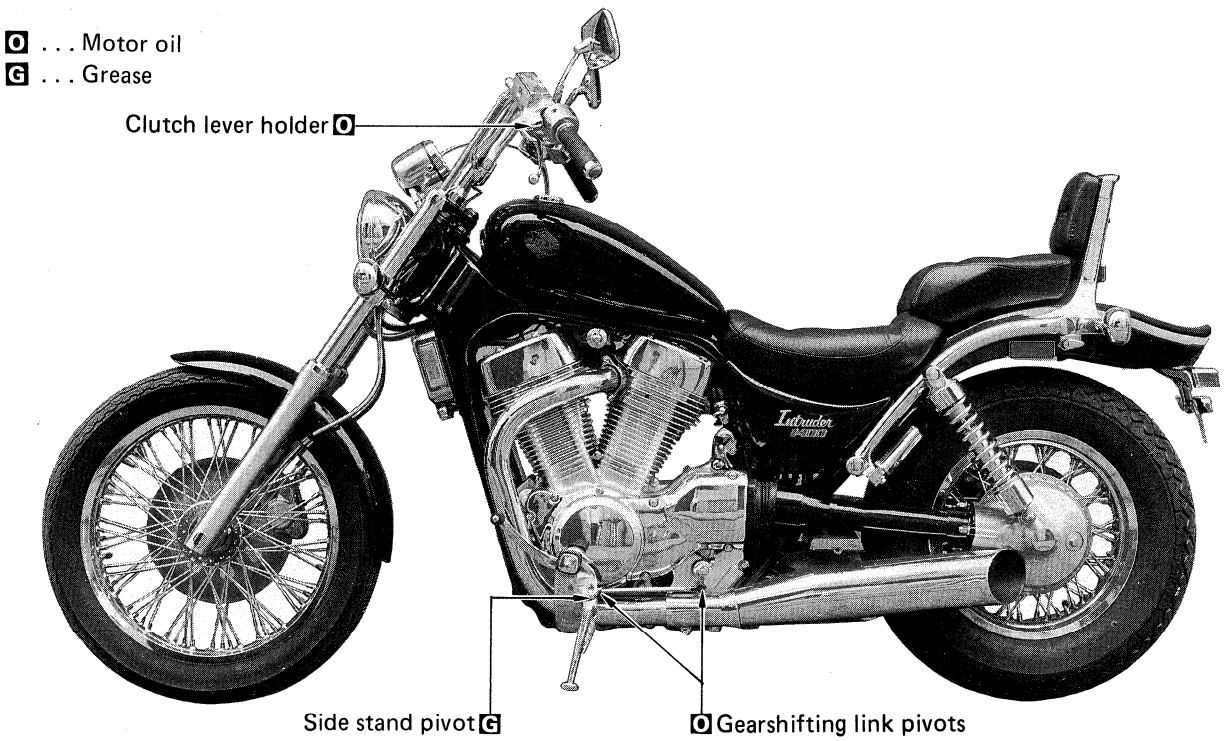
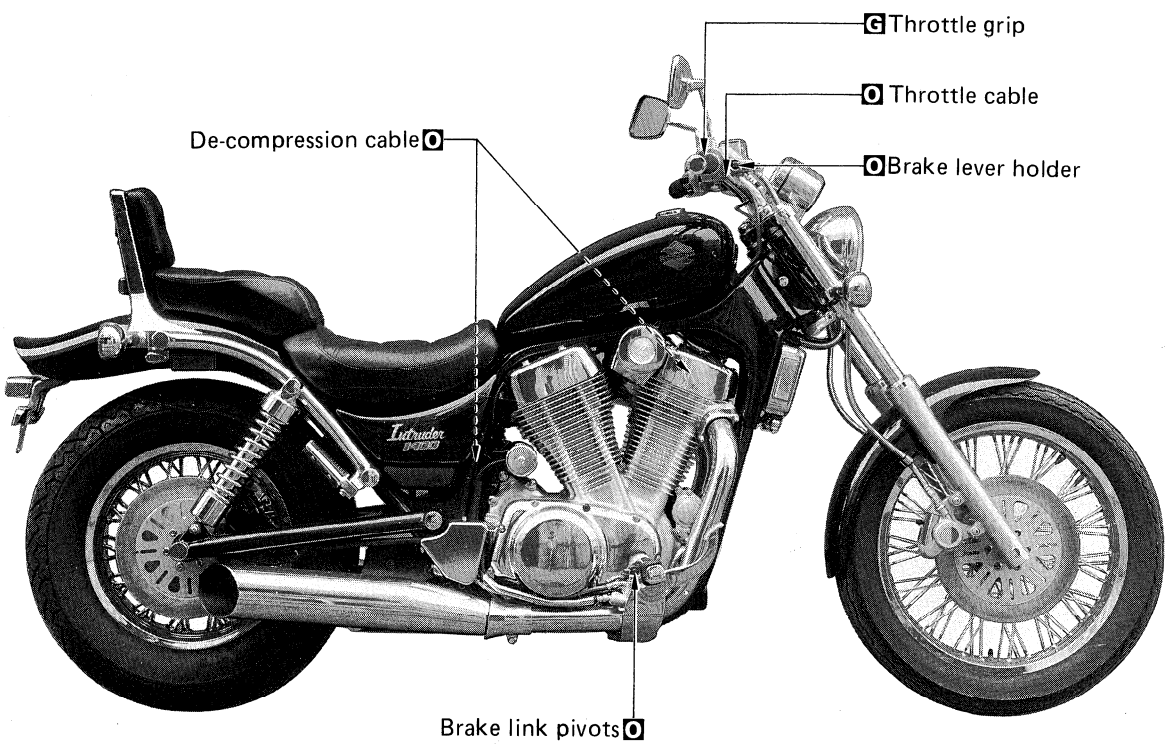
LUBRICATION POINTS

Proper lubrication is important for smooth operation and long life of each working part of the motorcycle and also for safe riding. It is a good practice to oil the machine after a long rough ride and after getting it wet in the rain or after washing it. Major oiling points are indicated below.

NOTE:
Before lubricating each part, clean off any rusty spots and wipe off any grease, oil, dirt or grime.





ENGINE

3

CONTENTS

COMPRESSION CHECK

The compression of a cylinder is good indicator of its internal condition. The decision to overhaul the cylinders is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression readings for each maintenance service.

COMPRESSION

Standard	Limit	Difference in cylinders
1 000 – 1 400 kPa (10 – 14 kg/cm^2) (142 – 199 psi)	800 kPa (8 kg/cm^2) (114 psi)	200 kPa (2 kg/cm^2) (28 psi)

Low compression pressure can indicate any of the following conditions:

* Excessively worn cylinder wall
* Worn-down piston or piston rings
* Piston rings stuck in the grooves
* Poor seating of valves
* Ruptured or otherwise defective cylinder head gasket
* Damaged lash adjuster
* Starter motor cranks too slowly

Overhaul the engine in the following cases:

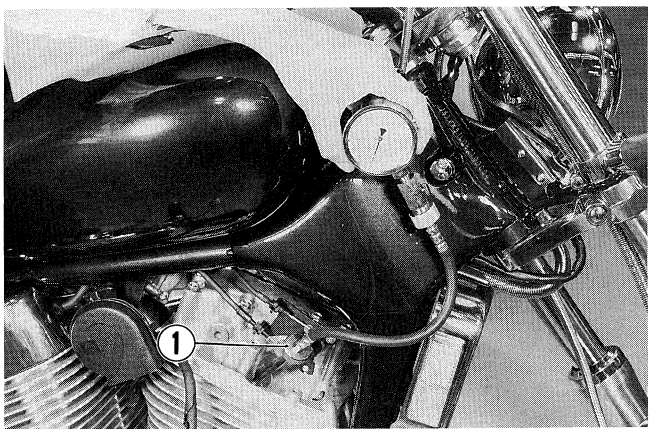
* Compression pressure in one of the cylinders is less than 800 kPa (8 kg/cm^2, 114 psi).
* Difference in compression pressure between two cylinders is more than 200 kPa (2 kg/cm^2, 28 psi).
* All compression pressure are below 1 000 kPa (10 kg/cm^2, 142 psi) (standard) even when they measure more than 800 kPa (8 kg/cm^2, 114 psi).

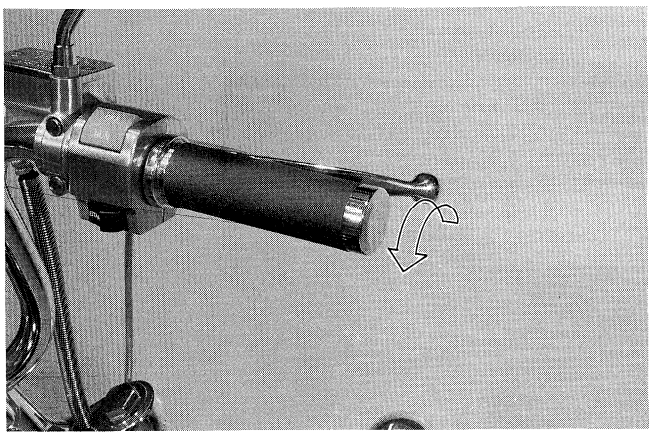
COMPRESSION TEST PROCEDURE

NOTE:
*** Warm up the engine before testing.**

- Remove the cylinder head side cover.
- Remove all the spark plugs.
- Fit the compression gauge ① in one of the plug holes, while taking care that the connection is tight.
- Twist the throttle grip full open.
- Crank the engine a few seconds with the starter, and record the maximum gauge reading as the compression of the cylinder.
- Repeat this procedure with the other cylinder.

09915-64510	Compression gauge
09918-03810	Adapter





The parts listed below can be removed and reinstalled without removing the engine from the frame. Refer to the page listed in this section for removal and reinstallation instructions.

ENGINE LEFT SIDE

ENGINE CENTER

ENGINE RIGHT SIDE

ENGINE REMOVAL AND REINSTALLATION

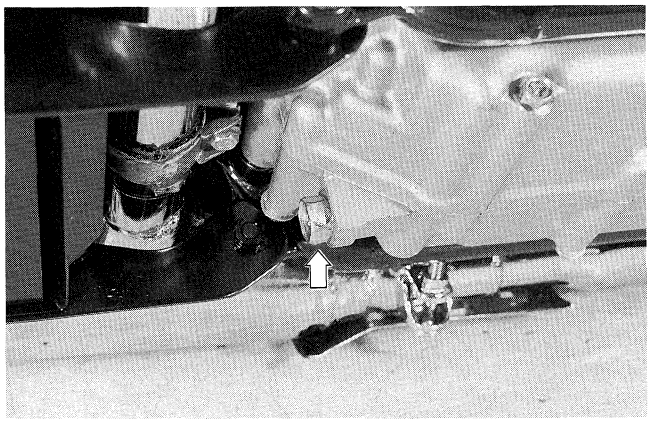
ENGINE REMOVAL

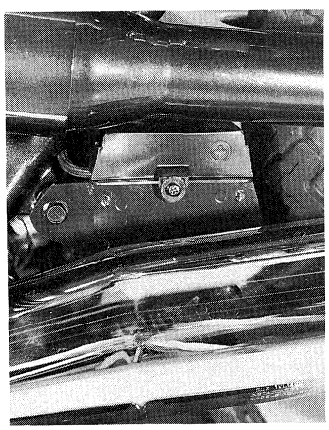
Before taking the engine out of the frame, wash the engine and drain engine oil etc. The procedure of engine removal is sequentially explained in the following steps, and engine installation is effected by reversing the removal procedure.

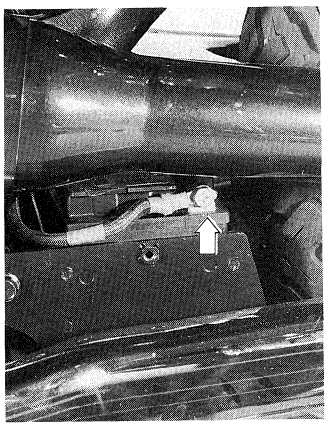
- Place an oil pan under the engine and remove the oil drain plug and filler plug to drain out engine oil.
- Remove the battery terminal cover.
- Disconnect the battery ⊖ and ⊕ lead wires from the battery terminals.
- Remove the battery case bottom plate bolts and open the case bottom plate.

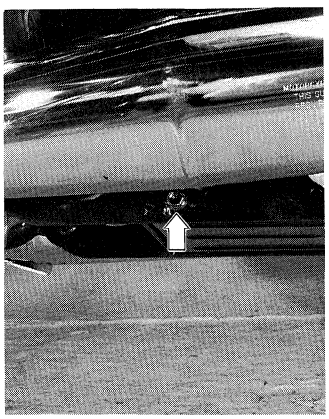
NOTE:
Be careful not to drop the battery.

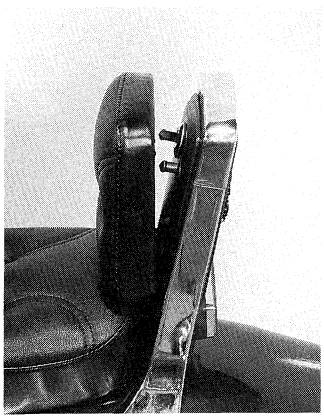
- Remove the seat pad and tool cover by using the key.
- Remove the pillion seat and rider seat by loosening the securing bolts.
- Disconnect the ignitor lead wire coupler.
- Remove the left and right frame covers.
- Loosen the fuel tank securing bolts.

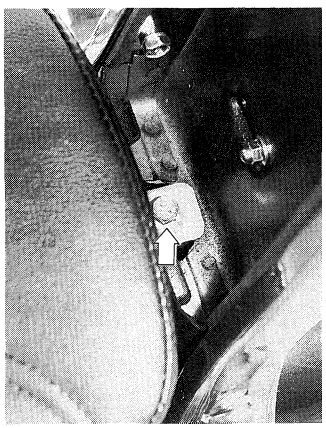


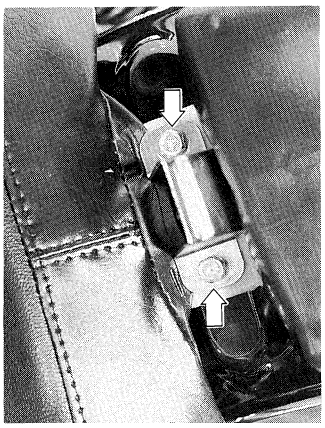


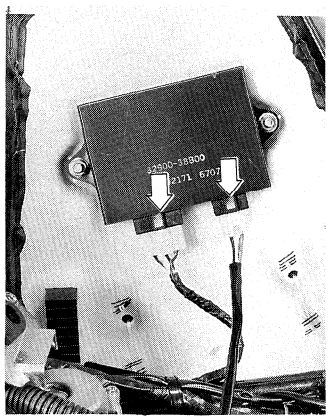


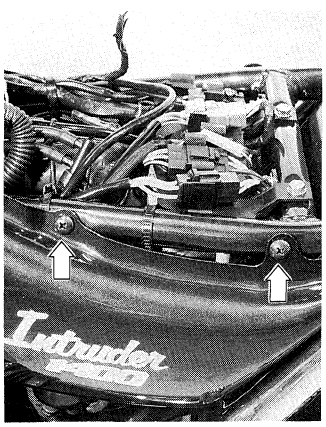


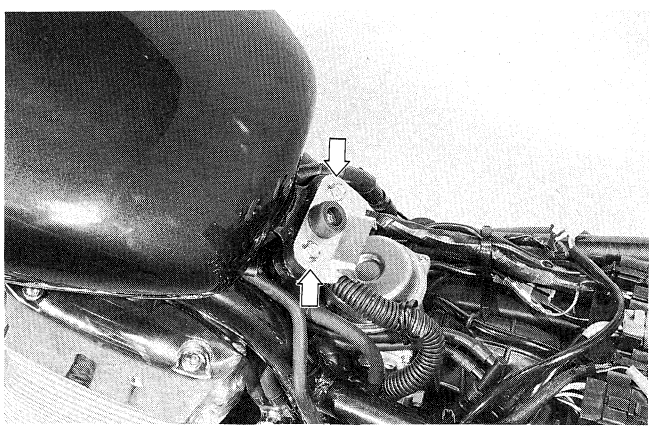




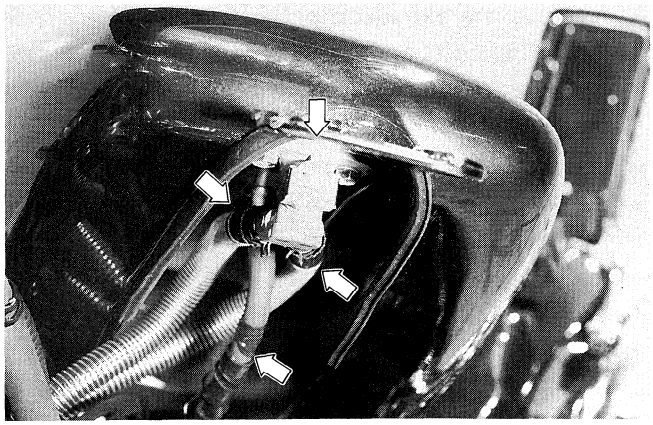




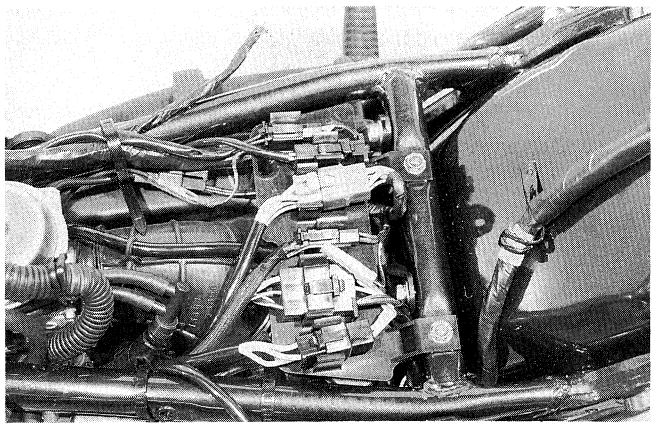




- Turn the fuel cock of fuel tank to "OFF" position and disconnect the fuel hose.

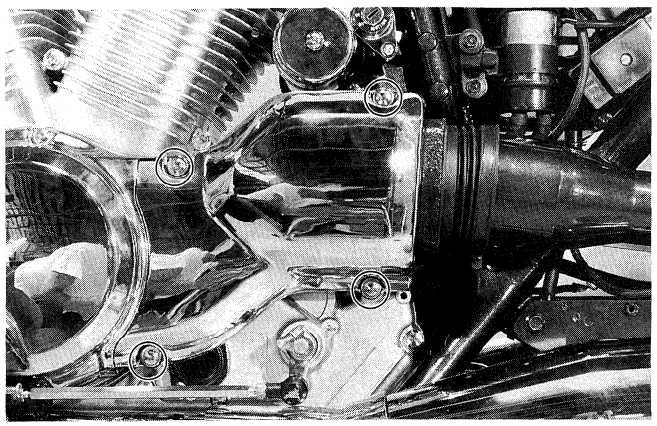


- Disconnect the following lead wires.
  * Starter motor lead wire
  * Generator lead wire
  * De-compression solenoid lead wire
  * Engine ground lead wire
  * Side stand switch lead wire
  * Brake switch lead wire
  * Ignition switch lead wire
  * Regulator/rectifier lead wire
- Remove the secondary bevel gear case cover.

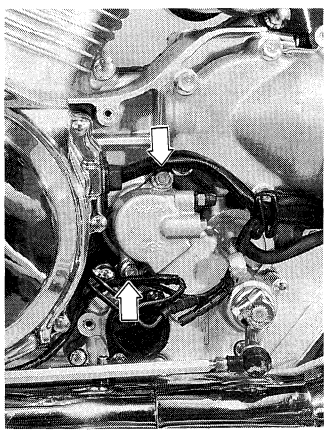


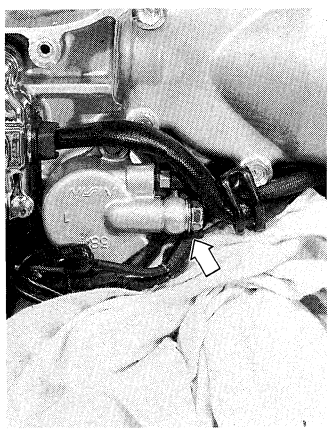
- Place a cloth underneath the union bolt on the clutch cylinder to catch spilled drops of clutch fluid. Unscrew the union bolt and disconnect the clutch pipe from the clutch cylinder joint.

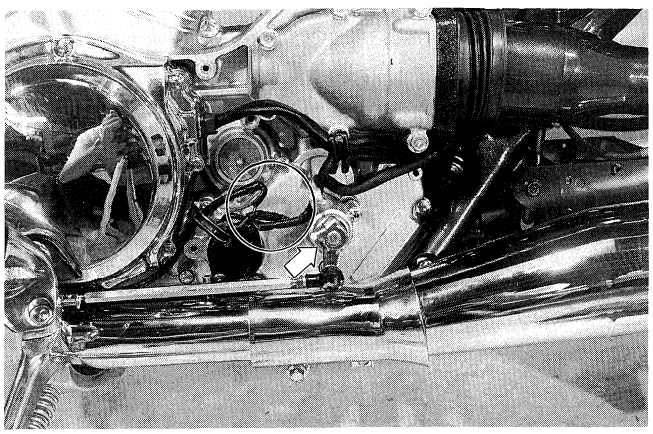
CAUTION:
Completely wipe off any clutch fluid adhering to any part of motorcycle. The fluid reacts chemically with paint, plastics, rubber materials, etc.



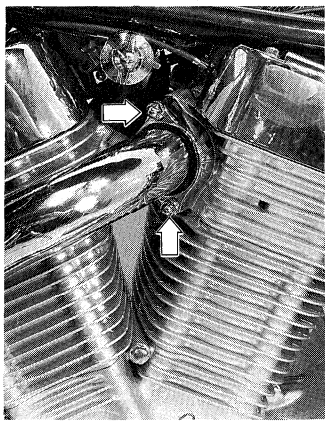
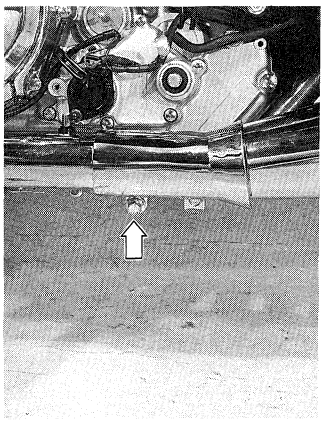
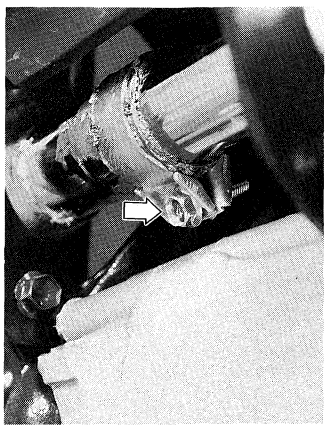
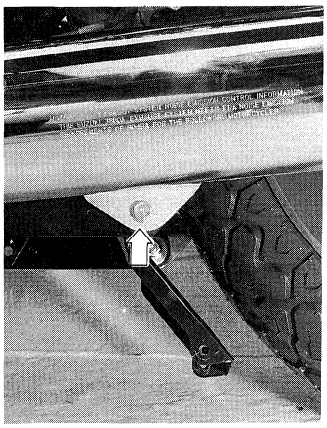
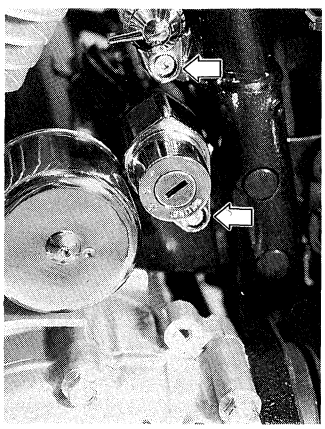
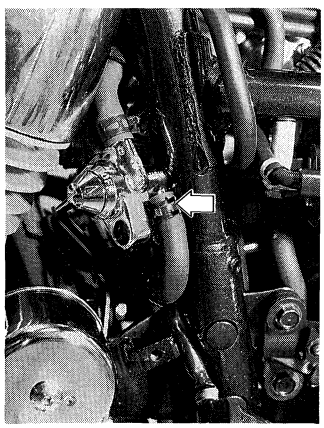
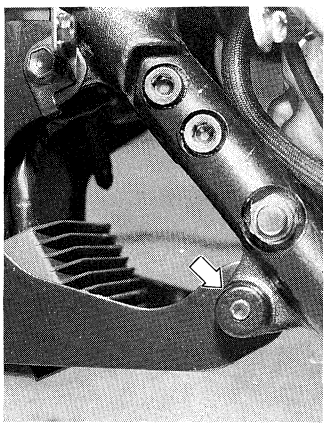
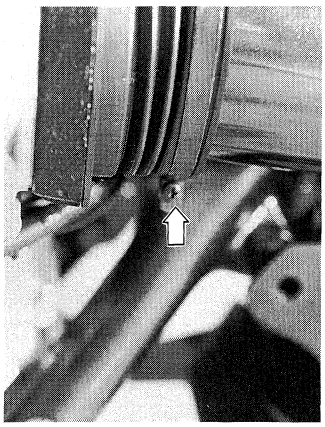
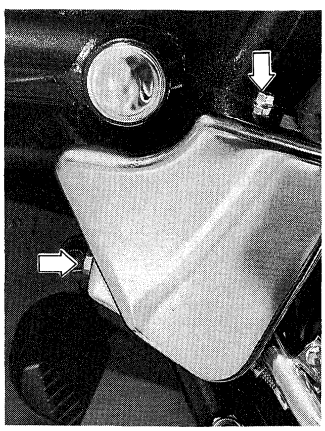
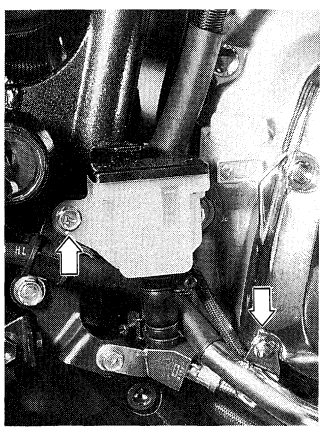
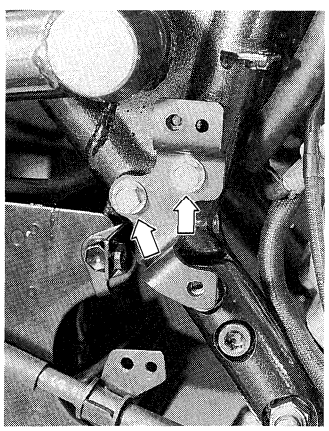
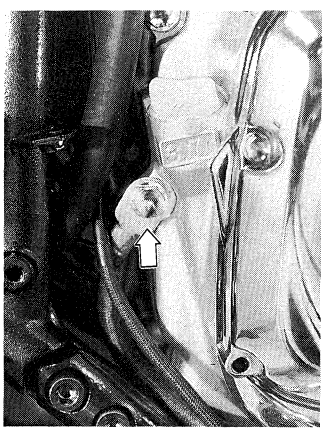
- Remove the clutch cylinder.
- Disconnect the side stand interlock switch lead wire.
- Remove the gearshift lever.







- Remove the exhaust pipe securing bolts, muffler mounting bolts and muffler connecting bolt.
- Remove the left and right exhaust pipes and mufflers.
- Loosen the secondary boot clamp screw.
- Remove the battery case mounting bolt.
- Remove the ignition switch.
- Remove the fuel cock.
- Disconnect the fuel hose to the fuel pump on fuel cock.
- Remove the rear brake reservior tank cover.
- Remove the reservior tank securing bolt and rear brake pipe securing bolt.
- Remove the rear brake reservior tank bracket bolt.
- Remove the engine ground from the crankcase by loosening the crankcase bolt.

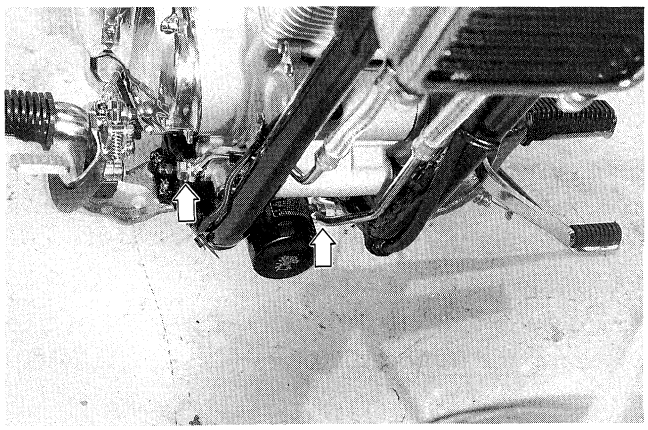
- Remove the oil pipe union bolts and hose holder bracket mounting bolt.

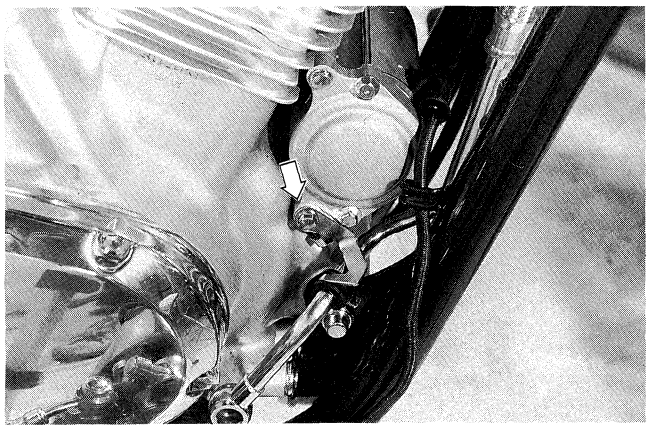
Union bolt tightening torque	25 – 30 N·m (2.5 – 3.0 kg-m / 18.0 – 21.5 lb-ft)

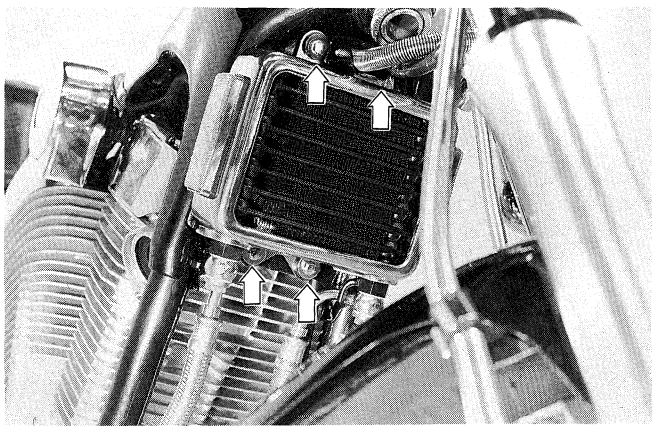
- Remove the oil cooler mounting bolts.
- Remove the oil filter by using the oil filter wrench.

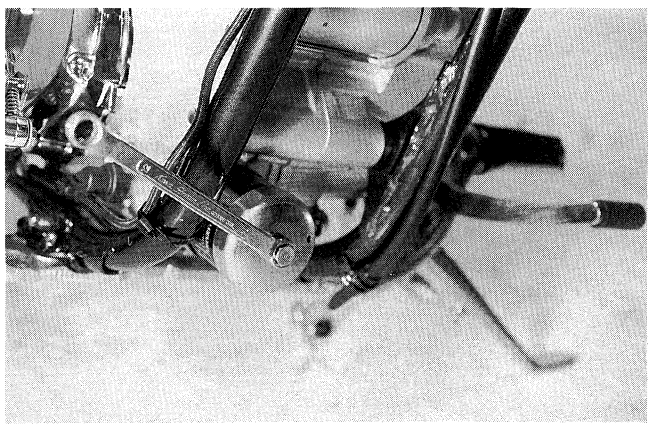
09915-40610	Oil filter wrench

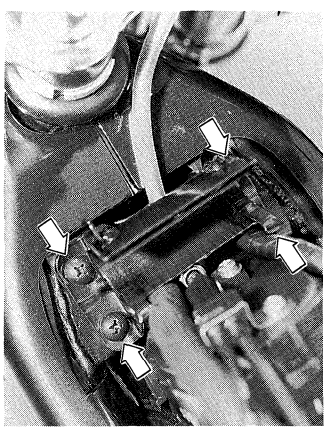
- Remove the fuel tank front bracket and frame head cover by unscrewing the securing screws.
- Remove the throttle cable retaining bracket screws.

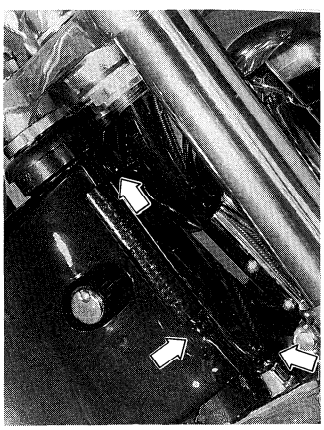


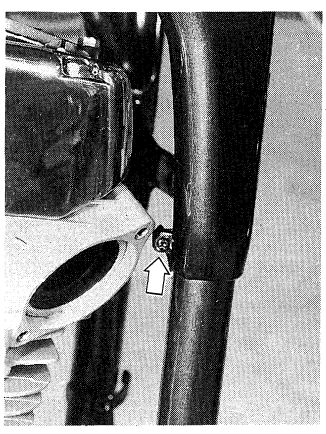


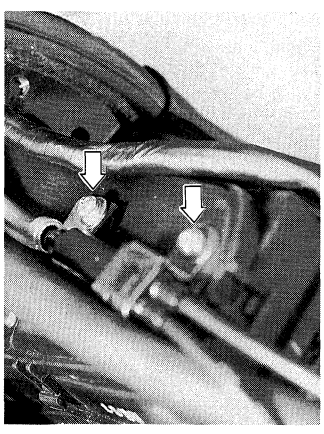




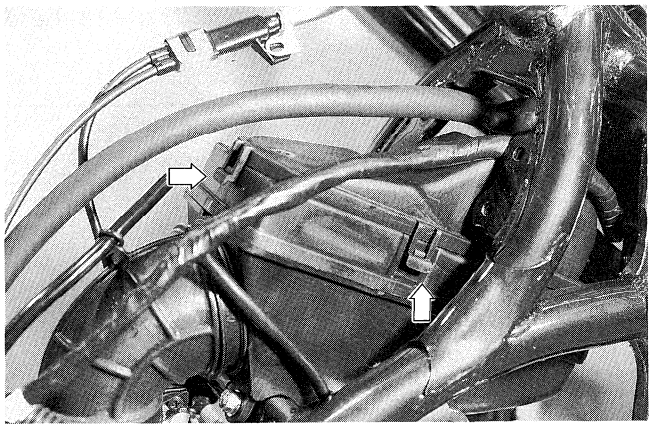


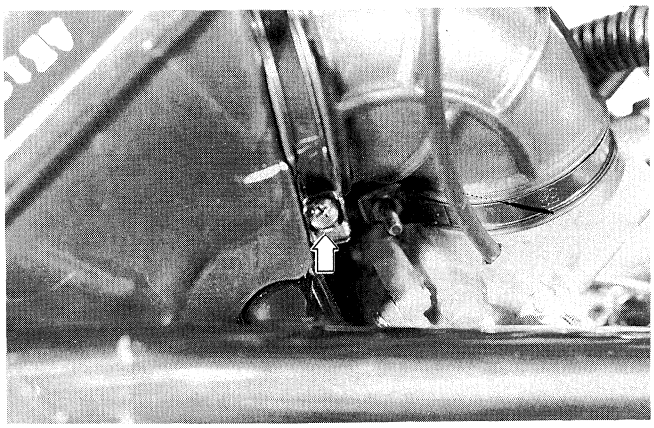


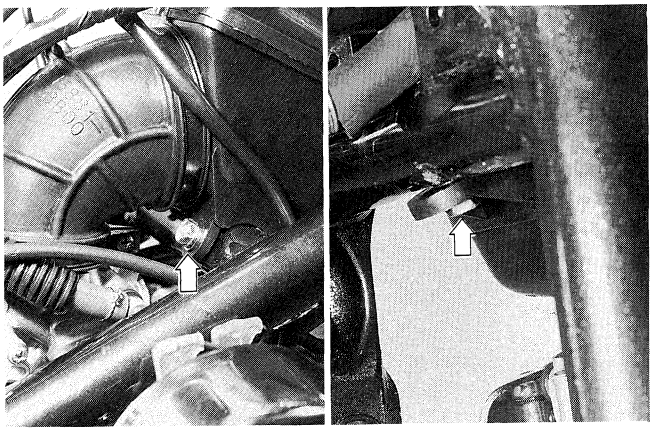


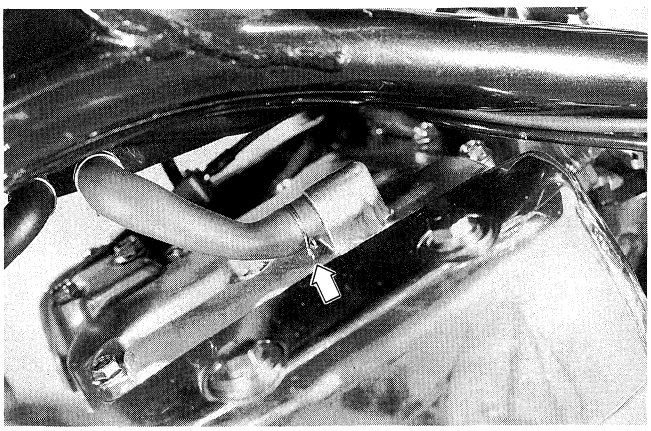


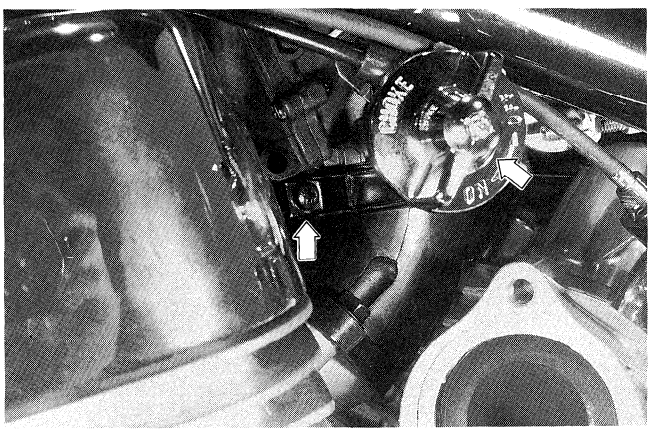
- Remove the front air cleaner case cover by unhooking.
- Remove the front carburetor outlet pipe by unscrewing the clamp screws.
- Remove the front air cleaner by loosening the securing bolts.
- Disconnect the breather pipe.
- Remove the choke knob.
- Loosen the front carburetor clamp screw and remove the front carburetor.



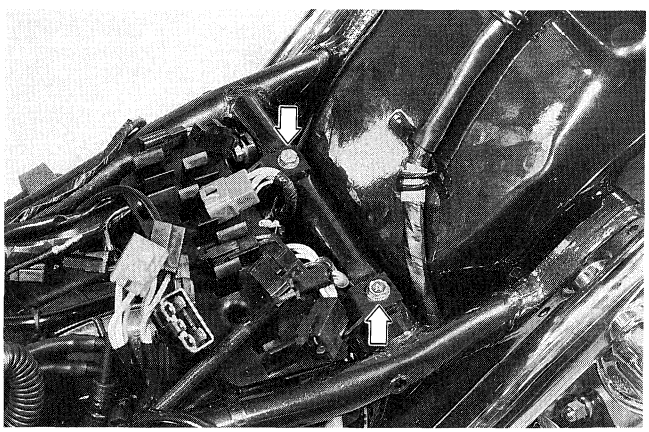




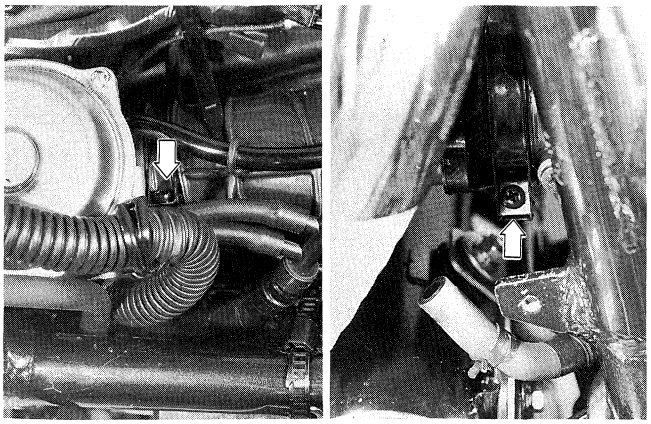




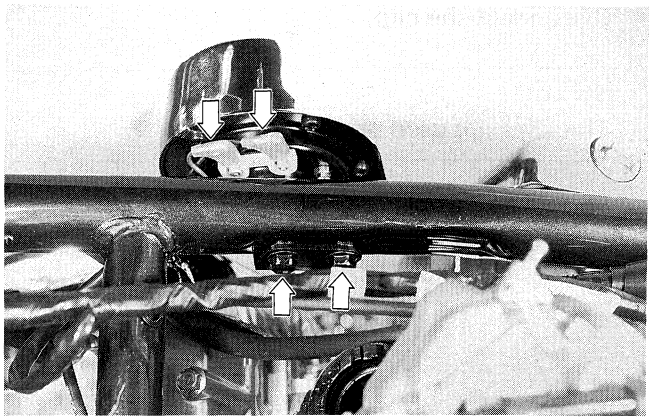
- Remove the coupler holder.



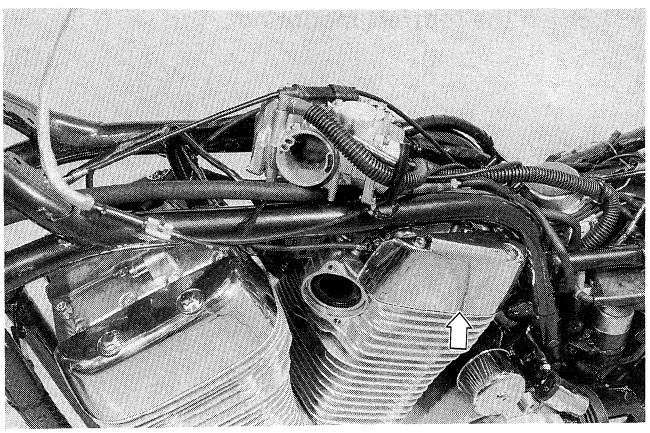
- Remove the rear carburetor outlet pipe by unscrewing the clamp screws.
- Loosen the carburetor clamp screw and remove the rear carburetor.



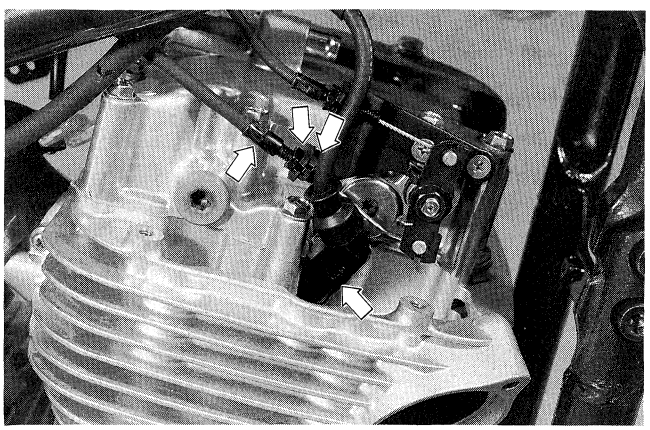
- Disconnect the horn lead wires.
- Remove the horn bracket bolts and remove the horn with bracket.



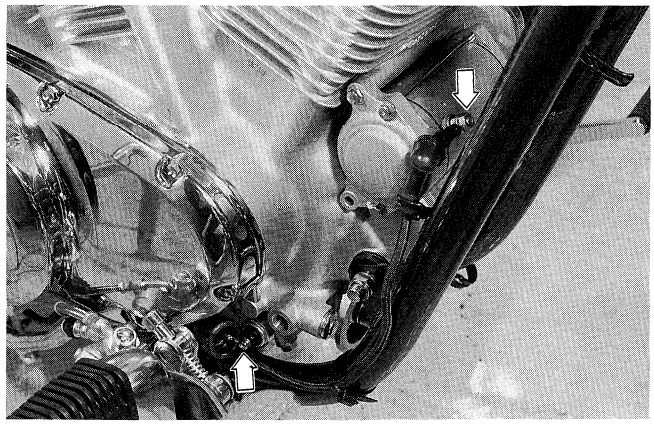
- Remove the right side cover of front cylinder and left side cover of rear cylinder.



- Loosen the de-compression cable adjuster nuts and remove the de-compression cable from the lever.
- Disconnect the front and rear spark plug caps.

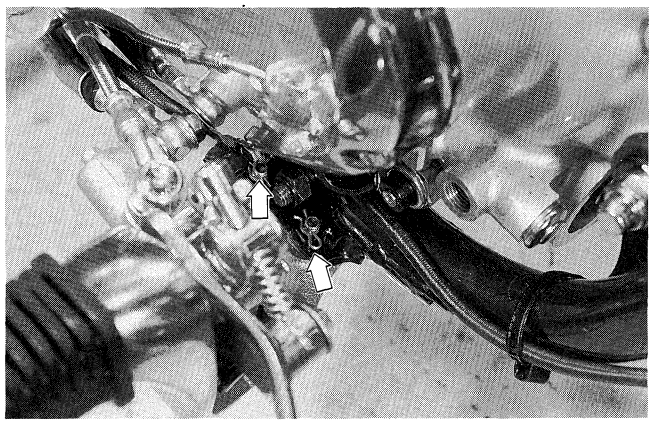


- Disconnect the oil pressure switch lead wire and starter motor lead wire.

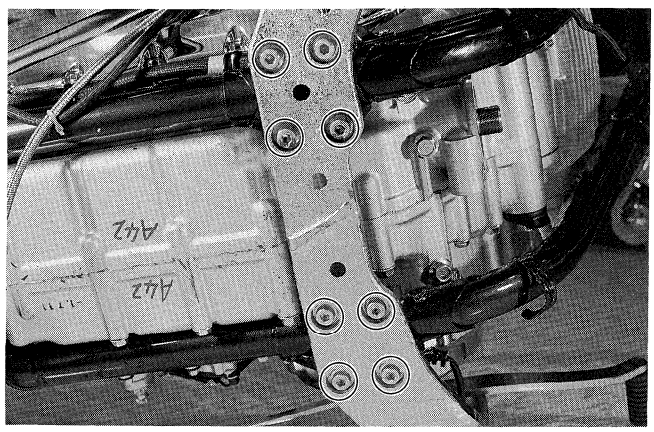


- Disconnect the clip.

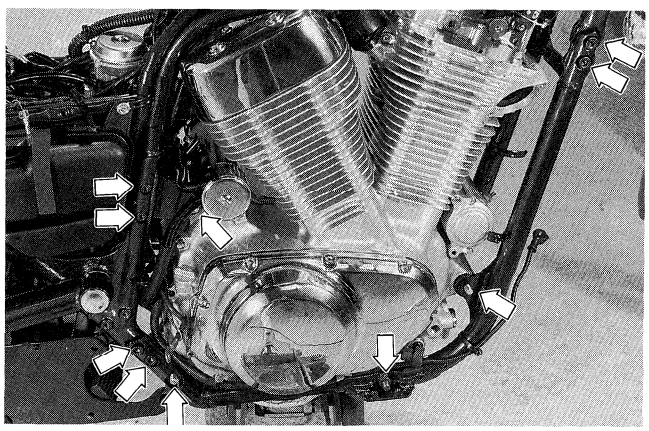
NOTE:
The clips are used on the outside bolts.



- Loosen the footrest mounting bolts.



- Taping the generator cover to prevent the scratch.
- Hold the chassis and engine by jack or block.
- Loosen the engine mounting bolts and frame mounting bolts.

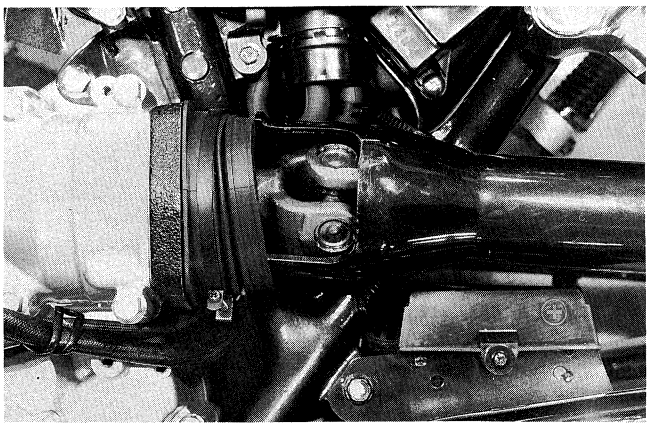


ENGINE REINSTALLATION

Reinstall the engine in the reverse order of engine removal.

- Engage the engine to the propeller shaft.

NOTE:
If engagement of engine and drive shaft is difficult, remove the rear wheel and final gear case box (Refer to page 7-33).



- Place the engine in the proper position and install the right down tube to the frame. Insert the engine mounting bolts from the left.

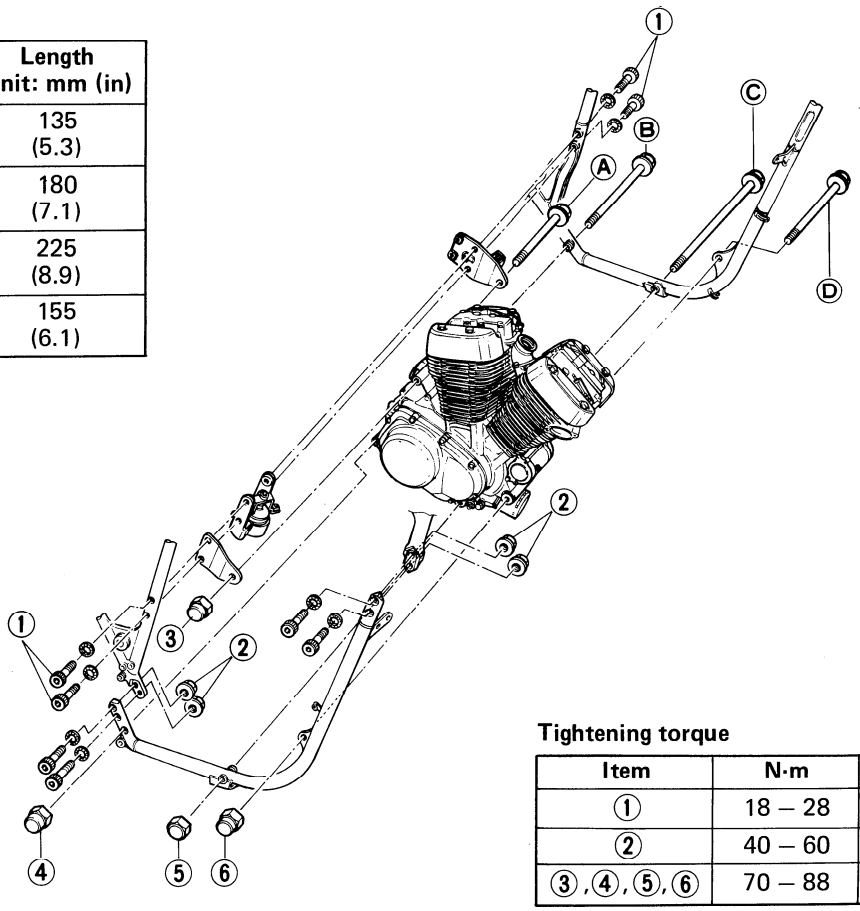
NOTE:
De-comp solenoid is tightened together with the engine bracket. When mounting the solenoid to the mounting bracket, its lead wire faces backward.

CAUTION:
One self-lock nut is used for engine mounting. Once the nut has been removed, it is no longer of any use. Be sure to use new nut and tighten it to the specified torque.

- After inserting the engine mounting bolts, tighten the engine mounting bracket bolts and engine mounting bolts.
  Install the brackets, bolts and nuts properly as shown in the following illustration.

Bolt Length

Item	Length Unit: mm (in)
Ⓐ	135 (5.3)
Ⓑ	180 (7.1)
Ⓒ	225 (8.9)
Ⓓ	155 (6.1)



Tightening torque

Item	N·m	kg-m	lb-ft
①	18 – 28	1.8 – 2.8	13.0 – 20.0
②	40 – 60	4.0 – 6.0	29.0 – 43.5
③, ④, ⑤, ⑥	70 – 88	7.0 – 8.8	50.5 – 63.5

- Install the exhaust pipes and mufflers properly. When securing exhaust pipe clamp bolts, make sure that clamps are positioned properly.

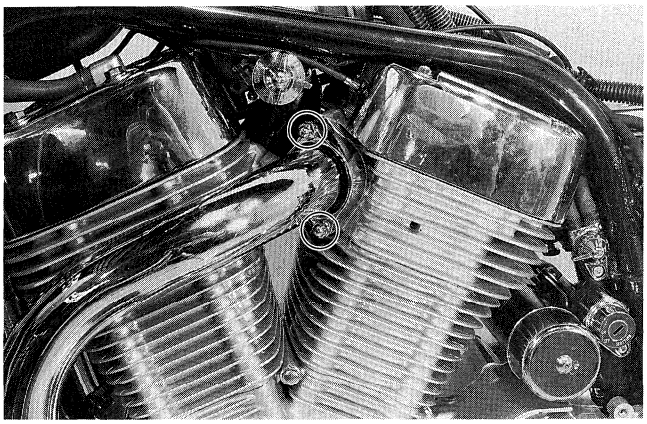
Tightening torque

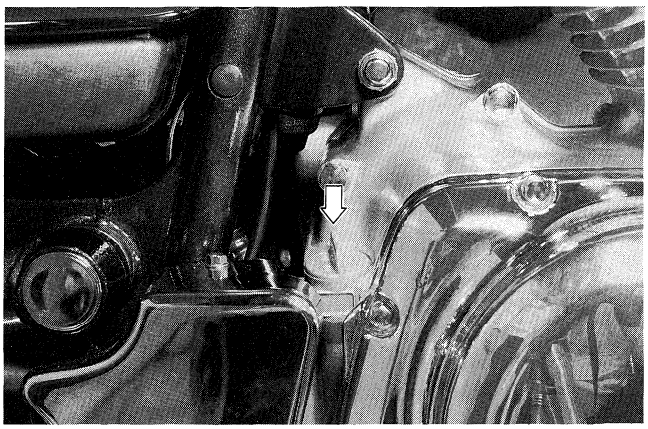
Exhaust pipe clamp bolt	20 – 25 N·m (2.0 – 2.5 kg-m / 14.5 – 18.0 lb-ft)
Muffler mounting bolt	27 – 43 N·m (2.7 – 4.3 kg-m / 19.5 – 31.0 lb-ft)

- Install 5.0 L (5.3 US qt.) (when overhauling engine) of engine oil SAE 10W/40 under API classification SE or SF into the engine. Several minutes after starting and stopping the engine, check that the oil level remains between the marks of the oil inspection dip stick.

Drain plug tightening torque	18 – 23 N·m (1.8 – 2.3 kg-m / 13.0 – 16.5 lb-ft)

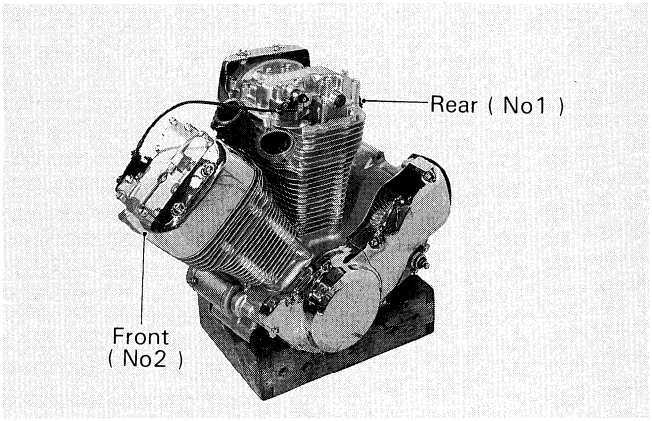
- After remounting the engine, route wiring harness, hoses and cables properly by referring to the sections, wire routing and cable routing, and adjust the following items to the specification.



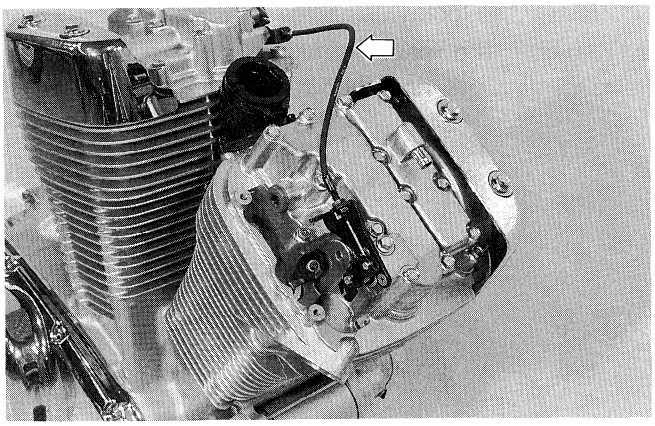


ENGINE DISASSEMBLY

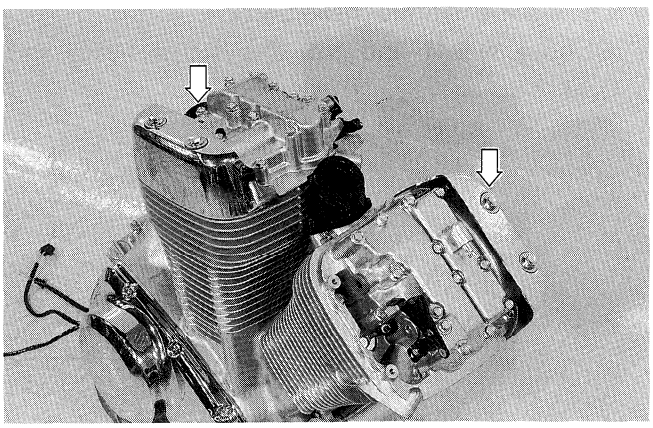
CAUTION:
Be sure to identify each removed part such as intake pipe, camshaft, piston, conrod etc. as to its location and lay the parts out in groups so that each will be restored to the original location during assembly.



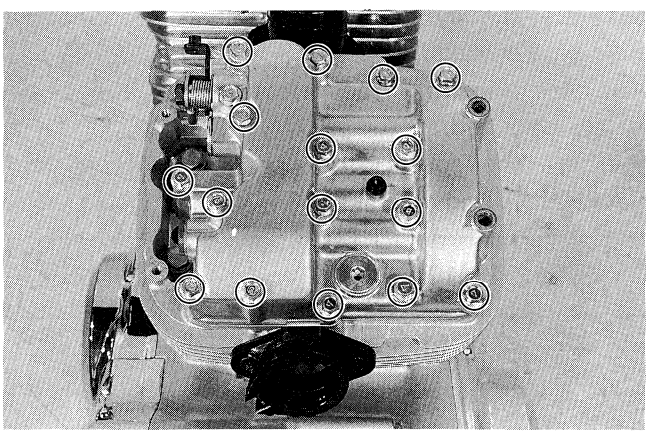
- Disconnect the automatic de-compression cable.



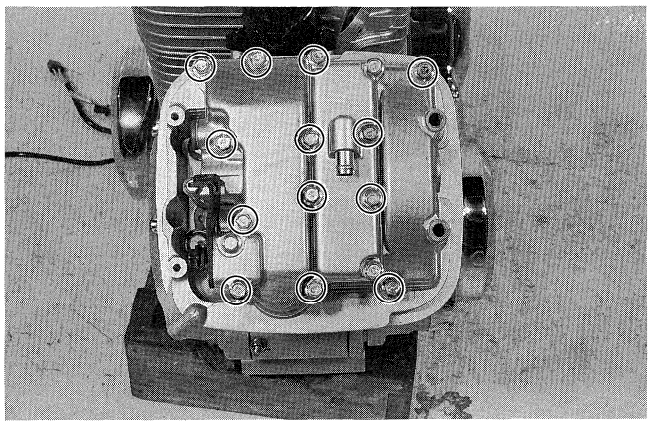
- Remove the cylinder head cover side cover.



- Remove the cylinder head cover.

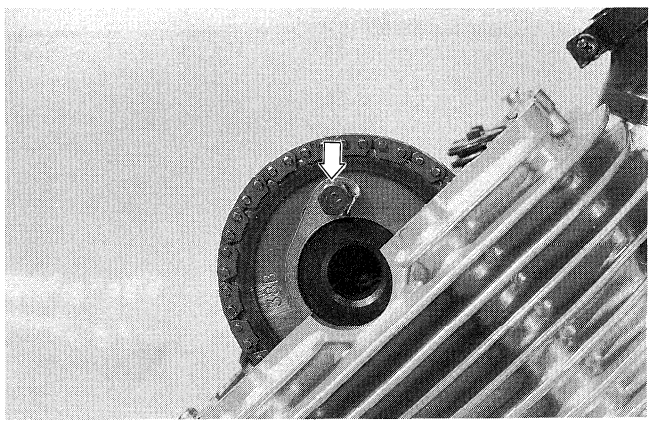


REAR (NO 1)

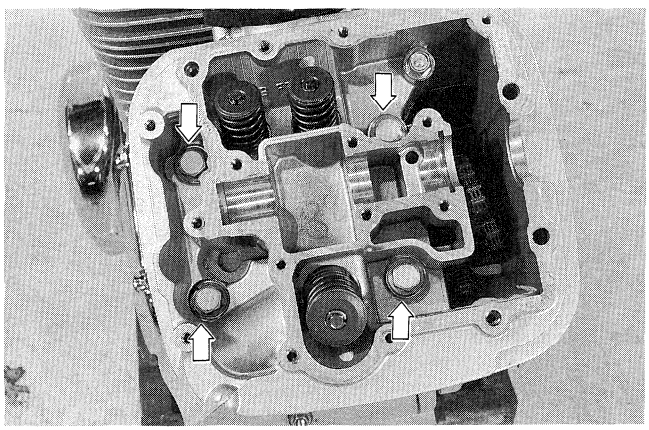


FRONT (NO 2)

- Flatten the lock washer.
- Remove the cam sprocket by loosening the securing bolts, and then remove the camshaft.



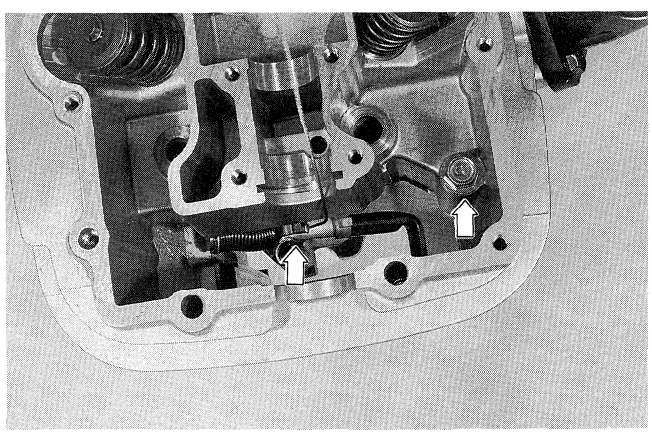
- Loosen the cylinder head bolts.
- Remove No. 1 and No. 2 cylinder heads and cylinders.



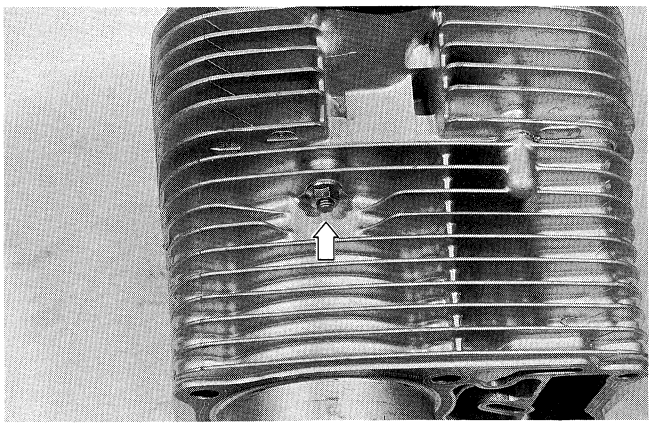
Separate the cylinder and cylinder head in the following procedure.

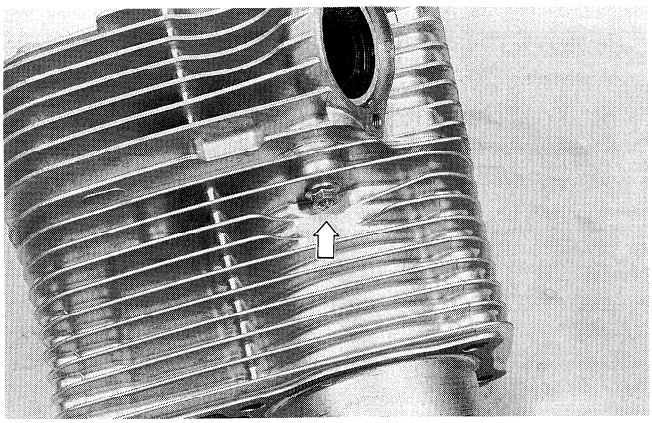
- After unlocking the ratchet, push the chain tensioner rod.
- Insert the special tool between ratchet and tensioner body.

09918-53810	Tensioner lock tool

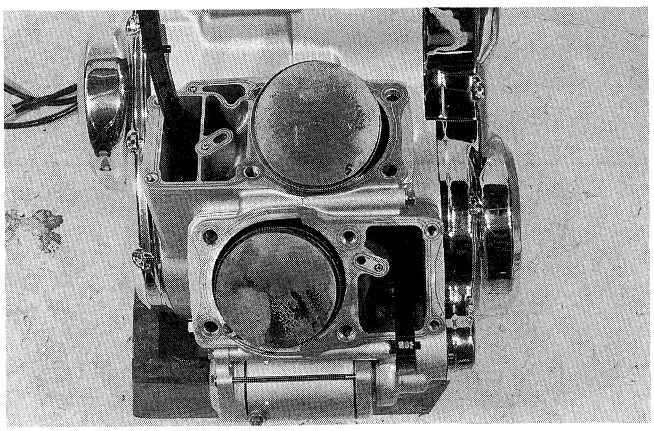


- Loosen the cylinder head nuts and bolts.
- Separate the cylinder and cylinder head.



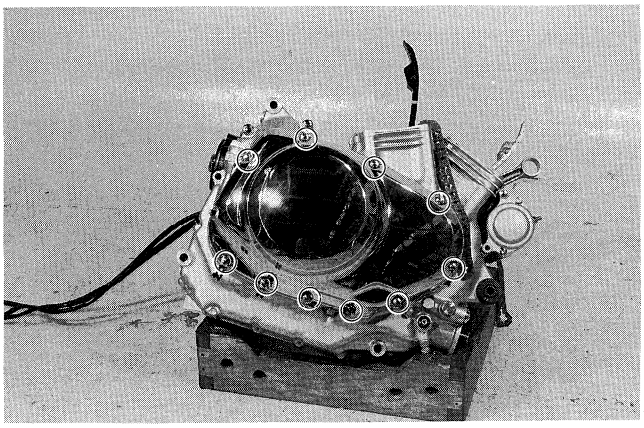


- Mark the "F" and "R" on the each piston head.



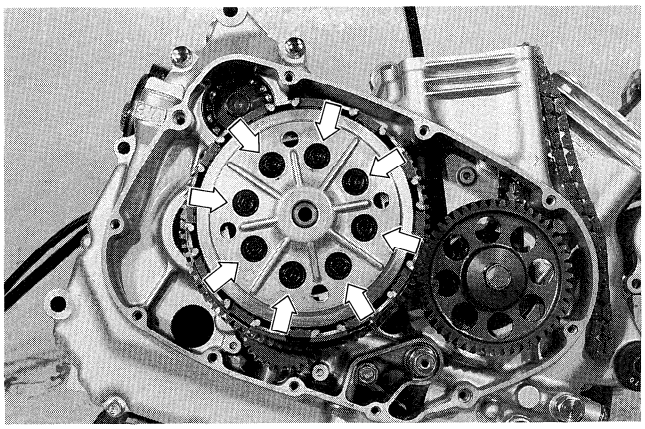
- Place a clean rag over the cylinder base to prevent piston pin circlip from dropping into crankcase, and then remove the piston pin circlip with long nose pliers.
- Remove the piston pin.

- Remove the clutch cover and gasket.



- By holding the con-rod with the special tool, remove the clutch spring bolts in a crisscross manner.
- Remove the clutch springs and pressure plate.

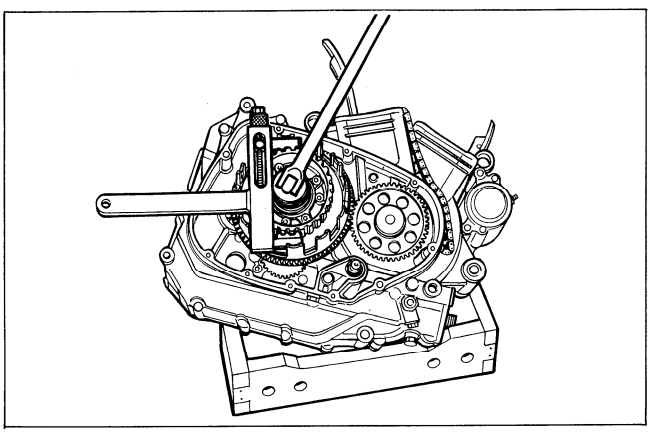
09910-20116	Con-rod holder



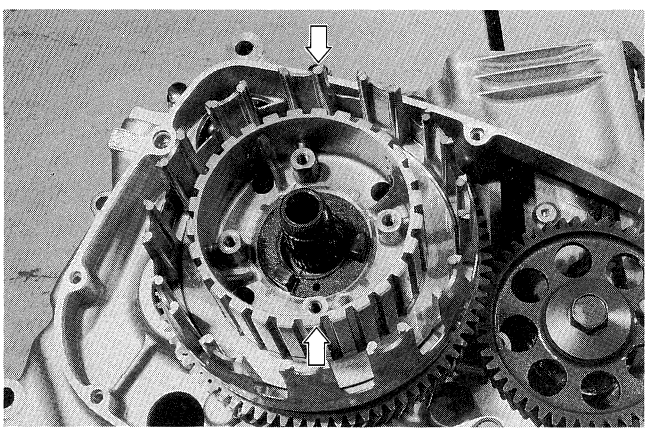
- Remove the clutch push piece, thrust washer, bearing, push rod, clutch drive and driven plates.

- Loosen the clutch sleeve hub nut with the special tool.

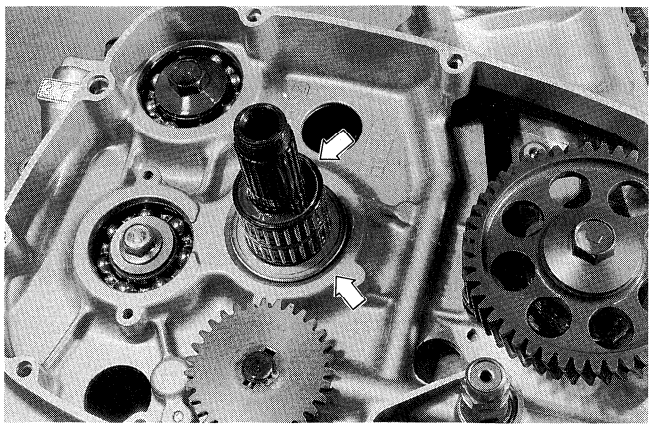
09920-50710	Clutch sleeve hub holder



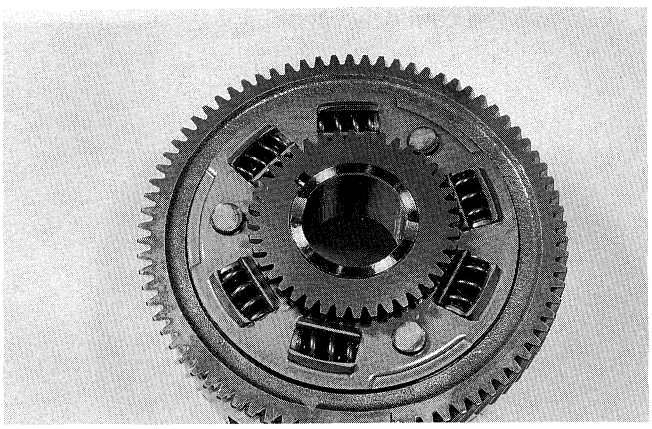
- Remove the clutch sleeve hub and clutch housing.



- Remove the bearing, spacer, washer and thrust washer.

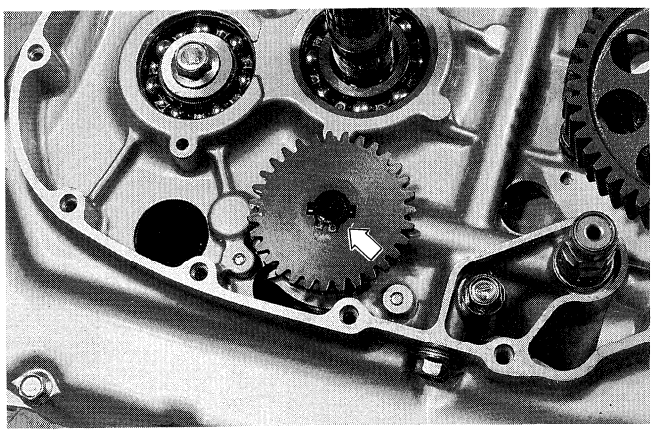


- Separate the primary driven gear and oil pump drive gear.

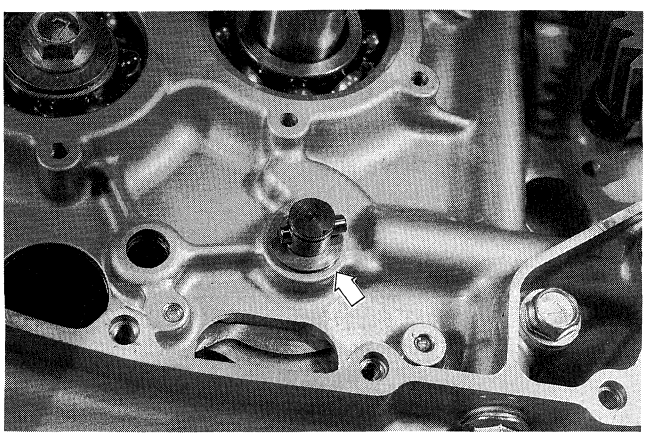


- Remove the oil pump driven gear circlip with the special tool.

09900-06107	Snap ring pliers



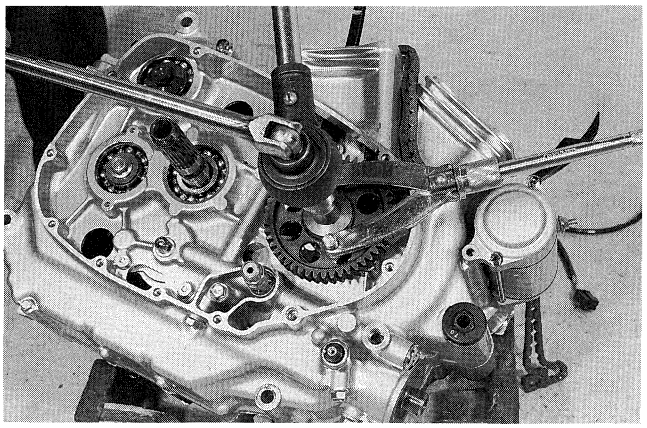
- Remove the oil pump driven gear.
- Remove the pin and washer.



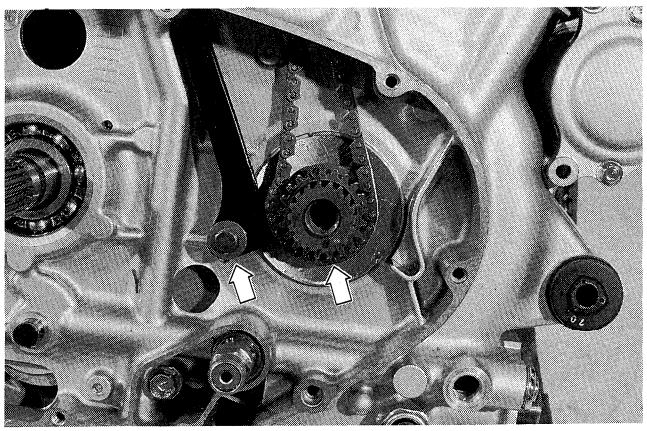
- Remove the primary drive gear bolt using the special tool and remove the primary drive gear.

09930-40113	Rotor holder

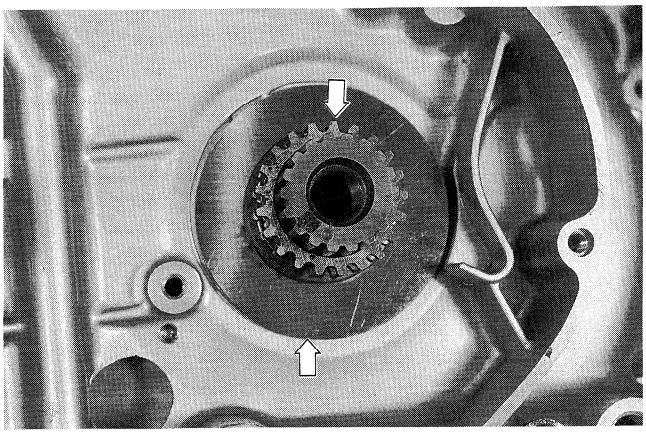
CAUTION:
This bolt has left-hand thread. Turning it counter-clockwise may cause damage.



- Remove the cam drive chain guide and chain.

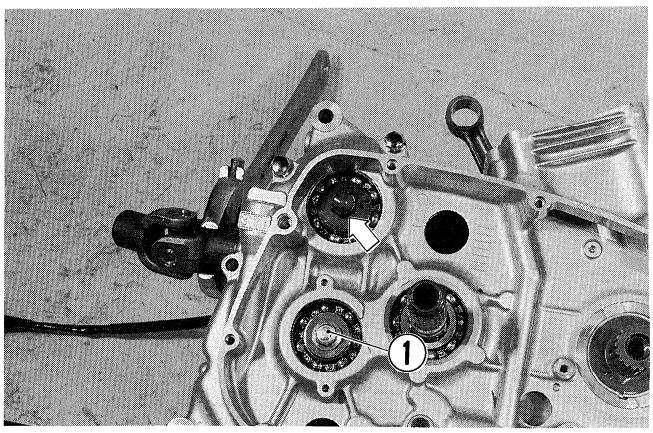


- Remove the cam sprocket drive gear and thrust washer.

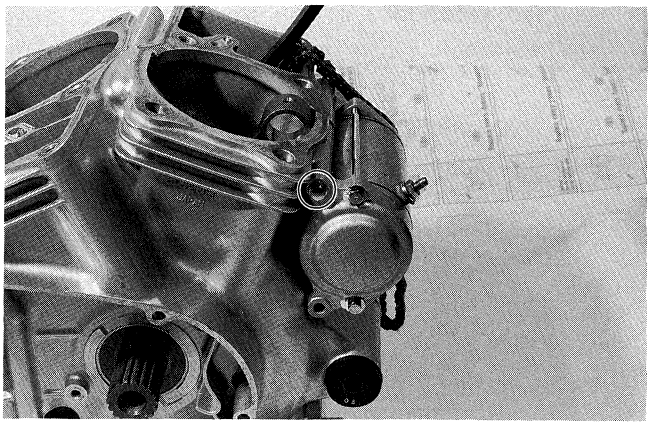


- Install the universal joint on the secondary driven gear.
- While holding the universal joint with an adjustable wrench, remove the secondary drive gear shaft bolt and drive shaft bolt.

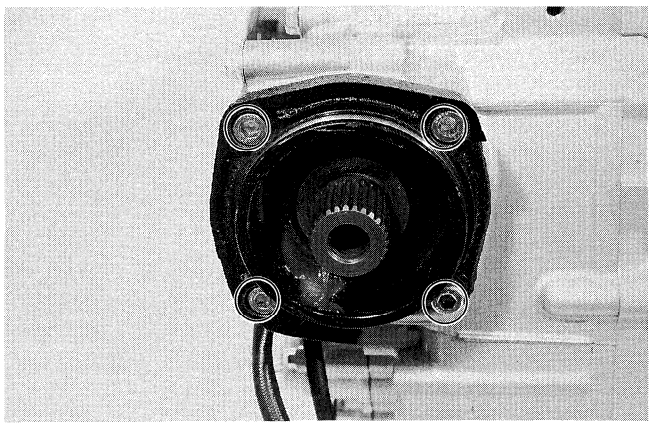
CAUTION:
Drive shaft bolt ① has left-hand thread.



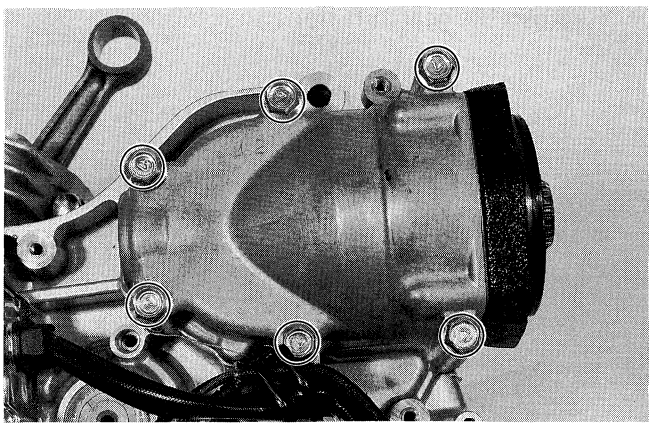
- Remove the starter motor by loosening the securing bolts.



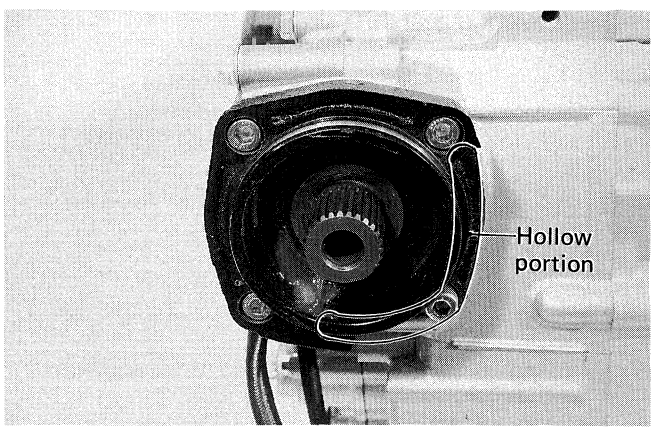
- Remove the secondary boot.
- Remove the secondary driven gear housing bolts and secondary gear case bolts.



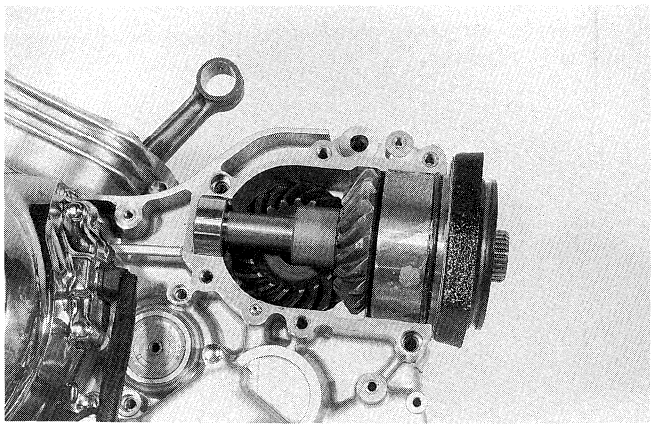
- Remove the secondary gear case.



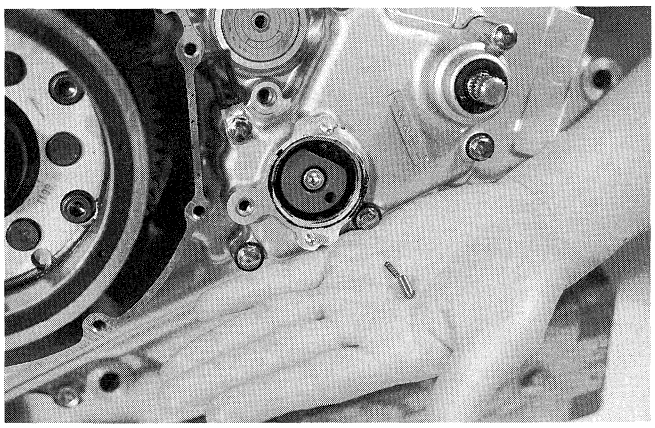
NOTE:
When installing the secondary driven gear housing, set hollow portion of housing as shown in the photograph.



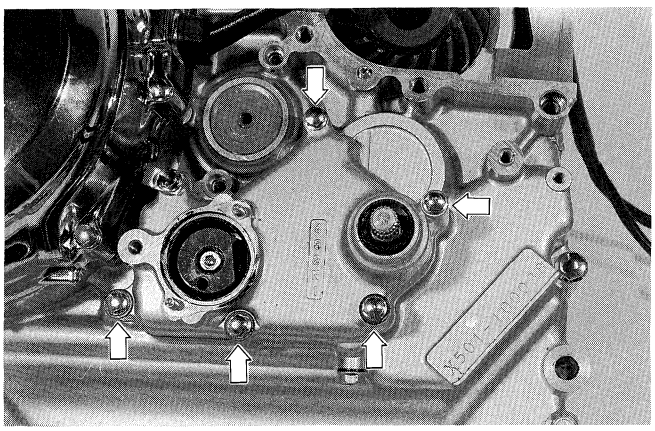
- Remove secondary driven bevel gear assembly and bearing.



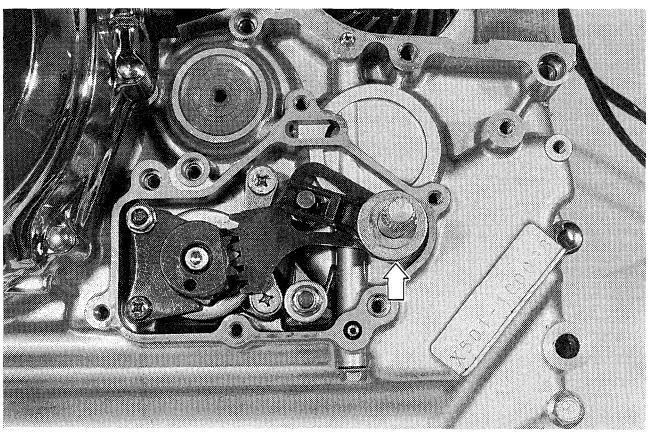
- Loosen the neutral switch securing nuts and then remove the neutral switch body, O-ring, switch contact and spring.



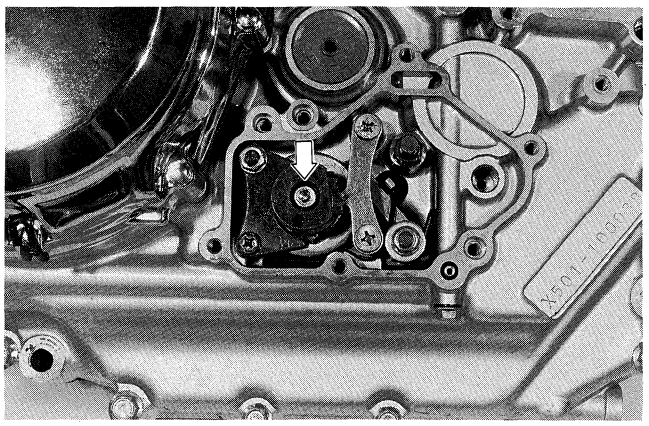
- Remove the gearshift housing cover.



- Remove the gearshift shaft.



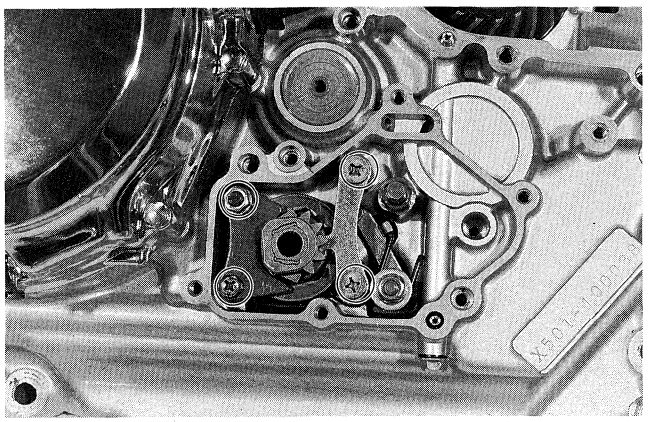
- Remove the gearshift cam retainer.



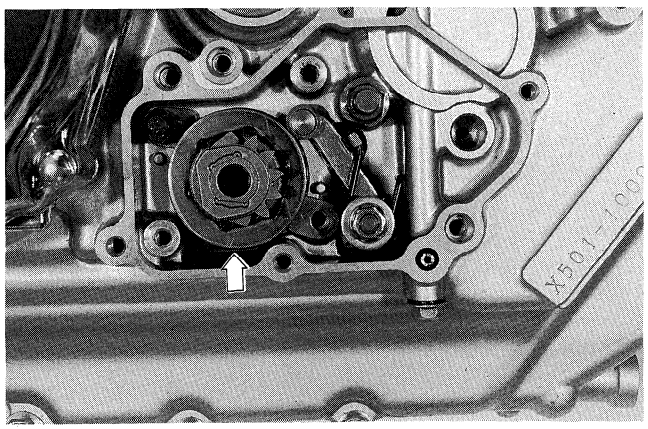
- Remove gearshift cam guide screws and pawl lifter screw and nut.

09900-09003	Impact driver set

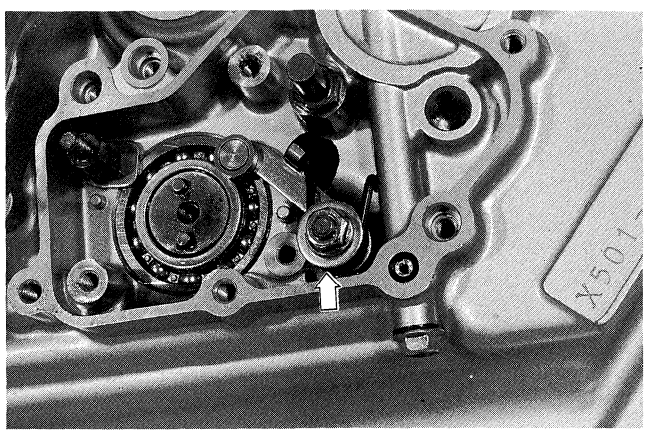
NOTE:
Do not lose the spacer and bearing retainer.



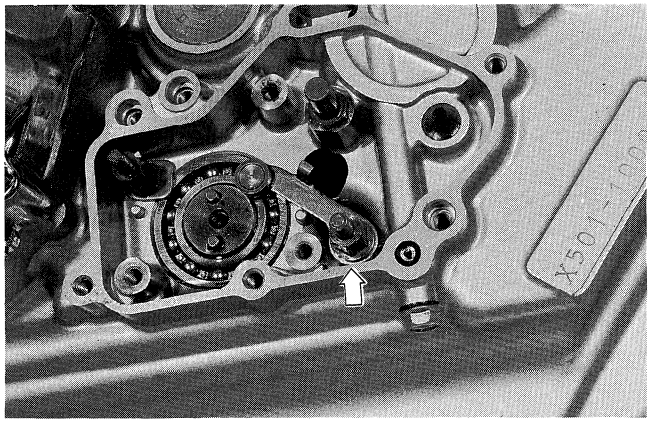
- Remove the gearshift cam driven gear and plate.



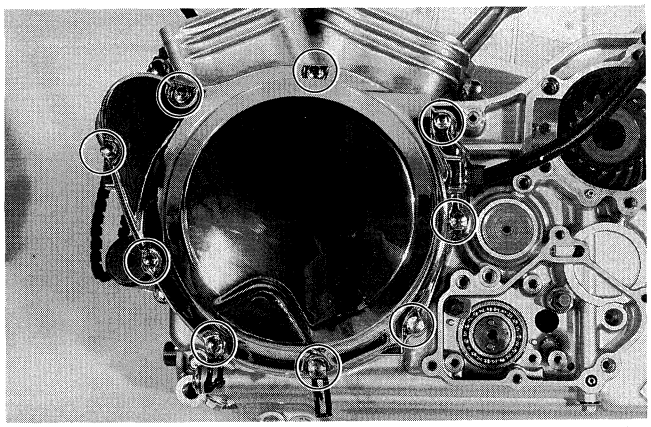
- Loosen the neutral stopper spring holder nut.
- Remove the washer and spring.



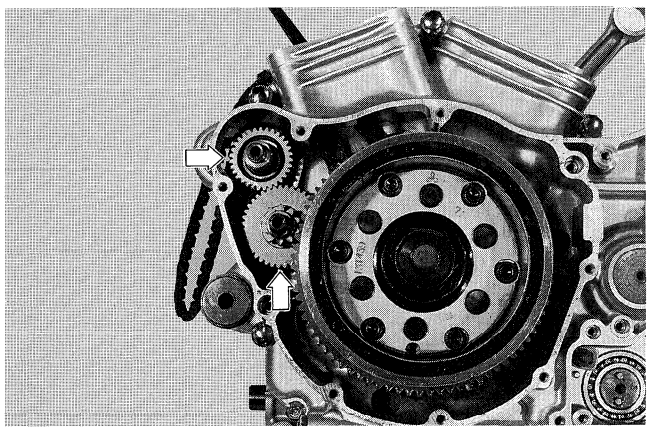
- Loosen the cam stopper bolt, and then remove cam stopper and washer.



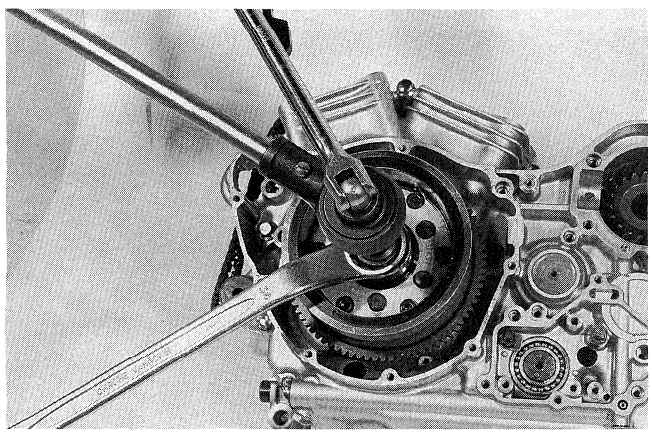
- Remove the generator cover.



- Remove the starter drive and idle gears and shafts.

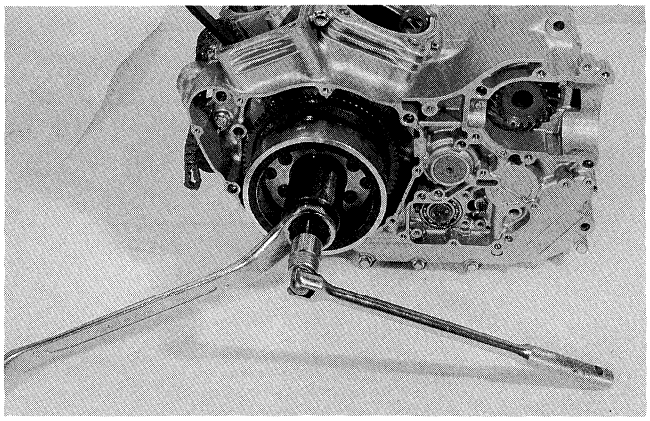


- Loosen the rotor securing bolt by several turns.



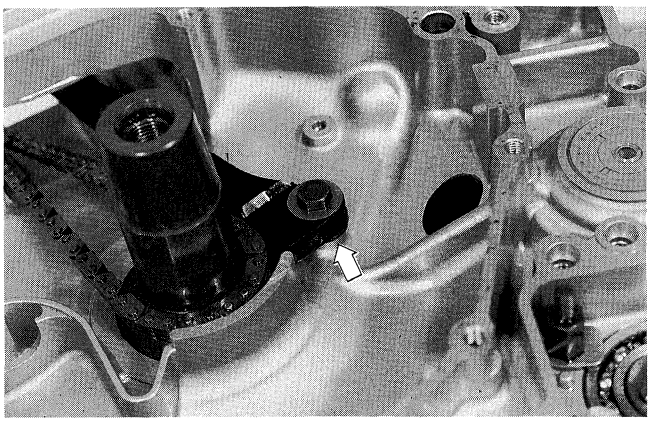
- Disengage the rotor from the crankshaft using the special tool.

09930-30720	Rotor remover

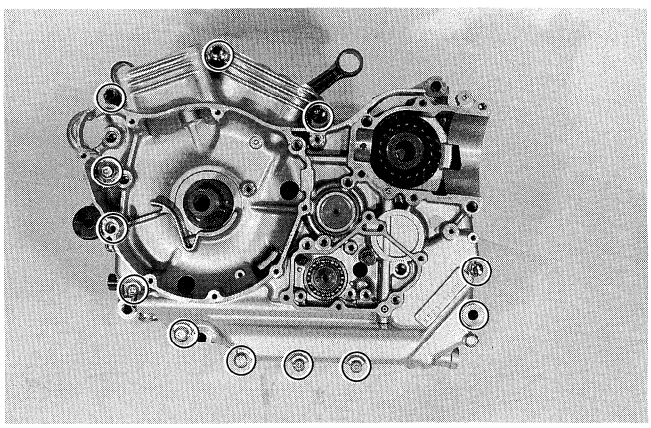


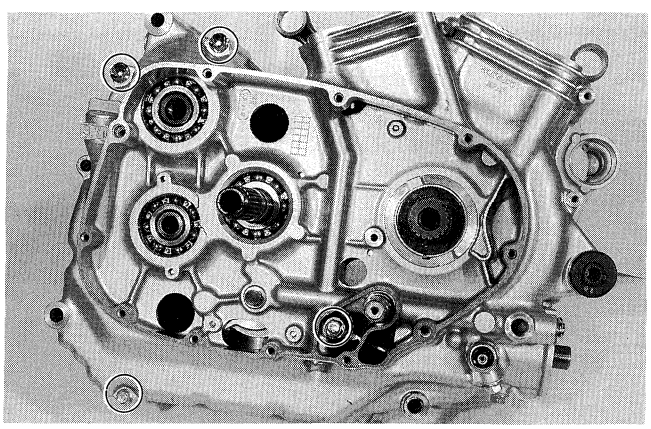
- Remove the special tool, bolt, generator rotor, key and starter driven gear.

- Remove the cam chain guide and chain.



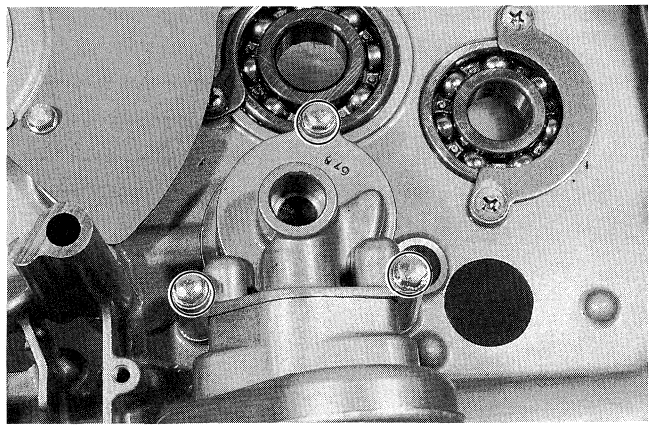
- Remove the crankcase securing bolts.
  Separate the right and left crankcases.



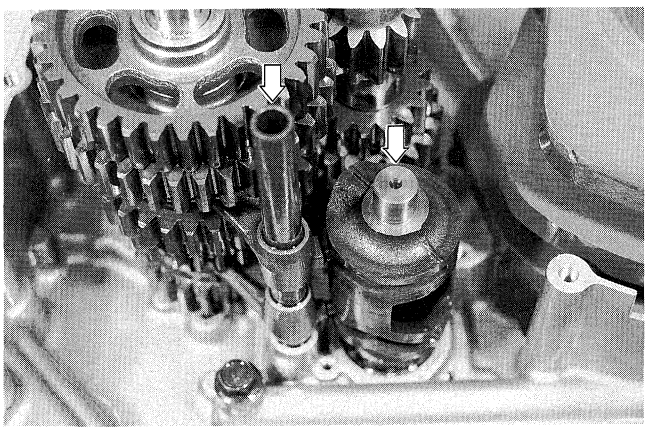


- Remove the oil pump by loosening the securing bolts.

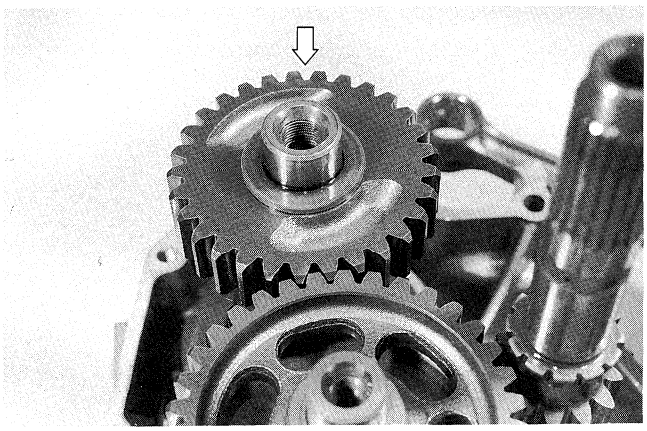
Tightening torque	9 – 13 N·m (0.9 – 1.3 kg-m 6.5 – 9.5 lb-ft)



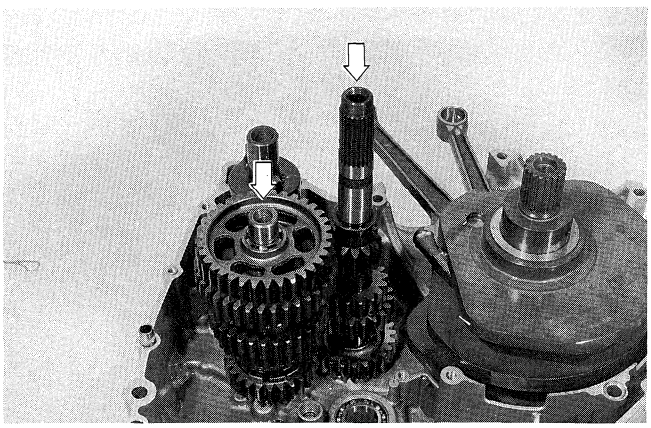
- Remove the gearshift cam, shift forks and shift fork shaft.



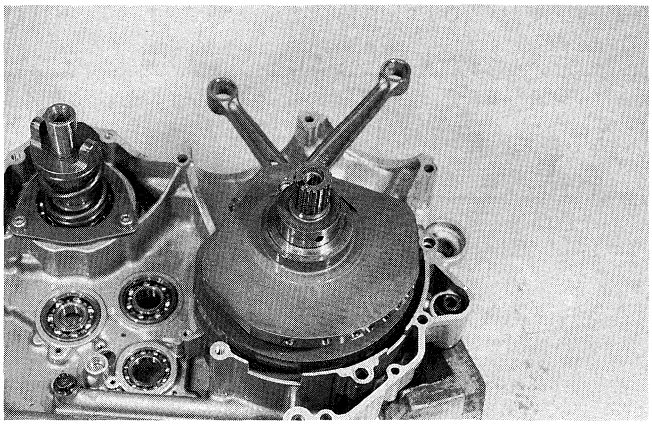
- Remove the over driving gear.



- Remove the countershaft, drive shaft and gears.

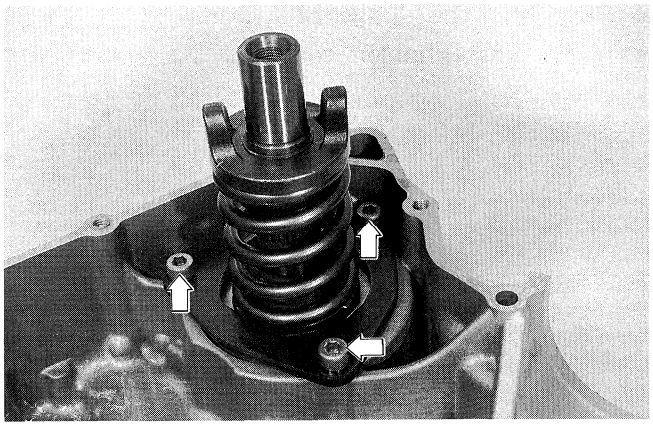


- Remove the crankshaft.



- Loosen the secondary drive bevel gear bolts and remove the secondary drive bevel gear.

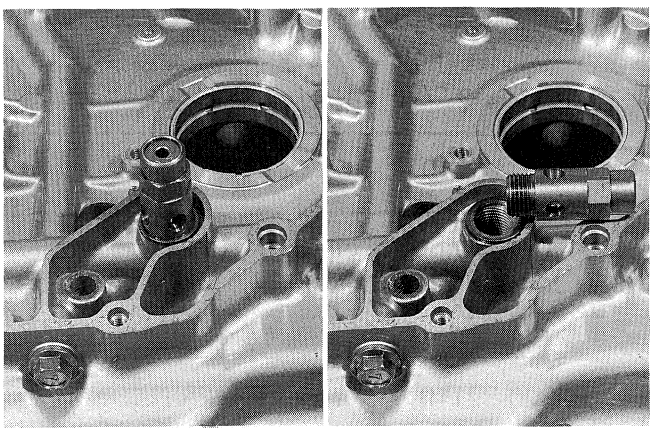
WARNING:
Never hit the secondary bevel gear. Secondary bevel gear circlip could come off.



LUBRICATION RELATED PARTS

- Remove the pressure regulator.

Tightening torque	25 – 30 N·m (2.5 – 3.0 kg-m 18.0 – 21.5 lb-ft)

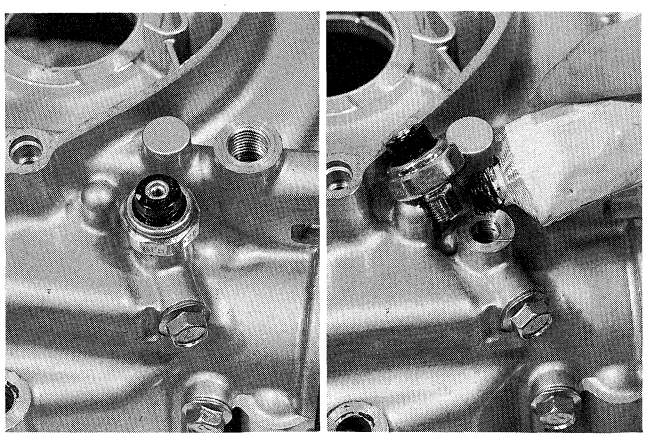


- Remove the oil pressure switch.

NOTE:
When reinstalling the oil pressure switch, apply SUZUKI BOND No. 1215 to the thread part.

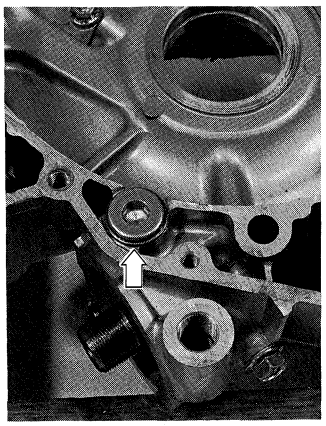
99000-31110	SUZUKI BOND No. 1215

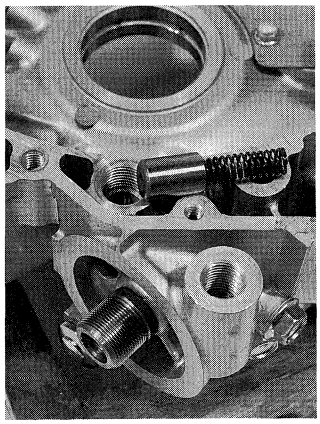
Tightening torque	12 – 15 N·m (1.2 – 1.5 kg-m 8.5 – 11.0 lb-ft)



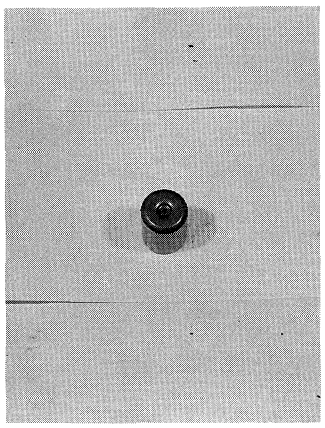
- Remove the oil plunger retaining bolt.

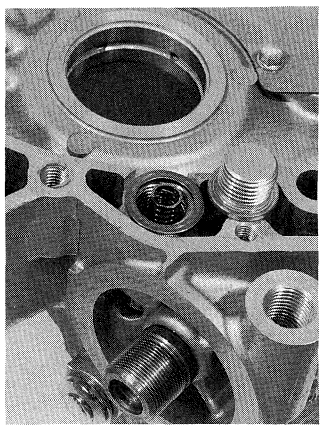
Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m) (14.5 – 18.0 lb-ft)





- Check that the plunger hole is clogged.
- Install the plunger retaining bolt with the gasket.



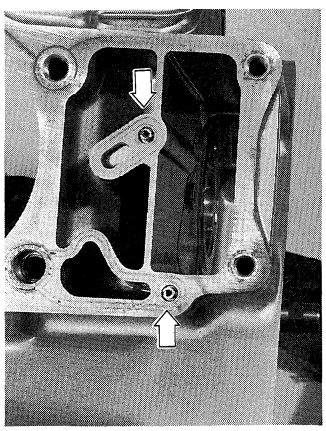


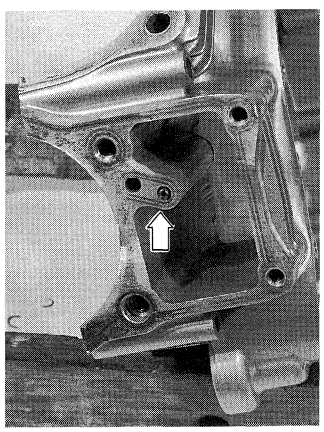
- When installing the oil jet, apply motor oil to the oil jet hole or crankcase and SUZUKI Super grease "A" to the O-ring of the oil jet.

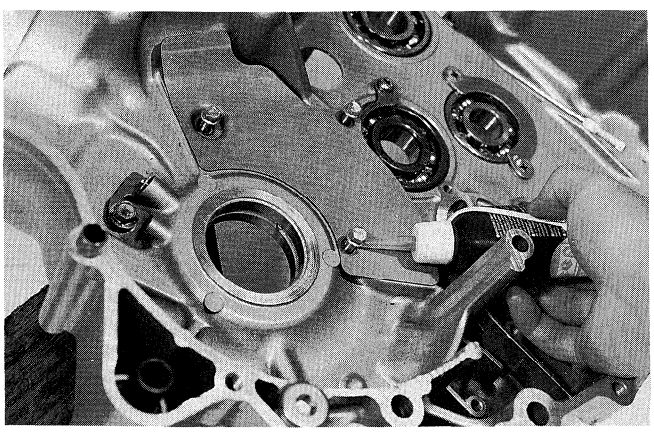
99000-25010	SUZUKI Super grease "A"

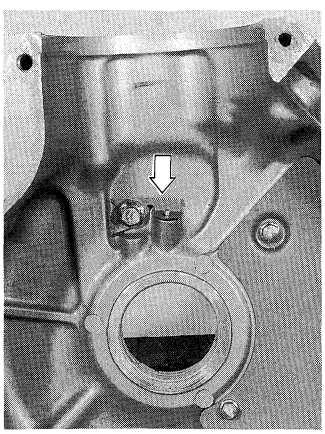
- When installing the oil separater bolts and piston jet retainer plate bolt, apply thread lock super "1322".

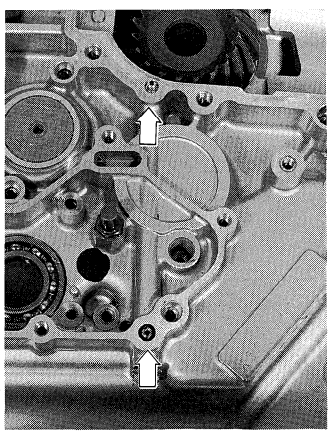
99000-32110	Thread lock super "1322"





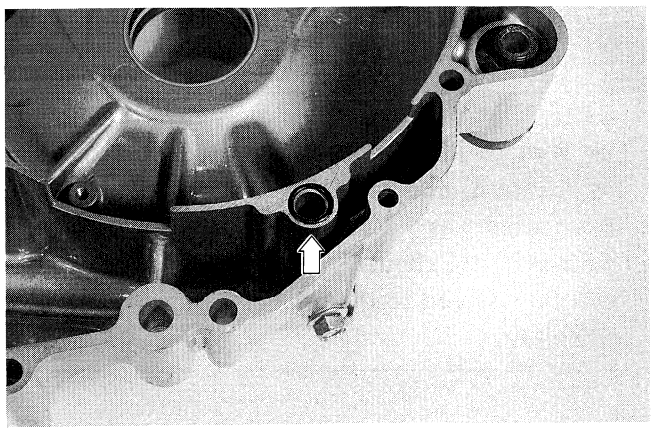






- Remove the O-ring.

NOTE:
When reassembling the crankcase, use a new O-ring.

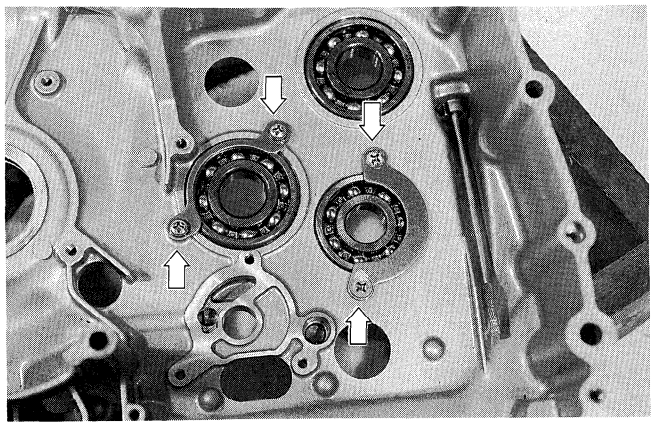


BEARINGS AND OIL SEALS (EXCEPT FOR CRANKSHAFT)

- Remove the bearing retainer screws and bolt.

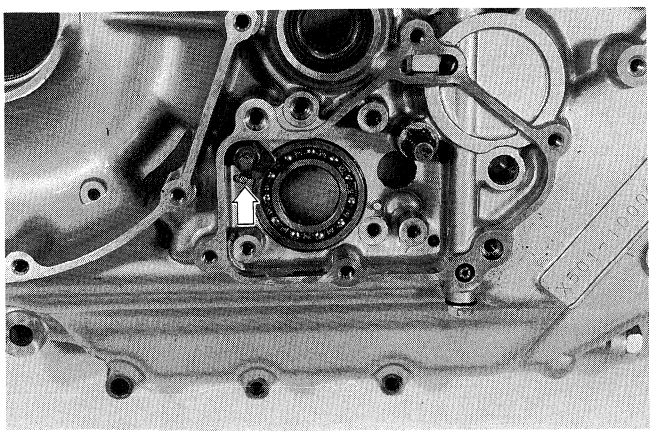
NOTE:
When reinstalling the bearings, apply thread lock super "1322" to bearing retainer bolt and screws.

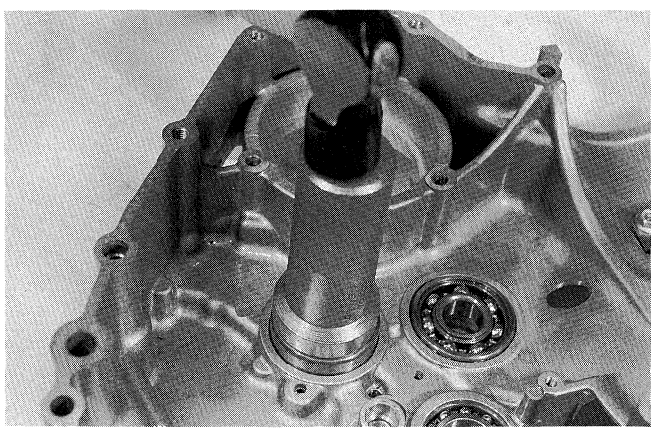
99000-32110	Thread lock super "1322"

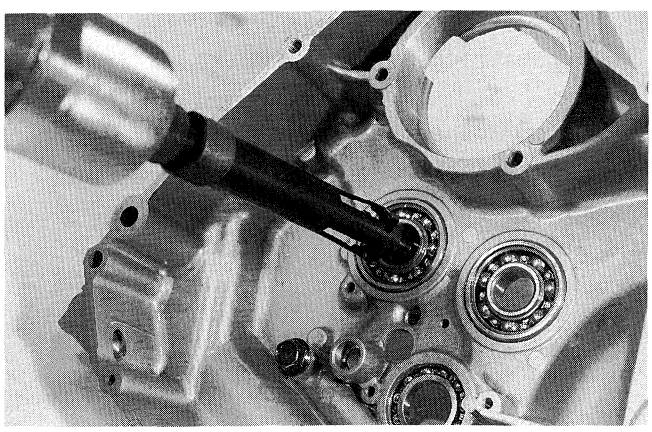


- Remove the bearings and oil seals using the special tool.

09923-74510	Bearing remover
09930-30102	Sliding shaft
09913-70122	Bearing installer
09913-76010	Bearing installer
09913-75520	Bearing installer
09914-79610	Bearing installer



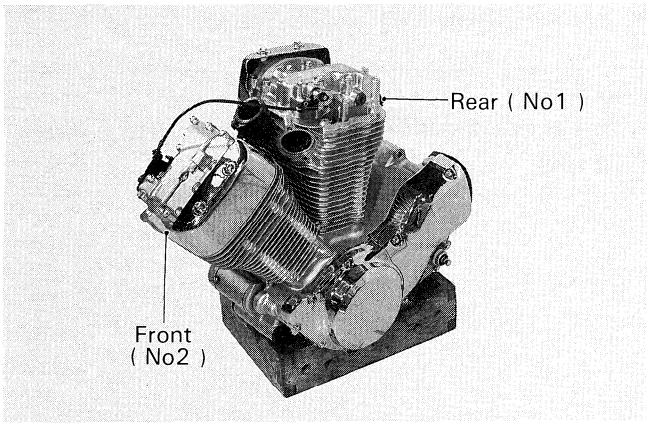




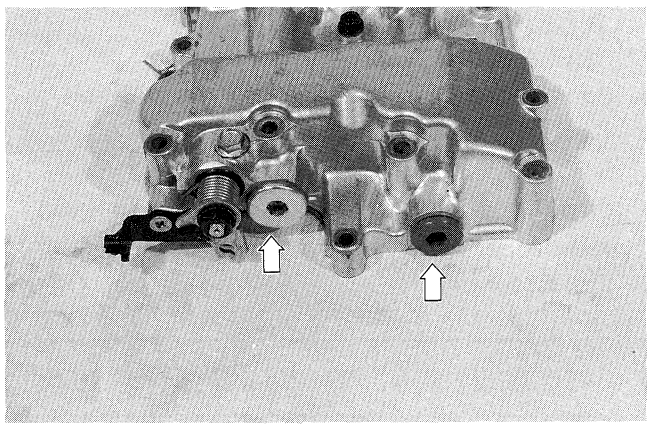
ENGINE COMPONENTS INSPECTION AND SERVICING

DISASSEMBLY AND SERVICING CYLINDER HEAD

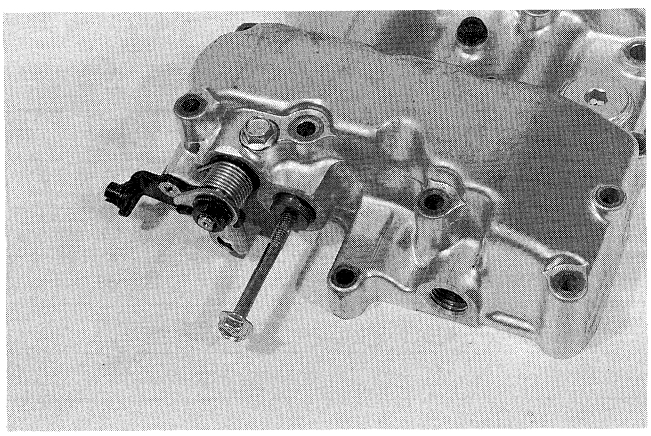
CAUTION:
Be sure to identify each removed part as to its location, and lay the parts out in groups designated as "No. 1 cylinder", "No. 2 cylinder", "Exhaust", "Inlet", so that each will be restored to the original location during assembly.



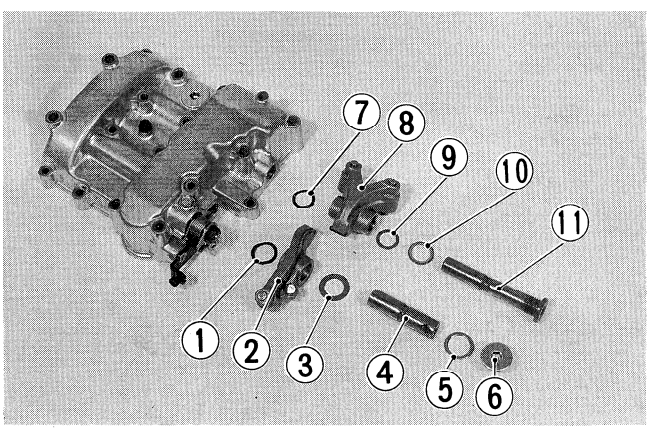
- Loosen the rocker arm shaft and plug.



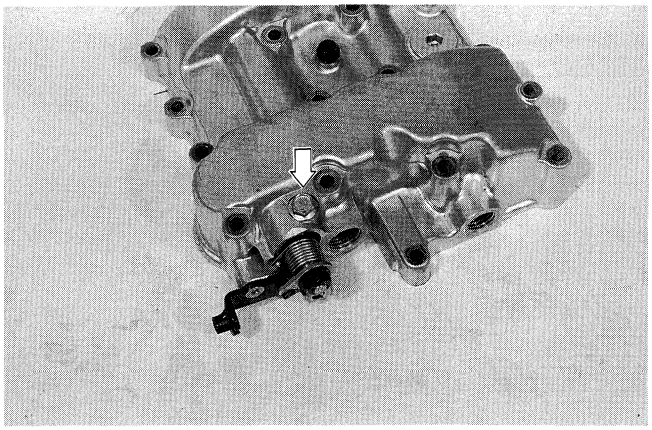
- Pull out the intake side rocker arm shaft.
- Pull out the exhaust side rocker arm shaft by using 6 mm bolt.



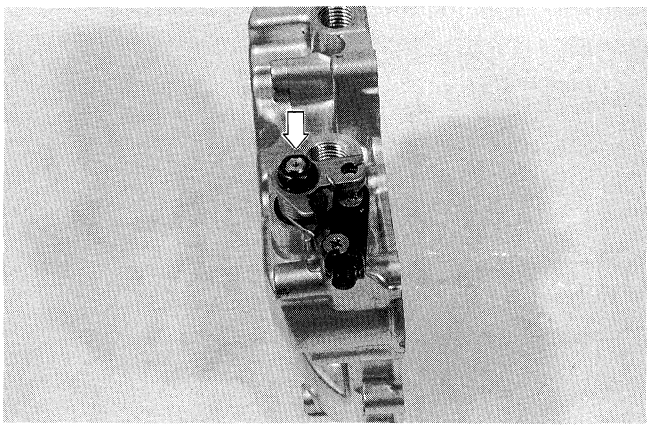
① Wave washer
② Exhaust rocker arm
③ Thrust washer
④ Exhaust rocker arm shaft
⑤ Gasket
⑥ Plug
⑦ Wave washer
⑧ Intake rocker arm
⑨ Thrust washer
⑩ Gasket
⑪ Intake rocker arm shaft



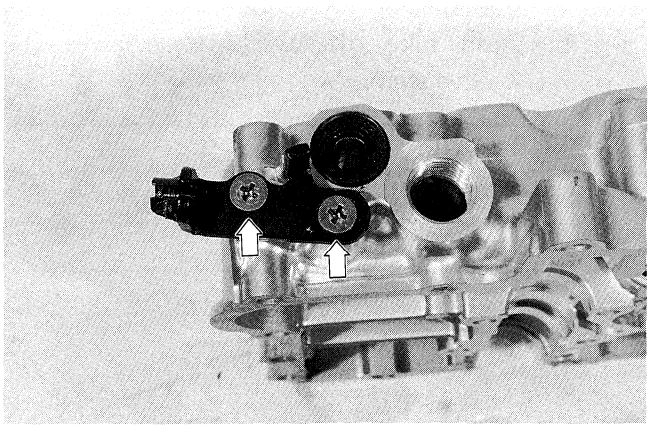
- Loosen the de-compression shaft securing bolt.



- Remove the de-compression shaft.



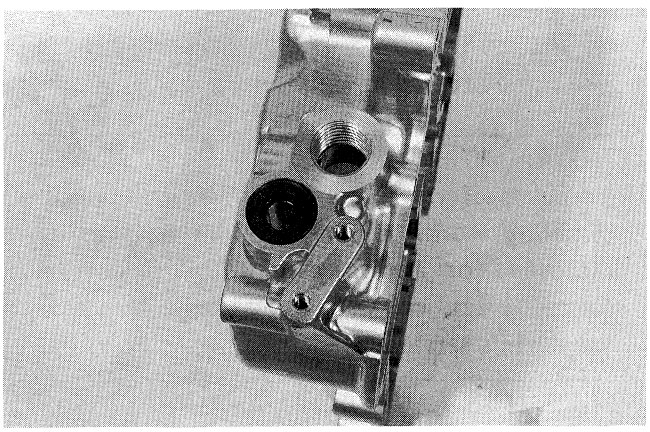
- Remove the de-compression cable holder.



- Inspect the oil seal for wear or damage.

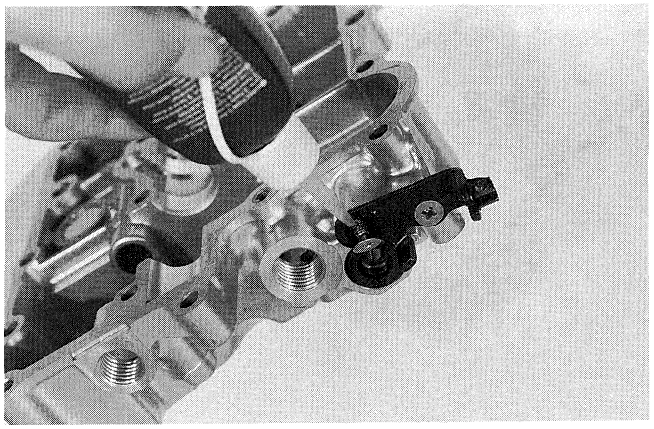
NOTE:
When installing de-compression shaft, apply grease to oil seal lip.

99000-25010	SUZUKI super grease "A"

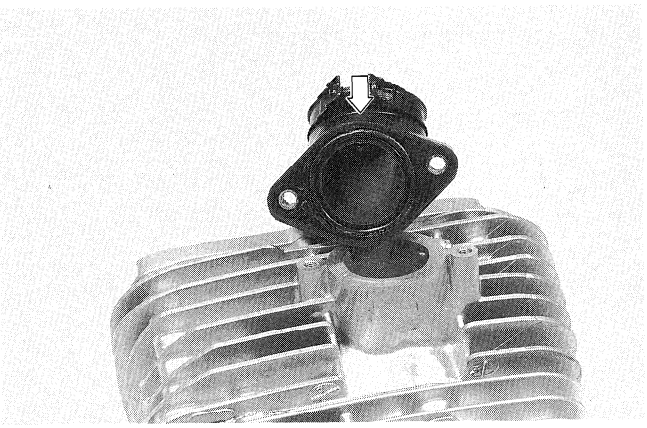


- Install the cable holder after applying the thread lock "1342" to the securing screw.

99000-32050	Thread Lock "1342"

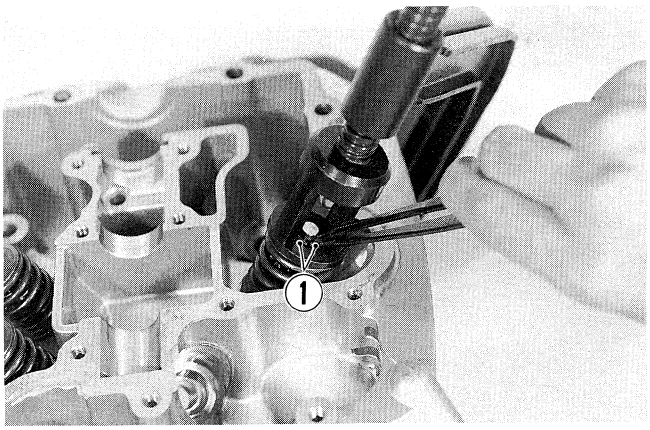


- When installing the intake pipe, use a new O-ring.



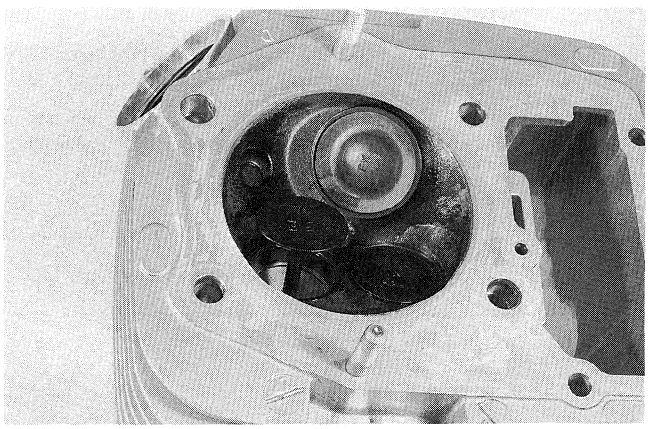
- Using the special tools, compress the valve springs and take off two cotter halves ① from the valve stem.

09916-14510	Valve lifter
09916-14910	Attachment (For INTAKE)
09916-84510	Tweezers



- Take out the spring retainer, inner and outer springs.
- From the other side, pull out the valve.

NOTE:
Removal of valves completes ordinary disassembling work. If valve guides have to be removed for replacement after inspecting related parts, carry out the steps shown in valve guide servicing.

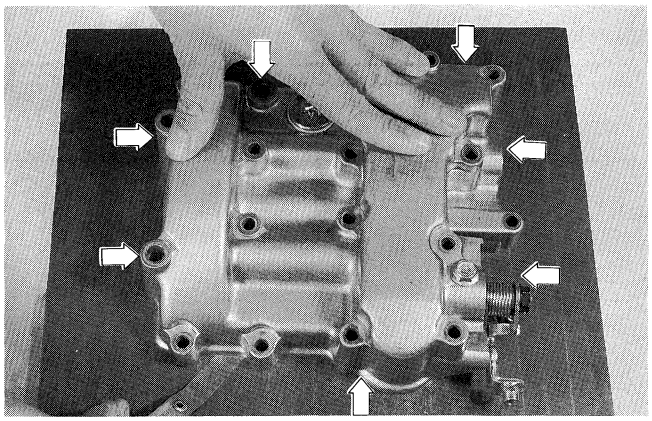


CYLINDER HEAD COVER DISTORTION

After removing sealant (SUZUKI BOND No. 1216) from the fitting surface of the cylinder head cover, place the cylinder head cover on a surface plate and check for distortion with a thickness gauge. Check points are shown in Fig.

Service Limit	0.05 mm (0.002 in)

If the distortion exceeds the limit, replace the cylinder head set.

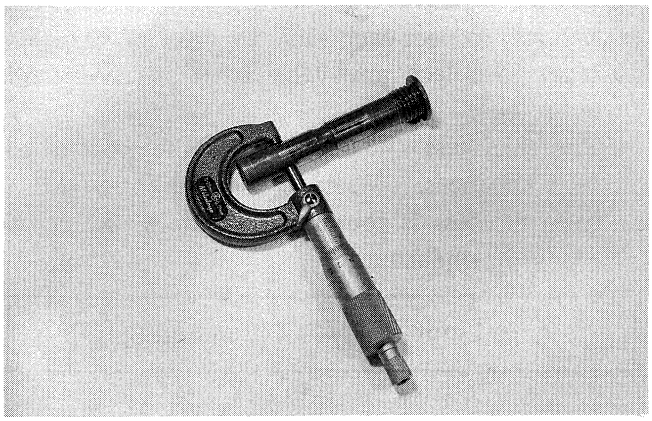


ROCKER ARM SHAFT O.D.

Measure the diameter of the rocker arm shaft.

09900-20205	Micrometer (0 – 25 mm)

Standard	IN	13.966 – 13.984 mm (0.5498 – 0.5506 in)
	EX	15.966 – 15.984 mm (0.6286 – 0.6293 in)

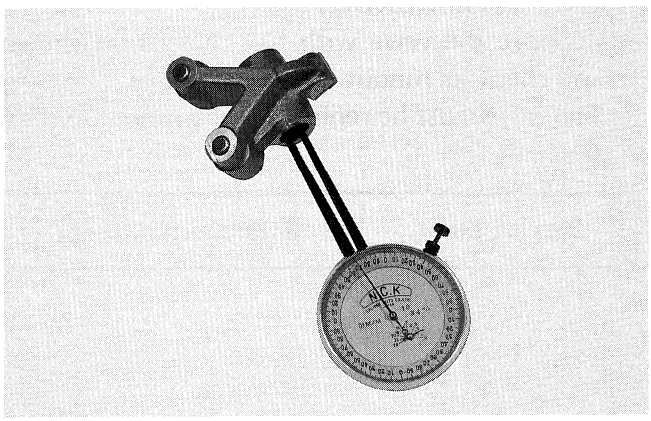


ROCKER ARM I.D.

When checking the valve rocker arm, the inside diameter of the valve rocker arm and wear of the camshaft contacting surface should be checked.

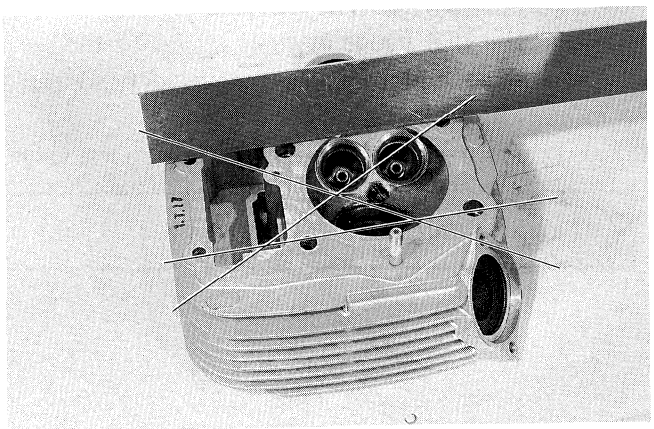
09900-20605	Dial calipers

Standard	IN	14.000 – 14.018 mm (0.5512 – 0.5519 in)
	EX	16.000 – 16.018 mm (0.6299 – 0.6306 in)



CYLINDER HEAD DISTORTION

- Decarbonize the combustion chambers.
- Check the gasketed surface of the cylinder head for distortion with a straightedge and thickness gauge, taking a clearance reading at several places indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder head.



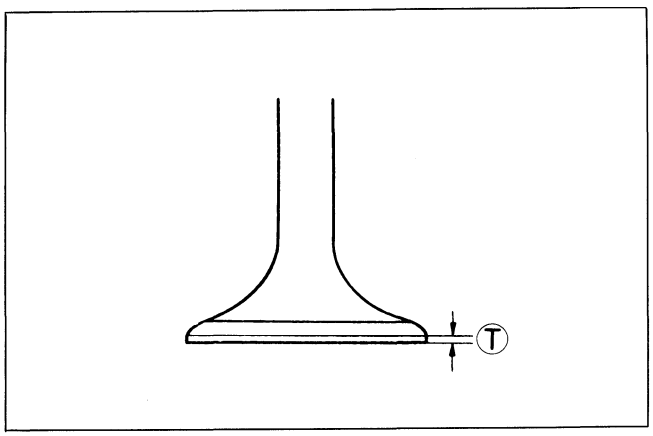
09900-20803	Thickness gauge

Service Limit	0.05 mm (0.002 in)

VALVE FACE WEAR

- Visually inspect each valve for wear of its seating face. Replace any valve with an abnormally worn face.
- The thickness Ⓣ decreases as the wear of the face advances. Measure the thickness and, if the thickness is found to have been reduced to the limit, replace it.

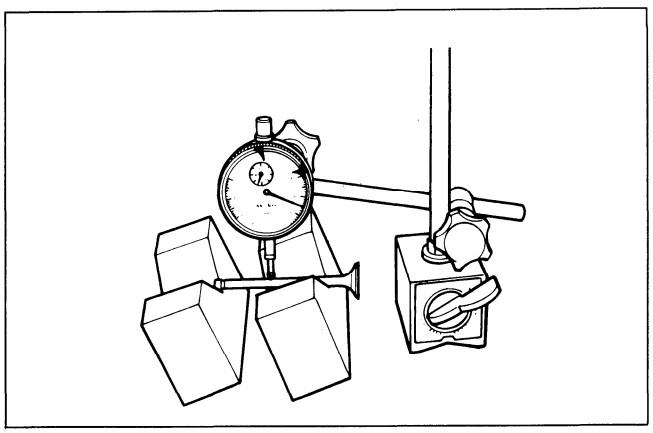
Service Limit	0.5 mm (0.02 in)



VALVE STEM RUNOUT

- Support the valve with "V" blocks, as shown, and check its runout with a dial gauge.
  The valve must be replaced if the runout exceeds the limit.

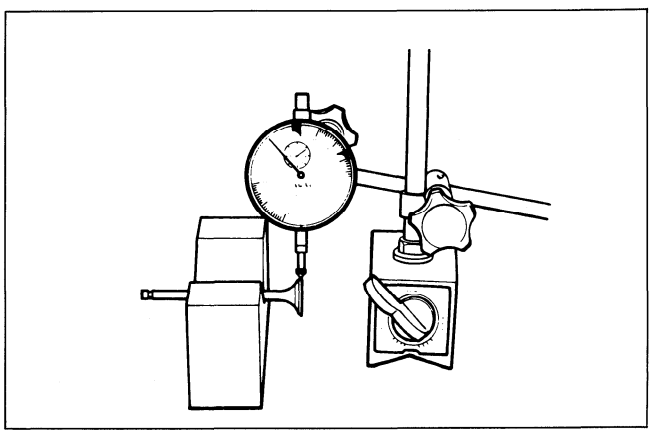
Service Limit	0.05 mm (0.002 in)



VALVE HEAD RADIAL RUNOUT

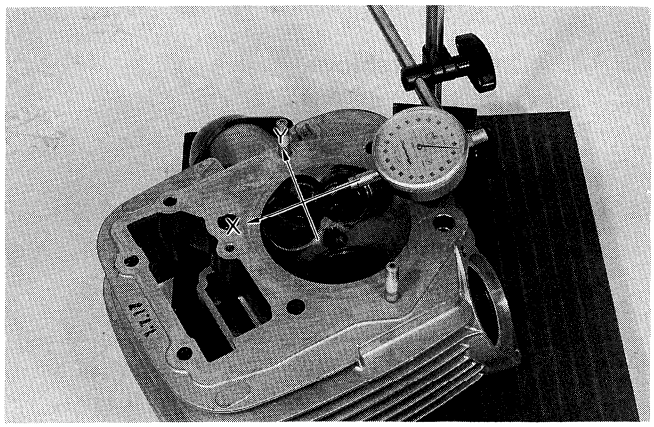
- Place the dial gauge at right angles to the valve head face, and measure the valve head radial runout.
  If it measures more than limit, replace the valve.

Service Limit	0.03 mm (0.001 in)



VALVE GUIDE–VALVE STEM CLEARANCE

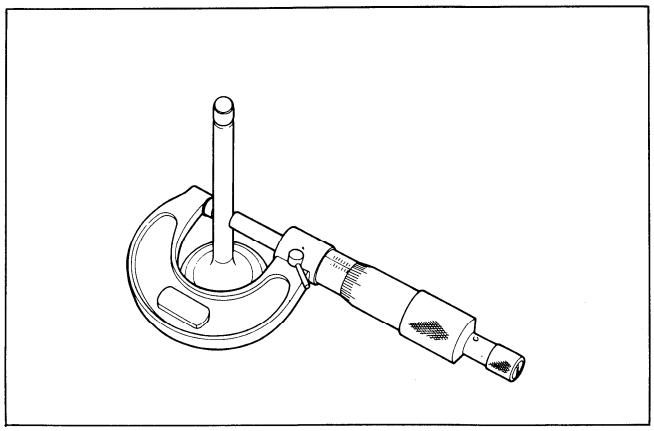
Measure the clearance in two directions "X" and "Y", perpendicular to each other, by rigging up the dial gauge as shown. If the clearance measured exceeds the limit, specified below, then determine whether the valve or the guide should be replaced to reduce the clearance to the standard range:



Valve	Service Limit
Intake valve	0.35 mm (0.014 in)
Exhaust valve	0.35 mm (0.014 in)

VALVE STEM WEAR

If the valve stem is worn down to the limit, as measured with a micrometer, where the clearance is found to be in excess of the limit indicated, replace the valve, if the stem is within the limit, then replace the guide. After replacing valve or guide, be sure to recheck the clearance.

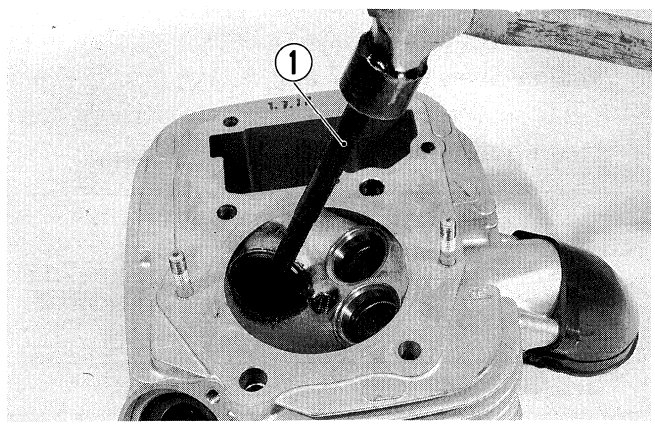


09900-20205	Micrometer (0 – 25 mm)

Valve	Standard
Intake valve	5.475 – 5.490 mm (0.2156 – 0.2161 in)
Exhaust valve	6.945 – 6.960 mm (0.2734 – 0.2740 in)

VALVE GUIDE SERVICING

- Using valve guide remover ①, drive the valve guide out toward intake or exhaust rocker arm side.

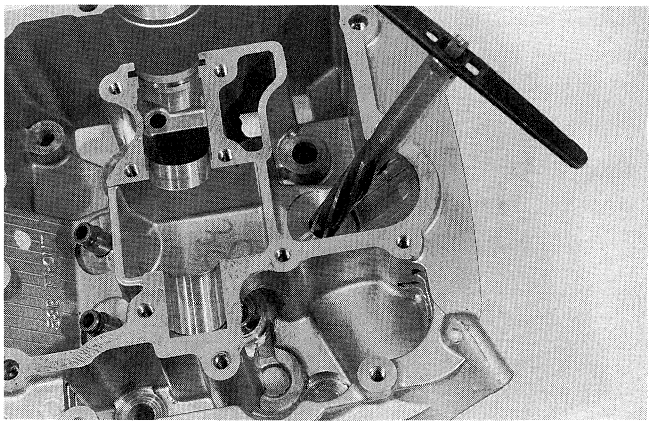


09916-44910	Valve guide remover (For intake)
09916-44511	Valve guide remover (For exhaust)

NOTE:
* **Discard the removed valve guide subassemblies.**
* **Only oversize valve guide is available.**

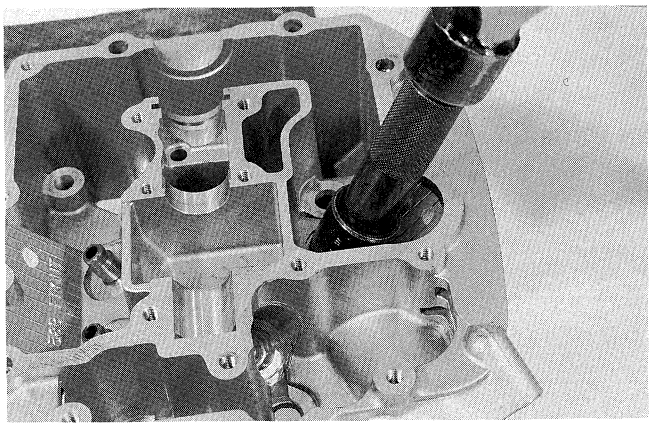
- Re-finish the valve guide holes in cylinder head with a 12.3 mm reamer (For EX) and a 10.8 mm reamer (For IN).

09916-34580	Valve guide hole reamer 10.8 mm (for intake)
09916-34531	Valve guide hole reamer 12.3 mm (for exhaust)
09916-34541	Reamer handle

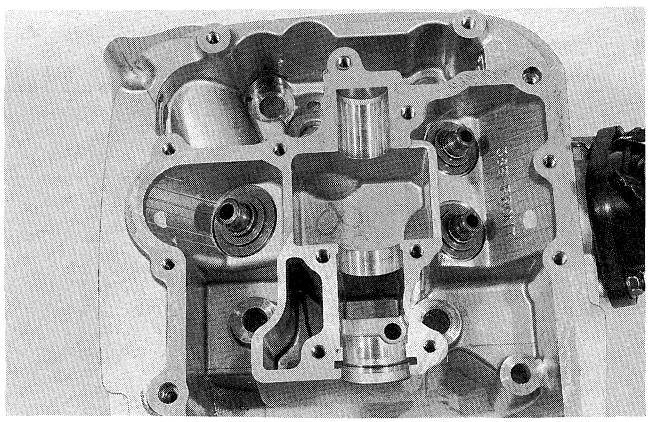


- Oil the stem hole of each valve guide and drive the guide into the guide hole with the valve guide remover and attachment.

09916-44910	Valve guide remover (for intake)
09916-44920	Valve guide installer attachment (for intake)
09916-57321	Valve guide installer handle (for exhaust)
09916-57311	Valve guide installer attachment (for exhaust) (Use 15.0 side)

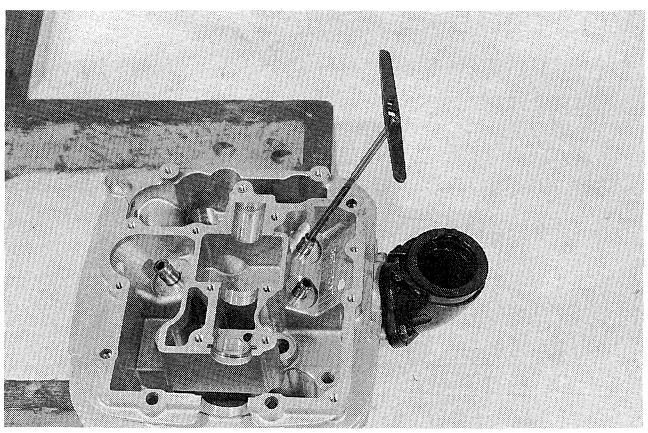


CAUTION:
Failure to oil the valve guide hole before driving a new guide into place many result in a damaged guide or head.



- Install the valve spring lower seat.
- After fitting all valve guides, refinish their guiding bores with a 7 mm reamer (For EX) and a 5.5 mm reamer (For IN). Be sure to clean and oil the guide after reaming.

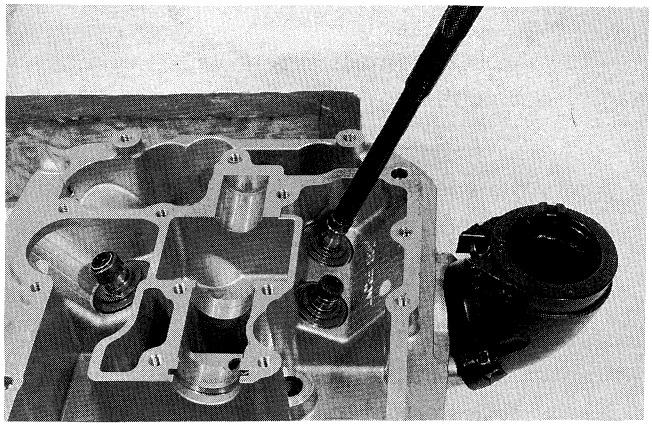
09916-34550	Valve guide reamer (for intake)
09916-34520	Valve guide reamer (for exhaust)
09916-34541	Reamer handle



- Oil each oil seal, and drive them into position with the valve guide remover.

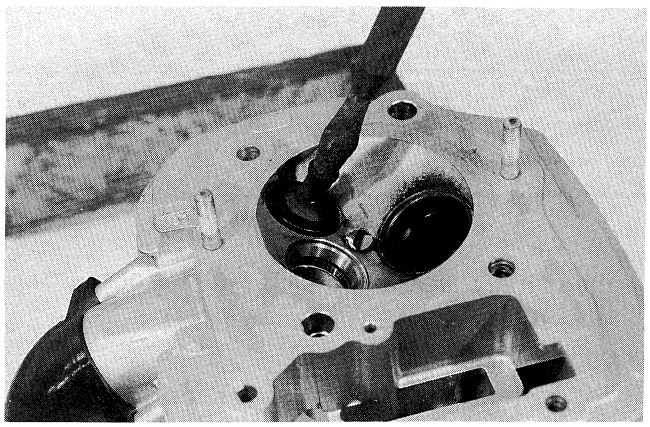
09916-44910	Valve guide remover (for intake)
09916-44511	Valve guide remover (for exhaust)

NOTE:
Do not use the oil seals removed in disassembly: use new oil seals.



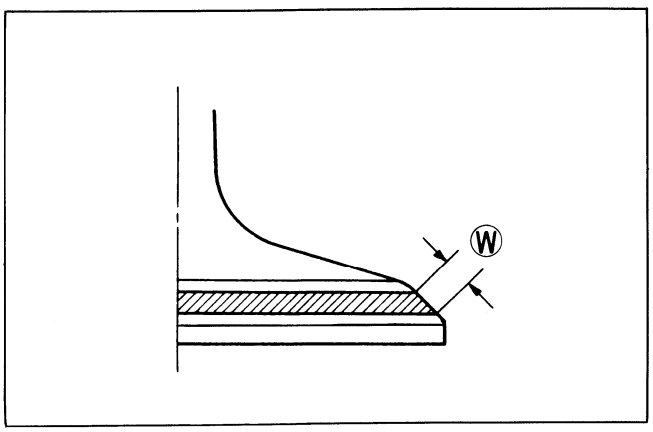
VALVE SEAT WIDTH

- Coat the valve seat with Prussian blue uniformly. Fit the valve and tap the coated seat with the valve face in a rotating manner, in order to obtain a clear impression of the seating contact. In this operation, use the valve lapper to hold the valve head.
- The ring-like dye impression left on the valve face must be continuous – without any break – and, in addition to this requirement, the width of the dye ring, which is the visualized seat "width", must be within the following specification:



Valve seat width

Seat width	Standard
Ⓦ	0.9 – 1.3 mm (0.035 – 0.051 in)



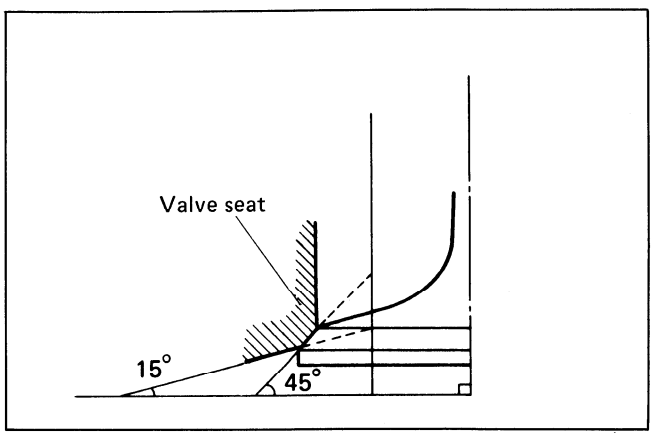
If either requirement is not met, correct the seat by servicing it as follows:

VALVE SEAT SERVICING

The valve seats for both the intake and exhaust valves are machined to two different angles. The seat contact surface is cut 45° and the area above the contact surface (closest to the combustion chamber) is cut to 15°.

Parts list of valve seat servicing tools

	IN		EX	
	45°	15°	45°	15°
Cutter head	N-608	N-212	N-635	←
Solid pilot	N-140 -5.5	←	N-140 -7.0	←
Adapter			N-503 -1	←
T-handle	N-503	←	←	←



NOTE:
The valve seat contact area must be inspected after each cut.

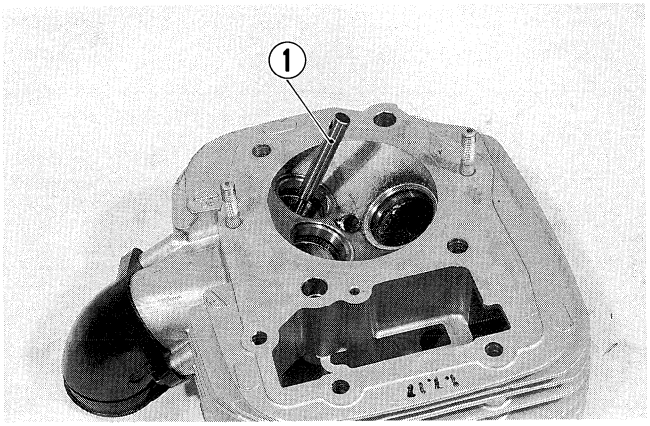
- Insert the solid pilot ① with a slight rotation. Seat the pilot snugly. Install the 45° cutter, attachment and T handle.
- Using the 45° cutter, descale and clean-up the seat with one or two turns.
- Inspect the seat by the previously described seat width measurement procedure. If the seat is pitted or burned, additional seat conditioning with the 45° cutter is required.

NOTE:
Cut only the minimum amount necessary from the seat.

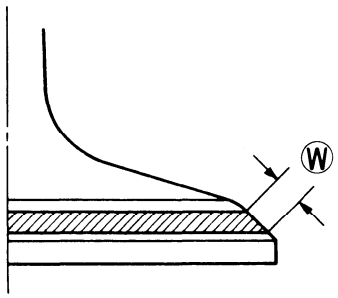
If the contact area is too high on the valve, or if it is too wide, use a 15° cutter to lower and narrow the contact area.
If the contact area is too low or too narrow, use the 45° cutter to raise and widen the contact area.

- After the desired seat position and width is achieved, use the 45° cutter very lightly to clean up any burrs caused by the previous cutting operations. DO NOT use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish and not a highly polished or shiny finish. This will provide a soft surface for the final seating of the valve which will occur during the first few seconds of engine operation.
- Clean and assemble the head and valve components. Fill the intake and exhaust ports with gasoline to check for leaks. If any leaks occur, inspect the valve seat and face for burrs or other things that could prevent the valve from sealing.

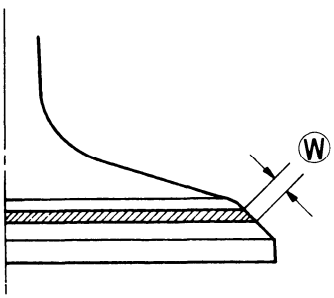
NOTE:
Always use extreme caution when handling gasoline.

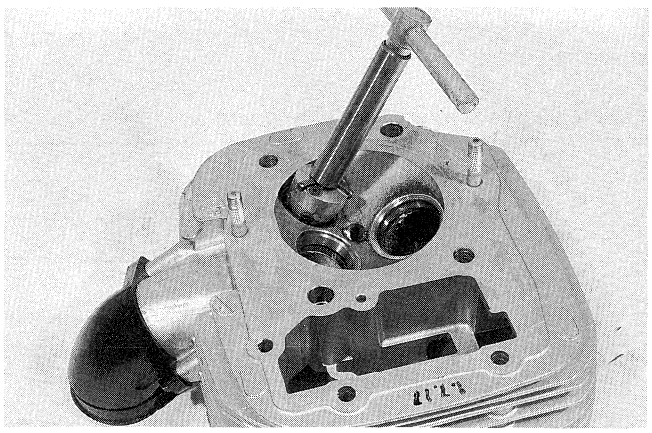


Contact area too high and too wide on face of valve



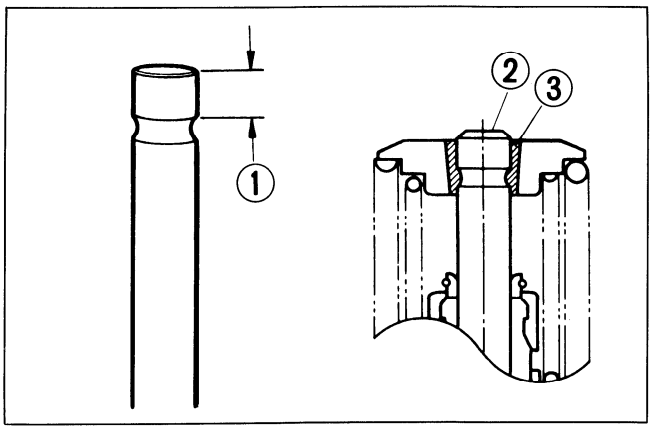
Contact area too low and too narrow on face of valve





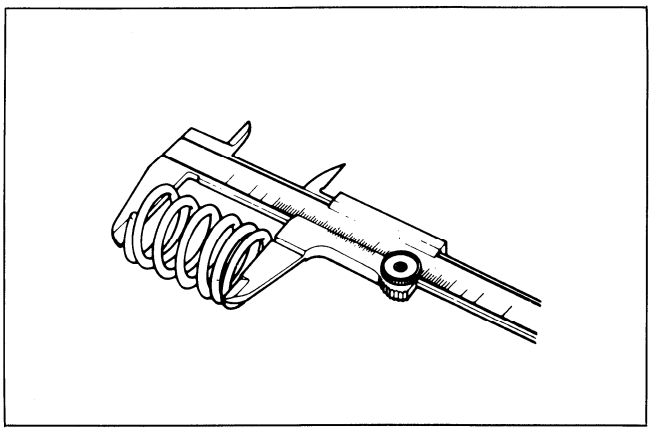
VALVE STEM END CONDITION

Inspect the valve stem end face for pitting and wear. If pitting or wear of the stem end face are present, the valve stem end may be resurfaced, providing that the length ① will not be reduced to less than 2.6 mm (0.10 in). If this length becomes less than 2.6 mm (0.10 in), the valve must be replaced. After installing a valve whose stem end has been ground off as above, check to ensure that the face ② of the valve stem end is above the cotters ③.



VALVE SPRINGS (REFER TO SERVICE DATA)

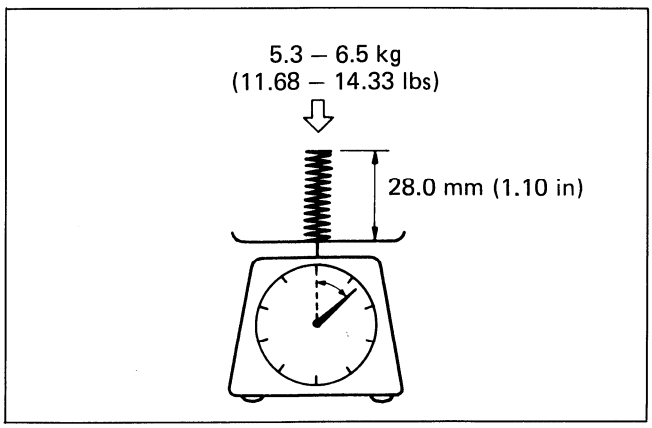
- The force of the two coil springs (for intake, one spring for exhaust) keeps the valve seat tight. Weakened springs result in reduced engine power output, and often account for the chattering noise coming from the valve mechanism.
- Check the springs for strength by measuring their free lengths and also the force required to compress them. If the limit indicated is exceeded by the free length reading or if the measured force does not fall within the range specified, replace with a SUZUKI spring.



CAUTION:
Replace both of the valve springs (for intake), inner and outer, at a time, if any one of these is found to be beyond the limit.

Valve spring free length limit **Unit: mm (in)**

	INNER	OUTER
IN	35.0 (1.38)	37.8 (1.49)
EX		40.5 (1.59)



Valve spring tension

(For IN)

Spring	Standard
INNER	5.3 – 6.5 kg/28.0 mm (11.68 – 14.33 lbs/1.10 in)
OUTER	14.0 – 14.2 kg/31.5 mm (30.86 – 31.31 lbs/1.24 in)

(For EX)

Standard
20.3 – 23.3 kg/35.0 mm (44.75 – 51.37 lbs/1.38 in)

LASH ADJUSTER

- Inspect the lash adjuster and O-ring for wear, dent and/or damage. If any defect is found, replace it with a new one.
- Compress and stroke the plunger with your finger by using air bleeding tool and remove the oil completely from the lash adjuster body. Wash it with kerosene and inspect the lash adjuster whether it strokes smoothly. If any hitches or stickiness is noted, replace it with a new one.

CAUTION:
When removing the cylinder head cover, always use kerosene to bleed the air from the lash adjuster before reinstalling. Never use any solvent, fluid or oil when bleeding the lash adjuster, or it may cause engine damage.

- Using the special tool, bleed the air from the lash adjusters in the kerosene as shown in the figure.

09913-10740	Air bleeding tool

- After filling the lash adjuster with fresh kerosene, compress the plunger and body with your finger and inspect that it strokes 0 – 0.5 mm. If it strokes more than specified, bleed the air again and check it. If the stroke is not within the specification, replace the lash adjuster with a new one.

Lash-adjuster plunger stroke	0 – 0.5 mm (0 – 0.02 in)

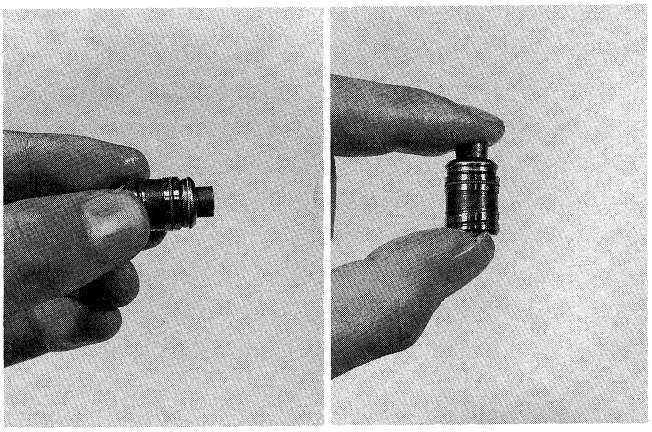
REASSEMBLY

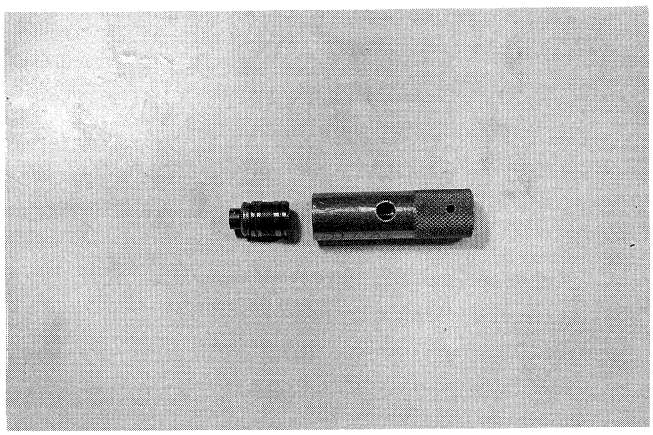
- Insert the valves, with their stems coated with high quality molybdenum disulfide lubricant (SUZUKI MOLY PASTE) all round and along the full stem length without any break.

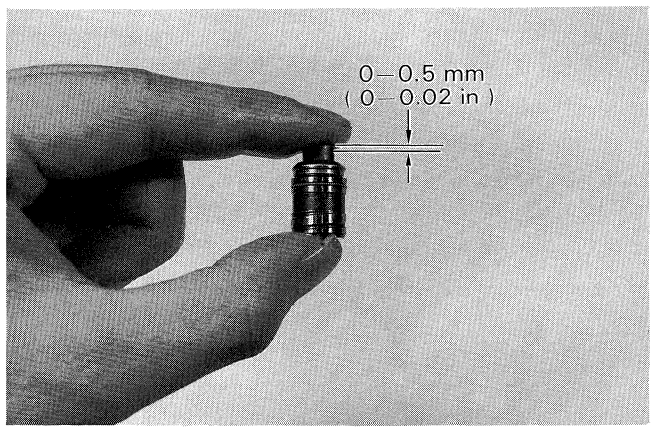
CAUTION:
When inserting each valve, take care not to damage the lip of the stem seal.

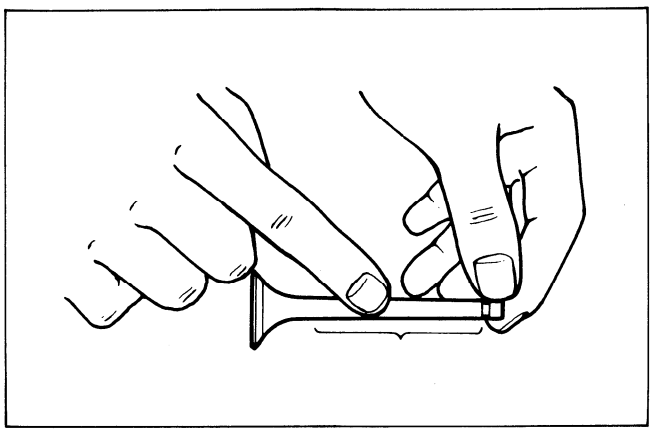
99000-25140	SUZUKI Moly Paste

- Install the valve springs with the small pitch portion Ⓐ down.
  Ⓑ : Large-pitch portion.

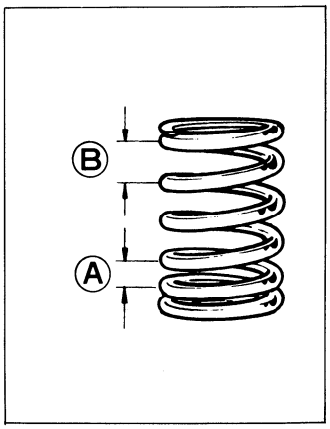


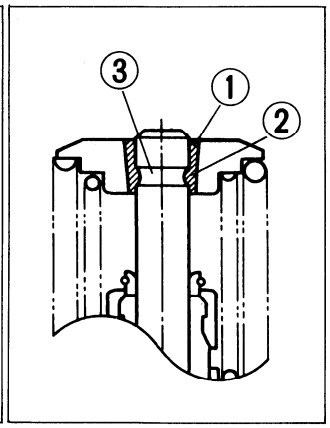






- Put on the spring retainer and, using the valve lifter, press down the spring, fit the two cotter halves to the stem end, and release the lifter to allow the cotter ① to wedge in between seat and stem. Be sure that the rounded lip ② of the cotter fits snugly into the groove ③ in the stem end.



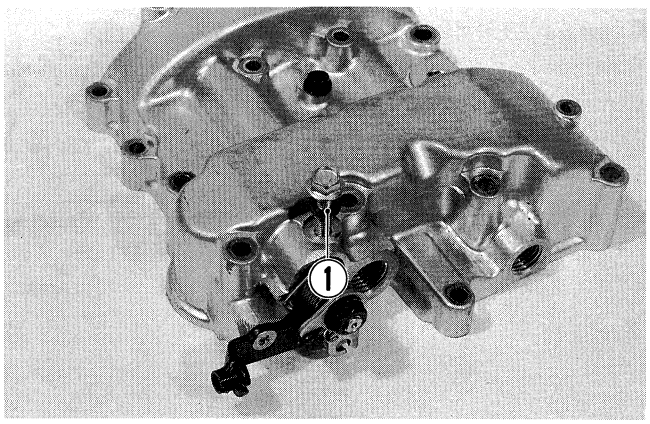


CAUTION:
Be sure to restore each spring, valve and spring retainer to their original positions.

- When installing the de-compression shaft, apply SUZUKI moly paste.

99000-25140	SUZUKI moly paste

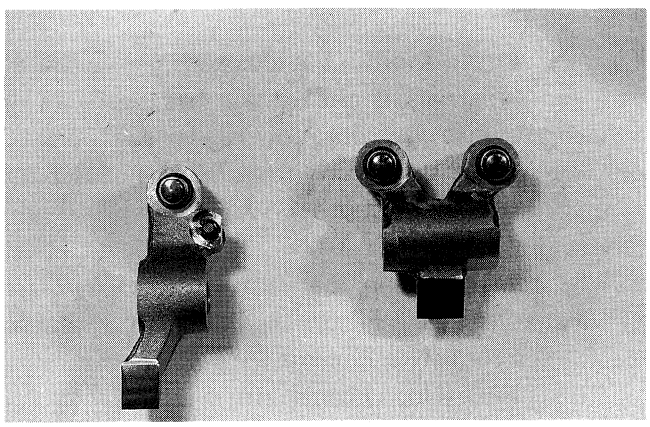
- After installing the de-compression shaft, tighten the set bolt.



CAUTION:
Use a new gasket ① on the set bolt to prevent oil leakage.

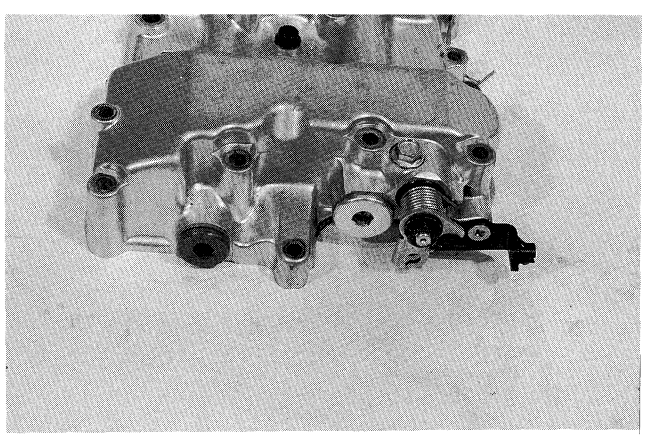
- Install the lash adjuster completed air bleeding on the rocker arm.

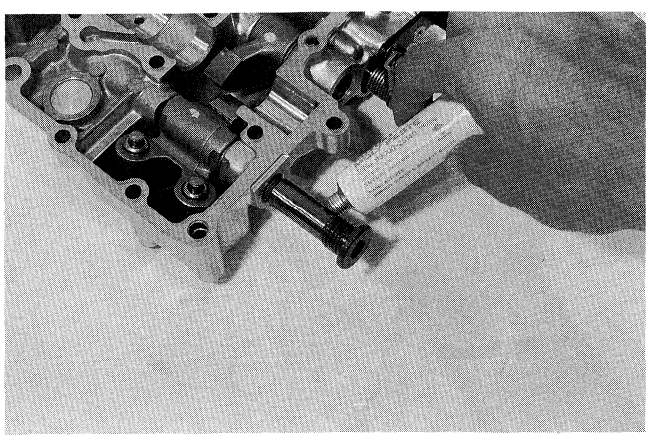
NOTE:
Inspect the O-ring for any damage.



- Apply SUZUKI moly paste to the rocker arm shaft.
- Tighten the rocker arm shaft and plug.

Tightening torque	Rocker arm shaft	34 – 40 N·m (3.4 – 4.0 kg-m / 24.5 – 29.0 lb-ft)
	Plug	25 – 30 N·m (2.5 – 3.0 kg-m / 18.0 – 21.5 lb-ft)





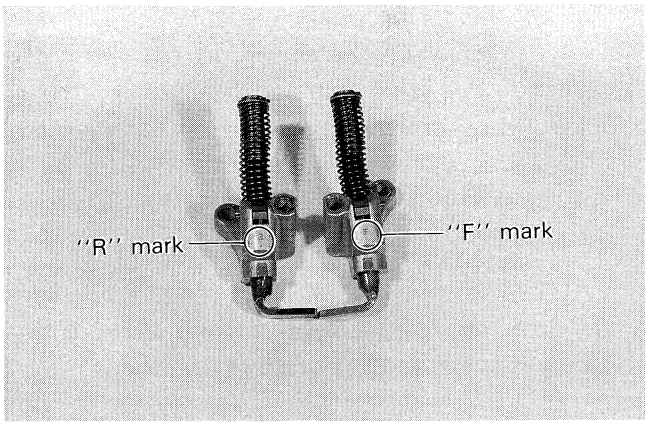
CAM CHAIN TENSIONER

For driving the camshafts, two cam chain tensioners are used on the respective cam drive chains. Unlock the ratchet mechanism, and move the push rod in place to see if it slides smoothly. If any stickiness is noted or ratchet mechanism is faulty, replace the chain tensioner assembly with a new one.

The cam chain tensioner can be distinguished by the punched-letters, "F" and "R", on the body.

F: Front (No. 2) cam chain tensioner

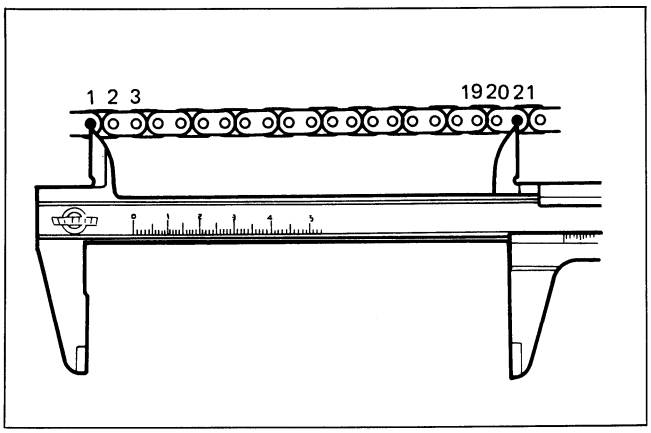
R: Rear (No. 1) cam chain tensioner



CAM CHAIN 20-PITCH LENGTH

Pull the chain tight to remove any slack, then using vernier calipers, measure the 20-pitch length of cam chain. If it measures more than limit, replace the cam chain.

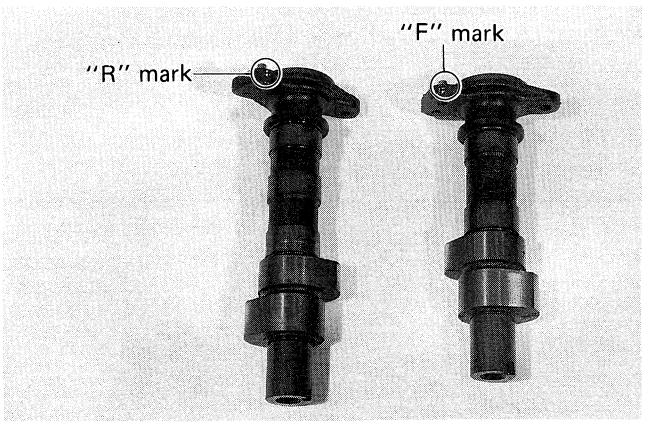
Service Limit	128.9 mm (5.07 in)

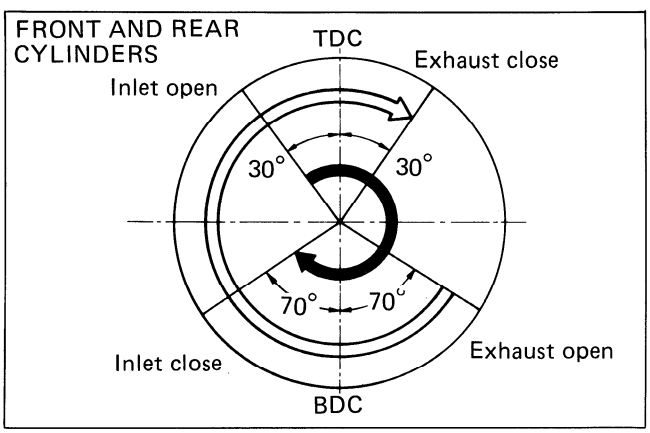


CAMSHAFT

The camshafts should be checked for wear of cams and journals if the engine has been giving abnormal noise or vibration or lack of power output. Any of these conditions may be caused by cam or camshafts journal worn down to the service limit.

- The camshaft can be distinguished by the punched-letters, "F" or "R", on the camshafts.
  "F" : Front (No. 2) camshaft
  "R" : Rear (No. 1) camshaft



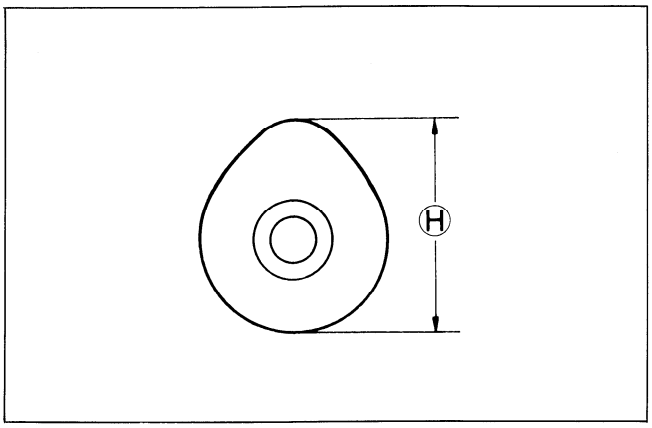


CAM HEIGHT

Worn-down cams are often the cause of mistimed valve operation resulting in reduced output power. The limit of cam wear is specified for both intake and exhaust cams in terms of cam height Ⓗ, which is to be measured with a micrometer. Replace camshafts if found worn down to the limit.

09900-20202	Micrometer (25 – 50 mm)

Height Ⓗ	Service Limit
Intake cam	35.41 mm (1.394 in)
Exhaust cam	36.61 mm (1.441 in)

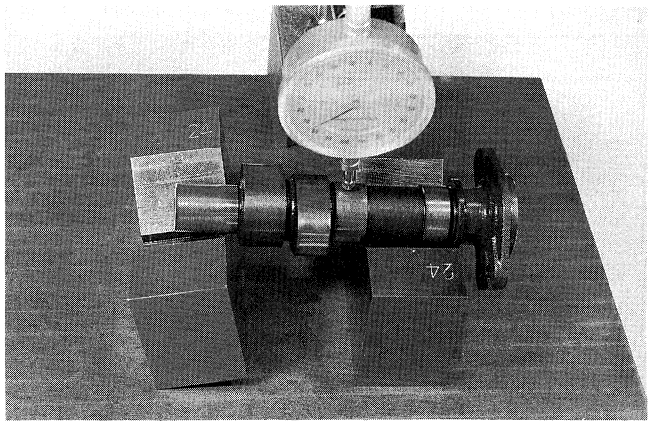


CAMSHAFT RUNOUT

Measure the runout with a dial gauge. Replace the camshaft if the runout exceeds the limit.

09900-20606	Dial gauge (1/100 mm)
09900-21304	V – block (100 mm)

Service Limit	0.150 mm (0.006 in)

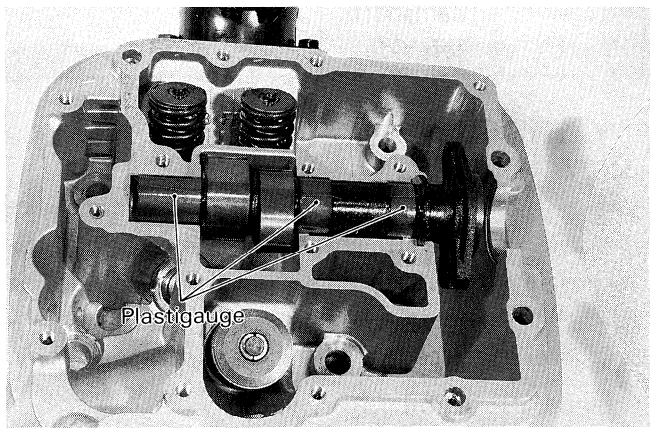


CAMSHAFT JOURNAL WEAR

Determine whether each journal is worn down to the limit or not by measuring camshaft journal oil clearance with the camshaft installed. Use plastigauge to read the clearance, which is speacified as follows:

Camshaft journal oil clearance

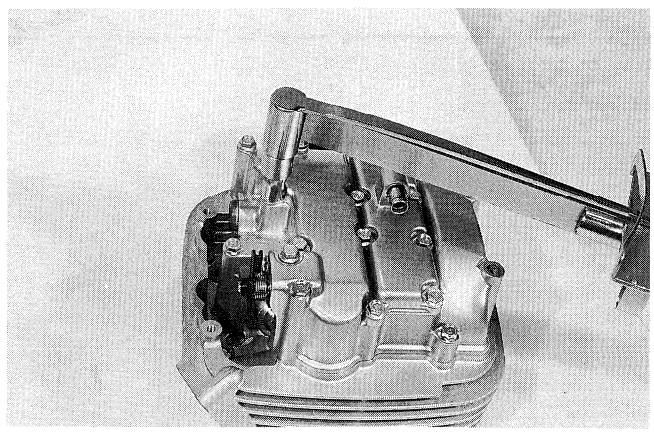
Service Limit	0.10 mm (0.004 in)



Cylinder head cover tightening torque

Thread diameter	N·m	kg-m	lb-ft
8 mm	23 – 27	2.3 – 2.7	16.5 – 19.5
6 mm	9 – 13	0.9 – 1.3	6.5 – 9.5

09900-22301	Plastigauge



NOTE:
When measuring the oil clearance, coating the cylinder head cover mating surface with SUZUKI BOND No. 1216 is not necessary.

If the camshaft journal oil clearance measured exceeds the limit, measure the outside diameter of camshaft journal.
Replace eigher the cylinder head set or the cam shaft.

09900-20205	Micrometer (0 – 25 mm)

Camshaft journal O.D.	Front camshaft left side, Rear camshaft right side	24.959 – 24.980 mm (0.9826 – 0.9835 in)
	Front camshaft right side, Rear camshaft left side	19.959 – 19.980 mm (0.7857 – 0.7866 in)

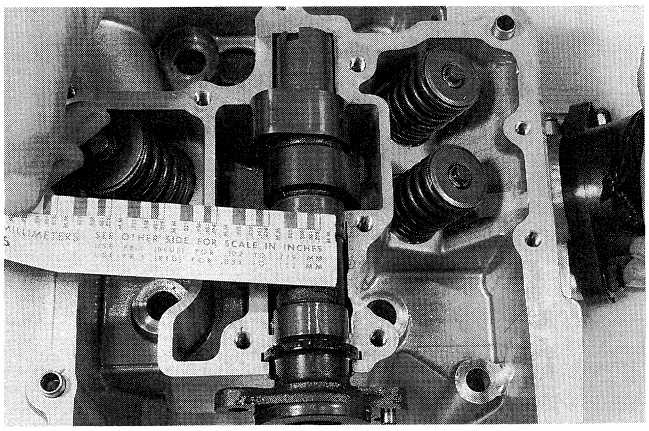
CYLINDER

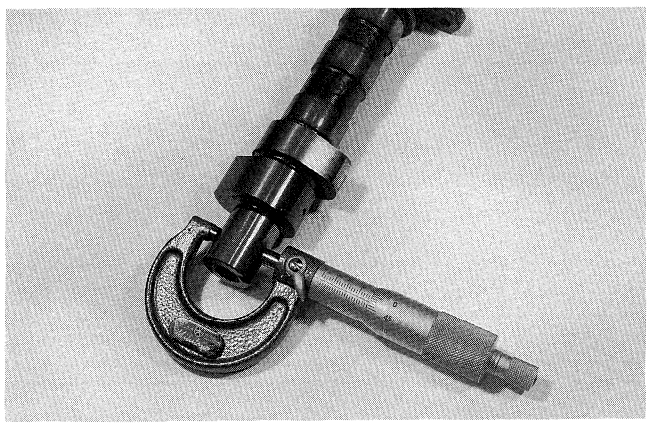
DISTORTION

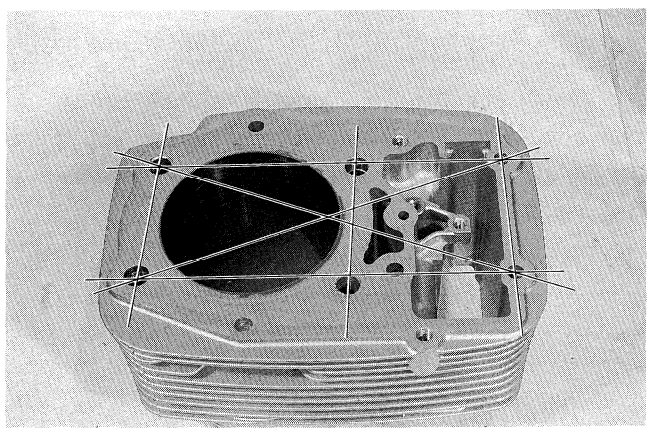
Check the gasketed surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.

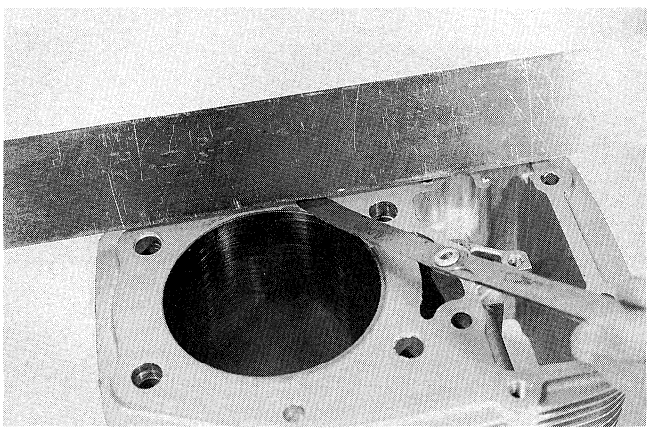
Cylinder distortion

Service Limit	0.05 mm (0.002 in)







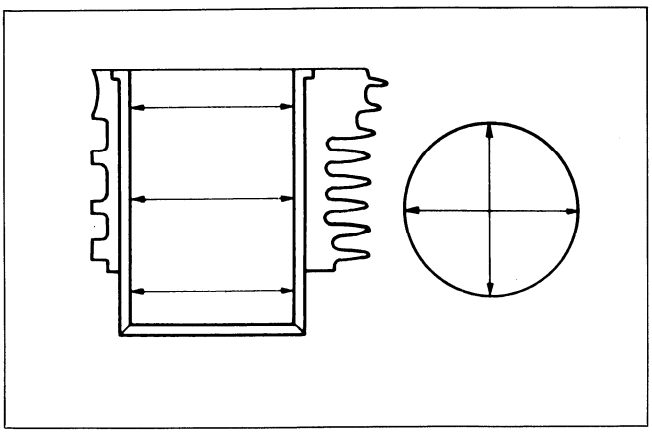


CYLINDER BORE

Measure the cylinder bore diameter at six places. If any one of the measurements exceeds the limit, overhaul the cylinder and replace the piston with an oversize, or replace the cylinder. Once the reboring is done on one cylinder which measurements is beyond the limit, the other cylinder must be also rebored accordingly. Otherwise the imbalance might causes excess vibration.

Cylinder bore

Service Limit	94.080 mm (3.7039 in)

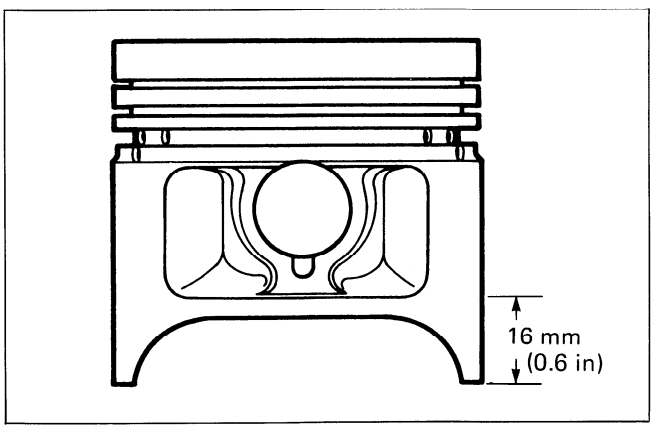


PISTON

DIAMETER

Using a micrometer, measure the piston outside diameter at the place shown in Fig. If the measurement is less than the limit, replace the piston.

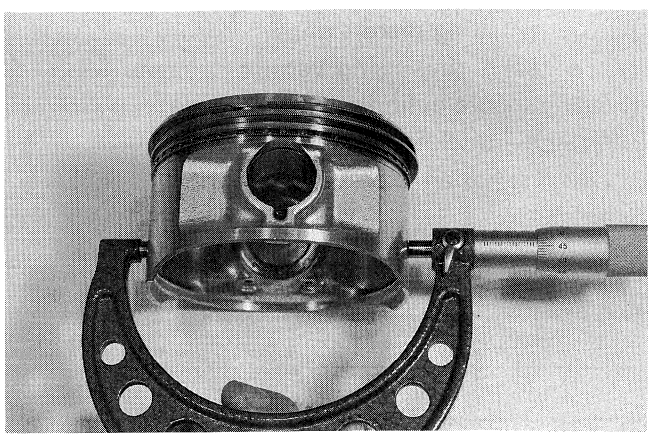
Piston oversize	0.5, 1.0 mm
Service Limit	93.880 mm (3.6961 in)
09900-20204	Micrometer (75 – 100 mm)



PISTON-CYLINDER CLEARANCE

As a result of the above measurement, if the piston clearance exceeds the following limit, overhaul the cylinder and use an oversize piston, or replace both cylinder and piston.

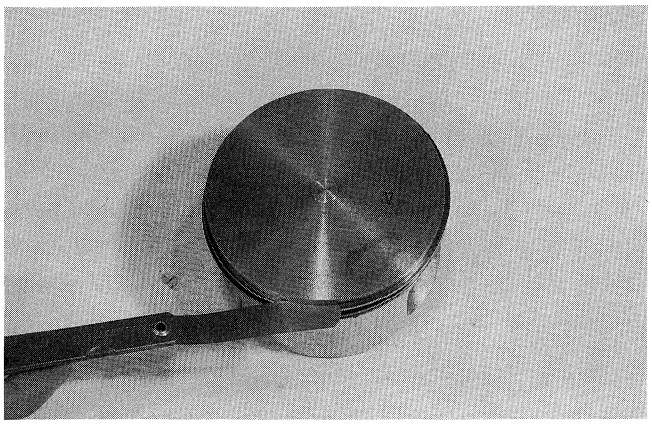
Service Limit	0.120 mm (0.0047 in)



PISTON RING-GROOVE CLEARANCE

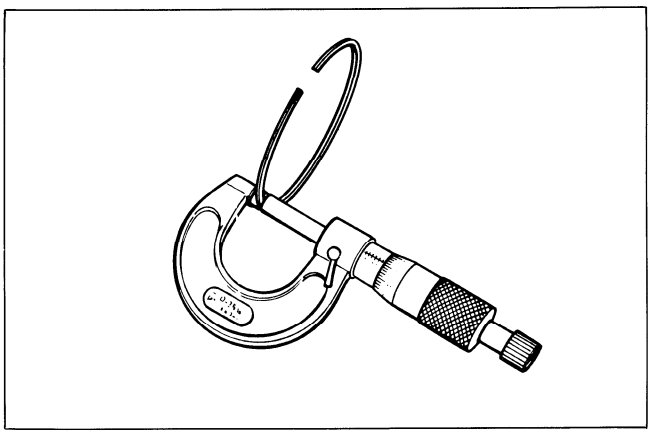
Using a thickness gauge, measure the side clearances of the 1st and 2nd rings. If any one of the clearances exceeds the limit, replace both piston and piston rings.

09900-20803	Thickness gauge



Piston ring—groove clearance

Piston ring	Service Limit
1st	0.180 mm (0.007 in)
2nd	0.150 mm (0.006 in)



Piston ring groove width

Piston ring	Standard
1st	1.230 – 1.250 mm (0.0484 – 0.0492 in)
2nd	1.510 – 1.530 mm (0.0594 – 0.0602 in)
Oil	2.810 – 2.830 mm (0.1106 – 0.1114 in)

Piston ring thickness

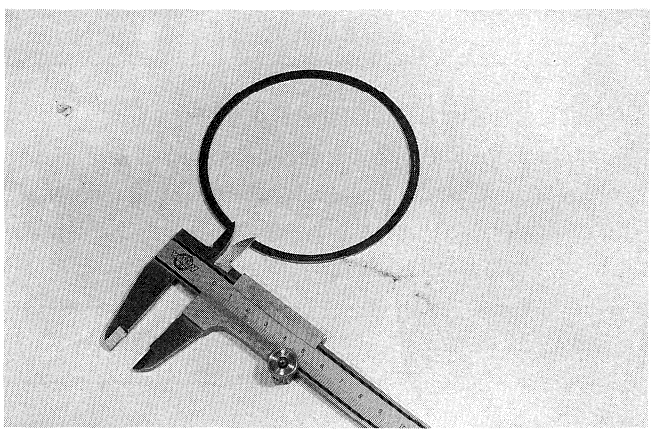
Piston ring	Standard
1st	1.175 – 1.190 mm (0.0463 – 0.0469 in)
2nd	1.470 – 1.485 mm (0.0579 – 0.0585 in)

PISTON RING

FREE END GAP AND END GAP

Before installing piston rings, measure the free end gap of each ring using vernier calipers. Next, fit the ring in the cylinder, and measure each ring end gap using a thickness gauge.

If any ring has an excess end gap, replace the ring.



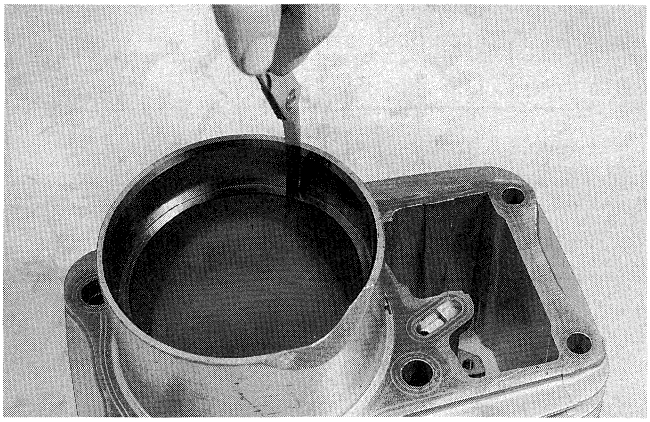
Piston ring free end gap

Piston ring		Service Limit
1st	T	11.6 mm (0.46 in)
2nd	T	9.2 mm (0.36 in)

Piston ring end gap

Piston ring	Service Limit
1st	0.70 mm (0.028 in)
2nd	0.70 mm (0.028 in)

09900-20803	Thickness gauge



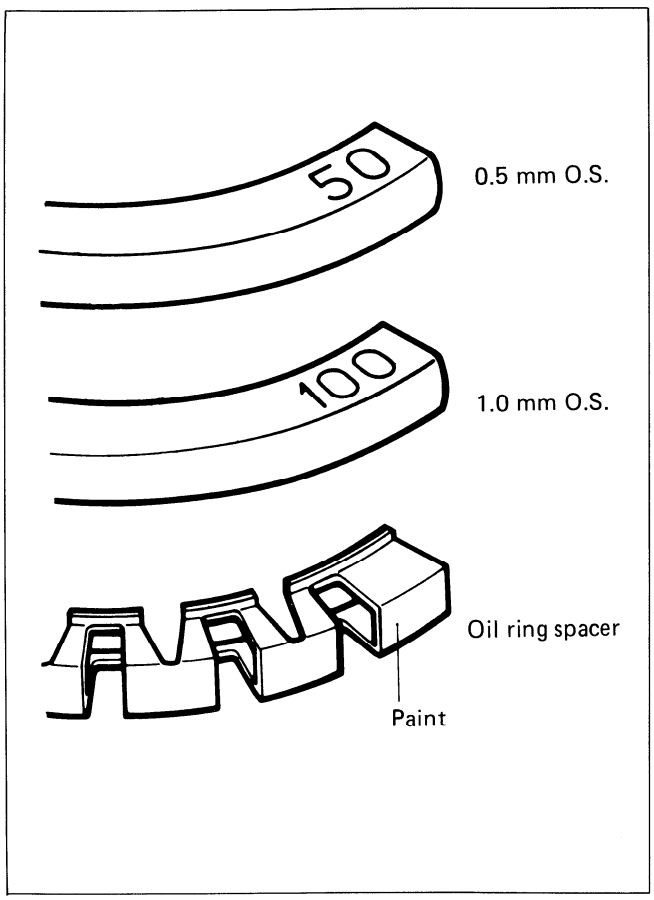
- **Oversize piston rings**
  The following two types of oversize piston rings are used. They bear the following identification numbers.

SIZE	1st	2nd
0.5 mm O.S.	50	50
1.0 mm O.S.	100	100

- **Oversize oil rings**
  The following two types of oversize oil rings are available as optional parts. They bear the following identification marks.

SIZE	COLOR
STD	NIL
0.5 mm O.S.	Painted Blue
1.0 mm O.S.	Painted Yellow

- **Oversize side rail**
  Just measure outside diameter to identify its size.

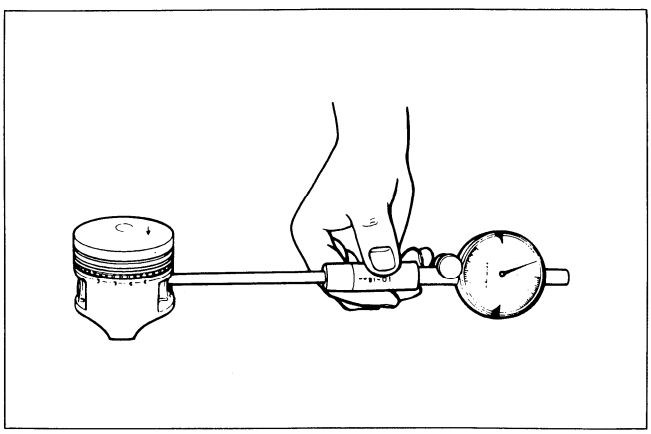


PISTON PIN AND PIN BORE

Using a small bore gauge, measure the piston pin bore inside diameter, and using a micrometer, measure the piston pin outside diameter. If the reading exceeds the following limit, replace both piston and piston pin.

Piston pin bore I.D.

Service Limit	23.030 mm (0.9067 in)

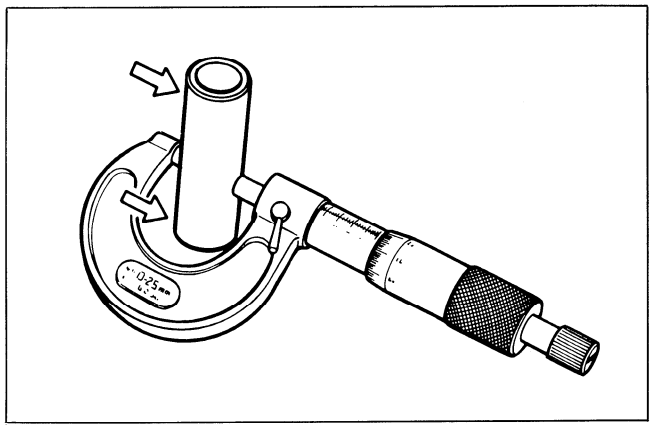


Using a micrometer, measure the piston pin outside diameter at three positions.

Piston pin O.D.

Service Limit	22.980 mm (0.9047 in)

09900-20205	Micrometer (0 – 25 mm)



CONROD

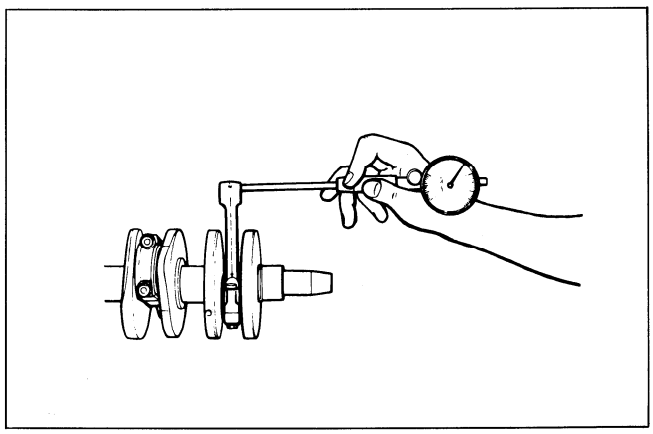
CONROD SMALL END BORE I.D.

Using a small bore gauge, measure the conrod small end inside diameter.

Conrod small end bore I.D.

Service Limit	23.040 mm (0.9071 in)

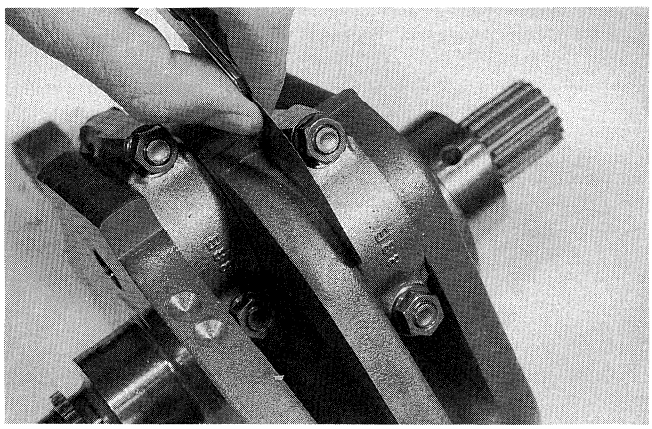
- If the conrod small end bore inside diameter exceeds the above mentioned limit, replace the conrod.



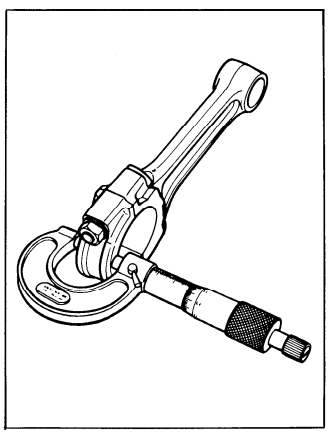
CONROD BIG END THRUST CLEARANCE

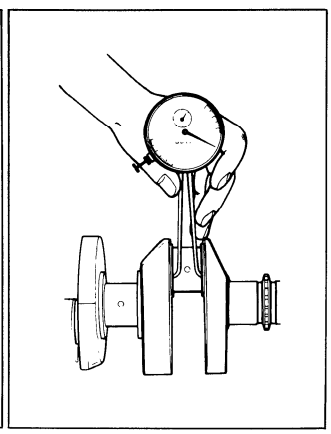
Check the conrod thrust clearance by using thickness gauge. If the clearance exceeds the limit, replace the conrod or crankshaft assembly.

Service Limit	0.30 mm (0.012 in)



	Standard
Big end width	21.95 – 22.00 mm (0.864 – 0.866 in)
Crank pin width	22.10 – 22.15 mm (0.870 – 0.872 in)





CONROD-CRANK PIN BEARING SELECTION

- Loosen bearing cap nuts and tap the bolt end lightly with plastic hammer to remove bearing cap.

CAUTION:
Be sure to install the bearing cap to the original position when reassembling.

- Remove rods and mark them to identify the cylinder position.
- Inspect bearing surfaces for any sign of fusion, pitting, burn or flaws. If any, replace them with a specified set of bearings.

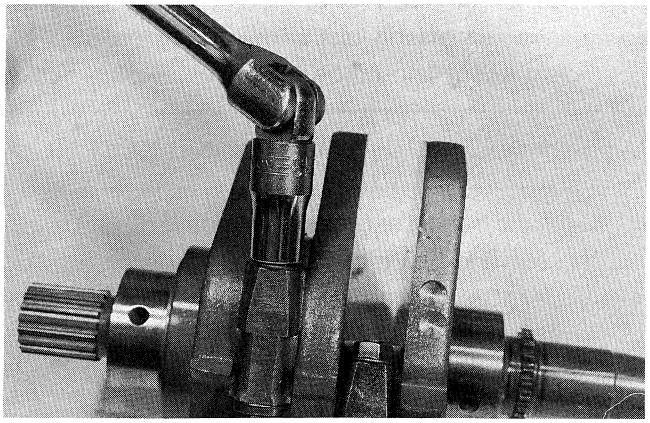
NOTE:
Never try to remove or loosen the conrod big end stud, otherwise, it will displace the stud and will not fit the bearing cap properly.

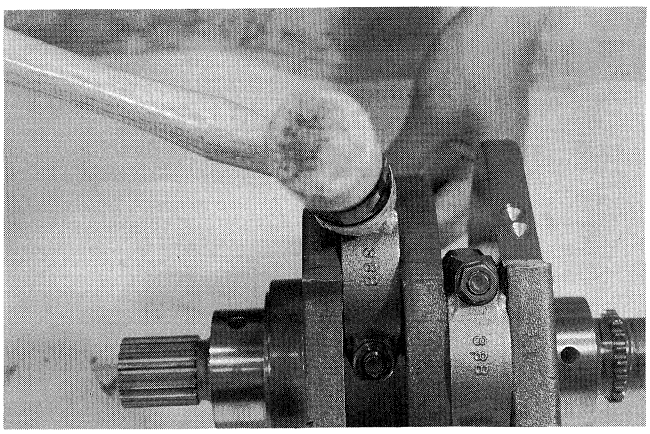
- Place plastigauge axially on the crank pin, avoiding the oil hole and at the TDC or BDC as shown.
- Tighten the bearing cap with two-step torque values.

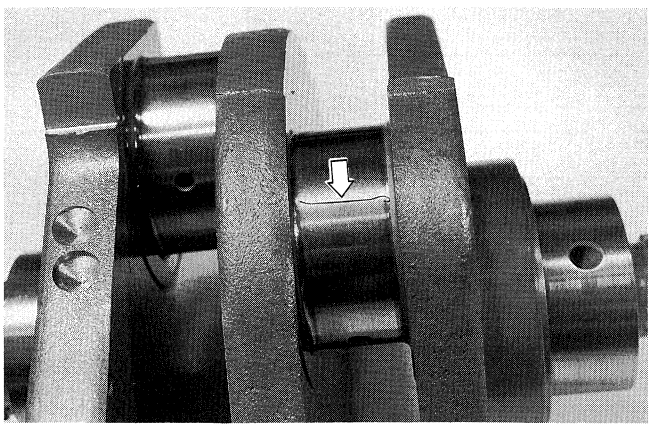
NOTE:
When fitting bearing cap to crank pin, be sure to discriminate between its two ends, I.D. code side and the other.
I.D. code always faces intake valve side.

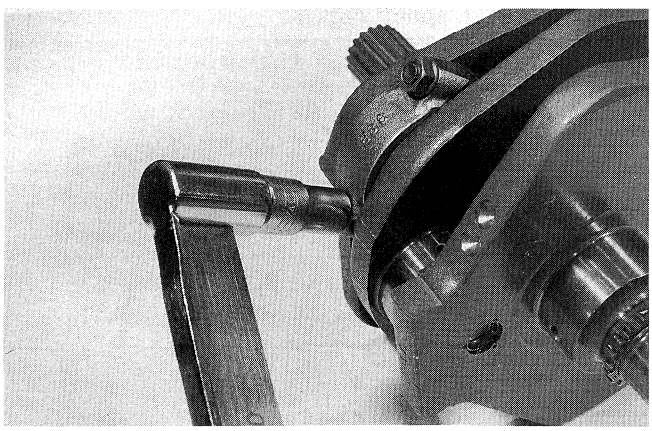
Initial tightening torque	22 – 28 N·m (2.2 – 2.8 kg-m 16.0 – 20.0 lb-ft)
Final tightening torque	49 – 53 N·m (4.9 – 5.3 kg-m 35.5 – 38.5 lb-ft)

NOTE:
Never rotate crankshaft or conrod when a piece of Plastigauge is in the clearance.





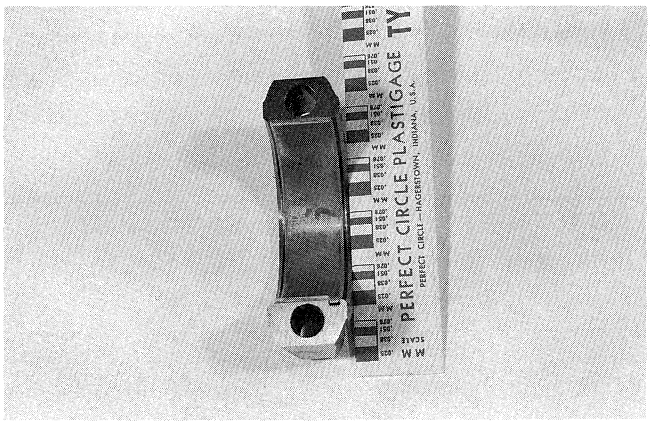


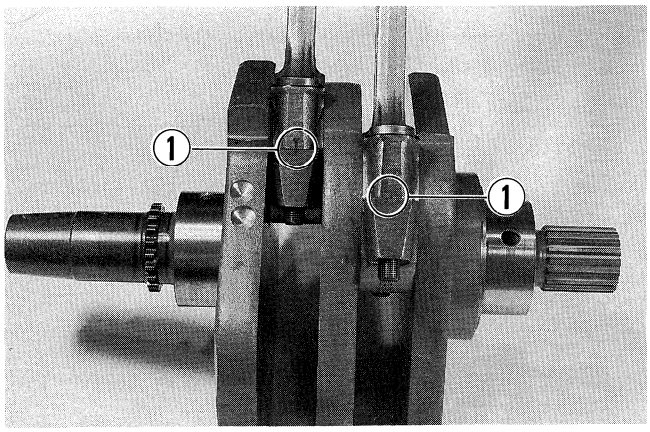


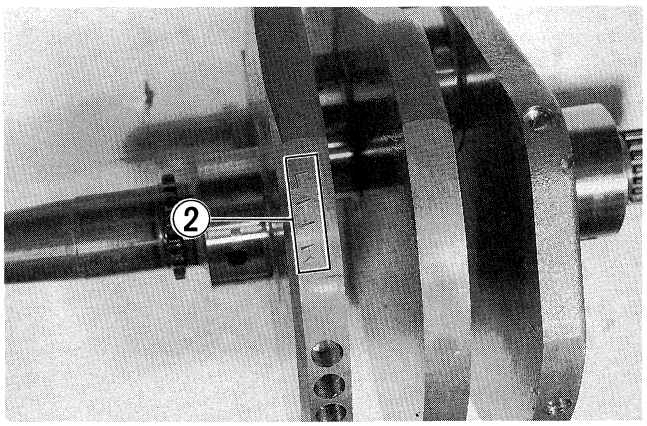
- Remove the caps and measure the width of compressed plastigauge with envelope scale. This measurement should be taken at the widest part.

Service Limit	0.080 mm (0.0031 in)

- If oil clearance exceeds the service limit, select the specified bearings from the following table.
- Check the corresponding conrod I.D. code number ①, "1", "2" or "3".
- Check the corresponding crank pin O.D. code number ②, "1 ", "2" or "3".
- The crank pin O.D. code number is on the left crank web.







Bearing selection table

		Crank pin O.D. code		
	Code	1	2	3
Con-rod I.D. code	1	Green	Black	Brown
	2	Black	Brown	Yellow
	3	Brown	Yellow	Blue

Oil clearance

Standard	0.024 – 0.042 mm (0.0009 – 0.0017 in)

Conrod I.D. specification

Code	I.D. specification
1	53.000 – 53.006 mm (2.0866 – 2.0868 in)
2	53.006 – 53.012 mm (2.0868 – 2.0871 in)
3	53.012 – 53.018 mm (2.0871 – 2.0873 in)

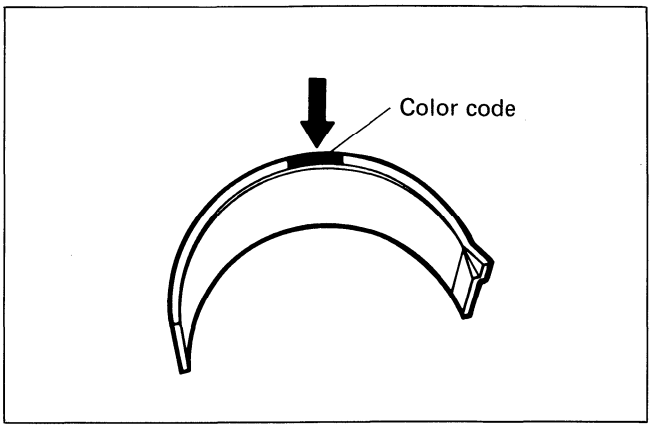
Crank pin O.D. specification

Code	O.D. Specification
1	49.994 – 50.000 mm (1.9683 – 1.9685 in)
2	49.988 – 49.994 mm (1.9680 – 1.9683 in)
3	49.982 – 49.988 mm (1.9678 – 1.9680 in)

CAUTION:
Bearing should always be replaced as a set.

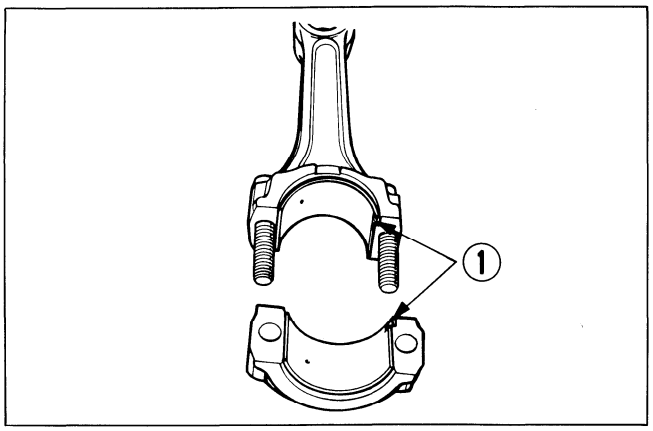
Bearing thickness

Color (Part No.)	Thickness
Green (12164-38B01-0A0)	1.485 – 1.488 mm (0.0585 – 0.0586 in)
Black (12164-38B01-0B0)	1.488 – 1.491 mm (0.0586 – 0.0587 in)
Brown (12164-38B01-0C0)	1.491 – 1.494 mm (0.0587 – 0.0588 in)
Yellow (12164-38B01-0D0)	1.494 – 1.497 mm (0.0588 – 0.0589 in)
Blue (12164-38B01-0E0)	1.497 – 1.500 mm (0.0589 – 0.0591 in)



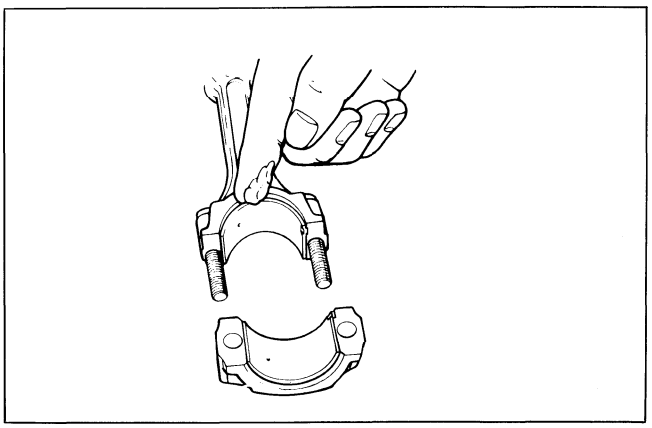
BEARING ASSEMBLY

- When fitting the bearing to the bearing cap and conrod, be sure to fix the stopper part ① first and press the other end.



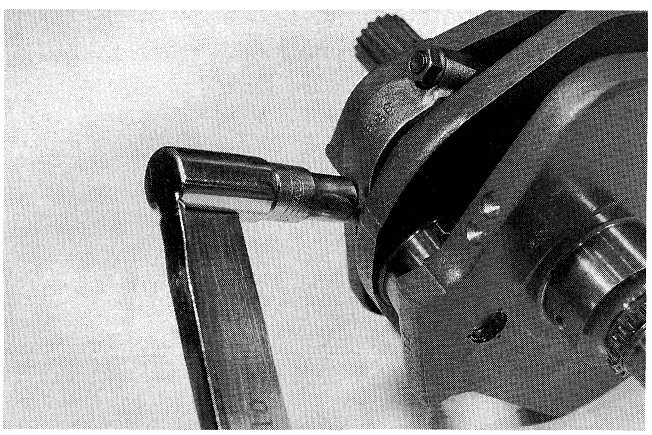
- Apply engine oil or SUZUKI Moly Paste to the crank pin and bearing surface.

99000-25140	SUZUKI Moly Paste



- When mounting conrod on the crankshaft, make sure that I.D. code of the conrod faces intake side.
- Tighten the conrod cap nuts to the specified torque after applying engine oil to the nut thread.

	Initial	Final
Tightening torque	22 – 28 N·m (2.2 – 2.8 kg-m / 16.0 – 20.0 lb-ft)	49 – 53 N·m (4.9 – 5.3 kg-m / 35.5 – 38.5 lb-ft)

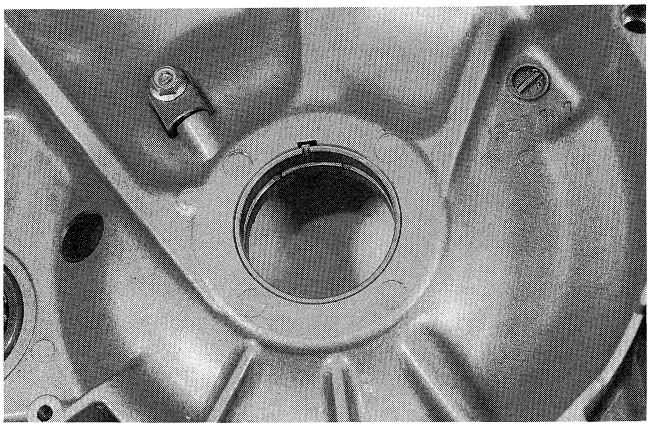


- Check the conrod for smooth turning.

CRANKSHAFT

CRANKCASE-CRANKSHAFT BEARING OIL CLEARANCE

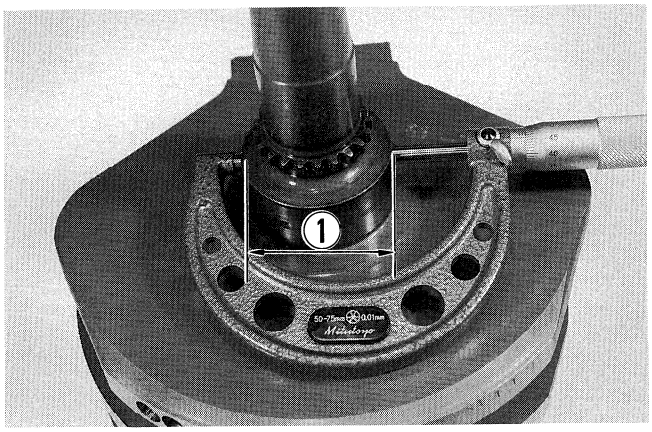
- Inspect the crankshaft and crankshaft bearing for any damage.



- Measure the crankshaft journal O.D. ① with the special tool.

09900-20203	Micrometer

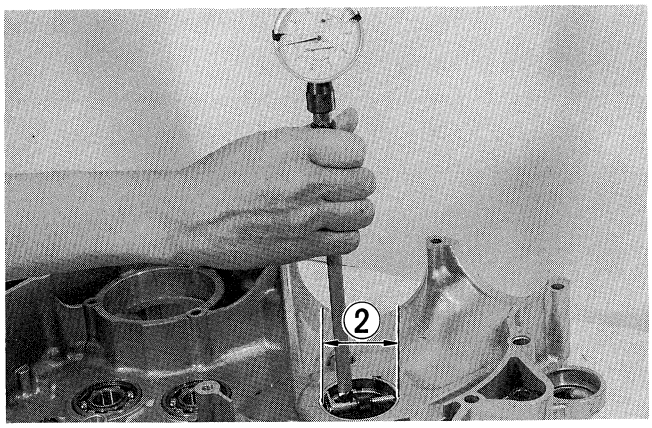
Crankshaft journal O.D. ①	51.965 – 51.980 mm (2.0459 – 2.0465 in)



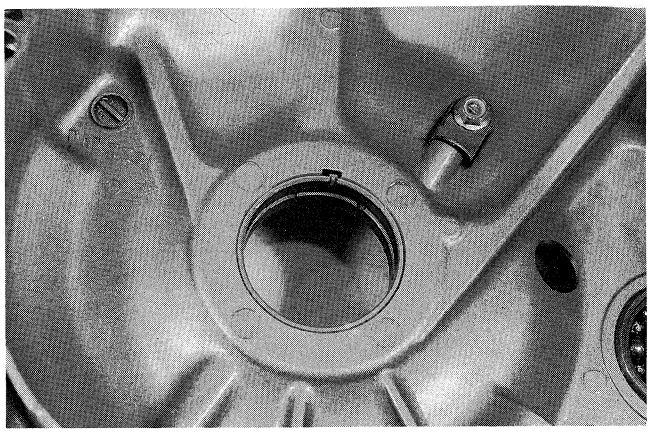
- Measure the crankshaft bearing I.D. ② with the special tool.

09900-20508	Cylinder gauge set

Crankshaft bearing I.D. ②	52.000 – 52.015 mm (2.0472 – 2.0478 in)

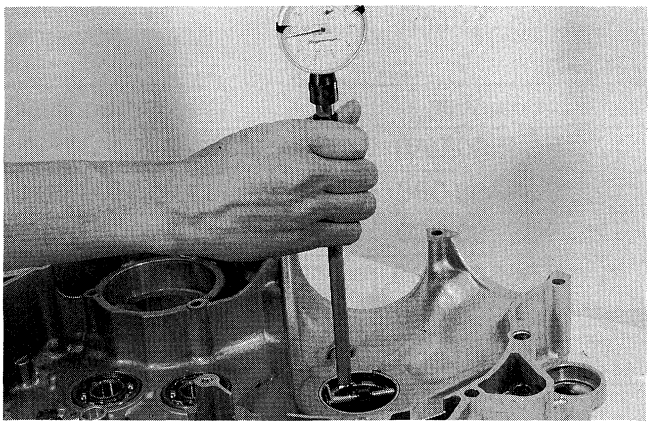


If the crankshaft bearing I.D. exceeds the limit, replace the bearing with new ones in the following procedure.



- Remove the crankshaft bearing with taking care not to damage the crankcase bearing hole.
- Inspect the bearing hole of crankcase for any sign of pitting or flaw.
  If any, repair it with emery paper.
- Install the bearings into the crankcases by hydraulic press.
- Honing the bearings with specified value.

Crankshaft bearing I.D.	52.000 – 52.015 mm (2.0472 – 2.0478 in)

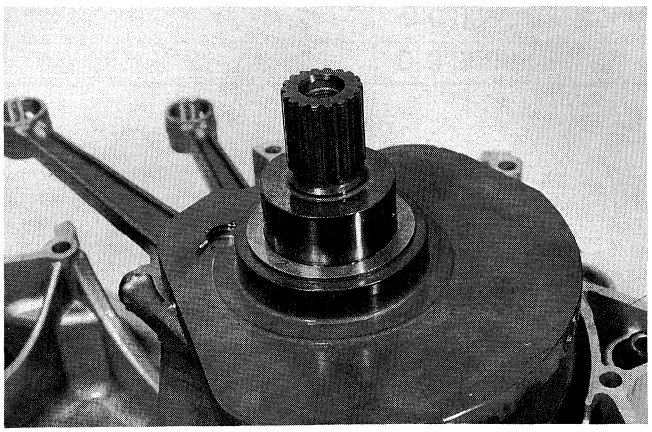


CRANKSHAFT THRUST CLEARANCE

Inspect the thrust shim for nicks and scratches.

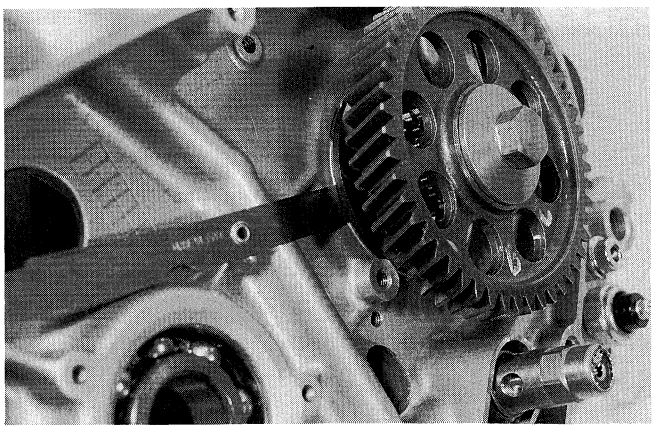
Install the crankshaft in the right crankcase half after installing the thrust shim on the crankshaft. Place the thrust washer, cam chian drive sprocket, and primary drive gear on the right end of the crankshaft and tighten primary drive gear bolt to the specified torque. Use a thickness gauge to measure the thrust clearance between right crankcase and thrust washer.

Tightening torque	140 – 160 N·m (14.0 – 16.0 kg-m 101.5 – 115.5 lb-ft)



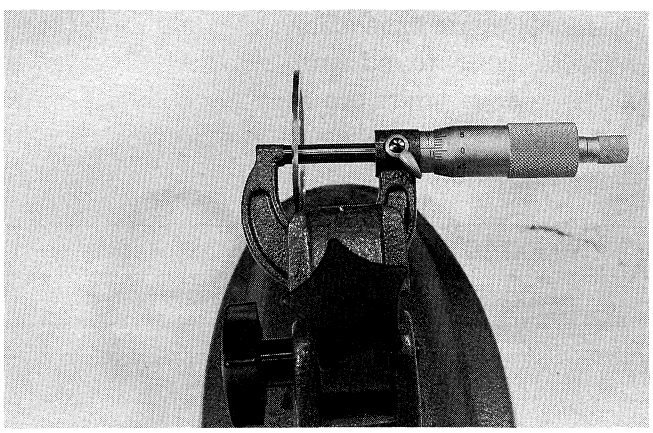
Thrust clearance

Standard	0.05 – 0.10 mm (0.002 – 0.004 in)



If the thrust clearance exceeds the standard range, adjust the thrust clearance by the following procedures.

- Remove the thrust shim, and measure its thickness with a micrometer.
- Change the shim with the other shim if the thrust clearance is incorrect.
- Perform the thrust clearance measurement described above once again.



List of thrust shims

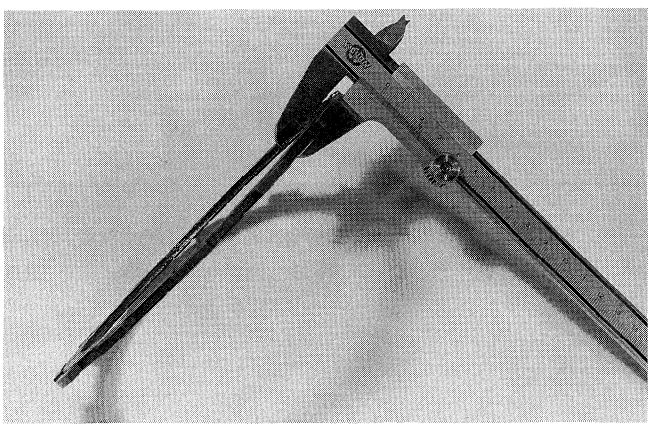
Unit: mm (in)

Part number	Thrust shim thickness	I.D. Number
12228-38B00-0A0	1.925 – 1.950 (0.0758 – 0.0768)	1
12228-38B00-0B0	1.950 – 1.975 (0.0768 – 0.0778)	2
12228-38B00-0C0	1.975 – 2.000 (0.0778 – 0.0787)	3
12228-38B00-0D0	2.000 – 2.025 (0.0787 – 0.0797)	4
12228-38B00-0E0	2.025 – 2.050 (0.0797 – 0.0807)	5
12228-38B00-0F0	2.050 – 2.075 (0.0807 – 0.0817)	6
12228-38B00-0G0	2.075 – 2.100 (0.0817 – 0.0827)	7
12228-38B00-0H0	2.100 – 2.125 (0.0827 – 0.0837)	8
12228-38B00-0I0	2.125 – 2.150 (0.0837 – 0.0847)	9
12228-38B00-0J0	2.150 – 2.175 (0.0847 – 0.0856)	10

CLUTCH

CLUTCH DRIVE PLATES AND DRIVEN PLATES

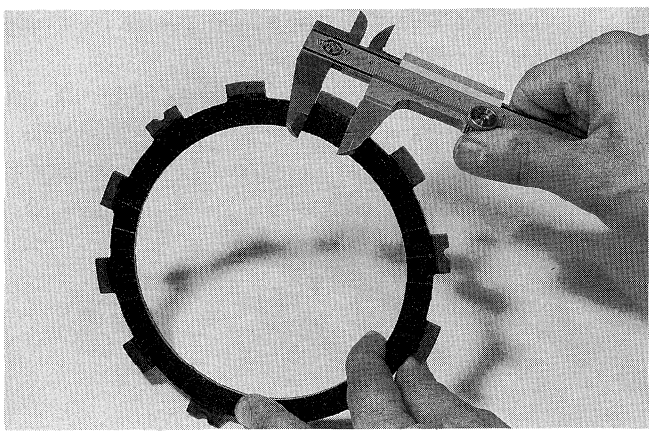
Clutch plates in service remain in oily condition as they were lubricated with oil. Because of this condition, both drive and driven plates are subject to little wearing action and therefore last much longer. Their life depends largely on the quality of oil used in the clutch and also on the way the clutch is operated.



Checking thickness

These plates are expendable: they are meant to be replaced when found worn down or distorted to the respective limit: use a caliper to check thickness and a thickness gauge and surface plate to check distortion.

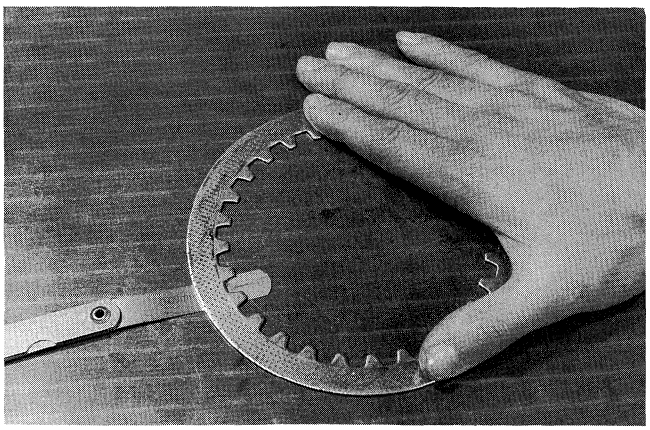
09900-20101	Vernier calipers
09900-20803	Thickness gauge



Checking claw width

Unit: mm (in)

Service Limit	Drive plate		Driven plate
	No.1	No. 2	
Thickness	2.42 (0.095)	3.15 (0.124)	–
Distortion	–	–	0.1 (0.004)
Claw width	15.2 (0.60)	15.2 (0.60)	–



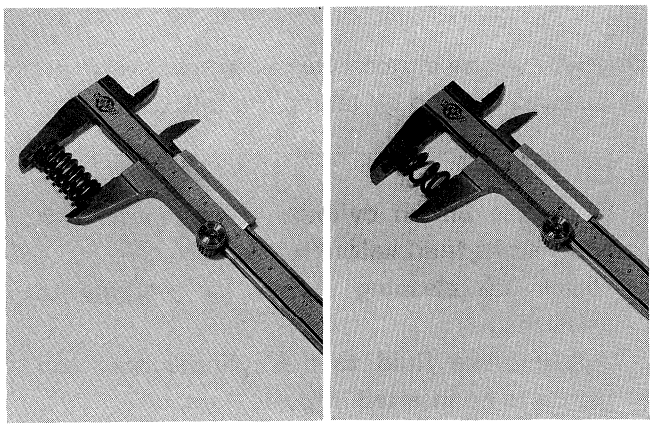
Checking distortion

CLUTCH SPRING FREE LENGTH

Measure the free length of each coil spring with vernier calipers, and compare the elastic strength of each with the specified limit. Replace all the springs if any spring is not within the limit.

Clutch spring free length

Service Limit	No. 1	27.6 mm (1.09 in)
	No. 2	20.0 mm (0.79 in)

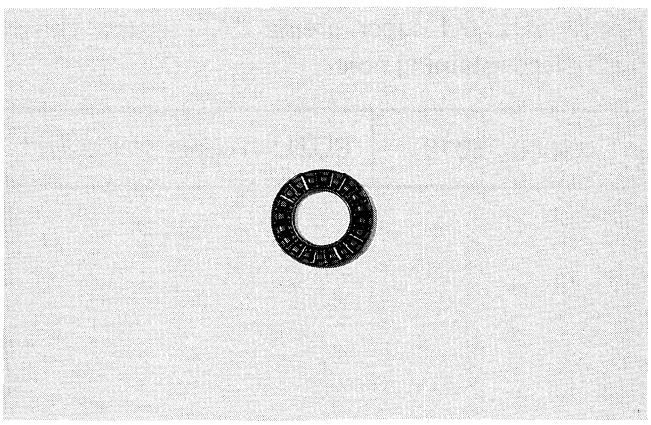


CLUTCH BEARINGS

Inspect clutch push piece bearing for any abnormality, particularly cracks, upon removal from the clutch, to decide whether it can be reused or should be replaced.

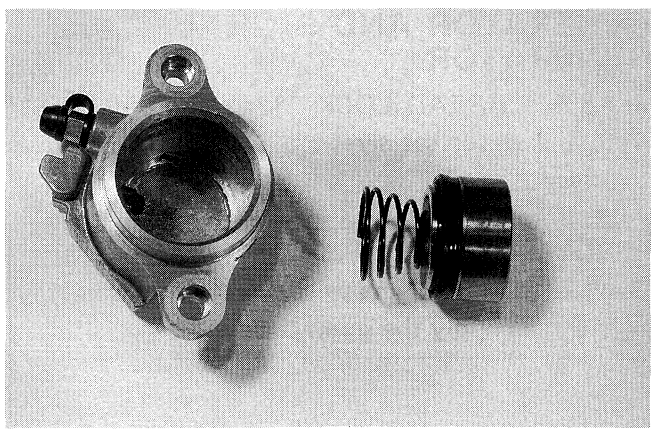
Smooth engagement and disengagement of the clutch depends much on the condition of this bearing.

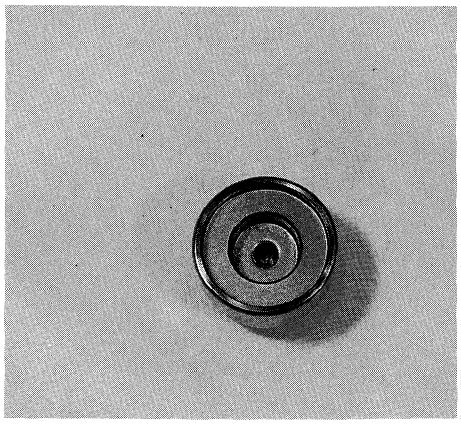
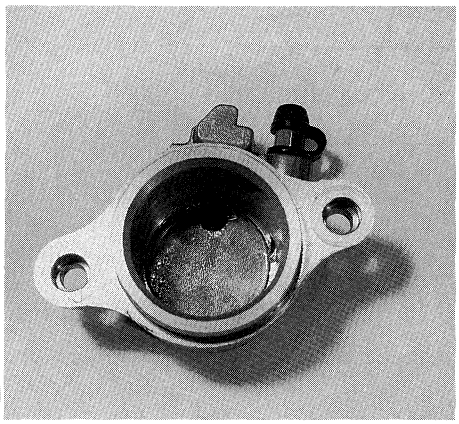
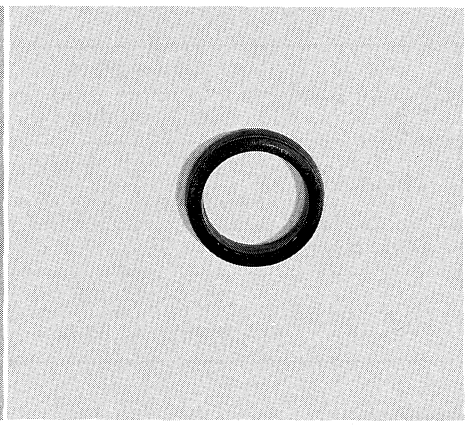
NOTE:
Thrust washer is located between the pressure plate and thrust bearing.



CLUTCH CYLINDER

- Remove the piston, oil seal and spring.
- Inspect the clutch cylinder bore wall for nicks, scratches or other damage.
- Inspect the each rubber parts for damage and wear.
- Inspect the piston surface for any scratches or other damage.

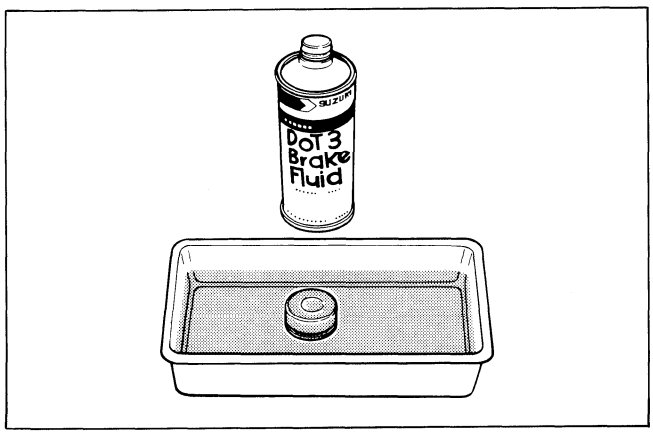


REASSEMBLY

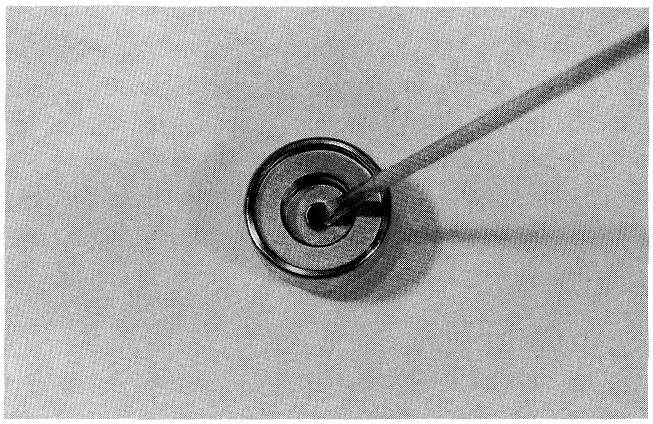
Reassemble the clutch cylinder in the reverse order of disassembly and by taking the following steps:

CAUTION:
Wash the clutch cylinder components with fresh brake fluid before reassembly.
Never use cleaning solvent or gasoline to wash them.
Apply brake fluid to the cylinder bore and piston to be inserted into the bore.



Apply SUZUKI super grease "A" to the clutch push piece retaining hole.

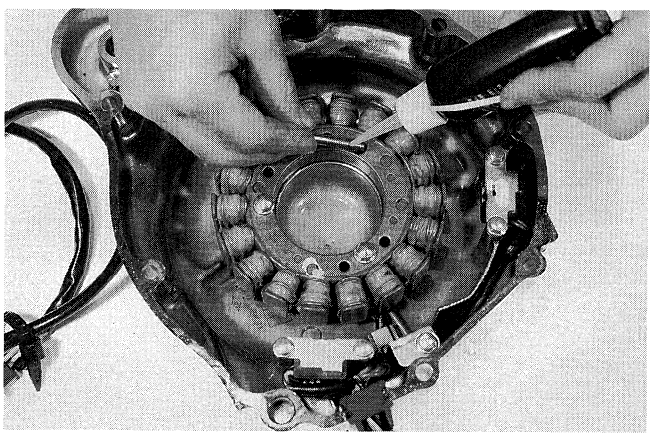
99000-25010	SUZUKI super grease "A"



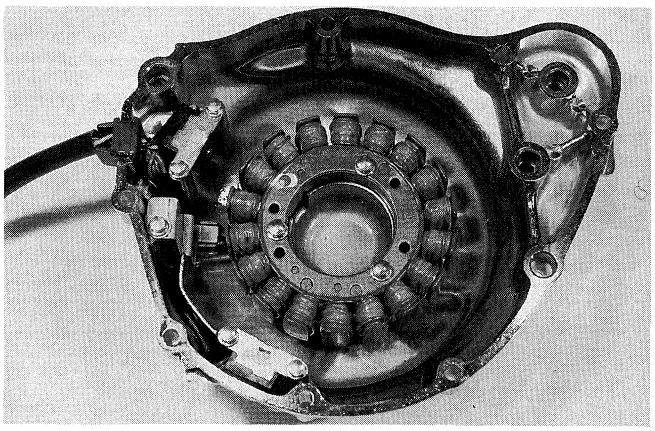
GENERATOR AND SIGNAL GENERATOR

- Apply THREAD LOCK "1342" (99000-32050) to the stator set screws and its lead wire guide screws.

NOTE:
Wipe off oil or grease on screw completely, and then apply the screw lock.



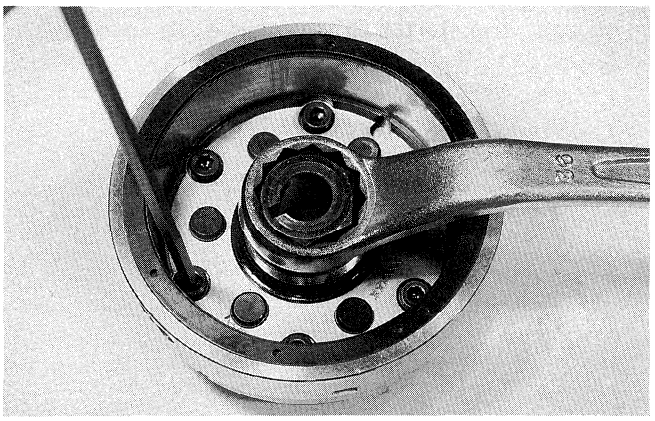
- Mount the lead wire clamp as shown in the photo.

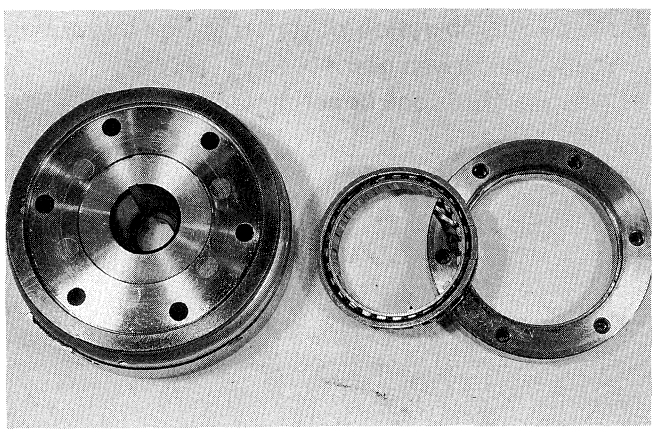


STARTER CLUTCH

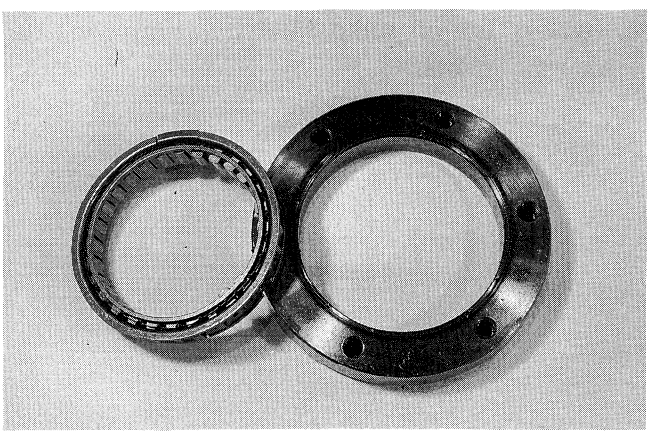
- Hold the rotor with 36 mm off-set wrench and separate starter clutch from the rotor using the special tool.

09914-25811	"T" type hexagon wrench (6 mm)





- When fitting the one way clutch to guide, position flange side of one way clutch to the rotor side.

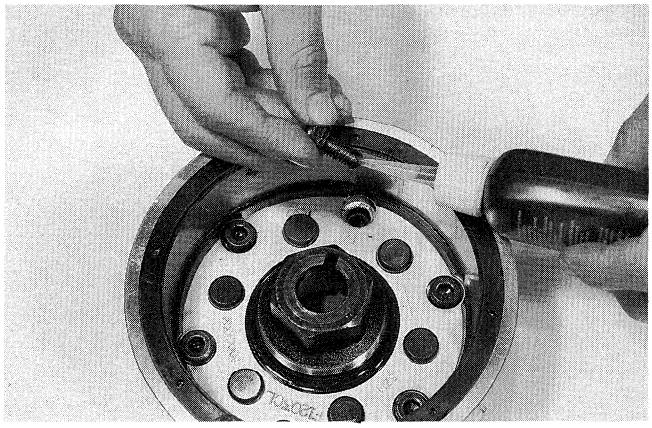


- Apply thread lock super "1303" to Allen bolts. Tighten them to the specified toruqe while holding the rotor with the 36 mm off-set wrench.

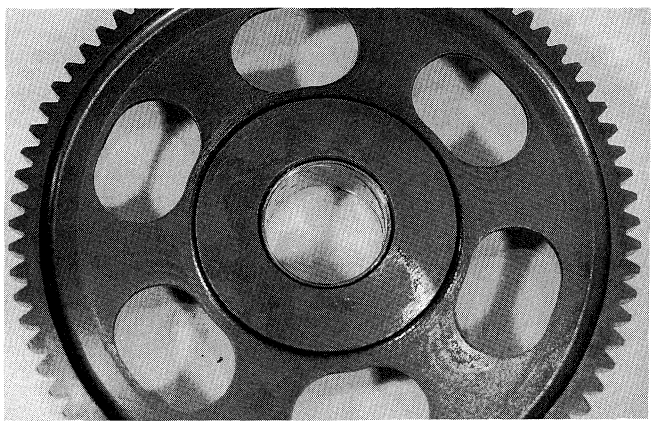
99000-32030	Thread lock super "1303"

09914-25811	T-type hexagon wrench

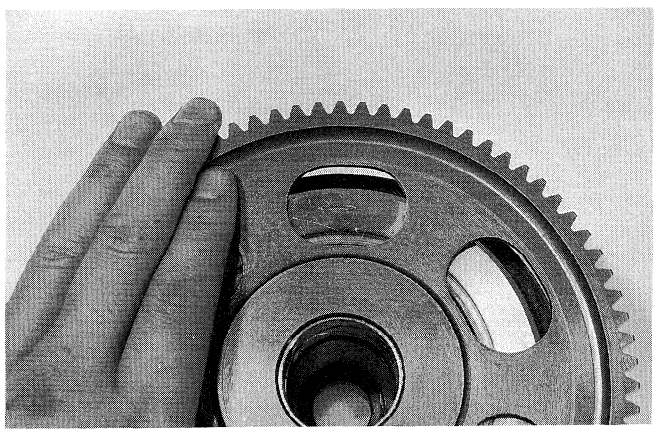
Tightening torque	23 – 28 N·m (2.3 – 2.8 kg-m 16.5 – 20.0 lb-ft)



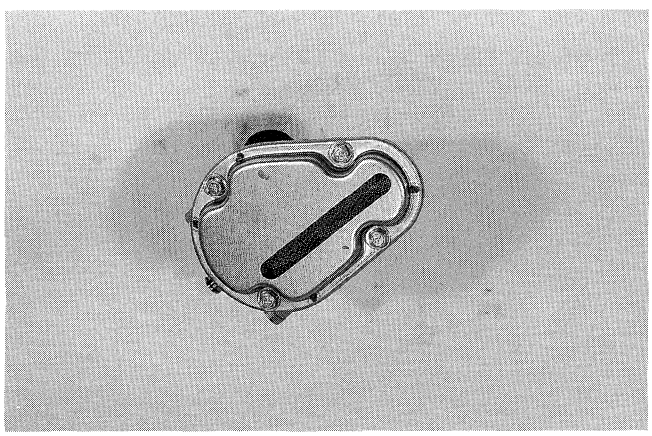
- Inspect the starter driven gear bush for wear or damage.



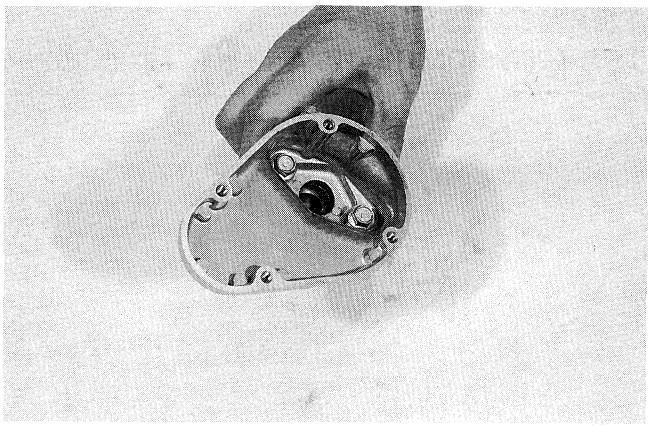
- Check the operation of starter clutch by turning the starter driven gear.
- The gear turns one direction only.



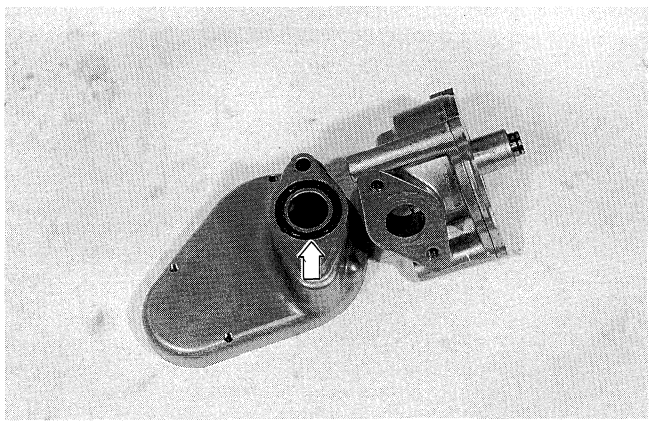
- Remove the oil sump filter by unscrewing the securing screws.



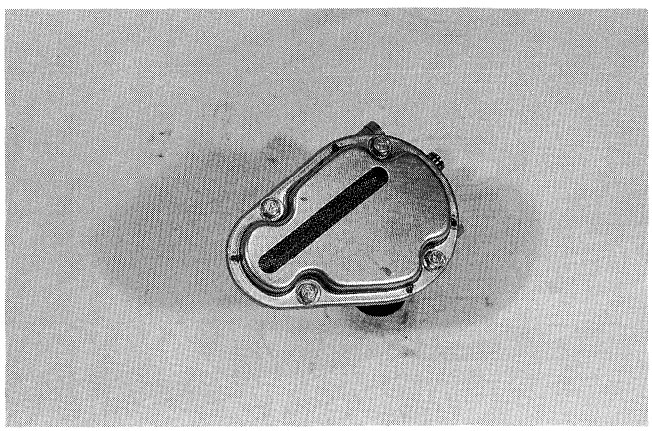
- Remove the oil sump filter holder by loosening the securing bolts.



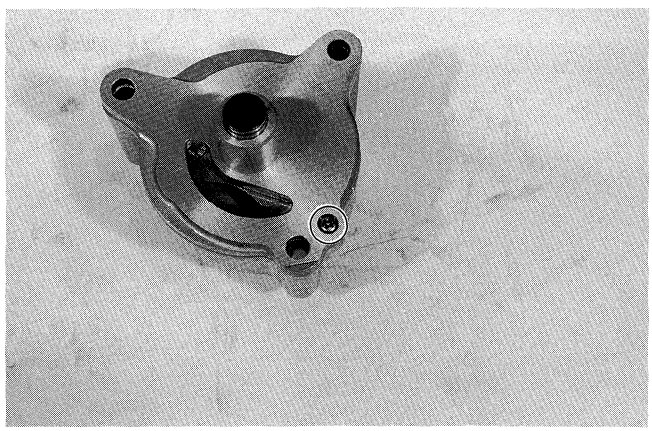
- Install the oil sump filter holder on the oil pump after installing a new O-ring.



- When installing the oil sump filter on the holder, clean the oil sump filter.



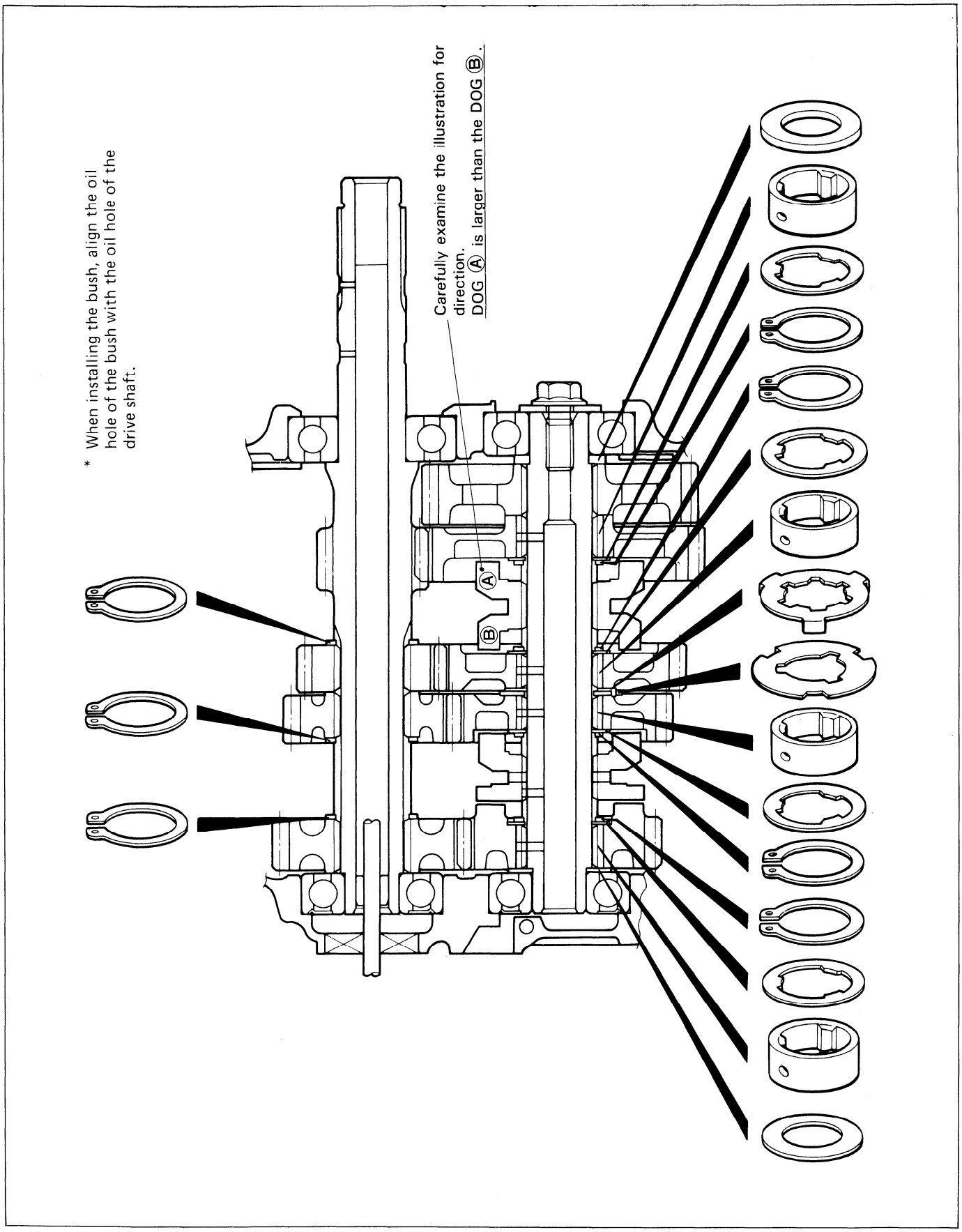
WARNING:
Oil pump case securing screws are applied with Thread Lock Super "1303". If attempt is made to overhaul the oil pump assembly, the screw may be damaged. As a replacement, only the oil pump unit is available.



99000-32030	Thread lock super "1303"

TRANSMISSION

TRANSMISSION GEARS AND RELATED PARTS

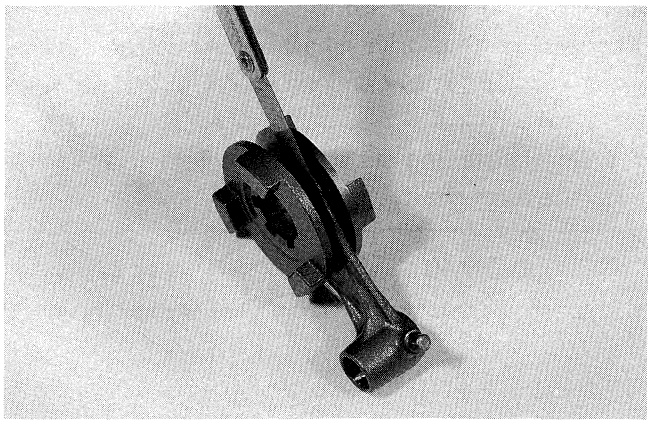


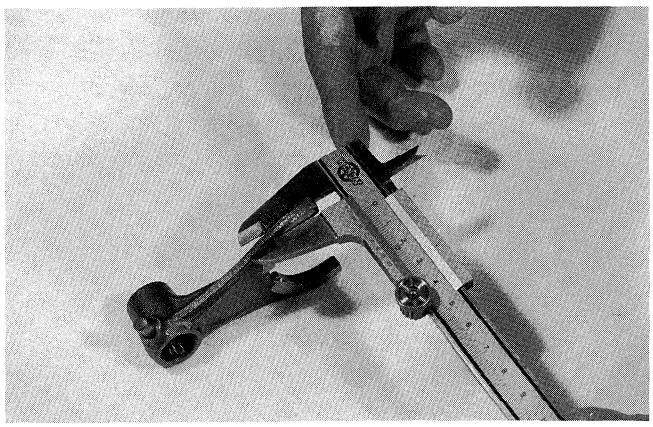
GEAR-SHIFTING FORK CLEARANCE

Using a thickness gauge, check the shifting fork clearance in the groove of its sliding dog.

This clearance for each of the two shifting forks plays an important role in the smoothness and positiveness of shifting action. Each fork has its prongs fitted into the annular groove provided in its sliding dog. In operation, there is sliding contact between fork and gear and, when a shifting action is initiated, the fork pushes the sliding dog axially. Too much a clearance is, therefore liable to cause the meshed gears to slip apart.

If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.





09900-20803	Thickness gauge
09900-20101	Vernier calipers

Shift fork — groove clearance

	Service Limit
No. 1, No. 2	0.5 mm (0.0020 in)

Shift forks groove width Unit: mm (in)

	No. 1, No. 2
Standard	5.50 – 5.60 (0.217 – 0.220)

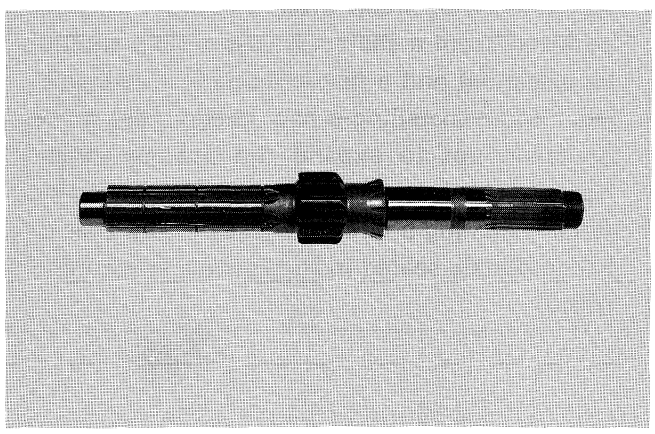
Shift fork thickness Unit: mm (in)

	No. 1, No. 2
Standard	5.30 – 5.40 (0.209 – 0.213)

COUNTERSHAFT REASSEMBLY

- Before installing gears, apply lightly moly paste to the countershaft.

99000-25140	SUZUKI Moly paste

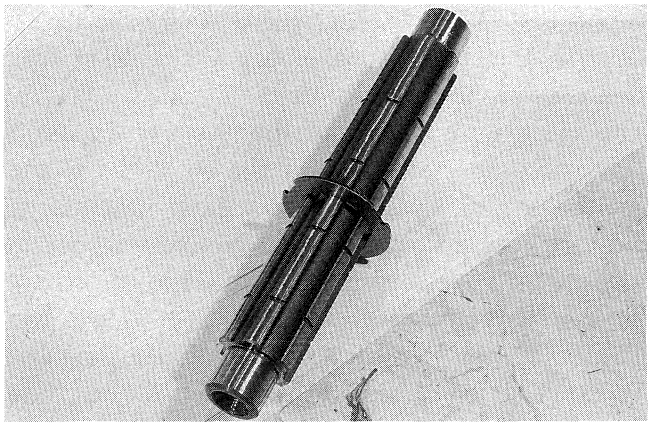


DRIVESHAFT REASSEMBLY

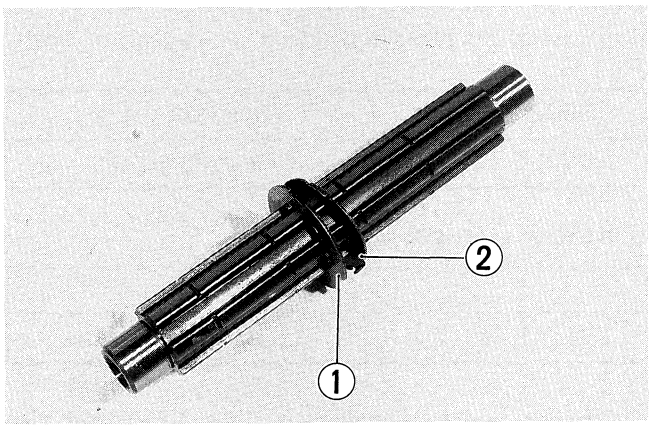
Reassemble the drive shaft gears in the reverse order of disassembly and also carry out the following steps.

- Before installing gears, apply lightly moly paste to the drive shaft.

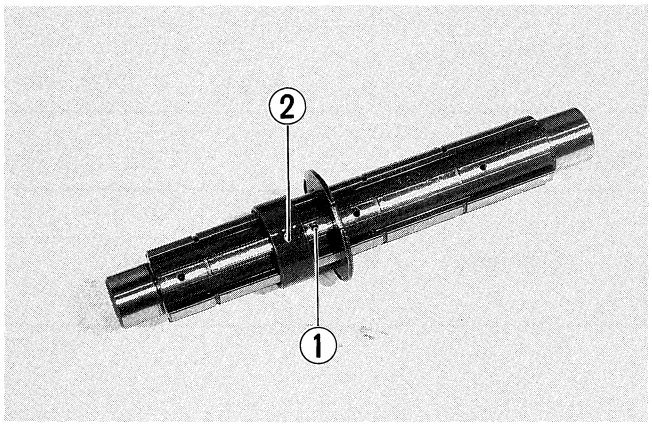
99000-25140	SUZUKI Moly paste



- When mounting the 3rd driven gear on the drive shaft, insert lock washer No. 2 ① into the drive shaft, and turn and fit it into the groove.
- Then, fit the lock washer No. 1 ② in the lock washer No. 2.

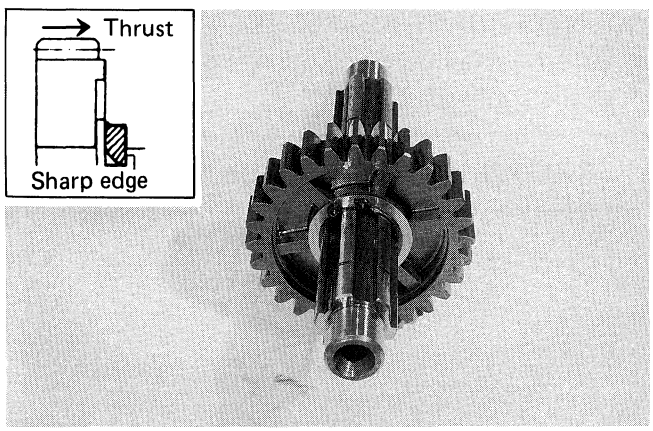


- When installing the gear bushing, align the oil hole ① of the drive shaft with the bushing oil hole ②.
- When mounting circlip, pay attention to the direction of the circlip. Fit it to the side where the thrust is as shown in the figure with the rounded side against the gear surface.



NOTE:
Always use new circlip.

CAUTION:
Never reuse a circlip after a circlip has been removed from a shaft. A used circlip should be discarded and a new circlip must be installed. When installing a new circlip, care must be taken not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always insure that it is completely seated in its groove and securely fitted.



ENGINE REASSEMBLY

This engine is reassembled by carrying out the steps of disassembly in the reverse order, but there are a number of steps which demand special descriptions or precautionary measures.

NOTE:
Apply engine oil to each running and sliding part before reassembling.

- Install the secondary drive bevel gear assembly. Apply the thread lock super "1303" to the thread of bolts.
  Tighten the secondary drive bevel gear housing bolts to the specified torque.

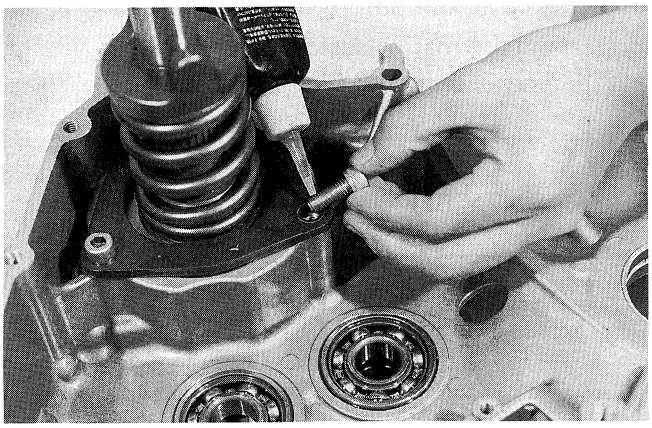
99000-32030	Thread lock super "1303"

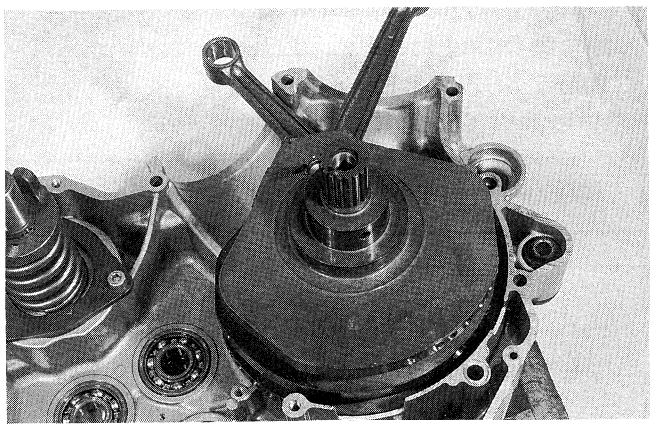
NOTE:
Make sure that the output cam dog circlip is seated in the groove properly.

Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m 14.5 – 18.0 lb-ft)

Install the crankshaft to the left crankcase half.

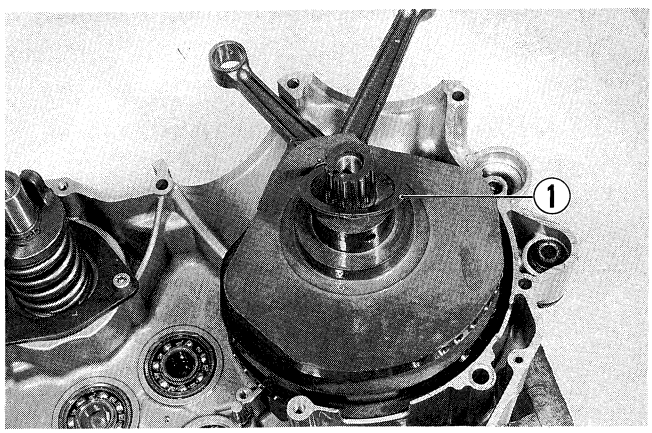
CAUTION:
Do not tap the crankshaft when reinstalling it to the crankcase.



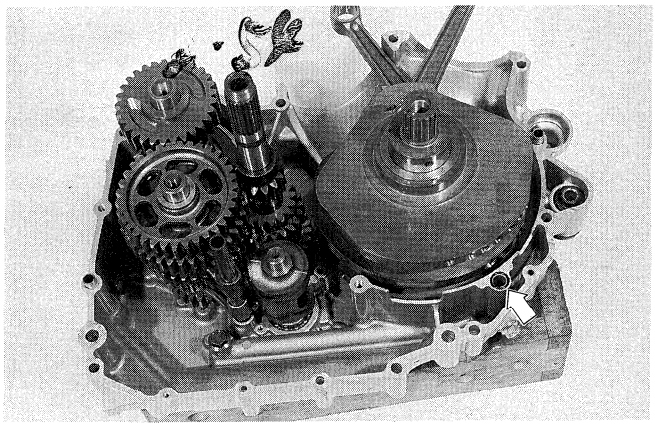


- Install the thrust shim on the crankshaft.

NOTE:
The chamfer of thrust shim ① should be faced to crankshaft web.

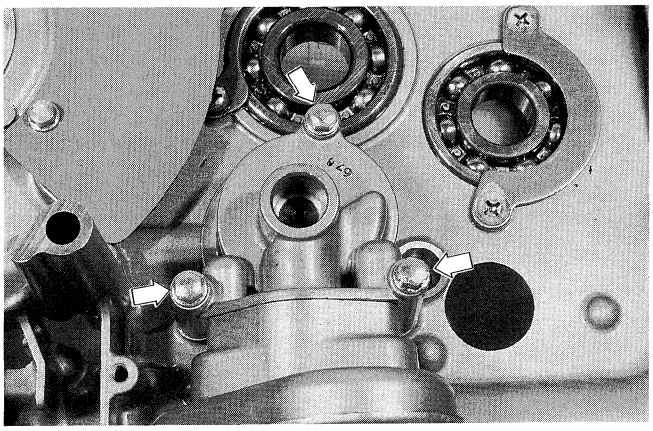


- Install the countershaft, drive gears, driveshaft, driven gears and reduction driven gear.
- Install the gear shift forks, shift fork shaft and gear shift cam.
- Install a new O-ring.



- Install the oil pump on the crankcase after cleaning the mating surface.
- Tighten the oil pump securing bolts.

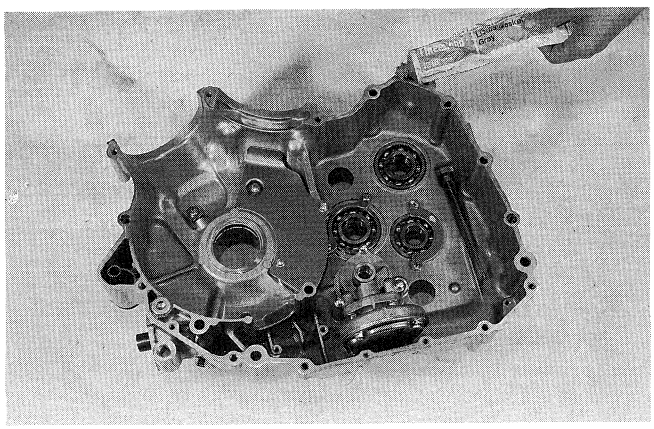
Tightening torque	9 – 13 N·m (0.9 – 1.3 kg-m) (6.5 – 9.5 lb-ft)



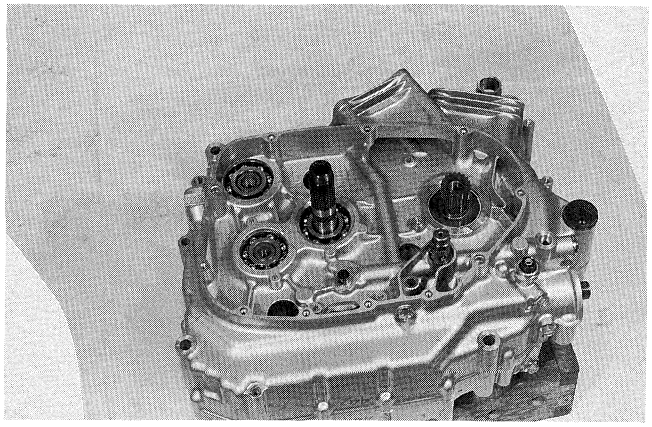
- Clean the mating surfaces of the crankcases before fitting the left and right ones.
- Apply SUZUKI Bond No. 1215 to the mating surface of the right crankcase.

99000-31110	SUZUKI Bond No. 1215

NOTE:
Use of SUZUKI Bond No. 1215 is as follows: follows:
- *** Make surfaces free from moisture, oil, dust and other foreign materials.**
- *** Spread on surfaces thinly to form an even layer.**
- *** Take extreme care not to apply any SUZUKI Bond No. 1215 to the oil hole, oil groove and bearing.**
- *** Apply to distorted surfaces as it forms a comparatively thick film.**



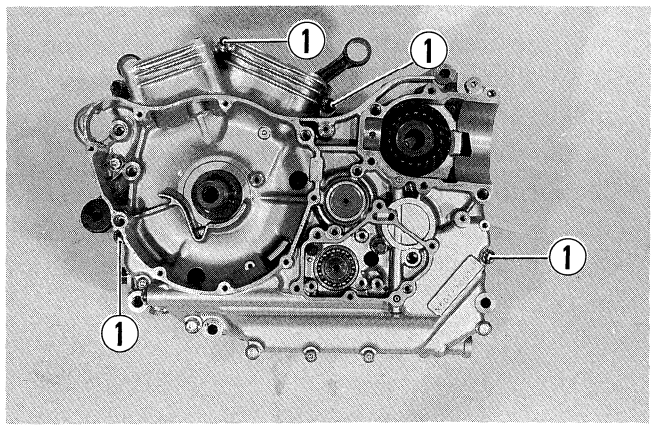
- Check that shafts turn smoothly.

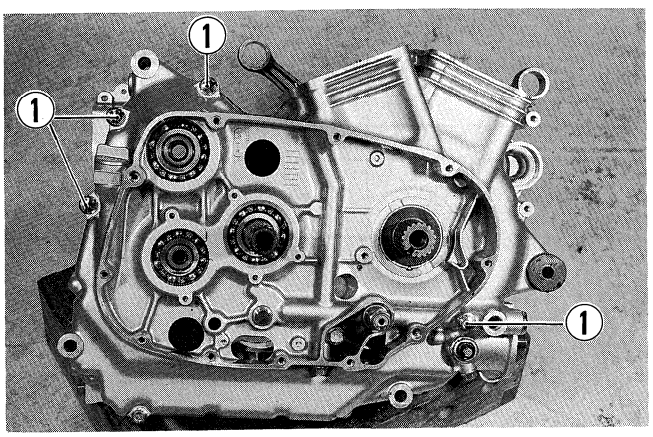


- When securing the left and right crankcases, tighten each bolt a little at a time to equalize the pressure. Tighten all the securing bolts to the specified torque values.

Tightening torque		6 mm bolt	8 mm bolt
Initial	N·m		12 – 18
	kg-m		1.2 – 1.8
	lb-ft		8.5 – 13.0
Final	N·m	9 – 13	20 – 24
	kg-m	0.9 – 1.3	2.0 – 2.4
	lb-ft	6.5 – 9.5	14.5 – 17.5

① Chrome plated bolt

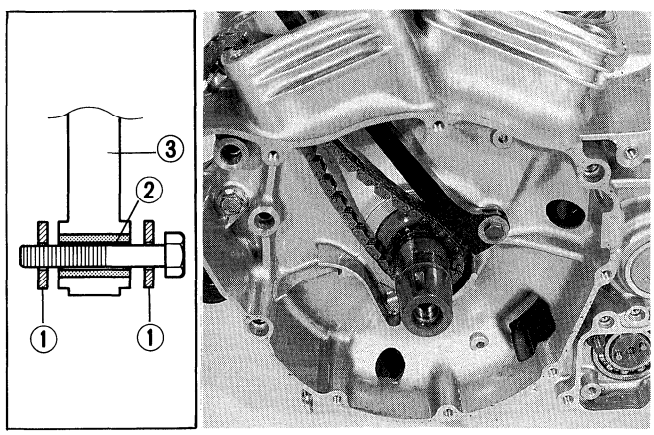




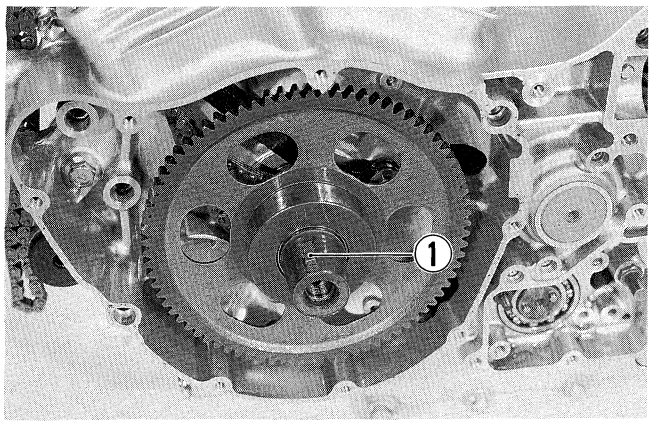
- Tighten the chain guide mounting bolt to the specified torque.

Tightening toruqe	8 – 12 N·m (0.8 – 1.2 kg-m 6.0 – 8.5 lb-ft)

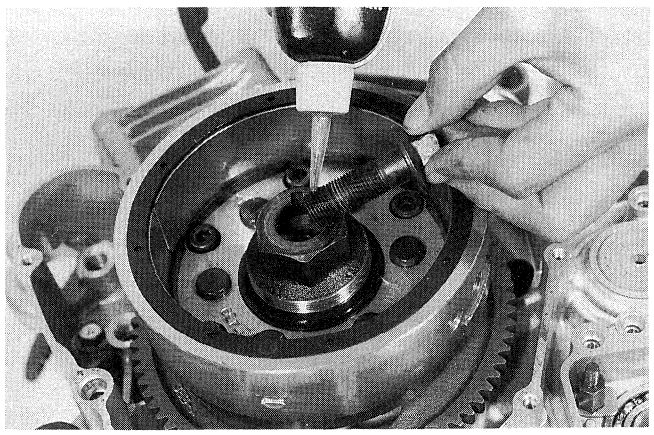
① Washer
② Spacer
③ Tensioner guide



- Install the starter driven gear and the key ① .

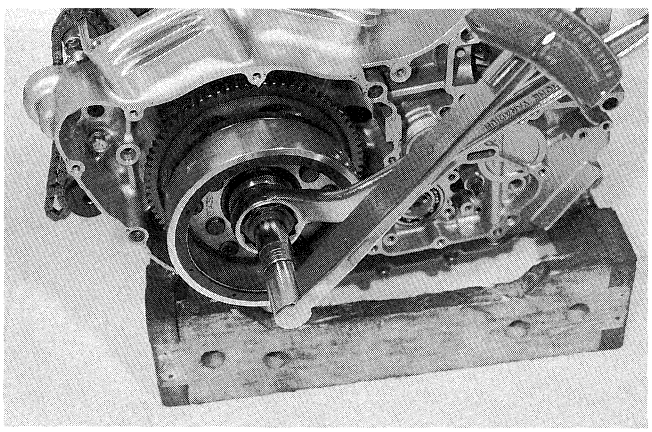


- Degrease the tapered portion of the rotor and also the crankshaft. Use nonflammable cleaning solvent to wipe off the oily or greasy matter to make these surfaces completely dry.
- Install the rotor to the crankshaft.
- Mount the rotor, secure the rotor by applying the thread lock super "1305" to the bolt and tighten the center bolt to the specified torque value.

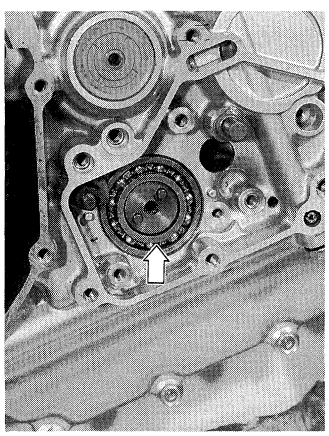


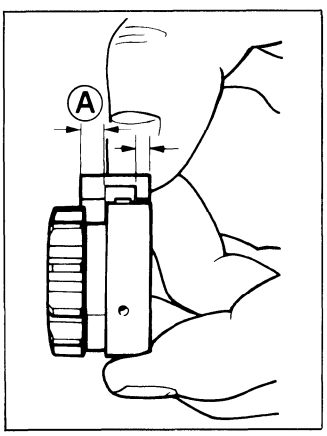
Tightening torque	140 – 160 N·m (14.0 – 16.0 kg-m 101.5 – 115.5 lb-ft)

99000-32100	Thread lock super "1305"



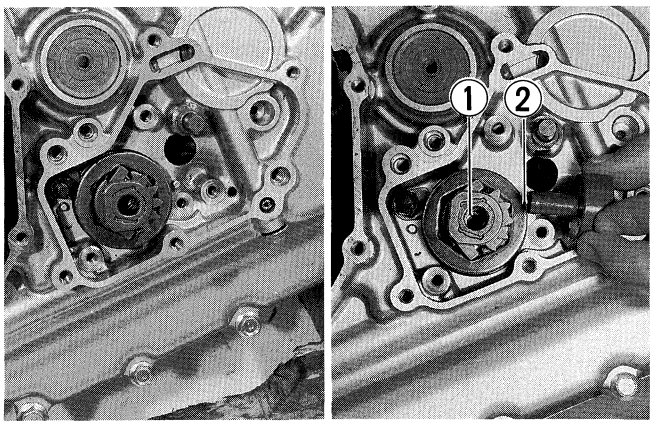
- Install each gear shifting pawl into the cam driven gear. The large shoulder Ⓐ must face to the outside as shown in the illustration.
- Install the plate and cam driven gear.





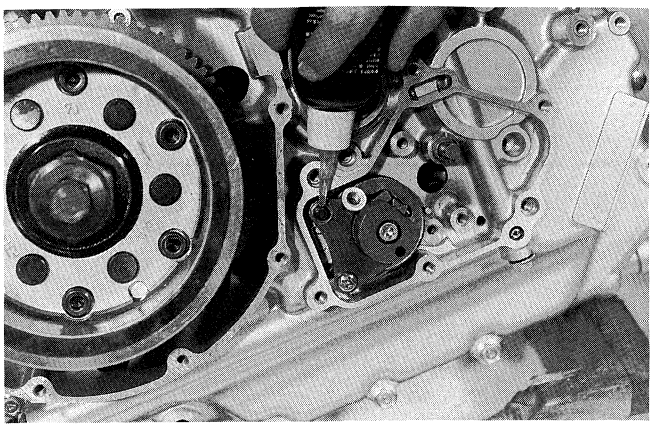
- Install the gearshift cam retainer while engage the slit ① with boss ② of retainer.
- Apply thread lock super "1322" to the set bolt and tighten it.

99000-32110	Thread lock super "1322"



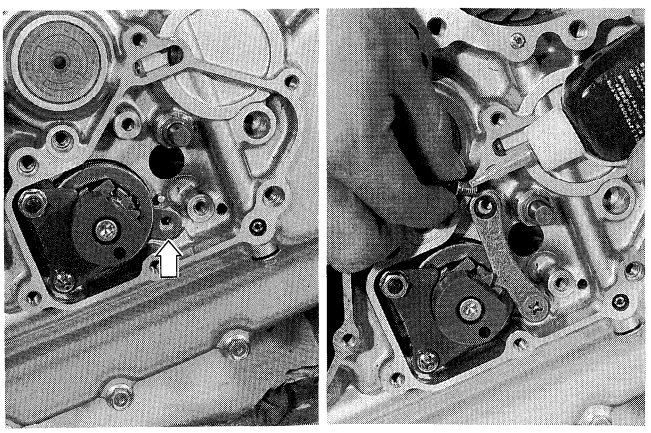
- Install the pawl lifter after applying the thread lock super "1322" to the stud bolt thread.

99000-32110	Thread lock super "1322"



- Install the bearing retainer, spacer and shift cam guide.
- Apply the thread lock super "1322" to the thread of screws.

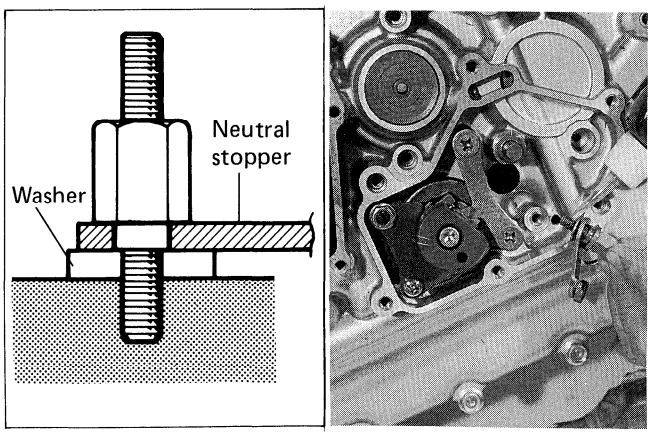
99000-32110	Thread lock super "1322"



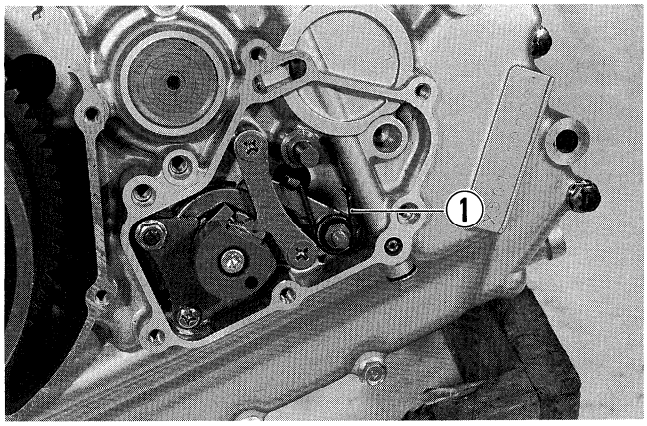
- Install the neutral stopper, and washer.
- Apply thread lock super "1322" to the thread of stud bolt.

99000-32110	Thread lock super "1322"

NOTE:
After tightening the stud bolt, make sure that the neutral stopper moves properly.

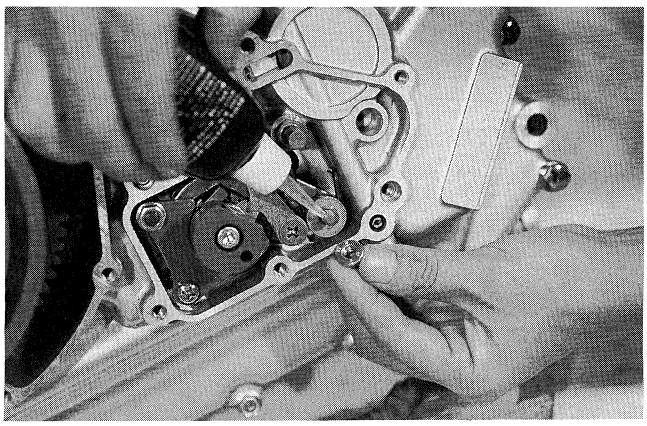


- Insert the spring ① to the stud bolt and hook the ends on the crankcase and on neutral stopper.



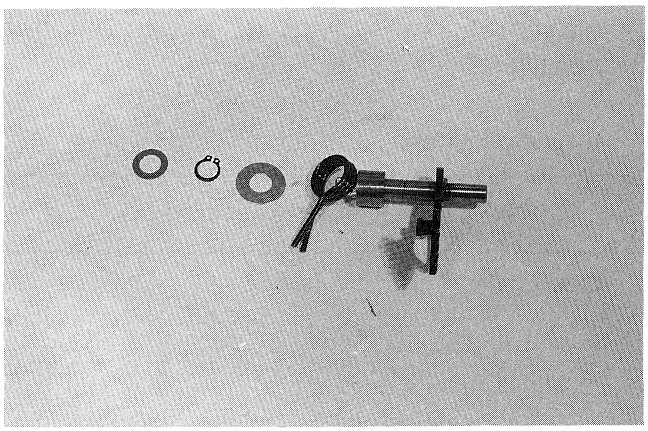
- Apply thread lock super "1322" to the thread of nut.

99000-32110	Thread lock super "1322"

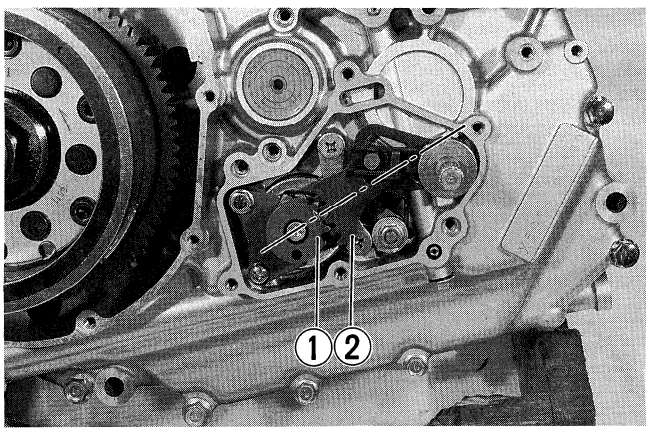


- Secure the spring by using washer and nut.

- Reassemble the gearshift shaft properly.

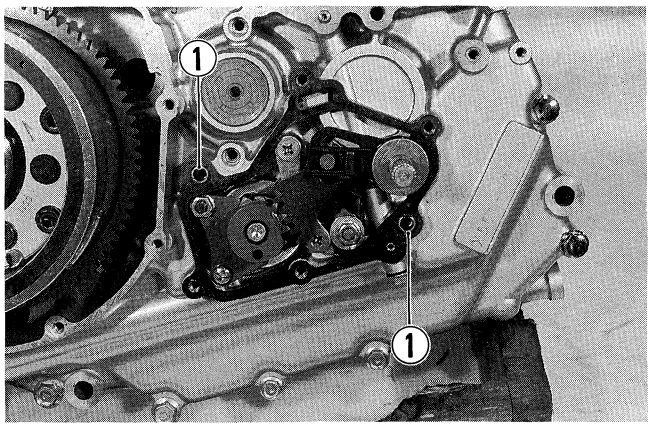


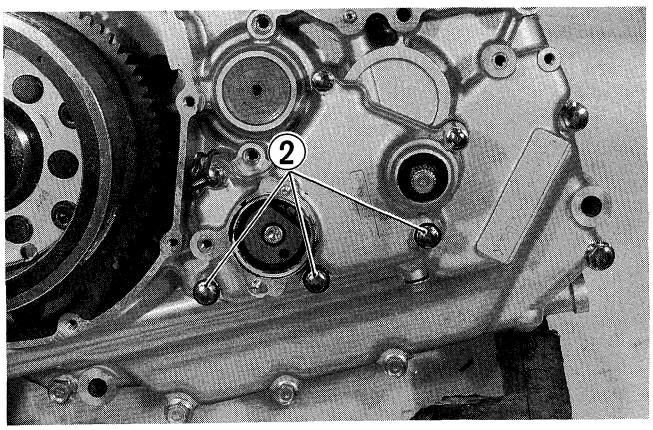
- Install the gearshift shaft in the crankcase. Align the gearshift cam driven gear ① meshes with the shifting gear ② mounted on the gearshift shaft. Be sure to mesh gears ① and ② with their center lines coinciding with each other or the mechanism will shift poorly or will not shift at all.



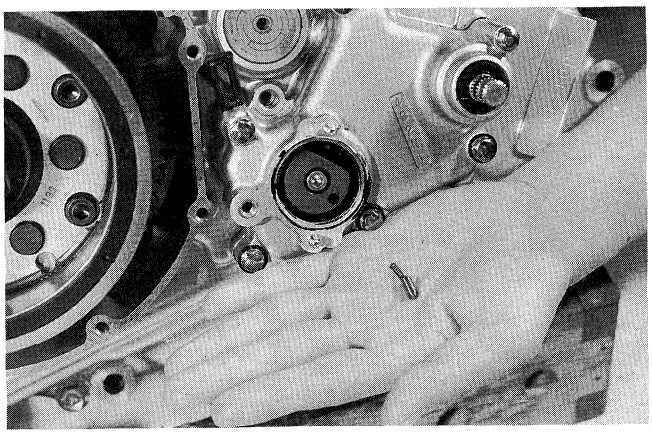
- Install a new gasket and two dowel pins ①.
- Install the gearshift housing cover.

NOTE:
Do not forget to install a set bolt gasket ②.



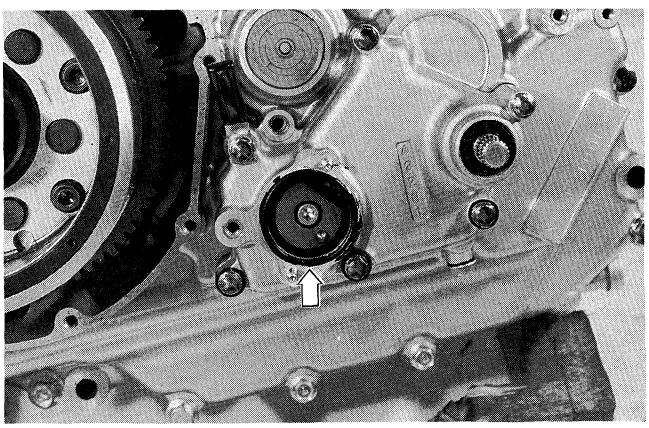


- Install the spring and switch contact into the gearshift cam retainer.

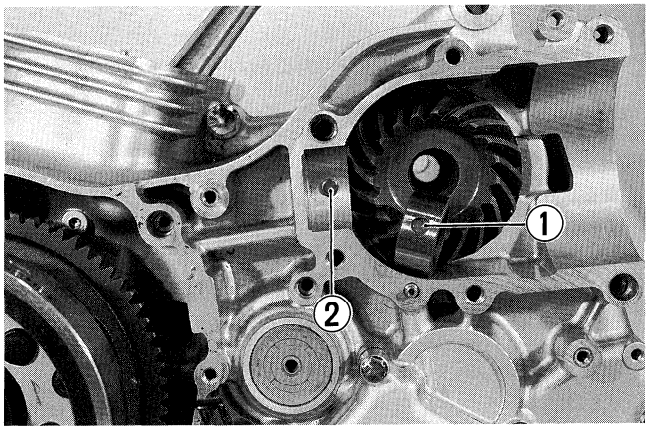


- Install the neutral indicator switch.

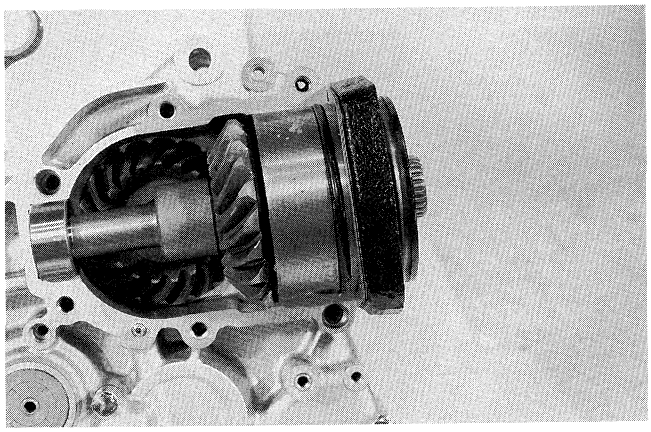
NOTE:
When installing the neutral indicator switch, be sure to locate the spring, switch contact and new O-ring.



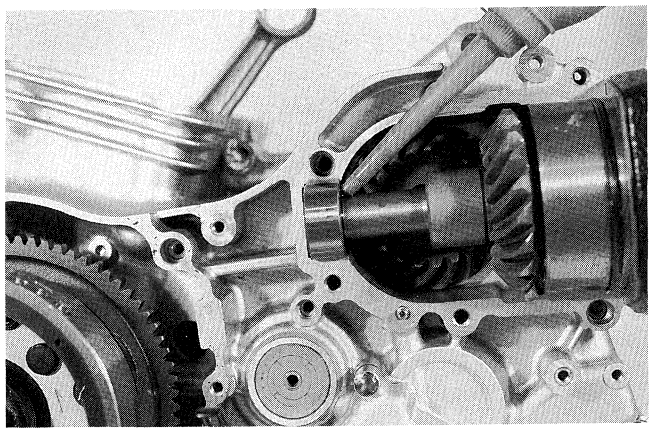
- Align the hole ① of the secondary bevel driven gear bearing with the notch ② .



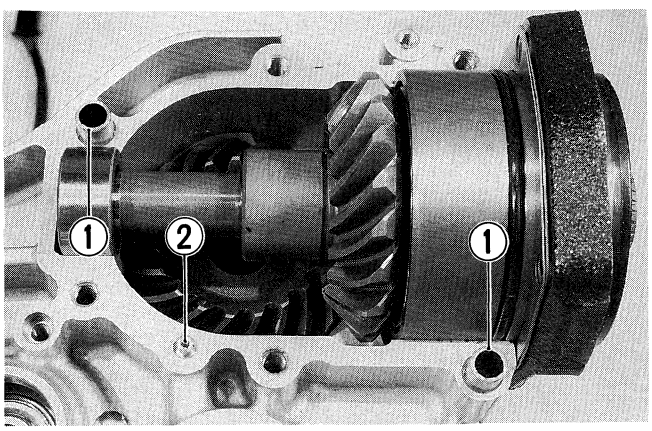
- Install the secondary driven bevel gear assembly, correct shims and a new O-ring.



- Apply motor oil to the bearing and gears.

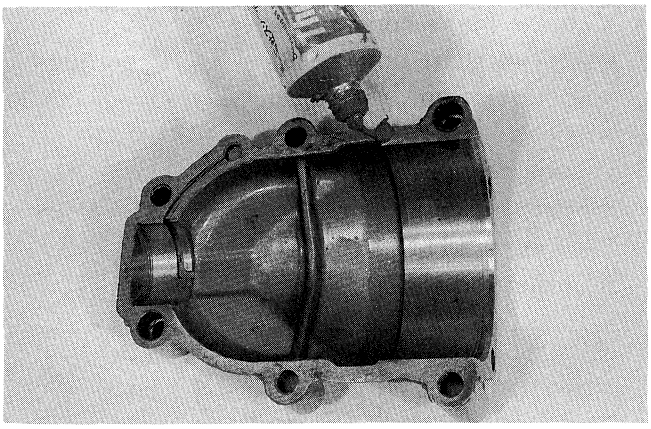


- Install the dowel pins ① .
- Check the oil jet ② for clogging.
- Install the jet so that large diameter end faces inside.



- Apply SUZUKI BOND No. 1207B to the secondary gear case.

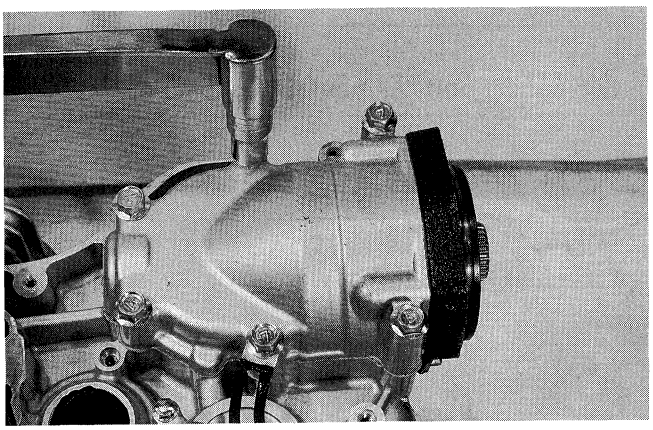
CAUTION:
Be careful not to block the oil passage.



- Tighten the secondary gear case bolts.

	Tightening torque		
	N·m	kg-m	lb-ft
Initial	12 – 18	1.2 – 1.8	8.5 – 13.0
Final	20 – 24	2.0 – 2.4	14.5 – 17.5

- Clamp is placed as shown in the photograph.

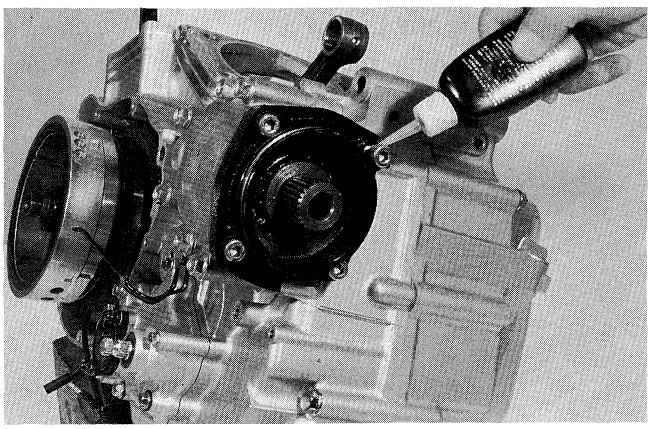


- Tighten the secondary driven bevel gear assembly after applying thread lock super "1303" to the bolt.

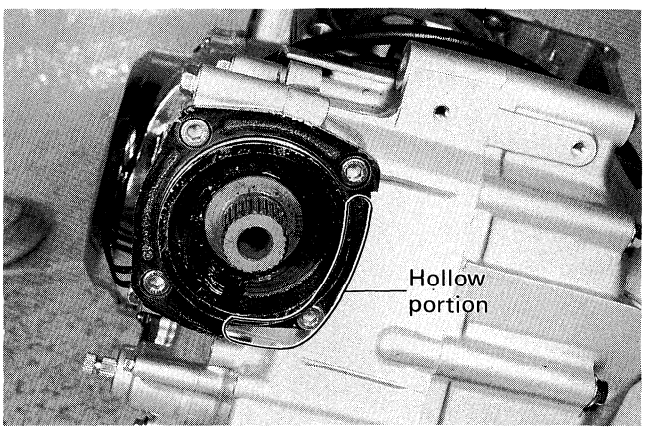
Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m 14.5 – 18.0 lb-ft)

99000-32030	Thread lock super "1303"

NOTE:
Hollow portion of secondary driven bevel gear assembly faces inside.



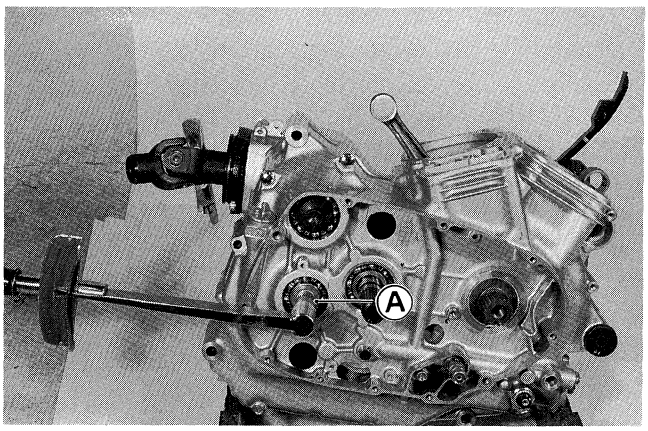
NOTE:
Do not forget to install the washer on the drive shaft.



- Tighten the secondary drive gear shaft bolt and drive shaft bolt to the specified torque by holding the universal joint with an adjustable wrench.

Tightening torque

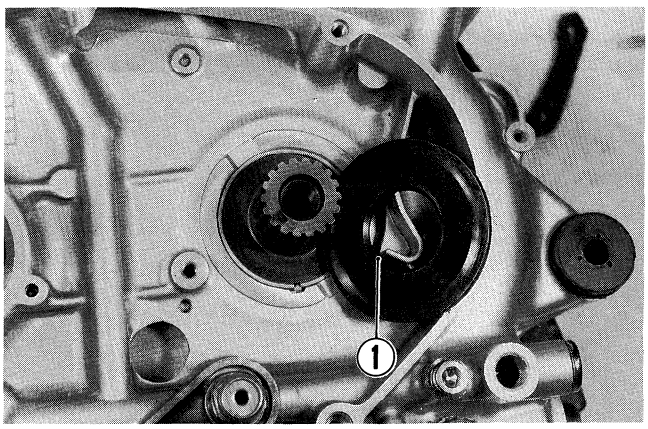
Secondary drive gear shaft bolt	90 – 110 N·m (9.0 – 11.0 kg-m / 65.0 – 79.5 lb-ft)
Drive shaft bolt	55 – 65 N·m (5.5 – 6.5 kg-m / 40.0 – 47.0 lb-ft)



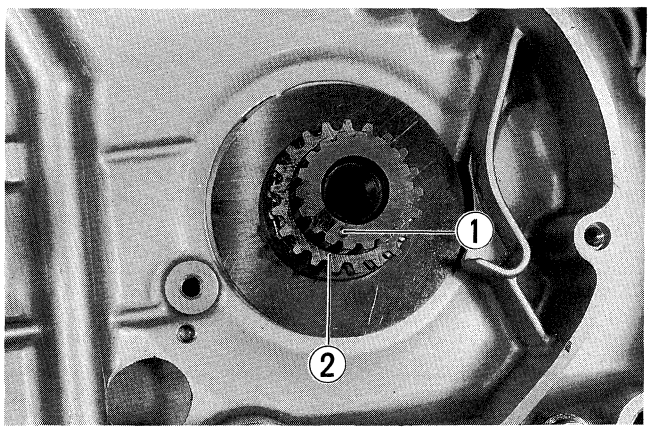
CAUTION:
Drive shaft bolt Ⓐ has left-hand thread.

- Install the thrust washer on the crankshaft.

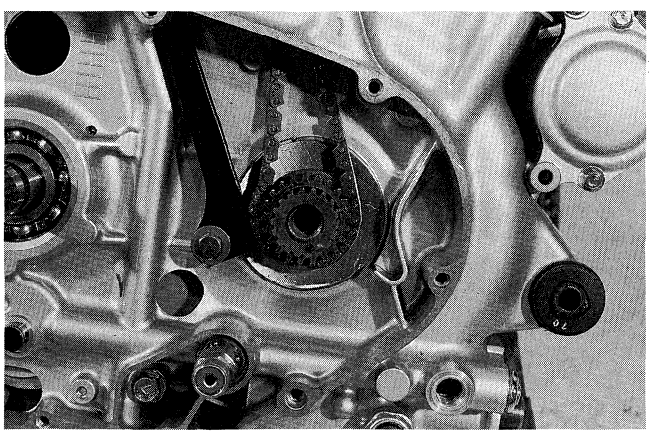
NOTE:
The chamfer of thrust washer ① faces crankcase.



- After aligning the punch mark ① of the crankshaft with punch mark ② of the cam chain drive gear, install the cam chain drive gear.



- Install the chain and chain guide.
- Tighten the chain guide bolt.

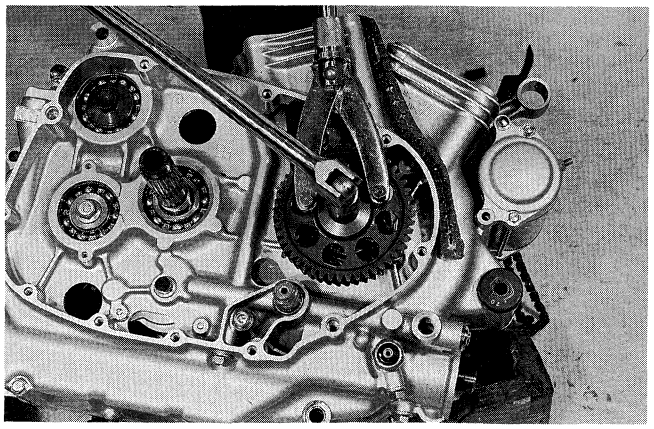


- Tighten the primary drive gear bolt to the specified torque.

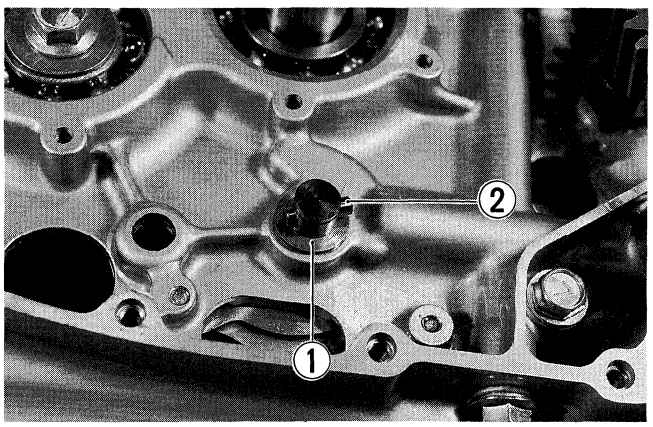
Tightening torque	140 – 160 N·m (14.0 – 16.0 kg-m 101.5 – 115.5 lb-ft)

09930-40113	Rotor holder

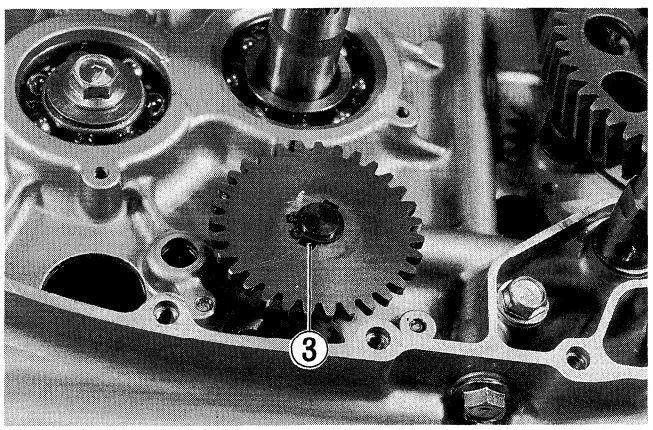
NOTE:
Primary drive gear bolt has left hand thread.



- Install the washer ① and pin ② .

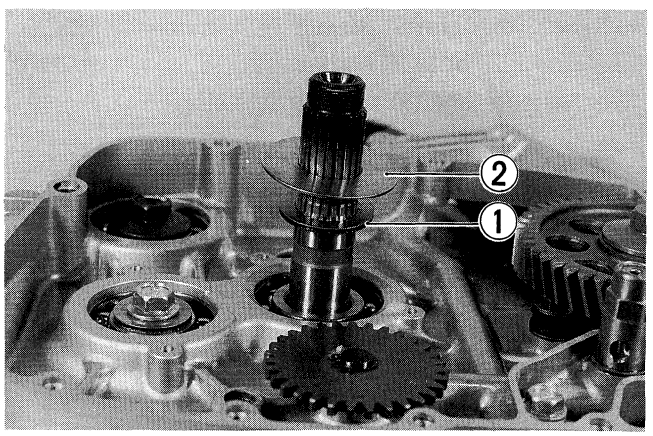


- Install the oil pump driven gear using the circlip ③ .

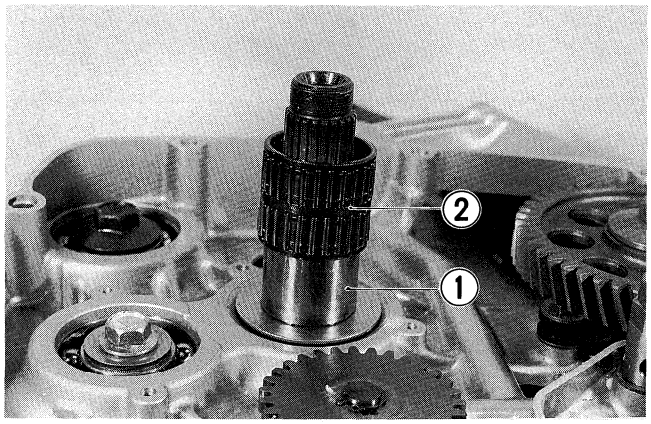


- Install the spacer ① and washer ② on the countershaft.

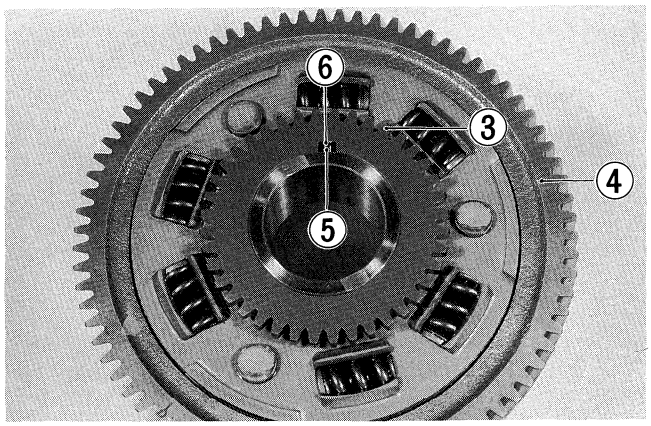
CAUTION:
The chamfer of washer ② faces inside.



- Install the spacer ① and bearing ② on the countershaft.

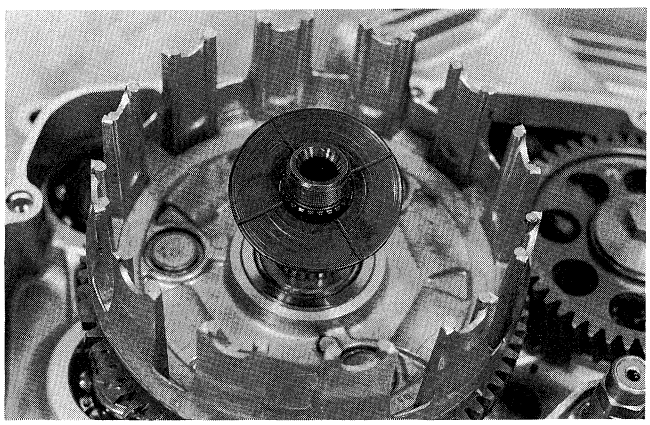


- Install the oil pump drive gear ③ on the primary driven gear ④ while aligning pin ⑤ with slit ⑥ of oil pump drive gear.

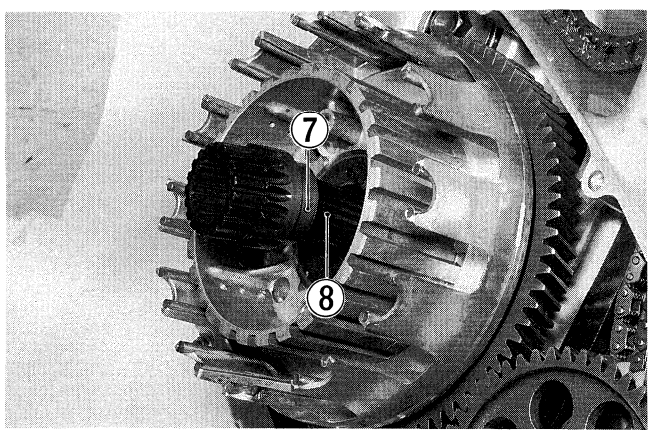


- Install the primary driven gear and washer.

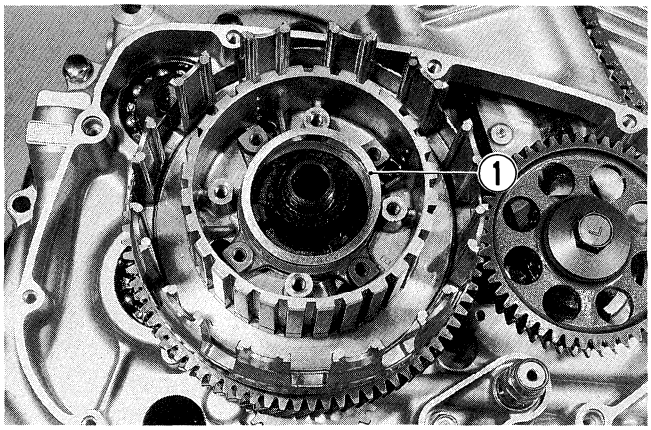
CAUTION:
Groove of washer faces clutch sleeve hub.



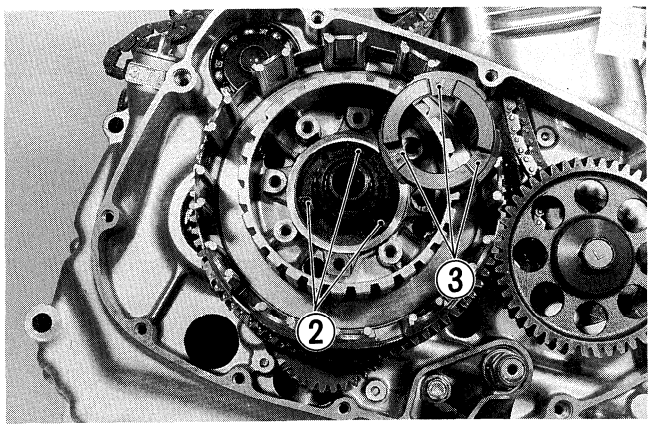
- Install the clutch sleeve hub spacer while engaging oil hole ⑦ of clutch sleeve hub with punched mark ⑧ of countershaft.



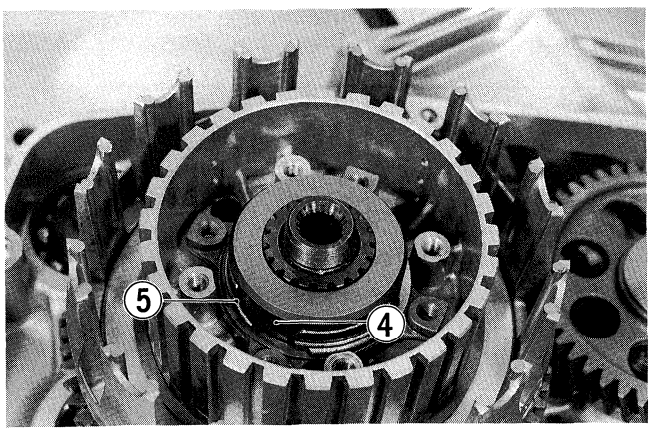
- Install the clutch spring slider and washer ①.



- Install the clutch No. 2 cam after engaging the boss ② of clutch sleeve hub with dog ③ of clutch No. 2 cam.



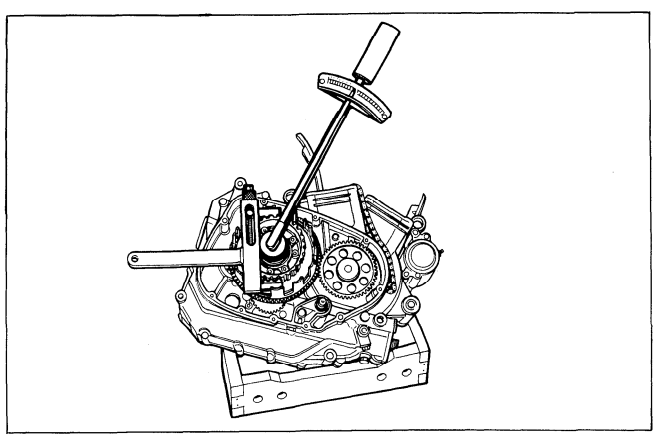
- Install the clutch No. 1 cam after engaging the boss ⑤ of clutch sleeve hub with dog ④ of clutch No. 1 cam.



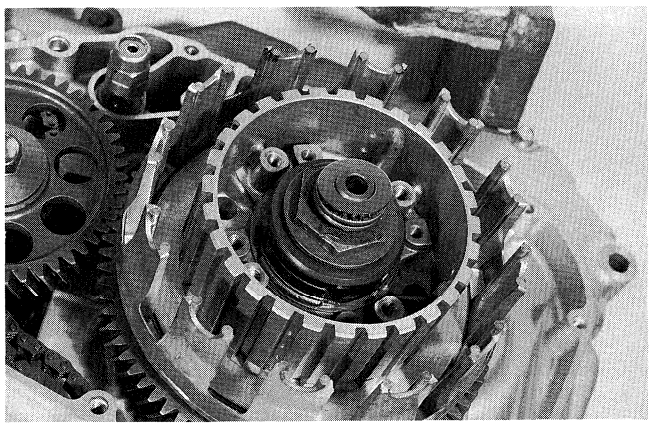
- Install the washer so that concave side faces nut, and then tighten the clutch sleeve hub nut using the special tool.
  Tighten the nut to the specification.

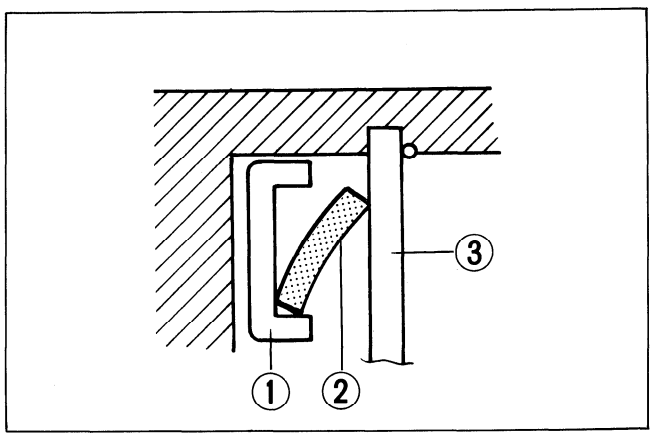
Tightening torque	90 – 110 N·m (9.0 – 11.0 kg-m 65.0 – 79.5 lb-ft)

09920-50710	Clutch sleeve hub holder



- Install the clutch push rods into the countershaft so that the long push rod touches clutch push piece.
- Install the clutch push piece, bearing and washer in that order.
- Apply engine oil to the bearing.
- Install the wave washer seat ①, wave washer ② and drive plate No. 2 ③ (thicker cork plate as shown in the figure).

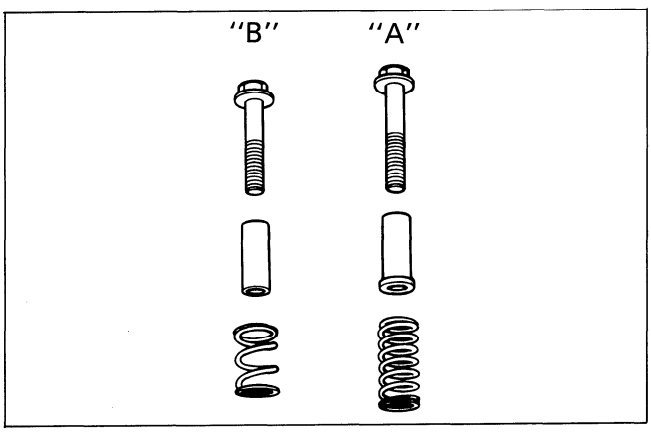




- Install the pressure plate and tighten the clutch spring set bolts.

NOTE:
Tighten the clutch spring set bolts in the criss-cross manner, tightening them by degrees until they attain a uniform tightness.

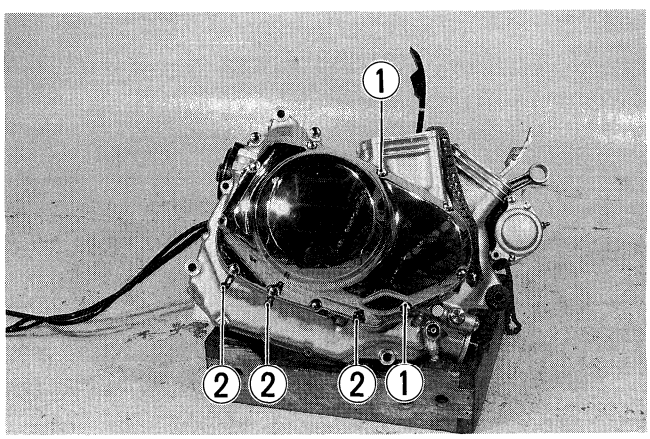
Clutch spring bolt tightening torque	11 – 13 N·m (1.1 – 1.3 kg-m / 8.0 – 9.5 lb-ft)



- Set "A" is used for clutch sleeve hub side.
  Set "B" is used for clutch spring slider side.
  "A" : bolt L: 40 mm (1.6 in)
  Spring L: 29 mm (1.1 in)
  Spacer L: 25 mm (1.0 in)
  "B" : bolt L: 35 mm (1.4 in)
  Spring L: 21 mm (0.8 in)
  Spacer L: 24 mm (0.9 in)

- Replace the clutch cover gasket with a new one to prevent oil leakage. (Refer to page 3-83.)
- Install the two dowel pins.
- Install the clutch cover.

NOTE:
Do not forget to install a set bolt gaskets ① and clamps ②.



- Compress the tensioner spring by unlocking the ratchet.
- Lock the spring using the special tool.

09918-53810	Tensioner lock tool

- Install the front and rear chain tensioners by tightening the mounting bolts.

Tightening torque	8 – 12 N·m (0.8 – 1.2 kg-m 6.0 – 8.5 lb-ft)

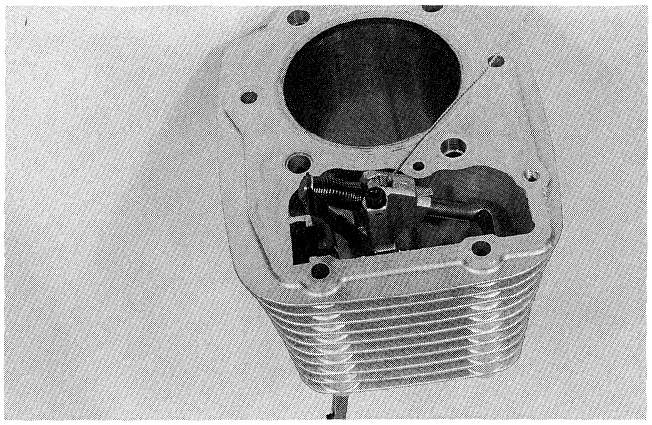
- Tighten the cylinder head nuts and bolt.

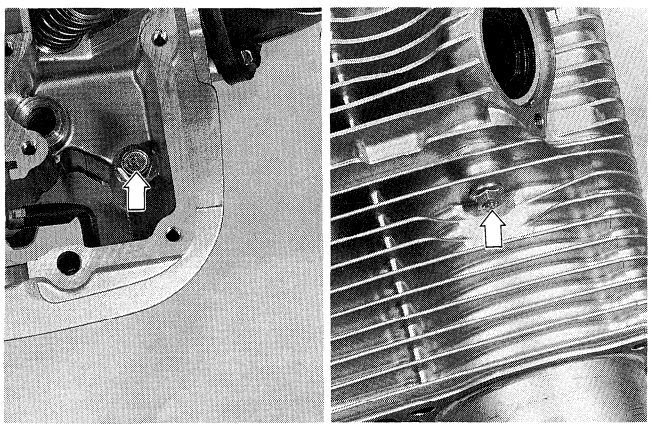
	Thread diameter	
	8 mm	10 mm
Initial	10 N·m (1.0 kg-m 7.0 lb-ft)	25 N·m (2.5 kg-m 18.0 lb-ft)
Final	23 – 27 N·m (2.3 – 2.7 kg-m 16.5 – 19.5 lb-ft)	35 – 40 N·m (3.5 – 4.0 kg-m 25.5 – 29.0 lb-ft)

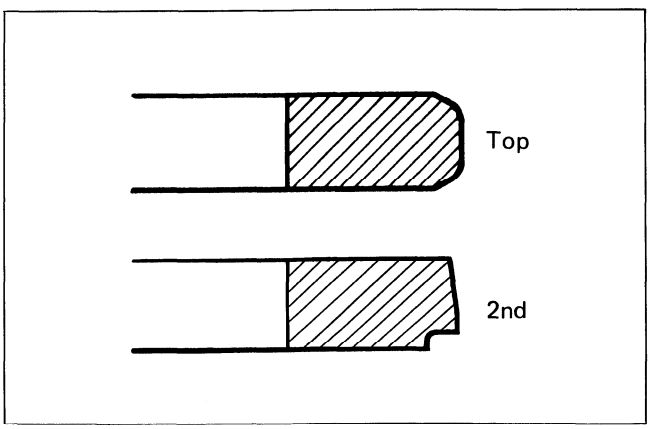
- Mount the piston ring in the order of oil ring, 2nd ring and top ring.
- Top ring and 2nd (middle) ring differ in the shape of ring face, and the face of top ring is chrome-plated whereas that of 2nd ring is not. The color of 2nd ring appears darker than that of the top one.

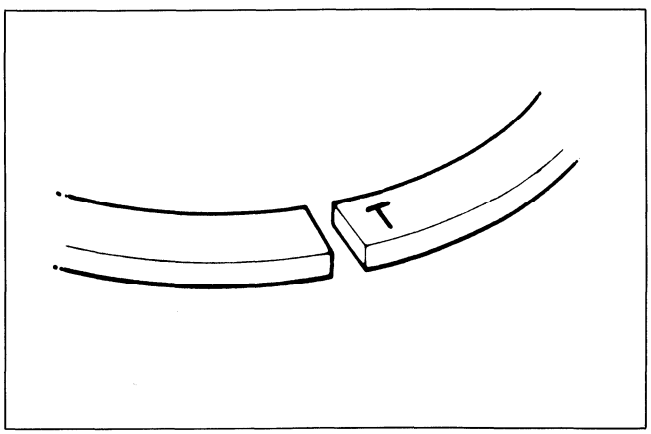
- Top and 2nd (middle) rings have letter "T" marked on the side. Be sure to bring the marked side to top when fitting them to the piston.
- The first member to go into the ring groove is spacer ①. After placing spacer, fit the two side rails ②. Side designations, top and bottom, are not applied to the spacer and side rails: you can position each either way.

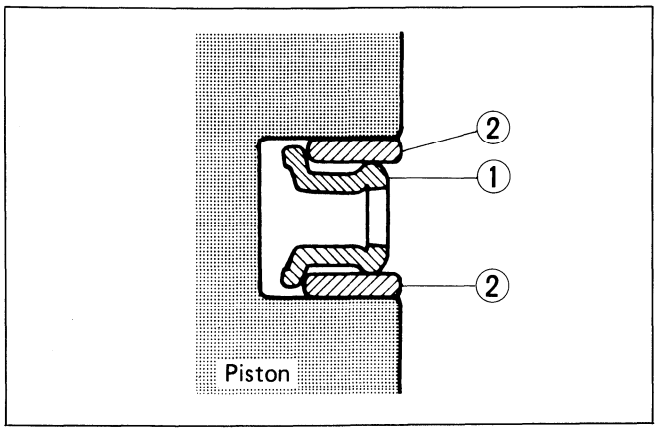
CAUTION:
When mounting the spacer, be careful not to allow its two ends to overlap in the groove.

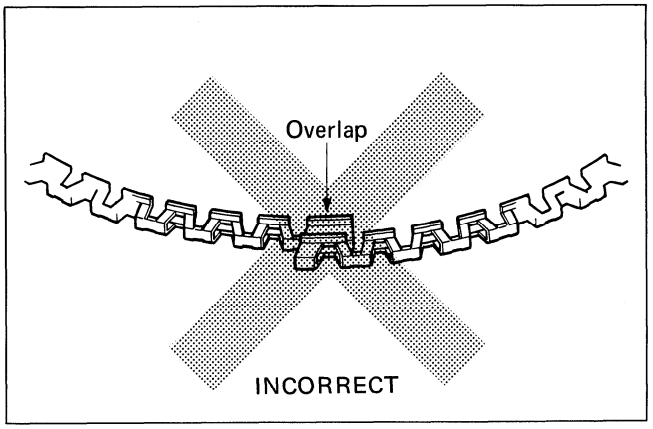




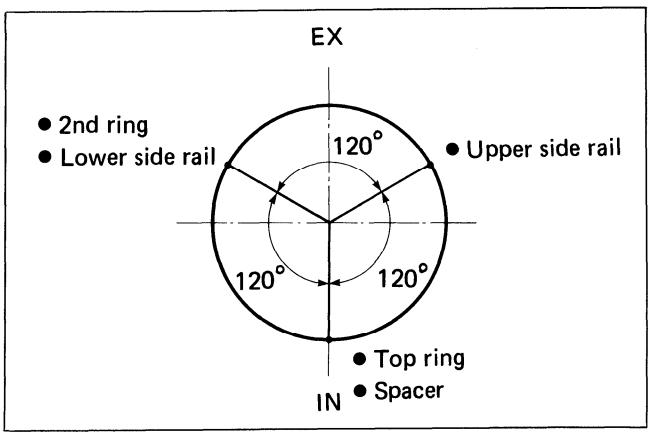




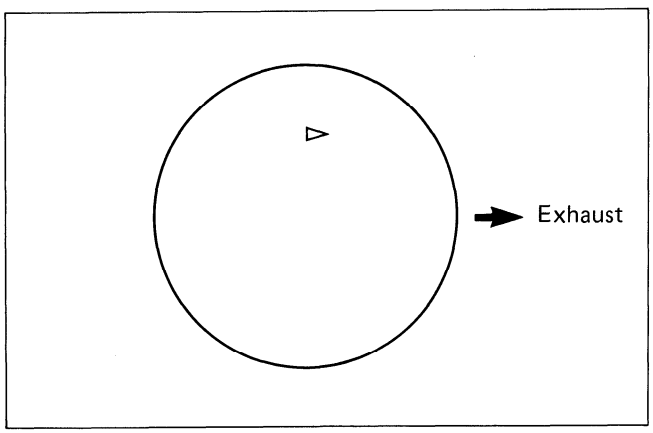




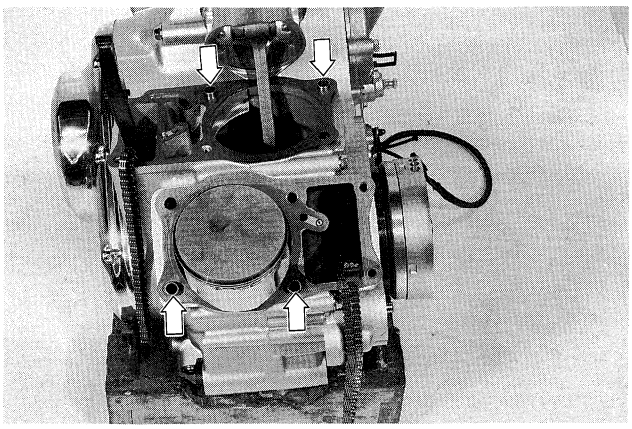
- Position the gaps of the three rings as shown. Before inserting each piston into the cylinder, check that the gaps are so located.



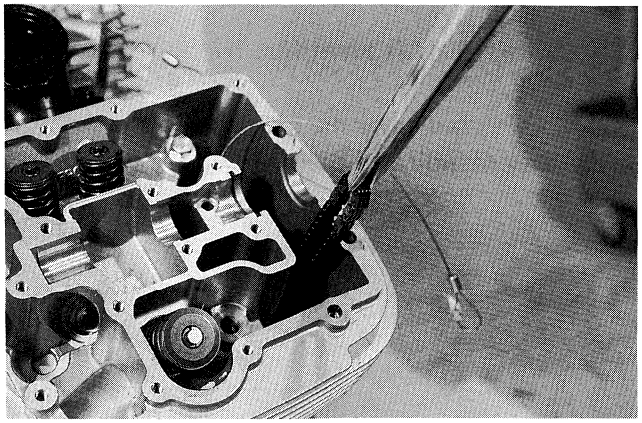
- Apply engine oil to the piston ring and piston surface.
- The piston is in correct position when its triangle (on the top) points exhaust valve side.



- Install a new gasket and dowel pins.

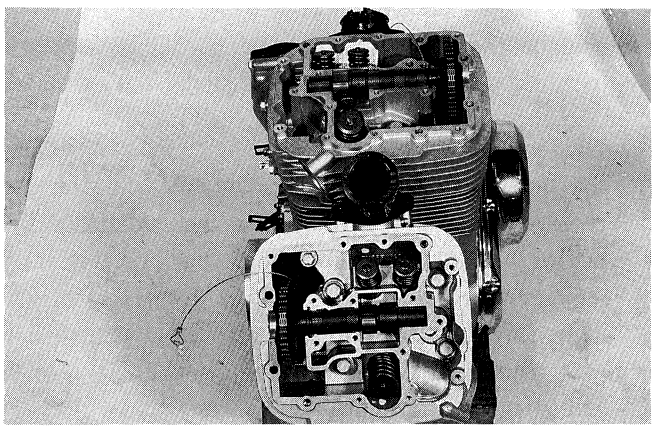


- Install the cylinder and cylinder head on the crankcase.



NOTE:
Pull the chain tightly not to hug the chain between crankcase and chain guide.

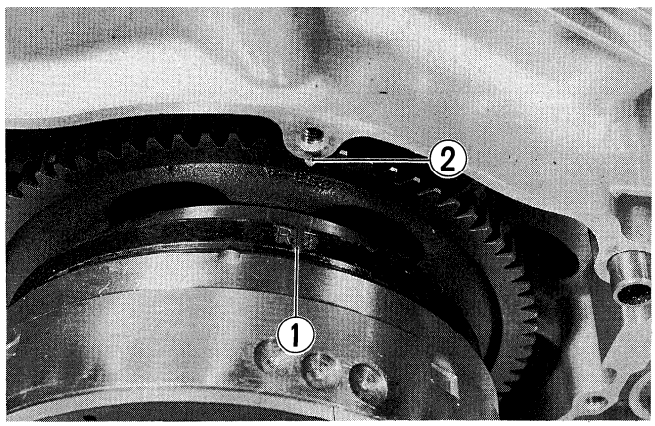
- Tighten the cylinder head bolt.



Bolt thread diameter	Initial			Final		
	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
8 mm	10	1.0	7.0	23–27	2.3–2.7	16.5–19.5
10 mm	25	2.5	18.0	35–40	3.5–4.0	25.5–29.0

CAMSHAFT TIMING

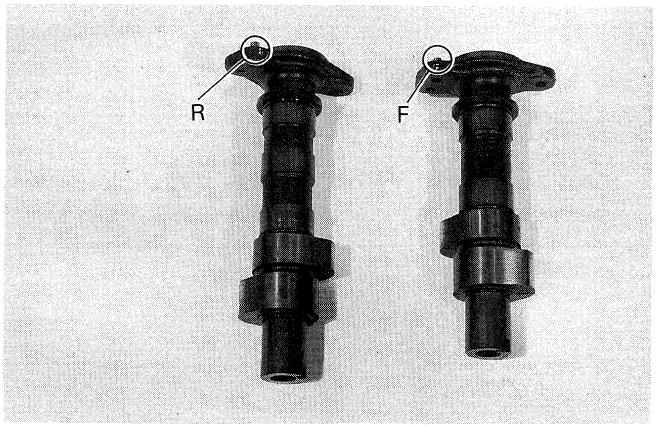
Before installing the camshaft, make sure that the index line ① (R.T is indicated at T.D.C. of No. 1 piston.) on the rotor aligns with the aligning mark ② of the crankcase.



NOTE:
If work is done without pulling the camshaft drive chain upward, the chain will be caught between crankcase and cam chain drive sprocket.

NOTE:
Apply grease on the cam sprocket locating pin and install the pin into the camshaft.

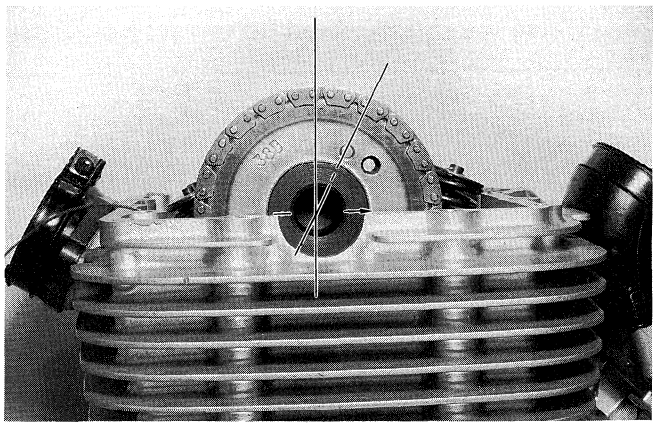
NOTE:
Each camshaft is identified by the letter "F" or "R".
"F" mark indicates the front (No. 2) cylinder.
"R" mark indicates the rear (No. 1) cylinder.



No. 1 (REAR) CYLINDER

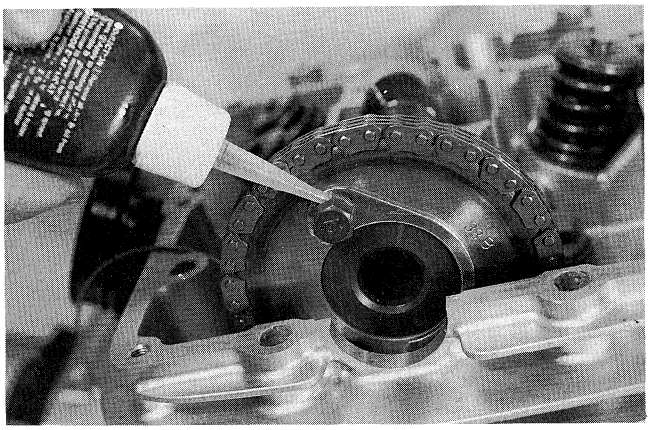
- Engage the chain on the cam sprocket with the locating pin hole at the one o'clock position.

NOTE:
Do not rotate the generator rotor while doing this. When the sprocket is not positioned correctly, turn the sprocket and bring it to the proper position. When installing the camshaft into the cam sprocket, pay attention not to dislodge the locating pin or it may fall into the crankcase.



- Align the marks on the camshaft so it is parallel with the surface of the cylinder head.

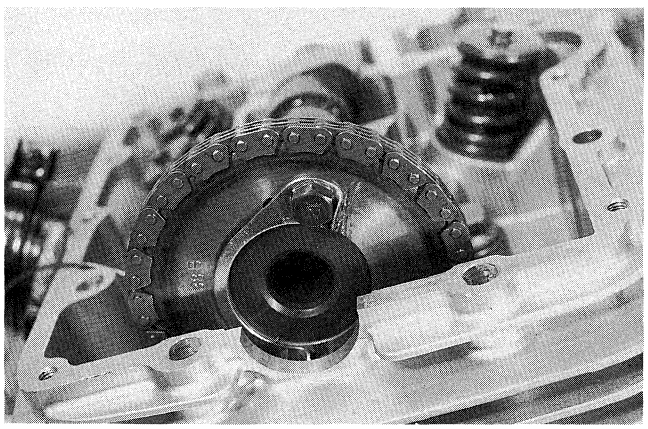
NOTE:
Arrow mark of camshaft faces forward.



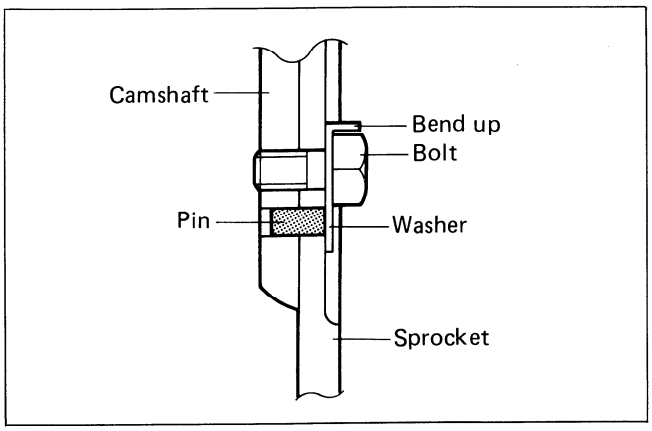
- Fit lock washer so that it is covering the locating pin.
- Apply Thread lock super "1303" to the bolts and tighten the cam sprocket bolts to the specification.

Tightening torque	14 – 16 N·m (1.4 – 1.6 kg-m 10.0 – 11.5 lb-ft)

99000-32030	Thread lock super "1303"

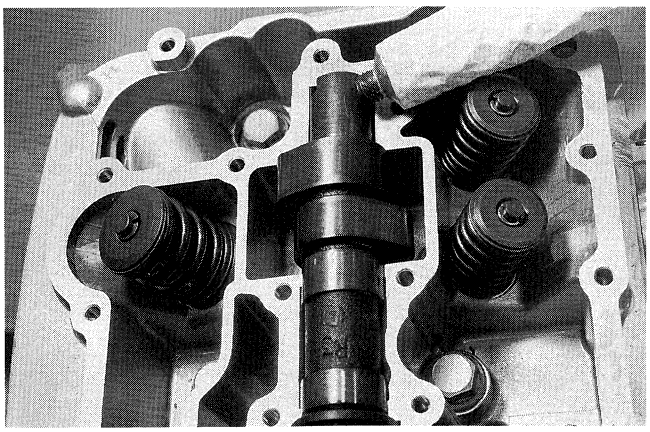


- Bend up the washer tongue positively to lock the bolts.

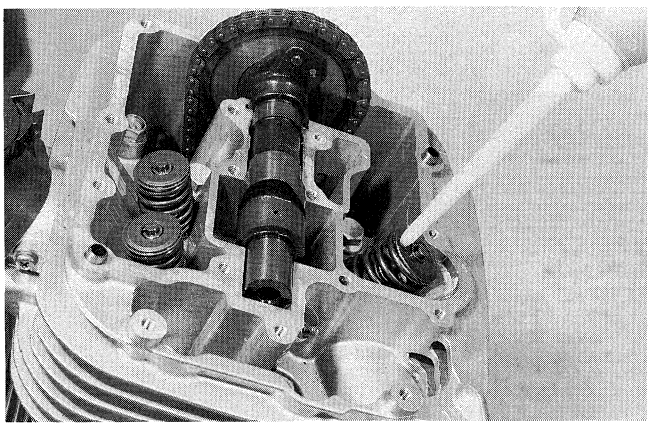


- Apply SUZUKI MOLY PASTE to the camshaft journals.

99000-25140	SUZUKI MOLY PASTE



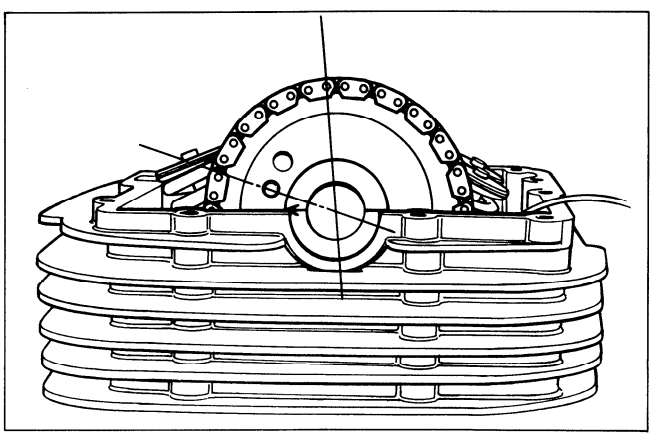
- Pour motor oil into the cylinder head.



No. 2 (FRONT) CYLINDER

- At this position, engage the chain on the cam sprocket with the locating pin hole at the nine half o'clock position.

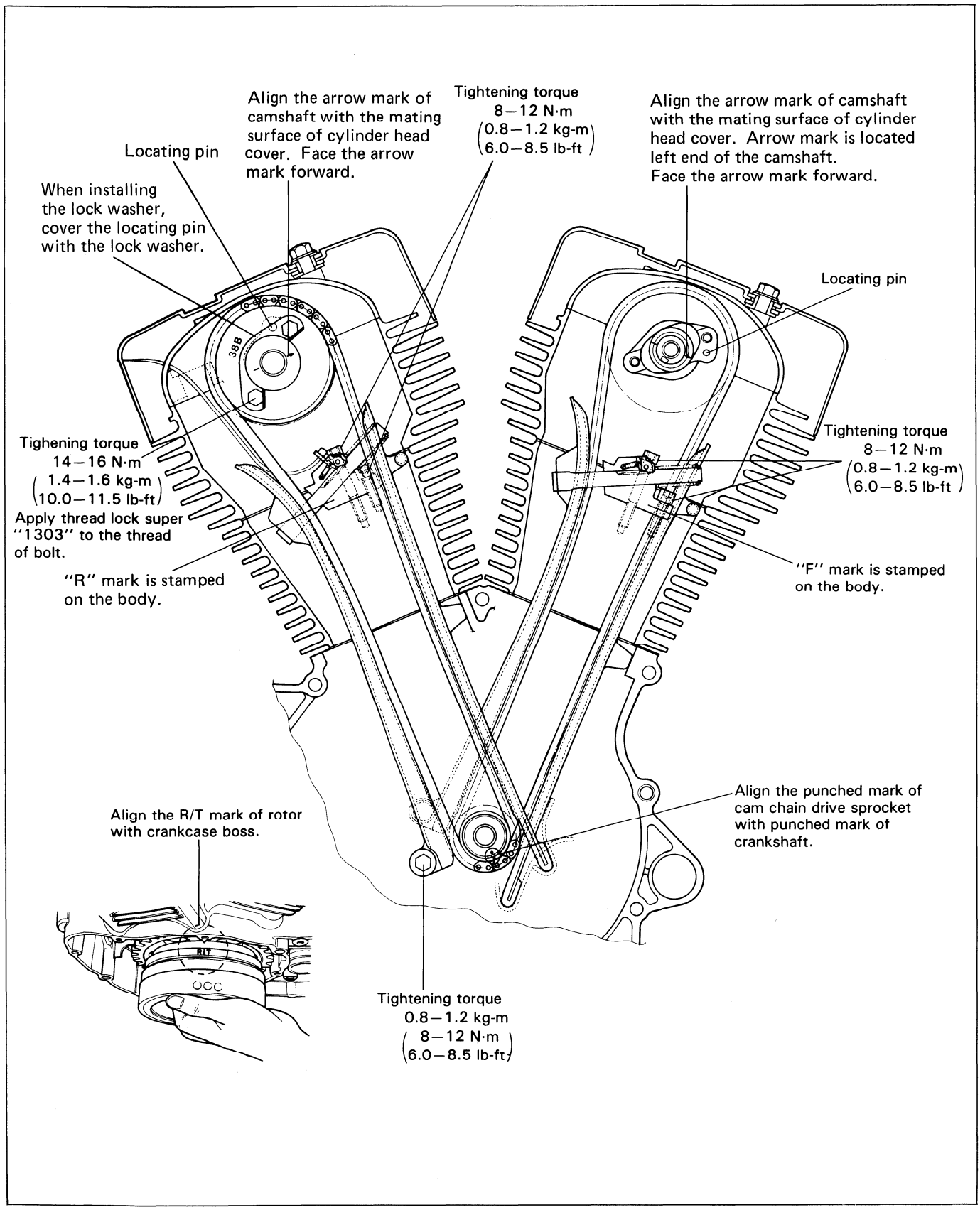
NOTE:
Do not rotate the generator rotor while doing this. When the sprocket is not positioned correctly, turn and bring the sprocket to the proper position. When installing the camshaft, pay attention not to dislodge the locating pin or it may fall into the crankcase.



- Remaining procedure is in the same manner as No. 1 (REAR) cylinder.

CAM SHAFT TIMING

- Turn the crankshaft so that the No. 1 (REAR) piston is positioned at T.D.C.



- Remove the plug from the rear cylinder head cover and the breather cover from front cylinder head cover.
- Thoroughly wipe off oil from the mating surfaces of cylinder head and cover.
- Fit the two dowel pins to the cylinder head side.
- Uniformly apply SUZUKI BOND No. 1216 to the cylinder head surface. (Refer to page 3-83.)

99104-31160	SUZUKI BOND No. 1216

NOTE:
Do not apply SUZUKI BOND No. 1216 to the camshaft end cap.

NOTE:
When tightening the cylinder head cover bolts, position must be at top dead center on compression stroke.

- Pass the tensioner locking tool through the hole of the cylinder head cover for the rear cylinder and through the breather hole for the front cylinder.
- Tighten the front and rear cylinder head cover bolts to the specified torque. (Refer to page 3-82.)

	6 mm	8 mm
Tightening torque	9 – 13 N·m (0.9 – 1.3 kg-m / 6.5 – 9.5 lb-ft)	23 – 27 N·m (2.3 – 2.7 kg-m / 16.5 – 19.5 lb-ft)

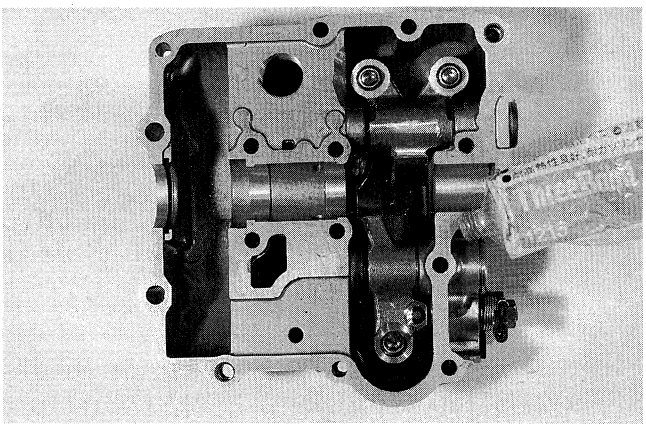
- Remove the oil plug and then pour the engine oil to fill the rocker arm oil passage through the hole ①, ② with a oiler. Necessary amount of oil is approx. 50 ml (1.7 US oz) for each cylinder.
- Tighten the oil plugs to the specified torque.

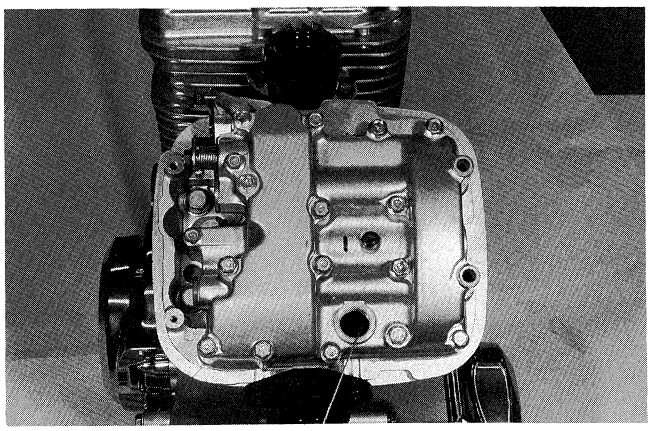
NOTE:
New gasket should be used on the oil plug.

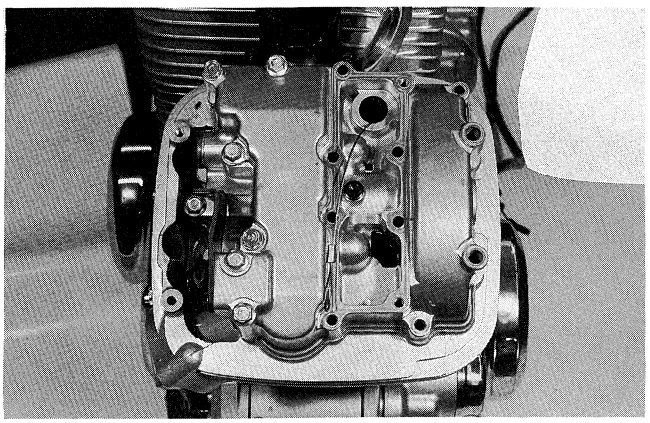
Tightening torque	8 – 12 N·m (0.8 – 1.2 kg-m / 6.0 – 8.5 lb-ft)

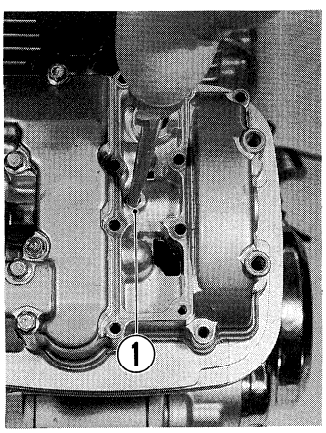
- Remove the tensioner locking tools.

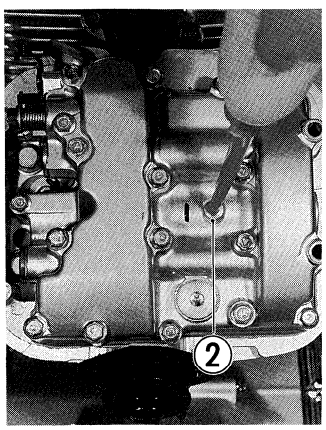
NOTE:
Click sound is heard when the cam drive chain tensioner is released.







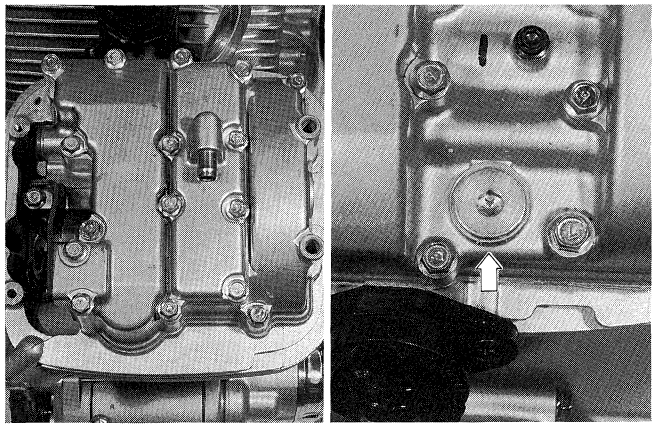




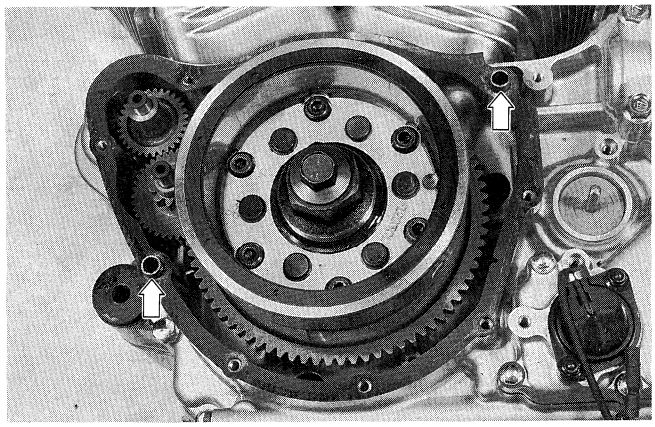
- Tighten the front cylinder head cover other bolts to the specified torque and the rear cylinder head cover plug to the specified torque below after applying SUZUKI BOND NO. 1216 to the plug thread.

Plug tightening torque	23 – 27 N·m (2.3 – 2.7 kg-m / 16.5 – 19.5 lb-ft)

99104-31160	SUZUKI BOND NO. 1216

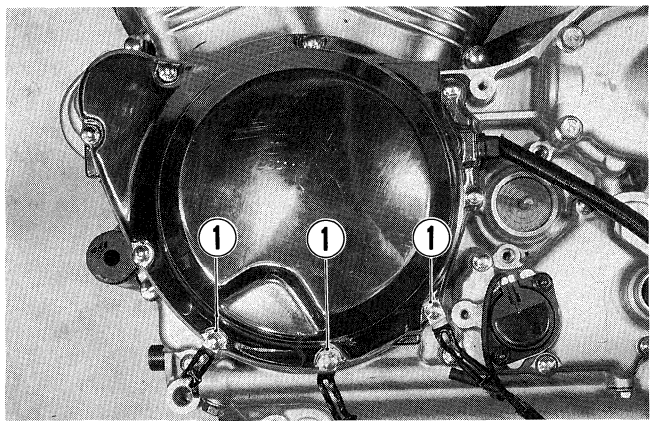


- Install a new gasket and two dowel pins.

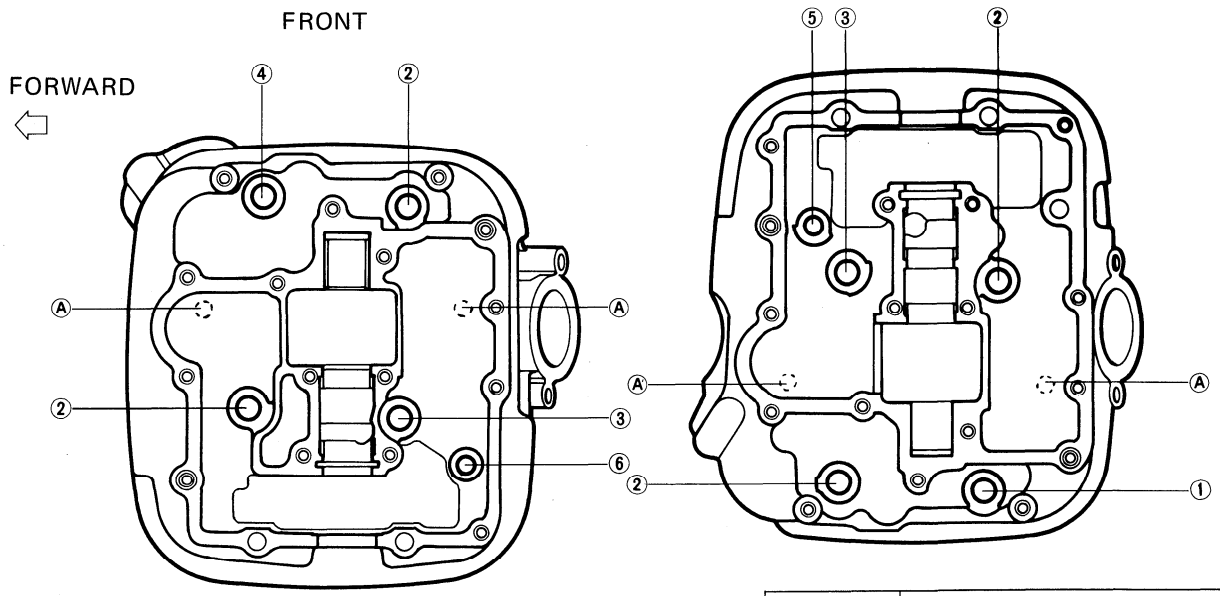


- Install the generator cover.

NOTE:
Do not forget to install the clamps ①.



CYLINDER HEAD BOLT

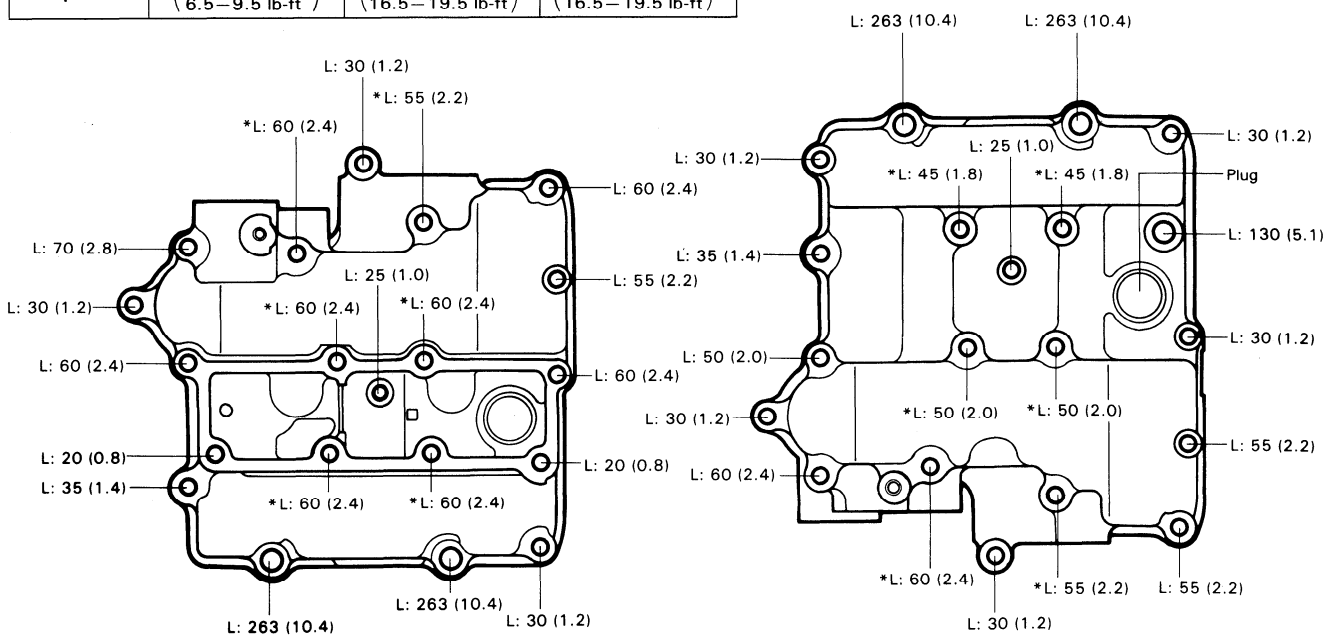


	①	②	③	④	⑤	⑥
Bolt length	200 mm (7.9 in)	190 mm (7.5 in)	180 mm (7.1 in)	215 mm (8.5 in)	70 mm (2.6 in)	57 mm (2.2 in)

	Tightening torque	
	①, ②, ③, ④	⑤, ⑥, Ⓐ
Initial	25 N·m (2.5 kg-m / 18.0 lb-ft)	10 N·m (1.0 kg-m / 7.0 lb-ft)
Final	35–40 N·m (3.5–4.0 kg-m / 25.5–29.0 lb-ft)	23–27 N·m (2.3–2.7 kg-m / 16.5–19.5 lb-ft)

CYLINDER HEAD COVER BOLT

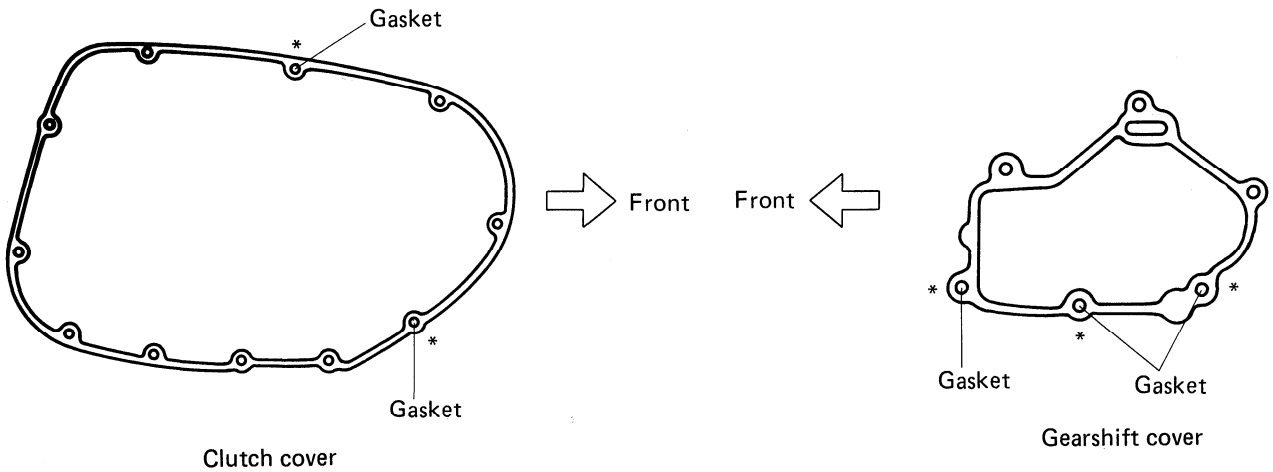
Thread diameter	6 mm	8 mm	Plug
Tightening torque	9–13 N·m (0.9–1.3 kg-m / 6.5–9.5 lb-ft)	23–27 N·m (2.3–2.7 kg-m / 16.5–19.5 lb-ft)	23–27 N·m (2.3–2.7 kg-m / 16.5–19.5 lb-ft)



L: Length
Unit: mm (in)

*Mark indicates the gasket position.

GASKET POSITION

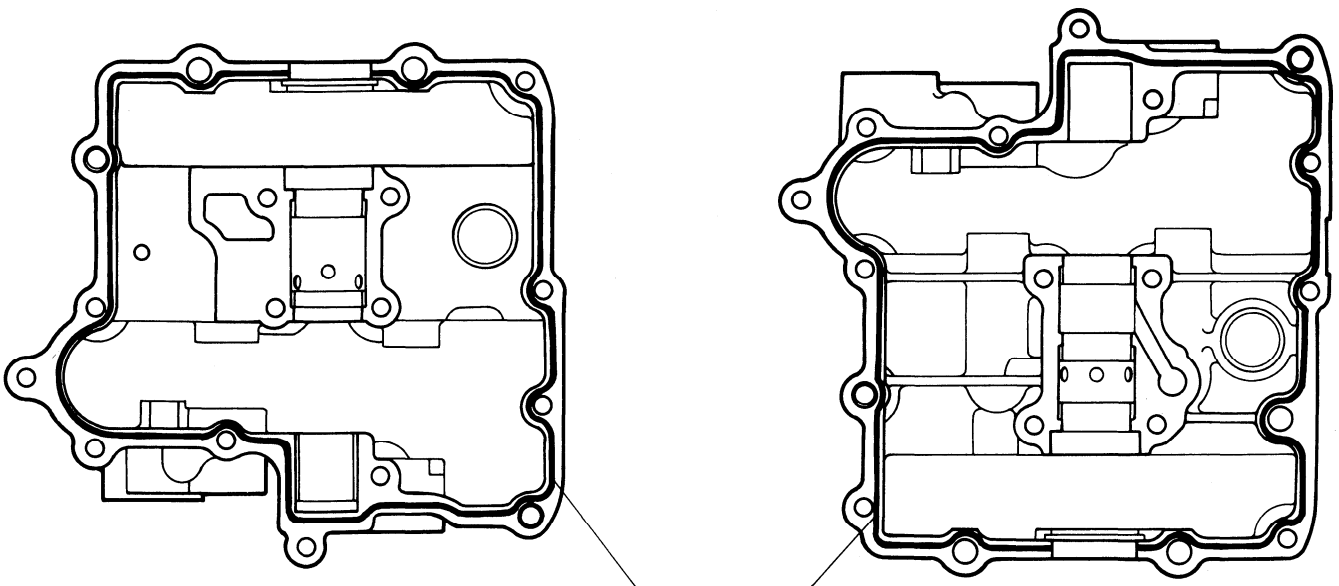


Clutch cover

Gearshift cover

*Mark indicates the gasket position.

LIQUID GASKET APPLYING PLACES OF CYLINDER HEAD COVER



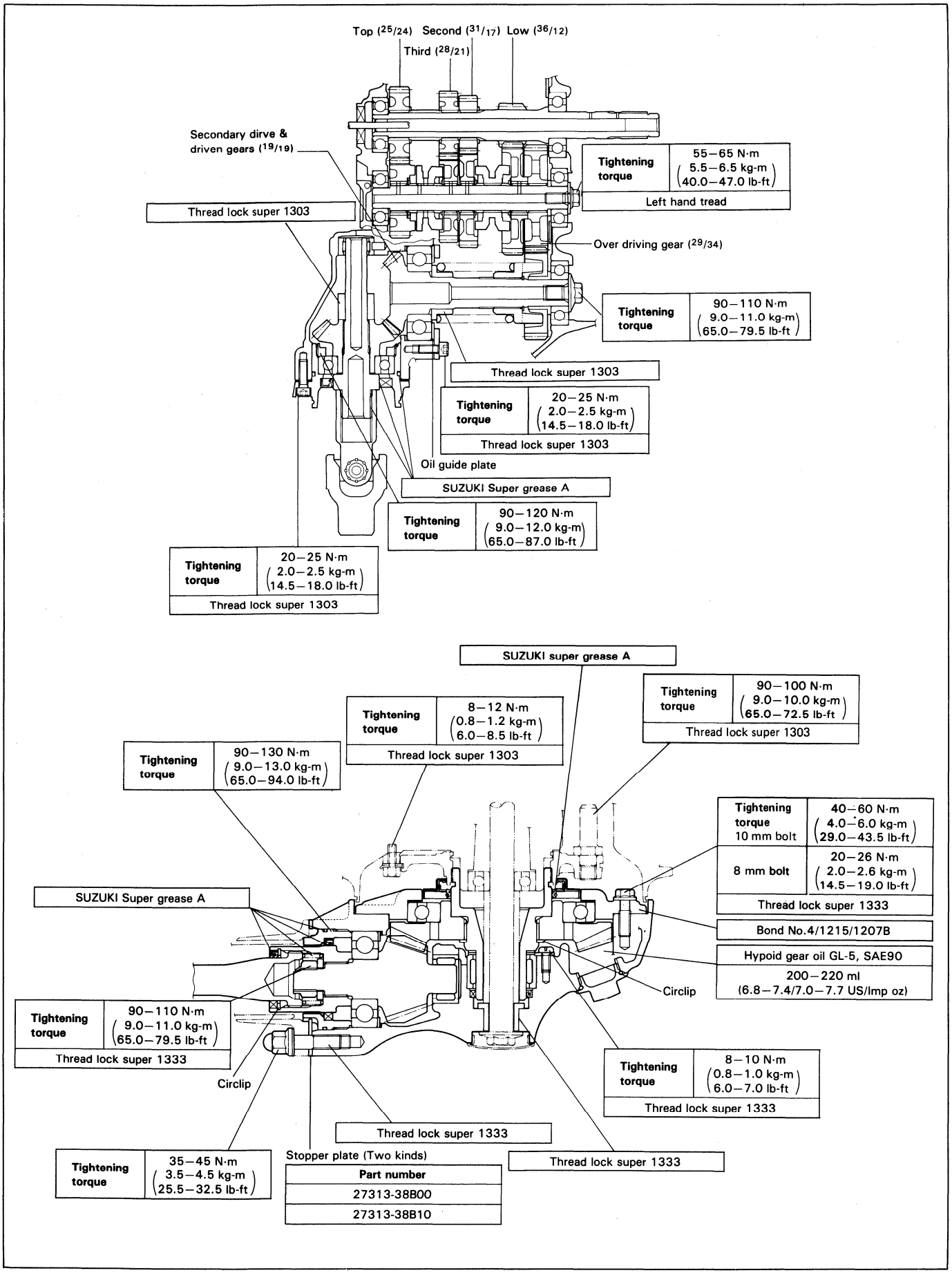
A thick line is liquid gasket applying places.

SHAFT DRIVE

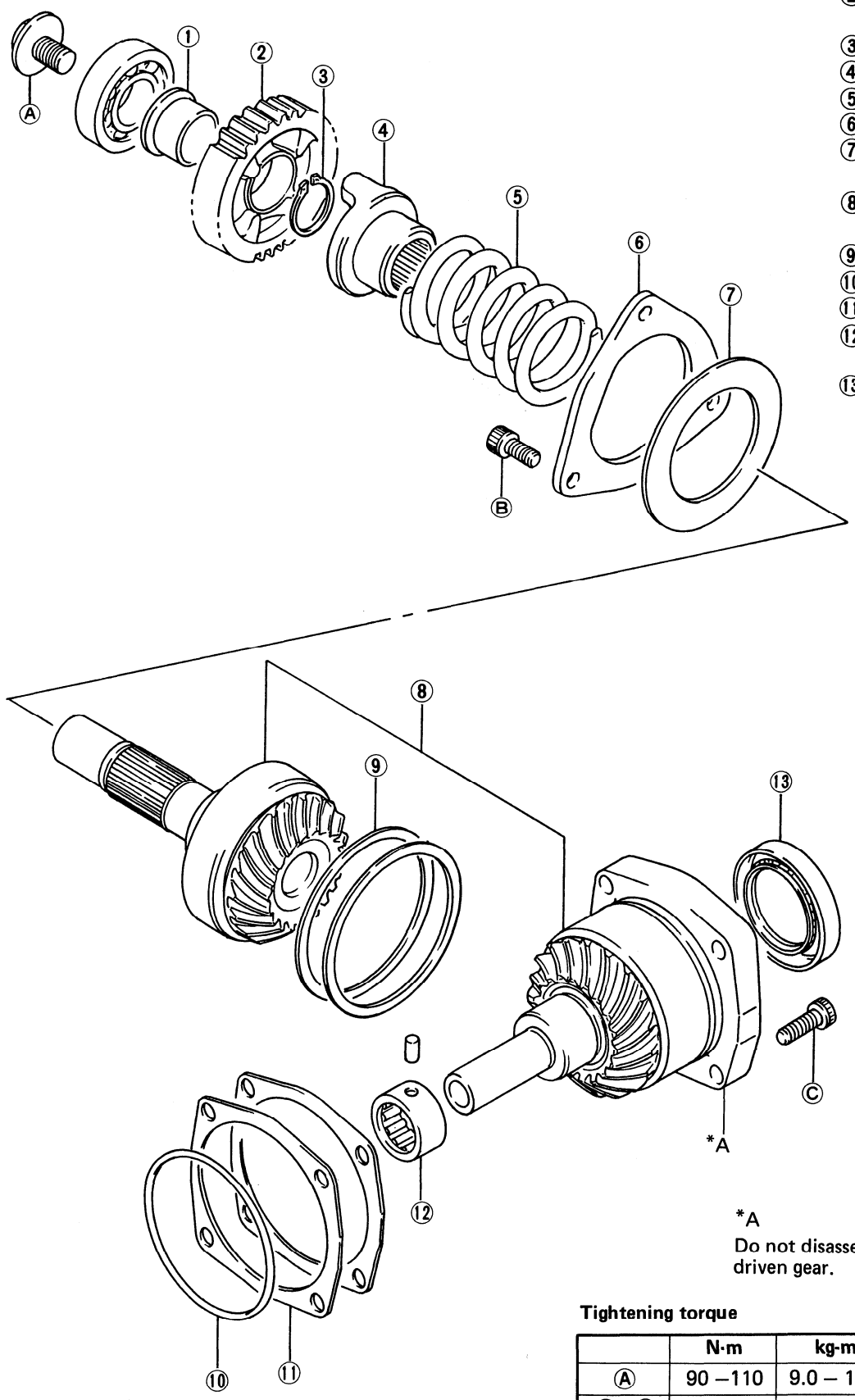
4

CONTENTS

SHAFT DRIVE


Top (25/24) Second (31/17) Low (36/12)
Third (28/21)
Secondary dirve & driven gears (19/19)
Thread lock super 1303
Tightening torque: 55–65 N·m (5.5–6.5 kg-m / 40.0–47.0 lb-ft)
Left hand tread
Over driving gear (29/34)
Tightening torque: 90–110 N·m (9.0–11.0 kg-m / 65.0–79.5 lb-ft)
Thread lock super 1303
Tightening torque: 20–25 N·m (2.0–2.5 kg-m / 14.5–18.0 lb-ft)
Thread lock super 1303
Oil guide plate
SUZUKI Super grease A
Tightening torque: 90–120 N·m (9.0–12.0 kg-m / 65.0–87.0 lb-ft)
Tightening torque: 20–25 N·m (2.0–2.5 kg-m / 14.5–18.0 lb-ft)
Thread lock super 1303
SUZUKI super grease A
Tightening torque: 90–100 N·m (9.0–10.0 kg-m / 65.0–72.5 lb-ft)
Thread lock super 1303
Tightening torque: 8–12 N·m (0.8–1.2 kg-m / 6.0–8.5 lb-ft)
Thread lock super 1303
Tightening torque: 90–130 N·m (9.0–13.0 kg-m / 65.0–94.0 lb-ft)
Tightening torque 10 mm bolt: 40–60 N·m (4.0–6.0 kg-m / 29.0–43.5 lb-ft)
8 mm bolt: 20–26 N·m (2.0–2.6 kg-m / 14.5–19.0 lb-ft)
Thread lock super 1333
Bond No.4/1215/1207B
Hypoid gear oil GL-5, SAE90
200–220 ml (6.8–7.4/7.0–7.7 US/Imp oz)
SUZUKI Super grease A
Circlip
Tightening torque: 90–110 N·m (9.0–11.0 kg-m / 65.0–79.5 lb-ft)
Thread lock super 1333
Tightening torque: 8–10 N·m (0.8–1.0 kg-m / 6.0–7.0 lb-ft)
Thread lock super 1333
Circlip
Thread lock super 1333
Tightening torque: 35–45 N·m (3.5–4.5 kg-m / 25.5–32.5 lb-ft)
Stopper plate (Two kinds)
Part number
27313-38B00
27313-38B10
Thread lock super 1333

SECONDARY BEVEL GEARS CONSTRUCTION



① Bush
② Overdriving driven gear
③ Circlip
④ Output cam dog
⑤ Damper spring
⑥ Stopper plate
⑦ Oil level guide plate
⑧ Secondary gear set
⑨ Shims (7 kinds)
⑩ O-ring
⑪ Shims (5 kinds)
⑫ Driven bevel gear bearing
⑬ Oil seal

*A
Do not disassemble the secondary driven gear.

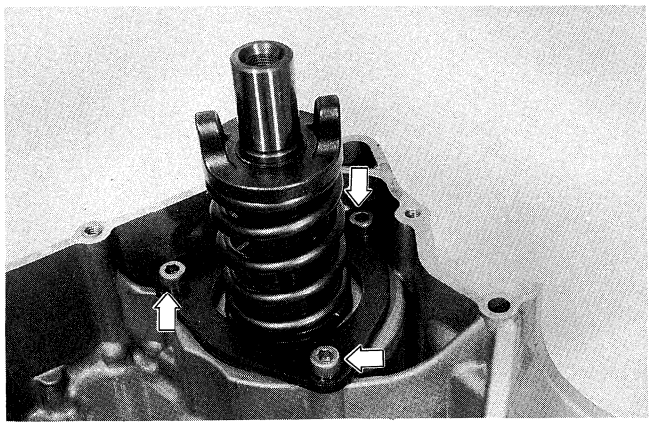
Tightening torque

	N·m	kg-m	lb-ft
Ⓐ	90 – 110	9.0 – 11.0	65.0 – 79.5
Ⓑ, Ⓒ	20 – 25	2.0 – 2.5	14.5 – 18.0

REMOVAL AND DISASSEMBLY

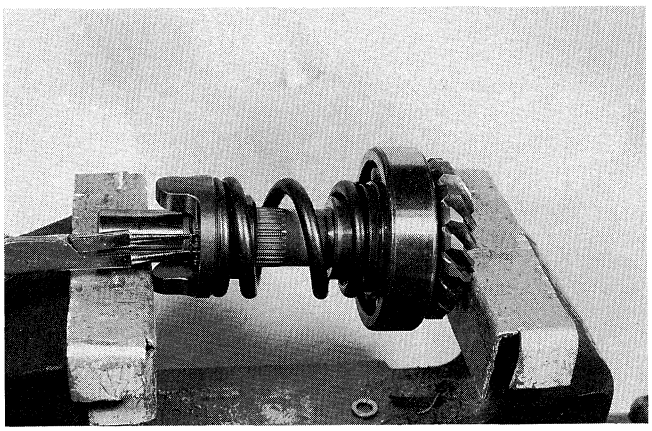
SECONDARY DRIVE BEVEL GEAR

- Remove the engine. (Refer to page 3-3.)
- Disassemble the engine and separate the left and right crankcases. (Refer to page 3-22.)
- Remove the secondary drive bevel gear assembly from the left crankcase.

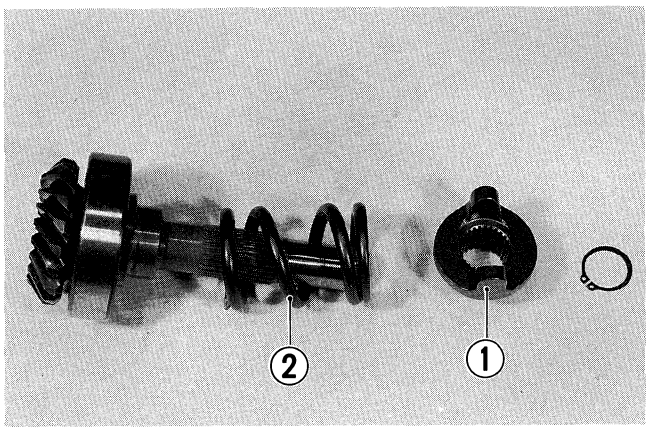


- Compress the damper spring with a vice, and remove the circlip using the special tool.

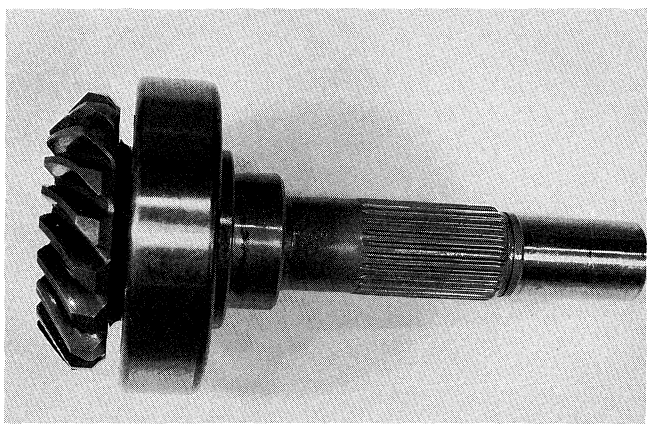
09900-06107	Snapring pliers



- Remove the cam dog ① and damper spring ② .



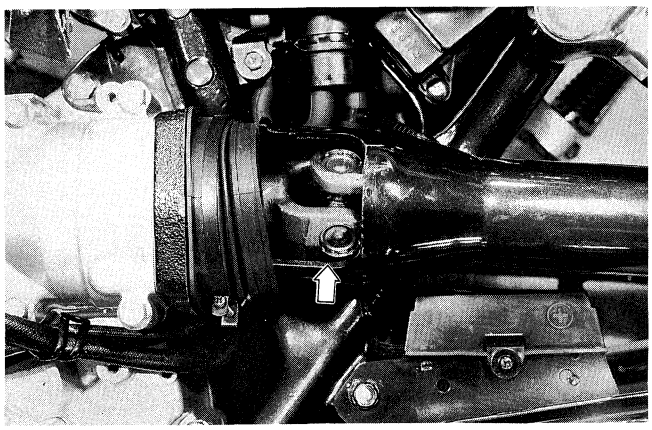
- Remove the spring seat and bearing from the drive bevel gear with a hydraulic press.



SECONDARY DRIVEN BEVEL GEAR

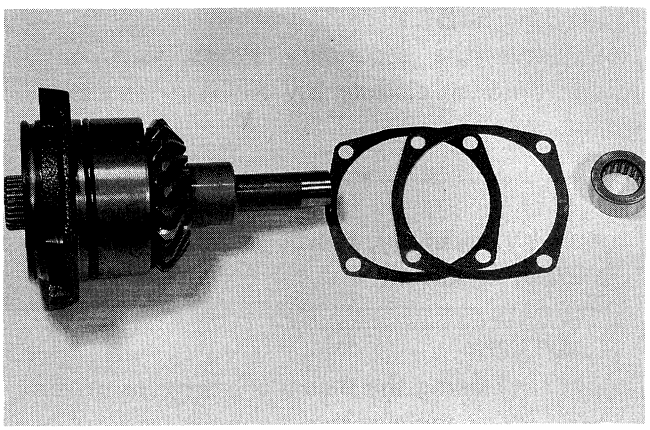
The secondary driven bevel gear is removable with the engine in place.

- Remove the dust boot and cover.



- Remove the secondary gear case cover and the secondary driven bevel gear bearing housing.
- Remove the secondary driven bevel gear and universal joint. (Refer to page 3-19.)

- Remove the bearing and shim from the secondary driven gear.



INSPECTION

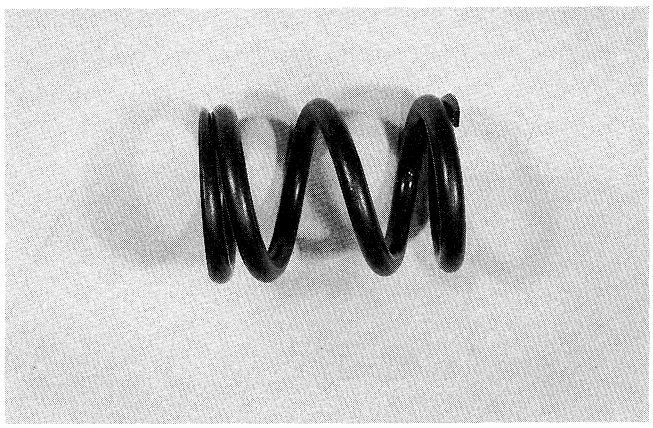
Inspect the removed parts for the following abnormalities.

* Drive and driven bevel gears damage or wear
* Improper tooth contact
* Abnormal noise of bearings
* Bearing damage or wear
* Oil seal damage or wear
* Output cam dog wear or damage

DAMPER SPRING

Measure the free length of the damper spring. If the length is shorter than the service limit, replace the spring with a new one.

Service Limit	88.5 mm (3.48 in)



REASSEMBLY

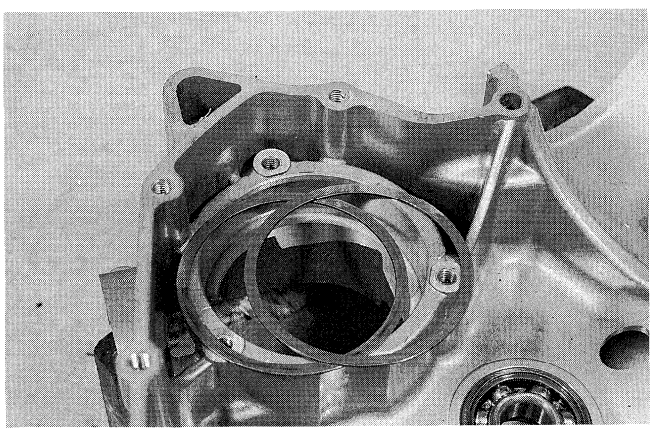
Reassemble the secondary bevel gears in the reverse order of disassembly and also carry out the following steps:

NOTE:
Before reassembly, thoroughly clean all parts in cleaning solvent.

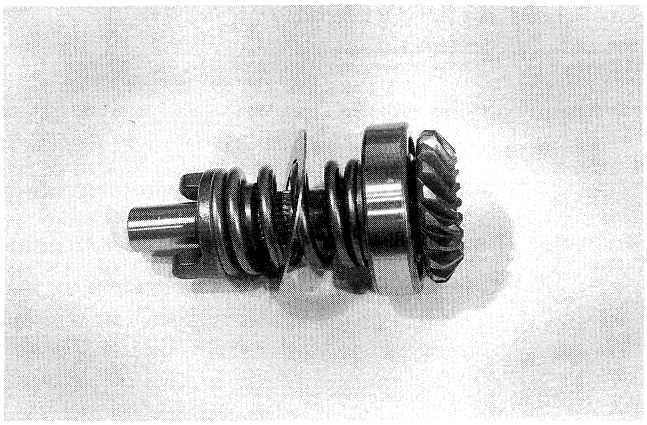
CAUTION:
When replacing the secondary drive or driven bevel gear, replace the secondary driven or drive bevel gear also, as they must be replaced together.

SECONDARY DRIVE BEVEL GEAR

- Adjust the backlash and tooth contact. (Refer to page 4-8.)
- Install the proper size of shims to the left crankcase.

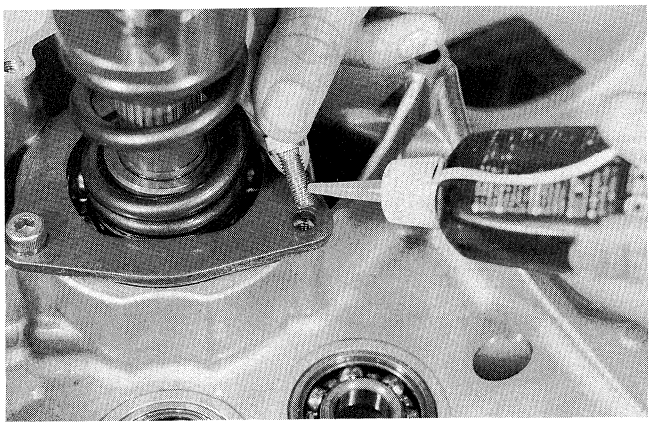


- Install the secondary drive bevel gear and washer.



- Apply thread lock "1303" to the bearing retainer bolts.

99000-32030	Thread lock super "1303"



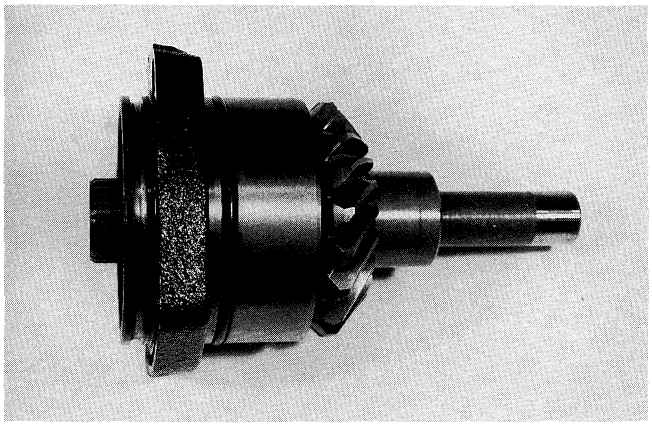
- Tighten the bolts to the specified torque.

Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m 14.5 – 18.0 lb-ft)

- Refer to page 3-60.

SECONDARY DRIVEN BEVEL GEAR

NOTE:
Apply engine oil to the bearing before inspecting.

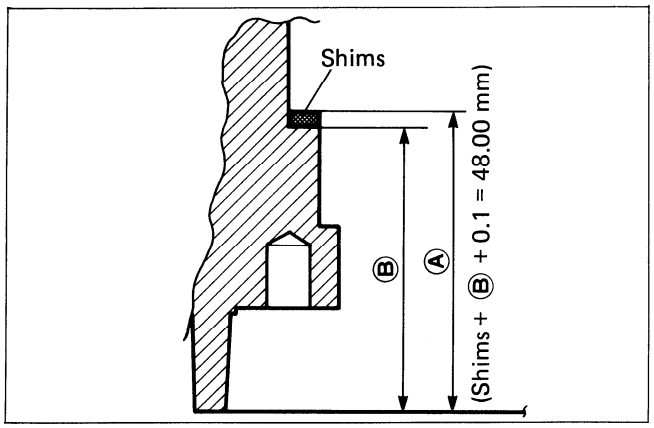


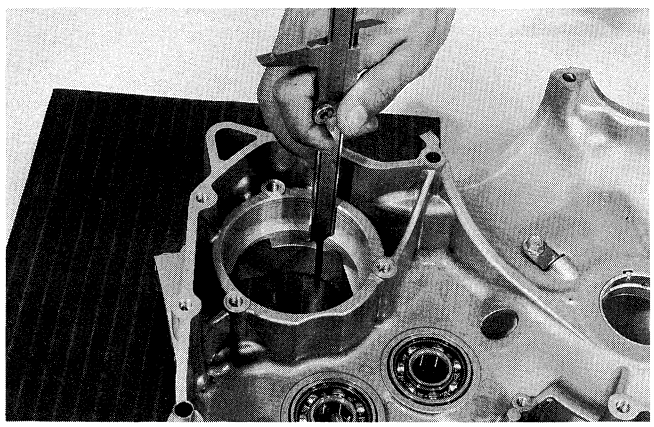
- Install the secondary driven bevel gear housing to the left crankcase. (Refer to page 3-67.)

SECONDARY GEARS SHIM ADJUSTMENT

BACKLASH

- When replacing the crankcases with new ones, measure the height Ⓑ with a surface plate and a vernier calipers. As the height Ⓐ is designed with 48.00 mm, calicurate the difference Ⓒ between Ⓐ − Ⓑ.





- Select the two pieces of shims that the total thickness equals Ⓒ.
- Install the shims to the secondary drive bevel gear assembly and tighten the bolts to the specified torque.

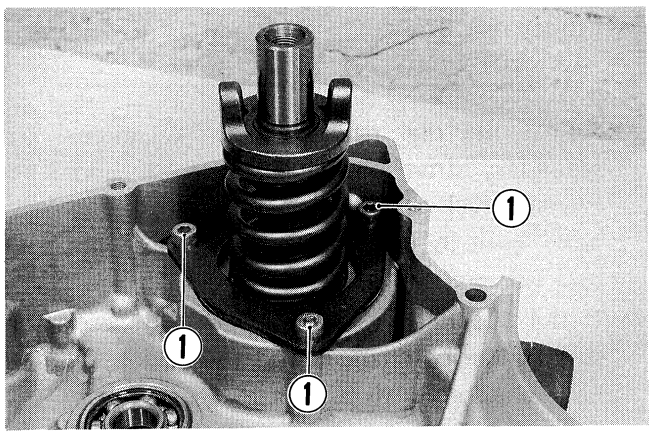
Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m 14.5 – 18.0 lb-ft)

List of shims

Part No.	Thickness
24935-38B00-110	1.10 mm
24935-38B00-115	1.15 mm
24935-38B00-120	1.20 mm
24935-38B00-125	1.25 mm
24935-38B00-130	1.30 mm
24935-38B00-135	1.35 mm
24935-38B00-140	1.40 mm

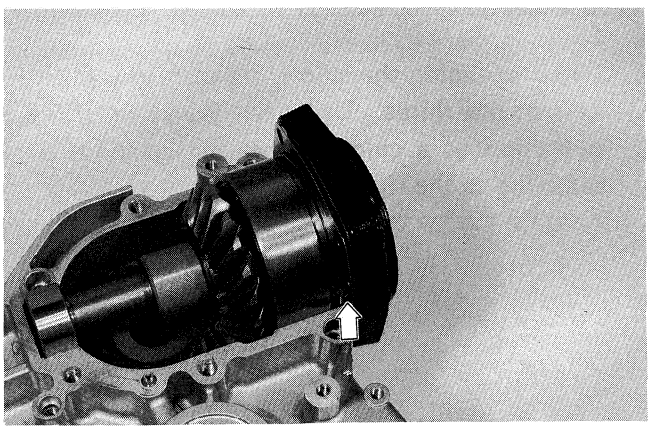
- When replacing the secondary drive and driven gears, install the secondary drive bevel gear assembly with removed shims, and tighten the three bolts ① to the specification.

Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m 14.5 – 18.0 lb-ft)



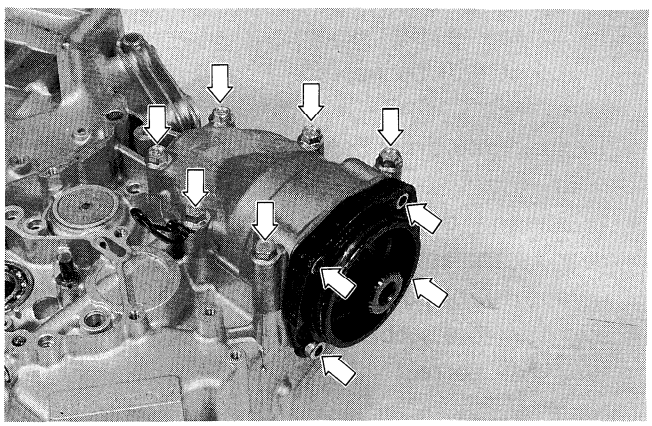
- Install the secondary driven bevel gear assembly with removed shims and secondary gear case.

NOTE:
Do not install the O-ring on the driven gear housing at this point. O-ring is installed after backlash and tooth contact are correct.



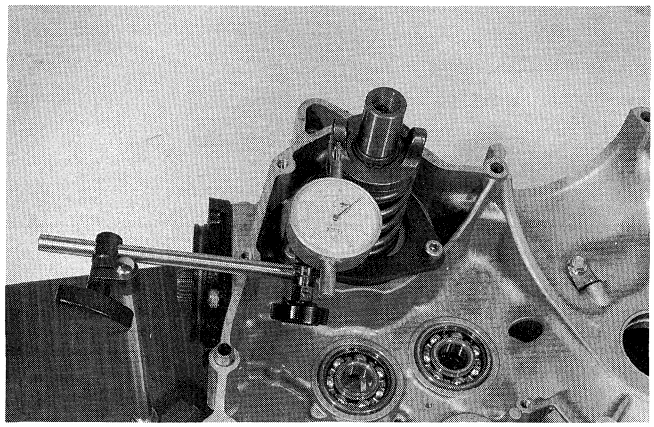
- Tighten the secondary case bolts and secondary driven bevel gear bearing housing bolts.

Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m 14.5 – 18.0 lb-ft)



- Set-up a dial gauge as shown in photo for measuring the backlash.

NOTE:
When measuring backlash, hold the left crankcase horizontally pull the secondary drive gear to take the bearing play out.



Secondary gear backlash	0.03 – 0.15 mm

- Adjust the dial gauge so that it touches the secondary drive bevel gear cam dog; hold the driven bevel gear securely, and turn the drive bevel gear in each direction, reading the total backlash on the dial gauge.
- If the backlash is not within specification, the shims must be changed and the backlash should be re-checked until correct.
  Refer to the right chart for appropriate changes.

Backlash	Shim adjustment
Under 0.03 mm	Increase shim thickness
0.03 – 0.15 mm	Correct
Over 0.15 mm	Decrease shim thickness

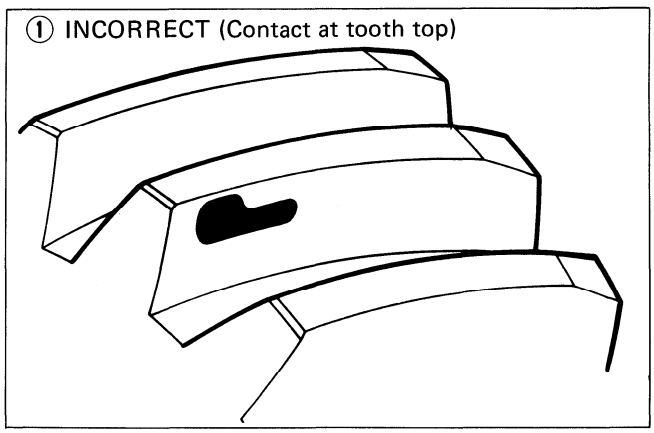
NOTE:
When changing the shims, measure the thickness of old shims. Using the thickness of the old shims as a guide, adjust the backlash by referring to the right chart.

List of shims Ⓐ (Refer to page 4-11.)

Part No.	Shim thickness
24945 - 38B00 - 030	0.30 mm
24945 - 38B00 - 035	0.35 mm
24945 - 38B00 - 040	0.40 mm
24945 - 38B00 - 050	0.50 mm
24945 - 38B00 - 060	0.60 mm

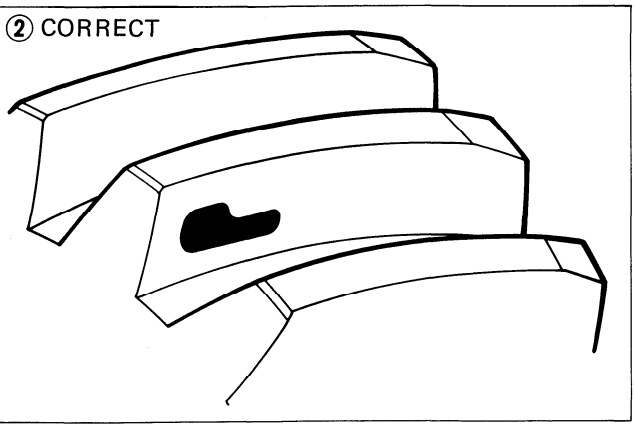
TOOTH CONTACT

- After bringing the backlash within specification by changing the secondary driven bevel gear shims, it will be necessary to check tooth contact.
- Remove the drive bevel gear assembly from the crankcase.
- Clean and degrease the secondary drive bevel gear teeth, and apply a coating of machinist's layout dye or paste to several teeth.
- Reinstall the secondary drive bevel gear assembly, with correct shim, onto the secondary gear housing.



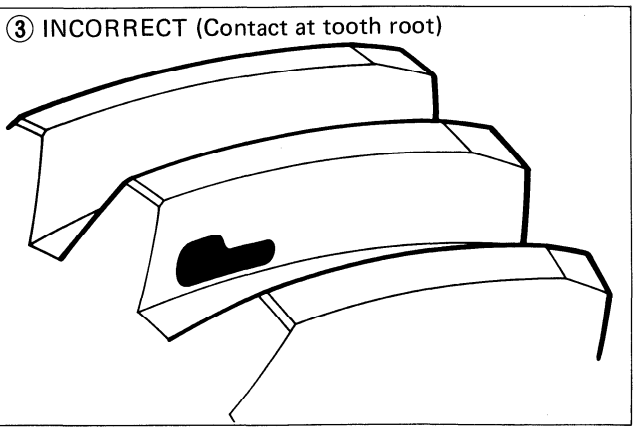
- Rotate the secondary driven bevel gear several turns in both directions.
- Remove the secondary drive bevel gear from the crankcase, and observe the tooth contact pattern made in the dye or paste.
- Compare the tooth contact pattern to the examples as shown in ①, ② and ③.
- If tooth contact is found to be correct, go the Final Assembly. (Refer to page 3-60.)

② CORRECT



- If tooth contact is found to be incorrect, the shims of the secondary drive bevel gear and secondary driven bevel gear must be changed, tooth contact should be re-checked until correct.

③ INCORRECT (Contact at tooth root)



CAUTION:
After the tooth contact adjustment is made, the backlash must be re-checked, as it may change. Refer to the backlash checking sub-section, and readjust until both backlash and tooth contact are correct.

Tooth contact	Shim adjustment
Contact at tooth top ①	Decrease thickness of shims Ⓐ or Ⓑ
Contact at tooth root ③	Increase thickness of shims Ⓐ or Ⓑ

List of shim Ⓐ

Par No.	Shim thickness
24945 - 38B00 - 030	0.30 mm
24945 - 38B00 - 035	0.35 mm
24945 - 38B00 - 040	0.40 mm
24945 - 38B00 - 050	0.50 mm
24945 - 38B00 - 060	0.60 mm

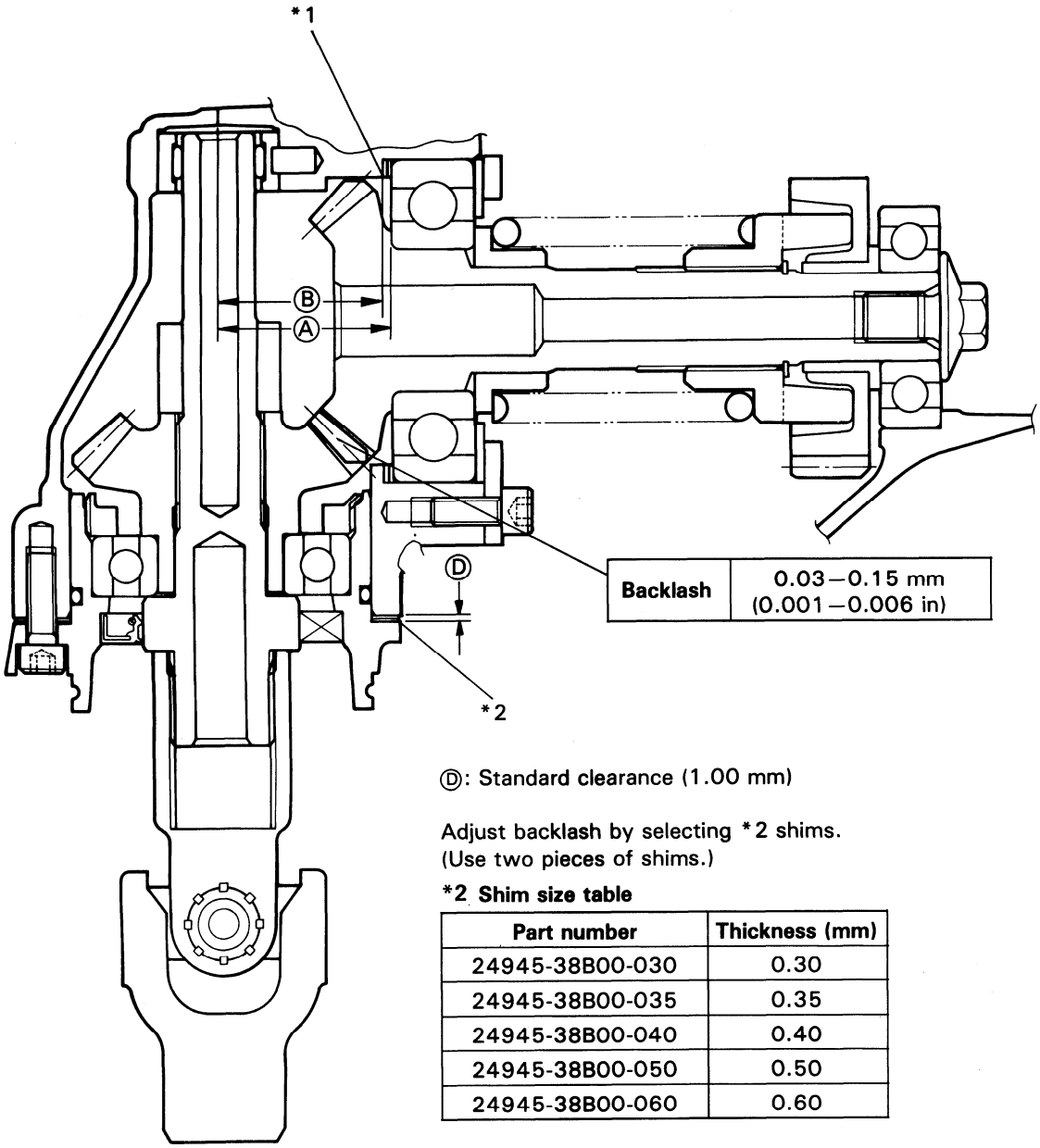
List of shims Ⓑ

Part No.	Shim thickness
24935 - 38B00 - 110	1.10 mm
24935 - 38B00 - 115	1.15 mm
24935 - 38B00 - 120	1.20 mm
24935 - 38B00 - 125	1.25 mm
24935 - 38B00 - 130	1.30 mm
24935 - 38B00 - 135	1.35 mm
24935 - 38B00 - 140	1.40 mm

FINAL ASSEMBLY AND REMOUNTING

- After installing the drive and driven bevel gear to the crankcase, make sure that both gears turn smoothly without any hitch or bearing noise.
- Refer to page 3-60 and 3-68.

REASSEMBLY INFORMATION



Backlash	0.03–0.15 mm (0.001–0.006 in)

Ⓓ: Standard clearance (1.00 mm)

Adjust backlash by selecting *2 shims.
(Use two pieces of shims.)

***2 Shim size table**

Part number	Thickness (mm)
24945-38B00-030	0.30
24945-38B00-035	0.35
24945-38B00-040	0.40
24945-38B00-050	0.50
24945-38B00-060	0.60

Ⓐ – Ⓑ – 0.1 = Ⓒ

Ⓐ : 48 mm
Ⓑ : Measured distance
Ⓒ : Correct shim thickness
(Use two pieces of shims.)

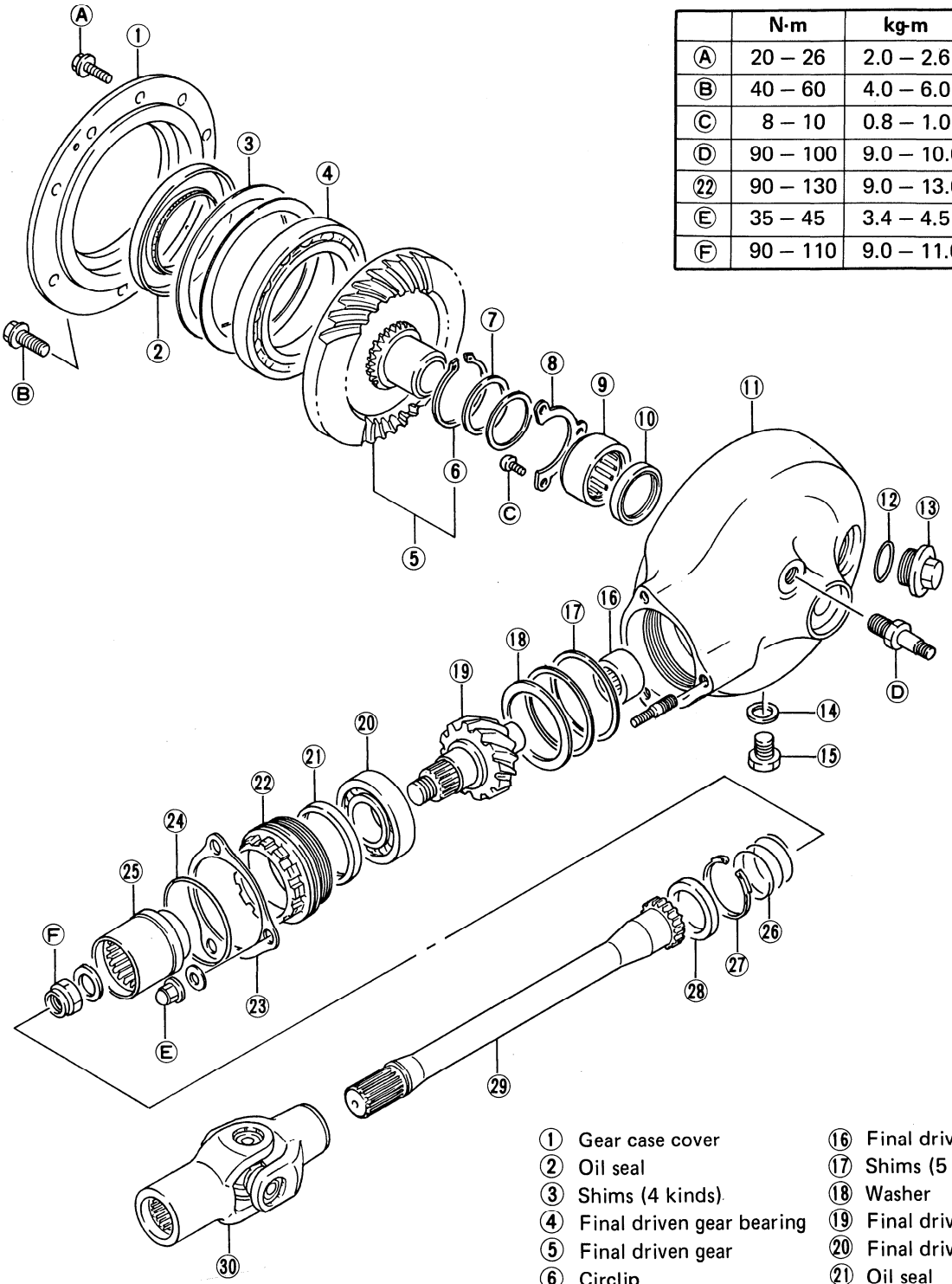
***1 Shim size table**

Part number	Thickness (mm)
24935-38B00-110	1.10
24935-38B00-115	1.15
24935-38B00-120	1.20
24935-38B00-125	1.25
24935-38B00-130	1.30
24935-38B00-135	1.35
27935-38B00-140	1.40

FINAL BEVEL GEARS CONSTRUCTION

Tightening torque

	N·m	kg-m	lb-ft
Ⓐ	20 – 26	2.0 – 2.6	14.5 – 19.0
Ⓑ	40 – 60	4.0 – 6.0	29.0 – 43.5
Ⓒ	8 – 10	0.8 – 1.0	6.0 – 7.0
Ⓓ	90 – 100	9.0 – 10.0	65.0 – 72.5
㉒	90 – 130	9.0 – 13.0	65.0 – 94.0
Ⓔ	35 – 45	3.4 – 4.5	25.5 – 32.5
Ⓕ	90 – 110	9.0 – 11.0	65.0 – 79.5



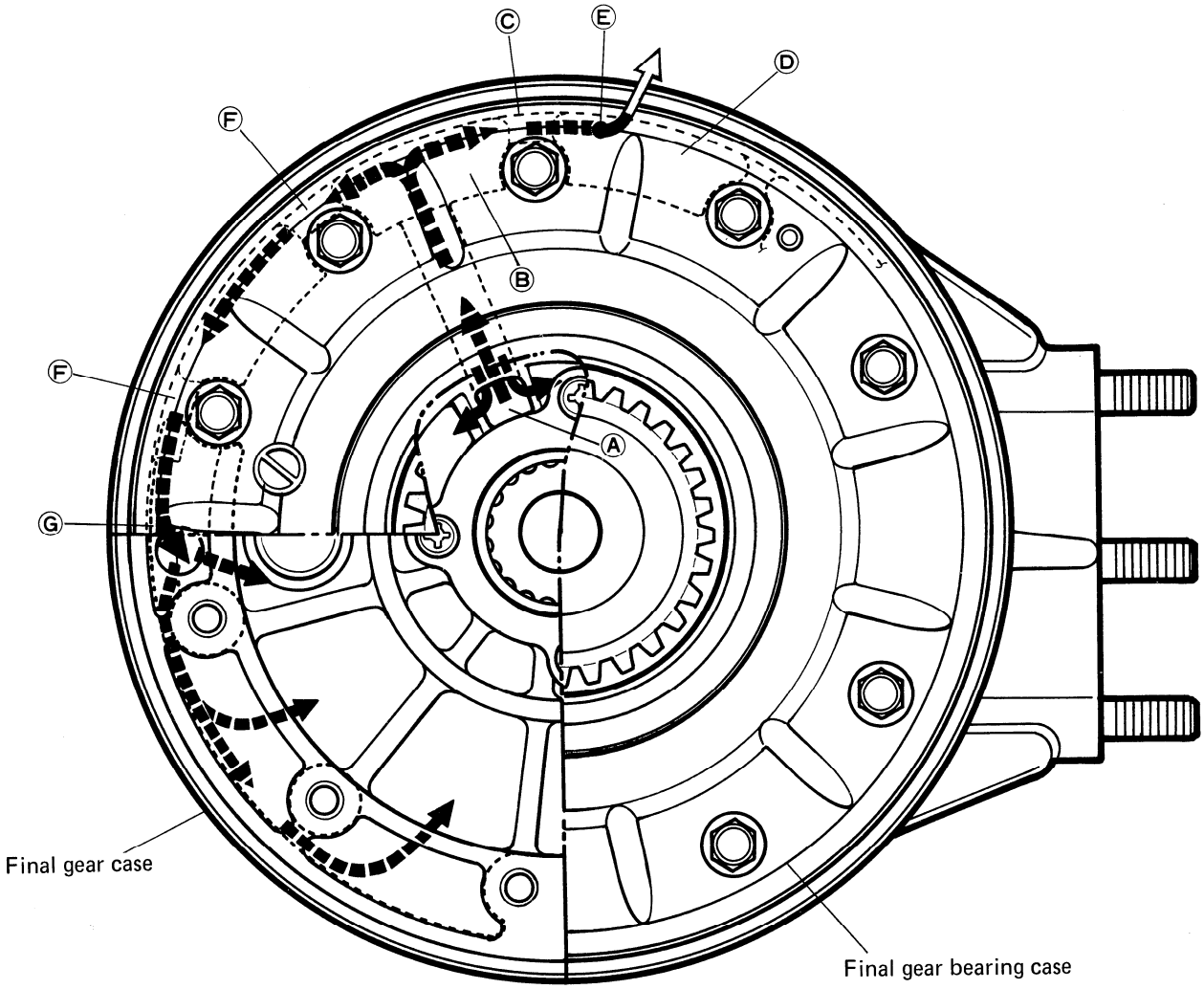
① Gear case cover
② Oil seal
③ Shims (4 kinds)
④ Final driven gear bearing
⑤ Final driven gear
⑥ Circlip
⑦ Shims (9 kinds)
⑧ Bearing stopper plate
⑨ Final driven gear bearing
⑩ Oil seal
⑪ Final gear case
⑫ O-ring
⑬ Oil filler plug
⑭ Gasket
⑮ Oil drain plug
⑯ Final drive gear bearing
⑰ Shims (5 kinds)
⑱ Washer
⑲ Final drive gear
⑳ Final drive gear bearing
㉑ Oil seal
㉒ Bearing stopper
㉓ Locking plate (2 kinds)
㉔ O-ring
㉕ Final drive coupling
㉖ Spring
㉗ Circlip
㉘ Oil seal
㉙ Propeller shaft
㉚ Unieversal joint

FINAL GEAR CASE BREATHER CIRCUIT

AIR AND GEAR OIL FLOW IN FINAL GEAR CASE BREATHER CIRCUIT

BREATHER CIRCUIT

The final gear case breather circuit (passage) consists of the final gear case and fianl gear bearing case. Air/oil mixed gas, flows through the following routes.



AIR PASSAGE

When the air pressure in the final gear case becomes higher than atmospheric pressure, both air and oil flow in the following passages.

- Air flows from hole Ⓐ to chamber Ⓑ and passes through the hole Ⓒ and chamber Ⓓ to the atmosphere through the breather hole Ⓔ.

OIL PASSAGE

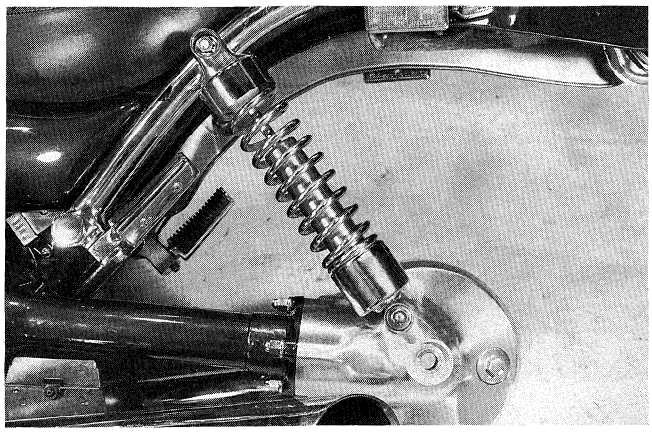
When the final gear case pressure rises abruptly or when the gear case oil level changes during cornering, the gear oil may sometime flow out into the air passage.

- In this case, the gear oil which has traveled into hole Ⓐ goes into chamber Ⓑ, where the oil is separated from the air.
- The air flows through hole Ⓒ and chamber Ⓓ, and goes out through the breather hole Ⓔ.
- The gear oil, however, flows through the passage Ⓕ and returns to the gear case from gear oil return port Ⓖ.

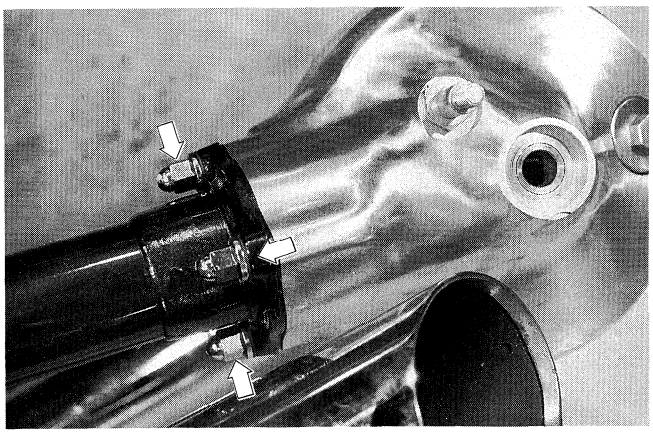
REMOVAL AND DISASSEMBLY

FINAL GEAR CASE

- Remove the rear wheel. (Refer to page 7-33.)
- Remove the rear shock absorbers.
- Place an oil pan under the final gear case and remove the drain plug to drain out gear oil.



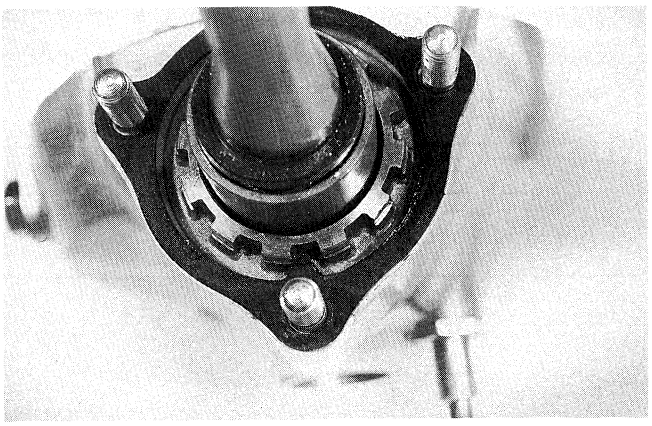
- Remove the final gear case from the swingarm.



PROPELLER SHAFT

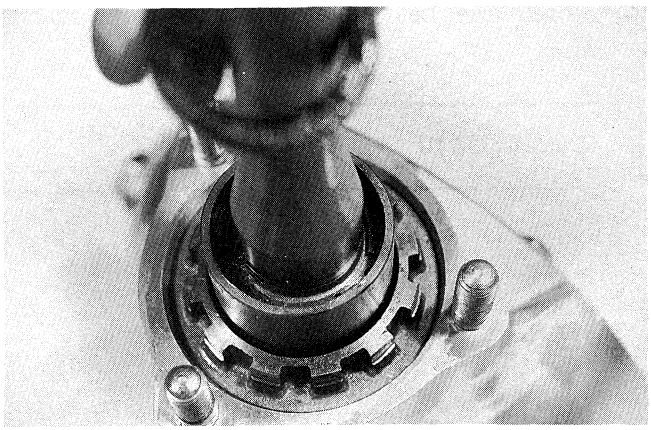
- Remove the oil seal.

CAUTION:
The removed oil seal should be replaced with a new one.

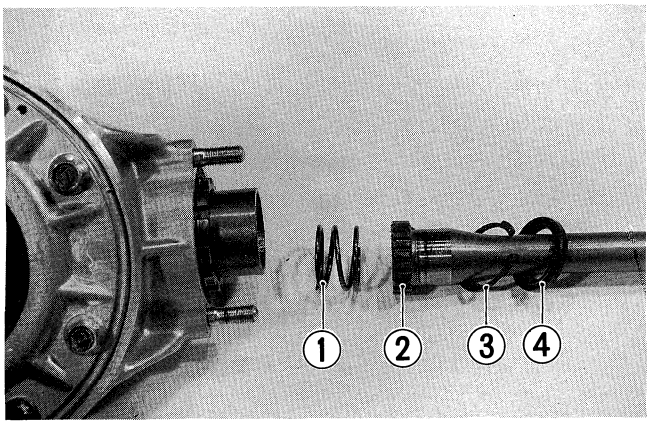


- Remove the circlip with the special tool and take off the propeller shaft and spring.

09900-06108	Snapring pliers

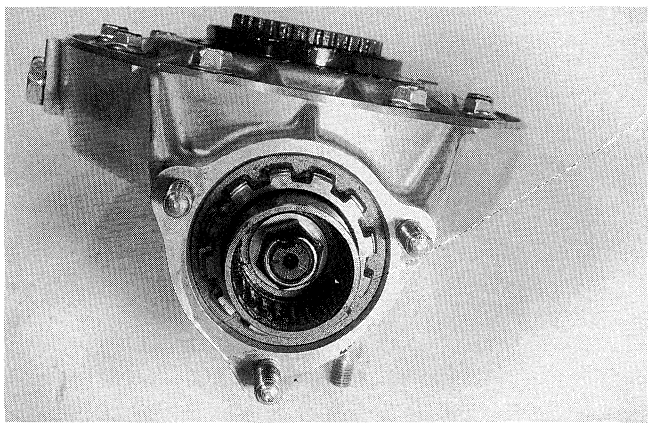


① Spring
② Propeller shaft
③ Circlip
④ Oil seal



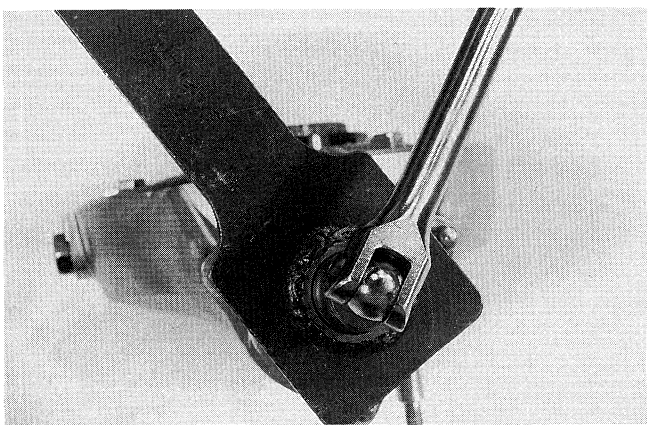
FINAL DRIVE BEVEL GEAR

- Using a chisel, unlock the nut.



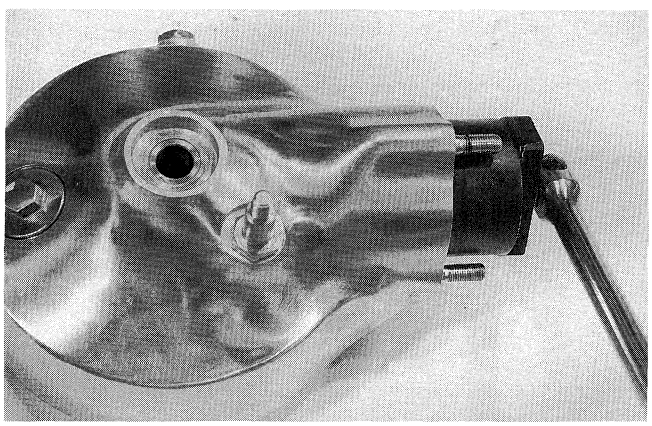
- Remove the drive bevel gear nut with the special tools and take off the coupling and bearing stopper.

09924-62420	22 mm long socket
09924-64510	Final drive gear coupling holder

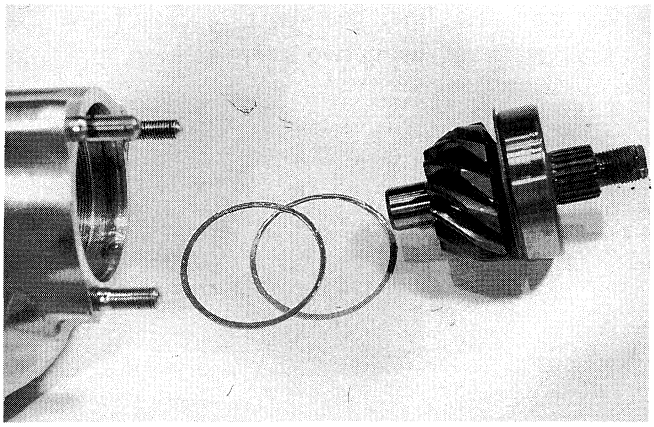


- Loosen the bearing stopper with the special tool.

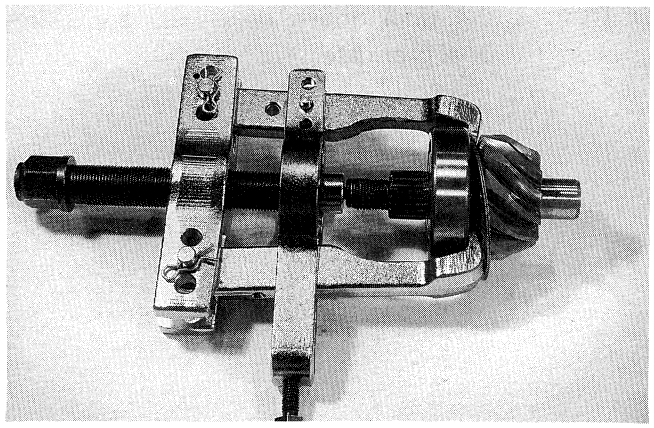
09924-62410	Final drive gear bearing holder wrench



- Remove the final drive gear and shims.

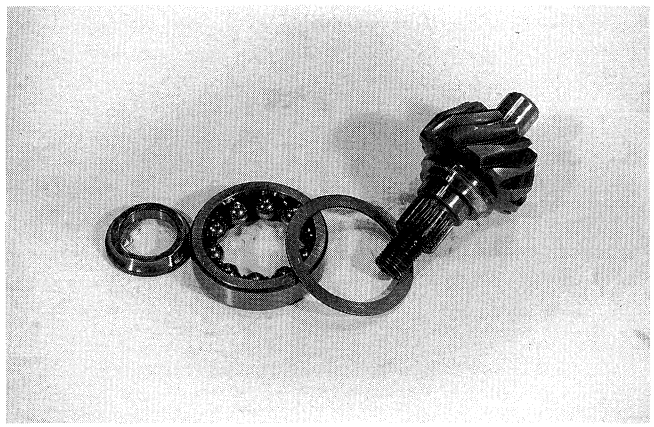


- Using a bearing puller, remove the bearing from the final drive bevel gear.



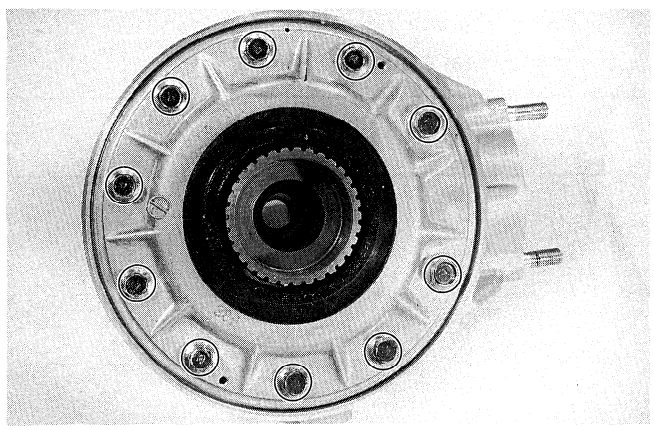
- Disassemble the final drive bevel gear, washer, bearing and inner race.

NOTE:
The removed bearing should be replaced with a new one.

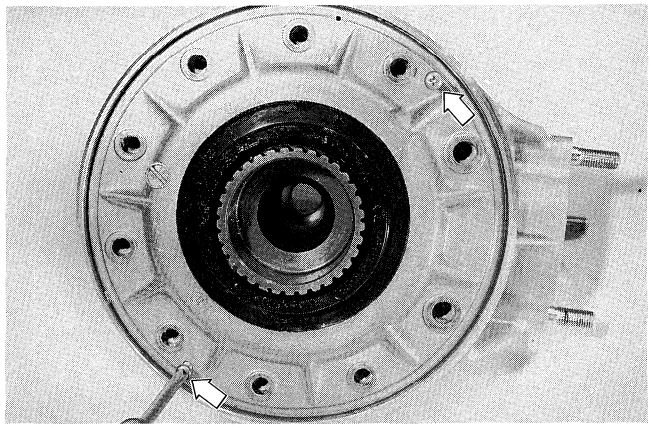


DRIVEN BEVEL GEAR

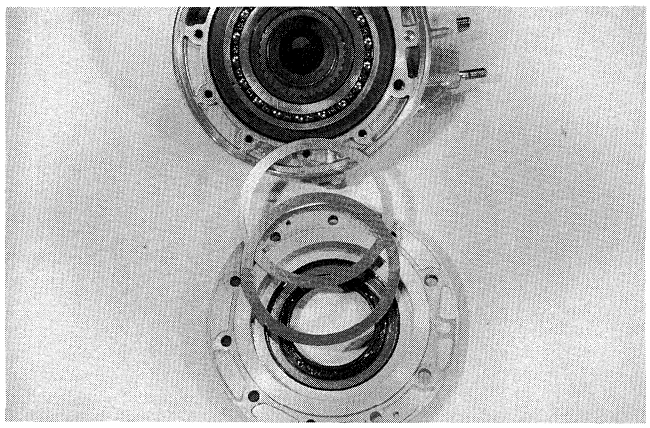
- Remove the final gear bearing case bolts.



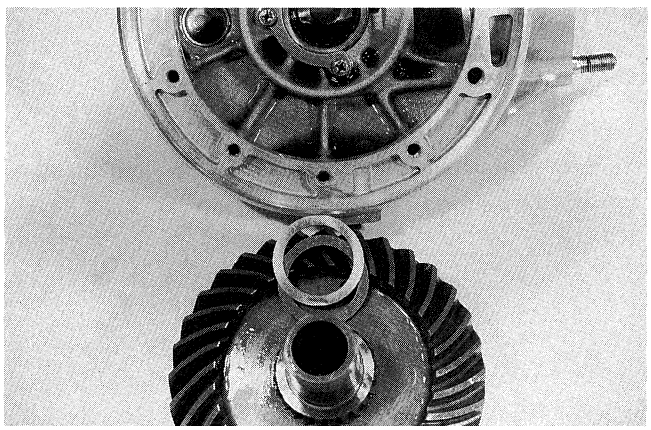
- Remove the final gear bearing case from the final gear case, using two 5 mm screws.



- Remove the final driven bevel gear and shims from the final gear case.

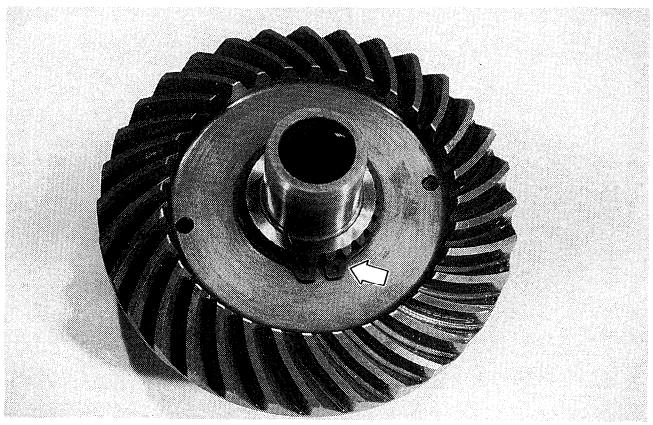


- Remove the final driven bevel gear shims from the bevel gear.

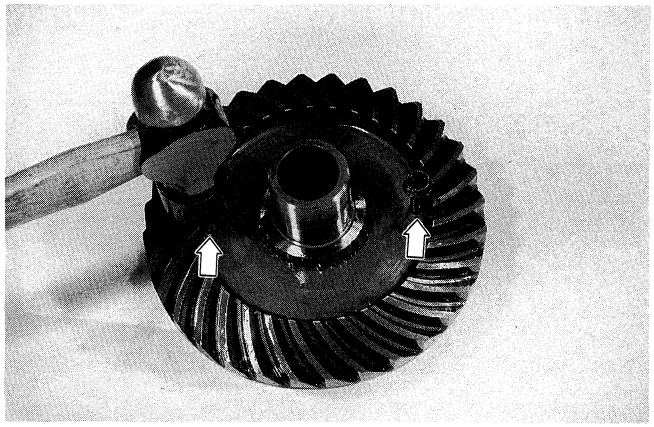


- Using the snapring pliers, remove the circlip from the final driven bevel gear shaft.

09900-06107	Snapring pliers

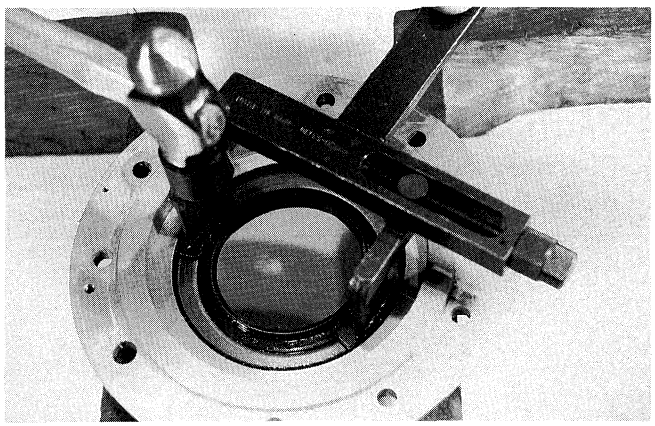


- Using two bolts or suitable drift, remove the final driven bevel gear bearing from the bevel gear.
- Using a hydraulic press, remove the gear from the coupling shaft.



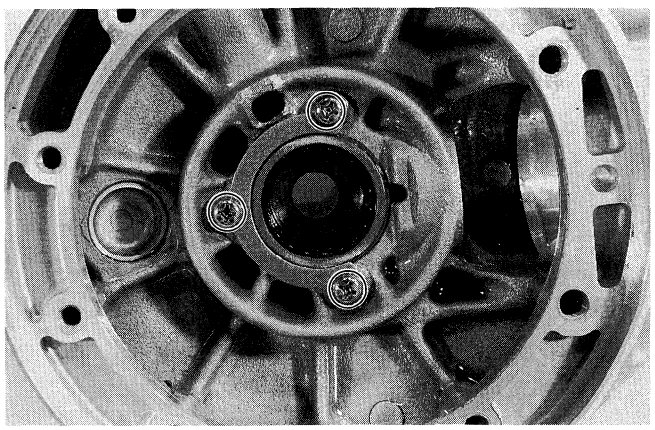
NOTE:
The removed bearing should be replaced with a new one.

- Remove the oil seal from the final gear case cover.



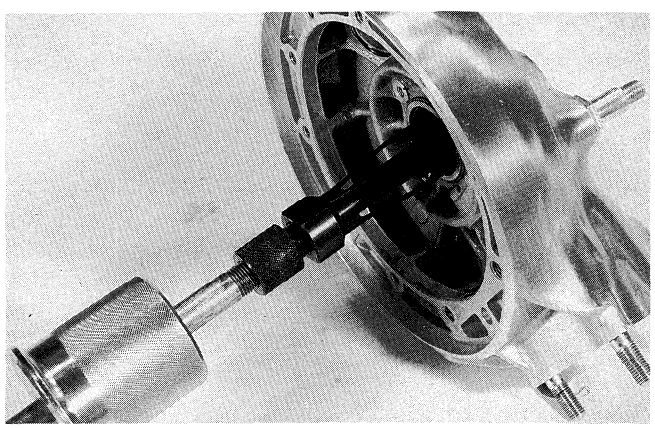
- Remove the bearing retainer screws, using an impact driver set.

09900-09003	Impact driver set



- Remove the final driven coupling shaft bearing, and oil seal, using the special tools.

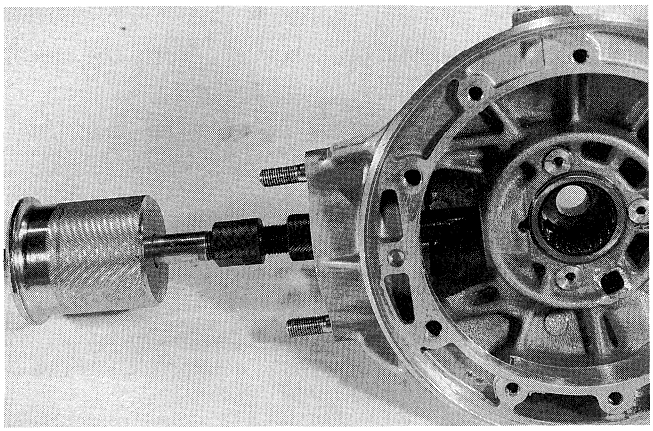
09941-64510	Bearing remover
09930-30102	Sliding shaft



NOTE:
The removed bearing and oil seal should be replaced with new ones.

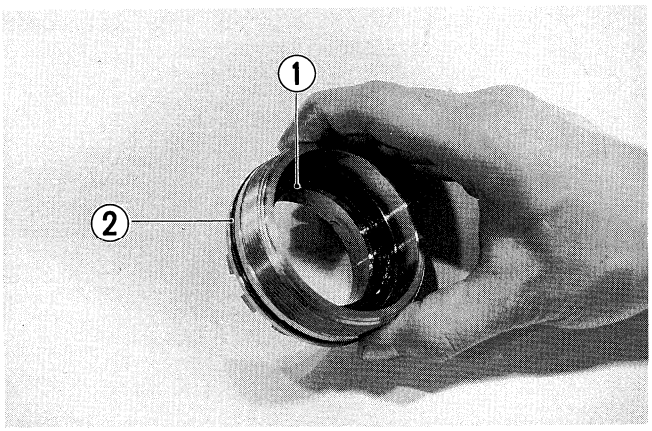
- Remove the final drive gear bearing, using the special tools.

09923-73210	Bearing remover
09930-30102	Sliding shaft



- Remove the oil seal ① and O-ring ② from the bearing stopper.

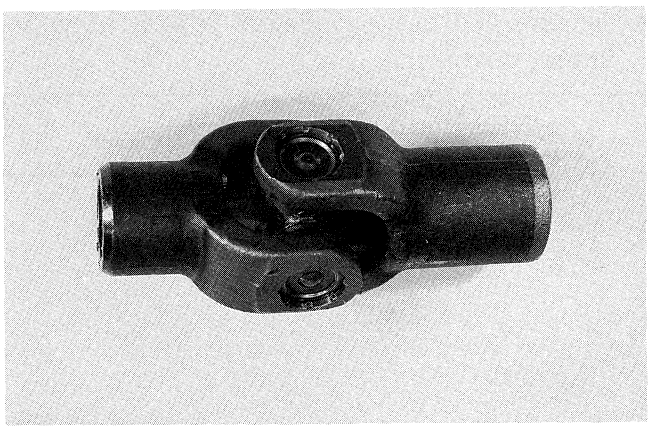
CAUTION:
The removed oil seal and O-ring should be replaced with new ones.



INSPECTION

Inspect the removed parts for the following abnormalities.

* Drive and driven bevel gear damage or wear
* Improper tooth contact
* Abnormal noise of bearings
* Bearing damage or wear
* Oil seal damage or wear
* Propeller shaft spline damage or wear
* Universal joint spline damage or wear



REASSEMBLY

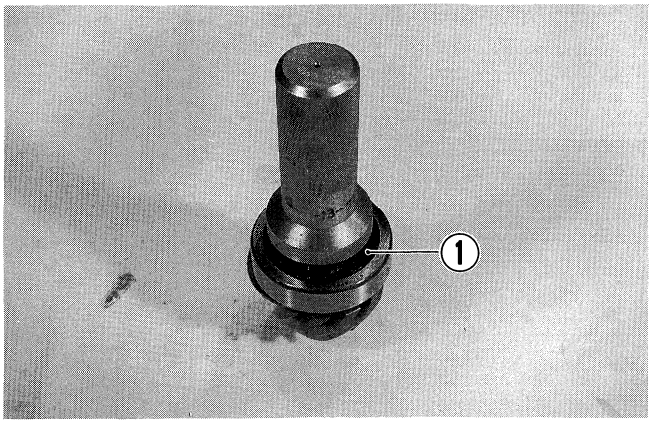
Reassemble the final bevel gears in the reverse order of disassembly, and also carry out the following steps:

NOTE:
Before reassembly, thoroughly clean all parts in cleaning solvent.

DRIVE BEVEL GEAR

- Install the bearing ① to the drive bevel gear, using the special tool or a suitable brift.

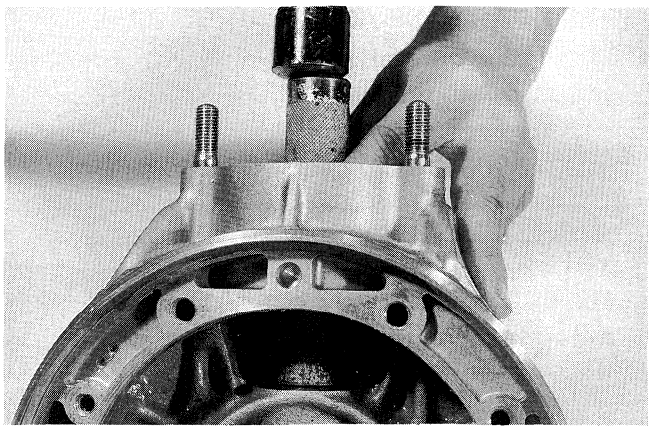
09913-76010	Bearing installer



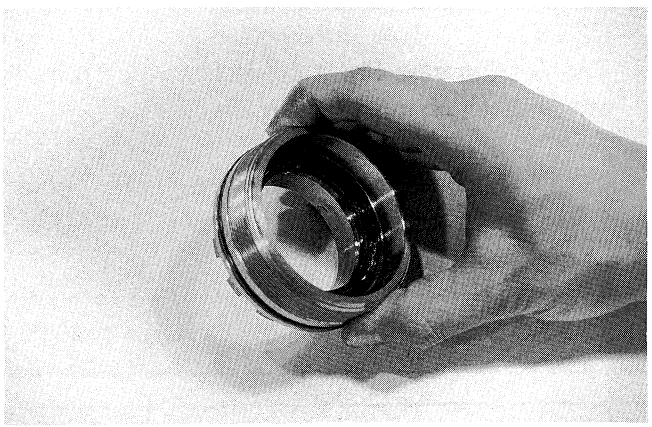
CAUTION:
When replacing the drive bevel gear, replace the driven bevel gear also, as they must be replaced together.

- Install the needle roller bearing for the final drive bevel gear into the final gear case with the special tool.

09913-75820	Bearing installer

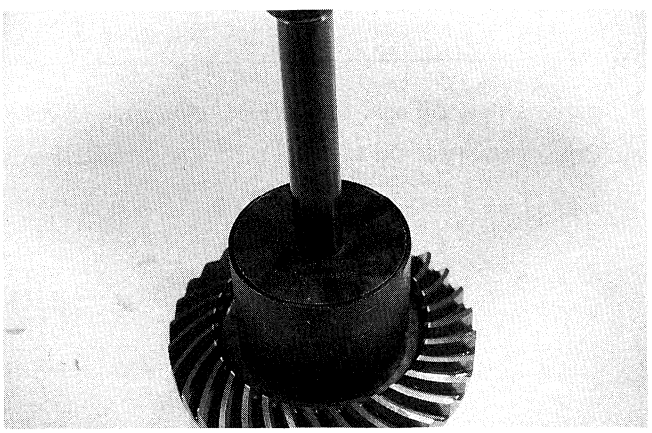


- Install a new O-ring and oil seal to the bearing stopper.



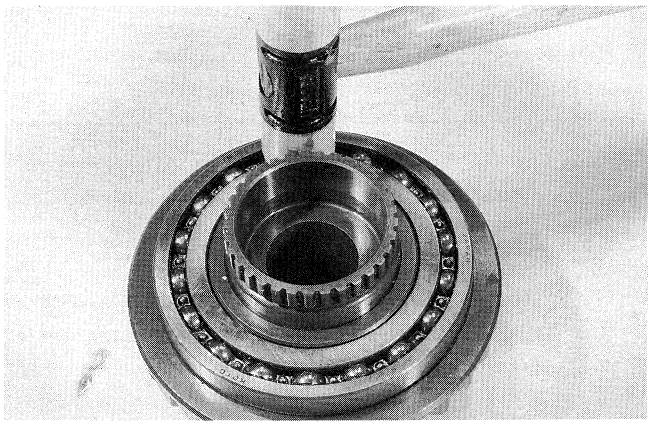
- Using the special tool, install the final driven gear to the coupling shaft.

09924-74570	Final driven gear bearing installer and remover



- Install a new circlip properly.

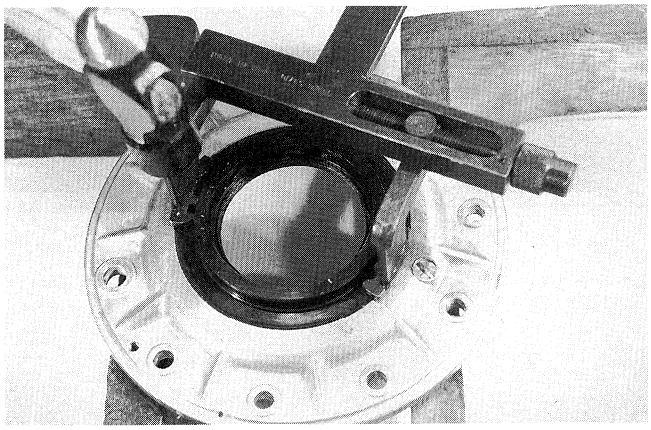
- Install the final driven bevel gear bearing to the bevel gear.



FINAL GEAR CASE AND BEARING CASE

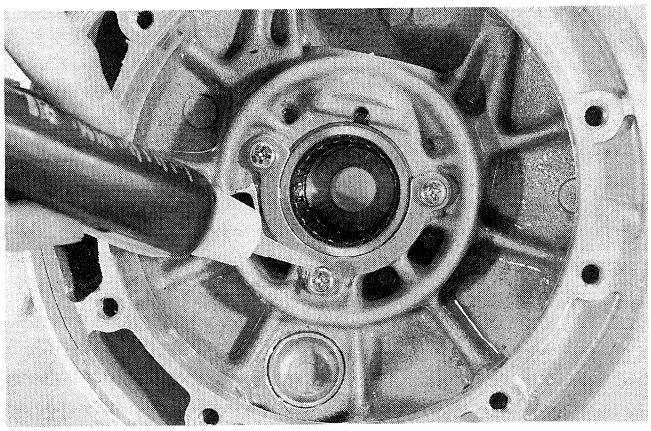
- Install the oil seal and bearing into the final gear case with the special tools.

09913-76010	Bearing installer



NOTE:
The oil seal is correctly installed when the lip and spring is on the driven bevel gear side.

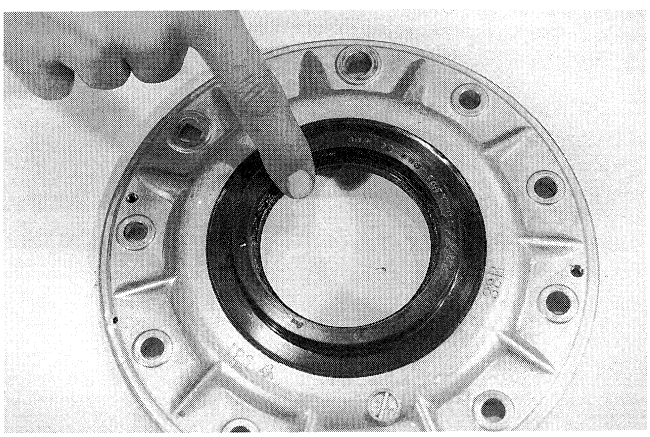
NOTE:
The bearing case has a stamped mark on its one end, which must face inside.



- Install the bearing retainer plate. Use Thread Lock Super "1303" on the screws, and tighten to the specification.

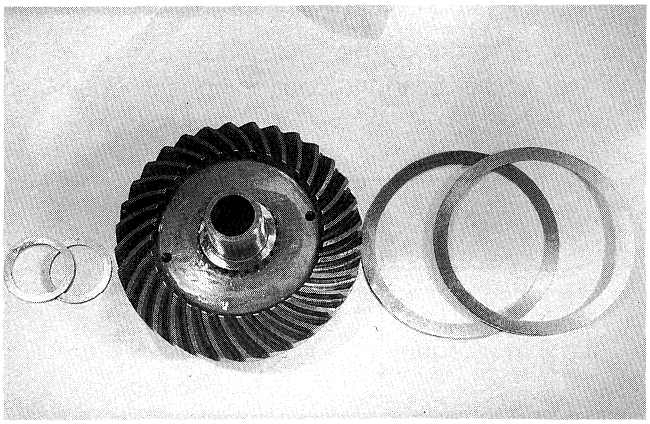
99000-32030	Thread lock super "1303"

Tightening torque	8 – 10 N·m (0.8 – 1.0 kg-m) (6.0 – 7.0 lb-ft)



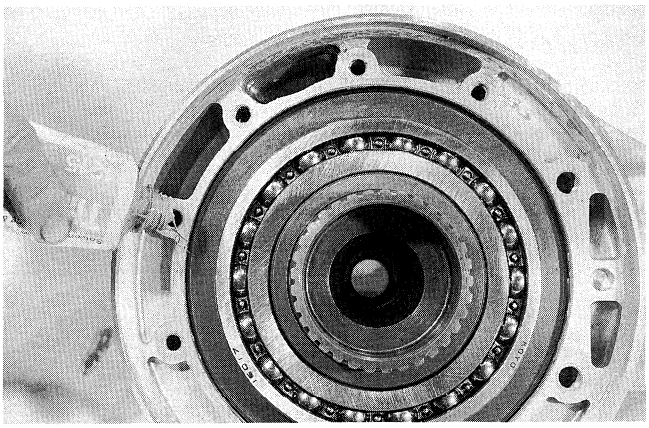
- Install a new oil seal to the final gear case cover.
- Apply final gear oil to the lip of the oil seal.

- Install correct shims to the both sides of the final driven bevel gear and install the gear to the final gear case. (Refer to page 4-24 for shim adjustment.)



- Apply SUZUKI Bond No. 1215 to the mating surface of the gear case and cover.

CAUTION:
Do not block the breather passage when applying SUZUKI Bond No. 1215.

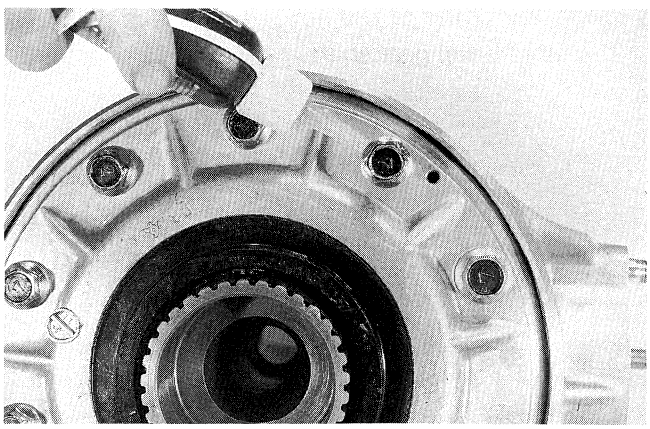


- Apply Thread lock super "1322" to the gear case bolts and tighten the bolts to the specified torque.

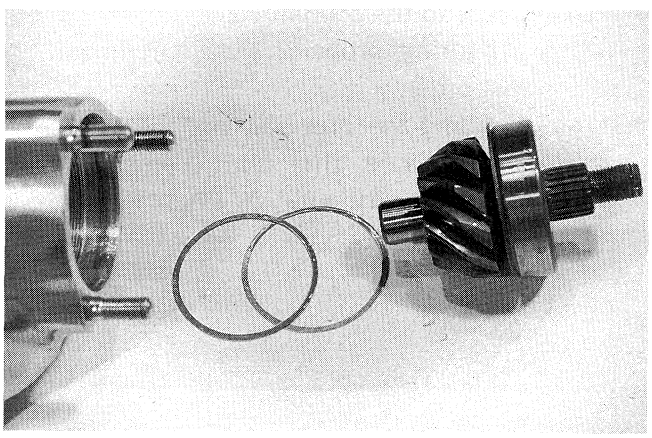
99000-32110	Thread lock super "1322"

Tightening torque

8-mm bolt	20 – 26 N·m (2.0 – 2.6 kg-m 14.5 – 19.0 lb-ft)
10-mm bolt	40 – 60 N·m (4.0 – 6.0 kg-m 29.0 – 43.5 lb-ft)



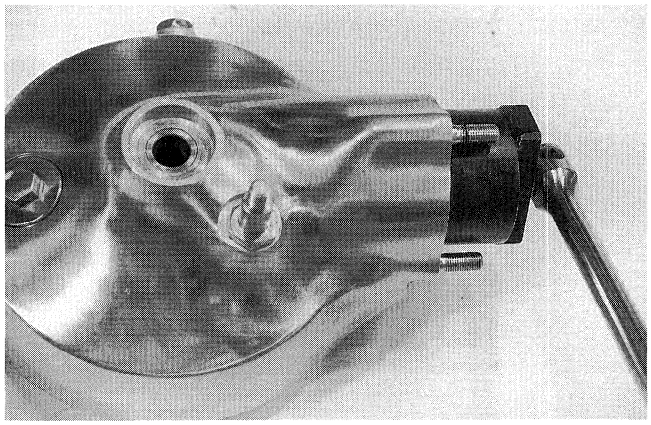
- Install the correct shims to the final drive bevel gear and install the bevel gear to the final gear case. (Refer to page 4-24 for shim adjustment.)



- Install a new O-ring to the bearing stopper and apply oil to the O-ring.
- Tighten the bearing stopper to the specified torque.

09924-62410	Final drive gear bearing holder wrench

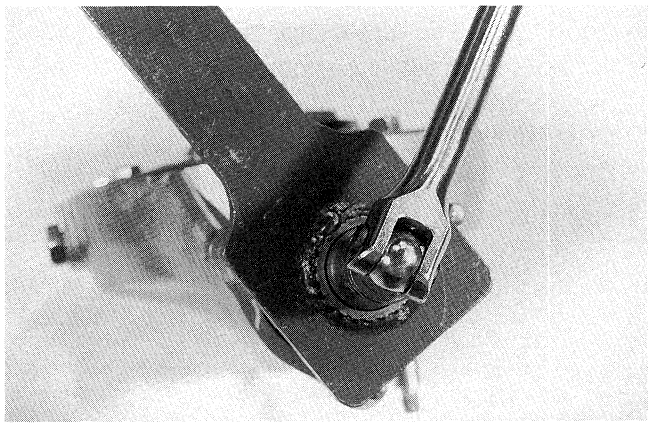
Tightening torque	90 – 130 N·m (9.0 – 13.0 kg-m 65.0 – 94.0 lb-ft)



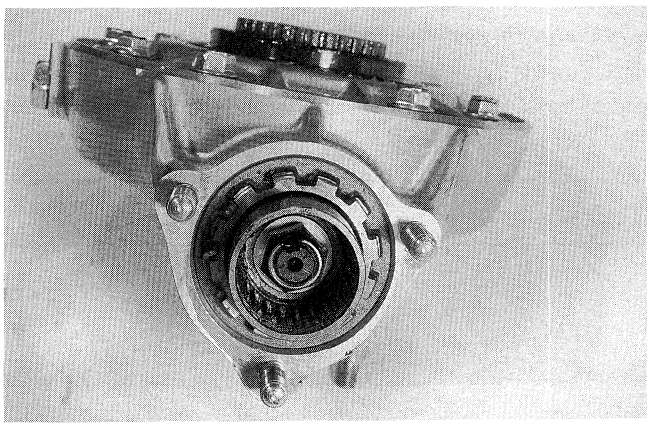
- Install the new drive bevel gear nut by using the special tools.
- Tighten the nut to the specified torque.

09924-62420	22-mm long socket
09924-64510	Final drive gear coupling holder

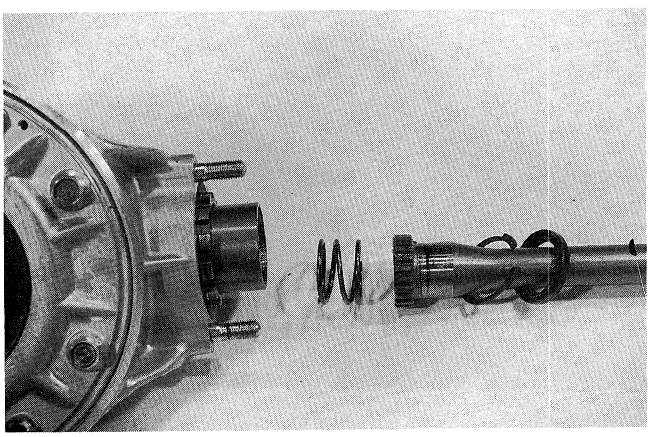
Tightening torque	90 – 110 N·m (9.0 – 11.0 kg-m 65.0 – 79.5 lb-ft)



- Bend the collar of the nut over into the notch in the drive bevel gear shaft.



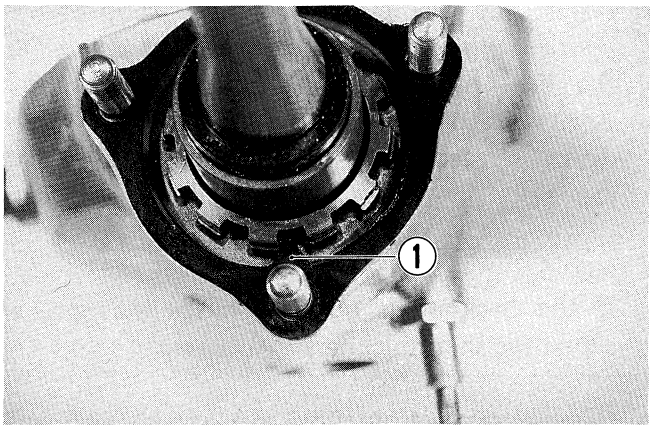
- Apply grease to the coupling.
- Install the spring, propeller shaft, circlip and oil seal in that order.
- After installing the propeller shaft with a new circlip, make sure that the propeller shaft turns smoothly without any hitch or bearing noise.



- Install the bearing stopper locking plate.

CAUTION:
When installing the plate, fit the protrution ① of plate to the bearing stopper groove.

NOTE:
Two kinds of plates are available to lock the stopper at the proper position.

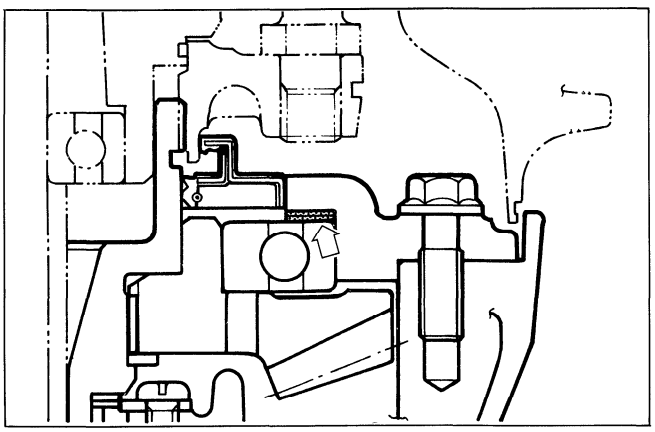


FINAL GEAR SHIM ADJUSTMENT

FINAL GEAR BEARING CASE SHIM CLEARANCE

- Measure the clearance between the shims and bearing. If it is not within the specification, the shims must be changed.

Final gear bearing case shim clearance	0.10 mm (0.004 in)



List of shims *3 (Refer to page 4-30)

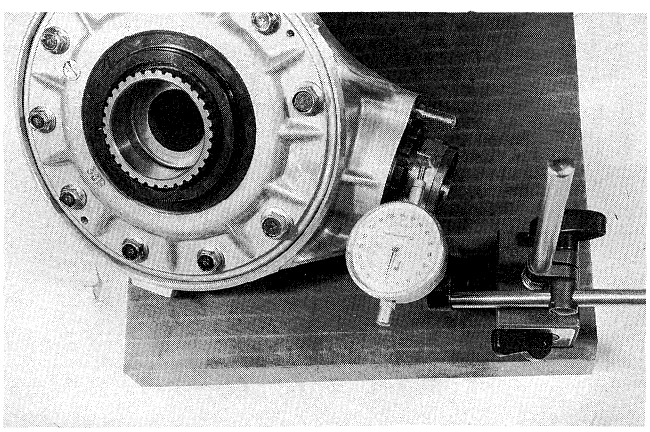
Part No.	Shim thickness
27327-38B00-035	0.35 mm
27327-38B00-040	0.40 mm
27327-38B00-050	0.50 mm
27327-38B00-060	0.60 mm

BACKLASH

- Install the backlash measuring tool on the drive bevel gear coupling, and set-up a dial gauge as shown in Fig.

09924-34510	Backlash measuring tool (27 – 50 mm)

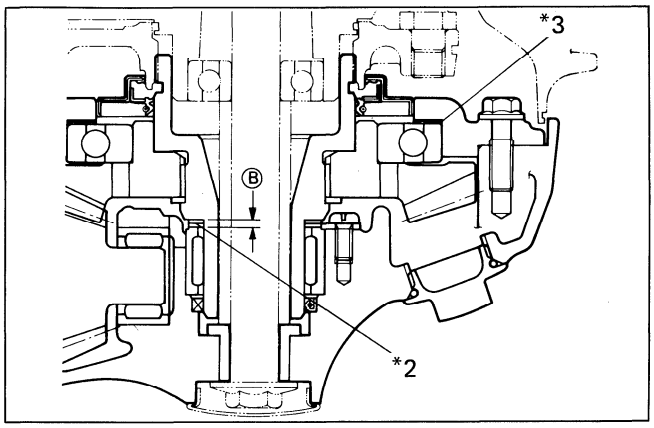
Final gear backlash	0.03 – 0.64 mm (0.001 – 0.025 in)



- Adjust the dial gauge so that it touches the backlash measuring tool arm at the mark; hold the final driven bevel gear securely, and turn the final drive bevel gear coupling slightly in each direction, reading the total backlash on the dial gauge.

NOTE:
If the backlash is not within specification, adjust the shim thickness as follows:

- Remove shims from final gear bearing case and final gear case, and measure total thickness.
- In order not to change the clearance between final driven bevel gear and bearing, the total thickness of the shims installed after a change is made must equal the original total thickness of shims.
- If backlash is too large:
  a) Install a thinner shim pack *2 between final driven bevel gear and final gear case.
  b) Increase thickness of shims *3 between final driven bevel gear bearing and bearing case by an amount equal to decrease above.
- If backlash is too small:
  a) Install a thicker shim pack *2 between final driven bevel gear and final gear case.
  b) Decrease thickness of shims *3 between final driven gear bearing and bearing case by an amount equal to increase above.



List of shims *2 (Refer to page 4-30)

Part No.	Shim thickness
09160-35008	0.95 mm
27326-45102	1.05 mm
27326-45103	1.10 mm
27326-45101	1.20 mm
27326-45100	1.25 mm
27326-45104	1.35 mm
27326-45100-140	1.40 mm
27326-45100-145	1.45 mm
27326-45100-150	1.50 mm

List of shims *3 (Refer to page 4-30)

Part No.	Shim thickness
27327-38B00-035	0.35 mm
27327-38B00-040	0.40 mm
27327-38B00-050	0.50 mm
27327-38B00-060	0.60 mm

EXAMPLE:

*2 Final gear to case shims;
1.45 mm + 1.40 mm = 2.85 mm

*3 Final gear bearing to bearing case shims;
0.35 mm + 0.60 mm = 0.95 mm

Original total measurement = 3.80 mm

Backlash too large:

*2 Final gear to case shims;
1.35 mm + 1.45 mm = 2.80 mm

*3 Final gear bearing to bearing case shims;
0.60 mm + 0.40 mm = 1.00 mm

Total thickness = 3.80 mm

Backlash too small:

*2 Final gear to case shims;
1.50 mm + 1.40 mm = 2.90 mm

*3 Final gear bearing to bearing case shims;
0.50 mm + 0.40 mm = 0.90 mm

Total thickness = 3.80 mm

TOOTH CONTACT

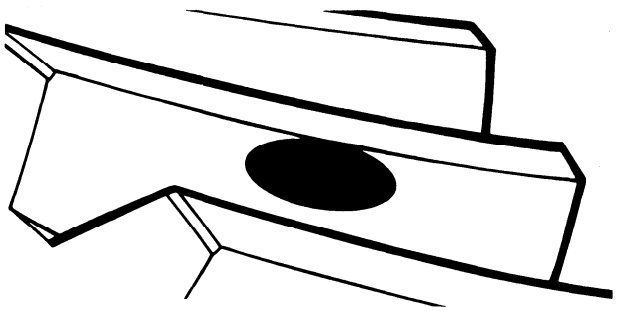
- After backlash adjustment is carried out, the tooth contact must be checked.
- Remove the 10 bolts from the final gear bearing case, and remove the case, using the two 5 mm screws. (Refer to page 4-17.) Do not misplace the shims. Remove the final driven bevel gear.
- Clean and de-grease several teeth on the final driven bevel gear. Coat these teeth with machinist's dye or paste, preferably of a light color.
- Re-install the final driven bevel gear with shims in place, positioning the coated teeth so that they are centered on the final drive bevel gear.
- Re-install the final gear bearing case and bolts, and tighten to specification.

Tightening torque

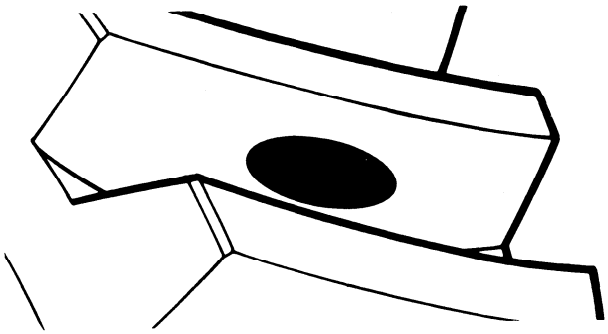
8-mm bolt	20 – 26 N·m (2.0 – 2.6 kg-m 14.5 – 19.0 lb-ft)
10-mm bolt	40 – 60 N·m (4.0 – 6.0 kg-m 29.0 – 43.5 lb-ft)

- Using a socket and handle on the final drive bevel gear coupling nut, rotate the final drive bevel gear several turns in each direction, while loading the final driven bevel gear. This will provide a contact pattern on the coated teeth of the driven bevel gear.
- Remove the final gear bearing case and final driven bevel gear, and inspect the coated teeth of the driven bevel gear. The contact patch should be as shown at right:
- If the tooth contact pattern is correct, as shown in ② , go to the Final Assembly sub-section.

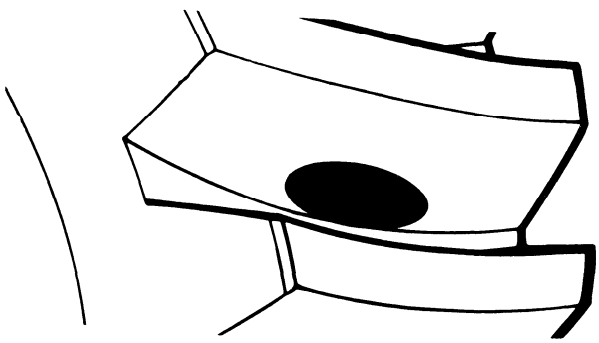
① INCORRECT (Contact at tooth top)



② CORRECT

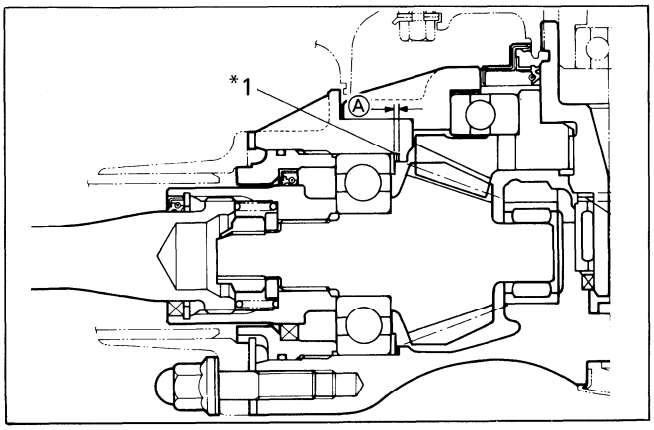


③ INCORRECT (Contact at tooth root)



- If the tooth contact pattern is incorrect, as shown in ① , a thinner shim is needed between the final drive bevel gear bearing and final gear case.
- If the tooth contact pattern is incorrect, as shown in ③ , a thicker shim is needed between the final drive bevel gear bearing and final gear case.
- If the tooth contact pattern is incorrect for either reason, the appropriate shim must be installed, and the tooth contact pattern re-checked by repeating the tooth coating procedure above.

NOTE:
If it is necessary to adjust the shim thickness between final drive bevel gear bearing and final gear case, the final gear backlash may change, and should be re-checked according to the procedure outlined under the Backlash Measurement sub-section. Both adjustments may be needed until both backlash and tooth contact are correct.



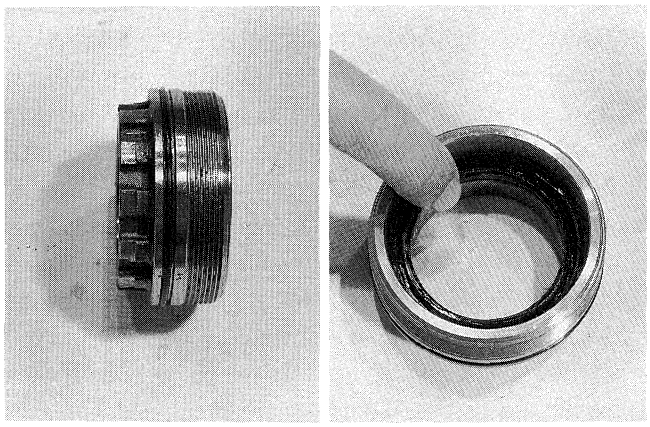
List of shims *1 (Refer to page 4-30)

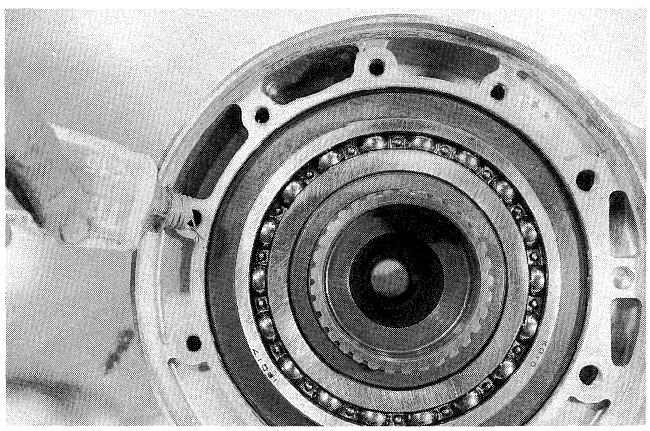
Part No.	Shim thickness
27445 - 24A01 - 030	0.30 mm
27445 - 24A01 - 035	0.35 mm
27445 - 24A01 - 040	0.40 mm
27445 - 24A01 - 050	0.50 mm
27445 - 24A01 - 060	0.60 mm

FINAL ASSEMBLY AND REMOUNTING

- After adjusting the backlash, tooth contact and clearance between the bearing case and the bearing, remove the final gear bearing case and final drive bevel gear assembly from the final gear case.
- Clean off any machinist's dye or paste from the gear teeth, and lubricate the teeth with Hypoid gear oil.
- Install new O-ring to the final drive bevel gear bearing stopper. Apply grease to the O-ring and lip of oil seal.
- Install the final drive bevel gear assembly into the final gear case.
- Apply SUZUKI Bond No. 1215 to the mating surface of the final gear case and cover.

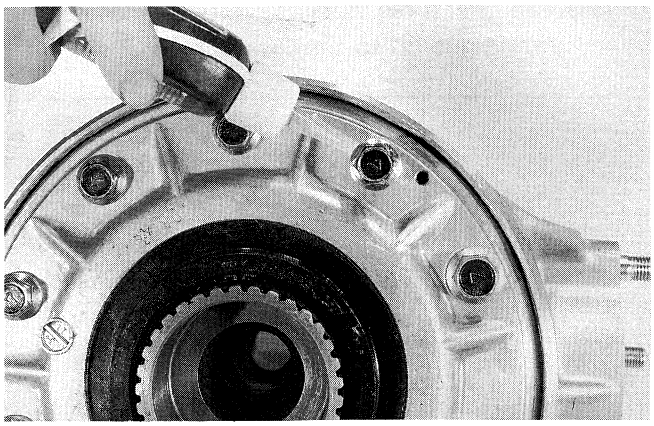
NOTE:
Do not apply SUZUKI Bond No. 1215 to the breather passage in the final gear case.





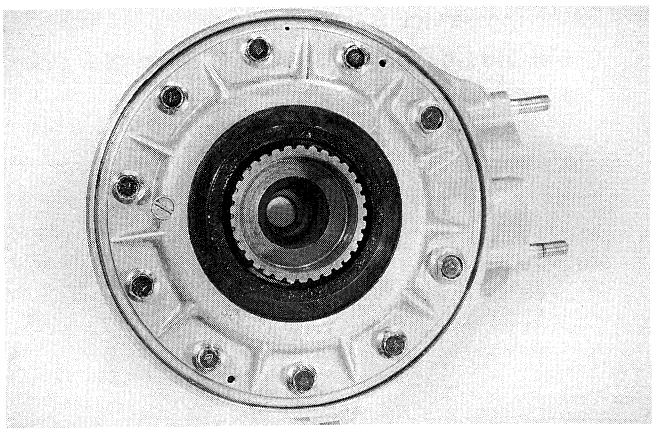
- Install the final gear bearing case to the final gear case and apply a small quantity of Thread lock super "1333" to the 10 bolts and tighten them to the specified torque.

99000-32020	Thread lock super "1333"



Tightening torque

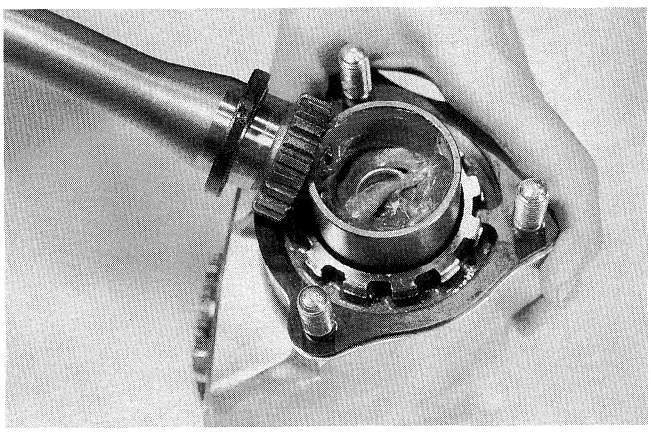
8-mm bolt	20 – 26 N·m (2.0 – 2.6 kg-m 14.5 – 19.0 lb-ft)
10-mm bolt	40 – 60 N·m (4.0 – 6.0 kg-m 29.0 – 43.5 lb-ft)



- Apply grease to the final driven bevel gear coupling.

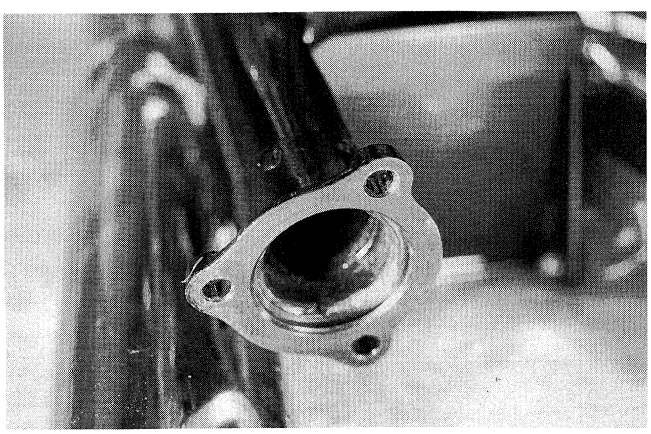
99000-25010	SUZUKI Super grease "A"

- Apply Lithium Base Molybdenum grease (NLGI # 2) to the propeller shaft splines and universal joint coupling.



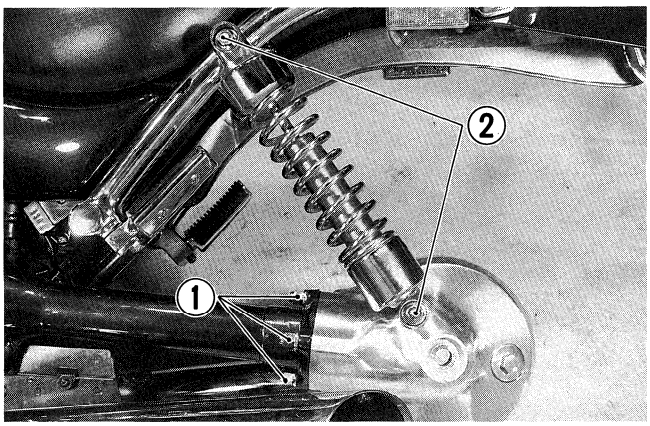
- Apply SUZUKI Bond No. 1215 to the mating surface of swingarm and final gear case.

99000-21110	SUZUKI Bond No. 1215



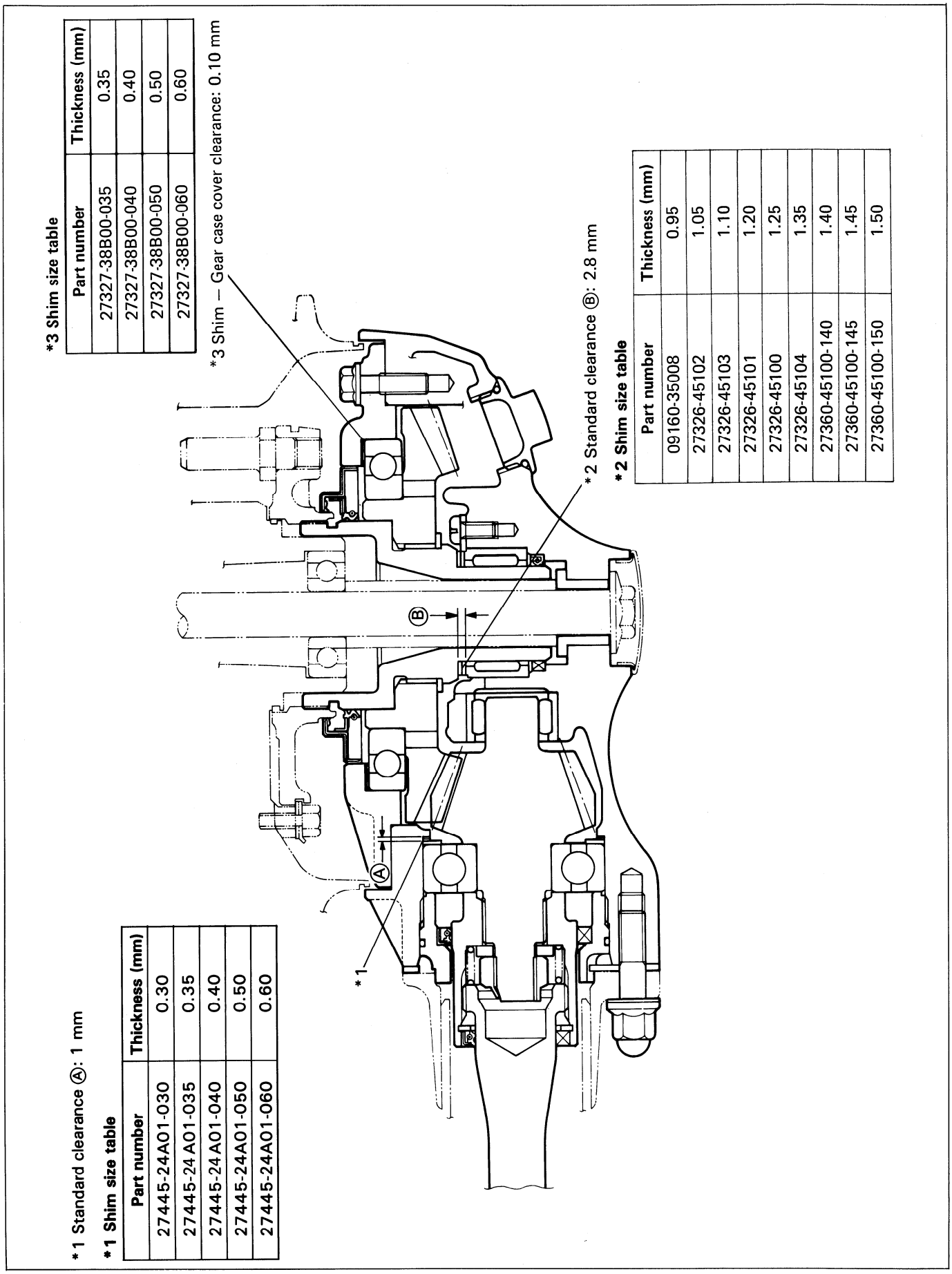
- Tighten the three nuts ① and shock absorber mounting nut ② to the specified torque.

Tightening torque	①	35 – 45 N·m (3.5 – 4.5 kg-m 25.5 – 32.5 lb-ft)
	②	20 – 30 N·m (2.0 – 3.0 kg-m 14.5 – 21.5 lb-ft)



NOTE:
After remounting the final gear case, the following service is necessary.
*** Fill the final gear case with Hypoid gear oil.**
Specified capacity: 200 – 220 ml
(6.8 – 7.4/7.0 – 7.7 US/Imp oz)

REASSEMBLY INFORMATION

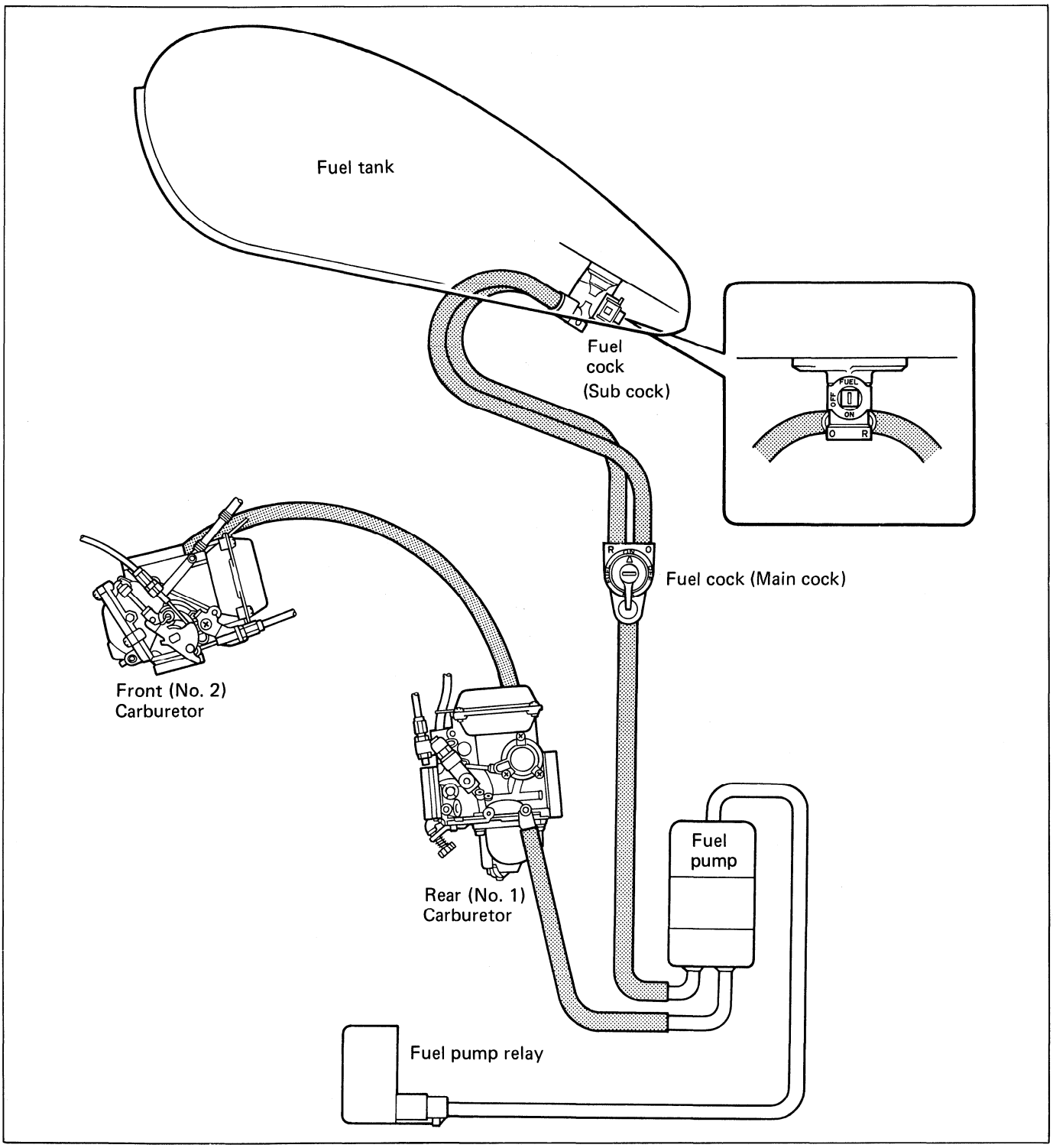


FUEL AND LUBRICATION SYSTEM

CONTENTS

FUEL SYSTEM

As shown in the following figure, the fuel system is composed of the fuel tank, two fuel cocks, the fuel pump, the fuel pump relay and the carburetors. The fuel pump relay operates according to ON – OFF of the primary current flowing to the ignition coil No. 2 (front) cylinder. The fuel pump is controlled by the fuel pump relay, and electromagnetic force is used to deliver fuel to the carburetor.
The fuel sent under pressure by the fuel pump flows into the float chamber when the float of the carburetor has dropped and the needle valve is open. When the needle valve closes, the pressure of the fuel in the hose connecting the carburetor and the fuel pump increases, and when the set pressure is reached, the operation of the fuel pump is stopped by the fuel pressure to prevent excessive supply.



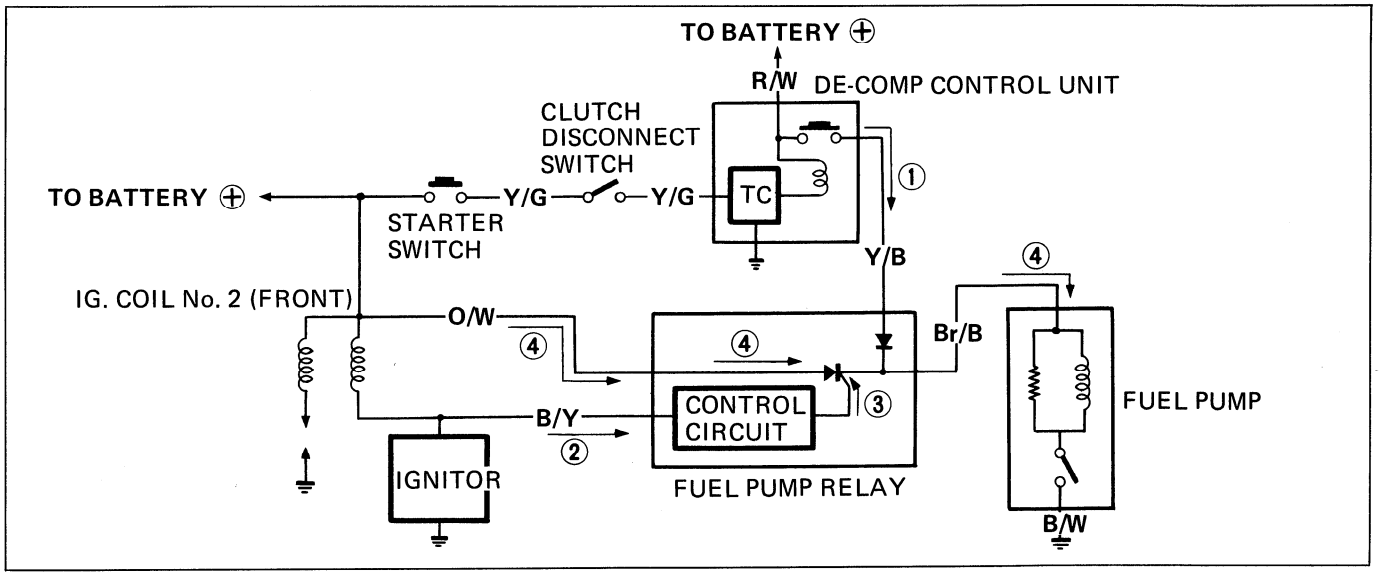
DESCRIPTION

When starting engine:

In order to supply supplement fuel when starting the engine, by turning the starter switch ON, current ① is sent directly from the battery and passes through the de-compression control unit and is reached the fuel pump relay. Fuel pump relay controls operation of the fuel pump.

After starting engine:

The current ② generated at No. 2 Ig. coil (front cylinder) flows to the fuel pump relay's control circuit. The control circuit receives this current ② and send signal ③ to the SCR, turning it ON. When the SCR turns ON, current ④ is sent from the battery through the fuel pump relay, thus operating the fuel pump. For safety purposes the fuel pump stops automatically when the engine stop producing ignition spark and the signal from the ignition coil is not sent.

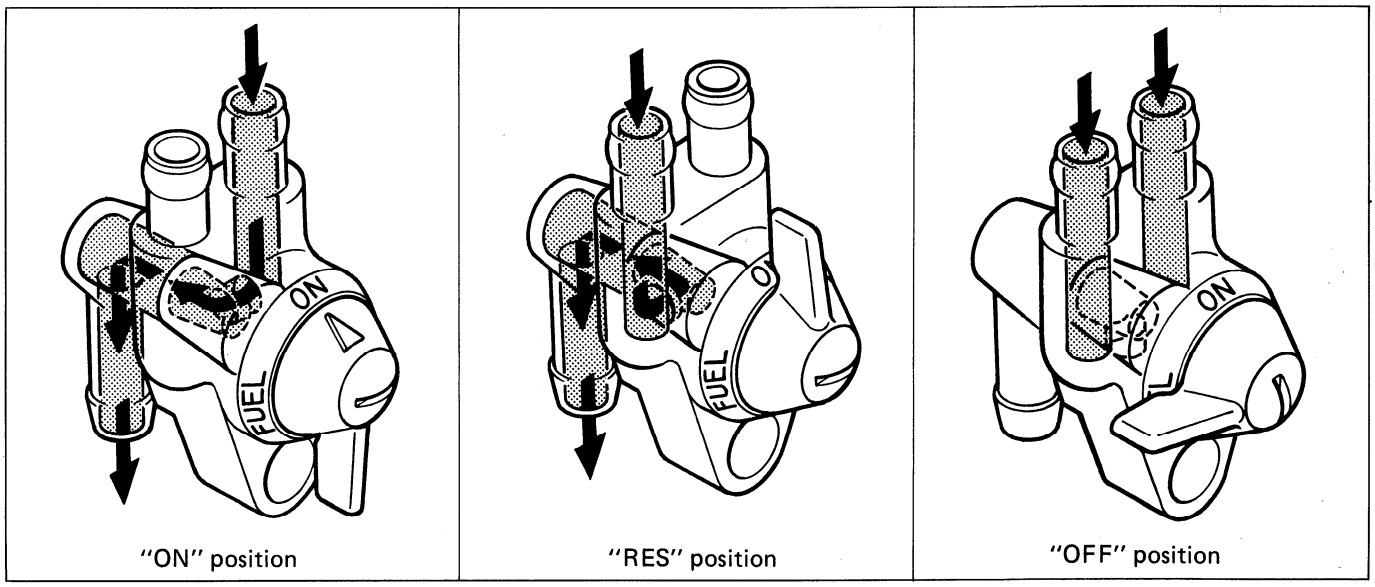


FUEL COCK

Two fuel cocks are provided for this fuel system. One is located on the fuel tank, the other is located behind the rear cylinder.

Main cock

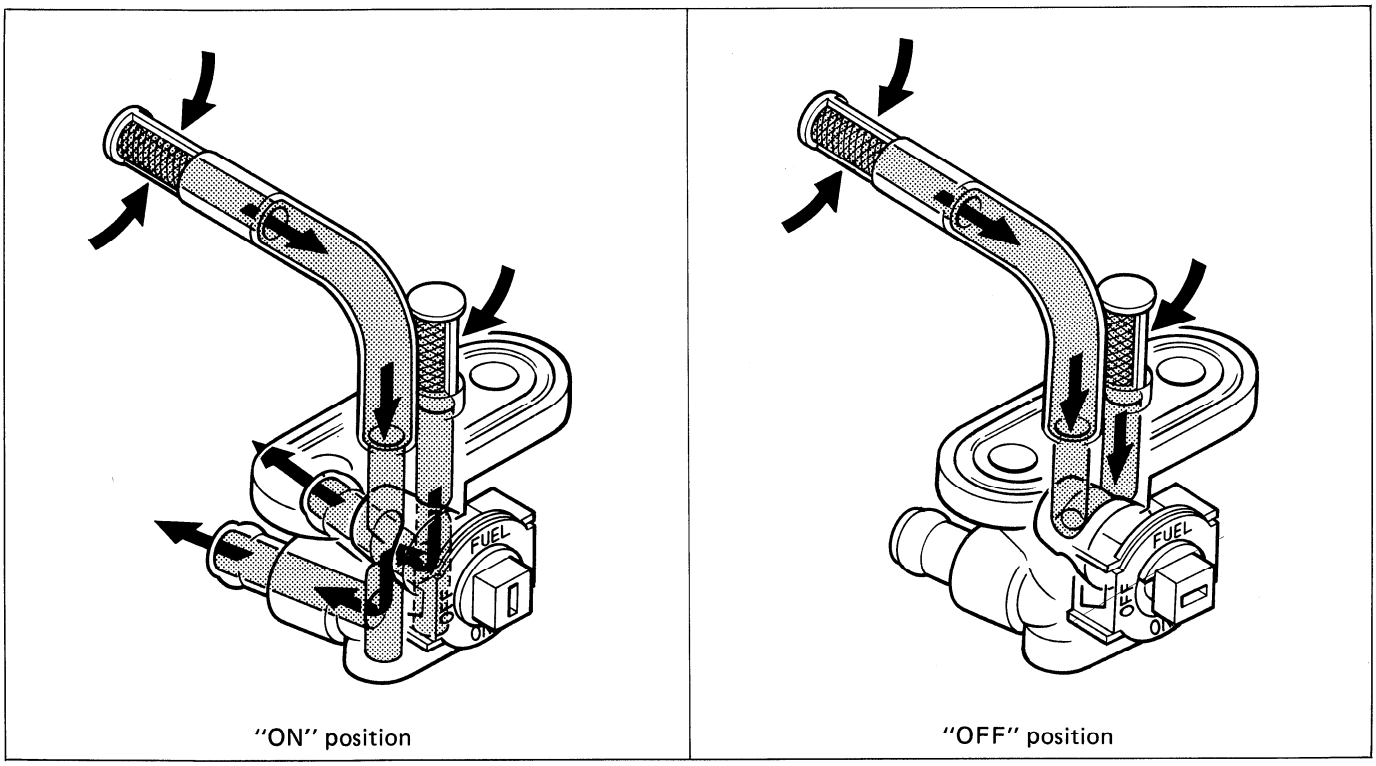
A valve is provided at the top of the fuel cock lever and can switch over to "OFF", "ON" and "RES". With the valve "ON" (normal), the main passage opens. With the valve "OFF", both holes close.



"ON" position | "RES" position | "OFF" position

Sub cock

A valve is provided at the top of the fuel cock and can switch over to "OFF" and "ON".
With the valve "ON" (normal), both holes (ON and RES) open with the valve "OFF", both holes close.



"ON" position

"OFF" position

FUEL PUMP

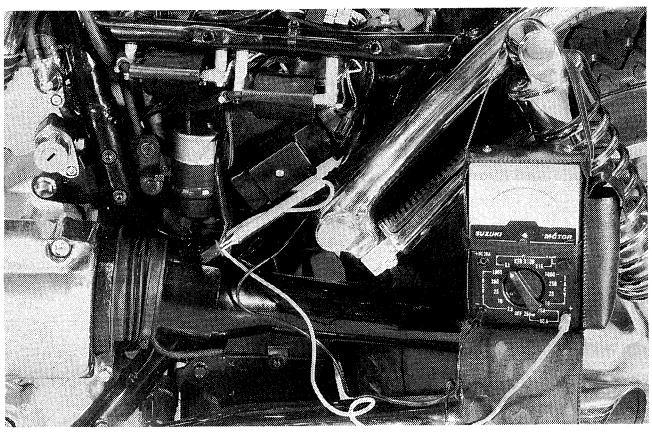
Measure the resistance between the fuel pump lead wires. If the resistance noted to show infinity or too low a resistance value, it must be replaced.

09900-25002	Pocket tester
S.T.D. resistance	1 – 2 Ω

Place the fuel pump and battery as shown in the following figure. Measure the amount of kerosene discharged and conduct a test on the fuel pump.

WARNING:
Do not use gasoline, which is extremely flammable and explosive.

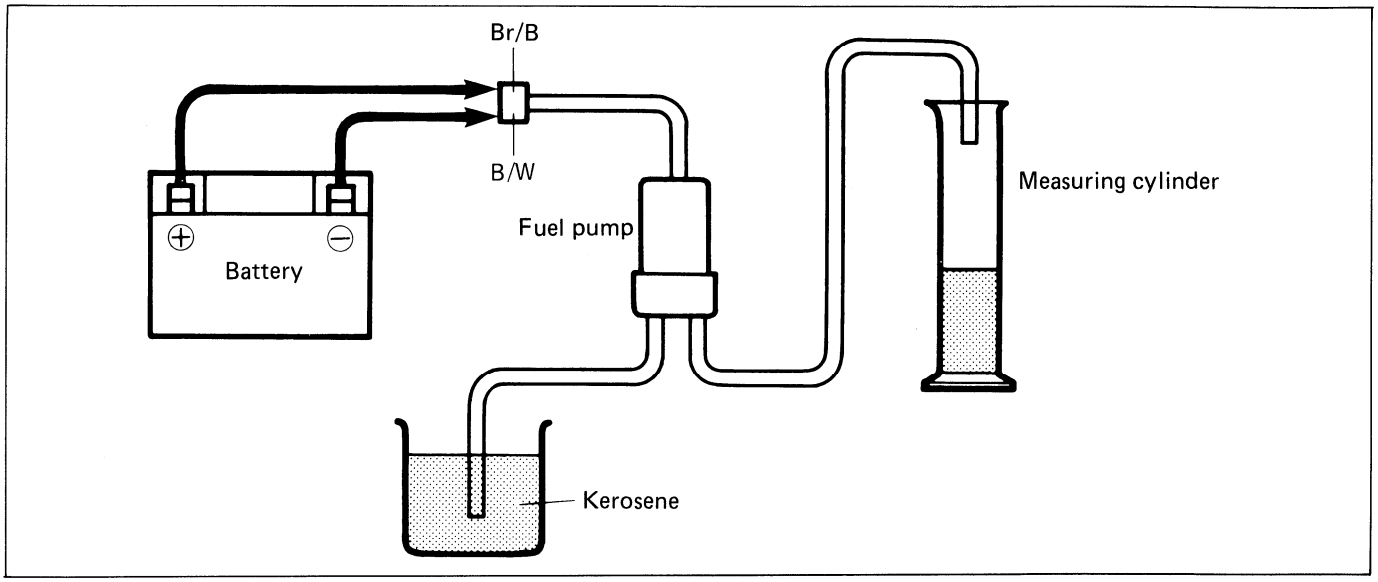
NOTE:
- *** The battery must be fully charged condition.**
- *** Upon completion of the test, all the kerosene should be removed from the each part.**



- Attach fuel pump harness B/Br to the battery ⊕ terminal and B/W to the battery ⊖ terminal with jumper wires.
- Measure the discharged amount from the fuel pump for 1 minute using a measuring cylinder.

Discharged amount	Over 600 ml (1.27 U.S. qt/minute)

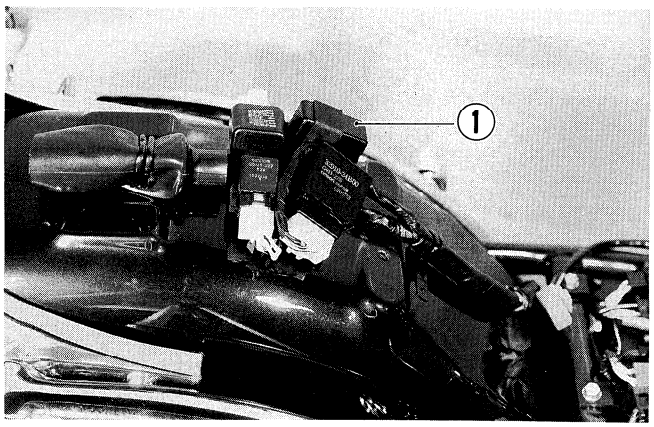
If the discharged amount is less than the specification, it means that the fuel pump is defective. Replace the fuel pump with a new unit.



FUEL PUMP RELAY

- Two types of the fuel pump relay is used.
- Remove the rear seat and disconnect the coupler, and take out the fuel pump relay ① .
- Using the SUZUKI pocket tester (x kΩ range), measure the resistance between the lead wires in the following table.
- If the resistance checked is incorrect, replace the fuel pump relay.

09900-25002	Pocket tester

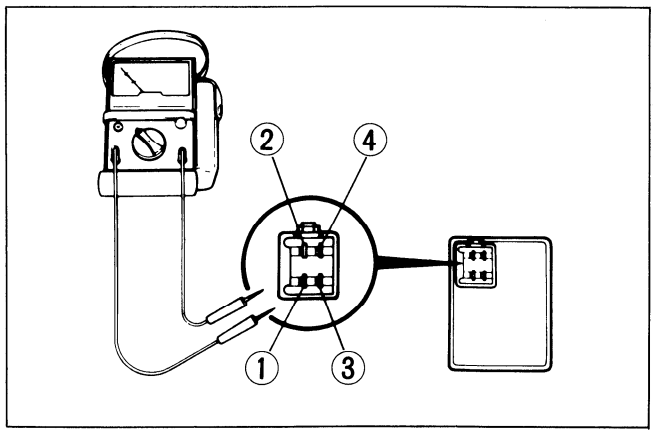


Part No. 05A00 Unit: kΩ

		⊕ Probe of tester to:			
		①	②	③	④
⊖ Probe of tester to:	①		∞	∞	∞
	②	∞		∞	∞
	③	0.5–1.0	20–100		∞
	④	2–20	20–100	0.5–10	

Part No. 38B00 Unit: kΩ

		⊕ Probe of tester to:			
		①	②	③	④
⊖ Probe of tester to:	①		∞	∞	∞
	②	∞		∞	∞
	③	∞	10–100		∞
	④	∞	20–200	1–5	



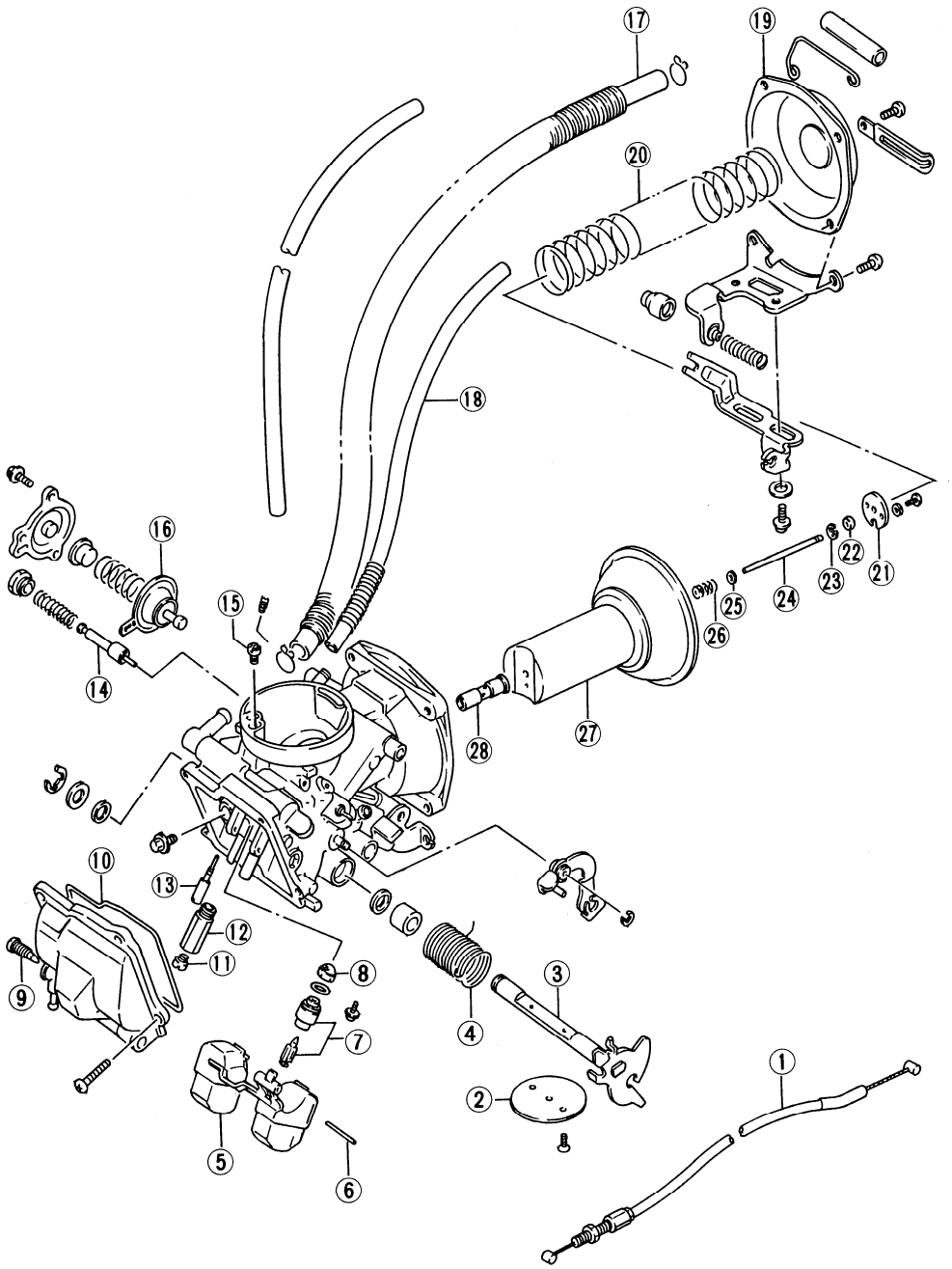
NOTE:
Fuel pump relays are distinguished by coupler color.

Part No.	Coupler color
05A00	White
38B00	Red

CARBURETOR

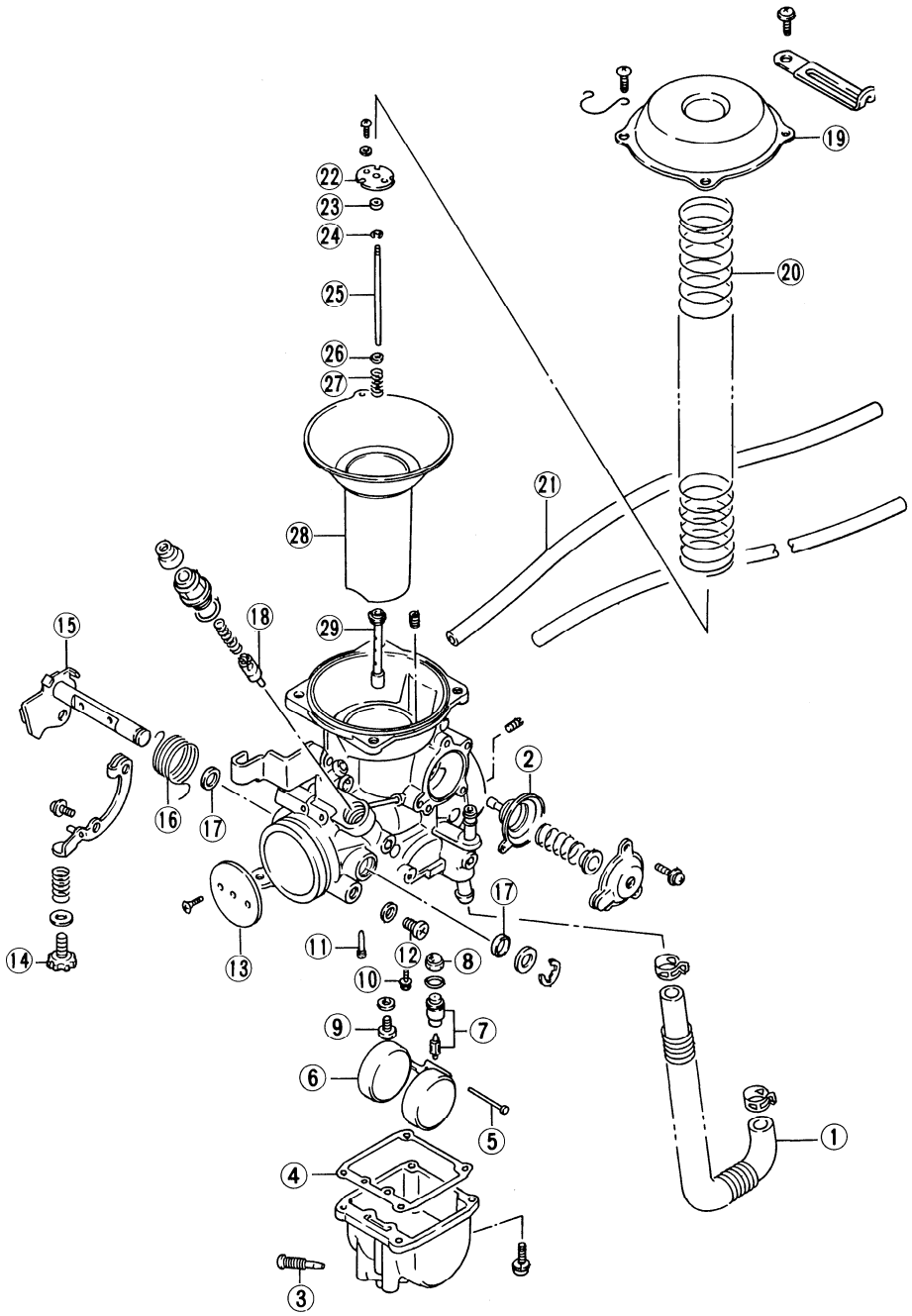
CARBURETOR CONSTRUCTION

No. 2 (FRONT) CARBURETOR



① Syncronizing cable
② Throttle valve
③ Throttle valve shaft
④ Throttle valve return spring
⑤ Float
⑥ Float pin
⑦ Needle valve
⑧ Filter
⑨ Drain screw
⑩ Seal ring
⑪ Main jet
⑫ Main jet holder
⑬ Pilot jet
⑭ Starter plunger
⑮ Main air jet
⑯ Coasting valve
⑰ Fuel hose
⑱ Breather hose
⑲ Carburetor top cap
⑳ Piston valve spring
㉑ Jet needle stopper plate
㉒ Spacer
㉓ E-ring
㉔ Jet needle
㉕ Washer
㉖ Spring
㉗ Piston valve
㉘ Needle jet

No. 1 (REAR) CARBURETOR



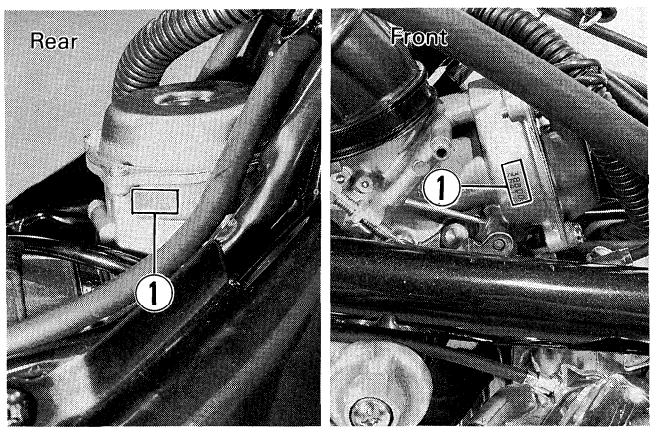
① Fuel hose
② Coating valve
③ Drain screw
④ Gasket
⑤ Float pin
⑥ Float
⑦ Needle valve
⑧ Filter
⑨ Main jet
⑩ Needle valve stopper screw
⑪ Pilot jet
⑫ Vacuum inspection screw
⑬ Throttle valve
⑭ Throttle stop screw
⑮ Throttle valve shaft
⑯ Throttle valve return spring
⑰ Seal
⑱ Starter plunger
⑲ Carburetor top cap
⑳ Piston valve spring
㉑ Breather hose
㉒ Jet needle stopper plate
㉓ Spacer
㉔ E-ring
㉕ Jet needle
㉖ Washer
㉗ Spring
㉘ Piston valve
㉙ Needle jet

SPECIFICATIONS

ITEM		SPECIFICATION			
		E-28		Others	
		No. 1 (REAR)	No. 2 (FRONT)	No. 1 (REAR)	No. 2 (FRONT)
Type		MIKUNI BS 36SS	MIKUNI BDS 36SS	MIKUNI BS 36SS	MIKUNI BDS 36SS
I.D. No.		38B20	←	38B30	←
Bore		36 mm (1.42 in)	←	←	←
Idle r/min		1 000 ± 50 r/min	←	←	←
Fuel level		9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet	(M.J.)	# 140	# 125	# 140	# 125
Main air jet	(M.A.J.)	1.8 mm (0.07 in)	←	←	←
Jet needle	(J.N.)	5D30-3rd	5D22-3rd	5D30-3rd	5D22-3rd
Needle jet	(N.J.)	P-3	P-0	P-3	P-0
Throttle valve	(Th.V.)	# 110	←	←	←
Pilot jet	(P.J.)	# 57.5	# 50	# 57.5	# 50
By-pass	(B.P.)	0.8, 0.8, 0.8 mm	←	←	←
Pilot outlet	(P.O.)	0.8 mm (0.03 in)	1.0 mm (0.04 in)	0.8 mm (0.03 in)	1.0 mm (0.04 in)
Valve seat	(V.S.)	1.5 mm (0.06 in)	←	←	←
Starter jet	(G.S.)	# 25	←	←	←
Pilot screw	(P.S.)	2.0 turn out	2-3/8 turn out	2.0 turn out	2-3/8 turn out
Pilot air jet 1	(P.A.J.1)	# 60	# 55	# 60	# 55
Pilot air jet 2	(P.A.J.2)	1.7 mm (0.07 in)	←	←	←
Throttle cable play		0.5 – 1.0 mm (0.02 – 0.04 in)	←	←	←

I.D. NO. LOCATION

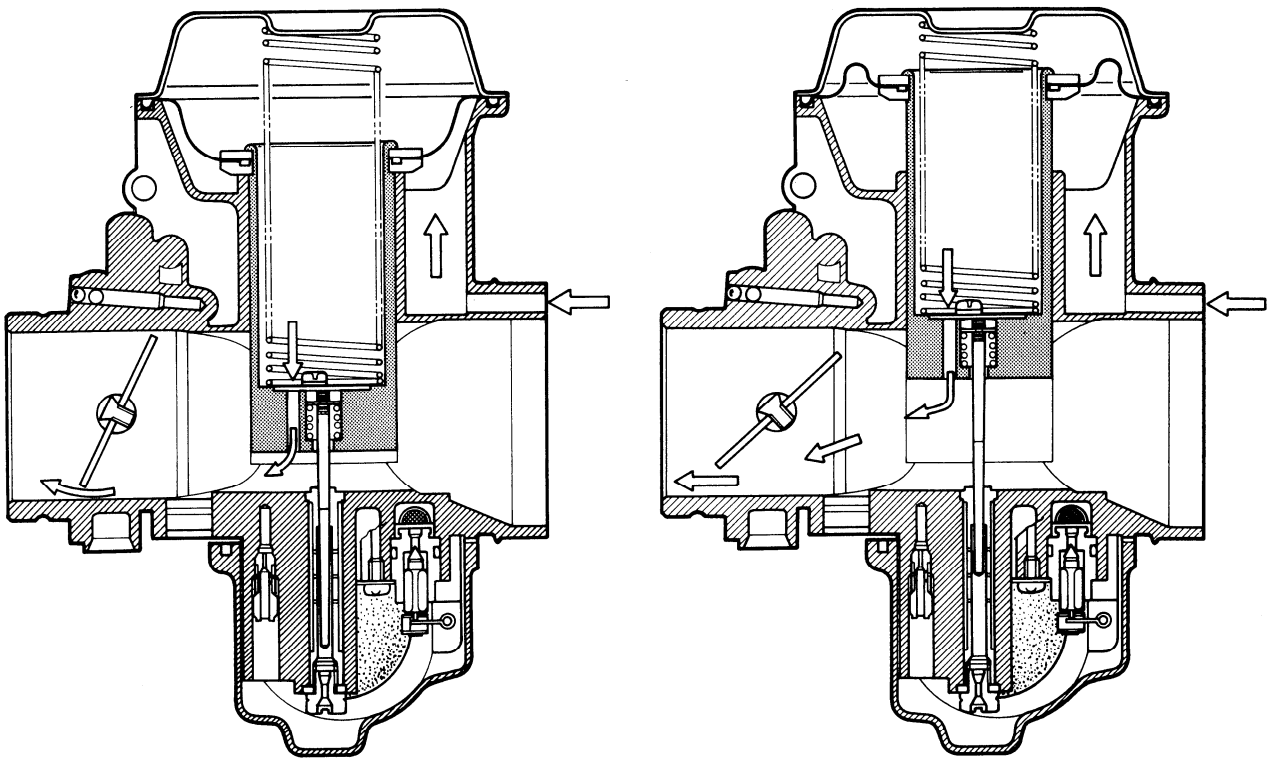
Each carburetor has I.D. Number ① stamped on the carburetor body according to its specifications.



DIAPHRAGM AND PISTON OPERATION

The carburetor is a variable-venturi type, whose venturi cross section area is increased or decreased automatically by the piston according to the vacuum presented on the down stream side of the venturi. Vacuum is admitted into the diaphragm chamber through an orifice provided in the sliding shaft guide.

Rising vacuum controls the diaphragm movement, causing the piston to rise to increase the venturi cross section area and thus prevent the air velocity from increasing. Thus, air velocity in the venturi passage is kept relatively constant improved fuel atomization and for securing an optimum ratio of fuel to air in the mixture.



Air

SLOW SYSTEM

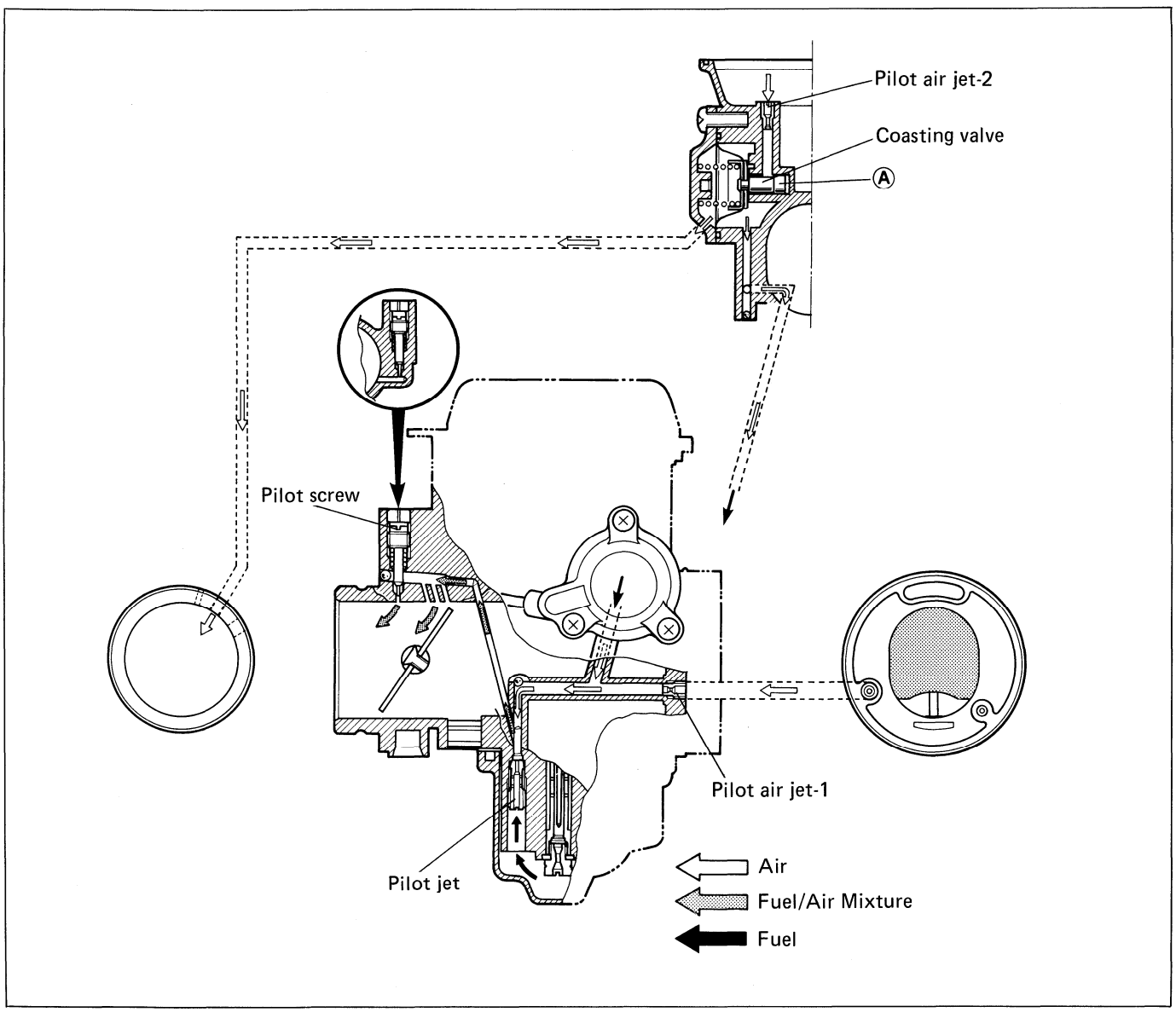
This system supplies fuel during engine operation with throttle valve closed or slightly opened. The fuel from the float chamber is first passed and metered by the pilot jet where it mixes with air coming in through pilot air jet.

This mixture, rich with fuel, then goes up through pilot pipe to pilot screw. A part of the mixture is discharged into the main bore out of the by-pass ports. The remainder is then metered by pilot screw and sprayed out into the main bore through pilot outlet.

TRANSIENT ENRICHMENT SYSTEM

This transient enrichment system is a device which keeps fuel/air mixture ratio constant in order not to generate unstable combustion when the throttle grip is returned suddenly during high speed driving. For normal operaion, joining of the air from upper part of carburetor inlet side to pilot air passage obtains proper fuel/air mixuture ratio. But if the throttle valve is suddenly closed a large negative pressure generated on cylinder side is applied to a diaphragm. The valve Ⓐ which interlocks with the diaphragm closes an air passage, thus, the air flows out to the pilot air passage.

This is system to keep the combustion condition constant by varying the fuel/air mixture ratio by controling air flow in the pilot circuit.



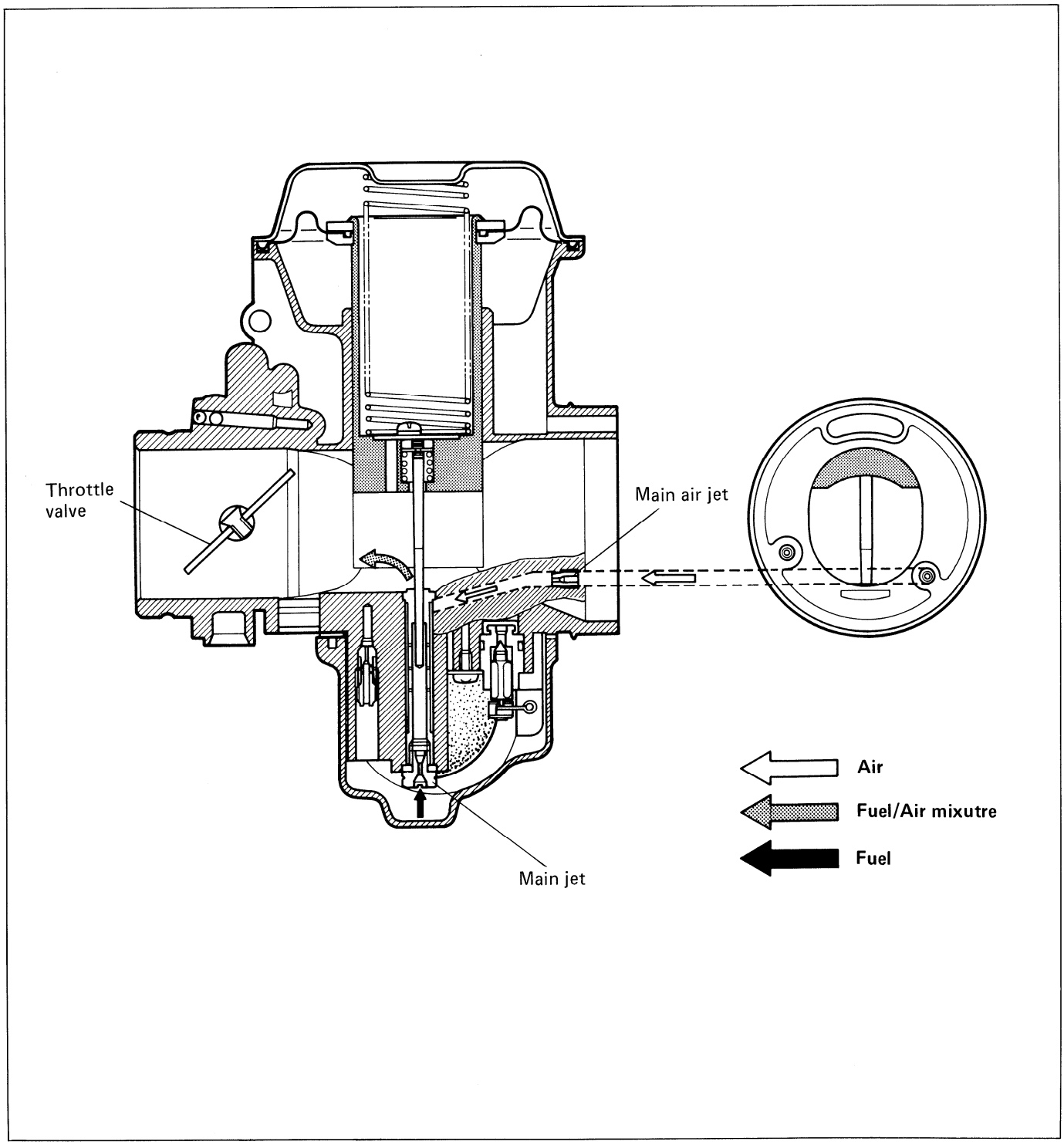
MAIN SYSTEM

As throttle valve is opened, engine speed raises, and this increases vacuum in the venturi. Consequently the piston valve moves upward.

Meanwhile, the fuel in float chamber is metered by main jet, and the metered fuel enters needle jet, in which it mixes with the air admitted through main air jet to form an emulsion.

The emulsified fuel then passes through the clearance between needle jet and jet needle, and is discharged into the venturi, in which it meets main air stream being drawn by the engine.

Mixture proportioning is accomplished in needle jet; the clearance through which the emulsified fuel must flow is large or small, depending ultimately on throttle position.

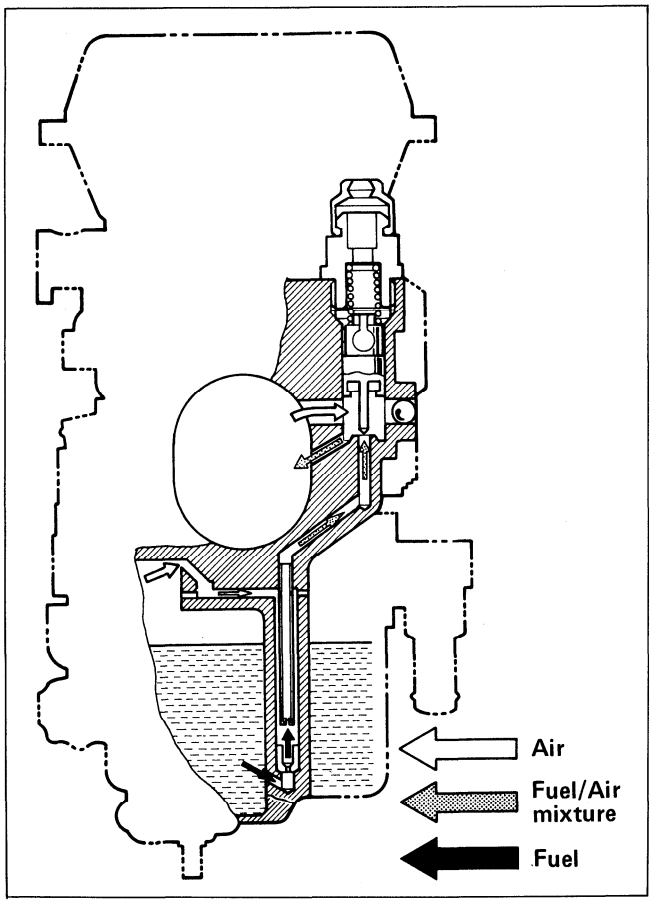


STARTER SYSTEM

Pulling the choke knob allows starter plunger to draw fuel into the starter circuit from the float chamber through starter jet.

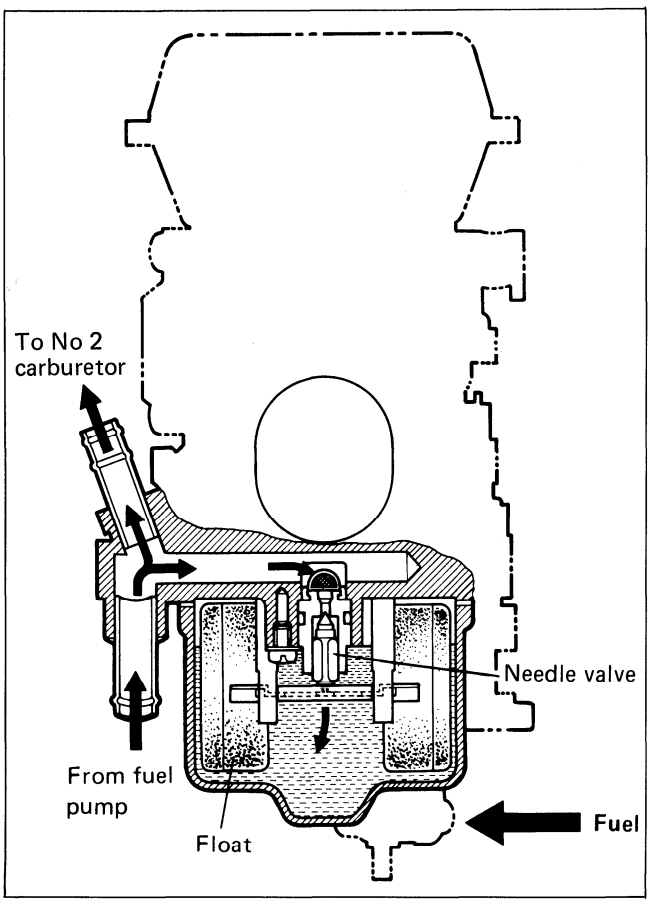
Starter jet meters this fuel, which then flows into starter pipe and mixes with the air coming from the float chamber. The mixture, rich in fuel content, reaches starting plunger and mixes again with the air coming through the main bore.

The two successive mixings of fuel with air are such that a proper fuel/air mixture for starting is produced when the mixture is sprayed out through starter outlet into the main bore.



FLOAT SYSTEM

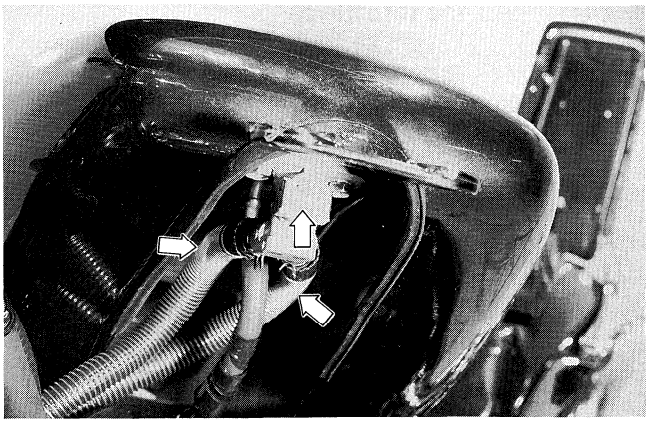
Floats and needle valve are associated with the same mechanism, so that, as the floats move up and down, the needle valve also moves likewise. When fuel level is up in float chamber, floats are up and needle valve remains pushed up against valve seat. Under this condition, no fuel enters the float chamber. As the fuel level falls, floats go down and needle valve unseats itself to admit fuel into the chamber. In this manner, needle valve admits and shuts off fuel alternately to maintain a practically constant fuel level inside the float chamber.



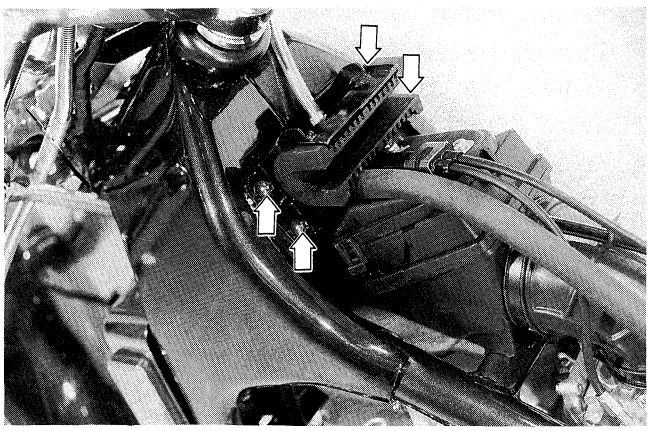
DISASSEMBLY

- Remove the seat. (Refer to page 3-3.)
- Remove the fuel tank.
- Remove the right and left frame covers.

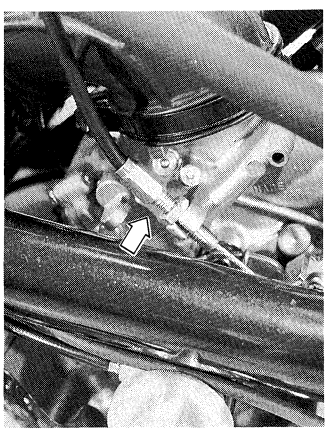
- Turn the fuel cock (of tank side) "OFF" position.
- Disconnect the fuel hose from fuel cock from fuel tank.

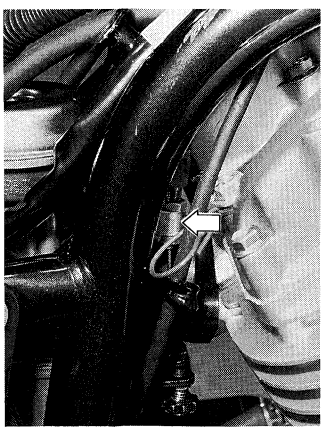


- Remove the fuel tank bracket.

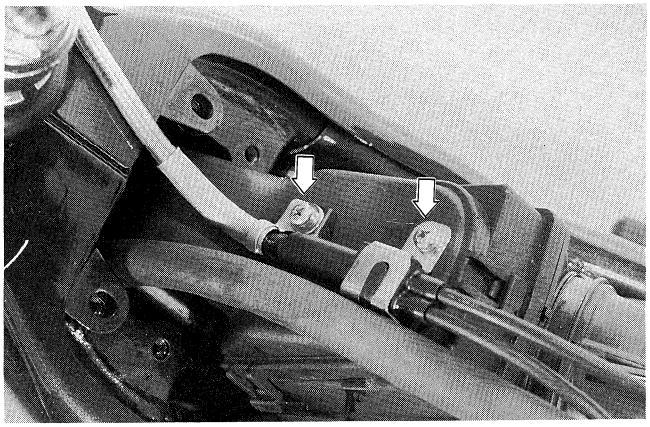


- Remove the rear cylinder right head cover.
- Loosen the throttle adjuster (front and rear).

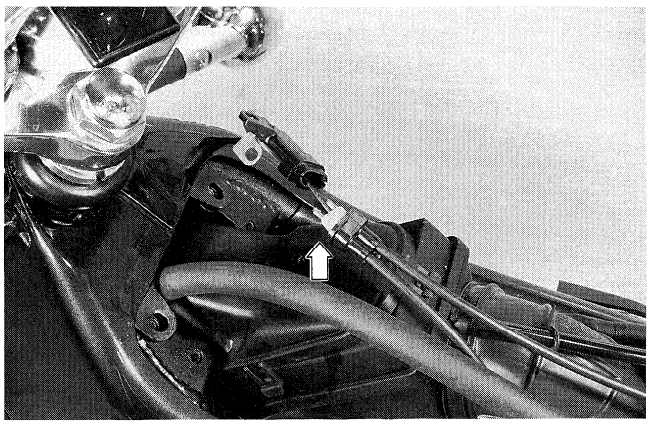




- Remove the throttle cable retaining bracket screws.

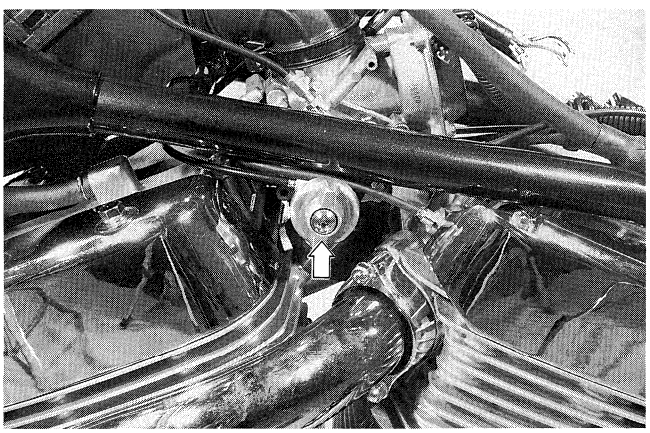


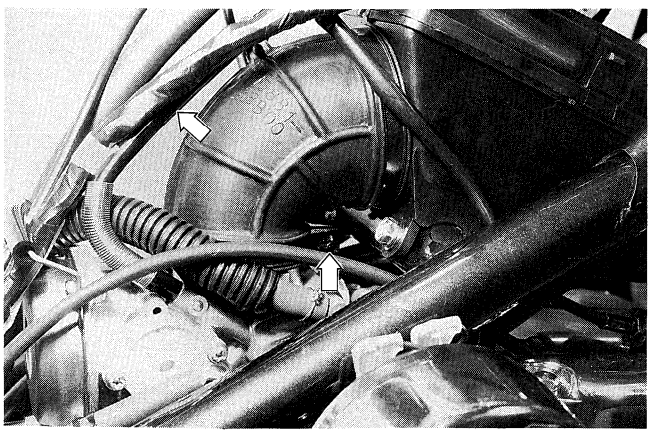
- Disconnect the throttle cables.

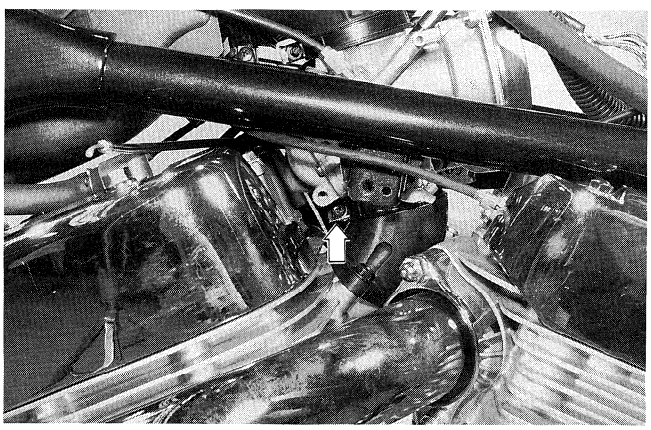


Front carburetor

- Remove the carburetor starter knob.
- Loosen the carburetor clamp screws and air cleaner outlet pipe clamp screw.
- Remove the carburetor vent pipe.
- Remove the front carburetor.

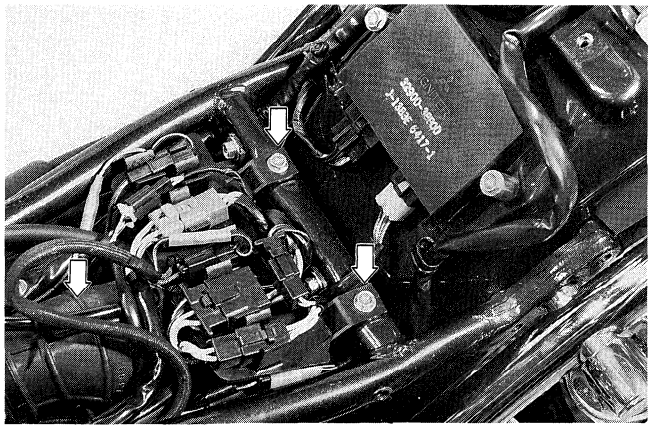




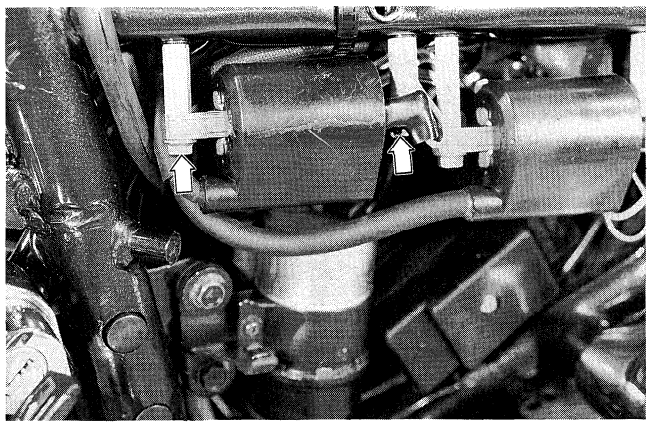


Rear carburetor

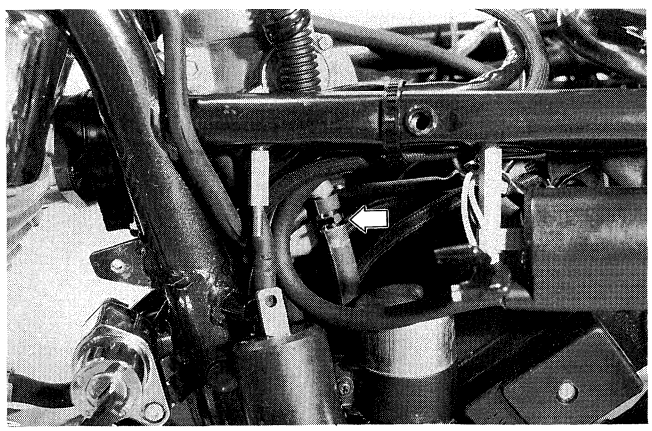
- Remove the harness coupler holder.
- Remove the air cleaner outlet hose.



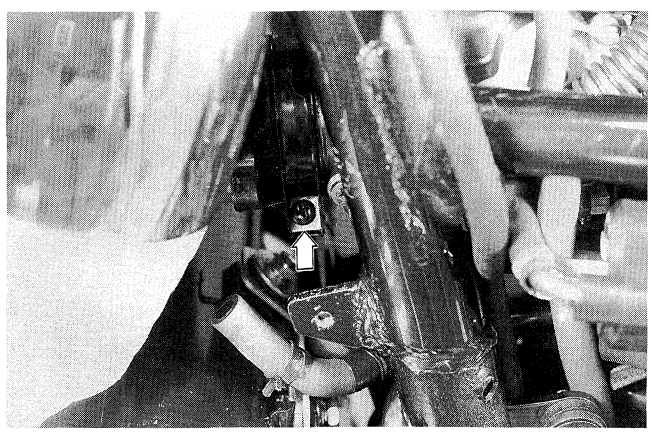
- Remove the I.G. coil of rear engine form the frame.



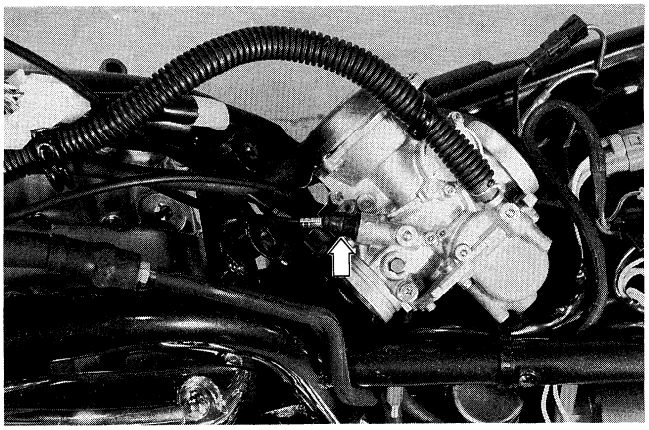
- Disconnect the fuel hose which comes from the fuel pump.



- Loosen the carburetor clamp screw.

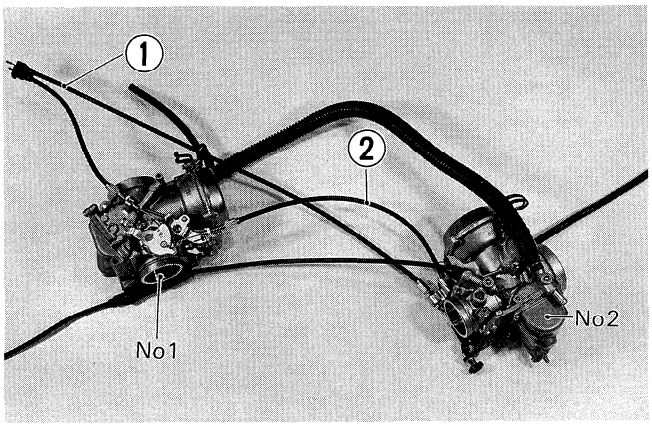


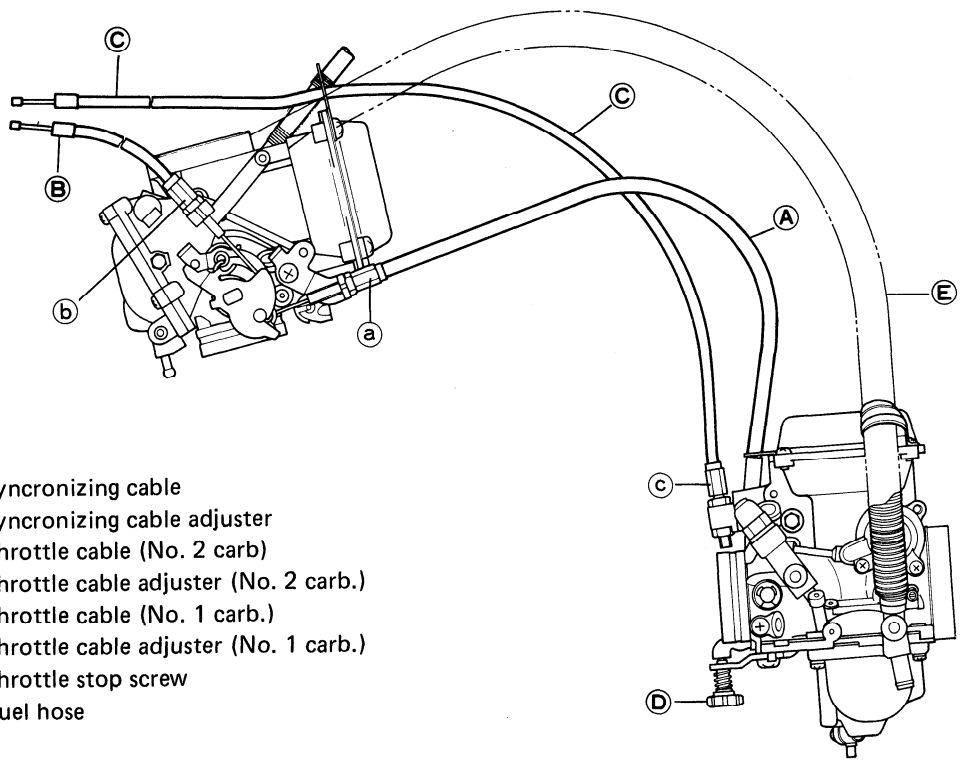
- Disconnect the starter cable of the rear carburetor.



- Take out the No. 1 and No. 2 carburetors with the throttle cables ① and the syncronizing cable ② attached to the carburetors.

CAUTION:
Be sure to identify each removed parts as to its location, and lay the parts out in groups designated as "No. 1 carburetor", "No. 2 carburetor", so that each will be restored to the original location during assembly.



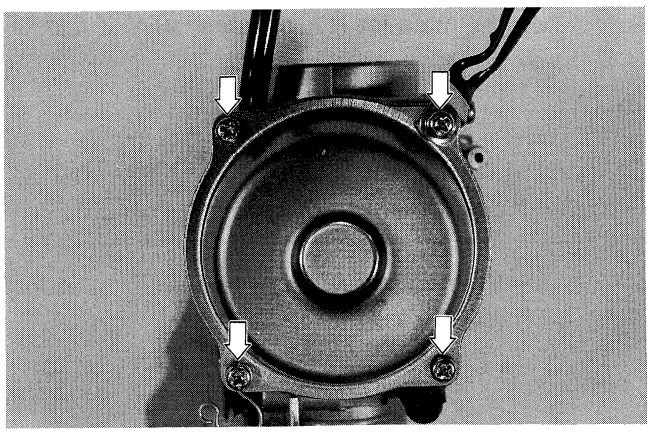


Ⓐ : Syncronizing cable
ⓐ : Syncronizing cable adjuster
Ⓑ : Throttle cable (No. 2 carb)
ⓑ : Throttle cable adjuster (No. 2 carb.)
Ⓒ : Throttle cable (No. 1 carb.)
ⓒ : Throttle cable adjuster (No. 1 carb.)
Ⓓ : Throttle stop screw
Ⓔ : Fuel hose

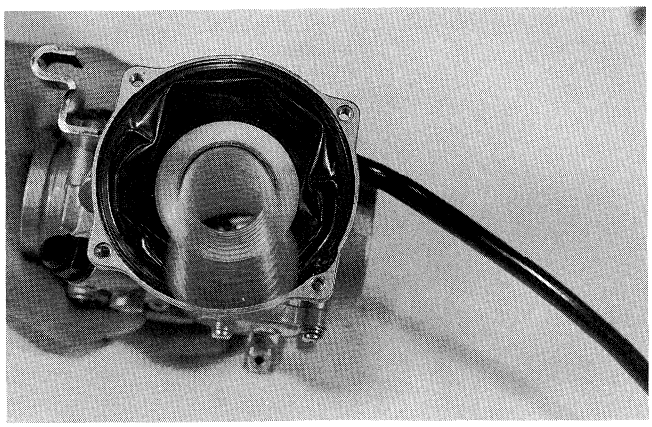
NOTE:
*** Do not turn the throttle cable adjusters ⓑ, ⓒ and the syncronizing cable adjuster ⓐ.**
*** Once removing a throttle cable or the syncronizing cable or a carburetor body, it is necessary to balance the two carburetors.**

- Remove the carburetor top cap using impact driver set.

09900-09003	Impact driver set

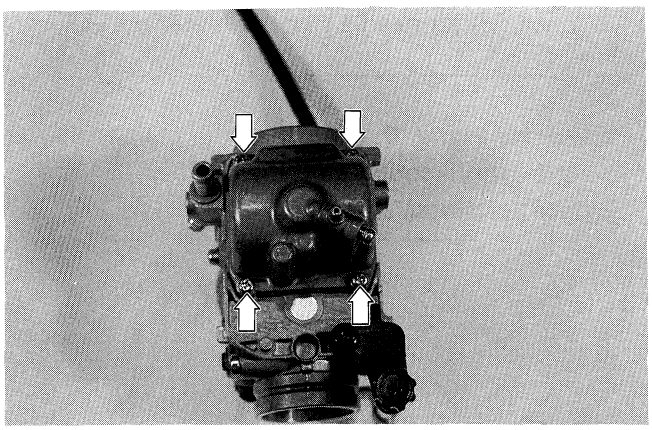


- Remove the piston valve spring and piston valve from the carburetor body.



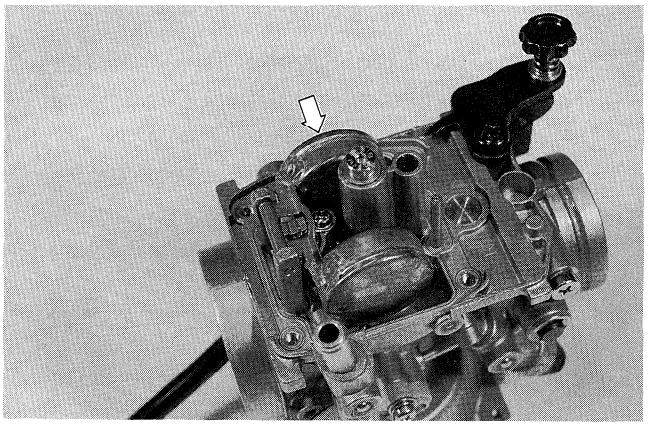
- Using the impact driver, remove the float chamber cap.

09900-09003	Impact driver set



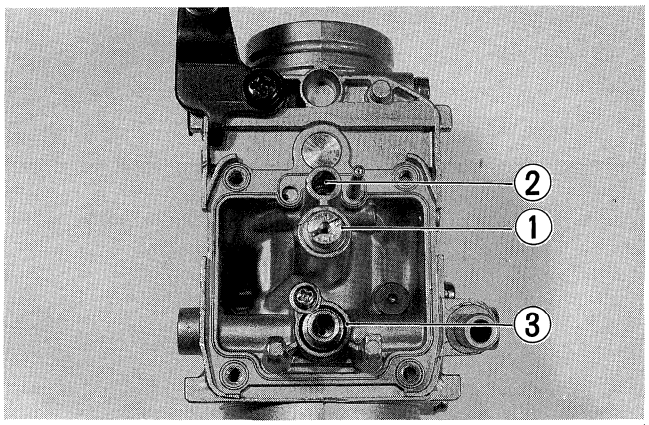
- Pull out the float pin and remove the float.

CAUTION:
When removing the float pin, be careful not to damage the carburetor body.

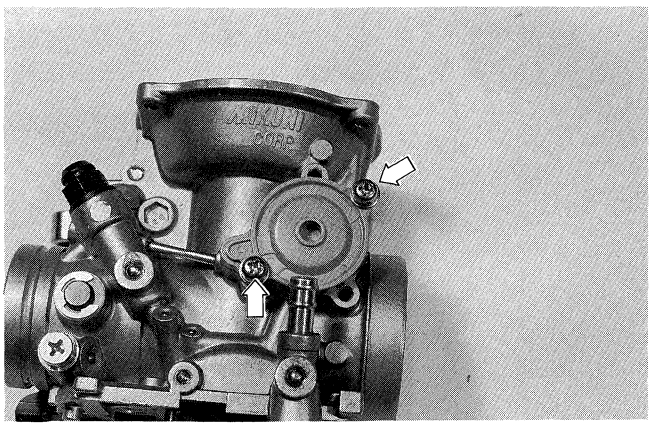


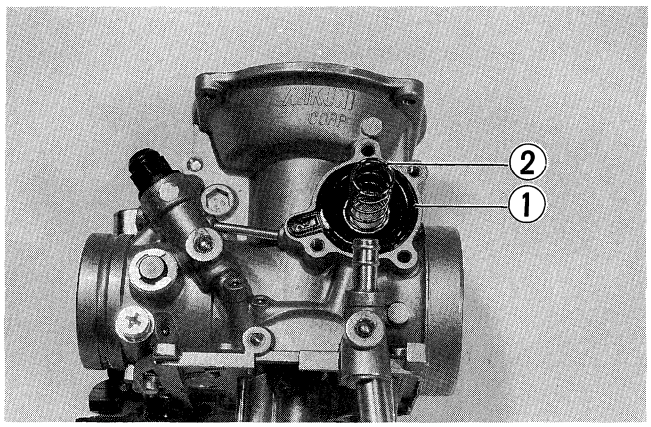
- Remove the main jet ①, pilot jet ② and needle valve ③.

NOTE:
When replacing the main jets, check their size and install them to the proper positions.



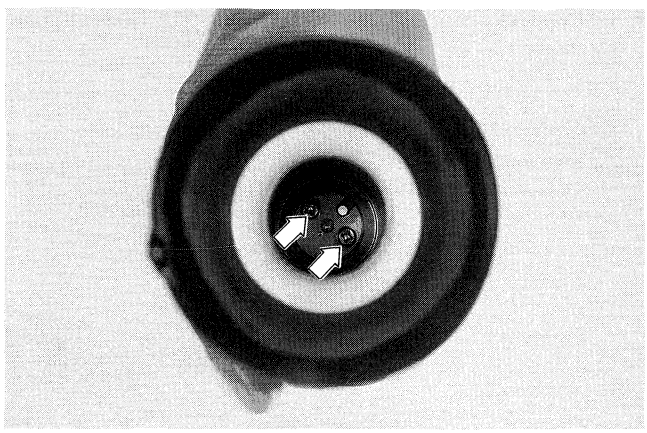
- Unscrew the two screws and remove the coasting valve ① and the spring ②.



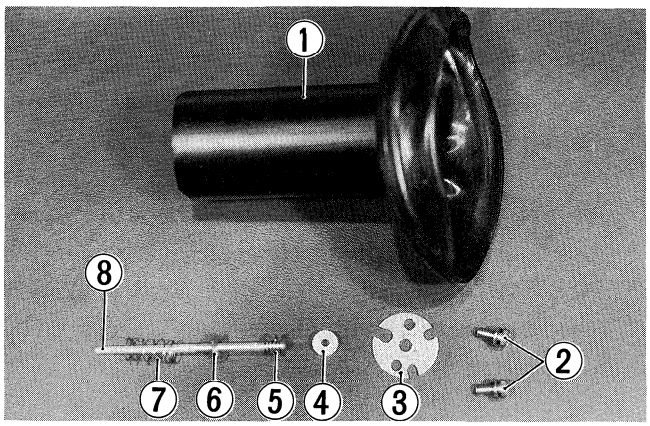


- Remove the jet needle stopper plate screws.

NOTE:
When replacing the jet needles, check their identification codes and install them to the proper positions.



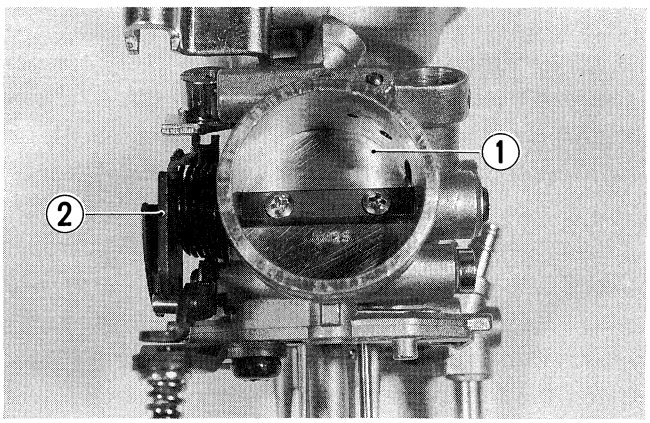
① Piston valve
② Jet needle stopper screw
③ Stopper plate
④ Spacer
⑤ E-ring
⑥ Washer
⑦ Spring
⑧ Jet needle



- Remove the two screws, and pull out the throttle valve ① by turning the throttle valve shaft ②.

09900-09003	Impact driver set

CAUTION:
These two screws are locked by punching its end. Once removing the screws, they will be damaged. When reinstalling the throttle valve, apply Thread lock "1342" to these two screws.

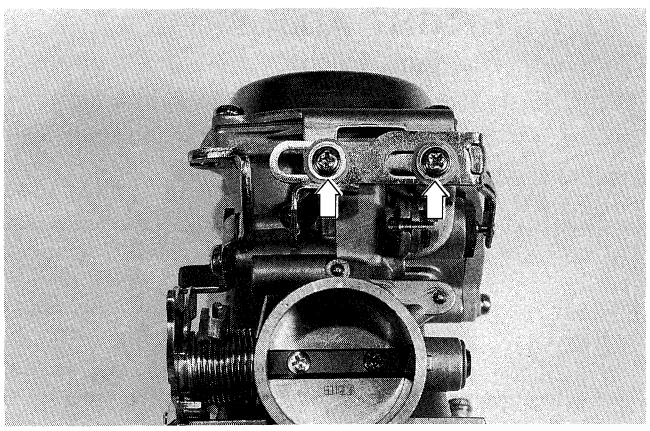


FRONT CARBURETOR

Only different point from rear carburetor is described.

- Remove the choke cable bracket by using impact driver set.

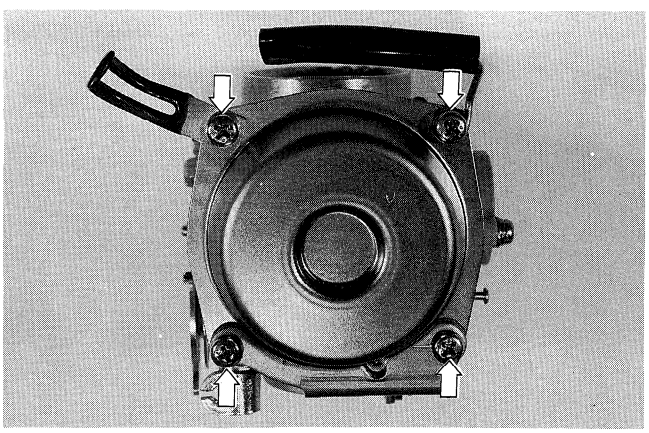
09900-09003	Impact driver set



- Remove the carburetor top cap by using impact driver set.

09900-09003	Impact driver set

NOTE:
Other procedure is as same as rear carburetor disassembly.



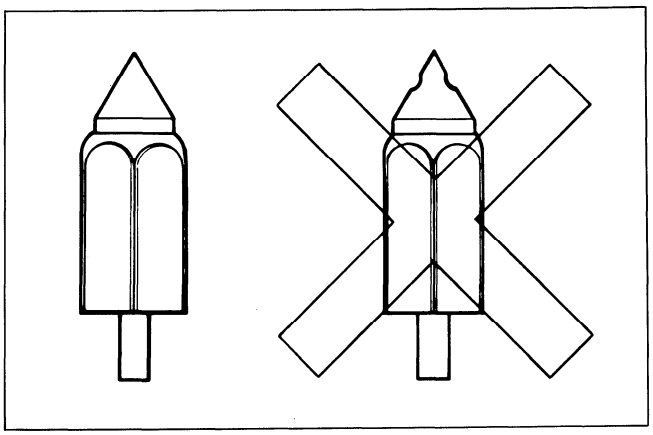
INSPECTION

- Check following items for any damage of clogging.

* Pilot jet
* Main jet
* Main air jet
* Pilot air jet
* Needle jet air bleeding hole
* Float
* Needle valve mesh and O-ring
* Diaphragm
* Gasket
* Throttle valve shaft oil seals
* Pilot outlet and by-pass holes
* Fuel hose
* Coasting valve

NEEDLE VALVE INSPECTION

If foreign matter is caught between the valve seat and the needle, the gasoline will continue flowing and cause it to overflow. If the seat and needle are worn beyond the permissible limits, similar trouble will occur. Conversely, if the needle sticks, the gasoline will not flow into the float chamber. Clean the float chamber and float parts with gasoline. If the needle is worn as shown in the illustration, replace it together with valve seat. Clean the fuel passage of the mixing chamber with compressed air.

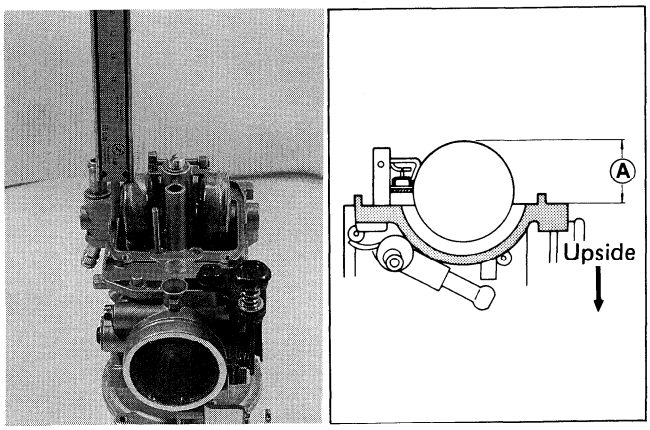


FLOAT HEIGHT ADJUSTMENT

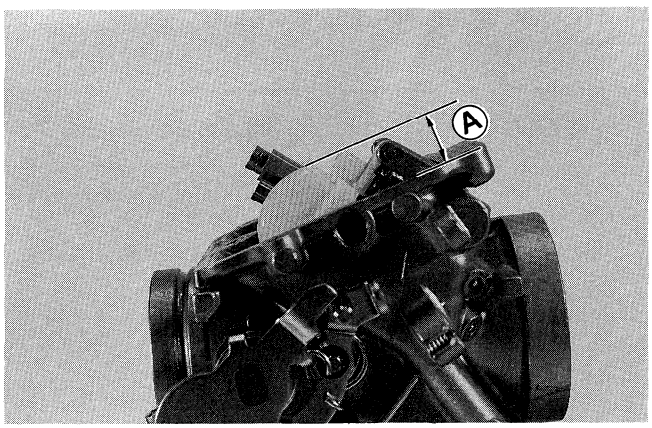
To check the float height, invert the carburetor body, with the float arm kept free, measure the height Ⓐ while float arm is just in contact with needle valve by using calipers.

Float height Ⓐ	No. 1	27.7 ± 0.5 mm (1.09 ± 0.02 in)
	No. 2	9.1 ± 0.5 mm (0.36 ± 0.02 in)

09900-20101	Vernier calipers

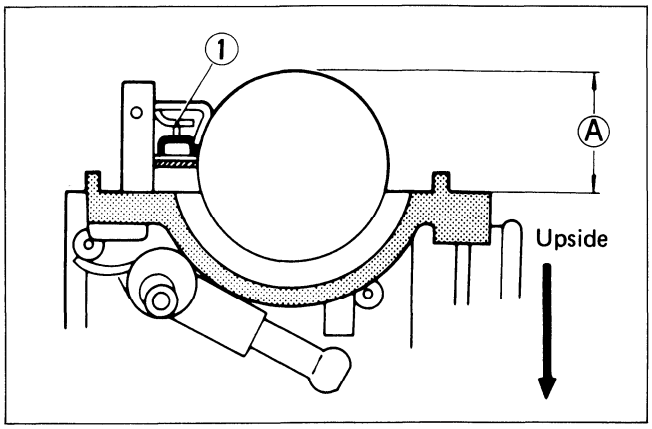


REAR CARBURETOR



FRONT CARBURETOR

- Bend the tongue ① as necessary to bring the height Ⓐ to this value.

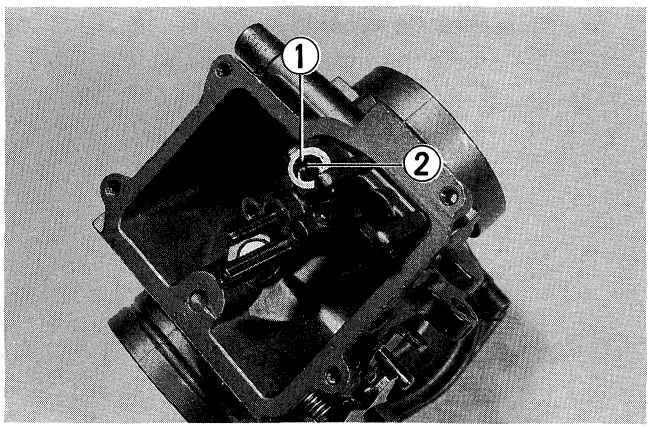


REASSEMBLY

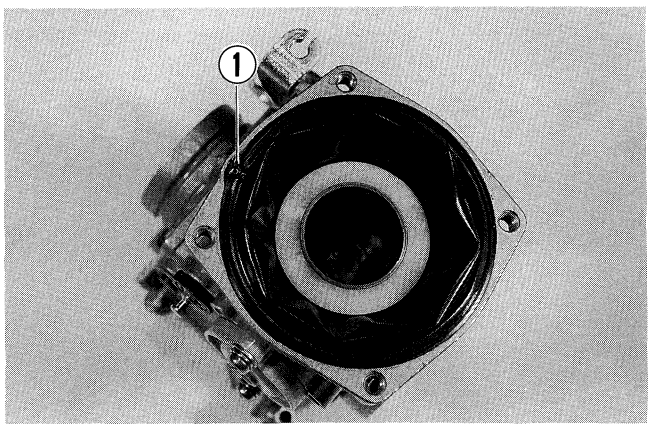
Reassemble the carburetor in the reverse order of disassembly.

Pay attention to the following points.

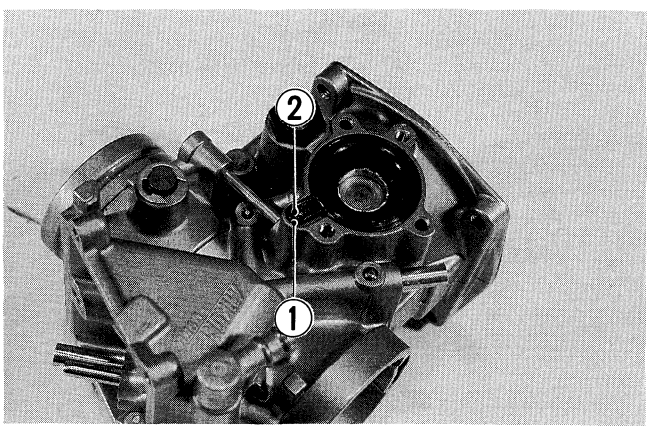
- Align the groove ① of the needle jet with the pin ② and replace it.



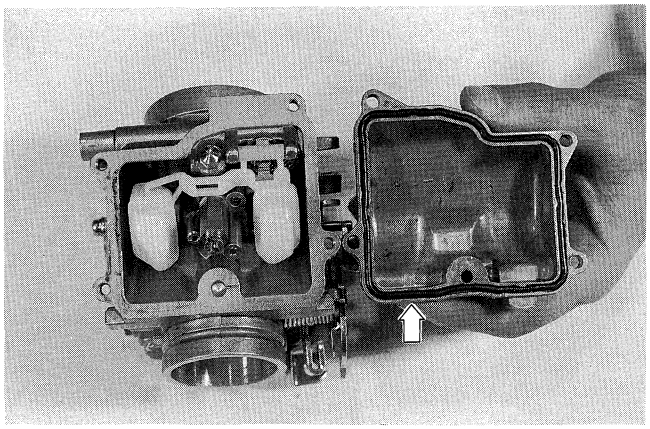
- Place tongue ① of diaphragm to the carburetor body properly.



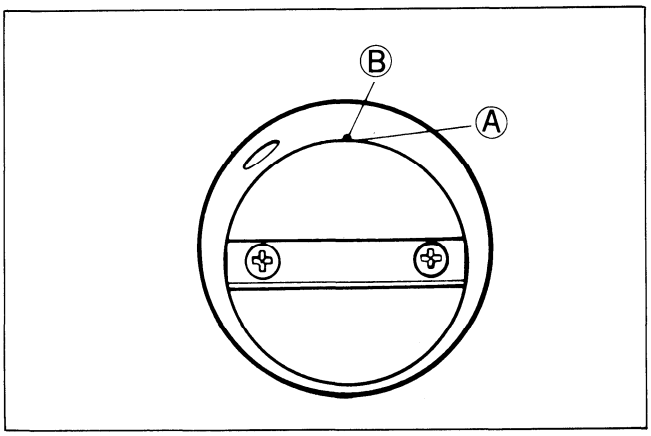
- When installing the coasting valve to the body, align the hole ① and air hole ②.



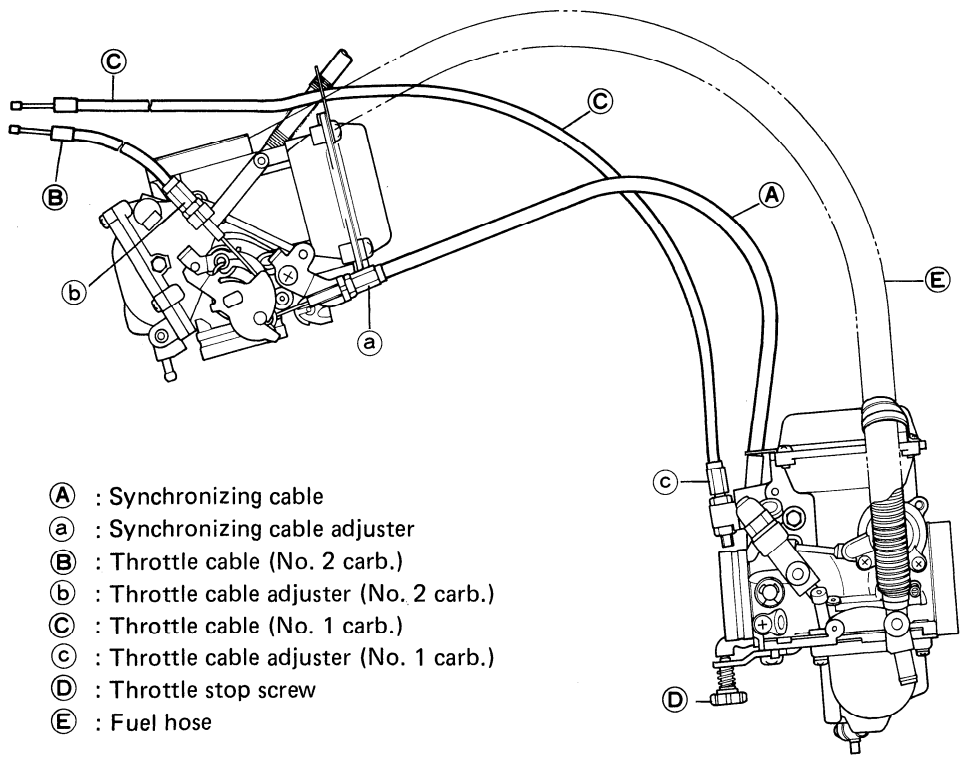
- Set a new seal-ring on the front carburetor float chamber to prevent fuel leakage.



- Set each throttle valve in such a way that its top end Ⓐ meets the foremost by-pass Ⓑ .



BALANCING CARBURETORS



Ⓐ : Synchronizing cable
ⓐ : Synchronizing cable adjuster
Ⓑ : Throttle cable (No. 2 carb.)
ⓑ : Throttle cable adjuster (No. 2 carb.)
Ⓒ : Throttle cable (No. 1 carb.)
ⓒ : Throttle cable adjuster (No. 1 carb.)
Ⓓ : Throttle stop screw
Ⓔ : Fuel hose

CAUTION:
Once removing the synchronizing cable Ⓐ or throttle cables Ⓑ, Ⓒ or carburetors, it is necessary to balance the two carburetors.

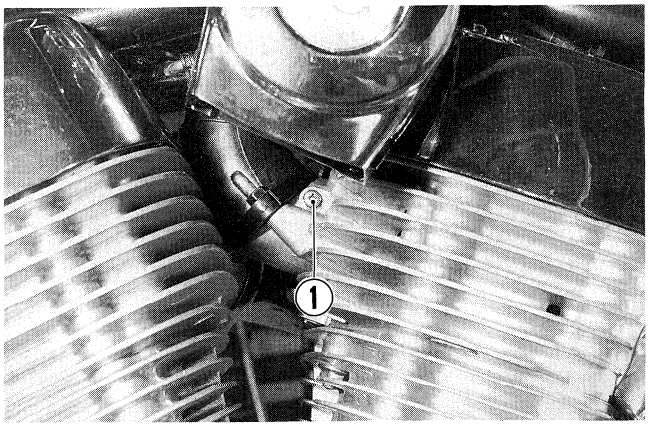
IN CASE OF CHANGING THE SYNCHRONIZING CABLE Ⓐ :

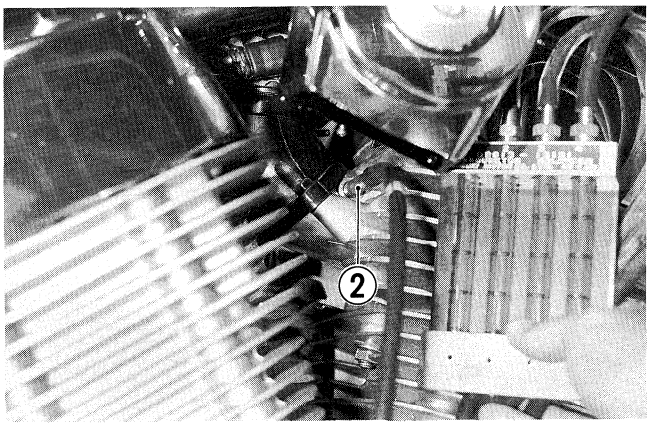
As the first step, calibrate the carburetor balancer gauge, as follows:

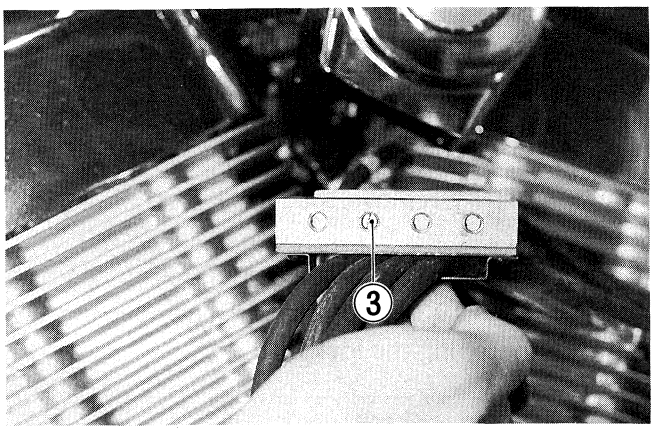
- Connect the ignitor coupler to the main harness.
- Connect the fuel hose to the fuel tank.

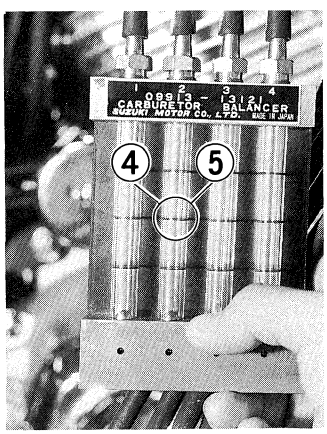
09913-13121	Carburetor balancer
09913-13140	Adapter

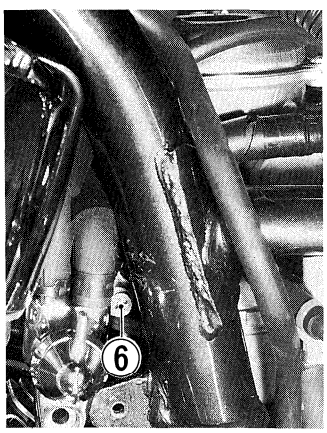
- Start up the engine and run it in idling condition for warming up.
- Stop the warm-up engine. Remove vacuum inspection screw ① for No. 2 carburetor and install adapter ② with gasket.
- Connect one of the four rubber hoses of the balancer gauge to this adapter, and start up the engine, and keep it running at 1 000 r/min by turning throttle stop screw Ⓓ.
- Turn the air screw ③ of the gauge so that the vacuum acting on the tube of that hose will bring the steel ball ④ in the tube to the center line ⑤.
- After making sure that the steel ball stays steady at the center line, disconnect the hose from the adapter and connect the next hose to the adapter. Turn air screw to bring the other steel ball to the center line. Now the balancer has been calibrated.
- Remove the vacuum inspection screw ⑥ for No. 1 carburetor and install the adapter with the gasket after removing the fuel cock.
- Install the calibrated balancer hose to the adapters.



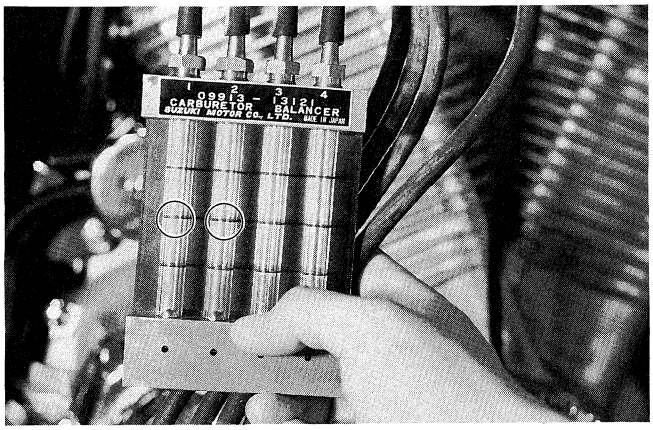


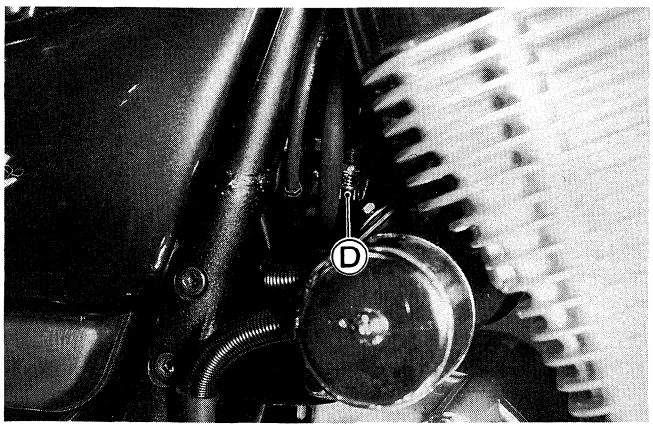


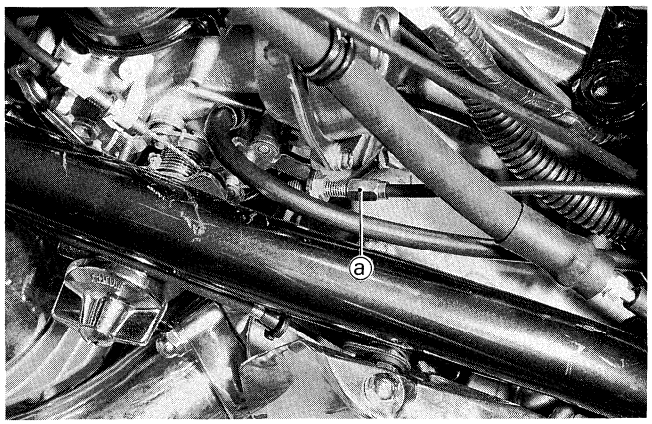




- Set the carburetor balancer which is calibrated.
- Warm up the engine, and keep it running at 1 000 r/min.
- Under this condition, see if the two steel balls stay equally at the center level line, as they should, to signify that the two carburetors are in balance: if not, loosen lock nut and turn the synchronizing adjuster ⓐ and the throttle stop screw Ⓓ to bring the steel balls to the center level line by keeping the engine running at 1 000 r/min.



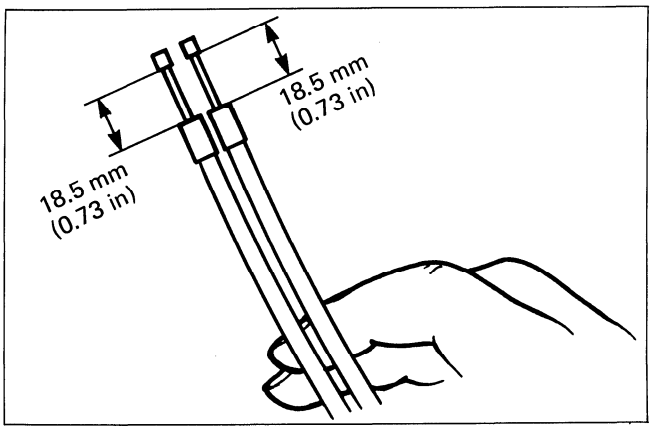




IN CASE OF CHANGING THE THROTTLE CABLE Ⓑ, Ⓒ

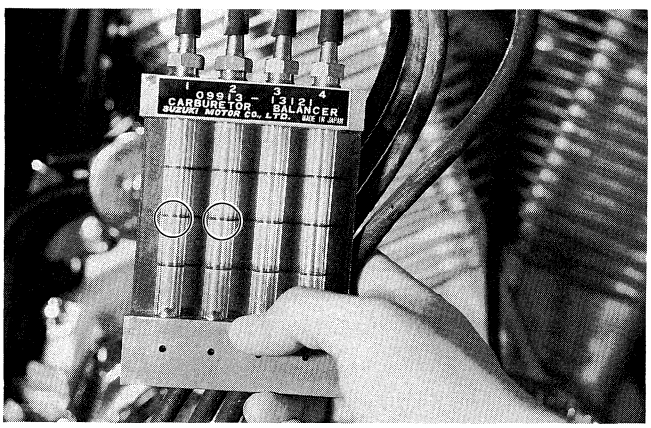
As the first step, calibrate the carburetor balancer gauge at 2 000 r/min, as the same manners of the case of changing the synchronizing cable.

- Temporarily remove the No. 1 and No. 2 carburetors.
- Set the throttle cables' inner wire length to 18.5 mm (0.73 in) by turning the adjusters ⓑ, after loosening the lock nuts.



NOTE:
*** Be careful not to twist the throttle cable Ⓑ, Ⓒ.**

- Install the No. 1 and No. 2 carburetors and set the carburetor balancer which is calibrated at 2 000 r/min.
- Warm up the engine, and keep it running at 2 000 r/min by turning the throttle grip.



- Under this condition, see if the two steel balls stay equally at the center level line, as they should, to signify the two carburetors are in balance: if not, loosen lock nuts and turn the throttle cable adjuster ⓑ to adjust the throttle valve setting to bring the steel balls to the center level line.

IN CASE OF CHANGING THE CARBURETORS

When changing the carburetors, it is necessary to remove the synchronizing cable and the throttle cables. So once removing the carburetor, it becomes necessary to adjust the cables by performing above two steps (i.e. IN CASE OF CHANGING THE SYNCHRONIZING CABLE and IN CASE OF CHANGING THE THROTTLE CABLE).

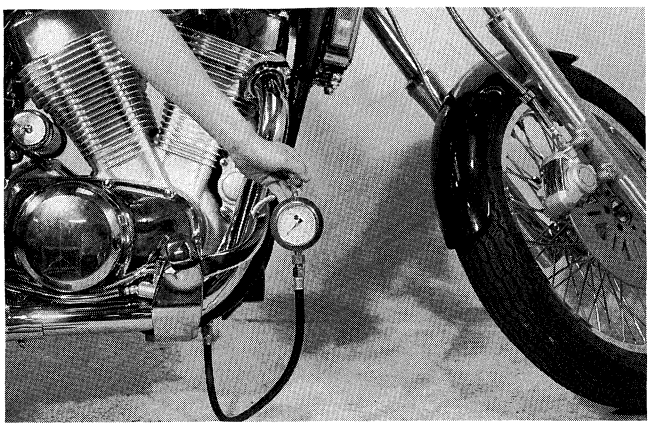
CAUTION:
In this case first adjust the synchronizing cable.

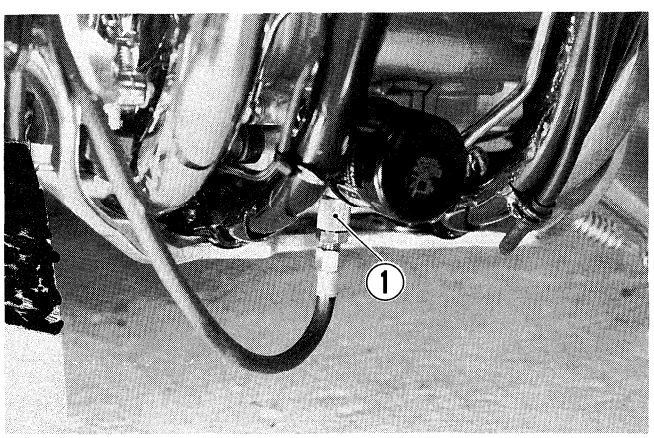
LUBRICATION SYSTEM AND COOLING SYSTEM

OIL PRESSURE

Check the oil level in the inspection window and check the oil pressure in the following manner.

- Remove the oil pressure inspection bolt.
- Install the oil pressure adapter ①.
- Install the oil pressure gauge in the position shown in the figure.
- Warm up the engine as follows:
  Summer 10 min. at 2 000 r/min.
  Winter 20 min. at 2 000 r/min.
- After warming up operation, increase the engine speed to 3 000 r/min, and read the oil pressure gauge.
- The oil pump pressure is specified below:





OIL PRESSURE SPECIFICATION

Above 3.5 kg/cm² (50 psi)
Below 6.5 kg/cm² (92 psi) at 3 000 r/min
Oil temp. at 60°C (140°F)

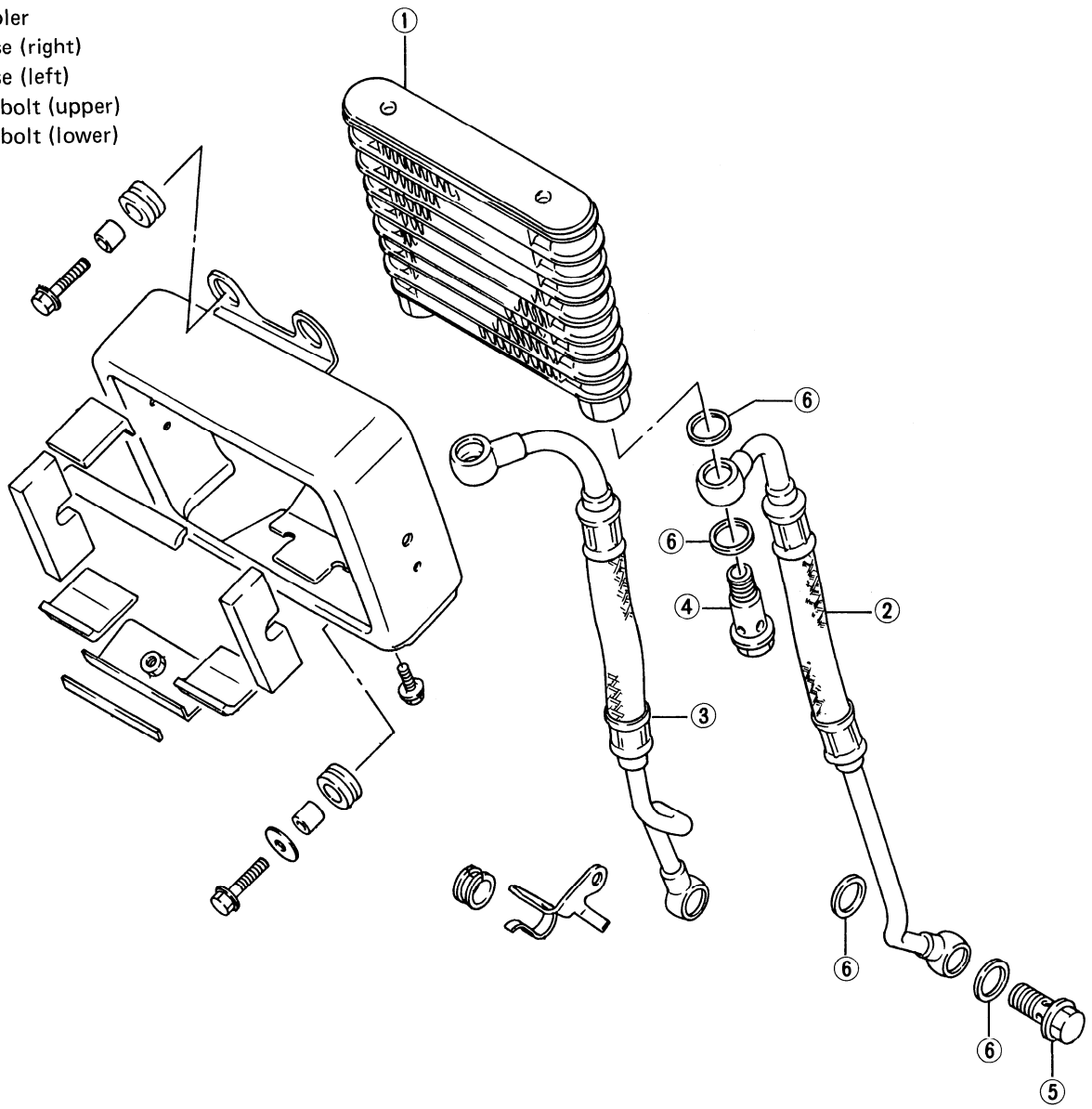
If the oil pressure is lower or higher than the specifications, several causes may be considered.

* Low oil pressure is usually the result of clogged oil filter, oil leakage from the oil passageway, damaged oil seal, a defective oil pump or a combination of these items.
* High oil pressure is usually caused by a engine oil which is too heavy a weight, a clogged oil passage, improper installation of the oil filter or a combination of these items.

CAUTION:
The recommended engine oil is, API classification SE or SF, 10W-40 motor oil.

09915-74510	Oil pressure gauge
09915-77330	Oil pressure gauge (meter)
09915-74530	Oil pressure gauge adapter

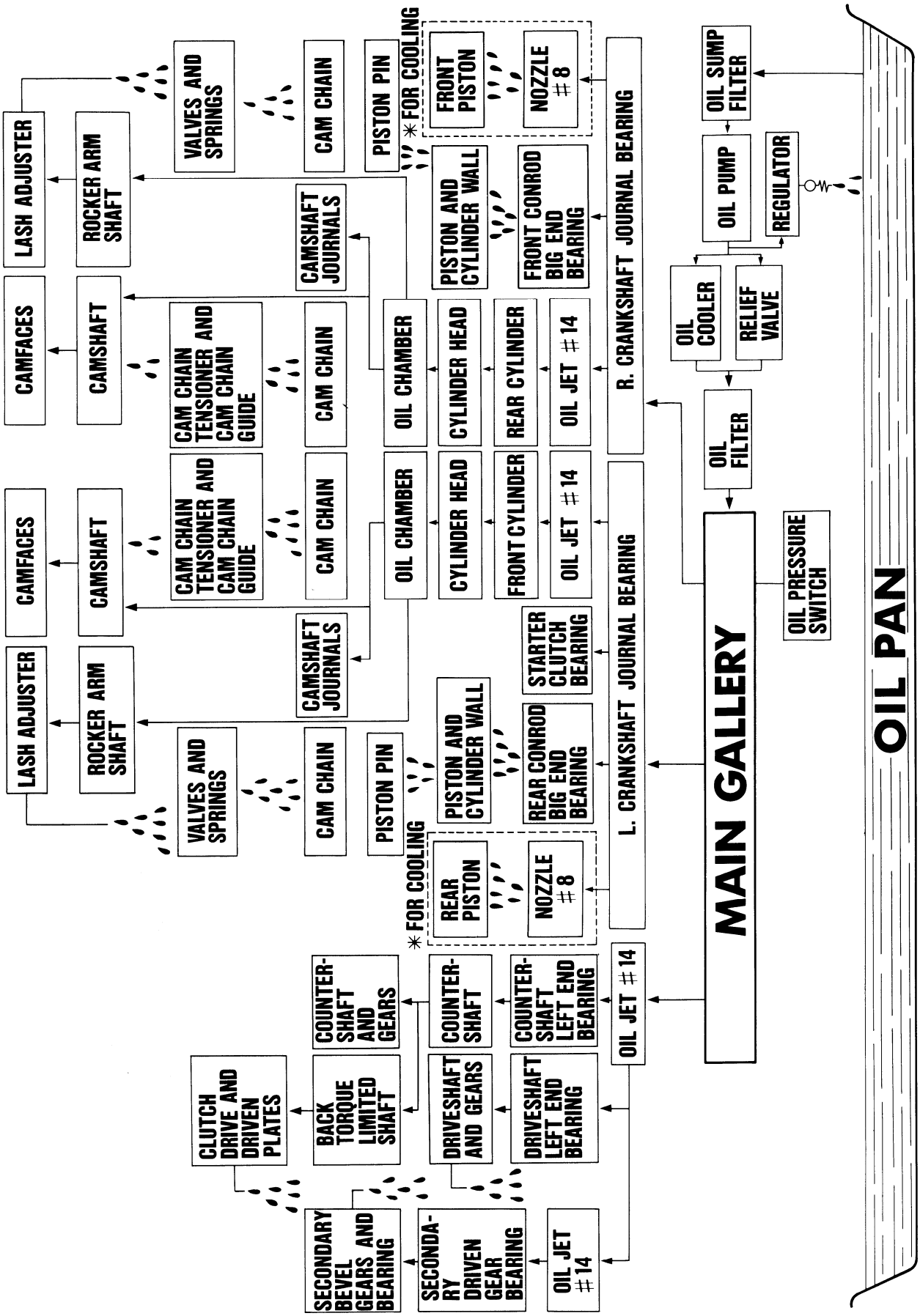
① Oil cooler
② Oil hose (right)
③ Oil hose (left)
④ Union bolt (upper)
⑤ Union bolt (lower)
⑥ Gasket

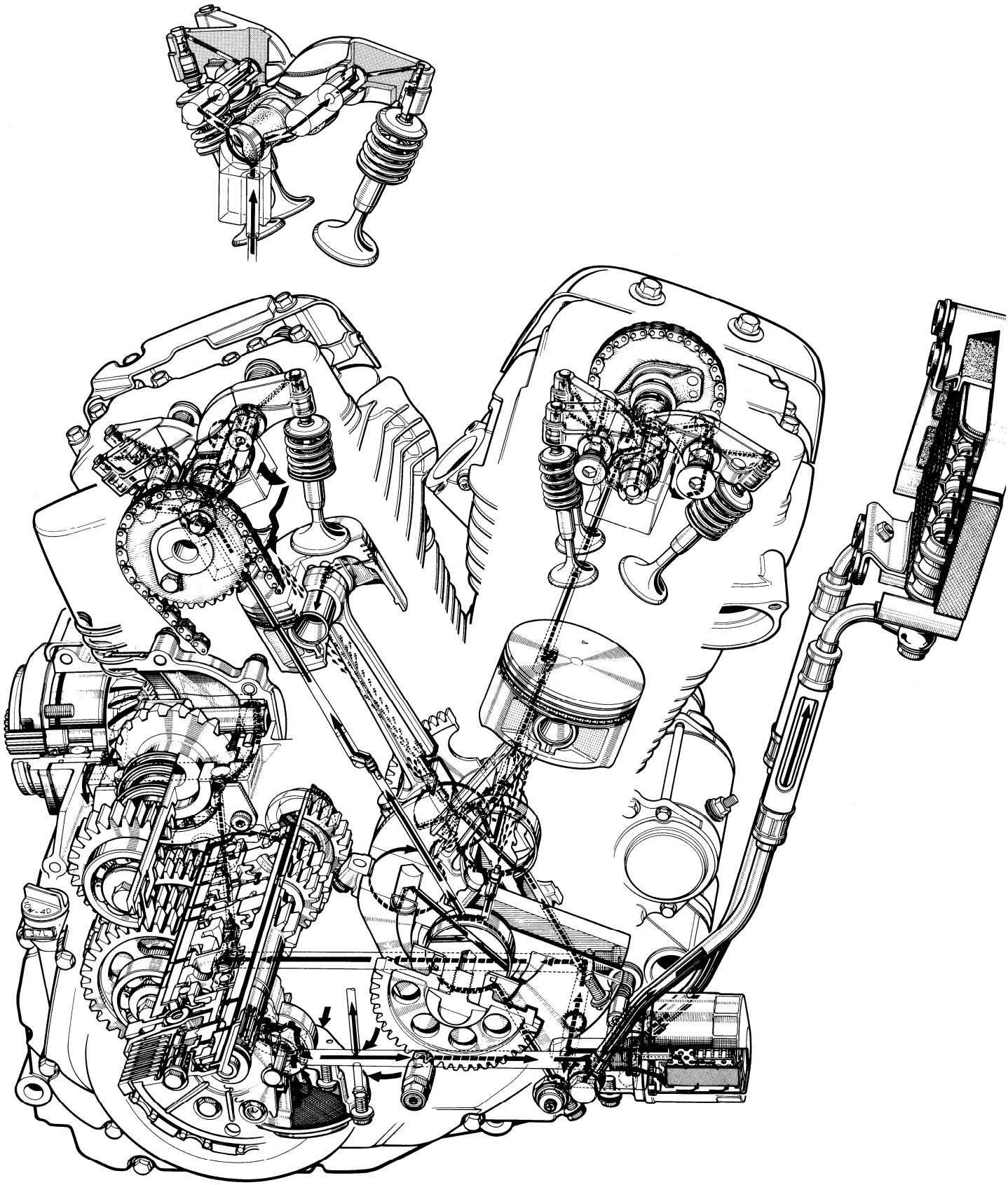


Tightening torque

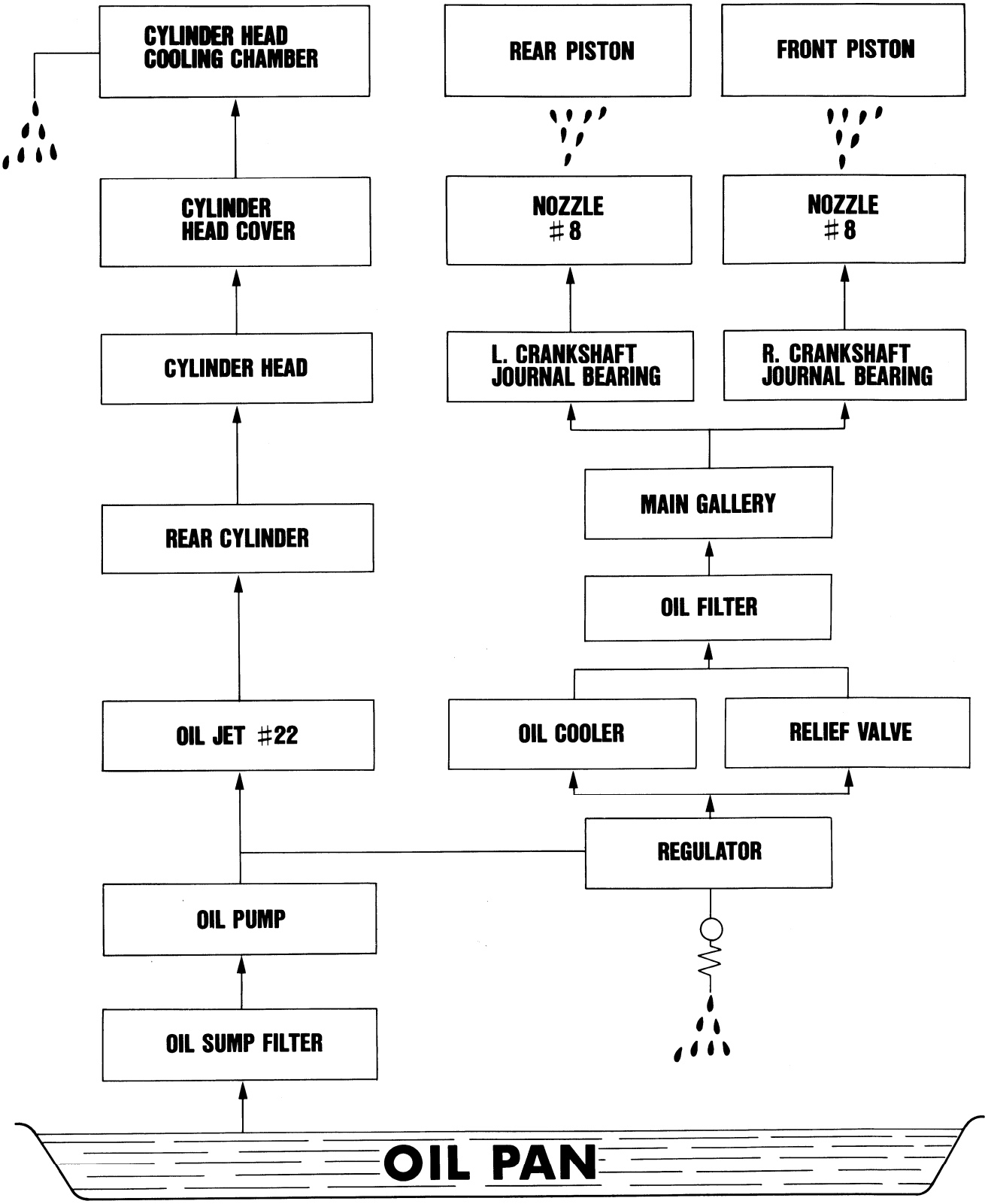
Item	N·m	kg-m	lb-ft
④, ⑤	25 – 30	2.5 – 3.0	18.0 – 21.5

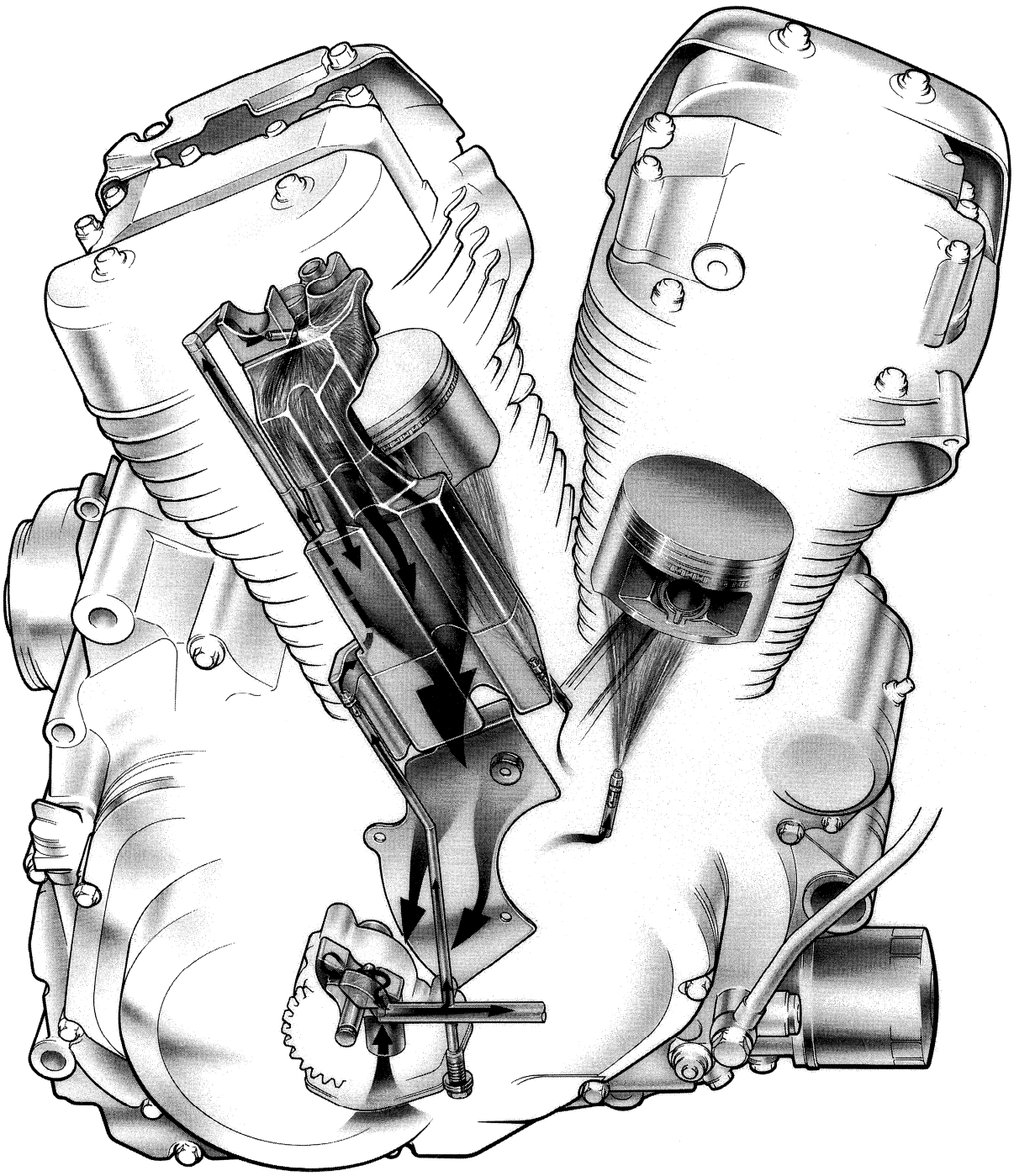
LUBRICATION SYSTEM CHART





COOLING SYSTEM CHART





ELECTRICAL SYSTEM

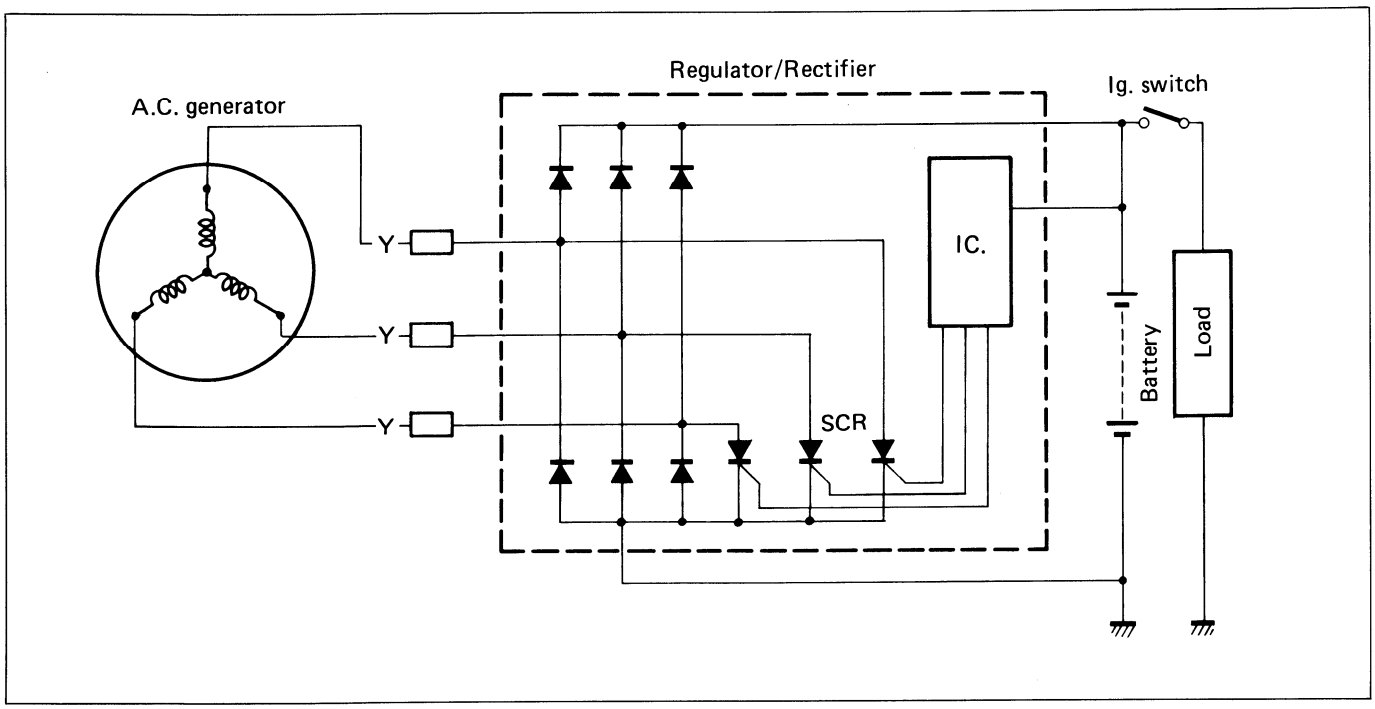
CONTENTS

CHARGING SYSTEM

DESCRIPTION

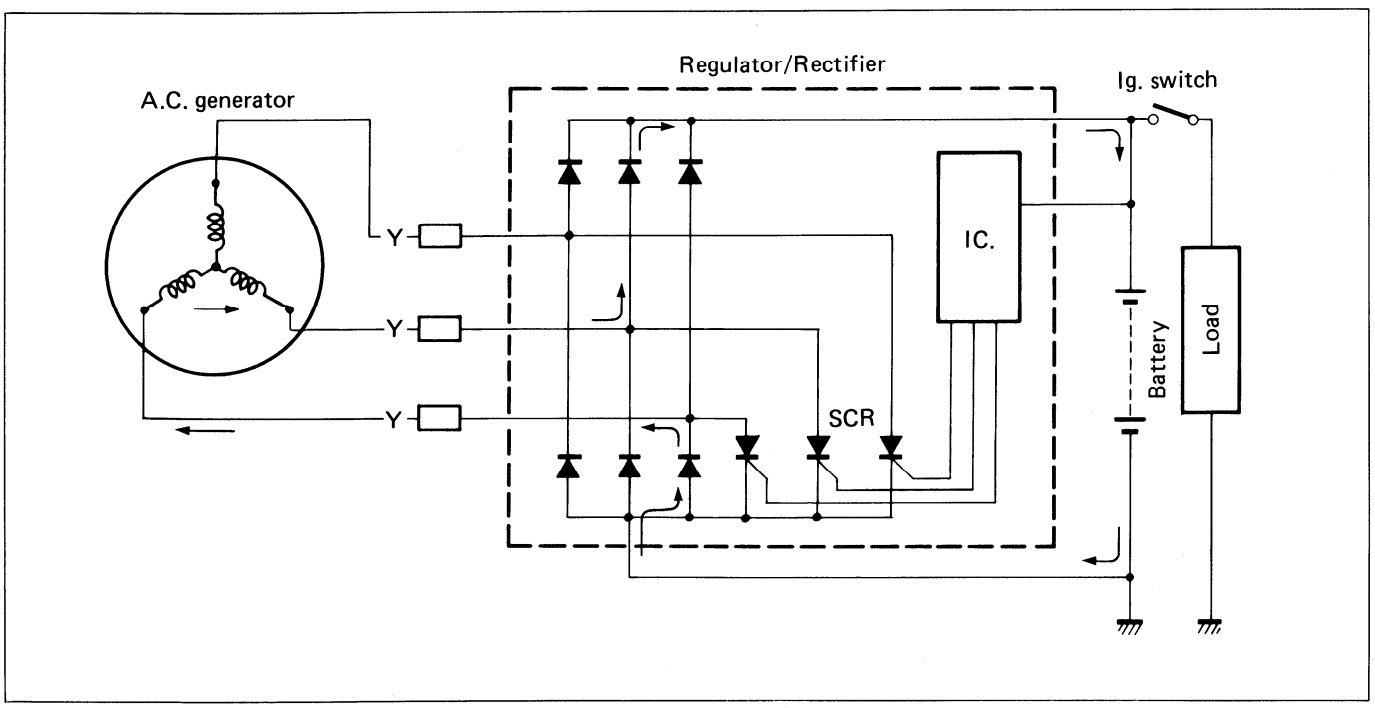
The circuit of the charging system is indicated in the figure, which is composed of an AC generator, regulator/rectifier unit and battery.

The AC current generated from the AC generator is rectified by the rectifier and is turned into DC current, then it charges the battery.

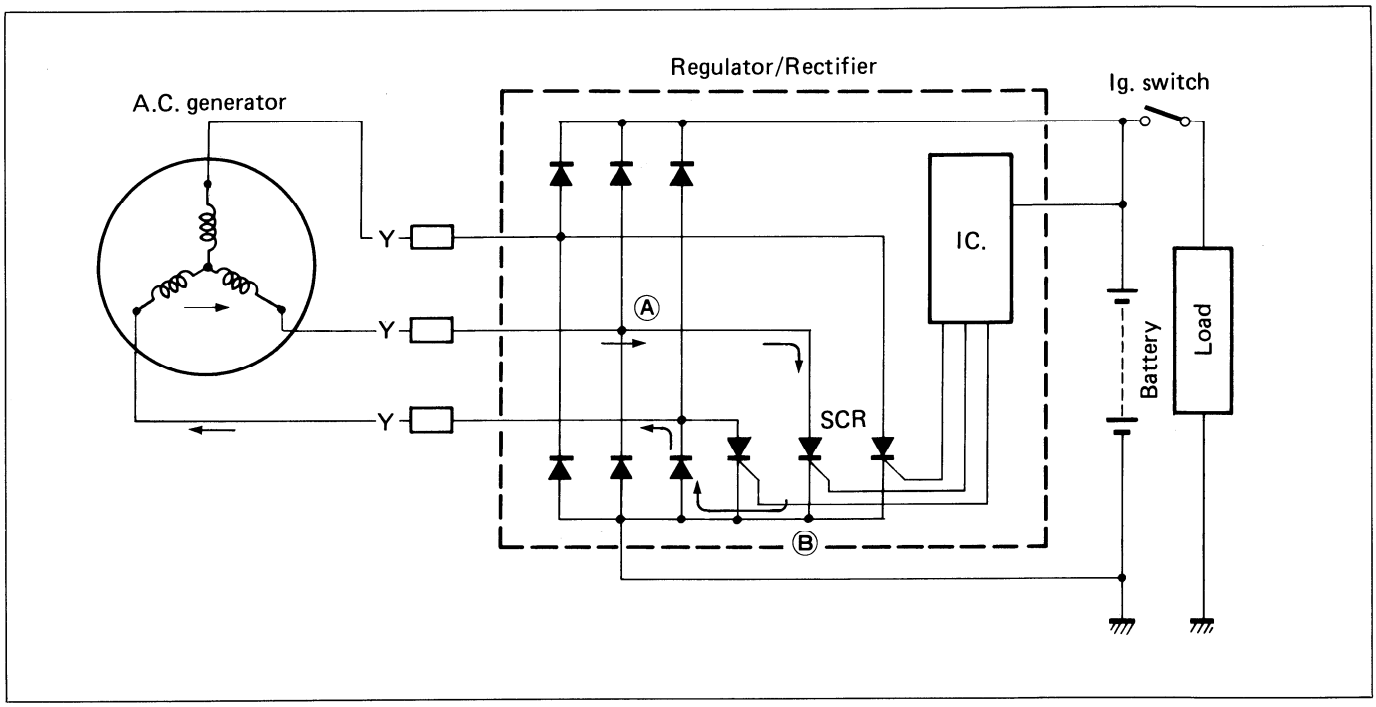


Function of Regulator

While the engine r/min is low and the generated voltage of the AC generator is lower than the adjusted voltage of regulator, the regulator does not function. However, the generated current charges the battery directly at this time.



When the engine r/min becomes higher, the generated voltage of the AC generator also becomes higher and the voltage between the battery terminals becomes high accordingly. When it reaches the adjusted voltage of the I.C., (Integrated Circuit) and it is turned "ON", a signal will be sent to the SCR (Thyristor) gate probe and the SCR will be turned "ON".
Then, the SCR becomes conductive in the direction from point Ⓐ to point Ⓑ. At this time, the current generated from the AC generator gets through the SCR without charging the battery and returns to AC generator again. At the end of this state, since the AC current generated from AC generator flows to point Ⓑ, the reverse current tends to flow to SCR. Then, the circuit of SCR turns to the OFF mode and begins to charge the battery again. Thus these repetitions maintain charging voltage and current to the battery constant and protect it from overcharging.



INSPECTION

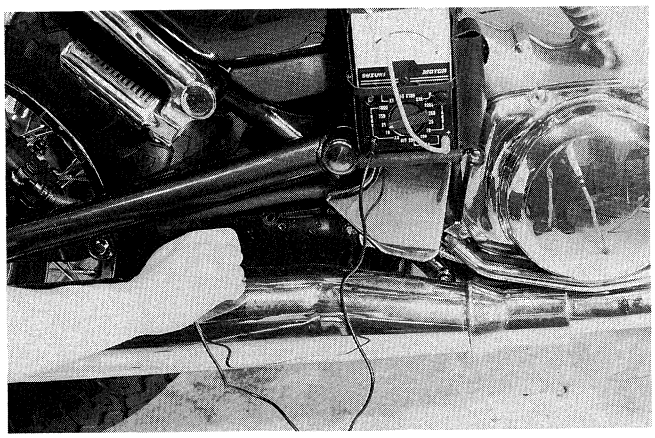
CHARGING OUTPUT CHECK

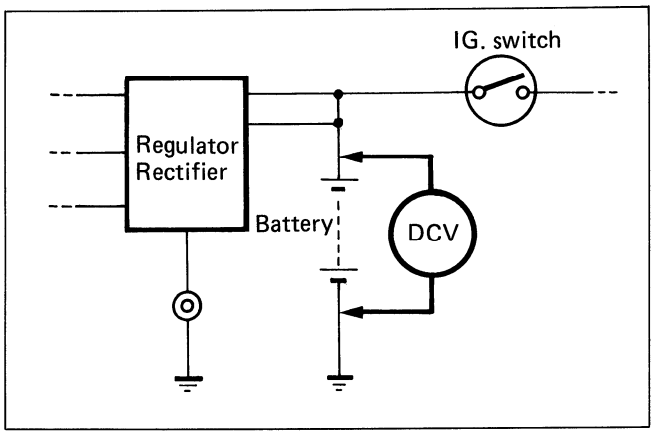
- Start the engine and keep it running at 5 000 r/min with dimmer switch turned HI position.
- Using the pocket tester, measure the DC voltage between the battery terminal ⊕ and ⊖ .
  If the tester reads under 14.0V or over 15.5V, check the AC generator no-load performance and regulator/rectifier.

NOTE:
When making this test, be sure that the battery is fully-charged condition.

STD charging output	14.0 – 15.5V (DC) at 5 000 r/min

09900-25002	Pocket tester



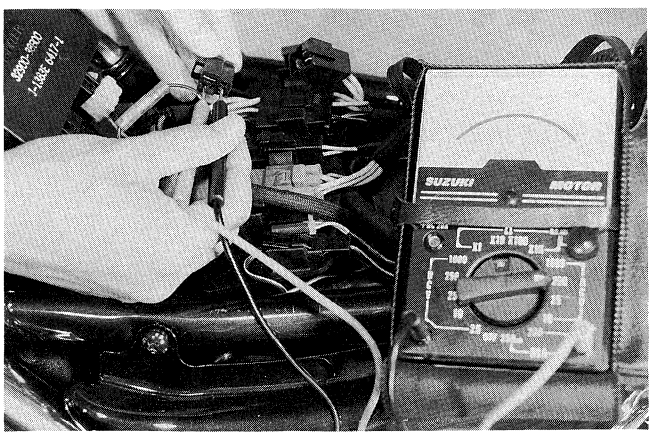


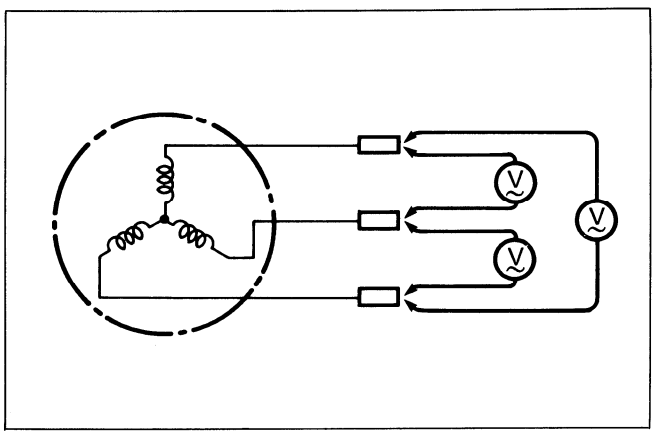
AC GENERATOR NO-LOAD PERFORMANCE

- Remove the frame covers and seat.
- Disconnect the AC generator lead wire couplers.
- Start the engine and keep it running at 5 000 r/min.
- Using the pocket tester, measure the AC voltage between the three yellow lead wires.
  If the tester reads under 80V, the AC generator is faulty.

STD No-load performance	More than 80V (AC) at 5 000 r/min

09900-25002	Pocket tester



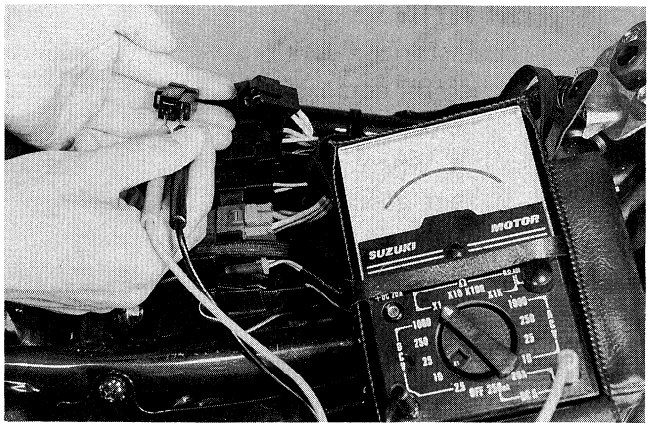


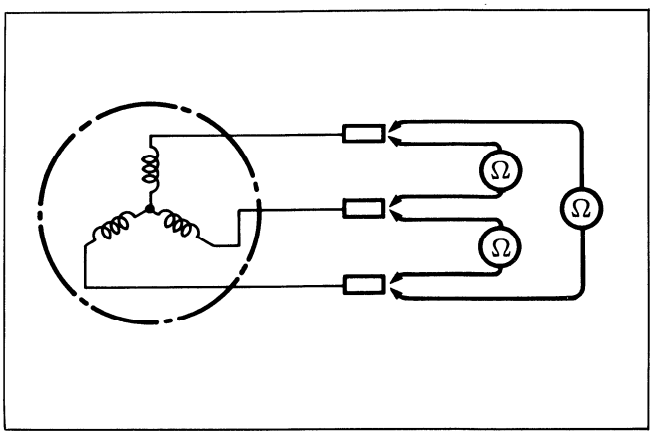
AC GENERATOR CONTINUITY CHECK

- Using the pocket tester, check the continuity between the lead wires of the stator.
  Also check that the stator core is insulated.

NOTE:
When making this test, it is not necessary to remove the AC generator.

09900-25002	Pocket tester





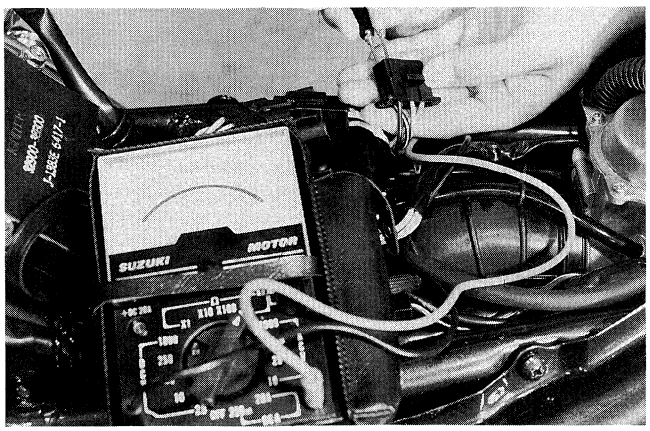
REGULATOR/RECTIFIER

- Remove the seat and left frame cover.
- Using the pocket tester (X 1kΩ range), measure the resistance between the lead wires in the following table.
  If the resistance checked is incorrect, replace the regulator/rectifier.

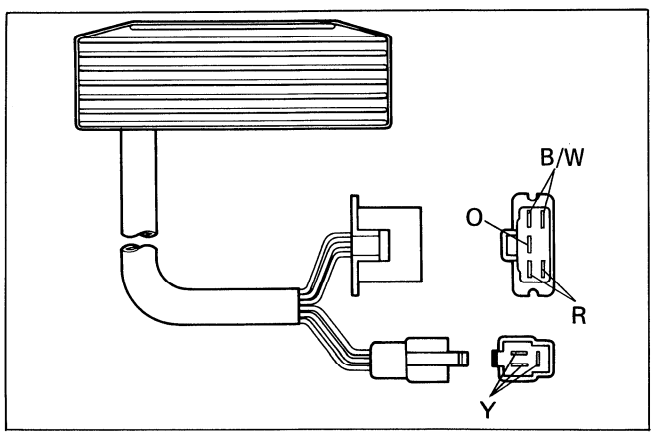
09900-25002	Pocket tester

Unit: Approx. kΩ

⊖ Probe of tester to: / ⊕ Probe of tester to:	R	O	B/W	Y
R		∞	∞	∞
O	70		34	45
B/W	6.5	4.2		2.5
Y	2.5	∞	∞	



CAUTION:
As transistors, capacitors, Zener diodes, etc. are used inside this regulator/rectifier, the resistance values will differ when an ohmmeter other than the SUZUKI pocket tester is used.



IGNITION SYSTEM

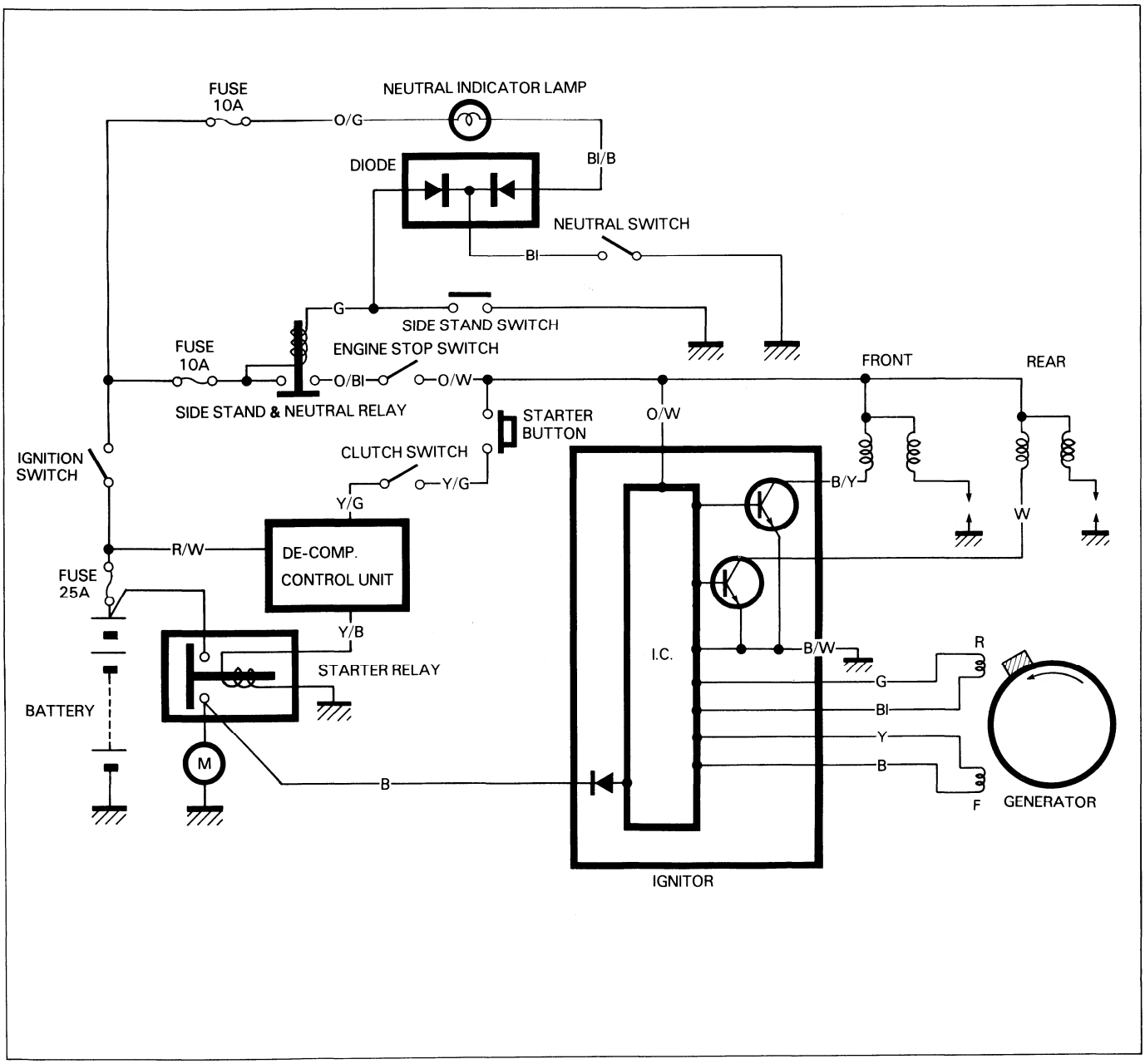
DESCRIPTION

The fully transistorized ignition system consists of a signal generator, ignitor, ignition coil, and spark plug. The signal generator comprises one rotor tip and two pick-up coils.

The signal generator coil is mounted on the generator cover. The output of the signal generator goes to the ignitor unit, where it turns ON and OFF the transistor alternately. As the transistor is turned ON and OFF, the current passing through the primary windings of the ignition coil is also turned ON and OFF accordingly. Thus, it induces the secondary current in the ignition coil secondary windings and produces the spark between spark plug gap.

Ignition cut-off circuit is incorporated in the ignitor unit. If the crankshaft turns in the reverse direction and reverse current is produced by the starter motor or the crankshaft turns more than 7,000 r/min., this circuit works on the transistor not to cut off the primary current of the ignition coil. It causes no sparking between spark plug gap.

Also, included in this ignition circuit is the sidestand and neutral relay whose function is to supply the current from the battery to the ignitor and ignition coil only when the transmission gear is at the neutral position or when the sidestand is at the upright position.



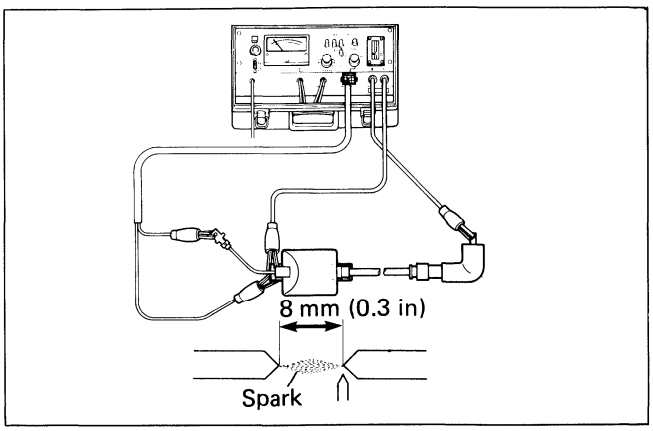
INSPECTION

IGNITION COILS (Checking with Electro Tester)

- Remove the ignition coils from the frame.
- Using the electro tester, test each ignition coil for sparking performance. The test connection is as indicated. Make sure that the three-needle sparking distance is at least 8 mm.
  If no sparking or orange color sparking occurs with this much gap, then it is defective and must be replaced.

09900-28106	Electro tester

STD Spark performance	8 mm (0.3 in)

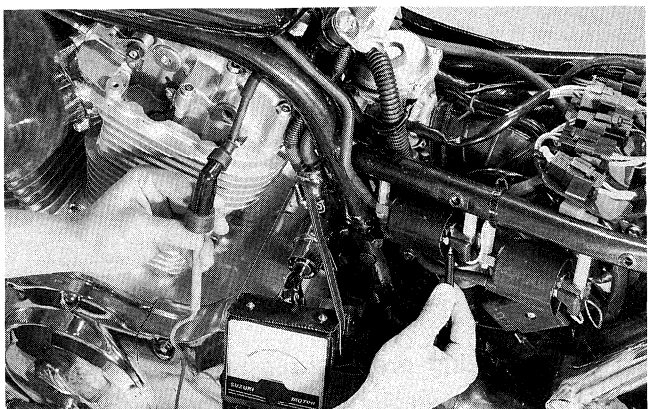


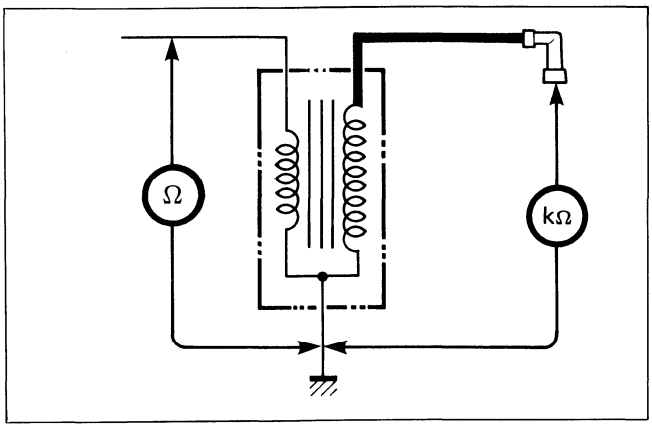
IGNITION COIL (Checking with Pocket Tester)

- A SUZUKI pocket tester or an ohm meter may be used, instead of the electro tester. In either case, the ignition coil is to be checked for continuity in both primary and secondary windings. Exact ohmic readings are not necessary, but, if the windings are in sound condition, their continuity will be noted with these approximate ohmic values.

09900-25002	Pocket tester

Ignition coil resistance	
Primary	1 – 7 Ω
Secondary	10 – 25 kΩ



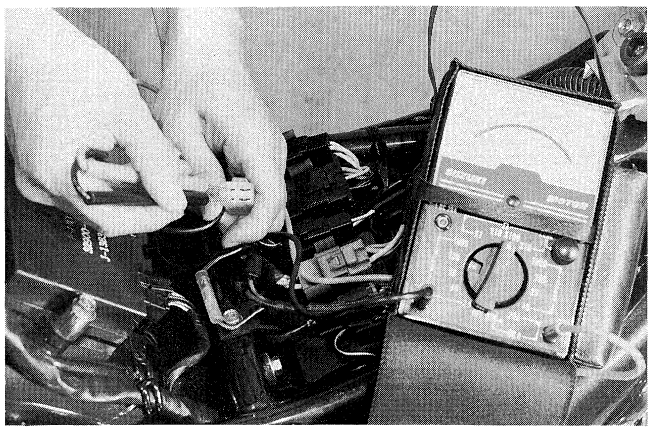


PICK-UP COIL (Checking with Pocket Tester)

- Remove the seat and the left frame cover.
- Measure the resistance between lead wires. If the resistance is infinity or less than the specification, the pick-up coil must be replaced.

09900-25002	Pocket tester

STD resistance	240 ± 20% Ω (Blue – Green Black – Yellow)

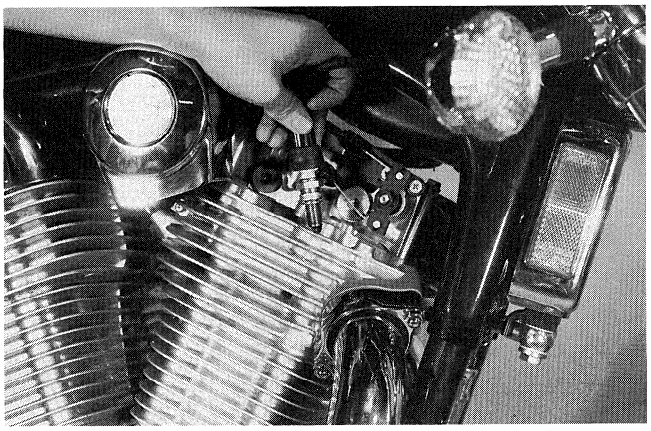


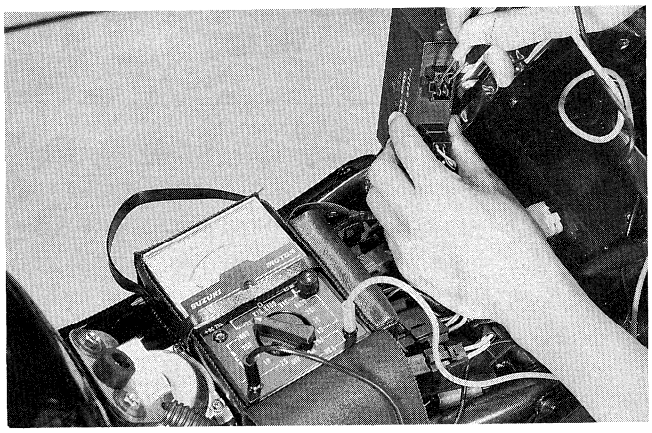
IGNITOR UNIT (TRANSISTOR UNIT)

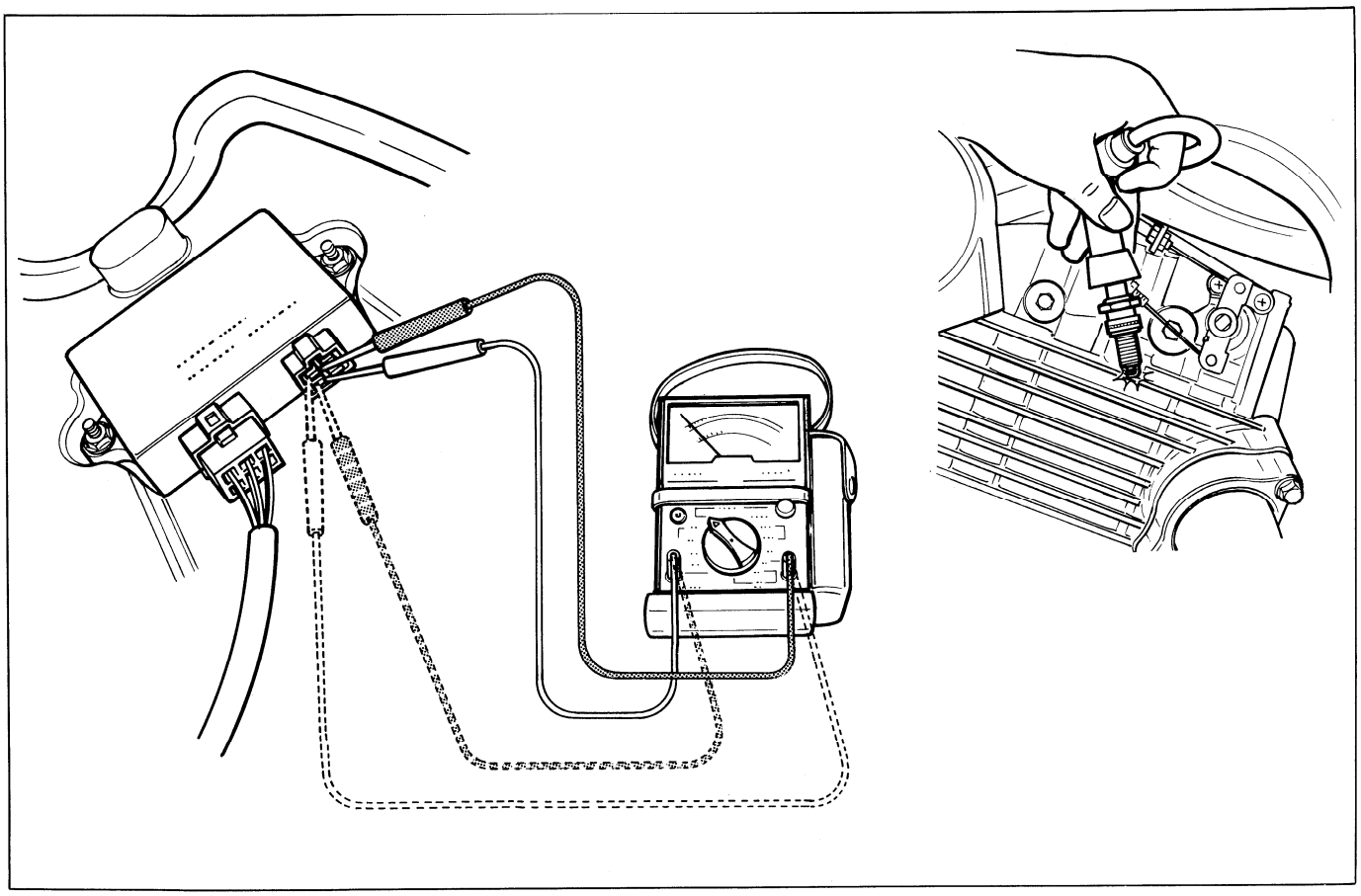
Remove the front and rear spark plugs, fit it to respective plug cap and place it on the cylinder head.

Remove the seat and left frame cover and disconnect the signal generator lead wire from the ignitor. Now, connect ⊕ pin of SUZUKI Pocket Tester (X1Ω range) with Blue lead wire on the ignitor side and ⊖ pin with Green lead wire. The ignitor is in good condition if the following is observed: The moment the test pins are taking reverse connection (positive to Green and negative to Blue) the spark plug of the rear cylinder sparks. Next, connect the ⊕ pin of tester with Yellow lead wire and the ⊖ pin with Black lead wire. Then, reverse the connection (⊕ pin to Black and ⊖ pin to Yellow). This should cause the front spark plug to fire. If the ignitor unit fails this test, it must be repalced.

NOTE:
This checking presupposes that the ignition coil used for checking is a good one.



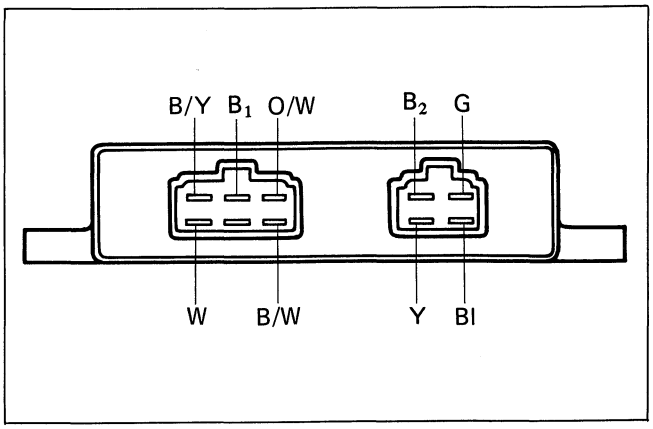




IGNITOR UNIT (Checking with Pocket Tester)

- Remove the seat.
- Remove the ignitor unit from the frame.
- Use the SUZUKI pocket tester, bring the ⊕ probe and the ⊖ probe into contact, with each lead wire of the ignitor unit, check for continuity, and measure the resistance value.
- When the continuity and the resistance values are as shown in the following table, it can be judged that the ignitor unit is normal.

CAUTION:
As capacitors, diodes, etc. are used inside this ignitor unit, the resistance values will differ when an ohmmeter other than SUZUKI pocket tester is used.



B/Y : to ignition coil primary winding (Front)
B : to starter relay
O/W : to battery +
W : to ignition coil primary winding (Rear)
B/W : Ground
B : to pick-up coil (Front)
Y : to pick-up coil (Front)
G : to pick-up coil (Rear)
BI : to pick-up coil (Rear)

Unit: Approx. kΩ

⊕ Probe of tester to: \ ⊖ Probe of tester to:	B/Y	B1	O/W	W	B/W	B2	Y	G	BI
B/Y		30	3.6	OFF	2.6	14	14	14	14
B1	OFF		18	OFF	17	40	40	40	40
O/W	OFF	18		OFF	1	7	7	7	7
W	OFF	30	3.5		2.5	14	14	14	14
B/W	OFF	19	1	OFF		5	5	5	5
B2	OFF	90	60	OFF	60		0.5	100	100
Y	OFF	90	60	OFF	60	0.5		106	100
G	OFF	90	60	OFF	60	100	100		0.5
BI	OFF	90	60	OFF	60	100	100	0.5	

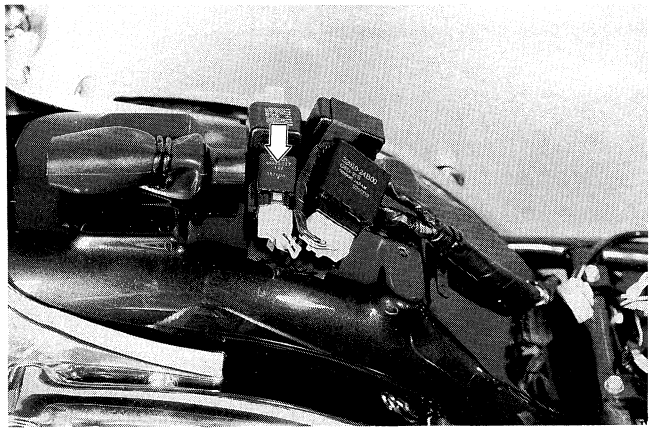
SIDE STAND AND NEUTRAL RELAY

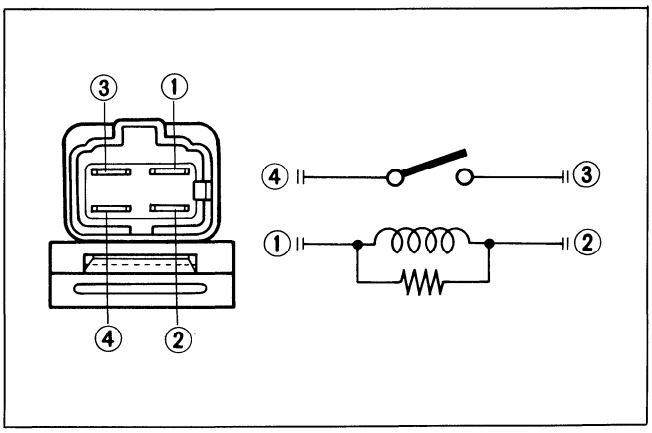
- Remove the side stand and neutral relay from the wiring harness.
- Check the resistance between terminal ① and ②.

Standard resistance	120 ± 20% Ω

- Apply 12 volts to ① and ② terminals, ⊕ to ① and ⊖ to ②, and check the continuity between ③ and ④ with pocket tester. If there is no continuity, replace the relay assembly with a new one.

09900-25002	Pocket tester





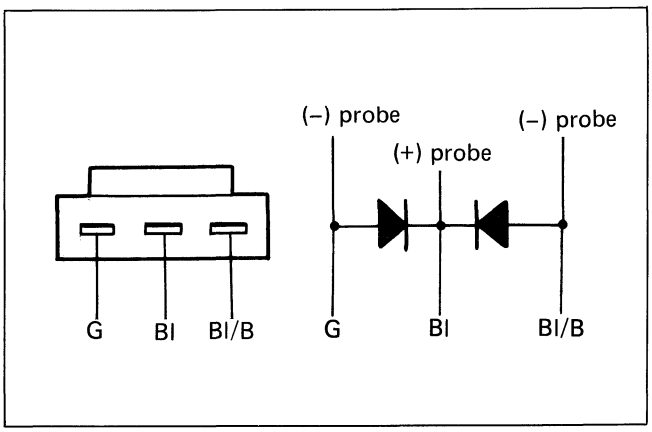
DIODE

The diode can pass current in one direction only. Check the diode for continuity.

Set the pocket tester to the "Ω x 1" range. Contact the pocket tester plus probe ⊕ to the rectifier Bl terminal and minus probe ⊖ to G or Bl/B terminal.

Reverse the test connections.

If the first step shows any continuity and the second step shows no continuity, the diode is in sound condition.



AUTOMATIC DE-COMPRESSION CONTROL AND STARTER SYSTEM

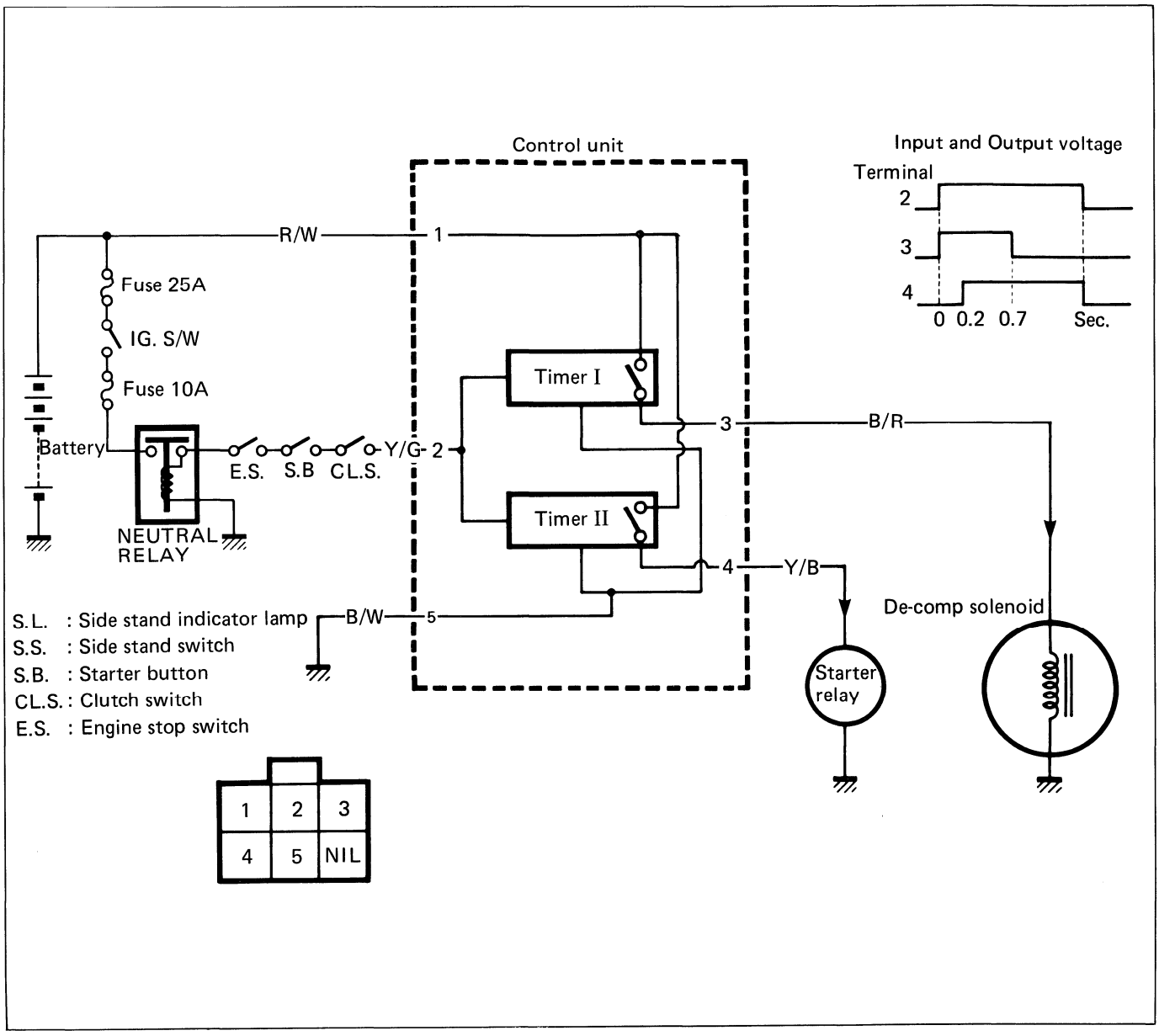
DESCRIPTION

This system consists of the de-comp. solenoid, starter relay and control unit. It facilitates operation of the starter motor by lifting up the de-comp. lever by means of the electric solenoid.

The control unit has two built-in timers, one of which controls the timing of letting the de-comp. lever up and down (timer I) and the other controls the start timing of the starter motor (timer II).

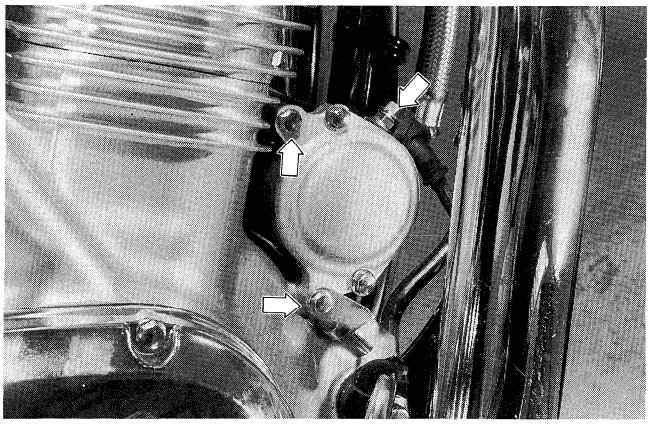
OPERATION

When the ignition switch, side stand relay, engine stop switch, clutch switch and starter button are turned ON, a 12V voltage is applied to the terminal 2 of the control unit. As the timer I starts operating at the same time, a 12V output voltage comes out at the terminal 3. This output voltage activates the de-comp. solenoid to lift up the de-comp. lever. When the timer II operates 0.2 second after the starter button is pushed, a 12V output voltage comes out at the terminal 4, whereby the starter relay turns ON and thus the starter motor starts to run. As the operation time of the timer I is 0.7 second, the de-comp. solenoid turns OFF 0.5 second after the starter motor starts to run and the de-comp. lever returns to the normal position.

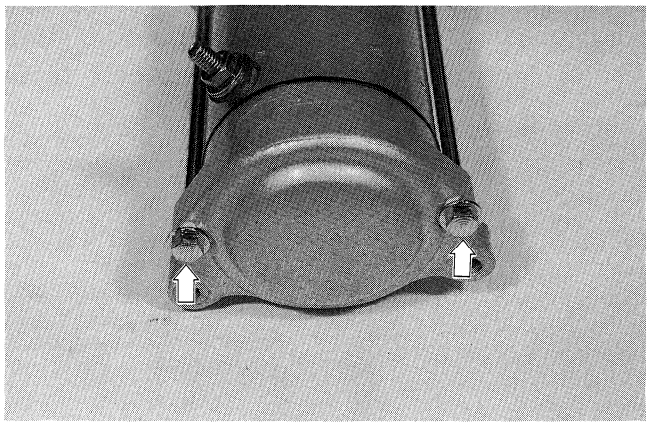


STARTER MOTOR REMOVAL AND DISASSEMBLY

- Disconnect the starter motor lead wire, and then remove the starter motor.



- Disassemble the starter motor by removing the two screws.

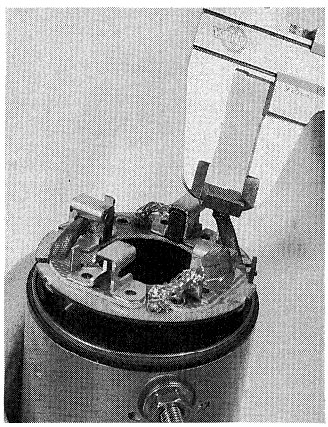


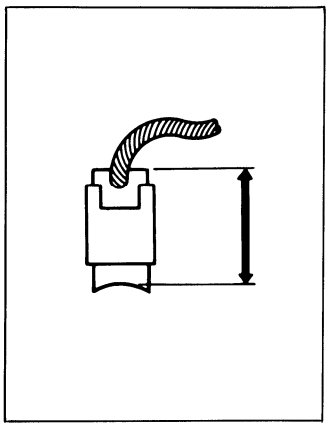
STARTER MOTOR INSPECTION

CARBON BRUSHES

When the brushes are worn, the motor will be unable to produce sufficient torque, and the engine will be difficult to turn over. To prevent this, periodically, inspect the length of the brushes, replacing them when they are too short or chipping.

Service Limit	9 mm (0.35 in)



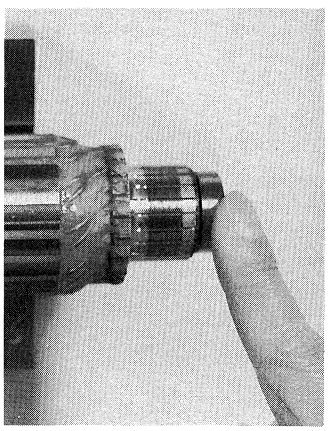


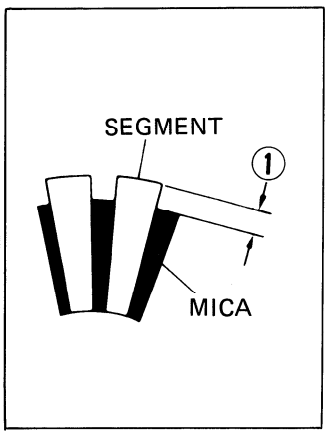
COMMUTATOR

If the commutator surface is dirty, starting performance decreases. Polish the commutator with #400 or similar fine emery paper when it is dirty. After polishing it, wipe the commutator with a clean dry cloth.

Measure the commutator under-cut ①.

Service Limit	0.2 mm (0.008 in)





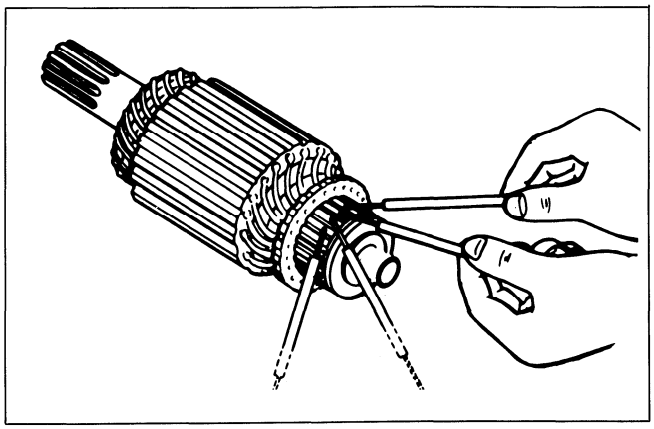
BEARINGS

Inspect the play of the bearings by hand. Replace the bearing if there is anything unusual.

ARMATURE COIL

Using a pocket tester, check the coil for open and ground by placing probe pins on each commutator segment and rotor core (to test for ground) and on any two segments at various places (to test for open), with the brushes lifted off the commutator surface.

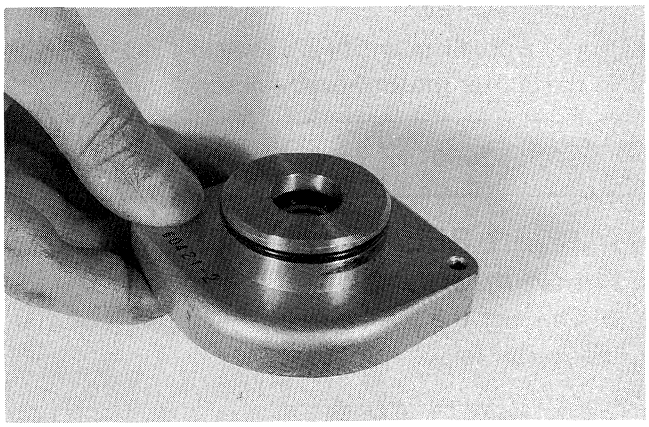
If the coil is found to be open-circuited or grounded, replace the armature. Continuous use of a defective armature will cause the starter motor to suddenly fail.



09900-25002	Pocket tester

OIL SEAL

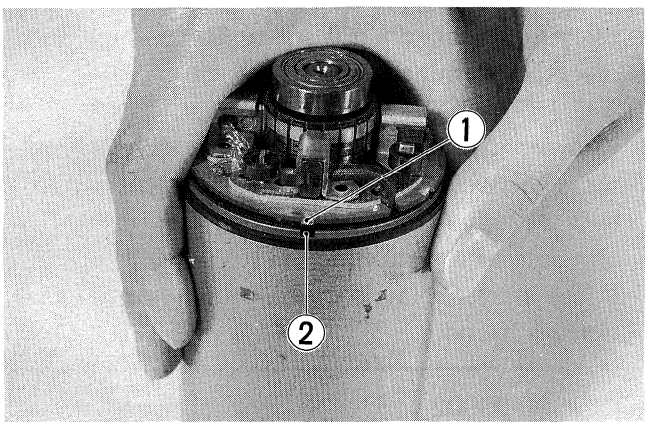
Check the seal lip for damage, wear or sign of oil leakage. If any damage is found, replace it.



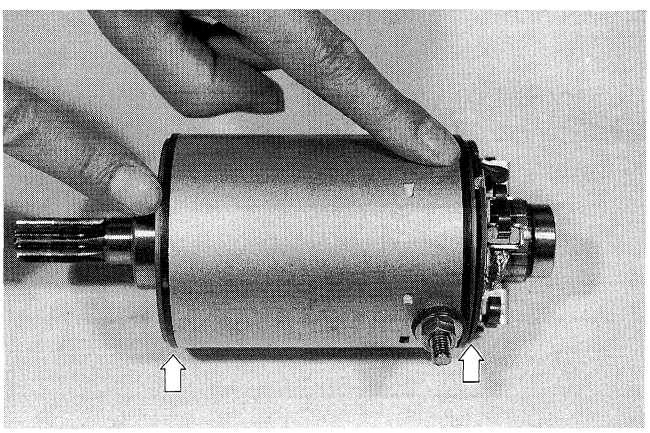
STARTER MOTOR REASSEMBLY

O-RING

- When installing the housing end, align the protrusion ① of the brushes mounting plate with the groove ② of the starter motor case.



- Install new O-rings on the correct positions as shown in Fig.

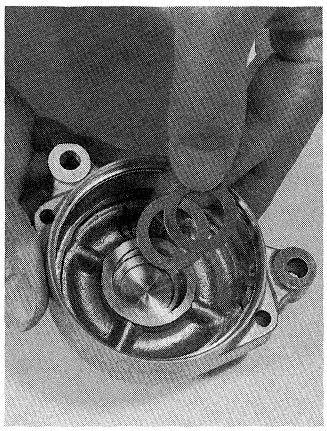


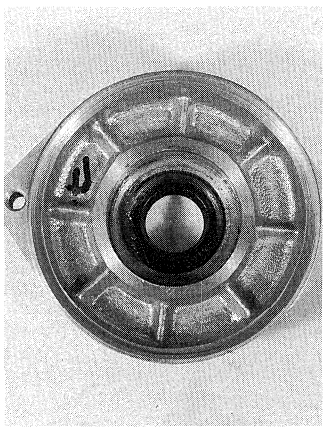
HOUSING END (Inside)

- Apply grease to the lip of the oil seal.

99000-25030	SUZUKI Super grease "A"

- When installing the housing end, install the thrust shims properly.

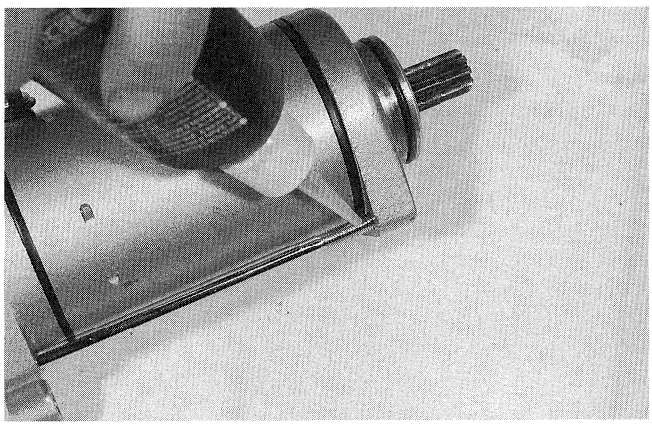




HOUSING SCREW

- Apply a small quantity of Thread Lock "1342" to the starter motor housing screw.

99000-32050	Thread Lock "1342"



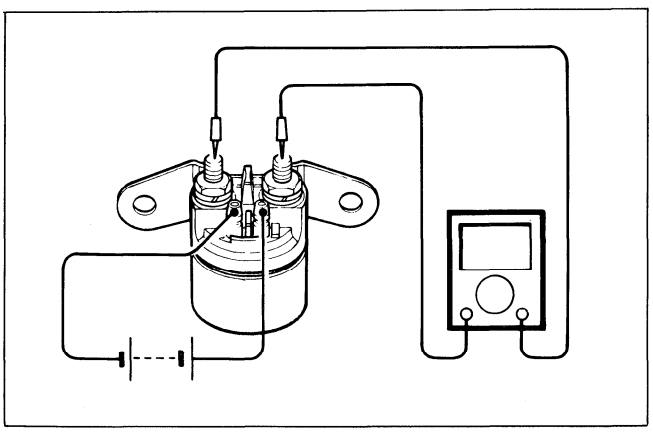
STARTER RELAY INSPECTION

- Remove the seat and the left frame cover.
- Disconnect the lead wire of the starter motor at the starter relay.

CAUTION:
When removing the lead wire from the starter relay terminal, do not touch the wrench to the other terminal.

- Turn on the ignition switch, inspect the continuity between the positive (from the battery) and negative terminals, when squeezing the clutch lever and pushing the starter button.
  If the starter relay is in sound condition, continuity is found.

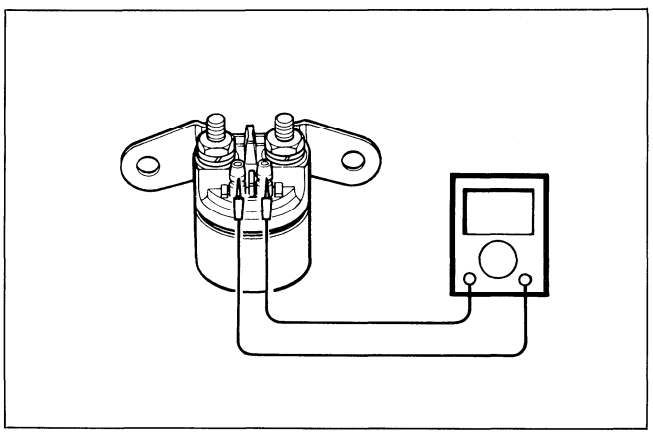
09900-25002	Pocket tester



- Disconnect the lead wire coupler of the starter relay.
- Check the coil for "open", "ground" and ohmic resistance. The coil is in good condition if the resistance is as follows.

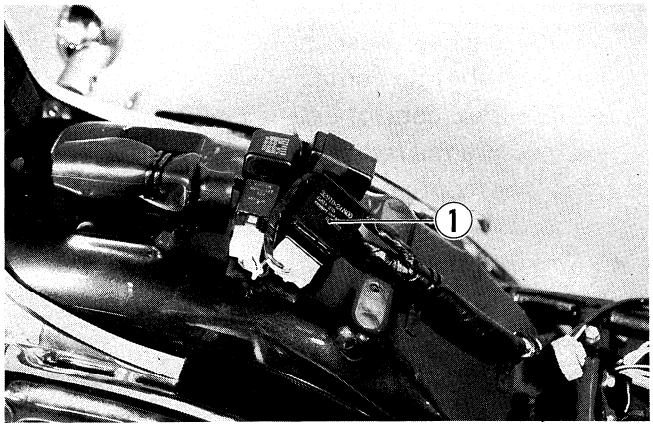
09900-25002	Pocket tester

STD resistance	2 – 6 Ω



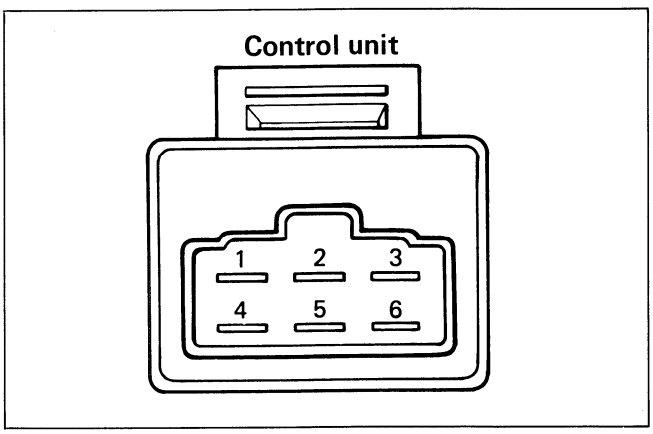
DECOMPRESSION SOLENOID CONTROL UNIT

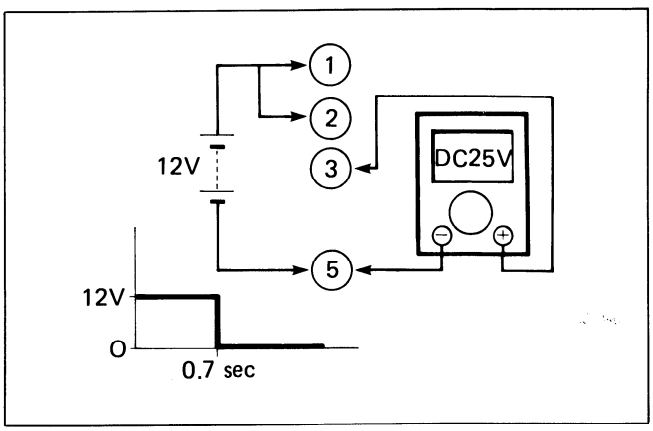
- Remove the control unit ①.
- Inspect the control unit in the following manner.
- Replace the control unit if it fails one of the following two inspection.



TIMER I INSPECTION

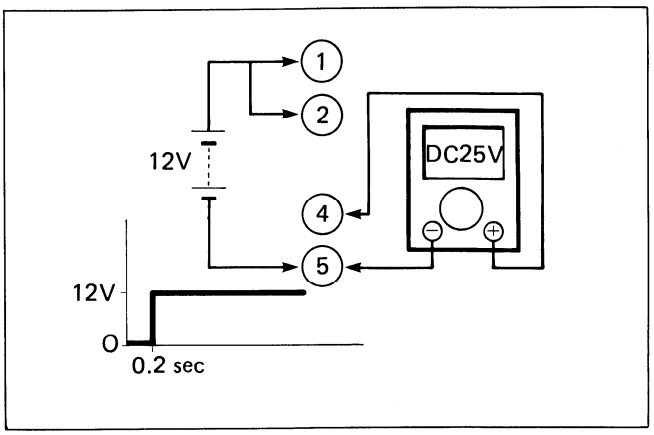
- Set the pocket tester to DC 25V range.
- Connect the ⊕ probe to the terminal 3 and ⊖ to 5.
- Connect the ⊕ terminal of 12V battery to the terminals 1 and 2, and ⊖ to the terminal 5.
- If the pocket tester shows 12V for 0.7 sec and returns to the 0V, timer I is in good condition.





TIMER II INSPECTION

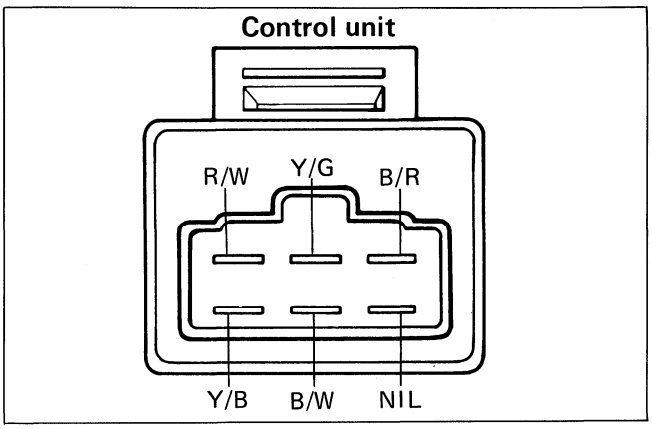
- Change the ⊕ probe of tester to the terminal 4.
- Connect the battery to the terminals in the same manner as the above inspection.
- If the pocket tester shows 0V for first 0.2 sec. and 12V thereafter, timer II is in good condition.



INSPECTION WITH POCKET TESTER

- Use the pocket tester, bring the ⊕ probe and the ⊖ probe into contact with each lead wire of the de-comp. control unit, check for continuity and measure the resistance value.
- When the continuity and the resistance values are as shown in the following table, it can be judged that the de-comp. control unit is normal.

CAUTION:
As capacitors, diodes, etc. are used inside this control unit, the resistance values will differ when an ohmmeter other than SUZUKI pocket tester is used.

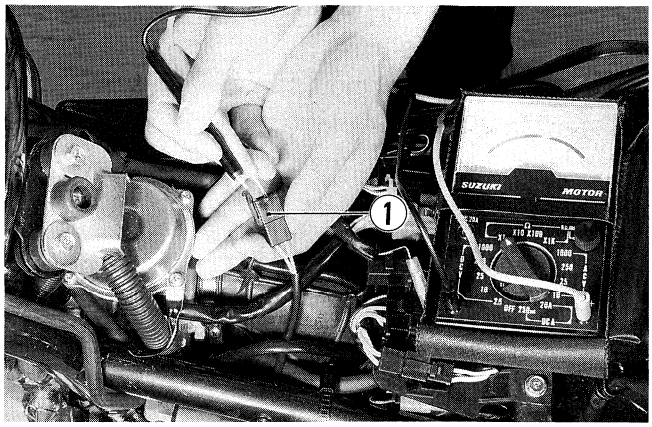


Unit: Approx. kΩ

⊕ Probe of tester to: \ ⊖ Probe of tester to:	B/W	Y/B	B/R	Y/G	R/W
B/W		OFF	2.2	3	OFF
Y/B	2.8		5.5	7	OFF
B/R	2	OFF		5	OFF
Y/G	3	OFF	5		OFF
R/W	OFF	OFF	OFF	OFF	

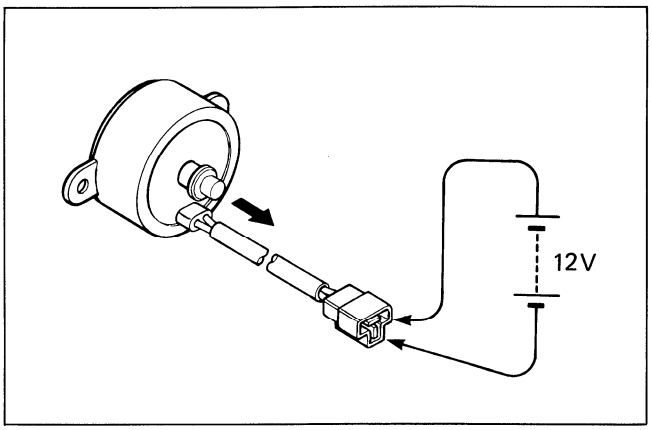
DE-COMP. SOLENOID

- Turn the ignition switch ON and turn the starter motor.
- Make sure that the de-comp. solenoid pulls decompression cable properly when turning the starter motor.
- If the de-comp. solenoid does not work properly, disconnect the coupler ① and check the continuity between the two lead wires with a pocket tester.



Solenoid resistance	0.1 – 1.0 Ω

- Apply DC 12V to the solenoid.



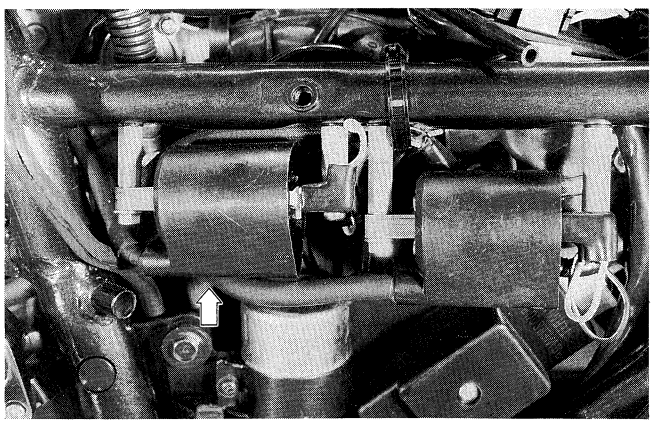
NOTE:
Neglect the positive and negative leads when applying 12V to the solenoid.

CAUTION:
Do not apply 12V to the solenoid for more than 5 seconds or damage to the solenoid coil may occur.

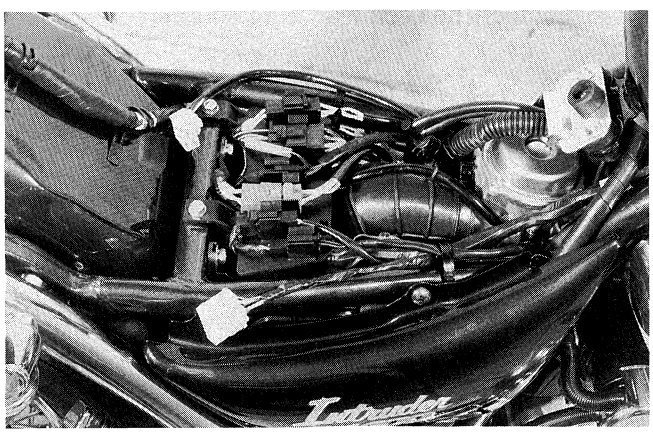
- If the solenoid does not work properly, replace the solenoid unit with a new one.
- When re-installing the solenoid, refer to page 2-8 for adjusting cable play.

DE-COMP. SOLENOID REMOVAL

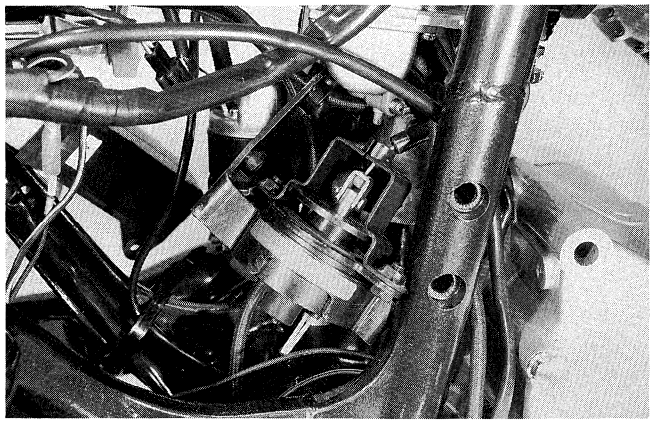
- Remove the ignition coil for the rear cylinder.



- Remove the rear carburetor, intake pipe and air cleaner case.

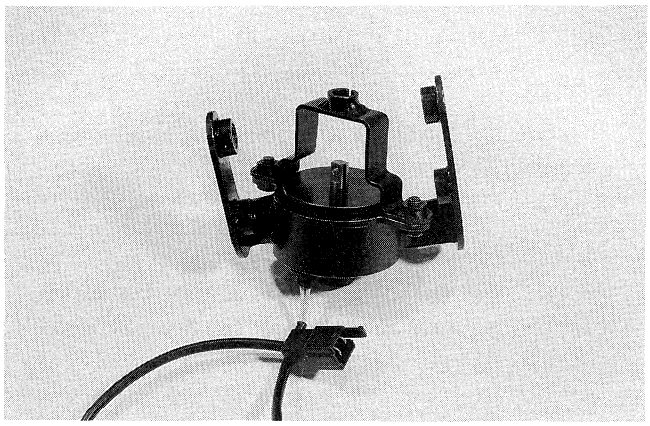


- Remove the engine mounting rear brackets bolts, left and right.
- Remove the engine mounting brackets.
- Remove the cotter pin ① and disconnect the de-comp. cable from the shaft.



- Remove the mounting brackets from the solenoid.

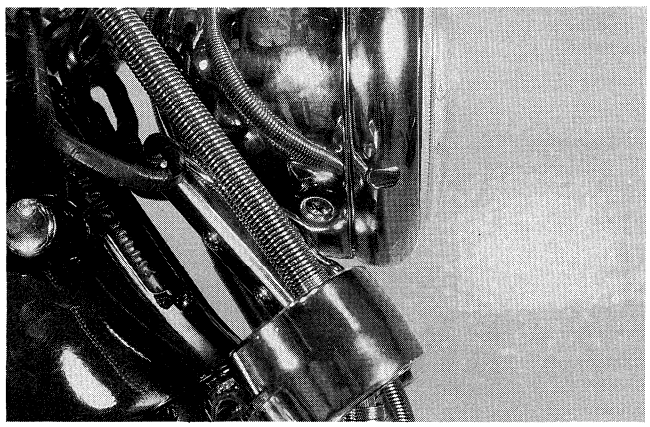
NOTE:
When mounting the solenoid to the frame, its lead wire faces backward.



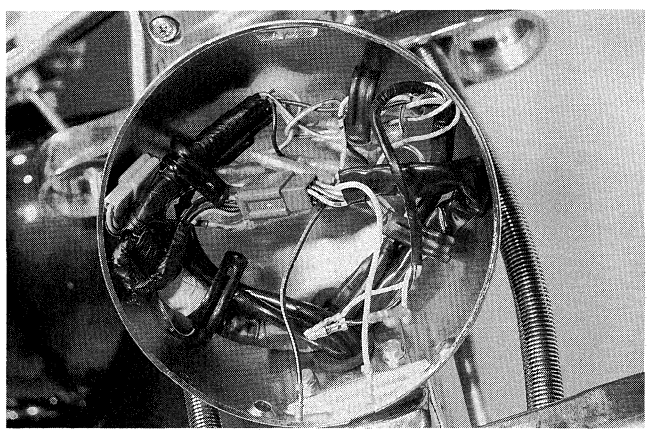
SPEEDOMETER AND INSTRUMENT PANEL

REMOVAL AND DISASSEMBLY

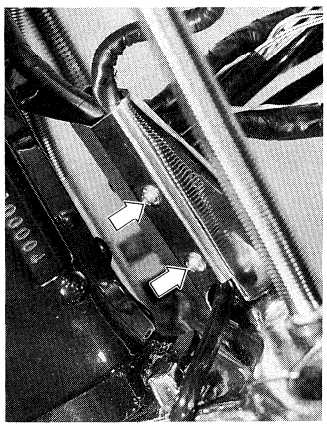
- Remove the headlamp unit from the headlamp housing.

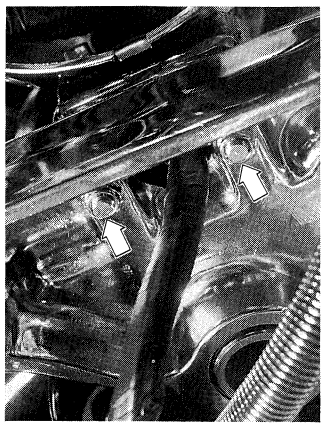


- Disconnect the each lead wire coupler.

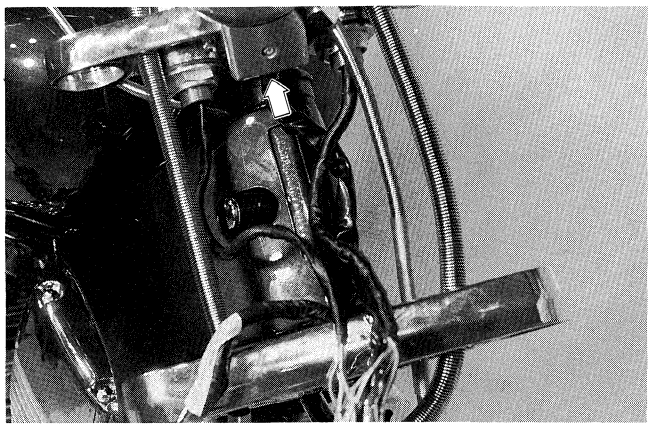


- Remove the headlamp housing and wiring harness guide.

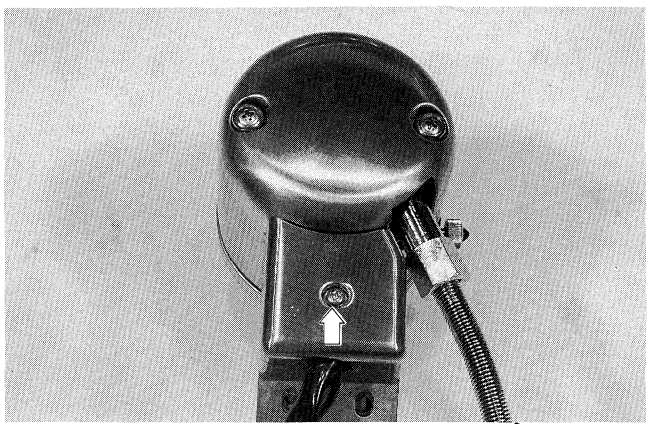




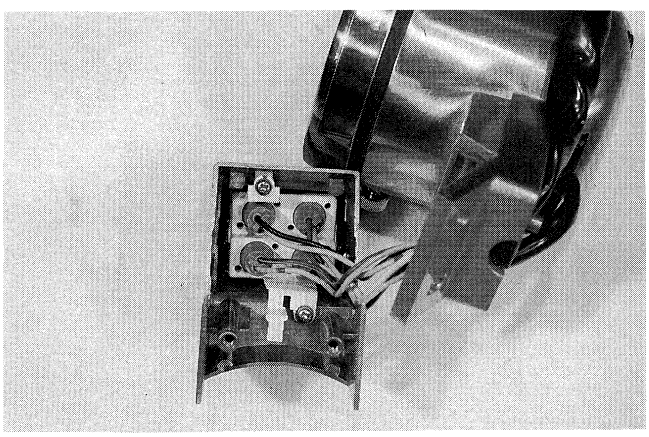
- Disconnect the speedometer cable and dismount the combination meter assembly from the upper bracket.

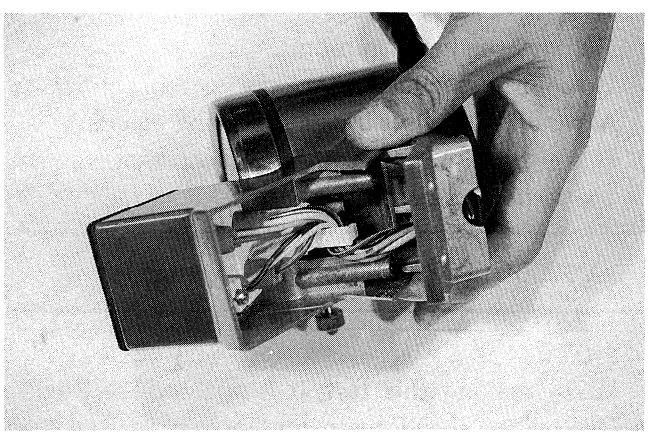


- Remove the speedometer cover and instrument cover.

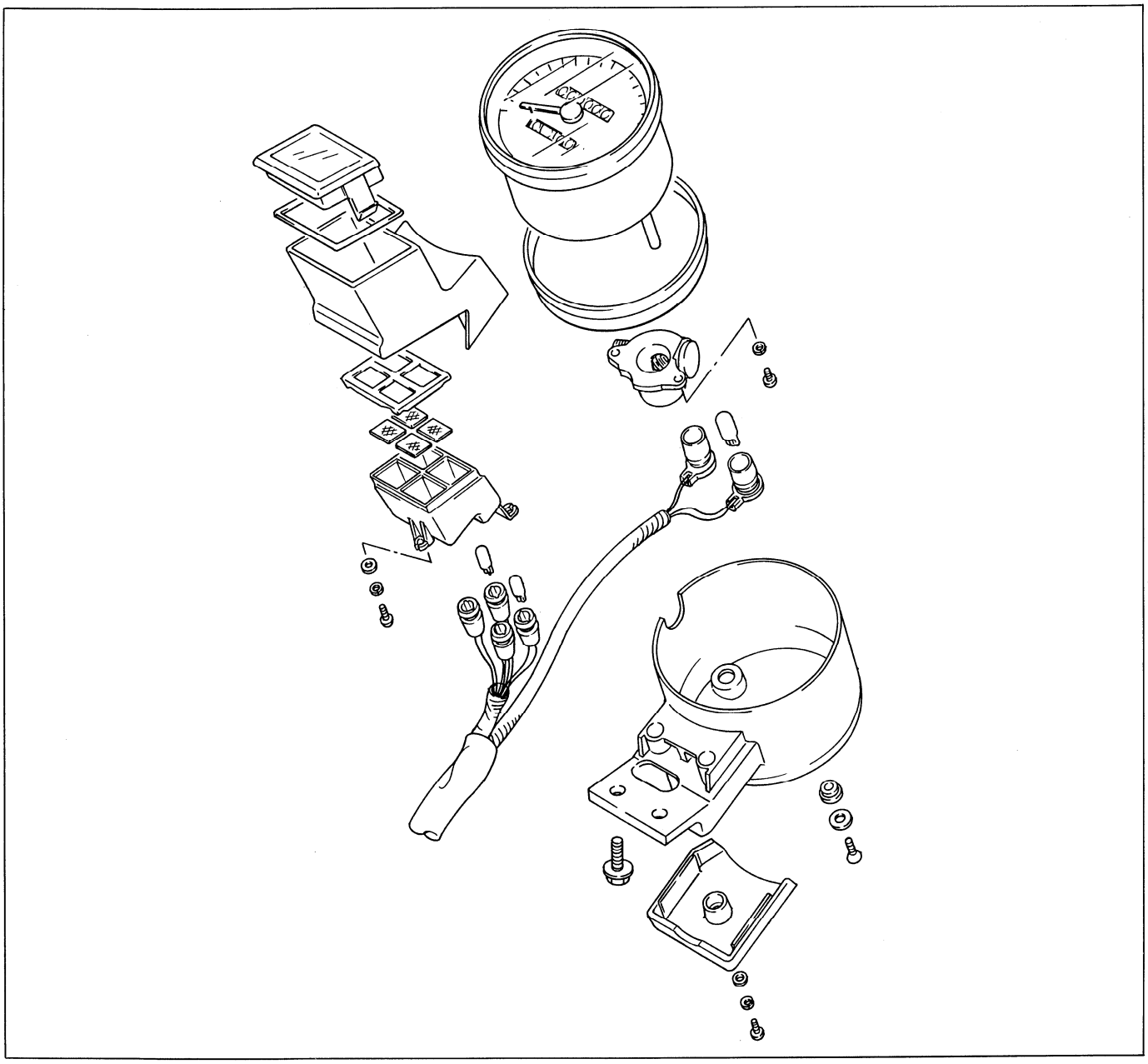


- Remove the instrument panel and replace the bulb.





- Disassemble the speedometer and instrument panel as follows.

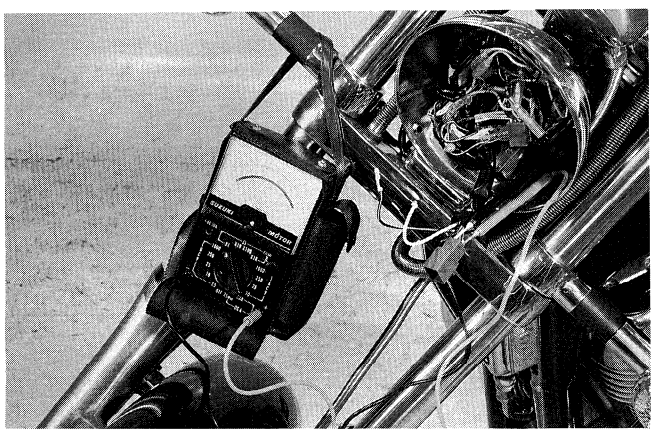


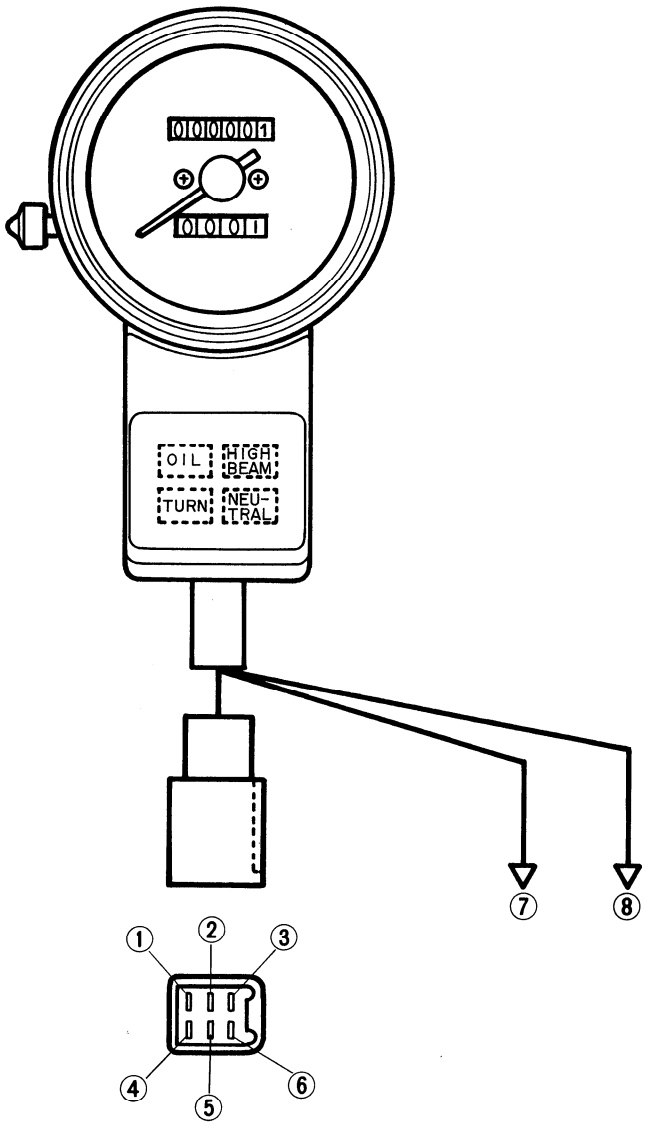
INSPECTION

- Remove the headlamp unit.
- Using the pocket tester, check the continuity between lead wires in the following diagram.
  If the continuity measured is incorrect, replace the respective parts.

09900-25002	Pocket tester

NOTE:
When making this test, it is not necessary to remove the speedometer and instrument panel.

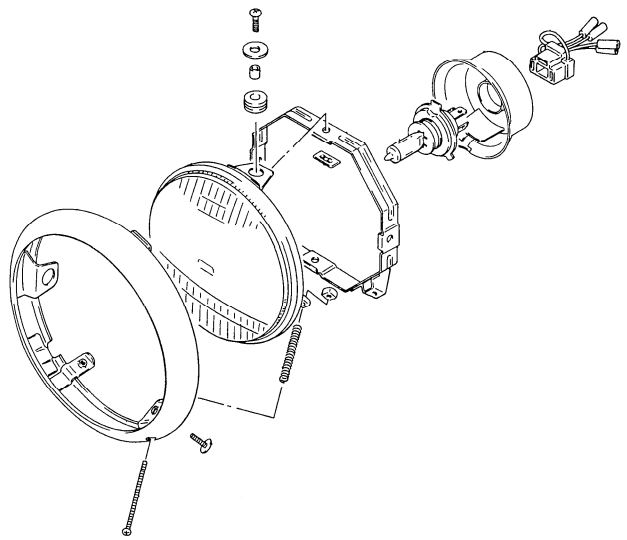




No.	Wire color, Part Name
①	Gr, Speedometer light
②	G/Y, Oil pressure indicator light
③	Lg, Turn signal indicator light
④	O, Oil pressure indicator light, Neutral indicator light
⑤	Bl, Neutral indicator light
⑥	B, Turn signal indicator light
⑦	Y, High beam indicator light
⑧	B/W, Speedometer light, High beam indicator light

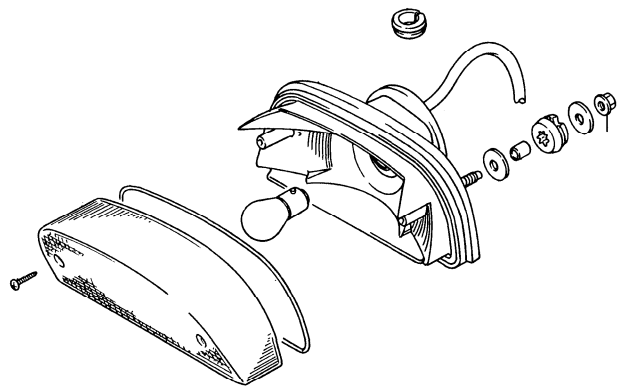
LAMPS

HEADLIGHT



NOTE: Adjust the headlight, both vertical and holizontal, after reassembly.

TAIL/BRAKE LIGHT

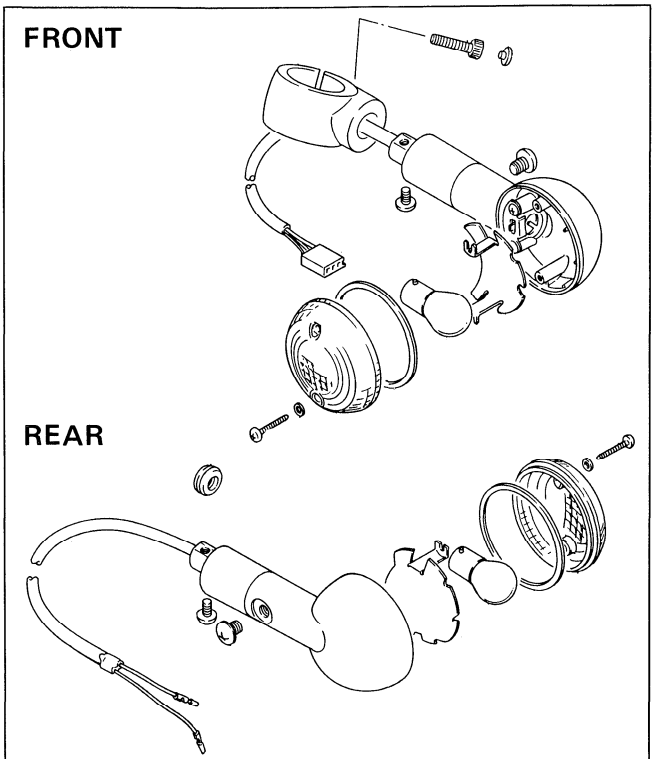


CAUTION: Do not overtighten the lens fitting screws.

TURN SIGNAL LIGHT

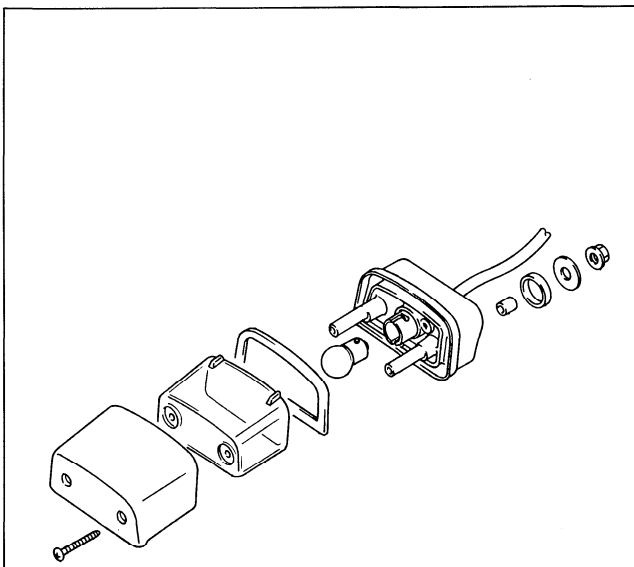
FRONT

REAR



CAUTION: Do not overtighten the lens fitting screws.

LICENSE LIGHT



CAUTION: Do not overtighten the lens fitting screws.

SWITCHES

Remove the headlamp unit.
Inspect each switch for continuity with the pocket tester referring to the chart. If any abnormality is found, replace the respective switch assemblies with new ones.

NOTE:
When replacing the defective switch, remove the headlamp housing, handlebar and steering upper bracket.

09900-25002	Pocket tester

IGNITION SWITCH

	R/W	O	Gr	Br
OFF				
ON	○——○		○——○	
P	○——			——○

DIMMER SWITCH

	W	Y	O/R
HI		○——	——○
LO	○——		——○

TURN SIGNAL SWITCH

	B	Lbl	Lg
R		○——	——○
.			
L	○——	——○	

HORN SWITCH

	G	B/W
ON (Push)	○——	——○
OFF		

SIDE STAND SWITCH

	G	B/W
ON (Upright position)	○——	——○
OFF (Down position)		

ENGINE STOP AND START SWITCH

	O/Bl	O/W	Y/G
OFF			
RUN	○——	——○	
START (Push)		○——	——○

CLUTCH SWITCH
(STARTER INTERLOCK SWITCH)

	Y/G	Y/G
ON (Squeeze lever)	○——	——○
OFF		

FRONT BRAKE SWITCH

	O/G	W/B
ON (Squeeze lever)	○——	——○
OFF		

NEUTRAL INDICATOR SWITCH

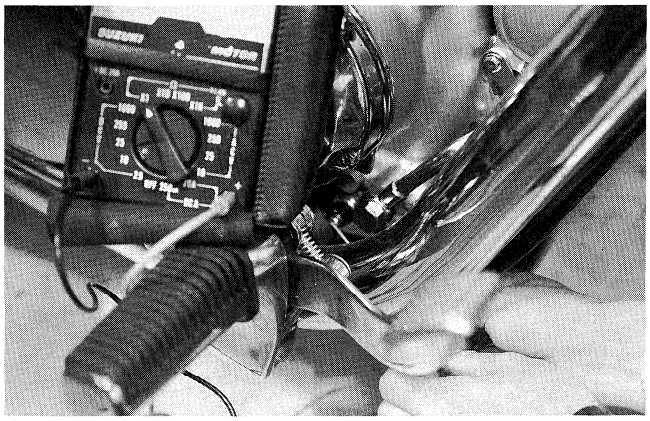
	Bl	Ground
Neutral	○——	——○

REAR BRAKE SWITCH

	O	W/B
ON (Depress pedal)	○——	——○
OFF		

OIL PRESSURE SWITCH

- Continuity, when engine is stopped.
- No continuity, when engine is running.

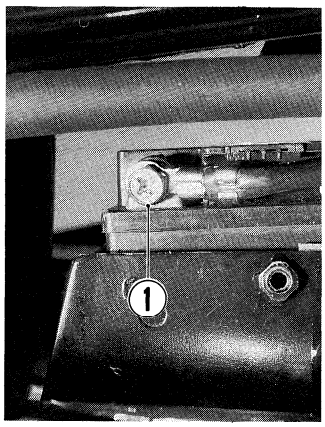


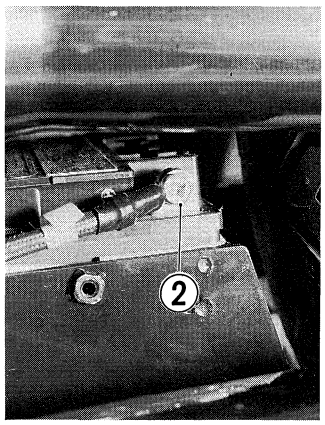
NOTE:
Before inspecting the oil pressure switch, check the engine oil level with the oil level gauge (dip stick). (Refer to page 2-6.)

BATTERY

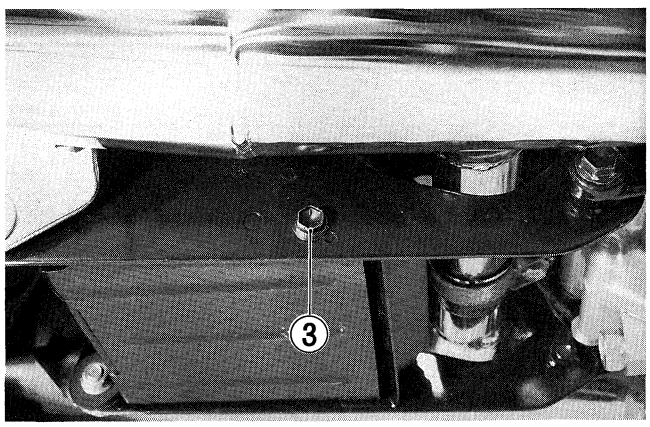
REMOVAL

- Remove the battery cover screws.
- Disconnect the battery ⊖ lead wire ① and ⊕ lead wire ②.

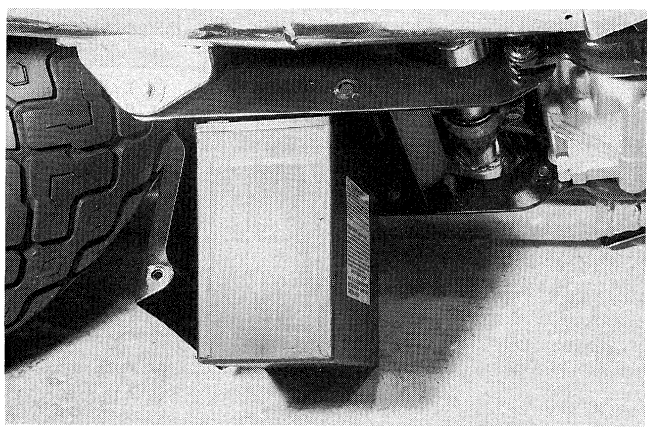




- Remove the battery case bottom plate bolts ③.



- Remove the battery from the case.

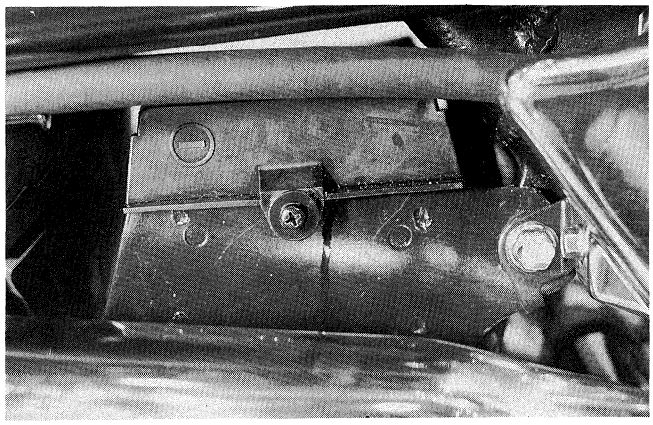


CAUTION:
Do not drop the battery on the ground or damage to the battery case may occur.

REMOUNTING

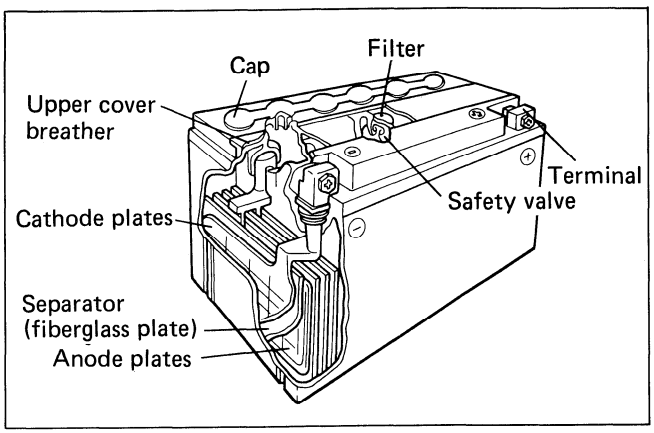
- Route the both lead wires and place the battery cover properly.
- Remount the battery in the reverse order of removal.

WARNING:
When installing the battery lead wires, fix the ⊕ lead first and ⊖ lead last.



SPECIFICATIONS

Type designation	FTH16-12
Capacity	12V, 50.4 kC (14Ah)/ 10HR
Standard electrolyte S.G.	1.32 at 20°C (68°F)

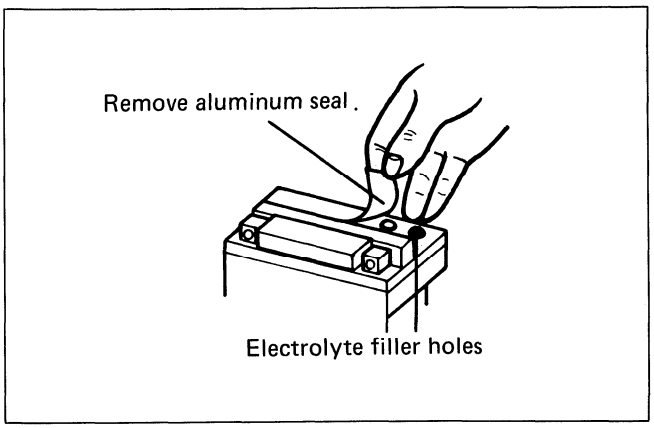


INITIAL CHARGING

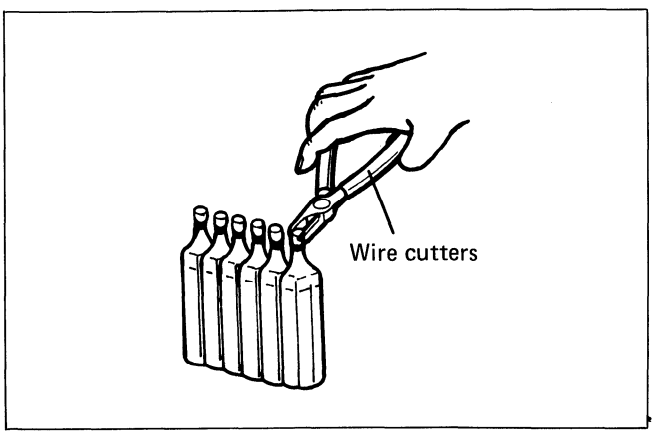
Filling electrolyte

- Remove the aluminum tape sealing the battery electrolyte filler holes.

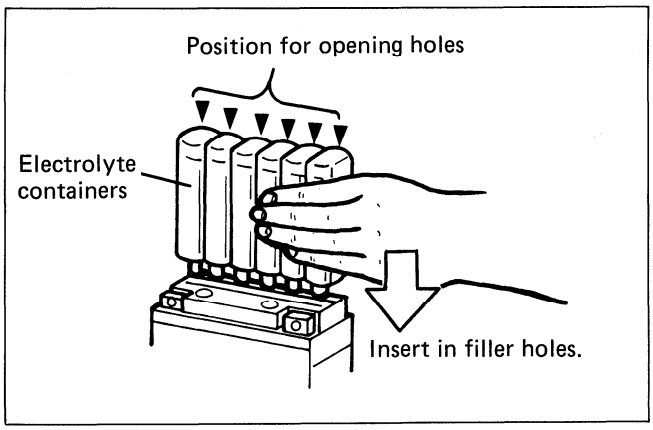
NOTE:
In winter season, electrolyte container should be placed in a warm room for several hours in advance before filling electrolyte. Viscosity of electrolyte depends on temperature. Low temperature makes viscosity high and it takes long time to fill electrolyte. Battery itself has a tendancy to show a decrease in performance.



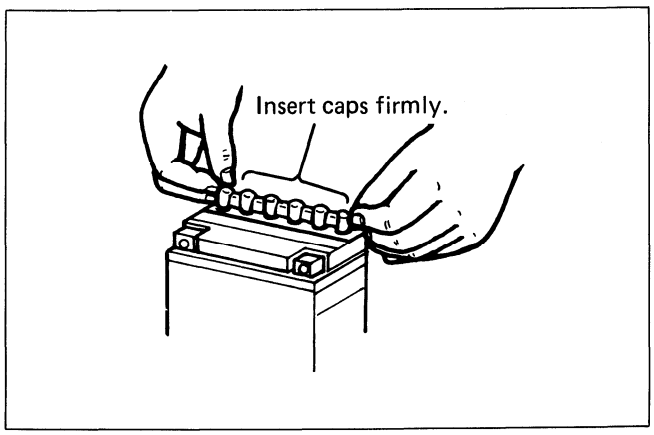
- Hold the electrolyte container with its nozzles upright, and use wire cutters, etc. to cut out off the end of the nozzles at the designated locations (between the ends and the packing).



- Insert the nozzles of the electrolyte container into the battery's electrolyte filler holes, holding the container firmly so that it does not fall. Take precaution not to allow any of the fluid to spill.
- Use wire cutters to cut the protruding part on the bottom of each container, and leave in this position for about 10 minutes.



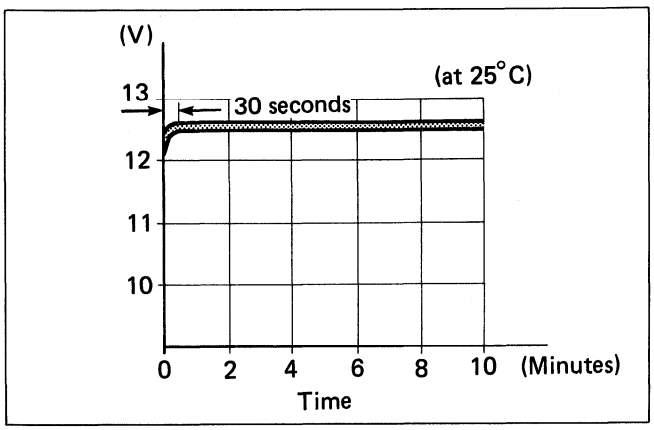
- After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery. Wait for around 10 minutes.
- Insert the caps into the filler holes, pressing in firmly so that the top of the caps do not protrude above the upper surface of the battery's top cover.



CAUTION:

* **Never use anything except the specified battery electrolyte.**
* **Once install the caps to the battery, do not remove the caps.**

- Using SUZUKI pocket tester, measure the battery voltage. The tester should indicate 12.5 – 12.6 V (DC) as shown in the Fig. If the battery voltage is lower than the specification, charge the battery with a battery charger. (Refer to the recharging operation on page 6-26.)



NOTE:

Initial charging for a new battery is recommended if two years have elapsed since the date of manufacture or if electrolyte is filled in winter season.

SERVCING

Visually inspect the surface of the battery container. If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one.

If the battery terminals are found to be coated with rust or an acidic white powdery substance, then this can be cleaned away with sandpaper.

RECHARGING OPERATION

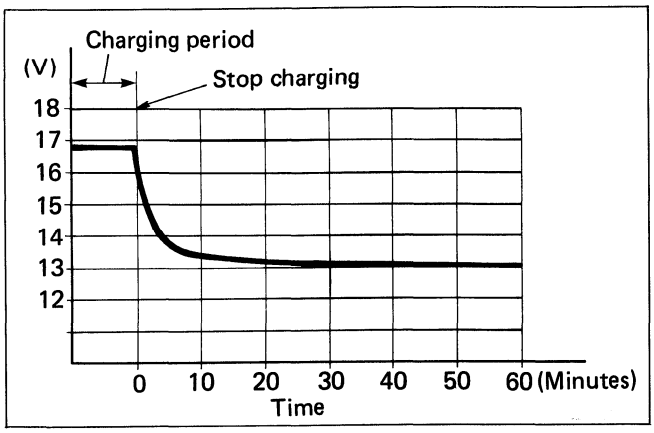
- Using the pocket tester, check the battery voltage. If the voltage reading is less than the 12.0V (DC), recharge the battery with a battery charger.

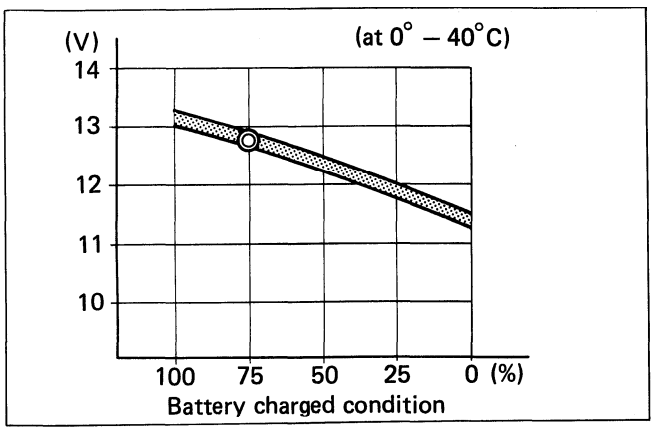
CAUTION:
When recharging the battery, remove the battery from the motorcycle.

NOTE:
Do not remove the filler caps on the battery top while recharging.

Recharging time	1.4A for five hours or 7.0A for one hour

CAUTION:
Be careful not to permit the charging current to exceed 7A at any time.





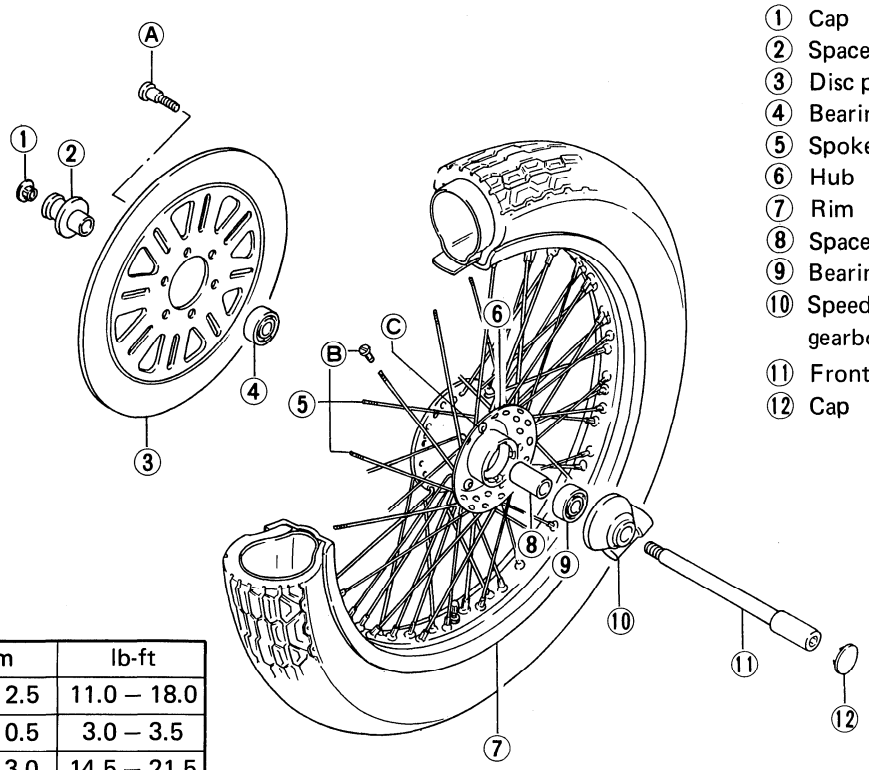
- After recharging, wait for more than 30 minutes and check the battery voltage with a pocket tester.
- If the battery voltage is less than the 12.5V, recharge the battery again.
- If battery voltage is still less than 12.5V after recharging, replace the battery with a new one.
- When a battery is left for a long term without using, it is subject to discharge. When the motorcycle is not used for more than 1 month (especially during the winter season), recharge the battery once a month at least.

CHASSIS

CONTENTS

FRONT WHEEL

CONSTRUCTION



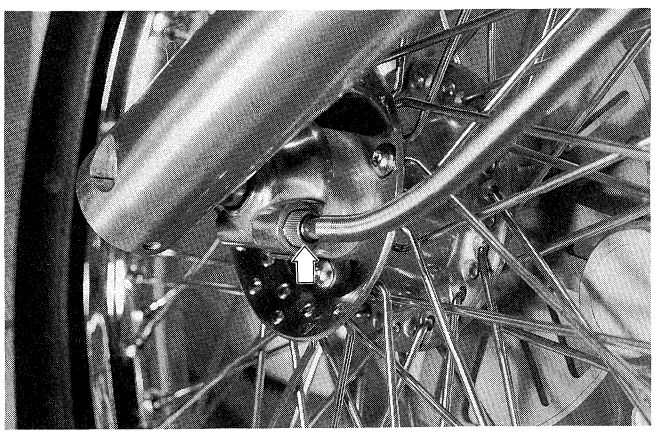
① Cap
② Spacer RH
③ Disc plate
④ Bearing RH
⑤ Spoke set
⑥ Hub
⑦ Rim
⑧ Spacer
⑨ Bearing LH
⑩ Speedometer drive gearbox
⑪ Front axle
⑫ Cap

Tightening torque

Item	N·m	kg-m	lb-ft
Ⓐ	15 – 25	1.5 – 2.5	11.0 – 18.0
Ⓑ	4 – 5	0.4 – 0.5	3.0 – 3.5
Ⓒ	20 – 30	2.0 – 3.0	14.5 – 21.5
⑪	36 – 52	3.6 – 5.2	26.0 – 37.5

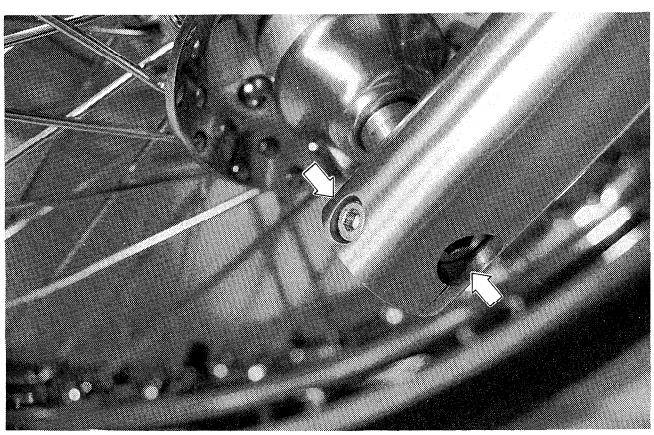
REMOVAL AND DISASSEMBLY

- Support the machine using jack and wooden block.
- Remove the speedometer cable from the speedometer gearbox.



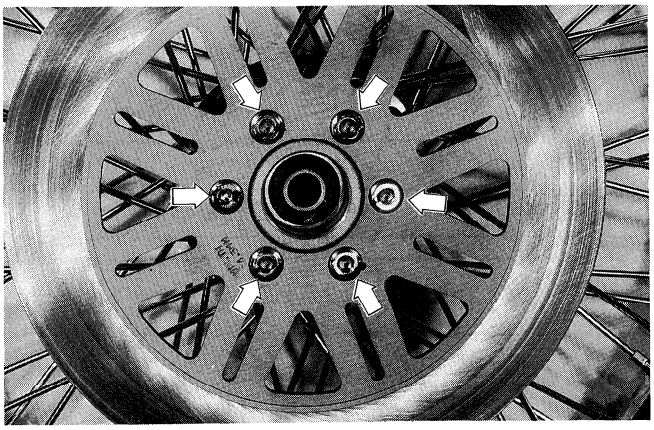
- Loosen the axle clamp bolt.
- Remove the cap and the axle shaft with a 12 mm hexagon wrench and take off the front wheel.

09900-18710	12 mm hexagon socket



BRAKE DISC

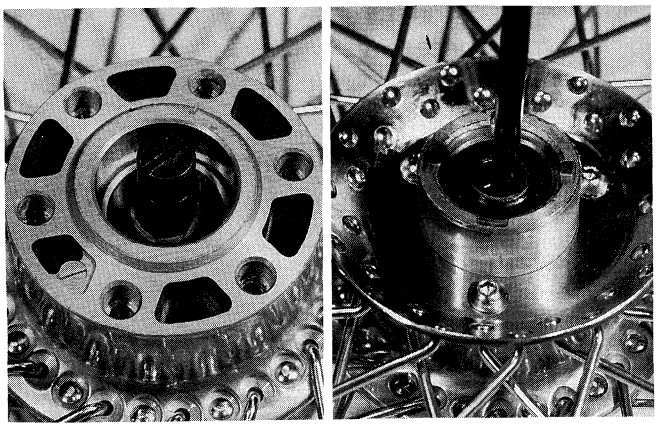
- Remove the securing bolts and separate the disc from the wheel.



WHEEL BEARING

Drive out the right and left wheel bearings by using the special tool in the following procedure.

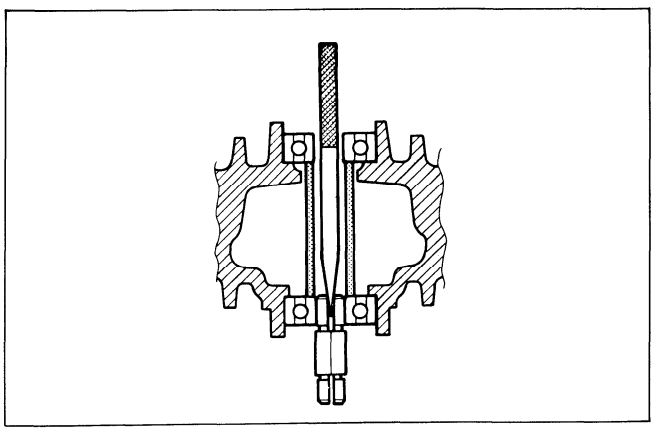
- Insert the adapter into the wheel bearing.
- After inserting the wedge bar from the opposite side, lock the wedge bar in the slit of the adapter.



- Drive out the wheel bearing by knocking the wedge bar.

CAUTION:
The removed bearing should be replaced.

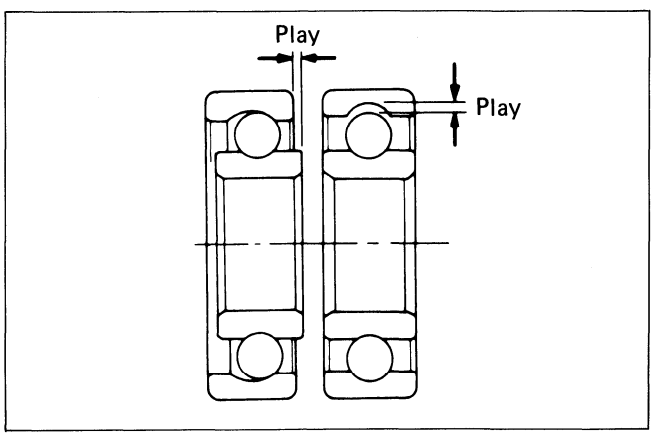
09941-50110	Bearing remover



INSPECTION

WHEEL BEARINGS

Inspect the play of wheel bearing inner race by hand while fixing it in the wheel.
Rotate the inner race by hand to inspect whether abnormal noise occurs or rotating smoothly.
Replace the bearing if there is something unusual.

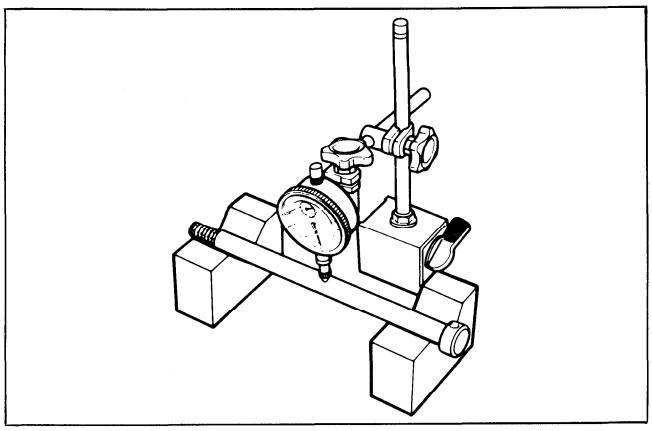


AXLE SHAFT

Using a dial gauge, check the axle shaft for runout and replace it if the runout exceeds the limit.

09900-20606	Dial gauge (1/100)
09900-20701	Magnetic stand

Service Limit	0.25 mm (0.010 in.)



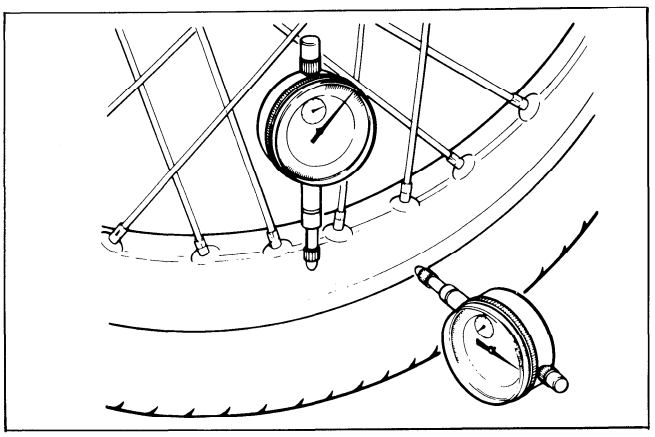
WHEEL RIM

Make sure that the wheel rim runout does not exceed the service limit when checked as shown. An excessive amount of runout is usually due to loose spokes or bent rim.

If properly tightening the spokes will not correct the runout, replace the wheel rim.

NOTE:
Worn or loose wheel bearings must be replaced before attempting to true a wheel rim.

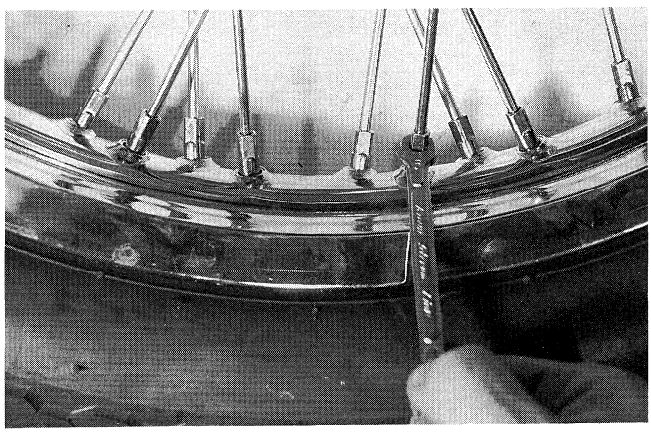
Service Limit (Axial and Radial)	2.0 mm (0.08 in)



SPOKE NIPPLE

Check to be sure that all nipples are tight, and re-tighten them as necessary by using 6 mm open end wrench.

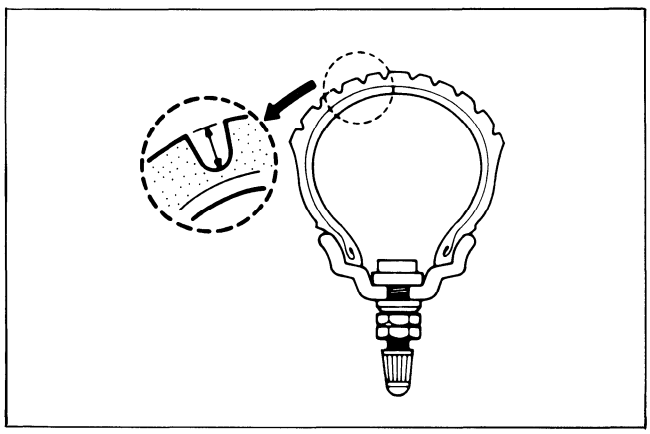
Tightening torque	4 – 5 N·m (0.4 – 0.5 kg-m) (3.0 – 3.5 lb-ft)



TIRE

For proper braking and riding stability, the tire should have sufficient groove depth from the tread surface. If the groove depth, measured as shown in the figure, reaches the wear limit, replace the tire.

	Service Limit
Front	1.6 mm (0.06 in)
Rear	2.0 mm (0.08 in)



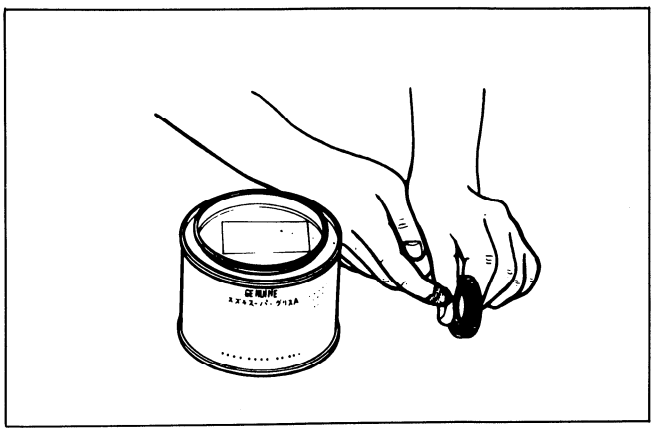
REASSEMBLY

Reassemble and remount the front wheel in the reverse order of disassembly and removal, and also carry out the following steps:

WHEEL BEARING

- Apply SUZUKI Super grease "A" before installing the bearings.

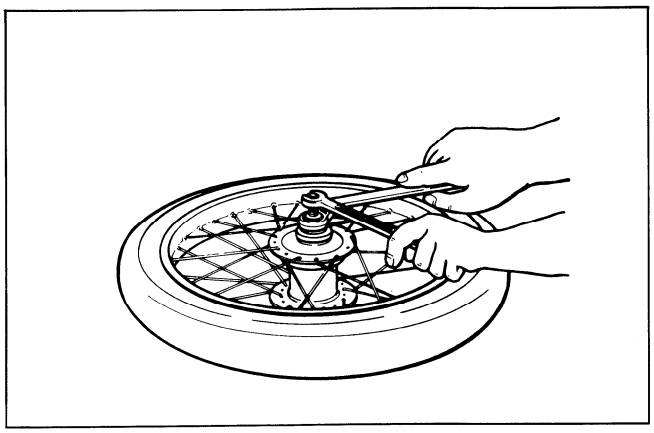
99000-25010	SUZUKI Super grease "A"

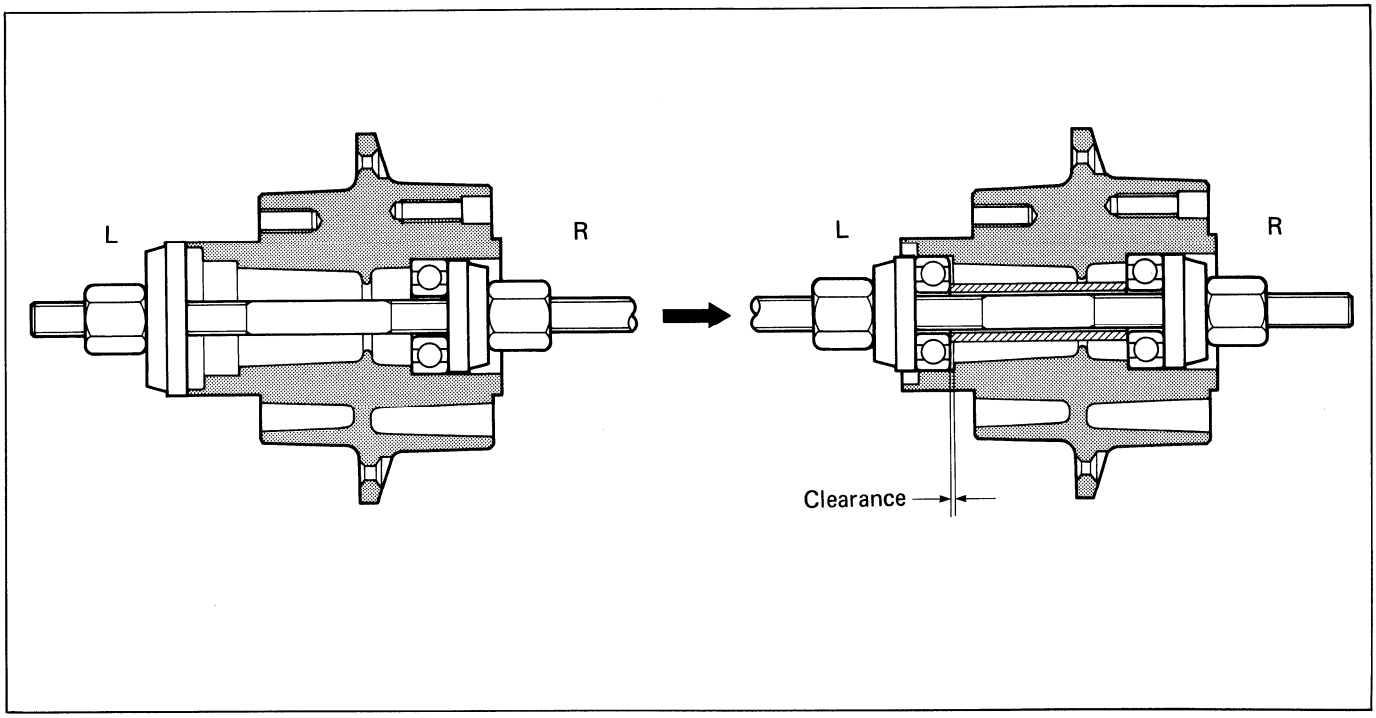


- Install the wheel bearings as follows by using the special tool.

CAUTION:
First install the wheel bearing for right side.

09924-84510	Bearing installer set

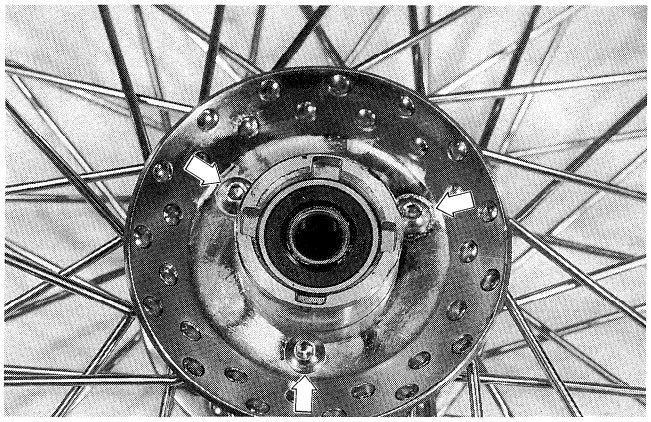




- When reinstalling the hub flange to the hub, apply Thread lock super "1303" to the three securing bolts.

99000-32030	Thread lock super "1303"

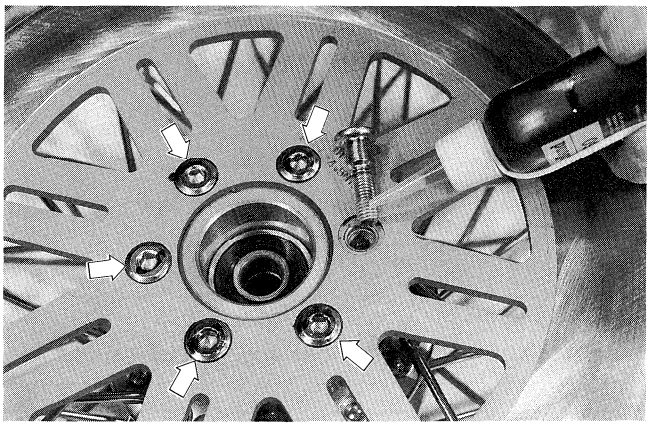
Tightening torque	20 – 30 N·m (2.0 – 3.0 kg-m 14.5 – 21.5 lb-ft)



- Make sure that the brake disc is clean and free of any greasy matter. Apply thread lock super "1360" to the disc bolts and tighten the disc bolts to the specified torque.

99000-32130	Thread lock super "1360"

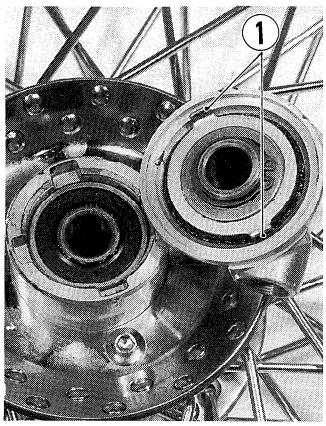
Tightening torque	15 – 25 N·m (1.5 – 2.5 kg-m 11.0 – 18.0 lb-ft)

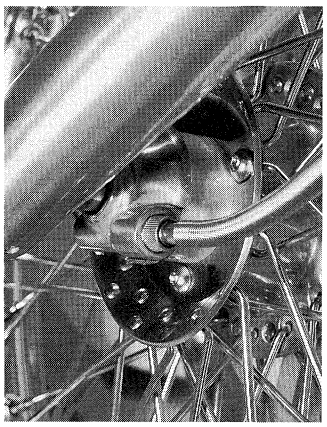


- When remounting the tire to the rim, be sure that the embossed arrow mark on the tire faces toward the rotational direction of the wheel.

NOTE:
An arrow mark is provided on the front and rear tires.

- Before installing the speedometer gearbox, grease it and align the two drive pawls ① (for fitting them into the two recesses of the wheel hub) and attach the speedometer gearbox to the wheel hub.
  When tightening the front axle, check to be sure that the speedometer gearbox is in the position as shown.





TIGHTENING TORQUE

	N·m	kg-m	lb-ft
Axle nut	36 – 52	3.6 – 5.2	26.0 – 37.5
Axle clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0

FRONT BRAKE

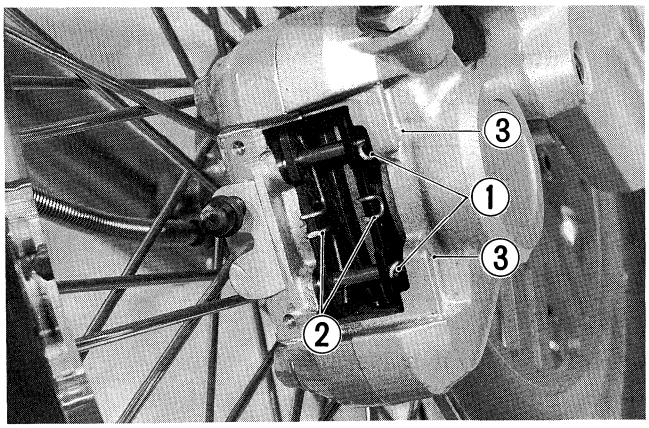
BRAKE PAD REPLACEMENT

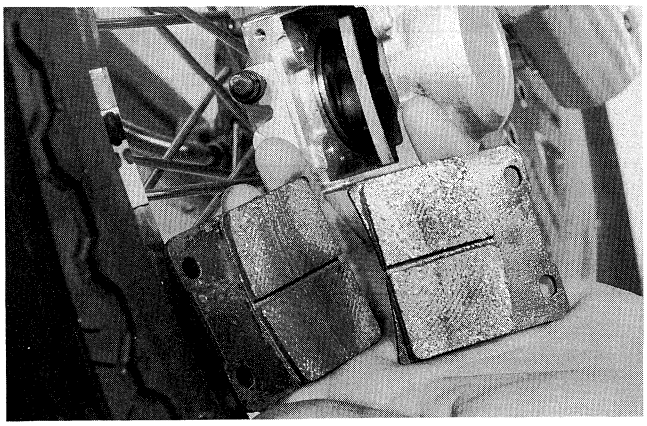
- Remove the dust cover and pull out the two stopper pins ①. While holding the spring ②, pull out the two pad pins ③.

CAUTION:
Do not operate the brake lever while dismounting the pads.

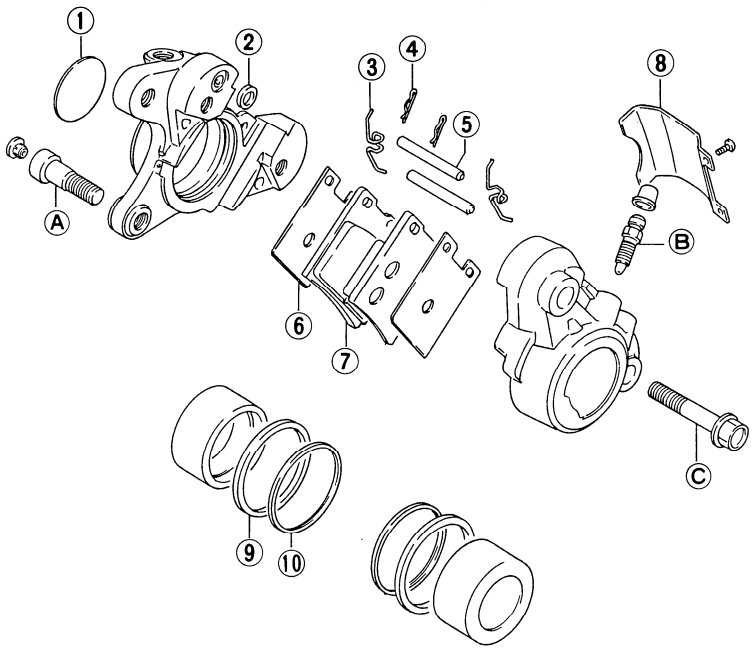
- Pull out the brake pads.

CAUTION:
Replace the brake pad as a set, otherwise braking performance will be adversely affected.





CALIPER REMOVAL AND DISASSEMBLY

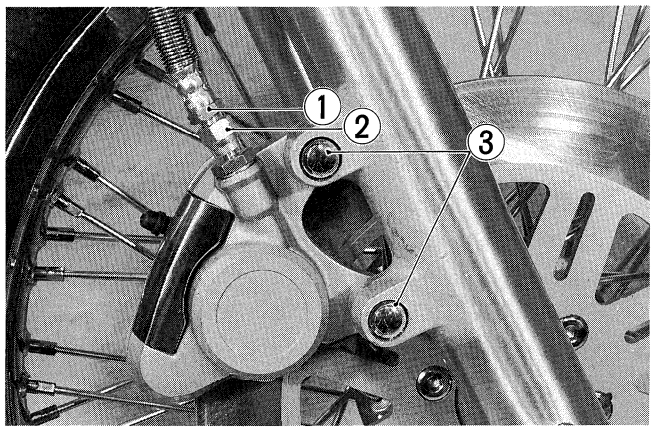


① Cap
② O-ring
③ Spring
④ Stopper pin
⑤ Pad pin
⑥ Shim
⑦ Brake pad
⑧ Cover
⑨ Piston seal
⑩ Dust boot

Tightening torque

Item	N·m	kg-m	lb-ft
Ⓐ	25 – 40	2.5 – 4.0	18.0 – 29.0
Ⓑ	6 – 9	0.6 – 0.9	4.5 – 6.5
Ⓒ	15 – 20	1.5 – 2.0	11.0 – 14.5

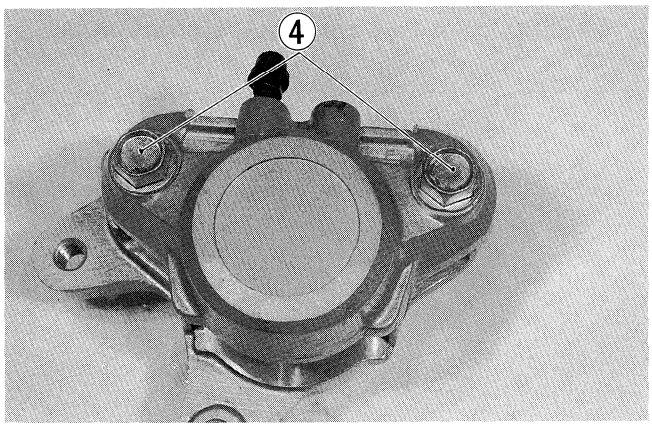
- Hold the brake hose ① and loosen the nut ② .
- Disconnect the brake hose and catch the brake fluid in a suitable receptacle.



CAUTION:
Never re-use the brake fluid left over from the last servicing and stored for long periods.

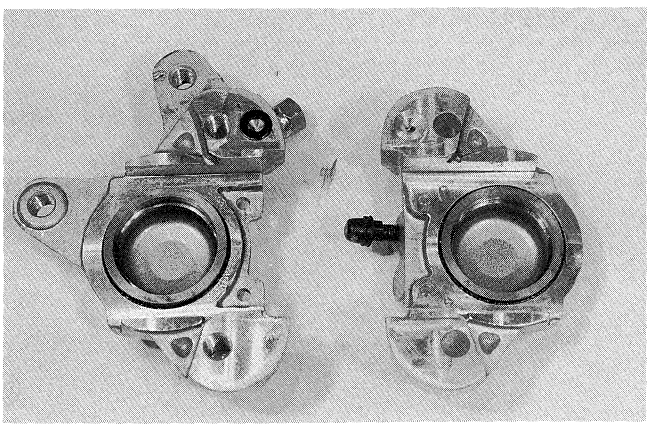
WARNING:
Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joint for cracks or leakage before riding.

- Remove the caliper mounting bolts ③ and take off the caliper.

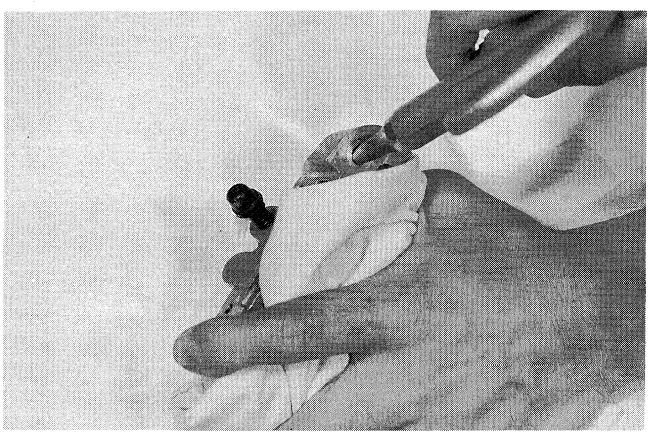


NOTE:
Slightly loosen the caliper housing bolts ④ to facilitate later disassembly.

- Remove the brake pads.
- Remove the caliper housing bolts, and separate the caliper halves.

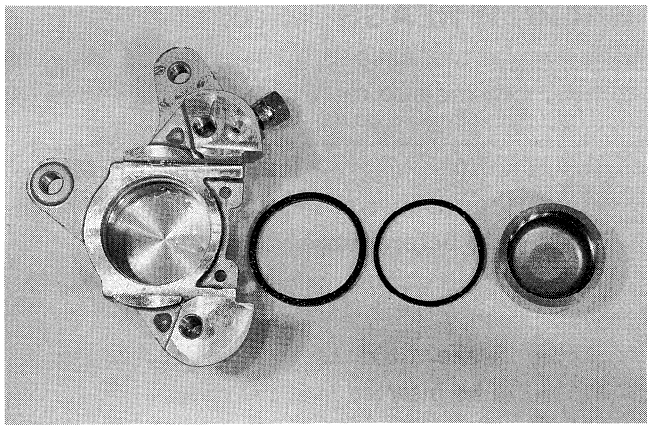


- Place a rag over the piston to prevent popping up. Force out the piston by using an air gun.



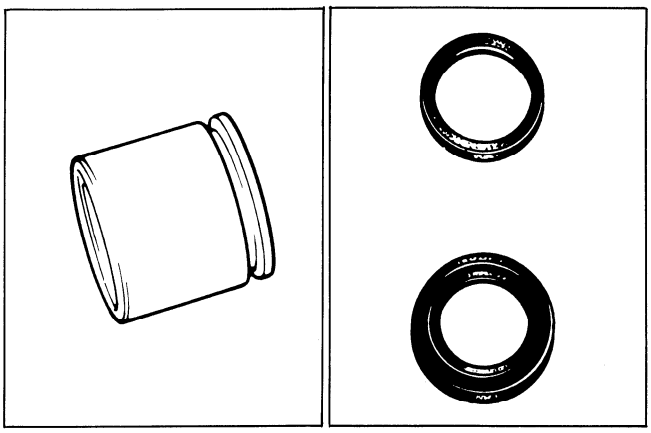
CAUTION:
Do not use high pressure air to prevent piston damage.

- Remove the dust boot and piston seal.



CALIPER AND DISC INSPECTION

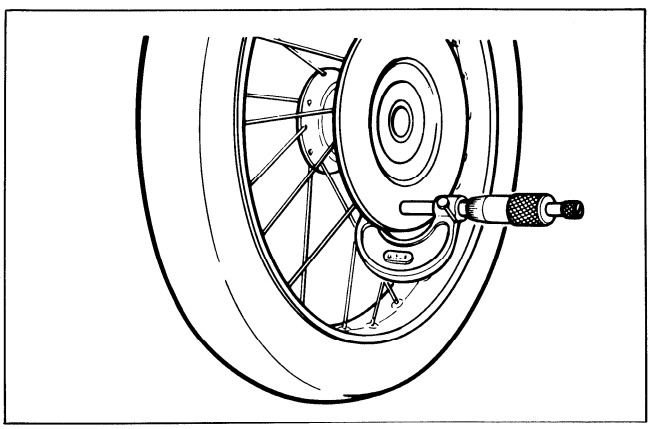
- Inspect the caliper bore wall for nicks, scratches or other damage.
- Inspect each of the rubber parts for damage and wear.
- Inspect the piston surface for any scratches or other damage.



- Check the disc for wear by using a micrometer. Its thickness can be checked with disc and wheel in place. Replace the disc if the thickness exceeds the service limit.

09900-20205	Micrometer (0 – 25 mm)

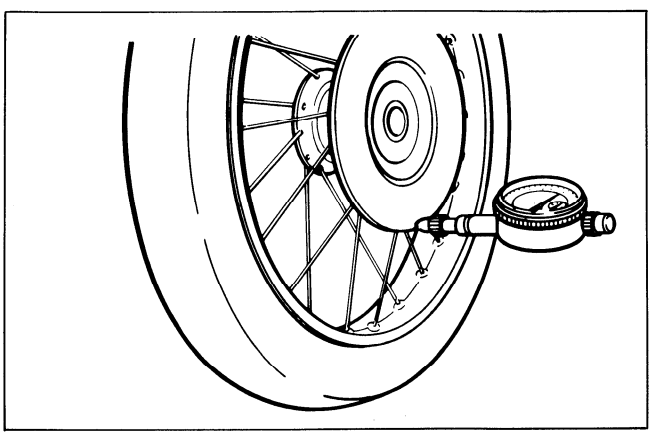
Service Limit	4.5 mm (0.18 in)



- With the disc mounted on the wheel, check the disc for face runout with a dial gauge, as shown. Replace the disc if the runout exceeds the service limit.

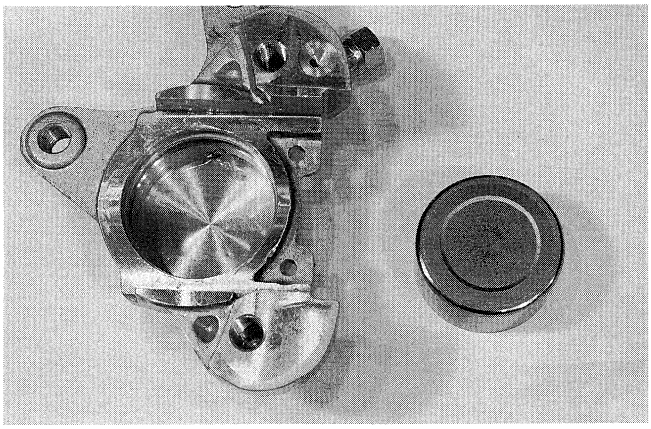
09900-20606	Dial gauge (1/100 mm)
09900-20701	Magnetic stand

Service Limit	0.30 mm (0.012 in)



CALIPER REASSEMBLY

Reassemble the caliper in the reverse order of disassembly and also carry out the following steps:



CAUTION:
Wash the caliper components with fresh brake fluid before reassembly.
Never use cleaning solvent or gasoline to wash them.
Apply brake fluid to the caliper bore and piston to be inserted into the bore.

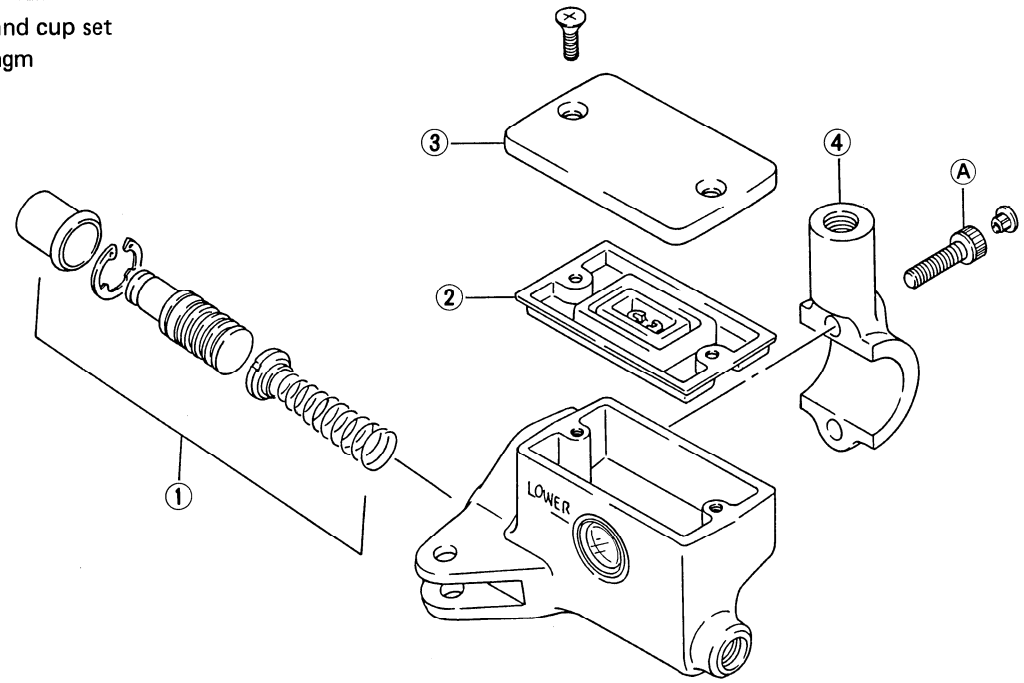
WARNING:
Bleed the air after reassembling caliper. (Refer to page 2-12).

Tightening torque:

	N·m	kg-m	lb-ft
Union bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
Caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
Caliper housing bolt	15 – 20	1.5 – 2.0	11.0 – 14.5

MASTER CYLINDER REMOVAL AND DISASSEMBLY

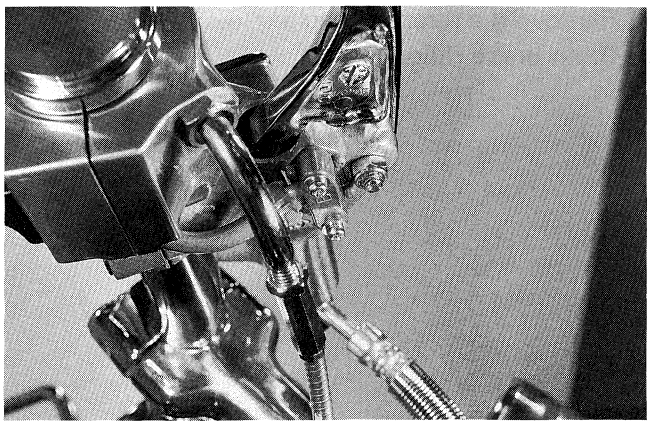
① Piston and cup set
② Diaphragm
③ Cap
④ Holder



Tightening torque

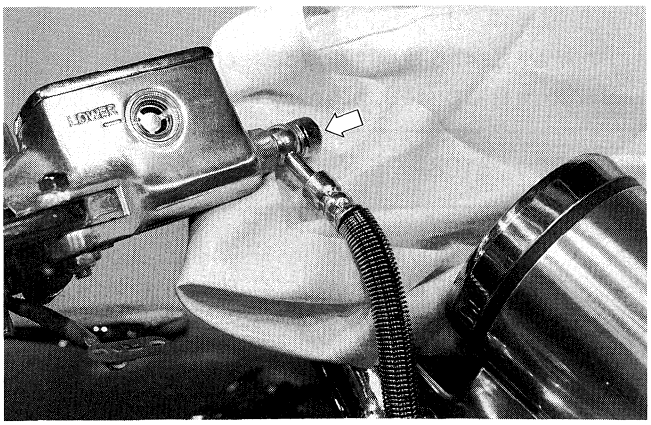
Item	N·m	kg-m	lb-ft
Ⓐ	5 – 8	0.5 – 0.8	3.5 – 6.0

- Take off the front brake light switch.

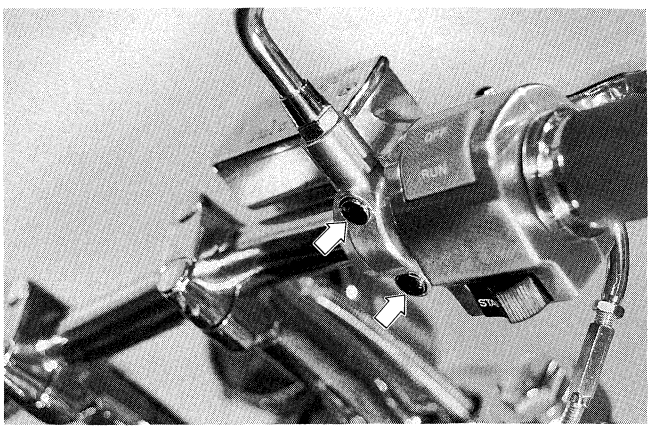


- Place a cloth underneath the union bolt on the master cylinder to catch spilled drops of brake fluid. Unscrew the union bolt and disconnect the brake hose/master cylinder joint.

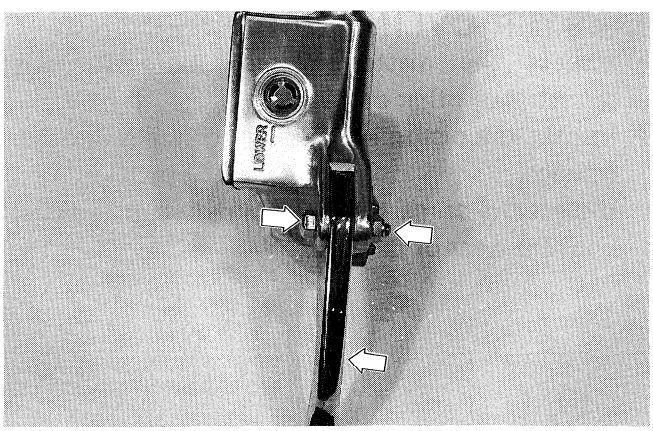
CAUTION:
Completely wipe off any brake fluid adhering to any part of motorcycle. The fluid reacts chemically with paint, plastics, rubber materials, etc.



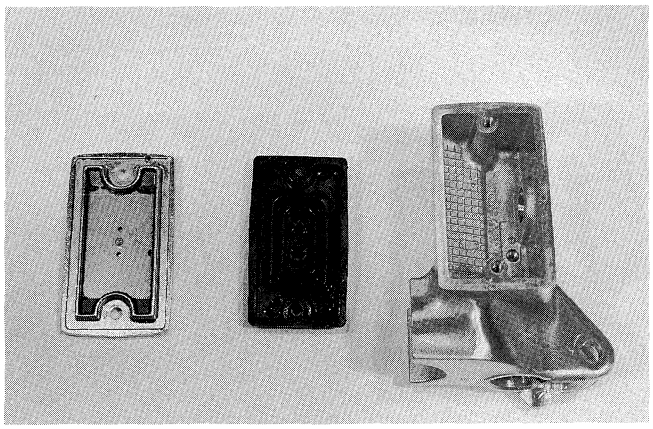
- Remove two clamp bolts and take off the master cylinder assembly.



- Remove the front brake lever.

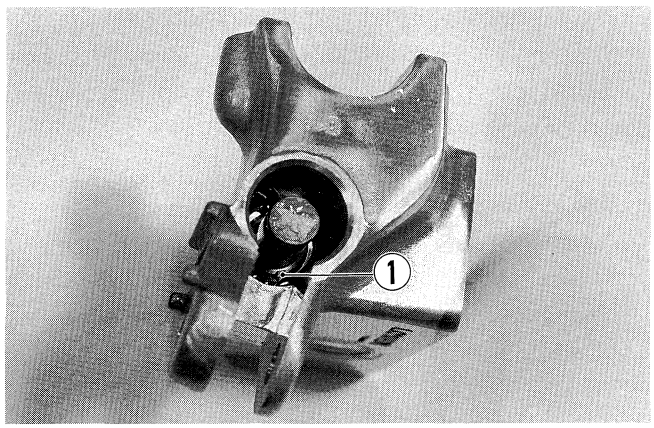


- Remove the reservoir cap and diaphragm.
- Drain brake fluid.

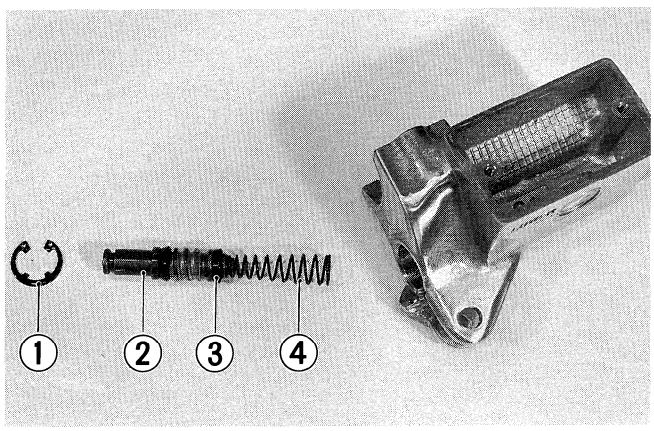


- Pull out the dust boot.
- Remove circlip by using the special tool.
- Remove the piston, primary cup and spring.

09900-06108	Snap ring pliers

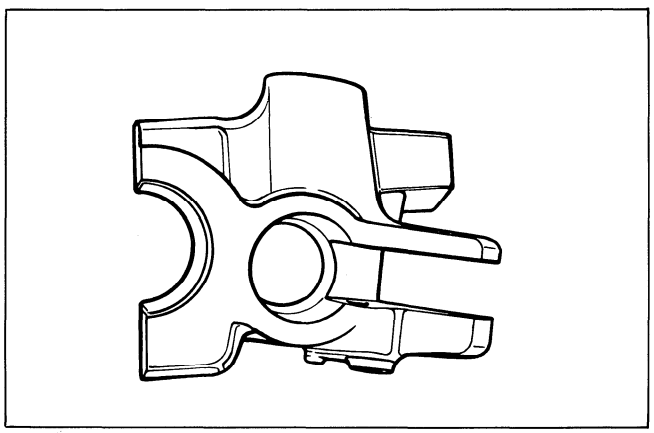


① Circlip ③ Primary cup
② Piston ④ Return spring



MASTER CYLINDER INSPECTION

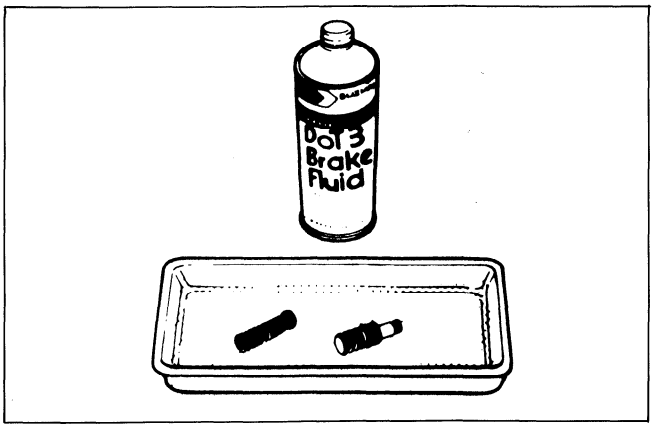
- Inspect the master cylinder bore for any scratches or other damage.
- Inspect the piston surface for scratches or other damage.
- Inspect the primary cup, secondary cup and dust boot for wear or damage.



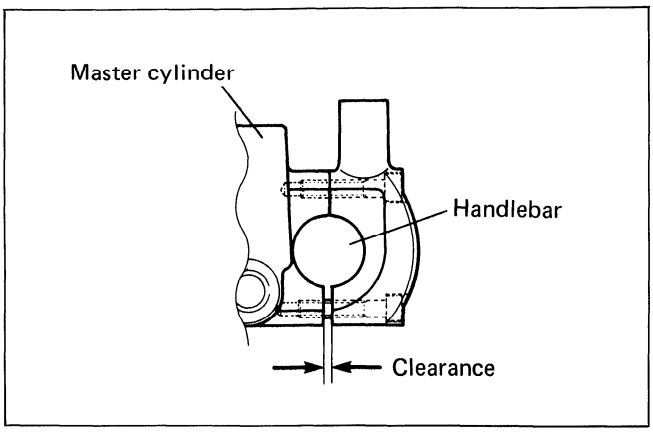
MASTER CYLINDER REASSEMBLY

Reassemble the master cylinder in the reverse order of disassembly and also carry out the following steps:

CAUTION:
Wash the master cylinder components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them. Apply brake fluid to the cylinder bore and all the internals to be inserted into the bore.



- Remount the master cylinder on the handlebar as shown in the illustration. Tighten the upper bolt first.

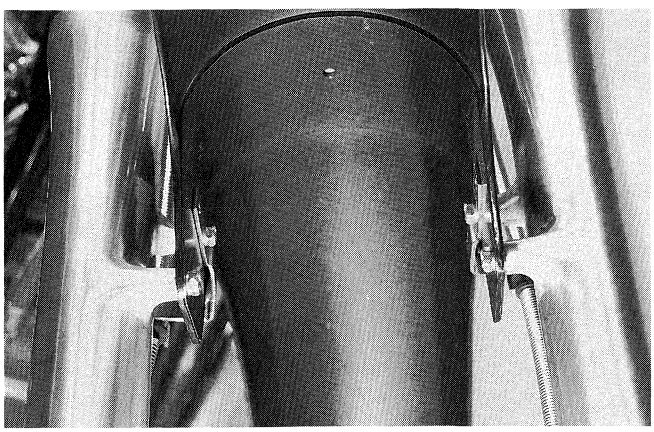


CAUTION:
Bleed the air after reassembling master cylinder. (Refer to page 2-12).
Adjust the front brake light switch after installation.

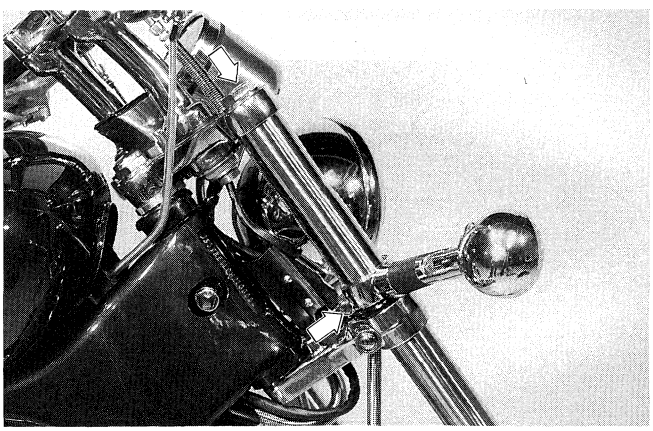
FRONT FORK

REMOVAL

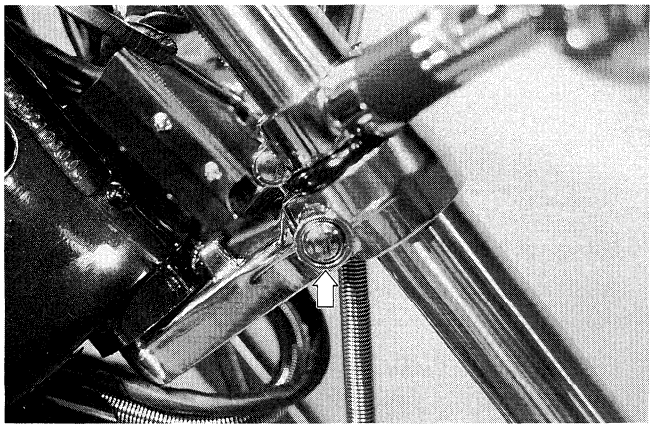
- Remove the front wheel.
- Disconnect the speedometer cable from speedometer drive gearbox. (Refer to page 7-1).
- Remove the caliper. (Refer to page 7-7).
- Remove the front fender.



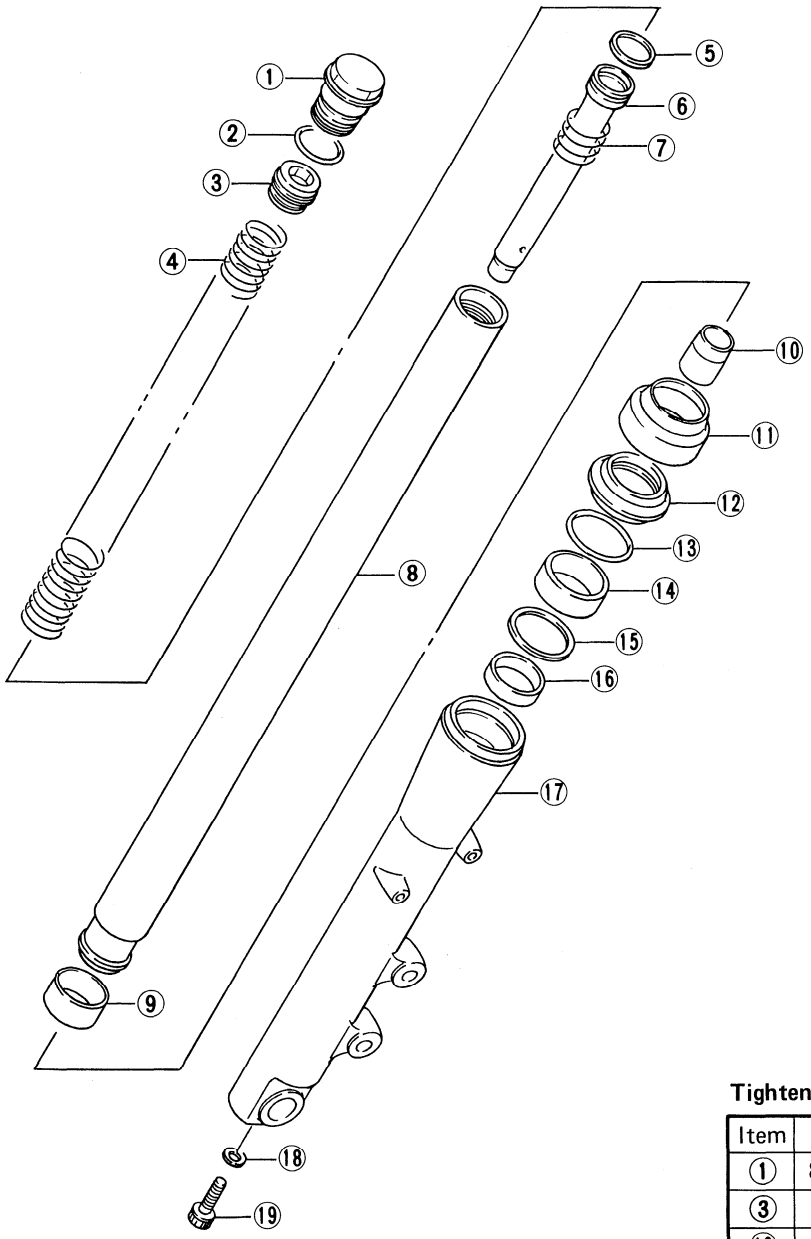
- Loosen the front turn signal lamp clamp bolt.
- Remove the front fork cap bolt.



- Loosen the front fork lower clamp bolt and pull off the front fork.



DISASSEMBLY



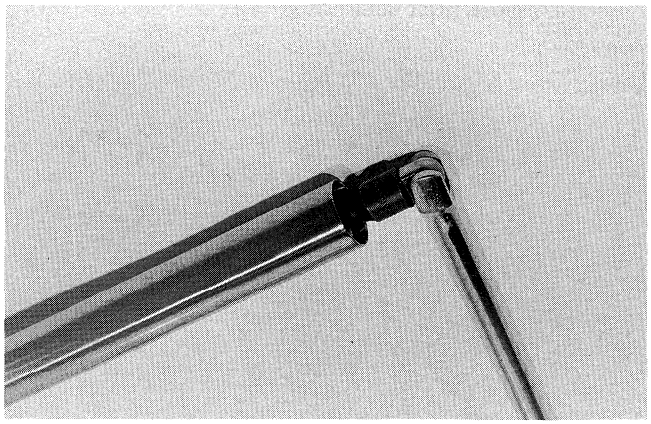
① Front fork cap bolt
② O-ring
③ Spring stopper
④ Spring
⑤ Damper rod ring
⑥ Damper rod
⑦ Rebound spring
⑧ Inner tube
⑨ Anti-friction metal
⑩ Oil lock piece
⑪ Dust seal cover
⑫ Dust seal
⑬ Stopper ring
⑭ Oil seal
⑮ Retainer
⑯ Anti-friction metal
⑰ Outer tube
⑱ Gasket
⑲ Damper rod bolt

Tightening torque

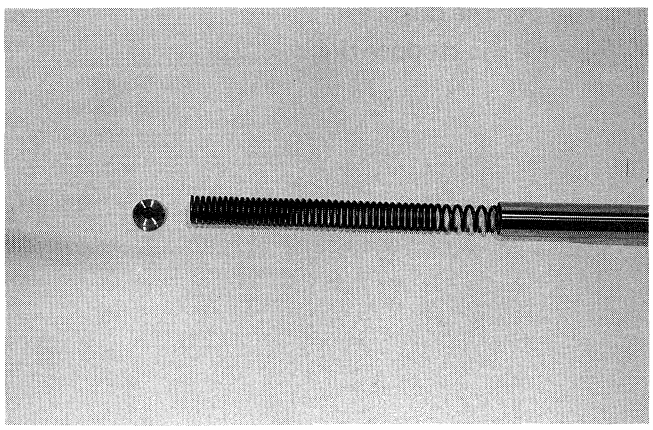
Item	N·m	kg-m	lb-ft
①	80 – 100	8.0 – 10.0	58.0 – 72.5
③	40 – 50	4.0 – 5.0	29.0 – 36.0
⑲	15 – 25	1.5 – 2.5	11.0 – 18.0

- Remove the fork spring retainer bolt with the 14 mm hexagon wrench.

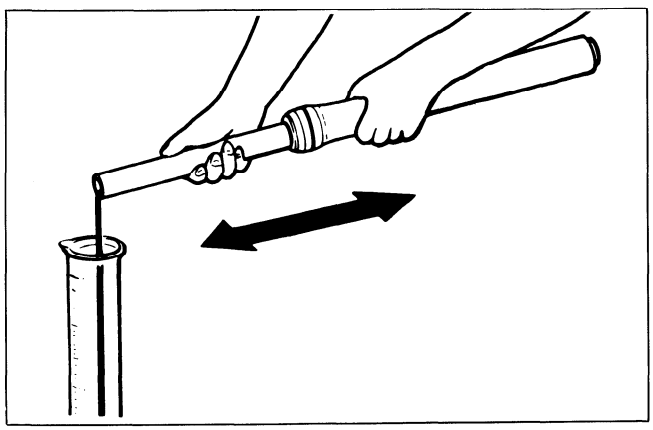
09900-18720	14 mm hexagon socket



- Remove the spring.

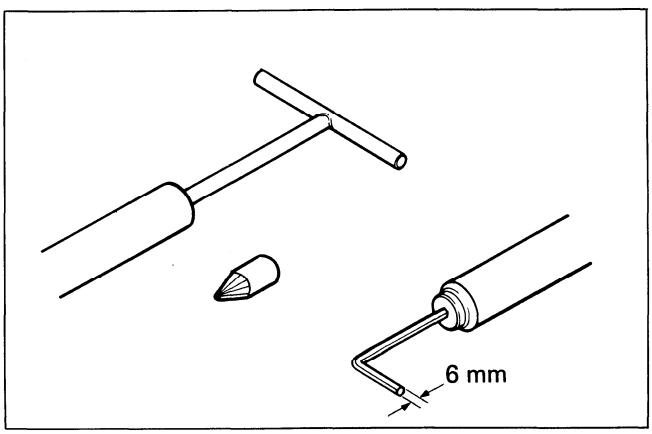


- Invert the fork and stroke it serveral times to let out fork oil.
- Under the condition (inverted condition), hold the fork for a few minutes.

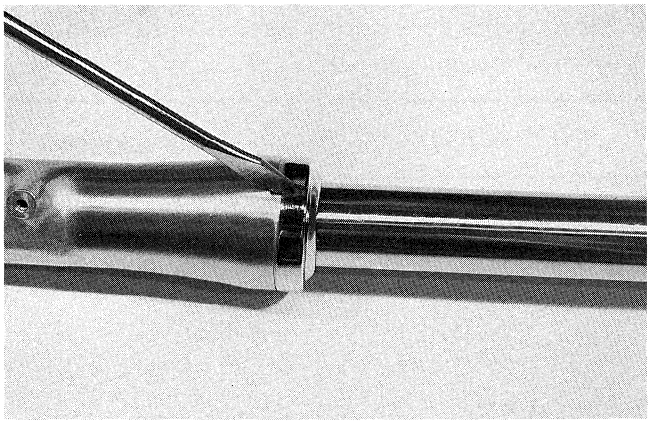


- Remove the damper rod securing bolt by using the special tools.
- Draw out the damper rod and rebound spring.

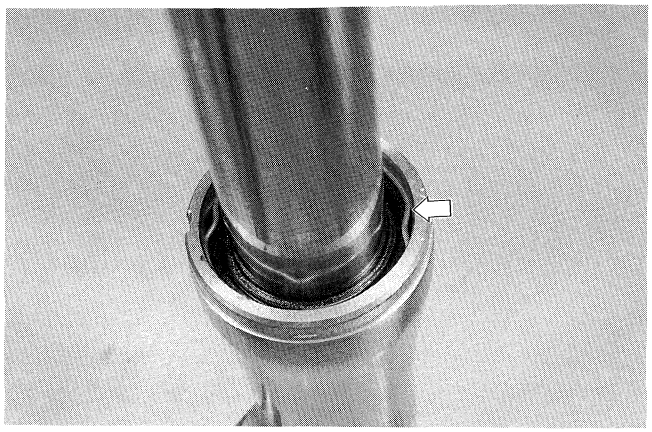
09940-34520	"T" handle
09940-34530	Attachement "A"
09900-00401	"L" type hexagon wrench set



- Remove the dust seal cover with a screw driver.

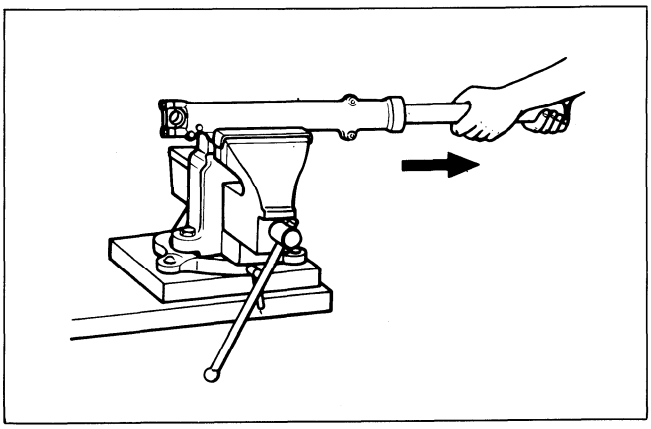


- Draw out the dust seal.
- Remove the stopper ring.

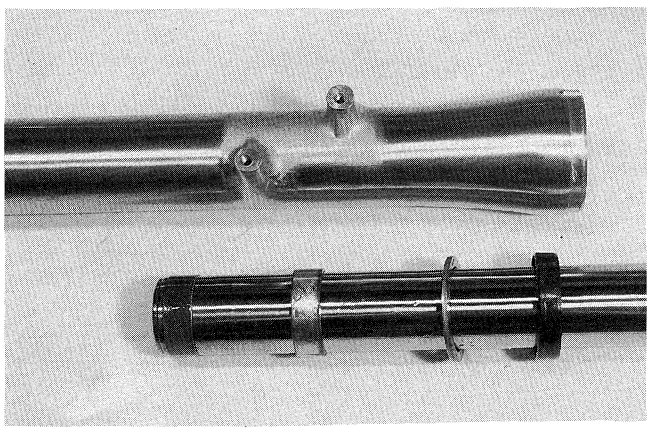


- While holding the caliper mounting portion of the outer tube by vise, separate the inner tube from the outer tube as shown.

NOTE:
When separating the inner tube from the outer tube, both anti-friction metals may be damaged and replace them with new ones.



- Remove inner tube anti-friction metal.

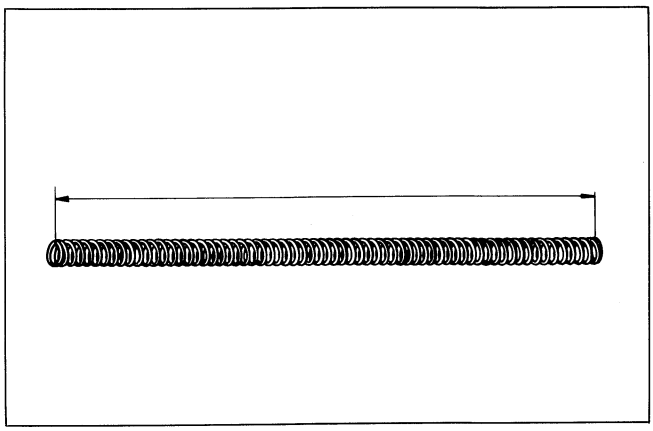


INSPECTION

FORK SPRING

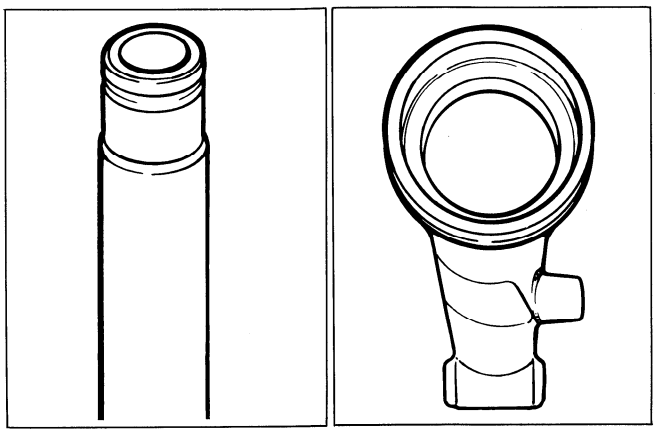
- Measure the fork spring free length. If it is shorter than the service limit, replace it.

Service Limit	549 mm (21.6 in)



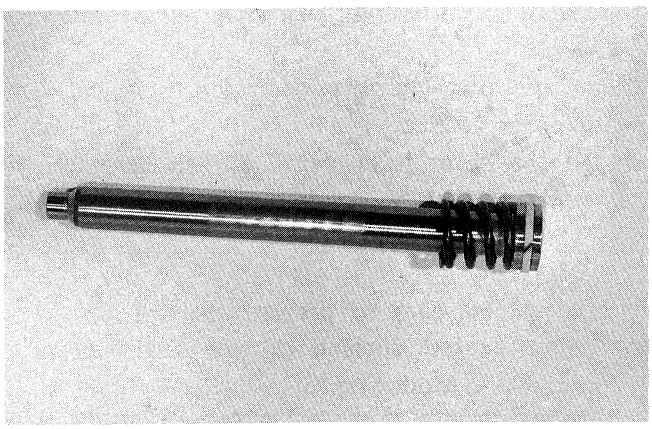
INNER TUBE AND OUTER TUBE

- Inspect inner tube sliding surface for any scuffing and check for bend. Inspect outer tube sliding surface for any scuffing.



DAMPER ROD RING

- Inspect damper rod ring for wear and damage.



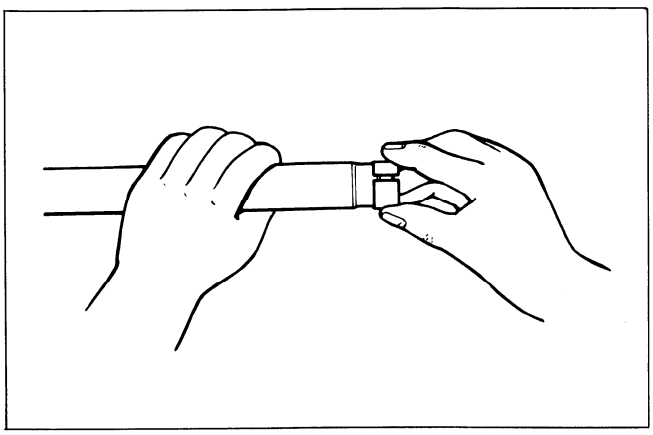
REASSEMBLY

Reassemble and remount the front fork in the reverse order of disassembly and removal, and also carry out the following steps:

INNER TUBE METAL

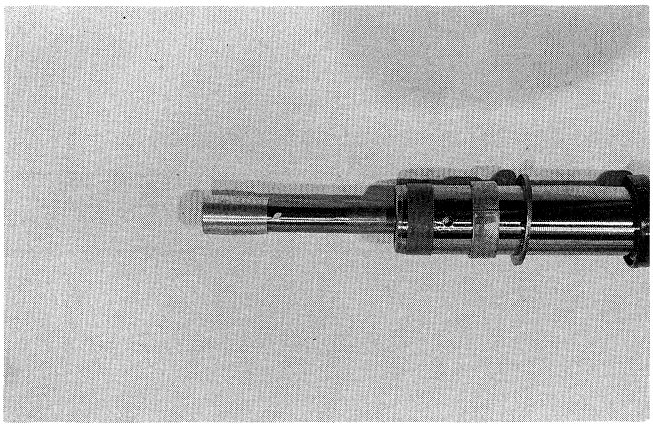
- Hold the inner tube vertically and clean the metal groove.
- Clean the new metal inner surface and install it to the metal groove of the inner tube as shown.

CAUTION:
Use special care to prevent damage to the Teflon coated surface of the Anti-friction metal when mounting it.



OIL LOCK PIECE

- Install the oil lock piece to the damper rod as shown in the Fig.

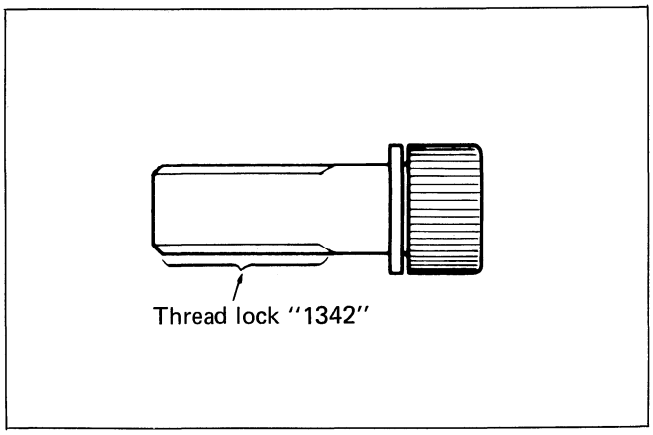


DAMPER ROD BOLT

- Apply Thread lock "1342" to the damper rod bolt.
  Tighten the damper rod bolt to the specified torque.

99000-32050	Thread lock "1342"

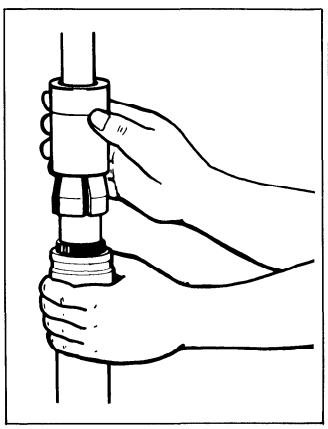
Tightening torque	15 – 25 N·m (1.5 – 2.5 kg-m 11.0 – 18.0 lb-ft)

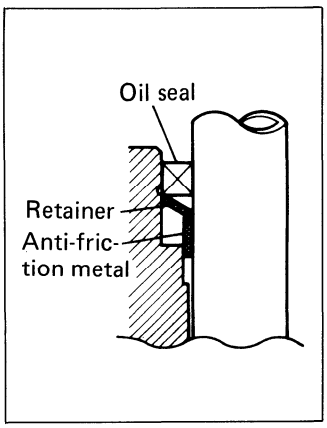


OUTER TUBE METAL, OIL SEAL AND DUST SEAL

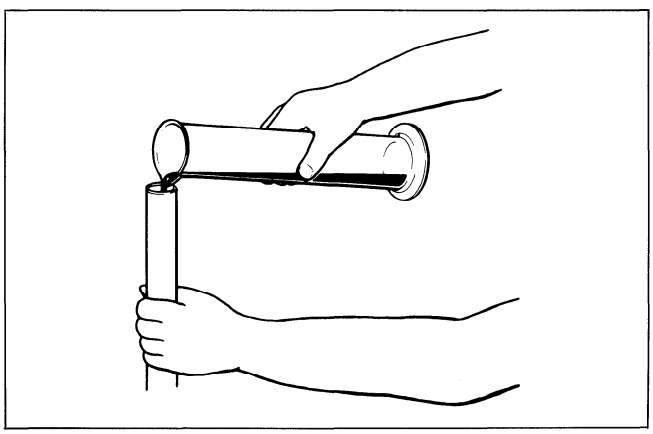
Clean the metal groove of outer tube and new metal outer surface.
Install the outer tube metal, oil seal retainer, oil seal and dust seal.

CAUTION:
Use special care to prevent damage to the Teflon coated surface of the Anti-friction metal when mounting it.





09940-50112	Front fork oil seal installer



FORK OIL

- For fork oil, be sure to use a front fork oil whose viscosity rating meets specification below.

09900-99044-10G	SUZUKI Fork oil # 10

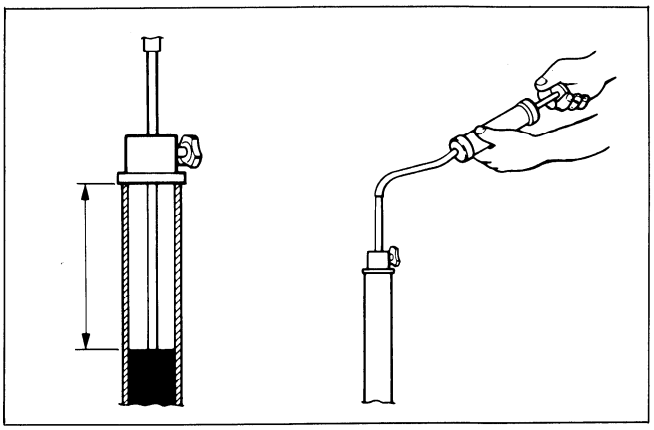
Fork oil capacity	354 ml (12.0 US oz)

- Hold the front fork vertical and adjust the fork oil level with the special tool.

NOTE:
When adjusting oil level, remove the fork spring and compress the inner tube fully.

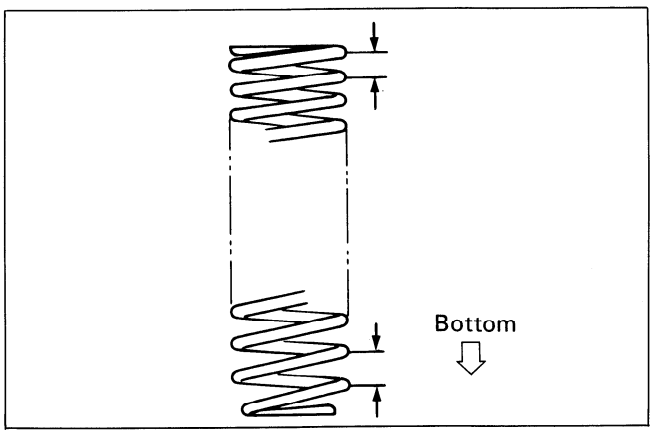
09943-74111	Fork oil level guage

STD oil level	203 mm (7.99 in.)



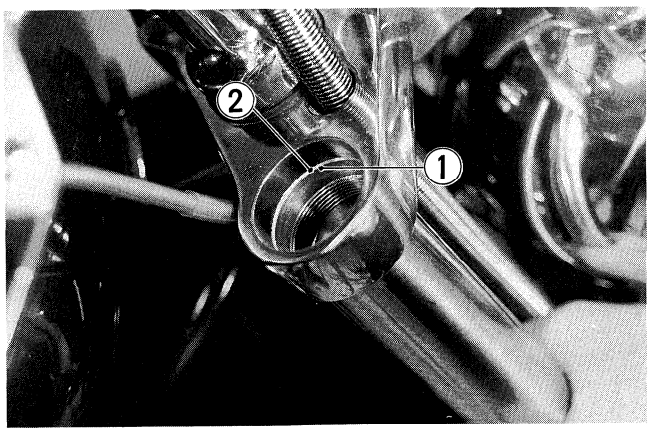
FORK SPRING

- When reinstalling the fork spring large pitch end should position in bottom.



INNER TUBE

- Install the front fork assembly aligning upper surface ① of the inner tube with the stopper part ② of the steering stem upper bracket.
- Tighten the bolts and nuts to the specified torque.



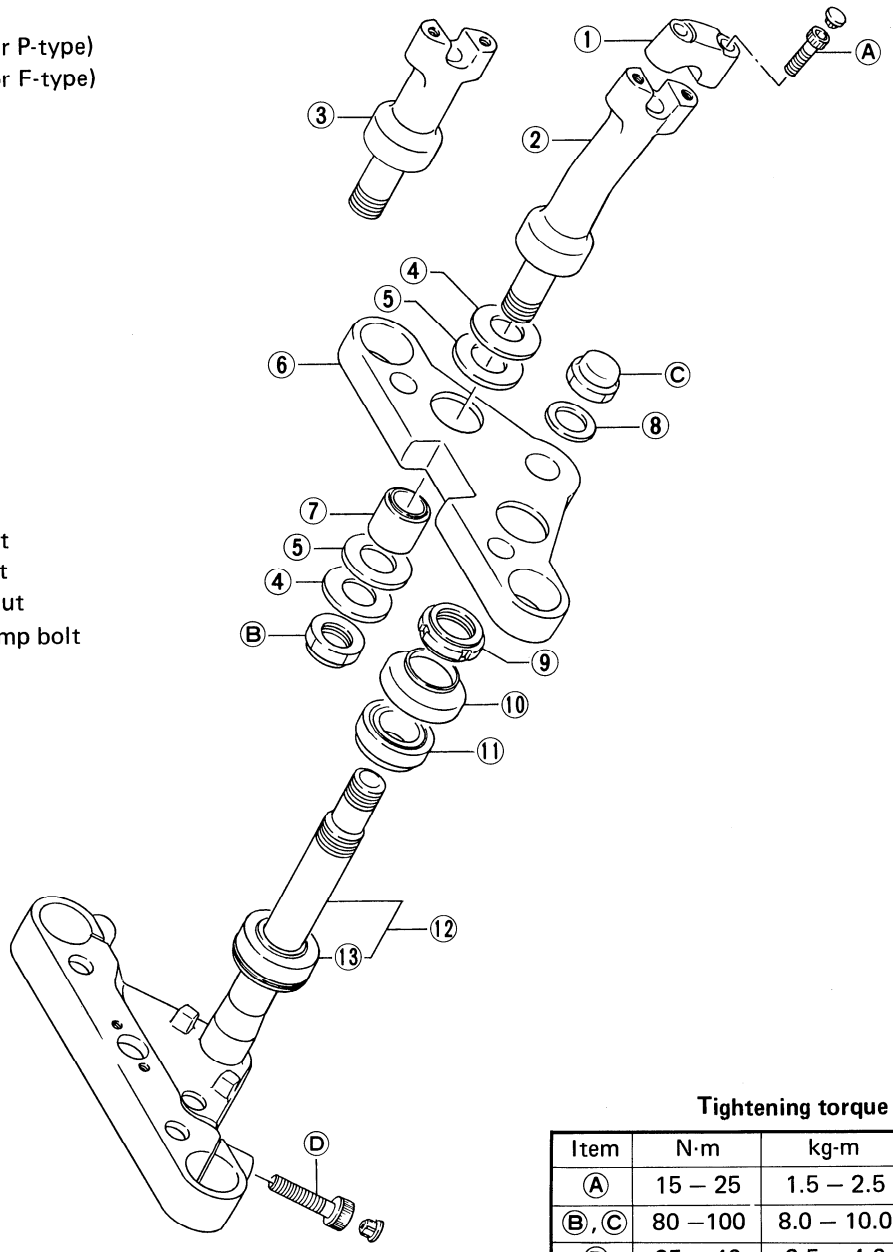
	N·m	kg-m	lb-ft
Front fork lower clamp bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
Spring stopper	40 – 50	4.0 – 5.0	29.0 – 36.0
Front fork cap bolt	80 – 100	8.0 – 10.0	58.0 – 72.5

HANDLEBAR AND STEERING STEM

CONSTRUCTION

① Handlebar clamp
② Handlebar holder (for P-type)
③ Handlebar holder (for F-type)
④ Washer
⑤ Damper
⑥ Steering stem head
⑦ Bush
⑧ Washer
⑨ Steering stem nut
⑩ Dust seal
⑪ Steering stem upper bearing
⑫ Steering stem
⑬ Steering stem lower bearing

Ⓐ Handlebar clamp bolt
Ⓑ Handlebar holder nut
Ⓒ Steering stem head nut
Ⓓ Front fork lower clamp bolt

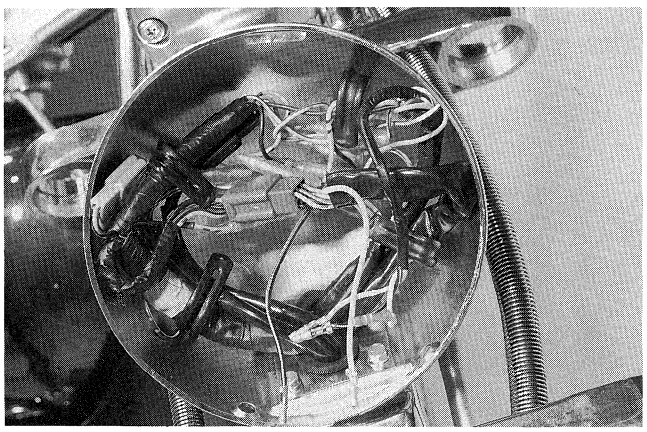


Tightening torque

Item	N·m	kg-m	lb-ft
Ⓐ	15 – 25	1.5 – 2.5	11.0 – 18.0
Ⓑ, Ⓒ	80 –100	8.0 – 10.0	58.0 – 72.5
Ⓓ	25 – 40	2.5 – 4.0	18.0 – 29.0

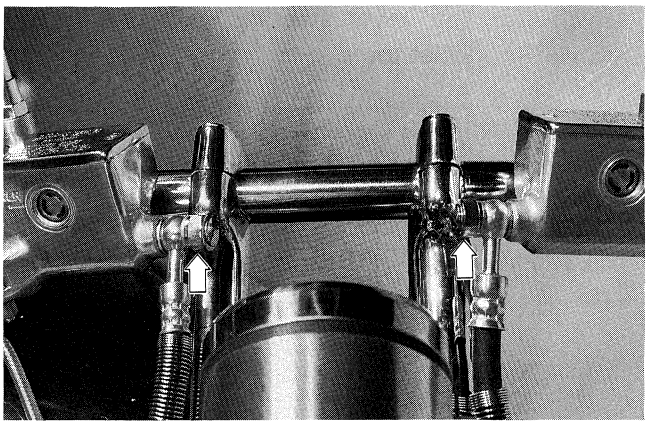
DISASSEMBLY

- Remove the fuel tank.
- Remove the front wheel. (Refer to page 7-1.)
- Remove the front fork. (Refer to page 7-12.)
- Remove the headlamp and disconnect the lead wire couplers.
- Remove the headlamp housing.

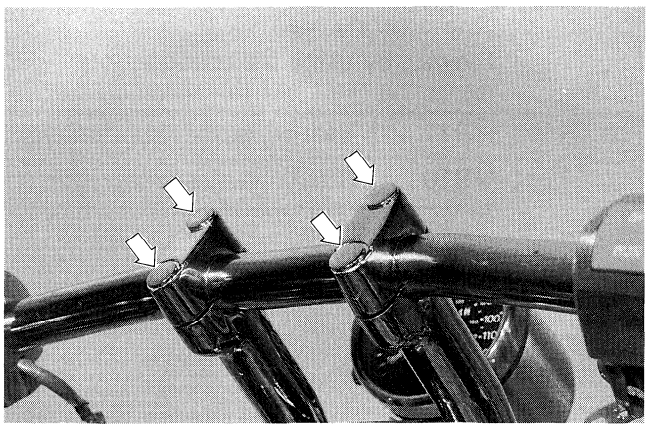


- Disconnect the clutch hose and brake hose from the master cylinders.

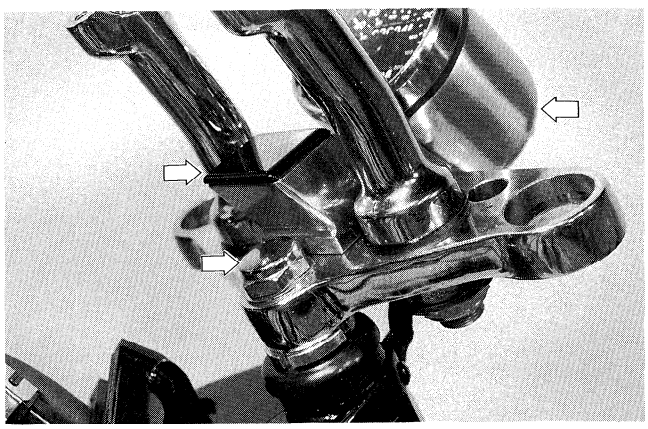
CAUTION:
Completely wipe off any brake fluid abhering to any part of motorcycle. The fluid reacts chemically with paint, plastics, rubber materials, etc.



- Remove the front brake switch and clutch switch from the switch box.
- Remove the handlebar clamps and handlebar.



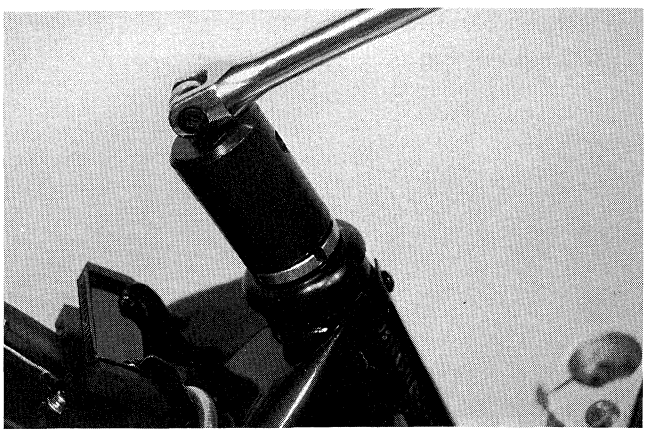
- Remove the speedometer and instrument panel from the steering stem head.
- Remove the steering stem head nut and dismount the steering stem head.



- Remove the steering stem nut by using the special tool.
- Remove the upper steering stem bearing.

NOTE:
Hold the steering stem lower bracket by hand to prevent dropping.

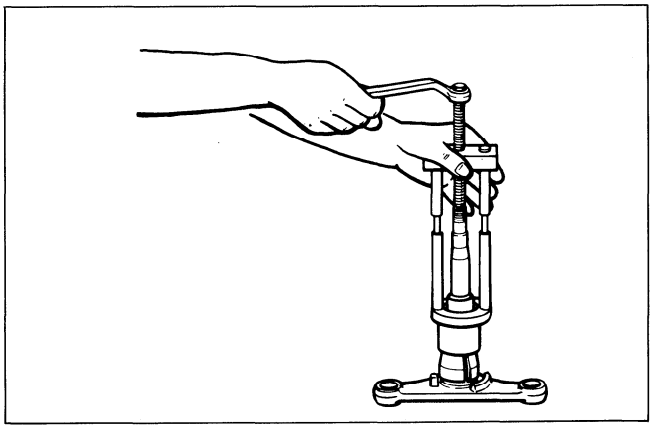
09940-14911	Steering nut socket wrench



- Draw out the lower steering stem bearing by using the special tool.

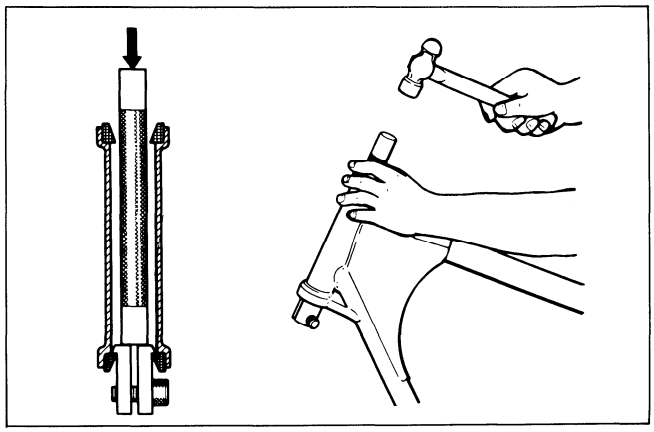
CAUTION:
The removed bearing should be replaced.

09941-84510	Bearing inner race remover

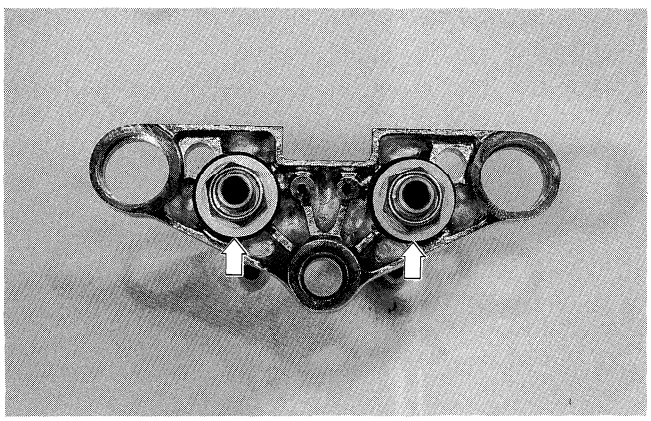


- Push out the steering stem bearing outer races, upper and lower, by using the special tools.

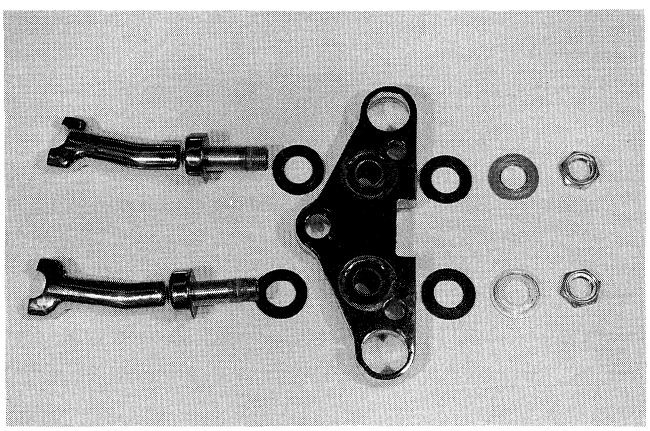
09941-54911	Bearing outer race remover
09941-74910	Steering bearing installer



- Hold the handlebar holder with a vise and remove the nut.



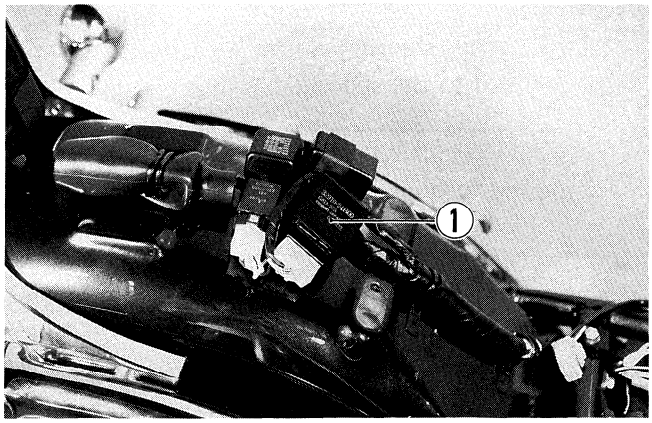
- Disassemble the handlebar holder related parts as shown in Fig.



INSPECTION

Inspect and check the removed parts for the following abnormalities.

* Handlebar distortion.
* Handlebar clamp, holder and damper rubber wear.
* Race wear and brinelling.
* Distortion of steering stem.



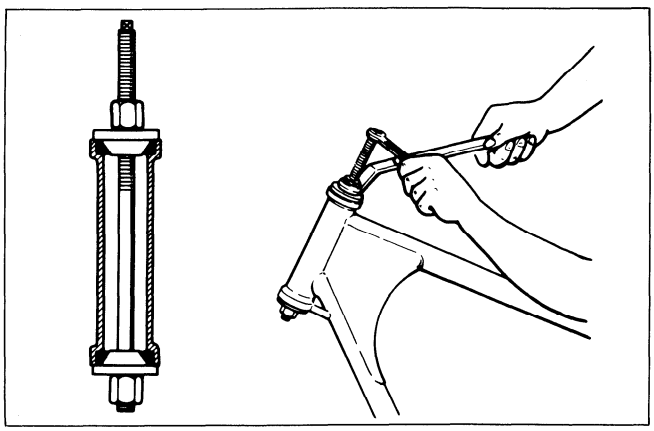
REASSEMBLY

Reassemble and remount the steering stem in the reverse order of disassembly and removal and also carry out the following steps.

OUTER RACES

- Press in the upper and lower outer races by using the special tool.

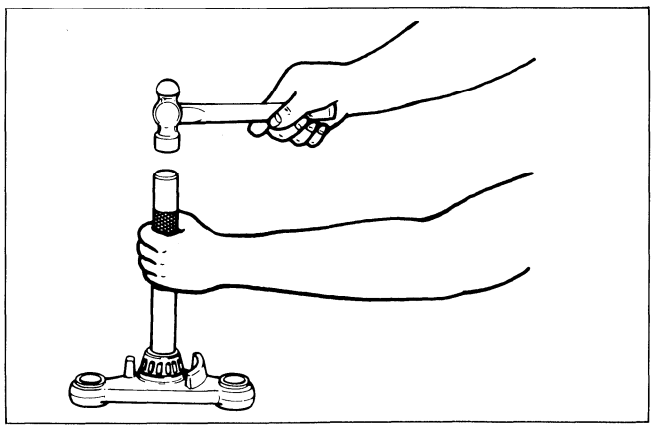
09941-34513	Steering race and swing arm bearing installer



BEARING

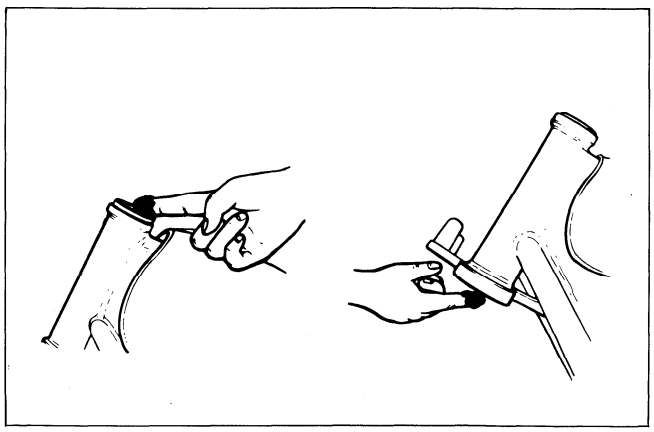
- Press in the lower bearing by using the special tool.

09941-74910	Steering bearing installer



- Apply grease to the upper and lower bearings before remounting the steering stem.

99000-25010	SUZUKI super grease "A"



STEM NUT

- Tighten the steering stem nut by using the special tool to the specified torque.

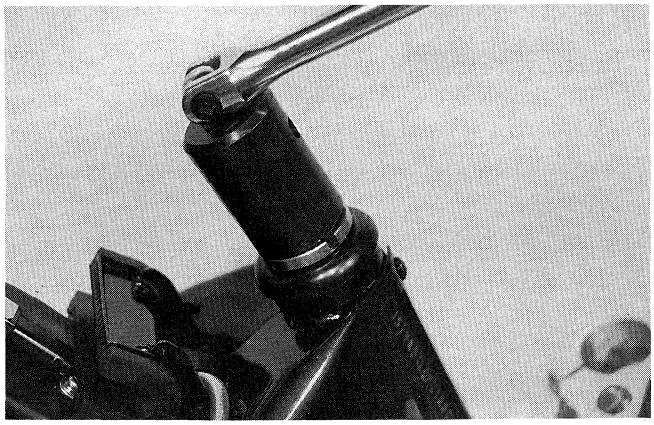
Tightening torque	40 – 50 N·m (4.0 – 5.0 kg-m 29.0 – 36.0 lb-ft)

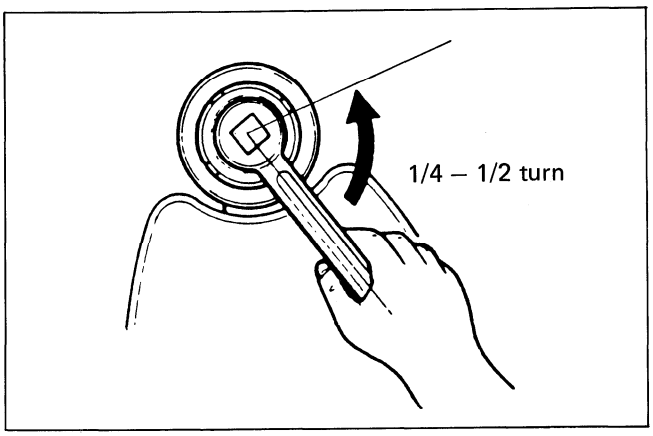
Turn the front fork right and left 5 or 6 times to seat the bearings.
Turn out the steering stem nut 1/4 turn.
Then retighten very lightly so that no play can be detected in the stem.

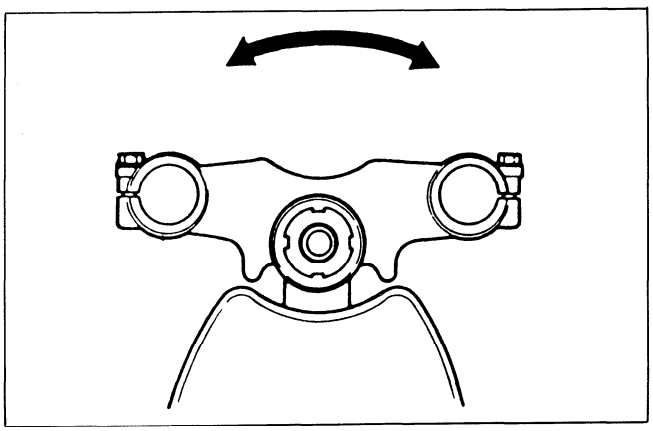
09940-14911	Steering nut socket wrench

NOTE:
This adjustment will vary from motorcycle to motorcycle.

CAUTION:
After performing the adjustment and installing the steering stem upper bracket, "rock" the front wheel assembly forward and back to ensure that there is no play and that the procedure was accomplished correctly. Finally check to be sure that the steering stem moves freely from left to right with its own weight. If play or stiffness is noticeable, re-adjust the steering stem nut.



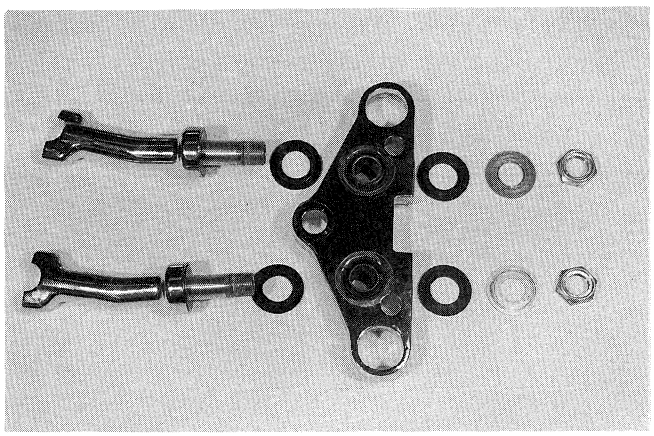




HANDLEBAR HOLDER

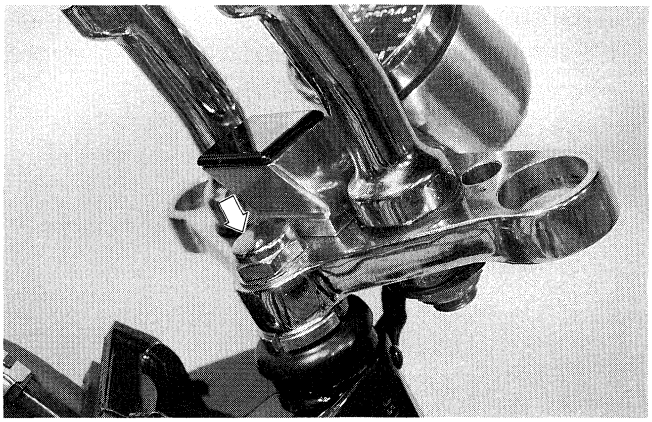
- Install the handlebar holder and related parts to the steering stem head.

NOTE:
When tightening the handlebar holder nut, install the handlebar to the holder and hold the handlebar with a vise.



- Remount the steering stem head.

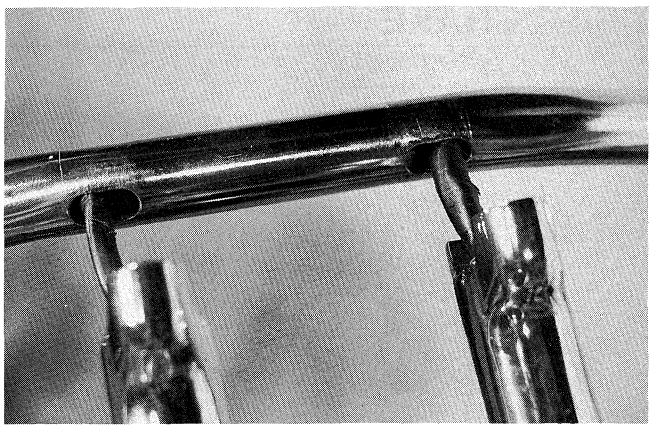
NOTE:
When tightening the steering stem head nut, install the left and right front forks to hold the stem head at the proper position.



- Pass the handlebar switch lead wires through the handlebar holder.
- Install the front fork to the steering stem and steering stem head. (Refer to page 7-18.)
- Tighten the steering stem head nut, handlebar clamp bolts and handlebar holder nut to the specification.

Tightening torque

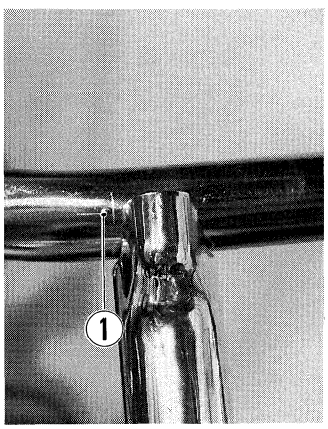
	N·m	kg-m	lb-ft
Steering stem head nut	80 – 100	8.0 – 10.0	58.0 – 72.5
Handlebar clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Handlebar holder nut	80 – 100	8.0 – 10.0	58.0 – 72.5

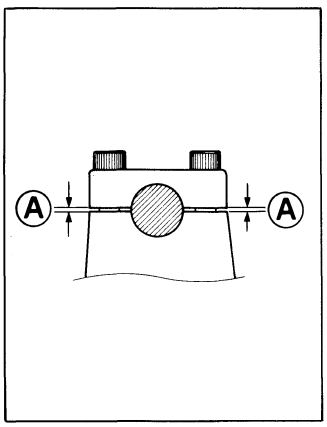


- Tighten the speedometer and instrument panel securing screws.

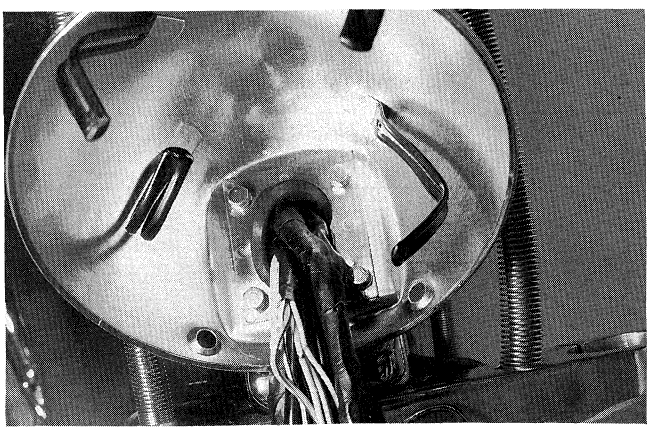
HANDLEBARS

- Set the handlebars to match its punched mark ① to the mating face of the holder.
- Secure the handlebars clamp in such a way that the clearance Ⓐ ahead of and behind the handlebars are equalized.

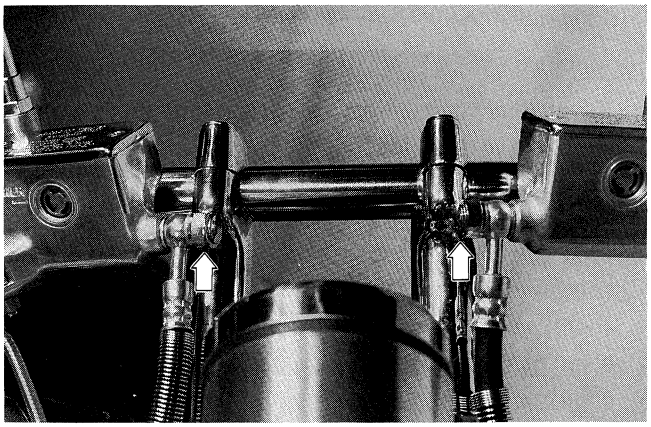




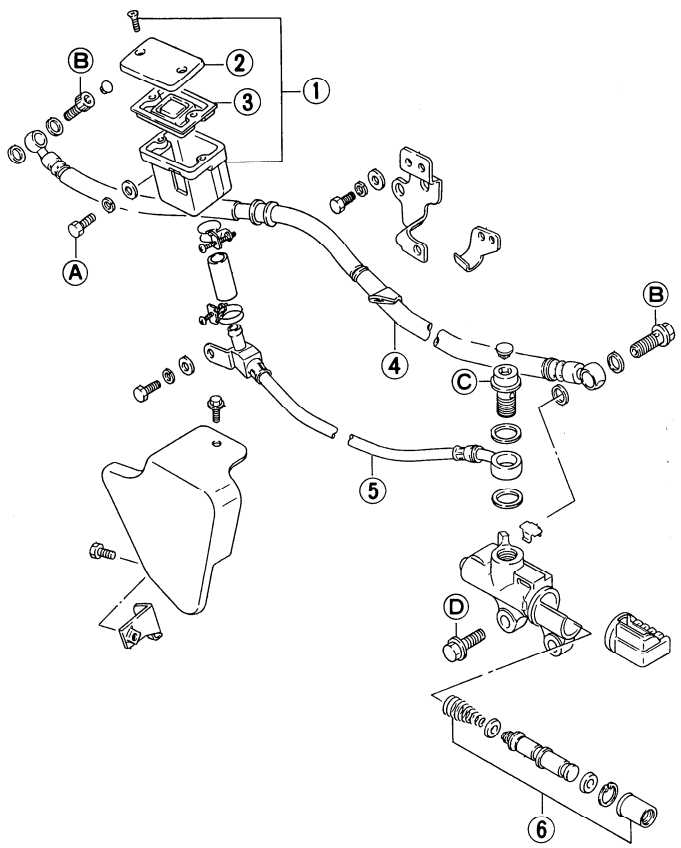
- Install the headlamp housing to the steering stem and pass the lead wires through the headlamp housing.
- Route the speedometer cable, clutch hose and brake hose properly.

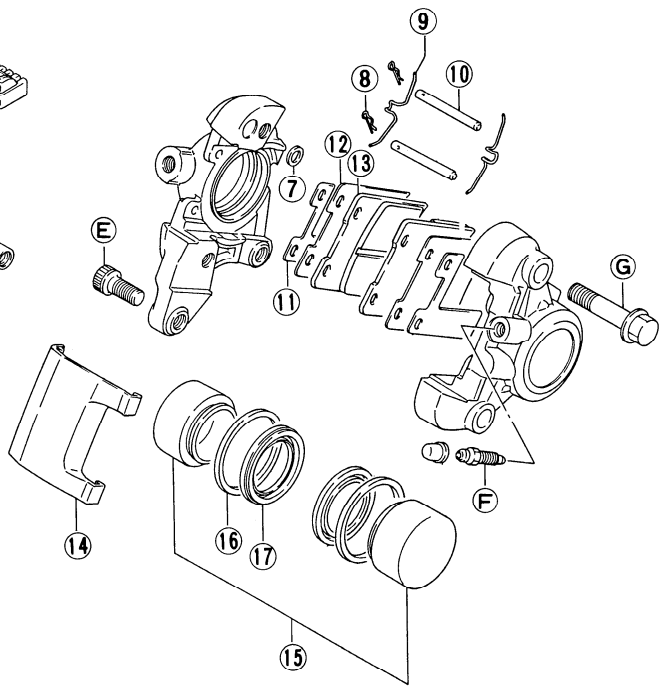


- After tightening the union bolts of the clutch hose and brake hose, bleed the air from the circuits. (Refer to page 2-9 and 2-12.)



REAR BRAKE





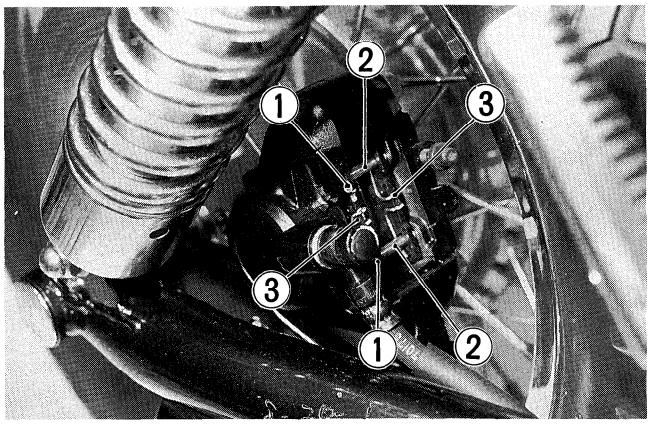
① Reservoir
② Cap
③ Diaphragm
④ Hose (Master cylinder to caliper)
⑤ Hose (Reservoir to master cylinder)
⑥ Piston and cup set
⑦ O-ring
⑧ Clip
⑨ Spring
⑩ Pin
⑪ Shim
⑫ Shim
⑬ Pad
⑭ Cover
⑮ Piston and seal set
⑯ Piston seal
⑰ Dust seal

Tightening torque

Item	N·m	kg-m	lb-ft
Ⓐ	8 – 12	0.8 – 1.2	6.0 – 8.5
Ⓑ	20 – 25	2.0 – 2.5	14.5 – 18.0
Ⓒ	30 – 35	3.0 – 3.5	21.5 – 25.5
Ⓓ	15 – 25	1.5 – 2.5	11.0 – 18.0
Ⓔ	25 – 40	2.5 – 4.0	18.0 – 29.0
Ⓕ	6 – 9	0.6 – 0.9	4.5 – 6.5
Ⓖ	15 – 20	1.5 – 2.0	11.0 – 14.5

BRAKE PAD REPLACEMENT

- Remove the dust cover.
- Remove the clips ① and draw out the pins ③. Remove the springs ②.
- Take out the pads.



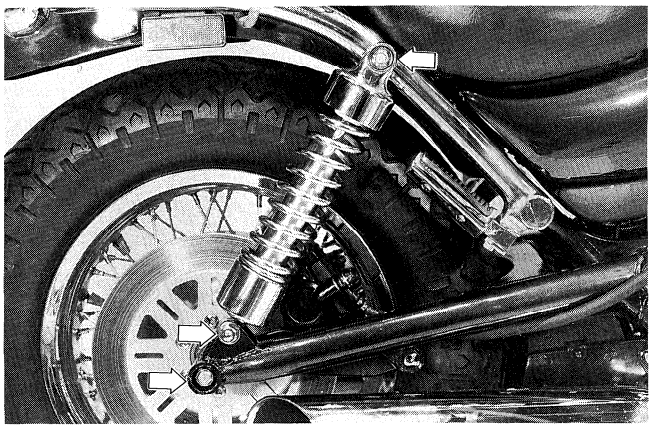
CAUTION:

*** Do not operate the brake pedal while dismounting the pads.**

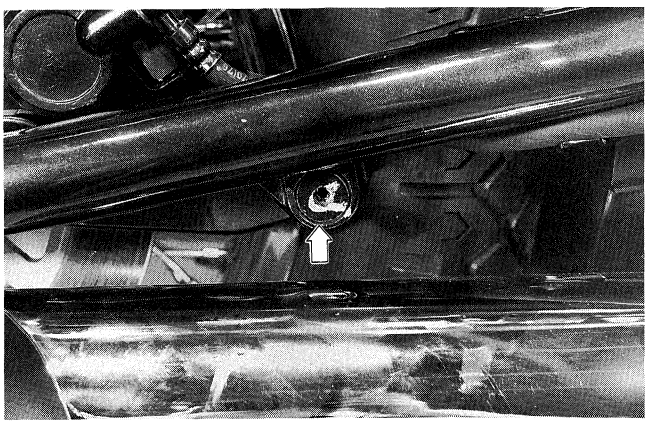
*** Replace the brake pad as a set, otherwise braking performance will be adversely affected.**

CALIPER REMOVAL AND DISASSEMBLY

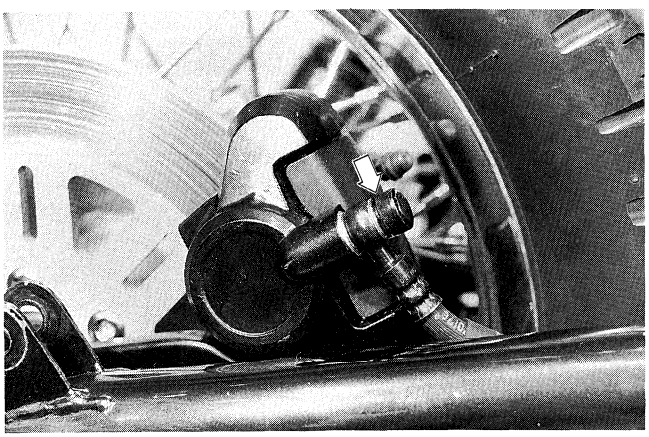
- Loosen the rear axle nut.
- Remove the right rear shock absorber.



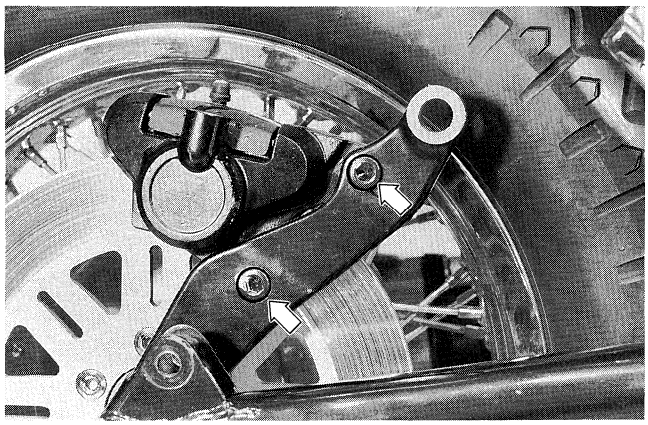
- Remove the caliper mounting holder bolt.



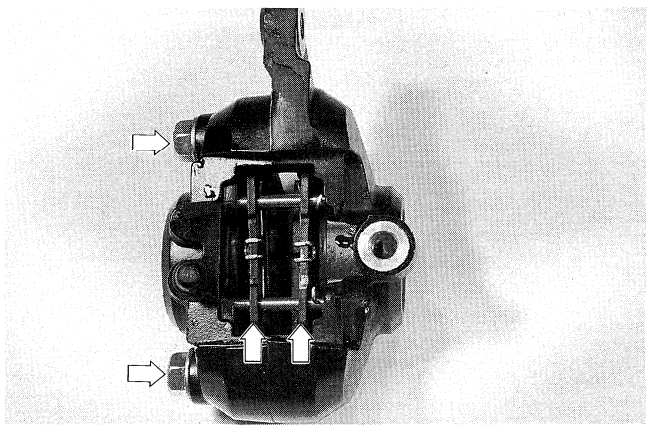
- Remove the union bolt and catch the brake fluid in a suitable receptacle.



- Remove the caliper mounting bolts.

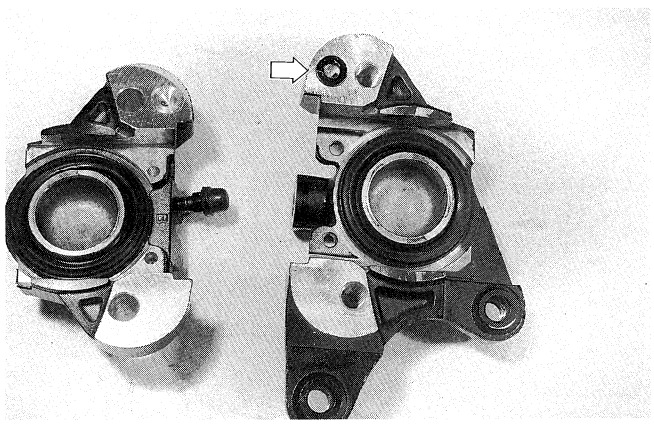


- Remove the pads. (Refer to page 7-26.)
  Remove the caliper housing bolts and separate the caliper halves.



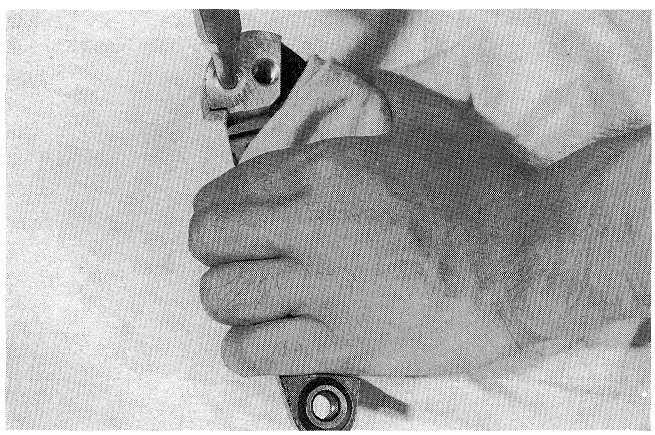
- Remove the O-ring.

NOTE:
Once separate the caliper halves, replace the O-ring with a new one.

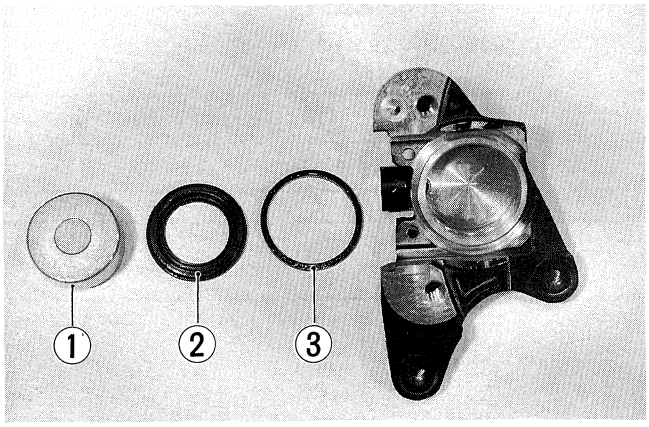


- Place a rag over the piston to prevent it from popping out and push out the piston by using air gun.

CAUTION:
To prevent piston damage, do not use high pressure air.



- Remove the piston ① , dust boot ② , and piston seal ③ .



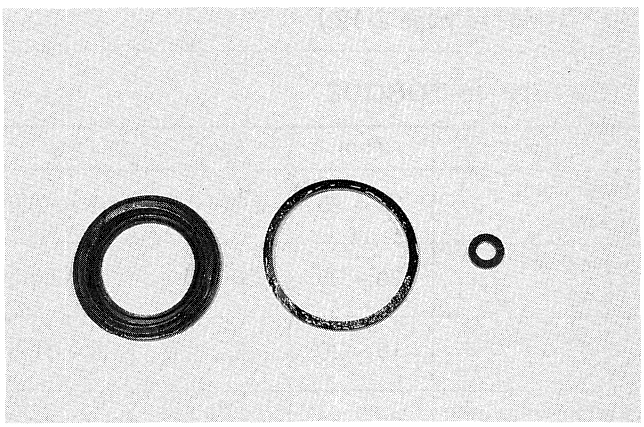
INSPECTION

CYLINDER AND PISTON

- Inspect the cylinder bore wall for nicks, scratches or other damage.
- Inspect the piston surface for any flaws or other damage.

RUBBER PART

Inspect the each rubber parts for damage and wear.

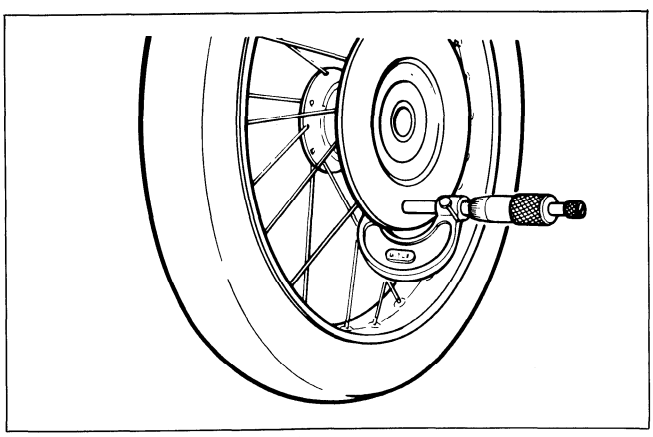


DISC

- Using a micrometer check the disc for wear. Its thickness can be checked with disc and wheel in place. The service limit for the thickness of the disc is shown below:

09900-20205	Micrometer (0 – 25 mm)

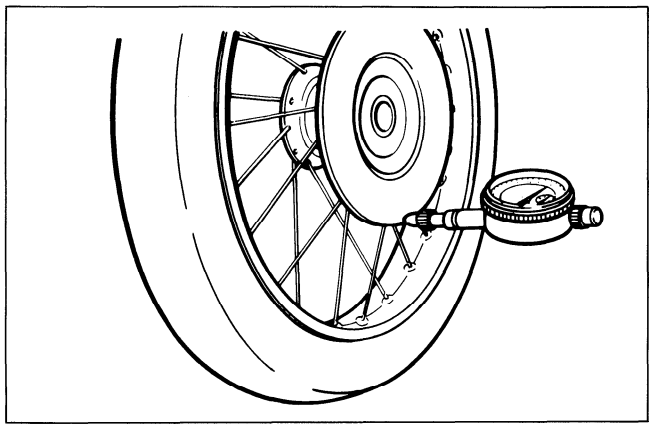
Service Limit (Rear disc)	5.5 mm (0.22 in)



- With the disc mounted on the wheel, check the disc for face runout with a dial gauge, as shown.

09900-20606	Dial gauge (1/100 mm)
09900-20701	Magnetic stand

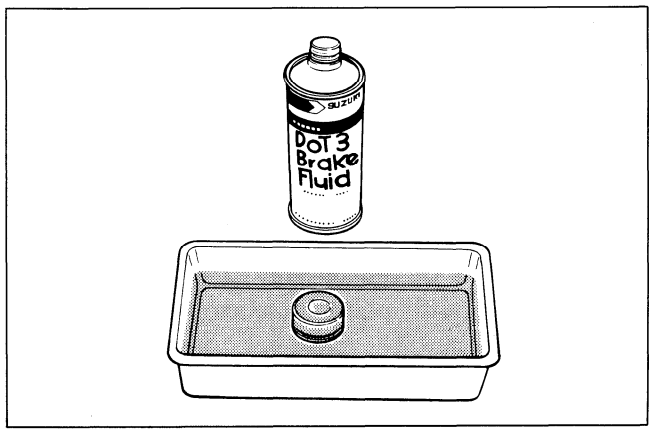
Service Limit	0.30 mm (0.012 in)



REASSEMBLY

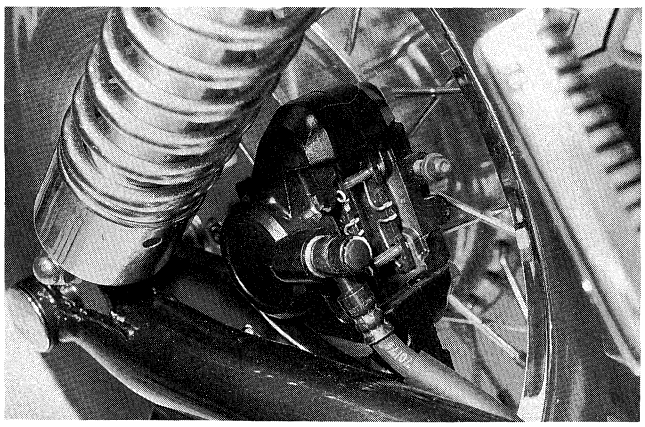
Reassemble and remount the caliper in the reverse order of disassembly and removal, and also carry out the following steps:

CAUTION:
- *** Wash the caliper components with fresh brake fluid before reassembly.**
- *** Never use cleaning solvent or gasoline to wash them.**
- *** Apply brake fluid to the caliper bore and piston to be inserted into the bore.**
- *** Bleed air after reassembling the caliper. (Refer to page 2-12.)**



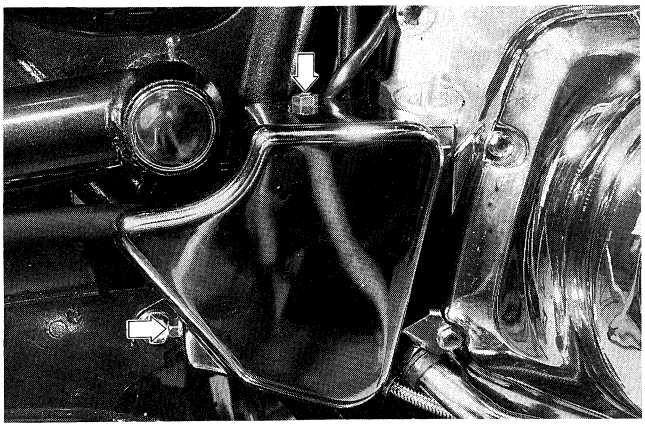
TIGHTENING TORQUE

Item	N·m	kg-m	lb-ft
Union bolt 10-mm	20 – 25	2.0 – 2.5	14.5 – 18.0
Union bolt 14-mm	30 – 35	3.0 – 3.5	21.5 – 25.5
Caliper housing bolt	15 – 20	1.5 – 2.0	11.0 – 14.5
Caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
Caliper mounting bracket bolt	40 – 60	4.0 – 6.0	29.0 – 43.5
Rear axle nut	60 – 96	6.0 – 9.6	43.5 – 69.5

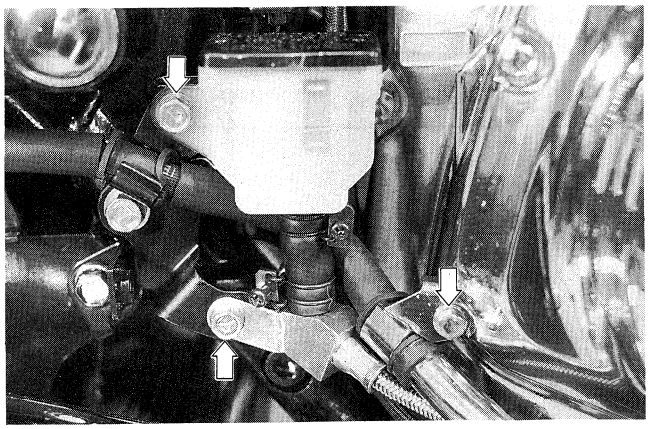


MASTER CYLINDER REMOVAL AND DISASSEMBLY

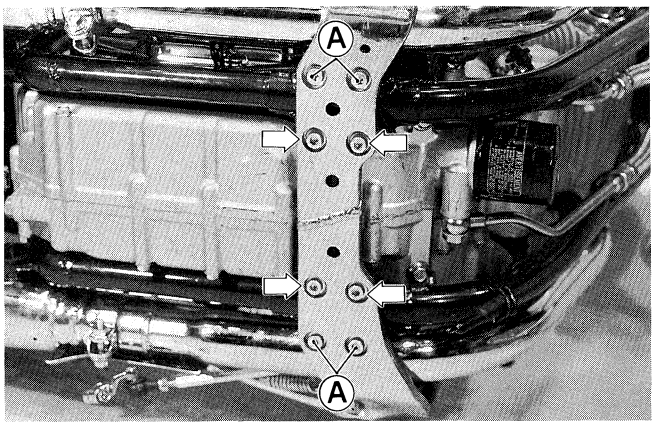
- Remove the brake fluid reservoir cover.



- Remove the reservoir and brake hose guides.

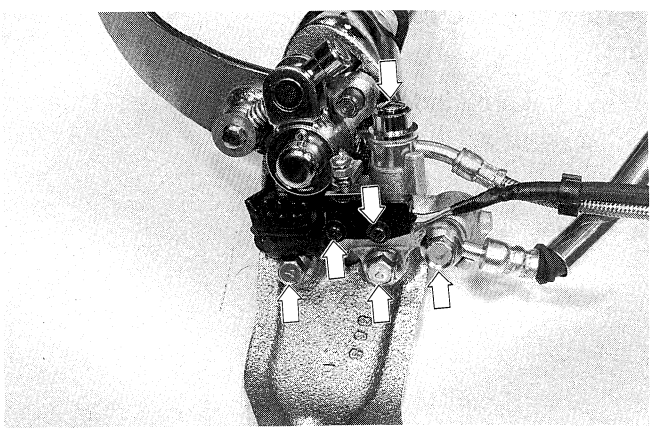


- Pull out the cotter pins from the bolts Ⓐ and remove the eight footrest bolts.



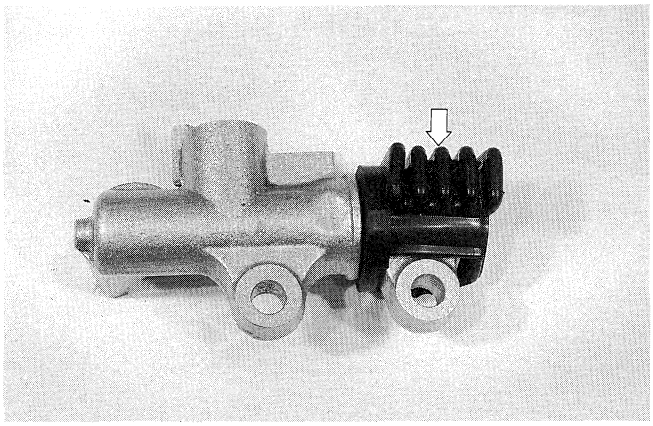
- Remove the rear brake light switch.
- Place a cloth underneath the union bolt on the master cylinder to catch spilled drops of brake fluid. Unscrew the union bolt and disconnect the brake hoses from the master cylinder joint.

CAUTION:
Immediately and completely wipe off any brake fluid contacting any part of the motorcycle. The fluid reacts chemically with paint, plastics and rubber materials, etc. and will damage them severely.



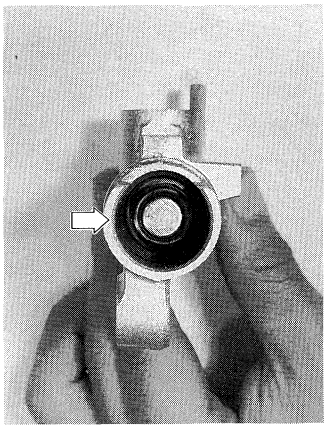
- Remove the master cylinder from the footrest.

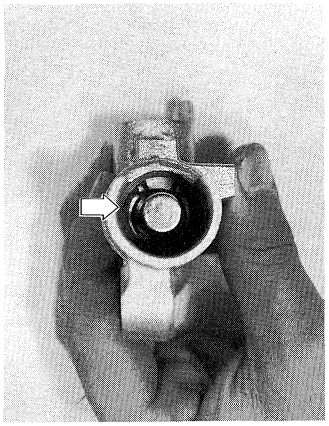
- Remove the dust boot.



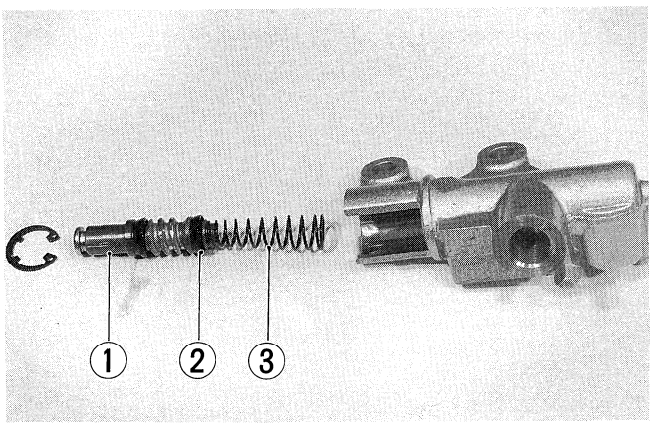
- Remove the dust boot and circlip.

09900-06105	Snapring pliers





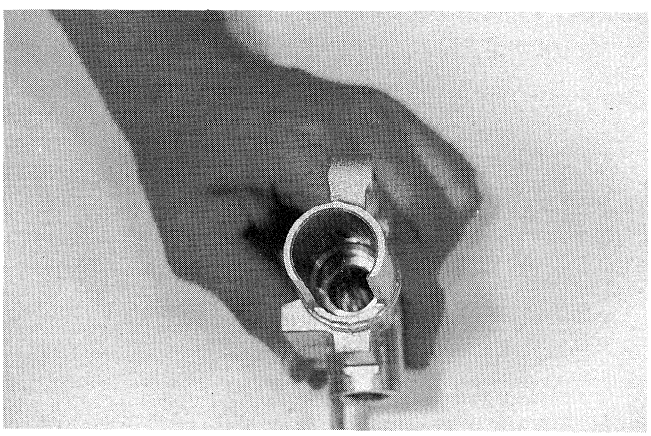
- Draw out the piston ①, primary cup ② and spring ③.



INSPECTION

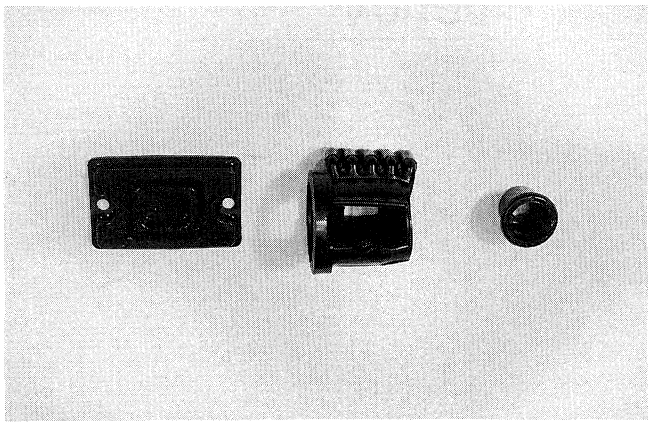
CYLINDER

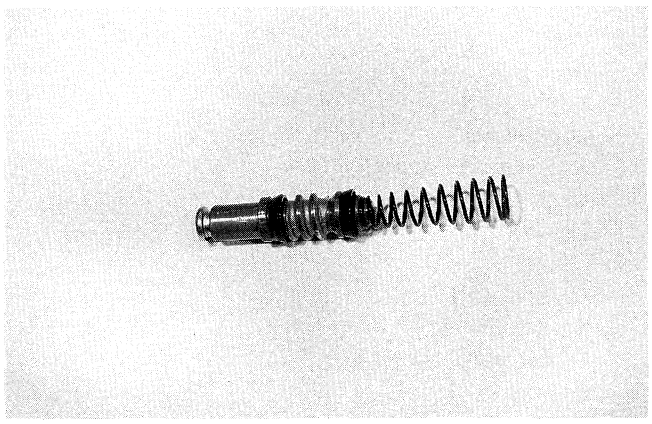
Inspect the cylinder bore wall for any scratches or other damage.



PISTON, CUP SET AND RUBBER PARTS

Inspect the piston surface for scratches or other damage.
Inspect the cup set and each rubber parts for damage.

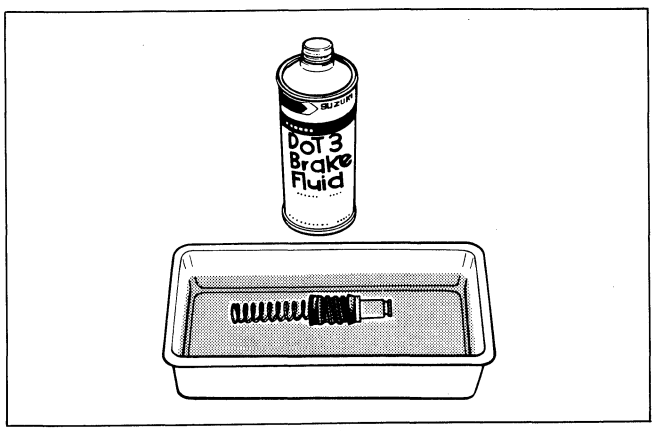




REASSEMBLY AND REMOUNTING

Reassemble and remount the master cylinder in the reverse order of removal and disassembly, and also carry out the following steps:

CAUTION:
Wash the master cylinder components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them. Apply brake fluid to the cylinder bore and all the internals to be inserted into the bore.

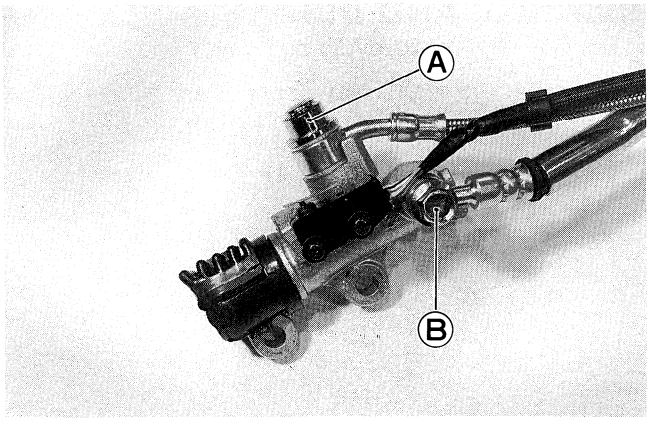


CAUTION:
Bleed air after reassembling master cylinder. (Refer to page 2-12.)
Adjust the rear brake light switch and brake pedal height after installation. (Refer to page 2-13.)

- Install the two brake hoses properly.

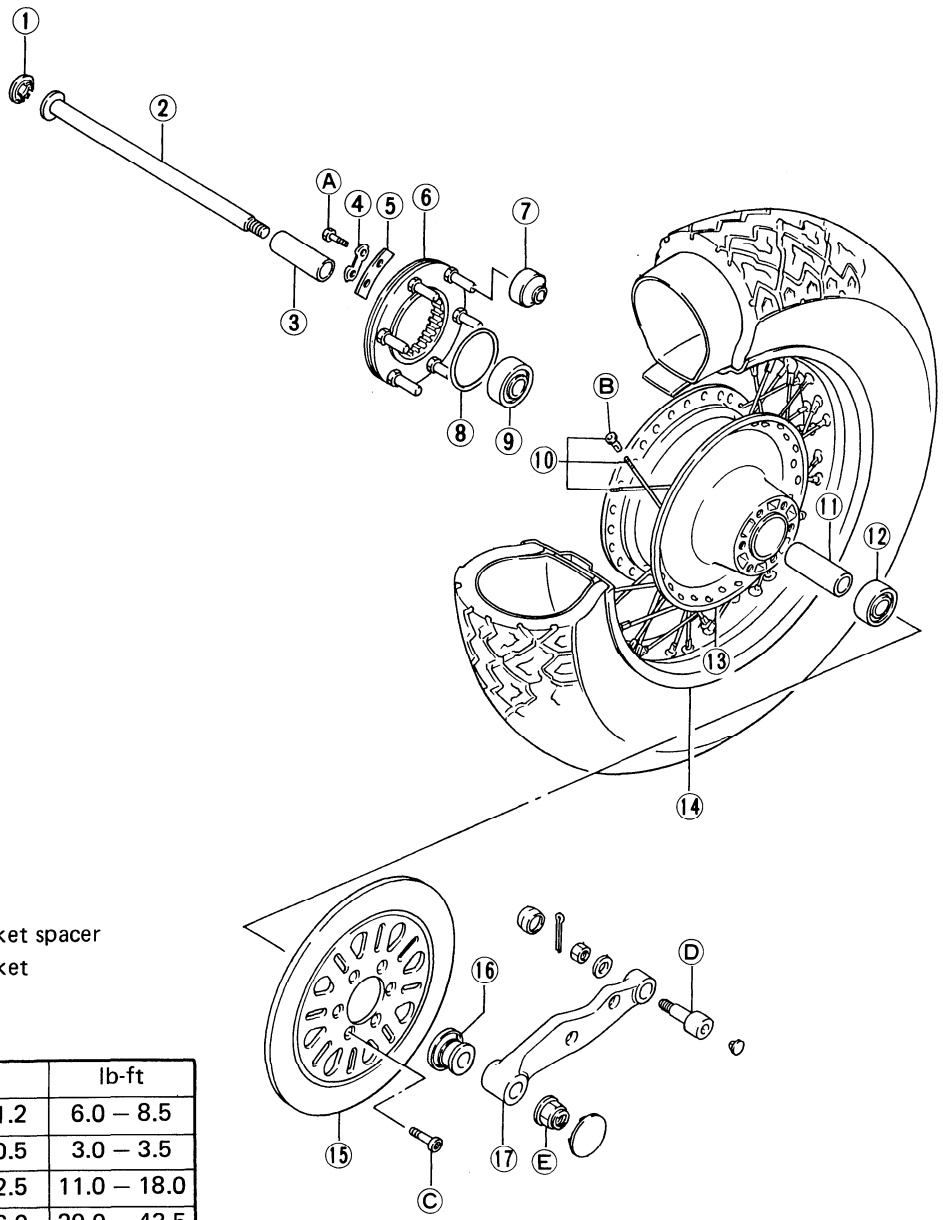
Tightening torque

Ⓐ	30 – 35 N·m (3.0 – 3.5 kg-m / 21.5 – 25.5 lb-ft)
Ⓑ	20 – 25 N·m (2.0 – 2.5 kg-m / 14.5 – 18.0 lb-ft)



REAR WHEEL

CONSTRUCTION



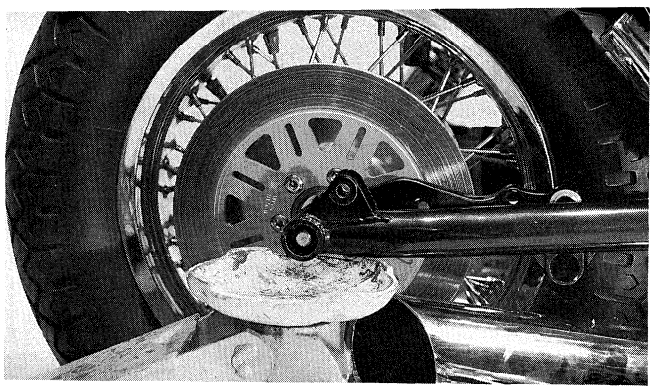
① Cap
② Rear axle
③ Spacer (LH)
④ Lockwasher
⑤ Driven joint stopper
⑥ Driven joint
⑦ Damper
⑧ O-ring
⑨ Bearing (LH)
⑩ Spoke set
⑪ Spacer (RH)
⑫ Bearing (RH)
⑬ Hub
⑭ Rim
⑮ Brake disc
⑯ Caliper mounting bracket spacer
⑰ Caliper mounting bracket

Tightening torque

Item	N·m	kg-m	lb-ft
Ⓐ	8 – 12	0.8 – 1.2	6.0 – 8.5
Ⓑ	4 – 5	0.4 – 0.5	3.0 – 3.5
Ⓒ	15 – 25	1.5 – 2.5	11.0 – 18.0
Ⓓ	40 – 60	4.0 – 6.0	29.0 – 43.5
Ⓔ	60 – 96	6.0 – 9.6	43.5 – 69.5

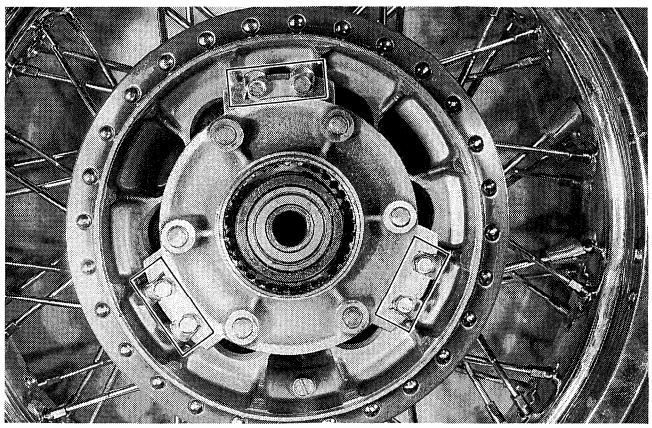
REMOVAL AND DISASSEMBLY

- Support the motorcycle by using jack.
- Remove the right rear shock absorber and the caliper assembly. (Refer to page 7-26.)
- Remove the rear axle.

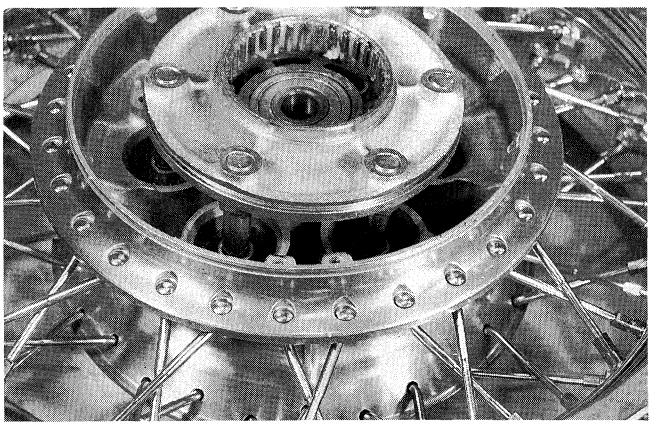


DISASSEMBLY

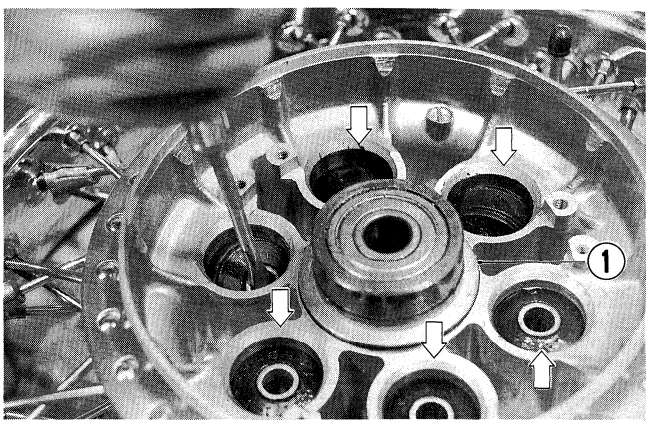
- Flatten the lock washers and remove the fitting bolts.



- Pull off the driven joint.

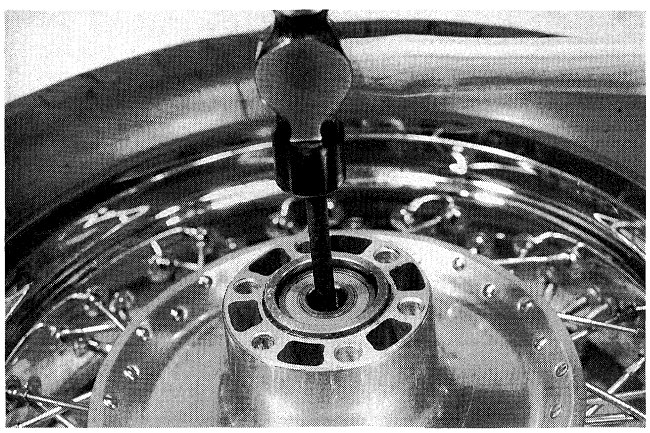


- Remove the O-ring ①.
- Take off the dampers with a screw driver.



- Remove the wheel bearings in the same manner as that of the front bearing. (Refer to page 7-2.)

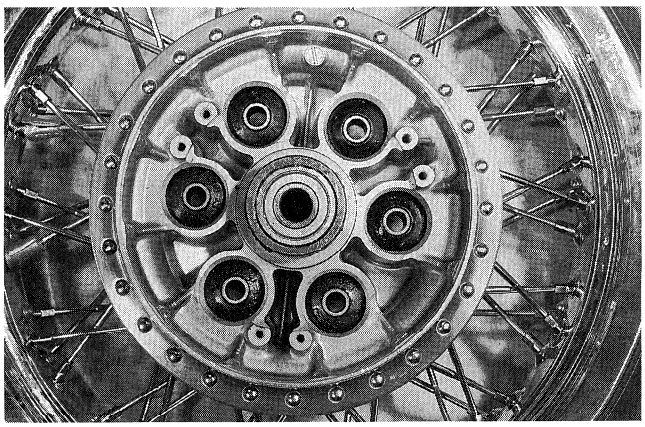
CAUTION:
The removed bearing should be replaced.



INSPECTION

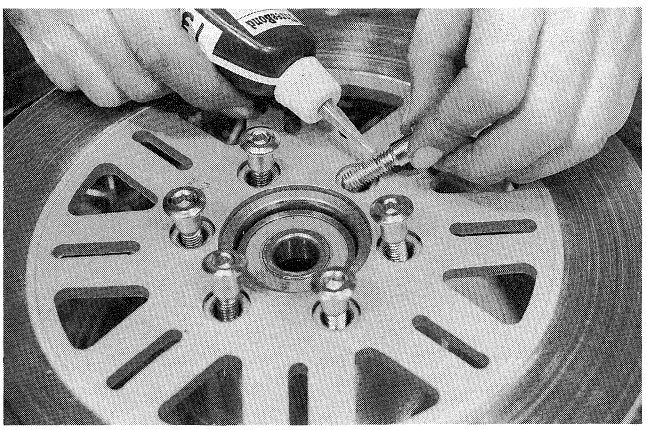
WHEEL DAMPER

Inspect the wheel dampers and driven joint O-ring for damage or wear.



REASSEMBLY

Reassemble and remount the rear wheel in the reverse order of disassembly and removal, and also carry out the following steps:



DISC PLATE

- Clean the disc plate.
- Apply thread lock super "1360" to the disc bolts and tighten the bolts to the specification.

99000-32130	Thread lock super "1360"

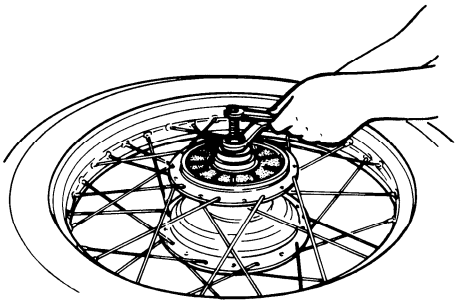
Tightening torque	15 – 25 N·m (1.5 – 2.5 kg-m 11.0 – 18.0 lb-ft)

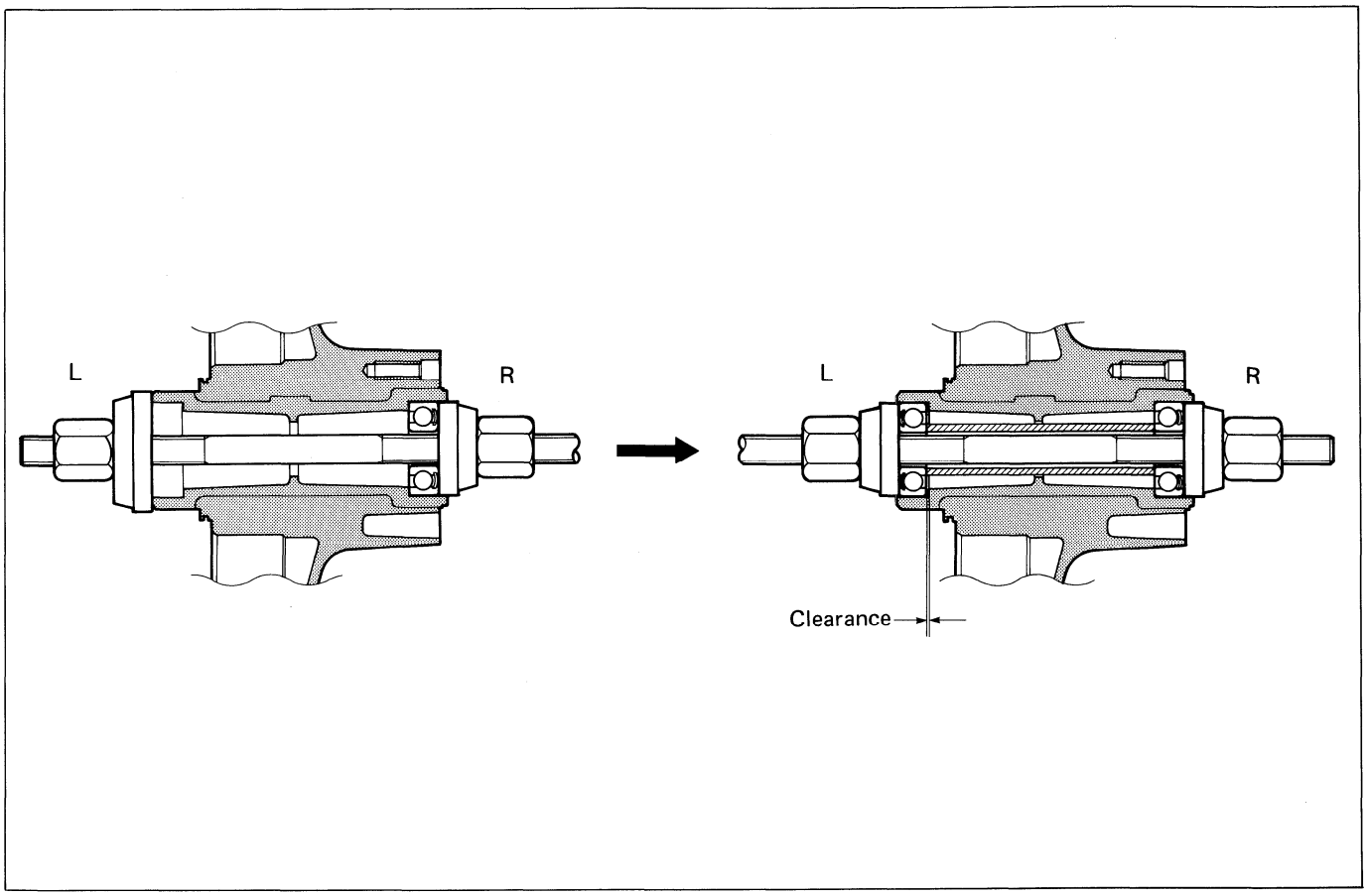
WHEEL BEARINGS

- Install the wheel bearing by using the special tool as shown.

CAUTION:
First install the wheel bearing for right side.

09924-84510	Bearing installer set





- Install the dampers.

NOTE:
If soap water is applied around the damper, it makes the job easier.

- Apply grease to the O-ring before installing the driven joint.
- Apply grease to the final gear spline before installing the rear wheel.

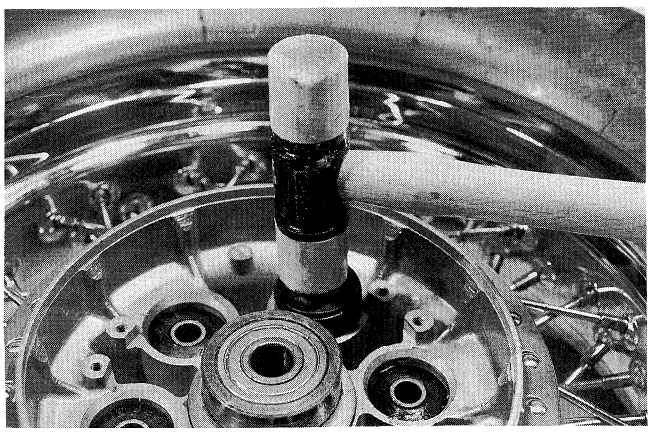
99000-25010	SUZUKI Super grease "A"

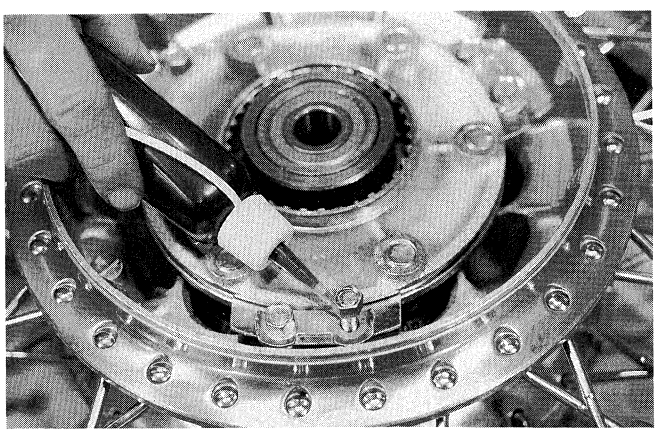
- Tighten the driven joint stopper bolts.

Tightening torque	8 – 12 N·m (0.8 – 1.2 kg-m) (6.0 – 8.5 lb-ft)

- Apply thread lock super "1303" to the thread of driven joint stopper bolts.

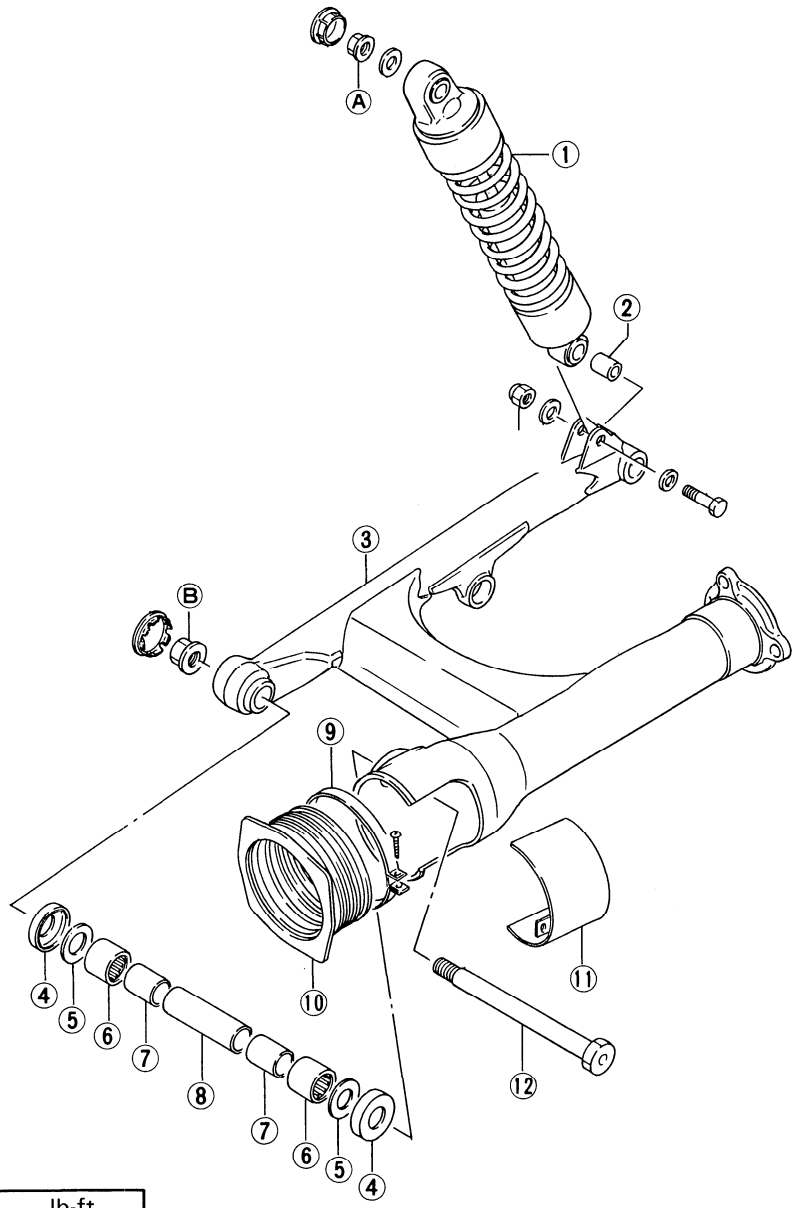
99000-32030	Thread lock super "1303"





REAR SUSPENSION AND SWINGARM

① Rear shock absorber
② Spacer
③ Swingarm
④ Dust cover
⑤ Washer
⑥ Bearing
⑦ Bearing spacer
⑧ Center spacer
⑨ Clamp
⑩ Dust boot
⑪ Swingarm cover
⑫ Pivot shaft



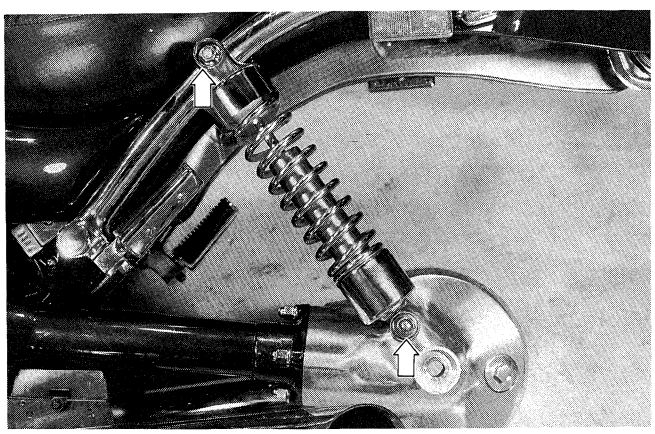
Tightening torque

Item	N·m	kg-m	lb-ft
Ⓐ	20 – 30	2.0 – 3.0	14.5 – 21.5
Ⓑ	50 – 80	5.0 – 8.0	36.0 – 58.0

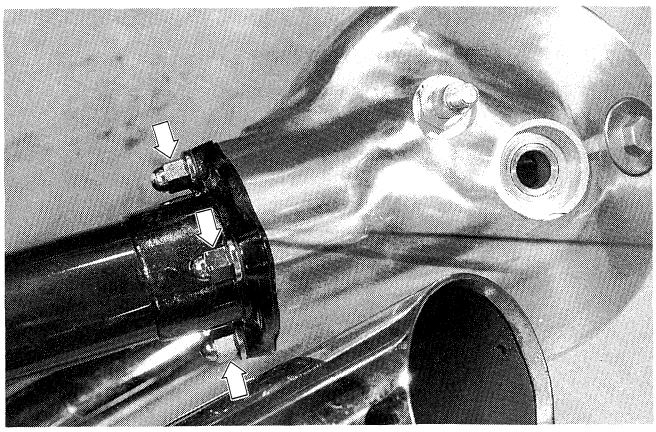
REMOVAL

- Remove the rear wheel. (Refer to page 7-26 and 7-33.)
- Remove the left and right rear shock absorbers.

Tightening torque	20 – 30 N·m (2.0 – 3.0 kg-m 14.0 – 21.5 lb-ft)



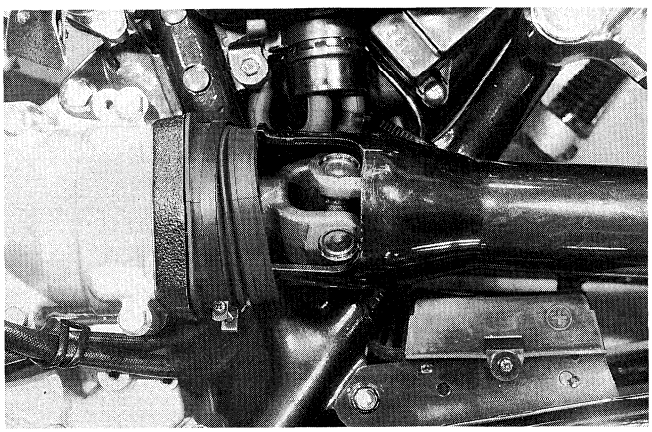
- Remove the final gear case with propeller shaft.



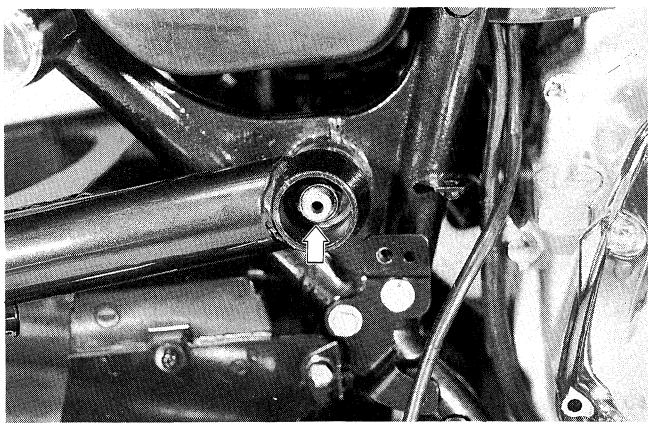
NOTE:
When reinstalling the final gear case, apply bond No. "1215" to the mating surface between rear swingarm and final gear case.

Tightening torque	35 – 45 N·m (3.5 – 4.5 kg-m 25.5 – 32.5 lb-ft)

- Loosen the clamp screw and slide the boot forward. Remove the cover and take out the universal joint from the swingarm.

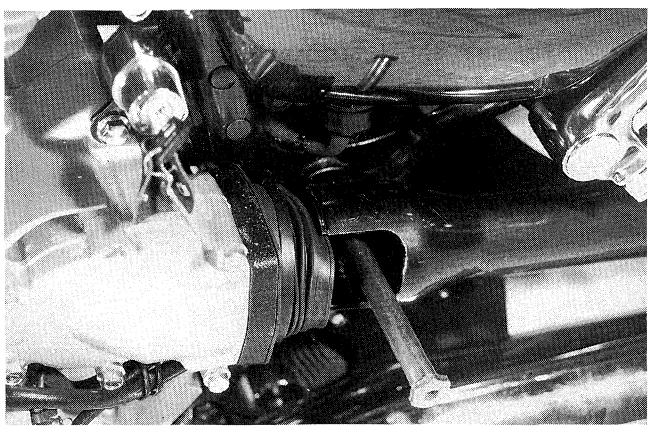


- Remove the cover and loosen the swingarm pivot shaft nut.

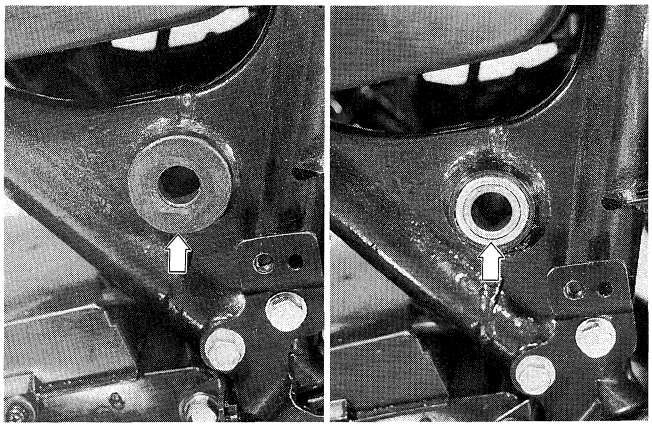


Tightening torque	50 – 80 N·m (5.0 – 8.0 kg-m 36.0 – 58.0 lb-ft)

- Draw out the swingarm pivot shaft.

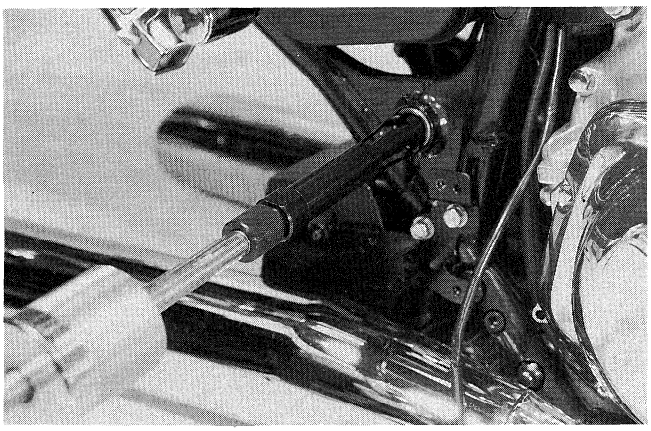


- Remove the rear swingarm from the chassis.
- Remove the swingarm bearing dust cover, left and right spacers and center spacer.



- Using the special tools, remove the swingarm bearings from the pivoting hole.

09930-30102	Sliding shaft
09921-20210	Bearing remover

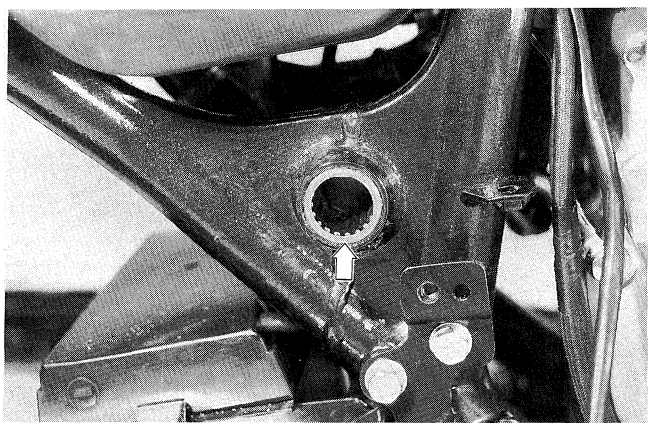


NOTE:
The removed bearing should be replaced with a new one.

INSPECTION

BEARING

Inspect the play of the bearing by hand while fixing the spacer in the swingarm pivoting hole.

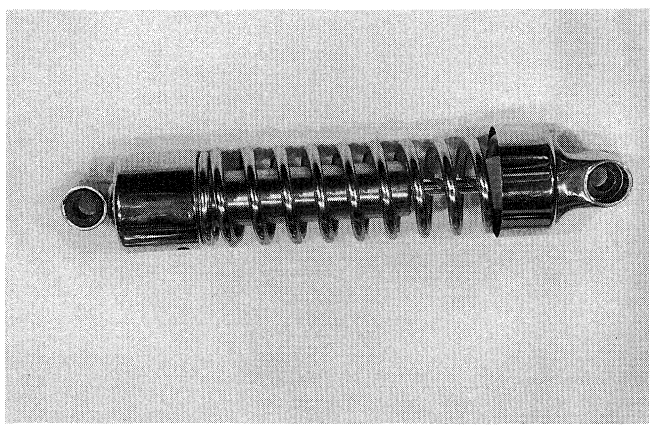


DUST SEAL

Inspect the dust seal, if they are found to be damaged, replace them with new dust seals.

REAR SHOCK ABSORBER

Inspect the rear shock absorber unit for oil leakage or damage. If there is any defect, replace the unit with a new one.



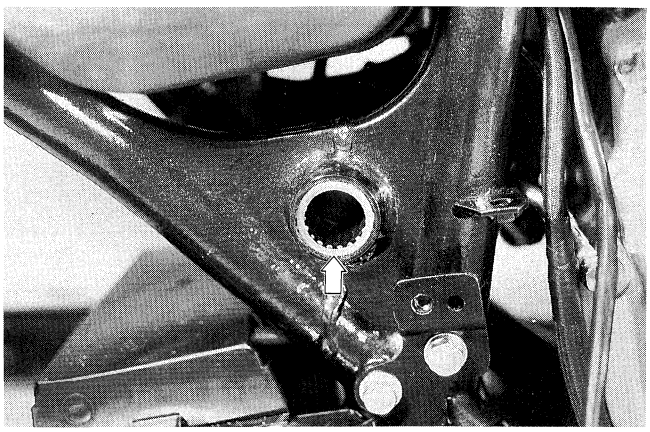
REASSEMBLY

Reassemble and remount the swingarm and rear shock absorber in the reverse order of disassembly and removal, and also carry out the following steps:

SWINGARM BEARING

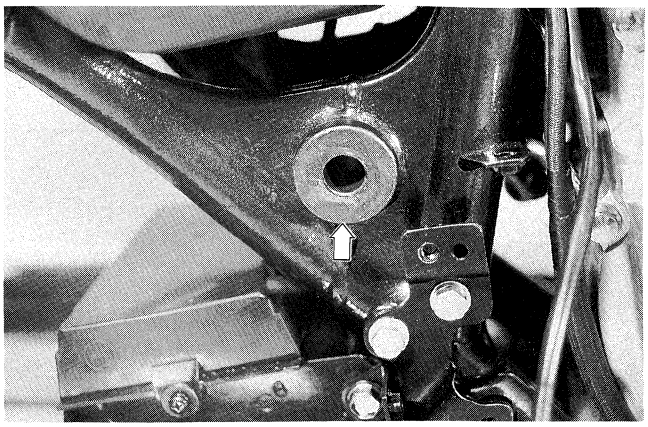
- Press in the bearing outer race.

NOTE:
When reinstalling the bearing, stamped mark of bearing is positioned outside.

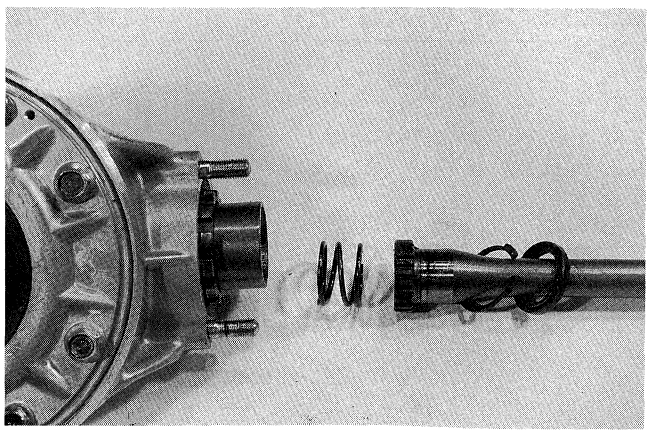


- Apply grease to the spacer, bearing, washer and dust seal.

99000-25010	SUZUKI super grease "A"

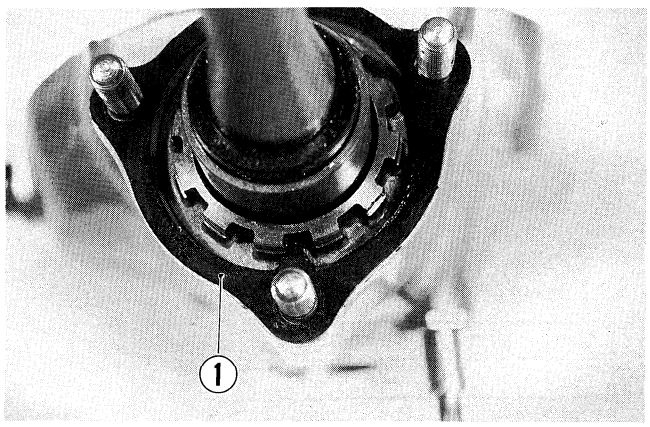


- Install the propeller shaft and final gear case.
- Apply grease to the joint part of universal joint and propeller shaft.



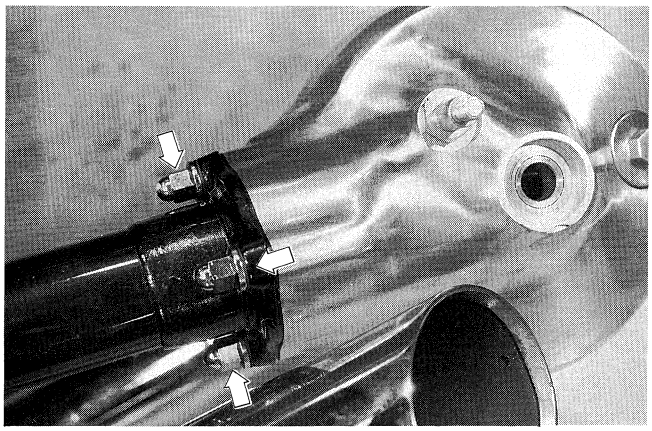
- Install a new gasket ① and apply bond No. 1215 to the mating surface.

99000-31110	SUZUKI Bond No. 1215



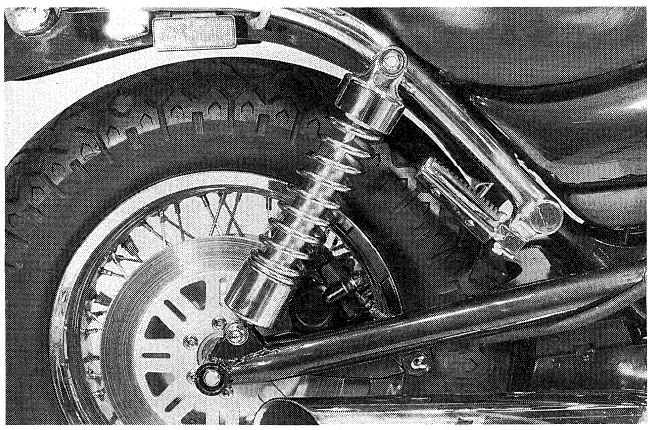
- Tighten the final gear case nut to the specified torque.

Tightening torque	35 – 45 N·m (3.5 – 4.5 kg-m 25.5 – 32.5 lb-ft)

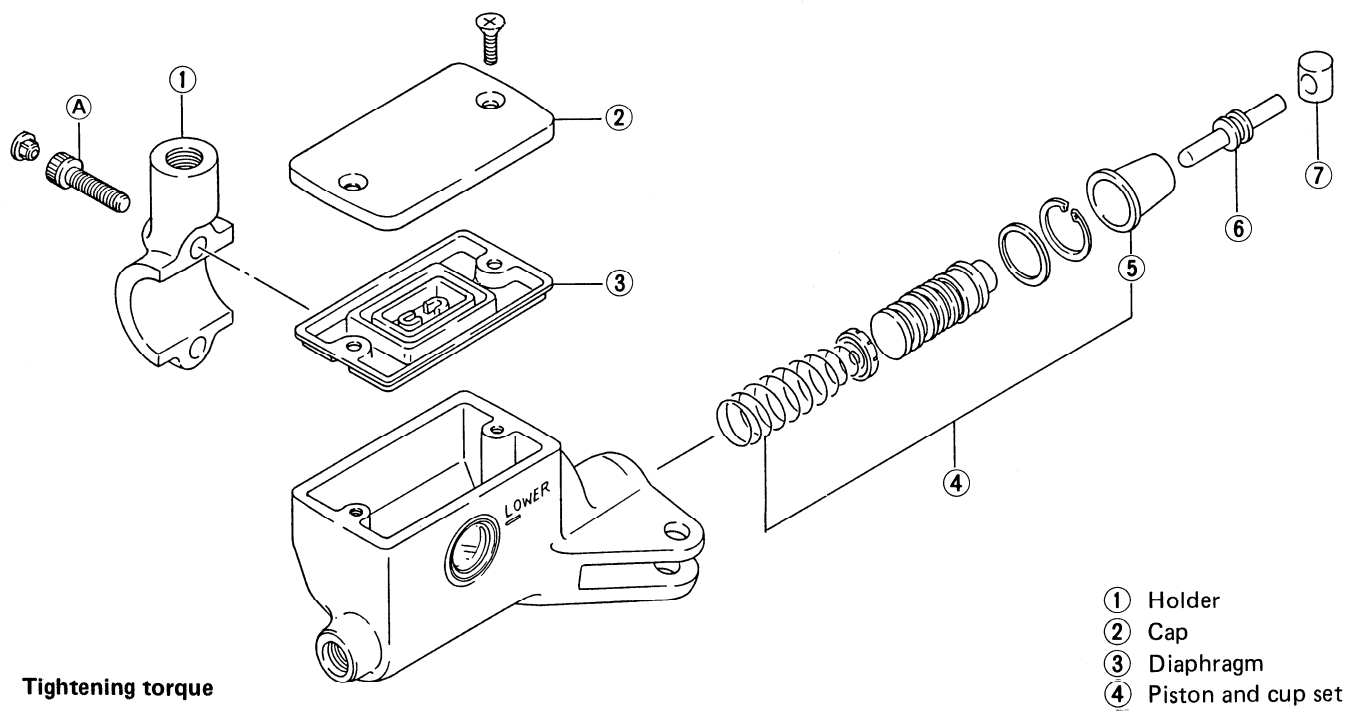


- When reinstalling the rear shock absorbers, make sure that both spring position should be equalized.

Standard setting	1 position



CLUTCH MASTER CYLINDER



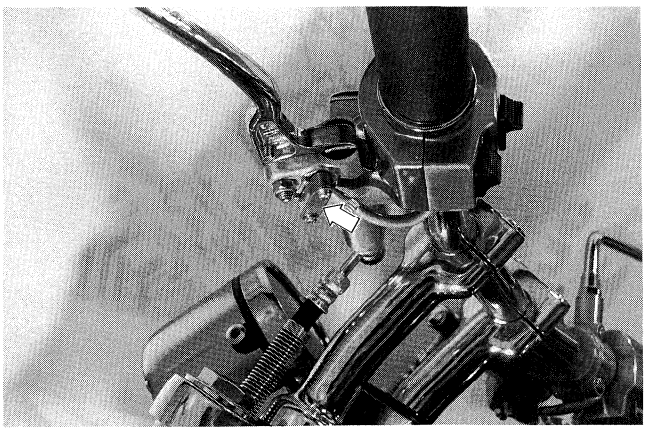
Tightening torque

Item	N·m	kg-m	lb-ft
A	5 – 8	0.5 – 0.8	3.5 – 6.0

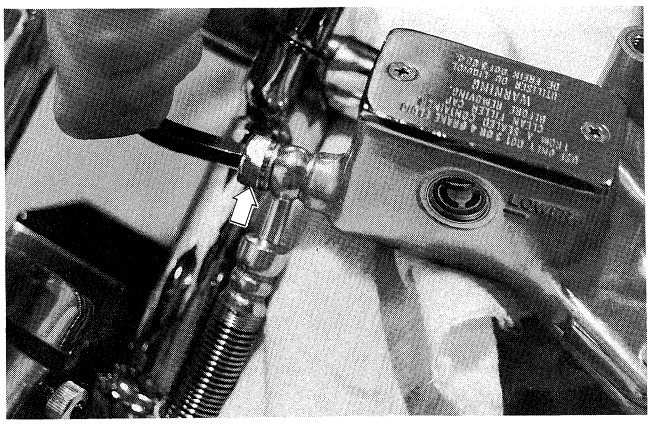
1. Holder
2. Cap
3. Diaphragm
4. Piston and cup set
5. Dust boot
6. Push rod
7. Piece

REMOVAL AND DISASSEMBLY

- Take off the starter interlock switch.

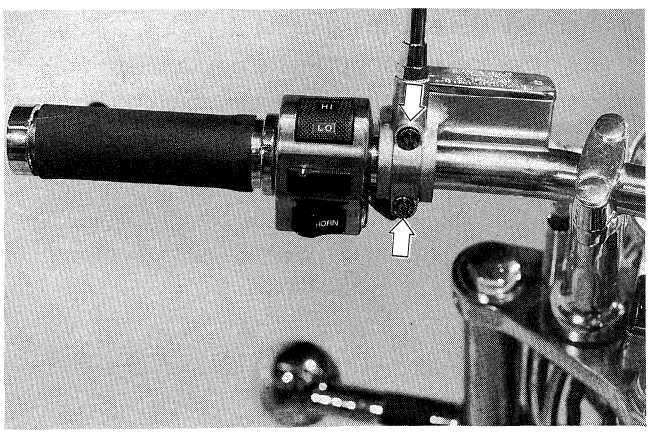


- Place a cloth underneath the union bolt on the master cylinder to catch spilled drops of brake fluid. Unscrew the union bolt and disconnect the clutch hose/master cylinder joint.

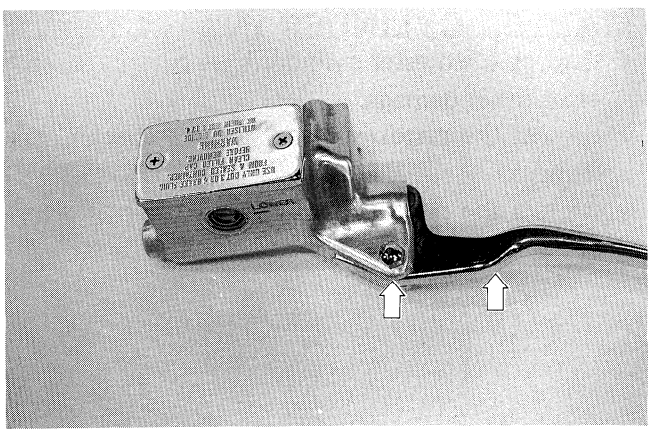


CAUTION:
Completely wipe off any clutch fluid adhering to any part of motorcycle. The fluid reacts chemically with paint, plastics, rubber materials, etc.

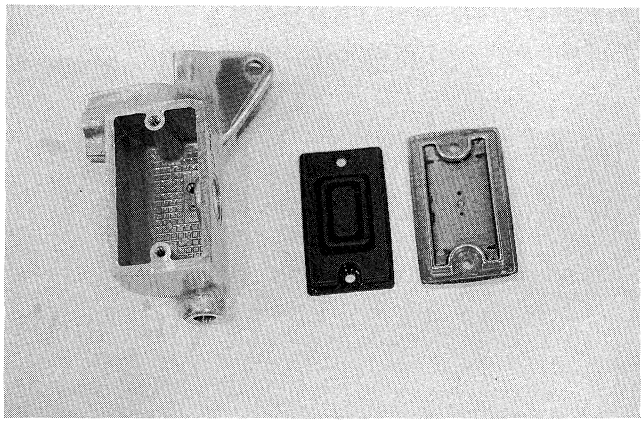
- Remove the two clamp bolts and take off master cylinder assembly.



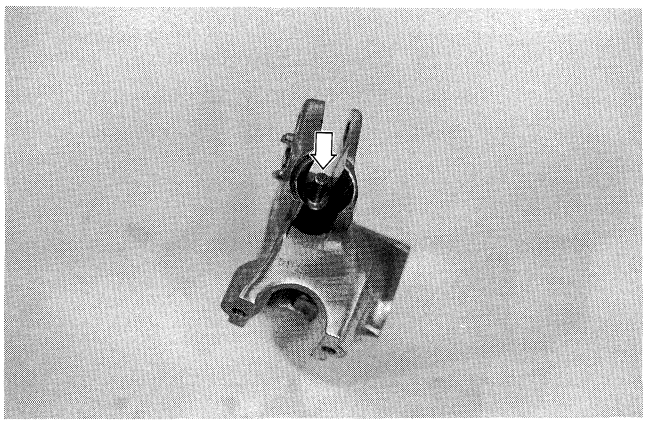
- Remove the clutch lever.
- Remove reservoir cap screws.



- Remove the reservoir cap and diaphragm.
- Drain brake fluid.



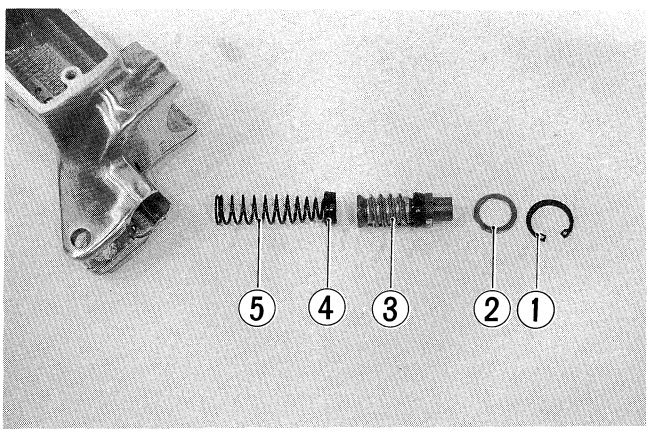
- Remove the push rod and dust boot.



- Remove the circlip by using the special tool.
- Remove the piston, primary cup and spring.

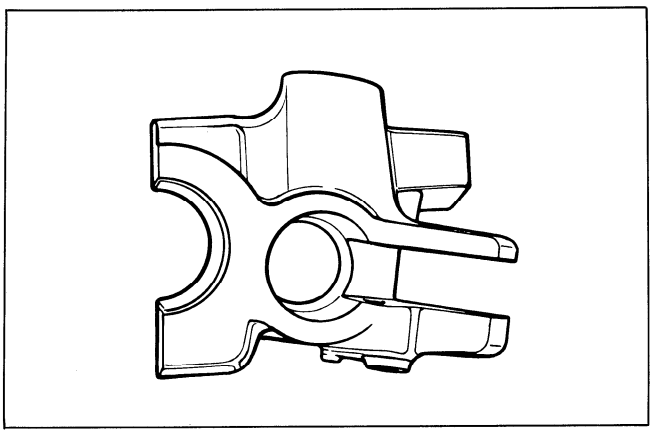
09900-06108	Snapring pliers

① Circlip
② Washer
③ Piston
④ Primary cup
⑤ Return spring



MASTER CYLINDER INSPECTION

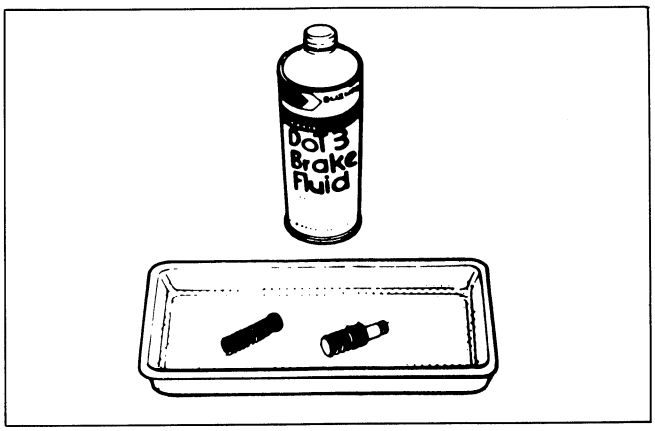
- Inspect the master cylinder bore for any scratches or other damage.
- Inspect the piston surface for scratches or other damage.
- Inspect the primary cup and dust boot for wear or damage.



MASTER CYLINDER REASSEMBLY

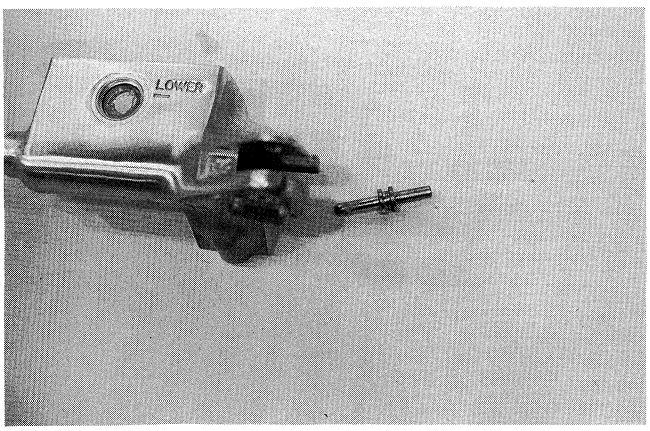
Reassemble and remount the master cylinder in the reverse order of disassembly and removal, and also carry out the following steps:

CAUTION:
Wash the master cylinder components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them. Apply brake fluid to the cylinder bore and all the internals to be inserted into the bore.

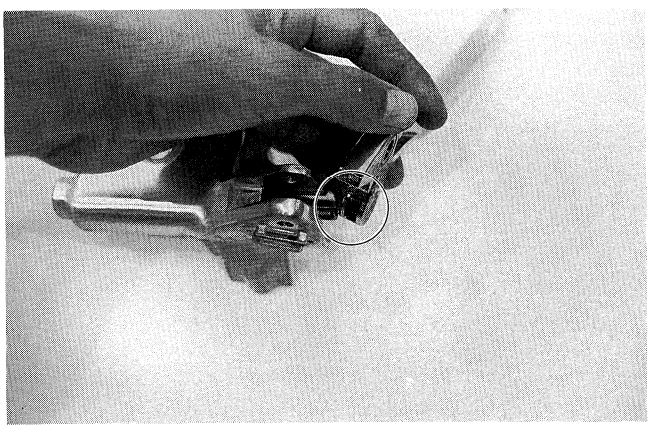


- Apply SUZUKI moly paste to the end of push rod.

99000-25140	SUZUKI moly paste

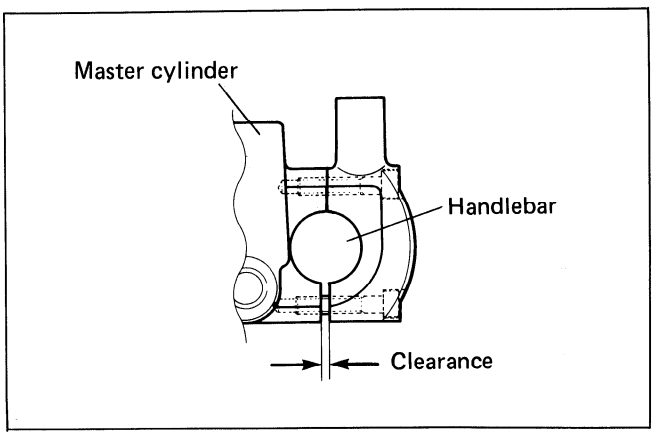


- Align the push rod with hole of lever piece.



When remounting the master cylinder on the handlebars, tighten the upper clamp bolts first as shown.

Tightening torque	5 – 8 N·m (0.5 – 0.8 kg-m 3.5 – 6.0 lb-ft)



CAUTION:
Bleed air after reassembling master cylinder (Refer to page 2-9.)
Adjust the starter disconnect switch after installation.

SERVICING INFORMATION

CONTENTS

TROUBLESHOOTING

ENGINE

Complaint	Symptom and possible causes	Remedy
Engine will not start, or is hart to start.	**Compression too low**	
	1. Defective lash-adjuster.	Replace.
	2. Trapped air in lash adjuster.	Bleed air.
	3. Worn valve guides or poor seating of valves.	Adjust.
	4. Valves mistiming.	Repair, or replace.
	5. Piston rings excessively worn.	Replace.
	6. Worn-down cylinder bores.	Replace, or rebore.
	7. Starter motor cranks too slowly.	Consult "electrical complaints".
	8. Defective de-compression solenoid or control unit.	Replace.
	9. Improperly adjusted de-compression cable.	Replace.
	Plugs not sparking	
	1. Fouled spark plugs.	Clean.
	2. Wet spark plug.	Clean and dry.
	3. Defective ignition coil.	Replace.
	4. Open or short in high-tension cord.	Replace.
	5. Defective pick-up coil or ignitor unit.	Replace.
	6. Defective side stand switch.	Adjust or replace.
	No fuel reaching the carburetors	
	1. Clogged hole in the fuel tank cap.	Clean.
	2. Clogged or defective fuel cock.	Clean or replace.
	3. Defective fuel pump.	Replace.
	4. Defective fuel pump relay.	Replace.
	5. Defective carburetor float valve.	Replace.
	6. Clogged fuel pipe or suction pipe.	Clean.
	7. Defective pick-up coil/ignition coil/ignitor/de-comp control unit.	Replace.
	8. Defective starter relay/starter button/side stand switch/ clutch switch.	Replace.
Engine stalls easily.	1. Fouled spark plugs.	Clean.
	2. Defective pick-up coil or ignitor unit.	Replace.
	3. Clogged fuel pipe.	Replace.
	4. Defective fuel pump/fuel pump relay.	Replace.
	5. Clogged jets in carburetors.	Clean.
	6. Defective lash-adjuster.	Replace.
	7. Defective ignition coil.	Replace.
	8. Defective starter relay/starter button/side stand switch/ clutch switch.	Replace.
Noisy engine.	**Excessive valve chatter**	
	1. Trapped air in lash-adjuster.	Blead air.
	2. Weakened or broken valve springs.	Replace.
	3. Camshaft journal worn and burnt.	Replace.
	4. De-compression cable play is maladjusted.	Adjust.
	Noise appears to come from pistons	
	1. Pistons or cylinders worn down.	Replace.
	2. Combustion chambers fouled with carbon.	Clean.
	3. Piston pins or piston pin bore worn.	Replace.
	4. Piston rings or ring groove worn.	Replace.
	Noise seems to come from timing chain	
	1. Stretched chain.	Replace.
	2. Worn sprockets.	Replace.
	3. Tension adjuster not working.	Replace.

Complaint	Symptom and possible causes	Remedy
Noisy engine.	**Noise seems to come from clutch**	
	1. Worn splines of countershaft or hub.	Replace.
	2. Worn teeth of clutch plates.	Replace.
	3. Distorted clutch plates, driven and drive.	Replace.
	4. Worn/Damaged clutch push rod bearing.	Replace.
	5. Worn clutch spring slider.	Replace.
	Noise seems to come from crankshaft	
	1. Rattling thrust bearing due to wear.	Replace.
	2. Big-end bearings worn and burnt.	Replace.
	3. Journal bearing worn and burnt.	Replace.
	4. Thrust clearance too large.	Adjust.
	Noise seems to come from transmission	
	1. Gears worn or rubbing.	Replace.
	2. Badly worn splines.	Replace.
	3. Primary gears worn or rubbing.	Replace.
Slipping clutch.	1. Weakened clutch springs.	Replace.
	2. Worn or distorted pressure plate.	Replace.
	3. Distorted clutch plates, driven and drive.	Replace.
	4. Worn clutch cam No. 1 or No. 2.	Replace.
Dragging clutch.	1. Leakage of clutch fluid.	Repair.
	2. Worn or damage master cylinder/clutch cylinder.	Replace.
	3. Damaged oil seal/clutch hose.	Replace.
	4. Some clutch springs weakened while others are not.	Replace.
	5. Distorted pressure plate or clutch plates.	Replace.
	6. Air trapped in clutch fluid circuit.	Bleed air out.
Transmission will not shift.	1. Broken gearshift cam.	Replace.
	2. Distorted gearshift forks.	Replace.
	3. Too much play on gearshift lever.	Adjust.
	4. Worn gearshift pawl/guide.	Replace.
	5. Air trapped in clutch fluid circuit.	Bleed air out.
Transmission will not shift back.	1. Broken return spring on shift shaft.	Replace.
	2. Shift shafts are rubbing or sticky.	Repair or replace.
Transmission jumps out of gear.	1. Worn shifting gears on drive shaft or countershaft.	Replace.
	2. Distorted or worn gearshift forks.	Replace.
	3. Weakened stopper spring on gearshift stopper.	Replace.
Engine idles poorly.	1. Trapped air in lash-adjuster.	Bleed air.
	2. Poor seating of valves.	Repair or replace.
	3. Defective valve guides.	Replace.
	4. Spark plug gaps too wide.	Adjust.
	5. Defective ignition coil.	Replace.
	6. Defective pick-up coil or ignitor unit.	Replace.
	7. Float-chamber fuel level out of adjustment in carburetors.	Adjust.
	8. Clogged jets or imbalance of carburetors.	Clean or adjust.
	9. Defective fuel pump/fuel pump relay.	Replace.
	10. Defective lash-adjuster.	Replace.
Engine runs poorly in high-speed range.	1. Valve springs weakened.	Replace.
	2. Trapped air in lash-adjuster.	Bleed air.
	3. Spark plug gaps too narrow.	Adjust.
	4. Clogged jets or imbalance of carburetors.	Clean or adjust.
	5. Defective ignition coil.	Replace.

Complaint	Symptom and possible causes	Remedy
Engine runs poorly in high-speed range.	6. Defective pick-up coil or ignitor unit.	Replace.
	7. Float-chamber fuel level too low.	Adjust.
	8. Clogged air cleaner element.	Clean.
	9. Clogged fuel pipe, resulting in inadequate fuel supply to carburetors.	Clean, and prime.
	10. Defective fuel pump/fuel pump relay.	Replace.
Dirty of heavy exhaust smoke.	1. Too much engine oil in the engine.	Check with level inspection window, drain out excess oil.
	2. Worn piston rings or cylinders.	Replace.
	3. Worn valve guides.	Replace.
	4. Cylinder walls scored or scuffed.	Rebore or replace.
	5. Worn valves stems.	Replace.
	6. Defective stem seal.	Replace.
Engine lacks power.	1. Loss of valve clearance.	Adjust.
	2. Weakened valve springs.	Replace.
	3. Valve timing out of adjustment.	Adjust.
	4. Worn piston rings or cylinders.	Replace.
	5. Poor seating of valves.	Repair.
	6. Spark plug gaps incorrect.	Adjust or replace.
	7. Clogged jets in carburetors.	Clean.
	8. Float-chamber fuel level out of adjustment.	Adjust.
	9. Clogged air cleaner element.	Clean.
	10. Carburetor balancing adjuster loose.	Retighten and balance the carbs.
	11. Sucking air from intake pipe.	Retighten or replace.
	12. Too much engine oil in the engine.	Drain out excess oil.
	13. Defective fuel pump/fuel pump relay.	Replace.
	14. Defective pick-up coil/ignitor unit/ignition coil.	Replace.
Engine overheats.	1. Heavy carbon deposit on piston crowns.	Clean.
	2. Not enough oil in the engine.	Add oil.
	3. Defective oil pump or clogged oil circuit.	Replace or clean.
	4. Fuel level too low in float chambers.	Adjust.
	5. Suck air from intake pipes.	Retighten or replace.
	6. Use incorrect engine oil.	Change.

SHAFT DRIVE

Complaint	Symptom and possible causes	Remedy
Noisy shaft drive.	**Noise seems to come from secondary bevel gear and final bevel gear assemblies.**	
	1. Oil level too low.	Refill. (Check oil jet/replace oil seal)
	2. Drive and driven bevel gears damaged or worn.	Replace.
	3. Excessive backlash.	Adjust.
	4. Improper tooth contact.	Adjust.
	5. Damage to bearings.	Replace.
	6. Weakened damper spring.	Replace.
	7. Cam dog contacting surface damaged or worn.	Replace.
	Noise seems to come from propeller shaft area.	
	1. Propeller shaft universal joint damaged.	Replace.
	2. Propeller shaft splines damaged or worn.	Replace.
	3. Insufficient lubricant.	Refill. (Replace oil seal)

Complaint	Symptom and possible causes	Remedy
No power transmitted from engine to rear wheel.	1. Broken propeller shaft. 2. Broken gear teeth. 3. Broken or damaged input/output cam dog. 4. Weakened damper spring.	Replace. Replace. Replace. Replace.
Secondary bevel gear and final bevel gear assemblies oil leak.	1. Damage to oil seals. 2. Damage to O-rings. 3. Loose bolts on secondary gear case and final gear bearing case.	Replace. Replace. Retighten.

CARBURETOR

Complaint	Symptom and possible causes	Remedy
Trouble with starting.	1. Starter jet is clogged. 2. Starter pipe is clogged. 3. Air leaking from a joint between starter body and carburetor. 4. Air leaking from carburetor's joint or vacuum gauge joint. 5. Starter plunger is not operating properly.	Clean. Clean. Check starter body and carburetor for tightness, adjust and replace gasket. Check and adjust. Check and adjust.
Idling or low-speed trouble.	1. Pilot jet, pilot air jet are clogged or loose. 2. Air leaking from carburetor's joint, vacuum gauge joint, or starter. 3. Pilot outlet or by-pass is clogged. 4. Starter plunger is not fully closed.	Check and clean. Check and adjust. Check and clean. Check and adjust.
Medium- or high-speed trouble.	1. Main jet or main air jet is clogged. 2. Needle jet is clogged. 3. Throttle valve not operating properly. 4. Filter is clogged. 5. Carburetor balancing adjuster loose.	Check and clean. Check and clean. Check throttle valve for operation. Check and clean. Retighten and balance the carbs.
Overflow and fuel level fluctuations.	1. Needle valve is worn or damaged. 2. Spring in needle valve is broken. 3. Float is not working properly. 4. Foreign matter has adhered to needle valve. 5. Fuel level is too high or low. 6. Clogged carburetor air vent pipe. 7. Defective fuel pump/fuel pump relay. 8. Defective pick-up coil/ignitor unit/ignition coil.	Replace. Replace. Check and adjust. Clean. Adjust float height. Clean. Replace. Replace.

ELECTRICAL

Complaint	Symptom and possible causes	Remedy
No sparking or poor sparking.	1. Defective ignition coil. 2. Defective spark plugs. 3. Defective pick-up coil or ignitor unit.	Replace. Replace. Replace.
Spark plugs soon become fouled with carbon.	1. Mixture too rich. 2. Idling speed set too high. 3. Incorrect gasoline. 4. Dirty element in air cleaner. 5. Spark plugs too cold.	Adjust carburetors. Adjust carburetors. Change. Clean. Replace by hot type plugs.
Spark plugs become fouled too soon.	1. Worn piston rings. 2. Pistons or cylinders worn. 3. Excessive clearance of valve stems in valve guides. 4. Worn stem oil seal.	Replace. Replace. Replace. Replace.
Spark plug electrodes overheat or burn.	1. Spark plugs too hot. 2. The engine overheats. 3. Defective pick-up coil or ignitor unit. 4. Spark plugs loose. 5. Mixutre too lean.	Replace by cold type plugs. Tune up. Replace. Retighten. Adjust carburetors.
Generator does not charge.	1. Open or short in lead wires, or loose lead connections. 2. Shorted, grounded or open generator coils. 3. Shorted or panctured regulator/rectifier.	Repair or replace or retighten. Replace. Replace.
Generator charge, but charging rate is below the specification.	1. Lead wires tend to get shorted or open-circuited or loosely connected at terminals. 2. Grounded or open-circuited stator coils of generator. 3. Defective regulator/rectifier. 4. Not enough electrolyte in the battery. 5. Defective cell plates in the battery.	Repair, or retighten. Replace. Replace. Add distilled water between the level lines. Replace the battery.
Generator overcharges.	1. Internal short-circuit in the battery. 2. Resistor element in the regulator/rectifier damaged or defective. 3. Regulator/rectifier poorly grounded.	Replace the battery. Replace. Clean and tighten ground connection.
Unstable charging.	1. Lead wire insulation frayed due to vibration, resulting in intermittent shorting. 2. Generator internally shorted. 3. Defective regulator/rectifier.	Repair or replace. Replace. Replace.
Starter button is not effective.	1. Battery run down. 2. Defective switch contacts. 3. Brushes not seating properly on commutator in starter motor. 4. Defective starter relay/starter interlock switch. 5. Defective de-compression control unit. 6. Defective side-stand switch. 7. Defective neutral switch.	Recharge or replace. Replace. Repair or replace. Replace. Replace. Replace. Replace.

BATTERY

Complaint	Symptom and possible causes	Remedy
Battery runs down quickly.	1. The charging method is not correct.	Check the generator, regulator/rectifier and circuit connections, and make necessary adjustments to obtain specified charging operation.
	2. Cell plates have lost much of their active material as a result of over-charging.	Replace the battery, and correct the charging system.
	3. A short-circuit condition exists within the battery due to excessive accumulation of sediments caused by the incorrect electrolyte.	Replace the battery.
	4. Battery is too old.	Replace the battery.
Reversed battery polarity.	The battery has been connected the wrong way round in the system, so that it is being charged in the reverse direction.	Replace the battery and be sure to connect the battery properly.
Battery discharges too rapidly.	1. Dirty container top and sides. 2. Battery is too old.	Clean. Replace.

CHASSIS

Complaint	Symptom and possible causes	Remedy
Handling feels too heavy.	1. Steering stem nut overtightened. 2. Worn roller bearing or race in steering stem. 3. Distorted steering stem. 4. Not enough pressure in tires. 5. Overtightened steering races.	Adjust. Replace. Replace. Adjust. Adjust.
Steering oscillation.	1. Loss of balance between right and left suspensions. 2. Bent front fork. 3. Bent front axle or crooked tire. 4. Loose steering stem bearings. 5. Worn or incorrect tires or wrong tire pressure.	Adjust. Repair or replace. Replace. Adjust. Adjust or replace.
Wobbly front wheel.	1. Distorted wheel. 2. Worn front wheel bearings. 3. Defective or incorrect tire. 4. Loose nut on axle. 5. Loose nuts on rear shock. 6. Worn swingarm bearings.	Replace. Replace. Replace. Retighten. Retighten. Replace.
Front suspension too soft.	1. Weakened springs. 2. Not enough fork oil. 3. Wrong weight fork oil.	Replace. Refill. Replace.
Front suspension too stiff.	1. Fork oil too viscous. 2. Too much fork oil. 3. Front axle bent. 4. Fork tubes not adjusted evenly in forks stem and steering stem head.	Replace. Remove excess oil. Replace. Adjust.
Noisy front suspension.	1. Not enough fork oil. 2. Loose nuts on suspension.	Refill. Retighten.

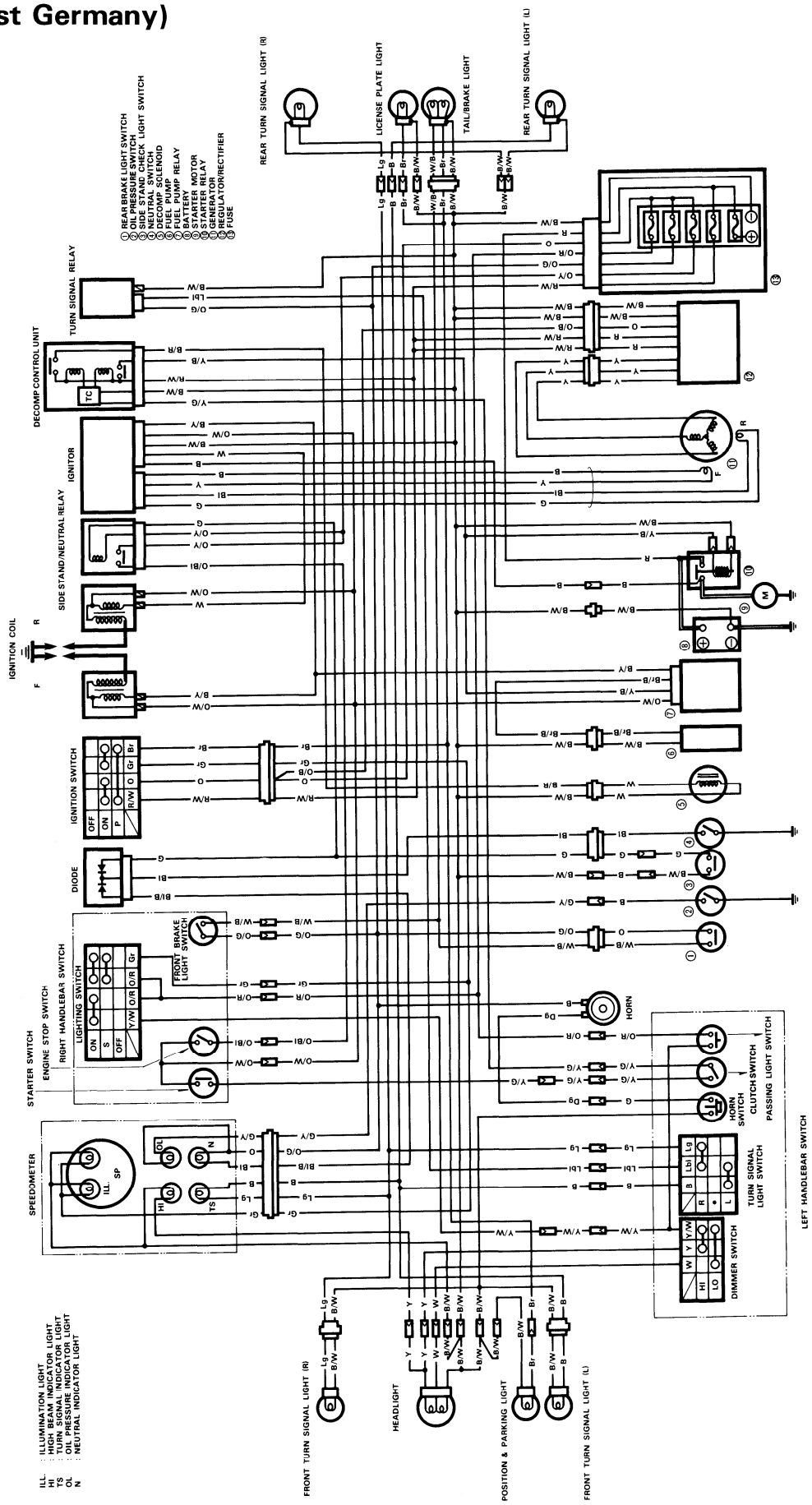
Complaint	Symptom and possible causes	Remedy
Wobbly rear wheel.	1. Distorted wheel rim. 2. Worn-down rear wheel bearings or swingarm bearings. 3. Defective or incorrect tire. 4. Worn swingarm bearings. 5. Loose nuts on rear suspension.	Replace. Replace. Replace. Replace. Retighten.
Rear suspension too soft.	1. Weakened spring. 2. Rear suspension adjuster improperly set. 3. Oil leakage of rear shock absorber.	Replace. Reset. Replace.
Rear suspension too stiff.	1. Rear suspension adjuster improperly set. 2. Shock absorber shaft bent. 3. Swingarm bent. 4. Worn swingarm bearings.	Adjust. Replace. Replace. Replace.
Noisy rear suspension.	1. Loose nut on rear suspension. 2. Worn swingarm bearings.	Retighten. Replace.

BRAKES

Complaint	Symptom and possible causes	Remedy
Poor braking.	1. Not enough brake fluid in the reservoir. 2. Air trapped in brake fluid circuit. 3. Pads worn down. 4. Too much play on brake lever/pedal.	Refill to level mark. Bleed air out. Replace. Adjust.
Insufficient brake power.	1. Leakage of brake fluid from hydraulic system. 2. Worn pads. 3. Oil adhesion on engaging surface of pads. 4. Worn disc. 5. Air entered into hydraulic system.	Repair or replace. Replace. Clean disc and pads. Replace. Bleed air.
Brake squeaking.	1. Carbon adhesion on pad surface. 2. Tilted pad. 3. Damaged wheel bearing. 4. Loose front-wheel axle or rear-wheel axle. 5. Worn pads. 6. Foreign material in brake fluid. 7. Clogged return port of master cylinder. 8. Wrongly fixed pad shims.	Repair surface with sandpaper. Modify pad fitting. Replace. Tighten to specified torque. Replace. Replace brake fluid. Disassemble and clean master cylinder. Set correctly.
Excessive brake lever stroke.	1. Air entered into hydraulic system. 2. Insufficient brake fluid. 3. Improper quality of brake fluid.	Bleed air. Replenish fluid to specified level; bleed air. Replace with correct fluid.
Leakage of brake fluid.	1. Insufficient tightening of connection joints. 2. Cracked hose. 3. Worn piston and/or cup.	Tighten to specified torque. Replace. Replace piston and/or cup.

WIRING DIAGRAM

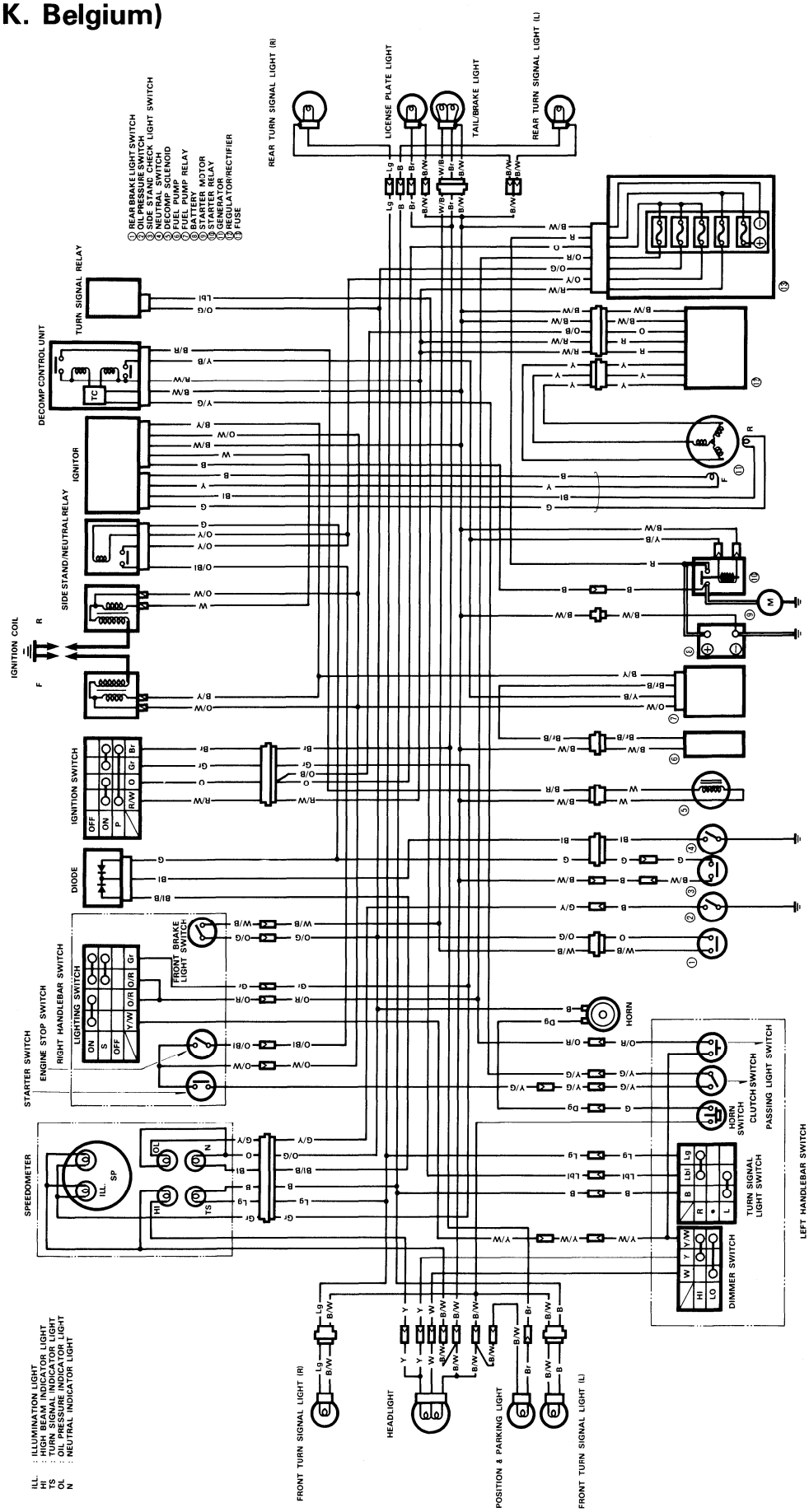
(For West Germany)



WIRE COLOR

B . . . . . Black	Lg . . . . . Light green	B/Y . . . . Black with Yellow tracer	O/R . . . . Orange with Red tracer
Bl . . . . . Blue	O . . . . . Orange	Bl/B . . . . Blue with Black tracer	O/W . . . . Orange with White tracer
Br . . . . . Brown	R . . . . . Red	Br/B . . . . Brown with Black tracer	O/Y . . . . Orange with Yellow tracer
Dg . . . . . Dark green	W . . . . . White	G/Y . . . . Green with Yellow tracer	R/W . . . . Red with White tracer
G . . . . . Green	Y . . . . . Yellow	O/B . . . . Orange with Black tracer	W/B . . . . White with Black tracer
Gr . . . . . Gray	B/R . . . . Black with Red tracer	O/Bl . . . . Orange with Blue tracer	Y/B . . . . Yellow with Black tracer
Lbl . . . . Light blue	B/W . . . . Black with White tracer	O/G . . . . Orange with Green tracer	Y/G . . . . Yellow with Green tracer

(For U.K. Belgium)

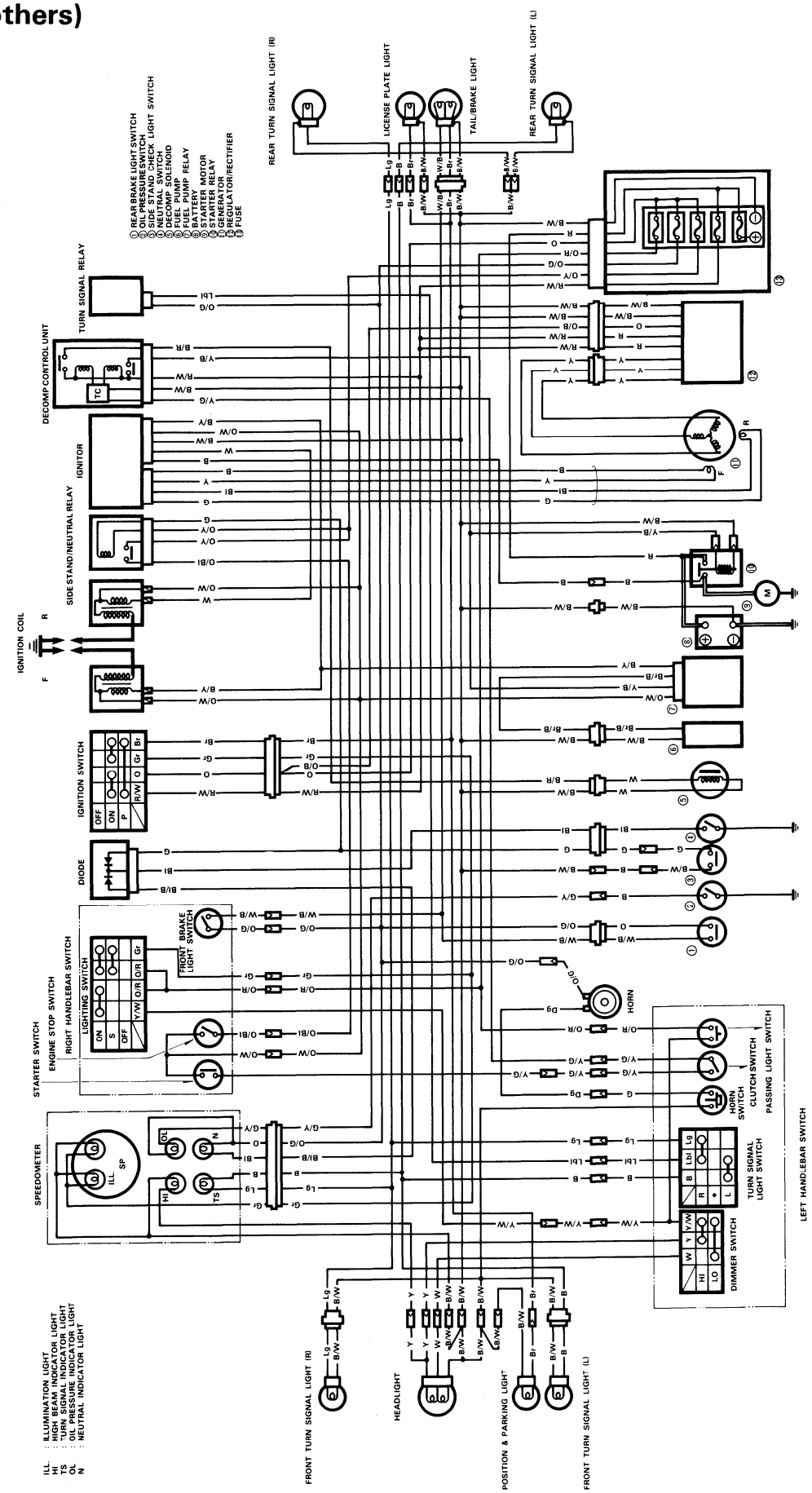


WIRE COLOR

B	. . . . . Black	Lg	. . . . . Light green	B/Y	. . . Black with Yellow tracer
Bl	. . . . . Blue	O	. . . . . Orange	Bl/B	. . . . Blue with Black tracer
Br	. . . . . Brown	R	. . . . . Red	Br/B	. . . . Brown with Black tracer
Dg	. . . . . Dark green	W	. . . . . White	G/Y	. . . . Green with Yellow tracer
G	. . . . . Green	Y	. . . . . Yellow	O/B	. . . . Orange with Black tracer
Gr	. . . . . Gray	B/R	. . . . Black with Red tracer	O/Bl	. . . . Orange with Blue tracer
Lbl	. . . . . Light blue	B/W	. . . Black with White tracer	O/G	. . . Orange with Green tracer

O/R	. . . . Orange with Red tracer	R/W	. . . . Red with White tracer
O/W	. . . . Orange with White tracer	W/B	. . . . White with Black tracer
O/Y	. . . . Orange with Yellow tracer	Y/B	. . . . Yellow with Black tracer
		Y/G	. . . . Yellow with Green tracer

(The others)

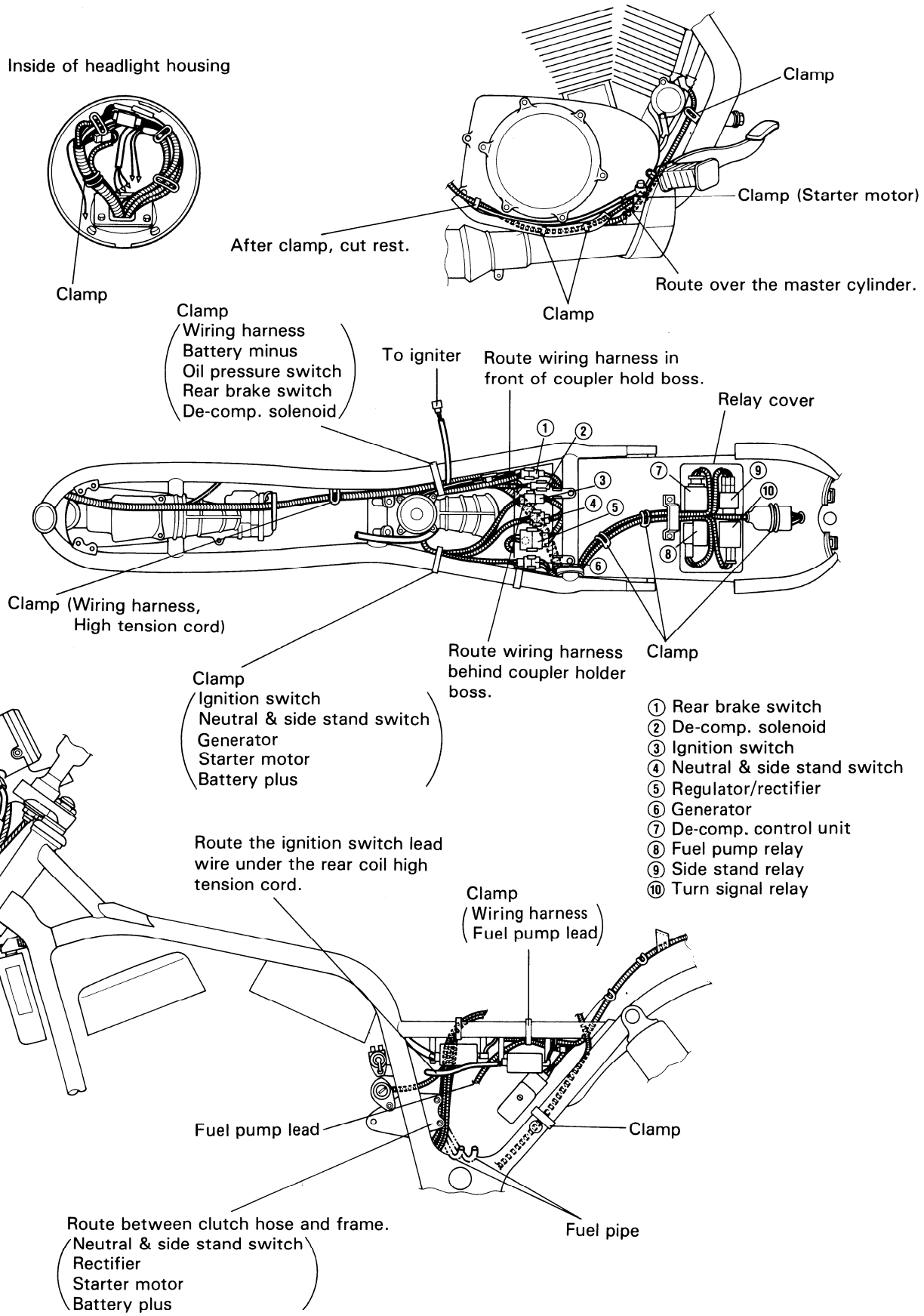


WIRE COLOR

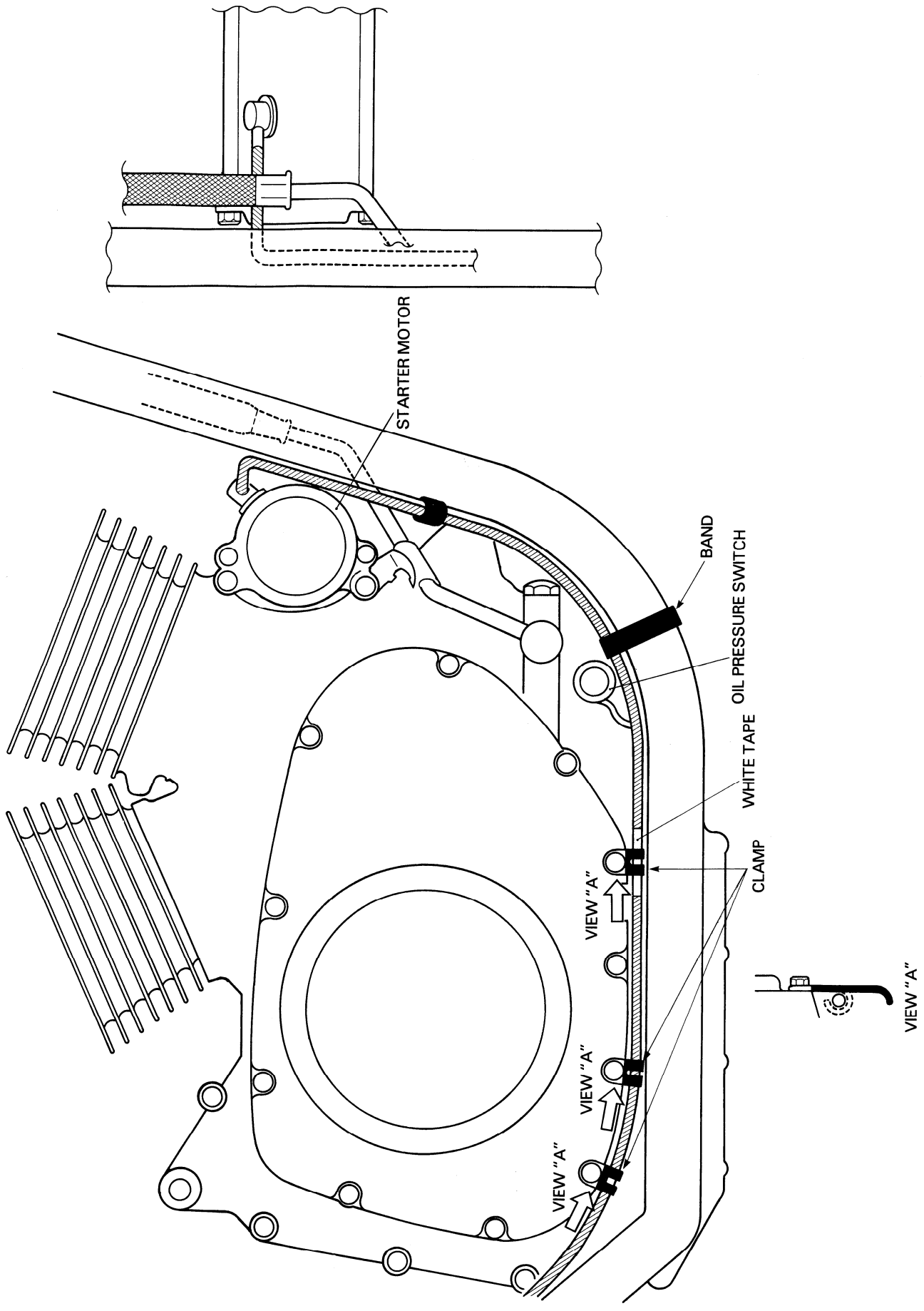
B	Black	Lg	Light green	B/Y	Black with Yellow tracer
Bl	Blue	O	Orange	Bl/B	Blue with Black tracer
Br	Brown	R	Red	Br/B	Brown with Black tracer
Dg	Dark green	W	White	G/Y	Green with Yellow tracer
G	Green	Y	Yellow	O/B	Orange with Black tracer
Gr	Gray	B/R	Black with Red tracer	O/Bl	Orange with Blue tracer
Lbl	Light blue	B/W	Black with White tracer	O/G	Orange with Green tracer

O/R	Orange with Red tracer	R/W	Red with White tracer
O/W	Orange with White tracer	W/B	White with Black tracer
O/Y	Orange with Yellow tracer	Y/B	Yellow with Black tracer
		Y/G	Yellow with Green tracer

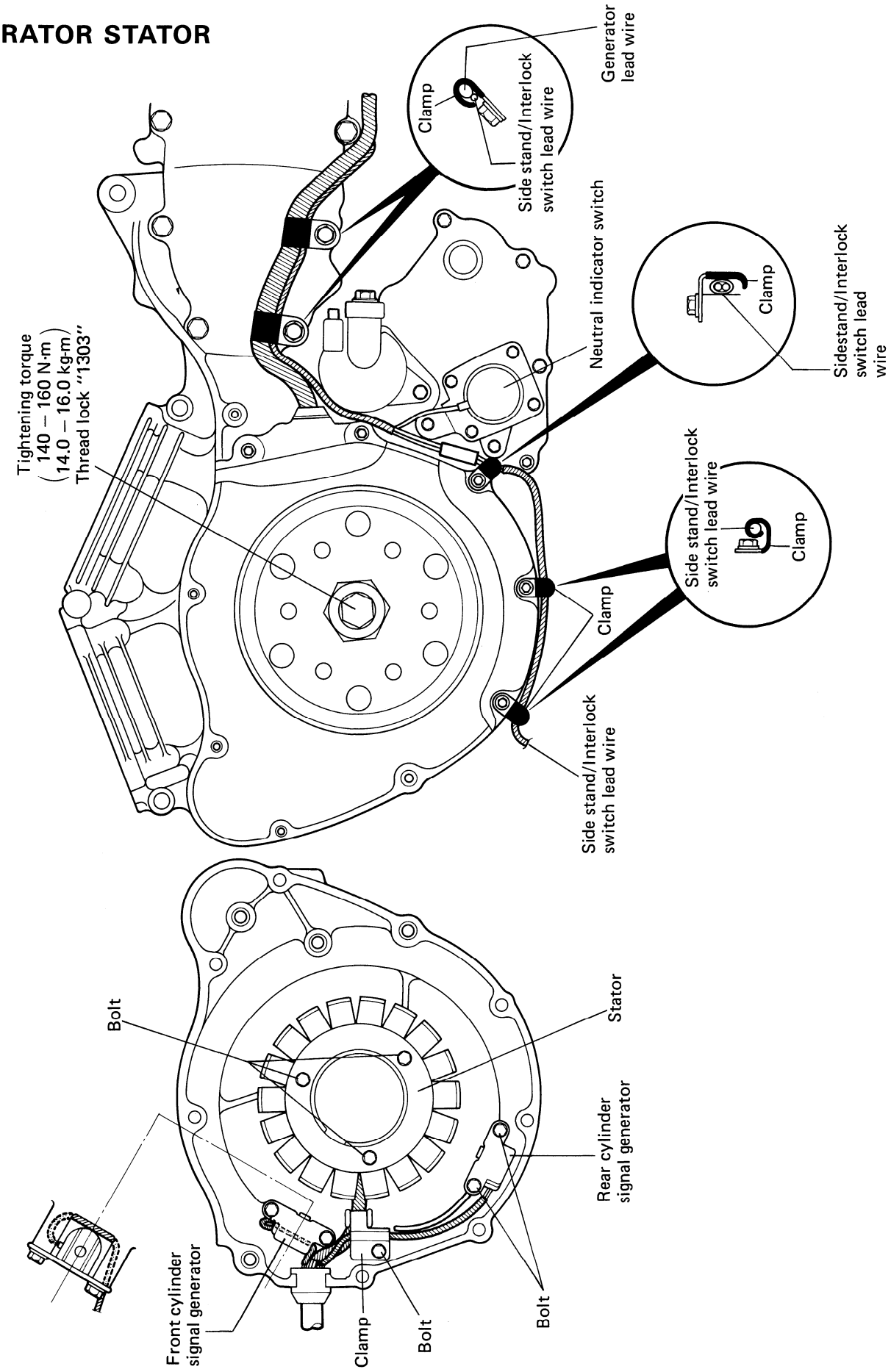
HARNESS ROUTING



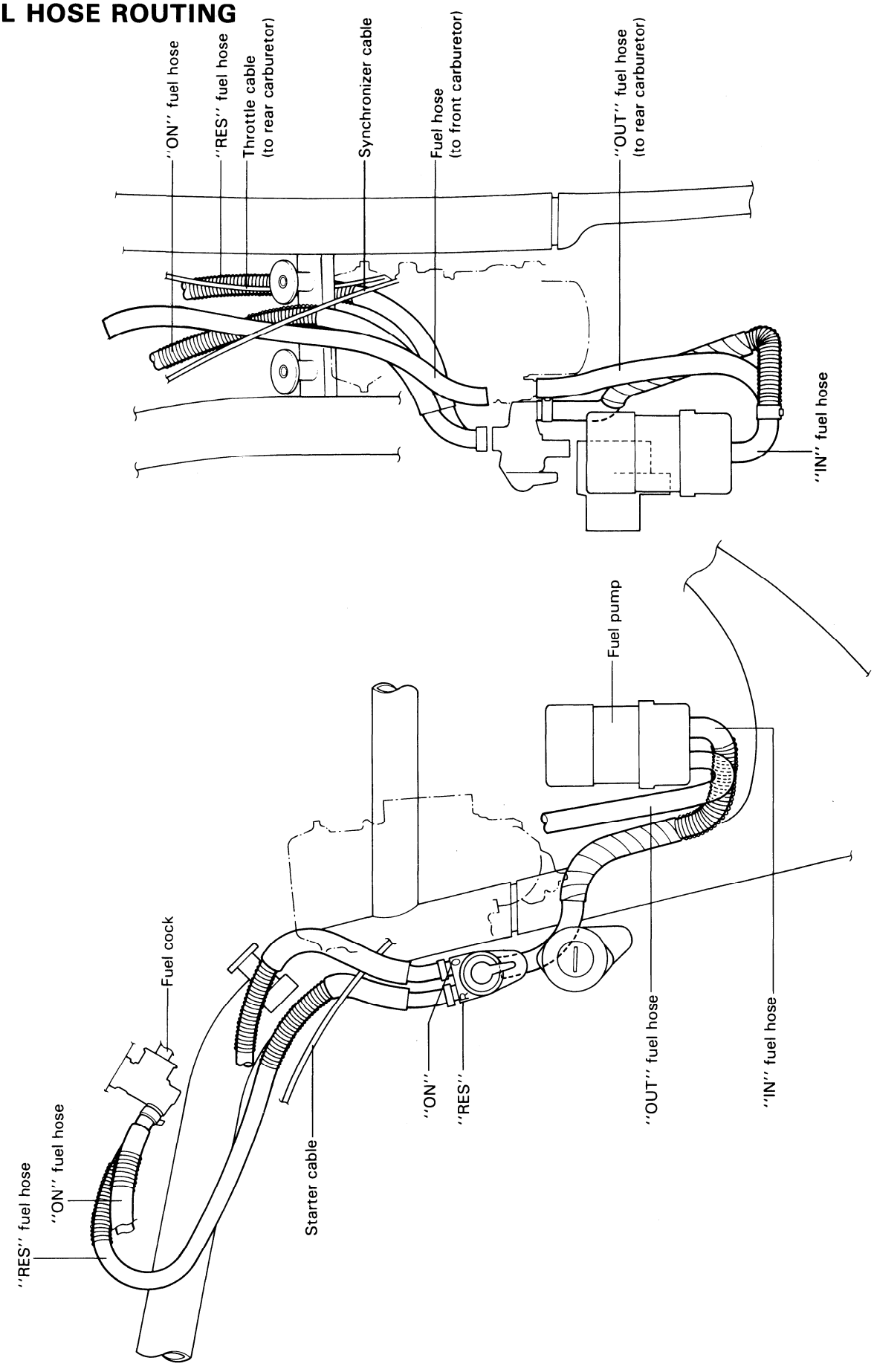
STARTER MOTOR LEAD



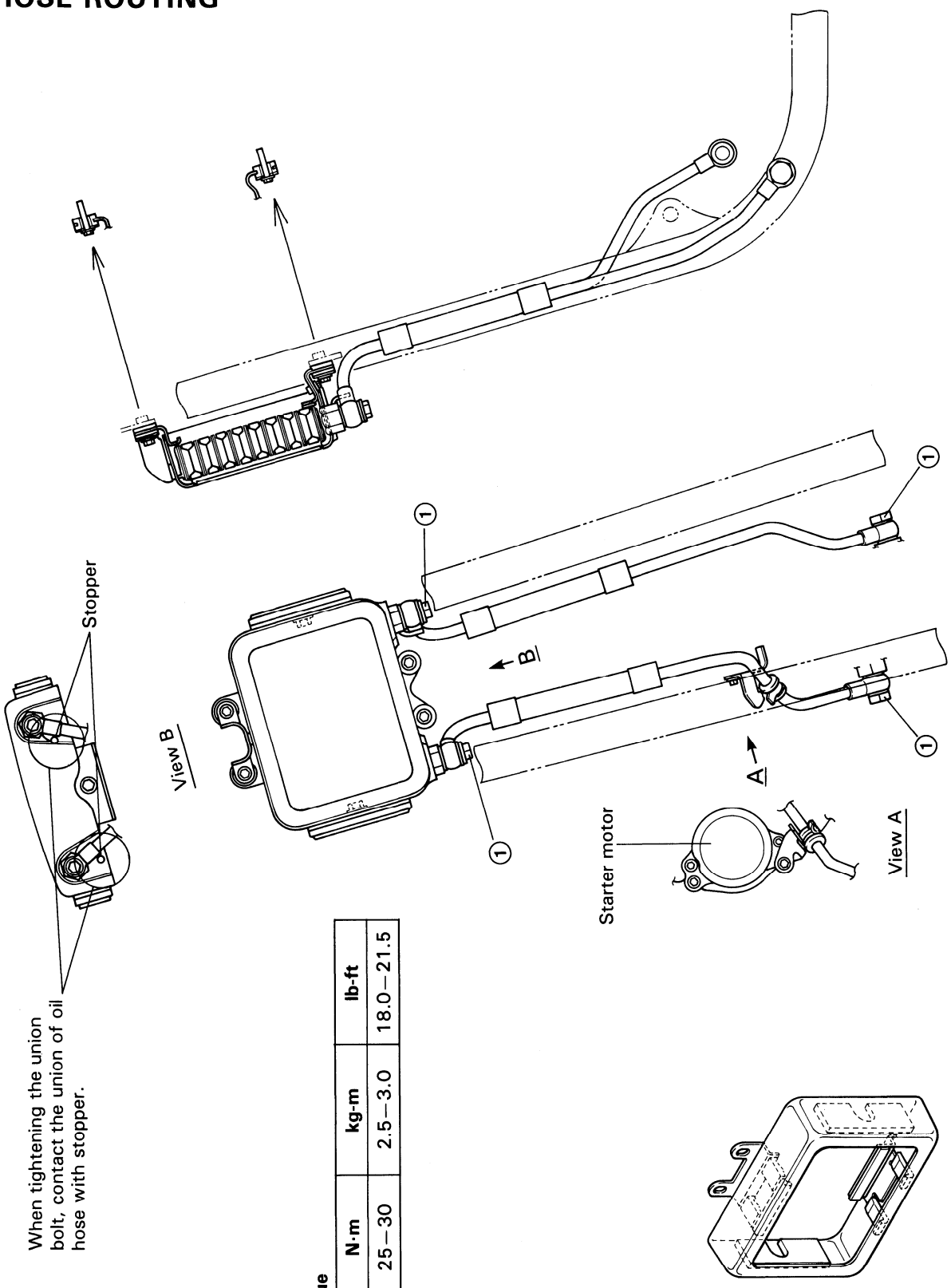
GENERATOR STATOR



FUEL HOSE ROUTING



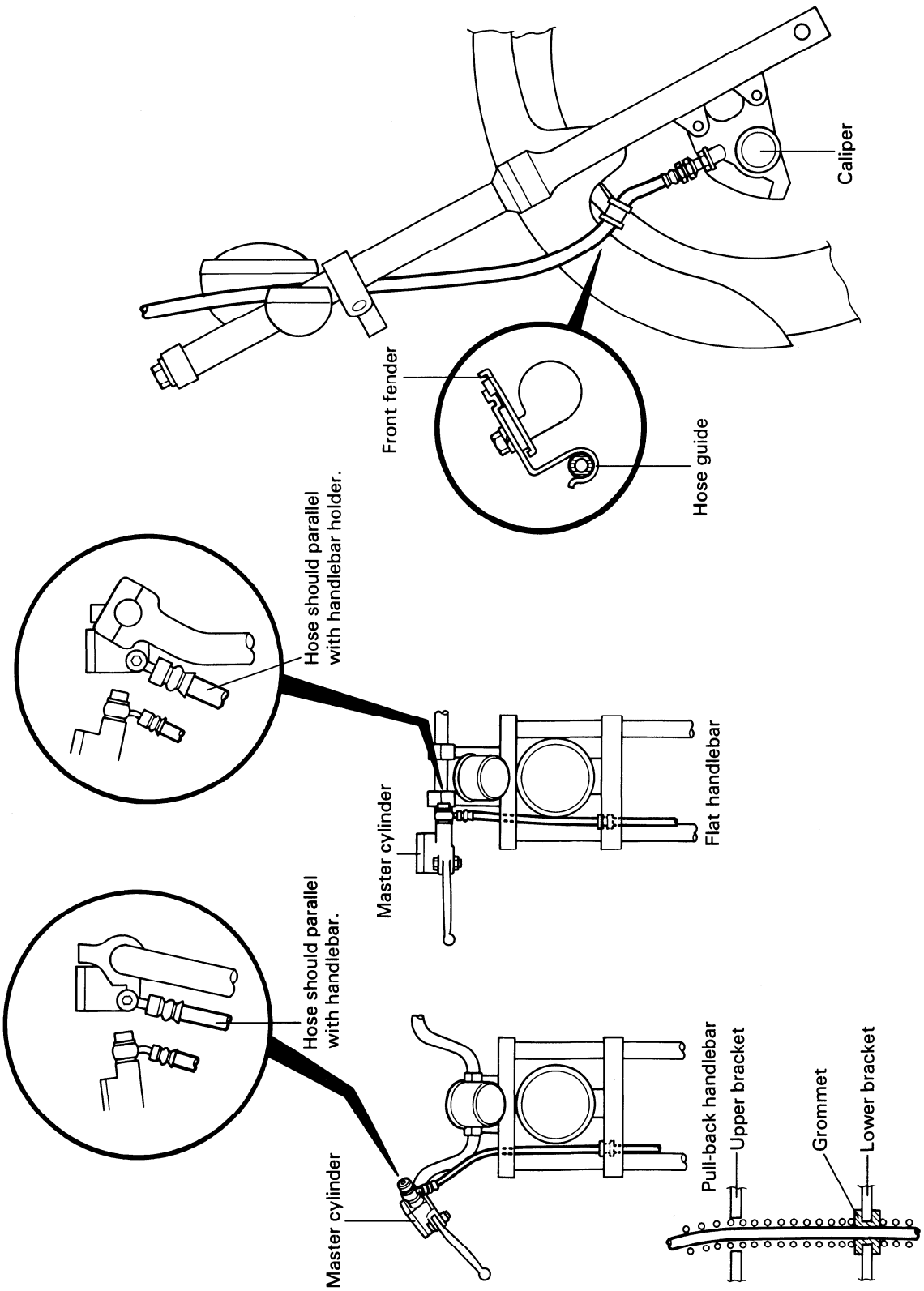
OIL HOSE ROUTING



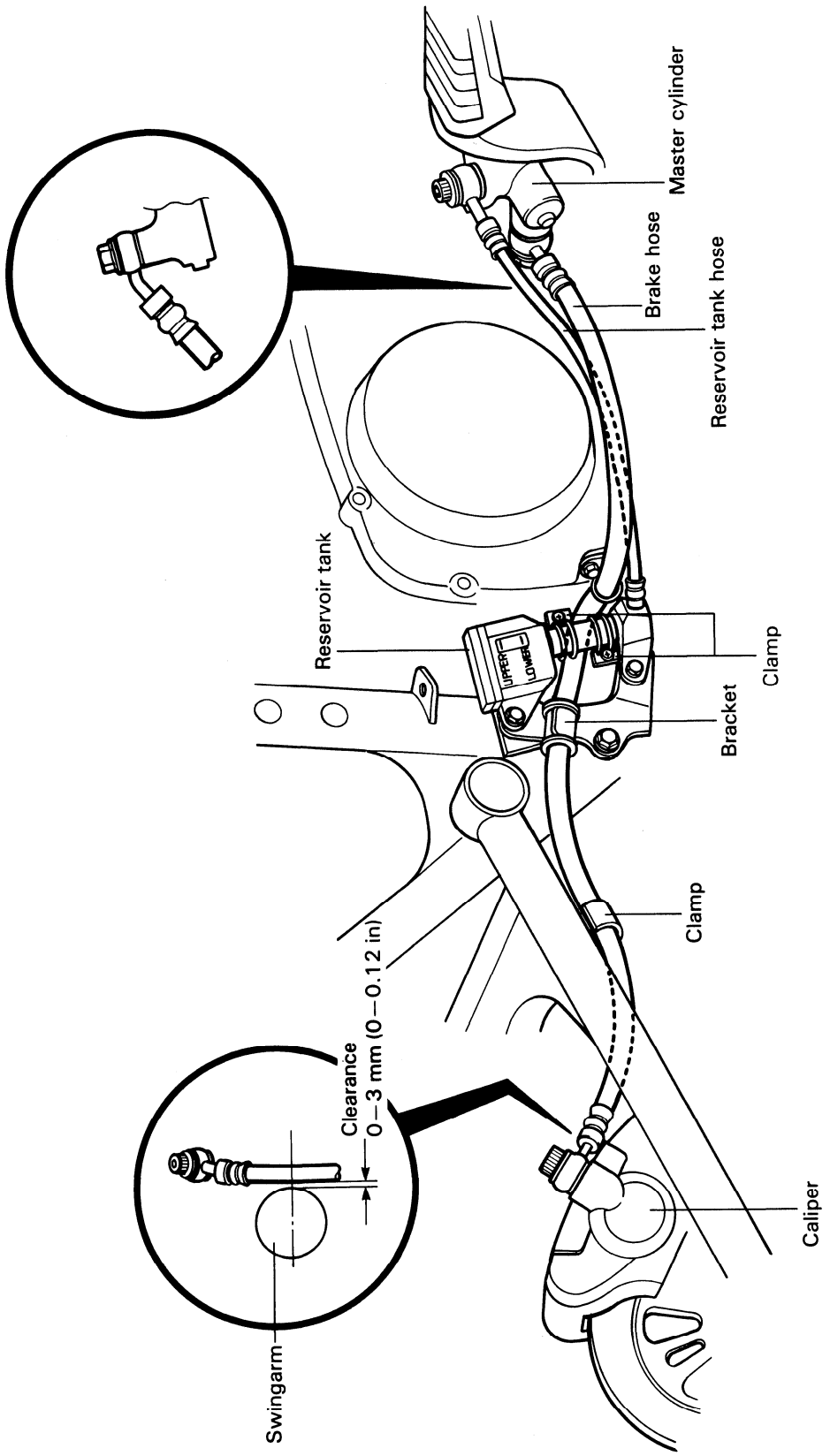
Tightening torque

Item	N·m	kg-m	lb-ft
①	25—30	2.5—3.0	18.0—21.5

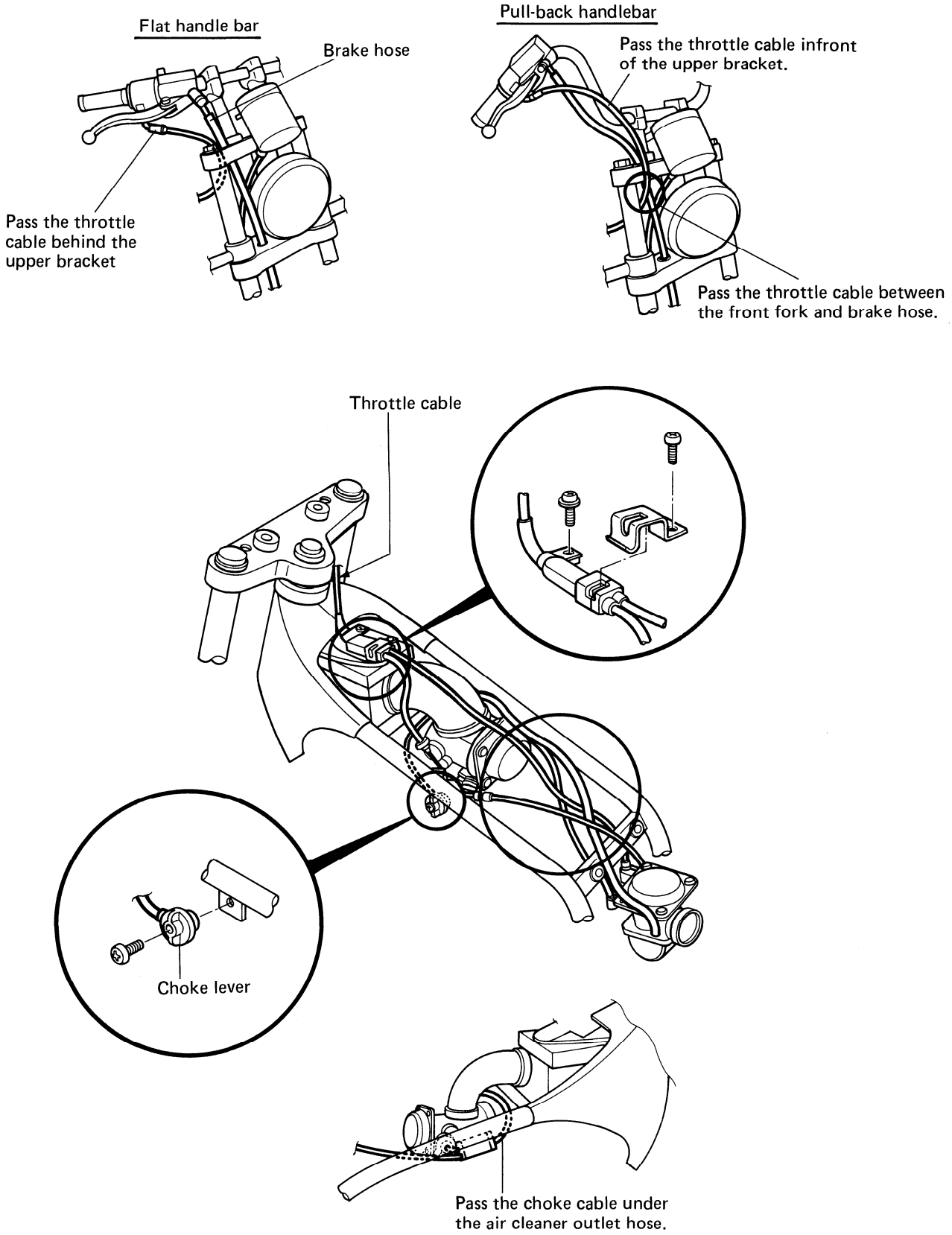
FRONT BRAKE HOSE ROUTING

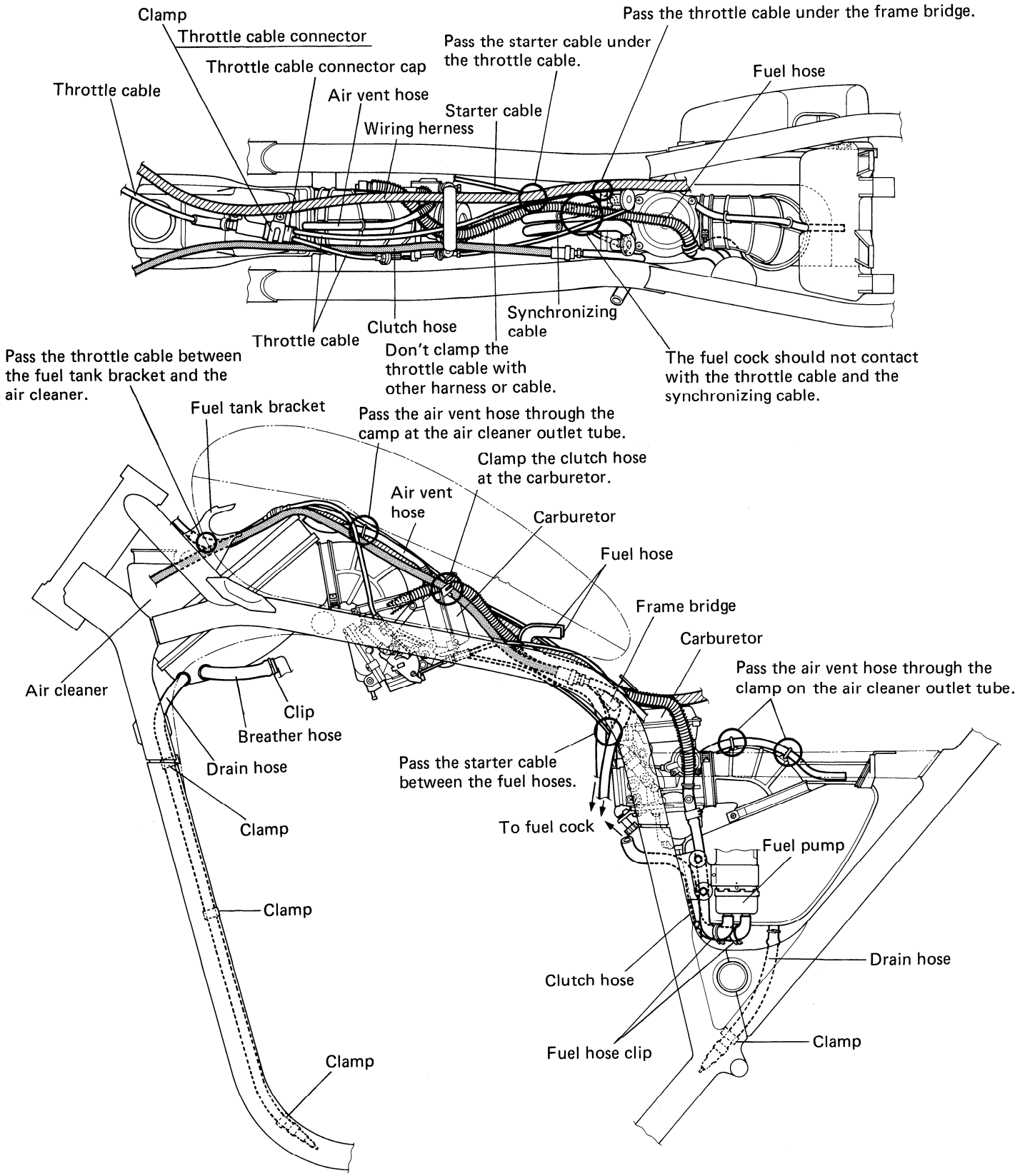


REAR BRAKE HOSE ROUTING

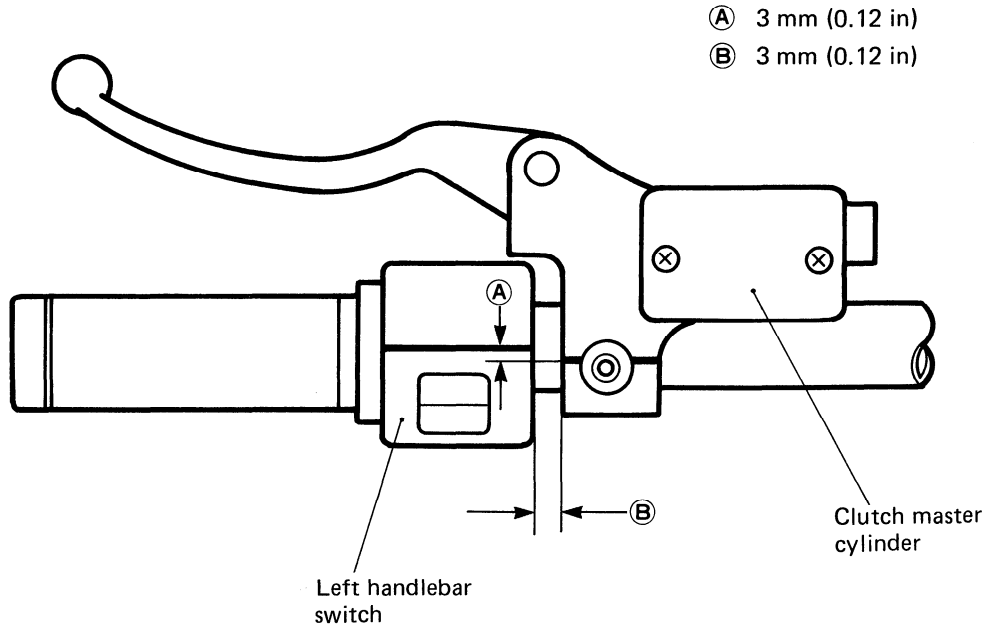


CABLE ROUTING

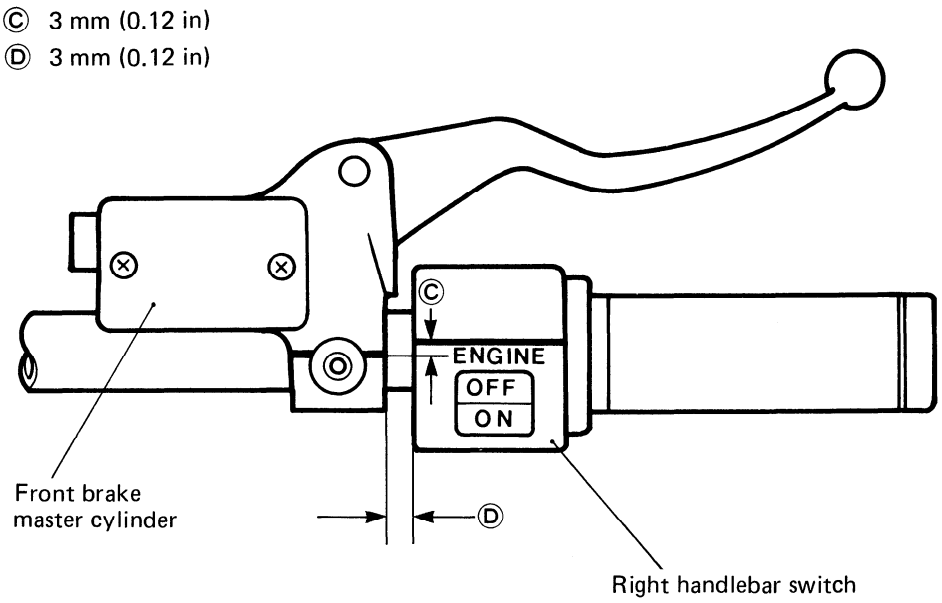



Clamp
Throttle cable connector
Throttle cable connector cap
Throttle cable
Air vent hose
Wiring herness
Starter cable
Pass the starter cable under the throttle cable.
Pass the throttle cable under the frame bridge.
Fuel hose
Synchronizing cable
Throttle cable
Clutch hose
Don't clamp the throttle cable with other harness or cable.
The fuel cock should not contact with the throttle cable and the synchronizing cable.
Pass the throttle cable between the fuel tank bracket and the air cleaner.
Fuel tank bracket
Pass the air vent hose through the camp at the air cleaner outlet tube.
Clamp the clutch hose at the carburetor.
Air vent hose
Carburetor
Fuel hose
Frame bridge
Carburetor
Pass the air vent hose through the clamp on the air cleaner outlet tube.
Air cleaner
Clip
Breather hose
Drain hose
Pass the starter cable between the fuel hoses.
Clamp
To fuel cock
Fuel pump
Clamp
Drain hose
Clutch hose
Fuel hose clip
Clamp
Clamp

LOCATION OF CLUTCH MASTER CYLINDER



LOCATION OF FRONT BRAKE MASTER CYLINDER



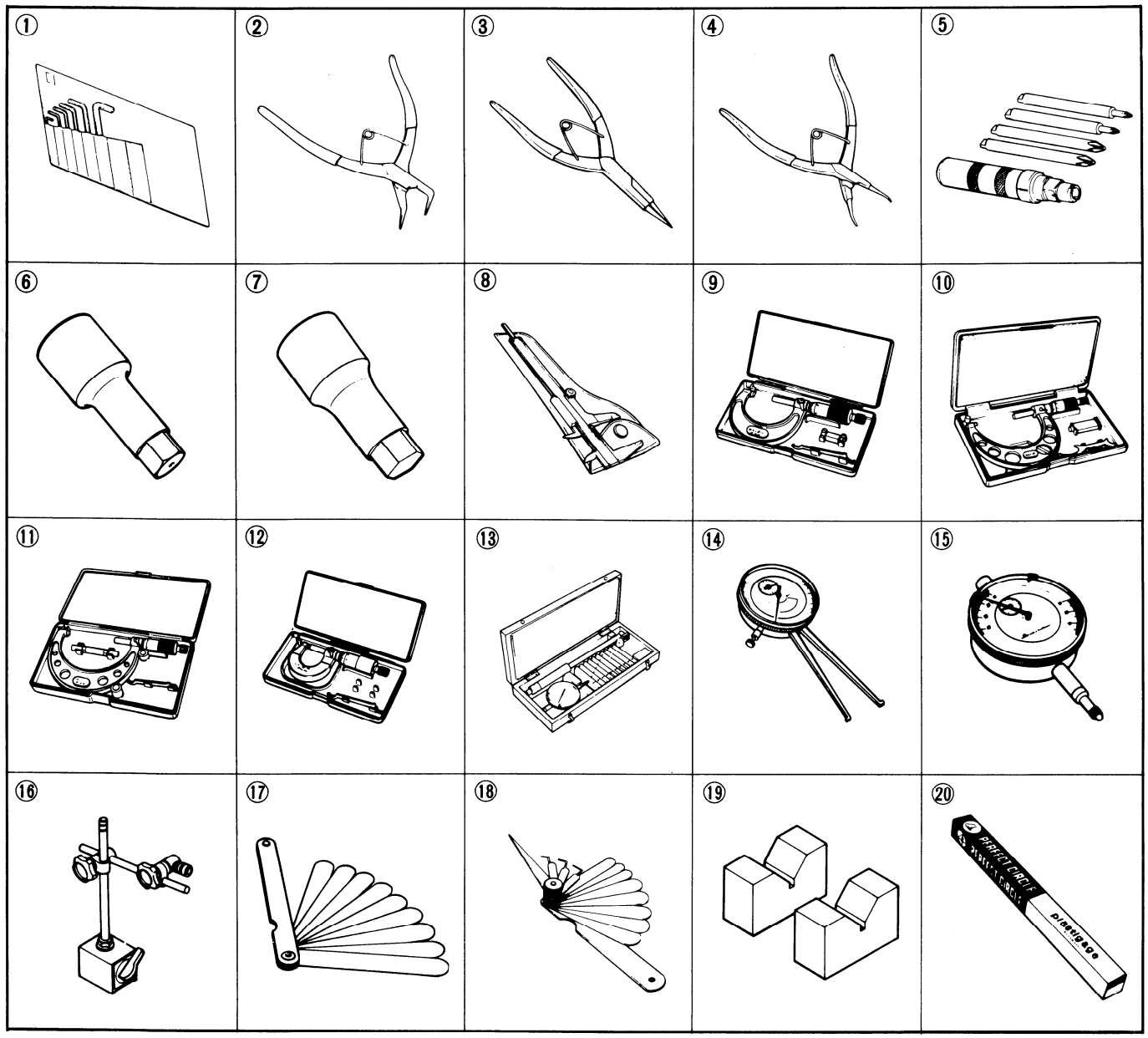
SPECIAL TOOLS

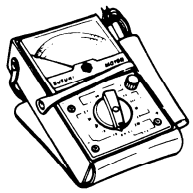
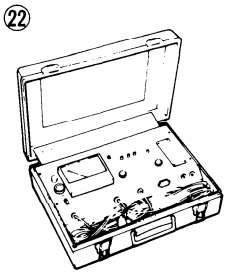
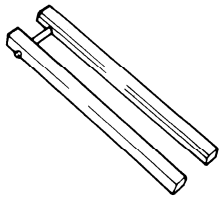
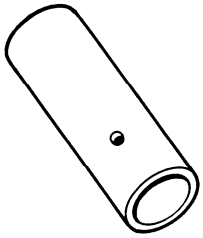
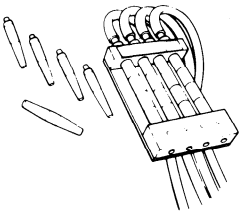
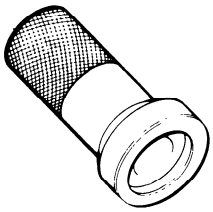
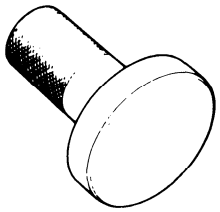
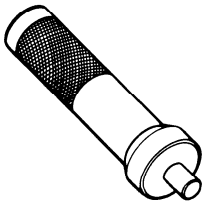
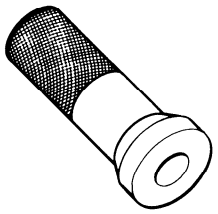
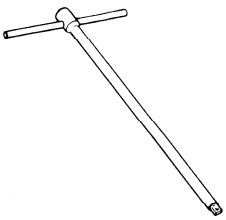
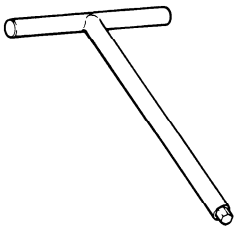
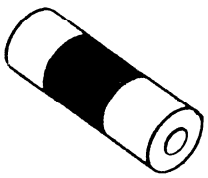
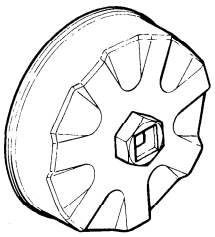
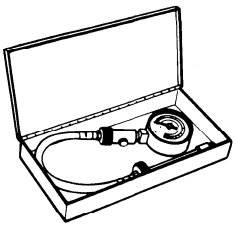
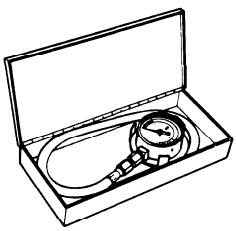
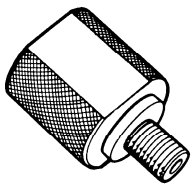
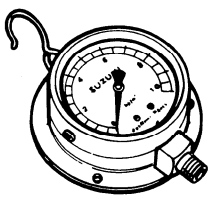
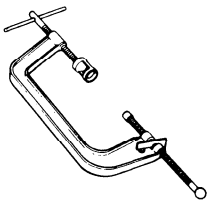
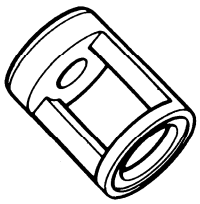
Item	Part No.	Name
①	09900-00401	"L" type hexagon wrench set
②	09900-06105	Snapring pliers
③	09900-06107	Snapring pliers
④	09900-06108	Snapring pliers
⑤	09900-09003	Impact driver set
⑥	09900-18710	12 mm hexagon socket
⑦	09900-18720	14 mm hexagon socket
⑧	09900-20101	Vernier calipers
⑨	09900-20202	Micrometer (25 – 50 mm)
⑩	09900-20203	Micrometer (50 – 75 mm)
⑪	09900-20204	Micrometer (75 – 100 mm)
⑫	09900-20205	Micrometer (0 – 25 mm)
⑬	09900-20508	Cylinder calipers
⑭	09900-20605	Dial calipers
⑮	09900-20606	Dial gauge (1/100)
⑯	09900-20701	Magnetic stand
⑰	09900-20803	Thickness gauge
⑱	09900-20804	Thickness gauge
⑲	09900-21304	V-block (100 mm)
⑳	09900-22301	Plastigauge
㉑	09900-25002	Pocket tester
㉒	09900-28106	Electro tester
㉓	09910-20116	Conrod holder
* ㉔	09913-10740	Air bleeding tool
㉕	09913-13121	Carburetor balancer
㉖	09913-13140	Adapter
㉗	09913-70122	Bearing installer
㉘	09913-75520	Bearing installer
㉙	09913-75820	Bearing installer
㉚	09913-76010	Bearing installer
㉛	09914-24510	T-handle
㉜	09914-25811	"T" type hexagon wrench
㉝	09914-79610	Bearing installer
㉞	09915-40610	Oil filter wrench
㉟	09915-64510	Compression gauge
㊱	09915-74510	Oil pressure gauge

Item	Part No.	Name
㊲	09915-74530	Oil pressure gauge adapter
㊳	09915-77330	Meter (Oil pressure)
㊴	09916-14510	Valve lifter
㊵	09916-14910	Attachment
㊶	09916-34520	Valve guide reamer
㊷	09916-34531	Valve guide hole reamer
㊸	09916-34541	Reamer handle
㊹	09916-34550	Valve guide reamer
㊺	09916-34580	Valve guide hole reamer
㊻	09916-44511	Valve guide remover
㊼	09916-44910	Valve guide remover
㊽	09916-44920	Valve guide installer attachment
㊾	09916-57311	Valve guide installer attachment
㊿	09916-57321	Valve guide installer handle
(51)	09916-84510	Tweezers
(52)	09917-47910	Vacuum pump gauge
(53)	09918-03810	Adapter
(54)	09918-53810	Tensioner lock tool
* (55)	09920-50710	Clutch sleeve
(56)	09921-20210	Bearing remover
(57)	09923-73210	Bearing remover
(58)	09923-74510	Bearing remover
(59)	09924-34510	Back lash measuring tool (27 – 50 mm)
(60)	09924-62410	Final drive gear bearing holder wrench
(61)	09924-62420	22 mm long socket
(62)	09924-64510	Final drive gear coupling holder
(63)	09924-74570	Final driven gear bearing installer and remover
(64)	09924-84510	Bearing installer set
(65)	09930-13210	Socket wrench
(66)	09930-14530	Universal joint
(67)	09930-30102	Sliding shaft
(68)	09930-30720	Rotor remover
(69)	09930-40113	Rotor holder
(70)	09940-14911	Steering nut socket wrench
(71)	09940-34520	"T" handle
(72)	09940-34530	Attachment "A"

Item	Part No.	Name
⑬	09941-34513	Steering race and swingarm bearing installer
⑭	09941-50110	Bearing remover
⑮	09941-54911	Bearing outer race remover
⑯	09941-64510	Bearing remover
⑰	09941-74910	Steering bearing installer
⑱	09941-84510	Bearing inner race remover
⑲	09943-74111	Fork oil level gauge

* Asterisk mark is newly established for VS1400.



㉑ 	㉒ 	㉓ 	㉔ 	㉕ 
㉖ 	㉗ 	㉘ 	㉙ 	㉚ 
㉛ 	㉜ 	㉝ 	㉞ 	㉟ 
㊱ 	㊲ 	㊳ 	㊴ 	㊵ 
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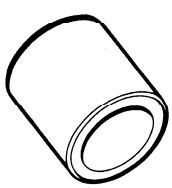
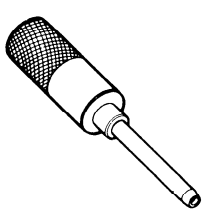
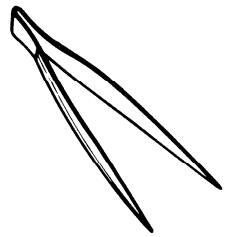
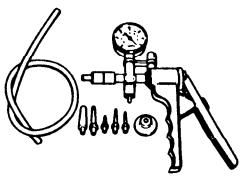
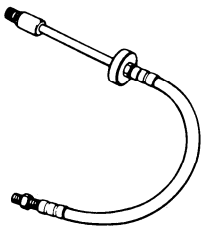
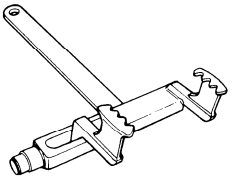
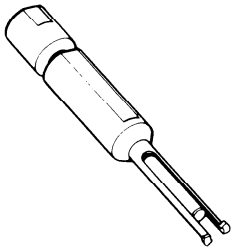
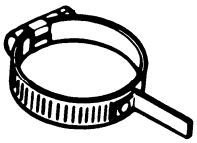
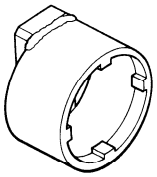
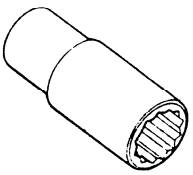
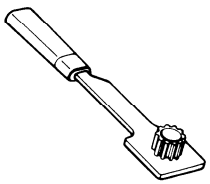
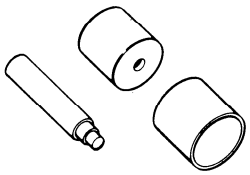
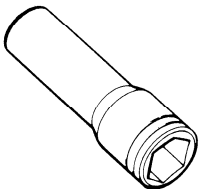
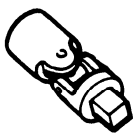
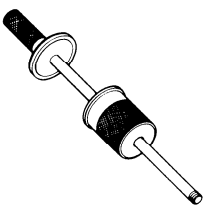
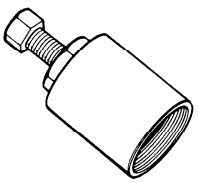
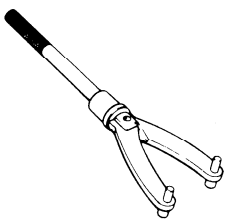
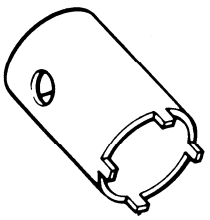
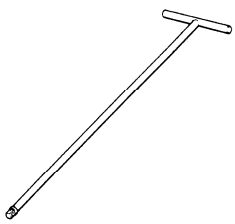
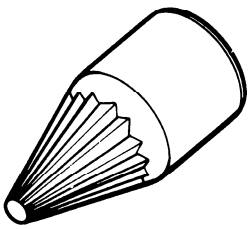
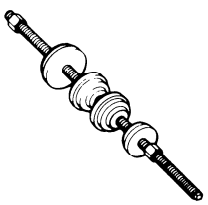
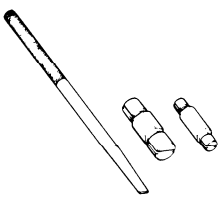
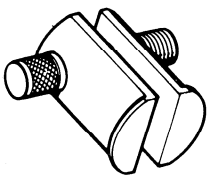
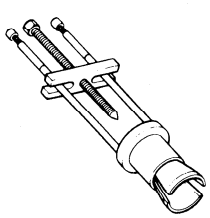
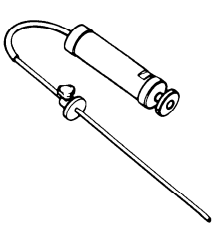
㊻ 	㊼ 	㊽ 	㊾ 	㊿ 

⑤① 	⑤② 	⑤③ 	⑤④	⑤⑤ 
⑤⑥ 	⑤⑦ 	⑤⑧ 	⑤⑨ 	⑥⓪ 
⑥① 	⑥② 	⑥③ 	⑥④ 	⑥⑤ 
⑥⑥ 	⑥⑦ 	⑥⑧ 	⑥⑨ 	⑦⓪ 
⑦① 	⑦② 	⑦③ 	⑦④ 	⑦⑤ 
⑦⑥ 	⑦⑦ 	⑦⑧ 	⑦⑨ 	

TIGHTENING TORQUE

ENGINE

Item			N·m	kg-m	lb-ft
Rocker arm shaft			34–40	3.4–4.0	24.5–29.0
Rocker arm shaft plug			25–30	2.5–3.0	18.0–21.5
Cylinder head cover bolt		6 mm	9–13	0.9–1.3	6.5–9.5
		8 mm	23–27	2.3–2.7	16.5–19.5
Cylinder head bolt and nut	8 mm	Initial	10	1.0	7.0
		Final	23–27	2.3–2.7	16.5–19.5
	10 mm	Initial	25	2.5	18.0
		Final	35–40	3.5–4.0	25.5–29.0
Cam sprocket bolt			14–16	1.4–1.6	10.0–11.5
Rear cylinder head cover plug			23–27	2.3–2.7	16.5–19.5
Cam chain tensioner mounting bolt			8–12	0.8–1.2	6.0–8.5
Cam chain guide mounting bolt			8–12	0.8–1.2	6.0–8.5
Primary drive gear bolt			140–160	14.0–16.0	101.5–115.5
Clutch spring bolt			8–12	0.8–1.2	6.0–8.5
Clutch sleeve hub nut			90–110	9.0–11.0	65.0–79.5
Secondary drive gear shaft bolt			90–110	9.0–11.0	65.0–79.5
Driveshaft bolt			55–65	5.5–6.5	40.0–47.0
Secondary case bolt		Initial	12–18	1.2–1.8	8.5–13.0
		Final	20–24	2.0–2.4	14.5–17.5
Rotor bolt			140–160	14.0–16.0	101.5–115.5
Starter clutch allen bolt			23–28	2.3–2.8	16.5–20.0
Crankcase bolt	6 mm		9–13	0.9–1.3	6.5–9.5
	8 mm	Initial	12–18	1.2–1.8	8.5–13.0
		Final	20–24	2.0–2.4	14.5–17.5
Conrod bolt		Initial	22–28	2.2–2.8	16.0–20.0
		Final	49–53	4.9–5.3	35.5–38.5
Clutch pipe union bolt			20–25	2.0–2.5	14.5–18.0
Oil pressure regulator			25–30	2.5–3.0	18.0–21.5
Oil pump mounting bolt			9–13	0.9–1.3	6.5–9.5
Oil filter union			12–18	1.2–1.8	8.5–13.0
Piston cooling jet retaining plate bolt			8–12	0.8–1.2	6.0–8.5
Oil separator plate bolt			8–12	0.8–1.2	6.0–8.5
Oil pressure switch			12–15	1.2–1.5	8.5–11.0
Drain plug			18–23	1.8–2.3	13.0–16.5

Item		N·m	kg-m	lb-ft
Oil plug	6 mm	4–7	0.4–0.7	3.0–5.0
	8 mm	8–12	0.8–1.2	6.0–8.5
	12 mm	18–23	1.8–2.3	13.0–16.5
	14 mm	20–25	2.0–2.5	14.5–18.0
	16 mm	20–25	2.0–2.5	14.5–18.0
Oil pipe union bolt		25–30	2.5–3.0	18.0–21.5
Engine mounting bolt		70–88	7.0–8.8	50.5–63.5
Engine mounting bracket bolt		18–28	1.8–2.8	13.0–20.0
Frame mounting bolt		40–60	4.0–6.0	29.0–43.5
Exhaust pipe clamp bolt		20–25	2.0–2.5	14.5–18.0
Muffler mounting bolt		27–43	2.7–4.3	19.5–31.0

SECONDARY AND FINAL

Item		N·m	kg-m	lb-ft
Secondary drive bevel gear housing bolt		20–25	2.0–2.5	14.5–18.0
Secondary driven bevel gear housing bolt		20–25	2.0–2.5	14.5–18.0
Secondary driven bevel gear bearing stopper		90–120	9.0–12.0	65.0–87.0
Final gear case mounting nut		35–45	3.5–4.5	25.5–32.5
Final drive bevel gear coupling nut		90–110	9.0–11.0	65.0–79.5
Final drive bevel gear bearing stopper		90–130	9.0–13.0	65.0–94.0
Final gear case oil drain plug		20–25	2.0–2.5	14.5–18.0
Final gear case cover bolt	8-mm	20–26	2.0–2.6	14.5–19.0
	10-mm	40–60	4.0–6.0	29.0–43.5
Final driven bevel gear bearing retainer screw		8–10	0.8–1.0	6.0–7.0
Final driven coupling joint stopper bolt		8–12	0.8–1.2	6.0–8.5

CHASSIS

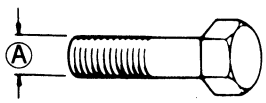
Item	N·m	kg-m	lb-ft
Front axle	36–52	3.6–5.2	26.0–37.5
Front axle clamp bolt	15–25	1.5–2.5	11.0–18.0
Front wheel hub flange bolt	20–30	2.0–3.0	14.5–21.5
Brake disc mounting bolt (Front and Rear)	15–25	1.5–2.5	11.0–18.0
Front wheel spoke nipple	4–5	0.4–0.5	3.0–3.5
Front fork cap bolt	80–100	8.0–10.0	58.0–72.5
Front fork spring stopper nut	40–50	4.0–5.0	29.0–36.0
Front fork damper rod bolt	15–25	1.5–2.5	11.0–18.0
Front fork lower clamp bolt	25–40	2.5–4.0	18.0–29.0
Steering stem head nut	80–100	8.0–10.0	58.0–72.5
Front brake master cylinder mounting bolt	8–12	0.8–1.2	6.0–8.5
Front brake caliper mounting bolt	25–40	2.5–4.0	18.0–29.0
Front brake caliper housing bolt	15–20	1.5–2.0	11.0–14.5
Front brake hose union bolt	20–25	2.0–2.5	14.5–18.0
Brake caliper air bleeder valve	6–9	0.6–0.9	4.5–6.5
Handlebar clamp bolt	15–25	1.5–2.5	11.0–18.0
Handlebar holder nut	80–100	8.0–10.0	58.0–72.5
Front footrest bolt	15–25	1.5–2.5	11.0–18.0
Rear brake reservoir mounting bolt	8–12	0.8–1.2	6.0–8.5
Rear brake master cylinder mounting bolt	15–25	1.5–2.5	11.0–18.0
Clutch master cylinder mounting bolt	8–12	0.8–1.2	6.0–8.5

Item		N·m	kg-m	lb-ft
Clutch hose union bolt		20–25	2.0–2.5	14.5–18.0
Rear swingarm pivot nut		50–80	5.0–8.0	36.0–58.0
Rear shock absorber mounting bolt		20–30	2.0–3.0	14.5–21.5
Rear axle nut		60–96	6.0–9.6	43.5–69.5
Rear caliper mounting bracket bolt		40–60	4.0–6.0	29.0–43.5
Rear brake caliper mounting bolt		25–40	2.5–4.0	18.0–29.0
Rear brake caliper housing bolt		15–20	1.5–2.0	11.0–14.5
Rear brake hose union bolt	10-mm	20–25	2.0–2.5	14.5–18.0
	14-mm	30–35	3.0–3.5	21.5–25.5

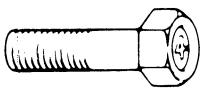
TIGHTENING TORQUE CHART

For other bolts and nuts not listed above, refer to this chart:

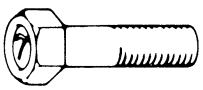
Bolt Diameter Ⓐ (mm)	Conventional or "4" marked bolt			"7" marked bolt		
	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
4	1.0 – 2.0	0.1 – 0.2	0.7 – 1.5	1.5 – 3.0	0.15 – 0.3	1.0 – 2.0
5	2.0 – 4.0	0.2 – 0.4	1.5 – 3.0	3.0 – 6.0	0.3 – 0.6	2.0 – 4.5
6	4.0 – 7.0	0.4 – 0.7	3.0 – 5.0	8.0 – 12.0	0.8 – 1.2	6.0 – 8.5
8	10.0 – 16.0	1.0 – 1.6	7.0 – 11.5	18.0 – 28.0	1.8 – 2.8	13.0 – 20.0
10	22.0 – 35.0	2.2 – 3.5	16.0 – 25.5	40.0 – 60.0	4.0 – 6.0	29.0 – 43.5
12	35.0 – 55.0	3.5 – 5.5	25.5 – 40.0	70.0 – 100.0	7.0 – 10.0	50.5 – 72.5
14	50.0 – 80.0	5.0 – 8.0	36.0 – 58.0	110.0 – 160.0	11.0 – 16.0	79.5 – 115.5
16	80.0 – 130.0	8.0 – 13.0	58.0 – 94.0	170.0 – 250.0	17.0 – 25.0	123.0 – 181.0
18	130.0 – 190.0	13.0 – 19.0	94.0 – 137.5	200.0 – 280.0	20.0 – 28.0	144.5 – 202.5



Conventional bolt



"4" marked bolt



"7" marked bolt

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	———
	EX.	40 (1.6)	———
Valve lift	IN.	8 (0.31)	———
	EX.	9 (0.35)	———
Lash-adjuster plunger stroke	0—0.5 (0—0.02)		———
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	0.35 (0.014)
	EX.	0.040—0.070 (0.0016—0.0028)	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	———
	EX.	7.000—7.012 (0.2756—0.2761)	———
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	———
	EX.	6.945—6.960 (0.2734—0.2740)	———
Valve stem runout	IN. & EX.	———	0.05 (0.002)
Valve head thickness	IN. & EX.	———	0.5 (0.02)
Valve stem end length	IN. & EX.	———	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	———
Valve head radial runout	IN. & EX.	———	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	———	35.0 (1.38)
	OUTER	———	37.8 (1.49)
Valve spring free length (EXHAUST)	———		40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3—6.5 kg (11.68—14.33 lbs) at length 28.0 mm (1.10 in)	———
	OUTER	14.0—14.2 kg (30.86—31.31 lbs) at length 31.5 mm (1.24 in)	———
Valve spring tension (EXHAUST)	20.3—23.3 kg (44.75—51.37 lbs) at length 35.0 mm (1.38 in)		———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683—35.723 (1.4048—1.4064)	35.41 (1.394)
	EX.	36.883—36.923 (1.4521—1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032—0.066 (0.0013—0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	20.012—20.025 (0.7879—0.7884)	———
	Front head left side, rear head right side	25.012—25.025 (0.9847—0.9852)	———
Camshaft journal O.D.	Front head right side, rear head left side	19.959—19.980 (0.7858—0.7866)	———
	Front head left side, rear head right side	24.959—24.980 (0.9826—0.9835)	———
Camshaft runout	Front & Rear	———	0.10 (0.004)
Cam chain 20-pitch length	———		128.9 (5.07)
Rocker arm I.D.	IN.	14.000—14.018 (0.5511—0.5519)	———
	EX.	16.000—16.018 (0.6299—0.6306)	———
Rocker arm shaft O.D.	IN.	13.966—13.984 (0.5498—0.5506)	———
	EX.	15.966—15.984 (0.6286—0.6293)	———
Cylinder head distortion	———		0.05 (0.002)
Cylinder head cover distortion	———		0.05 (0.002)
De-comp lever clearance	Front	1.5—2.5 (0.06—0.10)	———
	Rear	1.0—2.0 (0.04—0.08)	———

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000—1 400 kPa (10—14 kg/cm^2) (142—199 psi)	800 kPa (8 kg/cm^2) (114 psi)
Compression pressure difference	———	2 kg/cm^2 (200 kPa) (28 psi)
Piston to cylinder clearance	0.05—0.06 (0.0020—0.0024)	0.120 (0.0047)
Cylinder bore	94.000—94.015 (3.7008—37.0137)	94.080 (3.7039)

ITEM	STANDARD			LIMIT
Piston diam.	93.945—93.960 (3.6986—3.6992) Measure at 16 mm (0.6 in) from the skirt end.			93.880 (3.6960)
Cylinder distortion	———			0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30—0.45 (0.012—0.018)	0.70 (0.028)
	2nd		0.25—0.40 (0.010—0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040—0.075 (0.0016—0.0030)	0.180 (0.007)
	2nd		0.025—0.060 (0.0010—0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230—1.250 (0.0484—0.0492)	———
	2nd		1.510—1.530 (0.0594—0.0602)	———
	Oil		2.810—2.830 (0.1106—0.1114)	———
Piston ring thickness	1st		1.175—1.190 (0.0463—0.0469)	———
	2nd		1.470—1.485 (0.0579—0.0585)	———
Piston pin bore	23.000—23.006 (0.9055—0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996—23.000 (0.9054—0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006—23.014 (0.9057—0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10—0.20 (0.004—0.008)	0.3 (0.012)
Conrod big end width	21.95—22.00 (0.864—0.866)	———
Crank pin width	22.10—22.15 (0.870—0.872)	———
Conrod big end oil clearance	0.024—0.042 (0.0009—0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982—50.000 (1.9678—1.9685)	———
Crankshaft journal oil clearance	0.020—0.050 (0.0008—0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965—51.980 (2.0459—2.0465)	———

ITEM	STANDARD	LIMIT
Crankshaft thrust bearing thickness	1.925—2.175 (0.0758—0.0856)	———
Crankshaft thrust clearance	0.05—0.10 (0.002—0.004)	———
Crankshaft runout	———	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 × 31/40)	———
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm^2, 50 psi) Below 650 kPa (6.5 kg/cm^2, 92 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM		STANDARD	LIMIT
Drive plate thickness	No.1	2.72—2.88 (0.107—0.113)	2.42 (0.095)
	No.2	3.45—3.55 (0.136—0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.2 (0.600)
	No.2	15.9—16.0 (0.626—0.630)	15.2 (0.600)
Driven plate distortion		———	0.10 (0.004)
Clutch spring free length	No.1	———	27.6 (1.09)
	No.2	———	20.0 (0.79)
Clutch master cylinder bore		14.000—14.043 (0.5512—0.5529)	———
Clutch master cylinder piston diam.		13.957—13.984 (0.5495—0.5506)	———
Clutch release cylinder bore		35.700—35.762 (1.4055—1.4079)	———
Clutch release cylinder piston diam.		35.650—35.675 (1.4035—1.4045)	———

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD	LIMIT
Primary reduction ratio		1.645 (79/48)	———
Secondary reduction ratio		0.852 (29/34 × 19/19)	———
Final reduction ratio		2.666 (32/12)	———
Gear ratios	Low	3.000 (36/12)	———
	2nd	1.823 (31/17)	———
	3rd	1.333 (28/21)	———
	Top	1.041 (25/24)	———

ITEM	STANDARD		LIMIT
Shift fork to groove clearance	0.1—0.3 (0.004—0.012)		0.5 (0.020)
Shift fork groove width	No.1	5.50—5.60 (0.217—0.220)	———
	No.2	5.50—5.60 (0.217—0.220)	———
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	———
	No.2	5.30—5.40 (0.209—0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.15 (0.001—0.006)		———
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	———

CARBURETOR

ITEM	SPECIFICATION			
	E-28		Others	
	No.1 (REAR)	No.2 (FRONT)	No.1 (REAR)	No.2 (FRONT)
Carburetor type	MIKUNI BS36SS	MIKUNI BDS36SS	MIKUNI BS36SS	MIKUNI BDS36SS
Bore size	36 mm (1.42 in)	←	←	←
I.D. No.	38B20	←	38B30	←
Idle r/min.	1 000 ± 50 r/min.	←	←	←
Fuel level	9.5±0.5 mm (0.37±0.02 in)	17.5±0.5 mm (0.69±0.02 in)	9.5±0.5 mm (0.37±0.02 in)	17.5±0.5 mm (0.69±0.02 in)
Float height	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet (M.J.)	#140	#125	#140	#125
Main air jet (M.A.J.)	1.8 mm (0.07 in)	←	←	←
Jet needle (J.N.)	5D30-3rd	5D22-3rd	5D30-3rd	5D22-3rd
Needle jet (N.J.)	P-3	P-0	P-3	P-0
Throttle valve (Th.V.)	#110	←	←	←
Pilot jet (P.J.)	#57.5	#50	#57.5	#50
By-pass (B.P.)	0.8,0.8,0.8 mm	←	←	←

ITEM	SPECIFICATION			
Pilot outlet (P.O.)	0.8 mm (0.03 in)	1.0 mm (0.04 in)	0.8 mm (0.03 in)	1.0 mm (0.04 in)
Valve seat (V.S.)	1.5 mm (0.06 in)	←	←	←
Starter jet (G.S.)	#25	←	←	←
Pilot screw (P.S.)	2.0 turn out	2 3/8 turn out	2.0 turn out	2 3/8 turn out
Pilot air jet 1 (P.A.J.1)	#60	#55	#60	#55
Pilot air jet 2 (P.A.J.2)	1.7 mm (0.07 in)	←	←	←
Throttle cable play	0.5—1.0 mm (0.02—0.04 in)	←	←	←
Choke cable play	0.5—1.0 mm (0.02—0.04 in)	←	←	←

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Ignition timing		2° ± 2° B.T.D.C. at 1 500 r/min.		
		30° ± 2° B.T.D.C. at 4 000 r/min.		
Firing order		R·F		
Spark plug		Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
		Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance		Over 8 (0.3) at 1 atm.		
Signal coil resistance		240 ± 20 % Ω		Bl—G, B—Y
Ignition coil resistance		Primary	1—7 Ω	⊕ tap— ⊖ tap
		Secondary	10—25 kΩ	Plug cap— ⊖ tap
Generator no-load voltage		More than 80 V (AC) at 5 000 r/min.		
Regulated voltage		14.0—15.5 V at 5 000 r/min.		
Starter motor brush length		N.D.	Limit: 9.0 (0.35)	
commutator under-cut		Limit: 0.2 (0.008)		
Starter relay resistance		2—6 Ω		
De-comp. solenoid resistance		0.1—1.0 Ω		
Side stand and neutral relay		120 ± 20 % Ω		
Fuel pump resistance		1—2 Ω		
Fuel pump discharge amount		More than 600 ml (1.27 US qt)/minute		
Battery	Type designation	FTH 16—12		
	Voltage	12 V		
	Capacity	50.4 kC (14 Ah)/10 HR		
	Standard electrolyte S.G.	1.32 at 20°C (68°F)		

ITEM		SPECIFICATION	NOTE
Fuse size	HEADLIGHT	10 A	
	SIGNAL	10 A	
	IGNITION	10 A	
	MAIN	25 A	
	POWER SOURCE	10 A	

WATTAGE

Unit: W

ITEM		SPECIFICATION	
		E-28	Others
Headlight	HI	60	←
	LO	55	←
Tail/Brake light		8/27	5/21
Turn signal light		23	21
Running light		8	———
Speedometer light		3	←
Turn signal indicator light		3	←
High beam indicator light		1.7	←
Neutral indicator light		3	←
Oil pressure indicator light		3	←
License light		7.5	5

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	22 (0.87)		———
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Brake disc runout	———		0.30 (0.012)
Master cylinder bore	Front	12.700–12.743 (0.5000–0.5017)	———
	Rear	12.700–12.743 (0.4999–0.5017)	———
Master cylinder piston diam.	Front	12.657–12.684 (0.4983–0.4994)	———
	Rear	12.657–12.684 (0.4983–0.4994)	———
Brake caliper cylinder bore	Front	42.850–42.926 (1.6870–1.6900)	———
	Rear	42.850–42.926 (1.6870–1.6900)	———
Brake caliper piston diam.	Front	42.770–42.820 (1.6839–1.6858)	———
	Rear	42.770–42.820 (1.6839–1.6858)	———

ITEM	STANDARD		LIMIT
Wheel rim runout	Axial	———	2.0 (0.08)
	Radial	———	2.0 (0.08)
Wheel axle runout	Front	———	0.25 (0.010)
	Rear	———	0.25 (0.010)
Tire size	Front	110/90—19 62H	———
	Rear	170/80—15 77H	———
Tire tread depth	Front	———	1.6 (0.06)
	Rear	———	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	———	
Front fork spring free length	———	549 (21.6)	
Front fork oil level	203 (7.99)	———	
Rear shock absorber spring adjuster	1/5		
Rear wheel travel	105 (4.1)	———	
Swingarm pivot shaft runout	———	0.30 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm^2	psi	kPa	kg/cm^2	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION	NOTE
Fuel type	Use only unleaded or low-lead type gasoline of at least 85-95 pump octane ($\frac{R+M}{2}$ method) or 89 octane or higher rated by the Research Method.	E-28
	Use gasoline with an octane number of at least 85 octane (Research method), preferably unleaded or low-lead.	Others
Fuel tank including reserve	13.0 L (3.4/2.8 US/Imp gal)	
reserve	3.0 L (3.2/2.6 US/Imp qt)	

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	3 700 ml (3.9/3.2 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	354 ml (12.0/12.5 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200—220 ml (6.8—7.4/7.0—7.7 US/Imp oz)	
Brake fluid type	DOT3, DOT4 or SAE J1703		

APPENDIX
CLUTCH SET BOLTS, SPACERS & SPRINGS.

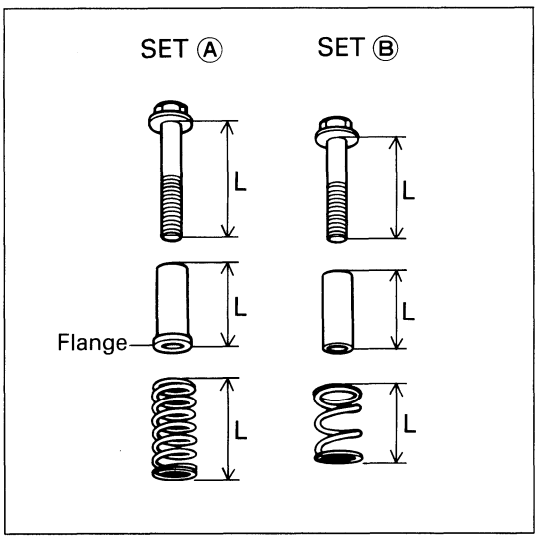
There are two kinds of bolts, spacers and springs of which size and shapes are illustrated below.

* The longer bolts/spacers/springs (shown below as SET Ⓐ) are fitted to the clutch sleeve hub side.
* The shorter bolts/spacers/springs (shown below as SET Ⓑ) are fitted to the clutch spring slider side.

The bolts, spacers and springs must be installed properly, as mentioned above, to avoid malfunction of clutch like slippage.

LENGTH AND PART NUMBER

Set	Part number	Part name	Q/ty	Remarks
Ⓐ	01107-06405	Bolt	4	L : 40 mm
	09180-06177	Spacer	4	L : 25 mm
	09440-14021	Spring	4	L : 29 mm
Ⓑ	01107-06355	Bolt	4	L : 35 mm
	09180-06192	Spacer	4	L : 24 mm
	09440-14022	Spring	4	L : 21 mm



NOTE:
When installing the spacer in the SET Ⓐ, the flange side must face clutch sleeve hub.

APP.

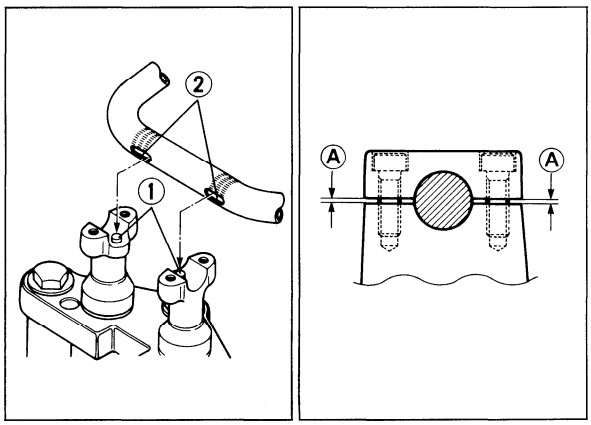
MODIFICATION OF PULL BACK HANDLE BARS.

This modification have been effective on the machine on and after the February '87 production. When setting-up the VS1400 motorcycles, please refer to the following instruction.

INSTALLATION METHOD FOR HANDLEBARS

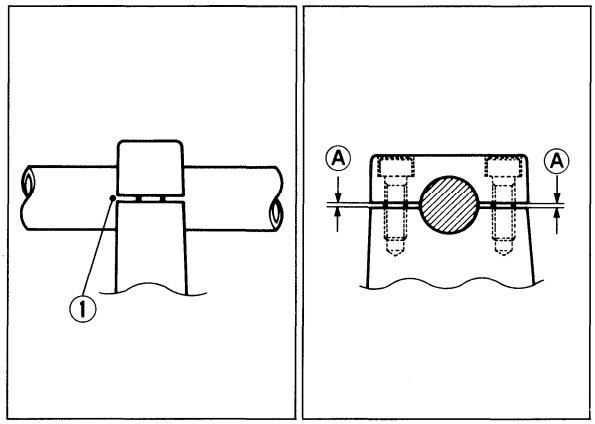
PULL BACK HANDLEBARS

- Align the boss ① of the handlebars holder with oval hole ② of the handlebars.
- Secure the handlebars clamp in such a way that the clearance Ⓐ ahead of and behind the handlebars are equalized.



FLAT HANDLEBARS

- Set the handlebars to match its punched mark ① to the mating face of the handlebar holder.
- Secure the handlebars clamp in such a way that the clearance Ⓐ ahead of and behind the handlebars are equalized.

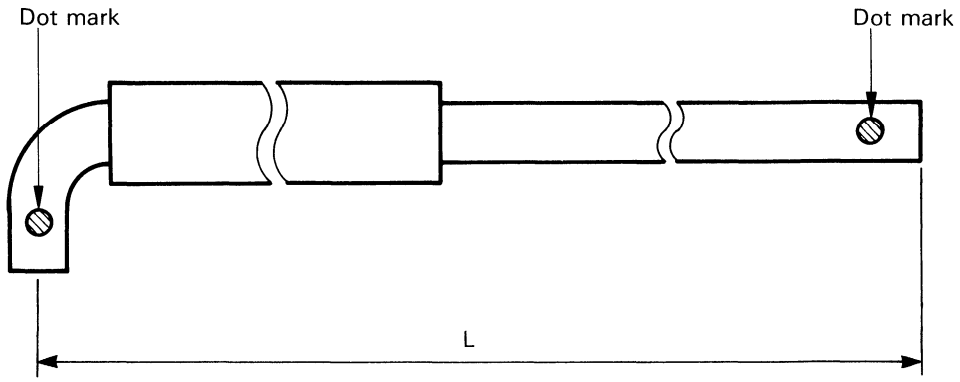


HANDLEBARS CLAMP BOLT TIGHTENING TORQUE
15—25 N·m (1.5—2.5 kg-m)

MODIFICATION OF THE FUEL HOSES AND THEIR ROUTING.

FUEL HOSE

The fuel hoses connecting the main fuel cock and the sub fuel cock have been modified as follows.



HOSE DIMENSIONS AND PART NUMBER

	EARLY	LATE	REMARKS
L: Length	470 mm	380 mm	———
Part number	44430-38B10	44430-38B11	with Dot mark
	44430-38B01	44430-38B02	———

NOTE: The fuel hose (44430-38B11) is for "RESERVE" side and the fuel hose (44430-38B02) is for "ON" side.
When changing one of the fuel hoses, both fuel hoses (RESERVE SIDE AND ON SIDE) should be changed with late type fuel hoses together.

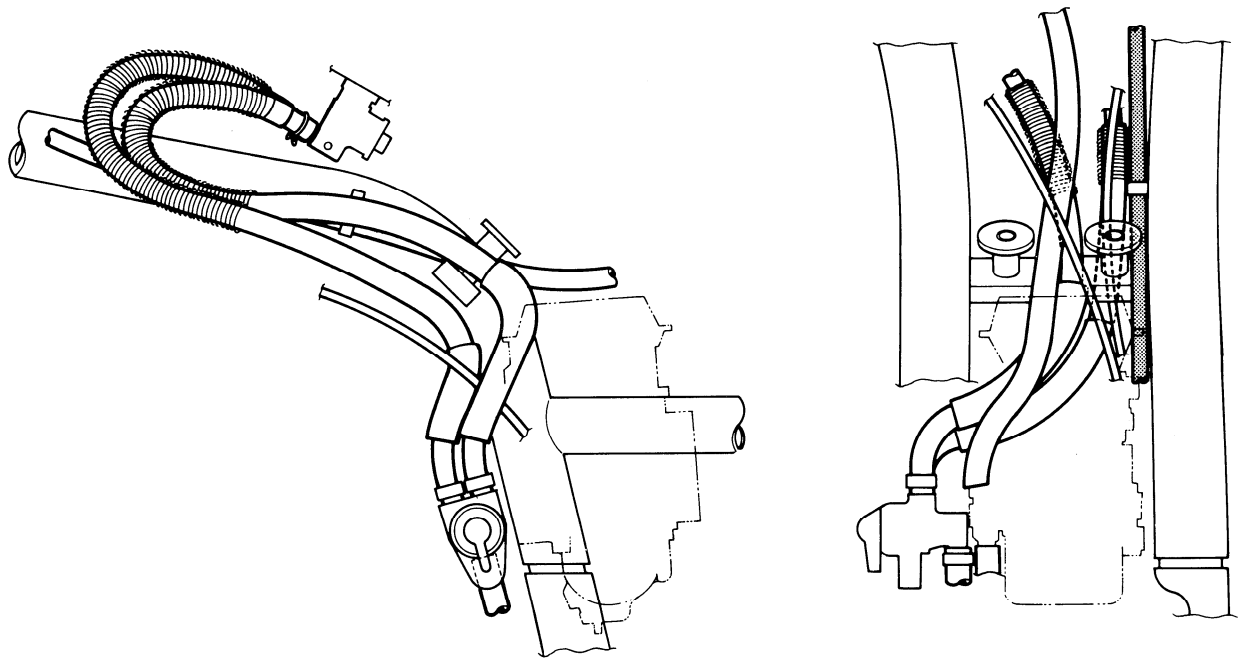
INTERCHANGEABILITY: EARLY — × → / ← ○ — LATE

PARTS AVAILABILITY : LATE type fuel hoses are only available.

This modification has been effective on and after frame No. 102917.

FUEL HOSE ROUTING

Fuel hose routing has been changed two times. In accordance with above changes, three different type fuel hose routing are existing. Following illustrations of the fuel hose routing are distinguished by the frame No.



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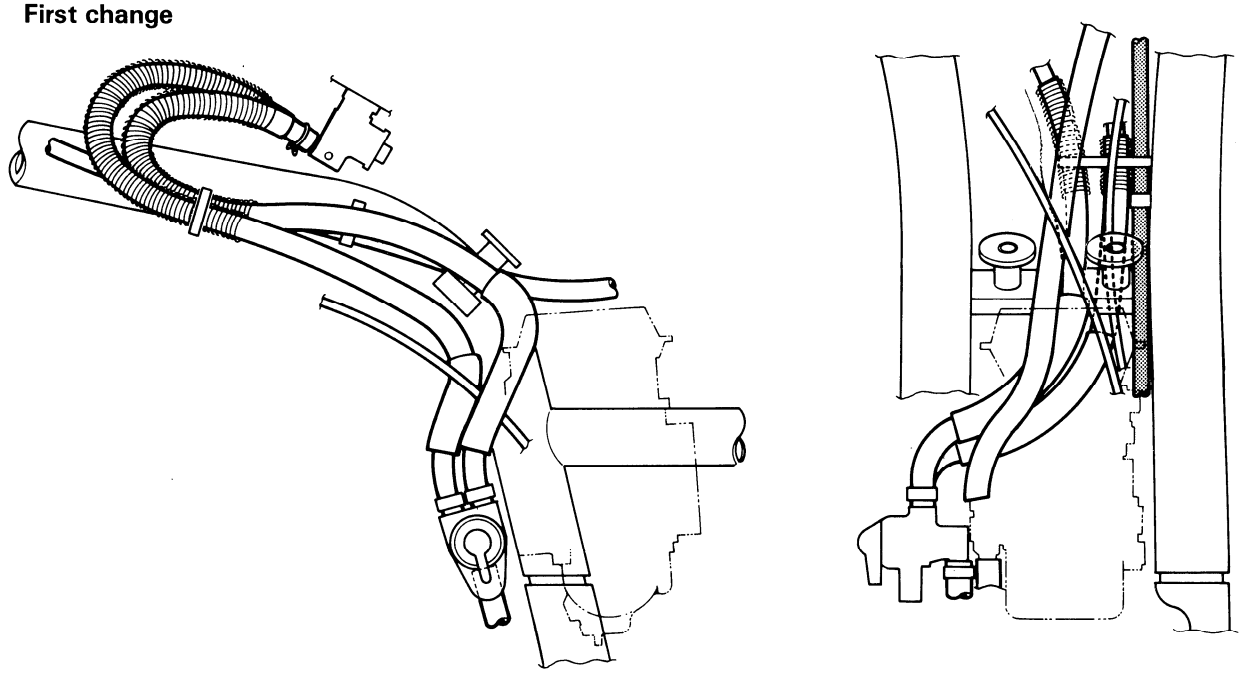
First change



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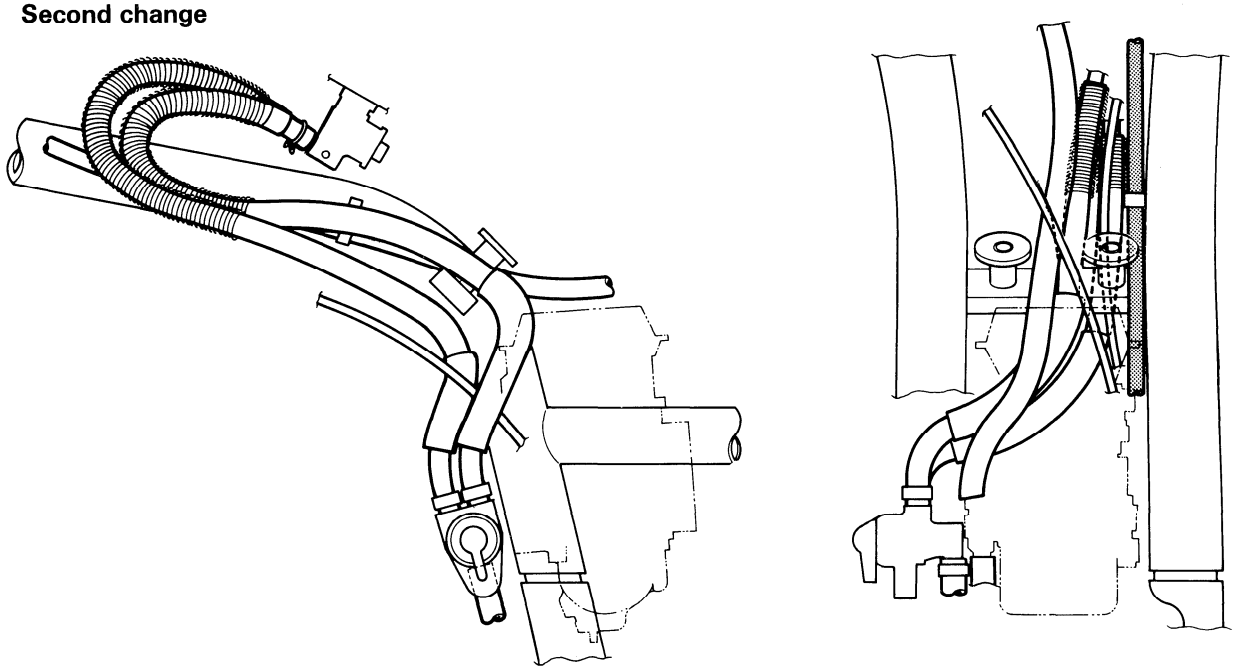
Second change



102917.....

These changes have been carried out for smoother routing of the fuel hoses. First change is addition of fuel hose clamp and change of the hose routing. Second change is elimination of the fuel hose clamp, modification of the fuel hose and change of the hose routing. Second change is final fuel hose routing.

Please check and correct the fuel hose routing and the fuel hose length when customer brings the motorcycle to your dealer for servicing or periodical inspection. If early type fuel hoses are used, cut the fuel hose by 90 mm or use the late type fuel hoses, and route them properly as shown second change illustration.

FOREWORD

This section describes up-to-date service procedures which differ from those of the VS1400GLH ('87-model).

CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 330 mm (91.7 in)
Overall width	710 mm (28.0 in)...GLF 770 mm (30.3 in)...GLP
Overall height	1 135 mm (44.7 in)...GLF 1 220 mm (48.0 in)...GLP
Wheelbase	1 620 mm (63.8 in)
Ground clearance	145 mm (5.7 in)
Dry mass	242 kg (533 lbs)...GLF (For Canada) 243 kg (535 lbs) ...GLF & GLP

ENGINE

Type	Four-stroke, 3 valves, OHC, 45-degree V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Piston displacement	1 360 cm^3 (83.0 cu.in)
Compression ratio	9.3 : 1
Carburetor	MIKUNI BDS36SS...front MIKUNI BS36SS...rear
Air cleaner	Polyurethane foam element
Starter system	Electric starter motor
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	4-speed constant mesh
Gearshift pattern	1-down, 3-up
Primary reduction	1.645 (79/48)
Secondary reduction	0.852 (29/34 × 19/19)
Final reduction	2.666 (32/12)
Gear ratios, Low 2nd 3rd Top	3.000 (36/12) 1.823 (31/17) 1.333 (28/21) 1.041 (25/24)
Drive system	Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swingarm, oil damped, spring pre-load 5-way adjustable
Steering angle	40° (right & left)
Caster	54°00′
Trail	166 mm (6.5 in)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc brake
Rear brake	Disc brake
Front tire size	110/90 — 19 62H
Rear tire size	170/80 — 15 77H
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)

ELECTRICAL

Ignition type	Transistorized
Ignition timing	2° B.T.D.C. below 1 500 r/min and 30° B.T.D.C. above 4 000 r/min
Spark plug	N.G.K.: DP8EA-9 N.D.: X24EP-U9
Battery	12V 50.4 kC (14 Ah)/ 10HR
Generator	Three phase A.C. Generator
Fuse	10A × 4, 25A × 1

CAPACITIES

Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)
reserve	3.0 L (3.2/2.6 US/Imp qt)
Engine oil, oil change	3.7 L (3.9/3.3 US/Imp qt)
with filter change	4.3 L (4.5/3.9 US/Imp qt)
Front fork oil	354 ml (12.0/12.5 US/Imp oz)
Final bevel gear oil	200 — 220 ml (6.8/7.0 — 7.4/7.7 US/Imp oz)

These specifications are subject to change without notice.

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	———
	EX.	40 (1.6)	———
Valve lift	IN.	8 (0.31)	———
	EX.	9 (0.35)	———
Lash-adjuster plunger stroke	0—0.5 (0—0.02)		———
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	0.35 (0.014)
	EX.	0.040—0.070 (0.0016—0.0028)	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	———
	EX.	7.000—7.012 (0.2756—0.2761)	———
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	———
	EX.	6.945—6.960 (0.2734—0.2740)	———
Valve stem runout	IN. & EX.	———	0.05 (0.002)
Valve head thickness	IN. & EX.	———	0.5 (0.02)
Valve stem end length	IN. & EX.	———	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	———
Valve head radial runout	IN. & EX.	———	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	———	35.0 (1.38)
	OUTER	———	37.8 (1.49)
Valve spring free length (EXHAUST)	———		40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3—6.5 kg (11.68—14.33 lbs) at length 28.0 mm (1.10 in)	———
	OUTER	14.0—14.2 kg (30.86—31.31 lbs) at length 31.5 mm (1.24 in)	———
Valve spring tension (EXHAUST)	20.3—23.3 kg (44.75—51.37 lbs) at length 35.0 mm (1.38 in)		———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683—35.723 (1.4048—1.4064)	35.41 (1.394)
	EX.	36.883—36.923 (1.4521—1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032—0.066 (0.0013—0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	20.012—20.025 (0.7879—0.7884)	———
	Front head left side, rear head right side	25.012—25.025 (0.9847—0.9852)	———
Camshaft journal O.D.	Front head right side, rear head left side	19.959—19.980 (0.7858—0.7866)	———
	Front head left side, rear head right side	24.959—24.980 (0.9826—0.9835)	———
Camshaft runout	Front & Rear	———	0.10 (0.004)
Cam chain 20-pitch length	———		128.9 (5.07)
Rocker arm I.D.	IN.	14.000—14.018 (0.5511—0.5519)	———
	EX.	16.000—16.018 (0.6299—0.6306)	———
Rocker arm shaft O.D.	IN.	13.966—13.984 (0.5498—0.5506)	———
	EX.	15.966—15.984 (0.6286—0.6293)	———
Cylinder head distortion	———		0.05 (0.002)
Cylinder head cover distortion	———		0.05 (0.002)
De-comp lever clearance	Front	1.5—2.5 (0.06—0.10)	———
	Rear	1.0—2.0 (0.04—0.08)	———

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000—1 400 kPa (10—14 kg/cm² 142—199 psi)	800 kPa (8 kg/cm² 114 psi)
Compression pressure difference	———	200 kPa 2 kg/cm² 28 psi
Piston to cylinder clearance	0.05—0.06 (0.0020—0.0024)	0.120 (0.0047)
Cylinder bore	94.000—94.015 (3.7008—3.7014)	94.080 (3.7039)
Piston diam.	93.945—93.960 (3.6986—3.6992) Measure at 16 mm (0.6 in) from the skirt end.	93.880 (3.6960)

ITEM	STANDARD		LIMIT
Cylinder distortion	———		0.05 (0.002)
Piston ring free end gap	1st T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st	0.30—0.45 (0.012—0.018)	0.70 (0.028)
	2nd	0.25—0.40 (0.010—0.016)	0.70 (0.028)
Piston ring to groove clearance	1st	0.040—0.075 (0.0016—0.0030)	0.180 (0.007)
	2nd	0.025—0.060 (0.0010—0.0024)	0.150 (0.006)
Piston ring groove width	1st	1.230—1.250 (0.0484—0.0492)	———
	2nd	1.510—1.530 (0.0594—0.0602)	———
	Oil	2.810—2.830 (0.1106—0.1114)	———
Piston ring thickness	1st	1.175—1.190 (0.0463—0.0469)	———
	2nd	1.470—1.485 (0.0579—0.0585)	———
Piston pin bore	23.000—23.006 (0.9055—0.9057)		23.030 (0.9067)
Piston pin O.D.	22.996—23.000 (0.9054—0.9055)		22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D	23.006—23.014 (0.9057—0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10—0.20 (0.004—0.008)	0.3 (0.012)
Conrod big end width	21.95—22.00 (0.864—0.866)	———
Crank pin width	22.10—22.15 (0.870—0.872)	———
Conrod big end oil clearance	0.024—0.042 (0.0009—0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982—50.000 (1.9678—1.9685)	———
Crankshaft journal oil clearance	0.020—0.050 (0.0008—0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965—51.980 (2.0459—2.0465)	———
Crankshaft thrust bearing thickness	1.925—2.175 (0.0758—0.0856)	———
Crankshaft thrust clearance	0.05—0.10 (0.002—0.004)	———

ITEM	STANDARD	LIMIT
Crankshaft runout	———	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 × 31/40)	———
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm², 50 psi) Below 650 kPa (6.5 kg/cm², 92 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM		STANDARD	LIMIT
Drive plate thickness	No.1	2.72—2.88 (0.107—0.113)	2.42 (0.095)
	No.2	3.45—3.55 (0.136—0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.2 (0.600)
	No.2	15.9—16.0 (0.626—0.630)	15.2 (0.600)
Driven plate distortion	———		0.10 (0.004)
Clutch spring free length	No.1	———	27.6 (1.09)
	No.2	———	20.0 (0.79)
Clutch master cylinder bore	14.000—14.043 (0.5512—0.5529)		———
Clutch master cylinder piston diam.	13.957—13.984 (0.5495—0.5506)		———
Clutch release cylinder bore	35.700—35.762 (1.4055—1.4079)		———
Clutch release cylinder piston diam.	35.650—35.675 (1.4035—1.4045)		———

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD	LIMIT
Primary reduction ratio		1.645 (79/48)	———
Secondary reduction ratio		0.852 (29/34 × 19/19)	———
Final reduction ratio		2.666 (32/12)	———
Gear ratios	Low	3.000 (36/12)	———
	2nd	1.823 (31/17)	———
	3rd	1.333 (28/21)	———
	Top	1.041 (25/24)	———
Shift fork to groove clearance		0.1—0.3 (0.004—0.012)	0.5 (0.020)

ITEM	STANDARD		LIMIT
Shift fork groove width	No.1	5.50—5.60 (0.217—0.220)	———
	No.2	5.50—5.60 (0.217—0.220)	———
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	———
	No.2	5.30—5.40 (0.209—0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.15 (0.001—0.006)		———
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	———

CARBURETOR

ITEM	SPECIFICATION			
	For Canada		For Others	
	No.1 (REAR)	No.2 (FRONT)	No.1 (REAR)	No.2 (FRONT)
Carburetor type	MIKUNI BS36SS	MIKUNI BDS36SS	MIKUNI BS36SS	MIKUNI BDS36SS
Bore size	36 mm (1.42 in)	←	←	←
I.D. No.	38B20	←	38B30	←
Idle r/min.	1 000 ± 50 r/min.	←	←	←
Fuel level	9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)	9.5± 0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)
Float height	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet (M.J.)	#140	#125	#140	#125
Main air jet (M.A.J.)	1.8 mm (0.07 in)	←	←	←
Jet needle (J.N.)	5D30-3rd	5D22-3rd	5D30-3rd	5D22-3rd
Needle jet (N.J.)	P-3	P-0	P-3	P-0
Throttle valve (Th.V.)	#110	←	←	←
Pilot jet (P.J.)	#57.5	#50	#57.5	#50
By-pass (B.P.)	0.8,0.8,0.8 mm	←	←	←
Pilot outlet (P.O.)	0.8 mm (0.03 in)	1.0 mm (0.04 in)	0.8 mm (0.03 in)	1.0 mm (0.04 in)

ITEM	SPECIFICATION			
	For Canada		For Others	
	No.1 (REAR)	No.2 (FRONT)	No.1 (REAR)	No.2 (FRONT)
Valve seat (V.S.)	1.5 mm (0.06 in)	←	←	←
Starter jet (G.S.)	#25	←	←	←
Pilot screw (P.S.)	2.0 turns out	2 3/8 turns out	2.0 turns out	2 3/8 turns out
Pilot air jet 1 (P.A.J.1)	#60	#55	#60	#55
Pilot air jet 2 (P.A.J.2)	1.7 mm (0.07 in)	←	←	←
Throttle cable play	0.5—1.0 mm (0.02—0.04 in)	←	←	←
Choke cable play	0.5—1.0 mm (0.02—0.04 in)	←	←	←

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Ignition timing		2° ± 2° B.T.D.C. below 1 500 r/min. and 30° ± 2° B.T.D.C. above 4 000 r/min.		
Firing order		R·F		
Spark plug		Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
		Gap	0.8—0.9 (0.031—0.035)	
Spark performance		Over 8 (0.3) at 1 atm.		
Signal coil resistance		240 ± 20% Ω		Bl—G, B—Y
Ignition coil resistance		Primary	1—7 Ω	⊕ tap— ⊖ tap
		Secondary	10—25 kΩ	Plug cap— ⊖ tap
Generator no-load voltage		More than 80 V (AC) at 5 000 r/min.		
Regulated voltage		14.0—15.5 V at 5 000 r/min.		
Starter motor brush length		N.D.	Limit: 9.0 (0.35)	
commutator under-cut		Limit: 0.2 (0.008)		
Starter relay resistance		2—6 Ω		
De-comp, solenoid resistance		0.1—1.0 Ω		
Side stand and neutral relay		120 ± 20% Ω		
Fuel pump resistance		1—2 Ω		
Fuel pump discharge amount		More than 600 ml (1.27 US qt)/minute		
Battery	Type designation	FTH 16—12		
	Voltage	12 V		
	Capacity	50.4 kC (14 Ah)/10 HR		
	Standard electrolyte S.G.	1.32 at 20°C (68°F)		

ITEM		SPECIFICATION	NOTE
Fuse size	HEADLIGHT	10 A	
	SIGNAL	10 A	
	IGNITION	10 A	
	MAIN	25 A	
	POWER SOURCE	10 A	

WATTAGE

Unit: W

ITEM		SPECIFICATION	
		For Canada	For Others
Headlight	HI	60	←
	LO	55	←
Tail/Brake light		8/27	5/21
Turn signal light		21	←
Running light		5	———
Speedometer light		3	←
Turn signal indicator light		3	←
High beam indicator light		1.7	←
Neutral indicator light		3	←
Oil pressure indicator light		3	←
License light		7.5	5

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal height		22 (0.87)	———
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Brake disc runout		———	0.30 (0.012)
Master cylinder bore	Front	12.700—12.743 (0.5000—0.5017)	———
	Rear	12.700—12.743 (0.4999—0.5017)	———
Master cylinder piston diam.	Front	12.657—12.684 (0.4983—0.4994)	———
	Rear	12.657—12.684 (0.4983—0.4994)	———
Brake caliper cylinder bore	Front	42.850—42.926 (1.6870—1.6900)	———
	Rear	42.850—42.926 (1.6870—1.6900)	———
Brake caliper piston diam.	Front	42.770—42.820 (1.6839—1.6858)	———
	Rear	42.770—42.820 (1.6839—1.6858)	———

ITEM	STANDARD		LIMIT
Wheel rim runout	Axial	———	2.0 (0.08)
	Radial	———	2.0 (0.08)
Wheel axle runout	Front	———	0.25 (0.010)
	Rear	———	0.25 (0.010)
Tire size	Front	110/90—19 62H	———
	Rear	170/80—15 77H	———
Tire tread depth	Front	———	1.6 (0.06)
	Rear	———	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	———	
Front fork spring free length	———	549 (21.6)	
Front fork oil level	203 (7.99)	———	
Rear shock absorber spring adjuster	1/5	———	
Rear wheel travel	105 (4.1)	———	
Swingarm pivot shaft runout	———	0.30 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm^2	psi	kPa	kg/cm^2	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION	NOTE
Fuel type	Use only unleaded or low-lead type gasoline of at least 85-95 pump octane ($\frac{R+M}{2}$ method) or 89 octane or higher rated by the Research Method.	For Canada
	Use gasoline with an octane number of at least 85 octane (Research method), preferably unleaded or low lead.	For Others
Fuel tank including reserve	13.0 L (3.4/2.8 US/Imp gal)	
reserve	3.0 L (3.2/2.6 US/Imp qt)	

ITEM	SPECIFICATION		NOTE
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	3 700 ml (3.9/3.2 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	354 ml (12.0/12.5 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200—220 ml (6.8—7.4/7.0—7.7 US/Imp oz)	
Brake fluid type	DOT3, DOT4 or SAE J1703		

IGNITOR UNIT INSPECTION

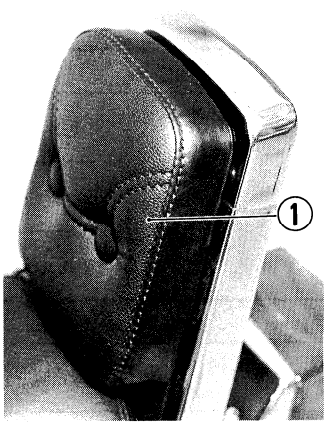
CHECKING WITH DIGITAL IGNITOR CHECKER

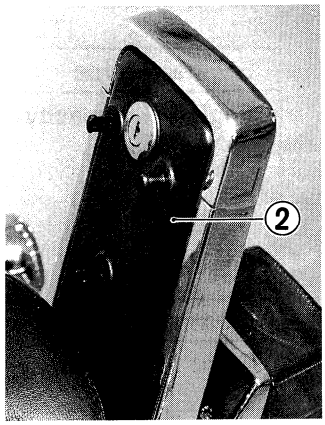
Check the ignitor unit with the special tool as shown below.

09931-64410	Digital ignitor checker

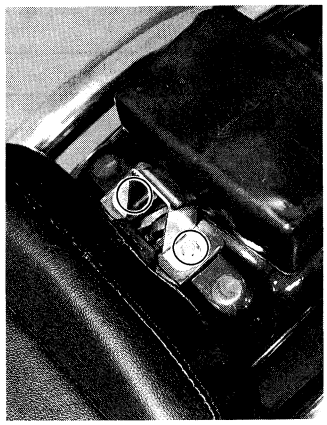
WIRING PROCEDURE:

- Remove the seat pad ① and tool cover ②.
- Remove the tool.

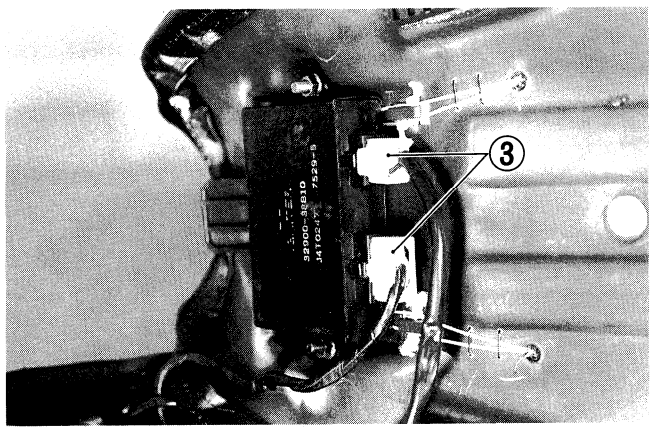




- Remove the pillion seat and rider seat.



- Disconnect the ignitor lead wire couplers ③.
- Prepare the checker lead wire "MODE 3" ④ which comes supplied with the checker and connect its end to the ignitor unit and another end to the checker.
- Connect the power source lead ⑤ to the battery.

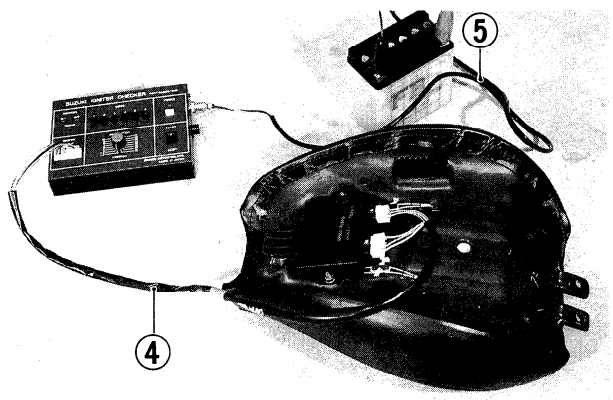


CAUTION:

*** Do not use the battery equipped on the motorcycle.**

*** Be sure to connect the black lead to the battery ⊖ terminal and red lead to the ⊕ terminal.**

*** Make sure "START" switch is in "off" position before connecting the power source lead.**



NOTE:

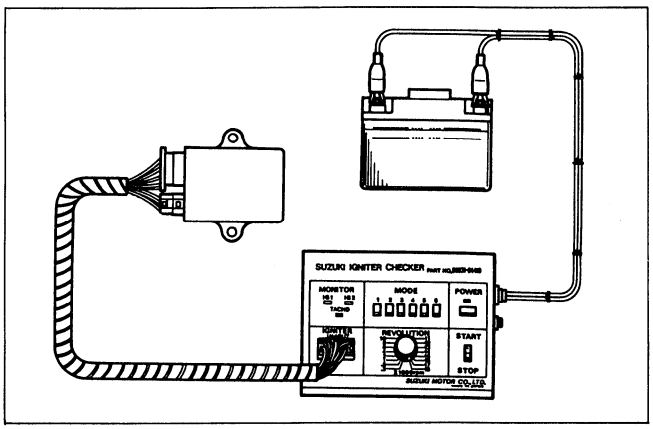
When making this test, be sure that the battery is fully charged condition.

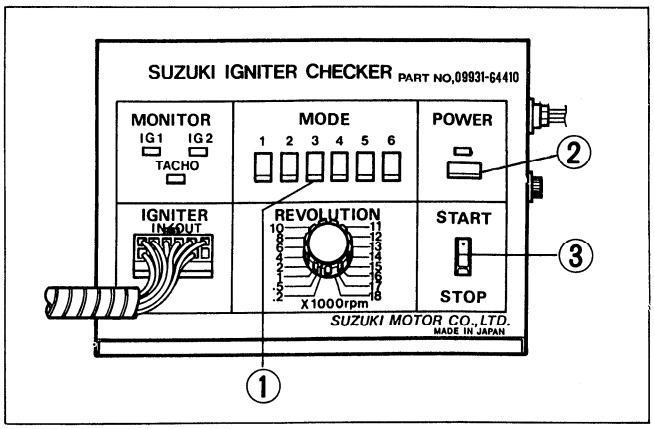
CHECK PROCEDURE:
With all the lead wires properly connected, check the ignitor unit in the following steps.

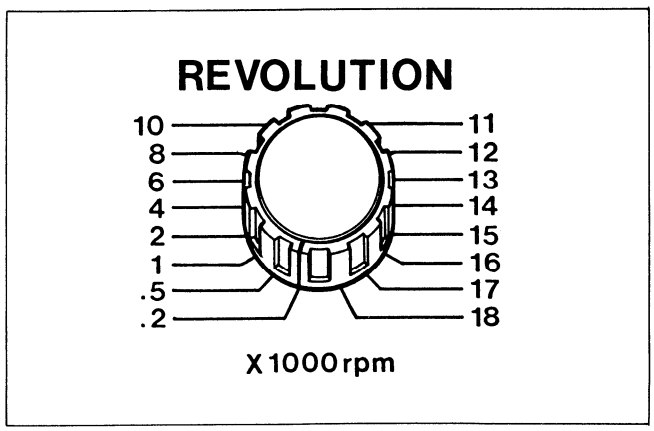
FIRST STEP:
Depress "MODE 3" button ① then "POWER" button ②. This time, "POWER" lamp should come on. If not, battery is under-charged condition.

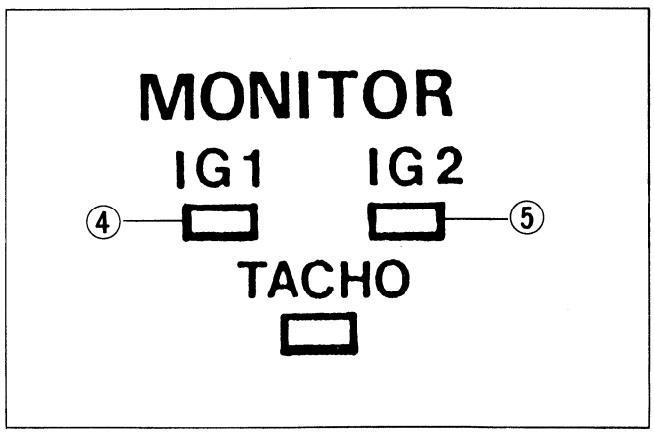
SECOND STEP:
Set "REVOLUTION" dial to ".2" position in which the checker produces the ignition primary current pulses simulating 200 r/min of engine revolution when "START" switch is turned on. With "START" switch ③ is turned to on position, check that two "MONITOR" lamps turn on and off in slow frequency in order of ④ — ⑤ as illustrated.
If these lamps do not turn on and off, the ignitor unit should be replaced.

THIRD STEP:
Turn "REVOLUTION" dial up gradually (assuming the engine is gradually revved up) and check that the MONITOR lamp flash frequency as explained in the SECOND STEP above increases. As the dial pointer passes beyond the graduation "4" (4 000 r/min), the two lamps should show continuously lighted. When REVOLUTION dial pointer reaches between "6" and "8" (6 000 — 8 000 r/min), MONITOR ④ and ⑤ lamps should go off. This is because the ignition "cut-off" provided in the VS1400 ignition system functions at 6 500 ± 100 r/min. If the lamps go off at the graduation below "6" the engine can not perform properly and therefore the ignitor unit must be replaced.



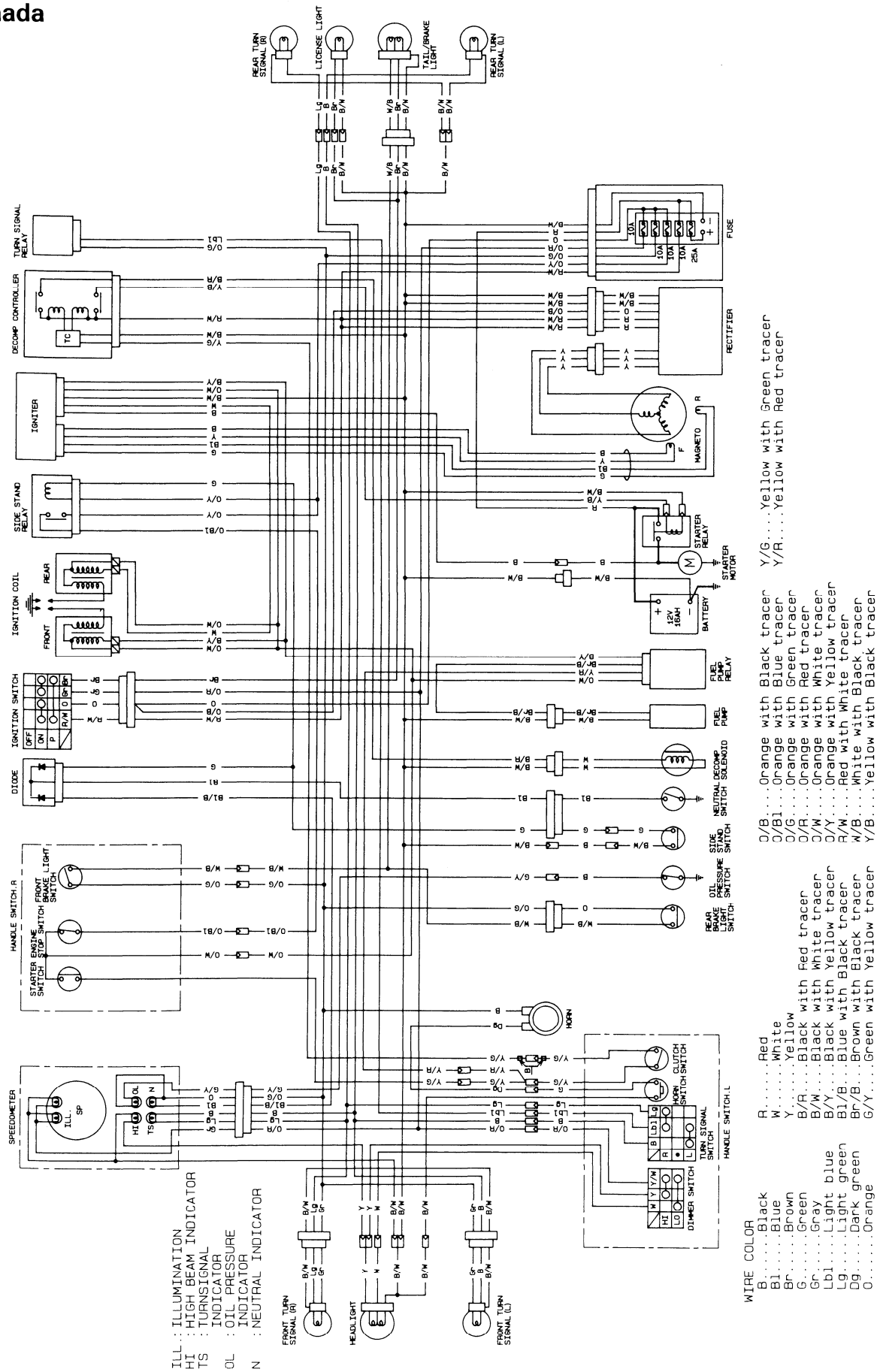




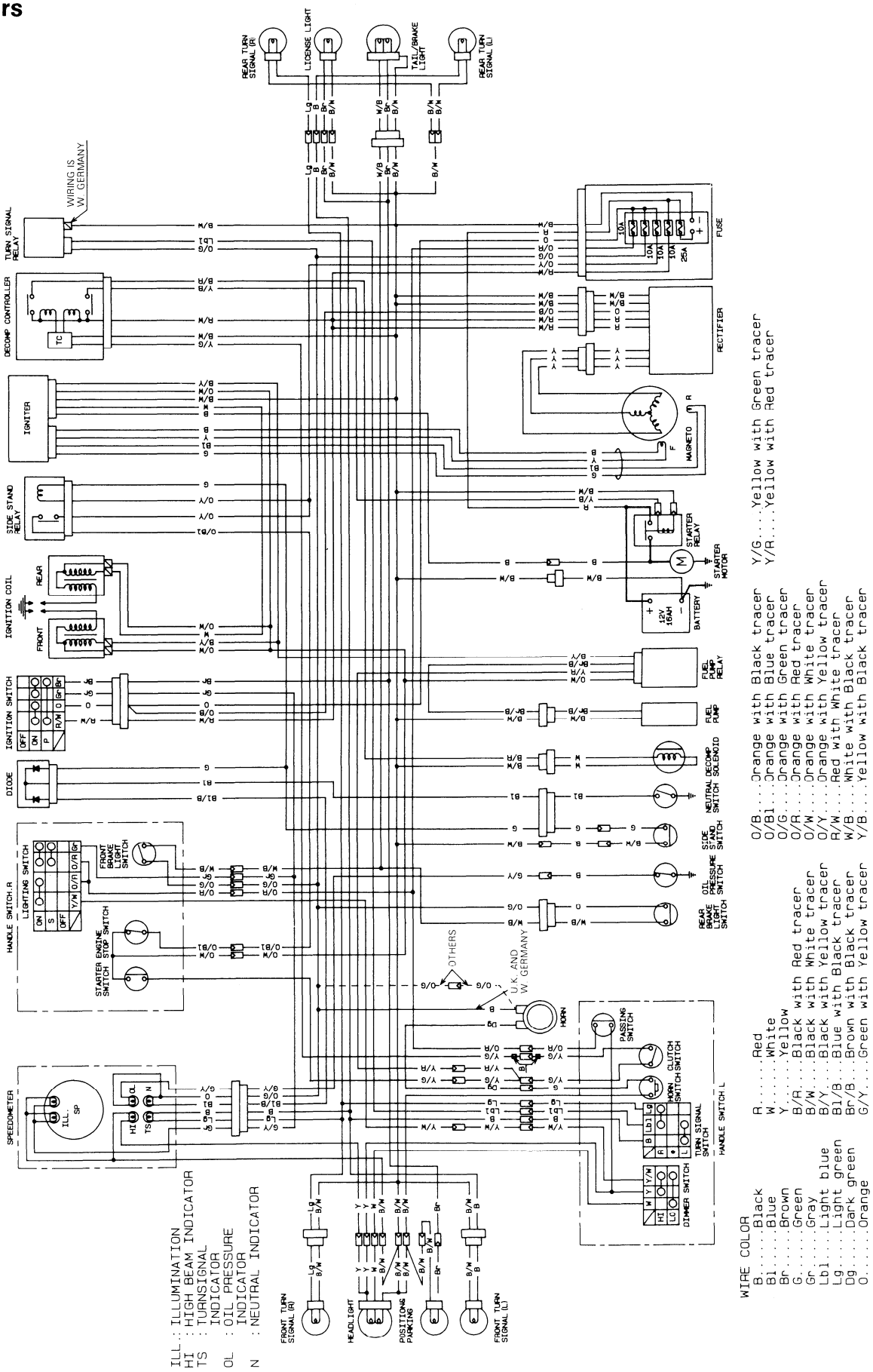


WIRING DIAGRAM

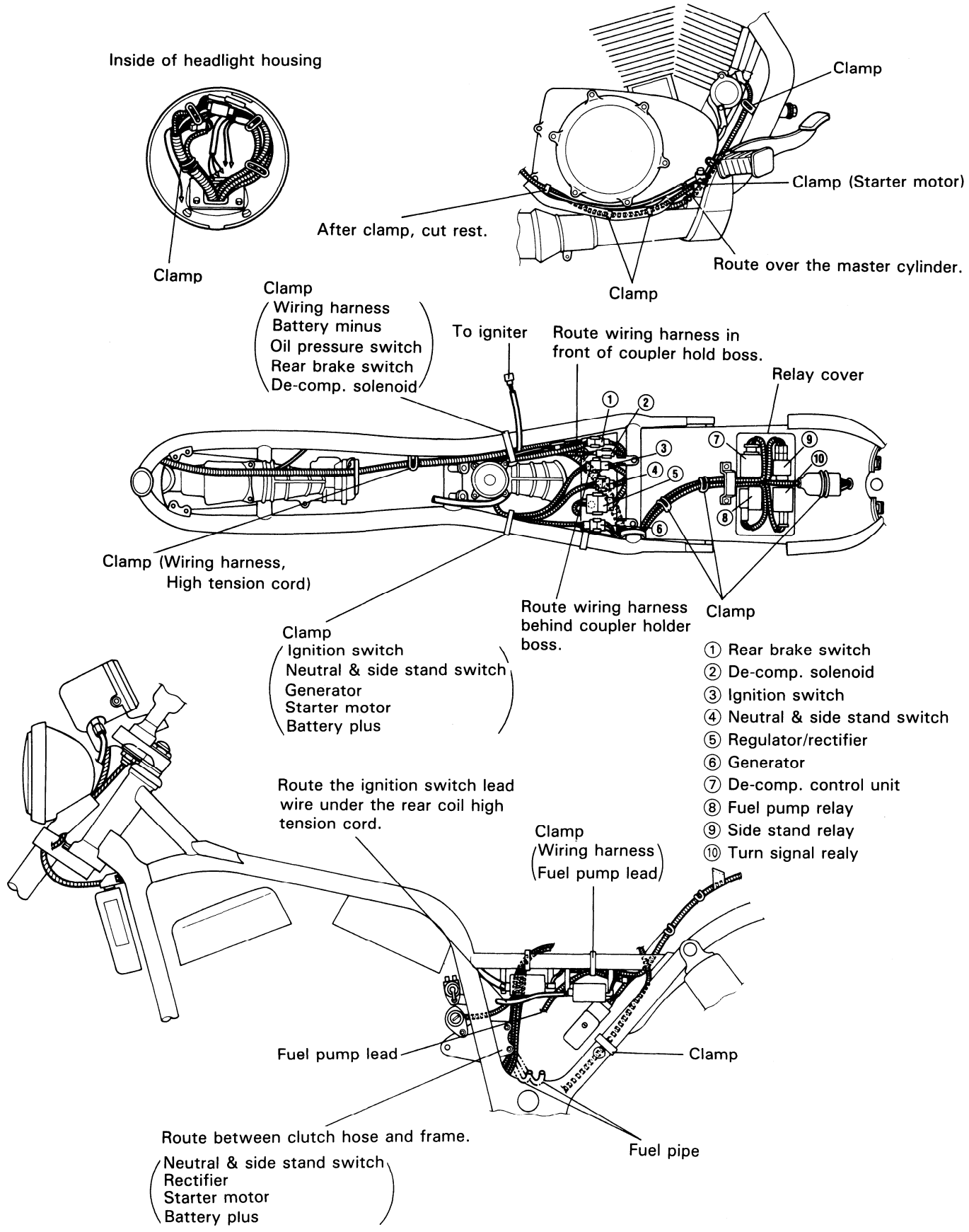
For Canada



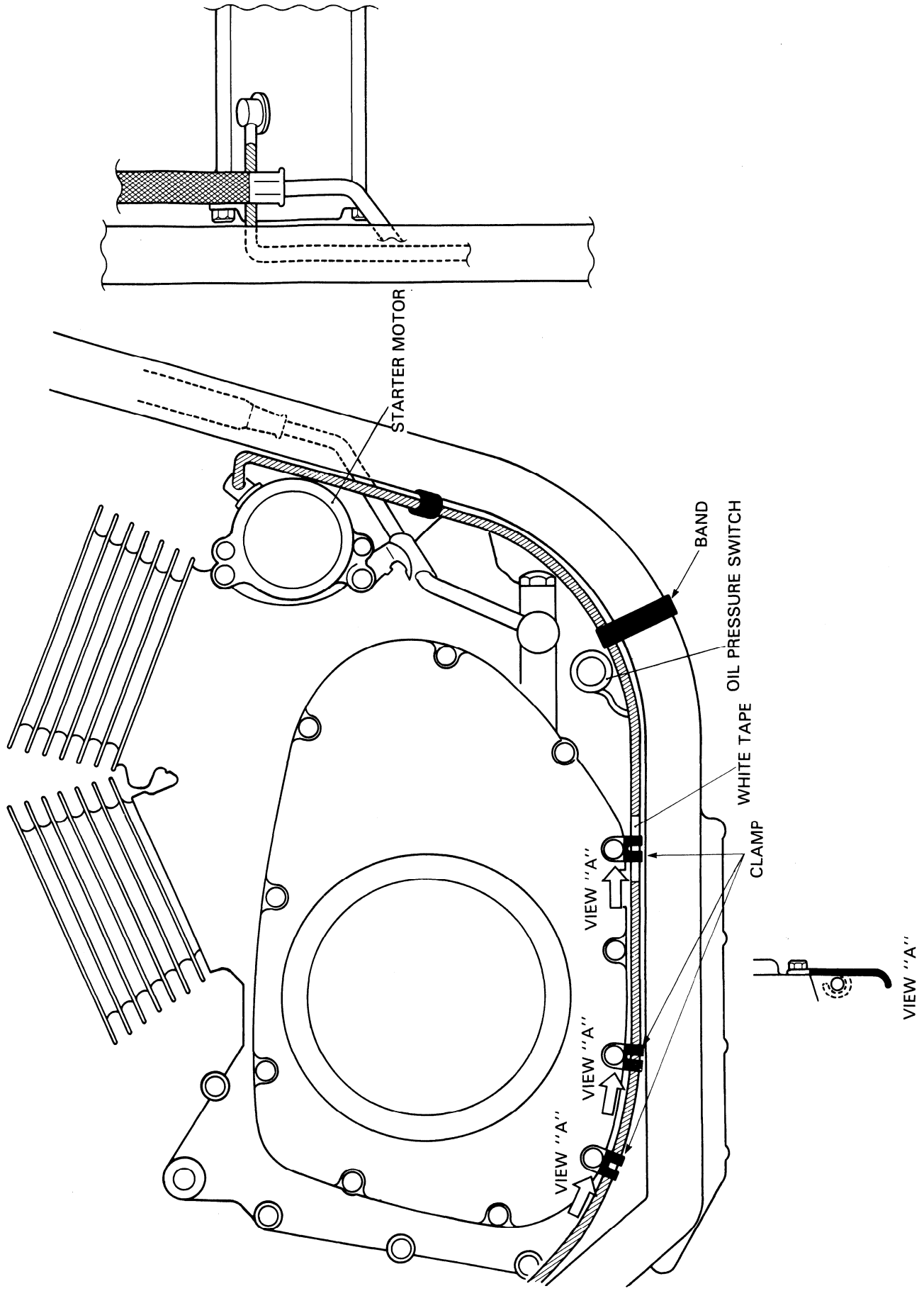
For Others


REAR TURN SIGNAL (R)
LICENSE LIGHT
TAIL/BRAKE LIGHT
REAR TURN SIGNAL (L)
WIRING IS W GERMANY
TURN SIGNAL RELAY
DECOMP CONTROLLER
IGNITER
SIDE STAND RELAY
IGNITION COIL
REAR
FRONT
IGNITION SWITCH
DIODE
HANDLE SWITCH-R
LIGHTING SWITCH
FRONT BRAKE LIGHT SWITCH
STARTER ENGINE SWITCH
REAR BRAKE LIGHT SWITCH
OTHERS
U.K. AND W. GERMANY
SPEEDOMETER
FUSE
RECTIFIER
MAGNETO
STARTER RELAY
STARTER MOTOR
BATTERY
FUEL PUMP RELAY
FUEL PUMP
NEUTRAL DECOMP SWITCH SOLENOID
SIDE STAND SWITCH
OIL PRESSURE SWITCH
HORN
PASSING SWITCH
CLUTCH SWITCH
HORN SWITCH
TURN SIGNAL SWITCH
HANDLE SWITCH-L
DIMMER SWITCH
FRONT TURN SIGNAL (R)
HEADLIGHT
POSITION/ PARKING
FRONT TURN SIGNAL (L)
ILL. : ILLUMINATION
HI : HIGH BEAM INDICATOR
TS : TURNSIGNAL INDICATOR
OL : OIL PRESSURE INDICATOR
N : NEUTRAL INDICATOR
WIRE COLOR
B.....Black
Bl.....Blue
Br.....Brown
G.....Green
Gr.....Gray
Lbl.....Light blue
Lg.....Light green
Dg.....Dark green
O.....Orange
R.....Red
W.....White
Y.....Yellow
B/R....Black with Red tracer
B/W....Black with White tracer
B/Y....Black with Yellow tracer
B/Bl...Blue with Black tracer
Br/B...Brown with Black tracer
G/Y....Green with Yellow tracer
O/B....Orange with Black tracer
O/Bl...Orange with Blue tracer
O/G....Orange with Green tracer
O/R....Orange with Red tracer
O/W....Orange with White tracer
O/Y....Orange with Yellow tracer
R/W....Red with White tracer
W/B....White with Black tracer
Y/B....Yellow with Black tracer
Y/G....Yellow with Green tracer
Y/R....Yellow with Red tracer

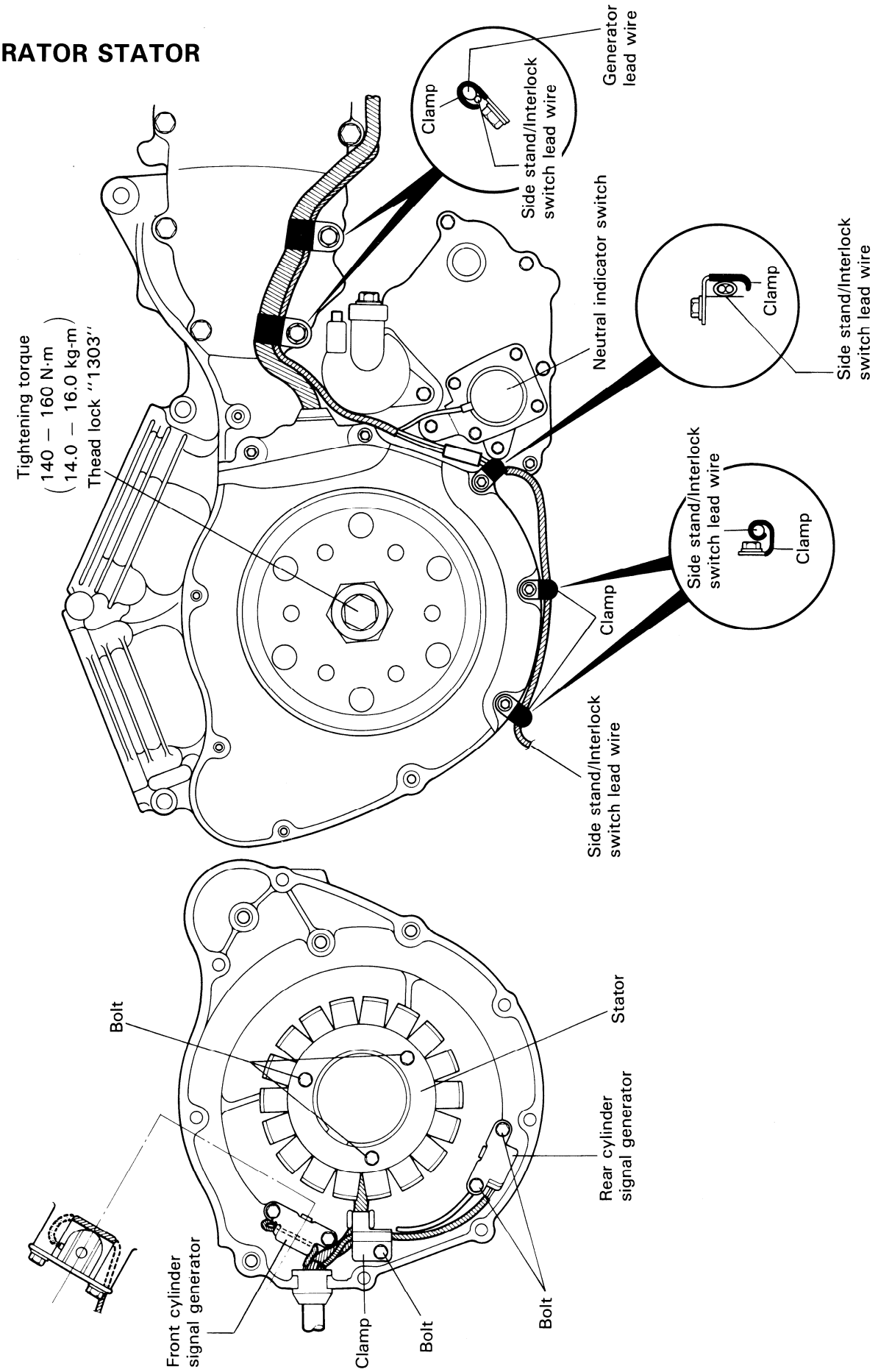
WIRE, CABLE AND HOSE ROUTING



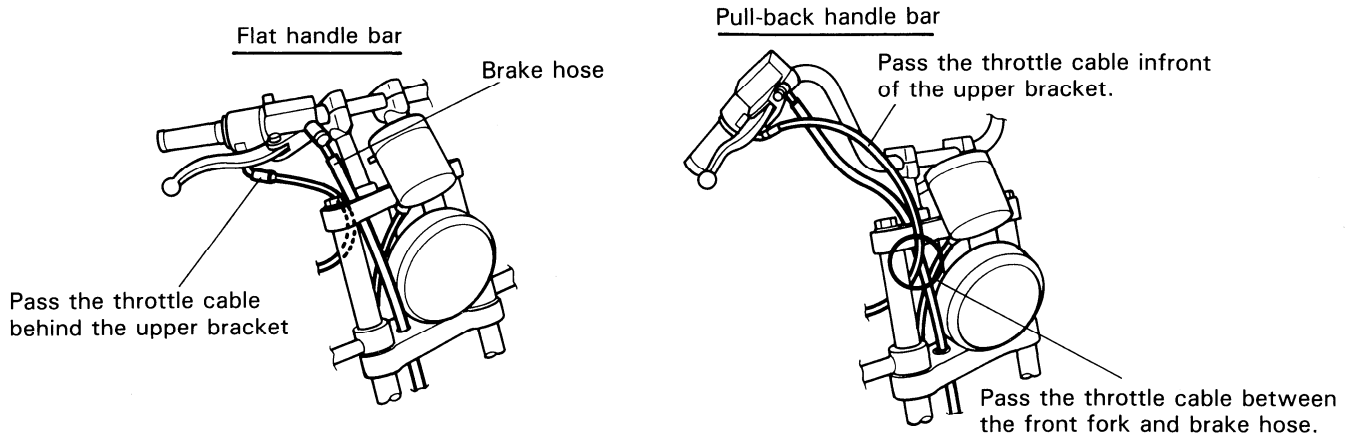
STARTER MOTOR LEAD

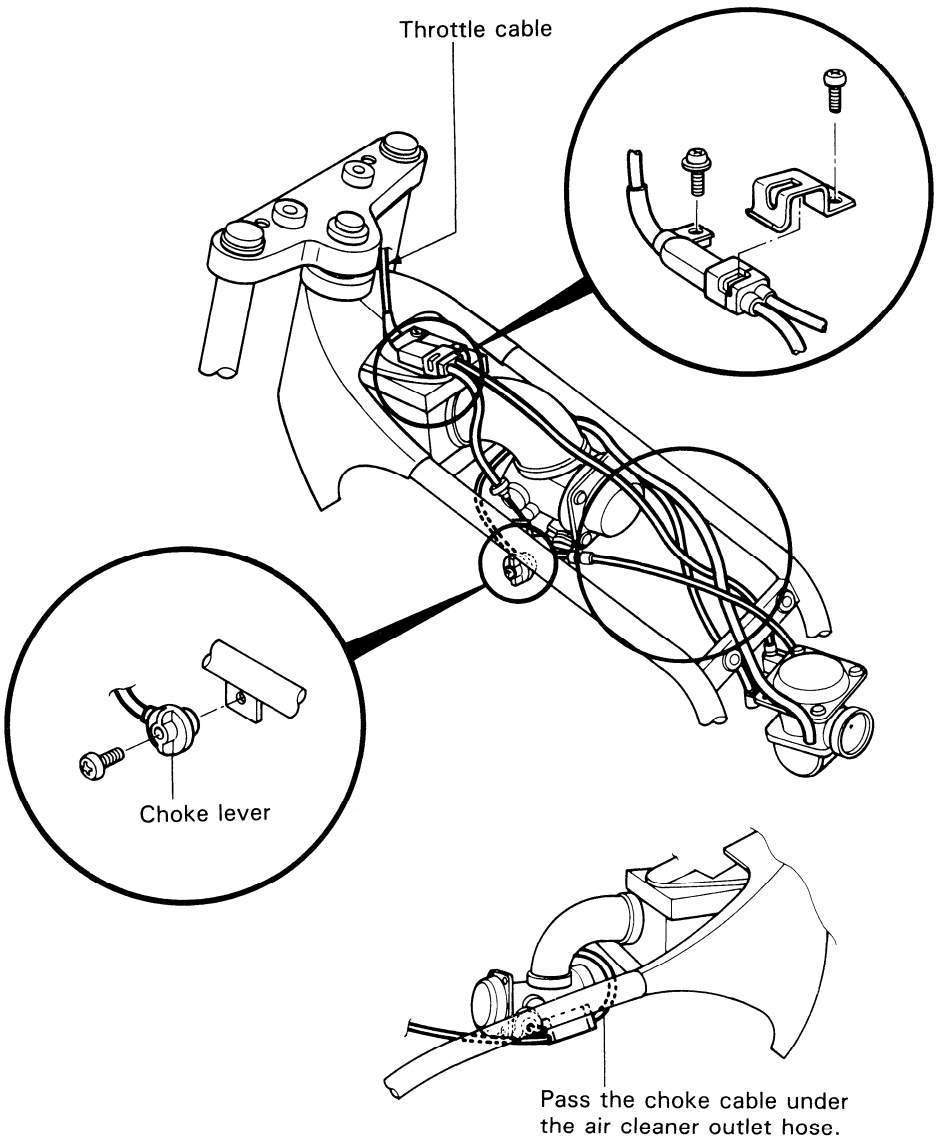


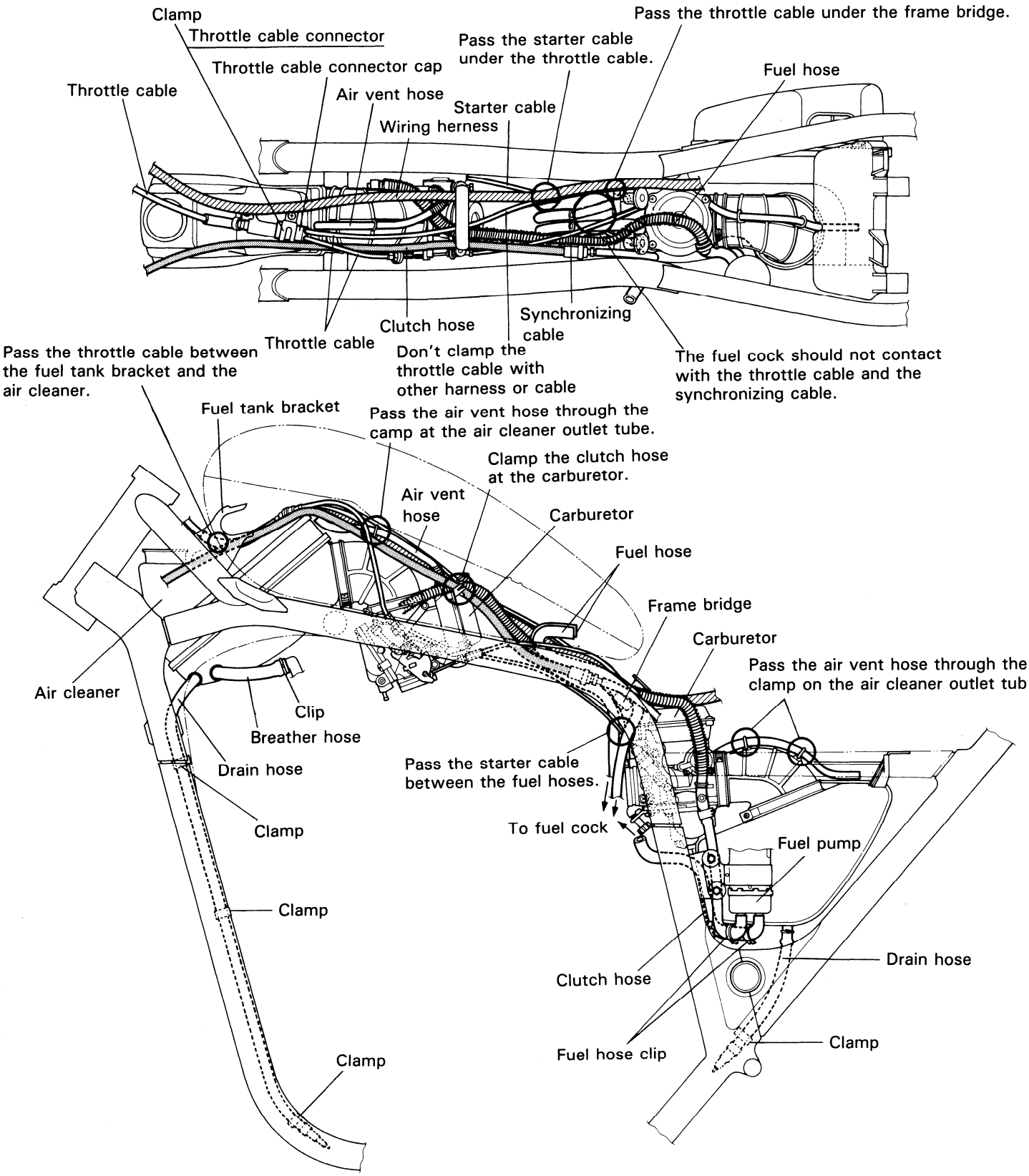
GENERATOR STATOR



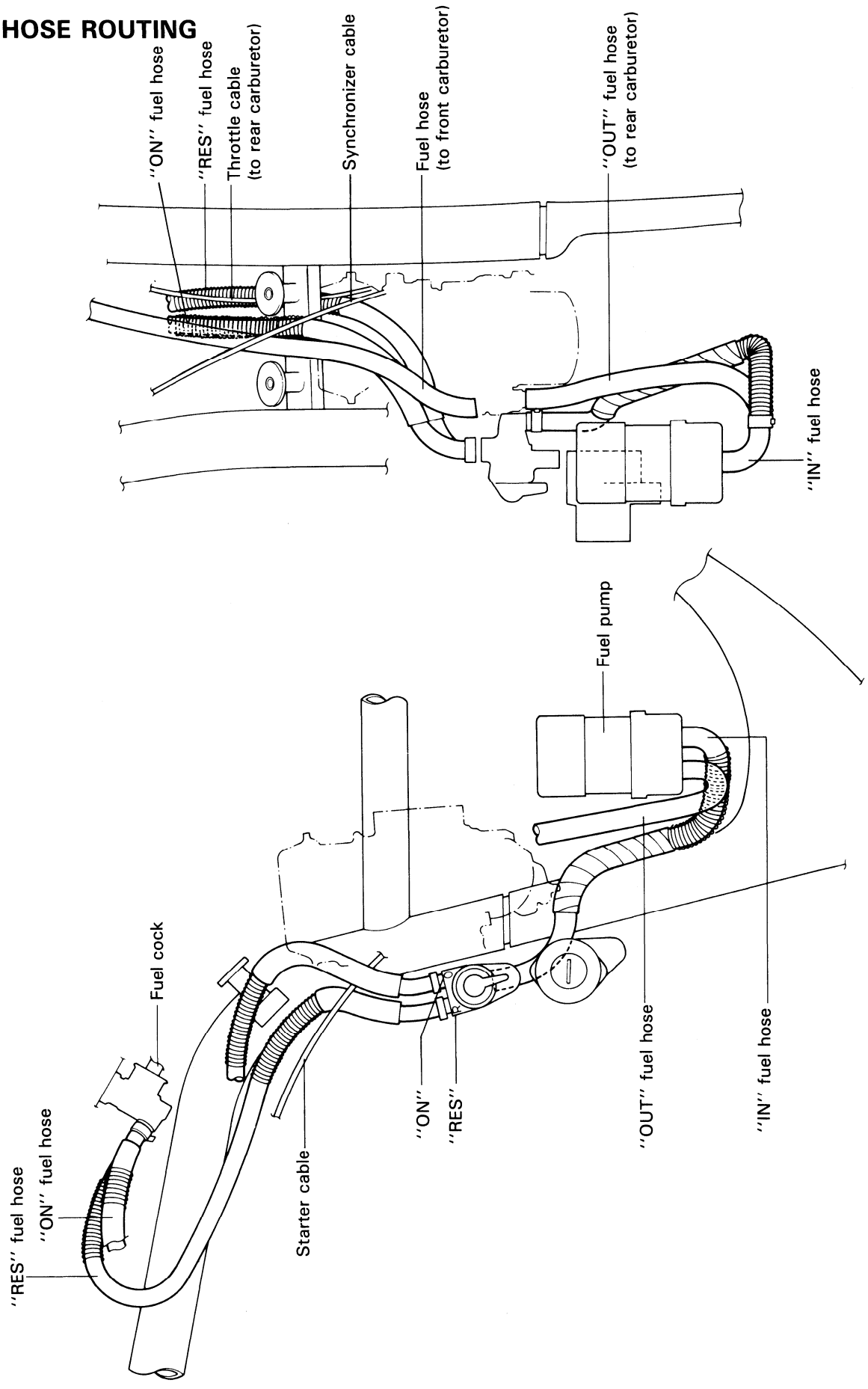
CABLE ROUTING



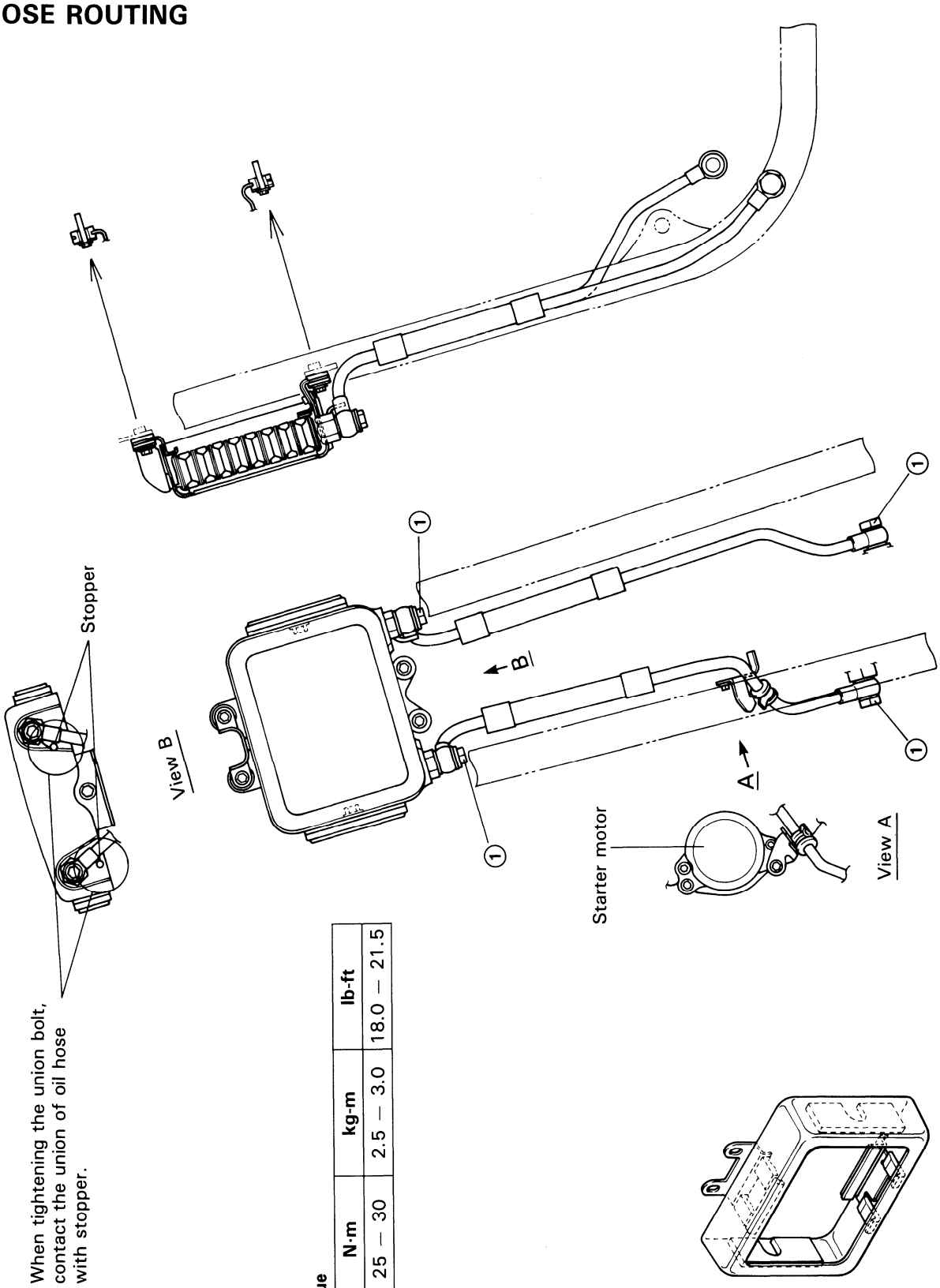



Clamp
Throttle cable connector
Throttle cable connector cap
Throttle cable
Air vent hose
Wiring herness
Starter cable
Pass the starter cable under the throttle cable.
Pass the throttle cable under the frame bridge.
Fuel hose
Clutch hose
Throttle cable
Synchronizing cable
Pass the throttle cable between the fuel tank bracket and the air cleaner.
Don't clamp the throttle cable with other harness or cable
The fuel cock should not contact with the throttle cable and the synchronizing cable.
Fuel tank bracket
Pass the air vent hose through the camp at the air cleaner outlet tube.
Clamp the clutch hose at the carburetor.
Air vent hose
Carburetor
Fuel hose
Frame bridge
Carburetor
Pass the air vent hose through the clamp on the air cleaner outlet tub
Air cleaner
Clip
Breather hose
Drain hose
Pass the starter cable between the fuel hoses.
Clamp
To fuel cock
Fuel pump
Clamp
Drain hose
Clutch hose
Fuel hose clip
Clamp
Clamp

FUEL HOSE ROUTING



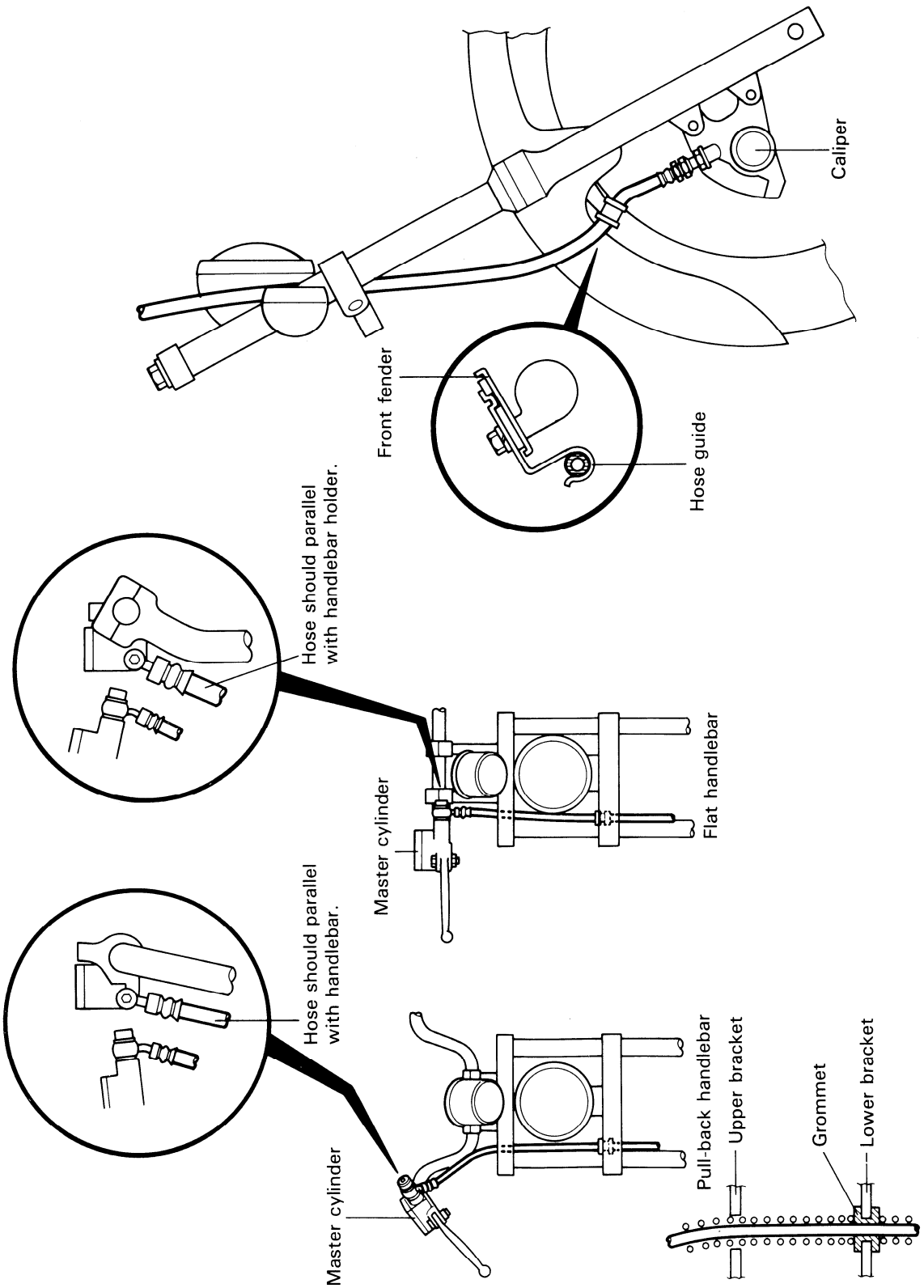
OIL HOSE ROUTING



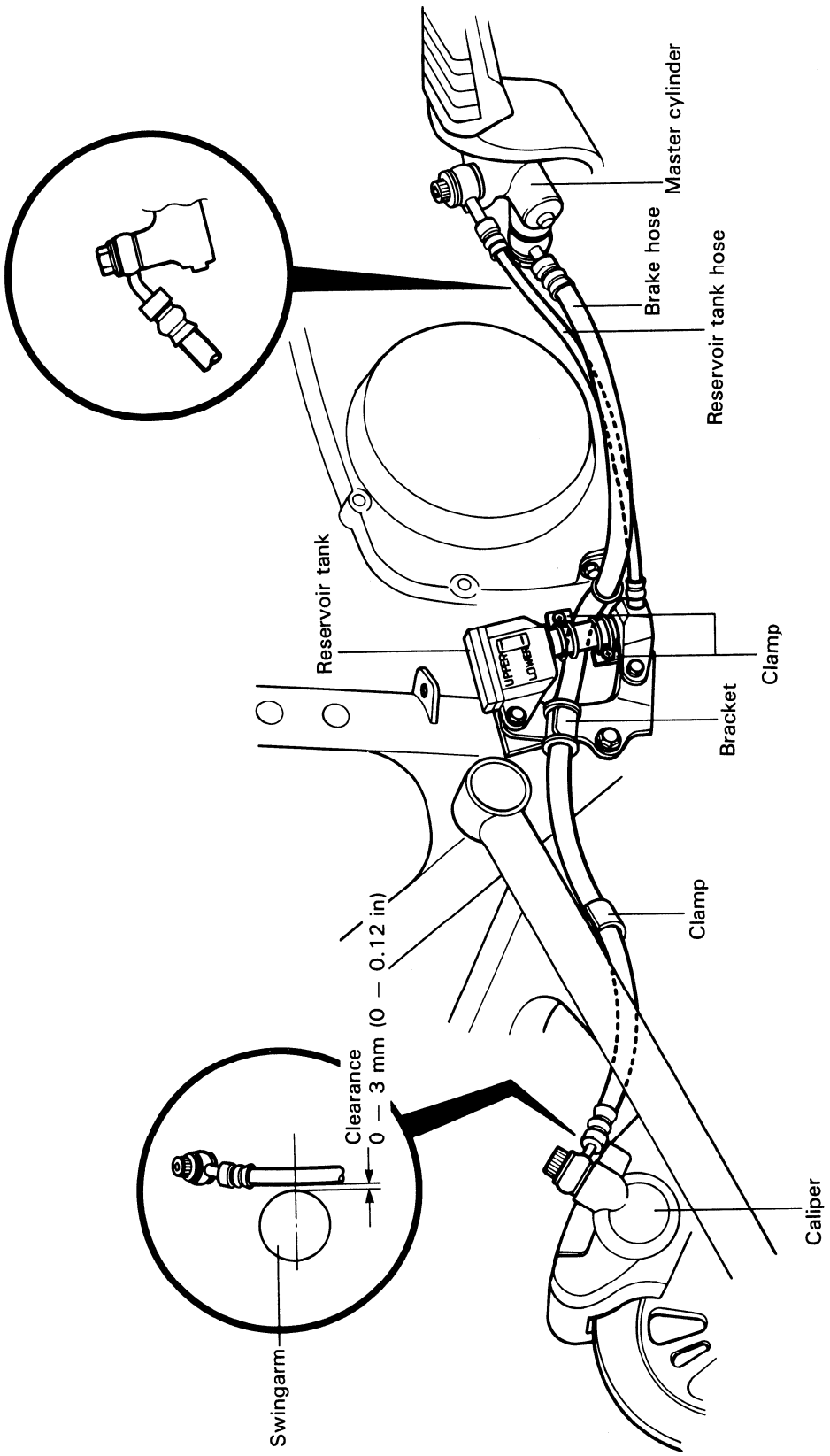
Tightening torque

Item	N·m	kg-m	lb-ft
①	25 — 30	2.5 — 3.0	18.0 — 21.5

FRONT BRAKE HOSE ROUTING



REAR BRAKE HOSE ROUTING



TIGHTENING TORQUE

ENGINE

Item			N·m	kg-m	lb-ft
Rocker arm shaft			34 – 40	3.4 – 4.0	24.5 – 29.0
Rocker arm shaft plug			25 – 30	2.5 – 3.0	18.0 – 21.5
Cylinder head cover bolt		6 mm	9 – 13	0.9 – 1.3	6.5 – 9.5
		8 mm	23 – 27	2.3 – 2.7	16.5 – 19.5
Cylinder head bolt and nut	8 mm	Initial	10	1.0	7.0
		Final	23 – 27	2.3 – 2.7	16.5 – 19.5
	10 mm	Initial	25	2.5	18.0
		Final	35 – 40	3.5 – 4.0	25.5 – 29.0
Cam sprocket bolt			14 – 16	1.4 – 1.6	10.0 – 11.5
Rear cylinder head cover plug			23 – 27	2.3 – 2.7	16.5 – 19.5
Cam chain tensioner mounting bolt			8 – 12	0.8 – 1.2	6.0 – 8.5
Cam chain guide mounting bolt			8 – 12	0.8 – 1.2	6.0 – 8.5
Primary drive gear bolt			140 – 160	14.0 – 16.0	101.5 – 115.5
Clutch spring bolt			8 – 12	0.8 – 1.2	6.0 – 8.5
Clutch sleeve hub nut			90 – 110	9.0 – 11.0	65.0 – 79.5
Secondary drive gear shaft bolt			90 – 110	9.0 – 11.0	65.0 – 79.5
Driveshaft bolt			55 – 65	5.5 – 6.5	40.0 – 47.0
Secondary case bolt		Initial	12 – 18	1.2 – 1.8	8.5 – 13.0
		Final	20 – 24	2.0 – 2.4	14.5 – 17.5
Rotor bolt			140 – 160	14.0 – 16.0	101.5 – 115.5
Starter clutch allen bolt			23 – 28	2.3 – 2.8	16.5 – 20.0
Crankcase bolt	6 mm		9 – 13	0.9 – 1.3	6.5 – 9.5
	8 mm	Initial	12 – 18	1.2 – 1.8	8.5 – 13.0
		Final	20 – 24	2.0 – 2.4	14.5 – 17.5
Conrod bolt		Initial	22 – 28	2.2 – 2.8	16.0 – 20.0
		Final	49 – 53	4.9 – 5.3	35.5 – 38.5
Clutch pipe union bolt			20 – 25	2.0 – 2.5	14.5 – 18.0
Oil pressure regulator			25 – 30	2.5 – 3.0	18.0 – 21.5
Oil pump mounting bolt			9 – 13	0.9 – 1.3	6.5 – 9.5
Oil filter union			12 – 18	1.2 – 1.8	8.5 – 13.0
Piston cooling jet retaining plate bolt			8 – 12	0.8 – 1.2	6.0 – 8.5
Oil separator plate bolt			8 – 12	0.8 – 1.2	6.0 – 8.5
Oil pressure switch			12 – 15	1.2 – 1.5	8.5 – 11.0
Drain plug			18 – 23	1.8 – 2.3	13.0 – 16.5

Item		N·m	kg-m	lb-ft
Oil plug	6 mm	4 – 7	0.4 – 0.7	3.0 – 5.0
	8 mm	15 – 20	1.5 – 2.0	11.0 – 14.5
	12 mm	18 – 23	1.8 – 2.3	13.0 – 16.5
	14 mm	20 – 25	2.0 – 2.5	14.5 – 18.0
	16 mm	20 – 25	2.0 – 2.5	14.5 – 18.0
Oil pipe union bolt		25 – 30	2.5 – 3.0	18.0 – 21.5
Engine mounting bolt		70 – 88	7.0 – 8.8	50.5 – 63.5
Engine mounting bracket bolt		18 – 28	1.8 – 2.8	13.0 – 20.0
Frame mounting bolt		40 – 60	4.0 – 6.0	29.0 – 43.5
Exhaust pipe clamp bolt		20 – 25	2.0 – 2.5	14.5 – 18.0
Muffler mounting bolt		27 – 43	2.7 – 4.3	19.5 – 31.0

SECONDARY AND FINAL

Item		N·m	kg-m	lb-ft
Secondary drive bevel gear housing bolt		20 – 25	2.0 – 2.5	14.5 – 18.0
Secondary driven bevel gear housing bolt		20 – 25	2.0 – 2.5	14.5 – 18.0
Secondary driven bevel gear bearing stopper		90 – 120	9.0 – 12.0	65.0 – 87.0
Final gear case mounting nut		35 – 45	3.5 – 4.5	25.5 – 32.5
Final drive bevel gear coupling nut		90 – 110	9.0 – 11.0	65.0 – 79.5
Final drive bevel gear bearing stopper		90 – 130	9.0 – 13.0	65.0 – 94.0
Final gear case oil drain plug		20 – 25	2.0 – 2.5	14.5 – 18.0
Final gear case cover bolt	8 mm	20 – 26	2.0 – 2.6	14.5 – 19.0
	10 mm	40 – 60	4.0 – 6.0	29.0 – 43.5
Final driven bevel gear bearing retainer screw		8 – 10	0.8 – 1.0	6.0 – 7.0
Final driven coupling joint stopper bolt		8 – 12	0.8 – 1.2	6.0 – 8.5

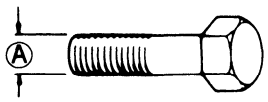
CHASSIS

Item		N·m	kg-m	lb-ft
Front axle		36 – 52	3.6 – 5.2	26.0 – 37.5
Front axle clamp bolt		15 – 25	1.5 – 2.5	11.0 – 18.0
Front wheel hub flange bolt		20 – 30	2.0 – 3.0	14.5 – 21.5
Brake disc mounting bolt (Front and Rear)		15 – 25	1.5 – 2.5	11.0 – 18.0
Front wheel spoke nipple		4 – 5	0.4 – 0.5	3.0 – 3.5
Front fork cap bolt		80 – 100	8.0 – 10.0	58.0 – 72.5
Front fork spring stopper nut		40 – 50	4.0 – 5.0	29.0 – 36.0
Front fork damper rod bolt		15 – 25	1.5 – 2.5	11.0 – 18.0
Front fork lower clamp bolt		25 – 40	2.5 – 4.0	18.0 – 29.0
Steering stem head nut		80 – 100	8.0 – 10.0	58.0 – 72.5
Front brake master cylinder mounting bolt		8 – 12	0.8 – 1.2	6.0 – 8.5
Front brake caliper mounting bolt		25 – 40	2.5 – 4.0	18.0 – 29.0
Front brake caliper housing bolt		15 – 20	1.5 – 2.0	11.0 – 14.5
Front brake hose union bolt		20 – 25	2.0 – 2.5	14.5 – 18.0
Brake caliper air bleeder valve		6 – 9	0.6 – 0.9	4.5 – 6.5
Handlebar clamp bolt		15 – 25	1.5 – 2.5	11.0 – 18.0
Handlebar holder nut		80 – 100	8.0 – 10.0	58.0 – 72.5
Front footrest bolt		15 – 25	1.5 – 2.5	11.0 – 18.0
Rear brake reservoir mounting bolt		8 – 12	0.8 – 1.2	6.0 – 8.5
Rear brake master cylinder mounting bolt		15 – 25	1.5 – 2.5	11.0 – 18.0
Clutch master cylinder mounting bolt		8 – 12	0.8 – 1.2	6.0 – 8.5
Clutch hose union bolt		20 – 25	2.0 – 2.5	14.5 – 18.0
Rear swingarm pivot nut		50 – 80	5.0 – 8.0	36.0 – 58.0
Rear shock absorber mounting bolt		20 – 30	2.0 – 3.0	14.5 – 21.5
Rear axle nut		60 – 96	6.0 – 9.6	43.5 – 69.5
Rear caliper mounting bracket bolt		40 – 60	4.0 – 6.0	29.0 – 43.5
Rear brake caliper mounting bolt		25 – 40	2.5 – 4.0	18.0 – 29.0
Rear brake caliper housing bolt		15 – 20	1.5 – 2.0	11.0 – 14.5
Rear brake hose union bolt	10 mm	20 – 25	2.0 – 2.5	14.5 – 18.0
	14 mm	30 – 35	3.0 – 3.5	21.5 – 25.5

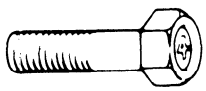
TIGHTENING TORQUE CHART

For other bolts and nuts not listed above, refer to this chart:

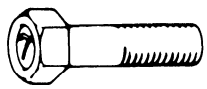
Bolt Diameter Ⓐ(mm)	Conventional or "4" marked bolt			"7" marked bolt		
	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
4	1.0 – 2.0	0.1 – 0.2	0.7 – 1.5	1.5 – 3.0	0.15 – 0.3	1.0 – 2.0
5	2.0 – 4.0	0.2 – 0.4	1.5 – 3.0	3.0 – 6.0	0.3 – 0.6	2.0 – 4.5
6	4.0 – 7.0	0.4 – 0.7	3.0 – 5.0	8.0 – 12.0	0.8 – 1.2	6.0 – 8.5
8	10.0 – 16.0	1.0 – 1.6	7.0 – 11.5	18.0 – 28.0	1.8 – 2.8	13.0 – 20.0
10	22.0 – 35.0	2.2 – 3.5	16.0 – 25.5	40.0 – 60.0	4.0 – 6.0	29.0 – 43.5
12	35.0 – 55.0	3.5 – 5.5	25.5 – 40.0	70.0 – 100.0	7.0 – 10.0	50.5 – 72.5
14	50.0 – 80.0	5.0 – 8.0	36.0 – 58.0	110.0 – 160.0	11.0 – 16.0	79.5 – 115.5
16	80.0 – 130.0	8.0 – 13.0	58.0 – 94.0	170.0 – 250.0	17.0 – 25.0	123.0 – 181.0
18	130.0 – 190.0	13.0 – 19.0	94.0 – 137.5	200.0 – 280.0	20.0 – 28.0	144.5 – 202.5



Conventional bolt



"4" marked bolt



"7" marked bolt

CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 335 mm (91.9 in)
Overall width	710 mm (28.0 in)...GLF 770 mm (30.3 in)...GLP
Overall height	1 135 mm (44.7 in)...GLF 1 220 mm (48.0 in)...GLP
Wheelbase	1 620 mm (63.8 in)
Ground clearance	150 mm (5.9 in)
Dry mass	242 kg (533 lbs) ...GLF, E-03, 28 243 kg (535 lbs) ...GLF, others 244 kg (537 lbs) ...GLP, E-33 243 kg (535 lbs) ...GLP, others

ENGINE

Type	Four-stroke, 3 valves, OHC, 45-degree V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Piston displacement	1 360 cm^3 (83.0 cu.in)
Compression ratio	9.3 : 1
Carburetor	MIKUNI BDS36SS...front MIKUNI BS36SS...rear
Air cleaner	Polyurethane foam element
Starter system	Electric starter motor
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	4-speed constant mesh
Gearshift pattern	1-down, 3-up
Primary reduction	1.645 (79/48)
Secondary reduction	0.852 (29/34 × 19/19)
Final reduction	2.666 (32/12)
Gear ratios, Low 2nd 3rd Top	3.000 (36/12) 1.823 (31/17) 1.333 (28/21) 1.041 (25/24)
Drive system	Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swingarm, oil damped, spring pre-load 5-way adjustable
Steering angle	40° (right & left)
Caster	54°00′
Trail	166 mm (6.5 in)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc brake
Rear brake	Disc brake
Front tire size	110/90 — 19 62H
Rear tire size	170/80 — 15 77H
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)

ELECTRICAL

Ignition type	Fully transistorized
Ignition timing	2° B.T.D.C. below 1 250 r/min and 30° B.T.D.C. above 4 000 r/min...E-03, 33 2° B.T.D.C. below 1 500 r/min and 30° B.T.D.C. above 4 000 r/min...Others.
Spark plug	N.G.K.: DPR8EA-9 N.D.: X24EPR-U9
Battery	12V 50.4 kC (14 Ah)/10HR
Generator	Three phase A.C. Generator
Fuse	10A × 4, 25A × 1

CAPACITIES

Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)
reverse	3.0 L (3.2/2.6 US/Imp qt)
Engine oil with filter change	4.3 L (4.5/3.8 US/Imp qt)
without filter change	3.7 L (3.9/3.3 US/Imp qt)
Front fork oil	354 ml (12.0/12.5 US/Imp oz)
Final bevel gear oil	200—220 ml (6.8/7.0 — 7.4/ 7.7 US/Imp oz)

These specifications are subject to change without notice.

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	———
	EX.	40 (1.6)	———
Valve lift	IN.	8 (0.31)	———
	EX.	9 (0.35)	———
Lash-adjuster plunger stroke	0—0.5 (0—0.02)		———
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	0.35 (0.014)
	EX.	0.040—0.070 (0.0016—0.0028)	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	———
	EX.	7.000—7.012 (0.2756—0.2761)	———
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	———
	EX.	6.945—6.960 (0.2734—0.2740)	———
Valve stem runout	IN. & EX.	———	0.05 (0.002)
Valve head thickness	IN. & EX.	———	0.5 (0.02)
Valve stem end length	IN. & EX.	———	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	———
Valve head radial runout	IN. & EX.	———	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	———	35.0 (1.38)
	OUTER	———	37.8 (1.49)
Valve spring free length (EXHAUST)	———		40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3—6.5 kg (11.68—14.33 lbs) at length 28.0 mm (1.10 in)	———
	OUTER	14.0—14.2 kg (30.86—31.31 lbs) at length 31.5 mm (1.24 in)	———
Valve spring tension (EXHAUST)	20.3—23.3 kg (44.75—51.37 lbs) at length 35.0 mm (1.38 in)		———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683–35.723 (1.4048–1.4064)	35.41 (1.394)
	EX.	36.883–36.923 (1.4521–1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032–0.066 (0.0013–0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	20.012–20.025 (0.7879–0.7884)	———
	Front head left side, rear head right side	25.012–25.025 (0.9847–0.9852)	———
Camshaft journal O.D.	Front head right side, rear head left side	19.959–19.980 (0.7858–0.7866)	———
	Front head left side, rear head right side	24.959–24.980 (0.9826–0.9835)	———
Camshaft runout	Front & Rear	———	0.10 (0.004)
Cam chain 20-pitch length	———		128.9 (5.07)
Rocker arm I.D.	IN.	14.000–14.018 (0.5511–0.5519)	———
	EX.	16.000–16.018 (0.6299–0.6306)	———
Rocker arm shaft O.D.	IN.	13.966–13.984 (0.5498–0.5506)	———
	EX.	15.966–15.984 (0.6286–0.6293)	———
Cylinder head distortion	———		0.05 (0.002)
Cylinder head cover distortion	———		0.05 (0.002)
De-comp lever clearance	Front	1.5–2.5 (0.06–0.10)	———
	Rear	1.0–2.0 (0.04–0.08)	———

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000–1 400 kPa (10–14 kg/cm^2) (142–199 psi)	800 kPa (8 kg/cm^2) (114 psi)
Compression pressure difference	———	200 kPa (2 kg/cm^2) (28 psi)
Piston to cylinder clearance	0.05–0.06 (0.0020–0.0024)	0.120 (0.0047)
Cylinder bore	94.000–94.015 (3.7008–3.7014)	94.080 (3.7039)

ITEM	STANDARD			LIMIT
Piston diam.	93.945—93.960 (3.6986—3.6992) Measure at 16 mm (0.6 in) from the skirt end.			93.880 (3.6960)
Cylinder distortion	———			0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30—0.45 (0.012—0.018)	0.70 (0.028)
	2nd		0.25—0.40 (0.010—0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040—0.075 (0.0016—0.0030)	0.180 (0.007)
	2nd		0.025—0.060 (0.0010—0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230—1.250 (0.0484—0.0492)	———
	2nd		1.510—1.530 (0.0594—0.0602)	———
	Oil		2.810—2.830 (0.1106—0.1114)	———
Piston ring thickness	1st		1.175—1.190 (0.0463—0.0469)	———
	2nd		1.470—1.485 (0.0579—0.0585)	———
Piston pin bore	23.000—23.006 (0.9055—0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996—23.000 (0.9054—0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006—23.014 (0.9057—0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10—0.20 (0.004—0.008)	0.3 (0.012)
Conrod big end width	21.95—22.00 (0.864—0.866)	———
Crank pin width	22.10—22.15 (0.870—0.872)	———
Conrod big end oil clearance	0.024—0.042 (0.0009—0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982—50.000 (1.9678—1.9685)	———
Crankshaft journal oil clearance	0.020—0.050 (0.0008—0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965—51.980 (2.0459—2.0465)	———

ITEM	STANDARD	LIMIT
Crankshaft thrust bearing thickness	1.925–2.175 (0.0758–0.0856)	———
Crankshaft thrust clearance	0.05–0.10 (0.002–0.004)	———
Crankshaft runout	———	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 × 31/40)	———
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm², 50 psi) Below 650 kPa (6.5 kg/cm², 92 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Drive plate thickness	No.1	2.72–2.88 (0.107–0.113)	2.42 (0.095)
	No.2	3.45–3.55 (0.136–0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8–16.0 (0.622–0.630)	15.2 (0.600)
	No.2	15.9–16.0 (0.626–0.630)	15.2 (0.600)
Driven plate distortion	———		0.10 (0.004)
Clutch spring free length	No.1	———	27.6 (1.09)
	No.2	———	20.0 (0.79)
Clutch master cylinder bore	14.000–14.043 (0.5512–0.5529)		———
Clutch master cylinder piston diam.	13.957–13.984 (0.5495–0.5506)		———
Clutch release cylinder bore	35.700–35.762 (1.4055–1.4079)		———
Clutch release cylinder piston diam.	35.650–35.675 (1.4035–1.4045)		———

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD	LIMIT
Primary reduction ratio		1.645 (79/48)	———
Secondary reduction ratio		0.852 (29/34 × 19/19)	———
Final reduction ratio		2.666 (32/12)	———
Gear ratios	Low	3.000 (36/12)	———
	2nd	1.823 (31/17)	———
	3rd	1.333 (28/21)	———
	Top	1.041 (25/24)	———

ITEM	STANDARD		LIMIT
Shift fork to groove clearance	0.1—0.3 (0.004—0.012)		0.5 (0.020)
Shift fork groove width	No.1	5.50—5.60 (0.217—0.220)	———
	No.2	5.50—5.60 (0.217—0.220)	———
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	———
	No.2	5.30—5.40 (0.209—0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.15 (0.001—0.006)		———
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	———

CARBURETOR

ITEM		SPECIFICATION			
		E-03		E-33	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. No.		38B40	←	38B50	←
Idle r/min.		1 000 ± 50 r/min.	←	1 000 ± 50 r/min	←
Fuel level		9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet	(M.J.)	# 140	# 125	# 140	# 125
Main air jet	(M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle	(J.N.)	5D35-1st	5D51-1st	5D35-1st	5D51-1st
Needle jet	(N.J.)	P-2	O-9	P-2	O-9
Throttle valve	(Th.V.)	# 120	# 110	# 120	# 110
Pilot jet	(P.J.)	# 55	# 50	# 55	# 50
By-pass	(B.P.)	0.8 mm × 3pcs	←	0.8 mm × 3pcs	←
Pilot outlet	(P.O.)	0.7 mm	1.0 mm	0.7 mm	1.0 mm

ITEM		SPECIFICATION			
		E-03		E-33	
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET	←	PRE-SET	←
Pilot air jet 1	(P.A.J.1)	#40	#70	#40	#70
Pilot air jet 2	(P.A.J.2)	1.55 mm	1.4 mm	1.55 mm	1.4 mm
Throttle cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

ITEM		SPECIFICATION			
		E-22, 39		E-01, 04, 17, 21, 28	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. No.		38B90	←	38B70	←
Idle r/min.		1 000±50 r/min.	←	1 000±50 r/min	←
Fuel level		9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)	9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)
Float height		27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet	(M.J.)	#140	#125	#140	#125
Main air jet	(M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle	(J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd
Needle jet	(N.J.)	P-3	P-0	P-3	P-0
Throttle valve	(Th.V.)	#110	←	#110	←
Pilot jet	(P.J.)	#57.5	#50	#57.5	#50
By-pass	(B.P.)	0.8 mm × 3pcs	←	0.8 mm × 3pcs	←
Pilot outlet	(P.O.)	0.8 mm	1.0 mm	0.8 mm	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET ($1\frac{3}{4}$ turns back)	←	PRE-SET ($1\frac{3}{4}$ turns back)	←
Pilot air jet 1	(P.A.J.1)	#60	#55	#60	#55
Pilot air jet 2	(P.A.J.2)	1.9 mm	1.7 mm	1.9 mm	1.7 mm
Throttle cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Ignition timing		2° B.T.D.C. below 1 250 r/min.		E-03, 33
		30° B.T.D.C. above 4 000 r/min.		
		2° B.T.D.C. below 1 500 r/min.		The others
		30° B.T.D.C. above 4 000 r/min		
Firing order		R·F		
Spark plug		Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
		Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance		Over 8 (0.3) at 1 atm.		
Signal coil resistance		240 ± 20 % Ω		Bl–G, B–Y
Ignition coil resistance		Primary	1–7 Ω	⊕ tap– ⊖ tap
		Secondary	10–25 kΩ	Plug cap– ⊖ tap
Generator no-load voltage		More than 80 V (AC) at 5 000 r/min		
Regulated voltage		14.0–15.5 V at 5 000 r/min.		
Starter motor brush length		N.D.	Limit: 9.0 (0.35)	
commutator under-cut		Limit: 0.2 (0.008)		
Starter relay resistance		2–6 Ω		
De-comp, solenoid resistance		0.1–1.0 Ω		
Side stand and neutral relay		120 ±20 %Ω		
Fuel pump resistance		1–2 Ω		
Fuel pump discharge amount		More than 600 ml (1.27 US qt)/minute		
Battery	Type designation	FTH 16–12		
	Voltage	12 V		
	Capacity	50.4 kC (14 Ah)/10 HR		
	Standard electrolyte S.G.	1.32 at 20°C (68°F)		
Fuse size	HEADLIGHT	10 A		
	SIGNAL	10 A		
	IGNITION	10 A		
	MAIN	25 A		
	POWER SOURCE	10 A		

WATTAGE

Unit: W

ITEM		SPECIFICATION	
		E-03, 28, 33	Others
Headlight	HI	60	←
	LO	55	←
Tail/Brake light		8/27	5/21
Turn signal light		21	←
Running light		5	←
Speedometer light		3, 4	←

WATTAGE

Unit: W

ITEM	SPECIFICATION	
	E-03, 28, 33	Others
Turn signal indicator light	3	←
High beam indicator light	1.7	←
Neutral indicator light	3	←
Oil pressure indicator light	3	←
License light	7.5	5

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	22 (0.87)		———
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Breake disc runout	———		0.30 (0.012)
Master cylinder bore	Front	12.700—12.743 (0.5000—0.5017)	———
	Rear	12.700—12.743 (0.4999—0.5017)	———
Master cylinder piston diam.	Front	12.657—12.684 (0.4983—0.4994)	———
	Rear	12.657—12.684 (0.4983—0.4994)	———
Brake caliper cylinder bore	Front	42.850—42.926 (1.6870—1.6900)	———
	Rear	42.850—42.926 (1.6870—1.6900)	———
Brake caliper piston diam.	Front	42.770—42.820 (1.6839—1.6858)	———
	Rear	42.770—42.820 (1.6839—1.6858)	———
Wheel rim runout	Axial	———	2.0 (0.08)
	Radial	———	2.0 (0.08)
Wheel axle runout	Front	———	0.25 (0.010)
	Rear	———	0.25 (0.010)
Tire size	Front	110/90—19 62H	———
	Rear	170/80—15 M/C 77H	———
Tire tread depth	Front	———	1.6 (0.06)
	Rear	———	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	———	
Front fork spring free length	———	549 (21.6)	
Front fork oil level	203 (7.99)	———	
Rear shock absorber spring adjuster	1/5		
Rear wheel travel	105 (4.1)	———	
Swingarm pivot shaft runout	———	0.30 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline or at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanorl with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline uded should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)		
reserve	3.0 L (3.2/2.6 US/Imp qt)		
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	3 700 ml (3.9/3.3 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Frok oil #10		
Front fork oil capacity (each leg)	354 ml (12.0/12.5 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200—220 ml (6.8—7.4/7.0—7.7 US/Imp oz)	
Brake fluid type	DOT 4		

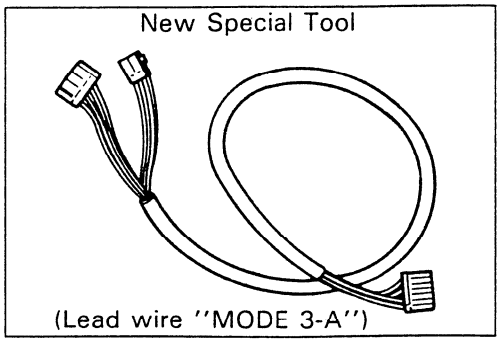
IGNITOR UNIT INSPECTION

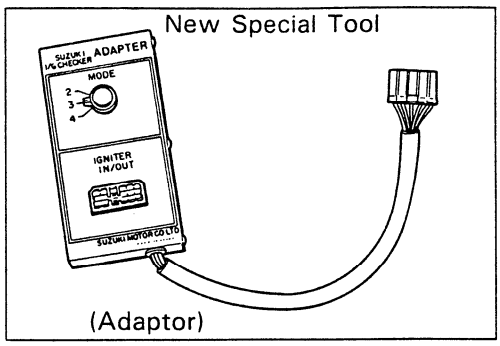
CHECKING WITH DIGITAL IGNITOR CHECKER

Check the ingnitor unit with the special tools as shown below.

09931-94430: Digital ignitor checker
***09931-94450: Lead wire "MODE 3-A"**
***09931-94460: Adaptor**

NOTE:
**Asterisk mark indicates the new special tools.*





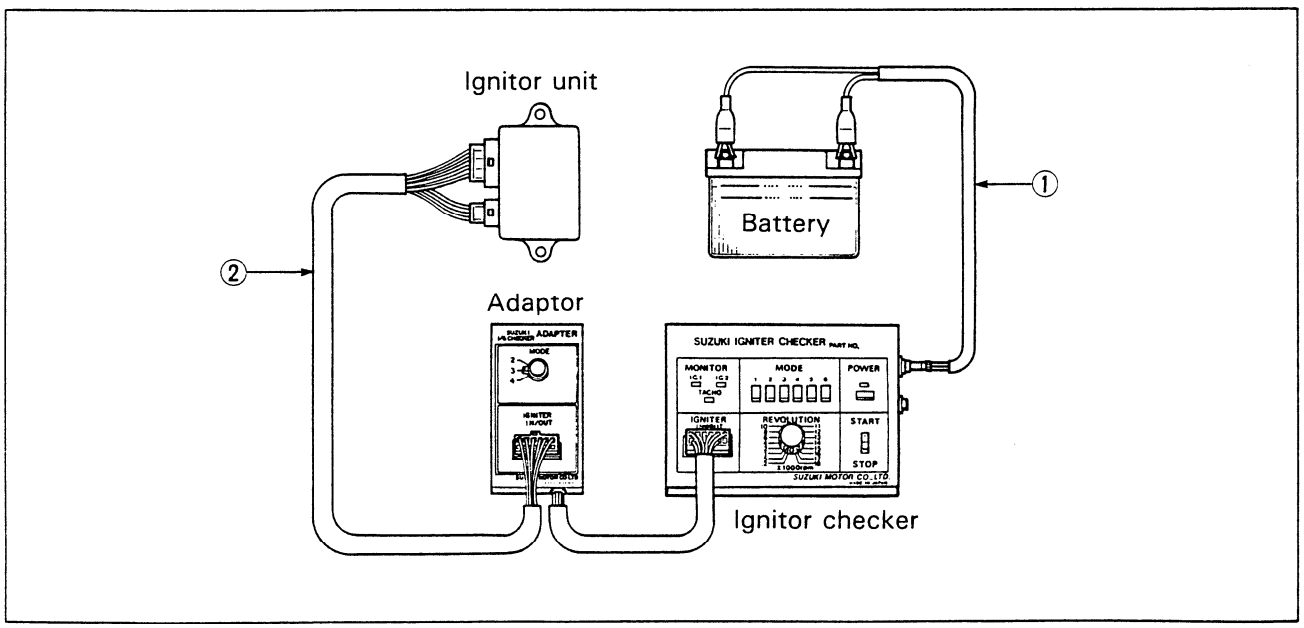
WIRING PROCEDURE:

- Remove the pillion seat and rider seat.
- Disconnect two ignitor lead wire couplers from the ignitor unit.
- Connect the power source lead wires ① and lead wire "MODE 3-A" ② as shown in the following illustration.

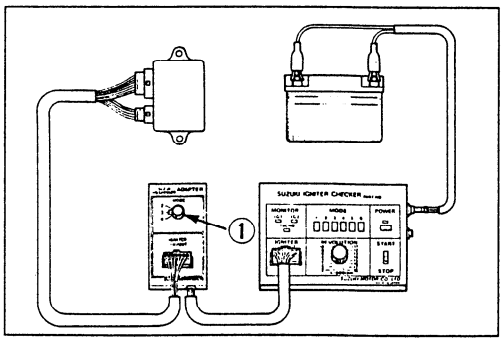
CAUTION:

- *** Do not use the battery equipped on the motorcycle.**
- *** Be sure to connect the black lead to the battery ⊖ terminal and red lead to the ⊕ terminal.**
- *** Make sure "START" switch is in "off" position before connecting the power source lead wires.**

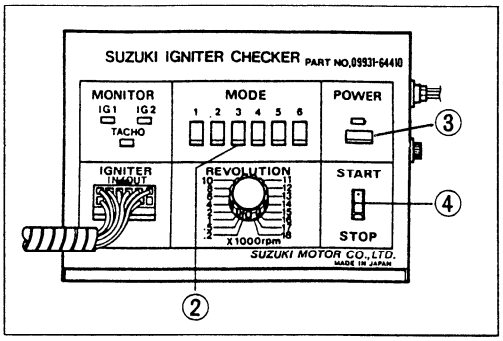
NOTE:
When making this test, be sure that the battery is fully-charged condition.



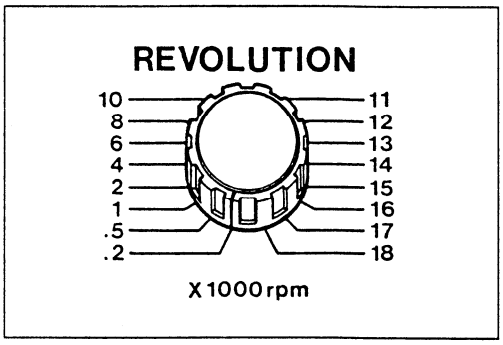
CHECK PROCEDURE:
With all the lead wires properly connected, check the ignitor unit in the following steps:



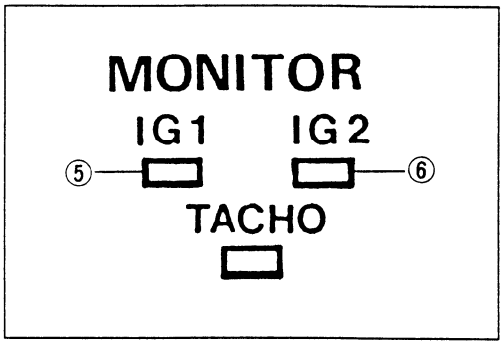
FIRST STEP:
Set "MODE" switch ① on the adaptor to "3" position and depress "MODE 3" button ② then "POWER" button ③. This time, "POWER" lamp should come on. If not, battery is under-charged condition.



SECOND STEP:
Set "REVOLUTION" dial to ".2" position in which the checker produces the ignition primary current pulses simulating 200 r/min of engine revolution when "START" switch is turned on. With "START" switch ④ is turned to on position, check that two "MONITOR" lamps turn on and off in slow frequency in order of ⑤ — ⑥ as illustrated.
If these lamps do not turn on and off, the ignitor unit should be replaced.



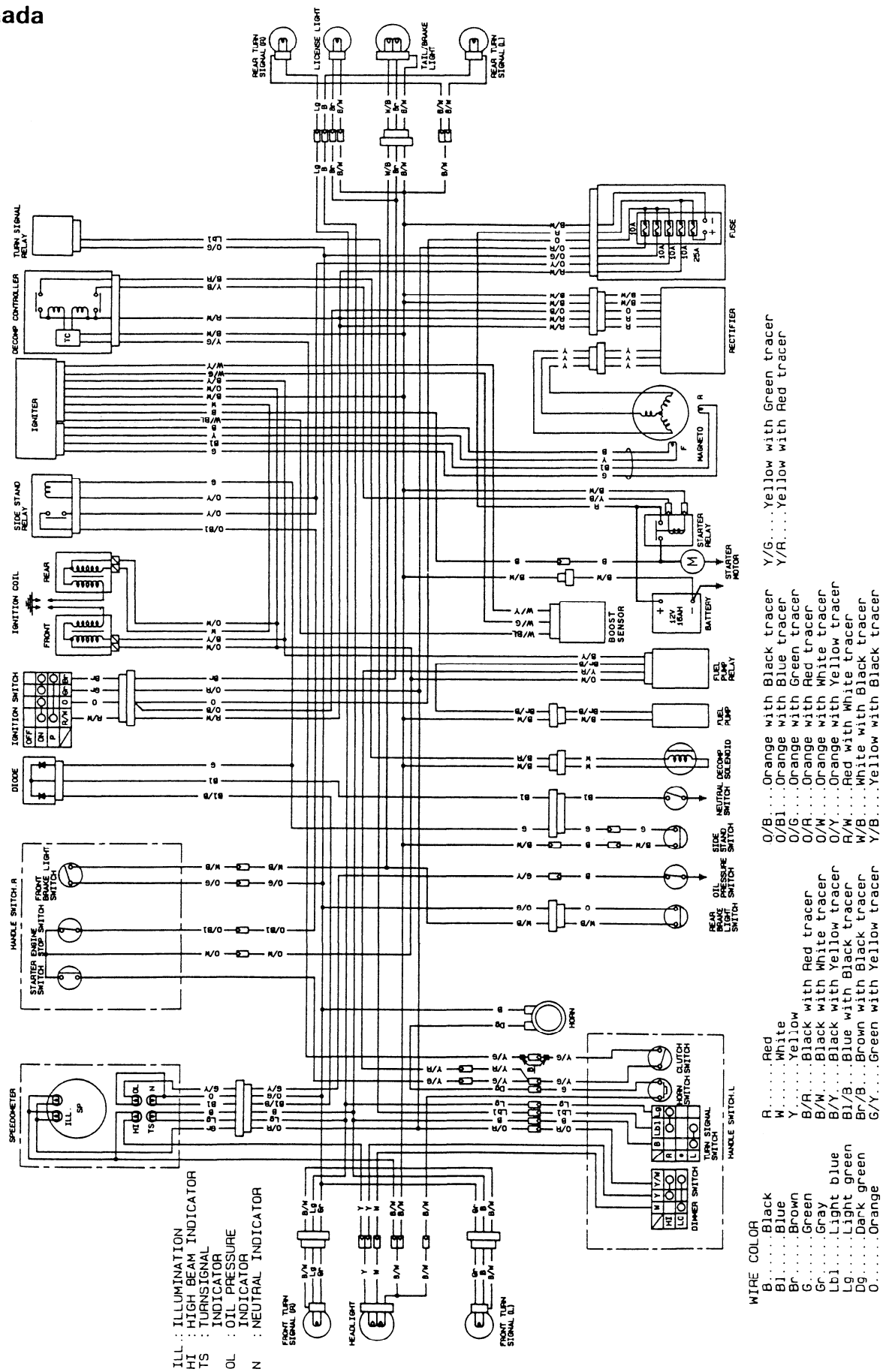
THIRD STEP:
Turn "REVOLUTION" dial up gradually (assuming the engine is gradually revved up) and check that the MONITOR lamps flash frequency as explained in the SECOND STEP above increases. As the dial pointer passes beyond the graduation "4" (4 000 r/min), the two lamps should show continuously lighted. When REVOLUTION dial pointer reaches between "6" and "8" (6 000—8 000 r/min), MONITOR ⑤ and ⑥ lamps should go off. This is because the ignition "cut-off" provided in the VS1400 ignition system functions at 6 500 ± 100 r/min. If the lamps go off at the graduation below "6" the engine can not perform properly and therefore the ignitor unit must be replaced.



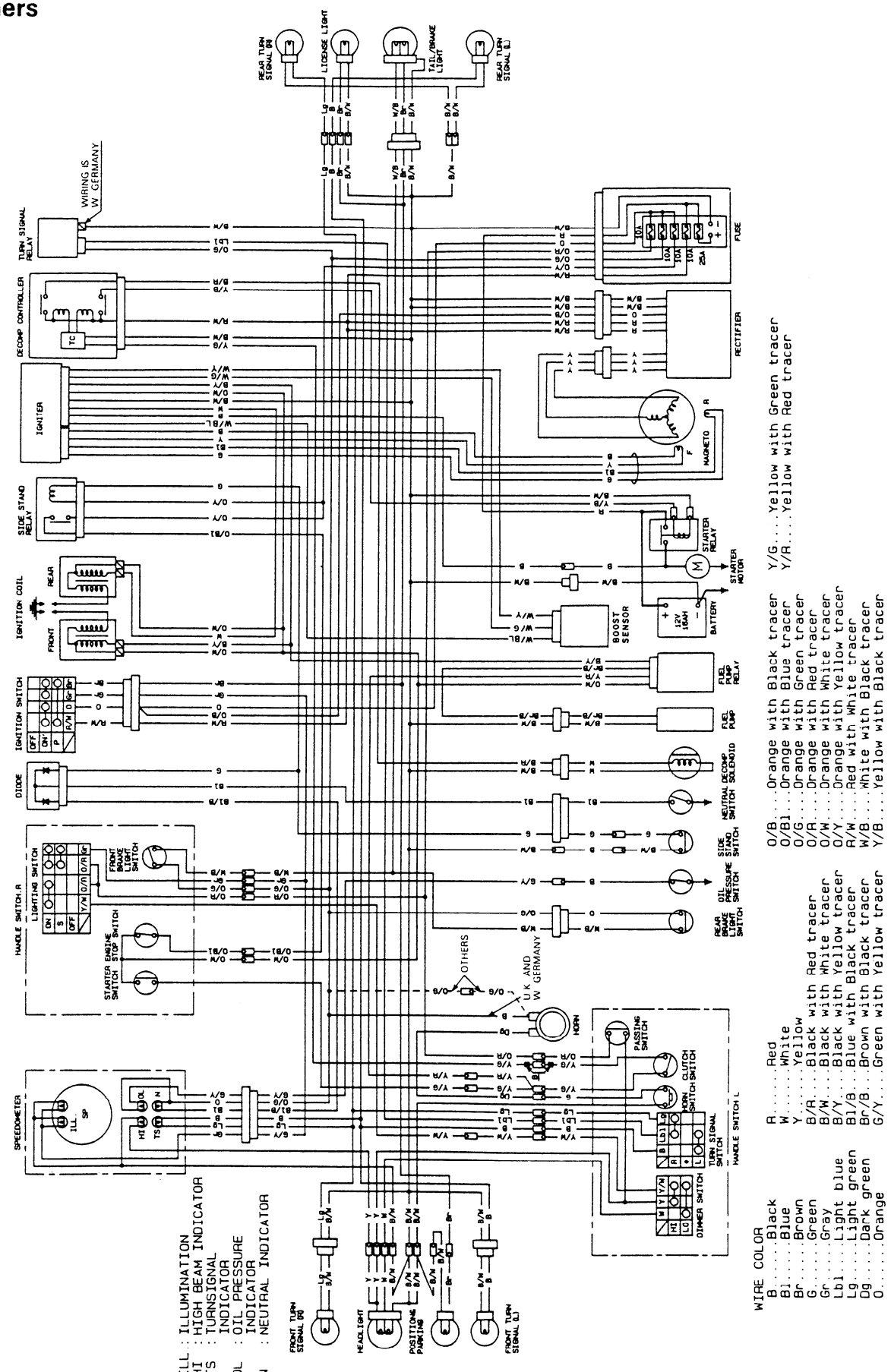
FOURTH STEP:
Turn "START" switch to STOP position.
If the "IG1" or "IG2", or both lamps remain light more than 5 seconds, the ignitor unit must be replaced.

WIRING DIAGRAM

For Canada

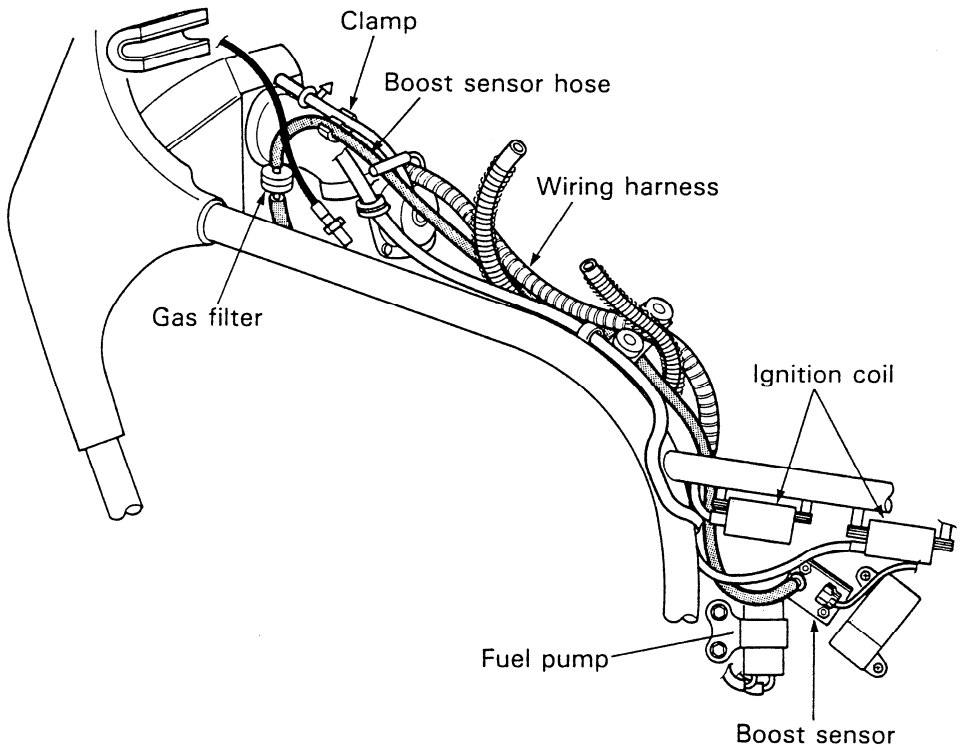


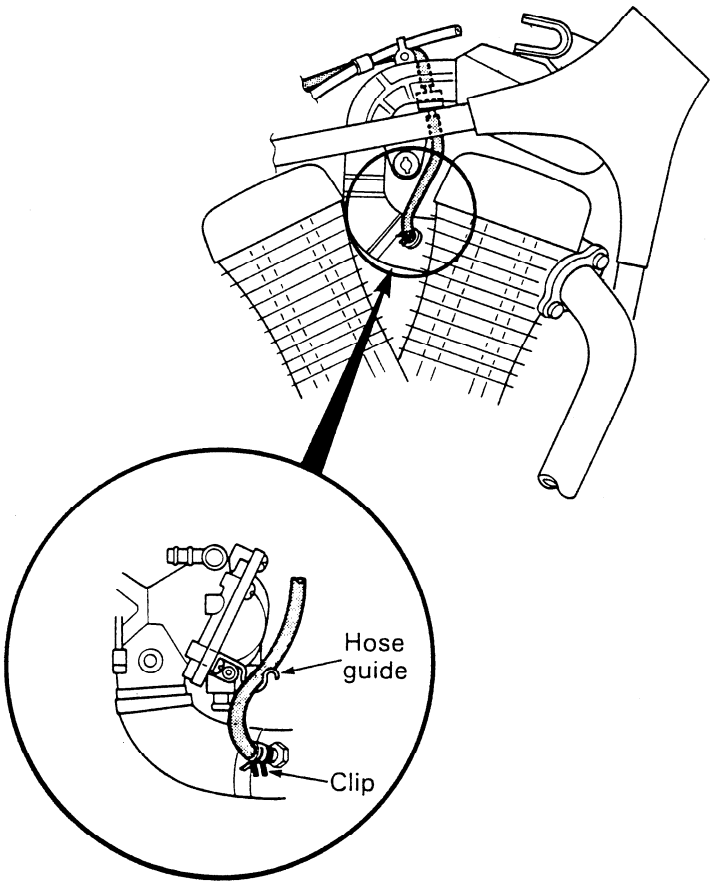
For Others


REAR TURN SIGNAL RR
LICENSE LIGHT
TAIL/BRAKE LIGHT
REAR TURN SIGNAL RL
WIRING IS W GERMANY
TURN SIGNAL RELAY
DECOMP CONTROLLER
IGNITER
SIDE STAND RELAY
IGNITION COIL
REAR
FRONT
IGNITION SWITCH
DIODE
HANDLE SWITCH R
LIGHTING SWITCH
FRONT BRAKE LIGHT SWITCH
STARTER ENGINE STOP SWITCH
OTHERS
U K AND W GERMANY
HORN
SPEEDOMETER
HANDLE SWITCH L
PASSING SWITCH
CLUTCH SWITCH
HORN SWITCH
TURN SIGNAL SWITCH
DIMMER SWITCH
FUSE
RECTIFIER
MAGNETO
STARTER RELAY
STARTER MOTOR
BATTERY
12V 16AH
BOOST SENSOR
FUEL PUMP RELAY
FUEL PUMP
NEUTRAL DECOMP SWITCH SOLENOID
SIDE STAND SWITCH
OIL PRESSURE SWITCH
REAR BRAKE LIGHT SWITCH
FRONT TURN SIGNAL RR
HEADLIGHT
POSITION/ PARKING
FRONT TURN SIGNAL RL
ILL. : ILLUMINATION
HI : HIGH BEAM INDICATOR
TS : TURNSIGNAL INDICATOR
OL : OIL PRESSURE INDICATOR
N : NEUTRAL INDICATOR
WIRE COLOR
B.....Black
Bl.....Blue
Br.....Brown
G.....Green
Gr.....Gray
Lbl....Light blue
Lg.....Light green
Dg.....Dark green
O.....Orange
R.....Red
W.....White
Y.....Yellow
B/R....Black with Red tracer
B/W....Black with White tracer
B/Y....Black with Yellow tracer
Bl/B...Blue with Black tracer
Br/B...Brown with Black tracer
G/Y....Green with Yellow tracer
O/B....Orange with Black tracer
O/Bl...Orange with Blue tracer
O/G....Orange with Green tracer
O/R....Orange with Red tracer
O/W....Orange with White tracer
O/Y....Orange with Yellow tracer
R/W....Red with White tracer
W/B....White with Black tracer
Y/B....Yellow with Black tracer
Y/G....Yellow with Green tracer
Y/R....Yellow with Red tracer

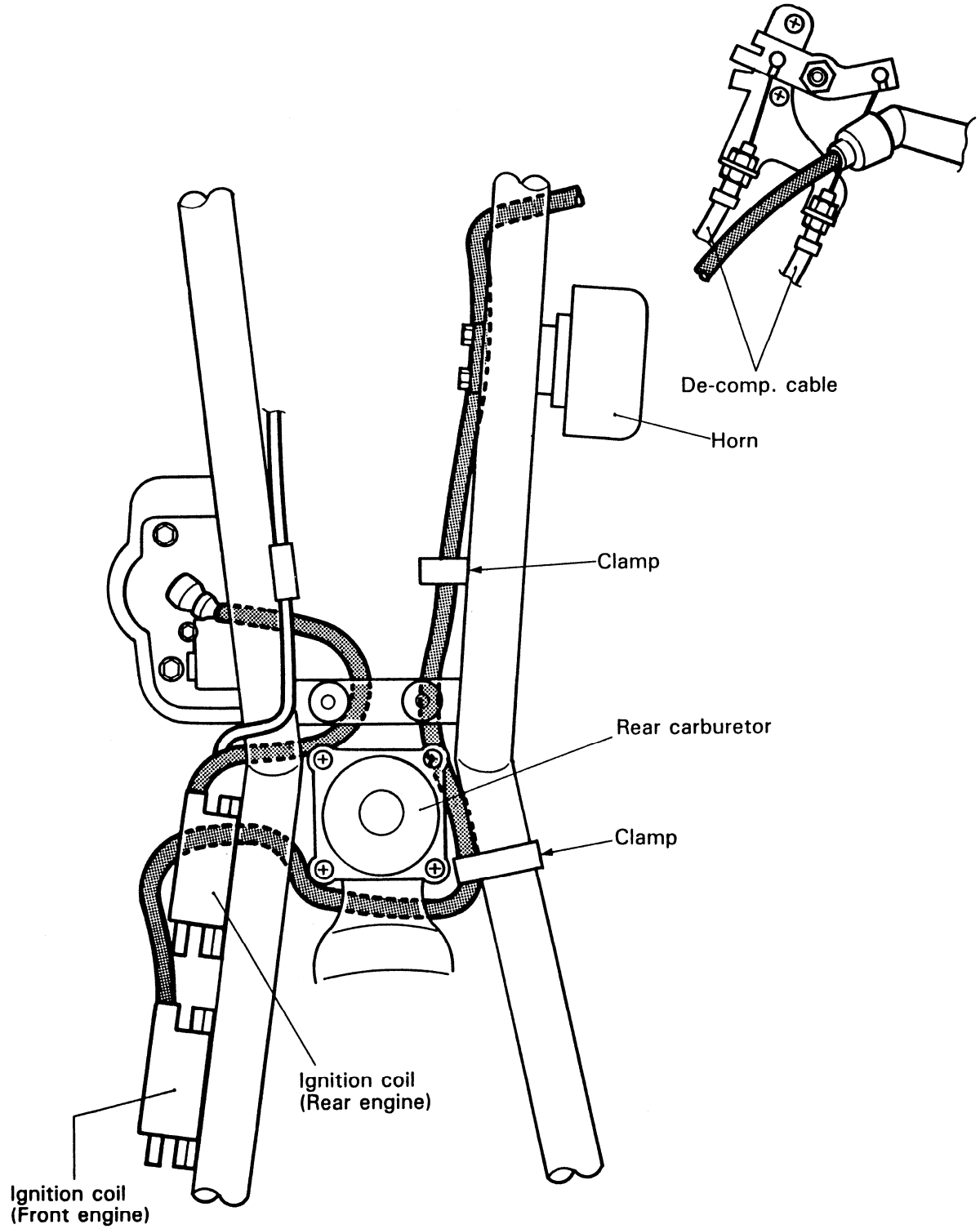
HOSE AND CORD ROUTING

IGNITION TIMING CONTROL BOOST SENSOR HOSE ROUTING





HIGH TENSION CORD ROUTING



CONTENTS

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM		STANDARD	LIMIT
Valve diam.	IN.	33 (1.3)	———
	EX.	40 (1.6)	———
Valve lift	IN.	8 (0.31)	———
	EX.	9 (0.35)	———
Lash-adjuster plunger stroke		0—0.5 (0—0.02)	———
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	0.35 (0.014)
	EX.	0.040—0.070 (0.0016—0.0028)	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	———
	EX.	7.000—7.012 (0.2756—0.2761)	———
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	———
	EX.	6.945—6.960 (0.2734—0.2740)	———
Valve stem runout	IN. & EX.	———	0.05 (0.002)
Valve head thickness	IN. & EX.	———	0.5 (0.02)
Valve stem end length	IN. & EX.	———	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	———
Valve head radial runout	IN. & EX.	———	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	———	35.0 (1.38)
	OUTER	———	37.8 (1.49)
Valve spring free length (EXHAUST)		———	40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3—6.5 kg (11.68—14.33 lbs) at length 28.0 mm (1.10 in)	———
	OUTER	14.0—14.2 kg (30.86—31.31 lbs) at length 31.5 mm (1.24 in)	———
Valve spring tension (EXHAUST)		20.3—23.3 kg (44.75—51.37 lbs) at length 35.0 mm (1.38 in)	———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683–35.723 (1.4048–1.4064)	35.41 (1.394)
	EX.	36.883–36.923 (1.4521–1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032–0.066 (0.0013–0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	20.012–20.025 (0.7879–0.7884)	———
	Front head left side, rear head right side	25.012–25.025 (0.9847–0.9852)	———
Camshaft journal O.D.	Front head right side, rear head left side	19.959–19.980 (0.7858–0.7866)	———
	Front head left side, rear head right side	24.959–24.980 (0.9826–0.9835)	———
Camshaft runout	Front & Rear	———	0.10 (0.004)
Cam chain 20-pitch length	———		128.9 (5.07)
Rocker arm I.D.	IN.	14.000–14.018 (0.5511–0.5519)	———
	EX.	16.000–16.018 (0.6299–0.6306)	———
Rocker arm shaft O.D.	IN.	13.966–13.984 (0.5498–0.5506)	———
	EX.	15.966–15.984 (0.6286–0.6293)	———
Cylinder head distortion	———		0.05 (0.002)
Cylinder head cover distortion	———		0.05 (0.002)
De-comp lever clearance	Front	1.5–2.5 (0.06–0.10)	———
	Rear	1.0–2.0 (0.04–0.08)	———

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000–1 400 kPa (10–14 kg/cm^2) (142–199 psi)	800 kPa (8 kg/cm^2) (114 psi)
Compression pressure difference	———	200 kPa (2 kg/cm^2) (28 psi)
Piston to cylinder clearance	0.05–0.06 (0.0020–0.0024)	0.120 (0.0047)
Cylinder bore	94.000–94.015 (3.7008–3.7014)	94.080 (3.7039)

ITEM	STANDARD			LIMIT
Piston diam.	93.945—93.960 (3.6986—3.6992) Measure at 16 mm (0.6 in) from the skirt end.			93.880 (3.6960)
Cylinder distortion	———			0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30—0.45 (0.012—0.018)	0.70 (0.028)
	2nd		0.25—0.40 (0.010—0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040—0.075 (0.0016—0.0030)	0.180 (0.007)
	2nd		0.025—0.060 (0.0010—0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230—1.250 (0.0484—0.0492)	———
	2nd		1.510—1.530 (0.0594—0.0602)	———
	Oil		2.810—2.830 (0.1106—0.1114)	———
Piston ring thickness	1st		1.175—1.190 (0.0463—0.0469)	———
	2nd		1.470—1.485 (0.0579—0.0585)	———
Piston pin bore	23.000—23.006 (0.9055—0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996—23.000 (0.9054—0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006—23.014 (0.9057—0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10—0.20 (0.004—0.008)	0.3 (0.012)
Conrod big end width	21.95—22.00 (0.864—0.866)	———
Crank pin width	22.10—22.15 (0.870—0.872)	———
Conrod big end oil clearance	0.024—0.042 (0.0009—0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982—50.000 (1.9678—1.9685)	———
Crankshaft journal oil clearance	0.020—0.050 (0.0008—0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965—51.980 (2.0459—2.0465)	———

ITEM	STANDARD	LIMIT
Crankshaft thrust bearing thickness	1.925—2.175 (0.0758—0.0856)	———
Crankshaft thrust clearance	0.05—0.10 (0.002—0.004)	———
Crankshaft runout	———	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 × 31/40)	———
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm^2, 50 psi) Below 650 kPa (6.5 kg/cm^2, 92 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Drive plate thickness	No.1	2.72—2.88 (0.107—0.113)	2.42 (0.095)
	No.2	3.45—3.55 (0.136—0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.2 (0.600)
	No.2	15.9—16.0 (0.626—0.630)	15.2 (0.600)
Driven plate distortion	———		0.10 (0.004)
Clutch spring free length	No.1	———	27.6 (1.09)
	No.2	———	20.0 (0.79)
Clutch master cylinder bore	14.000—14.043 (0.5512—0.5529)		———
Clutch master cylinder piston diam.	13.957—13.984 (0.5495—0.5506)		———
Clutch release cylinder bore	35.700—35.762 (1.4055—1.4079)		———
Clutch release cylinder piston diam.	35.650—35.675 (1.4035—1.4045)		———

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.645 (79/48)		———
Secondary reduction ratio		0.852 (29/34 × 19/19)		———
Final reduction ratio		2.666 (32/12)		———
Gear ratios	Low	3.000 (36/12)		———
	2nd	1.823 (31/17)		———
	3rd	1.333 (28/21)		———
	4th	E-04, 17, 21, 22, 34	1.086 (25/23)	———
	Top	E-01, 03, 28, 33, 39	1.041 (25/24)	———
		E-04, 17, 21, 22, 34	0.960 (24/25)	———

ITEM	STANDARD		LIMIT
Shift fork to groove clearance	01—0.3 (0.004—0.012)		0.5 (0.020)
Shift fork groove width	No.1	5.50—5.60 (0.217—0.220)	———
	No. 2	5.50—5.60 (0.217—0.220)	———
	No. 3	E-04, 17, 21, 22, 34: 5.50—5.60 (0.217—0.220)	———
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	———
	No. 2	5.30—5.40 (0.209—0.213)	———
	No. 3	E-04, 17, 21, 22, 34: 5.30—5.40 (0.209—0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.15 (0.001—0.006)		———
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	———

CARBURETOR

ITEM	SPECIFICATION			
	E-03		E-33	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←	36 mm	←
I.D. No.	38B40	←	38B50	←
Idle r/min.	1 000 ± 50 r/min.	←	1 000 ± 50 r/min	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	# 140	# 125	# 140	# 125
Main air jet (M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle (J.N.)	5D35-1st	5D51-1st	5D35-1st	5D51-1st
Needle jet (N.J.)	P-2	0-9	P-2	0-9
Throttle valve (Th.V.)	#120	#110	#120	#110
Pilot jet (P.J.)	# 55	# 50	# 55	# 50
By-pass (B.P.)	0.8 mm × 3pcs	←	0.8 mm × 3pcs	←

ITEM		SPECIFICATION			
		E-03		E-33	
Pilot outlet	(P.O.)	0.7 mm	1.0 mm	0.7 mm	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET	←	PRE-SET	←
Pilot air jet 1	(P.A.J.1)	#40	#70	#40	#70
Pilot air jet 2	(P.A.J.2)	1.55 mm	1.4 mm	1.55 mm	1.4 mm
Throttle cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

ITEM		SPECIFICATION			
		E-22, 39		E-01, 04, 17, 21, 28	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. No.		38B90	←	38B70	←
Idle r/min.		1 000±50 r/min.	←	1 000±50 r/min	←
Fuel level		9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)	9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)
Float height		27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet	(M.J.)	#140	#125	#140	#125
Main air jet	(M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle	(J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd
Needle jet	(N.J.)	P-3	P-0	P-3	P-0
Throttle valve	(Th.V.)	#110	←	#110	←
Pilot jet	(P.J.)	#57.5	#50	#57.5	#50
By-pass	(B.P.)	0.8 mm × 3pcs	←	0.8 mm × 3pcs	←
Pilot outlet	(P.O.)	0.8 mm	1.0 mm	0.8 mm	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET ($1\frac{3}{4}$ turns back)	←	PRE-SET ($1\frac{3}{4}$ turns back)	←
Pilot air jet 1	(P.A.J.1)	#60	#55	#60	#55
Pilot air jet 2	(P.A.J.2)	1.9 mm	1.7 mm	1.9 mm	1.7 mm
Throttle cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Ignition timing		2° B.T.D.C. below 1 250 r/min.		E-03, 33
		30° B.T.D.C. above 4 000 r/min.		
		2° B.T.D.C. below 1 500 r/min.		Others
		30° B.T.D.C. above 4 000 r/min		
Firing order		R·F		
Spark plug		Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
		Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance		Over 8 (0.3) at 1 atm.		
Signal coil resistance		240 ± 20 % Ω		Bl–G, B–Y
Ignition coil resistance		Primary	1–7 Ω	⊕ tap–⊖ tap
		Secondary	10–25 kΩ	Plug cap–⊖ tap
Generator no-load voltage		More than 80 V (AC) at 5 000 r/min		
Regulated voltage		14.0–15.5 V at 5 000 r/min.		
Starter motor brush length		N.D.	Limit: 9.0 (0.35)	
commutator under-cut		Limit: 0.2 (0.008)		
Starter relay resistance		2–6 Ω		
De-comp. solenoid resistance		0.1–1.0 Ω		
Side stand and neutral relay		120 ± 20 %Ω		
Fuel pump resistance		1–2 Ω		
Fuel pump discharge amount		More than 600 ml (1.27 US qt)/minute		
Battery	Type designation	FTH 16–12		
	Voltage	12 V		
	Capacity	50.4 kC (14 Ah)/10 HR		
	Standard electrolyte S.G.	1.32 at 20°C (68°F)		
Fuse size	HEADLIGHT	10 A		
	SIGNAL	10 A		
	IGNITION	10 A		
	MAIN	25 A		
	POWER SOURCE	10 A		

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-01, 03, 28, 33	E-02	Others
Headlight	HI	60	←	←
	LO	55	←	←
Tail/Brake light		8/27	5/21	←
Turn signal light		21	←	←
Running light		5		
Speedometer light		3	←	←
Turn signal indicator light		3	←	←

ITEM	SPECIFICATION		
	E-01, 03, 28, 33	E-02	Others
High beam indicator light	1.7	←	←
Neutral indicator light	3	←	←
Oil pressure indicator light	3	←	←
License light	7.5	5	←
Parking or city light		3.4	4

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	22 (0.87)		———
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Breake disc runout	———		0.30 (0.012)
Master cylinder bore	Front	12.700—12.743 (0.5000—0.5017)	———
	Rear	12.700—12.743 (0.4999—0.5017)	———
Master cylinder piston diam.	Front	12.657—12.684 (0.4983—0.4994)	———
	Rear	12.657—12.684 (0.4983—0.4994)	———
Brake caliper cylinder bore	Front	42.850—42.926 (1.6870—1.6900)	———
	Rear	42.850—42.926 (1.6870—1.6900)	———
Brake caliper piston diam.	Front	42.770—42.820 (1.6839—1.6858)	———
	Rear	42.770—42.820 (1.6839—1.6858)	———
Wheel rim runout	Axial	———	2.0 (0.08)
	Radial	———	2.0 (0.08)
Wheel axle runout	Front	———	0.25 (0.010)
	Rear	———	0.25 (0.010)
Tire size	Front	110/90—19 62H	———
	Rear	170/80—15 M/C 77H	———
Tire tread depth	Front	———	1.6 (0.06)
	Rear	———	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	———	
Front fork spring free length	———	549 (21.6)	
Front fork oil level	203 (7.99)	———	
Rear shock absorber spring adjuster	1/5		
Rear wheel travel	105 (4.1)	———	
Swingarm pivot shaft runout	———	0.30 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline or at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanorl with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline uded should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)		
reserve	3.0 L (3.2/2.6 US/Imp qt)		
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	3 700 ml (3.9/3.3 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	354 ml (12.0/12.5 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200—220 ml (6.8—7.4/7.0—7.7 US/Imp oz)	
Brake fluid type	DOT 4		

CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 335 mm (91.9 in)
Overall width	710 mm (28.0 in)...GLF 770 mm (30.3 in)...GLP
Overall height	1 135 mm (44.7 in)...GLF 1 220 mm (48.0 in)...GLP
Wheelbase	1 620 mm (63.8 in)
Ground clearance	150 mm (5.9 in)
Dry mass	242 kg (533 lbs) ...GLF, E-03, 28 243 kg (535 lbs) ...GLF, others 244 kg (537 lbs) ...GLP, E-33 243 kg (535 lbs) ...GLP, others

ENGINE

Type	Four-stroke, 3 valves, OHC, 45-degree V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Piston displacement	1 360 cm^3 (83.0 cu.in)
Compression ratio	9.3 : 1
Carburetor	MIKUNI BDS36SS...front MIKUNI BS36SS...rear
Air cleaner	Polyurethane foam element
Starter system	Electric starter motor
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	4-speed constant mesh···E01,03,28,33 5-speed constant mesh···Others
Gearshift pattern	1-down, 3-up...E-01,03, 28,33 1-down, 4-up...Others
Primary reduction	1.645 (79/48)
Secondary reduction	0.852 (29/34 × 19/19)
Final reduction	2.666 (32/12)
Gear ratios, Low	3.000 (36/12)
2nd	1.823 (31/17)
3rd	1.333 (28/21)
4th	1.086 (25/23)...E-04,17 21,22,34
Top	1.041 (25/24)...E-01,03, 28,33 0.960 (24/25)...Others
Drive system	Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swingarm, oil damped, spring pre-load 5-way adjustable
Steering angle	40° (right & left)
Caster	54°00′
Trail	166 mm (6.5 in)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc brake
Rear brake	Disc brake
Front tire size	110/90 — 19 62H
Rear tire size	170/80 — 15 M/C 77H
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)

ELECTRICAL

Ignition type	Fully transistorized
Ignition timing	2° B.T.D.C. below 1 250 r/min and 30° B.T.D.C. above 4 000 r/min...E-03, 33 2° B.T.D.C. below 1 500 r/min and 30° B.T.D.C. above 4 000 r/min...Others.
Spark plug	N.G.K.: DPR8EA-9 N.D.: X24EPR-U9
Battery	12V 50.4 kC (14 Ah)/ 10HR
Generator	Three phase A.C. Generator
Fuse	10A × 4, 25A × 1

CAPACITIES

Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)
reverse	3.0 L (3.2/2.6 US/Imp qt)
Engine oil with filter change	4.3 L (4.5/3.8 US/Imp qt)
without filter change	3.7 L (3.9/3.3 US/Imp qt)
Front fork oil	354 ml (12.0/12.5 US/Imp oz)
Final bevel gear oil	200 — 220 ml (6.8/7.0— 7.4/7.7 US/Imp oz)

These specifications are subject to change without notice.

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	———
	EX.	40 (1.6)	———
Valve lift	IN.	8 (0.31)	———
	EX.	9 (0.35)	———
Lash-adjuster plunger stroke	0—0.5 (0—0.02)		———
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	0.35 (0.014)
	EX.	0.040—0.070 (0.0016—0.0028)	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	———
	EX.	7.000—7.012 (0.2756—0.2761)	———
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	———
	EX.	6.945—6.960 (0.2734—0.2740)	———
Valve stem runout	IN. & EX.	———	0.05 (0.002)
Valve head thickness	IN. & EX.	———	0.5 (0.02)
Valve stem end length	IN. & EX.	———	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	———
Valve head radial runout	IN. & EX.	———	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	———	35.0 (1.38)
	OUTER	———	37.8 (1.49)
Valve spring free length (EXHAUST)	———		40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3—6.5 kg (11.68—14.33 lbs) at length 28.0 mm (1.10 in)	———
	OUTER	14.0—14.2 kg (30.86—31.31 lbs) at length 31.5 mm (1.24 in)	———
Valve spring tension (EXHAUST)	20.3—23.3 kg (44.75—51.37 lbs) at length 35.0 mm (1.38 in)		———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683–35.723 (1.4048–1.4064)	35.41 (1.394)
	EX.	36.883–36.923 (1.4521–1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032–0.066 (0.0013–0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	20.012–20.025 (0.7879–0.7884)	———
	Front head left side, rear head right side	25.012–25.025 (0.9847–0.9852)	———
Camshaft journal O.D.	Front head right side, rear head left side	19.959–19.980 (0.7858–0.7866)	———
	Front head left side, rear head right side	24.959–24.980 (0.9826–0.9835)	———
Camshaft runout	Front & Rear	———	0.10 (0.004)
Cam chain 20-pitch length	———		128.9 (5.07)
Rocker arm I.D.	IN.	14.000–14.018 (0.5511–0.5519)	———
	EX.	16.000–16.018 (0.6299–0.6306)	———
Rocker arm shaft O.D.	IN.	13.966–13.984 (0.5498–0.5506)	———
	EX.	15.966–15.984 (0.6286–0.6293)	———
Cylinder head distortion	———		0.05 (0.002)
Cylinder head cover distortion	———		0.05 (0.002)
De-comp lever clearance	Front	1.5–2.5 (0.06–0.10)	———
	Rear	1.0–2.0 (0.04–0.08)	———

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000–1 400 kPa (10–14 kg/cm^2) (142–199 psi)	800 kPa (8 kg/cm^2) (114 psi)
Compression pressure difference	———	200 kPa (2 kg/cm^2) (28 psi)
Piston to cylinder clearance	0.05–0.06 (0.0020–0.0024)	0.120 (0.0047)
Cylinder bore	94.000–94.015 (3.7008–3.7014)	94.080 (3.7039)

ITEM	STANDARD			LIMIT
Piston diam.	93.945–93.960 (3.6986–3.6992) Measure at 16 mm (0.6 in) from the skirt end.			93.880 (3.6960)
Cylinder distortion	———			0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30–0.45 (0.012–0.018)	0.70 (0.028)
	2nd		0.25–0.40 (0.010–0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040–0.075 (0.0016–0.0030)	0.180 (0.007)
	2nd		0.025–0.060 (0.0010–0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230–1.250 (0.0484–0.0492)	———
	2nd		1.510–1.530 (0.0594–0.0602)	———
	Oil		2.810–2.830 (0.1106–0.1114)	———
Piston ring thickness	1st		1.175–1.190 (0.0463–0.0469)	———
	2nd		1.470–1.485 (0.0579–0.0585)	———
Piston pin bore	23.000–23.006 (0.9055–0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996–23.000 (0.9054–0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006–23.014 (0.9057–0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10–0.20 (0.004–0.008)	0.3 (0.012)
Conrod big end width	21.95–22.00 (0.864–0.866)	———
Crank pin width	22.10–22.15 (0.870–0.872)	———
Conrod big end oil clearance	0.024–0.042 (0.0009–0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982–50.000 (1.9678–1.9685)	———
Crankshaft journal oil clearance	0.020–0.050 (0.0008–0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965–51.980 (2.0459–2.0465)	———

ITEM	STANDARD	LIMIT
Crankshaft thrust bearing thickness	1.925–2.175 (0.0758–0.0856)	———
Crankshaft thrust clearance	0.05–0.10 (0.002–0.004)	———
Crankshaft runout	———	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 × 31/40)	———
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm^2, 50 psi) Below 650 kPa (6.5 kg/cm^2, 92 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Drive plate thickness	No.1	2.72–2.88 (0.107–0.113)	2.42 (0.095)
	No.2	3.45–3.55 (0.136–0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8–16.0 (0.622–0.630)	15.2 (0.600)
	No.2	15.9–16.0 (0.626–0.630)	15.2 (0.600)
Driven plate distortion	———		0.10 (0.004)
Clutch spring free length	No.1	———	27.6 (1.09)
	No.2	———	20.0 (0.79)
Clutch master cylinder bore	14.000–14.043 (0.5512–0.5529)		———
Clutch master cylinder piston diam.	13.957–13.984 (0.5495–0.5506)		———
Clutch release cylinder bore	35.700–35.762 (1.4055–1.4079)		———
Clutch release cylinder piston diam.	35.650–35.675 (1.4035–1.4045)		———

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.645 (79/48)		———
Secondary reduction ratio		0.852 (29/34 × 19/19)		———
Final reduction ratio		2.666 (32/12)		———
Gear ratios	Low	3.000 (36/12)		———
	2nd	1.823 (31/17)		———
	3rd	1.333 (28/21)		———
	4th	E-04, 17, 21, 22, 34	1.086 (25/23)	———
	Top	E-01, 03, 28, 33	1.041 (25/24)	———
		E-04, 17, 21, 22, 34	0.960 (24/25)	———

ITEM	STANDARD		LIMIT
Shift fork to groove clearance	0.1—0.3 (0.004—0.012)		0.5 (0.020)
Shift fork groove width	No.1	5.50—5.60 (0.217—0.220)	———
	No. 2	5.50—5.60 (0.217—0.220)	———
	No. 3	E-04, 17, 21, 22, 34: 5.50—5.60 (0.217—0.220)	———
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	———
	No. 2	5.30—5.40 (0.209—0.213)	———
	No. 3	E-04, 17, 21, 22, 34: 5.30—5.40 (0.209—0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.15 (0.001—0.006)		———
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	———

CARBURETOR

ITEM	SPECIFICATION			
	E-03		E-33	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←	36 mm	←
I.D. No.	38B40	←	38B50	←
Idle r/min.	1 000 ± 50 r/min.	←	1 000 ± 50 r/min	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	# 140	# 125	# 140	# 125
Main air jet (M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle (J.N.)	5D35-1st	5D51-1st	5D35-1st	5D51-1st
Needle jet (N.J.)	P-2	O-9	P-2	O-9
Throttle valve (Th.V.)	#120	#110	#120	#110
Pilot jet (P.J.)	# 55	# 50	# 55	# 50
By-pass (B.P.)	0.8 mm × 3pcs	←	0.8 mm × 3pcs	←

ITEM		SPECIFICATION			
		E-03		E-33	
Pilot outlet	(P.O.)	0.7 mm	1.0 mm	0.7 mm	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET	←	PRE-SET	←
Pilot air jet 1	(P.A.J.1)	#40	#70	#40	#70
Pilot air jet 2	(P.A.J.2)	1.55 mm	1.4 mm	1.55 mm	1.4 mm
Throttle cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

ITEM		SPECIFICATION			
		E-22		E-01, 04, 17, 21, 28	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. No.		38B90	←	38B70	←
Idle r/min.		1 000±50 r/min.	←	1 000±50 r/min	←
Fuel level		9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)	9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)
Float height		27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet	(M.J.)	#140	#125	#140	#125
Main air jet	(M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle	(J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd
Needle jet	(N.J.)	P-3	P-0	P-3	P-0
Throttle valve	(Th.V.)	#110	←	#110	←
Pilot jet	(P.J.)	#57.5	#50	#57.5	#50
By-pass	(B.P.)	0.8 mm × 3pcs	←	0.8 mm × 3pcs	←
Pilot outlet	(P.O.)	0.8 mm	1.0 mm	0.8 mm	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET (1 3/4 turns back)	←	PRE-SET (1 3/4 turns back)	←
Pilot air jet 1	(P.A.J.1)	#60	#55	#60	#55
Pilot air jet 2	(P.A.J.2)	1.9 mm	1.7 mm	1.9 mm	1.7 mm
Throttle cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Ignition timing		2° B.T.D.C. below 1 250 r/min.		E-03, 33
		30° B.T.D.C. above 4 000 r/min.		
		2° B.T.D.C. below 1 500 r/min.		Others
		30° B.T.D.C. above 4 000 r/min		
Firing order		R·F		
Spark plug		Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
		Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance		Over 8 (0.3) at 1 atm.		
Signal coil resistance		240 ± 20 % Ω		Bl–G, B–Y
Ignition coil resistance		Primary	1–7 Ω	⊕ tap–⊖ tap
		Secondary	10–25 kΩ	Plug cap–⊖ tap
Generator no-load voltage		More than 80 V (AC) at 5 000 r/min.		
Regulated voltage		14.0–15.5 V at 5 000 r/min.		
Starter motor brush length		N.D.	Limit: 9.0 (0.35)	
commutator under-cut		Limit: 0.2 (0.008)		
Starter relay resistance		2–6 Ω		
De-comp. solenoid resistance		0.1–1.0 Ω		
Side stand and neutral relay		120 ± 20 %Ω		
Fuel pump resistance		1–2 Ω		
Fuel pump discharge amount		More than 600 ml (1.27 US qt)/minute		
Battery	Type designation	FTH 16–12		
	Voltage	12 V		
	Capacity	50.4 kC (14 Ah)/10 HR		
	Standard electrolyte S.G.	1.32 at 20°C (68°F)		
Fuse size	HEADLIGHT	10 A		
	SIGNAL	10 A		
	IGNITION	10 A		
	MAIN	25 A		
	POWER SOURCE	10 A		

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-01, 03, 28, 33	E-02	Others
Headlight	HI	60	←	←
	LO	55	←	←
Tail/Brake light		8/27	5/21	←
Turn signal light		21	←	←
Running light		5		
Speedometer light		3	←	←
Turn signal indicator light		3	←	←

ITEM	SPECIFICATION		
	E-01, 03, 28, 33	E-02	Others
High beam indicator light	1.7	←	←
Neutral indicator light	3	←	←
Oil pressure indicator light	3	←	←
License light	7.5	5	←
Parking or city light		3.4	4

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	22 (0.87)		———
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Breake disc runout	———		0.30 (0.012)
Master cylinder bore	Front	12.700–12.743 (0.5000–0.5017)	———
	Rear	12.700–12.743 (0.4999–0.5017)	———
Master cylinder piston diam.	Front	12.657–12.684 (0.4983–0.4994)	———
	Rear	12.657–12.684 (0.4983–0.4994)	———
Brake caliper cylinder bore	Front	42.850–42.926 (1.6870–1.6900)	———
	Rear	42.850–42.926 (1.6870–1.6900)	———
Brake caliper piston diam.	Front	42.770–42.820 (1.6839–1.6858)	———
	Rear	42.770–42.820 (1.6839–1.6858)	———
Wheel rim runout	Axial	———	2.0 (0.08)
	Radial	———	2.0 (0.08)
Wheel axle runout	Front	———	0.25 (0.010)
	Rear	———	0.25 (0.010)
Tire size	Front	110/90–19 62H	———
	Rear	170/80–15 M/C 77H	———
Tire tread depth	Front	———	1.6 (0.06)
	Rear	———	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	———	
Front fork spring free length	———	549 (21.6)	
Front fork oil level	203 (7.99)	———	
Rear shock absorber spring adjuster	1/5		
Rear wheel travel	105 (4.1)	———	
Swingarm pivot shaft runout	———	0.30 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline or at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanorl with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline uded should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)		
reserve	3.0 L (3.2/2.6 US/Imp qt)		
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	3 700 ml (3.9/3.3 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	354 ml (12.0/12.5 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200—220 ml (6.8—7.4/7.0—7.7 US/Imp oz)	
Brake fluid type	DOT 4		

IGNITOR UNIT INSPECTION

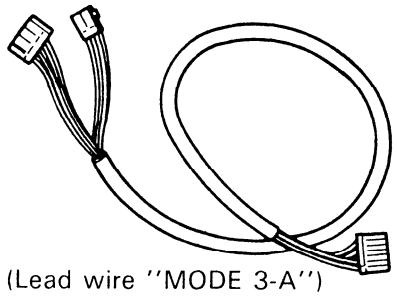
CHECKING WITH DIGITAL IGNITOR CHECKER

Check the ingnitor unit with the special tools as shown below.

09931-94430: Digital ignitor checker
***09931-94450: Lead wire "MODE 3-A"**
***09931-94460: Adaptor**

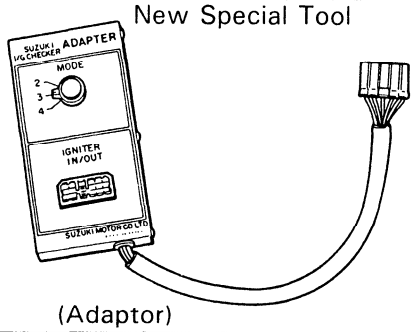
NOTE:
**Asterisk mark indicates the new special tools.*

New Special Tool



(Lead wire "MODE 3-A")

New Special Tool



(Adaptor)

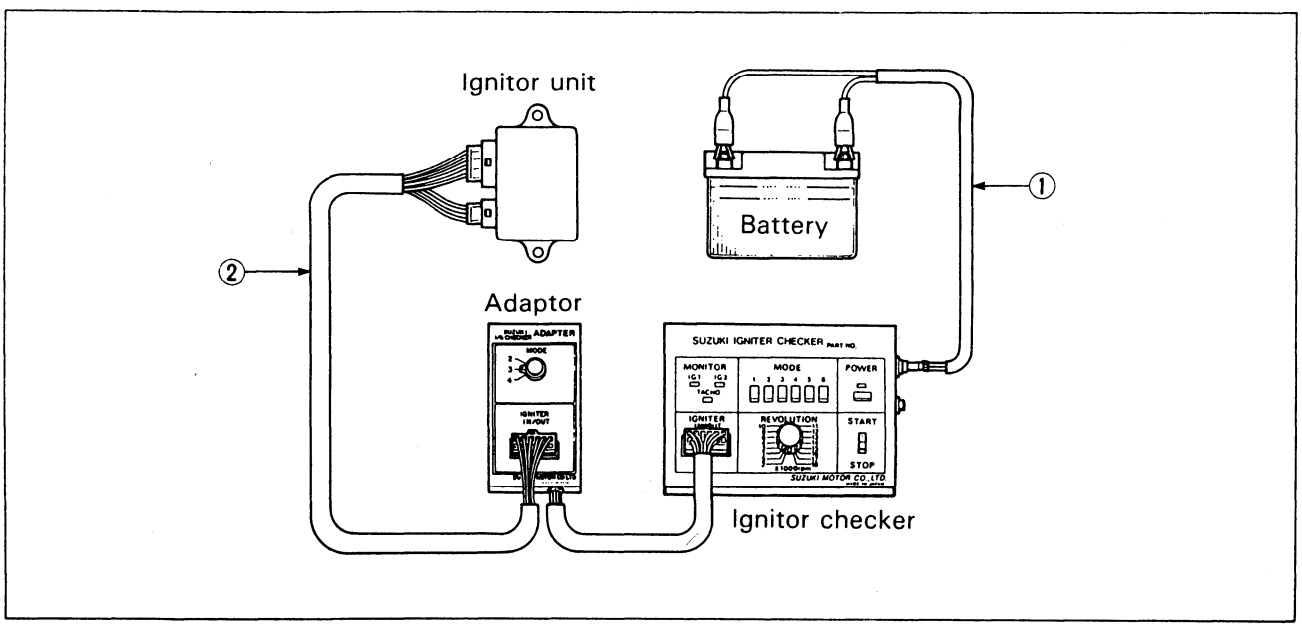
WIRING PROCEDURE:

- Remove the pillion seat and rider seat.
- Disconnect two ignitor lead wire couplers from the ignitor unit.
- Connect the power source lead wires ① and lead wire "MODE 3-A" ② as shown in the following illustration.

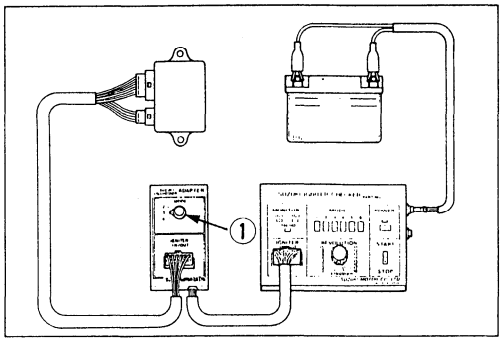
CAUTION:

- *** Do not use the battery equipped on the motorcycle.**
- *** Be sure to connect the black lead to the battery ⊖ terminal and red lead to the ⊕ terminal.**
- *** Make sure "START" switch is in "off" position before connecting the power source lead wires.**

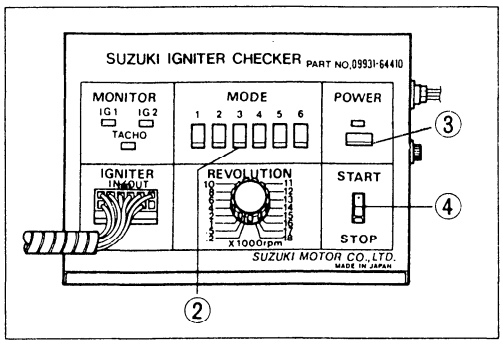
NOTE:
When making this test, be sure that the battery is fully-charged condition.



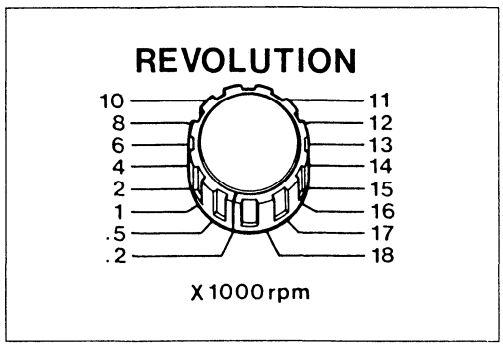
CHECK PROCEDURE:
With all the lead wires properly connected, check the ignitor unit in the following steps:



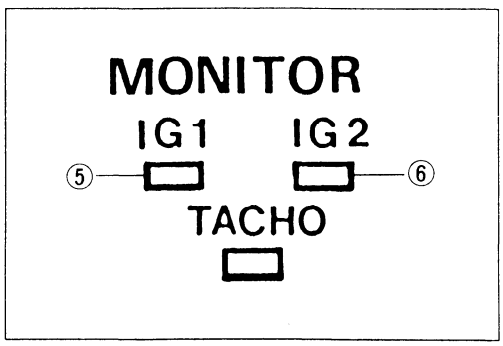
FIRST STEP:
Set "MODE" switch ① on the adaptor to "3" position and depress "MODE 3" button ② then "POWER" button ③. This time, "POWER" lamp should come on. If not, battery is under-charged condition.



SECOND STEP:
Set "REVOLUTION" dial to ".2" position in which the checker produces the ignition primary current pulses simulating 200 r/min of engine revolution when "START" switch is turned on. With "START" switch ④ is turned to on position, check that two "MONITOR" lamps turn on and off in slow frequency in order of ⑤ — ⑥ as illustrated.
If these lamps do not turn on and off, the ignitor unit should be replaced.



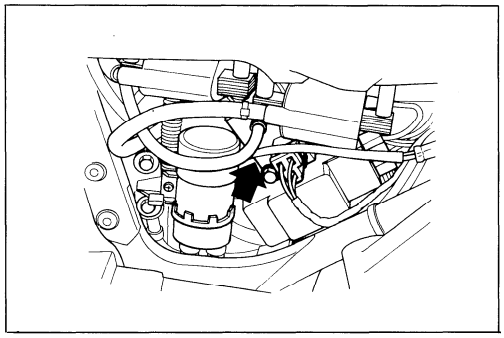
THIRD STEP:
Turn "REVOLUTION" dial up gradually (assuming the engine is gradually revved up) and check that the MONITOR lamps flash frequency as explained in the SECOND STEP above increases. As the dial pointer passes beyond the graduation "4" (4 000 r/min), the two lamps should show continuously lighted. When REVOLUTION dial pointer reaches between "6" and "8" (6 000—8 000 r/min), MONITOR ⑤ and ⑥ lamps should go off. This is because the ignition "cut-off" provided in the VS1400 ignition system functions at 6 500 ± 100 r/min. If the lamps go off at the graduation below "6" the engine can not perform properly and therefore the ignitor unit must be replaced.



FOURTH STEP:
Turn "START" switch to STOP position.
If the "IG1" or "IG2", or both lamps remain light more than 5 seconds, the ignitor unit must be replaced.

IGNITION TIMING CONTROL BOOST SENSOR

INSPECTION



- Remove the rider seat and left-frame cover.
- Check the boost sensor operation with the pocket tester and vacuum pump gauge.
- Replace the boost sensor, if it fails one of the following two inspection.

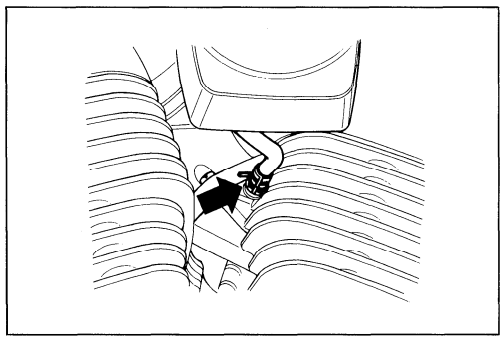
09900-25002: Pocket tester

09917-47910: Vacuum pump gauge

NOTE:

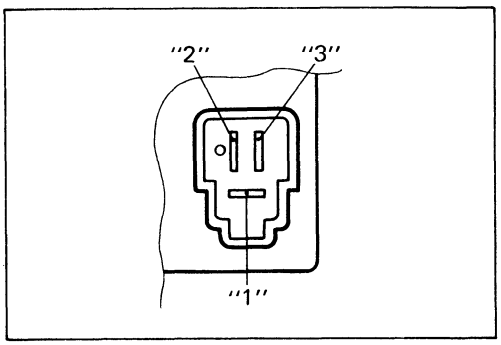
Be sure that the battery used is in fully-charged condition.

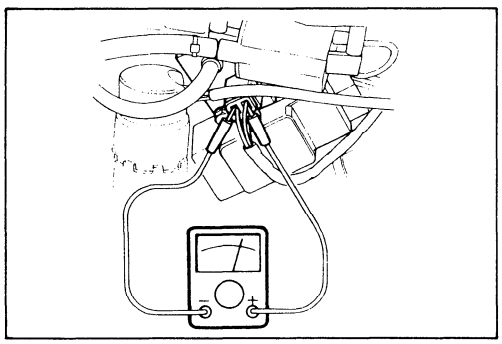
1.



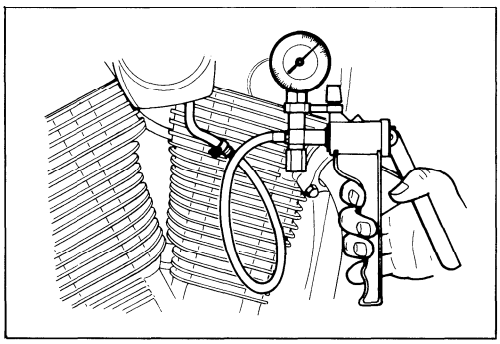
- Disconnect the boost sensor hose from the intake manifold at the front engine.
- Connect the ⊕ probe of the tester to terminal "3" and ⊖ probe of the tester to terminal "2" as shown in the illustration. (Tester range: DCV10)
- Turn on the ignition switch and check the voltage of the pocket tester.
- If the dial pointer indicates to approx. 3.0 voltage, it is in good condition.

Terminal 1: INPUT
Terminal 2: GROUND
Terminal 3: OUTPUT





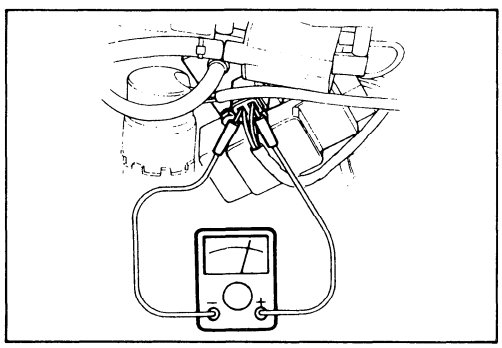
2.



- Connect the vacuum pump gauge to the boost sensor hose and apply the specified vacuum to the boost sensor.

SPECIFIED VACUUM: 250 mmHg

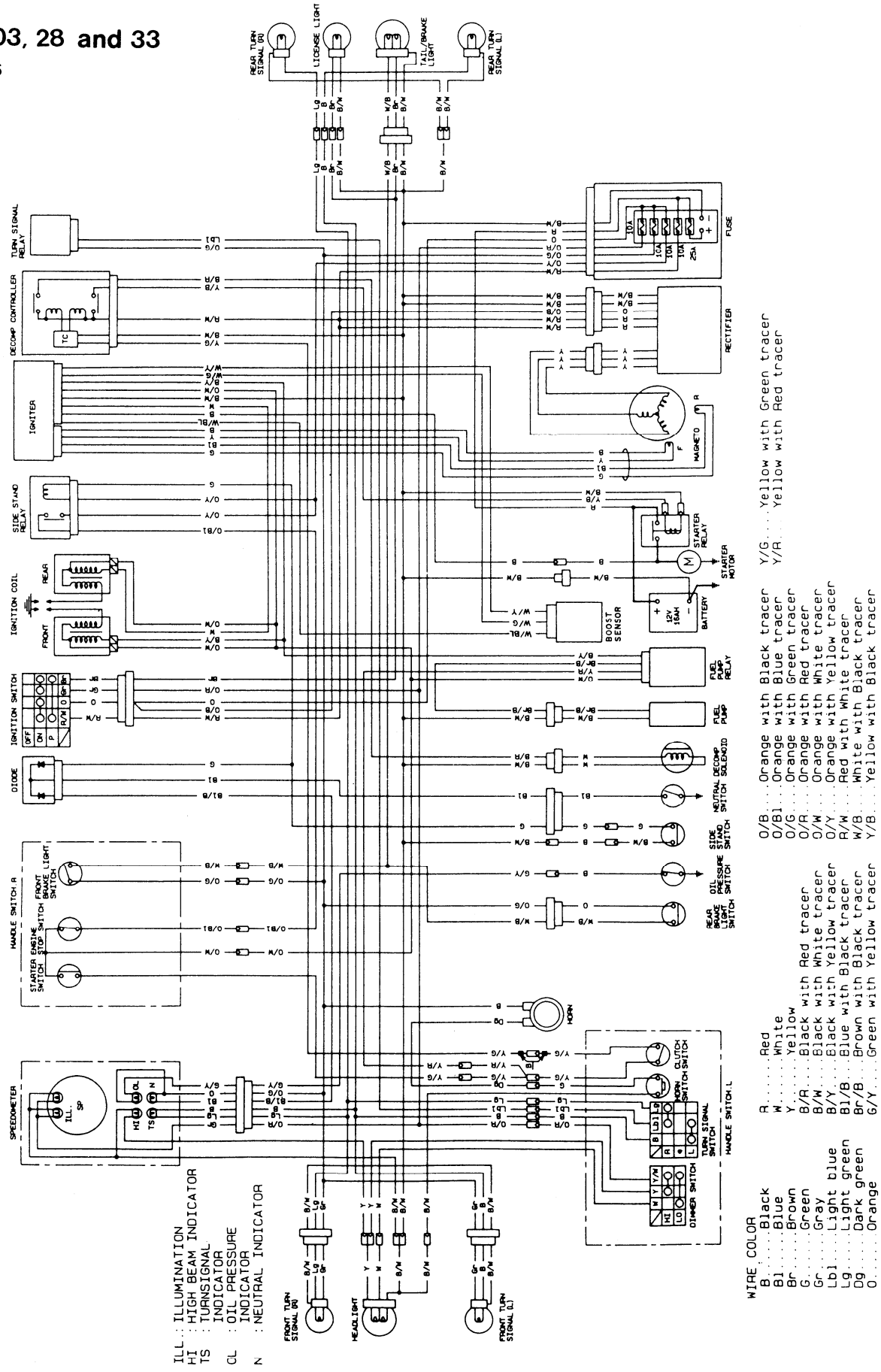
- Check the voltage of the pocket tester in the same manner as the above inspection.



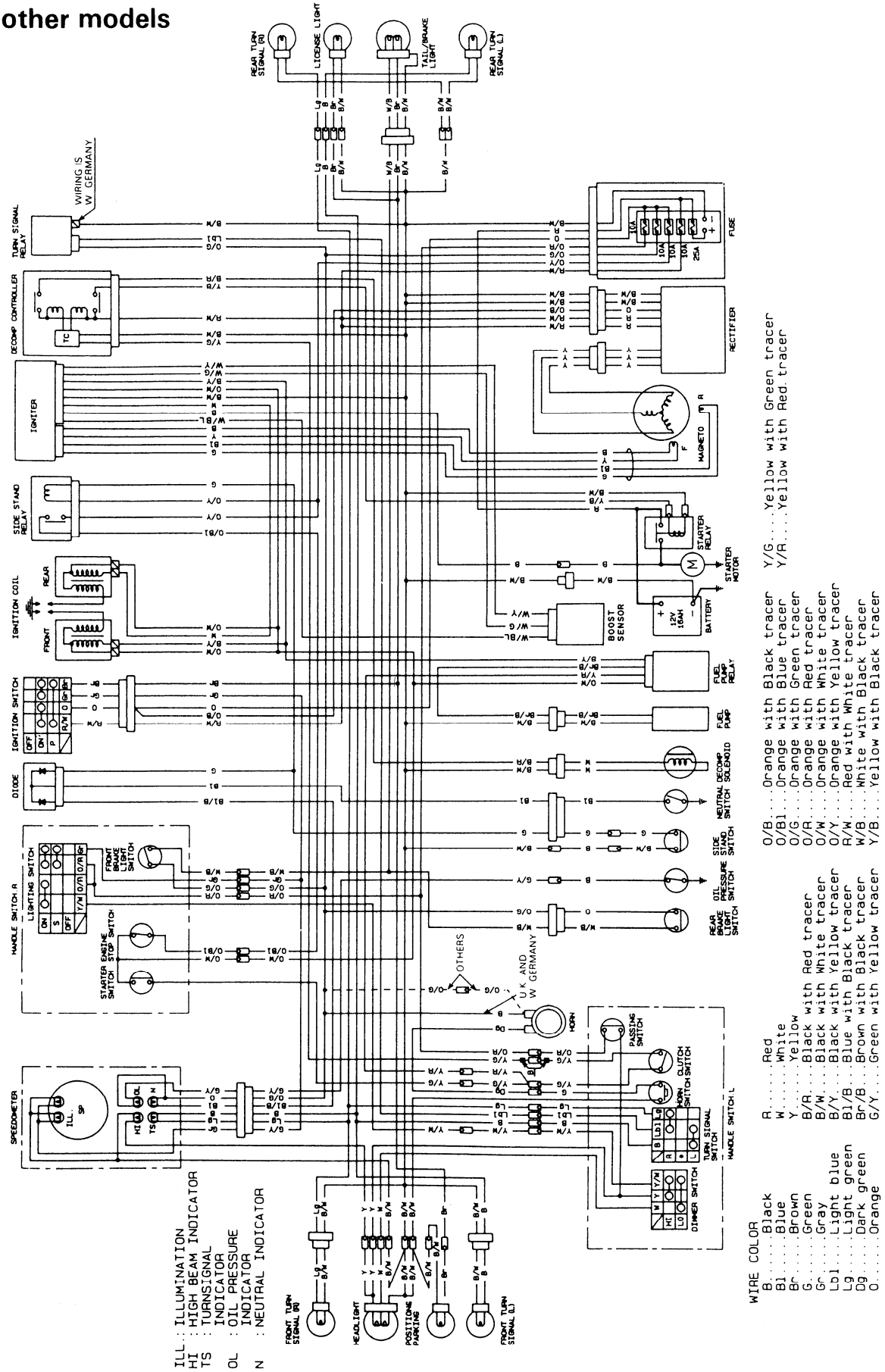
- If the dial pointer indicates to approx. 2.0 voltage, it is in good condition.

WIRING DIAGRAM

For E-03, 28 and 33 models



For the other models



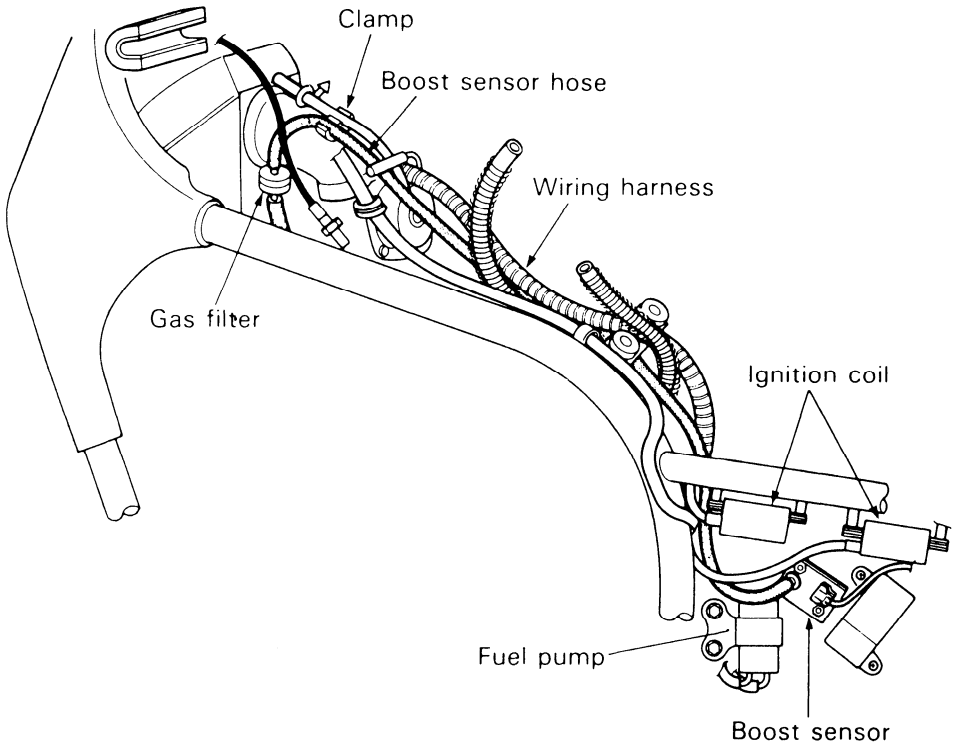
ILL. : ILLUMINATION
HI : HIGH BEAM INDICATOR
TS : TURNSIGNAL INDICATOR
OL : OIL PRESSURE INDICATOR
N : NEUTRAL INDICATOR

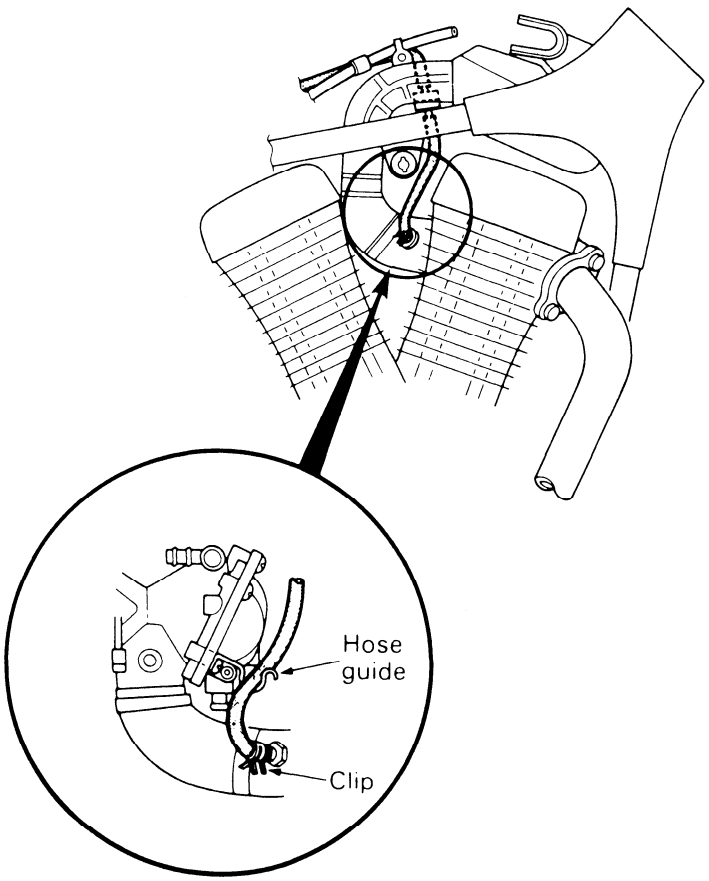
WIRE COLOR

B ....Black	R .....Red	O/B ...Orange with Black tracer	Y/G ....Yellow with Green tracer
Bl ....Blue	W .....White	O/Bl ...Orange with Blue tracer	Y/R ....Yellow with Red tracer
Br ....Brown	Y .....Yellow	O/G ...Orange with Green tracer	
G .....Green	B/R ...Black with Red tracer	O/R ...Orange with Red tracer	
Gr ....Gray	B/W ...Black with White tracer	O/W ...Orange with White tracer	
Lbl ...Light blue	B/Y ...Black with Yellow tracer	O/Y ...Orange with Yellow tracer	
Lg ....Light green	Bl/B ...Blue with Black tracer	R/W ....Red with White tracer	
Dg ....Dark green	Br/B ...Brown with Black tracer	W/B ....White with Black tracer	
O .....Orange	G/Y ...Green with Yellow tracer	Y/B ....Yellow with Black tracer	

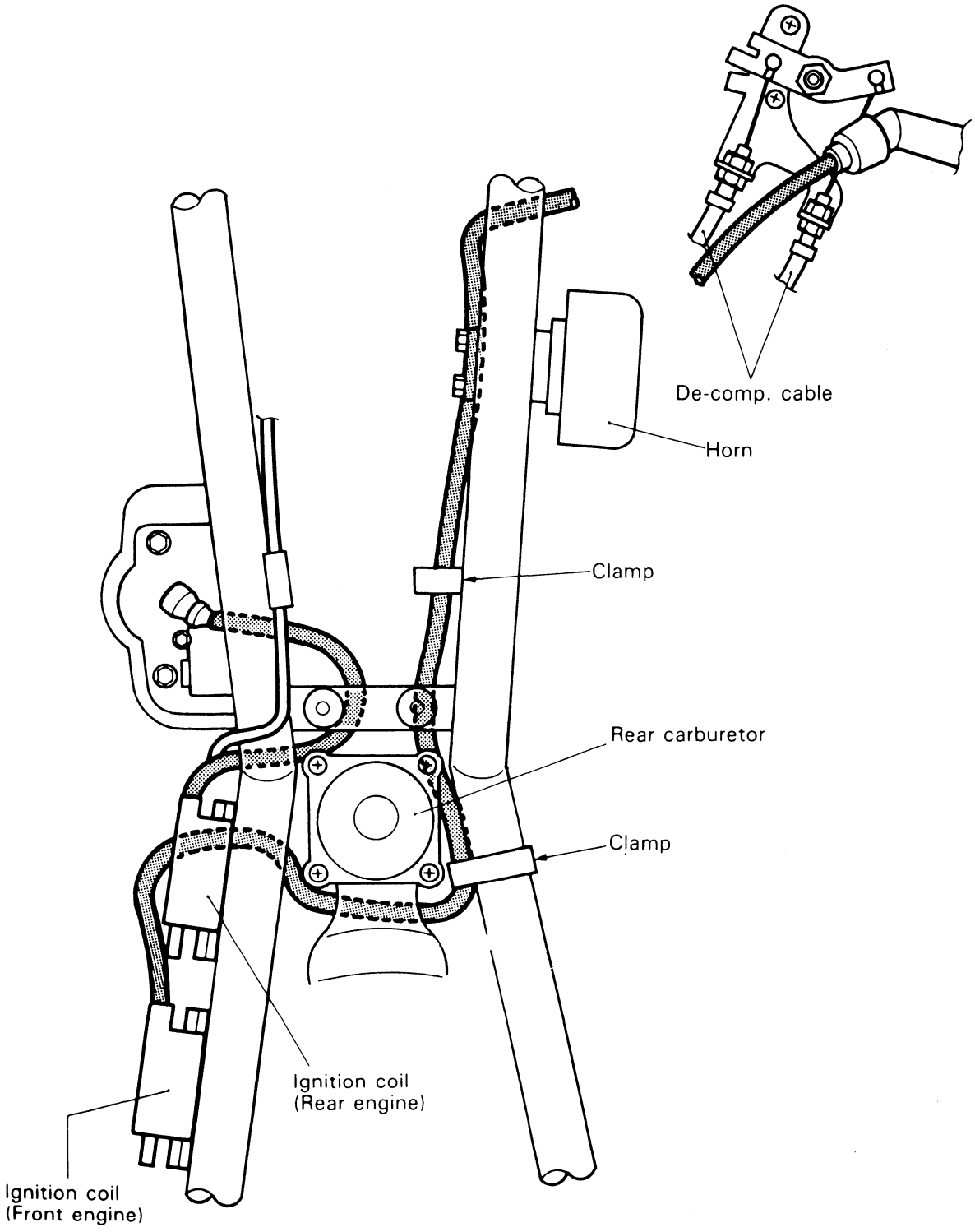
HOSE AND CORD ROUTING

IGNITION TIMING CONTROL BOOST SENSOR HOSE ROUTING





HIGH TENSION CORD ROUTING



VS1400GLFP/GLPP ('93 MODEL)

CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 335 mm (91.9 in)
Overall width	710 mm (28.0 in)...GLF 770 mm (30.3 in)...GLP
Overall height	1 135 mm (44.7 in)...GLF 1 220 mm (48.0 in)...GLP
Wheelbase	1 620 mm (63.8 in)
Ground clearance	150 mm (5.9 in)
Dry mass	242 kg (533 lbs) ...GLF, E-03, 28 243 kg (535 lbs) ...GLF, others 244 kg (537 lbs) ...GLP, E-33 243 kg (535 lbs) ...GLP, others

ENGINE

Type	Four-stroke, 3 valves, OHC, 45-degree V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Piston displacement	1 360 cm^3 (83.0 cu.in)
Compression ratio	9.3 : 1
Carburetor	MIKUNI BDS36SS...front MIKUNI BS36SS...rear
Air cleaner	Polyurethane foam element
Starter system	Electric starter motor
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	4-speed constant mesh···E01,03,28,33 5-speed constant mesh···Others
Gearshift pattern	1-down, 3-up...E-01,03, 28,33 1-down, 4-up...Others
Primary reduction	1.645 (79/48)
Secondary reduction	0.852 (29/34 × 19/19)
Final reduction	2.666 (32/12)
Gear ratios, Low	3.000 (36/12)
2nd	1.823 (31/17)
3rd	1.333 (28/21)
4th	1.086 (25/23)...E-04,17,21 22, 24, 34
Top	1.041 (25/24)...E-01,03, 28,33 0.960 (24/25)...Others
Drive system	Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swingarm, oil damped, spring pre-load 5-way adjustable
Steering angle	40° (right & left)
Caster	54°00'
Trail	166 mm (6.5 in)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc brake
Rear brake	Disc brake
Front tire size	110/90 – 19 62H
Rear tire size	170/80 – 15 M/C 77H
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)

ELECTRICAL

Ignition type	Fully transistorized
Ignition timing	2° B.T.D.C. below 1 250 r/min and 30° B.T.D.C. above 4 000 r/min...E-03, 33 2° B.T.D.C. below 1 500 r/min and 30° B.T.D.C. above 4 000 r/min...Others
Spark plug	N.G.K.: DPR8EA-9 N.D.: X24EPR-U9
Battery	12V 50.4 kC (14 Ah)/ 10HR
Generator	Three phase A.C. Generator
Fuse	10A × 4, 25A × 1

CAPACITIES

Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)
reserve	3.0 L (3.2/2.6 US/Imp qt)
Engine oil with filter change	4.3 L (4.5/3.8 US/Imp qt)
without filter change	3.7 L (3.9/3.3 US/Imp qt)
Front fork oil	354 ml (12.0/12.5 US/Imp oz)
Final bevel gear oil	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)

These specifications are subject to change without notice.

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM		STANDARD	LIMIT
Valve diam.	IN.	33 (1.3)	———
	EX.	40 (1.6)	———
Valve lift	IN.	8 (0.31)	———
	EX.	9 (0.35)	———
Lash-adjuster plunger stroke		0—0.5 (0—0.02)	———
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	0.35 (0.014)
	EX.	0.040—0.070 (0.0016—0.0028)	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	———
	EX.	7.000—7.012 (0.2756—0.2761)	———
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	———
	EX.	6.945—6.960 (0.2734—0.2740)	———
Valve stem runout	IN. & EX.	———	0.05 (0.002)
Valve head thickness	IN. & EX.	———	0.5 (0.02)
Valve stem end length	IN. & EX.	———	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	———
Valve head radial runout	IN. & EX.	———	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	———	35.0 (1.38)
	OUTER	———	37.8 (1.49)
Valve spring free length (EXHAUST)		———	40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3 – 6.5 kg (11.68 – 14.33 lbs) at length 28.0 mm (1.10 in)	———
	OUTER	14.0 – 14.2 kg (30.86 – 31.31 lbs) at length 31.5 mm (1.24 in)	———
Valve spring tension (EXHAUST)		20.3 – 23.3 kg (44.75 – 51.37 lbs) at length 35.0 mm (1.38 in)	———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683 – 35.723 (1.4048 – 1.4064)	35.41 (1.394)
	EX.	36.883 – 36.923 (1.4521 – 1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.0013 – 0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	20.012 – 20.025 (0.7879 – 0.7884)	———
	Front head left side, rear head right side	25.012 – 25.025 (0.9847 – 0.9852)	———
Camshaft journal O.D.	Front head right side, rear head left side	19.959 – 19.980 (0.7858 – 0.7866)	———
	Front head left side, rear head right side	24.959 – 24.980 (0.9826 – 0.9835)	———
Camshaft runout	Front & Rear	———	0.10 (0.004)
Cam chain 20-pitch length	———		128.9 (5.07)
Rocker arm I.D.	IN.	14.000 – 14.018 (0.5511 – 0.5519)	———
	EX.	16.000 – 16.018 (0.6299 – 0.6306)	———
Rocker arm shaft O.D.	IN.	13.966 – 13.984 (0.5498 – 0.5506)	———
	EX.	15.966 – 15.984 (0.6286 – 0.6293)	———
Cylinder head distortion	———		0.05 (0.002)
Cylinder head cover distortion	———		0.05 (0.002)
De-comp lever clearance	Front	1.5 – 2.5 (0.06 – 0.10)	———
	Rear	1.0 – 2.0 (0.04 – 0.08)	———

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000 – 1 400 kPa (10 – 14 kg/cm² 142 – 199 psi)	800 kPa (8 kg/cm² 114 psi)
Compression pressure difference	———	200 kPa (2 kg/cm² 28 psi)
Piston to cylinder clearance	0.05 – 0.06 (0.0020 – 0.0024)	0.120 (0.0047)
Cylinder bore	94.000 – 94.015 (3.7008 – 3.7014)	94.080 (3.7039)

ITEM	STANDARD			LIMIT
Piston diam.	93.945–93.960 (3.6986–3.6992) Measure at 16 mm (0.6 in) from the skirt end.			93.880 (3.6960)
Cylinder distortion	———			0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30–0.45 (0.012–0.018)	0.70 (0.028)
	2nd		0.25–0.40 (0.010–0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040–0.075 (0.0016–0.0030)	0.180 (0.007)
	2nd		0.025–0.060 (0.0010–0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230–1.250 (0.0484–0.0492)	———
	2nd		1.510–1.530 (0.0594–0.0602)	———
	Oil		2.810–2.830 (0.1106–0.1114)	———
Piston ring thickness	1st		1.175–1.190 (0.0463–0.0469)	———
	2nd		1.470–1.485 (0.0579–0.0585)	———
Piston pin bore	23.000–23.006 (0.9055–0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996–23.000 (0.9054–0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006–23.014 (0.9057–0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10–0.20 (0.004–0.008)	0.3 (0.012)
Conrod big end width	21.95–22.00 (0.864–0.866)	———
Crank pin width	22.10–22.15 (0.870–0.872)	———
Conrod big end oil clearance	0.024–0.042 (0.0009–0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982–50.000 (1.9678–1.9685)	———
Crankshaft journal oil clearance	0.020–0.050 (0.0008–0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965–51.980 (2.0459–2.0465)	———

ITEM	STANDARD	LIMIT
Crankshaft thrust bearing thickness	1.925 – 2.175 (0.0758 – 0.0856)	———
Crankshaft thrust clearance	0.05 – 0.10 (0.002 – 0.004)	———
Crankshaft runout	———	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 × 31/40)	———
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm^2, 50 psi) Below 650 kPa (6.5 kg/cm^2, 92 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Drive plate thickness	No.1	2.72 – 2.88 (0.107 – 0.113)	2.42 (0.095)
	No.2	3.45 – 3.55 (0.136 – 0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8 – 16.0 (0.622 – 0.630)	15.2 (0.600)
	No.2	15.9 – 16.0 (0.626 – 0.630)	15.2 (0.600)
Driven plate distortion	———		0.10 (0.004)
Clutch spring free length	No.1	———	27.6 (1.09)
	No.2	———	20.0 (0.79)
Clutch master cylinder bore	14.000 – 14.043 (0.5512 – 0.5529)		———
Clutch master cylinder piston diam.	13.957 – 13.984 (0.5495 – 0.5506)		———
Clutch release cylinder bore	35.700 – 35.762 (1.4055 – 1.4079)		———
Clutch release cylinder piston diam.	35.650 – 35.675 (1.4035 – 1.4045)		———

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.645 (79/48)		———
Secondary reduction ratio		0.852 (29/34 × 19/19)		———
Final reduction ratio		2.666 (32/12)		———
Gear ratios	Low	3.000 (36/12)		———
	2nd	1.823 (31/17)		———
	3rd	1.333 (28/21)		———
	4th	E-04,17,21,22,24,34	1.086 (25/23)	———
	Top	E-01, 03, 28,33	1.041 (25/24)	———
		E-04,17,21,22,24,34	0.960 (24/25)	———

ITEM	STANDARD		LIMIT
Shift fork to groove clearance	0.1—0.3 (0.004—0.012)		0.5 (0.020)
Shift fork groove width	No.1	5.50—5.60 (0.217—0.220)	———
	No. 2	5.50—5.60 (0.217—0.220)	———
	No. 3	E-04, 17, 21 22, 24, 34: 5.50—5.60 (0.217—0.220)	———
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	———
	No. 2	5.30—5.40 (0.209—0.213)	———
	No. 3	E-04, 17, 21, 22, 24, 34: 5.30—5.40 (0.209—0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.15 (0.001—0.006)		———
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	———

CARBURETOR

ITEM		SPECIFICATION			
		E-03		E-33	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. No.		38B40	←	38B50	←
Idle r/min		1 000 ± 50 r/min.	←	1 000 ± 50 r/min	←
Fuel level		9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet	(M.J.)	# 140	# 125	# 140	# 125
Main air jet	(M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle	(J.N.)	5D35-1st	5D51-1st	5D35-1st	5D51-1st
Needle jet	(N.J.)	P-2	0-9	P-2	0-9
Throttle valve	(Th.V.)	#120	#110	#120	#110
Pilot jet	(P.J.)	# 55	# 50	# 55	# 50
By-pass	(B.P.)	0.8 mm × 3pcs	←	0.8 mm × 3pcs	←

ITEM		SPECIFICATION			
		E-03		E-33	
Pilot outlet	(P.O.)	0.7 mm	1.0 mm	0.7 mm	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET	←	PRE-SET	←
Pilot air jet 1	(P.A.J.1)	#40	#70	#40	#70
Pilot air jet 2	(P.A.J.2)	1.55 mm	1.4 mm	1.55 mm	1.4 mm
Throttle cable play		0.5 – 1.0 mm (0.02 – 0.04 in)	←	0.5 – 1.0 mm (0.02 – 0.04 in)	←
Choke cable play		0.5 – 1.0 mm (0.02 – 0.04 in)	←	0.5 – 1.0 mm (0.02 – 0.04 in)	←

ITEM		SPECIFICATION			
		E-22, 24		E-01, 04, 17, 21, 28	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. No.		38B90	←	38B70	←
Idle r/min.		1 000 ± 50 r/min.	←	1 000 ± 50 r/min	←
Fuel level		9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet	(M.J.)	#140	#125	#140	#125
Main air jet	(M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle	(J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd
Needle jet	(N.J.)	P-3	P-0	P-3	P-0
Throttle valve	(Th.V.)	#110	←	#110	←
Pilot jet	(P.J.)	#57.5	#50	#57.5	#50
By-pass	(B.P.)	0.8 mm × 3pcs	←	0.8 mm × 3pcs	←
Pilot outlet	(P.O.)	0.8 mm	1.0 mm	0.8 mm	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET (1 3/4 turns back)	←	PRE-SET (1 3/4 turns back)	←
Pilot air jet 1	(P.A.J.1)	#60	#55	#60	#55
Pilot air jet 2	(P.A.J.2)	1.9 mm	1.7 mm	1.9 mm	1.7 mm
Throttle cable play		0.5 – 1.0 mm (0.02 – 0.04 in)	←	0.5 – 1.0 mm (0.02 – 0.04 in)	←
Choke cable play		0.5 – 1.0 mm (0.02 – 0.04 in)	←	0.5 – 1.0 mm (0.02 – 0.04 in)	←

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Ignition timing		2° B.T.D.C. below 1 250 r/min.		E-03, 33
		30° B.T.D.C. above 4 000 r/min.		
		2° B.T.D.C. below 1 500 r/min.		Others
		30° B.T.D.C. above 4 000 r/min		
Firing order		R·F		
Spark plug		Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
		Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance		Over 8 (0.3) at 1 atm.		
Signal coil resistance		240 ± 20 % Ω		Bl–G, B–Y
Ignition coil resistance		Primary	1–7 Ω	⊕ tap–⊖ tap
		Secondary	10–25 kΩ	Plug cap–⊖ tap
Generator no-load voltage		More than 80 V (AC) at 5 000 r/min.		
Regulated voltage		14.0–15.5 V at 5 000 r/min.		
Starter motor brush length		N.D.	Limit: 9.0 (0.35)	
commutator under-cut		Limit: 0.2 (0.008)		
Starter relay resistance		2–6 Ω		
De-comp. solenoid resistance		0.1–1.0 Ω		
Side stand and neutral relay		120 ± 20 %Ω		
Fuel pump resistance		1–2 Ω		
Fuel pump discharge amount		More than 600 ml (1.27 US qt)/minute		
Battery	Type designation	FTH 16–12		
	Voltage	12 V		
	Capacity	50.4 kC (14 Ah)/10 HR		
	Standard electrolyte S.G.	1.32 at 20°C (68°F)		
Fuse size	HEADLIGHT	10 A		
	SIGNAL	10 A		
	IGNITION	10 A		
	MAIN	25 A		
	POWER SOURCE	10 A		

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-01, 03, 28, 33	E-24	Others
Headlight	HI	60	←	←
	LO	55	←	←
Tail/Brake light		8/27	←	5/21
Turn signal light		21	←	←
Running light		5		
Speedometer light		3	←	←
Turn signal indicator light		3	←	←

ITEM	SPECIFICATION		
	E-01, 03, 28, 33	E-24	Others
High beam indicator light	1.7	←	←
Neutral indicator light	3	←	←
Oil pressure indicator	3	←	←
License light	7.5	←	5
Parking or city light			4

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal height		22 (0.87)	———
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Breake disc runout		———	0.30 (0.012)
Master cylinder bore	Front	12.700–12.743 (0.5000–0.5017)	———
	Rear	12.700–12.743 (0.4999–0.5017)	———
Master cylinder piston diam.	Front	12.657–12.684 (0.4983–0.4994)	———
	Rear	12.657–12.684 (0.4983–0.4994)	———
Brake caliper cylinder bore	Front	42.850–42.926 (1.6870–1.6900)	———
	Rear	42.850–42.926 (1.6870–1.6900)	———
Brake caliper piston diam.	Front	42.770–42.820 (1.6839–1.6858)	———
	Rear	42.770–42.820 (1.6839–1.6858)	———
Wheel rim runout	Axial	———	2.0 (0.08)
	Radial	———	2.0 (0.08)
Wheel axle runout	Front	———	0.25 (0.010)
	Rear	———	0.25 (0.010)
Tire size	Front	110/90–19 62H	———
	Rear	170/80–15 M/C 77H	———
Tire tread depth	Front	———	1.6 (0.06)
	Rear	———	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	———	
Front fork spring free length	———	549 (21.6)	
Front fork oil level	203 (7.99)	———	
Rear shock absorber spring adjuster	1/5		
Rear wheel travel	105 (4.1)	———	
Swingarm pivot shaft runout	———	0.30 (0.012)	

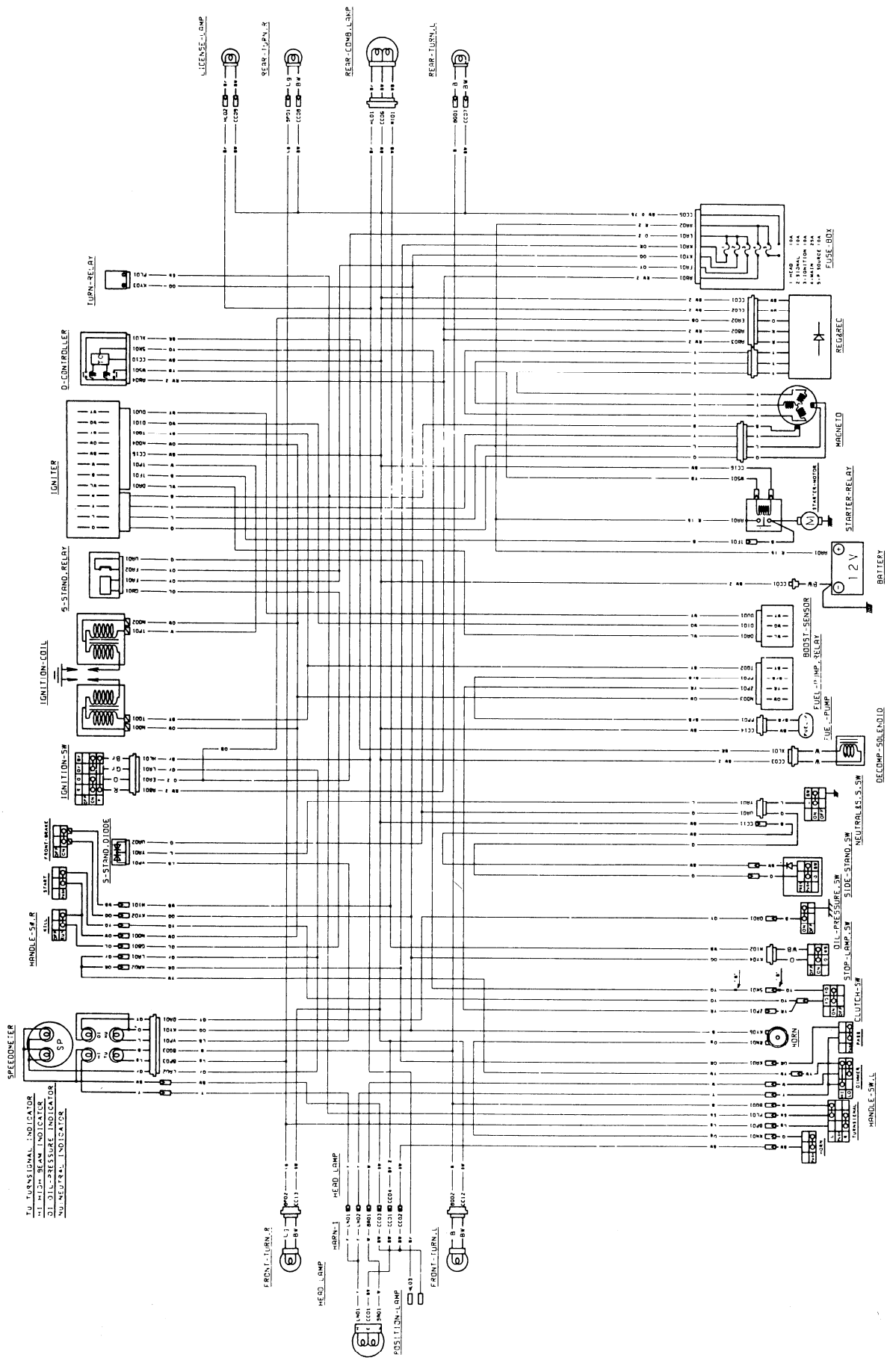
TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline or at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanorl with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline uded should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)		
reserve	3.0 L (3.2/2.6 US/Imp qt)		
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	3 700 ml (3.9/3.3 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	354 ml (12.0/12.5 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200—220 ml (6.8—7.4/7.0—7.7 US/Imp oz)	
Brake fluid type	DOT 4		

WIRING DIAGRAM (Only for AUSTRALIA)



WIRE COLOR

B ..... Black	R ..... Red	O/B ..... Orange with Black tracer	Y/G ..... Yellow with Green tracer
Bl ..... Blue	W ..... White	O/Bl ..... Orange with Blue tracer	Y/R ..... Yellow with Red tracer
Br ..... Brown	Y ..... Yellow	O/G ..... Orange with Green tracer	
G ..... Green	B/R ..... Black with Red tracer	O/R ..... Orange with Red tracer	
Gr ..... Gray	B/W ..... Black with White tracer	O/W ..... Orange with White tracer	
Lbl ..... Light blue	B/Y ..... Black with Yellow tracer	O/Y ..... Orange with Yellow tracer	
Lg ..... Light green	Bl/B ..... Blue with Black tracer	R/W ..... Red with White tracer	
Dg ..... Dark green	Br/B ..... Brown with Black tracer	W/B ..... White with Black tracer	
O ..... Orange	G/Y ..... Green with Yellow tracer	Y/B ..... Yellow with Black tracer	

CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 335 mm (91.9 in)
Overall width	710 mm (28.0 in) ... GLF 770 mm (30.3 in) ... GLP
Overall height	1 135 mm (44.7 in) ... GLF 1 220 mm (48.0 in) ... GLP
Wheelbase	1 620 mm (63.8 in)
Ground clearance	150 mm (5.9 in)
Dry mass	242 kg (533 lbs) ... GLF, E-03, 28 243 kg (535 lbs) ... GLF, Others 244 kg (537 lbs) ... GLP, E-33 243 kg (535 lbs) ... GLP, Others

ENGINE

Type	Four-stroke, 3 valves, OHC, 45-degree V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Piston displacement	1 360 cm^3 (83.0 cu. in)
Compression ratio	9.3 : 1
Carburetor	MIKUNI BDS36SS ... Front MIKUNI BS36SS ... Rear
Air cleaner	Polyurethan foam element
Starter system	Electric starter motor
Lubrication system	Wet pump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	4-speed constant mesh···E01,03,33 5-speed constant mesh···Others
Gearshift pattern	1-down, 3-up ... E-01, 03, 33 1-down, 4-up ... Others
Primary reduction	1.645 (79/48)
Secondary reduction	0.852 (29/34 x 19/19)
Final reduction	2.666 (32/12)
Gear ratios, Low 2nd 3rd 4th Top	3.000 (36/12) 1.823 (31/17) 1.333 (28/21) 1.086 (25/23) ... E-02,04, 17,21,22, 24,28,34 1.041 (25/24) ... E-03,33 0.960 (24/25) ... Others
Drive system	Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swingarm, oil damped, spring pre-load 5-way adjustable
Steering angle	40° (Right & Left)
Caster	54° 00′
Trail	166 mm (6.5 in)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc brake
Rear brake	Disc brake
Front tire size	110/90-19 62H
Rear tire size	170/80-15 M/C 77H
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)

ELECTRICAL

Ignition type	Fully transistorized
Ignition timing	2° B.T.D.C. below 1 250 r/min and 30° B.T.D.C. above 4 000 r/min ... E-03, 33 2° B.T.D.C. below 1 500 r/min and 30° B.T.D.C. above 4 000 r/min ... Others
Spark plug	N.G.K.: DPR8EA-9 N.D.: X24EPR-U9
Battery	12V 50.4 kC (14 Ah)/10HR
Generator	Three phase A.C. Generator
Fuse	10A x 4, 25A x 1

CAPACITIES

Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)
reserve	3.0 L (3.2/2.6 US/Imp qt)
Engine oil, oil change	3.7 L (3.9/3.3 US/Imp qt)
with filter change	4.3 L (4.5/3.8 US/Imp qt)
Front fork oil	354 ml (12.0/12.5 US/Imp oz)
Final bevel gear oil	200 – 220 ml (6.8/7.0–7.4/7.7 US/Imp oz)

These specifications are subject to change without notice.

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	40 (1.6)	—
Valve lift	IN.	8 (0.31)	—
	EX.	9 (0.35)	—
Lash-adjuster plunger stroke	0—0.5 (0—0.02)		—
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	0.35 (0.014)
	EX.	0.040—0.070 (0.0016—0.0028)	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	—
	EX.	7.000—7.012 (0.2756—0.2761)	—
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	—
	EX.	6.945—6.960 (0.2734—0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	—	35.0 (1.38)
	OUTER	—	37.8 (1.49)
Valve spring free length (EXHAUST)	—		40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3—6.5 kg (11.68—14.33 lbs) at length 28.0 mm (1.10 in)	—
	OUTER	14.0—14.2 kg (30.86—31.31 lbs) at length 31.5 mm (1.24 in)	—
Valve spring tension (EXHAUST)	20.3—23.3 kg (44.75—51.37 lbs) at length 35.0 mm (1.38 in)		—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683—35.723 (1.4048—1.4064)	35.41 (1.394)
	EX.	36.883—36.923 (1.4521—1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032—0.066 (0.0013—0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	22.012—22.025 (0.7879—0.7884)	—
	Front head left side, rear head right side	25.012—25.025 (0.9847—0.9852)	—
Camshaft journal O.D.	Front head right side, rear head left side	19.959—19.980 (0.7858—0.7866)	—
	Front head left side, rear head right side	24.959—24.980 (0.9826—0.9835)	—
Camshaft runout	Front & Rear	—	0.10 (0.004)
Cam chain 20-pitch length	—		128.9 (5.07)
Rocker arm I.D.	IN.	14.000—14.018 (0.5511—0.5519)	—
	EX.	16.000—16.018 (0.6299—0.6303)	—
Rocker arm shaft O.D.	IN.	13.966—13.984 (0.5498—0.5506)	—
	EX.	15.966—15.984 (0.6286—0.6293)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)
De-comp lever clearance	Front	1.5—2.5 (0.06—0.10)	—
	Rear	1.0—2.0 (0.04—0.08)	—

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	10—14 kg/cm² (1 000—1 400 kPa) (142—199 psi)	8 kg/cm² (800 kPa) (114 psi)
Compression pressure difference	—	2 kg/cm² (200 kPa) (28 psi)
Piston to cylinder clearance	0.05—0.06 (0.0020—0.0024)	0.120 (0.0047)
Cylinder bore	94.000—94.015 (3.7008—3.7014)	94.080 (3.7039)
Piston diam.	93.945—93.960 (3.6986—3.6992) Measure at 16 mm (0.6 in) from the skirt end.	93.880 (3.6960)

ITEM	STANDARD			LIMIT
Cylinder distortion	———			0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30—0.45 (0.012—0.018)	0.70 (0.028)
	2nd		0.25—0.40 (0.010—0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040—0.075 (0.0016—0.0030)	0.180 (0.007)
	2nd		0.025—0.060 (0.0010—0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230—1.250 (0.0484—0.0492)	———
	2nd		1.510—1.530 (0.0594—0.0602)	———
	Oil		2.810—2.830 (0.1106—0.1114)	———
Piston ring thickness	1st		1.175—1.190 (0.0463—0.0469)	———
	2nd		1.470—1.485 (0.0579—0.0585)	———
Piston pin bore	23.000—23.006 (0.9055—0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996—23.000 (0.9054—0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006—23.014 (0.9057—0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10—0.20 (0.004—0.008)	0.3 (0.012)
Conrod big end width	21.95—22.00 (0.864—0.866)	———
Crank pin width	22.10—22.15 (0.870—0.872)	———
Conrod big end oil clearance	0.024—0.042 (0.0009—0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982—50.000 (1.9678—1.9685)	———
Crankshaft journal oil clearance	0.020—0.050 (0.0008—0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965—51.980 (2.0459—2.0465)	———
Crankshaft thrust bearing thickness	1.925—2.175 (0.0758—0.0856)	———
Crankshaft thrust clearance	0.05—0.10 (0.002—0.004)	———

ITEM	STANDARD	LIMIT
Crankshaft runout	—	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 x 31/40)	—
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm², 50 psi) Below 650 kPa (6.5 kg/cm², 92 psi) at 3 000 r/min.	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Drive plate thickness	No.1	2.72—2.88 (0.107—0.113)	2.42 (0.095)
	No.2	3.45—3.55 (0.136—0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.2 (0.600)
	No.2	15.9—16.0 (0.626—0.630)	15.2 (0.600)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	No.1	—	27.6 (1.09)
	No.2	—	20.0 (0.79)
Clutch master cylinder bore	14.000—14.043 (0.5512—0.5529)		—
Clutch master cylinder piston diam.	13.957—13.984 (0.5495—0.5506)		—
Clutch release cylinder bore	35.700—35.762 (1.4055—1.4079)		—
Clutch release cylinder piston diam.	35.650—35.675 (1.4035—1.4045)		—

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.645 (79/48)		—
Secondary reduction ratio		0.852 (29/34 x 19/19)		—
Final reduction ratio		2.666 (32/12)		—
Gear ratios	Low	3.000 (36/12)		—
	2nd	1.823 (31/17)		—
	3rd	1.333 (28/21)		—
	4th	E-02,04,17,21,22,24,28,34	1.086 (25/23)	—
	Top	E-03,33	1.041 (25/24)	—
		E-02,04,17,21,22,24,28,34	0.960 (24/25)	—
Shift fork to groove clearance		0.1—0.3 (0.004—0.012)		0.5 (0.020)
Shift fork groove width	No.1	5.50—5.60 (0.217—0.220)		—
	No.2	5.50—5.60 (0.217—0.220)		—
	No.3	E-02,04,17,21 22,24,28,34	5.50—5.60 (0.217—0.220)	—

ITEM	STANDARD		LIMIT
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	———
	No.2	5.30—5.40 (0.209—0.213)	———
	No.3	E-02,04,17,21 22,24,28,34: 5.30—5.40 (0.209—0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.15 (0.001—0.006)		———
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	———

CARBURETOR

ITEM		SPECIFICATION			
		E-03		E-33	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. NO.		38B40	←	38B50	←
Idle r/min.		1000±50 r/min.	←	1000±50 r/min	←
Fuel level		9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)	9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)
Float height		27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet	(M.J.)	#140	#125	#140	#125
Main air jet	(M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle	(J.N.)	5D35-1st	5D51-1st	5D35-1st	5D51-1st
Needle jet	(N.J.)	P-2	0-9	P-2	0-9
Throttle valve	(Th.V.)	#120	#110	#120	#110
Pilot jet	(P.J.)	#55	#50	#55	#50
By-pass	(B.P.)	0.8 mm x 3pcs	←	0.8 mm x 3pcs	←
Pilot outlet	(P.O.)	0.7 mm	1.0 mm	0.7 m	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET	←	PRE-SET	←
Pilot air jet 1	(P.A.J.1)	#40	#70	#40	#70
Pilot air jet 2	(P.A.J.2)	1.55 mm	1.4 mm	1.55 mm	1.4 mm
Throttle cable play		3—6 mm (0.1—0.2 in)	←	3—6 mm (0.1—0.2 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

CARBURETOR

ITEM	SPECIFICATION			
	E-22,24		E-02,04,17,21,28,34	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←	36 mm	←
I.D. NO.	38B90	←	38B70	←
Idle r/min.	1000 ± 50 r/min.	←	1000 ± 50 r/min	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	# 140	# 125	# 140	# 125
Main air jet (M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle (J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd
Needle jet (N.J.)	P-3	P-0	P-3	P-0
Throttle valve (Th.V.)	# 110	←	# 110	←
Pilot jet (P.J.)	# 57.5	# 50	# 57.5	# 50
By-pass (B.P.)	0.8 mm x 3pcs	←	0.8 mm x 3pcs	←
Pilot outlet (P.O.)	0.8 mm	1.0 mm	0.8 m	1.0 mm
Valve seat (V.S.)	1.5 mm	←	1.5 mm	←
Starter jet (G.S.)	# 25	←	# 25	←
Pilot screw (P.S.)	PRE-SET (1¾ turns back)	←	PRE-SET (1¾ turns back)	←
Pilot air jet 1 (P.A.J.1)	# 60	# 55	# 60	# 55
Pilot air jet 2 (P.A.J.2)	1.9 mm	1.7 mm	1.9 mm	1.7mm
Throttle cable play	3 — 6 mm (0.1 — 0.2 in)	←	3 — 6 mm (0.1 — 0.2 in)	←
Choke cable play	0.5 — 1.0 mm (0.02 — 0.04 in)	←	0.5 — 1.0 mm (0.02 — 0.04 in)	←

ELECTRICAL

Unit: mm (in)

ITEM	SPECIFICATION		NOTE
Ignition timing	2° B.T.D.C. below 1 250 r/min.		E-03,33
	30° B.T.D.C. above 4 000 r/min.		
	2° B.T.D.C. below 1 500 r/min.		others
	30° B.T.D.C. above 4 000 r/min.		
Firing order	R·F		
Spark plug	Type	N.G.K.: DPR8EA-9 ND: X24EPR-U9	
	Gap	0.8 — 0.9 (0.031 — 0.035)	
Spark performance	Over 8 (0.3) at 1 atm.		
Signal coil resistance	240 ± 20% Ω		Bl — G, B — Y
Ignition coil resistance	Primary	1 — 7 Ω	⊕ tap — ⊖ tap
	Secondary	10 — 25 kΩ	Plug cap — ⊖ tap
Generator no-load voltage	More than 80V (AC) at 5 000 r/min.		

ITEM		SPECIFICATION		NOTE
Regulated voltage		14.0—15.5 V at 5 000 r/min.		
Startermotor brush length		N.D.	Limit: 9.0 (0.35)	
Commutator under-cut		Limit: 0.2 (0.008)		
Starter relay resistance		2—6 Ω		
De-comp. solenoid resistance		0.1—1.0 Ω		
Side stand and neutral relay		120 ± 20%Ω		
Fuel pump resistance		1—2 Ω		
Fuel pump discharge amount		More than 600 ml (1.27 US qt)/minute		
Battery	Type designation	FTH 16—12		
	Voltage	12V		
	Capacity	50.4 kC (14Ah)/10HR		
	Standard electrolyte S.G.	1.32 at 20°C (68°F)		
Fuse size	HEADLIGHT	10A		
	SIGNAL	10A		
	IGNITION	10A		
	MAIN	25A		
	POWER SOURCE	10A		

WATTAGE

Unit:W

ITEM		SPECIFICATION			
		E-03,28,33	E-24	E-02	Others
Headlight	HI	60	←	←	←
	LO	55	←	←	←
Parking or city light				3.4	4
Tail/Brake light		8/27	←	5/21	←
Turn signal light		21	←	←	←
Running light		5			
Speedometer light		3	←	←	←
Turn signal indicator light		3	←	←	←
High beam indicator light		1.7	←	←	←
Neutral indicator light		3	←	←	←
Oil pressure indicator light		3	←	←	←
License light		7.5	←	5	←

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal height		22 (0.87)	———
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Brake disc runout			0.30 (0.012)
Master cylinder bore	Front	12.700—12.743 (0.5000—0.5017)	———
	Rear	12.700—12.743 (0.4999—0.5017)	———

ITEM	STANDARD		LIMIT
Master cylinder piston diam.	Front	12.657—12.684 (0.4983—0.4994)	—
	Rear	12.657—12.684 (0.4983—0.4994)	—
Brake caliper cylinder bore	Front	42.850—42.926 (1.6870—1.6900)	—
	Rear	42.850—42.926 (1.6870—1.6900)	—
Brake caliper piston diam.	Front	42.770—42.820 (1.6839—1.6858)	—
	Rear	42.770—42.820 (1.6839—1.6858)	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Tire size	Front	110/90-19 62H	—
	Rear	170/80-15 M/C 77H	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	—	
Front fork spring free length	—	549 (21.6)	
Front fork oil level	203 (7.99)	—	
Rear shock absorber spring adjuster	1/5		
Rear wheel travel	105 (4.1)	—	
Swingarm pivot shaft runout	—	0.30 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03,33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline used should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)		
reserve	3.0 L (0.8/0.7 US/Imp gal)		
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	3 700 ml (3.9/3.3 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	354 ml (12.0/12.5 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200—220 ml (6.8—7.4/7.0—7.7 US/Imp oz)	
Brake fluid type	DOT4		

FOREWORD

This section describes service data,service specifications and servicing procedures which differ from those of the VS1400GLFS/GLPS ('95-model).

NOTE:
- *Any differences between VS1400GLFS/GLPS ('95-model) and VS1400GLFT/GLPT ('96-model) in specifications and service data are clearly indicated with the asterisk marks(*).*
- *Please refer to the section 1 through 14 for details which are not given in this section.*

CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS	
Overall length	2335 mm (91.9 in)
Overall width	710 mm (28.0 in) . . . . . F
	770 mm (30.3 in) . . . . . P
Overall height	1135 mm (44.7 in) . . . . . F
	1220 mm (48.0 in) . . . . . P
Wheelbase	1620 mm (63.8 in)
Ground clearance	150 mm (5.9 in)
Seat height	*735 mm (28.9 in)
Dry mass	244 kg (537 lbs) . . . . . P—E33
	242 kg (533 lbs) . . . . . F—E03,28
	243 kg (535 lbs) . . . . . F—Others, P Others
ENGINE	
Type	Four-stroke, air-cooled with SACS, OHC, 3-valves, 45° V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Piston displacement	1360 cm^3 (83.0 cu. in)
Compression ratio	9.3 : 1
Carburetor, Front	BDS36, single
Rear	BS36, single
Air cleaner	Polyurethane foam element
Starter system	Electric starter motor
Lubrication system	Wet sump
TRANSMISSION	
Clutch	Wet multi-plate type
Transmission	4-speed constant mesh E03,33
	5-speed constant mesh . . . . . Others
Gearshift pattern	1-down, 3-up E03,33
	1-down, 4-up . . . . . Others
Primary reduction ratio	1.645 (79/48)
Secondary reduction ratio	0.852 (29/34 x 19/19)
Final reduction ratio	2.666 (32/12)
Gear ratios, Low	3.000 (36/12)
2nd	1.823 (31/17)
3rd	1.333 (28/21)
4th	1.086 (25/23) . . . . . except E03,33
Top	1.041 (25/24) E03,33
	0.960 (24/25) . . . . . Others
Drive system	Shaft drive
CHASSIS	
Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swingarm, coil spring, oil damped, spring preload 5-way adjustable
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)
Caster	54° 00'
Trail	166 mm (6.54 in)
Steering angle	40° (right & left)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc, hydraulically operated
Rear brake	Disc, hydraulically operated
Front tire size	110/90-19 62H, tube type
Rear tire size	170/80-15 M/C 77H, tube type
ELECTRICAL	
Ignition type	Electronic ignition (Transistorized)
Ignition timing	2° B.T.D.C. below 1250 r/min and 30° B.T.D.C. above 4000 r/min ...E03,E33
	2° B.T.D.C. below 1500 r/min and 30° B.T.D.C. above 4000 r/min ... Others
Spark plug	NGK DPR8EA-9 or NIPPON DENSO X24EPR-U9
Battery	12V 50.4 kC (14 Ah)/10HR
Generator	Three-phase A.C. generator
Fuse	25/10/10/10/10A
Headlight	12V 60/55W
Parking or city light	12V 3.4W. E02
	12V 4W . . . . . Others (except E03,24,28,33)
Turn signal light	12V 21W
Running light (in front turn signal)	12V 5W . . . . . E03,28,33 only
Tail/Brake light	12V 8/27W E03,24,28,33
	12V 5/21W . . . . . Others
License plate light	12V 7.5W E03,24,28,33
	12V 5W . . . . . Others
Speedometer light	12V 3W
Neutral indicator light	12V 3W
High beam indicator light	12V 1.7W
Turn signal indicator light	12V 3W
Oil pressure indicator light	12V 3W
CAPACITIES	
Fuel tank, including reserve	13.0 L (3.4/2.9 US/Imp. gal)
Reserve	3.0 L (0.8/0.7 US/Imp. gal)
Engine oil, change	3700 ml (3.9/3.3 US/Imp. qt)
with filter change	4300 ml (4.5/3.8 US/Imp. qt)
overhaul	5000 ml (5.3/4.4 US/Imp. qt)
Final gear oil	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp. oz)
Front fork oil (each leg)	354 ml (12.0/12.5 US/Imp. oz)

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	40 (1.6)	—
Valve lift	IN.	8 (0.31)	—
	EX.	9 (0.35)	—
Lash-adjuster plunger stroke	0—0.5 (0—0.02)		—
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	—
	EX.	0.040—0.070 (0.0016—0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	—
	EX.	7.000—7.012 (0.2756—0.2761)	—
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	—
	EX.	6.945—6.960 (0.2734—0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	—	35.0 (1.38)
	OUTER	—	37.8 (1.49)
Valve spring free length (EXHAUST)	—		40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3—6.5 kg (11.68—14.33 lbs) at length 28.0 mm (1.10 in)	—
	OUTER	14.0—14.2 kg (30.86—31.31 lbs) at length 31.5 mm (1.24 in)	—
Valve spring tension (EXHAUST)	20.3—23.3 kg (44.75—51.37 lbs) at length 35.0 mm (1.38 in)		—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683—35.723 (1.4048—1.4064)	35.41 (1.394)
	EX.	36.883—36.923 (1.4521—1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032—0.066 (0.0013—0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	22.012—22.025 (0.7879—0.7884)	———
	Front head left side, rear head right side	25.012—25.025 (0.9847—0.9852)	———
Camshaft journal O.D.	Front head right side, rear head left side	19.959—19.980 (0.7858—0.7866)	———
	Front head left side, rear head right side	24.959—24.980 (0.9826—0.9835)	———
Camshaft runout	Front & Rear	———	0.10 (0.004)
Rocker arm I.D.	IN.	14.000—14.018 (0.5511—0.5519)	———
	EX.	16.000—16.018 (0.6299—0.6303)	———
Rocker arm shaft O.D.	IN.	13.966—13.984 (0.5498—0.5506)	———
	EX.	15.966—15.984 (0.6286—0.6293)	———
Cylinder head distortion	———		0.05 (0.002)
Cylinder head cover distortion	———		0.05 (0.002)
De-comp lever clearance	Front	1.5—2.5 (0.06—0.10)	———
	Rear	1.0—2.0 (0.04—0.08)	———

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000—1 400 kPa (10—14 kg/cm², 142—199 psi)	800 kPa (8 kg/cm², 114 psi)
Compression pressure difference	———	200 kPa (2 kg/cm², 28 psi)
Piston to cylinder clearance	0.05—0.06 (0.0020—0.0024)	0.120 (0.0047)
Cylinder bore	94.000—94.015 (3.7008—3.7014)	94.080 (3.7039)
Piston diam.	93.945—93.960 (3.6986—3.6992) Measure at 16 mm (0.6 in) from the skirt end.	93.880 (3.6960)
Cylinder distortion	———	0.05 (0.002)

ITEM	STANDARD			LIMIT
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30—0.45 (0.012—0.018)	0.70 (0.028)
	2nd		0.25—0.40 (0.010—0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040—0.075 (0.0016—0.0030)	0.180 (0.007)
	2nd		0.025—0.060 (0.0010—0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230—1.250 (0.0484—0.0492)	———
	2nd		1.510—1.530 (0.0594—0.0602)	———
	Oil		2.810—2.830 (0.1106—0.1114)	———
Piston ring thickness	1st		1.175—1.190 (0.0463—0.0469)	———
	2nd		1.470—1.485 (0.0579—0.0585)	———
Piston pin bore	23.000—23.006 (0.9055—0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996—23.000 (0.9054—0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006—23.014 (0.9057—0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10—0.20 (0.004—0.008)	0.3 (0.012)
Conrod big end width	21.95—22.00 (0.864—0.866)	———
Crank pin width	22.10—22.15 (0.870—0.872)	———
Conrod big end oil clearance	0.024—0.042 (0.0009—0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982—50.000 (1.9678—1.9685)	———
Crankshaft journal oil clearance	0.020—0.050 (0.0008—0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965—51.980 (2.0459—2.0465)	———
Crankshaft thrust bearing thickness	1.925—2.175 (0.0758—0.0856)	———
Crankshaft thrust clearance	0.05—0.10 (0.002—0.004)	———
Crankshaft runout	———	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 x 31/40)	—
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm², 50 psi) Below 650 kPa (6.5 kg/cm², 92 psi) at 3 000 r/min.	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Drive plate thickness	No.1	2.72—2.88 (0.107—0.113)	2.42 (0.095)
	No.2	3.45—3.55 (0.136—0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.2 (0.600)
	No.2	15.9—16.0 (0.626—0.630)	15.2 (0.600)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	No.1	—	27.6 (1.09)
	No.2	—	20.0 (0.79)
Clutch master cylinder bore	14.000—14.043 (0.5512—0.5529)		—
Clutch master cylinder piston diam.	13.957—13.984 (0.5495—0.5506)		—
Clutch release cylinder bore	35.700—35.762 (1.4055—1.4079)		—
Clutch release cylinder piston diam.	35.650—35.675 (1.4035—1.4045)		—

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.645 (79/48)		—
Secondary reduction ratio		0.852 (29/34 x 19/19)		—
Final reduction ratio		2.666 (32/12)		—
Gear ratios	Low	3.000 (36/12)		—
	2nd	1.823 (31/17)		—
	3rd	1.333 (28/21)		—
	4th	E-02,04,22,24,28,34,37	1.086 (25/23)	—
	Top	E-03,33	1.041 (25/24)	—
		E-02,04,22,24,28,34,37	0.960 (24/25)	—
Shift fork to groove clearance		0.1—0.3 (0.004—0.012)		0.5 (0.020)
Shift fork groove width	No.1	5.50—5.60 (0.217—0.220)		—
	No.2	5.50—5.60 (0.217—0.220)		—
	No.3	E-02,04,22,24, 28,34,37	5.50—5.60 (0.217—0.220)	—

ITEM	STANDARD		LIMIT
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	———
	No.2	5.30—5.40 (0.209—0.213)	———
	No.3	E-02,04,22,24, 28,34,37: 5.30—5.40 (0.209—0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.64 (0.001—0.025)		———
Final bevel gear backlash	Drive side	0.03—0.10 (0.001—0.004)	———

CARBURETOR

ITEM		SPECIFICATION			
		E-03		E-33	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. NO.		38B40	←	38B50	←
Idle r/min.		1000 ± 50 r/min.	←	1000 ± 50 r/min	←
Fuel level		9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet	(M.J.)	#140	#125	#140	#125
Main air jet	(M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle	(J.N.)	5D35-1st	5D51-1st	5D35-1st	5D51-1st
Needle jet	(N.J.)	P-2	O-9	P-2	O-9
Throttle valve	(Th.V.)	#120	#110	#120	#110
Pilot jet	(P.J.)	#55	#50	#55	#50
By-pass	(B.P.)	0.8 mm x 3pcs	←	0.8 mm x 3pcs	←
Pilot outlet	(P.O.)	0.7 mm	1.0 mm	0.7 m	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET	←	PRE-SET	←
Throttle cable play		3—6 mm (0.1—0.2 in)	←	3—6 mm (0.1—0.2 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

CARBURETOR

ITEM		SPECIFICATION			
		E-02,04,34		E-17,22	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. NO.		*38BB	←	*38BC	←
Idle r/min.		1000±50 r/min.	←	1000±50 r/min	←
Fuel level		9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)	9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)
Float height		27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet	(M.J.)	*#130	*#112.5	*#130	*#112.5
Main air jet	(M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle	(J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd
Needle jet	(N.J.)	P-3	P-0	P-3	P-0
Throttle valve	(Th.V.)	*#120	#110	*#120	#110
Pilot jet	(P.J.)	*#55	#50	*#55	#50
By-pass	(B.P.)	0.8 mm x 3pcs	←	0.8 mm x 3pcs	←
Pilot outlet	(P.O.)	0.8 mm	1.0 mm	0.8 mm	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	*PRE-SET (1 turns back)	*PRE-SET (2 turns back)	*PRE-SET (⅞ turns back)	*PRE-SET (1¾ turns back)
Pilot air jet 1	(P.A.J.1)	*#40	*#70	*#40	*#70
Pilot air jet 2	(P.A.J.2)	*1.55 mm	*1.4 mm	*1.55 mm	*1.4 mm
Throttle cable play		3—6 mm (0.1—0.2 in)	←	3—6 mm (0.1—0.2 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

CARBURETOR

ITEM		SPECIFICATION			
		E-24		E-28	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. NO.		38B90	←	38B70	←
Idle r/min.		1000±50 r/min.	←	1000±50 r/min	←
Fuel level		9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)	9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)
Float height		27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet	(M.J.)	#140	#125	#140	#125
Main air jet	(M.A.J.)	1.8 mm	←	1.8 mm	←
Jet needle	(J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd

Asterisk mark (*) indicates the new T-model specifications.

ITEM		SPECIFICATION			
		E-24		E-28	
Needle jet	(N.J.)	P-3	P-0	P-3	P-0
Throttle valve	(Th.V.)	#110	←	#110	←
Pilot jet	(P.J.)	#57.5	#50	#57.5	#50
By-pass	(B.P.)	0.8 mm x 3pcs	←	0.8 mm x 3pcs	←
Pilot outlet	(P.O.)	0.8 mm	1.0 mm	0.8 m	1.0 mm
Valve seat	(V.S.)	1.5 mm	←	1.5 mm	←
Starter jet	(G.S.)	#25	←	#25	←
Pilot screw	(P.S.)	PRE-SET (1¾ turns back)	←	PRE-SET (1¾ turns back)	←
Pilot air jet 1	(P.A.J.1)	#60	#55	#60	#55
Pilot air jet 2	(P.A.J.2)	1.9 mm	1.7 mm	1.9 mm	1.7mm
Throttle cable play		3—6 mm (0.1—0.2 in)	←	3—6 mm (0.1—0.2 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

CARBURETOR

ITEM		SPECIFICATION	
		E-37	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←
I.D. NO.		*38BD	←
Idle r/min.		1000±50 r/min.	←
Fuel level		9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)
Float height		27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet	(M.J.)	#130	#112.5
Main air jet	(M.A.J.)	1.8 mm	←
Jet needle	(J.N.)	5D38-3rd	5D39-3rd
Needle jet	(N.J.)	P-3	P-0
Throttle valve	(Th.V.)	#120	#110
Pilot jet	(P.J.)	#55	#50
By-pass	(B.P.)	0.8 mm x 3pcs	←
Pilot outlet	(P.O.)	0.8 mm	1.0 mm
Valve seat	(V.S.)	1.5 mm	←
Starter jet	(G.S.)	#25	←
Pilot screw	(P.S.)	PRE-SET (1 turn back)	PRE-SET (2 turns back)
Pilot air jet 1	(P.A.J.1)	#40	#50
Pilot air jet 2	(P.A.J.2)	1.55 mm	1.4 mm
Throttle cable play		3—6 mm (0.1—0.2 in)	
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	

Asterisk mark (*) indicates the new T-model specifications.

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Ignition timing		2° B.T.D.C. below 1 250 r/min.		E-03,33
		30° B.T.D.C. above 4 000 r/min.		
		2° B.T.D.C. below 1 500 r/min.		others
		30° B.T.D.C. above 4 000 r/min.		
Firing order		R·F		
Spark plug		Type	N.G.K.: DPR8EA-9 ND: X24EPR-U9	
		Gap	0.8—0.9 (0.031—0.035)	
Spark performance		Over 8 (0.3) at 1 atm.		
Signal coil resistance		240 ± 20% Ω		Bl—G, B—Y
Ignition coil resistance		Primary	1—7 Ω	⊕ tap—⊖ tap
		Secondary	10—25 kΩ	Plug cap—⊖ tap
Generator no-load voltage		More than 80V (AC) at 5 000 r/min.		
Regulated voltage		14.0—15.5 V at 5 000 r/min.		
Startermotor brush length		N.D.	Limit: 9.0 (0.35)	
Commutator under-cut		Limit: 0.2 (0.008)		
Starter relay resistance		2—6 Ω		
De-comp. solenoid resistance		0.1—1.0 Ω		
Side stand and neutral relay		120 ± 20%Ω		
Fuel pump resistance		1—2 Ω		
Fuel pump discharge amount		More than 600 ml (1.27 US qt)/minute		
Battery	Type designation	FTH 16—BS-1		
	Voltage	12V		
	Capacity	50.4 kC (14Ah)/10HR		
	Standard electrolyte S.G.	1.32 at 20°C (68°F)		
Fuse size	HEADLIGHT	10A		
	SIGNAL	10A		
	IGNITION	10A		
	MAIN	25A		
	POWER SOURCE	10A		

WATTAGE

Unit:W

ITEM		SPECIFICATION			
		E-03,28,33	E-24	E-02	Others
Headlight	HI	60	←	←	←
	LO	55	←	←	←
Parking or city light				3.4	4
Tail/Brake light		8/27	←	5/21	←
Turn signal light		21	←	←	←
Running light		5			
Speedometer light		3	←	←	←
Turn signal indicator light		3	←	←	←
High beam indicator light		1.7	←	←	←
Neutral indicator light		3	←	←	←
Oil pressure indicator light		3	←	←	←
License light		7.5	←	5	←

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	*65 (2.6)		———
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Brake disc runout	———		0.30 (0.012)
Master cylinder bore	Front	12.700—12.743 (0.5000—0.5017)	———
	Rear	12.700—12.743 (0.4999—0.5017)	———
Master cylinder piston diam.	Front	12.657—12.684 (0.4983—0.4994)	———
	Rear	12.657—12.684 (0.4983—0.4994)	———
Brake caliper cylinder bore	Front	42.850—42.926 (1.6870—1.6900)	———
	Rear	42.850—42.926 (1.6870—1.6900)	———
Brake caliper piston diam.	Front	42.770—42.820 (1.6839—1.6858)	———
	Rear	42.770—42.820 (1.6839—1.6858)	———
Wheel rim runout	Axial	———	2.0 (0.08)
	Radial	———	2.0 (0.08)
Wheel axle runout	Front	———	0.25 (0.010)
	Rear	———	0.25 (0.010)
Tire size	Front	110/90-19 62H	———
	Rear	170/80-15 M/C 77H	———
Tire tread depth	Front	———	1.6 (0.06)
	Rear	———	2.0 (0.08)

Asterisk mark (*) indicates the new T-model specifications.

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	—	
Front fork spring free length	—	549 (21.6)	
Front fork oil level	203 (7.99)	—	
Rear shock absorber spring adjuster	1/5		
Rear wheel travel	105 (4.1)	—	
Swingarm pivot shaft runout	—	0.30 (0.012)	

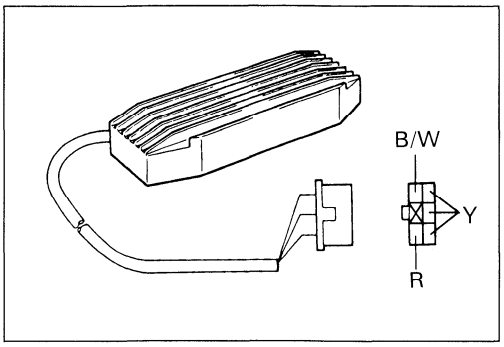
TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03,33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline used should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)		
reserve	3.0 L (0.8/0.7 US/Imp gal)		
Engine oil type	SAE 10W/40, API SE, SF or SG		
Engine oil capacity	Change	3 700 ml (3.9/3.3 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	354 ml (12.0/12.5 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200 – 220 ml (6.8 – 7.4/7.0 – 7.7 US/Imp oz)	
Brake fluid type	DOT4		

REGULATOR/RECTIFIER INSPECTION



- Remove the frame cover, seat and rear seat.
- Disconnect the regulator/rectifier couplers.

Using a pocket tester, measure the resistance between the lead wires in the following table.
If resistance is incorrect, replace the regulator/rectifier.

09900-25002: Pocket tester

Tester knob indication: x 1kΩ range

Unit: kΩ

⊖ Probe of tester to:	⊕ Probe of tester to: R	B/W	Y_1	Y_2	Y_3
R		∞	∞	∞	∞
B/W	1—20		1—10	1—10	1—10
Y_1	1—10	∞		∞	∞
Y_2	1—10	∞	∞		∞
Y_3	1—10	∞	∞	∞	

Y: Yellow, R: Red, B/W: Black with White tracer, ∞: Infinity

NOTE:
As diodes, thyristors are used inside this regulator/rectifier, the resistance values will differ when an ohmmeter other than the SUZUKI pocket tester is used.

SWITCHES (E-02,04,17,22,34,37 models)

Inspect each switch for continuity with the pocket tester. If any abnormality is found, replace the respective switch assemblies with new ones.

09900-25002: Pocket tester

Tester knob indication: X 1Ω range

GEAR POSITION SWITCH

Color / Position	Bl	R/B	G/Bl	Ground
Neutral	○			○
2nd		○		○
3rd			○	○

Bl: Blue R/B: Red with Black tracer G/Bl: Green with Blue tracer

THROTTLE POSITION SWITCH

Color / Position	B	B
ON (full-throttle)	○	○
OFF		

B: Black

NOTE:
When making above test, it is not necessary to start the engine.

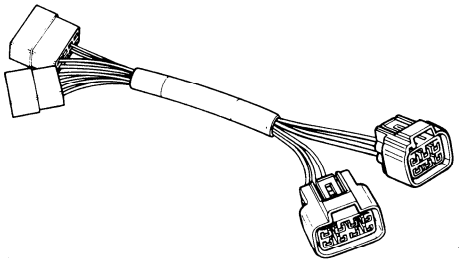
IGNITOR UNIT INSPECTION

CHECKING WITH DIGITAL IGNITOR CHECKER

Check the ignitor unit with the special tools as shown below.

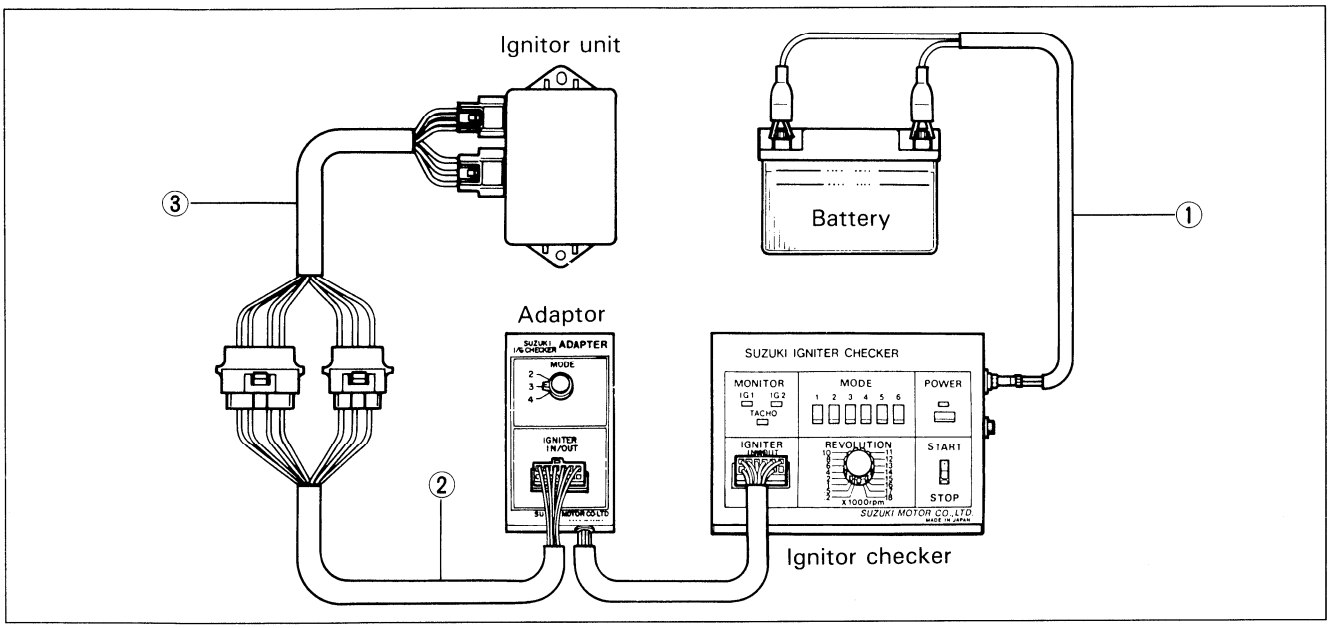
09931-94490: Digital ignitor checker
09931-94460: Adaptor
09931-94450: Lead wire "MODE 3-A"
***09931-61720: Lead wire "MODE 3-A1"**

New Special Tool



(Lead wire "MODE 3-A1")

NOTE:
**Asterisk mark indicates the new special tool.*



WIRING PROCEDURE:

- Remove the pillion seat and rider seat.
- Disconnect two ignitor lead wire couplers from the ignitor unit.
- Connect the power source lead wire ①, lead wire "MODE 3-A" ② and lead wire "MODE 3-A1" ③ as shown in the illustration.

⚠ CAUTION

*** Do not use the battery equipped on the motorcycle.**
*** Be sure to connect the black lead to the battery ⊖ terminal and red lead to the ⊕ terminal.**
*** Make sure "START" switch is in "off" position before connecting the power source lead wires.**

NOTE:
When making this test, be sure that the battery is fully-charged condition.

CHECK PROCEDURE:

With all the lead wires properly connected, check the ignitor unit in the same manner of the '95 (S)-model.

CHANGE OF THE AIR CLEANER INLET TUBE AND MUFFLER (E-02,04,17,22,34,37 models)

The air cleaner inlet tubes and mufflers have been chanbed as follows.

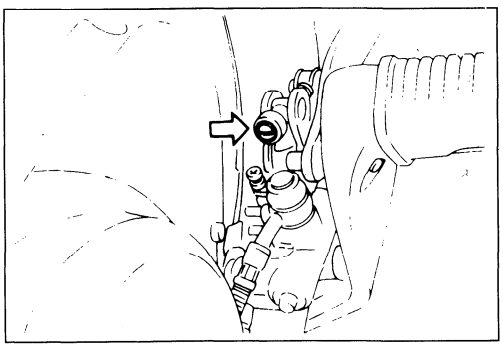
		PART NO. ('95-model)	PART NO. ('96-model)
Air cleaner inlet tube	Front	13891-38B00	13891-38B30
	Rear	13891-38B50	13891-38B80
Muffler	Right	14310-38B51	14310-38B60
	Left	14340-38B51	14340-38B60

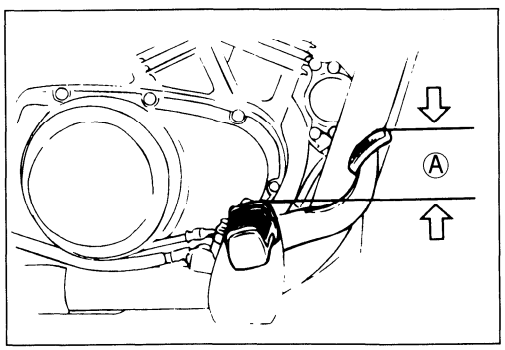
NOTE:
When replacing the air cleaner inlet tubes or mufflers with the '96-model ones, should replace as a set (air cleaner inlet tubes and mufflers) and change the carburetor setting.

REAR BRAKE PEDAL HEIGHT

Adjust the brake pedal height Ⓐ by turning the adjuster to locate the pedal 65 mm (2.6 in) above the top face of the footrest.

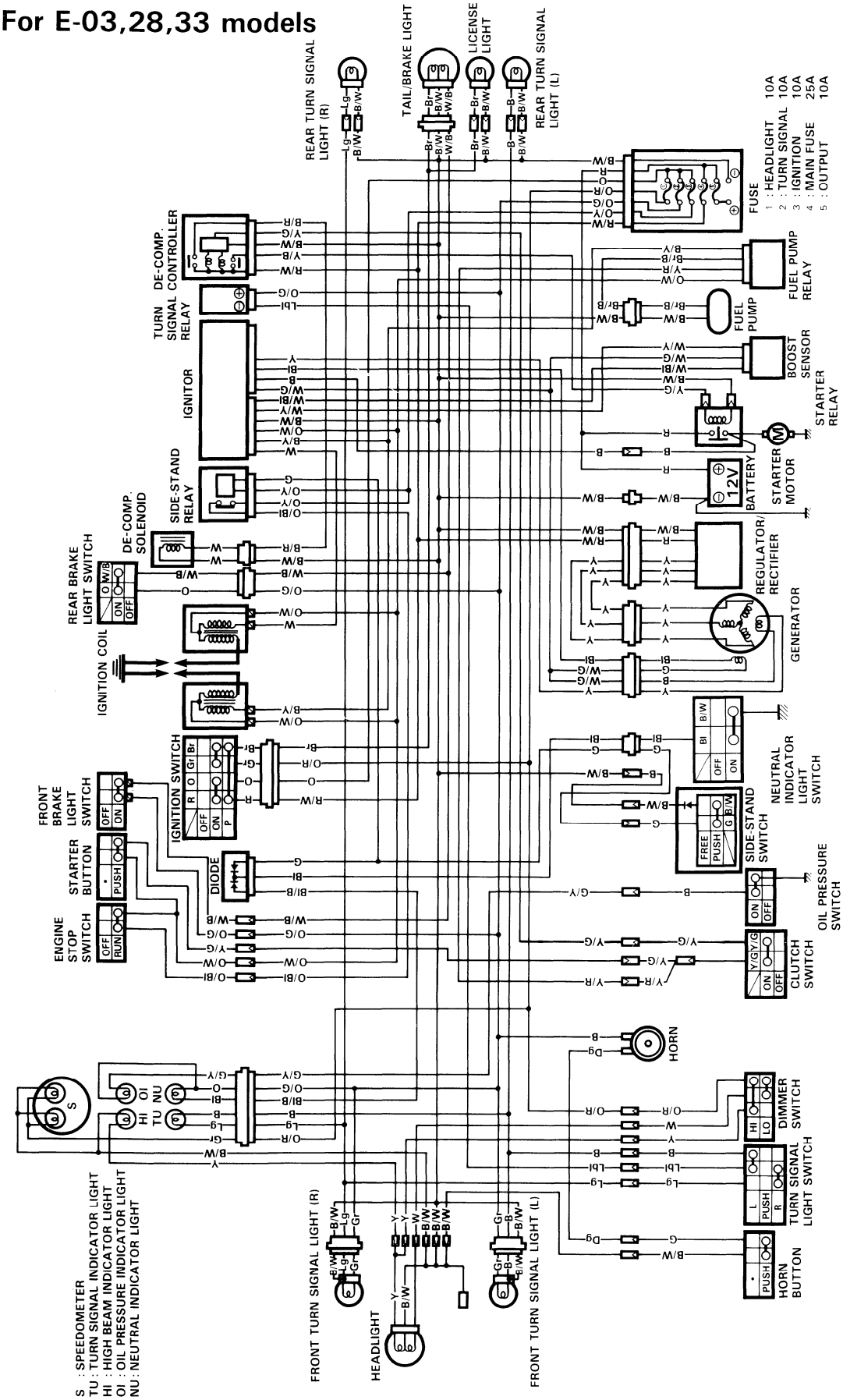
Brake pedal height Ⓐ: 65 mm (2.6 in)





WIRING DIAGRAM

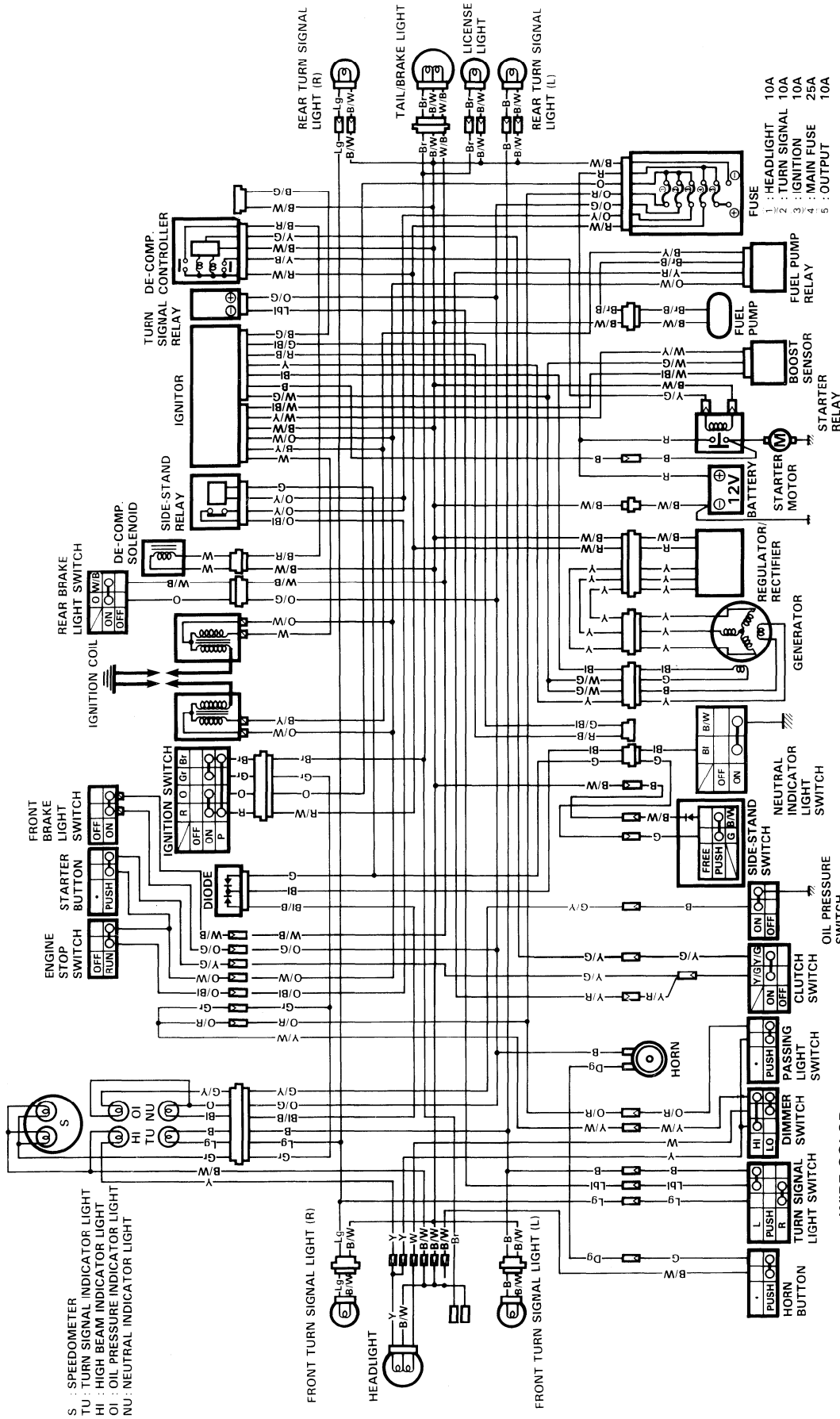
For E-03,28,33 models



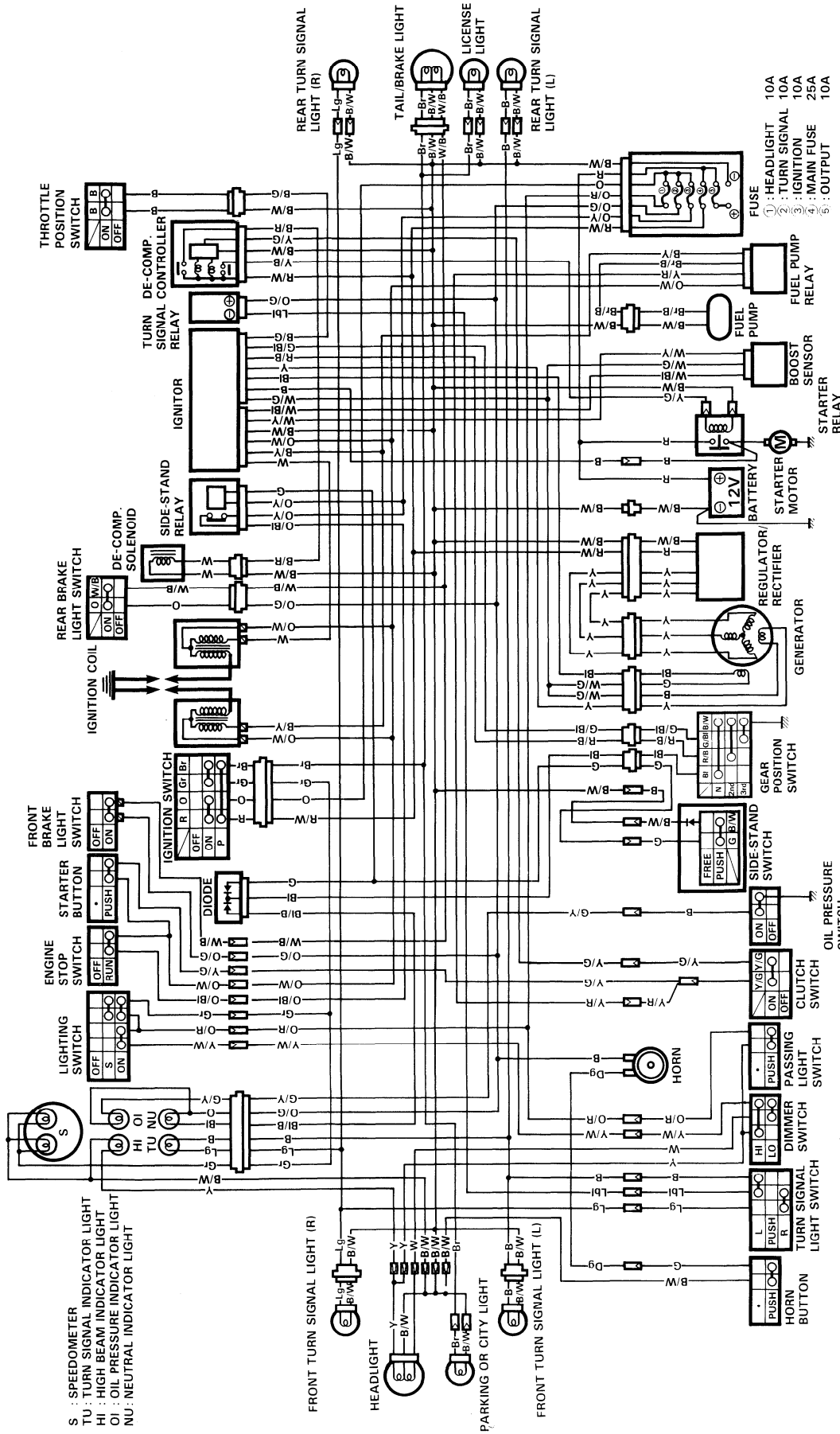
WIRE COLOR

B . . . . Black	R . . . . Red	Br/B . . Brown with Black tracer	W/G . . White with Green tracer
Bl . . . . Blue	W . . . . White	G/Y . . . Green with Yellow tracer	W/Y . . . White with Yellow tracer
Br . . . . Brown	Y . . . . Yellow	O/B . . . Orange with Black tracer	Y/B . . . Yellow with Black tracer
G . . . . Green	B/Br . . Black with Brown tracer	O/Bl . . Orange with Blue tracer	Y/G . . . Yellow with Green tracer
Gr . . . . Gray	B/G . . . Black with Green tracer	O/G . . . Orange with Green tracer	Y/W . . . Yellow with White tracer
Lbl . . . . Light blue	B/Bl . . . Black with Blue tracer	O/R . . . Orange with Red tracer	Y/R . . . Yellow with Red tracer
Lg . . . . Light green	B/R . . . Black with Red tracer	O/W . . Orange with White tracer	R/W . . Red with White tracer
Dg . . . . Dark green	B/W . . Black with White tracer	O/Y . . . Orange with Yellow tracer	
O . . . . Orange	B/Y . . . Black with Yellow tracer	W/B . . . White with Black tracer	
P . . . . Pink	Bl/B . . . Blue with Black tracer	W/Bl . . White with Blue tracer	

For E-24 model



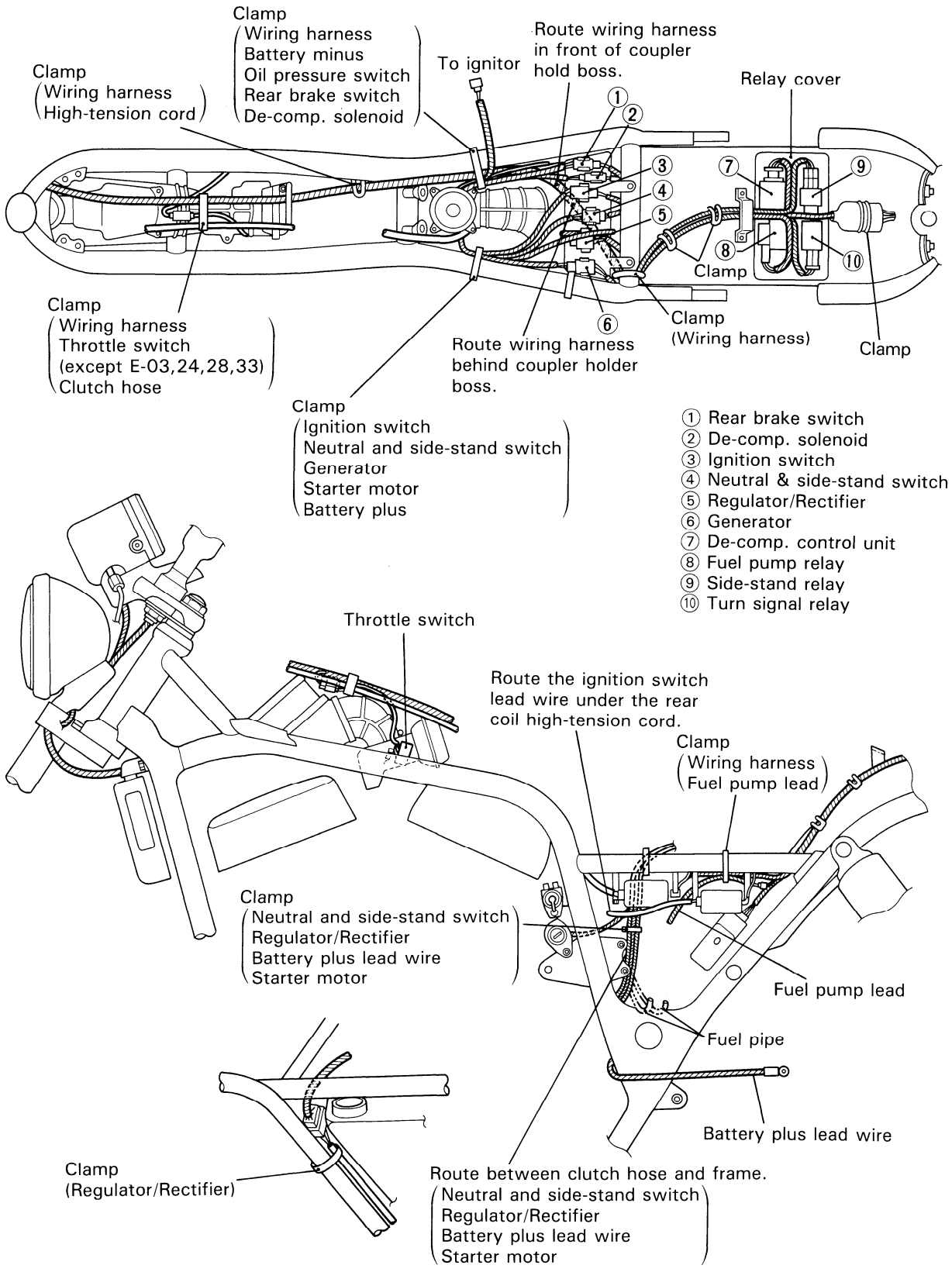
For the others



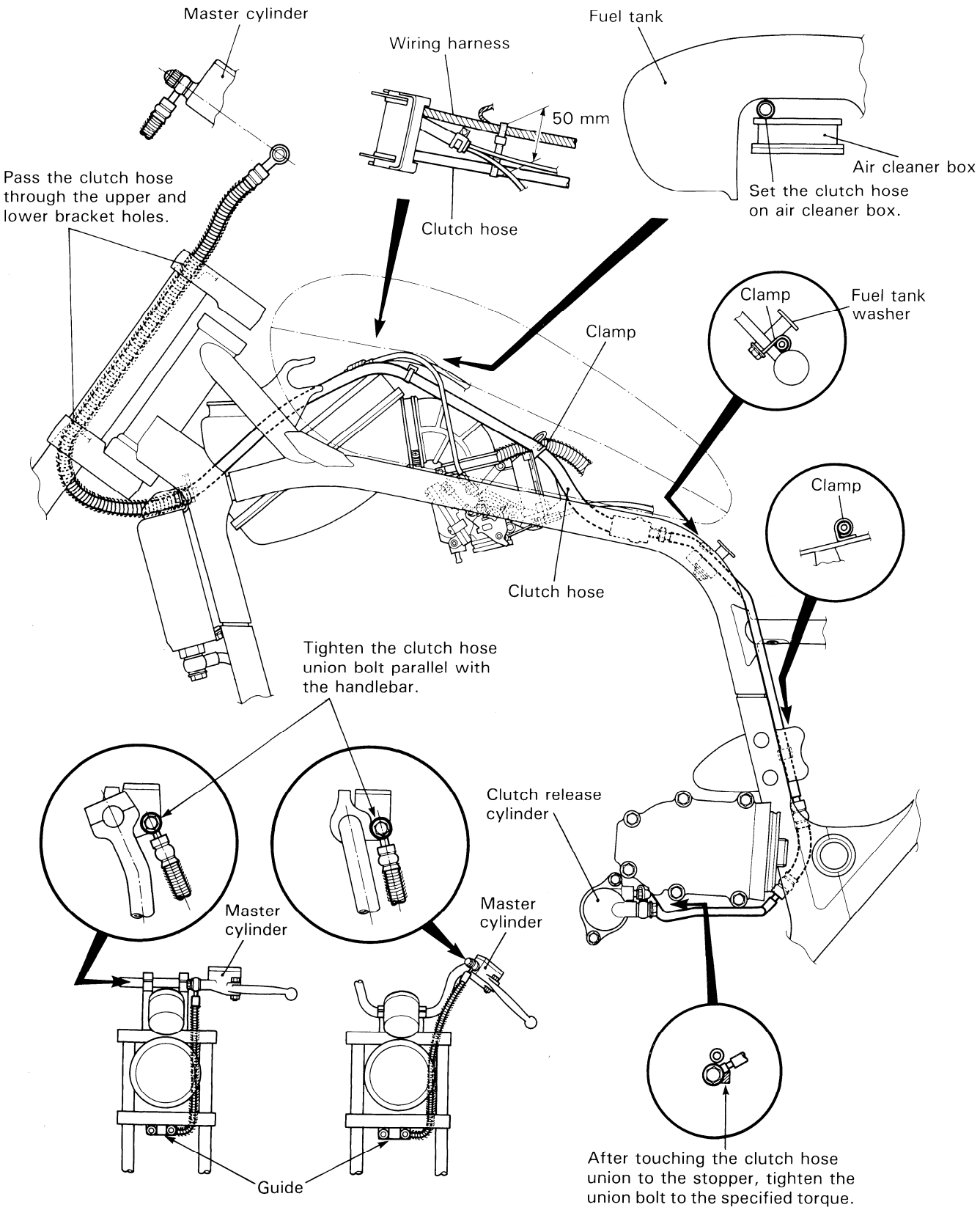
WIRE COLOR

B . . . . Black	R . . . . . Red	Br/B . . Brown with Black tracer	W/G . . White with Green tracer
Bl . . . . Blue	W . . . . . White	G/Y . . . Green with Yellow tracer	W/Y . . White with Yellow tracer
Br . . . . Brown	Y . . . . . Yellow	O/B . . . Orange with Black tracer	Y/B . . . Yellow with Black tracer
G . . . . Green	B/Br . . . Black with Brown tracer	O/Bl . . . Orange with Blue tracer	Y/G . . . Yellow with Green tracer
Gr . . . . Gray	B/G . . . Black with Green tracer	O/G . . . Orange with Green tracer	Y/W . . . Yellow with White tracer
Lbl . . . Light blue	B/Bl . . . Black with Blue tracer	O/R . . . Orange with Red tracer	Y/R . . . Yellow with Red tracer
Lg . . . . Light green	B/R . . . Black with Red tracer	O/W . . . Orange with White tracer	R/W . . Red with White tracer
Dg . . . . Dark green	B/W . . Black with White tracer	O/Y . . . Orange with Yellow tracer	
O . . . . Orange	B/Y . . . Black with Yellow tracer	W/B . . White with Black tracer	
P . . . . . Pink	Bl/B . . . Blue with Black tracer	W/Bl . . White with Blue tracer	

WIRE, CABLE AND HOSE ROUTING



CLUTCH HOSE ROUTING



CONTENTS

NOTE:
Any differances between VS1400 GLFT/GLPT ('96-model) and VS1400 GLFV/GLPV ('97-model) in specifications and service data are clearly indicated with the asterisk mark (*).

SPECIFICATIONS

DIMENSIONS AND DRY MASS	
Overall length	2335 mm (91.9 in)
Overall width	710 mm (28.0 in) . . . . . F
	770 mm (30.3 in) . . . . . P
Overall height	1135 mm (44.7 in) . . . . . F
	1220 mm (48.0 in) . . . . . P
Wheelbase	1620 mm (63.8 in)
Ground clearance	150 mm (5.9 in)
Seat height	735 mm (28.9 in)
Dry mass	244 kg (537 lbs) . . . . . P—E33
	242 kg (533 lbs) . . . . . F—E03,28
	243 kg (535 lbs) . . . . . F—Others, P Others
ENGINE	
Type	Four-stroke, air-cooled with SACS, OHC, 3-valves, 45° V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Piston displacement	1360 cm^3 (83.0 cu. in)
Compression ratio	9.3 : 1
Carburetor, Front	BDS36, single
Rear	BS36, single
Air cleaner	Polyurethane foam element
Starter system	Electric starter motor
Lubrication system	Wet sump
TRANSMISSION	
Clutch	Wet multi-plate type
Transmission	5-speed constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	1.645 (79/48)
Secondary reduction ratio	0.852 (29/34 x 19/19)
Final reduction ratio	2.666 (32/12)
Gear ratios, Low	3.000 (36/12)
2nd	1.823 (31/17)
3rd	1.333 (28/21)
4th	1.086 (25/23)
Top	0.960 (24/25)
Drive system	Shaft drive
CHASSIS	
Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swingarm, coil spring, oil damped, spring preload 5-way adjustable
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)
Caster	36° 00′
Trail	166 mm (6.54 in)
Steering angle	40° (right & left)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc, hydraulically operated
Rear brake	Disc, hydraulically operated
Front tire size	110/90-19 62H, tube type
Rear tire size	170/80-15 M/C 77H, tube type
ELECTRICAL	
Ignition type	Electronic ignition (Transistorized)
Ignition timing	2° B.T.D.C. below 1250 r/min and 30° B.T.D.C. above 4000 r/min ...E03,E33
	2° B.T.D.C. below 1500 r/min and 30° B.T.D.C. above 4000 r/min ... Others
Spark plug	NGK DPR8EA-9 or NIPPON DENSO X24EPR-U9
Battery	12V 50.4 kC (14 Ah)/10HR
Generator	Three-phase A.C. generator
Fuse	25/10/10/10/10A
Headlight	12V 60/55W
Parking or city light	12V 3.4W. E02
	12V 4W . . . . . Others (except E03,24,28,33)
Turn signal light	12V 21W
Running light (in front turn signal)	12V 5W . . . . . E03,28,33 only
Tail/Brake light	12V 8/27W E03,24,28,33
	12V 5/21W . . . . . Others
License plate light	12V 7.5W E03,24,28,33
	12V 5W . . . . . Others
Speedometer light	12V 3W
Neutral indicator light	*12V 1.7W
High beam indicator light	12V 1.7W
Turn signal indicator light	*12V 1.7W
Oil pressure indicator light	*12V 1.7W
CAPACITIES	
Fuel tank, including reserve	13.0 L (3.4/2.9 US/Imp. gal)
Reserve	3.0 L (0.8/0.7 US/Imp. gal)
Engine oil, change	3700 ml (3.9/3.3 US/Imp. qt)
with filter change	4300 ml (4.5/3.8 US/Imp. qt)
overhaul	5000 ml (5.3/4.4 US/Imp. qt)
Final gear oil	200—220 ml (6.8/7.0—7.4/7.7 US/Imp. oz)
Front fork oil (each leg)	354 ml (12.0/12.5 US/Imp. oz)

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	40 (1.6)	—
Valve lift	IN.	8 (0.31)	—
	EX.	9 (0.35)	—
Lash-adjuster plunger stroke	0—0.5 (0—0.02)		—
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	—
	EX.	0.040—0.070 (0.0016—0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	—
	EX.	7.000—7.012 (0.2756—0.2761)	—
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	—
	EX.	6.945—6.960 (0.2734—0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	—	35.0 (1.38)
	OUTER	—	37.8 (1.49)
Valve spring free length (EXHAUST)	—		40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3—6.5 kg (11.68—14.33 lbs) at length 28.0 mm (1.10 in)	—
	OUTER	14.0—14.2 kg (30.86—31.31 lbs) at length 31.5 mm (1.24 in)	—
Valve spring tension (EXHAUST)	20.3—23.3 kg (44.75—51.37 lbs) at length 35.0 mm (1.38 in)		—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683—35.723 (1.4048—1.4064)	35.41 (1.394)
	EX.	36.883—36.923 (1.4521—1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032—0.066 (0.0013—0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	22.012—22.025 (0.7879—0.7884)	—
	Front head left side, rear head right side	25.012—25.025 (0.9847—0.9852)	—
Camshaft journal O.D.	Front head right side, rear head left side	19.959—19.980 (0.7858—0.7866)	—
	Front head left side, rear head right side	24.959—24.980 (0.9826—0.9835)	—
Camshaft runout	Front & Rear	—	0.10 (0.004)
Rocker arm I.D.	IN.	14.000—14.018 (0.5511—0.5519)	—
	EX.	16.000—16.018 (0.6299—0.6303)	—
Rocker arm shaft O.D.	IN.	13.966—13.984 (0.5498—0.5506)	—
	EX.	15.966—15.984 (0.6286—0.6293)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)
De-comp lever clearance	Front	1.5—2.5 (0.06—0.10)	—
	Rear	1.0—2.0 (0.04—0.08)	—

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000—1 400 kPa (10—14 kg/cm², 142—199 psi)	800 kPa (8 kg/cm², 114 psi)
Compression pressure difference	—	200 kPa (2 kg/cm², 28 psi)
Piston to cylinder clearance	0.05—0.06 (0.0020—0.0024)	0.120 (0.0047)
Cylinder bore	94.000—94.015 (3.7008—3.7014)	94.080 (3.7039)
Piston diam.	93.945—93.960 (3.6986—3.6992) Measure at 16 mm (0.6 in) from the skirt end.	93.880 (3.6960)
Cylinder distortion	—	0.05 (0.002)

ITEM	STANDARD			LIMIT
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30—0.45 (0.012—0.018)	0.70 (0.028)
	2nd		0.25—0.40 (0.010—0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040—0.075 (0.0016—0.0030)	0.180 (0.007)
	2nd		0.025—0.060 (0.0010—0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230—1.250 (0.0484—0.0492)	—
	2nd		1.510—1.530 (0.0594—0.0602)	—
	Oil		2.810—2.830 (0.1106—0.1114)	—
Piston ring thickness	1st		1.175—1.190 (0.0463—0.0469)	—
	2nd		1.470—1.485 (0.0579—0.0585)	—
Piston pin bore	23.000—23.006 (0.9055—0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996—23.000 (0.9054—0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006—23.014 (0.9057—0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10—0.20 (0.004—0.008)	0.3 (0.012)
Conrod big end width	21.95—22.00 (0.864—0.866)	—
Crank pin width	22.10—22.15 (0.870—0.872)	—
Conrod big end oil clearance	0.024—0.042 (0.0009—0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982—50.000 (1.9678—1.9685)	—
Crankshaft journal oil clearance	0.020—0.050 (0.0008—0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965—51.980 (2.0459—2.0465)	—
Crankshaft thrust bearing thickness	1.925—2.175 (0.0758—0.0856)	—
Crankshaft thrust clearance	0.05—0.10 (0.002—0.004)	—
Crankshaft runout	—	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 x 31/40)	———
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm², 50 psi) Below 650 kPa (6.5 kg/cm², 92 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Drive plate thickness	No.1	2.72—2.88 (0.107—0.113)	2.42 (0.095)
	No.2	3.45—3.55 (0.136—0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.2 (0.600)
	No.2	15.9—16.0 (0.626—0.630)	15.2 (0.600)
Driven plate distortion	———		0.10 (0.004)
Clutch spring free length	No.1	———	27.6 (1.09)
	No.2	———	20.0 (0.79)
Clutch master cylinder bore	14.000—14.043 (0.5512—0.5529)		———
Clutch master cylinder piston diam.	13.957—13.984 (0.5495—0.5506)		———
Clutch release cylinder bore	35.700—35.762 (1.4055—1.4079)		———
Clutch release cylinder piston diam.	35.650—35.675 (1.4035—1.4045)		———

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.645 (79/48)		———
Secondary reduction ratio		0.852 (29/34 x 19/19)		———
Final reduction ratio		2.666 (32/12)		———
Gear ratios	Low	3.000 (36/12)		———
	2nd	1.823 (31/17)		———
	3rd	1.333 (28/21)		———
	4th	1.086 (25/23)		———
	Top	0.960 (24/25)		———
Shift fork to groove clearance		0.1—0.3 (0.004—0.012)		0.5 (0.020)
Shift fork groove width		No.1	5.50—5.60 (0.217—0.220)	———
		No.2	5.50—5.60 (0.217—0.220)	———
		No.3	5.50—5.60 (0.217—0.220)	———

ITEM	STANDARD		LIMIT
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	—
	No.2	5.30—5.40 (0.209—0.213)	—
	No.3	5.30—5.40 (0.209—0.213)	—
Damper spring free length	—		88.5 (3.48)
Gearshift lever height	65 (2.6)		—

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.15 (0.001—0.006)		—
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	—

CARBURETOR

ITEM	SPECIFICATION			
	E-03,28		E-33	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←	36 mm	←
I.D. NO.	*38BE	*←	*38BF	*←
Idle r/min.	1000 ± 50 r/min.	←	1000 ± 50 r/min	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	#140	#125	#140	#125
Jet needle (J.N.)	*5D35-1st	*5D51-1st	5D35-1st	5D51-1st
Needle jet (N.J.)	*P-2M	*0-9M	P-2M	0-9M
Throttle valve (Th.V.)	*#120	#110	#120	#110
Pilot jet (P.J.)	*#55	#50	#55	#50
Pilot screw (P.S.)	*PRE-SET (1 1/16 turns back)	PRE-SET (1 3/4 turns back)	PRE-SET	←
Throttle cable play	3—6 mm (0.1—0.2 in)	←	3—6 mm (0.1—0.2 in)	←
Choke cable play	0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

CARBURETOR

ITEM	SPECIFICATION			
	E-02,04,34		E-17,22	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←	36 mm	←
I.D. NO.	38BB	←	38BC	←
Idle r/min.	1000 ± 50 r/min.	←	1000 ± 50 r/min	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	# 130	# 112.5	# 130	# 112.5
Jet needle (J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd
Needle jet (N.J.)	P-3	P-0	P-3	P-0
Throttle valve (Th.V.)	# 120	# 110	# 120	# 110
Pilot jet (P.J.)	# 55	# 50	# 55	# 50
Pilot screw (P.S.)	PRE-SET (1 turn back)	PRE-SET (2 turns back)	PRE-SET (7/8 turns back)	PRE-SET (1 3/4 turns back)
Throttle cable play	3 – 6 mm (0.1 – 0.2 in)	←	3 – 6 mm (0.1 – 0.2 in)	←
Choke cable play	0.5 – 1.0 mm (0.02 – 0.04 in)	←	0.5 – 1.0 mm (0.02 – 0.04 in)	←

CARBURETOR

ITEM	SPECIFICATION	
	E-24	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←
I.D. NO.	38B90	←
Idle r/min.	1000 ± 50 r/min.	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	# 140	# 125
Jet needle (J.N.)	5D38-3rd	5D39-3rd
Needle jet (N.J.)	P-3	P-0
Throttle valve (Th.V.)	# 110	←
Pilot jet (P.J.)	# 57.5	# 50
Pilot screw (P.S.)	PRE-SET (1 3/4 turns back)	←
Throttle cable play	3–6 mm (0.1–0.2 in)	←
Choke cable play	0.5–1.0 mm (0.02–0.04 in)	←

CARBURETOR

ITEM	SPECIFICATION	
	E-37, P-37	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←
I.D. NO.	38BD	←
Idle r/min.	1000 ± 50 r/min.	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	#130	#112.5
Jet needle (J.N.)	5D38-3rd	5D39-3rd
Needle jet (N.J.)	P-3	P-0
Throttle valve (Th.V.)	#120	#110
Pilot jet (P.J.)	#55	#50
Pilot screw (P.S.)	PRE-SET (1 turn back)	PRE-SET (2 turns back)
Throttle cable play	3 – 6 mm (0.1 – 0.2 in)	
Choke cable play	0.5 – 1.0 mm (0.02 – 0.04 in)	

ELECTRICAL

Unit: mm (in)

ITEM	SPECIFICATION		NOTE
Ignition timing	2° B.T.D.C. below 1 250 r/min.		E-03,33
	30° B.T.D.C. above 4 000 r/min.		
	2° B.T.D.C. below 1 500 r/min.		others
	30° B.T.D.C. above 4 000 r/min.		
Firing order	R·F		
Spark plug	Type	N.G.K.: DPR8EA-9 ND: X24EPR-U9	
	Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance	Over 8 (0.3) at 1 atm.		
Signal coil resistance	240 ± 20% Ω		Bl – G, B – Y
Ignition coil resistance	Primary	1 – 7 Ω	⊕ tap – ⊖ tap
	Secondary	10 – 25 kΩ	Plug cap – ⊖ tap
Generator Max. output	Approx. 340W at 5 000 r/min.		
Generator no-load voltage	More than 80V (AC) at 5 000 r/min.		
Regulated voltage	14.0 – 15.5 V at 5 000 r/min.		
Startermotor brush length	N.D.	Limit: 9.0 (0.35)	
Commutator under-cut	Limit: 0.2 (0.008)		
Starter relay resistance	2 – 6 Ω		
De-comp. solenoid resistance	0.1 – 1.0 Ω		
Side stand and neutral relay	120 ± 20%Ω		
Fuel pump resistance	1 – 2 Ω		
Fuel pump discharge amount	More than 600 ml (1.27 US qt)/minute		

ITEM		SPECIFICATION	NOTE
Battery	Type designation	FTH 16—BS-1	
	Voltage	12V	
	Capacity	50.4 kC (14Ah)/10HR	
	Standard electrolyte S.G.	1.32 at 20°C (68°F)	
Fuse size	HEADLIGHT	10A	
	SIGNAL	10A	
	IGNITION	10A	
	MAIN	25A	
	POWER SOURCE	10A	

WATTAGE

Unit:W

ITEM		SPECIFICATION			
		E-03,28,33	E-24	E-02	Others
Headlight	HI	60	←	←	←
	LO	55	←	←	←
Parking or city light				3.4	4
Tail/Brake light		8/27	←	5/21	←
Turn signal light		21	←	←	←
Running light		5			
Speedometer light		3	←	←	←
Turn signal indicator light		*1.7	*←	*←	*←
High beam indicator light		1.7	←	←	←
Neutral indicator light		*1.7	*←	*←	*←
Oil pressure indicator light		*1.7	*←	*←	*←
License light		7.5	←	5	←

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	65 (2.6)		—
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Brake disc runout	—		0.30 (0.012)
Master cylinder bore	Front	12.700—12.743 (0.5000—0.5017)	—
	Rear	12.700—12.743 (0.4999—0.5017)	—
Master cylinder piston diam.	Front	12.657—12.684 (0.4983—0.4994)	—
	Rear	12.657—12.684 (0.4983—0.4994)	—
Brake caliper cylinder bore	Front	42.850—42.926 (1.6870—1.6900)	—
	Rear	42.850—42.926 (1.6870—1.6900)	—
Brake caliper piston diam.	Front	42.770—42.820 (1.6839—1.6858)	—
	Rear	42.770—42.820 (1.6839—1.6858)	—

ITEM	STANDARD		LIMIT
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	J19 × 2.15	—
	Rear	J15M/C × MT4.00	—
Tire size	Front	110/90-19 62H	—
	Rear	170/80-15 M/C 77H	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	—	
Front fork spring free length	—	549 (21.6)	
Front fork oil level	203 (7.99)	—	
Rear shock absorber spring adjuster	1/5		
Rear wheel travel	105 (4.1)	—	
Swingarm pivot shaft runout	—	0.30 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03,33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline used should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)		
reserve	3.0 L (0.8/0.7 US/Imp gal)		
Engine oil type	SAE 10W/40, API SF or SG		
Engine oil capacity	Change	3 700 ml (3.9/3.3 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	354 ml (12.0/12.5 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200—220 ml (6.8—7.4/7.0—7.7 US/Imp oz)	
Brake fluid type	DOT4		

VS1400 GLFW/GLPW ('98-MODEL)

CONTENTS

NOTE:
Any differances between VS1400 GLFV/GLPV ('97-model) and VS1400 GLFW/GLPW ('98-model) in specifications and service data are clearly indicated with the asterisk mark (*).

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 330 mm (91.7 in) E-04, 34
	2 335 mm (91.9 in) ..... Others
Overall width	710 mm (28.0 in) ..... F
	770 mm (30.3 in) ..... P
Overall height	1 135 mm (44.7 in) ..... F
	1 220 mm (48.0 in) ..... P
Wheelbase	1 620 mm (63.8 in)
Ground clearance	150 mm (5.9 in)
Seat height	735 mm (28.9 in)
Dry mass	244 kg (537 lbs) P–E-33
	242 kg (533 lbs) F–E-03, 28
	243 kg (535 lbs) ..... F–Others, P–Others

ENGINE

Type	Four-stroke, air-cooled with SACS, OHC, 3-valves, 45° V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Displacement	1 360 cm^3 (83.0 cu. in)
Compression ratio	9.3 : 1
Carburetor, Front	BDS36, single
Rear	BS36, single
Air cleaner	Polyurethane form element
Starter system	Electric starter motor
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	5-speed constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	1.645 (79/48)
Secondary reduction ratio	0.852 (29/34 × 19/19)
Final reduction ratio	2.666 (32/12)
Gear ratios, Low	3.000 (36/12)
2nd	1.823 (31/17)
3rd	1.333 (28/21)
4th	1.086 (25/23)
Top	0.960 (24/25)
Drive system	Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swingarm, coil spring, oil damped, spring preload 5-way adjustable
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)
Caster	36° 00′
Trail	166 mm (6.54 in)
Steering angle	40° (right & left)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc, hydraulically operated
Rear brake	Disc, hydraulically operated
Front tire size	110/90-19 62H, tube type
Rear tire size	170/80-15 M/C 77H, tube type

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	2° B.T.D.C. below 1 250 r/min and 30° B.T.D.C. above 4 000 r/min E-03, 28, 33
	2° B.T.D.C. below 1 500 r/min and 30° B.T.D.C. above 4 000 r/min ..... Others
Spark plug	NGK DPR8EA-9 or DENSO X24EPR-U9
Battery	12V 50.4 kC (14 Ah)/10HR
Generator	Three-phase A.C. generator
Fuse	25/10/10/10/10A
Headlight	12V 60/55W
Parking or city light	12V 3.4W E-02
	12V 4W ..... Others (except E-03, 24, 28, 33)
Turn signal light	12V 21W
Running light (in front turn signal)	12V 5W ..... E-03, 28, 33 only
Brake light/Taillight	12V 27/8W E-03, 24, 28, 33
	12V 21/5W ..... Others
License plate light	12V 7.5W E-03, 24, 28, 33
	12V 5W ..... Others
Speedometer light	12V 3.4W
Neutral indicator light	12V 1.7W
High beam indicator light	12V 1.7W
Turn signal indicator light	12V 1.7W
Oil pressure indicator light	12V 1.7W

CAPACITIES

Fuel tank, including reserve	13.0 L (3.4/2.9 US/Imp gal)
Reserve	3.0 L (0.8/0.7 US/Imp gal)
Engine oil, change	3 700 ml (3.9/3.3 US/Imp qt)
with filter change	4 300 ml (4.5/3.8 US/Imp qt)
overhaul	5 000 ml (5.3/4.4 US/Imp qt)
Final gear oil	200–220 ml (6.8/7.0–7.4/7.7 US/Imp oz)

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	40 (1.6)	—
Valve lift	IN.	8 (0.31)	—
	EX.	9 (0.35)	—
Lash-adjuster plunger stroke	0—0.5 (0—0.02)		—
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	—
	EX.	0.040—0.070 (0.0016—0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	—
	EX.	7.000—7.012 (0.2756—0.2761)	—
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	—
	EX.	6.945—6.960 (0.2734—0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	—	35.0 (1.38)
	OUTER	—	37.8 (1.49)
Valve spring free length (EXHAUST)	—		40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3—6.5 kg (11.68—14.33 lbs) at length 28.0 mm (1.10 in)	—
	OUTER	14.0—14.2 kg (30.86—31.31 lbs) at length 31.5 mm (1.24 in)	—
Valve spring tension (EXHAUST)	20.3—23.3 kg (44.75—51.37 lbs) at length 35.0 mm (1.38 in)		—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683—35.723 (1.4048—1.4064)	35.41 (1.394)
	EX.	36.883—36.923 (1.4521—1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032—0.066 (0.0013—0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	22.012—22.025 (0.7879—0.7884)	—
	Front head left side, rear head right side	25.012—25.025 (0.9847—0.9852)	—
Camshaft journal O.D.	Front head right side, rear head left side	19.959—19.980 (0.7858—0.7866)	—
	Front head left side, rear head right side	24.959—24.980 (0.9826—0.9835)	—
Camshaft runout	Front & Rear	—	0.10 (0.004)
Rocker arm I.D.	IN.	14.000—14.018 (0.5511—0.5519)	—
	EX.	16.000—16.018 (0.6299—0.6303)	—
Rocker arm shaft O.D.	IN.	13.966—13.984 (0.5498—0.5506)	—
	EX.	15.966—15.984 (0.6286—0.6293)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)
De-comp lever clearance	Front	1.5—2.5 (0.06—0.10)	—
	Rear	1.0—2.0 (0.04—0.08)	—

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000—1 400 kPa (10—14 kg/cm²) (142—199 psi)	800 kPa (8 kg/cm²) (114 psi)
Compression pressure difference	—	200 kPa (2 kg/cm²) (28 psi)
Piston to cylinder clearance	0.05—0.06 (0.0020—0.0024)	0.120 (0.0047)
Cylinder bore	94.000—94.015 (3.7008—3.7014)	94.080 (3.7039)
Piston diam.	93.945—93.960 (3.6986—3.6992) Measure at 16 mm (0.6 in) from the skirt end.	93.880 (3.6960)
Cylinder distortion	—	0.05 (0.002)

ITEM	STANDARD			LIMIT
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30—0.45 (0.012—0.018)	0.70 (0.028)
	2nd		0.25—0.40 (0.010—0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040—0.075 (0.0016—0.0030)	0.180 (0.007)
	2nd		0.025—0.060 (0.0010—0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230—1.250 (0.0484—0.0492)	—
	2nd		1.510—1.530 (0.0594—0.0602)	—
	Oil		2.810—2.830 (0.1106—0.1114)	—
Piston ring thickness	1st		1.175—1.190 (0.0463—0.0469)	—
	2nd		1.470—1.485 (0.0579—0.0585)	—
Piston pin bore	23.000—23.006 (0.9055—0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996—23.000 (0.9054—0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006—23.014 (0.9057—0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10—0.20 (0.004—0.008)	0.3 (0.012)
Conrod big end width	21.95—22.00 (0.864—0.866)	—
Crank pin width	22.10—22.15 (0.870—0.872)	—
Conrod big end oil clearance	0.024—0.042 (0.0009—0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982—50.000 (1.9678—1.9685)	—
Crankshaft journal oil clearance	0.020—0.050 (0.0008—0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965—51.980 (2.0459—2.0465)	—
Crankshaft thrust bearing thickness	1.925—2.175 (0.0758—0.0856)	—
Crankshaft thrust clearance	0.05—0.10 (0.002—0.004)	—
Crankshaft runout	—	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 x 31/40)	—
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm², 50 psi) Below 650 kPa (6.5 kg/cm², 92 psi) at 3 000 r/min.	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Drive plate thickness	No.1	2.72—2.88 (0.107—0.113)	2.42 (0.095)
	No.2	3.45—3.55 (0.136—0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.2 (0.600)
	No.2	15.9—16.0 (0.626—0.630)	15.2 (0.600)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	No.1	—	27.6 (1.09)
	No.2	—	20.0 (0.79)
Clutch master cylinder bore	14.000—14.043 (0.5512—0.5529)		—
Clutch master cylinder piston diam.	13.957—13.984 (0.5495—0.5506)		—
Clutch release cylinder bore	35.700—35.762 (1.4055—1.4079)		—
Clutch release cylinder piston diam.	35.650—35.675 (1.4035—1.4045)		—

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.645 (79/48)		—
Secondary reduction ratio		0.852 (29/34 x 19/19)		—
Final reduction ratio		2.666 (32/12)		—
Gear ratios	Low	3.000 (36/12)		—
	2nd	1.823 (31/17)		—
	3rd	1.333 (28/21)		—
	4th	1.086 (25/23)		—
	Top	0.960 (24/25)		—
Shift fork to groove clearance		0.1—0.3 (0.004—0.012)		0.5 (0.020)
Shift fork groove width	No.1	5.50—5.60 (0.217—0.220)		—
	No.2	5.50—5.60 (0.217—0.220)		—
	No.3	5.50—5.60 (0.217—0.220)		—

ITEM	STANDARD		LIMIT
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	———
	No.2	5.30—5.40 (0.209—0.213)	———
	No.3	5.30—5.40 (0.209—0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.15 (0.001—0.006)		———
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	———

CARBURETOR

ITEM	SPECIFICATION			
	E-03,28		E-33	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←	36 mm	←
I.D. NO.	38BE	←	38BF	←
Idle r/min.	1000 ± 50 r/min.	←	1000 ± 50 r/min	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	#140	#125	#140	#125
Jet needle (J.N.)	5D35-1st	5D51-1st	5D35-1st	5D51-1st
Needle jet (N.J.)	P-2M	O-9M	P-2M	O-9M
Throttle valve (Th.V.)	#120	#110	#120	#110
Pilot jet (P.J.)	#55	#50	#55	#50
Pilot screw (P.S.)	PRE-SET (1 1/16 turns back)	PRE-SET (1 3/4 turns back)	PRE-SET	←
Throttle cable play	3—6 mm (0.1—0.2 in)	←	3—6 mm (0.1—0.2 in)	←
Choke cable play	0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

CARBURETOR

ITEM	SPECIFICATION			
	E-02,04,34		E-17,22	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←	36 mm	←
I.D. NO.	38BB	←	38BC	←
Idle r/min.	1000 ± 50 r/min.	←	1000 ± 50 r/min	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	# 130	# 112.5	# 130	# 112.5
Jet needle (J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd
Needle jet (N.J.)	P-3	P-0	P-3	P-0
Throttle valve (Th.V.)	# 120	# 110	# 120	# 110
Pilot jet (P.J.)	# 55	# 50	# 55	# 50
Pilot screw (P.S.)	PRE-SET (1 turn back)	PRE-SET (2 turns back)	PRE-SET (7/8 turns back)	PRE-SET (1 3/4 turns back)
Throttle cable play	3 — 6 mm (0.1 — 0.2 in)	←	3 — 6 mm (0.1 — 0.2 in)	←
Choke cable play	0.5 — 1.0 mm (0.02 — 0.04 in)	←	0.5 — 1.0 mm (0.02 — 0.04 in)	←

CARBURETOR

ITEM	SPECIFICATION	
	E-24	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←
I.D. NO.	38B90	←
Idle r/min.	1000 ± 50 r/min.	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	# 140	# 125
Jet needle (J.N.)	5D38-3rd	5D39-3rd
Needle jet (N.J.)	P-3	P-0
Throttle valve (Th.V.)	# 110	←
Pilot jet (P.J.)	# 57.5	# 50
Pilot screw (P.S.)	PRE-SET (1 3/4 turns back)	←
Throttle cable play	3 — 6 mm (0.1 — 0.2 in)	←
Choke cable play	0.5 — 1.0 mm (0.02 — 0.04 in)	←

CARBURETOR

ITEM	SPECIFICATION	
	E-37	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←
I.D. NO.	38BD	←
Idle r/min.	1000±50 r/min.	←
Fuel level	9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)
Float height	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet (M.J.)	#130	#112.5
Jet needle (J.N.)	5D38-3rd	5D39-3rd
Needle jet (N.J.)	P-3	P-0
Throttle valve (Th.V.)	#120	#110
Pilot jet (P.J.)	#55	#50
Pilot screw (P.S.)	PRE-SET (1 turn back)	PRE-SET (2 turns back)
Throttle cable play	3—6 mm (0.1—0.2 in)	
Choke cable play	0.5—1.0 mm (0.02—0.04 in)	

ELECTRICAL

Unit: mm (in)

ITEM	SPECIFICATION		NOTE
Ignition timing	2° B.T.D.C. below 1 250 r/min.		E-03,33
	30° B.T.D.C. above 4 000 r/min.		
	2° B.T.D.C. below 1 500 r/min.		others
	30° B.T.D.C. above 4 000 r/min.		
Firing order	R·F		
Spark plug	Type	N.G.K.: DPR8EA-9 DENSO: X24EPR-U9	
	Gap	0.8—0.9 (0.031—0.035)	
Spark performance	Over 8 (0.3) at 1 atm.		
Signal coil resistance	240±20% Ω		Bl—G, B—Y
Ignition coil resistance	Primary	1—7 Ω	⊕ tap—⊖ tap
	Secondary	10—25 kΩ	Plug cap—⊖ tap
Generator Max. output	Approx. 340W at 5 000 r/min.		
Generator no-load voltage	More than 80V (AC) at 5 000 r/min.		
Regulated voltage	14.0—15.5 V at 5 000 r/min.		
Startermotor brush length	N.D.	Limit: 9.0 (0.35)	
Commutator under-cut	Limit: 0.2 (0.008)		
Starter relay resistance	2—6 Ω		
De-comp. solenoid resistance	0.1—1.0 Ω		
Side stand and neutral relay	120±20%Ω		
Fuel pump resistance	1—2 Ω		
Fuel pump discharge amount	More than 600 ml (1.27 US qt)/minute		

ITEM		SPECIFICATION	NOTE
Battery	Type designation	FTH 16—BS-1	
	Voltage	12V	
	Capacity	50.4 kC (14Ah)/10HR	
	Standard electrolyte S.G.	1.32 at 20°C (68°F)	
Fuse size	HEADLIGHT	10A	
	SIGNAL	10A	
	IGNITION	10A	
	MAIN	25A	
	POWER SOURCE	10A	

WATTAGE

Unit:W

ITEM		SPECIFICATION			
		E-03,28,33	E-24	E-02	Others
Headlight	HI	60	←	←	←
	LO	55	←	←	←
Parking or city light				3.4	4
Tail/Brake light		8/27	←	5/21	←
Turn signal light		21	←	←	←
Running light		5			
Speedometer light		3	←	←	←
Turn signal indicator light		1.7	←	←	←
High beam indicator light		1.7	←	←	←
Neutral indicator light		1.7	←	←	←
Oil pressure indicator light		1.7	←	←	←
License light		7.5	←	5	←

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	65 (2.6)		—
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Brake disc runout	—		0.30 (0.012)
Master cylinder bore	Front	12.700—12.743 (0.5000—0.5017)	—
	Rear	12.700—12.743 (0.4999—0.5017)	—
Master cylinder piston diam.	Front	12.657—12.684 (0.4983—0.4994)	—
	Rear	12.657—12.684 (0.4983—0.4994)	—
Brake caliper cylinder bore	Front	42.850—42.926 (1.6870—1.6900)	—
	Rear	42.850—42.926 (1.6870—1.6900)	—
Brake caliper piston diam.	Front	42.770—42.820 (1.6839—1.6858)	—
	Rear	42.770—42.820 (1.6839—1.6858)	—

ITEM	STANDARD		LIMIT
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	J19 × 2.15	—
	Rear	J15M/C × MT4.00	—
Tire size	Front	110/90-19 62H	—
	Rear	170/80-15 M/C 77H	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	—	
Front fork spring free length	—	549 (21.6)	
Front fork oil level	203 (7.99)	—	
Rear shock absorber spring adjuster	*2/5		
Rear wheel travel	105 (4.1)	—	
Swingarm pivot shaft runout	—	0.30 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03,33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline used should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)		
reserve	3.0 L (0.8/0.7 US/Imp gal)		
Engine oil type	SAE 10W/40, API SF or SG		
Engine oil capacity	Change	3 700 ml (3.9/3.3 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	354 ml (12.0/12.5 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil #90 API GL-5		
Bevel gear oil capacity	Final	200−220 ml (6.8−7.4/7.0−7.7 US/Imp oz)	
Brake fluid type	DOT4		

CONTENTS

NOTE:
The specifications and service data are the same as W-MODEL

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 330 mm (91.7 in) E-04, 34
	2 335 mm (91.9 in) ..... Others
Overall width	710 mm (28.0 in) ..... F
	770 mm (30.3 in) ..... P
Overall height	1 135 mm (44.7 in) ..... F
	1 220 mm (48.0 in) ..... P
Wheelbase	1 620 mm (63.8 in)
Ground clearance	150 mm (5.9 in)
Seat height	735 mm (28.9 in)
Dry mass	244 kg (537 lbs) P–E-33
	242 kg (533 lbs) F–E-03, 28
	243 kg (535 lbs) ..... F–Others, P–Others

ENGINE

Type	Four-stroke, air-cooled with SACS, OHC, 3-valves, 45° V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Displacement	1 360 cm^3 (83.0 cu. in)
Compression ratio	9.3 : 1
Carburetor, Front	BDS36, single
Rear	BS36, single
Air cleaner	Polyurethane form element
Starter system	Electric starter motor
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	5-speed constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	1.645 (79/48)
Secondary reduction ratio	0.852 (29/34 × 19/19)
Final reduction ratio	2.666 (32/12)
Gear ratios, Low	3.000 (36/12)
2nd	1.823 (31/17)
3rd	1.333 (28/21)
4th	1.086 (25/23)
Top	0.960 (24/25)
Drive system	Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swingarm, coil spring, oil damped, spring preload 5-way adjustable
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)
Caster	36° 00'
Trail	166 mm (6.54 in)
Steering angle	40° (right & left)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc, hydraulically operated
Rear brake	Disc, hydraulically operated
Front tire size	110/90-19 62H, tube type
Rear tire size	170/80-15 M/C 77H, tube type

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	2° B.T.D.C. below 1 000 r/min
Spark plug	NGK DPR8EA-9 or DENSO X24EPR-U9
Battery	12V 50.4 kC (14 Ah)/10HR
Generator	Three-phase A.C. generator
Fuse	25/10/10/10/10A
Headlight	12V 60/55W
Parking or city light	12V 3.4W E-02
	12V 4W ..... Others (except E-03, 24, 28, 33)
Turn signal light	12V 21W
Running light (in front turn signal)	12V 5W ..... E-03, 28, 33 only
Brake light/Taillight	12V 27/8W E-03, 24, 28, 33
	12V 21/5W ..... Others
License plate light	12V 7.5W E-03, 24, 28, 33
	12V 5W ..... Others
Speedometer light	12V 3.4W
Neutral indicator light	12V 1.7W
High beam indicator light	12V 1.7W
Turn signal indicator light	12V 1.7W
Oil pressure indicator light	12V 1.7W

CAPACITIES

Fuel tank, including reserve	13.0 L (3.4/2.9 US/Imp gal)
Reserve	3.0 L (0.8/0.7 US/Imp gal)
Engine oil, change	3 700 ml (3.9/3.3 US/Imp qt)
with filter change	4 300 ml (4.5/3.8 US/Imp qt)
overhaul	5 000 ml (5.3/4.4 US/Imp qt)
Final gear oil	200–220 ml (6.8/7.0–7.4/7.7 US/Imp oz)
Front fork oil (each leg)	353 ml (11.9/12.4 US/Imp oz)

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	40 (1.6)	—
Valve lift	IN.	8 (0.31)	—
	EX.	9 (0.35)	—
Lash-adjuster plunger stroke	0—0.5 (0—0.02)		—
Valve guide to valve stem clearance	IN.	0.010—0.037 (0.0004—0.0015)	—
	EX.	0.040—0.070 (0.0016—0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN.	5.500—5.512 (0.2165—0.2170)	—
	EX.	7.000—7.012 (0.2756—0.2761)	—
Valve stem O.D.	IN.	5.475—5.490 (0.2156—0.2161)	—
	EX.	6.945—6.960 (0.2734—0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.6 (0.10)
Valve seat width	IN. & EX.	0.9—1.3 (0.04—0.05)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	—	35.0 (1.38)
	OUTER	—	37.8 (1.49)
Valve spring free length (EXHAUST)	—		40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3—6.5 kg (11.68—14.33 lbs) at length 28.0 mm (1.10 in)	—
	OUTER	14.0—14.2 kg (30.86—31.31 lbs) at length 31.5 mm (1.24 in)	—
Valve spring tension (EXHAUST)	20.3—23.3 kg (44.75—51.37 lbs) at length 35.0 mm (1.38 in)		—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683—35.723 (1.4048—1.4064)	35.41 (1.394)
	EX.	36.883—36.923 (1.4521—1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032—0.066 (0.0013—0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	22.012—22.025 (0.7879—0.7884)	———
	Front head left side, rear head right side	25.012—25.025 (0.9847—0.9852)	———
Camshaft journal O.D.	Front head right side, rear head left side	19.959—19.980 (0.7858—0.7866)	———
	Front head left side, rear head right side	24.959—24.980 (0.9826—0.9835)	———
Camshaft runout	Front & Rear	———	0.10 (0.004)
Rocker arm I.D.	IN.	14.000—14.018 (0.5511—0.5519)	———
	EX.	16.000—16.018 (0.6299—0.6303)	———
Rocker arm shaft O.D.	IN.	13.966—13.984 (0.5498—0.5506)	———
	EX.	15.966—15.984 (0.6286—0.6293)	———
Cylinder head distortion	———		0.05 (0.002)
Cylinder head cover distortion	———		0.05 (0.002)
De-comp lever clearance	Front	1.5—2.5 (0.06—0.10)	———
	Rear	1.0—2.0 (0.04—0.08)	———

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000—1 400 kPa (10—14 kg/cm², 142—199 psi)	800 kPa (8 kg/cm², 114 psi)
Compression pressure difference	———	200 kPa (2 kg/cm², 28 psi)
Piston to cylinder clearance	0.05—0.06 (0.0020—0.0024)	0.120 (0.0047)
Cylinder bore	94.000—94.015 (3.7008—3.7014)	94.080 (3.7039)
Piston diam.	93.945—93.960 (3.6986—3.6992) Measure at 16 mm (0.6 in) from the skirt end.	93.880 (3.6960)
Cylinder distortion	———	0.05 (0.002)

ITEM	STANDARD			LIMIT
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30—0.45 (0.012—0.018)	0.70 (0.028)
	2nd		0.25—0.40 (0.010—0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040—0.075 (0.0016—0.0030)	0.180 (0.007)
	2nd		0.025—0.060 (0.0010—0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230—1.250 (0.0484—0.0492)	———
	2nd		1.510—1.530 (0.0594—0.0602)	———
	Oil		2.810—2.830 (0.1106—0.1114)	———
Piston ring thickness	1st		1.175—1.190 (0.0463—0.0469)	———
	2nd		1.470—1.485 (0.0579—0.0585)	———
Piston pin bore	23.000—23.006 (0.9055—0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996—23.000 (0.9054—0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006—23.014 (0.9057—0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10—0.20 (0.004—0.008)	0.3 (0.012)
Conrod big end width	21.95—22.00 (0.864—0.866)	———
Crank pin width	22.10—22.15 (0.870—0.872)	———
Conrod big end oil clearance	0.024—0.042 (0.0009—0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982—50.000 (1.9678—1.9685)	———
Crankshaft journal oil clearance	0.020—0.050 (0.0008—0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965—51.980 (2.0459—2.0465)	———
Crankshaft thrust bearing thickness	1.925—2.175 (0.0758—0.0856)	———
Crankshaft thrust clearance	0.05—0.10 (0.002—0.004)	———
Crankshaft runout	———	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 x 31/40)	—
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm², 50 psi) Below 650 kPa (6.5 kg/cm², 92 psi) at 3 000 r/min.	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Drive plate thickness	No.1	2.72—2.88 (0.107—0.113)	2.42 (0.095)
	No.2	3.45—3.55 (0.136—0.140)	3.15 (0.124)
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.2 (0.600)
	No.2	15.9—16.0 (0.626—0.630)	15.2 (0.600)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	No.1	—	27.6 (1.09)
	No.2	—	20.0 (0.79)
Clutch master cylinder bore	14.000—14.043 (0.5512—0.5529)		—
Clutch master cylinder piston diam.	13.957—13.984 (0.5495—0.5506)		—
Clutch release cylinder bore	35.700—35.762 (1.4055—1.4079)		—
Clutch release cylinder piston diam.	35.650—35.675 (1.4035—1.4045)		—

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.645 (79/48)		—
Secondary reduction ratio		0.852 (29/34 x 19/19)		—
Final reduction ratio		2.666 (32/12)		—
Gear ratios	Low	3.000 (36/12)		—
	2nd	1.823 (31/17)		—
	3rd	1.333 (28/21)		—
	4th	1.086 (25/23)		—
	Top	0.960 (24/25)		—
Shift fork to groove clearance		0.1—0.3 (0.004—0.012)		0.5 (0.020)
Shift fork groove width		No.1	5.50—5.60 (0.217—0.220)	—
		No.2	5.50—5.60 (0.217—0.220)	—
		No.3	5.50—5.60 (0.217—0.220)	—

ITEM	STANDARD		LIMIT
Shift fork thickness	No.1	5.30—5.40 (0.209—0.213)	———
	No.2	5.30—5.40 (0.209—0.213)	———
	No.3	5.30—5.40 (0.209—0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03—0.15 (0.001—0.006)		———
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	———

CARBURETOR

ITEM	SPECIFICATION			
	E-03,28		E-33	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←	36 mm	←
I.D. NO.	38BE	←	38BF	←
Idle r/min.	1000 ± 50 r/min.	←	1000 ± 50 r/min	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	#140	#125	#140	#125
Jet needle (J.N.)	5D35-1st	5D51-1st	5D35-1st	5D51-1st
Needle jet (N.J.)	P-2M	0-9M	P-2M	0-9M
Throttle valve (Th.V.)	#120	#110	#120	#110
Pilot jet (P.J.)	#55	#50	#55	#50
Pilot screw (P.S.)	PRE-SET (1 1/16 turns back)	PRE-SET (1 3/4 turns back)	PRE-SET	←
Throttle cable play	3—6 mm (0.1—0.2 in)	←	3—6 mm (0.1—0.2 in)	←
Choke cable play	0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

CARBURETOR

ITEM		SPECIFICATION			
		E-02,04,34		E-17,22	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. NO.		38BB	←	38BC	←
Idle r/min.		1000 ± 50 r/min.	←	1000 ± 50 r/min	←
Fuel level		9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet	(M.J.)	#130	#112.5	#130	#112.5
Jet needle	(J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd
Needle jet	(N.J.)	P-3	P-0	P-3	P-0
Throttle valve	(Th.V.)	#120	#110	#120	#110
Pilot jet	(P.J.)	#55	#50	#55	#50
Pilot screw	(P.S.)	PRE-SET (1 turn back)	PRE-SET (2 turns back)	PRE-SET (7/8 turns back)	PRE-SET (1 3/4 turns back)
Throttle cable play		3—6 mm (0.1—0.2 in)	←	3—6 mm (0.1—0.2 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←	0.5—1.0 mm (0.02—0.04 in)	←

CARBURETOR

ITEM		SPECIFICATION	
		E-24	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←
I.D. NO.		38B90	←
Idle r/min.		1000 ± 50 r/min.	←
Fuel level		9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet	(M.J.)	#140	#125
Jet needle	(J.N.)	5D38-3rd	5D39-3rd
Needle jet	(N.J.)	P-3	P-0
Throttle valve	(Th.V.)	#110	←
Pilot jet	(P.J.)	#57.5	#50
Pilot screw	(P.S.)	PRE-SET (1 3/4 turns back)	←
Throttle cable play		3—6 mm (0.1—0.2 in)	←
Choke cable play		0.5—1.0 mm (0.02—0.04 in)	←

CARBURETOR

ITEM	SPECIFICATION	
	E-37	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←
I.D. NO.	38BD	←
Idle r/min.	1000±50 r/min.	←
Fuel level	9.5±0.5 mm (0.37±0.02 in)	17.0±0.5 mm (0.67±0.02 in)
Float height	27.7±0.5 mm (1.09±0.02 in)	9.1±0.5 mm (0.36±0.02 in)
Main jet (M.J.)	#130	#112.5
Jet needle (J.N.)	5D38-3rd	5D39-3rd
Needle jet (N.J.)	P-3	P-0
Throttle valve (Th.V.)	#120	#110
Pilot jet (P.J.)	#55	#50
Pilot screw (P.S.)	PRE-SET (1 turn back)	PRE-SET (2 turns back)
Throttle cable play	3—6 mm (0.1—0.2 in)	
Choke cable play	0.5—1.0 mm (0.02—0.04 in)	

ELECTRICAL

Unit: mm (in)

ITEM	SPECIFICATION		NOTE
Ignition timing	2° B.T.D.C. below 1 000 r/min.		
Firing order	R·F		
Spark plug	Type	N.G.K.: DPR8EA-9 DENSO: X24EPR-U9	
	Gap	0.8—0.9 (0.031—0.035)	
Spark performance	Over 8 (0.3) at 1 atm.		
Signal coil resistance	240±20% Ω		Bl—G, B—Y
Ignition coil resistance	Primary	1—7 Ω	⊕ tap—⊖ tap
	Secondary	10—25 kΩ	Plug cap—⊖ tap
Generator Max. output	Approx. 340W at 5 000 r/min.		
Generator no-load voltage	More than 80V (AC) at 5 000 r/min.		
Regulated voltage	14.0—15.5 V at 5 000 r/min.		
Startermotor brush length	N.D.	Limit: 9.0 (0.35)	
Commutator under-cut	Limit: 0.2 (0.008)		
Starter relay resistance	2—6 Ω		
De-comp. solenoid resistance	0.1—1.0 Ω		
Side stand and neutral relay	120±20%Ω		
Fuel pump resistance	1—2 Ω		
Fuel pump discharge amount	More than 600 ml (1.27 US qt)/minute		

ITEM		SPECIFICATION	NOTE
Battery	Type designation	FTH 16—BS-1	
	Voltage	12V	
	Capacity	50.4 kC (14Ah)/10HR	
	Standard electrolyte S.G.	1.32 at 20°C (68°F)	
Fuse size	HEADLIGHT	10A	
	SIGNAL	10A	
	IGNITION	10A	
	MAIN	25A	
	POWER SOURCE	10A	

WATTAGE

Unit:W

ITEM		SPECIFICATION			
		E-03,28,33	E-24	E-02	Others
Headlight	HI	60	←	←	←
	LO	55	←	←	←
Parking or city light				3.4	4
Tail/Brake light		8/27	←	5/21	←
Turn signal light		21	←	←	←
Running light		5			
Speedometer light		3	←	←	←
Turn signal indicator light		1.7	←	←	←
High beam indicator light		1.7	←	←	←
Neutral indicator light		1.7	←	←	←
Oil pressure indicator light		1.7	←	←	←
License light		7.5	←	5	←

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	65 (2.6)		—
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Brake disc runout	—		0.30 (0.012)
Master cylinder bore	Front	12.700—12.743 (0.5000—0.5017)	—
	Rear	12.700—12.743 (0.4999—0.5017)	—
Master cylinder piston diam.	Front	12.657—12.684 (0.4983—0.4994)	—
	Rear	12.657—12.684 (0.4983—0.4994)	—
Brake caliper cylinder bore	Front	42.850—42.926 (1.6870—1.6900)	—
	Rear	42.850—42.926 (1.6870—1.6900)	—
Brake caliper piston diam.	Front	42.770—42.820 (1.6839—1.6858)	—
	Rear	42.770—42.820 (1.6839—1.6858)	—

ITEM	STANDARD		LIMIT
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	J19 × 2.15	—
	Rear	J15M/C × MT4.00	—
Tire size	Front	110/90-19 62H	—
	Rear	170/80-15 M/C 77H	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	—	
Front fork spring free length	—	549 (21.6)	
Front fork oil level	203 (7.99)	—	
Rear shock absorber spring adjuster	2/5		
Rear wheel travel	105 (4.1)	—	
Swingarm pivot shaft runout	—	0.30 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03,33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline used should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	13.0 L (3.4/2.9 US/Imp gal)		
reserve	3.0 L (0.8/0.7 US/Imp gal)		
Engine oil type	SAE 10W/40, API SF or SG		
Engine oil capacity	Change	3 700 ml (3.9/3.3 US/Imp qt)	
	Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
	Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type	Fork oil # 10		
Front fork oil capacity (each leg)	353 ml (11.9/12.4 US/Imp oz)		
Bevel gear oil type	Hypoid Gear oil # 90 API GL-5		
Bevel gear oil capacity	Final	200—220 ml (6.8—7.4/7.0—7.7 US/Imp oz)	
Brake fluid type	DOT4		

CONTENTS

NOTE:
Asterisk (*) mark indicates the New VS1400GLPY model specifications.

MODEL	CODE
Y ('00-MODEL)	E-02,03,04,17,22,24,28,33,34,37,9-37
K1 ('01-MODEL)	E-03,17,22,28,33,34
K2 ('02-MODEL)	E-03,17,22,28,33,34

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length		2 330 mm (91.7 in) E-02, 04, 22, 24, 34
		2 335 mm (91.9 in) ..... Others
Overall width	*	885 mm (34.8 in)
Overall height	*	1 205 mm (47.4 in)
Wheelbase		1 620 mm (63.8 in)
Ground clearance		150 mm (5.9 in)
Seat height		735 mm (28.9 in)
Dry mass		244 kg (537 lbs) E-33
		243 kg (535 lbs) ..... Others

ENGINE

Type	Four-stroke, air-cooled with SACS, OHC, 3-valves, 45° V-twin
Number of cylinders	2
Bore	94.0 mm (3.701 in)
Stroke	98.0 mm (3.858 in)
Displacement	1 360 cm^3 (83.0 cu. in)
Compression ratio	9.3 : 1
Carburetor, Front	MIKUNI BDS36SS, single
Rear	MIKUNI BS36SS, single
Air cleaner	Polyurethane form element
Starter system	Electric starter motor
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	5-speed constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	1.645 (79/48)
Secondary reduction ratio	0.852 (29/34 × 19/19)
Final reduction ratio	2.666 (32/12)
Gear ratios, Low	3.000 (36/12)
2nd	1.823 (31/17)
3rd	1.333 (28/21)
4th	1.086 (25/23)
Top	0.960 (24/25)
Drive system	Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swingarm, coil spring, oil dampad, spring preload 5-way adjustable
Fornt fork stroke	160 mm (6.3 in)
Rear wheel travel	105 mm (4.1 in)
Caster	36° 00'
Trail	166 mm (6.54 in)
Steering angle	40° (right & left)
Turning radius	2.8 m (9.2 ft)
Front brake	Disc, hydraulically operated
Rear brake	Disc, hydraulically operated
Front tire size	110/90-19 62H, tube type
Rear tire size	170/80-15 M/C 77H, tube type

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	2° B.T.D.C. at 1 000 r/min
Spark plug	NGK DPR8EA-9 or DENSO X24EPR-U9
Battery	12V 50.4 kC (14 Ah)/10HR
Generator	Three-phase A.C. generator
Fuse	25/10/10/10/10A
Headlight	12V 60/55W
Parking or city light	12V 3.4W ..... E-02 12V 4W E-04, 17, 22, 34, 37
Front turn signal light	12V 21W 12V 21/5W
Rear turn signal light	12V 21W
Running light (in front turn signal)	12V 5W E-03, 28, 33
Brake light/Taillight	12V 27/8W ..... E-03, 28, 33 12V 21/5W ..... Others
License plate light	12V 7.5W ..... E-03, 28, 33 12V 5W ..... Others
Speedometer light	12V 3.4W
Neutral indicator light	12V 1.7W
High beam indicator light	12V 1.7W
Turn signal indicator light	12V 1.7W
Oil pressure indicator light	12V 1.7W

CAPACITIES

Fuel tank, including reserve	13.0 L (3.4/2.9 US/Imp gal)
Reserve	3.0 L (0.8/0.7 US/Imp gal)
Engine oil, change	3 700 ml (3.9/3.3 US/Imp qt)
with filter change	4 300 ml (4.5/3.8 US/Imp qt)
overhaul	5 000 ml (5.4/4.4 US/Imp qt)
Final gear oil	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)
Front fork oil (each leg)	353 ml (11.9/12.4 US/Imp oz)

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	———
	EX.	40 (1.6)	———
Valve lift	IN.	8 (0.31)	———
	EX.	9 (0.35)	———
Lash-adjuster plunger stroke	0 – 0.5 (0 – 0.02)		———
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	———
	EX.	0.040 – 0.070 (0.0016 – 0.0028)	———
Valve stem deflection	IN. & EX.	———	0.35 (0.014)
Valve guide I.D.	IN.	5.500 – 5.512 (0.2165 – 0.2170)	———
	EX.	7.000 – 7.012 (0.2756 – 0.2761)	———
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	———
	EX.	6.945 – 6.960 (0.2734 – 0.2740)	———
Valve stem runout	IN. & EX.	———	0.05 (0.002)
Valve head thickness	IN. & EX.	———	0.5 (0.02)
Valve stem end length	IN. & EX.	———	2.6 (0.10)
Valve seat width	IN. & EX.	0.9 – 1.3 (0.04 – 0.05)	———
Valve head radial runout	IN. & EX.	———	0.03 (0.001)
Valve spring free length (INTAKE)	INNER	———	35.0 (1.38)
	OUTER	———	37.8 (1.49)
Valve spring free length (EXHAUST)	———		40.5 (1.59)
Valve spring tension (INTAKE)	INNER	5.3 – 6.5 kg (11.68 – 14.33 lbs) at length 28.0 mm (1.10 in)	———
	OUTER	14.0 – 14.2 kg (30.86 – 31.31 lbs) at length 31.5 mm (1.24 in)	———
Valve spring tension (EXHAUST)	20.3 – 23.3 kg (44.75 – 51.37 lbs) at length 35.0 mm (1.38 in)		———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.683 – 35.723 (1.4048 – 1.4064)	35.41 (1.394)
	EX.	36.883 – 36.923 (1.4521 – 1.4537)	35.61 (1.378)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.0013 – 0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Front head right side, rear head left side	22.012 – 22.025 (0.7879 – 0.7884)	———
	Front head left side, rear head right side	25.012 – 25.025 (0.9847 – 0.9852)	———
Camshaft journal O.D.	Front head right side, rear head left side	19.959 – 19.980 (0.7858 – 0.7866)	———
	Front head left side, rear head right side	24.959 – 24.980 (0.9826 – 0.9835)	———
Camshaft runout	Front & Rear	———	0.10 (0.004)
Rocker arm I.D.	IN.	14.000 – 14.018 (0.5511 – 0.5519)	———
	EX.	16.000 – 16.018 (0.6299 – 0.6303)	———
Rocker arm shaft O.D.	IN.	13.966 – 13.984 (0.5498 – 0.5506)	———
	EX.	15.966 – 15.984 (0.6286 – 0.6293)	———
Cylinder head distortion	———		0.05 (0.002)
Cylinder head cover distortion	———		0.05 (0.002)
De-comp lever clearance	Front	1.5 – 2.5 (0.06 – 0.10)	———
	Rear	1.0 – 2.0 (0.04 – 0.08)	———

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	1 000 – 1 400 kPa (10 – 14 kg/cm^2 142 – 199 psi)	800 kPa (8 kg/cm^2 114 psi)
Compression pressure difference	———	200 kPa (2 kg/cm^2 28 psi)
Piston to cylinder clearance	0.05 – 0.06 (0.0020 – 0.0024)	0.120 (0.0047)
Cylinder bore	94.000 – 94.015 (3.7008 – 3.7014)	94.080 (3.7039)
Piston diam.	93.945 – 93.960 (3.6986 – 3.6992) Measure at 16 mm (0.6 in) from the skirt end.	93.880 (3.6960)
Cylinder distortion	———	0.05 (0.002)

ITEM	STANDARD			LIMIT
Piston ring free end gap	1st	T	Approx. 14.5 (0.57)	11.6 (0.46)
	2nd	T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st		0.30 – 0.45 (0.012 – 0.018)	0.70 (0.028)
	2nd		0.25 – 0.40 (0.010 – 0.016)	0.70 (0.028)
Piston ring to groove clearance	1st		0.040 – 0.075 (0.0016 – 0.0030)	0.180 (0.007)
	2nd		0.025 – 0.060 (0.0010 – 0.0024)	0.150 (0.006)
Piston ring groove width	1st		1.230 – 1.250 (0.0484 – 0.0492)	———
	2nd		1.510 – 1.530 (0.0594 – 0.0602)	———
	Oil		2.810 – 2.830 (0.1106 – 0.1114)	———
Piston ring thickness	1st		1.175 – 1.190 (0.0463 – 0.0469)	———
	2nd		1.470 – 1.485 (0.0579 – 0.0585)	———
Piston pin bore	23.000 – 23.006 (0.9055 – 0.9057)			23.030 (0.9067)
Piston pin O.D.	22.996 – 23.000 (0.9054 – 0.9055)			22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006 – 23.014 (0.9057 – 0.9061)	23.040 (0.9071)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.3 (0.012)
Conrod big end width	21.95 – 22.00 (0.864 – 0.866)	———
Crank pin width	22.10 – 22.15 (0.870 – 0.872)	———
Conrod big end oil clearance	0.024 – 0.042 (0.0009 – 0.0017)	0.080 (0.0031)
Crank pin O.D.	49.982 – 50.000 (1.9678 – 1.9685)	———
Crankshaft journal oil clearance	0.020 – 0.050 (0.0008 – 0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	51.965 – 51.980 (2.0459 – 2.0465)	———
Crankshaft thrust bearing thickness	1.925 – 2.175 (0.0758 – 0.0856)	———
Crankshaft thrust clearance	0.05 – 0.10 (0.002 – 0.004)	———
Crankshaft runout	———	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.274 (79/48 × 31/40)	———
Oil pressure (at 60°C, 140°F)	Above 350 kPa (3.5 kg/cm², 50 psi) Below 650 kPa (6.5 kg/cm², 92 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM		STANDARD	LIMIT
Drive plate thickness	No. 1	2.72 – 2.88 (0.107 – 0.113)	2.42 (0.095)
	No. 2	3.45 – 3.55 (0.136 – 0.140)	3.15 (0.124)
Drive plate claw width	No. 1	15.8 – 16.0 (0.622 – 0.630)	15.2 (0.600)
	No. 2	15.9 – 16.0 (0.626 – 0.630)	15.2 (0.600)
Driven plate distortion	———		0.10 (0.004)
Clutch spring free length	No. 1	———	27.6 (1.09)
	No. 2	———	20.0 (0.79)
Clutch master cylinder bore	14.000 – 14.043 (0.5512 – 0.5529)		———
Clutch master cylinder piston diam.	13.957 – 13.984 (0.5495 – 0.5506)		———
Clutch release cylinder bore	35.700 – 35.762 (1.4055 – 1.4079)		———
Clutch release cylinder piston diam.	35.650 – 35.675 (1.4035 – 1.4045)		———

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD	LIMIT
Primary reduction ratio		1.645 (79/48)	———
Secondary reduction ratio		0.852 (29/34 × 19/19)	———
Final reduction ratio		2.666 (32/12)	———
Gear ratios	Low	3.000 (36/12)	———
	2nd	1.823 (31/17)	———
	3rd	1.333 (28/21)	———
	4th	1.086 (25/23)	———
	Top	0.960 (24/25)	———
Shift fork to groove clearance		0.1 – 0.3 (0.004 – 0.012)	0.5 (0.020)
Shift fork groove width	No.1	5.50 – 5.60 (0.217 – 0.220)	———
	No.2	5.50 – 5.60 (0.217 – 0.220)	———
	No.3	5.50 – 5.60 (0.217 – 0.220)	———

ITEM	STANDARD		LIMIT
Shift fork thickness	No.1	5.30 – 5.40 (0.209 – 0.213)	———
	No.2	5.30 – 5.40 (0.209 – 0.213)	———
	No.3	5.30 – 5.40 (0.209 – 0.213)	———
Damper spring free length	———		88.5 (3.48)
Gearshift lever height	65 (2.6)		———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.03 – 0.15 (0.001 – 0.006)		———
Final bevel gear backlash	Drive side	0.03 – 0.64 (0.001 – 0.025)	———

CARBURETOR

ITEM	SPECIFICATION			
	E-03		E-33	
Carburetor type	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size	36 mm	←	36 mm	←
I.D. NO.	38BE	←	38BF	←
Idle r/min.	1 000 ± 50 r/min.	←	1 000 ± 50 r/min	←
Fuel level	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet (M.J.)	# 140	# 125	# 140	# 125
Jet needle (J.N.)	5D35-1st	5D51-1st	5D35-1st	5D51-1st
Needle jet (N.J.)	P-2M	0-9M	P-2M	0-9M
Throttle valve (Th.V.)	#120	#110	#120	#110
Pilot jet (P.J.)	# 55	# 50	# 55	# 50
Pilot screw (P.S.)	PRE-SET	←	PRE-SET	PRE-SET
Throttle cable play	2.0—4.0mm (0.08—0.16in)	←	2.0—4.0mm (0.08—0.16in)	←
Choke cable play	0.5 – 1.0 mm (0.02 – 0.04 in)	←	0.5 – 1.0 mm (0.02 – 0.04 in)	←

CARBURETOR

ITEM		SPECIFICATION			
		E-02, 04, 34		E-17, 22	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. NO.		38BB	←	38BC	←
Idle r/min.		1 000 ± 50 r/min.	←	1 000 ± 50 r/min	←
Fuel level		9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet	(M.J.)	#130	#112.5	#130	#112.5
Jet needle	(J.N.)	5D38-3rd	5D39-3rd	5D38-3rd	5D39-3rd
Needle jet	(N.J.)	P-3	P-0	P-3	P-0
Throttle valve	(Th.V.)	#120	#110	#120	#110
Pilot jet	(P.J.)	#55	#50	#55	#50
Pilot screw	(P.S.)	PRE-SET (1 turn back)	PRE-SET (2 turns back)	PRE-SET (7/8 turns back)	PRE-SET (1¾ turns back)
Throttle cable play		2.0−4.0mm (0.08−0.16in)	←	2.0−4.0mm (0.08−0.16in)	←
Choke cable play		0.5 – 1.0 mm (0.02 – 0.04 in)	←	0.5 – 1.0 mm (0.02 – 0.04 in)	←

CARBURETOR

ITEM		SPECIFICATION			
		E-24		E-28	
Carburetor type		MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)	MIKUNI BS36SS (No.1)	MIKUNI BDS36SS (No.2)
Bore size		36 mm	←	36 mm	←
I.D. NO.		38B90	←	38BE	←
Idle r/min.		1 000 ± 50 r/min.	←	1 000 ± 50 r/min	←
Fuel level		9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)	9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)	27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet	(M.J.)	#140	#125	# 140	# 125
Jet needle	(J.N.)	5D38-3rd	5D39-3rd	5D35-1st	5D51-1st
Needle jet	(N.J.)	P-3	P-0	P-2M	0-9M
Throttle valve	(Th.V.)	#110	←	#120	#110
Pilot jet	(P.J.)	#57.5	#50	# 55	# 50
Pilot screw	(P.S.)	PRE-SET (1¾ turns back)	←	PRE-SET (1 1/16 turns back)	PRE-SET (1¾ turns back)
Throttle cable play		2.0−4.0mm (0.08−0.16in)	←	2.0−4.0mm (0.08−0.16in)	←
Choke cable play		0.5 – 1.0 mm (0.02 – 0.04 in)	←	0.5 – 1.0 mm (0.02 – 0.04 in)	←

CARBURETOR

ITEM		SPECIFICATION	
		E-37, P-37	
Carburetor type		MIKUNI BS36SS (No. 1)	MIKUNI BDS36SS (No. 2)
Bore size		36 mm	←
I.D. NO.		38BD	←
Idle r/min.		1000 ± 50 r/min.	←
Fuel level		9.5 ± 0.5 mm (0.37 ± 0.02 in)	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		27.7 ± 0.5 mm (1.09 ± 0.02 in)	9.1 ± 0.5 mm (0.36 ± 0.02 in)
Main jet	(M.J.)	#130	#112.5
Jet needle	(J.N.)	5D38-3rd	5D39-3rd
Needle jet	(N.J.)	P-3	P-0
Throttle valve	(Th.V.)	#120	#110
Pilot jet	(P.J.)	#55	#50
Pilot screw	(P.S.)	PRE-SET (1 turn back)	PRE-SET (2 turns back)
Throttle cable play		2.0—4.0mm (0.08—0.16in)	
Choke cable play		0.5 – 1.0 mm (0.02 – 0.04 in)	

ELECTRICAL

Unit: mm (in)

ITEM	SPECIFICATION		NOTE
Firing order	R.F		
Spark plug	Type	N.G.K.: DPR8EA-9 DENSO: X24EPR-U9	
	Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance	Over 8 (0.3) at 1 atm.		
Signal coil resistance	240 ± 20% Ω		Bl – G, B – Y
Ignition coil resistance	Primary	1 – 7 Ω	⊕ tap – ⊖ tap
	Secondary	10 – 25 kΩ	Plug cap – ⊖ tap
Generator Max. output	Approx. 340W at 5 000 r/min.		
Generator no-load voltage	More than 80V (AC) at 5 000 r/min.		
Regulated voltage	14.0 – 15.5 V at 5 000 r/min.		
Startermotor brush length	N.D.	Limit:9.0 (0.35)	
Commutator under-cut	Limit: 0.2 (0.008)		
Starter relay resistance	2 – 6 Ω		
De-comp. solenoid resistance	0.1 – 1.0 Ω		
Side stand and neutral relay	120 ± 20 % Ω		
Fuel pump resistance	1 – 2 Ω		
Fuel pump discharge amount	More than 600 ml (1.27 US qt)/minute		

ITEM		SPECIFICATION	NOTE
Battery	Type designation	FTH 16 – BS-1	
	Voltage	12V	
	Capacity	50.4 kC (14Ah)/10HR	
	Standard electrolyte S.G.	1.32 at 20°C (68°F)	
Fuse size	HEADLIGHT	10 A	
	SIGNAL	10 A	
	IGNITION	10 A	
	MAIN	25 A	
	POWER SOURCE	10 A	

WATTAGE

Unit: W

ITEM		SPECIFICATION			
		E-03, 28, 33	E-24	E-02	Others
Headlight	HI	60	←	←	←
	LO	55	←	←	←
Parking or city light				3.4	4
Brake light/Taillight		27/8	←	21/5	←
Turn signal light		21	←	←	←
Running light		5			
Speedometer light		3	←	←	←
Turn signal indicator light		1.7	←	←	←
High beam indicator light		1.7	←	←	←
Neutral indicator light		1.7	←	←	←
Oil pressure indicator light		1.7	←	←	←
License light		7.5	←	5	←

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height		65 (2.6)	———
Brake disc thickness	Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
	Rear	6.0 ± 0.2 (0.236 ± 0.008)	5.5 (0.22)
Brake disc runout		———	0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	———
	Rear	12.700 – 12.743 (0.4999 – 0.5017)	———
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4994)	———
	Rear	12.657 – 12.684 (0.4983 – 0.4994)	———
Brake caliper cylinder bore	Front	42.850 – 42.926 (1.6870 – 1.6900)	———
	Rear	42.850 – 42.926 (1.6870 – 1.6900)	———
Brake caliper piston diam.	Front	42.770 – 42.820 (1.6839 – 1.6858)	———
	Rear	42.770 – 42.820 (1.6839 – 1.6858)	———

ITEM	STANDARD		LIMIT
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	J19 x 2.15	—
	Rear	J15M/C x MT4.00	—
Tire size	Front	100/90−19 62H,110/90−19M/C 62H	—
	Rear	170/80-15 M/C 77H	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	—	
Front fork spring free length	—	549 (21.6)	
Front fork oil level	203 (7.99)	—	
Rear shock absorber spring adjuster	2/5		
Rear wheel travel	105 (4.1)	—	
Swingarm pivot shaft runout	—	0.30 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.00	29	200	2.00	29
REAR	200	2.00	29	225	2.25	33

FUEL + OIL

ITEM		SPECIFICATION		NOTE
Fuel type		Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
		Gasoline used should be graded 91 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including	reserve	13.0 L (3.4/2.9 US/Imp gal)		
	reserve	3.0 L (0.8/0.7 US/Imp gal)		
Engine oil type		SAE 10W/40, API SF or SG		
Engine oil capacity		Change	3 700 ml (3.9/3.3 US/Imp qt)	
		Filter change	4 300 ml (4.5/3.8 US/Imp qt)	
		Overhaul	5 000 ml (5.3/4.4 US/Imp qt)	
Front fork oil type		Fork oil #10		
Front fork oil capacity (each leg)		353 ml (11.9/12.4 US/Imp oz)		
Bevel gear oil type		Hypoid Gear oil# 90 API GL-5		
Bevel gear oil capacity		Final	200 – 220 ml (6.8 – 7.4/7.0 – 7.7 US/Imp oz)	
Brake fluid type		DOT 4		

TIGHTENING TORQUE

CHASSIS

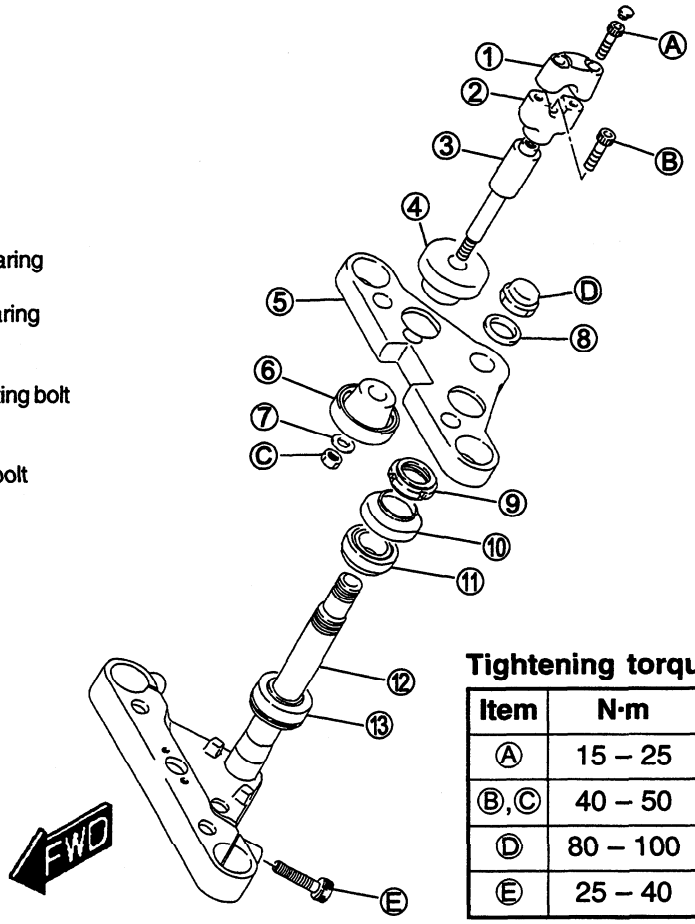
Item	N·m	kg-m	lb-ft
Front axle	36 – 52	3.6 – 5.2	26.0 – 37.5
Front axle clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Front wheel hub flange bolt	20 – 30	1.5 – 2.5	14.5 – 21.5
Brake disc mounting bolt (Front and Rear)	15 – 25	1.5 – 2.5	11.0 – 18.0
Front wheel spoke nipple	4 – 5	0.4 – 0.5	3.0 – 3.5
Front fork cap bolt	80 – 100	8.0 – 10.0	58.0 – 72.5
Front fork spring stopper nut	40 – 50	4.0 – 5.0	29.0 – 36.0
Front fork damper rod bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Front fork lower clamp bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
Steering stem head nut	80 – 100	8.0 – 10.0	58.0 – 72.5
Front brake master cylinder mounting bolt	8 – 12	0.8 – 1.2	6.0 – 8.5
Front brake caliper mountihg bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
Front brake caliper housing bolt	15 – 20	1.5 – 2.0	11.0 – 14.5
Front brake hose union bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
Brake caliper air bleeder valve	6 – 9	0.6 – 0.9	4.5 – 6.5
Handlebar clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Handlebar holder nut (Changed)	*40 – 50	*4.0 – 5.0	*29.0 – 36.0
Handlebar holder mounting bolt (Added)	*40 – 50	*4.0 – 5.0	*29.0 – 36.0
Front footrest bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Rear brake reservoir mounting bolt	8 – 12	0.8 – 1.2	6.0 – 8.5
Rear brake master cylinder mounting bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Clutch master cylinder mounting bolt	8 – 12	0.8 – 1.2	6.0 – 8.5
Clutch hose union bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
Rear swingarm pivot nut	50 – 80	5.0 – 8.0	36.0 – 58.0
Rear shock absorber mounting bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
Rear axle nut	60 – 96	6.0 – 9.6	43.5 – 69.5
Rear caliper mounting bracket bolt	40 – 60	4.0 – 6.0	29.0 – 43.5
Rear brake caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
Rear brake caliper housing bolt	15 – 20	1.5 – 2.0	11.0 – 14.5
Rear brake hose union bolt 10 mm	20 – 25	2.0 – 2.5	14.5 – 18.0
14 mm	30 – 35	3.0 – 3.5	21.5 – 25.5

STEERING STEM

CONSTRUCTION

① Handlebar upper holder
② Handlebar lower holder
③ Handle stay
④ Bush
⑤ Steering stem head
⑥ Bush
⑦ Washer
⑧ Washer
⑨ Steering stem nut
⑩ Dust seal
⑪ Steering stem upper bearing
⑫ Steering stem
⑬ Steering stem lower bearing

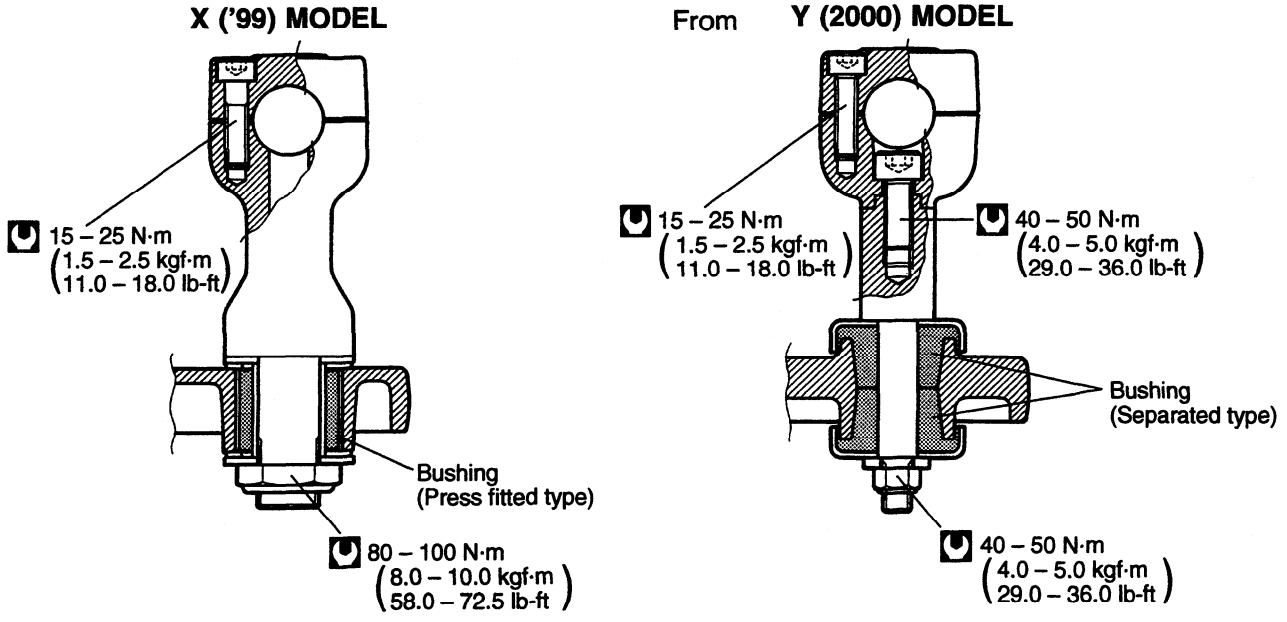
Ⓐ Handlebar clamp bolt
Ⓑ Handlebar holder mounting bolt
Ⓒ Handlebar holder nut
Ⓓ Steering stem head nut
Ⓔ Front fork lower clamp bolt



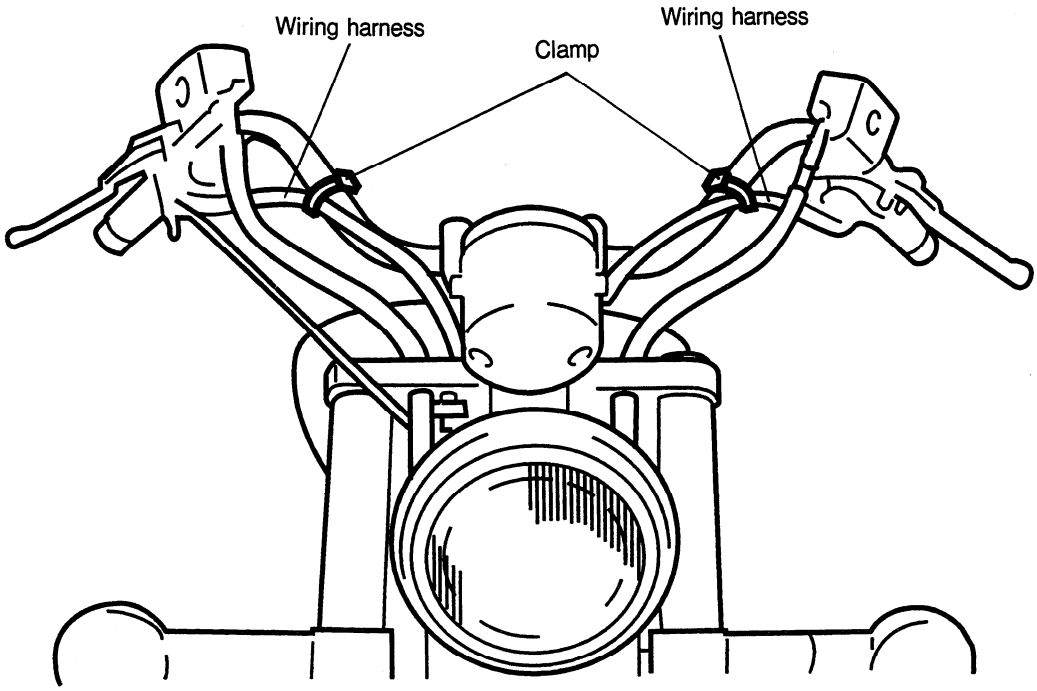
Tightening torque

Item	N·m	kgf·m	lb-ft
Ⓐ	15 – 25	1.5 – 2.5	11.0 – 18.0
Ⓑ,Ⓒ	40 – 50	4.0 – 5.0	29.0 – 36.0
Ⓓ	80 – 100	8.0 – 10.0	58.0 – 72.5
Ⓔ	25 – 40	2.5 – 4.0	18.0 – 29.0

HANDLEBAR HOLDER



CABLE ROUTING



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